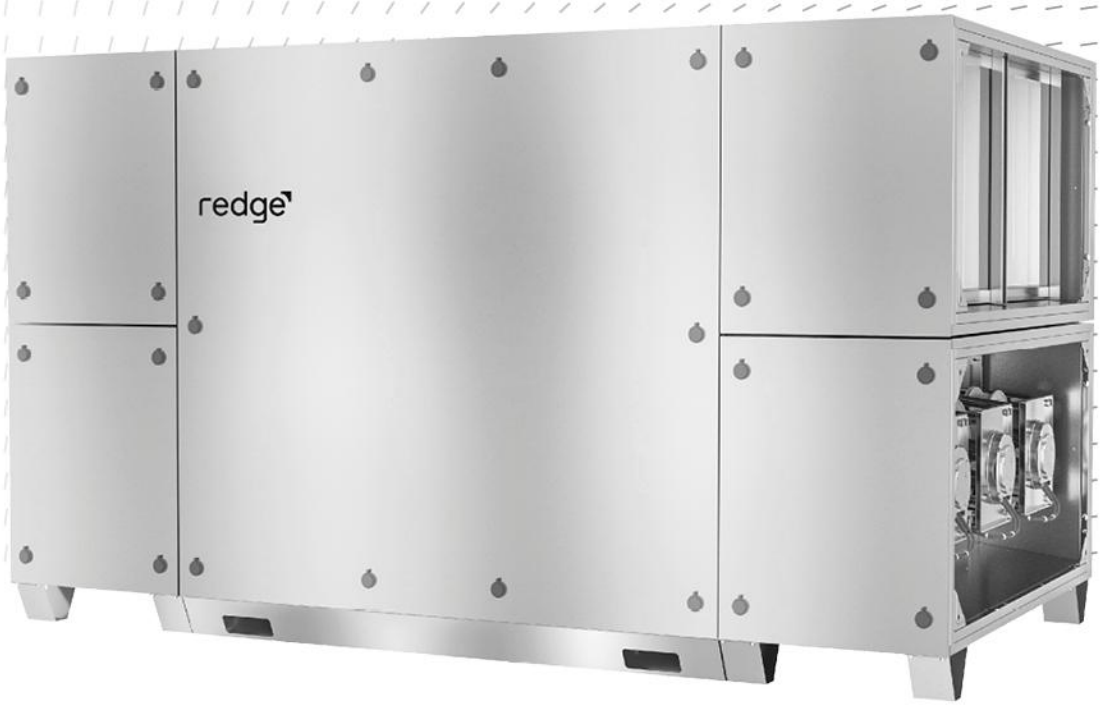
redge FORMERLY LENNOX

Compact ONEAIR FM

Air Handling Units



Installation, operating and maintenance

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1. OCCUPATIONAL AND SAFETY INSTRUCTIONS

The purpose of this document is to provide information about air handling units (AHU), their installation, start-up and operation. Following this guide will guarantee efficient and trouble-free use of the product. This document does not cover all possible configurations of units, nor their commissioning, operation, repair and maintenance cases. However it gives a good general guidance, that can be applied universally.
Both this static manual, as well as dynamic manual (customized, generated to specific order) contain information intended for qualified technical personnel only.
The following safety guidelines are intended to prevent unforeseen dangers or damage resulting from unsafe or improper use of the device.

The guidelines are divided into "WARNING" and "CAUTION" as described below.

		This symbol is displayed to indicate matters and operations that can cause risk. Read the part with this symbol carefully and follow the instructions in order to avoid risk.
	**WARNING**	This indicates that the failure to follow the instructions can cause serious injury or death.
	**CAUTION**	This indicates that the failure to follow the instructions can cause the minor injury or damage to the product.

Depending on the configuration air handling unit are suitable for indoor and outdoor installation. Devices are to be connected to other systems (ductwork, cooling, heating, waste water systems), depending on the project. Design parameters of the AHU are presented in selection sheet, available by manufacturer. For safety, direct access to rotating parts (fan impellers) is restricted by inspection panels and ductwork. Outdoor installation requires use of roofing and air intakes and outlets grilles. Peripheral controls components might require additional weather-proof protection.



WARNING DEVICE INSTALLATION, COMMISSIONNING AND SERVICING

- The installation, commissioning and servicing of air handling units and their equipment may involve certain safety risks and therefore require specific knowledge and training.
- Equipment improperly installed, adjusted, or repaired by a person without the required qualifications can become the cause of serious injury to individuals or even their death. The above relieves the manufacturer of liability and benefits under the warranty and guarantee.
- When connecting, servicing and operating air handling units, all precautions communicated by the manufacturer and those arising from good practice in the field of HVAC installations and equipment must be followed.
- Installation, maintenance and repairs must be carried out by qualified technical personnel and supervised by authorised specialists.
- Qualified technical personnel are understood to be trained specialists who, through their professional experience, knowledge of the relevant standards, documentation and regulations relating to operating procedures and associated safety, are authorised to carry out the necessary activities, and those who are able to diagnose and rectify any potential problems.
- Warranty repairs of air handling units may be carried out only by service employees with authorisations granted by the manufacturer, confirmed by an appropriate certificate, allowing them to perform this kind of work. We also recommend that the service staff authorised by

manufacturer carry out assembly, start-ups and post-warranty repairs, technical inspections and maintenance works which are required to be performed on air handling units.

WARNING DEVICE OPERATION

- This appliance is not intended for use by person (including children) with reduced physical, sensory or mental capabilities or lack of experience and knowledge, unless they have been given supervision or instruction.
- Concerning use of the appliance by a person responsible for their safety: children shall not play with the appliance.
- This appliance can be used by children aged 8 upwards and by persons with reduced physical, sensory or mental capabilities or who lack of experience and knowledge if they are supervised or have been given instructions concerning use of the appliance in a safe way and understand the hazards involved.
- This appliance is not intended to be accessible to the general public.
- Always install a dedicated circuit breaker. Improper wiring or installation may cause fire or electric shock.
- Have all electric works done by licensed electricians according to “electric facility engineering standard” and “interior wire regulations” and the instructions given in this manual
- Always use a separate electric circuit, dedicated for this device only.
- If the power source capacity is inadequate or electric work is performed improperly, electric shock or fire may result.
- do not use defective or wrongly selected circuit breaker.

- For safety reasons, opening inspection panels while the AHU is in operation is strictly forbidden.
- Before opening the inspection panels, switch off the AHU and wait 2 minutes until all rotating elements have stopped.
- Isolate the electric power supply from unintended switching on, before starting any actions on the AHU.
- The device must be equipped with individual control system, to provide optimal operation and protection. According to Ecodesign Directive 1253/2014, visual filter contamination measuring device must be installed.

INFORMATION FOR USERS ON THE CORRECT HANDLING OF ELECTRICAL AND ELECTRONIC WASTE (WEEE)

In accordance with the European Union Directive 2002/96/EC issued on 27 January 2003 and related national regulations, please note that:

- Product related to WEEE must not be disposed of as municipal waste and such waste must be collected and disposed of separately,
- You should use public or private waste collection systems as defined in local regulations,
- The equipment may contain hazardous substances: improper use or incorrect disposal of such substances may have negative effects on human health and the environment,
- The symbol (crossed-out waste bin) on the product or on the packaging and in the technical leaflet means that the equipment was put on the market after 13 August 2005 and must be disposed of separately,
- By separating and forwarding used electrical and electronic equipment for processing, recovery, recycling and disposal, you protect the environment from pollution and contamination, contribute to reducing the use of natural resources and reducing the costs of producing new equipment,
- In the case of illegal disposal of electrical and electronic waste, penalties are specified in local waste disposal regulations.

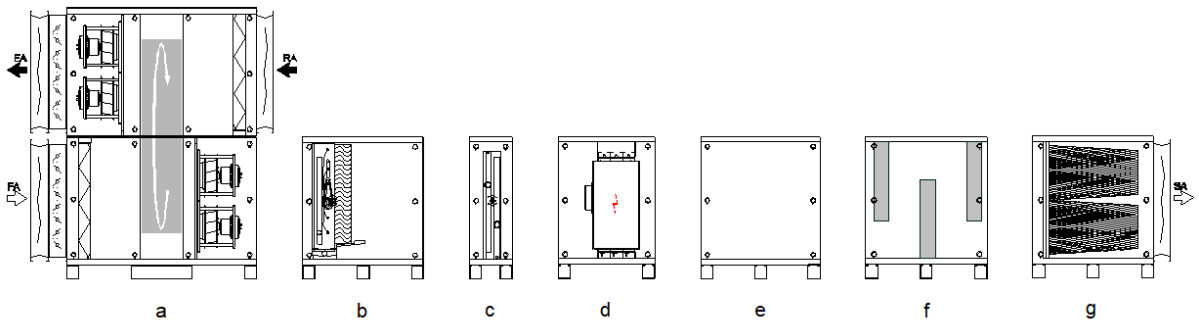
2. DEVICE RECOGNITION

OVERVIEW OF THE LINEUP

The lineup includes 8 sizes of devices, with the working range described below:

Unit size	Min. airflow[1] m^3/h		Max. airflow[1] m^3/h	Nominal airflow m^3/h
021c	806		2310	2100
030c	1167		3300	3000
040c	1958		4400	4000
055c	2878		6050	5500
075c	3805		8250	7500
100c	4863		11000	10000
120c	5815		13200	12000
150c	5815		16500	15000

[1]The minimal and maximal flow are recommended values, operation beyond them is allowable under circumstances. Local regulations, like Ecodesign can reduce allowable duty.



Example sections of horizontal device: a) main unit (with heat wheel), b) DX-coil, c) water heater coil, d) electric heater, e) empty chamber, f) silencer, g) secondary filtration stage. FA – fresh air, SA – supply air, RA – return air, EA – exhaust air

GENERAL INFORMATION ON COMPONENTS

Casing	Casing made of 40mm sandwich panel, external sheet AZ150 (aluzinc) coating, internal sheet Z140 (zinc). Insulation mineral wool, fire resistance class A1, working range -40°C ÷ + 60°C Classes according to EN 1886: D1, L1/L2, T2, TB3, F9
Fan sets	EC motors IE4 class, impellers made of aluminium or SAN (composite), maximum working temperature 55°C, protection class IP54
Heat recovery device	- Rotary heat wheel (RRG), executed as condensing, sorption or enthalpy type - Counterflow heat exchangers in made from aluminium or HIPS (High Impact Polystyrene) - No heat recovery
Filters	Filters of compact type (minipleat), or bag filters, available classes: - ISO Coarse 75% (ISO 16890) G4 (EN779) - only bags - ISO ePM10 50% (ISO 16890) M5 (EN779) - bags and minipleat - ISO ePM2,5 65% (ISO 16890) F7 (EN779) - bags and minipleat - - ISO ePM1 70% (ISO 16890) F9 (EN779) - bags and minipleat
Water coils (heating, cooling)	Heat exchangers made of copper pipes and aluminium fins, max. working temperature +150°C, max. working pressure 16 bar.
DX coils	Heat exchangers made of copper pipes and aluminium fins, max. working temperature +60°C, max. working pressure 42 bar.
Electric heaters	Set of resistive heating elements made from Cr-Ni-Fe alloy, smooth controls by means Solid State Releays (SSR) + engaging extra ON/OFF steps, protective devices to allow operation below +65°C
Air dampers	Blades made from aluminium with rubber gasket on edges, aluminium frame, drive gears made of composite and located inside of the frame
Mixing chambers	Mixing chambers equipped with the set of dampers.
Controls	- Devices equipped with heat recovery device (RRG or HEX) can be delivered fully wired and tested in factory – plug and play standard - Devices with no heat recovery are delivered with a set of control components (control cabinet, temperature sensors, humidity transducers, pressure transducers, CO2-transducers, pressure switches, damper actuators, antifreeze protection. Wires are not included. Internal wiring of devices, as well as setting up the controller and carrying out full test belongs to tasks of the installer. - Devices can be delivered without controls

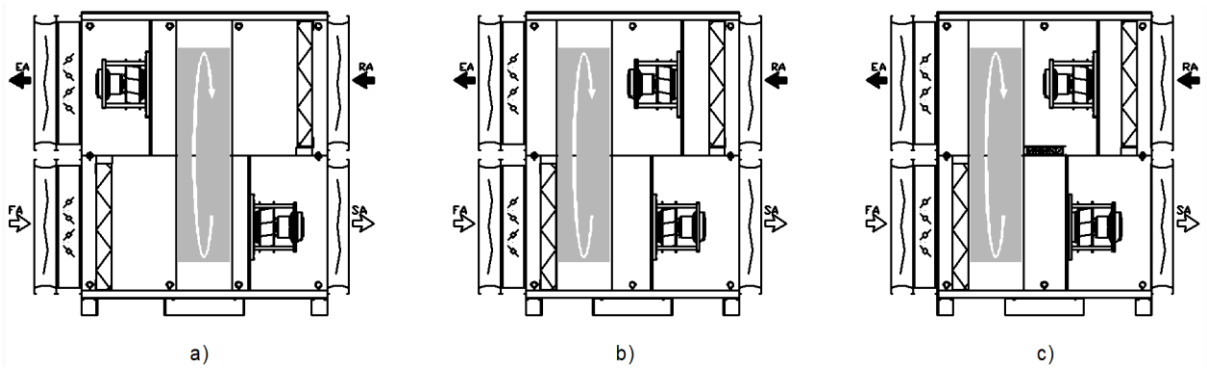
According to design, units may be equipped with various additional embedded or ducted functions and a dedicated controls system. AHU characteristic is presented in form of manufacturer's selection sheet. For the user's convenience, device may be labelled with stickers to indicate particular functionality. Example markings are presented below.

FUNCTION		AVAILABLE VARIANTS	
F	air filter	primary air filter 	secondary air filter 
V	fan 		
H	heater 	water air heater 	electric air heater 
C	cooler 	water air cooler 	DX air coooler 
P	plate heat exchanger	plate heat exchanger 	counter-flow HE 

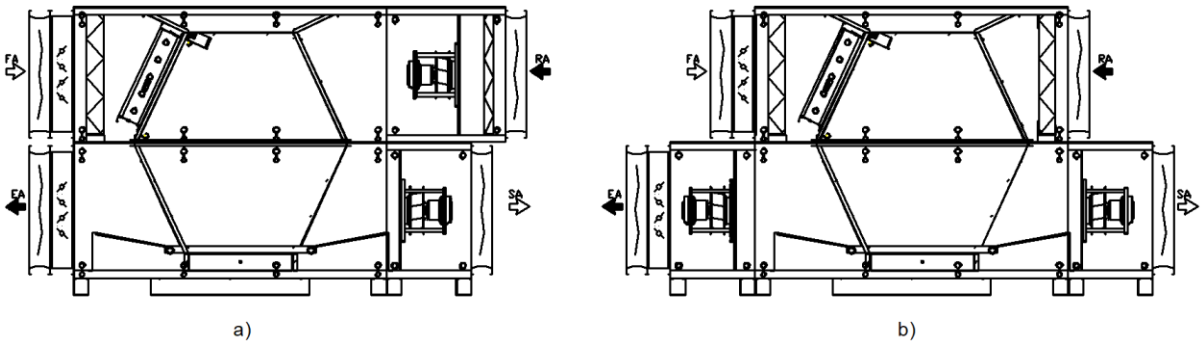
R	rotary heat exchanger		
G	run-around coil		
M	mixing chamber		
S	sound attenuator		
E	empty section		

OTHER POSSIBLE LABELS		
AD	air damper	
FLX.CON	flexible duct connection	
IN	inlet of cooling / heating medium	
OUT	outlet of cooling / heating medium	

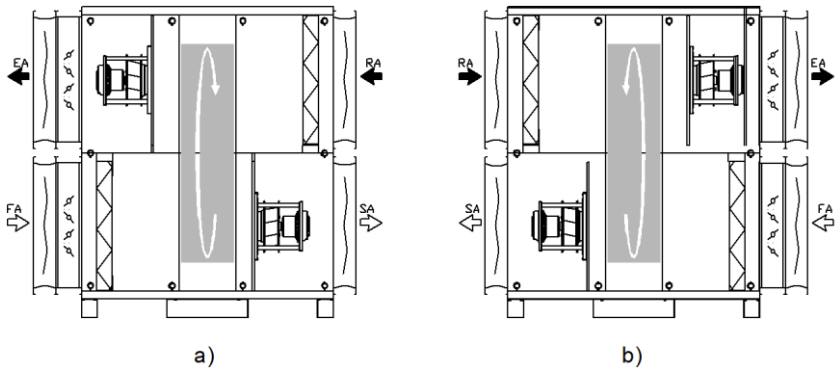
The AHUs are designed to be inspected from one side. Back panels are permanently locked during factory assembly. Both right- and left-handed options are available in the selection software. Changing the inspection side on site is not possible. The AHU orientation is determined by the direction of air in the supply path, looking from inspection side.
The AHU may consist of “core section” (with fans, heat recovery, filters and economizer embedded) and “additional functions” designed to be fixed to “core section”. Core section can be equipped with rotary wheel or counter-flow heat recovery device.



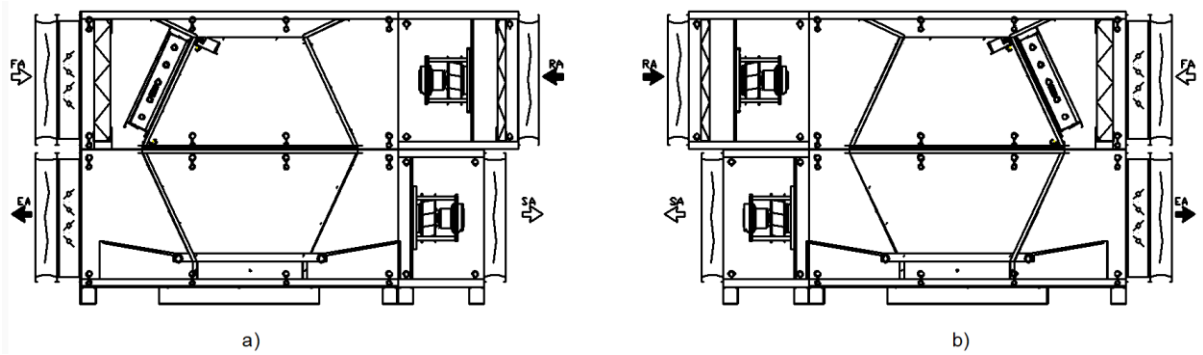
AHU with rotary wheel, core sections: a) fans on opposite sides, b) fans on the same side, c) fans on the same side + mixing chamber



AHU with counter flow heat exchanger: a) fans on the same side core sections: b) fans on opposite sides



AHU with rotary wheel handling: a) right - handed, b) left - handed. FA – fresh air, SA – supply air, RA – return air, EA – exhaust air



AHU with counterflow heat exchanger handling: a) right - handed, b) left - handed. FA – fresh air, SA – supply air, RA – return air, EA – exhaust air

3. BEFORE INSTALLING THE DEVICE

3.1. TRANSPORT AND STORAGE

RECEPTION OF GOODS

Upon delivery of the unit, all delivered elements must be checked for consistency and damage. The device and its optional equipment becomes the property of the customer when the CMR document is signed by the customer's representative. After opening of sealed transport packages, the customer is responsible for the contents and completeness of the delivery. Instantly upon receiving of the consignment, the check for transport damage must be carried out according to the points in the checklist.

ACCEPTANCE CHECKLIST	
1	All individual packages must be checked before accepting the consignment. Check packaging for damage and completeness according to the CMR document
2	If any device (package) appears to be damaged, it should be inspected immediately before accepting the entire consignment. Appropriate, damage-related entries should also be made on the CMR document. Delivery should not be refused.
3	Check the device immediately after delivery and before storage for hidden damage. Report hidden damage to the carrier within the time limit specified for this purpose from the date of delivery. Check with the carrier its deadline for making a claim.
4	Do not move the damaged appliance from the place to which it was delivered. It is the responsibility of the recipient of the delivery to provide adequate evidence that the hidden damage did not already occur after delivery.
5	If the unit in question appears to be damaged, stop unpacking it. Store all packaging, cartons and boxes. If possible, take photographs of the damage.
6	Immediately notify the carrier of the identified damage: by telephone and email in accordance with the procedure. Request the joint receiver - forwarder commission to investigate the damage and collect proofs.
7	Notify the manufacturer’s representative of the damage found and make arrangements for repair. The carrier's representative or insurance company may require inspection of the damage before repair.
8	Compare the electrical data on the unit's rating plate with that on the order to check that the unit received is correct.



- Any damage caused as a result of incorrect transport, unloading or storage is not covered by the guarantee and any claims submitted for cases of the above nature will not be considered by the manufacturer.
- Air handling units are supplied in assembled functional sections that need to be connected on site by installer.
- The unloading and internal transport of packages must be carried out by means of specialized equipment (forklift, pallet jack, crane) and by the qualified personnel.

STORAGE

The AHUs are packaged for easy internal transport and storage at the site.
Device:

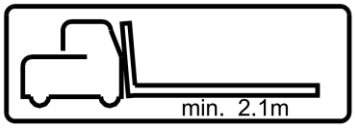
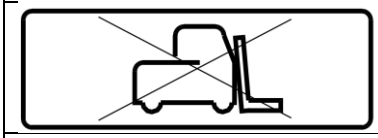
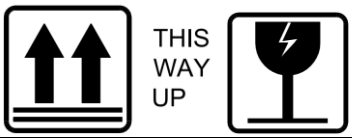
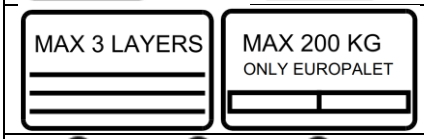
- should be placed in paved, dry locations protected from precipitation,
- should be placed and stored away from areas with active mechanical equipment (vehicles, cranes and other construction machinery),
- should be stored in places where they will not be exposed to any physical damage and not exposed to moisture, aggressive chemicals, liquids, dust and any other external factors whose influence may impair their technical and functional condition.
- should be stored in rooms with the following conditions:
  relative humidity: $\varphi < 80$ %, at t = (+20) °C
  ambient temperature: (-40) °C < t < (+60) °C

This is recommended to store the device in its original transport packaging for protection and to facilitate proper positioning.

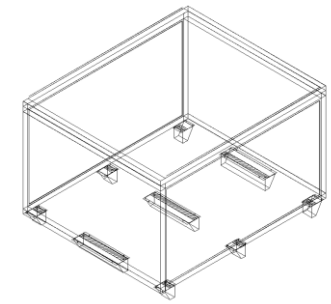
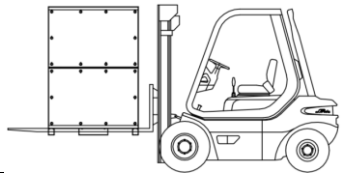
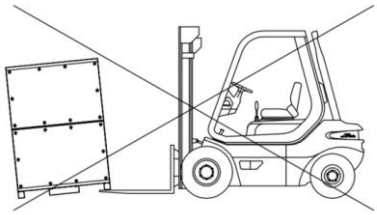
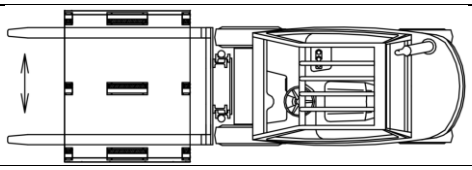
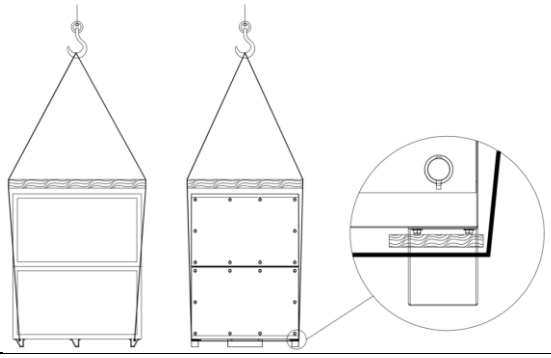
RULES FOR LIFTING AND MOVING

The device must be transported in the position and the manner marked on the original manufacturer's packaging. Pictograms shown below are sticked or printed with a hand printer on the packaging foil.

This is required to follow the instructions, otherwise damage may occur.

	Use forks of the forklift with at least the length indicated.
	Device is equipped with feet, which may be broken when sliding.
	Do not lift the device from this side.
	Lift the device in proper way and with care.
	Protect the device against water and store within the permissible temperature range.
	Do not exceed permissible number of layers and weight.
	Dispose of the packaging material accordingly.

When lifting and turning the device, following rules are applicable:

	Device is equipped with feet and approachable from sides marked as:  Device cannot be lifted from sides marked as: 
	Use forklift or pallet jack with appropriate fork length.
	Do not slide or put the excessive burden on part of feet only.
	Spread the forks to match the holes under the device and improve balance
	When lifting with crane, use distancing beams, to avoid damages caused by belt / rope pressing the casing. Use pieces of wooden plank to protect device corners from crushing

3.2. REQUIREMENT TO LOCATION

CHOOSING THE LOCATION

When choosing the location for the device, following should be considered:

- The location should be prepared to maintain the weight of the device. The weight is stated on the AHU name plate. The stated mass doesn't include the media; this should be additionally calculated.
- The device should be positioned on the sufficient level above the ground, to allow for water trap installation.
- Sufficient space to ensure easy removal of the inspection panels should be foreseen, for making maintenance work possible.
- There must be sufficient clearance for accessing electric components, including control cabinet.

- Device should be mounted on even and horizontal surfaces.
- Pay attention to spaces required for mounting the pipe work for coils (including venting and draining).
- Device ordered for indoor installation cannot be located outdoor.
- All piping and ducting should be fixed independently of the device, to reduce the risk of AHU damage and vibration propagation.
- The device should be placed on foundation screed or rigid steel structure, calculated to withstand the total burden.

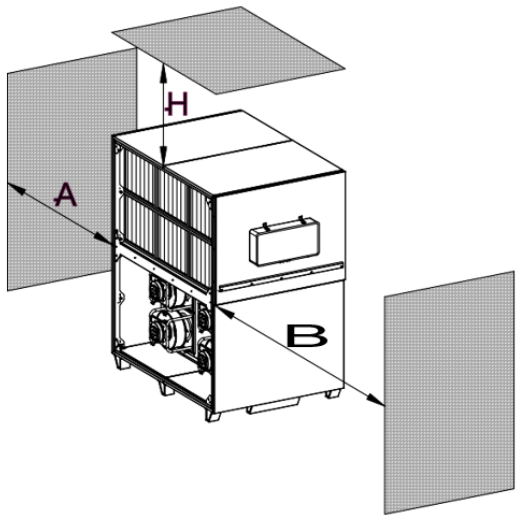
SERVICE SPACE

To allow proper operation and maintenance of the device, following clearances should be assured.

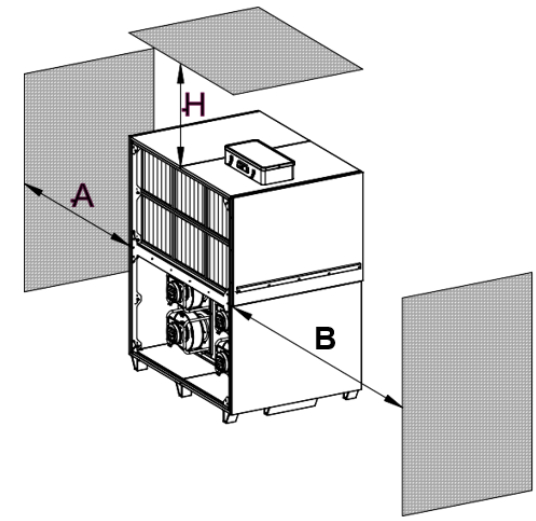
A – size of free space on inspection side (access to AHU internal components)

B – size of free space on the AHU back (access for mechanical connection and control box)

H – size of free space above the AHU (access for mechanical connection and control box)

CONTROL BOX LOCATED ON THE BACK OF THE DEVICE	**SIZE**	**H mm**	**A mm**	**B mm**
	021c	200	1500	1200
	030c	200	1500	1200
	040c	200	1700	1200
	055c	200	1900	1200
	075c	200	2000	1200
	100c	200	2200	1200
	120c	200	2400	1200
	150c	200	2600	1200

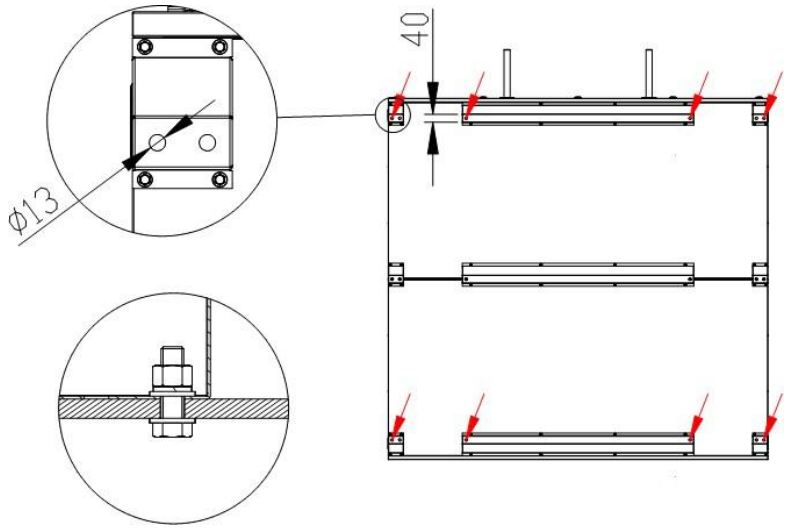
CONTROL BOX LOCATED ON THE TOP OF THE DEVICE	**SIZE**	**H mm**	**A mm**	**B mm**
	021c	1200	1500	600
	030c	1200	1500	600
	040c	1200	1700	600
	055c	1200	1900	600
	075c	1200	2000	600
	100c	1200	2200	600
	120c	1200	2400	600

	150c	1200	2600	600

4. INSTALLATION OF THE DEVICE

4.1. DOCKING THE UNIT

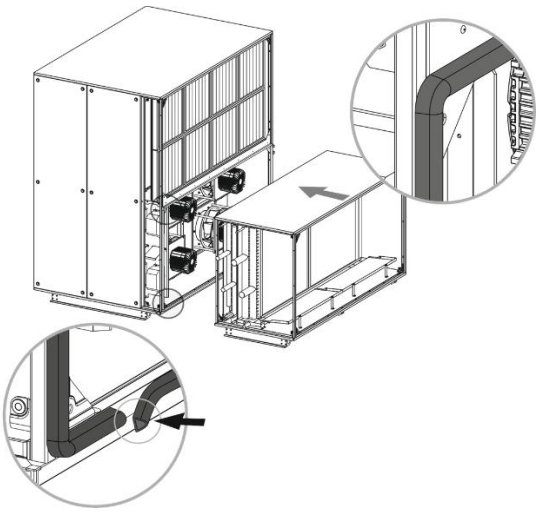
All device frames / feet must be supported. Use M10 screws or dowels to secure the frames to the foundation. Frame deflection of 1mm/1m must not be exceeded. Use the holes in device supporting frame / feet for anchoring the unit to the ground.



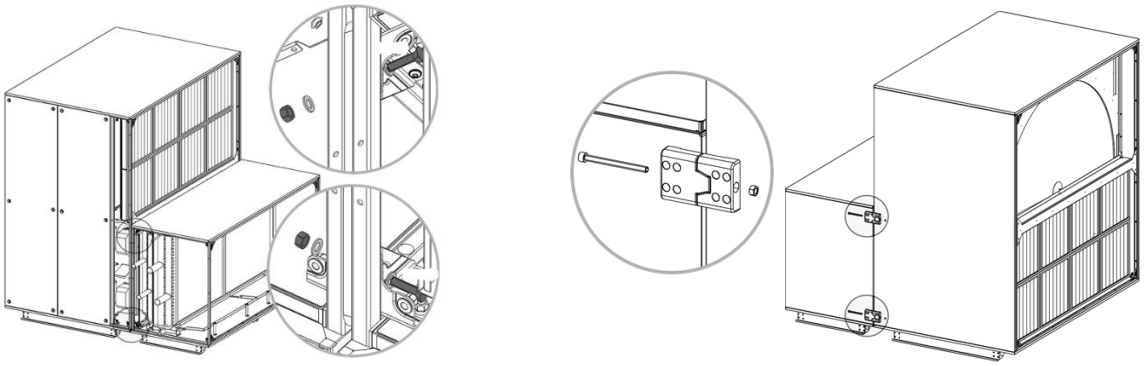
The device should be fixed through the available holes in the feet / frame.

4.2. JOINING AHU SECTIONS TOGETHER

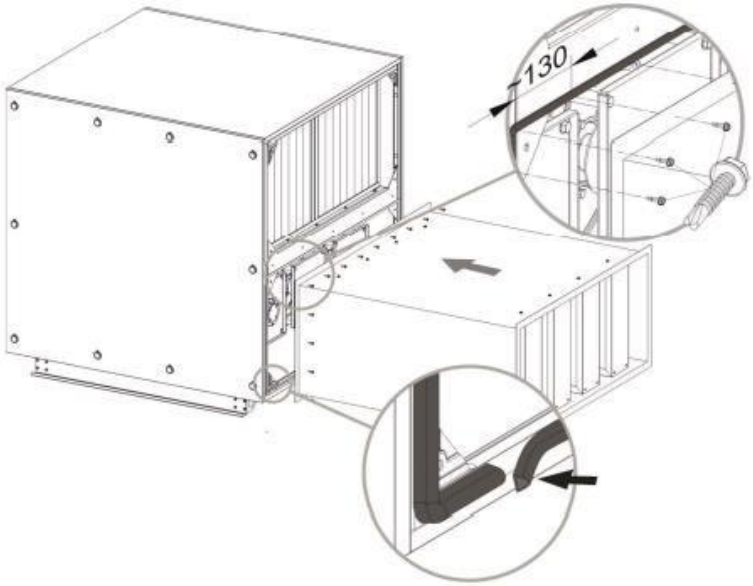
Connection between AHU functional blocks can be done internally or externally, depending on available access. Arrange AHU sections according to design and selection sheet.



Apply adhesive sealing gasket between surfaces being connected.



Join sections, using internal corners or external coupling on the AHU rear (bolts included)

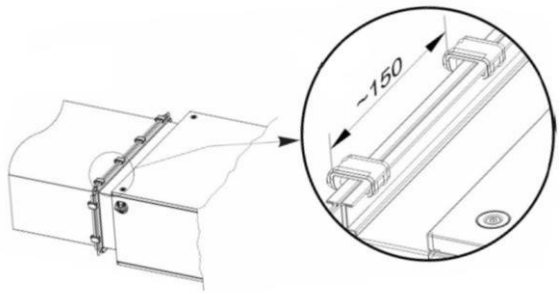


When fixing the ducted silencer, apply the gasket and use self-tapping bolts to join directly with the AHU body.

4.3. DUCT CONNECTION

This is recommended to use flexible connections (optional), to minimize vibration spreading and to ease

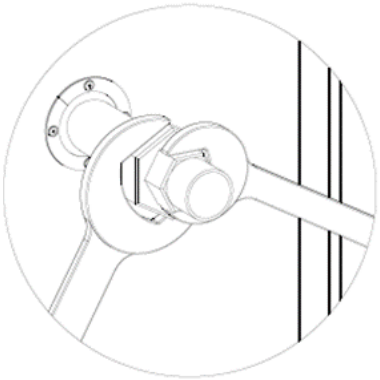
ducting alignment. Flexible connection flanges are fitted with sealing tape. Fixing the flange to the AHU is to be done with self-tapping screws, directly to the AHU structure.



When joining with ductwork, use slip-clamps (not included).

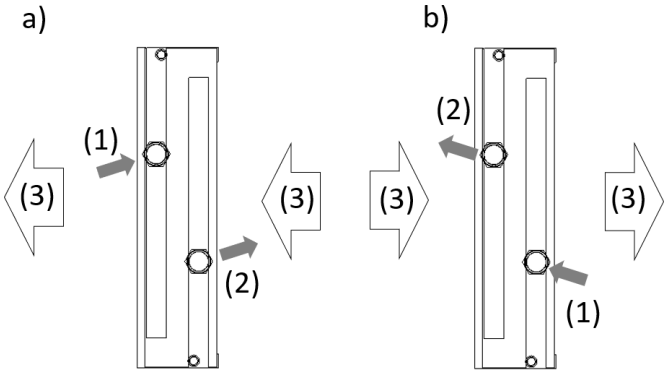
4.4. WATER COIL CONNECTION

While connecting water (heating, cooling) coils to external piping, do not apply any excessive force which might lead to mechanical damage and leakage of the coil. Allow for compensators to avoid forces caused by linear thermal extension. If necessary, coils should be frost protected (frost switch, back water temperature sensor, glycol mixture to reduce media freezing point). Water system should be equipped with couplings for easy disconnecting, to enable maintenance and servicing.
Operating conditions: +3°C ÷ +130°C, 16 bar, water hardness not greater than 11,5 °dH.

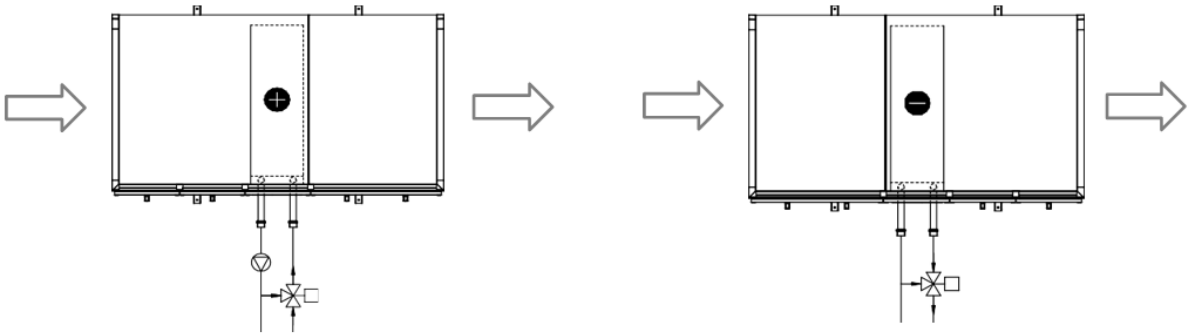


Use two spanners to tighten threaded connections

For optimum heat transfer, the counter-current arrangement of air and medium is preferred.



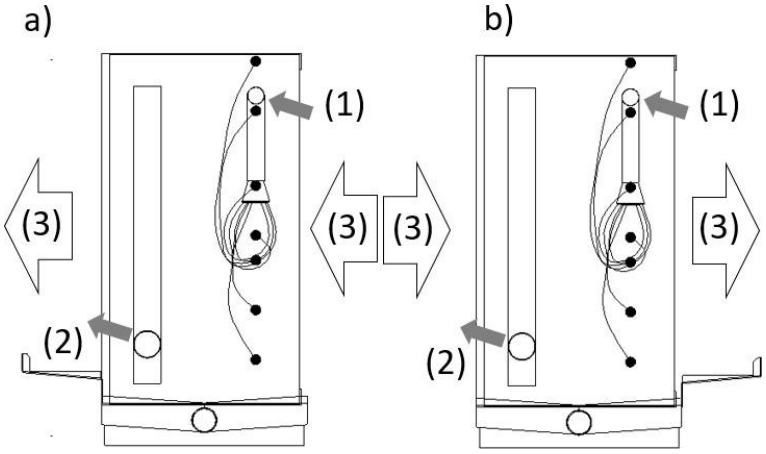
Water heater counterflow connection principle: a) left-hand execution, b) right-hand execution, (1) media inlet, (2) media outlet, (3) air flow direction



Preferred 3-way valve mounting position: heater (right), cooler (left)

4.5. REFRIGERANT COIL CONNECTION

Connection of DX-coil must be carried out by qualified personnel only (f-gas certified). DX coils are designed to operate with R410A and R32 gases. Maximal working pressure 42 bar (for 5/16" exchangers). Appropriate antifreeze controls scenarios should be provided, to avoid damage and malfunction of the exchanger. Do not release refrigerant to atmosphere. While adding or removing refrigerant, local regulations should be followed. DX exchangers are equipped with copper stubs suitable for brazing. Cover the tubes beyond the brazing spot with wet cloth, to reduce overheating of adjacent parts.



DX coil connection principle: a) left-hand execution, b) right-hand execution, (1) media inlet, (2) media outlet, (3) air flow direction

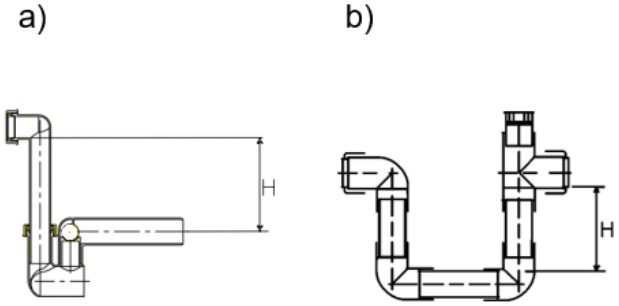
Each DX coil is supplied with a loaded nitrogen pressure and a control pressure gauge. Check the pressure gauge reading at the time of delivery. The pressure should be in the range of 11 bar (at -20°C) to 18.5 bar (at 60°C). If the pressure is lower, then a pressure test of the exchanger should be carried out to detect leaks.



The pressure gauge brazed to DX coil collector; the reading within the green range proves the tightness.

4.6. CONDENSATE DRAINAGE

In case the device is equipped with a cooling coil or counterflow heat exchanger, there are 32mm pipe drain pipe connections coming out from the unit side. Those should be fitted with water traps (not provided). Do not join drainage pipes from underpressure and overpressure sections, since this will cause unwanted side effects. In case of freezing risk, drainage tubes should be insulated or heated, to avoid ice clogging.



Determining the height of the syphon, a) for sections with underpressure (ball valve), b) for sections with overpressure. The height H [mm] > Dp [Pa] where Dp: static over / underpressure in connected AHU section.

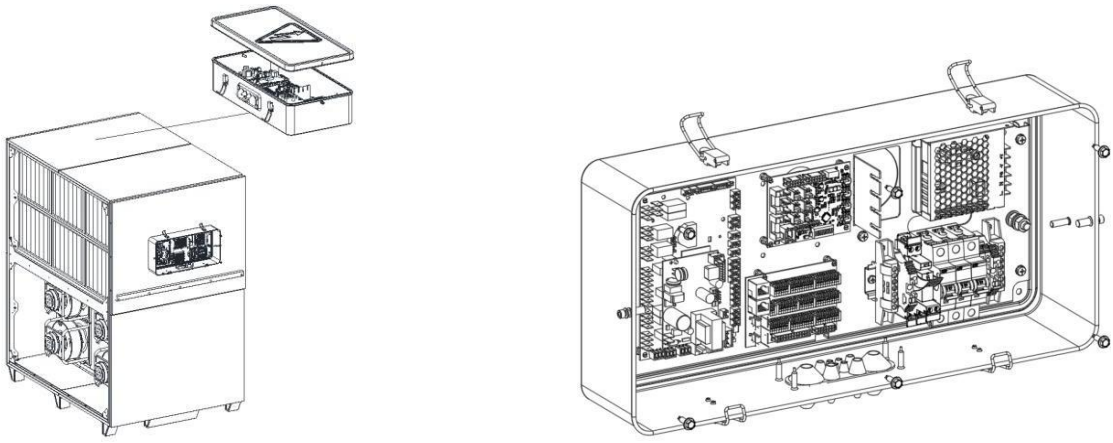
4.7. ELECTRICAL CONNECTION

4.7.1. CONTROLS SET

PLUG & PLAY UNITS

The core section of the air handling unit consist of casing with built-in fans, filters and heat recovery device (rotary wheel, counterflow heat exchanger). If ordered, the device is executed fully wired with complete controls system embedded.

The control cabinet is located outside of the unit casing, either on the top or on the back of the device.



Control box located on the top or on the back of the device

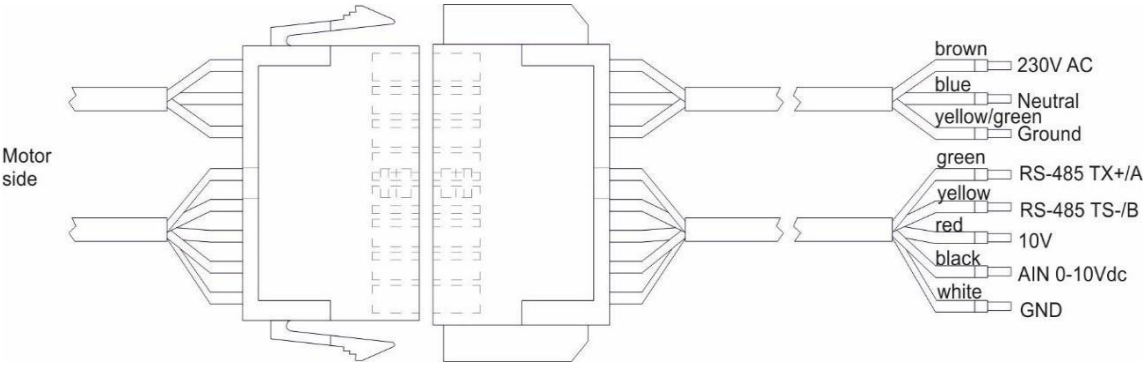
Electric heater sections are equipped with separate control box and requires separate power supply cord and isolator, independent from the one from core section.

UNITS WITHOUT CONTROLS

Alternatively, device can be delivered without controls. In such case, appropriate selection of cable cross-sections and type should be done on basis of rated current, cable length, working conditions and way of connection.

Each air path (supply, return) can consist of up to 10 fan sets, which are 230V EC fans, IP44 class with internal overloading protection. Fans are connected by branch cable terminated in common junction box, separate for each air path. This is advised to use three phase supply, with neutral and PE wire. Particular phases are split inside the branch cable to provide nearly equal power distribution over fan sets. Motors are set up for Modbus RTU communication, with factory assigned addresses.

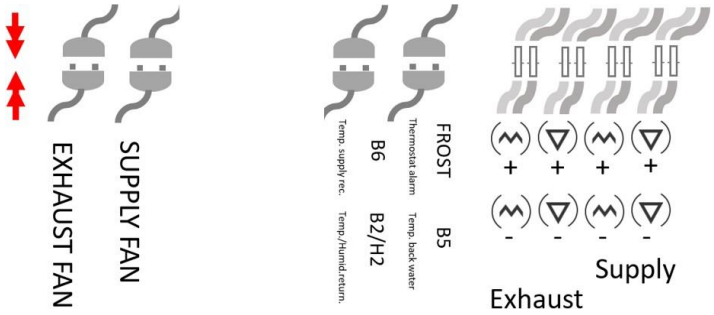
SUPPLY POWER AND RATED CURRENT FOR FAN WALLS, DEPENDING ON AHU SIZE 380 – 415V, N, 3~50Hz				
Fan code	**Possible in AHU size**	**Rated current**	**Min. circuit breaker**	**Power cable**
[-]	**[-]**	**[A]**	**[A]**	**[3~400V AC+N+P]**
225|0.74kW|1.33x2	021c,030c,055c	19	C25	5x2.5 mm^2
225|0.74kW|1.33x3	030c,040c,055c	22	C32	5x4 mm^2
225|0.74kW|1.33x4	055c	26	C32	5x6 mm^2
250|0.7kW|1.58x1	021c	19	C25	5x2.5 mm^2
250|0.7kW|1.58x3	075c,100c	22	C32	5x4 mm^2
250|0.7kW|1.58x4	075c,100c,120c	26	C32	5x6 mm^2
250|0.7kW|1.58x5	075c,100c,120c	30	C40	5x6 mm^2
250|0.7kW|1.58x6	100c	34	C40	5x6 mm^2
250|0.7kW|1.58x6	120c,150c	34	C40	5x10 mm^2
250|0.7kW|1.58x7	120c,150c	38	C50	5x10 mm^2
250|0.7kW|1.58x8	150c	41	C50	5x10 mm^2
250|0.7kW|1.58x9	150c	45	C63	5x10 mm^2
250|0.7kW|1.58x10	150c	49	C63	5x10 mm^2



Individual fan sets are connected by means of Molex connecting bracket

4.7.2. FANS

After mechanical connection of core unit and fan section, there are quick-fit connectors to be joined. They are marked according to their function, to ease intuitive connection.



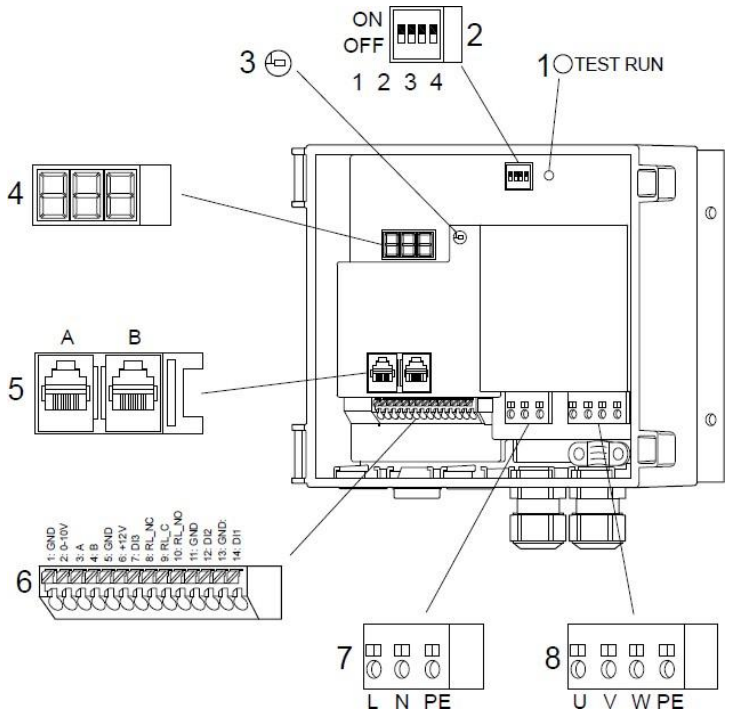
Set of quick-fit connectors (electric wires and air tubes). Tube colours: red / blue : high / low pressure for CAV/VAV controls, black / transparent – pressure drop over filter.

4.7.3. ROTARY WHEEL

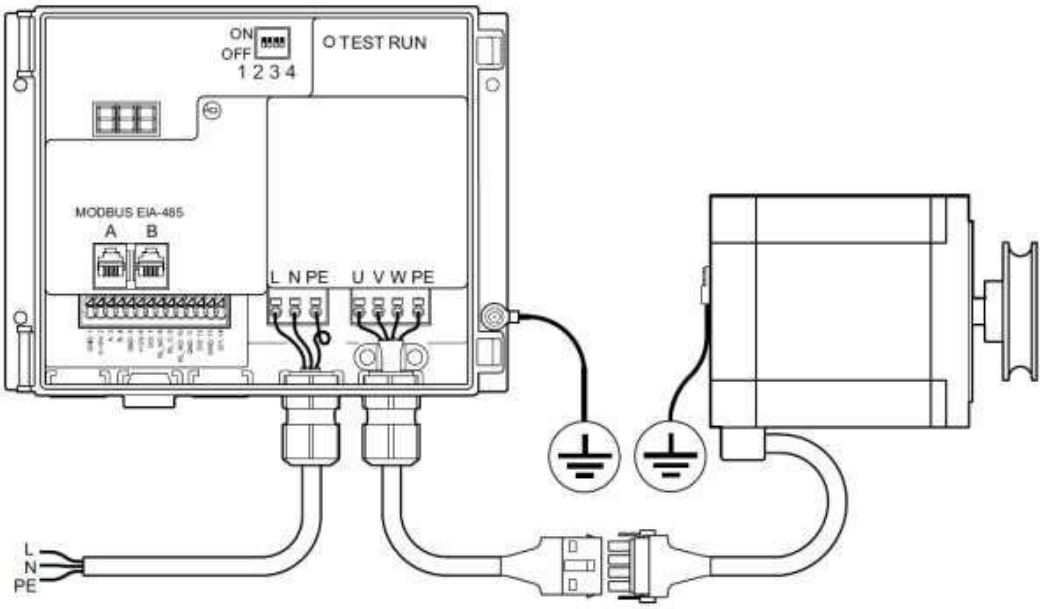
Rotary exchangers are equipped with controllers for speed control. By default, communication with the main controller takes place via Modbus only. The rotary wheel controller is factory connected and requires no additional actions while commissioning.

Devices with sizes 1-8 are equipped with the following stepper motors:

Motor	AHU size
2 Nm - 55 W	21c – 55c
4 Nm - 110 W	75c – 150c



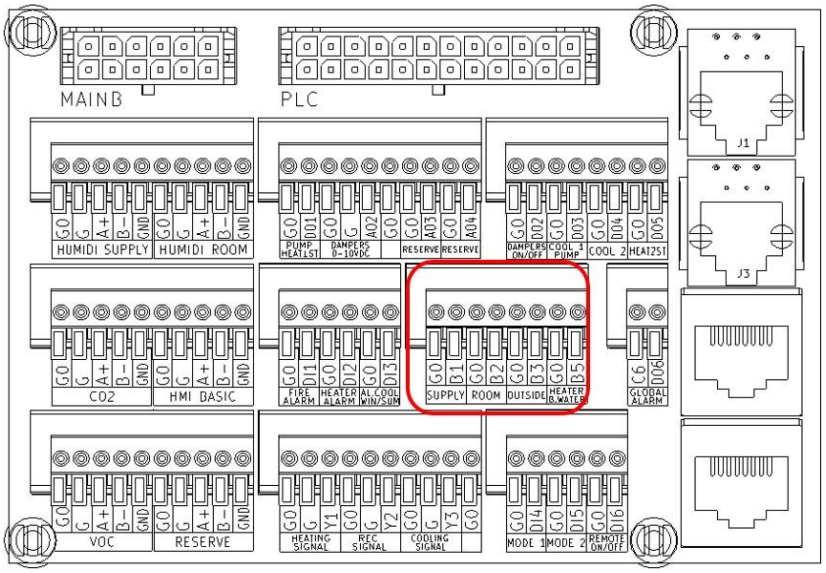
Stepper motor controller – terminals



Connection of stepper motor and controller

4.7.4. CONNECTIONS TO TERMINAL T1

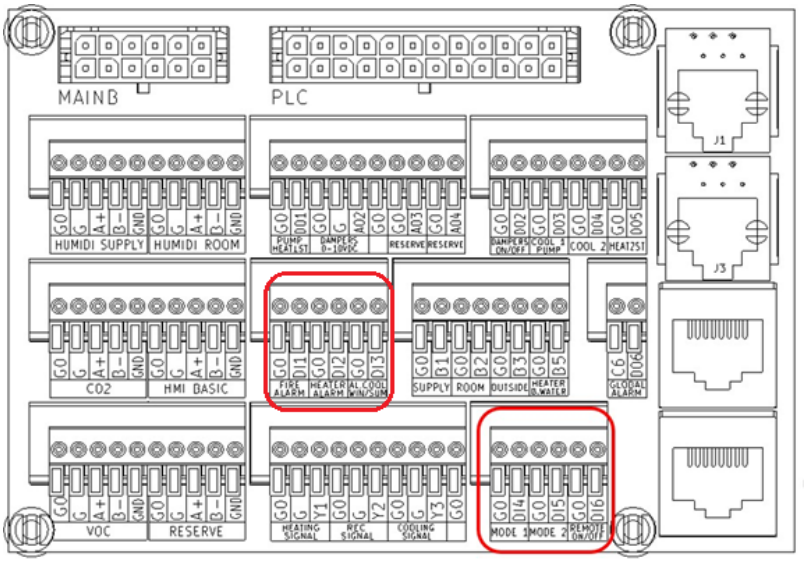
ANALOGUE INPUTS



Connections for NTC10k temperature sensors

B1	G0	Ducted supply temperature sensor (to be located ca 2 m after the heater)
B2	G0	Return temperature sensor – connection for room sensor
B2/6	G0	Ducted supply temperature sensor after preheater
B3	G0	Connection done directly to uPC3 controller, beyond T1
B5	G0	Strap-on sensor for preheater (priority) or main heater

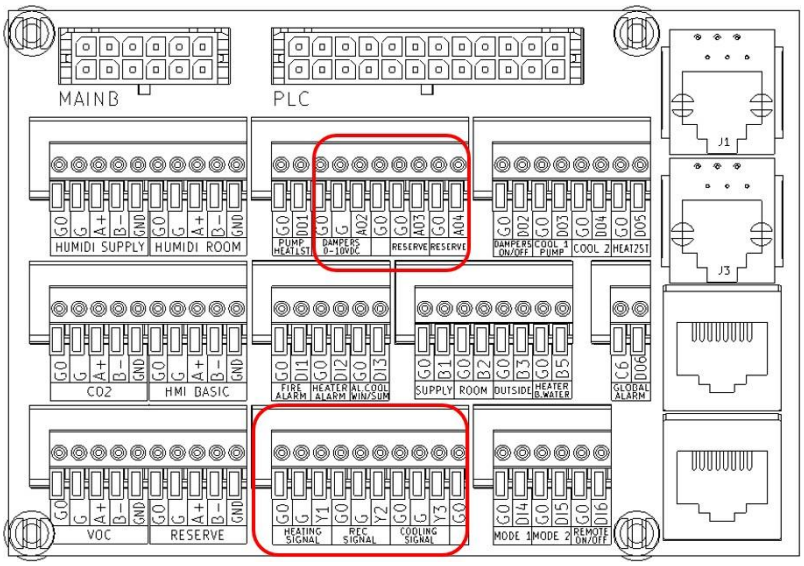
DIGITAL INPUTS



Connections for digital inputs

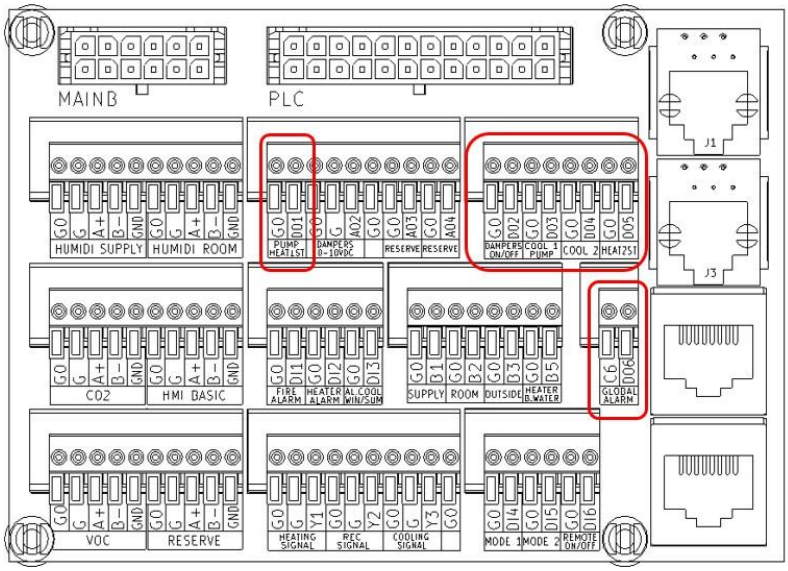
DI1	G0	Fire alarm
DI2	G0	Heater alarm (frost switch) or electric heater alarm
DI3	G0	Cooler alarm
DI4	G0	Humidifier alarm
DI5	G0	Cooling source alarm
DI6	G0	Programmable input for on/off or mode change

ANALOGUE OUTPUTS (0-10V)



AO1	G0	Heat recovery
AO2	G0	Mixing
AO3	G0	Humidifier or reheater
AO4	G0	Preheater or reheater
Y1	G0	Main heater or reheater after DX-H or mixing chamber
Y3	G0	Cooler or reheater after DX-H or mixing chamber

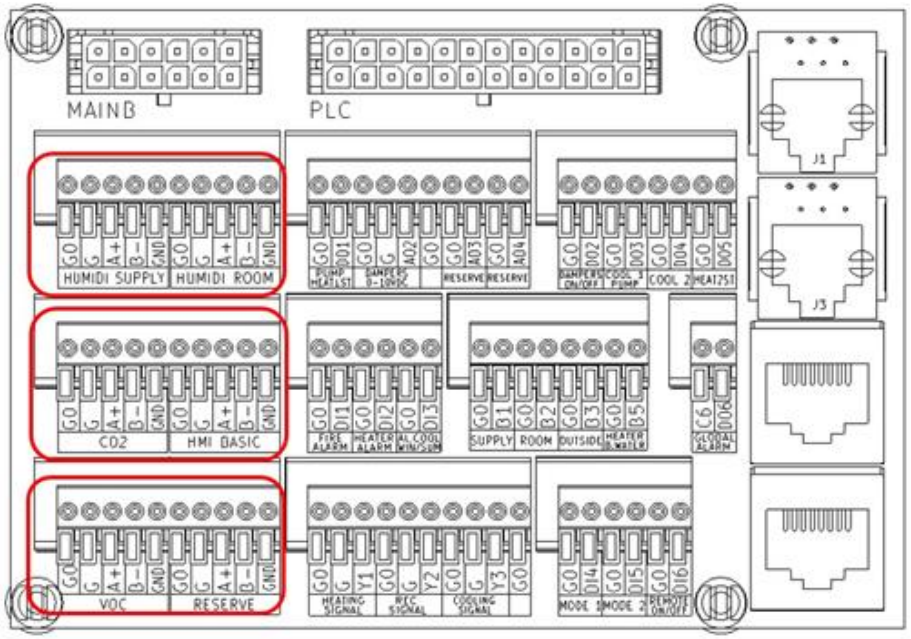
DIGITAL OUTPUTS



DO1	G0	Main heater or reheater after DX-H
DO2	G0	Fresh air and exhaust air damper actuator
DO3	G0	Cooler stage 1
DO4	G0	Cooler stage 2 or humidifier
DO5	G0	Heater stage 2 or cooler stage 2
DO6	G0	Preheater or reheater or global alarm

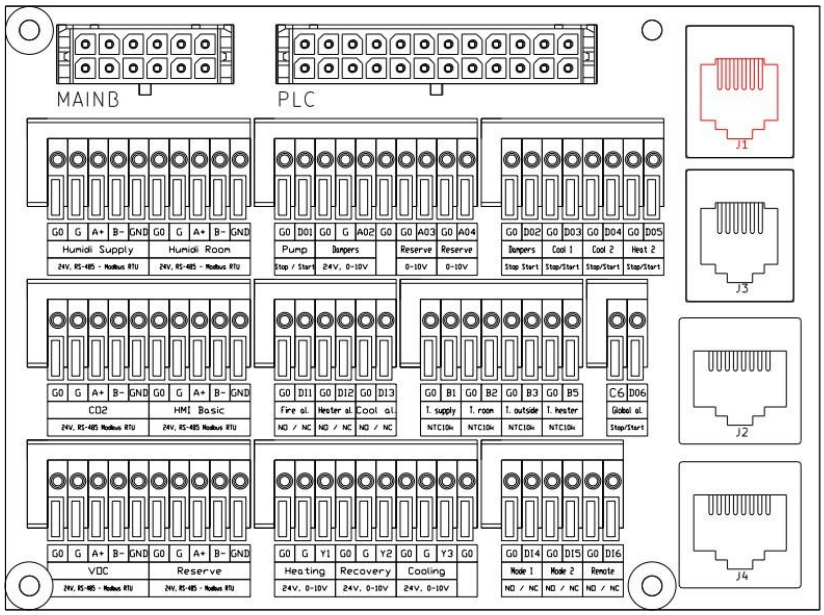
MODBUS RS485 CONNECTIONS

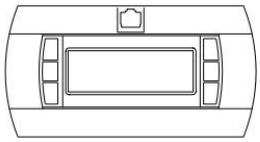
There are several Modbus connections on T1 to be used: supply humidity sensor, CO2 transducer, HMI Basic panel etc.



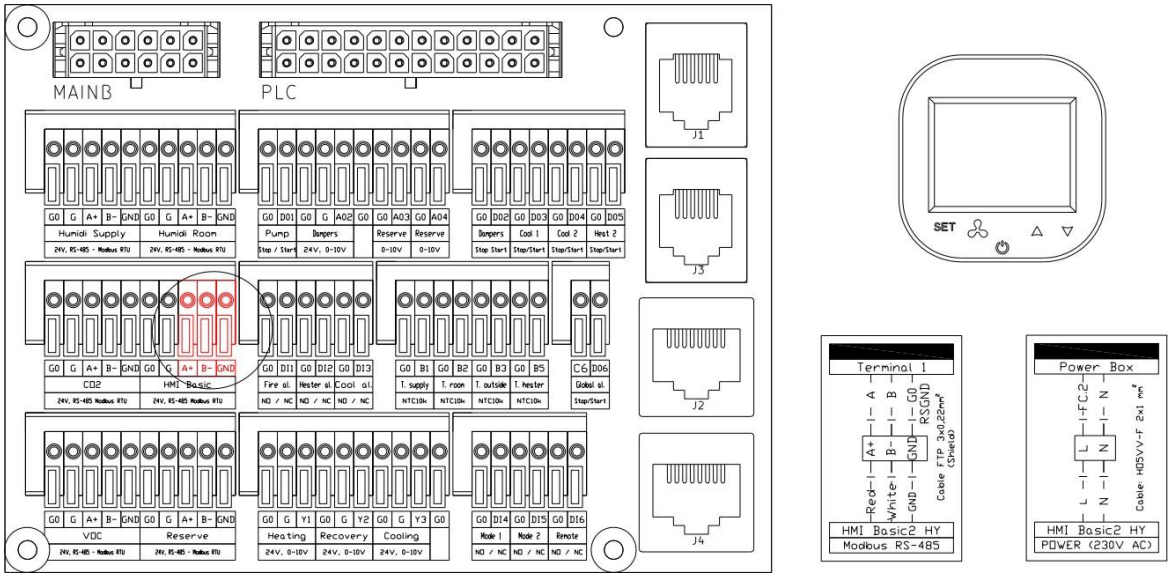
HMI ADVANCED

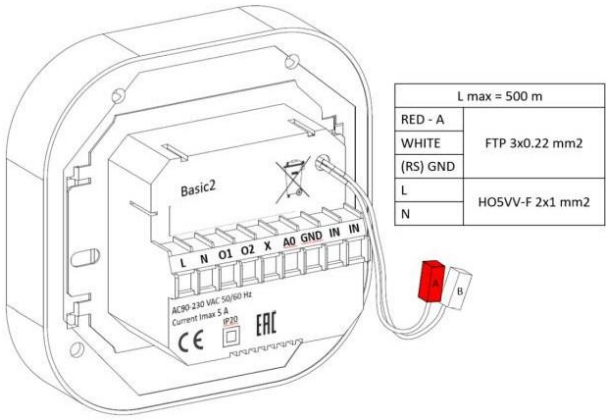
HMI advanced is to be connected to one of RJ12 port.



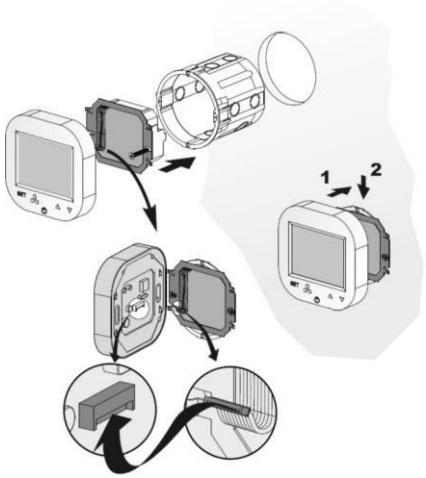


HMI BASIC





L max = 500 m	
RED - A	FTP 3x0.22 mm2
WHITE	
(RS) GND	
L	HO5VV-F 2x1 mm2
N	



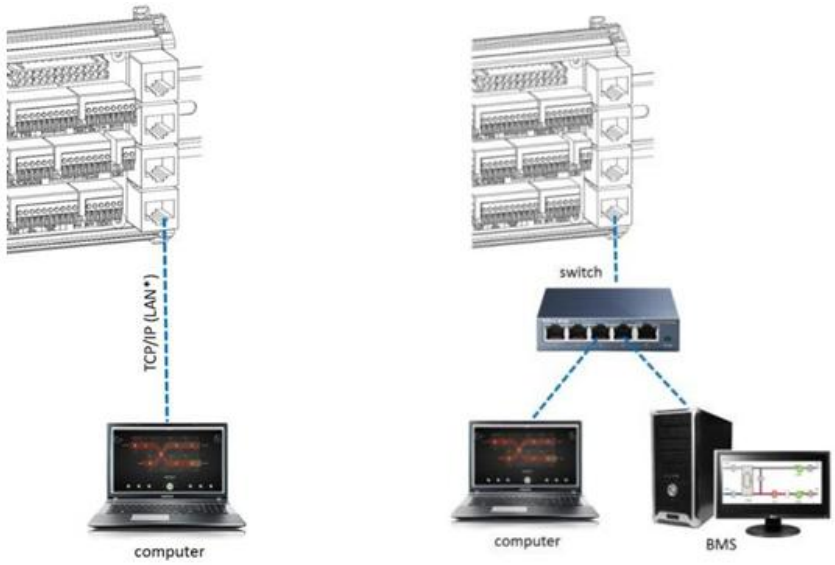
HMI Basic is powered by 110-230V AC mains voltage. To ensure correct operation, separate power and control cables must be used, not exceeding the recommended length of 500m. The following cable types are recommended:

Power supply: 2x1 mm2

Modbus communication: FTP 3x0.22 mm2 (shielded)

BMS AND WEB HMI

BMS and WEB HMI connections are realized by means of Ethernet port.



BMS and web HMI connection to RJ45 port

4.7.5. CONNECTION CABLE STANDARDS

External connections between T1 terminal board and peripherals should be done with cable types listed below. In plug & play standard, most of cables are included into delivery, and should be just installed and connected.

APPLICATION	WIRE TYPE	WIRING [mm]
Fire alarm relay	[2]	2x0,75
Multifunction switch	[2]	2x0,75
Optional multifunction switch	[2]	2x0,75
Supply air temperature sensor	[1]	2x0,75
Room / return air temperature sensor	[1]	2x0,75
Back water temperature sensor for water heater	[1]	2x0,75
Electric heater (HE) alarm input	[2]	2x0,75
Air-side antifreeze water heater thermostat inptu	[2]	2x0,75
Three-way valve	[1]	3x0,75
Electric heater power control output	[1]	3x0,75
Water heater circulation pump contactor		3x1,5
Alarm relay for refrigerator/cooling unit/heating pump	[2]	2x0,75
Refrigerator start-up input	[2]	2x0,75
Chiller start-up output - stage I	[2]	2x0,75
Chiller start-up output - stage II	[2]	2x0,75
Recirculation damper actuator	[1]	3x0,75
Bypass actuator for the cross-flow exchanger	[1]	3x0,75
HMI Basic UPC control panel	[3]	UTP 1x2
HMI Advanced UPC control panel	[4]	8x0,1

Cabel type requirements:

ID	TYPE WIRED	DESCRIPTION

[1]	Cables for the transmission of control signals - screened copper wires. PVC insulation.	Rated voltage 300/500 V. Ambient temperature: 30°C ÷ 80°C
[2]	Copper conductors PVC insulation	Rated voltage 450/750V. Ambient temperature: -40° ÷ 70°C
[3]	Copper conductors PVC insulation	Rated voltage 150 V. Ambient temperature: - 20°C ÷ 60°C
[4]	Unshielded flat data cable	Rated voltage 150 V. Ambient temperature: - 20°C ÷ 60°C

4.7.6. ELECTRIC HEATER

WARNING

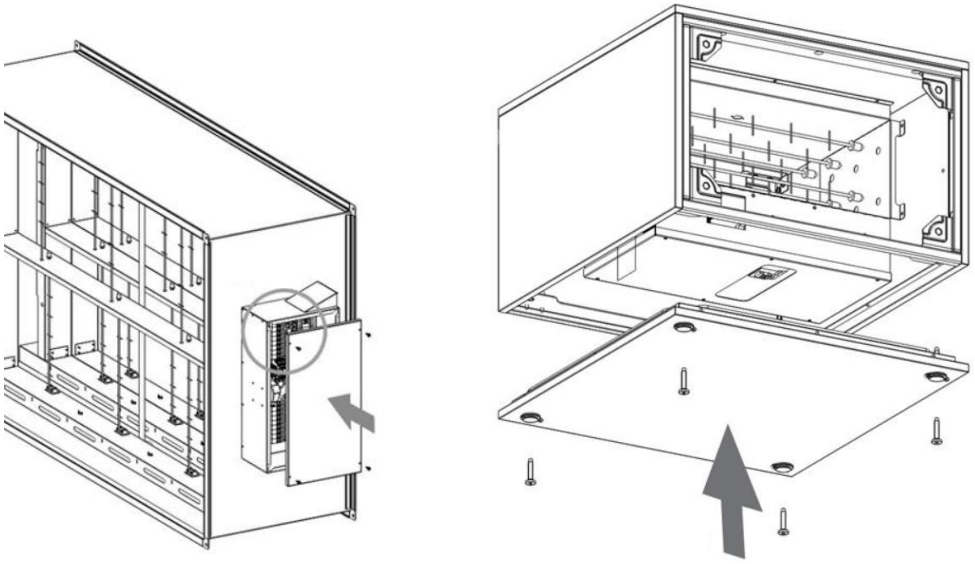
- The power supply connection must be made using a separate distribution board, which is not supplied by AHU manufacturer
- The electric heater can operate only with the air flowing through, by closed inspection panels. This is ensured by factory-fitted pressure switch and thermal switch, connected in series. For proper operation, pressure tubes of the pressure switch must be manually positioned, depending on AHU configuration.
- Both AHU and electric heater have got their individual control cabinets which are energized from different sources. When stopping the unit, both control cabinets must be switched off separately.

The electric heater is by default delivered as built-in separate section. It's equipped with individual control cabinet, covering SSR module, power switches and protection components and connection terminals.

The heater consist of an array of Cr-Ni-Fe heating wires each of 6kW/400V. They are connected in heating slices (1, 2 or 3 heating sections), for better power adaptation to project.

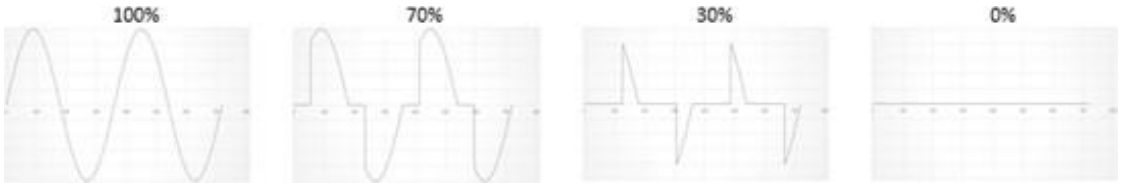
Every heater size is available it two power variants: low (wired in "star" connection) or high (wired in "delta" connection). The appropriate wiring is carried out by manufacturer, according the AHU selection sheet. This is not allowed to modify heater's internal wiring on site.

Electric heater section can be executed with casing (the same like the unit) or can be delivered as "ducted" option. In case the latter is insulated on site, pay attention to not covering control box ventilation grills and radiators.



Electric heater options: left: ducted version (while insulating, do not cover the control cabinet's ventilation grill nor radiators), right: cased version

The heater adapts it's power to the demand given from the AHU controller. First power slice is smoothly 0-10V controlled, whilst next slices are on/off. Each time a regulated slice reaches full output, the demand is passed on to the next slice, which starts operating at full capacity. Any additional heating power will be realised by stepless increasing the regulated heating power of the modulating slice.



Regulation principle for 1st slice - smooth regulation is done by periodic switching on and off the power supply.

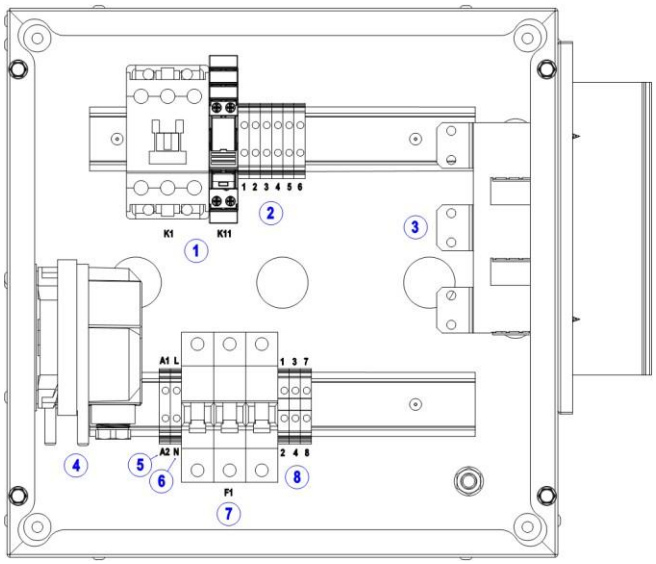
ELECTRIC HEATER CHARACTERISTICS	
Type of network	TN
Rated supply voltage – heating elements	3x400V AC
Rated supply voltage – controller	1x230V AC +N+PE
Rated insulation voltage	400V
Rated withstand surge voltage	2500V
Rated short-circuit current Icw for individual circuits - effective value of the periodic component withstanding for 1s, i.e. the short-circuit current expected at the switching voltage	6kA
Rated short-circuit current	6kA
Simultaneity factor	0,8
Rated frequency	50 Hz
Degree of protection	IP00
Permissible operating temperature	0 °C ÷ (+50) °C
Supply voltage of control circuits	24V DC

The type of wires used for the various heater functions is shown in the table below. The wire cross-section and its protection should be selected based on the device selection sheet.

TYPES OF CABLES FOR CONNECTING ELECTRIC HEATERS			
Application of the cable	**Rated voltage**	**Type**	**Operating temperature**
Power supply for electric heaters	380V-400V N3~ PE 50Hz	multi-stranded, stranded copper wire	(-30) °C ÷ (+60) °C
Power supply for the control system	220V-240V N~ 50Hz	multi-stranded, stranded copper wire	(-30) °C ÷ (+60) °C
Control of the heater Control system	24V DC	multi-stranded, stranded copper wire	(-30) °C ÷ (+60) °C

EXAMPLE OF CONNECTING AN ELECTRIC HEATER WITH A 1x18kW UNIT

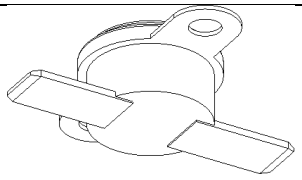
Below, this is an example of control box terminals and components. For detailed description please refer to specific AHU documentation.



Marking	Function	Connected by	Comments
1	relays / contactors	factory	-
2	heater terminals	factory	-
3	heaters	factory	-
4	pressure switch	factory / installer	the connection of the pressure switch tubes is made by the user
5	signal terminals - alarm	on site / installer	-
6	power terminals 1f	on site / installer	-
7	overcurrent circuit breakers	on site / installer	-
8	signal terminals - control	on site / installer	-

THERMAL BREAKER

The functionality of the thermal breaker is based on bimetallic element properties. When the ambient temperature exceeds the limit, the electric circuit gets open. After cooling down it closes again.

THERMAL BREAKER CHARACTERISTICS		
	Function	heater overheating protection
	Construction	metal housing, two screw terminals, bimetallic element with NC contact function
	Rated operating voltage	30V DC
	Output signal type	potential-free (changeover contact)
	Activation temperature	(+65) °C
	Temperature hysteresis	17 °C

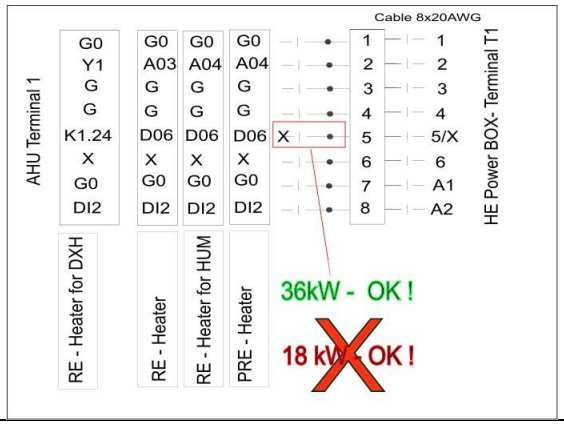
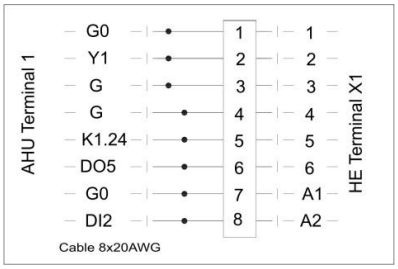
DIFFERENTIAL PRESSURE SWITCH

The differential pressure is another safety element, connected to thermal breaker serially. The electric heater cannot be operated without sufficient air flow, otherwise there's a risk of overheating. It is assumed, that by running fans there's the specific over / underpressure is built up in the heater's chamber. Therefore, the pressure is used to indicate the air flow.

The differential pressure switch is provided with a set of flexible measuring tubes, which are by default not installed. The installer is in charge of proper installation. Here're basic hints:

- If in the heater chamber the overpressure is expected, the (-) tube should be led to the ambient (atmosphere) and (+) tube should be led into the heater's chamber
- If the heater chamber the underpressure is expected, the (+) tube should be led to the ambient (atmosphere) and (-) tube should be led into the heater's chamber
- The switch triggering minimal pressure is 20 Pa. If such static pressure can't be reached in the system, the (-) pipe should be connected to fan's inlet chamber and (+) pipe should be connected to fan's discharge chamber.
- The installer can reposition the pressure switch in order to reduce the length of pneumatic tubes.
- If the pressure switch is mounted in horizontal position, the reading will be 11 Pa higher than actual one.
- The pressure switch have NC (normally closed) and NO (normally open) connections. Ensure it is operated in NC state.
- After connection, installer should start up the unit and adjust the pressure switch, to ensure the heater is activated by proper airflow first.

ELECTRIC HEATER CONNECTION CABLE MARKING BY PLUG&PLAY CONTROL	
PREHEATERS AND REHEATERS	**MAIN HEATER**

<table>
<tr><td>
</td><td>
</td></tr>
<tr><td>5/x – to be connected in case of 36kW heater only</td><td></td></tr>
<tr><td colspan="2">AHU Terminal 1 - Connection terminal "Terminal 1" in the AHU control box</td></tr>
<tr><td colspan="2">HE Power BOX - Connection terminal X1 in the electrical heater control box</td></tr>
<tr><td colspan="2">RE-Heater – reheater for a case other than the following.</td></tr>
<tr><td colspan="2">RE-Heater DXH – reheater for heat pump AHU unit (C_dxh).</td></tr>
<tr><td colspan="2">RE-Heater for HUM – reheater for AHU equipped with humidifier.</td></tr>
<tr><td colspan="2">PRE-Heater - preheater.</td></tr>
<tr><td colspan="2">K1.24 – this connection should be made to pin 24 of the pump relay (K1) located in the AHU control panel.</td></tr>
</table>

5. FIRST START-UP

5.1. BEFORE START-UP

Before taking any actions concerning the AHU, this is advised to investigate following aspects related to the ventilation system as a whole:

Question	Scope of checking
Is the delivered unit intended for this application?	Compare AHU characteristic with design and local requirements
Is the device complete?	Compare the existing components (additional sections, filters, dampers, actuators etc) with those stated on data sheet
Is the air ducting connected?	Checking if ductwork if physically connected to the unit
Are AHU filters installed	AHU operation without filters is not allowed. Shortly after start-up, filters may collect the dust from construction phase and therefore may clog faster – allow for filter replacement set
Is condition of ductwork ok?	Checking if ductwork internal surface is clean and free from obstacles. Check if dampers in the ventilation system are properly open.
Is the device intact?	Check if any AHU component has been damaged during the mounting phase.
Are the cooling and heating media connected?	Check if piping has been properly filled and vented.
Is the ventilation system earthed?	Check the earthing both AHU and ducting

Are the peripheral controls components connected?	Connection should be done according to dynamic OMM manual, dedicated for specific serial number.
Is the AHU power supply properly connected?	Check the correctness of connection and proper voltage value.
Is the electric heater ready for operation?	Check the supply voltage, correctness of connection of pressure switch and connection between the heater and the AHU control box. Note that the dust can settle on the heating body and once the heater is started there might be an initial burning smell given off. To avoid that, clean the heating elements with hoover with soft nozzle. Do not allow to operate the electric heater with the velocity lower than 1,5 m/s
Are the inspection panels closed?	Due to safety reasons, the AHU should be operated with closed panels only.

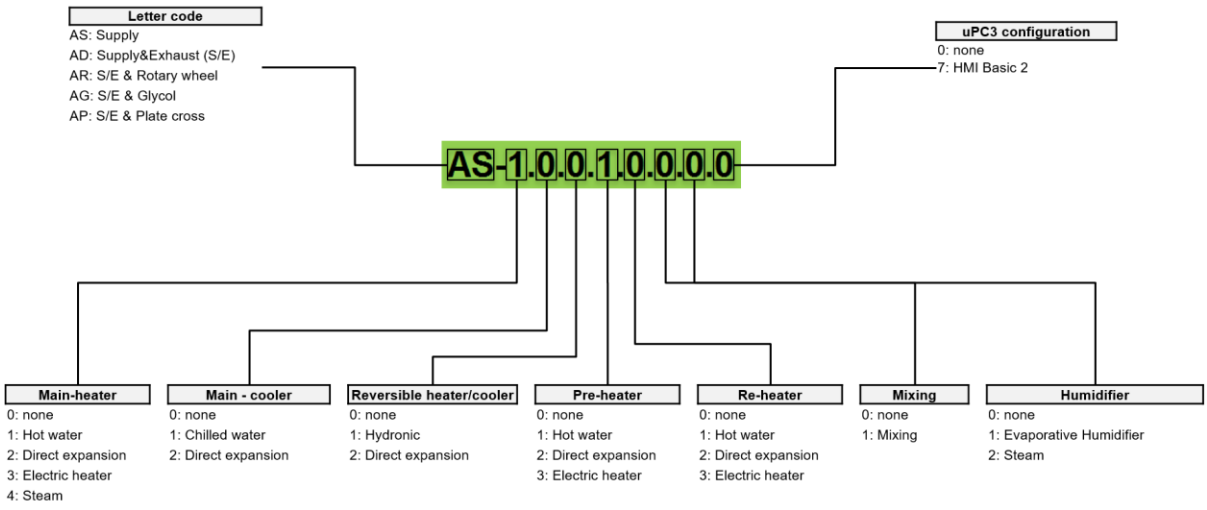
5.1.1. FACTORY SETTINGS

The device supplied as Plug&Play standard has been factory wired, the controller has been set according to characteristics given in AHU selection sheet. Theoretically, no extra settings are required on site. In practice, every site is different and the controller settings may require adaptation, to accommodate to site features.

Following parameters are customized for the project:

APPLICATION CODE

For every AHU configuration, specific application code is generated, in which all thermodynamically active functions are represented in form of a string of letters and digits. Possible configurations are listed below.



AHU-SPECIFIC SETTINGS

- Type of temperature control and leading sensor (supply, return, room)
- Type of humidity control and leading sensor (supply, return)
- Type of fans control (CAV, VAV, none)
- Type, size and number of EC fans
- Maximum airflow setpoint (for CAV) or maximum pressure setpoint (for VAV)
- Activation of CO2-controlled air flow

FACTORY CONFIGURATION - OPERATING MODES					
PARAMETER			MODES		
			Comfort COMF	Economic ECO	StandBy
Temperature	T	°C	22	22	22
Relative humidity - RH	RH*	%	50	50	50
Air quality - CO2 content	ppm	ppm	600	900	900
Supply airflow	VS	% m3/h	100	60	60
Return airflow	VE	% m3/h	100	60	60

5.1.2. ELECTRIC HEATER CONFIGURATION

Please note that the not all electric heater settings are done at the factory and some adaptations on site are necessary. Check wiring diagram of electric heater and apply settings according following guidelines.

CONFIGURATION OF ELECTRIC HEATER POWER STAGES

Read the power distribution from the diagram or technical data sheet. For example:

0-10V DC = 25%, ST2 = 25%, ST3 = 50%

This notation means that the smoothly controlled (0-10V) part of the heater covers 25% of its power. The second step (ST2) and the third step (ST3) cover accordingly 25% and 50% of the heater and are ON/OFF controlled.

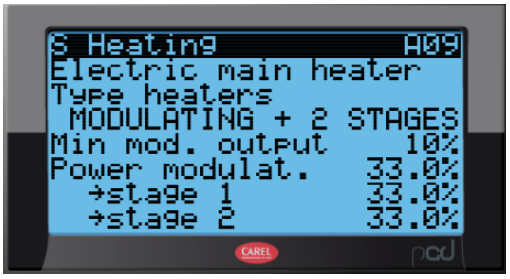
This status should be set up on specific screens of HMI Advanced:

- A05 for the preheater,
- A09 for the main heater,
- A06 for the reheater,

Note that:
ST1 = modulating part in HMI Advance
ST2 = stage 1 in HMI Advance
ST3 = stage 2 in HMI Advance.

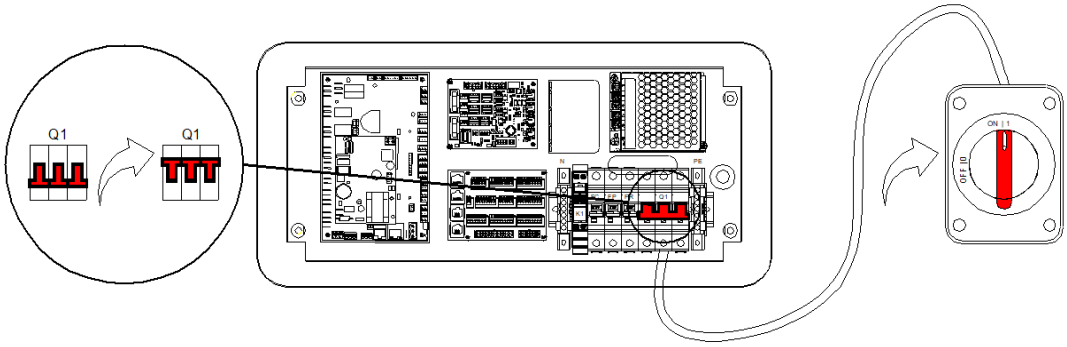
In case of smaller heaters, ST2 or ST3 might not exist. In such cases, their value should be set up as 0%.



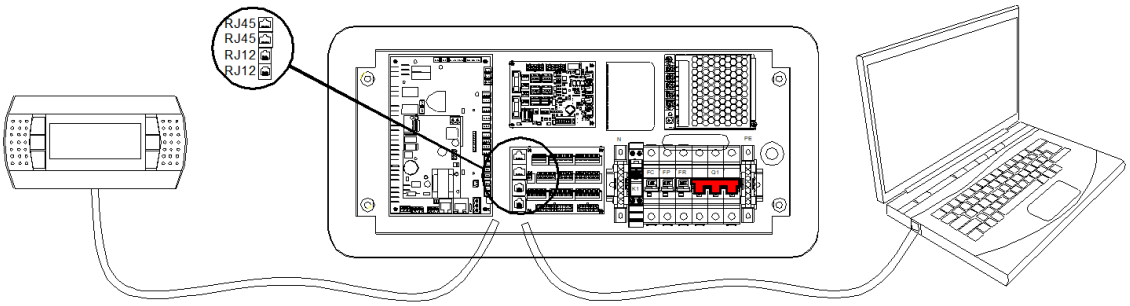




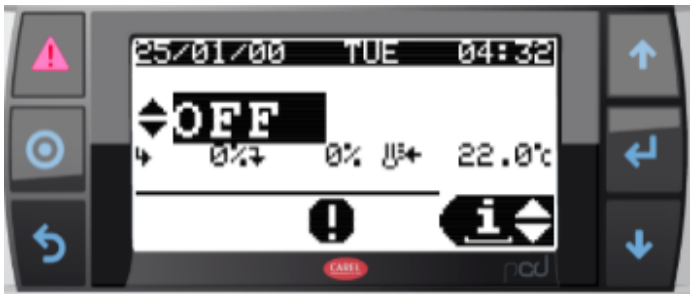
5.2. FIRST START-UP



Switch on the power supply by lifting the Q1 lever and turn on the external isolator (optional)



Connect physical HMI Advanced using RJ12 cable, or / and Virtual HMI Advanced over Ethernet cable, factory IP address: http://192.168.1.111



Change the AHU operation mode by pressing the button and confirming with ENTER.

Available modes are following:

OFF – air handling unit is switch off, control system energized

ECO - free configurable operational mode, by default set for low airflow

OPTI - free configurable operational mode, by default set for middle airflow (older software)

COMF - free configurable operational mode, by default set for high airflow

StBy - mode for controlling room temperature, fans are periodically activated to maintain temperature setpoint, and then switch again.

AUTO - the air handling unit operates according to working schedule.

It takes about a minute from the mode selection to start the mode effectively.

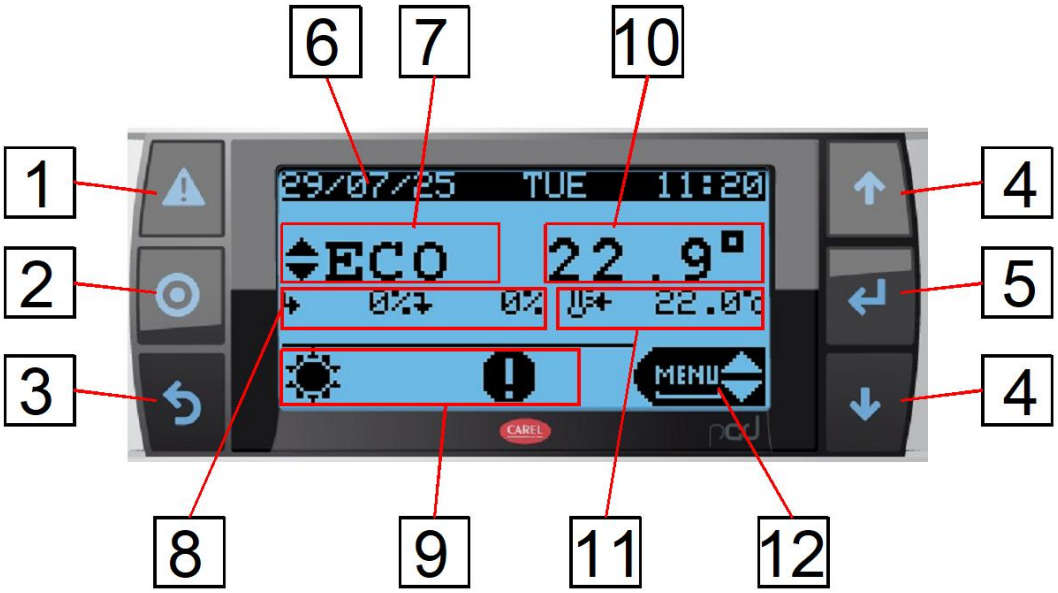
If following icons appear:  this might mean that the unit is blocked by fire alarm, thermal protection of fans, triple tripping electric heater protection alarm or triple tripping of the antifreeze thermostat. Each of these events requires the cause of the alarm sorted out.

Green and yellow LEDs on HMI Advance indicate that the controller's BIOS works properly.



The operation mode can be also selected on the HMI Basic 2 panel, by pressing SET couple times.

5.3. HMI ADVANCED PANEL



1 – alarm button (active and archive alarms, alarms acknowledgment), blinking red when alarm active

2 – change of operating mode (OFF/ECO/COMF/Standby), change to be confirmed by ENTER

3 – ESC button (return to previous field or screen)

4 – arrows UP and DOWN, navigation through screens, increasing / decreasing value

5 – ENTER button, selecting parameters, moving to next field

6 – current date and time

7 – current working mode

8 – current fan capacity demand (supply air , return air)

9 – current process realized, according to icons:

	Air dampers in motion		Dehumidification active
	Fans running		Heat recovery active
	Heating active		AHU on hold
	Cooling active		Emergency stop
	Humidification active		Calendar activated

10 – current temperature value (reading)

11 – current temperature set point

12 – toggling between:

“Info" module (running parameter overview), full access permitted

“Set” module (setpoint change), full access permitted

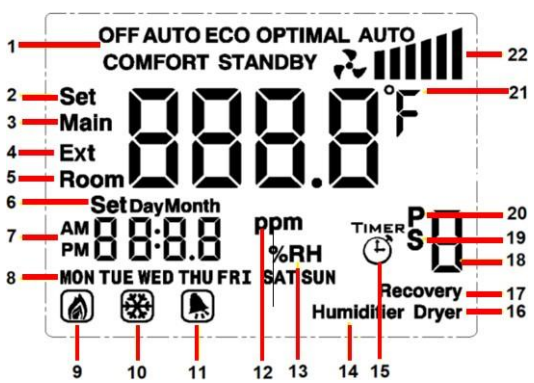
“Menu” module (advanced controller settings), log-in required

5.4. HMI BASIC 2HY

The HMI Basic 2 HY is a simplified panel for end user daily use. With the panel following is possible:

- Starting / stopping and changing the AHU working mode
- Change of setpoints to each working mode
- Reading the leading, room and outdoor temperature
- Setting the working schedule
- Managing alarms.

Available functions and meaning of buttons:





1 Current operating mode
2 Temperature setpoint
3 Leading temperature real value

4 Outdoor temperature
5 Room temperature
6 Date setting
7 Clock
8 Day
9 Heating process active
10 Cooling process active
11 Alarm active
12 Air quality
13 Air humidity
14 Humidification process active
15 Daily operating schedule
16 Dehumidification process active
17 Heat recovery process active
18 Schedule type
19 Special schedule
20 Periodic schedule
21 Temperature unit
22 Current fan demand

Fans stopped, 0% of airflow
Fans working, 0% – 60% of airflow
Fans working, 60% – 80% of airflow
Fans working, 80% – 100% of airflow

SET Change of operating mode / change to setting menu / return to previous menu
Confirm selection / go to next set-up parameter / return to main menu
Switch between displayed temperatures / exit to main screen / switch off the screen
Changing parameter value

5.5. START-UP EXTRA CHECKS

During the initial start-up, it is recommended that the steps listed below be carried out.

CHECKING THE OPERATION OF THE FANS

Check that the fans do not make excessive noise. Make sure there's no friction of impeller, nor is impeller mechanically blocked.

CHECKING THE OPERATION OF THE AIR DAMPER ACTUATORS

Check if dampers close and open completely with no extra resistance.
Observe dampers opening automatically or open them manually with hand, after pressing the release button on damper actuator.

If damper turns in wrong direction or doesn't move, change actuator rotation clock-wise or counterclowise. The switch is located on the actuator casing.

For actuators with 0-10V signal, it is necessary to check if they operate correctly in their full range.

Actuators can be manually engaged by changing their operation from automatic to manual in





specific screens (applies to both D – digital and A – analogue signals).	

CHECK OF SENSOR READINGS

• Check if the readings from temperature, pressure, CO2 and humidity sensors are correct. • During start-up, when inspection panels are open, air temperature reading on all sensors should be pretty similar to ambient temperature • CO2 reading should be about 400-600 ppm. • Pressure transducers readings should be 0 Pa when unit is stopped. Check parameters on screens: Sc01, Sc02, Sc03, Sc04, Sc05, Sc38.	 

5.6. AIR FLOW MEASUREMENT

The air flow measurement must be checked when:

- the device is being started up and commissioned
- the airflow is different from expected
- the device is undergoing periodical verification
- fans have been replaced

Before starting air flow measurements make sure that all dampers, grills and fire dampers are properly positioned.

Air handling units determine the exact air flow, basing on pressure drop measurements on fan inlet nozzles. This reading should be confronted with air flow measurements done in the ductwork.

The measurements in the ductwork should be done in place guaranteeing proper reading. Preferably, straight ducts are suggested, far from obstacles causing the air stream to distort (dampers, elbows, T-pieces etc.). The length of the straight duct piece should be at least 6 hydraulic dimensions from the obstacle upstream, and 3 hydraulic dimensions from the obstacle downstream.
Before taking measurements in the ducts, fan speed should operate on fixed air flow value. This will guarantee stable airflow across the measurement process.

An estimate of the measurement result is considered sufficient if it does not differ by more than ±10% from the design value. In the case of greater discrepancies, corrective actions are as follows:

- adjustment of ventilation ductwork
- changing fan speed or checking the k-factor of the fan.

5.7. WORKING PARAMETRS TO BE MODIFIED

Please refer to controls manual.

5.8. DESCRIPTION OF UPC3 CONTROLLER MASKS

Due to the document size, information about all masks of the uPC3 controller is available in separate document.

6. MAINTENANCE



- Personnel responsible for operating the device should read the documentation before starting any operations and maintenance activities. In the absence of such personnel with the necessary skills and competence, periodic inspections should be carried out by authorized manufacturer's service providers.
- The basic technical data of the air handling unit, such as the type, parameters and dimensions of the most essential components (filters, heat exchangers, fans, electric motors), can be found in the technical data sheet that is generated for each unit.
- All maintenance work on air handling units should be carried out with the unit switched off. To ensure safe operation of the unit, the service switch, which cuts off the power supply to motors during maintenance work, must be installed outside the fan section. Disconnection of the power supply circuit by the service switch must take place in a de-energized state. The service switch should be located near the inspection panels of the fan section.
- Thorough and regular maintenance as well as technical inspections of air-handling units and their components are essential in order to identify faults at an early stage - before more serious failures and damage occurs.
- This documentation only covers general guidelines for inspection intervals to ensure fault-free operation of the units under the various possible external operating conditions. The technical inspection intervals must be adapted to the local conditions (level of contamination, number of start-up cycles, loads, etc.).

AIR FILTERS

Under standard operating conditions for air handling units, **filters should be changed approximately twice a year**. The need to change the filter (in addition to visually visible contamination) is also indicated by a drop in pressure:

Coarse 80% (G4) - 150Pa,
ePM10 40% (M5) - 250 Pa,
ePM2.5 65% (F7) - 250 Pa,
ePM1 80% (F9) - 350 Pa,

If the final differential pressure exceeds the design value, filter must be replaced. Filters are disposable components.
When changing the filter, the filtration section should also be cleaned - either with a hoover or by dry cleaning.
When ordering a new filter set from an authorised service office, specify the type of filter, the filtration class, the size of the air handling unit and, if necessary, the size of the filter, as specified on the technical data sheet.
Incorrect or contaminated filters can cause an increase in the power consumption of the fan motors,

leading to damage to the drive motors.

HOT WATER HEATER / CHILLED WATER COOLER

Water coils should be controlled and maintained **every 4 months**
Water heaters / coolers should be equipped with antifreeze systems. Optionally, a non-freezing heating medium (e.g. glycol solution) can be used.
In case the device is at a standstill, or heating media is cut off when temperature is below +5°C, the heater must be drained. To do so:

- close the heating medium inlet and outlet valves (separate the heater from the heating system),
- remove the inspection panel,
- unscrew the drain and remove the vent plug from the coil collectors,
- allow water to run off the drained exchanger to outside of the unit,
- blow compressed air through the vent plug into the heater, till no water drops from the drainage connection,
- screw the drain plug and vent plug back in.

Check the contamination level on the heater / cooler fins at least every four months. Dust settling on the surface of the heater causes a deterioration of its heating power and increases the air pressure drop. Even if the air handling unit is equipped with filters, over time dust, supplied with the delivered air, settles on the heater fins. Cleaning should be done following way:

- separate adjacent sections and components, to avoid spread of contamination.
- using a hoover with a soft suction nozzle on the air inlet side,
- by blowing with a jet of compressed air against the direction of normal air flow, directing the jet parallel to fins,
- washing with warm water and non-corrosive cleaning agents for aluminium or copper components.

Vent the water heater / cooler regularly, to ensure it's completely filled with media and therefore features full capacity.
When the unit is not in operation, the medium flow through the heating medium should be limited to a minimum so that the temperature inside the unit does not exceed +60°C. Exceeding this value could cause damage to some components (motor, bearings, plastic parts, etc.) installed in adjacent sections.

DX COOLERS AND HEATERS

Exchangers should be checked for contamination at least every four months, and cleaned similarly to water exchangers.

ELECTRIC HEATERS

The electric heater battery consists of bare heating wires. During operation of the air handling unit, when the heater is switched off, dust may settle on the heating coils. When the heater is restarted, heavy contamination of the surface of the heater can generate unpleasant burning dust odours, even leading to an initial fire hazard.
Check all electrical connections, the condition of the heating elements and the level of contamination **at least every four months** and especially before the start of the heating season. Any dirt should be removed with a hoover with a soft tip or compressed air.
To ensure safety, check the correct trigger of overheating protection, by not flowing air.
In normal operating conditions, the air velocity not less than 1,5 m/s is necessary.



- Power off the device completely before starting cleaning the electric heater
- Do not wet clean the electric heater

ROTARY WHEEL

Rotary wheel should be controlled and maintained **every 4 months**. Following actions should be taken:

- Drag the rotary wheel body with both hands, to check if it rotates freely. In case of too high friction, check the condition of sealing strips. If needed, correct strips position or replace them with new ones. In that case, leave the rotary wheel spinning for 30 minutes, to allow the sealing to adapt.
- Check the rotary wheel motor current and compare with rated current.
- Check the condition of the drive belt for damage and wore. If the belt slips over the wheel or the motor pulley, adapt the length or tension of the belt.
- Check the air inlet surfaces for contamination. If needed remove the dust with hoover or compressed air. In case of heavy contamination, rotary wheel can be cleaned with pressurized water.
- The amount of grease in the rotor bearings during installation of the exchanger is sufficient for long-term operation and there is no need to lubricate the bearings during operation.
- Check motor and gearbox for dust. If needed, clean them with hoover or pressurized air. Exceeding layer of dust may worsen heat dissipation.
- In case of use of water for cleaning, make sure rotary wheel fins are not deformed or damaged by the pressure. Do not use agents corrosive to aluminum. If the rotary wheel is being cleaned during winter, dry out the rotary wheel completely, before putting back into operation.

At the time of first start-up the operation must be checked more frequently:

- at the start-up
- after 12 hours of operation
- after one week of operation
- then regularly, every four months.



- Power off the device completely before starting wet cleaning the rotary wheel

COUNTERFLOW HEAT EXCHANGER

Counterflow heat exchanger should be controlled and maintained **every 4 months**. Following actions should be taken:

- Check the air inlet surfaces for contamination. If needed remove the dust with hoover or compressed air. In case of heavy contamination, rotary wheel can be cleaned with pressurized water.
- In case of use of water for cleaning, make sure exchanger fins are not deformed or damaged by the pressure. Do not use agents corrosive to aluminum. If the exchanger is being cleaned during winter, dry it out completely, before putting back into operation.
- Check the correct operation of dampers
- Check the condition of droplet eliminator for contamination
- Check the cleanness of drip tray and clean if necessary
- Flush some water into drip tray and observe check correct water drainage.
- Check functionality of antifreeze system (if present).

FANS

Fans should be controlled and maintained **every 4 months**. Following actions should be taken:

- Right after stopping the motors, carefully check if motor casing temperature is pretty similar on every motor. If temperature is too high, specific motor must be examined.
- Turn the impeller by hand and check for friction and unbalance.
- Check if all impeller blades are not broken or damaged.

- Check all bolt connections on the fan set for tightness, with special emphasis on connection between impeller and motor axis
- The fan impeller and fan inlet nozzle keep even, minimal distance.
- Check the contamination of impeller blades. Excessive layer of dirt will cause the unbalance and will reduce the life cycle of the fan.
- Check if impeller rotates in proper direction. Impeller blades are of back – curved type. In case of wrong spinning direction, working conditions are improper and very harmful for the fan.\
- Check if the measuring pressure tubes are not clogged, kinked or broken. If needed clean or tighten the tubes. Improper condition of tube will lead to fans spinning with maximum rotation, which will lead to premature damage of fans.

Fans are designed for dust-free air flow or air with a light dust content. They are not designed to operate with aggressive gases, vapors or in a highly dusty environment. Operating the fans in an unsuitable environment can lead to bearing damage, corrosion, impeller imbalance or vibration.

When cleaning fan sets, use damp cloth with a soft cleaning agent, hoover and soft nylon brushes.



- Power off the device completely before starting maintenance of fans
- Make sure fans cannot be powered on during maintenance.
- After switching off the device, wait 2 minutes before opening inspection panels, so that fans completely stop.

SOUND ATTENUATORS

Check silencers **every four months** for cleanness and mechanical damages.

7. CONSUMABLES

Air handling units are equipped with air filters. The specific size and class of filter is project – based and may differ from unit to unit. To get filters type and quantity enter device serial number in the following webpage: http://doctech.systems/Search

8. SPARE PARTS

8.1.1. DX EXCHANGERS (5/16")

Following tables show dimensions of available DX-coil sizes. Example of coil description:

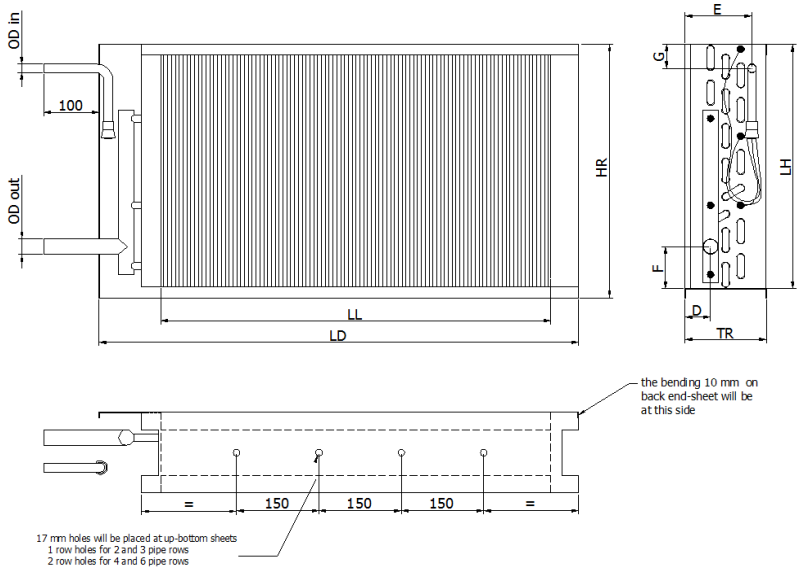
021 2 – 1

where: **021** – device size, **2** – number of rows, **1** – number of sections (circuits)

COILS DX/DXH (5/16”)													
5/16”	LL	LD	LH	HR	TR	D	E	F	G	ØD In	ØD out	Wgt	Vol.
	[mm]											[kg]	[dm^3]
021 2-1	710	873	300	321	110	41	91	75	13	5/8"	Ø28	4,15	1,02
021 3-1	710	873	300	321	140	45	120	75	13	5/8"	Ø28	5,24	1,46

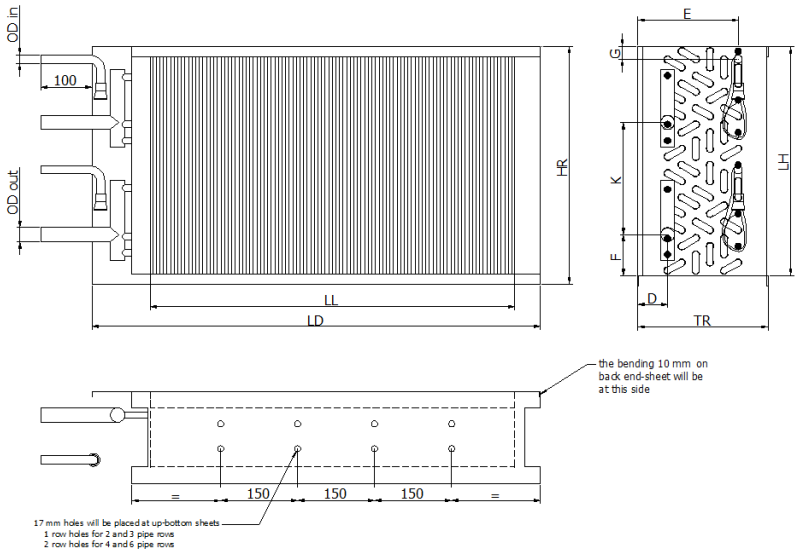
021 4-1	710	873	300	321	170	49	131	75	13	5/8"	Ø28	6,81	1,89
021 6-1	710	873	300	321	235	56	194	75	26	Ø22	Ø28	9,48	2,75
030 2-1	710	873	425	448	110	41	91	75	45	5/8"	Ø28	5,18	1,45
030 3-1	710	873	425	448	140	45	120	75	45	5/8"	Ø28	6,73	2,06
030 4-1	710	873	425	448	170	49	131	75	65	5/8"	Ø28	8,75	2,67
030 6-1	710	873	425	448	235	56	194	75	52	Ø22	Ø28	12,33	3,9
040 2-1	930	1080	425	448	110	41	91	75	41	Ø22	Ø35	6,51	1,81
040 3-1	930	1080	425	448	140	45	120	75	45	5/8"	Ø28	8,51	2,6
040 4-1	930	1080	425	448	170	49	131	75	41	Ø22	Ø35	11,45	3,52
040 6-1	930	1080	425	448	235	56	194	75	54	Ø22	Ø35	16,07	5,11
055 2-1	1050	1251	575	587	110	41	91	120	84	Ø22	Ø28	9,16	2,71
055 3-1	1050	1251	575	587	140	45	120	120	98	Ø22	Ø35	12,21	3,92
055 4-1	1050	1251	575	587	170	49	131	120	66	Ø22	Ø35	16,25	5,29
055 6-1	1050	1251	575	587	235	56	194	120	55	Ø22	Ø42	23,16	7,93

ONE SECTION



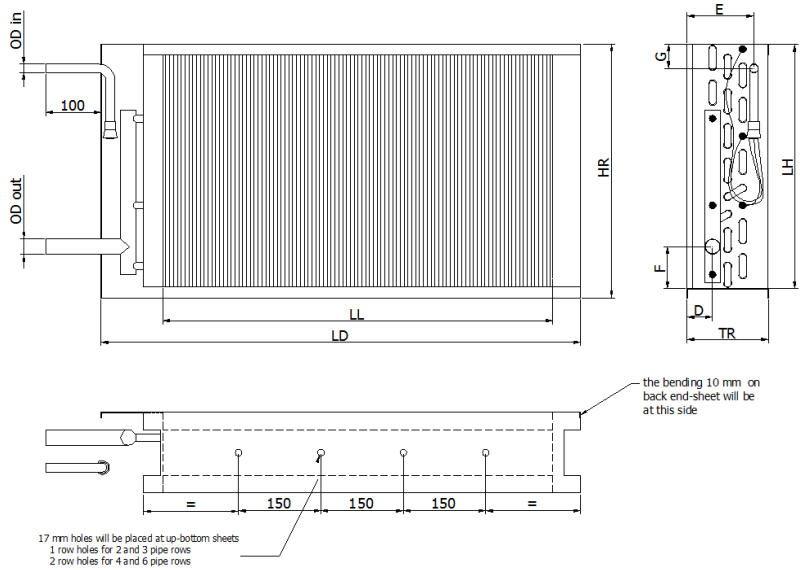
COILS DX/DXH (5/16”)														
5/16”	LL	LD	LH	HR	TR	D	E	F	G	K	ØD In	ØD out	Wgt	Vol.
	[mm]												[kg]	[dm^3]
030 6-2	710	873	425	448	235	56	194	75	25	191	2x5/8"	2xØ28	14,96	4,0
040 4-2	930	1080	425	448	170	49	131	75	22	191	2x5/8"	2xØ28	13,82	3,4
040 6-2	930	1080	425	448	235	56	194	75	22	191	2x5/8"	2xØ28	19,06	5,0
055 3-2	1050	1251	575	587	140	45	100	120	25	222	2x5/8"	2xØ28	14,33	4,0
055 4-2	1050	1251	575	587	170	49	131	120	38	222	2x5/8"	2xØ28	18,7	5,1
055 6-2	1050	1251	575	587	235	56	194	120	19	222	2xØ22	2xØ35	26,71	7,7
030 6-2	710	873	425	448	235	56	194	75	25	191	2x5/8"	2xØ28	14,96	3,9
040 4-2	930	1080	425	448	170	49	75	22	191		2x5/8"	2xØ28	13,82	3,4
040 6-2	930	1080	425	448	235	56	75	22	191		2x5/8"	2xØ28	19,06	5,0
055 3-2	1050	1251	575	587	140	45	120	25	222		2x5/8"	2xØ28	14,33	4,0

TWO SECTIONS

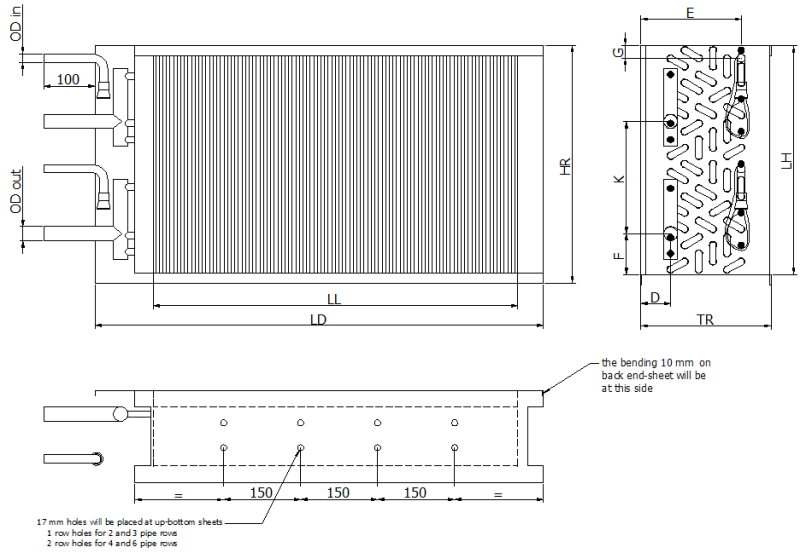


DX/DXH EXCHANGERS (5/16")														
5/16"	LL	LD	LH	HR	TR	D	E	F	G	K	ØD In	ØD out	Mass	Vol.
	[mm]												[kg]	[dm^3]
075 2-1	1190	1392	700	702	110	41	91	120	63		5/8"	Ø28	12,1	3,7
075 3-1	1190	1392	700	702	140	45	120	120	116		Ø22	Ø28	16,3	5,3
075 3-2	1190	1392	700	702	140	45	100	120	76	318	2x5/8"	2xØ28	18,4	5,34
075 4-1	1190	1392	700	702	170	49	131	120	159		Ø22	Ø35	21,6	7,2
075 4-2	1190	1392	700	702	170	49	131	120	19	318	2x5/8"	2xØ28	24,1	7,0
075 6-1	1190	1392	700	702	235	56	194	120	97		Ø22	Ø42	31,5	10,8
075 6-2	1190	1392	700	702	235	56	194	120	58	318	2xØ22	2xØ28	34,6	10,5
100 2-1	1370	1572	800	806	110	41	91	120	87		Ø22	Ø28	15,9	4,8
100 2-2	1370	1572	800	806	110	41	91	120	57	381	2x5/8"	2xØ28	17,6	4,8
100 3-1	1370	1572	800	806	140	45	120	120	87		Ø22	Ø35	22,4	7,2
100 3-2	1370	1572	800	806	140	45	100	120	50	381	2x5/8"	2xØ28	23,6	6,9
100 4-1	1370	1572	800	806	170	49	131	120	113		Ø28	Ø42	30,5	9,6
100 4-2	1370	1572	800	806	170	49	131	120	49	381	2xØ22	2xØ28	31,7	9,3
100 6-2	1370	1572	800	806	235	56	194	120	42	381	2xØ22	2xØ35	43,7	13,7

ONE SECTION

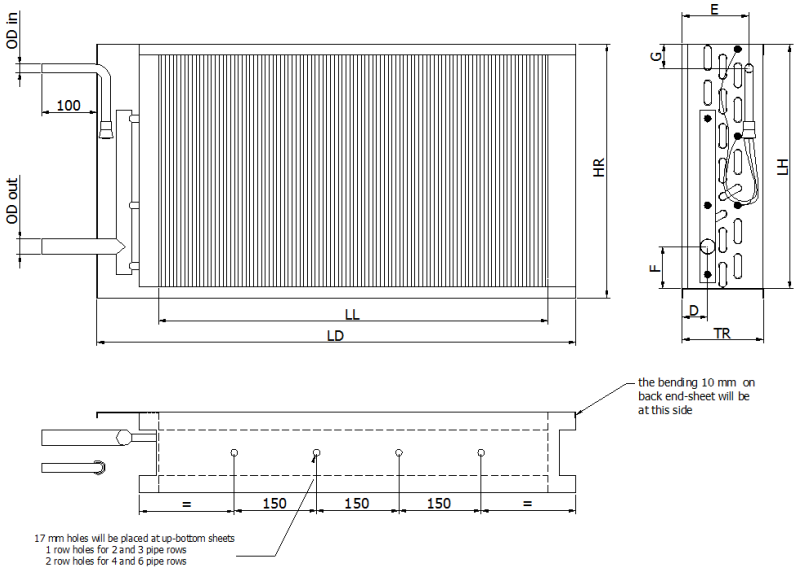


TWO SECTIONS

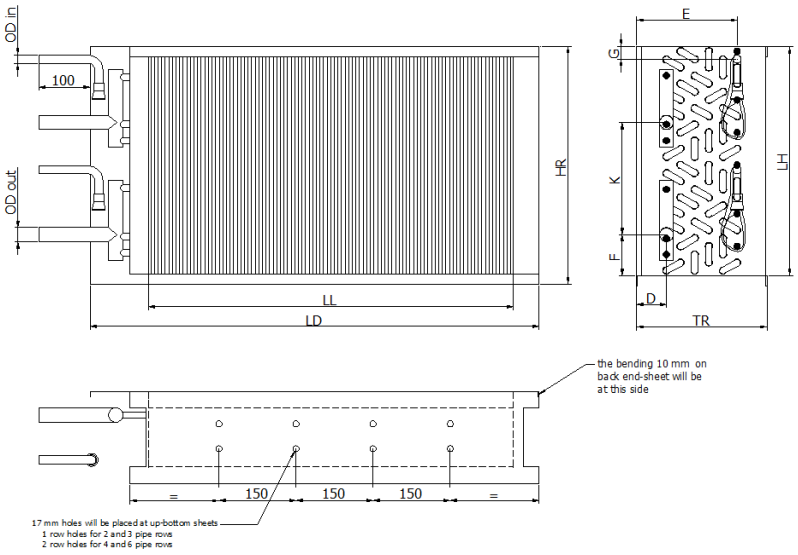


DX/DXH EXCHANGERS (5/16")														
5/16"	LL	LD	LH	HR	TR	D	E	F	G	K	ØD In	ØD out	Mass	Vol.
	[mm]												[kg]	[dm³]
120 2-1	1600	1802	825	838	140	59	118	120	102		Ø22	Ø35	19,3	5,9
120 2-2	1600	1802	825	838	110	41	91	120	73	381	2x5/8"	2xØ28	21,9	5,9
120 3-1	1600	1802	825	838	170	45	120	120	125		Ø22	Ø42	27,1	8,8
120 3-2	1600	1802	825	838	140	45	100	120	35	381	2x5/8"	2xØ35	29,1	8,5
120 4-1	1600	1802	825	838	210	49	131	120	125		Ø22	Ø42	36,0	11,4
120 4-2	1600	1802	825	838	170	49	131	120	35	381	2xØ22	2xØ28	37,4	11,1
120 6-2	1600	1802	825	838	235	56	194	120	19	381	2xØ22	2xØ35	52,9	16,3
150 2-1	1780	1997	925	937	140	59	118	120	91		Ø22	Ø35	23,2	7,2
150 2-2	1780	1997	925	937	110	41	91	120	107	381	2x5/8"	2xØ28	25,0	7,0
150 3-1	1780	1997	925	937	170	63	143	120	78		Ø22	Ø42	33,6	10,8
150 3-2	1780	1997	925	937	140	45	100	120	49	381	2xØ22	2xØ35	35,5	10,5
150 4-1	1780	1997	925	937	210	66	164	120	123		Ø22	Ø54	43,4	14,1
150 4-2	1780	1997	925	937	170	49	131	120	69	381	2xØ22	2xØ35	45,0	13,7
150 6-2	1780	1997	925	937	235	56	194	120	59	381	2xØ22	2xØ42	65,6	20,6

ONE SECTION



TWO SECTIONS



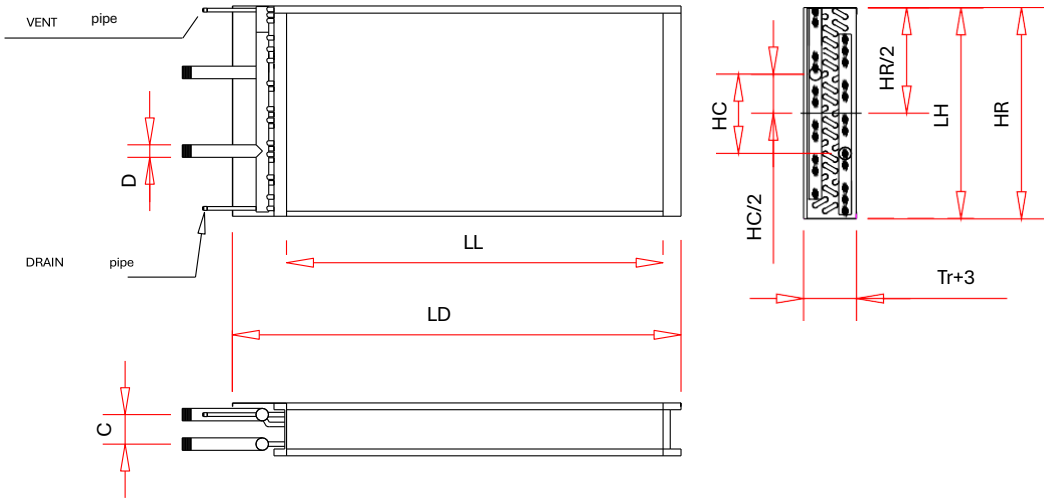
8.1.2. HYDRONIC COILS (WCL 3/8”)

Following tables show dimensions of available water coil sizes. Example of coil description:

021 WCL1

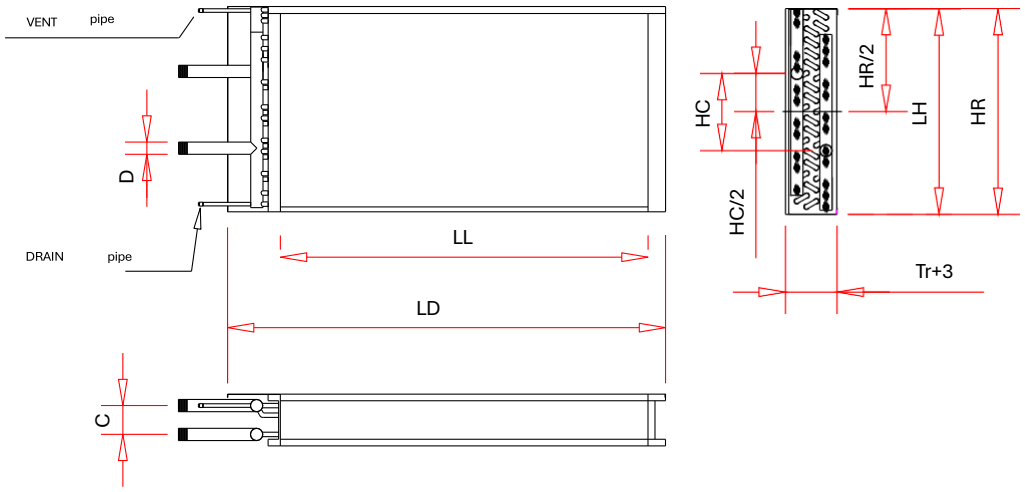
where: **021** – device size, **WCL1** – number of rows

3/8" WATER EXCHANGERS												
Size	Rows	LL	LD	LH	HR	C	HC	TR	D	d	De	Mass	Vol.
		[mm]							[inch].		[mm]	[kg]	[dm^3]
021	WCL1	710	873	300	321	50	150	100	1"	1/4"	33,7	5,56	1
021	WCL2	710	873	300	321	50	150	100	1"	1/4"	33,7	6,69	1,62
021	WCL3	710	873	300	321	66	150	125	1"	1/4"	33,7	7,92	2,25
021	WCL4	710	873	300	321	66	150	125	1"	1/4"	33,7	9,62	2,88
021	WCL6	710	873	300	321	110	150	160	1"	1/4"	33,7	12,56	4,14
021	WCL8	710	873	300	321	154	150	210	1"	1/4"	33,7	15,49	5,41
030	WCL1	710	873	425	448	50	150	100	1"	1/4"	33,7	6,83	1,17
030	WCL2	710	873	425	448	50	150	100	1"	1/4"	33,7	8,43	2,3
030	WCL3	710	873	425	448	66	150	125	1"	1/4"	33,7	10,17	3,18
030	WCL4	710	873	425	448	66	150	125	1"	1/4"	33,7	12,39	4,08
030	WCL6	710	873	425	448	110	150	180	1 1/4"	1/4"	42,4	17,28	6,25
030	WCL8	710	873	425	448	154	150	210	1 1/4"	1/4"	42,4	21,24	8,03
040	WCL1	930	1080	425	448	50	150	100	1"	1/4"	33,7	7,81	2,02
040	WCL2	930	1080	425	448	50	150	100	1"	1/4"	33,7	9,88	2,82
040	WCL3	930	1080	425	448	66	150	125	1"	1/4"	33,7	12,13	3,98
040	WCL4	930	1080	425	448	66	150	125	1"	1/4"	33,7	15	5,41
040	WCL6	930	1080	425	448	110	150	180	1 1/4"	1/4"	42,4	21,06	7,82
040	WCL8	930	1080	425	448	154	150	210	1 1/4"	1/4"	42,4	26,18	10,14
055	WCL1	1050	1251	575	586	50	260	110	1 1/4"	1/4"	42,4	11,34	2,93
055	WCL2	1050	1251	575	586	50	260	110	1 1/4"	1/4"	42,4	14,49	4,71
055	WCL3	1050	1251	575	586	66	260	125	1 1/4"	1/4"	42,4	17,92	6,46
055	WCL4	1050	1251	575	586	66	260	125	1 1/4"	1/4"	42,4	22,04	8,23
055	WCL6	1050	1251	575	586	110	260	180	2"	1/4"	60,3	32,91	13,14
055	WCL8	1050	1251	575	586	154	260	245	2"	1/4"	60,3	40,46	16,65



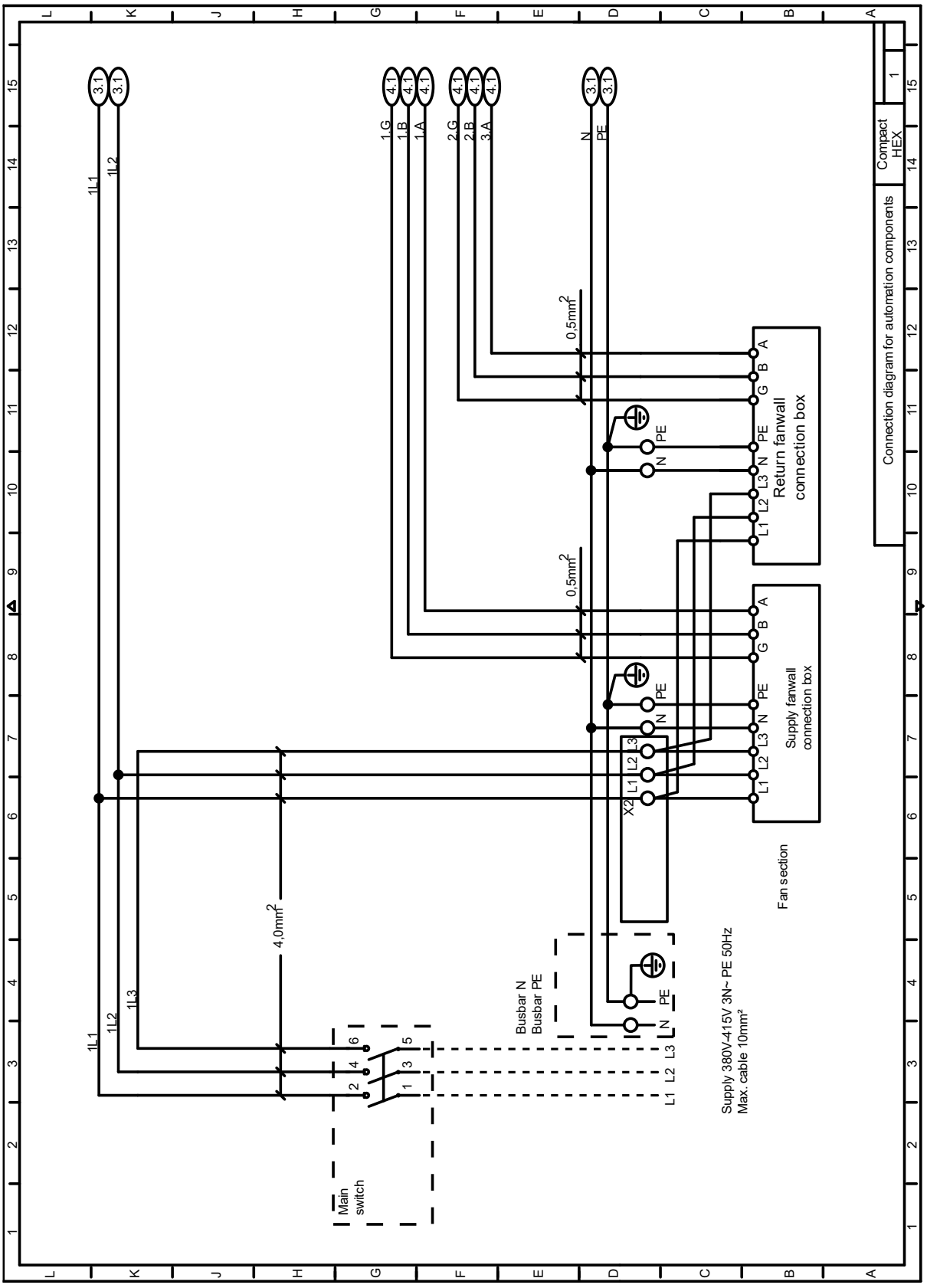
3/8" WATER EXCHANGERS													
Size	Rows	LL	LD	LH	HR	C	HC	TR	D	d	De	Mass	Vol.
		[mm]							[inch].		[mm]	[kg]	[dm^3]
075	WCL1	1190	1392	700	702	50	260	100	1 1/4"	1/4"	42,4	13,9	3,8
075	WCL2	1190	1392	700	702	50	260	100	1 1/4"	1/4"	42,4	18,2	6,3
075	WCL3	1190	1392	700	702	66	260	125	1 1/4"	1/4"	42,4	23,0	8,7
075	WCL4	1190	1392	700	702	66	260	125	1 1/4"	1/4"	42,4	28,5	11,1
075	WCL6	1190	1392	700	702	110	260	180	2"	1/4"	60,3	42,5	17,7
075	WCL8	1190	1392	700	702	154	260	245	2"	1/4"	60,3	52,8	22,5

3/8" WATER EXCHANGERS													
Size	Rows	LL	LD	LH	HR	C	HC	TR	D	d	De	Mass	Vol.
		[mm]							[inch].		[mm]	[kg]	[dm^3]
100	WCL1	1370	1572	800	806	50	260	100	1 1/4"	1/4"	25	5,0	24
100	WCL2	1370	1572	800	806	50	260	100	1 1/4"	1/4"	25	5,0	27
100	WCL3	1370	1572	800	806	66	260	160	2"	1/4"	25	5,0	24
100	WCL4	1370	1572	800	806	66	260	160	2"	1/4"	25	5,0	34
100	WCL6	1370	1572	800	806	110	260	180	2"	1/4"	25	5,0	24
100	WCL8	1370	1572	800	806	154	260	245	3"	1/4"	30	5,0	32
120	WCL1	1600	1802	825	838	50	260	100	1 1/4"	1/4"	25	12,0	24
120	WCL2	1600	1802	825	838	50	260	100	1 1/4"	1/4"	25	12,0	27
120	WCL3	1600	1802	825	838	66	260	160	2"	1/4"	25	12,0	24
120	WCL4	1600	1802	825	838	66	260	160	2"	1/4"	25	12,0	34
120	WCL6	1600	1802	825	838	1`10	260	210	3"	1/4"	30	12,0	24
120	WCL8	1600	1802	825	838	154	260	245	3"	1/4"	30	12,0	32
150	WCL1	1790	1997	925	937	50	260	100	1 1/4"	1/4"	25	11,0	24
150	WCL2	1790	1997	925	937	50	260	100	1 1/4"	1/4"	25	11,0	27
150	WCL3	1790	1997	925	937	66	260	160	2"	1/4"	25	11,0	24
150	WCL4	1790	1997	925	937	66	260	160	2"	1/4"	25	11,0	34
150	WCL6	1790	1997	925	937	110	260	210	3"	1/4"	30	11,0	24
150	WCL8	1790	1997	925	937	154	260	245	3"	1/4"	30	11,0	32

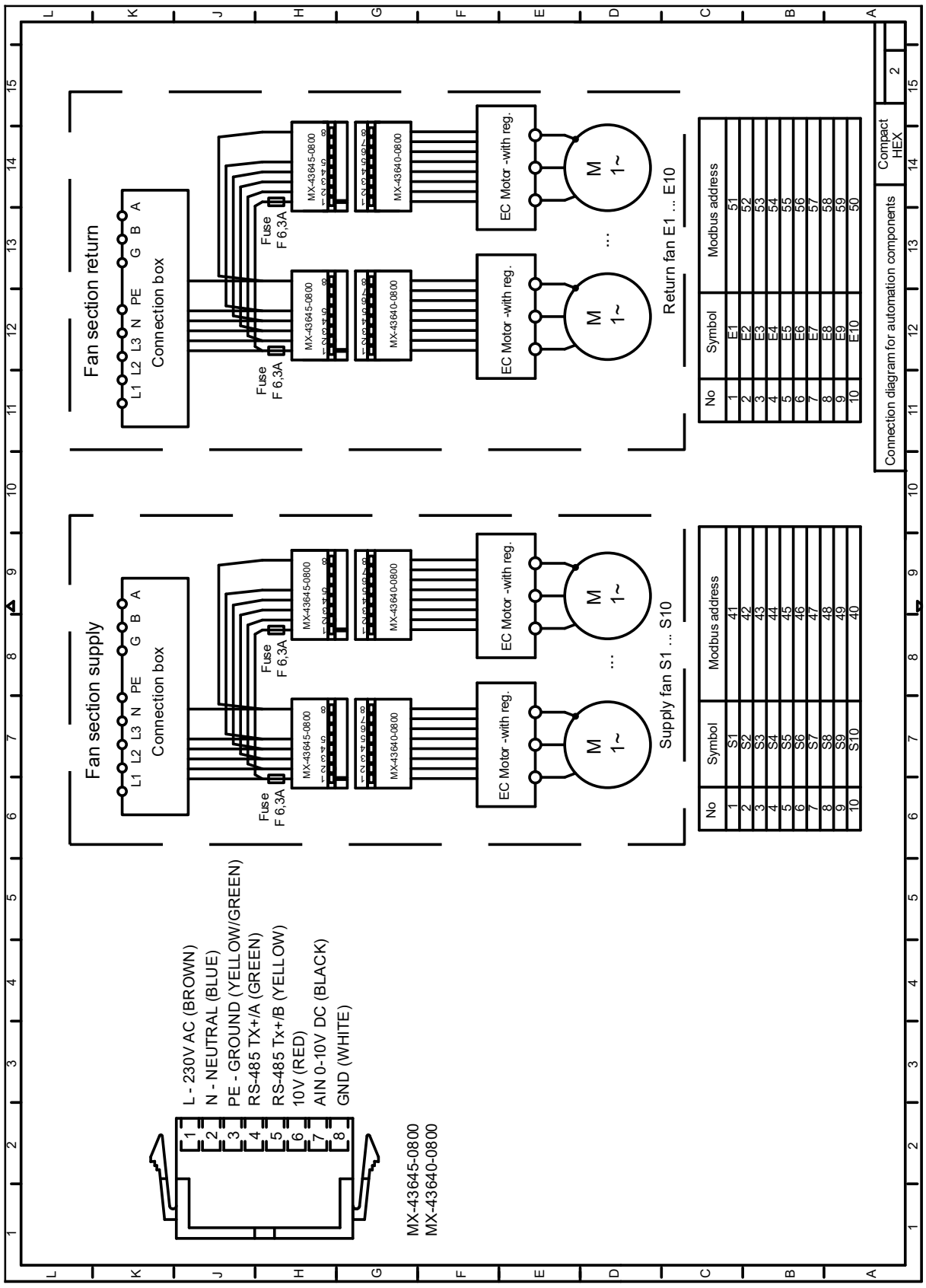


9. CONNECTION DIAGRAM FOR AHU WITH HEX

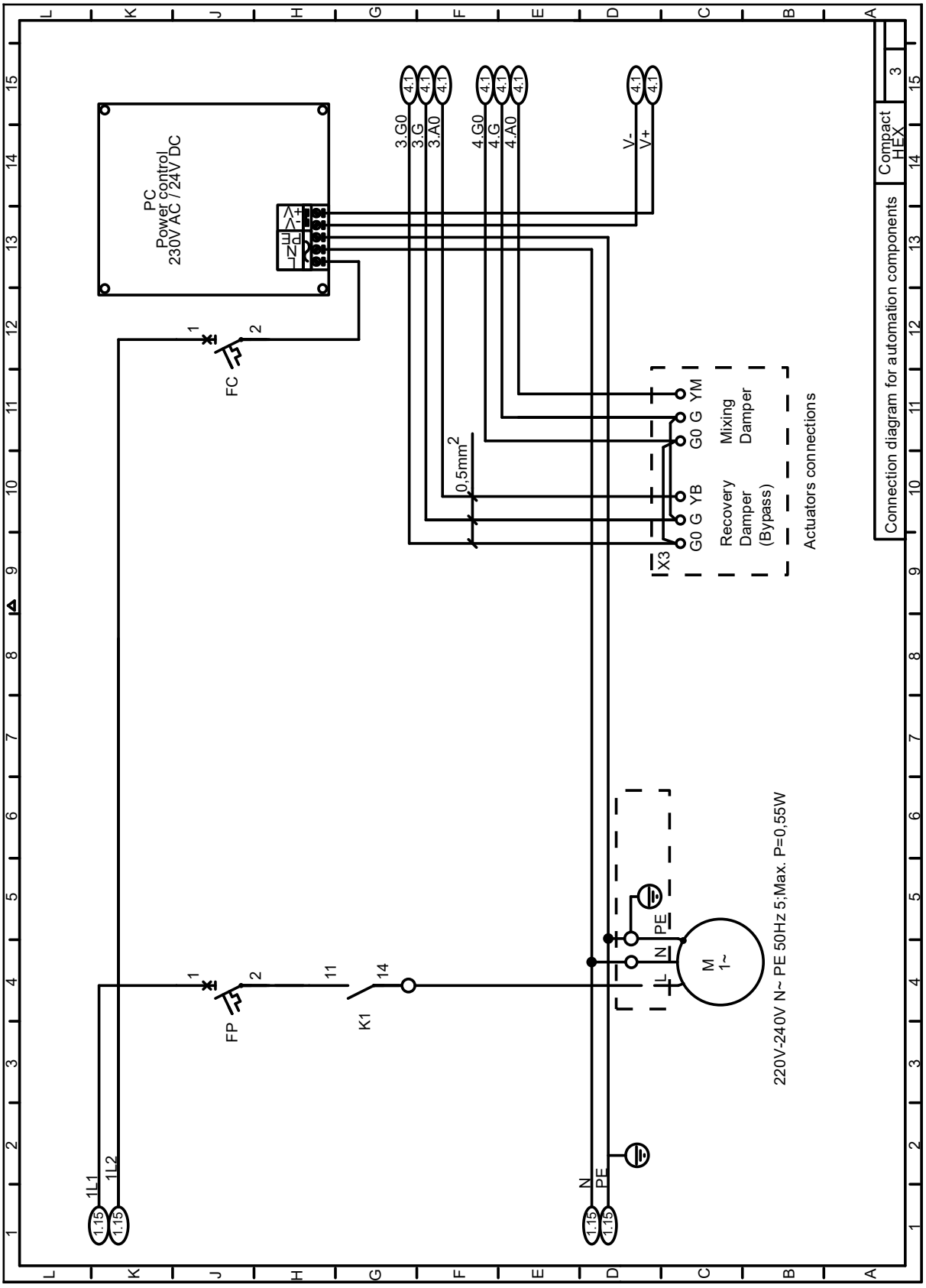
CONNECTION DIAGRAM – AHU with counterflow heat exchanger


Connection diagram for automation components
Compact HEX
1
Return fanwall connection box
Supply fanwall connection box
Fan section
Main switch
Busbar N
Busbar PE
Supply 380V-415V 3N~ PE 50Hz
Max. cable 10mm²
0,5mm²
4,0mm²
1L1
1L2
1L3
1G
1B
1A
2G
2B
3A
N
PE
L1
L2
L3
X2
A
B
G

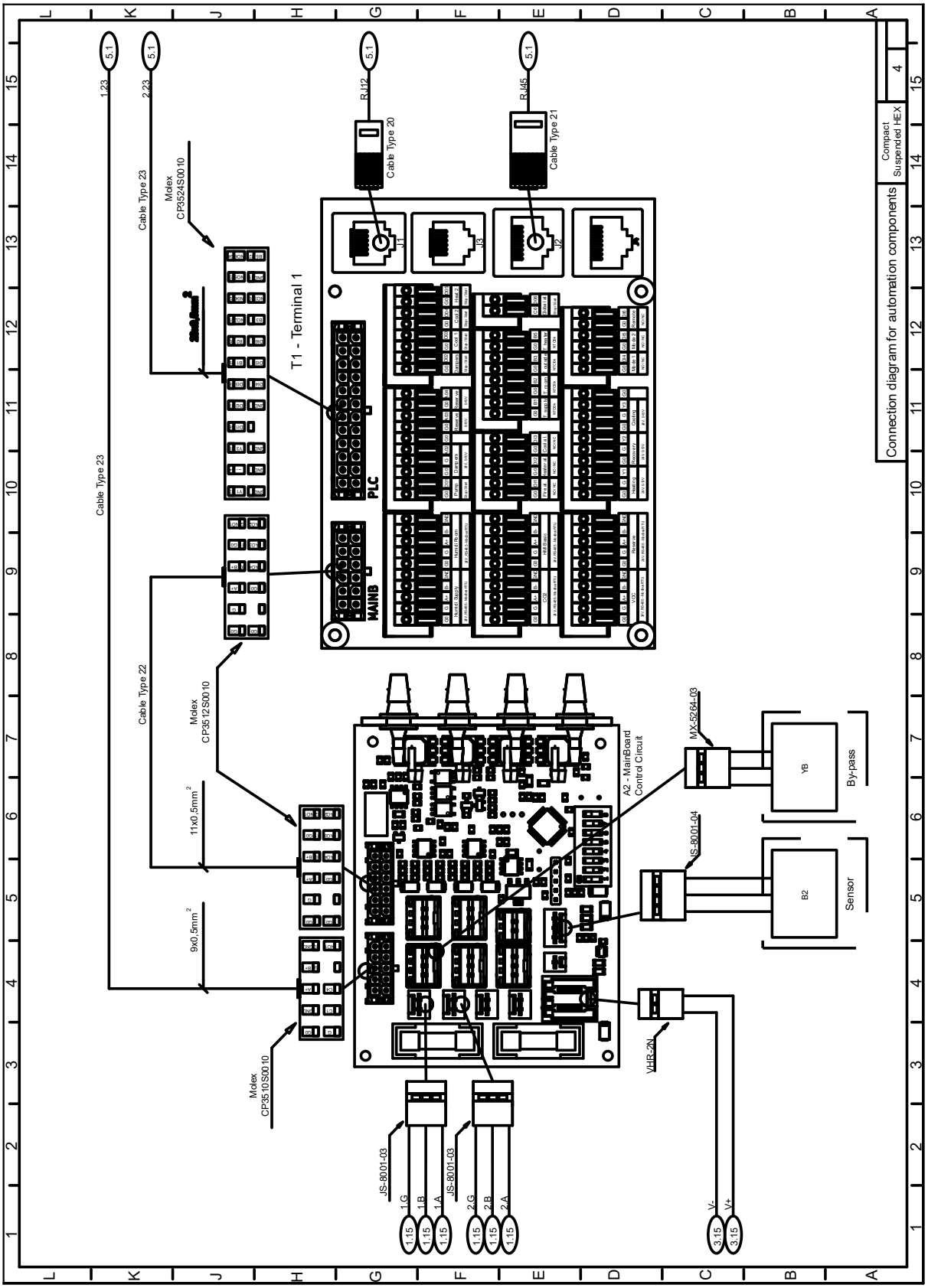
CONNECTION DIAGRAM – AHU with counterflow heat exchanger



CONNECTION DIAGRAM – AHU with counterflow heat exchanger

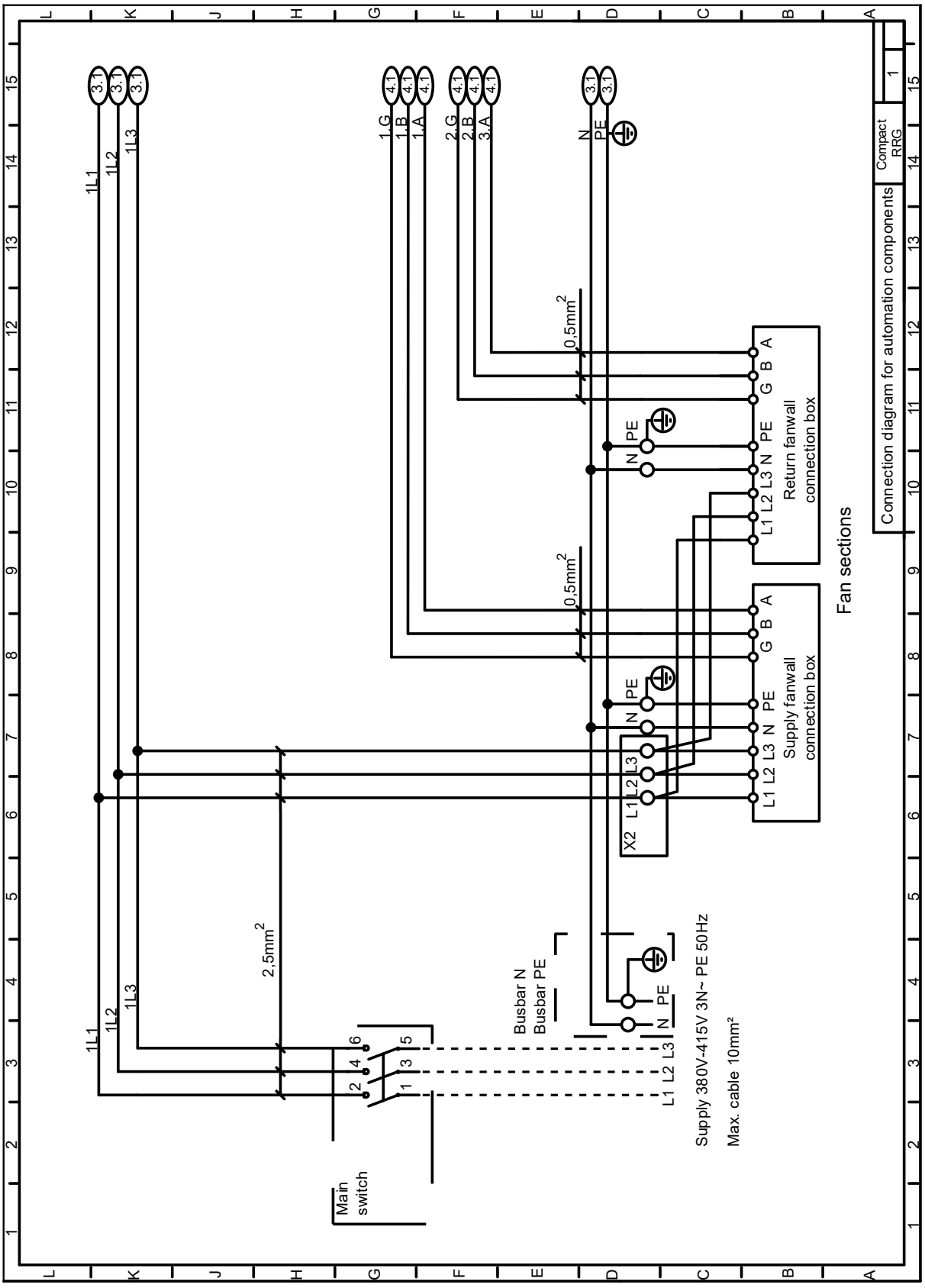


CONNECTION DIAGRAM – AHU with counterflow heat exchanger

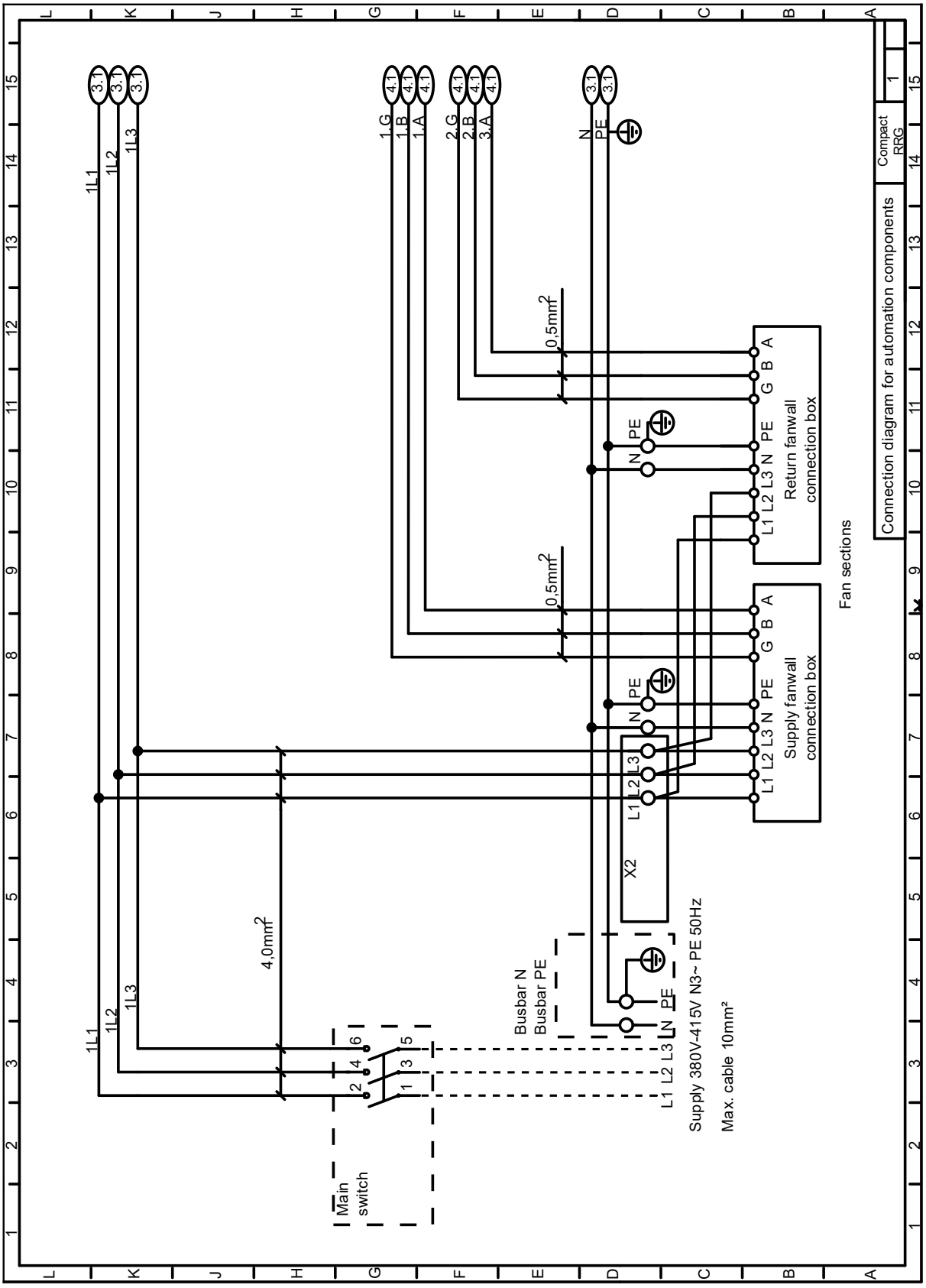


10. CONNECTION DIAGRAM FOR AHU WITH ROTARY WHEEL

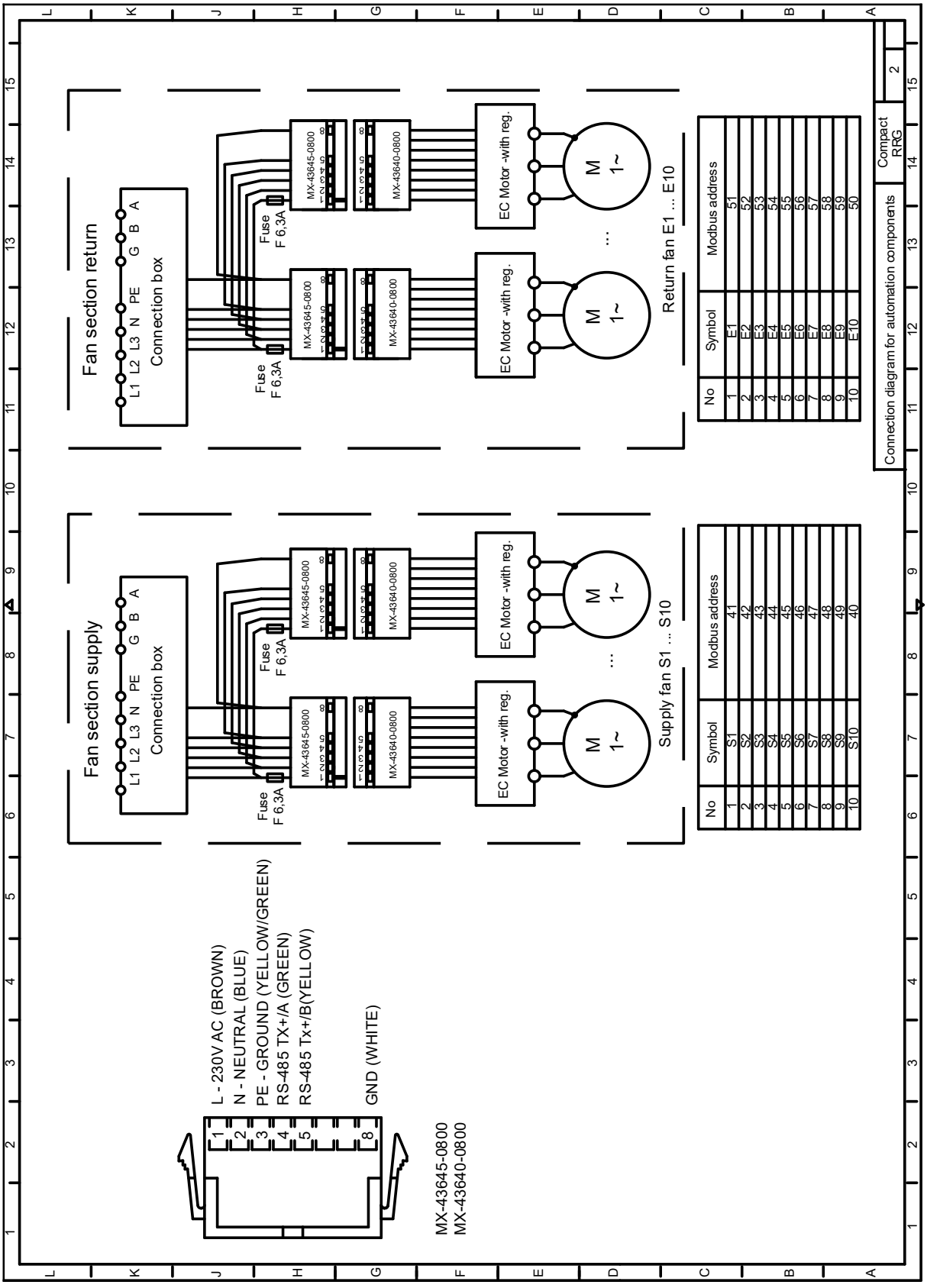
Connection diagram – AHU with rotary wheel (up to 6 fans)


Connection diagram for automation components
Compact RRG
1
Fan sections
Supply fanwall connection box
Return fanwall connection box
L1 L2 L3 N PE G B A
X2 L1 L2 L3 N PE
Busbar N
Busbar PE
Supply 380V-415V 3N~ PE 50Hz
Max. cable 10mm²
Main switch
1L1 1L2 1L3
2,5mm²
0,5mm²
1.G 1.B 1.A
2.G 2.B 3.A
N PE
3.1
4.1

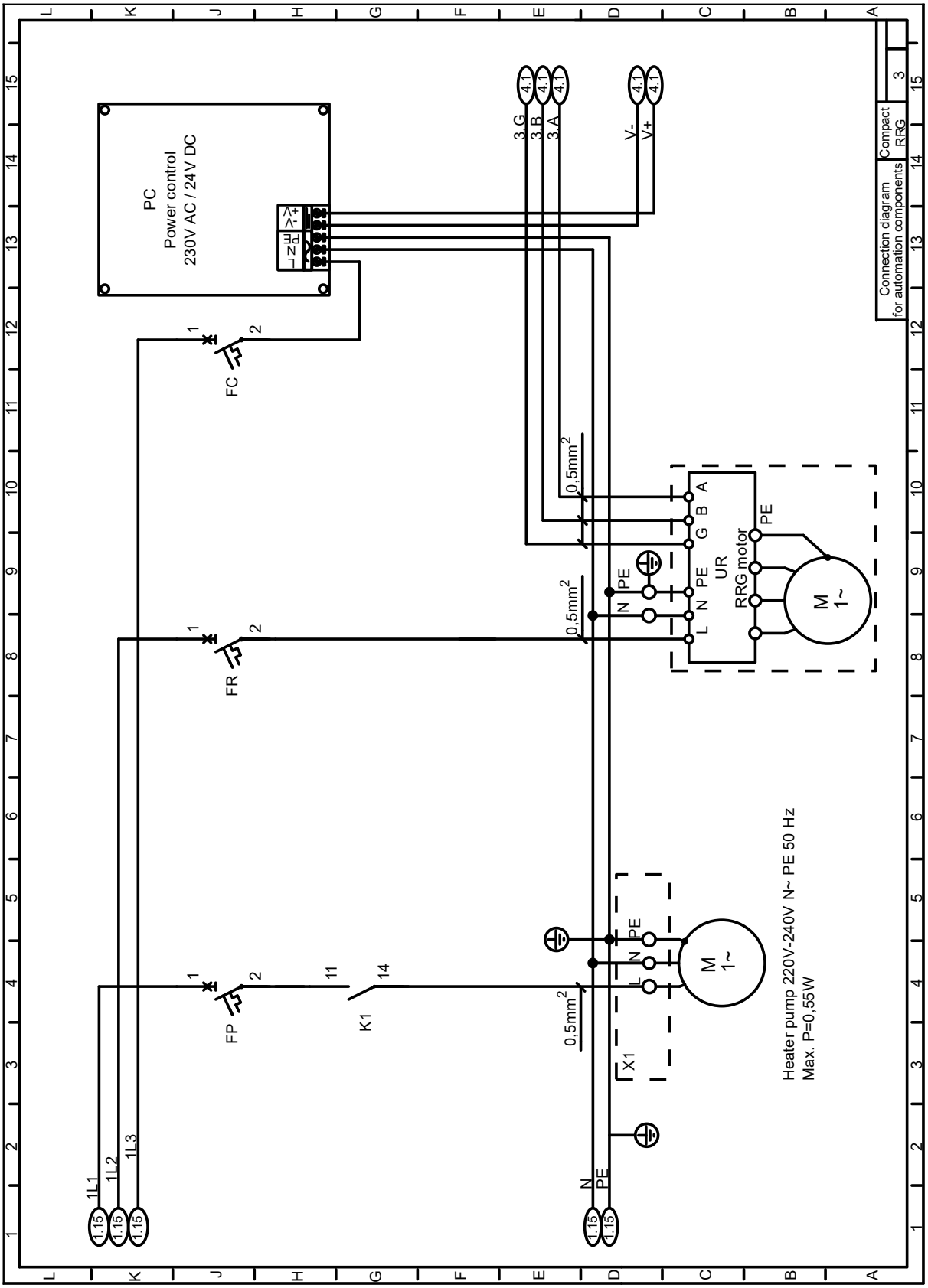
Connection diagram – AHU with rotary wheel (more than 6 fans)



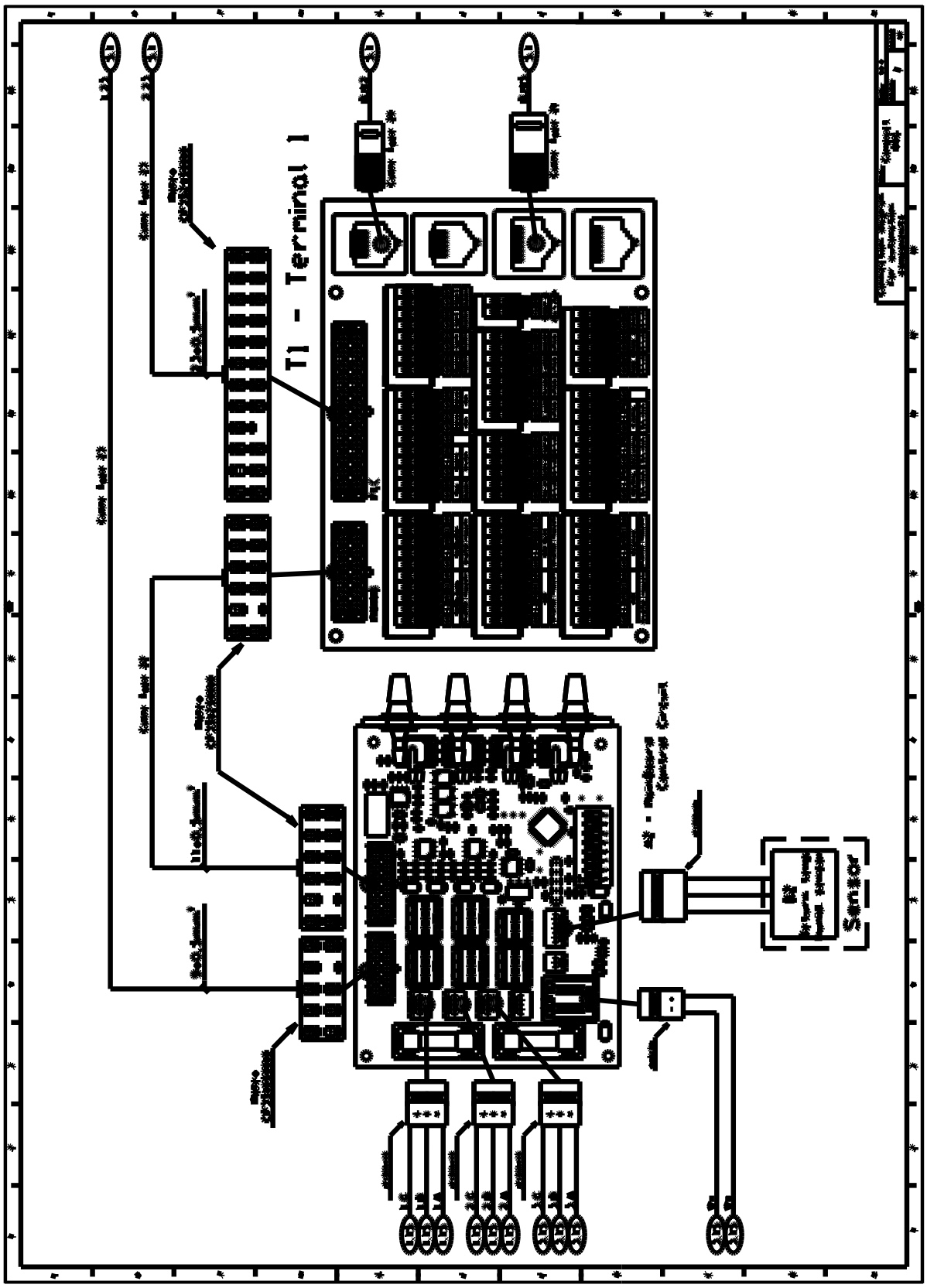
Connection diagram – AHU with rotary wheel



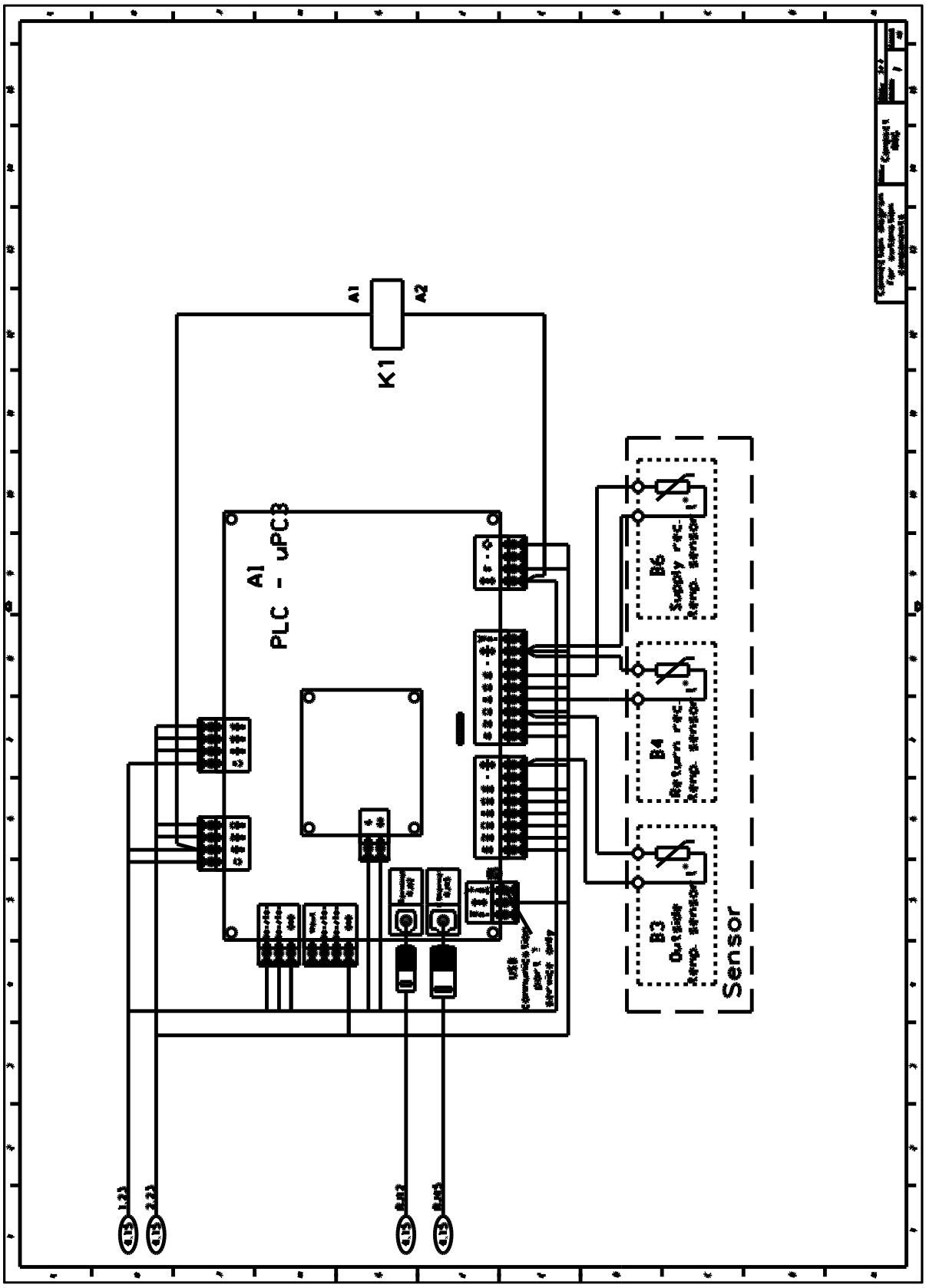
Connection diagram – AHU with rotary wheel



Connection diagram – AHU with rotary wheel



Connection diagram – AHU with rotary wheel



11. HEALTH AND SAFETY INSTRUCTIONS

WARNING DEVICE INSTALLATION, COMMISSIONNING AND SERVICING

- The installation, commissioning and servicing of air handling units and their equipment may involve certain safety risks and therefore require specific knowledge and training.
- Equipment improperly installed, adjusted, or repaired by a person without the required qualifications can become the cause of serious injury to individuals or even their death. The above relieves the manufacturer of liability and benefits under the warranty and guarantee.
- When connecting, servicing and operating air handling units, all precautions communicated by the manufacturer and those arising from good practice in the field of HVAC installations and equipment must be followed.
- Installation, maintenance and repairs must be carried out by qualified technical personnel and supervised by authorised specialists.
- Qualified technical personnel are understood to be trained specialists who, through their professional experience, knowledge of the relevant standards, documentation and regulations relating to operating procedures and associated safety, are authorised to carry out the necessary activities, and those who are able to diagnose and rectify any potential problems.
- Warranty repairs of air handling units may be carried out only by service employees with authorisations granted by the manufacturer, confirmed by an appropriate certificate, allowing them to perform this kind of work. We also recommend that the service staff authorised by manufacturer carry out assembly, start-ups and post-warranty repairs, technical inspections and maintenance works which are required to be performed on air handling units.

12. SUPPLEMENTARY INFORMATION

12.1. TECHNICAL INFORMATION ON FAN SETS

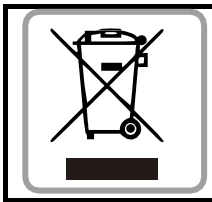
Technical information for Regulation (EU) No. 327/2011 Implementing Directive 2009/125/EC

SR-FS FANS							
Fan Set Model	#2	#5	#9-1	#9,2	#9-3	#10	#11
	[%]	[%]	[-]	[kW]	[m3/h]	[m3/h]	[rpm]
SR-FS-P-225-0.7	62.0	68.1	SR-FS-P-225-0.7	0.85	1642	1065	4500
SR-FS-P-250-0.3	66.2	73.3	SR-FS-P-250-0.3	0.49	1676	633	3000
SR-FS-P-250-0.7	67.4	72.4	SR-FS-P-250-0.7	0.98	2060	1058	3800
SR-FS-P-315-0.3	65.4	72.7	SR-FS-P-315-0.3	0.49	2256	461	2060
SR-FS-P-315-0.7	66.2	72.0	SR-FS-P-315-0.7	0.75	2411	674	2400
SR-FS-P-315-1.5	69.7	73.0	SR-FS-P-315-1.5	1.77	3560	1164	3250
SR-FS-P-315-2.5	67.8	70.4	SR-FS-P-315-2.5	2.44	3964	1419	3600
SR-FS-A-225-0.3	62.7	71.1	SR-FS-A-225-0.3	0.41	1238	674	3600
SR-FS-A-225-0.7	59.7	66.2	SR-FS-A-225-0.7	0.83	1527	1069	4500
SR-FS-A-250-0.3	62.4	70.0	SR-FS-A-250-0.3	0.48	1456	672	3000
SR-FS-A-250-0.7	65.2	70.6	SR-FS-A-250-0.7	0.93	2111	950	3800
SR-FS-A-315-0.3	62.3	70.2	SR-FS-A-315-0.3	0.46	2119	437	2060
SR-FS-A-315-0.7	64.4	70.6	SR-FS-A-315-0.7	0.71	2296	648	2400

SR-FS-A-315-1.5	67.6	71.3	SR-FS-A-315-1.5	1.69	3428	1118	3250
SR-FS-A-315-2.5	67.1	69.9	SR-FS-A-315-2.5	2.33	3902	1363	3600
SR-FS-A-355-1.6	70.0	73.6	SR-FS-A-355-1.6	1.65	4017	967	2650
SR-FS-A-355-2.5	69.9	72.2	SR-FS-A-355-2.5	2.5	4513	1316	3000
SR-FS-A-355-3.7	66.9	68.4	SR-FS-A-355-3.7	3.57	5199	1573	3400
SR-FS-A-400-1.6	70.7	73.3	SR-FS-A-400-1.6	1.89	4876	920	2250
SR-FS-A-400-2.5	68.4	71.0	SR-FS-A-400-2.5	2.41	6366	879	2000
SR-FS-A-400-3.7	66.7	67.9	SR-FS-A-400-3.7	3.83	5836	1499	2850
SR-FS-A-400-5.4	66.7	66.7	SR-FS-A-400-5.4	5.65	6802	1916	3250
SR-FS-A-450-1.6	70.2	73.6	SR-FS-A-450-1.6	1.75	5176	798	1800
SR-FS-A-450-2.5	68.1	71.0	SR-FS-A-450-2.5	2.24	5068	1021	2400
SR-FS-A-450-3.7	67.7	69.2	SR-FS-A-450-3.7	3.57	7086	1170	2300
SR-FS-A-450-5.4	66.8	67.1	SR-FS-A-450-5.4	5.29	8021	1526	2600
SR-FS-A-500-3.7	69.8	71.2	SR-FS-A-500-3.7	3.59	8577	1001	1900
SR-FS-A-500-5.4	70.1	70.5	SR-FS-A-500-5.4	5.06	9562	1284	2130
SR-FS-A-560-3.7	69.0	70.4	SR-FS-A-560-3.7	3.58	9486	893	1600
SR-FS-A-560-5.4	69.0	69.0	SR-FS-A-560-5.4	5.52	11192	1176	1830

WG PARAMETER (EU) 32/20211	VALUE
#3	A
#4	Static
#6	Year of manufacture printed on the product nameplate.
#7	Swiss Rotors sp. z o.o. , 586-001-73-79 , Rumska 18, 81-1 8, Dębogórze, Poland
#8	YES
#12	Disposal shall be carried out in a suitable and environmentally friendly manner in accordance with the legal regulations of the country concerned. "Materials are sorted and segregated in an environmentally friendly manner." If necessary, they should be taken to a specialist facility.
#13	Information provided in the relevant chapters of the dedicated manual, especially on maintenance (www. https://swissrotors.com)
#14	N/A

13. DISMANTLING AND DISPOSAL OF AHU



CAUTION

- The dismantling of the appliance should be carried out and/or supervised by suitably qualified personnel with the appropriate level of knowledge and authority. A certified waste disposal organization in your region should be contacted. Confirm how to prepare and segregate materials, especially hazardous materials that may have been used in the construction of the appliance (e.g. Batteries).
- Components should be sorted with a view to recycling by material: iron and steel, aluminum, copper, non- ferrous metals e.g. windings (winding insulation will be burned off when copper is recycled), insulating materials, electrical wiring, electronic waste, plastic components, etc. the same applies to fabrics and cleaning substances that have been used during component dismantling. the separation of components should be carried out according to local regulations or by a specialized recycling company.
- The unit should be dismantled using general procedures commonly used in mechanical engineering, respecting local regulations for disposal and waste management.
- CFC installations are filled with refrigerants, which cannot be escaped into the atmosphere. Refrigerants must be recovered in accordance with the regulations in force (this operation must be carried out by a qualified person).

GENERAL DISMANTLING PROCEDURE

- Permanent disconnection the unit from power supply
- Removing all cooling / heating media and refrigerants from the unit
- Disconnection of all external installations connected to the unit
- Dismantling of inspection panels
- Dismantling of electrical components and controls system
- Removal of all accessories and components from the unit
- Disassembly of the unit casing
- Separation of the casing insulation material from metal sheet
- Segregation of all components by material
- Transfer of materials for disposal

14. NOTES

Routine checks, carried out by qualified technical personnel or service personnel authorized by manufacturer, guarantee long-term, reliable and trouble-free operation of the equipment. Our service staff is available at all times to provides support for commissioning, maintenance and in the event of any emergency situation relating to the operation of the unit.

Authorized service sells spare parts and accessories for our air handling units. When ordering parts, please specify the type of air handling unit, size and serial number.

The unit's rating plate includes the sound pressure level LWA (1m) quoted for a distance of 1m from the unit. To calculate the LWA values at 3m and 5m, use the formula:

LWA (3m) = LWA (1m) - 9.54 LWA (5m) = LWA (1m) - 13.98

CE

Due to REDGE ongoing commitment to quality, the specifications, ratings and dimensions are subject to change without notice and without incurring liability.

Improper installation, adjustment, alteration, service or maintenance can cause property damage or personal injury.

Installation and service must be performed by a qualified installer and servicing agency.

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