► **Efficient room control** ►►

X AIRCONTROL

AIRCONTROL Zone **Master**

TRO**X**® TECHNIK
The art of handling air

X AIRCONTROL

Occupancy

Humidity

°C

CO$_2$ VOC

Efficient room control with X-AIRCONTROL

Increasingly demanding requirements on energy efficiency as well as the latest EU regulations have created a need for intelligent control engineering solutions in room air conditioning. To meet these requirements, it does no longer suffice to just look at the room temperature. Equally important factors that influence energy costs include the air quality, occupancy and the damper blade positions of VAV terminal units to control fan speeds according to the system characteristic.

Plug and play connections reduce design and engineering efforts and hence also the cost for integrating controls.

Excellent solution

TROX has combined its know-how from all areas of air distribution technology and developed an energy-efficient overall system. The integration of an X-CUBE air handling unit, volume flow controllers, heating and cooling components, and air-water systems into an overall system offers huge economic and ecological benefits.

TROX X-AIRCONTROL replaces an approach that was developed over a long time and in which measurement and control, electronics and air conditioning were treated as completely separate trades, with separate design and construction procedures. X-AIRCONTROL, on the other hand, is a comprehensive system solution that combines trades and allows for a new, innovative strategy.

www.trox.de/video-x-aircontrol

Up with comfort, down with costs

The system's main focus is on the individual, demand-based control of air volume flow rate and water circulation for a room. Measuring and evaluating the temperature, air quality, humidity level and occupancy not only improve air quality and comfort in a zone, but also drive costs down.

Configuration made easy

Using X-AIRCONTROL does not require any programming skills. All you have to do is enter the desired parameters on a web browser interface. Room values are captured by sensors and sent to the controller, which controls the connected components. Room values are transmitted by plug and play.

What is more, all data points in the system are matched, which significantly reduces the coordination effort between the various trades. This saves design and installation time and, even more important, costs. X-AIRCONTROL communicates with the central BMS via an Ethernet network with the open standard protocols HTTP, BACnet/IP and Modbus TCP.

X-AIRCONTROL – Advantages at a glance

- Individual room control
- Only one responsible person for each area
- Less design and commissioning effort
- Less space required, no conventional switch cabinets
- Adaptable if room use changes
- Centralised alarm management and display of actual operating values
- Optimisation of the air handling unit based on ventilation and air conditioning parameters, ideally with TROX X-CUBE and X-CUBE compact air handling units
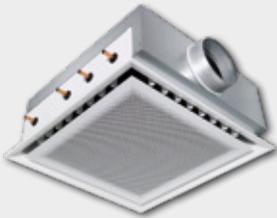
Ethernet

HTTP

ASHRAE BACnet™

Modbus
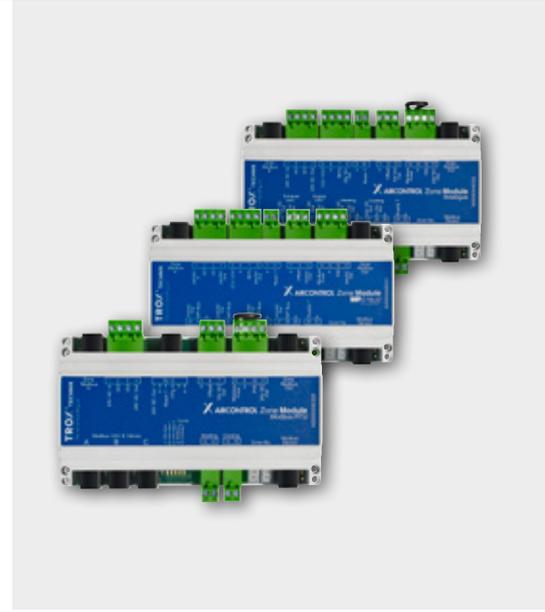
X-AIRCONTROL zone module

VAV terminal unit

DID active chilled beam

PIR sensor

Valve actuator for floor heating

Control panel with 2" touch display

Sensors for temperature, humidity and air quality

X-AIRCONTROL zone modules

X-AIRCONTROL zone modules combine information from humidity, air quality (VOC/CO_2), temperature and PIR sensors and ensure the perfect interaction of all air handling components in a room. The system recognises all digital sensors automatically and uses measured values to initiate control procedures.

No matter what type of system is installed – a ventilation system only or a combination with air-water components such as TROX DID –, X-AIRCONTROL will always ensure the control optimum. Yet the system does not require any programming by users.

The zone modules are available in three variants to meet different requirements and be ideally adapted to existing components, such as VAV terminal units or valves.

■ **Modbus RTU zone module**
- Modbus interface for peripheral components
- Minimal wiring required since a plug-in cable is used for both voltage supply and communication with TROX Compact controllers for variable air volume control (control component BMO-J6)

■ **MP bus zone module**
- MP bus interface for peripheral components
- For example, integration of TROX Compact controllers (control component BC0)

■ **Analogue zone module**
- 0 – 10 V interface for peripheral components
- For example, integration of TROX Easy controllers for variable air volume control or motorised CAV controllers of Type VFC for constant air volume control

Transparent data

The digital Modbus RTU and MP bus zone modules provide maximum data transparency; for example, they signal damper blade positions to the fans for optimised fan speed control.

X-AIRCONTROL zone master modules

X-AIRCONTROL zone master modules allow for expanding the system and provide interfaces to the central BMS and for remote maintenance. They group individual zone modules (e.g. for a floor) and offer a central point for displaying and setting individual zone parameters with the integral web server.

- Create larger systems by linking several zone master modules
- Easy connection with plug and play
- Integral web server for setting and displaying parameters for all connected zone modules
- Use mobile devices for wireless access (optional WiFi router)
- Integration into higher level systems
- 7 day trend logging on SD memory card
- Special functions for system optimisation

Enclosure

The X-AIR-PCASE230V enclosure simplifies installation and commissioning of an X-AIRCONTROL zone module or zone master module.
Advantages:

- **Plastic enclosure with integral transformer**
  - Maintenance-free and CE-certified
  - 230 V / 24 V AC transformer with micro fuse
  - To supply voltage to components
  - Factory wired

- **Mounting bracket**
  - Clicks into place, no tools required
  - For wall or ceiling attachment

- **No switch cabinet required**
  - Compact design
  - Decentralised installation of X-AIRCONTROL modules
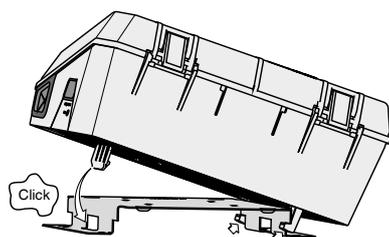
X-AIRCONTROL zone master

X-AIR-PCASE230V as delivered

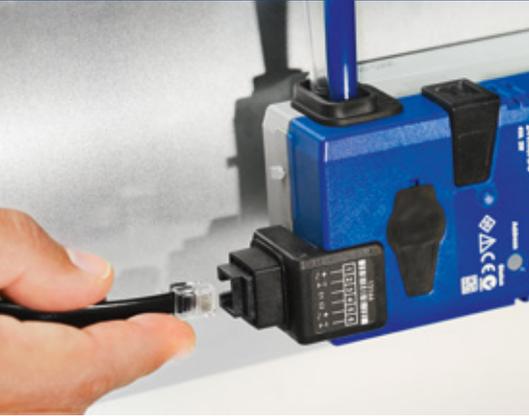*X-AIR-PCASE230V as delivered*

X-AIR-PCASE230V
With additional components (by others)
zone module / splitter

Clicks into place

Stand-alone solution for a zone

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

- Volume flow control with up to two supply air controllers and one extract air controller
- Control input signal for heating and cooling units (room temperature control)
- Timer programmes independent of the central BMS
- Simple wiring
- Plug and play connection of components
- Control panel for setting zone parameters and for temperature recording

Control panel

Optional sensors

To automatically include additional information such as:

- Occupancy
- Room air quality – VOC or CO_2
- Humidity

Plug and play connection of components

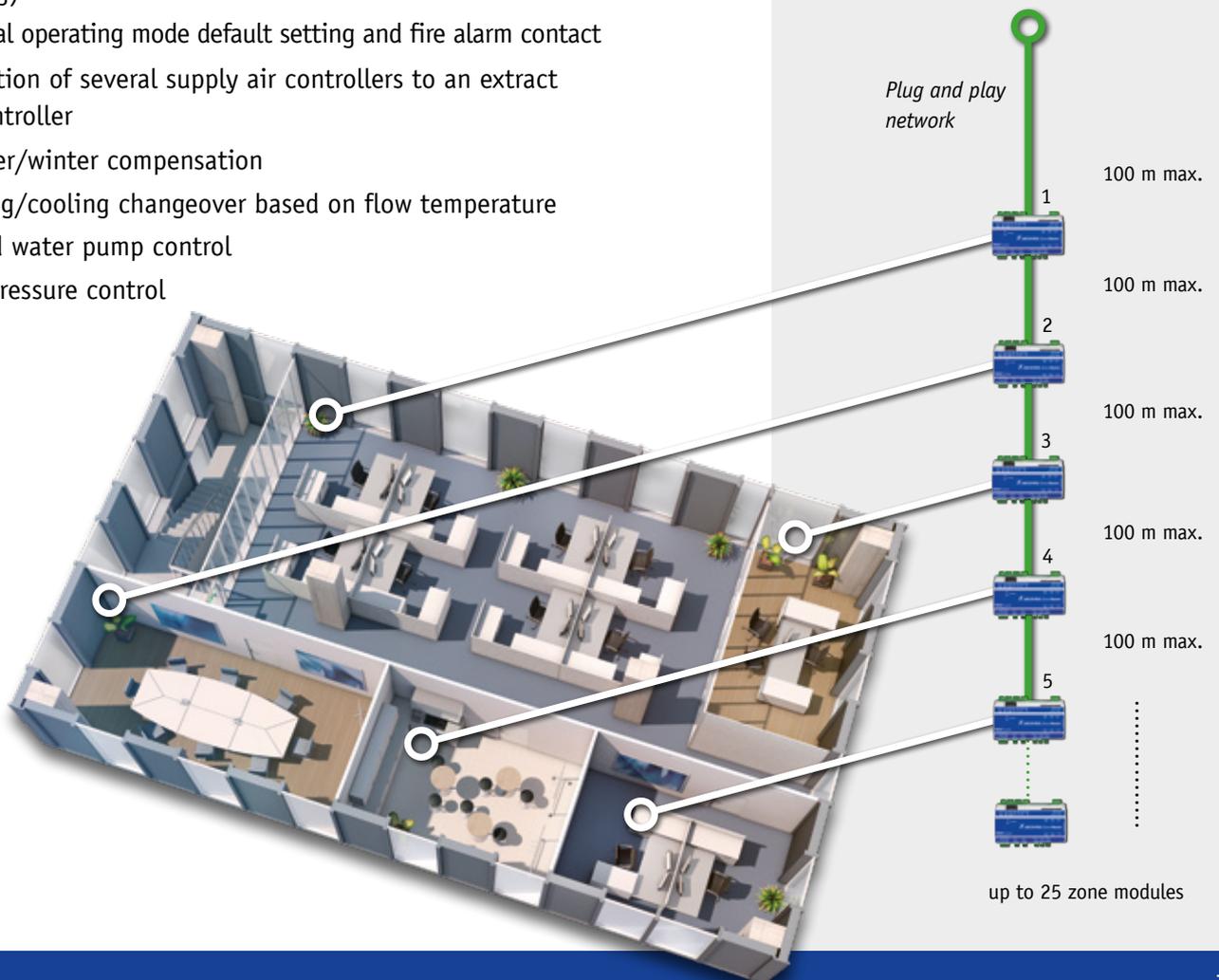**Linking individual zones for multi-zone operation**

An X-AIRCONTROL zone master module can be used to link up to 25 zones. And by adding up to four more master modules, you can expand the system to a total of 125 zones. All zone module variants can be combined as required and simply linked by plug and play.
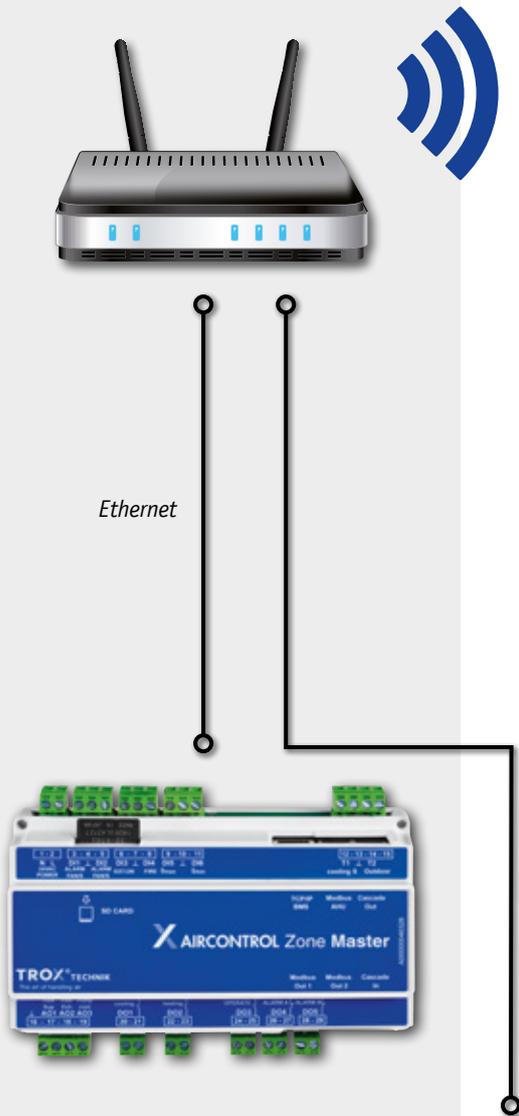
- Up to 5 X-AIRCONTROL zone masters
- Up to 25 X-AIRCONTROL zone modules per master module
- Up to 125 X-AIRCONTROL zone modules within a network

You can easily interconnect even larger areas of a building. Each master module and each zone module is automatically assigned its own address, which facilitates creating a system network enormously. Each zone module controls and maintains the required conditions for the particular room for which it is used.

X-AIRCONTROL zone master – function overview

- Fan optimisation based on the damper blade positions of VAV terminal units
- Setpoint determination for AHU outlet temperature based on local room temperatures (central air conditioning, heating/cooling)
- External operating mode default setting and fire alarm contact
- Allocation of several supply air controllers to an extract air controller
- Summer/winter compensation
- Heating/cooling changeover based on flow temperature
- Chilled water pump control
- Duct pressure control

Plug and play network

100 m max.

1

100 m max.

2

100 m max.

3

100 m max.

4

100 m max.

5

up to 25 zone modules

Easy configuration with a web browser

Using a WiFi router makes configuring the X-AIRCONTROL master and zone modules as well as displaying information a convenient affair. Notebooks, tablets or smartphones – the user interface of X-AIRCONTROL has been optimised for mobile devices, offers intuitive navigation and shows all setpoint and actual values on one screen.

Monitoring the relevant parameters and adjusting them is, hence, easy. It is immediately obvious whether all systems are working normally or if an error requires your intervention. You can select each zone individually for configuration or to adapt it to changing conditions.

Advantages

- Wireless operation with optional WiFi router
- Intuitive web browser interface (optimised for mobile devices)
- All relevant setpoint and actual values are available at a glance

Ethernet

The web browser interface shows all data.

Interfaces and monitoring functions

- Data points in open standards for connection to AHUs and to the central BMS
- Ethernet network connection with TCP/IP, BACnet/IP and Modbus TCP/IP protocols
- Web browser interface for display, configuration and monitoring
- Setting of individual weekly programmes (scheduling)
- Remote maintenance is possible
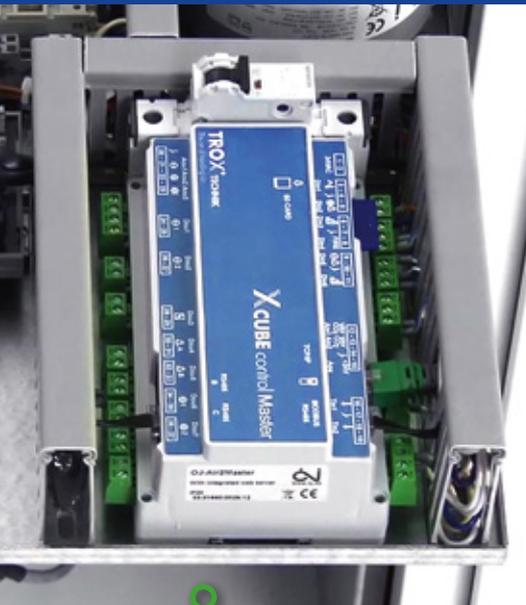- Save all zone module settings on an SD card

Z01 Office 053 — Zone 1 Section 1

Air Mode		Auto
Low Air Flow		20.0 %
High Air Flow		90.0 %
Override Timeout		60 min.
Menu Show		Show
Password		1234
Actual		24.3 °C
Setpoint		21.0 °C
Actual Setpoint		21.0 °C
PI Reg P-Band		10.0 °C
PI Reg I-Time VAV		10 s
PI Reg I-Time Cool		700 s
PI Reg I-Time Heat		20 s
Actual		54.1 % RH
Setpoint		45.0 % RH
PI Reg P-Band		10.0 % RH
PI Reg I-Time		10 s
Setpoint		100.0 %
Setpoint		34 m3/h
Actual Position		100.0 %
Actual Position		94 °
Actual Flow		0.0 %

Supply1	Actual Flow	0 m3/h
	Nominal Flow	100 m3/h
	Min. Air Flow	21 m3/h
	Max. Air Flow	34 m3/h
	Override	0.0 % Enable
	Testrun	Start
	Adaption	Start
	-- more --	
	Setpoint	100.0 %
	Setpoint	34 m3/h
	Actual Position	100.0 %
	Actual Position	94 °
	Actual Flow	0.0 %
Extract	Actual Flow	0 m3/h
	Nominal Flow	100 m3/h
	Min. Air Flow	21 m3/h
	Max. Air Flow	34 m3/h
	Override	0.0 % Enable
	Testrun	Start
	Adaption	Start
	-- more --	
PIR	Actual	Not Active
	Supply Min. Air Flow	20 m3/h
	Actual	Closed
	Setpoint	0.0 %
	Override	0.0 % Enable
	Testrun	Start
	Setpoint	100.0 %
	Override	0.0 % Enable
	Testrun	Start
	Save	Copy

Zone information overview

The simple solution for smaller projects

For smaller projects, i.e. if you want to control only few zones, the ideal solution is to combine X-AIRCONTROL with the X-CUBE compact air handling unit.

The X-CUBE compact's integral control system not only provides the control signal to the fan, the dampers and other peripheral components of the compact air handling unit, but also functions as an X-AIRCONTROL zone master. The zone master function of the X-CUBE compact unit allows for integrating up to four X-AIRCONTROL zone modules and hence to individually control the corresponding zones.

The Ethernet interface of X-CUBE compact control allows you to access the configuration parameters of both the compact unit and the X-AIRCONTROL zones by simply using a web server.

- X-AIRCONTROL zone master function is included in X-CUBE compact control
- Connect up to 4 zone modules of any type
- Use another zone master to add additional zone modules
- Use the integral web browser interface for configuration
- Remote maintenance is possible

Plug and play network
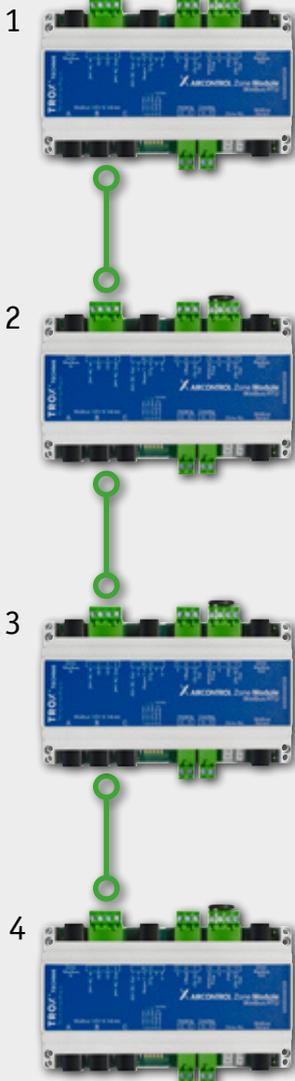
Top performance, small size
- *For volume flow rates of 600 to 6000 m³/h*
- *Maximum energy efficiency*

The TROX system concept implemented

More and more X-CUBE air handling units are provided with TROX X-CUBE control, offering new options with regard to energy efficiency and trades.

If you integrate X-CUBE with other systems, X-CUBE control offers even more functions:

TROXNETCOM

- Monitoring of duct smoke detectors and of up to 62 motorised fire dampers via TROXNETCOM (AS-i)
- Coordination and logging of maintenance runs for fire dampers
- Central alarm management

The following TROX subsystems send important information to X-CUBE control, which adds to the energy efficiency and comfort:

X-AIRCONTROL

- Signalling of the damper blade positions of all connected VAV terminal units. This allows for conclusions with regard to the system characteristic.
- Fan control based on the system characteristic saves up to 40% of energy.
- Information on actual temperature, humidity and air quality allows for an optimisation of the air treatment by the AHU. This minimises the required air transport and improves the overall efficiency at the same time.

LABCONTROL

- As with X-AIRCONTROL, damper blade positions are signalled to control the fans.
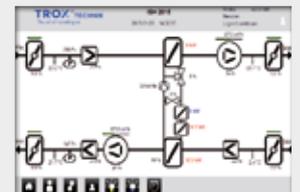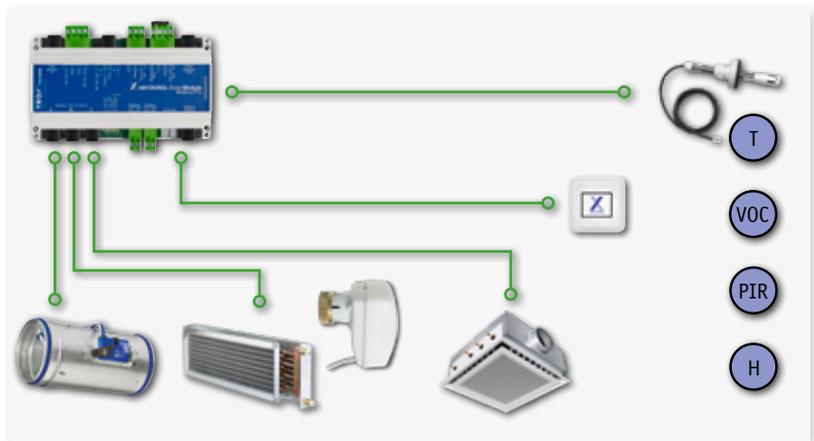
LABCONTROL

AIRCONTROL

TROXNETCOM

**CUBE control**

1) Single room control

- No zone master required
- Room control panel for setting and displaying values
- Single room control
  - Timer programmes
  - Temperature control
  - PIR sensors (optional)
  - Control based on VOC, humidity (optional)
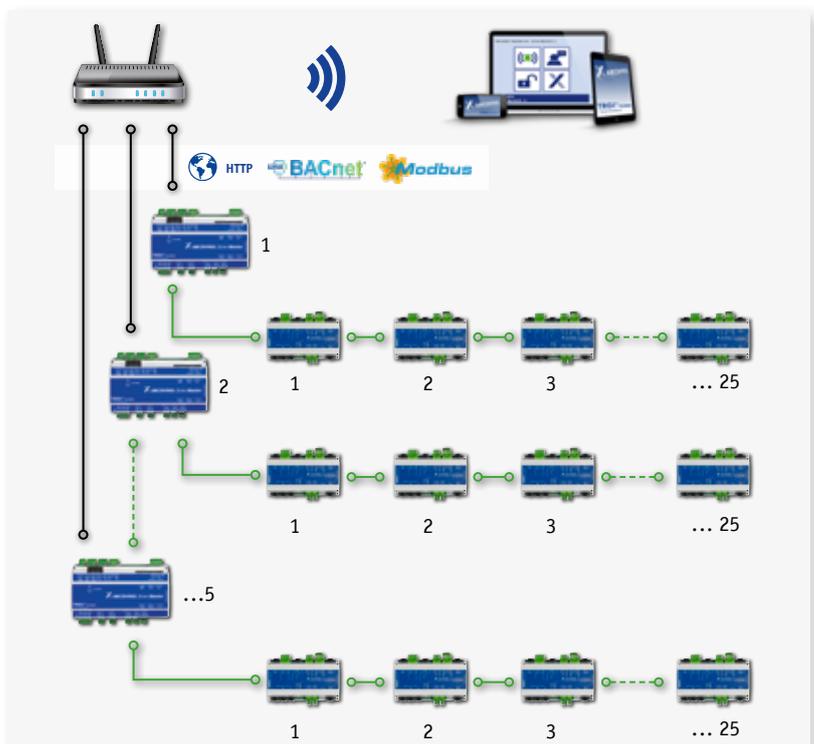

2) Control of several rooms

Same as 1), but:

- Integration of up to 25 zones per zone master
- Optional room control panels
- Central monitoring/parameter setting for zones
- BACnet/IP and Modbus TCP/IP interfaces to higher level systems
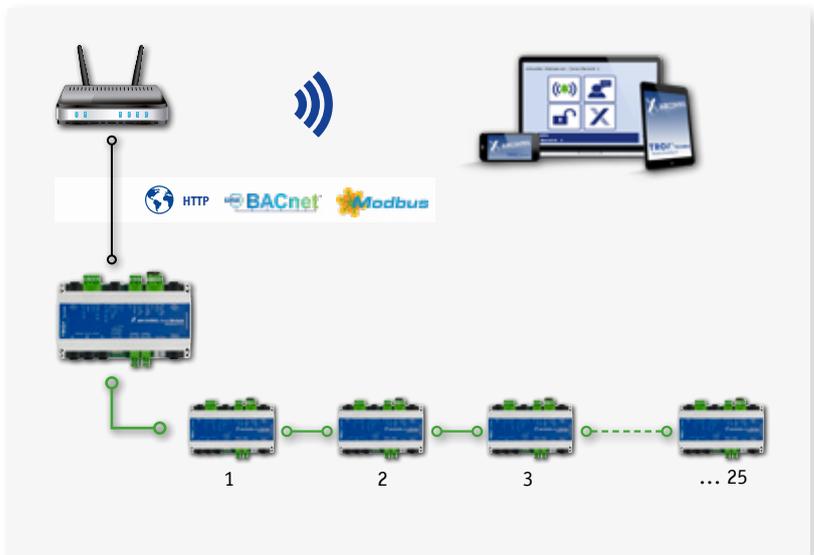
3) Control of more than 25 rooms

Same as 2), but:

- Cascade function for up to 5 zone master modules
- Optional room control panels
- Single room control as well as individual sensor and unit configuration
- Can be expanded to 125 modules

Key

─── Plug and play network
─── Ethernet network

X-TAIRMINAL
X-AIRCONTROL

Up to 4 zone modules can be connected

1 2 3 4

HTTP BACnet Modbus

1
2 1 2 3 ...25
   1 2 3 ...25
...5
   1 2 3 ...25

X-TAIRMINAL
X-AIRCONTROL

HTTP BACnet Modbus

1
2 1 2 3 ...25
   1 2 3 ...25
...5
   1 2 3 ...25

4) Control of up to 4 rooms with X-CUBE compact control

Same as 2), but:

- X-CUBE compact control includes zone master for up to 4 zone modules
- Web browser on integral X-CUBE compact display
- Easy energy optimisation of the entire system
- For example, fan control based on damper blade positions of VAV terminal units

## 5) Control of several zones with X-CUBE control

Same as 3), but:

- Easy energy optimisation of the entire system
- For example, 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

6) Control of several zones with central BMS (by others)
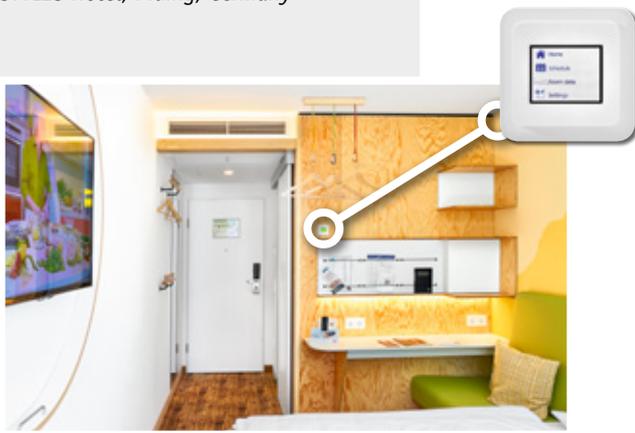
Same as 3), but:

- Use of standard interfaces of X-AIRCONTROL for integration with higher level systems
- Display and operation with web browser, X-TAIRMINAL or by others
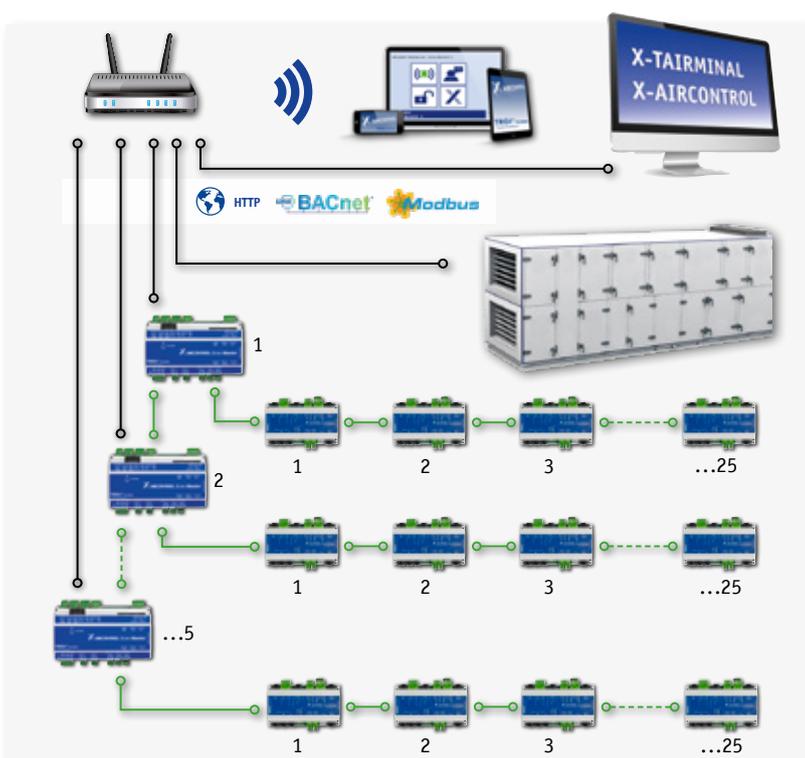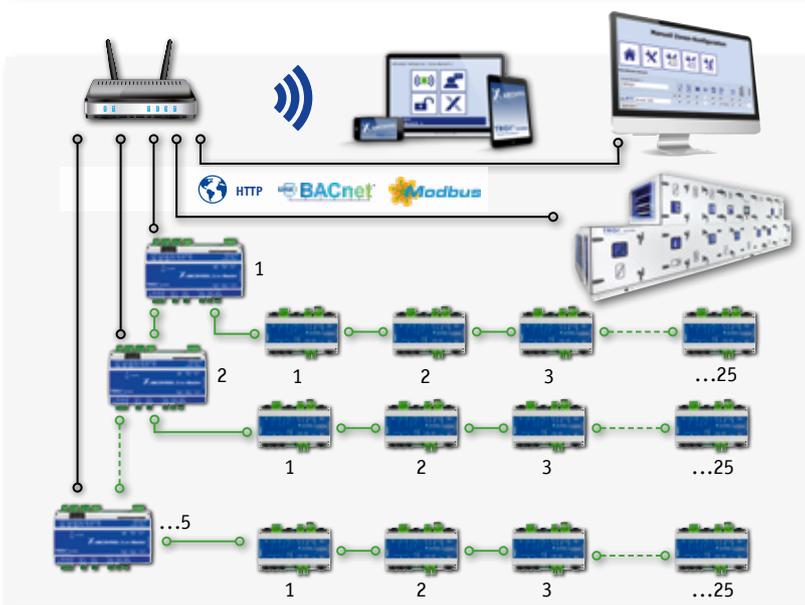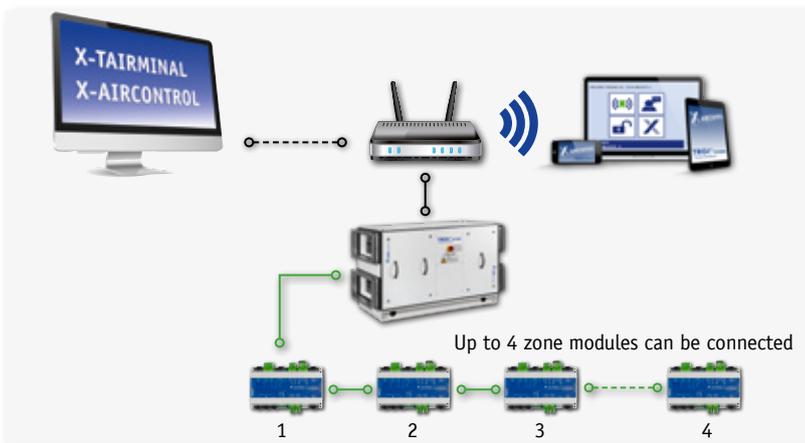
STYLES Hotel, Piding, Germany

Guest room with an X-AIRCONTROL zone module

Restaurant

Conference room

STYLES Hotel in Piding – a successful X-AIRCONTROL project

This design budget hotel has 107 guest rooms, 2 conference rooms and a large restaurant. TROX has supplied the entire air conditioning and fire protection system, which consists of VAV terminal units, X-AIRCONTROL zone modules and zone masters, a TROXNETCOM control system including smoke detectors and fire dampers, as well as two X-CUBE air handling units and the central X-TAIRMINAL software.

The comfort of guests was a priority from the start. Air management and fire protection were of particular importance to the owners of the design budget hotel.

X-AIRCONTROL zone modules provide a pleasant climate in the various areas of the hotel, i.e. in guest rooms, conference rooms and the restaurant. Zones were grouped for each floor and connected to a zone master module, then connected to the X-CUBE air handling units.

Hotel mode

At a previously set time, the temperature setpoint for a room is reset to a previously defined value, and the operating mode for the zone is reset to AUTO.

In other words, you can define different setpoints for different rooms; guests can manually adapt the room temperature, but AUTO mode will resume eventually, which reduces energy consumption.
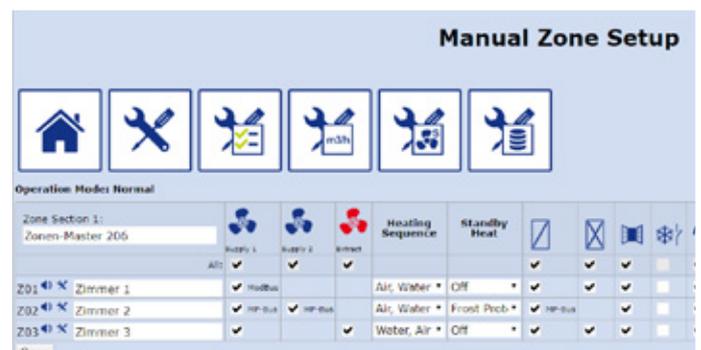

Hotel mode control

X-TAIRMINAL – Complete system overview

There is hardly a type of building with such a variety of rooms as a hotel. Whether suites, meeting rooms, spa or restaurants – the indoor conditions have to be constantly adapted to the number of occupants and to the individual comfort requirements of the guests.

To help the system owner to monitor energy consumption and system operation in general at all times, and to see trends that may be used to adapt parameters, the TROX X-TAIRMINAL software has been installed.

The STYLES Hotel is in fact equipped with several TROX systems that run in parallel, e.g. TROXNETCOM for fire and smoke protection, and X-AIRCONTROL for room control.
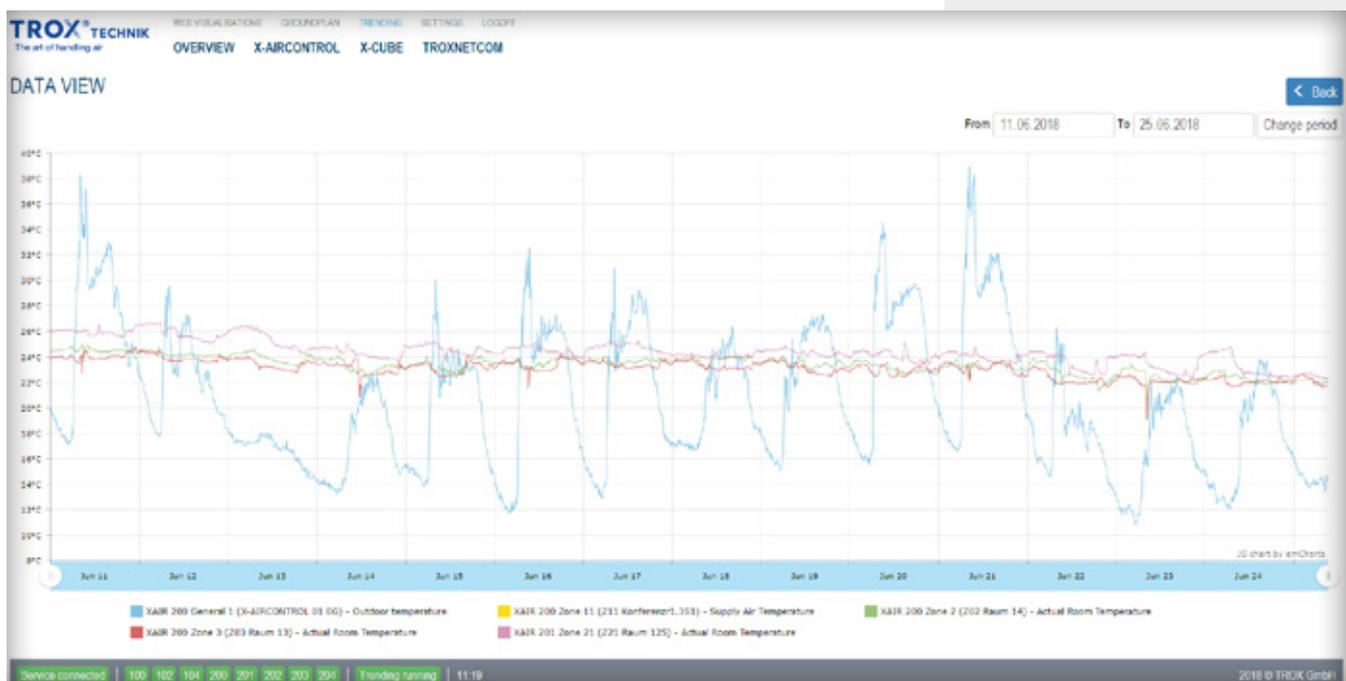
X-TAIRMINAL provides users with a complete overview of all systems on one screen. Users can display system values, alarms or trends centrally.
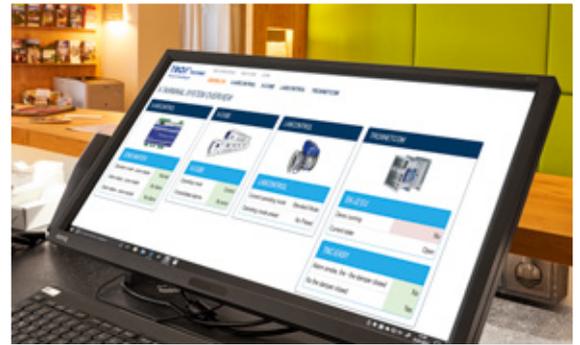
Immediate clarity: the TROX X-TAIRMINAL software

Reception area

X-TAIRMINAL allows users to display and analyse all parameters for a ventilation and air conditioning system, for example to recognise trends.

TROX **TECHNIK**
The art of handling air

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