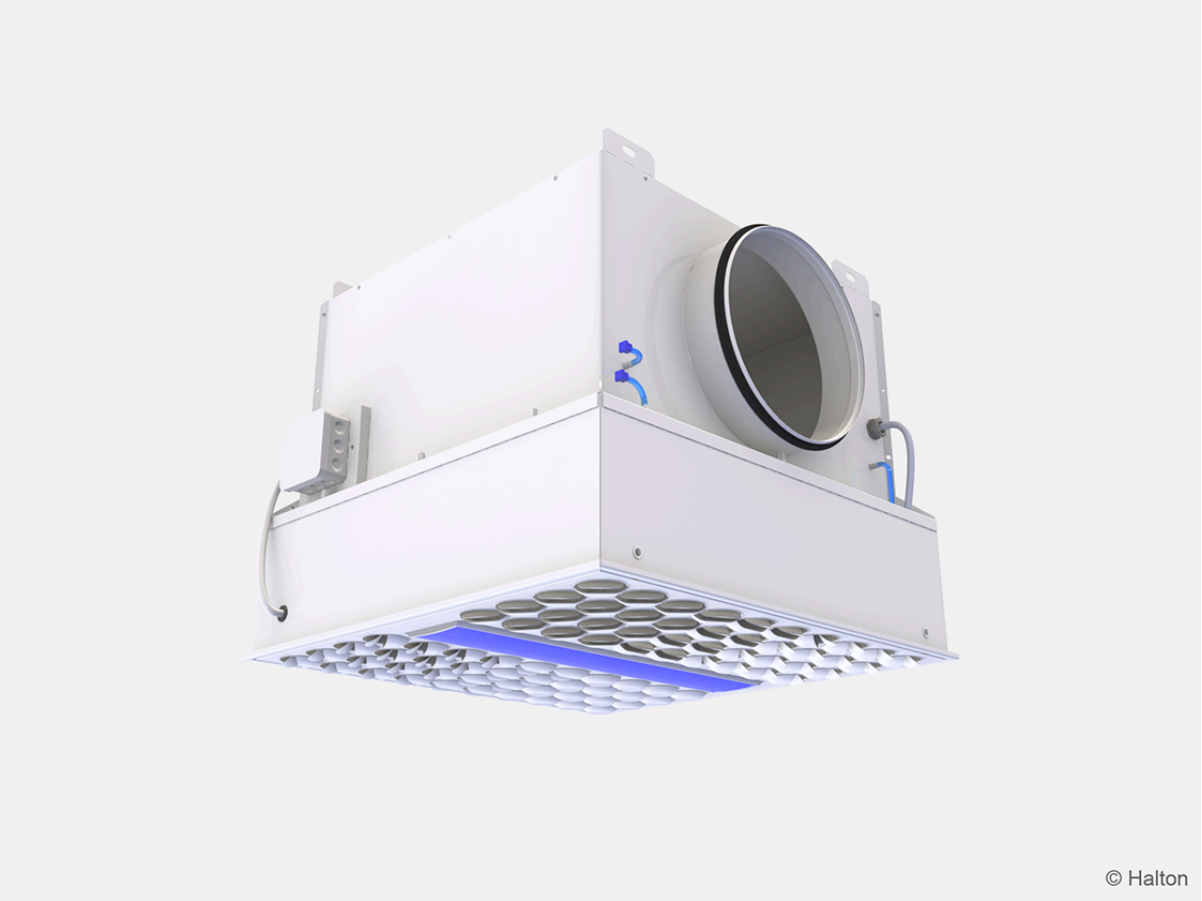
Halton Vita VHR – HEPA diffuser with blue light disinfection



Overview

Halton Vita VHR is a HEPA diffuser with integrated disinfection units for spaces where high cleanliness levels are required. Integrated blue light technology provides a chemical-free disinfection method for surfaces to ensure a safer working environment. Disinfection units also include white light LEDs for general lighting.

Applications

- Spaces with high cleanliness requirements, for example:
    - Cleanrooms in hospitals and laboratories
    - Industrial cleanrooms

Key features

- Suitable for supply and exhaust ventilation.
- Air supply through adjustable nozzles or a perforated front panel.

- Installed flush to the ceiling or a wall.
- Blue light disinfection system for improved room hygiene.
    - Optimised surface irradiation and disinfection performance due to integrated blue light LEDs.
    - High-quality white light LEDs for general room lighting.
    - Integrated units allow more space in the false ceiling for other installations.
    - Faster installation time due to pre-manufactured units.
- Depending on the used lighting control system, there are two alternative product models available (DALI and On/Off). The product model selection has to be done at latest when ordering the product.
- Antibacterial epoxy-polyester powder paint finishing to prevent microbial growth.
- Used with standard and high airflow HEPA filters (classes E10, H13 and H14).
- Test probes for measuring the filter pressure loss and the particle concentration before the filter. Differential pressure transmitter (optional).

Operating principle

Airflow

The Halton Vita VHR diffuser can be used both for supply and exhaust air.

In the supply application, the diffuser supplies the filtered air into the space through adjustable nozzles. The nozzles can be adjusted in 15-degree intervals, which makes it possible to create the desired airflow pattern.

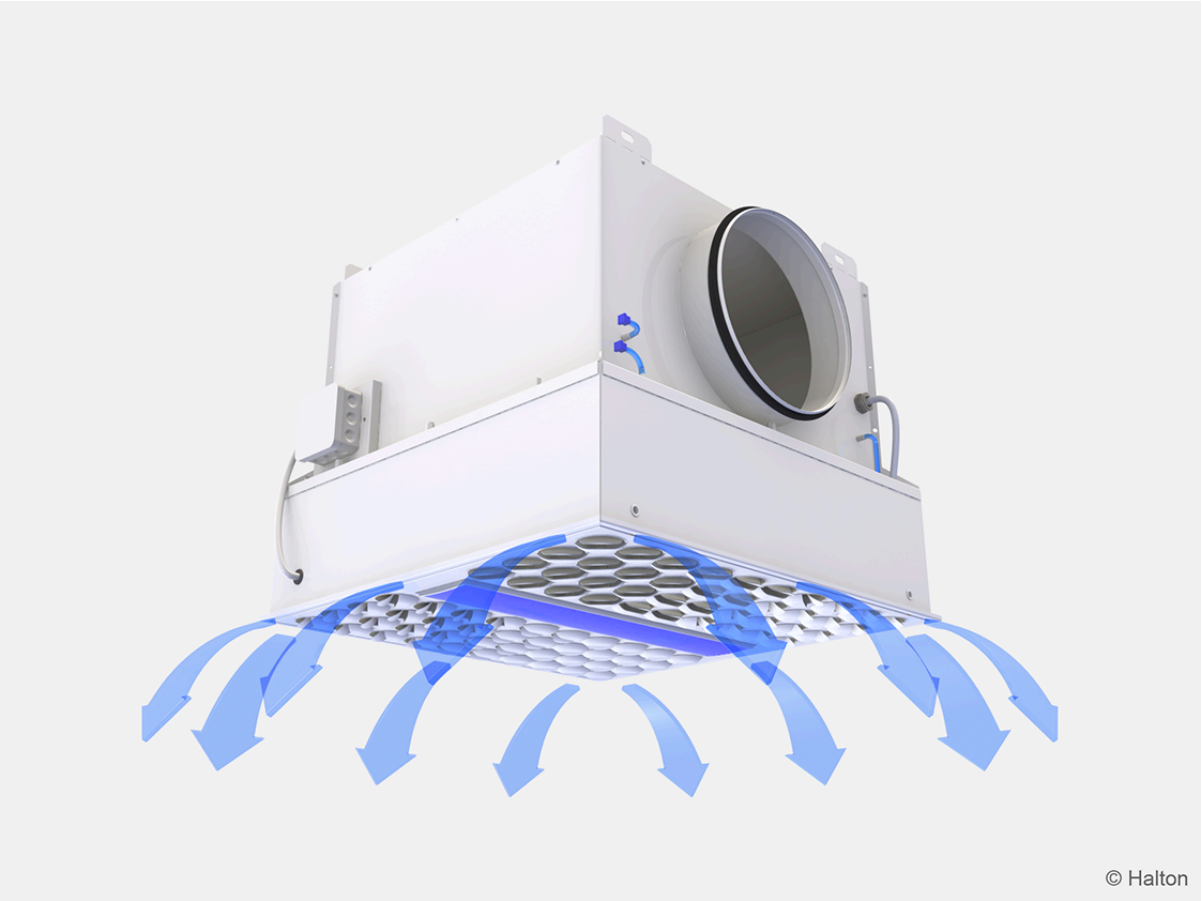


Fig.2. Halton Vita VHR: Supply air

In the exhaust application, the air is exhausted through the perforated front panel and filtered before it flows to the ductwork.

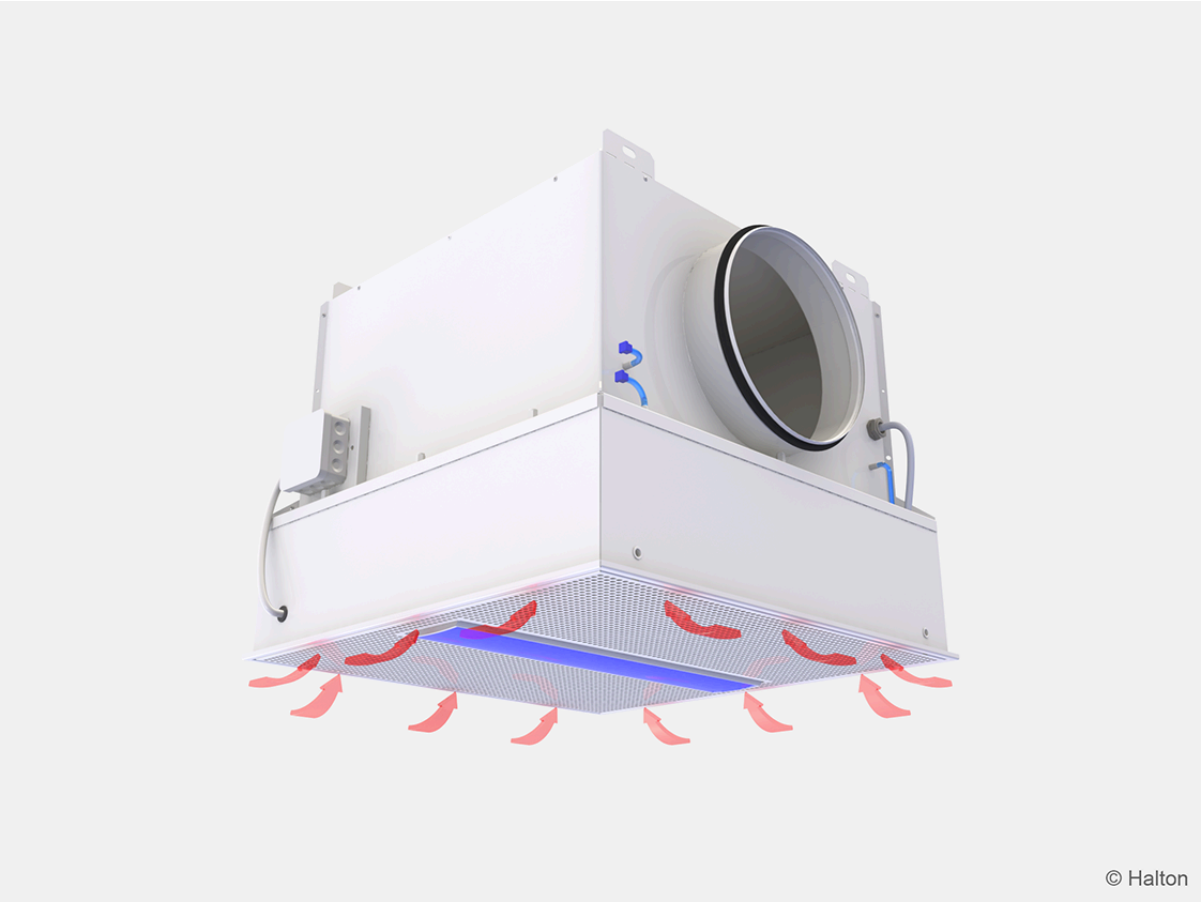


Fig.3. Halton Vita VHR: Exhaust air

Blue light disinfection system

Disinfection units can be integrated into the product. Each unit has both blue light and white light LED elements. The blue light LEDS are used for surface disinfection and the white light LEDs for general lighting.

The ability of blue light to destroy microbes is based on its ability to energise naturally light-sensitive compounds found in all bacteria, yeast, and mold cells. When these compounds are exposed to high-intensity blue light, a natural chemical reaction starts where free oxygen radicals are formed inside cells. These free radicals are highly reactive molecules that start destroying the cells from within by damaging their internal structures. When continued long enough, the reaction destroys the microbes.

The integrated design of disinfection units provides optimised disinfection over the whole operating room with a special emphasis to the critical operating area. Together with the normal, daily cleaning of operating rooms, blue light disinfection makes it easier to keep the operating room surfaces clean and safe.

Benefits:

- Safer operating environment
    - Blue light destroys microbes on surfaces.
    - Reduced number of microbes in the space.

    - Blue light does not develop antimicrobial resistance.
- Disinfection light integrated into the product
    - More space in the false ceiling for other installations.
    - Faster installation time due to pre-manufactured units.
- Fully automatic system
    - The blue light disinfection system can be configured so that it is automatically switched on when the room is not occupied.
    - Ensures disinfection and saves time for the staff.

Laboratory tests on the effectiveness of the blue light disinfection system have been carried out in an accredited laboratory. The results show that the blue light photon disinfection produces relevant bacteria reductions. When combined with photocatalytic coating, relevant reductions are achieved already before 30 minutes.

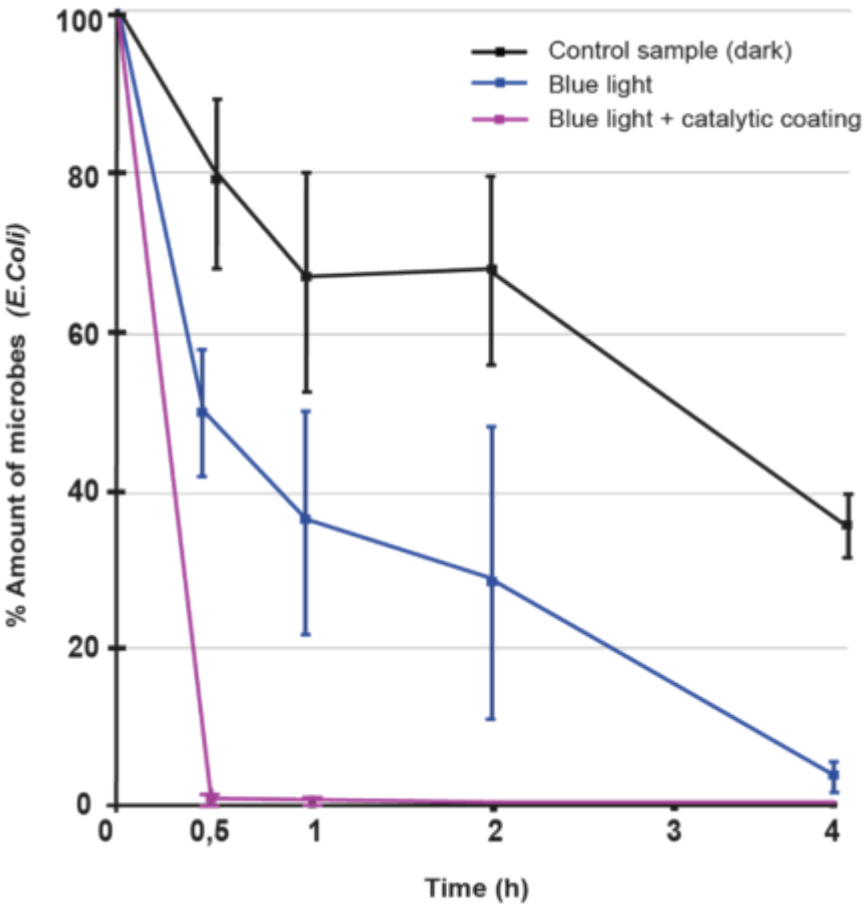


Fig. 4. Bacteria reductions with the blue light disinfection system (LED Taylor Oy)

High quality general room lighting

Blue light disinfection units also include integrated white light LED elements, which enables high-quality general room lighting. This also leads to additional savings in lighting installation and leaves ceiling space free for other installations.

Key technical data

Feature	Description
Airflow rate	Up to 400 l/s. For performace data, see Halton HIT Design tool.
Dimensions	600×600 mm and 1200×600 mm
Weight	18.3 – 45.7 kg (with disinfection units and filters)
Size of duct connections	**Circular:** • Ø 250 mm • Ø 315 mm • Ø 400 mm **Rectangular:** • 400×100 mm • 400×150 mm • 600×200 mm
HEPA filter class	E10, H13, H14
HEPA filter depth	68, 90 mm

Blue light LEDs	Power consumption: 90 W per disinfection unit. 1-2 disinfection units depending on the size of the diffuser.
White light LEDs	• Colour rendering index: R_a > 90 • Colour temperature: 4000 K • IP class 44 • Power consumption: 25 W per disinfection unit. 1-2 disinfection units depending on the size of the diffuser.
Light controller type	• DALI • Relay (On/Off)

Features and options

Feature	Options
Product model	Supply or exhaust air units with blue light disinfection. 1-2 disinfection units depending on the size of the diffuser. Also possible to add blue light disinfection later.
Front panel type	• Nozzles • Perforated **Note:** The front panel can be delivered later.
Location of duct connection	• Side (circular and rectangular) • Top (circular only)
Material	• Galvannead steel
Differenteil pressure transmitter	• Not assigned • HDP-PE differential pressure transmitter with display

Colour	• White antibacterial epoxy polyester powder paint (RAL 9003). • Normal white powder paint (RAL 9003) as option.

Fig.5. Halton Vita VHR diffuser with the Halton HDP-PE differentiel pressure transmitter

- For information on the pressure transmitter, see Accessories.
- For information on the order code, see Order code.
- For information on filters, see Filters.
  Note: Filters need to be ordered separately.

Structure and materials

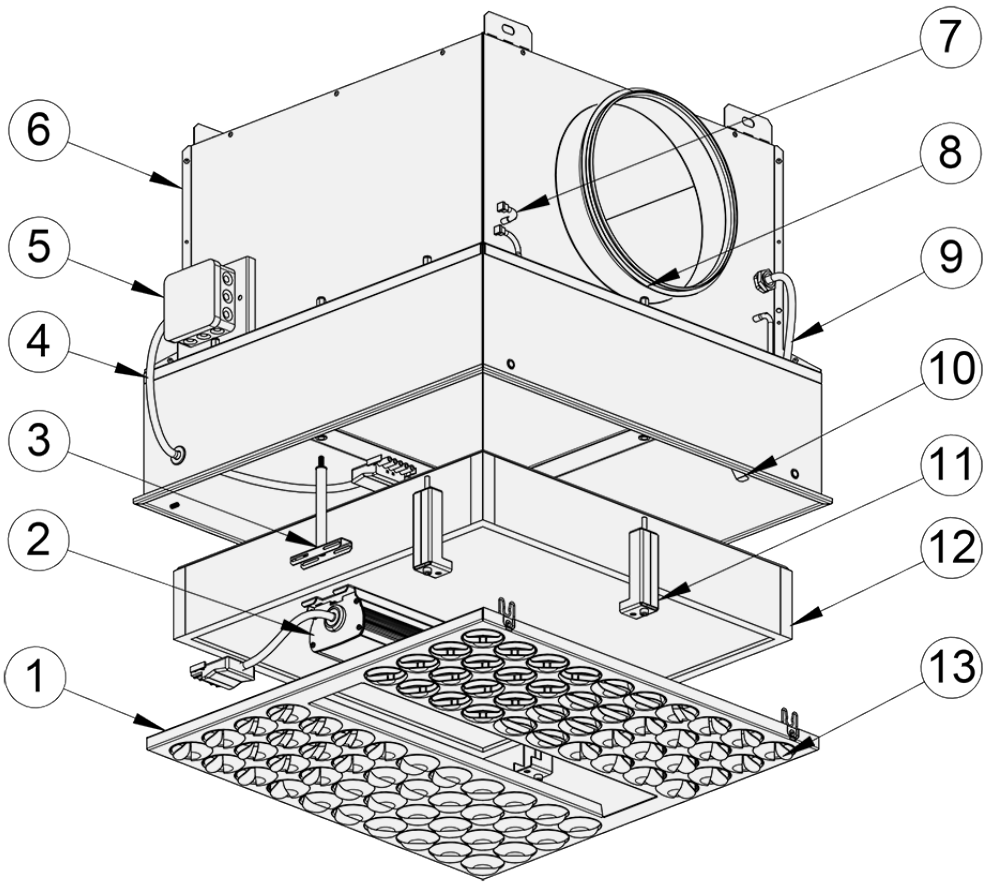


Fig.6. Structure of Halton Vita VHR

No.	Part	Description
1	Front panel	Galvannealed steel. White antibacterial epoxy polyester powder paint (RAL 9003). Normal white powder paint (RAL 9003) as option.
2	Disinfection unit	Aluminium, glass. IP 44
3	Disinfection unit brackets	Acid-proof steel and copper pipe. White antibacterial epoxy polyester powder paint (RAL 9003).
4	Disinfection unit power cable	5×1.0 MSK
5	Junction box	Plastic (polypropylene). IP65.
6	Casing	Galvannealed steel. Stainless steel as option. With galvannealed steel: White antibacterial epoxy polyester powder paint (RAL 9003). Normal white powder paint (RAL 9003) as option.
7	Pressure measurement ports	Polyurethane
8	Duct seal gasket	Rubber
9	Test probes	PVC hoses
10	Filter springs	Stainless steel

11	Filter brackets	Acid-proof steel
12	Filter	Fibreglass paper, aluminium frame, and a PUR gasket. **Note:** Filters need to be ordered separately.
13	Nozzle	Plastic (polyacetal)

Dimensions and weight

Halton Vita VHR 600×600 mm

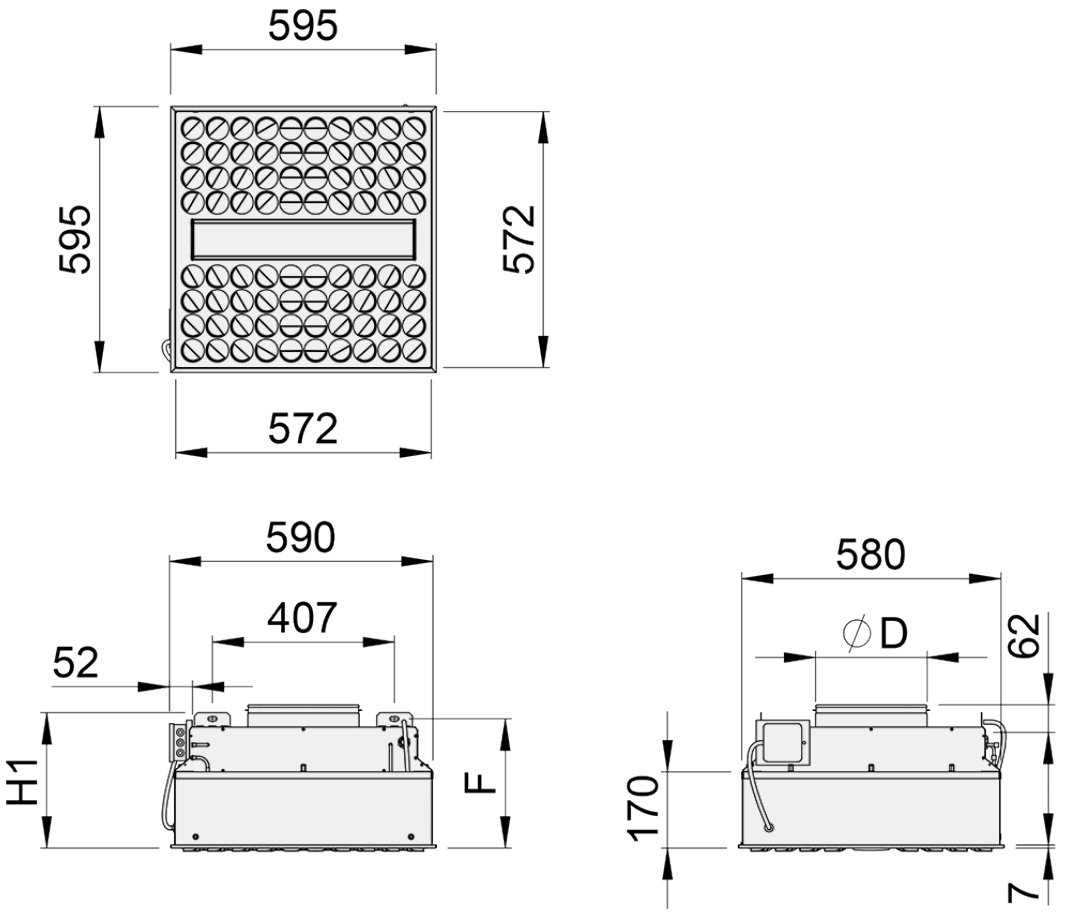


Fig.7. Halton Vita VHR 600×600 with top circular duct connection

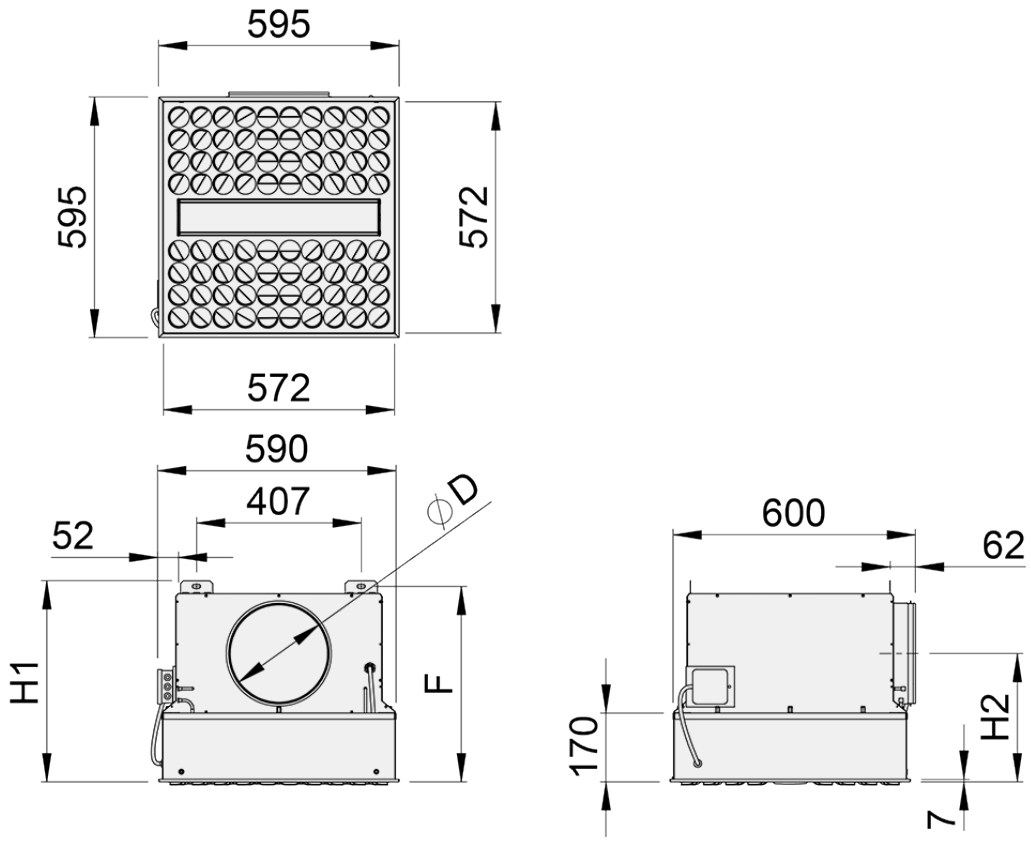


Fig.8. Halton Vita VHR 600×600 with side circular duct connection

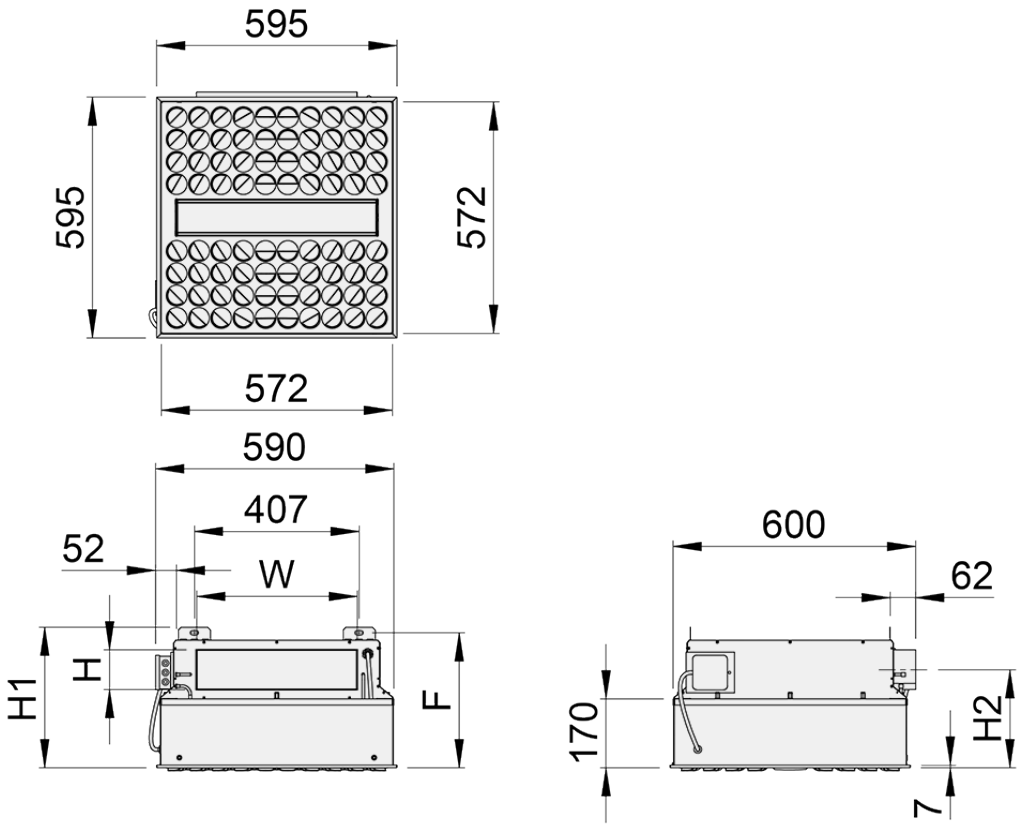


Fig.9. Halton Vita VHR 600×600 with side rectangulaer duct connection

Duct connection location	ØD	W	H	H1	H2	F	Weight (kg), with disinfection units and filters
Top	249	–	–	302	–	288	18.3
Top	314	–	–	302	–	288	18.3
Side	249	–	–	497	317	483	21.3
Side	314	–	–	562	350	548	22.3
Side	–	398	98	347	242	333	19.3
Side	–	398	148	397	267	383	19.8

Halton Vita VHR 1200×600 mm

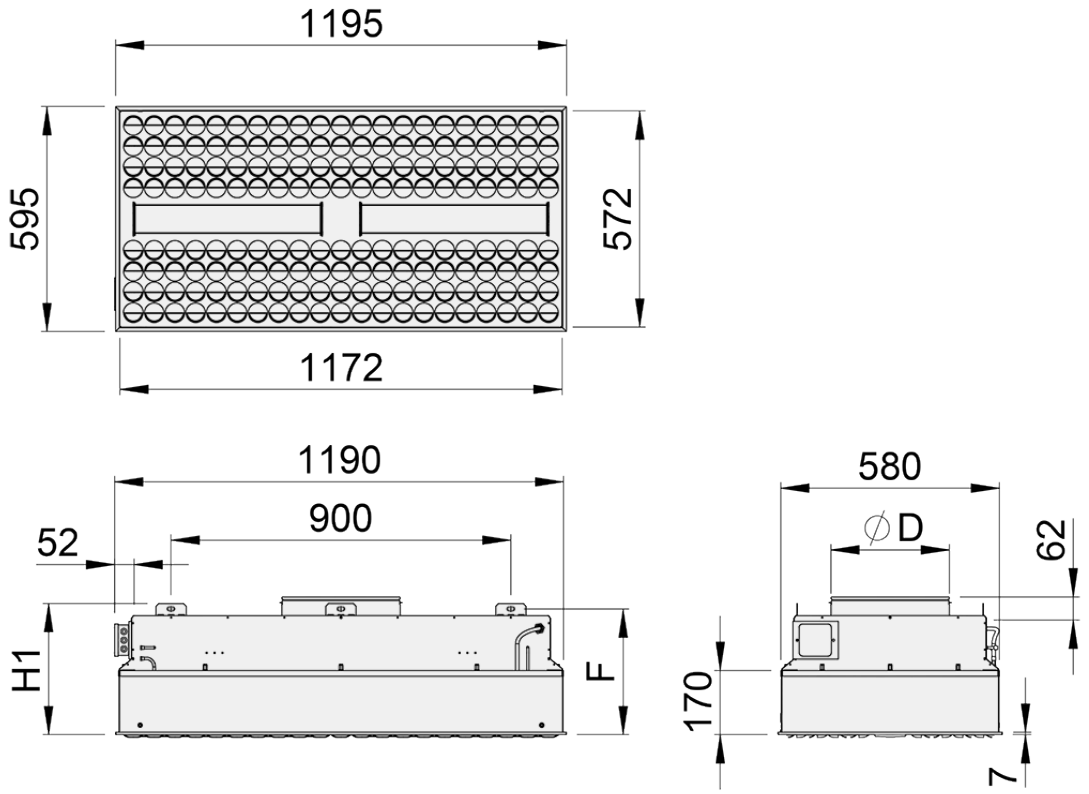


Fig.10. Halton Vita VHR 1200×600 with top circular duct connection

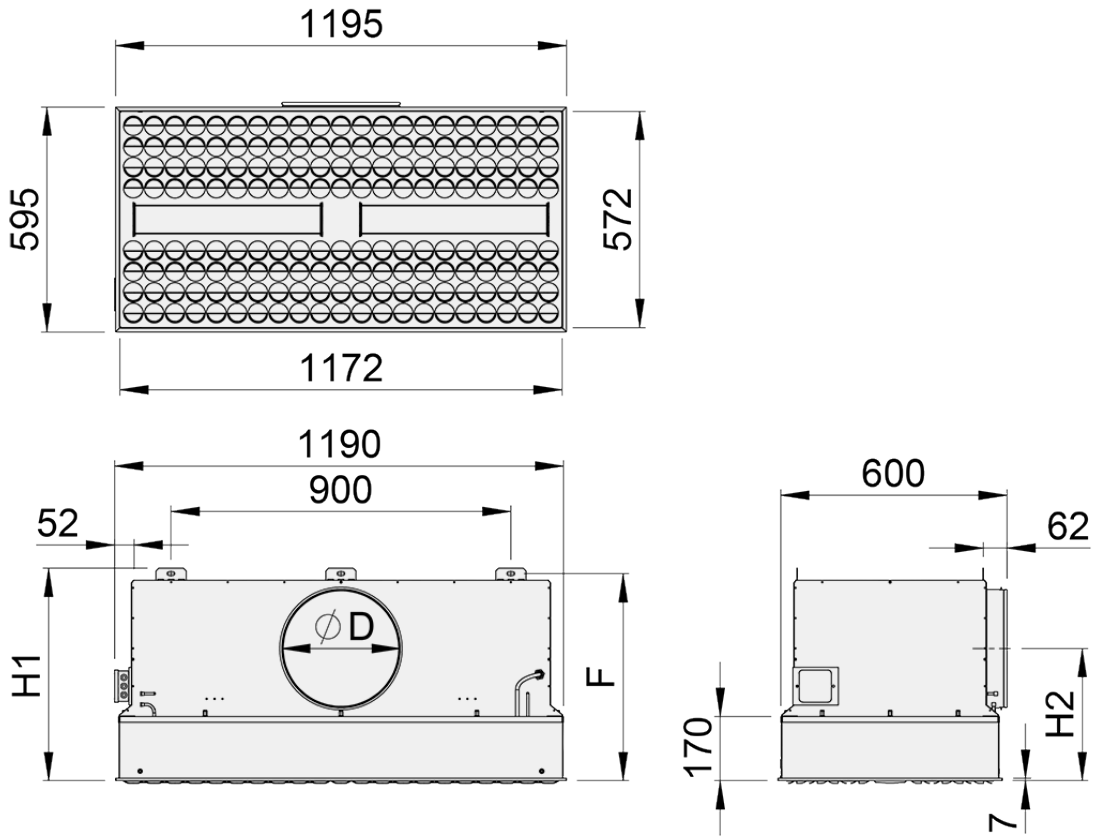


Fig.11. Halton Vita VHR 1200×600 with side circular duct connection

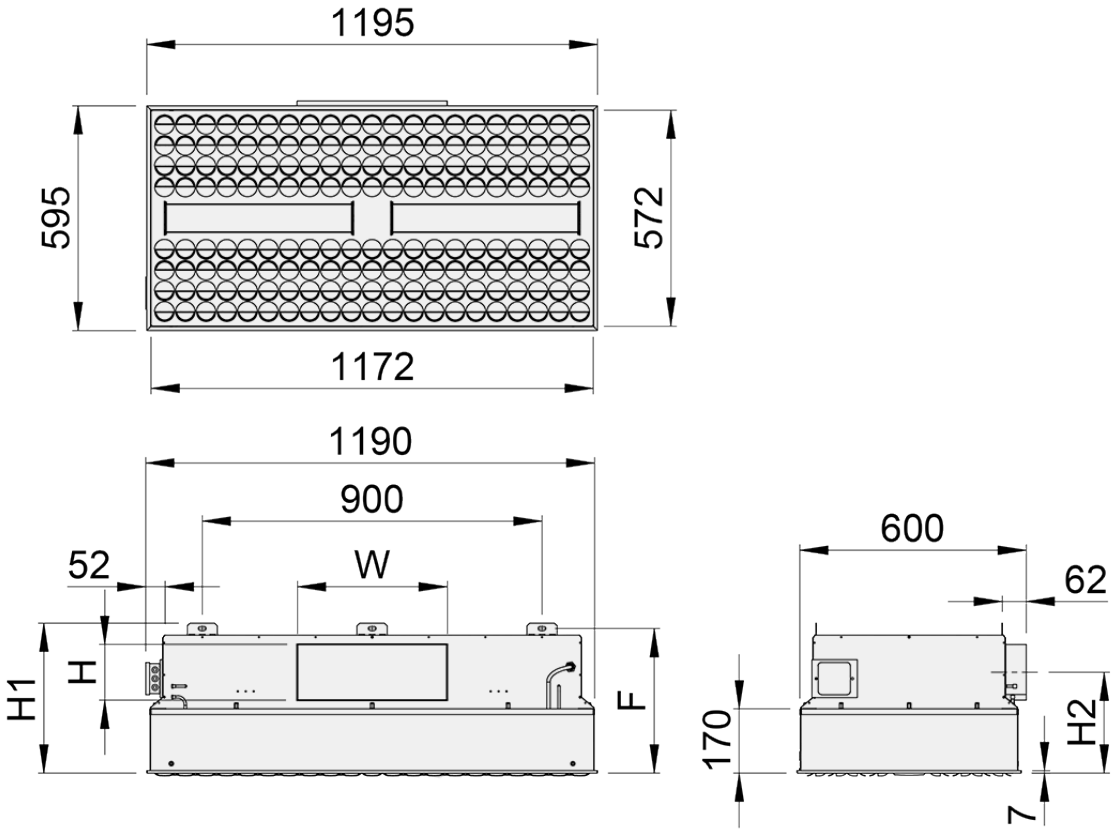


Fig. 12. Halton Vita VHR 1200×600 with side rectangular duct connection

Duct connection location	ØD	W	H	H1	H2	F	Weight (kg), with disinfection units and filters
Top	314	–	–	347	–	333	37.7
Top	399	–	–	347	–	333	37.7
Side	314	–	–	562	350	548	39.7
Side	399	–	–	647	392	633	45.7
Side	–	398	148	397	267	383	39.7
Side	–	598	198	447	292	433	40.7

Specification

- A diffuser with a HEPA filter for spaces where high cleanliness levels are required.
- Radial, swirl or low turbulent airflow pattern.
- Suitable for supply and exhaust ventilation.
- Installed flush to the ceiling or a wall.

Structure

- Unit size 600×600 mm or 1200×600 mm.
- Air supply through adjustable nozzles or a perforated front panel.
- The lockable nozzles ensure that the setting of the nozzles remains unchanged during cleaning.
- A smooth internal surface that enables easy cleaning.
- Easy filter change through the front panel.
- Test probe for measuring particle concentration before the filter.
- Test probe for measuring the filter pressure loss.
- Differential pressure transmitter to indicate the filter pressure loss.
- Disinfection unit with blue light and white light LED elements. Blue light is for disinfection

and white light is for general lighting.
- Used with an HEPA filter that has an aluminium frame and a PUR gasket according to EN 1822, including an
individual test certificate.

Material

- Casing and front panel manufactured from galvannealed steel.
- Antibacterial epoxy-polyester powder paint finishing to prevent microbial growth.
- Nozzles manufactured from plastic (polyacetal).

Packaging and identification

- The visible surface of the product is protected by a removable plastic coatingThe duct connection remains sealed during transport.
- The product is packed on a pallet.
- The product is identified by a serial number printed on labels attached both to the product and the package.

Installation

The diffuser is connected to the duct by screwing or by riveting. The duct connection spigot is equipped with a seal gasket. The diffuser can be installed in the following ways:

- Flush with the ceiling (hung from the ceiling with M6 drop rods using fixing brackets)
- Flush with the wall

Note: When installing the unit, be careful not to drill any holes into the casing. If the casing is damaged, unfiltered air may leak.

The internal cabling of disinfection units is done at the factory. The external cabling is connected to the junction box at the site.

The unit should be cleaned on the inside before filter installation.

Filter integrity testing should be performed after filter installation.

Commisioning

The nozzles are preset to four directions at the factory.

If needed, the nozzles can be manually adjusted on site to create the desired airflow pattern. The nozzles can be adjusted in 15-degree intervals.

Maintenance

The required maintenance tasks include changing the filter and cleaning the supply air unit.

Filter

To ensure that the air quality meets the requirements, the HEPA filter must be checked frequently and, if needed, the filter must be replaced. The maintenance frequency of a filter depends on the air cleanliness of the supply air and room air.

The filter must be immediately replaced in the following cases:

- The final differential pressure has been reached.
- The filter is damaged.
- There are micro-organisms, fungal spores, or odours present in the filter.

Diffuser

The unit can be cleaned using disinfectants. The front panel can be removed and cleaned in a washing machine (water temperature < 95°C). The lockable nozzles ensure that the setting of the nozzles remains unchanged during cleaning.

Be careful not to wet the filters. Dampening the filter media will permanently decrease the filter efficiency.

For cleaning frequency, follow the maintenance schedule of the building.

Filters

Fig.19. HEPA filters

Description

High efficiency particulate air (HEPA) filters are widely applied in cleanrooms where high air quality standards are
essential.

Note: Filters need to be ordered separately.

Technical data of HEPA filters

Filters compatible with the Halton Vita VHR HEPA diffuser are available in classes E10, H13 and H14 (European Standard EN 1822-1:2009) for standard and high airflow. The available filter depths are 68, 90 mm. All filters have a polyurethane (PUR) foam gasket.

Operating range:

- Temperature max. 70 °C

- Humidity max. 90 %
- Final pressure drop max. 500 Pa

Dimensions WxHxD (mm)	Filter class	Weight (kg)	Order code
525x525x68	H14, H13, E10	3.1	AF-H14/H13/ E10-AL-525*525*68-PUR
525x525x90	H14, H13, E10	3.3	AF-H14/H13/ E10-AL-525*525*90-PUR
1125x525x68	H14, H13, E10	9.5	AF-H14/H13/ E10-AL-1125*525*68-PUR
1125x525x90	H14, H13, E10	9.7	AF-H14/H13/ E10-AL-1125*525*90-PUR

Filter selections in Halton HIT Design

To get the right performance data (dpt and Lp(A)) to diagrams and CAD export files, in Halton HIT Design, select “Accessories”, then select the desired values for the following:

- Duct connection location
- Duct connection size
- Filtering type/bracket height

Filter class / Filter depth	Filter selection code
H14 / 68 mm	A1
H14 / 90 mm	A2
H13 / 68 mm	B1
H13 / 90 mm	B2
E10 / 68 mm	C1
E10 / 90 mm	C2

Accessories

Halton HDP-PE

The Halton HDP-PE differential pressure sensor is a pressure-measuring device, used to measure differential pressures in the duct.

Description

- The pressure sensor gives an accurate measurement of the airflow.
- The IP54 casing ensures that the unit can be used also in dusty and humid environments.
- The proper range of measurement can be selected at commissioning. The outputs are directly proportional to
  the pressure differences between the + and – inlets.
- The connections to the detected process are made by using plastic tubing (⌀ 6/4 mm).
- The software compensates the zero-point drift for the transmitter by making automatic calibrations every 5
  minutes, so that manual recalibration is not normally required.
- The influence of process disturbances can be filtered by increasing the time constant.
- The sensor can be used for measurement in polluted air.
- The PEL can be integrated in a fast system due to its standard time constant of 0.5 s.

Technical data

Feature	Description
Output signals	• 0...10 V DC • < 2 mA
Power supply	• 22...28 V AC • 22...28 V DC
Power consumption	• 24 V AC: < 1.0 VA • 24 V DC: < 1.5 VA
Temperature drift of range, typical	< 0.05% / K
Error at zero pressure	• Side (circular and rectangular) • 6Top (circular only)
Inaccuracy	< ± 0.5 Pa + ± 1% of reading (at 25°C)
Operating temperature	0...45°C
Max. static / over pressure	25 kPa
Housing	IP54

Table 2. Technical data for Halton HDP-PE differential pressure sensor

Pa	Drift
0... 100	± 50 Pa
0... 200	± 100 Pa
0... 500	± 250 Pa
0... 1000	± 500 Pa

Table 3. Measuring ranges for Halton HDP-PE differential pressure sensor

Note: The proper measuring ranges chosen at commissioning: ± ranges (s4 = open) 5 V / 12 mA = 0 Pa.

Measuring ranges

S2	S3	S4	
		0…2500 Pa	0…500 Pa
		0…2000 Pa	0…200 Pa
		0…1500 Pa	0…100 Pa
		0…1000 Pa	±100 Pa

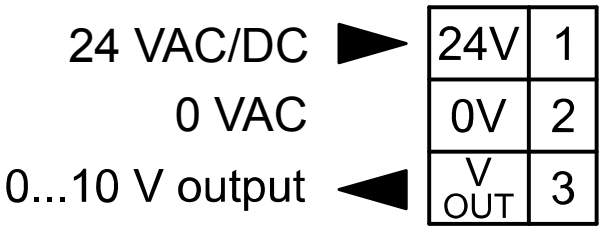
Time constant

S1	Output delay
	0.5 s
	8 s

Output mode: pressure or flow linear

S5	Output mode
	pressure linear
	flow linear

Wiring



Order code

VHR/M-A-FP; C-D-MA-CO-IO-DF-FA-PT-ZT

M = Model
A Supply air unit with blue light disinfection
B Exhaust air unit with blue light disinfection
C Supply air unit with option to add blue light disinfection later
D Exhaust air unit with option to add blue light disinfection later

A = Size (mm)
600 600×600
1200 1200×600

FP = Front panel
NO Nozzle
PE Perforated

Other options and accessories

LC = Light controller type
NA Not assigned
L5 DALI
L6 Relay, On/Off

C = Location of duct connection
S Side (circular and rectangular)
T Top (circular only)

D = Size of duct connection (mm)
Circular
C 250
D 315
E 400

Rectangular
G 400×100
H 400×150
I 600×200

MA = Material
GE Galvanaeled steel

IO = Installation options for ceiling types
NA Not assigned

DF = Diffuser delivered with front panel

Y Yes
N No

FA = Front panel attached to unit
Y Yes
N No

FT = Filtering type/bracket height (filter to be ordered separately)
A2 H14/90 mm
A1 H14/68 mm
B1 H13/68 mm
B2 H13/90 mm
C1 E10/68 mm
C2 E10/90 mm

PT = Differential pressure transmitter
NA Not assigned
P1 HDP-PE

CO = Colour
SA Signal White (antibacterial, RAL 9003)
SW Signal White (RAL 9003)
X Special colour (RAL xxxx)

ZT = Tailored product
N No
Y Yes (ETO)

Code example

VHR/A-600-NO,C=S,D=F,MA=GE,CO=SW,IO=NA,DF=Y,FA=Y,PT=NA,ZT=N