

Halton Rex Expander (RXP) – Chilled beam



Overview

Compact CAV/VAV chilled beam with 4-way air distribution for suspended ceilings. Ensures silent and pleasant room conditions even with higher cooling capacities.

Application area

- Cooling and ventilation in offices, hospital rooms, schools, and public spaces.
- Can be used in Halton's demand-based ventilation systems.

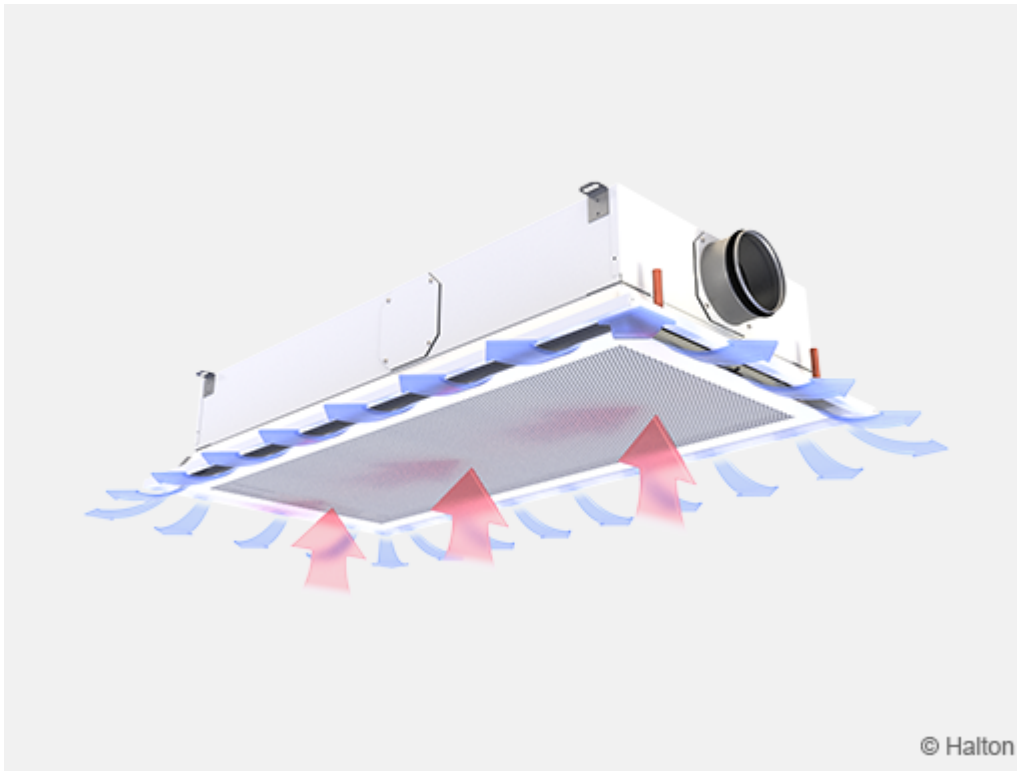
Key features

- Active chilled beam with 4-way air distribution.
- Adjustable airflow using manual CAV or motorised VAV, with the Halton Air Quality (HAQ) control.
- Throw pattern expanded to corners, which ensures pleasant room conditions even with high cooling capacities.
- Model with Halton Workplace WRA, room automation system package

Operating principle

The primary supply air enters the plenum of the Halton Rex Expander chilled beam, from which it is diffused into the room through the nozzles and supply slots. The air jets from the nozzles induce

ambient room air efficiently through the heat exchanger, where the air is cooled by means of the cool water circulating in the heat exchanger. The supply slots direct the air jets horizontally along the ceiling surface, which prevents the feeling of draught.



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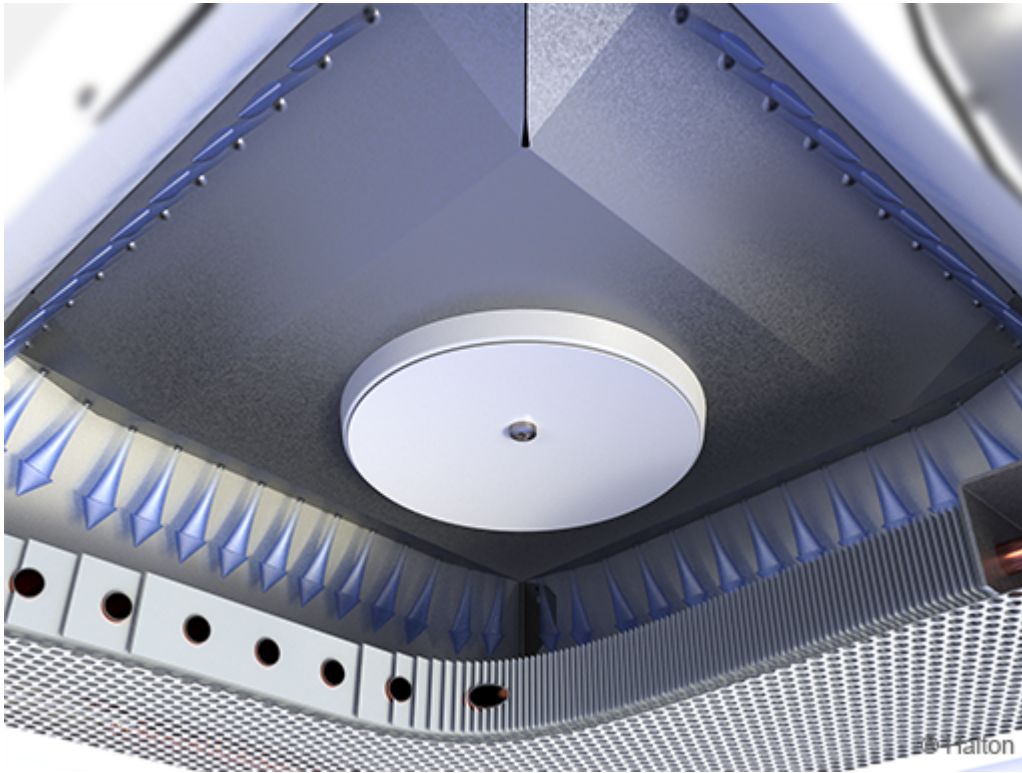
Fig.1. Operating principle of the Halton Rex Expander chilled beam

In figure Operating principle of the Halton Rex Expander chilled beam, the blue arrows show the supply air coming through the supply slots. The red arrows show the ambient room air going through the front panel and the heat exchanger.

Halton Air Quality (HAQ) control

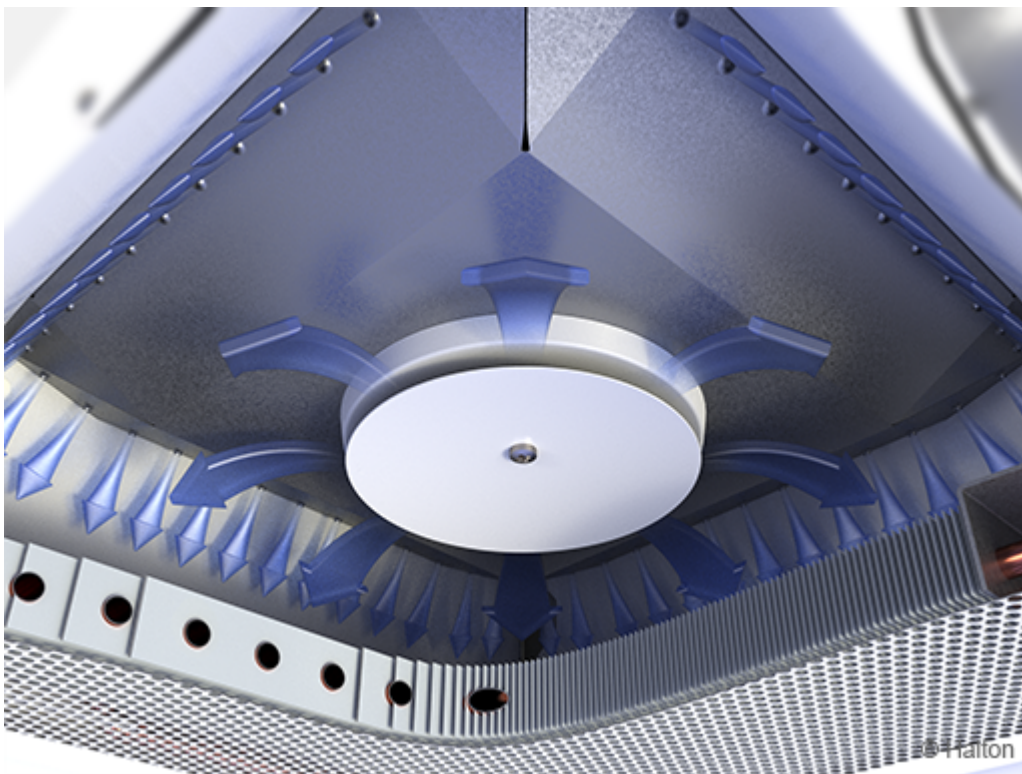
Halton Air Quality (HAQ) control is used for adjusting or controlling the rate of the additional supply airflow in a room space. In normal conditions, fresh supply air is provided through the nozzles. Whenever additional air is needed (boost/VAV function), the HAQ control opens and provides more air. VAV stands for Variable Air Volume.

The HAQ control can also be used as a Constant Air Volume (CAV) damper, that is, it can be used for adjusting the k-factor to achieve the correct airflow with a certain pressure level. This removes the need for changing or plugging the nozzles of the Halton Rex Expander chilled beam.



air from nozzles (normal mode)

Fig.2. VAV function: Supply



control: Supply air from nozzles and HAQ control (boost mode).

Fig.3. VAV function with HAQ



Fig.4. Manual actuator of HAQ control



Fig.5. Electric actuator of HAQ control

Key technical data

Feature	Description
Airflow rate	Max. airflow rate < 35 dB: 57 l/s or 205 m ³ /h (RXP/E-1200)
Dimensions	600×600 mm or 1200×600 mm
Water pressure drop	Max. 18.6 kPa (RXP-1200, waterflow 0.1 kg/s)
Cooling capacity	Up to 1700 W (RXP/E-1200, 100 Pa, 57 l/s, water inlet 14°C, water mass flow 0.1 kg/s, supply air 16°C)
Weight	10–22 kg
Typical static pressure	50–100 Pa
Water temperature	14–20°C (must be above dew point)



Features and options

Category	Feature (order code)	Option (order code)	Description
Size and orientation	Product length L	600, 1200	Two different lengths. Nominal width is always 600 mm.
	Duct connection E	S2, R2, L2	Factory-positioned straight, right, or left Ø 125 mm. Position can be changed on site. See Fig. 1.
Cooling	Coil type TC	C	Cooling coil. Connection pipes Ø 12 mm.
Airflow	Nozzle type S	C, D, E	3 options for different airflow or k-factor needs. Nozzle C is the smallest and nozzle E the largest.
	Halton Air Quality (HAQ) control AQ	NA	No HAQ. K-factor is determined by nominal size and nozzle selection (CAV).
		MA	Manually adjustable CAV control of additional airflow. Standard air from nozzles, additional air from HAQ.
		MO	Motorised VAV control of additional airflow. Standard air from nozzles, additional air from HAQ.

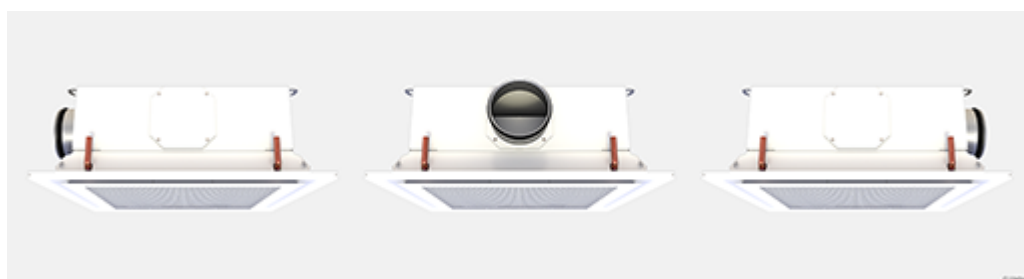


Fig.1. Duct connection: Spigot positions left, straight, right

For more detailed information on the order code, see section Order code.

System package

Halton Workplace WRA room automation system package for Halton Rex Expander (RXP) 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 Expander (RXP) 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
 - Halton Max MDC zone control dampers

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 Expander (RXP) active chilled beams with HAQ control and PTS damper, controlled with Halton Workplace WRA room automation controllers



Fig. 2: Halton Rex Expander (RXP) active chilled beams with HAQ control and PTS damper, 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 (type DXR2.E18-102A) control two Halton Rex Expander (RXP) active chilled beams. Each chilled beam has heating and cooling valves, motorised Halton Air Quality (HAQ) control, as well as integrated CO₂, pressure, and condensation sensors. A Halton PTS single-blade damper is used for controlling the minimum operating mode. The system also includes an exhaust VAV damper, window switch control, external occupancy sensor and a wall panel (type QMX3.P37) with a 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

- Chilled beam has heating and cooling valves
- Chilled beam has motorised HAQ control

- Chilled beam has integrated CO₂, pressure, and condensation sensors
- External occupancy sensor
- Wall panel with temperature sensor and display
- Window switch control
- Optional PTS damper for controlling minimum airflow
- Exhaust airflow control

Schematic drawing

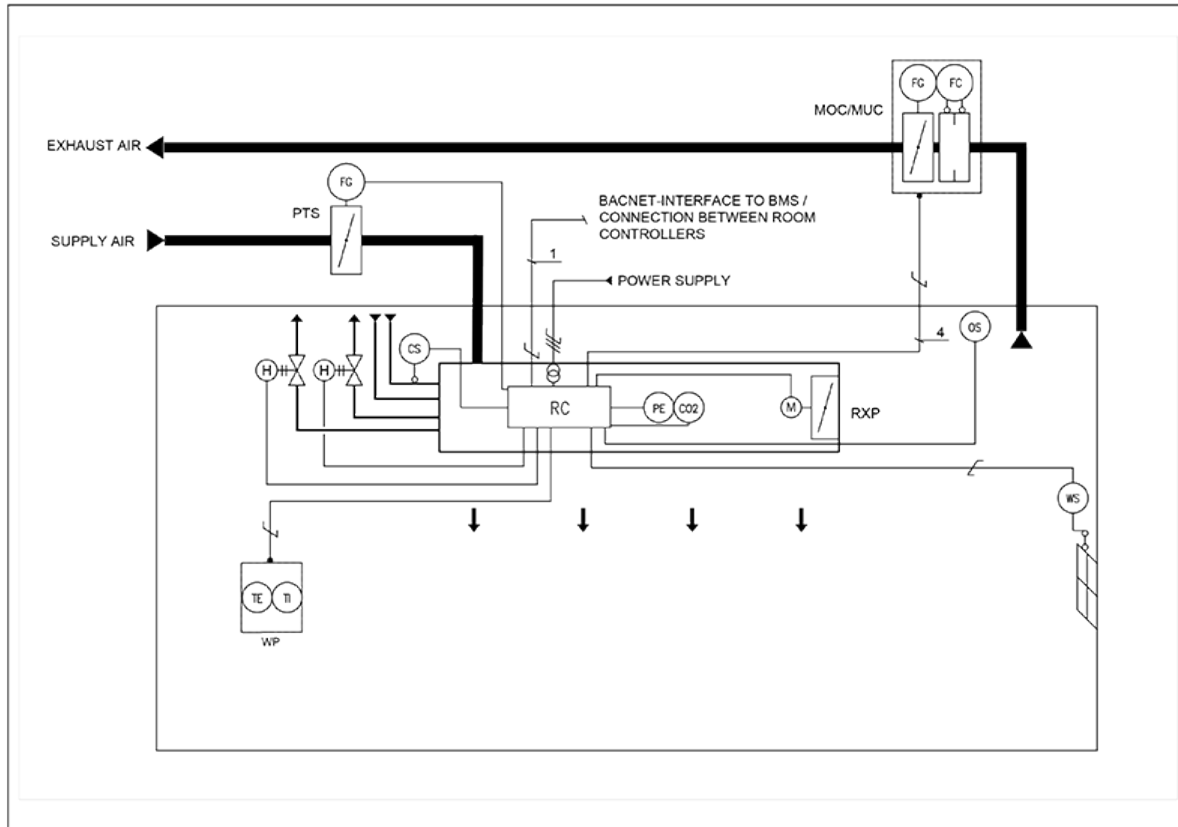


Fig. 13: Schematic drawing: Halton Rex Expander (RXP) chilled beam (4-pipe) controlled with Halton Workplace WRA room automation controller

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
CO2	CO ₂ sensor
WP	Wall panel
TE	Temperature sensor
TI	Temperature display
WS	Window switch control

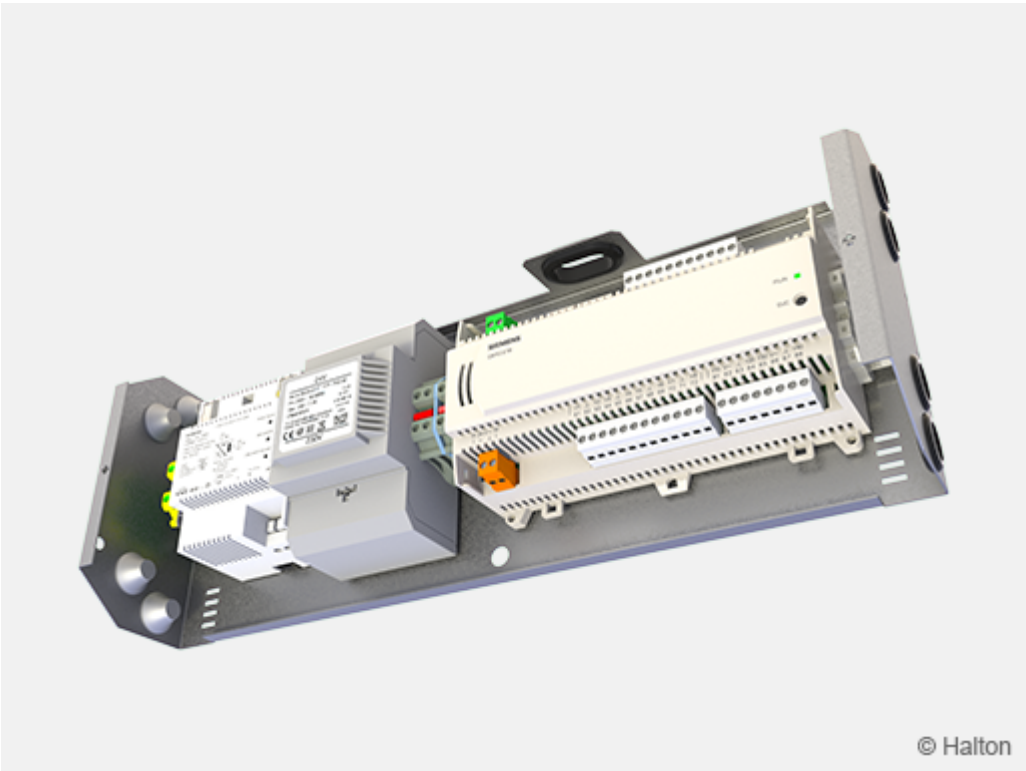


Fig. 14: Factory-installed Halton Workplace WRA room automation controller, type DXR2.E18-102A

Wiring diagram

For the wiring diagram of similar configuration, see Halton Workplace WRA room automation controller product page / section Installation information.

Components and order code examples for the system

- 2 x Active chilled beam: Halton Rex Expander (RXP)
RXP/C-1200-S2, TC=H, AQ=MO, 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 Ultra Circular (MUC) or Halton Max One Circular (MOC)
MUC/G-160, MA=CS
- 2 x standby, shut-off damper: Halton PTS
PTS/A-125, MA=CS, MO=B4, ZT=N
- 2 x standby, shut-off damper: Halton PTS
PTS/A-125, MA=CS, MO=B4, ZT=N
- Automation package: 2 x Halton Workplace WRA room automation controller unit with related components
WRA/RXP-E81-H3-EX4, WP=37, LC=NA, SE=CI, SW=NC, ST=IA, SL=OI, PM=P1, 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

Quick selection

Airflow

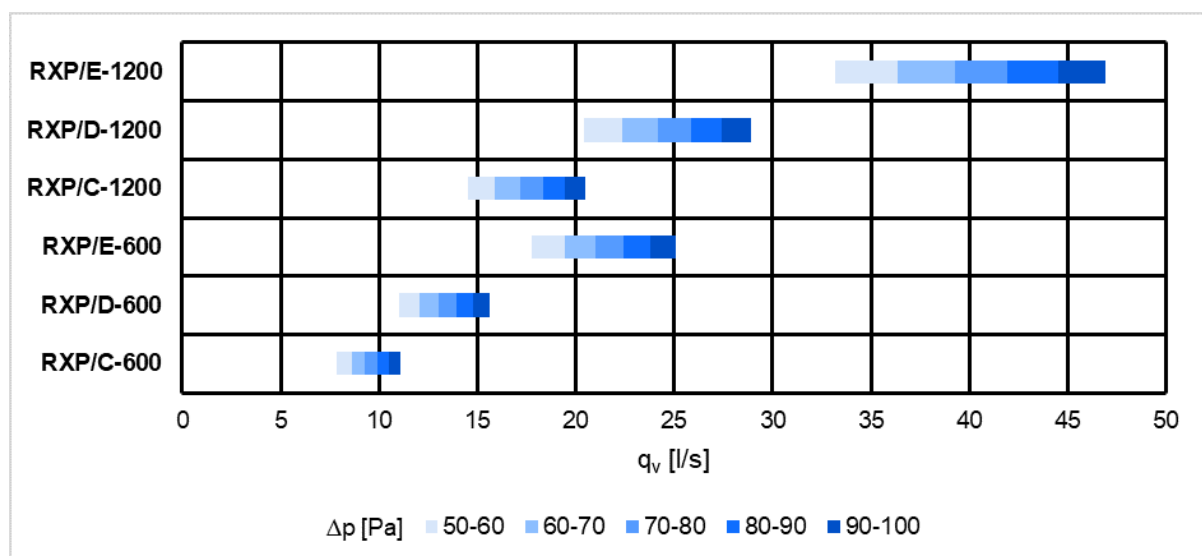


Fig.1. Airflow ranges for Halton Rex Expander without HAQ/with HAQ closed

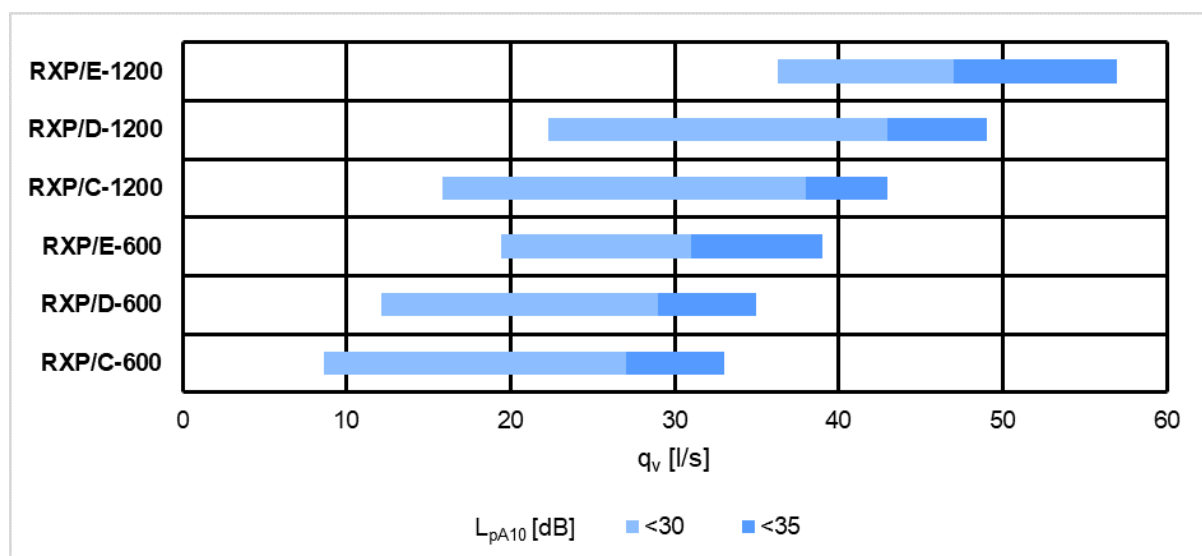


Fig.2. Airflow ranges for Halton Rex Expander with HAQ @60 Pa, 125 mm spigot

Cooling capacity

Product	Inlet/outlet water temp. [°C]	Room temp. [°C]	Chamber pressure [Pa]	Water mass flow [kg/s]	Airflow [l/s]	Capacity [W]		
						Water	Air (18°C)	Total
RXP/C-600	15/17	25	75	0.032	10	269	81	350
RXP/D-600				0.038	14	315	114	429
RXP/E-600				0.049	22	407	183	590
RXP/C-1200	15/18			0.043	18	536	150	686
RXP/D-1200				0.054	25	676	211	887
RXP/E-1200				0.063	41	790	343	1133

Structure and materials

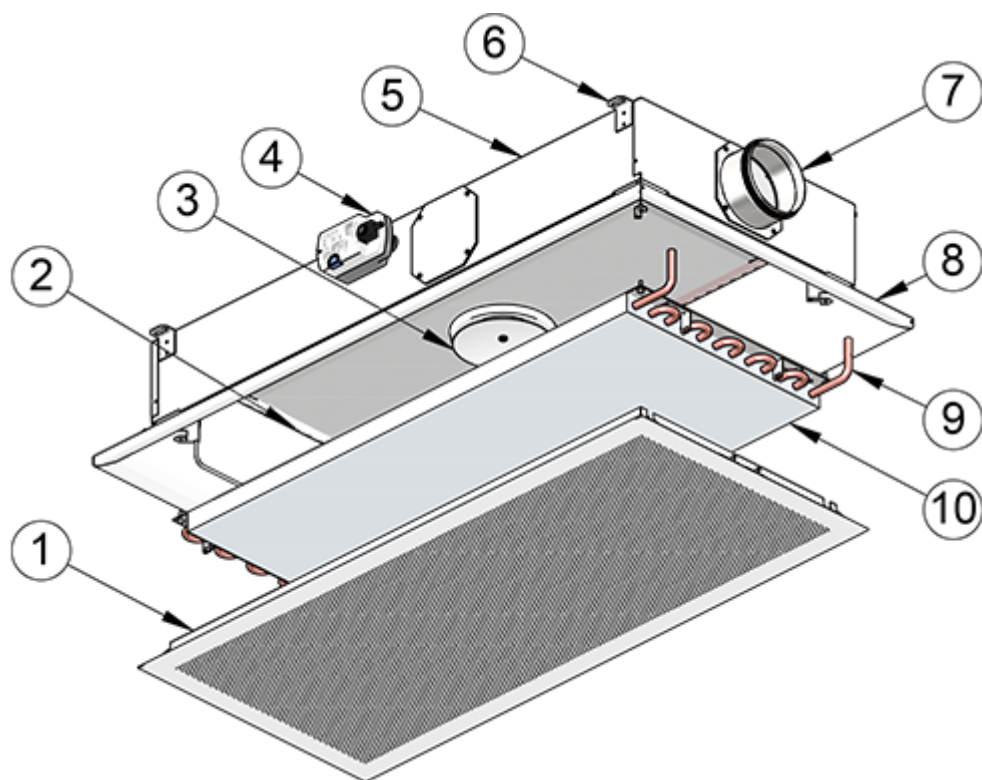


Fig.1. Halton Rex Expander parts

No.	Part	Description (material, colour options)
1	Front panel	Pre-painted galvanised steel Polyester-painted, white (RAL 9003 or 9010), with special colours available.
2	Nozzles	Nozzle plate: galvanised steel
3	HAQ control (optional)	Painted galvanised steel
4	Actuator of HAQ control (optional)	Electric actuator (shown in the figure): connecting cable length 0.9 m
		Manual actuator: galvanised steel
5	Plenum	Pre-painted galvanised steel Polyester-painted, white (RAL 9003 or 9010)
6	Brackets	Galvanised steel
7	Spigot	Galvanised steel
8	Frame	Pre-painted galvanised steel Polyester-painted, white (RAL 9003 or 9010), with special colours available.
9	Connection pipes	Copper. Ø 12 mm with a wall thickness of 0.9–1.0 mm, fulfilling the requirements of European Standard EN 1057:1996.
10	Coil/Heat exchanger	Pipes: copper Fins: aluminium

Dimensions and weight

The dimensions are given in millimetres (mm).

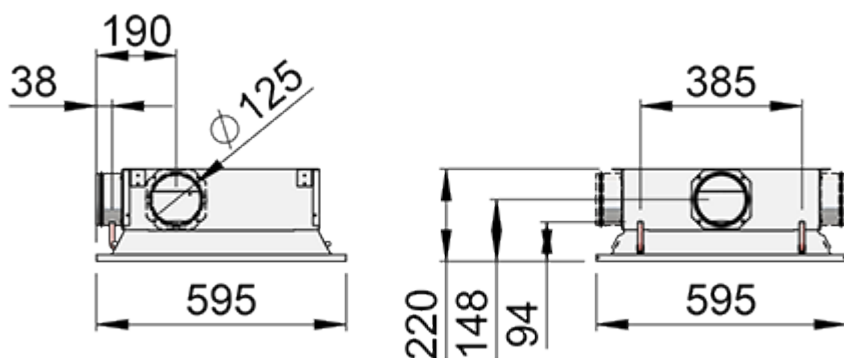


Fig.1. Halton Rex

Expander dimensions (RXP-600)

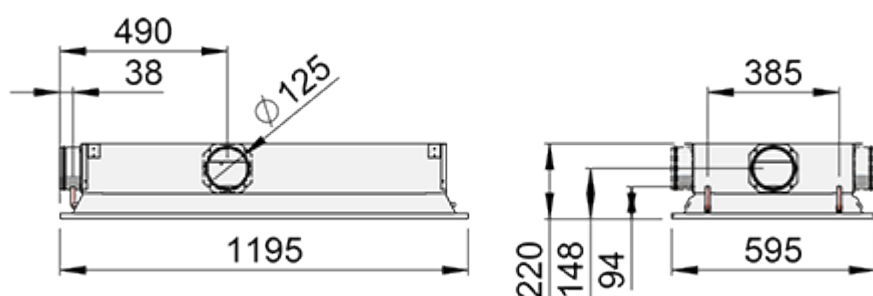


Fig.2. Halton Rex

Expander dimensions (RXP-1200)

Weight:

Product	AQ model	Dry mass (excl. water) [kg]	Water volume [l]
RXP-600	NA	10.5	0.5
	MA	11.4	
	MO	11.6	
RXP-1200	NA	20.9	1.2
	MA	21.8	
	MO	22.1	

Specification

The product must fulfil the following requirements:

Structure

- Integral recirculation air path through the perforated front panel.
- Front panel removable to allow general maintenance and cleaning.
- Front panel removable without special tools.
- Four-directional air distribution.
- Unit width 595 mm, height 220 mm.
- Inlet duct diameter 125 mm.
- Duct connection position changeable without special tools.
- Measurement tap to allow airflow measurement.
- Pipework's maximum operating pressure 1.0 MPa.

Materials

- Plenum, frame, and front panel manufactured from galvanised steel.
- All visible parts white, painted in RAL 9003, 20% gloss.
- All pipes manufactured from copper.
- Water connection pipes have a wall thickness of 0.9–1.0 mm.
- All pipe joints soldered.
- All pipe joints pressure-tested at the factory.
- Heat exchanger fins manufactured from aluminium.

Packaging and identification

- The product is protected by a removable plastic coating.
- The duct connection and pipe ends remain sealed during transport.
- The product is packed in a cardboard box.
- The product is identified by a serial number printed on labels attached both to the product and the cardboard box.

Installation

When planning the orientation of the Halton Rex Expander chilled beam, the location of the supply air and water circuit connections must be taken into account. The supply air spigot can be at either side of the unit or at the same end with the water connections. The location can be easily changed on site, if needed.

The location of the actuator of the HAQ control (optional) must also be taken into account to ensure access to the actuator. The actuator is located in the middle of the left side of the unit.

The Halton Rex Expander chilled beam can be attached directly to the ceiling surface (H = 220 mm) or suspended using threaded drop rods (8mm). The brackets for ceiling installation are located at the sides of the unit.

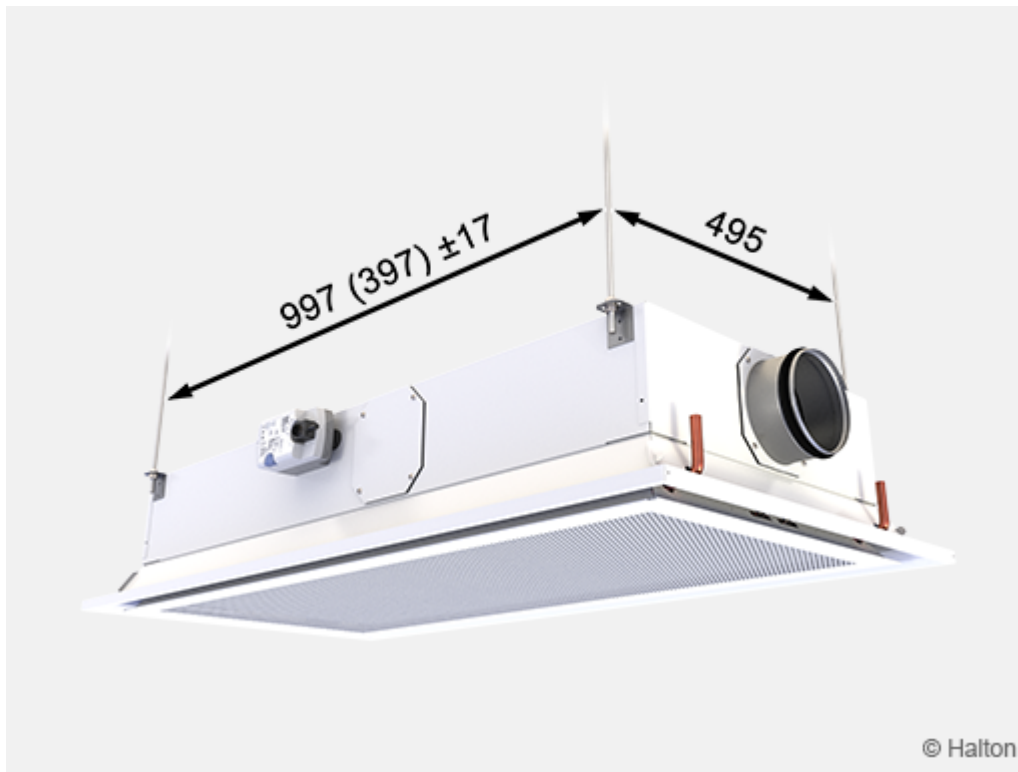


Fig.1. Installation points of

the RXP-1200 (RXP-600) chilled beam

Because there are no moving parts in the Halton Rex Expander chilled beam, no anti-vibration protection is needed when installing the unit or when connecting the unit to supply air or water circuit connections.

It is recommended that the main pipelines of the cooling and heating water circuits are installed above the level of the heat exchanger to enable venting of the pipework.

The maximum operating pressure for chilled/hot water pipework is 1.0 MPa.

Commissioning

Adjustment of the cooling capacity

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 minimum inlet water temperature of the heat exchanger is 14–16°C.

Balancing and control of water flow rates

The water mass flow rates of the Halton Rex Expander chilled beam are balanced with adjustment valves installed on the outlet side of the cooling water loops. The cooling capacity of the Halton Rex Expander chilled beam is controlled by regulating the water mass flow rate.

Adjustment of the supply airflow rate

With a Halton Rex Expander chilled beam that does not have the Halton Air Quality (HAQ) control, the airflow depends on the chamber pressure and the selected nozzle. With the HAQ

control included, also the position of the HAQ control must be taken into account. The chamber pressure can be measured from a measurement tap under the front panel. The total airflow rate is calculated using the formula below.

Total airflow rate

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

where

q_v	Airflow rate [l/s] or [m ³ /h]
Δp_m	Measured static chamber pressure [Pa]
k	Determined according to the table below [l/s]. If calculating m ³ /h, multiply by 3.6.

Position of HAQ control	RXP/C-600	RXP/D-600	RXP/E-600	RXP/C-1200	RXP/D-1200	RXP/E-1200
0 / no HAQ	1.1	1.6	2.5	2.1	2.9	4.7
1	1.7	2.1	3.1	2.6	3.5	5.3
2	2.2	2.7	3.6	3.1	4.0	5.8
3	2.7	3.2	4.1	3.7	4.5	6.3
4	3.2	3.7	4.6	4.1	5.0	6.8
5	3.7	4.1	5.1	4.6	5.5	7.3
6	4.1	4.6	5.5	5.0	5.9	7.7
7	4.5	5.0	5.9	5.5	6.3	8.1
8	4.9	5.4	6.3	5.9	6.7	8.5
9	5.3	5.7	6.7	6.2	7.1	8.9

Example:

The measured static chamber pressure is 70 Pa for RXP/E-600, and the position of the HAQ control is 3. The total airflow rate is $4.1 \cdot \sqrt{(70)} \approx 34.3 \text{ l/s}$.

Order code

RXP/S-L-E, TC-AQ-CO-ZT

S = Nozzle type

- C Medium
- D Large
- E Extra large

L = Length (mm)

600 or 1200

E = Duct connection

- S2 Straight (Ø125)
- R2 Right (Ø125)
- L2 Left (Ø125)

Other options and accessories

SP = System package

- N No
- Y Yes

TC = Cooling / Heating functions (Coil type)

- C Cooling

AQ = Halton Air Quality (HAQ) control

- NA Not assigned (CAV)
- MA Manual (adjustable CAV)
- MO Motorised (VAV)

CO = Colour

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

ZT = Tailored product

- N No
- Y Yes (ETO)

Sub products

System package	Halton Workplace Room Automation (WRA)
Room exhaust VAV damper	Halton Max One Circular (MOC)
Room exhaust VAV damper	Halton Max Ultra Circular (MUC)

Order code example

RXP/E-1200-S2, SP=N, TC=C, AQ=NA, CO=SW, ZT=N