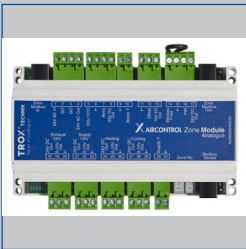


# Zone modules

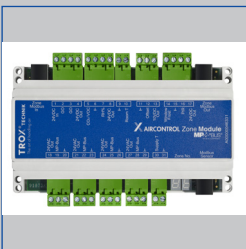
## Type X-AIR-ZMO



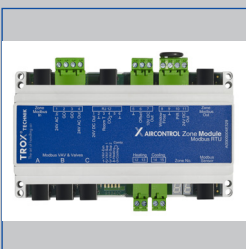
Zone module with plug-in connections for plug and play



X-AIR-ZMO-ANA



X-AIR-ZMO-MP



X-AIR-ZMO-MOD



### Zone modules for single room control

X-AIRCONTROL zone modules for single room control, with interfaces to a control panel and to a zone master module

- Single room control system for the demand-based control of temperature, air quality and humidity, and for detecting room occupancy
- Connection of a room temperature sensor, motion detector, VOC or CO<sub>2</sub> sensor as well as of a window contact, frost protection sensor or dew point sensor
- Connection of air terminal units for supply air and extract air
- Connection of a heating valve and a cooling valve
- Connection of a room control panel
- Single room control system can be expanded by centralised functions if a zone master is used

Optional equipment and accessories

- VAV terminal units for supply and extract air
- Valves with actuator for heating and cooling
- Control panels with setpoint value adjuster or touch screen
- Sensors

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## Application

### Application

- Type X-AIR-ZMO zone modules for single room control, i.e. for the demand-based control of temperature, air quality and humidity, and for detecting occupancy
- For use in office buildings, hotels, residential buildings and others
- Optimum number of data points for communication with the zone master
- Connection of a room temperature sensor, motion detector, VOC or CO<sub>2</sub> sensor as well as of a window contact, frost protection sensor or dew point sensor
- Connection of air terminal units for supply and extract air
- Connection of a heating valve and a cooling valve
- Connection of a room control panel

- Single room control system can be expanded by centralised functions if a zone master is used
- One zone master module and up to 25 zone modules form a segment
- Plug and play communication between the master module and the zone modules

### Special characteristics

- Plug and play system; master modules, zone modules and sensors are automatically detected if they have a Modbus interface
- RJ12 connections at the outside or plug-in screw terminals
- Activation of air terminal units and valve actuators
- Display for status information

## Description

### Variants

- X-AIR-ZMO-MOD: Modbus RTU is used for the communication with air terminal units and valves
- X-AIR-ZMO-MP: An MP bus is used for the communication with air terminal units and valves
- X-AIR-ZMO-ANA: Analogue signals are used for activating air terminal units and valves

### Parts and characteristics

- Micro processor system with software and system data stored in non-volatile memory
- Supply voltage 24 V AC
- Digital inputs with plug-in screw terminals
- Digital outputs with plug-in screw terminals
- Temperature input with plug-in screw terminals
- Interfaces for data exchange with the zone master module, with other zone modules,

sensors and the control panel

- Two-digit 7-segment display for status and diagnosis information

### Useful additions

- X-AIR-ZMO-COVER cover for zone modules
- X-AIR-ZMAS zone master module
- X-AIR-CP-2T, X-AIR-CP-TS control panels
- X-SENS-... sensors

### Construction features

- Casing fits on mounting rails
- All connections are at the outside

### Materials and surfaces

- Plastic casing

### Modbus RTU zone module

#### Functional description

Zone modules are electronic control components for single room control. They control temperature, air quality and humidity, based on demand and based on occupancy.

A zone module controls the air terminal units for supply air and extract air, and a heating valve and a cooling valve.

A control panel is used to operate a zone module. A single room control system can be expanded by centralised functions if a zone master is used. One zone master module and up to 25 zone modules form a segment. Up to five cascading master modules form a section with up to 125 zone modules.

There are two ways to configure and operate the system:

- Using the zone master module
- Using the X-AIR-CP-2T control panel with touch screen

#### Volume flow control

The X-AIR-ZMO-MOD zone module activates up to 3 electronic air terminal units (2 for supply air, 1 for extract air) and provides the volume flow rate setpoint value. The actual volume flow control is handled by a volume flow controller.

The volume flow rate setpoint value depends on the operating mode, the no. of air terminal units and the respective nominal volume flow rates.

Parameters that are stored in the volume flow controller, e.g.  $\dot{V}_{\min}$  and  $\dot{V}_{\max}$ , are automatically read and evaluated by a zone module.

The operating mode default can be set either on the zone master module (i.e. centrally) or on the room control panel.

Operating modes

- Automatic mode
- Increased operation ( $\dot{V}_{\max}$ )
- Reduced operation ( $\dot{V}_{\min}$ )
- Shut-off

Operating modes set on the X-AIR-CP-2T control panel apply only for a defined period of time. After this period has elapsed, the zone returns to Automatic mode. Shut-off remains active until a user changes the operating mode again.

Damper blade positions and volume flow rate actual values of the air terminal units are signalled to the zone module and then forwarded to higher-level systems; the purpose is energy-efficient fan control.

#### Temperature control

A sensor measures the room temperature or extract air temperature, which is constantly compared to the setpoint value. In case of any deviation, the system controls airflows and/or water flows in such a way that the required room temperature is achieved (again). Variants:

- All-air system: Cooling is achieved by increasing the volume flow rate
- All-water system: Heating valve and cooling valve are actuated
- Air-water system: Variable volume flow,

followed by valve control if necessary

- Air-water system: Valve control followed by variable volume flow control if necessary

It is also possible to combine room temperature control and supply air temperature control (cascade). With this type of control the deviation from the room temperature is used to determine the supply air temperature setpoint. In addition, the supply air temperature is limited by a minimum value and a maximum value (can be configured). Larger zones can be equipped with another two temperature sensors. The target value will then be the average value.

#### Air quality control

The air quality is measured with an air quality sensor (VOC or CO<sub>2</sub>) placed in the room or in the extract air. If the measured contaminant content exceeds a certain value, the system keeps increasing the supply and extract air flows until the air quality improves. If a zone is fitted with heating or cooling valves, the system activates these valves in order to control the room temperature.

#### Humidity control

A sensor measures the relative humidity of the extract air; the value is then compared to a threshold value. If the relative humidity exceeds the threshold value, the system keeps increasing the supply and extract air flows in order to decrease the humidity in the room.

If a zone is fitted with heating or cooling valves, the system activates these valves in order to control the room temperature.

#### Window contact and frost protection

The zone module has a volt-free digital input for the connection of a window contact or a frost protection sensor. It is possible to connect a dew point sensor instead of a window contact. Users can choose how to use the digital input:

- Window contact
  - The damper blades of the air terminal units, the heating valve and the cooling valve close.
- Dew point monitor
  - The cooling valve closes such that condensation is prevented. Volume flow control remains unaffected.
- Frost protection sensor
  - The heating valve opens fully to protect the heat exchanger. Volume flow control remains unaffected.

#### Motion detector

Another volt-free digital input is available for the connection of a motion detector (X-SENS-PIR-SM, X-SENS-PIR-FM). The volume flow rate is controlled as long as a room is occupied. If the room becomes unoccupied, volume flow control ends after a set delay, which can be configured.

#### Heating or cooling request

Two digital outputs on the zone module can signal a heating or cooling request and activate a heating or cooling system.

### MP bus zone module

#### Functional description

Zone modules are electronic control components for single room control. They control temperature, air quality and humidity, based on demand and based on occupancy.

A zone module controls the air terminal units for supply air and extract air, and a heating valve and a cooling valve.

A control panel is used to operate a zone module. A single room control system can be expanded by centralised functions if a zone master is used. One zone master module and up to 25 zone modules form a segment. Up to five cascading master modules form a section with up to 125 zone modules.

There are two ways to configure and operate the system:

- Using the zone master module
- Using the X-AIR-CP-2T control panel with touch screen

#### Volume flow control

The X-AIR-ZMO-MP zone module activates up to 3 electronic air terminal units (2 for supply air, 1 for extract air) and provides the volume flow rate setpoint value. The actual volume flow control is handled by a volume flow controller.

The volume flow rate setpoint value depends on the operating mode, the no. of air terminal units and the respective nominal volume flow rates.

Parameters that are stored in the volume flow controller, e.g.  $\dot{V}_{\min}$  and  $\dot{V}_{\max}$ , are automatically read and evaluated by a zone module.

The operating mode default can be set either on the zone master module (i.e. centrally) or on the room control panel.

Operating modes

- Automatic mode
- Increased operation ( $\dot{V}_{\max}$ )
- Reduced operation ( $\dot{V}_{\min}$ )
- Shut-off

Operating modes set on the X-AIR-CP-2T control panel apply only for a defined period of time. After this period has elapsed, the zone returns to Automatic mode. Shut-off remains active until a user changes the operating mode again.

Damper blade positions and volume flow rate actual values of the air terminal units are signalled to the zone module and then forwarded to higher-level systems; the purpose is energy-efficient fan control.

#### Temperature control

A sensor measures the room temperature or extract air temperature, which is constantly compared to the setpoint value. In case of any deviation, the system controls airflows and/or water flows in such a way that the required room temperature is achieved (again). Variants:

- All-air system: Cooling is achieved by increasing the volume flow rate

- All-water system: Heating valve and cooling valve are actuated
- Air-water system: Variable volume flow, followed by valve control if necessary
- Air-water system: Valve control followed by variable volume flow control if necessary

It is also possible to combine room temperature control and supply air temperature control (cascade). With this type of control the deviation from the room temperature is used to determine the supply air temperature setpoint. In addition, the supply air temperature is limited by a minimum value and a maximum value (can be configured). Larger zones can be equipped with another two temperature sensors. The target value will then be the average value.

#### Air quality control

The air quality is measured with an air quality sensor (VOC or CO<sub>2</sub>) placed in the room or in the extract air. If the measured contaminant content exceeds a certain value, the system keeps increasing the supply and extract air flows until the air quality improves. If a zone is fitted with heating or cooling valves, the system activates these valves in order to control the room temperature.

#### Humidity control

A sensor measures the relative humidity of the extract air; the value is then compared to a threshold value. If the relative humidity exceeds the threshold value, the system keeps increasing the supply and extract air flows in order to decrease the humidity in the room. If a zone is fitted with heating or cooling valves, the system activates these valves in order to control the room temperature.

#### Window contact and frost protection

The zone module has a volt-free digital input for the connection of a window contact or a frost protection sensor. It is possible to connect a dew point sensor instead of a window contact. Users can choose how to use the digital input:

- Window contact  
The damper blades of the air terminal units, the heating valve and the cooling valve close.
- Dew point monitor  
The cooling valve closes such that condensation is prevented. Volume flow control remains unaffected.
- Frost protection sensor  
The heating valve opens fully to protect the heat exchanger. Volume flow control remains unaffected.

#### Motion detector

Another volt-free digital input is available for the connection of a motion detector (X-SENS-PIR-SM, X-SENS-PIR-FM). The volume flow rate is controlled as long as a room is occupied. If the room becomes unoccupied, volume flow control ends after a set delay, which can be configured.

### Analogue zone module

#### Functional description

Zone modules are electronic control components for single room control. They control temperature, air quality and humidity, based on demand and based on occupancy.

A zone module controls the air terminal units for supply air and extract air, and a heating valve and a cooling valve.

A control panel is used to operate a zone module. A single room control system can be expanded by centralised functions if a zone master is used. One zone master module and up to 25 zone modules form a segment. Up to five cascading master modules form a section with up to 125 zone modules.

There are two ways to configure and operate the system:

- Using the zone master module
- Using the X-AIR-CP-2T control panel with touch screen

#### Volume flow control

The X-AIR-ZMO-ANA zone module activates up to 2 electronic air terminal units (1 for supply air, 1 for extract air) and provides the volume flow rate setpoint value. The actual volume flow control is handled by a volume flow controller.

The volume flow rate setpoint value depends on the operating mode, the no. of air terminal units and the respective nominal volume flow rates.

The operating mode default can be set either on the zone master module (i.e. centrally) or on the room control panel.

Operating modes

- Automatic mode
- Increased operation ( $\dot{V}_{\max}$ )
- Reduced operation ( $\dot{V}_{\min}$ )
- Shut-off

Operating modes set on the X-AIR-CP-2T control panel apply only for a defined period of time. After this period has elapsed, the zone returns to Automatic mode. Shut-off remains active until a user changes the operating mode again.

#### Temperature control

A sensor measures the room temperature or extract air temperature, which is constantly compared to the setpoint value. In case of any deviation, the system controls airflows and/or water flows in such a way that the required room temperature is achieved (again). Variants:

- All-air system: Cooling is achieved by increasing the volume flow rate
- All-water system: Heating valve and cooling valve are actuated
- Air-water system: Variable volume flow, followed by valve control if necessary

- Air-water system: Valve control followed by variable volume flow control if necessary

It is also possible to combine room temperature control and supply air temperature control (cascade). With this type of control the deviation from the room temperature is used to determine the supply air temperature setpoint. In addition, the supply air temperature is limited by a minimum value and a maximum value (can be configured). Larger zones can be equipped with another two temperature sensors. The target value will then be the average value.

#### Air quality control

The air quality is measured with an air quality sensor (VOC or CO<sub>2</sub>) placed in the room or in the extract air. If the measured contaminant content exceeds a certain value, the system keeps increasing the supply and extract air flows until the air quality improves. If a zone is fitted with heating or cooling valves, the system activates these valves in order to control the room temperature.

#### Humidity control

A sensor measures the relative humidity of the extract air; the value is then compared to a threshold value. If the relative humidity exceeds the threshold value, the system keeps increasing the supply and extract air flows in order to decrease the humidity in the room. If a zone is fitted with heating or cooling valves, the system activates these valves in order to control the room temperature.

#### Window contact and frost protection

The zone module has a volt-free digital input for the connection of a window contact or a frost protection sensor. It is possible to connect a dew point sensor instead of a window contact. Users can choose how to use the digital input:

- Window contact  
The damper blades of the air terminal units, the heating valve and the cooling valve close.
- Dew point monitor  
The cooling valve closes such that condensation is prevented. Volume flow control remains unaffected.
- Frost protection sensor  
The heating valve opens fully to protect the heat exchanger. Volume flow control remains unaffected.

#### Motion detector

Another volt-free digital input is available for the connection of a motion detector (X-SENS-PIR-SM, X-SENS-PIR-FM). The volume flow rate is controlled as long as a room is occupied. If the room becomes unoccupied, volume flow control ends after a set delay, which can be configured.

#### Operating modes

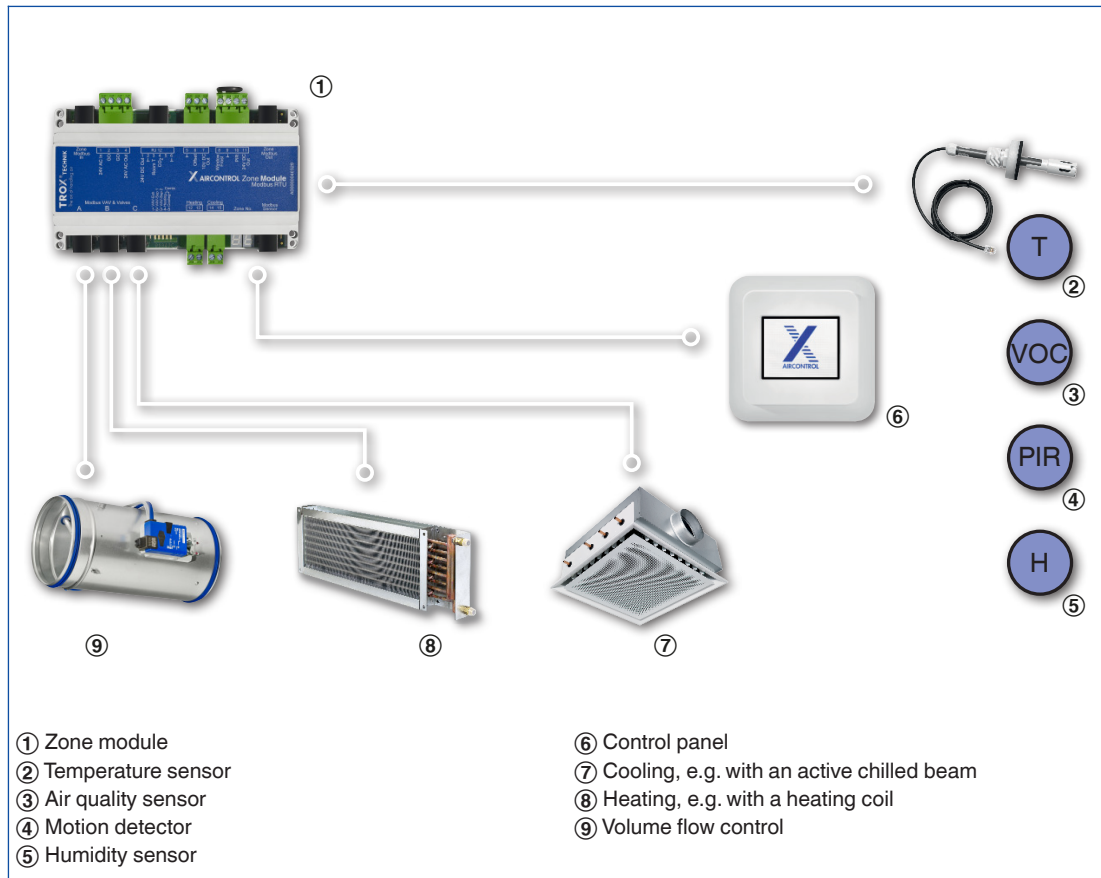
- Automatic: Demand-based zone control
- Minimum volume flow rate: All volume flow controllers are set to  $\dot{V}_{\min}$ , temperature control and control of heating and cooling valves

- remain active
- Maximum volume flow rate: All volume flow controllers are set to  $\dot{V}_{\max}$ , temperature control and control of heating and cooling valves remain active

– Fire alarm: Supply air  $\dot{V}_{\max}$  or shut-off, extract air  $\dot{V}_{\max}$  or shut-off

– Standby: All volume flow controllers are shut off, heating and cooling valves are closed

**X-AIRCONTROL zone**



Supply voltage	24 V AC $\pm$ 15 %
Power rating	2 VA without peripheral systems
Operating temperature	0 – 50 °C
Max. humidity	10 – 90% rh, no condensation
IEC protection class	III (protective extra-low voltage)
Protection level	IP 20
EC conformity	EMC to 2014/30/EU, ROHS 2011/65/EU
Installation location	Switch cabinet, wall or ceiling
Fixing	With screws or on a mounting rail
Dimensions	156 x 90 x 45 mm
Weight	270 g

#### X-AIR-ZMO-MOD

2 digital inputs	Volt-free
2 digital outputs	2 relays, NO, 5 A, 230 V max.
1 input for a temperature sensor	PT1000 temperature sensor, RJ12 socket (together with air quality sensor)
1 analogue input	0 – 10 V DC, for setpoint value adjuster $\pm$ 5 K max.
1 analogue input	0 – 10 V DC, for air quality sensor, RJ12 socket (together with temperature sensor)
Digital and analogue inputs and outputs	Plug-in screw terminals, 1.5 mm <sup>2</sup> , except for temperature and air quality sensors
2 interfaces for zone modules	Modbus, AWG 26/6 C data cable, RJ12 plug (6P6C), 100 m max. (module to module)
3 interfaces for actuators	Modbus, AWG 26/6 C data cable, RJ12 plug (6P6C), 30 m max. (total length per interface), with splitter (X-SENS-SPLITTER) up to 2 actuators on one interface; up to 5 actuators in total
1 interface, sensors and room control panel	Modbus, AWG 26/6 C data cable, RJ12 plug (6P6C), 30 m max. (total length)

#### X-AIR-ZMO-MP

2 digital inputs	Volt-free
1 input for a temperature sensor	PT1000 temperature sensor
1 analogue input	0 – 10 V DC, for setpoint value adjuster $\pm$ 5 K max.
2 analogue inputs	0 – 10 V DC, for air quality sensor and humidity sensor
All digital and analogue inputs and outputs	Plug-in screw terminals, 1.5 mm <sup>2</sup>
2 interfaces for zone modules	Modbus, AWG 26/6 C data cable, RJ12 plug (6P6C), 100 m max. (module to module)
4 interfaces for actuators	MP bus, including 24 V DC supply voltage, plug-in screw terminals, 1.5 mm <sup>2</sup> , 30 m max. (total length per interface), 1 or 2 actuators per interface, up to 5 actuators in total
1 interface, sensors and room control panel	Modbus, AWG 26/6 C data cable, RJ12 plug (6P6C), 30 m max. (total length)

#### X-AIR-ZMO-ANA

2 digital inputs	Volt-free
2 inputs for temperature sensors	PT1000 temperature sensors
1 analogue input	0 – 10 V DC, for setpoint value adjuster $\pm$ 5 K max.
2 analogue inputs	0 – 10 V DC, for air quality sensor and humidity sensor
4 analogue outputs	0 – 10 V DC, air terminal units and valve actuators
All digital and analogue inputs and outputs	Plug-in screw terminals, 1.5 mm <sup>2</sup>
2 interfaces for zone modules	Modbus, AWG 26/6 C data cable, RJ12 plug (6P6C), 100 m max. (module to module)
1 interface, sensors and room control panel	Modbus, AWG 26/6 C data cable, RJ12 plug (6P6C), 30 m max. (total length)

#### Modbus RTU zone module

X-AIRCONTROL zone modules for single room control, i.e. for the demand-based control of temperature, air quality and humidity, and based on occupancy. Modules for activating air terminal units for supply air and extract air, for heating valves and for cooling valves.

Two-digit 7-segment display for status and diagnosis information. The master module automatically addresses zone modules (plug and play), even after the system has been expanded. Zone modules can be configured, and diagnosis can be performed, either on the zone master module or using a room control panel. A control panel may be used to operate the zone module. The zone module provides voltage to the sensors and actuators.

A single room control system can be expanded by centralised functions if a zone master is used. One zone master module and up to 25 zone modules form a segment. Up to 5 master modules form a section with up to 125 zone modules.

Module suitable for installation in switch cabinets (on a mounting rail) or for installation on the face of walls or ceilings.

#### Special characteristics

- Plug and play system; master modules, zone modules and sensors are automatically detected if they have a Modbus interface
- RJ12 connections at the outside or plug-in screw terminals
- Activation of air terminal units and valve actuators
- Display for status information

#### Materials and surfaces

- Plastic casing

#### Technical data

- Supply voltage: 24 V AC  $\pm 15\%$ , 50/60 Hz
- Power rating: 2 VA without peripheral systems
- 1 digital input: Window contact, frost protection sensor or dew point sensor
- 1 digital input: Motion detector
- 2 digital outputs: 5 A, 230 V max., for cooling and heating
- 1 input for temperature sensor: PT1000 room temperature sensor

- 1 analogue input: 0 – 10 V DC, setpoint value adjuster,  $\pm 5$  K max.
- 1 analogue input: 0 – 10 V DC, air quality sensor
- All digital and analogue inputs and outputs with plug-in screw terminals
- 2 interfaces to zone modules: Modbus, for RJ12 plug (6P6C), 100 m max. (module to module)
- 3 interfaces for actuators: Modbus, for RJ12 plug (6P6C), 30 m max. (total length per interface)
- 1 interface for sensors and control panel: Modbus, for RJ12 plug (6P6C), 30 m max. (total length)
- Operating temperature: 0 to 50 °C
- Max. humidity: 10 – 90% rh, no condensation
- IEC protection class: III (protective extra-low voltage)
- Protection level: IP 20
- Installation location: Switch cabinet, wall or ceiling
- Fixing: With screws or on a mounting rail
- Dimensions: 156 × 90 × 45 mm

#### Measurement and control functions

- The operating mode default comes either from the zone master module or from the room control panel
- Room temperature, room air quality and humidity are taken into consideration
- Window contacts, dew point sensors and frost protection sensors are taken into consideration
- Easy adjustment of parameters, e.g.  $\dot{V}_{\min}$  and  $\dot{V}_{\max}$ , from a central point
- Signalling to two air terminal units for supply and of one for extract air
- Communication with actuators via Modbus
- Indicator lights show the status of actuators on the Modbus
- Evaluation of status messages for volume flow controllers and valve actuators
- Signalling of volume flow rate actual values and damper blade positions to X-AIRCONTROL for the optimiser function
- Activation of the digital outputs for heating and cooling if required

#### MP bus zone module

X-AIRCONTROL zone modules for single room control, i.e. for the demand-based control of temperature, air quality and humidity, and based on occupancy. Modules for activating air terminal units for supply air and extract air, for heating valves and for cooling valves.

Two-digit 7-segment display for status and diagnosis information. The master module automatically addresses zone modules (plug and play), even after the system has been expanded. Zone modules can be configured, and diagnosis can be performed, either on the zone master module or using a room control panel. A control

panel may be used to operate the zone module. The zone module provides voltage to the sensors and actuators.

A single room control system can be expanded by centralised functions if a zone master is used. One zone master module and up to 25 zone modules form a segment. Up to 5 master modules form a section with up to 125 zone modules.

Module suitable for installation in switch cabinets (on a mounting rail) or for installation on the face of walls or ceilings.

#### Special characteristics

- Plug and play system; master modules, zone



- modules and sensors are automatically detected if they have a Modbus interface
- RJ12 connections at the outside or plug-in screw terminals
- Activation of air terminal units and valve actuators
- Display for status information

#### Materials and surfaces

- Plastic casing

#### Technical data

- Supply voltage: 24 V AC  $\pm 15\%$ , 50/60 Hz
- Power rating: 2 VA without peripheral systems
- 1 digital input: Window contact, frost protection sensor or dew point sensor
- 1 digital input: Motion detector
- 1 input for temperature sensor: PT1000 room temperature sensor
- 1 analogue input: 0 – 10 V DC, setpoint value adjuster,  $\pm 5$  K max.
- 2 analogue inputs: 0 – 10 V DC, for air quality sensor and humidity sensor
- All digital and analogue inputs and outputs with plug-in screw terminals
- 2 interfaces to zone modules: Modbus, for RJ12 plug (6P6C), 100 m max. (module to module)
- 4 interfaces for actuators: MP bus, including 24 V DC supply voltage
- 1 interface for sensors and control panel:

- Modbus, for RJ12 plug (6P6C), 30 m max. (total length)
- Operating temperature: 0 to 50 °C
- Max. humidity: 10 – 90% rh, no condensation
- IEC protection class: III (protective extra-low voltage)
- Protection level: IP 20
- Installation location: Switch cabinet, wall or ceiling
- Fixing: With screws or on a mounting rail
- Dimensions: 156 × 90 × 45 mm

#### Measurement and control functions

- The operating mode default comes either from the zone master module or from the room control panel
- Room temperature, room air quality and humidity are taken into consideration
- Window contacts, dew point sensors and frost protection sensors are taken into consideration
- Easy adjustment of parameters, e.g.  $\dot{V}_{\min}$  und  $\dot{V}_{\max}$ , from a central point
- Signalling to two air terminal units for supply and of one for extract air
- Communication with actuators via MP bus
- Evaluation of status messages for volume flow controllers and valve actuators
- Signalling of volume flow rate actual values and damper blade positions to X-AIRCONTROL for the optimiser function

#### Analogue zone module

X-AIRCONTROL zone modules for single room control, i.e. for the demand-based control of temperature, air quality and humidity, and based on occupancy. Modules for activating air terminal units for supply air and extract air, for heating valves and for cooling valves.

Two-digit 7-segment display for status and diagnosis information. The master module automatically addresses zone modules (plug and play), even after the system has been expanded. Zone modules can be configured, and diagnosis can be performed, either on the zone master module or using a room control panel. A control panel may be used to operate the zone module. The zone module provides voltage to the sensors and actuators.

A single room control system can be expanded by centralised functions if a zone master is used. One zone master module and up to 25 zone modules form a segment. Up to 5 master modules form a section with up to 125 zone modules.

Module suitable for installation in switch cabinets (on a mounting rail) or for installation on the face of walls or ceilings.

#### Special characteristics

- Plug and play system; master modules, zone modules and sensors are automatically detected if they have a Modbus interface
- RJ12 connections at the outside or plug-in screw terminals
- Activation of air terminal units and valve

- actuators
- Display for status information

#### Materials and surfaces

- Plastic casing

#### Technical data

- Supply voltage: 24 V AC  $\pm 15\%$ , 50/60 Hz
- Power rating: 2 VA without peripheral systems
- 1 digital input: Window contact, frost protection sensor or dew point sensor
- 1 digital input: Motion detector
- 2 inputs for temperature sensors: PT1000, room temperature and supply air temperature
- 1 analogue input: 0 – 10 V DC, setpoint value adjuster,  $\pm 5$  K max.
- 2 analogue inputs: 0 – 10 V DC, for air quality sensor and humidity sensor
- 4 analogue outputs: 0 – 10 V DC, air terminal units and valve actuators
- All digital and analogue inputs and outputs with plug-in screw terminals
- 2 interfaces to zone modules: Modbus, for RJ12 plug (6P6C), 100 m max. (module to module)
- 1 interface for sensors and control panel: Modbus, for RJ12 plug (6P6C), 30 m max. (total length)
- Operating temperature: 0 to 50 °C
- Max. humidity: 10 – 90% rh, no condensation
- IEC protection class: III (protective extra-low voltage)
- Protection level: IP 20

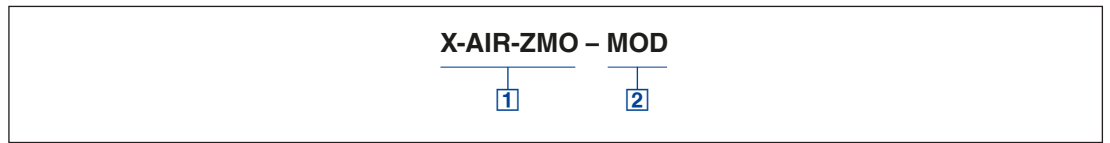
- Installation location: Switch cabinet, wall or ceiling
- Fixing: With screws or on a mounting rail
- Dimensions: 156 × 90 × 45 mm

**Measurement and control functions**

- The operating mode default comes either from the zone master module or from the room control panel
- Room temperature, room air quality and humidity are taken into consideration

- Window contacts, dew point sensors and frost protection sensors are taken into consideration
- Easy adjustment of parameters, e.g.  $\dot{V}_{\min}$  und  $\dot{V}_{\max}$ , from a central point
- Signalling to one air terminal unit for supply air and of one for extract air
- Communication with actuators via analogue signals: 0 – 10 V DC
- Signalling to any component (actuators) with a 0 – 10 V DC interface

X-AIR-ZMO



**1** Type

**X-AIR-ZMO** X-AIRCONTROL zone module

**2** Variant

**MOD** Zone module with Modbus RTU interface  
**MP** Zone module with MP bus interface  
**ANA** Zone module with analogue interface  
**COVER** Cover for zone modules

### Application

- Type X-AIR-ZMO-MOD zone modules for single room control, i.e. for the demand-based control of temperature, air quality and humidity, and for detecting occupancy
- Connection of sensors and actuators via Modbus RTU
- Connection of a room temperature sensor, motion detector, VOC or CO<sub>2</sub> sensor as well as of a window contact, frost protection sensor or dew point sensor
- Signalling to one or two air terminal units for supply and of one for extract air
- Connection of a heating valve and a cooling valve
- Connection of a room control panel

### Useful additions

#### Control panels

- X-AIR-CP-2T room control panel with temperature sensor and 2" touch screen
- X-AIR-CP-TS control panel with temperature sensor and setpoint value adjuster

#### Sensors

- X-SENS-VOC air quality sensor (VOC) for extract air ducts
- X-SENS-CO2-RH Combined CO<sub>2</sub> and humidity sensor for installation on a wall
- X-SENS-TEMP-RH-EXH Combined temperature and humidity sensor for extract air ducts
- X-SENS-TEMP-PT1000 Duct temperature sensor (PT1000)
- X-SENS-DEWPT Dew point monitor
- X-SENS-PIR-SM 180° motion detector for installation on a wall
- X-SENS-PIR-FM 360° motion detector for installation on a ceiling

#### Actuators

- TV.../.../BM0-J6 Air terminal unit with a

#### Compact controller

- X-VALVE-MOD-2W Actuator for two-way valves for heating or cooling
- X-VALVE-MOD-6W Actuator for six-way valves for heating or cooling

#### Accessories

- X-AIR-ZMO-COVER Cover for zone modules
- X-SENS-SPLITTER Four-way splitter for the connection of four sensors or control panels (Modbus)

### Interfaces

#### Inputs

##### Two digital inputs

- Window contact, frost protection sensor or dew point sensor
- Motion detector

##### One input for a temperature sensor

- Room temperature sensor PT1000

##### Two analogue inputs

- 0 – 10 V DC, for setpoint value adjuster
- 0 – 10 V DC, for air quality sensor

#### Outputs

##### Two digital outputs

- Heating request
- Cooling request

#### Communication interfaces

- Modbus In: Connection of zone modules (towards the zone master module)
- Modbus Out: Connection of zone modules
- Modbus sensor: Sensors and control panel
- Modbus A, B, C: Air terminal units for supply air and extract air, heating and cooling valves, with four-way splitter (X-SENS-SPLITTER) up to 2 actuators on an interface, up to 5 actuators in total

### X-AIR-ZMO-MOD





### Application

- Type X-AIR-ZMO-ANA zone modules for single room control, i.e. for the demand-based control of temperature, air quality and humidity, and for detecting occupancy
- Connection of all sensors via Modbus RTU
- Connection of actuators via 0 – 10 V DC analogue signals
- Connection of a room temperature sensor, motion detector, VOC or CO<sub>2</sub> sensor as well as of a window contact, frost protection sensor or dew point sensor
- Signalling to one air terminal unit for supply air and of one for extract air
- Connection of a heating valve and a cooling valve
- Connection of a room control panel

### Useful additions

#### Control panels

- X-AIR-CP-2T room control panel with temperature sensor and 2" touch screen
- X-AIR-CP-TS control panel with temperature sensor and setpoint value adjuster

#### Sensors

- X-SENS-VOC air quality sensor (VOC) for extract air ducts
- X-SENS-CO2-RH Combined CO<sub>2</sub> and humidity sensor for installation on a wall
- X-SENS-TEMP-RH-EXH Combined temperature and humidity sensor for extract air ducts
- X-SENS-TEMP-PT1000 Duct temperature sensor (PT1000)
- X-SENS-DEWPT Dew point monitor
- X-SENS-PIR-SM 180° motion detector for installation on a wall
- X-SENS-PIR-FM 360° motion detector for installation on a ceiling

#### Actuators

- TV.../.../Easy, BC0, B1\* Air terminal unit with an

Easy, a Compact or a Universal controller (0 – 10 V DC)

- X-VALVE-ANA-2W Actuator for two-way valves for heating or cooling
- X-VALVE-ANA-6W Actuator for six-way valves for heating or cooling

#### Accessories

- X-AIR-ZMO-COVER Cover for zone modules
- X-SENS-SPLITTER Four-way splitter for the connection of four sensors or control panels (Modbus)

### Interfaces

#### Inputs

Two digital inputs

- Window contact, frost protection sensor or dew point sensor
- Motion detector

2 inputs for temperature sensors

- Room temperature sensor PT1000
- Supply air temperature sensor PT1000

Three analogue inputs

- 0 – 10 V DC, for setpoint value adjuster
- 0 – 10 V DC, for air quality sensor
- 0 – 10 V DC, for humidity sensor

#### Outputs

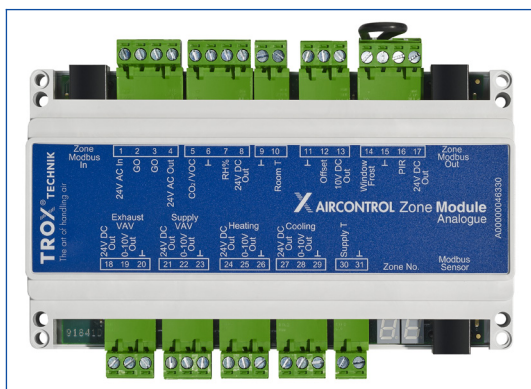
Four analogue outputs

- Supply air terminal unit
- Extract air terminal unit
- Valve actuator for heating
- Valve actuator for cooling

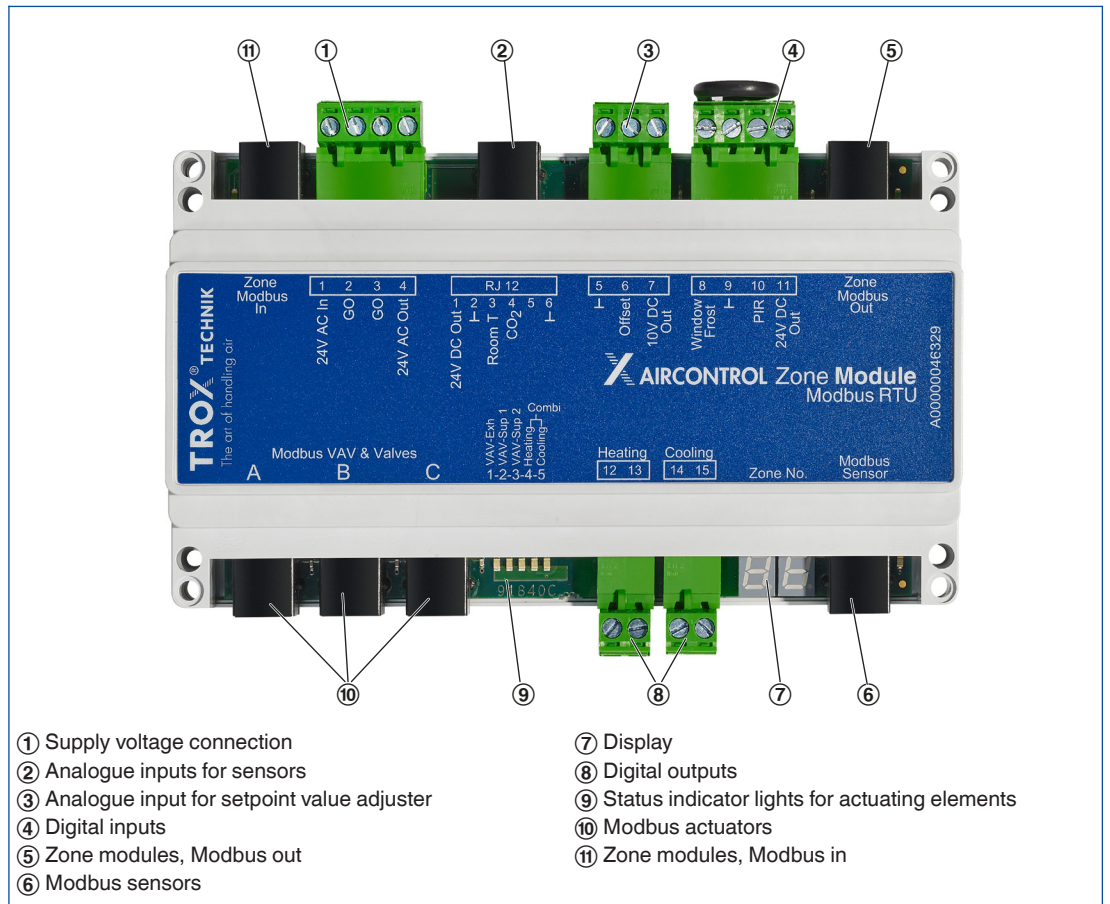
#### Communication interfaces

- Modbus In: Connection of zone modules (towards the zone master module)
- Modbus Out: Connection of zone modules
- Modbus sensor: Sensors and control panel

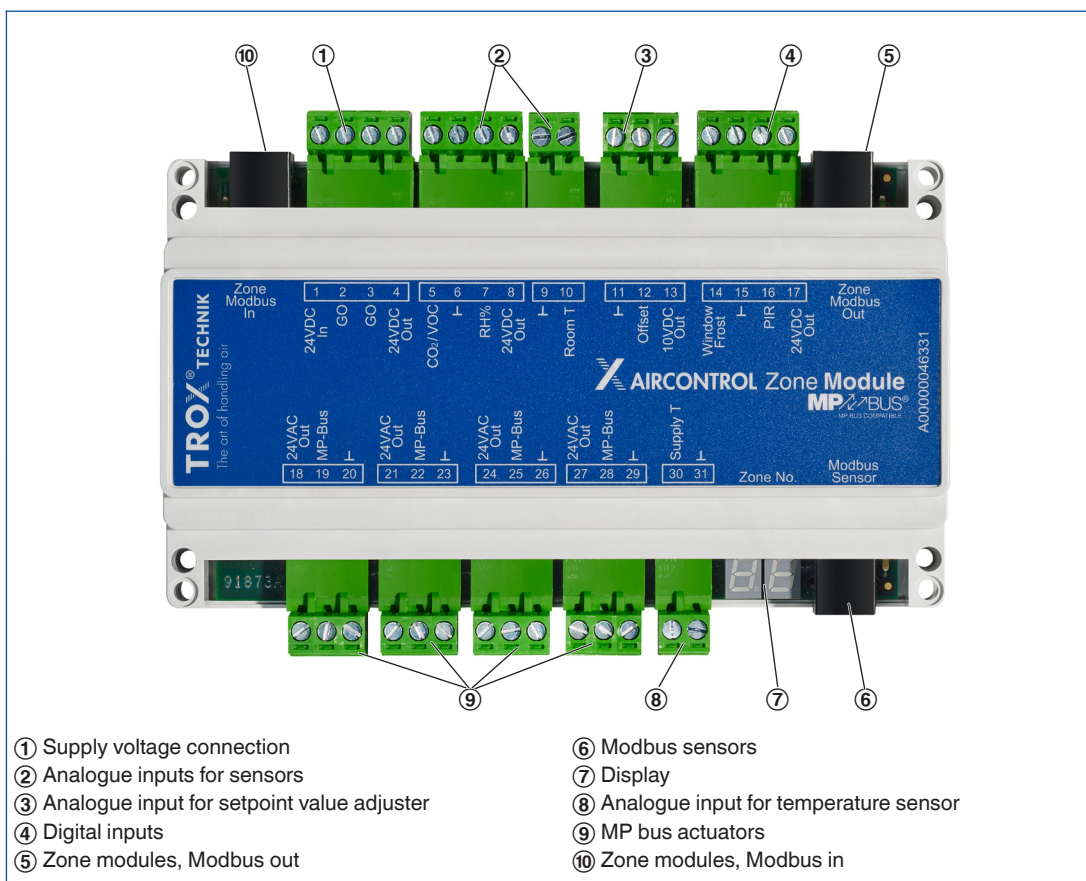
### X-AIR-ZMO-ANA



X-AIR-ZMO-MOD

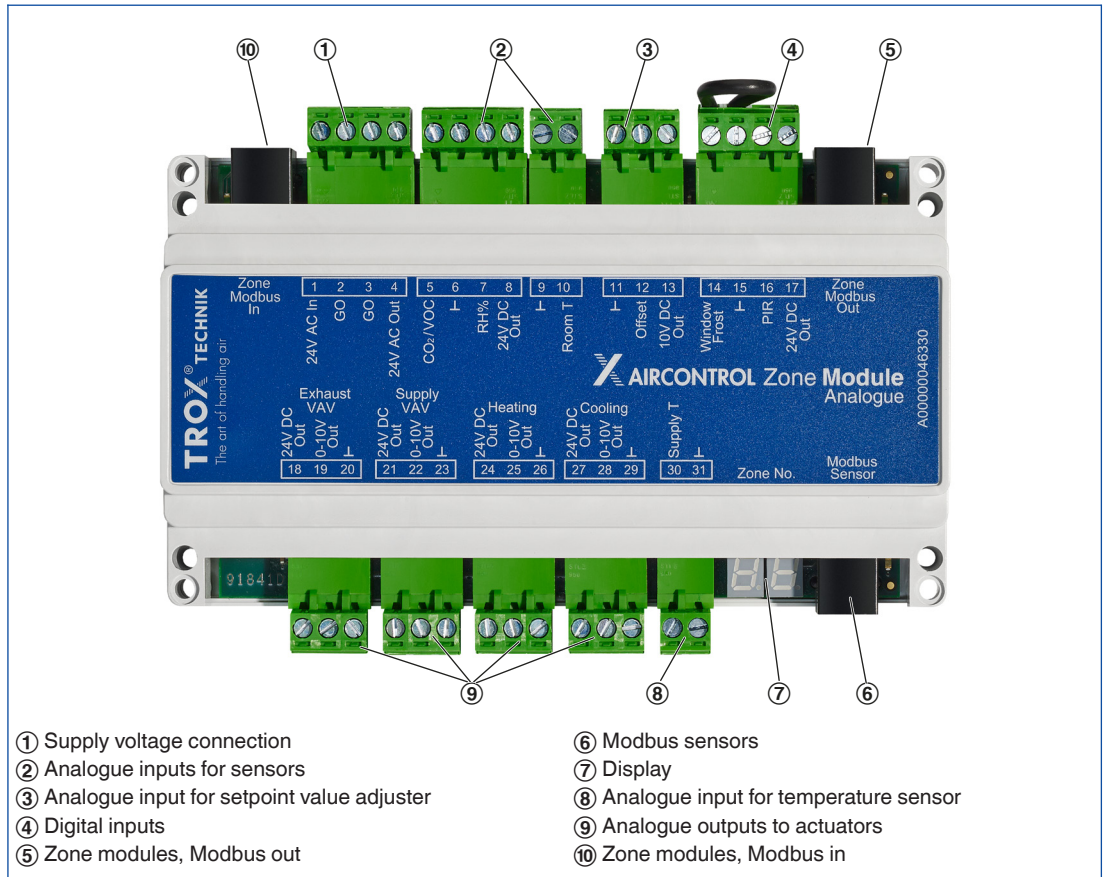


X-AIR-ZMO-MP





X-AIR-ZMO-ANA



**Installation and commissioning**

- Screw-fix the module inside a switch cabinet or to a wall or ceiling, or mount it onto a mounting rail
- Connect zone master and zone modules (in series) using flat cables with RJ12 plugs
- If the module is used as a stand-alone unit: Connect the X-AIR-CP-2T control panel
- Connect sensors, actuators, and external equipment, if any
- Connect the 24 V AC supply voltage
- If Modbus is used: Perform device addressing for volume flow rate controllers and valves
- Adapt the configuration by using the webserver (access is password protected)

Increasing requirements on the energy efficiency of ventilation and air conditioning systems as well as EU regulations can be fulfilled with intelligent control engineering solutions.

X-AIRCONTROL is a control system that uses information from sensors and actuating elements to optimise ventilation and air conditioning systems. It calculates what all is required to achieve a comfortable room climate, and controls fans, pumps and valves accordingly.

X-AIRCONTROL is a modular system that can be used to optimise individual functions or a whole range of functions for a project.

- Evaluate the damper blade positions of all air terminal units
- Optimise fan control (optimiser function)
- Evaluate the heating and cooling required for a zone
- Calculate the supply air temperature setpoint value for the air handling unit
- Configure the system, display the system configuration and manage alarms – all this from a central point

#### X-AIRCONTROL zone

An X-AIRCONTROL zone is an area where air conditioning parameters such as temperature and humidity are controlled based on demand and based on the occupancy. These are usually single rooms, but it is possible to create individual zones also in larger areas, e.g. in open plan offices.

- Each zone is controlled by a zone module
- Sensors detect various air conditioning parameters as well as occupancy
- Actuators control these conditions
- Room occupants can use control panels to adapt the system to their individual comfort requirements
- A zone module can be used either as a stand-alone unit or as part of a larger system

#### X-AIRCONTROL segment

A segment is a group of up to 25 zone modules; the entire segment is controlled as a unit, i.e. the same conditions apply to the entire segment. Grouping zones into segments is necessary when these zones are to be controlled centrally and when data from these zones are to be evaluated. A segment may be a floor in a building, the wing of a building or simply areas that are used differently from adjacent areas.

- A segment is controlled by a zone master module.
- Sensors detect various air conditioning parameters that are relevant to the segment, e.g. the outdoor air temperature
- Digital inputs and outputs are used to activate functions for a segment, e.g. to activate a fire alarm
- A webserver (integral part of the zone master module) is used to configure the entire segment, to display the segment configuration, to monitor all segment functions and to manage alarms
- Modbus TCP and BACnet IP interfaces allow for the integration with higher-level systems
- A segment can be treated as an individual unit

(stand alone) or it can be combined with other segments to form a section

#### X-AIRCONTROL section

A section is a group of up to 5 segments. A section may consist of up to 5 zone master modules and 125 zone modules.

- A section is controlled by the first zone master module
- If the first zone master module is connected to the control system of an air handling unit, the system can be operated most efficiently
- It is possible to have several, independent sections and hence create larger structures; there are virtually no limits to the size of the overall system

#### Stand-alone solution for a zone

A single zone module and a room control panel can be used to control a single room.

- Integrate air terminal units (up to 2 for supply air and 1 for extract air)
  - Activate valves for cooling and heating
  - Measure the temperature and configure the zone with the X-AIR-CP-2T control panel (required)
  - Define schedules independent of the central BMS
  - Simple wiring
  - Connect components using plug and play
- Use additional sensors (optional) to include other parameters.
- Occupancy
  - Air quality
  - Humidity

#### Interconnecting zones for multi zone operation

Up to 25 zone modules and another 4 zone master modules can be connected to a zone master module such that a system of up to 125 zones is achieved. Different zone modules (Modbus, MP bus or Analogue) can be combined and connected with plug and play.

- Up to 25 zone modules per zone master module (segment)
- Up to 5 zone master modules (section)
- Up to 125 zone modules in a section

Each zone module controls and maintains individually the required conditions for the particular zone (single room) for which it is used. The zone modules are connected in series; 100 m cables (module to module) allow for linking even large areas or different buildings. Each zone master module and each zone module is automatically assigned a unique address (plug and play), which simplifies commissioning.

Advantages of a zone master module

- Central access for displaying and setting individual zone parameters using the integral webserver
- Ethernet connection allows for easy integration with higher-level systems and for remote maintenance via the internet
- Option to connect a WiFi router (WLAN)

#### System solution with X-CUBE compact

If a project is to include X-CUBE compact air handling units, zone control with X-AIRCONTROL is the ideal system solution. With such a solution the air handling unit's X-CUBE Control system not only activates fans, dampers and other components of the air handling unit, it also acts as the zone master.

The X-CUBE compact air handling unit can serve up to four zones. If up to four zone modules are connected to the X-CUBE compact, no additional zone master module is required.

X-CUBE Control includes an Ethernet interface and a webserver for the configuration of the air handling unit, yet it can also be used to configure the connected zone modules.

- The zone master function is included in X-CUBE Control
- Up to four zone modules per X-CUBE compact unit, including different variants (Modbus, MP bus or Analogue)
- Integral webserver for configuring the air handling unit and the zone modules
- Remote maintenance is possible
- Expansion option: Up to 25 zone modules per air handling unit if an additional zone master module is used

#### System solution with X-CUBE

X-CUBE air handling units with X-CUBE Control offer zone master functions; no additional units or devices are necessary.

- Control of the air handling unit
- Zone master function for up to 125 zone

modules

If X-CUBE Control is to be used for the zone master function, all entries, both for the X-CUBE and for the zone modules, have to be made on the X-CUBE Control touch screen. This includes configuration, display of the system configuration, monitoring, and alarm management.

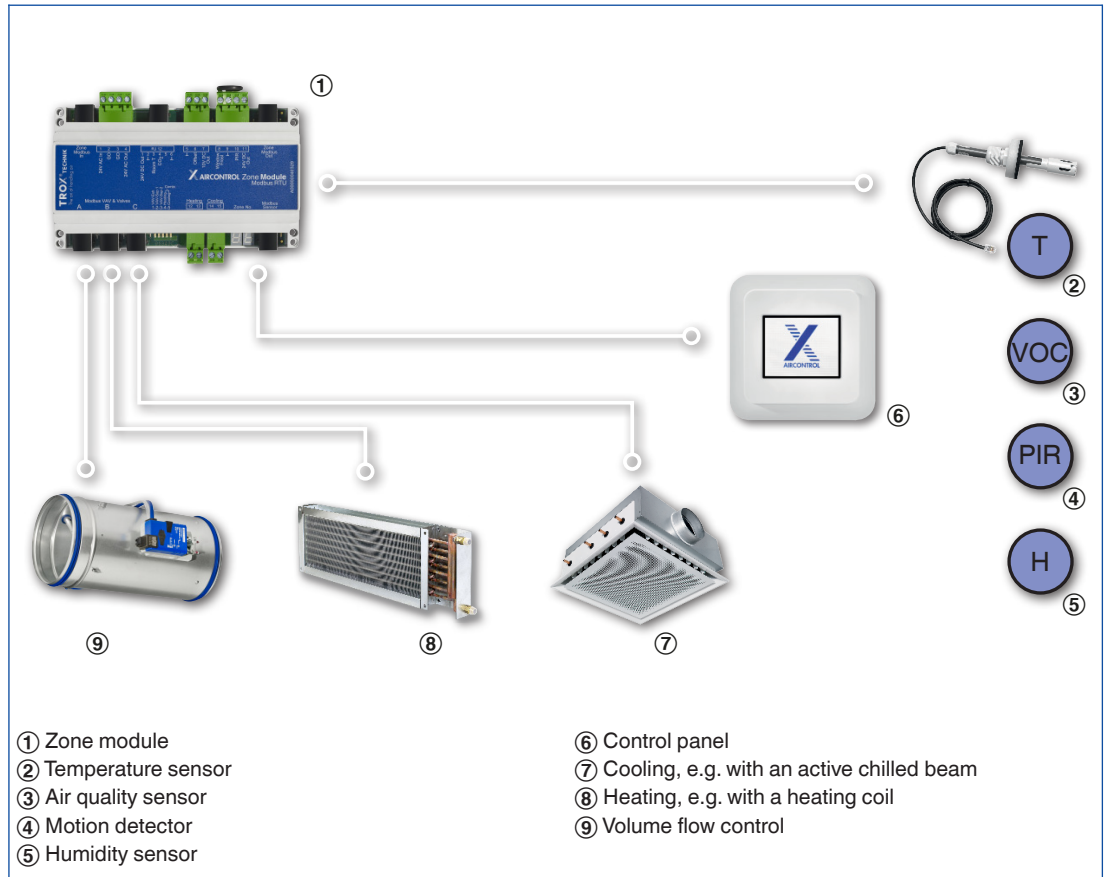
Since X-CUBE Control includes an integral webserver, the system can be accessed from anywhere with the correct password.

- Remote access via webserver
- Display of actual operating values
- Adjustment of parameters
- Maintenance management
- Alarm alert by e-mail or SMS

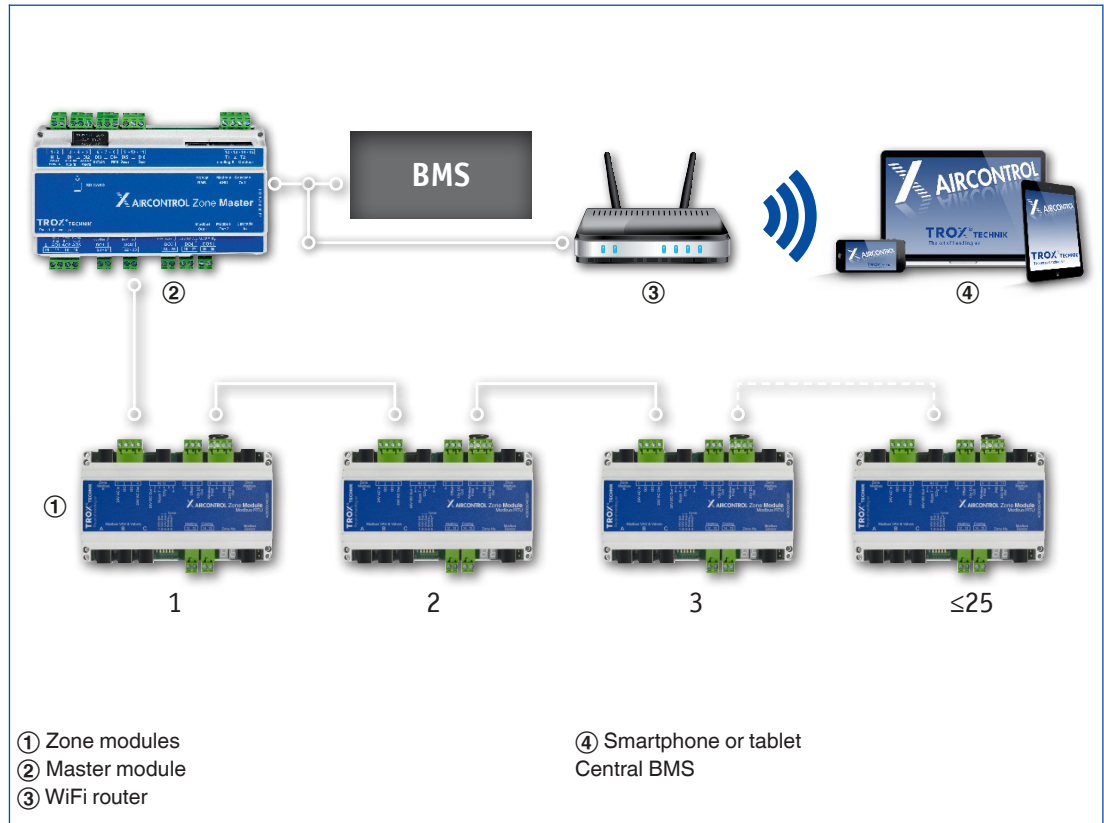
#### Design information

- Design and select sensors depending on the required zone functions
- Ensure that the zone module variants (Modbus, MP bus, Analogue) and actuators (volume flow controllers and valve actuators) you select are compatible
- For optimum energy efficiency select zone modules with bus compatible actuators (Modbus, MP bus) as only these will signal information on valve and damper positions
- If you use an X-CUBE air handling unit with integral X-CUBE Control system, you may connect up to 125 zone modules without the need for an additional zone master module
- If you use an X-CUBE compact air handling unit, you may connect up to 4 zone modules without the need for an additional zone master

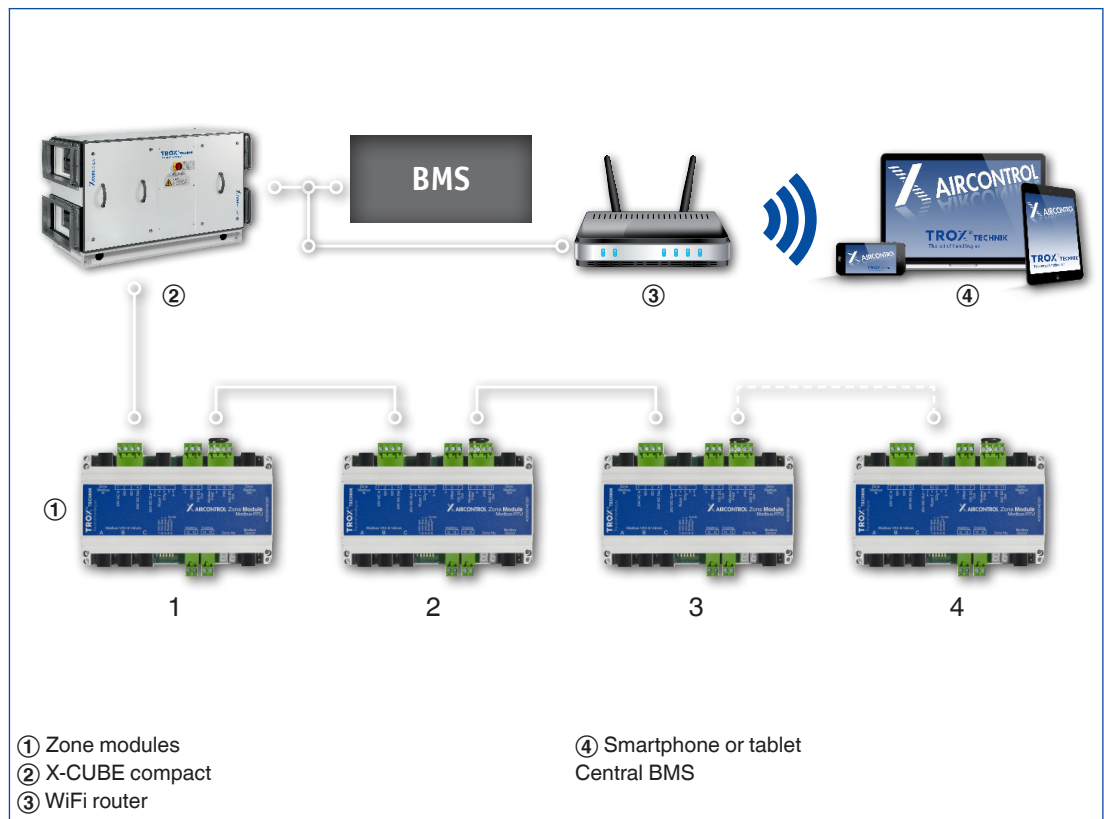
X-AIRCONTROL zone



X-AIRCONTROL segment



X-AIRCONTROL section with X-CUBE compact



X-AIRCONTROL section with X-CUBE

