



**NEW**

**X-CUBE CUSTOMISED**

# ONE *FOR ALL*

**Customised air conditioning solution with X-CUBE X1/X2**



## THE X-CUBE UNIQUE BY DESIGN

### X-CUBE – CUSTOMISED VENTILATION AND AIR CONDITIONING TECHNOLOGY. UNLIMITED CONFIGURATION OPTIONS.

The X-CUBE is the customisable air handling unit for every application. Whether in a hospital, laboratory, office or industrial environment, every application places specific demands on air quality and hygiene. The X-CUBE meets these requirements with maximum precision: thanks to automated development, patented manufacturing and high-quality components produced inhouse.

Each X-CUBE is individually developed and built for your application to ensure optimum performance, the highest quality and an indoor climate that benefits people and processes in equal measure. The ultimate goal is to ensure well-being.

## YOUR BENEFITS WITH X-CUBE



### INFINITE POSSIBILITIES

The X-CUBE is an extremely customisable system that meets all requirements. It is suitable for all building types and application scenarios.



### MAXIMUM ENERGY EFFICIENCY

Optimised air flow, thermally separated panels and intelligent control systems ensure outstanding energy efficiency and low operating costs.



### HIGHEST HYGIENE STANDARDS

Smooth internal surfaces, easily removable doors and intelligent drainage concepts simplify cleaning – ideal for use in sensitive environments.



### FUTURE-ORIENTED CONNECTIVITY

With integrated MCR technology, the system offers intuitive operation and seamless BMS integration via protocols such as BACnet or Modbus.



### COMPREHENSIVE SERVICE AND SUPPORT

Our experts are by your side every step of the way. You can rely on a fast response and a wide range of services and support.



### OPTIMISED IN EVERY DETAIL

Our system combines over 90 % in-house manufactured components and goes beyond simple ventilation in many respects. From splitters and multileaf dampers to the circulation system, everything is designed for maximum performance.



## ONE SOLUTION. FOR EVERY APPLICATION.

### OVER 25,000 TROX AIR HANDLING UNITS ARE CURRENTLY IN USE IN MORE THAN 80 COUNTRIES.

Our systems stand for first-class air quality, maximum safety and the highest energy efficiency, thus creating the ideal indoor climate for people and technology. They meet even the most demanding requirements, whether in operating theatres, cleanrooms, research laboratories or office buildings.

See for yourself what is possible:

## MST HOSPITAL, ENSCHEDE – MAXIMUM HYGIENE WITH LOW NOISE LEVELS



Healthcare

More info: <https://www.trox.de/referenzen/MSTKrankenhaus>

The Medisch Spectrum Twente hospital in Enschede (620 beds, around 78,000 m<sup>2</sup>) required a hygienically flawless indoor air supply – particularly in its operating theatres and intensive care units. Specifications included: precise regulation, low germ load, high filter and hygiene standards (VDI 6022), modular system flexibility and quiet running (< 50dB(A)).

- > 15 customised X-CUBE air handling units
- > Smooth, powder-coated internal surfaces and stainless steel floors
- > Stainless steel condensate drip trays
- > F9 NanoWave® filter
- > Redundant control
- > Maximum hygiene



Restaurants

More info: <https://www.trox.de/referenzen/dachstein>

## DACHSTEIN – TOP PERFORMANCE EVEN IN EXTREME CONDITIONS

The renovated mountain station of the Dachstein Glacier cable car, at an altitude of approximately 2,700 metres, required an extremely weather-resistant ventilation solution that not only operates energy-efficiently, but is also robust enough to withstand alpine conditions. Transport and installation were logistically very challenging due to the limited access routes and small room openings.

- > 2 customised X-CUBE supply air and exhaust air systems and 3 zone sections
- > Volume flows of up to 14,200 m<sup>3</sup>/h
- > Weather-resistant and energy-efficient systems
- > Direct connection to building automation
- > Delivery in transportable individual modules

## PFIZER CLEANROOM PRODUCTION – DECENTRALISED SOLUTION FOR THE HIGHEST DEMANDS

More info: <https://www.trox.de/referenzen/pfizer>

In Pfizer's high-containment factory "High- Con" in Freiburg, Germany, extremely high air quality had to be realised in highly sensitive cleanrooms in a cost-efficient manner with a low outside air rate and minimal energy consumption. With a conventional centralised air supply, the duct systems, resistances and energy consumption would have been significantly higher.

- > Central X-CUBE, combined with decentralised zone devices CROFCU (Clean Room Fan Coil Unit)
- > Minimal space requirements
- > Maximum safety (filter class H13, OEB-4 conformity)
- > Intelligent overpressure control
- > Heat exchanger with heat recovery coefficient > 70 %



Pharma

# CUSTOMISED DESIGN. MAXIMUM ADDED VALUE.

## X-CUBE IN DETAIL

The great advantage of the X-CUBE system lies in its sophisticated integral design. It enables the development of customised solutions in which every detail is designed for maximum flexibility and the highest quality, while at the same time meeting the highest requirements of automated production.



### FULL CUSTOMISATION:

- > Air volume flows from 500 to 150,000 m³/h
- > Flexible system design for supply and exhaust air systems
- > Freely configurable components (filter, heating, cooling, humidification, sound attenuation)
- > Integration of closed-loop systems (n:m) possible
- > Casing design in all RAL colours



### MAXIMUM SAFETY:

- > Multileaf dampers with high tightness (up to class 4)
- > Doors with safety caps to prevent unintentional opening
- > Factory Acceptance Test (FAT) for smooth system integration
- > Explosion-proof version (X-CUBE Ex) available



### MAXIMUM EFFICIENCY:

- > Low-noise EC/PM fans (up to IE6), fan arrays and AC plug and hybrid solutions
- > Heat and moisture recovery (plate, rotation, RAC incl. hydraulic module)
- > Optional: cold recovery, air preheating for filter, adiabatic cooling, humidification (contact, high pressure, steam)
- > Optimised air distribution and shut-off through flow adjustment dampers
- > Silencer with up to 30% reduced pressure loss
- > Sound and thermally insulated construction
- > Integrated monovalent heat pumps – split systems



### DURABILITY AND RELIABILITY:

- > Casing made of galvanised, powder-coated steel or stainless steel (C4/C5)
- > TÜV-tested casing quality in accordance with EN 1886 (D1 (M), L1 (M), T2, TB2)
- > Certified in accordance with Eurovent, TÜV-SÜD and RLT guidelines



### HIGHEST HYGIENE STANDARDS:

- > Smooth, easy-to-clean internal surfaces (coated or stainless steel)
- > Patented hygienic stainless steel condensate drip trays that slope on all sides
- > Efficient filter solutions with high dust holding capacity from ePM1 to HEPA, Eurovent-certified
- > Design in accordance with VDI 6022, DIN 1946-4 and other standards



### SIMPLE OPERATION & MONITORING:

- > X-CUBE control with touch control panel
- > Integration into TROX systems (TROXNETCOM, X-AIRCONTROL, TROX Ox) and central BMS (MCE)
- > Bus system to reduce the wiring effort



### EASY INSTALLATION & MAINTENANCE:

- > Modular design for transport and flexible customisation on site
- > Can be completely dismantled down to component level
- > Precise alignment thanks to internal 3D module connectors
- > 180° doors and LED inspection windows for optimum access and visual check
- > Motorised pull-out rails for easy maintenance of heavy components

# FURTHER REASONS TO CHOOSE THE X-CUBE

## MANUFACTURING EXPERTISE "MADE IN GERMANY":

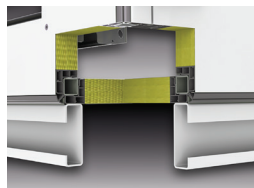
- > Sustainable and silicone-free production
- > Machining-free production of profiles and sheets
- > Internal testing and measurement department for acoustics, flow, energy
- > Industrial fans made by TROX X-FANS

## COMPREHENSIVE SERVICE OVER THE ENTIRE INVESTMENT CYCLE:

- > Design of an overall system (with fire protection, ventilation components, control, etc.)
- > Personal expert advice from specialised X-CUBE engineers in your area
- > Project support from consulting, design and commissioning through to training
- > Guaranteed delivery dates with flexible delivery (pre-assembled or in individual components)



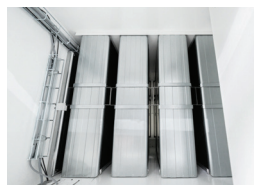
## CASING HIGHLIGHTS



The acoustically and thermally insulated casing ensures elimination of thermal bridging, even near the ground.



Panels with integral cover profiles, can be removed and re-installed easily using metric threaded screws.



TROX splitters with aerodynamically profiled splitter frames for up to 30% lower pressure losses. Adjustable airway width thanks to spacers, which also serve as an inspection handle.



Sturdy single and double-leaf doors in rectangular design for minimised leakage – even with large pressure differences.



Large square inspection windows with energy-efficient LED lighting for easy system monitoring.

## COMPONENT HIGHLIGHTS



Robust TROX Mini Pleat filters have a compact depth, low initial differential pressure and a high dust holding capacity. Alternative: TROX bag filters (glass fibre or NanoWave®), energy class A, Eurovent certified, filter classes M5 to F9.



The low-leakage TROX multileaf dampers with aerodynamically profiled hollow blades have been optimised for use in air handling units. Configurable up to tightness class 4 in accordance with DIN EN 1751 (e.g. for hospitals).



The heat exchanger for cooling and dehumidification is fitted with a stainless steel condensate drip tray that slopes on all sides. Insert in the base and intermediate floor panel (flat design) for complete drainage and easy cleaning.



Humidification systems (steam, contact and adiabatic high-pressure humidifiers) for flexible applications. Steam humidification via electric generation or saturated steam, integrated steam distributor, adiabatic systems with 1 to 3-stage control and contact humidifiers as fresh water or circulation systems.

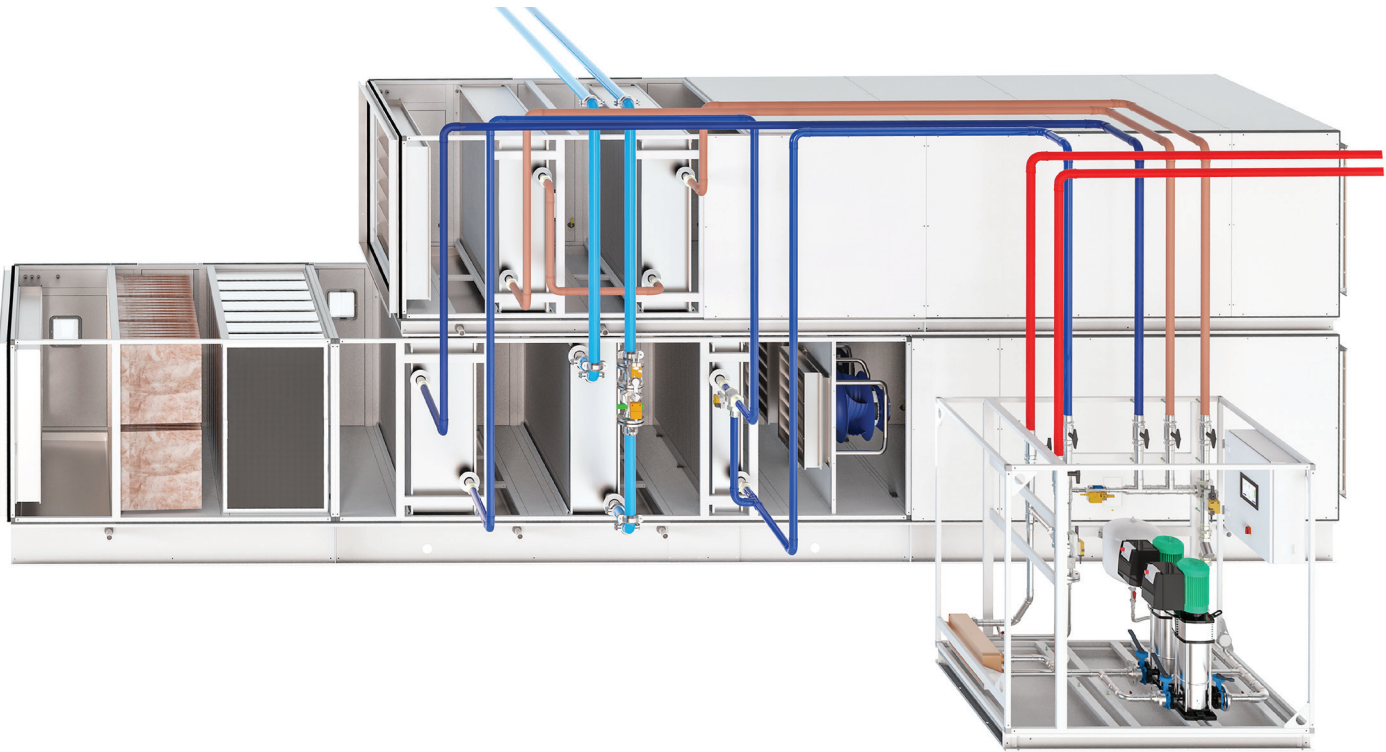


Energy-efficient fan technology with direct-drive EC impellers for high efficiency even in partial load operation. PM technology (IE4-IE6 in accordance with IEC 60034-30) and flow-optimised steel or plastic impellers for maximum efficiency with minimum noise levels.

# RUN-AROUND COIL SYSTEM FOR GREATER EFFICIENCY

## HEAT RECOVERY WITH RAC AND HYDRAULIC STATION

The fully integrated TROX hydraulic station enables the realisation of highly efficient RAC systems. It is particularly suitable for areas with very high hygiene requirements or spatially separated airflows, such as in hospitals or laboratories. The station has an integrated control system and can be networked directly with X-CUBE control. It is supplied ready for connection and can be intuitively controlled via the central TROX control panel or a web browser.



RAC system with waste heat utilisation

Hydraulic unit

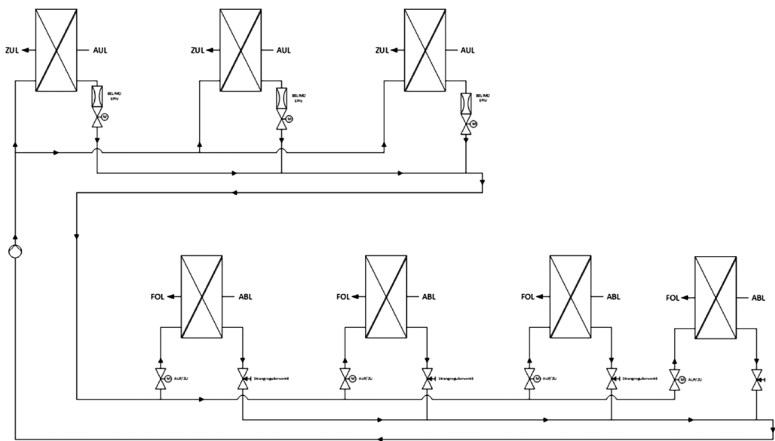


Diagram of hydraulic balancing n:m system

## ADVANTAGES OF THE TROX RUN-AROUND COIL SYSTEM:

- > **Heat recovery rates of up to 80 %** thanks to counterflow configuration and intelligent control
- > **Additional functions** such as heat recovery, heat feed and cooling feed
- > **Integrated optimisation of the glycol flow**, adapted to the air volume flow
- > **Maximised operational reliability** through plausibility check of the heat recovery function and anti-icing protection
- > **Hygienically separated airflows**: no risk of leakage – ideal for sensitive areas
- > **n:m heat recovery systems**
- > **Compact design**: (optional) heating/cooling input directly via the medium – air-side heat exchangers are not required
- > **Flexible control**: inductor or diverting circuits, multi-pump system with redundancy, power regulation for variable requirements
- > **State-of-the-art components**: high-pressure centrifugal pumps (IE4)
- > **Intelligent communication**: bus communication and conventional connection to the building management system (BMS) for seamless integration
- > **Minimal wiring effort during installation**
- > **Flexible use**: available in different casing variants (open, closed, weatherproof)
- > **Additional features**: dehumidification cold recovery (DCR), adiabatic pre-cooling, volume flow recording and intelligent control functions

# TYPICAL AREAS OF APPLICATION



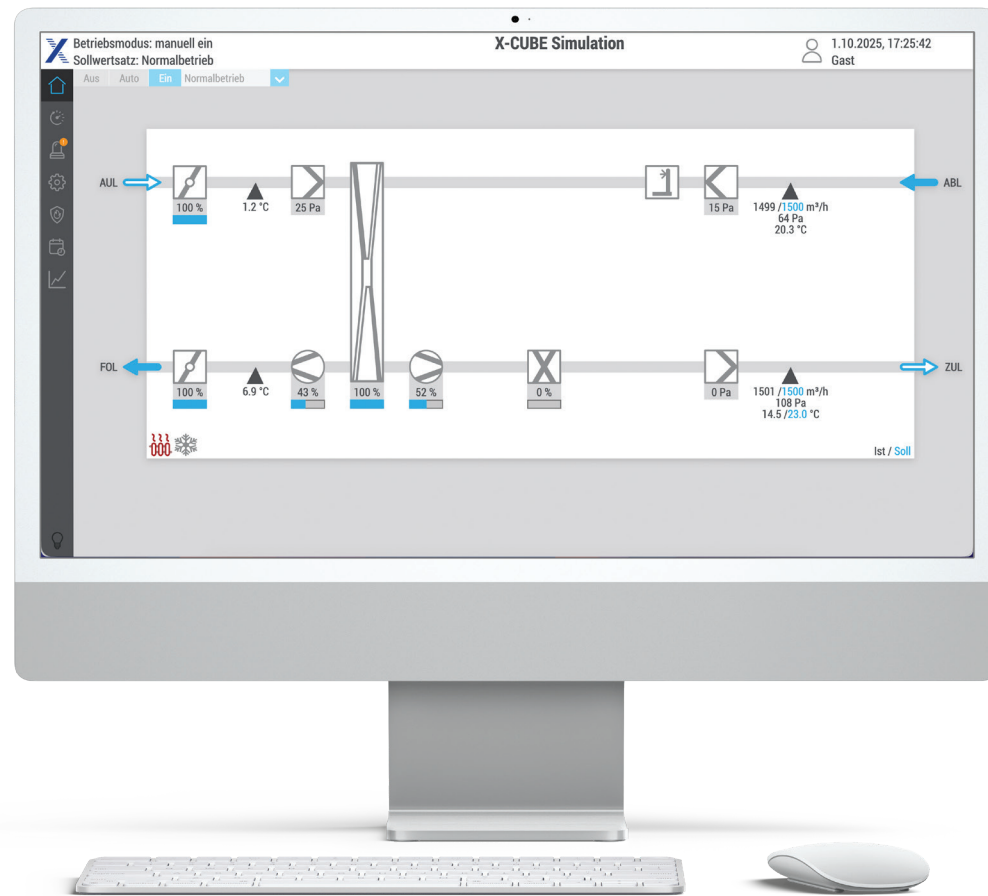
**Refurbishment & old buildings:**  
Separate installation of supply and exhaust air systems



**Hospitals & laboratories:**  
Hygienic RAC solutions for sensitive zones



**Industry & food products:**  
No air transfer – maximum operational safety



## X-CUBE CONTROL – INTELLIGENT CONTROL FOR THE HIGHEST DEMANDS

The modular X-CUBE control system is the smart centrepiece of the X-CUBE. It not only controls all air parameters precisely, but also fully integrates hydraulic systems and components. This allows all climatic processes in the appliance to be precisely controlled, from heating and cooling to humidification and dehumidification. Modern MCR technologies are used, which are not only designed for energy efficiency, but also for maximum operational safety.

Hot water or electric heating coils as well as adiabatic or mechanical cooling are available. Heat recovery takes place via plate or rotary heat exchangers. Functions such as summer/winter compensation or free night purge complete the comfort profile.



Marienhospital Osnabrück

### INTELLIGENT AIR QUALITY CONTROL:

- > Permanent monitoring of CO<sub>2</sub>, VOC, humidity, temperature and differential pressure values by the system
- > Dynamic, demand-based control (stepped or infinitely variable) of EC or AC fans, volume flow, pressure and air dampers
- > Integrated system for filter monitoring using differential pressure sensors for timely maintenance and prevention of energy losses

### SEAMLESS INTEGRATION INTO THE BUILDING MANAGEMENT SYSTEM:

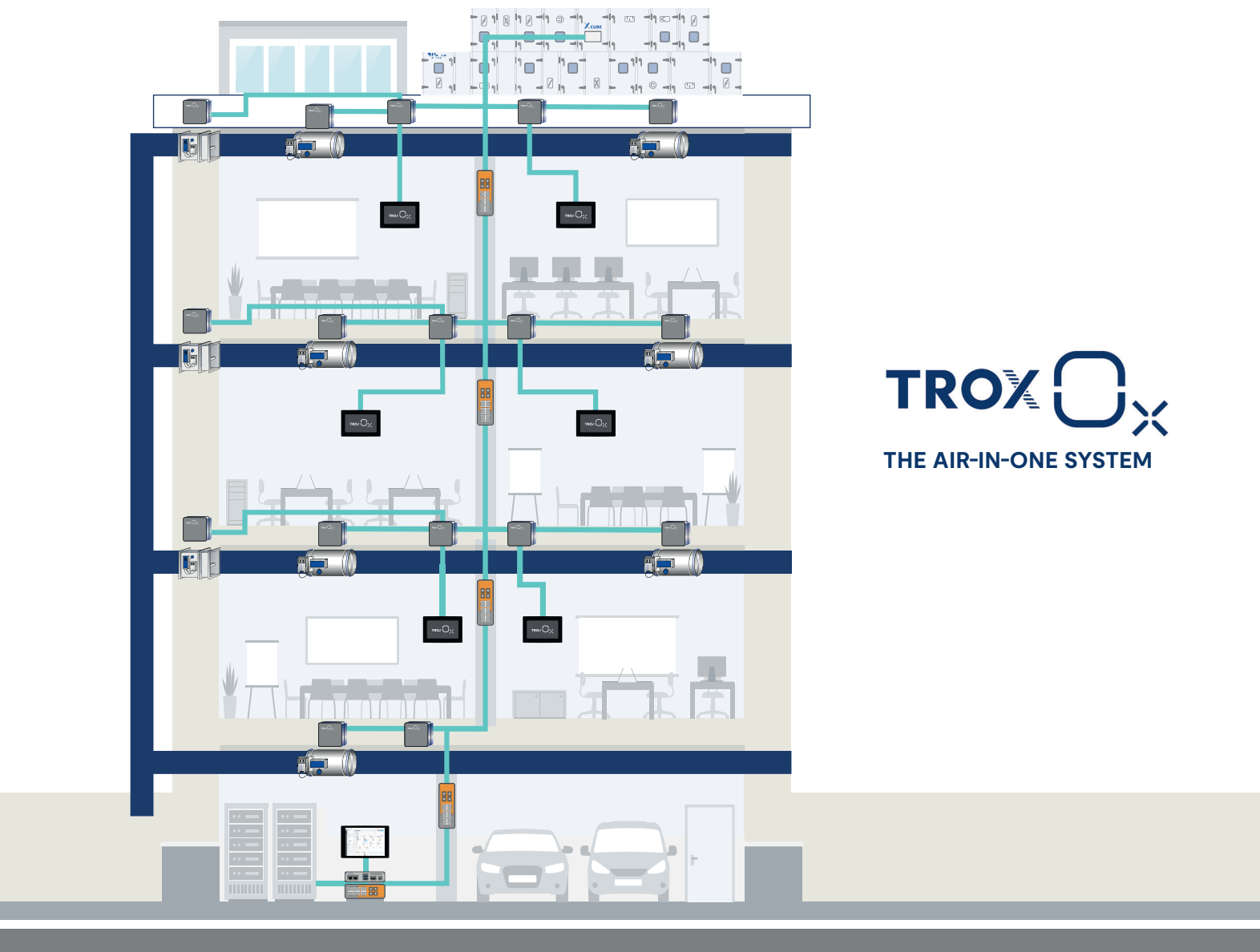
- > X-CUBE control can be easily integrated into any standard BMS (MCE) thanks to open protocols such as BACnet IP or Modbus TCP/IP
- > All TROX components can be controlled centrally and are operated via web access or touch panel
- > Quick installation, hygienically designed

### PLUG-AND-PLAY INSTALLATION:

- > Plug-and-play architecture with clearly structured cable duct and factory pre-wiring
- > Components designed in accordance with hygiene requirements as per VDI 6022
- > Simplified cable connection thanks to M8/M12 plug connection at each device division point

### FUTURE-PROOF DOWN TO THE LAST DETAIL:

- > Designed for future expansion with retrofittable inputs and outputs and modular sensor/actuator modules based on industrial PLCs
- > Transparent monitoring for maximised system efficiency
- > Complete device documentation available at any time and anywhere via QR code



**TROX Ox**  
THE AIR-IN-ONE SYSTEM

# TROX Ox – THE AIR-IN-ONE SYSTEM

The TROX Ox software platform makes air management easier than ever. All system components are optimally harmonised, networkable and easy to control. Whether as a flexible integration into existing management and operating equipment (MCE) or as a stand-alone solution for buildings without an existing system, TROX Ox offers maximum flexibility. The X-CUBE control system can be connected directly to TROX Ox. The system can be easily integrated into a higher-level MCE via BACnet IP, thus enabling a secure and future-proof connection. The result: more transparency, greater efficiency and new standards in modern building management.

For more information: [www.trox.de/troxox](http://www.trox.de/troxox)

## OUR SERVICES FOR YOU

### CONSULTANCY FOR YOUR SYSTEM DESIGN

You receive everything from a single source: expert advice on the custom design of your ventilation system, including air outlets and a suitable fire protection solution. Simulations also provide precise data for analysing and optimising the flow behaviour.

### LIFECYCLE COST CALCULATIONS

Lifecycle cost calculations provide a solid basis for informed decision-making in your project. They allow you to see which solution offers you the ideal cost-benefit ratio as early as the design stage.

#### How your individual LCC calculation is performed:

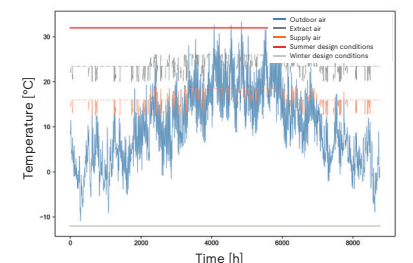
- > Use of location-specific weather data for realistic calculations
- > Inclusion of project-specific economic parameters
- > Automatically generated data sheet with all relevant key figures
- > Clearly visualised energy consumption and operating costs
- > Display of local climate data including information on heating, cooling and humidification
- > Reliable results, validated and tested by RWTH Aachen University

### FACTORY ACCEPTANCE TESTS

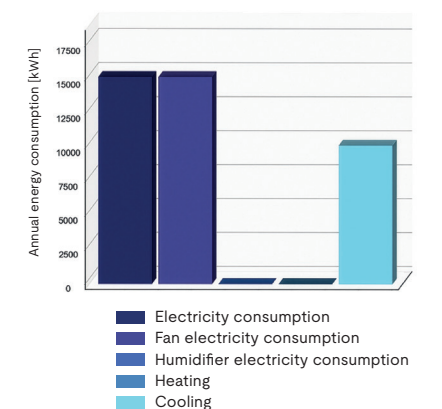
With the optional factory performance test, you can follow the performance test of your ordered X-CUBE live. You can see how your system is tested and discover for yourself its quality and reliability.

#### The following parameters are checked as part of the test:

- > Volume flows and differential pressures
- > Electrical power consumption
- > Sound power at the duct connections
- > Housing leakage class according to VDI guidelines



Outdoor air, supply air and extract air temperature progression diagram taking Berlin as an example



ARE YOU  
PLANNING  
A NEW  
PROJECT?  
*IN US, YOU HAVE  
A PARTNER BY  
YOUR SIDE.*



Icon Vienna  
<https://www.trox.de/referenzen/iconvienna>

CONTACT  
US



Veltins brewery  
<https://www.trox.de/referenzen/veltins>



ISIS Laboratory Strasbourg  
<https://www.trox.de/referenzen/ISISLabor>

**TROX**

**TROX SE**  
Heinrich-Trox-Platz  
47506 Neukirchen-Vluyn  
Tel. +49 2845 202-0

[www.troxgroup.com](http://www.troxgroup.com)