Plug and play connection of components

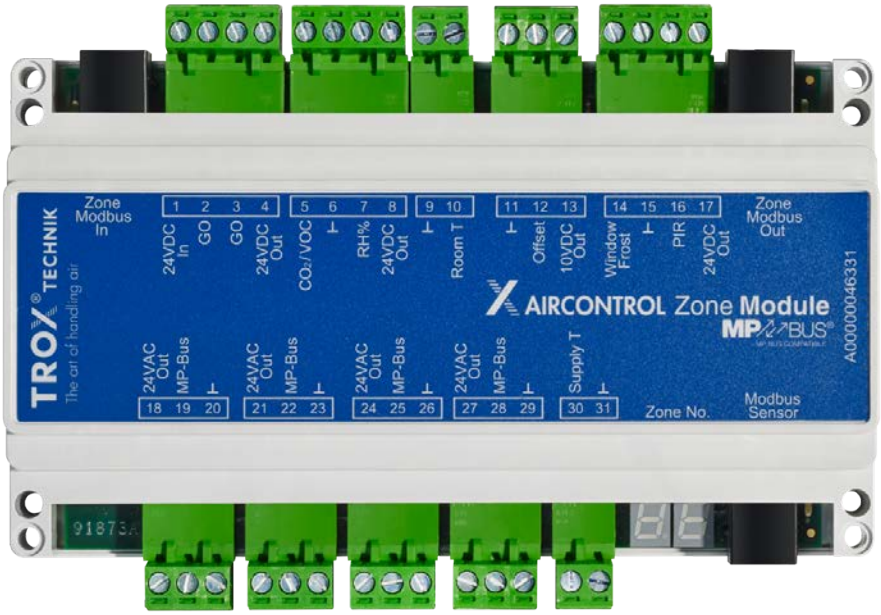
Optional room control panel with 2” touch display

X-AIR-PCASE230V

Suitable air terminal units, e.g. TVR with attachment BC0

MP bus zone module

X-AIR-ZMO-MP



Zone module MP bus for single room control

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

- Control of TROX air terminal units with MP bus interface for supply and extract air.
- Control of a heating valve and a cooling valve with MP bus interface
- Single room control system for the demand-based control of temperature, air quality and humidity, as well as the detection of room occupancy
- Connection of a room temperature sensor, motion detector, VOC or CO_2sensor, as well as of a window contact, frost protection sensor or dew point sensor
- 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 with MP bus interface for supply and extract air
- Valve actuators with MP bus interface for heating and cooling
- Control panels with setpoint value adjuster or touchscreen
- Sensor systems

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The X-AIRCONTROL system 9

General information

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_2sensor, as well as of a window contact, frost protection sensor or dew point sensor
- Control of TROX air terminal units for supply and extract air with an MP bus interface.
- Control of a heating valve and a cooling valve with a Modbus RTU interface (TROX approval required)
- Connection of a room control panel
- Expansion of single room control system for the connection of additional heating valve or cooling valve actuators (0-10V) or electric air heaters (0-10V) with module X-AIR-ZMO-EXT
- Single room control system can be expanded by centralised functions if a zone master is used (X-AIR-ZMAS)
- 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 features

- 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
- Control of air terminal units and valve actuators
- Display for status messages

Alternatives

- X-AIR-ZMO-MOD: Modbus RTU is used for the communication with air terminal units and valves
- X-AIR-ZMO-ANA: Analogue signals are used for signalling to air terminal units and valves

Parts and characteristics

- Microprocessor 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

Accessories

- X-AIR-ZMO-COVER cover for zone modules
- Enclosure X-AIR-PCASE230V
- Module for zone expansion X-AIR-ZMO-EXT

Construction features

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

Materials and surfaces

- Plastic casing

Useful additions

- X-AIR-ZMAS zone master module
- X-AIR-CP-2T, X-AIR-CP-TS control panels
- X-SENS-... sensors

Function

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 room 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 5 cascading zone 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 room control panel with touchscreen

Volume flow control

The X-AIR-ZMO-MP zone module activates up to 4 electronic volume flow controllers (2 for supply air, 2 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 number of air terminal units and the respective nominal volume flow rates. Parameters that are stored in the volume flow controller, e.g. q_{Vmin} and q_{Vmax}, 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 (q_{Vmax})
- Reduced operation (q_{Vmin})
- 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 2 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_2) 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 so that condensation is prevented. Volume flow control remains unaffected.
- Frost protection sensor

The heating valve opens fully to protect the heat exchangers. Volume flow control remains unaffected.

Motion detector

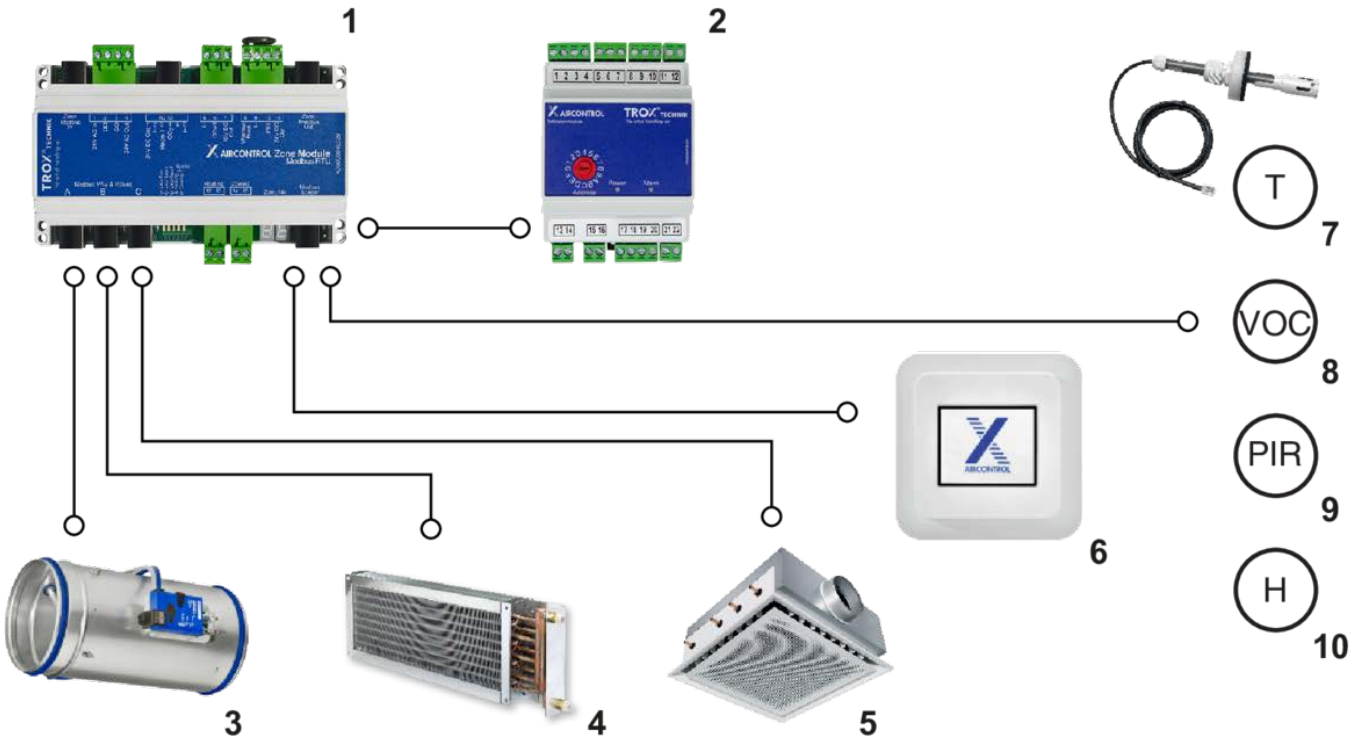
Another volt-free digital input is available for the connection of a motion detector (X-SENS-PIR-SM, X-SENS-PIR-FM). The volume flow rate is controlled as long as a room is occupied. If the room becomes unoccupied, volume flow control ends after a set switch-off delay, which can be configured.

Operating modes

- Automatic: Demand-based zone control
- Minimum volume flow rate: All volume flow controllers are set to q_{Vmin}, temperature control and signalling to heating and cooling valves remain active

- Maximum volume flow rate: All volume flow controllers are set to q_{Vmax}, temperature control and signalling to heating and cooling valves remain active
- Fire alarm: Supply air q_{Vmax} or shut-off, extract air q_{Vmax} or shut-off
- Standby: All volume flow controllers are shut off, heating and cooling valves are closed

X-AIRCONTROL zone



1 Zone module
2 Module for zone expansion
3 Volume flow control
4 Heating, e.g. with a heating coil
5 Cooling, e.g. with an active chilled beam
6 Room control panel
7 Temperature sensor
8 Air quality sensor
9 Motion detector
10 Humidity sensor

Note:
Components 2 to 10 are optional (maximum equipment).

Technical data

Supply voltage	24 V AC ± 15%
Power rating	2 VA without peripheral systems
2 digital inputs	Volt-free
2 inputs for temperature sensors	PT1000 temperature sensors
1 analogue input	0 – 10 V DC, for setpoint value adjuster, ±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 mm²
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 mm², 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)
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
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 × 90 × 45 mm
Weight	270 g

Specification text

This specification text describes the general characteristics of the product. Texts for variants can be generated with our Easy Product Finder design program.

Specification text

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 signalling to air terminal units for supply air and extract air, and to heating valves and 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 room 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 features

- 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
- Control of air terminal units and valve actuators
- Display for status messages

Materials and surfaces

- Plastic casing

Technical data

- Supply voltage: 24 V AC ±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, ±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 room control panel: Modbus, for RJ12 plug (6P6C), 30 m max. (total length)
- Operating temperature: 0 to 50 °C
- Max. humidity: 10 to 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. q_{Vmin} and q_{Vmax}, from a central point
- Signalling to one or 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 actual volume flow rate values and damper blade positions to X-AIRCONTROL for the optimiser function

Order code

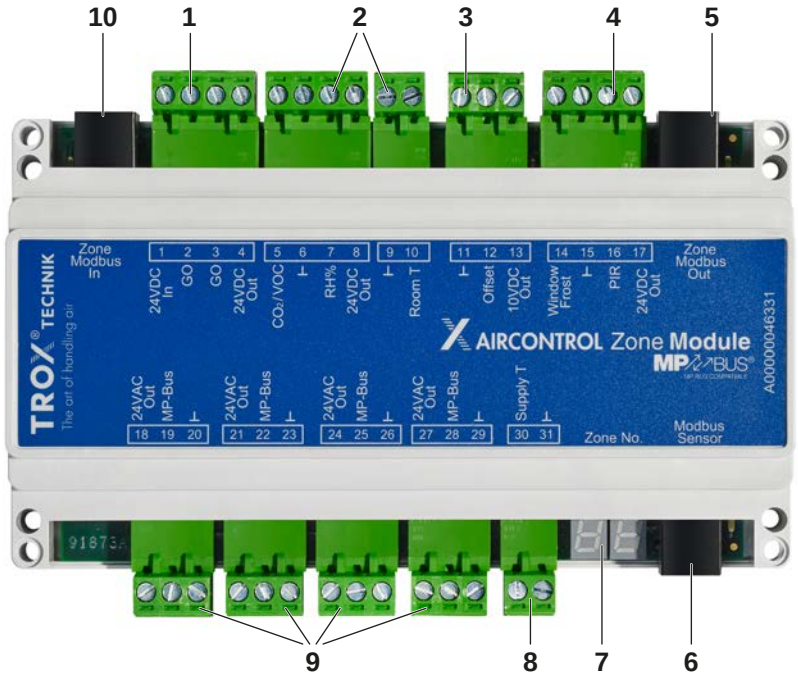
X-AIR-ZMO – MP
| |
1 2

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
EXT Module for zone expansion
COVER Cover for zone modules

Product details

X-AIR-ZMO-MP



1 Connection for the supply voltage
2 Analogue inputs for sensors
3 Analogue input for setpoint value adjuster
4 digital inputs
5 Zone modules, Modbus out
6 Modbus sensors
7 Display
8 Analogue input for temperature sensor
9 MP bus actuators
10 Zone modules, Modbus in

The X-AIRCONTROL system

Application

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.

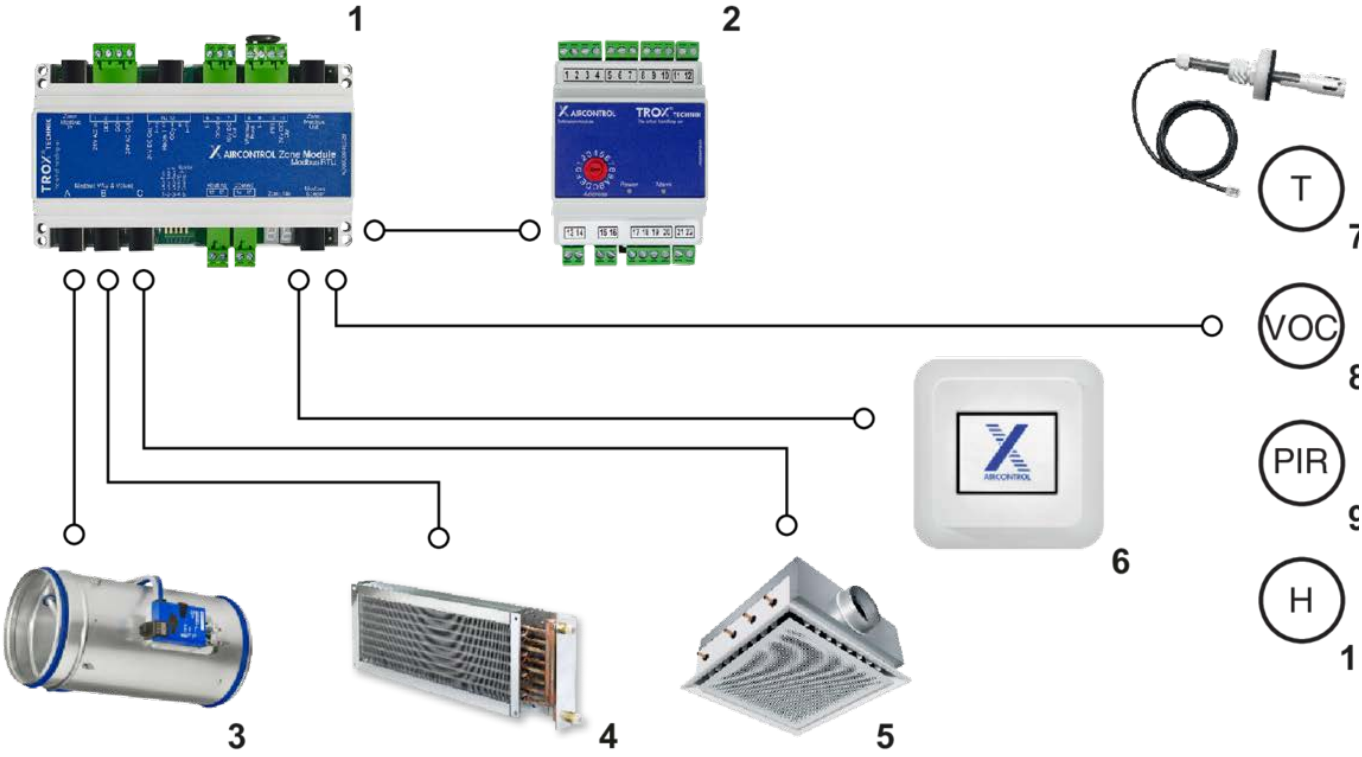
- Evaluation of the damper blade positions of all air terminal units (not with zone module X-AIR-ZMO-ANA)
- Optimisation of fan speed control (optimiser function)
- Evaluation of the heating and cooling required for a zone
- Calculation of the supply air temperature setpoint value for the central air handling unit
- Configuration of the system, display of the system configuration, management of alarms – all 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 on the occupancy. These are usually individual rooms, but larger areas, e.g. open-plan offices, can also be divided into zones.

- 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 own comfort requirements
- A zone module can be used either as a stand-alone unit or as part of a larger system

X-AIRCONTROL zone



1 Zone module
2 Module for zone expansion
3 Volume flow control
4 Heating, e.g. with a heating coil
5 Cooling, e.g. with an active chilled beam
6 Room control panel
7 Temperature sensor
8 Air quality sensor
9 Motion detector
10 Humidity sensor

Note:
Components 2 to 10 are optional (maximum equipment).

Stand-alone solution for a zone

A single zone module and a room control panel can be used to control a single room.
- Integration of air terminal units (maximum of 2 × supply air and 1 × 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
- Plug and play connection of components

Use additional sensors (optional) to include other parameters.
- Occupancy
- Air quality
- Humidity

Interconnecting zones for multi-zone operation

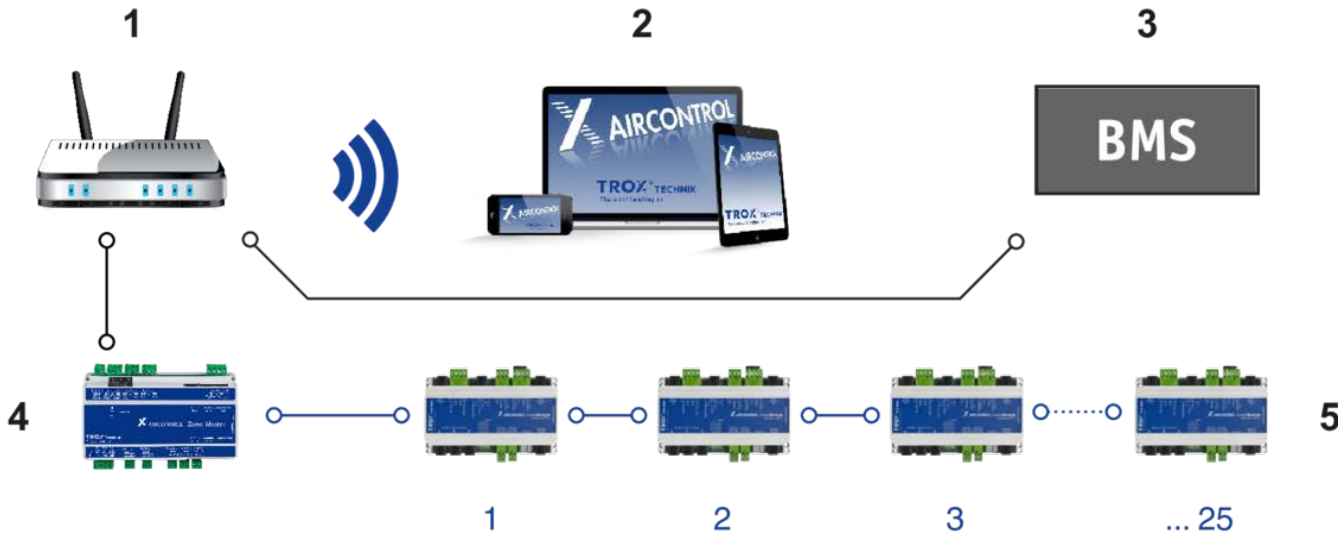
Up to 25 zone modules and another 4 zone master modules can be connected to a zone master module so that a system of up to 125 zones is achieved. Different zone modules (Modbus, MP bus or Analogue) can be combined and connected with plug and play.
- Up to 25 zone modules per zone master module (segment)
- Up to 5 zone master modules (section)
- Up to 125 zone modules in a section

Each zone module controls and maintains 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 zone parameters with the integral web server
- Ethernet connection allows for easy integration with higher-level systems and for remote maintenance via the internet
- Option to connect a WiFi router (WLAN)

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 web server (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 integration with higher-level systems
- A segment can be run in stand-alone operation or it can be combined with other segments to form a section



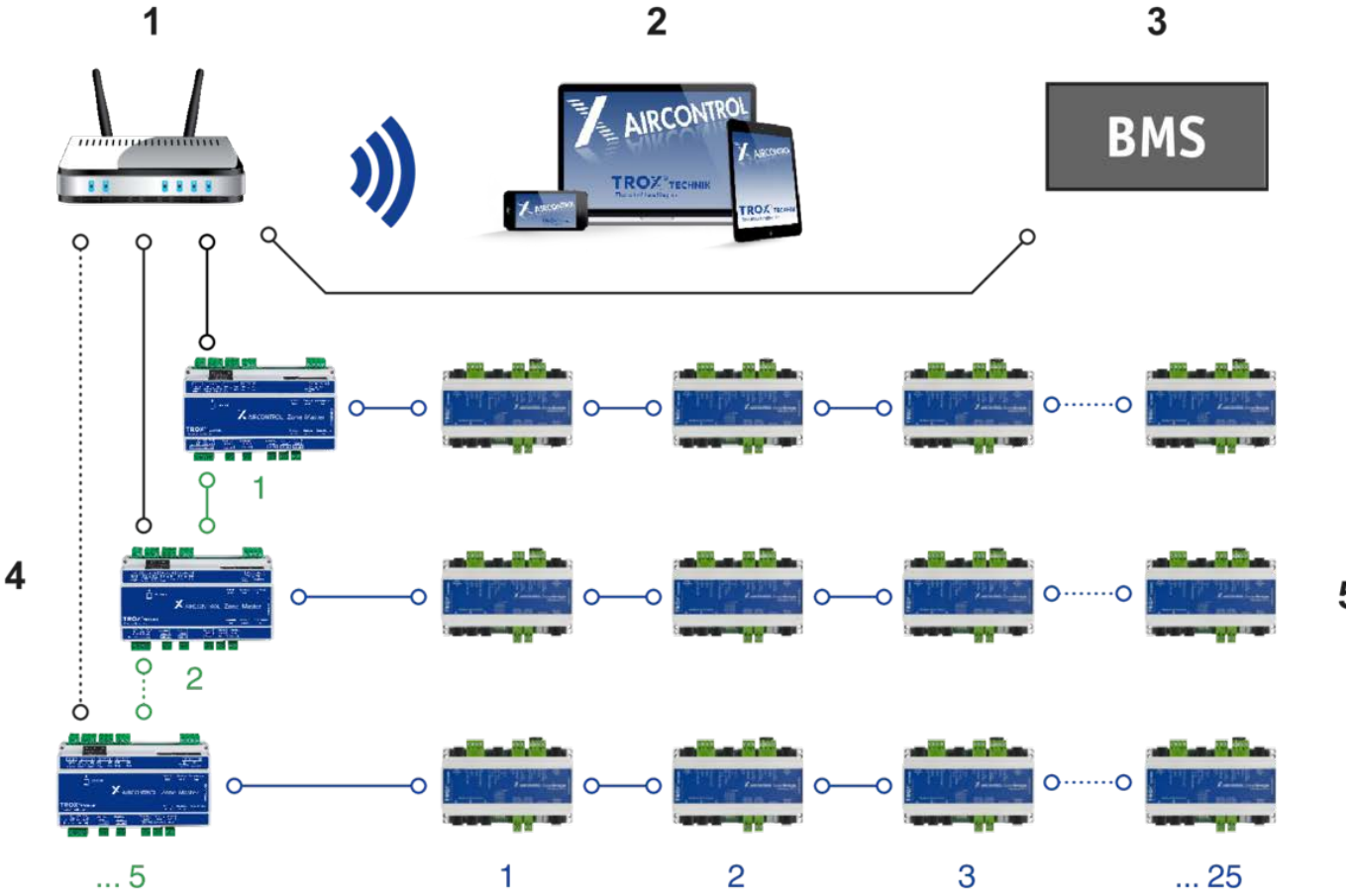
1 Wi-Fi router
2 Smartphone or tablet
3 Central building management system (BMS)
4 Zone master
5 Zone module

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

X-AIRCONTROL section



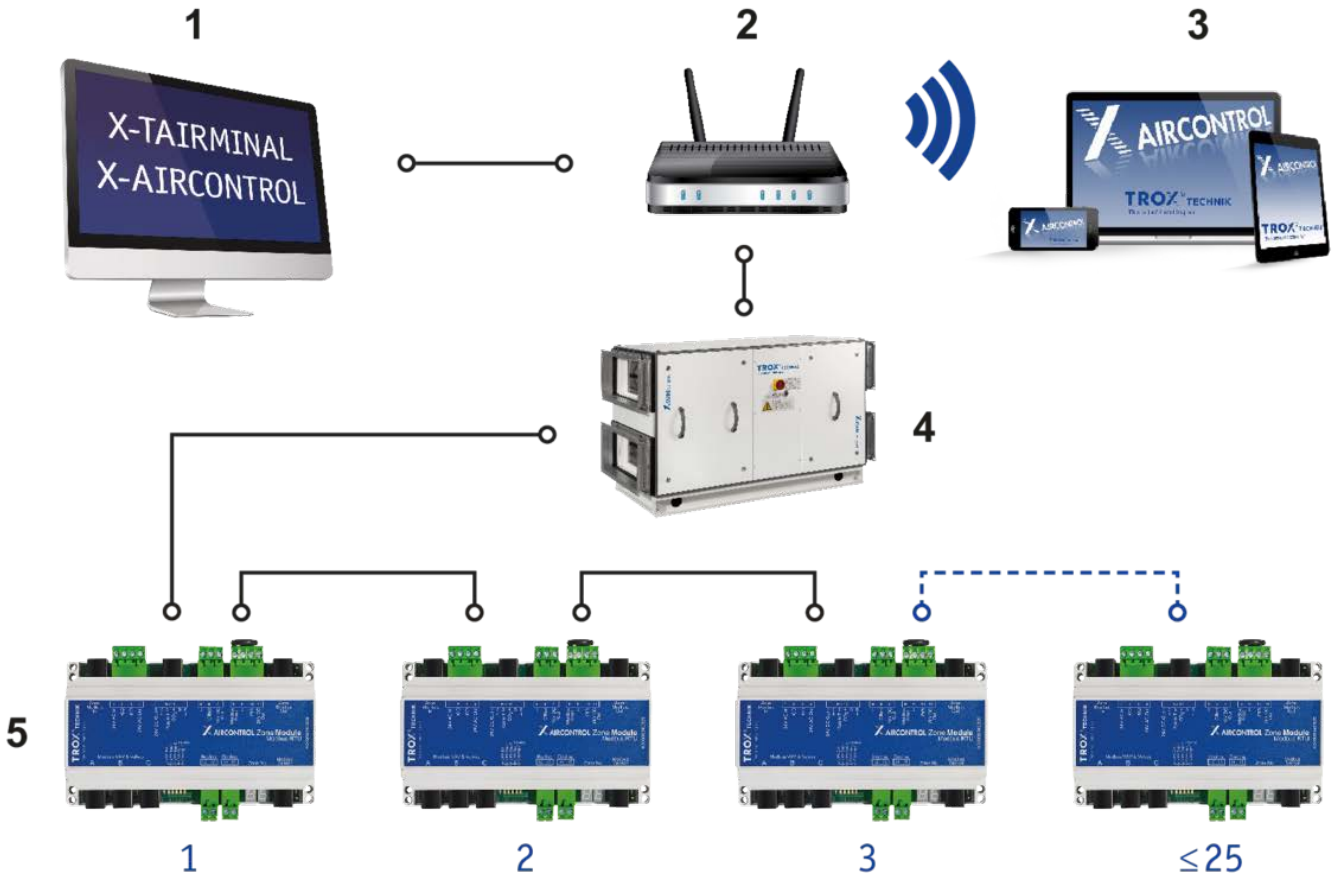
1 Wi-Fi router
2 Smartphone or tablet
3 Central building management system (BMS)
4 Zone master
5 Zone module

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 4 zones. If up to 4 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 web server 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 4 zone modules per X-CUBE Compact air handling unit, including variants (Modbus, MP bus or Analogue)
- Integral web server 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

X-AIRCONTROL with X-CUBE Compact



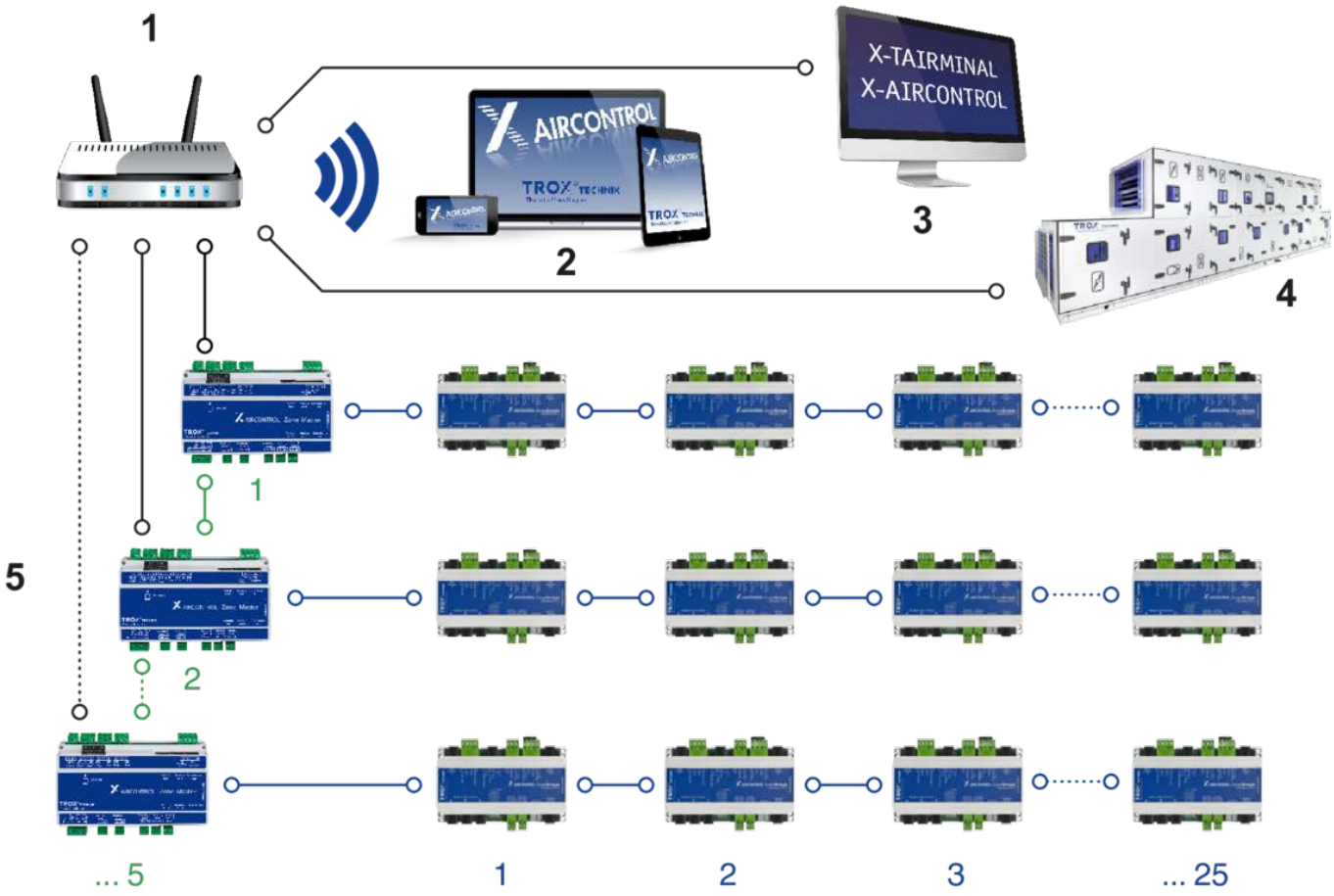
1 Central BMS/X-TAIRMINAL
2 Wi-Fi router
3 Smartphone or tablet
4 X-CUBE Compact
5 Zone module

System solution with X-CUBE

X-CUBE air handling unit can be optimised if one or several zone masters (integrated, multi-zone operation) are used.
Using the following functions, a simple energy-efficient optimisation of the entire system is possible:

- Fan control based on damper blade positions of VAV terminal units
- Centralised air conditioning (heating/cooling) based on actual room temperatures and VAV terminal units

X-AIRCONTROL section with X-CUBE



1 Wi-Fi router
2 Smartphone or tablet
3 Central BMS/X-TAIRMINAL
4 X-CUBE
5 Zone master
6 Zone module

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 blade positions
- 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 module