

USER MANUAL

OUMAN S105

Compact Air handling unit controller



The Ouman S105 is a compact and versatile air conditioning controller designed to manage 1-5 stage air conditioners: dampers, cooling, heat recovery, heating and fan controls. It is suitable for both stepless frequency converter-controlled and fixed-speed contactor-controlled AH devices, including AH devices with a battery.

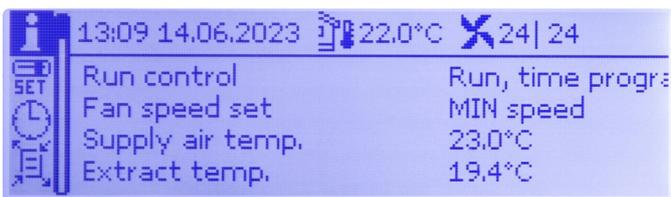
OUMAN S105

Compact Air handling unit controller

Ouman S105 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, humidity, air volume, channel pressure).

In addition to normal week/24 hour clock functions, S105 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.)

Main display



Control knob and OK



Press the control knob to enter the menu and accept the changes.



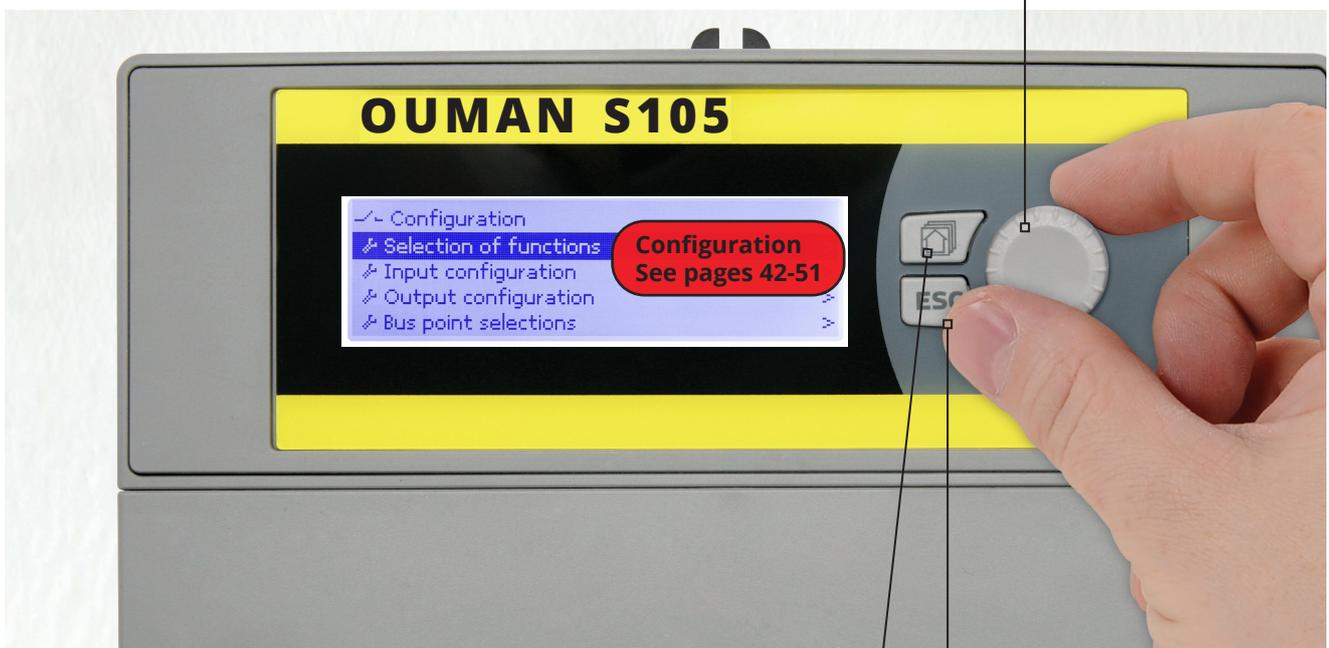
Rotate the control knob to navigate through the menu.



When the control knob is pressed down for an extended period of time, the hidden menus are displayed.

Explanation of the symbols appearing in the user manual

- This is a hidden setting value that you can make visible by long pressing OK.
- Changing the setting value requires a service code.



Info button: Pressing the info button will take you to the information view instantly. To return to the previous view, press the ESC button.

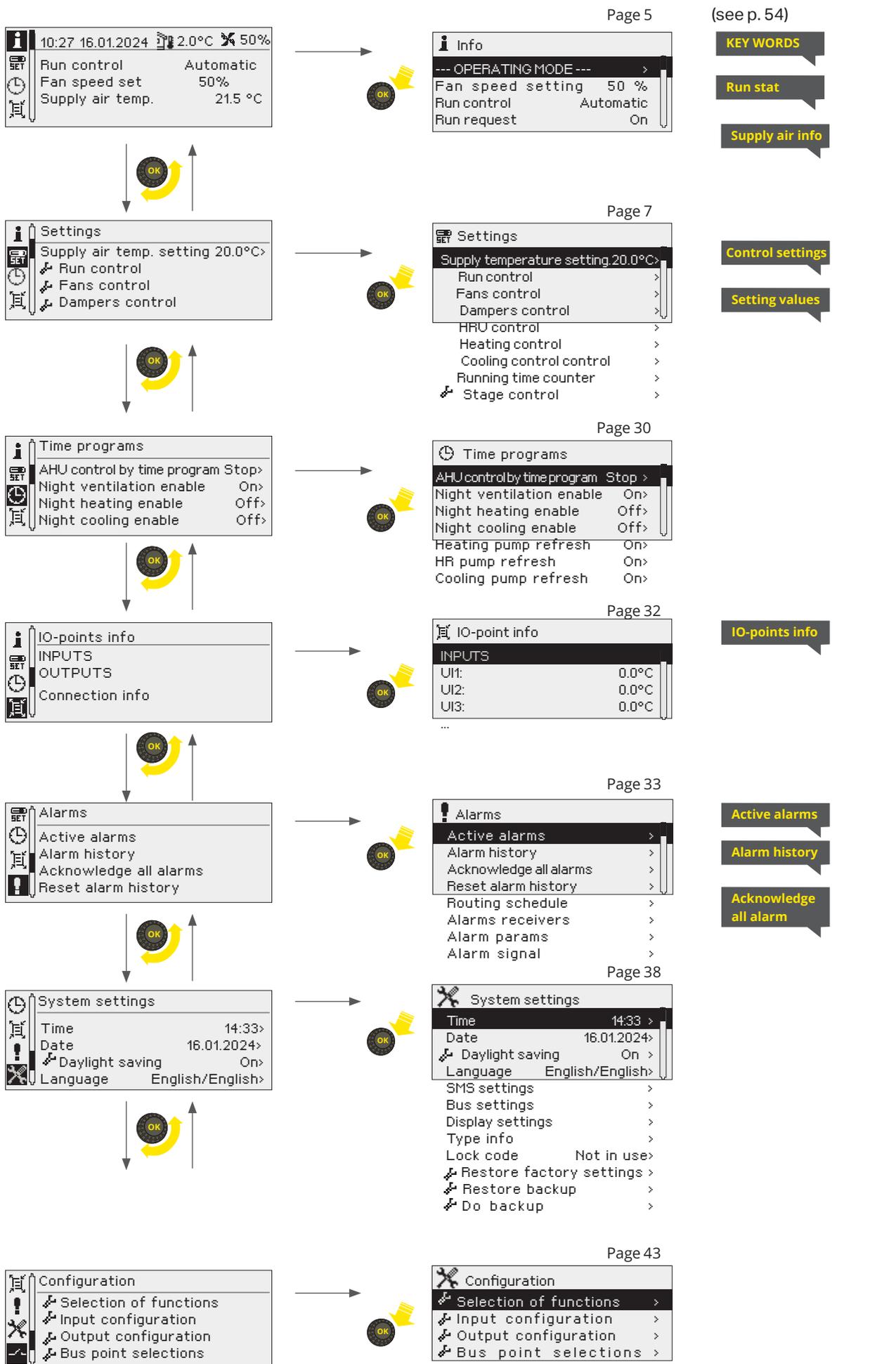
Cancel button

Holding the key down for an extended period of time returns the regulator to its basic mode. The display shows the basic view, the background light of the display dims and the keyboard locks if the locking function is in use.

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1 Menu structure



2 Info



Info	
--- OPERATING MODE ---	
Fan speed set	MIN speed
Run control	Auto control
- - - SUPPLY AIR - - -	
Room comp. effect	0.0°C
Min limit effect	0.0°C
Max limit effect	0.0°C
Calculated supply air setting 20.1°C	
...	

The information shown in the info view is categorized into **Operating mode, Supply air, Boosting/Limitation, and Step control.**

You can always access the info view directly by pressing the  button.

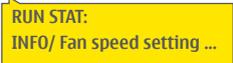
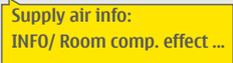
---	OPERATING MODE	---	Explanation
Fan speed set			The fan speed can be: stop; MIN speed, Low speed, Increased speed, or MAX speed. The speeds of 2-speed fans can be Stop, 1/2 ctrl and 1/1 ctrl.
Run control			Run control can be: Emergency stop, Post-running, Alarm stop, External timer, Manual control, Auto control, CO2 run request, Night heating, Night ventilation, Night cooling, Run Extern permit or Stopping.
Remaining run time h.min			When the fan is controlled by the timer, the display shows remaining time of the "Timer ON status duration" setting.
---	SUPPLY AIR	---	Information to display
			<ul style="list-style-type: none"> • Factors affecting supply air temperature control • Calculated setting value for supply air • Temperature measurement data: supply air and room/exhaust temperature • Information about whether the reverse function and cooling are enabled • Information about whether summer or winter control is enabled
---	BOOSTING/ LIMITATION	---	Information to display
			<ul style="list-style-type: none"> • Enhanced ventilation based on CO2 content • Enhanced ventilation based on air humidity • Enhanced ventilation based on room temperature • Limitation of ventilation based on outdoor temperature
---	STAGE CONTROL	---	Information to display
			<ul style="list-style-type: none"> • Information about cooling, heat recovery, damper and heating stage controls

The information displayed in the info can also be read using a text message.

KEY WORDS

If a GSM modem is connected to the S105 you can communicate with the controller by text messages using command words.

If the controller has a device ID in use, always write the device ID in front of the key word (example. Ou01 KEY WORDS or Ou01 ?). **Capital and small letters are different characters in the device ID!**

Text messages	Explanation
 	Send the following text message: Run stat.The reply message will show information about current fan speed setting, AHU control and run request.
 	Send the text message: Supply air info. The reply message will show information about effect of settings to the desired supply air temperature and setting value of room temperature and supply temperature.

2.1 Priority of the AHU control

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.

Priority	Running status	Explanation
STRONGEST		
I	'Run control' commands that bypass automatic and manual controls as well as external timer control	
	Service stop	After the controller's first setup, the 'Service Stop' mode is on until the user changes it. This mode also prevents the AHU from running.
	Emergency stop	When the "Emergency stop" input is activated, the AHU is stopped and the outputs are reset immediately. The alarm entry delay is 1 seconds, and the exit delay is 5 seconds. The alarm must be reset before the AHU can restart.
	Post-running	When the AHU receives a stop command, post-ventilation is performed in AHUs equipped with electric radiators before they stop.
	Alarm stop	Internal alarm in the program. The AHU stops due to a failure.
II	Run controls bypassing automatic control: Run controls bypassing automatic control:	
	External timer	External start control. The AHU starts in accordance with the "Timer-controlled speed" setting value. Control will be active in accordance with the "Timer ON status duration". (Settings -> Run control)
	Manual control	An option other than "Automatic" has been selected for run state control for the fan (Settings -> Run control -> AHU control) (more information on the next page).
III	The automatic control of the AHU includes follows controls	
	Automatic	The AHU is running in accordance with the time program. (Run control -> AHU control by time program. The same can be found in the time programs menu.
	CO2 run request	The function is activated from the "Start up acc.CO2 content" setting value (Run control -> CO2 run request) A "Start-up limit" and "Hysteresis" can be set for start-up. The AHU starts in accordance with the "Fan speed" setting value.
	Night heating	The function is activated from the "Night heating" setting value (Run control -> Night heating). If the room temperature drops to the "Start-up limit" setting value, night heating is activated, activated provided the time program allows it. When the measurement exceeds the start-up limit by the amount of the "Hysteresis", night heating is deactivated. The AHU runs in accordance with the "Night heating AHU speed" setting value. In a sensor fault situation, night heating is not in use.
	Night ventilation	The function is enabled from the "Night ventilation" setting value (Settings -> Run control -> Night ventilation). If the room temperature measurement is 1.5 °C higher than the day setting value for the room and the outdoor temperature measurement is below the room setting value by the amount of the "Room/Outd. t. diff./Start-up limit", the AHU can start at a time allowed by the time program. The AHU will start in accordance with the "Night ventilation AHU speed" setting value. Night ventilation stops when the measurement reaches the setting value, when the outdoor temperature rises or when stopped by the time program.
	Night cooling	The function is enabled from the "Night cooling" setting value (Run control -> Night cooling). Night cooling starts when permitted by the time program if the room temperature exceeds the "Start-up limit" setting value for night cooling. Night cooling stops when the room temperature falls below the start-up limit by the amount of the "Hysteresis" setting value. During operation, the fan speed setting value is "Night cooling AHU speed". During operation, the supply air setting value is the minimum limit for cooling (Settings -> Cooling control -> Supply temp. min cooling).

Safety alarms that always stop the AHU (the AHU running permission is interrupted):

Supply air overheat alarm (fire hazard)

Return water low limit alarm (Ice protection)

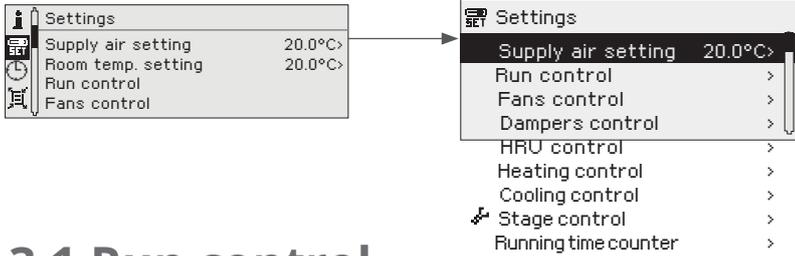
Emergency stop

Heating pump alarm

3 Settings

This symbol indicates a rarely used setting that remains hidden during regular operation. Press the OK button for a few seconds to reveal it.

This symbol tell that changing the setpoint requires a service code.

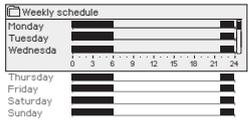
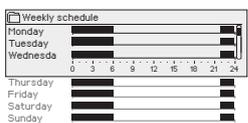


Choose either the "Supply air temperature" or "Room temperature" setting based on whether you are using a supply-controlled or room-controlled/exhaust-controlled AHU.

3.1 Run control

Settings -> Run control

Setting values	Factory setting	Setting area	Explanation
Run control	Automatic		Run state control can be: Stop, MIN speed, low speed, increased speed, MAX speed, automatic or service stop. Run state control of 1-speed fan can be: run, stop, automatic or service stop. Run state control of 2-speed fan can be: stop, 1/2, 1/1 automatic or service stop.
Timer ON status duration	120 min	0 ... 480	
Timer controlled speed	MIN speed		Timer controlled speed can be: stop, MIN speed, low speed, increased speed, MAX speed or Stop. Timer controlled speed of 2-speed fan can be: 1/2, 1/1 or stop.
External control			External controlled speed can be: stop, MIN speed, low speed, increased speed, MAX speed or Stop. Extern controlled speed of 2-speed fan can be: 1/2, 1/1 or stop
AHU control by time program			
Weekly schedule Exception schedule Special days Present value			You can create a weekly schedule, an exception schedule, and a special day program for AHU run control. Check the current status to see the present run control settings. More details on scheduling can be found in the "Time programs" section.
CO2 run request			
Start up acc. CO2 content	Disabled	Disabled/ Enabled	Permission for the start-up of the AHU according to CO2 content: disabled, enabled
Start up limit	600 ppm	400 ... 1200	CO2 content at which the AHU starts if the function is enabled.
Hysteresis	100 ppm	5 ... 200	The value of the CO2 measurement must fall below the start-up limit by the amount of the "Hysteresis" before the AHU stops.
AHU speed	MIN speed		AHU speed can be "MIN speed, Low speed, Increased speed or MAX speed"
Night heating			
Night heating	Not in use	Not in use/ In use	Permission for the AHU to start Night heating function if needed.
Hysteresis	5.0 °C	1.0 ... 10.0	The room temperature must rise above the start-up limit by the amount of the "Hysteresis" before night heating is deactivated.
Start up limit	15.0 °C	10 ... 30	Room temperature where night heating starts.
Weekly schedule			The default setting is a weekly schedule permitting night heating from 22:00 to 06:00 if necessary. You can edit the weekly program if you wish (see more information about weekly schedule page 29).
Night heating AHU speed	MIN speed		Fan speed can be: MIN speed, low speed, increased speed or MAX speed during night heating. Running control of 2-speed fan can be: stop, 1/2 or 1/1.

Setting value	Factory setting	Range	Explanation
Night ventilation			
Night ventilation	Not in use	Not in use/ In use	<p>Permission for the night ventilation function is given, if:</p> <ul style="list-style-type: none"> the room temperature is 1.5 °C higher than the room temperature setting value and the outdoor temperature measurement is below the room setting value by the amount of the "Room/Outd. t. diff./Start-up limit" and the weekly schedule of the night ventilation allow the night ventilation <p>The AHU starts based on the "Night ventilation AHU speed" setting. Night ventilation stops when</p> <ul style="list-style-type: none"> the room measurement reaches the setting value or the temp. difference between the outdoor temperature and the room temperature falls below the start limit night ventilation is stopped by the weekly schedule.
Night ventilation and night cooling can operate in series.			
Room/Outd. t. diff./Start up limit	2 °C	1 ... 5	<p>The difference between the room temperature setting value and the measured outdoor temperature at which night ventilation can start.</p> <p>When manual control is chosen, an icon depicting a palm  is displayed at the beginning of the row .</p>
Outdoor t. limit/Night vent. blocked	12 °C	5 ... 25	Night ventilation can start if the outdoor temperature is not below the "Outdoor t. limit/Night vent. blocked".
Weekly schedule			<p>By default, according to the weekly schedule, night ventilation is allowed from 22:00 to 06:00. If the manually control is in use, there is a picture of the palm at the beginning of the row.</p> <div style="display: flex; align-items: center;">  <div style="margin-left: 10px;"> <p>More information p.30.</p> </div> </div>
Night ventilation AHU speed	MIN speed		The fan speed during night ventilation can be: minimum speed, low speed, increased speed and maximum speed. 2-speed fans have the following speeds: stop, 1/2 speed and 1/1 speed.
Night cooling			
Night cooling	Not in use	Not in use/ In use	Permission for the night cooling function is granted based on the time program. Night cooling activates when the room temperature exceeds the specified "Start-up limit." The night cooling stops when the room temperature drops below the start-up limit by the defined "Hysteresis" amount. Throughout the operation, the supply air setting value acts as the minimum limit for cooling.
Hysteresis	2.0 °C	1.0 ... 10.0	The room temperature must drop below the start-up limit by the amount of the "Hysteresis" before night cooling is deactivated.
Start up limit	23.0 °C	10.0 ... 30.0	When the room temperature measurement exceeds the "Start-up limit", the AHU allows the night cooling to start.
Weekly schedule			<p>By default, according to the schedule, night cooling is allowed from 22:00 to 06:00.</p> <div style="display: flex; align-items: center;">  <div style="margin-left: 10px;"> <p>More information p.30.</p> </div> </div>
Night cooling AHU speed	MIN speed		Fan speed can be "MIN speed, Low speed, Increased speed or MAX speed" during Night cooling. Running control of 2-speed fan can be: "stop, 1/2 or 1/1".
Inputs/ Outputs			
The current run status and fan speed of the AHU are shown.			

3.2 Fans control

Settings -> Fan control

-  Press and hold OK to display the menu / setting values.
-  Changing the setpoint requires a service code.

Fan type can be 1-speed, 2-speed, constant speed, pressure controlled or air volume controlled AHU. The setting values are specific to the chosen fan type.

In renovation projects, an alternative solution allows the S105 to not directly engage in the adjustment process. Instead, external control manages the fan operation, and the controller acts as a link in granting permission for the fan to run. In this scenario, the controller displays the text "Run ext. run information" in the "Run control" view.

3.2.1 1-speed fans

Settings -> Fan control

Setting value	Factory setting	Range	Explanation
Alarm activation delay	10 s	0 ... 200 s	
  Fan type	1-speed		
SF Indication type EF Indication type	Running status	Not in use/ Running status/ Alarm	You select whether the input is used to indicate the running status or alarm.
Inputs/ Outputs			Fan control information is displayed here.

1-speed fan run control with external control

Run ext. run information

The "Run indication AHU start" function is designed for scenarios where the controller doesn't directly control the fans, but the operation of the fans is controlled by an external clock, etc., and the controller manages the heating adjustment and other "low current side" control, and acts as one part of the fans operation permit. This kind of external control was common in the past and occurs in renovation sites (see Principle diagram page 54).

1-speed fan when the 'Run indication AHU start' setting is 'Disabled':

If the "Run control" is on automatic and there is no (ventilation) run request and the controller receives running information, the controller gives a conflict alarm from the supply and exhaust fans.

If 'Run control is Stop' and the controller receives running information, the controller gives a conflict alarm from the supply and exhaust fans.

1-speed fan when the 'Run indication AHU start' setting is 'Enabled':

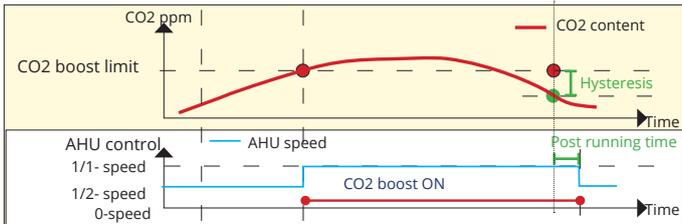
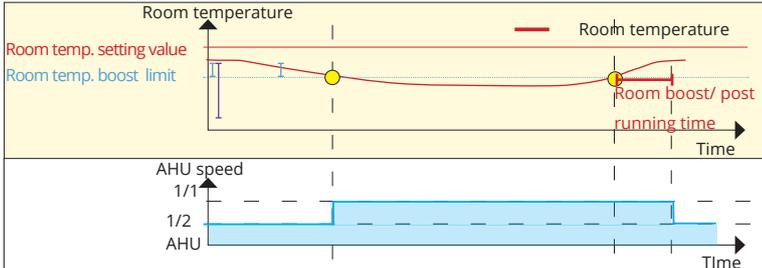
if the "Run control" is Automatic without a power request and the controller receives running information, the control starts but the controller does not activate the fan control. When the running information removes, the controller activates the fan control for the duration of post-ventilation with electric radiator AHU.

if the "Run control" is Stop, but the running information comes to the controller -> Nothing happens.

3.2.2 2-speed fans

The supply fan and exhaust fan have two speeds. The inputs can also be configured as alarm inputs. Running information/ alarm delay can be set. Entry and exit delays are the same.

Settings -> Fan control

Setting value	Factory setting	Range	Explanation
Alarm activation delay	10 s	0 ... 200 s	
Outdoor temp. limit/ speed change	-20 °C	-50 ... 0 °C	Outdoor temperature at which the AH unit1/1 output changes to 1/2 output. When the outdoor temperature rises above 2°C, the outdoor temperature limitation is disabled.
 Fan type	2-speed		
SF Indication type EF Indication type	Running status	Not in use/ Running status/Alarm	You select whether the input is used to indicate the running status or alarm. If the running information is taken from the distribution center, you must select "Running status" as the type of indication.
Inputs/ Outputs			Fan control information is displayed here.
CO2 boosting			
CO2 boosting	Not in use	Not in use/ In use	If the function is enabled, after the measurement has exceeded the set "CO2 boost limit" setpoint, the fans are controlled to 1/1 power. When the measurement falls below the "CO2 boost limit" - "CO2 boost hysteresis" value, 1/1 power is still on for the set "CO2 post running time".
CO2 boost limit	700 ppm	400 ... 1200	
CO2 boost hysteresis	100 ppm	50 ... 300	
CO2 post running time	15 min	0 ... 99	
Room temperature boost			
Room temp. boost	Not in use	Not in use/ In use	After the room temperature drops amount of the "Room. temp. boost limit" setting below the Room temperature setting value, the fans are controlled to 1/1 power. When the room temperature measurement reaches the room temperature setting value, the fans will still run at 1/1 power for the set "Room boost/post running time". The fans are controlled to 1/2 power after the post running time.
Room temp. boost limit	4 °C	0 ... 15	
Room boost/post running time	15 min	0 ... 99	
Outdoor temperature limitation			
Outdoor temperature limitation	In use	Not in use/ In use	
Outdoor temp. limit/ speed change	-20 °C	-50 ... 0 °C	Outdoor temperature at which the AH unit1/1 output changes to 1/2 output. When the outdoor temperature rises above 2°C, the outdoor temperature limitation is disabled.

3.2.3 Constant speed fans

The fans operate from 0 to 100% with four speed settings. Separate speed ranges can be set for the supply and exhaust fans. The fans start when the control is over 1%, and you can control how quickly the settings change. The inputs can show if the fans are running or signal an alarm, and you can decide the delay for alarms.

Settings -> Fan control

Setting value	Factory setting	Range	Explanation
Supply fan/ Exhaust fan			
AHU MIN speed	40 %	0 ... 100%	
AHU low speed	50 %	0 ... 100%	
AHU increased speed	70%	0 ... 100%	
AHU MAX speed	100 %	0 ... 100%	
Fan control MIN	0 %	0 ... 100 %	
Fan control MAX	100 %	0 ... 100 %	
Fan alarm delay	10 s	1 ... 60 s	
Fan type: Constant speed			
SF indication type	Running status		Selectable: Not in use, Running status or Alarm
EF indication type			
Max.speed of output change	50 s	0... 500s	The maximum speed of output change at which the speed of the fan can change from 0% to 100%.
CO2 boosting			
CO2 boosting	Not in use	Not in use/ Not MIN/Low speed Use in all speeds	Select whether to enable enhancement function. If you want, you can also limit, so that the boost is not used when the fan is at minimum power or low speed. The fan power is increased linearly when the CO2 measurement exceeds the set "CO2/boosting starts" limit. The CO2 boost is at the maximum set "CO2/boosting to MAX" limit. The amount of boost at this point is adjustable ("CO2 boost MAX").
CO2/boosting starts	500 ppm	300 ... 1000	
CO2/boosting to MAX	800 ppm	300...1500	
CO2 boost MAX	50 %	0 ... 100	
RH% boosting			
RH% boosting	Not in use	Not in use/ Not MIN/Low speed Use in all speeds	Select whether to enable enhancement function. If you want, you can also limit, so that the boost is not used when the fan is at minimum power or low speed. The fan power is increased linearly when the RH% measurement exceeds the set "RH% boosting starts" limit. The RH% boost is at the maximum set "RH% boosting to MAX" limit. The amount of boost at this point is adjustable ("RH% boost MAX").
RH% boosting starts	50 rH%	0...100	
RH% boosting to MAX	90 rH%	0 ... 100	
RH% boost max	50 %	0 ... 100	

Setting value	Factory setting	Range	Explanation
Room temp. boosting			
Room temp. boost	Not in use	Not in use/ Not MIN/ Low speed Use in all speeds	Select whether to enable enhancement function. If you want, you can also limit, so that the boost is not used when the fan is at minimum speed or low speed. The fans' speed gradually increases when the measurement falls amount of "Room temp. boost starts " below the "Room temperature setting". When the room temperature drops amount of "Room temp. boost to MAX"- below the room temperature setpoint, the fans reach the speed "Room temp. boost MAX". It is possible to activate both the room temperature boost and the serial control of the fan, in which case a situation may arise, that first the fan power is reduced and as the room/exhaust temperature continues to decrease, the power is increased.
Room temp. boost starts	4.0 °C	0 ... 10	
Room temp. boost to MAX	10.0 °C	0 ... 15	
Room temp. boost MAX	100 %	0 ... 100	
Outdoor temperature limitation			
Outdoor temp. limitation	In use	In use/ Not in use	The fan output is reduced gradually when the outdoor temperature measurement falls below the "Outdoor temp. limitation Start-up" setpoint. When the outdoor temperature drops to the "Outdoor temp. limitation to MAX" setpoint, the fan speed is reduced to "Low speed".
Outdoor temp. limitation start-up	-10 °C	-30 ... 0	
Outdoor temp. limitation to MAX	-15°C	-40 ... 0	
Serial control			
Serial control	In use	Not in use/ In use	When the heating stage is active and the need for heat increases, the heating power is increased. When the heating level is at its maximum and yet the measurement has not reached the set value, we start to reduce the power of the fans. This reduction in fan power causes an increase in the supply air temperature (since, with the same heating radiator power, a decrease in flow leads to a rise in temperature).It is possible to activate both the room temperature boost and the serial control of the fan, in which case a situation may arise, that first the fan power is reduced and as the room/exhaust temperature continues to decrease, the power is increased.
Maximum effect of serial control	-100%	-100 ... 0	When the control shift to the fan stage, the aim is to keep the temperature of the supply air at its set value by reducing the speed of the fans. The setting value 'Maximum effect of serial control' limits the lowering effect of the adjustment.
Inputs/Outputs			

3.2.4 Pressure controlled fans

The fans are managed using 0 to 10V control to maintain the channel pressure at the set value. There are four pressure settings to choose from in run control. Separate control ranges can be established for the supply and exhaust fans, determining where pressure controls apply. Running permission kicks in when the control exceeds 1%. You can set the maximum speed of output change. Choose between running information or alarm inputs for indication type, and set alarm delays. Entry and exit delays are identical. If an alarm is triggered, the AHU is stopped.

- 👁️ Press and hold OK to display the menu / setting values.
- 🔑 Changing the setpoint requires a service code.

Settings -> Fans control

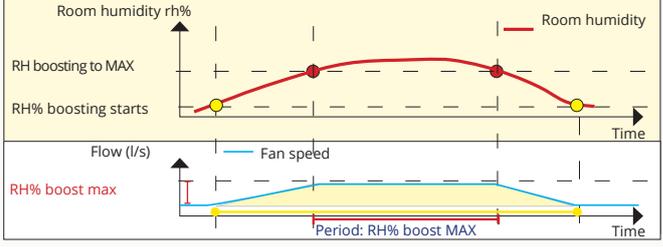
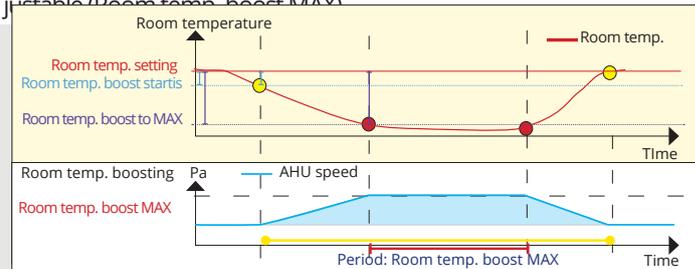
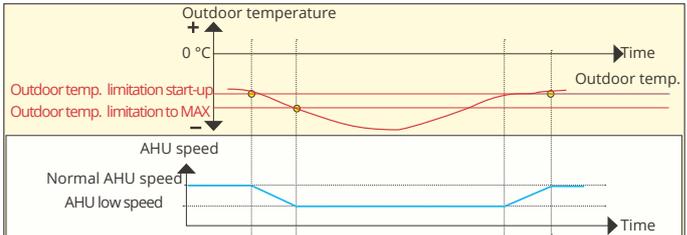
Setting value	Factory setting	Range	Explanation
👁️🔑 Supply fan/ Exhaust fan			
Pressure at MIN speed	100 Pa	0 ... 1000 Pa	
Pressure at low speed	200 Pa	0 ... 1000 Pa	
Pressure at increased speed	300 Pa	0 ... 1000 Pa	
Pressure at MAX speed	400 Pa	0 ... 1000 Pa	
Fan control MIN	0 %	0 ... 100%	
Fan control MAX	100 %	0... 100 %	
Deviation alarm:			
Deviation alarm	In use	Not in use/ In use	
Allowed deviation max	50 Pa	10... 1000 Pa	
PID settings:			
P-area	750 Pa	50...9000 Pa	
I-time	8 s	5 ... 300 s	
D-time	0 s	0 ... 100 s	
Fan alarm delay	10 s	1 ... 60 s	
👁️🔑 Fan type Pressure control			
SF Indication type	Running status		Selectable: Not in use, Running status, Pressure transmitter or Alarm
EF Indication type	Running status		
👁️🔑 Max.speed of output change	50 s	0... 500s	The maximum speed of output change at which the speed of the fan can change from 0% to 100%.
CO2 boosting			
CO2 boosting	Not in use	Not in use/ Not MIN/Low speed Use in all speeds	Select whether to enable enhancement function. If you want, you can also limit, so that the boost is not used when the fan is at minimum power or low speed. The fan power is increased linearly when the CO2 measurement exceeds the set "CO2/boosting starts" limit. The CO2 boost is at the maximum set "CO2/boosting to MAX" limit. The amount of boost at this point is adjustable ("CO2 boost MAX").
CO2/boost starts	500 ppm	300 ...1000	
CO2/boost to MAX	800 ppm	300 ...1500	
CO2 boost MAX	100 Pa	0 ... 200	

Setting value	Factory setting	Range	Explanation
RH% boosting			
RH% boosting	Not in use	Not in use/ Not MIN/ Low speed Use in all speeds	Select whether to enable enhancement function. If you want, you can also limit, so that the boost is not used when the fan is at minimum speed or low speed. The fan power is increased linearly when the RH% measurement exceeds the set "RH% boosting starts" limit. The RH% boost is at the maximum set "RH% boosting to MAX" limit. The amount of boost at this point is adjustable ("RH% boost MAX").
RH% boosting starts	50 rH%	0 ... 100	
RH% boosting to MAX	90 rH%	0 ... 100	
RH% boost max	100 Pa	0 ... 200	
Room temp. boosting			
Room temp. boost *)	Not in use	Not in use/ Not MIN/ Low speed Use in all speeds	Select whether to enable enhancement function. If you want, you can also limit, so that the boost is not used when the fan is at minimum speed or low speed. If the serial control is in use, the 'maximum effect of serial control' setting is first used to control the fan speed. The pressure setting is increased steplessly when the measurement falls amount of a "Room temp. boost starts" below the "Room temperature setting". When the room temperature drops amount of "Room temp. boost to MAX"- below the room temperature setpoint, the booster function reach the maximum. The amount of boost at this point is adjustable (Room temp. boost MAX).
Room temp. boost starts	4.0 °C	0 ... 10	
Room temp. boost to MAX	10.0 °C	0 ... 15	
Room temp. boost MAX	100 Pa	0 ... 200	
Outdoor temperature limitation			
Outdoor temp. limitation	In use	In use/ Not in use	The fan output is reduced steplessly when the outdoor temperature measurement falls below the "Outdoor temp. limitation Start-up" setpoint. When the outdoor temperature drops to the "Outdoor temp. limitation to MAX" setpoint, the fan speed is reduced to "Pressure at low speed".
Outdoor temp. limitation start-up	-10 °C	-30 ... 0	
Outdoor temp. limitation to MAX	-15°C	-40 ... 0	
Serial control			
Serial control *)	In use	Not in use/ In use	During operation, when the heating stage is active and heat demand increases, power is raised. If the heating stage is maxed and the temperature hasn't reached the set value, we reduce the fan pressure set value. This affects supply air temperature, causing a rise (with the same heating radiator power, lower flow leads to higher temperature). With serial control enabled, the "Maximum effect of serial control" adjusts fan speed.
Maximum effect of serial control	-500Pa	-500 ... 0	When the control shift to the fan stage, the aim is to keep the temperature of the supply air at its set value by reducing the setting of the fan pressure. The setting value 'Maximum effect of serial control' limits the lowering effect of the adjustment.
Inputs/ Outputs			
The current control of the supply fan and Exhaust fan AHU are shown.			

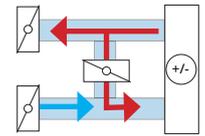
3.2.5 Air volume controlled fans

The fans are controlled with 0...10V control so that the flow measurements of the channel remain at their set value. There are four adjustable flow settings to choose from in the run control. A control range can be set separately for the supply and exhaust fans, where the flow controls work. The running permission is activated when the control is over 1%. The maximum speed of output change can be set. Indication type can be selected as running information or alarm inputs. Alarm delays can be set. Entry and exit delays are the same. When the alarm is activated, the AHU is stopped.

Setting value	Factory setting	Range	Explanation
Supply fan/ Exhaust fan			
Flow at MIN speed	400 l/s	0 ... 2500	
Flow at low speed	600 l/s	0 ... 2500	
Flow at increased speed	1000 l/s	0 ... 2500	
Flow at MAX speed	1500 l/s	0 ... 2500	
Fan control MIN	0 %	0 ... 100%	
Fan control MAX	100 %	0... 100 %	
Deviation alarm:			
Deviation alarm	In use	Not in use/ In use	
Allowed deviation max	250 l/s	10... 1000	
PID settings:			
P-area	1200 l/s	50...9000	
I-time	8 s	5 ... 300 s	
D-time	0 s	0 ... 100 s	
Fan alarm delay	10 s	1 ... 60 s	
Fan type		Air volume control	
SF Indication type EF Indication type	Running status	Not in use/ Running status/ Pressure transmitter/ Flow meas. / Alarm	
Max.speed of output change	50 s	0... 500s	The maximum speed of output change at which the speed of the fan can change from 0% to 100%.
CO2 boosting			
CO2 boosting	Not in use	Not in use/ Not MIN/ Low speed Use in all speeds	Select whether to enable enhancement function. If you want, you can also limit, so that the boost is not used when the fan is at minimum power or low speed. The fan power is increased linearly when the CO2 measurement exceeds the set "CO2/boosting starts" limit. The CO2 boost is at the maximum set "CO2/ boosting to MAX " limit. The amount of boost at this point is adjustable ("CO2 boost MAX").
CO2/ boost starts	500 ppm	300 ...1000	
CO2/ boost to MAX	800 ppm	300 ...1500	
CO2 boost MAX	500 l/s	0 ... 1000	

Setting value	Factory setting	Range	Explanation
RH% boosting			
RH% boosting	Not in use	Not in use/ Not MIN/ Low speed Use in all speeds	Select whether to enable enhancement function. If you want, you can also limit, so that the boost is not used when the fan is at minimum speed or low speed. The fan power is increased linearly when the RH% measurement exceeds the set "RH% boosting starts" limit. The RH% boost is at the maximum set "RH% boosting to MAX" limit. The amount of boost at this point is adjustable ("RH% boost MAX").
RH% boosting starts	50 rH%	0 ...100	
RH% boosting to MAX	90 rH%	0 ...100	
RH% boost max	500 l/s	0 ... 1000	
Room temp. boosting			
Room temp. boost*)	Not in use	Not in use/ Not MIN/ Low speed Use in all speeds	Select whether to enable enhancement function. If you want, you can also limit, so that the boost is not used when the fan is at minimum speed or low speed. If serial control is enabled, the "Maximum effect of serial control" setting value is used to adjust the fan speed. The pressure setting is increased steplessly when the measurement falls below the "Room temp. boost starts" below the "Room temperature setting". When the room temperature drops amount of "Room temp. boost to MAX"- below the room temperature setpoint, the booster function reach the maximum. The amount of boost at this point is adjustable (Room temp. boost MAX).
Room temp. boost starts	4.0 °C	0 ... 10	
Room temp. boost to MAX	10.0 °C	0 ... 15	
Room temp. boost MAX	100 Pa	0 ... 200	
Outdoor temperature limitation			
Outdoor temp. limitation	In use	In use/ Not in use	The fan output is reduced gradually when the outdoor temperature measurement falls below the "Outdoor temp. limitation Start-up" setpoint. When the outdoor temperature drops to the "Outdoor temp. limitation to MAX" setpoint, the fan speed is reduced to "Flow at low speed".
Outdoor temp. limitation start-up	-10 °C	-30 ... 0	
Outdoor temp. limitation to MAX	-15°C	-40 ... 0	
Serial control			
Serial control*)	In use	Not in use/ In use	During heating operation, as the demand for heat increases, the heating power is raised. If the heating stage reaches its maximum, and the measurement hasn't reached the set value, we begin to decrease the fan flow value. This decrease in fan flow has an increasing effect on the supply air temperature (with the same power of the heating radiator, a decrease in flow leads to a rise in temperature). If serial control is enabled, the "Maximum effect of serial control" setting value adjusts the fan speed.
Maximum effect of serial control	-100l/s	-1000 ... 0	When the control switches to the fan stage, the aim is to keep the supply air temperature at the setting value by reducing the flow. The setting value 'Maximum effect of serial control' limits the lowering effect of the adjustment.
Inputs/ Outputs			

3.3 Dampers control



AHU control -> Dampers control

- This symbol tells that it is a question of seldom needed setting which is hidden during normal use. Press OK for a number of seconds for it to appear.
- Changing the setpoint requires a service code.

You can choose On/Off dampers, Constant position dampers or Cascade control dampers. Changing the operating mode requires a service code.

The information displayed in the Inputs/Outputs menu depends on which functionalities have been selected for use.

3.3.1 On/Off dampers

The Dampers must also be selected to be "In use" when On/Off dampers are used (see p. 43 Configuration -> Enabling functions).

Settings -> Damper control

Setting value	Factory setting	Range	Explanation
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.
Damper close delay	10 s	0 ... 300	When the AHU stops, the dampers are kept open for a Damper close delay.
Damper preopen	20 s	0 ... 120	The fans are given permission to run after the "Damper preopen" time.
Inputs/ Outputs			

3.3.2 Constant position dampers

Settings -> Dampers control -> Dampers operating mode: Constant position dampers

Setting value	Factory setting	Range	Explanation
Constant dampers position	60 %	0 ... 100 %	Damper position during AHU is running. The % figure indicates the position of the fresh air damper. 0% = only recirculated air and 100% = only fresh air.
Actuator running time	90 s	5 ... 150 s	Running time from one extreme valve position to the other.
CO2 boosting			
CO2 boosting in use	No	No/Yes	
CO2/ boosting starts	700 ppm	300 ... 1500	When the CO2 concentration exceeds the set value "CO2/ boosting starts", the damper starts to open linearly.
CO2/ boosting to MAX	1000 ppm	400 ... 2000	When the CO2 concentration reached the set value "CO2/boosting to MAX", the damper have been opened to desired "Damper/ CO2 boost MAX" position.
Damper/CO2 boost MAX	100%	0 ... 100%	<p>Damper position (%)</p> <p>CO2/ boosting starts</p> <p>CO2/ boosting to MAX</p> <p>Damper/ CO2 boost MAX</p> <p>Damper position</p> <p>700</p> <p>1000</p> <p>CO2-cont. ppm</p>
Outdoor temperature limitation			
Outdoor temp. limitation in use	No	No/Yes	<p>Situation: Outdoor temperature drops</p> <p>Outdoor temp./ Limitation MIN -20°C</p> <p>Outdoor temp./ Limitation MAX -30°C</p> <p>Fresh air damper position (%)</p> <p>Damper position</p> <p>Damper position/ 30 %</p> <p>Outd.t. limitation MAX</p> <p>Time</p>
Outdoor temp./Limitation MIN	-20°C	-30 ... 0	When the Outdoor temp. drops to the set value "Outdoor temp. / Limitation MIN", the controller starts to drive dampers linearly to the closed direction.
Outdoor temp./Limitation MAX	-30 °C	-30 ... 0	When the Outdoor temp. drops to the set value "Outdoor temp. /Limitation MAX", the dampers are driven to the closed direction to position "Damper position/Out.t. limitation MAX"
Damper position/ Outd.t. limitation MAX	30%	0 ... 100%	
Dampers operating mode	Constant position dampers		
Inputs/Outputs:			

3.3.3 Cascade control dampers

Settings -> Dampers control -> Dampers operating mode: Cascade control dampers

Setting value	Factory setting	Range	Explanation
Reverse function	Disabled	Disabled/ Enabled	In the reverse function, when the outdoor temperature is higher than the room temperature, the supply air volume is limited to a minimum and the volume of circulating air is increased with the dampers. The reverse damper function is initiated when the following conditions are met: <ul style="list-style-type: none"> The outdoor temperature is higher than the room temperature. The room temperature is half-way between the setting value for room temperature during heating and cooling. The room temperature is at least 1 °C higher than the room setting value for heating. In addition, the 10 min time constant of outdoor temperature measurement and the fact that there is a difference of 0.5 °C between the outdoor temperature limit and the room temperature limit must be taken into account.
Position during cooling	40 %	0 ...100	Damper position when mechanical cooling is activated.
Damper MIN	30 %	0 ... 100	When the dampers are not used for active adjustment, they work in the same manner as standard position dampers. Their position during operation is set from the "Damper MIN" setting value. When adjustment shifts to the dampers, the system seeks to maintain the supply temperature at its setting value by changing the position of the dampers.
Damper MAX	100 %	0 ... 100	Dampers are opened when the supply temperature is above the setting value. The dampers can open up to "Damper MAX".
 Actuator running time	90 s	5 ... 150 s	Running time from one extreme valve position to the other.
CO2 boosting			
CO2 boosting in use	Off	Off /On	
CO2/ boosting starts	700 ppm	300 ... 1000	When the CO2 concentration exceeds the set value "CO2/ boosting starts", the damper starts to open linearly.
CO2/ boosting to MAX	1000 ppm	500 ... 2000	When the CO2 concentration reached the set value "CO2/boosting to MAX", the damper have been opened to desired "Damper MAX" position.
Outdoor temperature limitation			
Outdoor temp. limitation in use	Off	Off /On	<div data-bbox="746 1435 1471 1809" data-label="Figure"> <p>Situation: Outdoor temperature drops</p> <p>Outdoor temp./ Dampers MIN -10°C Outdoor temp./ Dampers MAX -20°C</p> <p>Fresh air damper position (%)</p> <p>Damper position</p> <p>Damper MIN 30 %</p> <p>Time</p> </div>
Outdoor temp./ Dampers MIN	-10°C	-30 ... 0	When the Outdoor temp. drops to the set value "Outdoor temp. /Dampers MIN", the controller starts to drive dampers linearly to the closed direction.
Outdoor temp./ Dampers MAX	-20 °C	-35 ... -10	When the Outdoor temp. drops to the set value "Outdoor temp. / Dampers MAX", the dampers are driven to the closed direction to position "Damper MIN".
Dampers operating mode	Cascade control dampers		The dampers are controlled by the "Damper Y" output (0 ... 10 V)
Inputs/Outputs:			

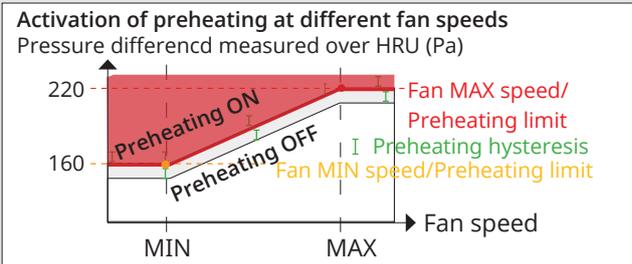
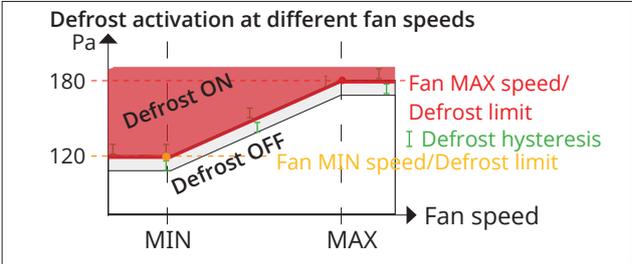
3.4 HRU control

Settings -> HRU control

At the value 100%, heat recovery is at its maximum. When the AHU is in STOP mode, the heat recovery position can be adjusted. Heat recovery is always included in the serial control and when in active mode, it adjusts the control output to maintain supply air temperature at the setting value. The adjustment itself is identical in all exchanger types. The supplementary functions differ.

Setting value	Factory setting	Range	Explanation
Plate HRU/ Rotating HRU/ Liquid HRU			
Recovery efficiency			
Efficiency alarm	Not in use	Not in use/ In use	Efficiency is displayed when the fans are running, the required measurements are enabled and the HRU efficiency is above 50%. <div style="border: 1px solid black; padding: 5px; margin-top: 5px;"> The recovery efficiency is calculated using the formula: $\frac{\text{Room temp./Extract air} - \text{Exhaust temperature}}{\text{Room temp./Extract air} - \text{Outdoor temp.}} \times 100 \%$ </div>
HRU efficiency/ Alarm limit	45 %	0 ... 100%	The alarm is blocked during HRU frost protection or if HRU control is below 95%.
Alarm activation delay	5 min	0 ... 120 min	
Output max	100%	0 ... 100	The maximum limit for heat recovery control.
Freezing risk identification	Temperature	Temperature/ Pressure switch/ 2 pressure switches/ Pressure transmitter	Frost information can be obtained from the temperature measured after the HRU, from a pressure switch connected over the HRU or from a pressure difference transmitter. If 2-speed fans are in use and two pressure switches have been connected over the HRU, the correct setting values are obtained for both speeds (1/2 and 1/1) to start defrosting.
Fans during defrost	Normal speed	Normal speed/ Low speed/ MIN speed	This determines the speed at which the fans run after the defrost command has been received. "Normal speed" means the power currently in use.
HRU position in STOP mode	0 %	0 ... 100%	The position of the HRU when the AHU is in the stop mode.
Reverse function	Disabled	Disabled/Enabled	In the reverse function, the fresh air from the outside has been cooled by the exhaust temperature. During reverse HRU function, the HRU runs at the maximum speed. The reverse function of the Dampers and HRU activates when the following conditions are met: <ul style="list-style-type: none"> The outdoor temperature is higher than the room temperature. The room temperature is half-way between the setting value for room temperature during heating and cooling. The room temperature is at least 1 °C higher than the room setting value for heating. In addition, the 10 min time constant of outdoor temperature measurement and the fact that there is a difference of 0.5 °C between the outdoor temperature limit and the room temperature limit must be taken into account.
 Anticipation of freezing, when measured temperature is used to identify the freezing risk			
Frost protection limit	5 °C	-10 ... 15	The Exhaust air temperature is kept at least at the set value of the "Frost protection limit" by adjusting the power of the HRU.
Minimum limit of Output	20%	5 ... 100%	
P-time	30 °C	2 ... 500	
I-time	80 s	5 ... 300	

Setting value	Factory setting	Range	Explanation
Frost protection when pressure switch is used to identify the freezing risk			
Defrosting/ Outdoor temp. limit	5 °C	-20 ... 20	
Post defrosting time	2 min	0 ... 5	The defrost function remains activated for the duration of the delay time set here when the defrost command is deleted.
HRU during defrosting	10		
Frost protection when two pressure switches is used to identify the freezing risk			
Defrosting/ Outdoor temp. limit	5 °C	-20 ... 20	
Postdefrosting time	3 min	0 ... 5	The defrost function remains activated for the duration of the delay time set here when the defrost command is deleted.
HRU during defrosting	10		
Frost protection when pressure difference transmitter is used to identify the freezing risk			
Defrosting/ Outdoor temp. limit	5 °C	-20 ... 20	
Postdefrosting time	3 min	0 ... 10	The defrost function remains activated for the duration of the delay time set here when the defrost command is deleted.
HRU during defrosting	10		
Fan MIN speed/ Defrost limit	120 Pa	10 ... 990	The pressure difference measured over the HRU that activates the defrosting of the HRU (frost prevention). When the limit is exceeded, the HRU defrosting speed is activated. Defrosting is deactivated when the pressure difference measured over the HRU has decreased below the defrost limit setting value by the amount of the "Defrost hysteresis".
Fan MAX speed/ Defrost limit	180 Pa	10 ... 990	
Defrost hysteresis	20 Pa	0 ... 100	
Preheating control/ Press. transmitter	Not in use	Not in use/ In use	Preheating prevents the HRU from frosting and freezing.
Preheating hysteresis	20 Pa	0 ... 100	Preheating is deactivated when the pressure difference measured over the HRU has decreased below the preheating setting value by the amount of the "Preheating hysteresis".
Fan MIN speed/ Preheating limit	160 Pa	10 ... 990	The pressure difference measured over the heat recovery that activates the preheating (frost prevention). When the limit is exceeded, preheating is activated. The preheating limit can be set for the fan's minimum and maximum speed. The limit value is determined linearly according to the fan speed.
Fan MAX speed/ Preheating limit	220 Pa	10 ... 990	



Setting value	Factory setting	Range	Explanation
Preheating			
Temperature setting	3 °C	-5 ... 15	
Heating delay	2 min	0 ... 5	
PWM cycle length	60 s	10 ... 300	
P-area	30 °C	2 ... 500	
I-time	80 s	5 ... 300	
D-time	0 s	0 ... 100	
Preheat. start up limit /Exhaust t.	-1 °C	-15 ... 10	
Fan MIN speed/Preheating limit	160 Pa	10 ... 990	
Fan MAX speed/Preheating limit	220 Pa	10 ... 990	
Preheating hysteresis	20 Pa	0 ... 100	
Preheat. activation limit/Lap amount	5	0 ... 10	
Actuator control			
Actuator running time	35 s	5 ... 500	Running time from valve open position to closed position and vice versa.
Inputs/ Outputs			

3.4.1 Plate HRU

Settings -> HRU control-> HRU type: Plate

The majority of HRU setting values are the same for all types of HRU. These shared setting values are presented in chapter 3.4 Heat recovery. Here, we only present information on the setting values for the plate HRU.

Operating principle of HRU defrosting: When the melting condition (pressure data) is met, the defrosting laps are started.

Process of the lap: the plate heat exchanger is melted by closing one plate (block) at a time.

The position of the bypass damper during defrosting should be such that the bypass air volume replaces the air volume of one closed block.

One defrosting lap = all defrosting dampers closed once during the lap.

Operating principle of HRU defrosting, when the heat exchanger bypass plate is controlled by FLEX AO 8 output number 6: The HRU defrosting operates by controlling the heat exchanger bypass plate through FLEX AO 8, specifically output number 6. During commissioning, there's no need to separately choose HRU control or HRU bypass control. When the HRU power decreases, all dampers close uniformly. Simultaneously, a proportionate percentage of bypass dampers opens via output 6 of FLEX AO 8.

Setting value	Factory setting	Range	Explanation
Plate HRU			
HRU defrosting			
Lap amount after defrost	2	0 ... 10	After the defrosting function, the controller runs the "Lap amount after defrost". After this, normal operation is resumed.
Defrost position of bypass damper	55%	0 ... 100	When a defrosting command is activated, the by-pass damper assumes its defrosting position and the defrost dampers assume their 100% position.
Amount of defrost dampers	4	1 ... 5	
Damper close time	3 min	0 ... 60	When a defrosting command is activated, the controller closes one defrost damper at a time for the duration of the "Damper close time" until the defrosting command is deactivated.
Lap limit Defrost alarm	10	5 ... 20	Maximum number of defrosting laps, after which an alarm is given and the bypass damper is run open and the defrost dampers are closed.
Preheat. control from defrost laps	Not in use	Not in use/ In use	Preheating can also be enabled on the basis of defrosting laps.
Preheating activation limit/Lap amount	5	0 ... 10	Preheating is enabled once the set number of defrosting laps has been reached and disabled when defrosting has been completed. Note: If the preheating control by temperature or pressure switch is enabled, they take bypass this function if the prerequisites for their use are met.
Inputs/ Outputs			

3.4.2 Rotating HRU

Settings -> HRU control-> HRU type: Rotating

The majority of HRU setting values are the same for all types of HRU. These shared setting values are presented in chapter 3.4 Heat recovery.

Here, we only present information on the setting values for the rotating HRU.

Setting value	Factory setting	Range	Explanation
Rotating HRU			
Recovery cleaning			
Function selection	Disabled	Disabled/ Enabled	Recovery cleaning: If the fans are running and the HRU control is at zero, HRU control is increased to 100% for 20 seconds at two hour intervals.
Output min	10 %	0 ... 100	The Y control value used to give the HRU permission to run.

3.4.3 Liquid HRU

Settings -> HRU control-> HRU type: Liquid

The majority of HRU setting values are the same for all types of HRU. These shared setting values are presented in chapter 3.4 Heat recovery.

Here, we only present information on the setting values for the liquid HRU.

Setting value	Factory setting	Range	Explanation
Liquid HRU			
 Actuator control			
Actuator running time	60 s	5 ... 500	Running time from one extreme valve position to the other.
Valve flushing limit	20 %	0 ... 100 %	In the liquid HRU, the valve opening volume during the pump's refresh use on Mondays at 8.00-8.01 am.
Network pressure			
Pressure alarm	Not in use	Not in use/ In use	A pressure alarm can be activated by a pressure switch or a pressure transmitter.
Pressure alarm/ Low limit	0.5 bar	0.0... 5	In a transmitter alarm, lower and upper limits are set for pressure alarms. The alarm entry delay is 5 seconds, and the exit delay is 5 seconds. An active alarm stops the AHU. To restart the unit, the alarm must be acknowledged first.
Pressure alarm/ High limit	2.5 bar	1... 10	
Hysteresis	0.3 bar	0 ... 2	
Pump control			
Alarm type	Contradiction alarm	Contradiction alarm/ Alarm	Contradiction alarm: An alert is triggered when there's a mismatch between the operational control set by the controller and the operational information received from the pump. Alarm: The alarm is received from the pump's own alarm output. When the contact is closed, the controller gives an alarm.
Pump refresh use	Disabled	Disabled/ Enabled	If the pump is in STOP mode, it is run on Mondays at 8.00-8.01 am. If the HRU control is at a level less than 1%, the control is opened in accordance with the 'Valve flush limit' setting (default is 20%).
Inputs/ Outputs			

3.5 Heating control

Settings -> Heating control

The controller activates heating as needed to reach the desired supply air temperature. Any heating device compatible with a 0-10V or PWM system can be utilized.

Setting value	Factory setting	Range	Explanation
Room temp. compensation factor	2.0	1 ... 5	The room temperature compensation function adjusts the supply air temperature. The room temperature compensation factor is a factor used to convey the difference between the room temperature measurement and setting value to the supply air setting value. E.g. if the room temperature is 1.5 degrees below the setting value and the compensation factor is 2.0, the supply air temperature is increased by 3 degrees (1.5 x 2.0).
Supply temp. min	18.0 °C	0 ... 35	The minimum supply air temperature when an extract air/room-controlled unit is used. Because the room temperature compensation function gives a setting value for the supply air temperature, this value is used to limit the supply air minimum temperature.
Supply temp. max	30.0 °C	0 ... 40	The maximum supply air temperature when an extract air/room-controlled unit is used. Because the room temperature compensation function gives a setting value for the supply air temp., this value is used to limit the supply air max. temperature.
Supply air fire risk	60 °C	25 ... 100	If the supply temperature rises above the "Supply air fire risk limit", a supply air fire risk alarm is activated. The AHU is stopped and emergency stop alarm is given. The alarm entry delay is 1 second, and the exit delay is 5 seconds. The hysteresis is 1 °C.
Outdoor temp. limit: summer/winter	15 °C	5 ... 30	When the outdoor temperature exceeds the "Outdoor temp.limit: summer summer/winter" setting by 1°C, the control switches to summer mode. When the outdoor temperature falls below the "Outdoor temp.limit: summer summer/winter" setting by 1°C, the control switches to winter mode. In summer mode, the heating cannot be turned on. In summer mode, cooling can be switched on after a 20-minute delay.
 Heating type	Water radiator	Water radiator/ Electric heater	A water radiator or electric heater can be used for heating.
 Heating control mode	Supply air controlled	Supply air controlled/ Extract/ room air controlled	The AHU can be either supply air- or extract air/room-controlled.
Control sensor sel.	Room temperature	Extract air/ Room temperature	If Extract air/ Room temperature is selected for the temperature control mode, you can select if the control based on extract air temperature or room temperature.



3.5.1 Electric heater

Settings -> Heating control -> Heating type: Electric heater

Setting value	Factory setting	Range	Explanation
 El. heating control mode	0 ... 10 V	0 ... 10 V/ PWM/ Electric step heater	As the control system, 0-10V, PWM (24Vac or 10Vdc (certain semiconductor contactors)) or stepped control can be selected. Stepped control is carried out with the additional FLEX DO4-TRS or FLEX DO4-R module.
El. heater >			
El. heater post ventilation time	30 s	0 ... 500	When the AHU stops, the heating is turned off, the dampers are kept open and the fans are still used during the "El.heater post ventilation time" at the power the fans were at when the stop command came. In emergency stop and fire situations, the fans switch off immediately without El.heater post ventilation.
El. step heater (FLEX DO4-TRS or FLEX DO4-R)			
PWM power	0,0 kW	0 ... 100	Heating power, when using PWM control or FLEX-DO4 (R or TRS module). If PWM is not enabled, the power is left at zero. PWM control is used to fine-tune the fixed steps.
Power 1	0,0 kW	0 ... 100	Power, TRS1/R1 control
Power 2	0,0 kW	0 ... 100	Power, TRS2/R2 control
Power 3	0,0 kW	0 ... 100	Power, TRS3/R3 control
Power 4	0,0 kW	0 ... 100	Power, TRS4/R4 control
Power 5	0,0 kW	0 ... 100	Power, TRS5/R5 control
PWM duty cycle	60 s	5 ... 300 s	Heating on period with PWM power when heating is controlled by PWM control
Minimum time in ON mode	10 s	0 ... 300 s	The minimum time that the TRS output must be switched on before exiting.
PWM working area max	90 %	0 ... 100 %	
PWM working area min	10 %	0 ... 100 %	
Input/ Output			

If output is not used, the power value is left at zero.

To achieve the best control result, all control stages, including PWM, should have the same power.

3.5.2 Water radiator

Settings -> Heating control -> Heating type: -> Water radiator

Setting value	Factory setting	Range	Explanation
Heating type	Water radiator	Water radiator/ Electric heater	A water radiator or electric heater can be used for heating.
Starting point for adjustment	40 %	0 ... 100	The position to which the START function runs the valve motor when the AHU starts.
Return water compensation (Freeze protection) ^{*)}			
Return water setting when AHU runs	13.0 °C	0 ... 50	When the AHU starts, the return water setting value is changed from the "Return w. setting when AHU is stopped" to the "Return water setting when AHU runs" within the "Time for change ret. wat. setting"
Return w. setting when AHU is stopped	20.0 °C	0 ... 50	During standstill, the valve is controlled so that the return water temperature remains at the "Return w. setting when AHU is stopped" setting.
Time for change ret. wat. setting	5 min	0... 10	The rate at which the "Return w. setting when AHU is stopped" changes to the "Return water setting when AHU runs" setting value after starting.
Ret. water alarm low limit (freezing risk)	8 °C	0 ... 10	
Returv. alarm Ack. required	Off	Off/Yes	
P-area	40 °C	2 ... 500	
I-time	40 s	5 ... 300	
Actuator control			
Actuator running time	35s	5 ... 500	Running time from one extreme valve position to the other.
Valve flushing limit	20 %	0 ... 100 %	The extent to which the valve opens during flushing. The valve flushing happens at the same time with pump refresh use function during summer time. The valve is opened to the "valve flushing limit" and then re-closed if the actuator control is below 1% and the "Pump refresh use" is enabled.
Network pressure			
Pressure alarm	Not in use	Not in use/ Pressure switch/ Pressure transmitter	A pressure alarm can be activated by a pressure switch or a pressure transmitter.
Low limit for pressure alarm	0.5 bar	0... 5	In a transmitter alarm, lower and upper limits are set for pressure alarms. The alarm entry delay is 60 seconds, and the exit delay is 5 seconds. An active alarm stops the AHU. The alarm must be acknowledged before the unit can re-start.
High limit for pressure alarm	2.5 bar	1... 10	
Hysteresis	0.3 bar	0 ... 2	
Heating pump			
Pump summer stop	In use	Not in use/ In use	During summer mode the pump is activated when the valve control is above 1%. The pump is stopped when the valve control has been under 1% for 20 minutes.
Pump refresh use		Disabled/ Enabled	Can be selected if the Pump summer stop function is enabled. If the pump is stopped, it is run every Monday from 8.00 am to 8.01 am to ensure functionality (default time program, you can change the time).
Alarm type	Contradiction alarm	Contradiction alarm/Alarm	
Acknowledge alarm required	Off	Off/ Yes	

^{*)} When the external freeze protection is active, and the return water measurement is connected, it serves as informative data without control, anticipation, or freeze protection features. Activating the "Freeze protection on/off" input triggers a "Freeze risk" alarm on S105, leading to the device's automatic shutdown (refer to page 45 for more details).

3.6 Cooling control

Cooling is allowed when the controller is in summer mode, when the outdoor temperature exceeds the "Outdoor temp. limit: summer/winter" setting value, the heating control has been below 1% for more than 20 min and the heating pump is in stop mode, if the pump is connected.

In continuous control, the cooling is given permission to run, e.g. the pump, when the cooling control is greater than 1%. The access permit expires 20 minutes after the control drops to 0%.

Delays can be set for the activation/exit of the mechanical cooling, based on which the controller gets permission for the cooling and run permission. These delays prevent unnecessary cooling on/off control when the outdoor temperature is close to the "Outd. temp. limit for cooling".

 This symbol tell that it is question of seldom needed setting which is hidden during normal use. Press OK for a number of seconds for it to appear.

 Changing the setpoint requires a service code.

Settings -> Cooling control

Setting value	Factory setting	Range	Explanation
Supply temp. min cooling	15.0 °C	0 ... 35	A minimum temperature for a cooling situation can be set for the supply temperature of an exhaust-controlled/room-controlled AHU.
Room temp. setting while cooling	23.0 °C	0 ... 40 °C	The room temperature setting value when cooling is on.
Outd. temp. limit for cooling	19 °C	0 ... 50 °C	The outdoor temperature limit above which cooling can be activated.
Heat./Cool hysteresis	1.0 °C	1 ... 5 °C	For cooling to be activated, the room temperature must be above the room temperature setting value by the amount of the "Heat./Cool. hysteresis".
Cooling on - delay	2 min	0 ... 30	Cooling may also be switched on when a cooling need has been activated and it has continued for the period of time set here. Permission for adjustment and running permission for the physical point is activated when the cooling request has been valid for the time specified in 'Cooling delay - on'.
Cooling off - delay	2 min	0 ... 30	Cooling may be switched off when the cooling need has been met for the period of time set here. Permission for adjustment and running permission for the physical point is removed after the time set by the setting value 'Cooling delay - off'.
  Cooling type	Continuous	Continuous/ On/Off	An "On/Off" type of control (magnetic valves) or continuous control (liquid cooling) can be used in mechanical cooling.
Continuous			
  Actuator control			
Actuator running time	35 s	5 ... 500	
Valve flushing limit	20 %	0 ... 100	The extent to which the valve opens during flushing. The valve flushing happens at the same time with pump refresh use function during summer time. The valve is opened to the "valve flushing limit" and then re-closed if the actuator control is below 1% and the "Pump refresh use" is enabled.
  Pressure alarm			
Pressure alarm	Not in use		Selectable: Not used, Pressure switch or Pressure transmitter.
Pressure alarm/ low limit	0.5 bar	0.0 ... 5.0	The controller activates an alarm when the pressure in the glycol network drops to the lower limit for a pressure alarm
Pressure alarm/high limit	2.5 bar	1.0 ... 10	The controller activates an alarm when the pressure in the glycol network reaches the upper limit for a pressure alarm.
Hysteresis	0.3 bar	0 ... 2	
  Cooling pump			
Alarm type	Alarm	Contradiction alarm/ Alarm	The pump alarm type is selected. The alarm entry delay is 5 seconds, and the exit delay is 5 seconds.
Pump refreshing function	Not in use	Not in use/ In use	When the pump is stopped, it is run every Monday from 8.00 am to 8.01 am to ensure functionality.
Pump alarm stops AHU	Off	Off/On	You can choose whether to stop the AHU when the controller gives a pump alarm.

Setting value	Factory setting	Range	Explanation
ON/ OFF control with solenoid valves			
Control limit 1	1 %	0 ... 100	When the cooling control output reaches the value 'Cooling limit 1', the magnetic valve control 1 (On/Off cooling stage 1) is activated. The control function is stopped when the control output value decreases to a level 2% below the 'Control limit 1' and control has been switched on at least for the time set in 'ON-time MIN'. Correspondingly, the magnetic valve must have been switched off at least for the time set in 'OFF-time MIN' before it can reactivate.
Control limit 2	90 %	0 ... 100	Works similarly to Control limit 1 but here when the output reaches the setting value of 'Control limit 2', the On/Off cooling stage 2 is activated.
ON-time MIN	10 s	0...300 s	Cooling can only be deactivated after the time set here has elapsed.
OFF-time MIN	10 s	0...300 s	Cooling can only be restarted after the time set here.
Inputs/ Outputs			

3.7 Running time counter

Settings -> Running time counter

Setting value	Factory setting	Range	Explanation
Total running time			Running time calculation information
  Reset total running time			Press and hold OK to display the setting value. Enter the service code. Press OK. Select "Counter reset" and press OK.
Service interval alarm	Not in use	Not in use/ In use	You can choose whether to enable the service interval alarm.
Service interval counter			The service interval counter shows the AHU running time after the last service.
Reset service interval counter			
Service interval	5000 h	0 ... 99999	If the service interval alarm is enabled, the controller will give an alarm when the AHU has run after service for the time set here.

3.8 Sequence control

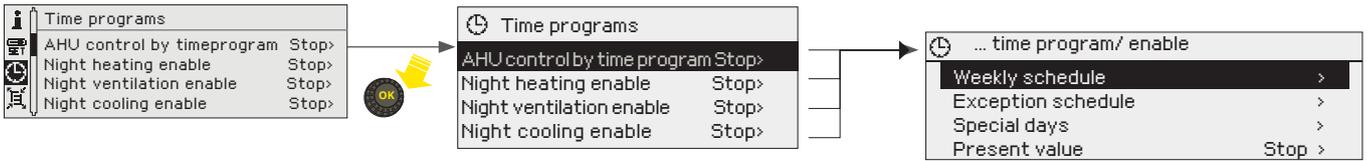
Settings -> Sequence control

Setting value	Factory setting	Range	Explanation
Stage order	Damper-Heating	Damper-Heating/ Heating-Damper	You can select which control stage is adjusted first.
Cooling			
Cooling stage	In use	Not in use/ In use	
Cooling type	Continuous	Continuous/ On/Off	
PID settings			
P-area	30°C	2 ... 500	
I-time	80 s	5 ... 300	
D-time	0 s	0 ... 100	
Stage delay, next stage	0 s	0 ... 600	

Setting value	Factory setting	Range	Explanation
Heating recovery			
Heating recovery	In use	Not in use/ In use	
HRU type	Rotating	Plate/ Rotating/ Liquid	
PID settings			
P-area	30°C	2 ... 500	
I-time	80 s	5 ... 300	
D-time	0 s	0 ... 100	
Stage delay, next stage	0 s	0 ... 600	
Damper			
Damper stage	In use	Not in use/ In use	
Damper operating mode	On/Off dampers	On/Off dampers/ Constant position dampers/ Cascade control dampers	
PID settings			
P-area	30°C	2 ... 500	
I-time	80 s	5 ... 300	
D-time	0 s	0 ... 100	
Stage delay, next stage	0 s	0 ... 600	
Heating			
Heating stage	In use	Not in use/ In use	
Heating type	Electric heater	Water radiator/ Electric heater	When step heater is used in the electric heating, you can select the function 'Run permission of stage control' from the Configuration->Functions -> Heating' menu This output gives the step control permission to operate. The permission is removed if there is a stopping alarm or a 'no-response alarm' from the step heater.
Heating summer stop	In use	Not in use/ In use	
PID settings			
P-area	30°C	2 ... 500	
I-time	80 s	5 ... 300	
D-time	0 s	0 ... 100	
Stage delay, next stage	0 s	0 ... 600	
Dead zone	0.5 °C	0.3 ... 3	
Fan			
Fan type	Constant speed	1-speed/ 2-speed/ Constant speed/ Pressure controlled/ Air volume controlled	
Serie control	In use	Not in use/ In use	Not selectable if 1 or 2 speed fans are used.
PID settings			
P-area	200°C	2 ... 500	
I-time	50 s	5 ... 300	
D-time	0 s	0 ... 100	
Stage delay, next stage	0 s	0 ... 600	

4 Time programs

Time programs



You can schedule programs for the following functions:

- AHU control by time program
- Night heating
- Night ventilation
- Night cooling
- Heating pump refresh
- HRU pump refresh
- Cooling pump refresh

The main screen of the time program displays the AHU status based on the set time program. It also indicates whether heating, night cooling, and night ventilation are permitted according to the time program

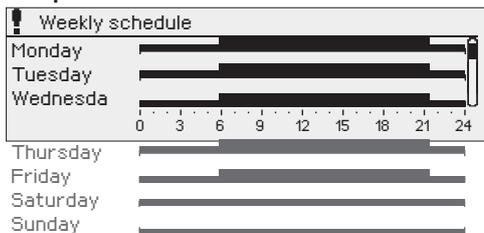
For refresh functions, the default time schedule is for recreation takes place on Mondays from 8:00 to 8:01.

4.1 Weekly schedule

Here, the "AHU control by time program" is described as an example. The time programs for enabling night heating, night ventilation and night cooling, as well as refresh functions are otherwise similar to the AHU control by time program, but in them "On" or "Off" can be selected as the mode.

Point info -> Time programs ->... ->Weekly schedule

Graph view



Weekly schedule have a general graph view as well as a edit view showing the exact time when the new state will be executed. In the graph view, other than stop or off control are shown bars of different heights.

Browsing a weekly schedule:

Turn the control knob to browse a weekly schedule. If you wish to see the exact switch times or you wish to change, delete or add switch times, press OK at any weekday.

Adding a new switch time:

1. Press OK at the "Add new" row.
2. You can select the value you want to change using the control knob. By pressing OK you can change the value. Press ESC to return without changing the value.
3. Set the switch time (set hours and minutes separately). Press OK to accept.
4. Press OK and then turn the control knob to set the fan speed. Press OK to accept.
5. Press OK at each weekday you wish to choose.
6. Press OK at the end of the row to accept the new time program.
Note! Remember also to define when the control returns to automatic (=normal). Press Esc to exit.

Editing view

Time Mode	M	T	W	T	F	S	S
21:00 Min speed	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				
06:00 Increased speed	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				
00:00 Add new	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				

In this example, you can see a weekly schedule. Fan runs at increased speed from 6 am to 9 pm from Monday to Friday. At other times, the fan runs at minimum speed.

Editing view

Time	Mode	M	T	W	T	F	S	S	
06:00	Increased temp.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>					
21:00	Min speed	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				
00:00	Add new	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>					

Time	Mode	M	T	W	T	F	S	S	
21:00	Min speed	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
06:00	Delete switch time	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
00:00	Add new	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Editing a weekly schedule:

1. Turn the control knob to move to the value you wish to change and press OK.
2. Turn the control knob to change the time and fan speed. Press OK to accept.
3. Press the OK button to change the day of the week.
4. Press Esc to exit.

Deleting a switch time:

1. Turn the control knob to move to the switch time you wish to delete and press OK.
2. Press OK at temperature level and select "Delete switch time".
3. Press OK at the end of the row.

4.2 Exception schedule

Time program -> Exception schedule

Day	Time
Add new	

Day:	31.05.2024
Time:	11:30
Mode:	MIN speed
Repeat:	No
Accept:	Ready

Day	Time	Mode
31.05.2024	11:30	MIN speed
10.08.2024	16:00	Automatic
Add new		

The picture shows an exception schedule. Heat fan is minimum speed on from 31 May 2024, 11:30 to 10 August 2024, 16:00

Important! Don't forget to set the end time for the exception schedule. When you set the date and time, the mode will change to "Automatic". In this case, the control returns back to the weekly schedule. If you selected that the start time "Repeats every month or every year", you have to do same selection to the end time.

If adjustments to the control mode are required outside the usual weekly schedule, you can utilize the exception schedule. This feature enables you to input specific dates, times, and control modes for a designated period. To revert to the regular weekly schedule, simply switch back to automatic mode.

Adding a new switch time:

1. Navigate to "Exception schedule" and press OK. The display will read "Add new." Press OK
2. Press OK and set the start date for the program, then the time and mode. You can select from the following:
 - one day schedule from the weekly schedule (Monday - Sunday)
 - a special day from the special day program (SD1 - SD7)
 - selected fan speed (MAX speed, Increased speed, Lowered speed, MIN speed, 1/1 speed, 1/2 speed, stop or "automatic."
3. Select, if the exception schedule repeats or not. If you select repeat, it can be repeated every month same time or every year same time.
4. Accept the exception schedule you created by pressing "Ready."

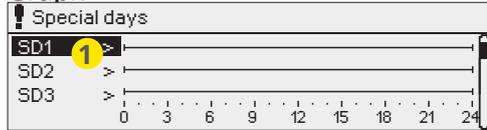
Deleting a switch time from an exception schedule:

1. Navigate to the row with the activation time you want to delete.
2. Select "Delete switch time."
3. Accept the deletion by pressing "Ready."

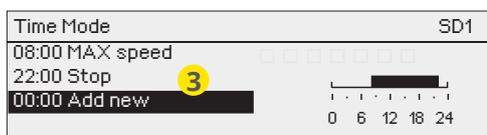
4.3 Special days

Time programs -> Special days

Graph



Editing view



To accommodate special occasions like holidays or other events, S105 allows you to create up to 7 special day programs as exceptions to your normal weekly schedule. These programs can be assigned to specific dates in the exception schedule, making it easy to adjust your regular schedule for special events without the need for manual overrides.

Adding a new switch time:

1. Navigate to "Special days" and press OK. Select an unused special day and press OK.
2. Move the cursor to "Add new" and press OK. Set the program time (hours and minutes are set separately). Choose the mode to switch to at the specified time. Confirm the program by pressing OK when the cursor is on OK.
3. Navigate to the "Add new" row. Set the time when the mode will change from special control mode back to normal control. Accept the program by pressing OK. You can set several different periods of temperature drop for the same special day.

Deleting a switch time from special day program:

1. Navigate to the row with the switch time you want to delete.
2. Select "Delete switch time."
3. Accept the deletion by pressing "Ready."

4.4 Present value

Controller shows, what is the control status according to the time program or manual control.

By pressing ok, you can change the control mode from automatic to manual and vice versa. If the manual control is selected, the image of the palm appears at the beginning of the line.

5 IO-points info

IO-Points info

IO-points info	
INPUT	
UI1:	0.0°C
UI2:	0.0°C
UI3:	0.0°C



IO-points info	
INPUT	
UI1:	0.0°C
UI2:	0.0°C
UI3:	0.0°C
...	

In the point information, you can see which inputs and outputs are connected to the device and the measurement / control data of the inputs and outputs. You can also see information about bus points.

If you want, you can set the input/output to manual control. Activate input/output. Enter the service code. Select manual control and set the input/output to the desired mode. Note! If you drive manually with a 3-point control, set the other direction to OFF mode with manual control so that you don't drive in both directions at the same time.

POINT INFO

If a GSM modem is connected to the S105 you can communicate with the controller by text messages using command words. If the controller has a device ID in use, always write the device ID in front of the key word (example. Ou01 Point info or Ou01 ?). Capital and small letters are different characters in the device ID!

Send the text message: Point info.
The reply message will show Inputs and Outputs.

6 Alarms

Acknowledging alarms: press OK and the alarm sound will mute. If the reason for the alarm is still present, the exclamation point in the top right will continue to blink.

An alarm can activate in for a number of different reasons. Information about the activated alarm is shown on the display. Also a continuous alarm signal is given.

If the controller has a number of unacknowledged alarms and you acknowledge the last one, the one before it will appear on the display. When all active alarms have been acknowledged, the alarm window closes and the alarm sound goes off.

Alarm signal can be muted by pressing Esc key. **It should be noted that the alarms remain unacknowledged. You can find both active alarms and Alarm history in the Alarm menu.**

If the sensor is defective, the regulator's display will show the measurement reading -50 °C (cable of the sensor is broken) or 130 °C (sensor short circuited).

Active alarms

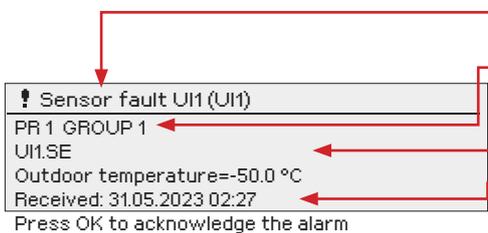


The alarm menu of the S105 device allows you to view both active alarms and previously active alarms. The number of active alarms is displayed in the top right corner of the main view.



Every active alarm is shown in a separate row, where you can see when the alarm has become active. Press OK to get more information about the alarm.

An exclamation mark in front of the date shows that the alarm has not been acknowledged.



The reason for the alarm is shown in the heading.

You can also see, what is the alarm priority (1 = Emergency, 2= Danger, 3=Fault, 4= Service, 5=Info) and to which group the alarm belongs (By default, all alarms belong to group 1)

Source of the alarm.

Time the alarm was received

ACTIVE ALARMS

Send message: Active alarms

The regulator sends a message showing all active alarms. Message is informational.

Acknowledge all alarms

You can acknowledge all alarms by pressing OK.

ACKNOWLEDGE ALL ALARMS

Send message: Acknowledge all alarms.

Alarm history



The reason, source and inactivation time (02.06.2022 10:11:42) is shown for every alarm in alarm history. The last 10 alarms can be seen in inactive alarms.

ALARM HISTORY

Send message: Alarm history

The controller sends a message showing the last 10 alarms. Message is informational.

Reset alarm history

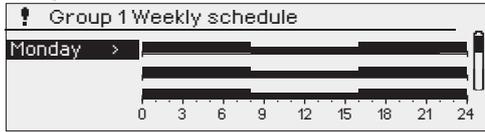
S105 requests confirmation before deleting alarm history.

6.1 Routing schedule

Alarms -> Routing schedule

! Routing schedule	
Group 1 Week program	>
Group 1 Present value	Team 1 >
Group 2 Week program	>
Group 2 Present value	Team 1 >

Graph



This example shows that group 1 alarms are always forwarded. During business hours (Monday - Friday 8:00 a.m. - 4:00 p.m.) alarms are forwarded to different teams than during evenings and weekends. More detailed information is shown in the "Editing view".

Editing view

Time	Mode	M	T	W	T	F	S	S
08:00	Team 1	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				
16:00	Team 2	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				
00:00	Add new	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				

All alarms are initially assigned to group 1 by default. In this scenario, you only need to create a routing schedule for Group 1 alarms. However, you have the flexibility to modify and generate new alarm groups. For instance, you can group alarms based on priority. In this case, you modify alarm group 1 to include priority 1 alarms and create group 2 for priority 2 alarms, group 3 for priority 3 alarms, and so on, within the 'Alarm params' menu.

In the routing schedule menu, you can view the current alarm routing settings and set up a schedule for each alarm group. The weekly schedule allows you to assign different alarm teams to specific times. In the graph, alarm teams are distinguished from each other by the bars with different thicknesses.

Turn the control knob to browse a weekly schedule. If you wish to see the exact switch times and names of alarm teams, or if you wish to edit, remove or add switch times, press OK at any weekday.

Browsing a weekly schedule:

An editing view opens, and it shows all the switch times and also to which alarm teams alarms are routed at these times on the chosen days.

1. Set switch time

2. Set alarm team | 3. Select day(s)

Time	Mode	M	T	W	T	F	S	S
08:00	Team 1	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				
16:00	Team 2	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				
00:00	Add new	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				

Adding a new switch time:

1. Press OK at the "Add new" row.
2. Press OK. Set the switch time for alarm routing (set hours and minutes separately) and press OK.
3. Press OK and then turn the control knob to set the alarm team or the "No routing" option. (No routing option means that alarms will not be sent.) Accept by pressing OK.
4. Press OK at desired weekdays you wish to choose.
5. Press OK at the end of the row to accept the created schedule.
6. Press Esc to exit.

Editing a weekly schedule:

1. Turn the control knob to navigate to the value you wish to change and press OK.
2. Turn the control knob to make the time and alarm team changes. Press OK to accept.
3. Press the OK button to change the day of the week.
4. Press Esc to exit.

Time	Mode	M	T	W	T	F	S	S
08:00	Team 1	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				
16:00	No routing	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				
00:00	Add new	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				

Time	Mode	M	T	W	T	F	S	S
08:00	Team 1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
21:00	Delete switch time	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
00:00	Add new	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				

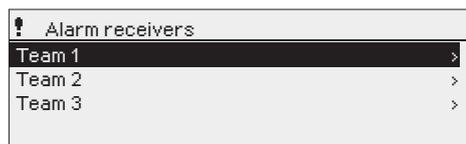
Deleting a switch time:

1. Turn the control knob to navigate to the switch time you wish to delete and press OK.
2. Press OK at the alarm team and select "Delete switch time"
3. Press OK at the end of the row.
4. To exit edit mode, press ESC.

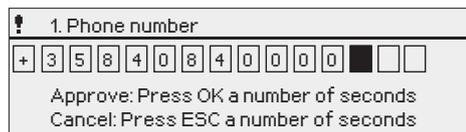
When alarms are routed, they will be forwarded to the alarm team as text messages according to the routing schedule. To acknowledge an alarm, simply forward the same message back to the S105.

6.2 Alarm receivers

Alarms -> Alarm receivers



Entering the telephone numbers:



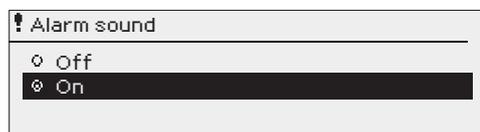
To send alarms as text messages to the service or maintenance team, you can connect a GSM modem to the S105. The controller will automatically send alarm messages to the appropriate team based on the alarm routing schedule. If an alarm is not acknowledged within 5 minutes, the message will be sent again to the same recipients and a backup number. Please be aware that the controller has a daily limit of sending a maximum of 100 messages.

1. Turn the control knob. Press OK to accept a number/sign.
2. Press OK to move to the next square. Press Esc to return to the previous square. OK
3. Press OK for a number of seconds to accept the number. Press Esc for a number of seconds to cancel



6.3 Alarm sound

Alarms -> Alarm sound



The alarm sound can be turned off if needed.

On: Information about the activated alarm is shown on the display. Also a continuous alarm signal is given. If the controller has a number of unacknowledged alarms and you acknowledge the last one, the one before it will appear on the display. When all active alarms have been acknowledged, the alarm window closes and the alarm sound goes off.

Off: The controller displays information on activating the alarm, but the controller does not include an alarm signal.

6.4 Alarm parameters

Alarms -> Alarm params

To access all alarm settings, long-press OK

Changing the settings requires a service code. By default, all alarms belong to group 1. Alarms are classified into different priorities according to urgency/severity: 1=emergency/ 2=danger/ 3=fault/ 4=service/5=info.

Sum alarm					
Sum alarm selection	1-emergency/ 2 - danger/ 3-fault/ 4-service/5-info (Yes/ No)				
Alarm	Setting value (setting area)	Entry delay	Exit delay	Priority	Group
AHU alarms					
Filter alarms					
Filter alarm	Not in use/ In use				
Filter alarm 1/2	Not in use/ In use				
SF filter alarm		1800 s	5 s	4-service	1
MIN speed/ supply filter alarm limit	30 Pa (5 ... 100 Pa)				
MAX speed/ supply filter alarm limit	60 Pa (5 ... 150 Pa)				
EF filter alarm		1800 s	5 s	4-service	1
MIN speed/ exhaust filter alarm limit	30 Pa (5 ... 100 Pa)				
MAX speed/ exhaust filter alarm limit	60 Pa (5 ... 150 Pa)				
Deviation alarm (In the event of a sensor fault, no exception alarm is issued)					
Supply air deviation alarm	In use/Not in use	10 min	5 s	3-fault	1
Max deviation	8.0°C (2.0 ... 20.0)				
Hysteresis	1°C				
Room temp deviation	In use/Not in use	30 min	5 s	3-fault	1
Max deviation	8.0°C (2.0 ... 20.0)				
Hysteresis	1°C				

Alarm	Setting value (setting area)	Entry delay	Exit delay	Acknowledge- ment required	Priority	Group
Emergency stop		1 s	5 s	Yes (No, Yes)	1-Emerg.	1
El. heater overheat		5 s	5 s		1-Emerg.	1
SF flow detector alarm	Not in use/ SF flow de- tector transm./ SF flow detector switch/ SF flow/ SF pressure			Yes (No, Yes)		
SF flow low limit SF pressure low limit	50 l/s (0 ... 500) 25 Pa (0 ... 500)	5 s	5 s		3 -fault	1
EF flow detector alarm	Not in use/ EF flow de- tector transm./ EF flow detector switch/ EF flow/ EF pressure			Yes (No, Yes)		
EF flow low limit EF pressure low limit	50 l/s (0 ... 500) 25 Pa (0 ... 500)	5 s	5 s		3 -fault	1
Supply air overheat High limit Hysteresis	Not in use/ In use 60°C (25 ... 100) 1°C	1 s	5 s		1-Emerg.	1
Heating (water radiator)						
Heating network pressure Low limit High limit Hysteresis	0.5 bar (0.0 ... 5.0) 2.5 bar (10 ... 10.0)	10 s/60 s	5 s		1-Emerg.	1
Heating pump contradiction alarm		2 s	5 s	Yes (No, Yes)	1-Emerg.	1
HRU pump contradiction		2s	5 s	Yes (No, Yes)	1-Emerg.	1
Heating valve leaking monitoring^{*)} Alarm limit for valve leakage Hysteresis	Not in use/ In use 2.0 °C (1 ... 5) 1°C				1-Emerg.	1
Return water low limit Enabled ^{**)} Low limit Hysteresis	On (On/Off) 7 °C (0... 10) 1°C	1 s	5 s	Yes (No, Yes)	1-Emerg.	1
Supply and Exhaust fan						
SF fan contradiction					1-Emerg.	1
EF fan contradiction		10 s			1-Emerg.	1
SF fan alarm		10 s			1-Emerg.	1
EF fan alarm		10 s			1-Emerg.	1
SF 1/1 fan contradiction alarm					1-Emerg.	1
EF 1/1 fan contradiction alarm					1-Emerg.	1
SF 1/2 fan contradiction alarm					1-Emerg.	1
EF 1/2 fan contradiction alarm					1-Emerg.	1
SF 1/1 fan alarm					1-Emerg.	1
EF 1/1 fan alarm					1-Emerg.	1
EF 1/2 fan alarm					1-Emerg.	1
SF 1/2 fan alarm					1-Emerg.	1
SF pressure deviation alarm Max deviation Hysteresis	Not in use/ In use 50 Pa (10 ... 1000) 5 Pa	60 s	5 s		3 -fault	1
EF pressure deviation alarm	Not in use/ In use				3 -fault	1
SF flow deviation alarm Max deviation Hysteresis	Not in use/ In use 250 l/s (10 ... 1000) 5 l/s	60 s	5 s		3 -fault 3 -fault	1 1
EF flow deviation alarm	Not in use/ In use				3 -fault	1

^{*)} In the leakage monitoring of the heating valve, the temperature difference over the heating radiator is measured (measurements Supply air after HRU and Supply air B). If the temperature difference exceeds the set value for a certain time when the heating valve control is less than 1%, an alarm is given.

^{**)} The "Return water low limit" alarm (freeze protection) is not allowed (0) if the "Freeze protection on/off" is enabled (see p. 45).

Alarm	Setting value (setting area)	Entry delay	Exit delay	Acknowledge- ment required	Priority	Group
Cooling						
❏ Cooling pump contradiction		5 s	5 s		3-fault	1
❏ Cooling pump alarm input		5 s	5 s		3-fault	1
Cooling network pressure		10 s	5 s		1-Emerg.	1
Low limit	0.5 bar (0.0 ... 5.0)	60s	5 s			
High limit	2.5 bar (10 ... 10.0)	60s	5s			
Hysteresis	0					
HRU						
❏ HRU melting alarm		5 s	5 s		3-fault	1
❏ HRU rotation alarm		5 s	1 s		3-fault	1
❏ HRU pressure alarm		10 s	5 s		1-Emerg.	1
Low limit	0.5 bar (0.0 ... 5.0)					
High limit	2.5 bar (10 ... 10.0)					
Hysteresis	0					
❏ HRU pump contradicton alarm		5 s	5 s		1-Emerg.	1
❏ HRU pump alarm		5 s	5 s		1-Emerg.	1
❏ HRU efficiency		5 min	5 s		3-fault	1
Low limit	45 % (0... 100 %)					
Hysteresis	5					
Stage control						
Stage control too many active stages		60 s	5 s	No (No, Yes)	1-Emerg.	1
Stage control no active stages		60 s	5 s	No (No, Yes)	1-Emerg.	1
Service interval alarm						
Service interval alarm	Not in use/In use				4-service	1
Service interval	5000 h (0...99999h)	10 s	5 s			
Service interval counter						
Reset service interval counter	(Reset counter)					
No-response alarms						
Device MB1. FLEXAO8 in address 2 not response	Enabled (Enabled/ Disabled)	120 s	10 s		1-Emerg.	1
Device MB1. FLEXDO4TRS in address 1 not response	Enabled (Enabled/ Disabled)	120 s	10 s		1-Emerg.	1
Device MB1. Ouman5CDPT in address 3 notresponse	Enabled (Enabled/ Disabled)	120 s	10 s		1-Emerg.	1
Sensor faults						
Sensor faults UI1 ... UI 16	Enabled/ Disabled	10 s	10 s		1-Emerg.	1
System error						
Enabled	Enabled/ Disabled	30 s	1 s		1-Emerg.	1
Low limit	0					
High limit	99					
Hysteresis	0					

SCertain safety alarms can stop the AHU (interrupt the AHU running permission). These include:

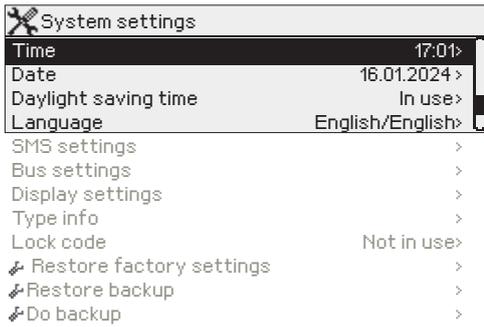
Supply air overheat alarm (fire hazard)

Return water low limit alarm (Ice protection)

Emergency stop

Heating pump alarm

7 System settings



System settings include date and time, language, SMS and bus settings, display settings and device type information.

7.1 Setting date, time and language

System settings > Time



Date and time information play a crucial role in various features, including time programs, alarm indication, and routing. The device's clock is equipped to automatically adjust for daylight savings and leap years. Additionally, it incorporates a power backup feature, ensuring the retention of accurate time and date information for up to a day in the event of a power outage.

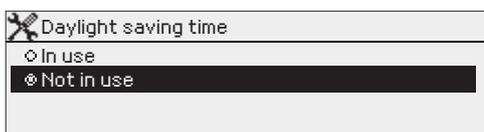
1. Set hours and press OK to accept.
2. Set minutes and press OK to accept.
3. To exit without saving and changes press Esc.

System settings > Date



1. Set day and press OK to accept (name of weekday is updated automatically).
2. Set month and press OK to accept.
3. Set year and press OK to accept.
4. To exit without saving and changes press Esc.

System settings > Daylight saving time



The controller will automatically be switched to daylight saving time and to standard time, if the selection "In use" is made.

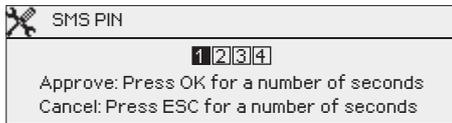
System settings > Language



The language of the user interface can be change here.

7.2 Text message (SMS) settings and take the GSM modem into use

System settings > SMS settings



Use of text messaging requires that the GSM modem (optional accessory) is connected to a S105.

Take the GSM modem into use:

1. Enter your PIN
2. Make a blackout.
3. Connect the modem.
4. Switch the power on and the controller initializes the modem and detects the message center. The message center number is read automatically. It should not be set manually (hidden set value). The message center number is not visible on the display when it is read automatically.
5. Check the signal strength and status of modem from S105 display
6. Enter Device ID, if you want.
7. Test the sms communication. Send to S105 a message: Key words. If the controller sends a message where is a list of key words, text message communication is ok. If the SMS communication does not work, check that the message center number has not been entered manually. Press and hold ok to open the hidden menus. If a message center number is entered but the number is incorrect, the number must be entered manually in the format +358. You can check the number with your operator. Another option is to take the SIM out from the modem and set it in the phone and then change the message center via the phone. In this case, delete the message center number from the controller. You can delete the message center number one character at a time by pressing the  button. Put the SIM card back in the controller. The controller automatically retrieves the message center number (the number is not displayed). Test at communication works.

SMS PIN:

If the SIM card has PIN inquiry in use, S105 device asks you to enter the PIN.

Entering the code:

- Turn the control knob and press OK to accept each number. Press ESC to return to the previous digit.
- Press OK for a few seconds to accept the code. Press ESC for a number of seconds to cancel.

GSM-modem connection:

The GSM modem is connected to S105 to RJ45 Port I.



Signal strength:

Signal strength is expressed with the following descriptions: "Excellent", "Good", "Moderate", "Low", "Very low" and "Initialization failed". If signal strength indicates "No network," try changing the modem's location or use an additional antenna. If the signal strength is "Very low" you should also move the modem to another location to try to improve signal strength. If "Initialisation failed" is stated, check that the SIM card is correctly installed.

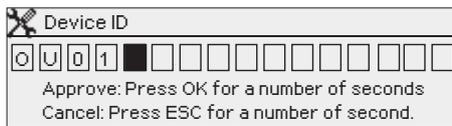
Modem status:

S105 recognizes whether the modem is connected or not. The controller initializes the GSM modem automatically.

SIM card status:

Mode	Explanation / Instructions
Ok	The modem is ready for use.
Not connected	The modem is not connected or the connection is incorrect.
Mode	Explanation / Instructions
Unregistered	The subscription agreement is not valid.
Registered	The SIM-card is ready for use.
PIN error	Enter S105 controller the same PIN as as the GSM modem's SIM card PIN.
PUK	SIM card is locked (PUK code).

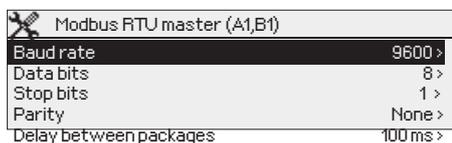
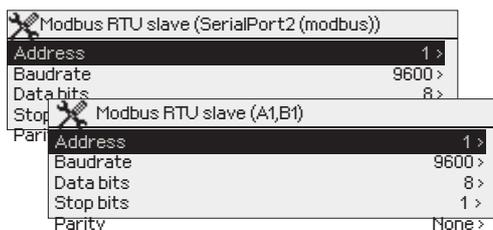
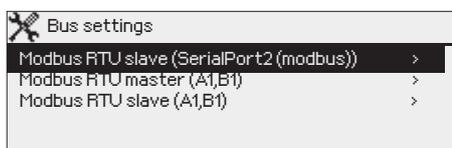
Device ID:



It's possible to define device ID to S105. Device ID works as a password for SMS communication. When device ID is in use, it should be added in front of the keyword in every SMS (e.g. **OU01** INPUTS).

7.3 Bus settings

System settings > Bus settings -> Modbus RTU slave (SerialPort2 (modbus))

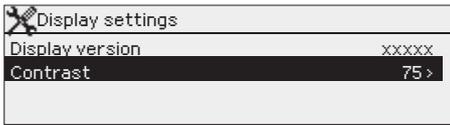


The S105 device can also be connected to the Modbus RTU bus as a slave device. The master/slave selection is made during commissioning in the bus point selections of the configuration (see p. 49). Other bus settings can be modified here.

Setting value	Factory setting	Range	Explanation
Address	1	1 ... 250	Modbus address of the slave device. Devices on the same bus must have a unique bus address. A duplicate address causes interference with the device's operation.
Baudrate	9600	4800, 9600, 14400, 19200, 38400, 56000, 57600, 115200	Devices on the same bus must have the same baud rate, data bits, stop bits and parity.
Data bits	8	7, 8	
Stop bits	1	1, 2	
Parity	None	None, Even, Odd	
Delay between packages	100 ms	0 ... 5000 ms	Master device setting value

7.4 Display settings

System settings > Display settings

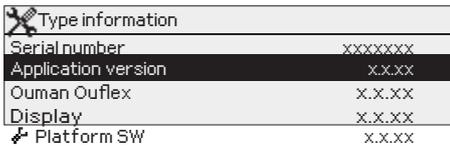


Contrast: You can adjust the contrast of the display. If you wish the display to be brighter, set a smaller numerical value.

The setting range is 50... 100. New setting is taken in use after confirmation is done.

7.5 Type information

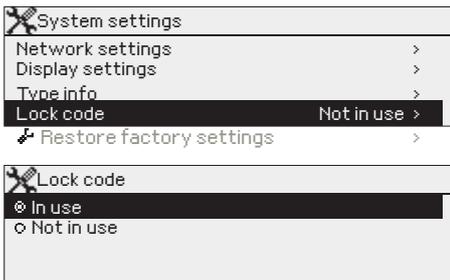
System settings > Type information



Type information shows the hardware and software versions. This information is useful especially in the case of maintenance or upgrade.

7.6 Lock code

System settings > Lock code



Enabling the lock code feature on the device ensures that no settings can be altered without entering the lock code.

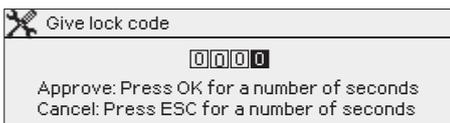
It is recommended to enable the lock code when the device is located where anyone can access it and change settings, such as deactivating burglar monitoring.

By locking the device and changing the lock code, you can prevent unauthorized use of the device.

This enhances the security of the device and protects it from potential tampering or misuse.

Lock code function	Description
Not in use	You can read S105 device information and change settings.
In use	You can view the device information of S105 without entering the lock code, but you cannot change any settings. The default factory setting for the lock code is 0000.

System settings > Change lock code



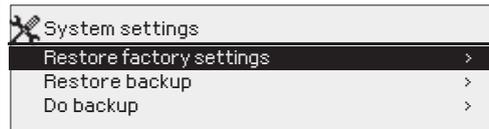
We highly recommend changing the lock code if taken into use.

1. S105 device asks you to enter the current code. The factory setting of lock code is 0000.
2. Turn the control knob and press OK to accept each number. Press ESC to return to the previous square.
3. Press OK for a number of seconds to accept the code. Press ESC for a number of seconds to cancel.

NOTE! When you enter a locking code when changing the default, the code will not be required again until the unit has been untouched for 10 minutes, when the display goes into idle state. You can also set the display in idle state by pressing the ESC button for a long period of time.

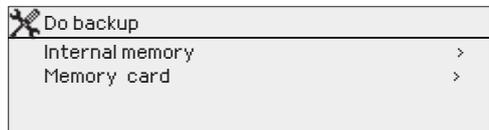
7.7 Restore settings and updates software

Restore factory settings



When you reset the system to factory default settings, the regulator will revert to controlled start-up mode. If you want to revert to the current settings later, create a backup copy before returning the factory settings.

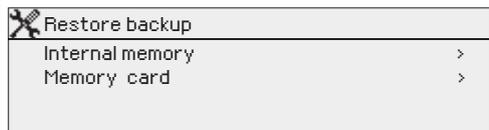
Do backup



Create a backup, when S105 has been configured and the device-specific settings have been set.

The backup function saves all parameters stored in the non-volatile memory, including setting values and time programs. You can save the backup (object_backup.cfg) to either the internal memory or a micro SD memory card. Backups saved to memory cards can be copied to another device.

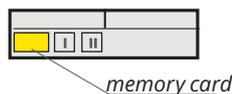
Restore backup



The latest backup may later be restored if necessary. You can restore a backup from a memory card or internal memory. When you select "restore backup", the controller restores the backup you have made yourself, if any. If it is not found, the controller automatically restores the backup that it has created.

Software updates

S105



The controller automatically creates backup (ANPBTWIMVWKW-CHXS.bak) **every hour to the controller's internal memory and also to the memory card if the controller has a memory card inserted. A software update should only be done if the device has a problem that requires an update. You can get more information about the possible need for an update by contacting Ouman's technical support (support@ouman.fi).**

We recommend that you make a manual backup before updating.

To update the software of S105, follow these steps:

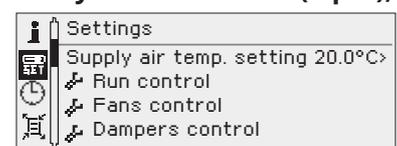
1. Insert a microSD memory card containing the new software into the controller.
2. S105 will ask, "Would you like to restart the device?"
3. Select "Yes."
4. S105 will reboot to begin updating the new software. The update process takes a few minutes.

8 Configuration

The easiest way to start commissioning is to go through the Selection of functions menu. Here, you can find the most important choices for different inputs and outputs connected to pre-selected functions. The content of the submenus changes somewhat, for example, depending on which fan type or heating mode. This makes it easier to choose the right inputs and outputs. Please note that more detailed input and output configuration information is not yet selected through this menu, and passive temperature measurements, for example, are NTC10-type by default.

When you have gone through the Selection of functions menu, you can view the settings in more detail for points from the Input configuration and Output configuration menus. You can change, for example, the sensor types of passive measurements, as well as change the scaling of transmitter measurements and analog outputs. Some things, such as for example freely named alarms (2 pcs), can only be found directly via the Income configuration menu.

When the items under the Configuration have been adjusted, the actual functional parameters of the process can be found in the contents of the Settings menu.



Before the actual start of the process, you can perform function tests by viewing the Point info menu and, for example, test analog control points with manual control.

The controller is in "Maintenance stop" mode after the first startup and configuration of the controller. Change the start control to the one you want when the machine is ready to start (Settings -> Run control). If you later want to change or remove some functionality, check and, if necessary, change unnecessary measurements/controls to "Not in use" mode.

 Configuration	
 Selection of functions	>
 Input configuration	>
 Output configuration	>
 Bus point selections	>

8.1 Selection of functions

Configuration -> Selection of functions

Selection of functions			
Stages			
Dampers	<input type="checkbox"/> Not in use	<input type="checkbox"/> In use	Select "In use" also when On/Off dampers are used.
Heating recovery	<input type="checkbox"/> Not in use	<input type="checkbox"/> In use	
Heating stage	<input type="checkbox"/> Not in use	<input type="checkbox"/> In use	
Cooling stage	<input type="checkbox"/> Not in use	<input type="checkbox"/> In use	
Main measurements			
	Select measurement channel		
Outdoor temperature	<input type="checkbox"/> Not in use	<input type="checkbox"/> In use -> select UI 1... UI 16	selected ____
Supply air temperature	<input type="checkbox"/> Not in use	<input type="checkbox"/> In use -> select UI 1... UI 16	selected ____
Supply air after HRU	<input type="checkbox"/> Not in use	<input type="checkbox"/> In use -> select UI 1... UI 16	selected ____
Extract air temperature	<input type="checkbox"/> Not in use	<input type="checkbox"/> In use -> select UI 1... UI 16	selected ____
Exhaust temperature	<input type="checkbox"/> Not in use	<input type="checkbox"/> In use -> select UI 1... UI 16	selected ____
Room temperature	<input type="checkbox"/> Not in use	<input type="checkbox"/> In use -> select UI 1... UI 16	selected ____
CO2 measurement	<input type="checkbox"/> Not in use	<input type="checkbox"/> In use -> select UI 1... UI 16	selected ____
Exhaust air RH%	<input type="checkbox"/> Not in use	<input type="checkbox"/> In use -> select UI 1... UI 16	selected ____
Fans			
Fan type	<input type="checkbox"/> 1-speed <input type="checkbox"/> 2-speed <input type="checkbox"/> constant speed <input type="checkbox"/> Pressure controlled <input type="checkbox"/> Air volume controlled		
SF Indication type	<input type="checkbox"/> Running status <input type="checkbox"/> Pressure transmitter <input type="checkbox"/> Alarm		
EF Indication type	<input type="checkbox"/> Running status <input type="checkbox"/> Pressure transmitter <input type="checkbox"/> Alarm		
SF pressure difference	<input type="checkbox"/> Not in use	<input type="checkbox"/> In use-> select UI 1... UI 16, DPT-CH 1... 5	selected ____
EF pressure difference	<input type="checkbox"/> Not in use	<input type="checkbox"/> In use-> select UI 1... UI 16, DPT-CH 1... 5	selected ____
SF volume of air flow	<input type="checkbox"/> Not in use	<input type="checkbox"/> In use-> select UI 1... UI 16, DPT-CH 1... 5	selected ____
EF volume of air flow	<input type="checkbox"/> Not in use	<input type="checkbox"/> In use-> select UI 1... UI 16, DPT-CH 1... 5	selected ____
SF indication	<input type="checkbox"/> Not in use	<input type="checkbox"/> In use-> select UI 1... UI 16, DI 1 or DI 2	selected ____
EF indication	<input type="checkbox"/> Not in use	<input type="checkbox"/> In use-> select UI 1... UI 16, DI 1 or DI 2	selected ____
SF 1/2 indication	<input type="checkbox"/> Not in use	<input type="checkbox"/> In use-> select UI 1... UI 16, DI 1 or DI 2	selected ____
SF 1/1 indication	<input type="checkbox"/> Not in use	<input type="checkbox"/> In use-> select UI 1... UI 16, DI 1 or DI 2	selected ____
EF 1/2 indication	<input type="checkbox"/> Not in use	<input type="checkbox"/> In use-> select UI 1... UI 16, DI 1 or DI 2	selected ____
EF 1/1 indication	<input type="checkbox"/> Not in use	<input type="checkbox"/> In use-> select UI 1... UI 16, DI 1 or DI 2	selected ____
AHU running info from distr. center	<input type="checkbox"/> Not in use	<input type="checkbox"/> In use-> select UI 1... UI 16, DI 1 or DI 2	selected ____
SF filter alarm	<input type="checkbox"/> Not in use	<input type="checkbox"/> In use-> select UI 1... UI 16, DPT-CH 1... 5	selected ____
EF filter alarm	<input type="checkbox"/> Not in use	<input type="checkbox"/> In use-> select UI 1... UI 16, DPT-CH 1... 5	selected ____
SF PDS filter alarm	<input type="checkbox"/> Not in use	<input type="checkbox"/> In use-> select UI 1... UI 16, DI 1 or DI 2	selected ____
EF PDS filter alarm	<input type="checkbox"/> Not in use	<input type="checkbox"/> In use-> select UI 1... UI 16, DI 1 or DI 2	selected ____
SF PDS 1/2 filter alarm	<input type="checkbox"/> Not in use	<input type="checkbox"/> In use-> select UI 1... UI 16, DI 1 or DI 2	selected ____
EF PDS 1/2 filter alarm	<input type="checkbox"/> Not in use	<input type="checkbox"/> In use-> select UI 1... UI 16, DI 1 or DI 2	selected ____
SF flow detector	<input type="checkbox"/> Not in use	<input type="checkbox"/> SF flow detector transm. <input type="checkbox"/> SF flow detector switch <input type="checkbox"/> SF flow <input type="checkbox"/> SF pressure	
SF flow detector	<input type="checkbox"/> Not in use	<input type="checkbox"/> In use-> select UI 1... UI 16, 5-DPT CH 1... 5 select UI 1... UI 16, DI 1 or DI 2	selected ____
EF flow detector	<input type="checkbox"/> Not in use	<input type="checkbox"/> EF flow detector transm. <input type="checkbox"/> EF flow detector switch <input type="checkbox"/> EF flow <input type="checkbox"/> EF pressure	
EF flow detector	<input type="checkbox"/> Not in use	<input type="checkbox"/> In use-> select UI 1... UI 16, 5-DPT CH 1... 5 select UI 1... UI 16, DI 1 or DI 2	selected ____

... Fans			
Supply fan output	<input type="checkbox"/> Not in use	<input type="checkbox"/> In use-> select AO 1... AO 6	selected _____
Exhaust fan output	<input type="checkbox"/> Not in use	<input type="checkbox"/> In use-> select AO 1... AO 6	selected _____
SF running permission output	<input type="checkbox"/> Not in use	<input type="checkbox"/> In use-> select TR1 ... TR6 or AO 1... AO 6	selected _____
EF running permission output	<input type="checkbox"/> Not in use	<input type="checkbox"/> In use-> select TR1 ... TR6 or AO 1... AO 6	selected _____
1/1 running permission output	<input type="checkbox"/> Not in use	<input type="checkbox"/> In use-> select TR1 ... TR6 or AO 1... AO 6	selected _____
1/2 running permission output	<input type="checkbox"/> Not in use	<input type="checkbox"/> In use-> select TR1 ... TR6 or AO 1... AO 6	selected _____
Run indication AHU start	<input type="checkbox"/> No	<input type="checkbox"/> Yes	
Serial control	<input type="checkbox"/> Not in use	<input type="checkbox"/> In use	selected _____
Emergency stop	<input type="checkbox"/> Not in use	<input type="checkbox"/> In use-> select UI 1... UI 16, DI 1 or DI 2	selected _____
External timer button input	<input type="checkbox"/> Not in use	<input type="checkbox"/> In use-> select UI 1... UI 16, DI 1 or DI 2	selected _____
Ext. control input	<input type="checkbox"/> Not in use	<input type="checkbox"/> In use-> select UI 1 ... UI 16 or DI 1... DI 2	selected _____
AHU run permission output	<input type="checkbox"/> Not in use	<input type="checkbox"/> In use-> select TR1 ... TR6 or AO 1... AO 6	selected _____
Dampers			
Damper operating mode	<input type="checkbox"/> On/Off dampers	<input type="checkbox"/> Constant position dampers	<input type="checkbox"/> Cascade control dampers
Dampers output	<input type="checkbox"/> Not in use	<input type="checkbox"/> In use-> AO 1... AO 6	selected _____
ON/OFF dampers output	<input type="checkbox"/> Not in use	<input type="checkbox"/> In use-> select DO1 ... DO6 or AO 1... AO 6	selected _____
HRU			
HRU type	<input type="checkbox"/> Plate	<input type="checkbox"/> Rotating	<input type="checkbox"/> Liquid
Freezing risk identification	<input type="checkbox"/> Temperature	<input type="checkbox"/> Pressure switch	<input type="checkbox"/> 2 pressure switches <input type="checkbox"/> Pressure transmitter
Supply air after HRU	<input type="checkbox"/> Not in use	<input type="checkbox"/> In use-> select UI 1... UI 16	selected _____
Exhaust temperature	<input type="checkbox"/> Not in use	<input type="checkbox"/> In use-> select UI 1... UI 16	selected _____
HRU pressure difference	<input type="checkbox"/> Not in use	<input type="checkbox"/> In use-> select UI 1... UI 16, DPT-CH 1... 5	selected _____
HRU pressure switch	<input type="checkbox"/> Not in use	<input type="checkbox"/> In use-> select UI 1... UI 16, DI 1 or DI 2	selected _____
HRU 1/2 pressure switch	<input type="checkbox"/> Not in use	<input type="checkbox"/> In use-> select UI 1... UI 16, DI 1 or DI 2	selected _____
HRU monitoring ind.	<input type="checkbox"/> Not in use	<input type="checkbox"/> In use-> select UI 1... UI 16, DI 1 or DI 2	selected _____
HRU running permission output	<input type="checkbox"/> Not in use	<input type="checkbox"/> In use-> select DO1 ... DO6 or AO 1... AO 6	selected _____
HRU circuit pressure	<input type="checkbox"/> Not in use	<input type="checkbox"/> Pressure switch <input type="checkbox"/> Pressure transmitter	
HRU circuit pressure transmitter	<input type="checkbox"/> Not in use	<input type="checkbox"/> In use-> select UI 1... UI 16	selected _____
HRU circuit pressure switch	<input type="checkbox"/> Not in use	<input type="checkbox"/> In use-> select UI 1... UI 16, DPT-CH 1... 5	selected _____
HRU pump indication	<input type="checkbox"/> Not in use	<input type="checkbox"/> In use-> select UI 1... UI 16, DI 1 or DI 2	
HRU pump output	<input type="checkbox"/> Not in use	<input type="checkbox"/> In use-> select DO1 ... DO6 or AO 1... AO 6	selected _____
HRU control mode	<input type="checkbox"/> Not in use	<input type="checkbox"/> 0 ... 10V	
HRU output	<input type="checkbox"/> Not in use	<input type="checkbox"/> In use-> AO 1... AO 6	selected _____
HRU override output	<input type="checkbox"/> Not in use	<input type="checkbox"/> In use-> select AO 1... AO 6	selected _____
Section defrost control	<input type="checkbox"/> Not in use	<input type="checkbox"/> In use	
Preheating according temperat.	<input type="checkbox"/> Not in use	<input type="checkbox"/> In use	
Preheating control/ Press. transmitter	<input type="checkbox"/> Not in use	<input type="checkbox"/> In use	
Preheating control from defrost laps	<input type="checkbox"/> Not in use	<input type="checkbox"/> In use	
Preheating actuator	<input type="checkbox"/> Not in use	<input type="checkbox"/> 0 ... 10V <input type="checkbox"/> PWM	selected _____
Preheating output	<input type="checkbox"/> Not in use	<input type="checkbox"/> In use-> AO 1... AO 6	selected _____
Preheating PWM output	<input type="checkbox"/> Not in use	<input type="checkbox"/> In use-> select DO1 ... DO6 or AO 1... AO 6	selected _____

*) Information about the use of the external ON/Off freeze protection (see next page): The message from the heating coil is sent from the S105 AO output to the 0-10V input of the freeze protection thermostat. Freeze protection changes the 0-10V signal coming to the actuator, if necessary, if it is needed for anticipation, or if the set value of the return water (if the freeze protection thermostat has an adjustable return water set value) does not match. The measurement value of the return water is obtained from the frost protection thermostat as a transmitter message. This can be connected to the measurement input of the S105 controller, so that the current return water temperature can be displayed.

Selection of functions: Heating

Heating type	<input type="checkbox"/> Water radiator	<input type="checkbox"/> Electric heater	
El. heating control mode	<input type="checkbox"/> 0 ... 10V	<input type="checkbox"/> PWM	<input type="checkbox"/> Electric step heater
Temperature control mode	<input type="checkbox"/> Supply air controlled	<input type="checkbox"/> Extract/room air controlled	
Control sensor sel.	<input type="checkbox"/> Extract air	<input type="checkbox"/> Room temperature	
Room temperature	<input type="checkbox"/> Not in use	<input type="checkbox"/> In use-> select UI 1... UI 16	selected _____
Extract temp.	<input type="checkbox"/> Not in use	<input type="checkbox"/> In use-> select UI 1... UI 16	selected _____
Return water	<input type="checkbox"/> Not in use	<input type="checkbox"/> In use-> select UI 1... UI 16	selected _____
Heat. pump ind.	<input type="checkbox"/> Not in use	<input type="checkbox"/> In use-> select UI 1... UI 16, DI 1 or DI 2	selected _____
Heat. pump control out	<input type="checkbox"/> Not in use	<input type="checkbox"/> In use-> select DO1...DO6 or AO1... AO6	selected _____
Pressure alarm	<input type="checkbox"/> Not in use	<input type="checkbox"/> Pressure switch	<input type="checkbox"/> Pressure transmitter
Heat. circuit press. switch	<input type="checkbox"/> Not in use	<input type="checkbox"/> In use-> select UI 1... UI 16, DI 1 or DI 2	selected _____
Heating circuit pressure	<input type="checkbox"/> Not in use	<input type="checkbox"/> In use-> select UI 1... UI 16	selected _____
El. overheating ind.	<input type="checkbox"/> Not in use	<input type="checkbox"/> In use-> select UI 1... UI 16, DI 1 or DI 2	selected _____
Heating actuator	<input type="checkbox"/> Not in use	<input type="checkbox"/> 0 ... 10V	<input type="checkbox"/> 3-point
Actuator running time	_____ 60 s	range 5 ... 500 s	
Heating output	<input type="checkbox"/> Not in use	<input type="checkbox"/> In use-> AO1... AO6	selected _____
Heating 3-point open output	<input type="checkbox"/> Not in use	<input type="checkbox"/> In use-> select DO1... DO6 or AO1...AO6	selected _____
Heating 3-point closed output	<input type="checkbox"/> Not in use	<input type="checkbox"/> In use-> select DO1... DO6 or AO1... AO6	selected _____
Valve leaking monitoring	<input type="checkbox"/> Not in use	<input type="checkbox"/> In use	
Supply air temperature B	<input type="checkbox"/> Not in use	<input type="checkbox"/> In use-> select UI 1... UI 16	selected _____
Supply air after HRU	<input type="checkbox"/> Not in use	<input type="checkbox"/> In use-> select UI 1... UI 16	selected _____
Electric heater control	<input type="checkbox"/> Not in use	<input type="checkbox"/> In use-> AO 1... AO 6	selected _____
Electric heater PWM output	<input type="checkbox"/> Not in use	<input type="checkbox"/> In use-> select DO1...DO6 or AO1... AO6	selected _____
Step heater PWM inp.	<input type="checkbox"/> Not in use	<input type="checkbox"/> In use-> AO 1... AO 6	selected _____
Run permission of el.heater	<input type="checkbox"/> Not in use	<input type="checkbox"/> In use-> select DO1...DO6 or AO1... AO6	selected _____
Direction of el.heater permission	<input type="checkbox"/> NO	<input type="checkbox"/> NC	Select the status of the relay when permission to run has not been given
Freeze protection on/off *)	<input type="checkbox"/> Not in use	<input type="checkbox"/> In use-> select UI 1... UI 16, DI 1 or DI 2	selected _____

Cooling

Cooling type	<input type="checkbox"/> Continuous	<input type="checkbox"/> On/Off	
Cooling pump ind.	<input type="checkbox"/> Not in use	<input type="checkbox"/> In use-> select UI 1... UI 16, DI 1 or DI 2	selected _____
Cooling running permission output	<input type="checkbox"/> Not in use	<input type="checkbox"/> In use-> select DO1 ... DO6 or AO 1... AO 6	selected _____
Pressure alarm	<input type="checkbox"/> Not in use	<input type="checkbox"/> Pressure switch	<input type="checkbox"/> Pressure transmitter
Cooling circuit pressure switch	<input type="checkbox"/> Not in use	<input type="checkbox"/> In use -> select UI 1... UI 16, DI 1 or DI 2	selected _____
Cooling circuit pressure	<input type="checkbox"/> Not in use	<input type="checkbox"/> In use-> select UI 1... UI 16	selected _____
Cooling actuator	<input type="checkbox"/> Not in use	<input type="checkbox"/> 0 ... 10V	<input type="checkbox"/> 3-point
Actuator running time	_____	default: 60 s (5 ... 500 s)	
Cooling output	<input type="checkbox"/> Not in use	<input type="checkbox"/> In use-> select AO 1... AO 6	selected _____
Cooling 3p-open output	<input type="checkbox"/> Not in use	<input type="checkbox"/> In use-> select DO1 ... DO6 or AO 1... AO 6	selected _____
Cooling 3p-closed output	<input type="checkbox"/> Not in use	<input type="checkbox"/> In use-> select DO1 ... DO6 or AO 1... AO 6	selected _____
Cooling 1. stage output	<input type="checkbox"/> Not in use	<input type="checkbox"/> In use-> select DO1 ... DO6 or AO 1... AO 6	selected _____
Cooling 2. stage out	<input type="checkbox"/> Not in use	<input type="checkbox"/> In use-> select DO1 ... DO6 or AO 1... AO 6	selected _____

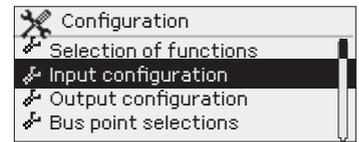
*) When Freeze protection on/off (external freeze protection) is selected, S105 does not require return water measurement, and return water prediction and freeze protection via the controller's own application are not enabled. The freeze protection stop of the process works only on the basis of the on/off state information and through the blower lock of the external freeze protection.

8.2 Input configuration

Configuration -> Input configuration

The following can be determined specific to each measurement channel:

- Input type (passive sensor, transmitter measurement, digital input, pulse input)
- Input selection (what is measured)
- You can name the measurement
- You can set the minimum and maximum limits for the measurement
- You can determine the polarity of the digital input (NO/NC, default: NO)
- You can specify the measurement accuracy (number of decimals)
- You can choose the unit of measurement (°C, °C/min, °C/h, K, °F, %, W, kW, MW, Pa, kPa, bar, m3, l, mA, A, V, Wh, kWh, MWh, Hz, h, min, s, m/s, 1/min, 1/s, l/s, ppm, rpm)
- You can activate the sensor fault alarm specific to each measurement channel (ON/ OFF)
- You can rename the position identifiers (the default format of the universal input position identifier is UI 1M)
- If a general alarm (Alarm 1 or Alarm 2) is connected to the DI1 or DI2 input, you can name the alarm, set the polarity, assign a position code, choose whether it is an alarm that stops the AHU and whether acknowledgment is required before the AHU can restart.



Note!

If you wish to deactivate or reuse one of the inputs (UI 1 ... UI 16), begin by selecting "Not in Use" mode in the Input Selection. Subsequently, choose "Not in use" as the Input Type, or select a new type if needed. This ensures the proper setup or modification of inputs.

Input configuration	
INPUT	
Type	
<input type="checkbox"/>	Not in use
<input type="checkbox"/>	Digital input
<input type="checkbox"/>	NTC-10
<input type="checkbox"/>	0...10V
<input type="checkbox"/>	mA
<input type="checkbox"/>	PT-1000
<input type="checkbox"/>	NI-1000
<input type="checkbox"/>	NI-1000DIN
<input type="checkbox"/>	NTC-1.8
<input type="checkbox"/>	NTC-2.2
<input type="checkbox"/>	NTC-20

Note! You can also make input selection in "Selection of functions" menu.

Input configuration																			
INPUT	0	UI 1	UI 2	UI 3	UI 4	UI 5	UI 6	UI 7	UI 8	UI 9	UI 10	UI 11	UI 12	UI 13	UI 14	UI 15	UI 16	MIN	MAX
Input selection																		-50	130
Outdoor temperature																			
Supply air																			
Supply air B																			
Supply air after HRU																			
Extract air																			
Exhaust air																			
Room temperature																			
Return water																			
CO2 measurement																			
Exhaust air RH%																			
HRU pressure difference																			
HRU circuit pressure																			
Cooling network pressure																			
SF pressure																			
EF pressure																			
SF filter alarm																			
EF filter alarm																			
Heating circuit pressure																			
SF flow																			
EF flow																			
SF flow detector																			
EF flow detector																			

Input configuration																					
INPUT	0	UI 1	UI 2	UI 3	UI 4	UI 5	UI 6	UI 7	UI 8	UI 9	UI 10	UI 11	UI 12	UI 13	UI 14	UI 15	UI 16	DI 1	DI 2	MIN	MAX
Input selection																				-50	130
Emergency stop																					
External timer button																					
SF indication																					
EF indication																					
HRU pump indication																					
Heating pump indication																					
Cooling pump alarm																					
Electric heater over heating protection																					
HRU rotation monitoring																					
SF 1/2 indication																					
SF 1/1 indication																					
EF 1/2 indication																					
EF 1/1 indication																					
SF PDS filter alarm																					
SF PDS 1/2 filter alarm																					
EF PDS filter alarm																					
EF PDS 1/2 filter alarm																					
HRU PDS																					
HRU 1/2 press switch																					
Heating circuit press. switch																					
SF flow detector																					
EF flow detector																					
External control																					
AHU running info from distr. center																					
Alarm 1																					
Alarm 2																					
Cooling circuit press. switch																					
HRU circuit press. switch																					
Freeze protection on/off																					

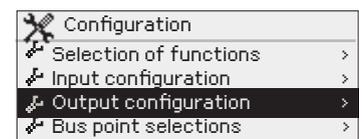
Input configuration																				
INPUT	UI 1	UI 2	UI 3	UI 4	UI 5	UI 6	UI 7	UI 8	UI 9	UI 10	UI 11	UI 12	UI 13	UI 14	UI 15	UI 16	DI 1	DI 2		
Input selection																				
Advanced settings																				
MIN																				
MAX																				
Polarity: <input type="checkbox"/> NO																				
<input type="checkbox"/> NC																				
Sensor fault alarm: <input type="checkbox"/> ON																				
<input type="checkbox"/> OFF																				
Type: °C, °C/min, °C/h, K, °F, %, W, kW, MW, Pa, kPa, bar, m3, l, mA, A, V, Wh, kWh, MWh, Hz, h, min, s, m/s, 1/min, 1/s, l/s, ppm, rh%, rpm																				
Type:																				
Pump alarm stops AHU																				
Acknowledgment required																				

Input configuration					
Input	5DPT-CH1 channel 1	5DPT-CH2 channel 2	5DPT-CH3 channel 3	5DPT-CH4 channel 4	5DPT-CH5 channel 5
Input selection:					
<input type="checkbox"/> HRU pressure difference					
<input type="checkbox"/> SF pressure					
<input type="checkbox"/> EF pressure					
<input type="checkbox"/> SF filter alarm					
<input type="checkbox"/> EF filter alarm					
<input type="checkbox"/> SF flow					
<input type="checkbox"/> EF flow					
<input type="checkbox"/> SF flow detector					
<input type="checkbox"/> EF flow detector					
Name	Pressure difference channel1	Pressure difference channel2	Pressure difference channel3	Pressure difference channel4	Pressure difference channel5
New name					
Lower limit for pressure range -1000 Pa (-1000 ...0)					
Upper limit for pressure range channel 1000 Pa (0 ... 1000)					
Reset Off (Off/ON)					
Measurement adjustment 0 Pa (-100 ...100)					
Position ID pressure	_____	_____	_____	_____	_____
DP-TPRESS.CHx.M	DPT-PRESS.CH1.M	DPT-PRESS.CH2..M	DPT-PRESS.CH3..M	DPT-PRESS.CH4.M	DPT-PRESS.CH5.M
--- FLOW ---	Flow channel1	Flow channel 2	Flow channel 3	Flow channel 4	Flow channel 5
Fan manufacturer					
<input type="checkbox"/> Ziehl-Abegg					
<input type="checkbox"/> EBM-papst					
<input type="checkbox"/> Fläktwoods					
<input type="checkbox"/> Rosenberg					
<input type="checkbox"/> Nicotra					
<input type="checkbox"/> Comefri					
<input type="checkbox"/> Gebhardt					
K-value 100 (0 ... 4700)					
Scaling:					
<input type="checkbox"/> m3/h					
<input type="checkbox"/> m3/s					
<input type="checkbox"/> tai l/s					
Position ID flow	_____	_____	_____	_____	_____
DPT-FLOW.CHx.M	DPT-FLOW.CH1.M	DPT-FLOW.CH2.M	DPT-FLOW.CH3.M	DPT-FLOW.CH4.M	DPT-FLOW.CH5.M

Don't forget to activate the functions you want to use. You can activate these functions in the 'Configuration' menu under 'Selection of functions.' Alternatively, you can activate functions via the control stage's setting values (Settings -> select the correct control stage -> Setting values)

8.3 Output configuration

Configuration -> Output configuration



Output selection: The control outputs for outputs are reserved here. The controller has 6 analogue control outputs and 6 digital outputs.

Output configuration: You have the flexibility to decide what the output controls, and you can even re-name it. An analog output can be restricted by configuring minimum and maximum voltage values, along with voltage values for the ON and OFF modes. For instance, a 10VDC relay control operates in an on/off mode, similar to PWM control of a semiconductor relay. Additionally, you can specify the polarity of the digital outputs (NO/NC).

Output configuration												
OUTPUT	Analog output						ON/OFF- digital output					
	AO 1	AO 2	AO 3	AO 4	AO 5	AO 6	TR 1	TR 2	TR 3	TR 4	TR 5	TR 6
Type: <input type="checkbox"/> Analog							-	-	-	-	-	-
<input type="checkbox"/> Digital							-	-	-	-	-	-
Output selection	Note! You can also make Output selection in "Selection of functions" menu.											
Dampers control							-	-	-	-	-	-
Heating control							-	-	-	-	-	-
Supply fan control							-	-	-	-	-	-
Exhaust fan control							-	-	-	-	-	-
HRU control							-	-	-	-	-	-
HRU override control							-	-	-	-	-	-
Cooling control							-	-	-	-	-	-
Preheat control							-	-	-	-	-	-
Electric step heater PWM							-	-	-	-	-	-
SF run permission												
EF run permission												
1/1 run permission												
1/2 run permission												
AHU run permission												
ON/OFF dampers												
Heating 3point/open												
Heating 3point/close												
Heating pump												
Heating PWM												
Preheating PWM												
HRU pump												
EF 1/1 running permission												
EF 1/2 running permission												
Cooling running permission												
Cooling 3point/open												
Cooling 3point/close												
Cooling stage 1 control												
Cooling stage 2 control												
HRU run permission												
Sum alarm												
El. heater run permission												
Advanced settings												
Minimum (default 0V)							-	-	-	-	-	-
Maximum (default 10V)							-	-	-	-	-	-
Off status (default 0V)							-	-	-	-	-	-
ON status (default 10V)							-	-	-	-	-	-
Position ID (AO 1...6.C)												
Polarity: <input type="checkbox"/> NO (default)	-	-	-	-	-	-						
<input type="checkbox"/> NC	-	-	-	-	-	-						

8.4 Bus point selections

Configuration -> Bus point selections

 Configuration	
 Selection of functions	>
 Input configuration	>
 Output configuration	>
 Bus point selections	>

The implementation of electric heater stage control and HRU melting requires the connection of additional modules.

The electric radiator DO controls are connected to outputs 1–4 in the Ouman FLEX-DO4-TRS or FLEX-DO4-R auxiliary module.

AO controls of HRU melting are connected to outputs 1–5 in the Ouman FLEX-AO8 auxiliary module.

Set a unique bus address. Note that address 1 is reserved for the electric radiator control, address 2 for sequence defrosting and address 3 for the Ouman DPT-5CH pressure difference transmitter if these bus points are enabled.

As a default the Modbus RTU bus is in slave use. If you connect an Ouman 5-CDPT device to the bus or enable the AO controls of the electric heater step control or HRU block melting via an additional module, the bus is automatically set to Master use and the controller requires you to restart the controller.

Devices on the same bus must have the same baud rate, the same number of data bits and stop bits, and the same parity.

Bus settings								
	INPUTS						OUTPUTS	
Bus points	Outdoor temp. from bus	Room temp. from bus	Room RH from bus	Heating pump ind. from bus	Emergency stop from bus	Ouman 5-CDPT from bus	El. heater stage control	HRU melting
<input type="checkbox"/> Not in use								
<input type="checkbox"/> In use								
Master/Slave	slave	slave	slave	slave	slave	master	master	master
Bus settings								
Address (1 ... 250)						3	1	2
Baud rate	<input type="checkbox"/> 4800/ <input type="checkbox"/> 9600 (default)/ <input type="checkbox"/> 14400/ <input type="checkbox"/> 19 200/ <input type="checkbox"/> 38400/ <input type="checkbox"/> 56000/ <input type="checkbox"/> 57600/ <input type="checkbox"/> 115200							
Data bits	<input type="checkbox"/> 7/ <input type="checkbox"/> 8 (oletus)							
Stop bits	<input type="checkbox"/> 1 (default)/ <input type="checkbox"/> 2							
Parity	<input type="checkbox"/> None (default)/ <input type="checkbox"/> Even/ <input type="checkbox"/> Odd							
Delay between packets (0 ... 5000 ms)	-	-	100 ms	100 ms	-	100 ms	100 ms	100 ms

Ouman 5-CDPT Settings

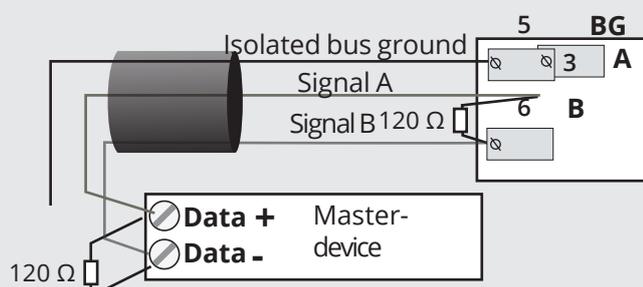
Input	DPT-CH1 channel 1	DPT-CH2 channel 2	DPT-CH3 channel 3	DPT-CH4 channel 4	DPT-CH5 channel 5
Measurement response time 4 s (0 ... 20 s)					
Measurement status					
<input type="checkbox"/> On					
<input type="checkbox"/> Off					
Lower limit for pressure range -1000 Pa (-1000 ... 0)					
Upper limit for pressure range channel 1000 Pa (0 ... 1000)					
Reset: Off (default)/ On					
Reset all channels Off (default)/ On					
Measurement adjustment 0 Pa (-100 ... 100)					
Fan manufacture	<input type="checkbox"/> Ziehl-Abegg/ <input type="checkbox"/> EBM-papst/ <input type="checkbox"/> Fläktwoods/ <input type="checkbox"/> Rosenberg/ <input type="checkbox"/> Nicotra/ <input type="checkbox"/> Comefri/ <input type="checkbox"/> Gebhardt				
K-value 100 (0 ... 4700)					
Scale <input type="checkbox"/> m3/h (default)	<input type="checkbox"/> m3/h <input type="checkbox"/> m3/s <input type="checkbox"/> l/s	<input type="checkbox"/> m3/h <input type="checkbox"/> m3/s <input type="checkbox"/> l/s	<input type="checkbox"/> m3/h <input type="checkbox"/> m3/s <input type="checkbox"/> l/s	<input type="checkbox"/> m3/h <input type="checkbox"/> m3/s <input type="checkbox"/> l/s	<input type="checkbox"/> m3/h <input type="checkbox"/> m3/s <input type="checkbox"/> l/s

FLOW CALCULATION

Fan manufacturer	Calculation formula	k-value	Unit
Fläktwoods	$q = \frac{1}{k} \cdot \sqrt{\Delta P}$	0.3 ... 99	m³/s
Rosenberg Comefri	$q = k \cdot \sqrt{\frac{2 \cdot \Delta P}{\rho}}$	Rosenberg: 37 ... 800 Comefri: 10 ... 2000	m³/h
Nicotra	$q = CPFN \cdot \sqrt{\frac{2 \cdot \Delta}{\rho}}$	10 ... 1500	m³/h
Gebhardt	$q = k \cdot \sqrt{\frac{2 \cdot \Delta P}{\rho}}$	50 ... 4700	m³/h
Ziehl-Abegg Ebm-papst	$q = k \cdot \sqrt{\Delta P}$	10 ... 1500	m³/h
Ziehl-Abegg Ebm-papst	$q = k \cdot \sqrt{\Delta P} \cdot \frac{1000}{3600}$	10 ... 1500	l/s

Modbus RTU connection:

Twisted pair cable is used to connect RTU devices, e.g. DATAJAMAK 2 x (2 + 1) x 0.24. The bus cable's shield (FE) is connected to the BG connector of the S105. In the master device the shield can be left disconnected or be connected to a potential free contact. A 120 Ω terminating resistor is connected to both ends of the bus.



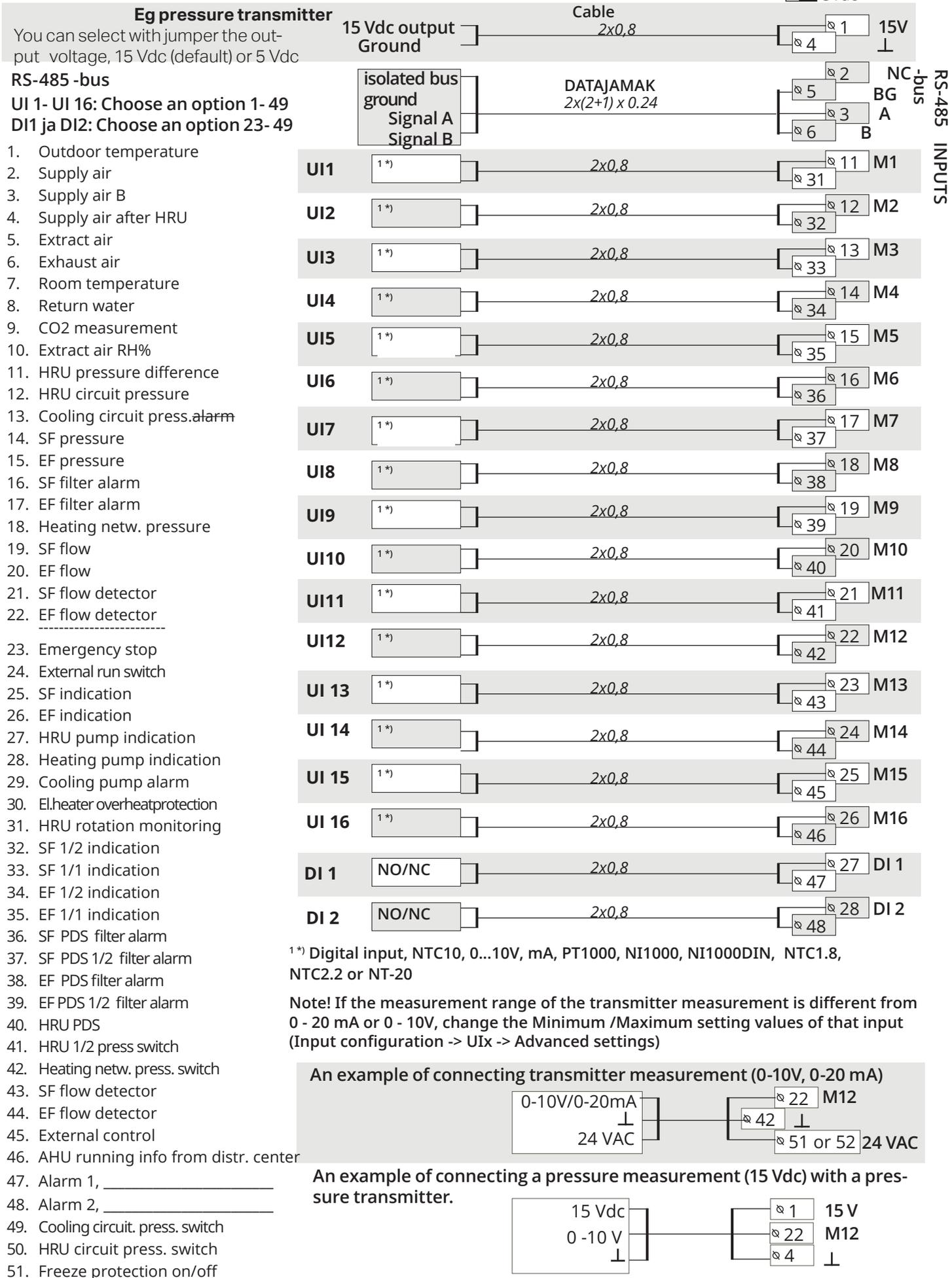
9. Connection guide

UI1-UI16 and DI1-DI2

S105 controller

Jumper: Output voltage of terminal 1

15Vdc (default)
 5Vdc



Outputs and power supply

S105 controller

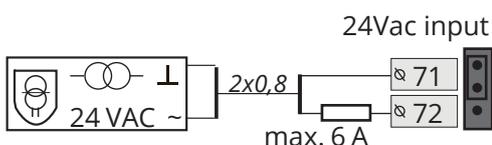
Selectable modes of use:

AO1- AO6: choose an option 1-29
TR1 - TR6: choose an option 10-31

1. Dampers control
2. Heating control
3. Supply fan control
4. Exhaust fan control
5. HRU control
6. HRU override control
7. Cooling control
8. Preheat control
9. Electric step heater PWM

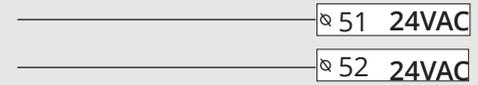
10. SF run permission
11. EF run permission
12. 1/1 run permission
13. 1/2 run permission
14. AHU run permission
15. ON/OFF dampers
16. Heating 3point/open
17. Heating 3point/close
18. Heating pump
19. Heating PWM
20. Preheating PWM
21. HRU pump
22. EF 1/1 running permission
23. EF 1/2 running permission
24. Cooling running permission
25. Cooling 3point/open
26. Cooling 3point/close
27. Cooling stage 1 control
28. Cooling stage 2 control
29. HRU running permission
30. Sum alarm
31. El. heater run permission

External power source

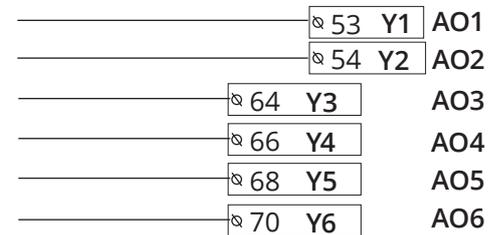


OUTPUTS

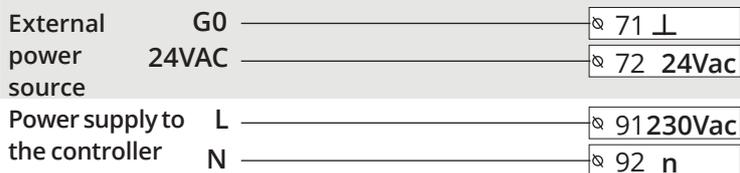
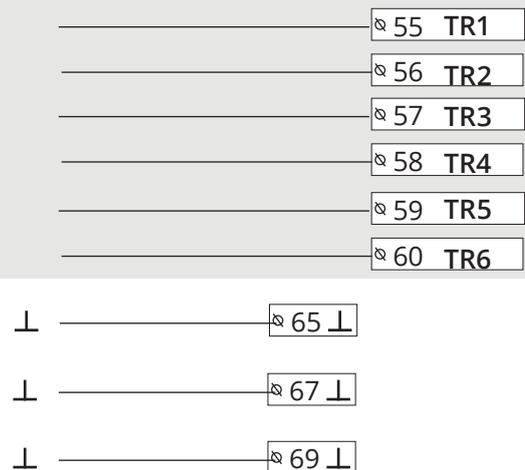
24VAC controls



0 ... 10VDC controls



Triac controls 24VAC

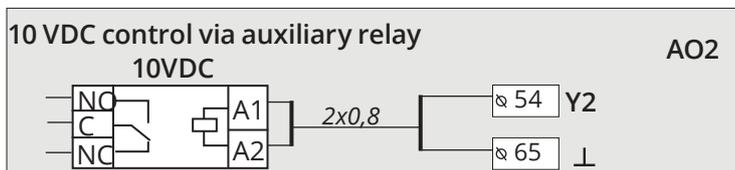
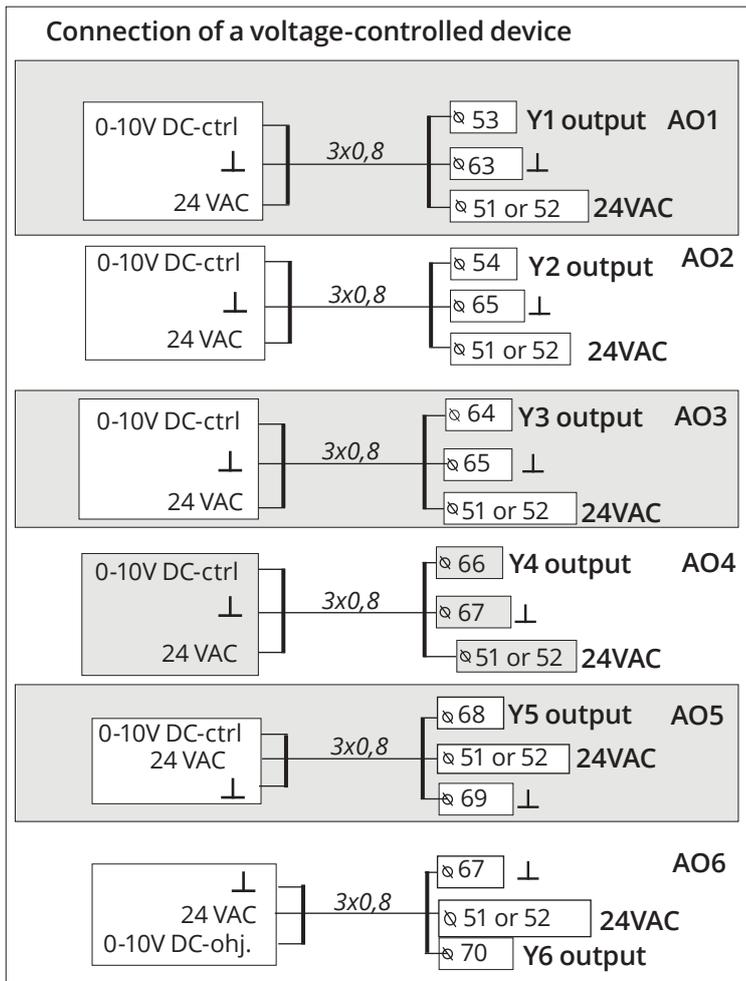


The controller uses a 230 VAC operating voltage, whereby the power supply is supplied to terminals L (91), N (92). In addition, use an external 24VAC power supply if the power requirement for triac outputs and 24 VAC outputs exceeds 23VA.

If you are using an external 24VAC power supply, we recommend that you use a conventional iron core transformer in an environment where electromagnetic interference can occur, because the iron core transformer will filter well external interference. If the external 24 Vac transformer is used in, move the jumper (J1) from right to left. Jumper is above the terminals 71 and 72..

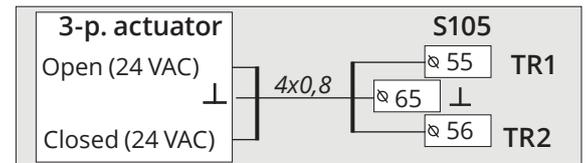
J1		Location of the jumper
•	Internal 24 Vac transformer is in use. (default)	
•	External 24 Vac transformer is in use.	

Analog outputs

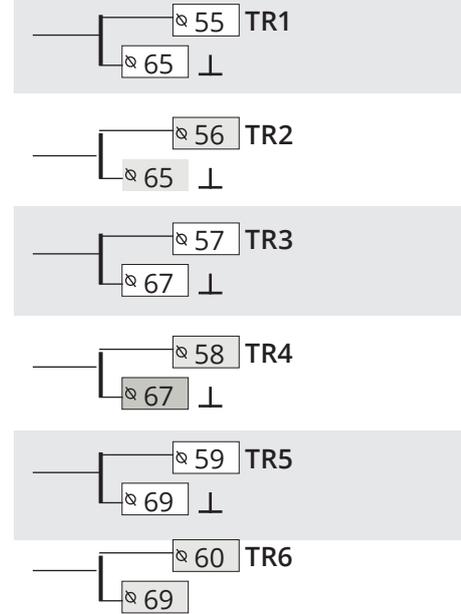


Digital outputs

As an example, the connection of a 3-point controlled actuator



DO controls (24 Vac Triac-output)

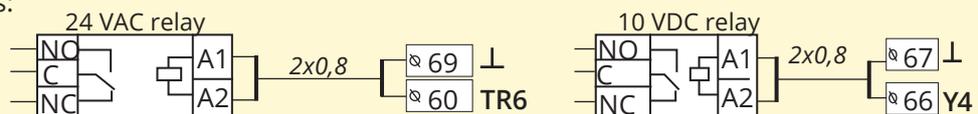


As an example, the connection of a pump

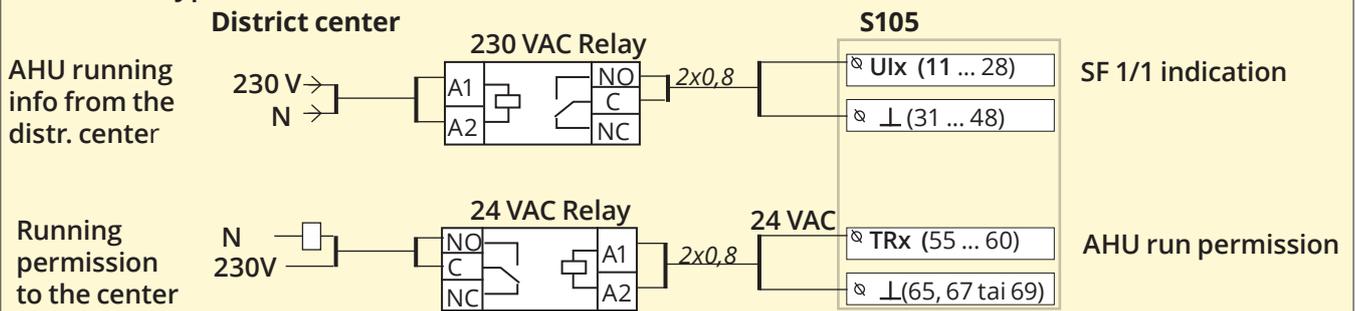


Sum alarm

The sum alarm can be connected to the following connectors: TR1 ... TR6 and ⊥ or AO1 ... AO6 and ⊥ .
Example connections:



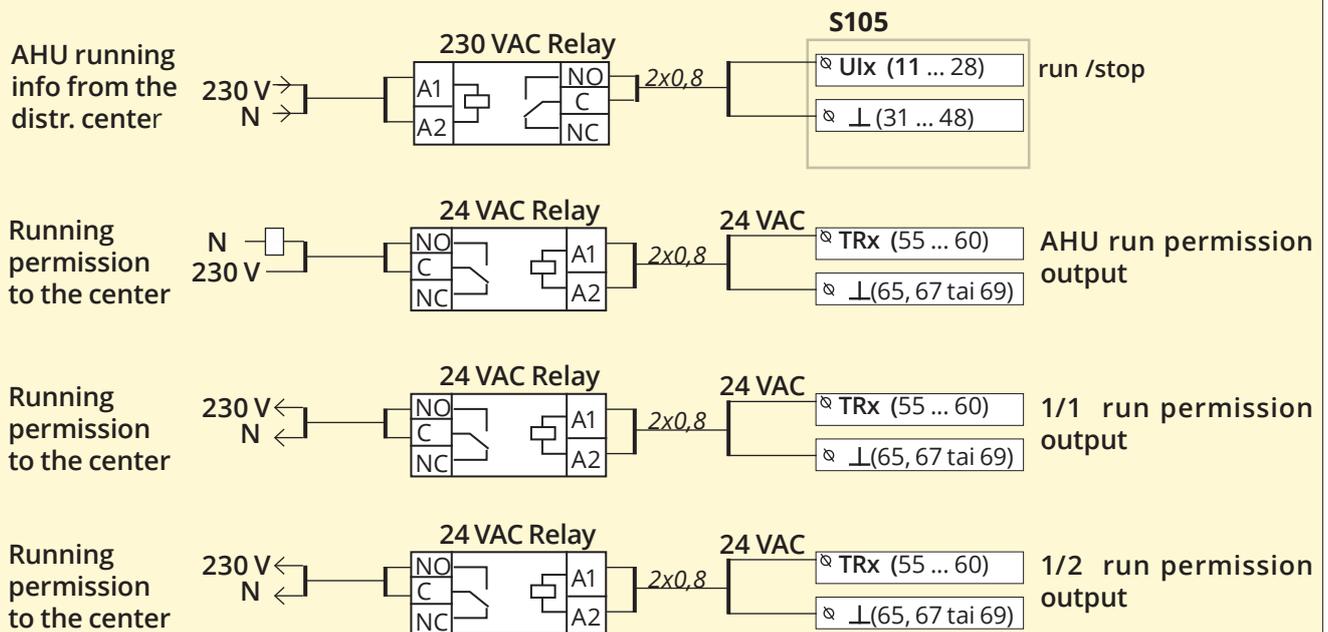
Principle diagram where the AHU runs with external control and a 2-speed AHU is used, but no SF 1/2 running information is connected to the controller. In this case, select a 1-speed AHU as the fan type.



If there is only one running permission from the center without information about the fan speed (as in the picture), the EF Indication is configured to "Not in use". Also select that "Run indication AHU start" is enabled. (Configuration → Selection of functions → Fans).

Principle diagram 2. This is a 2-speed AHU, where the controller receives information about whether the AHU is running or not. Here, there is no distinction between supply fan and exhaust fan control and fan speed.

The controller controls the supply fan and exhaust fan to 1/1 speed with one control output and to 1/2 speed with the other control output.



Complete the following selections (Configuration → Selection of functions → Fans):

- Fan type: 2 speed
- SF Indication type: Running status
- EF Indication type: Running status
- AHU running info from distr. center: UI xx
- 1/1 running permission output: TRxx
- 1/2 running permission output: TRxx
- AHU running permission output: TRxx

Text message quick reference



If a GSM modem is connected to the S105 you can communicate with the controller by text messages using command words.

Send the following text message to the controller: **KEY WORDS**.

If the controller has a device ID in use, always write the device ID in front of the key word (example. Ou01 KEY WORDS or Ou01 ?). **Capital and small letters are different characters in the device ID!**

The controller sends a list of key words as a text message that gives you information about the controllers' functions and state. The key word is separated by a /. You can write the key word using capital or small letters. Write only one key word per message. Store the key words into your phone's memory.

Key word	Explanation
?	Reply messages show all key words in the language that has been selected for the controller.
Key words	If the controller is set up in English, the regulator sends a list of key words.
Active alarms	The reply message will show all active alarms.
Alarm history	The reply message will show information about the latest alarms.
Acknowledge all alarms	The reply message will show information about alarm acknowledged
Run stat	The reply message will show information about current fan speed, AHU control and settings
Supply air info	The reply message will show information about effect of settings to the desired supply air temperature and also setting value of room temperature and supply temperature.
IO-points info	The response message shows the values of all inputs and outputs and bus inputs.
Control settings	The reply message shows which run control is in use. In addition, the timing control ON time and the power controlled by the timer are displayed and can be changed. You can change the control by copying the message and moving * to the desired control method and writing a new timer control time and sending the message to the controller. The controller makes the desired change and sends a response message showing the changes made.
Setting values	The reply message shows the setting values for supply air, extract air and room temperature. You can change the settings if necessary. Re-send the edited message to the controller and the controller adjusts the setting value and sends you a new message displaying the changes made.

Attention! If the controller has a device ID in use, always write the device ID in front of the key word

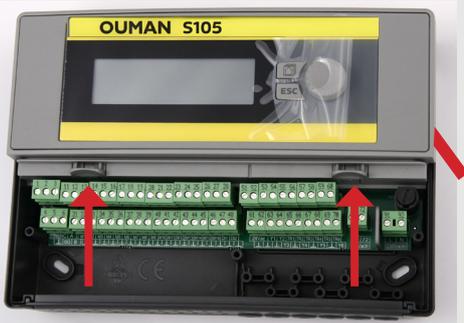
Turn the display unit

If you want to bring the cables to the regulator from above, you must turn the display unit according to the following instructions.

When you turn the display, the controller will be no electricity.



Open the front cover screws and remove the front cover.



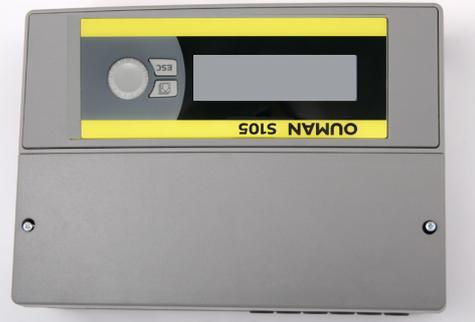
Release the display unit by pressing down firmly supports.



Turn the keyboard/display unit into the opposite position. Watch out for flat cable, that it does not shed.

Press the display unit carefully into place.

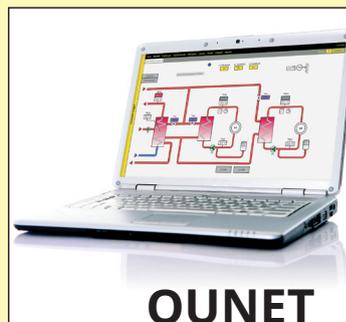
Attach the front cover with screws.



Remote control options:



Use of a GSM phone requires that the GSM modem (optional) is connected to the controller.



Internet-based on-line control room for professional remote control and monitoring (optional). Ounet use is possible when the controller is connected to an Access device on the Modbus-RTU bus.

Optional accessories



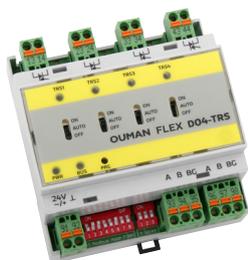
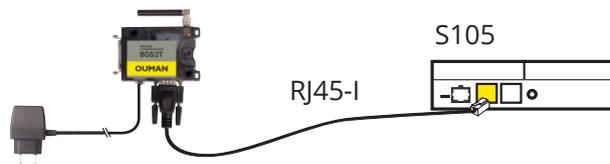
Additional Control panel

The external display is connected to the RJ45-II port. Use e.g. a CAT-5 cable up to 20 m.



GSMMOD

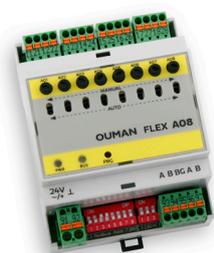
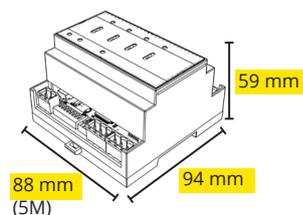
By connecting the modem to the S105 you can communicate with SMS's to the controller and have information on activated alarms to GSM phone. Ouman's GSM modem is connected to the S105 unit (RJ45 -I). The modem has a fixed antenna that can be changed to an external antenna with a 2,5m cord (optional equipment) if needed. The modem's indicator light shows what mode it is in.



FLEX DO4-TRS or FLEX DO4-R

The implementation of electric heater stage control requires the connection of additional module.

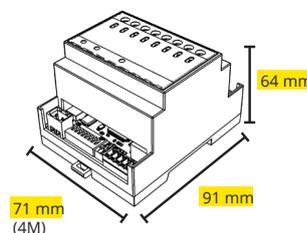
The electric radiator DO controls are connected to outputs 1-4 in the Ouman FLEX-DO4-TRS auxiliary module.



FLEX AO8

The implementation of HRU melting requires the connection of additional module.

AO controls of HRU melting are connected to outputs 1-5 in the Ouman FLEX-AO8 auxiliary module.



RB-40

External relay unit in casing, 4 pcs changeover relays (24V, 250VAC/16A), IP66.

The relay unit can be used to change the triack running information into potential-free tip information.



width 130 mm, height 110 mm, depth 57 mm

5-CDPT

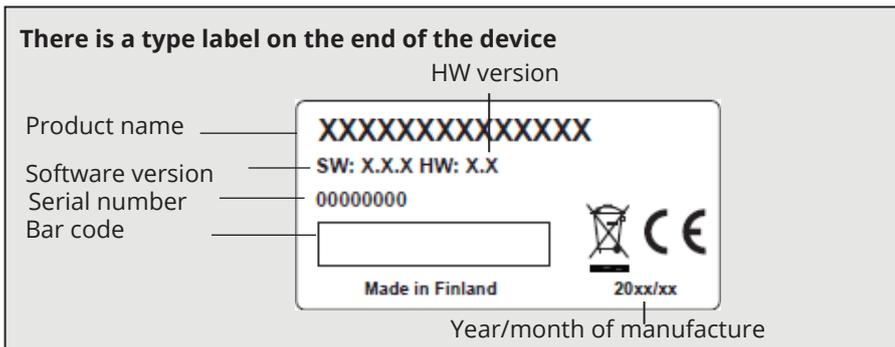
The 5-CDPT is a differential pressure transmitter with 5 measurement channel and communicates via the Modbus RTU bus. When using a 5-channel device, you can get all the most important pressure measurements with one device, which simplifies installation.

The flow difference over the fan, for example, can also be calculated from the pressure difference of each measuring channel. For this purpose, the device has ready-made calculation formulas from the most common fan manufacturers.

Selecting the correct fan manufacture and entering the K-value will show the current flow in display and also in the readable register.

Product information, warranty and product disposal

Product:	Air handling unit controller
Manufacturer:	Ouman Oy Linnunrata 14 FI-90440 Kempele FINLAND tel. +358 424 840 1 www.ouman.fi
Product name:	S105
Models:	S105
Version:	1.0
Valid:	2023/06



It is possible that the regulator has been updated later.

In the event of a fault, check the current information from the controller (System settings -> Type information).

WARRANTY

The seller provides a 24-month warranty for the quality of the materials and workmanship of all delivered goods.

The warranty period begins on the date of purchase. In the event that material or workmanship defects are detected and the goods are sent, without delay or no later than by the end of the warranty period, back to the seller, the seller agrees to address the defect at their own discretion either by repairing the damaged goods or by delivering a new, defect-free goods, free of charge, to the buyer.

The buyer is responsible for the costs resulting from delivering the goods to the seller for warranty repairs, while the seller is responsible for the costs resulting from returning the goods to the buyer.

The warranty shall not cover damages resulting from accidents, lightning, floods or other natural events, normal wear and tear, inappropriate, negligent or unusual use of the goods, overloading, incorrect maintenance, or reconstruction, alteration and installation work which is not carried out by the seller (or their authorized representative).

The buyer shall be responsible for selecting material of equipment susceptible to corrosion, unless other agreements are signed. In the event that the seller alters the structure of their equipment, they shall not be obligated to make similar changes to previously procured equipment. The validity of the warranty requires that the buyer has fulfilled their contractual obligations related to the delivery.

The seller shall provide a new warranty for goods replaced or repaired under the original warranty. However, the new warranty shall only be valid until the expiration of the warranty period of the original goods. For any repairs not covered by the warranty shall be subject to a 3-month maintenance warranty covering the material and workmanship.

	Product disposal: The enclosed marking on the additional material of the product indicates that this product must not be disposed of together with household waste at the end of its life span. The product must be processed separately from other waste to prevent damage caused by uncontrolled waste disposal to the environment and the health of fellow human beings. The users must contact the retailer responsible for having sold the product, the supplier or a local environmental authority, who will provide additional information on safe recycling opportunities of the product. This product must not be disposed of together with other commercial waste.
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Dimensions	width 230 mm, height 160 mm, depth 60 mm	
Weight	1.3 kg	
Protection class	IP 41	
Operating temperature	0 °C ... +50 °C	
Storing temperature	-20 °C ... +70 °C	
Power supply L(91), N (92)		
Operating voltage/ Power requirement	In addition, use an external 24VAC power supply if the combined operating voltage of triac and 24VAC outputs exceeds 23VA.	
Maximum load for internal 24 VAC power supply	1A/23 VA	
Front fuse	max 10A	
Measurement inputs		
Sensor measurement (inputs 1-16, connectors 11-26)	<p>Measurement channel accuracy: Also sensor tolerances and the effect of cables must be considered when calculating total accuracy.</p> <p>- NTC10: ±0.1 °C between -50 °C ... +100 °C and ±0.25 °C between 100 °C ... 130 °C - NTC20: ±0.1 °C between -20 °C ... 130 °C and ±0.5 °C between -50 °C ... -20 °C - NTC1.8: ±0.1 °C between -50 °C ... +100 °C and ±0.4 °C between 100 °C ... +130 °C - NTC2.2: ±0.1 °C between -50 °C ... +100 °C and ±0.6 °C between 100 °C ... +130 °C - Ni1000LG: ±0,2 °C between -50 °C ... +130 °C - Ni1000DIN: ±0,2 °C between -50 °C ... +130 °C - Pt1000: ±0,2 °C between -50 °C ... +130 °C</p>	
Milliampere signal (inputs 1-16, connectors 11-26)	<p>Inputs 12-15 (terminals 22-25) directly support current measurement. If current measurement is connected to inputs 1 - 11 and 16 (terminals 11 - 21 and 26), a 500 Ω parallel resistor must be connected to the measurement channel. 0/4 - 20 mA current signal, measurement accuracy 0.1 mA.</p> <p>Note! If the measurement range of the transmitter measurement is different from 0 - 20 mA, change the Minimum /Maximum setting values of that input (Input configuration -> UIx -> Advanced settings)</p>	
Voltage measurement (inputs 1-16, connectors 11-26)	<p>0 (2) -10V voltage message, meas. accuracy 50 mV.</p> <p>Note! If the measurement range of the transmitter measurement is different from 0 - 10V, change the Minimum /Maximum setting values of that input (Input configuration -> UIx -> Advanced settings)</p>	
Digital inputs (inputs 1-16 and DI1 - DI2, connectors 11-28)	<p>Contact voltage 15 Vdc (inputs 27 and 28), Contact voltage 5 Vdc (inputs 25 and 26). Switching current 1.5 mA (inputs 27 and 28), switching current 0.5 mA (inputs 25 and 26). Transfer resistance max. 500 Ω (closed), min. 11 k Ω (open). Inputs 27 and 28 are pulse inputs and input 26 is used for status information.</p>	
Analog outputs (53,54,64,66,68,70)		
	<p>Output voltage range 0...10 V. Output current max 7 mA /output</p>	
15V voltage output (1)		
	<p>15 VDC output maximum load 100 mA</p>	
24 VAC voltage outputs (51, 52)		
	<p>Output current max. 1A / output Without external power supply the total continuous load capacity of triac outputs and 24 Vac outputs is 23 VA</p>	
Control outputs Triac (55...60)		
	<p>24 Vac. Triac-outputs are in pairs (55, 56), (57, 58) and (59, 60). The total current output of each pair is max. 1A. Without external power supply the total continuous load capacity of triac outputs and 24 Vac outputs is 23VA</p>	
Data transfer connections		
RS-485-bus (3 and 6) (A and B)	Galvanically isolated, supported protocols Modbus-RTU	
MicroSD memory card	<p>Memory card is not included in the delivery. Technical requirements to microSD memory card: Standard micro SDHC, UHS, Capacity 512 MB...32 GB, File system FAT 32, Class: 4...10+</p>	
Optional accessories		
	See page 57	
Warranty		
	2 years	
APPROVALS		
EMC-directive	2014/30/EU	<p>Ouman products do not contain harmful substances defined in the REACH regulation, excluding the products that are listed on the website behind the attached QR code.</p>   
Interference tolerance	EN 61000-6-1	
Interference emissions	EN 61000-6-3	