AirSmart

Smart with air

AirSmart ICTUS 250P / 350P / 450P

User manual

1   Inhoudstafel

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2 Warning and safety regulations

Important

READ THESE INSTRUCTIONS CAREFULLY BEFORE INSTALATION.

1. Do not mount this product in places where the following conditions (may) occur:
   - Excessive oil or grease in the atmosphere;
   - Corrosive or flammable gases, liquids, or vapors;
   - Sprinkler water from fire hoses;
   - Temperatures above 40°C or below -10°C.
   - Possible obstructions preventing access to the unit or removal from it.
2. All wiring should conform to current IEE wiring regulations BS7671 or relevant standards in your country. Installation should be checked and tested after completion by a qualified person.
3. When installing an AirSmart ventilation unit, care should be taken not to damage electrical or other concealed wiring.
4. The installer is responsible for the on-site installation and electrical connection of the ventilation system. It is also his responsibility to ensure that the unit is installed safely and according to the guidelines.
5. All legal requirements must be strictly followed to prevent danger during and after the installation as well as during service and maintenance.
6. The ventilation device should be connected with a two-pole plug + grounding. This plug should be plugged into a matching socket. This socket must be protected by a 16A fuse.
7. Ensure that the power supply (voltage, frequency, and phase) matches the values on the identification plate.
8. AirSmart ventilation units should be grounded.
9. The unit's condensation drain should be connected to the drainage system via a water seal (e.g., filled siphon).
10. No exhaust or supply grilles may be connected to the unit in a room where an open combustion boiler is installed.
11. To obtain the desired noise level, the installer may be required to use noise and vibration-damping fasteners. These are not provided as standard.
12. The unit should not be connected directly to the return air of a dryer.
13. The exhaust or supply valves should be fully opened before the unit is put into operation.
14. Air supply must come from outside the building.
15. Check the internal condensation drain and associated pipes for blockages and obstructions before starting up.
16. The supply and exhaust valves on the ceiling should be at least 300 mm from a wall. This is necessary to correctly use the airflow measurement equipment.
17. The unit should stabilize for at least five minutes when you switch to another ventilation mode.
18. If the AirSmart ventilation unit is installed in a new building, the supply and exhaust filters should be checked at least every month for the first six months.
19. his device should be placed out of the use of children. It is not a toy.
20. Ensure that the supply and exhaust ducts are sufficiently separated and at least 2000 mm away from any flue.
21. If the ducts or condensation drainage pass through an unheated attic or similar location, they should be insulated.
22. This product should not be disposed of with household waste. If possible, arrange for recycling. Consult your local authorities for advice.

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3 General information about AirSmart ventilation units

3.1 Introduction to ICTUS

AirSmart offers with its ICTUS ventilation units a compact solution for residential ventilation. The three variants have the same functionalities but are suitable for different volumes (250 m3/h, 350 m3/h, and 450 m3/h). The ICTUS can fully supply a building with continuous ventilation with heat recovery.

One of the core values at AirSmart is doing business in a responsible way. This idea was always at the fore in the development and production of the units. Thus, on the one hand, the units are assembled at a (local) high-quality social workshop and the components are purchased as locally as possible. On the other hand, the design of the ICTUS is strongly focused on the environmental aspect, which makes the unit a true E-level champion. Because of its unique and out-of-the-box design, both ceiling and wall mounting is possible where a left/right configuration can be applied with smart software. In addition, the featherweight of the ventilation unit ensures light and ergonomic installation. Furthermore, the acoustic performance of the ICTUS is exceptional. To minimize noise produced by airflows, a new fan housing was developed. In addition, some deliberate choices were made regarding the shape, finish, and material of the units, further reducing air resistance to the minimum

The central brain of the ICTUS units is powered by a (self-learning) advanced software developed by AirSmart itself. This way, the various components are controlled in a smart and efficient way to work together seamlessly. The system further uses sensors to monitor both indoor and outdoor temperature, as well as air quality. All this data is processed and stored by the software which will adjust the various system components (bypass/heat recovery/atomization units) as needed. The units are connected to the 230V grid as standard and are controlled with a 4-stage RF transmitter, 3-position wired switch, or via the AirSmart application.

The ICTUS units also feature a bypass function based on the measured indoor air intake temperature instead of the outdoor temperature. This allows the bypass to have cooling, heating, and humidity control functions.

3.2 Available version of AirSmart ICTUS ventilation units

1. The AirSmart ICTUS 250P can deliver 255 m³/h at 200 Pa duct resistance. Comes standard with automatic bypass with cold and hot functions.
2. The AirSmart ICTUS 350P can deliver 360m³/h at 200 Pa duct resistance. Comes standard with automatic bypass with hot and cold functions.
3. The AirSmart ICTUS 450P can deliver 480m³/h at 200 Pa duct resistance. Comes standard with automatic bypass with cold and hot functions.

All units have the same compact EPP casing (1065x770x327mm) and weigh less than 15kg.

3.3 Mounting and placement options

All versions of the ICTUS have identical external dimensions. Each ICTUS (250p, 350p, and 450p) can be either ceiling or wall mounted. A left or right mounting is also free to choose since this can be easily adjusted by software. On the narrow sides of the unit, there are four Ø180 mm connections. On the cover of the packaging, there are arrows indicating the direction of airflow. Finally, the unit's electronics are fully accessible through the lid. Therefore the device can be built in all around. The cover should remain accessible only for maintenance convenience
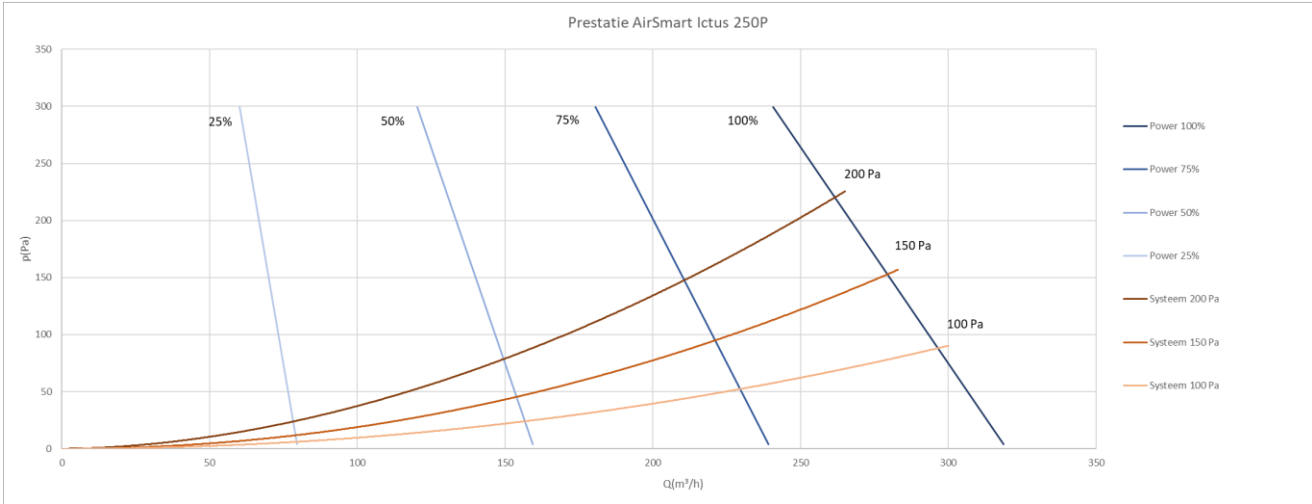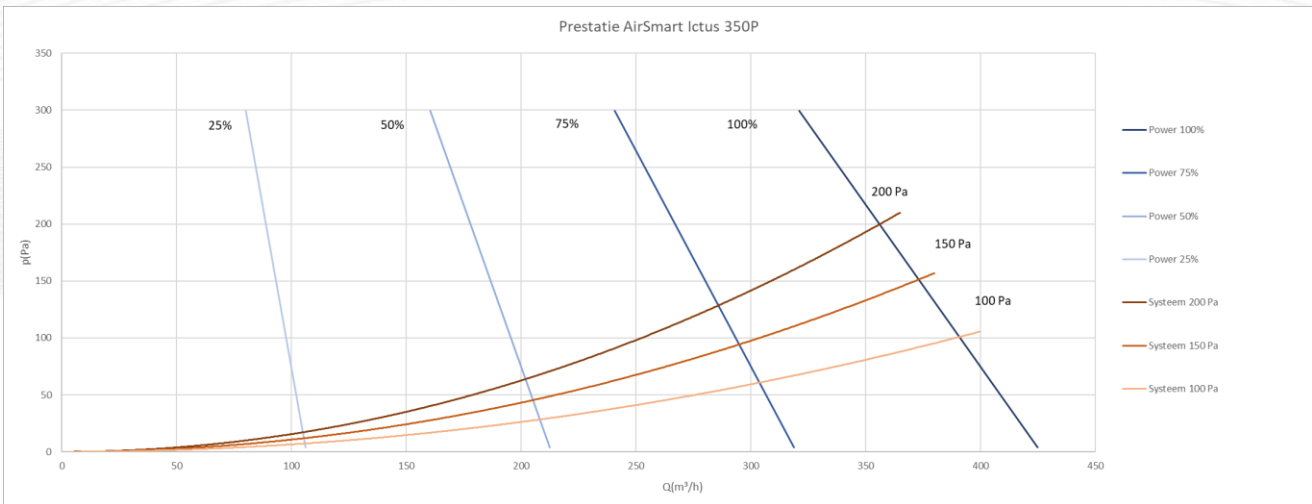
Smart with air

4   Technical data

	ICTUS 250	ICTUS 350	ICTUS 450
Physical characteristics			
Dimensions	1065x770x327mm	1065x770x327mm	1065x770x327mm
Connection	4 x Ø180mm	4 x Ø180mm	4 x Ø180mm
Weight	15 kg	15 kg	15 kg
Condensation drainage	Ø 19	Ø 19	Ø 19
Mounting	ceiling and wall	ceiling and wall	ceiling and wall
Heat exchanger	counterflow, PET/polystyrene	counterflow, PET/polystyrene	counterflow, PET/polystyrene
Casing	Expanded PolyPropylene (EPP)	Expanded Polypropylene (EPP)	Expanded Polypropylene (EPP)
Internal materials	EPP, PP, galvanized steel	EPP, PP, galvanized steel	EPP, PP, galvanized steel
Elektrische characteristics			
Ventilatortype	DC	DC	DC
Net voltage	220-230 VAC	220-230 VAC	220-230 VAC
Frequency	50Hz	50Hz	50Hz
MAX current	2A	2A	3,5A
MAX power	90 Watt	176 Watt	332 Watt
IP	IP40	IP40	IP40
General			
Filters (standard)	G4	G4	G4
Fine dust filter (F7)	option	option	option
Demand control	/	option	option
Control	AirSmart application	AirSmart application	AirSmart application
Rf transmitter	option	option	option

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	ICTUS 250P				ICTUS 350P				ICTUS 450P			
	Energy efficiency											
Airflow m³/h	/	151	201	256	256	291	366	401	365	405	451	501
efficiency %	/	84%	82%	81%	81%	80%	78%	77%	78%	77%	76%	75%
Max power	45 Watt / Fan				88 Watt / Fan				169 Watt / Fan			
Automated control	Ja				Ja				Ja			
Bypass	100%				100%				100%			
Internal CO_2, VOC, RH extension	f reduc 0,93				f reduc 0,93				f reduc 0,93			
CO_2 room sensor in living- and bedroom	f reduc 0,87				f reduc 0,87				f reduc 0,87			
CO_2 room sensor in each dry room	f reduc 0,53				f reduc 0,53				f reduc 0,53			

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Performance curve ICTUS 250P

Prestatie AirSmart Ictus 250P

Performance curve ICTUS 350P

Prestatie AirSmart Ictus 350P

Performance curve ICTUS 450P

Prestatie AirSmart Ictus 450P

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ICTUS left configuration

	House side		Outdoor	
Supply				Blow off

PCB

Fan 2 — T3, T4
Fan 1 — T1, T2

Co2 / T6 — Filter
T5 — Filter

Extraction

Fresh air

ICTUS right configuration

	Outdoor		House side	
Blow off				Supply

PCB

Fan 2 — T3, T4
Fan 1 — T1, T2

T6 — Filter
Co2 / T5 — Filter

Fresh Air

Extraction

Smart with air
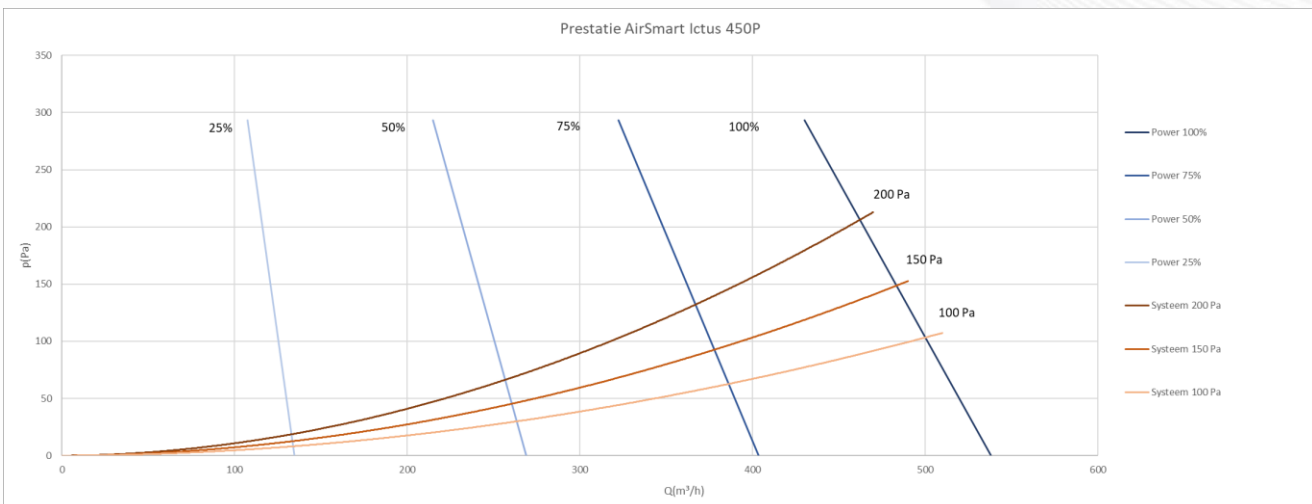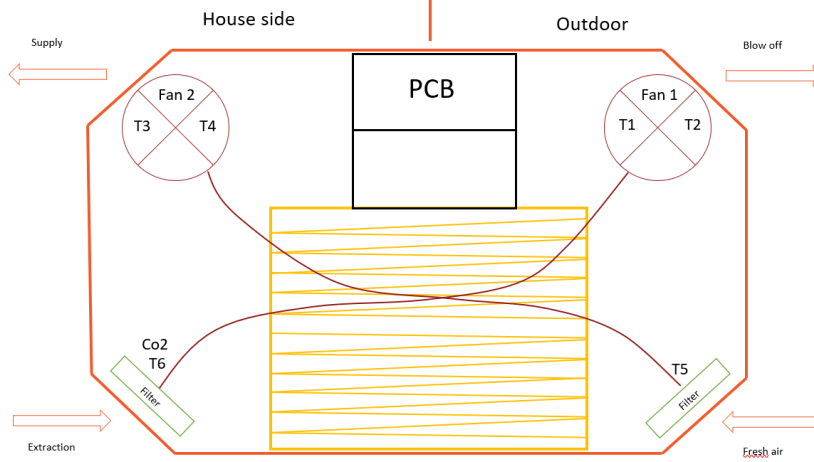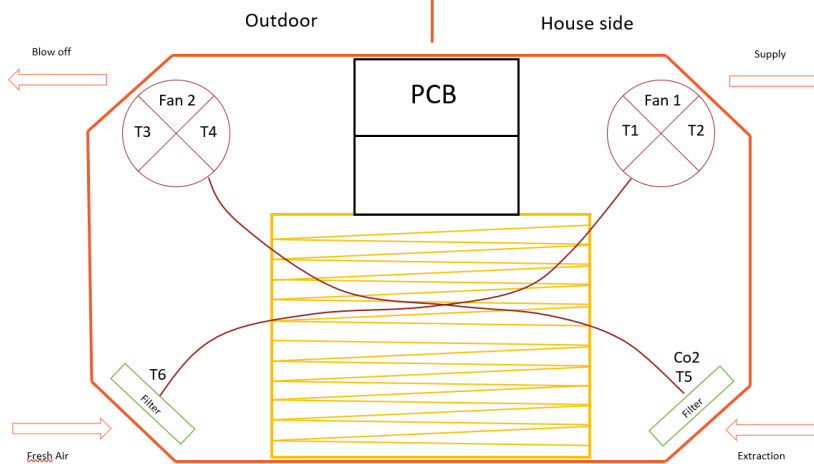
5 Installation requirements

5.1 Unboxing the unit

⚠️ Do not use sharp objects to open the box.

The package of the ICTUS units includes the following:

1	x	AirSmart ICTUS unit
2	x	Mounting profile
4	x	Self-tapping screws 4.2 x 45mm
4	x	Plug M8 x 40mm
4	x	Threaded screw with metric threaded end M6
2	x	Rubber vibration dampers Ø20 mm – 15 mm high
2	x	Rubber vibration dampers Ø20 mm – 30 mm high
4	x	Sterknop M6
1	x	Condense hose 20 mm
1	x	PP wall pass-through 1/2" – ceiling mounting
1	x	PP Pilar vertical 1/2" female - 20mm – ceiling mounting
1	x	PP Pilar vertical 1/2" male - 20mm – wall mounting
1	x	PP 90° 1/2" male - 20mm – wall mounting

Items for mounting
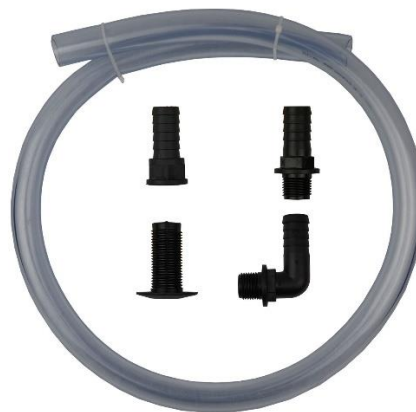
Items for condensation drainage

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5.2   Condensation drain

To avoid later problems, it is important that the appliance's condensation drain is properly installed. The location of the condensation drain is determined by whether the appliance is connected on the left or right and whether it is fixed against the wall or to the ceiling.

5.2.1   Wall mounting

For wall mounting, a straight PP pillar should be used. If space is limited, the 90° pillar can be used.

Pieces:

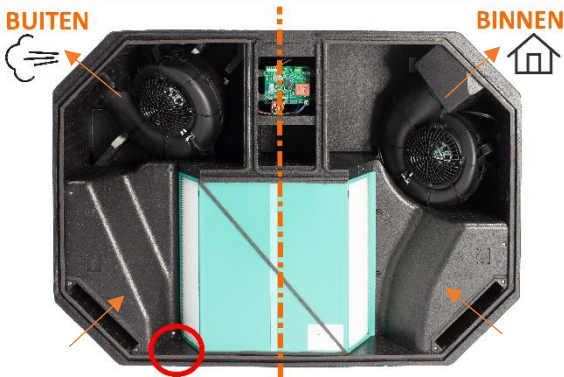PP Pilar straight 1/2" M - 20mm – wall mounting   PP 90° 1/2" M- 20mm – wall mounting
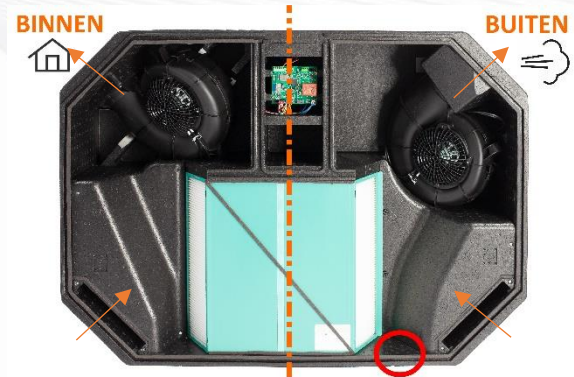

OR

Location of the condensation drainage:
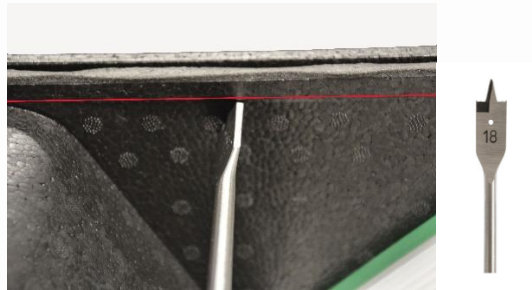marked with **RED**

Right CONFIGURATION   LEFT CONFIGURATION

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Installing condensation drainage:

STEP 1: Determine the location of the condensation drain. On the outside of the casing, you will find a small recess in the EPP. This will be different depending on whether the unit is connected on the left or right (see red markings above). Along the inside of the casing,y ou can feel this by a slight hollowing in the material.

STEP 2: To make the hole in the EPP use an 18MM wood drill, it is important to drill from the inside to the outside. This must be done very precisely to avoid leaks. Make sure that the drill stays under the edge of the casing as indicated in the picture below (under the red line).

STEP 3: Mount the pilar (straight or 90° bend) in the pre-drilled hole with the glue on the flat side (as marked with the orange arrows).

Mounting the hose:

The condensation hose must be placed in a siphon. It is important that it is completely submerged in water.
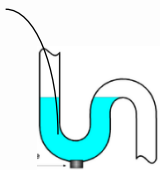
Caution: The PP Pillar Straight 1/2" M- 20mm - Ceiling Mounting (photo left) and the PP pilar1/2 "F- Ceiling Mounting (photo right) are only used for ceiling mounting! So do not use them for wall mounting, this would lead to an unwanted height difference.

5.2.2   Ceiling mounting

In case of ceiling mounting both a male (M) and female pillar (F) (see images below) should be used.

Pieces:

PP pillar straight 1/2" M – ceiling mounting   PP Pilaar straight 1/2" F - 20mm – ceiling mounting

and

Location of the condensation drainage:
marked in **RED**
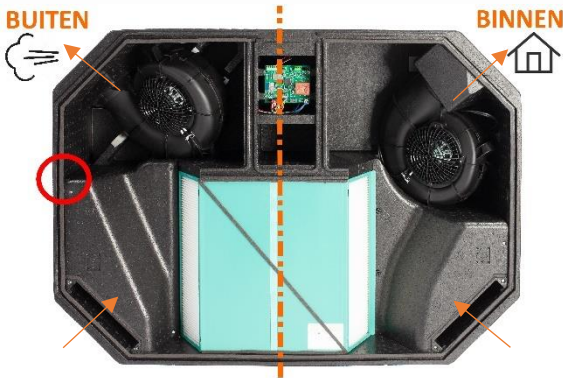
Right CONFIGURATION   Left CONFIGURATION
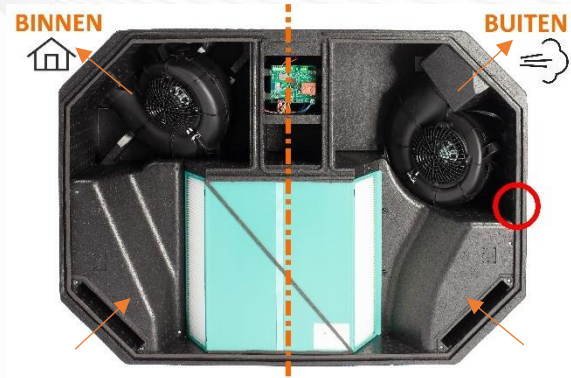
Installing condensation drainage:

STEP 1: Determine the location of the condensation drain. On the outside of the casing, you will find a small recess in the EPP. This will be different depending on whether the unit is connected on the left or right (see red markings above). Along the inside of the casing, you can feel this by a slight hollowing in the material.

STEP 2: To make the hole in the EPP use an 18MM wood drill, it is important to drill from the inside to the outside. This must be done very accurately to avoid leaks. Make sure that the drill stays under the edge of the casing as shown in the picture below (under the red line).
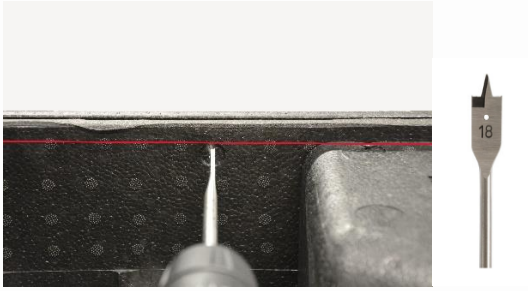
STEP 3: Glue the supplied PP pillar M from the inside out, with the glue on the flat side of the pillar (as indicated by the orange arrow). Then screw the PP pillar straight F onto the threaded end of the mounted wall bushing.

<u>Mounting the hose:</u>

The condensation hose must be placed in a siphon. It is important that it is completely submerged in water.
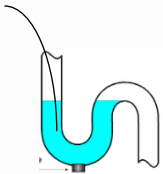
5.3   Mounting the ICTUS unit

5.3.1   *Drilling*

The correct dimensions of the drill holes are printed on the back of the box. If you cut the assembly template from the box (like the blue outline in the picture) you can use this to easily determine the position of the holes in the structure. Then drill 8mm holes at these positions with an appropriate drill bit according to the material.

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5.3.2 Mounting the hanging rials on the ICTUS

On the inside of the casing, galvanized mounting plates are glued into the bottom. This ensures that the unit can be easily and quickly mounted.

STEP 1: Place the unit on a flat surface with the cover down. Then on the back, you will see the four pre-cast recesses in the EPP casing (see picture)
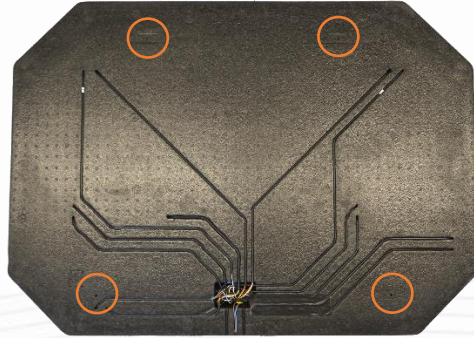
STEP 2: Place the two hanging rails on the bottom of the unit with the closed side facing the bottom. (see photo)

STEP 3: Place the self-tapping screws in the pre-drilled holes and screw them in place. This is best done with a screwdriver that slips at a certain pressure

5.3.3 Mounting vibration dampers

STEP 1: Insert the M8 plug into the pre-drilled hole of your wall or ceiling and screw the provided screw with the M6 end into the plug. Repeat this for the other three plugs.

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STEP 2: Screw the vibration damper onto the M6 threaded rod and secure the unit to the profile with the star knob. Repeat for the remaining three vibration dampers.

Caution: There are two sizes of vibration dampers, 15mm ones and 30mm ones. Depending on how the unit is mounted, their position switches. In 4.3.4 this is illustrated.

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5.3.4 Different positions of the ICTUS unit

To ensure proper condensation runoff, the unit must be mounted correctly (inclined). The illustrations below show the position of the unit in the different configurations.

PLAFONDMONTAGE: zij-aanzicht lange zijde

zij-aanzicht korte zijde

WANDMONTAGE
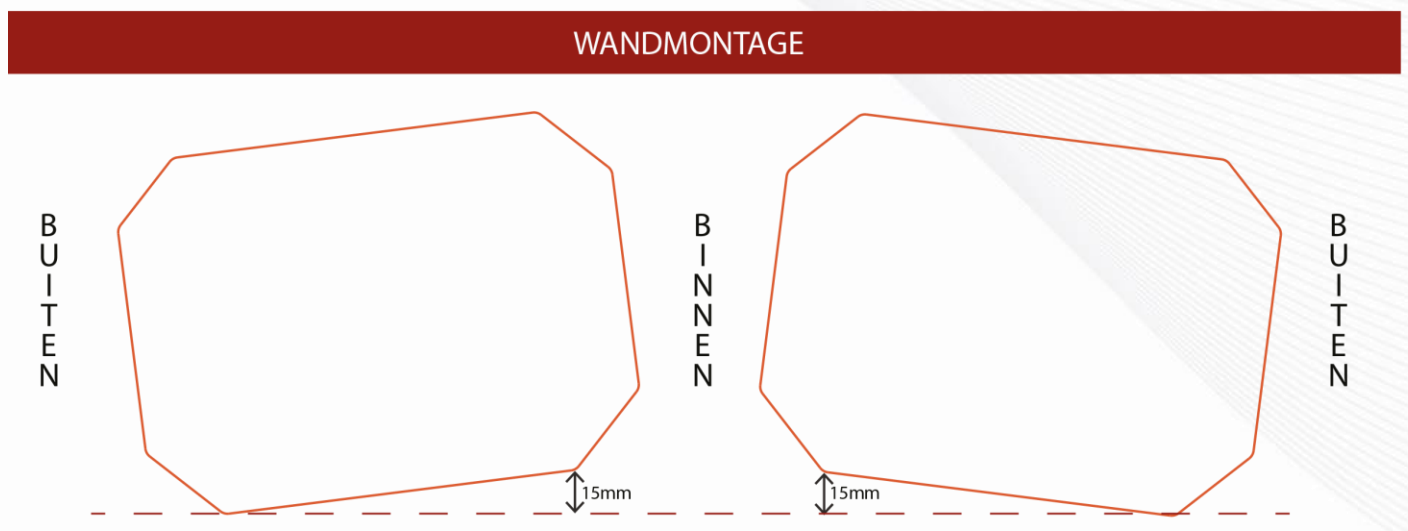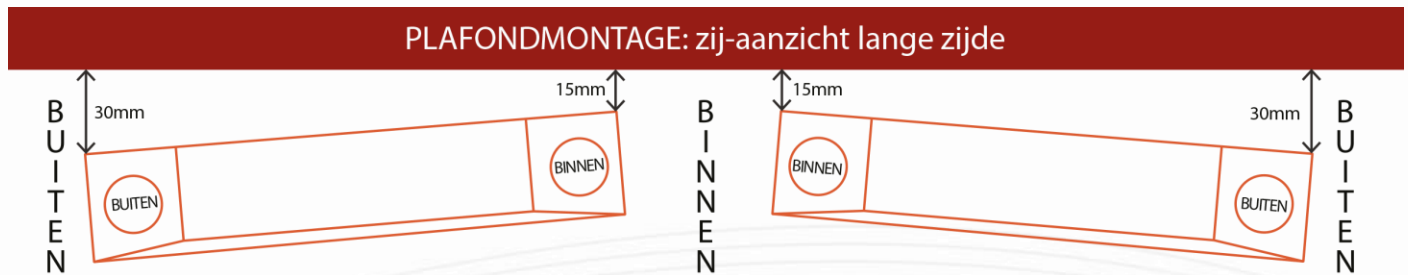
5.4 Connecting duct to the ICTUS unit

The AirSmart ventilation units provide their own balance via calibration, therefore no control valves should be provided on the unit.

To avoid condensation, the ducts in contact with the outside air (both supply and return) should be provided with vapor-tight insulation. If the connection of these ducts is difficult to perform with galvanized steel, it is recommended to use a thermal and acoustic flexible sock. Make sure that this is placed correctly so that no noise or resistance is created. Finally, we recommend that a silencer be placed at each air duct leaving from the ICTUS on the house side and as close to the unit as possible. (All connection nozzles have an inner diameter of 180 mm)

6 Wireless RF transmitter with LED communication

6.1 Wireless control with Rf transmitter

The Rf transmitter is part of the AirSmart Rf system and can be ordered optionally with the unit. This transmitter can be used to control the unit with a wireless connection. Transmission is by radio waves on the frequency 868.3MHz. Only products that do not transmit continuously are allowed on this frequency (1% per hour = 36s.) so the chance of interference is minimal. The system is modular using transmitters and receivers. The RF transmitter comes in the form of a wall switch and is easy to mount.

These products conform to EU regulations and meet the essential requirements of the R&TTE Directive: 1999/5/EC. You can request the declaration of conformity from the AirSmart support service.

A. (Re)placing batteries

- Use battery type CR2032

- Do not use NiCd batteries.

- Take into account the polarity when placing new batteries ('+' &'-' signs).

- Avoid direct hand contact with the battery.

-Used batteries should be returned to an authorized collection point.

B. Assembly instructions and recommendations

Do not place the control:

- in a metal distribution box, enclosure, or wickerwork;

- in the immediate proximity of large metal objects;

- on or near the ground.

6.2   Mounting Rf transmitter

The mounting of the transmitter can be done as desired. Some examples are the use of double-sided tape, fixing with screws or the use of a built-in frame. Here are basic tips that you can always apply:

- First, remove the protection between the battery and the contact.
- Clean the surface where the transmitter will come.
- Mount the controller so that the letters on the green board face up.
- To replace the battery, you can use a screwdriver to detach the plate from the transmitter itself.

| Snelheid Low | | High |
| Snelheid Medium | | Boost |
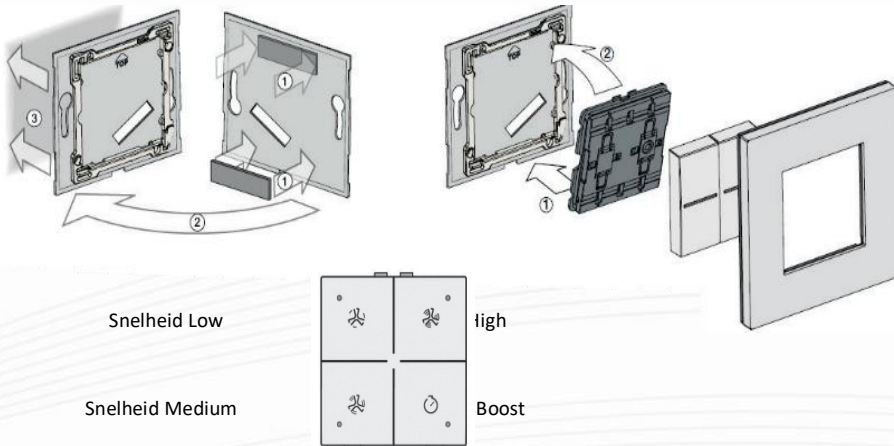
6.3   Pairing of Rf transmitter

STEP 1: Unplug the power cord of the ventilation unit and immediately reinsert it into the provided outlet. The unit is now in pairing mode and the unit's LEDs will begin to illuminate.

STEP 2: Press the four transmitter buttons consecutively for ± two seconds each (see picture below for sequence) The RF transmitter will initiate the pairing. It will then take ± 30 seconds for the controller to confirm the connection. When this is completed, a green LED will blink on the transmitter.
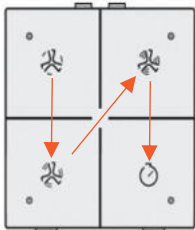
STEP 3: Mount the transmitter as described in 5.2.

STEP 4 (Optional): It is possible to pair up to four RF transmitters with one unit. Repeat steps 1 through 3 for each additional transmitter you wish to pair. If a fifth transmitter is paired, the first paired transmitter will drop out.

If for any reason it is not possible to pair the Rf transmitter, you can always connect a three-stage controller with wiring to the green connector in the unit (see point 6). With this controller, it is not possible to use the boost function.

Caution: to use the RF transmitter, it is best to press the button for ± two seconds each time you want to execute a command.

7 Demand control

Two green connectors are available for input from wired switches, home automation, and other demand controls.

Input:

1 = 3-stage switch

2 = Stand 2 / 3 switch

3 = Stand 3 / 3 switch

4 = 24 V

5 = calamity contact, can be replaced by a fire sensor

1 - 5

6 - 12

6 = 24 V

7 = PIR / Timer

8 = 24 V

9 = 0-10 V Sensor 1 (CO_2, Humidity, temperature, pressure,…)

10 = GND

11 = 0-10 V Sensor 2 (CO_2, Humidity, temperature, pressure,…)

12 = GND

For output, there are several options: heating coil, ionisation, etc.

Output:
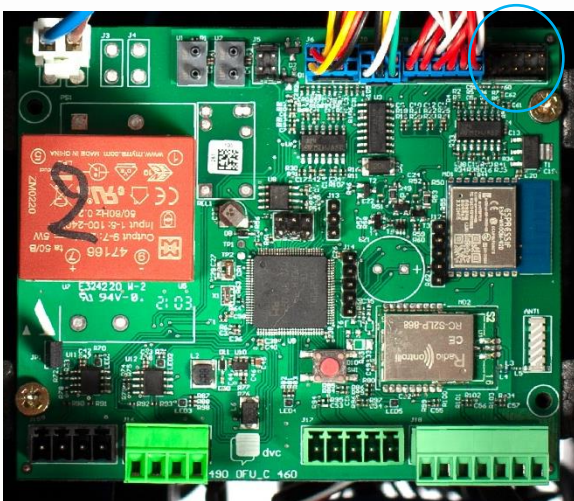
J10	
	1= 0-10Volt
	2= GND
	3= 0-10Volt
	4= GND
	5= 0-10Volt
	6= GND
	7= 0-10Volt
	8= GND
	9= 24Volt
	10= GND

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8 Start-up and configuration

8.1 Start-up with AirSmart application

The start-up process of the ICTUS via the AirSmart application is explained in a manual specifically written for this purpose. Visit www.airsmart.pro for more info.

8.2 Start-up via computer

Requirements for laptop startup

Computer   Interface   RF-transmitter

Step 1: Install AirSmart Configurator software on the laptop

To start up the Ictus unit using a laptop, you must first download the installation software. You can obtain this upon request at info@airsmart.pro.
Running the installation software installs the startup software Configurator, along with the necessary drivers.

Step 2: Pair the unit with the RF transmitter

The unit must be paired with the Rf transmitter before one can start the configuration, see "5.3 Pairing the Rf Transmitter"

Step 3: Connect the laptop to the unit via the interface

Remove the EPP electronics cover from the unit, the circuit board is now accessible. Connect the interface via USB to the laptop and via the green interface connector to the circuit board (see image below).

Step 4: Open the configurator on the laptop & connect

Open the *Configurator* on the *laptop* and click on **Connect** (see image below).
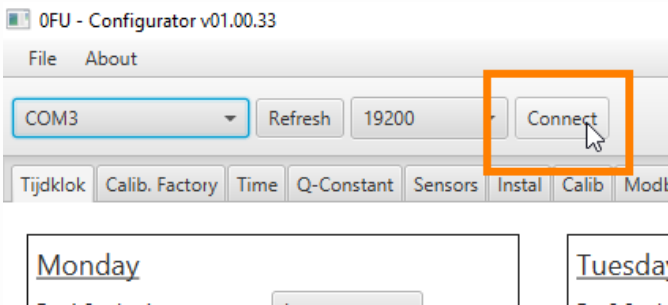
Step 5: Read the data from the board into the Configurator

After the Configurator connects to the unit, you can now read the data from the board, and lick **Read** (see image below).
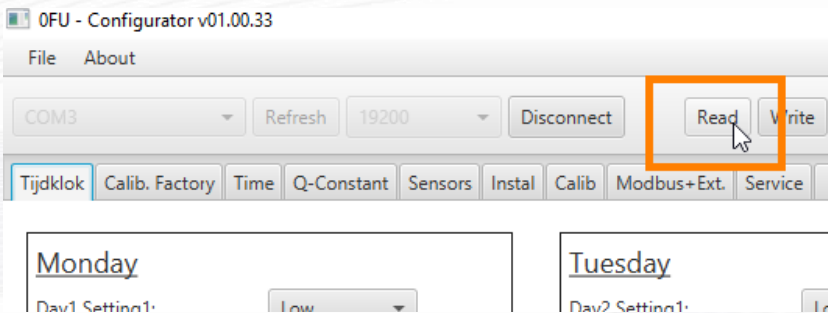
Step 6: Enter the appropriate installation parameters in the Configurator

The data from the board of the Ictus unit has been read in. Go to the "Install" tab in the Configurator and check if the installation parameters are correct:

- **Parameter [400] Mode** has to be on **Rf**.
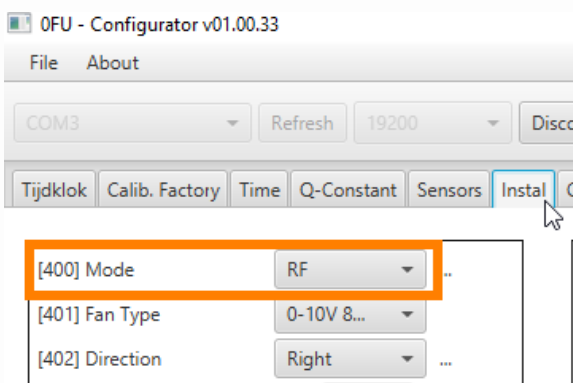
- **Parameter [402] Direction**

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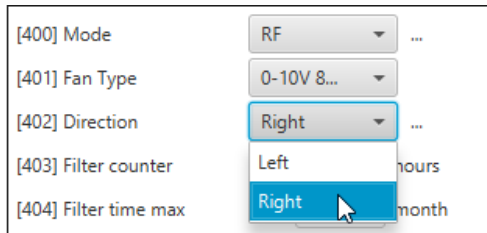
First determine the direction of your ICTUS unit i.e. **left** or **right** configuration. See 4.2.2 ceiling mounting".

If these parameters were modified, they still need to be saved to the unit. Press the **Write** button to carry out the changes (see image below).
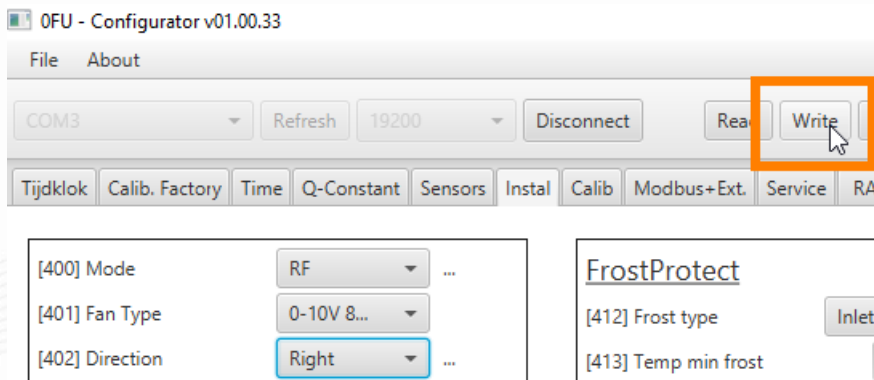
Step 7: Enter the appropriate calibration parameters in the Configurator

Go to the **"Calib"** tab in the Configurator and check if the calibration parameters are correct (see image below).
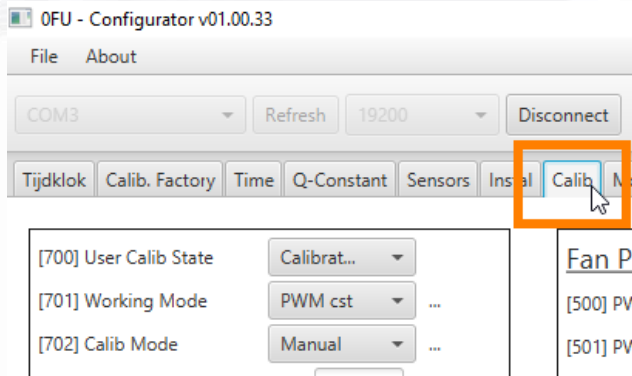
There are 3 different modes of operation. Check if the installation parameters are correct:

- **[701] Working Mode** on **PWM constant** and **[702] Calib Mode** on **Auto**
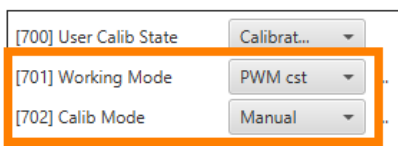
- **[701] Working Mode** on **Q CST** and **[702] Calib Mode** on **Auto**
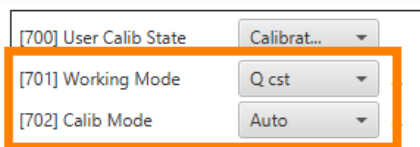
- **[701] Working Mode** on **Q CST** and **[702] Calib Mode** on **Manual**
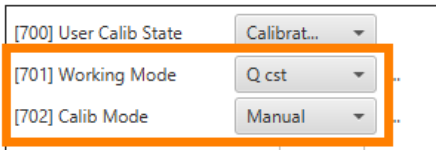
Select the desired configuration as described above and put the parameter **[700] User Calib State** on **Start Calib** (see image below).
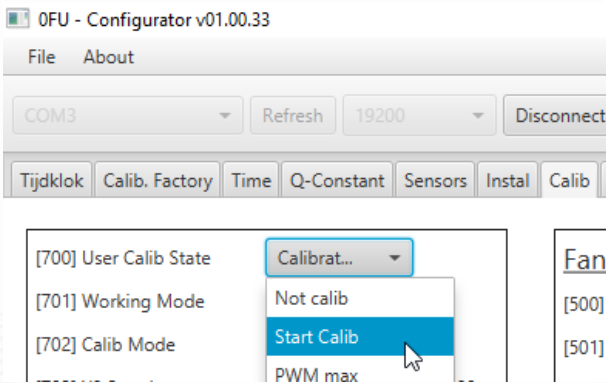
The user calibration parameters are now set in the Configurator, but they are not yet stored on the board.

Click the **Write** button to start the user calibration (see image below).
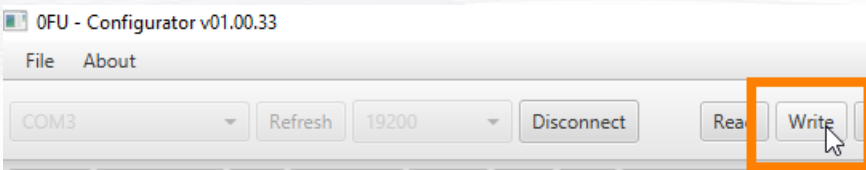
Step 8: Go to RAM, check User Calib

Go to the "RAM" tab in the Configurator. Here you can track the status of the user calibration (see image below).
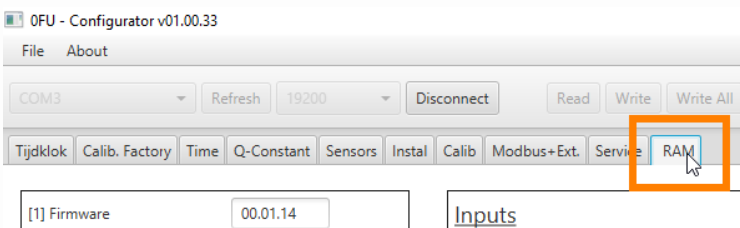
The user calibration passes sequentially through the states Start Calib, PWM max, Q max balanced and ends at Diaphragm (see image below).

Smart with air

Calib

[52] User Calib

- Not calib
- Start Calib
- PWM max
- Q max balanced
- **Diaphragm**
- Mem settings
- Calibrated
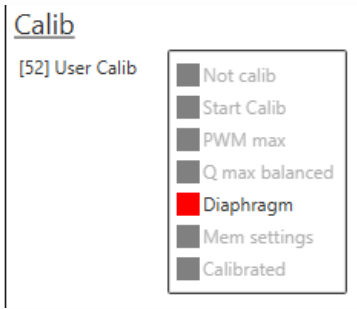
The Ictus unit will eventually speed up to its maximum power (100%), currently, the user calibration is at **Diaphragm**.

The airflows in the rooms can now be measured. Starting from these measurements they can be adjusted to the desired level. Changing the airflow can be done with the Rf transmitter. With the left side of the controller, you can adjust the supply ventilator and with the right side the extraction. See Step 2, "pairing the unit with the Rf transmitter".

−   **lower**

+   **higher**

The valves can now be adjusted to the predetermined airflows.

Step 9: Saving calibration data to the board

After the adjustment is done, save the calibration data. Go to the "Calib" tab in the Configurator and select "Mem settings" under the calibration parameter [700] User Calib State.

Now click Write to load the data into the board of the unit. The Ictus will now go to Low speed autonomously.

The new calibration data is now stored on the circuit board of the Ictus unit.

Step 10: Check status of user calibration & disconnect Configurator

Go to the "RAM" tab and check the user calibration status, it should now be on "Calibrated"

Click **disconnect** in the Configurator and close the Configurator.

Done!

8.2.1   Constantflow mode

Each ICTUS unit features a constant flow mode. In this mode, the air flows in the ducts will always remain balanced regardless of filter contamination. This mode must always be calibrated when the unit is started up. There is both a manual and an automatic method for this.

    A.   Manual:

Through the tab "calib" you can click on the arrow "User Calib State", here you select "start calib". In "working mode" select "Q CST" and in "calib mode" select "manual".

Load this to the controller with the "Write" button and the calibration will start. Through the computer program, you can also use the "RAM" tab to track the status of the startup in real-time.

When the "RAM" tab has reached the "Diaphragm" status, you start adjusting the valves in the house with the correct airflows. If you notice that there is no balance, or the correct flow rates are not being delivered, you can use the RF controls to adjust the speed. Using the left buttons, you further control the pulse fan by increasing or decreasing the speed. To adjust the extraction fan you do the same thing but with the two right buttons.

Once all valves are calibrated and the balance is obtained go to the "Calib" tab. Then click on "User Calib State" and select "mem setting ". You now save this via the "Write" button to complete the calibration.

The unit now performs one final measurement and automatically enters the selected operating mode.

B.   Automatic:

Via the tab "calib" you can click on the arrow "User Calib State", here you select "start calib". In "working mode" select "Q CST" and in "calib mode" select "auto" and enter the requested airflow "Q-max house".

If you now load this to the controller with the "Write" button, the user calibration will start. Through the computer program, you can also use the Tab "RAM" to track the status of the startup in real-time.

When the "RAM" tab has reached the "Diaphragm" status, you start adjusting the valves in the house with the correct flow rates. If you notice that there is no balance, or the correct airflows are not being delivered, you can use the RF controls to adjust the speed. Using the left buttons, you further control the pulse fan by increasing or decreasing the speed. To adjust the extraction fan you do the same thing but with the two right buttons.

Once all valves are calibrated and the balance is obtained go to the "Calib" tab. Then click on "User Calib State" and select "mem setting ". You now save this via the "Write" button to complete the calibration.

8.2.2   PWM Constant mode

Via the tab "calib" you can click on the arrow at "User Calib State" here you select "start calib". In "working mode" select "PWM CST" and in "calib mode" select "manual"

If you now load this to the controller with the "Write" button the user calibration will start. Through the computer program, you can also use the Tab "RAM" to track the status of the startup in real-time.

When the "RAM" tab reaches the "Diaphragm" status, the installer starts balancing the valves in the home with the correct flow rates. If you notice that you have no balance, or the ICTUS is not delivering the correct flow rate, you can use the Rf control to adjust the speed. With the left buttons, you further control the pulse fan by increasing or decreasing its speed. You can also do this activity with the right buttons of the Rf transmitter for adjustment of the extraction fan

Once all valves are calibrated and the balance is obtained go to the "Calib" tab. Then click open the arrow "User Calib State" and select "mem setting ". Now load this to the board via the "Write" button to complete the user calibration.

The unit now performs one final measurement and automatically enters the selected operating mode

8.3   Time settings

8.3.1   Date and time

To set the correct date and time on the device, open the software on your computer and click the "Time" tab. Then you can enter or modify the correct data (date and time) by clicking the "write" button. If you click on the "read" tab, you can verify that the data is correctly entered into the software.
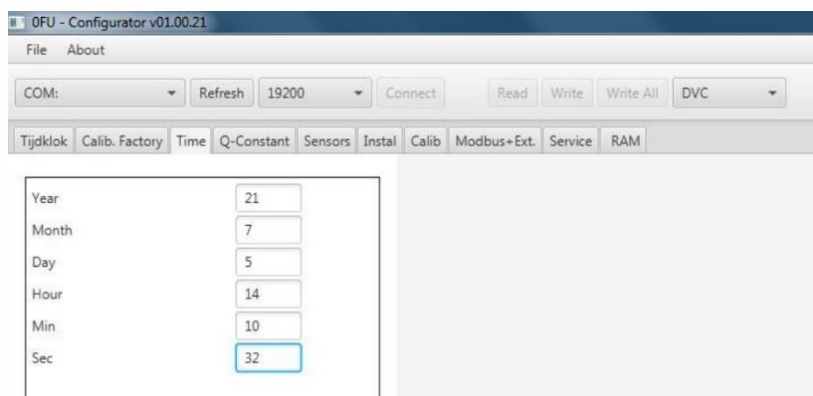
8.3.2   Timer settings

A weekly schedule can be set via the "time clock" tab.
You can set a number of switching points for each day of the week and determine when you want the unit to adjust its ventilation speed. To do this, click on "day setting" and enter the time when the unit should change speed. The clock does not take into account switching times set to 24 h and 0 min. Note that the unit will not automatically switch back to the default setting (low). An extra switching point must also be set for this. You can set a maximum of six different time points per day day 1 is Monday and day 7 is Sunday. Keep in mind that there must be at least five minutes time difference between two switching points.

If you now load the adjusted data to the controller using the "Write" button,

 your timers will be set. By clicking on the "Read" button, you can verify if the desired parameters have been effectively saved to the board.

9   Logic of ICTUS

9.1   Basis Logic

A.   Calamity contact:

As described in Part 6, the board of the ICTUS is equipped with a calamity cable. This green cable is plugged into ports 4 and 5 of the green connector. If the calamity cable is unplugged, the unit will not work. It is possible to replace this cable with a fire sensor which can be plugged into the connector at the same place (ports 4 and 5).

B.   Factory calibration

Each ICTUS ventilation unit is calibrated and tested at the end of production. Thus, the unit is ready to use in the box. Once the unit is calibrated and paired with the RF transmitter there are four modes available; low, medium, high and, boost. If the 3-stage switch is used, the boost function will not be available. If the boost mode is active, after a certain time the unit will switch back to the ventilation mode that was in operation before. The "boost" switching time is set by the manufacturer and ca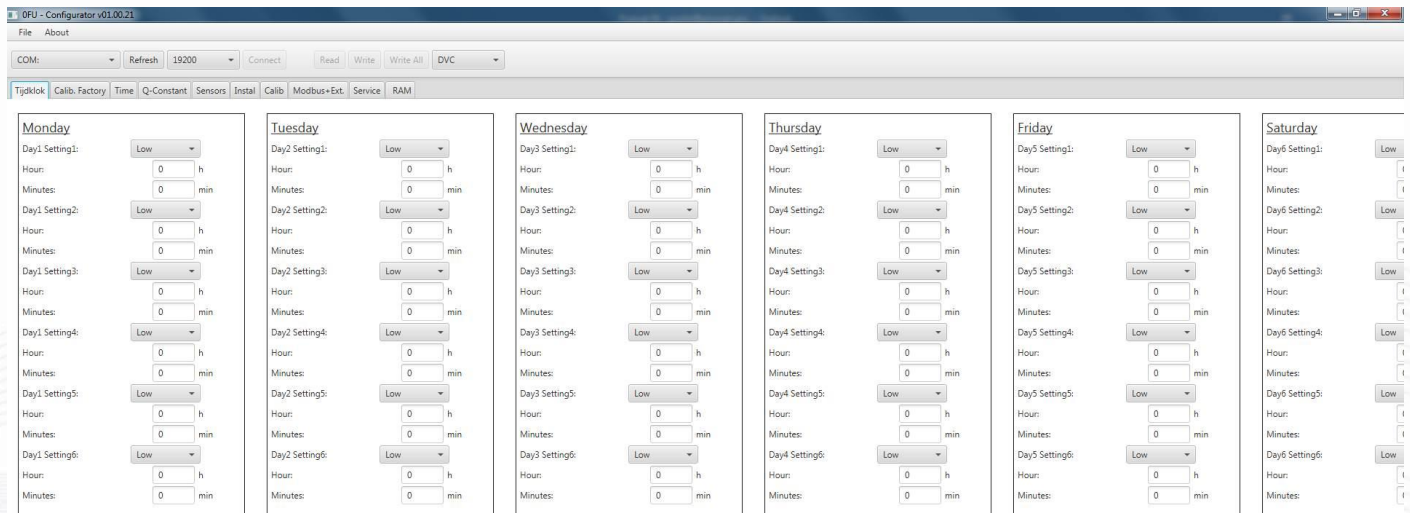n be terminated by switching to one of the other speeds. Furthermore, if desired, the timer function can be used as described in item 7.3.2. When this function is in operation, the RF control can still be used to change positions. If manual switching is performed during the clock function, this ventilation mode will remain active until the next switching moment.

It is possible to connect two different modes of demand control (sensors). Once these are connected, the unit will ventilate based on the input voltage from these sensors. During the operation of the demand control mode, you can use the application or RF transmitter to keep controlling the ventilation mode at all times. Possible demand control sensors are internal C02, VOC and RH extension, humidity, temperature, duct pressure, and room performance. The ICTUS control also offers the possibility of controlling the ventilation mode with a PIR sensor. This sensor can turn the ICTUS on and off in a non-residential application.

9.2   Functioning of bypass

Each ICTUS is equipped with a 100% bypass valve. This valve allows the system to direct incoming air partially or completely inward without incoming air going over the heat exchanger. The advanced control of the ICTUS offers some unique advantages. For example, the free cooling and heating function when conditions are feasible.

9.2.1   *Free cooling :*

This function is available when the indoor temperature exceeds 22°C

During the summer months, the bypass function is used to provide free cooling at night. The valve will open fully, allowing most of the fresh outside air to enter next to the heat exchanger. This will prevent the outside air from heating up and create a free-cooling effect.

Conditions for the bypass valve to open:

1. Outdoor temperature must be lower than indoor temperature + Delta T (margin)

2. Indoor temperature must be above comfort temperature + Delta T

3. Outside temperature must be above a certain min temperature + Delta T" to avoid condensation

If the three conditions are met, the bypass valve will open. It is still possible to adjust the fan speed with the four-position RF transmitter, three-position switch, or AirSmart application. If any of the conditions no longer apply, the valve will close again. At this time, the unit will switch back to the mode that was originally active.

With the bypass open, the user can still adjust the ventilation mode.

9.2.2   *Free heating:*

Will operate if indoor temperature is less than 20 °C.

Conditions for the bypass valve to open:

1. Outdoor temperature must be higher than indoor temperature + Delta T

2. Indoor temperature must be lower than the comfort temperature + Delta T'

If the two conditions are met, the bypass valve will open. It is still possible to adjust the fan speed with the four-position RF transmitter, three-position switch, or AirSmart application. If any of the conditions no longer apply, the valve will close again. At this time, the unit will switch back to the mode that was originally active.

9.2.3   *Humidity control*

The bypass valve can also be opened manually with the RF transmitter or application. If the outdoor air is more humid than the indoor air, opening the bypass valve allows the humid air to mix with the dry indoor air. This results in higher relative humidity in the home. You can open the valve manually by pressing the top two buttons of the RF transmitter simultaneously (2 seconds). To close the valve, press the two lower buttons.
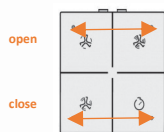
9.3   Frost protection

To prevent frost in the heat exchanger of the unit, ICTUS units are equipped with a frost protection function. Two modes are available for this purpose.

   A.   Unbalance mode:

If the air temperature after the heat exchanger is lower than the minimum temperature (Tmin), the ICTUS will enter frost protection. The pulse fan will stepwise decrease in speed. Between each step, the temperature will be measured again. If it is still too low, the pulse fan will run slower and slower. This is repeated until the minimum fan speed is reached. If after this the temperature is still lower than Tmin the extraction fan will increase the speed with the same steps and if necessary go to the maximum speed. This action ends when the air temperature exceeds Tmin

If the frost protection is activated, you cannot operate the ICTUS.

   B.   Inlet off mode:

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In Inlet off mode, the pulse fan will stop completely when the temperature is below Tmin. Then the heat exchanger is heated with the hot air from inside going out through the extraction fan. After 15 min, the pulse fan is restarted and the temperature is measured again. If it is still lower than Tmin, the unit will remain in frost protection. If the temperature, Tmin exceeds, the unit will switch back to normal mode.

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10 Maintenance

Two parties are responsible for the maintenance of the ICTUS units. The end user is responsible for minor maintenance. Major maintenance should be done by an installer.

10.1 Maintenance by the end user

A.   Filters

The end user only needs to clean and replace the filters. You will get a notification via the LED indicator on the unit or the AirSmart app when the filters need to be cleaned or replaced. Cleaning will need to be done approximately every three months, best done with a vacuum cleaner. The filters should be replaced after the fourth notification. They can be ordered from AirSmart. You can reset the filter time through the AirSmart app or by pulling out the green connector with five connections for 15 sec.

10.2 Maintenance by the installer

Approximately every five years, an installer should clean the heat exchanger and fans.

A.   Heat exchanger:

Once every five years the heat exchanger should be cleaned.
STEP 1: Open the lit of the EPP casing
STEP 2: Detach the heat exchanger by loosening the cross bolt and lifting it out of the casing.
STEP 3: Clean the heat exchanger with lukewarm soapy water (max 50 °C) of normal detergent. Then rinse and allow to dry.
STEP 4: Mount the heat exchanger back in its original place and secure it with the cross bolt (hand-tight).
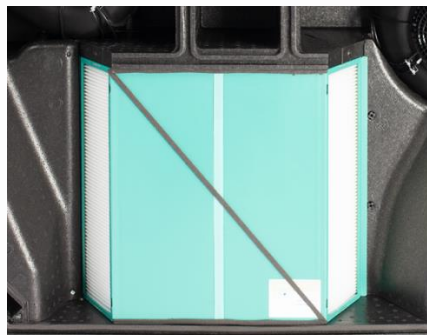
B.   Ventilators:

Once every five years, the rotor blades of the fans should be cleaned.

STEP 1: Unscrew the three torx screws at the air inlet and outlet.
STEP 2: Disconnect the cables from the fans. (Note: keep track of the color combinations of the cables so they are connected back correctly)
STEP 3: Remove the fan from the casing and loosen the clips on the fan housing.
STEP 4: Now you can use a vacuum cleaner or lukewarm soapy water to clean and dry the rotor blades.
STEP 5: reassemble the fans back into the cabinet by performing the step-by-step process in reverse.

Caution: Make sure that the connectors of the connecting cables lie flat on the bottom of the casing so that you can push the fan deep enough. Furthermore, it is best not to overtighten the torx screws when attaching the fans to avoid damage to the casing.

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11 Energy labels ICTUS units

AirSmart Bv — Ictus 250P

A⁺ · A · B · C · D · E · F · G

A^+

45 dB

250 m³/h

ENERGIA · ЕНЕРГИЯ · ΕΝΕΡΓΕΙΑ · ENERGIJA · ENERGY · ENERGIE · ENERGI
2016   1254/2014

AirSmart Bv — Ictus 350P

A⁺ · A · B · C · D · E · F · G

A^+

50 dB

350 m³/h

ENERGIA · ЕНЕРГИЯ · ΕΝΕΡΓΕΙΑ · ENERGIJA · ENERGY · ENERGIE · ENERGI
2016   1254/2014

AirSmart Bv — Ictus 450P

A⁺ · A · B · C · D · E · F · G

A

55 dB

450 m³/h

ENERGIA · ЕНЕРГИЯ · ΕΝΕΡΓΕΙΑ · ENERGIJA · ENERGY · ENERGIE · ENERGI
2016   1254/2014
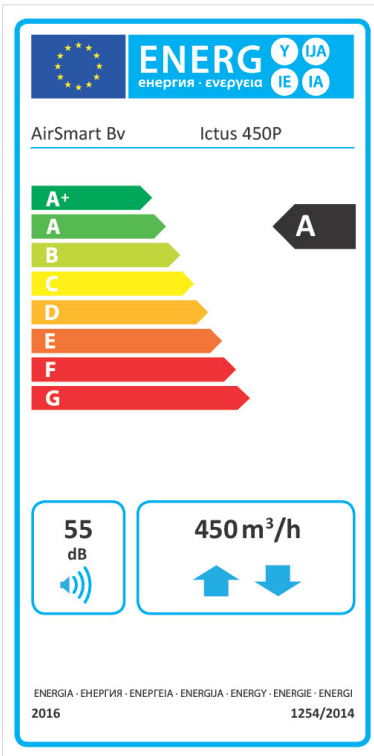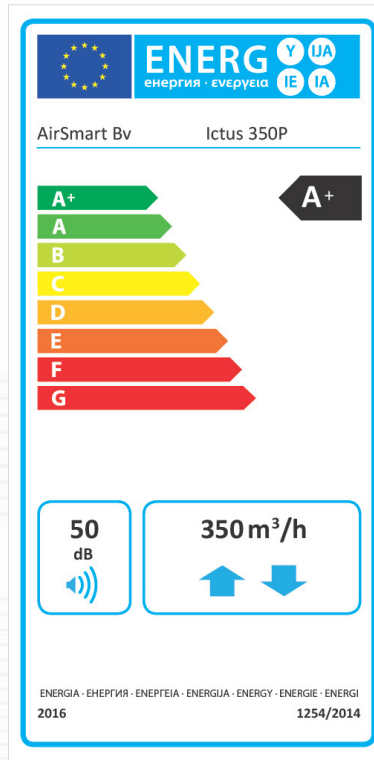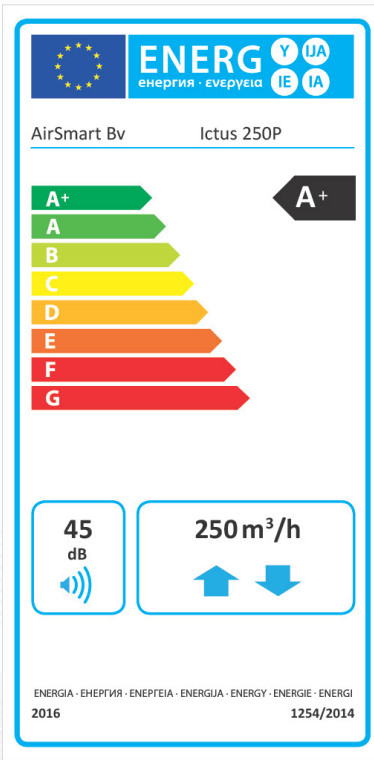
12   Productkaarten ICTUS units

12.1 Productcard AirSmart ICTUS 250P

Product card compliant with Ecodesign (ErP),EU-guideline 1254/2014 (attachment IV)					
Manufacturer		AirSmart Bv			
Model		ICTUS 250P			
Climate zone	Type of control	Sec-values in kWh/m²/a	SEC class	Yearly electricity consumption (AEC) in kWh	Yearly saved heating (AHS) in kWh
Cold	Manual control	-74,2	A+	842	8652
	Clock control	-75,1	A+	823	8699
	Central demand control	-77,4	A+	770	8792
	local demand control	-81,2	A+	692	8979
Average	Manual control	-37,3	A	305	4423
	Clock control	-38	A	286	4447
	Central demand control	-39,8	A	233	4494
	local demand control	-42,7	A+	155	4590
Hot	Manual control	-13,5	E	260	2000
	Clock control	-14,1	E	241	2011
	Central demand control	-15,6	E	188	2032
	local demand control	-18	E	110	2075
Type of ventilation unit		RVE – balanced residential ventilation device with heat recovery			
Ventilator		DC-ventilator with step-less control			
Type of heat exchanger		Recuperative - counterflow exchanger in plastic			
Thermal efficiency		86%			
Maximum airflow		250 m³/h			
Maximum power input		176 Watt			
Casing noise in Lwa dB(A)		45 dB(A)			
Reference airflow		175 m³/h - 0,049 m³/s			
Reference pressure		50 Pa			
Specific input capacity		0,148 W/(m³/h)			
Regelfactoren		1.0 in combination with controler			
		0.95 in combination with clock control			
		0.85 in combination with central demand control with one sensor			
		0.65 in combination with local demand control with two sensors and two-zone control			
leakage*	Internal	0,60%			
	External	0,30%			
Filter alarm		Via LED indication on unit / Touchscreen - ATTENTION! For optimal heat recovery and low energy consumption, we recommend replacing the filters regularly.			
Webpage for user manual.		https://www.airsmart.pro/downloads			

Smart with air

12.2 Productcard AirSmart Ictus 350P

Product card compliant with Ecodesign (ErP),EU-guideline 1254/2014 (attachment IV)					
Fabricant		AirSmart Bv			
Model		ICTUS 350P			
Climate zone	Type of control	Sec-values in kWh/m²/a	SEC class	Yearly electricity consumption (AEC) in kWh	Yearly saved heating (AHS) in kWh
Cold	Manual control	-74,2	A+	842	8652
	Clock control	-75,1	A+	823	8699
	Central demand control	-77,4	A+	770	8792
	local demand control	-81,2	A+	692	8979
Average	Manual control	-37,3	A	305	4423
	Clock control	-38	A	286	4447
	Central demand control	-39,8	A	233	4494
	local demand control	-42,7	A+	155	4590
Hot	Manual control	-13,5	E	260	2000
	Clock control	-14,1	E	241	2011
	Central demand control	-15,6	E	188	2032
	local demand control	-18	E	110	2075
Type of ventilation unit		RVE – balanced residential ventilation device with heat recovery			
Ventilator		DC-ventilator with step-less control			
Type of heat exchanger		Recuperative - counterflow exchanger in plastic			
Thermal efficiency		83%			
Maximum airflow		376 m³/h			
Maximum power input		176 Watt			
Casing noise in Lwa dB(A)		50 dB(A)			
Reference airflow		263 m³/h - 0,073 m³/s			
Reference pressure		50 Pa			
Specific input capacity		0,207 W/(m³/h)			
Regelfactoren		1.0 in combination with controler			
		0.95 in combination with clock control			
		0.85 in combination with central demand control with one sensor			
		0.65 in combination with local demand control with two sensors and two-zone control			
leakage*	Internal	0,60%			
	External	0,30%			
Filter alarm		Via LED indication on unit / Touchscreen - ATTENTION! For optimal heat recovery and low energy consumption, we recommend replacing the filters regularly.			
webpage for user manual.		https://www.airsmart.pro/downloads			

Smart with air

12.3 Productcard AirSmart ICTUS 450P

Product card compliant with Ecodesign (ErP),EU-guideline 1254/2014 (attachment IV)					
Manufacturer		AirSmart Bv			
Model		ICTUS 450P			
Climate zone	Type of control	Sec-values in kWh/m²/a	SEC class	Yearly electricity consumption (AEC) in kWh	Yearly saved heating (AHS) in kWh
Cold	Manual control	-68,5	A+	970	8403
Cold	Clock control	-69,8	A+	942	8462
Cold	Central demand control	-73	A+	863	8580
Cold	local demand control	-78,2	A+	746	8817
Average	Manual control	-32,8	B	433	4295
Average	Clock control	-33,8	B	405	4325
Average	Central demand control	-36,4	A	326	4386
Average	local demand control	-40,5	A	209	4507
Hot	Manual control	-9,7	F	388	1942
Hot	Clock control	-10,6	E	360	1956
Hot	Central demand control	-12,8	E	281	1983
Hot	local demand control	-16,3	E	164	2038

Type of ventilation unit	RVE – balanced residential ventilation device with heat recovery
Ventilator	DC-ventilator with step-less control
Type of heat exchanger	Recuperative - counterflow exchanger in plastic
Thermal efficiency	81%
Maximum airflow	491 m³/h
Maximum power input	345 Watt
Casing noise in Lwa dB(A)	55 dB(A)
Reference airflow	344 m³/h - 0,095 m³/s
Reference pressure	50 Pa
Specific input capacity	0,319 W/(m³/h)
Regelfactoren	1.0 in combination with controler
Regelfactoren	0.95 in combination with clock control
Regelfactoren	0.85 in combination with central demand control with one sensor
Regelfactoren	0.65 in combination with local demand control with two sensors and two-zone control
Leakage* Internal	0,40%
Leakage* External	0,30%
Filter alarm	Via LED indication on unit / Touchscreen - ATTENTION! For optimal heat recovery and low energy consumption, we recommend replacing the filters regularly.
Webpage for user manual	https://www.airsmart.pro/downloads

Smart with air

13 Declaration of Conformity

This declaration of conformity is provided under the full responsibility of the manufacturer

> AirSmart BV
> Metropoolstraat 30 Unit 3.2
> B – 2900 Schoten

who declares that the devices described below

> ICTUS 250P, 350P, 450P

comply with Union harmonization legislation and the provisions of European standards:

- CE-Label
- EN 13141-2 Testen componenten residentiële ventilatie (toevoer- en afvoermonden)
- EN 13141-4 Testen componenten residentiële ventilatie (ventilator)
- EN 13141-7 Testen componenten residentiële ventilatie (prestatietesten unit)
- EN 55014-1 + A1 EMC (emissie)
- EN 55014-2 +A1 + A2 EMC (immuniteit)
- EN 60335-1 + A1 + A2 + A3 + A4 Veiligheid (algemeen)
- EN 60335-2-80 + A1 Veiligheid (bijzondere eisen voor ventilatoren)
- NBN EN 308 (warmtewisselaar)
- EN 308 (warmtewisselaar)
- NEN 5138 (rendement warmteterugwinning)
- Machinerichtlijn 2006/42/EC, zoals geamendeerd en gecorrigeerd (veiligheid)
- 89/106/EEC Bouwproductenrichtlijn, zoals geamendeerd (veiligheid & sterkte)
- 305/2011 Bouwproducten verordening
- 2014/35/EU Laagspanningsrichtlijn
- 2014/30/EU EMC richtlijn
- CISPR14-1/EN 55014-1 (Elektromagnetische compatibilteit)
- IEC/EN 61000-3-2 (EMC limieten)
- IEC/EN 61000-3-3 (EMC limieten)
- IEC/EN 61000-6-2 (EMC immuniteit)

AirSmart BV declares that it guarantees the use of high-quality components in the manufacture of the devices, as well as continuous quality control to comply with the above guidelines.

Signature:

Gunter FRENCKEN (managing director)

Date of issue: 01/01/2021

Place of issue: Schoten

General phone number AirSmart: +323 600 71 97

VAT number AirSmart: BE0752980514

Smart with air

14 Warranty Procedure

The warranty is valid only if these details are entered on our website (www.airsmart.pro), after registration you will be sent a FREE replacement set of filters.

The undersigned end customer declares to have purchased a ventilation unit from AirSmart through:

Name business:……………………………………………………………………………..

Address business:…………………………………………………………………………..

Contact:…………………………………………………………………………………….

Room in which the unit is installed:……………………………………………

Installation and mounting of the unit	O
Self-mounted	O
Wall mounted	O
Ceiling mounted	O

End customer data:

Name:……………………………………………………………………………..

Street & Nr:…………………………………………………………………………….

Zip code & municipality:………………………………………………………………

Country:………………………………………………………………………………………

Phone:…………………………………………………………………………………….

E-Mail:………………………………………………………………………………..

Serial number:…………………………………………..

Type of control:………………………………………

Voltage: 230 Volt

Frequentie: 50 Hz

Return: tot 97 %

Power: max 207 W

IP-Klasse: 40

Smart with air