

# Geniox Air handling unit

Installation, Operation and Maintenance instruction

GB

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Only the English version is valid in case of a dispute. Translated versions are not valid in case of disputes.

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## **A Manufacturer**

This User Manual covers Geniox air handling units delivered by Systemair A/S.

### **Manufacturer and supplier data:**

Systemair A/S

Ved Milepælen 7

DK-8361 Hasselager

Responsible for documentation: Elisabeth Rahbek

## **B Name of machines**

This manual is about Systemair air handling units called Geniox 10, Geniox 11, Geniox 12, Geniox 14, Geniox 16, Geniox 18, Geniox 20, Geniox 22, Geniox 24, Geniox 27, Geniox 29, Geniox 31, Geniox 35, Geniox 38, Geniox 41 and Geniox 44.

## C EU Declaration of Conformity

We, the manufacturer

Company	Systemair A/S
Address	Ved Milepælen 7 DK-8361 Hasselager Denmark

declare under our sole responsibility that the products

Product designation	Air Handling Unit
Type/Model	Geniox 10-44 Geniox 10H-44H Geniox Core 10-20

fulfils all relevant provisions of following directives

Machinery directive	2006/42/EC
Ecodesign – Commission regulation	1253/2014
EMC – directive	2014/30/EU
Low voltage directive	2014/35/EU
Pressure equipment directive	2014/68/EU
European Standards	EN378-1+2:2016
	EN13053:2011
	EN308:1997
	EN1886:2008

Equipment type: **Heat pump section – Geniox and Geniox Core units**

Consisting of: Compressor, evaporator and condenser

Notified Body Bureau VERITAS CE0062 for PED  
Bureau VERITAS SA, 8 Cours du Triangle  
92800 PUTEAUX – LA DEFENSE, FRANCE

Module: A2  
Certificate no:  
CE-0062-PED-A2-SAI 001-21-DNK

Signed for and on behalf of:



Claus Pedersen  
R&D Manager

This declaration relates exclusively to the machinery in the state in which it was placed on the market and excludes components which are added and/or operations carried out subsequently by the final user.  
Hasselager, Denmark 2022-08-11



## D UKCA Declaration of Conformity

We, the manufacturer

Company	Systemair A/S
Address	Ved Milepælen 7 DK-8361 Hasselager Denmark

declare under our sole responsibility that the products

Product designation	Air Handling Unit
Type/Model	Geniox 10-44 Geniox 10H-44H Geniox Core 10-20

fulfils all relevant provisions of following directives

Supply of Machinery (Safety) Regulations	2008
Ecodesign – Commission regulation	1253/2014
Electromagnetic Compatibility Regulations	2016
Electrical Equipment (Safety) Regulations	2016
Pressure Equipment (Safety) Regulations	2016
European Standards	EN378-1+2:2016
	EN13053:2011
	EN308:1997
	EN1886:2008

Equipment type: **Heat pump section – Geniox and Geniox Core units**

Consisting of: Compressor, evaporator and condenser

Notified Body Bureau VERITAS CE0062 for PED  
Bureau VERITAS SA, 8 Cours du Triangle  
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Signed for and on behalf of:



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R&D Manager

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Hasselager, Denmark 2022-08-11



## E General descriptions, dangers and warnings

Geniox air handling units are order specific machines available in thousands of different configurations. Only a few examples of machine configurations are described below. The air handling units are intended for the transport and treatment of air between -40 °C and + 40 °C.

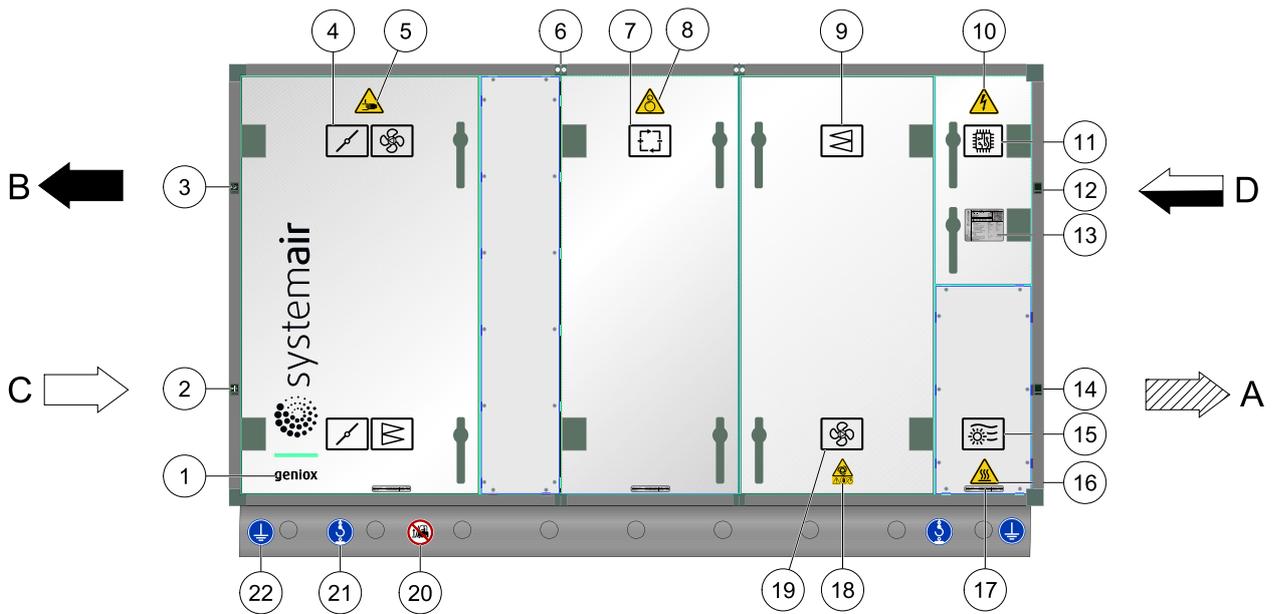
The units are exclusively for comfort ventilation.

Maintenance of the units must be carried out by skilled technicians.

On the drawing below, a right hand unit is shown because the inspection doors are mounted on the right hand side of the unit when looking parallel to the **SUPPLY** airflow. The unit below is with rotary heat exchanger.

Position	Description	Symbol
A	Connection, supply air (to the rooms)	
B	Connection, exhaust air	
C	Connection, outdoor air in	
D	Connection, extract air (from the rooms)	

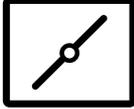
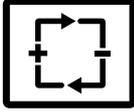
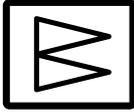
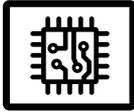
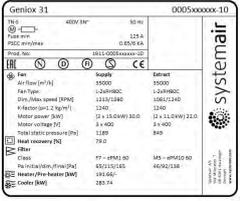
### E.1 Overview via pictograms on the inspection side of the unit



#### E.1.1 Where are pictograms placed on the units

Example (Pictograms and labels with descriptions of functions for fast identification)

Position	Description	Symbol
1.	Branding	
2.	Outdoor air duct connection	

Position	Description	Symbol
3.	Exhaust air duct connection	
4.	Damper	
5.	Warning about crushing	
6.	Connect sections with identical numbers	
7.	Energy recovery	
8.	Warning about danger by rotating parts	
9.	Filter with indication of airflow direction	
10.	Warning about danger by electricity	
11.	Controller in a cabinet behind this inspection door	
12.	Extract air duct connection	
13.	Machine card	

Position	Description	Symbol
14.	Supply air duct connection	
15.	Heating coil	
16.	Warning about danger by heat	
17.	Weight of the section, production number of the unit, number of the section.	
18.	Warning about danger by rotating fan during 4 minutes rundown period.	
19.	Fan with arrow for indication of airflow direction.	
20.	Lifting prohibited	
21.	Lifting permitted.	
22.	Grounding	

Position	Description	Symbol
Other labels	Cooling coil	
	Reversible heat pump	
	Attenuator	
	Inspection	
	Humidifier	
	Changeover coil	

### E.1.2 Weight of each section and production number – example for the Geniox unit

Weight of the section. Production number of the unit.  
Number of the section in the unit.

Product name in this example is Geniox 31, where 31 indicates the size of the unit. The unique production number for the complete unit in this example is – 0005xxxxxx-10 and – Section 1/6 indicates that this is section 1 out of the total of 6 sections.

Geniox 31		VE01A	
Prod. No:	0005xxxxxx-10	Weight:	576 kg
		Section:	1/6

### E.1.3 CE label – example for the Geniox unit

CE marking is printed on the machine card.

Geniox 31		0005xxxxxx-10	
TN-S	400V 3N~	50 Hz	
		125 A	
Fuse min		0.65/6 KA	
PSCC min/max			
Prod. No:	1911-0005xxxxxx-10		
	Fan	Supply	Extract
	Air flow [m³/h]	35000	35000
	Fan Type	L-2xRH80C	L-2xRH80C
	Dim./Max speed [RPM]	1213/1380	1061/1240
	K-factor (ρ=1.2 kg/m³)	1240	1240
	Motor power [kW]	(2 x 15.0 kW) 30.0	(2 x 11.0 kW) 22.0
	Motor voltage [V]	3 x 400	3 x 400
	Total static pressure [Pa]	1189	849
	Heat recovery [%]	79.0	
	Filter		
	Class	F7 – ePM1 60	M5 – ePM10 60
	Pa initial/dim./final [Pa]	65/115/165	46/92/138
	Heater/Pre-heater [kW]	191.66/-	
	Cooler [kW]	283.74	
			 Systemair AS JYR B&B Havnsgade 8250 Skjerve www.systemair.com

### E.1.4 Pictograms about warnings and dangers on the units

Pictograms according to EN1886 about



#### Warning

Warning about danger by rotating parts.



#### Warning

Warning about crushing.



#### Warning

Warning about danger by electricity.



#### Warning

Warning about danger by heat



#### Warning

Rotating fan during 4 minutes rundown period with risk of injury.



#### Warning

Attention – risk for injury or damage on material.

## E.2 Data about the unit according to cards and labels in and on the unit

### E.2.1 Example of Machine card with unique data on every unit

The unique production number for the complete unit in this example is 1911-0005xxxxxx-10 where 19 indicates production year 2019 and 11 indicates production month at the Systemair factory in Denmark. With questions about the unit, please inform staff at Systemair of this unique production number from the factory in Denmark.

If the unit is installed at a site outside of Denmark, please inform the staff at your local Systemair company of the production number and the original order confirmation number from the local Systemair company for questions regarding the air handling unit. If the order confirmation number is not available, please inform the staff at the local Systemair company that detailed information about the unit is available for Systemair staff from techdoc.systemair.dk through a personal password for each Systemair employee.

Geniox 31		0005xxxxxx-10	
TN-S	400V 3N~	50 Hz	
Fuse min		125 A	
PSCC min/max		0.65/6 kA	
Prod. No:	1911-0005xxxxxx-10		
Fan	Supply	Extract	
Air flow [m³/h]	35000	35000	
Fan Type	L-2XRH80C	L-2XRH80C	
Dim./Max speed [RPM]	1213/1380	1061/1240	
K-factor (ρ=1.2 kg/m³)	1240	1240	
Motor power [kW]	(2 x 15.0kW) 30.0	(2 x 11.0kW) 22.0	
Motor voltage [V]	3 x 400	3 x 400	
Total static pressure [Pa]	1189	849	
Heat recovery [%]	79.0		
Filter			
Class	F7 – ePM1 60	M5 – ePM10 60	
Pa initial/dim./final [Pa]	65/115/165	46/92/138	
Heater/Pre-heater [kW]	191.66/-		
Cooler [kW]	283.74		

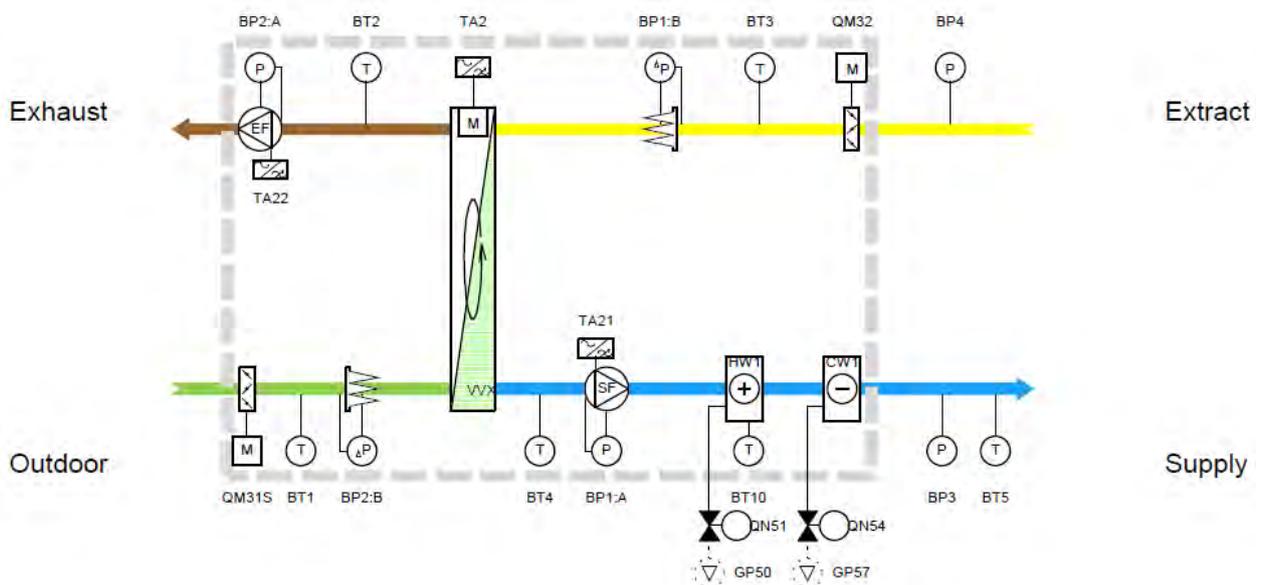
Systemair A/S  
Ved Mølleparken 7  
DK-8261 Højbjerg  
www.systemair.com

### E.2.2 Label with data about the cabinet – example.

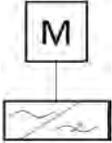
An example of the label that is always placed on or with the cabinet

Systemair A/S	
Systemair declares hereby that the cabinet is in conformity with:	
SBB Low voltage panels:	N60439-1
Electrical material on machines:	EN60204-1
EMC-directive environment:	89/336/EOF
Diagram version	Geniox ver. X:XX
Systemair order number	0020xxxxxx
Unit size	10
Cabinet data:	
System ground	TN-S
Current type	AC
Frequence	50 HZ
Rated voltage	3*400 V+N+PE VAC
Control voltage	24 VDC
PSCC max	6 kA
PSCC min	650 A
Max fuse	25
Min fuse	10
Cable colors:	
Protection circuit	Green/yellow
230 VAC phase	Black
0 VAC neutral	Blue
24 VDC	Grey
0 VDC	Grey
Analog/digital	Grey

### E.2.3 Flowchart – example of the label placed on or with the cabinet



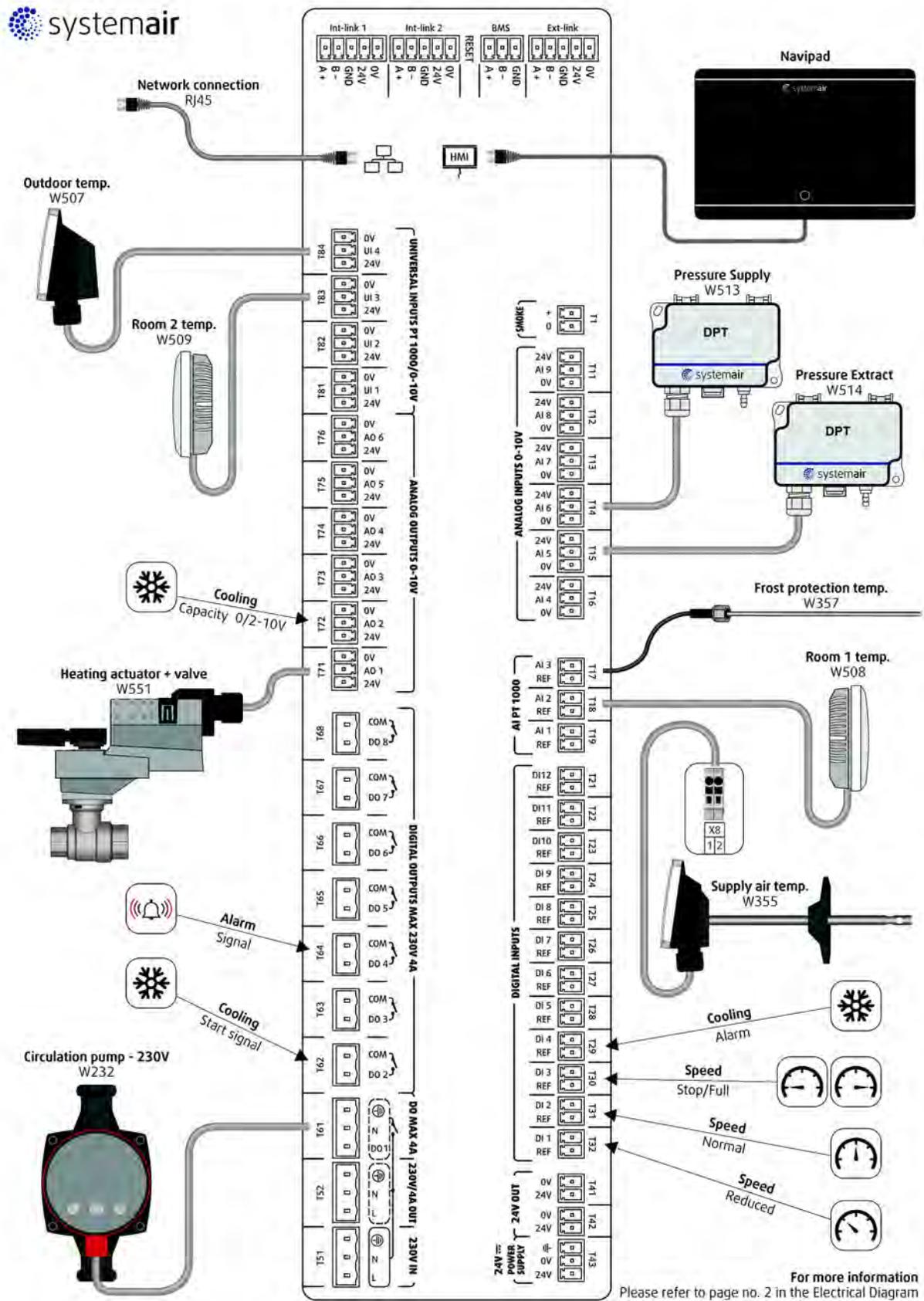
**E.2.4 Symbols in the flowchart and explanation about the symbols**

Id	Description	Symbol
T	Temperature sensor - PT1000	
M	Damper motor – on/off or spring return	
M	Damper motor – modulating – 0-10V	
P	Filter guard - digital	
P	Pressure transmitter – 0-10V	
RH	Sensor for relative humidity – 0-10V	
CO2	Sensor for CO2 – 0-10V	
M	Controller and drive motor for rotary heat exchanger – modulating – 0-10V	

### E.2.5 Example of label placed on or with the cabinet – Terminal plan for external components

External components	Symbol Name	Cable number	Page/ Column	Terminals	HW I/O
Supply air temperature	BT5	W355	14 : 3	X8:1-2	AI1
Normal speed	Ext. Sig.	W581	10 : 2	T31	DI2
Reduced speed		W580	10 : 1	T32	DI1
Unit stop		W583	10 : 4	T30	DI3
Internal components					
Rotor drive	TA2	W232	36 : 7	F3: L1-N	
		W642	36 : 8	Link 2	BUS Adr. 7
Temperature efficiency	BT4	W343	29 : 1	BP1	DPT BP1: In2
Damper motor on/off spring return, supply	QM31S	W631S	33 : 1	Link 1	BUS Adr. 21 (31)
Pressure over filter, supply	BP2:B	W662	30 : 2		DPT BP2: B
Outdoor air temperature	BT1	W341	30 : 1	BP2	DPT BP2: In1

### E.2.6 Control board for Systemair Access control system



Terminals at the Access control board. The connected components is an example, and not unique for any order.

### E.3 Hand terminal, if the unit is delivered with control system.

The hand terminal is delivered in a cardboard box containing the other external control components. This cardboard box is usually, but not always, placed in the section with the supply air fan.

This is the NaviPad control panel for the Access control system from Systemair.

The hand terminal is connected by a cable to the controller in the cabinet. 3 meters of cable is delivered with the unit and the customer has the possibility to replace this cable with an identical type of cable that is up to 100 meters long.



### E.4 Dimensions of the units

See Annex 1 with information about the exact dimensions.

### E.5 Ordinary automatically operation – only manual operation by new parameters

The unit is operating fully automatically and manual operation includes only selection of new parameters via a hand terminal. The alternative is that the controller is connected to a BMS system with the ability to select new parameters via PC, tablet or SmartPhone.

## F Drawings, diagrams, guides and instructions for the use, maintenance and repair

All units are manufactured in compliance with the EC Declaration of Conformity and they are CE marked as machines. Unique Declaration with production number of the machine is an integral part of the machine – enclosed as to this manual. If the buyer carries out changes or adds components in or on the machine, the buyer must issue a new EC Declaration of Conformity and a new CE marking of the machine.

To promote correct use of the machines, the below-mentioned instructions are an integral part of the machine:

- Unique drawings, data and description of functions for the delivered unit – Annex 1
- Instructions for use of the machine – chapter L in this manual
- Instructions about adjustment and maintenance – chapter S in this manual
- Safety during adjustment and maintenance – chapter T
- Wiring diagram, if the unit is delivered with control system.

## G Employees in charge of operation/control/maintenance

The units are constructed and built with a fully integrated control system. After start-up and hand-over from installer to operators/users, the unit operates fully automatically.

Indications of operating status as well as indication of faults are visible in the display at the hand terminal. The operators/users can enter new parameters in the controller via the hand terminal. Alternatively, the controller can be connected to a BMS system so that new parameters can be selected via PC, tablet or Smartphone. The operators/users do not need to open inspections doors for the operation.

Skilled technicians must carry care out maintenance as well as repairs.

## H Intended use and range of applications

The air handling units are intended for transport and treatment of air between -40 °C and + 40 °C The units are exclusively for comfort ventilation. The units are not for environments that exceed the corrosion class C4 according to EN ISO 12944-2 (motors are constructed for handling of air between -20 °C and + 40 °C).

Intended applications for the units are:

- Offices
- Teaching rooms
- Hotels
- Shops
- Homes and similar comfort zones
- The majority of rooms at clinics and hospitals where extended requirements according to Eurovent level 1 and 2 are requested

## I Unintended use and misuse – inappropriate applications for the machine

Units for outdoor installation must be specified and ordered for outdoor installation. The units must not be used in environments that exceed corrosion class C4 according to EN ISO 12944-2, and for transport of solid particles.

Examples of not intended use:

- Kitchen extraction
- Swimming pools
- Off-shore
- Ex-areas
- Drying of washed clothes.
- Do not use the unit with partly finished duct systems.
- Do not use the unit for ventilation of the building site until the unit is properly provided with guards.

### I.1 Air handling unit in operation

The pressure difference between interior and exterior of the unit must not exceed 2000 Pa for the Geniox units.

Before start-up of the unit all ducts, safety guards and all protective devices must be mounted to prevent any access to rotating fan impellers. All inspection doors must be closed and locked when the unit is in operation.

Do not use the unit without filters.

## J Instructions for unloading on the site as well as installation and connection

### J.1 Unloading on the site

The air handling unit – AHU - is delivered as one section or in several sections, which are to be assembled on site. The AHU is delivered on transport pallets, legs, base frame with brackets for lifting or base frames with holes for forks on forklifts. Loading and unloading as well as transport on the site is possible by fork-lift truck or by crane using suitable lifting straps.

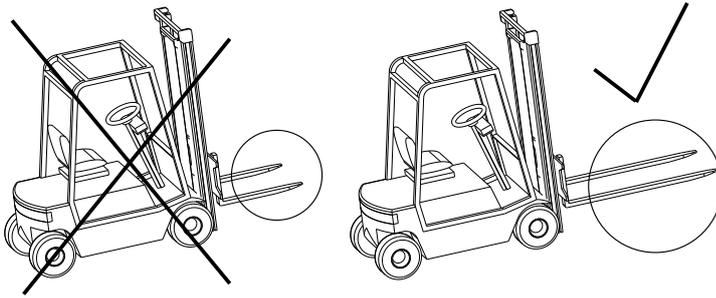
#### J.1.1 Handling methods

Possible (✓) and not possible (✗) handling methods are described in the table below.

Type	Handling methods						Hoisting pipe
	Forklift	Lifting by straps	Brackets at base frame for lifting	Hoist holes in base frames	Holes in base frames for forks (option)	Corners in sections for lifting	
Sections on pallets	✓	✓	✗	✗	✗	✓	✗
Sections on base frames	✓	✓	✓	✓	✓	✓	✓
Unit on base frame	✓	✓	✓	✓	✓	✗	✓

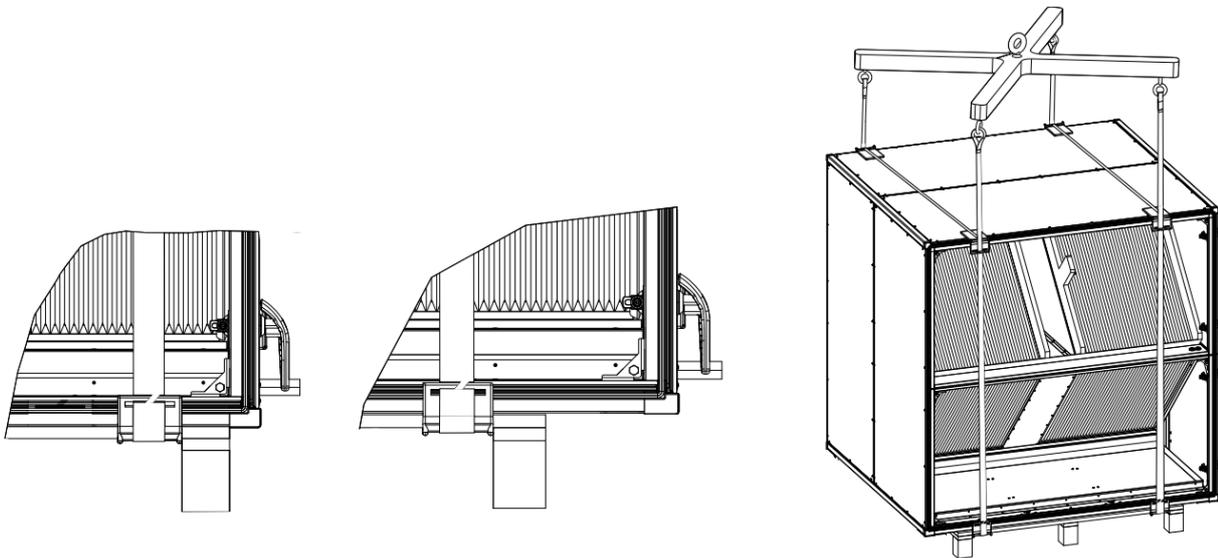
### J.1.2 Unloading by fork-lift truck

The forks of the truck must be sufficiently long to avoid any damage to the AHU underside.



### J.1.3 Unloading by crane

AHU delivered on transport pallet must be lifted by straps as shown in the illustration.



**Caution**  
Do not use the feet as lifting points, as this may cause damage to the air handling unit.

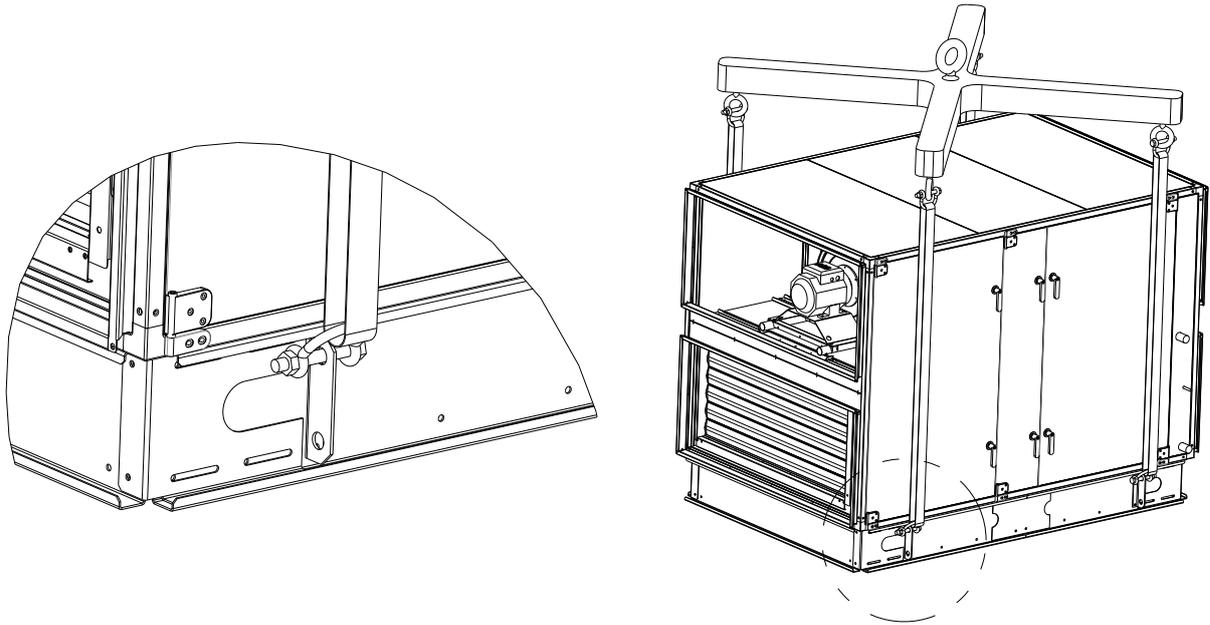
### J.1.4 Transport of unit without base frame on the site

Units without base frame are always delivered in sections with each section on a pallet. Sections can be transported on the site by hand manual forklifts.

### J.1.5 Lifting a unit with straps

Use an appropriate lifting beam with a sufficient span to avoid that the straps touch and damage the drip nose profiles and the inspection side with handles, pipes and accessories – for example manometers, cabinets, tabs for measuring the pressure.

**J.1.6 Lifting a unit with installed brackets on the base frame for lifting.**



Lifting beam and straps are not included in the delivery.

**J.1.7 Lifting a unit without base frame and legs but with installed brackets for lifting.**

Attach straps carefully to the 4 brackets at the bottom of sections on Geniox units sizes 20 – 44 if the brackets are marked with the blue labels showing a hook, because these blue labels tell that those brackets are mounted to the profiles that are bearing the heavy components in the section



This type of bracket at the bottom of Geniox units in the sizes 20 – 44 is reinforced for lifting the unit. Mount a shackle in each of the 4 brackets that are suitable for lifting the weight of the section. The weight of the section is printed on the label placed on the inspection side of the unit.



The information about the weight of a section is very accurate and you must always be sure that the equipment intended for lifting the section is constructed and authorized for the task.

Geniox 31		VE01A	
Prod. No:	0005xxxxxx-10	Weight:	576 kg
		Section:	1/6



**Caution**

Do not lift a section in the 4 brackets that are marked with the label – lifting prohibited.

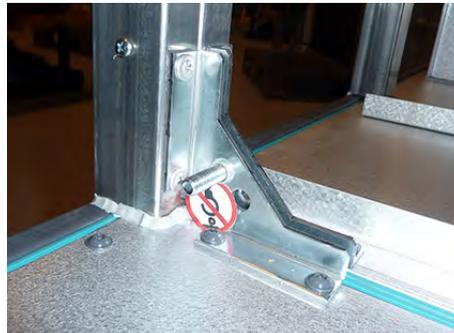
Lifting prohibited – in this bracket.



This bracket in Geniox units in the sizes 20 – 44 is not for lifting the unit. This bracket is for permanently holding 2 sections tight together with 8 mm bolts.

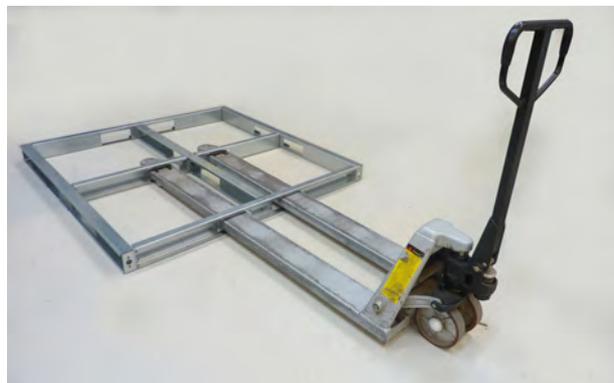


This bracket in Geniox units in the sizes 10 – 18 is not for lifting the unit. This bracket is for permanently holding two sections tight together with 8 mm bolts.

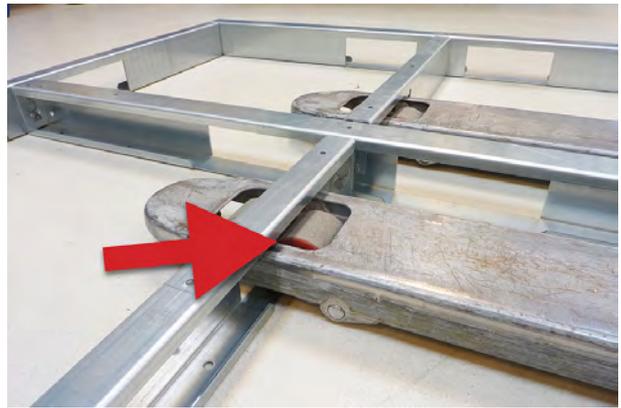


**J.1.8 Handling a unit with holes in base frame for forks**

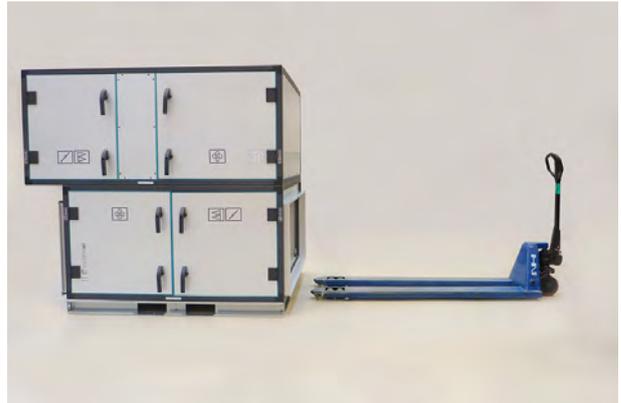
Depending on the width or length of the section/unit there will be 1, 2 or more middle profiles.



Do not activate the wheels of forklift on the horizontal profile of a middle profile. Activation of the wheels on the horizontal profile might bend the profile.



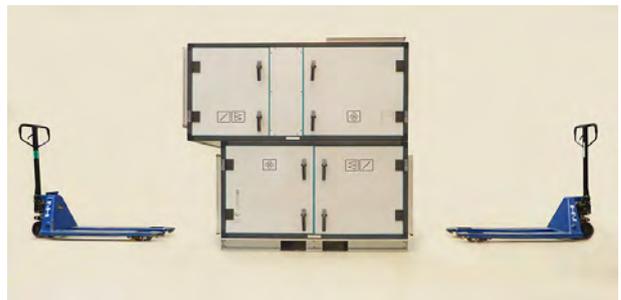
The forks of the forklift must be longer than the width or length of the section/unit to achieve safe transport of the section/unit.



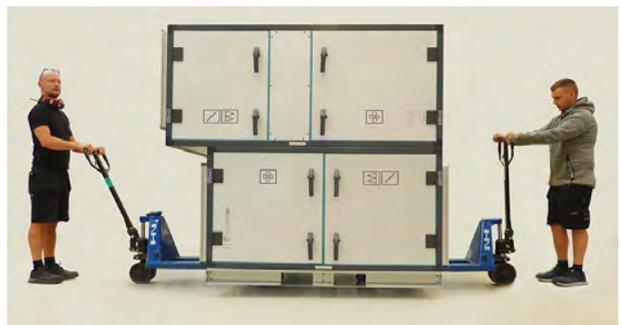
Very important to check that the wheels of the forklift are never activated on the horizontal profile of the base frame on the other side of the section/unit.



If only forklifts for Europallets with forks that are only 120 cm long are available, the alternative is to use 2 of those forklifts.



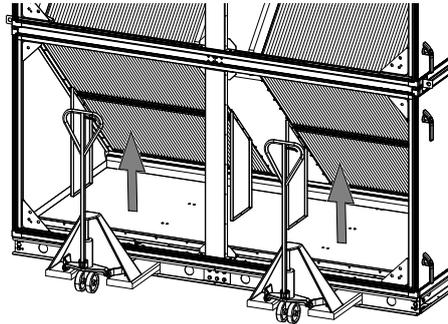
By lifting the section/unit with 2 or more forklifts it is important to avoid activation of wheels of any forklift on any horizontal profile the base frame.





**Caution**

If the base frame has 4 holes for forklifts as shown, the section/unit must be lifted evenly by 2 forklifts in each side. Hereby 4 forklifts must be used. There is a risk of overturning causing injury and damage to property if a section/unit is lifted unevenly or only by one forklift in each side.

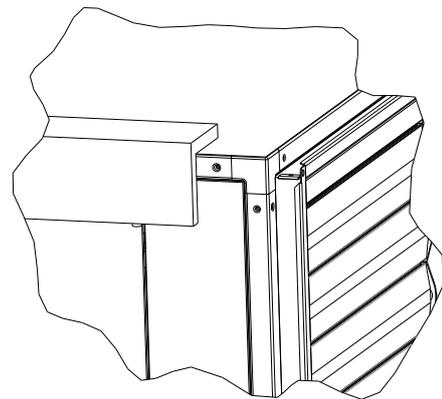
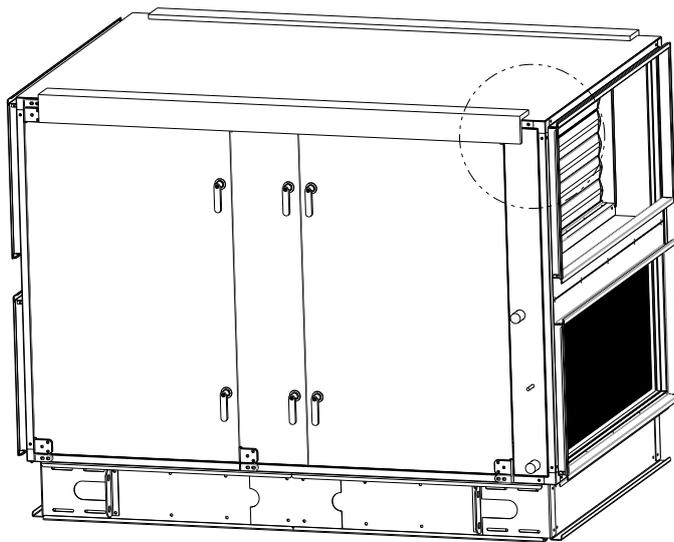


**Caution**

Avoid activating the wheels on forklifts over horizontal profiles of base frames

**J.1.9 Roof unit with PVC or bitumen roof**

Avoid damaging the drip nose profiles along the PVC or bitumen roof. Keep the protection profiles of Styrofoam on the unit until the installation has been completed. If the unit is lifted by straps, the straps must be kept away from the drip nose profiles by bars to avoid damage to roofing profiles.



**J.1.10 Roof unit with steel roof**



**Caution**

For units with steel plate roof, the steel plates are delivered uninstalled on a separate pallet. Do **not** step or walk on the plates.

**J.1.11 Storage and delivery**

After delivery, it is the responsibility of the customer/installer to avoid condensation and moist inside the air handling unit.

The AHU must be protected from the weather and accidental impact. Plastic packaging **must** be removed and the unit covered with tarpaulin or similar materials. In order to minimize condensation, sufficient air circulation must be ensured between the covering and the unit.

Condensation can also occur if the unit is connected to the duct system without operation of the fans because thermic airflows from the duct system can bring moist inside the air handling unit which will condensate.

### J.1.12 Tilt less than 15° during transportation of the section with heat pump

During transportation, the unit section **must** always be in the upright position or tilted less than 15°. If it is necessary to tilt the unit more than 15°, the suction pipe of the compressor must point upwards to prevent the escape of oil from the compressor sump.

### J.1.13 Transport and pre-installation storage of rotary heat exchanger – always in vertical position

During transportation, the unit section **must** always be in the upright vertical position and never in a horizontal or tilted position. During pre-installation storage the unit section **must** always be in the upright vertical position. The rotary heat exchanger is not constructed for transportation and storage in a horizontal or tilted position.

## J.2 Installation - mechanical

### J.2.1 Free area in front of and above the unit

#### Important

When positioning the unit on the site, it must be ensured that an area with the same width as the unit is kept free for service and inspection and also for replacement of fans and exchanger, if needed. The width of the free area must be at least 900 mm.

#### Important

For safe access to the cabinet with electrical components, if the cabinet is placed on top of the unit, the free area from the upper edge of the cabinet to the ceiling must be at least 700 mm.

### J.2.2 Supporting surface



#### Caution

Duct work must be sound insulated and must not be mounted directly on beams, trusses or other critical building parts.



#### Caution

The surface beneath the unit must be level, horizontal and vibration-free. The surface must be able to withstand the load of the AHU. Weights of the sections are written in Annex 1.



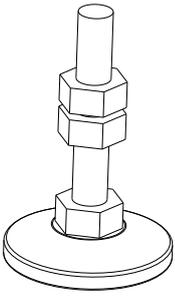
#### Caution

Roof units must be lifted from the roof level on the specific height which should be defined by national rule and/or weather condition (Expected amount of snow)

### J.2.3 Adjustable feet under legs or base frame and transport of sections

Adjustable feet are provided in a carton box placed inside the unit. Adjustable feet are delivered for indoor units and not for outdoor units.

Sections can be transported on the site by hand manual forklifts or similar. The frame profiles in the edges of the sections have carrying capacity for lifting by the hand manual forklifts.



## J.2.4 Base frame assembly

Base frame is delivered unassembled for the indoor units that are delivered in sections on pallets. Assembly of the base frame is illustrated on 4 pages in a manual in a plastic bag which is attached to one of the large base frame parts.

The 4 pages with the illustration regarding the assembly of the base frame are also available in this user manual in Annex 3, 4, 5 or 6.

There are two types of base frames:

1. 118 mm high base frames
2. 218 mm high base frames

There are 4 different manuals and each of them illustrates the assembly of the 4 different types of base frames:

1. Manual about the 118 mm high base frames for AHUs in the sizes from Geniox 10 to Geniox 18. The name of this manual is – **Base frame 118 sizes 10 - 18**
2. Manual about the 118 mm high base frames for AHUs in the sizes from Geniox 20 to Geniox 31. The name of the manual is – **Base frame 118 sizes 20 - 31**
3. Manual about the 218 mm high base frames for AHUs in the sizes from Geniox 10 to Geniox 18. The name of the manual is – **Base frame 218 sizes 10 - 18**
4. Manual about the 218 mm high base frames for AHUs in the sizes from Geniox 20 to Geniox 44. The name of the manual is – **Base frame 218 sizes 20 - 44**

Mount adjustable feet with a distance of maximum 1500 mm between each foot under the base frame. The base frame can now be levelled by the adjustable feet. The next step is to place and assemble AHU sections on the base frame.

## J.2.5 Base frames for outdoor units

Outdoor units must be installed on 118 or 218 mm high base frames and are always fitted to the AHU sections. Base frames are available in ZM310 or RAL 7024. Systemair delivers these base frames without the above mentioned adjustable feet.

## J.2.6 Outdoor units – support under the base frame of the unit

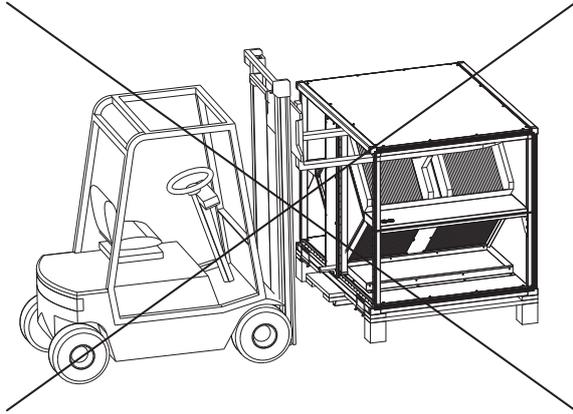
The installer must ensure that the base frame of the unit is supported with a distance of maximum 1500 mm both on the front side and the back side.



### Caution

To avoid that the unit may tilt during storm the base frame of the unit must be properly fastened to the frame provided by the installer.

### J.2.7 Installation on the site of unit sections at the base frame when sections are delivered on pallets



#### Caution

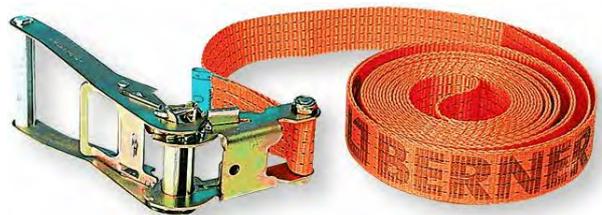
It is strictly forbidden to lift a section under the top of the section. The plastic corners and brackets are not at all reinforced for lifting the unit under the top. There is serious danger that the bottom with the heavy components will fall down with the risk of serious injury and damage to property.

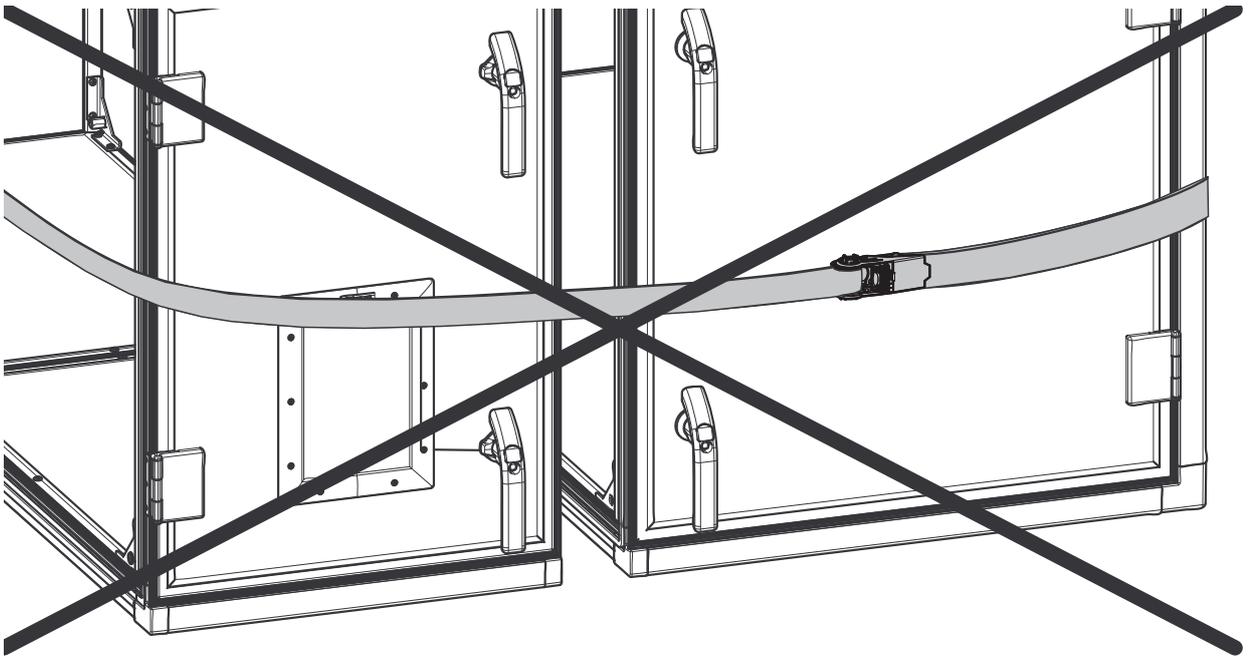
Lift up the section by **forklifts** to the level where the underside of the section is even with the overside of the base frame. Pull the section to the correct position on the base frame by straps – it is maybe necessary to support the section by heavy duty trolleys (see the photos below).

Example of heavy duty trolleys. The trolleys – with the wheels downwards – placed **under the profiles** of the unit section and with a plate placed on the forks of a forklift these heavy duty trolleys are suitable for safe rolling of a unit section over to the base frames.

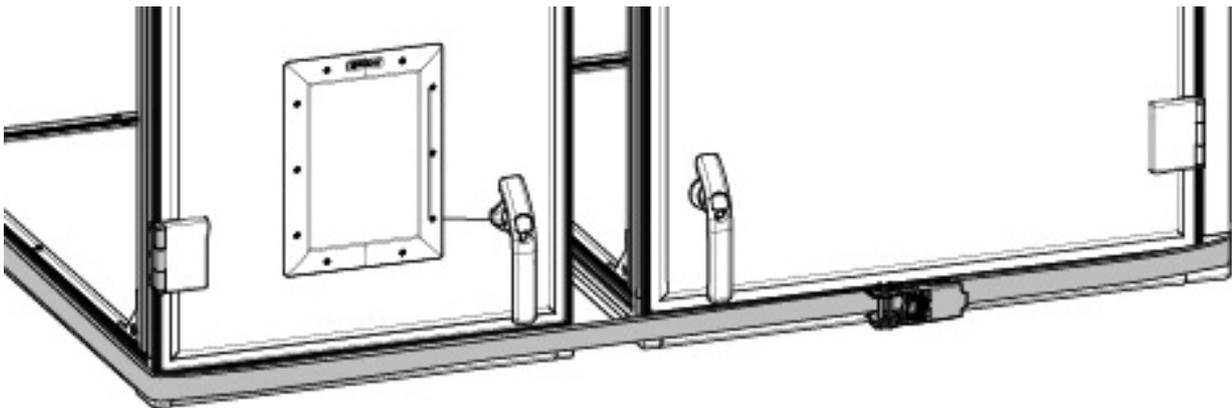


Pull sections together with a strap. We recommend the shown type of strap because this type is not damaging the frame profiles in the bottom of the units. An example of strap is shown to the right. **Note! To avoid any load and stress on the vertical profiles the strap must be carefully placed on the bottom profiles of the unit when sections are pulled together.**

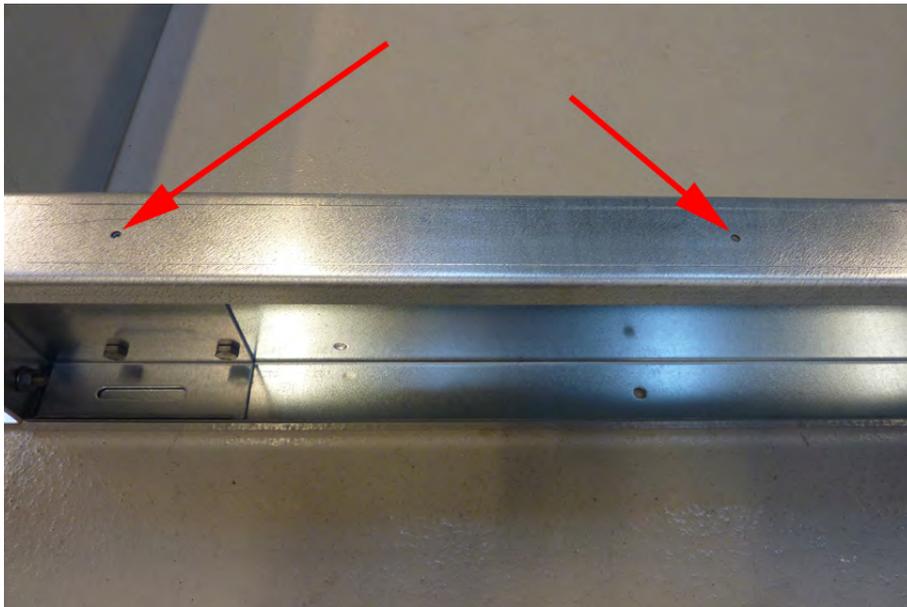




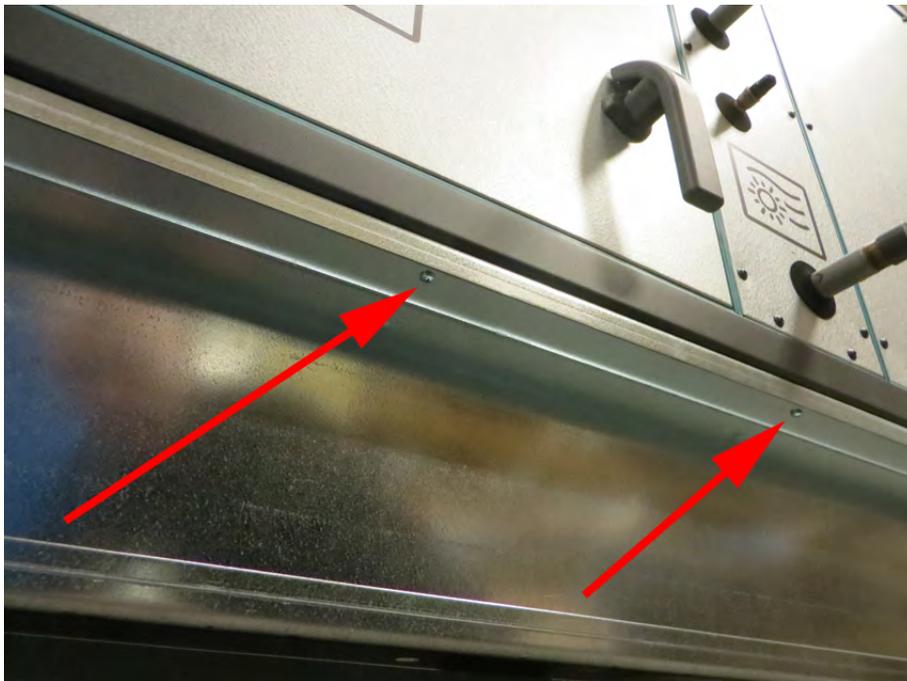
**Note! Never** — place the strap on the vertical profile when a section is pulled along the base frame or on the floor.



**Note! Place the strap on the bottom profiles of the unit to avoid any load and stress on the vertical profiles when sections are pulled together along the base frame or on the floor. The sections must be pulled fully and tight together with the strap placed on the bottom profiles.**



Mount sections to the base frames with self-drilling screws. A number of 5 mm holes are prepared for the self drilling screws. In this picture you are standing and you are watching the assembled base frame on the floor.



Use self-drilling screws – 4,8 X 18 mm – to be screwed upward through the holes into the bottom profile of the air handling unit **Note! A screw must be placed in every hole to achieve the necessary strength.** In this picture you are lying on the floor looking upward under the base frame.

### J.2.8 Joining the AHU sections

The sections must be placed on the base frame and if the unit is delivered with 150 mm legs, the sections must be positioned directly in line with each other.

Ensure that the internal factory-fitted rubber sealing is undamaged

The sections are then to be positioned directly opposite each other. If the sections are built with legs, the adjustable feet can be used to get the sections in line and at the same height.



Press the sections hard together so that the rubber profiles are so flat that the iron frames of the two sections are joined. Strap with tensioner is suitable for pressing the sections hard together.. **Note! Do not place the strap on the vertical profiles. The strap must be carefully placed on the bottom profiles of the unit.**

The sections must then be locked permanently together with 8 mm bolts and nuts through the grey guiding and connection blocks. Systemair have provided you the 8 mm bolts with round heads and nuts required to carry this task out. An Allen key – size 6 – will be required.



Assembly has been completed successfully

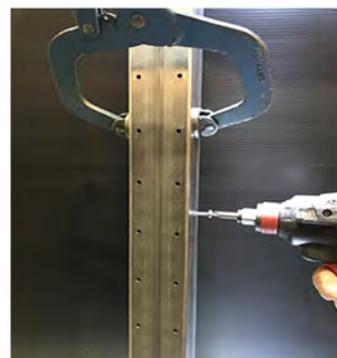
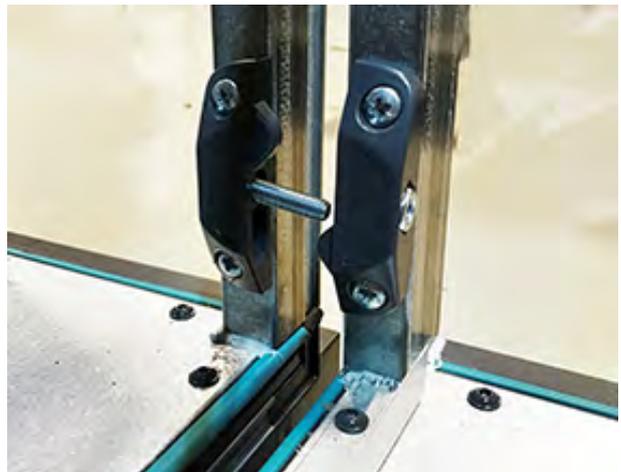


The grey guiding and connection blocks might be installed inside the units on the vertical profiles. Press the sections hard together so that the rubber profiles are so flat that the iron frames of the two sections are joined. Strap with tensioner is suitable for pressing the sections hard together.. **Note! Do not place the strap on the vertical profiles. To avoid any load and stress on the profiles the strap must be carefully placed on the bottom profiles of the unit.**

The sections must then be locked permanently together with 8 mm bolts and nuts through the grey guiding and connection blocks. Systemair have provided you the 8 mm bolts with round heads and nuts required to carry this task out. An Allen key – size 6 – will be required.

**Note! Do not move the sections together by tensioning the 8 mm bolts and nuts. Tighten the straps for this purpose.**

If none of the above mentioned grey guiding and connection blocks are installed this alternative method must be used. Demount the doors and lock the two sections permanently together with self-drilling screws. Self-drilling screws are delivered with the unit. It might be necessary to use clamps to hold the sections fully together prior to tightening the screws.



Bracket inside a section. A similar bracket is installed in the next section. This is the bracket in the Geniox sizes 10 and 18

Press the sections hard together so that the rubber profiles are so flat that the iron frames of the two sections are joined. Strap with tensioner is suitable for pressing the sections hard together.. **Note! Do not place the strap on the vertical profiles. To avoid any load and stress on the vertical profiles the strap must be carefully placed on the bottom profiles of the unit.**

The sections must then be locked permanently together with 8 mm bolts. Nut with thread is installed from the factory in one of the brackets

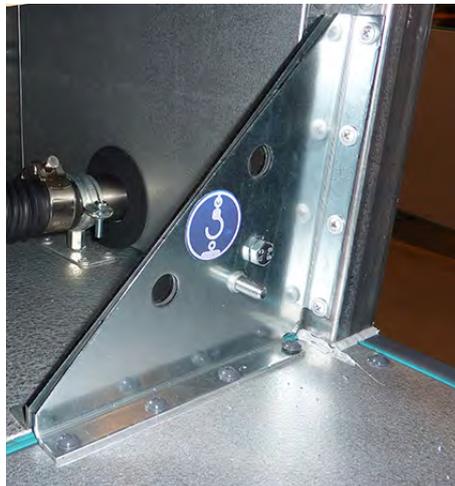
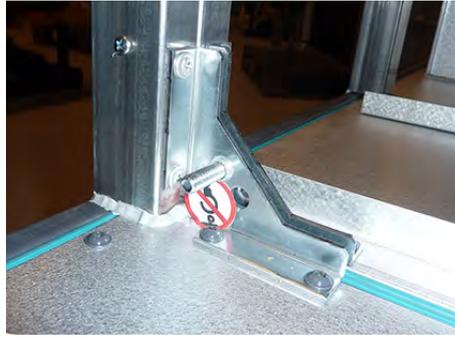
**Note! Do not pull the sections together by tensioning the 8 mm bolts. Use the strap for this purpose.**

Brackets inside a section. Similar brackets are installed in the next section. These are the brackets in the Geniox sizes 20 to 44

Press the sections hard together so that the rubber profiles are so flat that the iron frames of the two sections are joined. Strap with tensioner is suitable for pressing the sections hard together.. **Note! Do not place the strap on the vertical profiles. To avoid any load and stress on the profiles the strap must be carefully placed on the bottom profiles of the unit.**

The sections must then be locked permanently together with 8 mm bolts. Nut with thread is installed from the factory in one of the brackets

**Note! Do not pull the sections together by tensioning the 8 mm bolts. Use a strap for this pupose.**



### J.2.9 Fitting the ductwork

Flexible duct connections between AHU and ductwork must always be installed. Be sure that flexible duct connections are almost fully stretched. (Flexible connections are ordered as accessories). Avoid blockage and turbulence at the fan outlet.

## J.2.10 Risk of stack effect by vertical ducts and wind pressure on louvers

### Important

The Systemair air handling units can be ordered and delivered without dampers, and the installer/user must check that duct systems with the described risk of stack effect (chimney effect) will be provided with dampers and spring return motors.

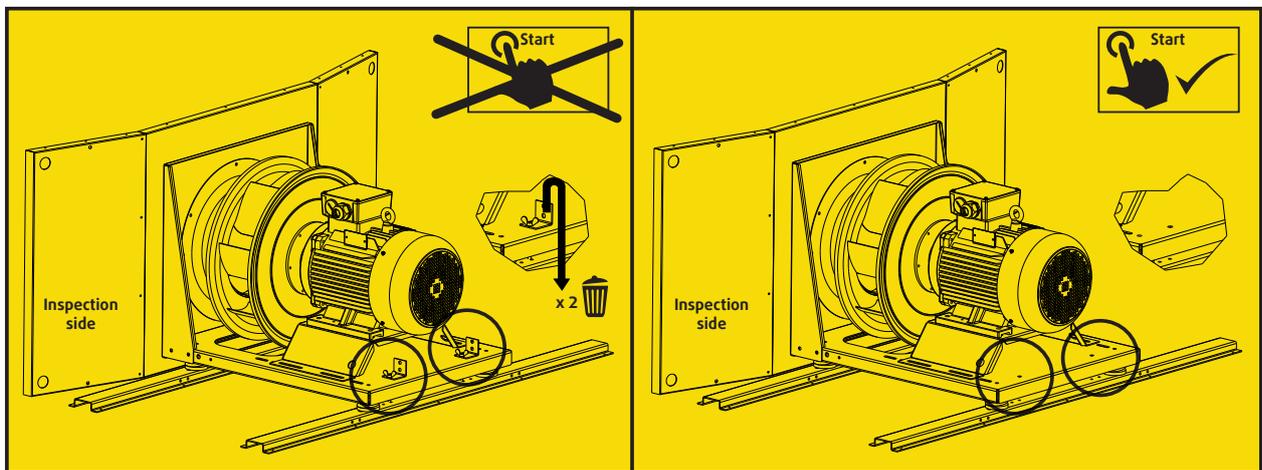
On special occasions stack effect – also called chimney effect – in the ducts create airflows that drives the impellers by turned off motors.

A rotating impeller is a potential hazard during cleaning and maintenance of the unit. Eliminate this airflow by dampers with spring return motors for automatic closing of the dampers - even by power failure.

## J.2.11 Remove transport brackets – when spring mounts are installed

### J.2.11.1 Impeller diameters 220 – 560 mm

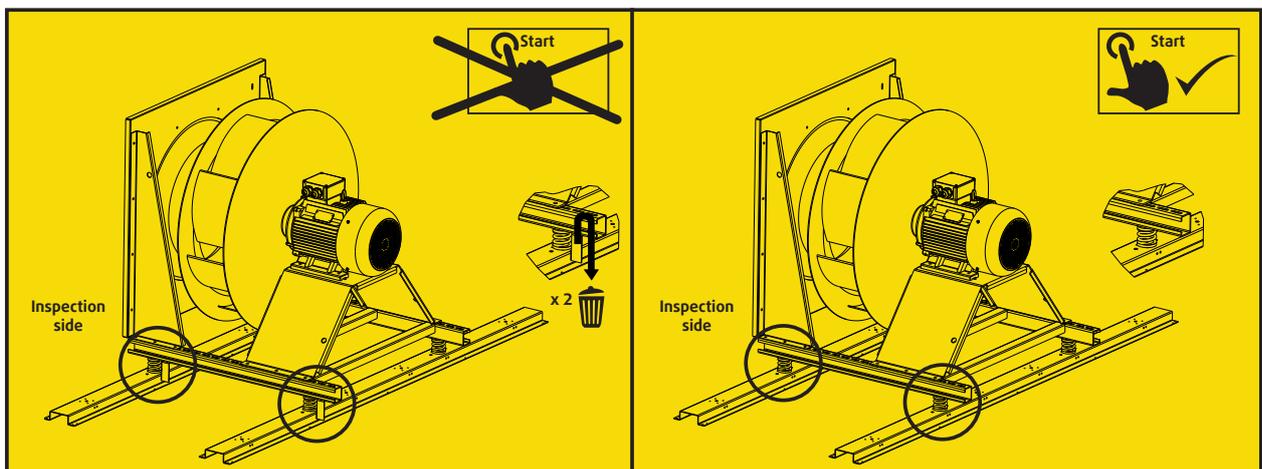
The fans are installed on spring mounts, and the transport brackets must be removed after the installation of the air handling unit. Two transport brackets are fitted to the coil springs during transport and installation. Both transport brackets must all be removed to give the full anti-vibration function to the coil springs. The transport brackets are made more visible with yellow labels. After removal of the transport brackets they must be disposed of safely.



After disposal of the transport brackets the yellow label on the outside of the fan inspection door has no function and should be removed.

### J.2.11.2 Impeller diameters 630 – 1.000 mm

The fans are installed on spring mounts, and the transport brackets must be removed after the installation of the air handling unit. Four transport brackets are fitted to the coil springs during transport and installation. The four transport brackets must all be removed to give the full anti-vibration function to the coil springs. The transport brackets are made more visible with yellow labels, as shown in the picture below. After removal of the transport brackets they must be disposed of safely.

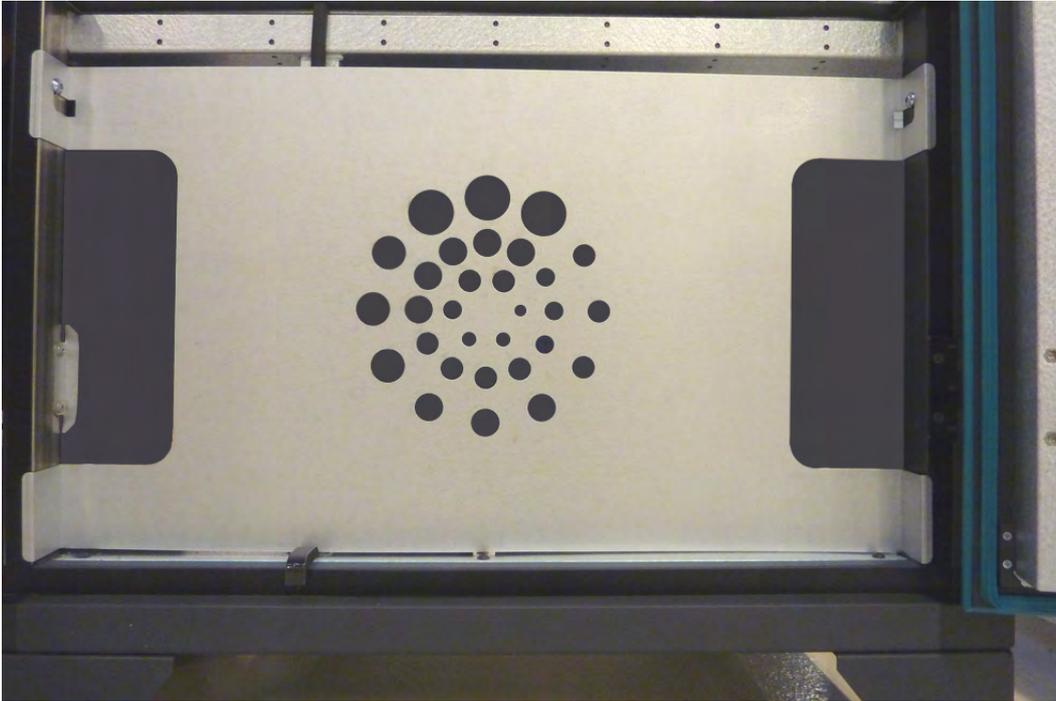


After disposal of the transport brackets the yellow label on the outside of the fan inspection door has no function and should be removed.

### J.2.12 Refitting of guards

The guard is a safety guard installed inside the door. The safety guard show on the illustration below is optional from Systemair. According to Machinery Directive guidelines, tools are necessary for the removal of the guard. If the guard has been demounted during the installation on the site, the guard must be refitted before startup of the unit.

If the optional guard from Systemair has not been ordered, the installer, that starts-up the unit, must make and install a guard, where a guard is necessary according to Machinery Directive guidelines.



Use an Allan key – size 6 or size 8 – for refitting the safety guard from Systemair. Replace the vibration damping rubber list if it is damaged.



### J.2.13 Lock the doors by using the key

Use the key to lock the doors. The doors are not locked automatically by turning the handle to the vertical position.



### J.2.14 Avoiding condensation

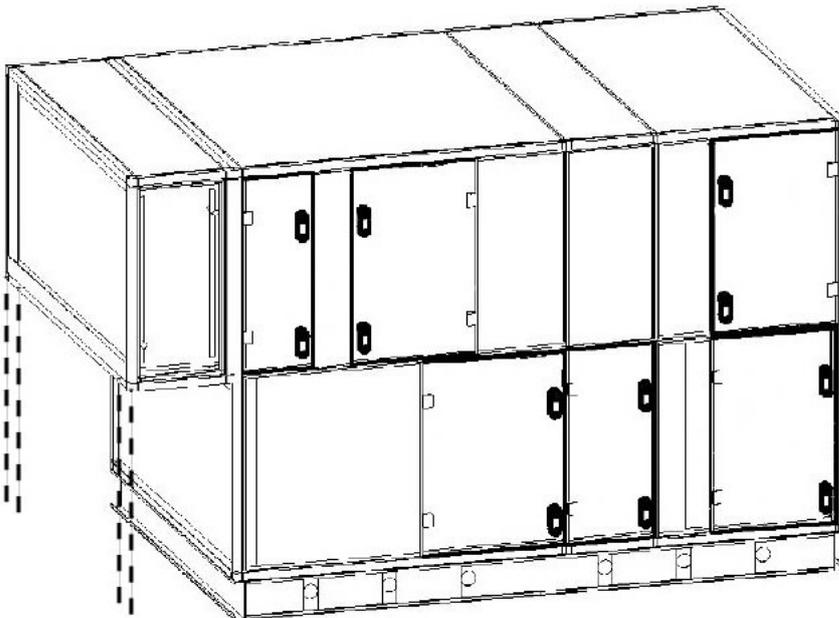
Condensation can form on the inside and outside of the AHU. This depends on the installation location (indoor or outdoor), temperature and relative humidity inside and outside the AHU.

Air handling units that are not in operation must not be connected to duct systems with air streaming through, as this may cause condensation and damage to electrical components. Air handling units that are connected to duct systems must be in operation. Alternatively, dampers to the room-side ducts must be added (not necessary if the unit is equipped with room-side dampers).

This also applies to any units that are switched off after commissioning – especially during the winter.

### J.2.15 Overhang support

In case of overhangs >400 mm, adequate support must be installed in order to prevent the unit from tipping (see example below).



## J.3 Installation - electrical



### Danger

- Disconnect the mains supply to the unit before performing any maintenance or electrical work!
- Carry out all electrical connections in accordance with local rules and regulation. Electrical connections must be carried out by an authorized installer.

### J.3.1 Description

The position of components is shown and described in Annex 1.

Connections to terminals are shown in the wiring diagram.

When control of constant pressure in the ducts (also called demand controlled capacity) is required, the pressure transmitters must measure in the duct system at places where all pressure changes can be registered accurately for reliable pressure control. This placement is left to the customer's free choice.

It is important to achieve a constant pressure – also for the most faraway diffusers.

### J.3.2 Wiring diagrams

The wiring diagrams are printed in separate manuals delivered with the units.

The wiring diagrams are not unique for the order specific units, but it is standard wiring diagrams with data about all configurations of the units. Hereby the wiring diagrams will inform about components that are not ordered and delivered. See the order confirmation and Annex 1 with exact information about the accessory components that are ordered and delivered.

The wiring diagram includes:

- General description
- Circuit diagrams
- Cabinet layout
- Terminal matrix
- Cable plan

#### J.3.2.1 Labels on or with the cabinet

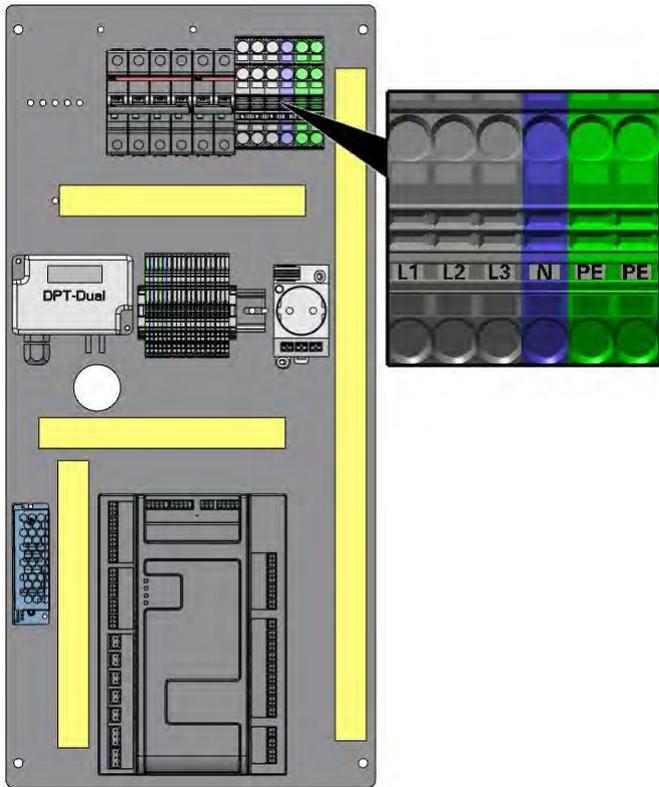
- Label with data about the cabinet – including data about fuses – see chapter E.2.2
- Flowchart – see the example in chapter E.2.3 – unique flowchart for the order specific unit is shown in annex 2 with the unique production number of the unit
- Label with an example of the terminal plan for external components is shown in chapter E.2.5 – the unique terminal plan for external components for the order specific unit is shown in annex 2 with the unique production number of the unit.

In chapter E.2.5 is for the Access control board shown a drawing of the control board with the terminals and this is just an example, and not unique for the order specific unit.

### J.3.3 Installation of mains power supply

An AC/DC residual current device must be installed in the power supply. The power supply for the units is 3\*400 V + N + PE - 50 Hz. Protection of the units in accordance with the local statutory requirements for the additional protection of systems with frequency converters and EC fans. The operator is responsible for the installation of the necessary protection equipment (supply disconnecting device is not delivered by Systemair).

Connect the mains power supply to the correct terminals shown below.



**J.3.3.1 Necessary mains power supply for units with cabinet/control system**

Necessary mains power supply is printed on the unique machine card placed on the front of every unit (see example of a machine card in chapter E.2.1).

**J.3.3.2 Necessary overvoltage protection device, that leads lightning overvoltage to an earth lead on a safe way.**

The Installer and user must be aware of the fact that lightning strikes make a risk that requires installation of overvoltage protection devices to lead the lightning overvoltage to an earth lead in a safe way. Installer and user must take care of this according to local statutory requirements.

**J.3.3.3 Additional earthing**

If external earthing is required in accordance with national regulations, we recommend connecting it according to the illustrations below for air handling unit with base frame and feet respectively. Drill a hole in the base frame or foot and connect with bolt, nut and cable shoe.



### J.3.4 Electrical connection of components and functions

External components and functions are delivered according to the order confirmation. Cable numbers appear from the label inside or on the cabinet, and cable numbers appear from the wiring diagrams.

#### J.3.4.1 Connection of the Systemair NaviPad control panel to the Access controller

The NaviPad control panel with touch screen is provided with 3 metres of cable for connection to the Access controller inside the cabinet. Up to 100 m of cable between the Systemair NaviPad control panel and the Access controller is possible. Place the Systemair NaviPad control panel on the outer side of the unit or on a wall.

Connection and start-up of the Access control system with the NaviPad control panel is described in:

**Quick guide NaviPad – on 16 pages.** This information is delivered with the unit in a booklet.



### J.3.5 Lock the doors by using the key

Use the key to lock the doors. The doors are not locked automatically by turning the handle to the vertical position.



## J.4 Installation – Pipes for water – hot and chilled, valves and drains

### J.4.1 Description

If ordered with the unit, the valves and valve motors are stored in a carton box placed inside the unit. Water trap(s) – standard or optional - is (are) necessary to ensure escape of water from the tray under plate heat exchanger and (or) cooling coil. Water trap(s) is (are) stored in a carton box placed inside the unit.

### J.4.2 Pipe connections

Connection pipes on heating- and cooling coils are provided with external thread. Drainage outlets on drip trays are provided with straight pipe for quick connect fittings on the pipe with the water trap.

### J.4.3 Possibility of extracting components from the unit

Pipes and cables must not obstruct the inspection doors and components which can be extracted from the unit. Potential components for extraction are filters, fans and rotary heat exchanger.

### J.4.4 Pipe connections to coils

#### J.4.4.1 Heating coils

Pipes for hot water must be protected by insulation against frost and loss of heat. Further protection against frost can be obtained by installing electrical heating wires around the pipes and under the insulation combined with temperature sensors and a control system. Pipes, insulation, electrical heating wires, control system for heating wires and circulation pump are not delivered by Systemair.

#### J.4.4.2 Cooling coils

If ordered with the unit, the valves and valve motors are stored in a carton box placed inside the unit. Pipes for cooling must be protected by insulation against condensation on the pipes and loss of cooling in the summer. Pipes and insulation are not delivered by Systemair.

#### J.4.4.3 Rigid pipe mounting brackets for valves, circulation pumps and pipe system

The coil and pipes from the coil are not constructed to withstand the weight and stress from valves, circulation pumps, long pipes and insulation of pipes. The system must be supported carefully in rigid pipe mounting brackets to roof, floor and walls.

##### J.4.4.3.1 Pipe connection to heating coils

The connection of the hot water to the pipe marked for inlet and the return water to the pipe marked for outlet is very important to ensure that the sensor for transmission of the water temperature really will be placed in a return circuit of the coil (Screw-joint for the water temperature sensor is welded in the main collection pipe for return water).

**For the frost protection of heating coil**, the water temperature in the coil is transmitted to the controller. The controller always generates a signal to the valve motor that keeps a sufficient flow of hot water to protect the coil against frost. This frost protection is also activated when the running mode is "off".

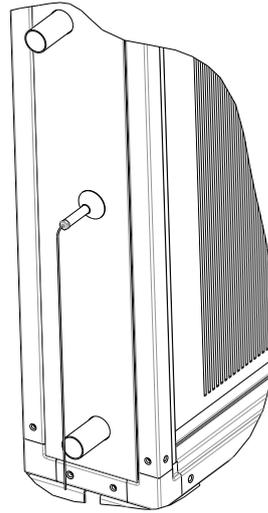
Coils with 3 rows or more must always be connected in counter flow to the airflow.



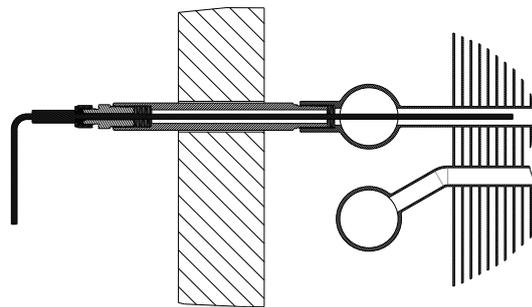
#### Note:

If glycol is added, the glycol must be without additives and auto glycol must not be used. Automatic bleeding has to be installed at the highest point of the 2 pipes – supply or return pipe.

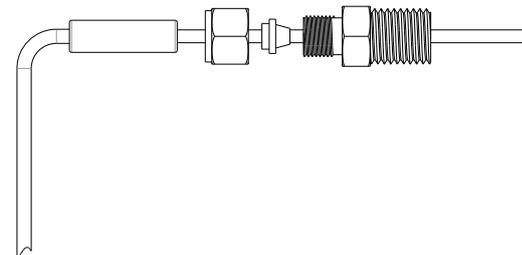
To protect against frost a temperature sensor for the transmission of an analog signal to the controller is placed in a pipe on the collection pipe for return water. The sensor must be fitted water tight with a cap in the pipe before water under pressure is in the coil. The pipe for the sensor is soldered on the collection pipe and it is important to hold contra on the pipe, when the cap is tightened.



**Coil seen from above.** The sensor measures the water temperature of the water inside one of the small pipes for return water in the coil. The sensor reduces the area in this pipe and hereby also the flow of warm water in this pipe. The temperature in this pipe is reduced more than the temperature in all other pipes by the airflow through the coil. Because the lowest temperature in the coil is probably measured here, this system creates early and safe warning of frost.



It is important that the cap is tightened sufficient to keep the sensor system fully water tight.



#### J.4.4.3.2 Pipe connection to cooling coils for chilled water

Coils with 3 rows or more must always be connected in counter flow to the airflow.



#### Caution

The glycol must be without additives and auto glycol must not be used.  
Automatic bleeding has to be installed at the highest point of the 2 pipes – supply or return pipe

#### J.4.4.3.3 Valve motor and valve for heating

The valve and valve motor are not installed. 2-way or 3-way valve is available.

#### J.4.4.3.4 Valve motor and valve for cooling

The valve and valve motor are not installed. 2-way or 3-way valve is available

### J.4.5 Draining condensate water

Drip trays for collection of condensate water are installed under plate heat exchanger, run-around coil and cooling coil. Each drip tray is provided with a drainage outlet. A water trap is always necessary. To avoid freeze ups and frost bursts of water trap and pipes, sufficient insulation is recommended and installation of heating between the insulation and water trap/pipes could even be necessary (insulation, heating and controller for the heating are not delivered by Systemair).

### J.4.6 Draining condensate water from heat exchanger

Condensate from the plate heat exchanger or run-around-coil is collected in the drip tray. Heavy negative air pressure in this section prevents the water from flowing out of the drainpipe. A water trap with sufficient closing level of the water is essential to ensure that condensate water flows out of the unit. The closing level of the water trap must be estimated correctly to ensure safe escape of the water (see the illustration and estimate the minimum closing level according to the table). The pipe diameter of the water trap and sewage system must be identical to the pipe diameter of the drainage outlet from the tray.

**Remember to check that there is water in the water trap.**

**Table 1 Negative pressure P (Pa)**

P	H1 Mini- mum	H2	H1 minus H2 Closing level	Excess height for flow
500 Pa	100 mm	40 mm	60 mm	10 mm
750 Pa	150 mm	55 mm	95 mm	20 mm
1.000 Pa	190 mm	70 mm	120 mm	20 mm

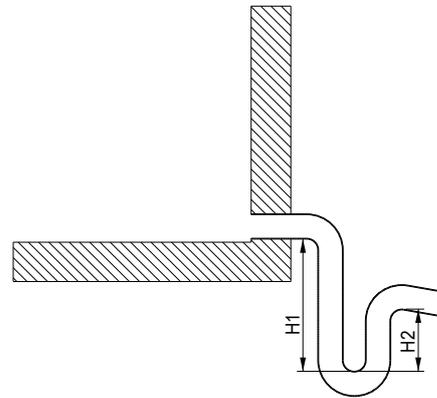
Necessary closing level that is H1 minus H2 – for example for the negative pressure 500 Pa – equal to 50 mm of water column is 60 mm because the 50 mm corresponds to the negative pressure is lifting the water 50 mm and an excess height of 10 mm enables the water to flow out through the water trap into the sewage system.

With the negative pressure at 750 Pa, an excess height of 20 mm enables the water to flow out through the water trap into the sewage system.

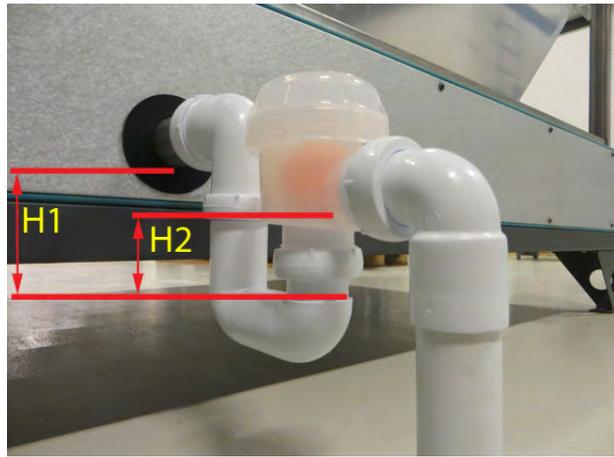
This type of water trap for sections with negative pressure and a ball that is sucked down into its seat for blockage of air flow into the section is available from Systemair. The above-mentioned heights – H1 and H2 – also apply to this type of water trap. The great advantage of this type of water trap for sections with negative pressure is that this type does not require water at the bottom to close for air flow backwards into the section. Condensate water will escape through this type of water trap – even after long periods without any water to close for air flow backwards through the trap.

This water trap is optional and must be ordered separately. Installation of water trap is not included.

The water trap in this picture has the delivered standard length of H1 of 150 mm and with the adjustable length of H2 adjusted to 55 mm, this set-up allows water to flow out at a negative pressure of 750 Pa, because the closing level that is H1 minus H2 is 95 mm and with 75 mm corresponding to the negative pressure lifting the water 75 mm and an excess height of 20 mm that enables the water to lift the ball and to flow out through the water trap into the sewage system..



H1 must be shortened on the site by the installer – sometimes to only 100 mm – because the height of the low version of the base frame is only 118 mm. The adjustable length of H2 must be reduced to the minimum of 40 mm. According to the values in the above table, this allows Water to flow out at a negative pressure up to 500 Pa because the closing level that is H1 minus H2 is 60 mm with 50 mm corresponding to the negative pressure lifting the water 50 mm and an excess height of 10 mm that enables the water to lift the ball and to flow out through the water trap into the sewage system.



To avoid freeze ups and frost bursts of water trap and pipes, sufficient insulation is recommended and installation of heating between the insulation and water trap/ pipes could even be necessary (insulation, heating and controller for the heating are not delivered by Systemair).

The insulation must be easy to remove above the cap, because the ball and the seat for the ball must be cleaned regularly to allow the ball to close air-tight to the seat.



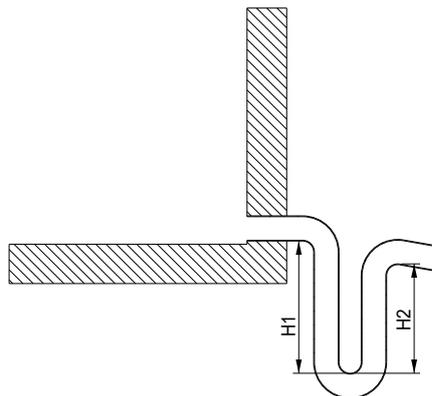
### J.4.7 Draining condensate water from cooling coil

If the cooling coil and the drip tray are placed in the unit where negative pressure (underpressure) occurs, the closing level of the water trap must be estimated correctly. See the above-mentioned information in J.4.6 *Draining condensate water from heat exchanger*. If the cooling coil and the drip tray are placed in the unit where positive pressure (overpressure) occurs, the closing level of the water trap must be estimated correctly as shown on the illustration below. A water trap is optional and installation of the water trap is not included.

**Remember to check that there is water in the water trap.**

**Table 2 Positive pressure P (Pa)**

P	H1 Minimum	H2
500 Pa	90 mm	65 mm
750 Pa	120 mm	90 mm
1.000 Pa	150 mm	120 mm



## K Installation and assembly instructions for reduction of noise and vibration emissions

Due to the design and construction of the units the (A) weighed sound pressure level from fans and other components do not exceed 70 dB (A) outside the units.

Data about sound in Annex 1.

Installation of the units on springs will reduce the transmission of noise and vibrations to the building. Systemair does not deliver springs for this purpose.

Flexible connections between the units and the ducts are available as accessories.

## **L Start-up, adjustments, use, commissioning and unit in hibernation**

### **L.1 Print-outs on paper**

The documents listed below are always printed on paper and delivered together with the units according to the Machinery Directive and the related national laws

This User Manual with:

- The unique technical data with production number for this unit – Annex 1
- Installation instructions for assembling of base frame. – Annex 3
- Installation instructions for assembling of base frame. – Annex 4
- Installation instructions for assembling of base frame. – Annex 5
- Installation instructions for assembling of base frame. – Annex 6
- Installation of base frame covers from unit sizes 35–44. – Annex 7
- Installation instructions for assembling of steel roof. – Annex 8
- Speed control for rotor and assembly of divided rotor. – Annex 9
- Instructions for connection of EC fan motor, diagnostics/faults and configuration of speed control – Annex 12
- Instructions for the Danfoss frequency converter if the unit was delivered with Danfoss frequency converters – 13
- Printed form for Commissioning protocol – Annex 14
- Test report if the unit was delivered with Systemair control system – Annex 15
- Short description about the main components in the control system if the unit was delivered with Systemair control system – Annex 16
- Wiring diagrams if the unit was delivered with Systemair control system – Annex 17

### **L.2 Documentation is available for download**

From <https://techdoc.systemair.dk>

Your local Systemair company is able to provide the below-mentioned documents and data.

Common

- This User Manual in an order specific version
- Declaration of conformity with production number for this unit and the unique technical data with production number for this unit
- Commissioning Protocol as a Word-file for modification by the installer
- Wiring diagrams – if Systemair control system was delivered

Components in the air handling unit

- Control system for rotary heat exchanger
- Danfoss frequency converter
- EC motors
- Damper motors
- Filter guards
- Temperature sensors
- Fire thermostats
- Smoke detectors
- Pressure transmitters
- Valves
- Valve motors
- Humidity sensors
- CO2 sensor
- Control panel

- Humidifier
- Manuals about configuration of Systemair control systems— Access
- Information about connection of Systemair control systems to Building Management Systems
- Other

### L.3 Start-up by installer

All protection and safety measures must be met before start-up of the unit. The mains supply voltage must also be checked too. The mains supply voltage must be measured at the supply terminals in the cabinet.

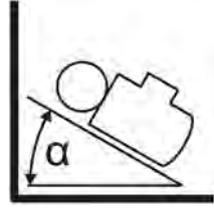
#### L.3.1 Checklist, relevant values

##### L.3.1.1 Checklist prior to start-up

- Is the unit assembled correctly with its functions in the correct order? See Annex 1.
- Are the sections and ducts assembled correctly?
- Check that fans and anti-vibration mounts are not damaged after transportation and installation.
- Are the fans turning freely?
- Is the rotary exchanger turning freely? See chapter L.3.1.2
- Are safety guards installed correctly?
- If the unit includes integrated heat pump, check whether it is installed and supervised by qualified service personnel.
- If the unit contains Electric air heater, make sure that the supply isolator disconnects with the unit.
- Ducts - are all ducts installed?
- External components - are the valve and valve motor installed correctly?
- Is the circulation pump installed correctly?
- Is water under pressure in the coil and circulation pump?
- Are the pressure transmitters installed and connected correctly? (If this is a system with pressure transmitters in the ducts)
- Main power supply:
  - Connected correctly? (3x400 V + N + PE)
  - Test of supply voltage for actuators and control signal!
  - Are control signals for actuators connected correctly?

##### L.3.1.2 Checklist for rotary heat exchanger

Perfrom the following checks of the rotary heat exchanger before initial start-up:

Visual check	Is there any visible damage due to transport or handling?			
Assembly check	Does the airflow through the exchanger correspond to the directional arrows on the casing?			
	Is the heat exchanger standing on horizontal, stable installation area and is it properly supported?			
	For horizontal installation: Is the casing supported over a wide area with additional support for the shaft?			
	For segmented construction: Is the wheel mounted correctly according to the instructions?			
	Is the V-belt sufficiently tensioned and does it not rub against the casing? For motors installed on a rocker: Check the angle of the rocker. Shorten the belt if necessary.			
	<b>Drive system</b>	$\varnothing < 1000 \text{ mm}$	$\varnothing = \geq 1000 \text{ mm}$	
	<b>K1, K3, K5, V0, V1</b>	$\alpha = 10^\circ \dots 15^\circ$	$\alpha = 30^\circ \dots 35^\circ$	
	<b>V6</b>	$\alpha = 10^\circ \dots 15^\circ$		
<b>V7</b>	firmly installed			
	Can the wheel be turned easily by hand? The brush seals must make tight contact on the wheel or the end wall of the casing over the entire length. If necessary, readjust the seals.			
	Is the purge sector correctly mounted?			
Function check	Does the wheel's direction of rotation correspond to the stuck-on directional arrow? If necessary, correct the electrical connection.			
	Does the wheel reach the optimum speed? <ul style="list-style-type: none"> <li>• approx. 12 min<sup>-1</sup> for design ST1/SC1/ST2/SE3</li> <li>• approx. 20 min<sup>-1</sup> for design ST3/SH1/HM1</li> </ul> If necessary, correct the setting in the controller.			
	Is the rotary guard functioning properly?			
Trial run	Perform a test run with fans switched on. <ul style="list-style-type: none"> <li>• Is the drive functioning without problems?</li> <li>• Do the brush seals fit tightly over the entire length?</li> </ul> If necessary, adjust the inclination of the wheel in the casing.			

After commissioning of the air handling unit or replacement of the belt, perform two extra checks for belt tension and wear:

- After 1 week
- After 3 months

### L.3.1.3 Switch on power



#### Warning

Do not start until all safety procedures have been completed and ensure that inspection doors are closed and locked.

Switch on power and the unit should be ready for the start-up.

## L.4 Adjustments and use

Adjust the factory set values for parameters on the Systemair Control panel if the unit was delivered with Systemair control system.



### Caution

Control system setup is only allowed to be performed by skilled personnel. Do not operate any functions in manual mode.

## L.5 Description of functions, if control system is delivered by Systemair

### L.5.1 Remote control

#### L.5.1.1 Communication to BMS systems with MODBUS

The controller has been prepared for communication via RS485 communication port to a MODBUS based BMS system (Building Management System).

The controller can work as a stand-alone system without any support from other controllers.

#### L.5.1.2 Communication to BMS systems via BACnet

The controller has been prepared for BACnet TCP/IP interface. This can be used for communication with a BMS system (Building Management System).

The controller can work as a stand-alone system without any support from other controllers.

### L.5.2 Extended operation and external start/stop (for example by presence detectors)

When the unit is running at reduced speed or is in shutdown mode, it can be forced up one step by using a Push button (impulse). The required number of minutes for the extended operation must be selected on the Systemair Control Panel. Button and cable are not delivered by Systemair. Furthermore when the unit is in shutdown mode it is possible to start/stop the unit by presence detectors. Presence detectors and cable are not delivered by Systemair.

### L.5.3 Valve and valve motor for heating coil

The supply voltage for the water valve actuator is 24V AC, the control signal is 0-10 V. The sensor for water temperature has to be installed in the heating coil and the sensor is provided with cable but not connected to the terminals in the cabinet. The cable between valve motor and terminals in the cabinet is not delivered by Systemair. Standard valves are available for 2 or 3-way connection.

### L.5.4 Valve and valve motor for cooling coil

The supply voltage for the water valve actuator is 24V AC, the control signal is 0-10 V. Cables between valve motor and terminals in the cabinet are not delivered by Systemair. Standard valves are available for 2 or 3-way connection.

### L.5.5 DX cooling

A DX-cooler can be connected to the controller. Input and output are available for:

Start cooling – Alarm cooling – Cooling Y3. Cables are not delivered by Systemair

### L.5.6 Circulation pump, heating

Circulation pump is not included in the delivery from Systemair. If the pump has not been activated for 24 hours, the pump is exercised once daily for 1 minute to keep the pump in a good condition. Cables are not delivered by Systemair.

### L.5.7 Fire alarm function

#### L.5.7.1 External fire signal that indicate block or run

The unit is available without components for this function. The controller is as standard configured for ordinary running when the contact is closed (NC). By open contacts the fans stop and the dampers close. If disconnected, fire is indicated and the unit will stop until the signal is re-connected. On the site qualified technicians are able to change the configuration.

#### L.5.7.2 External fire signal

The unit is delivered without components for this function. The controller is as standard configured for ordinary running when the contact is closed (NC). By open contacts the fans stop and the dampers close. When the unit has been shut down by a fire signal, the unit has to be restarted on the control panel. On the site qualified technicians are able to change the configuration.

### L.5.7.3 Two fire thermostats

The unit is available with 2 thermostats installed in the unit – 1 in the extract air and 1 in the supply air. The cut-off temperature in the thermostats is adjustable between 40 and 70°C. At the factory supply is set at 70°C and extract is set at 40°C. The controller is as standard configured to stop the fans and close the dampers if a thermostat is released. On the site qualified technicians are able to change the configuration.

### L.5.7.4 One smoke detector in extract air

The smoke detector has been installed in extract air next to the fan. The controller is as standard configured to stop the fans and close the dampers if the detector is released by smoke. When the unit has been shut down by a fire signal, the unit has to be restarted on the control panel. On the site, qualified technicians are able to change the configuration.

## L.5.8 Electric heating coil

### L.5.8.1 Control of heating capacity connected to unit with Systemair control system

Electric heating coil installed with separate controller beside the heater. The separate controller is designed for capacity conversion of the 0-10 V control signal from the main control system. The electric heater is not supplied from the air handling unit cabinet as the cabinet is not designed to supply the heater with power. Electrical coils must have separate power supply. The separate controller is without supply disconnecting device.

### L.5.8.2 Control of heating capacity connected to unit without Systemair control system

Electric heating coil installed with separate controller beside the heater. The separate controller is designed for capacity conversion of the 0-10 V control signal from the main control system. The heating capacity is adapted in steps.

The electric heater is not supplied from the air handling unit cabinet as the cabinet is not designed to supply the heater with power. No power supply cables are connected to the electric heater. The separate controller is without supply disconnecting device.

## L.5.9 Speed control of fans

### L.5.9.1 Control system - frequency converters inside the unit are IP 20

Fan motor revolutions are controlled by frequency converters, and they are configured and tested to comply with the data for the unit. The frequency converter for each fan motor is installed inside the unit beside the fan motor with cables between motor and converter. In units with complete control system the frequency converters are delivered with system parameters adapted to the motors and the project.

### L.5.9.2 Pressure transmitters

Separate control of the air flow or duct pressure for supply fan and for extract fan. The required air flow or duct pressures with normal as well as reduced capacity are selected on the Systemair Control Panel. The actual pressure is measured by pressure transmitters. PI calculation in the controller continuously transmits the necessary revolutions for the fans to the frequency converters to achieve the required pressure.

### L.5.9.3 CO<sub>2</sub>-dependent air flow

The air flow is controlled by a CO<sub>2</sub> sensor. High CO<sub>2</sub> concentration is equal to higher air flow. Low CO<sub>2</sub> concentration is equal to lower air flow. Based on the actual CO<sub>2</sub> level and a min/max level, the needed airflow is calculated. The speed of each fan is adjusted via frequency converter. Terminals in the cabinet are available for connection of the sensor.

### L.5.9.4 Humidity dependent air flow

The air flow is controlled by the humidity sensor. High humidity is equal to higher air flow. Low humidity is equal to lower air flow. Based on the actual humidity level and a min/max level the needed airflow is calculated. The speed of each fan is adjusted via frequency converter. Terminals in the cabinet are available for connection of the sensor

## L.5.10 Cabinet

### L.5.10.1 Integrated cabinet in units with control system

Cabinet is integrated in the unit behind an inspection door. Terminals are installed in the cabinet for all external components. The number of terminals is always adapted to the individual order.

### L.5.10.2 Cabinet placed on the unit with control system

The models with the cabinet on the unit are exclusively for indoor installation. Terminals are installed in the cabinet for all external components. The number of terminals is always adapted to the individual order.

### L.5.11 Temperature sensors

Four sensors are always delivered with each unit. See below where the sensors are placed;

- 1 sensor in the extract air, installed inside the unit
- 1 sensor in the outdoor air, installed inside the unit before the supply air filter on the cold side of the heat exchanger
- 1 sensor in the supply air to be placed in the supply air duct by the installer
- 1 sensor in the exhaust, installed inside the unit

### L.5.12 Damper motors

Four different types of damper motors are available;

- On/off damper motor, without spring return function. Torque is 20 Nm and run time is 150 seconds
- Modulating damper motor, without spring return function. Torque is 20 Nm and run time is 150 seconds
- On/off damper motor, with spring return function. Torque is 20 Nm and run time is 150/16 seconds
- Modulating damper motor, with spring return function. Torque is 20 Nm and run time is 150/16 seconds

### L.5.13 Filter guards

Filter guard over pre-filter and primary filter installed and connected to the controller for display of alarm when the mechanically set limit is exceeded. Filter alarm will be displayed on the Systemair Control Panel.

### L.5.14 Room temperature sensors

One or two external room temperature sensors are available. The cabinet has been prepared with additional terminals for connection of the room temperature sensors. The sensors are delivered without cable. The controller calculates an average of the value from the 2 sensors as input for the control.

### L.5.15 Frost protection

For the frost protection of the heating coil, the water temperature in the coil is transmitted to the controller by a temperature sensor in a water return circuit of the coil. The controller always generates a signal to the valve motor that keeps a sufficient flow of hot water to protect the coil against frost. This frost protection is also activated when the running mode is "off".

If the water temperature falls below the set point temperature the fans stop, the dampers close, and an alarm is activated.

From Systemair every heating coil for hot water is provided with a small pipe at the collection pipe for the return water. This small pipe is prepared for the installation of the above mentioned temperature sensor for the transmission of the return water temperature to the controller.

### L.5.16 Systemair Control Panel - NaviPad

The separate cable-connected (3m) hand terminal with touch screen – the NaviPad is always necessary for the normal handling and programming, because the main controller – Access – is without display and buttons.

### L.5.17 Cooling recovery

If the extract air temperature is lower than the outdoor air temperature, and there is a cooling demand in the rooms, the cooling recovery will be activated by reversing the heat exchanger signal. The signal is increased to the cooling recovery by increasing cooling demand.

### L.5.18 Free cooling

A temperature sensor has been installed inside the unit in the outdoor air entrance. If the outdoor temperature after midnight is below the room temperature set point and the actual average room temperature is above the set point temperature, the fans start during the summer to cool down the building during night hours.

### L.5.19 Alarm signal

By alarm there are 24 V DC on terminals in the cabinet. Lamps and cables are not available from Systemair.

### L.5.20 Heat recovery

The heat recovery capacity is controlled by modulating speed of the rotor.

### L.5.21 Frost protection – plate heat exchanger

Signals from a temperature sensor mounted in the airflow after the plate heat exchanger are transmitted to the controller for frost protection of the plate heat exchanger.

## L.6 Commissioning

When the installer has completed the installation and wants to hand over the finished installation to his customer for payment, the commissioning protocol can be the written receipt for the full ended job. Fill in the blank spaces and sign the proposed commissioning protocol that is Annex 14, or fill in the Word-file with a Commissioning Protocol that is available from your local Systemair office.

## L.7 Unit in hibernation – not in regular operation for several months

When the unit is in hibernation (is not in regular operation for several months) after the installer has completed the installation, the unit must be in operation for 10 – 15 minutes every day to protect the fan bearings. Please also see chapter J.2.14

## M Information about the residual risks

### M.1 Design of the machine to make transport safe

#### Hazards/dangerous area:

- Incorrect handling during transportation may cause that the unit is dropped.

#### Dangerous incident:

- If a person is hit by a unit that is dropped, this could in unfortunate circumstances lead to irreversible injury or death.

#### Claim for reduction of danger:

- Correct handling during transportation is described in this manual. If lifted by **fork-lift truck** the forks of the truck must be sufficiently long. Safety measures are also described in this manual by use of crane. Information about weight of each section is also visible.

### M.2 Risk caused by surfaces, edges and corners

#### Hazards/dangerous area:

- Sharp edges on plates might occur inside the machines as well as sharp edges on frames of dampers. No sharp edges on the outside of the units.

#### Dangerous incident

- Cut fingers/hands.

#### Claim for reduction of danger

- Risk only exists during maintenance and cleaning. This takes place at least once every year. Use of gloves and helmet is described in this manual. Cut-resistant gloves for protection against injury from sharp metal plate edges. Use CE-marked gloves for this purpose.

### M.3 Risk of dust, viral and bacterial infection

#### Hazards/dangerous area:

- Risk of dust, viral or bacterial infection when performing maintenance inside the machines.

#### Dangerous incident:

- Viral or bacterial infection or damage to respiratory passages.

#### Claim for reduction of danger:

- Risk only exists during maintenance and cleaning. This takes place at least once every year. Use of gloves, eye protection, particulate respirator and helmet is described in this manual.

## M.4 Risk caused by maintenance and cleaning of dampers

### Hazards/dangerous area:

- Are between the damper blades and the system of bars and links between motor and damper blades.

### Dangerous incident:

- Crushing of fingers.

### Claim for reduction of danger:

- Risk only exists during maintenance and cleaning. This task must be done by skilled technicians that are aware of this risk.

## M.5 Risk caused by maintenance and cleaning of attenuators

### Hazards/dangerous area:

- High concentration of dust on the surface of the baffles might be harmful to the health.

### Dangerous incident:

- To breathe in particles that is harmful to the health.

### Claim for reduction of danger:

- Risk only exists during maintenance and cleaning. This takes place at least one time every year. Use of particulate respirator is described in this manual. Particulate respirator – maintenance free including foam face-seal and adjustable pre-threaded headbands (same particulate respirator as recommended for change of filters).

## M.6 Risks in connection to filters

### M.6.1 Risk caused by missing change of filter

#### Hazards/dangerous area:

- Missing change of filters and missing maintenance decrease the capacity and final consequence will be breakdown.

#### Dangerous incident:

- By extensive lack of filter change and maintenance the machine can break down.

#### Claim for reduction of danger:

- In the manual is the method and schedule for change of filters and maintenance specified.
- If the filter is subject to heavier loads, the inspection interval must be shortened accordingly to prevent premature tearing.

### M.6.2 Risk caused by filter change

#### Hazards/dangerous area:

- Filter panels and filter bags

#### Dangerous incident:

- To breathe in particles that are harmful to the health when changing the filter.

#### Claim for reduction of danger:

- Use of particulate respirator – maintenance free including foam face-seal and adjustable pre-threaded headbands (same particulate respirator as recommended for cleaning of attenuators).

## M.7 Risks in connection to fans

### M.7.1 Risk caused by permanent magnet motor

#### Hazards/dangerous area:

- Rotation of the shaft generates electricity. This danger is always visualized by a yellow warning label on the inspection door where permanent magnet motors are installed.

**Dangerous incident:**

- Persons touching conductive parts get electric shock, burns, heart flicker and so on.

**Claim for reduction of danger:**

- By installation or repairs of conductive components, the shaft must be blocked to prevent any rotation.

**M.7.2 Risk of rotating impeller caused by stack effect (chimney effect)****Hazards/dangerous area:**

- On special occasions stack effect – also called chimney effect – in the ducts create airflows that drives the impellers by turned off motors.

**Dangerous incident:**

- Injury of fingers, hands and arms.

**Claim for reduction of danger:**

- Eliminate this airflow for supply air and exhaust air by dampers with spring return motors for automatic closing of the dampers by turned off fan motors and by power failure.

**M.8 Risks in relation to heating/cooling coils and electrical heater****M.8.1 Extreme temperatures - heating****Hazards/dangerous area:**

- Electrical heating elements can achieve surface temperature of 500°C.
- Coils and pipes for hot water can achieve 95°C.

**Dangerous incident:**

- According to ISO 13732-1:2006, here is no direct risk of burns. (short-time contact – lesser than 2,5 sec).

**Claim for reduction of danger:**

- Wear heat resistant gloves that can resist temperatures up to 95°C.
- Pipework must be insulated.
- The maximum inlet temperature for the water coil must be limited to 95°C.

**M.8.2 Extreme temperatures - cooling****Hazards/dangerous area:**

- Evaporator coils and pipes connected to cooling compressor can achieve minus 10°C.

**Dangerous incident:**

- According to ISO 13732-1:2006, here is no direct risk of burns. (short-time contact – lesser than 2,5 sec).

**Claim for reduction of danger:**

- No.

**Caution**

In order to prevent damage to pipes and heating/cooling coils, it is not allowed to make any modifications (drill holes, cut the sheet, etc.) to the cabinet.

### M.8.3 Risk of touching heat transfer fluid

#### Hazards/dangerous area:

- Heating/cooling coil could be filled with heat transfer fluid such as antifreeze, glycol, freon.

#### Dangerous incident:

- Burning, discomfort, injuries by the radiation of heat sources, damage to eyes and skin, poisoning, slight disease.

#### Claim for reduction of danger:

- Wear gloves and eye protection.
- Pipework must be insulated.
- The coil must be filled by the installer.
- The coil pipe connection fittings must not be leak.

## M.9 Heat pump units

### M.9.1 Risk of high temperature

#### Hazards/dangerous area:

- Condenser coils and pipes can achieve temperature of 60°C.

#### Dangerous incident:

- Assessed according to ISO 13732-1:2006, there is no immediate risk of burns. (contact time 2,5 sec.).

#### Claim for reduction of danger:

- To prevent damage to pipes and coils, it is not allowed to make any modifications (drill holes, cut the sheet, etc.) to the cabinet. In case of repair or maintenance, wearing gloves and eye protection is mandatory.

## M.10 Risk caused by lightning strike

#### Hazards/dangerous area:

- Lightning strike close to the machine.

#### Dangerous incident:

- Lightning strike can create flash over between phases and conductive parts. This can cause fire or the overvoltage can make injury on persons.

#### Claim for reduction of danger:

- Installer and user must be aware of the fact that lightning makes a risk that requires installation of overvoltage protection devices to lead the lightning overvoltage to an earth lead on a safe way. The need for overvoltage protection devices depend on where the unit is placed in and on the building.
- Installer and user must take care of this according to local statutory requirements. Overvoltage protection devices are also described in chapter J.3.3.2 of this manual.

## M.11 Risk of Legionella

#### Hazard/dangerous area

- The supplied water may contain Legionella bacteria that are already in the water supply system.

#### Dangerous incident

- Infection with Legionella bacteria when coming into contact with the supply water.

#### Claim for reduction of danger

- The supply water system must be checked for Legionella contamination in accordance with local regulations.

## N Instructions on the protective measures during repair and maintenance

Use the below-mentioned personal protective equipment for maintenance:

	Cut-resistant gloves for protection against injury from sharp metal plate edges. Use CE-marked gloves for this purpose.
	Helmet.
	Particulate respirator – maintenance free including foam face-seal and adjustable pre-threaded headbands – for replacing filters.
	Eye protection.
	Ear protection.
	Padlock for locking the automatic circuit breakers.

## O The essential characteristics of tools which may be fitted to the machinery

The subject in the Machinery Directive about tools on the machine does not exist for the Geniox air handling units, because those tools does not exist.

## P The conditions of stability during use, transportation, assembly, dismantling when out of service

The unit must always be handled in an upright position. Never tilt any section more than 15°. If sections must be tilted more than 15°, sections with fans or rotating exchangers that can be drawn out for service must be secured carefully.

During transportation, installation, dismantling or other handling, it must be secured that all components in the unit are properly fastened and with additional attention to the control of anti-vibration mounts under the fans that they are undamaged. The mounting and smooth running of the fans must be controlled and handled with great care.

### P.1 Installed reliable to avoid units to be tilted or moved by storm

Units installed on roofs and other places with the risk of heavy winds must be installed reliable to avoid that they can be tilted or moved by the any storm. The base frame is provided with holes that are intended for fastening by sufficient bolts and fittings supplied by the installer.

### P.2 Transport of section with heat pump unit



#### Warning

During transportation, the unit section – Geniox – HP **must** always be in the upright position or tilted less than 15°. If it is necessary to tilt the unit more than 15°, the suction pipe of the compressor must point upwards to prevent the escape of oil from the compressor sump.

### P.3 Disposal of the heat pump system - type Geniox - HP

Prior to the disposal of the Geniox – HP unit section, the refrigerant in the heat pump system must be drained off by a skilled technician from a certified company. After correct evacuation of the refrigerant, the disposal of the Geniox – HP unit section is similar to the disposal of the rest of the air handling unit.

### P.4 General disassembly – sharp edges

Pay attention to several sharp edges during dismantling and disposal of the unit. To avoid injury, CE-marked cut-resistant gloves as well as helmet must be used. The measures are described further in the Maintenance, Dismantling and Disposal Manual.

## Q Instructions for machinery where these are regularly to be transported

The subject in the Machinery Directive about machinery that are regularly to be transported does not exist for the Geniox air handling units, because those units are specially made for one intended application.

## R The operating method to be followed in the event of breakdown. Safe restart.

Use the below mentioned procedure in the event of breakdown or blockage:

- Switch off the power and lock the automatic circuit breaker by padlocks in the off position.
- Remove the reason for breakdown or blockage.
- Follow the start-up procedure described in chapter L.

## S Adjustment and maintenance operations

Must be performed by skilled technicians.

In connection with demands for compensation, Systemair must have full and unhindered access to all relevant reporting on service, repair, modification and use since the unit was transferred from Systemair to a transport company at the Systemair factory. It is a condition for compensation that maintenance outlined on the following pages has as a minimum been performed.

### S.1 Shutdown of the unit to a safe state

Switch the unit to OFF on the Systemair Control Panel. See the - Operator's Guide - if the unit was delivered with control system from Systemair. Switch off the automatic disconnecting device. The automatic disconnecting device are marked F1 and F2

Check that the disconnecting device marked F3 is still switched on because the lamps inside the unit are connected to this switch. Switch on the lamps for light during the maintenance activities. Be aware that F3 also supplies rotary heat exchanger and the Access control system – so if the lamps are on, the rotary heat exchanger and the Access control system are also supplied.

Use the start-up procedure described in chapter L, when the maintenance activities are completed.

### S.2 Unlock and lock the doors by using the key

Use the key to lock the doors. The doors are not locked automatically by turning the handle to the vertical position.



### S.3 Recommended maintenance intervals

Function	Maintenance	Number per year
Unit casing	Cleaning of the unit casing.	1
	Control of rubber seals on doors and between sections.	1
Filters	Change on demand by alarm and always minimum twice a year.	2
	Control of rubber seals. Control of the system on Geniox10 – Geniox44.	2
Fans	Cleaning of all parts.	1
	Check motors and bearings	1
	Check that the impellers are rotating without dissonance.	1
	Check that anti-vibration mounts are intact.	1
	Check that the unit is operating without vibrations after the cleaning, overhaul and maintenance.	1
Rotary heat exchanger	Check that leakage is insignificant. By significant leakage brush seals must be replaced.	1
	Check that the rotor can turn freely and easily manually with a hand when the belt is removed from the drive	1
	Check that dirt accumulation is insignificant. The rotor can only be cleaned by gentle vacuum cleaning.	1
	Check motor and the speed control system. Check and repair immediately by alarm for malfunction.	1
	Check drive belt tension and wear.	2
	Check that the surface is uniform without lamella damage.	1
Plate heat exchanger	Check bypass function and sequence for de-icing. Check and repair immediately by alarm for malfunction.	1
Dampers	Test the operation.	1
	Visual inspection of seals and tightness when closed.	1
Hot water coil	Check the dirt accumulation and clean, if needed.	1
	Bleeding, if needed.	1
	Test of frost protection sequence	1
	Test of circulation pump	1
Electric heating coil	Check dirt accumulation and clean, if needed.	1
	Test the function of the system with the fuses for the safety.	1
Cooling coil	Check dirt accumulation and clean, if needed.	1
	Test the frost protection (glycol)	1
Heat pump unit	Mandatory annual control of the heat pump system. Must be done by certified technician from a certified company.	1
Condensate drain	Cleaning of tray, water trap and outlet. Check the electrical heating between insulation and pipes, if installed. Check and clean on demand and always minimum twice a year.	2
Saving- and comfort functions	Test of CO2 sensor, humidity sensor, motion sensor, pressure transmitters for air capacity control, extended operation via button, cooling recovery, free cooling	1
Fire alarm	Test of thermostats, smoke detectors and fire detection systems	1
Battery in controller	Change the battery on demand by alarm in the display and always change the battery as a minimum every 5 years.	1
Remote control	Test of Communications.	1

## S.4 Filters – always replace filters with new filters with the same characteristics to maintain SFP value

Filters in supply air and in extract air always have the same sizes of frames and the number of filters for supply air and extract air are always the same. Remember to order filters for supply air as well as for extract air.

To maintain the factory-calculated SFP values for the air-handling unit, it is very important that filters with the same characteristics for start pressure as well as lifetime replace factory-mounted filters.

To achieve the most favourable SFP values, the factory-mounted filters represent the lowest achievable start pressure as well as the longest achievable lifetime. If other filters with higher start pressure and shorter lifetime replace the factory-mounted filters, the user will experience smaller airflow and/or consumption of more electricity, and the SFPv value calculated by Systemair according to the Eurovent certification will not be achieved. Poor SFPv values will be detected by tests according to commissioning standards, DGNB, LEED or BREEAM sustainability standards and locally defined performance standards (the SFPv is with new clean filters).

Filter frame for bag filters must be of NON-PVC plastic to ensure safe disposal by incineration.

For each individual air handling unit you will find the data for the factory-mounted filters in Annex 2 that is always provided in a cover placed inside the air handling unit when the air handling unit is delivered to the final site. Annex 2 is also always available from Systemair if you can inform us of the production number of the air handling unit. The production number is always printed on the so-called machine card that is attached to the unit.

The factory-mounted filters comply with indoor air quality demands of customers and with the SFP values according to local legislation.

The filters comply with the filter classes according to the new test standard EN ISO 16890:2016 valid from 1 January 2019.

Filter classes according to the old test standard EN 779:2012 and the new test standard EN ISO 16890:2016 are listed below:

G4 – coarse 65%
M5 – ePM10 60%
M6 – ePM2,5 50%
F7 – ePM1 60%
F7 CityFlo – ePM1 60%
F8 – ePM1 70%
F9 – ePM1 85%

### S.4.1 Bag filters – the number of filters and sizes of frames

Filters in supply air and in extract air are always the same sizes and the same numbers. See the filters in supply or extract air below.

Size of unit	Numbers and sizes of frames for bag filters (WxH)
10	1x[792x392]
11	2x[490x392]
12	1x[592x490] + 1x[490x490]
14	2x[490x592] + 1x[287x592]
16	2x[592x592] + 1x[287x592]
18	2x[490x392] + 4x[592x392]
20	3x[592x592] + 3x[287x592]
22	6x[592x490] + 2x[287x490]
24	3x[592x592] + 1x[490x592] + 3x[592x490] + 1x[490x490]
27	2x[592x592] + 8x[490x592]
29	6x[592x592] + 4x[490x592]
31	5x[592x592] + 5x[592x490] + 5x[592x287]
35	2x[287x592] + 5x[592x287] + 10x[592x592] + 1x[287x287]

Size of unit	Numbers and sizes of frames for bag filters (WxH)
38	3x[287x592] + 15x[592x592]
41	3x[287x592] + 18x[592x592]
44	3x[287x592] + 6x[592x287] + 18x[592x592] + 1x[287x287]

**Note:**

Special sizes of filters are available from Camfil.

Dept of filter frame must be 25 mm to ensure a complete airtight sealing around the AHU filter frame

### S.4.2 Panel filters – the number of filters and the sizes of the frames

Size of unit	Numbers and sizes of frames for panel filters (WxHxD)
10	1x[792x392x48]
11	2x[490x392x48]
12	1x[490x490x48] + 1x[592x490x48]
14	2x[490x592x48] + 1x[287x592x48]
16	2x[592x592x48] + 1x[287x592x48]
18	2x[490x392x48] + 4x[592x392x48]
20	3x[592x592x48] + 3x[592x287x48]
22	6x[592x490x48] + 2x[287x490x48]
24	3x[592x592x48] 4x[490x592x48] + 1x[490x490x48]
27	2x[592x592x48] + 8x[490x592x48]
29	6x[592x592x48] + 4x[490x592x48]
31	5x[592x592x48] + 5x[592x490x48] + 5x[592x287x48]
35	2x[287x592x48] + 5x[592x287x48] + 10x[592x592x48] + 1x[287x287x48]
38	3x[287x592x48] + 15x[592x592x48]
41	3x[287x592x48] + 18x[592x592x48]
44	3x[287x592x48] + 6x[592x287x48] + 18x[592x592x48] + 1x[287x287x48]

**Note:**

Special sizes of filters are available by Camfil.

### S.4.3 Bag filters

Turn the unit off and wait for 2 minutes till unit completely stops. Used filters can be pulled out. Store the used filters immediately in plastic bags to avoid that dust pollutes the environment. Geniox units are provided with a very corrosive-resistant and reliable system, where filters are slid into the units in a lower and upper durable u-profile of plastic/ rubber. Check the upper and lower U-profile for damage and check the vertical rubber profile on the back wall as well as the rubber profile on the inspection door for damage. The new filter bags must be pushed carefully into the unit in order to ensure that they are sealed properly. The filters must have vertical bags.

**Note:**

Instructions about easy, quick and safe change of filters are displayed in a 2-minutes video. The video is available on YouTube.

[https://youtu.be/w2yP5\\_770fc](https://youtu.be/w2yP5_770fc)

**Note:**

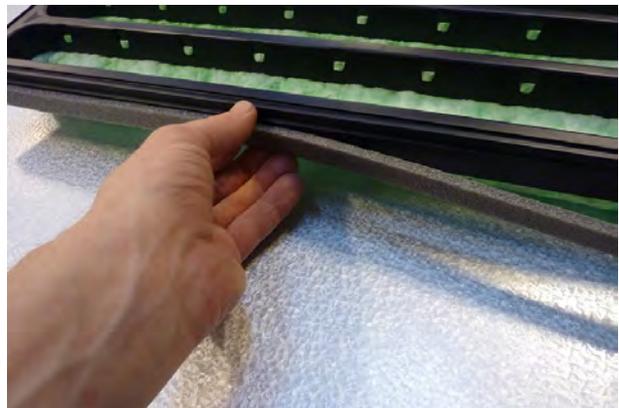
The following information about the use of self-adhesive foam strips does not apply to Geniox units in the sizes 35, 38, 41 and 44.

ONE self-adhesive foam strip must be placed on the vertical frame of EACH filter to avoid major air leakage through the vertical opening between 2 filters. Please note – only ONE self-adhesive foam strip must be placed on the vertical frame of EACH filter – Please establish the practical rule that the self-adhesive foam strip is placed on the vertical side that is visible from the inspection side. Those very important self-adhesive foam strips are usually not delivered by the suppliers of filters. The customer must order those self-adhesive foam strip from a supplier of foam strips. Width of the foam strip is about 15 mm and thickness of foam strip must be exactly 8 mm. If the thickness of the foam strip is less than 8 mm, there will be a gap for leakage between the filters. If the foam strip is more than 8 mm the row of filters in the U-profile will be too wide making it impossible to close the inspection door. **Note! The staff must have the self-adhesive foam strips available when they go to the air handling unit. Without those self-adhesive foam strips, any change of filters is impossible.**

Remove the protection from the self-adhesive side of the strip.



Place the self-adhesive strip on **one** vertical side of the filter frame.



Check that the end of the strip is fully even with the horizontal side of the filter frame.



Remove excess of the strip. The end of the strip must be fully even with the horizontal side of the filter frame.



Push the filters carefully in the U-profile to be sure that there are no leakages between the filters. Check that the vertical side of the last filter in the U-profile is fully even with the end of the U-profile. If the end of the last filter is not fully even with the end of the U-profile an additional self-adhesive profile must be added to avoid any gap between the rubber profile on the inspection door and the last filter.



The end of the last filter is fully even with the end of the U-profile. The rubber profile on the inspection door will close the gap between inspection door and filter. Job is done.



Check that rubber profiles on the back panel as well as rubber profiles on the inspection door are without wear and damage – still sufficient for avoiding any air leakage.



### S.4.4 Panel filters

The filter cell guide rails are to be cleaned before fitting the new filters.



## S.5 Changing the Internal Battery in the controller



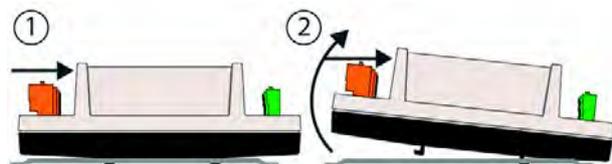
### Caution

This procedure requires knowledge of proper ESD protection; i.e. an earthed wristband must be used!

When the alarm "Internal Battery" is on the screen of the control panel, the battery for backup of program memory and real-time clock has become too weak. The battery is replaced as described below. A backup capacitor saves the memory and keeps the clock running for at least 10 minutes after the power supply is removed. Therefore, if the battery replacement takes less than 10 minutes, there will be no need to reload the program, and the clock will continue to run normally.

The replacement battery must be of the type CR2032.

- 1 Remove all the cables from the Access controller. All cables are in plugs that easily and fast can be pulled up. Release the Access controller from the mounting frame through pushing on one of the long sides of the controller. This is shown on the illustration below.



- 2 Remove the white cover from the black bottom by pressing on each of the six locking hooks at the two long edges of the cover using a small screwdriver, and at the same time pulling the cover outwards.



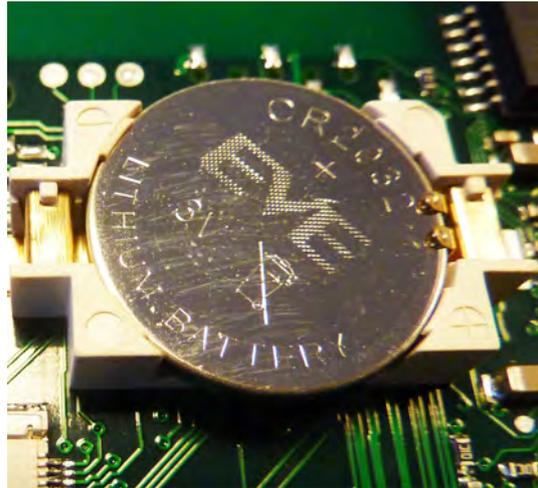
- 3 Use a small screwdriver to press this hook on the cover away from the edge of the black bottom



- 4 Each of the six hooks must be released from the block on the black bottom by a small screwdriver, and at the same time pulling the cover outwards.



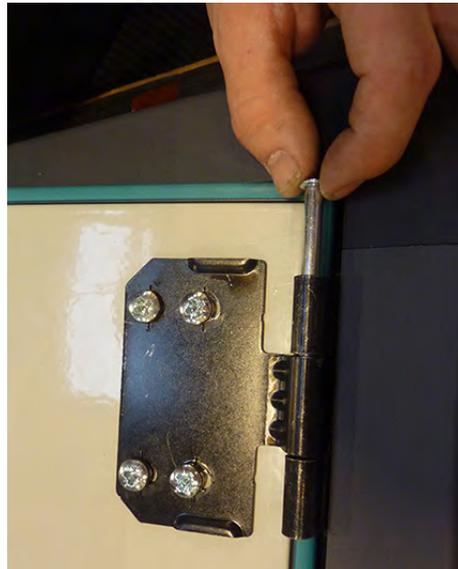
- 5 Grip the battery firmly with your fingers and lift it upwards until it rises from its holder. Press the new battery firmly down into place. Note that to preserve correct polarity; the battery can only be inserted the "right way round".



## S.6 Functions to maintain

### S.6.1 The unit

It is very easy to remove inspection doors for extraordinary good access to cleaning, service, repairs and replacement of components in the unit. Lift the stainless steel shaft in the hinge to remove the door



The unit should be cleaned once a year when operating with normal air quality for comfort ventilation with no special hygiene requirements.

To clean the unit, dry it off with a dry cloth, or use water mixed with a non-corrosive cleaning medium.

Any corrosion – for example the bottom of the section for outdoor air intake and the bottom of the section for exhaust air outlet must be cleaned off immediately, and the surface treated.

In special operating conditions, where the air is aggressive or very humid, for example, or where there are special hygiene requirements, the unit shall be cleaned more frequently as required.

Cleaning medium and method should be adapted to the relevant conditions. Any corrosion should be cleaned off immediately, and the surface treated.

Closing mechanisms are to be lubricated at least once a year. Synthetic door hinges are service free. Seals around inspection doors are to be cleaned at least once a year and are to be checked for leakage.

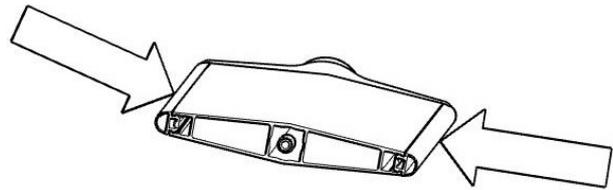
It is recommended to treat the seals with a moisture repellent agent.

All seals are to be inspected at least once a year and are to be repaired if necessary.

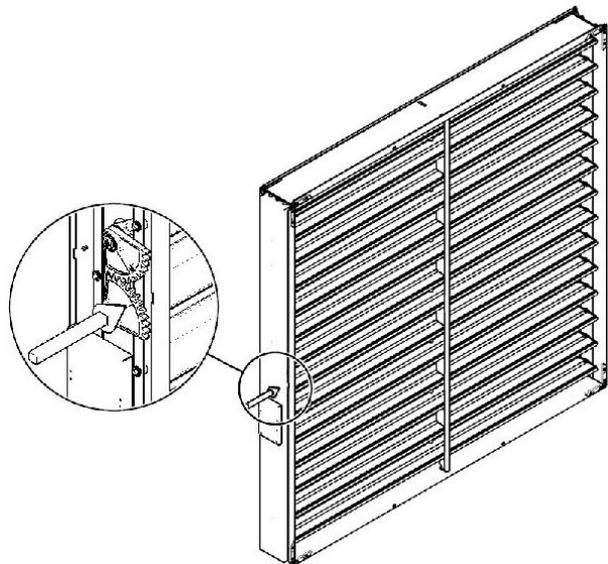
Grilles for air intake and exhaust air outlet are to be cleaned at least once a year to prevent blockage.

### S.6.2 Dampers

Rubber seals between the damper blades and the frame are to be checked once a year. These seals are not to be lubricated or treated in any other way.



The damper blades are driven by a mechanism consisting of steel rods and gearwheels made from a temperature-resistant, glass fibre reinforced polypropylene composite. The mechanism does not require lubrication.



The damper blades are fitted with synthetic bearings requiring no lubrication. Air-tightness of the damper, when the damper motor is in the closed position, must be visually checked once a year. The damper motor is to be adjusted if the damper does not close tightly.

### S.6.3 Rotary heat exchanger



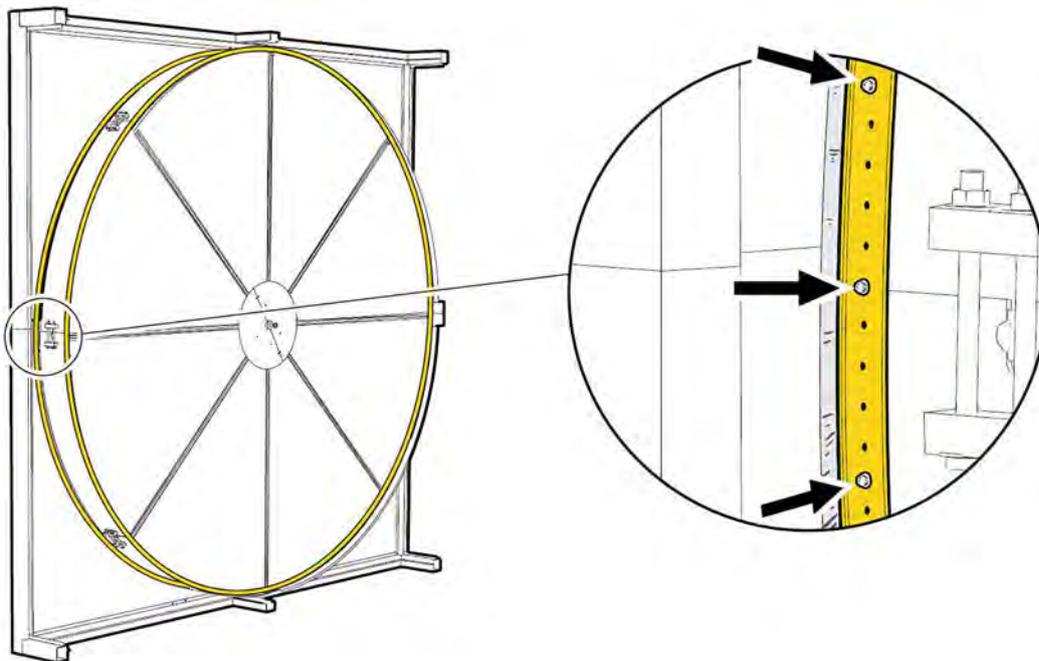
#### S.6.3.1 Rotor

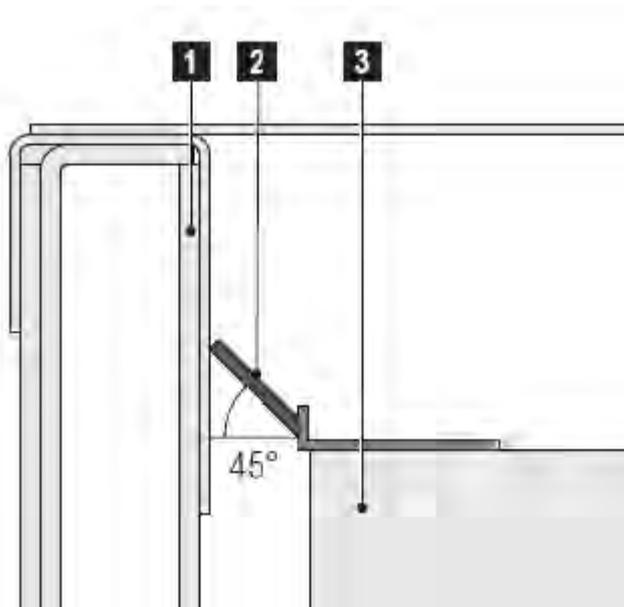
Check the rotor annually and ensure that it can turn freely and easily. This can be done by removing the belt drive at the motor and then turning the rotor manually with a hand on the peripheral rotor casing. At the same time, check that the brush seals are not damaged and that the surface is uniform and undamaged. The bearings are factory lubricated and do not require any service lubrication. During operation the rotor can become dirty.



**Note:**

The rotor can be cleaned by gentle vacuum cleaning and not with compressed air or water.





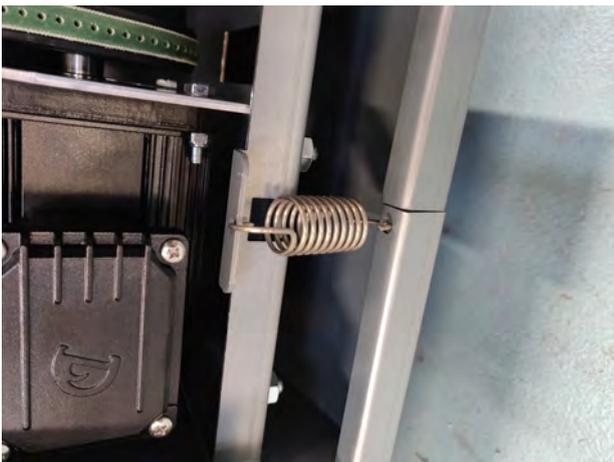
1. End wall of the casing
2. Brush
3. Wheel

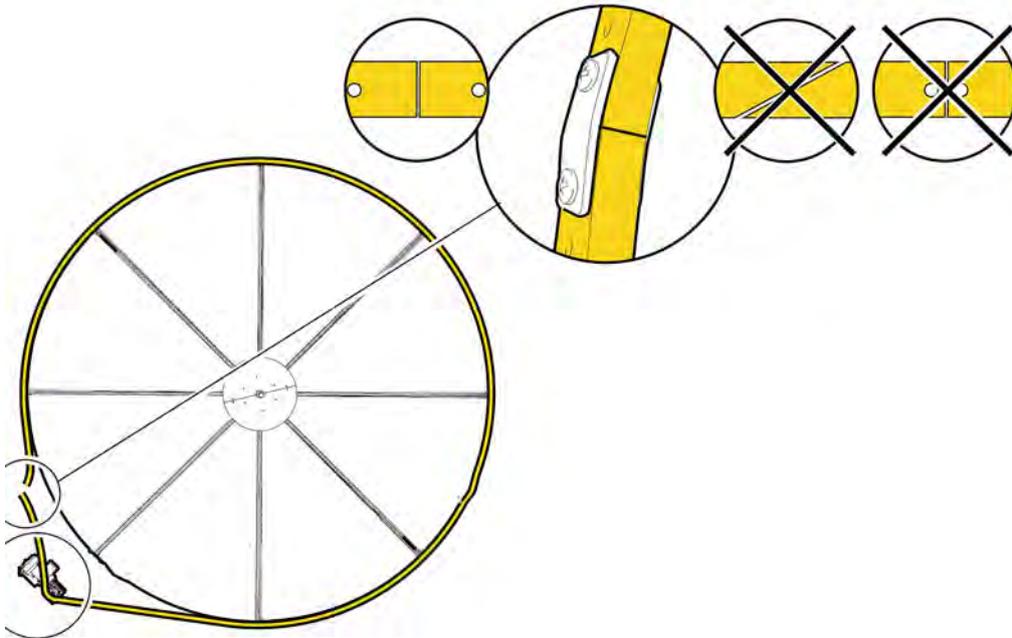
Check annually that the brush lists close well. If they do not close well, the brush lists need adjustment. During the adjustment, the brush seal must face outwards. The brush must be in contact with the end wall of the casing at a 45° angle. Let the two ends overlap and use an existing hole to screw the overlap onto the periphery plate. Check that the brush seal is in continuous contact and that the wheel can be easily turned by hand. If the rotor turns hard, readjustment is necessary. Expect that brush lists should be changed every 5 years – maybe more often – if necessary.

To ease inspection and service the rotor can be pulled out of the sizes 10, 11, 12, 14 and 16.

### S.6.3.2 Motor and belt drive

The bearings are factory lubricated and do not require any service lubrication. The belt drive is to be checked for correct tightness and that it is undamaged. The rotor has a V-belt with a belt connector. If the belt is no longer tight, it must be shortened to a length which enables the motor base frame tightening spring to hold the belt tight. If new screws are used for the belt connector, they must not have a length which exceeds the thickness of the belt and connector. Remove the excess, if any, with a file.





Check the drive belt twice per year. Expect that drive belts should be changed every 5 years – maybe more often – if necessary.

#### S.6.4 Cross flow and counter flow exchanger



**Note:**

Once a year the edges of the heat exchanger plates are to be checked for cleanliness and damage.

If there is dust on the edges of the plates, remove it with a soft brush. The thin plates are not constructed for cleaning with compressed air or water.

#### S.6.4.1 By-pass damper

The damper blades are fitted with synthetic bearings requiring no lubrication. Each damper blade is driven by a gear drive of a temperature resistant glass fibre reinforced PA6 nylon composite. The steel rods and brass bushes do not require lubrication. Air-tightness of the dampers, when the damper motor is in the closed position, must be visually checked once a year. The damper motor is to be adjusted if the damper does not close tightly.

#### S.6.4.2 Condensate water drain

At least once a year the drip tray beneath the heat exchanger, as well as the drain and the water trap must be cleaned. Take care that there is sufficient water in the water trap. If a droplet eliminator has been fitted, this must be checked once a year and cleaned if necessary.



Drip tray with slope is not supported for the weight of a person. Do not walk or stay in the drip tray.

Demount this type of water trap regularly for careful cleaning.



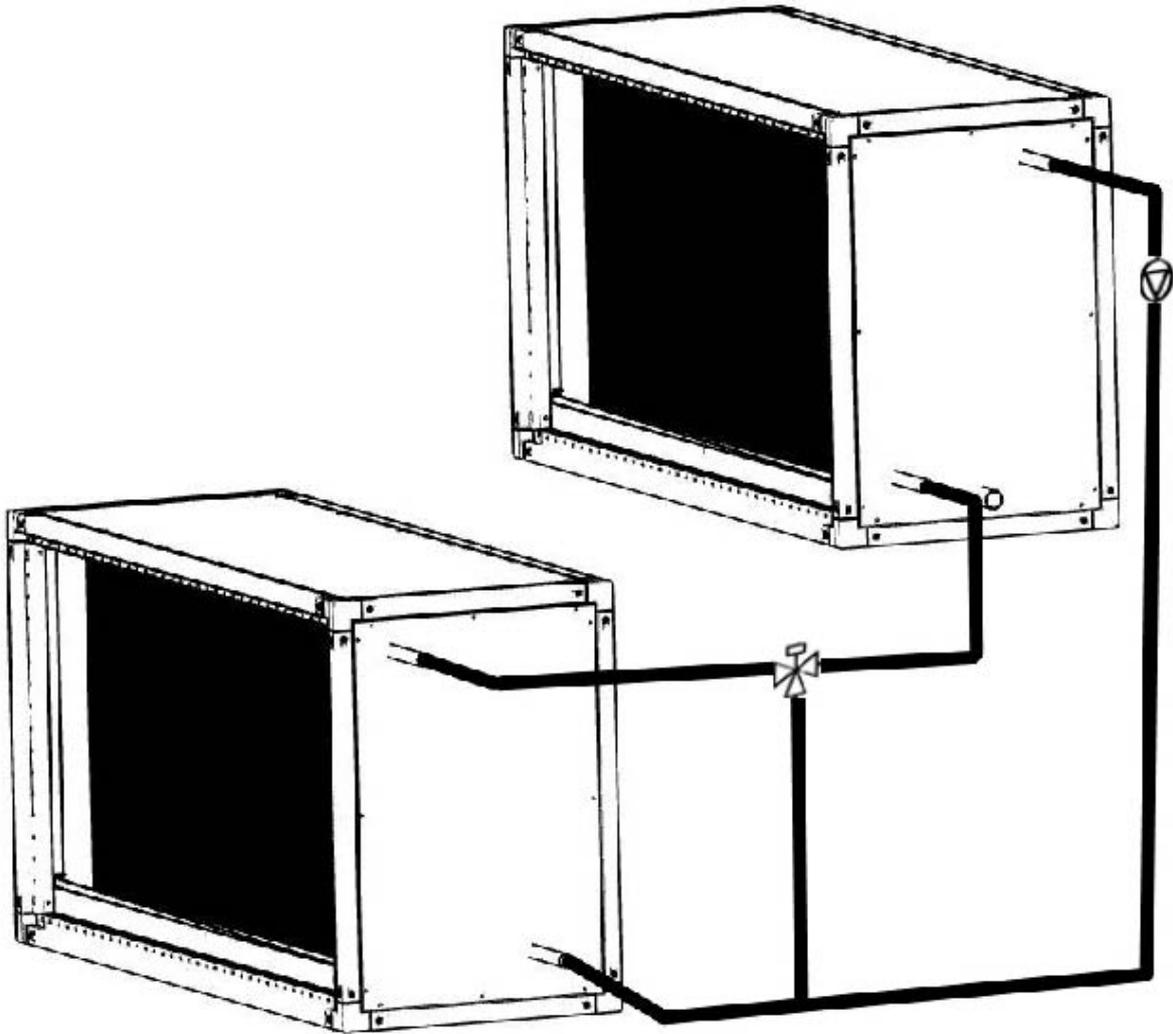
**Note:**

Information about disassembly, cleaning and reassembly is available in a 2-minutes video on YouTube.

<https://youtu.be/5qMswv2c0SQ>



### S.6.5 Run-around heat exchanger



A heat recovery system of this type consists of one or more heating coils in the supply airflow and one or more cooling coils in the extract airflow. After an extended running period (normally a few years) dust particles can accumulate on the surface of the coils. This can reduce the efficiency of the coils. Cleaning must be carried out with the utmost care to ensure that the coil fins are not damaged.

The piping system must be vented once a year as air in the system can significantly reduce the capacity of the coils.

#### S.6.5.1 Pump and pressure expansion

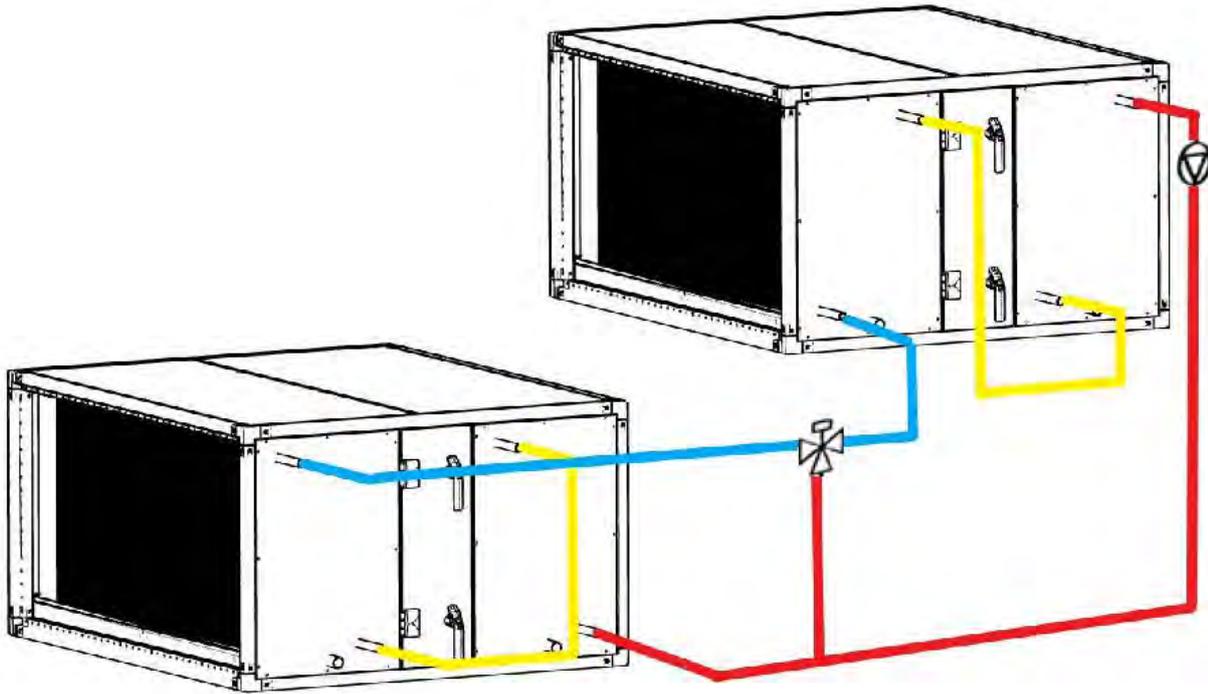
The service instructions issued by the pump manufacturer must be followed. The pressure expansion system must be checked once a year. If necessary, the pressure must be increased to the correct level.

#### S.6.5.2 Condensate water drain

Once a year clean the drip tray beneath the heat exchanger, as well as the drain and the water trap. Take care that there is sufficient water in the water trap. See the explanation above.

If a droplet eliminator has been fitted, this must be checked once a year and cleaned if necessary.

## S.6.6 Split run-around heat exchanger



A heat recovery system of this type consists of a heating coil in the supply airflow and a cooling coil in the extract airflow. After an extended running period (normally a few years) dust particles can accumulate on the surface of the coils. This can reduce the efficiency of the coils. Cleaning must be carried out with the utmost care to ensure that the coil fins are not damaged.

The piping system must be vented once a year as air in the system can significantly reduce the capacity of the coils.

### S.6.6.1 Pump and pressure expansion

The service instructions issued by the pump manufacturer must be followed. The pressure expansion system must be checked once a year. If necessary, the pressure must be increased to the correct level.

### S.6.6.2 Condensate water drain

Once a year clean the drip tray beneath the heat exchanger, as well as the drain and the water trap. Take care that there is sufficient water in the water trap. See the explanation above.

If a droplet eliminator has been fitted, this must be checked once a year and cleaned if necessary.

## S.6.7 Coils for heating and/or cooling

After an extended running period (normally a few years) dust particles can accumulate on the surface of the coil. This can reduce the efficiency of the coil. Cleaning must be carried out with the utmost care to ensure that the coil fins are not damaged. The piping system must be vented once a year as air in the system can significantly reduce the capacity of the coil.

### S.6.7.1 Heating coil



Check that the frost protection system is fully operational. A coil may burst due to frost if the frost protection system is not operational.

### S.6.7.2 Cooling coil



Once a year clean the drip tray beneath the cooling coil, as well as the drain and the water trap. Take care that there is sufficient water in the water trap. If a droplet eliminator has been fitted to the cooling coil, this must be checked once a year and cleaned if necessary.



Droplet eliminator must be checked once a year and cleaned if necessary.

### S.6.7.3 Electric heating coil

Check that the built-in safety thermostat with an automatic reset function and the overheat thermostat with manual re-setting are fully operational.



#### Caution

Turn off the electric heating coil and let the fan run for at least 4 minutes before accessing the electric heating coil.

### S.6.8 Plug fans



Dust can accumulate on the fan impeller which can cause imbalance and vibrations. The fan impeller must therefore be checked once a year and cleaned, if necessary. Anti-vibration mounts and flexible connections should be checked at the same time. If the anti-vibration mounts are damaged in any way they must be replaced.

#### S.6.8.1 Motor

The motors are usually fitted with factory lubricated bearings which require no further lubrication. Larger motors can be fitted with greasing nipples and bearings which require regular lubrication. Lubricating these types of bearings must be carried out according to the manufacturer's instructions.

#### S.6.9 Silencer

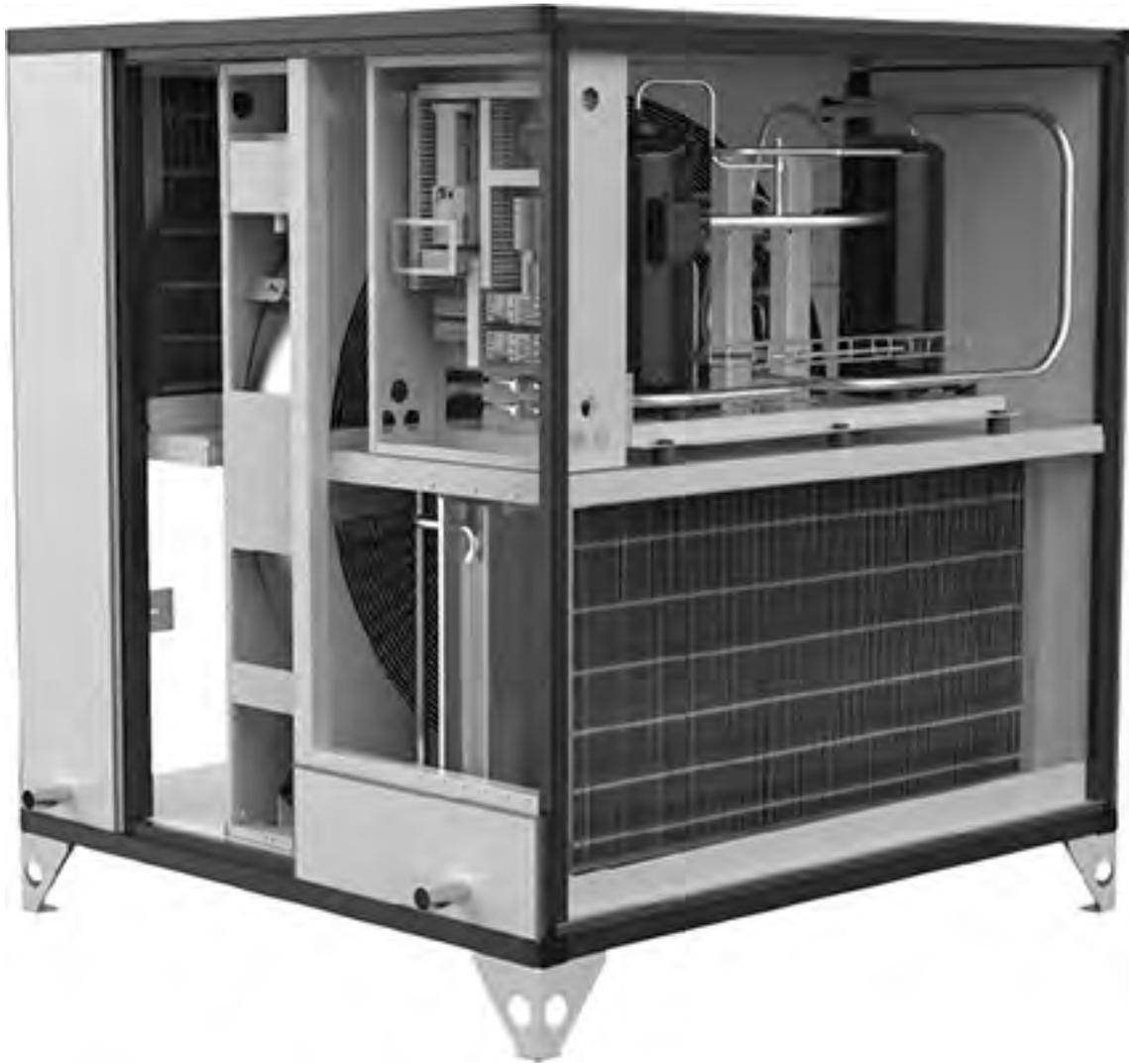
During operation dust particles can accumulate on the surface of the baffles. Silencers that are designed for dry and wet cleaning are fitted with baffles that can be extracted from the unit casing. Large inspection doors give access to easily extraction of the baffles. Baffles designed for dry cleaning can be vacuum cleaned. Baffles designed for wet cleaning can be washed down using a soft brush and soapy water. The detergent used must be non-aggressive. After washing, the baffles must be wiped dry with a cloth. Remember to clean the inside surface of the unit casing before re-fitting the baffles.

#### S.6.10 Outdoor air section

Dust and dirt can accumulate in this section. Large inspection doors give access for cleaning.

#### S.6.11 Heat pump unit

Mandatory annual control must be done by certified technicians from a certified company. See further description in Annex 10 and 11.



## **T Instructions to enable adjustment and maintenance safely**

### **T.1 Protective measures and additional protective measures**

Adjustment and maintenance must be done by skilled technicians – usually based on service contracts for some years or long-term ESCO contracts.

The units are provided with guards to avoid unintended hazards and injury because of rotating parts in the unit. The potential sources of harm are the fans with fast rotating impellers. Hazards from the impellers are obvious during operation, but when power is cut-off, the impellers are still potential hazards due to after-run for at least 20 seconds.

The fan guard's are the inspection doors and the doors are provided with locks. Inside the doors are additional protection installed – guards that only can be removed by use of tools.

Other motor-driven parts are dampers with damper motors and rotary heat exchangers, but the movement is so slow that guard measures are not necessary. Just keep your hands away from places with risk of injury.

Use particulate respirator when filters are replaced.

#### **T.1.1 Necessary protection measures prior to start-up**

Ensure that all protection measures are installed correct before start-up.

##### **T.1.1.1 Design of protection measures**

Inside the doors are additional protection installed – guards that only can be removed by use of tools.

### T.1.1.2 Configuration of frequency converters with installed guard

A frequency converter is mounted beside the fan in some units. If the configuration of frequency is carried out with the fan in operation, the guard must be installed for safety reasons and a long cable must be installed between the frequency converter inside the unit and the control panel outside the unit.

### T.1.2 Safe adjustment and maintenance

Before maintenance and repair, the unit must be switched off by switching off the disconnecting device. **Note that lamps must be switched on during maintenance** (lamps are an accessory – only installed, if ordered).

Use cut-resistant gloves for protection against injury from sharp metal plate edges. Use CE-marked gloves for this purpose. Use helmet during maintenance work in the unit.

### T.1.3 Personal protective equipment for maintenance staff – health and safety

Use the below-mentioned personal protective equipment for maintenance:

	Cut-resistant gloves for protection against injury from sharp metal plate edges. Use CE-marked gloves for this purpose.
	Helmet.
	Particulate respirator – maintenance free including foam face-seal and adjustable pre-threaded headbands – for replacing filters.
	Eye protection.
	Ear protection.
	Padlock for locking the above mentioned automatic circuit breakers.

## U The specifications of the spare parts to be used, when these affect the health and safety of operators

Geniox air handling units are operating automatically. Operators can control the unit by the Systemair control panel

### U.1 Spare parts - Mechanical

Annex 2 - available on demand

### U.2 Spare parts - Electrical

Annex 2 - available on demand

## V Information on airborne noise emissions exceeding 70 dB(A)

Due to the design and construction of the units the (A) weighed sound pressure level from fans and other components do not exceed 70 dB (A) outside the units.



# Annex Geniox Air handling unit

Installation, Operation and Maintenance instruction

GB

Document in original language | Version 14

Part number of this manual 90925520  
Order number Geniox



Only the English version is valid in case of a dispute. Translated versions are not valid in case of disputes.

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1-1 | Technical data – unique data for every unit (in separate cover)

## **Annex 1 Technical data – unique data for every unit (in separate cover)**

Printed on separate pages and delivered with every unit. Enclosed in separate cover.

## **Annex 2 Spare part list (in separate cover)**

Printed on separate pages but **not** delivered with every unit. Available on demand.

### Annex 3 Assembly of base frame – height 118 mm for unit sizes 10 – 18

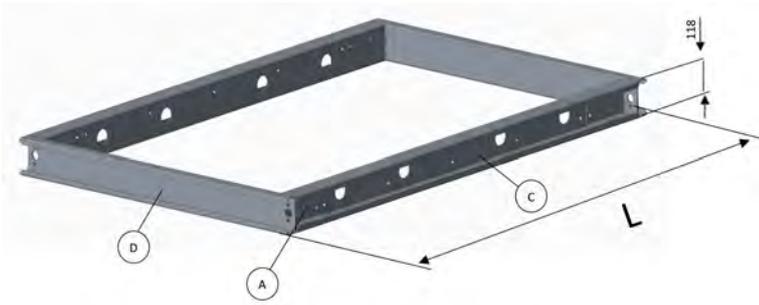


**Note:**

Information about assembly is available in a 2-minutes video on YouTube.  
<https://youtu.be/B3nX-x7KnrQ>

<p><b>A = Corner</b></p> 	<p><b>B = Splice</b></p> 
<p><b>C = Length profile</b></p> 	
<p><b>D = End profile (width of base frame)</b></p> 	
<p><b>D1 = Middle profile</b></p> 	

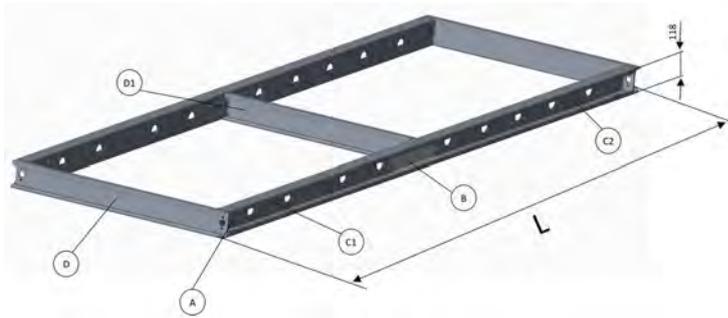
### 3.1 Base frame length 482 – 2564 [mm] Unit size 10 – 18



End profile type D (width of base frame)		
Unit size	Quantity	Length of endprofile (width of base frame) [mm]
Geniox10	2	1070
Geniox11	2	1170
Geniox12	2	1270
Geniox14	2	1470
Geniox16	2	1670
Geniox18	2	1870

Adjustable length of frame – L [mm]	Length profile type C		Corner A
	Quantity	Length of profile [mm]	Quantity
482 – 564	2	400	4
582 – 664	2	500	4
682 – 764	2	600	4
782 – 864	2	700	4
882 – 964	2	800	4
982 – 1064	2	900	4
1082 – 1164	2	1000	4
1182 – 1264	2	1100	4
1282 – 1364	2	1200	4
1382 – 1464	2	1300	4
1482 – 1564	2	1400	4
1582 – 1664	2	1500	4
1682 – 1764	2	1600	4
1782 – 1864	2	1700	4
1882 – 1964	2	1800	4
1982 – 2064	2	1900	4
2082 – 2164	2	2000	4
2182 – 2264	2	2100	4
2282 – 2364	2	2200	4
2382 – 2464	2	2300	4
2482 – 2564	2	2400	4

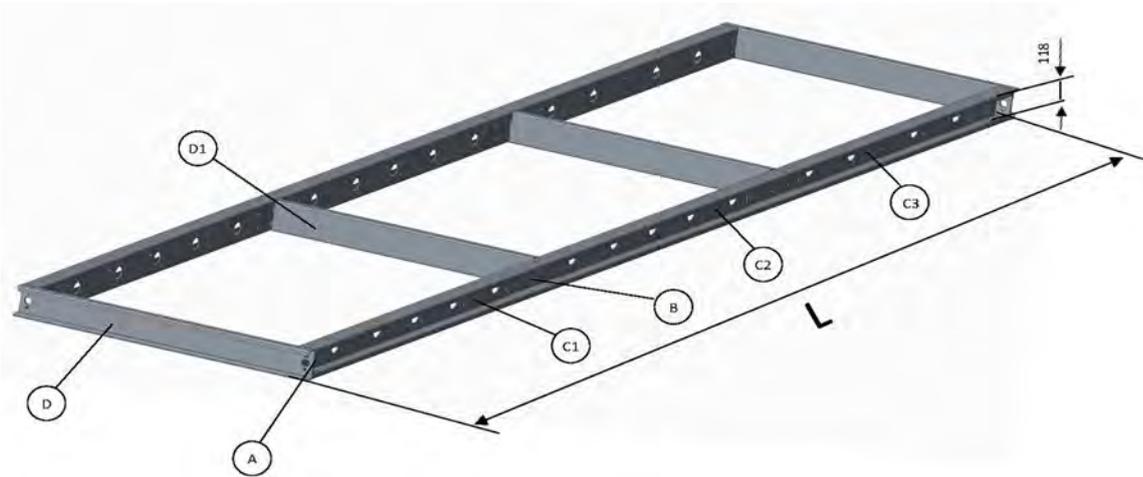
### 3.2 Base frame length 2582 – 4964 [mm] Unit size 10 – 18



End profile type D (width of base frame)			Middle profile type D1	
Unit size	Quantity	width of base frame [mm]	Quantity	Length [mm]
Geniox10	2	1070	1	950
Geniox11	2	1170	1	1050
Geniox12	2	1270	1	1150
Geniox14	2	1470	1	1350
Geniox16	2	1670	1	1550
Geniox18	2	1870	1	1750

Adjustable length of frame – L [mm]	Length profile C1		Length profile C2		Corner A	Splice B
	Quantity	Length [mm]	Quantity	Length [mm]	Quantity	Quantity
2582-2664	2	1200	2	1300	4	2
2682-2764	2	1300	2	1300	4	2
2782-2864	2	1300	2	1400	4	2
2882-2964	2	1400	2	1400	4	2
2982-3064	2	1400	2	1500	4	2
3082-3164	2	1500	2	1500	4	2
3182-3264	2	1500	2	1600	4	2
3282-3364	2	1600	2	1600	4	2
3382-3464	2	1600	2	1700	4	2
3482-3564	2	1700	2	1700	4	2
3582-3664	2	1700	2	1800	4	2
3682-3764	2	1800	2	1800	4	2
3782-3864	2	1800	2	1900	4	2
3882-3964	2	1900	2	1900	4	2
3982-4064	2	1900	2	2000	4	2
4082-4164	2	2000	2	2000	4	2
4182-4264	2	2000	2	2100	4	2
4282-4364	2	2100	2	2100	4	2
4382-4464	2	2100	2	2200	4	2
4482-4564	2	2200	2	2200	4	2
4582-4664	2	2200	2	2300	4	2
4682-4764	2	2300	2	2300	4	2
4782-4864	2	2300	2	2400	4	2
4882-4964	2	2100	2	2100	4	2

### 3.3 Base frame length 4982 – 6164 [mm] Unit size 10 – 18



End profile type D (width of base frame)			Middle profile type D1	
Unit size	Quantity	width of base frame [mm]	Quantity	Length [mm]
Geniox10	2	1070	2	950
Geniox11	2	1170	2	1050
Geniox12	2	1270	2	1150
Geniox14	2	1470	2	1350
Geniox16	2	1670	2	1550
Geniox18	2	1870	2	1750

Adjustable length of frame – L [mm]	Length profile C1		Length profile C2		Length profile C3		A	B
	Quantity	Length [mm]	Quantity	Length [mm]	Quantity	Length [mm]	Qty	Qty
4982-5064	2	1600	2	1600	2	1700	4	4
5082-5164	2	1600	2	1700	2	1700	4	4
5182-5264	2	1700	2	1700	2	1700	4	4
5282-5364	2	1700	2	1700	2	1800	4	4
5382-5464	2	1700	2	1800	2	1800	4	4
5482-5564	2	1800	2	1800	2	1800	4	4
5582-5664	2	1800	2	1800	2	1900	4	4
5682-5764	2	1800	2	1900	2	1900	4	4
5782-5864	2	1900	2	1900	2	1900	4	4
5882-5964	2	1900	2	1900	2	2000	4	4
5982-6064	2	1900	2	2000	2	2000	4	4
6082-6164	2	2000	2	2000	2	2000	4	4

## Annex 4 Assembly of base frame – height 118 mm for unit sizes 20 – 31

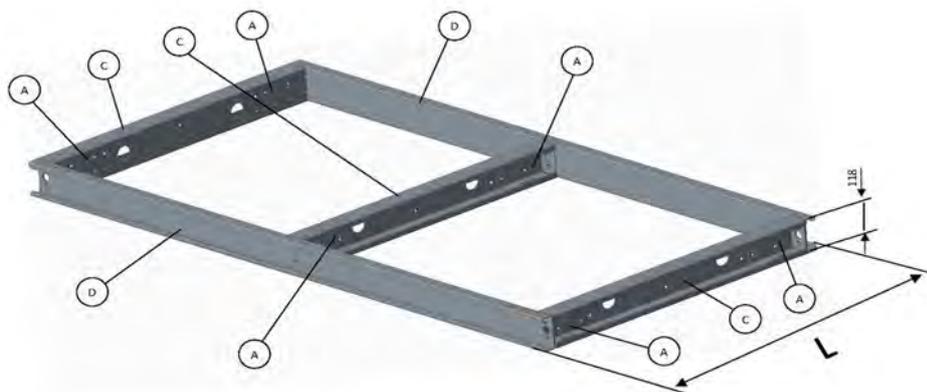


### Note:

Information about assembly is available in a 2-minutes video on YouTube.  
<https://youtu.be/N-oaYpwsAlo>

<b>A = Corner</b> 	<b>B = Splice</b> 	<b>C = Spacer</b> 
<b>C = Length profile</b> 		
<b>D = End profile (width of base frame)</b> 		
<b>D1 = Middle profile</b> 		

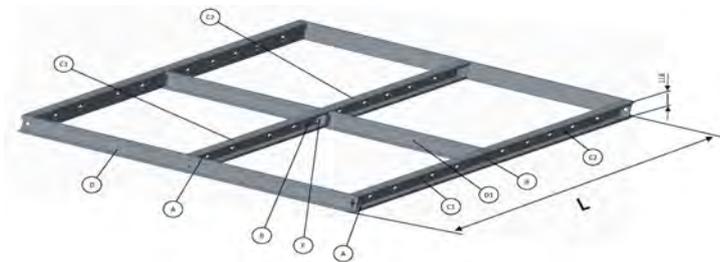
### 4.1 Base frame length 482- 2564 [mm] Unit size 20 – 31



End profile type D (width of base frame)		
Unit size	Quantity	Length [mm]
Geniox20	2	2070
Geniox22	2	2270
Geniox24	2	2470
Geniox27	2	2770
Geniox29	2	2970
Geniox31	4	1585

Adjustable length of frame – L [mm]	Length profile type C		Corner A
	Quantity	Length of profile [mm]	Quantity
482-564	3	400	6
582-664	3	500	6
682-764	3	600	6
782-864	3	700	6
882-964	3	800	6
982-1064	3	900	6
1082-1164	3	1000	6
1182-1264	3	1100	6
1282-1364	3	1200	6
1382-1464	3	1300	6
1482-1564	3	1400	6
1582-1664	3	1500	6
1682-1764	3	1600	6
1782-1864	3	1700	6
1882-1964	3	1800	6
1982-2064	3	1900	6
2082-2164	3	2000	6
2182-2264	3	2100	6
2282-2364	3	2200	6
2382-2464	3	2300	6
2482-2564	3	2400	6

#### 4.2 Base frame length 2582 – 4964 [mm] Unit size 20 – 31

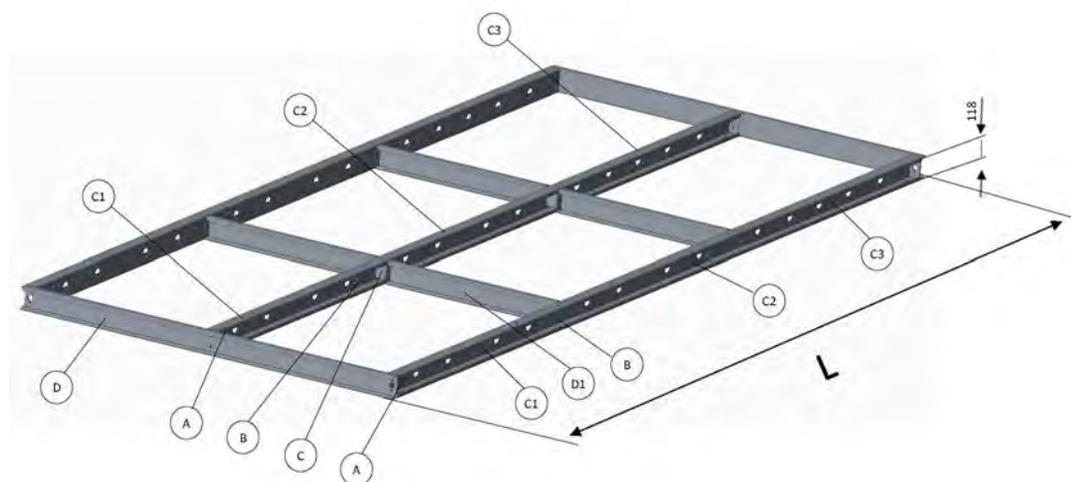


End profile type D (width of base frame)			Middle profile type D1		Spacer F
Unit size	Quantity	Length [mm]	Quantity	Length [mm]	Quantity
Geniox20	2	2070	2	941	1
Geniox22	2	2270	2	1041	1
Geniox24	2	2470	2	1141	1
Geniox27	2	2770	2	1291	1

End profile type D (width of base frame)			Middle profile type D1		Spacer F
Unit size	Quantity	Length [mm]	Quantity	Length [mm]	Quantity
Geniox29	2	2970	2	1391	1
Geniox31	4	1585	2	1491	1

Adjustable length of frame – L [mm]	Length profile type C1		Length profile type C2		Corner A	Splice B
	Quantity	Length [mm]	Quantity	Length [mm]	Quantity	Quantity
2582-2664	3	1200	3	1300	6	3
2682-2764	3	1300	3	1300	6	3
2782-2864	3	1300	3	1400	6	3
2882-2964	3	1400	3	1400	6	3
2982-3064	3	1400	3	1500	6	3
3082-3164	3	1500	3	1500	6	3
3182-3264	3	1500	3	1600	6	3
3282-3364	3	1600	3	1600	6	3
3382-3464	3	1600	3	1700	6	3
3482-3564	3	1700	3	1700	6	3
3582-3664	3	1700	3	1800	6	3
3682-3764	3	1800	3	1800	6	3
3782-3864	3	1800	3	1900	6	3
3882-3964	3	1900	3	1900	6	3
3982-4064	3	1900	3	2000	6	3
4082-4164	3	2000	3	2000	6	3
4182-4264	3	2000	3	2100	6	3
4282-4364	3	2100	3	2100	6	3
4382-4464	3	2100	3	2200	6	3
4482-4564	3	2200	3	2200	6	3
4582-4664	3	2200	3	2300	6	3
4682-4764	3	2300	3	2300	6	3
4782-4864	3	2300	3	2400	6	3
4882-4964	3	2400	3	2400	6	3

### 4.3 Base frame length 4982 – 6164 [mm] Unit size 20 – 31



End profile type D (width of base frame)			Middle profile type D1		Spacer F
Unit size	Quantity	Length [mm]	Quantity	Length [mm]	Quantity
Geniox20	2	2070	4	941	2
Geniox22	2	2270	4	1041	2
Geniox24	2	2470	4	1141	2
Geniox27	2	2770	4	1291	2
Geniox29	2	2970	4	1391	2
Geniox31	4	1585	4	1491	2

Adjustable length of frame – L [mm]	Length profile type C1		Length profile type C2		Length profile type C3		A	B
	Qty	Length [mm]	Qty	Length [mm]	Qty	Length [mm]	Qty	Qty
4982-5064	3	1600	3	1600	3	1700	6	6
5082-5164	3	1600	3	1700	3	1700	6	6
5182-5264	3	1700	3	1700	3	1700	6	6
5282-5364	3	1700	3	1700	3	1800	6	6
5382-5464	3	1700	3	1800	3	1800	6	6
5482-5564	3	1800	3	1800	3	1800	6	6
5582-5664	3	1800	3	1800	3	1900	6	6
5682-5764	3	1800	3	1900	3	1900	6	6
5782-5864	3	1900	3	1900	3	1900	6	6
5882-5964	3	1900	3	1900	3	2000	6	6
5982-6064	3	1900	3	2000	3	2000	6	6
6082-6164	3	2000	3	2000	3	2000	6	6

## Annex 5 Assembly of base frame – height 218 mm for unit sizes 10 – 18

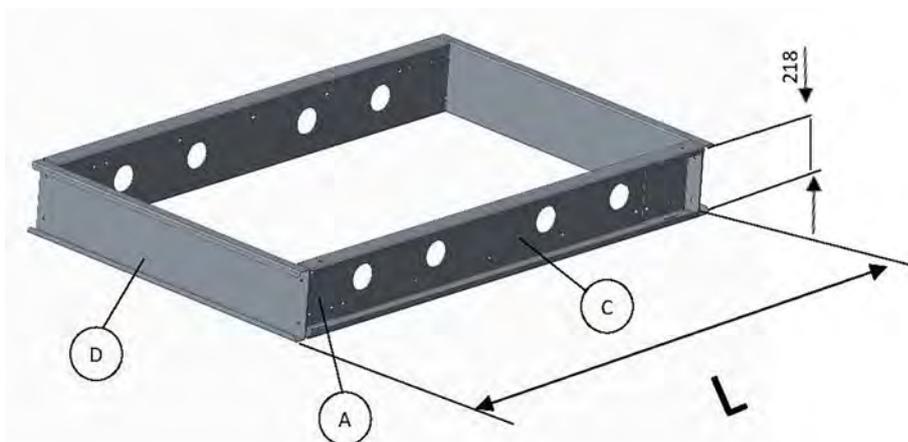


### Note:

Information about assembly is available in a 2-minutes video on YouTube.  
<https://youtu.be/B3nX-x7KnrQ>

<p><b>A = Corner</b></p> 	<p><b>B = Splice</b></p> 
<p><b>C = Length profile</b></p> 	
<p><b>D = End profile (width of base frame)</b></p> 	
<p><b>D1 = Middle profile</b></p> 	

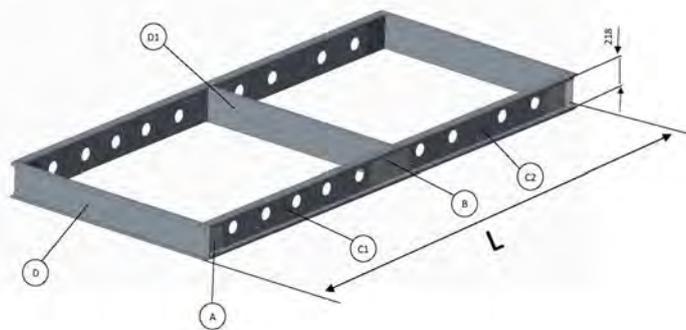
### 5.1 Base frame length 482– 2564 [mm] Unit size 10 – 18



End profile type D (width of base frame)		
Unit size	Quantity	Length of endprofile (width of base frame) [mm]
Geniox10	2	1070
Geniox11	2	1170
Geniox12	2	1270
Geniox14	2	1470
Geniox16	2	1670
Geniox18	2	1870

Adjustable length of frame – L [mm]	Length profile type C		Corner A
	Quantity	Length of profile [mm]	Quantity
482 – 564	2	400	4
582 – 664	2	500	4
682 – 764	2	600	4
782 – 864	2	700	4
882 – 964	2	800	4
982 – 1064	2	900	4
1082 – 1164	2	1000	4
1182 – 1264	2	1100	4
1282 – 1364	2	1200	4
1382 – 1464	2	1300	4
1482 – 1564	2	1400	4
1582 – 1664	2	1500	4
1682 – 1764	2	1600	4
1782 – 1864	2	1700	4
1882 – 1964	2	1800	4
1982 – 2064	2	1900	4
2082 – 2164	2	2000	4
2182 – 2264	2	2100	4
2282 – 2364	2	2200	4
2382 – 2464	2	2300	4
2482 – 2564	2	2400	4

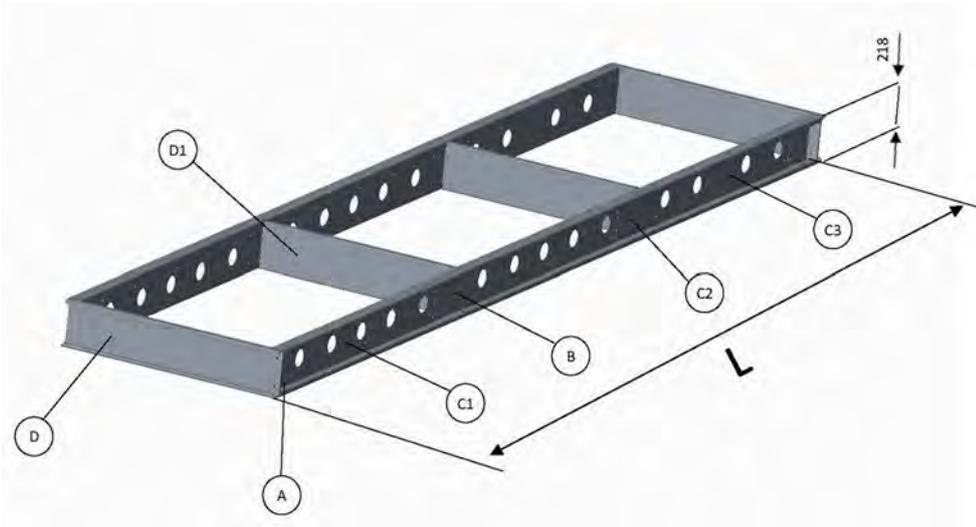
**5.2 Base frame length 2582 – 4964 [mm] Unit size 10 – 18**



End profile type D (width of base frame)			Middle profile type D1	
Unit size	Quantity	width of base frame [mm]	Quantity	Length [mm]
Geniox10	2	1070	1	950
Geniox11	2	1170	1	1050
Geniox12	2	1270	1	1150
Geniox14	2	1470	1	1350
Geniox16	2	1670	1	1550
Geniox18	2	1870	1	1750

Adjustable length of frame – L [mm]	Length profile C1		Length profile C2		Corner A	Splice B
	Quantity	Length [mm]	Quantity	Length [mm]	Quantity	Quantity
2582-2664	2	1200	2	1300	4	2
2682-2764	2	1300	2	1300	4	2
2782-2864	2	1300	2	1400	4	2
2882-2964	2	1400	2	1400	4	2
2982-3064	2	1400	2	1500	4	2
3082-3164	2	1500	2	1500	4	2
3182-3264	2	1500	2	1600	4	2
3282-3364	2	1600	2	1600	4	2
3382-3464	2	1600	2	1700	4	2
3482-3564	2	1700	2	1700	4	2
3582-3664	2	1700	2	1800	4	2
3682-3764	2	1800	2	1800	4	2
3782-3864	2	1800	2	1900	4	2
3882-3964	2	1900	2	1900	4	2
3982-4064	2	1900	2	2000	4	2
4082-4164	2	2000	2	2000	4	2
4182-4264	2	2000	2	2100	4	2
4282-4364	2	2100	2	2100	4	2
4382-4464	2	2100	2	2200	4	2
4482-4564	2	2200	2	2200	4	2
4582-4664	2	2200	2	2300	4	2
4682-4764	2	2300	2	2300	4	2
4782-4864	2	2300	2	2400	4	2
4882-4964	2	2400	2	2400	4	2

### 5.3 Base frame length 4982 – 6164 [mm] Unit size 10 – 18



End profile type D (width of base frame)			Middle profile type D1	
Unit size	Quantity	width of base frame [mm]	Quantity	Length [mm]
Geniox10	2	1070	2	950
Geniox11	2	1170	2	1050
Geniox12	2	1270	2	1150
Geniox14	2	1470	2	1350
Geniox16	2	1670	2	1550
Geniox18	2	1870	2	1750

Adjustable length of frame – L [mm]	Length profile C1		Length profile C2		Length profile C3		A	B
	Quantity	Length [mm]	Quantity	Length [mm]	Quantity	Length [mm]	Qty	Qty
4982-5064	2	1600	2	1600	2	1700	4	4
5082-5164	2	1600	2	1700	2	1700	4	4
5182-5264	2	1700	2	1700	2	1700	4	4
5282-5364	2	1700	2	1700	2	1800	4	4
5382-5464	2	1700	2	1800	2	1800	4	4
5482-5564	2	1800	2	1800	2	1800	4	4
5582-5664	2	1800	2	1800	2	1900	4	4
5682-5764	2	1800	2	1900	2	1900	4	4
5782-5864	2	1900	2	1900	2	1900	4	4
5882-5964	2	1900	2	1900	2	2000	4	4
5982-6064	2	1900	2	2000	2	2000	4	4
6082-6164	2	2000	2	2000	2	2000	4	4

## Annex 6 Assembly of base frame – height 218 mm for unit sizes 20 – 31

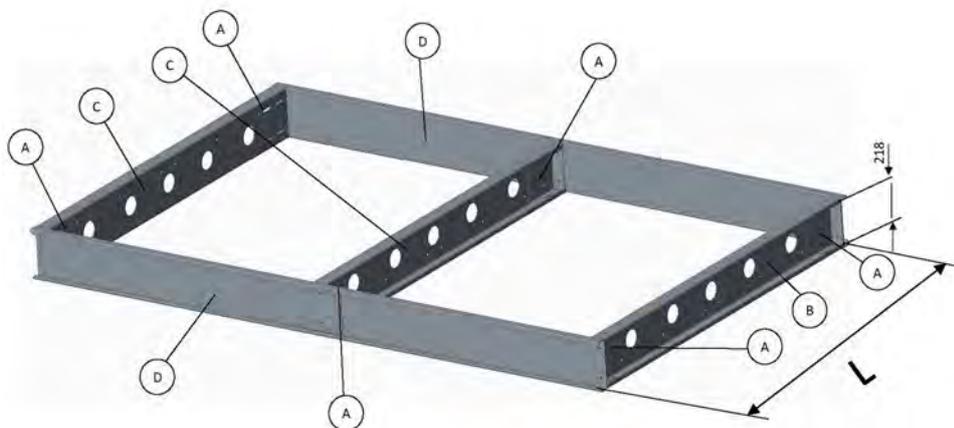


**Note:**

Information about assembly is available in a 2-minutes video on YouTube.  
<https://youtu.be/N-oaYpwsAlo>

<p><b>A = Corner</b></p> 	<p><b>B = Splice</b></p> 	<p><b>F = Spacer</b></p> 
<p><b>C = Length profile</b></p> 		
<p><b>D = End profile (width of base frame)</b></p> 		
<p><b>D1 = Middle profile</b></p> 		

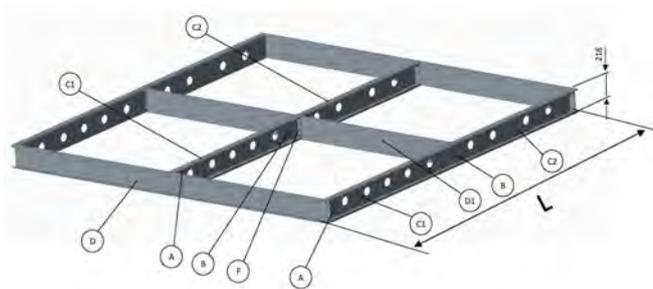
### 6.1 Base frame length 482– 2564 [mm] Unit size 20-31



End profile type D (width of base frame)		
Unit size	Quantity	Length [mm]
Geniox20	2	2070
Geniox22	2	2270
Geniox24	2	2470
Geniox27	2	2770
Geniox29	2	2970
Geniox31	4	1585

Adjustable length of frame – L [mm]	Length profile type C		Corner A
	Quantity	Length of profile [mm]	Quantity
482-564	3	400	6
582-664	3	500	6
682-764	3	600	6
782-864	3	700	6
882-964	3	800	6
982-1064	3	900	6
1082-1164	3	1000	6
1182-1264	3	1100	6
1282-1364	3	1200	6
1382-1464	3	1300	6
1482-1564	3	1400	6
1582-1664	3	1500	6
1682-1764	3	1600	6
1782-1864	3	1700	6
1882-1964	3	1800	6
1982-2064	3	1900	6
2082-2164	3	2000	6
2182-2264	3	2100	6
2282-2364	3	2200	6
2382-2464	3	2300	6
2482-2564	3	2400	6

**6.2 Base frame length 2582 – 4964 [mm] Unit size 20 – 31**

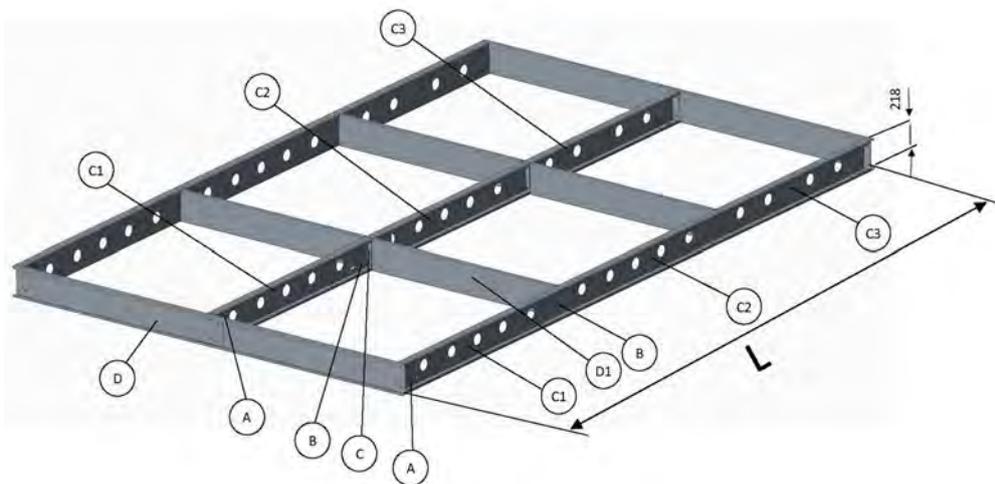


End profile type D (width of base frame)			Middle profile type D1		Spacer F
Unit size	Quantity	Length [mm]	Quantity	Length [mm]	Quantity
Geniox20	2	2070	2	941	1
Geniox22	2	2270	2	1041	1
Geniox24	2	2470	2	1141	1
Geniox27	2	2770	2	1291	1

End profile type D (width of base frame)			Middle profile type D1		Spacer F
Unit size	Quantity	Length [mm]	Quantity	Length [mm]	Quantity
Geniox29	2	2970	2	1391	1
Geniox31	4	1585	2	1491	1

Adjustable length of frame – L [mm]	Length profile type C1		Length profile type C2		Corner A	Splice B
	Quantity	Length [mm]	Quantity	Length [mm]	Quantity	Quantity
2582-2664	3	1200	3	1300	6	3
2682-2764	3	1300	3	1300	6	3
2782-2864	3	1300	3	1400	6	3
2882-2964	3	1400	3	1400	6	3
2982-3064	3	1400	3	1500	6	3
3082-3164	3	1500	3	1500	6	3
3182-3264	3	1500	3	1600	6	3
3282-3364	3	1600	3	1600	6	3
3382-3464	3	1600	3	1700	6	3
3482-3564	3	1700	3	1700	6	3
3582-3664	3	1700	3	1800	6	3
3682-3764	3	1800	3	1800	6	3
3782-3864	3	1800	3	1900	6	3
3882-3964	3	1900	3	1900	6	3
3982-4064	3	1900	3	2000	6	3
4082-4164	3	2000	3	2000	6	3
4182-4264	3	2000	3	2100	6	3
4282-4364	3	2100	3	2100	6	3
4382-4464	3	2100	3	2200	6	3
4482-4564	3	2200	3	2200	6	3
4582-4664	3	2200	3	2300	6	3
4682-4764	3	2300	3	2300	6	3
4782-4864	3	2300	3	2400	6	3
4882-4964	3	2400	3	2400	6	3

### 6.3 Base frame length 4982 – 6164 [mm] Unit size 20 – 31

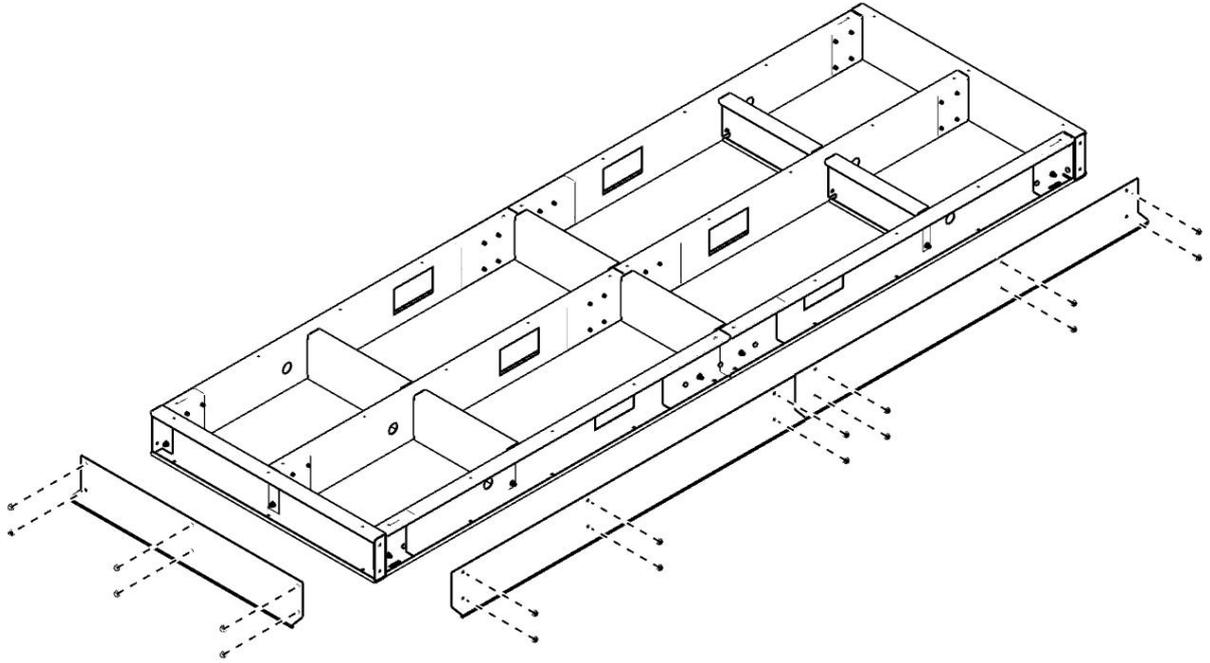


End profile type D (width of base frame)			Middle profile type D1		Spacer F
Unit size	Quantity	Length [mm]	Quantity	Length [mm]	Quantity
Geniox20	2	2070	4	941	2
Geniox22	2	2270	4	1041	2
Geniox24	2	2470	4	1141	2
Geniox27	2	2770	4	1291	2
Geniox29	2	2970	4	1391	2
Geniox31	4	1585	4	1491	2

Adjustable length of frame – L [mm]	Length profile type C1		Length profile type C2		Length profile type C3		A	B
	Qty	Length [mm]	Qty	Length [mm]	Qty	Length [mm]	Qty	Qty
4982-5064	3	1600	3	1600	3	1700	6	6
5082-5164	3	1600	3	1700	3	1700	6	6
5182-5264	3	1700	3	1700	3	1700	6	6
5282-5364	3	1700	3	1700	3	1800	6	6
5382-5464	3	1700	3	1800	3	1800	6	6
5482-5564	3	1800	3	1800	3	1800	6	6
5582-5664	3	1800	3	1800	3	1900	6	6
5682-5764	3	1800	3	1900	3	1900	6	6
5782-5864	3	1900	3	1900	3	1900	6	6
5882-5964	3	1900	3	1900	3	2000	6	6
5982-6064	3	1900	3	2000	3	2000	6	6
6082-6164	3	2000	3	2000	3	2000	6	6

## Annex 7 Installation of base frame covers for roof unit sizes 35-44

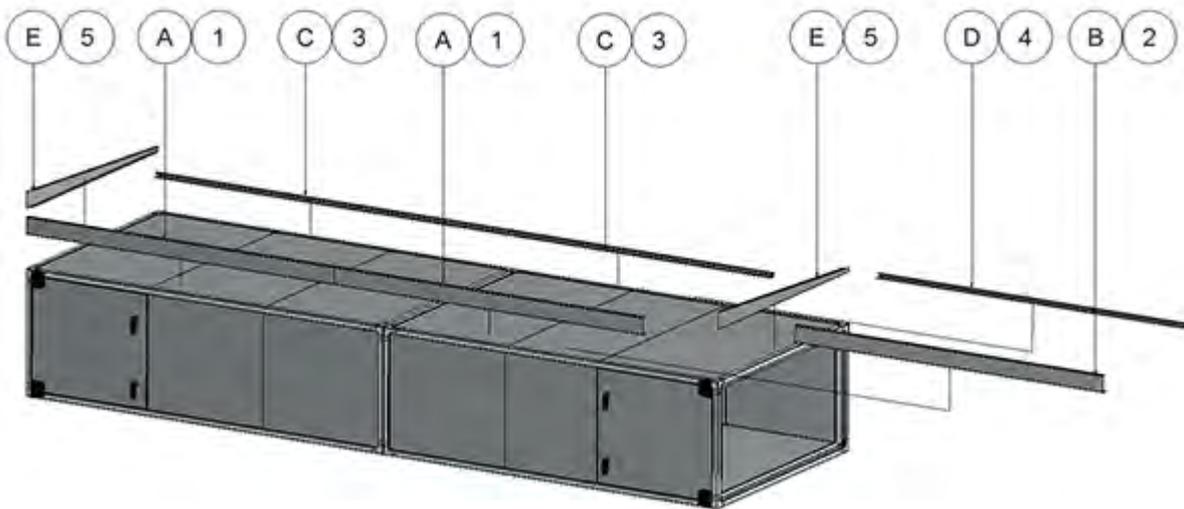
The base frame on the upper section of the unit must be fitted with the supplied base frame covers in order to prevent rain from entering the unit.



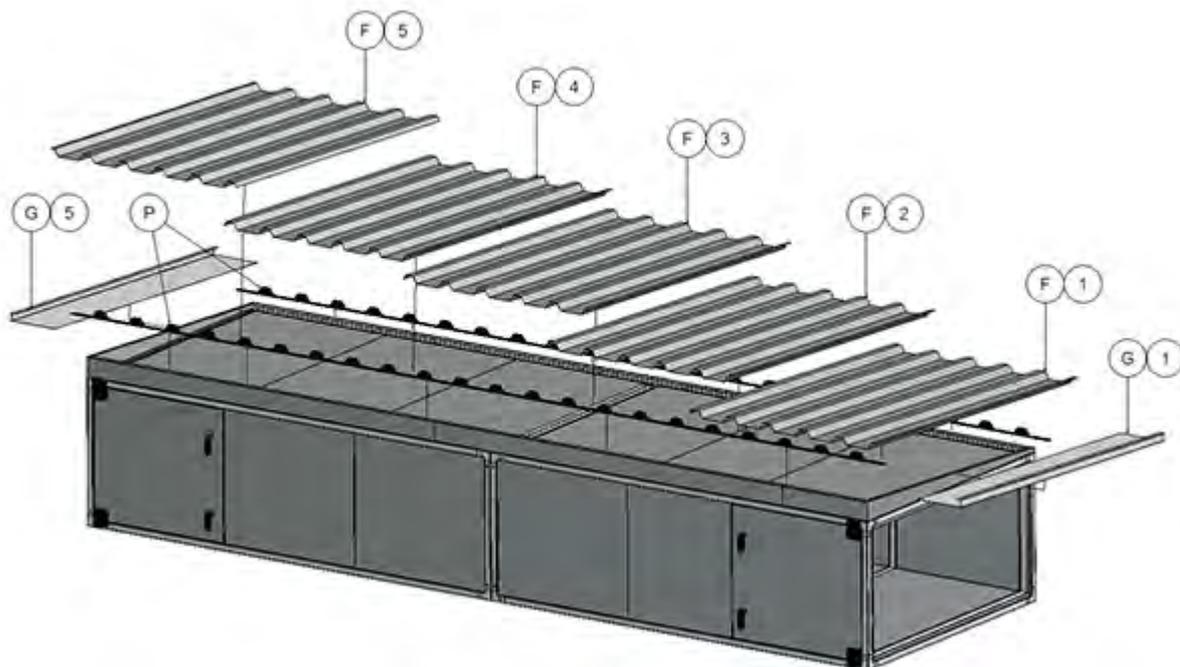
## Annex 8 Installation of steel roof in the sizes 10 – 44

### 8.1 Overview

- Mount rails A1, B2, C3, D4, E5 on the unit for support of trapezoidal roof plates (mount also rails Y and Z on units of the size 16 and on units that are larger than size 16).
- Place foam bands – P – on the horizontal rails A1, B2, C3 and D4 for support of roof plates.
- Calculate overhang of the roof at both ends of the unit and mount roof overhang profile – G1 on the first trapezoidal roof plate – F1 before the roof plate is mounted.
- Place and mount roof plates F1, F2, F3 and so on.
- Remember foam bands on the side laps between roof plates to prevent rainwater from passing through.
- Place roof overhang profile – G5 at the other end of the unit before the last roof plate is mounted.
- Mount sides and corners on the roof.
- Apply sealing where plates are joined to ensure water resistance - even in stormy weather.



### 8.2 Mount rails. Units of size 10, 11, 12, and 14



Squeeze sealant in sufficient quantity between the underside of the rails A1, B2, C3, D4, E5 and the horizontal top side of the unit before the rails are mounted. This means that the rails are standing on sealant to achieve the tightest

connection between rails and unit to prevent rainwater from passing under the rails and into the unit. Mount the rails A1 and B2 on the front side (the side with the inspection doors) – use the simple self-drilling screws without the sealing washer – see the illustration of the screw below.

**Note:**

Rail B2 fits into the rail A1, and this offers the advantage that the rail B2 can be slid inside the rail A1 to adjust the length of rail B2 accurately to the length of the unit. In this way it is not necessary to spend time and effort cutting the rail B2

Mount the lower rails C3 and D4 on the back side of the unit.

**Note:**

Rail D4 fits into the rail C3, and this offers the advantage that the rail D4 can be slid inside the rail C3 to adjust the length of rail D4 accurately to the length of the unit. In this way it is not necessary to spend time and effort on cutting the rail D4.

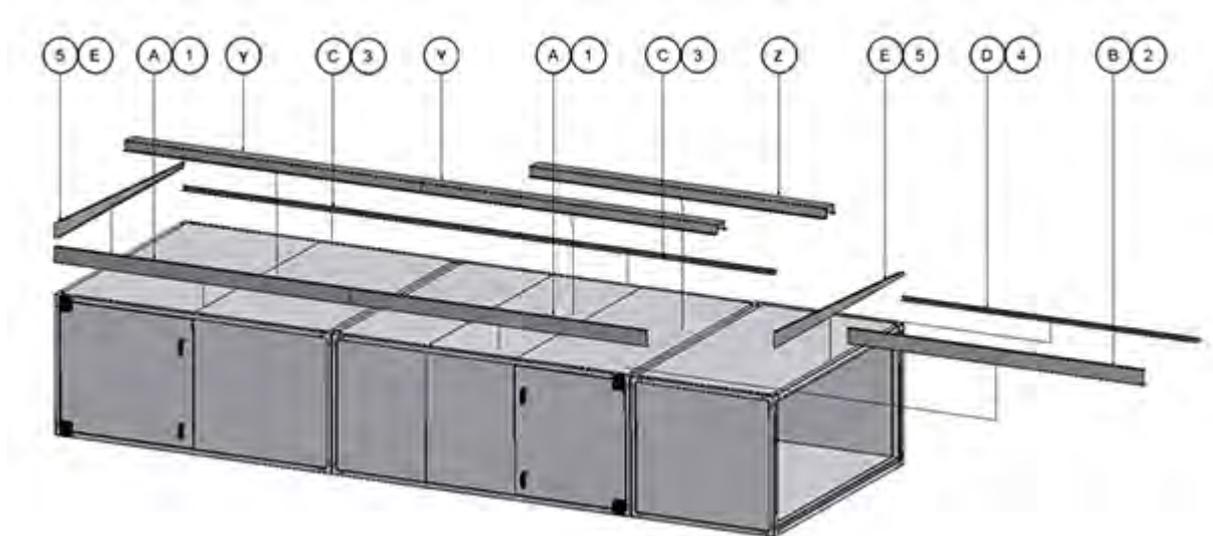
Mount vertical rail – E5 – with the roof slope at each end of the unit

**Caution**

**It is important to place a screw in each hole** – even though the number of holes for screws seems to be very large, a screw in each hole is necessary as the stress on the roof during stormy weather is extremely high.

### 8.3 Mount rails. Units of size 16, 18, 20, 22, 24, 27, 29 and 31

On units of size 16 – 31, rails A1, B2, C3, D4, E5 must be mounted on the unit for support of trapezoidal roof plates, but also rails Y and Z must be mounted longitudinally at the centre-line of the units to hold the trapezoidal roof plates.



Squeeze sealant in sufficient quantity between the underside of the rails A1, B2, C3, D4, E5 and the horizontal top side of the unit before the rails are mounted. This means that the rails are standing on sealant to achieve the tightest connection between rails and unit to prevent rainwater from passing under the rails and into the unit. Mount the rails A1 and B2 on the front side (the side with the inspection doors) – use the simple self drilling screws without the sealing washer – see the illustration of the screw below.

**Note:**

Rail B2 fits into the rail A1, and this offers the advantage that the rail B2 can be slid inside the rail A1 to adjust the length of rail B2 accurately to the length of the unit. In this way it is not necessary to spend time and effort cutting the rail B2.

Mount the lower rails C3 and D4 on the back side of the unit.

**Note:**

Rail D4 fits into the rail C3, and this offers the advantage that the rail D4 can be slid inside the rail C3 to adjust the length of rail D4 accurately to the length of the unit. In this way it is not necessary to spend time and effort cutting the rail D4.

Mount vertical rail – E5 – with the roof slope at each end of the unit.

Mount the rails Y and Z on the unit with the centre-line of the rails exactly over the centre-line of the unit. It is longitudinal on the middle of the units to hold the trapezoidal roof plates.

**Note:**

Rail Z fits over the lower rail Y, and this offers the advantage that the rail Z can be slid on the rail Y to adjust the length of rail Z accurately to the length of the unit. In this way it is not necessary to spend time and effort on cutting the rail Z.

**Caution**

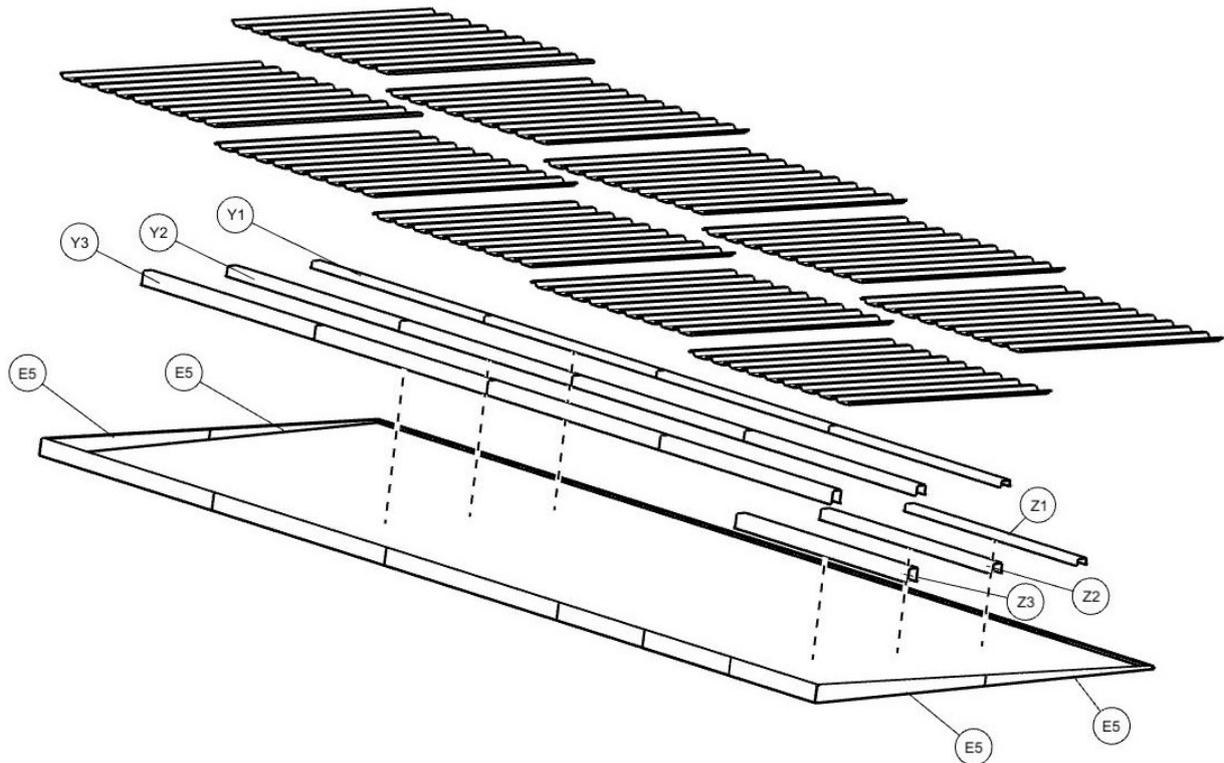
**It is important to place a screw in each hole** – even though the number of holes for screws seems to be very large, a screw in each hole is necessary as the stress on the roof during stormy weather is extremely high.

## 8.4 Mount rails. Units of size 35, 38, 41 and 44

On units of size 35-44, rails A1, B2, C3, D4, E5 must be mounted on the unit for support of trapezoidal roof plates, but also rails Y1, Y2, Y3, Z1, Z2 and Z3 must be mounted longitudinally with even spacing between them to hold the trapezoidal roof plates. Note that the Y og Z rails have different heights. Place them as shown to align with the height of E5.

**Note:**

On units of size 35-44 two rows of roof plates are needed due to the width of the unit.



Squeeze sealant in sufficient quantity between the underside of the rails A1, B2, C3, D4, E5 and the horizontal top side of the unit before the rails are mounted. This means that the rails are standing on sealant to achieve the tightest connection between rails and unit to prevent rainwater from passing under the rails and into the unit. Mount the rails A1 and B2 on the front side (the side with the inspection doors) – use the simple self drilling screws without the sealing washer – see the illustration of the screw below.



**Note:**

Rail B2 fits into the rail A1, and this offers the advantage that the rail B2 can be slid inside the rail A1 to adjust the length of rail B2 accurately to the length of the unit. In this way it is not necessary to spend time and effort cutting the rail B2.

Mount the lower rails C3 and D4 on the back side of the unit.



**Note:**

Rail D4 fits into the rail C3, and this offers the advantage that the rail D4 can be slid inside the rail C3 to adjust the length of rail D4 accurately to the length of the unit. In this way it is not necessary to spend time and effort cutting the rail D4.

Mount vertical rail – E5 - with the roof slope at each end of the unit.

Mount the rails Y and Z on the unit with the centre-line of the rails exactly over the centre-line of the unit. It is longitudinal on the middle of the units to hold the trapezoidal roof plates.



**Note:**

Rail Z fits over the lower rail Y, and this offers the advantage that the rail Z can be slid on the rail Y to adjust the length of rail Z accurately to the length of the unit. In this way it is not necessary to spend time and effort on cutting the rail Z.



### Caution

It is important to place a screw in each hole – even though the number of holes for screws seems to be very large, a screw in each hole is necessary as the stress on the roof during stormy weather is extremely high.

## 8.5 Roof overhang along the long sides of the unit

The roof plates are longer than the width of the unit to ensure sufficient overhang along the sides of the unit.

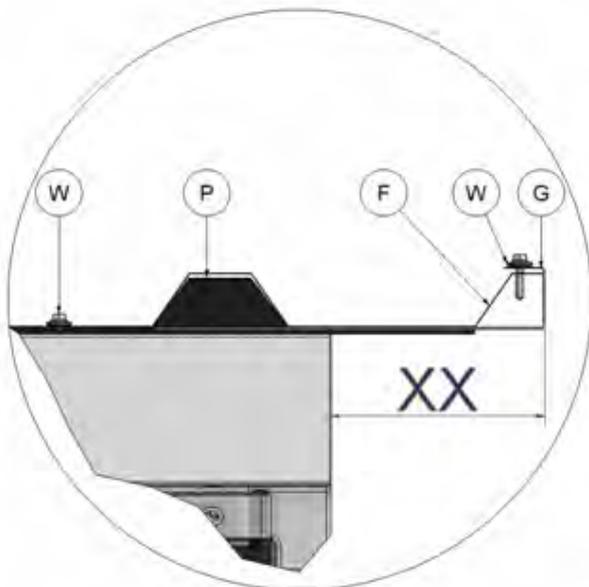
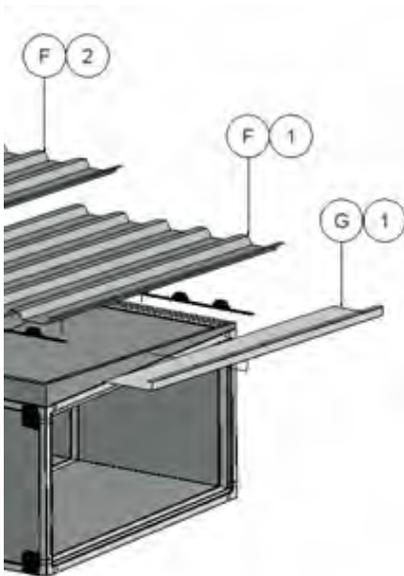
The overhang is 100 mm along each side of the smallest unit – size 10.

The overhang is 150 mm along each side of the units – size 11, 12, 14.

The overhang is 175 mm along each side of the biggest units – including size 16.

## 8.6 Calculation of the overhang at the ends of the unit. Mount overhang profile – G1.

The roof must be between 200 and 400 mm longer than the length of the unit to secure a roof overhang between 100 mm and 200 mm at the each of the 2 ends of the unit, and the length of this overhang must be calculated before the first roof plate is mounted.



The unit is delivered with 2 similar overhang profiles - G1 and G5 - one for each end of the roof. Mount one of the 2 roof overhang profiles - G on a trapezoidal roof plate. Use the self drilling, painted screws with sealing washers - W - see the illustration.



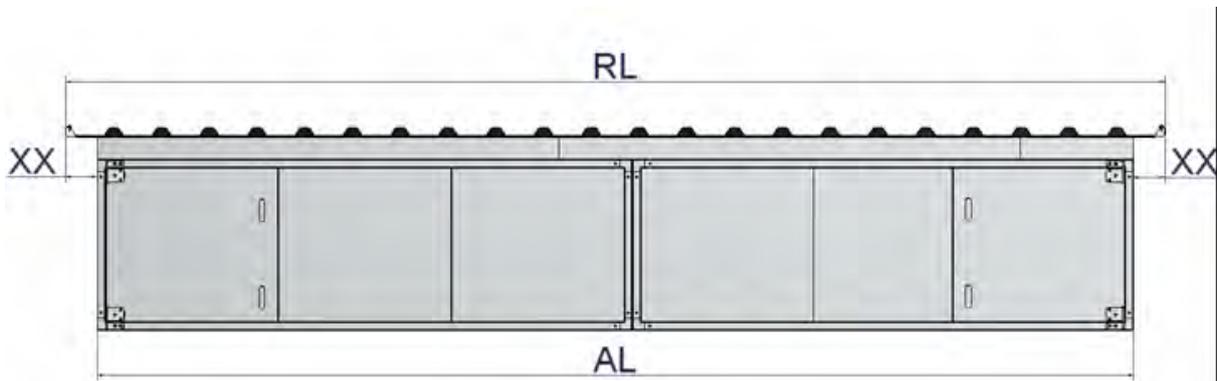
**Note:**

Foam bands - P - are necessary between the overhang profile G1 and the roof plate F1. See the illustration.



Self-drilling, painted screws supplied with sealing washer for the mounting of the trapezoidal plate to the roof overhang profile.

The total cover width of the trapezoidal roof plates always changes with the pitch of 205 mm between the trapezoidal ribs, making up a total length of the complete roof of - for example 2100 mm, 2305 mm, 2510 mm and so on. We call this length of the total roof for RL and we call the total length of the complete unit for AL. The trapezoidal roof must always be longer than the unit, to obtain a reasonable overhang called - XX - of the roof at both ends.



In the table below you will find 60 different lengths of roofs (always changing with the 205 mm) and the lengths of units that are ideal for each of the 60 alternative roof lengths.

Measure the total length - AL of the unit - for example 5000 mm between the 4925 and 5130 mm mentioned in the table below.

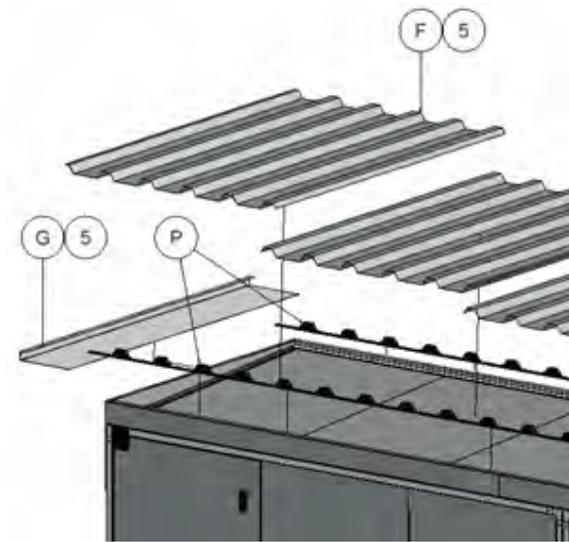
AHU length AL	Roof length RL	No. of plates	AHU length AL	Roof length RL	No. of plates	AHU length AL	Roof length RL	No. of plates
1650 - 1850	2050	2	5745 - 5950	6150	6	9845 - 10050	10250	10
1850 - 2055	2255	3	5950 - 6155	6355	7	10050 - 10255	10455	11
2055 - 2260	2460	3	6155 - 6360	6560	7	10255 - 10460	10660	11
2260 - 2465	2665	3	6360 - 6565	6765	7	10460 - 10665	10865	11
2465 - 2670	2870	3	6565 - 6770	6970	7	10665 - 10870	11070	11
2670 - 2875	3075	3	6770 - 6975	7175	7	10870 - 11075	11275	11
2875 - 3080	3280	4	6975 - 7180	7380	8	11075 - 11280	11480	12
3080 - 3285	3485	4	7180 - 7385	7585	8	11280 - 11485	11685	12
3285 - 3490	3690	4	7385 - 7590	7790	8	11485 - 11690	11890	12
3490 - 3695	3895	4	7590 - 7795	7995	8	11690 - 11895	12095	12
3695 - 3900	4100	4	7795 - 8000	8200	8	11895 - 12100	12300	12
3900 - 4105	4305	5	8000 - 8205	8405	9	12100 - 12305	12505	13
4105 - 4310	4510	5	8205 - 8410	8610	9	12305 - 12510	12710	13
4310 - 4515	4715	5	8410 - 8615	8815	9	12510 - 12715	12915	13
4515 - 4720	4920	5	8615 - 8820	9020	9	12715 - 12920	13120	13

AHU length AL	Roof length RL	No. of plates	AHU length AL	Roof length RL	No. of plates	AHU length AL	Roof length RL	No. of plates
4720 - 4925	5125	5	8820 - 9025	9225	9	12920 - 13125	13325	13
4925 - 5130	5330	6	9025 - 9230	9430	10	13125 - 13330	13530	14
5130 - 5335	5535	6	9230 - 9435	9635	10	13330 - 13535	13735	14
5335 - 5540	5740	6	9435 - 9640	9840	10	13535 - 13740	13940	14
5540 - 5745	5945	6	9640 - 9845	10045	10	13740 - 13945	14145	14

The mentioned length of roof – RL - for this length of unit is 5330 mm (the delivered trapezoidal plates can be combined to this length - RL = 5330 mm). 5330 mm minus 5000 mm is 330 mm overhang for both ends, and 330/2 mm = 165 mm is the overhang for each end. Place the trapezoidal roof plate F1 with the roof overhang profile G1 on rail E with an overhang of 165 mm.

## 8.7 Foam bands between rails and roof plates – mount roof plates

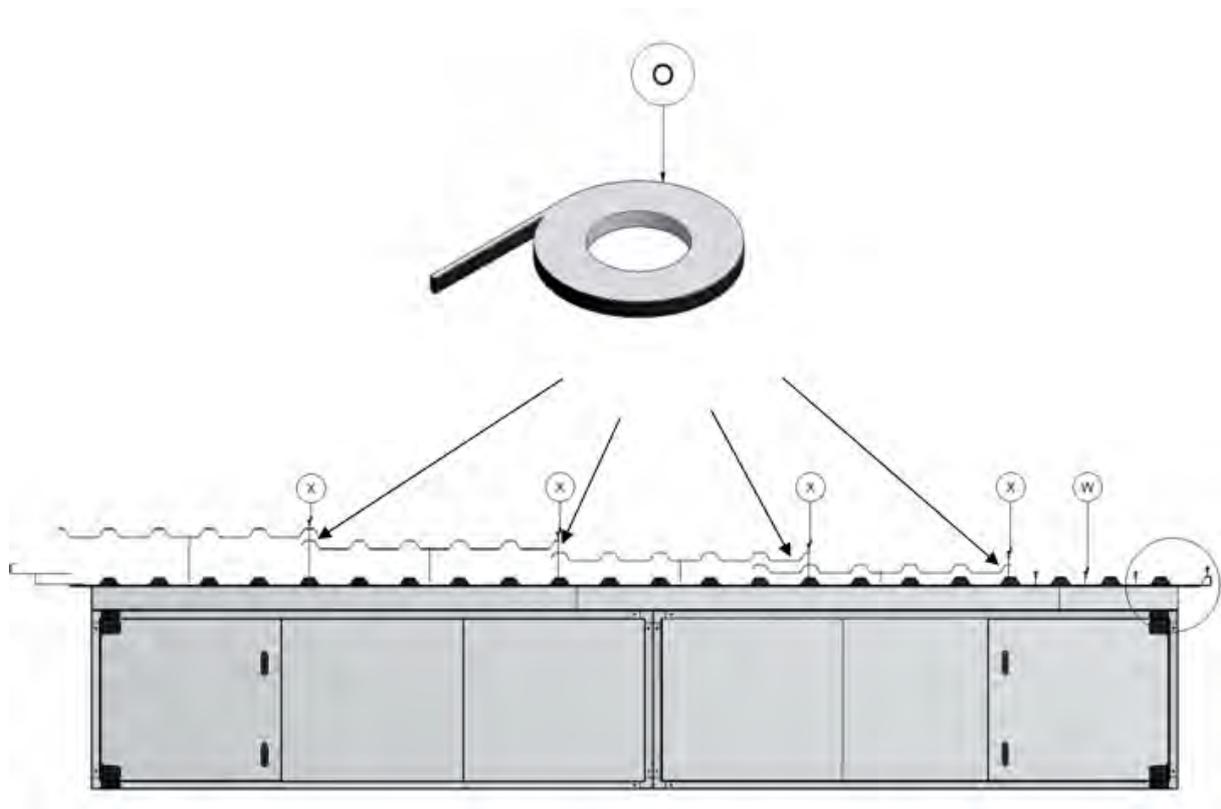
Place foam bands P between profiles A1, B2, C3, D4 and roof plates.



The trapezoidal roof plates are mounted with the self-drilling, painted screws supplied with sealing washer.

## 8.8 Foam bands between roof plates

Mount the self-adhesive foam band – O - on the underlapping rib for water resistant and effective sealing due to the small slope of the roof.

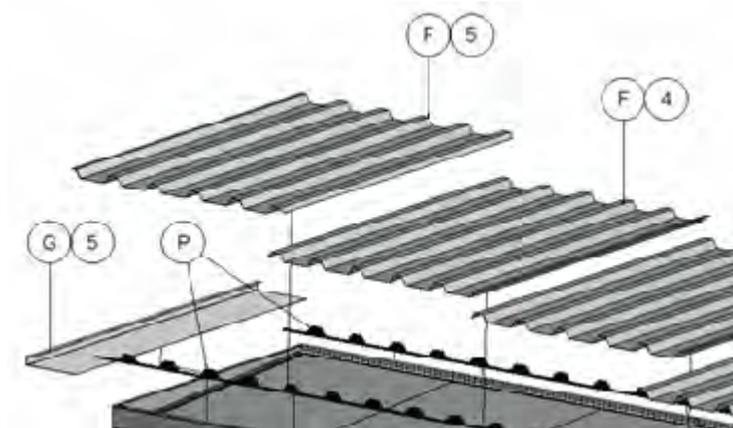


### 8.9 Mount roof plates – some of them are overlapping by 2 ribs

The width of each plate is always 1025 mm and some of the plates have to overlap by 2 ribs to achieve the optimal total length of the whole roof – see the illustration above.

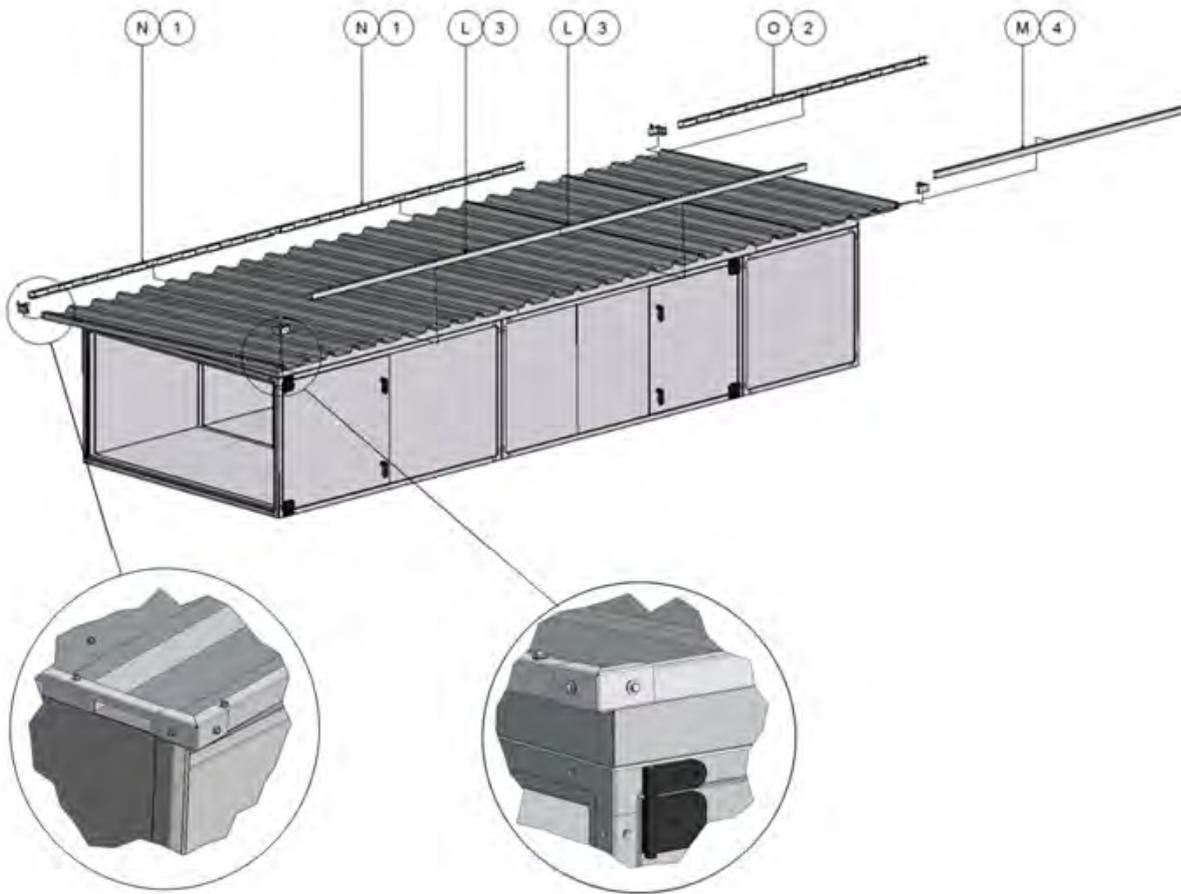
### 8.10 Mount overhang profile – G5 on the other end of the unit

When the last trapezoidal plate (in this example F5) has been placed on the unit, the second roof overhang profile G5 must be pushed under the trapezoidal roof plate and mounted with the self-drilling, painted screw with sealing washer. Mounting must be similar to the mounting of roof overhang profile under the trapezoidal roof plate at the other end of the unit.



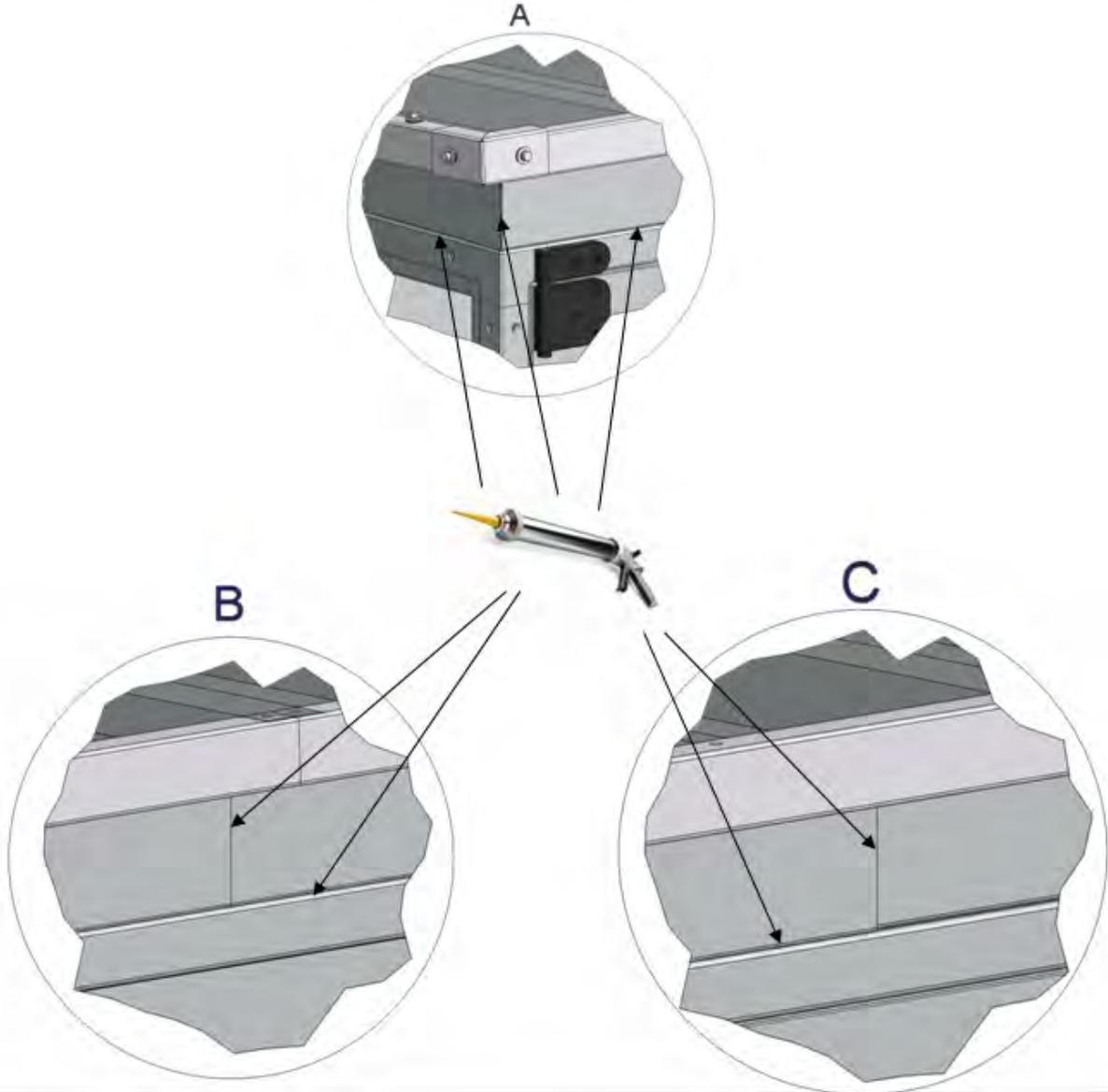
### 8.11 Mount side profiles and corners along the edges of the roof to protect persons

Profiles N and O with the rectangular holes are for the long and lower side of the roof because rain can escape through the holes. Mount the profiles type N first and the profile O last because the profile O goes over the profile N. Mounted in this order, the profile O can match the end of the roof and the surplus length of the profile O will just cover part of the previous profile N. Mount the profiles L and M along the long and higher front side of the roof. Mount the 4 protection corners.



## 8.12 Apply sealing on plate joints to ensure water resistance

Finish installation of the steel roof by sealing all plate joints with silicone to prevent rainwater from passing into the unit. See examples below of joints to be sealed.



## Annex 9 Speed control for rotor and assembly of divided rotor

### 9.1 Speed control RHC 200 delivered before March 2021

The cabinet with the speed control system for the rotor is installed behind the inspection door in the rotor section.

The cabinet contains the speed controller with all components, terminal blocks, LED displaying the operation mode, the dual position DIP switch with 8 sliding levers for programming the rotor motor signal and a button for the activation of the test mode.

Through the different combinations of the 8 sliding levers of this dual position DIP switch, the correct signal is available for the 3 different motors used for the 12 sizes of air handling units. The sliding levers are set and the function is checked at the factory. The positions of the levers appear from the tables below.

#### 9.1.1 Selection of correct signal via the 8DIP switch levers for RHC 200 delivered before March 2021

Position	Function	Code
Up	Active = ON	1
Down	Deactivated = OFF	0

The factory sets the positions of the 8 DIP switch levers for the maximum of 12 revolutions per minute for standard temperature exchangers. The position of each of the 4 DIP switches to the left is shown below.

Geniox	Pulley	Position for DIP switches to the left	Motor
10	54	0000	90TYD-S214-M 2.8Nm
11	54	0000	
12	54	1000	
14	77	0000	
16	77	1000	
18	77	1000	
20	85	0100	120TYD-S214-M 5.5Nm
22	95	0100	
24	106	0100	
27	118	0100	
29	106	1100	
31	112	1100	

The factory sets the positions of the 8 DIP switch levers for the maximum of 20 revolutions per minute for sorption–hybrid and sorption heat exchangers. The position of each of the 4 DIP switches to the left is shown below.

Geniox	Pulley	Position for DIP switches to the left	Motor
10	70	1000	90TYD-S214-M
11	77	1000	
12	95	1000	
14	95	1000	
16	118	0100	120TYD-S214-M
18	112	1100	
20	118	1100	
22	132	1100	
24	132	0110	
27	160	1010	
29	160	0110	
31	150	0110	

### 9.1.2 Indication of operation mode via red and green LED as well as test of motor for RHC 200 delivered before March 2021

The LED is in the cover of the cabinet.

LED indication	Value
No indication	Power off
Green	Ordinary operation
Green – flashes	Ready for operation
Green/redstrobe,slow	Magnet on the rotor has activated rotor guard
Green/red strobe, fast	Restart sequence active
Red	Rotor guard has not been activated

Number of red flashes in series	Value
1	Output current limit
2	Over voltage
3	Under voltage
4	Failure in the controller
5	Communication failure

#### Restart of rotor:

- Switch off power and switch on power again  
or
- Press the test button inside the cabinet

**Table 3 Test of motor by checking the resistance in all 3 windings**

Motor sizes	Ohm
90TYD-S214-M	40Ω
120TYD-S214-M	18Ω
120TYD-S214-L	10Ω

#### Setting of constant speed:

- Set fourth DIP switch lever in position - ON

#### Test:

- Set fourth DIP switch lever in position – ON
- Press the test button

### 9.1.3 Information about connection of cables to terminals on the control board in RHC 200 delivered before 2021

Connection of cables to the terminals on the board		
Terminal	Connection	
1	Earth – supply	
2	Earth – supply	
3	Fase – supply	
4	Neutral – supply	
5	Rotor turns upwards seen from inspection side	Rotor turns downwards seen from inspection side
6	Terminal 5 = wire 1	Terminal 5 = wire 2
7	Terminal 6 = wire 2 Terminal 7 = wire 3	Terminal 6 = wire 1 Terminal 7 = wire 3
8	Earth for rotor motor	
Test	Set DIP switch 4 in position – ON – and press the button for test. The signal is controlled by the potentiometer at constant speed <b>and not by any signal from the control system.</b>	
Adjust	Is activated by setting DIP switch 4 at OFF and DIP switch 5 at ON. Hereby the maximum revolutions can be adjusted between 50 and 100 % by the potentiometer. Usually, the factory setting is OK, but with this potentiometer the maximum revolutions can be reduced or increased.	
9	Alarm signal – COM (common)	
10	Alarm signal – Relay is normally closed (this is used by the control system from Systemair)	
11	Alarm signal – Relay is normally open (this is <b>not</b> used by the control system from Systemair)	
12	Control system input is 0 –10 volt DC	
13	Control system input – ground	
14	Rotor guard – (black cable from rotor guard from Systemair)	
15	Rotor guard – (blue cable from rotor guard from Systemair)	
16	Rotor guard – (brown cable from rotor guard from Systemair)	
17	For BUS signal – RS485 – A (green wire from Systemair control system)	
18	For BUS signal – RS485 – B (yellow wire from Systemair control system)	
19	For BUS signal – ground (white wire from Systemair control system)	

## 9.2 Speed control type NOVA drive 370 delivered after February 2021

The cabinet with the speed control system for the rotor is installed behind the inspection door in the rotor section.

The cabinet contains the speed controller with all components, terminal blocks, LED displaying the operation mode, the dual position DIP switches with 5 sliding levers for programming the rotor motor signal.

Through the different combinations of the 5 sliding levers of these dual position DIP switches, the correct signal is available for the 3 different motors used for the 12 sizes of air handling units. The sliding levers are set and the function is checked at the factory. The positions of the levers appear from the tables below.

### 9.2.1 Selection of correct signal via the 5 DIP switch levers in NOVA drive 370

Position	Function	Code
Up – direction ON	Active = ON	1
Down – direction numbers 1, 2, 3, 4, 5	Deactivated = OFF	0

The factory sets the positions of the 3 DIP switch levers called 1, 2, 3 for the maximum about 14 revolutions per minute for standard temperature exchangers. The position of each of the 3 DIP switches called 1, 2, 3 is shown below.

Geniox	Diameter of pulley in mm	Position for DIP switches called 1, 2, 3	Motor
10	70	000	90TYD-S214-M 2.8 Nm
11	70	000	
12	77	000	
14	70	100	
16	77	100	
18	95	100	
20	106	010	120TYD-S214-M 5.5 Nm
22	118	010	
24	118	010	
27	118	110	
29	106	001	
31	112	001	
35	250	Controlled via frequency converter	Emotron EMX D
35L	280		
38	250		
38L	315		
41	300		
41L	315		
44	300		
44L	355		

The factory sets the positions of the 3 DIP switch levers called 1, 2, 3 for the maximum about 20 revolutions per minute for sorption-hybrid exchangers as well as for sorption exchangers. The position of each of the 3 DIP switches called 1, 2, 3 is shown below.

Geniox	Diameter of pulley in mm	Position for DIP switches called 1, 2, 3	Motor
10	77	100	90TYD-S214-M 2.8 Nm
11	77	100	
12	95	100	
14	95	100	
16	118	010	120TYD-S214-M 5.5 Nm
18	112	110	
20	118	110	
22	118	001	
24	132	001	
27	140	001	
29	150	001	
31	160	011	120TYD-S214-L 8 Nm
35	315	Controlled via frequency converter	Emotron EMX D
35L	315		
38	315		
38L	400		
41	355		
41L	400		
44	355		
44L	400		

**For ordinary operation:**

- DIP switch 4 must be set to – OFF.  
and
- DIP switch 5 must be set to – OFF.

**9.2.1.1 Indication of operation mode via red, yellow and green LED on NOVA drive 370 as well as test of drive motor**

The LED is in the cover of the cabinet.

LED indication	Value
No indication	Power off
Green	Ordinary operation
Green – flashes slowly (500 ms on, 500 ms off)	Ready for operation
Green – flashes fast (200 ms on, 200 ms off)	Has been stopped due to fault and try to start again on its own
Red – green – red – green (200 ms each colour)	Magnet on the rotor has activated rotor guard
Yellow flashes –(400 ms on, 400 ms off, 2.000 ms pause)	Warning. Number of flashes indicates the below code that explains the reason for the warning
Red flashes –(400 ms on, 400 ms off, 2.000 ms pause)	Fault. Number of flashes indicates the below code that explains the reason for the fault

Number of yellow or red flashes in series	Value
1	Output current limit
2	Over voltage
3	Under voltage
4	Hardware error (gate kill)
5	Modbus communication failure (watch dog)

Number of yellow or red flashes in series	Value
6	Overheating stop
7	Internal communication failure
8	Configuration error

Number of yellow or red flashes in series	Value
1	Output current limit
2	Over voltage
3	Under voltage
4	Phase lost
5	Modbus communication failure (watch dog)
6	Overheating stop
7	Internal communication failure
8	Configuration error
9	Hardware error
10	Motor blocked

**Test of motor by checking the resistance in all 3 windings.**

Motor sizes	Ohm
90TYD-S214-M	40Ω
120TYD-S214-M	18Ω
120TYD-S214-L	10Ω

### 9.2.1.2 Restart, test, change of rotation direction, brake of rotation

#### Restart of rotor

Switch off power and wait some seconds before switching on power again

#### Automatic test

Activate DIP switch 5 for more than 10 seconds to start the automatic test. During the automatic test, the motor will accelerate to maximum speed and the motor will run at maximum speed for 10 seconds. After this the motor will ramp down and stop for another 10 seconds. The process is repeated again and again, until the DIP switch is set back to position – OFF.

#### Change of rotation direction to enable perfect function of purge section

With purge section in the air handling unit, the rotation direction of the rotary heat exchanger is important. The direction of the rotor must move the area of the rotor with polluted extract air to the area of the air handling unit with clean outdoor air to enable clean outdoor air to pass through the rotor via the purge section to the exhaust air. Clean outdoor air replaces the polluted extract air inside the rotor before the main flow of outdoor air passes through the rotor as supply air to the rooms.

The rotation direction is tested at the factory for every air handling units that is delivered with installed drive controller and drive motor.

In case of replacement at the building site, the installer can change drive direction of the motor by installing motor cables in other terminals at the drive controller, because all drive motors from Systemair are 3-phase motors.

#### Brake of rotation

If DIP switch 4 is set to – ON, the brake function is activated. When the motor is stopped and the brake function is activated, the motor is blocked by shortening the windings.



#### Note:

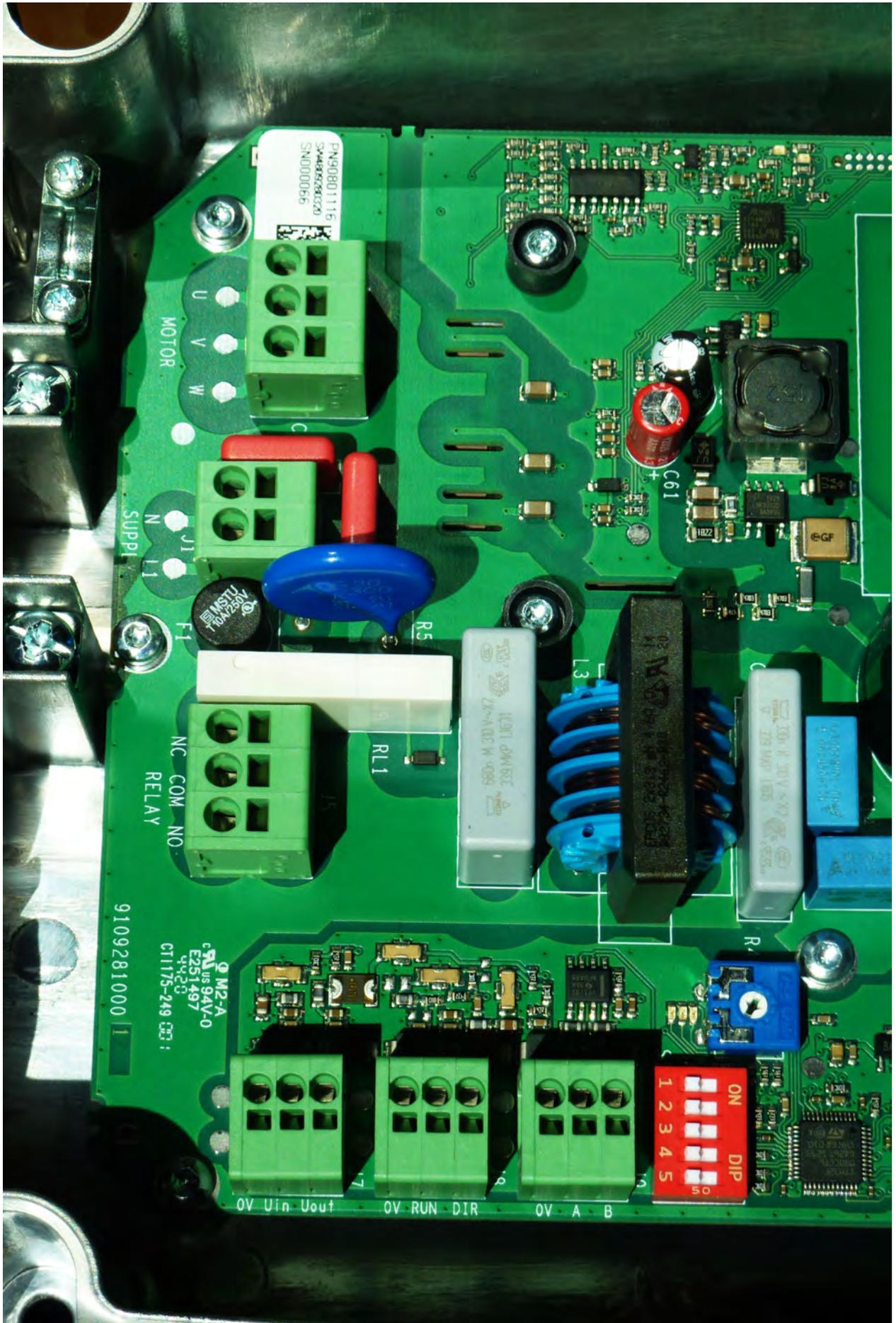
This brake function is only to be activated a few minutes for cleaning or maintenance.

### **9.2.1.3 Description of purge function for the rotary heat exchanger**

When the rotor has been stopped for 30 minutes the drive motor will be started to run at 10 RPM for 12 seconds. After this time the rotor will be stopped again. The sequence is repeated after 30 minutes of inactivity.

If the rotor is stopped for a long period of time and still with air flow, the half of the rotor in the extract air flow will be more polluted and hereby more heavy than the half of the rotor in the outdoor air flow with the consequence that the drive motor via the drive belt will not be able to drive the rotor.

9.2.2 The board in NOVA drive 370 for control of revolutions.



### 9.2.3 Information about connection of cables to terminals on the control board.

Connection of cables to the terminals on the board			
Terminal	Connection		
Earth	Connect to aluminium cabinet		
L1	Fase – supply		
N	Neutral – supply		
	<table border="1"> <tr> <td>Rotor turns one direction U = wire 1 V = wire 2 W = wire 3</td> <td>Rotor turns opposite direction U = wire 2 V = wire 1 W = wire 3</td> </tr> </table>	Rotor turns one direction U = wire 1 V = wire 2 W = wire 3	Rotor turns opposite direction U = wire 2 V = wire 1 W = wire 3
Rotor turns one direction U = wire 1 V = wire 2 W = wire 3	Rotor turns opposite direction U = wire 2 V = wire 1 W = wire 3		
Earth	From rotor motor connect to aluminium cabinet		
Test	Set DIP switch 5 in position – ON for more than 10 seconds and the motor will accelerate to maximum speed. See description above in section 9.2.1.2		
Adjust	The potentiometer can adjust the maximum revolutions between 50 and 100 % of the maximum speed set by the DIP switches 1, 2 and 3		
COM	Alarm signal – COM (common)		
NC	Alarm signal – Relay is normally closed		
NO	Alarm signal – Relay is normally open		
Uin	Analog control input 0 – 10 volt DC		
0V	Analog control input – ground		
RUN	Rotor guard – Sensor output (black cable from Systemair rotor guard)		
0V	Rotor guard – (blue cable from Systemair rotor guard )		
U out	Rotor guard – (brown cable from Systemair rotor guard)		
A	For BUS signal – RS485 – A		
B	For BUS signal – RS485 – B		
0V	For BUS signal – ground		

### 9.2.4 Modbus control for NOVA drive 370

#### Connection

The interface to Modbus follows:

**Table – Modbus connection details**

Configuration	Value
Interface	RS485
Baudrate	9600
Data bits	8
Parity	None
Stop bits	1
Default address	7

#### Addressing

The default address for the inverter is 7. The address can be changed through Modbus.

To change the address follow the following steps:

1. Connect to the inverter using the current address
2. Change the address in register 0x4F to the desired one
3. Wait 10 seconds
4. Turn off the device (wait 60 seconds)

5. Turn on the device

6. You can connect using the new address specified in point 2

### Modbus registers

The following Modbus registers are available. All registers are either input registers (16-bit read-only denoted by R) or holding registers (16-bit read-write denoted by RW).

Register	Address	Type	Description
Backwards compatible control			
Operation	0x01	RW	Bit 0: Run(1)/Stop(0) Bit 3: Clear fault (it can be combined with Run)
SpeedSet	0x02	RW	Speed set 0–100%, written 0–1000 for quantification
SupplyVoltage	0x03	R	DC link voltage in [V]
Fault Contents	0x04	R	Bits are set for each fault according to Table 10
OutputSpeed	0x05	R	Estimated motor speed in [rpm]
OutputVoltage	0x06	R	Motor RMS voltage in [V]
OutputCurrent	0x07	R	Motor RMS current in [mA]
OutputPower	0x08	R	Motor power in [W]
InputPower	0x09	R	Added for compatibility reasons. Same as OutputPower
AccOperationTime	0x0A	R	Total time the motor has been running x10 in hours. A value of 5 for example means 50 hours
MaxSpeed	0x0B	R	Max speed as set in [rpm]
MinSpeed	0x0C	R	Min speed as set in [rpm]
SW version	0x0D	R	Backwards compatible SW version, always increasing
HW version	0x0E	R	HW version of PCB
Applicaton type	0x0F	R	Application type, for backwards compatibility, set as 0
New info features			
ModbusAddress	0x04F	RW	Address used in Modbus. Default is 7
AlarmLog	0xC0	R	Last 4 FaultContent alarm codes
ModuleTemperature	0xC1	R	Temperature of the module in [°C]
MceStatusFlags	0xC2	R	Status flags of the motor control software for internal usage
MceFaultFlags	0xC3	R	Fault flags of the motor control software for internal usage
PCBTemperature	0xC4	R	PCB temperature in [°C]
WarningContents	0xC5	R	Warnings, which each bit as set for each one according to Table 10
SpeedSetScaled	0xC7	R	Reference speed in [10 <sup>*</sup> rpm]
For Factory test			
Dip1	0x110	R	Dip 1 value, 0 (off) or 1 (on)
Dip2	0x111	R	Dip 2 value, 0 (off) or 1 (on)
Dip3	0x112	R	Dip 3 value, 0 (off) or 1 (on)
Dip4	0x113	R	Dip 4 value, 0 (off) of 1 (on)
Dip5	0x114	R	Dip 5 value, 0 (off) or 1 (on)
Guard in	0115	R	Rotor guard value 0 or 1
Test running	0x116	R	1 when test is running, 0 otherwise
Speed external 0–10V	0x117	R	0 – 4095 speed input
Trimmer 0–10V	0x118	R	0 – 4095 trimmer input

Register	Address	Type	Description
Extended SW version			
FrontendVersion	0x320 – 0X333	R	Frontend software version C string.
BackendVersion	0x334 – 0X347	R	Backend software version C string.

### 9.2.5 Modbus control – Normal operation

Write the speed reference in SpeedSet between 0 and 1000 (0–100%). Note that the conversion from Speed Set to rpm speed is non-linear. The reference in rpm can be read using register SpeedSetScaled. The minimum and maximum speed can be read in registers MinSpeed and MaxSpeed.

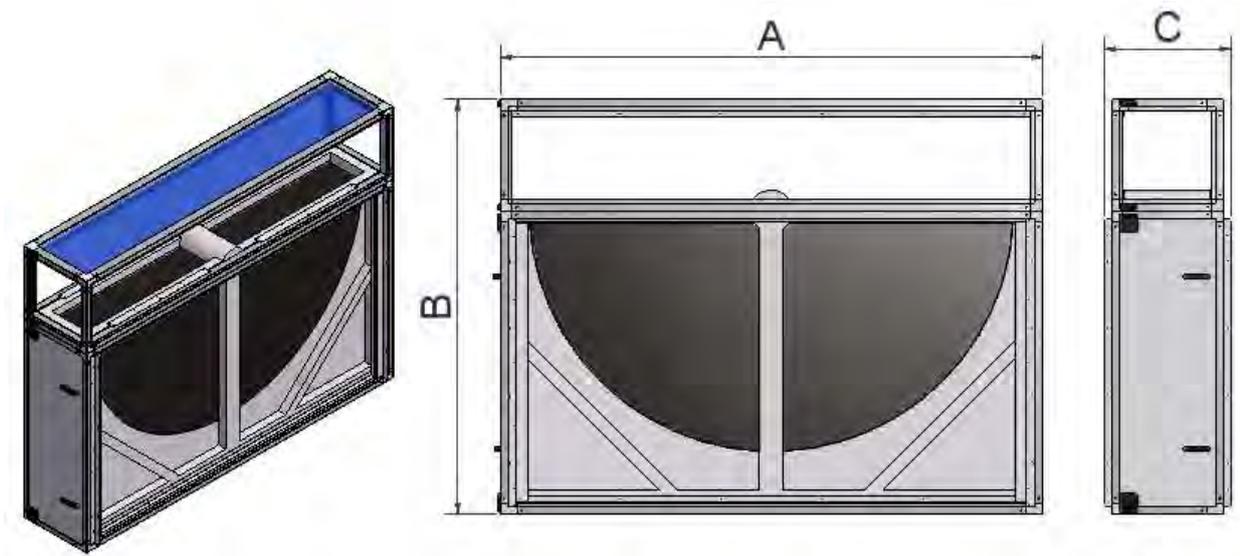
Start the motor by setting Operation to 1. Stop it by setting it to 0. You can change the speed while the motor is running.

If communication with the device is stopped, a warning will appear after 10 seconds but the motor will keep running.

Faults and warnings can be reset by setting operation to 8.

## 9.3 Assemble divided rotor and the Systemair casing

Half of the rotary heat exchanger is pre-assembled from Sytemair with centre of the rotor as well as bearings in the centre installed in the lower half of the unit section.

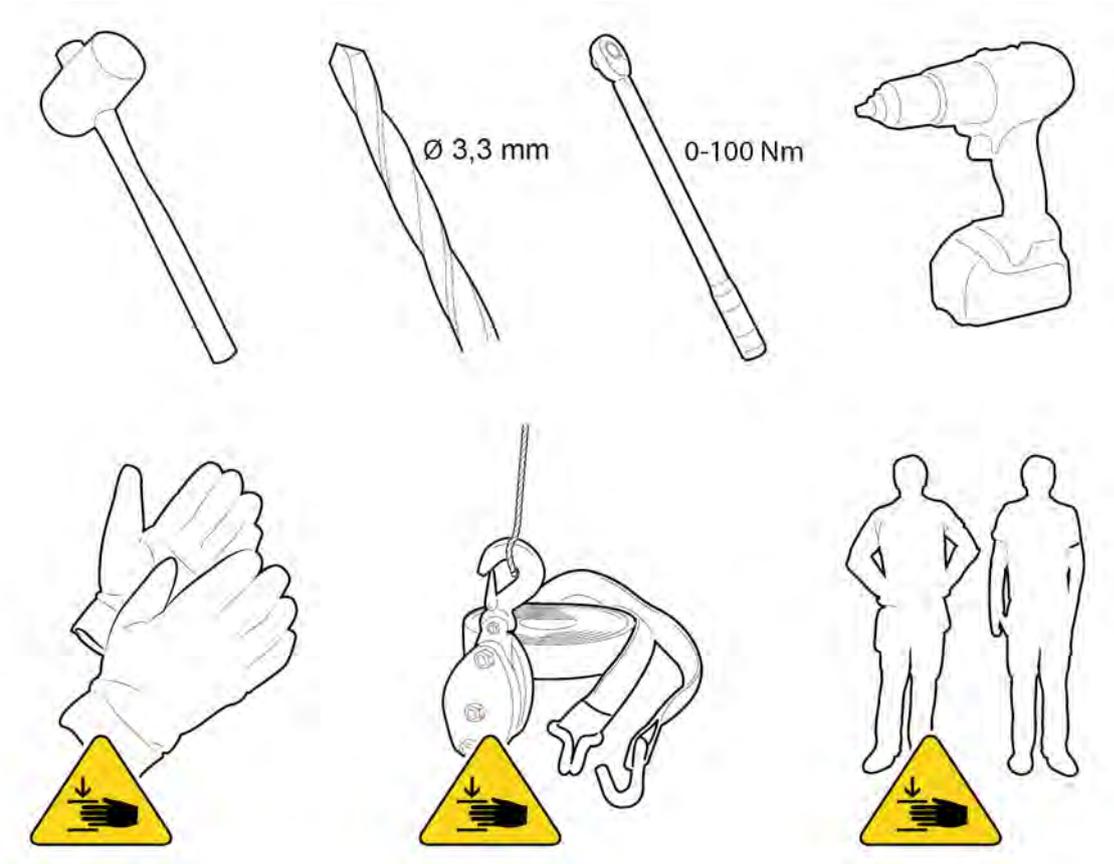


Size	A	B	C
Geniox 22	2282	1764	500
Geniox 24	2482	1864	500
Geniox 27	2782	1964	500
Geniox 29	2982	2064	500
Geniox 31	3182	2164	500
Geniox35	3482	2718	1082
Geniox38	3482	3018	1082
Geniox41	4082	3018	1082
Geniox44	4082	3018	1082

Remove the Systemair ceiling panel from the lower half of the Systemair unit section for free access to mount the upper half of rotor casing. With the upper half of the rotor casing properly mounted, the next step is to mount the radial walls to the flanges on the center. The radial walls are placed between the rotor segments.

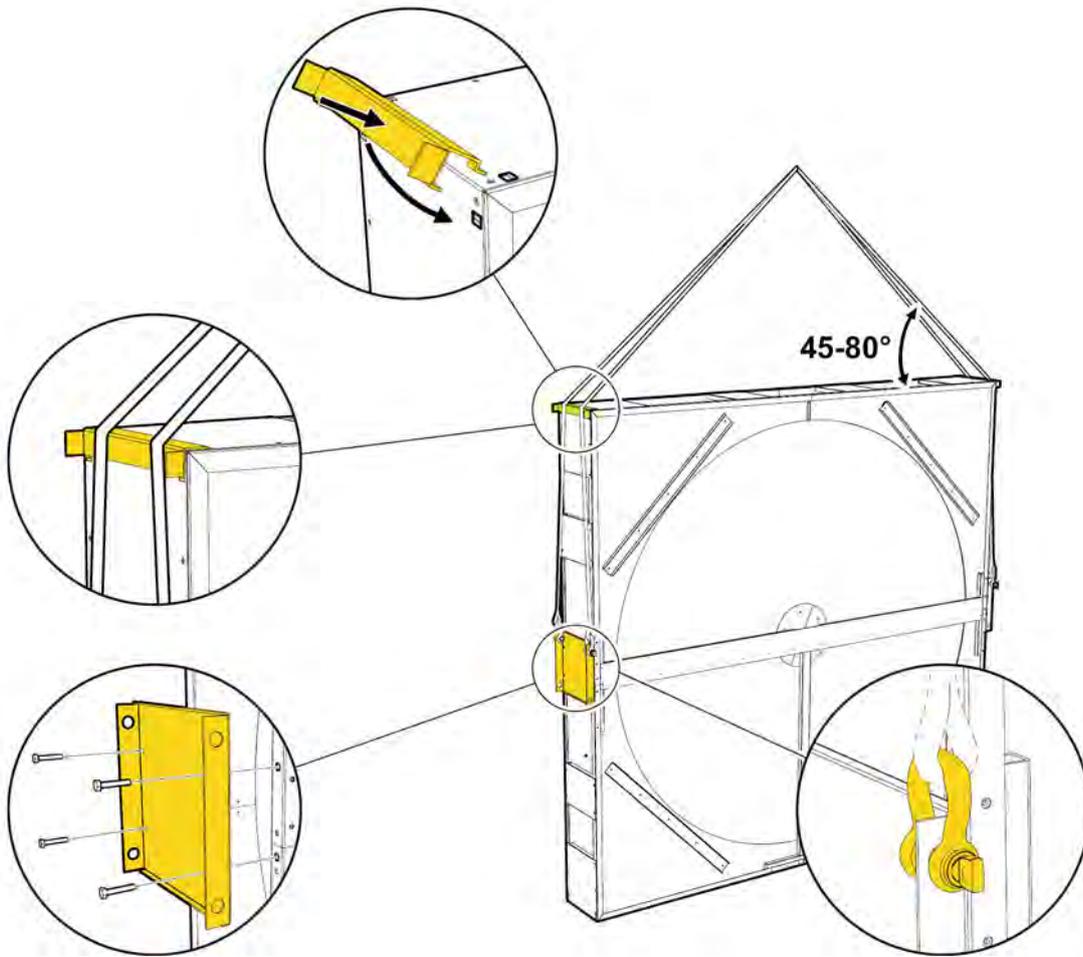
## 9.4 Assemble divided rotor from Hoval

### 9.4.1 Tools and aids

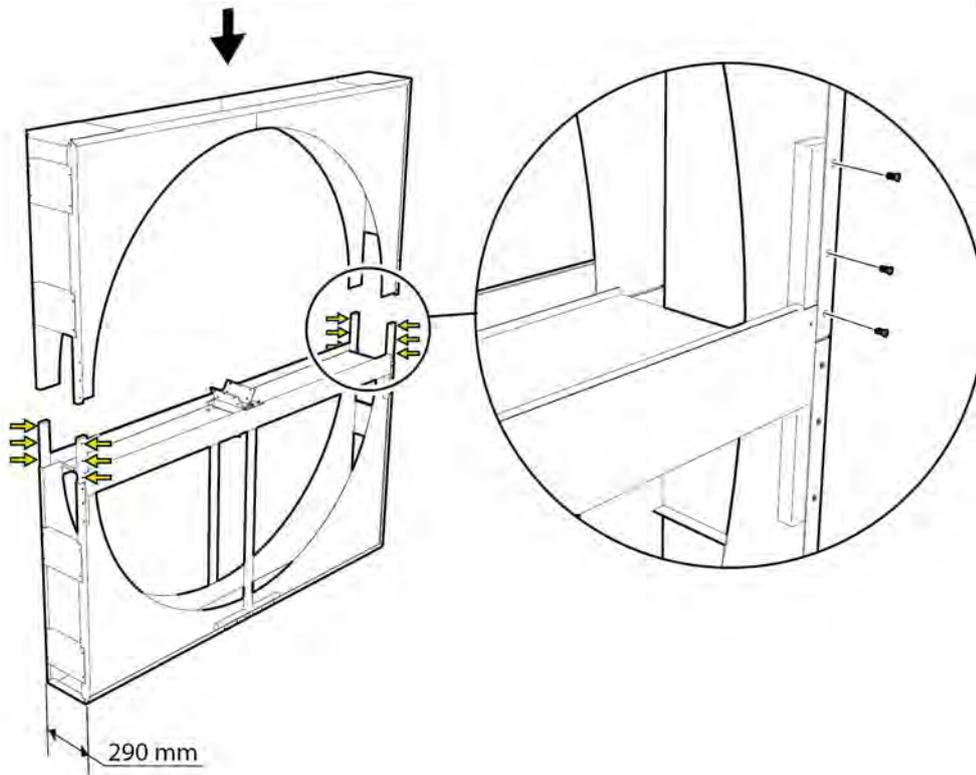


### 9.4.2 Lifting instruction for upper half of the Hoval CDS 290 mm rotor casing

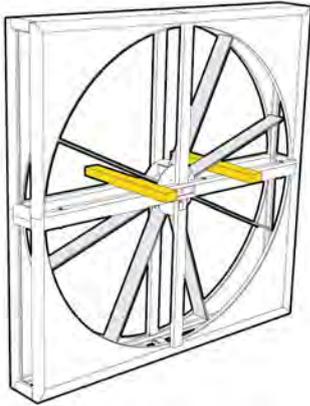




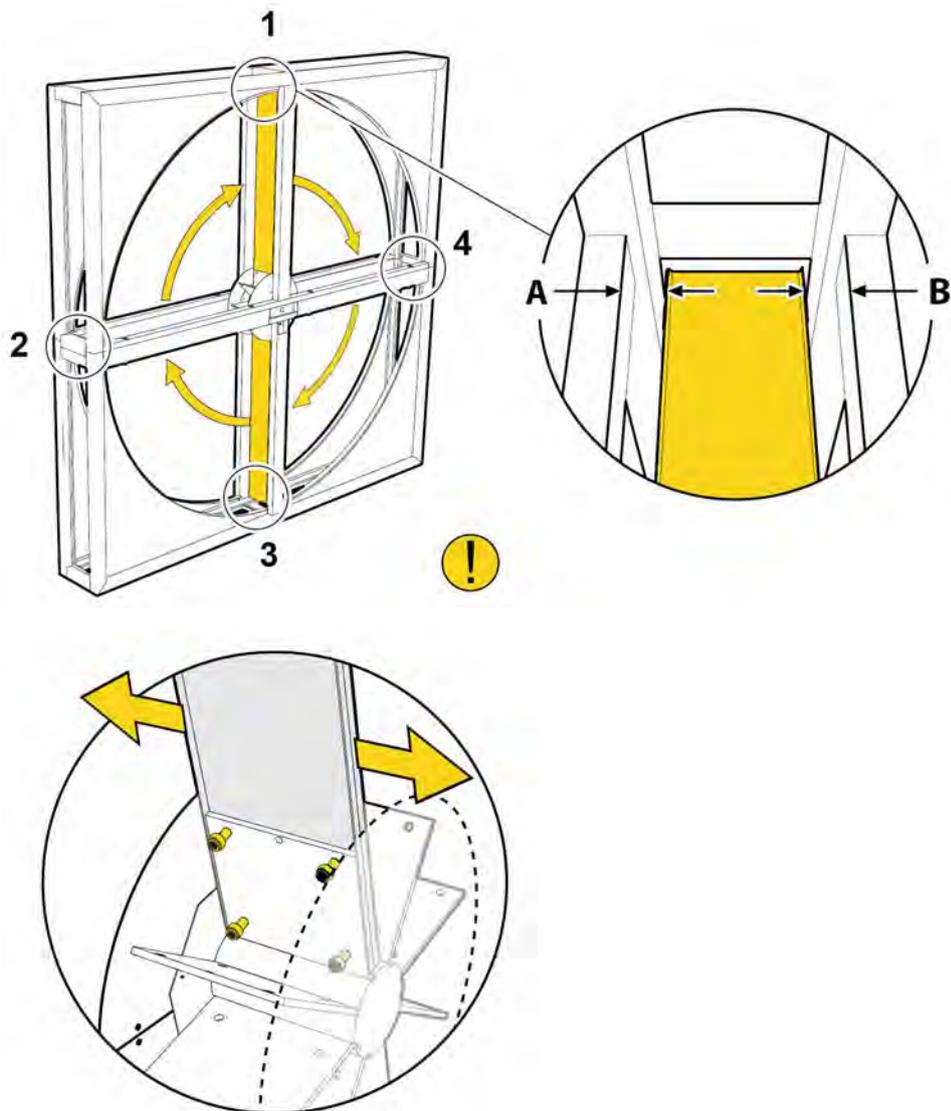
### 9.4.3 Installation of upper half of the Hoval CDS 290 mm rotor casing



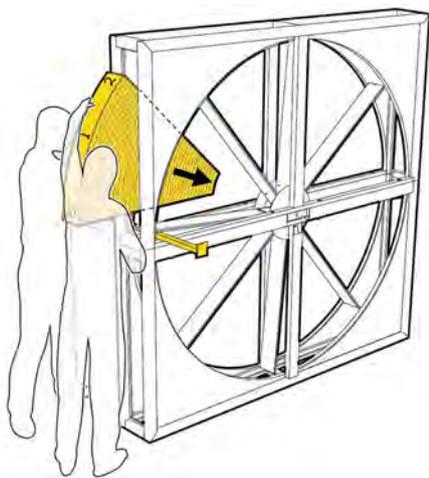
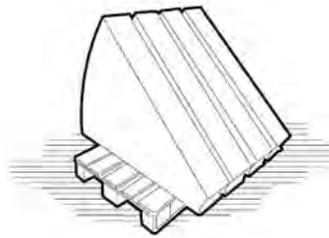
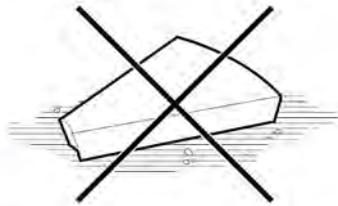
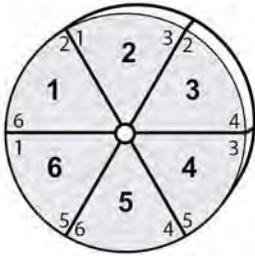
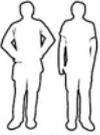
### 9.4.4 Installation of radial walls between segments

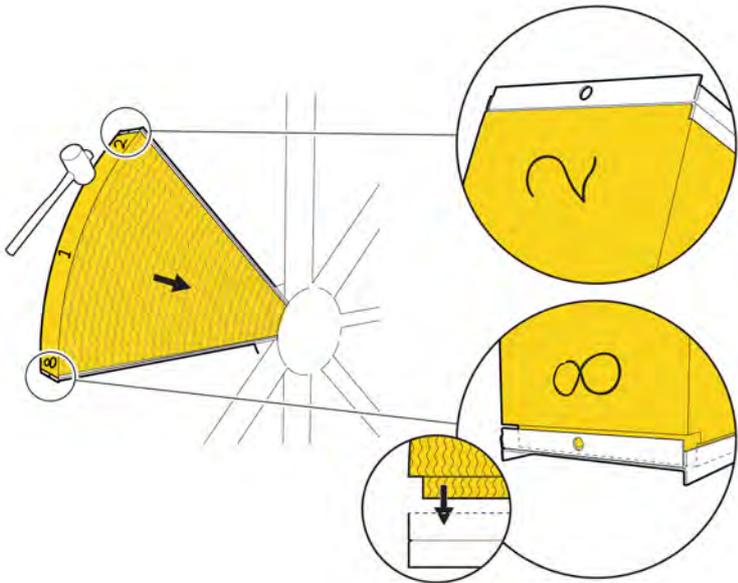


### 9.4.5 Adjusting clearance between radial walls and the casing

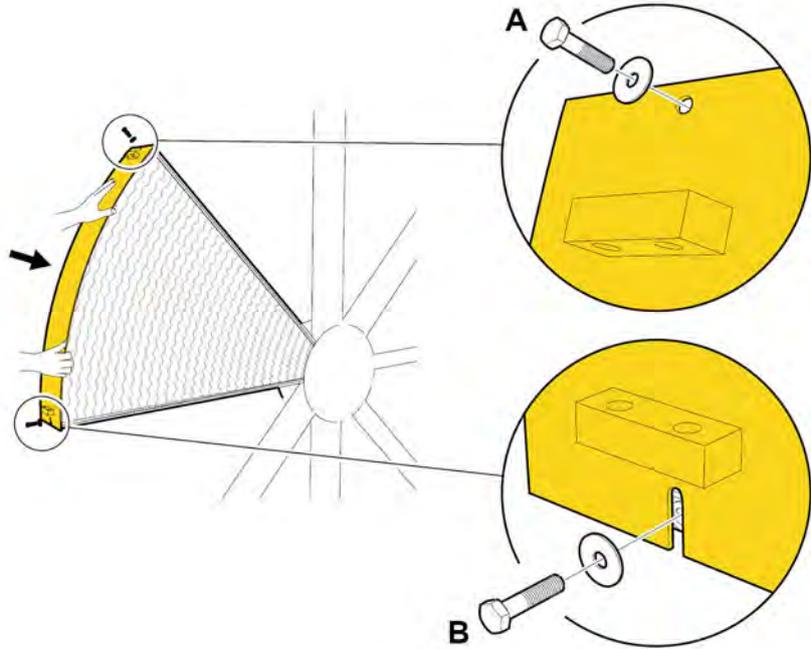


### 9.4.6 Installation of rotor segment and periphery plates

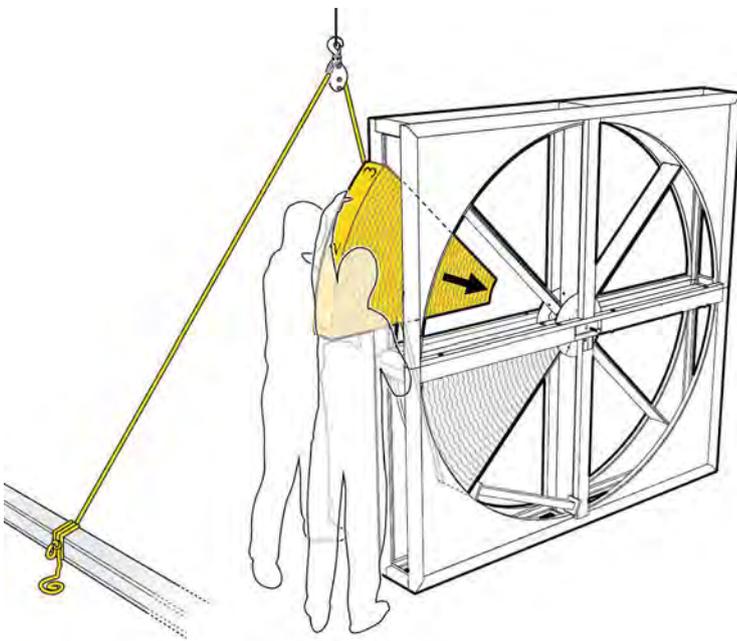
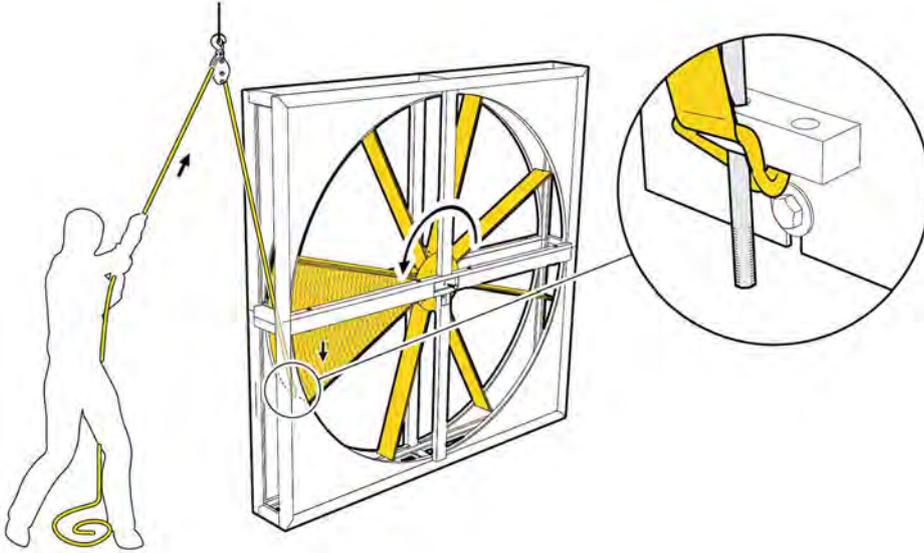




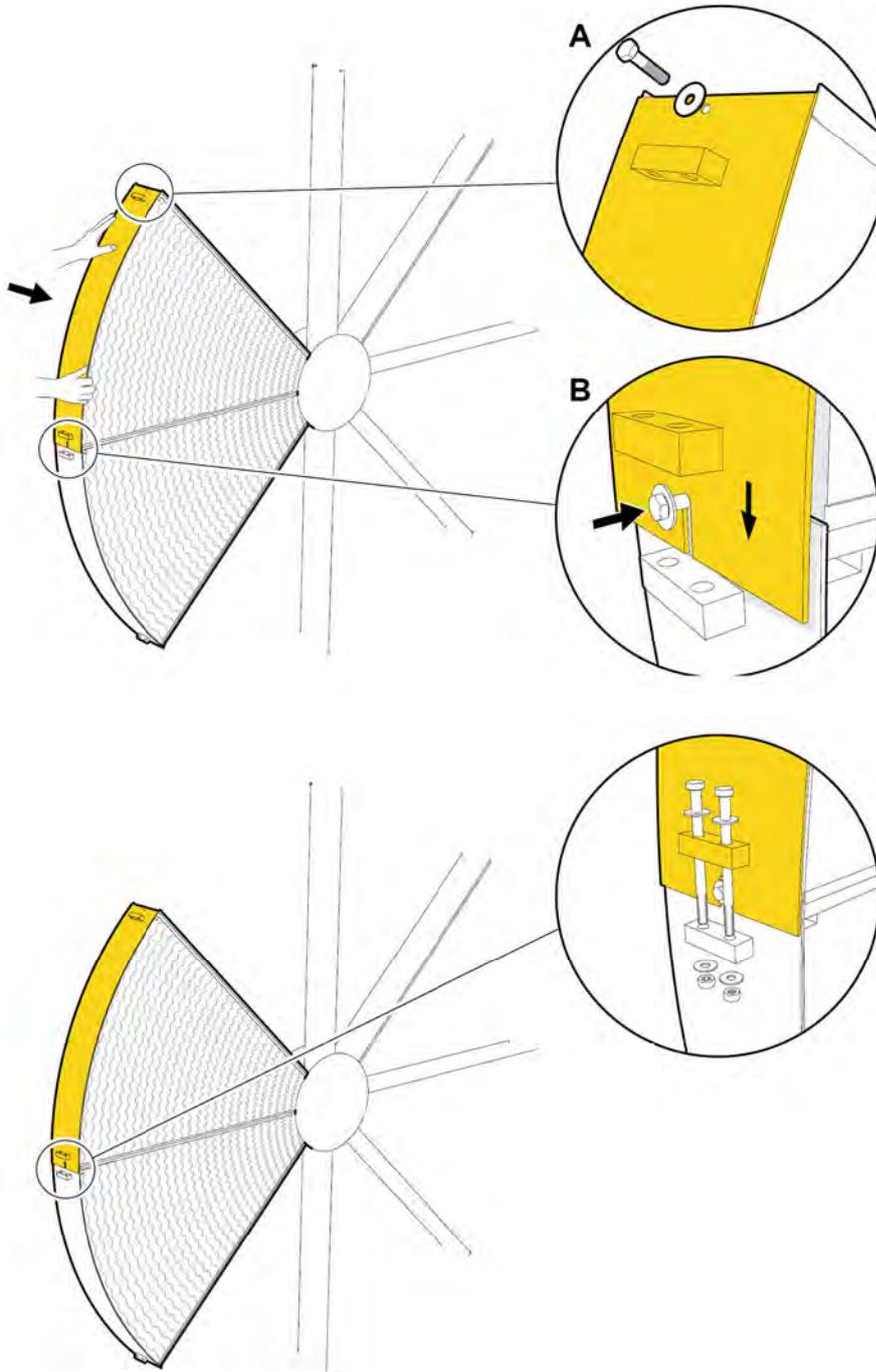
**9.4.7 Installation, first periphery plate**



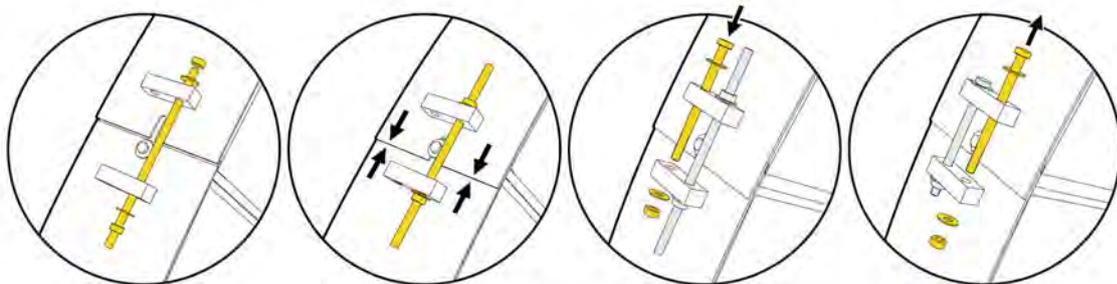
### 9.4.8 Installation of next segment



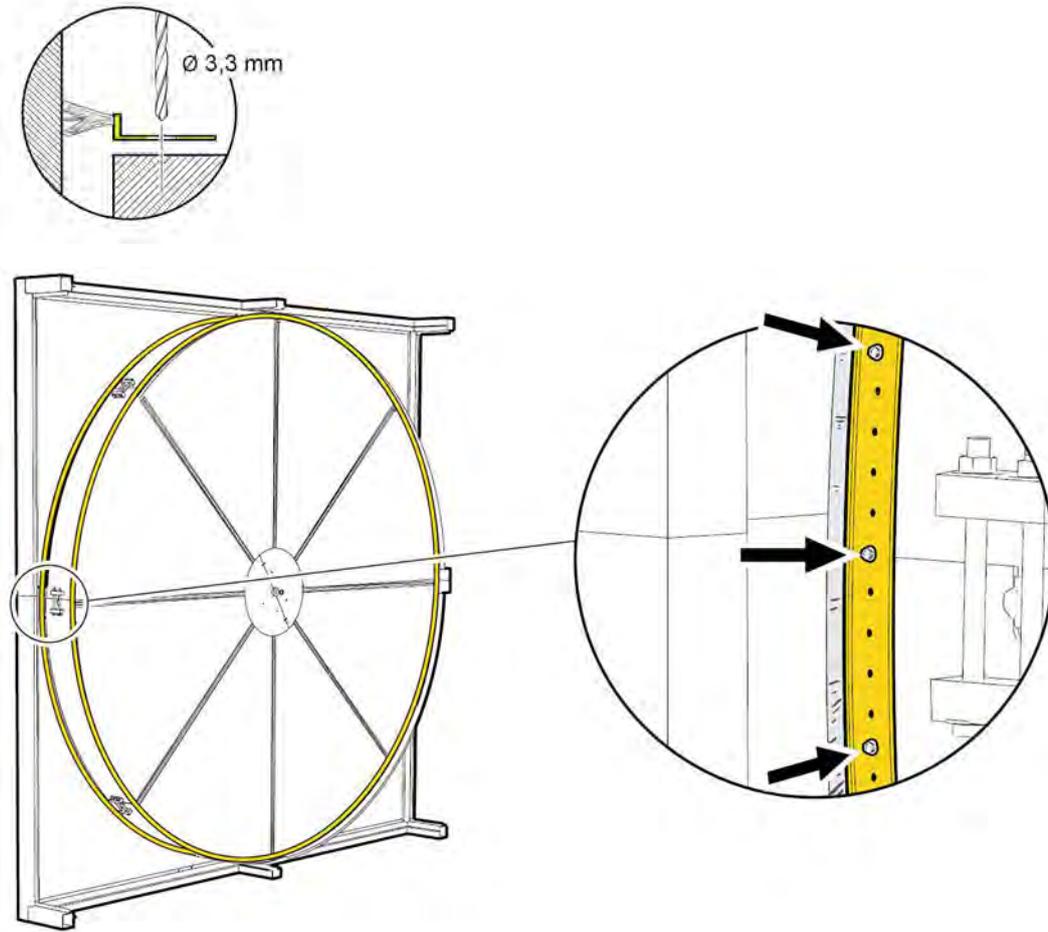
### 9.4.9 Installation, next periphery plate



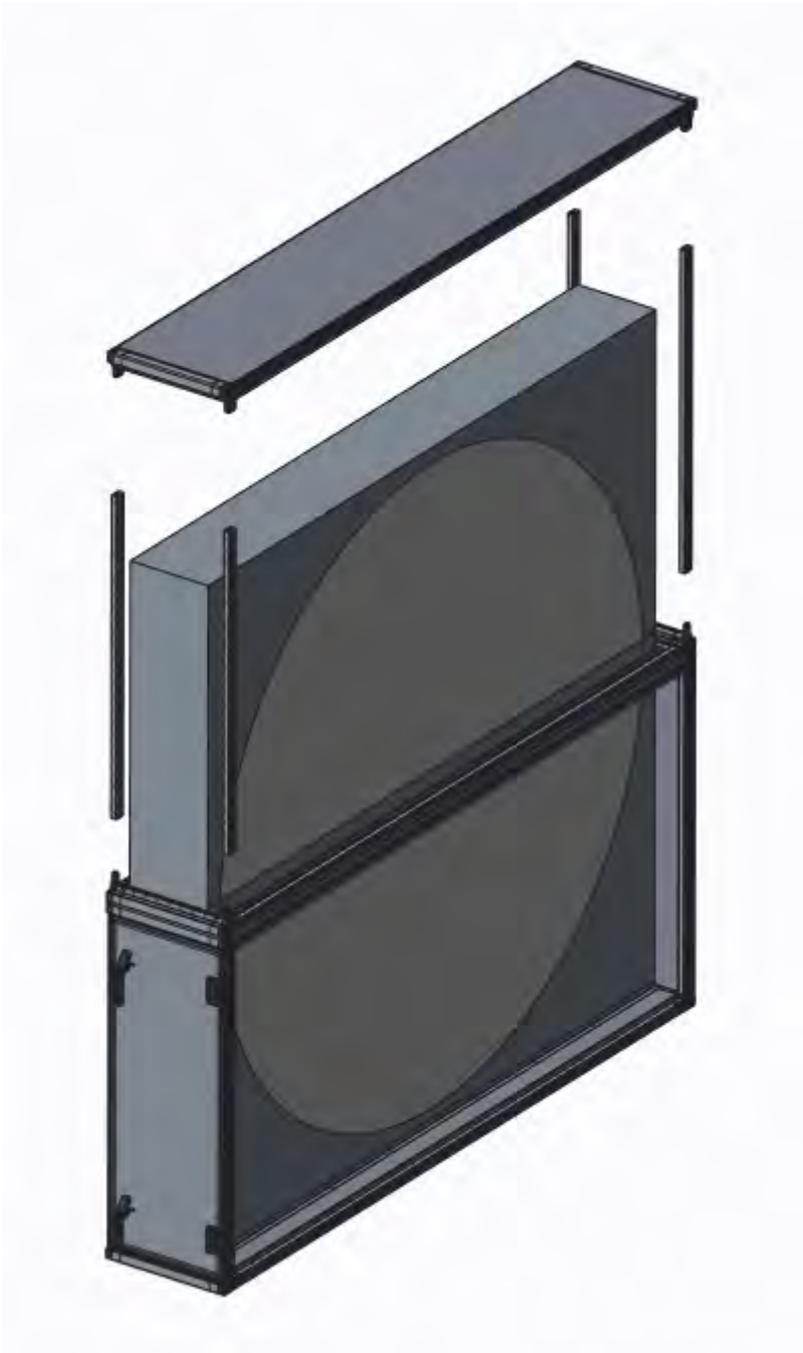
### 9.4.10 Final adjustment of segments and periphery plates



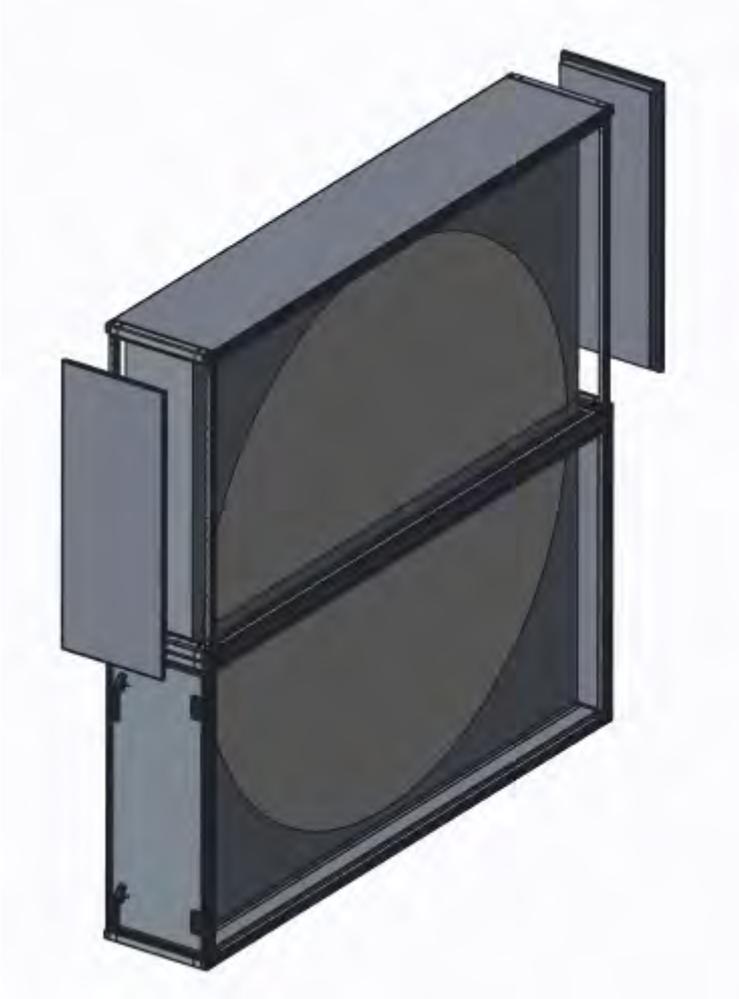
### 9.4.11 Installation of brush sealing and upper half of the Systemair casing



The next step is to mount the upper half of the Systemair unit casing consisting of 4 vertical profiles and the horizontal roof panel



Final step is to mount two panels.



## 9.5 Assemble divided rotor from Lautner

### 9.5.1 Tools and aids

#### Encasing / mounting corner / seals:

- Impact screwdriver, SW 10 bit
- Socket bit SW 10

#### Rotor:

- 2 ratchets with extensions
- Socket bit SW 10 (for segment wall foot screws)
- Socket bit SW 8 (for encasing panel screws)
- Installation lever
- Tongs
- Tension belt (longer than rotor circumference)
- Gloves
- Timber beams for blocking the rotor

#### V-belt and rotation sensor:

- Drill
- Drill bit (2.5 mm)
- Adhesive tape
- Riveting tongs
- Diagonal cutting nipper
- Phillips screwdriver
- Cable retainers

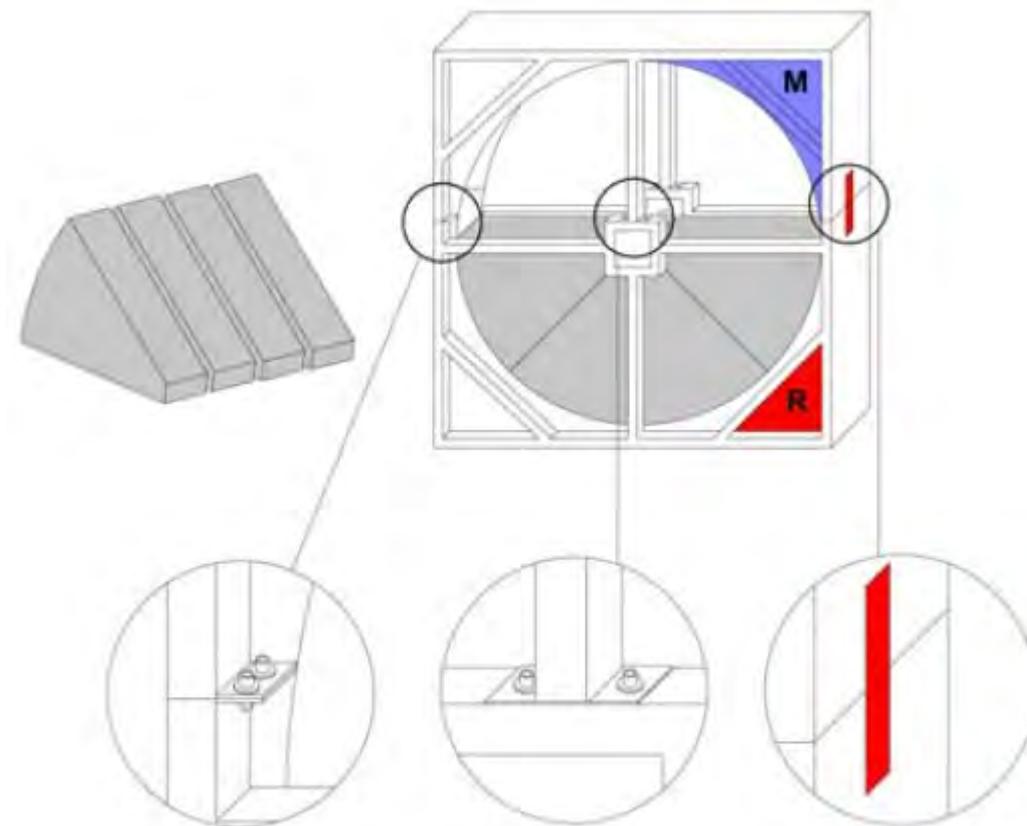
### 9.5.2 Assembly instructions

#### 9.5.2.1 Assemble casing

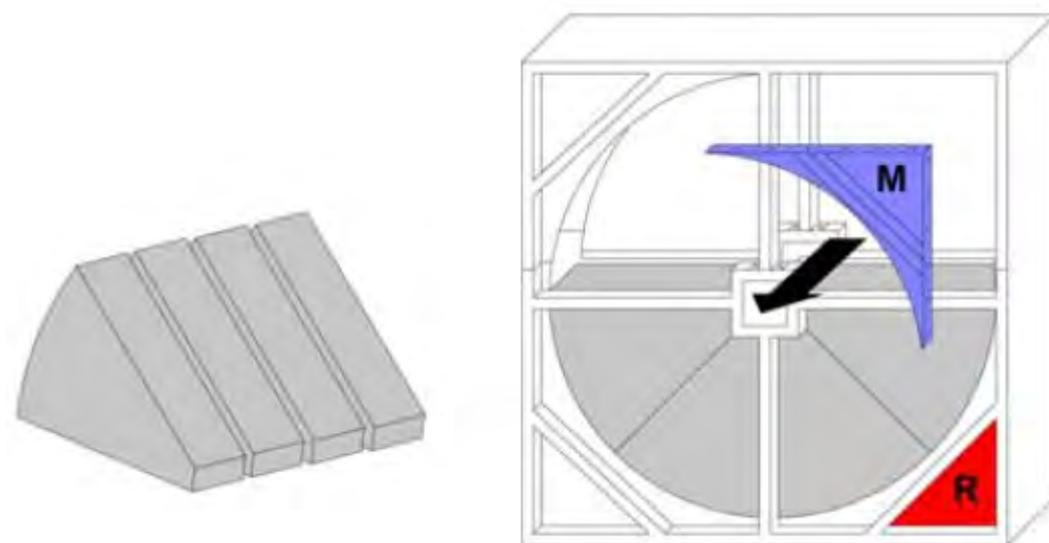
Place casing top part onto casing bottom part.

Observe markings.

Screw casing top part to encasing bottom part.



Unscrew mounting corner.



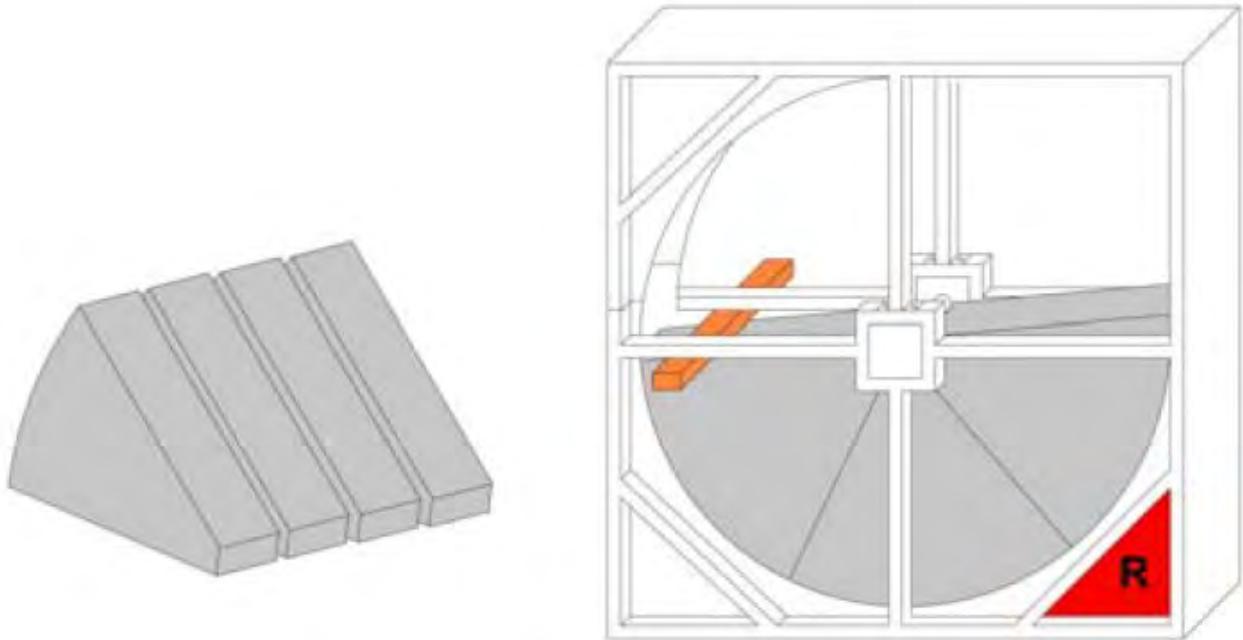
### 9.5.2.2 Block the rotor



#### Caution

The heat storage mass is very sensitive! Avoid high pressure, knocks, etc.

The already mounted rotor part needs to be blocked by a timber beam or by timber beams before installing the next segment.

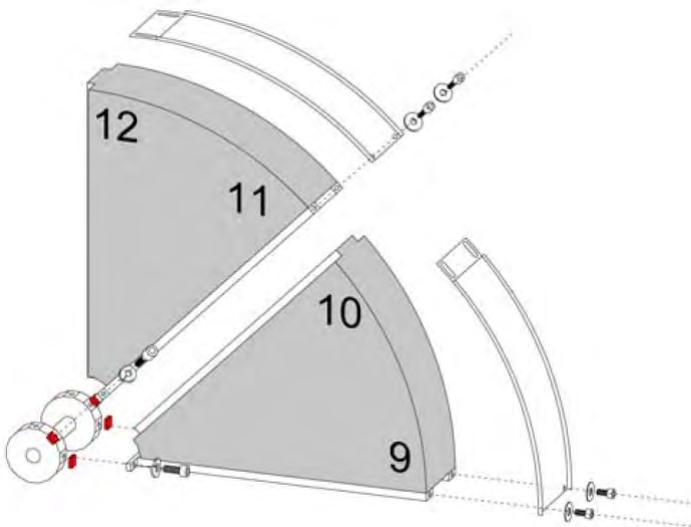


### 9.5.2.3 Assemble segments, circumferential panels and spacer discs

During the assembly of the segments, be sure to keep track of the numbering (segments are numbered in order, see figure below).

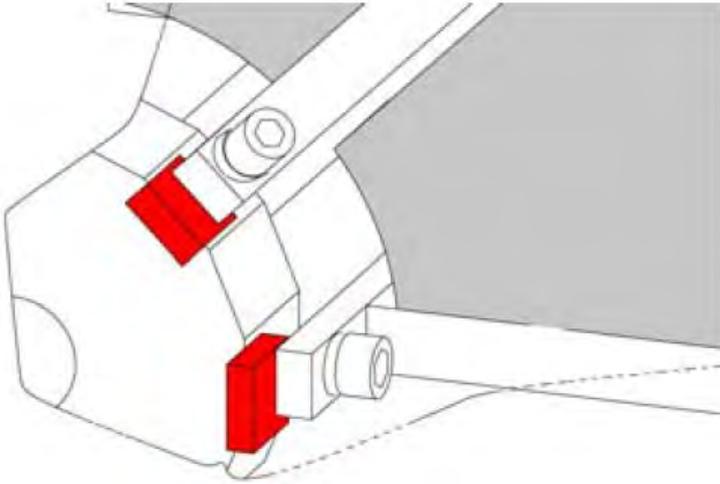
Do not remove the square profiles (transport protection) until the segment ahead of it has been mounted.

The appropriate segment needs to be inserted through the mounting corner into the guide grooves of the preceding segment. Screw the segment foot to the rotor hub using the M12x40 socket screws. Do not forget the retainers.

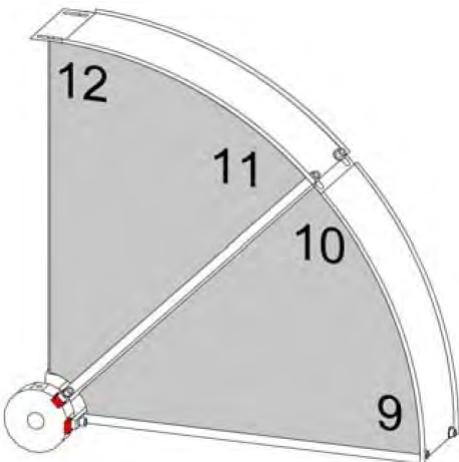
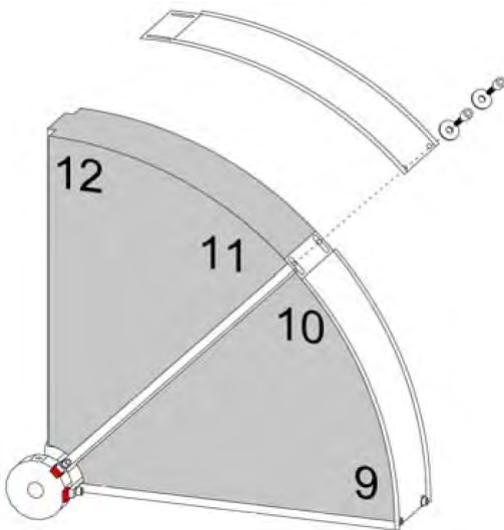


The supplied spacer discs must be placed as assembly aids between the segment foot and the rotor hub (to install the last segment).

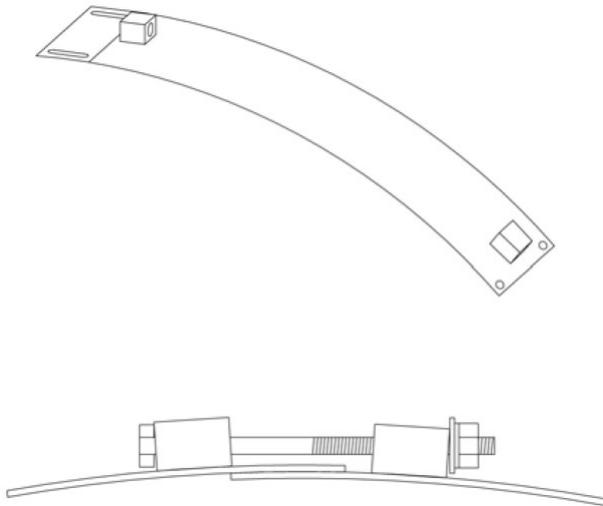
Insert the socket screws, but do not tighten yet!



To each new inserted segment, also attach a circumferential panel with M10x30 socket screws. Do not forget washers. Screw in the screws only about half way.



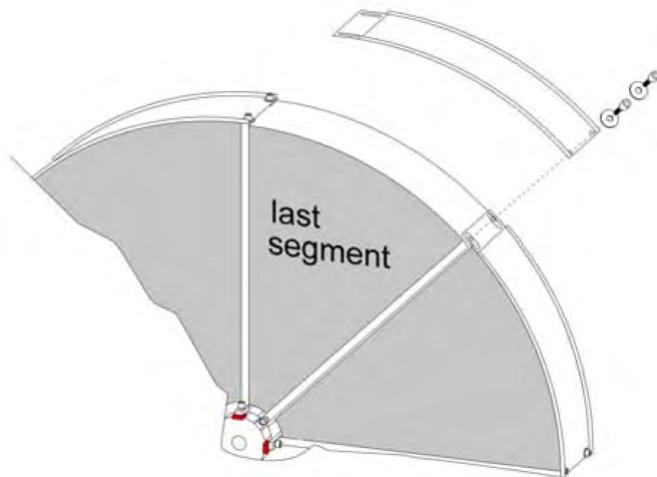
In case the circumferential panels are made of steel and are equipped with an additional clamping device, they also loosely mount the M12x120 screws, plain washers and self-securing nuts intended for this.



#### 9.5.2.4 Assemble the last segment

When the last segment is mounted, the spacer discs are no longer needed.

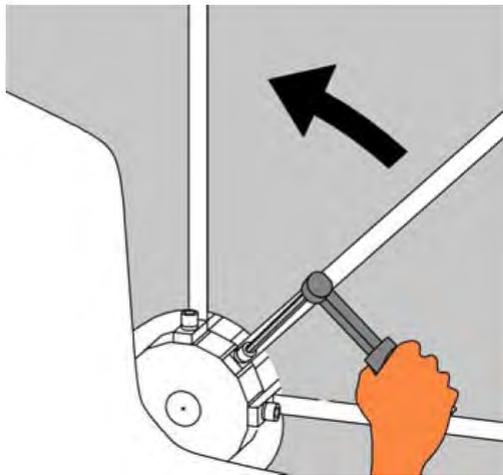
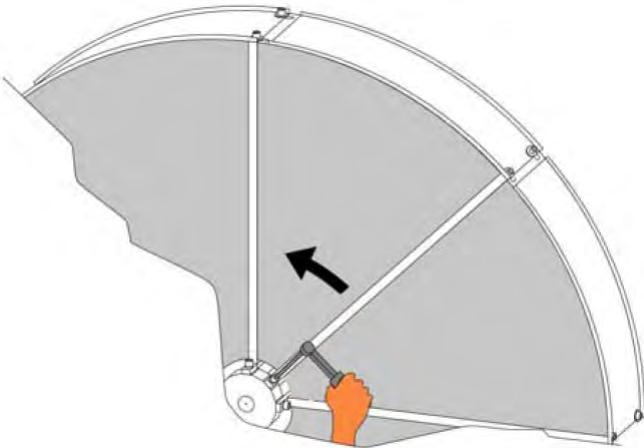
Integrate the last rotor circumferential panel into the rotor circumferential panel ring. The last circumferential panel needs to be brought under the first circumferential panel. For this, the screws of the first, already assembled circumferential panel, must be unscrewed.



### 9.5.2.5 Remove spacer discs

Remove the spacer discs; tighten opposite socket screws evenly, segment by segment. Always make sure the rotor can turn freely.

If the mounting has been done properly, the play of the rotor should be less than 1 mm per meter rotor diameter. In rare cases, it can be necessary to even out the play by inserting the supplied strips.



### 9.5.2.6 Clamp the encasing panels



#### Caution

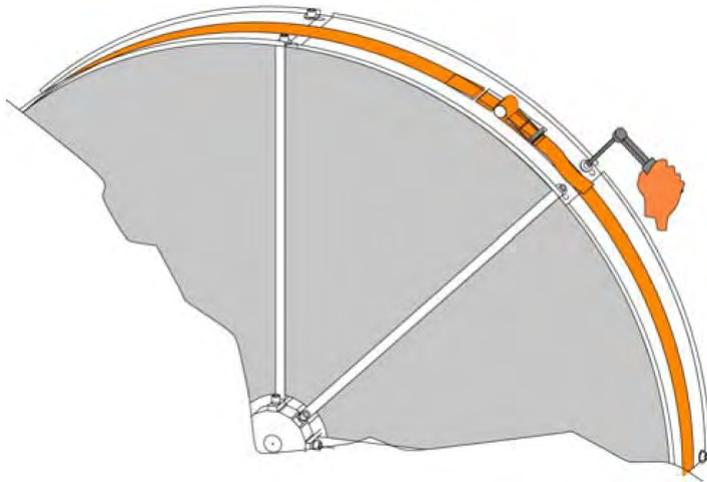
In case the circumferential panels feature an additional clamping device, then no tension belt is necessary. The rotor casing is clamped using the tensioning screws. The tensioning should be done as evenly as possible. It is recommendable to turn the rotor around several times.

Tighten the rotor with the tension belt after screwing on the circumferential panels. The tension belt is laid around the rotor like the V-belt using adhesive tape.

During the tightening, make sure that the mounted circumferential panels can be pulled together without a problem, loosen the M10 screws again if necessary.

After the rotor has been firmly clamped, tighten the M10 socket screws firmly.

If the rotor cannot be turned completely with the tension belt (tension belt lock), then this procedure needs to be repeated several times until all M10 socket screws have been firmly tightened.

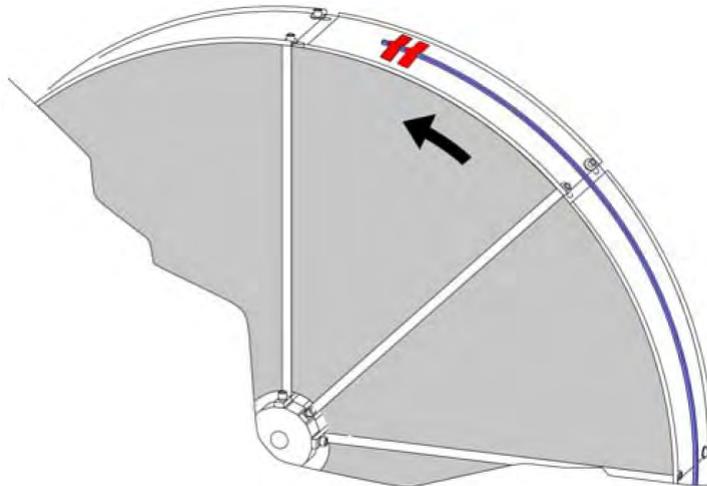


### 9.5.2.7 Mount V-belt

Open inspection cover.

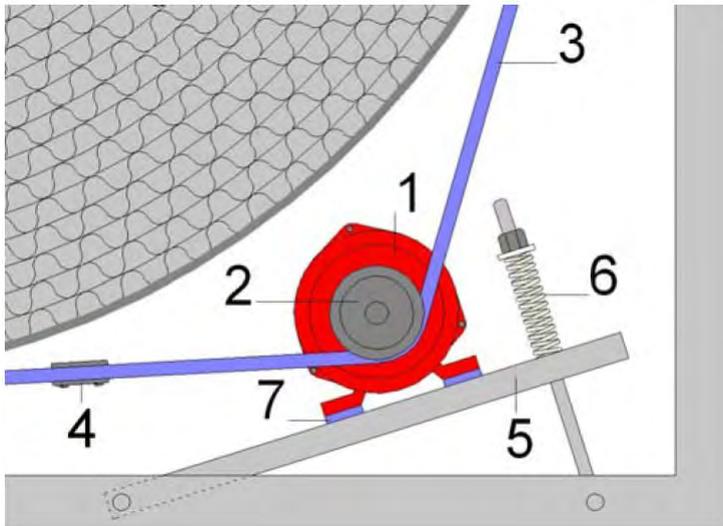
Attach a belt end to the rotor with adhesive tape.

Make sure that the V-belt does not twist as the rotor turns.

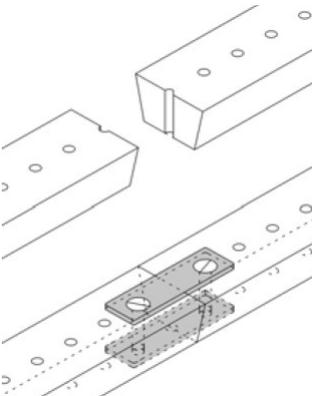


Turn the rotor and place the drive belt over the V-belt pulley – shorten so that there is sufficient clamp travel at the pivoting motor base

1. Drive motor
2. V-belt pulley
3. V-belt
4. V-belt lock
5. Pivoting motor base
6. Tension spring
7. Buffer element



Shorten the belt and attach V-belt lock.



### Caution

The drive belt may not be tensioned too much. Too much tension may damage the rotor casing and the variable speed drive unit. The drive motor may only be tensioned so that the drive belt does not slip.

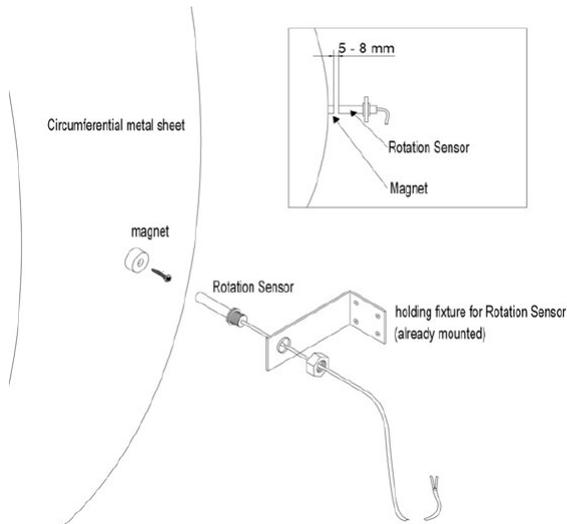
### 9.5.2.8 Mount rotation sensor

Attach the holder for the rotation sensor into the rotor system encasing so that after the mounting of the rotation sensor, a gap of 5–8 mm can be made between magnet and rotation sensor.

The magnet of the pulser i.e. the rotation sensor has to be screwed onto the circumference panel of the heat exchanger. Make sure that only the circumference panel of the rotor and not the accumulator is drilled into.

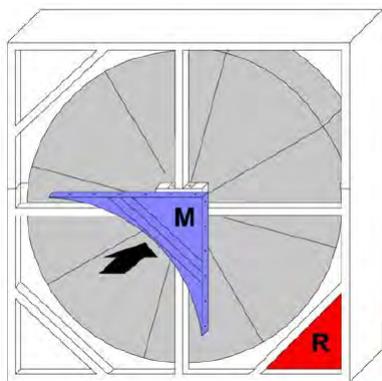
In most cases, the circumference panel of the rotor is made of aluminium. The magnet can be screwed directly to the circumference panel.

If the circumference panel is made of magnetic metal, then an insulating buffer needs to be attached between the magnet and the circumference panel.



### 9.5.2.9 Mount mounting corner

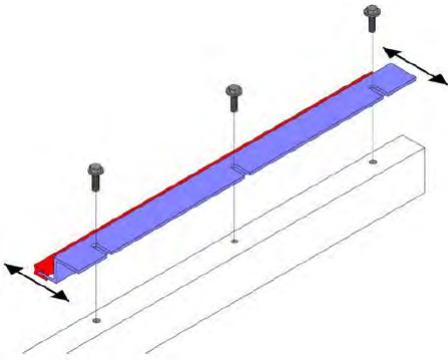
Insert the mounting corner again and fasten to the casing frame with the appropriate screws



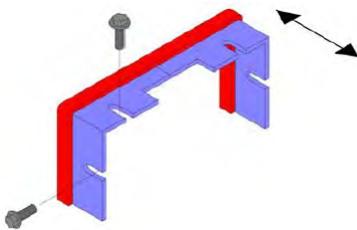
### 9.5.2.10 Mount seals

Middle seal Z-plates depending on intended air flow attach either to the horizontal or the vertical middle spar with the supplied cutting screws.

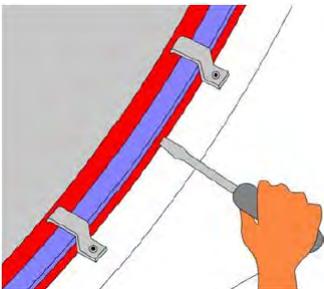
The middle seals should lie as close as possible, but not drag. To check the proper setting, the rotor should be turned several times carefully by hand.



Fasten bearing box seals with cutting screws.

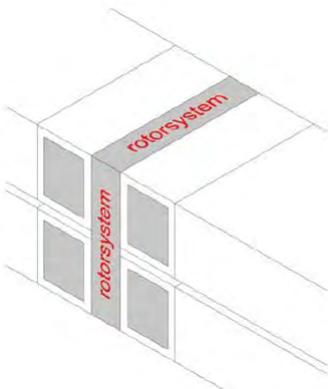


The circumferential seals are held by spring clamps and further secured by an additional spring steel sheet. The rubber seal is pushed gently up against the rotor with a screwdriver. The circumferential seal is pushed back slightly by the rotating rotor, thereby bringing it into optimal operational position.

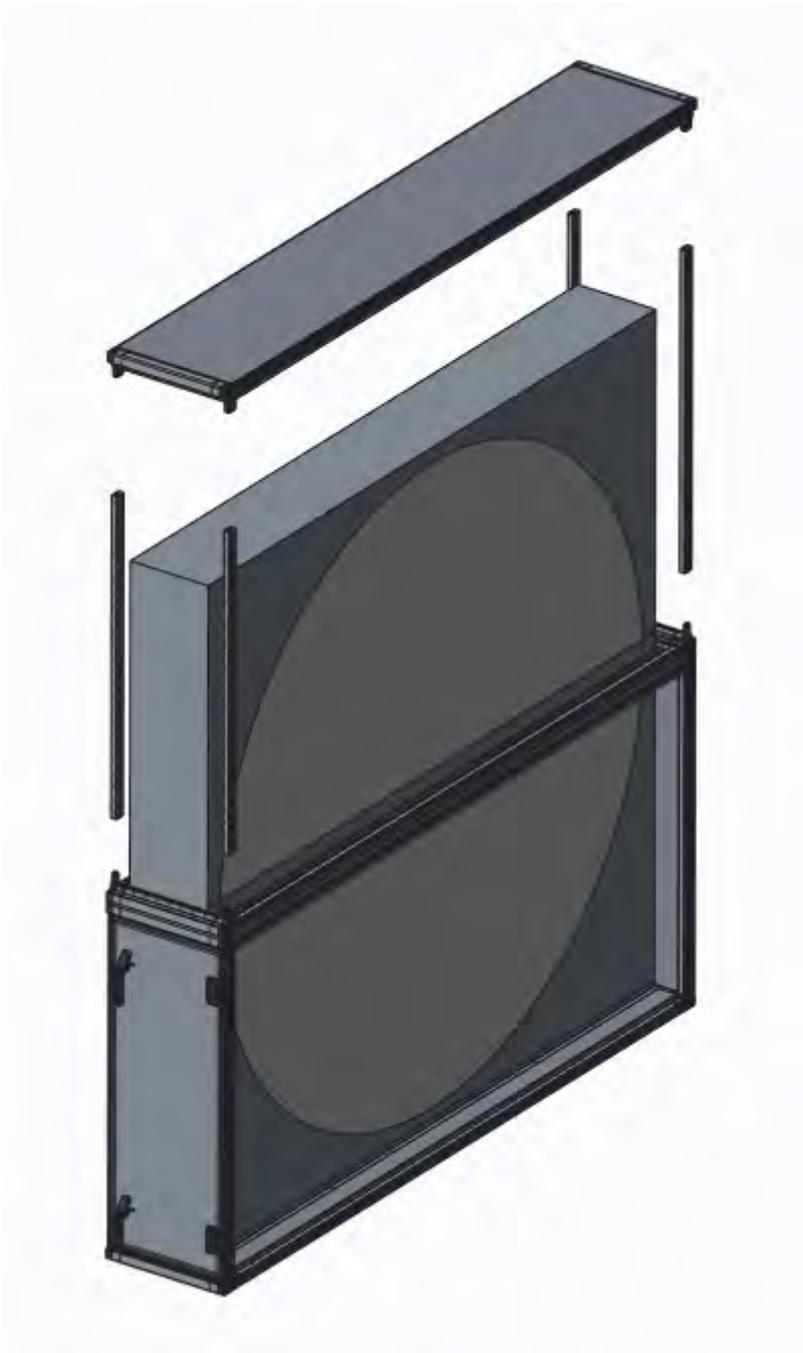


### 9.5.2.11 Duct connections

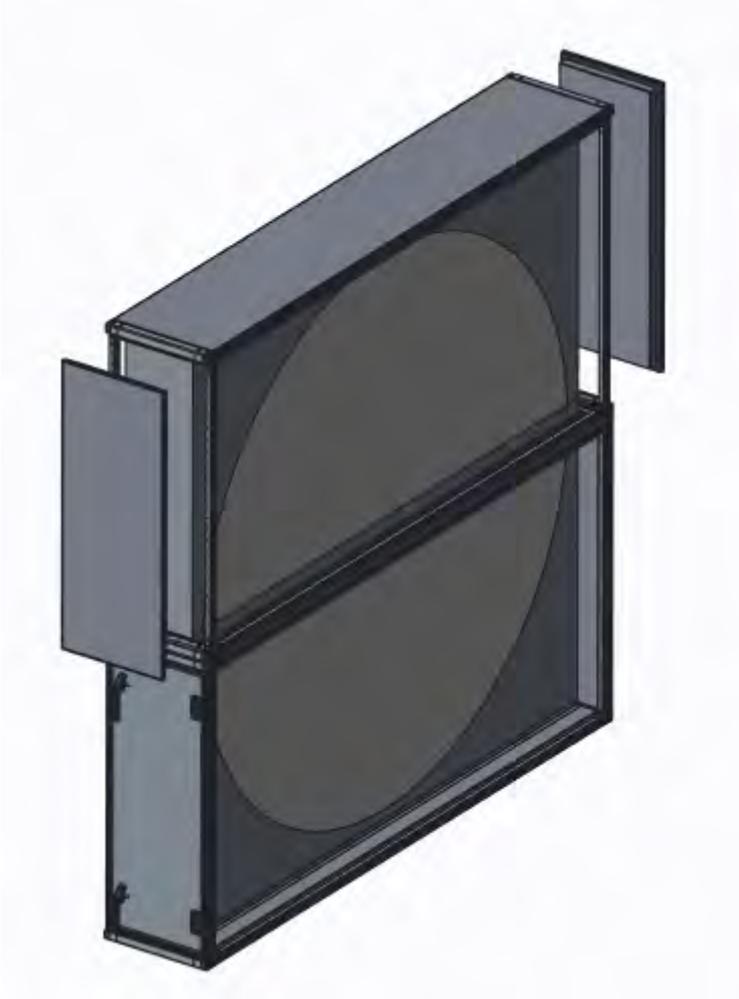
When mounting the ducts to the rotor system casing, make sure that no forces act on the casing that could change the casing position. In critical situations, we recommend installing elastic studs between rotor casing and air duct.



The next step is to mount the upper half of the Systemair unit casing consisting of 4 vertical profiles and the horizontal roof panel



Final step is to mount two panels.



## 9.6 Assemble divided rotor from Klingenburg

### 9.6.1 Tools and aids

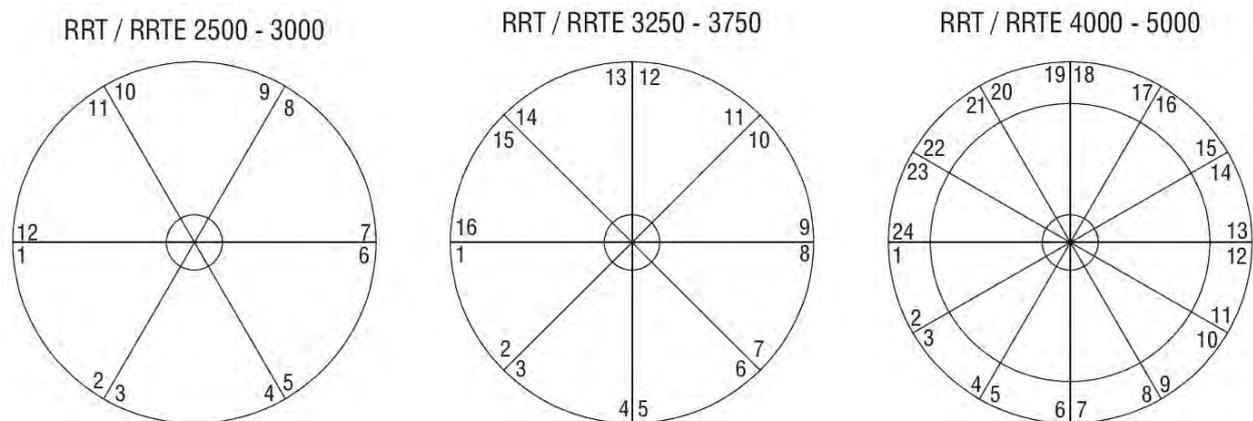
In addition to common technician's tools, the following tools are recommended:

- Hammer 1500 gm
- Plastic hammer
- Block of hard wood (10 cm x 10 cm x 50 cm)
- 2 steel bars (diameter = 25 mm, length = 600 mm)
- 2 x open spanners (17, 19, 24 mm)
- Socket set (7, 8, 17, 19 mm)
- Allen key bits (4, 6, 8, 10 mm)
- Electric screwdriver
- Side cutter
- Small ladder
- Pozidriv screwdriver (cross, not flat) (2, 8, 10 mm)
- Pump gun for sealant
- Sealant

### 9.6.2 Assembly instructions

The bottom half of the housing is already fitted with the bottom half wheel segments.

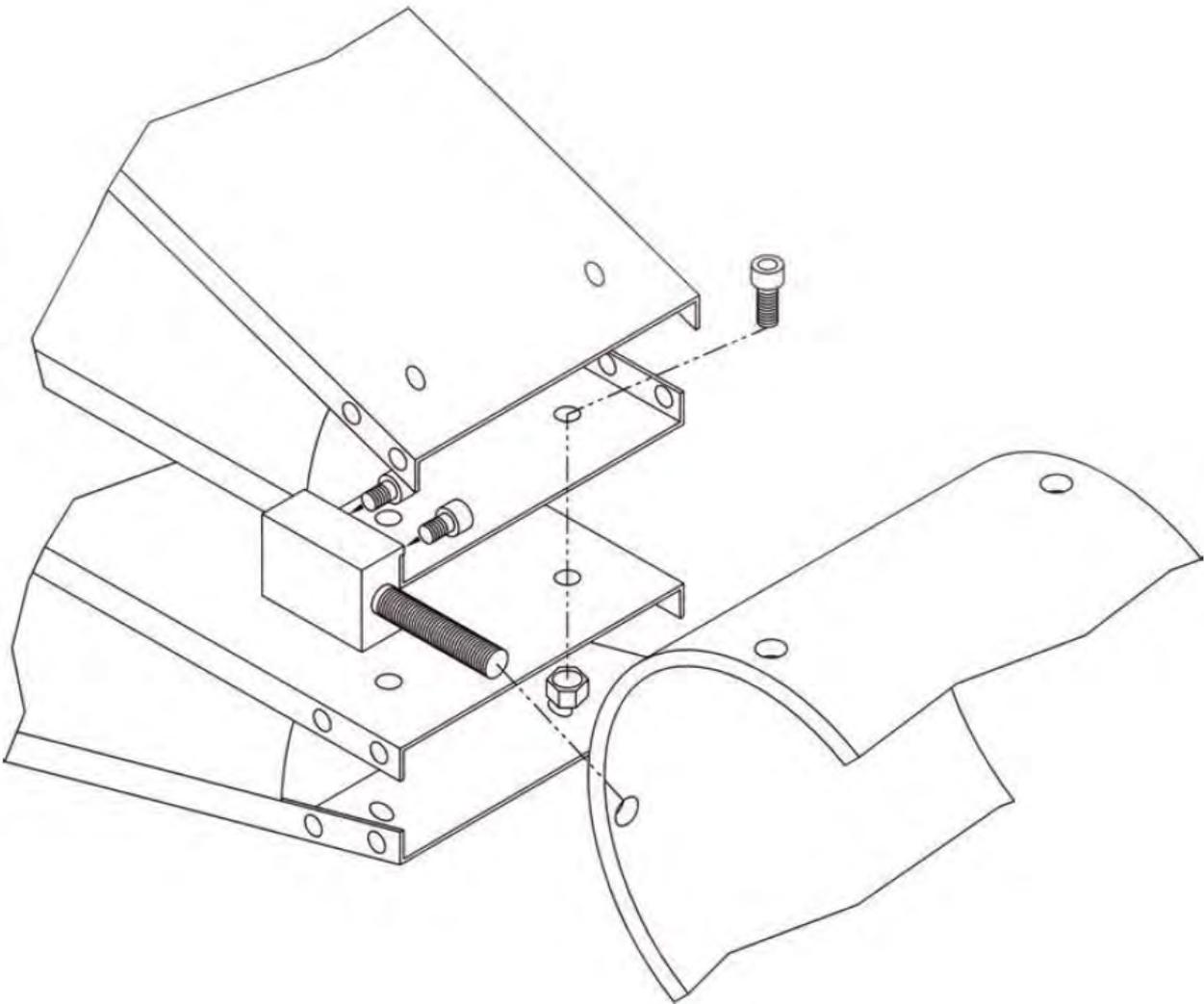
The connection or fixing points on each segment are numbered.



Block the rotation of the wheel by positioning the two steel rods (diameter = 25 mm, length = 600 mm) between the threaded rod at the bottom end of the segment and the bearing support frame.

Fix the rotor hub connector to the threaded rod on the segment cladding panel.

Connect the segment to the hub conform to the numbering sequence. Do not use any washers as support.

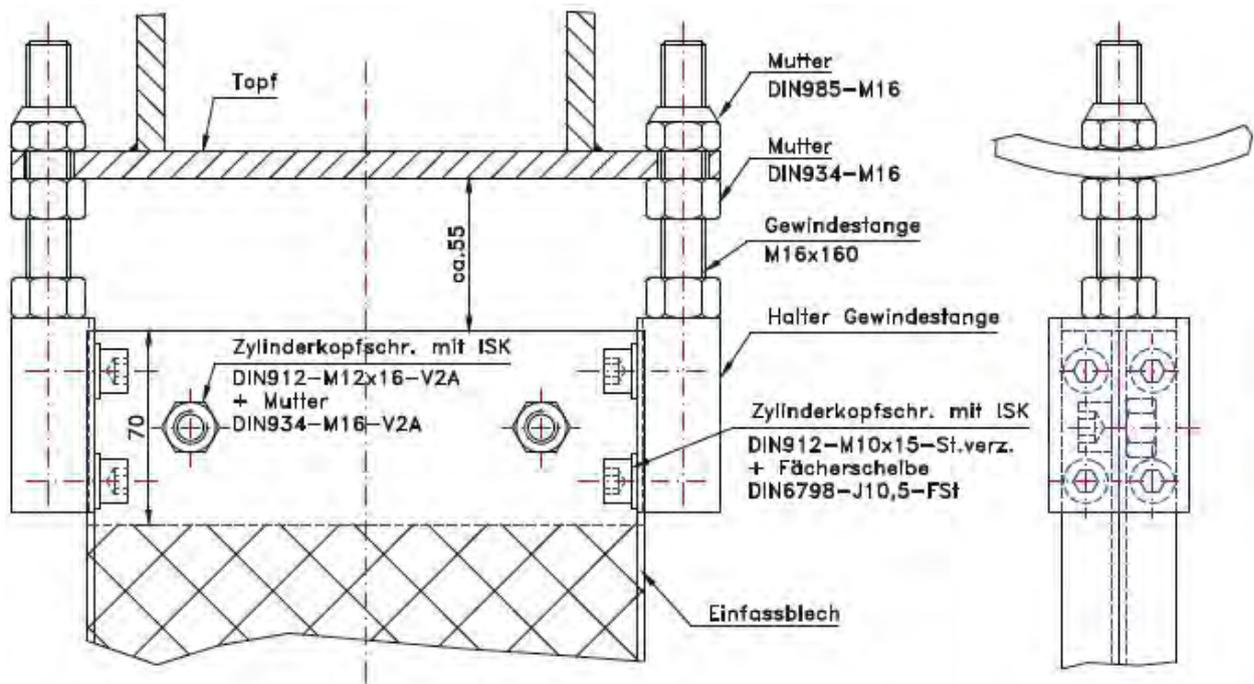


Tighten the nuts on the threaded rod with one nut against the other to prevent any loosening from occurring.



### Caution

The clearance between the outer rim of the hub and the segment's steel cladding panel should be approximately 55 mm. This clearance is used as a starting point to allow all segments to be initially installed. If this clearance is lower than 55 mm, difficulties could arise with the installation of the last segment.



Fix one segment back plate with the neighbouring segment back plate by use of the two nuts and bolts supplied and tighten (2 x M12 x 16 and nuts). See illustration above.

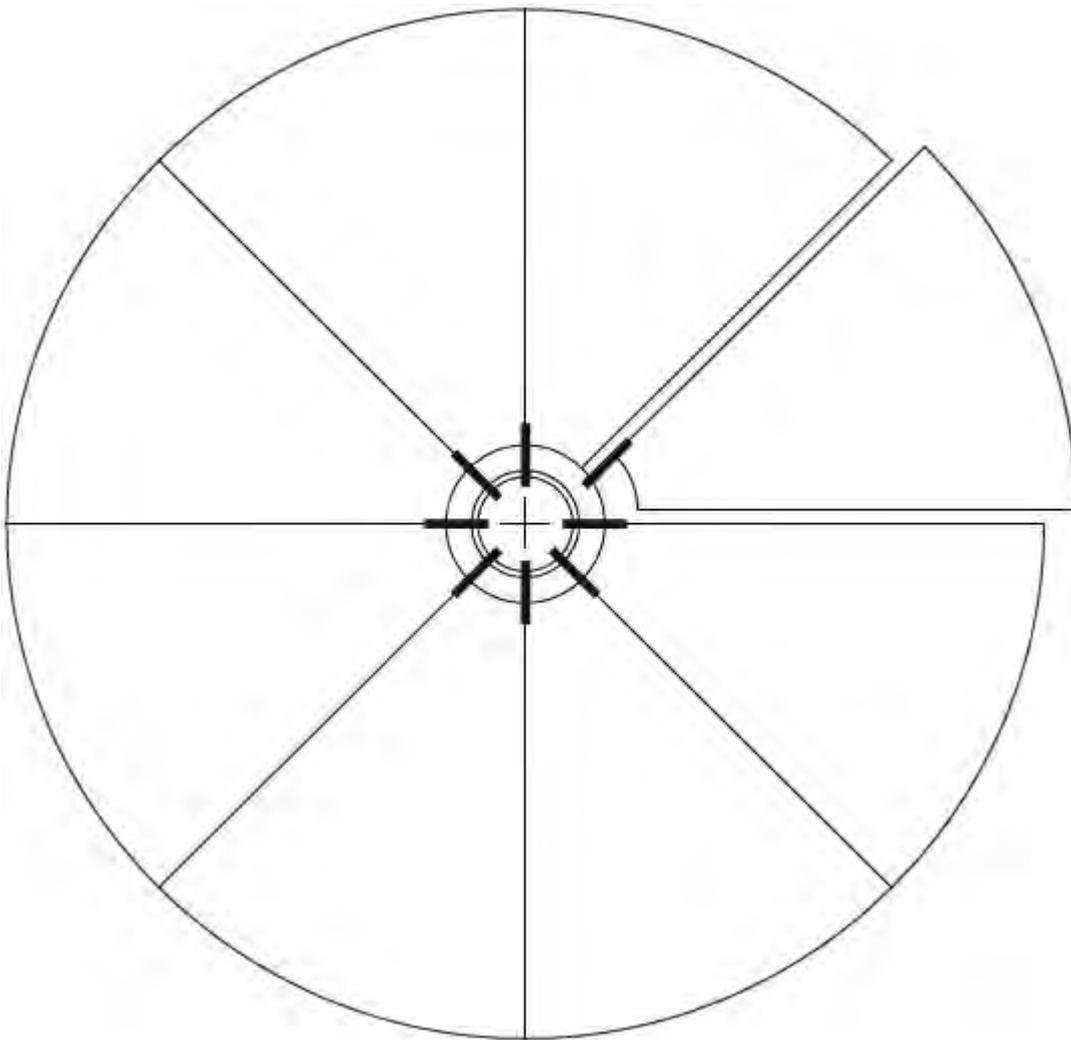
### Important

The steel cladding panels of each segment must be assembled so that there is no gap between one segment and the next. If this happens, the nuts on the threaded rod of that segment will have to be adjusted.

Should the last segment catch on the neighbouring segment, loosen the neighbouring segment's fixings and move it a few millimetres away from the hub until the last segment falls into place. If there are still gaps between cladding panels when all segments have been installed, carefully loosen all fixing nuts of the segments and move them all in by a few millimetres until all gaps have closed.

### Important

All segments must be tightly fixed. Otherwise, there is a risk that the wheel will bottom out against the housing.

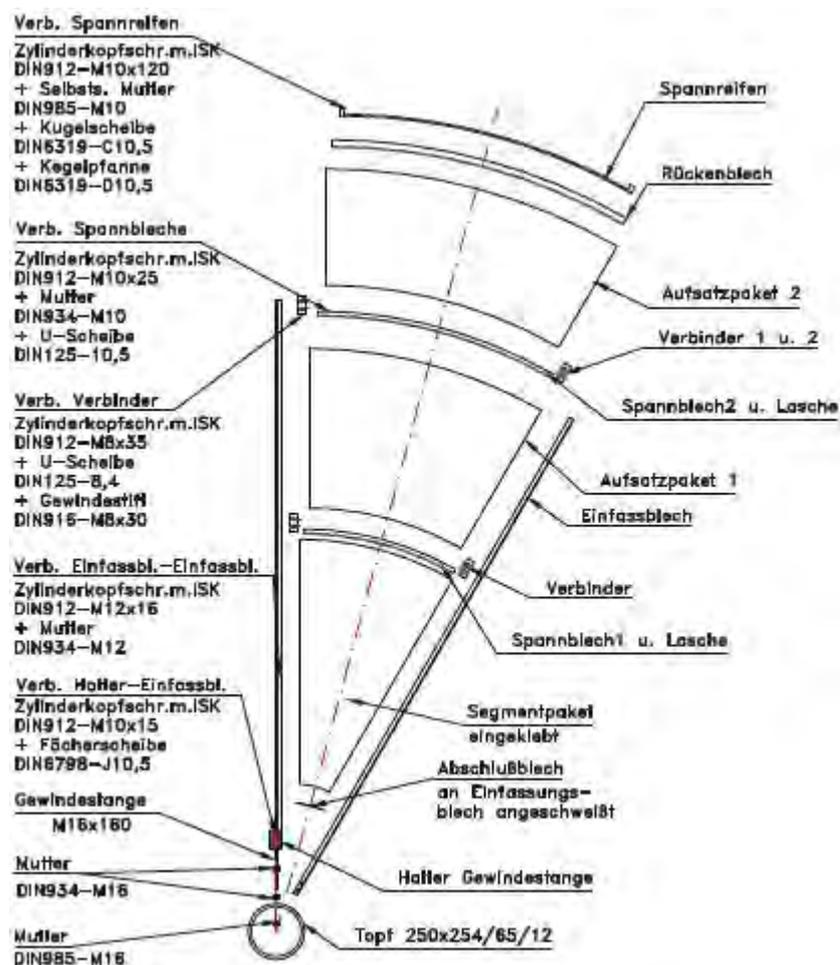


Install the first outer tensioning panel and assemble the connectors.

Install extra segments if included.

Install the second outer tensioning panel and assemble the connectors.

Install extra segments if included.



### 9.6.3 Adjusting the bearings

As a basic principle, the bearings are already adjusted from the factory. Should the wheel be tight or uneven after assembly, the bearings may have to be readjusted.

- Mark one of the segments on the outer edge.
- Spin the wheel until the marking is at the lowermost point.
- Measure the clearance between segment and housing frame.
- Spin the wheel until the marking is at the topmost point and measure again.
- Both measurements must be no more than +2 millimetres of each other.
- If necessary, shim one side of the bearings.
- Spin the wheel until the marking is at 9 o'clock position horizontal to the hub.
- Measure the clearance between segment and housing frame.
- Spin the wheel until the marking is at 3 o'clock position horizontal to the hub and measure again.
- Both measurements must be no more than + 2 millimetres of each other.
- If necessary, slightly loosen one of the bearings and move back or forth slightly to adjust the run out tolerance.

The separate segments are adjusted by loosening the fixings on the threaded rod where they meet the hub.

A sideways tolerance of 3 millimetres should not be allowed.

### 9.6.4 Installing back plates and tensioning belts



#### Note:

This section only applies to segmented wheels above 2500 mm.

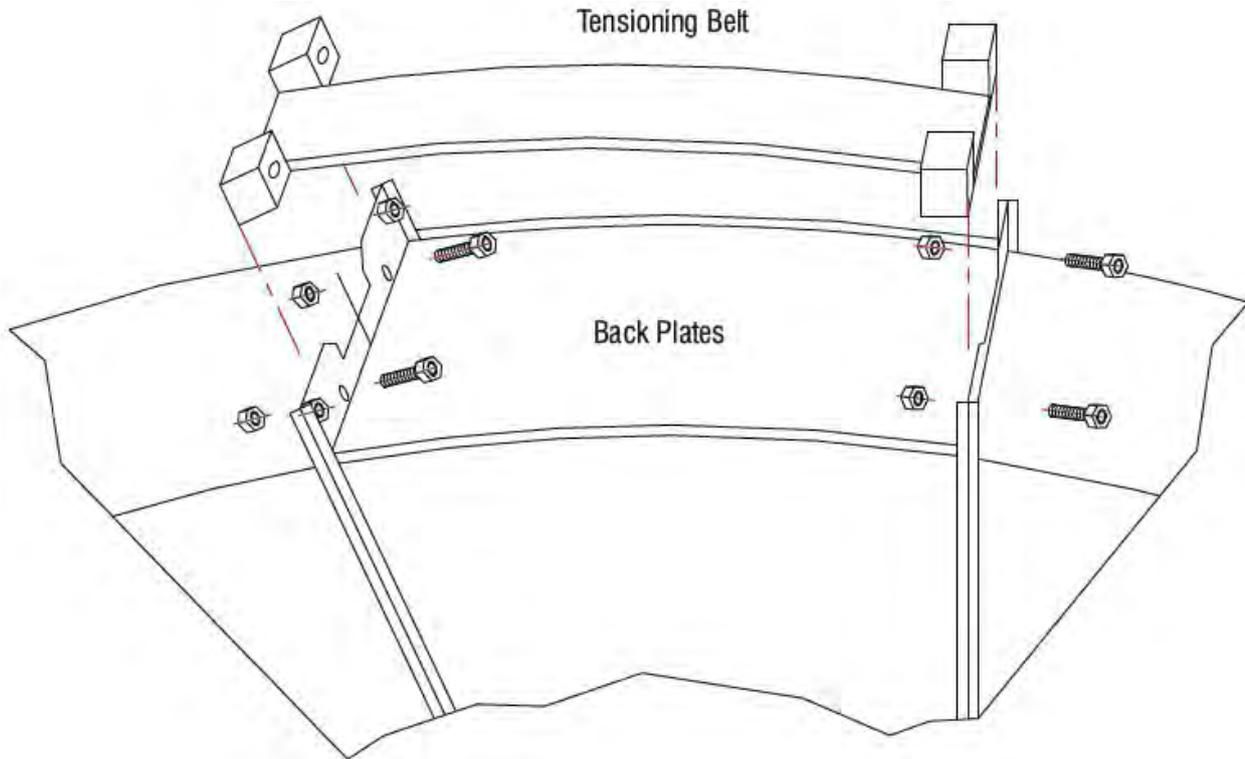
Now the back plates and tensioning belts will be installed and tightened.

Check that the wheel is running correctly before the final tightening of the fixings.

### Important

Ensure that the tensioning belts are tightened gradually and evenly. Repeat twice.

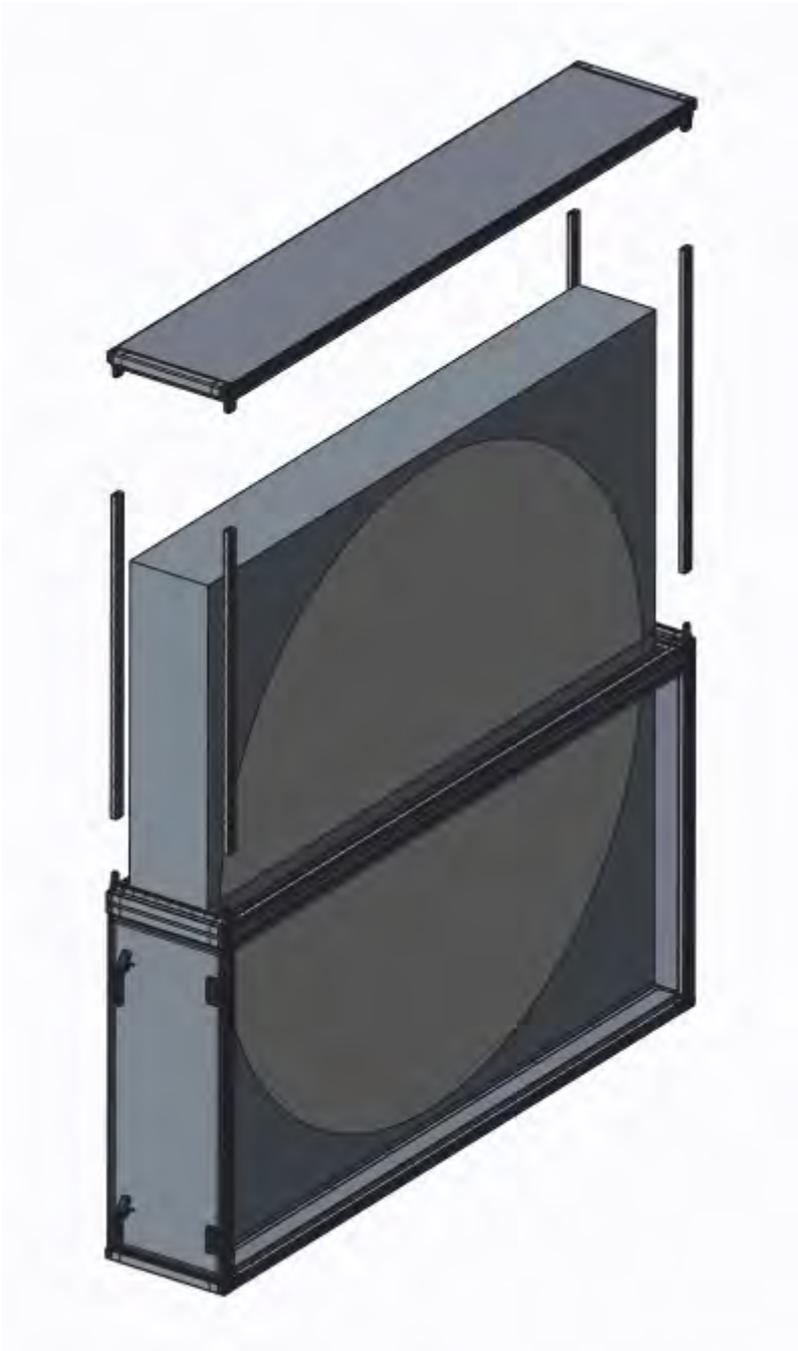
- Tighten bolts until all segments sit level and even to each other with no visible irregularities or gaps.
- With a plastic hammer or block of wood and a normal hammer, hammer the outer cladding panel around the entire circumference. Retighten all fixings.



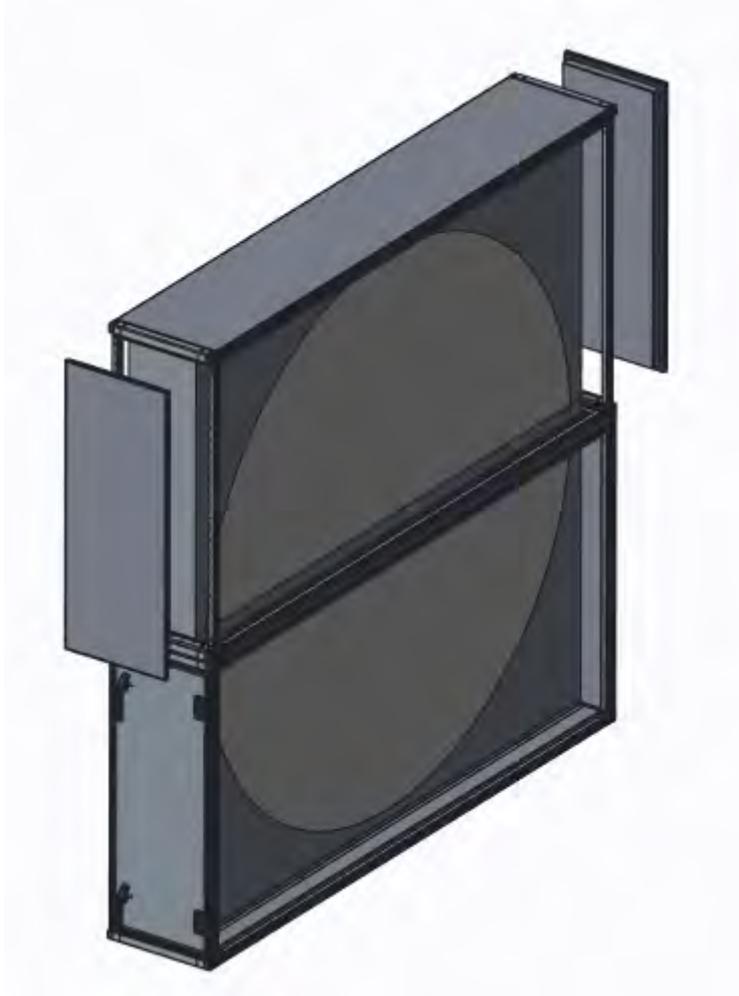
- Check side run out tolerance, clearance to the housing and the even depth run out while turning the wheel.
- Position the upper housing framework and fix in place.



The next step is to mount the upper half of the Systemair unit casing consisting of 4 vertical profiles and the horizontal roof panel



Final step is to mount two panels.



## 9.7 Installation of motor that turns rotor and sensor for control of rotation

After assembly of divided rotor drive belt between rotor and rotor motor as well as sensor for control of rotation must be installed.

The rotor motor is installed by Systemair before delivery.

The rotor motor is mounted on a motor console plate.

Sensor for control of rotation must be installed by the installer. On the rotor the installer must mount the screw that activates signal from the sensor. Distance between sensor and screw for activation of signal must **not** exceed 2mm.

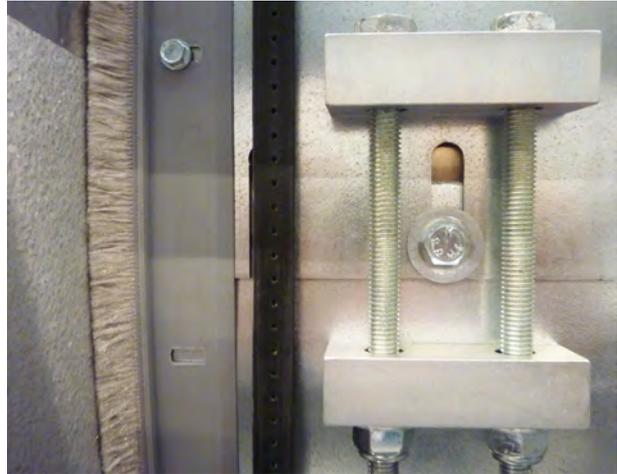
Pay attention to the heights of the brackets which are used for the assembly of the rotor segments. Check that collision between brackets and sensor is impossible. Please turn the rotor by hand in order to verify that the sensor will not be hit by the brackets.



### Note:

To activate the signal from the sensor during rotation of the rotor it is necessary to install a screw on the rotor. The distance from the screw to the sensor must **not** exceed 2 mm.

Check that collision between belt and bracket at the rotor is impossible. Adjust position of rotor motor if necessary.



Install sensor for registration of rotation. The sensor must be installed to the right seen from the inspection side of the unit. Check that collision between sensor and brackets at the rotor is impossible. Adjust position of sensor if necessary.



Mount the illustrated screw with two washers on the rotor for activation of signal from the sensor.



**Note:**

The distance from the screw to the sensor must **not** exceed 2 mm.



## **Annex 10 Reversible heat pump unit (in separate cover, if heat pump was delivered)**

### **10.1 Geniox-HP section (reversible heat pump unit)**

The air handling unit section – Geniox-HP – is a separate section in the air handling unit, containing a complete stand-alone reversible heat pump system (heating and cooling). If the air handling unit was delivered with this section, a separate manual about the heat pump was enclosed in the separate cover.

## **Annex 11 Menu for internal controller in the heat pump unit (in separate cover, if heat pump was delivered)**

If the air handling unit was delivered with this section, a separate manual about the heat pump was enclosed in the separate cover

## Annex 12 Connection of EC fan motor, diagnostics/faults and configuration of speed control

### 12.1 Connection of ECbluefin fan motor

Assembly instructions **ECblue BASIC-MODBUS**, **ECblue BASIC**

Enclosure

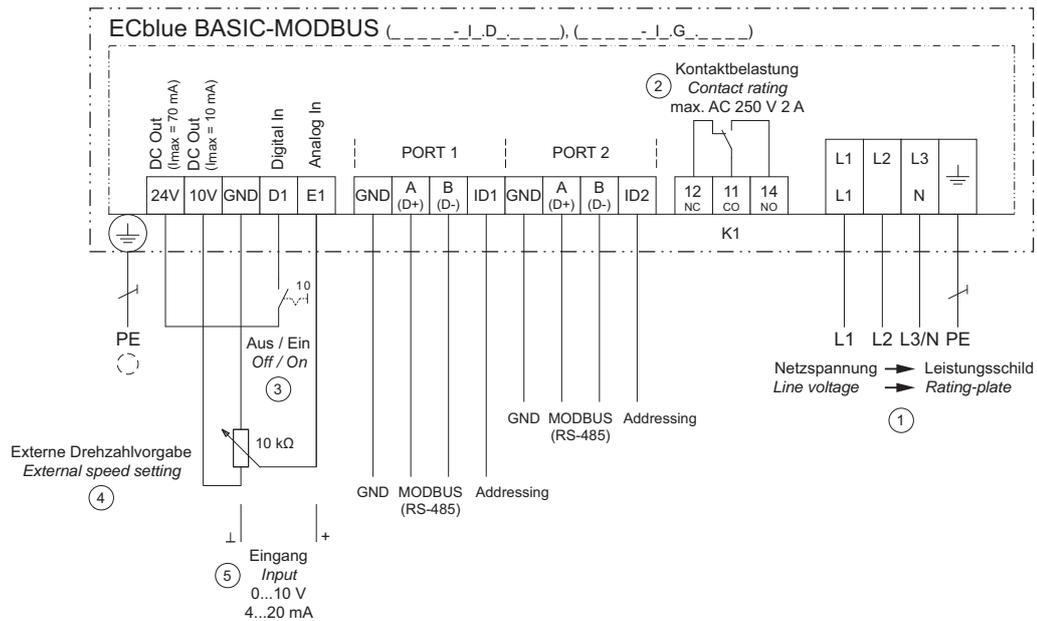
#### 12.3 Connection diagrams

Adhere to the further information under Mains connection.



##### UL: Input (Line)

Copper connecting leads with an insulation temperature of at least 80 °C must be used!

AP00001C  
28.08.2018

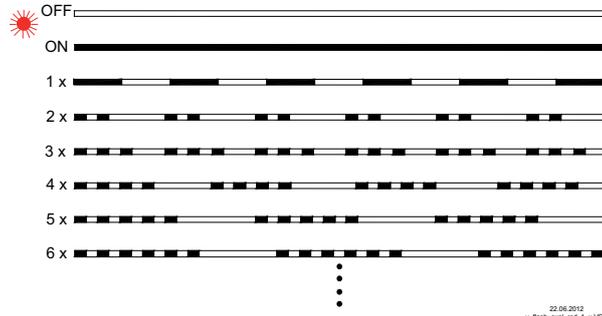
- 1 Line voltage see rating plate
- 2 Relay output "K1" for fault reporting (factory function), max. contact load AC 250 V 2 A
  - During operation the relay is energised, i.e. the connections "11" and "14" are bridged
  - In case of a fault, the relay is de-energised, i.e. the connections "11" and "12" are bridged
  - In case of a shutdown using the enable (D1 = Digital In 1) the relay remains energised
- 3 Digital enable input (factory function)
  - Device "ON" when contact closed
  - Device "Off" when contact open
- 4 External speed setting
- 5 Input 0...10 V, 4...20 mA
- 6 PWM input,  $f = 1...10$  kHz

## 12.2 Diagnostics/faults visualised by LED on the ECbluefin motor

### 10.2 Status output with flashing code



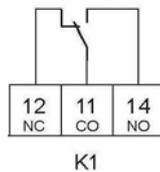
Vision panel for status LED in the case of plastic cover design



LED Code	Relays K1*	Cause Explanation	Reaction of Controller
			Adjustment
OFF	0	No line voltage	Line voltage available? Unit switch OFF and automatically ON when the voltage has been restored
ON	1	Normal operation without fault	
1 x	1	<b>No enable = OFF</b> Terminals "D1" - "24 V" (Digital In 1) not bridged.	Switch OFF by external contact (see digital input).
2 x	1	<b>Temperature management active</b> The device has an active temperature management to protect it from damage due to too high inside temperatures. In case of a temperature rise above the fixed limits, the modulation is reduced linearly.	With a drop in temperature the modulation rises again linear. Check installation of the device and cooling of the controller.
4 x	0	<b>Line failure</b> (only for 3 ~ types) The device is provided with a built-in phase-monitoring function for the mains supply. In the event of a mains interruption (failure of a fuse or mains phase) the unit switches off after a delay (approx. 200 ms). Only functioning with an adequate load for the controller.	Following a shutoff, a startup attempt is made after approximately 15 seconds, if the voltage supply is high enough. This keeps occurring until all 3 supply phases are available again. Check power supply
5 x	0	<b>Motor blocked</b> If after 8 seconds of commutation no speed is measured > 0, the fault "Motor blocked" is released.	EC-Controller switches off, renewed attempt to start after about 2.5 sec. Final shutoff, when fourth starting test fails. It is then necessary to have a reset by disconnecting the line voltage. Check if motor is freely rotatable.
6 x	0	<b>Failure power module</b> Short circuit to earth or short circuit of the motor winding.	EC-Controller switches off, renewed attempt to start after about 60 sec. see code 9. Final shutoff, if - following a second starting test - a second fault detection is detected within a period of 60 seconds. It is then necessary to have a reset by disconnecting the line voltage.
7 x	0	<b>Intermediate undervoltage</b> If the DC-link voltage drops below a specified limit the device will switch off.	If the DC-link voltage rises above the limit within 75 seconds, then the controller will attempt to start. Should the DC-link voltage stay for more than 75 seconds below the limit, the device will switch off with a fault message.
8 x	0	<b>Intermediate circuit overvoltage</b> If the DC-link voltage increases above a specified limit, the motor will switch off. Reason for excessively high input voltage or alternator motor operation.	If the DC-link voltage drops below the limit within 75 seconds, then the controller will attempt to start. Should the DC-link voltage stay above the limit for more than 75 seconds, the device will switch off with a fault message.

LED Code	Relays K1*	Cause Explanation	Reaction of Controller
			Adjustment
9 x	1	<b>Cooling down period power module</b> Cooling down period power module for approx. 60 sec. Final shutoff after 2 cooling-off intervals see code 6	Power module cooling down period for approx. 60 sec. Final shutoff after 2 cooling-off intervals see code 6.
11 x	0	<b>Error motor start</b> If a starting command is given (enable available and Setpoint > 0) and the motor does not start to turn in the correct direction within 5 minutes, then an error message will appear.	If it is possible to start the motor in the target direction of rotation after the error message, the error message will disappear Should a voltage interruption occur in the meantime, the time taken up to the switch off will begin again. Check if motor is freely rotatable. Check if the fan is driven in reverse direction by an air stream (see Behaviour in rotation by air current in reverse direction).
12 x	0	<b>Line voltage too low</b> If the DC-link voltage drops below a specified limit the device will switch off.	If the line voltage rises above a specified limit within 75 seconds, then the controller will attempt to start. Should the line voltage stay below the specified limit for more than 75 seconds, the device will switch off with an error message
13 x	0	<b>Line voltage too high</b> Cause to high input voltage If the line voltage increases above a specified limit, the motor will switch off.	If the line voltage drops below the specified limit within 75 seconds, then the controller will attempt to start. Should the line voltage stay above the specified limit for more than 75 seconds, the device will switch off with an error message.
14 x	0	<b>Error peak current</b> If the motor current increases above the specified limit (even in a short time-frame) the device will switch-off.	After a switch off the controller waits for 5 seconds then the controller attempt a start. Arises within 60 sec. in series 5 further disconnections a final switch off with fault indication follows. Should no further switch off be exceeded in 60 sec. the counter will be reset.
17 x	0	<b>Temperature alarm</b> Excess of the max. permissible inside temperature.	Controller switches off motor. Automatic restarting after cooling down. Check installation of the device and cooling of the controller.
20 x	0	<b>Communication fault</b> MODBUS communication interrupted	see description MODBUS communication

\* Relays K1 programmed function at factory (Fault indication not inverted)  
 0 Relays de-energized  
 1 Relays pulled up



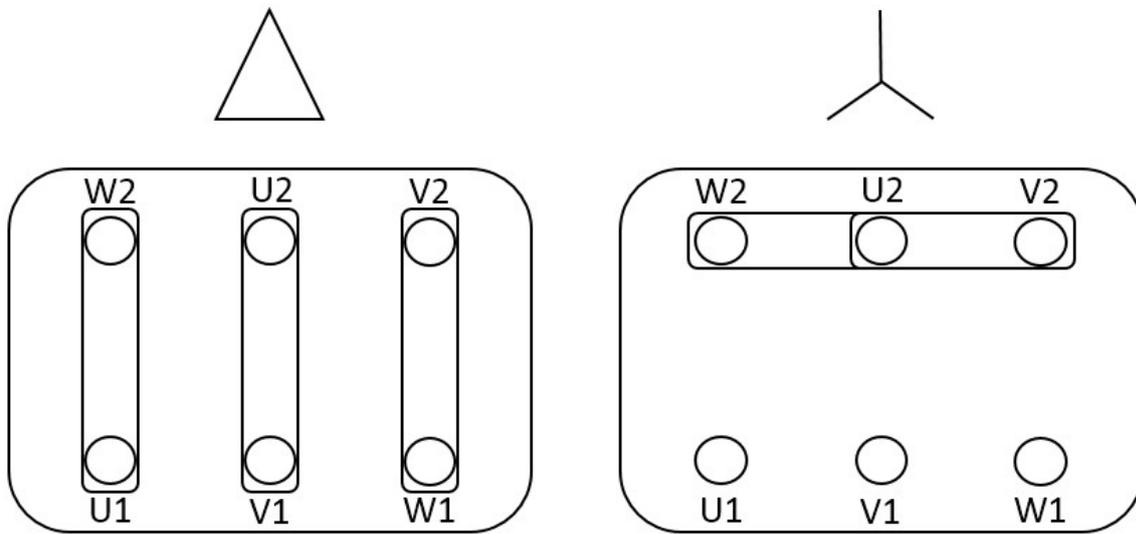
### 12.3 Configuration of speed control

See information in manual from Ziehl Abegg. The name of the manual is L-BAL-F078-D-GB

## Annex 13 Connection of fan motor and set-up manual for frequency converter

### 13.1 Connection of fan motor

Delta connection is shown to the left, and star connection is shown to the right.



### 13.2 Set-up for Danfoss FC101 for Geniox-units with AC motors

SETUP IS DONE IN FACTORY BEFORE DELIVERY

To reload Systemair factory settings from the control panel:

0-50: LCP Copy: [2]

Systemair factory set-up is based on Danfoss initialization.

14-22: **Operation mode:** [2] Initialisation (Danfoss Initialisation)

Turn power off and on.

Systemair factory set-up:

0-01: Language selection:

1-03: **Torque characteristic:** Single fan: [3] Auto-Energy optim.

With twin fan set-up: [1] Variable Torque

1-20: **Motor Power:** According to motor plate / order papers

With twin fan set-up total power must be used

1-24: **Motor Current:** According to motor plate / order papers

With twin fan set-up total current must be used

1-25: **Motor Nominal Speed:** According to motor plate / order papers

1-42: **Motor Cable Length:** 3m

1-50: **Motor Magnetisation at zero speed.:** 0 %

1-52: **Min. Speed Normal Magnetisation:** 10 Hz

1-73: **Flying Start:** [0] Disabled

1-90: **Motor Thermal Protection:** [2] Thermistor trip

3-15: **Reference 1 Source:** [2] Analog input AI54

1-93: **Thermistor Source:** [1] Analog input AI53

3-03: **Maximum Reference:** Max. Hz from order papers

3-16 + 3-17: **Reference 2- and 3 Source:** [0] No function

3-41 + 3-42: **Ramp 1 up and down:** 20 Sec.

4-19: **Max. Output Frequency:** 90Hz

4-14: **Motor Speed High Limit:** 90Hz

4-18: **Current limit:** 100 %

5-12: **Terminal 27 Digital input:** [0] No operation

5-40.0: **Function Relay:** [3] Drive ready/remote

5-40.1: **Function Relay:** [3] Drive ready/remote

6-25: **Terminal 54 High Reference:** Max. Hz from order papers

14-03: **Over modulation:** [1] Active

14-20: **Reset Mode:** [2] Automatic reset x 2

0-50: **LCP Copy:** [1] All to LCP (Copy of Systemair factory settings to panel)

Connections:

0-10V: terminal 54-55

Start: terminal 12-18

Thermistor: terminal 50-53

Drive ready: terminal 1-2

### 13.3 AC-fan operation without thermistor for Danfoss FC101

Systemair factory set-up is based on Danfoss initialization.

14-22: **Operation mode:** [2] Initialisation (Danfoss Initialisation)

Turn power off and on.

Systemair factory set-up:

0-01: Language selection:

1-03: **Torque characteristic:** [3] Auto-Energy optim.

1-20: **Motor power:** According to motor plate

1-24: **Motor Current:** According to motor plate

1-25: **Motor Nominal Speed:** According to motor plate

1-29: **Automatic motor adaption (AMA):** [1] Compl. motor adaption to (Turn power off and on.)

1-42: **Motor Cable Length:** Order specific

1-50: **Motor Magnetisation at zero speed.:** 0 %

1-52: **Min. Speed Normal Magnetisation:** 10 Hz

1-73: **Flying start:** [0] Deactivated

5-40.0: Function Relay: [3] Drive ready/remote

14-03: Over modulation: [1] Active

14-20: Reset Mode: [2] Automatic reset x 2

0-50: LCP Copy: [1] All to LCP (Copy of Systemair factory settings to panel)

Connections:

0-10V: terminal 54-55

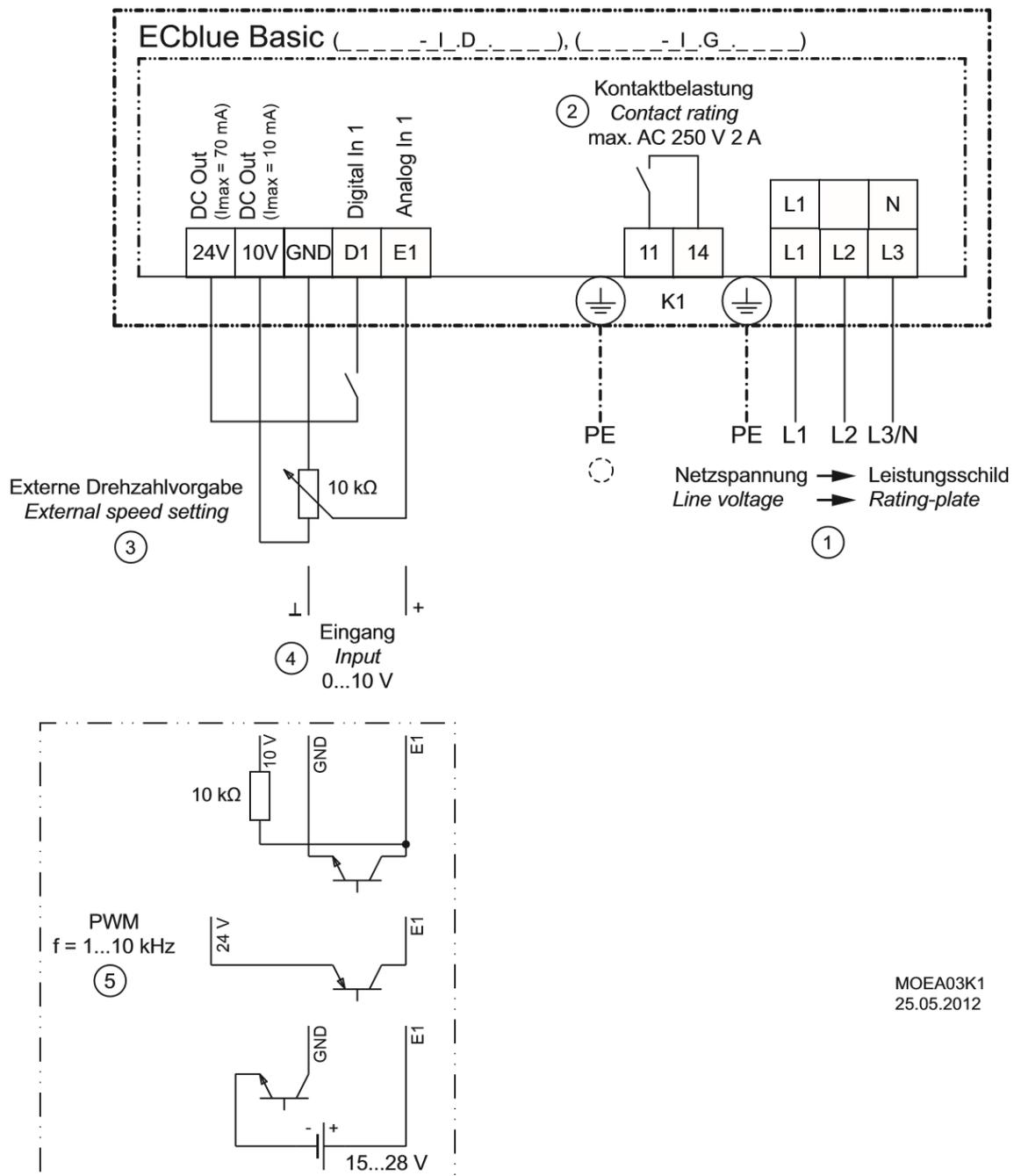
Start: terminal 12-18

Drive ready: terminal 1-2

Jumper terminal 12-27

## 13.4 Installation ECblue

### 13.4.1 Connection



- 1 Line voltage → rating plate
- 2 Contact rating max. AC 250 V 2 A
- 3 External speed setting

1. Line voltage rating plate
2. Contact rating max AC 250 V 2 A
3. External speed setting
4. Input 0...10 V
5. PWM input, f = 1...10 kHz

For ECblue 3 ~ types and when connecting 1 ~ types between two outer conductors, only all-current sensitive fault current circuit breakers (type B) are allowed ( → EN 50 178, Art. 5.2).

**Residual-current-operated protective devices**

Terminal	Function / connection
L1, N, PE	Mains connection for 1 ~ types (observe the line voltage indicated  rating plate).
L1, L2, L3, PE	Mains connection for 3 ~ types (observe the line voltage indicated  rating plate).
11, 14	Relay output "K1" for fault indication. <sup>1</sup> <ul style="list-style-type: none"> <li> For operation the relay is energized, connections "11" and "14" are bridged. For fault the relay is de-energized (Diagnostics / faults).</li> <li>When switching off via enable (D1 = Digital In 1), the relay remains energized.</li> </ul>
E1, GND	Analog input for setting speed via 0 - 10 V or PWM signal*
10V	Voltage supply for speed setting by 10 kΩ potentiometer.
24V	Voltage supply for external devices.
D1, +24V	Digital input for enable. <sup>1</sup> <ul style="list-style-type: none"> <li>Device "ON" for closed contact.</li> <li>Controller "OFF" with opened contact.</li> </ul>

<sup>1</sup> Function for standard factory setting, different presetting possible

**UL: Input (Line)**

- Cu connection leads with the following specifications must be employed:
  - Minimum insulation temperature of 80 °C
  - Terminal tightening torque for field block (L1, N, and/or L1, L2, L3) of 5 - 7 Lb In.  
(Exception: spring-cage terminal for motor size "G" @ line voltage 3 ~ 200...240 V) – Terminal tightening torque of 4.5 Lb In for field block (K1).
  - Terminal tightening torque of 4.5 Lb In for all other field blocks.
  - Terminal tightening torque of 2.2 Lb In for add-on modules.

**13.4.2 Diagnostic/faults**
**Status Out with flash code**

LED Code	Relays K1 <sup>1</sup>	Cause
OFF	de-energized, 11 - 14 interrupted	No line voltage
ON	energized, 11 - 14 bridged	Normal operation without fault
1 x	energized, 11 - 14 bridged	No enable = OFF
2 x	energized, 11 - 14 bridged	Temperature management active
3 x	de-energized, 11 - 14 interrupted	HALL-IC error
4 x	de-energized, 11 - 14 interrupted	Line failure (only for 3 ~ types)
5 x	de-energized, 11 - 14 interrupted	Motor blocked
6 x	de-energized, 11 - 14 interrupted	IGBT Fault
7 x	de-energized, 11 - 14 interrupted	Intermediate circuit undervoltage
8 x	de-energized, 11 - 14 interrupted	Intermediate circuit overvoltage
9 x	energized, 11 - 14 bridged	IGBT cooling down period
11 x	de-energized, 11 - 14 interrupted	Error motor start
12 x	de-energized, 11 - 14 interrupted	Line voltage too low
13 x	de-energized, 11 - 14 interrupted	Line voltage too high

LED Code	Relays K1 <sup>1</sup>	Cause
14 x	de-energized, 11 - 14 interrupted	<b>Error Peak current</b>
17 x	de-energized, 11 - 14 interrupted	<b>Temperature alarm</b>

<sup>1</sup> K1: programmed function at factory: Fault indication not inverted

## **Annex 14 Commissioning protocol – proposal (in separate cover)**

Printed on separate pages and delivered with every unit. Enclosed in separate cover.

15-1 | Report with data from final functional test on the Systemair factory (in separate cover, if control system was delivered)

**Annex 15 Report with data from final functional test on the Systemair factory (in separate cover, if control system was delivered)**

Printed on separate pages and delivered with every unit. Enclosed in separate cover.

## Annex 16 Short description of main components in the control system

### 16.1 Geniox units delivered in several sections

This model of the Geniox unit has an integrated control system and depending on the size of the unit, the cabinet is installed in the unit, on the unit or on the front of the unit. The controller is mounted in the cabinet, and all electrical connections between cabinet and components in the unit are installed. The control system is configured according to the customer's order – confirmed by the order confirmation – to promote easy start-up on the site. The unit is tested at the factory and all functions are confirmed by a final functional test and test report that is delivered with the unit. After the final test the unit is divided in sections to facilitate the transport. After reassembly of the unit on the site, the clearly marked cables with sockets must be reconnected in the marked terminals. Cable strips are preinstalled for installation of the cables between the components in the unit-sections and the cabinet. Cables installed on the unit-sections in the preinstalled strips are protected by metal covers. The covers have been removed before installation of the unit on the final site and must be replaced after installation of the cables. Cables with the mains power supply must be installed in the automatic circuit breakers belonging to fans, heat pump unit Geniox-HP (if delivered). All external components must be connected on the site.

#### 16.1.1 External components

External components are Systemair control panel, valves, valve motors, pressure transmitters, supply air temperature sensor, sensor for water temperature in the heating coil (if water heating coil was requested) and circulation pump (Systemair does not deliver the pump). Terminals are present in the cabinet for pressure transmitters, if it is a solution for constant pressure in the ducts, and terminals are present in the cabinet for valve motors, circulation pump, supply air temperature sensor and sensor for water temperature in the heating coil, but cables are not installed and not connected to terminals in the cabinet. The Systemair control panel with cable is not connected to the controller in the cabinet. All external components delivered are packed in a cardboard box delivered together with the unit.

### 16.2 Geniox unit delivered assembled on base frame

This model of the Geniox unit has an integrated control system and the cabinet mounted inside the unit. The cabinet is always mounted in the unit section with the heat exchanger and the cabinet is always placed at the warm side of the heat exchanger. The intelligent controller is mounted in the cabinet, and all electrical connections between cabinet and components in the unit are installed. The control system is configured according to the customer's order – confirmed by the order confirmation – to promote easy start-up on the site. The unit is tested at the factory and all functions are confirmed by a final functional test and test report that is delivered with the unit. The unit is delivered as one assembled section on base frame. Cables with the mains power supply must be installed in the automatic circuit breakers belonging to fans, heat pump unit Geniox-HP (if delivered). All external components must be connected on the site.

#### 16.2.1 External components

External components are Systemair control panel, valves, valve motors, pressure transmitters, supply air temperature sensor, sensor for water temperature in the heating coil (if water heating coil was requested) and circulation pump (Systemair does not deliver the pump). Terminals are present in the cabinet for pressure transmitters, if it is a solution for constant pressure in the ducts, and terminals are present in the cabinet for valve motors, circulation pump, supply air temperature sensor and sensor for water temperature in the heating coil, but cables are not installed and not connected to terminals in the cabinet. The Systemair control panel with cable is not connected to the controller in the cabinet. All external components delivered are packed in a cardboard box delivered together with the unit.

17-1 | Wiring diagram (in separate cover, if control system was delivered)

## **Annex 17 Wiring diagram (in separate cover, if control system was delivered)**

The wiring diagram is in a separate cover

## Annex 18 Geniox Air Handling Units – Sustainability

Weighting of criteria for DGNB sustainability certified office buildings for Systemair air handling units - type Geniox. Please be aware that the percentages below indicate the part of the criteria in the DGNB system that Systemair's products can affect. It is not exclusively Systemair's products that contribute to the 57,70%.

Topic	Criterion	Name	Geniox for office buildings	Geniox criteria score	DGNB criteria score
Process	PRO 1.5	Instructions on maintenance and use of the AHU	1.70 %	3.40 %	10 %
	PRO 2.2	Documentation of the quality of the design	1.70 %		
Environment	ENV 1.1	Life cycle assessment	7.90 %	12.40 %	22.50 %
	ENV 1.2	Environmental risks related to building materials	3.40 %		
	ENV 1.3	Environmentally friendly materials	1.10 %		
Economy	ECO 1.1	Building related lifetime costs	9.60 %	16.00 %	22.50 %
	ECO 2.2	Robustness	6.40 %		
Social	SOC 1.1	Thermal comfort	4.50 %	9.90 %	22.50 %
	SOC 1.2	Indoor air quality	2.70 %		
	SOC 1.4	Visual comfort	2.70 %		
Technical	TEC 1.1	Fire safety	3.20 %	16.00 %	22.50 %
	TEC 1.2	Noise	3.20 %		
	TEC 1.3	Casing quality	3.20 %		
	TEC 1.5	Cleaning and maintenance	3.20 %		
	TEC 1.6	Suitability for dismantling and recycling	3.20 %		
Sum			<b>57.70 %</b>	<b>57.70 %</b>	100.00 %

Quality	Subcategory	Geniox air handling units offer the following
<b>Process quality</b>	Guidance on maintenance and use of the air handling unit	For proper maintenance, see the User Manual.
	Documentation of quality of the execution on the building site	In your offer and order confirmation from Systemair you will find documentation for the air handling unit via a printout from the configuration software - SystemairCAD, which is quality controlled via Eurovent - Europe's Industry Association for Indoor Climate (HVAC), Process Cooling, and Food Cold Chain Technologies. Guidance on safe and correct installation can be found in the User Manual. The User Manual is in pdf format and includes a search register allowing installers to find relevant information quickly via their mobile phone. Each Geniox air handling unit is CE marked with a unique production number for identification of the origin of components throughout the service life of the unit in accordance with the interpretation of the 2010 Extended Machinery Directive for machines with a potential personal injury risk from unintended use.

<b>Environmental Quality</b>	Life-Cycle Assessment – LCA	It will be possible, by request, to perform Lifecycle assessment specifically for each Geniox air handling unit via Systemair Denmark internally operated software through calculating CO2 Equivalents from Ecobau with weights of material extracted accurately from the configuration software
	Environmental impact associated with construction products	At Systemair, accountability also means close and long-term cooperation with subcontractors. Based on a very large production volume of Geniox air handling units at Systemair factories in Denmark, Lithuania, the Netherlands and Spain, the ability to exercise restrictive control of subcontractors' responsibility is utilized.
	Sustainable resource extraction of materials	Geniox units do not include any components supplied by subcontractors in countries where child labor occurs. So far, it has not been possible to obtain confirmations from subcontractors as to whether they are buying components from countries where child labor occurs.
<b>Economic Quality</b>	Building-related life cycle costs	<p>The casing made of ZM310 coated steel plates is protected as well as possible against galvanic corrosion by installation of plastic plates between filter frame of ZM310 and stainless-steel base (if stainless steel base is selected) and between the copper-aluminum cooling coils and stainless steel trays for condensate. See photo a in the annex.</p> <p>To avoid galvanic corrosion, ZM310 coated steel profiles are assembled with plastic fittings and not with aluminum fittings. See photo b in the annex.</p> <p>To optimize acquisition costs and operating costs during the life cycle, LCC (Life Cycle Costs) can be calculated via the SystemairCAD configuration software, which calculates the energy cost in each of the year's 8,760 hours compared with the climate data for an average year.</p> <p>The service life time of the casing is expected to be at least 20 years.</p>
	Viability	<p>It is easy to replace wear parts in the air handling units throughout their service life by unscrewing all doors and panels because the sealing between the panels and the profiles of the casing is exclusively and without exception created via polyurethane sealing strips. This applies to the lists do not stick to the profiles. See photos d and e. This provides easy access to updating control system and wear parts. For example, replacing the control system with a new control system that transmits more detailed data more cost-efficient can be economically advantageous.</p> <p>Wear parts appear from the spare parts lists. Further information can be found in the technical dossier for each air handling unit, and the information is available on the website <a href="https://techdoc.systemair.dk">https://techdoc.systemair.dk</a> where access is granted by using a password, which can be ordered by the installer who has purchased the air handling unit from Systemair, or by a service partner whom Systemair has been authorized by the building owner to grant a password for access.</p>

<b>Sociocultural and Functional Quality</b>	Thermal comfort	Geniox air handling units can be built with filters, air capacity control, heating coils, cooling coils, humidifiers, attenuators, and CO2 and humidity sensors, which can all be controlled by users to meet their individual needs.
	Indoor air quality	All materials in Geniox air handling units have been selected for use in buildings marked with the Nordic Ecolabel. Data sheets as well as provisional data sheets provided by subcontractors confirm that Geniox air handling units contain no Nordic Ecolabelling-prohibited chemicals and materials. For use in buildings marked with the Nordic Ecolabel, it is confirmed that all materials are silicone-free and that the units are manufactured under nanoparticle-free conditions. Control procedures are repeated regularly to ensure that data sheets from all subcontractors are complete. If subcontractors are unable to provide adequate information, they will be replaced by other subcontractors who are able to provide adequate information.
	Visual comfort	For operating and service personnel who have the key to open the inspection doors, there are pictograms on the doors and panels of the functions inside the air handling unit for quick and secure identification. See the User Manual.
<b>Technical Quality</b>	Fire protection and safety	More than 90% of the weight of Geniox air handling consist of non-combustible steel, aluminum and rockwool. Plastic lists and polyurethane sealing strips are made of polymers and PVC, which melt at high temperatures and are extinguished using CO2 or powder.
	Sound quality	The sound power level is calculated by the SystemairCAD configuration software and appears from data sheets supplied with each air handling unit. The information is available on the password-protected website <a href="https://techdoc.systemair.dk">https://techdoc.systemair.dk</a>
	Quality of casing	Geniox units are Eurovent certified, and data is available at <a href="http://www.eurovent-certification.com">www.eurovent-certification.com</a> under the manufacturer Systemair, Denmark and the product name Geniox Comfort 1.
	Cleaning and maintenance	See the User Manual.
	Suitability for removal and recycling	When the AHU is scrapped, all components can be dismantled via Torx screws and 6-edge bolts and nuts. Nothing is welded together. Rockwool and iron sheets can be separated for 100% recycling. Photos f1 and f2 show that the exterior cover plate on a panel or a door can be removed for sorting of rockwool and steel plates. The Geniox standard version is built of steel plates that are unpainted and they can be recycled directly. Information about all materials in Geniox air handling units can be found in the Swedish Building Products Declaration (Byggevaredeklaration), which provides detailed information for companies sorting waste in connection with the scrapping of units in Sweden for the purpose of sorting for recycling and destruction according to guidelines.

## 18.1 Illustrations and explanations

Find illustrations and explanations that support the information about sustainability of Geniox air handling units from Systemair below.

### 18.1.1 Photo A

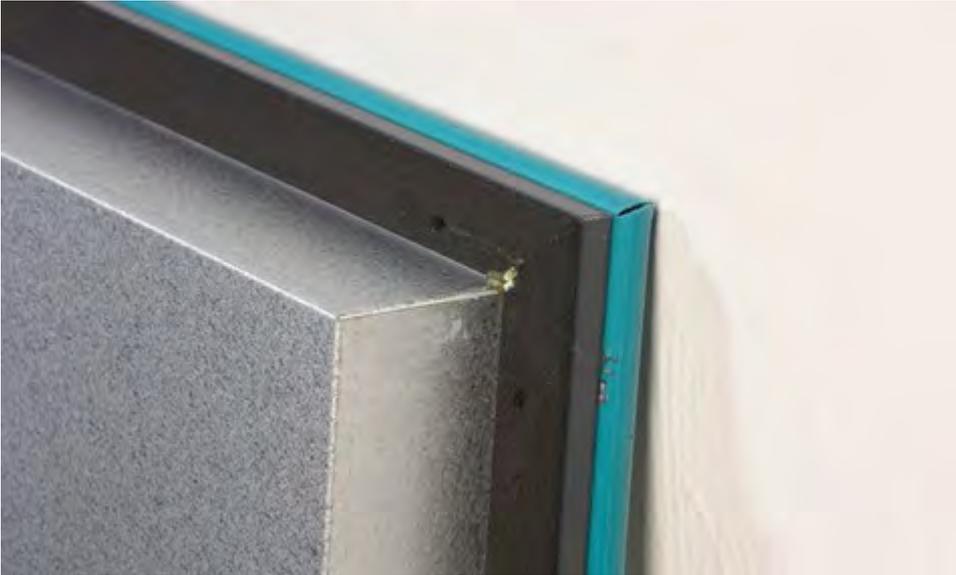


Plastic plate between bottom and/or tray for condensate made of stainless steel and cooling coil made of copper-aluminum to avoid galvanic corrosion.

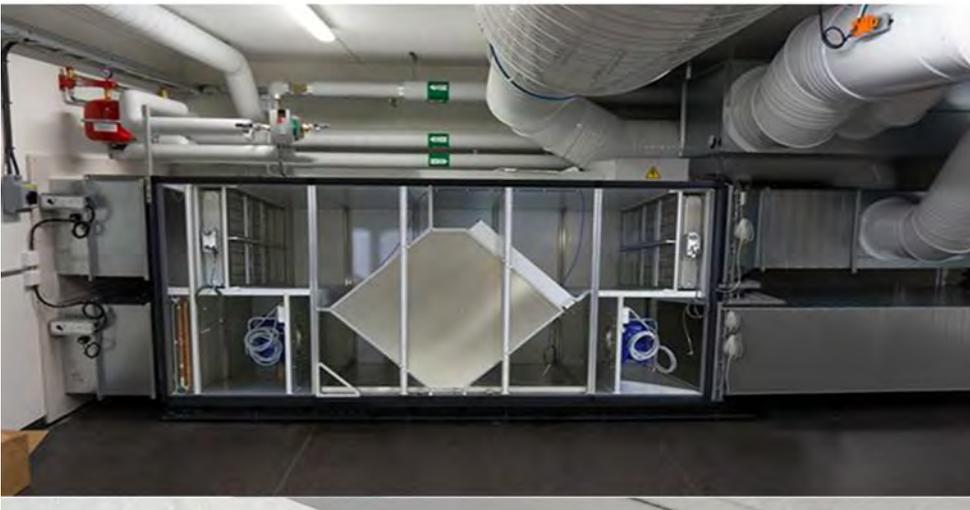
### 18.1.2 Photo B



Fittings of plastic between ZM310 coated steel profiles to avoid galvanic corrosion that would have been considerable with fittings made of aluminum.

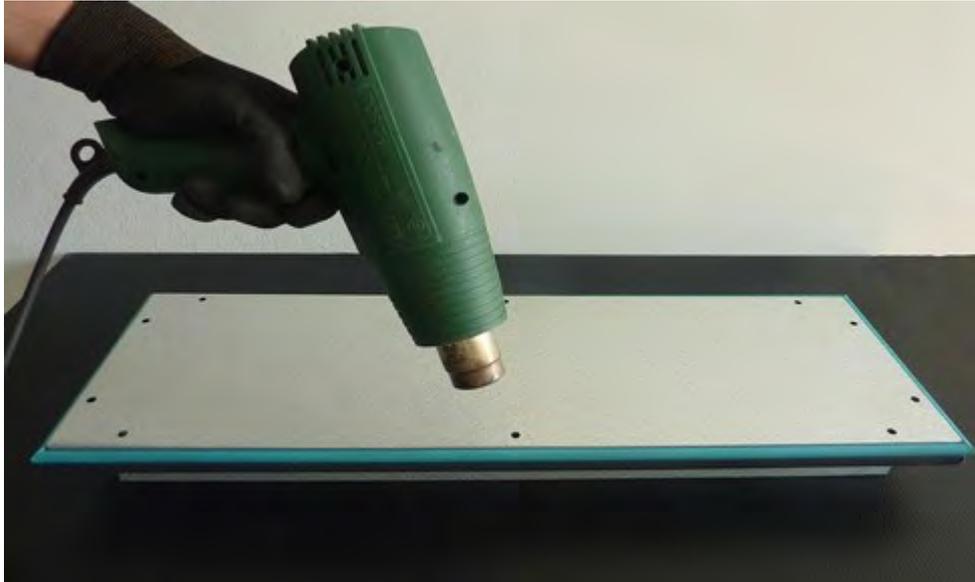
**18.1.3 Photo C**

Panels can be demounted, because flexible sealing strips made of polyurethane do not stick to the profiles. Panels can quickly and easily be demounted by unscrewing painted and anti-corrosion protected Torx screws.

**18.1.4 Photo D**

All doors and panels are quickly and easily removed for easy access to replacement of worn parts and for updating of the air handling unit with new components and also with a new control system with new sensors.

### 18.1.5 Photo E1



When the air handling unit is scrapped, Rockwool, iron sheets and plastic lists can easily be separated for 100% recycling because the cover plate can easily be separated from the plastic list between inner and outer iron plates by overheating the cover plate along the edges. Hereby the glue will lose adhesion for easy removal of the cover plate from the plastic lists.

### 18.1.6 Photo E2



When the cover plate is removed, Rockwool, iron sheets and plastic strips can easily be separated for 100% recycling. The plastic strips of abs plastic can be cleaned, melted, and granulated for recycling.





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