Heat Recovery Unit santos (F) 570 DC





Status: 05.10

Design version:

- □ R Right (supply air)
- \Box L Left (supply air)



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Table of Contents

FOREWORD 1

1	INTRO	ODUCT	10N	1
	1.1	CE Sy	mbol	1
	1.2	Warra	nty and Liability	1
		1.2.1	General Information	1
		1.2.2	Warranty Terms	1
		1.2.3	Liability	1
	1.3	Safety	/2	
		1.3.1	Safety Regulations	2
		1.3.2	Safety Provisions and Safety Measures	2
		1.3.3	Symbols Used	2
2	INSTR	RUCTIC	ONS FOR THE USER	3
	2.1	Defini	tion of Terms	3
		2.1.1	Balanced Ventilation (controlled residential ventilation)	
		2.1.2	Heat Recovery	3
		2.1.3	Bypass for Free Cooling	3
		2.1.4	Frost Protection	3
		2.1.5	Fireplace Control	3
		2.1.6	0-10 V Input	3
		2.1.7	Geothermal Heat Exchanger (optional)	4
		2.1.8	Frost Protection Device (optional)	4
		2.1.9	Enthalpy Exchanger (optional)	4
	2.2	Availa	ble Operating Aids	4
		2.2.1	Display on Unit	4
		2.2.2	3-Position Switch	5
		2.2.3	Forced Ventilation with Bathroom Switch	5
		2.2.4	CO ₂ Sensor	5
		2.2.5	Touchscreen	
		2.2.6	Membrane Keypad	6
	2.3	P Mer	nus for the User	7
	2.4.	Servio	ce by the User	8
		2.4.1	Cleaning or Replacing Filters	8
		2.4.2	Cleaning Valves (in the home)	9
	2.5	Malfu	nctions1	0
		2.5.1 I	Malfunction messages displayed on digital control panel 1	0
		2.5.2	What to do if a Malfunction Occurs? 1	0
	2.6.	Dispo	sal 1	0

3.	INFO	RMATION FOR THE INSTALLER1	1
	3.1	Configuring the santos1	1
	3.2	Technical Specifications1	2
	3.3	Dimension Sketch1	3
	3.4	Conditions for Installation1	5
	3.5	Installing the santos1	5
		3.5.1 Transport and Unpacking1	5
		3.5.2 Checking the Scope of Supply1	5
	3.6	Mounting the santos1	5
		3.6.1 Wall mounting	
		3.6.2 Connecting the Air Ducts1	
		3.6.3 Connecting the Condensation Drain1	6
	3.7	Commissioning the santos1	
		3.7.1 Display on Unit1	
		3.7.2 P Menus for the Installer1	
	3.8.	Setting Air Specifications	2
	3.9.	Maintenance Information for the Installer 2	-
		3.9.1 Inspecting the Heat Exchanger and Fans2	
		3.9.2 Cleaning the Filters of Units Equipped with a Frost Protection Device	4
	3.10	Malfunctions2	
		3.10.1 Malfunction messages displayed on digital control panel2	
		3.10.2 Overview of Malfunctions	
		3.10.3 Malfunctions (or Problems) not Displayed	
	3.11	Wiring Diagram: santos 570 DC – LEFT-HAND Version	1
	3.12	Wiring Diagram: santos 570 DC – RIGHT-HAND Version	2
		Commissioning and Acceptance Certificate3	4
		Checklist A User/Owner Maintenance3	4
		Checklist B Professional Maintenance	5
		Air Volume Protocol	7

Foreword

In addition to this general chapter, this operating manual consists of:

- A section for the user
- A section for the installer.

Please read this operating manual carefully before using the unit.

- User \rightarrow Chapters 1 and 2.
- Installer \rightarrow Chapters 1 and 3.

This operating manual contains all the information required to safely and properly install, operate and maintain the santos 570 DC. In addition, it should serve you as a reference manual during service work so that this can be carried out safely and responsibly. Due to ongoing further development of the unit it is possible that your santos 570 DC may differ slightly from the unit described in this manual.

This manual has been produced with the greatestSFlb care and attention. However, we do not accept legal liability for the contents. Furthermore, the company reserves the right to change the contents of this SFIboperating manual at any time without prior SFlbnotification.

1 Introduction

This chapter contains general information on the santos 570 DC.

1.1 CE Symbol

The unit carries the designation santos 570 DC, hereafter referred to as santos.

The santos is a balanced ventilation system with heat recovery functionality that provides healthy, balanced and energy-saving ventilation in residential premises. The santos identification plate is depicted below.

	CE
Туре	Voltage Hertz Phase
Articlecode	Current
	Power
Condenser Protecion class Insolation	Serial number

1.2 Warranty and Liability

1.2.1 General Information

Our "General Terms and Conditions" in their latest wording apply to the santos. The warranty period begins when the unit is commissioned, but not later than one month after delivery. The warranty extends to material replacement, but does not include labour costs. It shall only apply on proof of maintenance having been performed by specialist installer in accordance with our instructions.

1.2.2 Warranty Terms

The warranty period for our products shall be two years commencing on the date of dispatch from our work. Claims made under warranty shall only be accepted for material defects and/or manufacturing defects that become apparent during the warranty period. In the event a warranty claim is made the santos must not be dismantled without the prior written permission of the manufacturer. The manufacturer's warranty shall only apply to spare parts that have been installed by a specialist installer.

The warranty will be voided if:

- The warranty period has expired;
 - The unit is operated without an original PAUL filter;
 - Parts not supplied by the manufacturer are installed;
 - The unit is used for any purpose other than the intended use;
- Unauthorised changes or modifications have been made to the system.

1.2.3 Liability

The santos has been developed and manufactured for use in so-called "balanced ventilation systems". Any other use is considered 'improper use' that may result in damage to the santos or personal injury for which the manufacturer accepts no liability whatsoever.

The manufacturer accepts no liability for damage or injury resulting from the following:

- Failure to observe the safety, operating and maintenance instructions contained in this operating manual;
- Spare parts not supplied or specified by the manufacturer are installed.
 Responsibility for the use of such spare parts lies solely with the installer;
- Normal wear.

1.3 Safety

1.3.1 Safety Regulations

Observe the safety regulations given in this operating manual at all times. Failure to observe the safety regulations, warnings, comments and instructions can result in personal injury or damage to the santos.

- Unless clearly stated otherwise in this operating manual, the santos must be installed, connected, commissioned and maintained by an authorised installer only;
- The santos must be installed in compliance with the general building, safety and installation regulations applicable at the place of installation as issued by the respective local authority, water and electricity utility company as well as other official regulations and guidelines;
- Observe the safety regulations, warnings, comments and instructions described in this operating manual at all times.
- Keep this operating manual close the santos throughout its service life;
- Closely observe the instructions regarding the regular replacement of filters and cleaning of supply and exhaust air valves;
- Do not alter the specifications contained in this document;
- Do not make any modifications to the santos;
- In order to ensure that the unit is inspected at regular intervals, we recommend that the user concludes a service contract. Your supplier can provide you with the addresses of authorised installers in your vicinity.

1.3.2 Safety Devices and Safety Measures

- The santos cannot be opened without using tools.
- It must not be possible to touch the fans with your hand. For that reason air ducts must be connected to the santos. The minimum duct length is 900 mm.

1.3.3 Symbols Used

The following symbols are used in this operating manual:

Caution!

\Lambda Risk of:

- Damage to the unit;
- The operational performance of the unit will be adversely affected if the instructions are not correctly observed.
- Risk of physical injury to the user or the installer.

2 Instructions for the User

This chapter describes how you should use the santos.

Congratulations, you are now the owner of a santos 570 DC, a heat recovery unit built by Paul Wärmerückgewinnung GmbH. We wish you the highest levels of comfort.

2.1 Definition of Terms

- The santos unit offers the following functions:
- Balanced ventilation;
- Heat recovery;
- Bypass for free cooling:
- Frost protection;
- Fireplace control;
- Frost protection device (optional);
- 0-10 V input;
- Geothermal Heat Exchanger (optional);
- Enthalpy exchanger (optional).

These terms/properties are described briefly in more detail in the following sections.

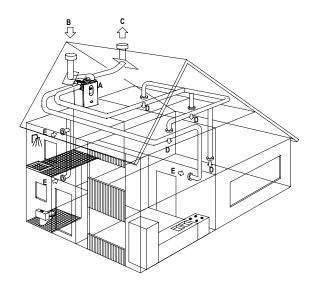
2.1.1 Balanced Ventilation (controlled residential ventilation)

The santos unit has been designed to provide balanced ventilation. Balanced ventilation systems extract stale air contaminated with smells from the kitchen, bathroom, WC(s) and, if necessary, a utility room and introduce an equal volume of fresh air to the living room, bedroom and children's room. A gap below the doors guarantees good and balanced air circulation in the home.

Ensure these gaps are not blocked by, for example, rubber draught excluders or high-pile carpets. This could prevent the system operating at an optimum.

Generally speaking, the balanced ventilation system comprises the following elements:

- santos (A);
- Duct system for the intake of outside air (B) and the extraction of indoor air (C);
- Air supply valves in the living rooms and bedrooms (D);
- Exhaust air valves in the kitchen, bathroom, toilet and, if required, the utility room (E);



2.1.2 Heat Recovery

In addition to a well-balanced ratio between supply and exhaust air volumes the santos unit also offers the benefit of heat recovery. Heat recovery removes the heat from stale exhaust air and transfers it to the fresh, mostly cooler intake air.

2.1.3 Bypass for Free Cooling

The bypass is used most of all on warmer days in the summer months to allow in the cool night air. The bypass functions automatically. All that is required is to set a comfortable temperature level.

2.1.4 Frost Protection

The santos is equipped with frost protection. Frost protection is an automatic safeguard function that drastically sinks (or even temporarily interrupts) the intake of outside air into the santos when there is a risk of frost. The risk of freezing exists in the winter months with moderate to heavy frost.

2.1.5 Fireplace Control

A suitable safety device or integral system safeguard is required when jointly operating non roomsealed fireplaces and ventilation systems if there is a risk that a dangerous negative pressure can be created in the room in which the fireplace is located. The santos is equipped with fireplace control; however, this must be activated by the installer.

Fireplace control does not replace a safety device designed to monitor the difference in pressure; it is a technical precondition for operating the unit when fireplaces are being used at the same time.

Once the fireplace control is activated the supply air and exhaust air fans cannot be deactivated manually.

2.1.6 0-10 V Input

The santos is equipped with four 0-10 V inputs. It is possible to connect a variety of different controls and sensors to these inputs. Several possible examples are listed below:

- CO₂ sensor; ventilation control according to carbon dioxide levels;
- Moisture sensor; ventilation control according to moisture levels.

2.1.7 Geothermal Heat Exchanger (optional)

The ventilation system can optionally be equipped with a geothermal heat exchanger. In addition, the GHE control valve (Geothermal Heat Exchanger control valve) makes it possible to route intake air either directly to the santos or via the ground collector. The geothermal heat exchanger provides frost-free, temperature controlled intake air with which the air is fed to the heat recovery unit. In other words, during frosty weather the outside air is heated with the aid of the underground geothermal heat exchanger before it enters the house via the santos. By contrast during the summer months when outdoor temperatures are high the intake air can be cooled with the aid of the geothermal heat exchanger before it is introduced into the house. The GHE control valve operates automatically.

The geothermal heat exchanger is a part of the ventilation system ductwork and is not included with the santos.

2.1.8 Frost Protection Device (optional)

An optional electric frost protection device can be fitted in the santos. This has the advantage of ensuring continued balanced ventilation. As a consequence the supply of cold outside air need not be restricted or can be restricted later if at all. The frost protection device turns itself on and off automatically.

2.1.9 Enthalpy Exchanger (optional)

The ventilation system can also optionally be equipped with an enthalpy exchanger. An enthalpy exchanger helps to regulate the humidity level in the home. As well as recovering heat the enthalpy exchanger also recovers moisture. This process sees moisture transferred from the exhaust air to the intake air and introduced into the ventilated rooms as fresh supply air. Moreover, enthalpy exchangers are less susceptible to frost.

2.1.10Additional Options

In addition to the options described above it is also possible to equip the santos as follows:

- Connection for forwarding malfunction messages (remote signalling, cabled);
- Connection for deactivating the fans (cabled);
- Connection for a device to signal a dirty external filter.

2.2 Available Operating Aids

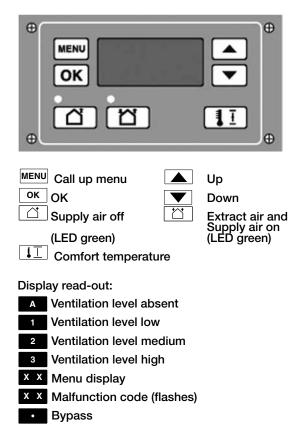
It is possible to equip the santos with the following operating aids:

- Display on unit;
- 3-position switch;
- Bathroom switch (optional) to temporarily set the highest ventilation level;
- CO2 sensor;
- Touchscreen;
- Membrane keypad.

These operating aids are described briefly in more detail in the following sections.

2.2.1 Display on Unit

Settings can be set via the digital display and operating panel on the santos unit.



Accessing menus

Se- quence	Operating keys	Display	Description
1	MENU	P2	Time delay values
2		P9	Status display
3	•	P1	Status display

Settings example

Deactivation delay bathroom setting

Se- quence	Operating keys	Display	Description
1		P2	Time delay values
2	ОК	P21	Activation delay value
3		P22	Select 22
4	ОК	30	Current setting
5	▼(10 x or hold down)	20	Select 20
6	ОК	P22	Current value is 20
7	MENU	P2	
8	MENU	1	Fan steps

Settings can only be made in the P2 menus. The other P menus (P1 and P9) are read-only menus.

End (read) menu

Press "MENU" (instead of "OK").

The display cannot be used to set santos ventilation levels. The arrow keys are used to select additional programmes.

2.2.2 3-Position Switch

A 3-position switch is used to set the ventilation levels of the santos. One or more 3-position switches can be installed in a home (for example, in the kitchen).

B When several position switches are installed in the home the santos operates according to the highest ventilation level set, unless a different level is determined in the automatic software control.

Setting the ventilation level with the **3-position switch**

The 3-position switch enables you to set three ventilation levels.

- Level 1 I ow. - Select this level for low ventilation requirements. Level 2 Normal.
 - Select this level for normal ventilation requirements.
- Level 3 High.
 - Select this level when cooking, showering and when high-level ventilation is desired.



2.2.3 Forced Ventilation with Bathroom Switch

A bathroom switch can be used to temporarily set the highest ventilation level available on the santos. To allow excess moisture to be discharged as quickly as possible after showering this switch is generally installed in the bathroom. As bathroom switches are available with very different designs, no switch is illustrated here.

If desired, the user may enter activation and deactivation time delays for the bathroom switch via the digital control panel.

Activation delay value

Activation delay ensures the highest ventilation level available on the santos is not activated immediately, but once the set activation delay time has elapsed.

First the bathroom switch is deactivated during the set activation delay time the santos maintains the current ventilation level and the highest ventilation level is not activated.

Activation delay is not available to all types of bathroom switches (such as a pulse switch). In this case leave the activation delay time setting at 0.

Deactivation delay

Deactivation delay ensures the santos does not react immediately when the bathroom switch is deactivated, but returns to the normal (or the originally set) ventilation level once the set deactivation delay time has elapsed.

Ś The deactivation delay function remains inactive if the bathroom switch is turned off during the set activation time.

Light switch

It is possible to integrate bathroom switch functionality into a light switch.

2.2.4 CO₂ Sensor

It is possible to regulate the santos with the aid of a CO_2 sensor. A CO_2 sensor can be utilised either as a 3-position switch or to convert CO₂ concentrations in the indoor air to a 0-10 V signal to regulate the air volume required to reduce the concentration CO₂ to permissible levels.

2.2.5 Touchscreen

The santos can be operated via a digital touchscreen that you are able to order separately.

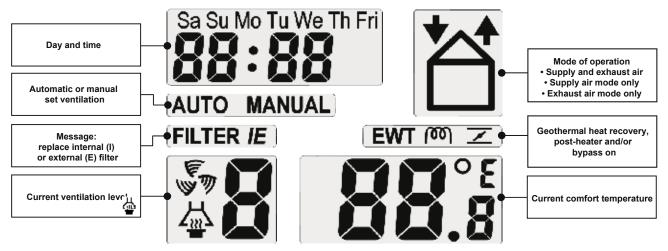
The touchscreen is mounted on the wall in the living room from where it communicates with the santos. The touchscreen is equipped with touch-sensitive display providing straightforward access to the functions.

2.2.6 Membrane Keypad

The santos can also be operated via membrane keypad that you are able to order separately. The membrane keypad is mounted on the wall in the living room from where you are able to communicate with the santos.



The overview below contains a short description of the information you can view on the display of the membrane keypad.



Various keys are available on the membrane keypad to allow you to operate and set the santos. These keys are explained below.

E	Use this key to set the unit to operate at the highest ventilation level. - Press 1x to temporarily switch the highest level ON. - Press 2x to temporarily switch the highest level OFF.
ľ	Use this key to switch the supply air and/or exhaust air on or off. - Press 1x SUPPLY AIR OFF (and EXHAUST AIR ON). - Press 2x EXHAUST AIR OFF (and SUPPLY AIR ON). - Press 3x SUPPLY AIR and EXHAUST AIR ON).
	This key allows you to view or set the comfort temperature. - Press for less than two seconds VIEW. - Press for more than two seconds MAKE SETTINGS.
\bigcirc	Use this key to set the following two functions. - Press for less than two seconds Set ventilation programme. (AUTO/MANUAL). - Press for longer than two seconds Set day and time.
+	Use this key to set a variety of functions: - In the P menu \rightarrow Set values. - In the main screen \rightarrow Determine ventilation level (A, 1, 2, 3).

2.3 P Menus for the User

Menu P1 Status of function control settings

		Status
Sub- menu	Description	Activated
P11	Menu 21 currently active?	Yes (1) / No (0)
P12	Menu 22 currently active?	Yes (1) / No (0)
P13	Menu 23 currently active?	Yes (1) / No (0)
P14	Menu 24 currently active?	Yes (1) / No (0)
P15	Menu 25 currently active?	Yes (1) / No (0)
P16	Menu 26 currently active?	Yes (1) / No (0)

Menu P2 Setting time delays

		Time	e delay val	ues
Sub-menu	Description	Mini- mum	Maxi- mum	Stand- ard
P20	N/A (not used)	0 Min.	180 Min.	0 Min.
P21 (optional) Note: Applies only to systems with a wired switch and only if your system is equipped with a second switch in the bathroom.	 Low voltage input Activation delay for the bathroom switch (to switch to the highest level). The santos switches to the ніднеят LEVEL 'n' minutes after the bath- room switch is operated. 	0 Min.	15 Min.	0 Min.
P22 (optional) Note: Applies only to sys- tems with a wired switch and only if your system is equipped with a second switch in the bathroom.	 Low voltage input Deactivation delay for the bathroom switch (to switch to the normal level). the santos switches to the NORMAL LEVEL 'n' minutes after the bath- room switch is operated. 	0 Min.	120 Min.	30 Min.
P23 (optional) Note: Applies only to sys- tems with a wired switch.	 Deactivation delay for ventilation level 3. If ventilation level 3 (the highest level) is activated for a short pe- riod (< 3 seconds) the santos will maintain ventilation level 3 for the time set in this menu. If the position switch is operated during the run-down time the santos immediately switches to the set ven- tilation level. 	0 Min.	120 Min.	0 Min.
P24	 Filter warning This option allows the user to determine when the "FILTER DIRTY" warning message is displayed. 	10 Weeks	26 Weeks	16 Weeks

		Tim	e delay val	ues
Sub-menu	Description	Mini- mum	Maxi- mum	Stand- ard
P25	N/A	1 Min.	20 Min.	10 Min.
P26	N/A	1 Min.	120 Min.	30 Min.
P27	 Forced ventilation time. When " " is pressed for MORE than two seconds the santos switches to the highest ventilation level for 'n' minutes before switch- ing back automatically to the pre- set level. 	0 Min.	120 Min.	30 Min.
P29	N/A	1%	99%	10%

Menu P9 Status of function control settings (from menu P5 additional function control settings)

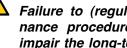
		Status
Sub-menu	Description	Activated
P90	Fireplace control active?	Yes (1) / No (0)
P91	Bypass open (=yes) / closed (=no)?	Yes (1) / No (0)
P92	GHE control valve	Yes (1) / No (0)
	Open (=yes) / closed (=no)	
P93	N/A	Yes (1) / No (0)
P94	0-10 V control active?	Yes (1) / No (0)
P95	Frost protection active?	Yes (1) / No (0)
P96	N/A	Yes (1) / No (0)
P97	Enthalpy exchanger active?	Yes (1) / No (0)

2.4 Service by the User

As the user you are obliged to service your santos as follows:

- Clean or replace the filters; ٠
- Clean the valves (in the home).

These maintenance procedures are described briefly in more detail in the following sections.



A Failure to (regularly) carry out maintenance procedures on the santos will impair the long-term performance of the balanced ventilation system.

2.4.1 Cleaning or Replacing Filters

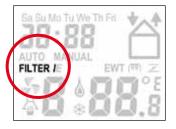
Clean or replace the filters as soon as the corresponding warning message is displayed on the digital control panel.

A Replace the filters (at least) once every six months and clean the filters every 2-3 months.

"FiL" and "tEr" are indicated alternately on the display.

- " FILTER I " -> The internal filters must be cleaned or replaced.
- " FILTER E " -> The external filters must be cleaned or replaced.

One of the filter warning messages stated above will be indicated on the display of the membrane keypad.



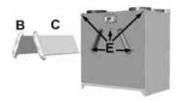
(B)	The internal filters are supplied as
	standard with the santos. The (optional)
	external filters belong to the ductwork of
	the ventilation system and are not part
	of the santos.

For replacement ...

- Press OK (display on unit) or "I for at least four seconds (key on keypad), until the filter warning message is cleared.
- 2. Isolate the unit from the mains power supply.
- 3. Lift the front panel (A) upwards and remove from the santos unit.



- 4. Pull the handles (B) of the filter cartridges.
- 5. Pull the used filters (C) out of the santos.



- 6. Insert the new filters into the santos.
- 7. Ensure the handles (B) of the filter cartridges lock into place.
- 8. Reconnect the unit to the mains power supply.

For cleaning ...

Instead of replacing the used filters (C) for new ones you can clean the filters (when necessary) using a vacuum cleaner.

Clean the filters (and valves) before using the santos for the first time. The ventilation system may have become soiled with building dust during the building phase.

2.4.2 Cleaning Valves (in the home)

The valves must be cleaned (at least) twice a year.

- 1 Remove the valve from the wall or ceiling;
- 2 Clean the valve in a warm soap solution;
- 3 Rinse the valve thoroughly before drying carefully;
- 4 Return the valve to EXACTLY THE SAME POSITION (and IN THE SAME HOLE);
- 5 Repeat this procedure for the other valves.

About valve settings ...

The installer will have set the valves to ensure the ventilation system operates to an optimum. Therefore, it is imperative that you do not change valve settings.

After cleaning, ALWAYS return all valves in exactly the same position (and in the same ventilation holes in the wall or ceiling). Returning them to different positions could impair the performance of the ventilation system.

The ventilation air is admitted and discharged via valves. Gaps under the doors ensure that the air is able to circulate in the home. To ensure that the right volumes of air are available to the rooms, observe the following:

- Do not block the gaps below the doors;
- Do not alter the setting of the valves;
- Do not swap the valves and their positions.

2.5 Malfunctions

A malfunction to the santos is displayed as follows:

- A malfunction message is displayed on the display of the unit;
- A malfunction message is displayed on the display of the membrane keypad;
- A malfunction message is displayed on the touchscreen;

The various malfunction messages are described briefly in more detail in the following sections.

2.5.1 Malfunction messages displayed on digital control panel

If a malfunction occurs, a corresponding malfunction message is displayed on the digital control panel. An 'A' or 'E' code and a number are always displayed on the display. Please refer to the overview of malfunction messages for the meaning of the corresponding code.



2.5.2 What to do if a Malfunction Occurs?

In the event of a malfunction, please contact the installer. Note the malfunction code indicated on the display of the digital control panel. Please also note your santos model type. This is indicated on the identification plate on the top of your santos.

The santos must always remain connected to the mains power supply unless it has to be shut down for a compelling reason such as a serious malfunction, for the purpose of cleaning or replacing the filters or for some other urgent reason.

The house will not be mechanically ventilated if the unit is isolated from the power supply. Moisture and mould can occur in the dwelling as a result. Consequently, you should avoid turning off the santos for longer periods of time.

- DIN 1946-6 specifies that apart from reasons of maintenance and repairs ventilation systems must be operated continually. When the home is unoccupied the system should be operated at the lowest ventilation level (level 1 set with 3-position switch, level "Absent" or an intermittent holiday programme set via the membrane keypad on the operating unit).
- It is possible that condensation will form on the outside of the unit if the unit is installed in a room subject to above average levels of humidity (for example bathroom or kitchen). This is perfectly normal and does not impair the functional performance of the system.

2.6 Disposal

Discuss with your supplier what you should do with your santos at the end of its service life. If you are unable to return the santos to your supplier, do not simply dispose of it via the household waste; contact your local authority to find out about the possibility of recycling the components or environmentally safe processing of the materials.

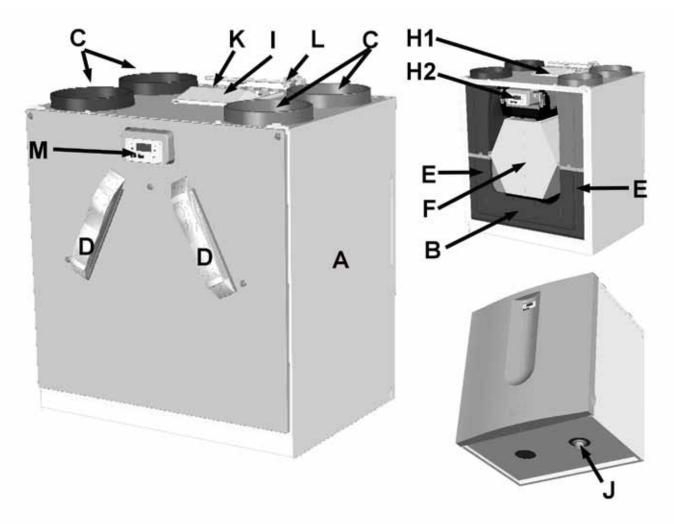
3 Instructions for the Installer

Observe the instructions contained in this chapter when installing the santos.

3.1 Configuring the santos

The standard version of the santos consists of the following components:

- Outer casing (A) made of coated sheet steel;
- Inner lining (B) made of high-quality expanded polypropylene (E)PP;
- Connections (C) for air ducts;
- 2 filters (D) for air filtration. Filter rating: Outside air G4, exhaust air G4;
- 2 energy-saving DC motors (E) with high-speed impeller;
- Highly efficient counter flow heat exchanger (F) or membrane moisture heat exchanger (optional);
- Switchbox (H1) for external connections and controller;
- Draw with control PCB (H2) with connections for the fans, bypass valve, frost protection device, temperature sensors (T1-T4), 3-position switch with or without the (optional) malfunction and filter display and the (optional) bathroom switch;
- Identification plate (I) with santos data (not visible);
- Condensation drain (J) for discharging condensation from the warm exhaust air.
- Sticker (K) indicating air connections (not visible).
- 230 VAC connection cable and plug with earthing contact (L);
- Display (M) to view data and make settings.



3.2 Technical Specifications

	santos 570 DC nL (normal air volume)				
Level	Ventilation rate	Value			
ABSENT	50 m3/h at 7 Pa	13 W			
Low	150 m3/h at 23 Pa	27 W			
MEDIUM	250 m3/h at 77 Pa	68 W			
Нідн	450 m3/h at 323 Pa	313 W			
Μαχιμυμ	550 m3/h at 240 Pa	365 W			
Level	Ventilation rate	Value			
ABSENT	50 m3/h at 7 Pa	0.11 A			
Low	150 m3/h at 23 Pa	0.23 A			
Medium	250 m3/h at 77 Pa	0.55 A			
Нідн	450 m3/h at 323 Pa	2.21 A			
Махімим	550 m3/h at 240 Pa	2.56 A			

Power supply		
Supply voltage	230/50 V/Hz	
Cos.phi	0,48 - 0,62	

Noise level supply air fan

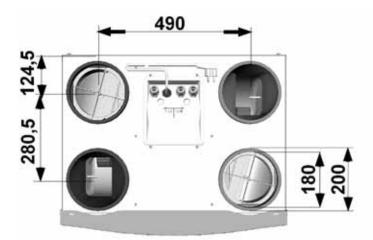
Level	Ventilation rate	Value
ABSENT	50 m3/h at 7 Pa	36 dB(A)
Low	150 m3/h at 23 Pa	50 dB(A)
Medium	250 m3/h at 77 Pa	63 dB(A)
Нідн	450 m3/h at 323 Pa	78 dB(A)
Μαχιμυμ	550 m3/h at 240 Pa	79 dB(A)

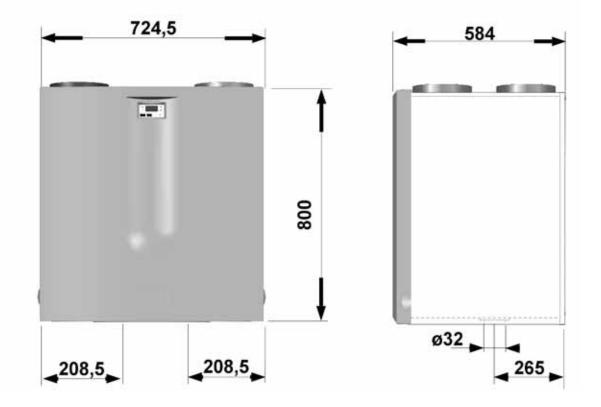
Noise level exhaust air fan

Level	Ventilation rate	Value
ABSENT	50 m3/h at 7 Pa	29 dB(A)
Low	150 m3/h at 23 Pa	39 dB(A)
Medium	250 m3/h at 77 Pa	49 dB(A)
Нідн	450 m3/h at 323 Pa	63 dB(A)
Махімим	550 m3/h at 240 Pa	64 dB(A)

General specifications			
Material of counter flow heat exchanger	Plastic		
Material of enthalpy exchanger	Cellulose		
Material of inner lining	(E)PP / PA / PA		
Heat recovery	up to 95%		
Weight	47 kg		

3.3 Dimension Sketch





3.4 Preconditions for Installation

Observe the following points when assessing if the santos can be installed in a particular room:

- In addition to observing the instructions contained in this manual you must comply with local safety and installation regulations specified by, amongst others, public utility companies when installing the santos.
- When selecting the place of installation ensure there is sufficient space around the santos for air connections, supply and exhaust air ducts as well as for carrying out maintenance work.
- The following installations must be available in the room:
 - Air duct connections.
 - 230 V mains power supply.
 - Connection for the condensation drain.
- Install the santos in a frost-protected room. Ensure the condensation water is discharged frost-free with a downward gradient and includes a trap.

We recommend you do not install the unit in a room with an on average higher level of humidity.

To ensure good and draught-free ventilation of the dwelling, ensure there are 10 mm gaps below the indoor doors. If these gaps are blocked, for example with door seals or highpile carpets, the circulation of air inside the dwelling will stagnate. This would prevent the system from operating at an optimum.

3.5 Installing the santos

3.5.1 Transport and Unpacking

Proceed with due care and attention when transporting and unpacking the santos.

Remove the unit from the packaging only immediately prior to mounting the unit.

To protect against the ingress of building dust and moisture cover open ends (duct connections) during any interruptions to installation procedures.

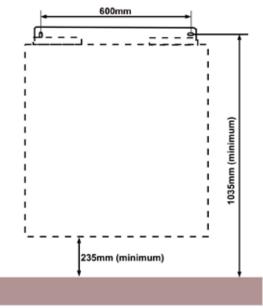
3.5.2 Checking the Scope of Supply

Please contact your supplier immediately if you discover any damage to or parts missing from the delivered product. The scope of supply includes:

- Santos 570 DC; Check the identification plate to ensure it is the correct unit type.
- Mounting brackets;
- Operating Manual

3.6 Mounting the santos

3.6.1 Wall mounting



Mount the santos on a wall with a mass of at least 200 kg/m².

With other walls we recommend the use of a mounting frame to install on the floor (optional). This helps to avoid the transmission of structure-borne noise as much as possible.

- Fasten the supplied mounting bracket to the wall horizontally.
- **Connect** the condensation drain (not included in the scope of supply) to the underside of the santos. The given dimension of 235 mm is intended as a guideline. This value depends on the type of trap selected.
- Ensure that at least 1 metre of space is left in front of the santos to allow future maintenance work.

3.6.2 Connecting the Air Ducts

Observe the following specifications when fitting air ducts:

- Install silencers of at least 1 meter in length to the supply and exhaust air connections of the unit. For relevant advice, please contact Paul Wärmerückgewinnung GmbH.
- Fit the air ducts to be connected (minimum ø180 mm), ensuring they are sealed airtight and offer as little resistance to the flow of air as possible.
- To guarantee the basic functionality of the balanced ventilation system when utilising flexible ducting, use only air ducting material from Paul Wärmerückgewinnung GmbH.
- Ensure the insulation of the intake air and discharge air ductwork is vapour tight. This prevents the formation of condensation on the outside of the ducts.
- If it is not possible to avoid creating a low point when installing the discharge air ducting from the discharge air connections on the unit to the wall opening, then a further condensate drainage line must be connected at the low point; the

reason being discharged air is saturated with water vapour when confronted with cold outdoor temperatures that causes droplets to form on the inside of the ductwork.

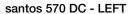
- If it is planned to install a silencer at the discharge air connection, then this must be routed upwards by a bend to protect it against being soaked by condensation flowing back out of the discharge air ductwork. When mounting the unit ensure the condensate can be drained with a good downward gradient along a longer distance.
- When routed across a roof the exhaust air duct must have a double-walled or insulated roof opening. This prevents the formation of condensation between the layers of the roof.
- To prevent unnecessary temperature losses in both summer and winter we recommend you insulate the supply and exhaust air ductwork with thermal, vapour-tight insulation.

3.6.3 Connecting the condensation drain



santos 570 DC - RIGHT





The warm extract air is cooled by the intake air in the heat exchanger. As a result, moisture contained in the inside air condenses in the heat exchanger. The condensation water that forms in the heat exchanger is directed towards the trap.

The connection for the condensation drain has an outside diameter of 32 mm. This is located on the underside of the santos.

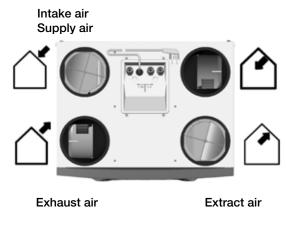
- Connect the condensation drain with a pipe or hose to the water seal of the domestic wastewater system.
- **Position** the upper edge of the water seal at least 40 mm below the condensation drain of the santos unit.
- Ensure that the end of the pipe or hose ends below the water level.

Extract air



Intake air





santos - right

- Ensure that the water seal connected to the domestic wastewater system is always filled with water.
- Ensure that the hose end terminates at least 60 mm below the water level. This will prevent the santos from drawing in air.

Do not connect the condensate drain directly to the sewage drain system (for example flowing freely into funnel with condensation drain at the sewage system)

3.7 Commissioning the santos

The santos can be put into operation after installation.

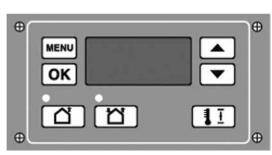
It is possible to carry out the commissioning procedures utilising P menus on the digital control panel. These P menus allow various settings (in particular for ventilation control) to be selected for the santos. An overview of the available P menus is given below:

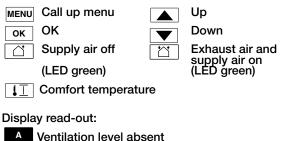
Menu	Possible options
P1	View status (from menu P2)
P2	Set time delay values
P3	Set ventilation levels
P4	View temperatures
P5	Set additional control functions
P6	Set additional control functions
P7	Read and reset malfunctions (and sys-
	tem information)
P8	Set 0-10 V inputs
P9	View status (from menu P5)

The P menus P1, P2 and P9 are user accessible and serve mainly for viewing statuses and setting time delays. The remaining P menus P3 to P8 are reserved <u>exclusively</u> for the installer.

The bypass valve will not move in the first 4 minutes following a drop in voltage, if the setting mode is not activated.

3.7.1 Display on Unit





Α	Ventilation level absent
1	Ventilation level low
2	Ventilation level medium
3	Ventilation level high
хх	Menu display
хх	Malfunction code (flashes)

Bypass

Accessing menus

Se- quence	Operating keys	Display	Description
1	MENU	P2	Time delay values
2	▲ + ▼ (3 seconds)	P3	Press keys simultaneously
3		P4	Temperatures
4		P5	Control settings
5		P6	Control settings
6	A	P7	Malfunction / reset / Self-test
7		P8	0 - 10 V inputs
8	A	P9	Status display

Settings example

Set the power of the supply air fan at THE MEDIUM LEVEL to 40%

Se- quence	Operating keys	Display	Description	
1	MENU	P2	Time delay values	
2	▲ + ▼ (3 seconds)	P3	Press keys simultaneously	
3	ок	P30	Exhaust air fan Level A	
4	▲ (6x)	P36	Select P36	
5	ОК	50	Current setting	
6	▼(10 x or hold down)	40	Select 40	
7	ОК	P35	Current value is 40	
8	MENU	P3		
9	MENU	1	Fan steps	

Some P menus (for example P1 and P9) are view only.

End (read) menu

- Press "MENU" (instead of "OK").
- The display cannot be used to set the santos ventilation levels. Arrow keys are used only to determine additional programmes.

Menu P3 → *Set ventilation controls*

		Values for ventilation controls		
Sub-menu	Description	Minimum	Maximum	Standard
P30	Power (in %) of the exhaust air fan for the LEVEL "ABSENT".	0% or 15%	97%	Normal / High 15% / 15%
P31	The power (in %) of the exhaust air fan FOR THE LEVEL "LOW".	16%	98%	Normal / High 35% / 40%
P32	The power (in %) of the exhaust air fan FOR THE LEVEL "MEDIUM".	17%	99%	Normal / High 50% / 70%
P33	The power (in %) of the exhaust air fan FOR THE LEVEL "HIGH".	18%	100%	Normal / High 70% / 90%
P34	Power (in %) of the supply air fan for the LEVEL "ABSENT".	0% or 15%	97%	Normal / High 15% / 15%
P35	The power (in %) of the supply air fan FOR THE LEVEL "LOW".	16%	98%	Normal / High 35% / 40%
P36	The power (in %) of the supply air fan FOR THE LEVEL "MEDIUM".	17%	99%	Normal / High 50% / 70%
P37	The power (in %) of the exhaust air fan FOR THE LEVEL "HIGH".	18%	100%	Normal / High 70% / 90%
P38	Current power (in %) of the exhaust air fan.	-	-	Current %
P39	Current power (in %) of the supply air fan.	-	-	Current %

Menu P4 → *View temperatures*

		Temperature values		
Sub-menu	Description	Minimum	Maximum	Standard
P42	N/A	-	-	Current °C
P41	Comfort temperature	12 °C	28 °C	20 °C
P44	N/A	-	-	Current °C
P45	Current value of T1 (= temperature of the intake air)	-	-	Current °C
P46	Current value of T2 (= temperature of supply air)	-	-	Current °C
P47	Current value of T3 (= temperature of exhaust air)	-	-	Current °C
P48	Current value of T4 (= temperature of discharged air)	-	-	Current °C
P49	Current value TGHE (= temperature of the outside air for GHE control valve)	-	-	Current °C

3.7.2 P Menus for the Installer

		Values for additional control functio				
Sub-menu	Description	Minimum	Maximum	Standard		
P50	Activating the fireplace control.	0 (= No)	1 (= Yes)	0		
P51	Indicate presence of a frost protection device.	0 (= No)	1 (= Yes)	0		
	 Note: Alter only if retrofitting a frost pr If it is necessary to restore the origin standard setting will reset the setting sent". Check for the presence of the frost via menu P75. 	al factory settir for a retrofitted	ngs on the san frost protectior	и device to "Ав-		
P52	Setting frost protection control: • 0; Particularly safe setting. • 1; Safe setting. • 2; Nominal setting. • 3; Economy setting.	0	3	2		
Note: The FROST PROTECTION DEVICE IS ACTIVATED earliest when the particularly selected. Consequently, this level offers the highest level of protecti balanced ventilation. On the other hand, the frost protection device is late as possible when the ECONOMY SETTING is selected. Consequently, the the least level of protection to maintain balanced ventilation. Generally speaking frost protection control can be left at level 2 when the santos: NOMINAL SETTING (= factory setting). Only in areas with col daytime temperatures regularly approx10° C or below) should Leve or even Level 0: PARTICULARLY SAFE SETTING be selected.				ion to maintain switched on as this level offers commissioning ld winters (with		
P53	N/A	0 (= No)	1 (= Yes)	0		
	Note: Keep this at the standard setting.					
P54	Indicate presence of a bypass	0 (= No)	1 (= Yes)	1		
	Note: The santos is fitted with a bypass valv can be left at '1'.	e as standard e	quipment. Ther	efore, the value		
P55	N/A	0 (= No)	1 (= Yes)	0		
	Note: Keep this at the standard setting.					
P56	Setting the requisite volume of air for the dwelling. • nL: "Normal air volume". • HL: "High air volume".	nL	HL	HL		
	Note: The setting undertaken in P56 for the air volume ("nL" or "HL") forms the basis for setting the air specifications and hence for setting the fans.					
P57	Santos setting. • Li = "Left-hand version" • Re = "Right-hand version".	Li	Re	Li		
	Note: The santos unit is correctly set ex works. • Refer also to the identification plate for this data.					
P58	 Enter the priority for the control setting. 0; Priority for high level INCLUDING analogue input. 1; Priority for high level EXCLUD-ING analogue input. 	0	1	0		

Menu P5 → Setting additional control functions

		Values for additional control functions		
Sub-menu	Description	Minimum	Maximum	Standard
P59	 Indicate the presence of the en- thalpy exchanger. 0; No enthalpy exchanger fitted 1; Enthalpy exchanger with RH sensor 2; Enthalpy exchanger without RH sensor 	0 (= No)	2 (= Yes)	0
	Note: It is not possible to connect an RH ser Option 2, if an enthalpy exchanger is ir		os unit. Consequ	uently, select

Menu P6 → Setting additional control functions

Values for additional cor			dditional contr	rol functions	
Sub-menu	Description	Minimum Maximum Standard			
P60	 Indicate presence of a geothermal heat exchanger. 0; No geothermal heat exchanger or brine defroster fitted 1; Enthalpy exchanger with GHE control valve or brine defroster fitted 3; Enthalpy exchanger without GHE control 	0 (= No)	3 (= Yes)	0	
	Note: If the configuration utilises a geothermal heat exchanger without a GHE control valve select the level for the permanent intake of outside air via the geothermal heat exchanger to ensure that the bypass valve of the santos continues to function.				
P61	Percentage setting at which the sup- ply air fan must operate higher when the GHE control valve is set to draw in air via the geothermal heat ex- changer.	0%	99%	0%	
P62	Tghe (temperature of intake air for GHE control valve), low	0 °C	15 °C	7 °C	
P63	Tghe (temperature of intake air for GHE control valve), high	10 °C	25 °C	23 °C	
P64	N/A	5 °C	40 °C	18 °C	

Menu P7 \rightarrow View and reset malfunctions (and system information)

		Values (malfunction) information			ormation
Sub-menu	Description	Minimun	n	Maxi- mum	Standard
P70	Current software version	Software version number (without "v")			out "v")
P71	Last malfunction.	Code compliant alarm and malfunction mes- sages			
P72	Last malfunction but one	Code compliant alarm and malfunction mes- sages			
P73	Last malfunction but two	Code compliant alarm and malfunction mes- sages			
P74	Reset a malfunction on the santos	0	1		0

P75	 Restore factory settings Press " for 5 seconds on the membrane keyboard to per- form a complete reset. This action will restore the original factory settings. 	0	1	0	
	Note: After a complete reset of the santos a message prompts you to re-enter the settings for "nL / HL" (see P56) and "Li / Re" (see P57).				
	After a complete reset, all settings in menus P2 and P3 and the existing controls P5 and P6 have to be set again.				
	If the santos is equipp vice it must be re-en- following a complete "disabled".	se			
P76	Santos self-test	0	1	0	
	Note: The santos switches to the highest level immediately when the self- test is activated. In addition, the bypass valve also opens and closes immediately after the self-test is activated. If this self-test is com- pleted without malfunctions, the valve of the frost protection device (if installed) then opens and closes.				
P77	Reset dirty filter counter	0	1 0		
	Note: This control command resets the coun ing message. This allows the filter to the filter warning message is displayed	be cleaned or r			

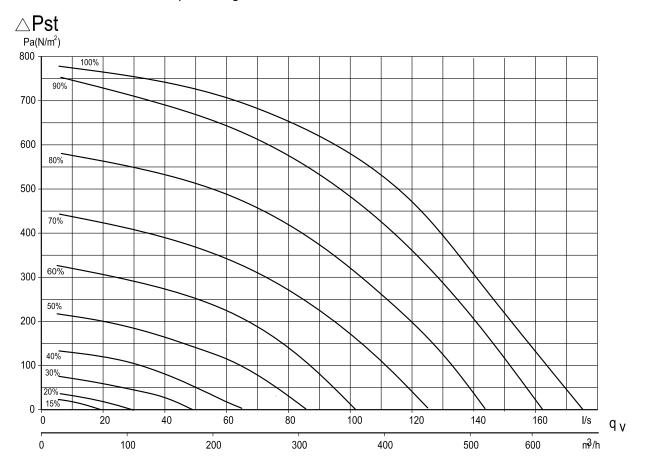
Menu P8 → Analogue control settings

		Values	Values (malfunction) information		
Sub-menu	Description	Minimum	Maximum	Standard	
810	Analogue input 1 0=absent 1=present	0	1	0	
811	0=Open loop 1 =Closed loop (analogue input 1)	0	1	0	
812	Setpoint analogue input 1 (closed loop)	0	100	50	
813	Min. setting analogue input 1	0	99	0	
814	Highest setting analogue input 1	0	100	100	
815	0=positive analogue input 1 1=negative setting analogue input 1	0	1	0	
816	Read out analogue input 1	0	100	-	
820	Analogue input 2 0=absent 1=present	0	1	0	
821	0=Open loop 1 =Closed loop (analogue input 2)	0	1	0	
822	Setpoint analogue input 2 (closed loop)	0	100	50	

		Values (malfunction) information			
Sub-menu	Description	Minimum Maximum Standar			
823	Min. setting analogue input 2	0	99	0	
824	Highest setting analogue input 2	0	100	100	
825	0=positive analogue input 2 1=negative setting analogue input 2	0	1	0	
826	Read out analogue input 2	0	100	-	
830	Analogue input 3 0=absent 1=present	0	1	0	
831	0=Open loop 1 =Closed loop (analogue input 3)	0	1	0	
832	Setpoint analogue input 3 (closed loop)	0	100	50	
833	Min. setting analogue input 3	0	99	0	
834	Highest setting analogue input 3	0	100	100	
835	0=positive analogue input 3 1=negative setting analogue input 3	0	1	0	
836	Read out analogue input 3	0	100	-	
840	Analogue input 4 0=absent 1=present	0	1	0	
841	0=Open loop 1 =Closed loop (analogue input 4)	0	1	0	
842	Setpoint analogue input 4 (closed loop)	0	100	50	
843	Min. setting analogue input 4	0	99	0	
844	Highest setting analogue input 4	0	100	100	
845	0=positive analogue input 4 1=negative setting analogue input 4	0	1	0	
346	Read out analogue input 4	0	100	-	
850	RF input 1 0=absent 1=present (remote control)	0	1	0	
851	0=Open loop 1 =Closed loop (RF input 1)	0	1	0	
852	Setpoint RF input 1 (closed loop)	0	100	50	
853	Min. setting RF input 1	0	99	0	
854	Highest setting RF input 1	0	100	100	
855	0=positive analogue input 1=negative setting RF input	0	1	0	
856	Read out RF input	0	100	-	

3.8 Setting Air Specifications

The santos unit must be set up following installation.



These can be undertaken using santos air specifications shown above.

The standard nL settings for the santos are as follows:

Level ABSENT	15%
Level Low	35%
Level MEDIUM	50%
Level нідн	70%

The standard HL settings for the santos are as follows:

Level ABSENT	15%
Level LOW	40%
Level MEDIUM	70%
Level нідн	90%

To set the santos (following installation) proceed as follows:

- 1. Set the santos to the programming mode.
 - Display: Simultaneously press the keys " 🖆 " and " 🖆 " for at least 3 seconds until "InR" is displayed.
 - Membrane keypad: Simultaneously press the keys " 🐓 " and " 🖆 " until "InR" is no longer displayed on the membrane keyboard display.

When in the setting mode the bypass valve damper and the frost protection device always remain closed. The santos automatically switches off the setting mode after 30 minutes.

- 2. Close all windows and outside doors.
- 3. Then close all inside doors.
- 4. Check the presence of air circulation systems in the building (at least 12 cm² per l/s).

The air circulation systems in the building must achieve at least 12 cm² per l/s.

- 5. **Check**, if both fans function in the three speed ranges.
- 6. Set the santos to high speed.
- Install all the valves and set them as detailed in the instructions or as in the reference dwelling.

If no data is known:

- Install the valves and open them as far as possible.
- Measure the air volumes beginning with the supply air and then the exhaust air.
 If the measured air volumes differ from

the nominal air volumes by more than approx. 10%, and if the majority of the deviations are in the plus range, **adjust** the fan so that all the deviations are in the plus range. If the majority of the deviations are in the minus range, **adapt** all the deviations so that they are all in the minus range. **Ensure** also that a supply and an exhaust valve remain fully open.

- 8 Alter the fan settings in the P menus P30 and P37 via the digital control panel.
 - Select the lowest possible setting to minimise energy consumption.
 - Ensure that the ratio of air volumes between high, medium and low remains the same.

Refer to the santos air specification diagram when setting the fans.

- 9. Should the air volumes set to date still differ too much:
 - Adjust the valves further.
- 10. Check the whole system again after adjusting all of the valve levels.
- 11. Switch on the santos unit (again) and set it to ventilation level 2.
 - Display: Simultaneously press the keys "
 " and " " " for at least 3 seconds until "InR" is no longer displayed.
 - Membrane keypad: Simultaneously press the keys " 🐨 " and

" I until "InR" is no longer displayed on the membrane keyboard display.

3.9 Service by the Installer

As the installer you are obliged to service your santos as follows:

- Inspect the heat exchangers and fans;
- Clean the filter if a frost protection device is installed.

These maintenance procedures are described briefly in more detail in the following sections.

Failure to (regularly) carry out maintenance procedures on the santos will impair the long-term performance of the balanced ventilation system.

3.9.1 Inspecting the Heat Exchanger and Fans

Check the condensation drain, the fans and the heat exchanger every 2 years.

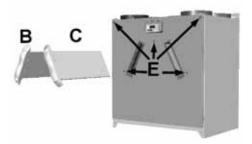
- 1. Isolate the unit from the mains power supply
- 2. Lift the front panel (A) upwards and remove from the santos unit.



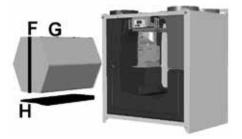
3. Pull the handles (B) away from the santos.



- 4. Remove the filters (C) from the santos.
- 5. Remove the sealing plate by removing the screws (E).



- When installing the sealing plate, its underside must first be inserted behind the raised edge to ensure a good seal is achieved.
 - 6. **Pull** the strap (F) to remove the heat exchanger (G) and the drain plate (H).



7. Remove the heat exchanger (G) from the drain plate (H).

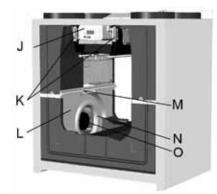
There may still be water in the heat exchanger!

- 8. Clean the heat exchanger, if necessary. Cleaning the counter flow heat exchanger:
 - To clean immerse the heat exchanger several times in warm water (max. 40 °C).
 - Finally, rinse the heat exchanger thoroughly with warm tap water (max. 40).
 - Hold the heat exchanger with both hands on the coloured side surfaces and shake out all the water.
 - Cleaning the enthalpy exchanger:
 - Vacuum clean the enthalpy exchanger with a vacuum cleaner with a soft brush attachment.
 - Do not use water!

Do not use aggressive or solvent-based cleaning agents.

Do not install the heat exchanger yet; proceed as follows to remove, inspect and, if necessary, clean the fans.

- 9. Remove screws from the electronic carriage
- 10. Carefully pull the electronic carriage forward.
- 11. Disconnect the connectors (J) and the earth wire from the PCB, and completely remove the cables as well as both grommets (K).
- 12. Remove the complete volute fan casing (L) by pressing in the click-fasteners (M).
- 13. Remove the inlet cone (N) by pressing in the click-fasteners around the volute fan casing.
- 14. Clean the fans (O).



- Ê Use a soft brush to clean the fan impellers.
- Remove dust using a vacuum cleaner.
- Take care not to damage the fan impellers.
- Take care not to damage the temperature sensor.
 - 15. Install all the parts again in the reverse order.
 - 16. Reconnect the unit to the mains power supply.
 - 17. Initiate the self-test routine in line with menu P76.
- A Refit the drain plate (F) again correctly below the heat exchanger. Ensure the bevelled side of the drain plate is positioned at the side of the condensation drain.



When refitting the heat exchanger ensure the four rubber seals are correctly seated.

Tighten the screws to a maximum torque of 1.5 Nm. This corresponds roughly to level 2 of a normal cordless drill.

3.9.2 Cleaning the Filters of Units Equipped with a Frost Protection Device

The filter of the frost protection device (if installed) must be cleaned every 4 years.

- 1. Isolate the unit from the mains power supply
- 2. Lift the front panel (A) upwards and remove from the santos unit.
- 3. Pull the handles (B) away from the santos.
- 4. Remove the filters (C) from the santos.
- 5. Remove the sealing plate by removing the screws (E).
- 6. Remove screws from the electronic carriage
- 7. Carefully pull the electronic carriage forward.
- Disconnect the connectors (J) and the earth wire from the PCB, and completely remove the cables as well as both grommets (K).
- 9. Remove the cable from the PCB.
- 10. Remove the bracket securing the frost protection device by pushing it upwards slightly and then pulling it away from the valve.
- 11. Clean the filter with a brush.
- 12. Remove any soiling with a damp cloth.
- 13. Install all the parts again in the reverse order.
- 14. Reconnect the unit to the mains power supply.
- 15. Initiate the self-test routine in line with menu P76.

The inward curved (hollow) side of the filter of the frost protection device must point towards the bracket securing the frost protection device.

Tighten the screws to a maximum torque of 1.5 Nm. This corresponds roughly to level 2 of a normal cordless drill.

3.10 Malfunctions

A warning message is generally displayed on the display of the digital control panel if a malfunction should occur in the santos.

However, not all malfunction messages are displayed on the display of the digital control panel, even if there is a malfunction (or problem). Both types of malfunction (or problem) are described briefly in the following sections.

3.10.1 Malfunction messages displayed

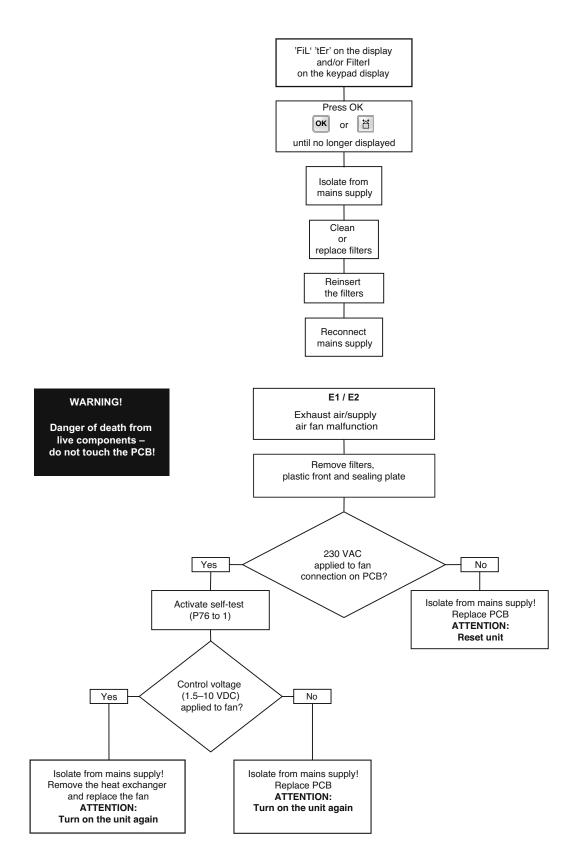
There follows an overview of the malfunction messages that are shown on the display of the digital control panel.

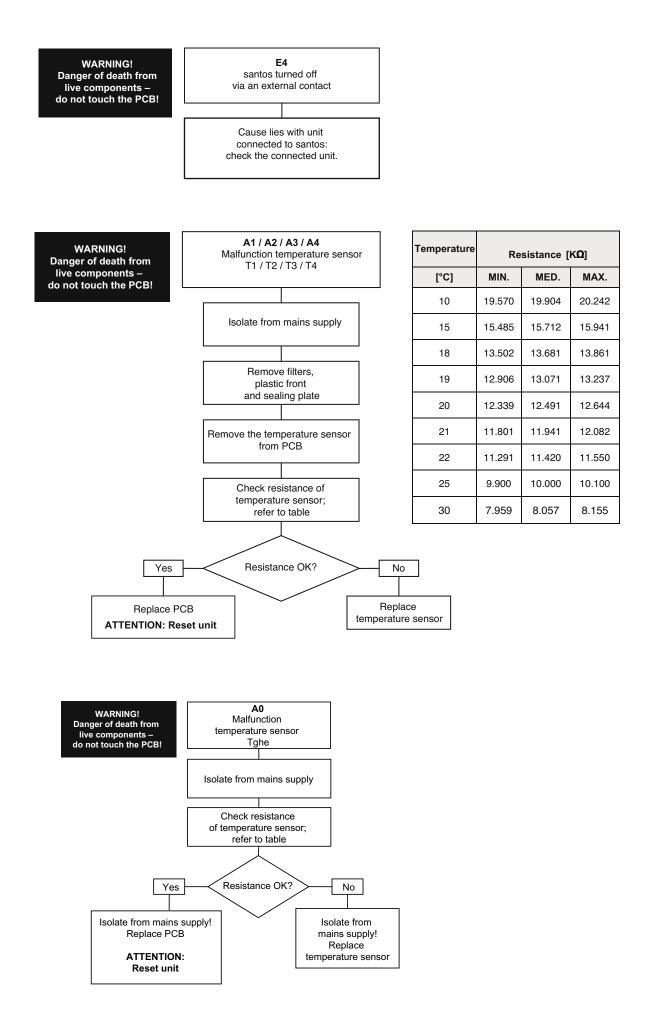
Code	Description
A0	NTC sensor Tghe defective.
	(= temperature of intake air for GHE
	control valve)
A1	NTC sensor T1 defective.
	(= temperature of the intake air)
A2	NTC sensor T2 defective.
	(= temperature of supply air)
A3	NTC sensor T3 defective.
	(= temperature of exhaust air)
A4	NTC sensor T4 defective.
	(= temperature of discharged air)
A5	Bypass motor malfunction.
A6	Motor of frost protection device mal-
	function.
A7	Frost protection device not warming
	sufficiently.
A8	Frost protection device too hot.
A10	N/A
A11	N/A
,Fil' ,tEr'	Replace filter display
E1	Exhaust air fan not working.
E2	Supply air fan not working.
E4	Heat recovery function turned off via an
	external contact
EA1	Enthalpy sensor measures excessively
	high moisture values.
EA2	No communication with
	enthalpy sensor.
NC	No communication with unit
Filterl	Internal filter dirty.
FilterE	External filter dirty.

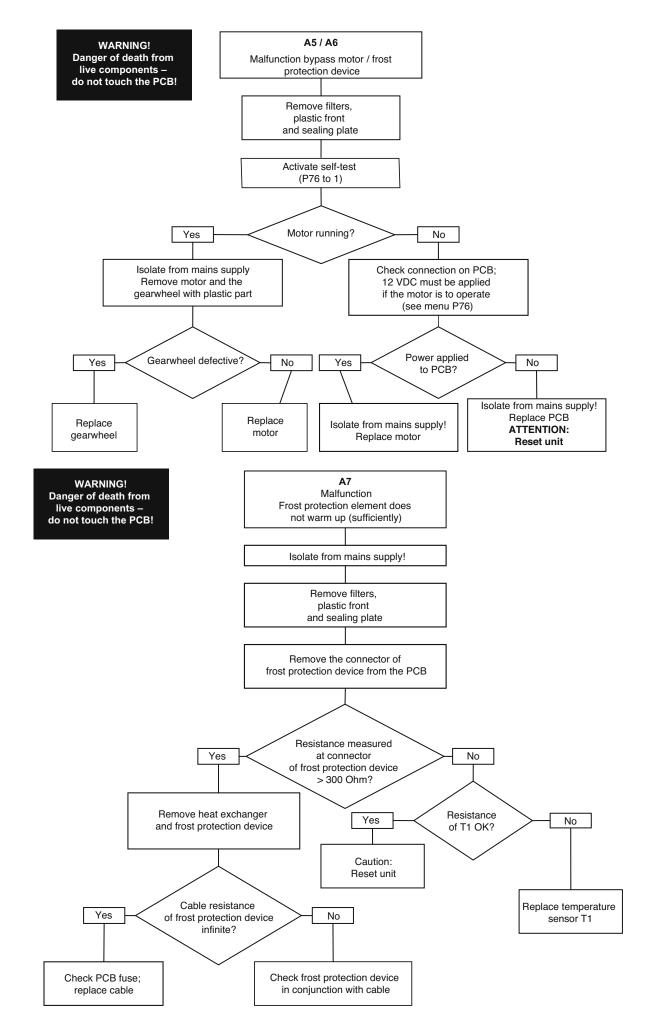
Ensure that the electrical connections do not come into contact with moisture.

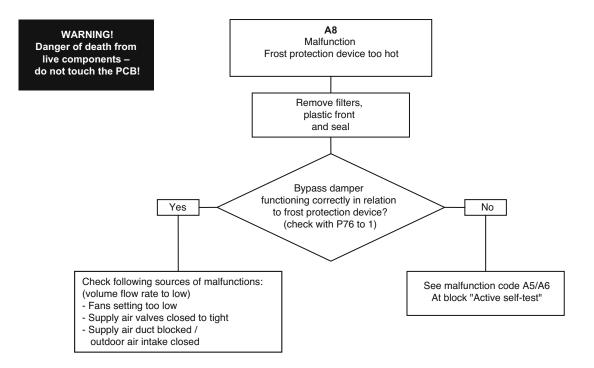
3.10.20verview of Malfunctions

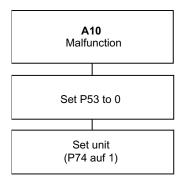
The graphic below offers an overview of the messages described above that can be viewed on the display of the digital control panel in the event of a malfunction.

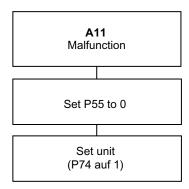








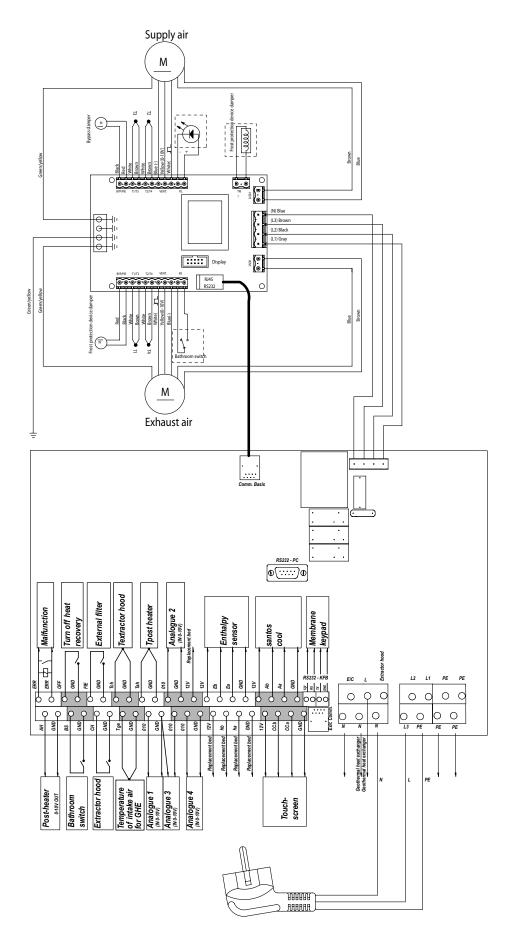




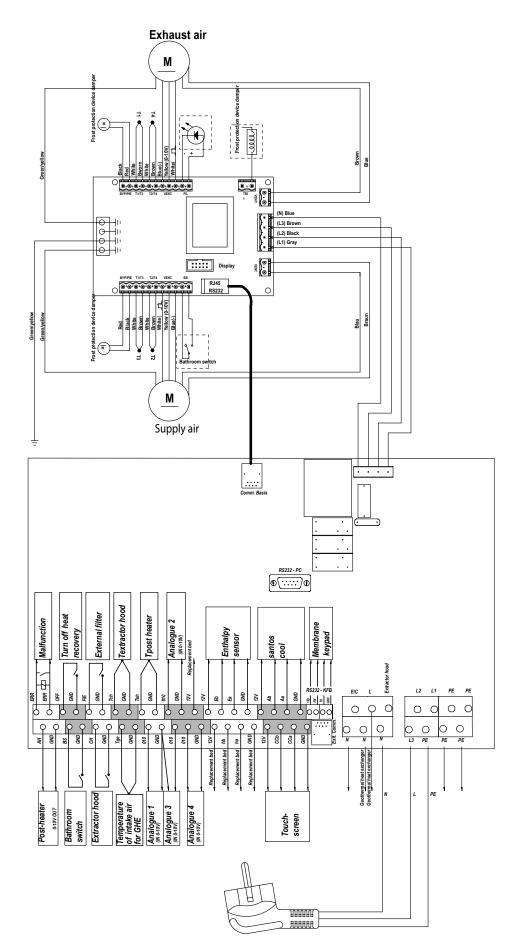
3.10.3Malfunctions (or Problems) not Displayed This section gives an overview of the malfunctions (or problems) that are not displayed.

Problem / Malfunc- tion	Cause	Check / Remedy
All OFF	Supply voltage	Check the fuse on the control PCB.If the fuse is OK the PCB is defective.
	No supply voltage	Mains power supply has failed.
High air delivery	Bypass remains closed	Lower the comfort temperature.
temperature in sum- mer	The santos is still in winter mode.	Wait until the santos switches to sum- mer mode.
Low supply air tem- perature in winter	Bypass remains open	Increase the comfort temperature.
No or too little sup-	Filter clogged	Replace the filters.
ply air; shower re-	Valves clogged	Clean the valves.
mains wet	Heat exchanger clogged with dirt	Clean the heat exchanger.
	Heat exchanger frozen	Thaw the heat exchanger.
	Fan dirty	Clean the fan.
	Ventilation ducts clogged	Clean the ventilation ducts.
	The santos is set to frost mode	Wait until warm-up phase occurs
Unusual	Fan bearings defective	Replace fan bearings.
noises	Fan settings	Change ventilation control settings.
	Scraping noise • Trap is empty • Trap does not seal	Install the trap again.
	Whistling noise Air leak somewhere in the system 	Seal the air leak.
Ladius and succ	 Air flow noises Valves connections with duct not properly sealed. Valves not open sufficiently 	Re-fit the valves. Reset the valves.
Leaking condensa- tion	Condensation drain clogged	Clean the condensation drain.
	Condensation from the exhaust air duct does not flow into the condensa- tion tray	Check whether the connections are properly joined.
Wired 3-position switch does not function	Wiring not correct Switch is defective	 Check the circuit of the 3-position switch by measuring the voltage: Voltage only between N and L3: [The fans operate at level 1]. Voltage only between N and L3 and N and L2: [The fans operate at level 2]. Voltage only between N and L3, and N and L1 or between N and L3, N and L2, N and L1: [The fans operate at level 3].

3.11 Wiring Diagram: santos 570 DC – LEFT-HAND Version



3.12 Wiring Diagram: santos 570 DC - RIGHT-HAND Version



EC Declaration of Conformity

Paul Wärmerückgewinnung GmbH August-Horch-Strasse 7 08141 Reinsdorf Tel.: +49(0)375 - 303505 - 0 Fax: +49(0)375 - 303505 - 55

EC Declaration of Conformity Designation of the appliance : Heat Recovery Units: santos 570 DC series Conforms to the directives : Machinery Directive (2006/42/EC)) Low Voltage Directive (93/68/EC)) EMC Directive (89/336/EC))

Reinsdorf, 16th November 2009 Paul Wärmerückgewinnung GmbH

Eberhard Poul

Eberhard Paul, General Managing Director

Status 18.03.10

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Commissioning and Acceptance Certificate

Proof of complete installation

and performance to DIN 1946-6



Customer data				
Name:	First name:	Tel.:		
Street:	Postcode:	Town:		
Building project:				
Unit type:	Serial number:	Year of manufacture:		

Nr	Components	Implementation	Result
1	Supply air ductwork	- Installed as planned	Yes/no
		- Cleaning possible	Yes/no
2	Supply air openings	- Arranged as planned	Yes/no
		- Installed as planned	Yes/no
		- Cleaning possible	Yes/no
3	Excess air openings	- Arranged as planned	Yes/no
		- Installed as planned	Yes/no
4	Exhaust air openings	- Arranged as planned	Yes/no
		- Installed as planned	Yes/no
		- Cleaning possible	Yes/no
5	Exhaust air ductwork	- Cleaning possible	Yes/no
6	Exhaust air fan	- Cleaning possible	Yes/no
7	Control system	- In working order	Yes/no
8	Filter, optional	- Replacement or	
		cleaning possible	Yes/no
9	Heat exchanger for heat recovery	- Cleaning possible	Yes/no
10	Exhaust air heat pump, optional	- Cleaning possible	Yes/no
11	Condensate drain system, optional	- In working order	Yes/no
12	Ground source heat exchanger, optional	- Cleaning possible	Yes/no
13	Preheater, optional	- Cleaning possible	Yes/no
14	Solar heat collector	- Cleaning possible	Yes/no
15	Documentation	- Provided	Yes/no

Function 1 Operational at rated **Result OK** Yes/no ventilation, as planned Remedial action required Yes/no 2 Operating levels possible, **Result OK** Remedial action required as planned Yes/no 3 Electrical power consumption Yes/no **Result OK** Remedial action required Yes/no **Confirmation note**

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Maintenance Work

Enter date in corresponding quarter

1. Replace both	filters in HR unit (filter	replacement cycle 90 day	ys):	
Quarte	r .			
Year		II II		IV
201				
201				-
201				
201				
201				
201				
201				
201				
201				
201				
2 Clean front ex	haust air filter / filter i	n exhaust air valves	(filter replacement cycle	approx 2 months)
Quarte				
Year		II	III	IV
201				
201				
201				
201				
201				
201				
201				
201				
201				
201				
	ltor in intoko oir duot			
	Iter in intake air duct	(Intake air suction – also	on geothermal heat excr	langer)
Quarte	er I	I	III	IV
Year				
201				
201				
201				
201				
201				
201				
201				
201				
201				
201				

Simplified formula for determining the provision of heat η on site

$\eta = \frac{t_{Sup} - t_{In}}{t_{Exh} - t_{In}}$	Key: t_{in} - Intake air temperature (outside air) t_{Exh} - Exhaust air temperature t_{Suv} - Supply air temperature	Note: Determine the air temperatures at rated ventilation levels with volume flow rate balance and with the sensors positioned
	<i>t_{Sup}</i> - Supply all temperature	as specified in DIN EN 308!

Checklist B Professional Maintenance



Maintenance Work

Enter result

Inspection of ventilation system to DIN 1946-6 Appendix E (normative) and Appendix F (informative) Hygiene inspection to VDI VDI 6022, Paragraph 5.3.2. _ Informal remarks about status. _ Additional yearly report on separate sheet. Components 201... 201... Yearly No. Result 201... 201... 201... Components cleaned? Yes/no Frost protection / thawing Yes/no device functioning? Structure-borne nose, fixings avoided? Yes/no Fan / ventilation unit 1 Preheater / evaporator / heat exchanger Yes/no are not dirty? Operating indicators Yes/no functioning? In working order? Yes/no Condensation drain and trap 2 Condensation Yes/no disposal OK? Cable connections and clamping fixtures secure? Yes/no 3 Electrical / controls Control units are Yes/no in working order? Cleaned? Yes/no Thermal insulation Yes/no Air ductwork / and vapour barrier OK? 4 thermal insulation Flexible connection between unit and Yes/no air ductwork OK? Switch-over function OK? Yes/no Ground source-air Switch-over function OK? heat exchanger, 5 Yes/no Intake air suction clear? if installed Condition of pre-filter OK? Yes/no Condensation drain OK? Yes/no Fan / ventilation unit Safety device for fireplace 6 and fireplace, in working order? Yes/no if installed Fan, ventilation unit, filters, Stipulated filter class 7 Yes/no condition of filters observed? Correctly seated Yes/no and secured? Exhaust air / Stipulated filter class 8 Yes/no Supply air opening observed? Filter, condition Yes/no of filter OK? Open cross-section Yes/no available? 9 Excess air openings No structure or air-borne Yes/no noise transmission?

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Stand 18.03.10

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Air Volume Protocol Operating Status, Functional Check 1),

Instructions



Custo	omer data						
Name:		First name:		Tel.:			
Street:		Postcode:		Town:	Town:		
Buildir	ng project:						
Unit type:		Serial number:		Year of manufacture			
Measu	urement data						
Measuring instruments used:			Description of malfunctions		Indoor temperature 2):		
			during measurements:		Outdoor temperature 2):		
					Weather 2):		
State of filter during calibration Supply air Clean		Exhaust air		Fan speed ratio exl	naust air / supply air:		
Approx days in use							
Very c							
Supply air		Due's statets		Fan level: %			
No.	Room designation		m³/h	ect data m³/s	m³/h	Measurement data m ³ /h m ³ /s	
Evha	ust air				Fan level:	%	
No.	Room designation		Project data		Measurement data		
				m³/h			
$P_{al} = V$	N (2 fans)						
				rating at normal le			
1) As a 2) To [3) To [4) DIN contin	agreed the air flow rate is mea DIN EN 14134, Paragraph. 7.3 DIN EN 14134, Paragraph 7.4 1946-6 specifies that apart fro ually. When the dwelling is un hittent holiday programme.	8.1.5. .1. b) Er om reas	nd ons of mainten	ance and repairs v	ventilation systems m		
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