

FITTING - and MAINTENANCE INSTRUCTIONS

HEAT RECOVERY UNIT
HRC 300 4B(P/R)



Store near the appliance



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1. General

To maintain a healthy indoor environment closely-controlled ventilation is essential. There are many pollutants that will affect the indoor air quality: human body waste products in shape of CO₂, dead skin, perspiration and moisture. Add to this the waste product of cooking (cooking-smells), showering (moisture), gases from building-materials and the waste products of pets.

Without proper ventilation this environment would be perfect for the growth of mould and subsequently damage to the decoration and fabric of a dwelling.

The HRC unit is fitted with two fans:

The exhaust fan ensures that warm, damp and polluted air as near as possible to the source will be extracted. The exhausted air must be replaced with fresh air and so the HRC heat recovery unit has not only an exhaust fan but is also fitted with a supply fan and air filters.

The supply air, which in winter is colder than the inside air, is heated in the heat recovery unit using the heat of the exhaust air by means of the heat-exchanger.

This heat exchanger has an efficiency of 97%, so a minimum loss of heat takes place and the supply air temperature is at an acceptable and comfortable level.

In the summer, when heat-recovery is not desirable, the air does not go through the heat exchanger, but is diverted by way of a bypass-valve. By doing this during the night, with relatively cool supply air to ventilate the dwelling, a cooler dwelling temperature is possible. This is automatically detected and controlled by the unit electronics. The electronics also ensures, that in winter, when ice-formation in the exchanger is possible, the exchanger is defrosted, at a time that is most comfortable to occupants of the dwelling.

Further the fan speed will automatically switch up to a higher setting when a 5% increase in relative humidity is detected within a 2 minute period (usually during showering or cooking). After a preset period the unit will return to the lower set speed.

The fans are energy-low by the use of DC-motors with a constant (adjustable) air volume.

The filters in the unit ensure that the fresh supply air is clean as it enters the dwelling. Also the extract air from the property is filtered, so that the pollution of the heat exchanger is minimised. These filters have to be cleaned every month, depending on the pollution. The electronics in the unit is fitted with a timer for filter cleaning, which automatically indicates when it is time to clean the filters. The maximum period between replacements of the filters will be a year.

2. Version

2.1 General

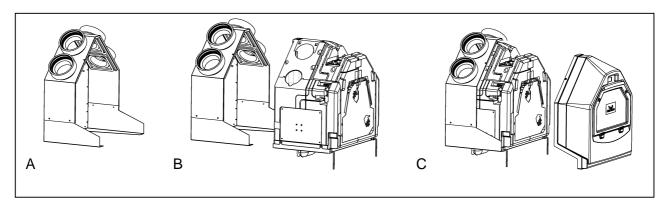
The Titon HRC is a complete heat recovery unit, which is fitted with an intelligent electronic control system to ensure optimum efficiency and protection under all conditions.

The unit can easily be set up for left or a right-handed operation. By changing the position of a module at the top of the unit it can quickly be configured to accommodate the ducting to outside on either the left or on the right side of the unit.

With the screws and plugs supplied fit the unit horizontally to the wall.

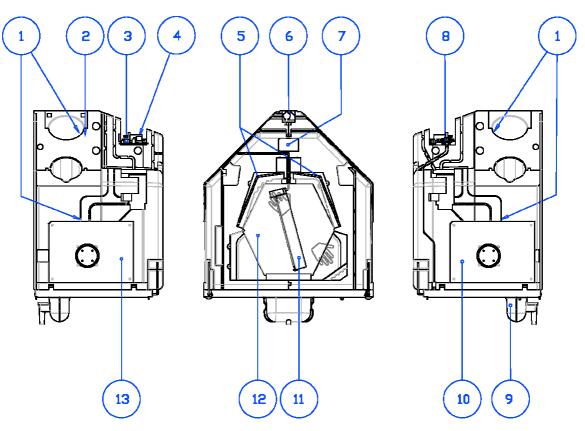
AS standard the unit is delivered complete with a wall mounting frame, fitting instructions, fixing kit and a condensate discharge trap. An fm wireless remote control is an optional extra.

2.2 Fitting HRC in brief



- A Mounting frame: Mounted by means of the screws and plugs supplied horizontally to the wall. Use the fixing points on the drawing attached to the mounting frame. When the frame is mounted horizontally to the wall, the ducting runs can be completed. Remember that both ducts to and from outside, will be fitted to one side of the unit and the ducts to and from the house are attached to the other side of the unit. Also the condensate discharge under the unit can be fitted at this stage.
- B When the ducting runs are completed if an appropriate electrical supply is present, the installation can be completed. Now the heat recovery module can be attached to the frame. Ensure that the "tree" on the left/right module corresponds to the side of the unit with the ducts to and from outside and the "house" is on the internal side. On the central PCB (3.1) adjust the air volume of the fans for low, middle and high speed. Both fans are adjusted to the same airflow to guarantee a balanced airflow. Push the heat recovery module fully to the back of the mounting frame and turn the handles at the bottom 180° to lock the unit in place. Also the condensation trap under the unit can be securely fastened with the wire clip supplied.
- C The cover of the unit can now be replaced and secured with the two screws and the power-supply can be connected. The unit will start-up immediately and begin to run but must be calibrated as described on page 13 in the start-up-procedure. When there are no failures during the start-up, the unit is ready and fully commissioned.

For further information about the operation, adjustment, failures and maintenance of the unit, read the next pages carefully.



Figuur 1: Parts of the heat recovery module - HRC 300 4B(P/R)

1.	Temperature sensor (4x)	Measures the temperatures in all connected ducts
2.	Humidity sensor	Measures the relative humidity in the exhaust air.
3.	Central PCB (3.1)	This pcb controls the fans, sensors and decides which function is
		activated
4.	Dip switches	Used to adjust the airflow for each speed setting
5.	Filters	Both supply and extract air is filtered
6.	Left/Right module	For left or right-handed orientation (house-tree / tree-house)
7.	Display Panel	Displays the current status and any failure of the HRC
8.	Receiver PCB (only R)	Pcb for wireless remote controlled HRC
9.	Condensate-trap	Connection for condensate drain with water trap
10.	Fan Right	Constant Flow fan with brushless DC motor supplies fresh filtered air
		to the dwelling or extracts stale air from the building depending on
		selected orientation of the HRC.
11.	Bypass valve	For supply of cool outside air in the summer.
12.	Heat exchanger	Takes care of the heat exchange between both airflows.
13.	Ventilator module links	Constant Flow fan with brushless DC motor supplies fresh filtered air
		to or extracts stale air from the dwelling depending on selected
		orientation of the HRC.

3.1 Mounting frame

The mounting frame of the HRC can be fitted directly to the wall with the delivered screws and plugs. The distance between both mounting-holes will be 53 cm. Under the mounting frame ensure there is at least 50 cm for the condensate discharge to be connected. On the mounting frame is a drawing, which indicates where to fit the condensate discharge. The position of the electrical power supply (an earthed wall socket or fused switched spur) is also indicated.

The unit must be secured horizontally. Ensure sufficient angle for the condensate discharge.

The installation must be in a frost-free room.

Make sure there is a free space of at least 80 cm at the front of the appliance for cleaning the filter and carrying out maintenance on the appliance.

3.2 Important instruction

The HRC unit must be installed in accordance with all relevant Building Regulations and Health & Safety requirements and the fitting instructions of the HRC 300 4B(P/R).

Connect mains after mounting the ducts!

3.3 Connecting ducts

When the mounting frame is fitted, the ducts can be fitted. On one side of the unit the duct to and from the dwelling, on the other side the ducts from and to outside.

To prevent condensation on the outside of the exterior air inlet duct and the air outlet duct from the HRC, these ducts must be insulated.

It is recommended that the ducts from and to the dwelling to the appliance using flexible ducting with a minimum length of 150 cm and flexible connections of the ducts to and from the outside to the appliance using flexible ducting with a minimum length of 50 cm. Flexible ducting should be fully extended with no drooping over joists but should not place any strain on the terminal or fixings.

Remember when sizing the ducts that this part of the installation will affect energy efficiency. So remember that energy will be wasted, during the passage of the air through the ductwork, if the ducts are too small. If possible ensure that the total resistance of the inlet- as well as the exhaust-system does not exceed 100 Pascal.

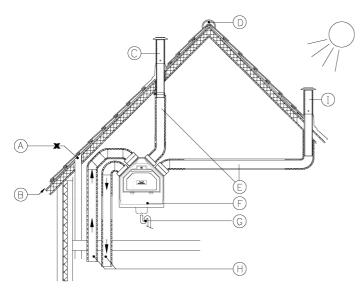
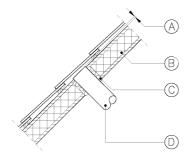


Figure 2: Connection example HRC

- A = No exhaust too close to an air inlet
- B = Ventilation inlet possible near roof end
- C = Inlet roof terminal
- D = Ventilated ridge tile
- *E* = Duct from and to outside insulated
- F = HRC (horizontal position)
- G = Condensate discharge conforms to installation instructions
- H = Ducts from and to the dwelling acoustically insulated
- *I* = Ventilation exhaust roof terminal

Arrange the exterior air supply from the sheltered side of the dwelling, for instance from the wall. Install the exterior air supply duct in such a manner that surface condensation is prevented.



A = 10mm above roofing

B = roof insulation

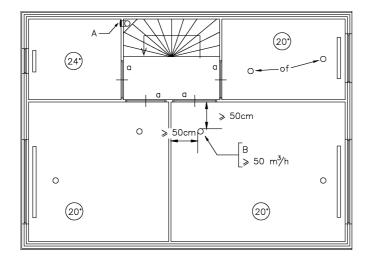
C = insulated with PUR

D = duct for air inlet - insulate carefully

Figure 3: Discharge duct through the roof.

Feed the discharge duct through the roof void in such a manner as to prevent condensation; in addition, the discharge duct between the HRC and the roof terminal must be designed to prevent surface condensation.

The mechanical ventilation outlet, the air inlet and any soil & vent pipes should each be separated by at least one metre.



- A = Outlet valve ø125 plastic (MKL) or metal (EFF-125)
- B = Inlet valve ø100 (TFF-100) or ø125 (TFF-125)
- a = Gap under the door 2 cm.

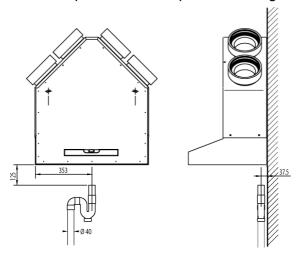
Figuur 4: Location outlet and inlet valves.

Install sufficient overflow openings, door gap 2 cm.

3.4 Connecting condensate discharge

The condensation-trap must be mounted at the bottom of the HRC with the wire clip supplied. **Caution!** Before mounting you have to fill the trap with water.

The diameter of pipework to the air-trap is 32 or 40 mm. The position of the drain is indicated at the drawing in the mounting frame. The condensate water must leave through the drain pipe. Take care that the distance between siphon and air-trap will be enough for de-mounting and cleaning.



Figuur 5: Connection of HRC to drain pipe

3.5 Placing the heat recovery module

After fitting all the ducts at the mounting frame, and after fitting the condensate discharge, the "heart" of the unit can now be installed.

Take the heat recovery module from the carton and push it from the front into the mounting frame. Push the unit fully to the back and secure by turning the handles at the bottom 180°.

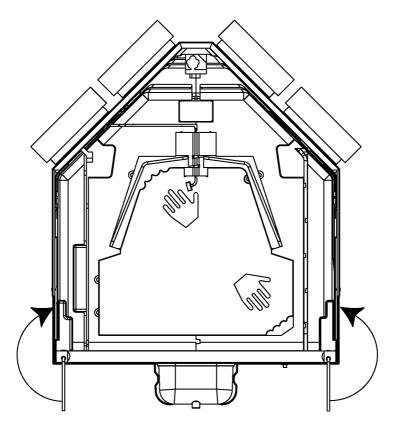


Figure 6: Placing the heat recovery module of the HRC

After positioning the heat recovery module, the dip switches can be adjusted to give the desired air volume. (See § 2.9.) Ensure that the filters are correctly located.

3.6 Replacing the cover

After the heat recovery module is fixed in place the cover can be attached. Offer up the cover with its front pointing downwards. Hook the two brackets on the underside of the cover into the slots in the mounting frame. Now you can fix the upper side of the cover at the upper side of the mounting frame with the two screws provided. If it is difficult to push the cover totally against the unit open the flap in the cover. After closing the cover (and flap) the unit can be connected to the power supply.

3.7 Electrical connections

3.7.1 HRC with 4 core and earth cable

The electric installation must comply with the local regulations.

3.7.2 HRC with fm wireless remote control

The electric installation must comply with the local regulations.

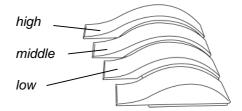
3.7.3 Speed control with 4 core and earth cable

The unit requires a power supply of 230 Volt (terminal L3 and N). The speed control takes place by means of a 3-speed switch and utilising 4 core and earth cabling to the unit.

For the correct wiring diagram see § 5.4.1..

3.7.4 Speed control with a fm wireless remote control

The HRC-4-BR is delivered prewired. The unit must be connected to 230V~50Hz supply via a 3A fused spur. Dip switch 1 on the transmitter should be set to "off", (low battery simulation). Test that the unit responds to the transmitter by changing the speed. When the unit works properly, dipswitch 1 can be put "on" again and the controller fixed to the wall with the fixings provided.



The transmitter dipswitches and the dipswitches on the receiver of the HRC must be set to the same configuration. The transmitter is provided with four keys: The smallest paddle and the one above both give the low speed. The next paddle is for the middle speed and the largest paddle is for the highest speed.

See § 5.4.2 for settings of the fm wireless remote controller.

3.8 Overview connection HRC

The HRC can be configured either as a standard or a mirrored unit. As a standard unit, the duct connections on the left side of the unit will go outside and the duct connections at the right side go to the dwelling. The turn-module will show a "tree" on the left and a "house" on the right side.

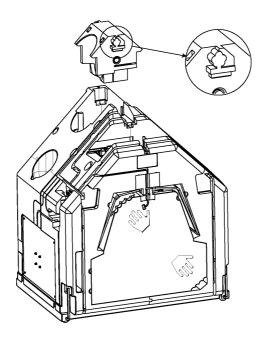


Fig.3.8 Turn-module

If the unit is to be configured as a mirrored unit, you can pull the turn-module out of the unit and turn it 180° (reverse side to the front) and insert it back into position. You will see that now the "tree" is on the right side and the "house" on the left side. The connections at the unit have now changed. The connections on the left side now lead to the dwelling and the connections on the right side lead outside.





The top connection is always the suction side (suction from outside or from the dwelling) and the bottom connections are the pressing connections (exhaust to outside or inlet to the dwelling). The magnets on the turn-module are used to configure the unit for left or right-handed operation and must not be changed or removed after the initial set up.

Attention! Keep the magnet away from credit cards and other objects sensitive to magnetic fields.

3.9 Adjusting the air performance

The HRC is provided with constant volume fans.

The integrated electronics controls the speed of each ventilator, to keep the airflow equal conform the settings of the dipswitches independent of the resistance of the system. For this reason the speed of both fans will not always be equal, because he resistance of the inlet and exhaust system will not always will be equal.

By means of the dip switches on motor-pcb's at both sides of the unit, you can easily change the airflow of the highest speed. The factory setting is 225 m³/h.

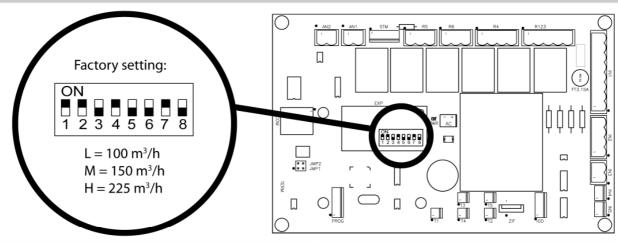
Possible configurations are 200, 225, 250 275 and 300 m³/h.

To change the airflow of the ventilator follow instructions below:

- 1. Remove the cover from the unit.
- 2. The dip switches on the motor-pcb's on both sides of the unit are now accessible
- 3. Set the dip switches on both pcb's to the desired airflow after checking the setting on the drawing below.
- 4. Refit the cover and make sure that the filters in the unit are clean.
- 5. Restart the unit.

Important: Before removing the cover you must isolate the electrical power to the unit.

Dipswitch settings



Low	
ON 1 2	1 = OFF , 2 = ON 90 m³/h
ON 1 2	1 = ON , 2 = ON 100 m³/h

Middle	
ON	3 = ON , 4 = OFF 125 m³/h
ON	3 = OFF , 4 = ON 150 m³/h
ON	3 = ON , 4 = ON 175 m³/h

High		
ON	5 6 7 8	5 = OFF , 6 = OFF, 7 = OFF, 8 = OFF 200 m ³ /h
ON	5 6 7 8	5 = ON , 6 = OFF, 7 = OFF, 8 = OFF 210 m³/h
ON	5 6 7 8	5 = OFF , 6 = ON, 7 = OFF, 8 = OFF 220 m³/h
ON	5 6 7 8	5 = OFF , 6 = OFF, 7 = ON, 8 = OFF 225 m ³ /h
ON	5 6 7 8	5 = OFF , 6 = OFF, 7 = OFF, 8 = ON 230 m³/h
ON	5 6 7 8	5 = ON , 6 = ON, 7 = OFF, 8 = OFF 240 m ³ /h
ON	5 6 7 8	5 = OFF , 6 = ON, 7 = ON, 8 = OFF 250 m ³ /h
ON	□ □ □ □ 5 6 7 8	5 = OFF , 6 = OFF, 7 = ON, 8 = ON 260 m³/h

ON	5 6 7 8	5 = ON , 6 = OFF, 7 = OFF, 8 = ON 270 m³/h
ON	5 6 7 8	5 = ON , 6 = OFF, 7 = ON, 8 = OFF 275 m³/h
ON	5 6 7 8	5 = OFF , 6 = ON, 7 = OFF, 8 = ON 280 m³/h
ON	5 6 7 8	5 = ON , 6 = ON, 7 = ON, 8 = OFF 290 m³/h
ON	□	5 = OFF , 6 = ON, 7 = ON, 8 = ON 300 m ³ /h
ON	5 6 7 8 5 6 7 8	
		300 m³/h 5 = ON , 6 = OFF, 7 = ON, 8 = ON

4. Maintenance

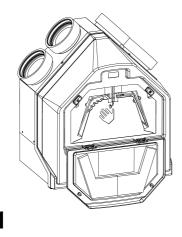
4.1 User maintenance

User maintenance is limited to periodically cleaning the filters. The unit is fitted with a filter timer.

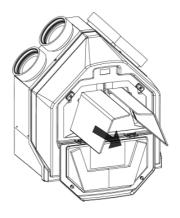
If you have to clean the filters a red led in the panel will start flashing on/off. This filter indication will start flashing each month. The unit should not be used without filters.

2

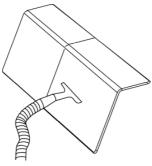
Cleaning the filters by user



- Switch off the power supply
- Open the filter door

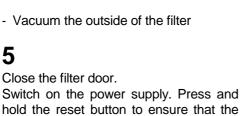


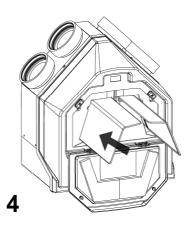
- Remove the filters





red led stops flashing.

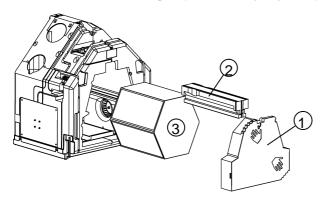




- After cleaning replace filters at same side

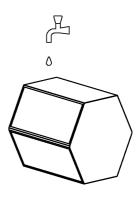
4.2 Installer maintenance

Take out the heat exchanger (once every 3 years)



1

Switch off the power supply and remove the cover Remove the bypass cover (1) Remove the press tray (2) Remove the heat-exchanger (3)



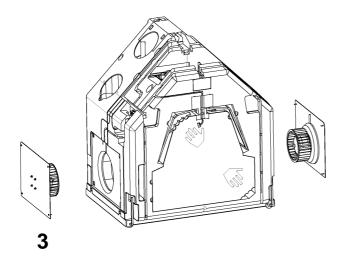
2

Clean the heat-exchanger with warm water and a mild detergent.
Rinse with warm water.

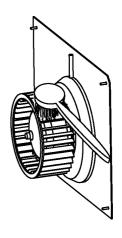
Clean the fans (if dirty)

The fans must be cleaned if they are dirty.

Be sure not to bend the fan blades; this could cause a motor imbalance, unnecessary noise and will shorten the life of the motor bearings.



Disconnect the power supply
Pull the inner-assembly out of the frame
Disconnect the wiring to the motor from the pcb
Unscrew the 4 screws of the motor plate
Take off the fan



Clean the fan with a dry stiff brush Prevent damage to the fan blades. Do not use water for cleaning.

4. Maintenance

4.3 Mounting of the heat-exchanger and the motor plates

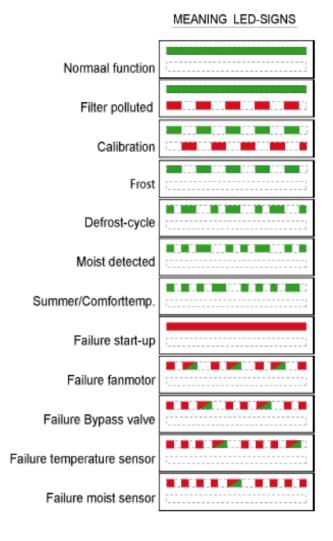
- Replace the heat exchanger and fans by reversing the instructions in 4.2
- Replace the heat exchanger from above and ensure that there is no leakage between supply and extract airflows.
- Push the pressure tray into position. This may require some force as the seal between the exchanger and the housing is a tight fit. Replace the filters.
- Replace the motor plates into the housing and fix the 4 screws (M3). Reconnect the wiring of the motor to the motor-pcb.
- Mount the cover of the unit.
- Reconnect the power to the unit and check that the unit functions correctly.

4.4 LED indication / Fault warnings

When there is a failure or a certain scenario, this will be shown on the display of the unit.

The key to the meanings of the various LED indications is located on the filter door of the cover. A red LED indicates that action is required. A green LED indicates a particular mode of operation.

When the LED indication is not in the key shown here stop the unit immediately and contact your installer or the distributor of the unit.



5. Technical specifications

5. Technical specifications

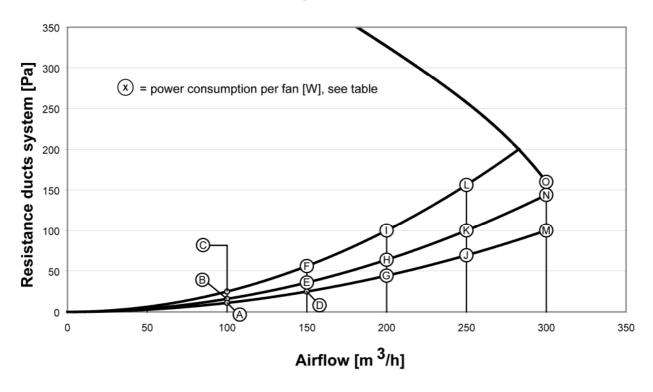
5.1 Appliance data

Fan settings	Low speed	Middle speed	High speed	Maximum speed	
Ventilation capacity, factory settings [m³/h]	100	150	225	300	
Rated power [W]	18-22	29-50	72-98	144-169	
Rated current [A]	0.14-0.15	0.21-0.34	0.49-0.65	0.95-1.1	
$Cos\ arphi$	0.60-0.61	0.62-0.63	0.64-0.65	0.66-0.67	
Permissable duct/ system resistance [Pa]		160 Pa	at 300 m ³ /h		
Dimensions (w x h x d) [mm]		706 x	780 x 565		
Duct diameter [mm]	Ø1	50/160 (Ø180 =	Outside diamet	er ducts)	
External diameter condensate discharge [mm]	Ø 20				
Filter class	EU3 (EU7 optionel)				
Weight [kg]	39 kg (frame 12kg; unit 23kg; cover 4kg)				
Supply voltage [V~/Hz]	230 / 50				
Protection degree	IP30				
Temperature efficiency [%]	95				
Factory Setting	Middle speed				
Independently laboratory tested to Dutch mechanical ventilation with heat recovery	η_{WTW} measured [%]		97,3		
test standard, NEN 5128.	$\eta_{ m WTW}$ NEI	N 5128 [%]	95		
	I [A]		0	0,155	
	U [V]		230		
	$\cos \varphi$		(0,62	
	No of fans 2				

Sound pressure level LpA [dB(A)]					
Ventilation capacity [m³/h]	Static pressure [Pa]	0 Pa	50 Pa	150 Pa	300 Pa
150	Breakout from unit	29,5	34,4	38,6	44,9
150	Supply air outlet	46,3	49,0	54,3	60
300	Breakout from unit	44,3			
300	Supply air outlet	59,5			

5.2 Fan air performance graph

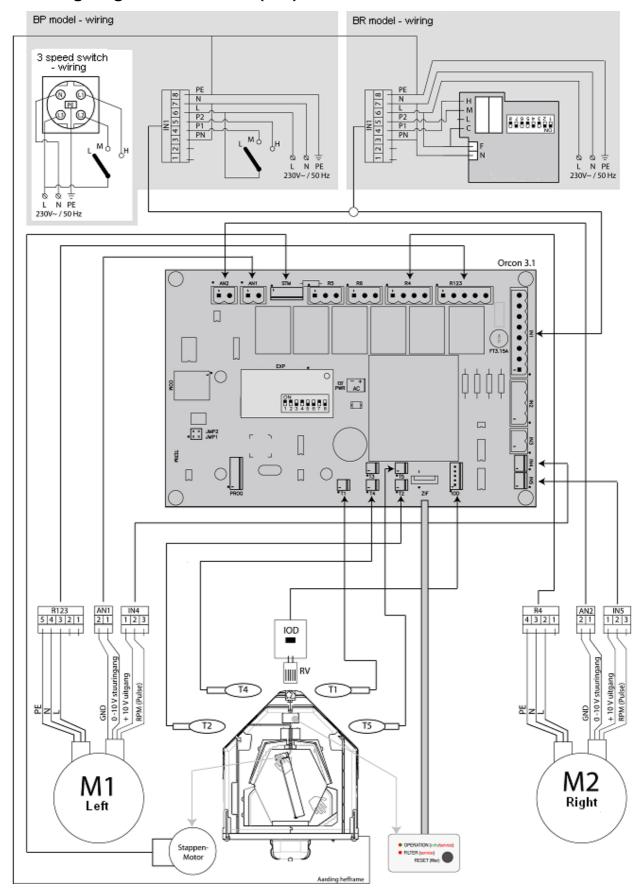




Point	[m ³ /h]	[Pa]	U [V]	I [A]	$\cos \varphi$	P [W]
Α	100	12	230	0,068	0,602	9,4
В	100	16	230	0,070	0,604	9,7
С	100	25	230	0,075	0,612	10,6
D	150	25	230	0,102	0,626	14,8
Е	150	36	230	0,110	0,621	15,7
F	150	56	230	0,120	0,625	17,3
G	200	44	230	0,188	0,643	27,8
Н	200	64	230	0,191	0,642	28,2
I	200	100	230	0,225	0,652	33,7
J	250	69	230	0,287	0,663	43,8
K	250	100	230	0,323	0,668	49,6
L	250	156	230	0,402	0,667	61,7
М	300	100	230	0,472	0,671	72,9
N	300	144	230	0,515	0,658	77,9
0	300	160	230	0,546	0,662	83,2

5. Technical specifications

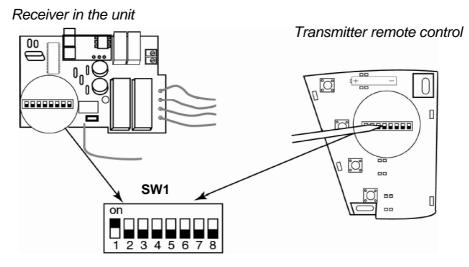
5.3 Wiring diagram HRC 300 4B(P/R)



5. Technical specifications

5.5 Setting transmitter / receiver dipswitches (R versions only)

Set the dip switches, 2 to 8 on the transmitter (under "middle" speed selector arm on the transmitter remote control) to the same positions as the dip switches on the receiver. These are located under the cover next to the PCB 3.1. There are 127 variants possible. Ensure that the 'code' varies from other people in the neighbourhood. The two other dip switches are unused.



5.6 Mounting remote control

Before mounting the transmitter remote control you first have to test that the transmitter signal reaches the HRC unit from the chosen mounting position, with dipswitch 1 set to off (low battery simulation).

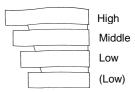
Please do not mount the remote control under a metal cooker hood.

Mount on a flat surface with the screws and wall plugs supplied. Please note: After mounting dip switch 1 has to be set to the "ON" position.

USE

The remote control of the HRC is fitted with four keys:

- High: use this speed for cooking or showering
- Middle: for daily use by normal use of the dwelling
- Low: for use during the night or during vacations.
- (Low): Pressing this key, the unit works as Low.



6. Maintenance

6.1 Exploded view HRC

When ordering parts, you have to mention the article code number (see exploded view), the type of heat recovery appliance, serial number, production year and the name of the part:

Example: Appliance type : HRC-300-4BP

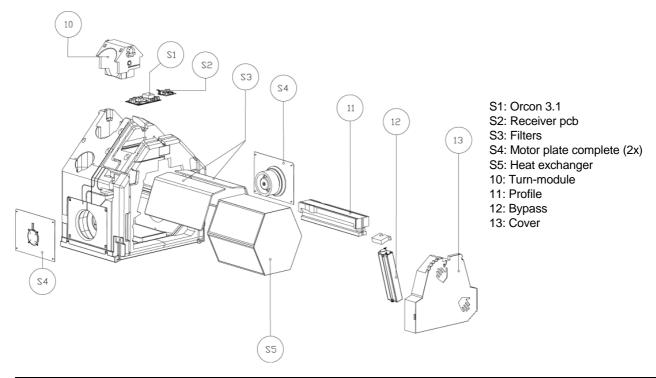
Serial number : 061180031 Year of production : 2006

Part : Motor plate complete

Article code : 29199170

Quantity : 1

Type and serial number are printed at the identification plate on the top of the inner assembly.



Article codes service-articles HRC				
Nr.	Article description	Article code		
S1	Central PCB (Orcon 3.1)	29199753		
S2	Receiver pcb (R-version only)	29190750		
S3	Filter set (2 x G3 filter)	29199770		
	Pollen filter (1 x F7)	29190773		
S4	Motor plate complete	21200170		
S5	Heat-exchanger	29199771		
S6	Humidity sensor	29199763		
S7	Temperature sensor	29199748		
S8	Condensate trap	29199836		

Specifications may change

We continuously strive to improve our products and reserve the right to change the specification without prior notice.

The heat recovery appliances type

HRC-300 4-B..

Manufactured by Orcon B.V. in Veenendaal, the Netherlands

bears the CE label

and satisfies the machine directive 89/392/EEG, the low voltage directive 73/23/EEG and the EMC-directives 89/336/EEG.

Orcon B.V. warrants that the HRC-300 heat recovery appliances are manufactured from high-quality materials and that continuous quality control ensures that they comply with the above directives.

Orcon B.V.

M. Voorhoeve,

Director



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