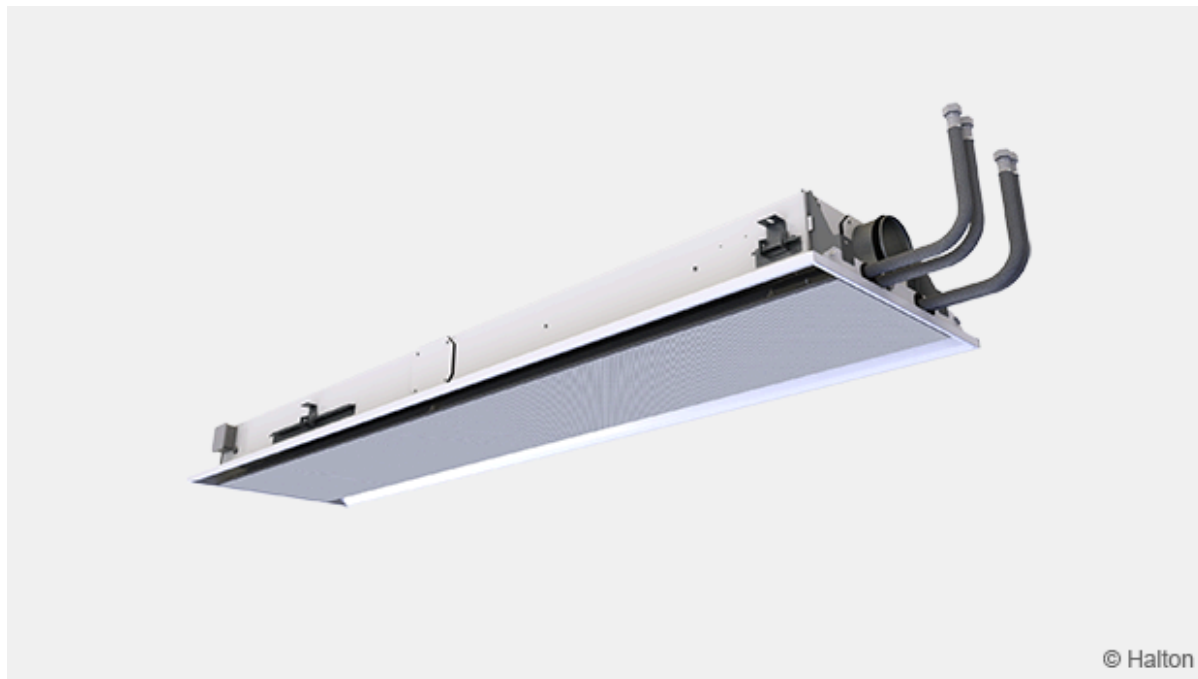


Halton Vita VPR – Hygienic chilled beam



Overview

Halton Vita VPR hygienic chilled beam provides:

- Silent, Comfortable and stable indoor environment
- Combined Ventilation, Heating and Cooling for flush installation within a suspended ceiling
- High Energy-Efficiency
- Easy upgrade to old facilities

The Halton Vita VPR hygienic chilled beam has

- Hygienic and openable construction with smooth surfaces that is 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
- Cleaning guidance is provided to enable successful maintenance
- Reduced amount of dust accumulation and less need for specialist cleaning compared to other chilled beams
- Integral adjustment for operational modes and exhaust air outlet

Typical applications: Hospital patient rooms and other spaces with hygienic requirements.

The Halton Vita VPR chilled beam is especially designed for hygienic and performance needs of hospitals and other environments with higher hygienic needs. The Halton Vita VPR operation can be easily adapted to changed operation conditions and requirements from the design to the end of

the building life cycle.

- Easy and fast selection with Halton HIT Design tool
- Individually adjustable velocity conditions with Halton Velocity Control (HVC)
- In-built flexibility of operation for partition wall relocations with Halton Velocity Control
- Individually adjustable supply air flow rate for changes in space layout using Halton Air Quality (HAQ) control
- Demand based control of supply air flow rate for efficient use of energy in constant-pressure ductwork zone applications; when the air flow rate changes have no effect on the coil cooling/heating capacities of the chilled beam.
- Effective site logistics
- Enhanced life cycle performance with optimized low air and water flow rates

Product models

- Model with combined cooling and heating exchanger
- Model with manual or motorised Halton Air Quality (HAQ)
- Model with removable, cleanable coil, shut-off valves

Halton chilled beams are certified by Eurovent Certita.

[Link to Certificate](#)



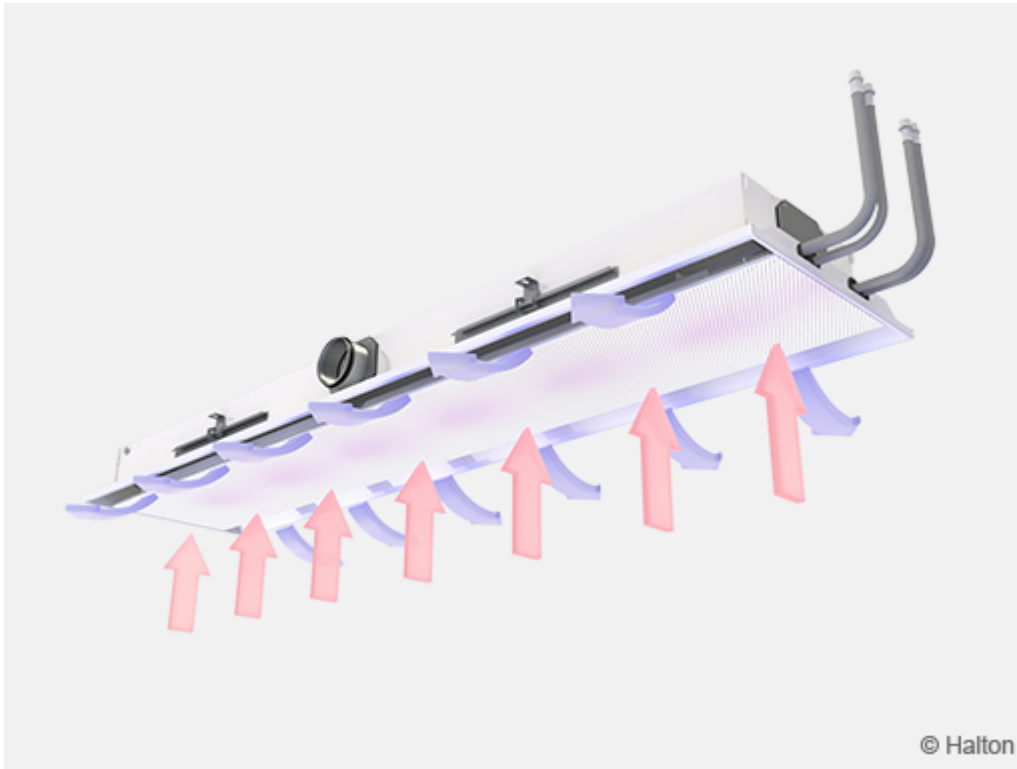
Operating principle

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

The primary supply air enters the plenum of the active chilled beam. From there it is diffused into the room through nozzles and the diffuser of the HAQ- control. Supply slots located at the bottom of the beam.

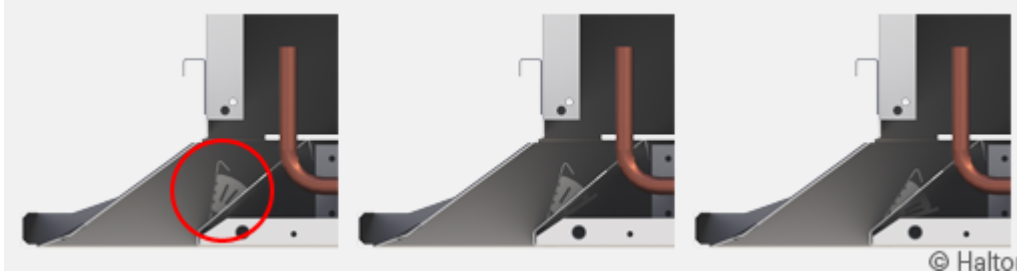
The supply air nozzle jets efficiently induce ambient room air. The induced air flows through the heat exchanger, where it is either cooled or heated.

The supply air jet is directed horizontally along the ceiling surface.



Velocity control in the occupied zone

Halton Velocity Control (HVC) is used for adjusting room air velocity conditions either when room layout is changed (e.g., in cases where the partition wall is located near the chilled beam) or when local, individual velocity conditions need to be altered. HVC adjustment has an impact on the induced room air flow through the heat exchanger, and therefore it either increases or decreases both the velocities in the occupied zone and the cooling/heating capacity of the chilled beam.



Pos.1 = Throttle position **Pos.2** = Normal position **Pos. 3** = Boost position

The HVC damper 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 in order to allow both throttle and boost functions during the building's life cycle.

Airflow rate control

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

Optional Halton Air Quality control (HAQ) is used for adjusting and/or controlling the outdoor air flow rate in a room space. 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 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 air flow rate adjustment can be retrofitted to motorised version for demand based ventilation .

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

- 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 not significant impact to ductwork pressure conditions and respectively to airflow rates of other chilled beams in the same ductwork zone.

The appearance of different units with constant, adjustable, or variable airflow – is identical.

The Halton Air Quality (HAQ) control unit's position and the selection of chilled beam nozzle size allow adjustment of the primary air flow rate in the space. The separate air flow adjustment damper installed in the duct branch ois used for balancing the air flows in the ductwork. When a motorised air quality control (HAQ) unit is used, the maximum and minimum air flow rates are adjusted with the stroke limiters of the damper.

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



Air quality and temperature controls

The cooling and heating capacities of the chilled beam are controlled by regulating the water flow rate according to the control signal of the room temperature controller.

Air quality control for a room space can be arranged using, e.g., a CO₂ sensor when room air temperature is controlled separately by regulating the water flow rate. Alternatively, a temperature sensor can be used for air quality control, with the airflow rate modulated in the first sequence and, if the temperature exceeds the set point, the water valve starting to open in the second sequence.

In heating mode, it is recommended that the temperature difference between the jet outlet and room air would not be greater than 3 °C. The inlet water temperature of the heat exchanger should not be 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.

Key technical data

Feature	Description
Airflow rate	Max. nozzle airflow rate < 35 dB (LpA): 48 l/s or 172 m ³ /h (VPR/C-3600)
Dimensions	1795/2395/2995/3595/ * 595 mm
Water pressure drop	10.8 kPa (VPR 3600, waterflow 0.1 kg/s)
Cooling capacity	Total capacity up to 1840 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)

Features and options

Accessory/option	Code	Description	Note
Combined cooling and heating coil	TC = H	Coil with hot water circulation	Cooling/heating copper water pipe connections are Ø 15/10 mm
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
Quick release valves	QV = Y	Quick release of the coil for servicing and cleaning	

System package

The system package should be selected in the VPR product order code when the product is intended to be equipped with Halton Vita VRA room automation system.

The package consists of a controller unit and a user panel used to adjust the ventilation airflow, room temperature, and lighting in a hospital patient room.



Fig 1. Automation control unit and a user panel

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

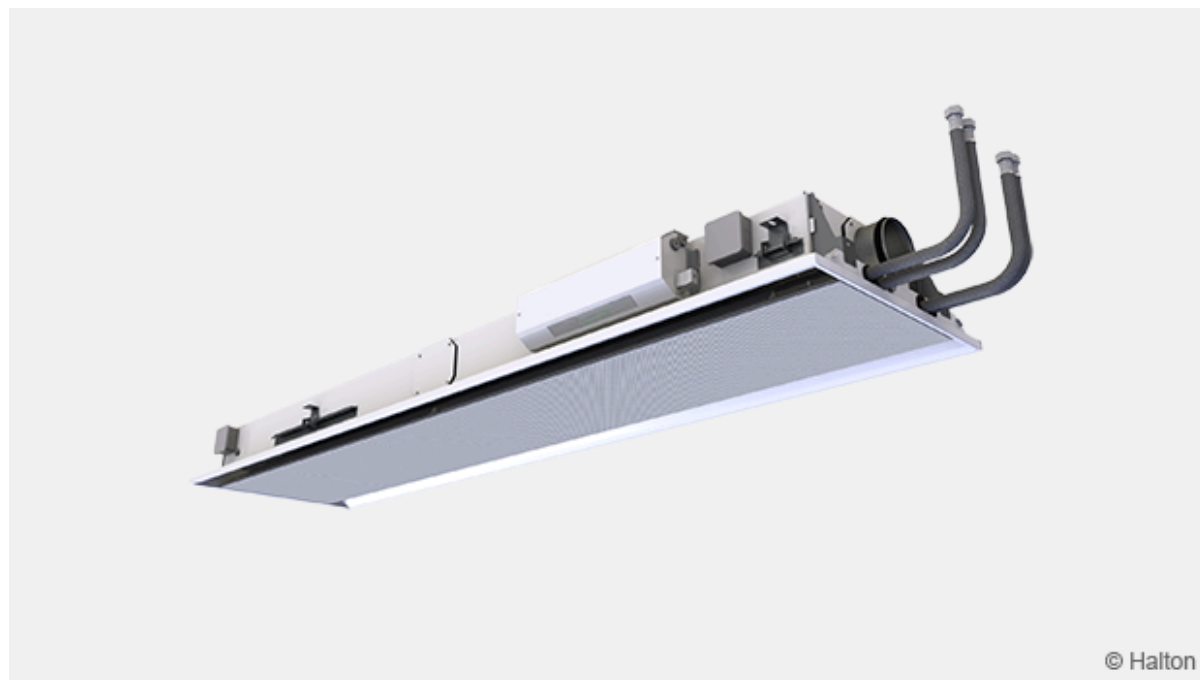
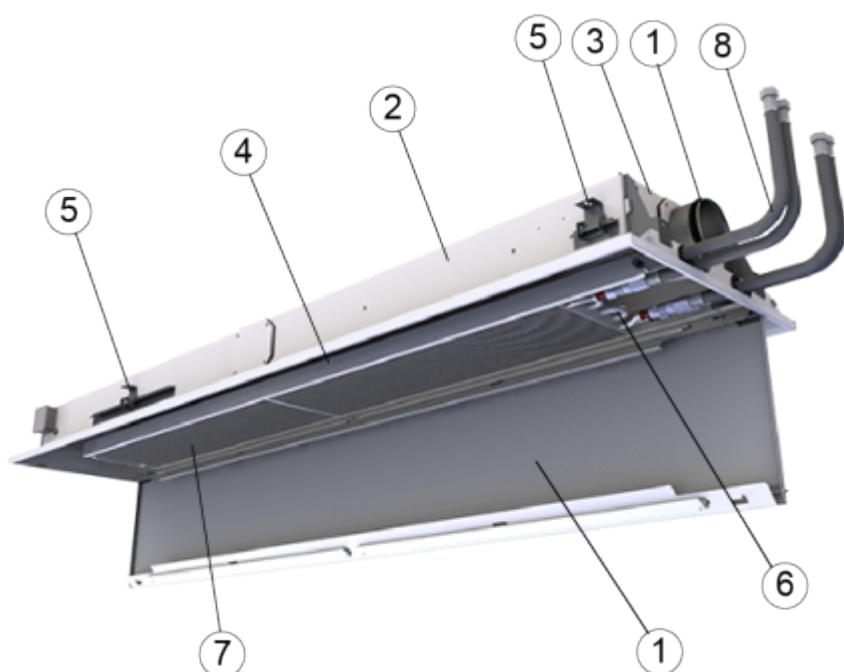


Fig 2. Location of system package components

You can find more detailed information about the system package under Halton Vita VRA room automation product pages.

Structure and material



No.	Part	Description	Note
1	Front panel	Pre-painted galvanised steel. Polyester-painted, white (RAL 9003 or RAL 9010, 20% gloss)	–
2	Side plates	Pre-painted galvanised steel. Polyester-painted, white (RAL 9003 or RAL 9010, 20% gloss)	–
3	End plates	Pre-painted galvanised steel. Polyester-epoxy-painted, white (RAL 9003 or RAL 9010, 20% gloss)	–
4	Supply air plenum	Galvanised steel	–
5	Brackets	Galvanised steel	–
6	Coil pipes	Copper	ᵃ) Antibacterial coating, white (RAL 9003/30%)
7	Coil fins	Aluminium	ᵃ) Antibacterial coating, white (RAL 9003/30%)
8	Flexible connectors	Stainless steel	Stainless steel (braided)

ᵃ) 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%(24hours) Reduction of many common bacterias**

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

Dimensions and weight

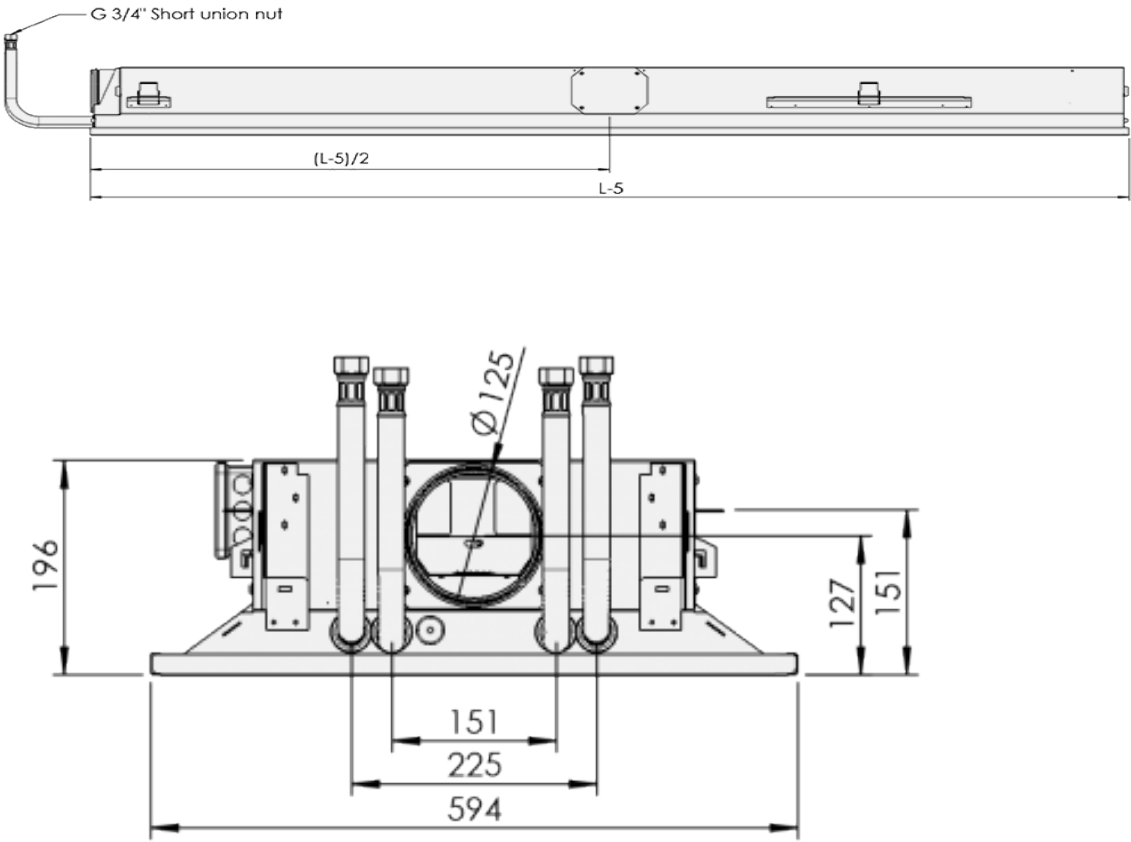


Fig. 1. Halton Vita VPR dimensions

Coil length	1300, 1900, 2500, 3100
L- 5	1795, 2395, 2995, 3595

Integration with suspended ceiling (standard T-profile 600)

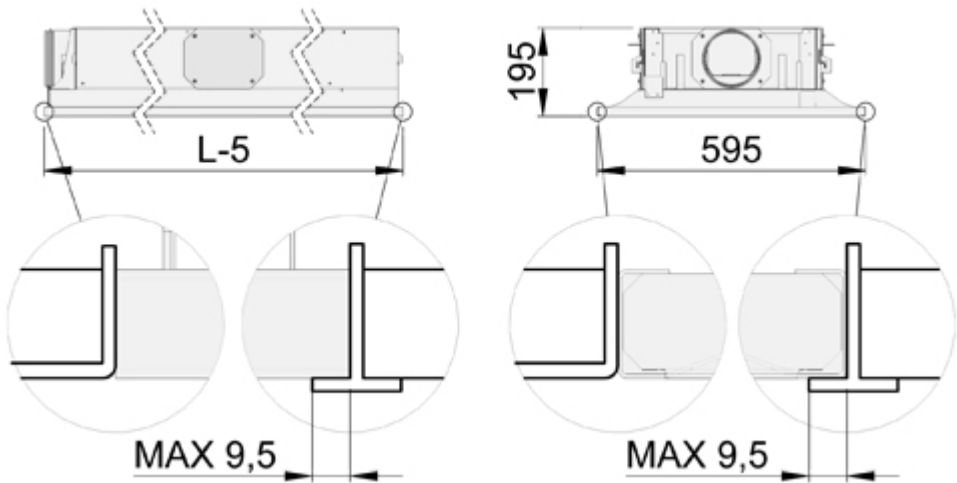


Fig. 2. Integration with suspended ceiling (standard T-profile 600)

Weight

Model	[kg/m]
Without water	15
With water	16

Servicing

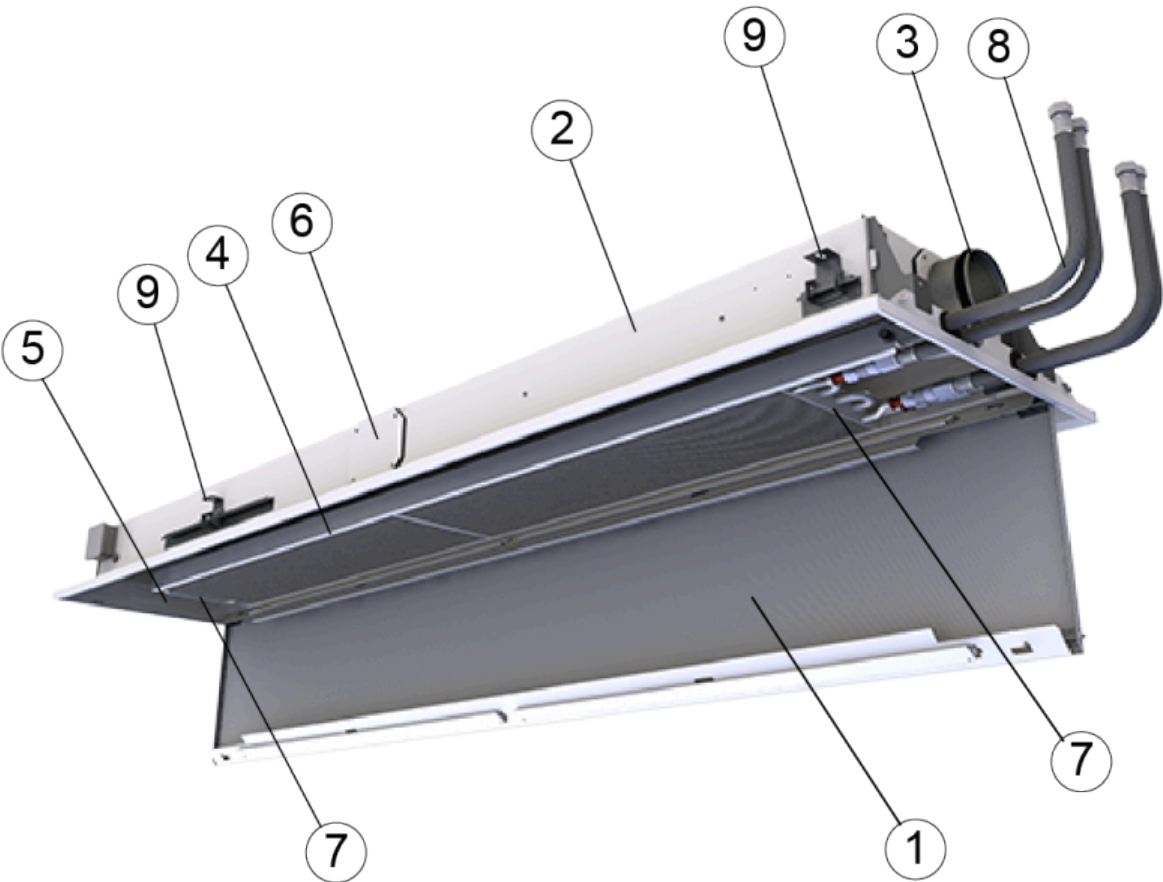


Fig.1 Front panel open

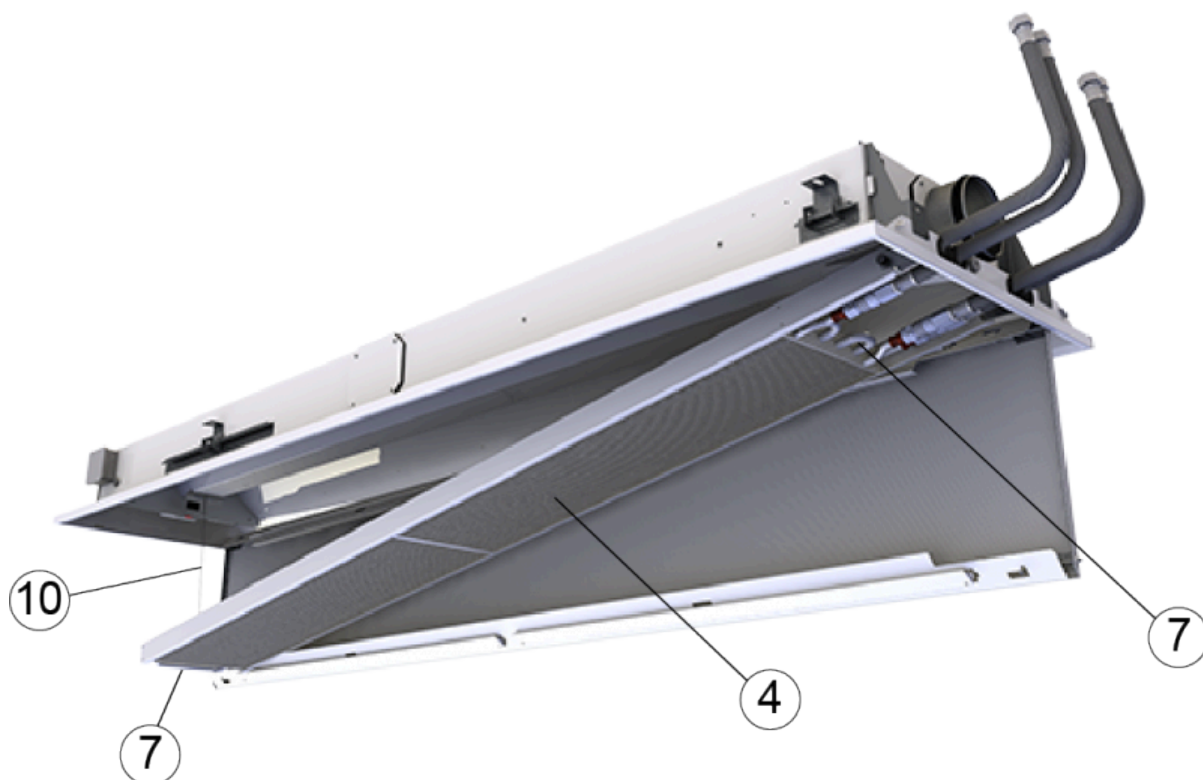


Fig.2 Heat exchanger lowered

Code description:

1. Front panel
2. Casing
3. Supply air connection
4. Heat exchanger
5. Halton Air Quality control (HAQ)
6. Duct connection cover
7. Knurled head screws (2 pcs)
8. Flexible connectors
9. Sliding brackets (4 pcs)
10. Hanging wire

Open the front panel (1.) of the Halton Vita VPR.

Open two knurled head screws (7.) to pull down the heat exchanger (4.) with care. Leave it hanging from the wires (10.).

Clean the supply air plenum and finned coils of the heat exchanger with a vacuum cleaner, taking care not to damage the finned coils.

Clean the front panel and, if required, the side plates, using a damp cloth.

The Halton Air Quality control unit (HAQ) is removable for chamber cleaning. Unscrew the screws for removing the HAQ.

Specification

The hygienic active chilled beam for room ventilation, cooling and heating is especially designed 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. .

The primary airflow rate shall be adjustable over a wide range without plugging or changing the nozzles via a supply air unit integrated into the chilled beam. Adjustment of the airflow rate do not have any affect on induced airflow rate through the coil nor 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 are able to be retrofitted with a motorised airflow control damper unit.

The beam with adjustable airflow rate has only 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 other end to enable cleaning access to both bottom and top side of the coil and to internal surfaces of the chilled beam that are covered with the coil during normal operation. The coil edges are protected from damage during cleaning with side covers and the opening end of the coil is secured with stopping mechanism to reduce the decay of the coil.

The cooling coil is connected to piping with a flexible pipe connection from the factory.

(Option) The pipe connections shall be equipped with quick connections to enable total removal of the coil.

The front panel is fully perforated with round holes with the diameter of 2 mm. The finned cooling/heating coil has minimum of 5mm space between the fins.

The air supply to the room space is either unidirectional or bi-directional.

The active chilled beam is 595 mm wide and 195 mm high.

The active chilled beam has an inlet duct diameter of 125 mm.

The position of the duct connection is changeable without the use of any special tools.

The frame, front, and side panels is made of galvanised steel plate.

All visible parts and internal surfaces of the beam casing shall be white, painted to RAL 9003, (20% gloss) or RAL 9010, (20% gloss).

The casing is enclosed and the pipe-connections covered to prevent ingress of the air from the ceiling void into the room airflow.

All pipes are manufactured from copper, and connection pipes with a wall thickness of 0.9-1.0 mm. The fins are manufactured from aluminium.

Optionally, heating can be incorporated within the heat exchanger by means of two 10-mm pipes, connected in series.

The coill is thoroughly power-coated with white antibacterial paint.

All joints are soldered and factory pressure-tested.

The pipework s maximum operation pressure is 1.0 MPa.

The active chilled beam has an airflow adjustment damper as an option and a measurement tap to allow airflow measurement.

As an option, an exhaust valve can be integrated into the chilled beam.

Active chilled beams are protected by a removable plastic coating and individually wrapped in a plastic.

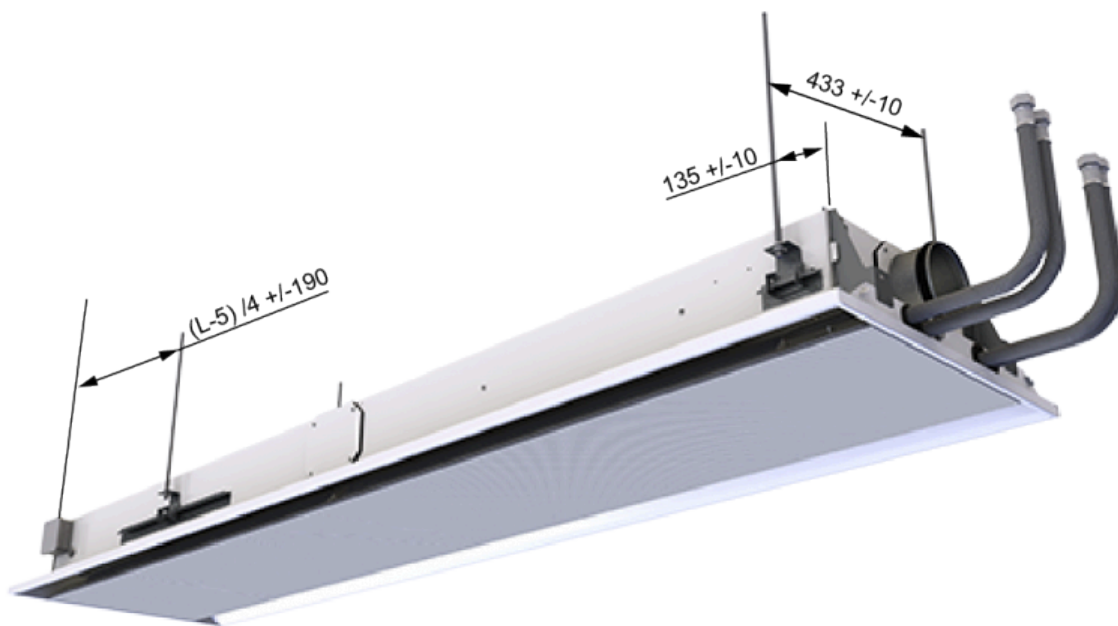
The duct connection and pipe ends remain sealed during transport.

The active chilled beams is identified by labels attached to both the active chilled beam and the plastic packaging.

Installation

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

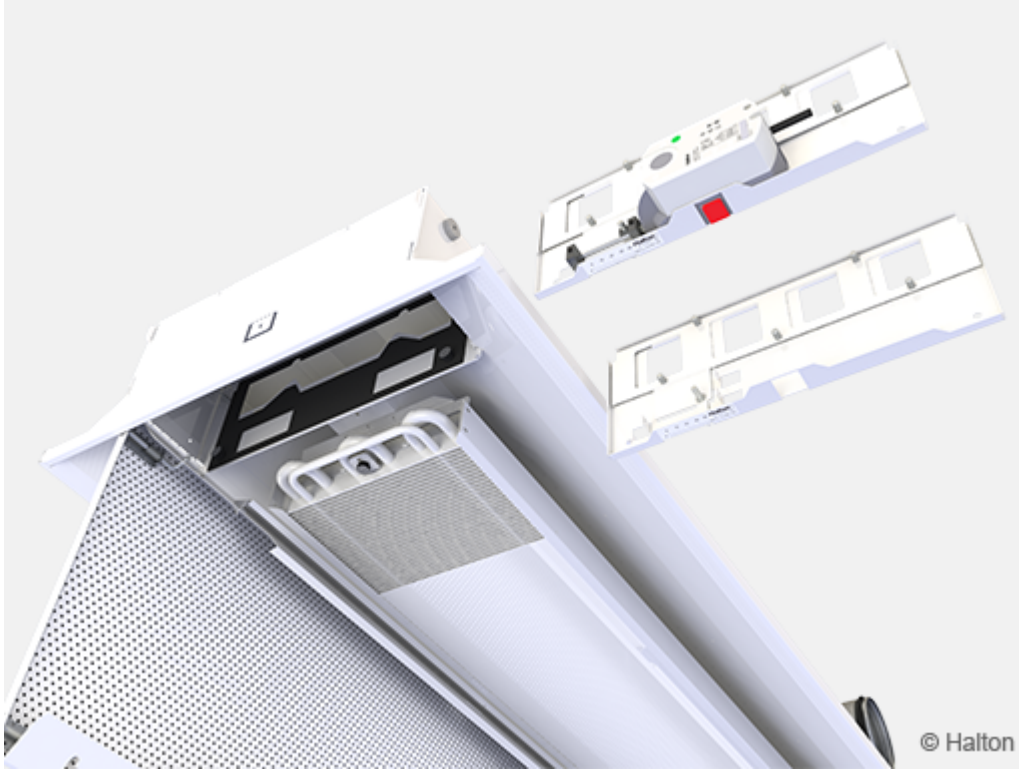
The chilled beam can be attached directly to the ceiling surface ($H1 = 195 \text{ mm}$) or suspended using threaded drop rods (8 mm). Each beam is equipped with movable brackets fixed to both sides of the beam. It is recommended that the brackets be positioned one quarter of the unit length ($L/4$) away from the end of the beam.



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. Relocation of the duct connection to either side of the chilled beam can be done easily on-site by using a screw driver.

Replacing manual HAQ with motorised HAQ (Halton Air Quality control)



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

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 recommended maximum 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 (qv)

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

- qv Total airflow rate, l/s or m3/h
- qv1 Nozzle jet air flow rate, l/s or m3/h
- qv2 Air quality control diffuser (HAQ) air flow rate l/s or m3/h

Nozzle jet air flow rate (qv1)

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

- 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 [m3/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

Air quality control diffuser airflow rate (qv2)

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

- a HAQ position
- k k-factor (from table below)

Δp_m Measured static chamber pressure [Pa]

k [l/s]	k [m3/h]
0.17	0.61

Adjustment of the airflow in constant airflow applications

Define the position of Halton Air Quality control (HAQ) in millimeters that correspond to airflow rate at the actual chamber pressure level.

Adjustment of HAQ is done manually with the help of position scale by adjusting the opening of the unit. It is possible to verify the opening in millimeters on the position scale.

In order to ensure accurate adjustment it is recommended to adjust HAQ-position and in the same time read the targeted chamber pressure using the manometer.

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

Halton Air Quality control (HAQ)

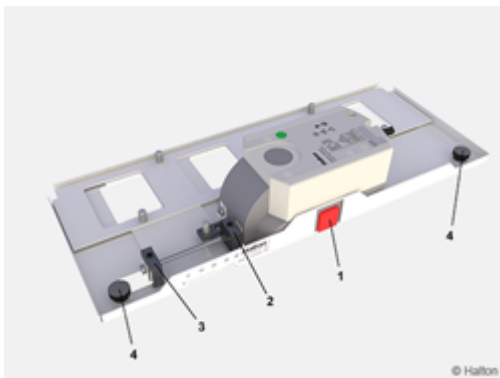


Fig.1 Motorised HAQ

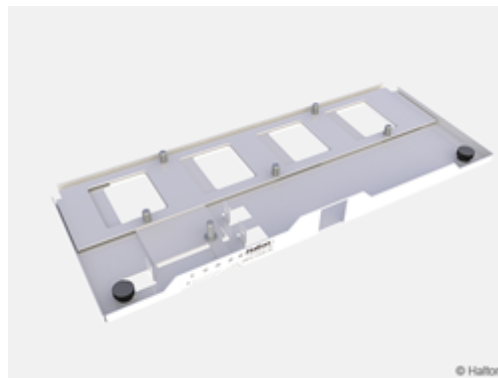


Fig.2 Manual HAQ

Code description:

1. Release of the actuator
2. Restriction of the max. opening
3. Restriction of the min. opening
4. Knurled – head screw (2 pcs)

Adjustment of the airflow range in variable air flow applications

Switch-off the power supply of the actuator.

Disengage the actuator gear into manual override position by releasing the knob (1).

Define the maximum and minimum positions, in millimeters that correspond to maximum and minimum air flow rates at the actual chamber pressure level.
The maximum and minimum positions are adjusted with two hexagonal socket set screws (2,3). It is possible to verify the opening in millimeters on the position scale.

Switch on the power supply (24 VAC) of the actuator. The actuator calibrates the min. and max. positions automatically according to the set limits.

The actuator can be controlled from this point on by using a 0...10VDC control signal. (0 VDC=min.position, 10 VDC = max. position).

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

Order code

VPR-S-L-C-E; TC-CO-AQ-QV-ZT

Main options	
S = Nozzle size	
A	A (Ø3mm)
B	B (Ø4mm)
C	C (Ø5mm)
D	D (Ø6mm)
E	E (Ø8mm)
L = Length of beam [mm]	1800, 2400, 3000, 3600
C = Effective length of coil	1300, 1900, 2500, 3100 (L-500)
E = Duct connection and size	
R2	Right / 125
L2	Left / 125
S2	Straight / 125
Other options and accessories	
SP = System package	
N	No
Y	Yes
TC = Cooling / Heating functions (coil type)	
C	Cooling
H	Cooling and Heating
CO = Colour	
SW	Signal white (RAL 9003)
W	Pure white (RAL 9010)
AQ = Air quality control (HAQ)	
MA	Manual (adjustable CAV)
MO	Motorised (VAV)
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
ZT = Tailored product	
N	No
Y	Yes (ETO)

Order code example

VPR/C-2400-1900-R2N,SP=Y,TC=C,CO=SW,AQ=MO,QV=N,CV=NA,CS=N,ZT=N