



INSTRUCTION MANUAL

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DUOVENT® MODULAR XLH / XLHL Ventilation units with heat recuperation

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1. GENERAL INFORMATION

1.1 INTRODUCTION

This manual is intended for the DUOVENT® MODULAR XLH and XLHL HVAC units. Its purpose is to provide as much information as possible for the safe installation, commissioning and use of this equipment. Due to the fact that our products are constantly evolving, we reserve the right to change this manual without prior notice.

1.2 WARRANTY

We do not guarantee the suitability of the devices for special purposes, the determination of suitability is fully in the competence of the customer and the designer. The warranty is only valid if all installation and maintenance instructions, including protection, are observed. The warranty covers manufacturing defects, material defects or malfunctions of the device.

The warranty does not cover defects caused by:

- Improper use and design
- Improper handling (does not apply to mechanical damage)
- During transport (compensation for damage caused during transport must be claimed from the carrier)
- Incorrect installation, incorrect electrical connection or protection
- Incorrect operation
- Unprofessional intervention in the device
- Disassembling the device
- Use in unsuitable conditions or in an unsuitable manner
- Wear and tear caused by normal use
- Third party intervention
- Due to a natural disaster
- Frost-damaged water exchanger parts are not covered by the warranty if it has been demonstrably proven that the unit was in operation without heating water at min. design temperature or during shutdown of the boiler circuit

When claiming the warranty, it is necessary to submit a report containing:

- data on the complaining company
- date and number of the sales document
- exact specification of the defect
- wiring diagram and fuse details
- measured values when starting the device
 - voltage
 - current
 - air temperature
 - air flow

The warranty repair is carried out in principle at the discretion of ELEKTRODESIGN ventilatory spol. s r.o. at the company's service centre or at the installation site. The method of eliminating the defect is solely at the discretion of the service company ELEKTRODESIGN ventilatory spol. s r.o. The complaining party will receive a written statement on the result of the complaint. In the event of an unjustified complaint, the complaining party pays all costs of its implementation.

Warranty conditions

The device must be installed by a professional air handling service company. The DUOVENT® MODULAR XLH / XLHL device, including the DVAV, DCAV, DCOP control system, must be put into operation exclusively by the Seller or a person designated by the Seller (StartPack service). **Failure to comply with this condition will result in the termination of the Buyer's rights from defective performance and from the Quality Warranty. Detailed terms are specified in the Seller's Complaint Procedure.** The electrical connection must be made by a specialist electrical company. Installation and location of the device must be unconditionally performed in accordance with ČSN 33 2000-4-42 (IEC 364-4-42). The device must be subjected to an initial electrical inspection according to ČSN 33 1500. **The device must be regulated to the designed air-conditioning parameters.** When starting the device, it is necessary to measure the above-specified values and make a record of the measurement, confirmed by the company putting the device into operation. In the event of a complaint about the equipment, it is necessary to submit a record of the above-mentioned parameters from commissioning together with the declaration protocol together with the initial revision, which the operator acquires within the commissioning and maintenance of the electrical installation.

During the operation, it is necessary to perform regular inspections of electrical equipment within the deadlines according to ČSN 33 1500 and inspection, maintenance and cleaning of air-conditioning equipment. It is necessary to keep a „Maintenance and inspection book“ for the maintenance and service of the device, for which the device operator is responsible.

When taking over the device and unpacking it from the transport packaging, the customer is obliged to perform the following inspections. It is necessary to check the integrity of the device, as well as whether the delivered device exactly agrees with the ordered device. It is always necessary to check whether the label and identification data on the transport packaging, equipment or engine correspond to the designed and ordered parameters. Due to the continuous technical development of the equipment and changes in technical parameters reserved by the manufacturer, and the time lag between the project and the implementation of own sales, fundamental differences in the parameters of the equipment at the date of sale cannot be ruled out. The customer is obliged to inform the manufacturer or supplier about such changes before ordering the goods. Subsequent complaints cannot be taken into account.

1.3 SAFETY REGULATIONS

Adherence to these instructions should not pose any safety, health or environmental risks in accordance with EC directives (CE marked). The same applies to other products used in the device or during installation. Consider the following warnings:

- Observe the safety instructions to prevent damage to the device or personal injury.
- The technical information in this manual must not be changed.
- It is forbidden to interfere with the motor of the device.
- In order for the device to comply with EC directives, the device must be connected to the mains in accordance with the applicable regulations.
- The device must be installed in such a way that under normal operating conditions it cannot come into contact with any moving part and / or live part.
- The device complies with the applicable regulations for the operation of electrical equipment.
- Always disconnect the device from the power supply before carrying out any work on it.
- Appropriate tools must be used when handling or maintaining the device.
- The device must only be used for the purposes for which it is intended.
- This appliance is not intended for use by children under 8 years of age and persons 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 responsible person. The user must ensure that children do not play with the device. Cleaning and maintenance of the appliance must not be carried out by children without supervision.

2. GENERAL INFORMATION ON PRODUCT

The DUOVENT® MODULAR XLH/XLHL unit is manufactured in accordance with valid Czech and European laws, decrees, standards and technical rules. The unit may only be installed and used in accordance with this documentation. The manufacturer is not liable for damage caused by other uses and the buyer bears all risks. Changes and modifications to the complete product that could affect safety and proper function are prohibited. Installation and operating documentation must be available to the operator and service. It is advisable to place it close to the installed unit.





When disposing of the unit, the relevant environmental and waste disposal regulations must be observed. In the case of final disposal, it is necessary to follow the principles of separate collection. The applicable standards, safety regulations and generally accepted technical rules must be observed during installation, electrical connection, commissioning, repairs and maintenance of the units. Assembly of units, connection of electrical installation, commissioning of the unit, repairs, maintenance and operation may be performed only by a natural or legal person with a valid authorization.

The current version of this manual is available at de.elektrodesign.cz.

3. TECHNICAL DATA

3.1 MANUFACTURING LABEL AND INFORMATION LABELS

Each unit is provided with a manufacturing label, which contains the basic data needed to identify the device. The label is usually located on the front of the unit or on the connection side of the heat exchanger parts.

   				
TYP	DUO-MOD-XLHL RV EC 63 DCA DX MX KL FP/FO DCAV PP E18 HRU398-20			
VÝROBNÍ ČÍSLO	CIC-001/2020	HMOTNOST	3 560	kg
VYROBENO	07/2020	MEDIUM PRO DCA	80/60	°C
POPTÁVKA	P01AYxxxxxx	MEDIUM PRO DX	R449A	
MAX. PROVOZNÍ TEPLOTA	40	°C	CELKOVÝ EL. PŘÍKON P _{max}	16,5 kW
MAX. PRŮTOK VZDUCHU	60 000	m ³ /h	NAPĚTÍ	Um 400 V 3N ~ 50 Hz
MAX. EXTERNÍ TLAK	500	Pa	PROUD	In 23,9 A
PARAMETRY PRO VODNÍ OHŘÍVAČ		Max.teplota 110°C,max.tlak 1,6MPa		
Výrobce: C.I.C JAN HŘEBEC, s.r.o., Na Zlaté Stezce 1075, 263 01 Dobříš				

Key for distinguishing the variant of DUOVENT® MODULAR XLH/XLHL heat recovery units (in the „TYP“ (TYPE) field label):

DUO - MOD - XLHL DV EC 50 DCA DCC MX KL FP / FO DVAV LV E18 HRU220 - 20
 1 2 3 4 5 6 7 8 9 10 11 12 13

- 1 – unit section type
DUO-MOD-XLH - square channel section of modular unit DUOVENT® MODULAR
DUO-MOD-XLHL - rectangular channel section of modular unit DUOVENT® MODULAR
- 2 – type of heat recuperation within the unit:
DV - plate counter-low exchanger or cross-plate exchanger
RV - rotating regeneration exchanger
BV - without fie heat recuperation exchanger
- 3 – type of fan electric motors:
EC - electronically commutated motors with step-less speed control 0 ...10 V
AC - alternating electric motor without step-less speed control
FC - alternating electric motor with stepless speed control by frequency converter
- 4 – unit size
- 5 – air heater type:
DI - electric
DCA - water
- 6 – air cooler type:
DCC - water
DX - direct evaporator (for a direct evaporator, it is always necessary to specify the type of refrigerant, the required capacity and the division of the refrigeration capacity into sections according to the type of condensing unit used).
 For evaporation units used for reverse operation with the thermal pump this fact must be specified in the order note.
DXr - evaporator In connection for reverse operation (cooling i heating)
- 7 – **MX** - mixing flap ready for assembly of servo-drive (If the unit is fitted with I&C system, the servo-drive is within the scope of delivery)
C - mixing flap enabling 100 % air circulation with preparation for mounting the actuator (when the unit is fitted with I&C system, the actuator falls within the delivery scope)
- 8 – **KL** - inlet and outlet damper with preparation for mounting the actuator (if the unit is equipped with the I&C system, the actuator is included)
- 9 – **FP** - unit fitted with single-stage of multi-stage filtering in inlet section
FO - unit fitted with single-stage of multistage filtering in outlet section
- 10 – type of control system:
DVAV - Digireg® with variable airflow
DCAV - Digireg® with constant airflow
DCOP - Digireg® with constant static pressure supplied to A/C piping
- 11 – operation side and variant:
LV - left-hand vertical (air flows stacked)
LP - left-hand floor (air flows next to each other)
PV - right-hand vertical (air flows stacked)
PP - right-hand floor (air flows next to each other)
- 12 – **PRV** - unit arrangement for process ventilation (PROCESS) - for applications excluded from applicability of EC regulation no. 1253/2014, further for applications and markets beyond applicability of EC regulation no. 1253/2014.
E18 - unit arrangement complying with EC regulation no. 1253/2014-Ecodesign 2018.
- 13 – **HRU220-20** - internal no. of ELEKTRODESIGN ventilatory, s.r.o.. The internal number is unique for each unit arrangement/variant.

Complete technical data of each assembly of the DUOVENT MODULAR XLH/XLHL units form part of the technical specification of each device, which is integral part of the unit accompanying documentation – see Annex.

In addition, the unit is equipped with **labels to identify the internal arrangement of functions:**



WATER / ELECTRIC HEATER



WATER / DIRECT COOLER

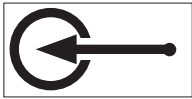


FAN

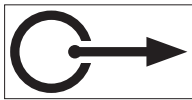


FILTER

The unit is also equipped with labels with warnings:



HEATING / COOLING MEDIA INPUT



HEATING / COOLING MEDIA OUTPUT

**NESAMOČINNÁ TEPELNÁ
POJISTKA POD KRYTEM**
**MANUAL RESET UNDER
THE COVER**



NOTICE ON LOCATION OF FAULT RESET BUTTON OF EL.HEATER

**ODVOD
KONDENZÁTU**

**CONDENSATE
DRAIN**



NOTICE ON LOCATION OF THE CONDENSATE DRAINAGE NECK
IN THE BOTTOM OF THE UNIT



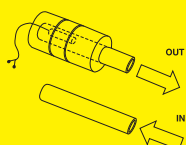
IMPORTANT WARNING

It is necessary for warranty recognition, to connect built-in thermal protection of the electric motor (see instruction manual ELEKTRODESIGN VENTILATORY).
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NOTICE ON CONNECTION OF FAN MOTOR PROTECTIONS

IMPORTANT NOTICE!!


sensor located below the thermal insulation




CAUTION!
Correct function of the water exchanger anti-freeze protection requires proper insulation of the protecting (contact) temperature sensor at the water circuit return line as closest to the water exchanger outlet as possible to prevent influencing of the decisive temperature by the environment temperature.

BEFORE START OF THE UNIT, THE SYSTEM MUST BE VENTED. THE VENTING SCREWS ARE LOCATED INSIDE OR OUTSIDE THE UNIT AT THE WATER EXCHANGER MANIFOLD.

WARNING OF THE NECESSITY OF INSULATION
OF THE ANTIFREEZE PROTECTION CONTACT SENSOR

**WARNING**
Do not start and/or use the unit during constructions works (drilling, grinding etc.). There is a risk of unrepairable damage of the unit and distribution lines! The unit must be commissioned by an authorized person only!
If these instructions are violated, the manufacturer has no responsibility for any subsequent losses and the warranty for the HVAC unit becomes void!

WARNING – DO NOT OPERATE THE UNIT DURING CONSTRUCTIONAL WORKS

**BEWARE!
ELECTRIC
APPLIANCE**

**DON'T OPEN
THE DOOR
DURING
OPERATION**

WARNING LABELS

MAIN SWITCH

Labels to identify the type of air stream:


SUP
Zuluft / Supply air


ETA
Abluft / Extract air


EHA
Fortluft / Exhaust air


ODA
Außenluft / Outdoor air

4. TRANSPORT, HANDLING AND STORAGE

4.1 TRANSPORT TO THE INSTALLATION SITE, HANDLING ON THE CONSTRUCTION SITE

Transport all parts in the working position. Especially with the ZZT rotary heat exchanger, even short-term laying or tilting is not permitted. When transporting and handling the individual chambers, lift the unit and its parts only by the lower reinforced frame. There are holes in the base frames and bases, which are used to attach the rope hooks during vertical transport or clamping to the loading surface of the vehicle. Sufficiently secure the units and their parts or mounting assemblies against slipping and tipping over on the truck bed.

During loading and unloading by the fork-lift the unit must be lifted suspended on the transport pallet. Careful handling is required.

When lifting with a crane, pass the ropes through the transport pallet and balance the transported part.

For smaller parts, use the holes in the base frames to attach the rope hooks.

In both cases, the ropes must be spread over the chamber so that they do not compress the chamber. The spacers can be created also as roping at the chamber edges.

4.2 STORAGE ON CONSTRUCTION SITE

Store the units acc. to the package type in warehouses acc. to ČSN EN 60721-3-1 „Environment condition classification – Part 3: Classification of the environment parameter groups and their strictness levels – Section 1: Storage.“ Store the units packed to PE foil in the IE11 type warehouse. During storage, the units must be protected against mechanical damage and moisture. This requirement is based on the assumption of possible precipitation of air humidity under the PE foil and subsequent oxidation of galvanized elements.

For storage under a shelter, in IE13 type warehouse, but fauna and flora is negligible, pre-arrange packaging in PE foil, cardboard, battens on the edges and strapping. To enable storage in an open space in IE14 type warehouse, but the fauna and flora negligible, you can arrange wooden packaging.

5. UNIT ASSEMBLY

The unit can only be installed by a professional installation company authorized in accordance with the Trade Licensing Act.

5.1 INSPECTION BEFORE ASSEMBLY

Check in particular:

- Delivery completeness
- integrity regarding transport and storage
- Free rotation of fan aggregate (manually) and tightening of V-belts (if delivered)
- Free rotation of the rotor, tightening of belt and correct adjustment of ZZT rotation exchanger sealing elements
- Movability of flaps, constructional readiness
- Voltage grid parameters
- Pressure and temperature of heating and cooling media

5.2 UNIT STORAGE

You can freely store the units on a horizontal base (floor, landing), no anchoring is required, but we recommend underlaying the unit with a strip of grooved rubber to compensate for minor unevenness of the substrate.

Flatness and parallelism of the unit positioning is one of pre-conditions of the unit proper functioning.

You can store units of the same size in two layers on top of each other. When storing a smaller unit on a larger unit, it must always fit the longitudinal walls on one side.

Only hang units designed to be suspended from the ceiling on the hinges (brackets) that are part of the unit. Connect the brackets to the ceiling structure with galvanized M8 threaded rods. Threaded rods and anchors are not included in the delivery of the units. It is necessary to observe the horizontal suspension of the unit.

Position units that contain water exchangers or chambers with condensate drain so that any accident (e.g. freeze of the exchanger or malfunction of the condensate drain) does not cause any damage. We recommend placement in the engine room with a waterproof floor and a GULA.

Handle the units carefully, especially to avoid crossing the structure. Pay more attention and caution, especially when handling pipes, drip traps and plastic chambers. At temperatures below 5 °C, we recommend increased caution, especially when handling plastic parts.

5.3 UNIT LATERAL DISTANCE

When seating the unit in plan, ensure lateral distances from other objects on the operating side at least at the following distances:

- The fan chamber 0.7times part width, but minimum 600 mm to slide the aggregate out
- The filter chamber min. 600 mm to slide the filter cassettes out
- The exchanger chamber min.1.15times width of the chamber part to slide the exchanger out
- The chamber with eliminator min.1.15times width of the part to slide the eliminator out
- Chamber with plate recuperation exchanger min.1.15times width of the part to slide the plate exchanger out
- Chamber with service hole min. 600 mm for maintenance access
- Gas heating chamber min.1.5times of the part width
- Distance of combustible objects min. 200 mm from the unit



NOTICE

For ceiling mounting units, the doors and service openings open downwards, the heat exchangers and eliminators slide out to the sides.

5.4 CHAMBER JOINING

Connect the individual chambers of the modular units with special „MSHYGB“ couplings and screws.

Apply a self-adhesive seal on one side to the seating surfaces of the individual chambers.

After gluing the seal, lower the chambers together as far as they will go.

Perform screwing outside the chambers using screws, washers and couplings, fasten them with screws, tap and tighten.

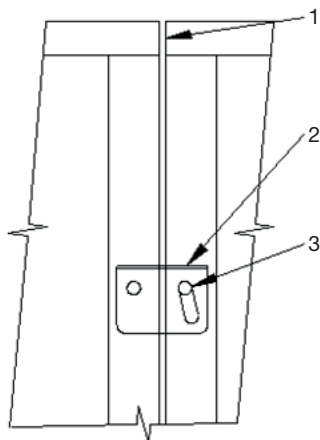
Repeat the same process for all chambers. Connecting and sealing material for connecting the chambers is part of the delivery of the unit.

In the case of under-ceiling units and chambers placed side by side, the compression nuts for connection are located inside the chamber at the bottom and the lid.

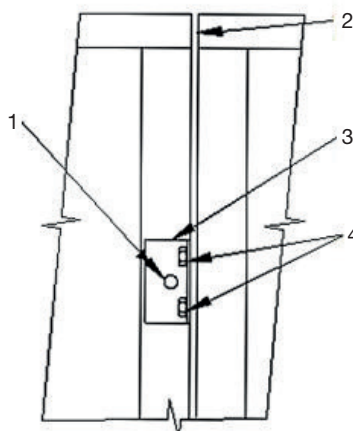
Join the ceiling unit either on the ground and pull it out on the threaded rods as a whole, or (depending on the location and weight) pull the individual pieces on the threaded rods and then connect them under the ceiling.

Access to the couplings is enabled through the filtering chambers and the fan doors. For plate recuperator and heating / cooling chambers, first remove the front panel and slide out the heat exchanger.

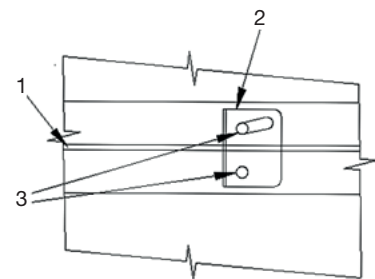
Due to the conductive connection of the chambers, always use a fan washer on one joint instead of precise washers. For inspection purposes, we recommend making this conductive connection on the operator's side.



Chamber joining: A – outer
 1 – sealing MQTES1904
 2 – coupling MSHYGB
 3 – Allen screw M8x16,
 precise washer (fan washer)



Chamber joining: B – chamber different sizes
 1 – precise washer (fan washer)
 2 – sealing MQTES1904
 3 – sealing MSHYGB90
 4 – screw M6x16, precise washer
 (fan washer)



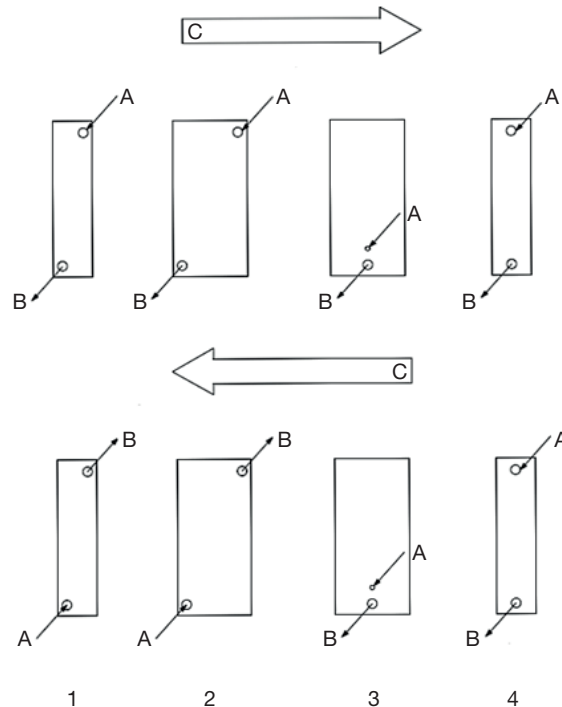
Chamber joining: C – inner
 1 – sealing MQTES1904
 2 – Allen screw M8x16,
 precise washer (fan washer)
 3 – coupling MSHYGB

5.5 CONNECTION TO HVAC PIPING

Connect the ventilation ducts to the flexible inserts or flanges of the unit in such a way that the ducts do not burden them with their weight and do not deform them.

5.6 CONNECTION TO HEATING/COOLING MEDIA

Connect the multi-row water exchangers and evaporators in counter-flow pattern.



Position of media inlets and outlets at the exchangers
 A – media inlet
 B – media outlet
 C – air flow direction,
 1 – water heater
 2 – water cooler
 3 – direct evaporator
 4 – steam heater

The expansion forces and the weight of the valves supplying the medium to the exchangers must not burden the unit. Insulate the heater connection pipe so that the surface temperature is below 60 °C.



NOTICE

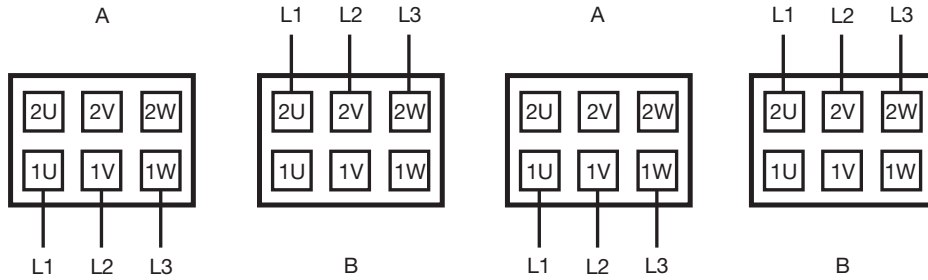
When connecting the fittings to the heat exchangers, tighten with two wrenches to prevent the heat exchanger neck from twisting.

5.7 PROTECTION AGAINST CONTACT WITH NON-LIVE PARTS

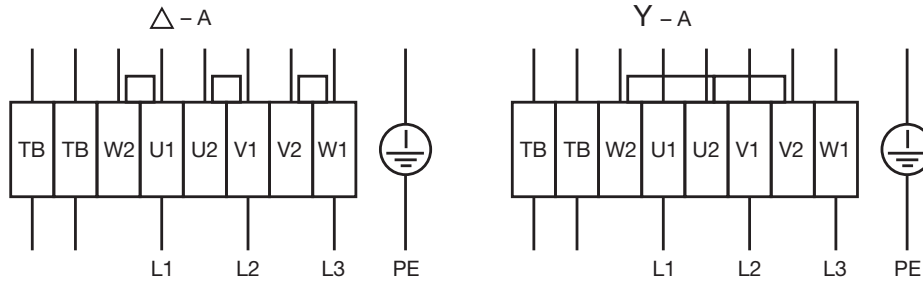
Ensure the protection by integral bonding of the HVAC piping and other conductive non-live parts with the unit. For this purpose, press-fit nuts marked with the earthing symbol and screws on the damper profiles are used. Individual chambers are integrally bonded acc. to 5.4.

5.8 CABLE CONNECTIONS

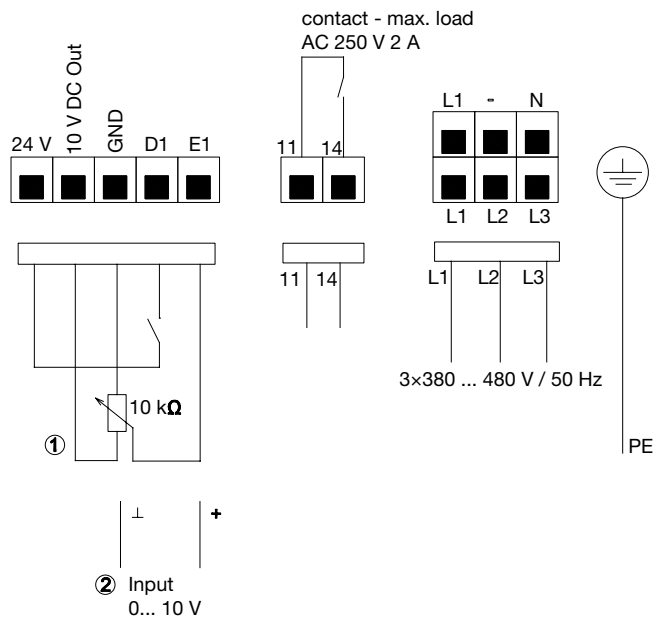
Connect the power supply to the motors with a flexible cable through a bushing located in the panel. If the switchgear is not close to the unit, the motors must be connected via a service switch for safe shut-down located within reach of the unit. If the openings for the cable and wires of the electric motor are closed by a „cast membrane“, punch it out with a suitable tool and fit it with a suitable gland. The terminal board, terminal board and cable connections in the interior of the terminal box must not be damaged! Seal unused openings for cable and wires in the terminal box and the terminal box itself in a dust-tight manner.



Wiring diagram of high-speed motors 4/2 (21), 8/4 (23), Dahlander / 4/6 (25), two separate windings
 A – lower speed
 B – higher speed



Wiring diagram of motors for RHM type fans (fan chamber under-ceiling variant)
 U1 – brown U2 – black
 V1 – blue V2 – grey
 W1 – black W2 – orange
 TB – white (thermal contact)



Connection terminal board of the fans with EC motors

Legend for connection of terminal blocks of EC motors:

① – Entered speed using e.g. external potentiometer REB-Ecowatt. Connected to terminals „+10V“ and „GND“ with sensor at terminal „E1“.

② – Excitation via external signal 0 ... 10 V.

L1, L2, L3, PE - network connection for types 3~

11, 14 - relay output for fault reporting. During operation, terminals „11“ and „14“ are bridged (relay is closed). In the event of a fault, the relay opens. When switched off with D1 (digital input set to 1), the relay remains closed.

E1, GND - analog input for entering the speed 0... 10V

10V DC Out - voltage supply for entering the speed using an external potentiometer REB-Ecowatt

D1, +24V (resp. +10V) - digital input. Fan on = contact closed. Fan off = contact open.

**NOTICE**

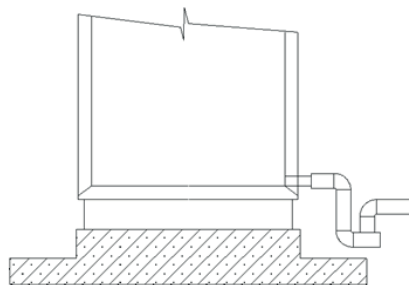
The specific recommended connection of the motors is part of the diagram, which is located on the back of the terminal cover of the electric motor.

Also connect the electrical equipment located inside the unit (actuators, differential pressure gauges, solenoid valves, etc.) with a cable routed through a bushing in the panel.

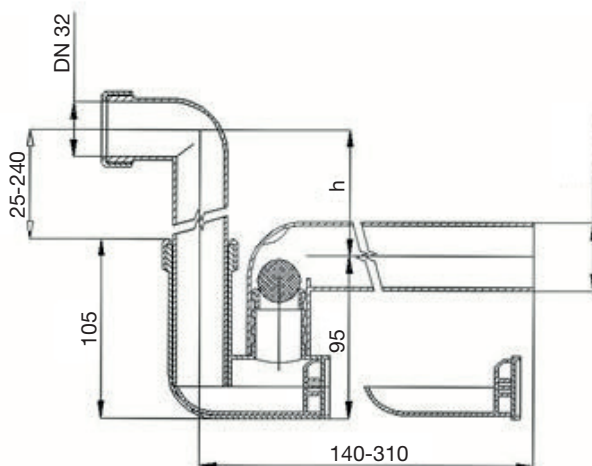
5.9 CONDENSATE DRAIN CONNECTION

Connect the condensate drains to the sewer via siphons. Place the siphon directly at the unit.

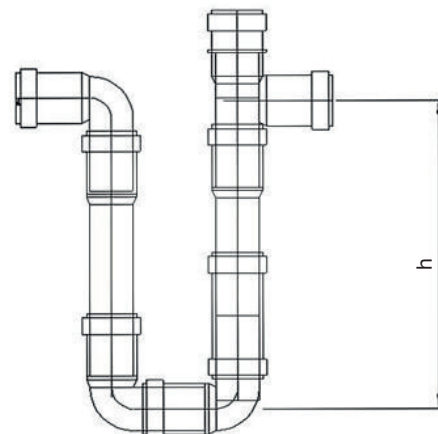
Each condensate must be fitted with its own siphon. It is necessary to adhere to the siphon specified height (see calculation).



Location of siphon on the chamber



Vacuum chamber siphon



Overpressure chamber siphon (max. overpressure 1800 Pa)

Location of siphon on the chamber - min. siphon height $h = 100$ mm, when total fan pressure $dP < 1000$ Pa; for higher total pressure $h [\text{mm}] = dPt [\text{Pa}] / 10$.

5.10 ASSEMBLY OF WATER HUMIDIFICATION CHAMBER (AIR WASHER)

If the washing machine is not put in operation by the manufacturer's specialist or a trained service technician, carry out the following:

- Verify proper fixing of the pump suction basket. Verify proper fitting of the nozzle holder and nozzles.
- Fill the washer bath with water (until it run out of the siphon). If the pump operates with a shut-off valve on the discharge line, open the shut-off valve when filling to fill the pump with water.
- Only then verify the pump rotation direction. Correct rotation direction is marked by arrow on the pump housing.
- To do this, the pump is briefly started and stopped. Under no circumstances may the pump be idling, as this would destroy the pump seal. When the pump motor does not rotate in the arrow direction, change the motor connection phases.

Before shipping, the washer is subject to cleaning and trial operation. However during installation the contaminants and solid substances may get to the washer. These must be removed. The manufacturer shall not be responsible for contamination at the installation site and subsequent losses (such as pump damage); they are not subject of any warranty claims.



CAUTION!

Idle running of the operation is not allowed!

5.11 MEDIA CONNECTIONS

All connections of CH, cooling, electrical, I&C or other structures must not prevent full opening of the door, extension of filters and drip eliminators, operation and maintenance of the unit.

5.12 ACCESSORY ASSEMBLY

Eventual accessories assemble acc. to the unit specification and installation manual of the accessory manufacturer.

5.13 UNIT CLEANING

Clean dust and contaminants from the installation from the unit.

6. COMMISSIONING

The device may only be put into operation for the first time by a suitably qualified specialist.

6.1 BEFORE FIRST COMMISSIONING

Before the first commissioning, it is necessary to check:

- Completeness, unit cleanness and installation quality
- Tightening of ZZT rotation exchanger belt
- Fan / electric motor free rotation
- Free rotation of ZZT rotation exchanger rotor
- Operation voltage and current of the electric motor acc. to type labels on the motor
- Actuator control and operating voltage
- Condition of operating surfaces and collectors of the exchangers to check the mechanical damage during transport
- Connection of the exchangers to the heat/cold sources of max. pressure 0.6 MPa
- Exchanger venting
- Function of condensate drain and trap water flooding
- Cleanness of filter cartridges
- Flap movability
- Tight connection to distribution lines
- Closing of all doors and service holes

Any faults must be rectified before first starting of the unit.

6.2 COMPLYING WITH ELECTRO-TECHNICAL REGULATIONS

Before starting the unit for the first time, perform the initial revision of the electro-technical equipment in accordance with ČSN EN 33 1500 „Electro-technical regulations. Revisions of electric equipments“ on basis of ČSN EN 332000-6-61 „Electro-technical regulations. Electric equipments, part 6:Revision, section 61: Procedures for initial revisions“.

6.3 AT FIRST PUTTING THE UNIT TO OPERATION

Connection of frequency converters to the grid:

- At first check the inverter supply system (1x 230 V, 3x 400 V) according to its nameplate.
- Install earthing cable.
- With 3-phase connection, connect the power supply wires to all three terminals.
- With 1-phase connection, connect the power supply wires to terminals L1/L and L3/N (terminal L2 is blinded).

The cable cross-section, recommended fuses and other operating instructions of the frequency inverter must be observed, see its operating instructions!

At first putting the unit to operation verify following:

- The correct direction of rotation of the fan according to the arrow on the fan.
- The correct direction of rotation of the ZTZ rotation exchanger according to the arrow in the chamber.
- Motor current consumption (shall not exceed value stated on the electric motor nameplate).
- Motor current protections must be set to a value equal to or lower than the value on the electric motor nameplate.
- The connection of the electric motor must correspond to the voltage system to which the motor is connected, especially when using a frequency converter. If a frequency converter is used, check its voltage version. This means that if the frequency converter is supplied with single-phase voltage 1x 230 V, its output voltage is 3x 230 V and the motor must be connected according to the motor rating plate (not according to the plate on the HVAC door) to 3x 230 V!!! In the case of using a frequency converter supplied with a voltage of 3x 400 V, the output voltage from this converter is also 3x 400 V, which must correspond to the connection of the motor terminal board according to the motor label for 3x 400 V!!!
- If the frequency converter is not used, observe the minimum start-up times of the fan in a suitable way, e. g. with a soft starter, see following table. The type designation can be found on the impeller label inside the fan chamber.

Fan type	Minimum start-up time [s]
RH22C – RH35C	10
RH40C – RH63C	20
RH71C – RH11C	30

- If the fan motor is equipped with thermal contacts or PTC thermistors, connect them with a suitable system to block the fan operation if these protections are actuated. You can use a frequency converter or a master I&C system to evaluate them.
- Failure to observe these parameters may result in irreversible damage to the motors. In the event of a complaint about such an engine, its legitimacy cannot be taken into account.

6.4 OPERATION OF ZTZ ROTATION EXCHANGER

When operating a ZTZ rotation exchanger with a frequency converter, the output frequency from the converter must not exceed the data on the ZTZ rotation exchanger label.

Connection of rotation recuperator motor see par. 6.4.

Following must be checked during commissioning:

- Tightening of belt
- Free rotation of rotor
- Correct setting of the rotor sealing elements – brushes, felt
- Correct direction of rotor rotation
- Current consumption – shall not exceed value stated on the electric motor nameplate

6.5 BEFORE COMMISSIONING

Perform the electric revision inspections before commissioning.

6.6 TRIAL OPERATION

After fulfilling these prerequisites, you can put the unit into trial operation.

6.7 SETTING OF AIR POWER AND EQUIPMENT TEST

In trial operation, perform the correct setting of distribution elements on the pipeline route and comprehensive equipment tests according to the project documentation, including measuring the performance of the unit and verifying the function of the I&C system. A written document must be issued on the test result.

6.8 TRAINING OF USERS

The professional company putting the unit into operation, or into trial operation, is obliged to train the operator, about which a written document must be made. Without such a document, the warranty will not be valid and the device must not be put into permanent operation.



NOTICE

For the first start of the air handling unit, the company ELEKTRODESIGN ventilatory, s.r.o. offers the STARTPACK assistance service package. Find out about the conditions and scope of the STARTPACK package at www.elektrodesign.cz.

7. OPERATION, CONTROL AND MAINTENANCE

For safe operation, operation and maintenance of the air conditioner, we recommend elaborating local operating regulations according to the scope and equipment of the air conditioner and local conditions, including equipping individual units with safety signs or messages. The local operating regulations must contain, inter alia, the provisions of this article.



NOTICE

If you are performing any work that opens the unit, you must disconnect the unit from the power supply and take measures to prevent it from being switched on unintentionally during work.



CAUTION!

It is forbidden to operate the unit when the door or service openings are open.

7.1 CHECK OF UNIT FUNCTION IN OPERATION

During operation, the operator checks the function and operation of all parts of the units, the tightness of the door and mounting joints, removable panels, the temperature of the media and the transported air, the clogging of the by means of sensors.

7.2 INSPECTION OF OPERATION SYSTEMS (CH, I&C)

At the same time, check the status and function of the operating files to which the unit is connected and to which its correct function is related, but which are not part of the unit..Acc. to the unit type, they are mainly as follows:

- Electric installations
- I&C system
- CH system
- Cooling system
- Sanitary (health care) installations – condensate drain

7.3 INSPECTION FREQUENCY

Depending on the operating conditions, determine the period between thorough inspections, but no longer than once in three months.

7.4 ACTIVITIES IN THE OPERATION AND MAINTENANCE OF INDIVIDUAL CHAMBERS

For all chambers, the operator checks for contamination.

FAN CHAMBER

Check the cleanliness of the impeller, clean it if necessary. If dirt causes impeller unbalance and excessive vibration, contact the manufacturer.

Motor bearings for lower outputs are permanently filled with lubricant and do not require re-lubrication. They are filled with a lithium-type grease and their theoretical service life is 20,000 hours.

Motor bearings for higher power are fitted with lubrication nipple and must be lubricated with lithium grease.

Motor axis height [mm]	Grease quantity [g]	2pole motor [h]	4pole motor [h]	6pole motor [h]	8pole motor [h]
160	25	3800	9300	12400	15200
200	25	3800	9300	12400	15200
225	30	3100	8900	12200	14800
280	40	800	3900	5600	6700
315	50	800	2300	4100	5100

Specified lubricant replenishment intervals (hours) for engines equipped with lubricators, at air temperatures up to 40 °C.

FLAPS AND FLAP MOTORS

- Check the flap movability
- Check correct closing of the flaps

FILTERING CHAMBERS

Check for clogging regularly and frequently. The inspection interval is determined on the basis of a test run.

If the filters are clogged, replace the filter cartridges according to the type of filter (front filters, pocket filters).

Grease traps: regeneration with degreasers.

Activated carbon filters: replace cartridges or filling only. Dispose of all used filtration materials in an environmentally friendly manner.

DAMPING CHAMBER

If the chamber becomes dirty, clean it by vacuuming.

HEATING AND COOLING CHAMBERS

Before the start and during the winter season, ensure antifreeze protection of the exchangers, for heaters check the functionality of the I&C system, for coolers by draining water or filling with antifreeze mixture.

If the heat exchanger is drained for the winter, remove the water completely from it, e.g. by blowing with compressed air. When draining the heat exchanger, the water temperature must be below 60 °C.

Some chambers are equipped with heat exchangers with secondary drain valves. These valves are located inside the chamber on the exchanger and access to them is provided by mounting panels at the bottom and lid. The panels are marked with a sticker with a valve symbol and must be freely accessible so that the operator has sufficient space to vent and drain the water or antifreeze mixture.

If the chamber becomes dirty, clean the heat exchanger surfaces with compressed air, steam or a hot water cleaner with a nozzle. Carry out cleaning with care to avoid mechanical damage to the slats.

The steam supply and condensate drain pipes must be hung separately. It must not burden the connecting pipe of the heat exchanger with its weight and expansion forces. Avoid turning the heat exchanger connection during installation. Hold the connection against the tightening direction with a suitable tool. This prevents damage to the outlets in the exchanger manifold.

Ensure perfect condensate drainage, including the slope of the condensing pipe, so that the heat exchanger is free of condensate after shut-down.

It is strictly forbidden to drill any holes in the plastic insert in the overpressure chambers.

Ensure that the system is gradually started in such a way that pressure surges do not occur and that any remaining condensate is gradually expelled.

Clean the heat exchanger fins against the air flow by blowing with compressed air. The heated air supply and the steam supply to the heat exchanger must be closed.

CHAMBERS WITH CONDENSATE DRAIN

- Check the functionality of the condensate drain and siphon.
- Top up the siphon with water for the pressure cap to function properly.
- Before the start of the winter season, take measures against freezing of the water in the siphon.

ZZT PLATE CHAMBER

If the chamber becomes dirty, clean the heat exchanger surfaces with compressed air, steam or a hot water cleaner with a nozzle. Carry out cleaning with care to avoid mechanical damage to the slats.

ZZT ROTATION CHAMBER

- Check the rotor rotation.
- Check tightening of the drive belt.
- Change and top up the oil in the gearbox: the gearbox is filled with 0.08 l of PP 90H oil, change the oil after 4000 operating hours or after 2 years.
- If the chamber becomes dirty, clean the heat exchanger with compressed air or steam. Carry out cleaning with care to avoid mechanical damage to the slats.

ZZT CHAMBER, GLYCOL CIRCUIT

Before the start of the winter season, check the fluid circuit, in particular for leaks, pump functionality and antifreeze filling.

WATER HUMIDIFICATION CHAMBER (AIR WASHER)

In accordance with these operating and maintenance instructions, observe the following basic points for the trouble-free operation of the air washer:

- Check the suction strainer, remove foreign bodies from the washing machine tub and fill with water to a height of approx. 10–20 mm below the overflow neck. Use both filling via a float and filling with rinsing nozzles.



CAUTION!

When the water level reaches the float, close the rinsing nozzles.

- Filling is terminated automatically via the float valve.
- Check the setting of the float valve at the specified operating pressure of fresh water max. 2.5 bar. The float valve is set correctly when the water level is between min. 1 cm above the minimum level sensor and max. 1 cm below the lower overflow edge.
- It is normal for the droplet separator to initially show a breakthrough because the profiles are not yet moistened. This phenomenon disappears over time (switch off the appliance repeatedly and let the water dry).
- Check the direction of rotation of the pump and the pressure (2.5-3 bar) at the nozzle inlet only when the washing machine tub is full and after commissioning with the specified amount of air.
- Check all cables, screw connections and nozzle attachments for leaks.

PUMP OPERATION AND MAINTENANCE MANUAL

The following are the most important points for proper pump operation.

Follow the special operating and maintenance instructions issued by the pump manufacturer.

- Never start the pump in dry condition.
- Switch on the pump at 2-day intervals, otherwise it will freeze over time (it does not apply to stainless steel block pumps).
- Foreign substances must not enter the pump.
- Maximum frequency of switching per hour:
 20 for power up to 5.5 kW
 15 for power up to 15 kW
 12 for higher power
- Supply voltage according to pump nameplate: +6 % / -10 %.
- Maximum fluctuations in the supply voltage compared to the value on the type plate: ±5 %.
- The motor is suitable for work in an environment according to ČSN EN 60 034-1.
- Max. relative humidity 95 %. Protection level IP55.
- The operation frequency of the pump shall not be lower than 25 Hz.
- The electrical connection and the appropriate protection must be made in accordance with the applicable regulations.
- The pump is secured against idling by monitoring min. level in the washing machine bath.
- Set the HRH-2 level switch to:
 - DOWN function option
 - Setting of outlet delay to 10 s
 - Setting of probe sensitivity to middle value (acc. to water used)

Any manipulation with the settings during operation is prohibited.

OPERATION AND MAINTENANCE

- The water washer chamber is almost maintenance-free.
- Set regular intervals for cleaning the air washers according to the degree of soiling. Do not use foam cleaners.
- The most suitable for cleaning is the use of a pressurized water cleaner with disinfectant dosing.
- Do not use a humidifier when filling or draining the bath.
- If the operation is interrupted for a longer period of time, drain the water from the washing machine and remove the washing machine before refilling.
- Damage to the equipment due to insufficient cleaning or circulating water of illegal parameters is not the subject of a complaint and warranty.
- Regularly exchange the water in the washer. The frequency depends on the soiling level. Optimum: once a week.
- Inspect the droplet separators, nozzles and rectifiers for deposits and clean if necessary..
- To disinfect the washer chamber, we recommend using SAVO for drinking water in the concentration according to the manufacturer's instructions.
- Use the following procedure to refill quickly:
 Open the clean water supply valve and at the same time the bath washing nozzles. After reaching a water height > 1 cm above the lowest level sensor, close the valve of the bath wash nozzles.
- The maximum level is further ensured by the float valve.
- Create an „Operation log“ for maintenance.

Property			Ventilation device for:		
			Normal ventilation demands	Data processing sections	Sterile and clean areas
Appearance			clear, no colour and deposits		
pH value			7 – 8.5		
Total content of salts	G S G	g/m ³	< 800	< 250	< 100
Conductivity		mS/m	< 100	< 30	< 12
Calcium	Ca**	mol/m ³	> 0.5		
Carbonate hardness	KH	mol/m ³	< 0.7		
Sterilisation at hardness test	KH	mol/m ³	< 3.5		
Chloride	Cl-	mol/m ³	< 5		
Sulphate	SO ₄ -	mol/m ³	< 3		
KMnO ₄ consumption		g/m ³	< 50	< 20	< 10
No. of seeds		ml ⁻¹	< 1000	< 100	< 10

**NOTICE**

Even short-term exceeding of the stated limit values leads to breakdown of the droplet separators and to dangerous deposition of salts in the connected devices.

1. Sterilization with organic phosphate plus dispersant, depending on the sterilizing effect, higher concentrations are possible.
2. A prerequisite for a low germ content is a dark (opaque) air washer.
3. When humidifying at more than 95 % relative humidity, limit the conductivity to 800 µS/cm. (Otherwise, the droplet separator will break.)
4. Material in contact with water: plastic and steel CrNiMo.
5. In a specific case, eg additional feed water permeate RO, it is possible to allow higher limit values, e.g. 200 µS/cm (then there is a higher dust load of the filter).

When aluminium is used and the SiO₂ concentration is increased to more than 10 to 20 g/m², hard coatings are formed. Observe the limit values for waste water discharge and environmental protection.

When checking, measure all values. These must be below the recommended limits.

The above parameters are usually met by drinking water from the public water supply system.

7.5 ACTIONS TO BE UNCONDITIONALLY AND PROVABLY ENSURED

- Check of the function of frost protection of heaters in the I&C system before and during the winter period.
- Cooler anti-freeze protection.
- Relubrication of bearings equipped with lubrication nipple, oil change (addition) in the gearbox of the ZZT rotation chamber.
- If the filtration chamber is equipped with a device for sensing the pressure difference on the filtration insert, it is necessary to check the correct setting of this device according to the manufacturer's documentation. If the nominal air flow flows through the filter insert and the initial pressure drop of the clean filter insert [Pa] and its clogging reserve [Pa] reaches the value according to the manufacturer's documentation, this filter insert can be considered clogged and must be replaced. The clogging status must be signalled by various signals to the operator. In I&C systems, the signalling of this condition is various ways of visual signalling by means of mechanical and / or liquid manometers, etc.

8. DISASSEMBLY AND DISPOSAL

At the end of its service life, the unit must be disassembled and disposed of. The device may only be dismantled by a specialist company.

8.1 DISASSEMBLY PROCEDURE

First, disconnect the unit from the power supply to prevent electric shock.

Disconnect the unit from the hot water supply, ventilation pipes and pool water heat outlet (if fitted) and drain the refrigerant from the heat pump circuit.

Be careful not to leak operating fluids (refrigerant, oil, glycol / water mixture).

Disassemble the unit into individual components.

When disassembling, pay attention to work safety.

Tools needed to disassemble the unit:

- Flat and cross screwdriver
- Set of open-side wrenches
- Set of IMBUS wrenches
- Hacksaw
- Driller + set of drills

8.2 RECYCLING

It is necessary to ensure safe and environmentally friendly disposal of operating and auxiliary substances, packaging materials and replacement parts. In doing so, local recycling options and regulations must be used and observed. For disposal, the parts of the unit must be separated as far as possible and sorted according to the type of material.

8.3 ENVIRONMENTAL DAMAGES

All parts and consumables (such as oil, coolant and water/glycol mixture) must be disposed of in an environmentally friendly manner in accordance with local laws and regulations.

9. SPARE PARTS

The spare parts are not delivered with the unit. If necessary, you can order the necessary spare parts from the manufacturer. Indicate the type and serial number of the unit, the year of manufacture and specify the necessary parts in the order.

10. DELIVERY SERVICE

You can contractually arrange delivery service directly from the manufacturer. The manufacturer may authorise trained service companies to perform the delivery service. Replacement of fi filter inserts, including ecological disposal and desorption, can be arranged directly from the manufacturer.

The manufacturer reserves the right to change the installation and operating instructions without prior notice.

In case of questions and ambiguities, please contact the service department of ELEKTRODESIGN ventilatory, s.r.o.

11. Digireg® DIGITAL CONTROL SYSTEM

The control system is located in a compact sheet steel switchboard equipped with a main switch, digital controller on the PCB board and safety and switching elements for individual HVAC units. The cables pass through plastic bushings with locking in the left side of the cabinet. Depending on the scope of delivery, the control system and its elements are either pre-assembled in the individual transport blocks of the unit or can be delivered separately on a pallet with the final connection realized within the authorized commissioning of STARTpack. The scope of delivery of the Digireg® I&C system must be consulted with the technical department of ELEKTRODESIGN ventilatory, s.r.o.



Basic dimensions of Digireg® M3-Vx switchboard with protection level IP20

The switchboard M3-E36 with protection level IP20 features dimensions of 660 x 280 x 120 mm.



The switchboard Digireg® (M3-Vx and M3-E36 / E72) with protection level IP65 features dimensions of 600 x 600 x 210 mm.

11.1 TEMPERATURE REGULATION

Digireg® controller is designed to control the output of the heater or cooler of the air handling unit to reach the desired temperature. Digireg® can command direct cooling or a heat pump. There is a 3-point output for servo drive of the mixing valve, direct power outputs SSR for electric heating or two analogue outputs 0–10 V / 0–20 mA. The heat pump or cooling unit is controlled by potential-free contacts.

- **Regulation to a constant supply air temperature**
Uses one temperature sensor in the supply pipe, the supply air is heated or cooled to the required set temperature within the minimum and maximum configured temperature.
- **Regulation to a constant temperature of the exhaust air**
Uses one temperature sensor in the exhaust pipe, the supplied air is heated or cooled to the required set temperature within the minimum and maximum configured temperature.
- **Spatial temperature control (for constant room temperature)**
Cascade control is used with limitation of the minimum and maximum supply air temperature. The main sensor is placed in a ventilated area, the supply air sensor is placed in the outlet of the unit in a place with sufficient air mixing. If the room temperature is higher than the set value, the controller will try to reduce the supply air temperature to the set minimum supply air temperature. If the room temperature falls below the set value, the controller tries to compensate for this by increasing the supply air temperature. The room temperature can be selected as the room temperature, the temperature from the sensor in the controller, or from a separate sensor connected. The controller cools or heats according to the set parameters in the automatic summer/winter mode according to the outdoor temperature and time dependencies. Manual mode selection is also possible. The heater can be hot water, controlled by a three-point actuator, or electric, directly controlled by SSR, or external TRIAC switches 0-10 V. Electric heater controlled by internal SSR can have up to 72 kW depending on the cabinet, water heater is not limited mixing unit size). Cooling can be cold water, controlled by a 0-10 V analogue actuator or direct in conjunction with a condensing cooling unit.



CAUTION!

For units with a direct evaporator (marked DX and DXr in the unit code), it is possible to maintain the required air temperature in the room with accuracy, depending on the correctness of the project and the correct function and setting of the ventilation system with accuracy of ± 2 °C.

11.2 INSTALLATION

Controllers with IP20 protection are designed for installation in an indoor dry environment without aggressive chemicals in normal areas according to ČSN 33 2000-3, ambient temperature up to 30 °C. The short-circuit resistance of the Digireg® switchboard is 6 kA. The distribution board protection level is IP20 or IP65 and the material is specified below in the catalogue lists on www.elektrodesign.cz.



CAUTION!

Digireg® distribution boards are not designed for direct installation to the flammable material!



CAUTION!

For recuperation units delivered with free standing Digireg® control box, which is not fixed to the unit wall, it is necessary to provide firm housing of the cable harness between the unit and control box in the firm cable line (such as cable trays, cable bench etc.). The cable harness between the unit and the control box shall not be freely suspended or positioned on the floor!!! After firm laying of the harness it is possible to start the works on connection of individual wires to the Minireg® or Digireg® control box.

Cross-sections of power cables (fans, pumps, electric heaters...) must be designed according to specific installation conditions in accordance with ČSN 33 2000-5-52 ed.2.

The installation must be carried out by an authorized person working on electrical equipment in accordance with legal requirements and familiar with the function of the individual components of air conditioning and control. Observe the valid ČSN during installation. An initial revision inspection must be performed before commissioning.

For the assembly and installation of air conditioning, an authorized project of air conditioning and I&C is required, which solves both the air outputs and the piping system, as well as the electrical connection of elements and operating modes.

The actual commissioning and setting of the basic parameters of the controller must be performed by an authorized company with authorization and training from ELEKTRODESIGN ventilátory, s.r.o.

The cables must be secured outside the unit against being pulled out in the installed bushings.

The cable routes of safe and mains voltage must be separated due to electromagnetic compatibility requirements. It is necessary to build 2 cable routes at a distance of at least 20–30 cm from each other, if possible with a minimum of crossing. A grounded metal partition in the entire height of the metal grounded gutter is also permissible.

If the main supply has a conductor cross-section of less than 6 mm², we recommend connecting the controller to the earthing system with a copper conductor with a cross-section of at least 6 mm² due to the impedance of the earth conductor for high-frequency interference.

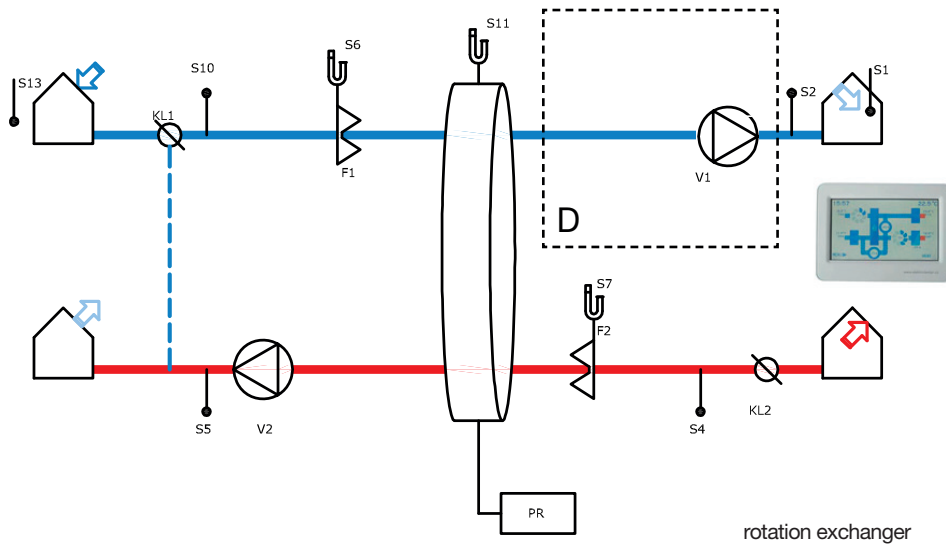
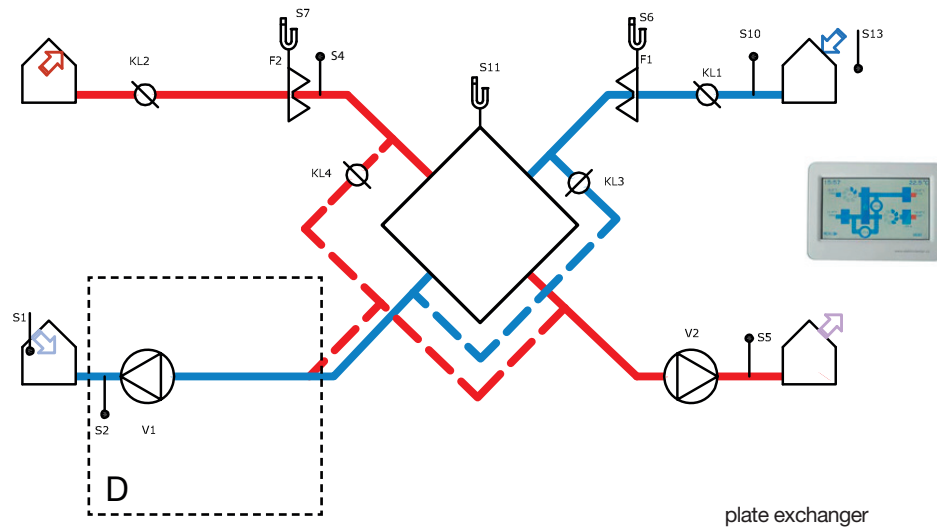
We recommend to treat whole power supply network with surge protectors.

It is necessary to check the function of all connected elements, especially emergency inputs, the direction of rotation of the fans, the correct phasing of the damper actuators and mixing valves. If the unit is equipped with Digireg® control system directly from the factory, a SETPACK test package has been performed on the unit. SETPACK covers basic settings of control system parameters and testing of all peripherals.

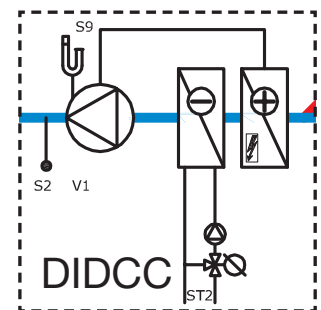
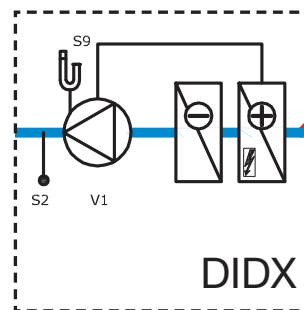
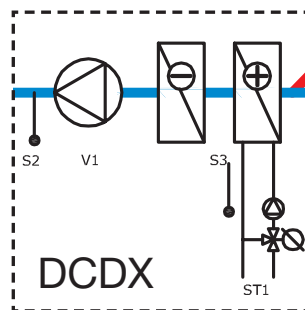
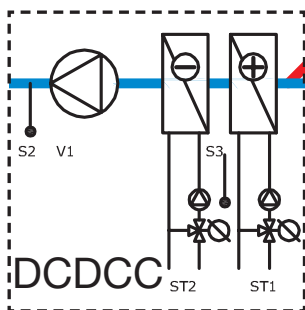
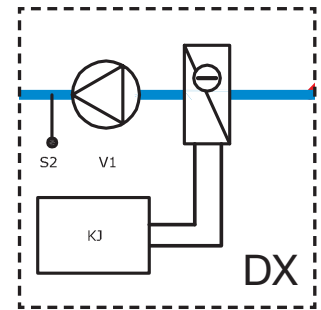
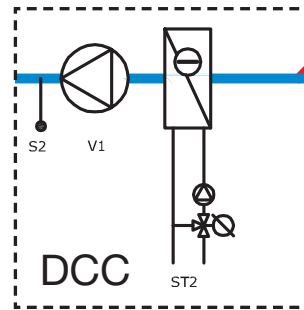
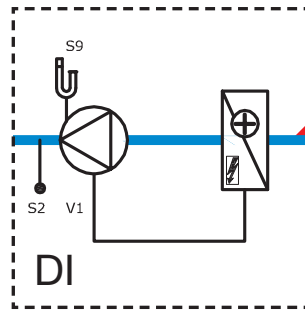
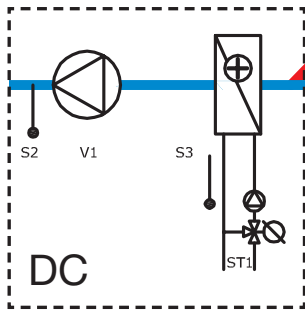
11.3 TECHNOLOGICAL SCHEME OF DIGIREG® I&C SYSTEMS

Key to following diagrams

S1	room temperature sensor	S2	supply air temperature sensor
S3	temperature sensor of frost protection of water heating	S4	discharge air temperature sensor
S5	waste air temperature sensor	S6	inlet filter pressure sensor
S7	drain filter pressure sensor (optional)	S9	inlet fan pressure sensor (mandatory – monitors the fan running)
S10	suction air temperature sensor	S11	recuperator icing sensor
S13	outdoor temperature sensor (enable condenser unit operation)	V1	supply fan
V2	exhaust fan	KL1	inlet flap actuator (circulation)
KL2	outlet flap actuator (can be coupled with KL1)	KL3	recuperator bypass actuator
KL4	integrated mixing flap actuator	ST1	heating water mixing valve actuator
ST2	cooling water mixing valve actuator	KJ	condensing unit
PR	control of the rotation exchanger drive		

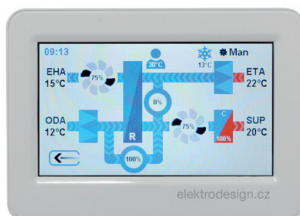


HVAC fiction variants exchanger

**11.4 CONTROL**

The controller is operated exclusively via the touch control. Service settings are performed by the appropriate service program, which is only available to trained and certified companies.

CP touch control for Digireg®:



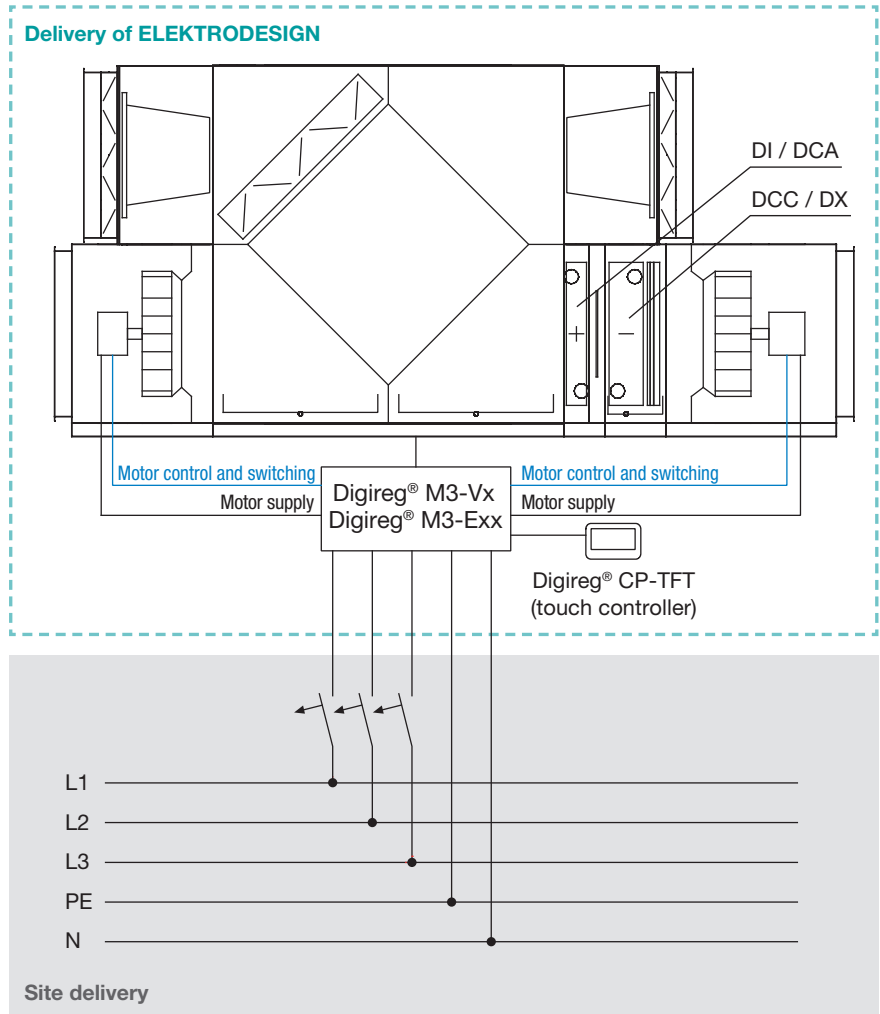
Detailed settings and control of the controller are in the manuals for individual control systems. The instructions are available at www.elektrodesign.cz.

11.5 DELIVERY SCOPE OF DIGIREG® I&C SYSTEM

Digireg control system is delivered complete with all sensors and actuators. The difference can be only in delivery of protection for the fan electric motors. Individual variants are given on the following diagrams.

I/C power supply logic schemes

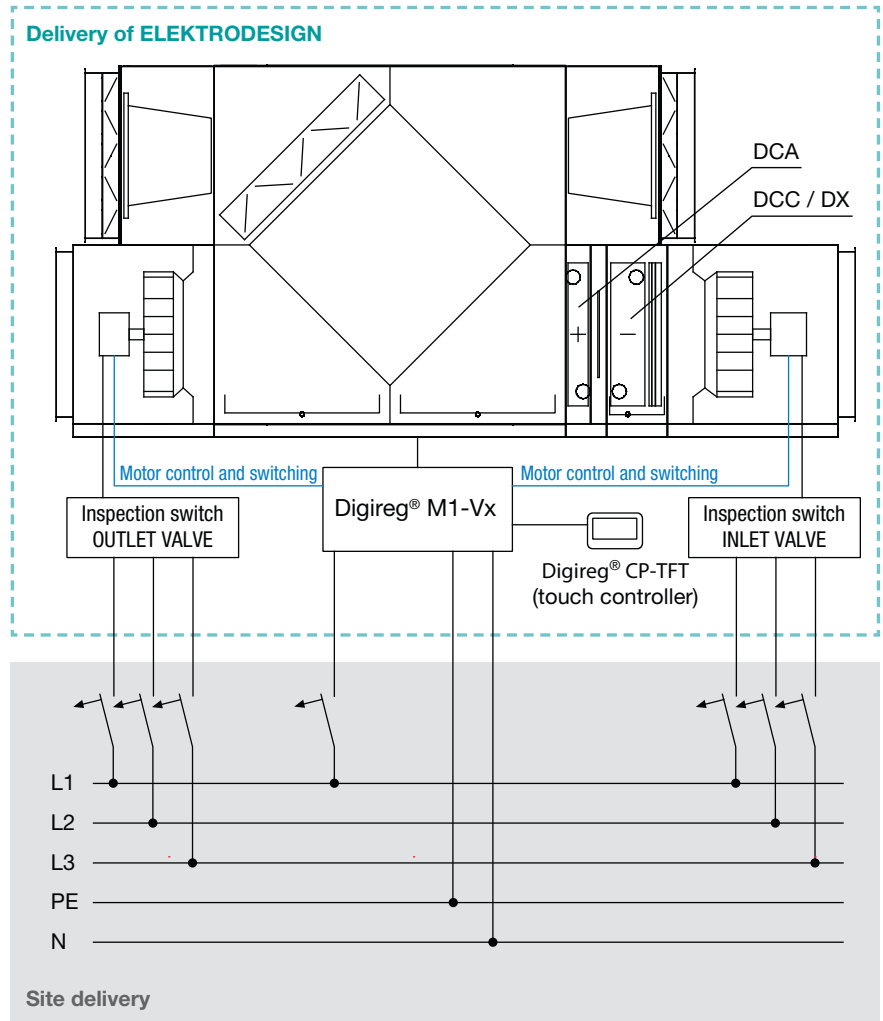
Variant for A/C units Modular XLH/XLHL
of motor max. power to 2 x 6 kW
(6 kW - unit inlet section,
6 kW - unit outlet section).
Max. power of electric heater in unit
72 kW (3 x 400 V / 50 Hz)



Note: Design of the main breaker and inlet cable to the Digireg® I/C system is part of electric project (the project is not within supply scope of ELEKTRODESIGN ventilatory s.r.o.). Information on total electric inlet power of A/C unit is part of the unit technical specification.

I/C power supply logic schemes

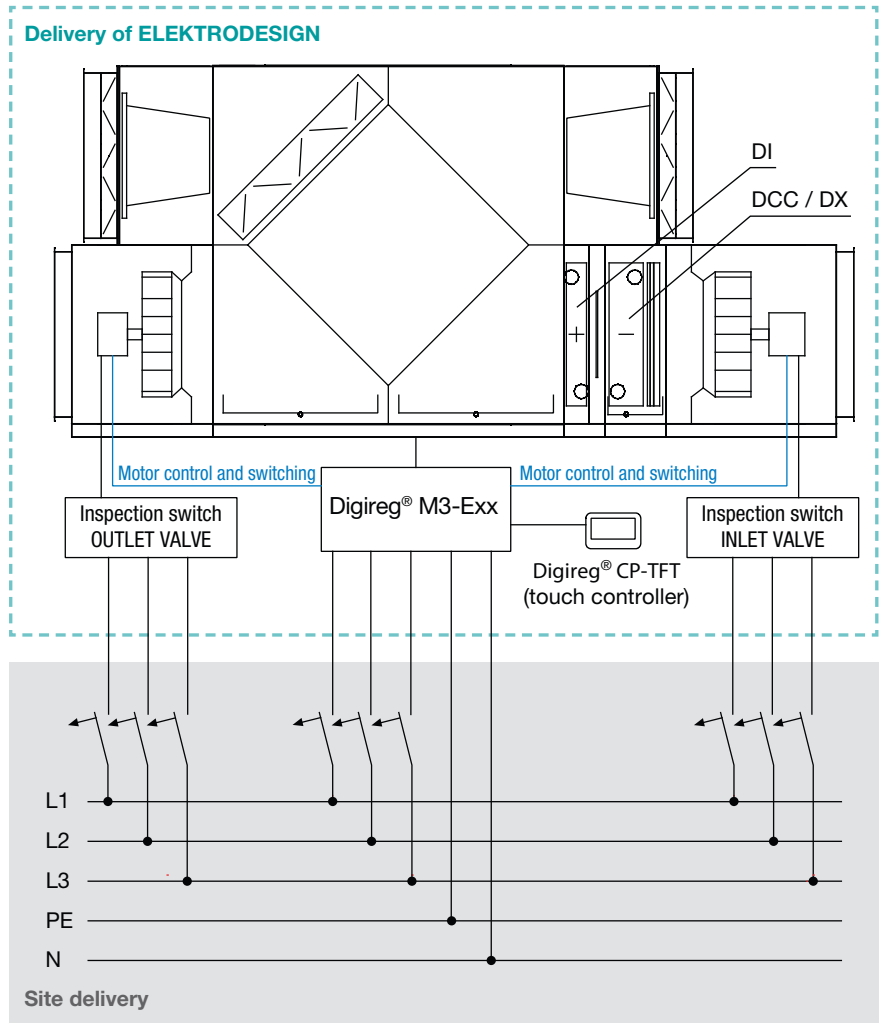
Variant for A/C units Modular XLH/XLHL with motor power above 2 x 6 kW (6 kW and more - unit inlet section, 6 kW and more - unit outlet section). The diagram applies only to water heating units (not electric heating).



Note: Design of the main breaker and inlet cable to the Digireg® I/C system is part of electric project (the project is not within supply scope of ELEKTRODESIGN ventilátory s.r.o.). Information on total electric inlet power of A/C unit is part of the unit technical specification.

I/C power supply logic schemes

Variant for A/C units Modular XLH/XLHL with motor power above 2 x 6 kW (6 kW and more - unit inlet section, 6 kW and more - unit outlet section). The diagram applies only for units with electric heating of max. power 72 kW.



Note: Design of the main breaker and inlet cable to the Digireg® I/C system is part of electric project (the project is not within supply scope of ELEKTRODESIGN ventilátory s.r.o.). Information on total electric inlet power of A/C unit is part of the unit technical specification.

ANNEX – REALISATION EXAMPLE OF TECHNICAL SPECIFICATION OF DUOVENT MODULAR XLH/XLHL
Technical specification: HRU398-20
Project data

Customer:			
Project name:	Testing actions		
Designer:	Alex Ventilios	Date:	2020/06/04
AHU select version:	6.8.V6 (1458)	Variant:	Variant 1

Certification according to EN 1896, issued by TÜV SÜD Czech s.r.o.

Mechanical strength:	D1 (mm/m)	4.00
Heat conductivity:	T3 (W/m ² K)	1.1
Thermal bridges:	TB2	0.66
Tightness (-400 Pa):	L1(R) (l/s.m ²)	0.04
Tightness (+400 Pa):	L1(R) (l/s.m ²)	0.04
Leakage between the filter and frame:		< 0.5 % (F9)

Unit overview

Position in project:	2.1	Dimensions (mm):	8505 x 2900 x 4730
Unit series:	TP12105	Contour dimensions (mm):	8765 x 2900 x 4730
Unit size:	DUO-MOD-XLHL63	Insulation vol. weight:	50 kg/m ³
Wall thickness:	50 mm	Input flow rate:	2.03 m/s
Housing variant (outer):	RAL 9002	Height of frame and legs:	130 mm
Housing variant (inner):	PZ	Weight:	6575 kg
Air flow – inlet:	45000 m ³ /h	Outlet flow rate:	45000 m ³ /h

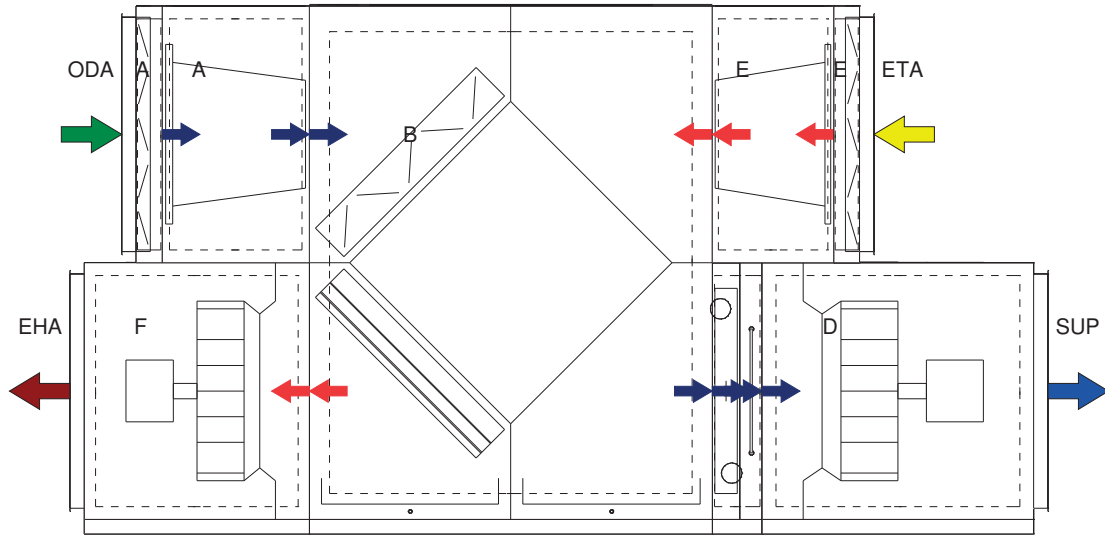
Parameters according to EU 1253/2014

Unit typology:	NRVU, BVU – Venting unit for other then residential buildings, double-direction venting unit		
Drive type:	Variable speed drive		
Type of heat recuperation:	Other (plate)	Thermal efficiency:	74 %
Max. internal leakage:	1 %		
Nominal flow:	12.50 m ³ /s	Mixing air share:	0.0 %
Effective input power:	32.331 kW	Design ambient temperature:	-15.0 °C
SFPint:	231 W (m ³ /s)	SFPint_limit:	830 W (m ³ /s)
Unit inner pressure loss:		Inlet:	138 Pa
Unit inner pressure loss:		Outlet:	89 Pa
External pressure loss:		Inlet:	400 Pa
External pressure loss:		Outlet:	400 Pa
Cabinet acoustic power level:		Inlet:	71 dB(A)
Cabinet acoustic power level:		Outlet:	71 dB(A)
Installation manual available:	www.elektrodesign.cz		

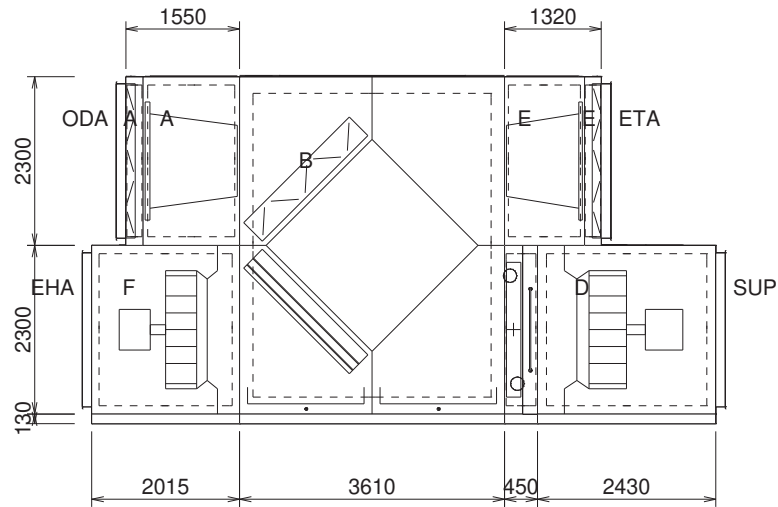
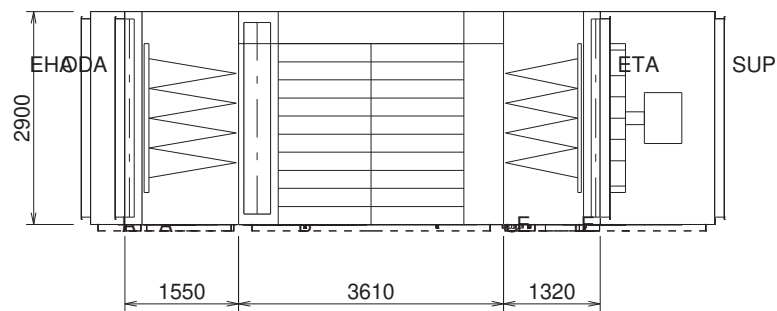
The unit is not designed for applications requiring compliance with EC directive no. 1253/2014.

Note: the unit is designed for outdoor variant and is fitted with a roof.

Operation side view:



H x W:, ODA = 2100 x 2700 mm, SUP = 2100 x 2700 mm, ETA = 2100 x 2700 mm, EHA = 2100 x 2700 mm
ODA - fresh air, SUP - supply air, ETA - exhaust air, EHA - waste air

Operation side view:**Top view:****Technical data – inlet part:****Blok A: L630-NVIM-FK6X****End panel**

with big hole	Flap:	1 Pa
Chamber weight:	63 kg	

Filter chamber

Pocket filter:	F7 ePM1 55 % 630	Design pressure loss:	87 Pa
Pressure reserve:	for filter clogging	27 Pa	
Initial pressure loss:		Filter: 60 Pa	
Recommended end pressure loss:		Filter: 160 Pa	
E. demand of filter acc. to EN779:2012:		F	
Filter composition:	12/592 x 592, 4/592 x 287, 3/287 x 592, 1/287 x 287		
Chamber weight:	321 kg		

Blok B: L630-DVBE
Heat recuperation chamber

Plate, cross exchanger		Bypass	0 Pa
Inlet:	45000 m ³ /h	Inlet: -15.0 °C, 99 %	Outlet: -15.0 °C, 99 %
Outlet:	45000 m ³ /h	Inlet: 24.0 °C, 50 %	Outlet: 24.0 °C, 50 %
Static efficiency:	0.0 %	Thermal gain:	0.0 kW
Efficiency acc. to EN13053	73.9 %	Dry thermal recuperation efficiency (without condensing in outlet part) in winter at the same weight flow (outlet mass flow is the same as the inlet one).	
Chamber weight:	2470 kg	Item:	1xMZS2380-2420-048
Accessories:	Condensate drain siphon		2 pcs

Block C : L630-OV3K
Heating chamber

Water:	three-row		49 Pa
Air:	45000 m ³ /h	Input: 2.4 °C	Outlet: 22.0 °C
Heating medium connection G	3"		Power: 295.5 kW
Medium: ethylene-glycol 21 %	80/60 °C	Medium flow: 13.369 m ³ /h	2.0 kPa
Chamber weight:	379 kg	Item:	MWOB6303

Block D : L630-MXXM
Fan chamber

with free impeller			1 Pa
Air:	45000 m ³ /h	External pressure loss	400 Pa
Fan: ER90C	Speed: 1267 rpm	Static efficiency: 40.83 %	Power: 14.56 kW
Dynamic pressure:	183 Pa	Static pressure:	538 Pa
Motor: AC – 2P200L6	Voltage: 400/690 V	Connection: D/Y	Current: 36.4 / 21.0 A
SFP: 1.318 kW (m ³ /s), SFP4	Speed: 980 rpm	Fan system input power:	18.5 kW
Fan operating point:	65 Hz (max. 66 Hz)	Protection: IP55	
Frequency converter:	3x400 V, 18.5 kW, IP20	Terminal covers:	18 – 22 kW
Chamber weight:	1500	Motor protection:	not fitted
The calculation covers the fan system effect.			
Regulation:	3PG switch, motor (to 40 A)	IP65	2 pcs

Acoustic power levels

Band	63	125	250	500	1000	2000	4000	8000	dB(A)
Cabinet acoustic power to environment	56.0	71.0	72.0	71.0	63.0	59.0	45.0	42.0	70.8
Acoustic pressure to inlet suction	61.0	79.0	81.0	80.0	78.0	81.0	69.0	59.0	84.9
Acoustic pressure to inlet discharge	66.0	87.0	92.0	97.0	95.0	99.0	90.0	84.0	102.5

Technical data – outlet part:
Block B: LV630-DVBE
Heat recuperation chamber

Plate	See inlet	0 Pa
Droplet eliminator		31 Pa

Block E: L630-NVIM-FK5X
End panel

with big hole	Flap	1 Pa
Chamber weight:	63 kg	

Filter chamber

Pocket filter	M5 ePM10 65 % 500	Design pressure loss:	56 Pa
Pressure reserve:	for filter clogging		27 Pa
Initial pressure loss:		Filter:	29 Pa
Recommended end pressure loss:		Filter:	86 Pa
E. demand of filter acc. to EN779:2012		F	
Filter composition:	12/592 x 592, 4/592 x 287, 3/287 x 592, 1/287 x 287		
Chamber weight:	321 kg		

Block F: L630-WXXM**Fan chamber**

with free impeller			1 Pa
Air:	45000 m ³ /h	External pressure loss	400 Pa
Fan: ER90C	Speed: 1267 rpm	Static efficiency: 40.83 %	Power: 14.00 kW
Dynamic pressure:	183 Pa	Static pressure:	489 Pa
Motor: AC – 2P200L6	Voltage: 400/690 V	Connection: D/Y	Current: 36.4 / 21.0 A
SFP: 1.318 kW (m³/s), SFP4	Speed: 980 rpm	Fan system input power:	18.5 kW
Fan operating point:	64 Hz (max. 66 Hz)	Protection: IP55	
Frequency converter:	3x400 V, 18.5 kW, IP20	Terminal covers:	18 – 22 kW
Chamber weight:	1500	Motor protection:	not fitted

The calculation covers the fan system effect.

Acoustic power levels

Band	63	125	250	500	1000	2000	4000	8000	dB(A)
Cabinet acoustic power to environment	56.0	71.0	72.0	71.0	63.0	59.0	45.0	43.0	70.6
Acoustic pressure to inlet suction	62.0	80.0	83.0	84.0	81.0	84.0	74.0	67.0	88.1
Acoustic pressure to inlet discharge	66.0	87.0	92.0	97.0	95.0	99.0	90.0	85.0	102.6

Components of Digireg® I&C control system (HRU398-20):

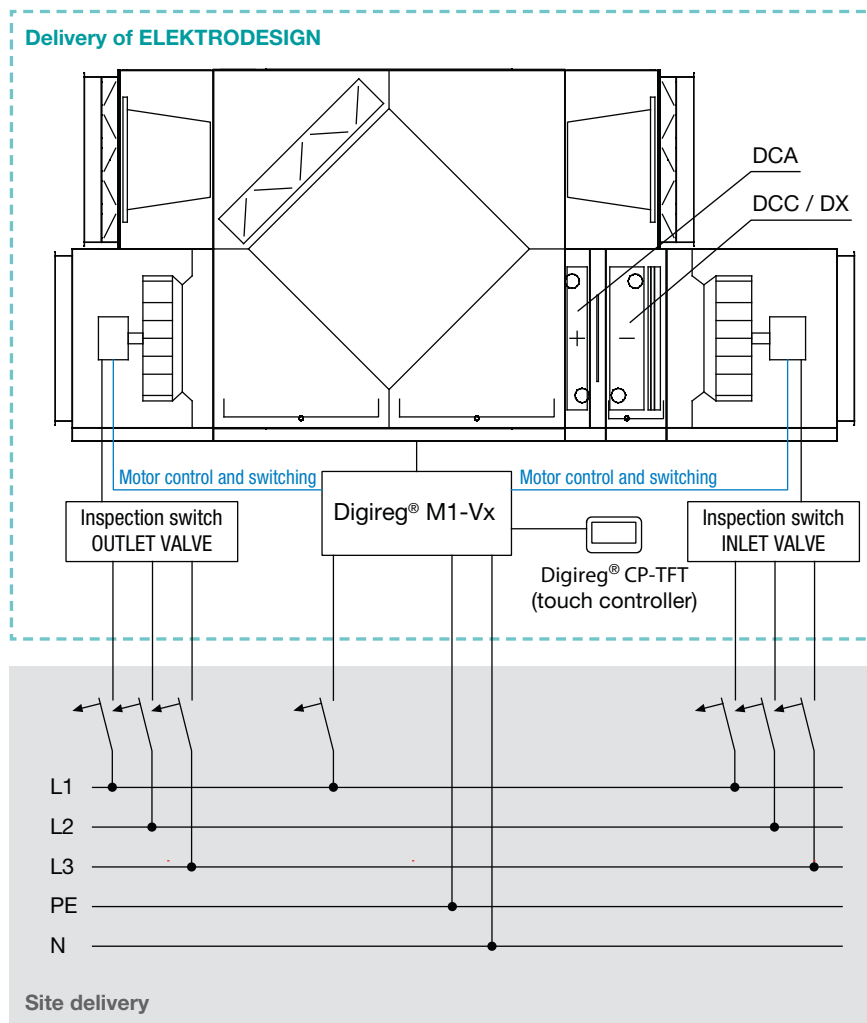
Item	Name	Unit	No. of units
1	Digireg M1-Vx Evo18	pc	1
2	CP control with graphic display and touch panel Evo 18 (Wifi)	pc	1
3	TGCU-MP-3 contact temperature probe	pc	1
4	TGCU-M-3 metal temperature probe	pc	4
5	TGCU-3 temperature probe for DigiReg, cable 3m	pc	1
6	Thermostat THE-F – capillary 6 m	pc	1
7	DTS PSA 30/500 pressure switch 30 – 500 Pa (filter ODA, EHA, antifreeze DV)	pc	4
8	Digireg – additional charge for IP65 (M1-Vx)	pc	1
9	SF24A Belimo actuator with emergency function 20 Nm (flap ODA/ETA)	pc	2
10	Electric installation material	kpl	1
11	I&C connection – production plant EDV Stará Boleslav	h	15
12	SM24A-SR (DV bypass actuator)	pc	1

Note:

1. The control system does not contain power supply of inlet and outlet motor. Unsecured supply to the inlet and outlet fan will be within the site delivery scope – see diagram below. The inlet power supply cables can be connected to the service switches of the inlet and outlet fan located at the operation side of the HVAC unit.
2. For the control box of Digireg® control system it is necessary to provide the power supply with corresponding securing. The inlet cable and main breaker of the control system are within the site delivery scope.
3. The delivery does not contain control nod for the water heater. Recommended power supply cable of the Digireg® M1-Vx I&C main switchboard is CYKY-J 3x4 and recommended breaker is 1P×16A.

I/C power supply logic schemes

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