Halton Vita VPR, hygienic chilled beam - Technical description

Contents

1 Introduction

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1.2 About this document

The purpose of this document is to give technical information and design examples for salespersons, technical support and designers.

1.3 Summary of changes

Release	Date	Description
1.0	13-05-2026	First published version

2 Product description

2.1 Overview

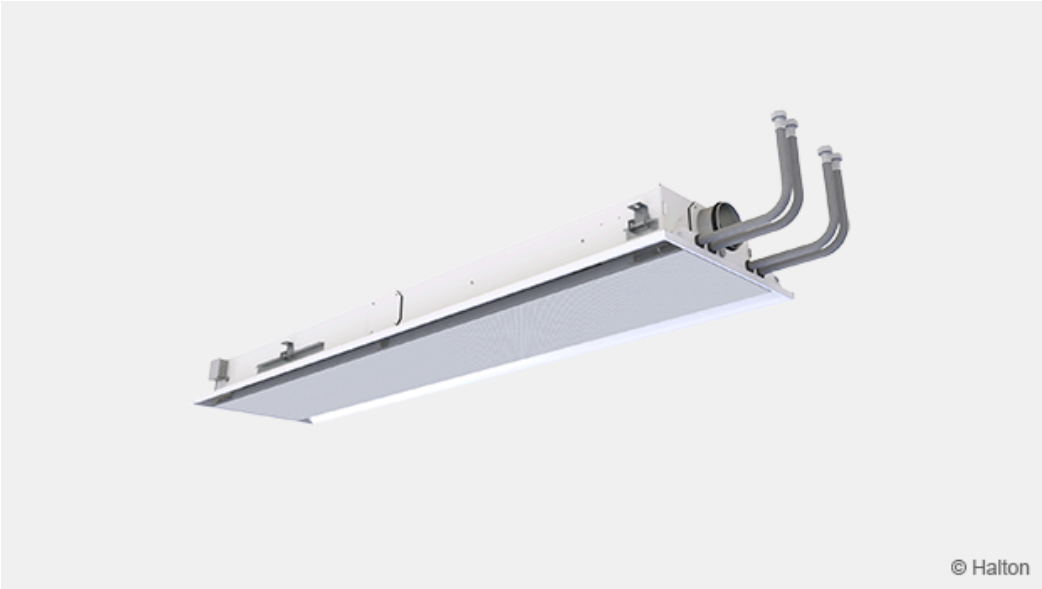

Fig. 1. Halton Vita VPR, hygienic chilled beam

The Halton Vita VPR hygienic chilled beam delivers silent, comfortable, and stable indoor conditions through an innovative combination of ventilation, heating, and cooling. Designed for flush installation within a suspended ceiling, it features an integrated recirculation air path through its perforated front panel for efficient and balanced air distribution.

Highly energy-efficient and suitable for upgrading existing facilities, the Halton Vita VPR delivers optimal performance throughout the building life cycle, while reduced cleaning frequency supports energy efficiency, lowers life-cycle costs, and promotes sustainable building operation, making it an ideal solution for modern healthcare and research facilities.

Specifically engineered for the stringent hygiene and performance requirements of hospitals, laboratories, and other critical environments, this chilled beam is built to support safe, clean, and adaptable indoor air management. Its flexible design allows for easy adjustment to evolving operational conditions, from the initial design phase to long-term facility use.

Application area

- Hospital patient rooms
- Laboratories
- Other spaces with high hygienic requirements

Key features

- Easy and fast selection with Halton eHIT design tool
- Combined cooling, heating, and supply air unit for flush installation within a suspended ceiling.
- Hygienic and openable construction with smooth surfaces that are easy to clean thoroughly
- Coil with anti-bacterial finishing to prevent eventual microbial growth
- Hinged coil to enable access to both sides of the coil and internal beam surfaces for cleaning
- Reduced amount of dust accumulation and less need for specialist cleaning compared to other chilled beams

- Individually adjustable velocity conditions with Halton Velocity Control (HVC)
- Individually adjustable supply airflow rate for changes in space layout using Halton Air Quality (HAQ) control (optional)

2.2 Operating principle

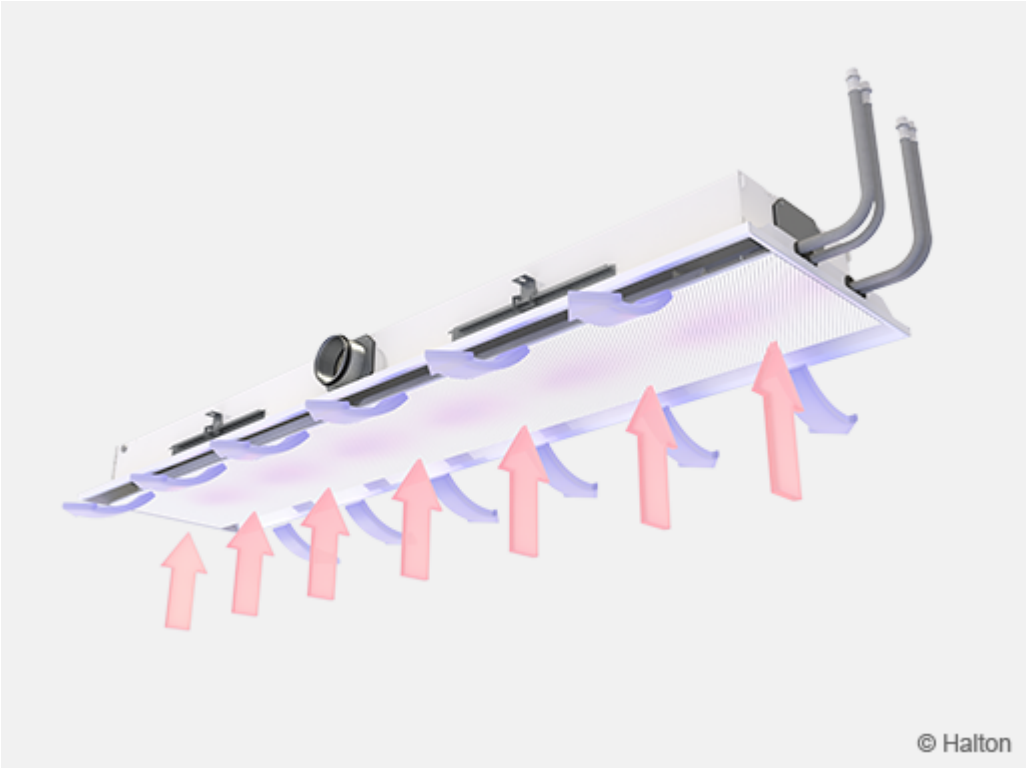

Fig. 2. Operating principle of the Halton Vita VPR hygienic chilled beam

The Halton Vita VPR hygienic chilled beam is designed to be installed flush with a suspended ceiling.

The primary supply air enters the chamber of the active chilled beam and is delivered into the room through precision-engineered nozzles and the Halton Air Quality (HAQ) control. The supply slots, positioned on the underside of the beam, ensure optimal air distribution.

As the high-velocity supply air exits the nozzles, it generates jets that effectively induce ambient room air into the unit. The built-in heat exchanger then conditions this induced air, either cooling it or heating it as required. The resulting mixed airflow is discharged horizontally along the ceiling surface, which enhances air circulation and ensures uniform thermal comfort throughout the space.

2.2.1 Velocity control in the occupied zone

The Halton Velocity Control unit (HVC) is used to adjust room air velocity conditions either when the room layout is changed, (e.g., in cases where the chilled beam is located near the partition wall) or when local, alter the individual velocity conditions. The HVC adjustment impacts the induced room airflow through the heat exchanger. Therefore, it either increases or decreases both the velocities in the occupied zone and the cooling/heating capacity of the chilled beam.

The HVC involves manual velocity adjustment in three different positions, as shown in Fig. 3. The HVC unit is divided into sections to enable the adjustment of conditions in different parts of the occupied zone. Depending on the length of the beam, the HVC unit module lengths are between 500 and 1400 mm.

The HVC unit is divided into sections (Pos. 1-3) to enable the adjustment of conditions in different parts of the

occupied zone.

It is recommended to design the chilled beam in the normal position, to allow both throttle and boost functions during the building's life cycle.

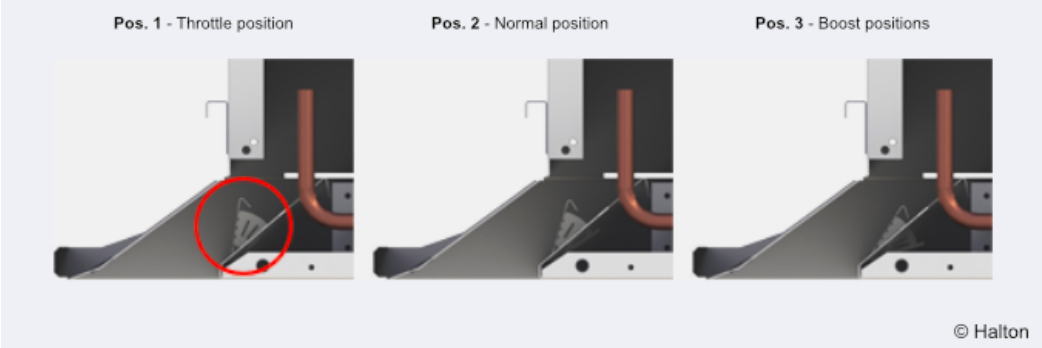

Fig. 3. Halton Velocity Control (HVC) positions

2.2.2 Airflow rate control

The supply airflow of the chilled beam nozzle jets is dependent on effective length and static chamber pressure, which can be adjusted, e.g., using a separate airflow adjustment damper.

Optional Halton Air Quality Control (HAQ) adjusts and/or controls the outdoor airflow rate in a room. The airflow rate is dependent on the opening position of the control damper and the static chamber pressure.

Airflow rate adjustment is needed when the use of the space is changed and there is a need to adapt the supply airflows. Airflow rate can be adjusted either manually or automatically, on the basis of demand, with a motorised control damper.

A chilled beam equipped with HAQ manual airflow rate adjustment can be retrofitted to a motorised version for demand-based ventilation.

It is recommended that chilled beams for demand based airflows should be connected to constant pressure ductwork zone.

Halton Air Quality Control (HAQ) can operate efficiently in the constant-pressure ductwork zone with the following features:

- The HAQ adjustment has no impact on nozzle jet airflow.
- The HAQ adjustment has no impact on either the coil cooling or heating capacities.
- The HAQ airflow control has no significant impact on ductwork pressure conditions or the airflow rates of other chilled beams in the same ductwork zone.

The constant pressure ductwork zone should be designed based on the maximum/boost airflow rates and the same main ductwork size. It ensures uniform ductwork pressure conditions and correct airflow rates in response to demand.

The appearance of different units with constant, adjustable, or variable airflow is identical. The Halton Air Quality control unit's position and the selection of chilled beam nozzle size allow adjustment of the primary airflow rate in the space. The separate airflow adjustment damper installed in the duct branch is used for balancing the airflows in the ductwork.

When a motorized air quality control (HAQ) unit is used, the maximum and minimum airflow rates are adjusted with the stroke limiters of the damper.

The primary airflow rate of each beam is adjusted using the HAQ control unit during the installation and commissioning. There is no need to change or plug nozzles of the chilled beam.

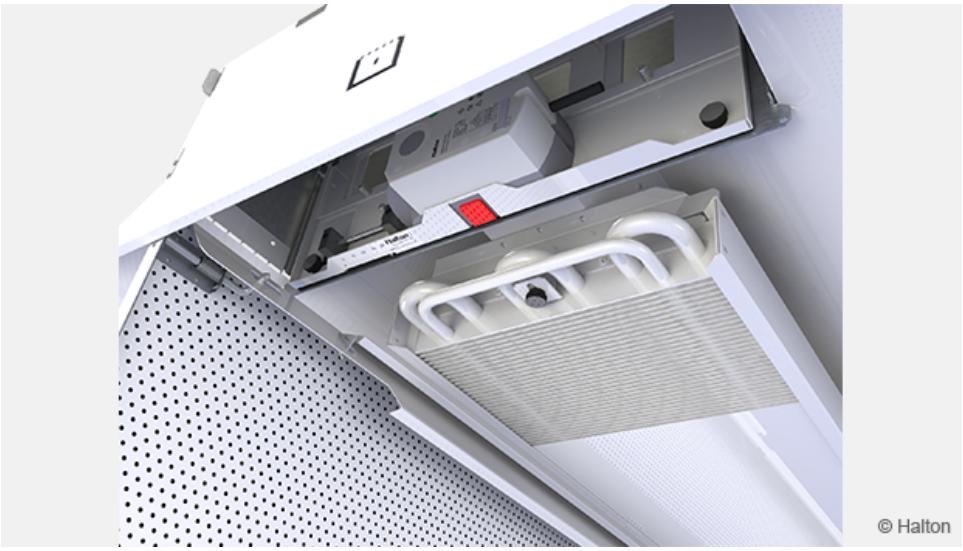

Fig. 4. Halton Air Quality (HAQ) control unit

2.2.3 Air quality and temperature controls

The room temperature controller regulates the water flow rate to control the chilled beam's cooling and heating capacities.

Air quality control for a room space can be arranged using, e.g., a CO_2 sensor while separately controlling the room air temperature by regulating the water flow rate.

Alternatively, a temperature sensor can be used for air quality control. In the first sequence, the airflow rate is modulated, and if the temperature exceeds the set point, the water valve starts to open in the second sequence.

In heating mode, it is recommended that the temperature difference between the jet outlet and room air be no greater than 3 °C. The inlet water temperature of the heat exchanger should also be no higher than 35 °C. Optimal heating performance requires an appropriate primary air flow rate. Thus, the air handling unit shall operate during heating periods to ensure proper heating performance.

2.3 Feature and options

Accessory / mode	Code	Description	Note
Combined cooling and heating coil	TC = C	Coil with cooling water circulation	Cooling copper water pipe connections are Ø 12 mm with normal pressure drop and Ø 15 mm with low pressure drop.
	TC = H	Coil with both cooling and heating water circulation	Cooling and heating copper water pipe connections are Ø 12 mm with normal pressure drop. With low pressure drop, cooling water pipe connection is Ø 15 mm and heating Ø 12 mm.

Accessory / mode	Code	Description	Note
Halton Air Quality control (HAQ damper)	AQ = A	Manual operation	Coil length: L – 500 mm
	AQ = B	Motorised operation. Power supply: 24 VAC. Control signal: 0 ... 10 VDC.	Coil length: L – 500 mm
	AQ = NA	Not assigned (without HAQ)	Coil length: L - 300 mm
Quick release valves	QV = N	No (without quick release valves)	-
	QV = Y	Quick release of the coil for servicing and cleaning	-
Water valves and actuators	CV = NA	No water valves and actuators	-
	CV = DA1	AB-QM without actuator	-
	CV = DA4	AB-QM with ABNM 24V NC	-
Condensation sensor	CS = N	No condensation sensor	-
	CS = Y	Yes (with condensation sensor)	-

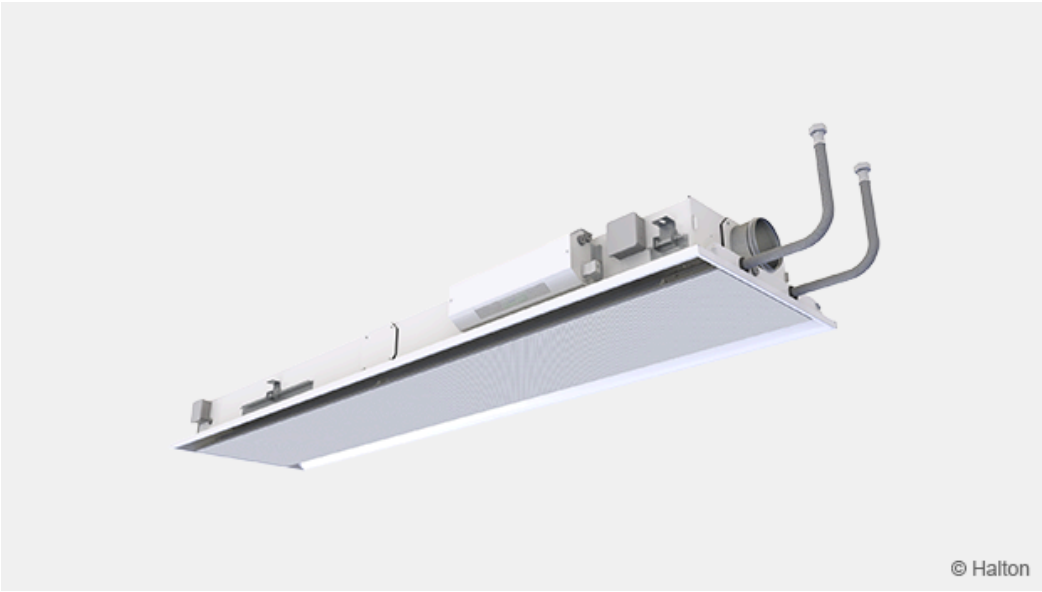

Fig. 5. Halton Vita VPR, hygienic chilled beam with cooling coil (TC=C)

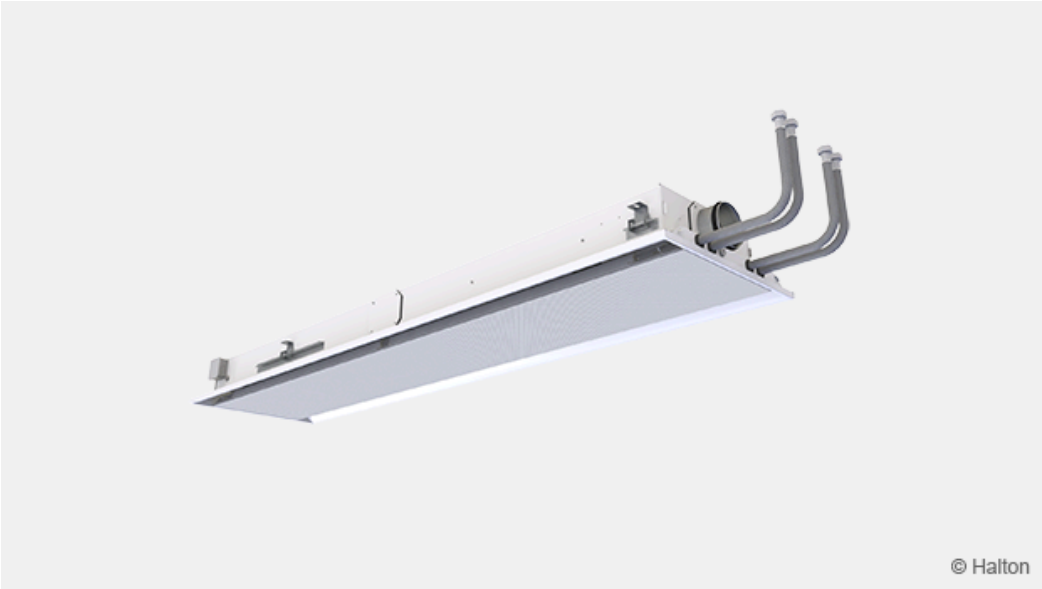

Fig. 6. Halton Vita VPR, hygienic chilled beam with heating and cooling coil (TC=H)

2.4 Key technical data

Features	Description
Airflow rate	Max. nozzle airflow rate < 35 dB (LpA): 48 l/s or 172 m^3/h (VPR/C-3600)
Dimensions (Length L-5)	1795 / 2395 / 2995 / 3595 / * 595 mm
Cooling capacity	Total capacity up to 1800 W (water in 14.0 °C, mass flow 0.1 kg/s, airflow 48 l/s, air temperature 16 °C, room temperature 24 °C)
Weight	29 – 58 kg (with water)
Typical static pressure	50-100 Pa
Water temperature	14-20 °C (must be above dew point)

2.5 Structure and materials

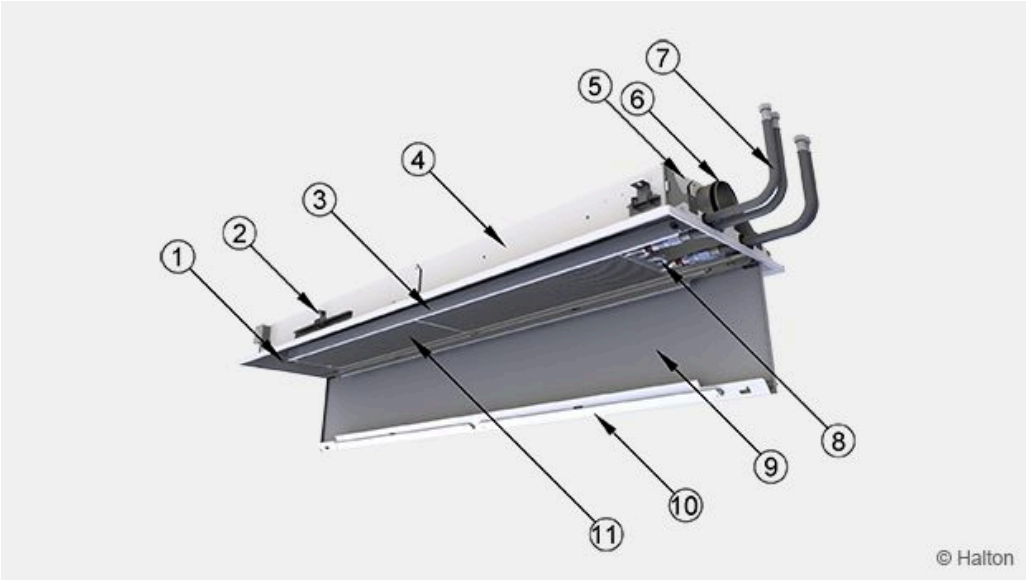

Fig. 7. Halton Vita VPR, structure

No.	Part	Description	Note
1	Halton Air Quality control (HAQ)	-	Optional
2	Brackets	Galvanised steel	-
3	Supply air chamber	Galvanised steel	-
4	Side plates	Pre-painted galvanised steel. Polyester-painted, white (RAL 9003, 20% gloss)	-
5	End plates	Pre-painted galvanised steel. Polyester-epoxy-painted, white (RAL 9003, 20% gloss)	-
6	Supply air connection	-	-
7	Flexible connectors	Stainless steel	Stainless steel (braided)
8	Coil pipes	Copper	*Antimicrobial coating, white (RAL 9003/30%)
9	Front panel	Pre-painted galvanised steel. Polyester-painted, white (RAL 9003, 20% gloss)	-
10	Halton Velocity Control (HVC)	-	-
11	Coil fins	Aluminium	*Antimicrobial coating, white (RAL 9003/30%)

* The antibacterial performance of coil coating used in Halton Vita VPR has been tested in independent microbiological laboratory (in reference to standards ISO 22196 and JIS Z 2801) with following result:

>99% (24 hours) Reduction of many common bacteria.[1]

2.6 Dimension and weight

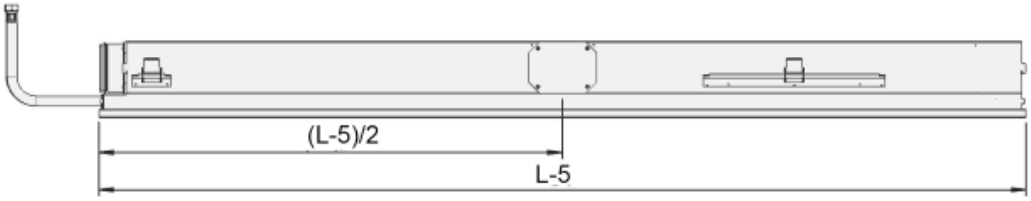

Fig. 8. Halton Vita VPR, dimensions

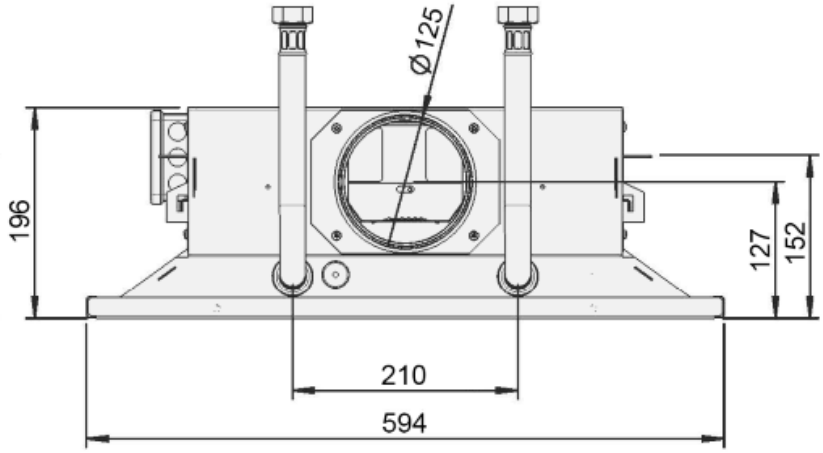

Fig. 9. Halton Vita VPR dimensions, cooling

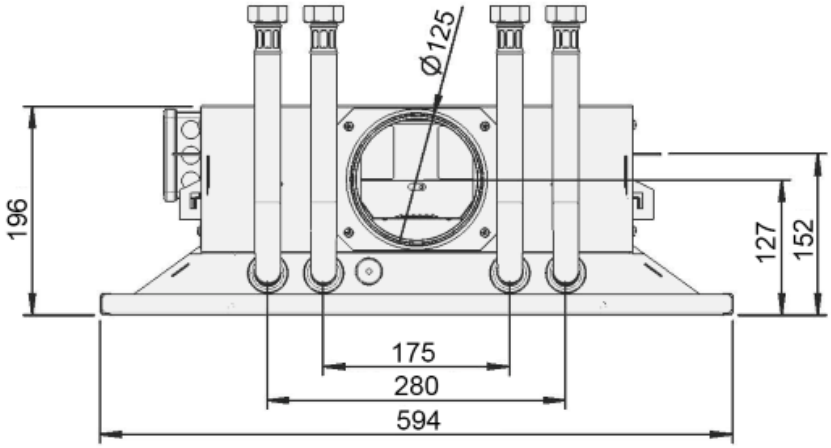

Fig. 10. Halton Vita VPR dimensions, cooling and heating

1. Acinetobacter baumannii, Pseudomonas Aeruginosa, Methicillin Resistant Staphylococcus Aureus (MRSA), Salmonella Enteritidis, Vibrio Parahaemolyticus, Enterobacter Faecalis, Enterobacter Aerogenes, Escherichia Coli, Listeria Monocytogenes, Salmonella Enterica, Legionella Pneumophilia

ØD	Coil length [mm]	Length L-5 [mm]	Weight [kg/m, water excluded]
125	1300, 1500, 1900, 2100, 2500, 2700, 3100, 3300	1795, 2395, 2995, 3595	15 (+1 with water)

Integration with suspended ceiling (standard T-profile 600)

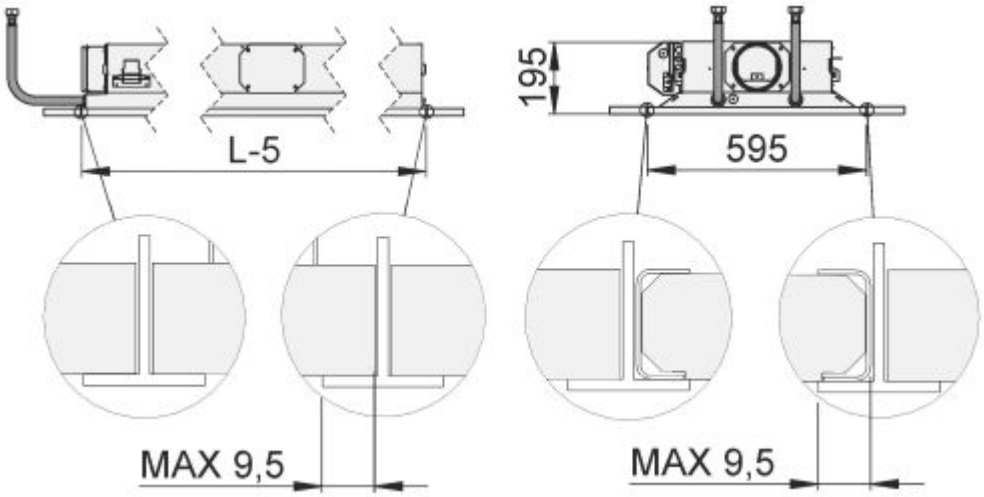

Fig. 11. Integration with suspended ceiling

2.7 System package

To equip it with the Halton Vita VRA room automation system, select the system package in the Halton Vita VPR product order code.

The package consists of a controller unit and a user panel for adjusting ventilation airflow, room temperature, and lighting in a hospital patient room.

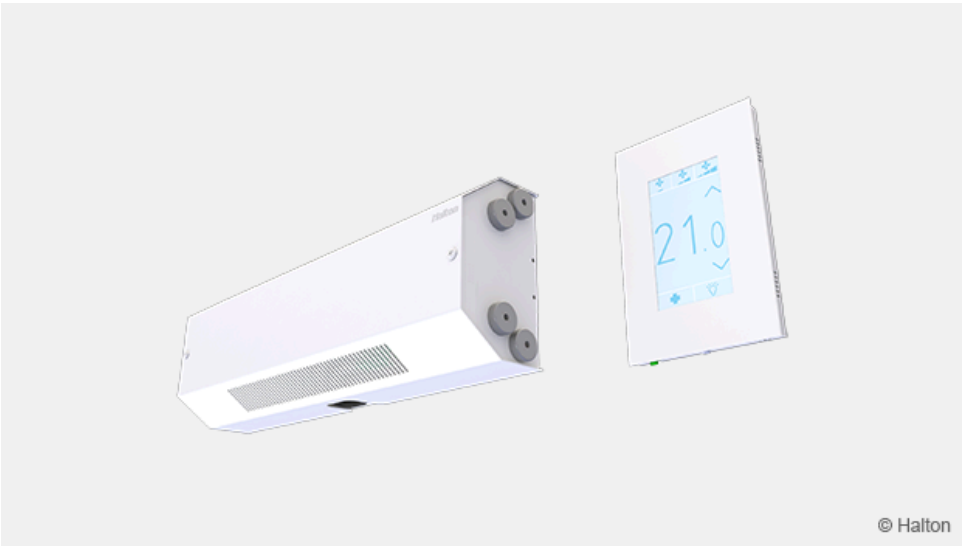

Fig. 12. Automation control unit and a user panel

The controller unit is installed on top of the beam and the user panel on the wall.

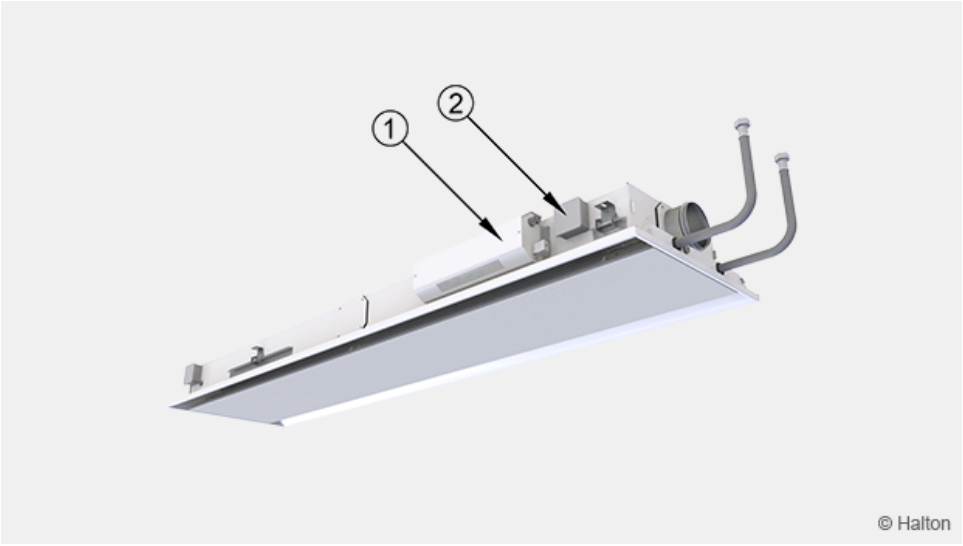

Fig. 13. Location of system package components

No.	Part
1	Halton Vita VRA (automation control unit)
2	Connection box

More detailed information about the system package can be found under the room automation product pages.

2.8 Specification

The hygienic active chilled beam for room ventilation, cooling and heating is designed especially for hospitals and other environments with high hygienic demands. The chilled beam has an integral recirculation air path through the perforated front panel. The induced room airflow rate is manually adjustable via three setting positions without influencing the primary air supply flow rate.

Function

- A supply air unit integrated into the chilled beam shall allow the primary airflow rate to be adjusted over a wide range without plugging or changing the nozzles.
- Adjustment of the airflow rate does not affect the induced airflow rate through the coil or the coil cooling or heating capacity when static chamber pressure is kept constant (optional).
- The chilled beam unit equipped with a manually adjustable airflow damper can be retrofitted with a motorised airflow control damper unit.
- The air supply to the room space is bi-directional.

Structure

- The beam with an adjustable airflow rate has one duct connection.
- The front panel is openable from either side in order to allow general maintenance and cleaning.
- The front panel is removable without any special tools.
- The cooling/heating coil is hinged from one end to enable lowering of the coil from the other end, enabling cleaning access to both the bottom and top sides of the coil and to internal surfaces of the chilled beam that are covered with the coil during normal operation.
- Side covers protect the coil edges from damage during cleaning, and a stopping mechanism secures the

opening end of the coil to reduce its decay.

- The casing is enclosed, and the pipe connections are covered to prevent air from the ceiling void from ingressing into the room's airflow.
- The coil is connected to piping with a flexible pipe connection.
- The front panel is fully perforated with round holes with a diameter of 2 mm. The finned cooling/heating coil has a minimum of 5 mm space between the fins.
- The position of the duct connection is changeable without the use of any special tools.
- The pipework's maximum operation pressure is 1.0 MPa.
- The active chilled beam offers an airflow adjustment damper as an option and a measurement tap for measuring airflow.
- The active chilled beam is 595 mm wide and 195 mm high.
- The active chilled beam has an inlet duct diameter of 125 mm.
- As an option, the pipe connections shall be equipped with quick connections to enable total removal of the coil.

Materials

- The frame, the front, and the side panels are made of galvanised steel plates.
- All visible parts and internal surfaces of the beam casing shall be white and painted to RAL 9003 (20% gloss).
- All pipes are made of copper, and connection pipes with a wall thickness of 0.9-1.0 mm.
- The fins are made of aluminium.
- The coil is thoroughly power-coated with white antibacterial paint.

Packaging and transport

- A removable plastic coating protects active chilled beams and is wrapped individually in plastic.
- The duct connection and pipe ends remain sealed during transport.
- The active chilled beams are identified by labels attached to both the active chilled beam and the plastic packaging.

2.9 Order code

VPR-S-AQ-L-C; E-SP-TC-CR-QV-CV-CS-CO-ZT

Main options	
S = Nozzle type	
A	Extra small
B	Small
C	Medium
D	Large
E	Extra large
AQ = Air quality control (HAQ)	

Main options	
MA	Manual (adjustable CAV)
MO	Motorised (VAV)
NA	Not assigned
L = Beam length [mm]	1800, 2400, 3000, 3600
C = Effective/coil length [mm]	1300, 1500, 1900, 2100, 2500, 2700, 3100, 3300

Other options and accessories	
E = Duct connection [mm]	
R2	Right (Ø125)
L2	Left (Ø125)
S2	Straight (Ø125)
SP = System package	
N	No
Y	Yes
TC = Cooling/Heating functions (coil type)	
C	Cooling
H	Cooling and heating
CR = Coil water pressure drop	
N	Normal
L	Low
QV = Quick release valves	
N	No
Y	Yes
CV = Water valves and actuators	
NA	Not assigned
DA1	AB-QM without actuator
DA4	AB-QM with ABNM 24V NC
CS = Condensation sensor	
N	No
Y	Yes
CO = Colour	

Other options and accessories	
SW	Signal white (RAL 9003)
ZT = Tailored product	
N	No
Y	Yes (ETO)

Order code example
VPR-A-MA-2400-1900; E=R2, SP=Y, TC=C, CR=N, QV=N, CV=NA, CS=N, CO=SW, ZT=N

3 Design information

3.1 Installation

The Halton Vita VPR hygienic chilled beam is especially suitable for ceiling mounting running parallel to the exterior wall of the room. When selecting the chilled beam orientation, the location of the supply air and water circuit connections is taken into account.

The chilled beam can be attached directly to the ceiling surface (H1 = 195 mm) or suspended using 8 mm threaded drop rods (not included). Each beam is equipped with movable brackets fixed to both sides. The brackets should be positioned one-quarter of the unit length (L/4) away from the end of the beam.

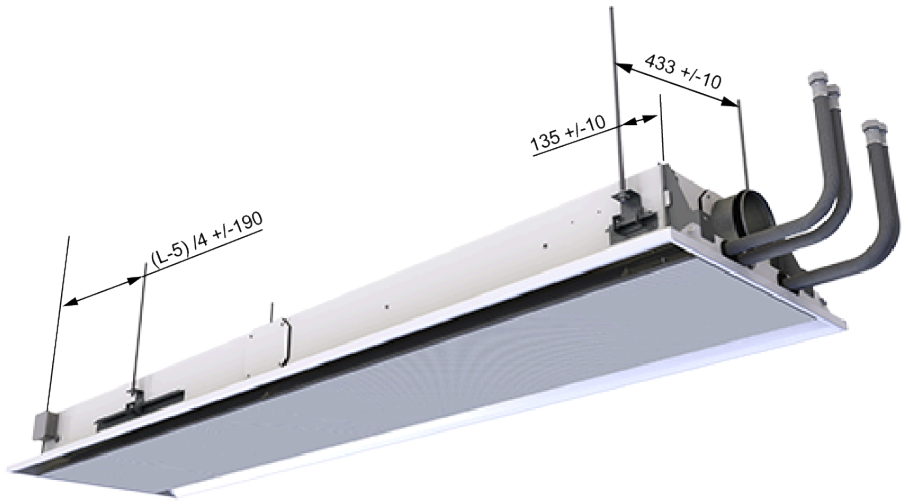

Fig. 14. Halton Vita VPR, installation

Install the main pipelines of the cooling and heating water circuits above the level of the chilled beam in order to enable venting of the pipework. The duct connection is at the same end of the chilled beam as the pipe connections. Relocating the duct connection to either side of the chilled beam can be done easily on-site using a screwdriver.

Replacing Halton Air Quality control (HAQ) from manual to motorised

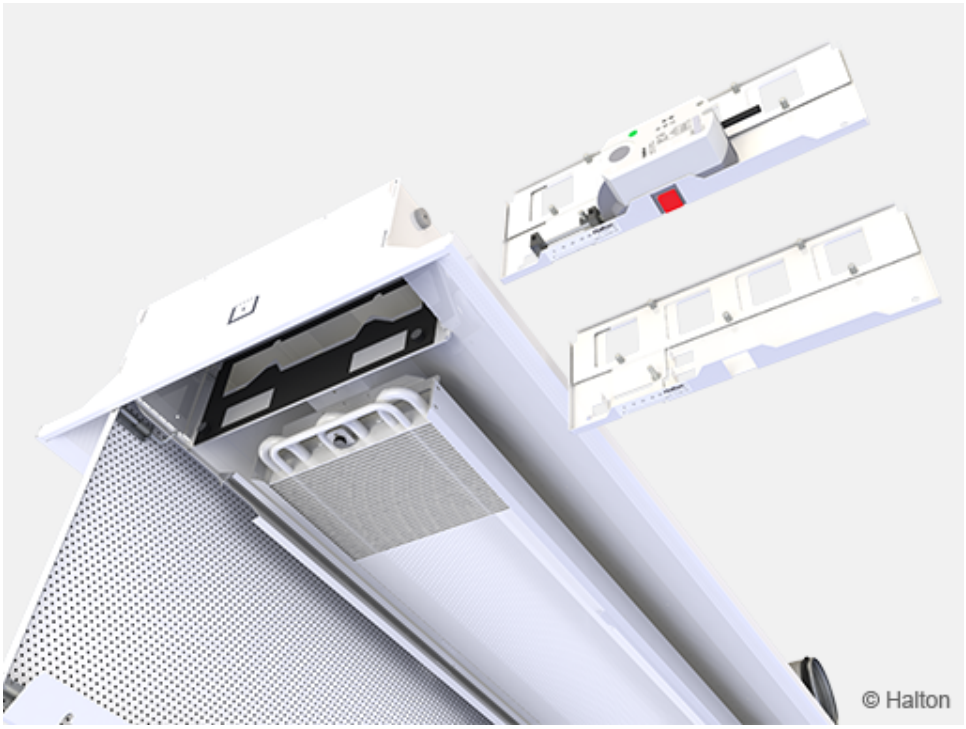

Fig. 15. Replacing manual HAQ with motorised HAQ

Power supply	24 VAC
Control signal	0 ...10 VDC

3.2 Commissioning

Cooling

The recommended cooling water mass flow rate is 0.02 ... 0.10 kg/s, resulting in a temperature rise of 1 ... 4 °C in the heat exchanger. To avoid condensation, the recommended inlet water temperature of the heat exchanger is 14 ... 16 °C.

Heating

The recommended heating water mass flow rate is 0.01 ... 0.04 kg/s, resulting in a temperature drop of 5 ... 15 °C in the heat exchanger. The maximum recommended temperature of the inlet water for the heat exchanger is 35 °C.

Balancing and control of water flow rates

Balance the water flow rates of the Halton Vita VPR chilled beam with adjustment valves installed on the outlet side of the cooling and heating water loops. The cooling capacity and heating capacity of the chilled beam are controlled by regulating the water mass flow rate. The water mass flow rate can be controlled by using an ON/OFF valve or a two- or three-way proportional valve.

Adjustment of supply airflow rate

Connect a manometer in the measurement tap and measure the static pressure in the Halton Halton Vita VPR hygienic chilled beam. The airflow rate is calculated according to the formula below.

Total airflow rate (q_v)

$$q_v = q_{v1} + q_{v2}$$

q_v	Total airflow rate, l/s or m^3/h
q_{v1}	Nozzle jet airflow rate, l/s or m^3/h
q_{v2}	Air quality control airflow rate l/s or m^3/h

Nozzle jet airflow rate (q_{v1})

$$q_{v1} = k * l_{eff} * \sqrt{\Delta p_m}$$

k	k-factor (from table below)
l_{eff}	Length of the coil [m]
Δp_m	Measured static chamber pressure [Pa]

Nozzle	k [l/s]	k [m^3/h]
A	0.71	2,56
B	0.99	3,56
C	1.36	4,90
D	2.09	7,52
E	3,33	11,99

The supply airflow rate of the Halton Air Quality control unit is determined by measuring Halton Vita VPR chilled beam static pressure and reading the opening position of the HAQ unit. The airflow rate is calculated using the formula below.

Air quality control (HAQ) airflow rate (q_{v2})

$$q_{v2} = a * k * \sqrt{\Delta p_m}$$

a	HAQ position
Δp_m	Measured static chamber pressure [Pa]

k [l/s]	k [m^3/h]
0,17	0,61

3.2.1 Adjustment of the airflow in constant airflow applications

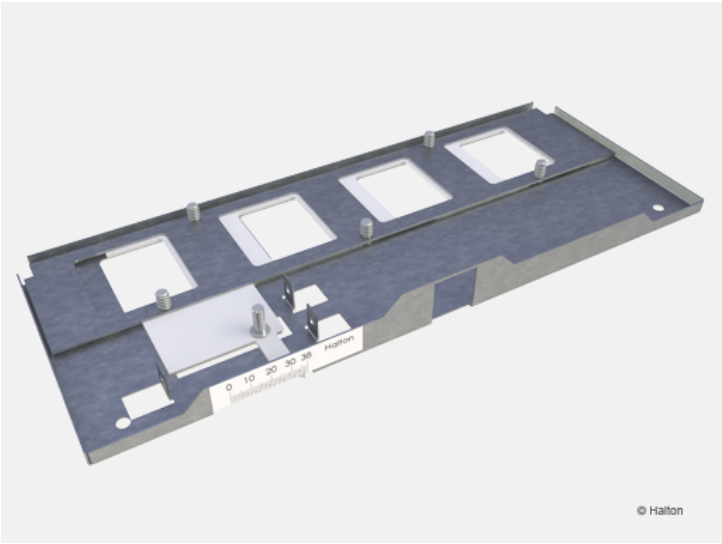

Fig. 16. Manual Halton Air Quality (HAQ)

Define the position of HAQ opening in millimetres that corresponds to the airflow rate at the actual chamber pressure level.

The adjustment of HAQ is done manually with the help of a position scale by adjusting the unit's opening. It is possible to verify the opening in millimetres on the position scale.

To ensure accurate adjustment, it is recommended to adjust the HAQ position and simultaneously read the targeted chamber pressure using a manometer.

It is also possible to remove the HAQ unit from the frame by opening two knurled-head screws (4) for the adjustment.

3.2.2 Adjustment of the airflow range in variable airflow applications

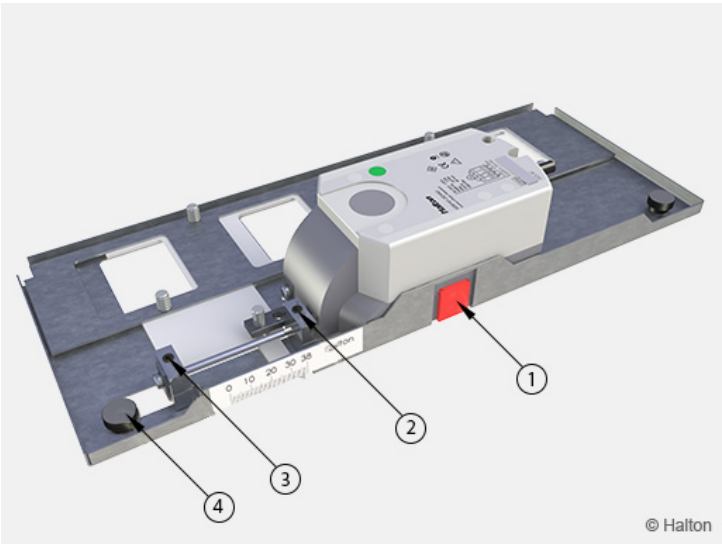

Fig. 17. Motorised Halton Air Quality (HAQ)

No.	Parts
1	Release of the actuator

No.	Parts
2	Restriction of the max. opening
3	Restriction of the min. opening
4	Knurled head screw (2 pcs)

Switch off the power supply to the actuator.

Disengage the actuator gear from the manual override position by releasing the knob.

Define the maximum and minimum opening positions, in millimetres, that correspond to maximum and minimum airflow rates at the actual chamber pressure level. The maximum and minimum positions are adjusted with two hexagonal socket set screws (see image above, points 2 and 3). It is possible to verify the opening in millimetres on the position scale. Switch on the power supply (24 V_{AC}) of the actuator. The actuator calibrates the minimum and maximum positions automatically according to the set limits.

The actuator can be controlled from this point on by using a 0...10V_{DC} control signal. (0 V_{DC} = min. position, 10 V_{DC} = maximum position).

It is also possible to remove the HAQ unit from the frame by opening two knurled-head screws (4) for adjustment.

3.3 Maintenance

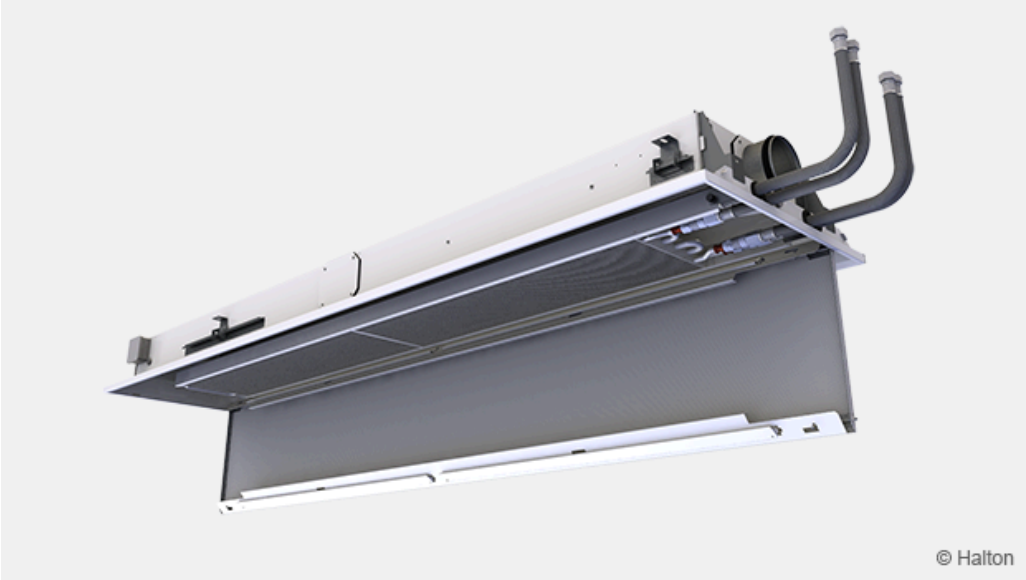

Fig. 18. Halton Vita VPR, front panel open

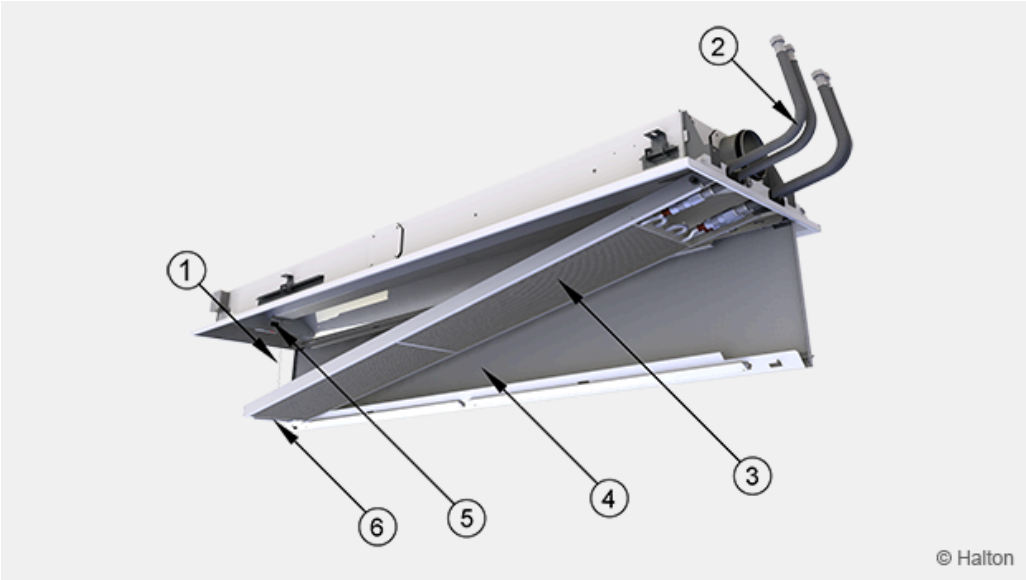

Fig. 19. Halton Vita VPR, heat exchanger lowered

No.	Description
1	Hanging wire
2	Flexible connectors
3	Heat exchanger
4	Front panel
5	Halton Air Quality control (HAQ)
6	Knurled head screws (2 pcs)

Install the main pipelines of the cooling and heating water circuits above the level of the chilled beam in order to enable venting of the pipework. The duct connection is at the same end of the chilled beam as the pipe connections. Relocating the duct connection to either side of the chilled beam can be done easily on-site using a screwdriver.

1. Open the front panel (4) of the Halton Vita VPR.
2. Open two knurled head screws (6) to pull down the heat exchanger (3) with care. Leave it hanging from the wires (1).
3. Clean the supply air plenum and finned coils of the heat exchanger with a vacuum cleaner, taking care not to damage the finned coils.
4. Clean the front panel and, if required, the side plates using a damp cloth.
5. The Halton Air Quality Control unit (HAQ) (5) is removable for chamber cleaning. Unscrew the screws to remove the HAQ.