LTR-3 eAir

Installation instructions for the ventilation unit

CONTENTS

READ FIRST

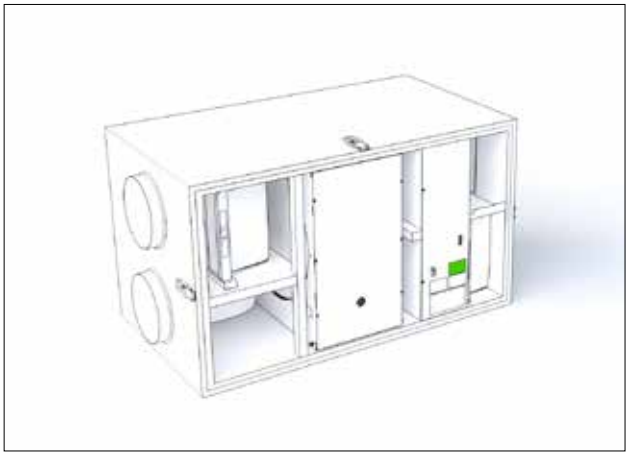
This instruction manual is intended for all the persons involved in the installation of the Enervent ventilation units. Only qualified professionals may install the equipment described in this manual in accordance with the instructions in this manual and the local laws and regulations. If the instructions provided in this manual are not followed, the warranty for the equipment becomes void and damages may be caused to persons or property.

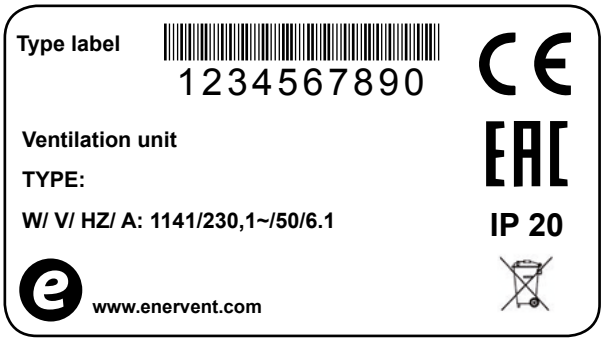
The equipment described in this manual may not be used by persons (including children) with reduced physical, sensory or mental capacity or without sufficient experience or knowledge, unless a person responsible for their safety is supervising and advising them in the use of the equipment.

FOR YOUR INFORMATION

If the delivery does not contain all of the components listed in the section 'Contents of the delivery', please check the order and contact your distributor or Enervent before commencing installation.

TYPE PLATE





If you need technical support, please check the equipment type and serial number from the type plate.

SAFETY

General information

DANGER

Always check that the supply voltage to the equipment is switched off before opening the service hatch.

WARNING

In case of a malfunction, always determine the reason for the malfunction before restarting the unit.

WARNING

When you have switched off the power to the unit, wait for two (2) minutes before starting the maintenance work. Even though the power is switched off, the fans continue running and the post-heating coil remains hot for a while.

Electrical safety

DANGER

Only an authorised electrician may open the electrical box.

DANGER

Follow the local regulations on electrical installations.

CAUTION

Check that the unit is completely isolated from the mains supply before conducting any voltage tests, insulation resistance measurements or other electrical work or measurements. Such work may damage the sensitive electrical equipment.

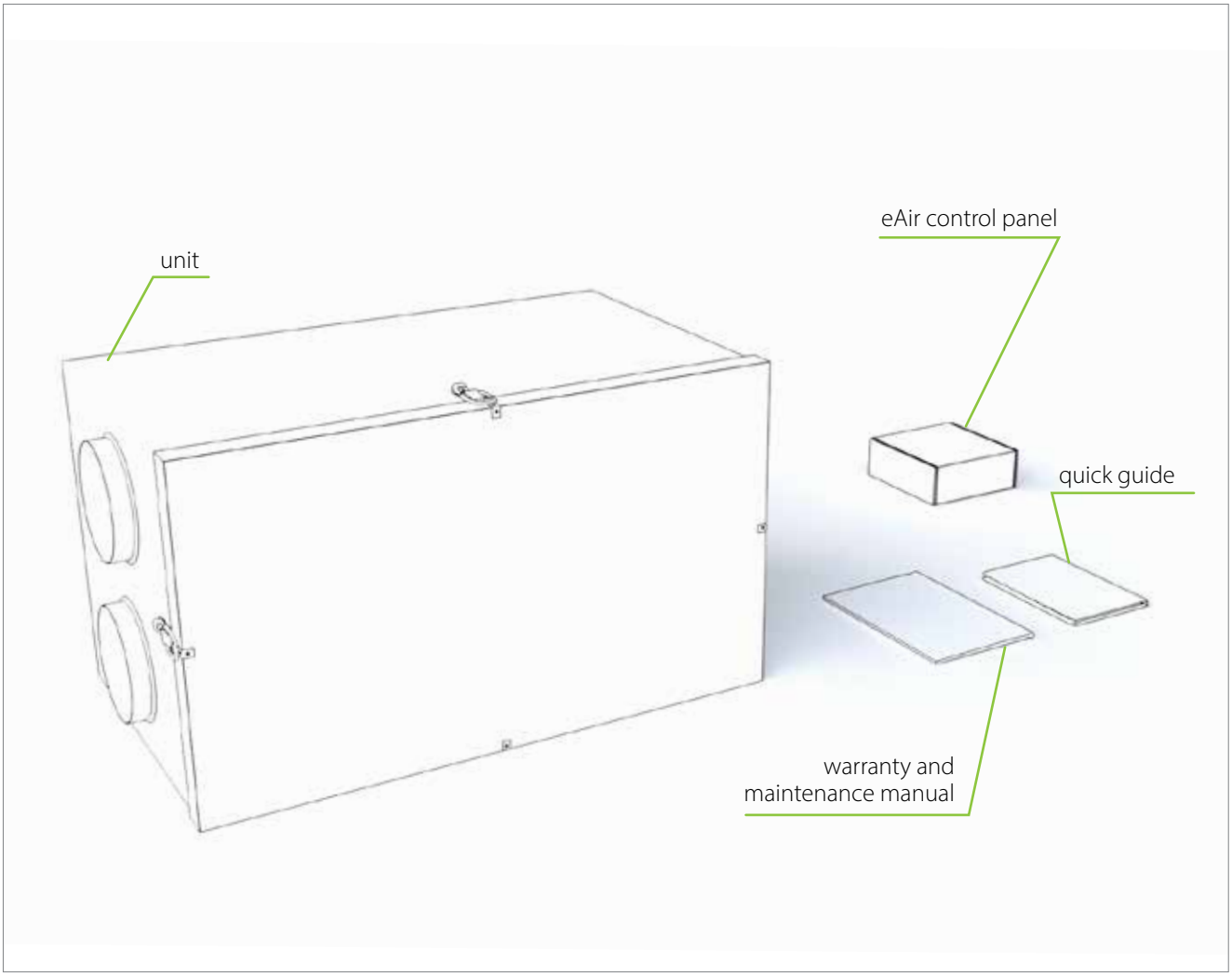
CAUTION

Control equipment used in the ventilation units may cause leakage current. This may affect the operation of the residual current protection.

CAUTION

All ventilation units containing a control system must be equipped with an overvoltage protector.

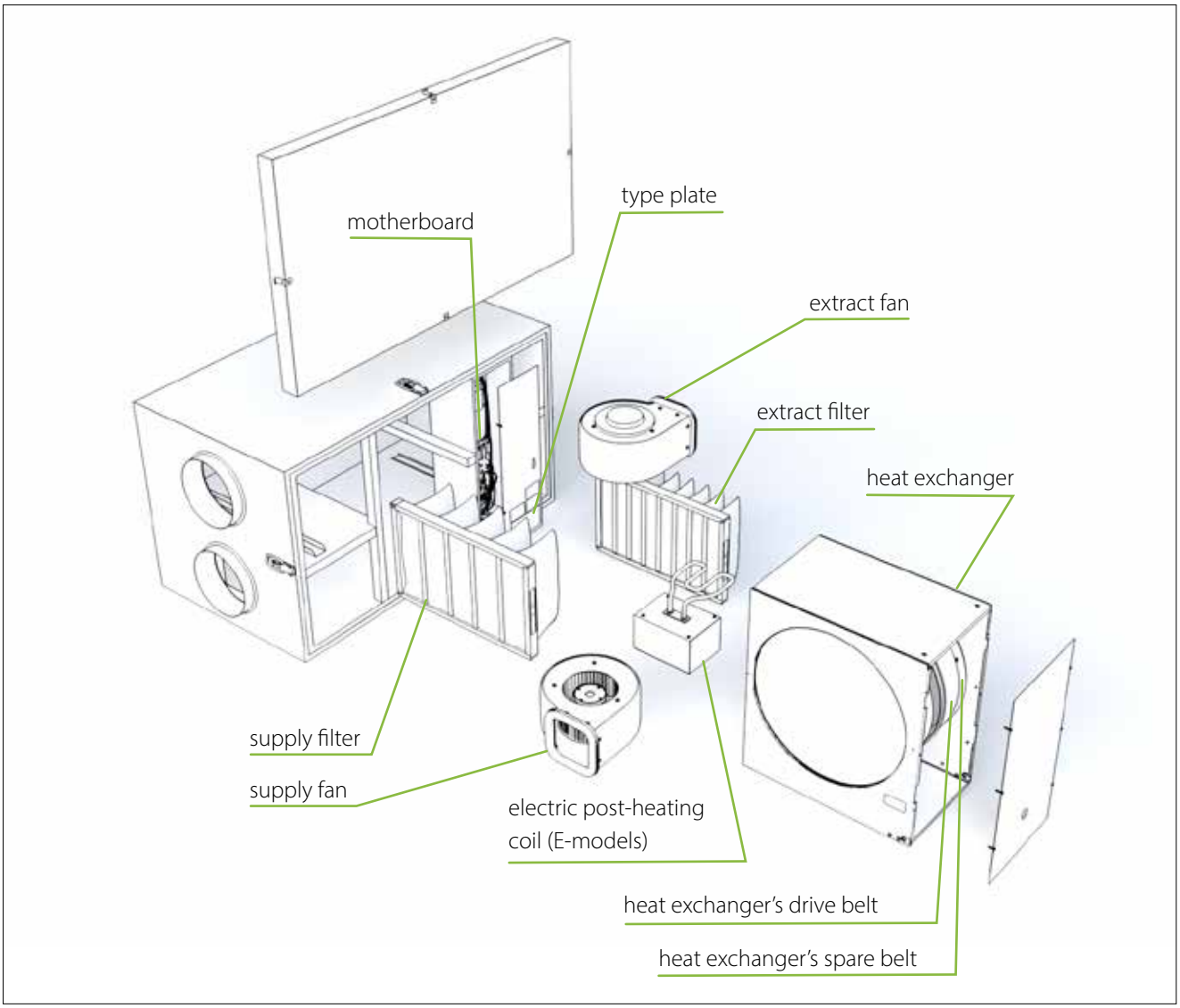
CONTENTS OF THE DELIVERY



Available accessories

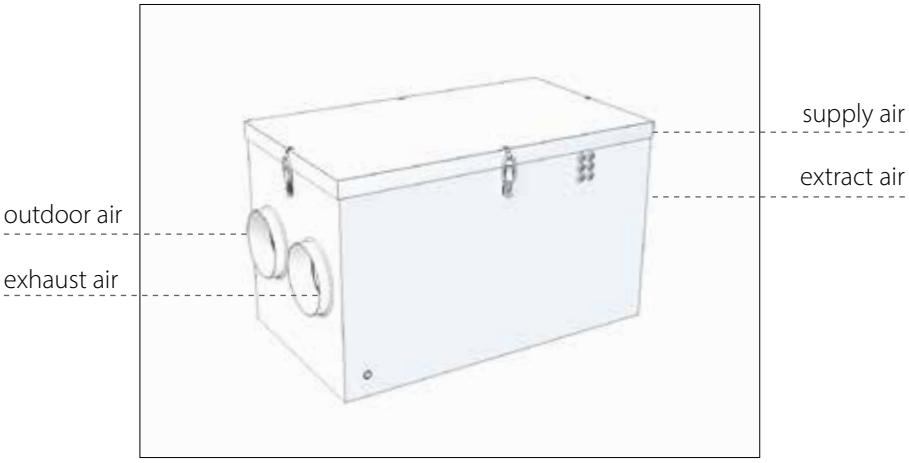
Product number	Product name
K580030015	eAir controller. The package contains a controller, surface mounting box and a 10-metre cable
K930030004	CO_2 carbon dioxide transmitter for the room 0–10 V/24 V
K930030006	%RH humidity transmitter 0–10 V/24 V
M230110002	Humidity transmitter duct mounted KLK100
K930030008	Overpressure push button 'fireplace switch'/boost
K930030029	KNX bus adapter

TECHNICAL SPECIFICATIONS OF THE UNIT



Width	470 mm
Depth	840 mm
Height	500 mm
Weight	52 kg
Duct connection (duct size)	Ø 160 mm
Fans	117 W, 1,05 A A exhaust 117 W, 1,05 A
Heat exchanger motor with thermal protection	5 W, 0.04 A
Power of electric post-heating coil in E-models	500 W / 230 V, 1~/50 Hz
Input power, E-model (post-heating coil)	1140 W / 230 V, 1~/50 Hz/5.3 A
Circuit breaker	B10 A
Mains supply	230 V, 1~/50 Hz/10 A

Duct connections



Choosing the installation location

- Ensure that the ventilation system has been designed and realised in accordance with the building regulations.
- We recommend that the unit be installed in the technical facility.
- Do not install the unit in a room where the temperature and humidity are high. Under certain conditions, condensation may occur on the outer surface of the unit.
- Take the noise level of the unit into account when choosing the installation location.
- Do not install the ventilation unit directly outside the bedroom, as the unit is never completely silent, although it is quiet.
- Install an insulation plate behind the ventilation unit, or try to prevent the sound from being conducted to the structure by other means. Using soft foam sheets is recommended (not included in the delivery).
- Ensure that connecting the condensation water discharge pipe and water trap is possible. Remember to take the space required by the condensation water connection into account.
- Install the unit in a warm room (over +5°C).
- Ensure that at least 500 mm of free space is left in front of the unit for maintenance purposes.

WOULD YOU LIKE TO KNOW MORE?

If you would like to know more about the construction of ventilation systems and the insulation of ventilation ducts, you can read about them on our website at **www.enervent.com**.

Building a ventilation ductwork

Planning a ventilation ductwork is a task for professionals. When building a ductwork, it is crucial to follow the plan exactly. Following the plan ensures operationality and customer satisfaction. The performance capacity of ventilation unit and its evaluated heating or cooling power can be calculated with the Enervent Energy Optimizer program on the Enervent website. We recommend reading the planning guide on the Enervent website for professionals.

- Type-approved, factory-made materials are used for building a ductwork.
- The intended valves must be suitable for mechanical ventilation.
- The outer louvre must not be covered with an anti-insect netting, as it will impede with maintenance.
- The access of rainwater and snow into outdoor and exhaust air ducts must be blocked.
- The ductwork must have enough inspection hatches through which the ducts can be cleaned.
- The locations of inspection hatches have to be marked on the roof framework, for example, so that they are easier to find.
- Each fire zone must have its own, separate ventilation system. Different fire zones are garage and living quarters, for example. These different fire zones cannot share a ventilation system.
- The kitchen must have a cooking hood with its own blower above the stove. The cooking hood must have its own exhaust duct that goes straight out of the house. Motor-less cooking hood can be connected to a ventilation unit only if the unit has a connection for a cooking hood.
- Cabinet dryers with their own blowers can be indirectly connected to the exhaust valve with the dryer's own connecting system. A portion of exhaust air is taken from the indoor spaces and a portion from the cabinet dryer. Exhaust air must flow through the valve at the rate of 12 liters per second.
- Dampeners are needed for supply and exhaust ducts, at the very least.
- Dampeners are measured on a case-by-case basis.
- Installing automatically closing air locks in outdoor and exhaust air ducts is recommended. In case of a blackout, the locks will close and prevent cold air from entering the duct, which in turn prevents the water coils from freezing. If cold air enters the ventilation ductwork, condensation water can form when cold air mixes with warm air.
- If the unit has a constant duct pressure control, the ducts must have differential pressure transmitters.

NOTE

Ventilation ducts must be closed until the ventilation system is commissioned, so that warm air does not flow into the ducts. Condensation water is formed when warm air mixes with cold outdoor air or the cold surface of the duct. Shutdown prevents dirt and particles from blocking the system.

Insulation of ventilation ducts

The ventilation ducts must be appropriately insulated. Insulation is especially important, if the unit has a cooling function.

Ventilation ducts must be insulated so that no water can condense on the outer or inner surface of the duct in any circumstance. Air must not cool or warm too much in the ductwork due to external factors. Ventilation designer will proportion the insulation on a case-by-case basis, depending on the duct placements and temperatures.

Ventilation duct insulation in heating	
Supply air duct from ventilation unit to inlet valve	Insulation must be planned and implemented so that changes in the temperature of airflow are 1°C at most.
Exhaust air duct from exhaust valve to ventilation unit	Insulation must be planned and implemented so that changes in the temperature of airflow are 1°C at most.

Insulation of ventilation ducts in cooling use	
Supply air duct from ventilation unit to inlet valve	Insulation must be planned and implemented so that changes in the temperature of airflow are 1°C at most. A cell rubber insulation with a thickness of at least 18 mm is needed for the surface of the duct, together with a sufficient additional insulation.
Exhaust air duct from exhaust valve to ventilation unit	Insulation must be planned and implemented so that changes in the temperature of airflow are 1°C at most.

Examples of ventilation duct insulation

Soundproofing is not included in these insulation instructions and examples.

NOTE

Half-warm space* can mean a lowered ceiling, midsole, or casing.

Outside air intake duct (fresh air intake duct)

Cold space:

- 100 mm plate, mat or pipe insulation (+ additional possible blowing wool).

Warm/semi-warm* space and suspended ceilings, intermediate floor and enclosures:

- Option 1: 80 mm insulation with steam-tight surface
- Option 2: 20 mm cellular rubber insulation on the surface of the duct and 50 mm insulation on the steam-tight surface.

Insulation must prevent the condensation of steam on the outer surface of the duct. In summer it must prevent the air from heating too much.

Supply air duct

Cold/semi-warm* space and lowered ceilings, intermediate floor and enclosures:

- In basic ventilation, the insulation must be planned and implemented so that changes in the temperature of airflow are less than 1°C. It is possible to use 100 mm plate, mat or pipe insulation, for example (as well as possible blowing wool).

Warm space:

- Basic ventilation does not require insulation.

For heating and cooling uses, cf. tables "Insulating ventilation ducts for heating" and "Insulating ventilation ducts for cooling".

Exhaust air duct

Warm space:

- Basic ventilation does not require insulation.

Cold/semi-warm* space:

- In basic ventilation, the insulation must be planned and implemented so that changes in the temperature of airflow are less than 1°C. It is possible to use 100 mm plate, mat or pipe insulation, for example (as well as possible blowing wool).

If used for heating or cooling, cf. tables "Insulating ventilation ducts for heating" and "Insulating ventilation ducts for cooling".

Extract air duct

Cold space:

- 100 mm plate, mat or pipe insulation

Warm/semi-warm* space:

- Option 1: 80 mm insulation with steam-tight surface
- Option 2: 20 mm cellular rubber insulation on the surface of the duct and 50 mm insulation on the steam-tight surface.

Insulation must prevent the condensation of steam on the inner and outer surface.

NOTE

The duct coils to be installed in the ventilation system must be insulated in the same way as the ventilation ducts are. The ceiling mounting plate is an extra sold separately.

* semi-warm space = +5... +15°C

Electrical connection requirements and preparations

NOTE

The electrical installation of ventilation units has to be left to an authorized electrician.

Cf. the electric files at the end of this manual.

Preparing electrical work

Make sure before beginning the installation that:

- An appropriate main power connection is available for use for the ventilation unit.
- Over 30mA residual current protection is in use. Because of the residual current protection, no other electric devices can be plugged in the socket.
- The user has an internet connection, if they want to use the web interface of the eAir panel.
- The eAir panel wall mount is installed on wall mounting box. Keep the eAir panel wall mount always installed when you use the eAir panel. If you accidentally touch the circuit board behind the wall mount with your hand or with an object that can conduct electricity, the circuit board may be damaged.
- The unit is connected to the control panel with a cable. Cable must run in a protective pipe with a minimum diameter of 20 mm. The unit delivery includes a 10 m cable. A 30-meter cable is available as an extra. The cable connections are type RJ4P4C.

External sensors:

- Some ventilation unit models may require certain outer sensors to be installed.
- The sensor element of the temperature, humidity and CO2 sensors must be installed inside the duct. Most temperature sensors are delivered with a 5-meter long connection cable. Humidity and CO2 sensors must be wired locally.
- The location of the sensor is selected based on measurements. For more information, see the control graph at the end of this manual. The location has to be on the straight part of the duct, and the placement must be at least twice the diameter of the duct from the duct coils, turns, or joints.
- A hole must be drilled into the duct, for the sensor and the grommet.
- The sensors connected to the cable are pushed through a rubber grommet so that the sensor element is a few centimeters inside the duct. The rubber grommet must be airtight and tight enough so that the sensor cable cannot slide through on its own. It is recommended that the sensor is secured with a cable tie.
- Sensors with stiff pipe-like sensor elements are placed in the duct with an attachable, adjustable flange. The sensor element is pushed through the flange and locked in place with a suitable screw.
- Electrical connections are done based on the schematics at the end of this manual.

Preparing the eAir control panel wall mount

eAir control panel must be installed in the wall mount box. One ventilation unit can be controlled with two panels at most. Panels can be installed in different wall mounts or in the same mount. If the panels are installed in the same wall mount, the other one will need a separate micro USB charger (not part of the Ensto Enervent unit delivery).

Commissioning two control panels installed in their own wall mounts.

If the ventilation unit is controlled with two control panels mounted on different wall mounts, the panels must have different addresses. The address is selected from the control board behind the wall mount. One wall mount has address 1 and the other address 2. We recommend marking the address both on the wall mount and on the control panel so that the inhabitants will know which panel belongs to which wall mount.

Commissioning two control panels installed in the same wall mount

If the ventilation unit is controlled with two control panels installed in the same wall mount, the extra panel must be connected to the wall mount. Connecting is done by sliding the DIP slide switch two steps down and then up again. Check for more information from the electric file on page 206. Connection mode is active, when the yellow LED light of the control circuit begins to flash. The connecting mode stays active for 10 minutes. Put the eAir control pale in the wall mount for a moment, so that the panel can start. Panel shows that it is trying to connect

to the network. Press Re-connect the radio > Reset. The control panel connects itself to the wall mount.

Connecting the indoor temperature sensor to the wall mount (extra)

An indoor temperature sensor must be connected to the ventilation unit, if it is used for controlling indoor temperature. The indoor temperature sensor is connected to the control circuit behind the wall mount. If two wall mounts with an indoor temperature sensor are installed, sensor TE20 is connected to wall mount 1 and sensor TE21 to wall mount 2.

NOTE

Settings wizard needs to be run in only one of the panels. Switch the power on in the other panel once you have configured the settings. The panel retrieves the information from the motherboard.

The functions and extras listed in the following table can require external wiring or connecting to work.

	Location on MD controller card	Voltage/current	Cable example	External wiring of the ventilation unit
AI NTC				
Room temperature sensor TE20/ TE21	Connector in the circuit board of the eAir control panel wall mount	3.3 VDC	KLM 2X0.8	Yes
TE01 air temperature outside	X1	3.3 VDC	Quick connector cable 5 m, delivered with the unit	Yes, if pre-heater/ pre-cooler (CHG)
TE10 supply air temperature	X3	3.3 VDC	Quick connector cable 5 m, delivered with the unit	Yes, if duct heating/ cooling coil
TE62 liquid line of a supply air coil (MDX)	X5	3.3 VDC	Quick connector cable 5 m, delivered with the unit	Yes, if DX duct coil TE62 (MDX)
TE45 temperature of return water in heating coil	X12	3.3 VDC	Quick connector cable 5 m, delivered with the unit	Yes, if water heating coil in the duct
Digital outputs (DO)		Potential-free contact		
On/Off control of heating	DO2	Max. 250 VAC / 50 VDC 8 A / 2 A inductive load	MMJ 3x1.5	Yes, if water heating
On/off control of cooling / On/ off control of heating (MDX)	DO3	Max. 250 VAC / 50 VDC 8 A / 2 A inductive load	MMJ 3x1.5	Yes, except if HP and CO
On/Off control of air locks	DO5	Max. 250 VAC / 50 VDC 8 A / 2 A inductive load	MMJ 3x1.5	Yes
On/Off control of pre-heating / On/Off control of pre-cooling / On/Off control of water heating coil circulating pump (Aqua KIW)	DO6	Max. 250 VAC / 50 VDC 8 A / 2 A inductive load	MMJ 3x1.5	Yes, except if Twin Tropic or in-built pre-heating coil
Time-controlled relay / accumulator charge pump on/off control PU80 (Aqua) / exhaust air cooling on/off control (TCG)	DO7	Max. 250 VAC / 50 VDC 8 A / 2 A inductive load	MMJ 3x1.5	Yes
A/AB alarm output, closing	DO8	Max. 250 VAC / 50 VDC 8 A / 2 A inductive load	KLM 2x0.8	Yes
Analog inputs (AI)				
%RH1	AI1 (user-defined)	0–10 VDC	KLM 4x0.8	Yes
%RH2 / temperature of water heater TE80 (Aqua)	AI2 (user-defined)	0–10 VDC	KLM 4x0.8	Yes
Free / PDE10 supply air duct pressure	AI3 (user-defined)	0–10 VDC	KLM 4x0.8	Yes
Free / PDE30 exhaust air duct pressure	AI4 (user-defined)	0–10 VDC	KLM 4x0.8	Yes
CO2/1	AI5 (user-defined)	0–10 VDC	KLM 4x0.8	Yes
CO2/2	AI6 (user-defined)	0–10 VDC	KLM 4x0.8	Yes
RH10 supply air relative humidity sensor (Dehum/Twin Tropic/ TCG)	AI11 (program-defined)	0–10 VDC	KLM 4x0.8	Yes, if duct coil

	Location on MD controller card	Voltage/current	Cable example	External wiring of the ventilation unit
TE10 supply air temperature (Dehum/Twin Tropic/TCG)	AI12 (program-defined)	0–10 VDC	KLM 4x0.8	Yes, if duct coil
Free	AI13 (program-defined)	0–10 VDC	KLM 4x0.8	
Free	AI14 (program-defined)	0–10 VDC	KLM 4x0.8	
Free	AI15 (program-defined)	0–10 VDC	KLM 4x0.8	
Free	AI16 (program-defined)	0–10 VDC	KLM 4x0.8	
Analog outputs (AO)				
Cooling control voltage / additional post-heating control voltage (MDX-E/HP-E/HP-W)	AO3	0-10 VDC 10 mA	KLM 2x0.8	Yes, except if in-built coil
Heating control voltage / compressor power control voltage (MDX/HP)	AO5	0-10 VDC 10 mA	KLM 2x0.8	Yes, if MDX or water heating
Pre-heating control voltage / pre-cooling control voltage (CHG) / LTO n:o 2 control voltage (Twin Tropic)	AO6	0-10 VDC 10 mA	KLM 2x0.8	Yes, CHG
Exhaust air pre-heating control voltage (HP) / exhaust air drying control voltage (TCG) / LTO de-frosting control voltage (WGHR)	AO7	0-10 VDC 10 mA	KLM 2x0.8	Yes, if duct heating
Hot water production control voltage	AO8	0-10 VDC 10 mA	KLM 2x0.8	Yes
Digital inputs DI		Connected to a potential-free terminating connector		
Emergency stop	DI1 (fixed)	24 VDC	KLM 2x0.8	Yes
PDS10 supply air blower pressure switch / de-frosting indication (MDX/HP)	DI2 (user-defined)	24 VDC	KLM 2x0.8	Yes, MDX
Overtime (only in Office use)	DI3 (user-defined)	24 VDC	KLM 2x0.8	Yes
Manual boost	DI4 (user-defined)	24 VDC	KLM 2x0.8	Yes
Away mode	DI5 (user-defined)	24 VDC	KLM 2x0.8	Yes
Overpressure	DI6 (user-defined)	24 VDC	KLM 2x0.8	Yes
Central vacuum system indication	DI7 (user-defined)	24 VDC	KLM 2x0.8	Yes
Cooker hood indication	DI8 (user-defined)	24 VDC	KLM 2x0.8	Yes
Electrical post-heating alarm / compressor failure (MDX/HP)	DI10 (fixed)	24 VDC	KLM 2x0.8	Yes, if MDX
Other connections				
Control panel connections	X27, X28		10 m cable supplied with the unit	Yes
Modbus-RTU	X26		Instrument cable 2x2x0,5	Yes
Ethernet	X19		Cat5	Yes
O3 ozone sensor (ION)	ICEA2000A unit connector 11	0–10 VDC	KLM 4x0.8	Yes

NOTE

Before installing the ventilation unit, make sure that the unit or the ductwork do not have foreign objects.

- See the model-specific pictures of your unit at the end of this manual.
- Check the duct output order to avoid cross installations.
- Don't start the ventilation unit before the building is in use.
- If the ventilation unit is turned on too early, the system can intake building dust.
- The duct output of the ventilation unit are duct-sized. Use the duct part when connecting the ventilation unit to a duct.
- Remember to insulate the duct all the way to the ventilation unit box.

Necessary additional installation materials

Material	Intended use
Screws	Mounting the rear attachment list and ventilation unit on a wall (for suitable models). Choose the screws based on the wall material.
Sheet metal screws	Attaching the rear attachment bracket to the ventilation unit
Wall mounting box	eAir wall mounting rack
Cables	As defined in section ***Preparing electrical work***
Duct tape	Compacting
Acoustic panels (soft cellular plastic)	Preventing structure-borne sounds
Insulation material (cell plastic and/or wool, depending on the location of installation)	Insulation and soundproofing
Staples	Connecting ventilation ducts to the unit
Spirit level	Making sure the unit is set straight
Water pipe	Connecting duct coils and condensation water drainage
Hydraulic valve	Removal of condensation water
Duct connection reducing bushing	Fitting the ducts into the ventilation ducts NOTE: Always use reducing bushing when necessary.
Air locks	Keeping cold air outside
Dampers	Dampening possible noise
Suitable grommets for the sensors installed in the duct	Installing sensors in ducts.
Shut-off valves	Making unit maintenance possible
Water circulation balancing valves	Adjusting the water flow to correct level

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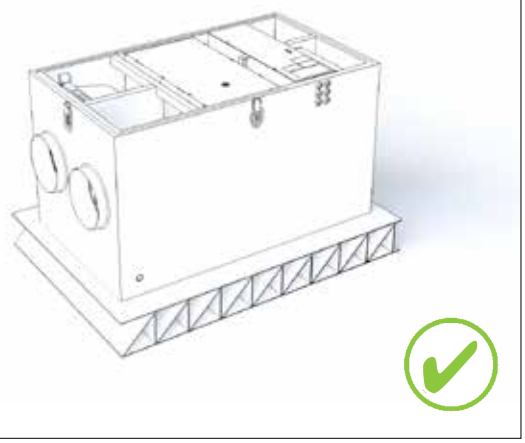

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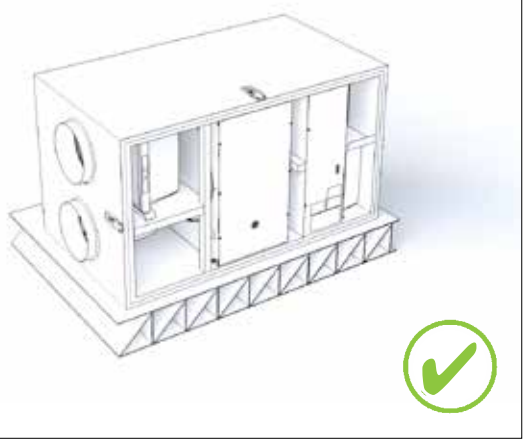

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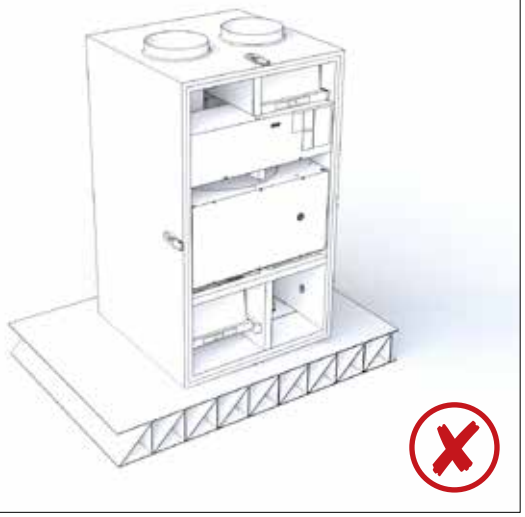

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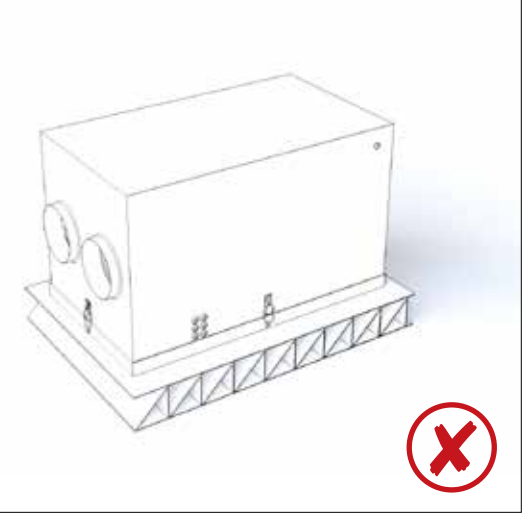


CAUTION

Check before the installation of the ventilation unit that there are no foreign objects in the ventilation unit or ductwork.

Note the space needed for disposal of condensate water and the water trap.

- Make sure that there is enough space left in front of or above the maintenance hatch: The space needed is at least 50 cm.
- Tilt the unit slightly in the direction of the condensation drain.

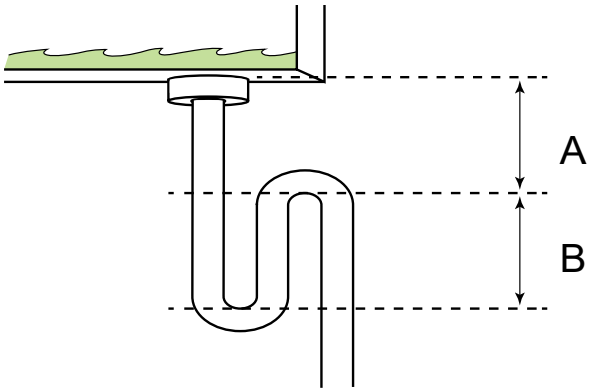
Draining condensate water

All Enervent ventilation units must be drained. When air cools down (condenses), condense water forms. For example in winter time when humid inside air meets cold heat recovery wheel, or when warm outside air meets the cooling coil in the ventilation unit (if applicable).

CAUTION

The condense water drain must not be directly connected to a sewer pipe.

- The condensate water should be led in a falling, at least Ø15 mm pipe, through a water trap to a floor drain or such.
- The pipe must at all times lie lower than the condensate water drip pan / condensate water connection of the ventilation unit.
- There must not be any longer horizontal sections on the pipe.
- The condensation drain pipe must be insulated if mounted in spaces where freezing can occur.
- Only one water lock is allowed for each condensate water drain.
- If the unit is equipped with more than one condense water drains, each one must have a water lock of its own.
- There is underpressure in the ventilation unit. We recommend a height difference of (A) 75 mm, or at least the underpressure divided with 10 in millimeters (i.e. 500 Pa under pressure -> 50 mm), between the unit drain and the water lock drain.
- We recommend that the height of backwater in the water lock (B) is 50 mm, or at least the underpressure divided with 20 in millimeters (i.e. 500 Pa under pressure -> 25 mm height of backwater). The above also applies to duct coils for cooling mounted in the outside air duct or extract air duct.
- There are over pressure inside duct coils mounted in the supply air duct. We recommend the height difference (A) between the duct coil drain and the water lock drain is 25 mm. The water lock height of backwater (B) must be 75 mm, or at least the over pressure divided with 10 in millimeters (i.e. 500 Pa under pressure -> 50 mm).
- The water lock must be filled with water before starting up the unit. The water lock might dry up if water is not accumulated in it. If this happens, air might get into the pipe and hinder water from entering the water lock, which might result in an irritating "bubbling" sound.
- The functionality of the water lock must be checked every year before the heating season and also in the spring if the ventilation unit is equipped with cooling.



Installing eAir control panel

The eAir control panel (cf. section "Control system and eAir control panel") is installed in a wall mounting box, or installed with a surface installation box (extra). Maximum two external control panels can be installed to a ventilation unit.

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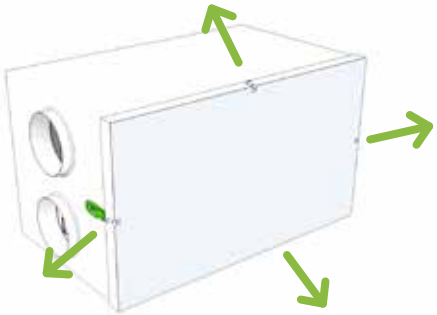

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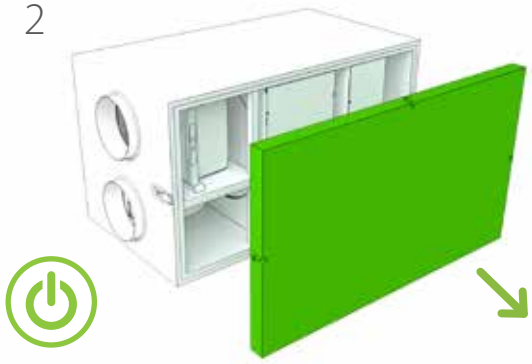

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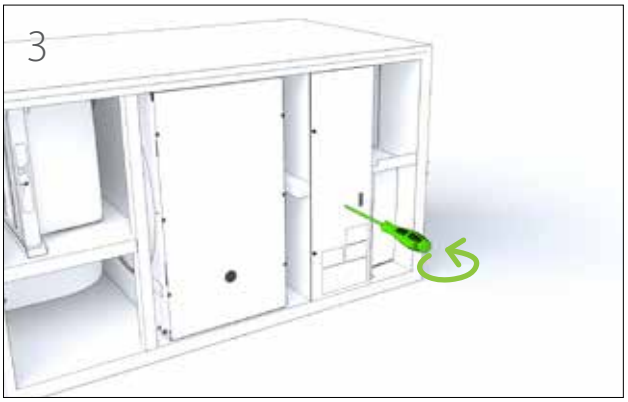

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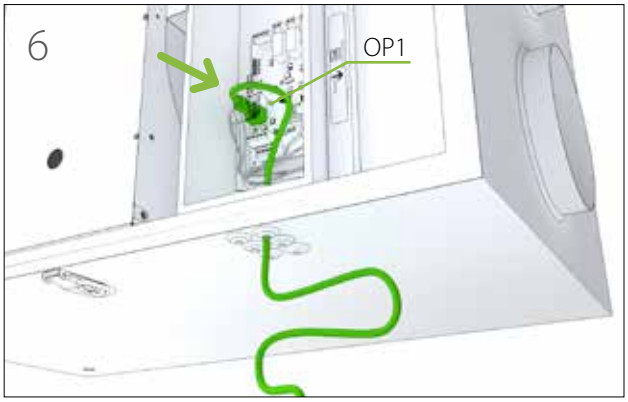

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10

11

12

Extra

13

14

15

1-2 min

Installation to a Modbus

The ventilation unit can be controlled via Modbus as well. There are two alternative Modbus connection methods available. By using the X26 connector of the Modbus RTU eAir motherboard. Or by using the Modbus TCP/IP (md-sw version 1.30 onwards) with a X19 connector. The connection method is selected in the settings wizard in the eAir control panel, on the Modbus tab (eAir control panel software version 2.07 onwards).

Modbus RTU default values

- Modbus address 1 (1–100)
- Communication form RS 485
- Speed 19,200 (9,600 or 115,200) bps
- Parity None (Even).

Modbus RTU X26 connection termination

RS485 X26 connector has options termination and biasing. These are selected in the short-circuit block JP5, which is right behind the X26 connection.

The below table shows the JP5 jumper. The bottom row is closest to the X26 RS485 connector.

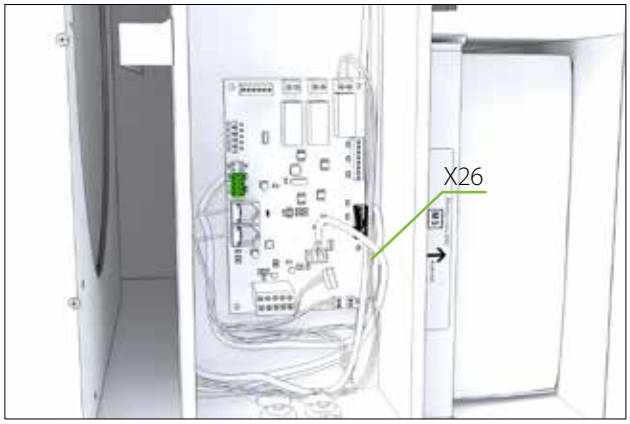
[o o]	Biasing: Jumper installed = RS485 B line earthed via the GND 600 Ω resistor.
[o o]	Termination: Jumper installed = bus terminated
[o o]	Biasing: Jumper installed = RS485 A line connected via the +5V 600 Ω pull-up resistor

Modbus TCP/IP usage

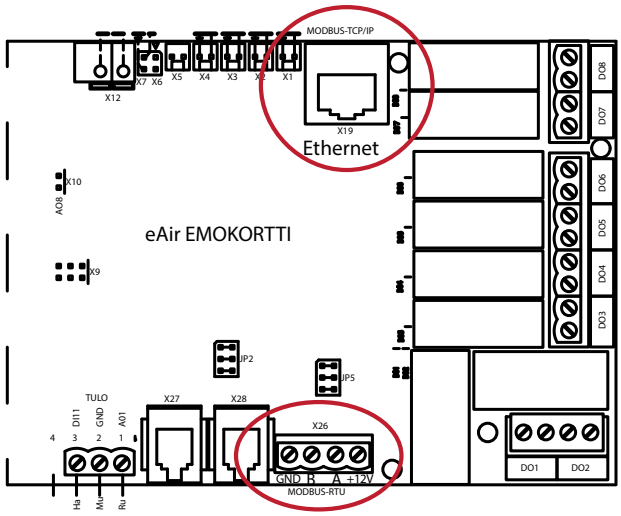
- Modbus address is not in Modbus TCP/IP use. Access to unit is via the unit IP address.
- Maximum two TCP/IP connections can be active at the same time.

NOTE

The Modbus TCP/IP connection method does not allow any kind of authentication or encryption. The unit must not be connected to a network that has open access to public internet. At the minimum, there must be a firewall that prevents external incoming network traffic.



In the picture below you can see the placements of the Modbus RTU and Ethernet / Modbus TCP/IP connections on the eAir motherboard.



Modbus registers can be found on the Enervent website at www.enervent.fi.

WARNING

Bus control must not be connected to the ventilation unit before the bus is configured and compatible with unit control parameters.

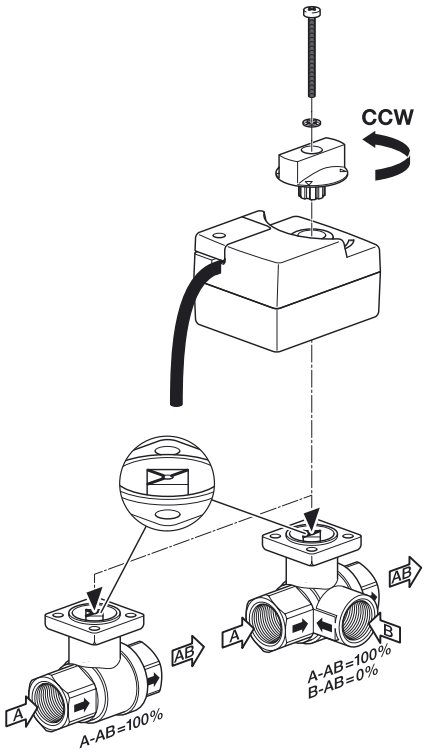
Installing model eAir W

Principal, control and wiring diagrams for each model can be found at the end of this manual.

Check the principal charts for units with fluid coil. Install and connect the water pipes according to these charts.

Installing:

1. Install the dampers and damper motors.
2. Install and connect the water pipes.
3. Install the valve and the valve actuator.



Valve and actuator open counter-clockwise and close clockwise. Picture shows valve and actuator in the fully open position. Also shown is the allowed direction of the liquid flow.

NOTE

Do not install the actuator so that the manual control knob faces downwards.

4. Connect the water.
   - Do not connect where the water circulation stops, eg when hot water is produced.
5. Check the water coil and its connections for leaks immediately after the system has been filled with water.
   - The water heating coil needs a steady flow of sufficiently warm water without large temperature fluctuations. Be sure to check and adjust the water flow in the heating coil according to the technical features table at the end of this manual.
   - Do not connect to a point where the water circulation ends for example during hot water production. If the water is taken for instance from a ground source heat pump, the heating coil needs its own circulation pump.
   - If the installation is done in wintertime it is recommended not to let water in the coil until the ventilation is running. This in order to prevent cold air from entering the ventilation system and possibly freezing the coil.
6. Connect the external cables such as the cable between the unit and the control panel holder, external sensor(s), actuator and pump.
   - Do not connect Modbus until all installation and commissioning work is done.
7. Install over voltage protection to the unit.
8. Open the unit's maintenance hatch and make sure that
   - the unit is clean from the inside
   - there are no unwanted objects inside
   - the filters are in place and
   - the condensate drain works.
9. Close the hatch carefully.
10. Connect the unit to an appropriate electric supply.

NOTE

The valve and actuator must be in the same position when connected. When the valve is in open position, the actuator is turned counter-clockwise before connecting, and when the valve is closed, the actuator is turned cw before connecting.

Installing duct coils

Check the principal diagrams at the end of this manual for correct mounting of duct coils.

Water duct coils for after heating are installed in the supply air duct (after the ventilation unit).

Duct coil for fluids

When installing a duct coil

- Place the duct coil in the supply air duct after the ventilation unit or in the outside air duct before the ventilation unit depending on its function.
- Make sure there is a filter before pre-heater coils in the outside air duct to prevent dirt from entering the coil.
- Do not install the coil too close to a fan outlet or a bend in the ducting.
  - This can result in lower efficiency.
  - Connect the coil so that the system is easy to empty for maintenance.
- A duct heater can be fitted in a horizontal or a vertical duct with optional direction of airflow. To facilitate venting of the coil, the unit should be fitted with the longitudinal tubes horizontal.
- A duct cooler must be fitted in a horizontal duct and the airflow must be in the direction of the arrow.
  - The cooler must be insulated externally to prevent the formation of condensation.
  - The cooler must be connected to a condensate drain and water trap and tilted at an angle of 10-15 degrees to the horizontal in the direction of the drain.
- Insert the coil into standard spiral ducting and attach it to the ducting with screws. Support the weight of the coil.
  - Connect the coil with clamping ring connectors.
- Connect the water inlet to the lowest pipe connector in order to facilitate venting of the coil.
- Consult the principal drawings at the end of the manual on how to construct the hydronic circulating system.
- Install a venting valve near the coil or at the highest point in the system.
- Check the duct coil and its connections for leaks immediately after the system has been filled with liquide.
- Place the supply air temperature sensor (TE10) in the duct after the coil, and the water coil return water sensor (TE45) on the return water pipe of the coil, if the coil is mounted in the supply air duct.
- Place the outside air temperature sensor (TE01) in the outside air duct before the coil, if the coil is mounted in the outside air duct.
- Connect the sensor to the ventilation unit control circuit board.
- Refer to the electrical schematics at the end of this manual for correct connections.

General instructions

NOTE

Do not shut down the ventilation unit. The ventilation unit must always be kept in operation at the power level set by the ventilation system designer.

- Ventilation must be sufficient.
- If ventilation is not sufficient, the indoor air humidity will rise, which can cause condensation on cold surfaces.
- The indoor air humidity levels must be checked at regular intervals.
- The recommended relative room air humidity is 40–45% at most (with room temperature at 20–22°C). By adhering to these values, the indoor air humidity remains at a healthy level and the risk of condensation lowers significantly. Humidity can be measured with a hygrometer. When air humidity rises over 45%, ventilation must be boosted. When air humidity drops under 40%, ventilation can usually be reduced.
- The cleanliness of filters must be checked regularly.
- In winter, the exhaust air filter collects dirt faster than the replacement air filter. This means that the replacement air flow is reduced, which can lead to a rise in indoor air humidity, which in turn weakens the efficiency of heat recovery.
- Check monthly that the heat exchanger is functioning correctly, i.e. rotating.
- If ventilation unit is not used for a long time, it can be shut down as long as the fresh air intake vent and exhaust air blowout vent are covered.
- This prevents humidity from condensing on the electric motors of blower, for example.
- In the autumn, before the beginning of heating period and before beginning cooling (if the unit has a cooling function), the condensation water sewage functionalities must be checked by pouring water in the condensation water sewer and making sure that the water drains away.

Using the eAir control panel

Ventilation is used primarily with modes. The modes in use can be seen in the control panel main screen. The user can choose the best mode for each situation: At home, Away, Boost, Overpressure, Silent, or Max. cooling / Max. heating. The Silent and Max. cooling / Max. heating modes must be activated separately from the Settings > Modes menu before they are shown in the Modes menu. The Modes menu can be accessed by tapping the round button in the middle of the control panel main screen.

Eco mode can be activated in all modes except in Max. cooling / Max. heating mode. Eco mode stops post-heating and active cooling, and maximizes the use of heat recovery. Heat recovery is 100% until outdoor temperature reaches the outdoor temperature limit of heating, or until supply air temperature reaches the supply air temperature maximum limit. If the supply air temperature drops below the minimum temperature, post-heating activates and keeps the supply air temperature at minimum level.

The circle around the operating mode button changes its color depending on what the ventilation unit is doing. The circle is green when heat recovery is active; orange and red when heating is active, and blue when cooling is active.

The other functions of the ventilation unit can be found in the Main menu. The menu can be accessed by tapping the arrow at the bottom of the control panel main screen. The main menu consists of the following submenus: Time programs, Measurements, Alarm, Settings, System information, Maintenance, and eAir web settings For more information on menus, see the Instructions.

If the system has an automatic alarm, it is shown in yellow in the control panel main screen. The most common alarm is the one about changing filters. The reason for the alarm must always be checked. Check the Alarms menu for the possible reason for the alarm and the instruction to how to acknowledge it.

Description of action

Operating environments

The operating environments for the ventilation unit are Home, Office, VAK1, VAK2, and VAK3.

The functions available differ based on the operating environment.

- The unit operates constantly in the Home operating environment. This is a default setting
- In the Office operating environment, the unit operates based on the time program or on external control. The Office mode can be activated from the control panel.
- VAK1, 2, and 3 operating environments are meant for large properties, where the unit is operating as a part of an external control center. The unit operates only on external commands. VAK operation environment can be preset in the factory in advance, if necessary.

Fans

When electricity is connected to the ventilation unit, the air lock control relay activates and heat recovery starts at maximum efficiency. Exhaust air blower will turn on in a moment, after which the supply air blower will turn on after a small delay. After this the ventilation unit will function based on the configured settings.

Blowers operate at speeds set by the active mode. Blower speeds (or duct pressures) are configured for each mode during commissioning. Supply and exhaust blowers both have their own speed.

The modes affecting the blowers are:

- At home (Office)
- RH%, CO2, or temperature boost
- Away
- Summer night cooling
- Manual boost
- Overpressure, cooking hood and central vacuum cleaner modes
- Alarm modes A and AB
- Silent mode
- Max. heating/cooling
- De-frosting function

The speed of supply and exhaust blower is set for each mode, except for alarm modes, in which the supply blower is always stopped and the exhaust blower is either stopped or operating on minimum speed.

Constant duct pressure control

Constant duct pressure control is an alternative for fixed blower speeds. When using constant duct pressure control, instead of the fixed blower speed, each mode is given a fixed pressure difference that the automation will try to maintain.

The ventilation unit motherboard has two 0–10 V / 24 V differential pressure transmitters (extra) connected to it. They measure the differential pressure of supply channel and exhaust channel in comparison to the surrounding air. Differential pressures are maintained at target values by changing blower speeds. If differential pressure is measured over the iris damper, that is constant air volume control.

Carbon dioxide, humidity, and temperature boost of blowers

The blower power of the ventilation unit is controlled based on load conditions and on the measurements collected by the humidity and/or carbon dioxide sensors.

The concentration of carbon dioxide and/or humidity is kept below the limit value set in the control panel. Humidity control manages the blowers based on the internal and possible external humidity transmitters in the ventilation unit. The standard ventilation unit delivery contains one inbuilt humidity sensor. Three carbon dioxide transmitters and three humidity transmitters can be connected to a ventilation unit. Transmitters are extras.

Carbon dioxide, humidity and temperature boost can activate in At home mode. Humidity booster can activate in Away mode as well.

If humidity booster is not enough to remove humidity from the rooms, the boosted humidity removal can be activated from the settings menu (Settings > Booster > Humidity Booster > Boosted humidity removal). When humidity booster is active, the boosted humidity removal operates automatically if the outdoor temperature is less than 0°C and the function has been activated in the Settings menu. This function slows down the rotation of the heat exchangers, which allows for more efficient humidity removal.

Supply air humidity removal is available for certain ventilation units. The absolute humidity of supply air remains on a level configured in Settings > System configuration > Drying settings.

Overtime (Office usage mode)

In the Office mode the ventilation unit shuts down unless a time program instructs it to operate, or the overtime setting is active.

Overtime length is configured in the control panel. It can be activated from the control panel or from a separate button (extra). Overtime control can be interrupted from the control panel. Overtime can also be activated via Modbus.

Overpressure (fireplace function)

Controlling overpressure can be started from the control panel or from a separate button (extra), which will make lighting a fireplace easier. Overpressure time and the supply and exhaust blower speeds can be set from the control panel. Overpressure control can be interrupted from the control panel. Over pressure control lowers the speed of the exhaust air blower and raises the supply air blower speed for 10 minutes.

NOTE

Overpressure function should be used only temporarily for making lighting the fireplace easier. The fireplace combustion air must be provided by other means than via the ventilation unit.

Manual boost

Boost and ventilation functions are started from the control panel. Boost raises the speed of both blowers for the time wanted (default setting is 30 minutes). Boosting can be interrupted from the control panel.

Cooking hood and central vacuum cleaner modes

Switching to cooking hood or central vacuum cleaner mode is possible only by external control (potential-free contact). The intent is to maintain the pressure level of the apartment, despite using the cooking hood and/or the central vacuum cleaner.

Summer night cooling

On summer nights, the room temperatures can be lowered with cool night air. Heat recovery and heating are turned off during summer night cooling. Blower speeds are controlled by the selected control mode. Summer night cooling starts and stops automatically when it has been activated from the panel.

Weekly and annual programs

Time program can be used to set a not-normal mode to activate at certain time on certain weekdays, or for two calendar days.

For example, when the apartment is empty, the blower speed can be reduced by creating a time program that sets the unit in Away mode.

Weekly and annual programs are set in the Time programs menu. The weekly program has 20 different time program rows, to which you can enter both the start and end dates of the time program and the time program mode according to which the unit functions for that time. If the weekly program is wanted to run overnight, both starting and ending date weekdays must be selected in the program.

The annual program has five time program rows, to which you can enter both the start and end dates of the time program with hour and date information and the time program mode according to which the machine functions for that time.

Time program does not check for possible overlaps in programs. The user must ensure that there are no overlapping programs.

Temperature control

Heat recovery

Heat recovery is limited during summertime, if the outdoor temperature is over +8°C. During this the heat exchanger is not operating if no heating request is received.

Heat recovery is on at 100% efficiency when temperature is lower than +8°C. This may lead to contradictions, especially in the spring, when the sun is heating the indoor air even though the temperature outside is still under +8°C. The temperature limit value can be changed from the control panel.

Cooling recovery

During the summertime power limitation, the heat exchanger activates at full power when the outdoor air is over 1°C warmer than exhaust air. The heat exchanger stops, when the outdoor temperature drops below the exhaust air temperature. This helps with maintaining the coolness of indoor spaces.

Heat recovery anti-freezing

MD control divides the supply blower operation based on temperature measurements, which in turn prevents the heat exchanger from freezing. Supply blower operates normally after freezing risk has passed. Anti-freezing automation can be activated from the control panel.

Efficiency of heat recovery

The efficiency of the heat recovery of supply and exhaust air is displayed in the Measurements menu of the control panel.

Supply, exhaust, and room temperature controls

The supply air temperature in the apartment is controlled by the supply air control. Ventilation unit can be used either as supply air controlled, which is when the unit aims to keep the supply air temperature on the set level, or as exhaust or indoor air controlled, which is when the unit aims to keep the exhaust or indoor air temperature on a set constant level by controlling the setting point of the supply air controller.

The supply air controller makes sure that the temperature does not drop or rise over the limits set in the panel. If the outdoor temperature is less than the heat recovery temperature limit (default value +8°C), or if the ECO mode is active, the supply air temperature can rise over the set temperature, if the rise is from heat recovery only.

Exhaust or indoor air temperature constant control is used when the temperature in the whole apartment needs to be adjusted by heating or cooling the ventilation unit supply air. The method of control is standard in ventilation unit models that have cooling.

If the outdoor temperature is less than the heat recovery temperature limit (default value +8°C), or if the ECO mode is active, the exhaust or indoor air temperature can rise over the set temperature, if the rise is from heat recovery only.

Room temperature control requires that the unit has either a temperature sensor (extra) connected to the control panel or a room temperature transmitter (extra) connected to the MD card. Indoor air temperature control measurements must be activated separately from settings.

Heating is active when the control requests heating, i.e. when the set temperature value is higher than the measured exhaust air (or indoor air) temperature. Cooling is active when the control requests cooling, i.e. when the set temperature value is lower than the measured exhaust air (or indoor air) temperature. Heating and cooling can be active at the same time, if the ventilation unit is equipped with supply air absolute humidity control (extra).

W model have a water heating coil return water check function that activates heating if the temperature of the return water drops too much. If the return water temperature is still dropping, the ventilation unit will shut down and send an alarm.

If Max. heating / Max. cooling is selected from the control panel quick menu, efficient heating or cooling activates momentarily. The function forces the supply air control to its limit value and raises the blowers to the Manual boost level.

The function will run until the temperature value set in the control panel main screen is reached.

Alarms

In alarm modes the machine either stops completely (A alarms, such as fire alarm) or remains in malfunction mode, in which the exhaust blower operates at minimum speed (the so-called AB alarms, such as if supply air is too cold).

It is possible to configure the unit so that the exhaust blower will not remain operating when AB alarms happen.

Filter guard (extra)

The ventilation unit can be fitted with a filter guard function as an extra. Filter guard sends an alarm if the filter is blocked. The filter guard function requires that a ventilation unit has differential pressure sensors installed. These measure the difference in pressure caused by the filters. If ventilation unit is ordered from the factory with a filter guard function, then the automation will automatically activate the filter guard function when the settings wizard is completed. The blowers will work at full power for some time, during which the system measures the pressure difference caused by clean filters, and sets the right value to indicate blocked filters. The filter guard is active following this. The blocked filters alarm is sent, if the alarm level set by the automation is exceeded. The filter guard tests the filters every Wednesday at 12:00. All blowers will operate at full power for a few minutes.

The filter guard alarm must be manually acknowledged in the Settings > Alarm > Acknowledge maintenance notification menu. If the type or manufacturer of the filter is changed, the alarm limits of the filter guard must be updated. This is done in the menu: Settings > Alarm > Update alarm limits for filter guard

Requirements

Functioning requirements of the ventilation unit:

- Intake and exhaust air temperature less than +55°C.
- Exhaust air temperature at least +8°C
- Heat recovery intake air temperature over +5°C.
- Supply air temperature over +10°C.
- All foreign objects have been removed from the ventilation system.
- Both blowers are rotating.

Adjusting air flow

When the unit has been started, the air flows must be configured to the designed values.

- Air flows are adjusted when commissioning the ventilation unit.
- The controls are done separately for both blowers in each mode (= blower speed).

Check the following when setting up:

- All filters are clean.
- All supply and exhaust air valves, the feedthrough in the ceiling, and the outdoor louvre are in place.

FOR INFORMATION

Do not cover the outdoor louvre with mosquito netting.

In order to get the optimal control values, the air flows must be measured in each duct-opening. A suitable instrument is a thermal anemometer or a differential pressure instrument With the help measurements, the air flow can be adjusted to follow the planned values.

Correctly configured ventilation unit is silent and has good heat economy. Additionally, it maintains a minor underpressure in the house. Underpressure prevents humidity from getting inside the walls and ceiling.

Commissioning check list

Action	Reviewed	Notes
The unit is installed according to the installation instructions provided by the manufacturer.		
Condensation water drainage pipe is attached to the water seal and its functionality has been tested.		
Dampeners have been installed in the supply air and exhaust air ducts.		
The terminals are connected to the ductwork.		
Outdoor louvre has been installed for fresh air intake. **NOTE** Do not cover the louvre with mosquito netting. It makes cleaning difficult.		
The unit is connected to the appropriate electric input.		
Ventilation ducts are insulated according to the ventilation plan.		
Condensation water drainage is attached to the water seal and its functionality has been tested.		

Control system and eAir control panel

The ventilation unit is controlled with an inbuilt eAir control system and eAir control panel. The control is configured in the factory, but the commissioning must be done at the site of installation.

Commissioning the eAir control panel

eAir control panel is used for configuring the ventilation system controls and for managing ventilation.

WARNING

Do not damage the control panel screen with a sharp or scratching object.

Installing the battery

The battery is not inside the control panel when delivered. It must be put in place before charging the panel.

1. Open battery case cover from the backside of the control panel.
2. Remove the possible protective tape from the battery terminals.
3. Slide the battery in place.
4. Close the battery box cover.

WARNING

Insert the battery right way around so that it does not damage the connectors!

Loading the control panel

1. Set the panel in the wall mount.
   Battery begins to recharge. Charge the battery for 24 hours before starting the settings wizard.

FOR INFORMATION

The control panel can be recharged with a micro-USB charger (not included in the delivery).

The settings wizard starts automatically when the ventilation system is powered up the first time.

Important information on the control system

FOR INFORMATION

Note: The code for settings wizard and system settings is **6143**.

The settings wizard is intended to make the commission of the control panel easier. The function goes through all the settings needed in commissioning the ventilation system.

All settings are configured with the settings wizard. The settings can be reviewed in the Settings menu, but the settings affecting blower speeds cannot be changed from there.

If you need additional help in configuring the settings, tap the target text for instructions.

Factory settings are basic values that are suitable enough in most cases. Naturally this does not apply to the blower settings in different modes, because air quantities must be configured and set on a house-by-house basis. In other parts, the values do not need changing, if they are not configured in the ventilation system plan.

All the settings configured with the wizard are in force immediately.

The changes are automatically saved in the unit's long-term memory once the wizard is finished for the first time. In the following operation times the changes are saved by answering "Yes" when the function asks whether or not the changes are saved.

Running the settings wizard in one panel is enough even if you have two panels connected to the ventilation unit. Switch the power on in the other panel once you have configured the settings. The panel prompts which language do you want to use, and retrieves the rest of the information from the ventilation unit motherboard.

Returning to settings wizard

If the whole settings wizard is not completed the first time, it will automatically restart every time the machine is switched on, and the settings can be finalized.

If you have finished the function and want to change the settings, open the wizard by tapping first the arrow at the bottom of the start screen, and then selecting ***Settings*** > ***Settings wizard***. Then, enter the code 6143.

2. This setting defines which temperature is displayed in the main screen (upper right corner). The default value is the ***Outdoor temperature***.
3. **Accept the choice by tapping OK.**

Commissioning the system with settings wizard

The check list covers the whole settings wizard.

Make sure that the installation of ventilation is done before starting the settings wizard. If the external sensor connection is removed or if the indoor temperature is less than +15°C, the settings wizard cannot be run. Alarms cannot be checked in the settings wizard. If there is an alarm during the settings wizard, it can be acknowledged only after the settings wizard is done.

If you pause the setting configuration, the control panel will automatically restart the wizard when you switch the ventilation system on the next time. Then you can finalize the settings.

If the eAir panel is showing a text about connecting to a network and it is not connecting to the wall mount, check first the connection between the wall mount and the ventilation unit. **Do no** tap the ***Re-connect radio*** button. It removes the pairing between the wall mount and eAir panel, after which the eAir panel cannot be used before a new pairing is formed as instructed on page 162.

Make sure before starting the settings function that all the necessary information is available. Request the necessary Modbus parameters from the supplier of the control system linked with Modbus, and network settings from the administrator of local area network (only if DHCP is not in use).

1. Switch the ventilation unit on.

FOR INFORMATION

The blower settings for different modes must be configured and set on a house-by-house basis.

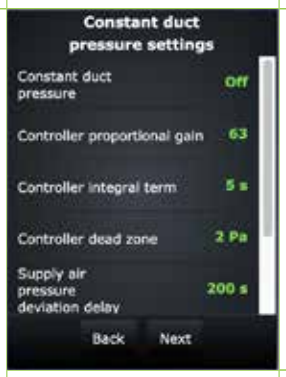
2. The panels starts automatically and the Enervent logo appears on the screen.
3. Wait for the language choice to appear.
4. This may take some time. Wait patiently.
5. Choose the correct language and tap ***Next***.
6. Settings wizard opens.
7. Begin defining settings by tapping ***Next***.

The following pages contain all the settings in the settings wizard.

Setup wizard

	NOTE! Factory settings are suitable for most installations. The fan speed settings for different operating modes are installation specific and must be specified and set separately for each installation. Otherwise, do not change the factory setting, unless otherwise specified in the ventilation system plan.			
DISPLAY	MENU	SUB MENU	FACTORY SETTING	DESCRIPTION/REMARKS
	Setup wizard			
1				Choose language.
2				The date is displayed in a year-month-day format.
3				The clock displays 24 h time.
4		Screen brightness	97 %	Scale 0 - 100 %.
		Sleep mode delay	90 sek	This setting defines the time after which the screen will turn itself off to save the battery when it is not used.
		Sleep mode delay for wall mounting bracket	OFF	This setting defines whether the power saving sleep delay is on or off when the control panel is stored in the wall mount.

		Temperature sshown on front of panel	Outside air temperature	The alternatives are outside air temperature, supply air temperature and extract air temperature.
5		Use	Home	The options are Home or Office. In the Office mode, the unit can be switched on only by using a timer.
		Temperature control	Supply air Extract air is the default setting for units with cooling functionality.	***Supply air*** maintains the supply air temperature at the value specified on the main view. This is the default setting for units with no cooling functionality. ***Room temperature average*** or ***Extract air c***ompare the temperature setting in the main view with the room temperature or extract air temperature and heat or cool the supply air accordingly. To be able to use ro***om temperature control***, at least one room temperature sensor must be ***connected.*** ***Extract air*** is the default setting for units with cooling functionality.
		Cooling	OFF	Options are ON/OFF.
		Outside temperature limit for cooling	17°C	When the outside temperature is below the set value, no active cooling is allowed.
		Heating	ON	Options are ON/OFF.
		Outside temperature limit for heating	25°C	When the outside temperature is above the set value, no heating is allowed.
		Min. supply air temprature	13°C	This is the minimum temperature for the supply air when the temperature control value is ***Extract air*** or ***Room temperature average***.
		Maximum supply air temperature	40°C	This is the maximum temperature for the supply air when the temperature control value is ***Extract air*** or ***Room temperature average***.
		Heating/cooling limitation	OFF	This setting is used if the user wants to prevent continuous switching between heating or cooling when the temperature setpoint is very close to the desired temperature.
		Heating	18°C	When the extract air (or the room temperature average, in room temperature mode) temperature drops, the heating is not activated until this temperature is reached.
		Cooling	24°C	When the extract air (or the room temperature average, in room temperature mode) increases, the cooling is not activated until this temperature is reached.
		TE20-21 sensor	OFF	Options are ON/OFF. If both sensors are selected here, the temperature control uses the mean temperature of the room sensors. If you have installed only one wall mounting bracket with room temperature sensor, it is TE20.
		Room temperature sensor 1-3	OFF	Options are ON/OFF. These sensors are room temperature transmitters that are connected to the ventilation unit. The sensors can be included or left out of the mean room temperature measuring by setting them on or off.

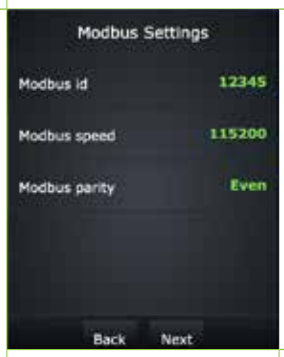
6		Analog input 1	%RH sensor1	Define the functionality and set the voltage for the analog inputs 1-6 on the MD motherboard. AI settings needs to be configured if there are external sensors connected to the ventilation unit, besides the two RH% and CO_2 sensors that are preconfigured.
		Analog input 2	%RH sensor 2	
		Analog input 3	None	
		Analog input 4	None	
		Analog input 5	CO2 sensor1	
		Analog input 6	CO2 sensor 2	
7		Constant duct pressure control	OFF	Options are ON/OFF.
		Air flow setup mode	Constant pressure	Selecting ***Constant pressure*** requires all fan power settings to be entered as duct pressures, and the automation will automatically maintain the duct pressure by varying the fan speeds. Select this setting if you know the required duct pressures for the different operating modes. Selecting ***Constant speed*** will allow the airflow measurements to be made without the duct pressure control. The measured duct pressures are shown under the fan speed settings for reference, and are automatically stored when continuing to the next setting. After completing all fan speed settings the constant duct pressure control is automatically activated, and fan speed control will be automatic according to duct pressures. Use this setting if you don't know the needed duct pressures for the different operating modes.
		P-band	25	P-band value determines how much the fan speed will be altered.
		I-time	5 s	I-time value determines how quick the change to the fan speed will be.
		DZ	2 Pa	DZ (dead zone) is the deviation in the set duct pressure where the controller has no effect on the fan speed.
		Alarm delay for supply air duct pressure	200 s	If pressure deviation is greater than the set alarm limit, an alarm will be triggered after the delay set here.
		Alarm delay for extract air duct pressure	200 s	If pressure deviation is greater than the set alarm limit, an alarm will be triggered after the delay set here.
		Alarm limit	10 Pa	An alarm is triggered if pressure deviation is greater than the alarm limit set here.

8		Defrost	OFF	Options are ON/OFF. The function is active during winter season, if enabled. When defrosting is active, the supply air fan stops and the extract air fan runs at a set speed.
		Limit temperature for winter boost	8°C	When the outside temperature is below this value, the heat recovery is always on 100%.
		Arctic mode	OFF	Options are ON/OFF. Arctic mode is a defrosting mode that takes the outside air temperature and the absolute humidity of the extract air into account when determining the need for defrosting.
	Operating modes			
9		Supply air	30 %	This value defines the supply air fan speed in Home operating mode.
		Extract air	30%	This value defines the extract air fan speed in Home operating mode.
10		Summer night cooling	OFF	Options are ON/OFF. Summer night cooling boosts the fan speed to increase cooling when the outside air is cooler than the room air.
		Start temperature	25°C	Summer night cooling starts when the temperature of extract air exceeds this temperature value.
		Stop temperature	21°C	Summer night cooling stops when the temperature of extract air drops below this temperature value.
		Lowest outside temperature	10°C	The temperature of outside air must be higher than this value for the summer night cooling to start.
		Min. temperature difference	1°C	Outside air must be cooler than extract air by this value.
		Supply air	70 %	The speed of the supply air fan when summer night cooling is active.
		Extract air	70 %	The speed of the extract air fan when summer night cooling is active.
		Start time	22.00	Summer night cooling is only allowed after this specified time.

		Stop time	7.00	Summer night cooling is stopped after this specified time.
		Weekdays	Every day	Set the weekday or days for summer night cooling.
		Active cooling blocked	ON	Options are ON/OFF. If this setting is on, no active cooling is allowed.
11		Supply air	20 %	This value defines the supply air fan speed in Away operating mode.
		Extract air	20 %	This value defines the extract air fan speed in Away operating mode.
		Temperature setback	2°C	This value defines the temperature drop in the main view temperature display when Away operating mode is on.
		Heating	ON	Options are ON/OFF. This setting defines whether or not after heating is allowed in Away operating mode.
		Cooling	ON	Options are ON/OFF. This setting defines whether or not active cooling is allowed in Away operating mode.
12		Boost duration	30 min	This setting defines the time the fan speed is boosted.
		Supply air	90 %	This is the speed with which the supply air fan will be running when manual boosting is activated.
		Extract air	90 %	This is the speed with which the extract air fan will be running when manual boosting is activated.
13		Overpressure duration	10 min	This setting defines the time the fan speed is boosted.
		Supply air	50 %	This is the speed with which the supply air fan will be running when manual overpressure is activated.
		Extract air	30 %	This is the speed with which the extract air fan will be running when manual overpressure is activated.

	Boost functions			
14		% RH boost	OFF	Options are ON/OFF. This setting allows or prohibits boosting according to the air humidity.
		Summaer / winter limit temperature	4°C	When the 24 hour mean temperature of outside air is higher than this limit, boosted ventilation based on the 48 hour mean humidity of extract air is taken into use. If the 24 hour mean temperature is below the value set here, a fixed limit for boosted ventilation is used.
		% RH boost limit value	45 %	In winter mode (24 h mean temperature of outside air is less than +4°C) boosted ventilation activates when relative humidity is higher than this value.
		Threshold value 48 hr % RH	15 %	In summer mode (24 h mean temperature of outside air is higher than +4°C) boosted ventilation activates when relative humidity of extract air is higher than the 48 h mean humidity by the value set here.
		Max. supply air fan speed	90 %	The maximum allowed speed of the supply air fan during boosted humidity ventilation.
		Max. extract air fan speed	90 %	The maximum allowed speed of the extract air fan during boosted humidity ventilation.
		Rotor dehumidification	OFF	Options are ON/OFF. If allowed rotor dehumidification is active when humidity boosting is active and the outside air temperature is below 0 °C.
15		CO2 boost	OFF	Options are ON/OFF. This setting allows boosting of the fans according to the CO2 level. CO2 settings require an external carbon dioxide transmitter (not included in the basic delivery).
		CO2 boost limit value	1000 ppm	Boosting starts when the amount of CO2 exceeds the value set here.
		Max. supply air fan speed	90%	The maximum allowed speed of the supply air fan during boosted CO2 ventilation.
		Max. extract air fan speed	90%	The maximum allowed speed of the extract air fan during boosted CO2 ventilation.

16		Temperature boost	OFF	Options are ON/OFF.
		Select temperature	Extract air temperature	The options are ***Extract air temperature*** or ***Room temperature average***. To be able to select room temperature average, you need a separate room temperature sensor (not included in the basic delivery).
		Max. supply air fan speed	90%	The maximum allowed speed of the supply air fan during temperature boost ventilation.
		Max. extract air fan speed	90%	The maximum allowed speed of the extract air fan during temperature boost ventilation.
17		Cooker hood on, supply air	50 %	Set the supply air fan speed for when the cooker hood is on.
		Cooker hood on, extract air	30 %	Set the extract air fan speed for when the cooker hood is on.
		Central vacuum cleaner on, supply air	50 %	Set the supply air fan speed for when the central vacuum cleaner is on.
		Central vacuum cleaner on, extract air	30 %	Set the extract air fan speed for when the central vacuum cleaner is on.
		Cooker hood and central vacuum cleaner on, supply air	70 %	Set the supply air fan speed for when the cooker hood and the central vacuum cleaner is on.
		Cooker hood and central vacuum cleaner on, extract air	30 %	Set the extract air fan speed for when the cooker hood and the central vacuum cleaner is on.
		Cooker hood, central vacuum cleaner and manual overpressure on, supply air	100 %	Set the supply air fan speed for when the cooker hood, the central vacuum cleaner and the manual over pressure is on.
		Cooker hood, central vacuum cleaner and manual overpressure on, extract air	30 %	Set the extract air fan speed for when the cooker hood, the central vacuum cleaner and the manual over pressure is on.

	Modbus and eAir web settings			
18		Modbus ID	1	Each device that is connected to the Modbus needs a unique identification.
		Modbus speed	19200	The options are 19200, 115200 or 9600.
		Modbus parity	None	The options are None or Even.
		Modbus TCP/IP	OFF	Options are ON/OFF.
19		Serial number		
		PIN code		
20		Enable eAir web		Enables the eAir web service.
		Switch off eAir web		Disables the eAir web web service.
		Re-connect eAir web		Enables a switched off eAir web web service.
		Reset PIN code		Generates a new PIN code to the eAir web web service.
21		DHCP	ON	Options are ON/OFF.
		IP address		
		Gateway IP address		
		Subnet mask		
		DNS IP address		

Settings that are not defined in the settings wizard

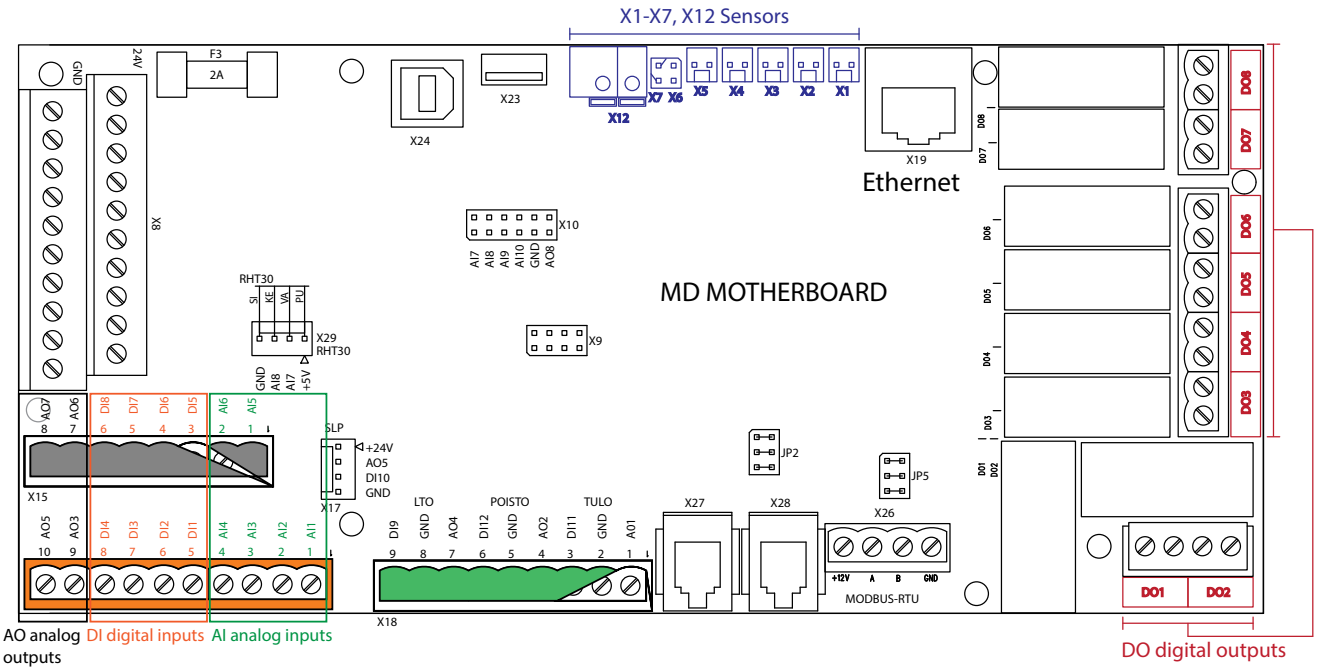
The ventilation units are pre-prepared at the factory in order to shorten the installation time. However, the possible extras cannot be taken into account for installation. The settings for the devices connected to the motherboard must be configured on the control panel.

The following table contains the MD card connections and their placements on the motherboard.

MD card connections	
NTC sensors	
The MD card has connections for eight (8) NTC-10 sensors.	
Intake	**Intended use**
X1	Outdoor air temperature measuring TE01
X2	Temperature of supply air after heat recovery unit TE05
X3	Supply air temperature TE10 Supply air temperature after humidity removal coil TE07 (only units with humidity removal function)
X4	Exhaust air temperature TE32
X5	Exhaust air temperature before heat recovery TE31 (HP only) Evaporator fluid pipe temperature TE62 (MDX only) CG radiator freezing guard TE46 (CG-W only)
X6	Pre-heated exhaust air temperature TE50 (HP only)
X7	Pre-warmed outdoor air temperature TE02 (CHG)
X12	Return water temperature TE45
Analog inputs AI 0-10V	
Analog inputs AI1–AI6 are between 0–10V. These input functions are user-defined.	
Intake	**Intended use**
AI1 (X16)	Humidity transmitter 1
AI2 (X16)	Humidity transmitter 2 Water heater temperature TE80 (Aqua only)
AI3 (X16)	(Free) Supply air duct pressure PDS10
AI4 (X16)	(Free) Exhaust air duct pressure PDS30
AI5 (X15)	Carbon dioxide transmitter 1
AI6 (X15)	Carbon dioxide transmitter 2
Analog inputs AI1–AI6 have the following functions available:	
	Humidity transmitter 1, 2, and 3
	Carbon dioxide transmitter 1, 2, and 3
	Room temperature transmitter 1, 2, and 3
	Outdoor temperature transmitter
	Pressure difference transmitter PDE10 and PDE30. These sensors are used in the constant duct pressure control.
	Changing the temperature setting
Analog inputs AI7–AI8 are between 0–5V. These intake functions are locked by the program.	

MD card connections	
AI7 (X29)	Exhaust air humidity RH30
AI8 (X29)	Exhaust air temperature TE30
Analog inputs AI9–AI16 are between 0–10V. These intake functions are locked by the program.	
AI9 (X10)	Supply air filter pressure difference PDE01 (extra)
AI10 (X10)	Exhaust air filter pressure difference PDE31 (extra)
AI11 (X10)	Supply air humidity RH10 (only models with humidity removal function)
AI12 (X10)	Supply air temperature TE10 (only models with humidity removal function)
AI13 (X10)	Free
AI14 (X10)	Free
AI15 (X10)	Free
AI15 (X10)	Free
Analog outputs AO 0-10V	
Output	**Intended use**
AO1 (X18)	Supply air blower control voltage
AO2 (X18)	Exhaust air blower control voltage
AO3 (X16)	Cooling control voltage / additional post-heating control voltage (MDX-E/HP-E/HP-W)
AO4 (X18)	Rotating heat exchanger control voltage
AO5 (X16)	Heating control voltage / compressor power control voltage (MDX/HP)
AO6 (X15)	Pre-heating control voltage / pre-cooling control voltage (CHG) / HRW n:o 2 control voltage (Twin Tropic)
AO7 (X15)	Exhaust air pre-heating control voltage (HP) / exhaust air drying control voltage (TCG) / LTO de-frosting control voltage (WGHR)
AO8 (X10)	Hot water production control voltage
Digital outputs (DO), relays, closing contacts.	
Intake	**Intended use**
DO1	On/off control of blowers
DO2	On/Off control of heating
DO3	On/off control of cooling / On/off control of heating (MDX)
DO4	On/off control of LTO
DO5	On/Off control of air locks
DO6	On/Off control of pre-heating / On/Off control of pre-cooling / On/Off control of heating circulating pump (Aqua KIW)
DO7	Time-controlled relay / circulation pump on/off control PU80 (Aqua) / exhaust air cooling on/off control (TCG)
DO8	A/AB alarm output, closing
Digital inputs (DI) (buttons and indications) Connection only to the GND terminal (earthing)! Voltage must not be connected to digital inputs.	
The digital inputs are user-defined	
Intake	**Intended use**
DI1 (X16)	Emergency stop (fixed)
DI2 (X16) user-defined	PDS10 supply air blower pressure switch / de-frosting indication (MDX/HP)
DI3 (X16) user-defined	Overtime (only in Office use)

MD card connections	
DI4 (X16) user-defined	Manual boost
DI5 (X15) user-defined	Away mode Away mode is active when input is earthed.
DI6 (X15) user-defined	Overpressure, connected to reversible button switch. Overpressure mode is active for 10 minutes, starting from grounding the input (factory setting). If the input is connected to a switch, the overpressure mode is re-activated only after the circuit is broken.
DI7 (X15) user-defined	Central vacuum system indication
DI8 (X15) user-defined	Cooker hood indication
DI9 (X18) fixed	LTO rotation speed input
DI10 (X17) fixed	Electrical post-heating alarm / compressor failure (MDX/HP)
DI11 (X17) fixed	Supply air blower rotation speed input
DI12 (X17) fixed	Exhaust air blower rotation speed input
Other connections	
X27, X28	Control panel connections only to eAir wall mount
X26	ModBus RTU
X19	Ethernet
X23 USB master	Program update only, from USB
X24 USB device	Inactive
X8	+24 VDC
X8	GND
O3 ozone sensor (ION)	ICEA2000A unit connector 11



eAir motherboard connections and their locations

When you want to set unit settings, tap the upwards arrow in the main screen > choose ***Settings*** > scroll the screen to ***System settings*** > enter password 6143 > ***OK*** > ***I/O settings*** > choose ***AI settings*** (analog input settings) or ***DI settings*** (digital input settings) > choose the connection you want to set. Then tap the green text on the row you want to select, and select the unit you added from the list displayed on the screen.

Documenting the commissioning

- Fill in warranty information.
- Write down all possible changes made to the factor settings in the parameter table at the end of this manual.
- Fill the air rate measurement document. A copy of the document is at the end of this manual.

FOR INFORMATION

Warranty is not in effect for units that do not have the air quantity measurements documented.

It is very important that all changes in parameters are written down. This way the information has backups in case the automation is damaged (e.g. by lightning strike).

Alarm	Reason	Instruction	Solution
LTO input village (TE-05 min)	Heat exchanger trace has broken	A green trace circles the heat exchanger. Check if the trace can be seen from the LTO cell review hole. If it cannot be seen, the trace has broken.	Change the trace
	The heat exchanger trace is lubricated so that it can slide	A green trace circles the heat exchanger. Check from the LTO trace review hole if the pulley is rotating even though the LTO cell is not rotating.	Change the trace
	Exhaust blower has stopped	Open the access door while the machine is operating. The supply blower should be rotating. In LTR model machines, press with a screwdriver and check, if the blower starts.	Change blowers
	Exhaust air filter is blocked	Open the access door when the machine is off. Pull out the filter and check the dirtiness of the filter.	Change the exhaust filter
	Exhaust air valves adjusted wrong		Contact the company that installed the ventilation unit and find out if the air flow and valves are correctly adjusted. Contact the maintenance.
	Ducts have inadequate insulation		Check the thickness of insulation in supply and exhaust ducts, and add insulation if necessary. Contact the maintenance.
	The protection against additional heating overheating has launched.		Find out the cause for the failure and reset the protection against overheating (® button in the radiator). Contact the maintenance.
	The motor/gearbox in the heat exchanger is faulty	Open the access door while the machine is operating and listen, if the sound comes from the LTO.	Contact the maintenance.
	The LTO controller card is faulty (EDA models)	The LTO cell is controlled by a separate controller card that is located in the electric box of the machine.	Contact the maintenance.
	LTO pulley has separated from the shaft	Check from LTO trace review hole if the shaft is rotating empty and the pulley is in its place.	Tighten the screw on the pulley. Contact the maintenance.

Alarm	Reason	Instruction	Solution
Supply air cold (TE-10 min)	Heat exchanger trace has broken	A green trace circles the heat exchanger. Check if the trace can be seen from the LTO cell review hole. If it cannot be seen, the trace has broken.	Change the trace
	The heat exchanger trace is lubricated so that it can slide	A green trace circles the heat exchanger. Check from the LTO trace review hole if the pulley is rotating even though the LTO cell is not rotating.	Change the trace
	Exhaust blower has stopped	Open the access door while the machine is operating. The supply blower should be rotating. In LTR model machines, press with a screwdriver and check, if the blower starts.	Change blowers
	Exhaust air filter is blocked	Open the access door when the machine is off. Pull out the filter and check the dirtiness of the filter.	Change the exhaust filter
	Exhaust air valves adjusted wrong		Contact the company that installed the ventilation unit and find out if the air flow and valves are correctly adjusted. Contact the maintenance.
	Ducts have inadequate insulation		Check the thickness of insulation in supply and exhaust ducts, and add insulation if necessary. Contact the maintenance.
	The protection against additional heating overheating has launched.		Find out the cause for the failure and reset the protection against overheating (® button in the radiator). Contact the maintenance.
	TE-10 temperature sensor is faulty		Check from the measurements menu on the control panel if the supply temperature measurement is off the charts. Contact the maintenance.
	The motor/gearbox in the heat exchanger is faulty	Open the access door while the machine is operating and listen, if the sound comes from the LTO.	Contact the maintenance.
	The LTO controller card is faulty (EDA models)	The LTO cell is controlled by a separate controller card that is located in the electric box of the machine.	Contact the maintenance.
	LTO pulley has separated from the shaft	Check from LTO trace review hole if the shaft is rotating empty and the pulley is in its place.	Tighten the screw on the pulley. Contact the maintenance.
Hot supply air (TE-10 max) Fire risk	Electrical post-heating faulty		Contact the maintenance.
	Water heating radiator has a faulty control valve actuator		Contact the maintenance.
	TE-10 temperature sensor faulty		Check from the measurements menu on the control panel if the supply temperature measurement is off the charts. Contact the maintenance.
Hot room air (TE-20 max)	Fire risk		Contact the maintenance.
	TE-20 temperature sensor faulty		Check from the measurements menu on the control panel if the room temperature measurement is off the charts. Contact the maintenance.

Alarm	Reason	Instruction	Solution
Exhaust air cold (TE-30 min)	Ducts have inadequate insulation		Check the thickness of insulation in supply and exhaust ducts, and add insulation if necessary. Contact the maintenance.
	The protection against additional heating overheating has launched.		Find out the cause for the failure and reset the protection against overheating (® button in the radiator). Contact the maintenance.
	The ventilation unit door is open		Close the door. Contact the maintenance.
	Low room temperature		Raise the room temperature. Contact the maintenance.
	TE-30 temperature sensor is faulty		Check from the measurements menu on the control panel if the supply temperature measurement is off the charts. Contact the maintenance.
Exhaust air hot (TE-30 max)	Fire risk		Contact the maintenance.
	TE-30 temperature sensor faulty		Check from the measurements menu on the control panel if the exhaust temperature measurement is off the charts. Contact the maintenance.
Electric radiator overheated (SLP fault)	Electrical post-heating faulty		Contact the maintenance.
	Supply blower stopped	Open the machine access door while the machine is operating. The supply blower should be rotating. In LTR model machines, press the door switch with a screwdriver and check, if the blower starts.	Contact the maintenance.
	Supply filter blocked	Open the access door when the machine is off. Pull out the filter and check the dirtiness of the filter.	Change the supply filter. Contact the maintenance.
	Outdoor louvre blocked	Check if the louvre on the outside of the house is blocked.	Clean the outdoor louvre. Contact the maintenance.
	The heating controller card is broken		Change the heating controller card. Contact the maintenance.
Water radiator freezing risk (TE-45 min)	Heat exchanger trace has broken	A green trace circles the heat exchanger. Check if the trace can be seen from the LTO cell review hole. If it cannot be seen, the trace has broken.	Change the trace
	The heat exchanger trace is lubricated so that it can slide	A green trace circles the heat exchanger. Check from the LTO trace review hole if the pulley is rotating even though the LTO cell is not rotating.	Change the trace
	Exhaust blower has stopped	Open the machine access door while the machine is operating. The exhaust blower should be rotating. In LTR model machines, press the door switch with a screwdriver and check, if the blower starts.	Change blowers
	Exhaust air filter is blocked	Open the access door when the machine is off. Pull out the filter and check the dirtiness of the filter.	Change the exhaust filter
	Exhaust air valves adjusted wrong		Contact the company that installed the ventilation unit and find out if the air flow and valves are correctly adjusted. Contact the maintenance.

Alarm	Reason	Instruction	Solution
	Ducts have inadequate insulation		Check the thickness of insulation in supply and exhaust ducts, and add insulation if necessary. Contact the maintenance.
	The protection against additional heating overheating has launched.		Find out the cause for the failure and reset the protection against overheating (® button in the radiator). Contact the maintenance.
	Water heating radiator has a faulty control valve actuator		Contact the maintenance.
	The circulator has shut down	Check if the heating/cooling circulator is rotating.	Start the pump. If the issue persists, contact maintenance. Contact the maintenance.
	The LTO controller card is faulty (EDA models)	The LTO cell is controlled by a separate controller card that is located in the electric box of the machine.	Contact the maintenance.
	LTO pulley has separated from the shaft	Check from LTO trace review hole if the shaft is rotating empty and the pulley is in its place.	Tighten the screw on the pulley. Contact the maintenance.
Cooling error	The external cooling unit has shut down	Check that the safety switch of the external unit is on.	Start the external unit. If the issue persists, contact maintenance. Contact the maintenance.
External emergency shutdown	Ventilation stopped with the emergency shutdown button.	If the house has an external shutdown switch, check if it has been pressed.	Find the root cause before resetting. Contact the maintenance.
External fire risk	Ventilation shut down with an external fire risk controller.	If your house has an external fire risk controller, check if it has been activated.	Find the root cause before resetting. Contact the maintenance.
Maintenance notice	Normal notice every 4 or 6 months (depending on the model)		Change the filters and clean the unit from inside. Check that the machine functions. Contact the maintenance.
Filter alarm: Supply (extra)	Supply filter is blocked.	Open the access door when the machine is off. Pull out the filter and check the dirtiness of the filter.	Change the supply filter. Contact the maintenance.
Filter alarm: Exhaust (extra)	Exhaust air filter is blocked.	Open the access door when the machine is off. Pull out the filter and check the dirtiness of the filter.	Change the exhaust filter. Contact the maintenance.
Supply air filter rotation guard	Supply blower has stopped.	Open the machine access door while the machine is operating. The supply blower should be rotating. In LTR model machines, press the door switch with a screwdriver and check, if the blower starts.	Contact the maintenance.
Exhaust air filter rotation guard	Exhaust blower has stopped.	Open the machine access door while the machine is operating. The supply blower should be rotating. In LTR model machines, press the door switch with a screwdriver and check, if the blower starts.	Change blowers. Contact the maintenance.
PDS 10 alarm	Supply blower has stopped.	Open the access door while the machine is operating. The supply blower should be rotating. In LTR model machines, press with a screwdriver and check, if the blower starts.	Contact the maintenance.
	Supply filter blocked.	Open the access door when the machine is off. Pull out the filter and check the dirtiness of the filter.	Change the supply filter. Contact the maintenance.
	Outdoor louvre blocked.	Check if the louvre on the outside is blocked.	Clean the outdoor louvre. Contact the maintenance.
Compressor alarm	The internal alarm of the air source heat pump unit is active.		Contact the maintenance.

enervent

EU DECLARATION OF CONFORMITY

We declare that our products follows the provisions of low voltage directive LVD 2014/35/EU, electromagnetic compatibility directive EMC 2014/30/EU, machine directive MD 2006/42/EC, radio equipment directive RED 2014/53/EU, ROHS II directive 2011/65/EU, battery directive 2013/56/EU and waste electrical and electronic equipment directive WEEE 2012/19/EU.

Manufacturer:	Enervent Zehnder Oy
Manufacturer´s contact:	Kipinätie 1, 06150 Porvoo, FINLAND, tel. +358 207 528 800, fax +358 207 528 844 enervent@enervent.com, www.enervent.com
Description of the product:	Ventilation unit with heat recovery
Trade name of the product:	LTR-3 eAir E, LTR-3 eAir W 35/25 °C

The products are in conformity with the following standards:

LVD EN 60335-1:2012/A11:2014
EN 62233:2008/AC:2008

EMC EN 61000-3-2:2014 and EN 61000-3-3:2013
EN 61000-6-1:2007 and EN 61000-6-3:2007/A1:2011/AC:2012
EN 55014-1:2006/A2:2011 and EN 55014-2:1997/A2:2008

RED EN 300328 v2.1.1

MD EN ISO 12100:2010

ROHS EN 50581:2012

The conformity of each manufactured product is taken care according our quality descriptions.

Product is CE-marked year 2019.

Porvoo 5th of July 2019

Enervent Zehnder Oy

Tom Palmgren
Technology manager

Enervent LTR-3

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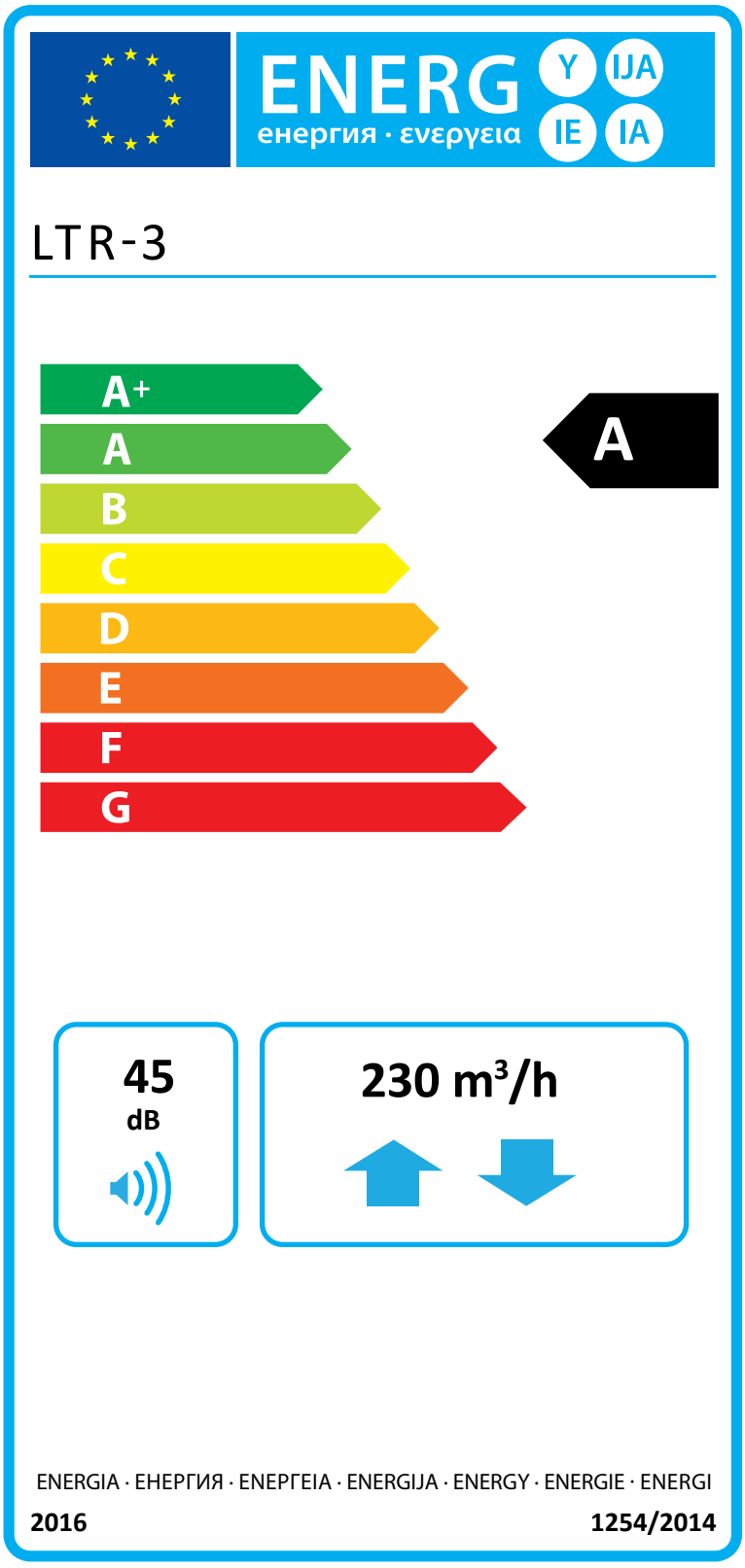
PRODUCT INFORMATION ACCORDING TO EU COMMISSION REGULATION NO 1253/2014 AND 1254/2014

Supplier's name or trade mark	Enervent
Supplier's model identifier	LTR-3
Specific energy consumption (sec) in kWh/(m^2.A) • Cold climate • Average climate • Warm climate	 -82,05 -39,45 -15,04
Declared typology in accordance with article 2 of this regulation	RVU / BVU
Type of drive installed or intended to be installed	Multi-speed drive
Type of heat recovery system	Regenerative
Thermal efficiency of heat recovery	78,5
Maximum flow rate in m^3/h	328
Electric power input of the fan drive, including any motor control equipment, at maximum flow rate (W)	190
Sound power level (L_{WA}), rounded to the nearest integer	44
Reference flow rate in m^3/s	0,064
Reference pressure difference in Pa	50
SPI in W/(m^3/h)	0,39
Control factor and control typology in accordance with the relevant definitions and classification in annex VIII, table 1	0,65
Declared maximum internal and external leakage rates (%) for bidirectional ventilation units	<4% / <2%
Position and description of visual filter warning for rvus intended for use with filters, including text pointing out the importance of regular filter changes for performance and energy efficiency of the unit	Filter warning on control panel. Instructions in user manual.
Internet address for disassembly instructions as referred to in point 3	https://doc.enervent.com/out/out.ViewFolder.php?folderid=957
The annual electricity consumption (AEC) (in kWh electricity/a)	204
The annual heating saved (AHS) (in kWh primary energy/a) for each type of climate • Cold climate • Average climate • Warm climate	 8716 4445 2015

The information on the energy label for this product has been defined with local demand control. Local demand control means that the ventilation unit continuously regulates the fan speed(s) and flow rates based on more than one sensor. Please remember to connect all local sensors (some sold as extra equipment) in order to achieve the declared energy class.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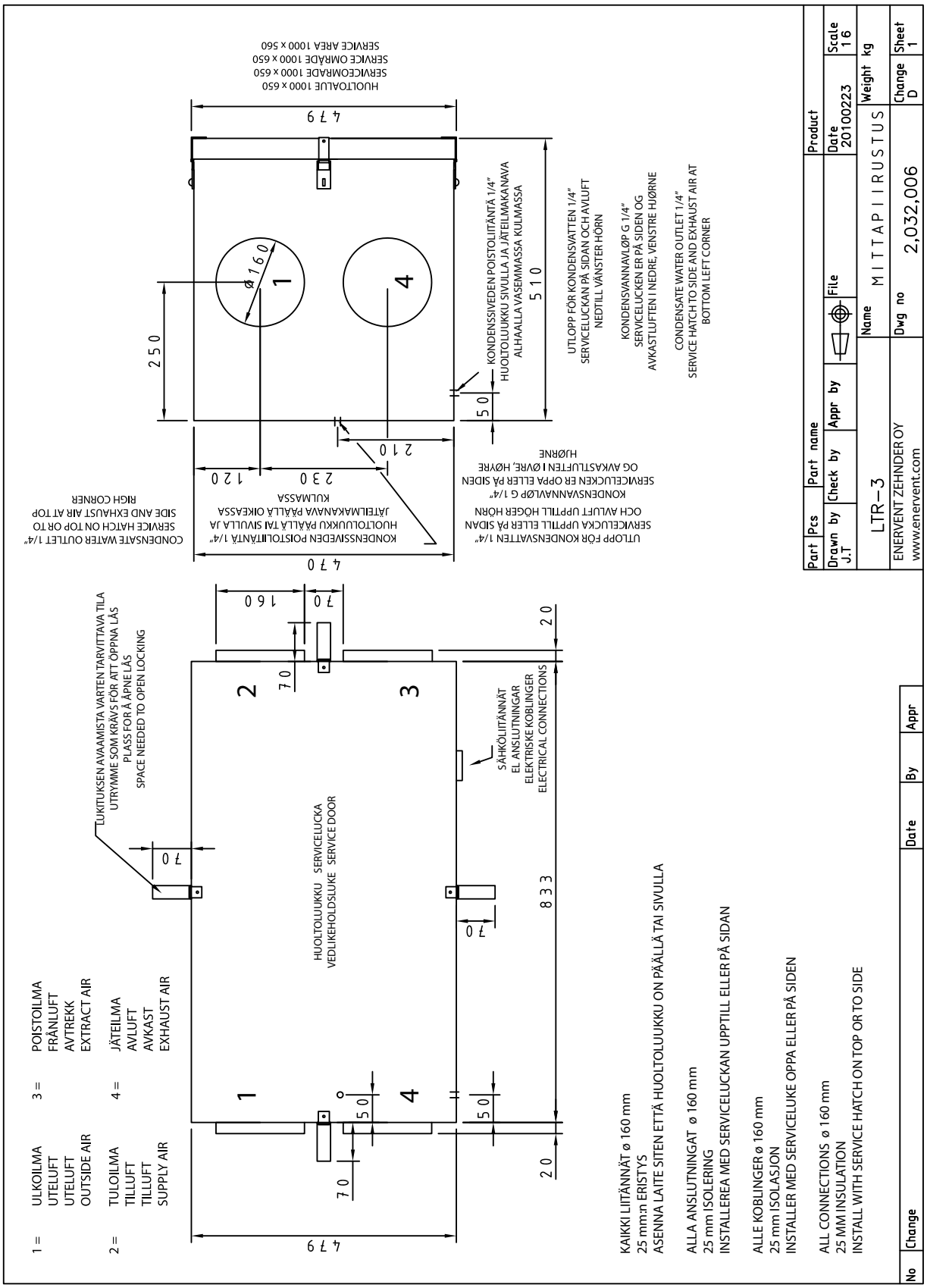
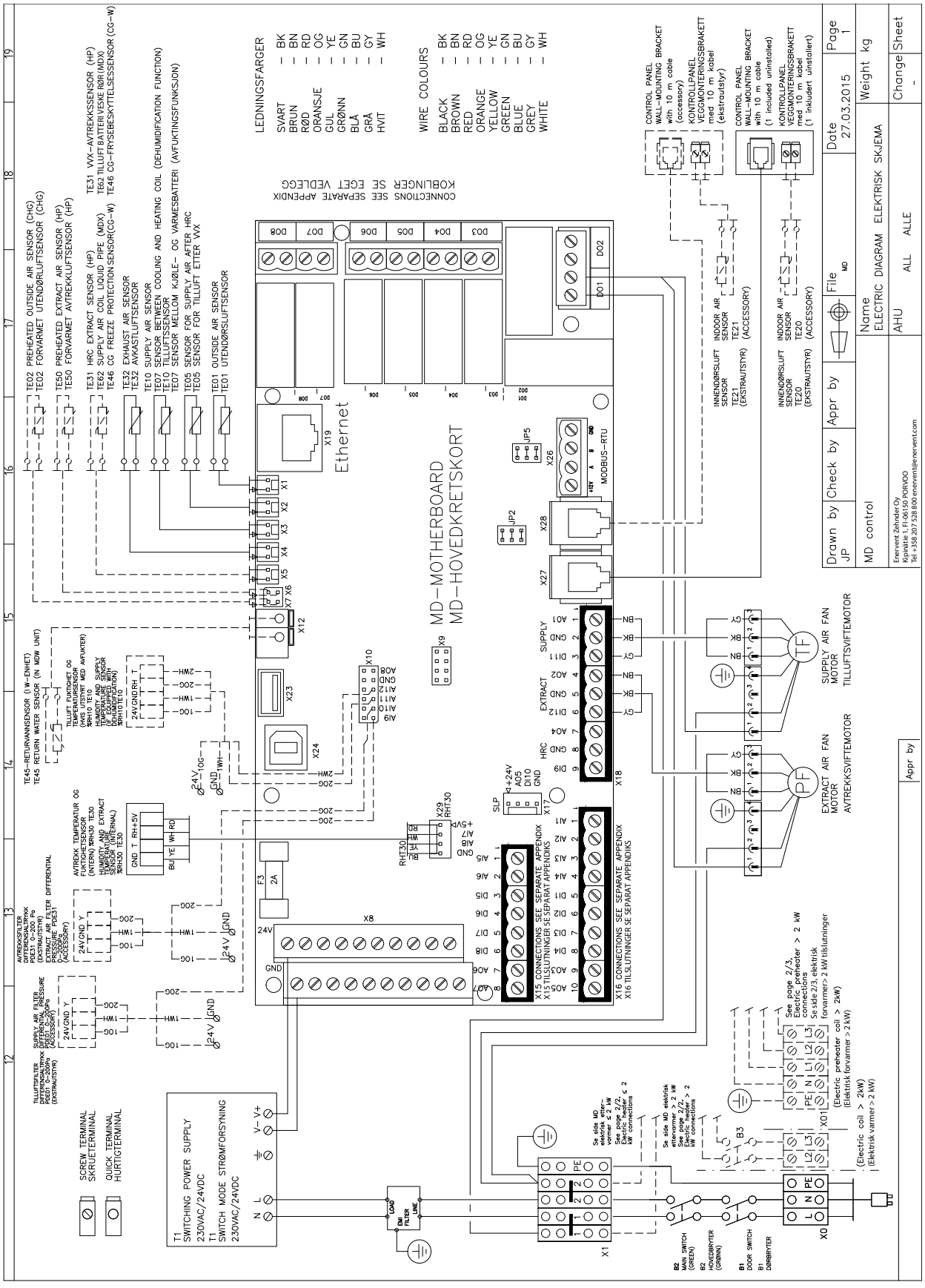
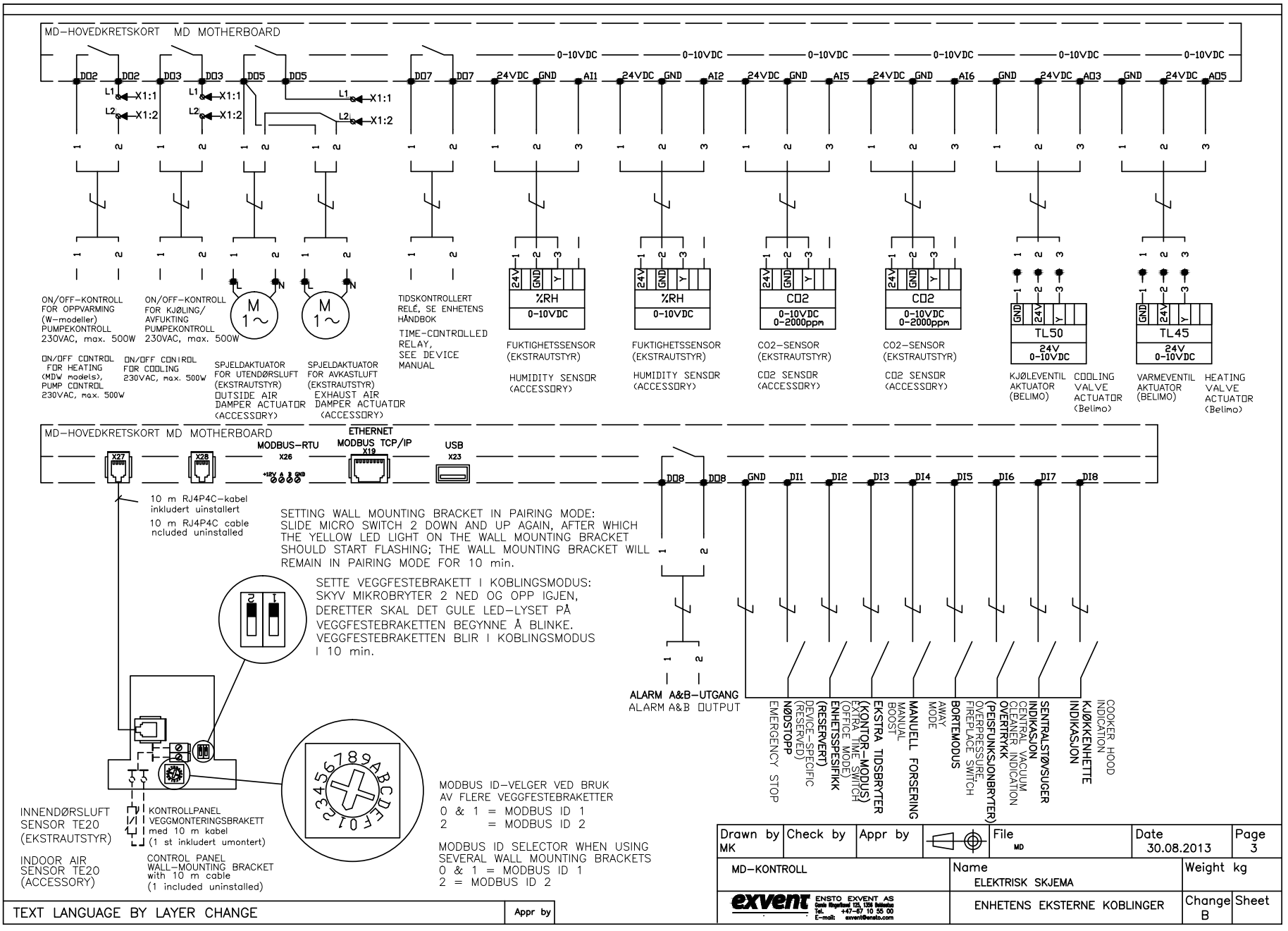
Dimensional drawings

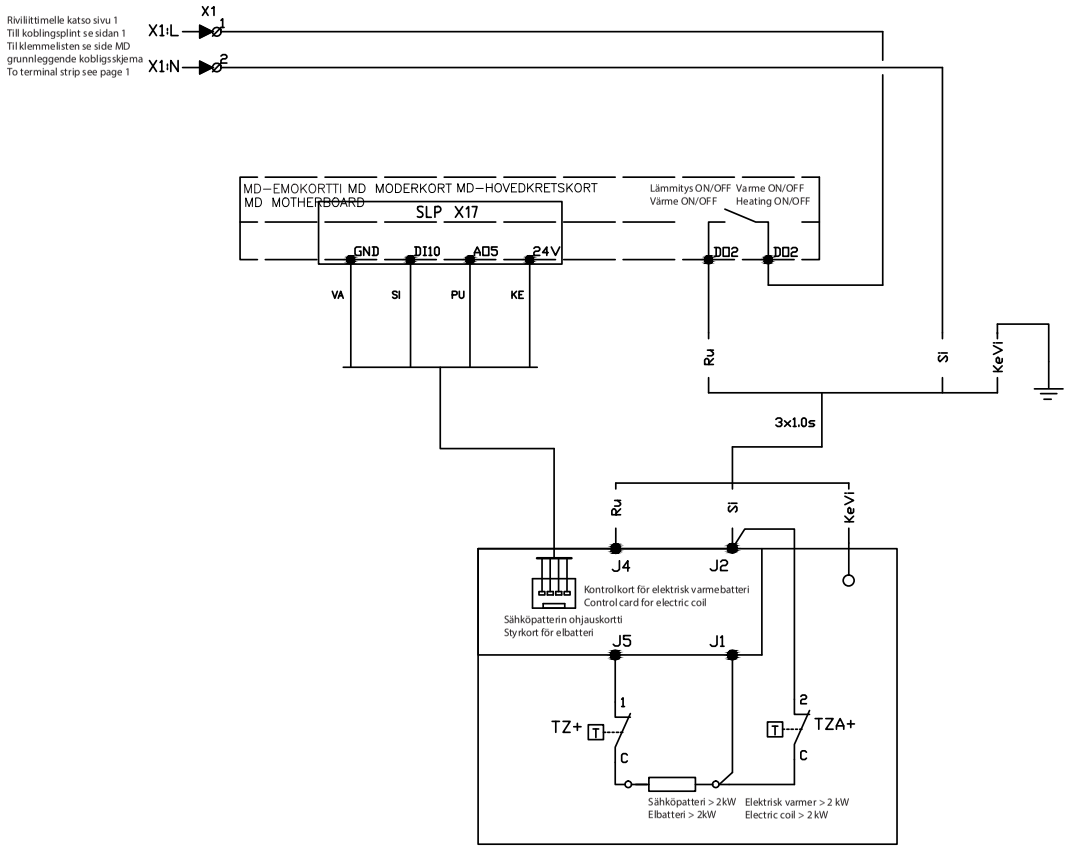


Electrical diagrams

Connections



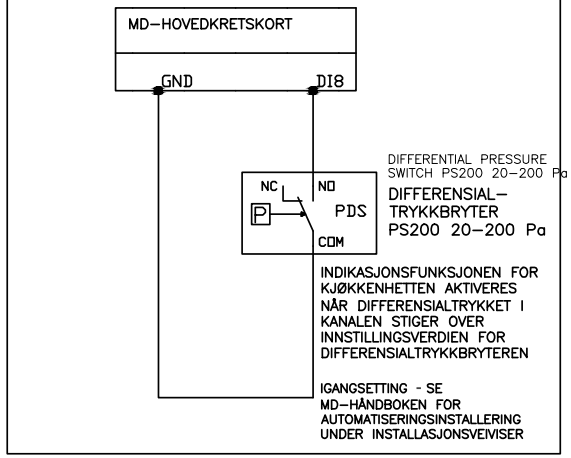

MD–HOVEDKRETSKORT MD MOTHERBOARD
DO2 DO2 DO3 DO3 DO5 DO5 DO7 DO7
L1 X1:1
L2 X1:2
0–10VDC
24VDC GND AI1 AI2 AI5 AI6 AI3 AI5
ON/OFF–KONTROLL FOR OPPVARMING (W–modeller) PUMPEKONTROLL 230VAC, max. 500W
ON/OFF–KONTROLL FOR KJØLING/ AVFUKTING PUMPEKONTROLL 230VAC, max. 500W
M 1~
TIDSKONTROLLERT RELÉ, SE ENHETENS HÅNDBOK
TIME–CONTROLLED RELAY, SEE DEVICE MANUAL
24V GND Y
%RH 0–10VDC
CO2 0–10VDC 0–2000ppm
TL50 24V 0–10VDC
TL45 24V 0–10VDC
ON/OFF CONTROL FOR HEATING (MDW models), PUMP CONTROL 230VAC, max. 500W
ON/OFF CONTROL FOR COOLING 230VAC, max. 500W
SPJELDAKTUATOR FOR UTENDØRSLUFT (EKSTRAUTSTYR) OUTSIDE AIR DAMPER ACTUATOR (ACCESSORY)
SPJELDAKTUATOR FOR AVKASTLUFT (EKSTRAUTSTYR) EXHAUST AIR DAMPER ACTUATOR (ACCESSORY)
FUKTIGHETSSENSOR (EKSTRAUTSTYR) HUMIDITY SENSOR (ACCESSORY)
CO2–SENSOR (EKSTRAUTSTYR) CO2 SENSOR (ACCESSORY)
KJØLEVENTIL AKTUATOR (BELIMO) COOLING VALVE ACTUATOR (Belimo)
VARMEVENTIL AKTUATOR (BELIMO) HEATING VALVE ACTUATOR (Belimo)
MD–HOVEDKRETSKORT MD MOTHERBOARD
X27 X28 MODBUS–RTU X26 +12V A B GND ETHERNET MODBUS TCP/IP X19 USB X23
10 m RJ4P4C–kabel inkludert uinstallert
10 m RJ4P4C cable ncluded uninstalled
SETTING WALL MOUNTING BRACKET IN PAIRING MODE: SLIDE MICRO SWITCH 2 DOWN AND UP AGAIN, AFTER WHICH THE YELLOW LED LIGHT ON THE WALL MOUNTING BRACKET SHOULD START FLASHING; THE WALL MOUNTING BRACKET WILL REMAIN IN PAIRING MODE FOR 10 min.
SETTE VEGGFESTEBRAKETT I KOBLINGSMODUS: SKYV MIKROBRYTER 2 NED OG OPP IGJEN, DERETTER SKAL DET GULE LED–LYSET PÅ VEGGFESTEBRAKETTEN BEGYNNE Å BLINKE. VEGGFESTEBRAKETTEN BLIR I KOBLINGSMODUS I 10 min.
DO8 DO8 GND DI1 DI2 DI3 DI4 DI5 DI6 DI7 DI8
ALARM A&B–UTGANG
ALARM A&B OUTPUT
NØDSTOPP EMERGENCY STOP
(RESERVERT) ENHETSSPESIFIKK (DEVICE–SPECIFIC (RESERVED)
(KONTOR–MODUS) EKSTRA TIDSBRYTER (EXTRA TIME SWITCH (OFFICE MODE)
MANUELL FORSERING MANUAL BOOST
BORTEMODUS AWAY MODE
(PEISFUNKSJONBRYTER) OVERTRYKK OVERPRESSURE FIREPLACE SWITCH
SENTRALSTØVSUGER INDIKASJON CENTRAL VACUUM CLEANER INDICATION
KJØKKENHETTE INDIKASJON COOKER HOOD INDICATION
INNENDØRSLUFT SENSOR TE20 (EKSTRAUTSTYR)
INDOOR AIR SENSOR TE20 (ACCESSORY)
KONTROLLPANEL VEGGMONTERINGSBRAKETT med 10 m kabel (1 st inkludert umontert)
CONTROL PANEL WALL–MOUNTING BRACKET with 10 m cable (1 included uninstalled)
MODBUS ID–VELGER VED BRUK AV FLERE VEGGFESTEBRAKETTER
0 & 1 = MODBUS ID 1
2 = MODBUS ID 2
MODBUS ID SELECTOR WHEN USING SEVERAL WALL MOUNTING BRACKETS
0 & 1 = MODBUS ID 1
2 = MODBUS ID 2
TEXT LANGUAGE BY LAYER CHANGE
Appr by
Drawn by MK
Check by
Appr by
File MD
Date 30.08.2013
Page 3
MD–KONTROLL
Name ELEKTRISK SKJEMA
Weight kg
exvent ENSTO EXVENT AS Tel. +47–67 10 55 00 E–mail: exvent@ensto.com
ENHETENS EKSTERNE KOBLINGER
Change B
Sheet



Piirt MK	Tark	Hyv		File MD	Pvm 30.08.2013	Sivu 2
MD-ohjaus sähköpatterin ≤ 2 kW kytkennät MD-Kontroll Elektrisk värmare ≤ 2 kW anslutningar MD-Kontroll Elektrisk varmeapparat ≤ 2 kW-koblinger MD Control Electrical heater ≤ 2 kW connections			Nimitys SÄHKÖKAAVIO KOPPLINGSCHEMA ELECTRIC DIAGRAM ELEKTRISK SKJEMA			Paino kg
Enervent Zehnder Oy Kipinätie 1, FI-06150 PORVOO Tel +358 207 528 800 enervent@enervent.com			KOJEEN SISÄISET KYTKENNÄT ENHETENS INTERNE KOBLINGER ENHETENS INTERNA ANSLUTNINGAR UNIT'S INTERNAL CONNECTIONS		Muutos B	Lehti 2

	Hyv

KJØKKENHETTE INDIKASJON
COOKER HOOD INDICATION



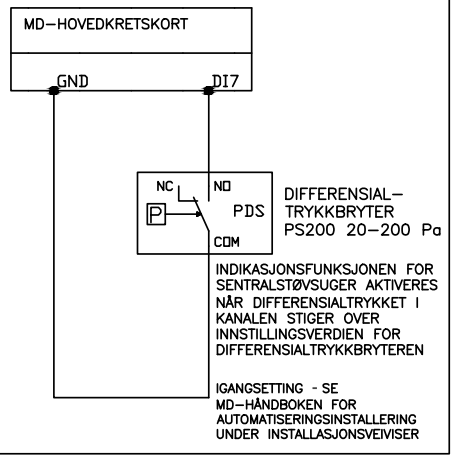
INDIKASJONSFUNKSJONEN FOR KJØKKENHETTEN AKTIVERES NÅR DIFFERENSIALTRYKKET I KANALEN STIGER OVER INNSTILLINGSVERDIEN FOR DIFFERENSIALTRYKKBRYTEREN

IGANGSETTING - SE MD–HÅNDBOKEN FOR AUTOMATISERINGSINSTALLERING UNDER INSTALLASJONSVEIVISER

THE COOKER HOOD INDICATION FUNCTION IS ACTIVATED WHEN THE DIFFERENTIAL PRESSURE N THE DUCT RISES ABOVE THE SETTING VALUE OF THE DIFFERENTIAL PRESSURE SWITCH

COMMISSIONING – SEE MD AUTOMATION INSTALLATION MANUAL UNDER SETUP WIZARD

INDIKASJON PÅ SENTRALSTØVSUGER
CENTRAL VACUUM CLEANER INDICATION



INDIKASJONSFUNKSJONEN FOR SENTRALSTØVSUGER AKTIVERES NÅR DIFFERENSIALTRYKKET I KANALEN STIGER OVER INNSTILLINGSVERDIEN FOR DIFFERENSIALTRYKKBRYTEREN

IGANGSETTING - SE MD–HÅNDBOKEN FOR AUTOMATISERINGSINSTALLERING UNDER INSTALLASJONSVEIVISER

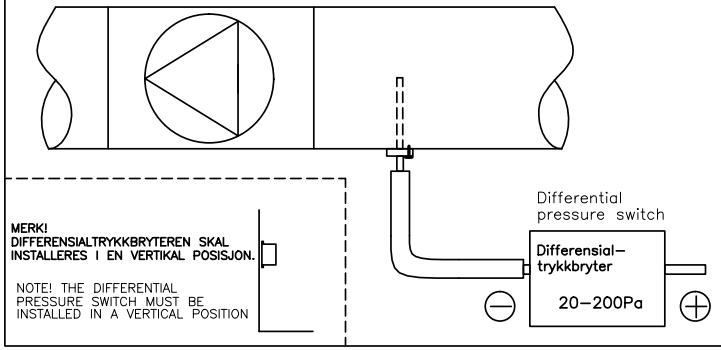
THE CENTRAL VACUUM CLEANER INDICATION FUNCTION IS ACTIVATED WHEN THE DIFFERENTIAL PRESSURE IN THE DUCT RISES ABOVE THE SETTING VALUE OF THE DIFFERENTIAL PRESSURE SWITCH

COMMISSIONING – SEE MD AUTOMATION INSTALLATION MANUAL UNDER SETUP WIZARD

OPTION 1:
IF THE DIFFERENTIAL PRESSURE WILL BE MEASURED ON THE SUCTION SIDE (BEFORE THE FAN), THE DIFFERENTIAL PRESSURE SWITCH'S MINUS (-) MEASURING CONNECTION IS CONNECTED TO THE DUCT. THE PLUS (+) MEASURING CONNECTION WILL NOT BE INSTALLED AND WILL MEASURE THE PRESSURE IN THE ROOM.

INSTALLERING AV DIFFERENSIALTRYKKBRYTER: DIFFERENTIAL PRESSURE SWITCH INSTALLATION:

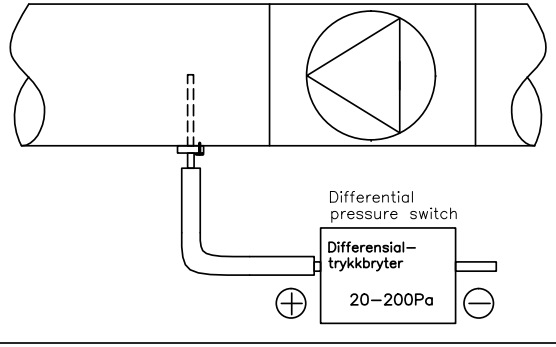
ALTERNATIV 1: HVIS DIFFERENSIALTRYKKET SKAL MÅLES PÅ SUGESIDEN (FØR VIFTEN), ER DIFFERENSIALTRYKKBRYTERENS MINUSMÅLEKOBLING (–) KOBLET TIL KANALEN. PLUSSMÅLEKOBLINGEN (+) KOBLES IKKE OG MÅLER TRYKKET I ROMMET.



MERK!
DIFFERENSIALTRYKKBRYTEREN SKAL INSTALLERES I EN VERTIKAL POSISJON.

NOTE! THE DIFFERENTIAL PRESSURE SWITCH MUST BE INSTALLED IN A VERTICAL POSITION

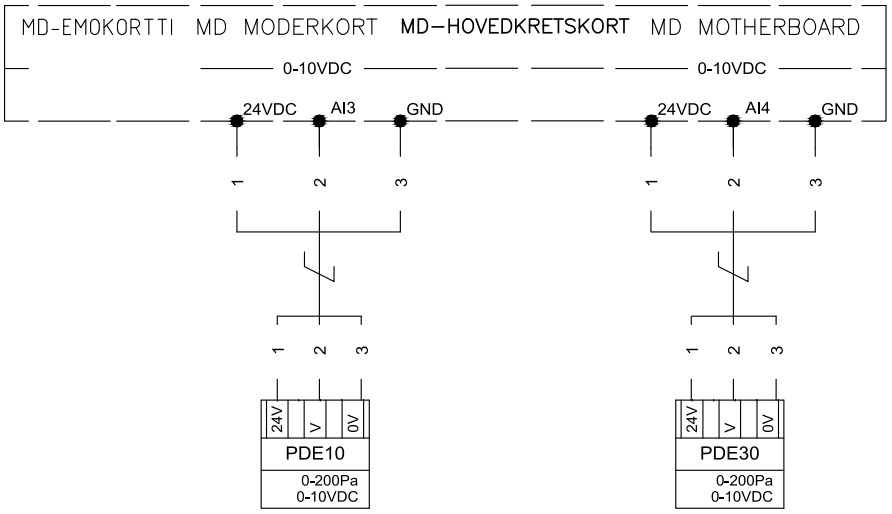
ALTERNATIV 2: HVIS DIFFERENSIALTRYKKET SKAL MÅLES PÅ LEVERINGSSIDEN (ETTER VIFTEN), ER DIFFERENSIALTRYKKBRYTERENS PLUSSMÅLEKOBLING (+) KOBLET TIL KANALEN. MINUSMÅLEKOBLINGEN (–) KOBLES IKKE OG MÅLER TRYKKET I ROMMET.



OPTION 1:
IF THE DIFFERENTIAL PRESSURE WILL BE MEASURED ON THE DELIVERY SIDE (AFTERTHE FAN), THE DIFFERENTIAL PRESSURE SWITCH'S PLUS (+) MEASURING CONNECTION IS CONNECTED TO THE DUCT. THE MINUS (-) MEASURING CONNECTION WILL NOT BE INSTALLED AND WILL MEASURE THE PRESSURE IN THE ROOM.

Drawn by MK	Check by	Appr by		File	Date 25.11.2013	Page 1
MD–KONTROLL Indikasjon for kjøkkenhette og sentralstøvsuger				Name ELEKTRISK SKJEMA		Weight kg
exvent ENSTO EXVENT AS Gamle Ringeriksvei 125, 1306 Bekkestua Tel. +47–67 10 55 00 E–mail: exvent@ensto.com				AHU ENHETENS EKSTERNE KOBLINGER	Change A	Sheet

TEXT LANGUAGE BY LAYER CHANGE	Appr by



TULOILMAN
KANAVAPAINE MITTAUS
PAINE–ERO LÄHETIN

TILLUFT KANALTRYCKSMATNING
TRYCKSKILLNADSGIVARE

**TRYKKMÅLING FOR TILLUFTSKANAL,
DIFFERENSIALTRYKKSENDER**

SUPPLY AIR DUCT PRESSURE
MEASUREMENT, DIFFERENTIAL
PRESSURE TRANSMITTER

POISTOILMAN
KANAVAPAINE MITTAUS
PAINE–ERO LÄHETIN

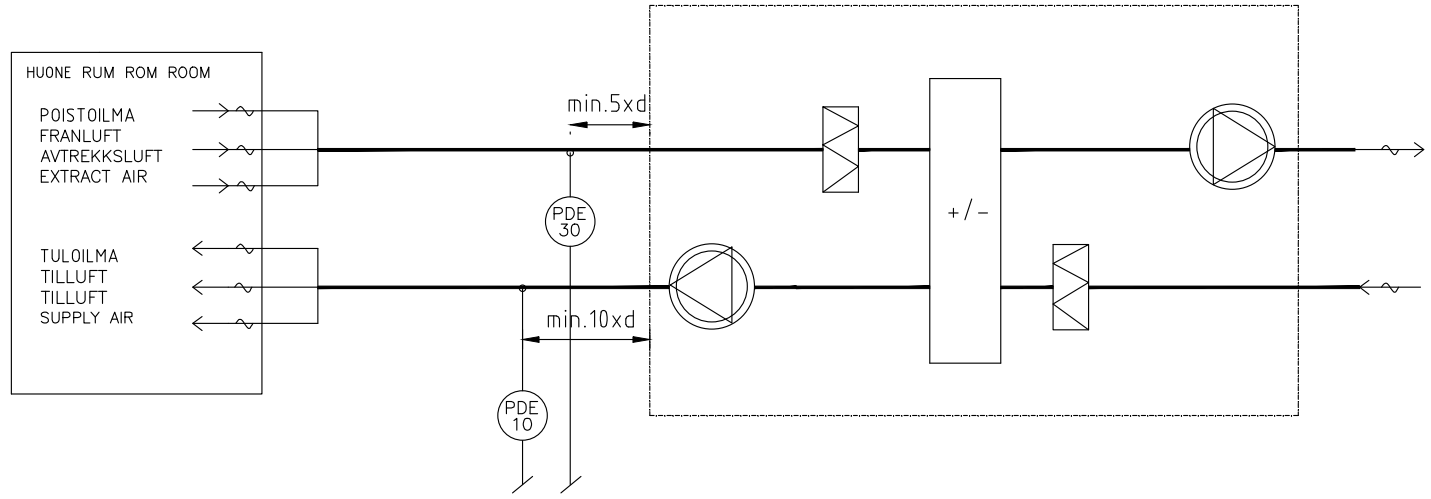
TRYCKSKILLNADSGIVARE
FRÅNLUFTENS
KANALTRYCKSMÄTNING

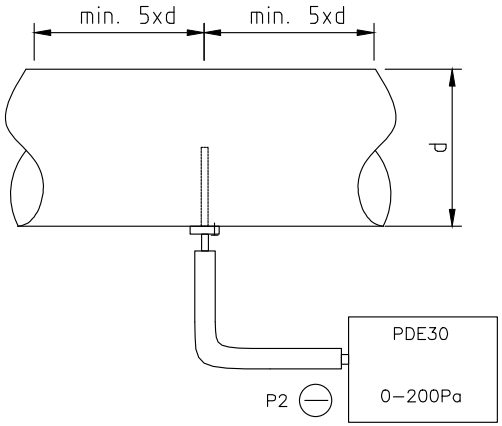
**TRYKKMÅLING FOR AVTREKKSLUFTSKANAL,
DIFFERENSIALTRYKKSENDER**

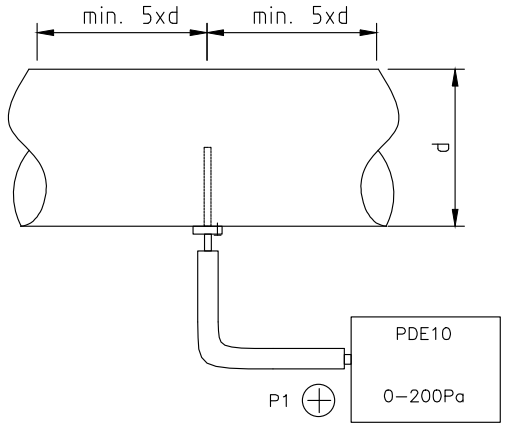
EXTRACT AIR DUCT PRESSURE
MEASUREMENT, DIFFERENTIAL
PRESSURE TRANSMITTER

Piirt MK	Tark	Hyv		File KANAVAPAINE	Pvm 12.12.2013	Sivu 1
MD Ohjaus PAINE–ERO LÄHETTIMIEN KYTKENTÄ			Nimitys SÄHKÖKAAVIO		Paino kg	
Enervent Zehnder Oy Kipinätie 1, FI-06150 PORVOO Tel +358 207 528 800 enervent@enervent.com			IV-koje KANAVAPAINE		Muutos A	Lehti

	Hyv

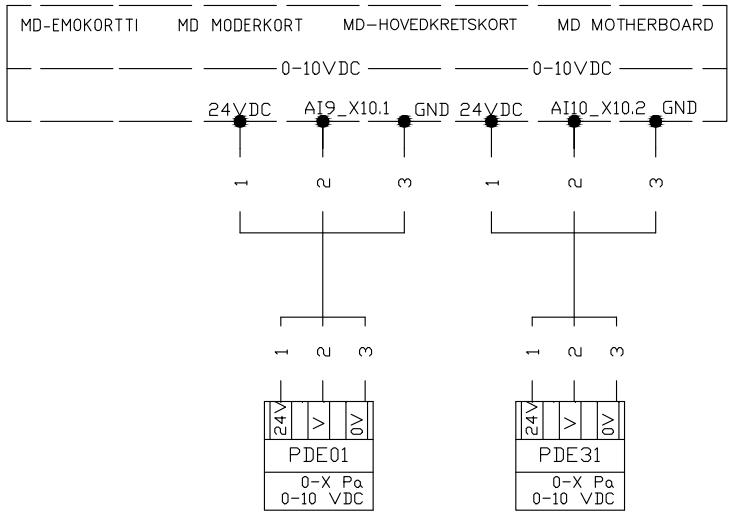






Piirt MK	Tark	Hyv		Tiedosto	Pvm 12.12.2013	Sivu	
			Nimitys KANAVAPAINEMITTAUS			Paino kg	
Enervent Zehnder Oy Kipinätie 1, FI-06150 PORVOO Tel +358 207 528 800 enervent@enervent.com			IV-koje			Muutos A	Lehti 1

				Hyv



TULOSUODATTIMEN
PAINE-ERO MITTAUS

TRYCKSKILLNADSGIVARE,
TILLUFTENS
FILTERTRYCKSMÄTNING

DIFFERENSTRYKK MÅLING
FOR TILLUFTSFILTER,
DIFFERENSIALTRYKKSENDER

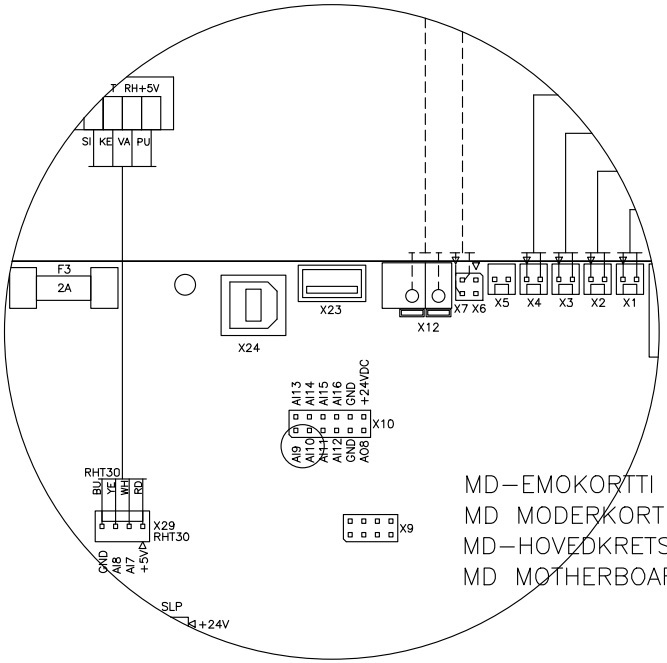
SUPPLY AIR FILTER
PRESSURE MEASUREMENT,
DIFFERENTIAL PRESSURE
TRANSMITTER

POISTOSUODATTIMEN
PAINE-ERO MITTAUS

TRYCKSKILLNADSGIVARE,
FRÅNLUFTENS
FILTERTRYCKSMÄTNING

DIFFERENSTRYKK MÅLING FOR
AVTREKKSLUFTSFILTER,
DIFFERENSIALTRYKKSENDER

EXTRACT AIR FILTER
PRESSURE MEASUREMENT,
DIFFERENTIAL PRESSURE TRANSMITTER



Kaapelivärit:

BK	MUSTA
BN	RUSKEA
RD	PUNAINEN
OG	ORANSSI
YE	KELTAINEN
GN	VIHREÄ
BU	SININEN
GY	HARMAA
WH	VALKOINEN

Kabelfärger:

BK	SVART
BN	BRUN
RD	RÖD
OG	ORANGE
YE	GUL
GN	GRÖN
BU	BLÅ
GY	GRÅ
WH	VIT

Ledningsfarger:

BK	SVART
BN	BRUN
RD	RØD
OG	ORANSJE
YE	GUL
GN	GRØNN
BU	BLÅ
GY	GRÅ
WH	HVIT

Wire colours:

BK	BLACK
BN	BROWN
RD	RED
OG	ORANGE
YE	YELLOW
GN	GREEN
BU	BLUE
GY	GREY
WH	WHITE

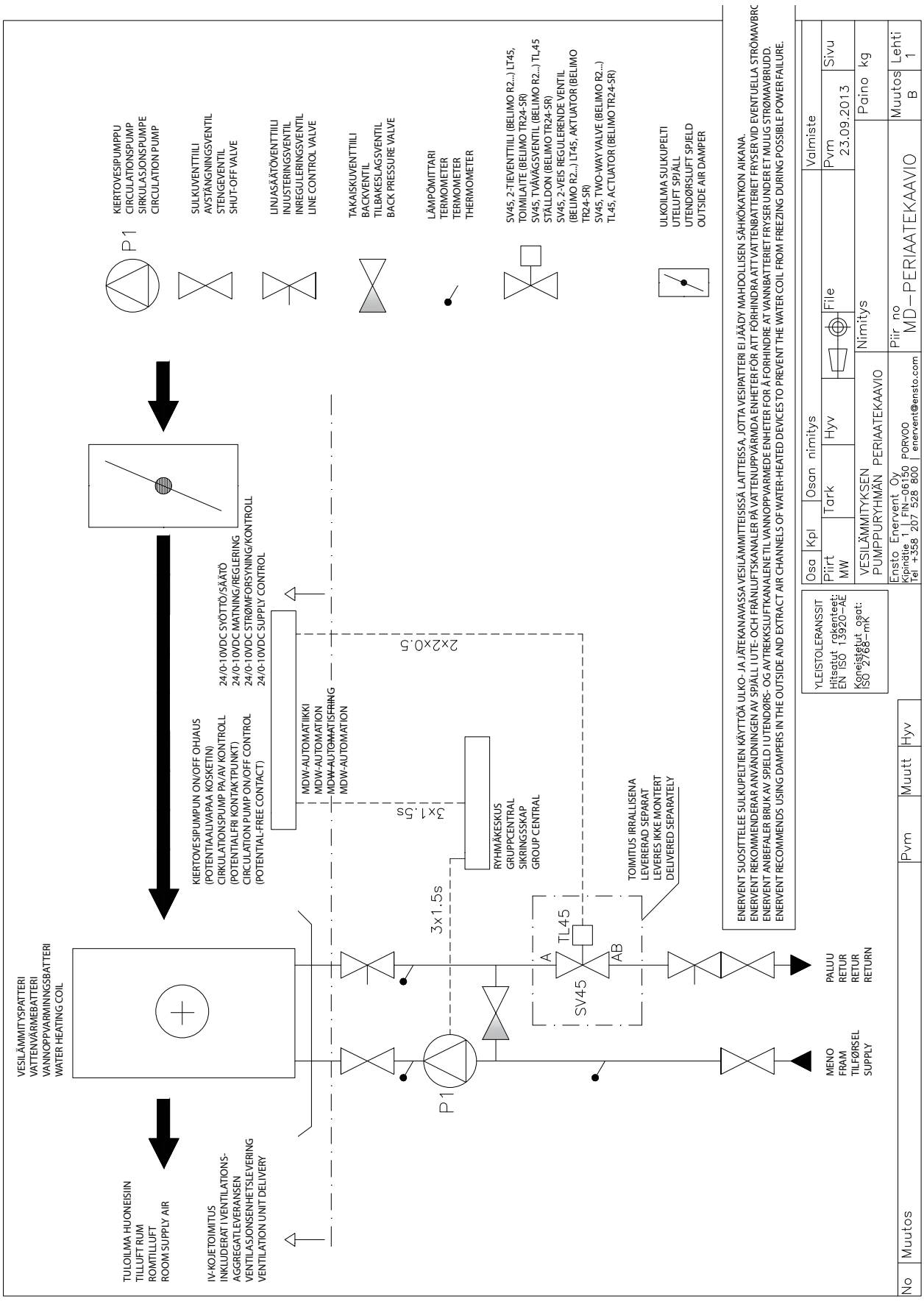
Piirt MK	Tark	Hyv		Tiedosto Suodatinvahti	Pvm 28.05.2014	Sivu 1
MD Ohjaus PAINE-ERO LÄHETTIMIEN KYTKENTÄ			Nimitys SÄHKÖKAAVIO		Paino kg	
Enervent Zehnder Oy Kipinätie 1, FI-06150 PORVOO Tel +358 207 528 800 enervent@enervent.com			SUODATINVAHTI		Muutos C	Lehti

	Hyv

Sensors

Nimi / Namn / Navn /Name	Selitys / Definition / Definisjon / Definition
TE01	Ulkoilma / Uteluft / Temperatur uteluft / Outside air
TE02	Ulkoilma esilämmittimen jälkeen / Uteluft efter förvärmare / Forvarmet utelufttemperatur, ekstern forvarmer / Outside air after preheater
TE05	LTO jälkeinen tuloilma / Tilluft efter VVX / Temperatur etter varmegjenvinning / Supply after HRW
TE07 (Dehum)	Tuloilma kuivatuksen jälkeen / Tilluft efter avfuktning / Tilluft etter avfuktning / Supply after dehumidification
TE10	Tuloilma / Tilluft / Tilluft / Supply air
TE20	Huonelämpötila / Rumstemperatur / Romstemperatur / Room temperature
TE30	Poistoilma / Frånluft / Avtrekk / Extract air
TE31 (HP)	Poistoilmapatterin jälkeinen / Efter frånluftbatteri / Etter fraluftsbatteri / Exhaust air after coil
TE32	Jäteilma / Avluft / Avkast / Waste air
TE45 (MDW)	Paluuvesi / Returvatten / TEMPERATURFØLER FOR RETURVANN eWind-MODELLER / Return water
TE46 (CGW)	CG jäätymisvaara / CG frysskydd / CG frostbeskyttelse / CG freeze protection
TE50 (HP)	Esilämmitetty poistoilma / Förmärmd avluft / Forvarmet avtrekksluft / Preheated exctract air
TE51 (HP Oceanic)	Poistoilma LTO:n jälkeen / Avluft efter VVX / Avkast etter varmegjenvinning / Exctract air after HRW
TE62 (MDX)	Kylmäaine lämpötila / Kylmedel temperatur / Kjølemiddel temperatur / Refrigerant temperature
TE80 (Aqua)	Varaajan lämpötila / Värmeackumulator temperatur / Varmeakkumulatortemperatur / Heat accumulator temperature
RH10 (Dehum)	Tuloilma %RH / Tilluft %RH / Tilluft %RH / Supply air %RH
%RH30	Poisto %RH / Frånluft %RH / Avtrekk %RH / Extract air %RH
%RH07 (Dehum)	Tulo %RH kuivatuksen jälkeen / Tilluft %RH efter avfuktning / Tilluft %RH etter avfuktning / Supply %RH after dehumidification
PDE10	Tulo paine-ero / Tilluft tryck differens / Tilluft trykkdifferanse / Supply pressure difference
PDS10 (MDE >3kW)	Tulo painevahti / Tilluft tryckvakt / Tilluft trykkbryter / Supply pressure switch
PDE30	Poisto paine-ero / Frånluft tryck differens / Avtrekk trykkdifferanse / Extract pressure difference

eAir W Principle schema



RECORD OF MEASURING AIR AMOUNTS AND SOUND LEVELS
FORTEGNELSE OVER MÅLING AV LUFTMENGDE OG LYDNIVÅ

Company / Sellskap:

Date / Dato:
Building / Objekt:
Ventilation unit / Ventilasjonsaggregat:
Serial number / Serienummer:

Performed by / Fremført av:

Filter: M5/M5 F7/M5 F7/F7 l/s m^3/h

Room /measuring point / floor Rom / målepunkt / etasje	Supply air / Tilluft					Extract air / Avtrekk						
	Terminal device Terminal enhet	Planned air amount Planert luft-mengde	Measured air amount Målt luft-mengde	p Pa	Setting Innstilling	Terminal device Terminal enhet	Planned air amount Planert luft-mengde	Measured air amount Målt luft-mengde	p Pa	Setting Innstilling	Lpa dB(A)	Note! Merk!

Total planned air amounts / Totalt planlagte luftmengde	supply air / tilluft:		extract air / avtrekk:		
Total realized air amounts / Totalt realisert luftmengde	supply air / tilluft:		extract air / avtrekk:		
Air amount / Luftmengde Fanspeed+difference/ Viftehastighet+forskjell	Home / Hjemme	Away / Borte	Forsterkning		
Measuring instrument / Måleinstrument:					
Weather conditions / Værforhold:					
Underpressure in the building / Undertrykk i bygningen:	Pa				

EZ_INSTALLATION INSTRUCTION, LTR-3 eAir, en, 02/2022, subject to change without notice

Enervent Zehnder Oy
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FIN-06150 Porvoo, Finland
Tel. +358 207 528 800
enervent@enervent.com
www.enervent.com

Frejagatan 8
SE-506 34 Borås, Sverige
Tel. +46 33-120 200
enervent@enervent.se
www.enervent.se

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NO-1339 Vøyenenga, Norge
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www.exvent.no