Application software libraries for air-handling units (AHUs)

schneider-electric.com/hvacmachines

Life Is On | Schneider Electric

Application software libraries for air-handling units (AHUs)

Shorten your engineering time with extensively tested application software! SoMachine™ libraries provide software functionality in the form of ready-to-use function blocks (AFBs = Application Function Blocks), which are supplied for many basic common automation tasks and machine functionalities. They can be easily configured, customized, and implemented in your machine program.

Discover the built-in intelligence with AHU-specific functions for more systems' energy efficiency, operational reliability, and availability:

1. Plant mode control
2. AHU temperature control
3. Energy management
4. Drive communication control
5. PID
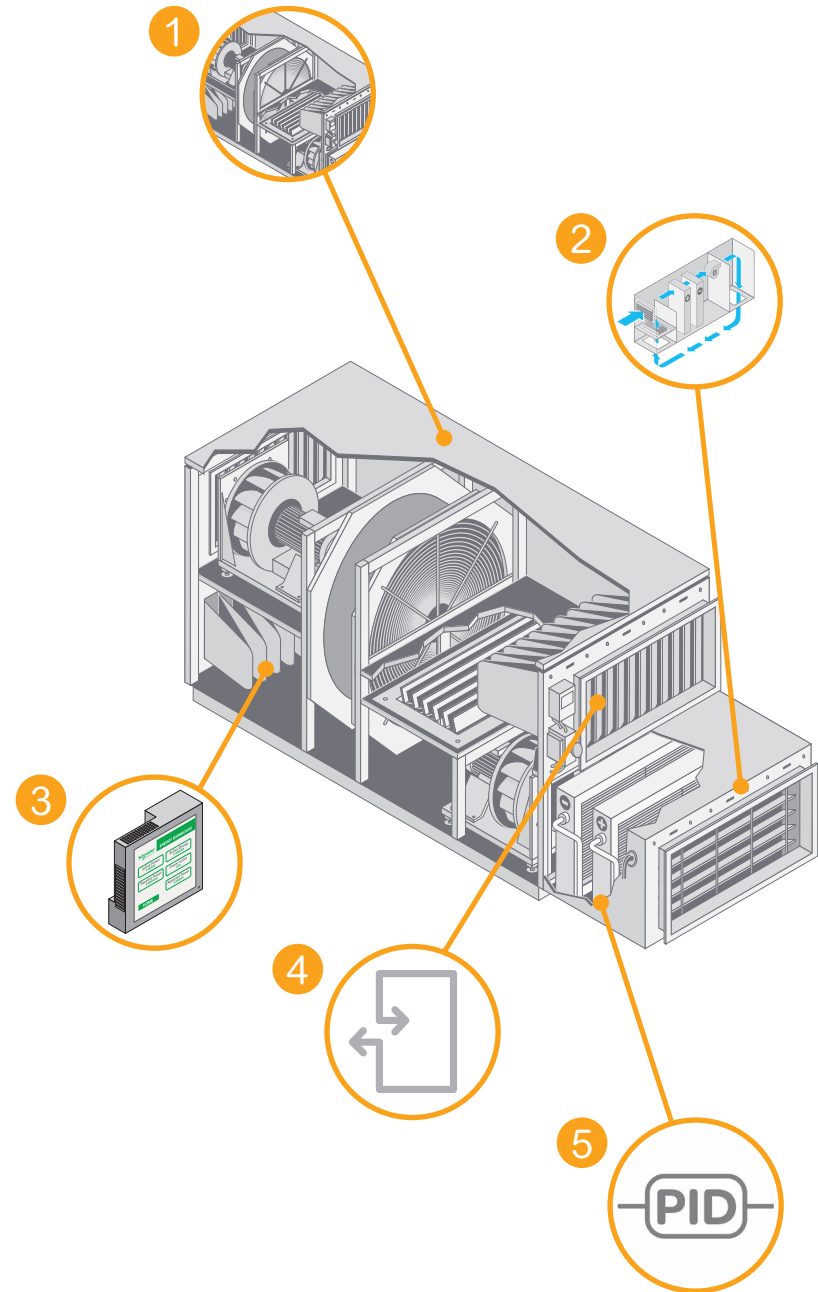
Control automatically starts or stops the air handling units

This AFB determines the operating mode for an AHU. Besides monitoring the status of alarms, the AFB also monitors room and outdoor air temperatures to reduce cooling energy needs and improve comfort levels.

Benefits

- Monitored operation
  - The AHU is set to a secure operation mode on detection of a fire alarm, fan alarm, or freeze state alarm.
  - The night cycle function monitors room temperatures to help protect the building against condensation or other damage due to extreme indoor temperature conditions (too hot or too cold).
- Energy optimization
  - The night purge function purges and precools the building during unoccupied periods to reduce cooling energy needs (free cooling).
  - The night cycle mode maintains a lower room temperature during heating periods and a higher room temperature during cooling periods to reduce the cooling or heating energy needs.


| OUTDOOR | FREEZE | FAN | FIRE | SCHEDULE | PRESENCE | ROOM |
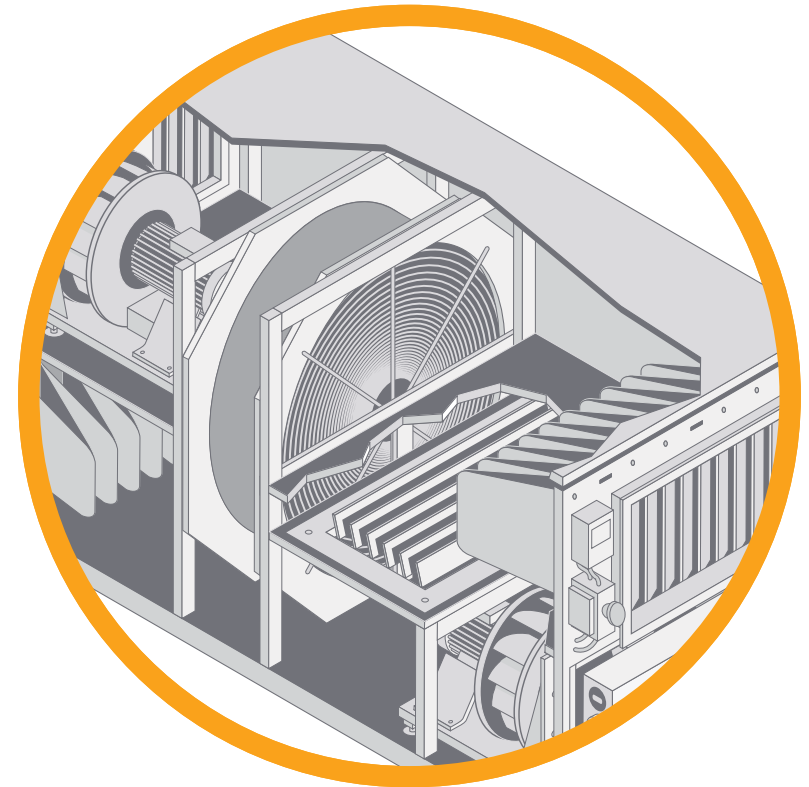
Plant mode control

Optimize energy performance and human comfort

This AFB controls the discharge air temperature of AHUs with or without mixing dampers. Heating coil, cooling coil, dampers, and fan speed are modulated in sequence to control the temperature. The function block supports two major temperature algorithms: constant discharge air temperature control and return air compensated discharge air temperature control.

Benefits

- Energy performance
  - The AHU air volume is controlled to keep optimum indoor air quality conditions with minimum air volume.
  - The economiser control function reduces cooling energy costs by choosing the most economical air for cooling indoor space.
  - The summer compensation function reduces cooling energy costs by increasing indoor space temperature in summer seasons.

- Comfort
  - Optimum comfort is achieved by adjusting the compensated discharge air temperature according to changes in the outdoor air temperature. An increased indoor space temperature during summer seasons avoids climate shocks when entering or leaving buildings.
  - An increased discharge air temperature during winter seasons increases human comfort by compensating conductive cold from walls during winter seasons.
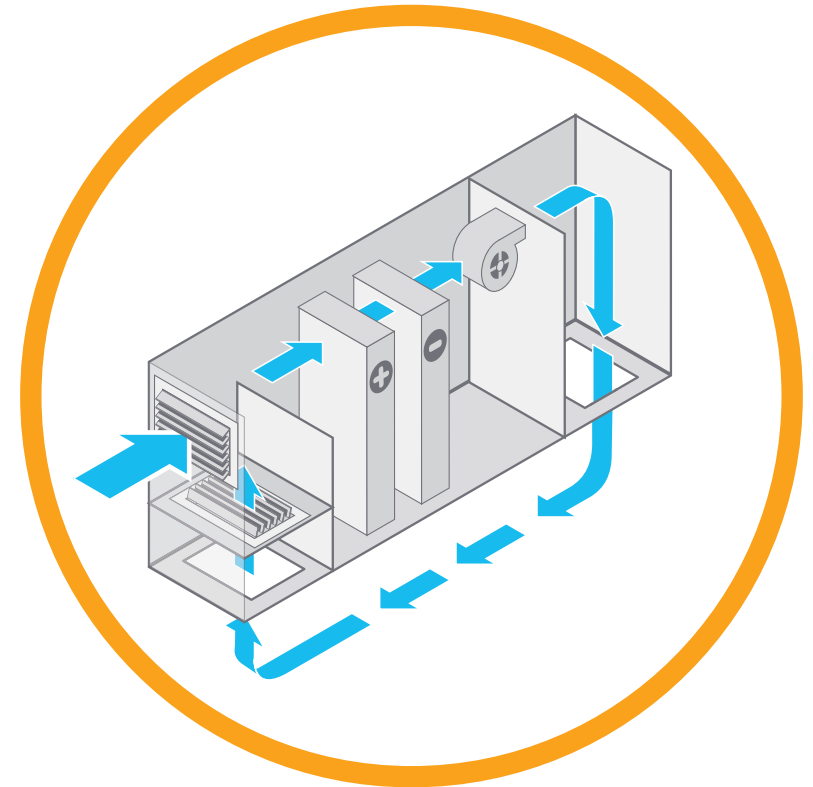

AHU temperature control

Monitor and manage
the drive permanently via
the modbus SL communication

These function blocks provide an easy and efficient way to integrate one or several Altivar™ variable-speed drive(s) connected, via modbus SL fieldbus, in the Modicon™ M171 system. The function blocks manage communication with the drives and provide control and monitoring capabilities.

Benefits
- Easy integration
    - Easy and efficient integration of Altivar variable-speed drives in the Modicon M171 system.
- Complete drive control
    - Control and monitoring of Altivar variable-speed drives on a Modicon M171 controller without any additional development.
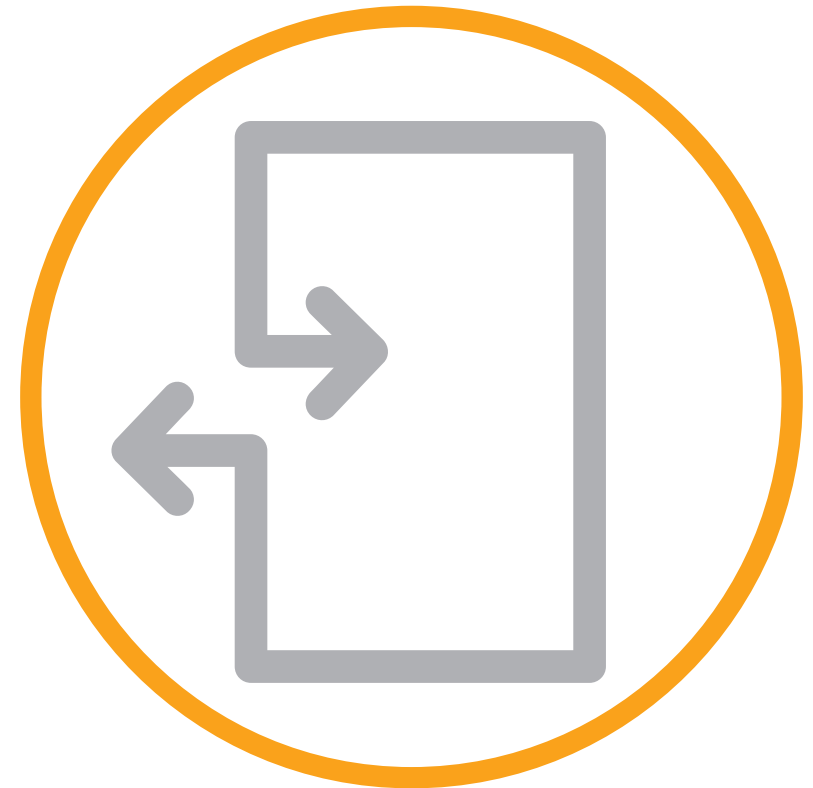

Drive communication control

Retrieve energy information and energy efficiency calculations

The energy management function blocks are designed for applications where the machine energy consumption needs to be metered and energy-efficiency information is required. The function blocks provide an easy integration of metering devices into the system and offer calculation methods to determine the machine efficiency, COP[1], or ESEER[2].

Benefits

- Quick and easy integration
  - Preprogrammed and fully tested metering functions are provided for a quick and easy integration of energy metering devices and machine efficiency calculation methods.
  - The function blocks provide an efficient integration of electrical metering devices either connected via modbus SL or hard-wired by using pulses.
  - A thermal energy calculation function block is embedded to determine the produced thermal energy. With dedicated trending and COP (1) calculation functions, machine efficiency can be monitored and analysed in detail.
  - The function block allows the cooling capacity to be calculated without adding a flow meter.

1 - COP = Coefficient of Performance
2 - ESEER = European Seasonal Energy Efficiency Ratio
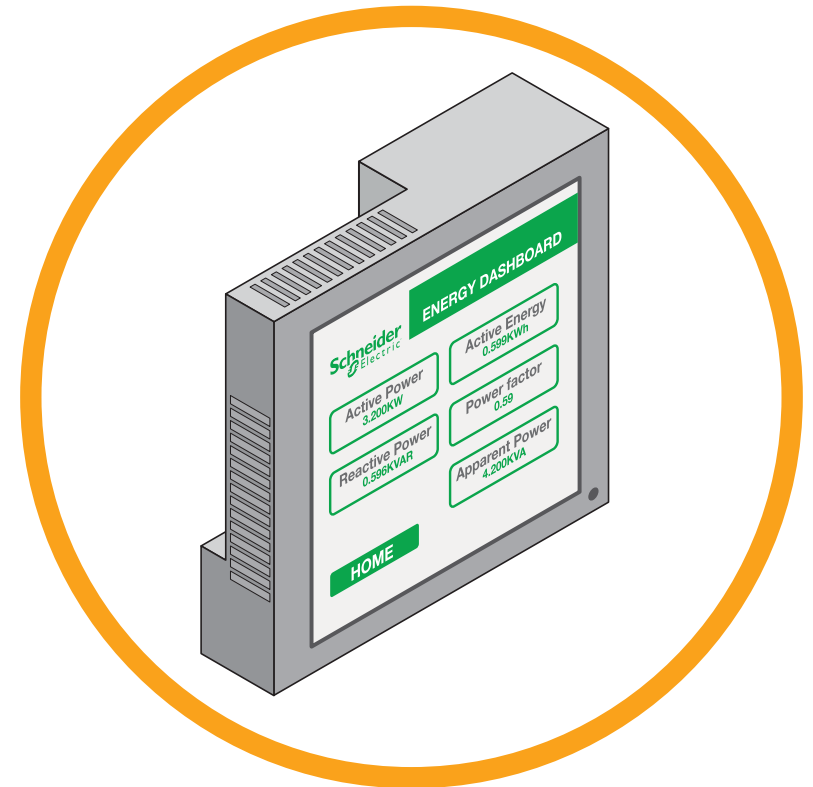
Energy management

Maintain the actual value and adjust the output value in automatic or manual operating mode

The advanced PID function blocks are optimized for temperature or pressure control in HVAC systems. With the additional PID Autotune function, the control system is capable of analysing the response time of the control loop and calculating the correct PID parameter settings.

Benefits

- Precision
  - PID control maintains the required controlled variable through adjustment.
  - It minimizes deviation of the actual process value from the setpoint to optimize system control.
- Efficient setup
  - Various loop control interactions available to manage different required machine operating modes.
  - Automatic detection of PID control loop parameter with autotuning.

PID

Life Is On | Schneider Electric
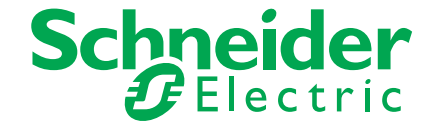
Application software libraries for air-handling units (AHUs)
schneider-electric.com/hvacmachines

Schneider Electric Industries SAS
Head Office
35, rue Joseph Monier - CS 30323
F92506 Rueil-Malmaison Cedex
FRANCE

www.schneider-electric.com