REV	02
Date	04-2026
Supersedes	D-EOMAH03812-25_01EN

Operating Manual
D-EOMAH03812-25_02EN

DATA CENTER AIR HANDLING UNIT

AWB

ACE

AVS

ACB

Contents

1. About this document

1.1. Revision history

Name	Revision	Date	Scope	Software version	Comments
D-EOMAH03812-25_00EN	0	September 2025	Data_1.10.A_00_Package	FujinData_1.10.A_00	
D-EOMAH03812-25_01EN	1	February 2026	Data_1.12.A_00_Package	FujinData_1.12.A_00	
D-EOMAH03812-25_02EN	2	April 2026	Data_1.21.A_03_Package	FujinData_1.21.A_03	
			Data_2.00.A_00_Package	FujinData_2.00.A_00	Support AWB

1.2. Notice

MicroTech 4	from Daikin Applied Europe	
Before starting	This document refers to the following components: POL688, POL 955, POL895, POL871, pGDX07000	
Application range	Microtech 4	Controller
Users	Users of this document are intended to be:	
	- AHU users	
	- Sales staff	
Conventions	MicroTech 4 further in this document and when proper will be referred to as “MicroTech”	

2. Safety Information

Observe all safety directions and comply with the corresponding general safety regulations in order to preventpersonal injury and damage to property.

- Safety devices may not be removed or taken out of operation.
- Apparatus and system components may only be used in a technically fault-free state. Faults that canaffect safety must be rectified immediately.
- Observe the required safety instructions against excessively high contact voltages.
- The plant may not be in operation if the standard safety devices are out of operation or if their effectsare influenced in some other way.
- All handling that affects the prescribed disconnection of the protective extra-low voltage (AC 24 V)must be avoided.
- **Disconnect the supply voltage before opening the apparatus cabinet. Never work when thepower is on!**
- Avoid electromagnetic and other interference voltages in signal and connection cables.
- Assembly and installation of system and plant components may only be performed in accordance with corresponding installation instructions and instructions for use.
- Every electric part of the system must be protected against static charging: electronic components, open printed circuit boards, freely accessible connectors and apparatus components that are connected with the internal connection.
- All equipment that is connected to the system must be CE marked and comply with the Machine SafetyDirective.

3. Introduction

This operating manual provides basic information that allows the control of the Daikin Air Handling Unit (AHU) of: AWB, ACE, AVS and ACB.
Data center AHUs are used for air conditioning and air handling in terms of pressure and temperature level control.

3.1. Basic Control System Diagnostic

Unit controllers, extension modules and communication modules are equipped with two status LED, BSP and BUS, to indicate the operational status of the devices. The “BUS” LED indicates the status of the communication with the controller. The meaning of the two status LED is indicated below.

- **MAIN CONTROLLER**
- BSP LED

LED Color	Mode
Solid Green	Application running
Solid Yellow	Application loaded but not running (*) or BSP Upgrade mode active
Solid Red	Hardware Error (*)
Flashing Green	BSP startup phase. The controller needs time for starting.
Flashing Yellow	Application not loaded (*)
Flashing Yellow/Red	Fail safe mode (in case that the BSP upgrade was interrupted)
Flashing Red	BSP Error (software error*)
Flashing Red/Green	Application/BSP update or initialization

(*) Contact Service.

- **EXTENSION MODULES**
- BSP LED

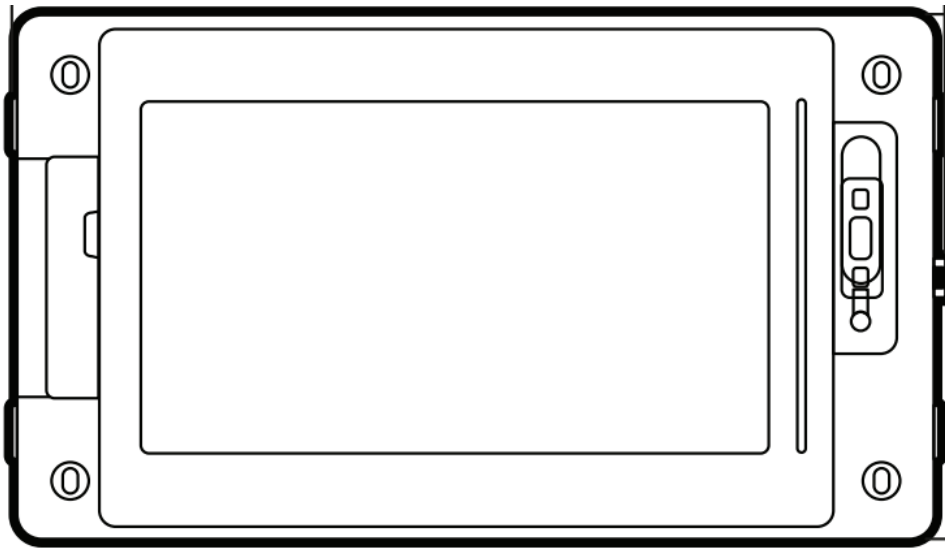
LED Color	Mode
Solid Green	BSP running
Solid Red	Hardware Error (*)
Flashing Red	BSP Error (*)
Flashing Red/Green	BSP upgrade mode

- BUS LED

LED Color	Mode
Solid Green	Communication running, I/O working
Solid Yellow	Communication running but parameter from the application wrong or missing, or incorrect factory calibration
Solid Red	Communication down (*)

3.1.1 Touch screen

The pGDx 7 inch graphic terminal is part of the family of touchscreen terminals designed to simplify user interface with the pCO sistema family controllers. The electronic technology used and the new 16.7M colour display means high quality images and advanced functions are available for a superior appearance. The touchscreen panel moreover makes interaction between the user and the unit much easier by simplifying navigation between the various screens.



3.1.2 LCD

All HMIs except POL 822 allow navigation through the application pages, the available data can change, the LCD shows additional data to configure optional items such as BMS configuration, some of the additional values are protected with different level passwords to prevent wrong parameterizations to unauthorized users.
To select the voice the user must click on green triangle (web interface) or pushing knob POL895 or Enter key POL871.

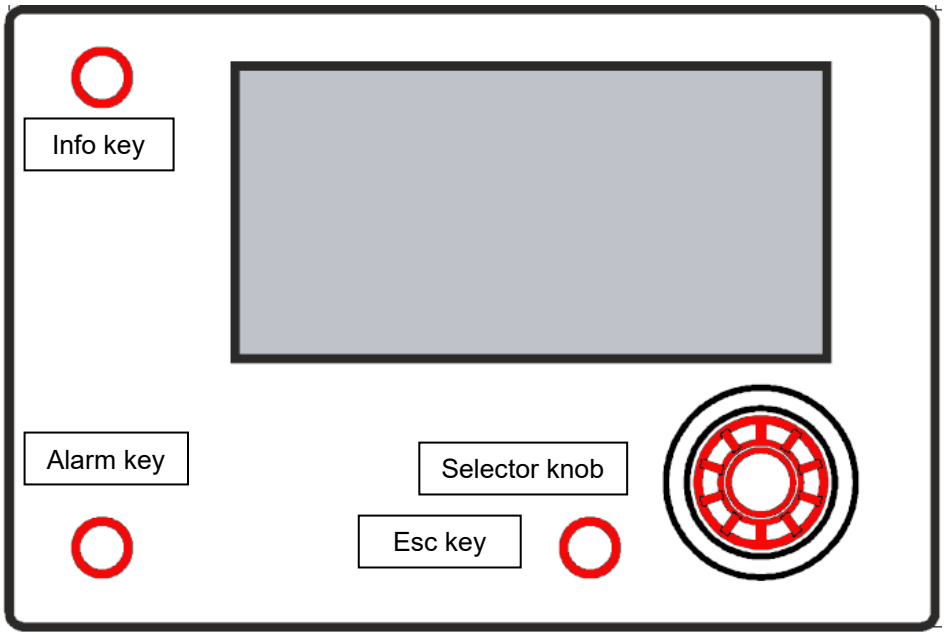


Figure 1 POL895

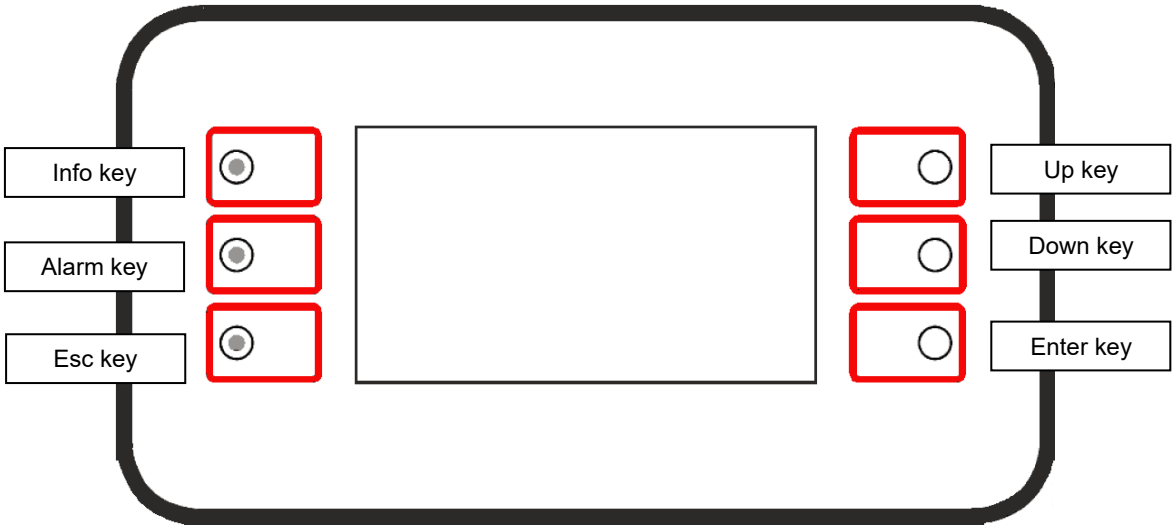


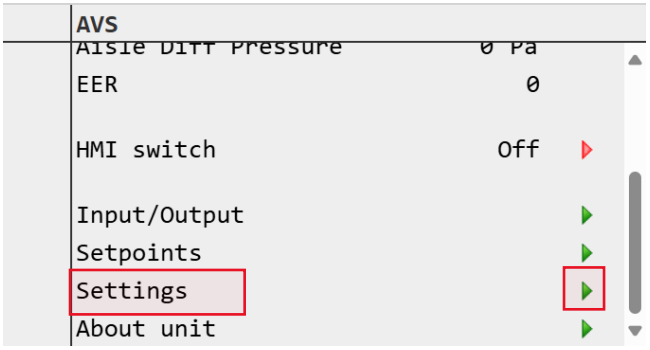
Figure 2 POL 871

3.2. Password

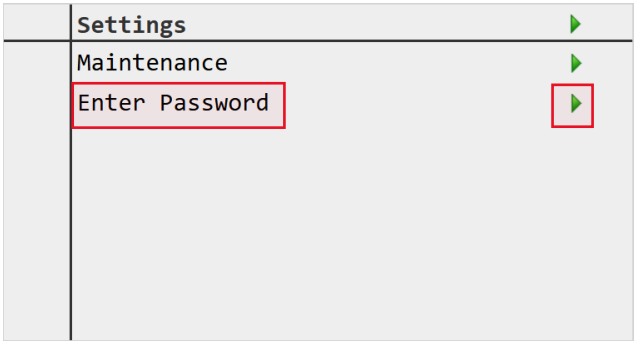
Different levels of password are available in the application; at each level different parameters are accessible. Summary of password and access level in the table below

Level name	Level index	Password
End user	--	--
User	6	5321
Maintenance	4	2526
Service	2	****

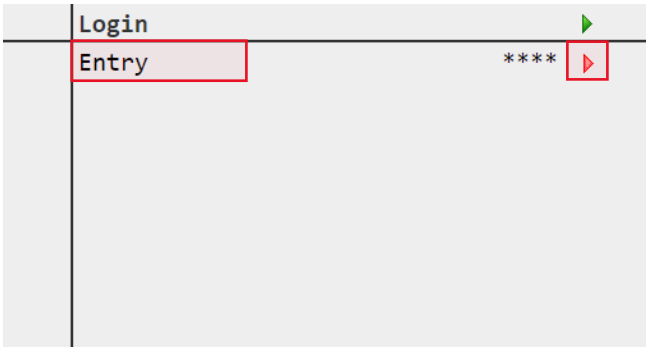
HMI Path: Main page à Settings à Enter Password
To access password input page, select “Settings” from main menu as shown below:



Select “Enter Password” to show menu with “Login”



Select “Entry” and use the needed value as reported in table at the beginning of the chapter.



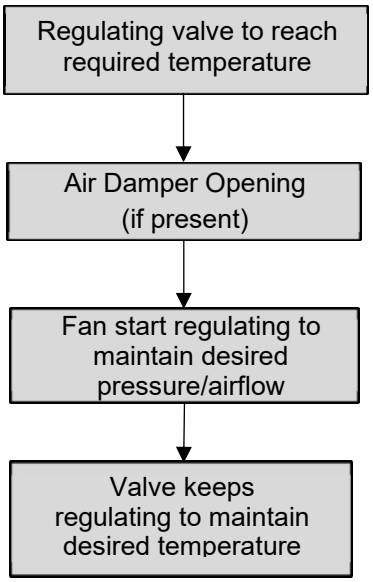
4. Control Functions

This section describes the primary control functions and device activation sequence for the Data Center Air Handling Units. Thermoregulation control logic is governed by a multi-phase safety and performance sequence to ensure environmental stability.

- On the base Unit, the **Startup Phase** prevents the ventilation of hot air by checking the coil water temperature; fans are inhibited until the water drops below the "Threshold Max Water" setpoint, or for a specified time.
  (Not for AVS units) If shutoff dampers are installed, the unit ensures fans wait for a confirmed SPDT opening signal before starting to protect the unit.

- The **fan speed** is monitored and regulated via an algorithm that evaluates pressure/airflow data from all connected transducers. This allows the system to adjust fan speeds to reach the setpoint while maintaining the ability to compensate for thermal loads within defined power limits.

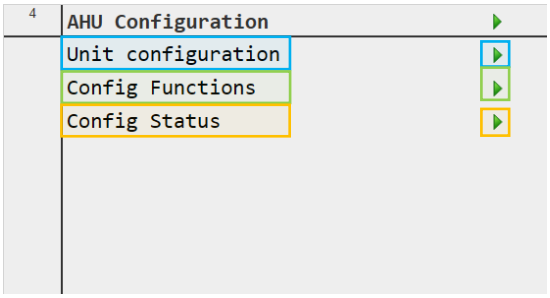
- Simultaneously, the **coil signal** is regulated by a temperature algorithm to maintain the supply temperature setpoint.



The sequence is performed to meet the desired pressure/airflow and temperature setpoints as efficiently as, to keep energy consumption low.
For more information about the control sequence logic *see Appendix A**.*

5. Configuration pages

For activation of the various functions, after putting the password [Maintenance level or higher-level password] in Settings, go to the Unit Configuration, Config Function and Config Status.



5.1. Unit Configuration

To access the Unit Configuration page, follow these steps

Minimum password level: (Maintenance Level)

HMI Level: Main page à Settings à AHU Configuration à Unit Configuration.

5.2. Configuration Functions

To access the Configuration Functions page, follow these steps

Minimum password level: (Maintenance Level)

HMI Level: Main page à Settings à AHU Configuration à Config Functions.

5.3. Configuration Status

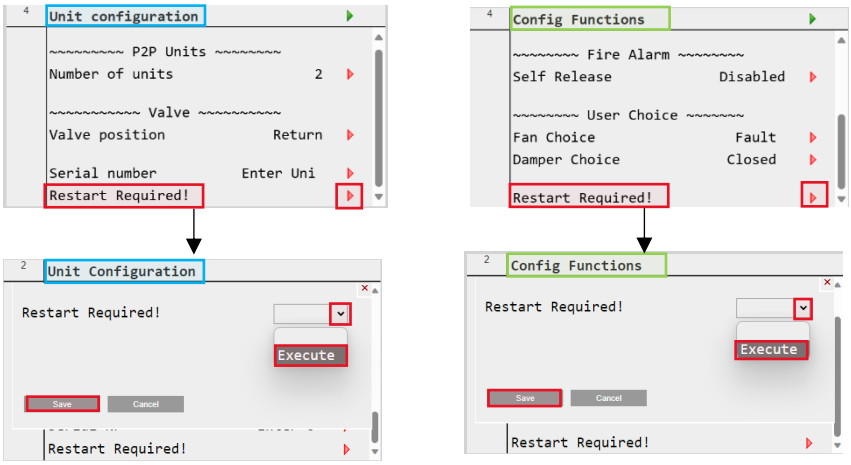
To access the Configuration Functions page, follow these steps

Minimum password level: (Maintenance Level)

HMI Level: Main page à Settings à AHU Configuration à Config Status.

5.4. Restart

Remember to go to the "Restart required!" item after you have made all the changes to each individual menu of Unit configuration and Configuration Functions.



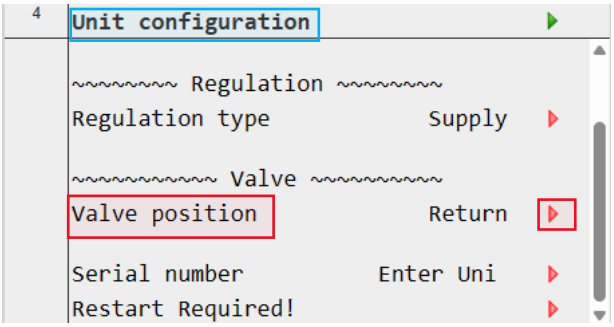
- Restarting after making changes in Configuration Status page is recommended, but not obligatory.

6. Configuration

6.1. Valve

6.1.1 Main probe

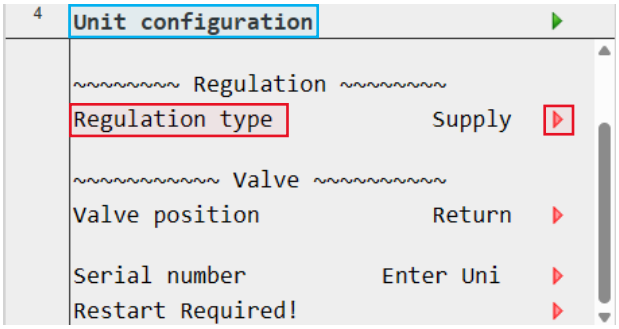
The valve position can be changed in Unit Configuration page – Valve section to be on Supply or Return



6.2. Regulation type

In the Configuration Functions – Regulation section, the user can choose the control regulation type for the temperature which can be either on:

- Supply
- Return

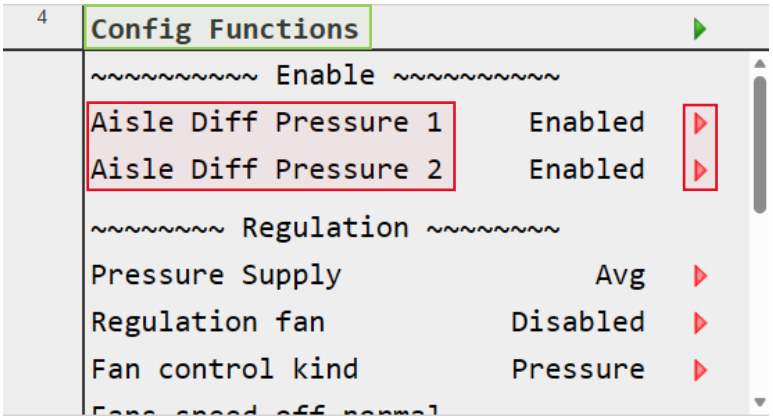


Notice that:

- If selecting the *Regulation type* on Supply a “Supply temp” setpoint is available on the setpoints page
- If selecting the *Regulation type* on Return the following setpoints are available on the setpoints page
  1- Return temp setp
  2- Supply min setpoint
  3- Supply max setpoint
- More information is available in point 14 Setpoint – Temperature

6.3. Disabling differential pressure transducers

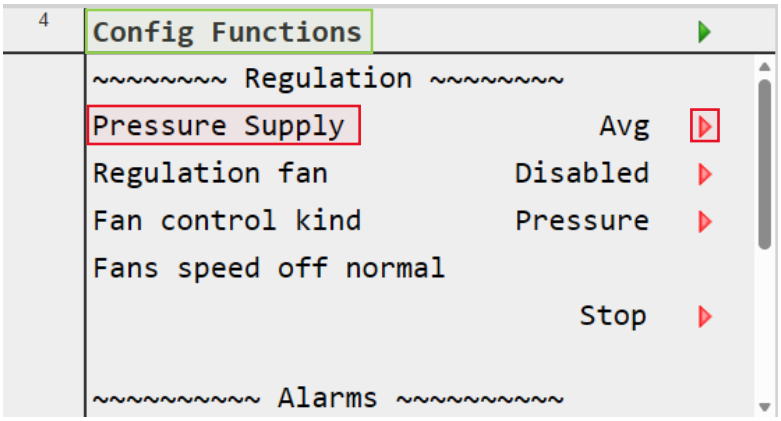
In Configuration Functions page – Enable section, the user can disable the differential pressure transducers if not available ONLY if the unit is connected to the P2P grid (Number of P2P units must be more than one)



6.4. Pressure Supply

In Configuration Functions page – Regulation section, the user can select the pressure supply reading used as the basis for regulation.
The available options are:

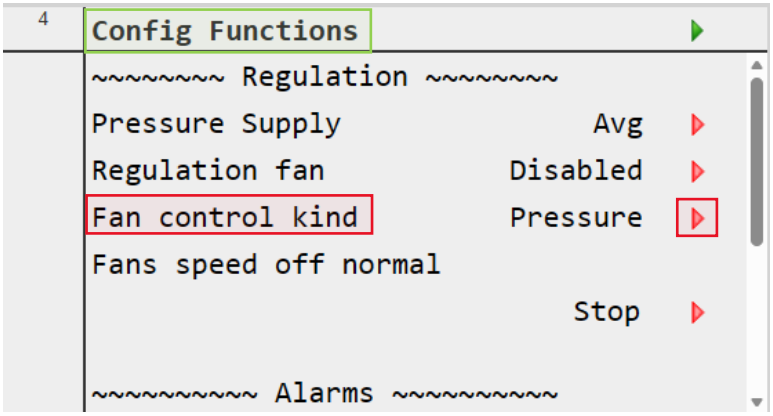
- (Min) Minimum pressure readings
- (Max) Maximum pressure readings
- (Avg) Average pressure readings



- Pressure/flow readings include the pressure/flow readings from the unit itself, and any other unit connected to the P2P grid, if not in alarm or disabled.

6.5. Fan control kind

In Configuration Functions page – Regulation section, the user can select if regulating the fans on pressure or flow.

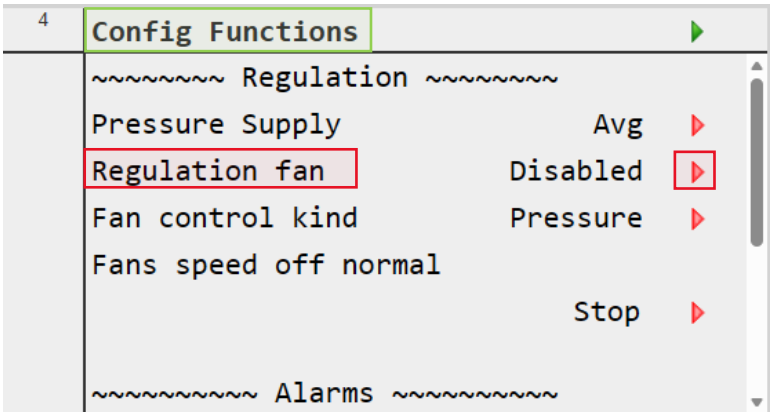


Each ***Fan control kind*** has its own setpoint

- Supply pressure setpoint if fan control kind is on Pressure
- Supply flow if fan control kind is on Flow
  More information is available in point 14 Setpoint

6.6. Regulation fan

In Configuration Functions page – Regulation section, the user can select if regulating the fans on pressure/flow with temperature reference.



- When the ***Regulation fan*** feature is enabled, the fans are modulated within a scaled minimum and maximum pressure/flow range, using the temperature regulation value as reference.
- Notice that when enabled the following setpoints are available in addition to the setpoints related to the temperature regulation
  - If fan control kind is on Pressure
    - Minimum pressure regulation setpoint
    - Maximum pressure regulation setpoint
  - If fan control kind is on Flow
    - Minimum flow regulation setpoint
    - Maximum flow regulation setpoint

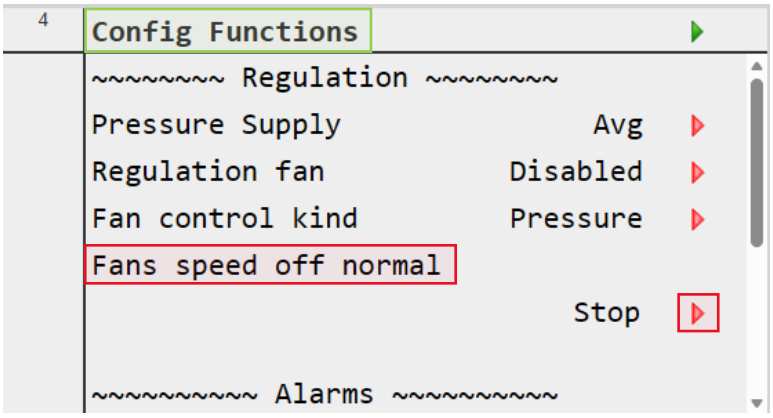
  More information is available in point 14 Setpoint

- The ***Regulation Fan*** feature modulates airflow to assist the coil in achieving and maintaining the target temperature setpoint

6.7. Regulation fan

In Configuration Functions page – Regulation section, the user can select which action takes place regarding the fan speed if both transducers are disabled or in alarm, and P2P communication is in alarm.
The available fans speed modes are:

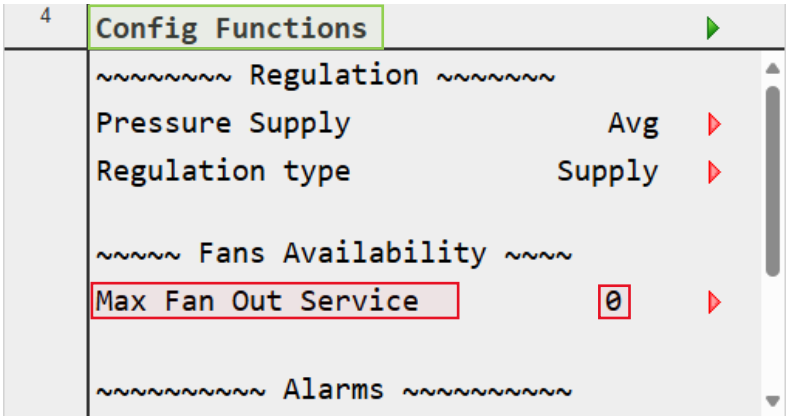
- Fixed speed: Fans run at a pre-defined % speed
- Flow: Fans switch to local flow-based regulation
- Last value: Fans maintain the last known speed before failure
- Stop: Fans shut down immediately and a fault alarm is triggered



6.8. Fans

6.8.1 Fans Availability *(Not available in AVS AHUs)*

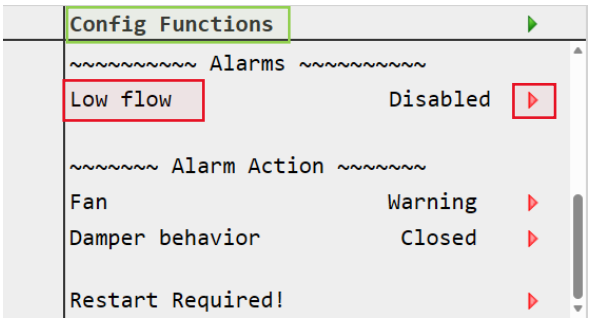
In the Configuration Functions – Fans Availability section, in the Max Fan Out Service setting, the user can define how many fans may be out of service before the unit triggers a fault alarm and shuts down.



Notice that: The maximum number of fans out of service must be strictly less than the number of available fans.

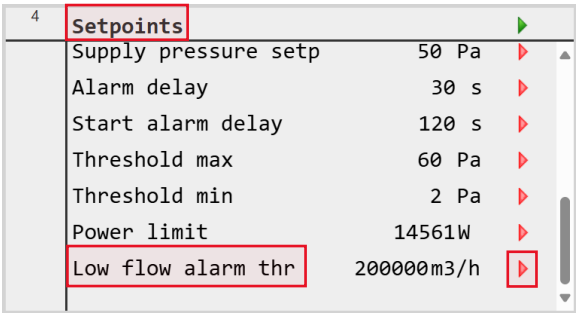
6.9. Low Flow Alarm

The low flow alarm can be enabled in Configuration Functions page – Alarm section



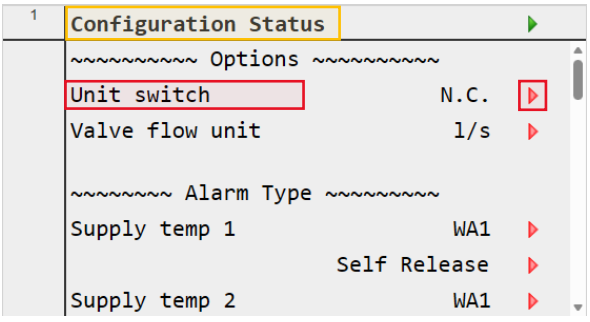
Notice that:

- The low flow alarm is an alarm triggered if the air flow is less than the setpoint threshold for x seconds
- The low flow alarm threshold can be changed in Setpoints page – Fans section (by default 200000 m^3/h).
- The startup delay is 300 seconds.
- The run delay is 60 seconds.



6.10. Polarity

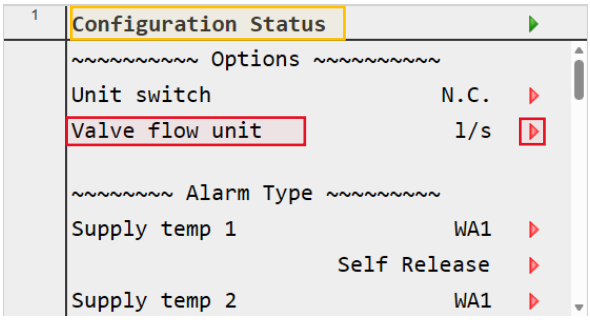
The polarity of the unit switch can be determined to be N.O. (Normally open) or N.C. (Normally closed) in Configuration Status page – Options section



6.11. Valve flow unit

The unit measurement of the valve flow can be determined in in Configuration Status page – Options section
Available units:

Liters / seconds (l/s)
Liters / hours (l/h)



6.12. Alarm Type

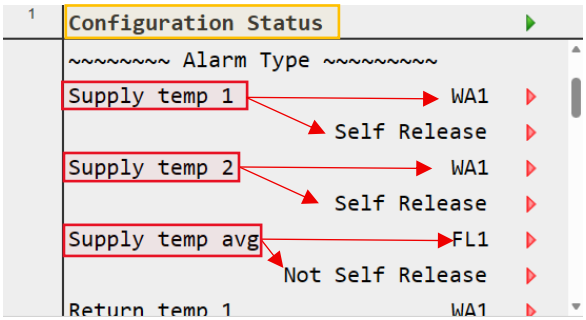
In Configuration Status page – Alarm Type section, the user can change

A. The alarm level for each component to be:
- DG1: Danger alarm
- FL1: Fault alarm
- WA1: Warning alarm

B. The self-releasing alarm for each component to be:
- Self Release
- Not Self Release

Enabling the Self-Release function allows an alarm to be automatically cleared once the trigger condition is resolved. On the other hand, if this feature is disabled, the alarm remains and requires manual acknowledgment (see Alarm reset point) by the operator, even after the fault condition has cleared.

Alarm type is available for the following components:
Supply temp 1 – Supply temp 2 – Supply temp avg – Return temp 1 – Return temp 2 – Return temp avg – Aisle Diff Pressure 1 – Aisle Diff Pressure 2 – Supply pressure – Return humidity 1 – Return humidity 2 – Emergency stop – Ultra cap alarm – Filter switch – Flood switch – Fire alarm – Voltage Line 1 – Voltage Line 2 – ATS State – Ultra cap status

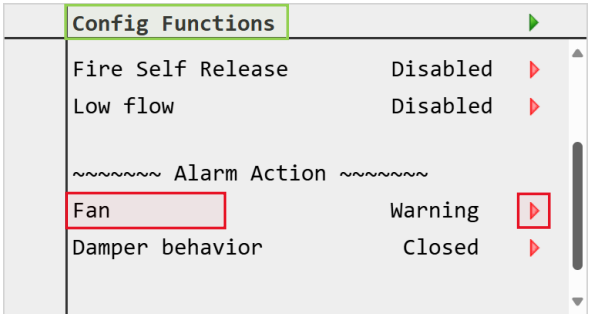


6.13. Alarm action

(Only for AVS AHUs)

6.13.1Fan

User can choose what actions are taken if fans go in alarming in Configuration Functions – User Choice section

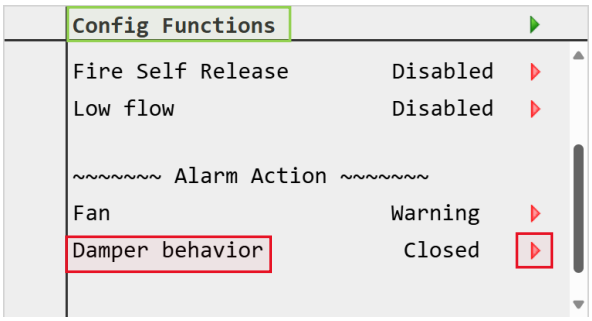


- **Fan Warning Alarm:** If the fan goes in alarming these actions will be taken:
  - Dampers remain open
  - Valves keep regulating

- **Fan Stop**: If the fan goes in alarming these actions will be taken:
  - Unit OFF

6.13.2 Damper Behavior

User can choose what actions are taken if the valve goes in alarming in Configuration Functions – User Choice section



*a. User chooses **Opened Dampers***

- Then if the valve goes in communication alarming these actions will be taken:
  - Dampers remain open
  - Fans keep running
  - Valve fully opened

*b. User chooses **Closed Dampers***

- Then if the valve goes in communication alarming these actions will be taken:
  - Dampers are closed
  - Fans keep running
  - Valve fully opened

6.13.3Valve alarm action

Actions taken for the valve alarm are as follows:

If Valve is in Communication Alarm *(Actions taken)*

- Valve fully opened
- Dampers opened/closed (based on user damper choice *(see previous point 6.4.2)*)
- Fans running

6.1. Fan alarms

Malfunction and service information

6.1.1 Motor Status

- UzLow: DC-link undervoltage
- RL_Cal: Rotor position sensor calibration error
- n_Lim: Speed limit exceeded
- BLK: Motor blocked
- HLL: Hall sensor error
- TFM: Motor overheated
- FB: Fan Bad (general error)
- SKF: Communication error between master controller and slave controller
- TFE: Output stage overheated
- PHA: Phase failure (3-phase devices) or line undervoltage (single-phase devices)

6.1.2 Warning

- lLim: Current limitation in action
- L_hi: Line impedance too high (DC-link voltage unstable)
- P_Lim: Power limiter in action
- TE_hi: Output stage temperature high
- TM_hi: Motor temperature high
- TEI_hi: Temperature inside electronics high
- UzLow: DC-link voltage low
- Braking: Braking mode: set in the case of external drive in opposite direction at high speed for lengthy period
- RLCal: Calibration of rotor position sensor in progress
- nLow: Actual speed is lower than speed limit for running monitoring
- OpnCir: Open circuit at analog input or PWM input for the set value (voltage at analog input < open circuit limit value - or signal at PWM input statically high)
- UzHi: DC-link voltage high
- UeHi: Line voltage high
- LRF: Shedding function active

6.2. Valve alarms

Malfunction and service information

EVxxxF:

- Error Sensor T1: Error with remote temperature sensor
- Error Sensor T2: Error with embedded temperature sensor
- Error Flow Sensor: Error with the flow sensor
- Actuator can’t move: Mechanical overload due to blocked valve, etc.
- Flow with closed valve: Flow is measured but position of valve is closed
- Air bubbles: Air bubbles in the hydronic system. As long as there are air bubbles in the system
- Flow not reached: Setpoint cannot be reached within 10 min during flow control
- Power not realized: Setpoint cannot be reached within 10 min during power control
- Gear train disengaged: Gear train disengaged button is pressed
- Reverse flow detected: Reverse flow is detected
- MP communication faulty: Internal communication between sensor and actuator faulty
- Freeze warning: Measured temperature & glycol concentration indicate that grease ice can build up

EVxxxR2:

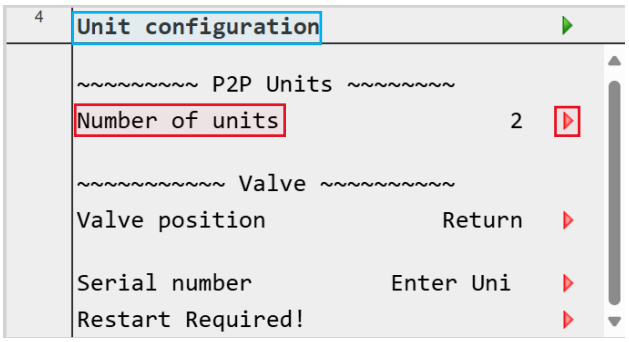
- No communication to actuator: Communication with actuator not possible.
- Gear train disengaged: Gear train disengaged button is pressed
- Actuator cannot move: Mechanical overload due to blocked valve, etc.
- Reverse flow: Reverse flow is detected
- Flow setpoint not reached: Setpoint cannot be reached within 15 min during flow control
- Flow with closed valve: Flow is measured but position of valve is closed
- Flow actual exceeds flow nominal: Actual flow exceeds the designed nominal flow
- Flow measurement error: Air in the system, error occurred during flow measurement
- Remote temperature error: No connection to external temperature sensor
- Flowbody temperature error: Error with embedded temperature sensor
- Communication to Sensor interrupted: Internal communication to flow sensor interrupted

- Freeze warning: Measured temperature & glycol concentration indicate that grease ice can build up
- Glycol detected: Glycol was detected in a MID application
- Power setpoint not reached: Setpoint cannot be reached within 15 min during power control
- Device end of life reached: MID only. The sensor module must be replaced
- Bus watchdog triggered: Timeout for the Bus watchdog expired. No update of Setpoint / Override within specified time.
- No differential pressure detected: No differential pressure detected within 5 min during pressure control
- Differential pressure setpoint can’t be reached: Differential pressure setpoint can not be reached within 15 min during pressure control mode
- Minimum position applied: Minimum position (27%) is applied if: – The valve is restartet – After a power failure – The manual override was previously operated – Switching from another control mode (e.g. flow control) to control mode differential pressure control – No differential pressure is present at a flow rate < 0.7% V'nom

7. P2P

7.1. P2P Units

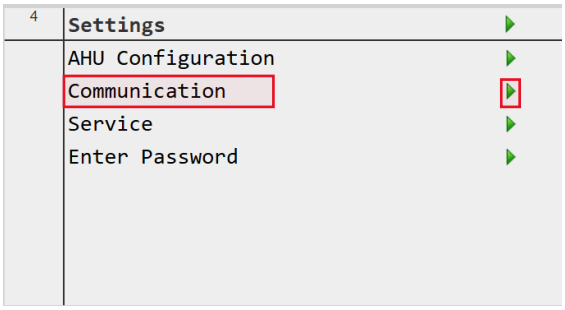
The user can select how many Peer-to-Peer units are connected in the Unit Configuration – P2P Units section

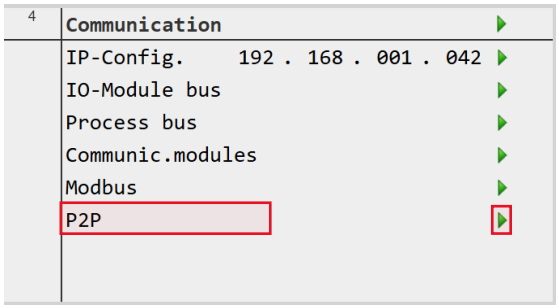


Notice that: The user can select up to 128 units.

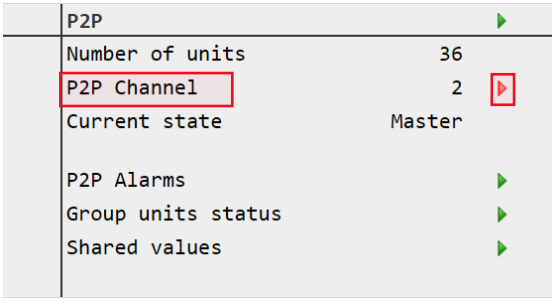
7.2. P2P Address

HMI Path: Settings à Communication à P2P





The user can choose the unit P2P channel address

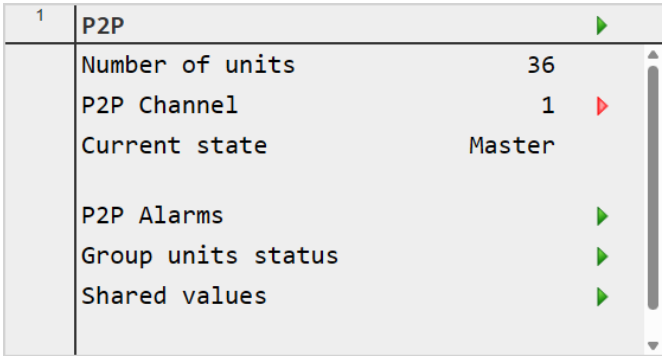


7.3. Logic

1. P2P

- A channel address of zero (0) indicates that the unit is not connected to the P2P network and therefore acts as its own master.
- Within a P2P network, the unit with the lowest channel address becomes the master of all other units, provided it is not in a P2P communication alarm.
- If the current master enters an alarm state, it loses its master role over the P2P network but it keeps acting as its own master, the unit with the next lowest channel address not in a P2P communication alarm will take over as master.
- Master control: The Master unit can force all Slaves to **On**, **Off**, or **Test** modes. Slaves must be set to **On** to follow the master Group unit status
- Master can regulate the slave units even if the master unit status itself is off
- Slaves can be set to **Test** mode to be tested independently of the Master command. This is done by setting the unit's own status to **Test** (changing the channel address to zero is not required)
- If a slave loses communication with the P2P network, it will continue regulating its fans on its values/setpoints (will not start from zero)

- P2P communication alarm is triggered if:
  i. The unit's P2P channel address is incorrectly configured
  ii. The unit is not powered on
  iii. A disconnection in the P2P cable (T13, CE-/CE+)
  iv. Notice that this alarm is delayed by (**Alarm delay setpoint**) seconds
  v. Notice that it is no longer a 10 minutes delay before resetting this alarm instead it is (**P2P -startup delay**) seconds
- **Alarm delay setpoint**: available in Setpoint page – P2P units section, to prevent network overload when a large number of units are connected simultaneously
- **Startup delay setpoint:** is available in Setpoint page – P2P units section, is the time needed to start the P2P communication after powering on the unit
- P2P page in Input/Output page provides the following data



  - **Number of units** (read only), this can be modified in the Configuration Unit page (a restart is required)
  - **P2P Channel** this can be changed with a password level (setting at zero disconnects the unit from the P2P network)
  - **Current state**: Displays where the unit is (Master, Slave), if P2P Channel is at zero then the unit becomes Master of itself only
  - **P2P Alarms**: See 7.4 P2P Alarms
  - **Group units' status page:** Displays the unit status for all units
    - **Master Address**: Indicates the master address
    - **n: xxxxx** --> (**n** refers to the unit number, **xxxxx** refers to the status of the unit)
  - **Shared values page**
    - **n: Aisle 1 ~ Aisle 2 ~ Fan** --> (**n** refers to the number of the unit, **Aisle 1/2** for the Aisle differential pressure 1/2, **Fan** for the supply pressure) all values are measured in Pascals, notice that: if the value is -99 then it refers to an alarm or disabled transducer, and -98 refers to P2P communication alarm

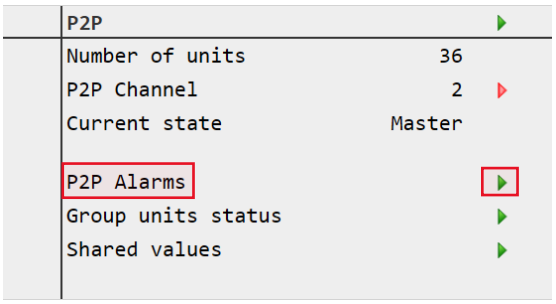
2. Test mode: Testing the units can be performed in the following ways:
    a. Individual testing: each unit can be tested individually by setting the HMI switch at **Test** then forcing the signals from Test page in Input/Output page (the coil keep regulating based on the controller signal, to force a valve signal change the option of **Valve signal** to **Test** instead of Regulation) as previously mentioned no need to change the P2P channel address to zero
    b. Test by the master: all units can be tested simultaneously by the master signal when:
        - Slaves: HMI switch is On
        - Master: HMI switch is Test, Group HMI switch is Test

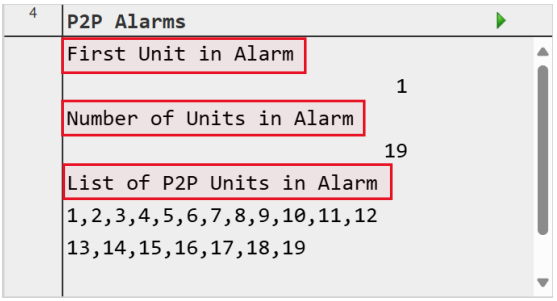
    Notice that the slave unit status becomes: “Test by Master ‘n’”
3. On mode: Turning on the units can be performed in the following ways:
    a. Individual On: to turn on only the unit independently, set the P2P address channel to zero and HMI switch to On
    b. Turn on by the master: all units can be commanded simultaneously by the master when:
        i. Slaves: HMI switch is On
        ii. Master: Group HMI switch is On
            1. HMI switch is On: the master unit will turn on as well
            2. HMI switch is Off: the master unit will be turned off, however, it keeps regulating the fans speed of slaves based on its setpoints, and the shared pressure values
        iii. Notice that the slave unit status becomes: “On by Master ‘n’”

4. Off mode: Turning off the units can be performed in the following ways:
    a. Individual Off: to turn off the unit individually, put the HMI switch Off
    b. Turning off by the master:
        i. Master: Group HMI switch Off
        ii. Notice that the HMI switch of the slave is On, however, the unit status becomes “Off by Master ‘n’”
    c. Turn off by the panel unit switch, (rotate to the left)
    d. Notice that manually turning a unit off (HMI or physical switch) will not trigger a P2P communication alarm on other units in the network. A P2P communication alarm is triggered when a unit is completely powered off (loss of electrical power)

7.4. P2P Alarms

On the P2P Alarms page the following information is shown:

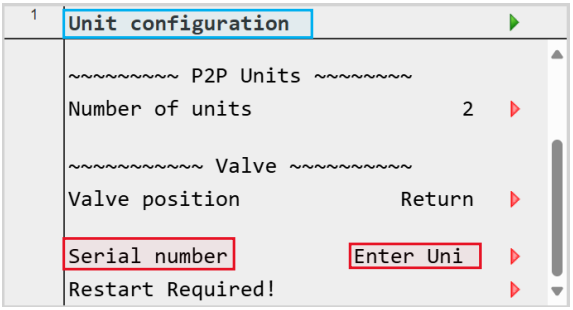




- First Unit in Alarm**:** Displays the address of the unit with the lowest channel number currently in a P2P communication alarm state.
- Number of Units in Alarm: Indicates the total number of units currently in a P2P communication alarm state.
- List of P2P Units in Alarm: Shows the addresses of all units that are currently in a P2P communication alarm state.

7.5. Serial Number

The service has the possibility to add the Serial Number in the Unit Configuration.

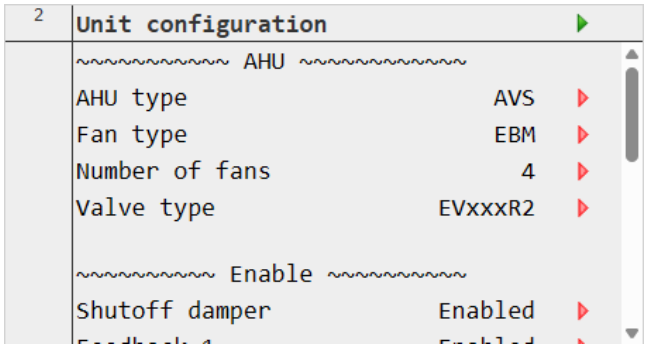


8. Service configuration

(This section is dedicated to service only and require Service password level)

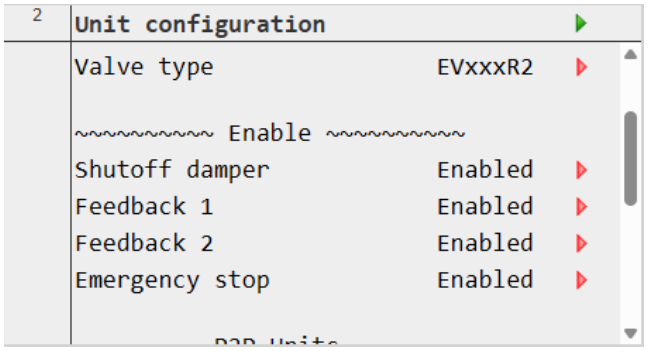
****** ANY MODIFICATION TO SERVICE-LEVEL CONFIGURATIONS MAY RESULT IN MALFUNCTION OF THE UNIT. THE USER ASSUMES FULL RESPONSIBILITY FOR ANY DAMAGE ARISING FROM SUCH MODIFICATIONS.***

8.1. Unit configuration



- AHU type: To change the air handling unit model ***
- Fan type: To change the fan model ***
- Number of fans: To change the total number of fans ***
- Valve type: To change the valve model ***

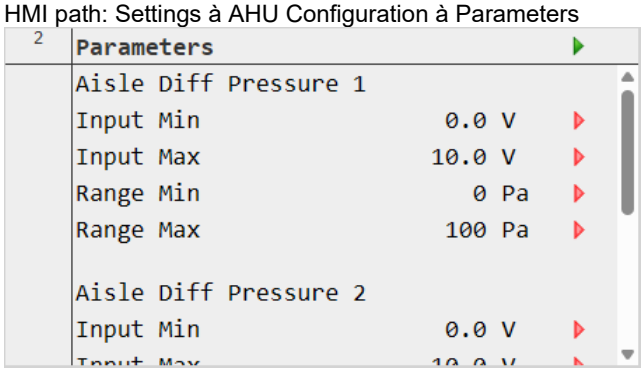
8.2. Enabling



- Shutoff damper: To enable the shutoff damper ***
- SPDT 1 and 2: To enable the SPDT 1 and 2 ***
- Emergency stop: To enable the emergency stop ***

8.3. Parameters

HMI path: Settings à AHU Configuration à Parameters



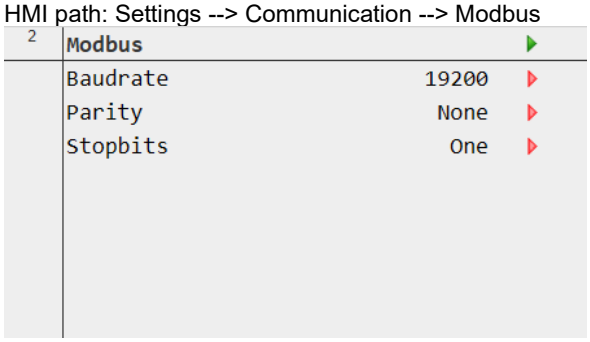
- Input Min: The minimum voltage given by the transducer ***
- Input Max: The maximum voltage given by the transducer ***
- Range Min: The minimum pressure measured by the transducer ***
- Range Max: The maximum pressure measured by the transducer ***

Each for the following transducers

- Aisle Diff Pressure 1
- Aisle Diff Pressure 2
- Supply Pressure

8.4. Modbus configuration

HMI path: Settings --> Communication --> Modbus



- Baudrate: To change the baud rate ***
- Parity: To change the parity ***
- Stopbits: To change the stop bits ***

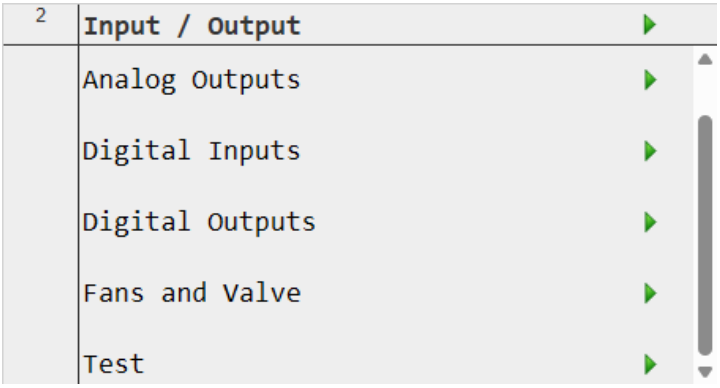
8.5. Main regulation

HMI path: Settings à Service à Main regulation

- Parity: To change the parity of fans ***
- Supply K: To change the K factor of fans ***
- AutoPI: Demo feature for dynamic regulation of the fans control loop

8.6. Test

Forced values for the valve, damper and fans for testing purposes can be done inside Input/Output page – Test section
* HMI switch should be selected on Test



9. Main Menu screen

The unit is sold without its own on-board interface. the parameters can be accessed in various ways, via web interface if the unit is connected to the network, via Pol 895 with which the user have the possibility to access the various menus of the AHU depending on the password entered, turn the AHU ON/OFF, change the temperature set point and change the hot/cold status of the unit (if set by the HMI on the control).

9.1. LCD/Web interface

Through Main Menu screen the user can read the main important information necessary for monitoring the AHU status. In particular, the user can:

- Display actual status
- Read main values
- Switch unit Off/On
- Change the AHU Setpoints
- Access to the I/O overview menu
- Access settings
- About Unit
- Restore alarm conditions

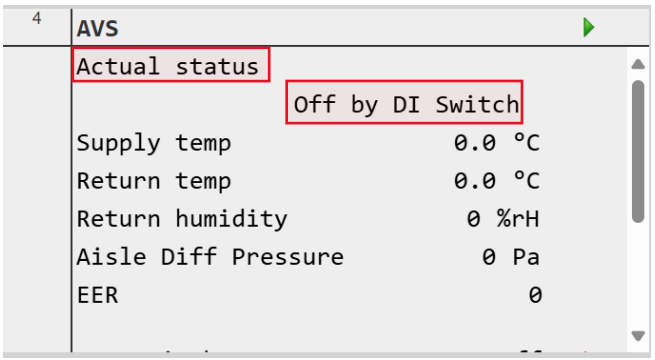
Next chapters will describe any item of the main menu. In the following table the user can find all the items of the main menu screen and the section where it is described.

Main Menu item	Section
Actual status	Display the actual status of the AHU. ***(Chapter 10)***
Main Menu Display	Display actual supply, return temperature used to regulate treatment system. (***Chapter 11***)
HMI switch	Change the unit status from OFF to On and vice versa. (***Chapter 12***)
Input/Output	Allow user to access the menu that shows all the input/output values of the AHU. (***Chapter 13***)
Setpoints	Allow user to access the menu that shows unit setpoints. (***Chapter 14***)
Settings	Allow the user to access the menu that shows all unit settings (up to the password input). (***Chapter 15***)
Service	Allow the user to access the menu that shows service settings. (***Chapter 16***)
About unit	Allow the user to access information about the control system of the AHU. (***Chapter 17***)
Restore alarm condition	Allow the user to reset alarms once the problem is fixed. (***Chapter 18***)

10. Actual status

This item displays the actual status of the AHU. All possible statuses are reported in the table below.

HMI Path: Main page → Actual status



Main Menu item	Value	Description
Actual status	- Off by Fire alarm - Off by Alarm - Off by DI switch - Off by Master - Off - On - On by Master - On by BMS - Startup - Fire Alarm - Alarm - Test - Test by Master	– ***Off by Fire alarm:*** The unit is switched off immediately due to a fire alarm. – ***Off by Alarm*** The unit is switched off due to alarms that don't allow the system to work in safety condition. – ***Off by BMS*** The unit is switched off by BMS. – ***Off by DI switch*** The unit is switched off by the selector on the electrical panel. – ***Off by Master*** The unit is switched off by the Master unit command – ***Off*** The unit is switched off by HMI command. – ***On*** The unit is witched on and operational. – ***On by Master*** The unit is witched on by the Master unit command. – ***On by BMS*** The unit is witched on by the BMS. – ***Startup*** The unit is in startup mode. – ***Fire Alarm*** The unit is switched off due to a fire alarm, however, the valve keeps regulating – ***Alarm*** The unit is switched off due to a fault alarm, however, the valve keeps regulating – ***Test*** The unit is in test mode – ***Test by Master*** The unit is in test mode by Master unit command

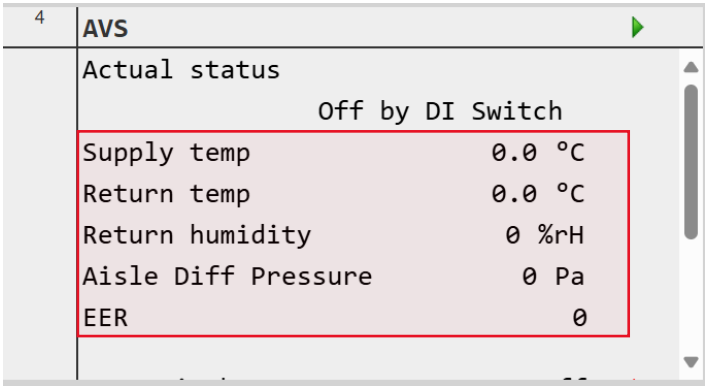
On status follows a priority chain according to the following table:

HMI Switch	Panel Switch	BMS Enabled	BMS	Unit actual status
OFF	X	X	X	OFF
ON	OFF	X	X	OFF
ON	ON	YES	OFF	OFF
			ON	ON
		NO	X	ON

The “X” value means that whichever state doesn’t affect the unit actual status.

11. Main menu display

These items (read-only) display different values used to regulate the AHU.

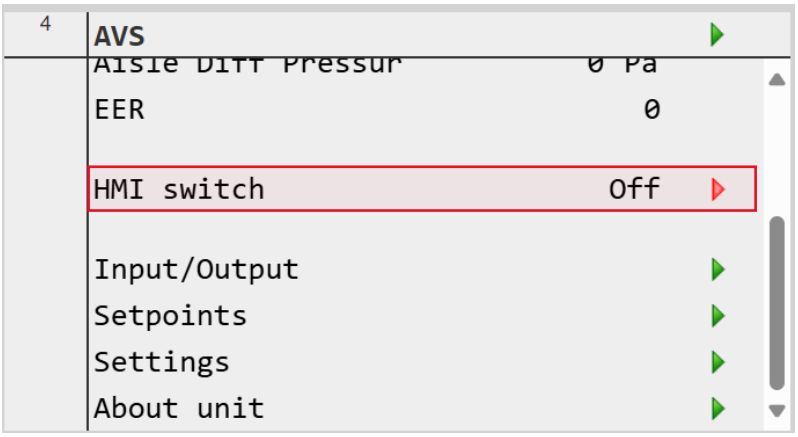


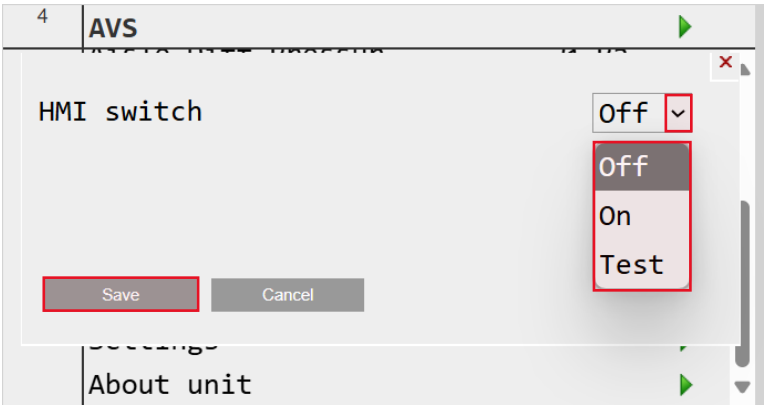
- Supply temperature: The average supply temperature
- Return temperature: The average return temperature
- Return humidity: The average humidity
- Aisle differential pressure
- EER: The Energy Efficiency Ratio represents the ratio between the cooling capacity and the electrical power input required to produce that cooling. It is an important indicator of the energy efficiency of cooling systems.
  A higher EER value indicates a more energy-efficient system.

12. HMI Switch

This item displays and allows you to set the status of the AHU.

HMI Path: Main Menu → HMI Switch





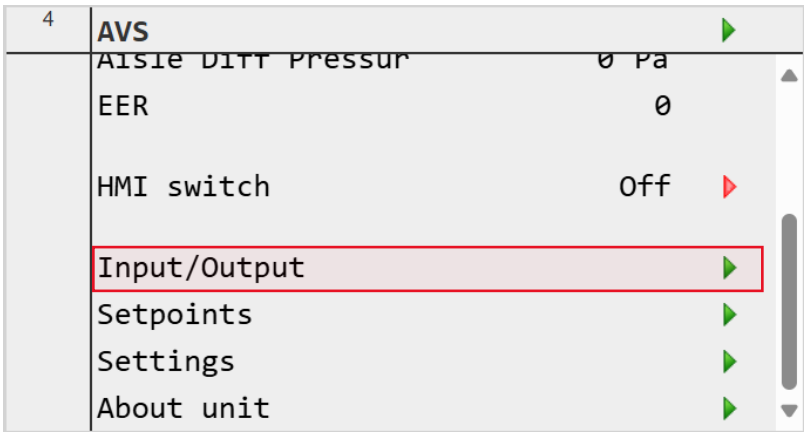
HMI Switch can be set on:

1. Off: Turning off the unit
2. On: Turning on the unit
3. Test: Used only by service

13. Input/Output

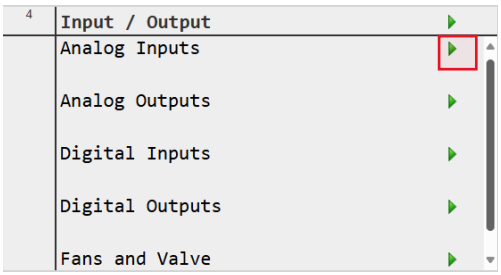
This menu (read-only) allows to access submenus of read values throughout the application.

HMI Path: Main Menu -> Input/Output

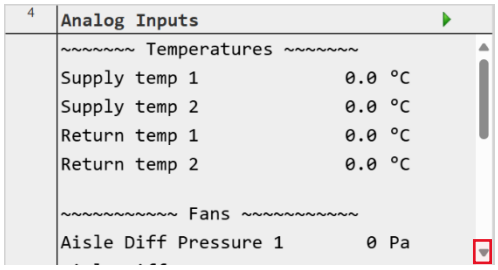


Be aware that the following Inputs/Outputs refer to the AVS, other AHUs may have different components.

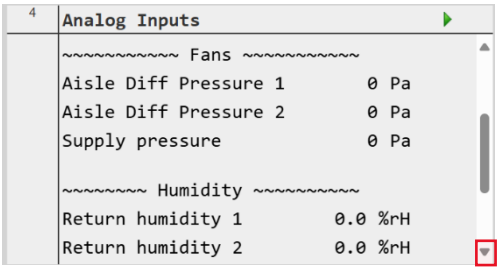
Selecting “Input/Output” a menu shows the access to sub menus dedicated to different signals of the system as explained below:

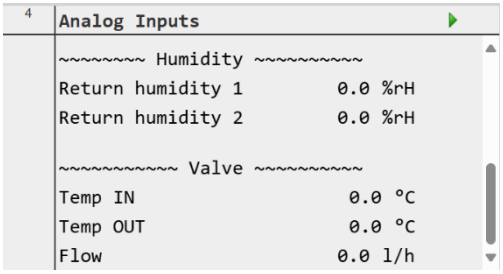


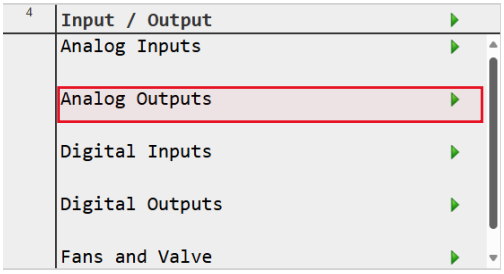
Select “Analog Inputs” to show probes and transducers values.



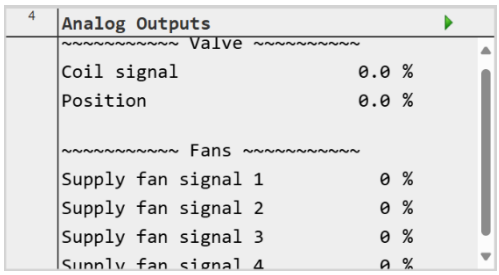
Scroll down to show remaining values.

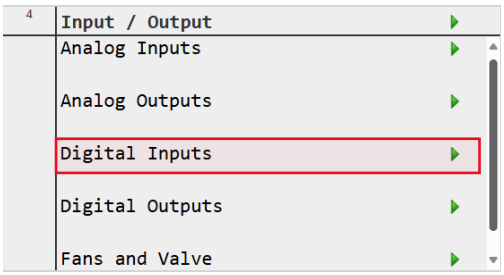




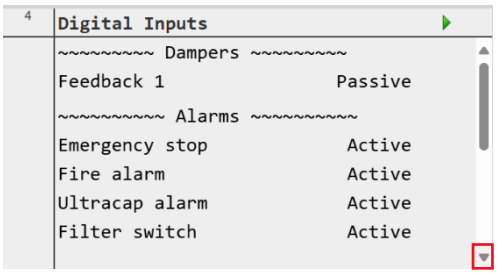


Select “Analog Outputs” to show coil and fans values.

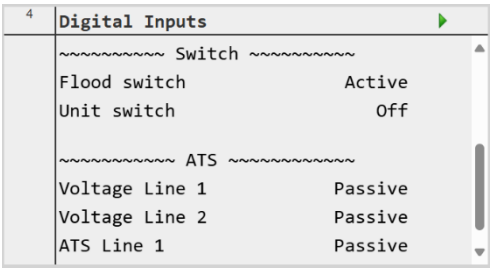


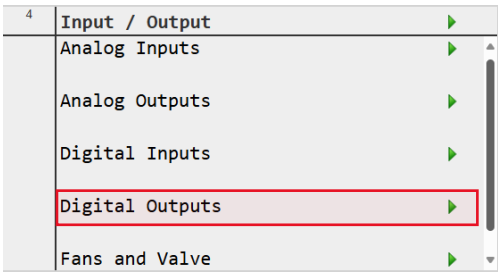


Select “Digital Inputs” to show alarms and switch status.

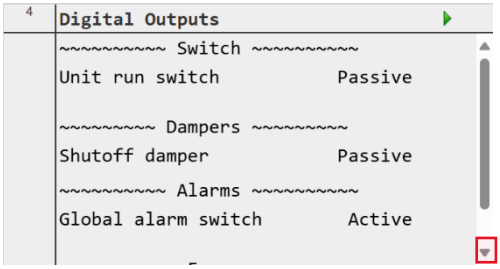


Scroll down to show remaining values.

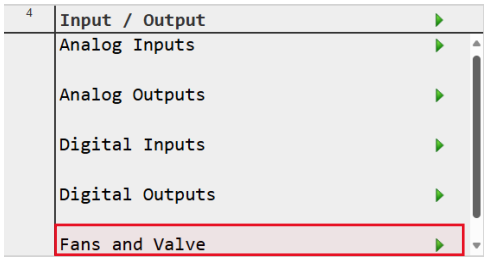




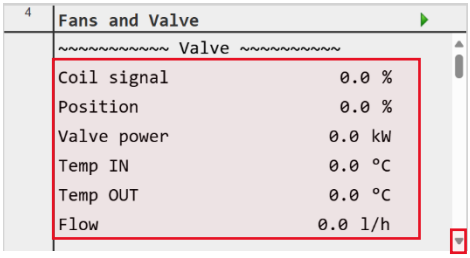
Select “Digital Outputs” to show command and switch.

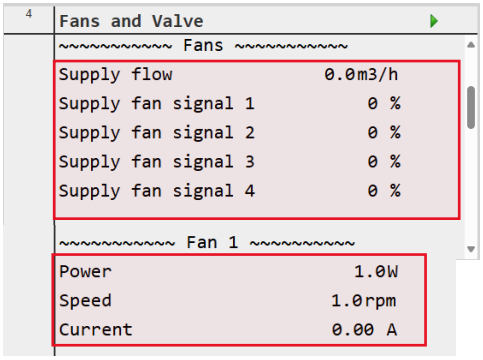


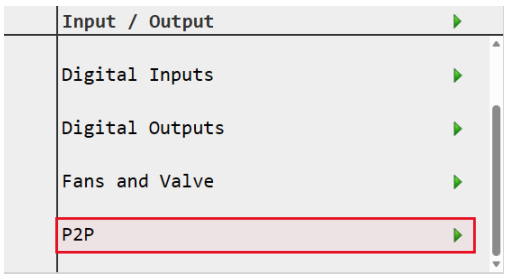
When you enable the components, the various sections will be created, scroll to view all.



Select “Fans and Valve” to show more information about the fans and valve.





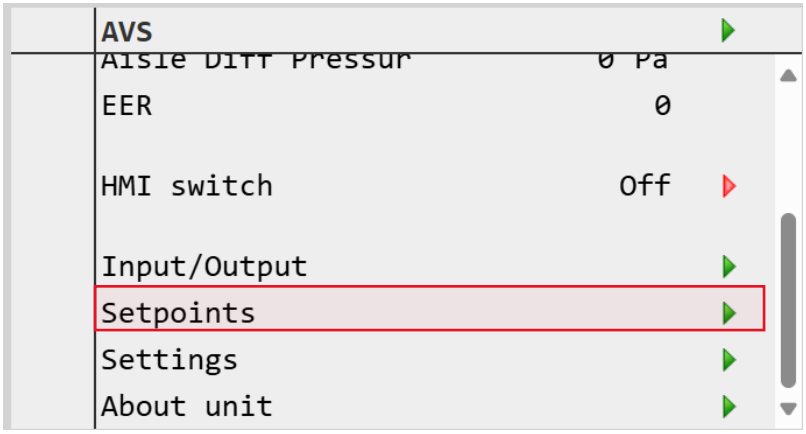


Select “P2P” to show more information about the P2P.

14. Setpoint

This menu allows the user to access all setpoints used to control AHU.

HMI Path: Main Menu → Setpoints



Selecting “Setpoints” a page allows to change all setpoints values, used by the system to target regulation algorithm.

14.1. Fans

- Supply pressure: Desired supply pressure setpoint if fan regulation is on pressure
- Supply flow: Desired supply flow setpoint if fan regulation is on flow or off normal speed is on flow
- Alarm delay: Time delay before triggering the pressure alarm after exceeding the maximum threshold
- Start alarm delay: Time delay before enabling the pressure alarm after fan startup
- Threshold max: Maximum pressure limit
- Threshold min: Lowest valid pressure value considered in the calculation of average, maximum, and minimum pressure
- Power limit: Maximum allowed fan power consumption
- Low flow alarm threshold: Minimum airflow level before the low-flow alarm is triggered
- Pressure Min Reg: Minimum pressure range if regulating the fan with temperature reference
- Pressure Max Reg: Maximum pressure range if regulating the fan with temperature reference
- Flow Min Reg: Minimum flow range if regulating the fan with temperature reference
- Flow Max Reg: Maximum flow range if regulating the fan with temperature reference

14.2. P2P Units

- Startup delay: Time delay before triggering the P2P communication alarm

14.3. Supply Temperature

- Threshold max. supply: Maximum allowed average supply air temperature
- Alarm startup delay: Time delay before triggering the average supply temperature for exceeding the high temperature limit after starting the unit
- Alarm delay: Time delay before triggering the average supply temperature for exceeding the high temperature limit

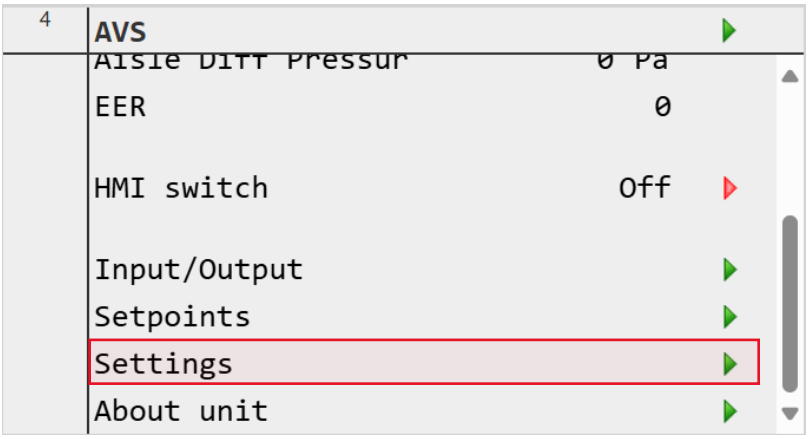
14.4. Temperatures

- Return temperature setpoint: Desired temperature if regulation is on return
- Supply temperature setpoint: Desired temperature if regulation is on supply
- Supply min. setpoint: The lower limit for scaling regulation temperature if regulation is on return
- Supply max. setpoint: The upper limit for scaling regulation temperature if regulation is on return
- Threshold max. return: Maximum allowed average return air temperature
- Threshold max. water: Maximum allowed water temperature
- Time max water: Maximum time allowed for startup mode after wise unit starts and ignores the maximum water threshold condition

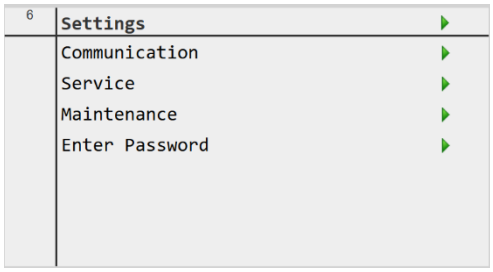
15. Settings

This menu, up to the password level, allows the user to access submenus for communication channels.

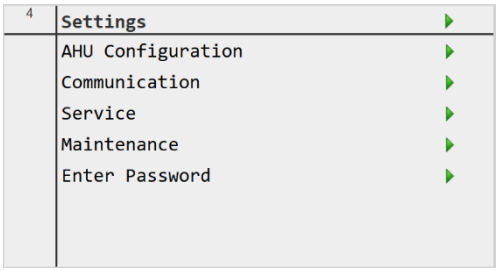
HMI Path: Main Menu → Setting



Selecting settings and logging in with needed password to access different menu as shown below:



Menu with User level password.

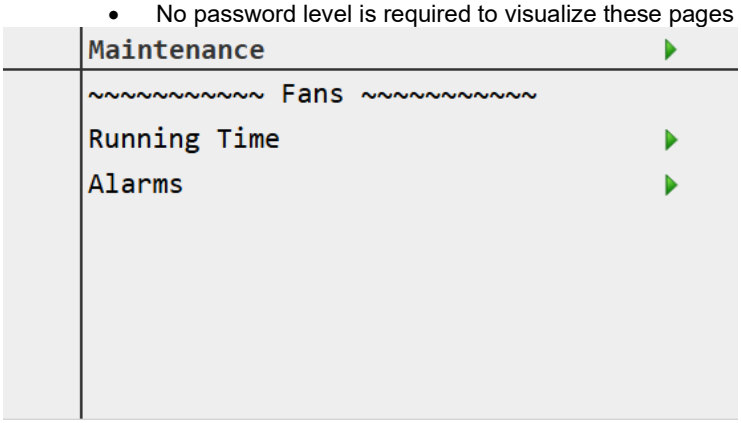


Menu with Maintenance level or higher-level password

15.1. Maintenance

Maintenance page contains running time and alarms of all available fans
Notice that:

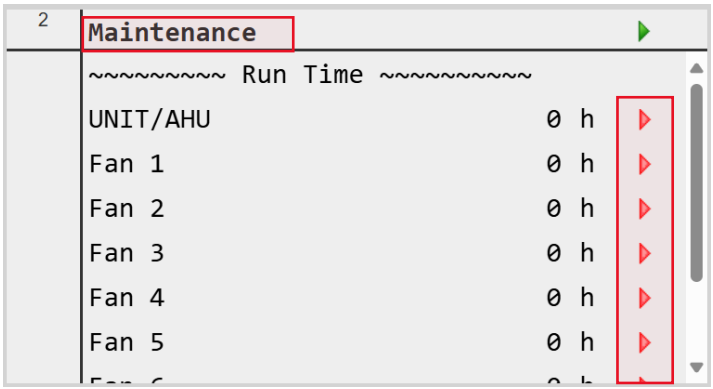
- No password level is required to visualize these pages

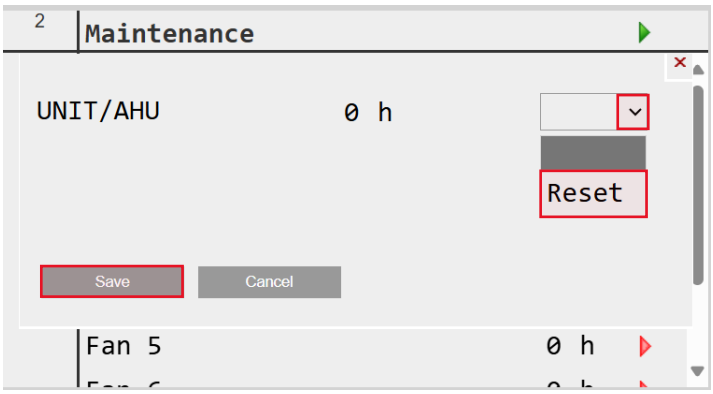


15.1.1 Running Time

Maintenance – Running time page contains the running time of the AHU and each fan (in hours), with the possibility to reset the running time if needed.
Notice that:

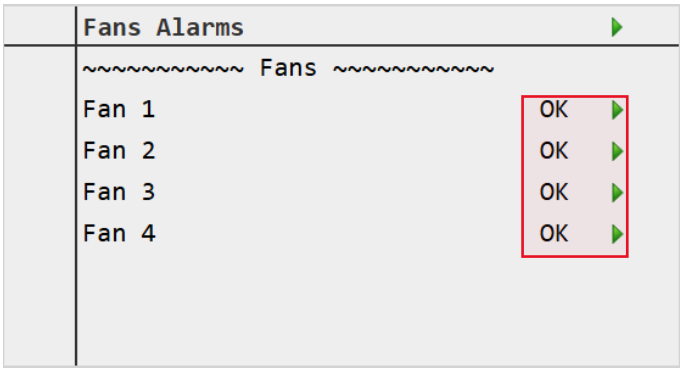
- No password level is required to visualize the running time
- Maintenance level or higher level password is required to reset the running time

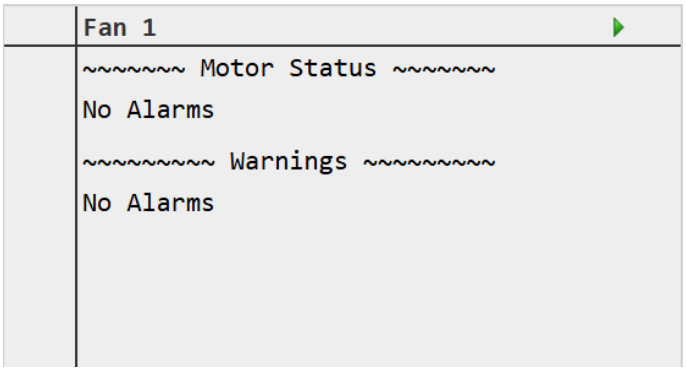




15.1.2 Fan Alarms

Fan Alarms page contains general status of alarms and more details about the Motor status alarm, and Warning alarms inside each page for each fan

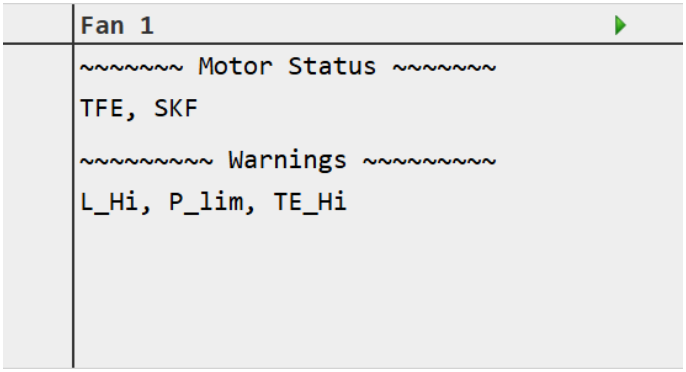




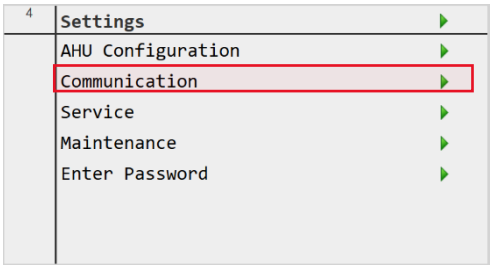
Notice that:

- If no alarm is present the fan alarm will be “OK” and “No Alarms” inside the fan alarm page
- A “Comm Fault” will appear if the fan is not properly communicating with the unit
- If there is any alarm present the fan alarm will be “FAULT” and reference alarm code inside the fan alarm page which can be referred to point 6.1

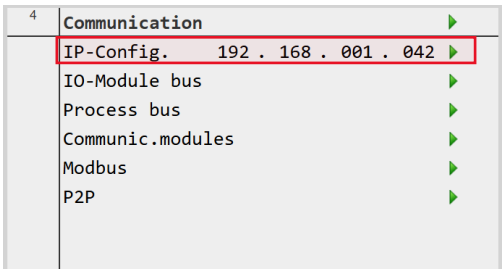
e.g. If Fan 1 alarm is in FAULT and inside its page the following alarms are observed, so with referring to reference point, TFE correspond to “Output stage overheated” and so on for the rest of the alarms



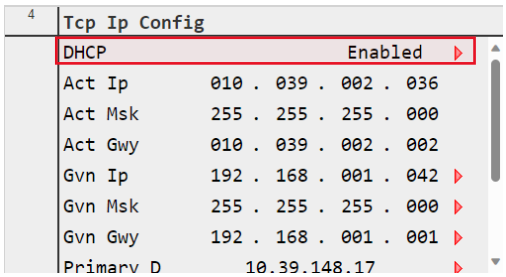
15.2. IP Configuration



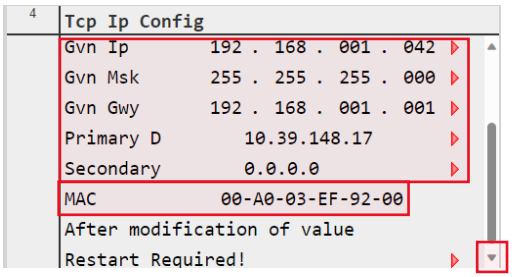
Select “Communication” to access different channel parametrization.



Select “IP-Config.” to access configuration of IP address of the control system.

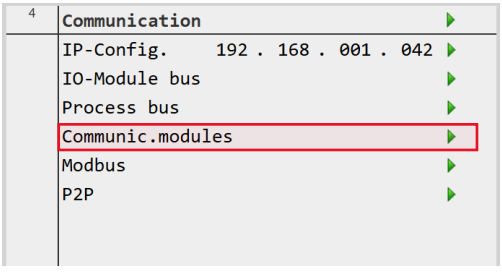


Select “DHCP” to enable or disable the service.

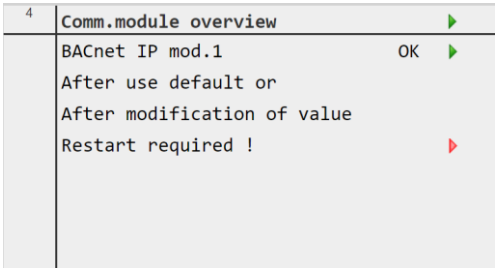


Scroll down to show remaining values.
In case of DHCP disabled use Gvn (given) fields to assign specific IP values to the control system.
MAC is the mac address of the POL688 (control system) of the unit.

15.3. Communication modules

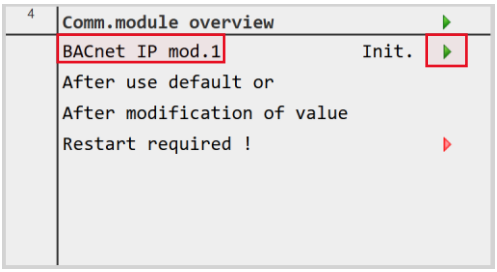


Select “Communic.modules” to access configuration of additional comm modules if present.

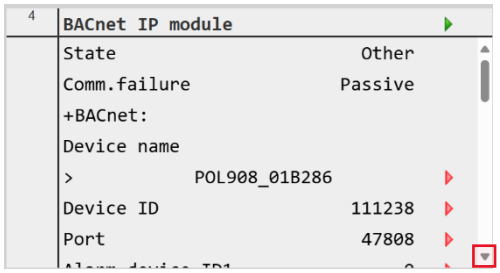


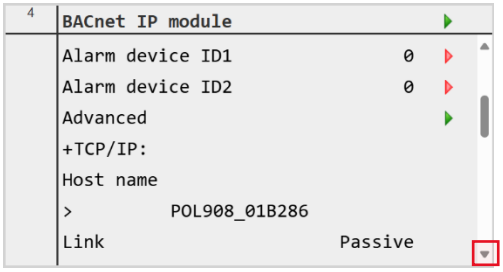
In the presence of a connected module, specific menu will appear to allow parametrization (communication setting) of every single module installed.

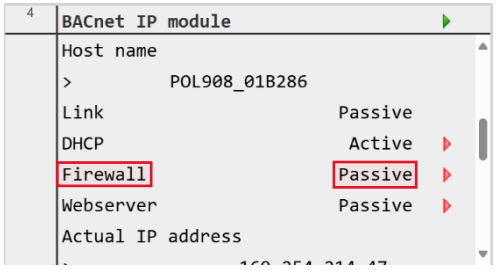
15.3.1 BACnet POL 908



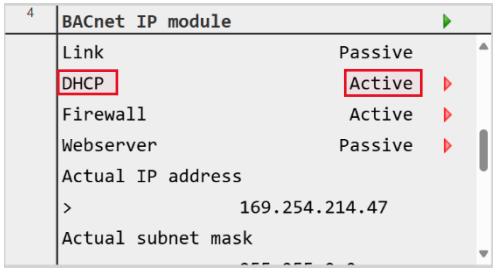
After connecting POL 908 to the main controller and restarting, a new menu appears (BACnet IP mod. x)



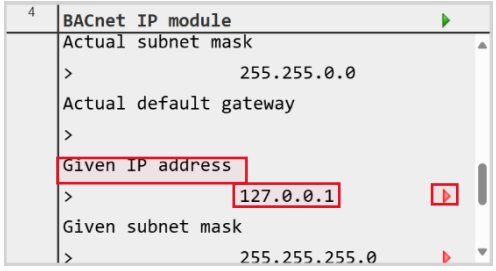




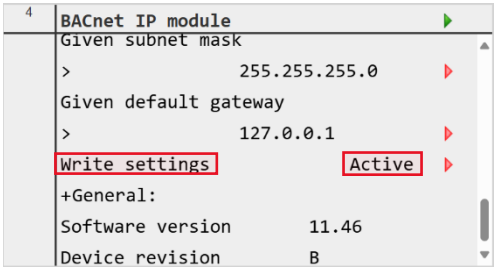
The Firewall must be disactivated.



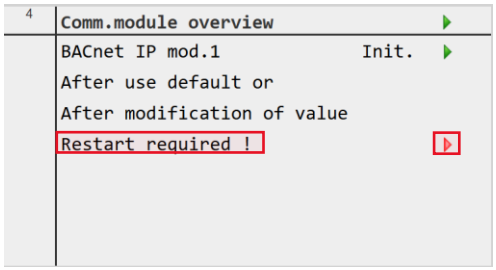
Be aware that the DHCP must be disactivated if POL908 is directly connected to a personal computer and activated if connected to the network.



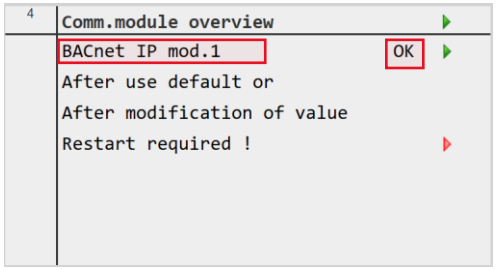
If the DHCP is passive (POL 908 connected point to point to a pc) a given IP address is required



Write Settings must be activated.

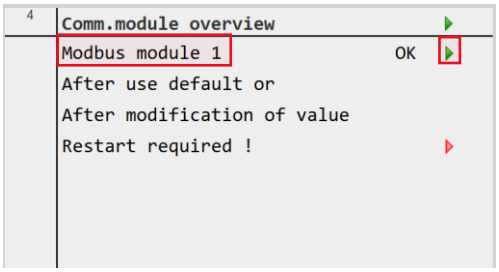


Now a restart is required.

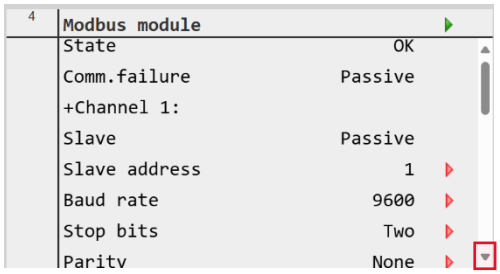


After restarting wait till seeing the OK message

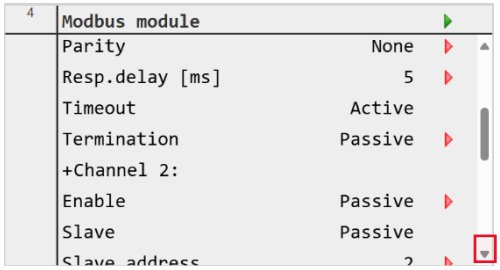
15.3.2 Modbus POL902

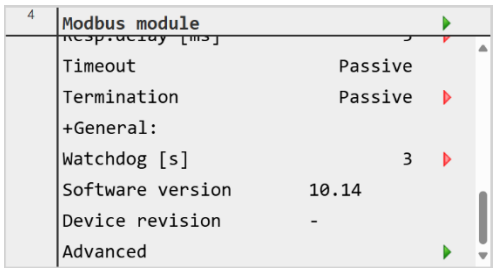


After connecting POL 902 to the main controller and restarting, a new menu appears (Modbus module x)

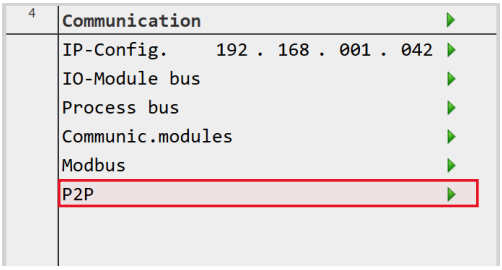


Modbus's settings can be modified as needed.





15.4. P2P



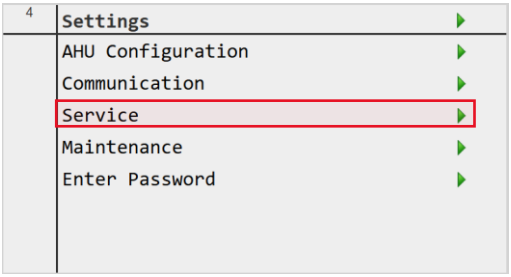
More information has been explained in Chapter 7 (P2P)
Notice that: firstly, you need to specify the number of units connected to the P2P channel in P2P Units

16. Service

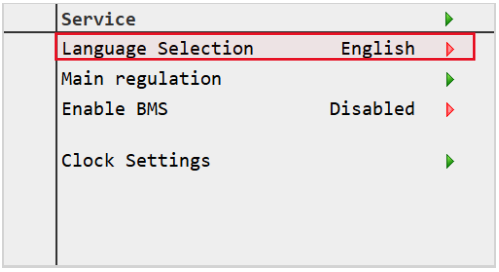
From Settings you can enter to Service where you can access several services as

- Language Selection
- Main Regulation
- Enabling BMS
- Clock Settings

HMI Path: Main Menu → Settings → Service

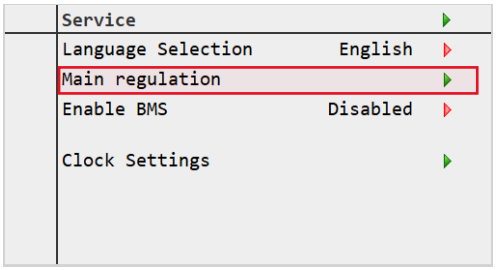


16.1. Language Selection



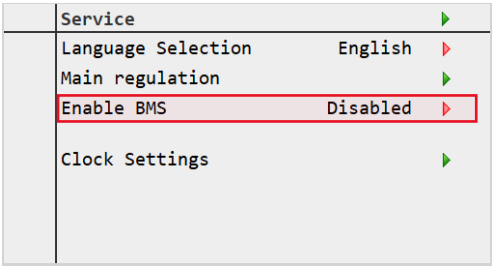
Select “Language Selection” to change language of HMI if available.

16.2. Main Regulation



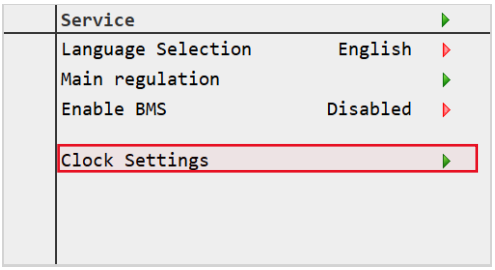
Select “Main Regulation” to access the parameters of the fans and coil control loops.

16.3. Enabling BMS



Select “Enable BMS” to access menu that Allow to enable or disable BMS functionality (Off / On of the unit).

16.4. Clock Settings

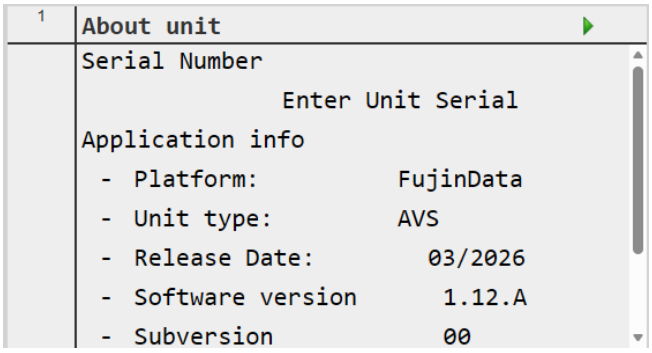


Select “Clock Settings” to adjust the date and time of the unit and other time related settings.

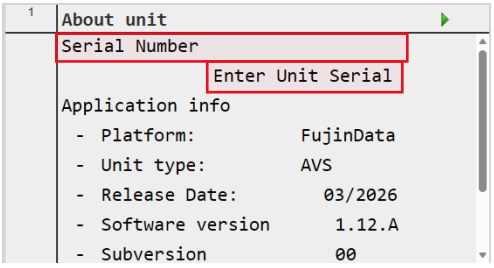
17. About Unit

This menu allows users to access pages with information about unit software.

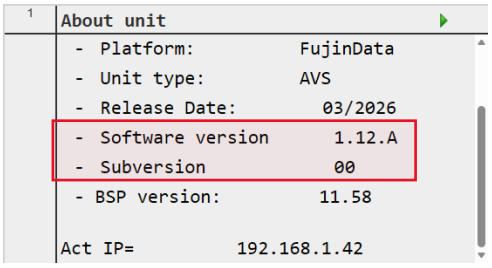
HMI Path: Main Menu → About unit



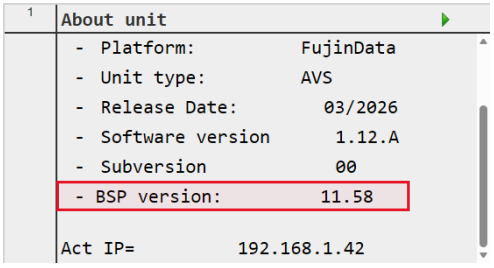
This page shows useful information to note while contacting service in case of need.
Single information is explained below:



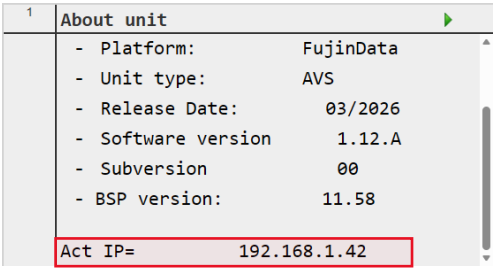
"Serial Nr" show the specific serial number of the unit.



"Software version and Subversion:" show the application release running on the unit control system.



"BSP" shows the release of the operating system running on the unit control system.



"Act IP" show the actual IP address of the control system board.

18. Alarm

18.1. Alarm list

Alarms		Class	Self-Release	High Limit	Low Limit
Type	Name				
Digital Inputs	Emergency Stop [1/2/3/4]	WA1/FL1	✗* / ✓		
	Ucap Alarm [1/2/3/4]	WA1/FL1	✗ / ✓		
	Filter Switch [1/2/3/4]	WA1/FL1	✗ / ✓		
	Flood Switch [1/3/4]	WA1/FL1	✗ / ✓		
	Fire Alarm [1/2/3/4]	WA1/FL1	✗ / ✓		
	Pump Alarm [2]	WA1	✗ / ✓		
	Voltage Line 1 [1/3/4]	WA1/FL1	✓		
	Voltage Line 2 [1/3/4]	WA1/FL1	✓		
	ATS Status [1/3/4]	WA1/FL1	✗ / ✓		
	Ucap Status [1/3/4]	WA1/FL1	✗ / ✓		
Analog inputs	Supply Temperature 1 [1/2/3/4]	WA1/FL1	✗ / ✓	80 °C	- 20 °C
	Supply Temperature 2 [1/2/3/4]	WA1/FL1	✗ / ✓	80 °C	- 20 °C
	Average Supply Temperature [1/2/3/4]	WA1/FL1	✗ / ✓	Var SP	- 20 °C
	Return Temperature 1 [1/2/3/4]	WA1/FL1	✗ / ✓	80 °C	- 20 °C
	Return Temperature 2 [1/2/3/4]	WA1/FL1	✗ / ✓	80 °C	- 20 °C
	Average Return Temperature [1/2/3/4]	WA1/FL1	✗ / ✓	Var SP	- 20 °C
	Supply fan pressure x [1/2/3/4]	WA1/FL1	✗ / ✓	300 Pa	-50 Pa
	Pressure Supply [1/2/3/4]	WA1/FL1	✗ / ✓	2500 Pa	0 Pa
	Pressure Alarm [1/2/3/4]	FL1*	✓		
	Return Humidity 1 [1/2/3/4]	WA1/FL1	✗ / ✓	100 %r.H	0 %r.H
	Return Humidity 2 [1/2/3/4]	WA1/FL1	✗ / ✓	100 %r.H	0 %r.H
	Supply Humidity 1 [1/2/3/4]	WA1/FL1	✗ / ✓	100 %r.H	0 %r.H
	Supply Humidity 2 [1/2/3/4]	WA1/FL1	✗ / ✓	100 %r.H	0 %r.H
COM	Fan x [1/2/3/4]	WA1/FL1	✓		
	Valve [1/2/3/4]	WA1	✓		

Legend		
WA1 =	Warning	The unit will continue to work by reporting the alarm.
FL1 =	Fault	The unit will stop operation as it is a critical alarm.
FL1* =	Fault*	The alarm is fault, except in off normal fan speed situation
WA1/FL1 =		The alarm is warning or fault based on the configuration
Superscript[1/2/3/4]	AHU	1= AWB, 2= ACE, 3= AVS, 4= ACB.
Var SP		Variable setpoint which can be set in Setpoint page
✗ / ✓	Self-Release	✓ = Self-Release ✗ = NOT Self-Release (A manual acknowledge is required to clear the alarm) ✗ / ✓ = Self-Release can be enabled/disabled in Configuration Status page ✗* = Not self-release except when voltage line 1 and 2 are in alarm

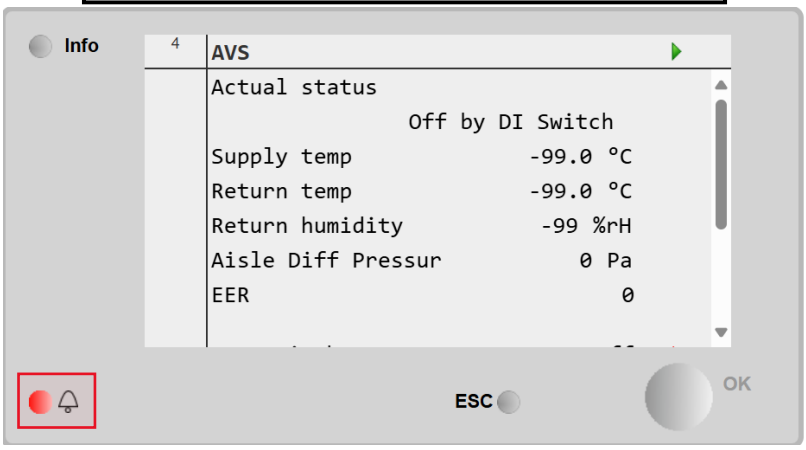
See Appendix B for the procedure for restarting the AHU after emergency stop activation

Alarms		Class	Self-Release	Delay	Explanation
Type	Name				
Various	Damper not opened	WA1	✓	85 sec	Damper not fully open
	Damper not closed	WA1	✓	85 sec	Damper not fully closed
	Low Flow Alarm	WA1	✓	Low flow alarm startup/run delay	Flow is less than Low Flow Threshold
	Global Alarm Switch	WA1/FL1	✓	-	Global alarm triggered
	Pressure Not Readable	WA1	✓	-	Pressure Transducer 1, 2 and P2P shared pressure not available
	Pressure Flow Alarm	WA1	✓	5s	Supply pressure and P2P supply pressure shared are in alarm
	Max Temp Water	WA1	✓	Time Max Water	Water temperature is greater than the Max Water Threshold at startup only

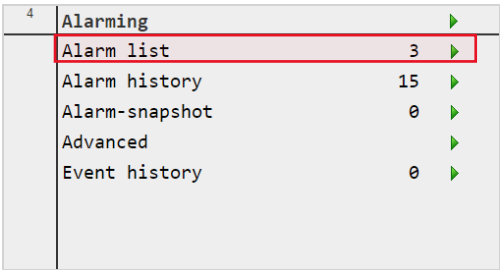
18.2. Alarm Reset

This menu allows the user to reset alarms once the problem is fixed.

HMI Path: Main Menu → Red blinking bell

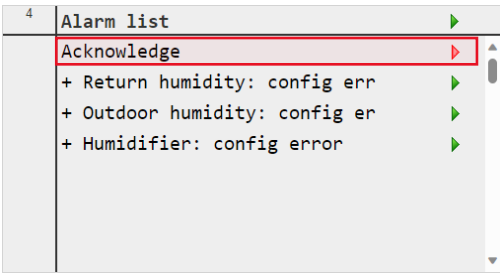


This page shows everything about the alarms and allows reset once the problem is fixed.
To access the reset, you must enter one of the passwords described in the previous chapters.

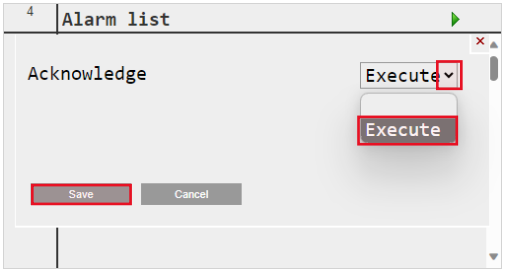


Select “Alarm list” to open the page where all the alarms are shown.

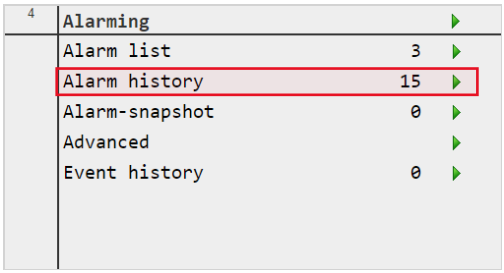
The number next to the green triangle means the number of alarms present.



Select "Acknowledge" to open the page where you can execute the reset command select execute and press save. (User password or higher-level password is required)



If the problem has been solved the alarm will disappear from the list.



Select "Alarm history" to view the list of actions taken for each alarm.

18.3. Alarm troubleshooting

Alarm Type	Description	Potential Cause	Recommendation
Under range	Value reading is below the minimum threshold.	- Sensor calibration drift - Negative pressure in DPI (reversed tubes), parameters mismatch - Supply voltage too low	- **Measure:** Use a multimeter to check the voltage output at the sensor - **Verify DPI:** Check parameters (Min/Max Input & Range) - **Adjust:** Check the min-limit alarm threshold; increase if needed
Over range	Value reading exceeds the maximum threshold	- Sensor saturation - Blocked tubes, parameters mismatch	- **Measure:** Use a multimeter to check the voltage output at the sensor - **Verify DPI:** Check parameters (Min/Max Input & Range) - **Adjust:** Check the max-limit alarm threshold; increase if needed
No sensor/ Open loop/ Shorted loop/com fault	Controller detects a broken circuit or positive and negative wires are touching	- Broken wire or loose terminal - Blown fuse in the 24V DC loop - Burned-out sensor element.	- **Visual**: Check for snapped wires or loose connectors - **Continuity**: Use a multimeter to verify the loop is "closed"
Configuration error	Siemens configuration error	- Wrong module address - Siemens configuration error	- **Led color:** check the color led in 955 POL - **Address:** check the address of 955 POL - **Restart:** execute a system rest (available in configuration unit/functions)

Appendix A

Data Center AHU Control Logic Sequence

1. Unit Initialization & Safety

- **Unit status:** Unit status is **ON** if there are no active fault alarms.
- **Startup Phase (Thermal Protection):** Before fans start, the controller checks the water temperature.
    - **Condition:** If water temperature > **Threshold Max Water** setpoint, the fans remain **OFF** and the valve opens to **100%**.
    - **Goal:** Pre-cool the coil to prevent blowing hot air.
    - **Transition:** Once water temperature drops below the threshold or for a **Time Max Water** setpoint, the unit proceeds to the next phase.

2. Pre-Dynamic Phase (not present in AVS; fans are independent from the SPDT feedback signal)

- **Damper Command:** The controller issues a 100% open command to the dampers.
- **Interlock:** The system waits for an **SPDT** feedback signal.
- **Transition:** Fans are inhibited until the dampers are confirmed fully open to prevent duct over-pressurization.

3. Dynamic Phase:

Fan control:

The control strategy depends on whether the unit is designated as a **Master** or **Slave** in the P2P network.

If Unit is MASTER:

The fans regulate based on the **Pressure/Flow Setpoint**.

- **Shared Data:** The process variable (PV) is calculated using the **Min, Max, or Average** of all pressure transducers on the P2P network.
- **Coil Compensation:** If fan regulation is active, fan speed may be adjusted to assist the coil in meeting thermal loads, provided it stays within defined pressure/flow limits.
- **Power Limit:** Fans will never exceed the **Maximum Power Limit** setpoint, regardless of whether the setpoint is met.

If unit is SLAVE:

- The fans ignore local PI logic and mirror the **control signal** received from the Master unit.
- **Cooling control (Coil):**
    - **Supply Control:** Regulates the valve to maintain the **Supply Temp Setpoint**.
    - **Return Control:** Regulates based on **Return Temp**, but scales the output to ensure supply temperature stays within the **Min/Max Supply Setpoint** envelope.

4. Off Normal & Failure Modes

If the P2P network fails and both transducers are disabled, the unit enters **Off-Normal Mode**. You must select one of the following "Off-Normal" behaviors:

- **Fixed speed**: Fans run at a pre-defined % speed (Fixed Fan Speed Setpoint).
- **Flow**: Fans switch to local flow-based regulation.
- **Last value**: Fans maintain the last known speed before failure.
- **Stop**: Fans shut down immediately and a fault alarm is triggered.

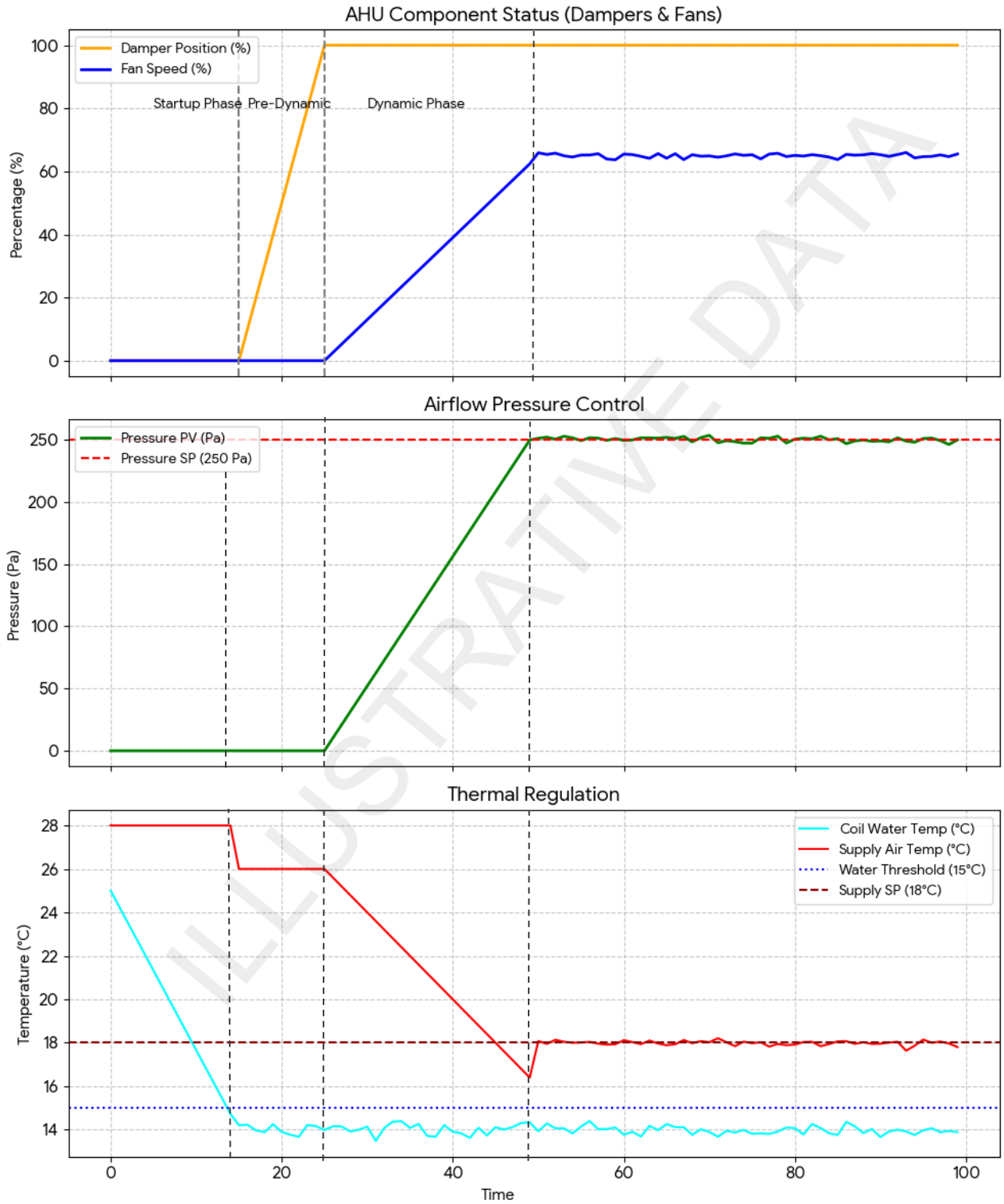
5. Steady State

Once the fans are stable, the unit keeps managing the thermal load via the cooling coil.

- **Fan Tuning (Auto PI) *DEMO*:** If enabled, the controller dynamically adapts **Kp** and **Ti** for smoother airflow. *(Note: This is a demo feature and requires site-specific commissioning).*

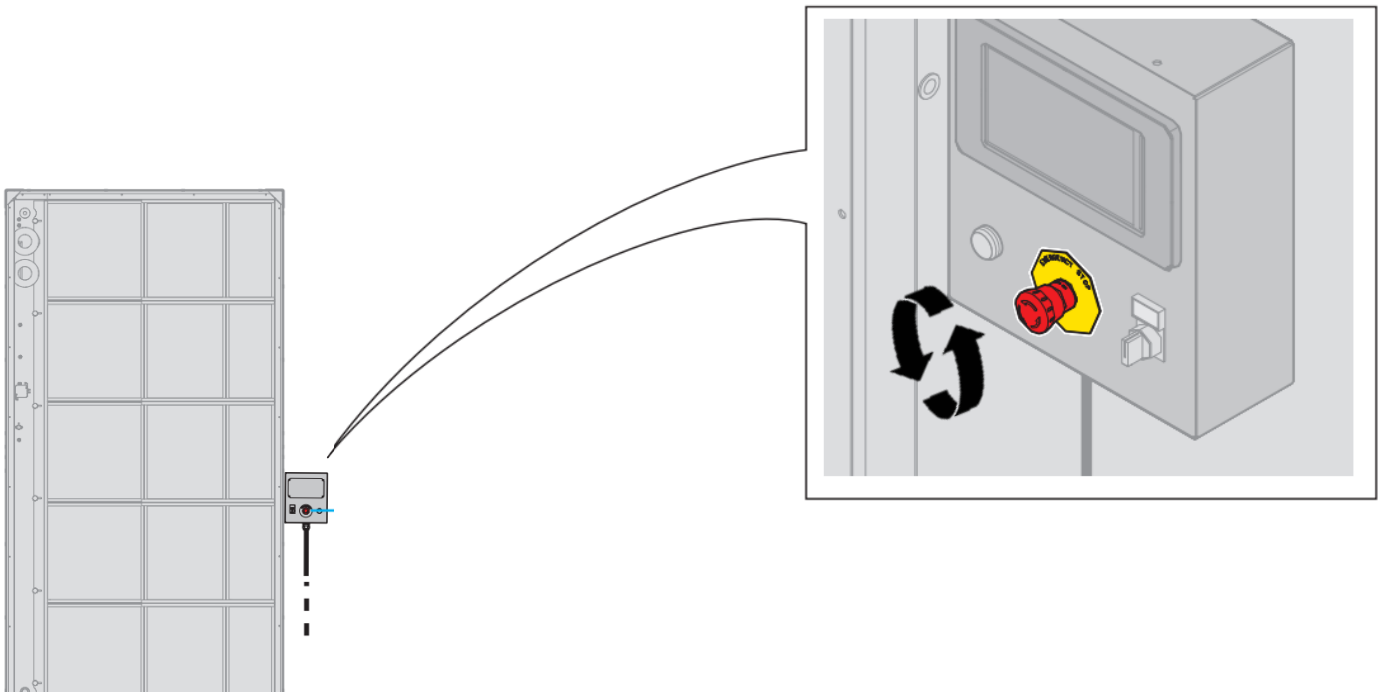
Disclaimer

NOTICE: The following study case is for **theoretical and illustrative purposes only**. All data, setpoints, and performance results are based on simulated parameters intended to explain control logic sequences. Real-world values, environmental factors, and specific equipment tolerances will vary. This study case does **NOT** substitute for site-specific engineering calculations or manufacturer-approved commissioning procedures.



Appendix B

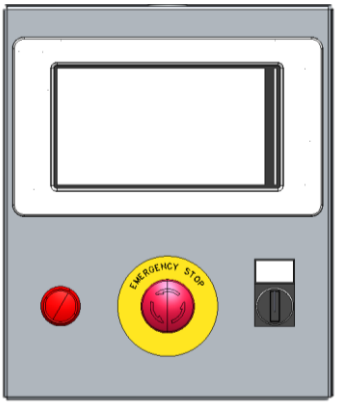
Procedure for restarting the AHU after emergency stop activation



AVS (Fan Wall Slim) Emergency Stop

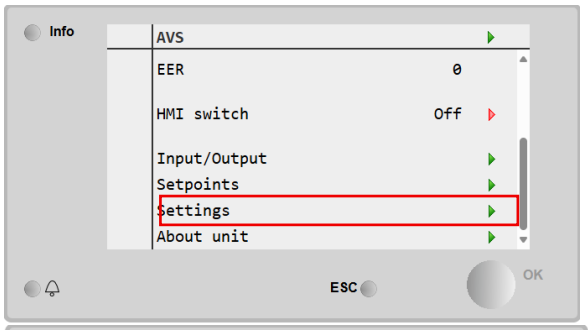
1. Emergency Stop Reset (Mechanical Reset)
When the emergency stop push button is activated:

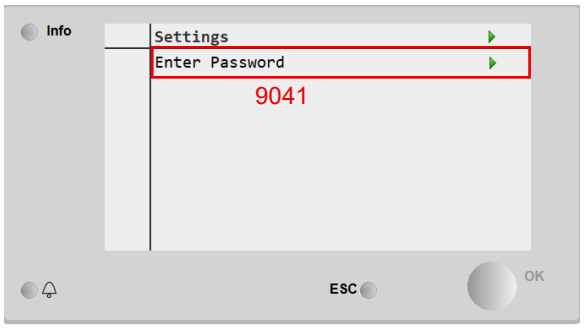
- The push button remains mechanically latched in the pressed position.
- To reset the device, rotate the emergency stop push button **counterclockwise (CCW)**.
- Continue rotating until a mechanical **"click"** is heard and the pushbutton returns to its normal (released) position.

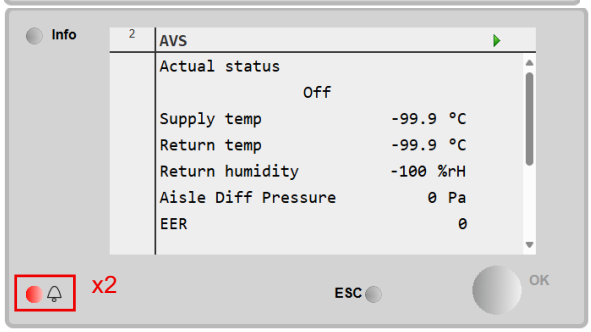


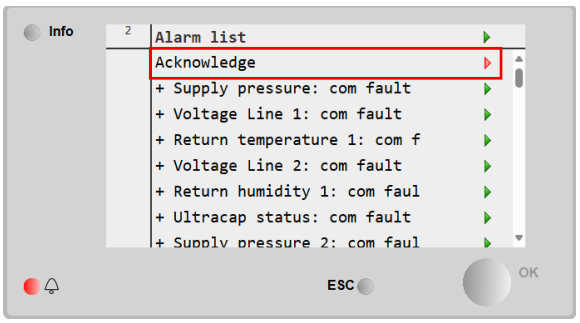
2. Alarm Acknowledgment (POL 895 HMI)

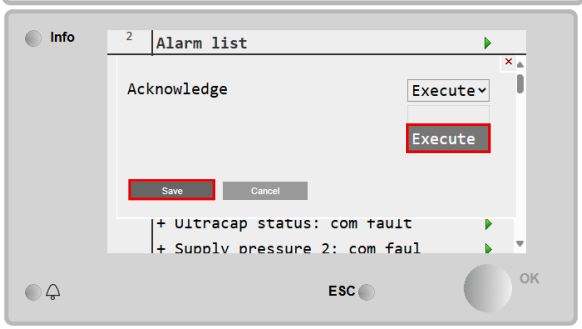
The Emergency Stop alarm is configured as a **non self-release alarm**, therefore, a manual acknowledgment is required. To acknowledge the alarm using the POL 895 HMI follow the following procedures.



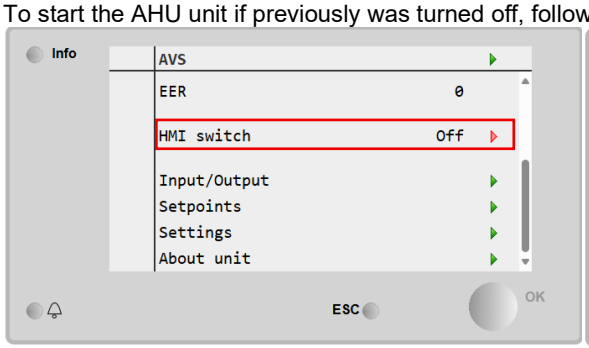


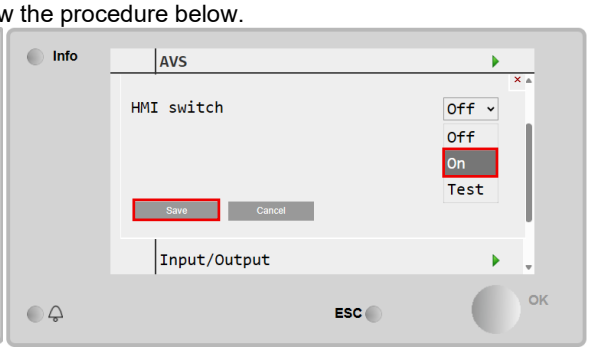






To start the AHU unit if previously was turned off, follow the procedure below.





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