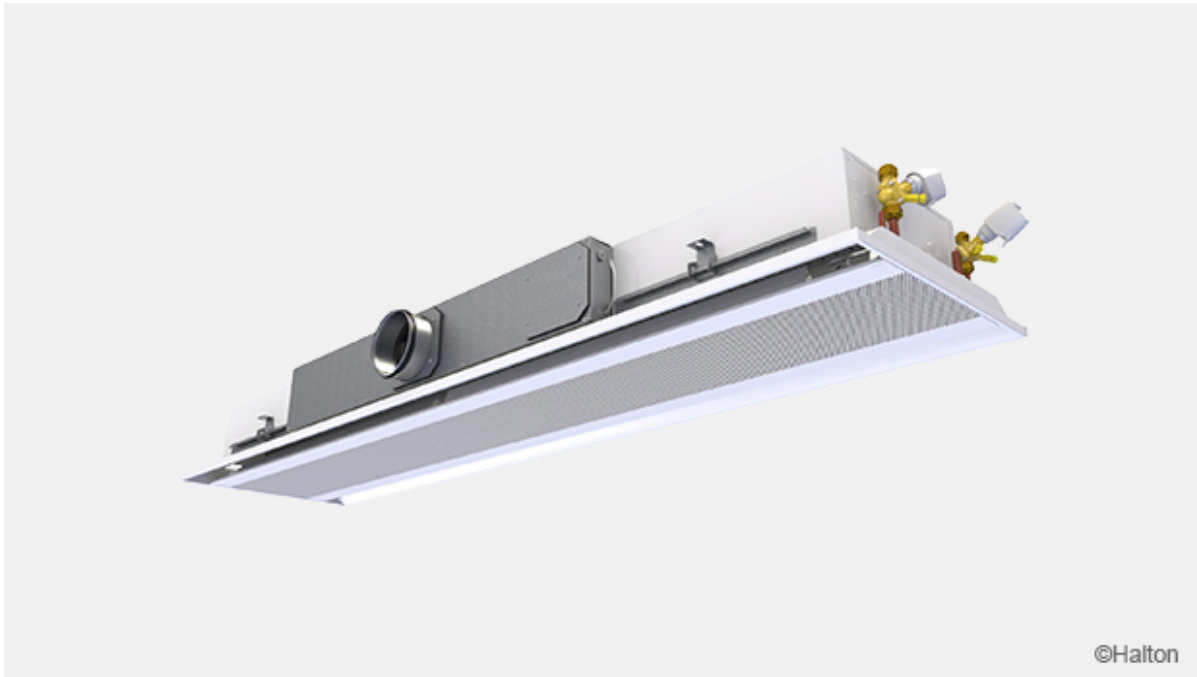


Halton Rex R60 – Variable air volume chilled beam (VAV)



Overview

Halton Rex Integrated VAV chilled beam is:

- Suitable for demand based Halton Workplace systems.
- Combined cooling, heating, and supply air unit for flush installation within a suspended ceiling
- Well suited for demand based ventilation with constant static pressure ductwork
- Ideal solution for applications where high-quality indoor conditions, energy efficient operation and individual room control are appreciated

Typical applications: Office rooms, landscape offices and meeting rooms.

Halton Rex Integrated VAV chilled beam is designed for high quality office requirements with high flexibility of the airflow adjustability. The Halton Rex Integrated VAV operation will adapt to changes in the use of the space and office layout changes.

- Adjustable supply air flow rate changes with Operation Mode Damper (OMD).
- Individually adjustable velocity conditions with Halton Velocity Control (HVC).
- In-built flexibility for partition wall relocations with Halton Velocity Control.
- Demand based ventilation for efficient use of energy in constant-pressure ductwork zone applications.
- Enhanced life cycle performance with optimised air and water flow rates

Product models and accessories

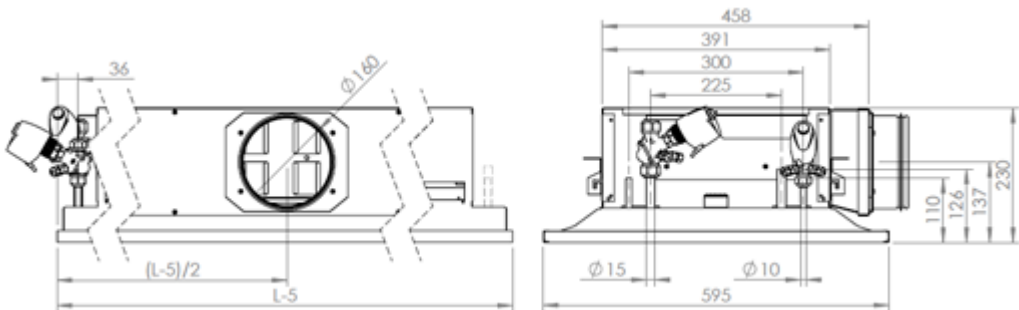
- Model with combined cooling and heating coil
- Model with Halton Workplace WRA, room automation system package

Halton chilled beams are certified by Eurovent Certita.

[Link to Certificate](#)

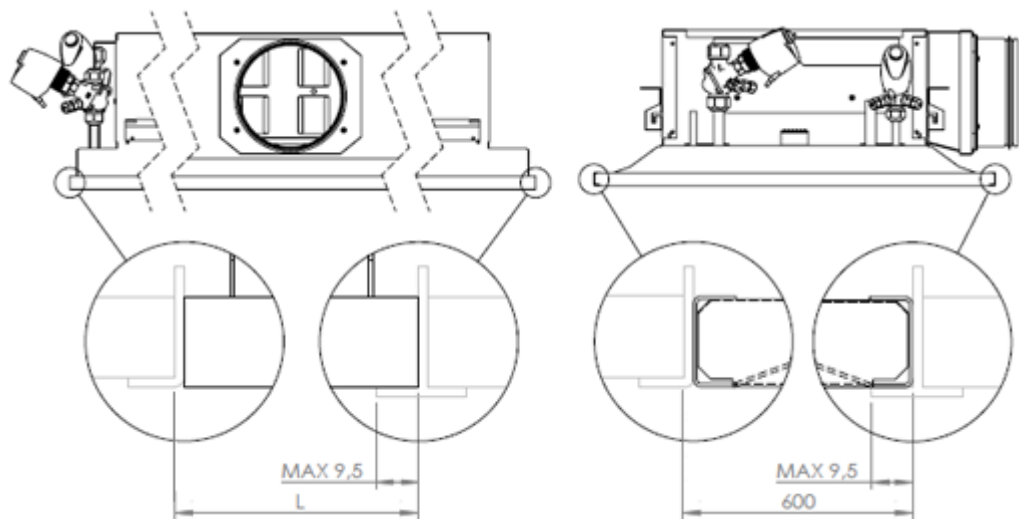


Dimensions



Ø D	160
Coil length (mm)	1000, +100, ..., 3400
L-5 (mm)	1195, +100, ..., 3595 (+1715)
kg/m	15

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-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	–	–

Cooling/heating water pipe connections are Cu15/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.

Accessories

Accessory/mode	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 (See section Order code)

Function

The Halton Rex Integrated VAV 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 the air is diffused into the room through nozzles controlled by Operation Mode Damper (OMD).

The supply air nozzle jets efficiently induce ambient room air, which is directed horizontally along

the ceiling surface. Secondary air is drawn through the perforation located at the bottom of the beam. The air then cycled through the heat exchanger, where it is either cooled or heated before being diffused into the room.

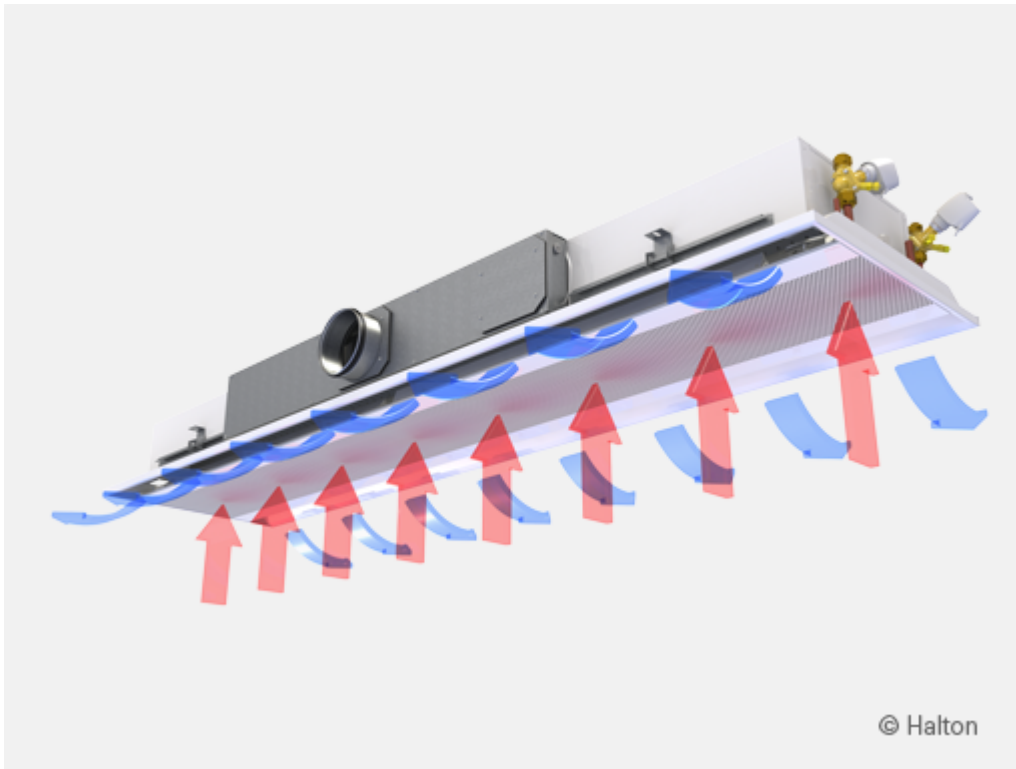


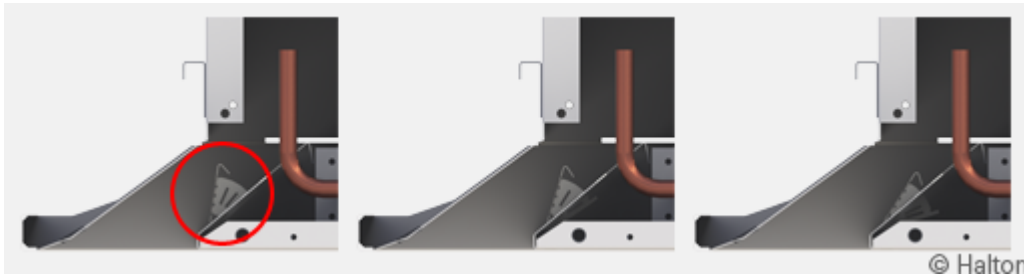
Fig.1. Function of the Halton Rex Integrated VAV beam

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 chilled beam is located near the partition wall) or when local, individual velocity conditions need to be altered. Halton velocity control adjustment has an impact on the induced room airflow 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.

Halton Velocity Control involves manual velocity adjustment with three different positions (Fig.2.): 1 = Throttle, 2 = Normal, and 3 = Boost. The Halton velocity control system is divided into sections to enable the adjustment of conditions in different parts of the occupied zone. Depending on the length of the beam, optimal HVC damper module lengths between 500 and 1400 mm are used.

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.



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

Fig.2. Halton Velocity Control (HVC) positions

Operation mode control

The supply airflow of the chilled beam nozzle jets is dependent on the nozzle type, nozzle row length and static chamber pressure.

The Operation Mode Damper (OMD, green in Fig. 3.) is used for adjusting and controlling the fresh airflow rate in a room space. The airflow rate is dependent on the opening position of the control damper. Operation mode of the room space is monitored with occupancy sensor.

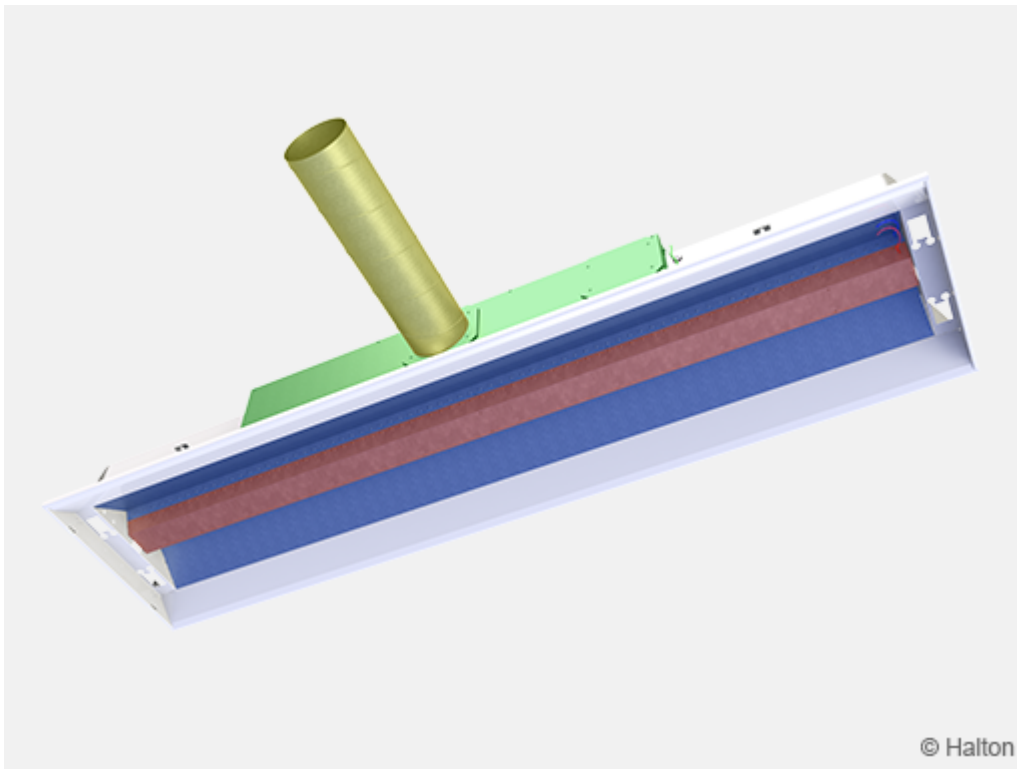
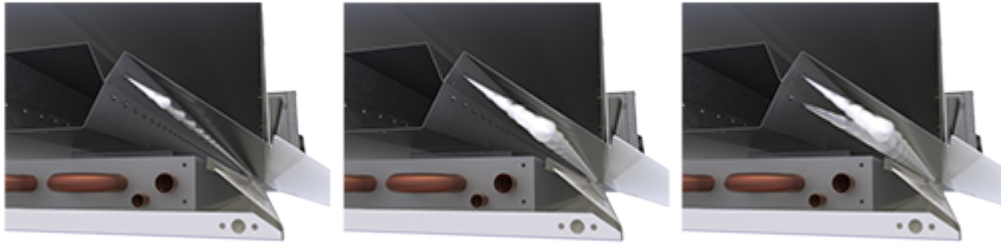


Fig.3. OMD (green), Chamber 1 (blue) , Chamber 2 (red)

Fig.4. below presents the function in different modes controlled by the OMD. In unoccupied mode (1.) the supply airflow rate is set to minimum value that can remove material emission. In occupied mode (2.) supply airflow rate is set to normal office mode. When more persons are coming to the space, based on CO₂-sensor airflow is increased to boost mode (3.) to maintain the set target value of the indoor air quality.



1. Unoccupied mode

2. Occupied mode

3. Boost mode

Fig.4. Supply air modes of the Halton Rex Integrated VAV beam

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

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.

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.

System package

Halton Workplace WRA room automation system package for Halton Rex Integrated VAV (R6O) chilled beam

Halton Workplace WRA is part of the Halton Workplace solution offering.

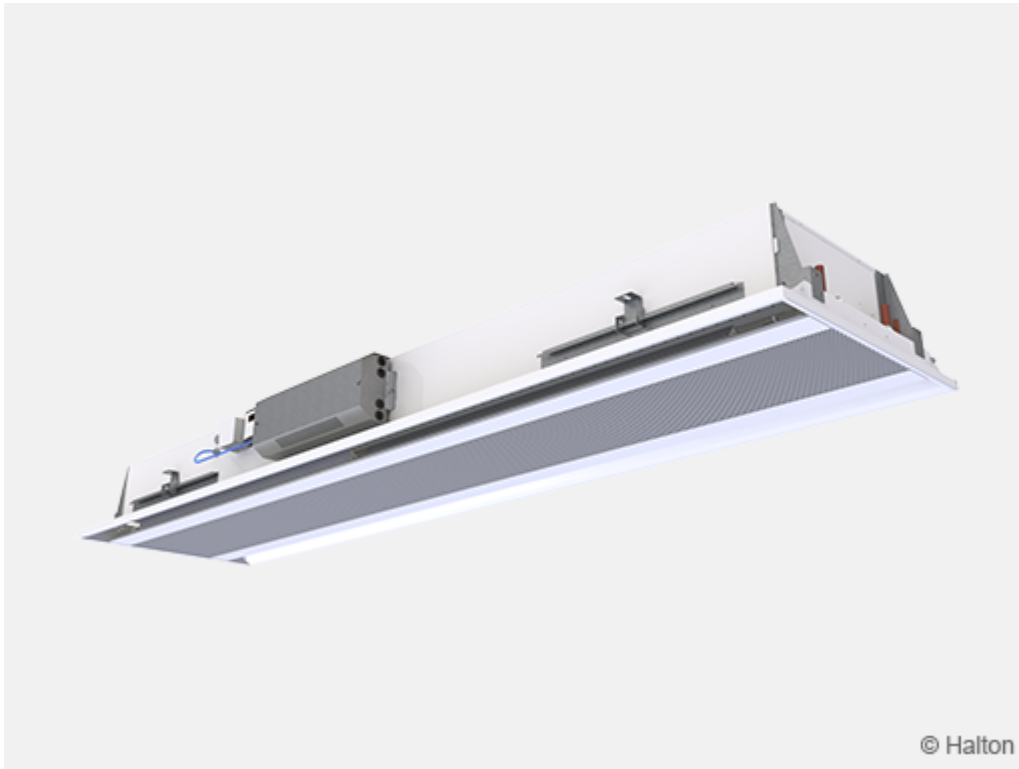


Fig.1. Halton Workplace WRA room automation controller integrated to Halton Rex Integrated VAV chilled beam

Halton Workplace WRA is a controller especially designed for controlling the automation system of office spaces and meeting rooms. It is used for controlling the ventilation airflow, room temperature, and indoor air quality.

The Halton Workplace WRA room automation package consists of a controller unit and optional components depending on customer needs: a wall panel and sensors for temperature, CO₂, occupancy, pressure, and condensation.

There are options available for the controller unit and wall panel, depending on the number of controls and sensors required. The Halton Workplace WRA room automation controller is always combined with other Halton products for adaptable and high-level indoor climate.

Application area

- Controlling the ventilation airflow, room temperature, and indoor air quality in office spaces and meeting rooms
- The Halton Workplace WRA room automation controller is an important part of the Halton Workplace system, controlling room units and airflow control dampers
- Overall Halton Workplace system includes:
 - Room air conditioning applications with Halton Workplace WRA room automation controller:
 - Active chilled beams
 - Exhaust units
 - VAV dampers
 - Active VAV diffusers

- Halton Max MDC zone control dampers
- Halton Workplace WSO system optimiser

Key features

- Factory-tested controller and wiring, easy to install
- Pre-installed project-specific parameters, quick to commission
- Several operating modes based on occupancy, thermal comfort, and indoor air quality
- Enables fully flexible layout solutions for changing needs in office environments
- Highly energy-efficient and reliable system operation

Operating principle

The Halton Workplace WRA room automation controller operates with Variable Air Volume (VAV) dampers and active chilled beams of the Halton Workplace system. These are used for adjusting the ventilation airflow, room temperature, and indoor air quality in office spaces.

Each room unit in an office space can have its own dedicated Halton Workplace WRA room automation controller, or a single controller can control multiple room units. The Halton Workplace WRA room automation controller can automatically adjust the system according to the indoor environment level preferred by users. Each room unit having its own dedicated controller brings maximum flexibility.

Room automation: Halton Rex Integrated VAV (R6O) active chilled beams controlled with Halton Workplace WRA room automation controllers

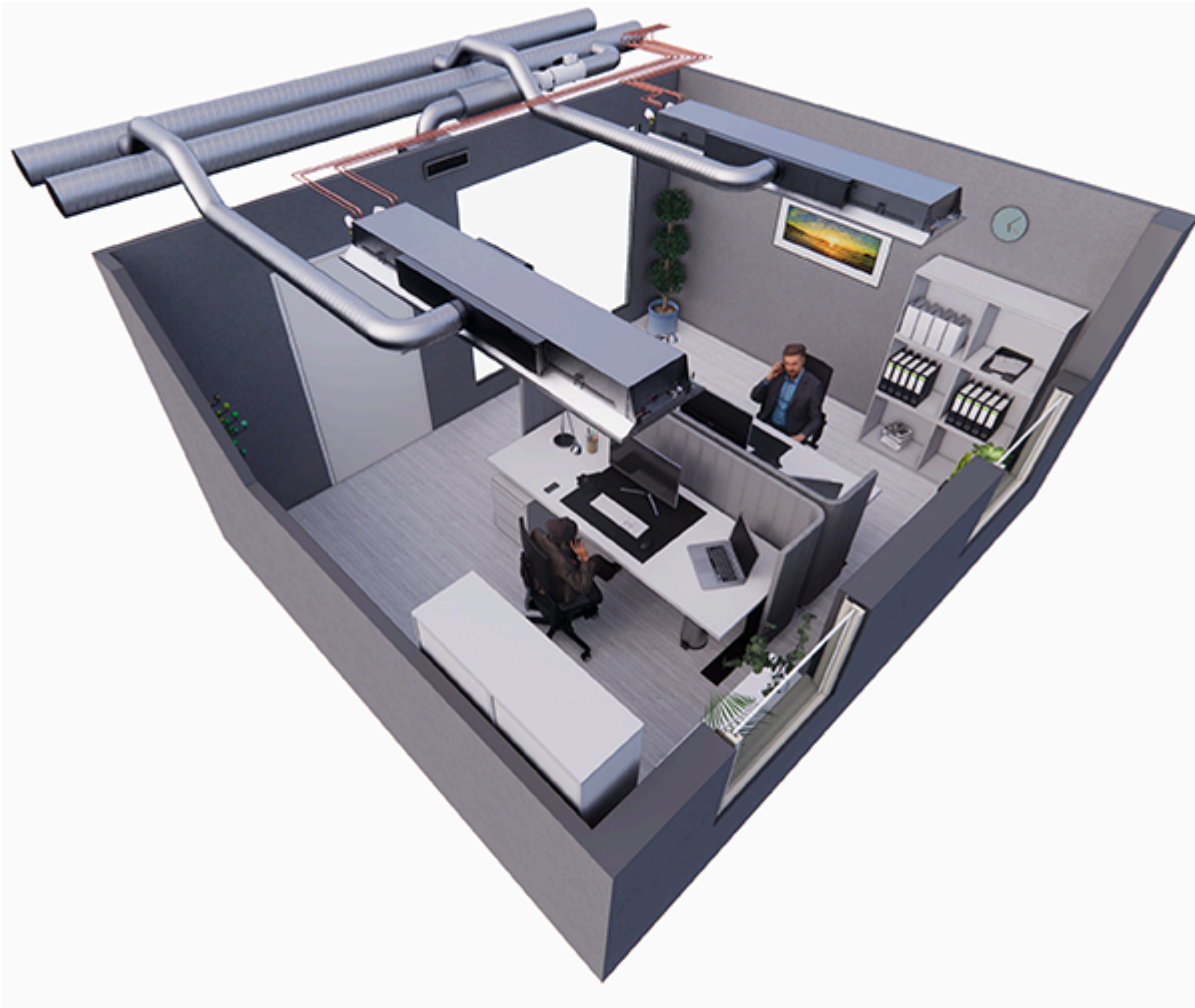


Fig.2. Halton Rex Integrated VAV (R6O) chilled beams controlled with Halton Workplace WRA room automation controllers in a double office room

Room automation description

In this configuration, two Halton Workplace WRA room automation controllers (DXR2.E12P-102A) control two Halton Rex Integrated VAV (R6O) active chilled beams. Each R6O chilled beam has heating and cooling valves, a motorised Operation Mode Damper (OMD) control, and integrated CO₂ and condensation sensors. A pressure sensor is integrated into the Halton Workplace WRA room automation controller. The system also includes an exhaust VAV damper and a wall panel (QMX3.P37) with temperature sensor and display. One Halton Workplace WRA room automation controller can individually control up to four terminal units, and there can be several Halton Workplace WRA room automation controllers in the room.

Design criteria for room automation

- R60 chilled beam has motorised OMD control
- Condensation sensor and CO₂ sensor integrated into R60 chilled beam
- Exhaust airflow control
- Wall panel with temperature sensor and display
- Window switch control
- Pressure sensor integrated into Halton Workplace WRA room automation controller

Schematic drawing

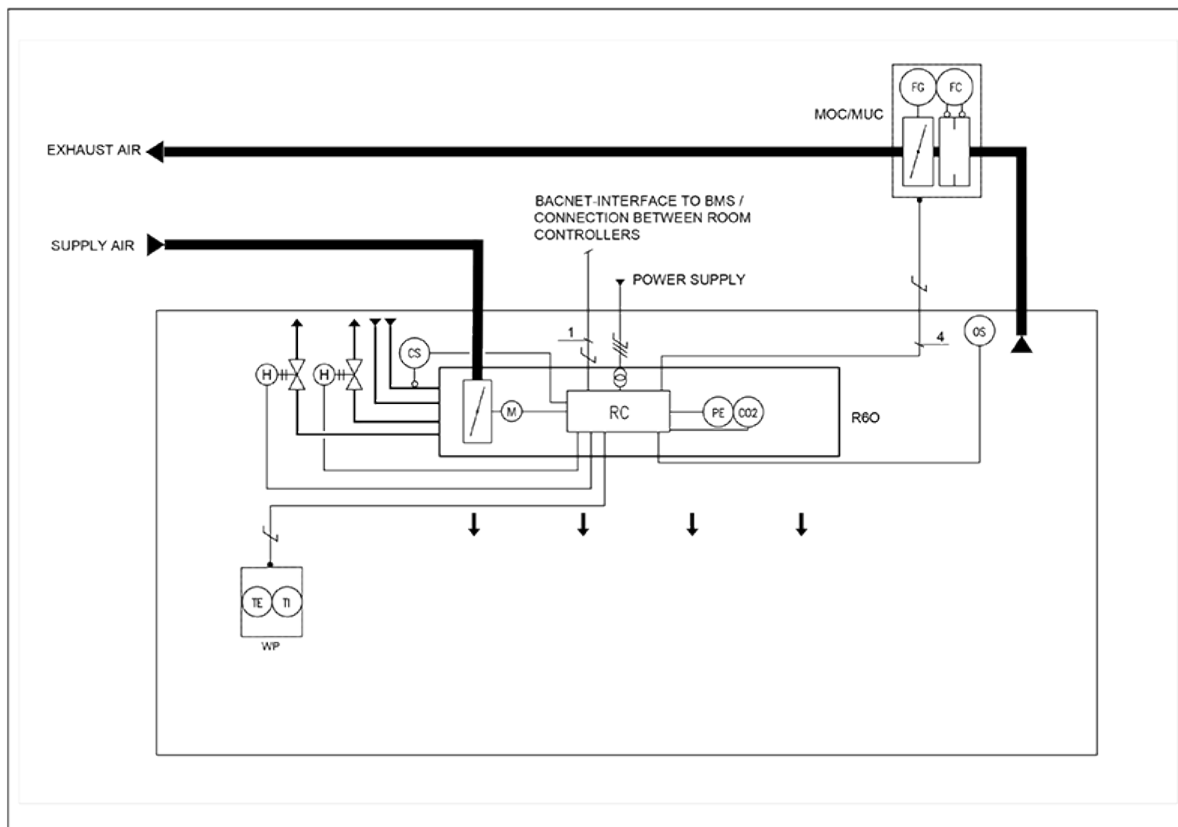


Fig.3. Schematic drawing: Halton Rex Integrated VAV (R60) chilled beam (4-pipe) controlled with Halton Workplace WRA room automation controller

Equipment list

Code	Equipment
RC	Controller unit
FG	Airflow damper actuator
FC	Airflow measurement
H	Water valve actuator
CS	Condensation sensor
OS	Occupancy sensor
PE	Pressure sensor
CO ₂	CO ₂ sensor
WP	Wall panel
TE	Temperature sensor
TI	Temperature display

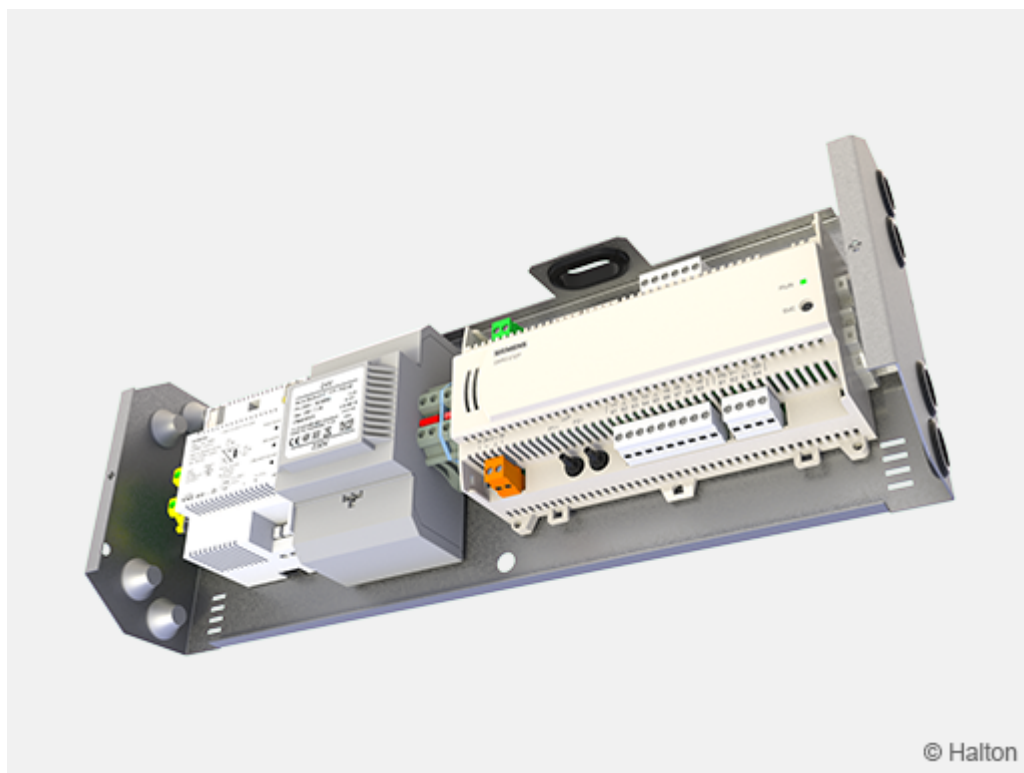


Fig.11: Factory-installed Halton Workplace WRA room automation controller DXR2.E12P-102A

Wiring diagram

For the wiring diagram of this configuration, see Halton Workplace WRA room automation controller product page / section Product selection examples.

Components and order code examples for the system

- 2 x Active chilled beam: Halton Rex Integrated VAV (R6O)
R6O/A-2400-C-2100, SP=Y, LD=R3, TC=H, CO=SW, ZT=N
- 1 x Exhaust unit: Halton AGC Exhaust grille + Halton PRL Plenum for grilles
AGC/N-400-100 FS=CL, ME=A, FI=PN, CO=W, ZT=N+PRL/F-400-100-160
- 1 x VAV damper: Halton Max MUC or Halton Max MOC
MUC/G-160, MA=CS
- Automation package: 2 x Halton Workplace WRA room automation controller unit with related components
WRA/R6O-E21-OM-EX4, WP=37, LC=NA, CD=CS, SW=NA, ST=IC, SL=OE, PM=P2, TC=H, CV=SP5, RV=NA, ZT=N

NOTE: Further information can be found on Halton Workplace WRA room automation controller product page.

Cooling and heating water valve selection in Halton Workplace WRA room automation system package

Water valve selection is done in Halton Workplace WRA room automation system package. Water valve sizing depends on the number of secondary and primary chilled beam units that are controlled with single controller. One water valve is used to control the whole chilled beam group cooling or heating operated by one room controller. Water valve is sized for whole group when there are multiple chilled beams controlled with single controller unit. There can be one primary chilled beam with room controller and up to three secondary chilled beams. Water valve sizing for 1-4 chilled beams is shown below.

Number of chilled beams (pcs.)	Water valve type	Size for cooling (DN)	Size for heating (DN)	Installation
1	ABQM	DN15	DN15	Integrated to chilled beam
2	ABQM	DN20	DN15	Loose
3	ABQM	DN20	DN15	Loose
4	ABQM	DN25	DN15	Loose

Number of chilled beams (pcs.)	Water valve type	Size for cooling (DN)	Size for heating (DN)	Installation
1	VPP46..	DN15	DN15	Loose
2	VPP46..	DN20	DN15	Loose
3	VPP46..	DN20	DN15	Loose
4	VPP46..	DN25	DN15	Loose

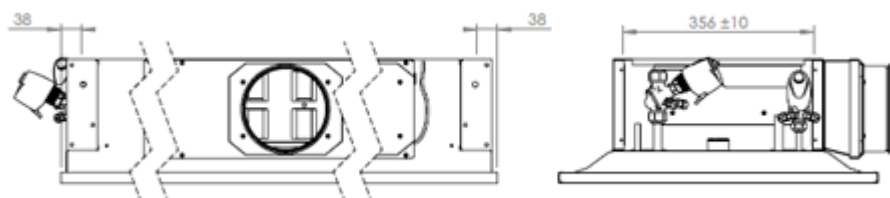
Installation

The Halton Rex Integrated VAV active 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.

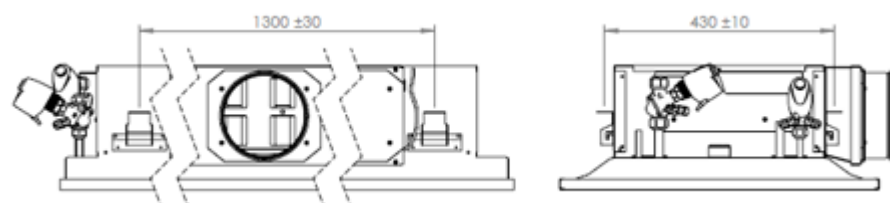
The chilled beam can be attached directly to the ceiling surface ($H1 = 230$ mm) or suspended using threaded drop rods (8 mm). Depending on the length of the unit the fixing points are located as show at the drawings.

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.

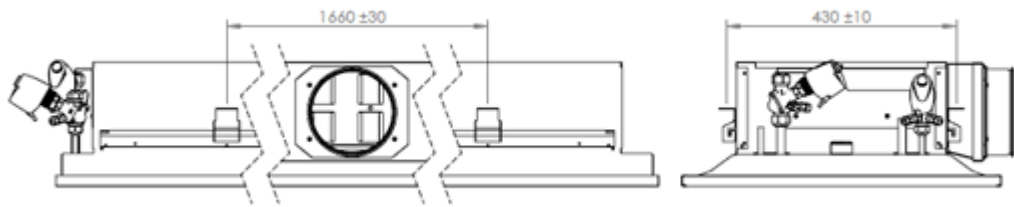
Bracketing, total length from 1200 or 1500 mm



Bracketing, total length from 1600 or 2200 mm



Bracketing, total length from 2300 – 3600 mm



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 Halton Rex for Vario 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 Rex Integrated VAV chilled beam. The measurement tab locations for OMD and chambers 1 and 2 are presented in Fig.1.

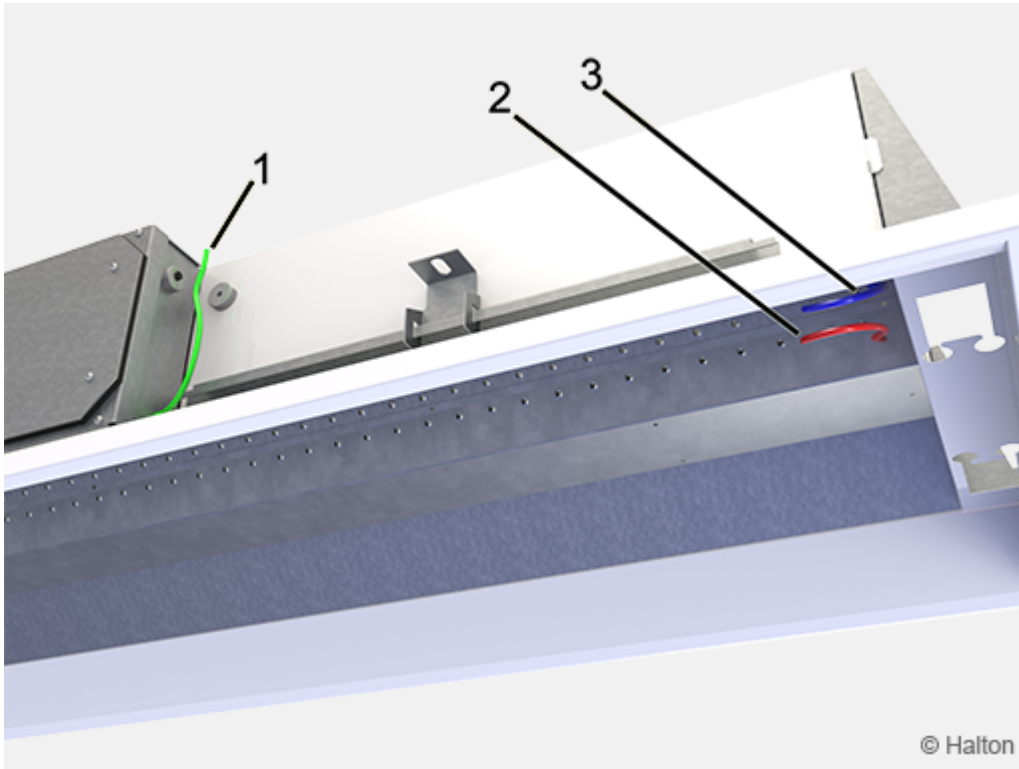


Fig.1. Location of measurement tabs

Key:

- 1. OMD (green)
- 2. Chamber 2 (red)
- 3. Chamber 1 (blue)

Total airflow rate (q_v)

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

q_v Total airflow rate, l/s or m³/h

q_{v1} Chamber 1 nozzle jet airflow rate, l/s or m³/h

q_{v2} Chamber 2 nozzle jet airflow rate, l/s or m³/h

Nozzle jet airflow rate for Chamber 1 and 2 (q_{v1} and q_{v2})

$$q_{v1,2} = k * l_{eff} * \sqrt{\Delta p_m}$$

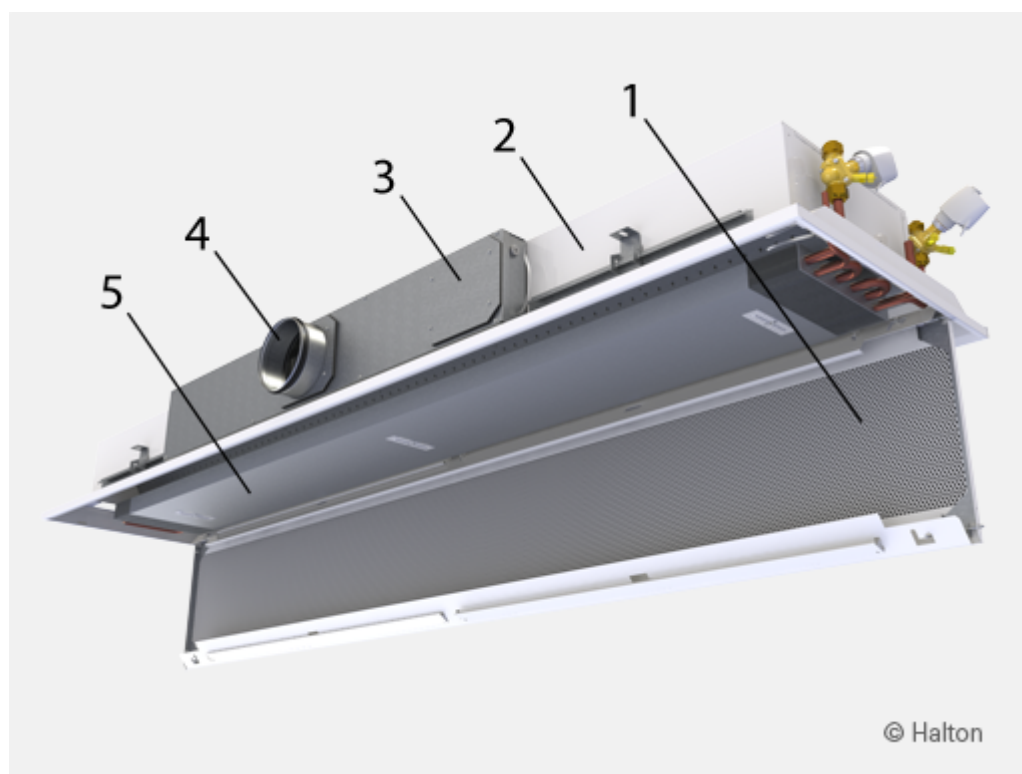
l_{eff} Length of the coil [m]

Δp_m Measured static chamber pressure [Pa]

	k (l/s)	k (m3/h)
A	0,70	2,52
B	1,06	3,82
C	1,35	4,86
D	2,03	7,31
E	3,31	11,92

Same k factors will be used to all the operation modes.
Please note the l_{eff} may differ between the normal and boost modes.

Servicing



Code description:

1. Front panel
2. Side plate
3. Operation mode damper (OMD)
4. Supply air connection
5. Heat echanger

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.

Specification

The active 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 airflow rate of the chilled beam is adjustable without plugging or changing the nozzles.

The primary airflow rate adjustable in meeting rooms from minimum to maximum (0-100%) when static chamber pressure is kept constant.

The chilled beam unit is equipped with a motorised Operation Mode Damper (OMD).

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 air supply to the room space is bi-directional.

The active chilled beam is 595 mm wide and 230 mm high.

The active chilled beam has an inlet duct diameter of 160 mm.

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

All visible parts are white, painted to RAL 9003 or RAL 9010 (20% gloss).

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.

All joints are soldered and factory pressure-tested.

The pipework's maximum operation pressure is 1.0 MPa.

The active chilled beam has measurement taps to allow air flow measurements to all the operation modes.

Active chilled beams are protected by a removable plastic coating.

The duct connection and pipe ends remain sealed during transport.

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

Order code

R60/S-L-P-D; SP-ED-TC-CO-ZT

S = Nozzle size, 1st row

- A Extra small
- B Small
- C Medium
- D Large
- E Extra large

L = Beam length (mm)

1200,+100,...,3600 (and 1720)

P = Nozzle size, 2nd row

- A Extra small
- B Small
- C Medium
- D Large
- E Extra large

D = Length of second nozzle row (mm)

1000,+100,...,3400

Other options and accessories

SP = System package

- N No
- Y Yes

ED = Duct connection

- R3 Right (Ø160)
- L3 Left (Ø160)

TC = Cooling/heating functions (coil type)

- C Cooling
- H Cooling and heating

CO = Colour

- SW Signal white (RAL 9003)
- W Pure white (RAL 9010)
- X Special colour (RALxxxx)

ZT = Tailored product

- N No
- Y Yes (ETO)

Sub products

System package	Halton Workplace WRA
Room exhaust VAV damper	Halton Max MOC
Room exhaust VAV damper	Halton Max MUC

Code example

R60-B-3000-C-2600; SP=N, ED=R3, TC=C, CO=SW, ZT=N