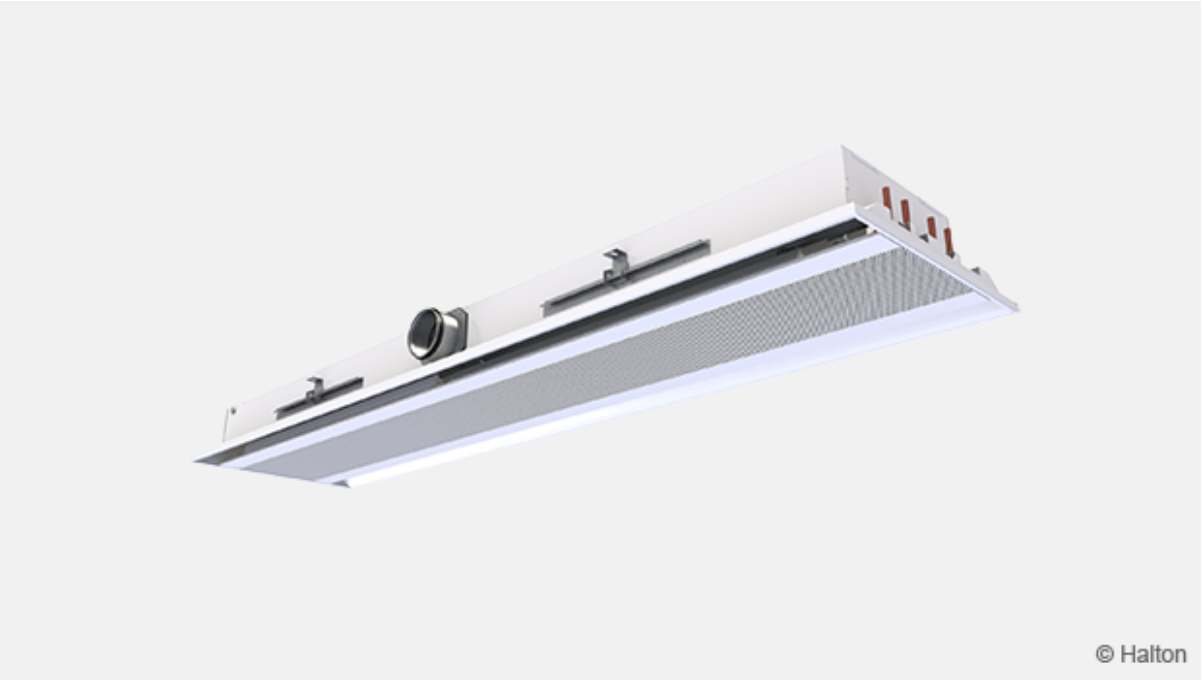
Halton Rex 600 (RE6)



概览

- 采用嵌入式吊顶安装的集制冷、供热和送风一体的设备。
- 特别适合高制冷负荷、低湿负荷和多变通风需求的空间。
- 更是高质量环境条件、按需通风和独立房间控制应用的理想解决方案。

典型应用：办公室房间、大开间办公室和会议室。

Halton Rex 600冷梁是为典型办公室空间的风量调节高灵活性的通风需求所设计的。Halton Rex 600的运行可以很容易的适应于改变的运行条件和从设计到建筑生命周期结束的需求。

- 容易且快速的选择
- Halton速度控制 (HVC) 可实现独立速度调节
- 借助Halton速度控制HVC可轻松实现隔墙的重新灵活定位
- 使用Halton空气质量控制器（HAQ）可独立调节空间布局变化时的送风量
- 为恒定的有效使用能源而按需控制送风量—压力管道系统区域的应用；当风量的改变对冷梁的盘管制冷/供热负荷没有影响时。
- 现场物流高效
- 通过优化水量和风量来提升生命周期性能

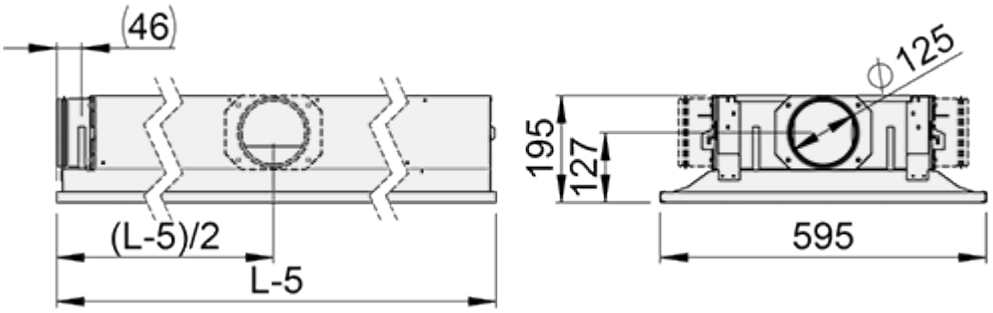
产品型号&附件

- 配有组合式制冷和供热交换器的型号
- 配有手动或者电动的Halton空气质量控制器（HAQ）的型号
- 配有集成排风阀的型号

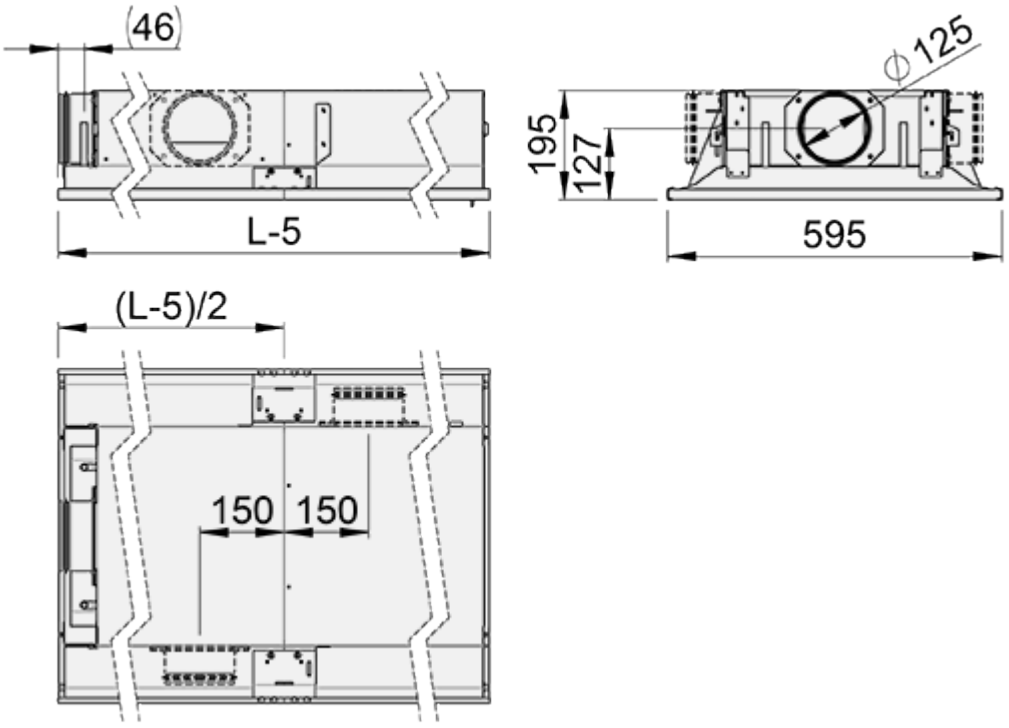
Dimensions and Weight

Main dimensions

Total length 1200 – 2400 mm



Total length 2500 – 3600 mm

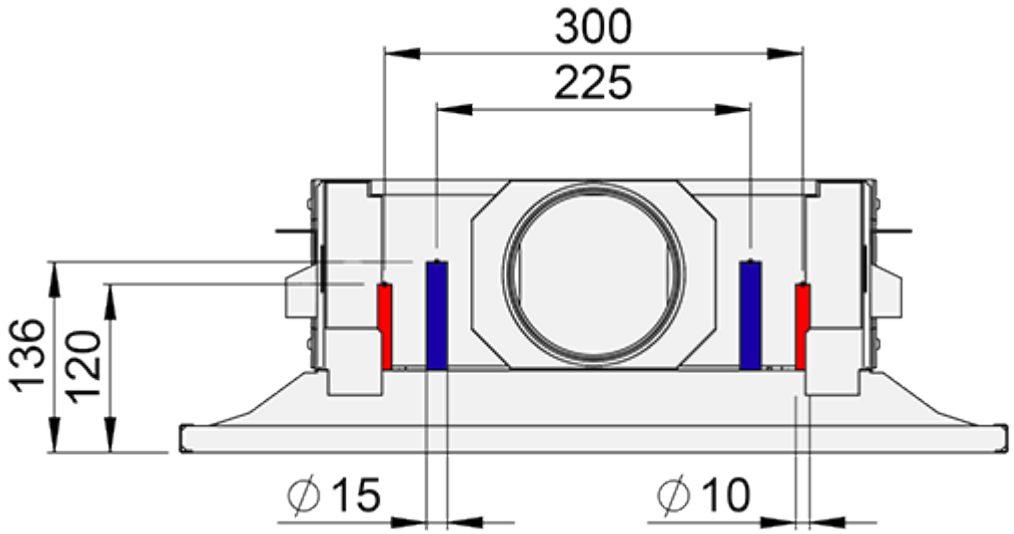


Note: For lower models (min.145 mm), please contact sales.

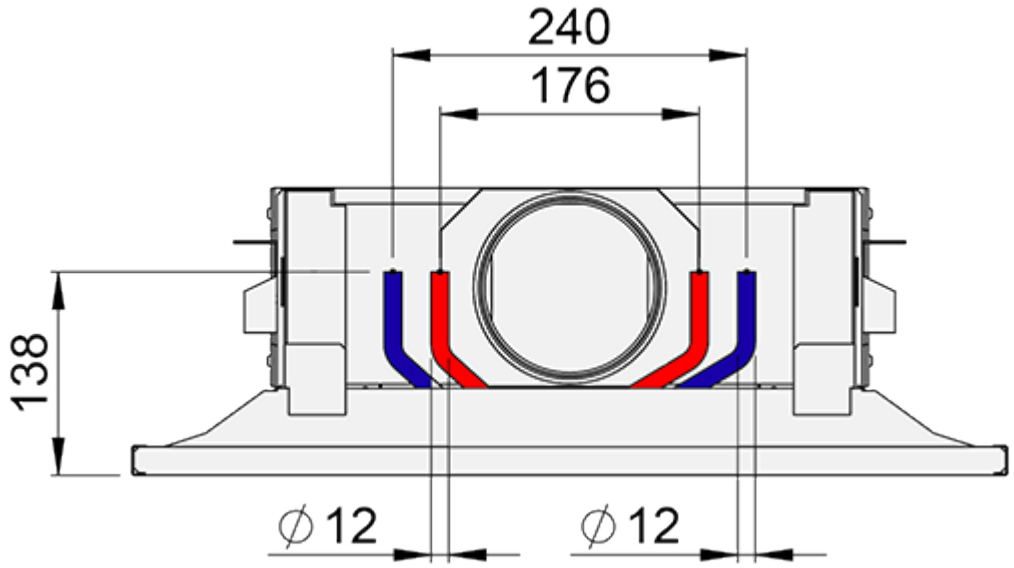
Coil length	900, +100, ..., 3300
L-5	1195, +100, ..., 3595 (+1715)
Weight (kg/m)	14

Coil pipe dimensions

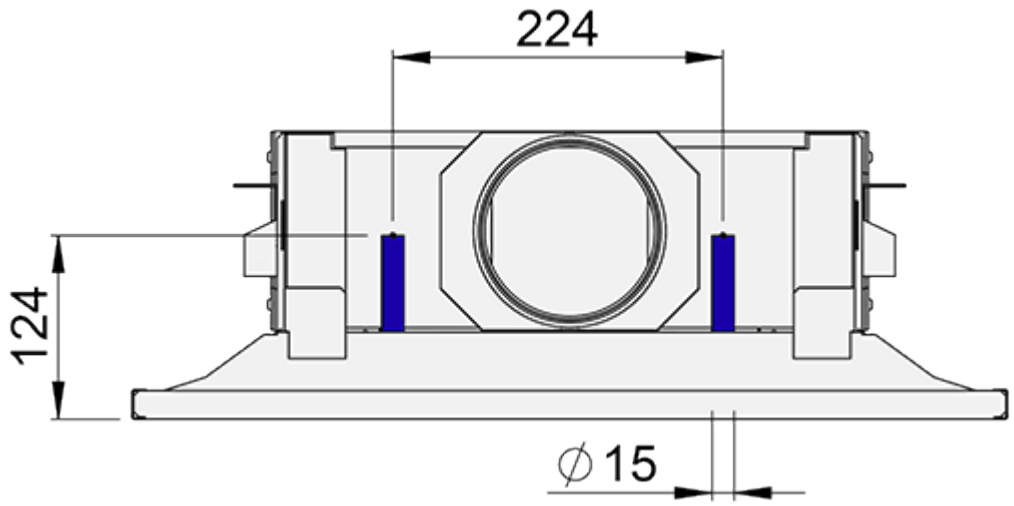
Normal efficiency (CE=N)



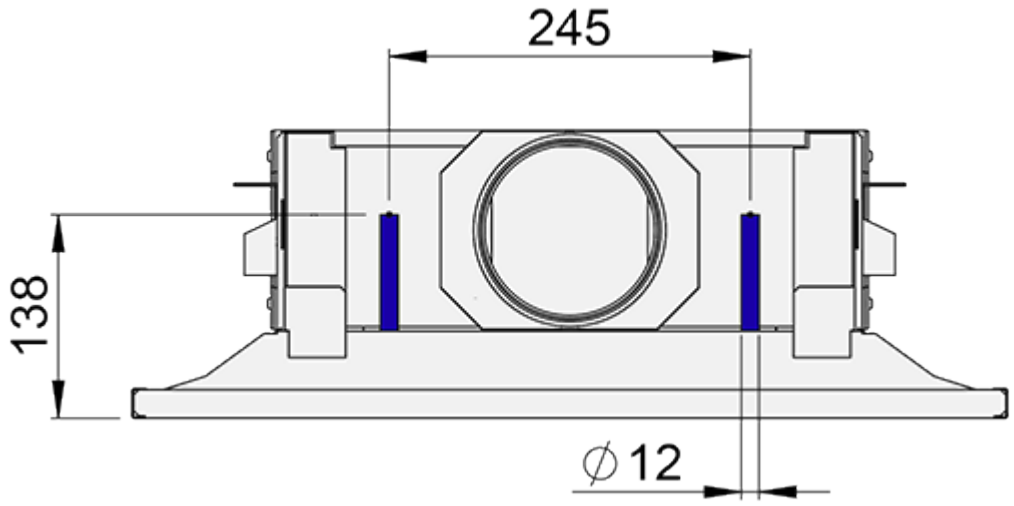
High efficiency coil, single loop (CE=H1)



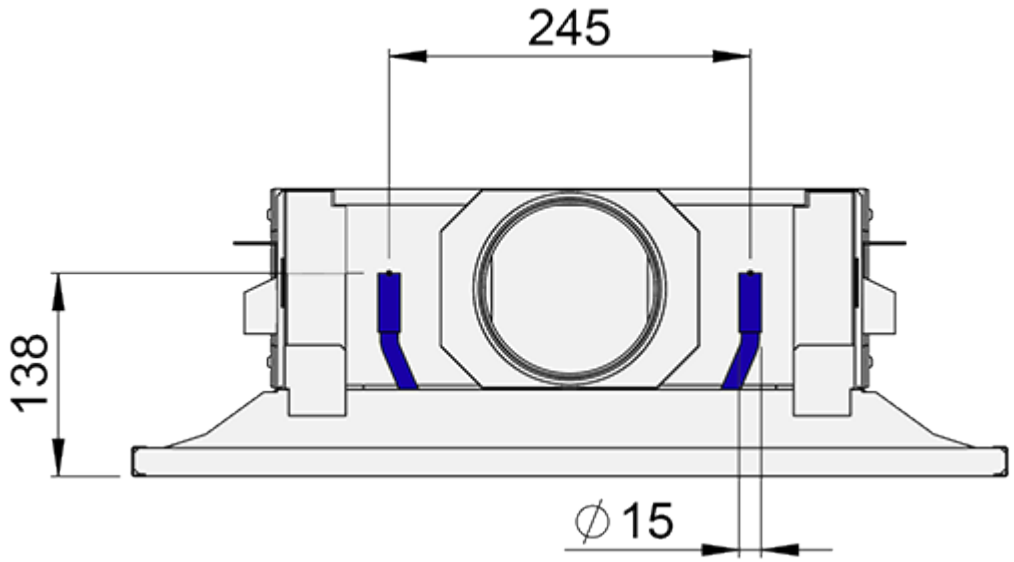
High efficiency coil, twin loop (CE=H2)



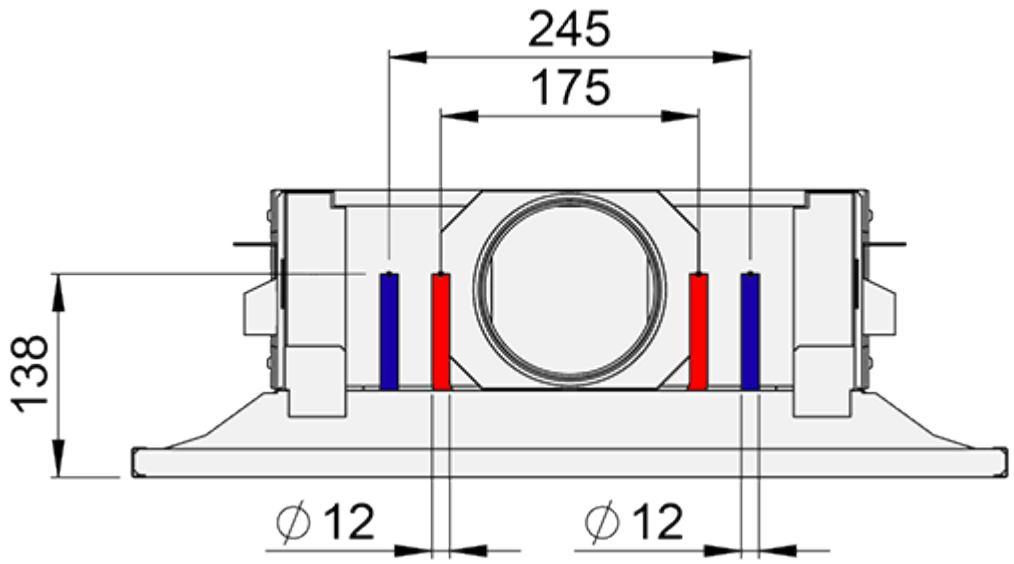
Standard, cooling (CE=S)



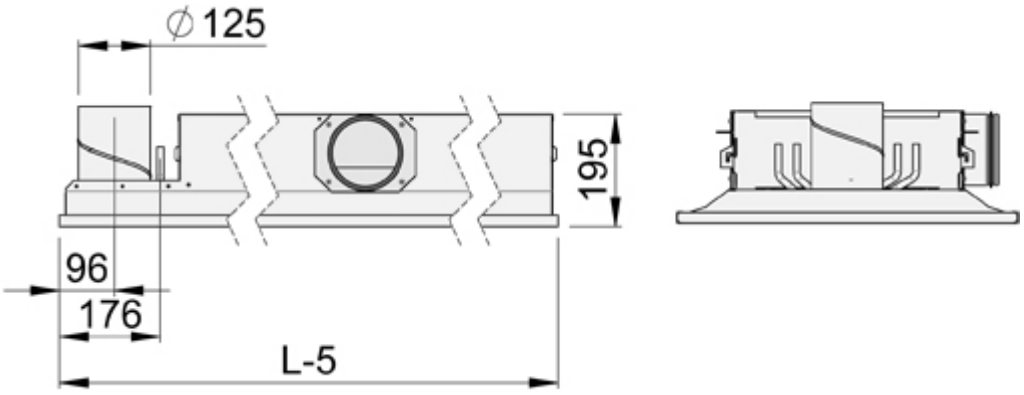
Standard, cooling, low pressure drop (CE=SL)



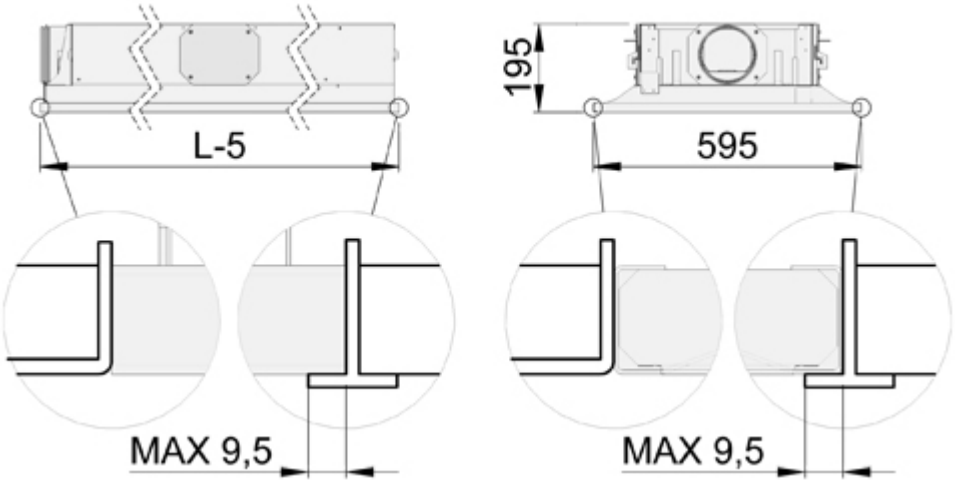
Standard, cooling and heating (CE=SH)



Model with integrated exhaust (EX=A)



Integration with suspended ceiling



Material

Part	Material	Finishing	Note
Front panel	Pre-painted galvanised steel	Polyester-painted, white (RAL 9003 or RAL 9010, 20% gloss)	Special colours available Polyester-epoxy-painted
Side plates	Pre-painted galvanised steel	Polyester-painted, white (RAL 9003 or RAL 9010, 20% gloss)	Special colours available Polyester-epoxy-painted
End plates	Galvanised steel	Polyester-epoxy-painted, white (RAL 9003 or RAL 9010, 20% gloss)	Special colours available
Supply air plenum	Galvanised steel		
Brackets	Galvanised steel		
Coil pipes	Copper		
Coil fins	Aluminium		
Exhaust valve	Galvanised steel	Polyester-epoxy-painted, white (RAL 9003, 30% gloss)	See Halton URH valve 125mm

Cooling/heating water pipe connections are Cu15/Cu12/Cu10 with wall thickness of 0.9-1.0 mm fulfilling European Standard EN 1057:1996.

The maximum chilled/hot water circuit operating pressure is 1.0 MPa. The supply air duct connection is 125 mm.

Accessories

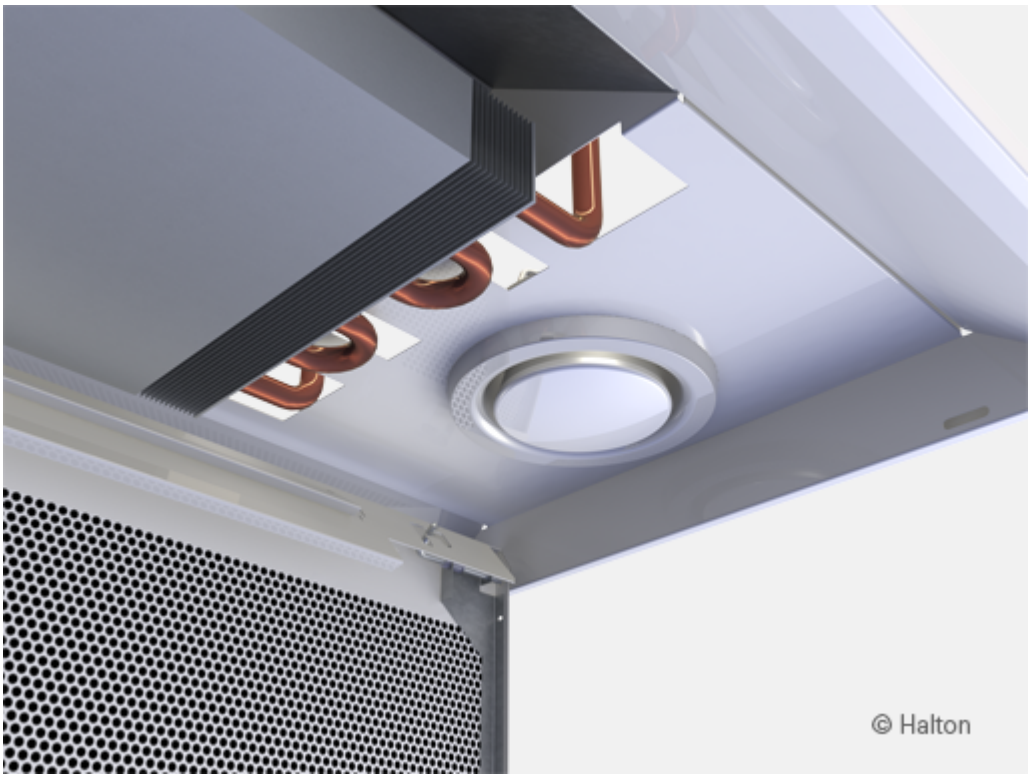
Accessory/option	Code	Description	Note
Combined cooling and heating coil	TC=H	Coil with hot water circulation	Cooling/heating copper water pipe connections are Ø 15/10 or 12 mm (see section Dimensions)
Halton Air Quality control (HAQ damper)	AQ=A	Manual operation	
	AQ=B	Motorised operation. Power supply: 24 VAC. Control signal: 0 ... 10 VDC.	
	AQ=R	Retrofit	
Integrated exhaust valve	EX=A	Integrated exhaust valve located in the front end of the chilled beam	
Adapters for Clip-In ceiling installation (Dampa)	IO=DC	Installation within Clip-In ceiling	Available as tailored solution

Effective coil length

Accessory option	Code	Effective coil length
Without HAQ	AQ=N	L – 200 mm
With HAQ	AQ=A,B,R	L – 300 mm
Without HAQ, with URH	AQ=N;EX=A	L – 300 mm
With HAQ and URH	AQ=A,B,R; EX=A	L – 500 mm

Exhaust valve integration

The Halton Rex 600 chilled beam can be equipped with an integrated exhaust valve, providing air supply and exhaust in the same unit. The integrated exhaust valve decreases the effective length to total length 500 mm (L – 500 mm) (for standard chilled beam L-300).

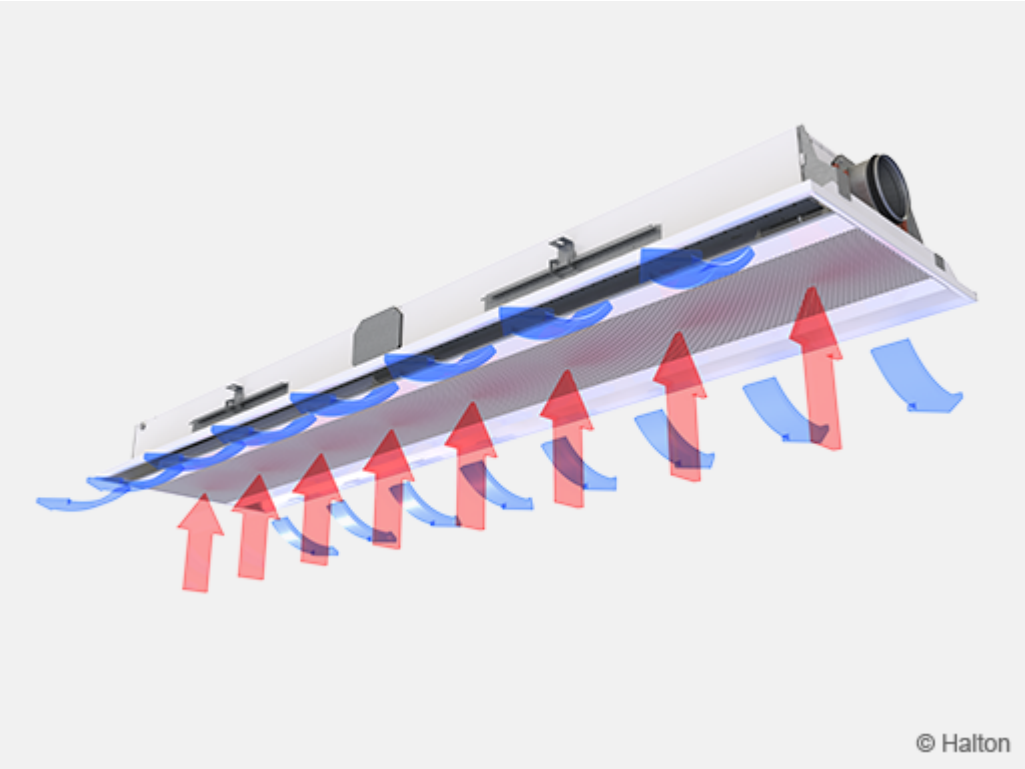


Function

The Halton Rex 600 chilled beam is designed to be installed flush with a suspended ceiling.

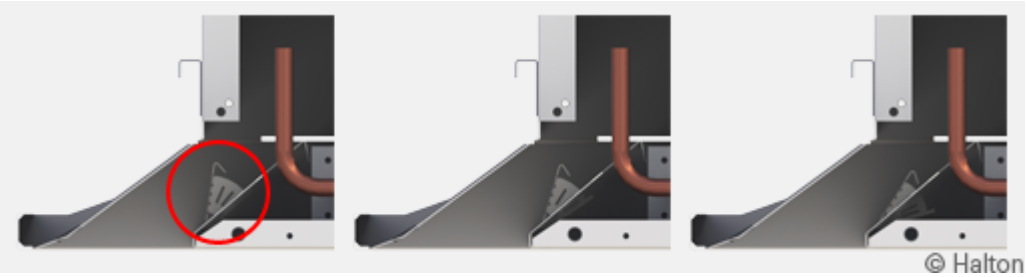
The primary supply air enters the plenum of the active chilled beam. From there it is diffused into the room through nozzles and the diffuser of the HAQ- control. Supply slots located at the bottom of the beam.

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.

Air flow rate adjustment is needed when the use of the space is changed and there is need to adapt the supply airflows. Air flow 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.

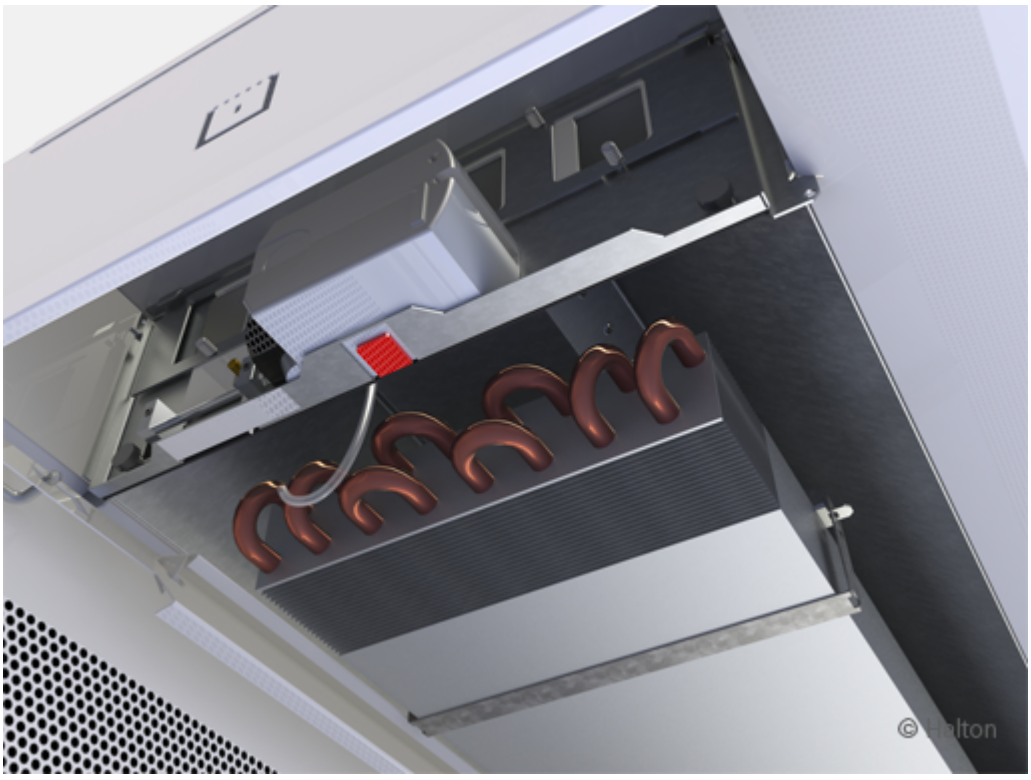
It is recommended that chilled beams for demand based airflows should be connected to constant pressure ductwork zone, when

- 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 air flow – is identical.

The Halton Air Quality 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 motorized 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 air flow 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.

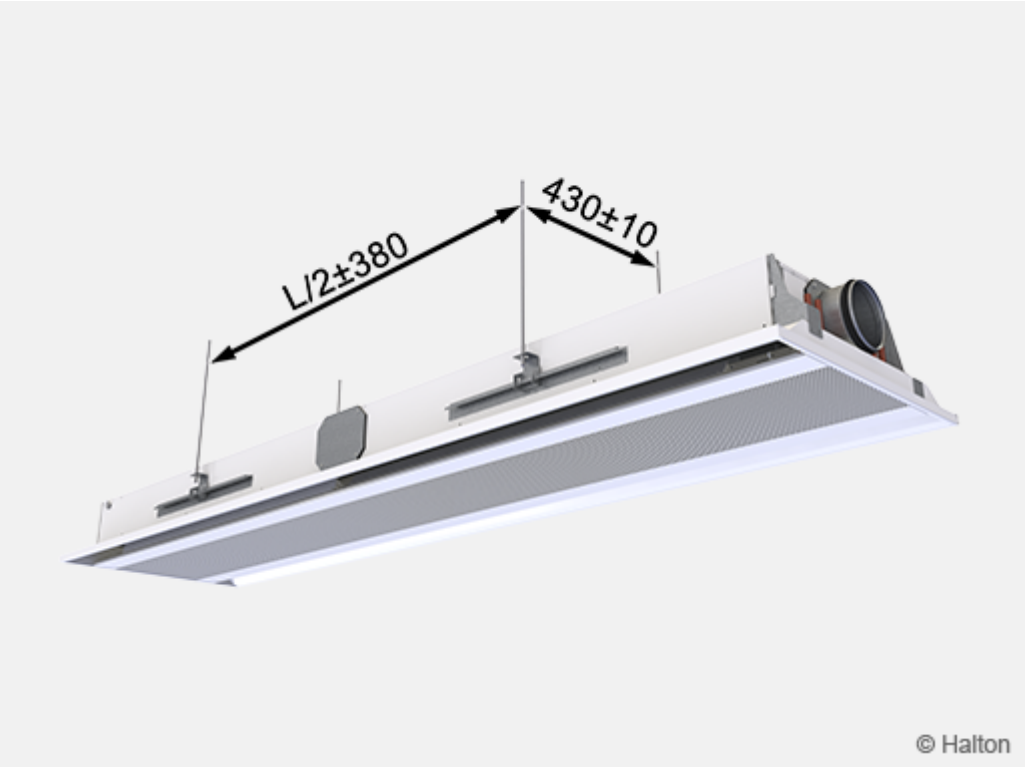
Air quality control for a room space can be arranged using, e.g., a CO_2 sensor when room air temperature is controlled separately by regulating the water flow rate. Alternatively, a temperature sensor can be used for air quality control, with the airflow rate modulated in the first sequence and, if 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.

Installation

The Halton Rex 600 adabtable 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 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.

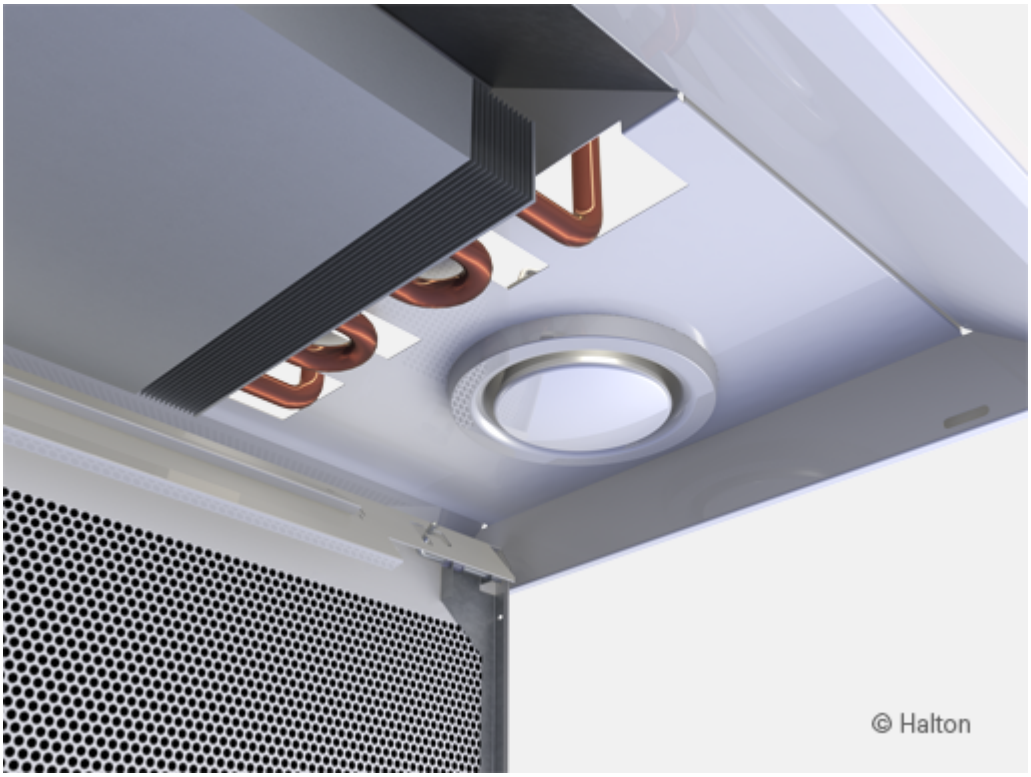


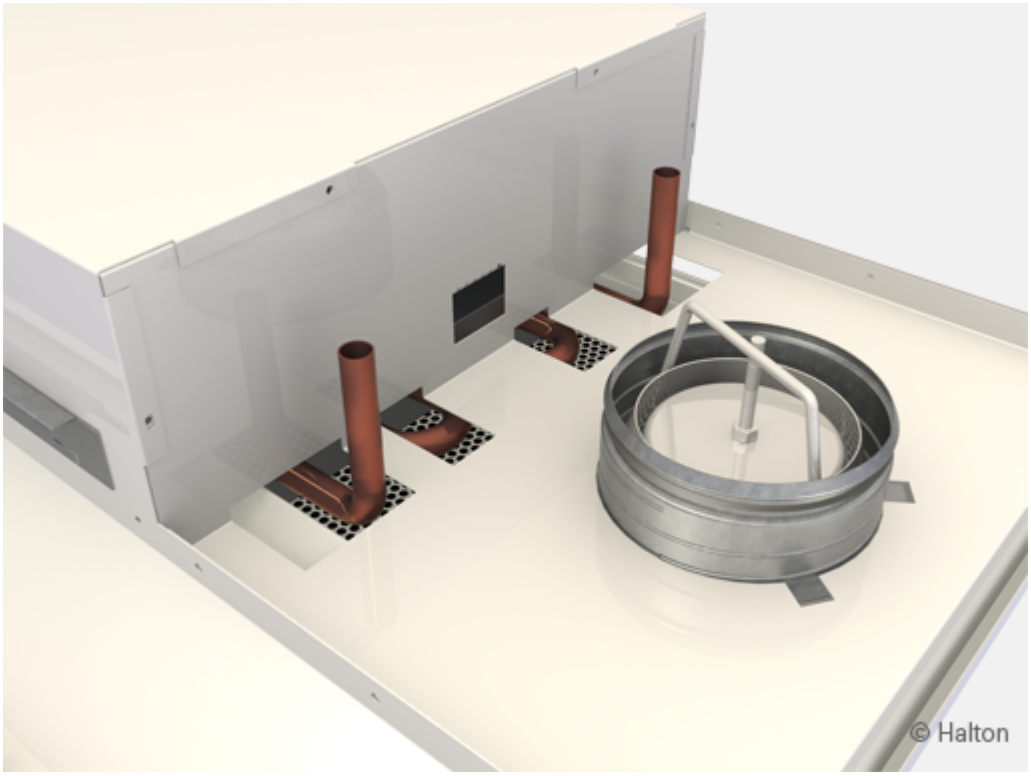
Install the main pipelines of the cooling and heating water circuits above the level of the chilled beam in order to enable venting of the pipework.

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.

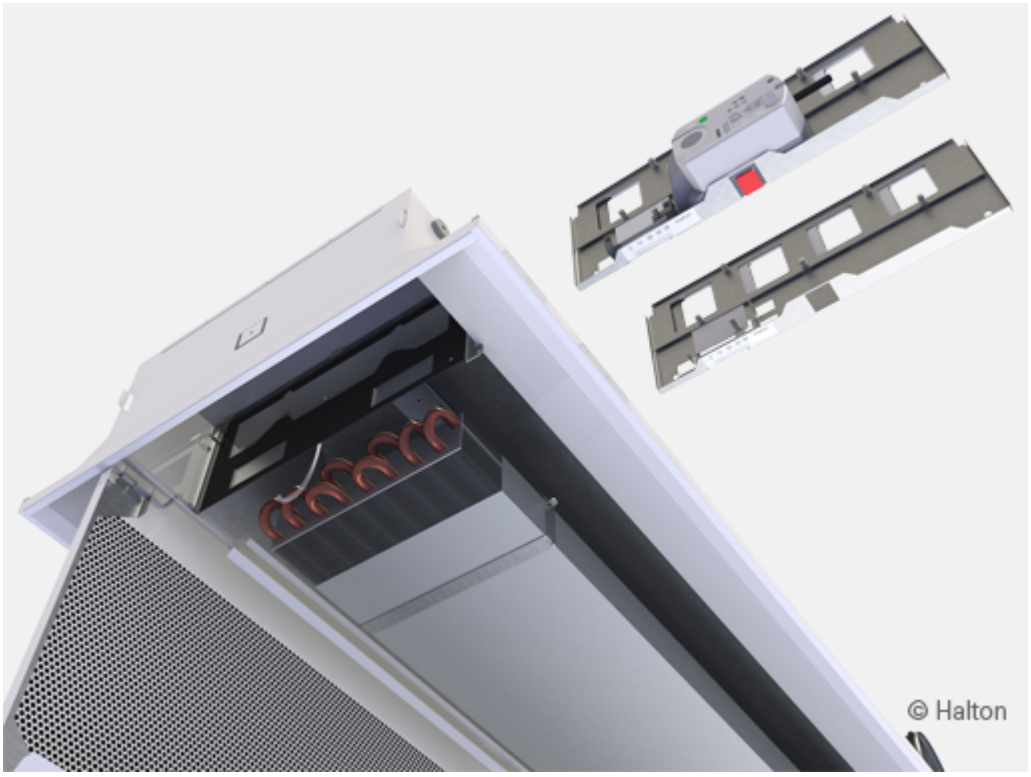
An optional exhaust valve is installed in the front. Only left and right supply air duct connections are possible. By choosing the exhaust valve option, the active length is total length (L) – 500mm.

Duct installation of the exhaust valve





Replacing manual HAQ with motorised HAQ



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

Adjustment

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 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 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 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 m^3/h
qv_1 Nozzle jet airflow rate, l/s or m^3/h
qv_2 Air quality control diffuser (HAQ) airflow rate, l/s or m^3/h

Nozzle jet airflow rate (qv_1)

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

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

Air quality control diffuser 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

Adjustment of the airflow in constant airflow applications

Define the position of 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.

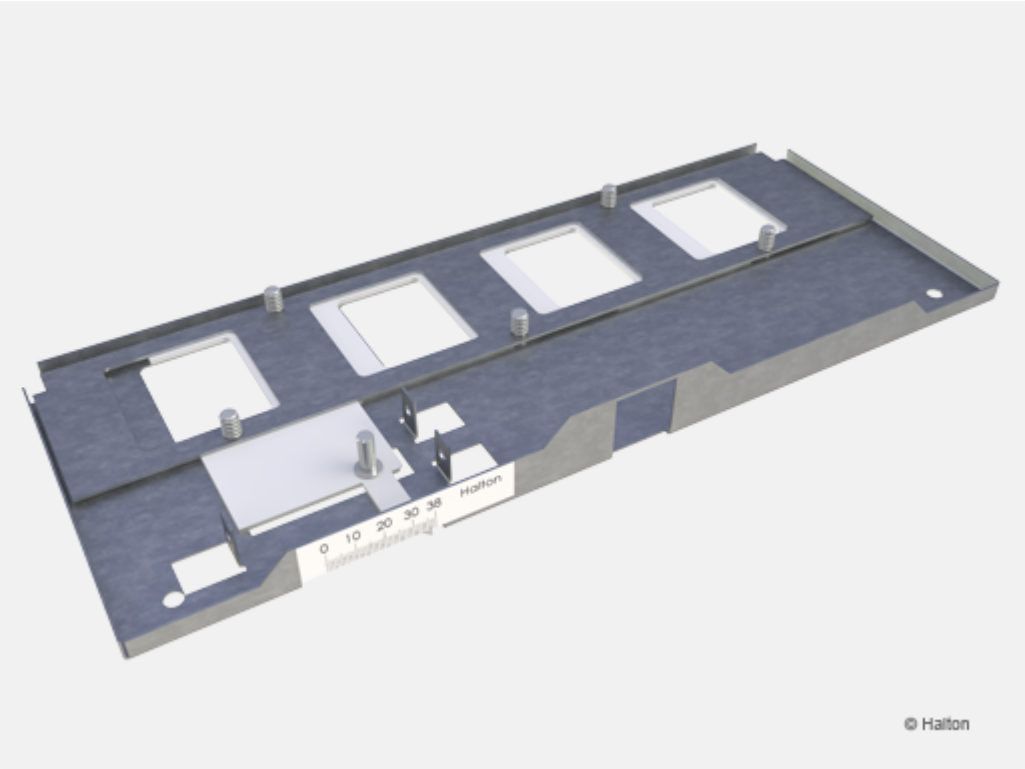


Fig.1. Halton Air Quality control (HAQ), manual

Adjustment of the airflow range in variable airflow 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 airflow 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.

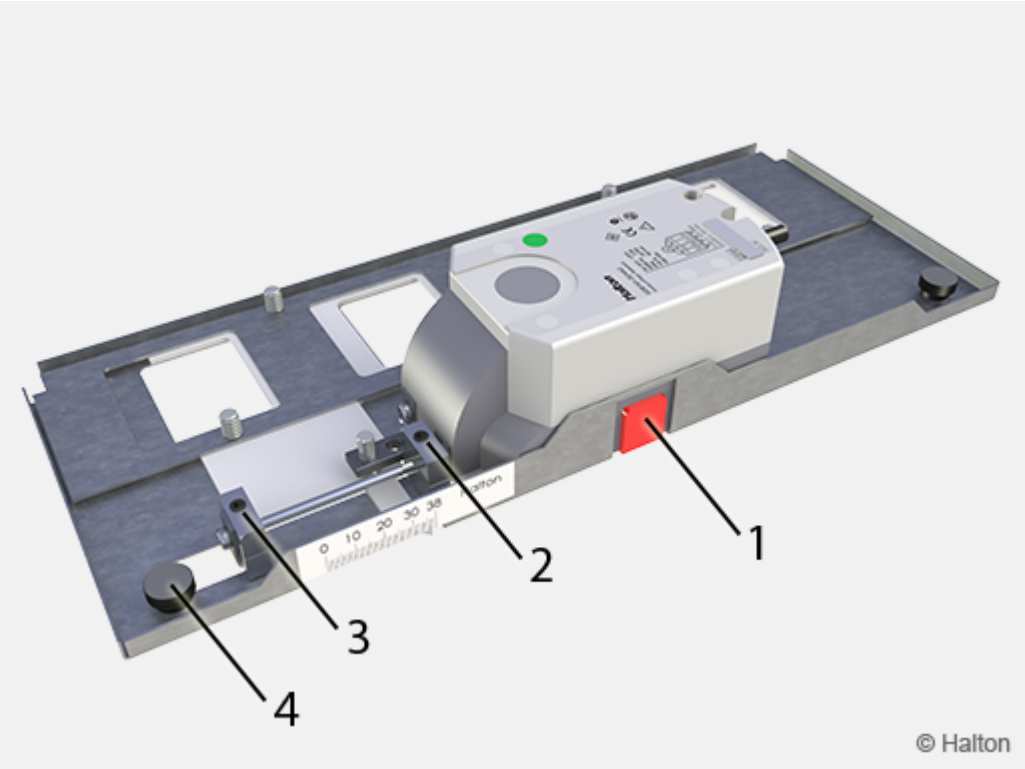


Fig.2. Halton Air Quality control (HAQ), motorised

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

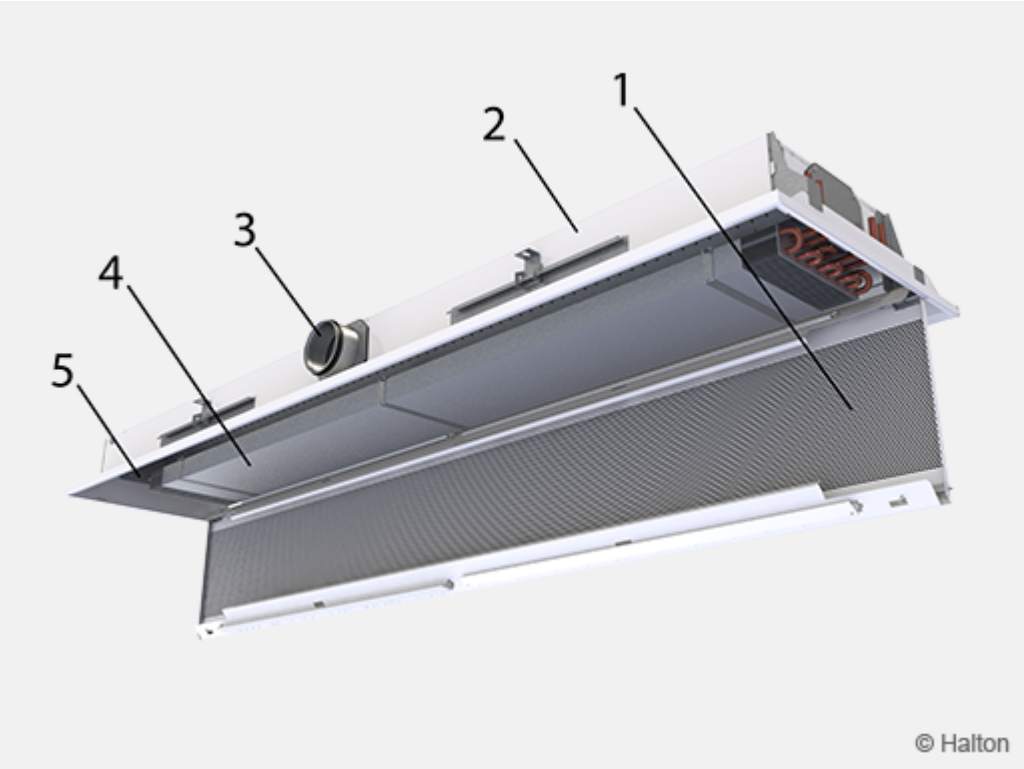
Adjustment of exhaust airflow rate

The valve is adjusted by rotating the central cone. Measure (A) the opening position (in mm) of the central cone. There is a special tool available from Halton for accurate opening position measurement. Set a pressure probe inside the valve, and measure the differential pressure with a manometer. The airflow rate is calculated using the formula below, using k factors presented in the table. After the adjustment, lock the central cone with the locking nut.

$$q_v = k * \sqrt{\Delta p_m}$$

URH 125	
A	k
-15	0,65
-12	0,92
-9	1,22
-6	1,53
-3	1,84
0	2,17
3	2,52
6	2,83
9	3,14
12	3,46
15	3,77

Servicing



Code description:
1. Front panel
2. Side plate
3. Supply air connection

4. Heat exchanger
5. Halton Air Quality control (HAQ)

Open the front panel of the supply air plenum, the ductwork, and the heat exchanger. In beams longer than 2400 mm, the front panel can be opened in two sections.
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 active chilled beam has an integral recirculation air path through the perforated front panel. The induced room air flow rate is manually adjustable via three setting positions without influencing the primary air supply flow rate. The airflow rate of the chilled beam is adjustable without plugging or changing the nozzles.

The primary air flow rate is adjustable over a wide range via a supply air unit integrated into the chilled beam. Adjustment of the air flow rate has not any affect on induced air flow rate through the coil when static chamber pressure is kept constant (optional).

The chilled beam unit equipped with a manually adjustable air flow damper shall be able to be retrofitted with a motorised air flow control damper unit.

Outdoor air flow rate control shall not have any effect on coil cooling and heating capacities.
The beam with adjustable air flow rate shall have only one duct connection.
The appearance of the chilled beams with constant air flow and variable air flow rate shall be the same.

The front panel shall be openable from either side in order to allow general maintenance and cleaning.
The front panel shall be removable without any special tools.

The air supply to the room space shall be either unidirectional or bi-directional.
The active chilled beam shall be 595 mm wide and 195 mm high.
The active chilled beam shall have an inlet duct diameter of 125 mm.
The position of the duct connection shall be changeable without the use of any special tools.
The frame, front, and side panels shall be made of galvanised steel plate.

All visible parts shall be white, painted to RAL 9003 or RAL 9010 (20% gloss).
All pipes shall be manufactured from copper, and connection pipes with a wall thickness of 0.9-1.0 mm.
The fins shall be manufactured from aluminium.
Optionally, heating shall be incorporated within the heat exchanger by means of two 10-mm pipes, connected in series.

All joints shall be soldered and factory pressure-tested.

The pipework s maximum operation pressure is 1.0 MPa.
The active chilled beam shall have an air flow adjustment damper as an option and a measurement tap to allow air flow measurement.
As an option, an exhaust valve shall be integrated into the chilled beam.

Active chilled beams shall be protected by a removable plastic coating and individually wrapped in a plastic.
The duct connection and pipe ends shall remain sealed during transport.
The active chilled beams shall be identified by labels attached to both the active chilled beam and the plastic packaging.

Order Code

RE6-S-L-C-E, TC-CE-CO-AQ-EX-ZT

S = Nozzle type
A Bi-directional / Nozzle 1
B Bi-directional / Nozzle 2
C Bi-directional / Nozzle 3
D Bi-directional / Nozzle 4
E Bi-directional / Nozzle 5

L = Total length
1200,+100,..,3600 (and 1720)

C = Effective length (Cooling coil length)
(See in Accessories tab table of effective length of coil with different accessories and product options)
900,+100,..,3400

E = Duct connection / Duct size / Damper
R2N Right / 125 / Without damper
L2N Left / 125 / Without damper
S2N Straight / 125 / Without damper

Other Options and Accessories

TC = Cooling /Heating functions (Coil type)
C Cooling
H Cooling and Heating

CE = Coil efficiency
N Normal
H1 High efficiency (single loop)
H2 High efficiency (twin loop)
S Standard, cooling

SL Standard, cooling, low pressure drop
SH Standard, cooling and heating

CO = Colour
SW Signal white (RAL9003)
W Pure white (RAL 9010)
X Special colour (RALxxxx)

AQ = Air quality control (HAQ)
A Manual
B Motorised
R Retrofit

EX = Exhaust
N No
A URH

ZT = Tailored product
N No
Y Yes (ETO)

Code example

RE6-A-3000-2700-R2N, TC=C,CE=N,CO=SW,AQ=A,EX=N,ZT=N