IMP KLIMA
AN ORANGE CLIMATE COMPANY

TECHNICAL MANUAL

Compact air handling unit CompAir RW

Transport, installation, start-up, maintenance and service

We care about healthy air

Transport, installation, start-up, maintenance and service manual

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1 General

- The air handling unit can be supplied in several shipment units, which are factory protected with wooden beams or pallets, protective foil, props and aids to ensure safe transportation. Check packing list for complete supply and check for transportation damage.
- Please note, that some components are not factory mounted in the unit, but are enclosed to the unit as separate packages and equipped with manuals of the component's producer. Prior to the assembly, please remove the packaging accordingly and follow the installation instruction for each component.
- Prior to any work on the unit, please study carefully the transport and assembly manual in full.
- Until installation, store the air handling units in a roofed and dry area.
- Always place the units on even ground. Lift the shipment units applying the hoisting procedure described in this manual.

1.1 Warnings & Tips

- The air handling unit may only be installed, checked, commissioned and maintained by trained personnel, who must observe engineering standards and local safety regulations.
- If installing, commissioning and maintenance of functional elements, produced by manufacturers other than Lindab, the manufacturer's instruction shall be followed.
- The air handling unit shall only be used for the purpose and under the operating conditions specified in the technical sheets, generated from the selection software AirCalc++.
- The unit manufacturer shall not be kept liable in case of failure to observe the information provided in the instructions or in cases of alterations of electrical or mechanical unit components without a prior approval by the manufacturer.

2 Transportation

2.1 Truck loading and forklifting

- Protect each unit to prevent damaging, during loading, transportation and unloading due to tumbling, sliding or uncontrolled release from the vehicle. Futhermore, to protect staff against any safety and health hazards.
- During transportation, any handling of the unit must be carried out by means of the structural frame – **no pressure on the housing**!
- All shipment units are factory protected by:
  - wooden beams (unit with support base frame) – size CompAir 6000 to 10000 or
  - wooden pallets (unit without support base frame) – size CompAir 1000 to 4000
- When loading and unloading with fork lift allways transport units on the wooden beams or on the pallet – Figure 1.
- When loading and unloading with the crane always use lifting tubes as it is shown on Figure 2.
- Always observe the weight and the position of the centre of gravity of the compact shipment unit.
- **Pay special attention not to excert any pressure to the bottom cover of the unit.**

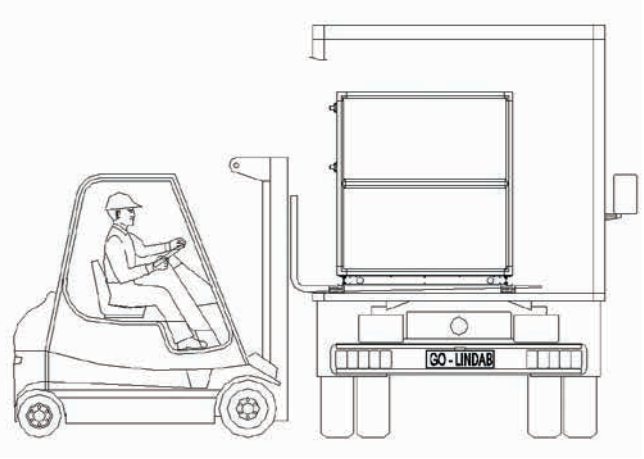

Figure 1

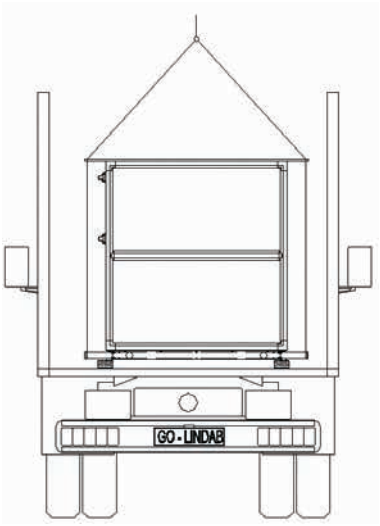

Figure 2

- Forks may only excert pressure to the bottom frame whereby the forks should reach beyond the last part of the section frame – Figure 3.

1 - wooden beams or palette
2 - forks
3 - transport unit

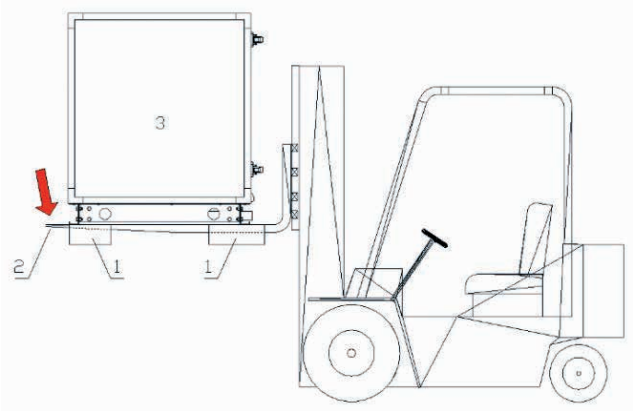

Figure 3

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2.2 Hoisting with crane

- Any crane hoisting of packaged components is to be performed by means of the structural frame provided underneath the component.
- Insert appropriate tubes (thick wall tube of outside diameter ø 48.3 mm and wall thickness of 10 mm) through the circular leads in the structural frame:
  - CompAir size 1000 to 4000 - see Figure 4
  - CompAir size 6000 to 10000 - see Figure 5

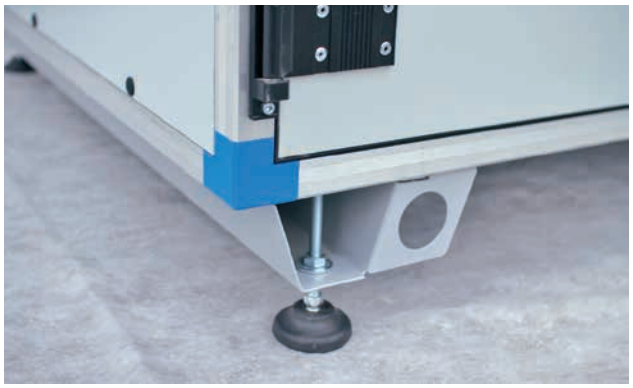

Figure 4

Figure 5

- For lifting, apply steel hoisting ropes or chains; in all cases, apply two spacer supports (Figure 6, detail A). The tubes must be provided with appropriate guards at both ends (Figure 6, detail B).

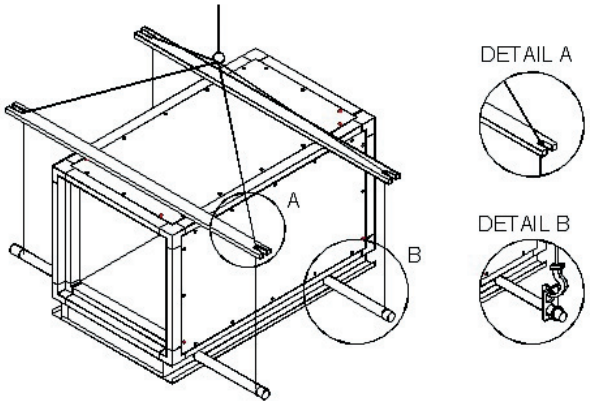

Figure 6

- Hoisting without spacer supports (Figure 7) is not allowed, as this may damage the housing.

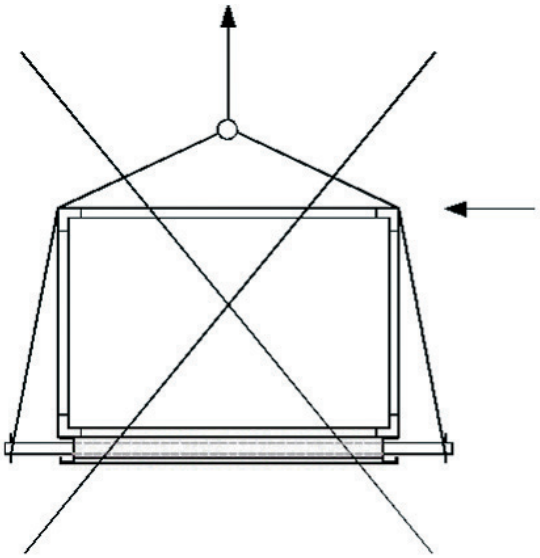

Figure 7

3 Assembly and installation

3.1 Assembly and servicing area

- To allow maintenance interventions and operation (e.g. withdrawal of a heat exchanger), always provide a clear area of a minimum width of 1.3 x unit width on the air handling unit servicing side.
- To facilitate the assembly, a clearance area of a minimum width of 0.5 m should be provided on the non-servicing side as well (Figure 8).
- In case of installation on an elevated platform, provide safe access to the platform and the necessary servicing area on the platform.

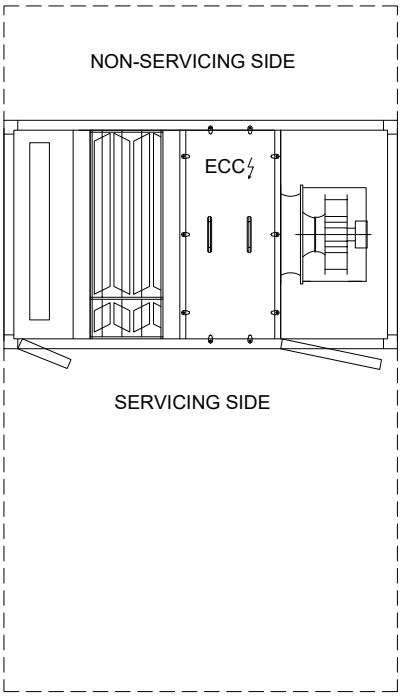

Figure 8

3.1.1 Construction of a foundation

- Mount the air handling unit onto an appropriately high, levelled and flat concrete or steel foundation – Figure 9.

Figure 9

3.1.2 Mounting of an air handling unit on legs

- The foundation may be substituted by mounting the unit onto Lindab type base legs fitted with a structural noise and vibration insulation bolt:
- Unit without support base frame – size CompAir 1000 to 4000 (Fig. 10)
- Unit with support base frame – size CompAir 6000 to 10000 (Fig.11)

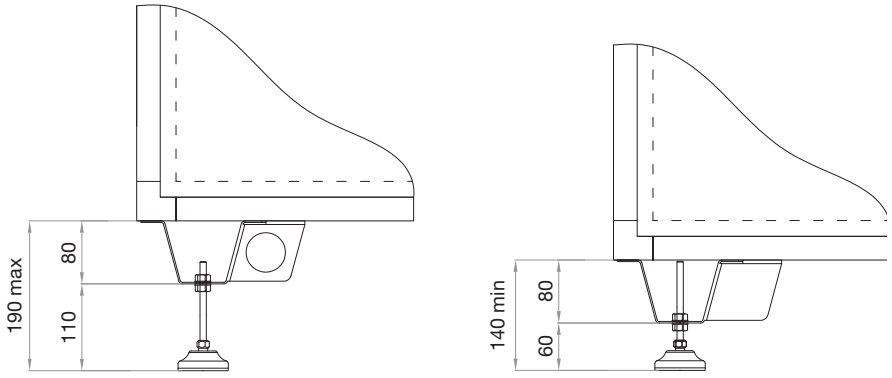

Figure 10

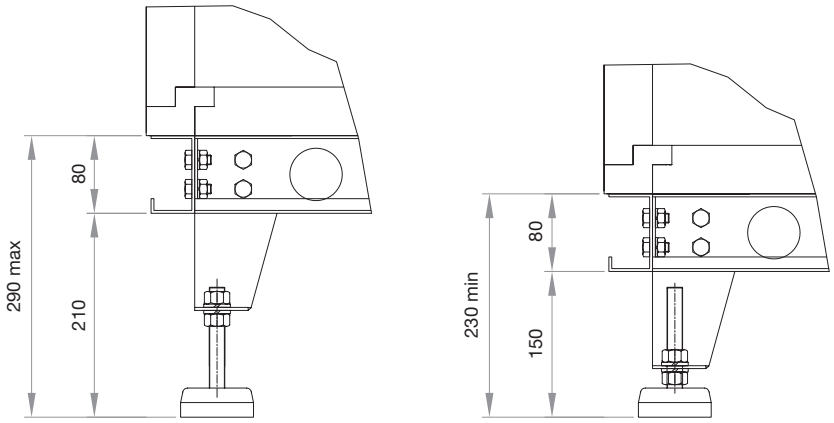

Figure 11

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- The legs are to be mounted on site. Mount the legs to the base frame from the inner side with M10x20 bolts, as shown in Figure 12.

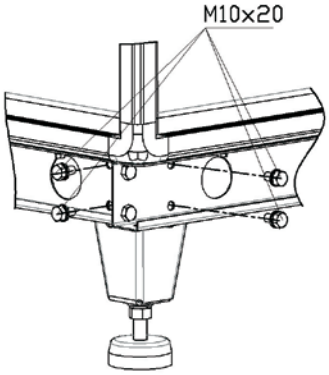


Figure 12

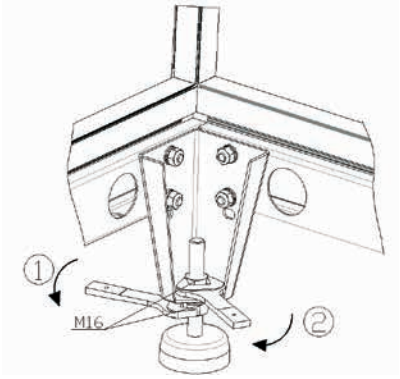


Figure 13

- To level each leg within the 30 mm range, use a wrench for M16 bolts. The height of the leg can be adjusted with the lower nut – see Figure 13. After reaching the correct level, tighten the upper nut.

3.1.3 Air handling unit assembly

- Remove the protective foil, guards, wooden supports, pallets under the structural frame, etc. and ensure that the foundation is in level and flat.

Figure 14: Apply self-adhesive EPDM rubber sealing tape with a 20 x 8 mm cross-section (supplied with the air handling unit) onto the contact front faces (housing frame), when connecting the sections with aluminium profile.

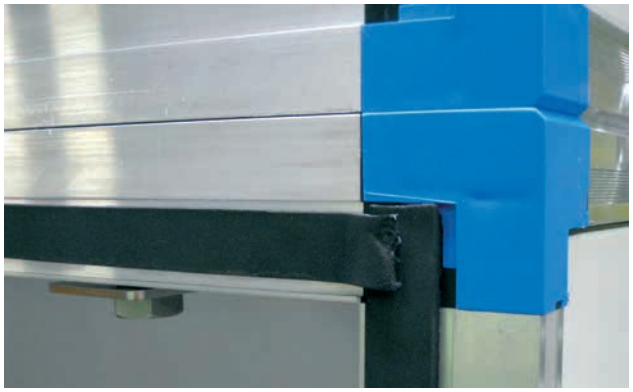


Figure 15: The sealing tape must overlap at the corners. When connecting two sections, apply the sealing tape only on one of the sections.

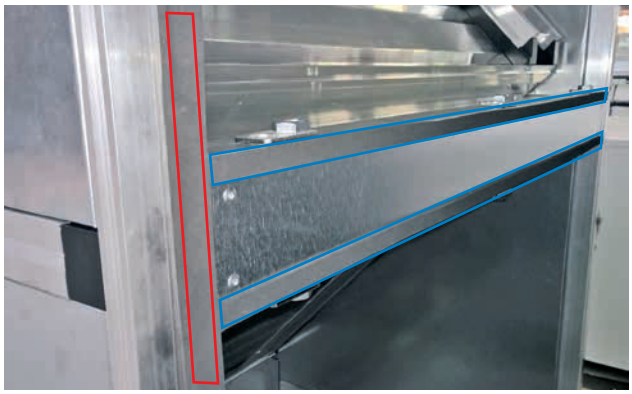


Figure 16: For sections with a steel profile (e.g. plate heat exchanger or rotary wheel section), additional EPDM rubber sealing tape with a 15 x 5 mm cross-section is used, see also blue marked tape.
The self-adhesive EPDM rubber sealing tape with a 20 x 8 mm cross-section is applied where the tape is marked red.

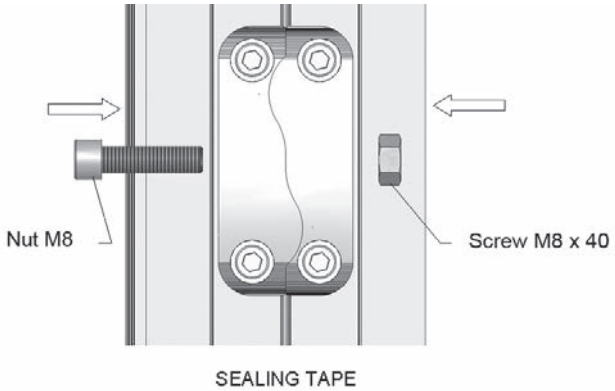


Figure 17: After having drawn the sections together, join them by means of eccentric clamps fitted on the section frames. Connect clamps with standard M8x40 screws. Screws are included as a separate delivery.

3.1.3.1 Installation of outdoor units

- Mount the air handling unit on a foundation of adequate height.
- Construct the foundation, so as to protect the unit or its components against sliding or tumbling over under wind gusts. Check the wind strength for this purpose.
- The roof of the air handling unit is factory mounted. However, when assembling sections on site, roof joints must be sealed watertight. Mount the ridge tiles on the joints with rust-proof rivets (Figure 18) and seal (watertight) all the vertical joints between sections.

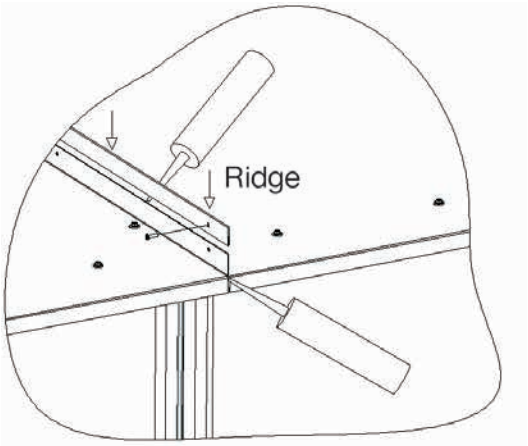


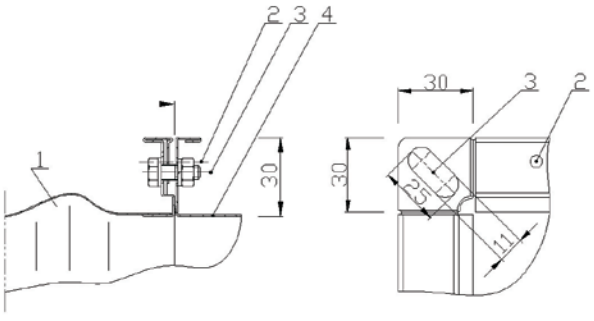
Figure 18

3.1.4 Duct connection

- The different types of duct connections are described below. When connecting ducts to air handling units, all joints between unit connections and the intake and outflow air ducts must be sealed air and watertight.

3.1.4.1 AHU delivered with flexible rectangular duct connections

- The flexible connection is attached to the duct by means of M8 bolts in the corners and, additionally with ø 4,8x19 mm bolts along the flange, as shown in Figure 19.

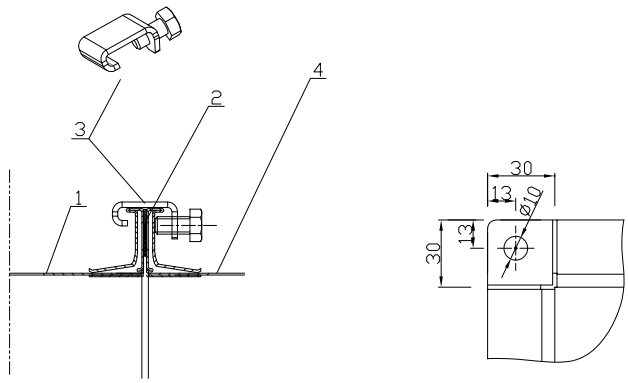


1 - flexible connection mounted on AHU housing
2 - Self drilling screw ∅4,8x19; 3 - Screw connection M 8; 4 - Duct

Figure 19

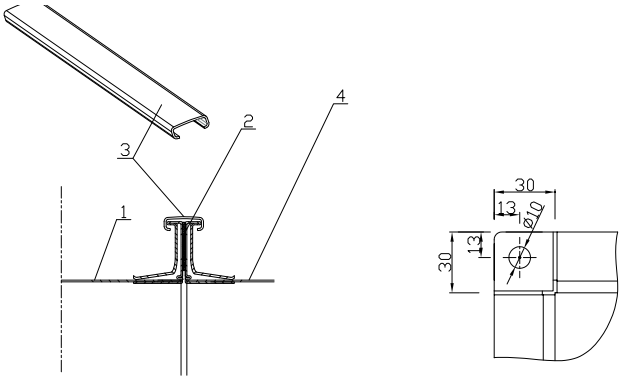
3.1.4.2 AHU delivered with fixed rectangular duct connections

- The fixed connection is attached to the rectangular duct either by means of RJFP clamps, as shown on Figure 20 or, in case of airtight duct connection, by means of RJFP profile, as shown in Figure 21.



1 – RJFP connection mounted on AHU housing;
2 – rubber sealing tape 19 x 5mm
3 – RJFP clamp; 4 – Duct

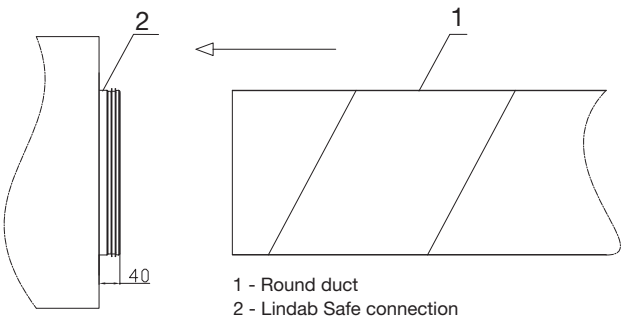
Figure 20



1 – RJFP connection mounted on AHU housing;
2 – rubber sealing tape 19 x 5mm
3 –RJFP Profil; 4 – Duct

Figure 21

3.1.4.3 AHU delivered with fixed round duct connections



1 - Round duct
2 - Lindab Safe connection

Figure 22

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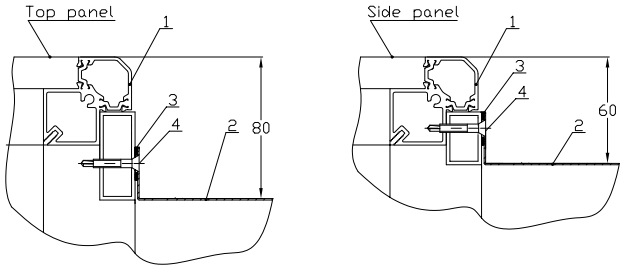
The duct system is connected to the air handling unit according Lindab document »Assembly instruction Lindab Safe«, available on www.oc-impklima.com

3.1.4.4 AHU delivered with duct mounted on unit casing

- Fixing of the duct directly to the air handling unit's casing is shown in Figure 23.



1 – AHU housing, 2 – Duct 3 – Rubber sealing tape 19 x 5mm, 4 – Self drilling screw ø4,8x19

Figure 23

3.1.5 Siphon installation

- All sections, where condensation is likely to occur, are equipped with a drip tray and a drain. It is important, that the siphon mounted on the drainpipe is designed correctly and has correct dimensions.
- Both positive and negative pressure may occur in sections that require draining. The siphon assures the water drainage and prevents escaping of conditioned air through the drain or unconditioned air being dragged into the unit.

Figure 24

In case of negative pressure a siphon type with ball shown on Figure 25 is normally used. In case of positive pressure in the section, a siphon similar to Figure 24 is to be used. Make sure to flood the positive pressure siphon with water.

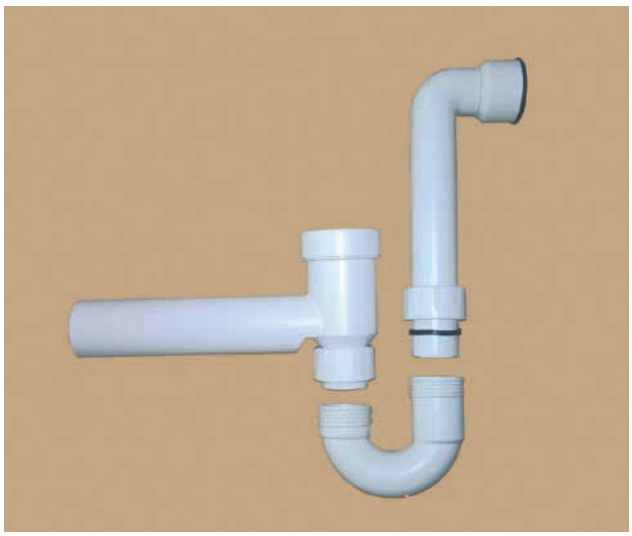


Figure 25

Figure 26

- All drain pipes are size ø40, with smooth pipe connection.

NOTE:

- In case of outdoor installed air handling unit the drainpipe and siphon should be insulated and equipped with a heating cable.
- Please always assure, that the rubber sealing of the siphon is mounted tightly around the drain pipe – see Figure 26.
- Do not connect the drain directly to the sewer system. Condensate must be able to flow freely from the siphon to the sewer through an open funnel. The drain pipe should be installed with a minimum 2% slope in the drain direction.

IMPORTANT:

- Ensure an adequate height of foundation and thus a proper height of the water trap. Is the column of liquid (H) in the siphon too small, water may build up inside the drip tray.

3.1.5.1 Siphon sizing

- The height of the siphon must be larger than the total negative or positive pressure inside the air handling unit section being drained. Please take into account the increased pressure loss generated during normal operation.

- Below the installation of positive pressure siphon (Figure 27) and the installation of negative pressure siphon (Figure 28) is shown.

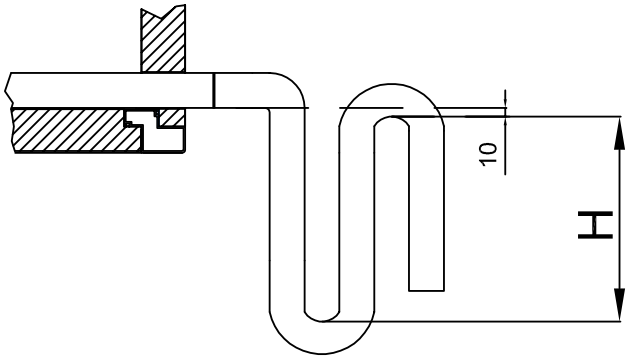


Figure 27

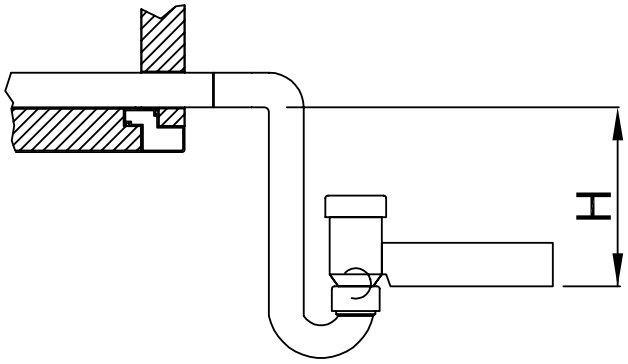


Figure 28

- For quick selection the minimum dimension H is shown in the following table.
- Please assure for a 10 mm lower outlet bend, preventing water build up inside the drip tray.

Section pressure (Pa)	H (mm) Positive pressure / negative pressure
300	40
600	75
900	110
1200	140

3.2 Assembly checklist

Assembly checklist	**Checked**
• Remove packaging.	
• Ensure that the foundation is in level and flat.	
• Apply rubber sealing tape onto the contact front faces of sections.	
• Draw the individual sections together.	
• Join sections by means of clamps fitted on the section frames.	
• Mount legs.	
• Remove instructions attached to components inside sections.	
• Store instructions at a safe place.	
• Close sections.	
• Check the height and correct installation of siphon.	

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4 Functional elements

Horizontal connections: with side connections and all optional sections – Figure 29.

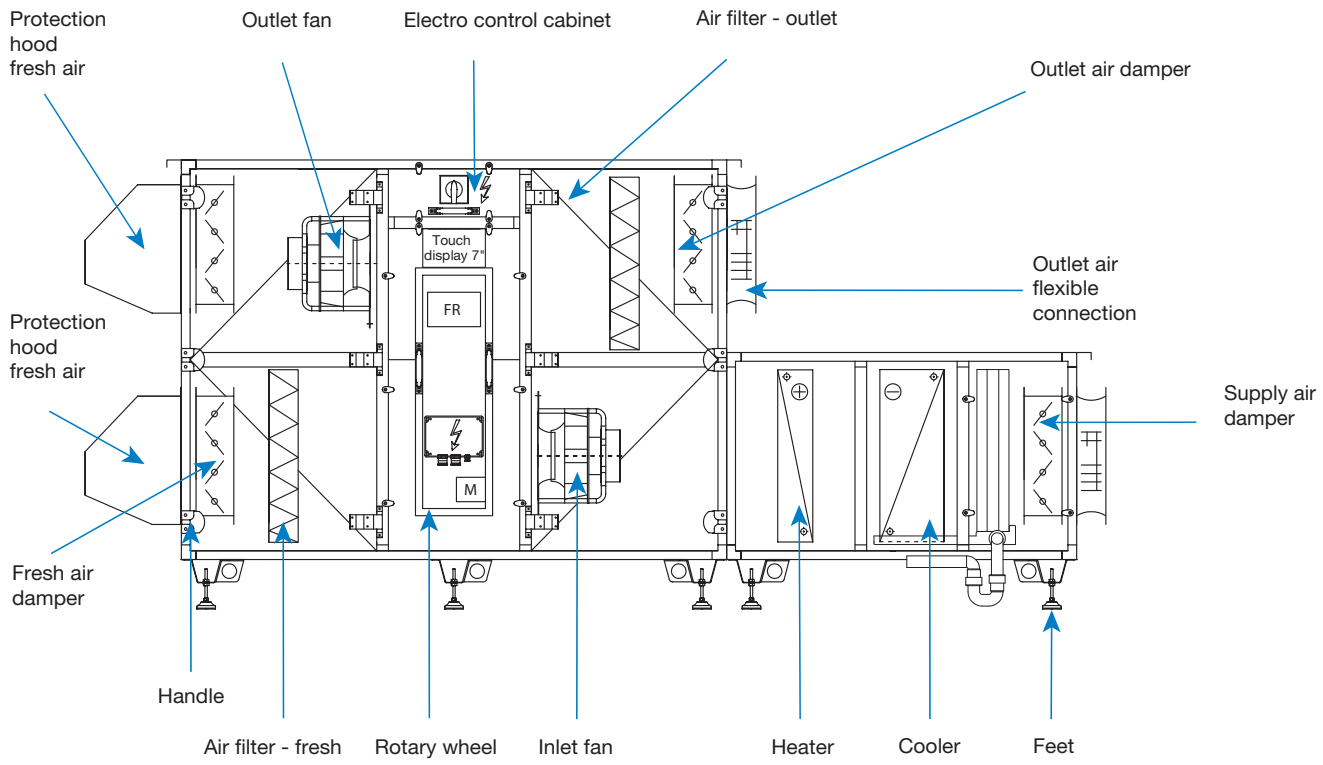

Figure 29

Vertical connections: with top connections and all optional sections – Figure 30.

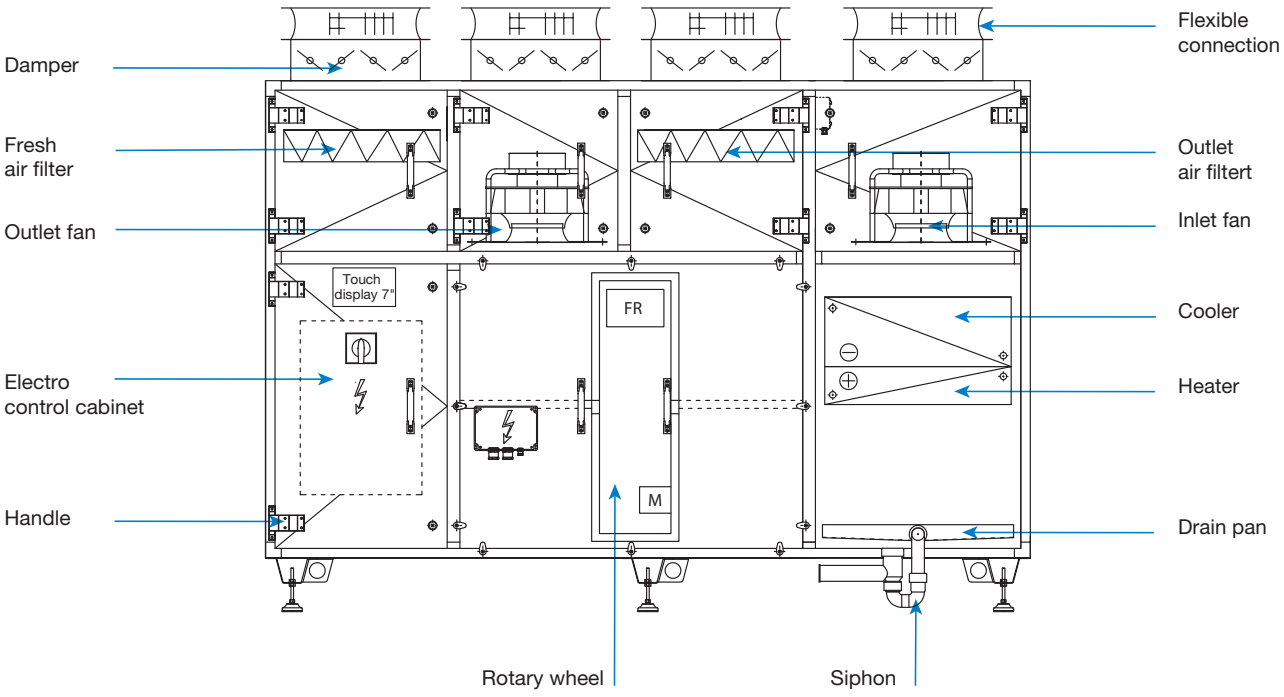

Figure 30

Access to the elements - doors with handles:
- Open the cover of the handle (Fig. 31 and 32)
- Open the door by pulling the handles (Fig. 33)

Access to the elements - panels with blockers:
To remove / fasten the blocators use Imbus key size 4 for the blockers (Fig. 34).

Figure 31

Figure 32

Figure 33

Figure 34

4.1 Fan section

The fan (Figure 35) is driven by an electric motor directly, by means of a shaft. The electric motor is installed mounted on the fan frame by means of a base plate.

Figure 35

4.1.1 Electric motor connection

- Prior to commissioning, check the conformity of the connection parameters specified on the electric load nameplates or in the a/c installation control cabinet with the site power main parameters.
- The electric motor connection shall be carried out in accordance with the electric design specifications and following the electric motor manufacturer's instructions. The instruction is to be found either inside the connection box for the motor, located at the bottom of the fan unit section (Figure 36) or attached on the motors's casing.
- **The fan should not be operated with the fan section door open.**

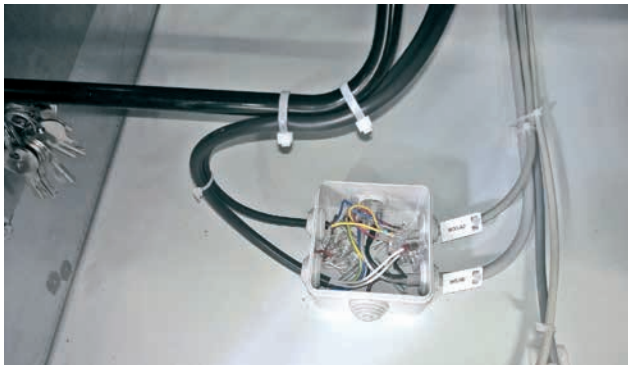

Figure 36

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4.1.2 Commissioning

- Prior to checking the correct fan installation and operation, switch off the main switch on the unit and lock it in the off state to disconnect the power supply to the electric motor drive.
- Before start-up remove any tools and other material from the section, check the tightness of screw joints and the condition of electric connections, mount all covers and wall panels, removed during the intervention into the section, and close the servicing door and secure them against any unauthorised opening by means of a mechanical lock.

Check list prior to commissioning plug fan	Checked
• Check for gap between rotor and cone - see fan manufacturer's instructions.	
• Check for uninterrupted rotation in the housing.	
• Check the vibration insulator.	
• Check for correct grounding.	
• Check for correct electric connections and their function according to the wiring diagram.	
• Remove any tools or other materials in the housing.	
• Close and fasten all covers and doors.	

- Following the startup, the fan should operate free of vibrations and noise at all loads. If not, stop the fan and search for a solution.

4.1.3 Service and maintenance

- Prior to checking the correct fan installation and operation, switch off the main switch on the unit and lock it in the off state to disconnect the power supply to the drive electric motor.
- Replace damaged bearings. If maintained according the manufacturer's instructions, all bearings are guaranteed a minimum service life of 30,000 hours.
- Prior to maintenance of the electric motor, observe the motor manufacturer's instructions.

4.2 Heater section with water heater

4.2.1 Connection

- Water connection pipes are made through the insulated panel. Connections are alyaws threaded. The heater coil temperature sensor is mounted inside the heater coil.
- The connection cable for heater coil temperature sensor has to be connected in a connection box inside the basic unit.
- When tightening threaded joints, apply counterforce with an appropriate tool (pipe wrench – padded), to avoid damaging the heater piping circuit – see Figure 37.

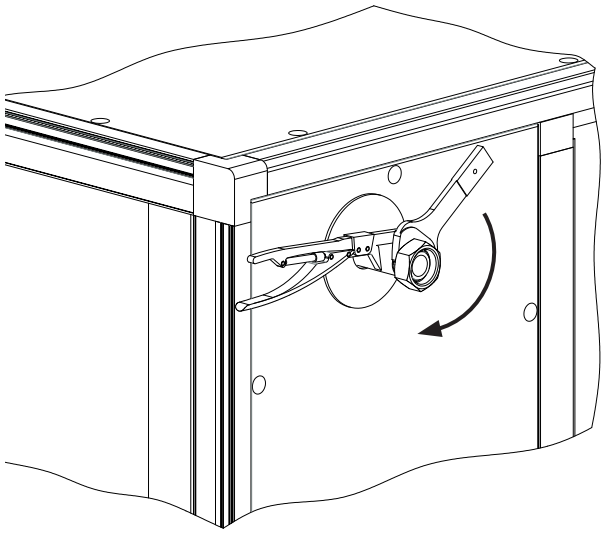

Figure 12

- When arranging the two piping connections to the water heater observe the air flow direction, so that the air inlet to the heater is closer to the return pipe, to ensure medium/air counterflow, see also blue arrows on the casing (Figures 38, 39, 40).

Figure 38

Figure 39

HEATING FUNCTION		COOLING FUNCTION	
MEDIUM ENTRY	MEDIUM EXIT	MEDIUM ENTRY	MEDIUM EXIT

Figure 40

4.2.1.1 Overheating protection

- Check medium temperature. When applying a high temperature heating medium (water above 70 °C), the electric motor shall be protected against overheating by means of an automatic shut-off of the heating medium supply. The fan must remain in operation for a certain period after the shutdown (3 to 5 minutes).

4.2.1.2 Antifreezing protection on the waterflow side

- The coil is prepared for mounting of a medium flow thermostat in a connection tube. It is to be mounted inside the connection tube in the heating coil (Figure 41).
- The temperature sensor delivery is part of the control system. The control system will protect the heater against freezing.

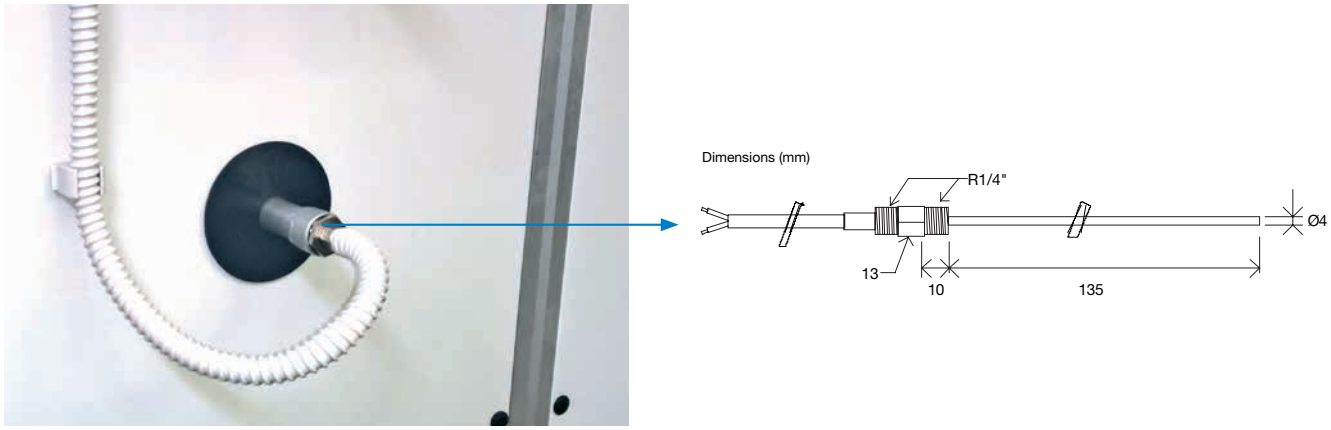

Figure 41

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4.2.2 Service and maintenance

To ensure proper functioning of the heat exchangers, regularly carry out the following operations:

- Check the tightness of all water connections and air thightness of ducts.
- Check the operation of the bleeding valve. In an event of disturbed medium flow through the exchanger, or presence of air in the circuit, bleed the piping system.
- Check the proper operation of the heater automatic anti-freezing protection.
- Periodically, check the proper operation of the heating medium supply automatic shut-off upon unit shut-down.
- To prevent overheating of the electric motor, check that the fan operates (3 to 5 minutes) following shut-down of the unit.
- Regularly check for dust build-up on the heater's fins. Dust or scale build-up on the fins reduces the capacity of the heat exchanger. Periodically – approximately every 500 hours of operation – clean the fins by means of an industrial vacuum cleaner. If this is not sufficient, blow compressed air (maximum recommended pressure: 6 bar) in the direction opposite to the air flow direction.
- If this cleaning method is not sufficient, dismount the heater and wash it with low pressure water or steam. To avoid deformation of the aluminium fins do not use high pressure water or steam. When washing with water, the water pressure must not exceed 6 bar, and the water jet must be strictly perpendicular to the fin surfaces. A water jet applied at an angle will damage the fins, In particular the more sensitive fins along the edges. Never use any hard object for cleaning.

4.3 Heater section with electrical heater

4.3.1 Connection

- Connection of the electric heater must be done by a qualified electrician, in conformance with the local applicable regulations.

WARNING: Electric heating coils are connected to a 1x220 V or 3x380 V power supply. During operation the surface temperature of the heater may reach 350 °C.

4.3.2 Operation check

- The electric air heater must only start with the fan already running and with an adequate air flow volume.
- After the heater has switched off, the fan must continue to operate for 3 to 5 minutes in order to cool the heater coils.
- The electric air heater is not water-tight; hence the electric heater section must not be installed so as to be exposed to water or steam.
- See also heating coil manufacturer's instructions and wiring diagram, located inside the heater connection box.

4.3.3 Service and maintenance

- See common checklist in this document.

4.4 Cooling section with water cooler

4.4.1 Connection

- Connection of the water cooler will be performed in a similar manner as connection of the heating coil. See chapter 4.2 Heater section with water heater.
- Water coolers are supplied with a fitted bleeding valve and drain cock.

4.4.2 Service and maintenance

- See common checklist in this document and instructions in the chapter 4.2. Heater section with water heater.

4.5 Water droplet eliminator

- Check the water droplet eliminator for proper installation and check for damage.
- Ensure unimpeded withdrawal from the air handling unit's housing.

4.6 Cooling section with direct expansion coil (DX)

4.6.1 Connection

- The DX cooling system connection may only be carried out by a qualified person.
- The common pipe connection methods are soldering or fast joints.

1 – refrigerant distributor;
2 – capillary;
3 – inlet piping;
4 – outlet piping

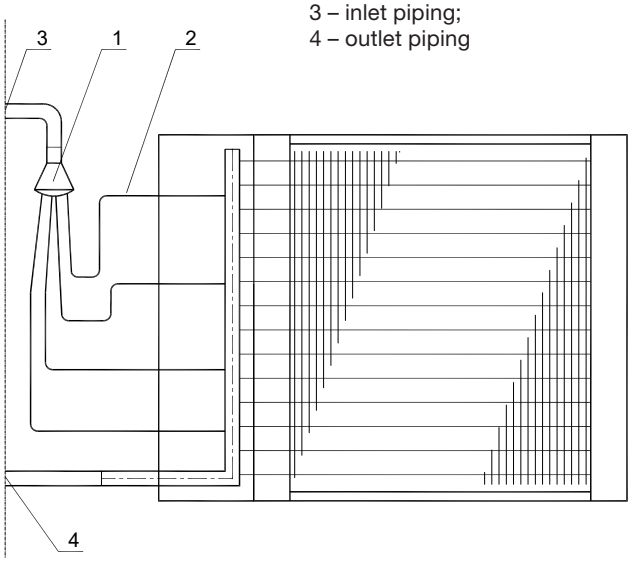

Figure 22

The cooling section with direct expansion coil (DX) is mounted inside the casing, while the connections are to be accessed from the outside.

4.6.2 Service and maintenance

- See common checklist in this document and instructions in the chapter 4.2.

4.7 Filter section

4.7.1 Installation of panel filters

- Panel filters are usually installed in the factory. If not, install the panel filters through the door opening. Then push the profile into locking position (see Figure 43 and 44).

4.7.2 Installation of bag filters

- Bag filters, if not already installed, should be inserted into the frame. They are supplied with the air handling unit in a separate box. The same procedure is to be applied as for panel filters (Figure 43 and 44).

Figure 43

Figure 44

4.7.3 Service and maintenance

- Prior to installing new filters, always check the complete, uniform and air-tight mounting of the sealing tape on the sealing seat between the filter and its frame.
- Only use filters declared conformant with the SIST EN 779 standard by the manufacturer.
- Handle the contaminated filters in compliance with applicable environment protection regulations.
- The required frequency of cleaning or changing the filter medium depends on the air flow rate and contamination.

4.8 Rotational regenerator

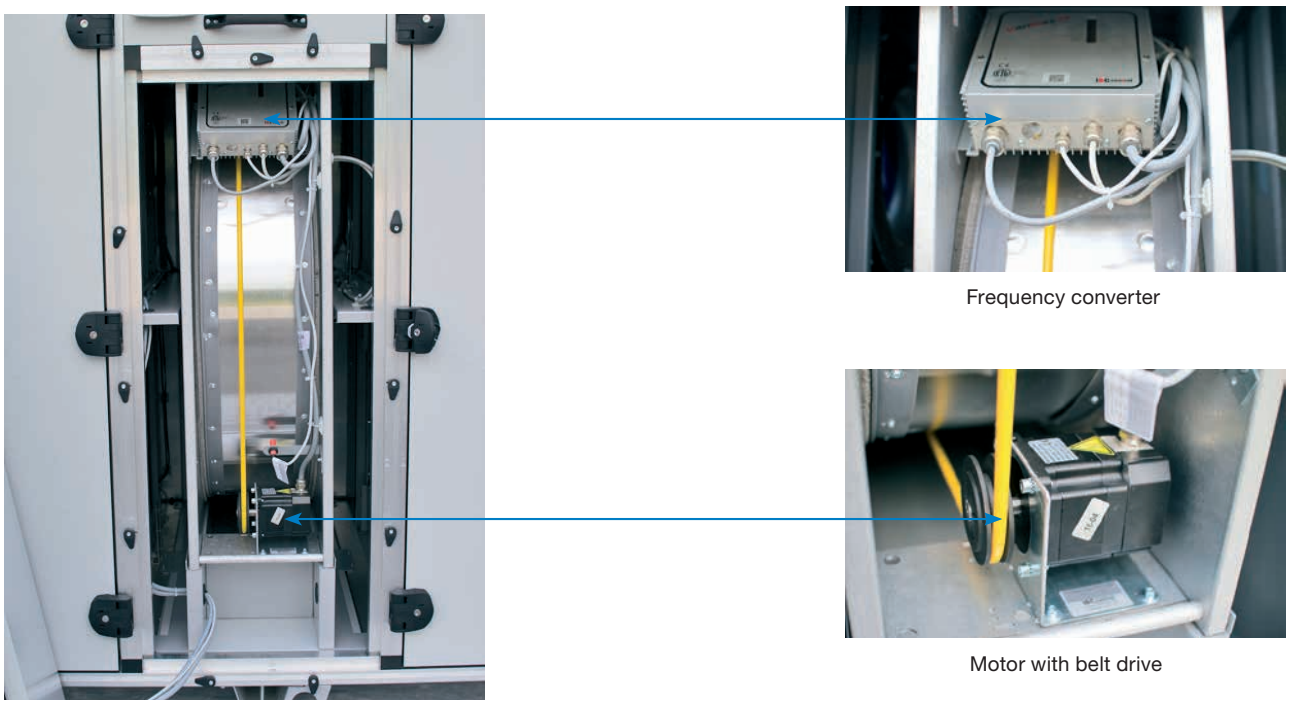

Figure 45

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4.8.1 Option with fire by-pass and damper

- The fire by-pass is located on the exhaust airflow side (EHA), on the back of the rotary wheel heat exchanger (Figure 46).
- The actuator of the fire by-pass damper is activated, when there is a fire alarm present. In this case the fire by-pass opens, the supply fan stops and the extract fan starts to operate on maximum speed.

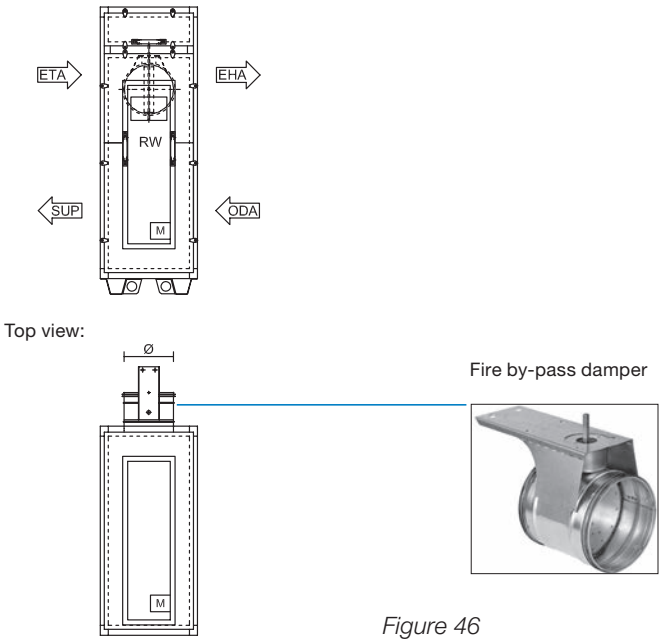

Figure 46

4.8.2 Commissioning

- Observe the manufacturer's instructions for the motor and controller.

4.8.3 Service and maintenance

- The regenerator matrix structure may be cleaned by means of air, water, steam or special cleaning agents.
- The following procedure is recommended for cleaning of the matrix:
- For a small amount of easily removable dirt, use a vacuum cleaner.
- For heavier dirt use compressed air (maximum pressure: 6 bar), with caution.
- Firmly attached dirt in the rotor is most easily removed by use of hot water (maximum temperature: 90°C) and a mild detergent. The detergent may be removed with high-pressure water (maximum pressure: 6 bar), with the nozzle held 50-100 mm from the matrix.
- The rotary heat exchanger is driven by a round belt. It is delivered welded together. If adjustment is needed the belt must be cut, shortened and joined together again with a special joining pin, which is attached on the casing (see Figure 47). Belt tension should be 4-6%.
- Check the tightness between the rotor and the housing. If necesary, adjust brush sealing by unscrewing the screws on the plastic guide and pushing the brush sealing more closely to the matrix. Then fix the screws again. (Figure 48)

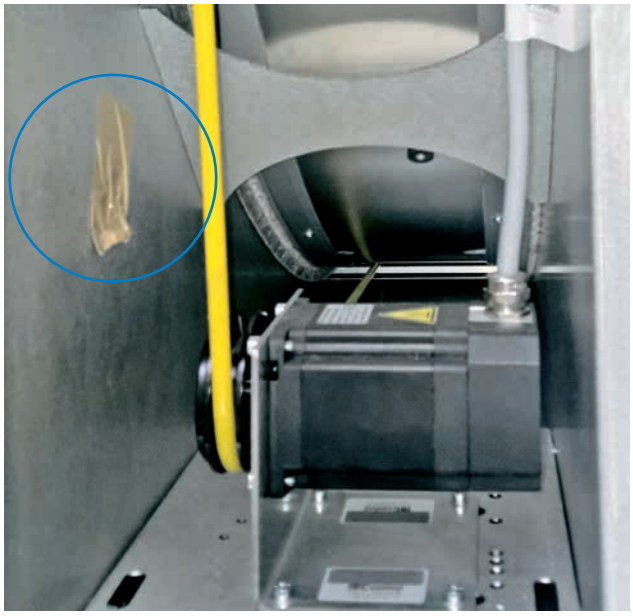

Figure 47

Figure 48

5 Start-up checklist

Section	Components	Check points	Start-up
General			
	All functions	Remove obstacles and loose debris	
	Doors / access covers	Close and lock before start-up	
	Earthing	Ensure correct earthing	
	Roof (outdoor installation)	Check for complete water tightness	
	Duct connections	Check for complete air and water tightness	
Fan			
	Transport protection brackets	Remove transport brackets before start-up	
	Impeller	Check for the correct direction of rotation	
	Motor	Check for correct connection	
Heaters			
	Water heater	Check all connections	
		Frost protection thermostat must be connected	
	Electric heater	Check for heater earthing	
		Check for correct fuse size	
		Check for correct wiring	
Coolers			
	Water cooler	Check for correct connection	
	Droplet eliminator	Check for correct installation	
	Siphon	Check for correct siphon installation	
Dampers			
		Proper operation	
		Check for the 90° rotation.	
Filters			
		Correct installation of filters	
		Check for correct filter type and class	
Rotational regenerator			
	Rotor	Check for correct direction of rotation	
	Seal	Check for proper sealing towards the rotary wheel	
	Drive	Check for correct electrical connection	
	Belt drive	Check the belt tension	
	Controller	Check for correct operation	

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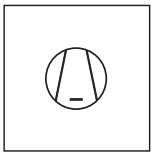
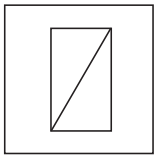
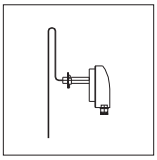
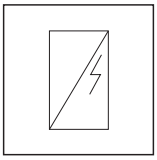
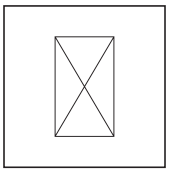
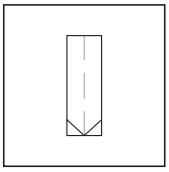
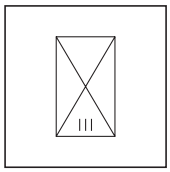
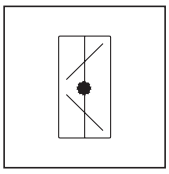
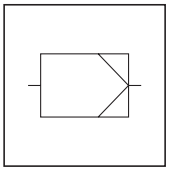
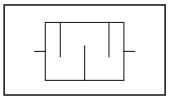
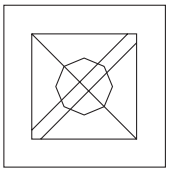
6 Maintenance check list

Section	Checking and maintenance shedule	Time interval (months)				
		1	3	6	12	24
4.8.1 Housing						
	Check the door seals, the tightness of duct connections and that the roof is watertight.				x	
	Inspect for contamination, damage and corrosion of the housing interior.				x	
	Check that the air intake is free of obstacles.				x	
	Clean and ensure a hygienic condition.				x	
Fan						
	Check bearings and anti vibration damper.				x	
	Inspect for contamination, damage and corrosion.			x		
	Clean and ensure a hygienic condition.				x	
Water heater						
	Air vent the coil, check for leakage.				x	
	Inspect for contamination, damage and corrosion.			x		
	Clean and ensure a hygienic condition.				x	
Anti-frost protection						
	Inspect for contamination, damage and corrosion.			x		
	Inspect electrical and safety eqipment.			x		
	Clean and ensure a hygienic condition.				x	
Electrical heater						
	Inspect for contamination, damage and corrosion (before annual startup).			x		
	Inspect electrical and safety eqipment.			x		
	Clean and ensure a hygienic condition.				x	
Water cooler						
	Inspect for contamination, damage and corrosion.		x			
	Inspect the coil for lekage and air vent the coil.			x		
	Inspect the drip tray for function and test the siphon. If required, the siphon should be filled with water.		x			
	Clean and ensure a hygienic condition.		x			

Section	Checking and maintenance shedule	Time interval (months)				
		1	3	6	12	24
Droplet eliminator						
	Inspect for contamination, damage and corrosion.	x				
	Inspect the driptray for contamination, corrosion and function.			x		
	Clean and ensure a hygienic condition.			x		
Direct expansion coil						
	Inspect for contamination, damage and corrosion.		x			
	Inspect the coil distributer piping.			x		
	Inspect the drip tray and test the siphon function.		x			
	Clean and ensure a hygienic condition.		x			
Damper						
	Inspect for contamination, damage and corrosion.					x
	Check the motor drive.				x	
	Check the seals and bearings.					x
	Clean and ensure a hygienic condition.				x	
Filter						
	Inspect for contamination and damage.		x			
	Check the differential pressure.		x			
	Replacement of the filter stage < F9				x	
	Replacement of the filter stage ≥ F9					x
	Clean and ensure a hygienic condition.			x		
Sound attenuator						
	Inspect for contamination, damage and corrosion.				x	
	Clean and ensure a hygienic condition.				x	
Rotational regenerator						
	Inspect for contamination, damage and corrosion.			x		
	Inspect for tightness between the rotor and the housing.				x	
	Check the rotation of the rotor.			x		
	Check the motor and bearing and the drive and controller functions.				x	
	Check the belt - if it slides, adjust the belt tension.					
	Clean and ensure a hygienic condition.				x	

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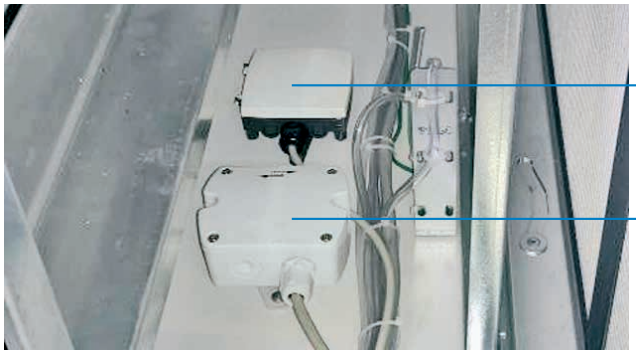
7 Controls

7.1 Sensors



Humidity sensor for measuring outlet/room humidity.

Sensor for measuring outlet/room CO_2 . It also measures room temperature.

Figure 49

Figure 50: Differential pressure switch for fresh air or extract air filters.

Figure 51: Pressure sensors unit with two differential pressure sensors. In CompAir it is used for measuring pressure in duct and also for measuring air flow of inlet and outlet fans. Communication with controller is via EXOline communication.

Figure 52: Tube connector for measuring duct pressure. User has to connect the attached tube to connector. The other end has to be connected to outlet air duct. The same procedure is required on inlet side. Inside CompAir, tubes must be connected to inside connectors.

Figure 53: Temperature sensor for inlet air temperature. It has to be connected in the connection box located behind supply fan (green connector – see Figure 54

Figure 54

Figure 55: Actuator for the fresh air and exhaust dampers,

Figure 56: Smoke detector. Works on optical detection and has a built-in relay for alarming. When the smoke detector is activated, the unit stops as in case of fire.

7.1.1 Sensors in case of duct coils installed

When the air handling unit is supplied with a heating coil / electrical heater / cooling coil installed in the duct, the supply temperature sensor must be installed in the supply duct after the last coil and connected to the connection box, placed inside the unit under the electro cabinet. On the duct heating coil there is an immersion sensor which needs to be connected to the connection box. Check wiring diagram for connection terminals in the connection box.

7.2 Functional diagram with rotational regenerator

Valve size depends on unit size. An example of functional diagram is shown in Figure 57. Functional diagrams are available as a print-out from selection software AirCalc++.

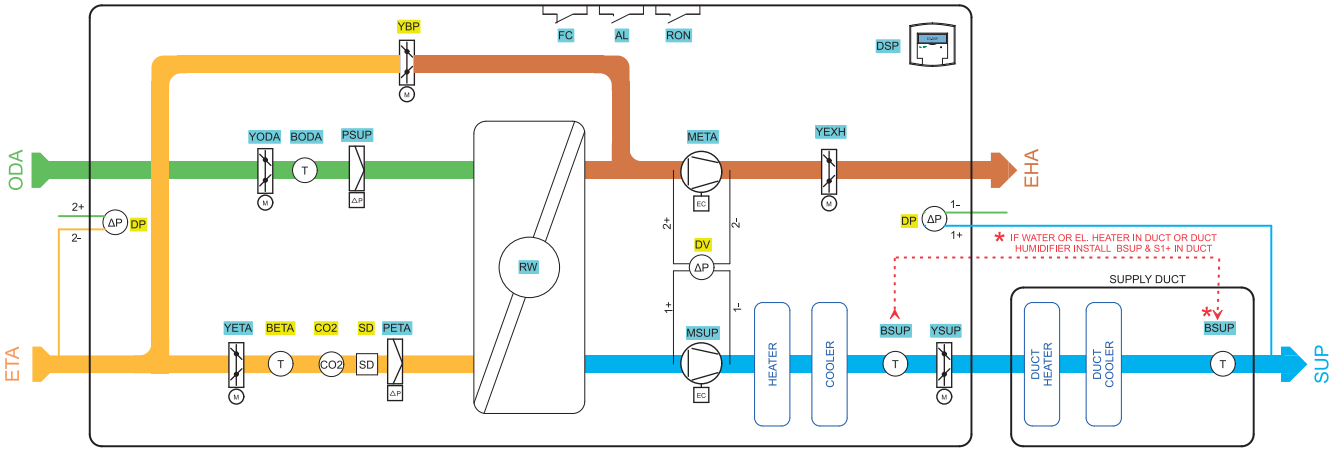


Figure 57

7.3 Functional description

The duct temperature sensor measures air temperature in the room and the controller N1 compares this value to the desired value. In the case of a downward deviation (heating) followed by the output control signals for sequential control of a rotary heat recovery (rotary wheel), the controller starts to open the valve of the heater (or electric powered) and turns on the water heater pump. The pump runs for few minutes after the valve has been closed. In case of upward deviation (cooling), the rotary wheel is activated (speed of rotation depends on the room temperature and ambient air) and the valve opens (el. actuator). The duct temperature sensor measures the value of the supply air temperature and the controller N1 compares it to the desired value. In case that the measured supply temperature is lower or higher than the lower or upper limit values set in the controller N1, the controller starts to regulate the supply air temperature (limitting temperature between puffs set Tmin - 16 ° C and T max - 40 ° C). The duct temperature sensor is used for measuring of the outside temperature.

7.4 Functional element regulation

7.4.1 Electrical heater regulation

Electrical heater is used to preheat outside air to specific value (setpoint). Setpoint (it can be set from 5°C to 30°C) can be set in controller, then it is compared with sensor value (sensor measures temperature behind preheater). If temperature is too low, electrical heater is turned ON and works until setpoint is reached. Safety thermostat is used to prevent damage from overheating. First point of safety thermostat is set to 80°C, second on 110°C.

7.4.2 Heat exchanger regulation

The outside temperature is measured with NTC sensor. Exhaust/outlet temperature is measured with NTC sensor. Both sensors send signal to controller, where both values are compared. Thus the temperature value of outside and outlet air is estimated. In dependance of this estimation, output signal is lead to the actuator of the rotational regenerator. Maximum of disposable energy (of outside or outlet air) is used. In case of heat energy additional signal is lead to electric heater and/or water heater (if electric/water heaters are installed into the unit).

7.4.3 Filters

Filters are used as protection against dirt particles inside of the air handling unit, ensuring clean air. Filters are controlled by pressure switches, additionally, the alarm »check filters« is shown every 1000 working hours. In case of filter replacement the direction of air flow through filters must be considered.

Air handling unit must be turned off at the time of filter replacement!

7.4.4 Heater frost protection

The frost protection sensor measures the temperature after water heater. If at any point the temperature of water falls below the set value (5 ° C), the controller reports an error, the heater valve is fully opened, heater pump is turned on, both fans are turned off, dampers are closed. When the error is fixed, the air conditioning switches on automatically and the error is automatically reset.

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7.4.5 Inlet and outlet fan

EC fans are driven by a reference signal (0-10V), which is sent from the controller. The controller has two speed options.

Fans can also be driven by CO_2 sensor (mounted in duct or room) or by pressure sensors (constant pressure or airflow in duct).

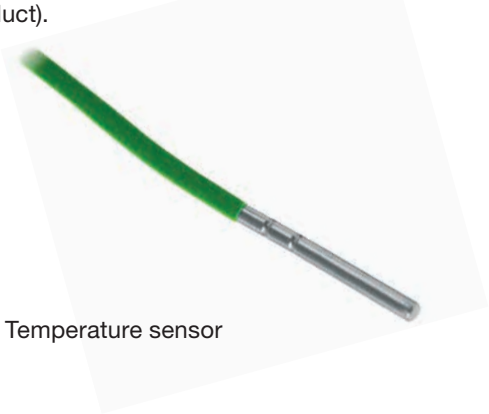


Figure 58: Temperature sensor

Figure 59: Pressure sensor

Figure 60: Duct CO_2 sensor

Figure 61: Graphic display

7.5 Managing with air handling unit

The main switch on the front side of electro cabinet must always be in ON position, because only in that case you may be assured that the controller and all safety functions work correctly.

FOR SERVICE ON ANY PART OF AIR HANDLING UNIT SUITABLE FUSE MUST BE TURNED OFF (check wiring diagram)!

7.5.1 Displays

The controller is delivered together with a display as standard, which allows easy monitoring and changing of all parameters of the compact air handling unit.

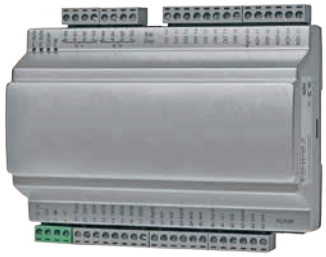


Figure 62: Controller

Figure 63: Standard display

Figure 64: Swipe&Touch Display

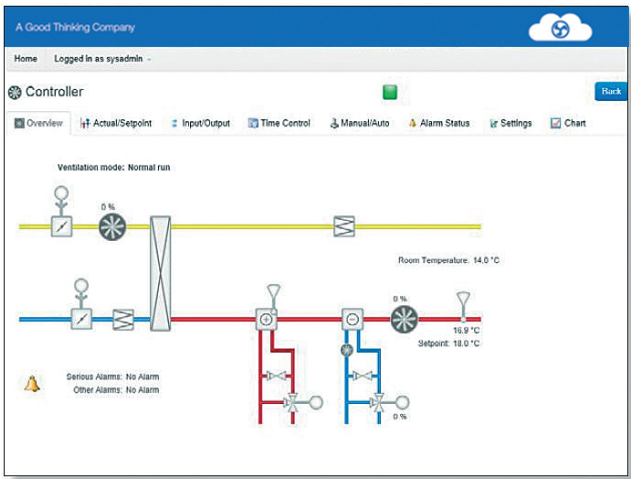
The Swipe&Touch display can be used as a remote display and is delivered in case of ordering of the Advanced controls version. It's used for local monitoring and control of the main functions of the unit.

7.5.2 Connection to external units

Connection is possible to external units such as DX coolers, humidifiers or electrical heaters. The air handling unit can control such external units with analog and digital signals.

7.5.3 Connection to cloud

If advanced option is chosen, the cloud solution is possible – the documentation is made separately.



7.5.4 Use of controller and display

For the use of the controller and display see instructions published on www.oc-impklima.com/en/products/air-handling-units.

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Alarm list

The alarm text is shown in the display. The priority columns show the factory set values.

	Alarm text	Prio	Description
1	Malfunction supply air fan	B	Malfunction supply air fan
2	Malfunction extract air fan	B	Malfunction extract air fan
3	Malfunction P1 heater	B	Malfunction pump, heating circuit
4	Malfunction P1 cooler	B	Malfunction pump, cooling circuit
5	Malfunction P1 exchanger	B	Malfunction pump, liquid connected exchanger
6	Filter alarm 1	B	Filter guard pressure switch or analogue filter switch activated. The analogue filter switch may be flow dependent.
7	Flow guard	B	Flow switch activated
8	External frost guard	A	External frost protection thermostat activated
9	Deicing pressure guard	-	Exchanger deicing pressure switch activated
10	Fire alarm	A	Fire alarm activated
11	External switch	C	"External switch" activated
12	External alarm	B	External alarm activated
13	Supply air control error	B	Supply air temperature deviates too much from the setpoint for too long
14	Humidity control error	-	The room humidity deviates too much from the setpoint
15	High supply air temp	B	Supply air temp too high
16	Low supply air temp	B	Supply air temp too low
17	Supply air temp max limit	-	Maximum limiting of supply air temp active
18	Supply air temp min limit	-	Minimum limiting of supply air temp active
19	High room temp	B	Room temp too high during room temp control
20	Low room temp	B	Room temp too low during room temp control
21	High extract air temp	B	High extract air temp during extract air control
22	Low extract air temp	B	Low extract air temp during extract air control
23	Electric heating is overheated	A	Heater high temperature limit switch activated
24	Frost risk	B	Frost protection function is overriding the control of the heater output
25	Low frost guard temp	A	Frost protection temperature below frost limit value
26	Low efficiency	B	Heat exchanger efficiency below limit value
27	Sensor error outdoor temp	B	Malfunction in connected sensor
28	Analogue deicing	-	Exchanger deicing activated by deicing sensor
29	Rotation sentinel exchanger	B	Exchanger rotation sentinel alarm activated
30	Malfunction fire damper	B	Fire damper exercise test failed
31	Supply air fan control error	-	Supply air pressure deviates too much from the setpoint for too long
32	Extract air fan control error	-	Extract air pressure deviates too much from the setpoint for too long.

	Alarm text	Prio	Description
33	Supply air fan external operation	C	SAF run-signal received when unit is stopped
34	Extract air fan external operation	C	EAF run-signal received when unit is stopped
35	Ventilation manual mode	C	The unit is in manual mode
36	Manual supply air control	C	Supply air temp controller in manual control
37	Manual supply air fan mode	C	Supply air fan in manual control
38	Manual supply air fan freq control	C	The SAF is in manual mode
39	Manual extract air fan mode	C	Extract air fan in manual control
40	Manual extract air fan freq control	C	The EAF is in manual mode
41	Manual heater control	C	The heater is in manual mode
42	Manual exchanger control	C	Heat exchanger output in manual control
43	Manual cooler control	C	Cooling output in manual control
44	Manual P1 heater	C	Heating circulation pump in manual control
45	Manual P1 exchanger	C	Exchanger circulation pump in manual control
46	Manual P1 cooler	C	Cooling circulation pump in manual control
47	Manual fire damper	C	Fire dampers in manual control
48	Internal battery error	A	Internal battery needs replacing
49	Sensor error supply air temp	B	Malfunction in connected sensor
50	Sensor error extract air temp	B	Malfunction in connected sensor
51	Sensor error room temp 1	B	Malfunction in connected sensor
52	Sensor error room temp 2	B	Malfunction in connected sensor
53	Sensor error exhaust air temp	B	Malfunction in connected sensor
54	Sensor error extra sensor 1	B	Sensor error Extra sensor 1
55	Sensor error SAF pressure	B	Malfunction in connected sensor
56	Sensor error EAF pressure	B	Malfunction in connected sensor
57	Sensor error deicing temp	B	Malfunction in connected sensor
58	Sensor error frost protection temp	B	Malfunction in connected sensor
59	Sensor error CO2	B	Malfunction in connected sensor
60	Sensor error humidity room	B	Malfunction in connected sensor
61	Sensor error humidity duct	B	Malfunction in connected sensor
62	Sensor error extra unit temp	B	Malfunction in connected sensor
63	Sensor error external control SAF	B	Malfunction in connected sensor
64	Sensor error external control EAF	B	Malfunction in connected sensor
65	Sensor error SAF pressure 2	B	Malfunction in connected sensor
66	Sensor error outdoor humidity	B	Malfunction in connected sensor
67	Sensor error intake temp	B	Malfunction in connected sensor

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	Alarm text	Prio	Description
68	Sensor error extra sensor 2	B	Malfunction in connected sensor
69	Sensor error extra sensor 3	B	Malfunction in connected sensor
70	Sensor error extra sensor 4	B	Malfunction in connected sensor
71	Sensor error extra sensor 5	B	Malfunction in connected sensor
72	Sensor error extra SAF pressure	B	Malfunction in connected sensor
73	Sensor error extra EAF pressure	B	Malfunction in connected sensor
74	Sensor error backup 8	B	Malfunction in connected sensor
75	Sensor error backup 9	B	Malfunction in connected sensor
76	Sensor error backup 10	B	Malfunction in connected sensor
77	Alarm frequency converter SAF	A	Malfunction of frequency converter SAF
78	Alarm frequency converter EAF	A	Malfunction of frequency converter EAF
79	Communication error frequency SAF	C	Communication error Vacon NXL/Lenze SMV/Omron V1000/Emerson
80	Alarm frequency converter EAF	C	Communication error Vacon NXL/Lenze SMV/Omron V1000/Emerson
81	Communication error expansion unit 1	C	Communication problem with connected expansion unit
82	Communication error expansion unit 2	C	Communication problem with connected expansion unit
83	Warning frequency converter SAF	C	Alarm from frequency converter via Modbus communication
84	Warning frequency converter EAF	C	Alarm from frequency converter via Modbus communication
85	Output in manual mode	C	Analogue or digital output in manual mode
86	Time for service	C	Time for service
87	Y4 extra sequence control manual	C	Y4-Extra sequence in manual control
88	Restart blocked after power- on	B	Restart blocked due to earlier power failure
89	Y5 extra sequence control manual	C	Y5 Extra sequence in manual control
90	Filter guard 2	B	Filter guard pressure switch or analogue filter switch activated. The analogue filter switch may be flow dependent.
91	High temp extra sensor 1	-	High temperature extra sensor 1
92	Low temp extra sensor 1	-	Low temperature extra sensor 1
93	High temp extra sensor 2	-	High temperature extra sensor 2
94	Low temp extra sensor 2	-	Low temperature extra sensor 2
95	High temp extra sensor 3	-	High temperature extra sensor 3
96	Low temp extra sensor 3	-	Low temperature extra sensor 3
97	High temp extra sensor 4	-	High temperature extra sensor 4
98	Low temp extra sensor 4	-	Low temperature extra sensor 4
99	High temp extra sensor 5	-	High temperature extra sensor 5
100	Low temp extra sensor 5	-	Low temperature extra sensor 5
101	Extra alarm 1	-	Extra alarm 1 on digital input

	Alarm text	Prio	Description
102	Extra alarm 2	-	Extra alarm 2 on digital input
103	Extra alarm 3	-	Extra alarm 3 on digital input
104	Extra alarm 4	-	Extra alarm 4 on digital input
105	Extra alarm 5	-	Extra alarm 5 on digital input
106	Extra alarm 6	-	Extra alarm 6 on digital input
107	Extra alarm 7	-	Extra alarm 7 on digital input
108	Extra alarm 8	-	Extra alarm 8 on digital input
109	Extra alarm 9	-	Extra alarm 9 on digital input
110	Extra alarm 10	-	Extra alarm 10 on digital input
111	Extra unit in manual mode	-	Extra controller in manual mode
112	Malfunction motor control 1	-	Malfunction in motor control 1
113	Malfunction motor control 2	-	Malfunction in motor control 2
114	Motor control 1 external operation	-	External operation of motor control 1
115	Motor control 2 external operation	-	External operation of motor control 2
116	Not used	-	Not used
117	Motor control 1 in manual mode	-	Motor control 1 in manual mode
118	Motor control 2 in manual mode	-	Motor control 2 in manual mode
119	Communication error expansion unit 3	-	Communication problem with a connected expansion unit
120	Communication error expansion unit 4	-	Communication problem with a connected expansion unit
121	Low outdoor air temp	-	Outdoor temperature is too low
122	High outdoor air temp	-	Outdoor temperature is too high
123	Malfunction adiabatic cooling	-	Adiabatic cooling is malfunctioning
124	Communication error expansion unit 5	-	Communication problem with a connected expansion unit
125	Communication error expansion unit 6	-	Communication problem with a connected expansion unit

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7.5.5 Electrical board

Electrical board is mounted (integrated) on the top of the unit (for unit sizes 1000 – 4000) or mounted on the front side (for unit sizes 6000 - 10000). The electrical board can be drawn out, but not completely – see Figure 65.

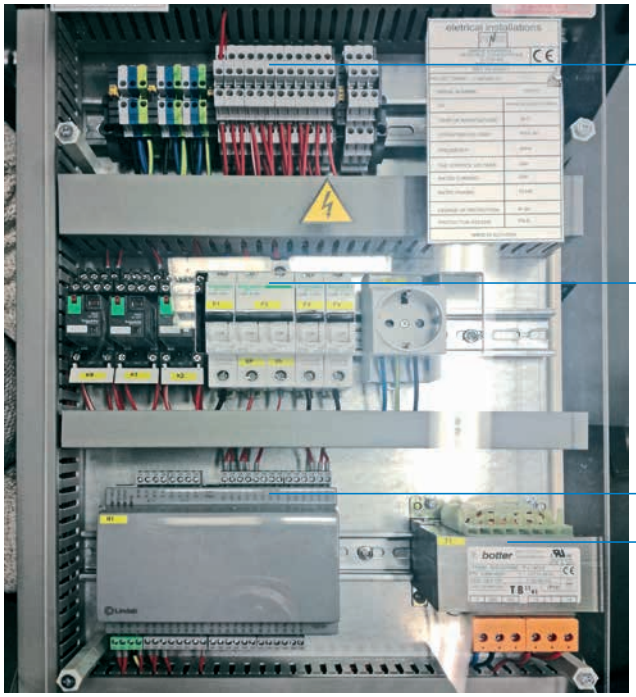

Figure 65

There is a sticker HIGH VOLTAGE on the front of electrical board so when drawing it out, be aware of high voltage! For additional user safety the board is protected with a plexi glass cover as standard.

7.5.6 Connecting of display

The screen on the display is a copy of the screen on the controller and is used to facilitate the managing of air handling unit since the controller itself is usually hidden and sometimes hard to access.

7.5.7 Electrical connection in splitted units

If the air handling unit consists of 3 parts it is necessary for proper operation to connect connectors which are connected to motors, sensors, etc.. before unit assembling. Connect the connectors to each other with the same numbers as shown in Figure 66.
Connected connectors must be inserted in a connection box, as shown in Figure 67. All cables are marked on both sides of the connector.

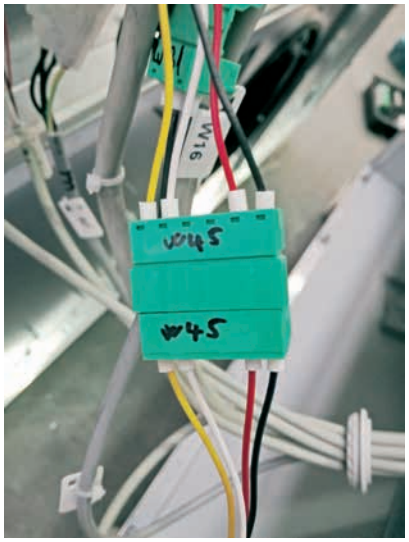

Figure 66

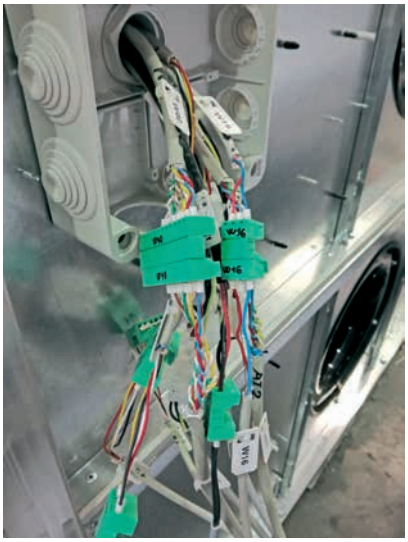

Figure 67

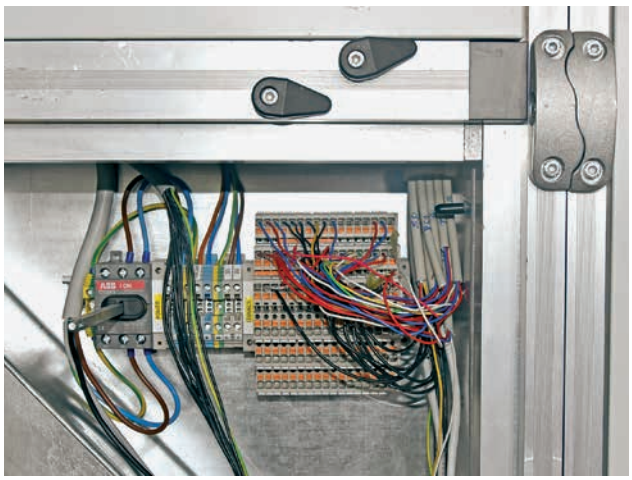

Figure 68

Figure 68: Connection box with contacts for:
- main power supply,
- heater pump power supply,
- heating valve,
- cooling valve,
- fire central,
- BMS connection

Note: Wiring diagrams are enclosed in printed form in the electrical board of every AHU unit.

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