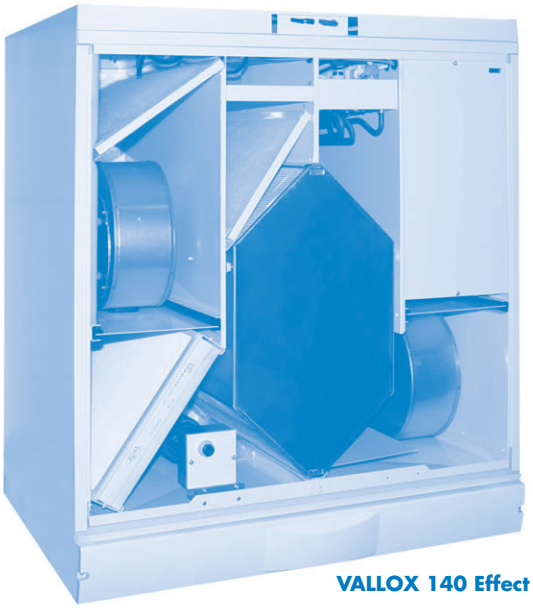
• 1.09.358 E
• 14.10.2008
• Code 3530

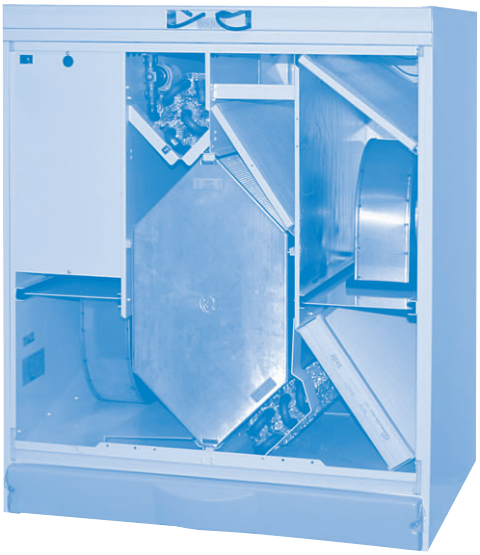
VALLOX 140 Effect SE

Code 3530



VALLOX 140 Effect SE L

DIGIT SED
ELECTRONIC CONTROLLER
WITH LCD DISPLAY



VALLOX 140 Effect SE MLV R

TECHNICAL SPECIFICATION

MODELS:

VALLOX 140 Effect SE L
VALLOX 140 Effect SE R
VALLOX 140 Effect SE VKL L
VALLOX 140 Effect SE VKL R
VALLOX 140 Effect SE MLV L
VALLOX 140 Effect SE MLV R

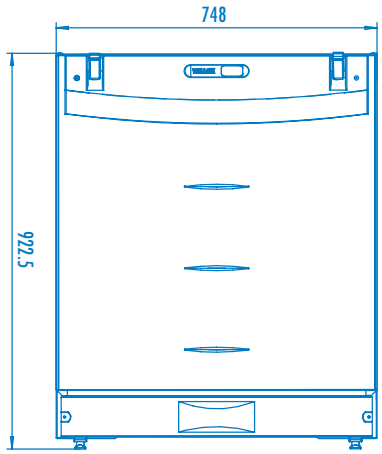
- Supply and extract air ventilation with heat recovery
- Silent operation
- Energy-efficient unit; high-efficiency counter-current cell and direct current fans
- Electronic DIGIT SED control or wireless remote monitoring
- Week clock control as a standard feature
- Humidity control (option)
- Carbon dioxide control (option)
- Maintenance reminder
- Summer / winter automation
- Fireplace / booster switch function at the controller
- Good filtering
- Fixed air flow measurement outlets
- The MLV model is especially designed for use with ground heat systems.

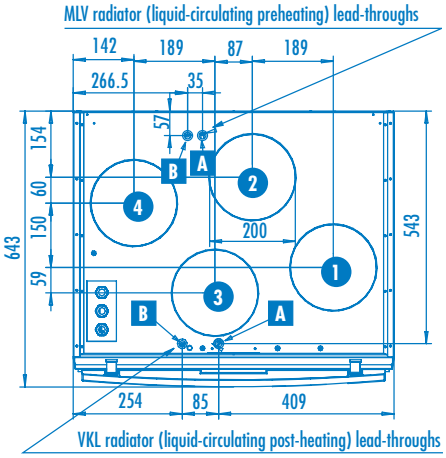
Electrical connection		230 V, 50 Hz, ≈ 9.52 A
Class of protection		IP 34
Fans direct current (DC)	Extract air 0.105 kW 0.46 A	120 dm^3/s (100 Pa)
	Supply air 0.105 kW 0.46 A	108 dm^3/s (100 Pa)
Heat recovery		Counter-current cell, η >80 %
Heat recovery bypass		Summer / winter automation
VALLOX 140 Effect SE		
	Preheating unit (standard)	Electric, 1000 W
	Post-heating unit (standard)	Electric, 1000 W
VALLOX 140 Effect SE VKL		
	Preheating unit (standard)	Electric, 1000 W
	Post-heating unit (standard)	VKL water radiator
VALLOX 140 Effect SE MLV		
	Preheating unit (standard)	MLV heating / cooling radiator unit
	Post-heating unit (option)	VKL water radiator
Filters	Supply air	G3 and F7
	Extract air	G3
Weight		102 kg
Ventilation adjustment options		- control via control panel
		- week clock control
		- CO_2 and %RH control (option)
		- wireless remote control (option)
Options		- CO_2 sensor
		- %RH sensor
		- wireless remote control
		- filter guard (supply and/or extract air)
		- LON converter

VALLOX 140 Effect SE/VKL/MLV

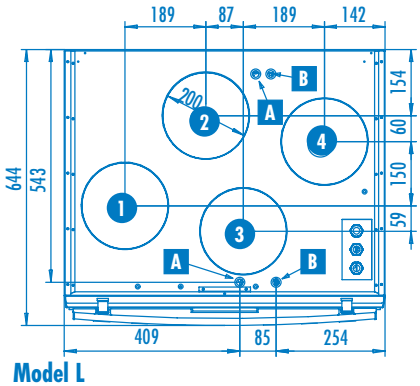
DIMENSIONS AND MAIN PARTS

Dimensions and duct outlets





Model R



Model L

Inner diameter of female outlets
⌀ 200 mm

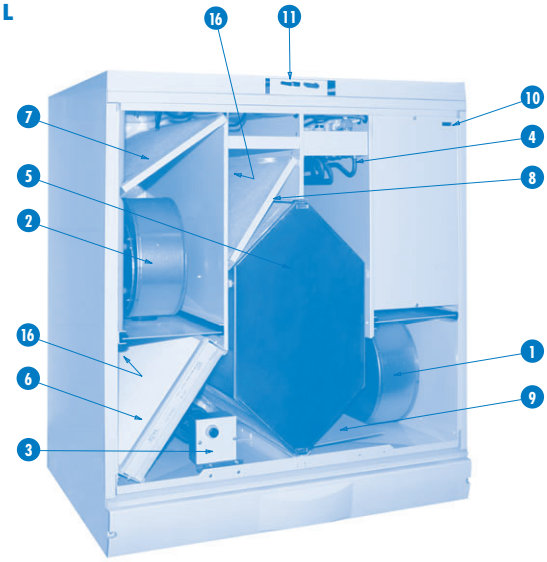
1. Outdoor air to the unit
2. Extract air from the dwelling
3. Supply air to the dwelling
4. Exhaust air outside

A Return water

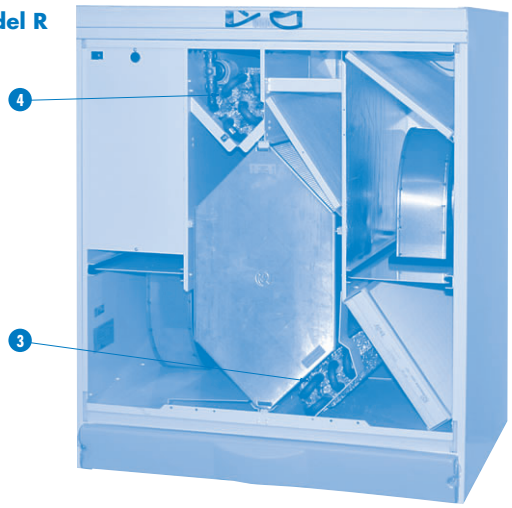
B Supply water

Unit weight 102 kg

VALLOX 140 Effect SE model L



VALLOX 140 Effect SE MLV model R



DIGIT SED
ELECTRONIC CONTROLLER WITH LCD DISPLAY

12 13 14 15

Main parts

1. Extract air fan
2. Supply air fan
3. Preheating radiator (electric radiator 1000 W or MLV heating / cooling radiator)
4. Post-heating radiator (electric radiator 1000 W or VKL radiator)
5. Heat recovery cell
6. Outdoor air filter F7
7. Outdoor air filter G3
8. Extract air filter G3
9. Summer / winter damper
10. Safety switch
11. Measurement outlets
12. Control panel DIGIT SED

Options

13. Carbon dioxide sensor
14. Humidity sensor
15. LON/EIB converter
16. Filter guard (supply and/or extract air)

VALLOX 140 Effect SE/VKL/MLV

PERFORMANCE

Air volumes

SUPPLY / EXTRACT AIR VOLUMES DC FANS

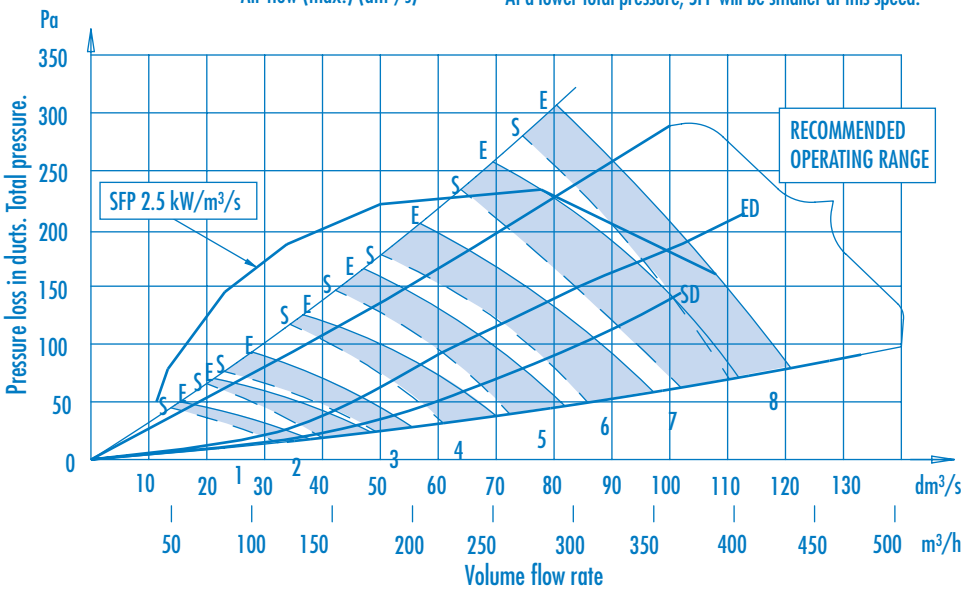
E = Extract air fan
S = Supply air fan

ED and SD are examples of pressure losses in supply and extract ducts

SFP (Specific Fan Power)
guideline value < 2.5 (kW/m³/s)

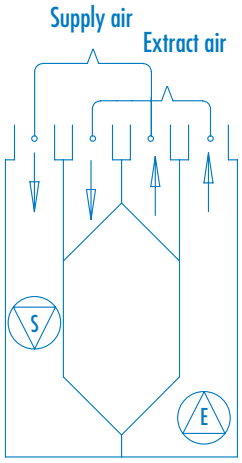
$$SFP = \frac{\text{Input power (total) (W)}}{\text{Air flow (max.) (dm}^3\text{/s)}}$$

At a lower total pressure, SFP will be smaller at this speed.



Measuring points after the connection outlet.

Fan curves indicate the total pressure available for duct losses.



Fan speeds	Extract air flow (l/s)	Fan input power W
1	35	30
2	45	40
3	55	50
4	70	80
5	85	110
6	97	160
7	115	225
8	125	280

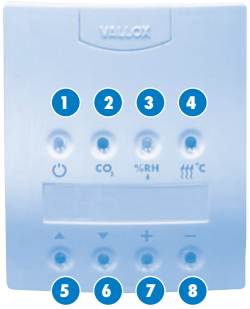
Sound values

		Sound power level from the ventilation unit to supply air ducts by octave band Lw, dB				Sound power level from the ventilation unit to extract air ducts by octave band Lw, dB			
		ADJUSTMENT POSITION / AIR FLOW				ADJUSTMENT POSITION / AIR FLOW			
	Hz	2 34 l/s	4 57 l/s	6 80 l/s	8 107 l/s	2 38 l/s	4 61 l/s	6 91 l/s	8 116 l/s
Medium frequency of the octave band, Hz	63	57	65	70	75	72	74	79	79
	125	57	58	65	71	53	59	65	70
	250	40	46	53	58	42	48	56	60
	500	35	41	46	51	35	41	46	50
	1000	31	37	42	45	36	42	45	48
	2000	21	29	36	42	25	33	39	45
	4000	14	23	29	35	14	24	31	37
	8000			18	27				27
	L_W, dB	60	66	71	77	72	74	79	80
	L_{WA}, dB(A)	41	47	53	58	44	49	54	58

	A-weighted sound pressure level dB (A) coming from the unit through the envelope in rooms where the unit has been installed (10 m² sound absorption)				
	ADJUSTMENT POSITION / AIR FLOWS (supply / extract)				**VALLOX 140 Effect SE**
	2 37/45 l/s	4 56/65 l/s	6 77/78 l/s	8 100/109 l/s	
L_{pA}, dB(A)	33	35	41	46	

VALLOX 140 Effect SE/VKL/MLV

CONTROL PANEL



Keyboard

Control

VALLOX 140 Effect SE can be controlled with a control panel coming with the unit (3 at most) and with optional CO_2 (5 at most) and %RH sensors (2 at most). Fan speeds of the unit can be controlled via remote monitoring with a voltage or current signal. In case of disturbances, a potential-free relay contact signal is issued.

With an optional VALLOX LON converter, the whole operation of the unit can be controlled via remote monitoring.

Week clock control

The week clock in the control panel of the unit can be used to programme the desired fan power option (1…8) for each hour in the day.

Control panel

1 Start button
With this button, you switch the unit on and off.
When the indicator is lit, the unit is on.

2 Carbon dioxide adjustment
With this button, you set carbon dioxide adjustment on and off.
When the indicator is lit, the adjustment is on.

3 Humidity adjustment
With this button, you set humidity adjustment on and off.
When the indicator is lit, the adjustment is on.

4 Post-heating
Press this button to switch post-heating on and off. Preheating also switches on. When the indicator is lit, post-heating is on. The summer function is active when the indicator is not lit.

5 Scrolling up
With this button, you can scroll the displays upward.

6 Scrolling down
With this button, you can scroll the displays downward.

7 Increase button
With this button, you can increase values.

8 Decrease button
With this button, you can decrease values.

Main display

3	Fan speed (3).		Maintenance reminder alert.
21 C	Supply air temperature (21 °C).		Fireplace / booster switch on. The fireplace / booster switch is activated in this display by simultaneously pressing down the + and – buttons for 2 seconds.
	Post-heating is on.		
10:20	Time.		
	Filter guard alert.		Week clock control on.

Fan speed can be changed in this display with the + and – buttons

Panel address
1

Mounting, removing and wiring of control panel

The control panel is wired straight from the electrical connection box. The control panel can also be connected in series with a CO_2 sensor or another control panel. (See External electrical connections on page 7).

Control panel addresses

If two or more control panels are connected to the system, the addresses of the control panels need to be changed.

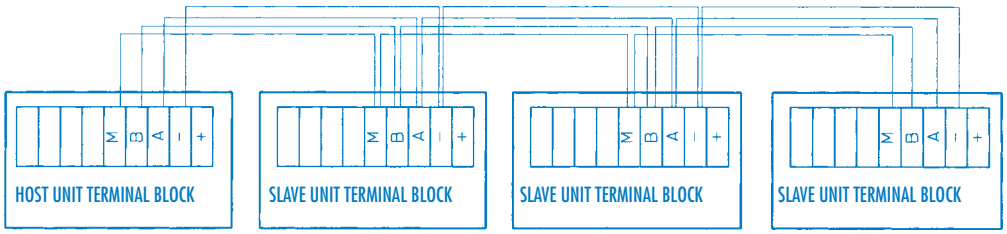
E.g. 3 control panels.

- Connect the first control panel to the unit and change its address to 3.
- Connect the second control panel to the unit and change its address to 2.
- Connect the third control panel and make sure that its address is 1.

If control panels have the same address, they go to bus fault state. In this case, remove one of the control panels and change the address of the other panel. The above mentioned situation can arise in connection with the later installation of an additional control panel.

Connecting two or more units (slave unit)

Connect slave units as specified in the adjoining connection instructions. Slave units do not operate independently, but follow the instructions received from the host unit. Neither control panel nor sensors must be connected to a slave unit.



NOTE! + wire must not be connected to a SLAVE UNIT.

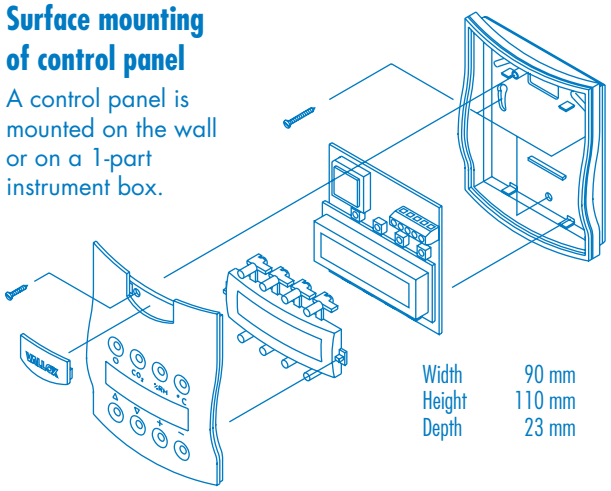
SLAVE UNIT must not have a 6K8 resistor in place.

VALLOX 140 Effect SE/VKL/MLV

MOUNTING THE CONTROL PANEL AND SENSORS

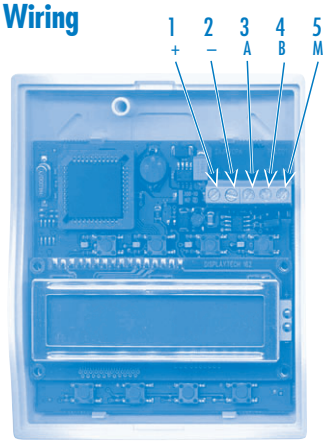
Surface mounting of control panel

A control panel is mounted on the wall or on a 1-part instrument box.



Width	90 mm
Height	110 mm
Depth	23 mm

Wiring



Electronics board of control panel

Cable:
NOMAK 2 x 2 x 0.5 mm² + 0.5 mm²

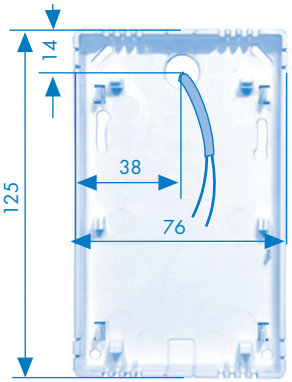
NOTE!
Faulty coupling of the (+) wire destroys the control panel!

1 = orange 1	= +	} ca. 21 VDC
2 = white 1	= –	
3 = orange 2	= A	
4 = white 2	= B	
5 = metal	= signal ground	

Mounting and wiring of humidity sensor

The sensor is wired straight from the electrical connection box of the unit.

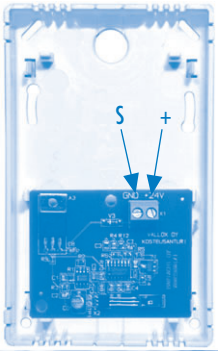
Surface mounting



Base plate of sensor

Wiring

Electronics board of %RH sensor

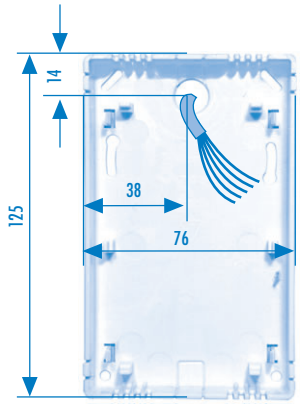


Cable:
2 x 0,5 mm²

Mounting and wiring of carbon dioxide sensor

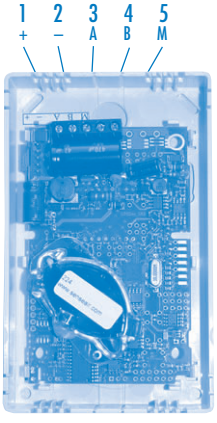
The CO_2 sensor is connected directly from the connection box of the unit, or in series with another CO_2 sensor or control panel (see External electrical connections on page 7).

Surface mounting



Base plate of the CO_2 sensor

Wiring



Electronics card of the CO_2 sensor (model may vary)

Cable:
NOMAK 2 x 2 x 0.5 mm² + 0.5 mm²

NOTE!

Faulty coupling of the (+) wire destroys the carbon dioxide sensor!

1 = orange 1	= +	} ca. 21 VDC
2 = white 1	= –	
3 = orange 2	= A	
4 = white 2	= B	
5 = metal	= signal ground	

HUMIDITY SENSORS

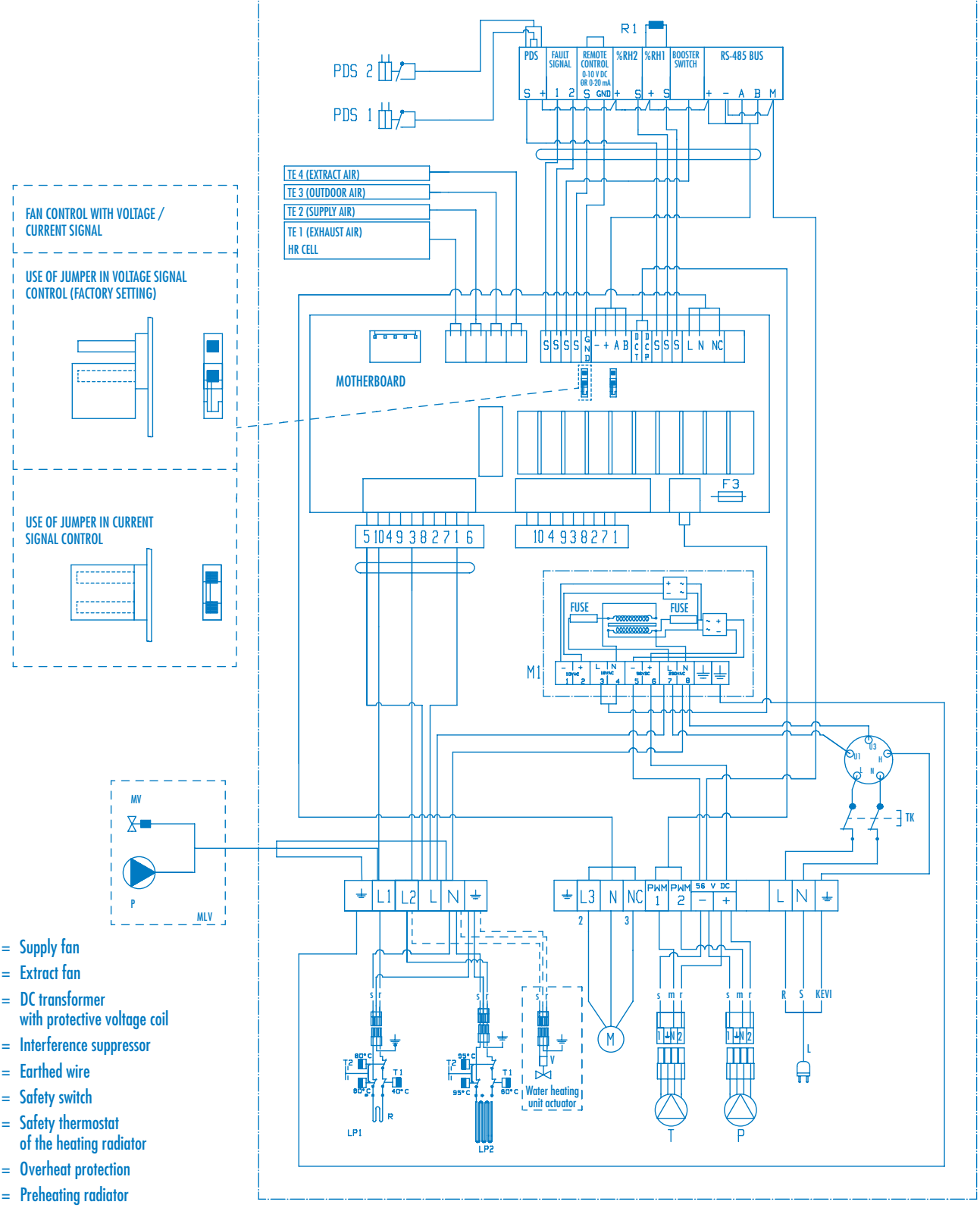
- When mounting two or more humidity sensors, connect them to the terminal block of the connection box by connecting the first humidity sensor to %RH1, in place of the resistor 6K8 in the terminal block (remove the resistor in this case), and the second humidity sensor to %RH2. See the electrical diagram.

CARBON DIOXIDE SENSORS

- Carbon dioxide sensors are connected individually.
- When the first carbon dioxide sensor has been connected to the system, the unit is switched on. After this, the unit gives the sensor an address. Follow the same steps for other carbon dioxide sensors.

VALLOX 140 Effect SE/VKL/MLV

INTERNAL CONNECTION DIAGRAM



T = Supply fan
P = Extract fan
M1 = DC transformer with protective voltage coil
H = Interference suppressor
L = Earthed wire
TK = Safety switch
T1 = Safety thermostat of the heating radiator
T2 = Overheat protection
LP1 = Preheating radiator
LP2 = Post-heating radiator
V = Water radiator thermostat valve
M = Damper motor
TE = Temperature sensors
R1 = Auxiliary resistor 6.8 kohm

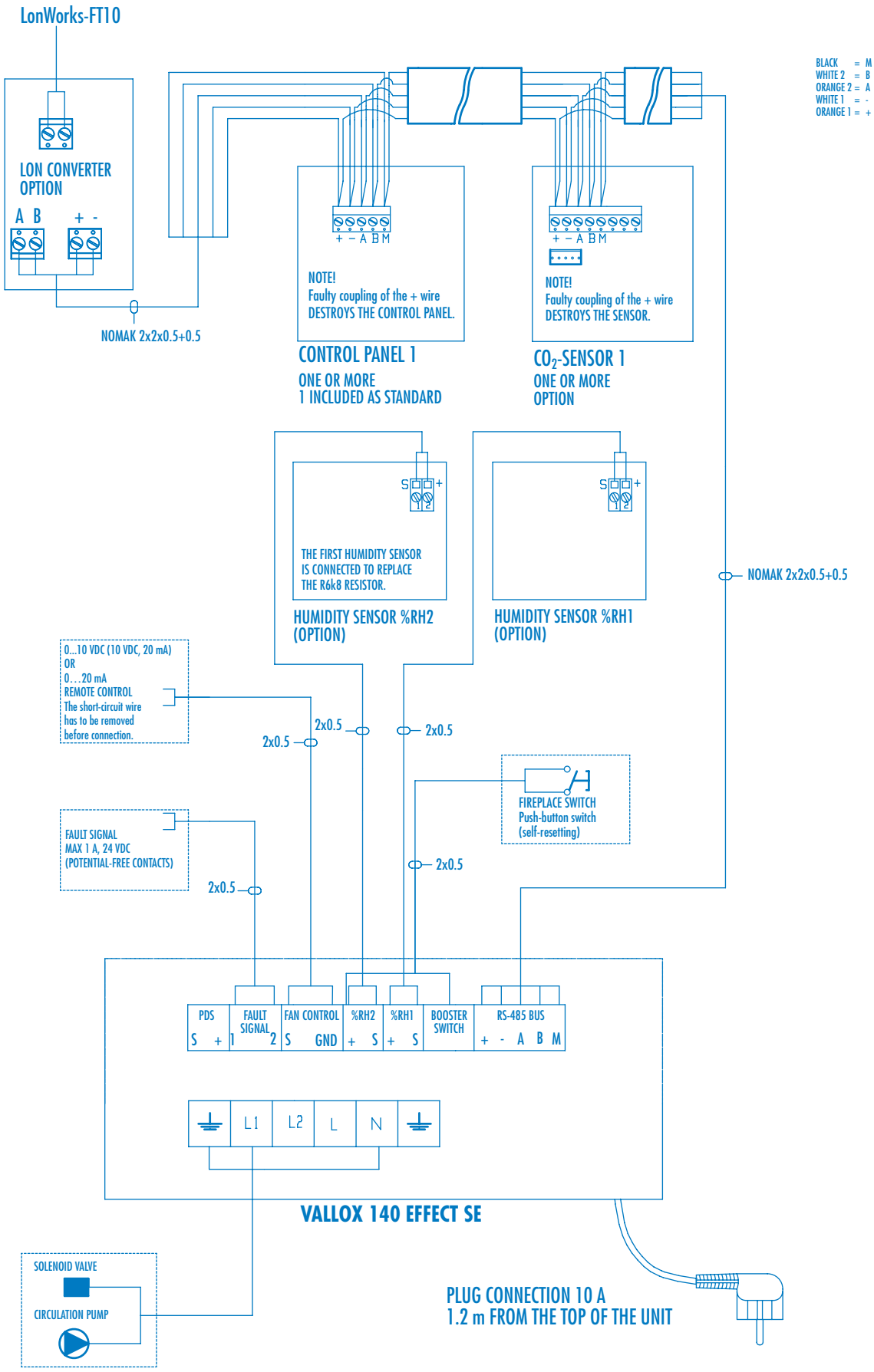
PDS1 = Filter guard for the supply air ductwork (option)
PDS2 = Filter guard for the extract air ductwork (option)
MV = Solenoid valve
P = Circulation pump

Wire colours:

s = blue
r = brown
m = black
kevi = yellow-green

VALLOX 140 Effect SE/VKL/MLV

EXTERNAL ELECTRICAL DIAGRAM



VALLOX 140 Effect SE/VKL/MLV

FILTERING, HEAT RECOVERY, HEATING

Filtering

Efficient filtering of outdoor air (G3 + F7) prevents harmful particles from entering the ductwork and rooms via the unit. Good filtering of extract air (G3) diminishes the contamination of the unit and ensures efficient heat recovery and extract air fan operation. Clogging of the supply/extract air filters can be monitored by equipping the unit with a pressure difference switch.

Heat recovery and heating

With efficient heat recovery most of the heat from contaminated extract air can be transmitted to outdoor air coming inside. The efficiency of the heat recovery cell is circa 80%. If outdoor air does not get sufficiently warm in the heat recovery cells, it can be heated with a water or electric post-heating unit.

The unit features an automatic heat recovery bypass function, which eliminates needless heating of outdoor air during summer.

Antifreezing

The automatic antifrost function of the heat recovery cell intermittently stops the supply air fans when the temperature of exhaust air goes under the set threshold value. In order to minimise momentary stoppages of the supply air fans the unit is also equipped with an electric preheating unit or a liquid-circulating preheating radiator (MLV).

Electric preheating unit (standard equipment)

- In VALLOX 140 Effect SE and VALLOX 140 Effect SE VKL units
- Power 1.0 kW, 4.3 A

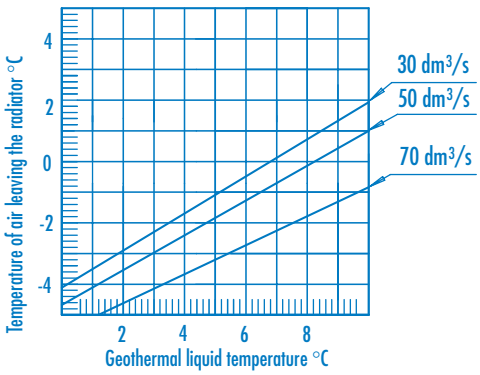
MLV heating / cooling preheating unit (standard)

- In VALLOX 140 Effect SE MLV unit

MLV radiator heating power (500-1500 W)

An outdoor temperature value which starts preheating is set at the control panel. The value must be lower than the temperature of the liquid coming from the ground collector.

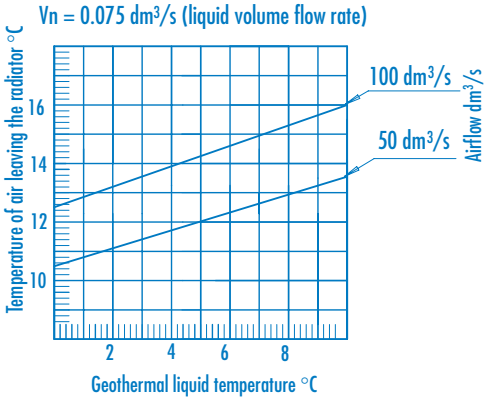
Ethylene glycol 25%
ti = -12 °C (supply air temperature)
Vn = 0.075 dm³/s (liquid volume flow rate)



MLV radiator cooling power (800-2000 W)

Supply air temperature is chosen at the control panel. Because of the risk of humidity damage supply air temperature in a duct with no condensation insulation should not go below +16...20 °C in hot weather.

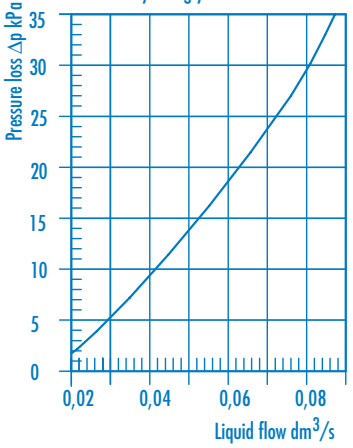
Ethylene glycol 25%
ti = 25 °C (supply air temperature)
Relative humidity RH 50%
Vn = 0.075 dm³/s (liquid volume flow rate)



MLV radiator pressure loss in liquid circulation

(MLV radiator causes a small pressure loss also in air flow.)

Ethylene glycol 25%



Electric post-heating unit (standard equipment)

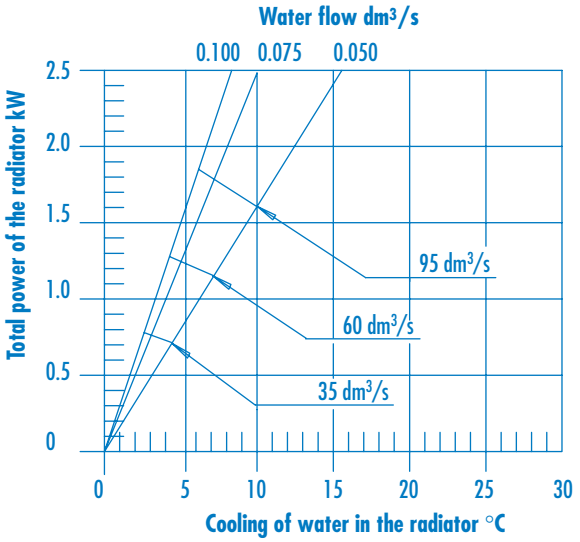
- In VALLOX 140 Effect SE unit.
- Power 1.0 kW, 4.3 A.

Water post-heating unit

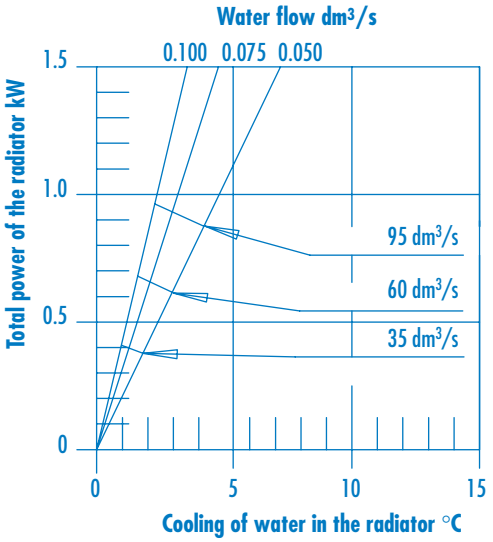
In VALLOX 140 Effect SE VKL unit standard equipment, VALLOX 140 Effect SE MLV unit optional equipment.

Performance of the water post-heating radiator (VKL) in VALLOX 140 Effect SE

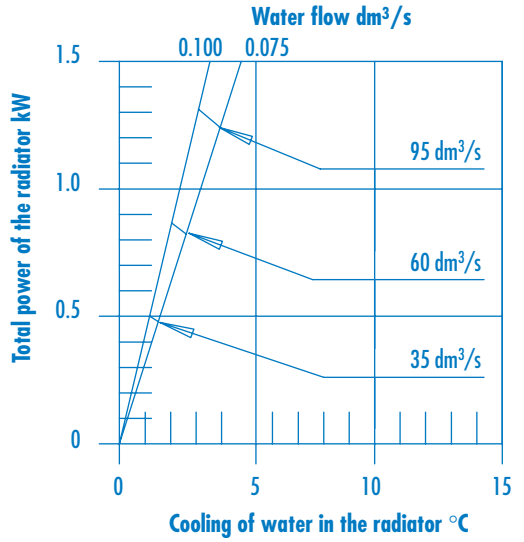
ti = 13 °C (temperature of air coming to the radiator)
tv = 50 °C (temperature of water coming to the radiator)



ti = 13 °C (temperature of air coming to the radiator)
tv = 30 °C (temperature of water coming to the radiator)

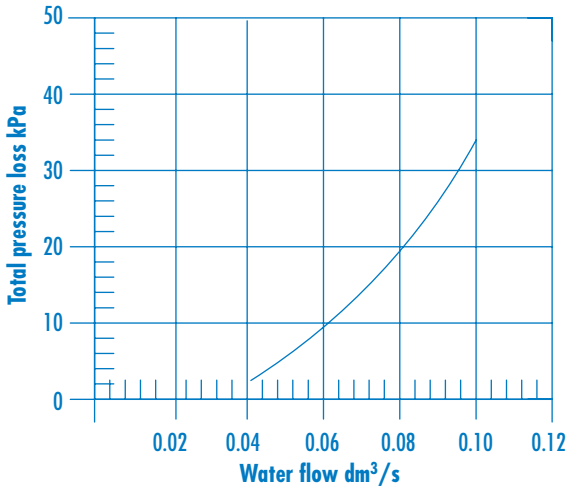


ti = 13 °C (temperature of air coming to the radiator)
tv = 35 °C (temperature of water coming to the radiator)



VKL water radiator pressure loss in water circulation

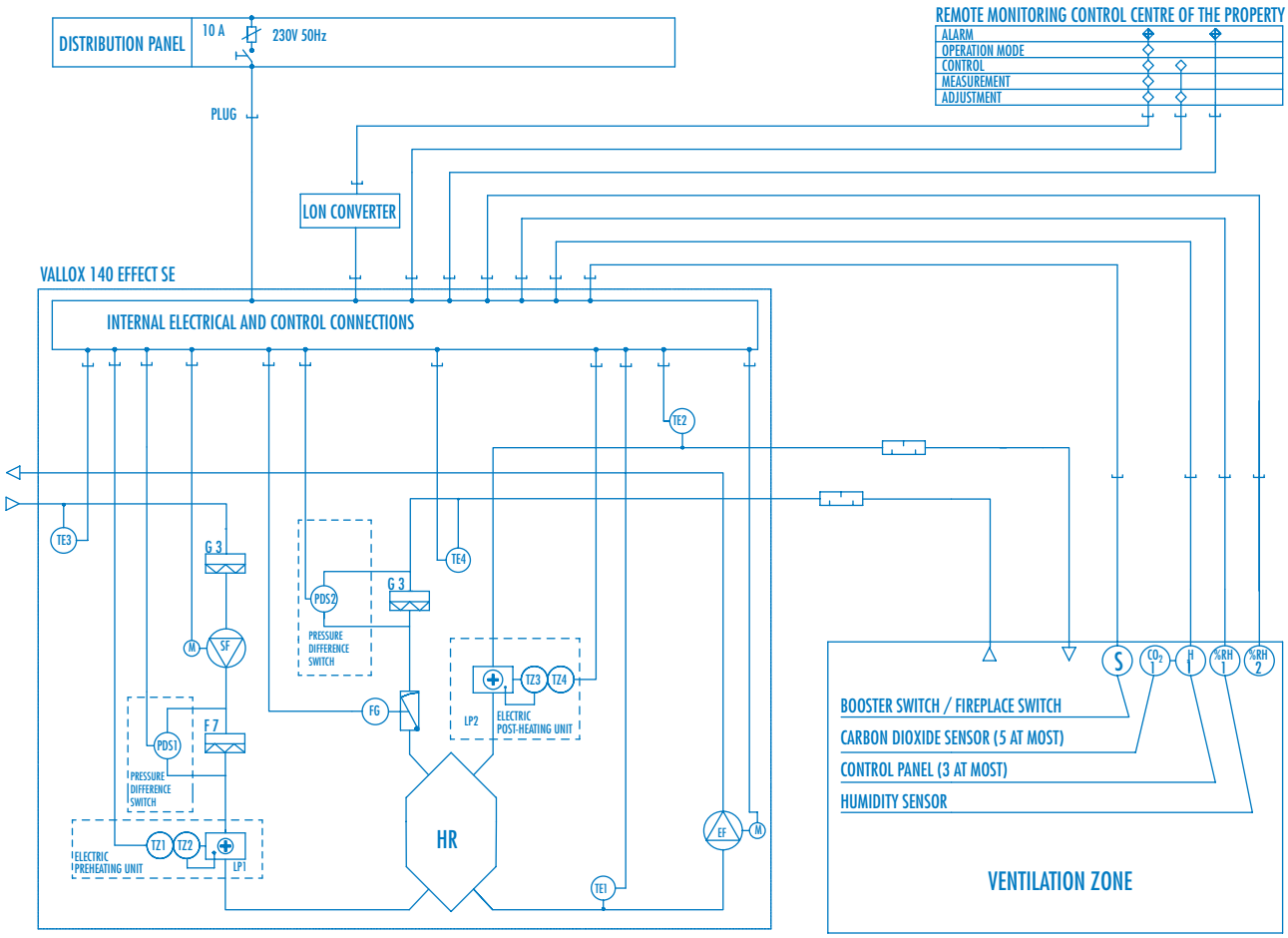
Defined for 100% water



VALLOX 140 Effect SE/VKL/MLV

CONTROL DIAGRAM/ Electric post-heating unit

ADJUSTMENT DIAGRAM VALLOX 140 Effect SE, electric post-heating unit



Parts list VALLOX 140 Effect SE

Code	Name	Technical data (factory settings in parentheses)	Standard / Option
CO_2	Carbon dioxide sensor, 5 at most Carbon dioxide control	Adjustment range 500...2000 ppm (900) Adjustment range 1...15 min. (10)	option
G3	Filter	Supply air, extract air	standard
F7	Filter	Supply air	standard
FG	Damper motor	HR bypass automation, 24 V, 2 W, 8 Nm	standard
H	Control panel, 3 at most	User interface	standard
LP1	Preheating unit	Electric radiator 1 kW	standard
LP2	Post-heating unit	Electric radiator 1 kW	standard
HR	Heat recovery cell	Counter-current, efficiency = 80%	standard
PDS1	Pressure difference switch Pressure guard on the supply air side	Adjustment range 0...500 Pa (320)	option
PDS2	Pressure difference switch Pressure guard of the extract air filter	Adjustment range 0...500 Pa (320)	option
EF	Extract air fan	DCqv = 120 dm^3/s (120 Pa)	standard

Code	Name	Technical data (factory settings in parentheses)	Standard / Option
%RH	Humidity sensor, 2 at most Humidity control	Automatic / Adjustment range 1...99% (99) Adjustment range 1...15 min. (10)	option
TE1	Temperature sensor, HR antifreeze, preheating control	Exhaust air temperature Adjustment range –6...+15 °C (HR bypass) Adjustment range –6...+15 °C (preheating)	standard
TE2	Temperature sensor	Supply air temperature	standard
TE3	Temperature sensor	Outdoor air temperature	standard
TE4	Temperature sensor	Extract air temperature	standard
SF	Supply air fan DC	qv=108 dm^3/s(100 Pa)	standard
TZ1	Overheat protection of heating unit	Automatic + 40 °C	Included in LP1
TZ2	Overheat protection of heating unit	Manually reset, +80 °C	Included in LP1
TZ3	Overheat protection of heating unit	Automatic + 60 °C	Included in LP2
TZ4	Overheat protection of heating unit	Manually reset, +95 °C, Included in LP2	
S	Fireplace / booster switch function	Functions as either a fireplace or booster switch (fireplace switch)	option
LON	LON converter	Remote monitoring control	option

DESCRIPTION OF OPERATION / Electric post-heating unit

Control of operation

Power supply to the unit can be controlled with a contactor in the distribution panel if needed, e.g. with a timer programme. After starting, the unit first operates at base fan speed. After that power is adjusted based either on the measurement data from air quality sensors and/or on manual control at the control panel.

Fan speed adjustment

Manual control

Fan speed of the ventilation unit is controlled in 8 steps at control panel **H**.

Week clock control

Fan speed of the ventilation unit is controlled in 8 steps using the week clock in control panel **H**. The week clock can be used to programme the desired fan power option for each hour in the day.

Carbon dioxide and humidity control

The fan capacity of the ventilation unit is controlled in multiple steps depending on loads, and based on the measurement results of the air quality sensors (CO_2 and %RH sensors) located in the ventilation zone. The aim is to keep carbon dioxide and/or humidity content below the threshold set at control panel **H**. One or more modes of control may be used simultaneously - the mode demanding boosting is the dominant one. Fan speed varies depending on load between the base and maximum fan speeds. The base and maximum fan speeds can be set at the desired level at the control panel **H**.

Control through voltage or current signal

The fan power of the ventilation unit is controlled in 8 steps with a voltage signal of 0...10 VDC, or with a current signal of 0...20 mA. However, fan power cannot be raised above the set maximum fan speed. Voltage or current signal control is used to control base fan speed. Because of this, fan speed can only be raised when necessary, but not lowered by the manual, CO_2 and %RH controls.

Voltage and current signal values (selection in the motherboard)

Voltage values for each fan speed:			Current values for each fan speed:		
0	0.20...1.25	VDC	0	0.5...2.5	mA
1	1.75...2.25	VDC	1	3.5...4.5	mA
2	2.75...3.25	VDC	2	5.5...6.5	mA
3	3.75...4.25	VDC	3	7.5...8.5	mA
4	4.75...5.25	VDC	4	9.5...10.5	mA
5	5.75...6.25	VDC	5	11.5...12.5	mA
6	6.75...7.25	VDC	6	13.5...14.5	mA
7	7.75...8.25	VDC	7	15.5..16.5	mA
8	8.75...10.00	VDC	8	17.5...20.0	mA

Supply air temperature

Supply air temperature can be controlled with either constant temperature control or cascade control.

Supply air constant temperature control

The control unit directs the operation of post-heating unit **LP2** on the basis of the measurement data given by temperature sensor TE2, aiming at keeping supply air temperature at the temperature value set on control panel H (+10...+30 °C).

Supply air cascade control

The control unit directs the operation of post-heating unit **LP2** on the basis of the measurement data given by extract air sensor **TE4**, aiming at keeping extract air temperature at the temperature value set on control panel H (+10...+30 °C).

Heat recovery bypass

Heat recovery is enabled whenever post-heating has been switched on. Automatic heat recovery bypass is active whenever post-heating has been switched off and outdoor temperature is more than the set threshold value (to be set between +0...+25 °C). In this case, the control unit directs the operation of damper motor FG on the basis of measurement results given by outdoor temperature sensor **TE3** and extract air temperature sensor **TE4**. The aim is to get as cool supply air to the ventilation zone as possible. However, heat recovery is always active when outdoor air temperature is below the set threshold value.

Heat recovery antifreeze

The control centre of the unit controls the operation of preheating unit **LP1** on the basis of the measurement data of temperature sensor **TE1**, preventing freezing alerts and the stopping of supply air fan SF. If the capacity of preheating unit **LP1** is not sufficient, the control centre keeps stopping supply air fan **SF** on the basis of the measurement data on temperature sensor **TE1**, thus preventing the heat recovery cell from freezing. As soon as the risk passes, the fan restarts automatically. The threshold temperature (-6...+15 °C) and the difference area (1 ...10 °C) for antifreeze can be set at control panel H.

Overheat protection of heating unit

Overheat protection thermostats **TZ1** and **TZ2** monitor the surface temperature of heating unit **LP1** and overheat protection thermostats **TZ3** and **TZ4** that of **LP2**. If surface temperature exceeds the threshold, overheat protection is triggered and power supply to the heating unit is stopped. Overheat protection for **TZ1** and **TZ3** is reset automatically, whereas overheat protection for **TZ2** and **TZ4** is reset manually.

Alarms

Pressure difference switches **PDS1** and **PDS2** monitor the pressure difference of the supply and exhaust air sides. If the pressure difference rises too high because of dirty filters or clogged ducts, an alarm will be issued. This is indicated by a symbol (⛒) in the main display of the control panel. If the unit is not equipped with pressure difference switches, the symbol (❢) appearing in the main display of the control panel reminds of the need for maintenance of the unit. The reminder interval can be set between 1...15 months. The factory setting is 4 months. This function is active all the time. The fault signal relay in the unit gives potential-free alarm indications on the following fault conditions.

- Alarm of high carbon dioxide content (> 5000 ppm) switches the relay at 1-second intervals.
- In other fault situations, such as sensor faults, the contacts of the relay close.

Booster or fireplace switch function

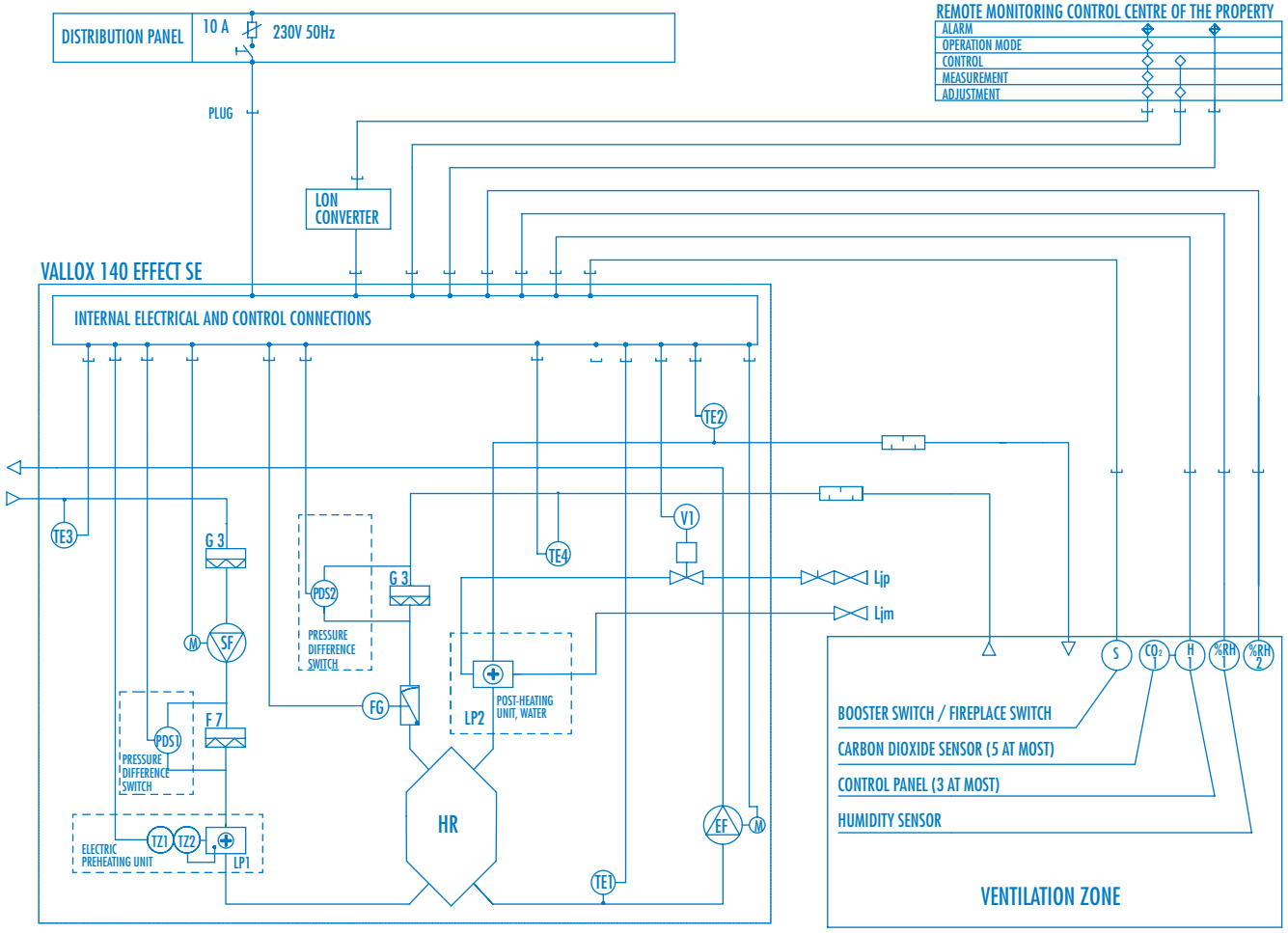
The booster or fireplace switch function of the ventilation unit is controlled either at control panel **H** and/or separate switch **S**, which can be connected to the connection box of the unit. The mode of operation of the switch is selected at control panel **H**. The booster switch function raises fan speed to the set maximum fan speed for 45 minutes. The fireplace switch stops the extract air fan for 15 minutes and produces overpressure in the ventilation zone.

LON remote monitoring control can be implemented with the VALLOX LON converter.

VALLOX 140 Effect SE/VKL/MLV

CONTROL DIAGRAM/ Water-circulating post-heating unit

ADJUSTMENT DIAGRAM VALLOX 140 Effect SE, water post-heating unit



Parts list VALLOX 140 Effect SE VKL

Code	Name	Technical data (factory settings in parentheses)	Standard / Option
CO_2	Carbon dioxide sensor, 5 at most Carbon dioxide control	Adjustment range 500...2000 ppm (900) Adjustment range 1...15 min. (10)	option
G3	Filter	Supply air, extract air	standard
F7	Filter	Supply air	standard
FG	Damper motor	HR bypass automation, 24 V, 2 W, 8 Nm	standard
H	Control panel, 3 at most	User interface	standard
LP1	Preheating unit	Electric radiator 1 kW	standard
LP2	Post-heating unit	Water radiator	standard
HR	Heat recovery cell	Counter-current, efficiency = 80%	standard
PDS1	Pressure difference switch Pressure guard on the supply air side	Adjustment range 0...500 Pa (320)	option
PDS2	Pressure difference switch Pressure guard of the extract air filter	Adjustment range 0...500 Pa (320)	option
EF	Extract air fan DC	DCqv = 120 dm^3/s (120 Pa)	standard
V1	Water radiator thermostat valve		standard

Code	Name	Technical data (factory settings in parentheses)	Standard / Option
%RH	Humidity sensor, 2 at most Humidity control	Automatic / Adjustment range 1...99% (99) Adjustment range 1...15 min. (10)	option
TE1	Temperature sensor, HR antifreeze, preheating control	Exhaust air temperature Adjustment range –6...+15 °C (HR bypass) Adjustment range –6...+15 °C (preheating)	standard
TE2	Temperature sensor	Supply air temperature	standard
TE3	Temperature sensor	Outdoor air temperature	standard
TE4	Temperature sensor	Extract air temperature	standard
SF	Supply air fan DC	qv=108 dm^3/s(100 Pa)	standard
TZ1	Overheat protection of heating unit	Automatic + 40 °C	Included in LP1
TZ2	Overheat protection of heating unit	Manually reset, +80 °C	Included in LP1
S	Fireplace / booster switch function	Functions as either a fireplace or booster switch (fireplace switch)	option
LON	LON converter	Remote monitoring control	option

VALLOX 140 Effect SE/VKL/MLV

DESCRIPTION OF OPERATION / Water-circulating post-heating unit

Control of operation

Power supply to the unit can be controlled with a contactor in the distribution panel if needed, e.g. with a timer programme. Upon starting, the unit first operates at base fan speed. After that power is adjusted based either on the measurement data from air quality sensors and/or on manual control at the control panel.

Fan speed adjustment

Manual control

Fan speed of the ventilation unit is controlled in 8 steps at control panel **H**.

Week clock control

Fan speed of the ventilation unit is controlled in 8 steps using the week clock in control panel **H**. The week clock can be used to programme the desired fan power option for each hour in the day.

Carbon dioxide and humidity control

The fan power of the ventilation unit is controlled in multiple steps depending on load and based on the measurement results of the air quality sensors (CO_2 and %RH sensors) located in the ventilation zone. The aim is to keep carbon dioxide and/or humidity content below the threshold set at control panel **H**. One or more modes of control may be used simultaneously – the mode demanding boosting is the dominant one. Fan speed varies according to load between the base and maximum fan speed.

The base and maximum fan speeds can be set at the desired level at the control panel **H**.

Control through voltage or current signal

The fan power of the ventilation unit is controlled in 8 steps with a voltage signal of 0…10 VDC, or with a current signal of 0…20 mA. However, fan power cannot be raised above the set maximum fan speed. Voltage or current signal control is used to control base fan speed. This means that fan speed can be raised when necessary, but not lowered, by the manual CO_2 and %RH controls.

Voltage and current signal values (selection in the motherboard)

Voltage values for each fan speed:			Current values for each fan speed:		
0	0.20...1.25	VDC	0	0.5...2.5	mA
1	1.75...2.25	VDC	1	3.5...4.5	mA
2	2.75...3.25	VDC	2	5.5...6.5	mA
3	3.75...4.25	VDC	3	7.5...8.5	mA
4	4.75...5.25	VDC	4	9.5...10.5	mA
5	5.75...6.25	VDC	5	11.5...12.5	mA
6	6.75...7.25	VDC	6	13.5...14.5	mA
7	7.75...8.25	VDC	7	15.5..16.5	mA
8	8.75...10.00	VDC	8	17.5...20.0	mA

Supply air temperature

Supply air temperature can be controlled with either constant temperature control or cascade control.

Supply air constant temperature control

The control unit directs the operation of post-heating unit **LP2** on the basis of the measurement data given by temperature sensor **TE2**, aiming at keeping supply air temperature at the temperature value set on control panel H (+10…+30 °C).

Supply air cascade control

The control unit directs the operation of post-heating unit **LP2** on the basis of the measurement data given by extract air sensor **TE4**, aiming at keeping extract air temperature at the temperature value set on control panel **H** (+10…+30 °C).

Heat recovery bypass

Heat recovery is enabled whenever post-heating has been switched on. Automatic heat recovery bypass is active whenever post-heating has been switched off and outdoor temperature exceeds the setpoint (to be set between 0…+25 °C). In this case, the control unit directs the operation of damper motor **FG** on the basis of measurement results given by outdoor temperature sensor **TE3** and extract air temperature sensor **TE4**. The aim is to get as cool supply air to the ventilation zone as possible. However, heat recovery is always active when outdoor air temperature is below the set threshold value.

Heat recovery antifreeze

The control centre of the unit controls the operation of preheating unit **LP1** on the basis of the measurement data of temperature sensor **TE1**, preventing freezing alerts and the stopping of supply air fan TF. If the power of preheating unit **LP1** is not sufficient, the control centre keeps stopping supply air fan **TF** on the basis of the measurement data on temperature sensor **TE1**, thus preventing the heat recovery cell from freezing. As soon as the risk passes, the fan restarts automatically. The threshold temperature (-6…+15 °C) and the difference area (1…10 °C) for antifreeze can be set at control panel **H**.

Overheat protection of heating unit

Overheat protection thermostats **TZ1** and **TZ2** monitor the surface temperature of heating unit **LP1**. If surface temperature exceeds the threshold, overheat protection is triggered and power supply to the heating unit is stopped. Overheat protector **TZ1** is reset automatically and **TZ2** manually.

Water radiator freezing protection

The control centre of the unit stops fans **TF** and **PF** on the basis of the measurement data in outdoor temperature sensor **TE3** (outdoor air < 0 °C) and supply air temperature sensor **TE2** (supply air < 7 °C), thus preventing water heating unit **LP2** from freezing. A freezing alert appears in the display of the control panel. The fans restart automatically as soon as the risk of freezing passes (supply air > 10 °C).

Alarms

Pressure difference switches **PDS1** and **PDS2** monitor the pressure difference on the supply and extract air sides. If the pressure difference rises too high because of dirty filters or clogged ducts, an alarm will be issued. This is indicated by a symbol in the main display of the control panel. If the unit is not equipped with pressure difference switches, the symbol appearing in the main display of the control panel reminds of the need for maintenance of the unit. The reminder interval can be set between 1 and 15 months. The factory setting is 4 months. This function is always active.

The fault signal relay in the unit gives potential-free alarm indications on the following fault conditions:

- Alarm of high carbon dioxide content (> 5000 ppm) switches the relay at 1-second intervals.
- In other fault situations, such as sensor faults, the contacts of the relay close.

Booster or fireplace switch function

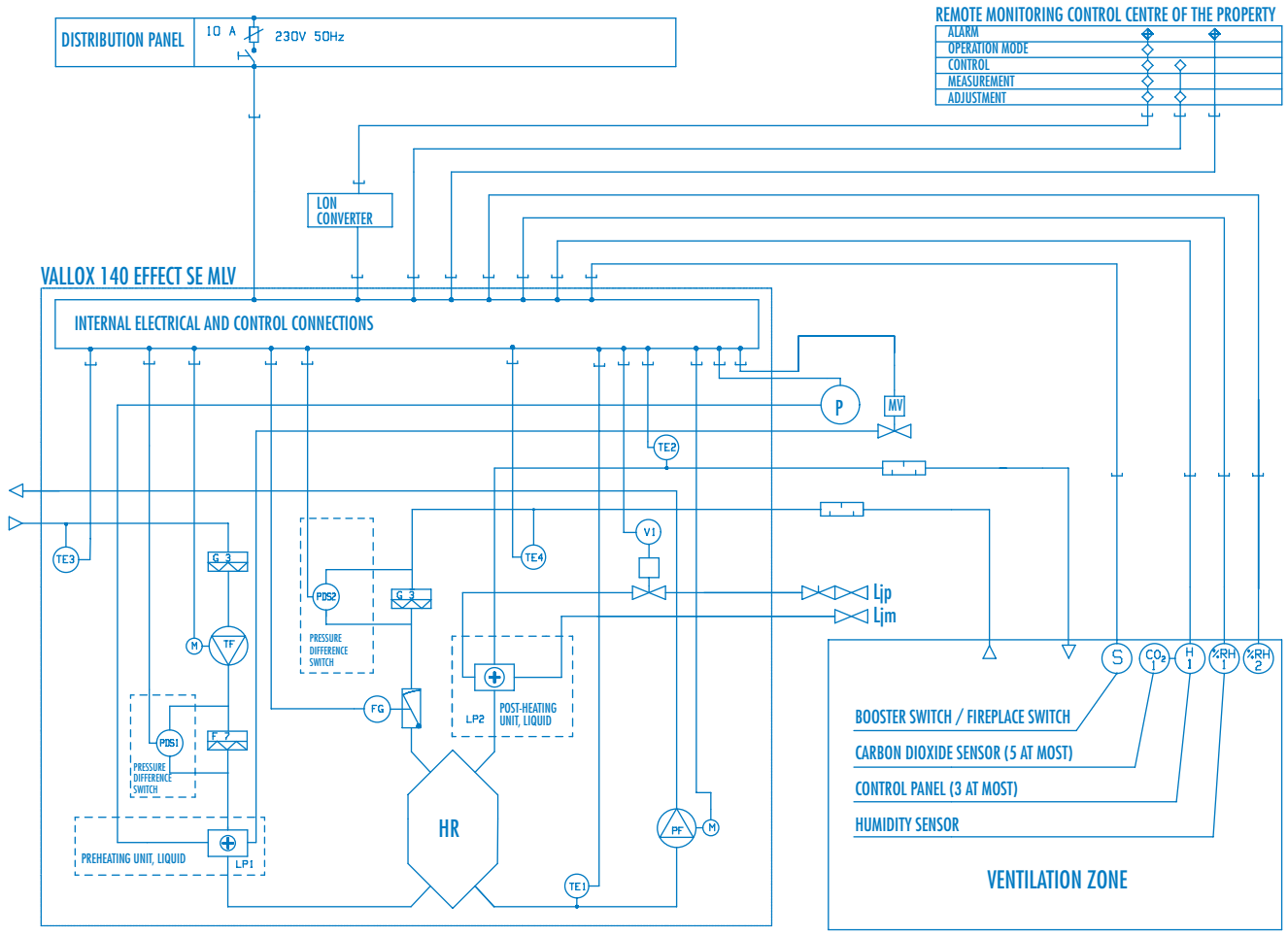
The booster or fireplace switch function of the ventilation unit is controlled either at control panel **H** and/or separate switch **S**, which can be connected to the connection box of the unit. The mode of operation of the switch is selected at control panel **H**. The booster switch function raises fan speed to the set maximum fan speed for 45 minutes. The fireplace switch stops the extract air fan for 15 minutes and produces overpressure in the ventilation zone.

LON remote monitoring control can be implemented with the VALLOX LON converter.

VALLOX 140 Effect SE/VKL/MLV

CONTROL DIAGRAM / MLV radiator

ADJUSTMENT DIAGRAM VALLOX 140 Effect SE MLV



Parts list VALLOX 140 Effect SE MLV

Code	Name	Technical data (factory settings in parentheses)	Standard / Option
CO_2	Carbon dioxide sensor, 5 at most Carbon dioxide control	Adjustment range 500...2000 ppm (900) Adjustment range 1…15 min. (10)	Option
G3	Filter	Supply air, extract air	Standard
F7	Filter	Supply air	Standard
FG	Damper motor	Automatic heat recovery bypass 24 V, 2 W, 8 Nm	Standard
H	Control panel, 3 at most	User interface	Standard
LP1	Preheating unit	Liquid radiator	Standard
LP2	Post-heating unit	Liquid radiator	Option
HR	Heat recovery cell	Counter-current, efficiency = 80%	Standard
PDS1	Pressure difference switch unit Pressure guard on the supply air side	Adjustment range 0...500 Pa (320)	Option
PDS2	Pressure difference switch unit Pressure guard on the extract air side	Adjustment range 0...500 Pa (320)	Option
PF1	Extract air fan DC	qv = 120 dm³/s (120 Pa)	Standard
%RH	Humidity sensor, 2 at most Humidity control	Automatic / Adjustment range 1...99% (99) Adjustment interval 1...15 min. (10)	Option

Code	Name	Technical data (factory settings in parentheses)	Standard / Option
TE1	Temperature sensor, heat recovery cell antifreeze	Exhaust air temperature Adjustment range -6...+15 (HR-cell)	Standard
TE2	Temperature sensor	Supply air temperature	Standard
TE3	Temperature sensor, preheating control	Outdoor air temperature Adjustment range -6… +15 °C (preheating)	Standard
TE4	Temperature sensor	Extract air temperature	Standard
TF	Supply air fan DC	qv = 108 dm³/s (100 Pa)	Standard
V1	Water radiator thermostat valve		Standard
MV	Solenoid valve		Not included in the delivery
P	Circulation pump		Not included in the delivery
S	Fireplace / booster switch function	Works as either a fireplace or booster switch (fireplace switch)	Option
LON	LON converter	Remote monitoring control	Option

DESCRIPTION OF OPERATION / MLV radiator

Control of operation

Power supply to the unit can be controlled with a contactor in the distribution panel if needed, e.g. with a timer programme. Upon starting, the unit first operates at minimum power. After that power is adjusted based either on the measurement data from air quality sensors and/or on manual control at the control panel.

Fan speed adjustment

Manual control

Fan speed of the ventilation unit is controlled in 8 steps at control panel **H**.

Week clock control

Fan speed of the ventilation unit is controlled in 8 steps using the week clock in control panel **H**. The week clock can be used to programme the desired fan power option for each hour in the day.

Carbon dioxide and humidity control

The fan capacity of the ventilation unit is controlled in multiple steps depending on loads, and based on the measurement results of the air quality sensors (CO_2 and %RH sensors) located in the ventilation zone. The aim is to keep carbon dioxide and/or humidity content below the threshold set at control panel **H**. One or more modes of control may be used simultaneously – the mode demanding boosting is the dominant one. Fan speed varies depending on load between the base and maximum fan speeds. The base and maximum fan speeds can be set at the desired level at the control panel.

Control through voltage or current signal

The fan capacity of the ventilation unit is controlled in 8 steps with a voltage signal of 0…10 VDC or with a current signal of 0…20 mA. However, fan power cannot be raised above the set maximum fan speed. Voltage or current signal control is used to control base fan speed. This means that fan speed can be raised when necessary, but not lowered, by the manual, carbon dioxide and humidity controls.

Voltage and current signal values (selection in the motherboard)

Voltage values for each fan speed:			Current values for each fan speed:		
0	0.20...1.25	VDC	0	0.5...2.5	mA
1	1.75...2.25	VDC	1	3.5...4.5	mA
2	2.75...3.25	VDC	2	5.5...6.5	mA
3	3.75...4.25	VDC	3	7.5...8.5	mA
4	4.75...5.25	VDC	4	9.5...10.5	mA
5	5.75...6.25	VDC	5	11.5...12.5	mA
6	6.75...7.25	VDC	6	13.5...14.5	mA
7	7.75...8.25	VDC	7	15.5..16.5	mA
8	8.75...10.00	VDC	8	17.5...20.0	mA

Supply air temperature

Supply air temperature can be controlled with either constant temperature control or cascade control.

Supply air constant temperature control

The control unit directs the operation of post-heating unit **LP2** on the basis of the measurement data given by temperature sensor **TE2**, aiming at keeping supply air temperature at the temperature value set at control panel **H** (+10…+30 °C).

The cooling function of the **MLV** radiator starts when the post-heating radiator has been switched off and supply air temperature exceeds the setpoint for supply air.

Supply air cascade control

The control unit directs the operation of post-heating unit **LP2** on the basis of the measurement data given by extract air sensor **TE4**, aiming at keeping extract air temperature at the temperature value set at control panel **H** (+10…+30 °C).

Heat recovery bypass

Heat recovery is enabled whenever post-heating has been switched on. Automatic heat recovery bypass is active whenever post-heating has been switched off and outdoor air temperature exceeds the setpoint (to be set between 0…+ 25 °C). In this case, the control unit directs the operation of damper motor **FG** on the basis of measurement results given by outdoor temperature sensor **TE3** and extract air temperature sensor **TE4**. The aim is to get as cool supply air to the ventilation zone as possible. However, heat recovery is always active when outdoor air temperature is below the set threshold value.

Heat recovery antifreezing

Controlling preheating in a liquid-circulating **MLV** radiator is different from that in an electric preheating radiator. The liquid radiator switches on based on the measurement data from outdoor air temperature sensor **TE3**. The control centre of the unit starts the pump and opens the solenoid valve when post-heating is on and outdoor air temperature goes below the setpoint for preheating. The setpoint must be lower than the temperature of the liquid coming from the ground collector. If the capacity of preheating unit **LP1** is not sufficient, the control centre keeps stopping supply air fan **TF** on the basis of the measurement data on temperature sensor **TE1**, thus preventing the heat recovery cell from freezing. As soon as the risk passes, the fan restarts automatically. The threshold temperature (-6…+15 °C) and the difference area (1 …10 °C) for antifreezing can be set at control panel **H**.

Water radiator freezing protection

The control centre of the unit stops fans **TF** and **PF** on the basis of the measurement data in outdoor temperature sensor **TE3** (outdoor air < 0 °C) and supply air temperature sensor **TE2** (supply air < 7 °C), thus preventing water heating unit **LP2** from freezing. A freezing alert appears in the display of the control panel. The fans restart automatically as soon as the risk of freezing passes (supply air > 10 °C).

Alarms

Pressure difference switches **PDS1** and **PDS2** monitor the pressure difference on the supply and extract air sides. If the pressure difference rises too high because of dirty filters or clogged ducts, an alarm will be issued. This is indicated by a symbol ( ) in the main display of the control panel. If the unit is not equipped with pressure difference switches, the symbol ( ) appearing in the main display of the control panel reminds of the need for maintenance of the unit. The reminder interval can be set between 1…15 months. The factory setting is 4 months. This function is always active.

The fault signal relay in the unit gives potential-free alarm indications on the following fault conditions:

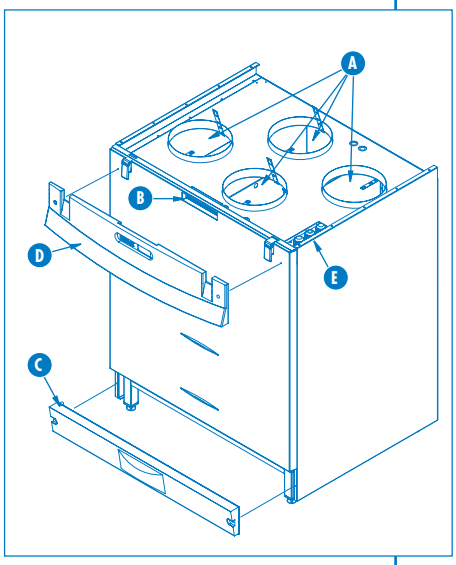
- Alarm of high carbon dioxide content (> 5000 ppm) switches the relay at 1-second intervals.
- In other fault situations, such as sensor faults, the contacts of the relay close.

Booster or fireplace switch function

The booster or fireplace switch function of the ventilation unit is controlled either at control panel **H** and/or separate switch **S**, which can be connected to the connection box of the unit. The mode of operation of the switch is selected at control panel **H**. The booster switch function raises fan speed to the set maximum fan speed for 45 minutes. The fireplace switch stops the extract air fan for 15 minutes and produces overpressure in the ventilation zone.

LON remote monitoring control can be implemented with the VALLOX LON converter.

INSTALLATION INSTRUCTIONS



- A Duct outlets
- B Measurement outlets
- C Base plate
- D Top panel
- E Lead-in seals

Location of the ventilation unit

- The unit is mounted indoors, in a place where temperature does not fall below +10 °C.
- The unit is mounted in a place where the sound pressure level coming through the envelope is not acoustically disturbing (storerooms, corridors, technical rooms, and in some cases rooms where people spend time).
- The unit is equipped with an adjustable base. If the unit is mounted on the wall, attention needs to be paid to the weight of the unit (102 kg) and to vibration isolation.
- The unit is splash protected (IP 34) and can thus also be mounted in a damp room.

Electrical connections

- The unit has a plug connection. The electrical connection box of the unit is located inside the unit next to the connection outlet of the exhaust air ductwork.
- The cables to be connected to the unit are wired through the lead-in seals located next to the connection outlet of the exhaust air ductwork.

Installation

- Remove the door of the unit (latches on top edge).
- Remove the cover of the electrical connection box (2 screws 3.5 x 9.5).
- Mount and connect necessary cables to the terminal block as specified in the connection instructions.
- These instructions include the internal and external electric diagrams.

Channel outlets of the unit

- The unit is equipped with four ø200 external connection outlets. Necessary connecting pieces (e.g. inner or bent connectors) can be attached to external connection outlets.
  Note! Length of the connecting head of the connecting piece no more than 35 mm.
  Fix the ducts steadily and tightly to the relevant outlets. (NOTE! Unit models L/R). Implement duct insulation if needed as defined in the ventilation plan.

Air flow measurement outlets

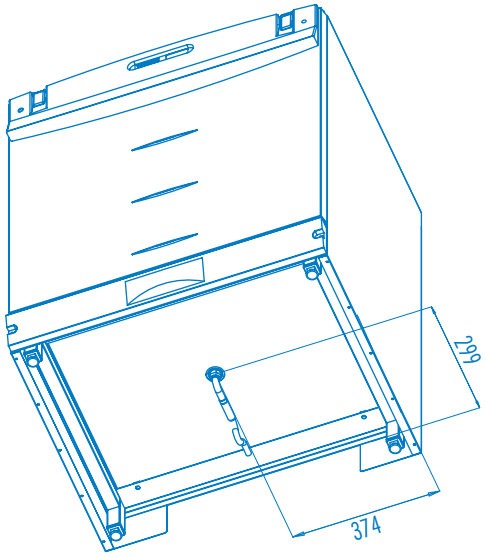
- The fixed air flow measurement outlets are located behind the top panel. To remove the top panel, open its fixing screws.
- Via the measurement outlets, the total pressure of the supply and extract air ductwork can be measured with a differential pressure instrument. Pressure readings and the unit's air volume tables (p. 3) show volume air flows at various adjustment positions.
- The red measurement hose is on the pressure side and the black hose on the suction side of the fan.

Condensing water connections

The delivery includes a water seal. With a pipe connected to the water seal, water condensing from extract air can be led to a floor drain (not straight to the drain). The pipe must not rise after the water seal.

As the screw-type coupling is located in the middle of the unit, the unit has to be mounted level with the horizontal.

Location of condensing water connection

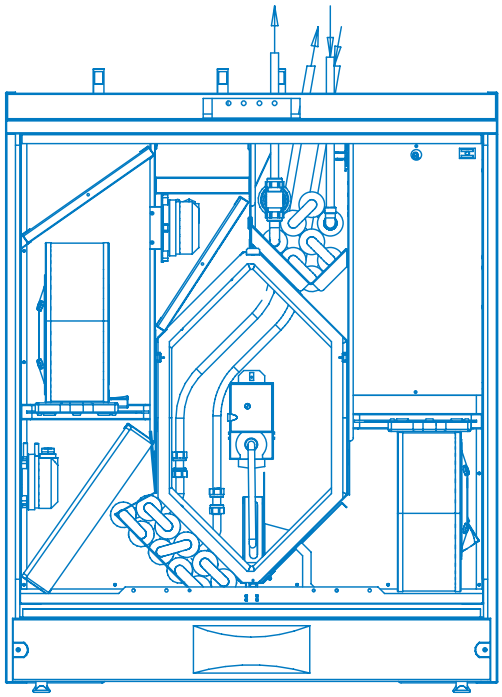


Pipe connections

- If the unit is equipped with a liquid-circulating post-heating or MLV preheating /cooling unit, it is connected to the liquid circuit using a plastic or copper pipe with a recommended inner diameter of 10...13 mm.

  Note! When using a plastic pipe pay attention to the temperature stability of the pipe!
- MLV radiator is connected to plastic pipes. When needed, the connections can be reached by taking the heat recovery cell away.
- The following figures describe different ways of connecting the MLV radiator and the VKL post-heating radiator.

NOTE!
WATER-CIRCULATING POST-HEATING RADIATOR INCLUDES A CONTROL VALVE.



Model L in the figure

RADIATOR CONNECTIONS

Connection of VKL post-heating radiator

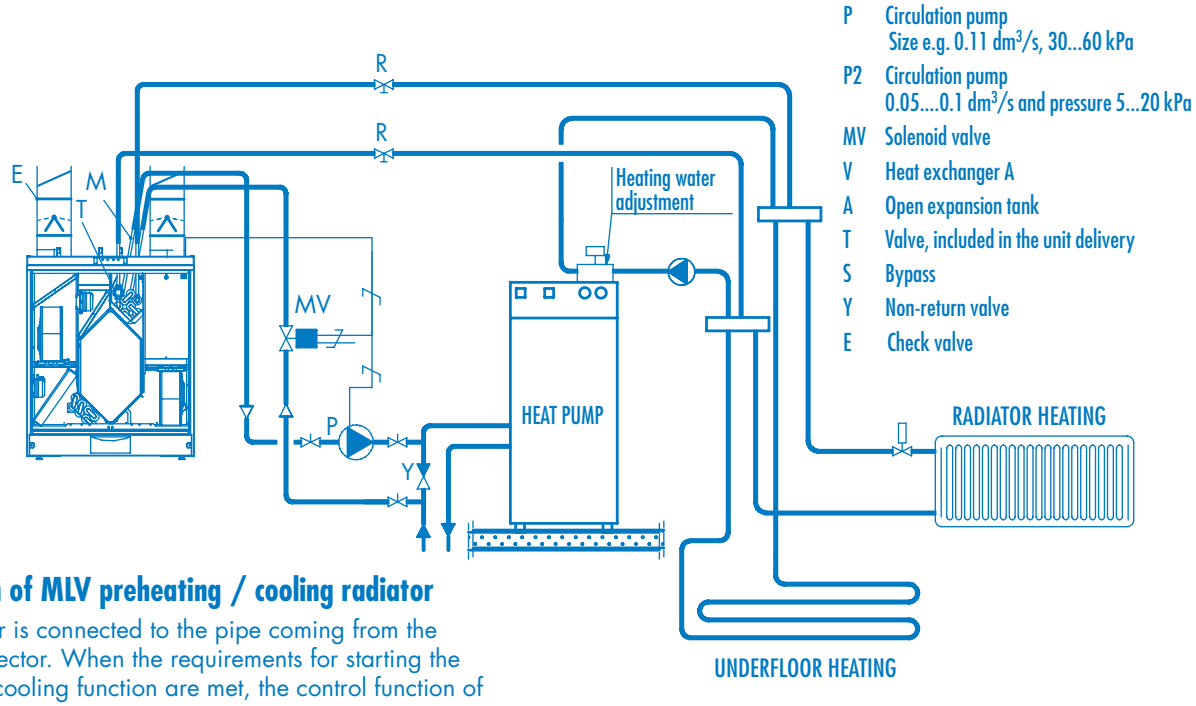
Sample connection: direct connection to the underfloor heating or radiator network

It is sometimes convenient to connect the unit directly to the heating network. The connection involves a risk of freezing although efforts have been made to minimise the risk of freezing in the radiator.

The unit stops if supply air temperature goes below the set temperature and automatically starts as soon as temperature rises above the set value. The unit also issues an alarm of freezing risk at the controller. It is recommended to have e.g. a spring-actuated check valve (E) in the outdoor air duct (and possibly also in the exhaust air duct). This valve closes the duct from the unit to outdoor air and prevents cold air from flowing to the unit while it is stopped. The base volume of water flow into the radiator of the unit can be adjusted with valves (R), which can also act as stop valves.

No water must be led into the radiator of the unit until the system has been adjusted for operation and the heating network has heating on or it has been otherwise ensured that the radiator will not freeze.

Water circulation in the heating network connected to the unit and the circulation pump must not be stopped during the heating season.



Connection of MLV preheating / cooling radiator

The radiator is connected to the pipe coming from the ground collector. When the requirements for starting the heating or cooling function are met, the control function of the unit opens the solenoid valve (MV) and starts the pump (P). The pipes (M) of the radiator are plastic pipes Ø12 mm with an oxygen barrier layer. Observe the frost resistance of the liquid used in the ground collector.

RADIATOR CONNECTIONS

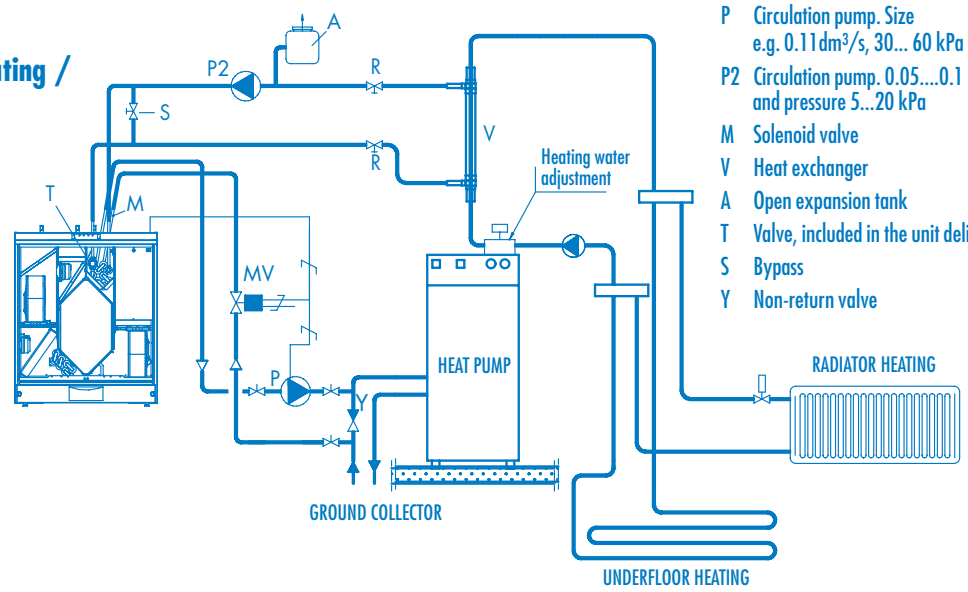
Connection of VKL post-heating radiator

Sample connection: exchanger in the supply water pipe of the underfloor heating or radiator network (non-freezing connection)

You need no other anti-freeze protection if you choose a non-freezing heat transfer solution, either a 15…30% water-glycol mixture used in cars or a non-toxic alternative. In the connection shown in the example the exchanger (V) is connected to the supply pipe of the heating network. Supply air temperature mainly adjusts according to the temperature of supply water. If needed, air temperature can also be adjusted with a valve (T). The valve T is included in the delivery. The valve (T) requires bypass (S). The open expansion tank (A) is circa 2.5 litres and is installed on the suction side of the pump. Stop valves (R) are also installed in the pipe system. The pump (P2) is an ordinary heat pipe pump (pump power 0.05 l/s and pressure 5…20 kPa).

Connection of MLV preheating / cooling radiator

The radiator is connected to the pipe coming from the ground collector. When the requirements for starting the heating or cooling function are met, the control function of the unit opens the solenoid valve (MV) and starts the pump (P). The pipes (M) of the radiator are plastic pipes Ø12 mm with an oxygen barrier layer. Observe the frost resistance of the liquid used in the ground collector.



P Circulation pump. Size e.g. 0.11dm³/s, 30... 60 kPa
P2 Circulation pump. 0.05....0.1 dm³/s and pressure 5...20 kPa
M Solenoid valve
V Heat exchanger
A Open expansion tank
T Valve, included in the unit delivery
S Bypass
Y Non-return valve

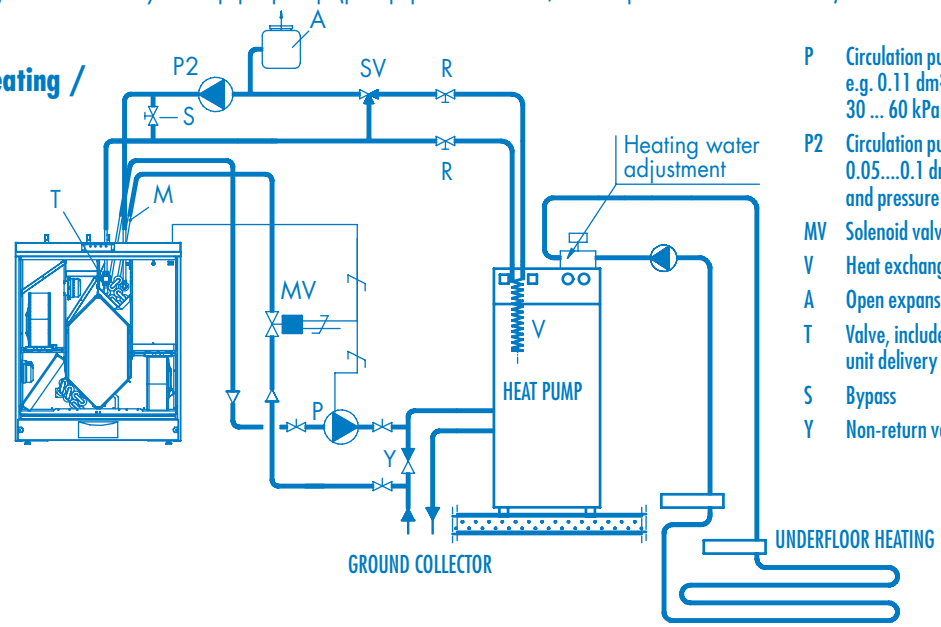
Connection of VKL post-heating radiator

Sample connection: separate heat exchanger for the ventilation unit (non-freezing connection)

You need no other anti-freeze protection if you choose a non-freezing heat transfer solution, either a water-glycol mixture used in cars or a non-toxic alternative. In the connection shown in the example the exchanger (V) is installed in the heat source. Supply air temperature mainly adjusts according to the temperature of supply water, controlled with a three-pass valve (SV). Air temperature can be adjusted and limited also using the valve (T) included in the unit delivery. The valve (T) requires bypass (S). The open expansion tank (A) is circa 2.5 litres and is installed on the suction side of the pump. Stop valves (R) are also installed in the pipe system. The pump (P2) is an ordinary heat pipe pump (pump power 0.05 l/s and pressure 5…20 kPa).

Connection of MLV preheating / cooling radiator

The radiator is connected to the pipe coming from the ground collector. When the requirements for starting the heating or cooling function are met, the control function of the unit opens the solenoid valve (MV) and starts the pump (P). The pipes (M) of the radiator are plastic pipes Ø12 mm with an oxygen barrier layer. Observe the frost resistance of the liquid used in the ground collector.



P Circulation pump. Size e.g. 0.11 dm³/s, 30 ... 60 kPa
P2 Circulation pump. 0.05....0.1 dm³/s and pressure 5...20 kPa
MV Solenoid valve
V Heat exchanger
A Open expansion tank
T Valve, included in the unit delivery
S Bypass
Y Non-return valve

VALLOX

Vallox Oy FIN-32200 Loimaa Finland Telephone +358 2 7636 300 Fax +358 2 7631 539
www.vallox.com.

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