

User manual

DESIGN & TECHNICAL INFORMATION

OPERATION & CONTROL

MAINTENANCE & SERVICE

Exhaust air filter, article No: Q120101
Supply air filter, article No: Q120100



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Product description

RT 250/400S-EC-RS is an air handling unit (AHU) fitted in a cabinet. The unit is designed for the ventilation of homes, offices, nurseries and other small premises.

The Temovex unit should be installed in a heated room, such as a scullery, laundry or similar.

The standard Temovex unit consists of a counterflow heat exchanger, 2 fans, 2 filters, after-heater, by-pass damper and a control system.



1. Casing

The casing is made of hot galvanised sheet metal with 30 mm insulation between the sheets. As a standard, the side panels and the front are white (powder paint). The front door has a magnetic strip which keeps the door closed. The unit top has sleeve connections where all ducts are connected.

2. Exhaust air filter

G3, bag (art. No. Q120101)

3. By-pass damper

The Temovex AHU has an automatic by-pass damper which makes the air by-pass the heat exchanger whenever heat recovery is not necessary. The by-pass setting is adjusted on the control panel.

4. Exhaust air fan

The low-energy fan is of EC type. It has a wide working range and works at constant flow ("cruise control"), which compensates for filter clogging. The fan motor comes with integrated overheating protection which cuts the power and stops the fan. Reset: turn the fan motor off for approx. 1 min.

5. Supply air fan

The same type as exhaust air fan (see point 4)

6. Heat exchanger

The highly efficient Temovex counterflow heat exchanger was first designed over 30 years ago by our own people, and has since been developed to fit today's needs.

It is made of thin aluminium sheets, and the supply air and exhaust air sides are completely sealed from each other. This is important in order to avoid odours and other contaminants from old air seeping through to fresh air. The heat exchanger has no moving parts, which eliminates wear.

7. Supply air filter

F7, bag (art. No. Q120100).

8. Inspection door

When cleaning the heat exchanger or controlling the condensate drain, the Inspection door is opened. (See chapter "Maintenance & service").

9. Adjustable feet

The cabinet has adjustable rubber feet.

10. Condensate drain

The Temovex unit is fitted with a condensate drain at the bottom of the unit, 3/4". This should be connected to a drain or fed to a floor drain.

11. Control panel

All settings for fan speed, after-heating, by-pass etc. are made via the control panel and the AHU's integrated control system.

If you have added optional parts to your Temovex AHU, these functions, too, are set via the control panel.

12. After-heater

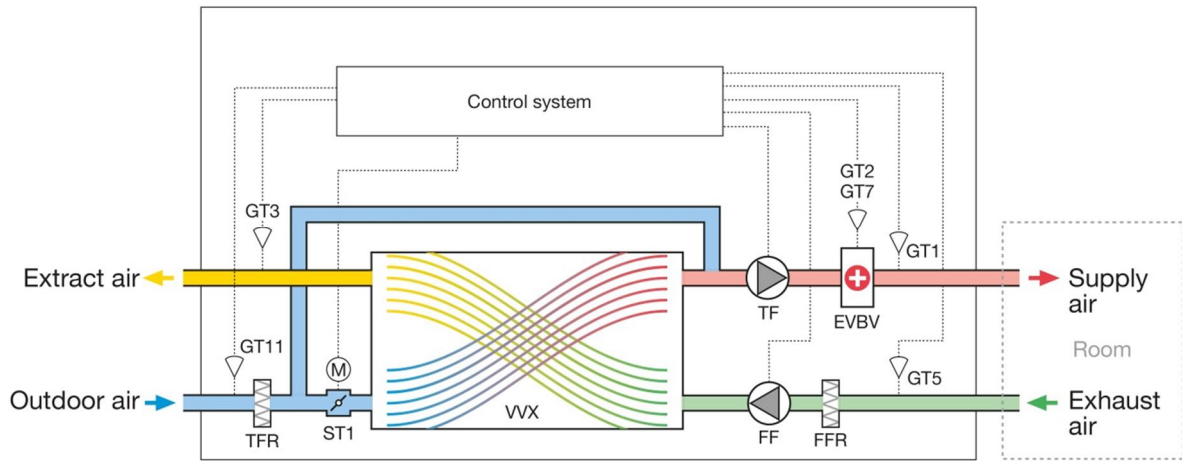
RT 250/400S-EC-RS is fitted with an electric after-heater, 0.9 kW.

As an optional extra, a reinforced electric after-heater, 1,8 kW, or a water coil (two different sizes) for waterborne heating is offered. The heater is integrated in the unit and settings are made via the control panel.

In the case of a water coil, the water connections are at the top of the unit, dimension DN12.

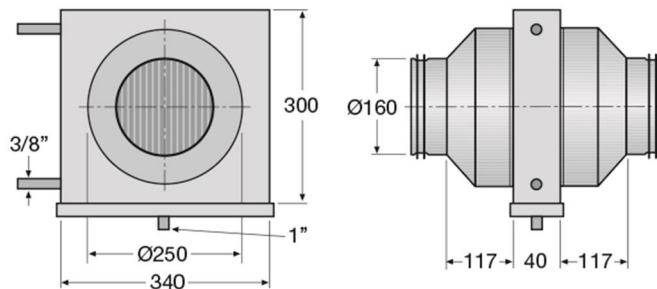
The RT 250/400S-EC-RS with water coil includes a two-way valve and valve motor in the consignment from REC..

Functional diagram - supply air control



| | | | |
|------|---------------------------------------|-----|---|
| VVX | Counterflow heat exchanger | FF | Fan, exhaust air |
| ST1 | Damper motor, heat recovery (By-pass) | FFR | Filter, exhaust air |
| TFR | Filter, outdoor air | GT5 | Sensor, exhaust air temperature |
| GT11 | Sensor, outdoor air temperature | TF | Fan, supply air |
| GT3 | Sensor, extract air temperature | EVB | After-heater, electricity/water |
| | | GT1 | Sensor, supply air temperature |
| | | GT2 | Overheating protection (when electric coil) |
| | | GT7 | Freeze protection (when water coil) |

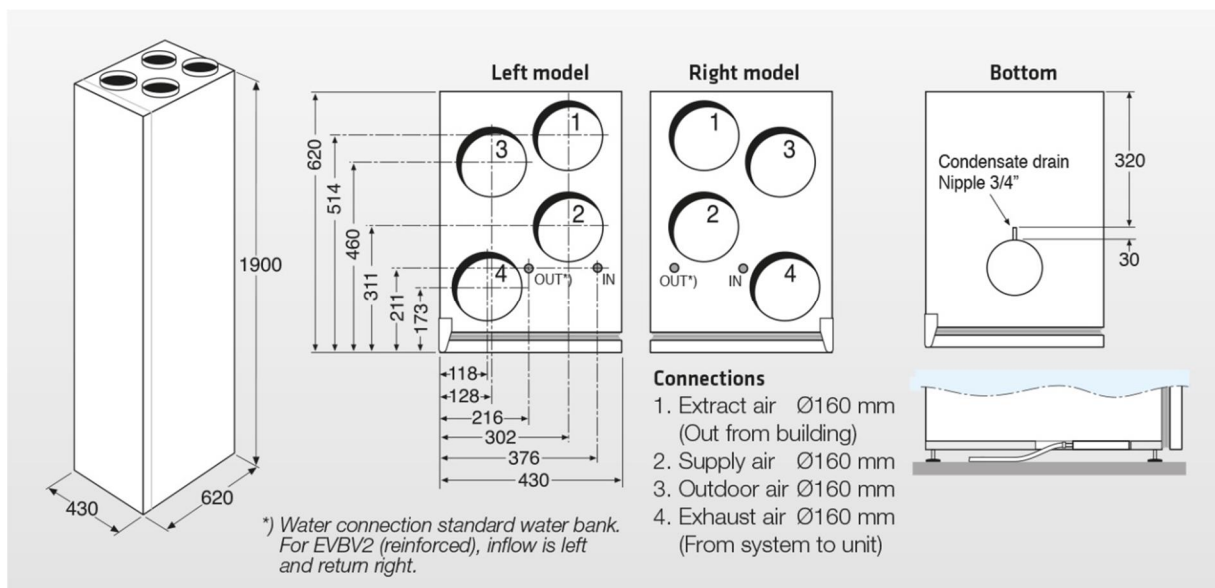
Chiller (cooling coil) EKB (optional)



Technical specification

| | Electrical version | | HW version Water temp. 55/45°C | |
|----------------------------------|--------------------|-----------|-----------------------------------|-----------|
| | RT250 | RT400 | RT250 | RT400 |
| Rated output, unit | 1034 W | 1138 W | 134 W | 238 W |
| Rated output, standard heater | 900 W | | 1150 W | 1500 W |
| Rated output, reinforced heater | 1800 W | | 2000 W | 2800 W |
| Rated output, fans | 2 x 67 W | 2 x 119 W | 2 x 67 W | 2 x 119 W |
| Voltage/Frequency input | 230 V, 50 Hz | | 230 V, 50 Hz | |
| Fuse | 10 A | | 10 A | |
| Filter, supply air / exhaust air | Bag F7 / Bag G3 | | Bag F7 / Bag G3 | |
| Weight | 100 kg | | 100 kg | |
| Water connection | - | | DN12 | |
| Fire classification | A15 | | A15 | |
| Measurements (WxDxH) | 430x620x1900 mm | | 430x620x1900 mm | |
| Duct connections | 4 x Ø160 mm | | 4 x Ø160 mm | |
| Condensate drain | ¾+ | | ¾+ | |
| Storage Temperature Range | -20 °C . +50°C | | | |
| Operating Temperature | 0 °C . +50°C | | | |

Dimensions



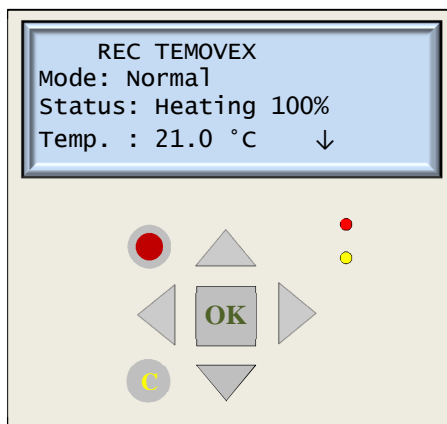
Overview








On the following pages you will find information about the basic functions that you yourself can adjust to fit your requirements and wishes. The unit control system optimizes its function according to the settings you define.

Please note the following:

In the menus regarding heating and cooling, where you have the option of making changes, *Auto Mode* gives you an optimized function. If you select a manual setting, *On* or *Off*, the manual setting overrules auto settings.

Control unit



-  Up
-  Down
-  Right
-  Left
-  Confirm
-  Show alarm
-  Delete

| | | |
|-----------|----------|---|
| ● Alarm | Flashing | There are one or more alarms that have not been acknowledged.. |
| | Steady | There are one or more acknowledged alarms left. |
| ● Setting | Flashing | You are in a menu where it is possible to change some parameters. |
| | Steady | You are now in change position. |

The menu system

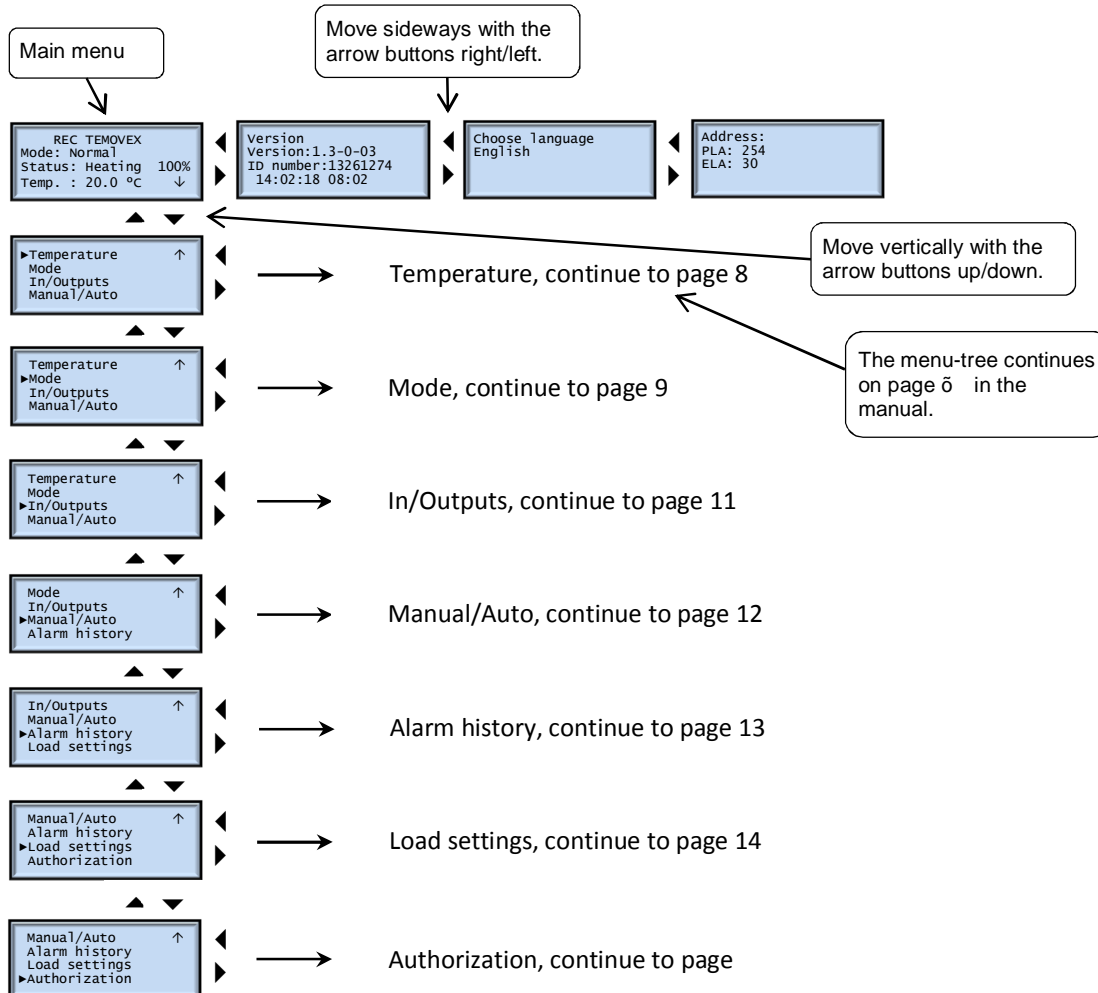
The AHU's settings and status can be studied by scrolling the menu screens. Some parameters and settings can be changed. Basic system configurations cannot be changed without authorized access code (technician level). If no buttons are pressed for 25 minutes, the system will automatically revert to the control unit's Main screen. When the access code has been used to log in, the system will automatically log out when 25 minutes have passed.

How to change values and settings

The yellow LED is flashing in menus where adjustments can be made by the user (see page 6). If you press OK, the changeable parameter will flash. Changes are made using the arrow buttons up or down. Move between positions sideways using the arrow buttons right and left. When the desired value shows, confirm with OK. The cursor automatically indicates next variable that is possible to adjust in this menu.

Menu and structure

The manual shows the menus roughly the same way as they appear on the terminal. If jumps between different menus are possible, these are shown in the manual. In some cases, more information about menus are shown after each section. The walk through the menus starts with the main menu below.



Main menu

Mode shows current fan mode. The unit can work in different modes, depending on for instance temperature and commands given to the unit. Available modes are Stop, Low, Normal, Boost, Max, Kitchen mode, Stove mode, Night cooling, Defrost, ECO, Fire, ECO2 and Safe mode. Further information can be found under the various heading in this manual.

Status shows the current level of heating or cooling. Available modes are Heating xx%, By-pass xx% and Cooling xx%. If they all show level 0%, the unit shows ----- 0%.

Temp shows current set temp.

Version

Shows current program version and the serial number of the electronics. Present date and time is shown and can be changed here.

Language choice

Choose Swedish, English or Polish.

Address

Shows the address to the unit. Possible to change.

1. Temperature.

Temperature

The outdoor temperature is measured on incoming air close to the AHU. The temperature can differ a little from the real outdoor temperature, depending on the duct length, insulation etc.

The supply air temperature is measured in the supply air duct, normally about one meter from the AHU. Supply air is the fresh air that - after possible heating - is sent into the room.

The exhaust air temperature is measured close to the AHU. Exhaust air is the air that leaves the room and goes back to the AHU, where the heat is recovered.

The extract air temperature is measured close to the AHU. Extract air leaves the AHU and is sent out from the house.

The room temperature is measured with an external sensor, placed in an appropriate place in the flat/house.

The freeze protection temperature is only used with water heating and shows the temperature of the return water from the heater. To prevent freezing of the water heater, the AHU will stop if the water temperature is too low.

ECO adjust.

ECO adjust. is only used with exhaust air control and room control, and gives a temperature range where heating and cooling is disabled.

Example: ECO-adjust 2 degrees and a set temp at 20 degrees means heating and cooling will be disabled between 18 and 22 degrees. ECO-adjust is activated when ECO is enabled.

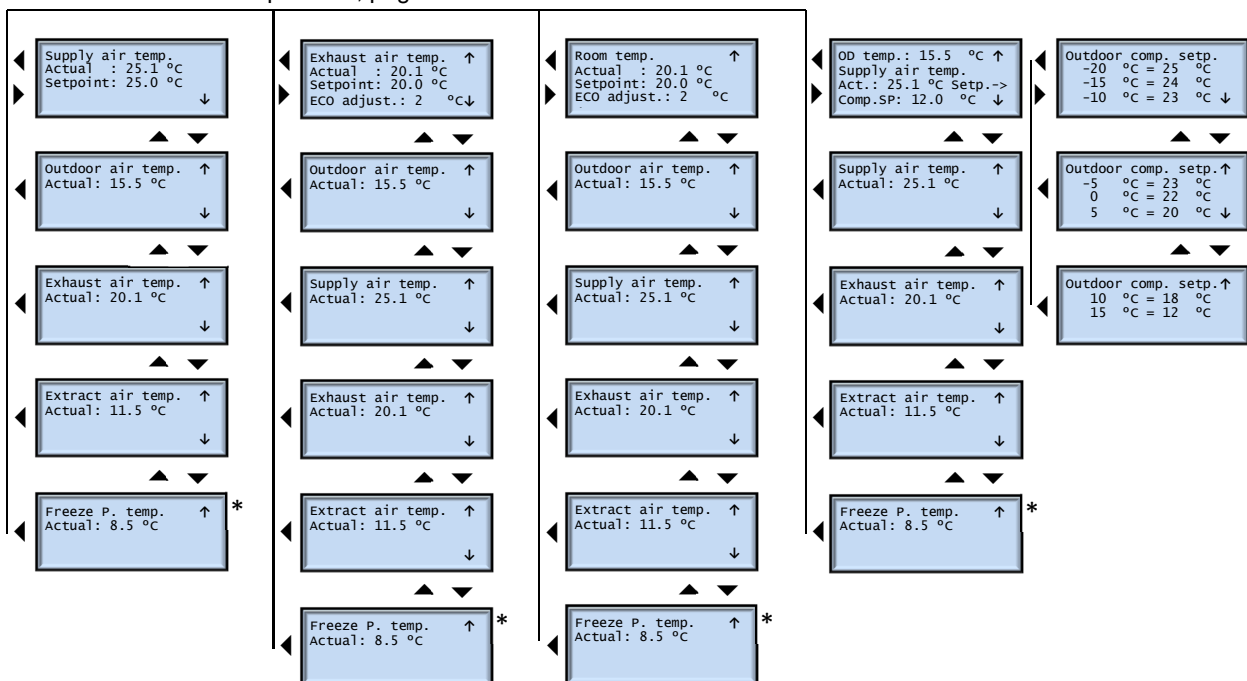
Control function

What is shown in the temperature menu depends on the selected control function. There are four control functions to choose between, depending on application: a) supply air control, b) cascade exhaust air control, c) cascade room control and d) outdoor compensated supply air control.

For temperature settings and reading, choose the column that corresponds to your configuration.

- a) Supply air control
- b) Exhaust air control
- c) Room control
- d) Outdoor compensated supply air control

Continued from Temperature, page 7

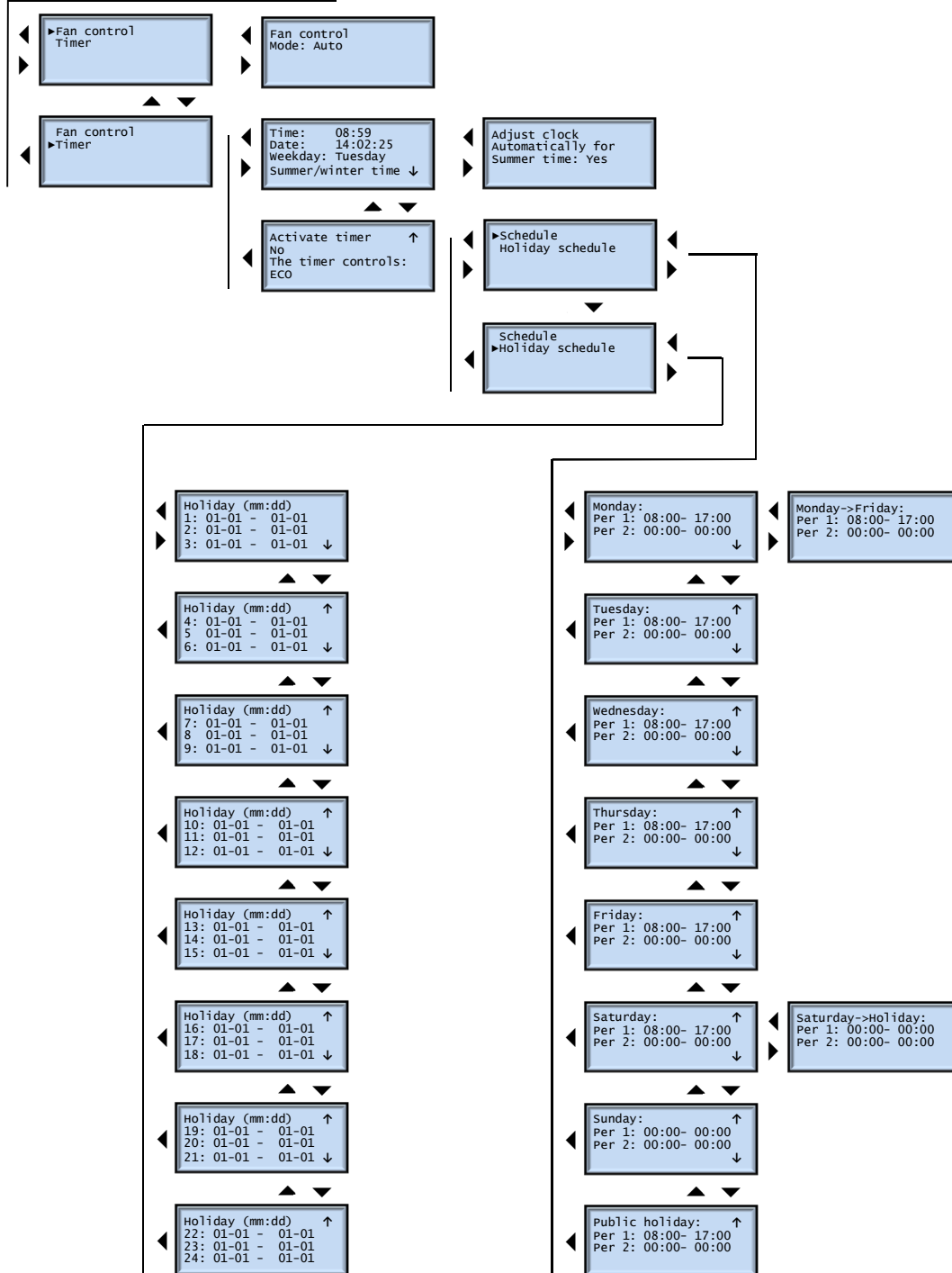


* The menu Freeze P temp. is only shown if water heater is configured.

2. Operation mode

In the mode menu, the operation mode of the fans can be changed. Date and time can be set and the timer can be configured.

Continued from Mode, page 7



Fan control

Five modes are always available:

- Auto: gives you an optimized function. The temperature is automatically controlled in accordance with the unit's internal and optimized algorithms.
- Min. flow: The system is forced to use a set minimum air flow.
- Boost flow: The system is forced to boost the air flow. Useful for example if you need to air the building very fast.
- Max. flow: The system works at set maximum air flow.
- Off: All fans are switched off.

Four other modes are available if those functions are installed and configured. (It is possible to choose these modes even if the function is not configured, but the system will return to earlier choice after a few seconds.

- Stove: This mode should be used when the stove/fireplace is used. The supply air fan works at a higher speed than the exhaust air fan, to compensate for the air the stove extracts. The cooling is disabled for a while after the stove/fireplace has been used, in order to retain the good stove heat.
- Kitchen: Use this mode when the cooker fan is running. The supply air fan works at a higher speed than the exhaust air fan, to compensate for the air the cooker fan extracts.
- ECO: Suitable to use when no one is at home. The fans switch to minimum flow, but gradually increase to normal flow when there is need for higher or lower temperature. ECO-adjust gives a temperature range around the setpoint and neither heat nor cool is enabled.
- Fire: To be used above all when testing the fire function. The supply air fan stops at the same time as the exhaust air fan works at its maximum speed.

Timer settings

The clock and summer/winter time

The clock can be set and the change between summer and winter time can be made automatic.

Enable timer

The timer is enabled upon delivery and connected to the function Min flow. If the timer is disabled, so are preset times and holiday schedules.

Time schedule

Two periods a day may be set. Note! To enable the timer from, for example Monday 20:00 until Tuesday 06:00 the settings should be Monday Per 2: 20:00 . 24:00 and Tuesday Per 1: 00:00 . 06:00.

To repeat the same time every day of the week, use the function Monday → Friday.

If you want the same time on Saturdays, Sundays and all holidays (specified in holiday settings), use the macro function Saturday → Holiday.

There is a separate menu for holiday schedules.

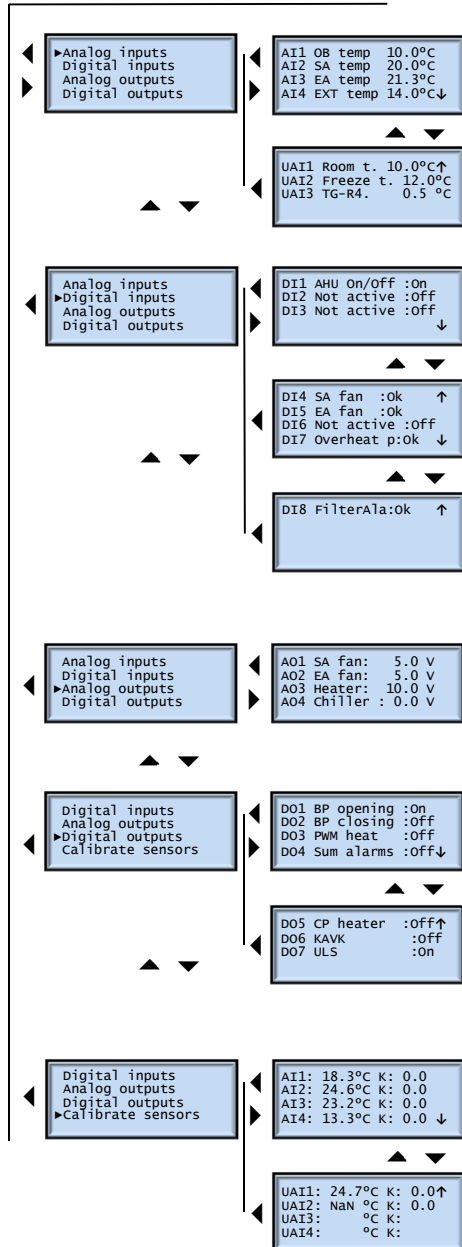
Holiday schedule

Up to 24 separate holiday periods for a complete year may be programmed. A holiday period may consist of a succession of days, from 1 to 365. The date is written: MM:DD. (It is important to set the time period from 00:00 one day until 00:00 next day. For example holiday June 6 will be written 06:06 . 06:07.) If that particular day falls during a holiday period, the system will use the schedule for %Holiday+.

3. In/Outputs

In this menu it is possible to check the status of every input and output. It is also possible to calibrate the sensors in this menu.

Continued from In/outputs, page 7



Analog inputs status.

All current temperatures are displayed here. The room temperature is only displayed if room control is configured. Freeze temperature is only displayed if water heater is configured. UAI3 displays the adjusted setpoint if TG-R4 is chosen as option.

Digital inputs status.

+Not active+means that the input is not in use (nothing is configured to the input). %On+means 24V on the input and the function that is configured to the input is active. %Off+means 0V on the input and the function that is configured to the input is not active. The alarm inputs can have status Ok or Alarm.

Analog outputs status.

Current voltage on the output is displayed.

Digital outputs status.

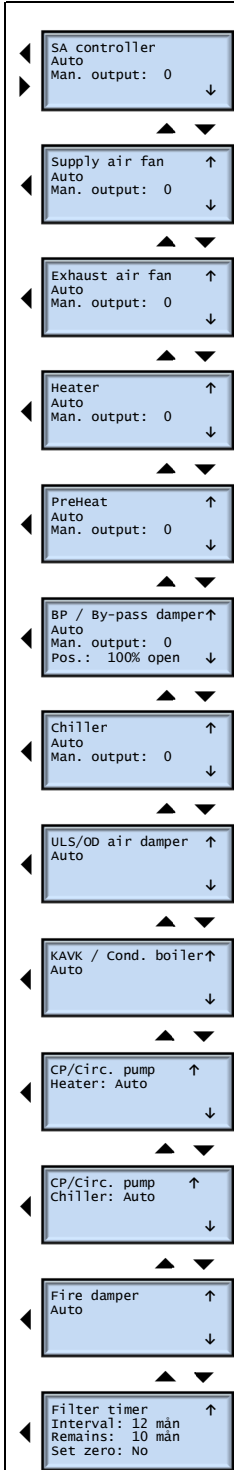
+On+means that the output is active and %Off+ consequently that the output is not active.

Calibrating the temperature sensors.

The sensors values may be adjusted up or down. (Set an offset value). For example, the old common thermometer could be synchronized with the AHU temp. State the difference here and they will show the same.

4. Manual/Auto

Continued from Manual/Auto, page 7



In Manual/Auto it is possible to control a number of functions manually, which is very useful during the start-up process and for troubleshooting.

Available menus are shown here. All functions cannot be configured at the same time as there are not enough outputs available. Furthermore, some functions are not needed in the application.

If an output is controlled manually, it means that the normal regulation is out of order. Therefore, an alarm will be generated as soon an output is changed to anything else than Auto.

Supply air controller

The output from the supply air controller may be adjusted manually between 0-100%. The output from the temperature controller will follow if it is in Auto mode.

Fans, By-pass damper, Heat and Cool.

The output to the fans, heater, by-pass damper and cooling may be adjusted manually between 0-100%. The actual position of the by-pass damper is displayed in the menu.

Digital outputs

All configured digital output signals, such as ULS, KAVK, CP etc, can be assigned Auto, On or Off (or a similar word that indicates the two possible levels of a digital signal).

Filter timer

The filter timer is administered here. The interval between the filter changes may be set from 6 to 18 months. The menu displays how many months remain before the filters must be changed. Do not forget to reset the timer when the filters are changed (even if the filters are changed earlier than expected).

5. Alarm

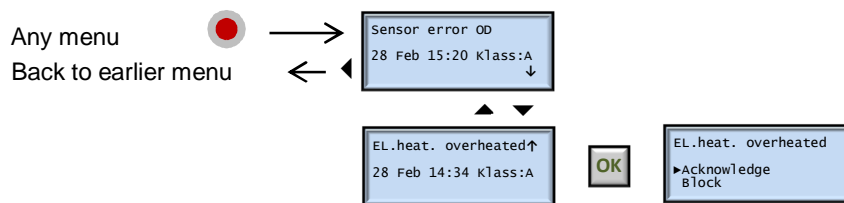
All current alarms and the status can be seen by pressing the red button. In this menu alarms can be acknowledged, blocked or unblocked (allow alarm).

There are 2 types of alarms: A and C alarms. A-alarms do not disappear until they have been fixed and acknowledged. C-alarms are internal alarms and will disappear automatically as soon as the alarm reason has disappeared.

Some faults cause immediate stop of the unit, as continued operation would be dangerous.

An acknowledged alarm that has not yet been dealt with remains on the menu as *Acknowledged*. It disappears from the menu when the fault has been dealt with.

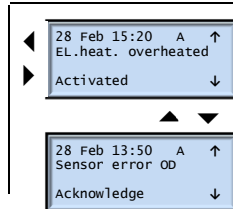
It is possible to block an alarm and continue to run the unit. **Note!** Do not do this unless you really know what you are doing, since it could be dangerous and in worst case damage both unit and property.



Alarm history

The last 21 alarms are displayed. You can see when the alarm went off, when it was acknowledged and/or returned and so on. In this menu, it is not possible to acknowledge or block any alarms.

Continued from Alarm history, page 7

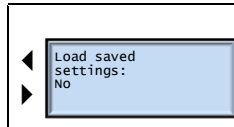


List of alarms. (abbreviations . see page 43)

| A-alarm | C-alarm |
|-----------------------|-----------------------------------|
| Sensor error OD temp | SA controller man. |
| Sensor error SA temp | SA fan manual |
| Sensor error EA temp | EA fan manual |
| Sensor error EXT temp | Heater manual |
| Sensor error RM temp | By-pass manual |
| Sensor error FRP temp | Chiller manual |
| Freeze P alarm | ULS (Outdoor air damper) manual |
| Supply fan failure | KAVK (Condensation boiler) manual |
| Exhaust fan failure | P1-heating manual |
| El. heat. overheated | P1-cooling manual |
| Filter alarm | Int. battery failure |
| Filter guard | |
| Fire damper alarm | |
| Fire alarm | |

6. Load settings

Continued from Load settings, page 7



Earlier saved settings are loaded back to the DUC here. If nothing has been saved, the standard settings apply. All settings except date and time will be loaded.

7. Authorization

Continued from Authorization, page 7



This is where an authorized technician can log in to adjust the system and, if necessary, change parameters.

Options

Remote panel Ę Easy (art.no. Q100446)



Remote panel - Easy

Remote panel - Easy (TG-R4) has a temperature sensor and a set point knob. The unit is used as room sensor with possibility to adjust the set point within preprogrammed limits. The normal set point is set on the display at the ventilation unit. This set point can later be moved some degrees up or down on the Remote panel . Easy. The adjusted value is displayed on the display at the ventilation unit. Remote panel . Easy has analog transmission of data to the ventilation unit.

Remote panel Ę Without display (art.nr. Q100040)



Remote panel . Without display

Remote panel . Without display has a temperature sensor and a set point knob. The unit is used as room sensor with possibility to adjust the set point within preprogrammed limits. Remote panel . Without display has the same functions as Remote panel . Easy, but works with serial data (RS485) to the ventilation unit.

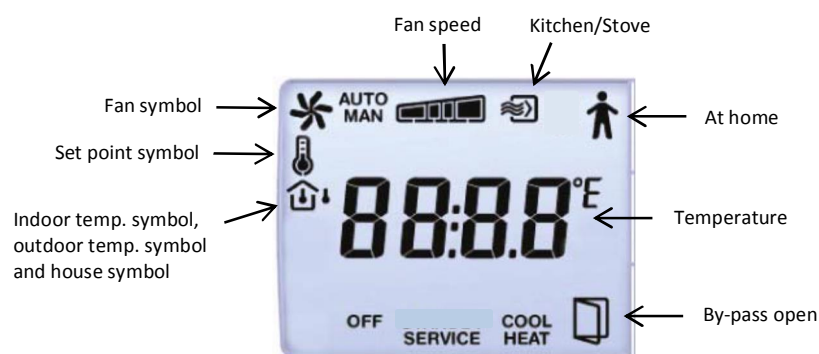
Remote panel Ę With display (art.nr. Q101299)



Remote panel . With display

"Away" button
 Setting buttons
 Navigation button

Remote panel . With display is the most advanced remote panel. It has a temperature sensor that could be used as room sensor. This unit has a display and buttons that enables you to see different temperatures and to set them. It is also possible to change the fan speed and see a lot of other information. In addition to this there is an %away+button included.



Display the temperature set point.

When no buttons have been pressed for 10 seconds, the set point is displayed and both the indoor temperature symbol and the house symbol are lit.

Changing of temperature set point.

Press the navigation button once and the set point symbol starts blinking. It is now possible to change set point with the setting buttons. The value is saved by pressing the navigation button, or if no button is pressed for 10 seconds.

Display actual temperature.

Press the navigation button once more (within 10 sec) and the set point symbol will be turned off. The indoor temperature symbol will start blinking and the display shows the actual value. At this point, the setting buttons have no function. When no buttons are pressed for 10 seconds, the display will again show the set point.

Display outdoor temperature.

Press the navigation button once more (within 10 sec) and the indoor temp. symbol will be turned off. The outdoor temperature symbol will start blinking and the display shows the outdoor temperature. At this point, the setting buttons have no function. When no buttons are pressed for 10 seconds, the display will again show the set point.

Fan speed:

Press the navigation button once more (within 10 sec) and the fan symbol, the fan speed symbol as well as MAN or AUTO will light up. The fan symbol starts blinking and the fan speed can be changed to desired position (min, normal, boost or max) with the setting buttons. The positions correspond with the possible settings in menu choice MODE on the main display. A change made on the remote panel will also be seen on the main display. The symbol MAN tells that the unit works in a different mode than AUTO. The unit may run at a fan speed between minimum and normal, or between normal and boost flow, due to boosting or safe mode. The symbol fan speed shows actual fan mode as follow:

- | | |
|------------------------------------|----------------------------------|
| • Fan speed zero | no box is lit |
| • < normal mode | the box leftmost is lit |
| • = normal mode | the two boxes leftmost are lit |
| • > normal mode but < = boost mode | the three boxes leftmost are lit |
| • = max mode | all boxes are lit |

If the unit has been put in manual mode on the main display, nothing will happen to the fan speed if you try to change it on the remote panel. The symbols in the menu MODE on both the remote panel and the main display will change, but the fans speed will not change until you shift from manual mode to AUTO on the main display. The new settings will be saved when the navigation button is pressed, or when no buttons are pressed for 10 seconds. The main display again shows the set point.

Kitchen/Stove.

The symbol Kitchen/Stove will light up when the unit is placed in stove mode or kitchen mode.

Away mode/ECO-mode.

By pressing the "away" button, the "at home" symbol will be turned off and the unit will change to ECO mode. Turn off ECO mode by pressing once more. The function requires that ECO is configured on the main display.

By-pass damper.

The By-pass symbol will light up when the by-pass is open > 0 %.

Cool.

COOL will light up if cooling is configured at the main display and the cooling-valve is open > 0 %.

Heat.

HEAT will light up if the regulator is calling > 0 % heat.

Alarm.

SERVICE will light up if there are unacknowledged alarms.

Off.


OFF will light up if the unit is turned off.

Cleaning

For best possible performance and a long life, the AHU should be kept clean. Please see instructions below on how to clean fans and heat exchanger.

Changing filters

There are two filters in this AHU: exhaust air filter and supply air filter (fresh air). Both filters should be changed at least once a year, and more often if need be. Do not wash the filters, but exchange them for new ones. To buy new filters, please contact the local dealer in your country or order from www.rec-indovent.se

 **NOTE!** The Temovex AHU must be fitted with the Temovex filters listed on page 1 of this manual. If the unit operates without filters, the performance will be affected adversely and fans and heat exchanger may be seriously damaged.



(Ref. numbers - see page 6)

- Cut off the power using the main switch.
- Open the unit door (1).
- Remove Cover plate A (see page 2).
- Take hold of the filter (2) or of the clamp between the bags. Push the front part backwards, downwards.
- The supply air filter (7) is behind the inner over plate, behind the exhaust filter. Remove the filter.
- Clean accessible surfaces if necessary.
- Fit the new filters in reverse order (the blue, exhaust air filter, is fitted in the front).
- Refit the access door.
- Close the unit door.
- Turn on the power.

The unit operates even if the filters are dirty, but the performance would be less good; energy consumption increases and heat recovery decreases.


To turn off/acknowledge filter alarm, see Ch 5.

Cleaning the fans

- Cut off the power using the main switch.
- Open the unit door (1).
- Remove both covers (4 and 5)
- Clean one fan at a time.
- Undo the fan's electric plug and pull out the fan.
- Clean the impeller using a brush or compressed air.
- Refit the fans in reverse order.
- Refit the covers.
- Close the unit door.



- Switch on the power using the main switch.

 **NOTE!** The fans must under no circumstances be cleaned under running water!


Cleaning the heat exchanger

- Cut off the power using the main switch.
- Open the unit door (1).
- Remove both covers (4 and 5) and remove both fans (see above).
- Open the inspection door (8)
- Remove the red plug at the bottom of the unit, the condensate drain (10)
- Flush the heat exchanger with hot water.




NOTE! If the unit is fitted with a condensate evaporator unit (KAVK), a wet vac should be used to deal with the rinse water.

A degreasing agent may be required if the heat exchanger is very dirty.

 **NOTE!** The agent must be of a type which is not aggressive to aluminium. Alkaline detergents with caustic ammonia and alike must never be used, since they have a corrosive action on aluminium, i.e. ruin the heat exchanger.

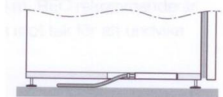
- Refit the red plug (10) (On the same side of the unit as the filters).
- Refit the inspection door (8).
- Refit the fans in reverse order (4, 5)

 **NOTE!** Make sure the fan motors are not/do not get wet when restarting the unit. If wet, this could be fatal!

- Refit the covers.
- Close the unit door.
- Turn on the power using the main switch.

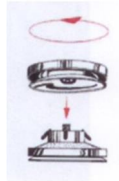
Checking the condensate drain

- Open the unit door (1).
- Open the access door (8) at the bottom of the cabinet.
- Make sure the drain is not blocked. This can be done by pouring some water into the bottom of the unit. **NOTE!** On the side which does not have a red plug.
- If the drain is jammed, try to remove the obstruction. If need be, call a plumber.
- Refit the access door.
- Close the unit door.



Cleaning the air diffusers

The building's air diffusers must be cleaned regularly in order to maintain correct ventilation. Use a dry cloth and/or a small brush to reach inside the opening of the diffuser. It can also be taken down if that makes cleaning easier. Use a duster or a dry cloth to remove possible dirt marks in the ceiling around the device.

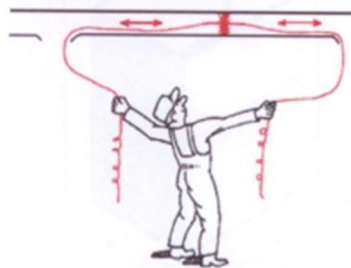


NOTE! The air diffuser's setting must not be changed. If taken down, each diffuser must be returned to its original place.

Cleaning the duct system

The exhaust air ducts - and sometimes the supply air ducts as well - may need cleaning at long intervals. Dust and dirt will deteriorate the capacity of the AHU if not removed.

Authorized ventilation cleaners should carry out the cleaning. However, you yourself can easily clean the part of the duct which is close to the air diffusers.







Take down the diffuser. Use a vacuum cleaner or duster to clean the inner part of the duct as far as you can reach. Refit the diffuser, making sure the setting is not changed.

Checking the outdoor air intake

Once a year the outdoor air intake should be checked. Make sure it is not clogged by for example leaves, snow or ice.

Service

Service and repairs, beyond normal maintenance, should be carried out by professionals in the ventilation field, or - if electricity is involved - by an authorized electrician.

-  The electric panel must not be opened by other than authorized specialist.
-  The plates covering the fans must not be removed when the AHU is running, as there is a risk of contact with moving parts. Make sure the electricity has been cut off (unplugged or fuse removed).
-  Interference with the AHU system may affect the warranty terms.
-  Use original spare parts only.

Disposal

Prevent accidents when the AHU is disposed of. Remove the cable from the wall socket and cut it as close to the unit as possible. Store and transport the waste unit lying down. Please leave the unit to be recycled where such facilities exist. Check with your local authority for recycling advice..

List of abbreviations

| | |
|----------|---------------------|
| AHU | air handling unit |
| BP | by-pass damper |
| Comp. | compensate(d) |
| CP | circulation pump |
| DUC | controller |
| EA | exhaust air |
| El.heat. | electric heating |
| EXT | extract air |
| FRP | freeze protection |
| h | hour |
| Int. | Internal |
| KAVK | condensation boiler |
| mm:dd | month:day |

| | |
|-------|--------------------|
| OD | outdoor |
| P | protection |
| per | period |
| pos. | position |
| RM | room |
| s | second |
| Setp. | setpoint |
| SA | supply air |
| Temp. | temperature |
| ULS | outdoor air damper |

DATE is shown in the format YY-MM-DD.

TIME is shown in 24-hour format.

Notes:



REC Indovent AB reserves the right to make alterations to specification and construction without prior notification.



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Certified acc. to ISO 9001/14001

REC 15-06-11

Technician manual

INSTALLATION

OPERATION & CONTROL

Exhaust air filter, article No: Q120101
Supply air filter, article No: Q120100



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Safety



Read this user's guide carefully before installing the Air Handling Unit (abbreviated AHU), particularly those parts marked with the above safety sign.

If you use and care for your AHU in a correct way, it will perform in the best possible way for a long time.

The AHU creates an indoor climate that is very good, at the same time as energy is saved due to efficient heat recovery.

NOTE! This user's guide should be stored together with the AHU, and should be passed on to possible new owners.

Receipt of goods

Check the following before you sign the delivery note:

- the number of cartons should conform to the delivery note/packing list
- there should be no visible transport damages.

The AHU should be stored indoors.



If possible, store the AHU laying down before installation, in order to avoid it tipping over. This is particularly important if there are children around.

Installation Ę how

Work carried out by laymen may impair the performance of the AHU and cause injury or damage to persons or property. If the unit is installed incorrectly, it will not be possible to achieve the desirable benefits, such as satisfactory air quality and maximum energy savings.

The AHU is heavy. Edges and corners, which you would not normally come into contact with, may be sharp. Therefore, we suggest you wear gloves when moving the unit.



Keep an eye on children! Before the unit has been installed, it may easily tip over if abnormally loaded.

Installation Ę where

The unit can be installed in for example a scullery, laundry or similar. Recommended minimum temperature in the room is +12°C. At lower temperature, heat loss and more condensate water could be a problem.

Place the unit upright on a flat and solid foundation. In order to avoid structure-borne sounds, there should be a gap of at least 10 mm between unit and wall. We also recommend that walls to adjacent rooms are soundproofed. These precautions should be taken although the Temovex AHU is considered very silent. The unit has adjustable rubber feet and well balanced fans, to avoid vibration.

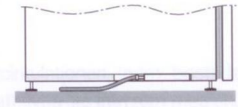
The unit should be installed in such a way that it is easy to access for maintenance and inspection. Make sure the front door can be fully opened. The AHU should be placed in such a way that water cannot splash over it. As an option, the unit can be equipped with protection that enables the installation to comply with IP class X5.

Condensate drain

The Temovex unit is fitted with a condensate drain at the bottom of the unit, 3/4". This should be connected to a drain or fed to a floor drain. Make sure the drain pipe is lowered well down in the floor drain, or there might be a cold draft. There is no need for a water seal.

NOTE! The condensate drain has to be connected when the unit is installed.

If the unit is fitted with the optional condensation boiler (KAVK), no external connection is required. If the unit has a condensation boiler (KAVK) and/or if the unit is installed on a wooden floor or other floor material sensitive to damp, the AHU should be placed on a water resistant mat (like the ones you use under a dishwasher) to avoid damages caused by possible leakage or condensation.



Connecting ducts

Ducts and duct details should be made from an age-resistant material, and should be easy to clean inside. A flexible duct connector can be used where a short connection between for example roof hood and duct system is needed.

Tumble dryers and drying cabinets must not be connected directly to the duct system.

Outdoor air, extract air

The outdoor air intake, fitted with an external wall grille, is best positioned on the north or east wall of the building, slightly above ground level in order to avoid dirt from the ground. The outdoor air intake should be placed at a distance from kitchen flues, exhausts from central vacuum cleaners, etc.

Extract air should be discharged above roof level via a roof hood.

Mounting the duct system

Ducts and duct details are fitted in accordance with the instructions given by the duct supplier, normally using 3 pop rivets or special assembly screws at each joint. If duct details with rubber seals are used, no additional joint sealing is required.

Silencers

Silencers dimensioned for the installation should be fitted both for the supply air and exhaust air, either directly onto the Temovex unit, or to the duct system as close to the unit as possible. Under certain conditions, silencers on the outdoor air duct as well as extract air duct may be necessary.

Temperature sensors - location

Sensors for outdoor air, exhaust air and extract air are already mounted in the AHU's respective air ducts. They are also electrically connected to the control system.

Should the unit be equipped with an after-heater, the sensor for freeze protection is mounted and connected.

The sensor for supply air is just electrically connected upon delivery. It should be placed in the supply air duct, at least 0,6 m from the heater to avoid direct heat radiation, and after the first bend if possible, where the temperature is more homogeneous.

NOTE! Seal the lead-through carefully.

If a room sensor is used, it should be placed approx. 1,8 m above floor level in the living room, preferably on an inner wall.

Insulation

Outdoor air and extract air ducts in heated spaces must be insulated against condensation along their entire length, using an insulation sleeve with minimum 30 mm insulation. The diffusion barriers are sealed using ventilation tape.

Supply air and exhaust air ducts in warm rooms do not need to be insulated against condensation, however, heat insulation may be appropriate. This should be decided in each individual case.

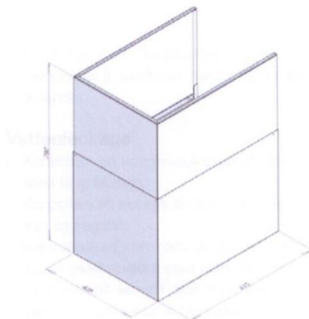
Supply air and exhaust air ducts located in cold or unheated rooms should be insulated against frost. If blanket insulation is used, 2 layers with overlapping joints should be achieved, with a minimum insulating thickness of 120 mm.

If loose-fill insulation is being laid, the layer covering the ducts must be at least 150 mm.

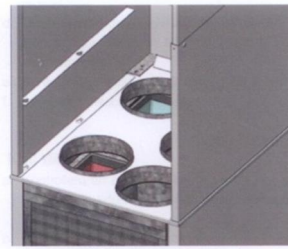
Duct cover for AHU top

The lacquered, 2-piece cover hides the ducts at the top of the Temovex unit. The cover is telescopic and will fit ceiling heights between 2,30 - 2,70 m. We recommend a gap of 5 mm between ceiling and duct cover to avoid any transfer of vibrations.

1. Measure the distance from the top of the unit (without duct cover) to the ceiling. Assemble the two pieces on a flat surface/floor, and ensure that the height will allow a gap of approx. 5 mm to the ceiling. Use the enclosed 4 self-tapping screws to make the holes in the upper (smaller) cover plate. Use the 4 white screws to join the two cover plates.



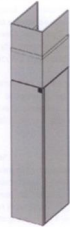
2. Put the duct cover on top of the unit, placing the



screw-heads in the "key" holes. Fix the cover onto the unit by sliding it backwards some 5 mm (see picture). If the duct cover is mounted onto an existing unit, the

pop rivets at the unit top have to be replaced by screws.

3. Whenever you need access to the upper part of the Temovex unit, the duct cover is lifted off in one piece (point 2 above, but reverse order)



Air diffusers

Supply air diffusers are normally installed in rooms where people spend much time, such as bedrooms and living room.

Exhaust air diffusers are normally installed in "damp and smelly" rooms, for example bathroom, laundry etc.

Both supply and exhaust air valves can be mounted on the wall or in the ceiling. They should be placed where they can easily be demounted for cleaning, service or inspection of the duct system.

Transmitted air between rooms

To facilitate the circulation of air in the home, supply air from rooms with such valves must be given the chance to move to rooms with exhaust air valves. Use doors with an air transfer slit, or doors without door sill (minimum 70 cm² free area/exhaust air valve). Alternatively, wall mounted transfer air grilles can be used.

Stove/fireplace

Most modern stoves have a separate outdoor air connection which provides combustion air to the stove. If this is not available/possible, a separate outdoor air device should be mounted. The stove consumes some 150-300 m³/h.

To facilitate the lighting of fires (to start with, the stove door should be left ajar) an option is to provide the Temovex AHU with a "stove" button.

Kitchen flue

The cooker fan is fitted with a separate fireproof spiral duct. The extract air is fed out via a roof hood. Use an approved duct and 2 speed clamps to connect the cooker hood/kitchen fan to the kitchen flue.

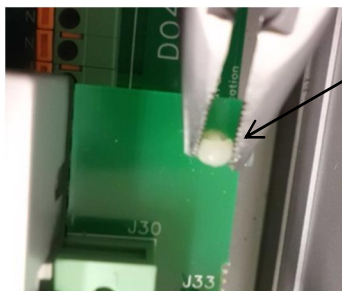
Power connection

The AHU is provided with a grounded plug. Connect the plug to an earthed 1-phase socket (230 VAC / 10 A). Connection at the top of the unit.

DUC Ë how to remove



DUC



Remove the DUC from the PCB by squeezing each top of the four spacers with a pair of pliers. Squeeze one at a time and ease the DUC out at the same time.



The DUC is now attached to the board by 2 ribbon cables only.

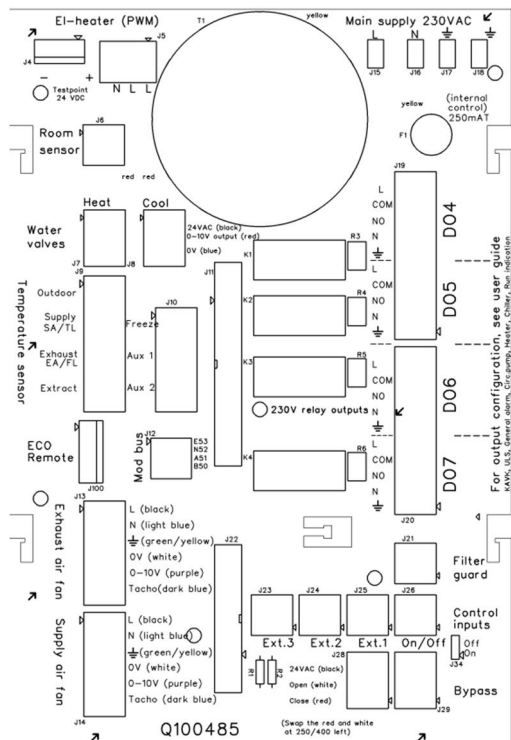


The spring locks on the plugs of the DUC's ribbon cables make it easy to loosen them from the circuit board.

The bottom card can now be reached and set up with required functions.

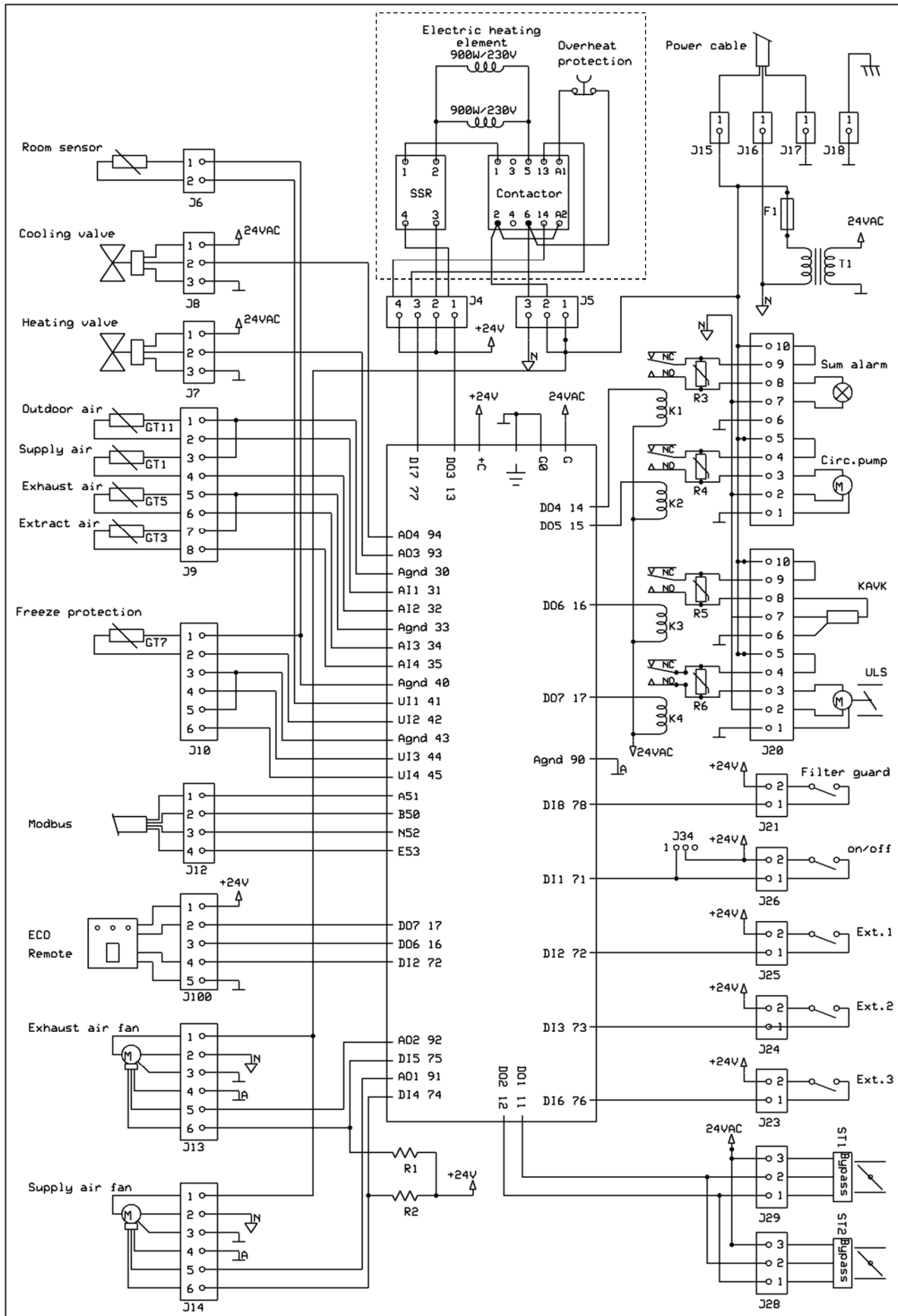


After the installation of functions is done, re-fit the DUC in reverse order.



The printed circuit board screen print.

Connecting the AHU wiring diagram



Description of terminal blocks

General

Joining of circuits is made on the bottom circuit board. To access the circuit board, remove the DUC (see previous page).

Texts on the circuit board show where to connect what. All terminals have a Jxx No. and a small triangle on pin 1.

When in the following text for example J26/1,2 is stated, it means that the function should be connected to terminal J26, pin 1 and 2.

Where appropriate, the signal is marked on the board.

Room sensor (terminal J6/1,2)

If a room sensor is installed, this must be stated in the AHU's configuration. This is done by a qualified installer.

External cooling (terminal J8/1,2,3)

The AHU can be fitted with an external water chiller (cooling coil), for example natural cooling from a drilling hole. The chiller is controlled via an external control valve (0-10 V).

After-heating water (terminal J7/1,2,3)

The water heater is controlled via an external control valve (0-10 V).

(The cable may already be connected upon delivery)

Temperature sensors (terminal J9)

Temperature sensors (PT1000) for outdoor air, supply air, exhaust air and extract air are already connected upon delivery.

Freeze protection - After-heater (terminal J10/3,4)

In connection with water heating, a freeze protection (temperature sensor) is fastened on the return water pipe of the after-heater, in order to protect the after-heater from freezing,

Modbus (J12)

Terminal for possible modbus communication.

ECO Remote (J100)

Terminal for connecting a remote control (optional) with among other things alarm indication and a switch for ECO mode.

NOTE! When using ECO Remote, DO6 must be configured for Normal flow, DO7 for Sum alarms

Fans (J13 and J14)

Terminals for the fans. These are already connected upon delivery.

By-pass (J28)

Connection terminal for the by-pass damper.

Optional terminal for by-pass (J29)

Extra connection terminal for by-pass damper (some AHU models)

Ext.1, Ext.2 and Ext.3 (terminals J23 to J25/1,2)

As an optional extra, you can choose to connect three external switches that will change the speed of the fans in accordance with the preset values.

Suitable air flows have been preset, but may be altered by a qualified installer, using the control panel.

To see which options are available, please turn to chapter "Operation & control".

Start/stop (terminal J26/1,2)

An external switch for "Start/stop" can be connected. The switch makes the AHU stop running, but does not make it powerless.

If this function is used, the jumper J34 should be moved to mode OFF.

Optional terminal for filter guard (J21)

For some of the larger AHU models only.

Relay outputs (terminals J19, J20)

The system has 4 identical relay outputs which can be configured to various functions. The configuration shown above is one example, and others may be made.

To see which options are available, please turn to chapter "Operation & control".

A condensation boiler (KAVK), if any, would be installed at the factory.

Mains voltage (terminals J15, J16, J17)

230VAC, 50Hz

Casing (terminal J18)

Ground connection of the casing.

Electric heating, voltage feed (terminal J5/2,3)

Pin 2 phase, pin 3 neutral (blue).

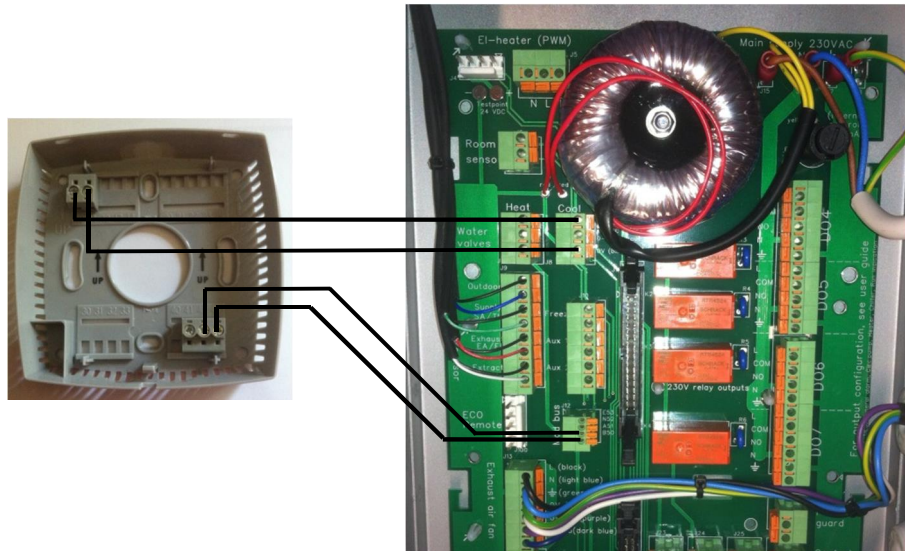
Electric heating, control signals (terminal J4)

Connecting options

Connecting Remote panel Ę Without/With display at port 1

If not addition Modbus communication, the remote panel should be connected to port 1 as below.

| Remote panel | PCB |
|--------------|-------|
| 10 | J8/1 |
| 11 | J8/3 |
| 42 | J12/3 |
| 43 | J12/4 |

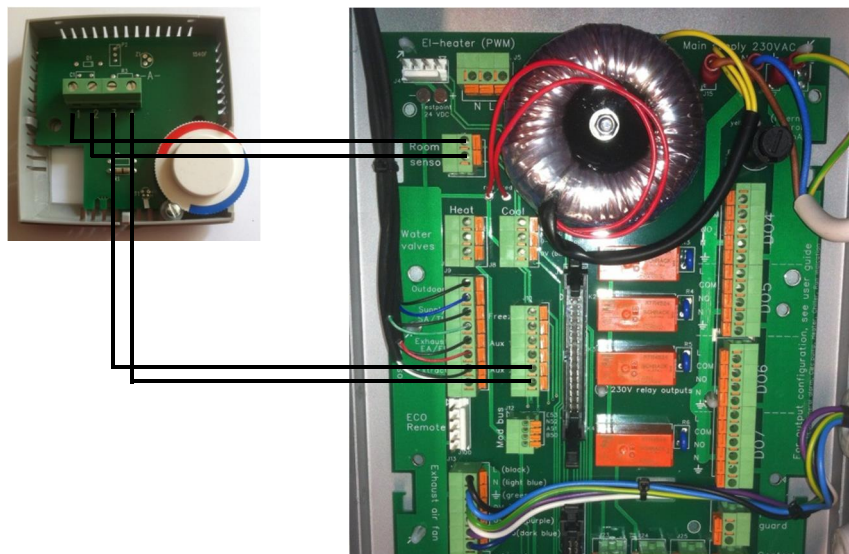


Connecting Remote panel Ę Without/With display at port 2

If addition Modbus communication, the remote panel should be connected to port 2. (No picture available). The connection shall be close to the DUC signal A (42) and B (43) (not at the PCB). Power supply (10, 11) in the same way as if port 1.

Connecting Remote panel Ę Easy (TG-R4)

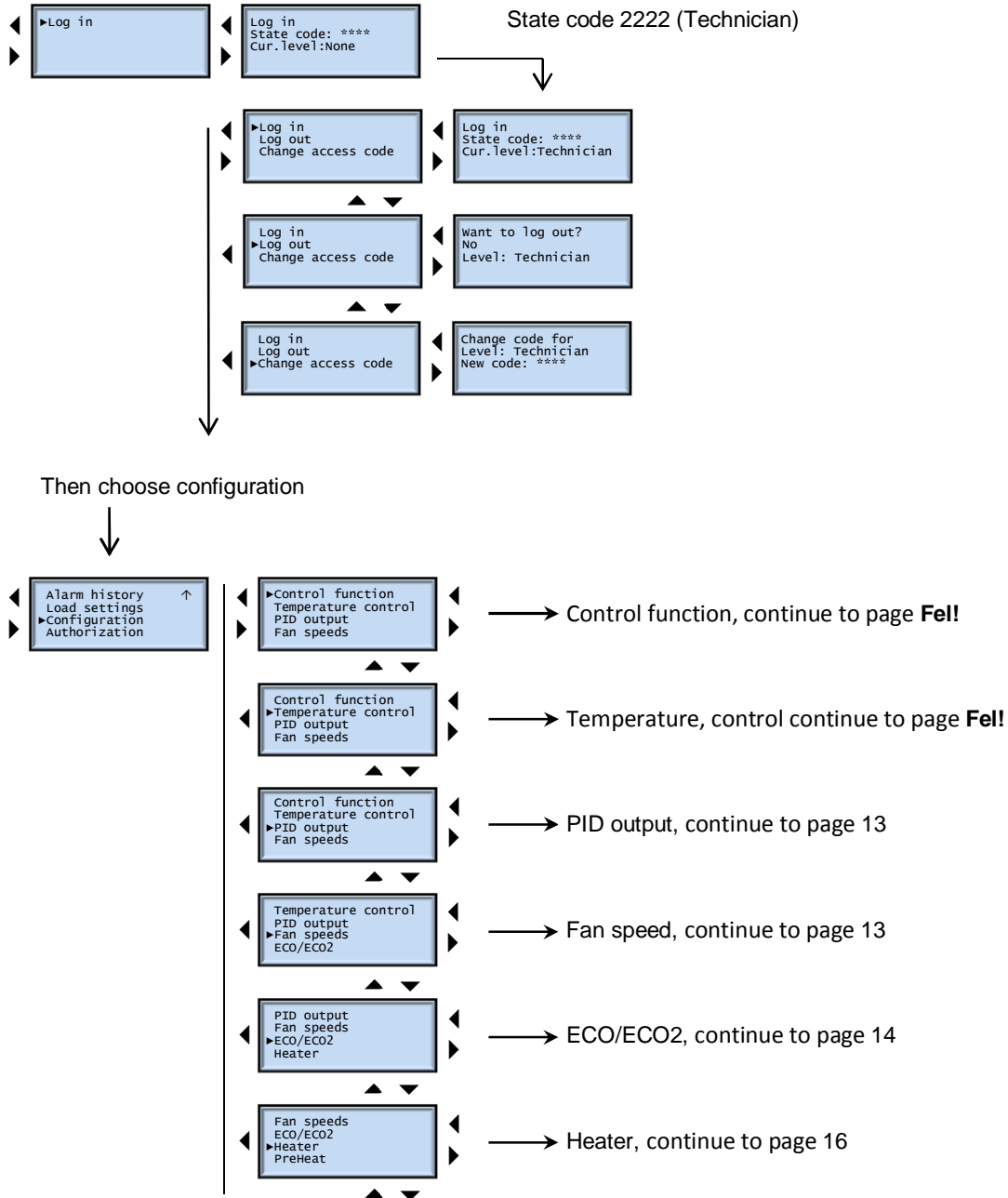
| Remote panel | PCB |
|--------------|-------|
| Easy | J6/1 |
| 1 | J6/2 |
| 2 | J10/3 |
| 3 | J10/4 |
| 4 | J10/4 |



For introductory information se User manual!

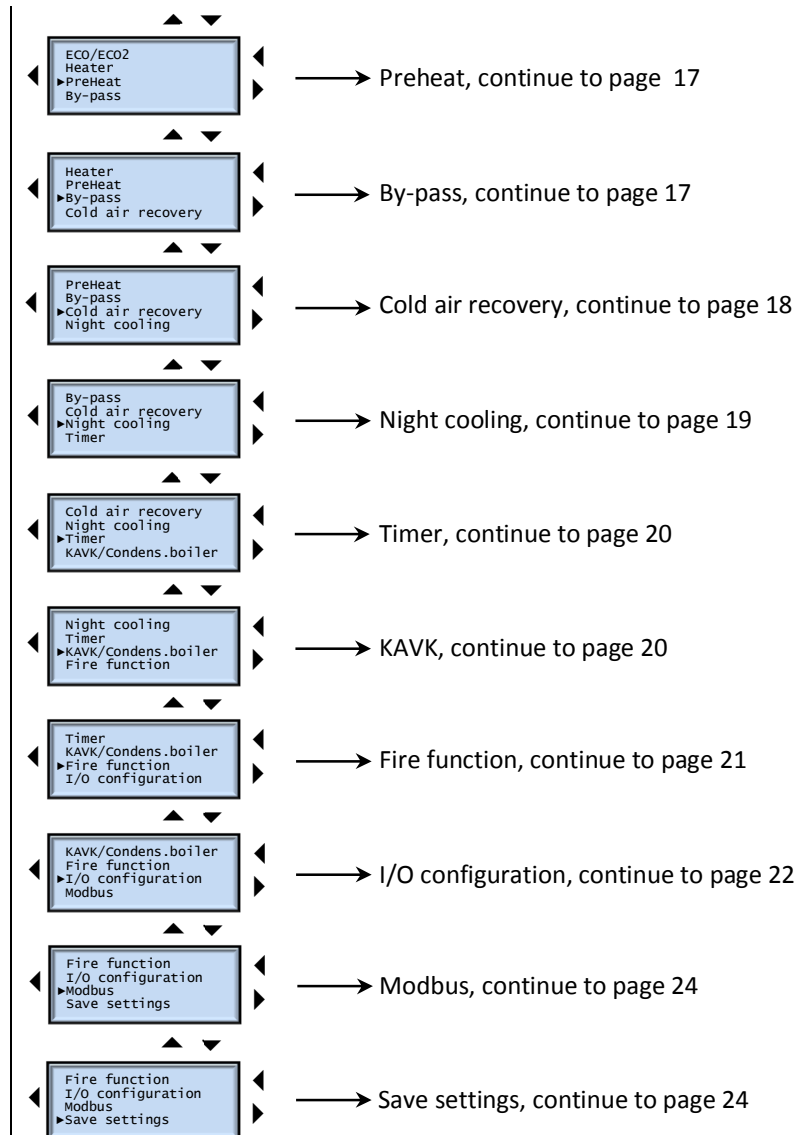
7. Configuration

Begin at Authorization and log on as Technician.



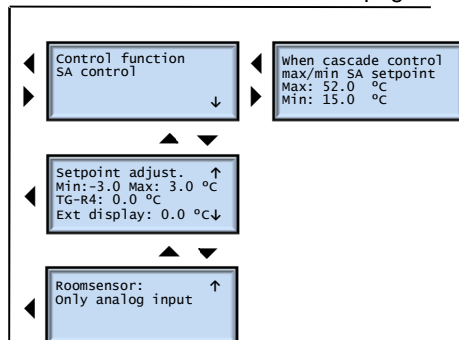
Continues on next page.

Continued from previous page.



7.1 Control function

Continued from Control function page 9



Control functions

Selectable features:

- SA control The temperature is regulated by the SA sensor only.
- ODT comp. SA control The temperature is regulated as a function of the SA sensor and OD sensor.
- Casc. Room control The temperature is regulated as a function of the room sensor and SA sensor.
- Casc. EA control The temperature is regulated as a function of the EA sensor and SA sensor.

Cascade control

This function is only active when cascade room control and cascade exhaust air control is used. The room desired set point is set on the room sensor if room control and on the EA sensor if EA control. The system calculates a new supply air (SA) set point based on the control error. In the extreme case (if large control error) this could be very high (or low), which could generate much too cold or hot supply air, which could feel uncomfortable. It is possible to limit the SA set point both up and down. Setting range for both min and max is 0-150°C. Default settings are max 52°C, min 15°C.

Set point adjust

The menu "Set point adjust" is used together with room sensor with set point adjust included, like Remote panel . Easy (TG-R4) or Remote panel . Without display. State the range for the set point adjust in this menu. With the knob in mid position (0 adjust), use the set point in the main display. The function %Set point adjust+is only working if it has been activated by the factory. Settable range for min and max is ±10 degrees. Default is ±3°C. Current adjustment can be seen in the display on the subsequent lines.



Remote panel - Easy



Remote panel . Without display

Several room sensors

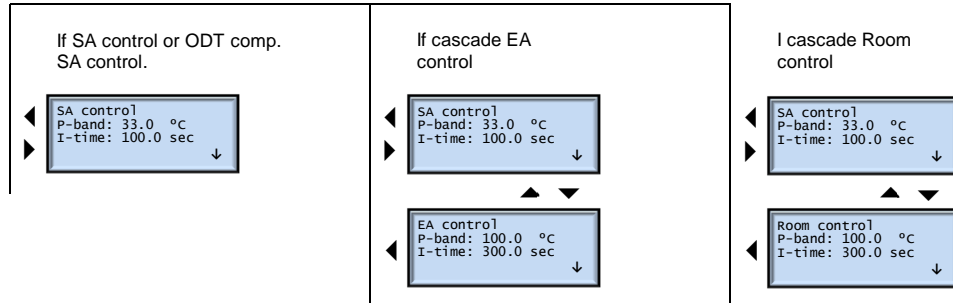
If there is more than one room sensor and one of them is connected to the analog input (a simple standard sensor or for example Remote panel . Easy (TG-R4)) and the other one is a serial Remote panel, connected to port 1 or 2, it is possible to choose from where the actual value should be taken. This menu is only displayed if room control is used.

Selectable alternatives:

- Only analog input
- Only Remote panel
- Average

7.2 Temperature control

Continued from Temperature control page 9



Controllers function

The SA controller is acting indirectly, which means that the output is rising with falling temperature. The controller is a PI-controller with settable P-band and I-time.

In the first case, the temperature at the SA sensor will be constant at the set point.

In case 2 and 3, the supply air temperature is controlled as a part of a cascade control, together with the EA controller/room controller. A difference in the room temperature relatively the set point, moves the operating point until the error is eliminated.

Setting the controllers

The control parameters could be adjusted if needed. The default settings are 33 and 100 respectively, which in most cases is ok. (It is the same SA controller in all three cases above. An adjustments will follow automatically if one changes to another control function.)

The default setting of the EA controller and room controller (which in fact is the same controller) is 100 and 300 respectively.

Warning! A faulty setting could make the system work very badly.

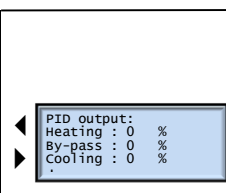
What is P and I?

P-band is the temperature change needed to move the actuator from closed to fully open. A small P-band (= large gain) causes an unstable system. A small temperature-change on the sensor generates maximum heat and provides large overshoots. A large P-band (low gain) on the other hand provides smaller overshoots, but will take longer before the correct value is reached.

Including an integrator (I-value) in the control loop will provides smaller overshoots. The gain decreases the closer one comes to set point.

7.3 PID output

Continued from PID output page 9



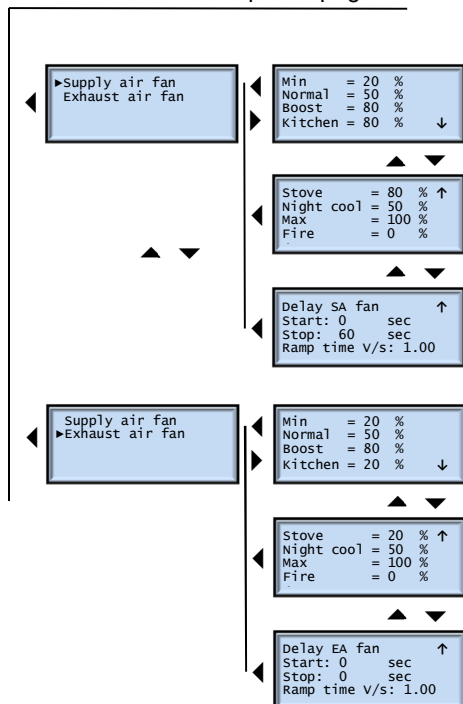
Here the output from the SA controller is displayed, divided between the three outputs cooling, by-pass and heating.

The output from the SA controller 0-100% is divided between the outputs as follow.

| Controller output (PID-output) | Cooling | By-pass | Heating |
|--------------------------------|----------|----------|----------|
| 0 - 32% | 100 - 0% | 100% | 0% |
| 32 - 64% | 0% | 100 - 0% | 0% |
| 64 - 66% | 0% | 0% | 0% |
| 66 - 100% | 0% | 0% | 0 - 100% |

7.4 Fan speeds

Continued from Fan speeds page 9



Setting the fan speeds

In this menu the fan speed for different modes is set (in % of max speed). By changing the %-value for each fan, the system can be adjusted to get the correct flow-balance. The menu to the left, shows the default values.

Fan speed night cooling

The value for night cooling is, on delivery, the same as normal mode.

If the value for normal mode is changed, the value for night cooling will be changed too, unless the value for night cooling is actively set to something else. To get them synchronized again, set the night cooling value at the same value as normal mode.

Fan delay

It is also possible to set a start and stop delay for each fan, and a ramp time.

Settable values for start and stop is 0-3600 sec. Settable values for the ramp time is 0-100V/sec.

7.5 ECO/ECO2

About ECO.

ECO-mode

- ECO can be used together with all control functions.
- ECO saves energy when nobody is at home. The fans go down to minimum flow.
- ECO means that the fans, when they go on min. flow, increase speed up to normal flow, to carry more heat or cool if min. flow cannot hold the set point.
- ECO-boosting together with cooling works even without cooler. The AHU takes cold air through the by-pass only and will cool as far as possible.
- ECO-mode can be activated in different ways, either by a manual switch connected to a digital input or automatically according to a time schedule. ECO can also be activated manually in the mode menu.

ECO2-mode

- ECO2 is used only together with EA and room -control.
- ECO2 means that the fans increase the speed more than with ECO alone. They increase all the way to boost-flow, to carry more heat or cool if actual flow cannot hold the set point.
- ECO2-boosting together with cooling, works even without cooler. The AHU takes cold air through the by-pass only and will cool the room as far as possible.
- ECO2 works just as well in ECO mode (when nobody home), as it does when you are at home and the unit is running at normal flow.
- ECO2-boosting together with cooling can be turned off, if you want boosting together with heating only.

ECO-adjusting

- ECO-adjusting is only active with EA- and room-control.
- ECO-adjusting needs ECO to be activated.
- ECO-adjusting indicates a temperature range where heat and cool is inactive. For example with ECO-adjust 2 °C and a set temp of 20 °C, the heat and cool will be inactive between 18 °C and 22 °C.

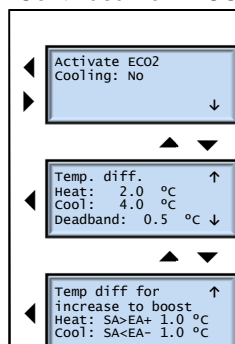
Safe mode

- To make it possible to heat/cool with air, it is necessary that enough heat/cool is available through the heater/cooler.
- Safe mode is an extra protection function that blocks the boosting, in the event of lack of heating / cooling media. The aim is to bring as little unwanted cooling / heating to the apartment as possible during a possible unit failure, but still have some ventilation. The fans regulate down towards minimum flow, pending the return of heating / cooling media. It is a continuous regulation, which means that if there is not enough heat/cool, the fans speed up only as much as the heat/cool allows to give a positive heat/cool supplement.
- If there is no heating media the AHU will generate an alarm when the fan speed has been at min flow for at least 5 minutes. (No alarm will be generated if there is no cooling media).
- Safe mode is only active with EA and room control, unless ECO and/or ECO2 is configured on delivery.

The menu below shows setting possibilities for ECO and safe mode.

The menu is only displayed if the option ECO and/or ECO2 is configured on delivery.

Continued from ECO/ECO2 page 9



Activate ECO2 cooling.

The menu is only displayed if ECO2 is configured on delivery. To use ECO2 cooling, change No to Yes.

Temp diff.

In this menu, you set how fast the fans shall increase to boost flow. There is a deadband, before the fans start to increase at all. I.e this is how much the actual temperature may differ from the set point before the fans start to increase the flow.

The same deadband applies to both heat and cold.
Setting range deadband: 0,0-1,0 °C in steps of 0,1.

The value for heat and cool shows, how many degrees above the deadband the actual value is allowed to differ, before fans should have reached boost flow. The fans increase proportionally according to the temperature difference within the stipulated range. Setting range temp. diff.: 0,0-10,0 °C in steps of 0,1.

Temperature conditions for boosting

Here you specify how much warmer (or colder) the supply air must be to allow boosting. Example: with a setting for heat 1 degree, the fans will start to regulate towards minimum flow when the supply air temperature is one degree above the exhaust air, and then reach min flow when supply air and exhaust air temperature are equal. The temperature value is settable 0-10 degrees in steps of 0,1 degree.

The table below specifies how the fans regulate in different conditions.

| ECO Factory setting | ECO2 Factory setting | ECO-mode | Heating requirement | Cooling requirement |
|---------------------|----------------------|----------|---------------------|---|
| - | - | - | Normal | Normal |
| Yes | - | - | Normal | Normal |
| Yes | - | Yes | Min → Normal | Min → Normal |
| - | Yes | - | Normal → Boost | Normal → Boost if ECO2 cooling is activated |
| Yes | Yes | - | Normal → Boost | Normal → Boost if ECO2 cooling is activated |
| Yes | Yes | Yes | Min → Boost | Min → Normal and → Boost if ECO2 cooling is activated |

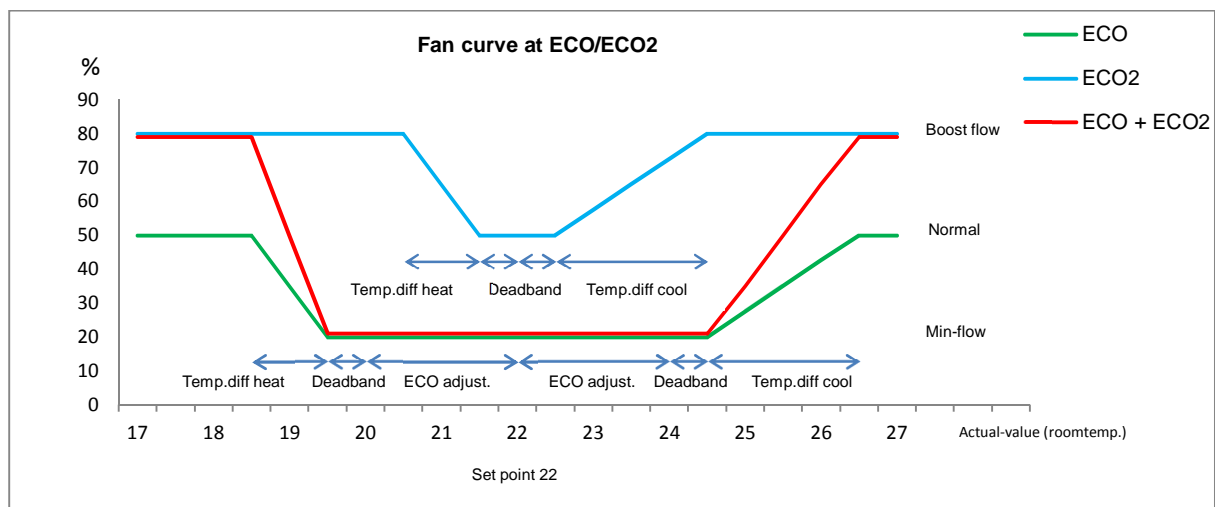
Screen view at boosting and ECO

- At fan speed between min and normal: ECO.
- At fan speed normal: Normal.
- At fan speed between normal and boost: ECO2.

Example of fan curve at ECO, ECO2 and ECO+ECO2

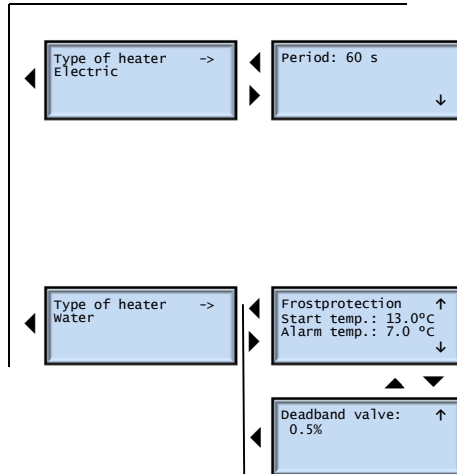
NOTE! ECO is only permitted when nobody is at home.
With no ECO-functions activated the fans work at normal flow all the time.
The following values have been used in the example below.

- ECO adjust. : 2,0°C
- Deadband: 0,5°C
- Temp diff. heating: 1,0°C
- Temp diff. cooling: 2,0°C
- ECO2 cooling activated



7.6 Heater

Continued from Heater page 9



Electric heater

Choose type of after-heater. Default is electric. A period between 0 and 600 seconds can be set.

Example: At a heat level of 50% and a period of 60 seconds, the heater will connect for 30 seconds and disconnect for 30 seconds and so on.

Water heater

Another option is water heater.

Water heating entails a risk that the water may freeze if the hot water supply fails. Therefore, the AHU is equipped with a freeze protection sensor and freeze protection control.

The water temperature is measured close to the water heater with a freeze protection sensor (PT1000) clamped on the return pipe and then isolated.

Freeze protection control

There is a freeze protection control 0-100% according to a linear scale, between start value and alarm temperature plus 1 degree. The heat level will be whichever is the higher of the normal temperature controller's value and that of the freeze protection controller.

At set alarm temperature a freeze protection alarm is generated and both fans will be stopped, outdoor air damper (ULS) and by-pass will close. The heat valve will still be open and the circulation pump for heat continues to run. The alarm can be acknowledged whatever freeze protection temperature, and the alarm output will then return. To get the AHU running again, the freeze protection temperature needs to be $\bar{\text{ set alarm temp + 2,5 degrees}}$.

Sensor error

If there is a fault in the freeze protection sensor, this generates a freeze protection alarm and a sensor error alarm and both fans stop, outdoor air damper and by-pass will close. The heat valve will open to its maximum and the circulation pump for heat will continue to run.

Special case

If the AHU is in manual heating, no freeze protection control will be made of the heating. Instead the manual value will be valid all the way down to the set alarm temperature. When reaching alarm temperature both fans stop, outdoor air damper and by-pass will close, the heat valve will open to its maximum and the circulation pump for heat will start. This will happen even if some of these are set in manual mode.

Stop delay for the fans is ignored if the stop is due to freeze protection alarm and/or freeze protection sensor alarm.

Setting freeze protection control

The start temperature (the temperature of the freeze protection sensor when the control shall start) is set in the setup menu (see above).

Setting range: $+13\text{ °C}$ to $+50\text{ °C}$. Default: 13 °C .

The alarm temperature (the temperature when alarm shall be generated) will automatically be changed to 6 °C lower than start temp. The default setting 13 °C for start temp. will automatically give the alarm temp 7 °C .

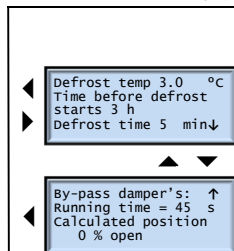
Deadband valve means that the step response from the controller must be over a set %-value of max. control voltage to give a change of the signal to the valve. Example: at deadband 0,5% the step response must be $5\% \times 10V = 0,5V$.

Setting range: 0-50%. Default: 0,5%

7.7 Preheater (Not used!)

7.8 By-pass

Continued from By-pass page 10



Defrost function

When the extract air temperature continuously has remained below set defrost temperature for set number of hours, the defrost function will start and runs for set number of minutes.

What happens at defrost depends on whether the AHU has electric heat or water heat.

In both cases the SA fan will stop and the EA fan will run at normal flow.

Further if electric heater: the by-pass closes and the heater turns off.

Further if water heater: The by-pass will instead open and maximum heat is turned on.

By-pass damper run time interval

The time it takes the by-pass damper to go from open to closed position varies between our AHU models. Here you set the total run time for the damper to go from open to closed, or the other way around. The system then automatically sets the damper in desired position.

The same menu also shows the calculated current opening in percent.

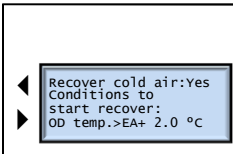
7.9 Cooling recovery

If cooling is required, the heat exchanger can use the cool air that is already in the house to cool warm incoming air. If cooling recovery is activated and exhaust air temperature is a set number of degrees lower than the outdoor temperature, cool indoor air will be recovered.

Activating and configuring

Cooling recovery can be changed, Yes/No, and is default activated (Yes). The temperature offset, for cooling recovery can be changed 0-20 °C in steps of 0,1 °C and is as default set at 2.0°C.

Continued from By-pass page 10



How it works

The by-pass is effected by the relationship between outdoor air and exhaust air.

| Requirement | Cool | Cool | Heat | Heat |
|-------------|--|---|---|--|
| OD air | >EA+2 | <EA+2 | >EA+2 | <EA+2 |
| By-pass | Regulates towards closed to cold exchange the cooler inside air. | Regulates towards open to cool with the colder outside air. | Regulates towards open to heat with the warmer outside air. | Regulates towards closed to heat exchange the warmer inside air. |

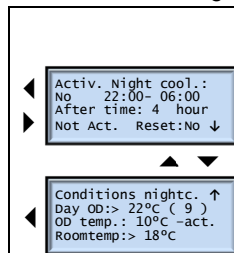
7.10 Night cooling

Night cooling means that at the night during the warm season, cold outdoor air is taken directly into the house to cool down the house and buffer for the warm day ahead.

Night cooling is recommended if warming with air, like EA or room control. But it is also possible to use together with supply air control, as the AHU switches to EA control when night cooling (including after time) is active. This works on conditions that the normal heating equipment has been turned off.

Settings for the night cooling is available in the setup menu below.

Continued from Night cooling page 10



Activating night cooling.

The activation is changeable (Yes/No) and is default inactive (No). When night cooling is activated it's default active between 22:00 and 6:00 in the morning. The time range is changeable in steps of 1 minute day and night.

An extended running time (after time) can be set, settable 0-24 h in steps of 1 hour. The heat is off during the part of the extended running time that is within the night cooling activating time. The remaining time the heat is controlled with the room temperature set in the menu "conditions night cooling" as set point. (This to save the newly acquired night cool). If the extended running time

would encroach on next day's activating time, night cooling will have priority. If the conditions for night cooling no longer are fulfilled within the activating time, the extended running time will start at this point. If the conditions should be fulfilled again before the activating time ends, night cooling will start again and the extended running time resets its self.

The last row in the menu shows if the activating time is active or not. It is also possible to reset an ongoing extended running time. (If the extended running time is set to 0 hour the time will in reality be 1 min, which makes it easy to test the functions).

During the time night cooling is active boost cooling is disabled. (See chapter ECO including safe mode). Default 22:00 to 06:00. Even if night cooling has ended because the conditions no longer are fulfilled, boost cooling is disabled all the stated time.

In the standard case the fans will run at the same speed (normal speed) all night long (22:00-06:00). In the morning boosting is allowed but still with a low set point (18 degrees) until the extended running time (4 h) has ended, which will be at 10:00h.

Conditions night cooling.

In this setup menu you configure the temperature conditions for night cooling to be active.

Day OD+ shows that the average value of the OD temperature between 9:00 . 16:00 must be higher than set value. Setting range 0-30 °C in steps of 1 °C. Default 22 °C. The value within parenthesis shows actual average value. The value resets at 9:00 h and a new value is calculated during the day. The value within parenthesis is updated every hour. Current OD temperature must be above a set value and below current room temperature (if EA control, the EA sensor). Setting range 0-30 °C in steps of 1 °C. Default 10 °C.

Room temperature must be above set value. Setting range 10-30 °C in steps of 1 °C. Default 18 °C.

Any set point adjustments will not affect this value.

Fan values for night cooling.

There are also special fan speeds connected to the night cooling. See chapter Fan speeds.

How it works.

If all conditions for night cooling are fulfilled the following will happen.

By-pass is open max. Heat and cool is off.

The fans change speed according to the settings for night cooling.

Night cooling is displayed in the panel as long as it really is active (all conditions are fulfilled).

If any of the conditions no longer are fulfilled, the extended running time will start and next the AHU will return to normal mode.

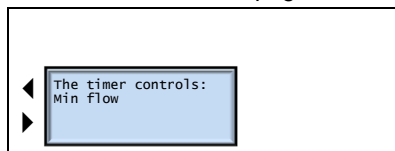
7.11 Timer

In this setup menu you configure what the timer should do.

Default is Min flow, which means the AHU will go to min flow during the periods set in the menu timer schedule. Normally used as an away mode+if there are periods every week when nobody is at home.

The timer could for example instead be used to stop or boost the AHU according to a schedule.

Continued from Timer page 10



7.12 KAVK (Condensation boiler)

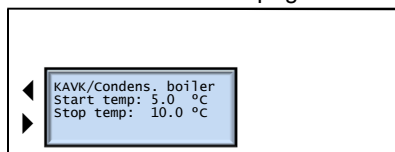
If there is no floor drain available close to the AHU, a KAVK is a good solution. KAVK is an electric heater that starts when there is a risk of condensation. The water vaporizes and is ventilated out through the extract air pipe.

This menu is only displayed if KAVK is configured to any digital output.

The outdoor temperature when the KAVK shall start could be set in the menu, as well as the stop temperature. The start temperature should normally be lower than the stop temperature, which will make a so-called hysteresis between start and stop. If start and stop is the same, it could make the relay toggle all the time if the outdoor temperature happens to be the set value. If stop temperature is set lower than start temperature, the start temp will have priority as both start and stop temp.

Default settings are start 5.0°C and stop 10.0°C.
Setting range for both start and stop is 0-30°C.

Continued from KAVK page 10

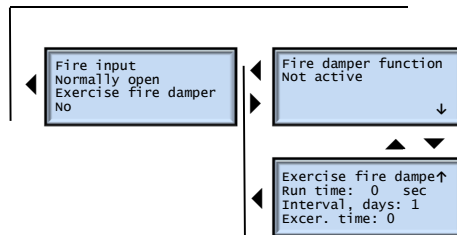


7.13 Fire function

This menu is used to change speed of the fans in case of fire, so they evacuate fire gases. The menu is also used to put the fire dampers in appropriate positions.

This menu is only displayed if Fire is activated from factory.

Continued from Fire function page 10



Fire input

The fire input can be configured:

- Normally open (default)
- Normally closed

This means, if configured Normally open and a closure (fire alarm) occur, the AHU will be set in fire mode and the alarm output will be activated.

It is possible to exercise (test) the fire dampers. If exercise is wanted, you can choose if the AHU should stop or not during the exercise.

Selectable alternatives:

- No
- Yes don't stop AHU
- Yes stop AHU

Fire damper function

The fire dampers function can be configured:

- Not active (default)
- Fire dampers normally closed
- Fire dampers normally open

Exercise fire damper

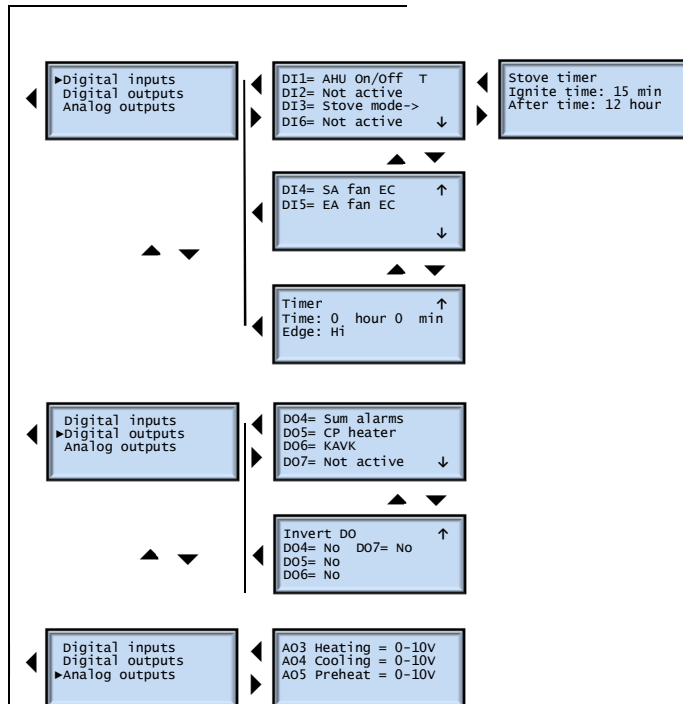
To ensure that the fire dampers really work in case of fire, the dampers can be exercised (tested) at regular intervals. The interval is adjustable. To make this possible, the dampers are equipped with limit switches. The exercise checks that the dampers reach their limit positions and that the limit switches are working. If not, an alarm will be generated.

The run time (0-600 sec) for the dampers can be set. This is the maximum time it may take for the damper to go from one limit point to the other.

The number of days (1-30) between the exercises can also be set, as can the time of the day (0-23) when exercising shall take place. If the time is set to 0, the exercise will be done at midnight.

7.14 I/O configuration

Continued from I/O configuration page 10



Digital inputs

If needed, choose function for inputs DI1, DI2, DI3 and DI6.

Selectable main function:

- Not active
- Min. flow
- Boost flow
- Max. flow
- AHU On/Off
- Normal

(DI1 is default AHU On/Off but can be changed if other inputs are occupied).

Selectable options (on condition that the function has been configured from factory).

- Kitchen Mode
- ECO
- Stove mode
- Fire alarm
- Fire damper

Timer

A timer could be connected to any of the inputs if a T is activated at any of the rows. There is only one timer. All functions except Not active, Fire damper, Fire alarm and Stove mode can have timer connected.

Connection of timer to desired function

When you have gone through the rows and selected functions for the inputs, the cursor will make one more loop and there is a possibility is to put a T against any of the rows. Use arrow up and down to connect the timer to a specific row. A $\%T+$ will light up at the row. To remove the $\%T+$ use up and down arrows. After acknowledging with OK the timer will be connected to that specific input. To move the timer to another row, it is necessary to first remove the T from the present row. If you try to configure the timer to a row and the timer already is connected to another row, the first T will light up when pushing the up or down arrow, but it disappears after you have passed through all rows.

Timer configuration

The timer can be set from 0 to 24 hours and 59 min in steps of 1 min.

You can select of high or low start signal. The timer is edge triggered.

When the input is triggered, the timer will start and current function is active until the timer stops.

It is possible to reset the timer in advance. This will be done if changing to another mode (in the mode menu) for a short moment.

Priority for the timer is equal with other functions below.

Priority

No.1 has highest priority.

1. AHU On/Off regardless of which input it is configured.
2. Fire alarm and Fire damper regardless of which inputs they are configured.
3. Any of other functions linked to DI6
4. Any of other functions linked to DI3
5. Any of other functions linked to DI2
6. Any of other functions linked to DI1
7. Timer (regardless of what is linked to the timer)

Configuring fan type

At DI4 and 5 configures type of fans in the unit, EC (default) or AC. (Different type of feedback signal). Those are normally configured at the factory and should not be changed.

Selectable alternatives:

DI4: SA fan EC or SA fan AC.

DI5: EA fan EC, EA fan AC or Not active.

It is possible to disconnect the feedback signal from the EA fan to avoid alarm if an external EA fan without feedback signal is used.

Stove mode

The function Stove must be activated from factory, otherwise Stove mode will not work.

Stove mode means to decrease EA and increase SA the stove has been lit. It also means that the cooling is stopped in order not to cool the comfortable stove heat.

Configure any of the inputs DI1, DI2, DI3 or DI6 to Stove mode. When Stove mode is selected, an arrow to the right is displayed. That means a new menu is available to the right.

Configuring stove timer

Two different times are set at the stove timer.

The start -up time 0-30 min in steps of 1 min. During this time the fans will run at the speed set for stove (see setup for fan speeds chapter 7.4).

The after time 0-24 hours in steps of 1 hour. During this time the cooling is disabled. By-pass does not open and active cooling is not activated.

Digital outputs

If needed, choose function for outputs DO4, DO5, DO6 and DO7.

Selectable standard features:

- Not active
- KAVK (condensation boiler)
- ULS (outdoor air damper)
- Sum alarms
- CP Heater
- Normal flow

Selectable options (electrical preheater must be selected, see chapter 7.7)

- PWM preheat (only possible at DO4)

More selectable options (the functions must be configured from factory).

- CP chiller
- Fire damper

Inverting digital outputs

In some cases it may be preferred that the alarm relay turns on immediately when the unit gets power, and instead switch off if there is an alarm.

This will generate an alarm if there is an interruption in the power supply.

In this menu one or more outputs can be inverted.

Analog outputs

If the valves do not have a 0-10V input (default) other selections are possible.

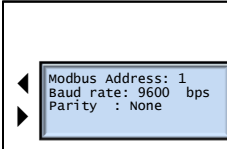
Selectable features:

- 0-10V
- 2-10V
- 10-2V
- 10-0V

7.15 Modbus

This menu is only displayed if Modbus is activated from factory.

Continued from Modbus page 10

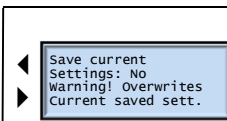


Parameter settings Modbus

- Address.
- Baud rate: 150, 300, 600, 1200, 2400, 4900, 9600 or 19200 bps
- Parity: None, Odd or Even

7.16 Save settings.

Continued from Save settings page 10



Save current settings

Here current settings will be saved. Earlier saved settings will be lost.
All settings except date and time will be saved.
On the next page there is a list of all data saved and their default settings.

| | Default setting |
|--|--|
| Set point SA control | 18 |
| Set point EA control | 21 |
| Set point room control | 21 |
| Set point ODT comp. SA control | 25, 24, 23, 23, 22, 20, 18, 18 |
| Eco adjust | 2 |
| Fan control | Auto |
| Summer time | Yes |
| Activate timer | No |
| Time schedule Monday-Friday | 8-17, 0-0 |
| Time schedule Saturday-Sunday | 0-0 |
| Holiday schedule | 01-01 . 01-01 |
| Manual/Auto (all) | Auto |
| Filter timer | Interval 12 months |
| Control function | SA control |
| Min/Max SA set point | 52 15 |
| Set point adjust | -3 +3 |
| Temperature control | P 33 I 100 |
| Fan speed supply air fan | 20,50,80,80,80,50,100,0 |
| Delay SA fan | 0, 60, 1 |
| Fan speed exhaust air fan | 20,50,80,20,20,50,100,100 |
| Delay EA fan | 0, 0, 1 |
| Activate ECO2 cooling | No |
| Temp. diff. | 2.0, 4.0, 0.5 |
| Temp. diff. for increase to boost | 1.0, 1.0 |
| Heater | Electric, period 60 sec |
| Freeze protection | 13 |
| Deadband valve | 0,5 |
| Preheat | Not active |
| Period | 60 s |
| Deadband valve | 0,5 |
| By-pass | Defrost temp 3, 3h 5 min |
| By-pass damperø running time | 45 |
| Cold air recovery | Yes 2 |
| Night cooling | Yes 22-06 4 |
| Conditions night cooling | 22, 10, 18 |
| Timer | Min flow |
| KAVK (Condens. Boiler) | 5, 10 |
| Fire input | Normally open, No |
| Fire damper function | Not active |
| Exercise fire damper | 90, 1, 0 |
| I/O configuration Digital inputs | AHU On/Off, not active, not active, not active, SA fan EC, EA fan EC |
| Timer | 0,0, Hi |
| I/O configuration Digital outputs | Sum alarm, CP heater, KAVK, ULS |
| Invert DO | No, No, No, No |
| I/O configuration Analog outputs | 0-10V, 0-10V, 0-10V |
| Language | Swedish |
| Activate functions | No, No, No. No, No, No |
| Activate EA-fan | Yes |
| Activate filter timer | Yes |
| Activate external display | No, 2, 254,253 |
| Set point adjust. | 3 -3 |
| Set point adjust. with TG-R4 (remote panel Easy) | No |
| Modbus communication | Not active |
| Address | 1, 9600,none |
| Exoline | 254,30 |
| | |

List of abbreviations

| | |
|--------|------------------------|
| AHU | Air handling unit |
| Casc. | Cascaded |
| CP | Circulation pump |
| DUC | Controller |
| DO | Digital output |
| EA | Exhaust air |
| EXT | Extract air |
| h | hour |
| I-time | Integration time |
| I/O | In/Output |
| KAVK | Condensation boiler |
| Max | Maximum |
| Min | Minimum |
| OD | Outdoor |
| ODT | Outdoor temperature |
| P-band | Proportional band |
| PCB | Printed circuit board |
| PWM | Pulse width modulation |
| SA | Supply air |
| Temp. | Temperature |
| ULS | Outdoor air damper |

DATE is shown in the format YY-MM-DD.

TIME is shown in 24-hour format.

Notes:

Medlem i



Svensk Ventilation
Bransch i samverkan

REC Indovent AB reserves the right to make alterations to specification and construction without prior notification.



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REC 15-06-12