

Halton Rex RXP, standard model - Installation, commissioning, and maintenance guide

Contents

1	Introduction	4
1.1	Copyright and disclaimers	4
1.2	About this document	4
1.3	Summary of changes	4
1.4	Safety notes	5
1.5	Contact information	5
2	Product description	6
2.1	Overview	6
2.2	Operating principle	6
2.3	Structure and materials	9
2.4	Dimensions and weight	11
3	Transport, storage and handling	13
3.1	Pre-packing and packing	13
3.2	Shipping and handling	13
3.2.1	Handling the product	13
3.3	Checking the received equipment	13
3.4	Unpacking	13
3.5	Lifting the equipment	14
3.6	Storing the equipment	14
4	Installation	15
4.1	Before you start	15
4.1.1	Safety during installation	15
4.1.2	Installation process	15
4.1.3	Installation requirements	16
4.1.4	Checks before installation	17
4.2	Step by step instructions	17
4.2.1	Installing the unit	17
4.2.2	Connecting the unit to the ductwork	17
4.2.3	Connecting the water circuit connections	18
4.3	Checks after installation	19
5	Commissioning	20
5.1	Before you start	20
5.1.1	Safety during commissioning	20
5.1.2	Commissioning process	20
5.1.3	Commissioning information	20
5.2	Step by step instructions	23
5.2.1	Adjusting the position of the manual actuator of HAQ control	23

6	Maintenance	24
6.1	Before you start	24
6.1.1	Safety during maintenance	24
6.1.2	Checks before maintenance	24
6.1.3	Maintenance information	24
6.2	Maintenance schedule	24
6.3	Step by step instructions	24
6.3.1	Cleaning the unit	24
6.3.2	Opening the front panel	25
6.3.3	Filling in the maintenance documents	25
6.4	Checks after maintenance	25
7	End of life	26
7.1	Removing the product from use	26
7.2	Recycling and waste disposal	26
8	Troubleshooting and repairs	28
8.1	Troubleshooting	28
8.2	Fault reporting and reclamations	28
8.3	Spare parts	28
9	Technical reference data	29
9.1	Connections: Electric actuator of HAQ control	29

1 Introduction

1.1 Copyright and disclaimers

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1.2 About this document

This document provides the instructions on how to install, commission, and maintain the product. This document is intended for properly trained persons performing these tasks.

Note: Project-specific variations are possible.







1.3 Summary of changes

Release	Date	Description
2.0	5-Nov-2021	<ul style="list-style-type: none">▪ A new coil type added: cooling and heating.▪ A new duct connection size added: Ø 160 mm.
1.0	15-Sep-2021	First release



1.4 Safety notes

All information in this section is important and relevant for your safety. Pay special attention to these icons and the related safety texts when used later in context in this document.

Cautions

	<div data-bbox="805 448 1058 495"> CAUTION</div> <div data-bbox="408 533 1265 598"> <p>FALLING HAZARD Pay special attention and use proper equipment when working at height.</p> </div>
	<div data-bbox="805 701 1058 748"> CAUTION</div> <div data-bbox="408 786 1272 851"> <p>PERSONAL INJURY HAZARD Do not lift objects over 20 kg (44 lbs) alone. Use a lift or seek assistance.</p> </div>
	<div data-bbox="805 954 1058 1001"> CAUTION</div> <div data-bbox="408 1039 1355 1137"> <p>PERSONAL INJURY HAZARD Follow all local health and safety regulations and use proper personal protective equipment.</p> </div>

Notices

	<div data-bbox="850 1290 1013 1337">NOTICE</div> <div data-bbox="408 1375 1380 1473"> <p>NOTICE All installation, commissioning, and maintenance work must only be carried out by qualified personnel.</p> </div>
	<div data-bbox="850 1547 1013 1594">NOTICE</div> <div data-bbox="408 1632 1185 1700"> <p>NOTICE All electrical work must only be carried out by qualified personnel.</p> </div>

1.5 Contact information

For contact information, see www.halton.com.

2 Product description

2.1 Overview

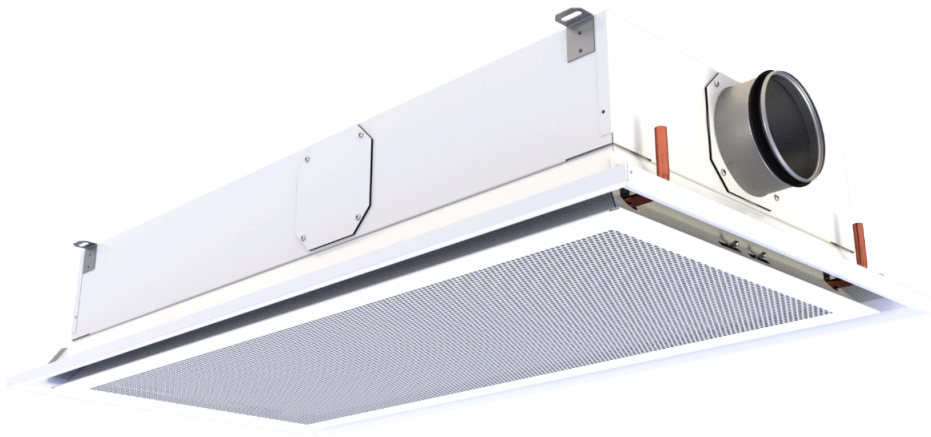


Figure 1. Halton Rex Expander

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, heating, 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.

2.2 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 or heated by means of the water circulating in the heat exchanger. The supply slots direct the air jets horizontally along the ceiling surface, which prevents the feeling of draught.

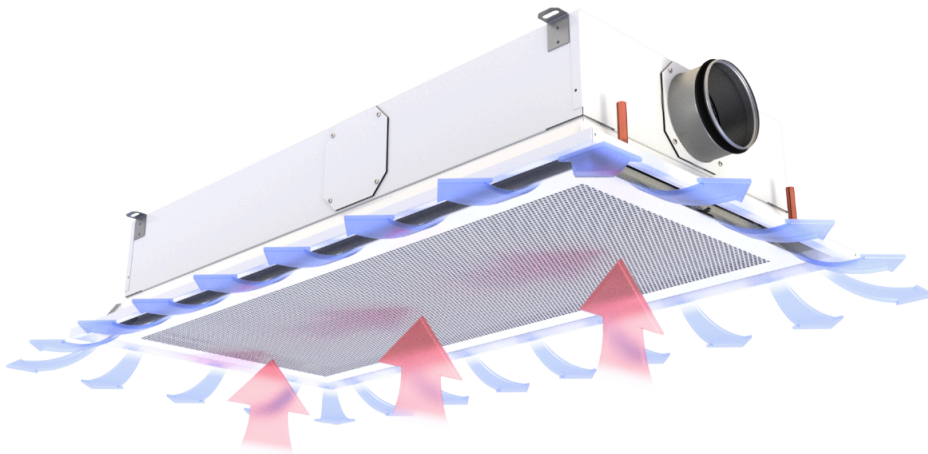


Figure 2. Operating principle of the Halton Rex Expander chilled beam

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.

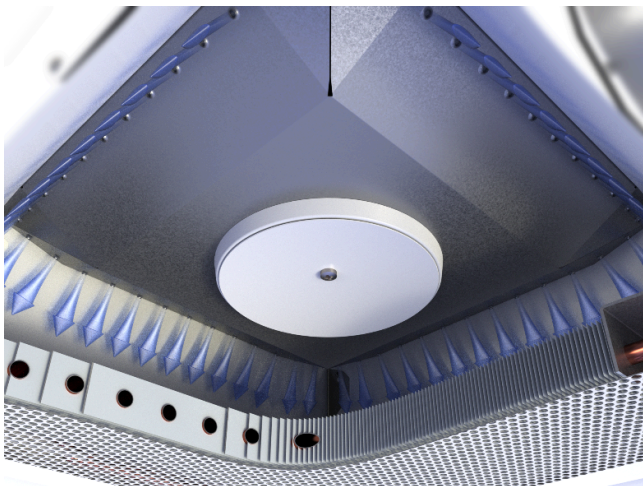


Figure 3. VAV function: Supply air from nozzles (normal mode)

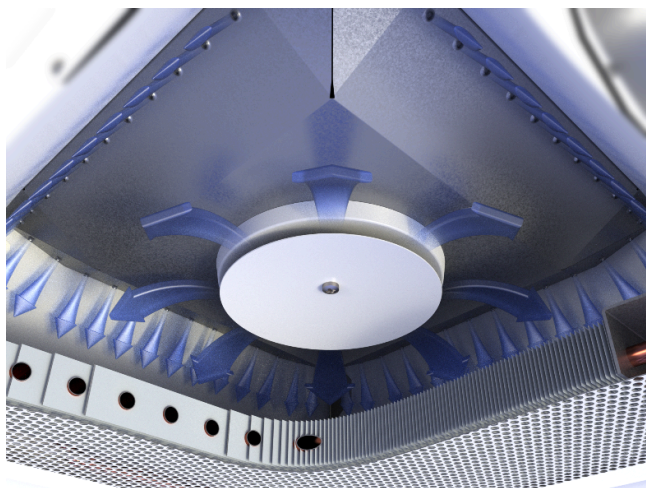


Figure 4. VAV function with HAQ control: Supply air from nozzles and HAQ control (boost mode)

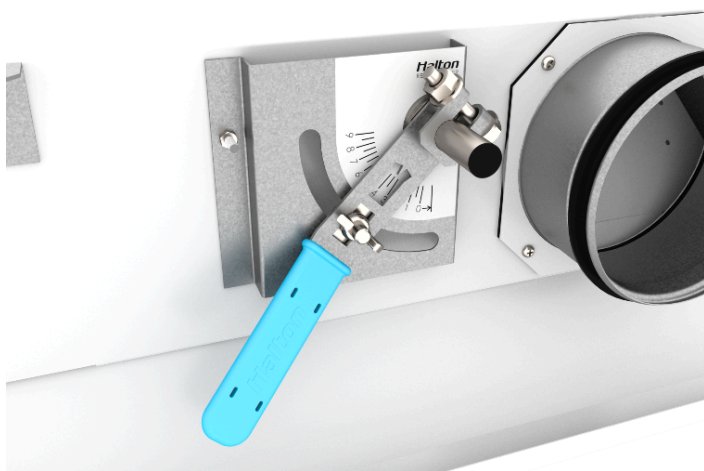


Figure 5. Manual actuator of HAQ control

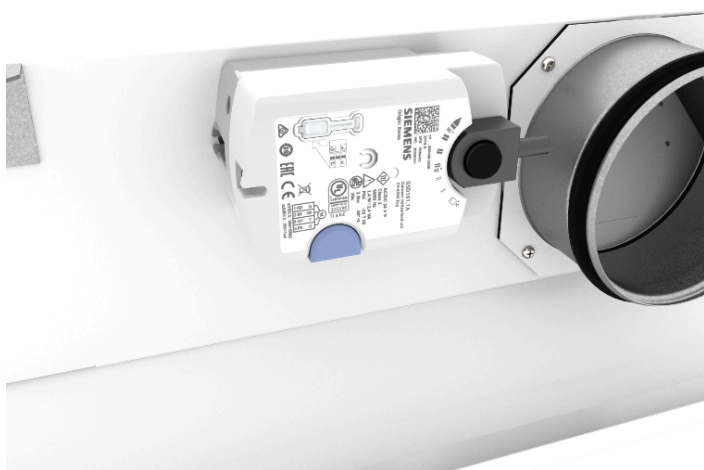


Figure 6. Electric actuator of HAQ control

2.3 Structure and materials

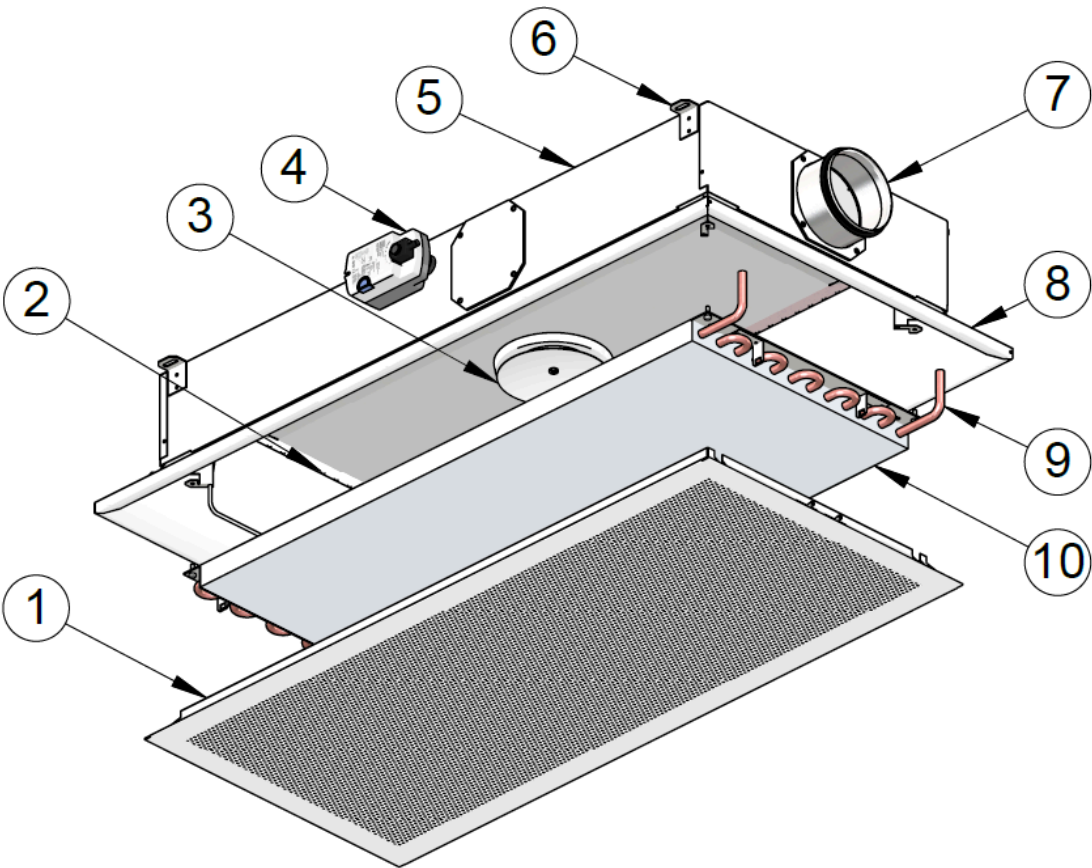


Figure 7. Halton Rex Expander parts

No.	Part	Description
1	Front panel	Pre-painted galvanised steel Polyester-painted, white (RAL 9003), 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)
6	Brackets	Galvanised steel
7	Spigot	Galvanised steel
8	Frame	Pre-painted galvanised steel Polyester-painted, white (RAL 9003), with special colours available.
9	Connection pipes	Copper. \varnothing 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

2.4 Dimensions and weight

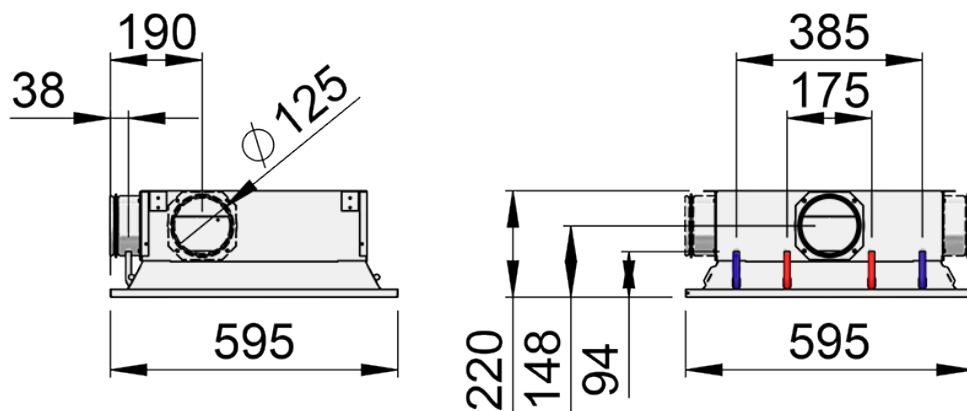


Figure 8. Halton Rex Expander dimensions (RXP-600)

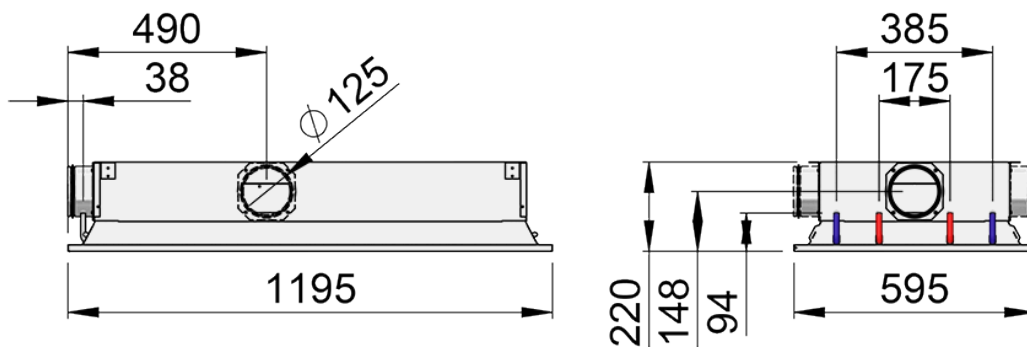


Figure 9. Halton Rex Expander dimensions (RXP-1200)

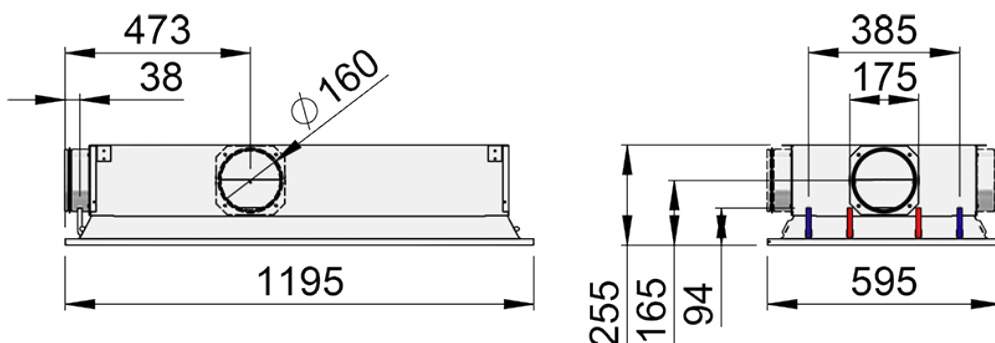


Figure 10. Halton Rex Expander dimensions (RXP-1200 with duct connection $\phi 160$ mm)

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	

3 Transport, storage and handling

3.1 Pre-packing and packing

Prior to packing, Halton inspects all products fully for any damages or physical faults. Halton inspects all nameplates and identification tags against the purchase order and the Halton order confirmation to eliminate the possibility of any mistakes or issues. If necessary, corrections are made.

Once the pre-packing procedure is complete, each product is sorted and packed according to weight and size. Depending on the shipping requirements, the products are packed onto open pallets or pallets protected by wooden covers. The products are secured to the pallets with plastic wrapping and straps.

3.2 Shipping and handling

Prior to loading the shipment, all packing and shipping documentation is checked.

One copy of the packing list is attached to each pallet, crate, or cardboard box in a waterproof plastic envelope. Any additional copies of packing lists, customs invoices, shipping marks, and other documents are added according to the client and shipping company requirements.

Use a forklift for loading or unloading the pallets.

Note: Some of the components can be delivered to the site in separate shipments.

3.2.1 Handling the product

To protect the product from damage or dirt, keep the product in its original box until it is needed for installation. There is a product label in each box, which helps move the product in its correct location without the need for unboxing.

When you take the product out of the box, do not lift the product by the pipes, as they damage easily, which leads to leaking coils.

3.3 Checking the received equipment



1. Inspect the pallet or cardboard box and the products for any damage or missing parts. If you detect any damage, or the shipment is incomplete, immediately file a claim with the shipping company.
2. Confirm that the products that you received are the ones that you ordered. If the products are not the ones you ordered, see [Fault reporting and reclamations](#) for instructions.

3.4 Unpacking

Remove the straps and the plastic wrapping or other package covers from the pallets. Open the cardboard boxes. Avoid damaging the products when you unpack them.

Note: The visible surface of the unit is protected with removable plastic coating. It protects the surface from dust, dirt, and small scratches. It is recommended that you leave the plastic coating in place until the unit is taken into use.


3.5 Lifting the equipment


	 CAUTION
	<p>PERSONAL INJURY HAZARD Do not lift objects over 20 kg (44 lbs) alone. Use a lift or seek assistance.</p>

Note: For information on the weight of the product, see [Dimensions and weight](#).

When you take the product out of the box, do not lift the product by the pipes, as they damage easily, which leads to leaking coils.

3.6 Storing the equipment

	NOTICE
	<p>NOTICE Do not expose the products to weather or store them outside.</p>

	NOTICE
	<p>NOTICE Do not use any part of the products for climbing or support.</p>

Protecting against moisture


The pallets onto which the products are stored enable air circulation inside the plastic wrappings. It is a strict requirement that the products be stored in a dry indoor environment. Products must be protected against moisture in any junction box or other closed enclosures. A dry indoor environment should not create moisture in junction boxes, however, if necessary, additional moisture protection such as Silica Gel can be installed to the junction boxes by the BUYER.


1. Store the products in a dry indoor area. Provide adequate mechanical protection at all times during storage and during installation and construction activities.
2. Periodically check the products for any damage and repair or replace any component, wiring or piping that shows signs of damage.

4 Installation


4.1 Before you start


4.1.1 Safety during installation


	! CAUTION
	<p>FALLING HAZARD Pay special attention and use proper equipment when working at height.</p>

	! CAUTION
	<p>PERSONAL INJURY HAZARD Do not lift objects over 20 kg (44 lbs) alone. Use a lift or seek assistance.</p>

Note: For information on the weight of the product, see [Dimensions and weight](#).

	! CAUTION
	<p>PERSONAL INJURY HAZARD Follow all local health and safety regulations and use proper personal protective equipment.</p>

	NOTICE
	<p>NOTICE All installation, commissioning, and maintenance work must only be carried out by qualified personnel.</p>

	NOTICE
	<p>NOTICE All electrical work must only be carried out by qualified personnel.</p>

4.1.2 Installation process

The main steps in the installation process are the following:

- Determining the installation place and orientation of the unit from the design drawings.
- Installing the unit.
- Connecting the unit to ductwork.

- Connecting the water connections.

Note: When equipped with an electric actuator, the unit is part of a system. The needed wires are connected during the installation phase of the system.

4.1.3 Installation requirements

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 (8 mm). The brackets for ceiling installation are located at the sides of the unit.

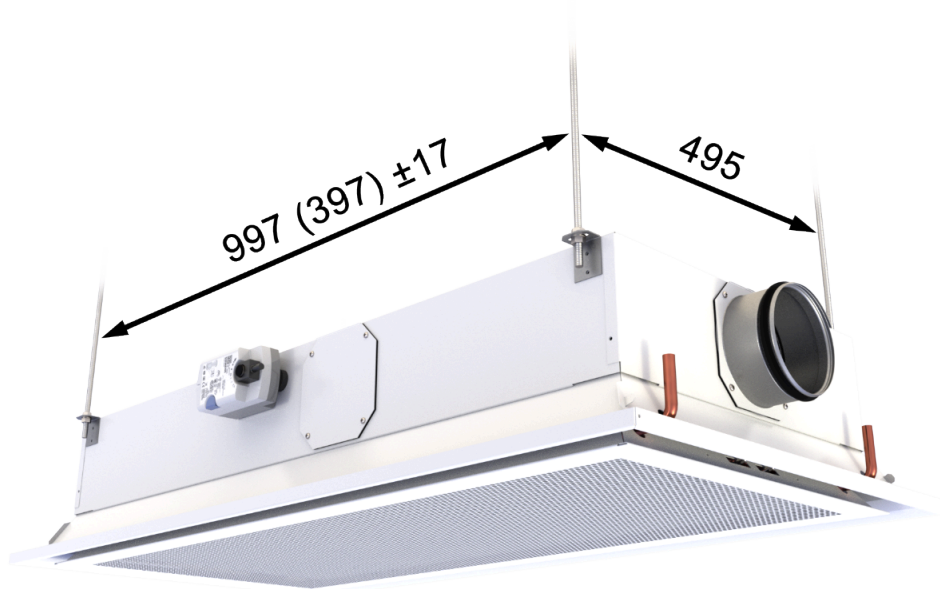


Figure 11. Installation points of the RXP-1200 (RXP-600) chilled beam

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.

4.1.4 Checks before installation

Make sure you have all the needed materials:

- The unit to be installed.
- Instructions (this document, design drawings)
- The needed tools, for example:
 - Board lifter
 - Ladder
 - Materials and tools needed for installing the unit to the ceiling.
 - Materials and tools needed for connecting the air and water connections.

Note: The materials and tools needed for installing or connecting the unit are not included in the delivery.

4.2 Step by step instructions

4.2.1 Installing the unit

See also the following information:

- [Installation requirements](#)
- [Lifting the equipment](#)

1. Make sure the unit is in good condition.
2. From the design drawings, determine the installation place.
3. From the design drawings, determine the orientation of the unit (the locations of the water circuit connections and supply air spigot).
4. From the design drawings, determine the height of the unit according to the planned suspended ceiling. The bottom surface of the unit should be on the same level as the bottom surface of the suspended ceiling.
5. Install the unit accordingly.

4.2.2 Connecting the unit to the ductwork

1. Remove any contamination from the ductwork.
2. Remove the plastic cover from the spigot of the unit.
3. Push the duct into the spigot of the unit. The spigot has a seal gasket.

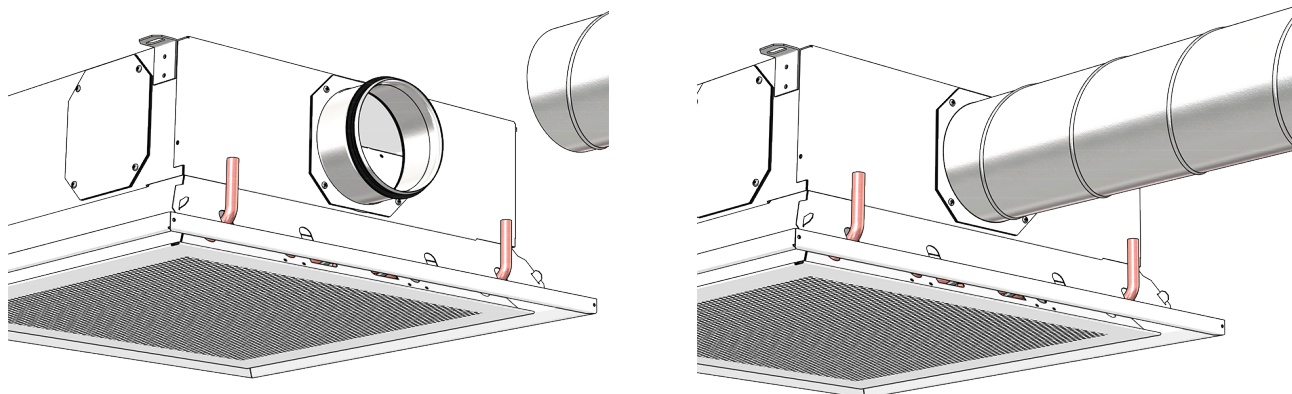


Figure 12. Connecting the duct

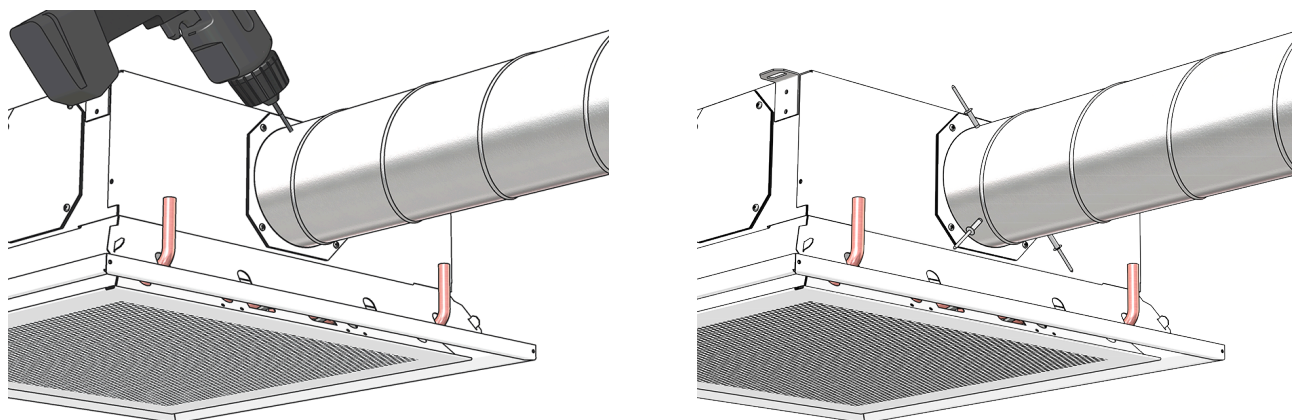


Figure 13. Securing the duct with blind rivets

4.2.3 Connecting the water circuit connections

If there are two connection pipes, the unit can be used for cooling or heating. If there are four connection pipes, the outer pipes are used for cooling and the inner pipes for heating.



NOTICE

NOTICE

When tightening the fittings, be careful not to damage the pipes.

Connect the water circuit connections according to the design drawings. You can use, for example, push-fit fittings or compression fittings. With compression fittings, to avoid damaging the pipes, use two wrenches to tighten the fitting.

Note: It does not matter which way you connect the supply and return water connections. The flow direction in the coil does not affect the performance of the unit.

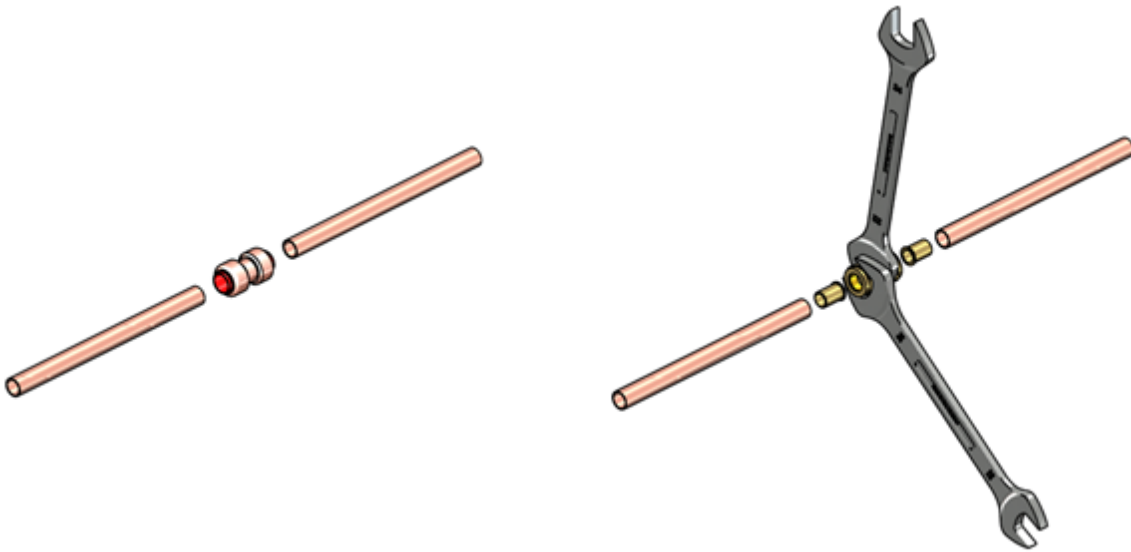


Figure 14. Connecting the pipes. Left: Push-fit fitting. Right: Compression fitting.

4.3 Checks after installation

Before commissioning can start, make sure the following has been taken care of:


- The unit is installed correctly.
- The unit is connected to the ductwork correctly.
- The water connections are connected correctly.

Note: The visible surface of the unit is protected with removable plastic coating. It protects the surface from dust, dirt, and small scratches. It is recommended that you leave the plastic coating in place until the unit is taken into use.

5 Commissioning

5.1 Before you start

5.1.1 Safety during commissioning

	<p style="text-align: center; margin: 0;">NOTICE</p> <p>NOTICE All installation, commissioning, and maintenance work must only be carried out by qualified personnel.</p>
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5.1.2 Commissioning process

Commissioning includes adjusting the settings and doing the required start-up tests. Commissioning is carried out by Halton Field Service or an approved partner.

Note: When equipped with an electric actuator, the unit is part of a system. The needed settings are adjusted during the commissioning phase of the system.

5.1.3 Commissioning information

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.

Adjustment of the heating capacity

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 inlet water temperature of the heat exchanger is 35°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 water loops. The cooling or heating 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 [m³/h]
Δp_m	Measured static chamber pressure [Pa]
k	Determined according to the table below [l/s]. If calculating m³/h, multiply by 3.6.

Position of HAQ control	Control signal voltage [V]	k-factor (total)					
		RXP/ C-600	RXP/ D-600	RXP/ E-600	RXP/ C-1200	RXP/ D-1200	RXP/ E-1200
0 / closed / no HAQ	0-1	1.1	1.6	2.5	2.1	2.9	4.7
1	2	1.7	2.1	3.1	2.6	3.5	5.3
2	3	2.2	2.7	3.6	3.1	4.0	5.8
3	4	2.7	3.2	4.1	3.7	4.5	6.3
4	5	3.2	3.7	4.6	4.1	5.0	6.8
5	6	3.7	4.1	5.1	4.6	5.5	7.3
6	7	4.1	4.6	5.5	5.0	5.9	7.7
7	8	4.5	5.0	5.9	5.5	6.3	8.1
8	9	4.9	5.4	6.3	5.9	6.7	8.5
9	10	5.3	5.7	6.7	6.2	7.1	8.9

Table 1. K-factors with different HAQ control positions

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 $4.1 \cdot \sqrt{70} \approx 34.3$ l/s.

5.2 Step by step instructions

5.2.1 Adjusting the position of the manual actuator of HAQ control

Note: By default, the manual actuator of HAQ control is closed.

Adjust the position of the manual actuator of HAQ control according to the HVAC plan of the building.

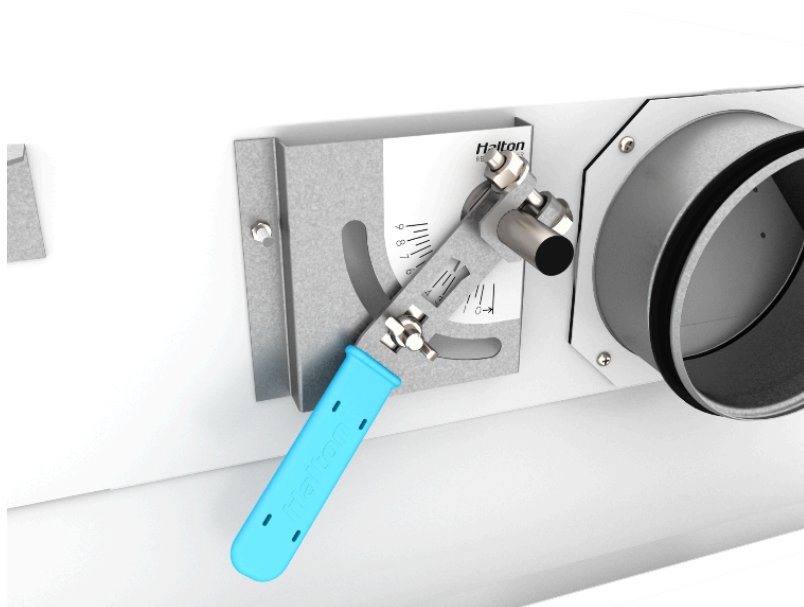



Figure 15. Manual actuator of HAQ control

6 Maintenance

6.1 Before you start

6.1.1 Safety during maintenance

	NOTICE
	<p>NOTICE All installation, commissioning, and maintenance work must only be carried out by qualified personnel.</p>

6.1.2 Checks before maintenance

Make sure you have the following:

- A list of the ID numbers and locations of the units
- Access to the units

6.1.3 Maintenance information


The front panel of the Halton Rex Expander chilled beam is removable to allow general maintenance and cleaning.

6.2 Maintenance schedule

Carry out scheduled maintenance according to the maintenance plan of the building.

6.3 Step by step instructions

6.3.1 Cleaning the unit

	NOTICE
	<p>NOTICE Be careful not to damage the fins of the coil.</p>

1. Vacuum the front panel and coil periodically. The period depends on the room properties, often being once a year. For instructions on opening the front panel, see [Opening the front panel](#).
2. After vacuuming, replace the front panel.

6.3.2 Opening the front panel

The latches for opening the front panel are located at both ends of the front panel.

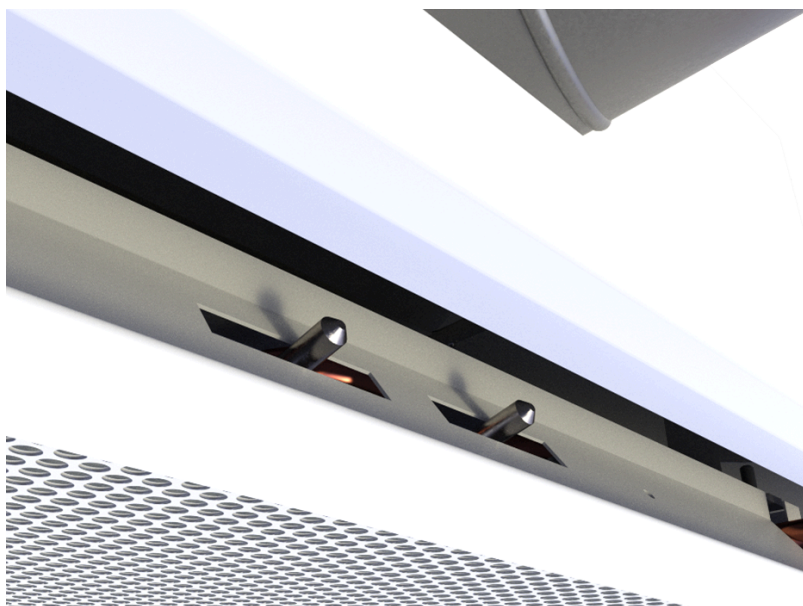


Figure 16. Front panel latches

To open the front panel, press the latches towards each other.

6.3.3 Filling in the maintenance documents


Fill in the maintenance documents required by your organisation.


6.4 Checks after maintenance

Make sure you have filled in the maintenance documents.

7 End of life

7.1 Removing the product from use

	<p style="text-align: center;">NOTICE</p> <p>NOTICE All installation, commissioning, and maintenance work must only be carried out by qualified personnel.</p>
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	<p style="text-align: center;">NOTICE</p> <p>NOTICE All electrical work must only be carried out by qualified personnel.</p>
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1. Disconnect the wiring.
2. Disconnect the duct connection.
3. Disconnect the water connections.
4. Dismount the unit.

7.2 Recycling and waste disposal

Carry out all recycling and waste disposal in accordance with the law and regulations of each country. Observe the specific requirements enforced by the legislation and local authorities of each country. Keep the environment clean.

Packaging waste

Packaging materials that can be recycled are listed below. They must be disposed of in conformity with existing local regulations.

- Polyethylene: outer protective film
- Cardboard: angle protections, cardboard boxes etc.
- Wood: pallet, plywood etc.

Electronic and other components

Any electronic and other corresponding components of the product should be assessed for the most suitable recycling route in accordance with local regulations.

Recycling after decommissioning

Recycle the product and its components upon decommissioning. Follow the local laws and regulations when disposing of electrical components and steel materials. The following instructions are general.

- Disconnect and dismount all electrical and/or pneumatic components (such as actuator, junction box, switches, cables etc.).
- Recycle electronic and other corresponding components of the product in accordance with WEEE provisions.

- Recycle the steel frame and steel parts in accordance with steel recycling provisions.

If you require more details for recycling and waste disposal concerning a product, contact Halton.

8 Troubleshooting and repairs

8.1 Troubleshooting

Problem	Possible cause	Possible solution
Poor air quality in the room.	The airflow rate is too low.	Check and, if needed, adjust the chamber pressure. Check and, if needed, adjust the position of the HAQ control.
Cooling or heating does not work properly.	The airflow rate is too low.	Check and, if needed, adjust the chamber pressure.
Cooling or heating does not work properly.	The water valve does not work.	Check the operation of the water valve.
The unit makes a loud or whistling noise.	The airflow rate is too high.	Check and, if needed, adjust the chamber pressure.

8.2 Fault reporting and reclamations

For fault reporting and reclamations, contact Halton.

Provide the following information for easier service:

- Product type and serial number
- Customer name/project
- Order confirmation number (purchase or sales order number)
- Serial numbers of faulty components
- Reclamation description
- Pictures

8.3 Spare parts

For spare parts for your specific product, contact Halton.

Provide the following information for easier service:

- Product
- Customer name/project
- Order confirmation number (purchase or sales order number)
- Description
- Pictures

9 Technical reference data

9.1 Connections: Electric actuator of HAQ control

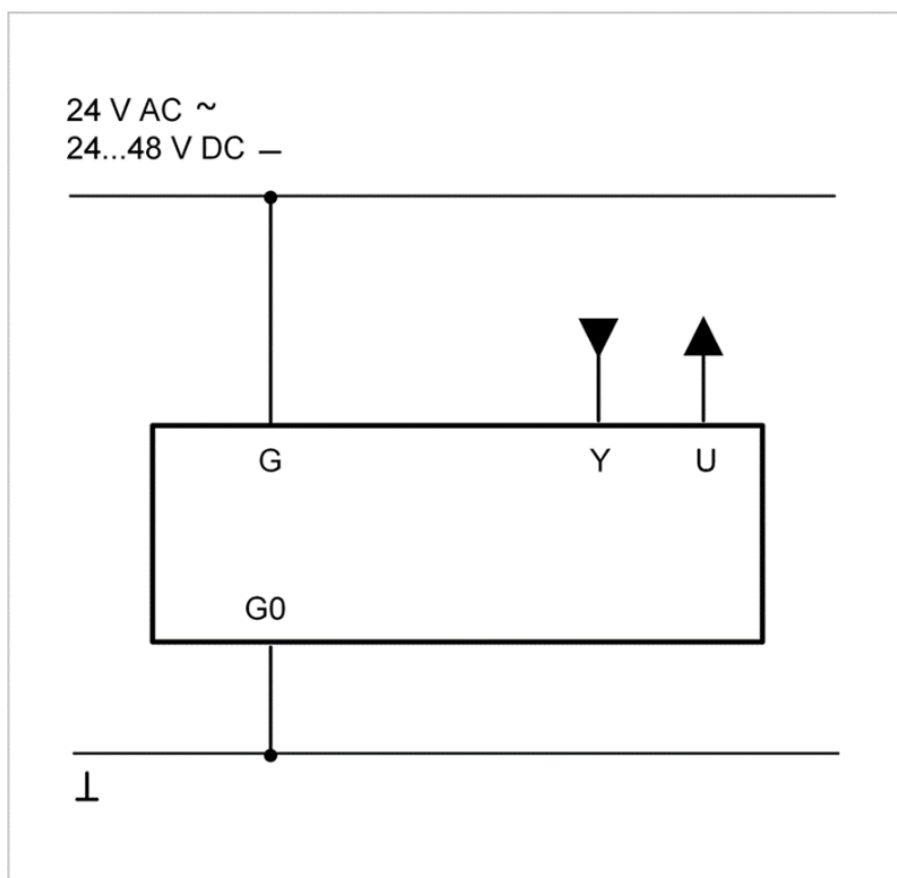


Figure 17. Connection diagram: Electric actuator of HAQ control

Connection	No.	Colour	Comment
G	1	Red	24 V AC / 24...48 V DC
G0	2	Black	Ground
Y	8	Grey	0...10 V DC. Control signal in for HAQ position. The voltage corresponds to the HAQ openings and k-factors according to the table below.
U	9	Pink	0...10 V DC. Feedback signal out indicating the HAQ position.

Position of HAQ control	Control signal voltage [V]	k-factor (total)					
		RXP/ C-600	RXP/ D-600	RXP/ E-600	RXP/ C-1200	RXP/ D-1200	RXP/ E-1200
0 / closed / no HAQ	0-1	1.1	1.6	2.5	2.1	2.9	4.7
1	2	1.7	2.1	3.1	2.6	3.5	5.3
2	3	2.2	2.7	3.6	3.1	4.0	5.8
3	4	2.7	3.2	4.1	3.7	4.5	6.3
4	5	3.2	3.7	4.6	4.1	5.0	6.8
5	6	3.7	4.1	5.1	4.6	5.5	7.3
6	7	4.1	4.6	5.5	5.0	5.9	7.7
7	8	4.5	5.0	5.9	5.5	6.3	8.1
8	9	4.9	5.4	6.3	5.9	6.7	8.5
9	10	5.3	5.7	6.7	6.2	7.1	8.9

Table 2. K-factors with different HAQ control positions