

EH-105

Air handling unit controller

Ouman EH-105 is an intelligent air handling unit controller that is suitable for all kinds of applications. The controller's diverse and innovative control solutions are as easy to use as the other Ouman controllers that have a reputation for user friendliness. The controller makes it possible to maintain optimal air handling in spite of changing conditions in the room to be ventilated (temperature, CO2 content, channel pressure, increase in humidity).

In addition to normal week/24 hour clock functions, EH-105 has a yearly clock that makes it easy to create air handling unit controls for certain times of the year (e.g., summer holidays, Sundays during the week, etc.).

Alarms can be received and acknowledged, time programs and settings can be adjusted and measurement data can be read quickly via text messages. A GSM modem must be connected to the controller to be able to use a GSM.

Control sequences:

- Dampers
- HRU
- Heating
- Cooling
- Fan control

Fan controls:

- Contactor controlled AH units
- AC converter controlled AH units

Remote control options:

- **EH-net**
Web based user interface
- **GSM Control**
Traditional text message use with all GSM phones
- **Other remote control options**
Possibility to join SCADA solutions using Modbus or LON protocol by means of adapter card (optional).

User manual



Web-based remote control takes place via EH-net server (optional equipment).



GSM use requires that a GSM modem (optional equipment) has been connected to the controller.

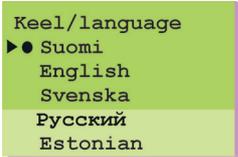
LONWORKS®

MODBUS®

www.ouman.fi

Ouman EH-105 is a versatile air handling controller, suitable for controlling many types of air handling units. The information appearing on your controller's display varies in different situations depending on controller connections and selected functions. All the possible functions are outlined in this user guide. First, we will outline the basic principles of controller use.

Language selection



Press the button to move the cursor to the language you want to use. Press OK.
Press ESC.

Operation panel

Current controller controlled air handling unit output

Browse button moves the > cursor up and down.

Group select button -
- moves you from one control sequence to the next.
- Dampers
- HRU
- Heating
- Cooling
- AH unit control

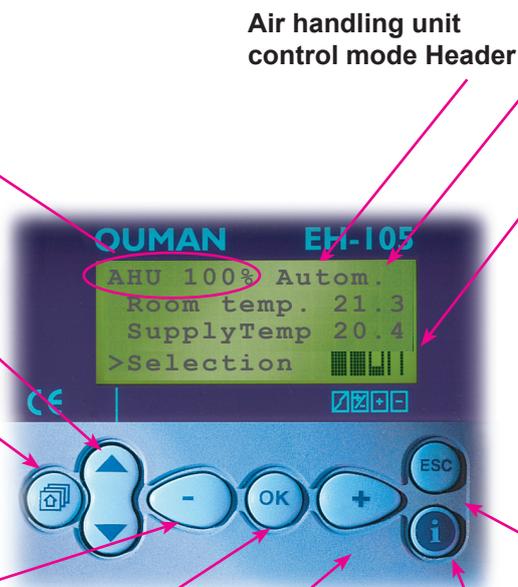
Decrease - button

OK button - confirms the setting and moves the cursor to the next menu item.

Increase -button

INFO button gives operating instructions or additional information in different situations.

ESC button - press to return to the previous display



Header text

E.g. "Sports hall SU102" scrolls in the display, if the header text has been taken into use, see p. 46.

Symbols for control:

- Control at 0%
- Height of the pillar shows the level of control 0-100% (0-10V)
- Control at 100% (10V)
- M** Manual control
- Controller drives the 3-point actuator open
- Controller drives the 3-point actuator closed

Abbreviations and terms used

AH = air handling unit
SF = supply air fan
EF = exhaust air fan
HRU = heat recovery unit

Symbols in use

- Dampers
- HRU
- Heating
- Cooling
- Fan control

AH output 100% = The SF and EF fans are set to a speed that produces 100% air volumes or duct pressures at the supply and exhaust units. (designed volumes and pressures).

Remote control

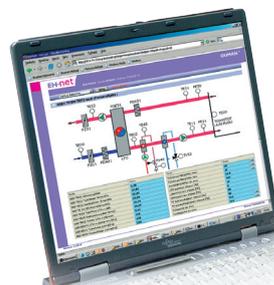
Remote control via mobile phone

Most of the functions in the controller's user level can be carried out via GSM-phone text messages.



GSM functions via text messages see p. 22.

Web-based remote control



EH-net

User guide



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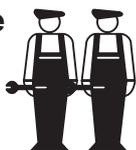
Maintenance

These pages contain directions for maintenance persons authorized by Ouman. Access to the regulator's maintenance mode is prevented by a maintenance mode.



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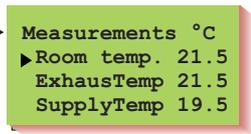
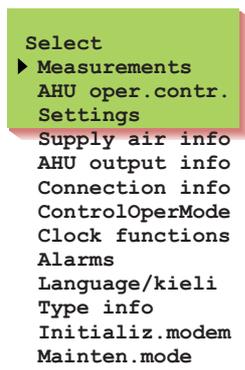
The controller can be connected to 18 different measurement data at the same time (6 NTC measurements, 5 transmitter measurements and 7 digital outputs) If a measurement is reserved for alarms or for a free temperature measurement, it can be labeled accordingly. Measurements can be taken into use or removed from use in the maintenance mode (see p. 42-43).



Also, the state of the voltage controlled (0...10V or 2...10V) actuator can be seen on the measurements display. Measurement info can also be read through the bus interface or a GSM. Only the measurements connected to the controller appear on the display.

OPERATING INSTRUCTIONS:

Press the button to browse measurements



Hint!
Press the + button to enter the measurements mode directly from the basic display (In addition to the normal menu path)

Measured value outside of sensor' range:

Each sensor has its own typical range. (E.g., outdoor sensor -50...+50 °C). If the sensor's measured value is outside of this range, a - or + character will appear on the "Measurements" display at the sensor's measured value to indicate whether the value is above or below the range.

Indication of sensor defect:

If there is a sensor defect the controller gives an alarm (see p. 18) and "err" will appear in place of the measured value.

Text on the display:	Measurement information:	Setting range:
----------------------	--------------------------	----------------

NTC measurements (strip connectors 1- 6)

Outdoor temp	Outdoor temperature (connect to measurement 1)	-50 ... + 50°C
SupplyTemp	Supply air temperature after the fans	-30 ... +100°C
Supp.TempB	Supply air temperature before the cooling cell	-30 ... +100°C
Room temp	Room temperature	-30 ... +100°C
ExhaustTemp	Exhaust air temperature	-30 ... +100°C
Room tempB	Room temperature sensor 2 temperature (for computing the average)	-30 ... +100°C
Rad.Ret.Wat	Return water temperature	-30 ... +100°C
Exh.aft.HRU	Exhaust air temperature after the HRU	-30 ... +100°C
SuppAfterHRU	Supply air temperature after the HRU	-30 ... +100°C
RemoteSetPot	The remote setting potentiometer makes changes to the main setting in supply controlled units or room controlled units.	-5 ... + 4°C
FreeMeasurem	Free temperature measurement, which can be labeled using the text editor	-30 ... +100°C

Transmitter measurements (strip connectors 7 - 11), The setting range is set in the maintenance mode

SF press.	Supply air pressure, pressure transmitter	0 ... 999 Pa
EF press.	Exhaust air pressure, pressure transmitter	0 ... 999 Pa
SF fan PDE	Pressure difference over the supply fan or air flow volume measuring ring	0...5000Pa
EF fan PDE	Pressure difference over the exhaust fan or air flow volume measuring ring	0...5000Pa
CO2cont.	CO2 content, carbon dioxide content transmitter	0 ... 2000 ppm
Rh/pot	Room temperature humidity or remote setting trans.data (transm.0...10V)	0 ... 100 %
SF flow	Supply air flow, flow transmitter	0.0 ... 10.0 m/s
EF flow	Exhaust air flow, flow transmitter	0.0 ... 10.0 m/s
SFfilt.PDE	Pressure difference meas. over the supply air filter, pressure transmitter	0 ... 999 Pa
EF filt.PDE	Pressure difference meas. over the exhaust air filter, pressure transmitter	0 ... 999 Pa
HRU PD	Pressure difference measurement over the HRU, pressure transmitter	0 ... 999 Pa
Room temp	Room temperature	-20 ... +100°C
ExhaustTemp	Exhaust air temperature	-20 ... +100°C

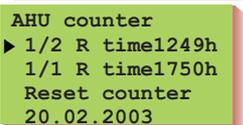
Text on the display:	Measurement information:	Setting range:
-----------------------------	---------------------------------	-----------------------

Other measurements and calculations:

HRU effic.	Heat recovery efficiency (%) from the formula: $\frac{[Supply\ temp\ after\ HRU] - [Outdoor\ temp]}{[Exhaust\ temp] - [Outdoor\ temp]} * 100$	
SF air	Supply air flow volume, calculated value, see p. 25	m3/h
EF air	Exhaust air flow volume, calculated value, see p. 25	m3/h
DamperCtrl	Control signal from controller to dampers	The control signal appears only with a 0...10V (2...10V) controlled actuator
HRU ctrl	Control signal from controller to HRU	
HRU defrost	Control signal from controller to HRU when HRU defrost is activated (Frost prevention)	
Heat. ctrl	Control signal from controller to heating	
Cool. ctrl	Control signal from controller to cooling	0...100%
Alarm stop	The alarm has shut down the AH unit	
AHU output	Controller controlled air handling output	0...100%
SF control	Control of supply fan's AC freq. converter (0...10V = 0...100%)	0...100%
EF control	Control of exhaust fan's AC freq. converter. Combined running time of AH unit's 1/1 and 1/2 outputs (after the last time the counter is reset)	0...100%
AHU R time	Press OK to see next display	0...9999h



One-speed AH unit running time (after the counter is reset)

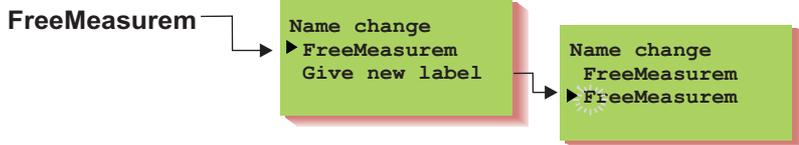


Running time for AH unit's different outputs (after the counter is reset)

After reset, the date on the display changes and the reset day appears.

Hint! The counter should always be reset during maintenance of the AH unit.

Labeling measurements



A free temperature measurement can be labeled as follows: Move the cursor to the measurement that has to be relabeled. Press **OK**. Move the cursor to "Give new label". Press **OK**.

Write the new name on top of the "old name". The first character blinks. You can change the letter/character by pressing the **+** or **-** button to move forward or backwards in the character row. Confirm the character by pressing **OK**, and the next character will blink. If the new name is shorter than the old name, the extra characters are replaced with an "empty" character. If the new name is longer, the text editor will give the letter that has been fed last as the new letter. The character that has been fed last is deleted by pressing **ESC**. If you press the **ESC** button for a while you can delete the new name and the old name remains in effect. When you have written the name, press **OK** for a while (over 2 sec.), to exit from the data entry mode and the name that has been written will come into effect.

Text editor's characters in the order in which they appear:

"Empty". numbers 0...9 letters A...Z and a... z ä ö ä

Resistance value table:

	°C	Ω	°C	Ω	°C	Ω	°C	Ω
Ouman temperature sensors (NTC 10k)	-30	177 100	5	25 400	40	5 330	75	1 482
	-25	130 400	10	19 900	45	4 368	80	1 259
	-20	96 890	15	15 710	50	3 602	90	917
	-15	72 830	20	12 490	55	2 987	100	680
	-10	55 340	25	10 000	60	2490	110	511
	-5	42 340	30	8 064	65	2084		
	0	32 660	35	6531	70	1753		



KEYWORD: Measurements

- MEASUREMENTS:**
 Room temp. 21.5/
 ExhausTemp 21.5/
 SupplyTemp 19.5/
 Outdoor temp -15/
 Rad.Ret.Wat28/
 Rad.SuppWat 55/
 Exh.aft.HRU 3/
 SuppAfterHru 17/
 CO2cont.1000ppm/
 HRU effic. 50%/
 Damper ctrl 45%/
 ...continuing...
- MEASUREMENTS:**
 ...continuing...
 HRU ctrl100%/
 Heat. ctrl 45%/
 Cool. ctrl. 0%/
 TF ctrl 0%/
 PF ctrl 0%/
 SF press. 300Pa/
 EF press. 500Pa/
 SF flow 2.0 m/s/
 EF flow 2.0 m/s/
 AHU R time 9990h
 ...continuing...



The AH unit may receive contradicting output controls at the same time. The controls are prioritised as listed below. The control that is listed higher is stronger than the control listed at a lower level.

The stop commands in group 1 can only be deleted from the place where it has been given. An exception is the stop command from the monitor, which can also be deleted from the controller.

STRONGEST

- 1 The AH unit is shut down either by the "Emergency-STOP" switch or when the controller is at "Maintenance-STOP" or when a STOP command comes from the bus. An A-alarm also shuts down the AH unit. The AH unit is shut down by relays 1 and 2 as well as running permit relay 3.
- 2 B-alarm that shuts down the AH unit.
- 3 **Night heating and preheating.** Can only start up the AH unit, if the AH unit receives no other start up commands. (Exception: night heating and preheating are not activated if "Switch control Auto is taken into use and the switch connected to the controller is not in the A position, see p. 44). 
- 4 **AH output limiting** determined by the outdoor temperature, HRU defrost or cascade control.
- 5 **Air handling enhancement** according to the CO2 content, room temperature, or room humidity when "Sw. override" has been selected. (can override external switch controls see p. 29).
- 6 **1/1 or 1/2 switch control** (press button or timer) connected to the controller or AC freq. converter override switch SF fConvOvrr/ EF fConvOvrr. The output controls' post run delays operate as stipulated by item 9.   
- 7 "Auto" control is taken into use and the switch connected to the controller is not in the A-position. The controller drives the AH unit to 0 output. The AH unit output depends on the position of the selector switch. 
- 8 Controller controls: **continuous** 0, 1/2 or 1/1.
- 9 Controller controls: **timed** 0, 1/2 or 1/1.
- 10 **Forced controls** 0, 1/2 or 1/1 by the **special calendar**.
- 11 **Air handling enhancement** according to the CO2 content, room temperature or room humidity when "Auto override" has been selected. See page 29.
- 12 **The AH unit starts up** according to the CO2 content if time controls do not start up the AH unit.
- 13 Night ventilation, night cooling (can start up the AH unit if the unit is not running according to the time programs).
- 14 **Special calendar** controls using the **day change** (Mo-Su or Sd).
- 15 **Time control** according to the week clock.

WEAKEST

Attention! If the controller receives AH unit running information, AH unit control begins even though the controller itself has not given the AH unit start up command.

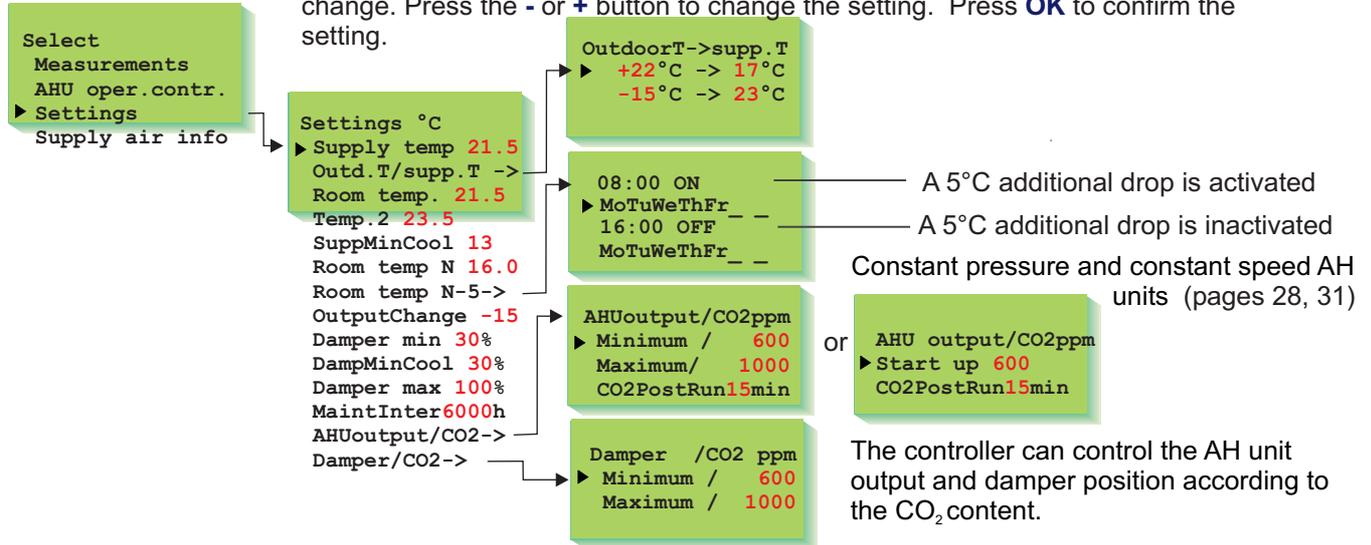
AHU 1/1 Autom.
Room temp. 21.2°C
SupplyTemp 20.4°C
▶ Selection

Ouman EH-105 has two different types of settings, user level and maintenance level settings. The user can change the user level settings shown here if necessary. Only a maintenance man authorised by Ouman can change the maintenance level settings. The settings that appear on the display vary depending on what settings and measurements are connected to the controller.

OPERATING INSTRUCTIONS:

Browsing and making changes to settings:

Press the button to move the cursor to the setting you want to inspect or change. Press the - or + button to change the setting. Press **OK** to confirm the setting.



Text on the display:	Factory settings:	Setting range:	Explanation:
----------------------	-------------------	----------------	--------------

Supply controlled AH units:

Supply temp	21.5°C	-20.0...90.0°C	Supply air temperature setting.
Temp. 2	22.5°C	-20.0...90.0°C	Supply air temperature setting when the external temperature change switch is turned off (see p. 45).

Room or exhaust controlled AH units:

Room temp.	21.5°C	-20.0...90.0°C	Room temperature setting.
ExhaustTemp	21.5°C	-20.0...90.0°C	Exhaust air temperature setting (exhaust controlled AH unit).
Temp. 2	22.5°C	-20.0...90.0°C	Room temperature (exhaust air) setting when the external temperature change switch is turned off.
SuppTempMax	32°C	5 ... 95°C	Supply air maximum temperature setting.
SuppTempMin	17°C	-25 ... 90°C	Supply air minimum temperature during the heating phase. During summer the "SupplyMinCool" setting is used, see p. 10.
Room temp N	16.0°C	-20.0...90.0°C	Room temperature at which the night heating function is activated: the AH unit which has been shut down starts up at full output and the dampers go to the night heating position (see p. 34 N.HeatPosit). When the room temperature rises by the amount of the hysteresis the controller shuts down the AH unit and the dampers go to the idle time position. Attention! The exhaust controlled AH unit must have a room sensor connected to it if the night heating function is going to be taken into use. During night heating the room sensor controls the controller (p.25).

Room temp N-5

An additional drop of the night temperature setting occurs (constant 5°C) at a selected time.

Outdoor temperature controlled AH units:

Text on the display:	Factory settings:	Setting range:	Explanation:	Attention!
SuppMinCool	14°C	5.0...45.0°C	Supply air minimum temperature when the outdoor temperature is above the "Outd.inhibit" limit and ½ of the "Heat/CoolHys" setting has been realized. See pages 39.	
OutputChange	-15°C	-50...50°C	Outdoor temperature at which the AH unit 1/1 output changes to ½ output.	Outdoor sensor must be connected. The hysteresis is 2°C

Settings for dampers:					
Damper min	%	30%	0...100%	Minimum position for fresh air damper during heating (0% = damper closed)	Can be seen if the dampers operate by cascade control (see damper operation p. 33)
DampMinCool	%	30%	0...100%	Minimum position for fresh air damper during cooling (0% = damper closed)	
Damper max	%	100%	0...100%	Maximum position for fresh air damper (100% = damper open)	Can be seen if the dampers operate by constant position (see p. 33).
DampStdMix	%	30%	0...100%	Constant position for the fresh air damper when the AH unit is running (100% = damper open)	

Controller maintenance reminder setting:

MaintInter	6000h	0...9900h	The controller has an AH unit running time counter. Enter the counter's alarm limit at which the controller requests maintenance of the AH unit. The alarm is shut off by raising the maintenance limit or by resetting the AH unit counter (see p. 6). If the setting is "0", the maintenance alarm is not in use.
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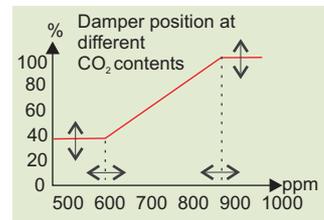
Settings for controls according to CO2 content:

AH unit start-up according to the CO2 content (see p. 31):

<div style="border: 1px solid black; padding: 2px;"> AHUoutput/CO2 ppm ▶ Minimum / 600 Maximum / 1000 CO2PostRun 15min </div>	600ppm	500...1800	The controller starts up the AH unit to ½ or minimum output when the CO ₂ content rises 100 ppm above the CO ₂ "Minimum" value given here. The controller shuts down the AH unit when the CO ₂ content has been below the CO ₂ "Minimum" value for the post-running time.
	1000ppm	700...2000	The controller switches the AH unit to 1/1 output (maximum output), when the CO ₂ content rises to the CO ₂ "Maximum" value given here. The controller switches the AH unit output to ½ (minimum output), when the CO ₂ content has been 200 ppm below the CO ₂ "Maximum" value for the post-running time. Attention! AC inverter AH units: stepless AH unit control according to the CO ₂ content.

CO2PostRun	15 min	0 ... 99 min	AH unit post-running time: When the CO ₂ content control switches the AH unit from maximum control to minimum control or shuts down the AH unit from minimum control, the change occurs after the CO ₂ post-running time. This prevents the AH unit from switching too soon from one operating mode to the next when the CO ₂ content changes quickly.
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<div style="border: 1px solid black; padding: 2px;"> Damper / CO2 ppm ▶ Minimum / 600 Maksimum/ 1000 </div>	600ppm	500...1800	Damper control according to CO2 content. (see p. 33): The dampers begin to open from the "Damper min." position when the CO ₂ content has risen above the CO ₂ "Minimum" value.
	1000ppm	700...2000	The dampers open to the "Damper max." position when the CO ₂ content has risen above the CO ₂ "Maximum" value.



KEYWORD: Settings

SETTINGS:
 Supply temp 21.5/
 Room temp. 21.5/
 Temp. 2 23.5/
 SuppMinCool 13/
 Room temp N 16.0/
 OutputChange -15/
 Damper min 30%/
 DampMinCool 30%/
 ... Continuing...

SETTINGS:
 ...continuing ...
 Damper max 100%/
 MaintInter 6000h/
 AHUoutput: CO2ppm
 (Minimum 600/Maximum
 1000 (CO2PostRun15min)
 Damper ppm (Minimum
 600/Maximum 1000)



The supply air information states which factors form the supply air temperature determined by the controller at the time of inspection. With room/exhaust controlled control, the controller calculates the supply air temperature setting according to the room temperature. With supply controlled control the supply air temperature is kept at the supply air temperature set value. The supply air information changes according to different AH unit running situations as follows:

```
AHU 1/1 Autom.
Room temp.21.2°C
SupplyTemp20.4°C
▶Selection
```

```
Select
Measurements
AHU oper.contr.
Settings
▶ Supply air info
AHU output info
```

Hint! The supply air info helps you see which factors are currently effecting the supply air temperature.

During heating:

```
Supp.air.info °C
▶Room temp. 14.5
Room set. 18.5
RemoteSetPot-1.3
Room comp. 4.0
MaxDifHeat 0
MaxDifCool 0
Max limit -1.0
Min limit 0.0
Start Incr. 0.0
Interaction21.5
FreezeAntic. 0%
```

Supply temp
Room temp.
ExhaustTemp
Room set.
ExhaustTset.
Room set.N
SupplyTset
Temp 2 set

Current supply temperature
Current room temperature or
Current exhaust air temperature.
Room temperature setting or
Exhaust air temperature setting or
Room temperature setting during night heating or
Supply temperature setting or
Temperature setting when the temperature control switch is turned off. This is another setting for the room, exhaust, or supply air temperature.

Room comp.
ExhausComp

Effect of a room temperature deviation on the supply air temp.
Effect of an exhaust air temp. deviation on the supply air temp.

MaxDifHeat:
MaxDifCool:

The maximum limit for the difference between room and supply air temperatures during heating
The maximum limit for the difference between room and supply air temperatures during cooling

Supply air temperature drop due to the maximum limit

Supply air temperature increase due to the minimum limit

Increasing effect of the start-up phase on the supply air temperature (effects about 5 min. from start-up)

Current supply air temperature determined by the controller (°C)

Radiator return water anticipate freeze protection function as an additional control to heating actuator control. (0...100%)

During cooling:

```
Supp.air info °C
▶Room temp. 25.0
Room inst. 21.5
Cool.start 23.0
Cool. Need 2.0
P-roomCtrl 25%
I-roomCtrl 8%
Min limit -13%
Cooling -> 20%
Room comp. -6.5
I-roomCtrl -2.0
Min limit 1.0
Interaction16.0
```

Stepped control

Continuous control

Current room temperature
Room temperature setting
Start-up temperature for cooling. The temperature must be higher than the room setting by the amount of the heating/cooling hysteresis before cooling starts up (=room setting + HeatCoolHyst)

Cooling need: Shows how much to drop the room temperature
Effect of P-room control on the cooling output in stepped control
Effect of I-room control on the cooling output in stepped control
The reducing effect of the supply air minimum limit on the cooling output in stepped control

Current controller control of cooling (%) in stepped cooling

Effect of room compensation on the supply air temperature in continuous control
Effect of I-room control on the supply air temperature in continuous control
The increasing effect of the supply air minimum limit on the supply air temperature

Current supply air temperature determined by the controller in continuous control cooling

During idle time:

```
Supp.air info °C
Returv.inst. 25
▶Returv.temp. 25
Room M set.16.0
Room temp. 18.5
```

Radiator return water temperature setting
Current radiator return water temperature
Room temperature night setting
Current room temperature



KEYWORD:
Supply air info

```
SUPPLY AIR INFO:
Room temp.22.8/
Room set.22.0/
Room comp.-2.7/
I-roomCtrl-3%/
MaxDifHeat 0.0/
MinDifCool 0.0/
Max limit0.0/
... Continuing...

SUPPLY AIR INFO:
... Continuing...
Min limit1.0/
StartIncr. 0.0/
Interaction16.2/
FreezeAntic.=0%/
```



```
AHU 1/1 Autom.
Room temp.21.2°C
SupplyTemp20.4°C
▶Selection
```

```
Select
Measurements
AHU oper.contr.
Settings
Supply air info
▶AHU output info
Connection info
```

AH OUTPUT INFORMATION

The AH output info display shows all the currently activated control commands. The ● character is at the determining (strongest) factor. The numeral indicates the amount of the AH unit output control. AH priorities are illustrated on page 8.

```
AHU output info%
Week clock 100
▶CO2 enhance 80
HeatEnhance -
●OutdT Limit 65
```

"- " Character indicates that the control command is in use but control has no effect at this moment.

● Commanding (strongest) factor

CONNECTION INFORMATION

Connection information is primarily intended for the maintenance person. It shows what the measurement channels and digital inputs have been reserved for and which ones are still free. Channels 1-6 are primarily intended for NTC measurements. Channels 7-11 are primarily intended for transmitter measurements, but they can also be connected to On/Off inputs. Channels 21-27 can only be connected to On/Off inputs. (see pages 43-45).

```
AHU 1/1 Autom.
Room temp.21.2°C
SupplyTemp20.4°C
▶Selection
```

```
Select
Measurements
AHU oper.contr.
Settings
Supply air info
▶AHU output info
Connection info
```

```
Connection info
▶1= Outdoor temp
2= Supply temp
3= Exhaust temp
4= Return water
5= SupplyAft.HRU
6=-
7= HRU frostPDE
8= SF press
9= EF press
10=SF filterPDE
11=EF filterPDE
21= CSF 1/1 run
22= CSF 1/2 run
23= CEF 1/1 run
24= GenAlClose
25=-
26=-
27=-
```

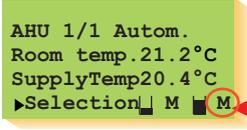
Press the  button to browse. The list shows for which use the measurement channels and digital inputs have been reserved.

"-" indicates that the control command is activated but the control has no influence at the moment.

Connection point of measurement or On/Off input on the controller's strip connector.

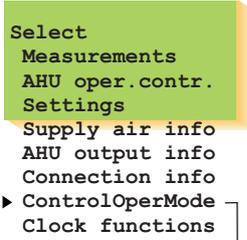
Measurements and On/Off inputs are individually outlined in the operating instructions on pages 44-45.

Operating modes for controls that are in use are selected in this mode. Each control sequence can be operated automatically or manually operated either mechanically or electrically. Each control sequence has factory set automatic control.



Operating mode information about each control sequence appears on the top line of the basic display. The letter M above the symbol for the control indicates that that control has been selected for manual operation. The letter M and position information alternate during manual drive.

OPERATING INSTRUCTIONS:



Press the button to browse operating modes. The text that appears after the name of the control indicates whether automatic or manual operation is in use.

Changing the operating mode:

Move the cursor to the control whose operating mode you want to change. Press **OK**. Move the cursor to the operating mode that you want. Press **OK**. The ● character indicates which operating mode has been selected.



Note! When in the manual control mode the damper and cooling sequences go to 0-stage when the AH unit stops and return to the set manual control position when the AH unit starts up. When the AH unit is stopped the manual position % is 0. If it is not changed, the unit will run at the previously set manual control position when

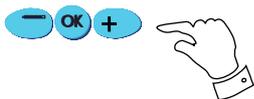
Text on the display:

Information about control sequence operation modes:

AutomaticCtrl

The control in question operates according to the selected operation mode. (see pages 25-32).

Manual electr.



Manual operation of actuator electrically. Manual operation occurs as follows: Press **OK**. Press the - or + button to change the position of the actuator. The direction the actuator is being driven can be seen from the display. The position's % reading indicates the actuator's position if a voltage controlled 0...10V or 2...10V actuator (0% = closed, 100% = open) is being used. Press **OK** to confirm the actuator position.

Attention! With manual operation of the actuator electrically the freeze protection anticipate function can force drive the actuator open regardless of the manual operation selection.

Attention! If the dampers are manually operated electrically and the AH unit shuts down, the controller drives the dampers shut. When the AH unit starts up again the controller drives the dampers to the position they were in before the unit shut down.

Attention! Cooling control can be set to manual control only when AH unit is running.

Note! Check the combined power consumption of all the actuators. The maximum combined total load of the controller's transformer is 25 VA

AHU 1/1 Autom.
Room temp. 21.2°C
SupplyTemp 20.4°C
▶ Selection

The Ouman EH-105 controller's clock registers summer time and standard time changes and leap years. The clock has a back-up in the event of short power shortages.

Select
Measurements
AHU oper. contr.
Settings
Supply air info
AHU output info
Connection info
ControlOperMode
▶ Clock functions
Alarms

SETTING THE TIME AND DATE:

Clock functions
▶ Time/date
Week Clock
Spec. day progr.
SpecialCalendar

Time/date
▶ 15:45 hours:min
03.11 day.month
2011 Thursday

Set the time:

The hours blink.
Press the - or + button to set the hours.
Press **OK**. The minutes blink.
Press the - or + button to set the minutes.
Press **OK**.

Time/date
15:45 hours:min
▶ 03.11 day.month
2011 Thursday

Set the date:

The day blinks.
Press the - or + button to set the month.
Press **OK**. The month blinks.
Press the - or + button to set the month.
Press **OK**

Time/date
15:45 hours:min
03.11 day.month
▶ 2011 Thursday

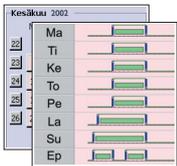
Set the year and weekday:

Press **OK**. The year blinks.
Press the - or + button to set the year.
Press **OK**. The weekday blinks.
Press the - or + button to set the weekday.
Press **OK**. Exit with **ESC**.

Attention!

The controllers clock has a backup in case of short power failures (max. 3 days).

CLOCK PROGRAMS: EH-105 has diverse time control options for AH unit automatic control



A week program can control daily AH unit running according to a normal weekly rhythm.

An extra "eighth" day program (e.g., summer Sunday) can be created with the special day program (sd). The special day can be situated in the special calendar for a certain day of the year.

With the special calendar program, a normal calendar weekday can be changed to some other weekday. It is also possible to give a control command to the AH unit that sets it into a certain state on a certain calendar day, after which the operation is continued until the next special calendar event. Return to a normal week program occurs at a point in the calendar when the state of the AH unit is set to "auto".

Hint!

Examples for using the special calendar:

- April 13 is a Saturday, but the Sunday program is in use.
- July 28 is a Sunday, but the special day (sd) program is in use.
- From June 3 to Aug. 10 (summer holiday) the AH unit is shut down.

CLOCK PROGRAMMING PRINCIPLE:

Clock functions
Time/date
▶ Week Clock
Spec. day progr.
SpecialCalendar

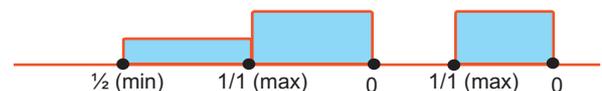
06:00 AHU 1/2
▶ MoTuWeThFr
18:00 AHU 0
MoTuWeThFr

Next switching cycle

AH unit speed change time
AH unit speed at the before mentioned time
Weekdays during which the AH unit speed change time is activated

How to proceed:

1. Give the time, for the AH unit the speed change
2. Give the AH unit speed starting from the above given time
3. Give the weekdays during which the above given AH unit speed and time are activated
4. Using the same principle, give the time, AH unit speed and weekdays for the end of the switching cycle



● Switching time, for which you give the weekdays (one or more)

Text on the display:

Information about clock program:

Week program



Browse/ location for additional programming:

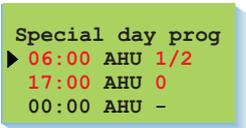
Move the cursor to "Week program". Press **OK**. Press the button to browse the clock programs which have been made. If you want to make additional programs, move cursor to the first empty program block.

Select AH unit starting time and speed: Press **OK**. The starting time blinks. Press the - or + button to set the hours, minutes, and then the speed of the AH unit. Press **OK** to confirm each setting in turn. The different outputs are: 1/2 output (minimum), 1/1 output (maximum), or 0 (AH unit is shut down).

Set the weekdays for the above mentioned starting time and output: Press the + button to select the weekday. The day is left unselected/ press the - button to delete the selection. Press **OK** to take into use the selection shown on the display. Make your selection for each day and press **OK**. Delete the program block by deleting the output (-) or weekday (-).

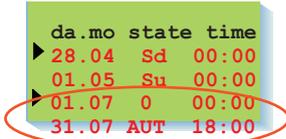
The example shows the AH unit running at 1/2 output Mo.- Fri. from 06:00 - 18:00.

SD program



You can make your own separate special day "sd" clock program. This special day is taken into use at "SpecialCalendar". Move the cursor to "Spec.day progr." and press **OK**. The time blinks. Set the hours, minutes and then the speed of the AH unit. Press **OK** to confirm each setting in turn. You can program 5 program blocks for a special day. Delete the program block by deleting the output (-).

SpecialCalendar



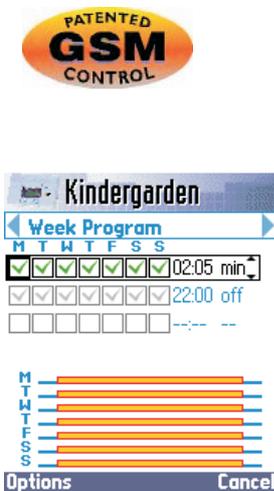
"Day change": The special calendar can be used for special situations when a different day program is needed for a certain day. A date is set for the special day. After that, a day's program is chosen for the special day. Any day of the week or special day (Sd) program can be selected. The controller indicates that the special day program begins at the beginning of a 24 hour period at 00:00. The starting time cannot be changed. At the end of the 24 hour period, the program which was operating before the special day will be in effect, or if a new command was given during the special day then that command will be in effect.



Example. Making a summer holiday program

When a week day is changed, the AH unit runs at the normal starting situation output of the changed day. E.g., If Saturday is changed to Wednesday, the day changes as it does from fri-sa. Attention! The Sd program always begins at 0 output if not otherwise indicated.

Other variations of the year program: First give the date (day. month) and then the AH unit control mode. Options are 1/1 output (AC freq. converter control at maximum output), 1/2 output (AC freq. converter control at minimum output), 0 (AH unit shut down) and auto (exit from special program and go to week clock mode). Here it is easy to e.g., shut down the AH unit during a summer holiday. **Attention.** Remember to program a return time to the automatic mode (auto).



There is a max. of 5 connecting moments in one reply message.

KEYWORD	TEXT MESSAGE SENT BY THE CONTROLLER
Week program Reply message #1	WEEK PROGRAM (#1): MO-FR 07:00 MIN / MO-FR 09:00 ON / MO-FR 16:00 MIN / MO-FR 17:00 OFF / SA 09:00 MIN...continue...
Sd program Reply message #2	WEEK PROGRAM (#2): SA 10:00 ON/ SA 13:00 OFF
Special calendar Reply message #3	SPECIAL CALENDAR (#1): 28.04 SD/ 01.05 SU/ 01.07 06:00 OFF / 31.07 18:00 AUTO /

EH-105 has very diverse alarm functions for special situations. The causes for the alarms depend on what functions have been taken into use. In the event of an alarm, the controller gives an alarm and a message appears on the display. The alarm relay contact also closes. The alarms are grouped into classes A and B depending on whether the alarm is sent as a text message immediately or whether it is timed.

- Select
- Measurements
- AHU oper.contr.
- Settings
- Supply air info
- AHU output info
- Connection info
- ControlOperMode
- Clock functions
- Alarms
- Language/kieli

Alarms
Alarm history
B-alarm transf.

Risk of Freez!
▶ 06.02.02 16:00
Meas. 5 7°C
Rad. ret.wat

Filter alarm!
02.12.01 20:00
Meas. 10
Supply filt.PDS

08:00 ON
MoTuWeThFr -- --
16:00 OFF
MoTuWeThFr -- --

Hint ! The alarm history contains the last 10 alarms: the time the alarm was given, the type of alarm, the measurement channel and the measurement value at the time of the alarm.

B-alarm transf.



Alarm transfer on
Alarm transfer off

The controller sends B alarms to a GSM phone according to the clock program made here. The clock program principle is outlined on pages 14-15. In the example above, B alarms are transferred during work-days between 8:00 - 16:00. Note! In the event of a B alarm, the alarm relay can not be active if SMS transfer has been blocked.

ALARM DISPLAY:

Risk of Freez!
31.07.02 16:20
Meas. 5 6°C
Rad. ret.wat

- Type of alarm
- Time alarm was given
- Alarm information measurement line and measurement information at the time of the alarm
- Name of alarm

A-ALARMS

A-alarms are always sent immediately, e.g., as a text message via a GSM phone or via the bus to the monitor. In addition, a local alarm can be received via the alarm relay (e.g., a buzzer) Class A alarms are listed below.

Alarm type:	Alarm name:	Explanation:	R1 R2	R3
Freezing risk!	Radiator ret. wat	Radiator return water temperature is below the "Freeze risk" value (see p. 37). The controller shuts down the AH unit.		
Fire risk!	Supply temperat. Exhaust temp.	Supply or exhaust air temperature is above the "Fire risk" value (see p. 24). The controller shuts down the AH unit.		
Temp.relay alarm	Heating pump	AH unit heating's circulating pump's temperature relay alarm. The controller shuts down the AH unit.		
Pump alarm	Heating pump	Running information is not received from the AH unit heating's circulating pump. The controller shuts down the AH unit. The pump alarm is not given and the AH unit is not shut down if the controller has shut down the heating pump. When the controller is starting the pump, pump alarm can start 10 s after the control command at earliest		
Overheating alarm	Electric heater	Electric heater overheating protection gives an alarm (close switch). The controller shuts down the AH unit. Possible acknowledgement also from the electric heater.		
Sensor fault	Radiator ret.wat	Err appears in place of the setting to indicate a sensor fault. In the event of a radiator's return water sensor fault alarm the controller shuts down the AH unit.		
	Supply temperat.	"Supply temp" sensor fault. The controller shuts down the AH unit.		
Alarm!	Smoke alarm	Smoke alarm information (open switch) shuts down the AH unit (electrically heated AH units do not have post ventilation). In the event of an alarm the dampers remain in the selected position.		
Alarm!	Emergency- STOP!	STOP command for the AH unit from the external emergency STOP switch connected to the controller.		
Pressure alarm!	AH-networkWater	Alarm indicating positive or negative water pressure in the AH heating network.		
Alarm!	EIHeatEmrgS	The alarm shuts down the AH unit when the electric heater emergency protection has been triggered.		

B-ALARMS

Alarm type:	Alarm name:	Explanation:	R1 R2	R3
Deviation alarm	Supply temp. Exhaust temp. Room temp.	Supply temp., exhaust temp. or room temp. deviates too much from the temperature indicated by the controller. Alarm limits and duration of deviations are given in the maintenance mode. Hint: see "Supply air info".		
	SF pressure EF pressure	The supply or exhaust air channel pressure deviates too much from the current setting for a time period of 5 min.		
	EF running info	The deviation alarm is given if the EF did not start up 35 seconds after the SF started up and contradiction alarms are not in use.		
Flow alarm	SF flow EF flow	The supply or exhaust air flow speed is below the alarm limit for a time period of 2 min. The flow alarm is activated if the flow is under the alarm limit for 10 seconds. A cause for the alarm may be, e.g., the belt breaks. *)The controller shuts down the AH unit if "Actuator stop" has been selected from maintenance's general settings.		
	SF filter PDE EF filter PDE	The pressure difference (Pa) over the supply or exhaust air filter is below the alarm limit 2 min after the unit has been started up. (e.g., belt breaks)		
Pressure alarm!	SF fan PDS EF fan PDS SF fan PDE EF fan PDE	The pressure difference (switch or transmitter information) over the supply or exhaust air fan (or over the measuring ring for air flow) is below the alarm limit 35 s after the unit has been started up. (e.g., belt breaks)		
Contradiction!	SF running info EF running info	When the controller has given a fan running command and has not received running information after 35 s, the controller gives a contradiction alarm. *) with 2-speed units the controller controls the AH unit at 1/2 speed in the event of a contradiction alarm.		
	SF 1/2 running info EF 1/2 running info	When the controller has given a fan 1/2 speed running command and does not receive running information for 35 s, the controller gives a contradiction alarm.		
Pump alarm	AH main pump	When the controller does not receive main pump running information, the controller gives a pump alarm but not an additional alarm (see p. 45).		
	HRU pump	The controller does not receive running information from the HRU glycol pump 1)		
	Cooling pump	The controller does not receive running information from the cooling glycol pump 1)		
		1) The pump alarm is not given if the controller has stopped the pump.		
Temp. relay alarm	SF 1/1 fan EF 1/1 fan	The fan's temperature relay (overflow protection) has been triggered. *) In 2-speed units the controller controls the AH unit at 1/2 speed.		
	SF 1/2 fan EF 1/2 fan	The fan's temperature relay (overflow protection) has been triggered.		
	HRU pump	The HRU's glycol pump temperature relay has been triggered.		
	Cooling pump	The cooling glycol pump temperature relay has been triggered.		
Efficiency alarms	HRU	HRU efficiency has dropped below the alarm limit.		
Switch override	SF AC f. conv. EF AC f. conv.	The SF (EF) freq. converter is overridden by a hand switch, the fans run at maximum speed.		
In the event of an alarm the controller shuts down the AH unit by interrupting R1 and R2 relay control.				
In the event of an alarm the controller also shuts down the AH unit by the R3 locking relay (conn. to the distribution centre).				

B-ALARMS

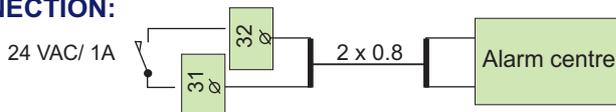
Alarm type:	Alarm name:	Explanation:	R1 R2	R3
Filter alarm	Supply filter PDS Exhaust filt PDS	Filter dirty. Clean or change filter (PDS= pressure difference switch information)		
	Supply filter PDE Exhaust filt PDE	Filter dirty. Clean or change filter. (PDE= pressure difference emitter information)		
Pressure alarm	HRU glycol	Alarm indicating HRU's glycol circuit positive or negative pressure		
Alarm	Cooling unit	Fault alarm from cooling unit		
	HRU rotation	Fault alarm from HRU		
	Annual maintTime	The AH unit running time counter has exceeded the "Maintenance interval limit"		
Sensor fault	Room temp. Room temp. B Exhaust temp. Outdoor temp. HRU exhaust temp Supply after HRU Remote setting Free measurement	When Err appears in place of the setting, the sensor circuit is cut or short-circuited		
	Supply temp. B	In the event of a "Supply temp B" sensor fault, control switches to the "Supply temp" sensor.		

In the event of a room temperature or exhaust temperature sensor fault the controller switches the AH unit to supply temperature control.

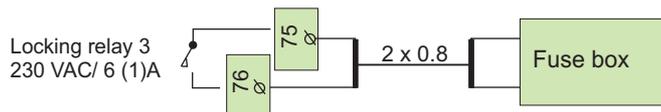
ALARM ACKNOWLEDGEMENT:

Before acknowledging an alarm, press the  button to check other possible alarms. To go to the controller's basic display before acknowledging, press the **ESC** button to bypass the alarm display. The alarm message will return to the display if you don't press the keyboard in 20 sec. Press **OK** to acknowledge the alarm appearing on the display. If the cause for the alarm has not been deleted, the alarm will remain activated but the alarm signal will disappear and the alarm relay contact will open to wait for a new alarm. **ESC** to delete the alarm signal. Press the group select button to find active alarms on the basic display.

ALARM RELAY CONNECTION:



AH UNIT RUNNING PERMIT:



A-alarms that shut down the AH unit and stop-forced drives shut down the AH unit by locking relay 3. (in addition, R1 and R2 control ends).



The GSM-modem (optional equipment) offers an economical "miniature monitor solution" Alarm information is directed to the desired GSM numbers (1 and 2). See p. 21). In the event of an alarm the controller first sends a text message to GSM 1 where the cause for the alarm appears. The alarm is acknowledged when the GSM sends the same message back to the controller. If the alarm is not acknowledged by GSM 1 within 5 min, the controller sends the text message again to both GSM numbers.

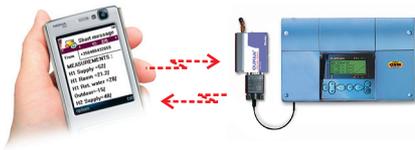

```
AHU 1/1 Autom.  
Room temp.21.2°C  
SupplyTemp20.4°C  
▶Selection
```

```
Select  
Measurements  
AHU oper.contr.  
Settings  
Supply air info  
AHU output info  
Connection info  
ControlOperMode  
Clock functions  
Alarms  
Language/kieli  
Type info  
▶Initializ.modem  
Mainten.mode
```

“**Initializ modem**” appears on the menu only if the modem has been taken into use (stripconnector B-D pins are connected).

Press **OK** to send initializing commands to the modem. The controller gives an error message if the modem did not become initialized. In this case, check the modem connection and settings (see pages 49-51).

This is necessary only if the modem type or its settings are changed.



EH-105 can be connected to a GSM modem, making it possible to communicate with a GSM phone via text messages. (initialization p. 49). The functions performed using a graphic user interface (see p. 21) can also be performed using traditional text messages.

COMMUNICATION WITH THE CONTROLLER VIA GSM:

Send the controller the following text message: KEY WORDS

KEY WORDS:
MEASUREMENTS/
AHU CONTROL/
SETTINGS/
SUPPLY AIR INFO/
WEEK PROGRAM/
SD PROGRAM/
SPECIAL CALENDAR/
OPERATION CODE/

If the controller has an equipment ID (p. 48), you must write the equipment ID in front of the key word (e.g., TC1 KEY WORDS). You don't need the equipment ID if you have only one controller in use. The controller sends a list of key words as a text message, from which you can receive information about the controller's operations. Each key word is separated from the others by a / character.

MEASUREMENTS:
 Room temp 21.5/
 ExhaustTemp 21.5/
 SupplyTtemp 19.5/
 Supply TempB 18.5/
 Outdoor temp -15/
 Rad. ret. wat. 28/
 Rad. SuppWat 55/
 SuppAfter HRU17/
 ..continuing...

Obtaining information from the controller via GSM:

Send a text message to the controller using the key words given by the controller. The controller only identifies one request at a time, so write only one key word/message. You can write the key word using capital or small letters. (If the controller has an equipment ID (p. 48), write the equipment ID in front of the key word).

The controller answers your request by sending the requested information via text message.

SETTINGS :
 Supply temp 21.5/
 Room temp 21.5/
 Temp. 2 23.5/
 SuppMinCool 13/
 Room temp N 16.3/
 OutputChange -15/
 ...Continuing...

Controller control via GSM:

You can change user level settings and supply air unit control via a GSM phone. Send a text message to the controller and, using a key word, request information about the function whose settings you want to change (or obtain the information from your telephone's memory). Change the text message sent by the controller and send the changed message to the controller. The controller makes the requested changes and acknowledges by sending a text message showing the new settings.

Keyword: Change to the text message sent by the controller

Settings Write the setting as a text message in place of the setting you received and send the message to the controller. E.g., room temperature 21.5°C is changed to 23.5°C by writing 23.5 in place of room temperature 21.5 in the text message.

AHU control In the text message the *character indicates the control mode in use. To change the control mode: Move the * character to the control mode you want to use and send the message to the controller. E.g., If you want to change AH unit running from automatic control to manual 1/1 (maximum) output, delete the *character from in front of automatic control in the text message you received and put the *character in front of manual 1/1 (Manual max).

Week program, SD program and special calendar are illustrated on page 15

OPERATION CODE:
 o12H0m004125780
 000ijPZabcd0

Operation code The controller sends a function code based on the settings that can be converted with the help of the EH-105 configuration program to a readable form.

ALARM:
 Filter alarm
 02.11.02 14:16
 Meas. 10
 SF filter PDS

Alarm acknowledgement:

You can give the controller the GSM numbers (max. 2) that you want the alarms directed to. The cause of the alarm is clearly stated in the alarm message. The alarm is acknowledged when the GSM sends the same message back to the controller. When the alarm arrives, the GSM 1 immediately receives the alarm information. If the alarm is not acknowledged, the controller sends a new text message to both GSM numbers 5 minutes after the alarm has appeared.



This is the beginning of the maintenance guide intended for the maintenance person (p. 23-60).

Access to the Ouman EH-105 is prevented by user rights. Only those persons who have a maintenance code have access to the maintenance mode.

There are typical tuning values and settings in the maintenance mode which the maintenance person needs in conjunction with installation. Settings that are not needed as often can be done in the special maintenance mode, e.g., restoring original factory settings, locking the controller's user menu, LON settings, initializing bus measurements, as well as modem settings and text message settings.

```
AHU 1/1 Autom.
Room temp.21.2°C
SupplyTemp20.4°C
▶Selection ████|
```

ENTERING THE MAINTENANCE MODE:

Press **ESC** until the display no longer changes. You are then in the "Selection" display shown in the adjoining picture. Press **OK**.

```
Select
Measurements
AHU oper.contr.
Settings
Supply air info
AHU output info
Connection info
ControlOperMode
Clock functions
Alarms
Language/Kieli
Type info
Initializ.modem
▶Mainten.mode
```

Press the button to move the cursor to "Mainten. Mode". Press **OK**.

```
Maintenance Mode
Enter maint code
0000
```

Press **OK**. Press the - or + button to set the correct maintenance code one number at a time and press **OK** after each number.



```
Maintenance Mode
▶GeneralSettings
CascadeCtrlSyst
AHU controls
Actuator alarm
AHU stop alarm
Damper
HRU
Heating
Cooling
24VAC controls
Measur. 1-6
Measur. 7-11
ON/OFF inputs
Special mainten
```

MAINTENANCE MODE

Press the button to choose what you want to access from the adjoining menu.

Each item is presented individually on a separate page.



SPECIAL MAINTENANCE:

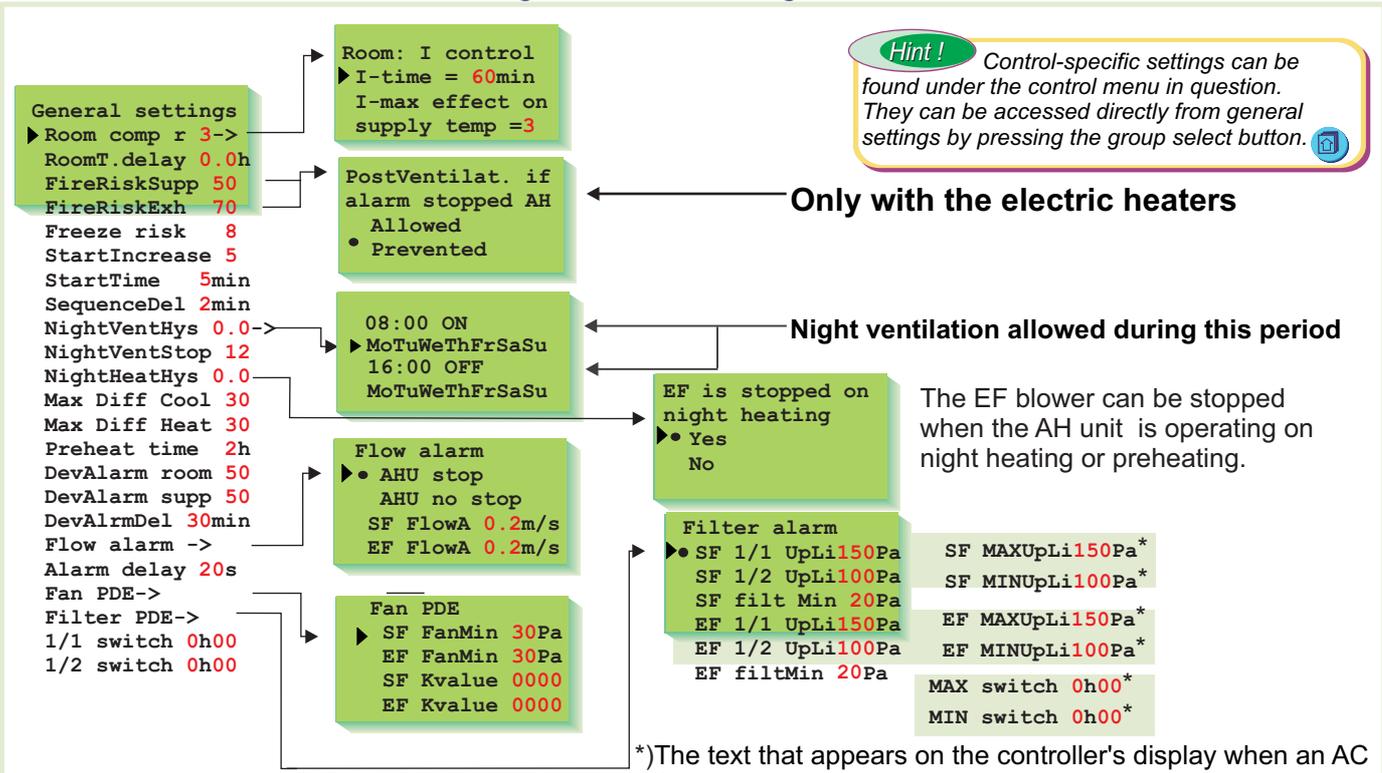
```
Special mainten.
▶Rstore settings
Locking code
Bus measurement
LON initializ.
TextMessage set
```



Ouman-105 has two types of settings:

- a) user level settings that the user can adjust (p. 9)
 - b) maintenance mode settings that the maintenance person may have to adjust
- Original factory settings are restored in special maintenance (p. 46)
 General settings and control settings are in the maintenance level.

Hint! Control-specific settings can be found under the control menu in question. They can be accessed directly from general settings by pressing the group select button.



INFORMATION ABOUT GENERAL SETTINGS

Text on the display:	Factory setting:	Setting range:	Explanation:
Room comp r 3°C ExhausCompR	3°C	0 ... 8°C	If the room temperature deviates from its set value, the room compensation function changes the supply air temperature. E.g., if the room compensation is 3 and the room temperature is 1,5°C below the set value, the controller raises the supply air temperature 4,5°C (3x1,5°C = 4,5°C) above the room setting. Room compensation is doubled during the prewarming period.
I-time	60min	10 ... 120min	Room I-control changes the supply temperature by the "room temperature deviation x room compensation ratio" during I-time.
I-max effect on supply temp	3°C	0 ... 9°C	The maximum effect of room I-control on the supply temperature is limited to the temperature set here. I-control is not in use when the setting is at 0.
RoomTdelay	0.0h	0.0 ... 2.0h	Room temperature slow down: the time period from which the average room temp. is calculated, which is used as the room temperature in room temperature control.
Fire RiskSupp	50°C	0 ... 90°C	Fire risk alarm limit. The function is not in use when the setting is at 0. If the supply exhaust air temperature exceeds the fire risk setting the controller shuts down the AH unit and gives an alarm.
Fire RiskExh	70°C	0 ... 90°C	
Freeze risk	8°C	5 ... 50°C	The controller gives a freezing risk alarm and shuts down the supply air unit if the radiator return water temperature drops below the "Freeze risk" setting. Attention! If the outdoor temperature is above +7°C and the freezing risk set value is below 20°C, the controller uses a freezing risk set value of +4°C. (The cut off point during a trial run is above the set value of + 20°C.)
StartIncrease	5°C	0 ... 9 °C	The number of degrees that "StartIncrease" raises the controller determined supply air temperature during the AH unit start-up. The effect of the start-up function disappears at a rate of 1°C/min. The start-up function cannot raise the controller determined supply air temperature above 25 °C.
Start time	5min	0 ... 9min	The length of the start function period during which controls cannot be changed.
SequenceDel	2min	0 ... 9min	The time after which the controller can lower the temperature by moving from one control sequence to the next. (e.g., the heating valve must be closed during the sequence delay before the HRU output can be decreased).
NightVentHys	0°C	0.5...5.0°C	Night ventilation hysteresis shows how many degrees below the room temperature the outdoor temperature must be for night ventilation to start up. (0 = night ventilation is not in use). Night ventilation starts up when the room temperature is at the room temperature set value + 1,5 °C and it stops at the room temperature set value. Night ventilation is allowed during the set time period.



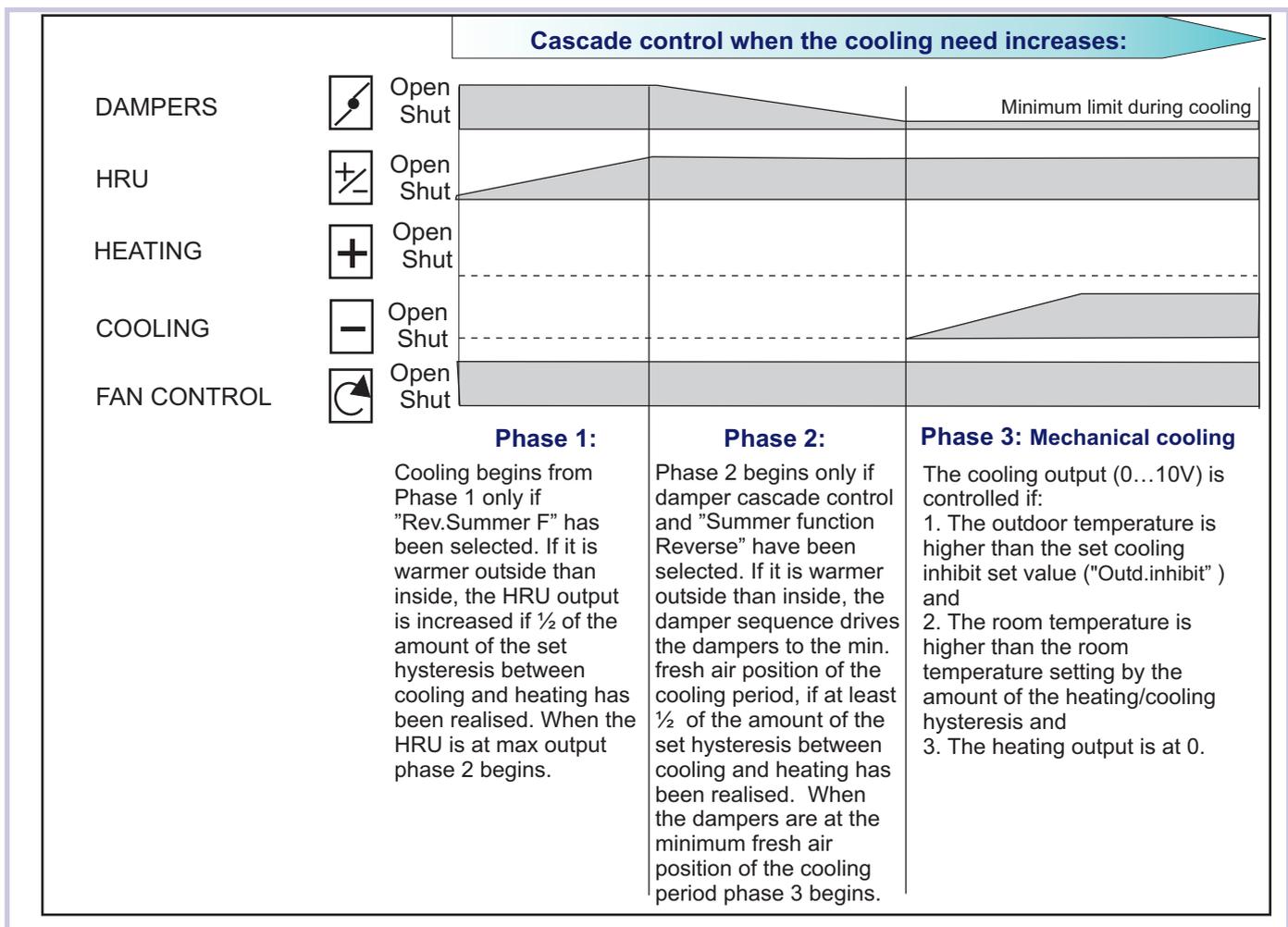
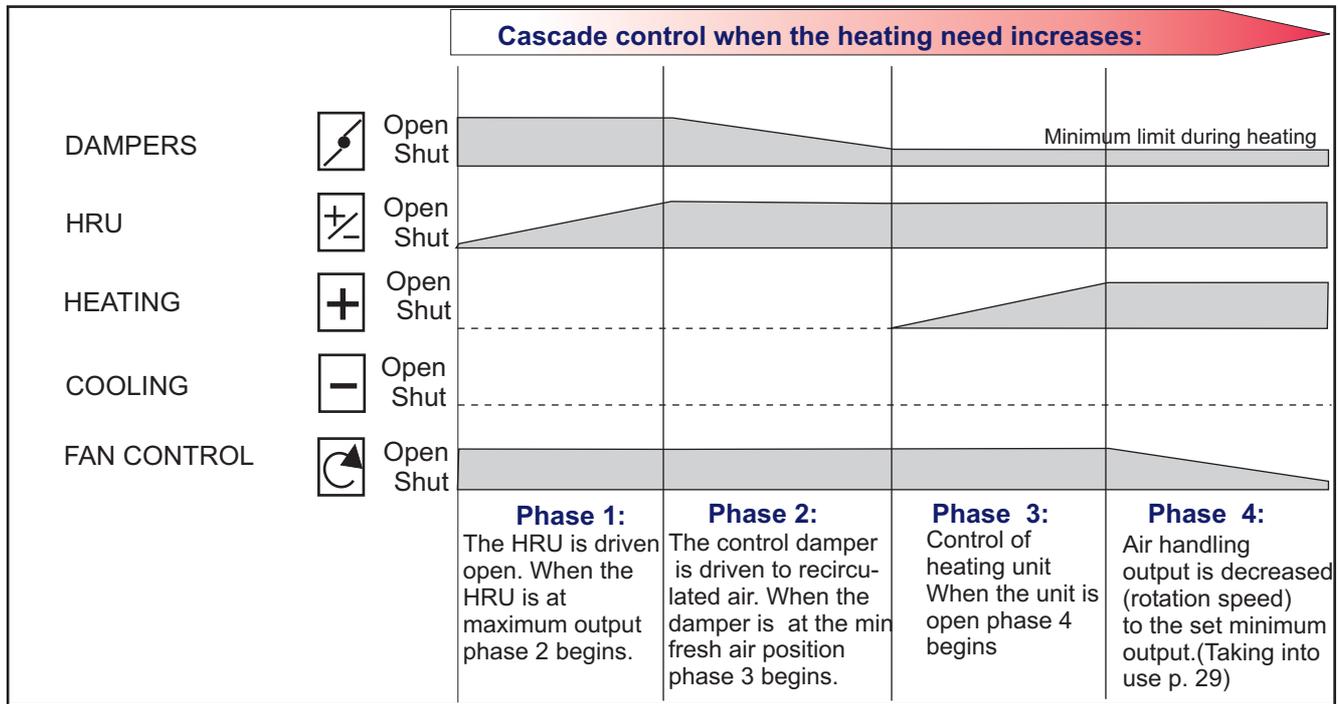
Text on the display:	Factory-setting:	Setting range:	Explanation:
NightVentStop	12 °C	5 ... 50°C	Outdoor temp. limit below which night ventilation and night cooling are inhibited. (See p. 38, 39)
NightHeatHys	0 °C	0.5 ... 5.0°C	Night heating hysteresis (0 = night heating is not in use). See p. 9. When the temperature drops below the night heating setting, the AHU starts up at maximum output and stops when the room temperature has risen the equivalent of NightHeatHys.
Max Diff Cool	30 °C	1 ... 30°C	Maximum allowed difference between the room temperature and supply temperature when dropping the room temperature. The recommended setting for displacement air handling is approx. 5°C.
Max Diff Heat	30 °C	1 ... 30°C	Maximum allowed difference between the room temperature and supply temperature when raising the room temperature. (The recommended setting for displacement air handling is approx. 2°C). If the supply air does not fall to floor level in an air heated room, lower this setting (approx. 10°C) or use Heat enhancement, see page 31.
Preheat. time	2 h	0 ... 8 h	When moving from night heating to daytime temperature, the temperature can be increased faster by starting to increase it by the preheating time before the clock determined AH unit starting time. Preheating is not in use when the setting is at 0.
Alarm settings:			
DevAlarm room DevAlarm exh. DevAlarm supp	50 °C	1 ... 75°C	Deviation of the room air, exhaust air, or supply air temperature from the controller determined setting value that causes an alarm to be given. Deviation alarms function while the unit is running. A deviation alarm is not given if the outdoor temperature is above the cooling "Outd.inhibit" set value and mechanical cooling is not in use.
DevAlrmDel	30 min	0 ... 90min	Deviation alarm delay. The alarm is given if the deviation has lasted for the time set here. Deviation alarms for room temperature, exhaust air and supply air have the same delay time.
Flow alarm->			
SF FlowA EF FlowA	0.2 m/s 0.2 m/s	0.1 ... 9.9m/s 0.1 ... 9.9m/s	Minimum flow alarm. The alarm is given when the flow is below the limit set here (10 s) and the AH unit has been running for at least 120s. In the event of an alarm: you can choose whether or not the AH unit shuts down during the alarm.
Alarm delay	20 s	0 ... 500s	The alarm delay for the alarms that do not shut down the AH unit. The controller gives an alarm after a delay. Fire and freeze risk alarms do not have a delay.
SF FanMin EF FanMin	30 Pa 30 Pa	0...500 Pa 0...500 Pa	Minimum value for pressure diff. above the supply and exhaust fan or over the meas. ring volume of air flow. When the pressure is under the minimum value, an alarm is given after 35 s, while the AH unit is running after which the AH unit is shut down.
SF Kvalue EF Kvalue	0000 0000	0...9999 0...9999	The volume of air flow (m ³ /h, according to the standard) is displayed in measurements when the pressure difference over the meas. ring (installed in connection with the fan) is measured and K-value has a value other than 0 (given by the manufacturer of the fan or the meas. ring). The pressure diff. measurement (SF Fan/ EF Fan) is converted into air flow volume using the formula: $m^3/h = K \cdot \sqrt{\Delta p}$. If the K-value is expressed as l/s (air flow volume), multiply the K-value by 3,6 and set the resulting value into the controller. (Some manufacturers use also other characters, e.g. C).
Filter PDE->			
SF 1/1 UpLi SF MAX UpLi*	150 Pa	50 ... 500Pa	Supply air unit filter's pressure difference upper limit for the filter impurity alarm while the AH unit is running at 1/1 output or maximum output*.
SF 1/2 UpLi SF MIN UpLi*	100 Pa	50 ... 500Pa	Supply air unit filter's pressure difference upper limit for the filter impurity alarm while the AH unit is running at 1/2 output or minimum output*. With AC freq. converter controlled AH units the alarm limit changes linearly / from the "SF MAX UpLi" to the "SF MIN UpLi" value according to the AH unit running speed.
SF filtMin	30 Pa	0 ... 99Pa	Monitoring supply air unit running by the filter minimum pressure difference. The function is not in use when the setting is at 0 or during night heating. If the controller receives running information for 2 minutes and the pressure difference is not filled, a flow alarm is given and the AH unit is shut down.
EF 1/1 UpLi EF MAX UpLi*	150 Pa	50 ... 500Pa	Exhaust air unit filter's pressure difference upper limit for the filter impurity alarm while the AH unit is running at 1/1 output or maximum output*.
EF 1/2 UpLi EF MIN UpLi*	100Pa	50 ... 500Pa	Exhaust air unit filter's pressure difference upper limit for the filter impurity alarm while the AH unit is running at 1/2 output or minimum output*. With AC freq. converter controlled AH units the alarm limit changes linearly from the "EF MAX UpLi" to the "EF MIN UpLi" setting according to the AH unit running speed.
EF filtMin	30 Pa	0 ... 99Pa	Monitoring exhaust air unit running by the filter minimum pressure difference. The function is not in use when the setting is at 0 or during night heating. If the controller receives running information for 2 minutes and the pressure difference is not filled, a flow alarm is given and the AH unit is shut down.
1/1 switch MAX switch* 1/2 switch MIN switch*	0h00 0h00 0h00 0h00	0h00 ... 9h59 0h00 ... 9h59	AH unit control by a switch or press button: When connecting switch or press button controls (e.g., "1/1 PowerSw") to the controller's On/Off inputs, the AH unit runs for the time, set here, that the press button is depressed. If a switch is in use, the AH unit keeps running after switch control has been deleted for the post-run time set here.*AC freq. converter controlled AH unit in use.



Select
 ↳ Mainten.mode
 ↳ CascadeCtrlSyst

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In blast air temperature control, an attempt is usually made to utilise "free energy" as much as possible. The diagrams below illustrate a typical order for controls in a heating situation (upper diagram) and cooling situation (lower diagram). The cascade control system can be changed, see the following page.



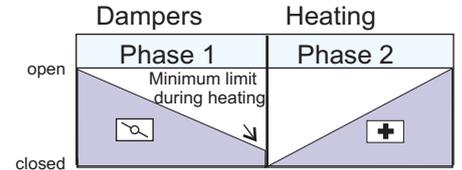


CascadeCtrlSyst
 ● DamperMin-Heat
 Heat-DamperMin

The order in which heating and dampers function is selected in the cascade control system when there is a need to increase the room temperature.

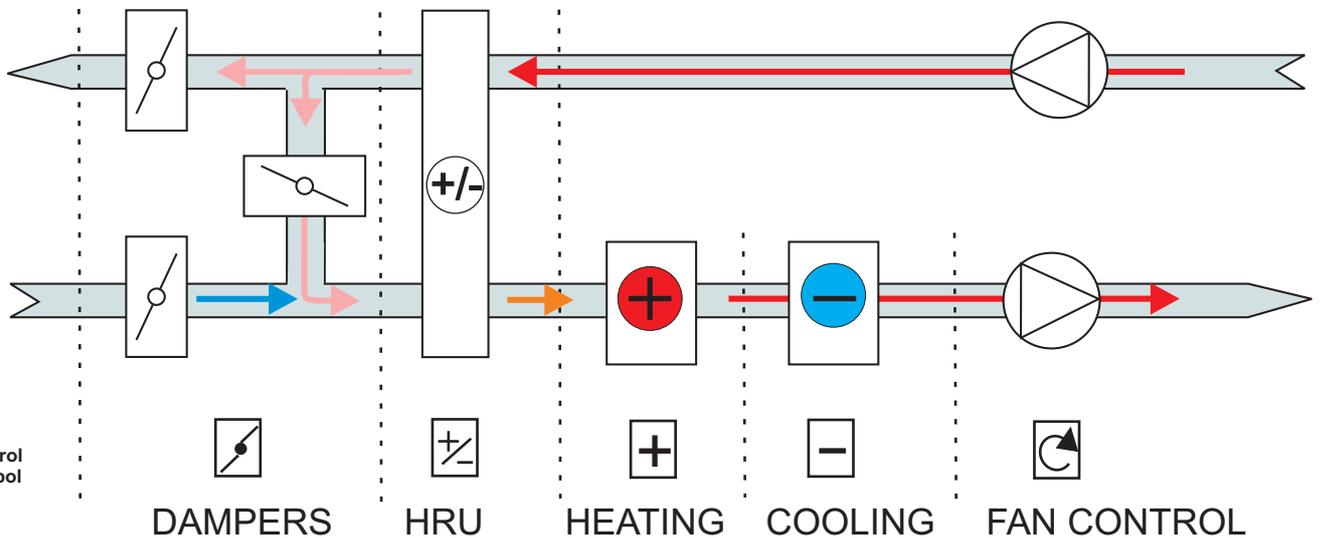
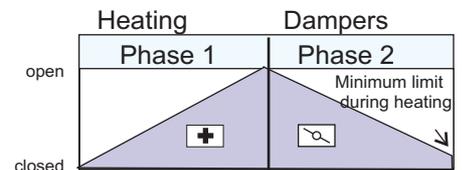
DamperMin-Heat: When the temperature must be increased, the dampers are driven to the minimum limit of the heating period and after that the heating output is increased. The most commonly used cascade control principle.

Vinkki! Reason:
 For energy saving reasons, a smaller amount of fresh air is used during heating.



Heat-DamperMin: When the temperature must be increased, the heating output is first increased. When heating has reached maximum output the dampers are driven to the heating period's minimum limit.

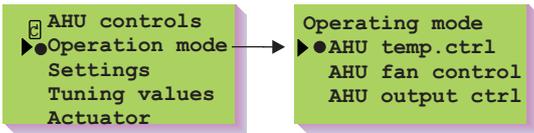
Vinkki! Reason:
 If the heating output need is greater than the available maximum heating output (e.g., HRU defrost), the amount of fresh air is decreased to ensure a sufficient heating output.



Control symbol

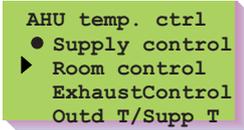


Instr. p.23



Hint!
 Press the group select button to browse other operating modes that have been selected.

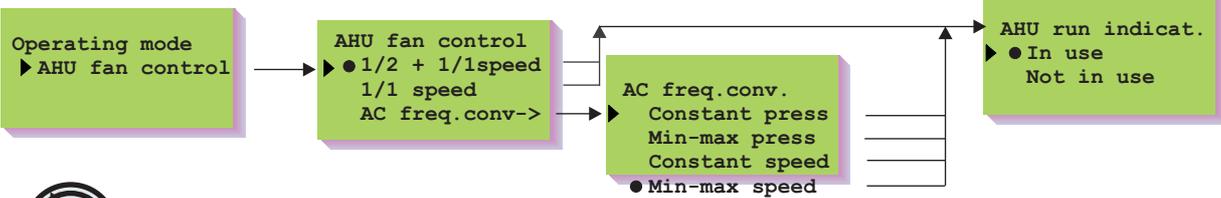
TEMPERATURE CONTROL



Supply control: blown in air (supply air) has a constant temperature.
Room control: the supply air temp. is controlled according to the room temp. (cascade control).
ExhaustControl: the supply air temperature is controlled according to the exhaust air temperature (cascade control).
Outd T/Supp T: the supply air temperature is controlled according to the outdoor temperature.

AHU FAN CONTROL

The fan type and control mode are selected here.



1/2 + 1/1 speed: An air handling unit with contactor controlled 2-speed fans is in use. The controller controls the fans by relay 1 (1/1output) and relay 2 (1/2 output). The supply air and exhaust air fans run at the same time (locked in electrical control box).



1/1 speed: An air handling unit with contactor controlled 1-speed fans is in use. The controller controls both fans by relay 1 (locked in electrical control box).



AC freq.conv An air handling unit whose fan rotation speed is controlled by an AC freq. converter is in use. The controller uses a 0...10V control to control the fan speed. Supply fan control: strip connector 65. Exhaust fan control: strip connector 66. The AC freq. converter running permit is given to the supply air unit by relay 1 and to the exhaust air unit by relay 2.

Constant press: The controller controls the fan rotation speed by AC freq. converters so that a constant pressure is maintained in the supply and exhaust channels. Constant pressure settings are given in the maintenance mode (settings p. 30, AH max output/ SF pressure/ EF pressure). The function requires channel pressure emitter measurements. AH max output = constant pressure in SF and EF channels. The pressure control uses SF FanPDE/ EF FanPDE- measurements (constant air flow control), if SF press./EF press.-measurements are not connected.

Min-max press: The controller controls the fan rotation speed by AC freq. converters so that the supply and exhaust channel pressures correspond with the desired output. (p. 30, AH max output/ SF and EF pressure, AH min output/ SF and EF pressure). The pressure control uses SF FanPDE/ EF FanPDE- measurements (min-max air flow control), if SF press./EF press.-measurements are not connected.

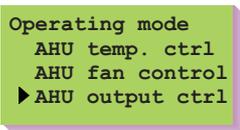
Constant speed: The controller controls the fans to a constant rotation speed by AC freq. converters. Settings are given in the maintenance mode (p. 30, AH max output/ SF control/ EF control). AH max output = SF and EF fans run at a constant speed.

Min-max speed: The controller controls the fan rotation speed by AC freq. converters so that the desired AH output is realised. Settings are given in the maintenance mode (p. 30, AH max output/ SF and EF control, AH min output/ SF and EF control).

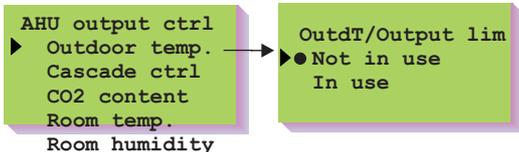
AHU run indication: In use: The running indication is connected to the controller. When the running indication "appears" to the controller from the AH unit, the controller starts to regulate the control sequences from the stand-by situation to the "normal running (operation)" stage. The running indication is possible to connect either to the digital input (see page 44) or to the strip connector 81 = 230 V running indication. When the running indication is in use, it is also possible to take the contradiction alarms in use.

Not in use: The running indication from the AH unit is not connected. The AH unit can get started only by the controller. The controller regulates on "normal running control", when the controller gives to the AH unit min-or max output (1/1-or 1/2-output) control (the running indication is not connected). Otherwise the control is on stand-by stage.

AH OUTPUT CONTROL

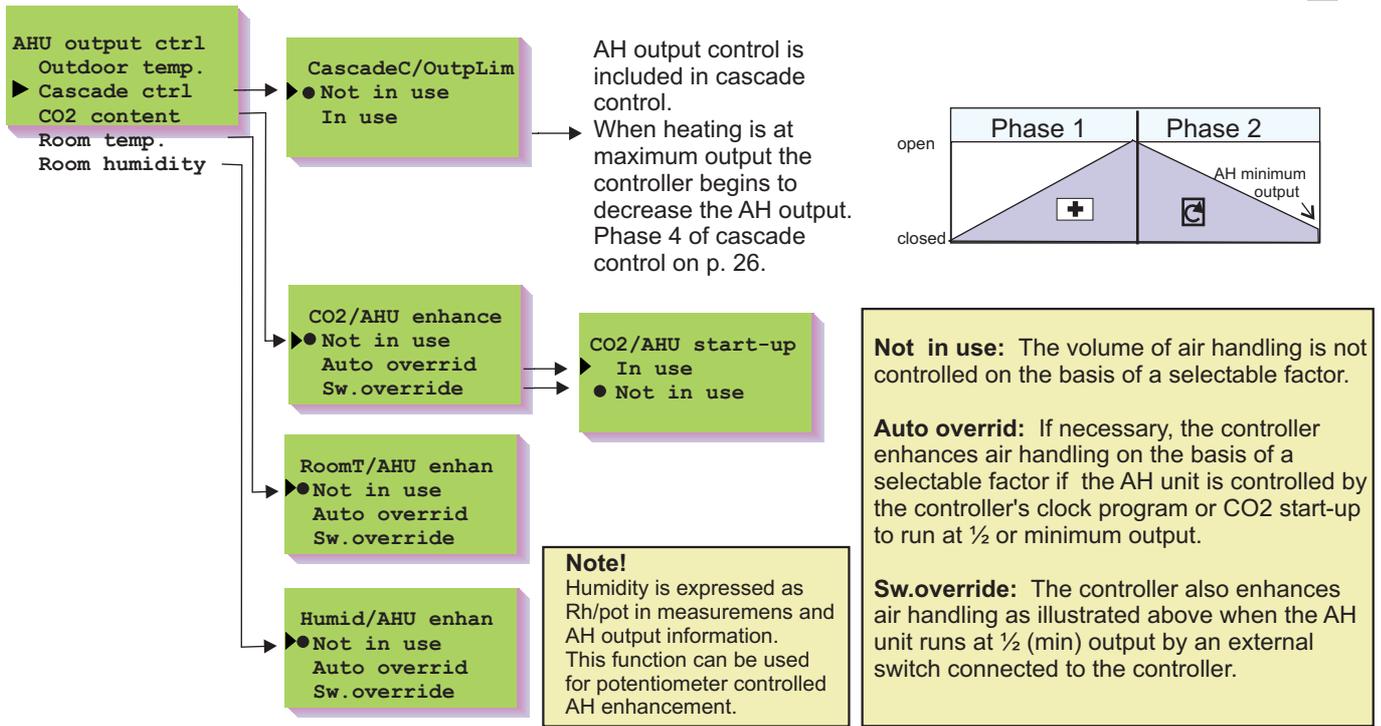


With AH output control, air handling output limits can be taken into use based on the outdoor temperature and cascade control, and air handling enhancement can be taken into use based on CO2 content, room temperature or humidity.



In contactor controlled AH units, the fan output drops to 1/2 speed when the outdoor temperature drops below the output exchange set value.

In AC freq. converter controlled AH units the AH unit output is steplessly limited from maximum to minimum as the outdoor temperature drops from the given AH maximum outdoor temperature to the given AH minimum outdoor temperature (see p. 31). The outdoor temperature limit can always decrease air handling regardless of other control commands.



CO₂/AHU enhance

Air handling enhancement according to air quality (CO₂ content):

In contactor controlled AH units the controller switches the AH unit from ½ output to 1/1 output according to the CO₂ content. In AC freq. converter controlled AH units the controller switches the AH unit output steplessly from minimum to maximum according to the CO₂ content.

AH start-up: The AH unit starts up according to the CO₂ content.

RoomT/AHU enhan

Air handling enhancement with the room temperature below the set value:

Hint! In high rooms (industrial buildings and sports arenas) warm air drops more effectively when fan output is increased.

In contactor controlled AH units the controller switches the AH unit from ½ output to 1/1 output according to the room temperature. To ensure adequate heating output, the controller switches the AH unit from 1/1 output to ½ output if the supply temperature is below the room temperature for 8 minutes. If the supply air temperature is 2°C above the room temperature after an hour, the AH enhancement function can switch the AH unit to 1/1 output.

In AC freq. converter controlled AH units the controller begins to increase the AH unit output steplessly according to the room temperature. To ensure adequate heating output, "CascadeC/OutpLim" cascade control can be used in AC freq. converter controlled AH units. The function is not in use during heating when the "HeatBoost" setting is at 0.

Hint! Excessive heat can be eliminated, e.g., from conference rooms by increasing fan speed (without the supply air temperature getting too cold). **Attention!** Be careful so that excessive radiator network heating doesn't cause needless AH enhancement.

Air handling enhancement with the room temperature above the set value:

In contactor controlled AH units the controller switches the AH unit to 1/1 output as the room temperature rises. In AC freq. converter controlled AH units the controller begins to increase the AH unit output steplessly according to the room temperature.

The function is not in use during cooling when the "CoolBoost" setting is at 0.

Humid/AHU enhan

Air handling enhancement when the humidity is below the set value:

Hint! E.g., Increasing AH speed in laundrettes enhances humidity elimination.

Only AC freq. converter controlled AH units. When the minimum setting for room air humidity has been exceeded, the humidity function begins to steplessly increase AH unit output. Maximum output is reached when the room air humidity has reached the AH unit maximum room air humidity setting.



Select
 ▶ Mainten.mode
 ▶ AHU controls

Instr.
 p.23

☐ AHU controls
 Operation mode
 ▶ ● Settings
 Tuning values
 Actuator

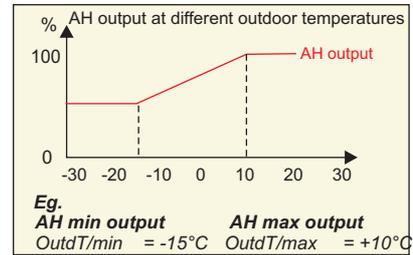
AH FAN CONTROL SETTINGS

☐ Settings
 ▶ Max settings->
 Min settings->
 AHU maximum ->
 AHU minimum ->

☐ Max settings
 ▶ SF control 100%
 SF pressure 290Pa
 EF control 100%
 EF pressure 300Pa
 Dev.alarm 100Pa

☐ Min settings
 ▶ SF control 50%
 SF pressure 220Pa
 EF control 50%
 EF pressure 230Pa
 Dev.alarm 80Pa
 Scale Displ 50%

See next page
 See next page



Hint !
 The AH output % is made to correspond to the actual air handling volume in relation to the total air handling volume. (Enter how many % of maximum air handling the minimum air handling is.)

Setting:	Factory setting:	Range:	Explanation:
----------	------------------	--------	--------------

Max settings

The SF and EF fans run at a speed that produces 100% air volume or maximum channel pressure.

SF control	100%	0 ... 100%	Control by supply air fan's AC freq. converter. (0...10V control = 0...100%). Maximum limit of AC freq. converter control in pressure controlled units.
SF pressure	290Pa	30 ... 3000Pa	Supply air unit channel pressure setting (or SF FanPDE). Attention! Setting the "SF control" too low may limit realization of channel pressure.
EF control	100%	0 ... 100%	Control by exhaust air fans's AC freq. converter (0...10V control = 0...100%). Maximum limit of AC freq. converter control in pressure controlled units.
EF pressure	300Pa	30 ... 3000Pa	Exhaust air unit channel pressure setting(or EF FanPDE). Attention! Setting the "EF control" too low may limit realization of channel pressure.
Dev.alarm	100Pa	0 ... 300Pa	Deviation alarm setting (which changes according to the AH output) with AH at minimum output.A deviation alarm is given when the SF and EF channel pressures have deviated from the set value for 5 min. The deviation alarm is not in use at a0 setting.

Min settings

The SF and EF fans run at a speed that produces minimum air volume or minimum channel pressure.

SF control	50%	0 ... 100%	Control by supply air fan's AC freq. converter. (0...10V control = 0...100%). Minimum limit of AC freq. converter control in pressure controlled units.
SF pressure	220Pa	30 ... 3000Pa	Supply air unit channel pressure setting(or SF FanPDE). Attention! Setting the "SF control" too high may limit realization of channel pressure.
EF control	50%	0 ... 100%	Control by exhaust air fans's AC freq. converter (0...10V control = 0...100%). Minimum limit of AC freq. converter control in pressure controlled units.
EF pressure	230Pa	30 ... 3000Pa	Exhaust air unit channel pressure setting(or EF FanPDE). Attention! Setting the "EF control" too high may limit realization of channel pressure.
Dev.alarm	80Pa	0 ... 300Pa	Deviation alarm setting (which changes according to the AH output) with AH at minimum output. A deviation alarm is given and the AH unit is shut down when the SF or EF channel pressure has deviated from the set value for 5 min. The deviation alarm is not in use at a 300 setting.
Scale Displ	50	0...100%	AH output % display calibration. Set the value here that indicates the % of maximum output air handling at minimum output. The AH output display is calibrated so that the value set here appears on the display when AH is at minimum output. AH output 100% always appears at AH maximum output.

AHU at maximum
 CO2/max 1000ppm
 HeatBoost 6.0
 Cool Boost 0.0
 Humid./max 90%
 Outd. T/max +10°C

AHU at minimum
 CO2/min 600ppm
 CO2postRun 15 min
 Humid./min 60%
 Outd. T/min -15°C

The controller can enhance air handling by changing the AH output according to the CO2 content, room temperature, exhaust temperature, room humidity or remote setting potentiometer. The outdoor temperature may inhibit AH output during cold weather.

AH enhancement according to the CO₂ content

Setting:	Factory setting:	Range:
CO2/max	1000ppm	700 ... 2000ppm
CO2/min	600ppm	500 ... 1800ppm
CO2postRun	15min	0 ... 99min

The CO₂ content at which AH enhancement drives the AH unit to max output (1/1 output). The CO₂ content at which AH enhancement drives the AH unit to min output (1/2 output). The AH unit post-running delay when switching from 1/1 output to 1/2 output or shutting down the AH unit by the CO₂ content. This prevents the AH unit from switching too soon from one mode to the next when the CO₂ content changes quickly.

AC freq. converter controlled AH units

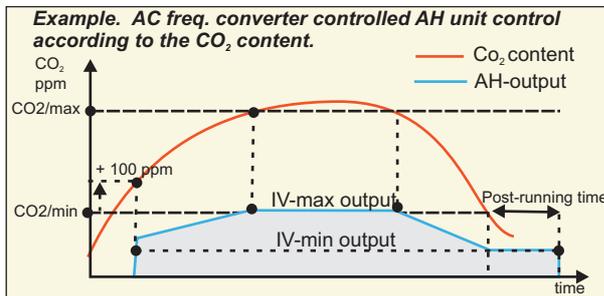
The controller changes the AH unit output steplessly according to the CO2 content. When the CO₂ content has risen to the "CO2/max" setting, AH output is at maximum. When the CO₂ content has dropped to the CO2/min setting, AH output is at a minimum.

Contactor controlled AH units

The controller switches the AH unit to 1/1 output when the CO2 rises to the "CO2/max" setting. The controller switches the AH unit to 1/2 output when the CO2 content has been 200ppm below the "CO2/max" value for the "CO2 postRun" time.

AH start-up/shut down according to the CO₂ content

The AH unit can be automatically started up and shut down according to the quality of the room air (CO₂ content) if this function has been taken into use. (see p. 29). When the CO₂ content rises 100 ppm above the "CO2/min" setting, the controller starts up the AH unit; a 2-speed AH unit starts up at 1/2 output and an AC freq. converter controlled AH unit starts up at minimum output. When the CO₂ content has been under the "CO2/min" setting for the "CO2 postRun" amount of time the controller shuts down the AH unit.



AH enhancement according to room temp.

HeatBoost	6.0°C	1.5 ... 9.9°C
-----------	-------	---------------

Enhancement function during the heating period

AH unit driven to maximum as the room temperature drops: When the room temperature deviates from the set value by -1 °C, the AH enhancement function can begin steplessly increasing the AC freq. converter controlled AH unit output. A maximum output is reached when the room temperature deviates from the set value by the "HeatBoost" set value + 1°C. In contactor controlled AH units the controller drives the AH unit to 1/1 output when the room temperature deviates from the set value by the "HeatBoost" set value + 1°C and returns to 1/2 output when the room temperature rises to within 2 °C of its set value. Ensuring adequate heating output (see p. 29)

The heating period function is not in use at a 0 setting.

Cool Boost	0.0°C	1.5 ... 9.9°C
------------	-------	---------------

Enhancement function during the cooling period

AH unit driven to maximum as the room temperature rises: When the room temperature deviates from the set value by +1 °C, the AH enhancement function can begin steplessly increasing the AC freq. converter controlled AH unit output. A maximum output is reached when the room temperature deviates from the set value by the "CoolBoost" set value + 1°C. In contactor controlled AH units the controller drives the AH unit to 1/1 output when the room temperature deviates from the set value by the "Cool Boost" set value + 1°C and returns to 1/2 output when the room temperature drops to within 2°C of its set value. (see p. 29) The cooling period function is not in use at a 0 setting. When the outdoor temperature rises to the room temperature - 2°C, the cooling enhancement function is deleted after which the cooling enhancement can be activated again at the earliest after 15 min.

AH enhancement according to room humidity or remote setting potentiometer

Humid./max	90%	0...100%
Humid./min	60%	0 ... 100%

AH unit output control according to the room humidity or remote setting potentiometer (only with AC freq. converter controlled AH units): When the "Humidity/min" setting has been exceeded, the controller begins steplessly increasing the AH unit output and reaches maximum output when the room air humidity has reached the "Humidity/max" setting.

AH output limiting accord. to outdoor temp.

Outd. T/max	-10°C	-30 ... +30°C
Outd. T/min	-15°C	-30 ... +30°C

The outdoor temperature at which the AH unit is run at maximum output: The AH unit output is limited steplessly from maximum to minimum according to the outdoor temperature. The AH unit output is not limited when the temperature reaches the "Outd. T/max" setting.

The outdoor temperature at which the AH unit is limited to minimum output: The AH unit output is limited steplessly from maximum to minimum according to the outdoor temperature. The AH unit output is limited to minimum output when the outdoor temperature drops to the AH minimum output "Outd T" set value set here.



EXHAUST CONTROLLED AH UNIT TUNING VALUES

EH-105 pressure controlled AH units have PI control. The supply air and exhaust air units have their own tuning values.

	Factory setting:	Range:
SF: P-area	750Pa	50 ... 9000 Pa
SF: I-time	8 s	5 ... 100 s
EF: P-area	750Pa	50 ... 9000 Pa
EF: I-time	8 s	5 ... 100 s

Tuning values

- SF: P-area 750Pa
- SF: I-time 8s
- EF: P-area 750Pa
- EF: I-time 8s

AH FAN CONTROLLED ACTUATOR SELECTION

Setting the maximum change speed of the control message. The minimum amount of time during which the message going to the AC freq. converter can change 0...10 V. (at start-up, the AH unit is immediately driven to a voltage equivalent to the minimum output).

Actuator

- SF: 0-10V/ 80s
- EF: 0-10V/ 80s

Alarm definitions: Actuators AH start-up

Select

- Mainten.mode
- Actuator alarm

Instr. p.23

AH-fans

- No ContradAlrm
- ContradictAlrm
- Alarm delay 35s

When the controller stops/starts up the AH unit, start-up information may leave/come after a delay because of e.g., the ramp of an AC frequency converter controlled unit. The controller waits the length of the alarm delay time for start-up information to leave/come. If there is a contradiction between control and start-up information for the entire set delay time, a contradiction alarm goes off.

Cannot be selected in AC freq. converter controlled units

Contradiction alarms for SF and EF fans

- ContradictAlrm** EH-105 gives a contradiction alarm in the following situations: Running information connected to On/Off inputs is not received, even though the controller drives the AH unit to the output in question. Running information is received even though controls are not given to the AH unit. Attention! Pump contradiction alarms are activated by connecting their running information to the controller by On/Off inputs.
- No ContradAlrm** The controller does not give SF and EF contradiction alarms based on running information. The controller only uses fan running information to change AH unit control from idle-time to running time control.
- Alarm delay** Contradiction alarm delay. Running information must appear during alarm delay or the controller will give a contradiction alarm. The setting range of alarm delay is 0...200s. The factory setting is 35 s.

AH start-up when the alarm disappears:

Select

- Mainten.mode
- AHU stop alarm

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AHU start after alarm is deactiv

- Contr.acknowl.
- Also remoteAck

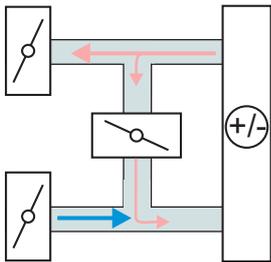
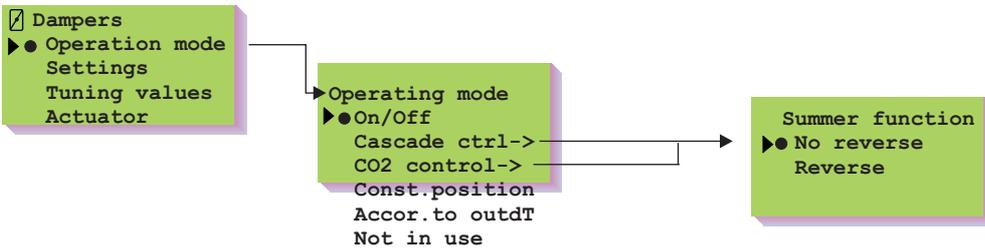
Alarm selections are made here. Select when the AH unit can be restarted if the alarm has shut down the AH unit and the cause for the alarm has been eliminated. Select whether the alarm is acknowledged by the controller or whether it can be remotely acknowledged.

- Contr.acknowl.** The AH unit can start up if the cause for the alarm has been eliminated and the alarm has been acknowledged by the controller.
- Also remoteAck** Alarm acknowledgement sent from the monitor or via a GSM text message can also start up the AH unit if the cause for the alarm has been eliminated. GSM acknowledgement takes place by sending the alarm that has been received by the mobile phone back to the controller as a text message.



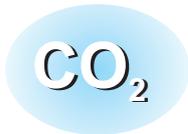
The dampers are taken into use here and the operation mode is defined.

Press the group select button to go from one control sequence to the next.

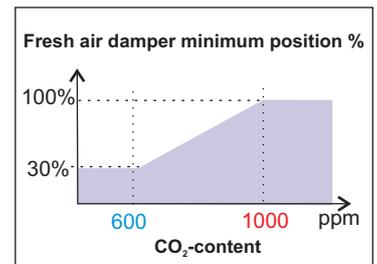


ON-OFF: The fresh air damper and exhaust air damper are open while the air handling unit is running. When the AH unit shuts down the dampers close.

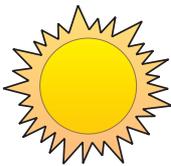
Cascade ctrl: When cascade control is taken into use, energy consumption can be lowered by controlling the proportion of fresh air to circulating air by the position of the dampers. 0% = only circulating air, 100% = only fresh air. You can set the minimum and maximum positions of the fresh air damper in the user level settings as well as the minimum position of the damper for cooling. (range 0...100%). Voltage controlled actuators are suitable for use in cascade control. (Operating sequence for controls, see p. 26 and 27)



CO2 control: Air handling is controlled so that a good air quality is maintained. The controller changes the fresh air damper's minimum position according to the CO₂ content. Fresh air dampers open from a minimum to maximum position according to the CO₂ content. When the carbon dioxide content exceeds the "Min/CO₂" set value the controller opens the fresh air damper. The damper reaches it's maximum position when the CO₂ content reaches the "Max/CO₂" set value. The same CO₂ limits apply during both heating and cooling situations. If the AH unit starts up on the basis of the CO₂ content, the fresh air damper opens at least 30% (programmed lock).



Hint! AH fans can also be controlled by the CO₂ content. See p. 31.



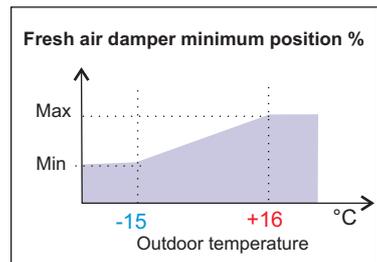
Summer function - reverse- With the reverse summer function, the cooling need can be decreased during hot summer weather by limiting the amount of outdoor air with dampers. When it is warmer outside than inside and when half of the hysteresis between heating and cooling is realized, the dampers are driven to the minimum fresh air position of the cooling period.

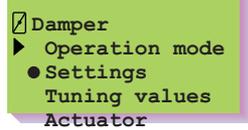
Const. position: The proportion of circulating air and fresh air is kept constant. The mixing ratio is set in the user level at the "DampStandMix" setting. The % indicates the position of the fresh air damper. 0% = only circulating air and 100% = only fresh air. The position of constant position dampers can only be driven by a voltage controlled actuator.

According to outdoor temperature:

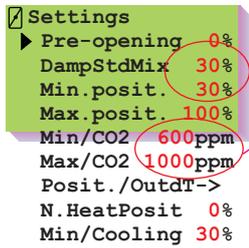
The damper position is linearly controlled by set outdoor temperature limits. The outdoor temperature limits are set in damper settings ("Position/OutdT"). See next page. The position of the dampers can only be controlled by a voltage controlled actuator.

Not in use: The dampers have not been taken into use.





DAMPER SETTINGS



The minimum and maximum position of the damper can also be set in the user level (see p. 9)

The minimum and maximum CO₂ content can also be set in the user level (see p. 10)

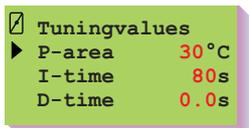
The minimum limit of the fresh air damper changes linearly according to the outdoor temperature.

ADDITIONAL INFORMATION ABOUT SETTINGS:

Setting:	Factory setting:	Range:	Explanation:
Pre-opening	0	0 ... 100%	The controller opens the dampers by the "Pre-opening" amount before the controller starts up the AH unit. Pre-opening also functions with On/Off controlled dampers, with 100% equivalent to 100 seconds. The function prevents the air handling channels from becoming damaged during start-up.
DampStdMix	30%	0...100%	Constant position of the fresh air damper while the AH unit is running (100% = damper open)
Min. posit.	30	0 ... 100%	Fresh air damper minimum position (Can also be installed in the user level)
Max. posit.	100	0 ... 100%	Fresh air damper maximum position (Can also be installed in the user level)
Min/CO2	600	500...1800ppm	CO ₂ content at which the minimum limit position of the fresh air damper is linearly changed toward the "Damper max" limit.
Max/CO2	1000	700...2000ppm	CO ₂ content at which the fresh air damper minimum limit drives the damper to the maximum position (see p. 33). Min/CO2 and Max/CO2 cannot be set closer than 200 ppm to each other (programmed locking). Attention. AH unit running and shut down according to CO ₂ content see p. 29 and 31.
Posit./OutdT-> Min / -15°C	-15	-30 ...+30°C	Outdoor temperature at which the fresh air damper minimum position is linearly changed toward the "Damper max" limit.
Max/ +10°C	+10	-30 ...+30°C	Outdoor temperature at which the fresh air damper minimum limit drives the damper to the maximum position.
N.HeatPosit	0%	0 ... 100%	Fresh air damper position during night heating.
Min/Cooling	30%	0 ... 100%	Fresh air damper minimum position during cooling, if the outdoor air is warmer that the room air or exhaust air (0% = damper is shut).

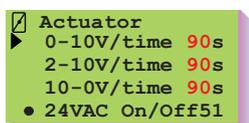
DAMPER TUNING VALUES

EH-105 dampers have PID control



	Factory setting:	Range:
P-area	30 °C	5 ... 100 °C
I-time	80 s	10 ... 500 s
D-time	0.0 s	0.0 ... 5.0 s

DAMPER ACTUATOR SELECTION

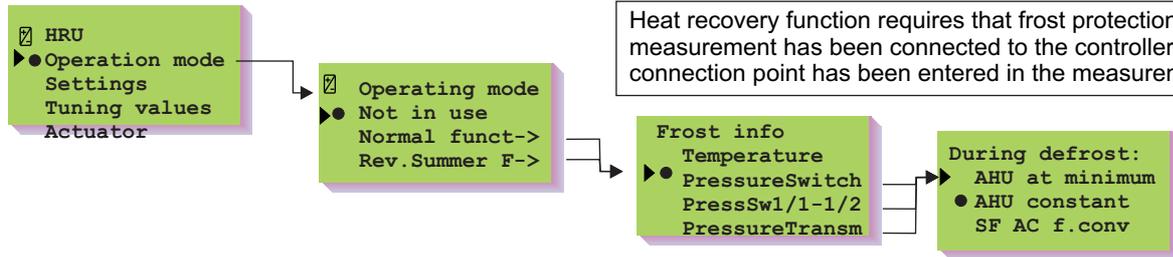


Select the damper actuator control mode and set the drive time. The drive time means the time during which the actuator drives the valve continuously from a closed to an open position. The range is 5...150s. The ● character is at the selected control mode.





The HRU is taken into use here and the operating modes are defined. EH-105 can control different types (rotating, plate and glycol) of heat recovery units (HRU's).



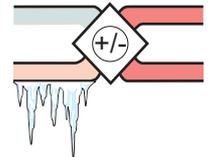
Not in use: The HRU has not been taken into use.

Normal funct: A plate HRU, glycol HRU or a rotating HRU is used in the HRU which is driven to a higher output when the temperature needs to be increased.

Rev. Summer F: HRU has a reverse summer function. When it is warmer outside than inside and when half of the hysteresis between heating and cooling has been realised, the HRU is driven on. The normal HRU function is on during heating.

FROST INFO:

The heat recovery unit may frost over (freeze), if the temperature of the exhaust air after the LTO drops too low. The controller automatically switches on the defrost function (drops the HRU output) if frosting over has occurred. Select the mode for giving frost information and select the frost protection function.



Temperature:

The controller measures the temperature of the exhaust air channel which is after the HRU. The controller decreases the HRU output so that the exhaust air temperature after the HRU does not drop below the "Fr.Protect" set value which is set in the maintenance mode. This prevents the HRU unit from frosting over.

PressureSwitch:

A pressure difference switch that gives a defrost command to the controller (HRU defrost) is connected above the HRU. When the pressure difference exceeds the pressure difference switch set value the defrost function starts lowering the HRU output toward the "DefrostOut" set value at a speed depending on the post defrost time. When the pressure difference drops below the pressure difference switch set value, HRU control remains at its attained state for the post defrost period. After that the HRU is driven to the state it is in during normal control (100%). If only a 1/1 output pressure difference switch is used, defrost control also operates according to it at 1/2 output. Pressure difference switch connection and taking into use is outlined in On/Off inputs, see p. 44.

PressSw 1/1 -1/2

The defrost function functions the same as in "PressureSwitch", but 2 pressure difference switches are connected over the HRU: This makes it possible to get correct settings for both AH outputs (1/1 and 1/2 output) when the defrost function begins.

PressureTransm:

The controller activates the defrost function on the basis of the measurement information from the pressure difference transmitter connected above the HRU. Needed settings are set in the controller's maintenance mode settings ("Defr.Limit Pr", see p. 36). A pressure difference transmitter can be connected to measurement channels 7-11 and can be taken into use in measurement 7-11 settings, where the emitter's range is determined. If the AH unit output is controlled steplessly (min max), the pressure difference limit for defrost also changes steplessly between "AHU min Pa" and "AHU max Pa" (see page 36). The defrost function is the same as "PressureSwitch" (above).

DURING DEFROST

The AH unit speed is determined here, when the defrost command has come from the pressure switch or the pressure difference transmitter.

AHU at minimum:

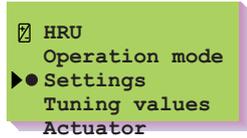
During HRU defrost the AH unit runs at minimum speed.

AHU constant:

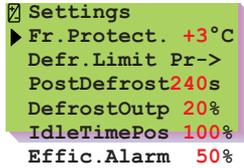
During HRU defrost the AH unit running time remains constant.

SF AC f.conv:

The supply air unit runs at minimum speed during HRU defrost. The exhaust air unit running speed remains constant. An AC freq. converter controlled supply air unit must be in use for the function to be activated.



HRU SETTINGS

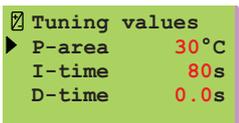


HRU defrost functions according to measurement information (Pa) from the pressure difference transmitter above the HRU, or according to switch information from the pressure switch.

ADDITIONAL INFORMATION ABOUT SETTINGS:

Settings:	Factory setting:	Range:	Explanation:
Fr.Protect	+3	-30 ... +30	The exhaust air temperature (after the HRU), at which the HRU frost protection function prevents the temperature from dropping below the "Fr.Protect" setting by decreasing the heat recovery unit output.
Defr.Limit Pr->			
AHU max	180 Pa	10 ... 990Pa	Pressure difference limits measured above the heat recovery unit that activate HRU defrost (frost prevention) and drive the HRU to defrost output. During defrost the AH unit runs at minimum output (see p. 40). The HRU defrost limits of the AC freq. converter controlled AH unit change steplessly in proportion to the AH unit output. Contactor controlled AH units: AH max = 1/1 output, AH min = 1/2 output.
AHU min	120 Pa	10 ... 990Pa	
Hysteresis	20 Pa	0 ... 100Pa	The hysteresis between the start and end of HRU defrost
PostDefrost	240s	10 ... 500s	The defrost function remains activated for the set delay time when the defrost command is deleted.
DefrostOutp	20%	0 ... 100%	Heat recovery minimum output during the defrost function. The defrost function is inhibited when the outdoor temperature is above +7°C
IdleTimePos	0%	0 ... 100%	Control of HRU output when the AH unit is shut down (set the cube HRU at 100% and other HRU's at 0%). Attention! Cleaning function: At the 0 setting the controller drives the HRU to maximum output and then back to 0 output if the HRU has been at 0 output for 6 hours when the AH unit is running (service hourmeter information). The recommended value for "cubic plate HRU" at the idle time position is 100 %.
Effic.Alarm	50%	0 ... 100%	Setting the HRU efficiency lower limit alarm. If the outdoor temperature is not 5°C colder than the exhaust temperature and if the HRU is not at maximum output the efficiency alarm function is not in use.

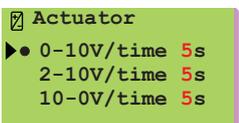
HRU TUNING VALUES



EH-105 HRU has PID control. Other HRU tuning is done only in exceptional cases.

	Factory setting:	Range:
P-area	30°C	5 ... 100 °C
I-time	80 s	10 ... 500 s
D-time	0.0 s	0.0 ... 5.0 s

HRU ACTUATOR SELECTION



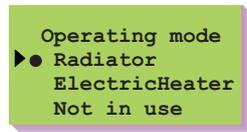
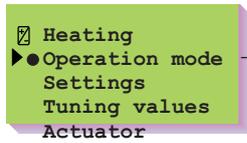
Select the HRU operating mode and set the drive time. The drive time is the time during which the HRU drives continuously from zero to maximum output.

The range is 5...150s. The ● character is at the selected control mode.



Heating functions are defined here. The controller activates heating if needed, so the desired supply air temperature is reached. A radiator or electric heater can be used for heating. With an electric heater solution the freezing protection function is not in use.

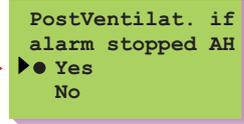
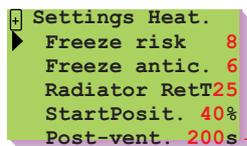
HEATING OPERATING MODE



Radiator: A radiator is used for heating.

Electric heater: An electric heater is used for heating. We recommend using an air flow detector with electric heater heating. When the alarm comes from a flow detector, SF filter PDE minimum pressure, SF fan PDS minimum pressure, or when an A-alarm is given, the electric heater output drops to zero.

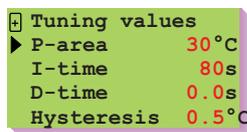
HEATING SETTINGS



The length of the AC frequency converters' deceleration time cannot be more than 30 sec. to ensure that start-up information coming to the controller leaves in time. Otherwise the controller interprets running as external control and generates a new post ventilation.

Setting:	Factory setting:	Range:	Explanation:
Freeze risk	8°C	5...50°C	The controller gives a freezing risk alarm and shuts down the supply air unit if the radiator return water temperature drops below the "FreezeRisk" setting. If the outdoor temperature is above +7°C, the freezing protection set value is +4°C if the freezing risk set value is below +20°C. The freezing risk alarm can be acknowledged when the temperature is above the set value + 10°C.
Freeze antic.	6°C	1...12°C	The freezing anticipate function opens the valve if the radiator return water temperature drops below the freezing risk set value + the freezing anticipate set value ("Freeze risk + "Freeze antic."). The anticipate function does not function if the outdoor temperature is above +7°C.
Radiator RetT	25°C	10...40°C	Radiator return water temperature during idle-time.
StartPosit.	40%	0...100%	The position that the start-up function drives the valve actuator in as the AH unit starts up. Is not in use with electric heater heating. The function is not in use when the outdoor temperature is higher than the freezing risk set value.
Post-vent	200s	0... 500s	Electric heater post-ventilation time. When the AH unit stops, the heat is turned off and the fans continue to run for the electric heater post-ventilation time.

HEATING TUNING VALUES

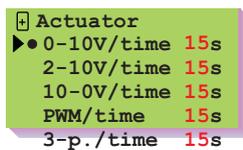


EH-105 heating has PID control. The hysteresis can be set if an electric heater is in use.

	Factory setting:	Range:
P-area	30 °C	5 ... 100 °C
I-time	80 s	10 ... 500 s
D-time	0.0 s	0 ... 5.0 s
Hysteresis	0.5 °C	0.3 ... 3.0 °C

HEATING ACTUATOR SELECTION

Only in radiator units
Only in electric heater units



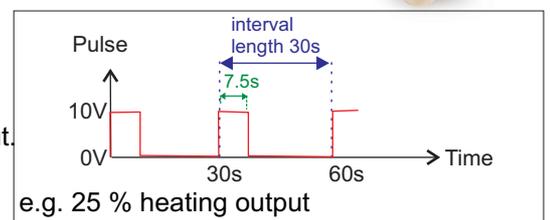
Select the valve actuator control mode and set the drive time. The drive time is the time during which the actuator continuously drives the valves from a closed to an open position. The range is 5...150s. The ● character is at the selected control mode. PWM start for the semiconductor relay 10VDC, time span 30 s, control ratio 1/100.

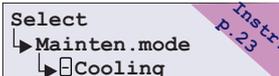


Note! Cascade control is not possible with 3-mode use.

Control of electric heater's solid state relay

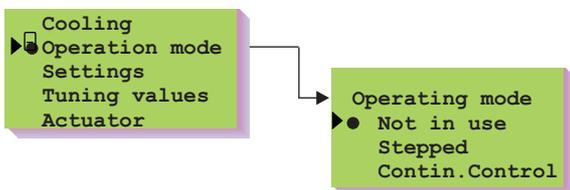
PWM output for SSR 10 VDC. Interval length is 30 s and control ratio is 1/100. Pulse length depends on controller-determined heating output. For example, if the controller-determined heating output is 25 %, pulse length is 25 % of interval length (25% * 30s = 7.5 s).





Cooling can be realized with the HRU and damper reverse summer function, night ventilation and mechanical cooling. On /Off type control (magnetic valves) or continuous control (glycol cooling) can be used with mechanical cooling. The cooling unit running permit can be obtained from strip connectors 42, 43 or 51 (activated in actuator selection, p. 41).

If you want to use night ventilation or mechanical night cooling, the outdoor temperature sensor must be installed outside (not in a fresh air channel) and the room temperature sensor inside (not in an exhaust air channel). The cooling step can also start up when the outdoor sensor is not connected.



Not in use: Mechanical cooling is not in use.

Stepped: Cooling blocks can be used in cooling. Each block is controlled by On/Off type magnetic valves. The magnetic valves are driven by 0...10VDC control (strip connector 64), by EHR voltage controlled relays or by EH-686.

Contin.Control: During continuous cooling the controller drives the cooling circuit's valve actuator by means of a 0...10VDC control output (strip connector 64).

Mechanical cooling starts up if:

1. the room temperature is higher than the room temperature set value set in the user level by at least the hysteresis between heating and cooling ("Heat/cool Hys"). (this requirement does not pertain to supply temperature controlled AH units).
2. the outdoor temperature is not below the set value that inhibits cooling (outd.inhibit) and
3. the cooling output is zero.

Mechanical night cooling starts up if the room temperature rises above the "Night cool." setting. The room is cooled during the night to the "Night cool." setting - 2°C. Night cooling is not in use at a setting of 0°C. The night cooling function is limited if mechanical cooling is blocked.

Night cooling and reverse summer function can be taken into use whether or not cooling is in use.

Night ventilation: The outdoor sensor must be connected (channel meas. is not adaptable for this purpose)

Night ventilation decreases the need for mechanical cooling by ventilating rooms with fresh outdoor air. Night cooling is not in use when "NightVentHys" is set at 0. During night cooling the fresh air dampers are completely open, the HRU is at minimum, the heat is turned off and the cooling unit does not run.

Night ventilation starts up if:

1. No other start-up commands are in effect, e.g., clock control (see AH unit running p. 7-8)
2. The room temperature is at least 1.5°C above the room temperature setting.
3. The outdoor temperature is below the room temperature by at least the night ventilation hysteresis ("NightVentHys")
4. The outdoor temperature is warmer than the night ventilation inhibiting limit (e.g., "NightVentStop"= +12°C, see p. 25)

Cooling with the HRU and/or damper reverse summer function:

The reverse summer function is taken into use in the operating mode menu of the control in question. With reverse summer function, the HRU is driven to maximum output and the dampers to the minimum position of cooling when half of the hysteresis between heating/cooling or at least 1°C is realized.



Select
 ↳ Mainten.mode
 ↳ Cooling

Instr. p. 23

Cooling is in use when it has been taken into use in the operating mode menu and its operating mode has been specified (see p. 38). Dropping the room temperature by other means than mechanical cooling; illustrated on page 33 and 38. (HRU and/or damper reverse summer function and night ventilation).

COOLING SETTINGS

Settings Cool.
 ▶ Heat/coolHys 2.5
 Outd.inhibit +7
 Night cool. 0°C

Setting:	Factory setting:	Range:	Explanation:
Heat/coolHys	2.5 °C	1.0 ... 5.0°C	The least amount that the room temperature must be above the day temperature setting so that cooling control begins.
Outd.inhibit	+7 °C	5 ... 50°C	The outdoor temperature below which cooling is inhibited.
Night cool.	0 °C	20 ... 50°C	The room temperature above which mechanical night cooling starts up. At the same time the AH unit automatically starts up at 1/1 output/ maximum output*. At a 0 setting, night cooling is not activated. The same cooling inhibitors limit night cooling and daytime cooling. Attention! An outdoor sensor must be installed outside (not in a fresh air channel) and the room temperature sensor inside (not in an exhaust air channel).

Hint! Example: ADP room night cooling enhances night ventilation. The controller starts up the AH unit and cools mechanically.

*) An AC freq. converter controlled AH unit is in use.

COOLING TUNING VALUES

Room controlled cooling Stepped control (magn. valves)

Tuning values
 ▶ P-room C. 3°C
 I-room C. 60min
 I-maxEffect 30%
 P-min limit 30°C
 I-min limit 40s
 ReverseDel. 3min

Room controlled cooling Continuous control

Tuning values
 ▶ Room comp.R. 3
 I-room C. 60min
 I-maxEffect 3°C
 P-supp.air 30°C
 I-supp.air 80s

Supply controlled cooling

Tuning values
 ▶ P-area 30°C
 I-time 80s
 ReverseDel. 3min

Tuning value:	Factory setting:	Range:	Explanation:
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Room controlled cooling, stepped control (magn. valves)

P-room C. 3 °C 1 ... 8 °C

Attention! The cooling period set value means the sum of the room temperature set value + the "Heat/cool Hys" set value.

With magnetic valve controlled stepped cooling, when the room temperature rises above the set value of the cooling period, actuator control begins to increase linearly in relation to the room temperature deviation, reaching 100% when the room temperature has risen above the set value of the cooling period by an amount equal to the P-area. A change in the unit's control direction is slowed down by the turn delay.

I-room C. 60 min 10 ... 120 min
I-maxEffect 30 % 0 ... 100%

When the room temperature rises 0.6°C above the cooling period set value, I-control is activated. I-control can change actuator control at the most by the "I-maxEffect" set value. The effect of I-control begins to decrease when the room temperature drops below a temperature equivalent to the room temperature during the cooling period + 0.3°C. The "I-maxEffect" setting is the P-amount when calculating the I-value

P-min limit 30 °C 5 ... 100°C
I-min limit 40 s 10 ... 500 s

When the supply air temperature (SuppMinCool) drops below the set minimum value, the supply air temperature minimum limit's PI-controller begins decreasing the actuator control. The effect of the minimum limit PI-control is set with "P-min limit" and "I-min limit" settings.

ReverseDel 3 min 1 ... 8min

Attention! The cooling period set value means the sum of the room temperature set value + the "Heat/cool Hys" set value.

When the supply air temperature (SuppMinCool) drops below the set minimum value, the supply air temperature minimum limit's PI-controller begins decreasing the actuator control after the reverse delay. When the supply air temperature exceeds the "SuppMinCool" temperature and the set reverse delay time has passed, the minimum limit's PI-controller begins ending control. The set reverse delay time is valid if the supply air temperature drops below or during the exit phase exceeds the set temperature value by at least 4°C. If the deviation is smaller, the reverse delay time is continued steplessly from 100%...0% with a deviation of 0.2°C...4.0°C.



Tuning value:	Factory setting:	Range:	Explanation:
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Room controlled cooling, continuous control:

Room comp.R.	3°C	1 ... 8°C	During continuous control the supply air temperature is reduced from the room temperature during cooling by an amount equal to room compensation for each degree of temperature exceeding the set value. If the room compensation ratio during cooling is smaller than the heating room compensation ratio during heating, the controller uses heating settings (p. 24).
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I-room C.	60min10 ... 120 min		When the room temperature rises 0.6°C above the cooling period set value, I- control is activated. I- control can decrease the supply air temperature at the most by the "I-maxEffect" set value. I- control begins to decrease when the room temperature drops below the cooling period room temperature + 0.3°C. I- control is no longer in effect when the room temperature drops below the set value of the cooling period. The "I-max effect" setting is the P-amount when calculating the I-value.
I-maxEffect	3°C	1 ... 8°C	

Attention! The cooling period set value means the sum of the room temperature set value + the "Heat/cool Hys" set value.

P-supp.air	30°C	5 ... 100°C	PI-control controls the cooling unit so that the supply air temperature remains at the temperature indicated by room control.
I-supp.air	80 s	10 ... 500 s	

Supply controlled cooling:

P-area	30°C	5 ... 100 °C	Continuous control: The supply air temperature is controlled by the PI control. Reverse delay is not in use.
I-time	80 s	10 ... 500 s	
ReverseDel	3min	0 ... 8min	

Stepped control (cooling control by magnetic valves):

When the reverse delay is set at 0, cooling functions as in continuous control. When the reverse delay time is given, control functions as follows: When the supply air temperature exceeds the supply air temperature set value and the set reverse delay time has passed, the PI-controller begins increasing the actuator control. When the supply air temperature drops below the set value, the supply air temperature's PI-controller begins decreasing the actuator control after the reverse delay.

The set reverse delay is in effect if the supply air temperature drops below or during the exit phase exceeds the set temperature value by at least 4°C. If the deviation is smaller, the reverse delay time is continued steplessly from 100%...0% with a deviation of 0.2°C...4.0°C.

COOLING ACTUATOR SELECTION

 Actuator
▶ ● 0-10V/time 90s
2-10V/time 90s
10-0V/time 90s

Cooling can be controlled by stepless continuous control (0-10V, 2-10V or 10-0V) or On/Off control. With On/Off control, the cooling output is controlled by the EHR, with the steps controlling the magnetic valves.

Select control mode. The ● character is at the selected control mode.

The running permit for the cooling unit can be obtained from the controller's strip connectors 42, 43 or 51. (Taking into use 24VAC On/Off outputs see p. 41)



Select
 ↳ Mainten.mode
 ↳ 24VAC controls

Instr. p. 23

- 24 VAC Controls
- ▶ Damper ON/OFF 51
- ExhaustDamper
- Heating open -
- Heat. closed -
- CoolRunPermit -
- Cooling pump -
- HRU pump -
- Heating pump -
- IndicatorLamp -
- ElHeatPermit -
- Regul.control -
- Night heat. -
- SmokeFireAl. -

EH-105 has three 24 VAC control outputs. This display shows if they are free or for what use they have been reserved. They are taken into use in this menu according to the directions given below.

Attention! The heating actuator output can be 3-point control (1-step AH unit) or the damper actuator output can be a 24 VAC On/Off output. The selections in question cannot be taken from use in this menu mode (see p. 34 and 37).

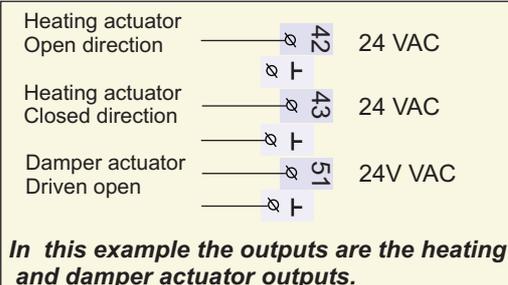
Attention! Outputs 42, 43 and 51 have continuous 24 VAC voltage if they are not reserved for any use that appears on the menu.

Press the button to move the cursor to the control that you want to use. Press **OK**. Press the - and + button to select the output by which 24 VAC control takes place (42, 43 or 51).

The ● character indicates which controls are in use.
 The - character indicates that the control in question is not in use.

24 VAC-controls	Explanation:
Damper On/Off	1-wire controlled On/Off damper actuator 24 VAC control. Taken into use in damper actuator selections.
Exh. damper	24VAC control, when the controller receives exhaust fan running information or the On/Off damper function opens the damper.
Heating open Heat. closed	1-step AH unit's 3-point controlled 24 VAC valve actuator control. Taken into use and removed from use in heating actuator selection. Connector 42 = opening, connector 43 = closing.
IndicatorLamp	Indicator light control of AH unit 1/1 (or Max) output control.
CoolRunPermit	24 VAC running permit for a cooling unit. Conditions: The AH unit must be running, the outdoor temperature must be higher than the cooling "Outd.inhibit" set value and actuator control is above 2%. Attention! The cooling unit running permit is deleted if actuator control of cooling has been at 0% for 20 min.
Cooling pump	Glycol cooling pump 24 VAC control. Pump control according to the above mentioned conditions.
HRU pump	HRU pump 24 VAC control. The pump runs when the AH unit runs and HRU control is above 2%. The pump stops when the AH unit is shut down or HRU control has been at 0% for 20 min.
Heating pump	Heating pump 24 VAC control. The pump runs when the outdoor temperature is below the cooling "Outd.inhibit" set value or the heating actuator control is above 2%: The pump stops when the heating actuator control has been 0% for 20 min. with the outdoor temperature above the "Outd.inhibit" set value.
ElHeatPermit	Permit from the controller to use the electric heater for heating while the AH unit is running.
RegulControl	24 VAC is not realized if only switch control starts up the AH unit. 24 VAC control is realized when the controller's automatic, timer or continuous control starts up the AH unit. Use: opening of all after-treatment dampers.
Night heat.	24 VAC control when AH unit is running on night or preheating function.
SmokeFireAl.	The control of the smoke damper. When the smoke alarm or supply /exhaust fire risk alarm is alarming 24 VAC control is disconnected.

Automatic interval use:
 If the controller has stopped the cooling pump, HRU pump or heating pump, the pumps are run for 5 minutes every 24 hours from 03:00 03:05 A.M. This function prevents the pumps from becoming stuck.





Select
 ↳ Mainten. mode
 ↳ Measur. 1-6

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Measurements 1-6 are NTC measurements that are connected to Ouman temperature sensors. These measurement channels can also be used to receive On/Off information (see On/Off input selections p. 44). NTC measurements 2 - 6 have a range of -30 ... +100 °C. Outdoor temperature measurement is always connected to measurement 1.

TAKING INTO USE AND REMOVING FROM USE:

Press the button to move the cursor to the measurement that you want to take into use. Press **OK**. The cursor blinks at measurement channel information (strip connector number). Press the - and + button to select which measurement channel the measurement will be connected to. Measurement channels 2 - 6 can be selected. Press **ESC** to exit. Press the - character to free a measurement channel that has already been taken into use.

- Measurements 1-6
- ▶ Outdoor temp 1
- Supply temp 2
- Exhaust temp 3
- Room temp. -
- Supply tempB -
- Room temp B -
- Return water 4
- Exh.aft.HRU -
- SupplyAft.HRU -
- RemoteSetPot -
- FreeMeasur. -

The - character indicates that the control in question is not in use.

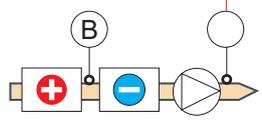
Name change
 FreeMeasur
 Give new label

Name change
 FreeMeasur
 FreeMeasur

Labeling free measurements:
 See page 6.

ADDITIONAL INFORMATION ABOUT MEASUREMENTS 1 6:

On the display:	Explanation:	Range:	Measurement channel:
Outdoor temp	Outdoor temperature	-50 ... + 50	1
Supply temp	Supply air temperature	-30 ... +100	2 - 6
Supply temp B	Supply air temperature before the cooling cell (taking into account the process delay caused by the cooling cell during the heating period). The controller changes the "Supply tempB" sensor to be a controlling sensor when the "Supply temp" deviates from the "Supply temp B" by over 6 °C and the outdoor temperature is below the cooling "Outd.Inhibit" set value. Control switches back to the "Supply temp" sensor when the amount of deviation has been less than 5.5°C for 6 minutes.	-30 ... +100	2 - 6
Room temp.	Room temperature	-30 ... +100	1 - 6
Exhaust temp.	Exhaust air temperature	-30 ... +100	1 - 6
Room temp. B	Room temperature sensor 2 temperature (for computing the average)	-30 ... +100	2 - 6
Return water	Radiator return water temperature	-30 ... +100	2 - 6
Exh.aft.HRU	Exhaust air (or glycol) temperature after the HRU	-30 ... +100	2 - 6
SupplyAft.HRU	Supply air temperature after the HRU	-30 ... +100	2 - 6
FreeMeasur	Free temperature measurement, which can be labeled using the text editor	-30 ... +100	2 - 6
RemoteSetPot	Remote setting potentiometre: -Supply controlled and room controlled AH units	-5 ... +4	2 - 6



Use of NTC measurement channel for receiving On/Off inputs:
 Free NTC measurement channels (1-6) can also be used for receiving On/Off information. (Taking On/Off information into use, see p. 44)

Meas.1	Meas.2	Meas.3	Meas.4	Meas.5	Meas.6
1	2	3	4	5	6
∅	∅	∅	∅	∅	∅
∅	∅	∅	∅	∅	∅



Select
 ↳ Mainten.mode
 ↳ Measur. 7-11

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Measurements 7-11 are 0...10V transmitter measurements. They can be connected to pressure transmitters, CO2 content transmitters, humidity transmitters, and air flow transmitters. These measurement channels can also be used to receive On/Off information (see On/Off input selections p. 44)

TAKING INTO USE AND REMOVING FROM USE:

Press the button to move the cursor to the measurement that you want to take into use. Press **OK**. The cursor blinks at measurement channel information (strip connector number). Press the **-** and **+** button to select which measurement channel the measurement will be connected to. Measurement channels 7-11 can be selected. Press **ESC** to exit. Press the **-** character to free a measurement channel that has already been taken into use.

Taking transmitter measurements into use:

- Measurements 7-11
- ▶ Room temp
 - SF press 8
 - EF press 9
 - CO2 content -
 - Rh/pot -
 - SF flow -
 - EF flow -
 - SF filterPDE 10
 - EF filterPDE 11
 - HRU frostPDE 7
 - SF Fan PDE -
 - EF Fan PDE -

Transmitter area

▶ 0V = 0 °C
 10V = 50 °C

Set a temperature (-20...0°C) that corresponds to a 0V transmitter message and set a temperature(0...100°C) that corresponds to a 10V transmitter message.

Transm. / Max Pa

▶ ● 0-10V 500Pa
 2-10V 500Pa
 4-20mA 500Pa

Press the button to select the transmitter output message. Press **OK**. The ● character indicates what has been selected. Press the **-** and **+** button to set the amount of pressure (Pa) at which the transmitter gives a maximum message (10V or 20mA). Attention! Each pressure transmitter measurement has its own settings.

Transmitter area

▶ 0V = 0 ppm
 10V = 2000ppm

Set which ppm content gives a 0V transmitter message and which gives a 10V transmitter message. The range is 0 ...2000 ppm.

Transm. / max m/s

▶ ● 0-10V 10.0
 2-10V 10.0
 4-20mA 10.0

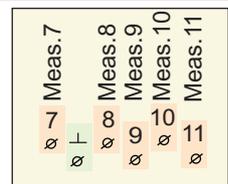
Press the button to select the transmitter output message. Press **OK**. The ● character indicates what has been selected. Press the **-** and **+** button to set the volume of air flow (m/s) at which the transmitter gives a maximum message (10V or 20mA). The range is 0.0 ...10.0 m/s.

Attention! If an mA-transmitter is used, approx. a 500 Ω parallel resistance must be connected to the measurement input.

ADDITIONAL INFORMATION ABOUT TRANSMITTER MEASUREMENTS 7-11:

On the display:	Explanation:	Range:
Room temp	Room temperature	-20...+100°C
SF press	Supply air pressure (Measurement filtering: 30s time constant)	0 ... 990Pa
EF press	Exhaust air pressure (Measurement filtering: 30s time constant)	0 ... 990Pa
CO2 content	CO2 content of air	0 ... 2000 ppm
Rh/pot	Room air humidity percentage or remote setting potentiom.(transmitter 0 ...10V)	0 100%
SF flow	Supply air flow speed (used for flow detector function)	0.0 ... 10.0 m/s
EF flow	Exhaust air flow speed (used for flow detector function)	0.0 ... 10.0 m/s
SF filterPDE	Pressure difference over supply air filter	0 ... 990Pa
EF filterPDE	Pressure difference over exhaust air filter	0 ... 990Pa
HRU frostPDE	Pressure difference over the HRU. The controller switches on defrost on the basis of measurement information, if needed.	0 ... 990Pa
SF Fan PDE	Pressure difference over the supply fan or the air flow measurement ring	0...5000Pa
EF Fan PDE	Pressure difference over the supply fan or the air flow measurement ring	0...5000Pa

Use of transmitter measurement channel for receiving On/Off inputs:
 Free transmitter measurement channels (7-11) can also be used for receiving On/Off information. (Taking On/Off information into use, see p. 44)





EH-105 has seven digital inputs that can receive contact information about AH unit operation. (e.g., information about what state the AH unit is in when it is running or On/Off alarm information). Contact information can also be connected to NTC and transmitter measurement channels that have not been connected; they are taken into use for this purpose here.

The symbol indicates which control the contact information is connected to.

- AHU fan
- Cooling
- Closing contact
- Heating
- HRU
- Opening contact

- ON/OFF inputs:
- 1/1PowerSw
 - 1/2PowerSw
 - AUTO Switch
 - Emerg. Stop
 - SF 1/1 run 21
 - SF 1/2 run 22
 - EF 1/1 run 23
 - EF 1/2 run
 - SF fConvOver
 - EF fConvOver
 - SF fan PDS
 - EF fan PDS
 - Pumprun
 - MainPumpRun
 - Pump run
 - Pump run
 - Pump run
 - SF 1/1TRela
 - SF 1/2TRela
 - EF 1/1TRela
 - EF 1/2TRela
 - Pump T Relat
 - Pump T Relat
 - Pump T Relat
 - FrostPDS1/1
 - FrostPDS
 - FrostPDS1/2
 - SF filt.PDS
 - EF filt.PDS
 - Smoke alarm
 - Temperat. 2
 - ElHeatOverh
 - Water press
 - Glyc.press
 - Rotat.Alarm
 - Unit alarm
 - ElHeatEmrgS
 - ElHeatPerm.
 - Mainten.SOP
 - GenAlClose
 - GenAlClose
 - GenAlarmOpen

TAKING INTO USE AND REMOVING FROM USE:

Press the button to move the cursor to the On/Off input that you want to use. Press **OK**.

The character blinks. Press the **-** and **+** button to select the digital input (21-27) or measurement input (1-11) that you want the On/Off information in question connected to. Exit from this mode by pressing **ESC**.

AHU output drop from maximum

- Enabled
- Disabled

: Is the drop from maximum to minimum output enabled when the clock controls the AH unit to maximum output?

AH start after alarm is deactiv

- No acknowledg.
- After acknowl.

Note! The factory setting for the Emerg.Stop-information is AH start after acknowledgement.

AH start after alarm is deactiv

- No acknowledg.
- After acknowl.

The AH unit starts up 5 min. after the alarm has disappeared without it being separately acknowledged. Attention! Make sure that the pipe work is short enough so it has time to warm up after a 5 minute delay and there is no freezing risk, See p. 47.

Alarm situation:

- Dampers open
- Dampers close

Name change

- GenAlarmOpen
- Give new name

You can label a general alarm. Directions for using the text editor are outlined on page 6.

Attention! Only those On/Off input functions illustrated here are in effect that have been taken into use by a connection point number.

In AC freq. converter controlled AH units, Min and Max indicate AH unit outputs.



On the display:	Explanation:
-----------------	--------------

AH unit control by switches or press buttons (closing contact) connected to the controller:

- C
1/1 (1/2) PowerSw
MIN (MAX)PowerSw
The AH unit is driven to the desired output by external switches or press buttons (bypasses the clock program). The running time is given in the maintenance mode that sets the amount of time the AH unit is at the output in question after the press button is depressed or the switch is freed.
- C
Auto switch
Information about automatic control from an external hand switch. If there is no switch information, the AH unit can only be started up by external switches 1/1 or 1/2 or by an AC freq. converter's override switch (SF fConvOver/ EF fConvOver)
- C
Emerg.Stop
Contact information that switches on the EMERGENCY-STOP switch. Bypasses the clock program and other controls and ensures that the AH unit is shut down by interrupting the relay 3 locking circuit (opening contact). Restart after the alarm disappears according to the choice "No acknowledg./After acknowl."

Running information about AH unit control and contradiction alarms (see p. 17):

- C
SF 1/1 drift
EF1/1 drift
Running information about AH unit fans.
- C
SF drift
EF drift
Running information about AC freq. converter controlled AH unit fans (closing switch info). Running period control begins when SF running information is received. SF and EF running information is also used to give contradiction alarms and EF running information is used to give deviation alarms when contradiction alarms have not been selected.

- C
SF fConvOver
EF fConvOver
AC freq. converter override (e.g., AC freq. converter maintenance). The controller drives the AH unit to max. output and gives an AC freq. converter override alarm.

- C
SF fan PDS
EF fan PDS
Fan pressure difference switch information. A contradiction alarm is given regardless of the AH fan alarm selection (Actuator alarm/AH fans selection, p. 32) if the SF or EF pressure difference switch contact is open 30 s after SF running information (on/off input or strip conn. 81) is received. A contradiction alarm is also given by the Actuator alarm/AH fans/ContradicAlrm selection if running information has not been received and the SF or EF pressure difference switch contact closes.

- +
Pump run
AH unit heating pump running information. The controller gives a pump alarm (stops the AH unit) if pump running information is not received (no pump alarm if the controller has stopped the pump).

MainPumpRun AH network main heating pump running information. The controller gives a pump alarm without an additional alarm (shuts down the AH unit), when the outdoor temperature is below +12 °C and main pump running information is not received. An additional alarm is not given after a pump alarm.

AH start after alarm is deactiv
 ► No acknowledg.
 After acknowl.

"No acknowledg" selection: when the outdoor temperature is below +12 °C, the AH unit starts up 5 min after the alarm disappears if the heating actuator is 20% open(at the most) and the return water temperature is above the "Radiator RetT" set value -3°C. If the outdoor temperature is above +12°C when the alarm disappears, the AH unit starts up immediately.

- +/-
Pump run
HRU pump running information. The controller gives a pump alarm if HRU pump running information is not received while the AH unit is running and the controller has not stopped the pump.

- **Pump run**
Cooling pump running information. A pump alarm is given if the AH unit is running and the controller has given a cooling permit and running information is not received from the cooling pump.

Contact information from the temp. relay (from the overload protector) for alarms, AH unit shut down or speed changes:

- C
SF 1/1 TRela
SF 1/2 TRela
EF 1/1 TRela
EF 1/2 TRela
Alarm information from the AH unit fan's temp. relays. If the supply fan or exhaust fan temperature relay is triggered (the contact closes), a temperature relay alarm is given and the AH unit is shut down. Exception; two-speed units whose controller given control changes from 1/1 to 1/2 if the SF 1/1 or EF 1/1 temperature relay is triggered (temperature relay alarm is given regardless). (In AC freq. converter controlled AH units:SF TRela, EF TRela)



On the display:	Explanation:
+ Pump T Rela	Contact information from the heating pump's temperature relay. When the contact closes, the controller gives an alarm and the AH unit shuts down.
+/- Pump T Rela	Contact information from the HRU pump's temperature relay. When the contact closes, the controller gives an alarm.
- Pump T Rela	Contact information from the cooling pump's temperature relay. When the contact closes, the controller gives an alarm.

Contact information from the HRU's pressure switch for starting the HRU defrost function:

+/- Frost PDS 1/1 Frost PDS Frost PDS 1/2	Information from the pressure difference switch as the HRU's defrost limit is exceeded with the unit running at the output in question. The contact for the PDS switch closes when the HRU defrost limit is exceeded. Attention! If one pressure difference switch is used in 2 output AH units, it is connected to the 1/1FrostPDS input. (AC freq. converter controlled AH units: connect Frost PDS)
---	--

Contact information from the filters for the filter impurity alarm:

↻ SF filt. PDS EF filt. PDS	Contact information from the supply air unit's filter pressure difference switch. When the contact closes, the alarm is given. Clean or change the filter.
--------------------------------	--

Other contact information:

↘ Smoke alarm	Smoke alarm information (open contact) shuts down the AH unit (electrically heated AH units do not have post-ventilation). In the event of an alarm the dampers remain in the selected position.
Temperat. 2	Contact information from an external temperature selector switch. When the contact is closed, the desired switch "Temp. 2" set value is in effect. (The desired temperature is given in the user level settings, "Temp. 2").
+ EIHeatOverh	Electric heater overheating alarm. When the contact closes an alarm is given and after the post-ventilation period the AH unit is shut down. The electric heater overheating protection may also have to be acknowledged by the electric heater. Check AH unit function. A power failure may cause a false overheating alarm, because the electric heater post-ventilation has not occurred.
+ Water press	AH heating network's water pressure lower limit alarm. In the event of an alarm, the AH unit is shut down if the outdoor temperature is below +12°C. Start after the alarm disappears according to the choice "No acknowl./After acknowl" as with the Main Pump-function.
+/- Glyc.press	Information from the pressure switch about the glycol pressure in the glycol cell HRU dropping too low or going too high. The contact closes and the controller gives an alarm.
+/- Rotat.Alarm	Contact information from the rotating HRU control center. The contact closes and the controller gives an alarm. Check HRU function.
- Unit alarm	Cooling unit alarm. The contact closes and the controller gives an alarm. Check cooling unit function.
↘ EI Heat EmrgS	Alarm information from the electric heaters emergency protection. When the contact closes, the AH unit is shut down without the postrunning to the stand-by -stage. The electric heater is forced to zero and an alarm is given
↘ EI HeatPerm.	When the electric heaters overheating protection is desired to connect to function without the alarm and the AH unit stop it is connected into this function. The contact is closed: electric heater can heat, the contact is open: the heating stage output to electric heater is zero.
↘ Mainten.STOP	After the external contact information is closed the AH unit is shut down to Mainen.STOP- stage. AH units with electric heaters are shut down after the postrun. Is stronger than other outputs as long as the contact is closed. No alarm is sent, but in the main display is the text Mainten. STOP.
↘ GenAlClose	Contact information about an alarm. When the contact is closed an alarm is given. A maximum of two general closing alarms can be connected to the controller and they can be labeled using the text editor.
↘ GenAlarmOpen	Contact information about an alarm. When the contact is open an alarm is given. One general opening alarm can be connected to the controller and it can be labeled using the text editor.



```
Select
├─ Mainten.mode
│   └─ Special mainten
│       └─ Rstore settings
```

Instr. p. 23

```
Factory settings
└─ Rstore settings
    Operating code
    Reset alarms
```

```
Restore factory
settings?
└─ No
    Yes
```

Attention! When settings are restored, the items included in the function code stay in effect (see the "operating code" below).

RSTORE SETTINGS

Restoring factory settings:

- Eliminates clock programs
- Restores user level and maintenance level settings
- Restores maintenance level tuning values
- Selects automatic control for the operating mode
- Restores actuator output drive times to factory settings
- Eliminates bus measurements from use
- Erases telephone numbers and restores the factory settings to the modem settings.

OPERATING CODE

```
Operaton code
└─ o12H0m004125780
    000ijPZabcd0
    Modify
```

Hint! **Operation code**
The operation code can be made with the AH-105 configuration program.

The operation code includes the following information about controller settings:

- Temperature control mode
- AH fan control mode
- Control sequence operating modes
- Conditions for AH start-up in the event of an alarm
- Conditions for contradiction alarm
- Conditions for air handling enhancement and limiting
- Conditions for control actuator output
- 24VAC output settings
- Measurement and digital output settings

Changing the operation code:

Move the cursor to "Change" and press **OK**.

The operation code will reappear on the display. Press the **OK** button to move the cursor to the place you want in the function code. The cursor moves one character at a time. Press the **-** and **+** button to change the function code. Press the **ESC** button to move backward. Press the **↵** button to move from one row to the next.

RESET ALARMS

```
Reset alarms?
└─ No
    Yes
```

Clears the alarm buffers and alarm history

LOCKING CODE

```
Select
├─ Mainten.mode
│   └─ Special mainten
│       └─ Locking code
│           Header text
```

Ohje s. 23

```
Locking code
└─ Not in use
    In use 0000
```

EH-105 can be set into a mode here that prevents the user from changing settings but allows him to move in the menu and scan settings. Taking the locking code into use:

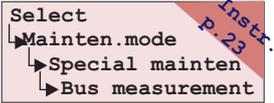
Move the cursor to "In use". The cursor blinks at the first number. Press the **-** and **+** button to select the locking code number you want. Press **OK**. Use the same principle to give the rest of the locking code numbers. Press **OK**. Press the **ESC** button to exit. After this, the controller always asks for the locking code if you want to change settings.

Attention! If no keys are pressed in 30 min. they will lock when the locking code has been taken into use.

HEADER TEXT

```
Header text
└─ Modify
```

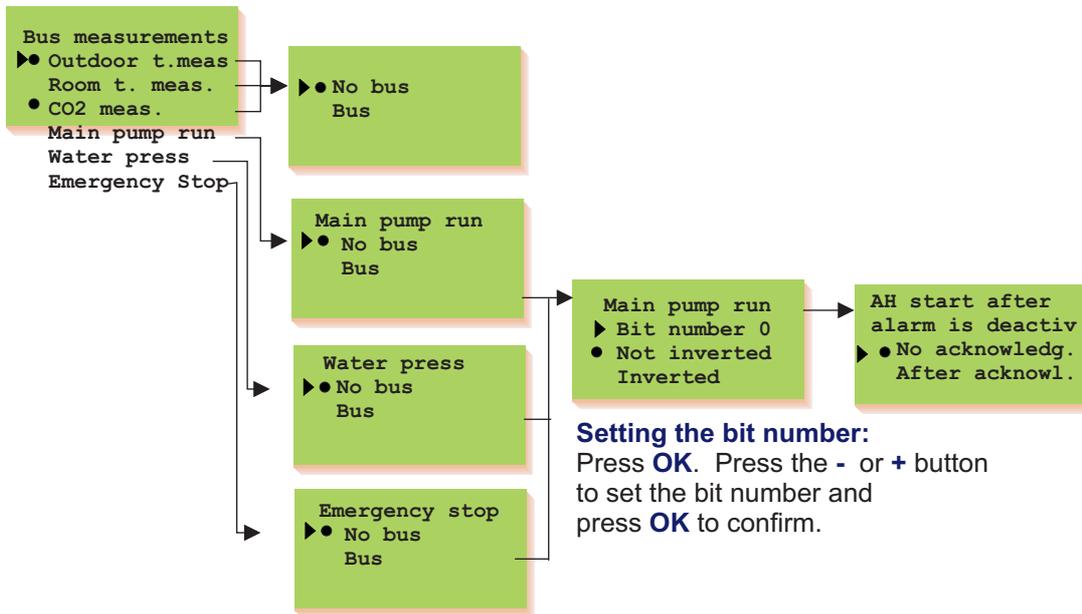
You can write with the text editor a scrolling header text, which can be seen in the controller's basic display. You can write e.g. the name of the object. You can write to Modify-line, acknowledge by pressing OK-button for a few seconds. You can remove the text on Modify-line by moving to the end of the text and removing the characters one by one with ESC-button. At last press OK-button a few seconds.



Ouman EH-105 has an LON-100 adapter card (optional equipment) which makes it possible to connect the controller to an LON field bus, and an EH-485 and a MODBUS-100 adapter card which changes the EH-105 controller's series traffic bus to be compatible with the RS-485 field bus. In this special maintenance mode you can select which measurement information is read via the bus.

Setting bus measurements:

Move the cursor to the measurement you want and press **OK**.
 If you want to select a series traffic bus for the measurement in question, move the cursor to "Bus" and press **OK**.
 The ● character indicates that the measurement information is read from the bus.



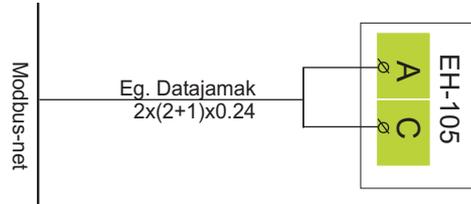
Setting the bit number:
 Press **OK**. Press the - or + button to set the bit number and press **OK** to confirm.



The Ouman EH-105 controller can be connected to the MODBUS, RS-485 or LON bus. When the EH-203 controller is connected to the bus, a (Modbus-200, EH-485, or LON-200 card) bus adapter card (optional equipment) is installed. Detailed instructions for installing and initializing the bus adapter card are provided.

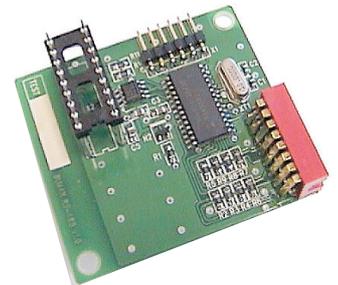
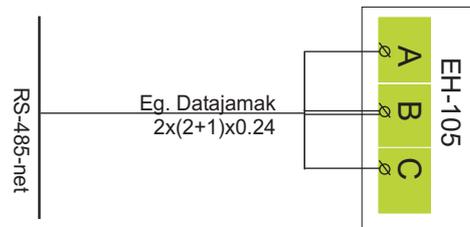
When connecting the controller to the LON-field bus, LON-bus initialization occurs in the controller's special maintenance mode. Other buses do not have to be initialized from the controller.

Connect the EH-105 to a MODBUS field bus:



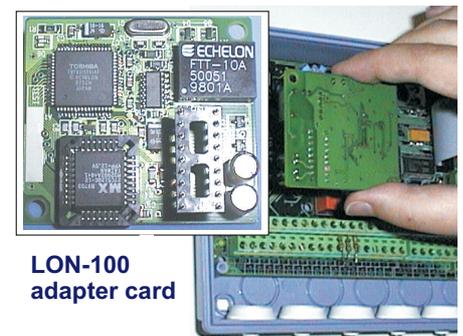
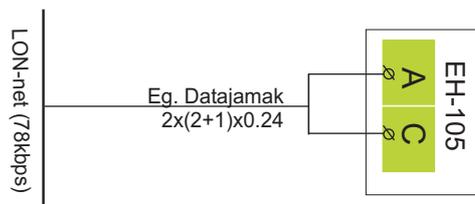
MODBUS-100-adapter card

Connect the EH-105 to a RS-485 field bus:

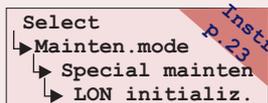


EH-485-adapter card

Connect the EH-105 to a LON field bus:

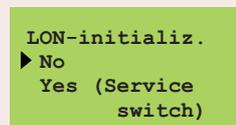


LON-100 adapter card

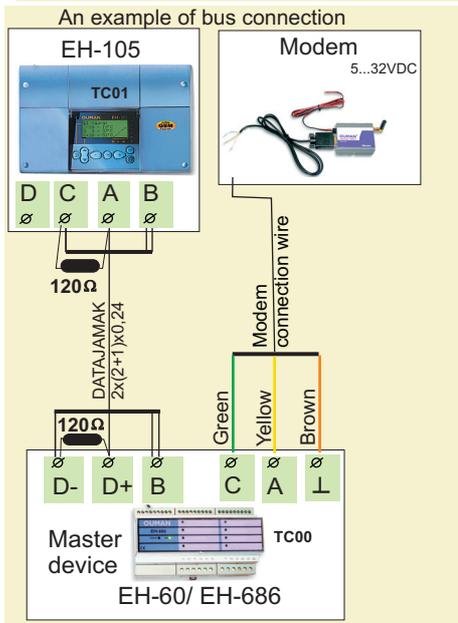
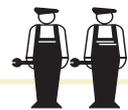


LON initialization:

Press the button to move the cursor to "LON initializ.". Press **OK**.

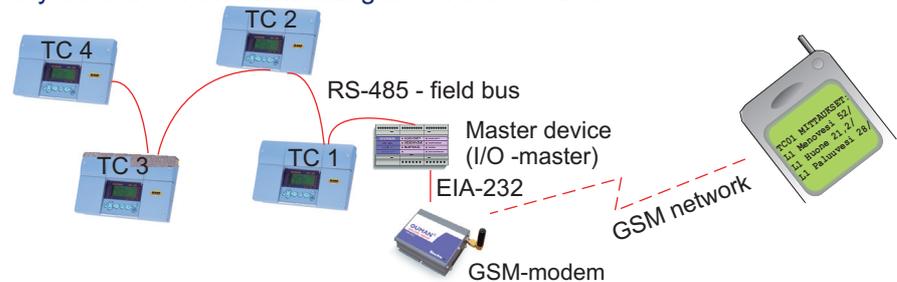


In this special maintenance mode you can control the Neuron processor's service pin which is on the LON-100 card so that the Neuron sends the bus its own identification (48 bit Neuron ID). This procedure is necessary when initializing EH-105 + LON-100 into the facility's LON net .



That which is presented on this page is in effect when a modem has not been directly connected to the controller. Communication occurs through the controller's RS-485 field bus. Many controllers can be connected to the system by using the EH-485 bus adapter card and a modem can be connected to the RS-485 field bus through the master device, EH-686.

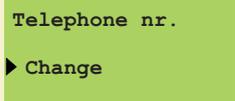
An EH-485 bus adapter card must be installed in the controller so that the EH-105 controller can be connected to the RS-485 field bus. (see installation and initialization guide in the instructions that come with the EH-485 card). Controllers that are connected to the bus are given a device ID (e.g., TC 1) so the system can identify which controller is being communicated with. The device ID always has to be written in front of the key word when communicating with the controller.



Installing receivers for alarm messages:

A GSM telephone can receive alarms and also acknowledge them. A telephone number is given here that the regulator automatically sends a text message to about an alarm in the event of an alarm.

At first the alarm message is only sent to GSM number 1. If the alarm is not acknowledged from this number, after five minutes the regulator sends a new alarm to both GSM numbers 1 and 2

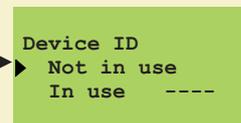


Press the button to move the cursor to "Change". Press **OK**. "O" blinks. Write the telephone number using the text editor. You can move forward or backward in the character

row with the + or - button. Confirm the number by pressing **OK**, then the same number that you selected will blink in the next space. Whichever has been selected last can be deleted by pressing **ESC**. If you press the **ESC** button for a while, the number will be deleted and the number that was previously fed will remain in effect. When you are ready, press **OK** for a while (over 2 secretary.).

Installing the device ID:

When an RS-485 field bus is used for text message connections, the regulators are identified using a device ID. The device ID which is 4 characters long and can be freely labeled using the text editor functions as address information. The device ID is given as follows.



Move the cursor to "In use". Press **OK**. "0" blinks. Write a device ID that has a max. of 4 characters by pressing the + or - button. Confirm the character by pressing **OK**.

Guide for Ouman/ Fargo modem initialization:

LED indicator light Modem mode/ instructions

LED is not on:
LED is on:

The modem is not on. Connect the modem to the network device.
The power is on but the modem is not ready to use. Inspect the following:
1. EH-60/EH-686 has the same PIN code as the GSM modem's SIM card PIN code. During initialization of the GSM modem the PIN code must be 0000.
2. After the modem is connected turn the power off and then on.
The modem is ready to use.

LED blinks slowly:
LED blinks rapidly:

The modem sends or receives messages. If a message does not come from the controller/controlling device, check the text message you have sent to see that the device ID and keyword have been written correctly. Also check that EH-60/EH-686 has the operator's message centre number of the GSM connection you have in use. Saunalahti connection is a default.
You can find specific instructions for connecting the GSM modem to a master device from the EH-60/EH-686 user manual under GSM modem initialization.



In order to communicate via text messages, the controller must be connected to a GSM modem (optional equipment). The modem comes with an adapter cable equipped with D-connector that is used to connect the Modem to the controller. The controller's strip connector B-D space is connected with a jumper wire.

GSM modem connection is done in start functions. The controller automatically initializes the GSM modem in two hour intervals. This prevents the GSM from becoming disconnected in the event of a power failure.

Installing receivers for alarm messages:
 Give a telephone number that the regulator automatically sends a text message to about an alarm in the event of an alarm. At first the alarm message is only sent to the GSM number 1. If the alarm is not acknowledged from this number, after five minutes the regulator sends a new alarm to both the GSM 1 and 2 numbers.

Telephone nr.
 Change
 Press the button to move the cursor to "Change". Press **OK**. "0" blinks. Write the telephone number using the text editor. You can move forward or backward in the character row with the **+** or **-** button. Confirm the number by pressing **OK**, then the same number that you selected will blink in the next space. Whichever has been selected last can be deleted by pressing **ESC**. If you press the **ESC** button for a while, the number will be deleted and the number that was previously fed will remain in effect. When you are ready, press **OK** for a while (over 2 secretary.).

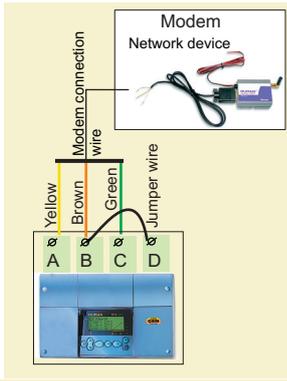
Device ID:
 The regulator can be given a device ID, which functions as the device's secret password and address information. The device ID can be freely labeled. The device ID is always written in front of the key word when using the GSM to communicate with the regulator.

Device ID
 Not in use
 In use 0000
 Move the cursor to "In use". Press **OK**. "0" blinks. Write a device ID that has a max. of 4 characters. The text editor has the letters A...Z and the numbers 0...9. You can move forward or backward in the character row by pressing the **+** or **-** button. Confirm the character by pressing **OK**.

Telephone nr.
 Change
Installing the number for the message center:
 Give the operator-specific message center number with **+** or **-** button. Confirm by pressing **OK**.

Installing the modem's PIN for the regulator:
 Give the SIM card's PIN code. The regulator will not initialize the GSM modem before the PIN code is installed. The SIM card has to be put in the GSM telephone to change the modem's PIN code. When you have changed the PIN code, install the SIM card back in the modem.

Modem type
 Falcom
 Nokia/Siemens
 Ouman/Fargo
Selecting the modem type:
 EH-203 is compatible with Falcom A2D, Nokia 30, Siemens M20T, Ouman and Fargo Maestro modems.



Guide for Ouman/Fargo Maestro modem connection and initialization:

LED indicator light	Modem mode/ instructions
LED is not on:	The modem is not on. Connect the modem to the network device.
LED is on:	The power is on but the modem is not ready to use. Inspect the following: 1. EH-105 has the same PIN code as the GSM modem's SIM card PIN code. 2. Perform the start-up function. To start-up, move to Start function. Press OK. Exit with ESC without changing settings.
LED blinks slowly:	The modem is ready to use.
LED blinks rapidly:	The modem sends or receives messages. If a message does not come from the controller, check the text message you have sent to see that the device ID and keyword have been written correctly. Also check that the EH-105 controller has the operator's message centre number of the GSM connection you have in use. The factory setting is a Saunalahti connection.

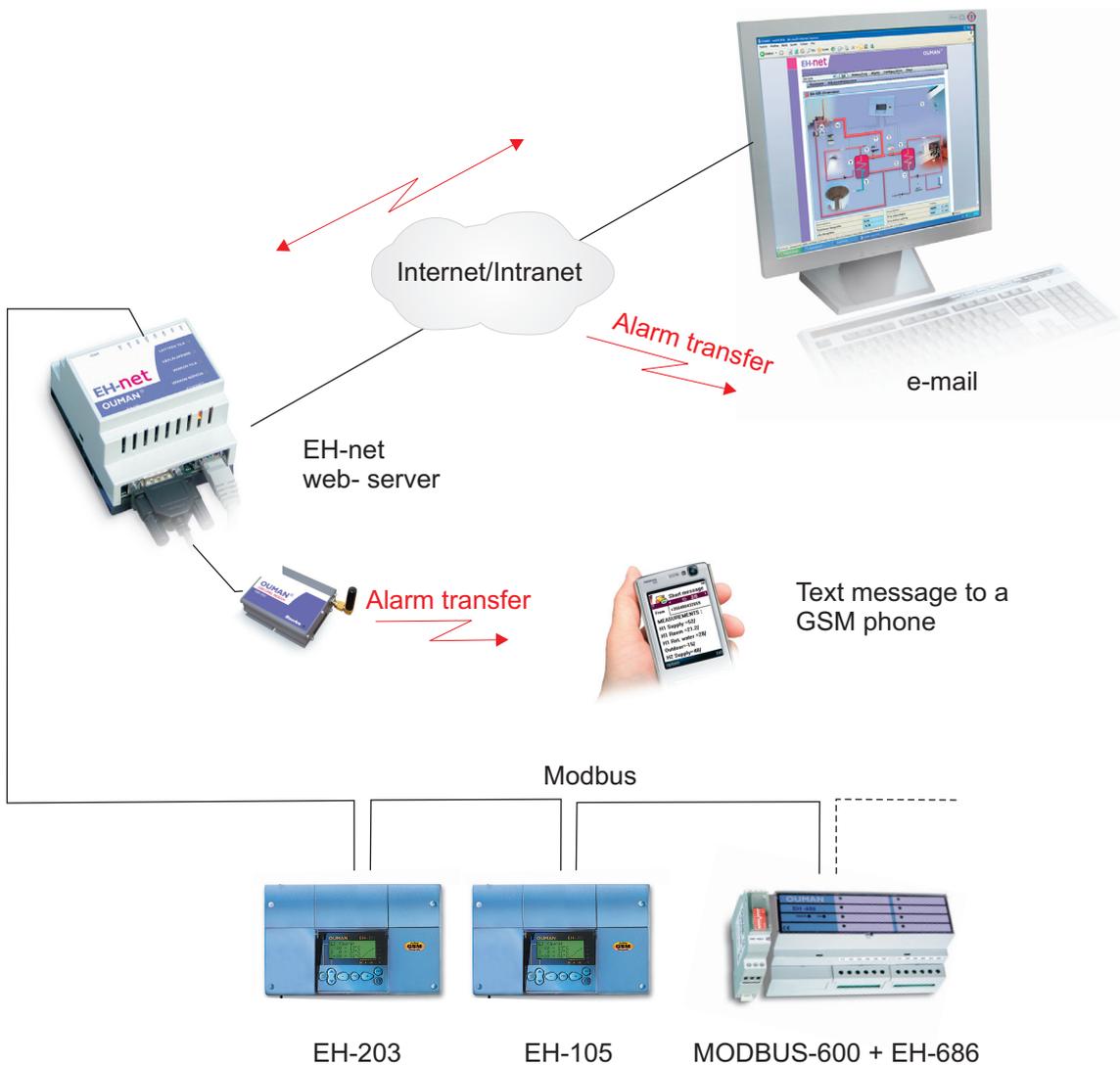
If a MODBUS bus adapter card (optional equipment) has been installed into Ouman EH-105 the controller can be connected to a browser-based user interface through the Modbus bus using the EH-net.

The EH-net can be connected to the public Internet network or to the local network, intranet. If the EH-net is connected directly to a public IP address, we recommend using a firewall device between the EH-net and the network.

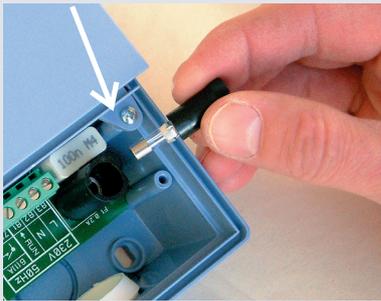
By using the browser it is possible to communicate with the EH-105 controller from any pc. Information from the controller can be read and changed from the pc. If desired, entry to certain functions can be limited or certain things can be hidden that can be security risks or which are not relevant.

If the controller gives an alarm, alarm information can be transmitted by e-mail. If a GSM modem is connected to the master device, alarm information can be transmitted as text messages to a GSM phone.

Specific instructions for installing the MODBUS into the EH-105 controller and initialization come with the bus adapter card. Instructions for network connections and initialization come with the EH-net master device.

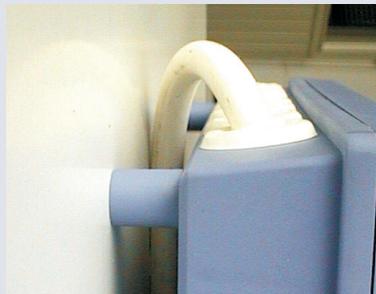


Changing the fuse:



Switch off the voltage from the controller. Press the fuse socket and turn it counterclockwise. Change the 0,2 A (5x20mm) glass tube fuse. Press and turn the fuse socket clockwise into place.

Spacers:



The cables can be routed between the controller and installation base when spacers are used to mount the controller.

Plugs:



Complete installation by pressing the plastic plugs into the screw holes.

EH-105 is fastened to its mounting base with three screws (two mounting points under the cover in the connection space and one in the installation bracket).

Cables can be brought for the controller from above (standard factory delivery) or from below. In addition, there are 6 cable through-holes in the bottom of the controller case which can be opened, e.g., with a screw driver. Then the cables can be brought into the connection space through the bottom.

Cabling from above: (standard factory delivery)



Cabling from below: (turn the keyboard/display unit)



Mounting guide:

Screw the controller to the wall using the installation bracket. Position the unit so it is level. Screw the controller firmly into place using two screws through the connection space.

If you want to bring the cables to the controller from below, you must turn the keyboard/display unit according to the following instructions.

Changing the cabling direction:



Remove the clear cover. Press as illustrated in the picture and pull the cover out of place.



Detach the keyboard/display unit carefully by prying it with a screwdriver.



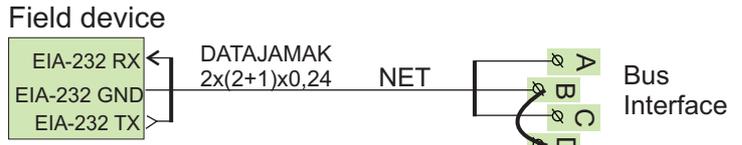
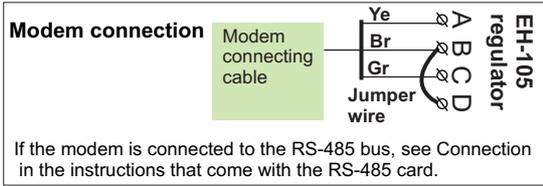
Turn the keyboard/display unit into the opposite position.



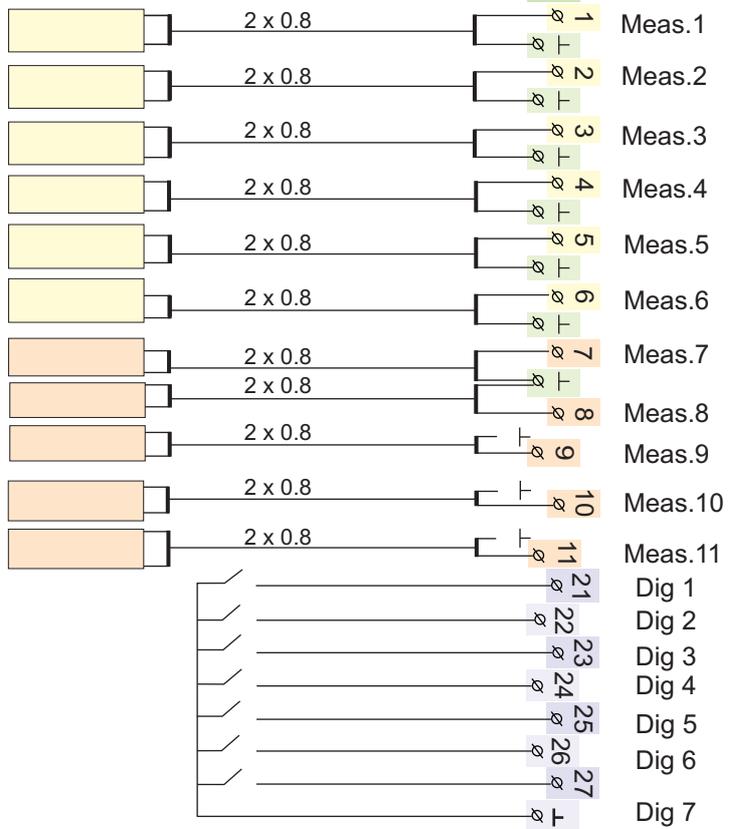
Press the keyboard/display unit carefully into place.

EH-105

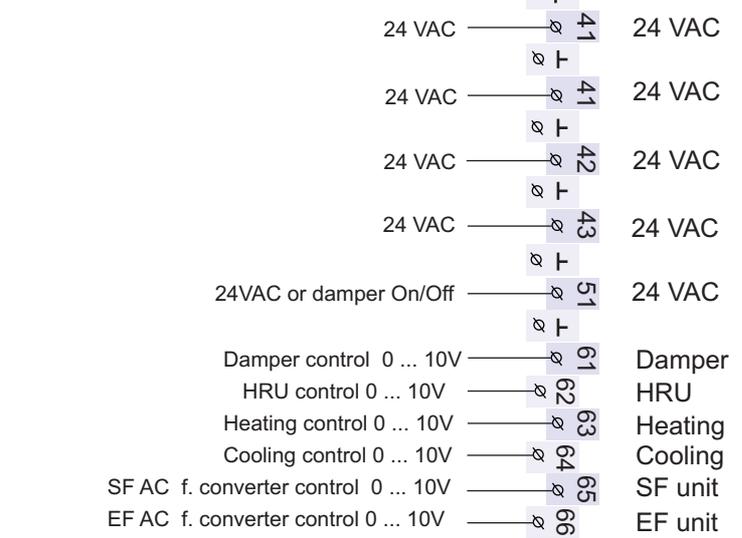
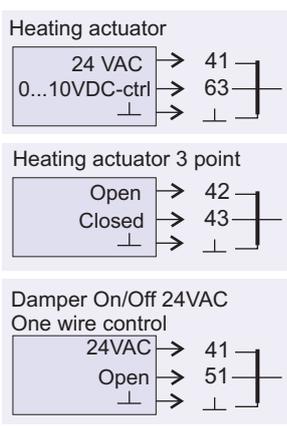
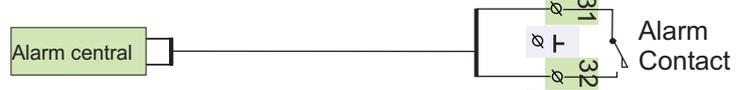
GENERAL CONNECTION GUIDE



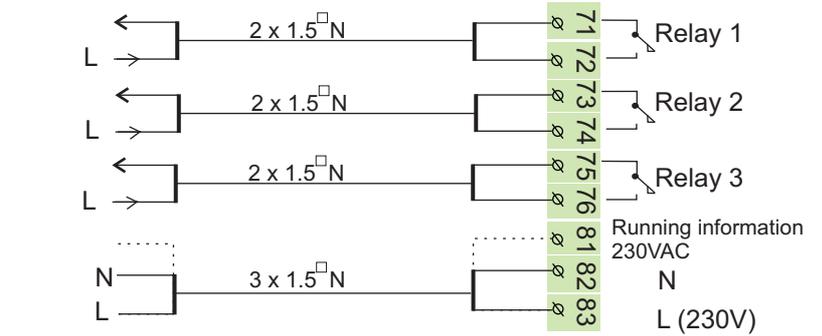
- Outdoor temperature or contact information
- NTC 10k or contact information
- 0...10V transmitter or contact information
- Contact information



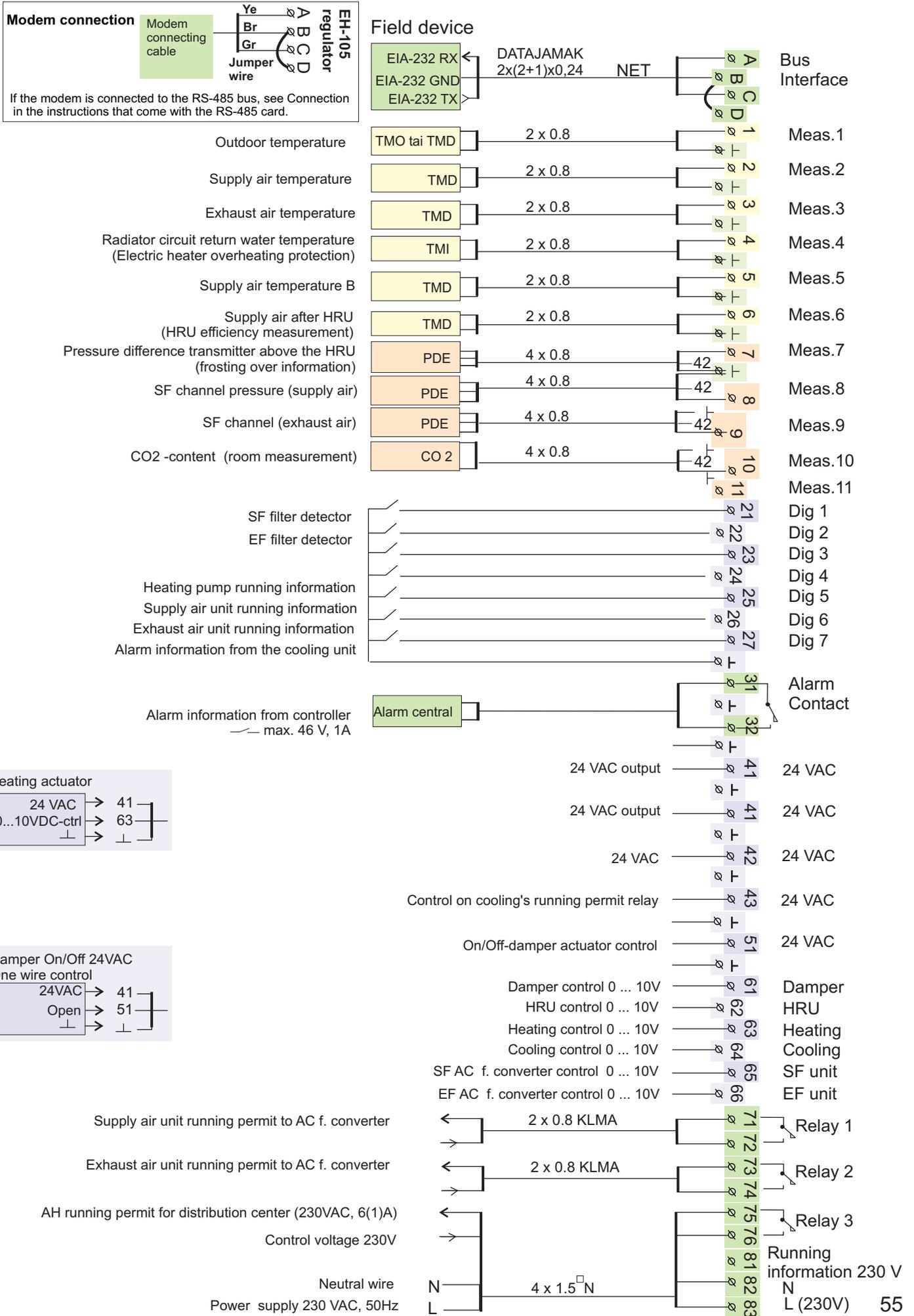
Alarm information from controller
 max. 46 V, 1A



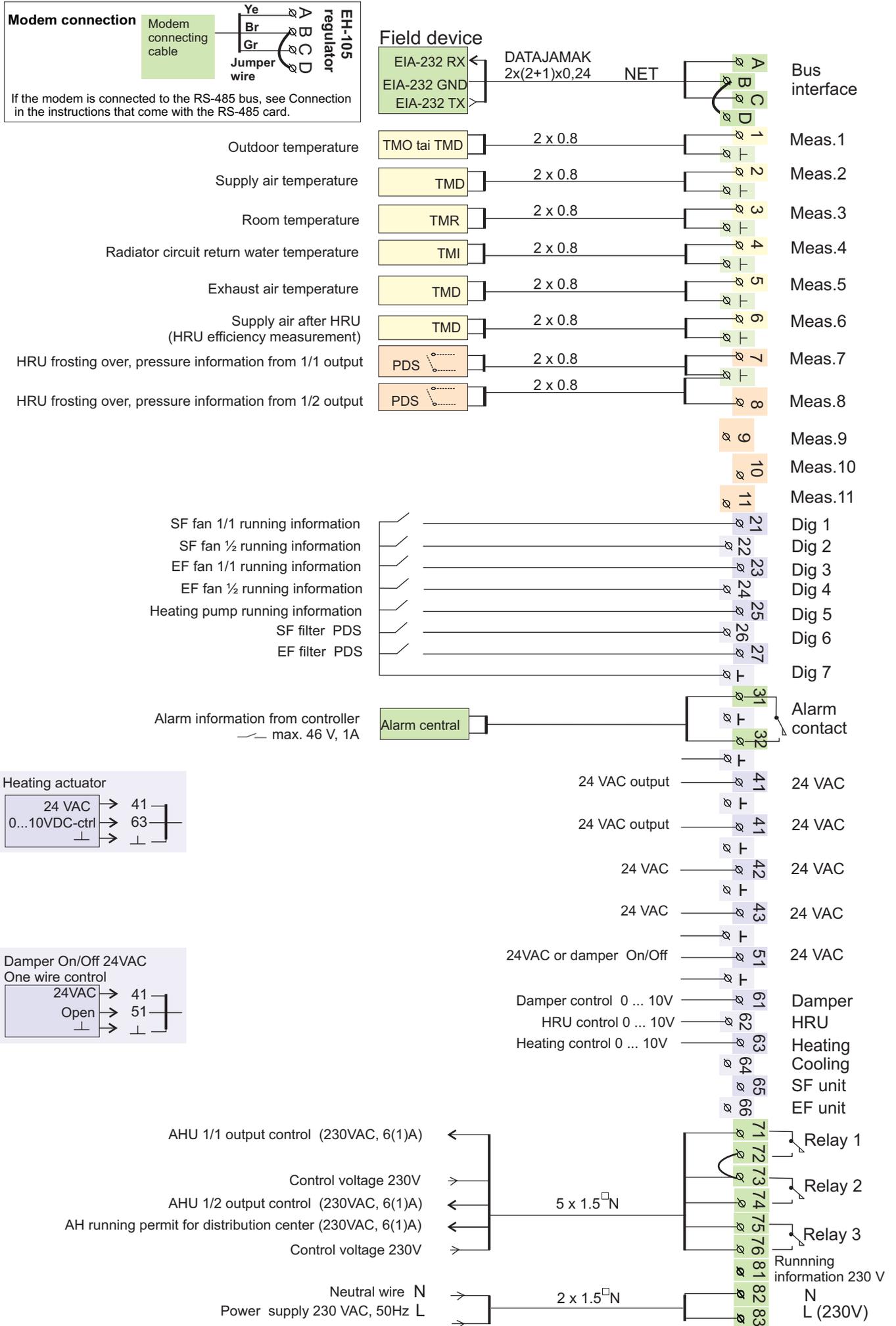
- 1/1 output control or SF AC f. converter running permit, R1 (230VAC, 6(1)A)
- 1/2 output control or EF AC f. converter running permit, R2 (230VAC, 6(1)A)
- AH running permit for distribution center (230VAC, 6(1)A)
- AH unit running information 230 VAC
- Neutral wire
- Power supply 230 VAC, 50Hz



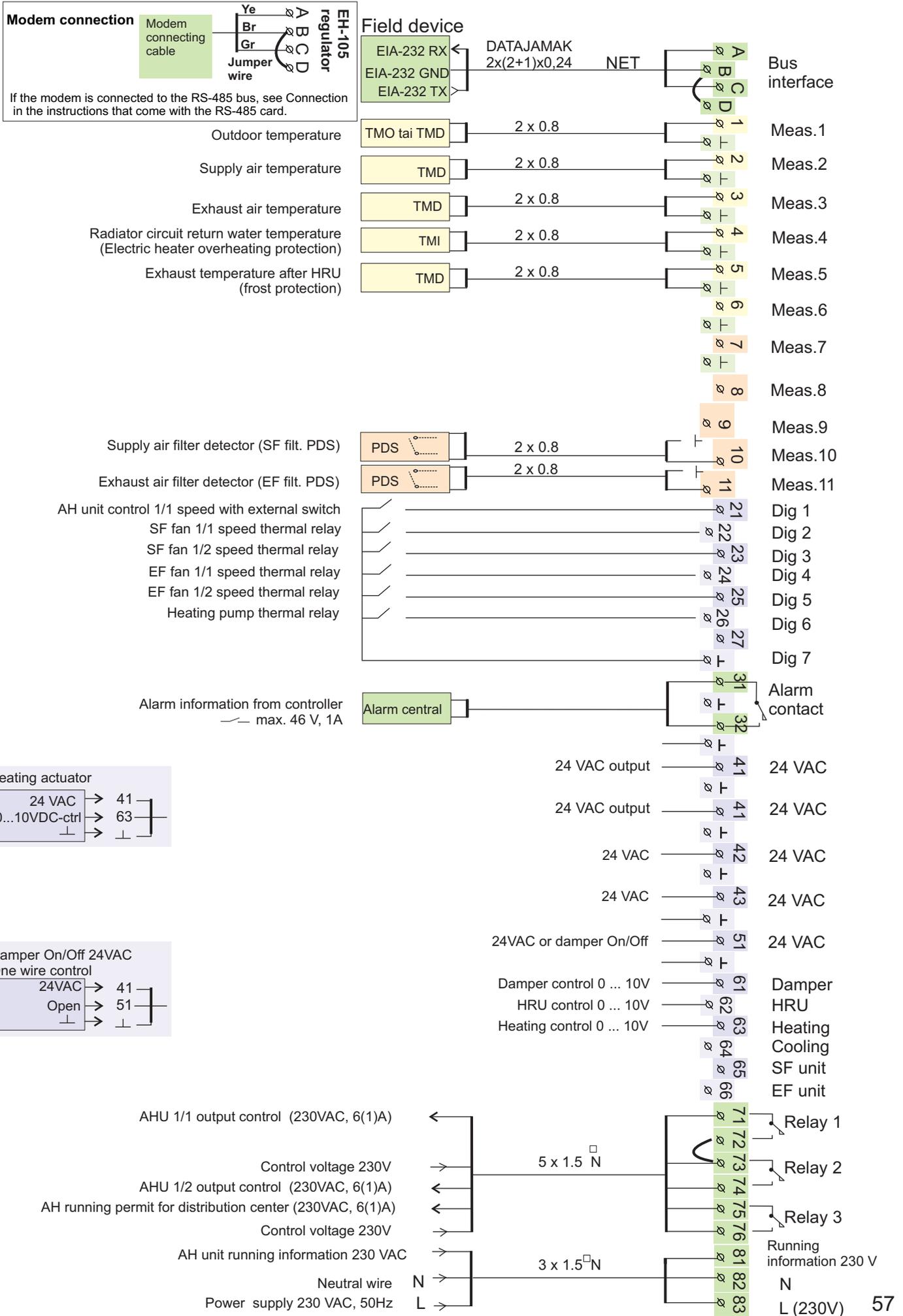
AC FREQ. CONVERTER CONTROLLED AHU WITH CONTRADICTION ALARMS

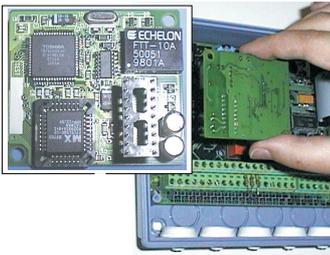


CONTACTOR CONTROLLED AH UNIT WITH CONTRADICTION ALARMS



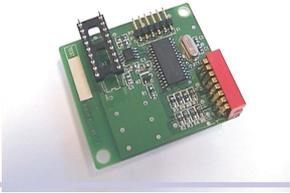
CONTACTOR CONTROLLED AH UNIT WITH THERMAL PROTECTION ALARMS





LON-100

LON -100 is an adapter card which changes the EH-105 series controller's serial communication bus so it is compatible with the LON field bus. An installation guide comes with the LON-100 adapter card.



EH-485

Ouman has an EH-485 bus adapter card available as optional equipment which makes the EH-105 serial interface compatible with the RS-485 field bus. This offers the choice of economically connecting the EH-105 regulator to the OuNet monitor or a GSM telephone.



MODBUS-100

MODBUS-100 is an adapter card which makes the EH-105 controllers' serial communication bus compatible with the RS-485 field bus. The physical interface to the field bus is galvanically isolated RS-485 network.



GSM-modem

When a GSM modem is connected to the controller a GSM telephone can be used to communicate with the regulator via text messages. Then the regulator can also be wirelessly connected to the monitor.



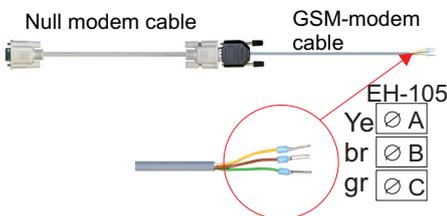
EH-686

An input/output unit which contains relays, analog and digital inputs as well as analog outputs. The unit makes it possible to carry out time controlled relay functions, transfer alarms using digital inputs and make an individual regulating circuit. EH-686 can also function as a master in the Ouman RS-485 bus by directing traffic in the bus.



TMR/SP

OUMAN TMR/SP is a remote setting potentiometer equipped with room temperature measurement. It can be used to change the EH-105 temperature setting $-5...4^{\circ}\text{C}$. TMR/SP also has a room temperature measurement that can be taken in use as needed either as an informative or compensatory measurement.



CC-PCDEV1

You may connect EH-105 directly to your computer with the CC-PCDEV1 jumper cable set. If you download Ouman Trend software from www.ouman.fi, you may collect measurement data from the controller and save it in your computer. You may examine measurement data as a graph either in real time or afterwards. The Ouman Trend SMS program is a simulator that you may use to make the same queries as via mobile phone. Ouman Trend is available in Finnish only.



PAN-200

You may connect EH-105 directly to your computer with the CC-PCDEV1 jumper cable set. If you download Ouman Trend software from www.ouman.fi, you may collect measurement data from the controller and save it in your computer. You may examine measurement data as a graph either in real time or afterwards. The Ouman Trend SMS program is a simulator that you may use to make the same queries as via mobile phone. Ouman Trend is available in Finnish only.

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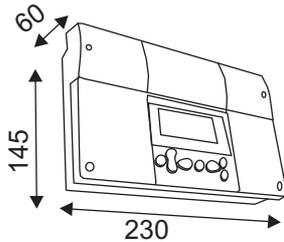
Operat. voltage 230 VAC, 50Hz, 0.2A

24 VAC output loading capacity: together 25 VA

Casing: PC/ABS

Protection class: without cover seal IP41

Measurements: (mm)



Weight: 1200 g

Cabling direct.: From above or below (turnable display and keyboard). Through holes on the bottom.

Operating temp.: 0...+ 40°C

Storing temp.: - 20...+ 70°C

Controller type: P, I and PID

Analog inputs: 11 pieces, which can be connected to :
6 NTC temperature measurements and
5 transmitter measurements (pressure, CO₂, humidity, air flow) or
they can all be connected to potential-free contact information (loading capacity 5VDC/0.5 mA)

Digital inputs: 7 pieces
The potential free contact is connected to the digital input (load 6...9 VDC/20mA)

230 VAC control inputs:1 running information

24 VAC control outputs:3 pieces

Voltage control outputs:6 pieces 0 - 10 or 2 - 10 VDC

Relay outputs: 2 pieces 230VAC 6(1)A or 24VAC/DC 6(1)A (resistive load 6A, inductive load 1A)
1 / 230VAC 6(1)A

Alarm relay outputs: 1 / 24VAC/DC 1A

Information transfer connection: Standard equipment: EIA-232C
Optional equipment:RS-485, MODBUS or LON

GSM-control readiness Yes; GSM use requires GSM modem.

Internet readiness: Yes; requirements include a Modbus-100 adapter card (optional equipment) for the controller, connection to the EH-net server via Modbus, and at least SEC1 level internet and data security

Approvals:
EMC-directive 2014/30/EU, 93/68/EEC EN
- Interface toler.: 50082-1
- Interf. emissions: EN 50081-1
Small voltage direct.: 2014/35/EEC, 93/68/EEC
- Safety EN 60730-1

Warranty 2 years

Manufacturer: Ouman Oy
www.ouman.fi



XM1191_EH-105_User manual_ENG_v.1.75_20170321

OUMAN

We reserve the rights to make technical changes.