



Run around coil system for efficient heat recovery



The TROX run around coil system

Hygienic, safe, efficient

Run around coil systems (RAC) are regenerative heat recovery systems in which the airflows are completely separated from one another. As a result, they are suitable for applications in which no leakages between the supply and extract air are desired or permitted for hygienic reasons: for example in hospitals as well as in the food and pharmaceutical industries. They are also used if supply and extract air units are set up separately from one another due to the layout situation.

A run around coil system consists of at least one heat exchanger in the supply and extract airflow which are connected to one another by a hydraulic circuit. The heat transfer fluid is usually a mix of glycol and water.

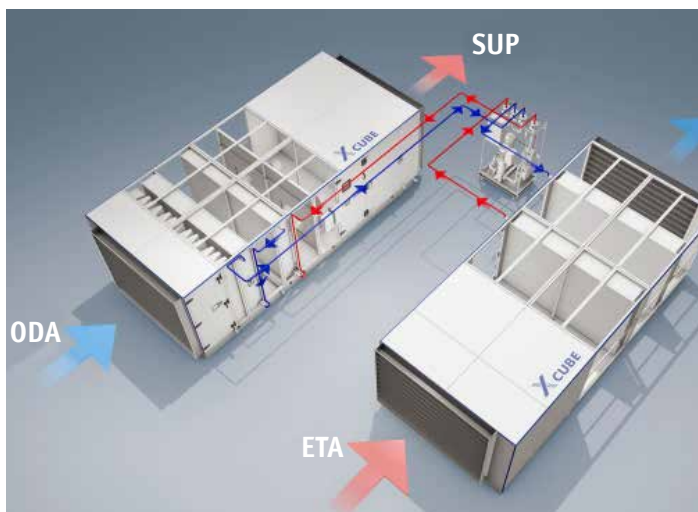
Investment with a future – up to 80% heat recovery

The Ecodesign Directive prescribes that from 2018 onwards, air handling units must offer a heat recovery efficiency of more than 73%, and RAC systems more than 68%. A run around coil system from TROX with a TROX hydraulic unit including special RAC control guarantees highly efficient heat recovery. Heat recovery efficiencies of up to 80% can be achieved with this system.

To achieve this energy efficiency, several heat exchangers with a special internal counterflow system in the airflow are connected in series. The hydraulic circuit is connected in the opposite direction to the airflow so as to generate a consistent temperature profile between the air and the exchanger operating fluid.

System expertise from TROX

TROX has optimally adapted the hydraulic unit to the TROX X-CUBE using tried-and-tested system expertise. The entire system offers convincing efficiency and extensive functions.



The advantages at a glance

Reliable data by certified design software

The X-CUBE Configurator sales tool has been certified by the Association of Air Handling Unit Manufacturers for configuration of RAC systems as well. The calculation software has been specially developed in-house at TROX. Planners and system owners will receive precise and reliable figures for their planning within a very short time.



High energy efficiency

The TROX X-CUBE and TROX hydraulic unit have been consistently designed for energy efficiency. Low life-cycle costs are made possible by the design principle, insulation, leak-tightness, heat recovery, energy-efficient actuators and the intelligent control engineering.



Intelligent control engineering

The innovative control engineering from TROX networks all components and units into one intelligent overall system for maximum safety and energy efficiency.



Made in Germany

Using the latest production technology in the plant built specially for the X-CUBE in Anholt, TROX guarantees the best quality and short delivery lead times. Needless to say TROX implements the relevant industry standards and has all its components and processes certified.



High degree of flexibility

The TROX hydraulic unit is available with three casing variants:

- Open frame
- Closed casing
- Weatherproof construction variant



Easy installation

The X-CUBE and the hydraulic unit are delivered pre-assembled and ready to operate.



Intuitive operation

Hydraulic units can be easily and conveniently controlled and checked using operating terminals on the units as well as via a web browser. Virtually all status information is available at a glance.

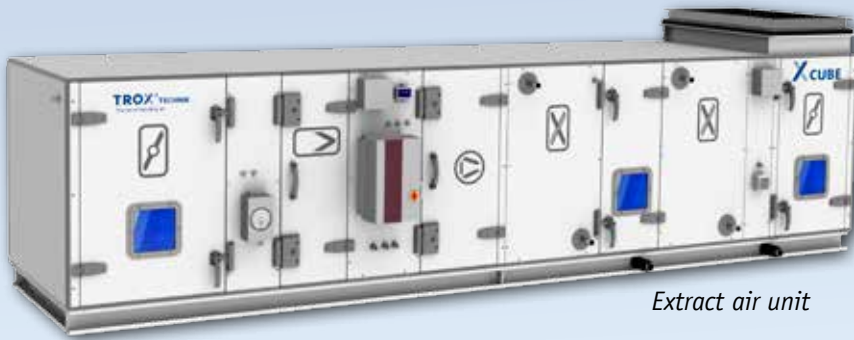


Seamless integration with modern building management systems

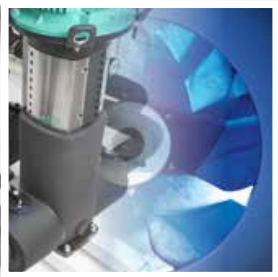
Hydraulic units can be integrated into modern instrumentation and control systems by means of Modbus TCP/IP and BacNet IP, or conventional analogue signals.



The perfect overall system



Extract air unit



Optimum flow rate relationship

The TROX hydraulic unit continuously balances the exchanger operating fluid flow rate with the air flow rate, and adapts them optimally. This guarantees high energy efficiency in all operating statuses.



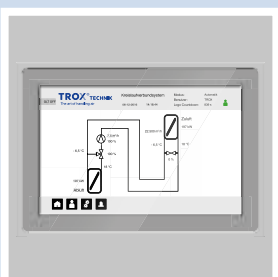
High operational reliability

Pressure monitors with two switching points, a membrane expansion vessel and an 8 bar safety valve in the TROX hydraulic unit ensure high operational reliability.



State-of-the-art technology

- High-pressure multistage centrifugal pumps with IE4 motors
- High-quality stainless steel press-fit system up to nominal width 65 mm
- From nominal width 65 mm onwards, by coupling system with removable connections
- Optional thermal insulation of the pipelines



Plausibility checks for greater efficiency

The TROX hydraulic unit monitors all internal temperatures to detect all non-economical operating parameters and report them.

Optional cold and heat feed

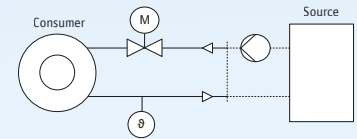
A RAC system creates a closed hydraulic circuit, which means it is possible to feed additional heating or cooling capacity into the system. This option makes the air handling unit more compact, and eliminates the air-side pressure loss from cooling coils or heating coils. Depending on the building's requirement, the feed capacity can be controlled by various hydraulic circuits.



Flexible feed control

■ Throttle circuit

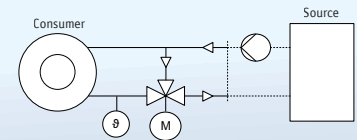
E.g. for systems with condensing boilers or district heating connection



Throttle circuit

■ Diverting circuit

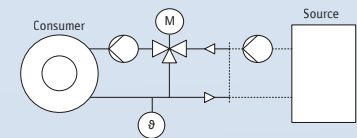
For a variable flow rate in the consumer circuit and a constant flow rate and pressure in the source circuit
– not suitable for district heating connections



Diverting circuit

■ Mixing circuit

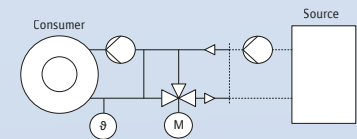
E.g. for constant flow through the consumer circuit and variable flow through the source circuit



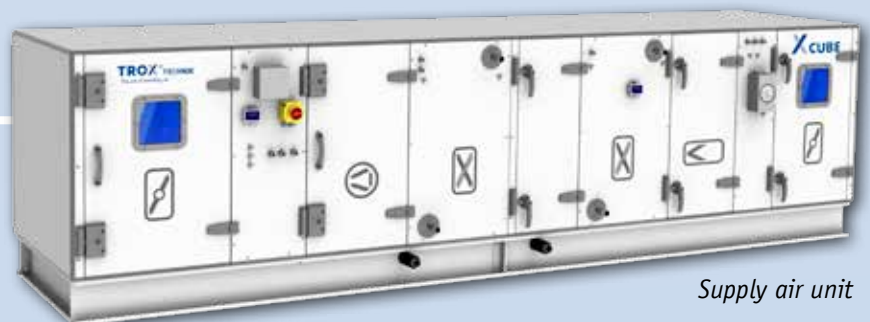
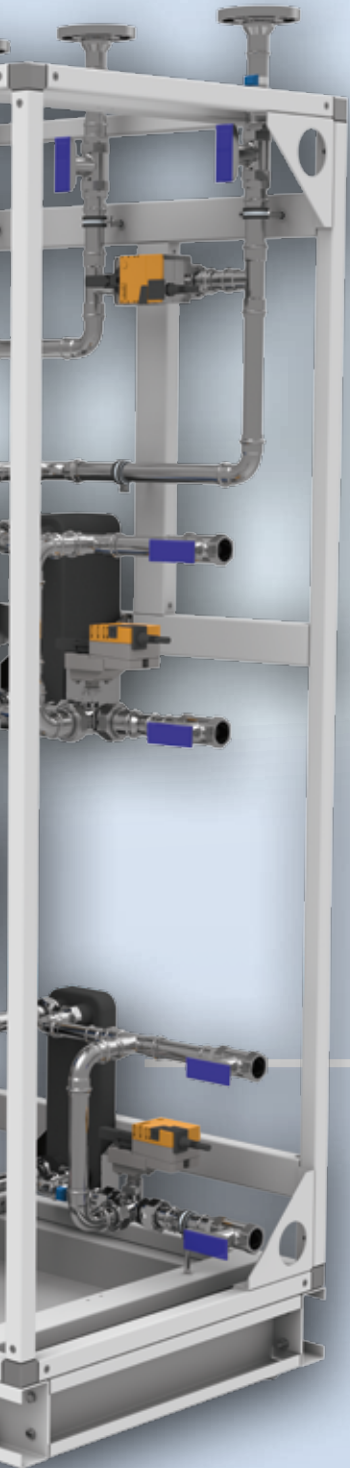
Mixing circuit

■ Injection circuit

- Optimum control response
- Temperature control via availability of mixed flow through the consumer circuit at all times
- Not suitable for district heating connections



Injection circuit

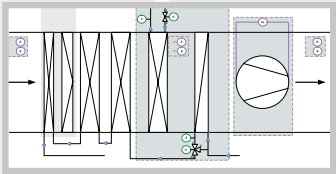
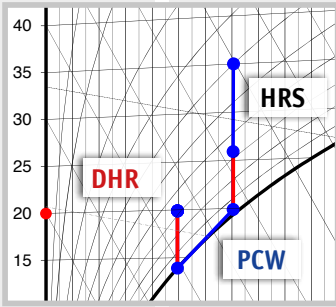


Supply air unit

Suitable for all requirements

Dehumidification recovery

By using dehumidification recovery (referred to as: DHR), it is possible to reduce mechanical cooling for dehumidification of the outside air, e.g. for laboratories, clean rooms and the like. At the same time, this arrangement means there is no need for subsequent heating using conventional heating technology. A cooling coil (PCW) in the supply air unit dehumidifies the warm, moist outside air. The downstream heat exchanger integrated in the RAC system provides subsequent heating of the dehumidified air to bring it to nominal temperature. The heat recovered from the extract air is used for this.



The operating fluid cooled by an integral heat exchanger in the hydraulic circuit is supplied to a further heat exchanger located upstream of the dehumidifying cooling coil in the airflow direction. This heat exchanger provides pre-cooling of the warm outside air, thereby reducing the mechanical cooling capacity that has to be supplied from outside the system.

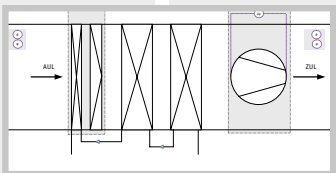
Indirect adiabatic cooling

An adiabatic humidifier can be installed in the extract airflow to save the need for mechanical cooling capacity in summer. It cools the extract air by adiabatic humidification. The modification takes place until the air is approaching saturation point. The cooled air absorbs the heat from the glycol mixture in the RAC, thereby cooling it down. In turn, the cooled operating fluid is used for pre-cooling of the warm outside air.



Preheating/filter

If the outside air is moist, for example on foggy days, water can collect in the outside air filter and represent an optimum growth medium for bacteria and mould. Filter preheating can be installed in the RAC to prevent this happening. An additional heat exchanger before the first filter stage heats the outside air by 3 - 5 K which prevents moisture penetration by reducing the relative outside humidity. The heat exchanger is built to enable it to be cleaned effectively.



Twin pump

Two pumps can be installed in parallel to increase the operational reliability or efficiency in part-load mode. 100% redundancy is also possible, as is continuous parallel operation.



Temperature control

If necessary, the RAC unit can take over the entire temperature control function in the air handling unit. Corresponding sensors are arranged in the air handling unit for this purpose.



Volume flow rate measurement

Active pressure registration of the fan enables the volume flow rate of the air handling unit to be calculated.

Diagram with dehumidification recovery

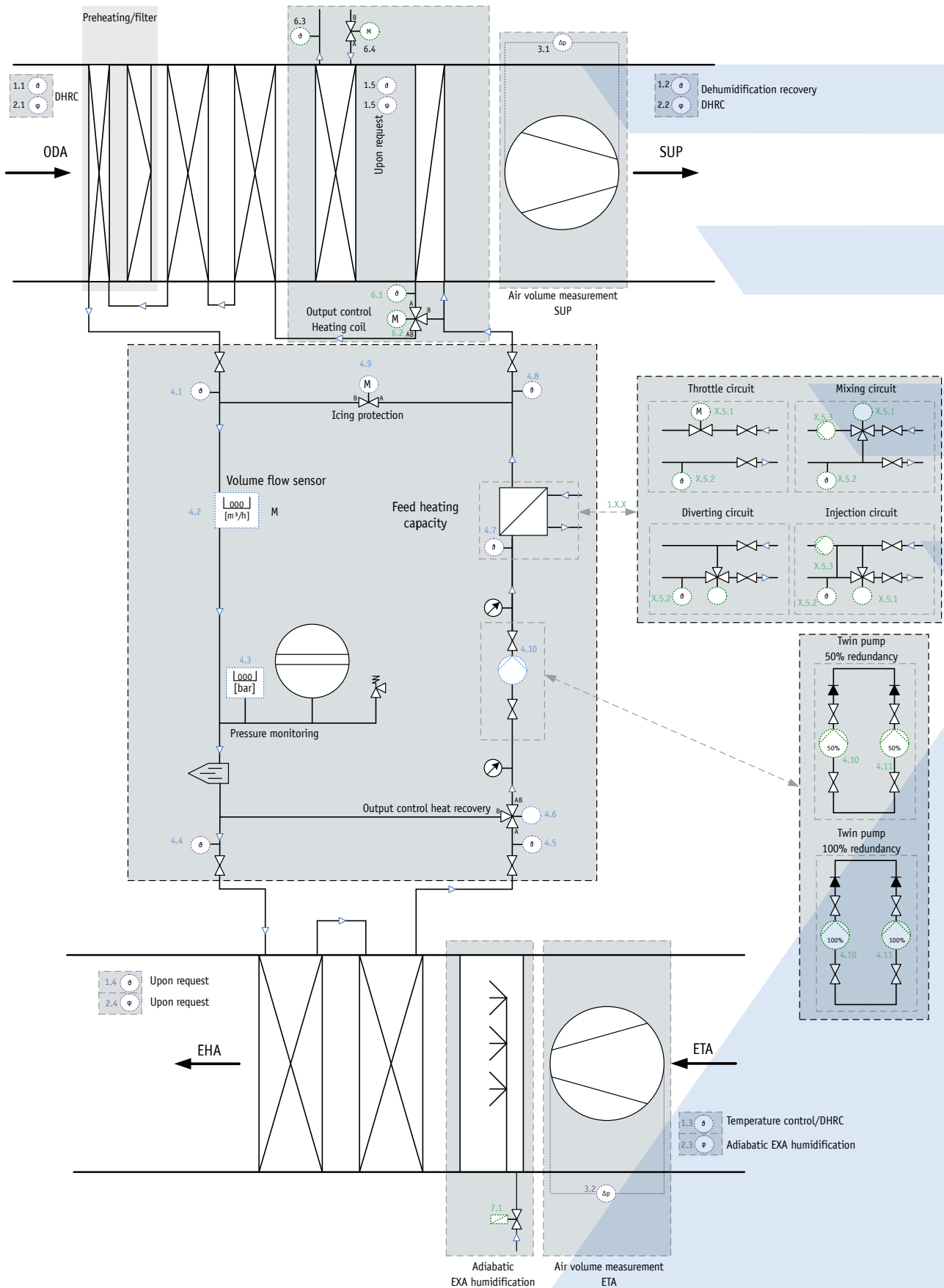
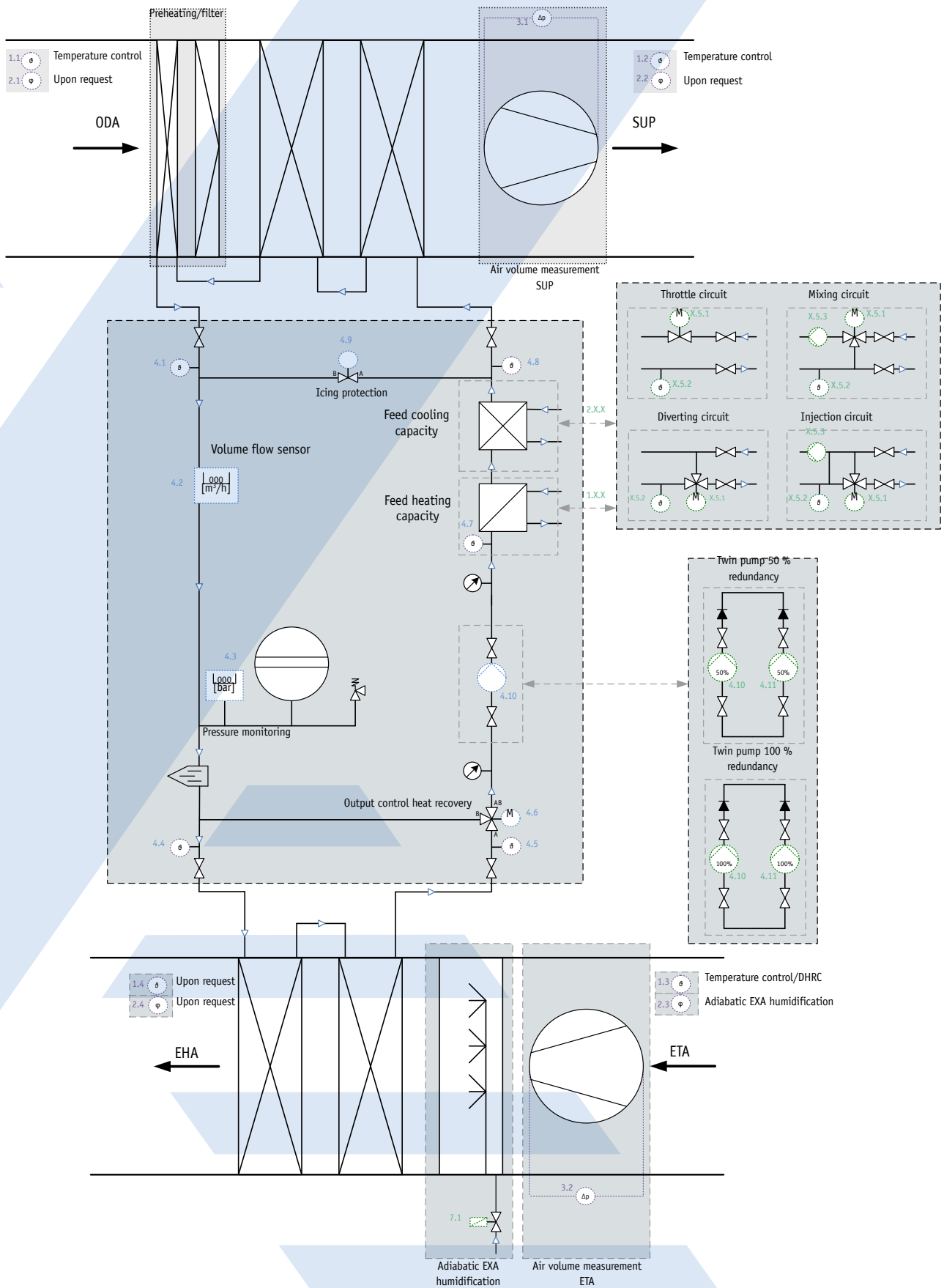


Diagram with heating and cooling feed



X-CUBE Run around coil systems in operation

University Hospital, Heidelberg, Germany



Henninger Turm, Frankfurt, Germany



Hospital, Augsburg, Germany



Inselhalle (Reception hall), Lindau, Germany



Novatic Color Company, Dresden, Germany



TROX[®] TECHNIK

The art of handling air

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