



# Decentralised ventilation unit

## SCHOOLAIR-B



Read the instructions prior to performing any task!

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## General information

### About this manual

This operating and installation manual enables operating or service personnel to correctly install the ventilation unit and to use it safely and efficiently.

This operating and installation manual is intended for use by fitting and installation companies, in-house technicians, technical staff, properly trained persons, and qualified electricians or air conditioning technicians.

It is essential that these individuals read and fully understand this manual before starting any work. The basic prerequisite for safe working is to comply with the safety notes and all instructions in this manual.

The local regulations for health and safety at work and the general safety regulations for the area of application of the ventilation unit also apply.

This manual must be given to the system owner when handing over the system. The system owner must include the manual with the system documentation. The manual must be kept in a place that is accessible at all times.

Illustrations in this manual are mainly for information and may differ from the actual design.

### Other applicable documentation

- FSL-CONTROL II installation and configuration manual (for units with FSL-CONTROL II control system)
- Project-specific documents (if any)

### TROX Technical Service

To ensure that your request is processed as quickly as possible, please keep the following information ready:

- Product name
- TROX order number
- Delivery date
- Brief description of the fault

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The information in this manual has been compiled with reference to the applicable standards and guidelines, the state of the art, and our expertise and experience of many years.

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- Incorrect use
- Operation or handling by untrained individuals
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- Technical changes
- Use of non-approved replacement parts

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# 1 Ventilation unit overview

## Components of the ventilation unit

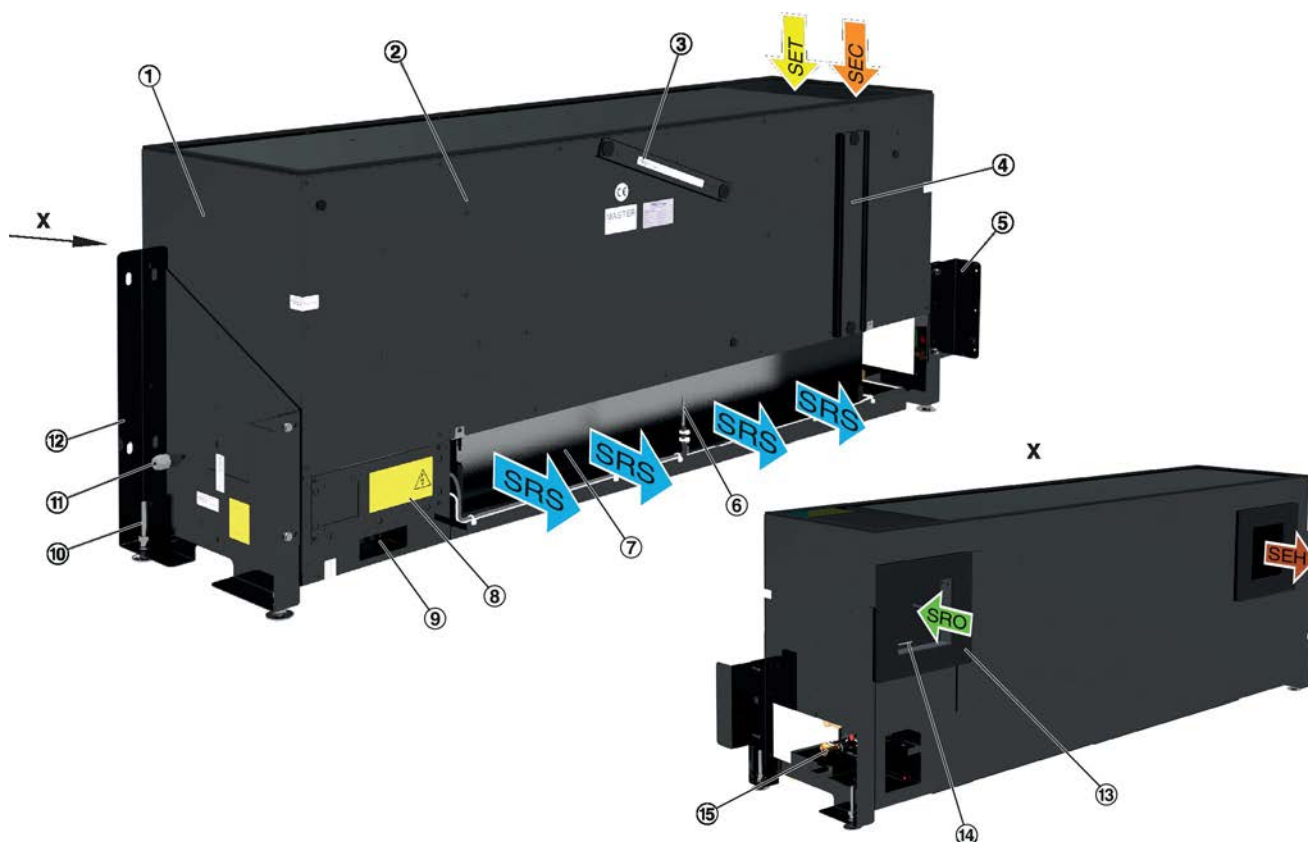


Fig. 1: SCHOOLAIR-B ventilation unit

- |  |   |
|--|---|
| ① Casing   | ⑪ Cable glands                            |
| ② Cover plate                                    | ⑫ Fixing brackets                         |
| ③ Cover of G3 coarse dust filter chamber         | ⑬ Seal                                    |
| ④ Cover of F7 fine dust filter chamber           | ⑭ Fresh air temperature sensor (optional) |
| ⑤ Fixing bracket for the outer casing (optional) | ⑮ Water connections                       |
| ⑥ Supply air temperature sensor (optional)       | SEH Single room exhaust air               |
| ⑦ Heat exchanger                                 | SET Single room extract air               |
| ⑧ Controls access panel                          | SRO Single room outdoor air               |
| ⑨ Network connections                            | SRS Single room supply air                |
| ⑩ Levelling feet                                 | SEC Secondary air (optional)              |

## Schematic illustration of the airflows

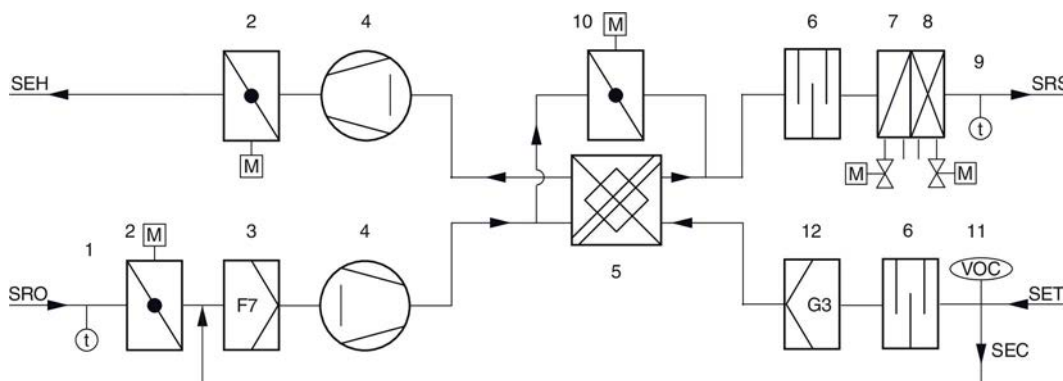


Fig. 2: Ventilation diagram Schoolair-B

- |   |   |     |                             |
|---|---|-----|-----------------------------|
| 1 | Outdoor air temperature sensor (optional)                   | 10  | Bypass damper with actuator |
| 2 | Shut-off damper with actuator (exhaust air and outdoor air) | 11  | VOC sensor (optional)       |
| 3 | Fine dust filter  | 12  | G3 coarse dust filter       |
| 4 | Fan (supply air and extract air)                            | SEH | Single room exhaust air     |
| 5 | Recuperative heat exchanger                                 | SET | Single room extract air     |
| 6 | Sound attenuator  | SRO | Single room outdoor air     |
| 7 | Heating coil (optional)                                     | SRS | Single room supply air      |
| 8 | Cooling coil (optional)                                     | SEC | Secondary air (optional)    |
| 9 | Supply air temperature sensor (optional)                    |     |                             |

### Functional description

Decentralised supply and extract air units for room ventilation and for dissipating cooling loads and heat loads.

An EC centrifugal fan draws in the outdoor air which then passes through the motorised shut-off damper and the F7 filter. The air then flows through the recuperative heat exchanger, which can be bypassed to protect the unit and if it is more energy efficient.

If necessary, the air is heated or cooled by the heat exchanger before it is discharged to the room as a displacement flow (for 4-pipe systems this is optional).

The extract air first passes a G3 filter, then flows through the recuperative heat exchanger, the extract air fan and the motorised shut-off damper before it is discharged to the outside as exhaust air.

If the room air quality is sufficient, FSL-CONTROL II closes the outdoor air dampers and changes to secondary air operation, which is more energy efficient in any case.

The control system compares the room air quality set-point value to the actual value measured by the VOC sensor and switches automatically between outdoor air and secondary air operation.

If the power fails, the outdoor air and exhaust air dampers are closed to ensure fire protection and frost protection and to avoid draughts. This is ensured by a capacitor in each actuator.

## 2 Safety

### 2.1 Symbols used in this manual

#### Safety notes

Symbols are used in this manual to alert readers to areas of potential hazard. Signal words express the degree of the hazard.

Comply with all safety instructions and proceed carefully to avoid accidents, injuries and damage to property.

#### **DANGER!**

Imminently hazardous situation which, if not avoided, will result in death or serious injury.

#### **WARNING!**

Potentially hazardous situation which, if not avoided, may result in death or serious injury.

#### **CAUTION!**

Potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

#### **NOTICE!**

Potentially hazardous situation which, if not avoided, may result in property damage.

#### **ENVIRONMENT!**

Environmental pollution hazard.

#### Safety notes as part of instructions

Safety notes may refer to individual instructions. In this case, safety notes will be included in the instructions and hence facilitate following the instructions. The above listed signal words will be used.

Example:

1. ▶ Untighten the screw.

2. ▶

 **CAUTION!**  
**Danger of finger entrapment when closing the lid.**

Be careful when closing the lid.

3. ▶ Tighten the screw.





#### Tips and recommendations



*Useful tips and recommendations as well as information for efficient and fault-free operation.*

#### Additional markers

In order to highlight instructions, results, lists, references and other elements, the following markers are used in this manual:

Marker	Explanation
 1., 2., 3. ...	Step-by-step instructions
	Results of actions
	References to sections in this manual and to other applicable documents
	Lists without a defined sequence
[Switch]	Operating elements (e.g. push buttons, switches), display elements (e.g. LEDs)
'Display'	Screen elements (e.g. buttons or menus)

### 2.2 Correct use

Decentralised ventilation units are used for the air conditioning of rooms such as classrooms.

Functions of the ventilation unit Schoolair-B:

- Ventilation
- Outdoor air filtering
- Heating and/or cooling (optional)

The ventilation unit is designed for frost-proof installation in buildings, on the inside of an external wall. The unit has to be properly installed on the external wall (by others).

Correct use also involves complying with all the information provided in this manual.

Any use that goes beyond the correct use or any different use of the unit is regarded as incorrect use.

## Incorrect use

### **WARNING!**

#### **Danger due to incorrect use!**

Incorrect use of the unit can lead to dangerous situations.

Incorrect use includes:

- Any use that is not described in this operating manual
- Operation that does not comply with the technical data
- Modifying of the unit by others, tampering with the unit
- Use, installation, operation, maintenance or repair other than described in this manual
- Having work carried out by unqualified individuals
- Use of non-genuine replacement parts or accessories, whose quality and function are not equivalent to those of the original parts
- Operation in rooms with explosive gases or gas mixtures
- Operation in rooms where the supply or extract air contains particles that are conductive, aggressive, corrosive, combustible or hazardous to health
- Operation in rooms where the humidity is permanently high (> 90 %)
- Operation outdoors
- Use for enforced ventilation
- Operation without air filters

## 2.3 Safety signs

The following symbols and signs are found on the unit. They apply to the very location where they are found.

### Electrical voltage



Hazardous electrical voltage that is present in the ventilation unit. Only skilled qualified electricians are allowed to work on parts of the ventilation unit marked with this symbol. Such work must be carried out only by skilled qualified electricians or the technical service.

## Controls access panel



Only skilled qualified electricians are allowed to open the controls access panel. Ensure that no voltage is present on any mains circuit before you open the cover to access the terminal connections.

## 2.4 Electric shock hazard

### Electric current

#### **DANGER!**

#### **Danger of death due to electric current!**

Danger of electric shock! Do not touch any live components! Damaged insulation or damaged parts are a life threatening hazard.

- Only a skilled qualified electrician must work on the electrical systems.
- If the insulation is damaged, disconnect the power supply immediately and have the insulation repaired.
- Switch off the power supply before you carry out maintenance or cleaning.
- Ensure that live parts do not come into contact with moisture. Moisture can cause a short circuit.

## 2.5 Risks from rotating parts

### Rotating parts

#### **WARNING!**

#### **Risk of injury from rotating parts!**

Rotating parts in the fan can cause severe injuries.

- Switch off the power supply before you carry out maintenance or cleaning.
- The fan does not stop immediately! Check that no parts are moving once you have opened the ventilation unit.
- Do not reach into the moving fan.
- Do not open the ventilation unit while the fan is in operation.



## 2.6 Health risks due to hygiene issues

### Hygiene issues

#### CAUTION!

##### Health risk due to hygiene issues.

When the unit is not used for several weeks, bacteria and germs may start growing in the air filter and in the recuperative heat exchanger.

- Change the air filters and clean the recuperative heat exchanger after lengthy idle periods.
- Change filters and clean the recuperative heat exchanger at the recommended intervals.

## 2.7 Risks caused by an unsuitable installation location

### Unsuitable installation location

#### WARNING!

##### Risks caused by an unsuitable installation location!

Installing the unit in an unsuitable location can lead to dangerous situations.

- The ventilation unit should preferably be installed in a thermally insulated, low-leakage building.
- Frost free and dry installation location.
- Install the optional outer casing or use other means (by others) to protect the unit from being tampered with by unauthorised individuals.
- The unit must remain accessible for maintenance and cleaning.

## 2.8 Qualified staff

### Qualification

The work described in this manual has to be carried out by individuals with the qualification, training, knowledge and experience described below:

#### Facility manager

Facility managers are trained individuals who understand any potential hazards related to the work under consideration, and who recognise and avoid any risks involved. Facility managers must not carry out any jobs beyond regular operation unless explicitly stated in this manual and unless the system owner has specifically agreed to them. Training to a facility manager is provided by the HVAC contractor when the system is handed over.

A facility manager's tasks include cleaning the unit, performing functional tests and regular checks, and carrying out maintenance and adjustment work.

#### HVAC technician

HVAC technicians are individuals who have sufficient professional or technical training in the field they are working in to enable them to carry out their assigned duties at the level of responsibility allocated to them and in compliance with the relevant guidelines, safety regulations and instructions. HVAC technicians are individuals who have in-depth knowledge and skills related to HVAC systems; they are also responsible for the professional completion of the work under consideration.

HVAC technicians are individuals who have sufficient professional or technical training, knowledge and actual experience to enable them to work on HVAC systems, understand any potential hazards related to the work under consideration, and recognise and avoid any risks involved.

#### Network administrator

Network administrators design, install, configure and maintain the IT infrastructure in companies or organisations.

#### Skilled qualified electrician

Skilled qualified electricians are individuals who have sufficient professional or technical training, knowledge and actual experience to enable them to work on electrical systems, understand any potential hazards related to the work under consideration, and recognise and avoid any risks involved.

Any work has to be carried out by individuals who can be expected to carry out their assigned duties reliably. Individuals whose reaction time is delayed due to alcohol, drugs or other medication must not carry out any work.

### 2.8.1 Personal protective equipment

Personal protective equipment is equipment that protects the user against health or safety risks at work.

Personal protective equipment must be worn for various types of work; the protective equipment required is listed in this manual together with the description of each type of work.

#### Description of personal protective equipment

##### Industrial safety helmet



Industrial safety helmets protect the head from falling objects, suspended loads, and the effects of striking the head against stationary objects.

## Protective gloves



Protective gloves protect hands from friction, abrasions, punctures, deep cuts, and direct contact with hot surfaces.

## Safety shoes



Safety shoes protect the feet from crushing, falling parts and prevent slipping on a slippery floor.

### 3 Transport and storage

#### Checking delivered goods

Check delivered items immediately after arrival for transport damage and completeness.

If there is any visible damage, proceed as follows:

- Either do not accept the delivered items, or accept them with reservations.
- Note down the damage on the shipping documents or on the shipping company's delivery note.
- Immediately file a complaint with the shipping company and vendor.



*File a complaint as soon as you detect any damage. Claims for compensation can be filed only within the complaint period.*

#### Transport

##### CAUTION!

**Danger of injury from sharp edges, sharp corners and thin sheet metal parts!**

Sharp edges, sharp corners and thin sheet metal parts may cause cuts or grazes.

- Be careful when carrying out any work.
  - Wear protective gloves, safety shoes and a hard hat.
- If possible, take the module in its transport packaging up to the installation location.
  - Use only lifting and transport gear designed for the required load.
  - Always secure the load against tipping and falling.
  - Do not move bulky items just by yourself. Get help to prevent injuries and damage.

#### Storage

Please note:

- Store the unit only in its original packaging
- Protect the unit from the effects of weather
- Protect the unit from humidity, dust and contamination
- Storage temperature: -10 °C to 50 °C.
- Relative humidity: 95 % max., no condensation

#### Packaging

Properly dispose of packaging material.

## 4 Installation

### 4.1 General installation information

#### Before installation

Before you install the unit, take suitable precautions to protect air distribution components from contamination during installation ⇒ VDI 6022.

If this is not possible, at least cover the unit or take other precautions to protect it from contamination. In this case you have to ensure that the unit cannot be started.

Ensure that all components are clean before you install them. If necessary, clean them thoroughly. If you have to interrupt the installation procedure, protect all openings from the ingress of dust or moisture.

#### Installation information

- Install the ventilation unit preferably in a thermally insulated, low-leakage building.
- Frost free and dry installation location.
- Installation and connections to be performed by others; fixing, connection and sealing material to be provided by others
- Install the unit only on structural elements that can carry the load of the unit.
- Use only certified fixing systems.
- The room facing side of the unit must remain completely accessible for maintenance and cleaning.

#### Air connection

Two openings in the façade are required, one for outdoor air and one for exhaust air. The ventilation unit is to be sealed to the external wall with a factory fitted closed cell perimeter seal. The surfaces onto which the outdoor air and exhaust air openings are sealed must be even. Ensure that the unit is correctly sealed to the wall.

The outdoor air and exhaust air openings have to be protected against the effects of weather (by others).

Secondary air units are not to be connected to the façade.

### 4.2 Installing the ventilation unit

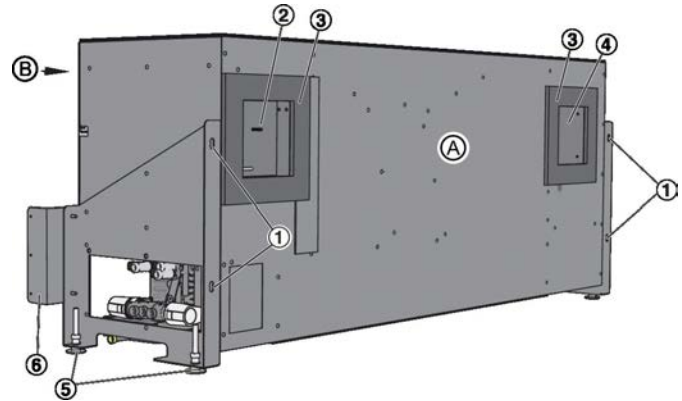


Fig. 3: Installation

- Ⓐ Side facing the wall
- Ⓑ Side facing the room
- ① Fixing holes (for fixing the unit to an external wall)
- ② Outdoor air connection
- ③ Seal, 50 x 10 mm (wall side)
- ④ Exhaust air connection
- ⑤ Levelling feet
- ⑥ Fixing bracket for the outer casing (both sides)

#### Personnel:

- HVAC technician

The ventilation unit is to be installed and fixed on the inside of an external wall, floor-standing. Façade openings for outdoor air and exhaust air are required (see approval drawing). Screws and wallplugs for fixing the ventilation unit are not included in the supply package, but have to be selected by others and fit for the wall.

Install the unit in such a way that it rests completely on its feet. Use the fixing points only as an additional means of securing the unit against tipping.

Make sure that the unit can be connected to the pipe-work and to the mains supply.

1. ▶ Place the unit in such a way that the wall side (Fig. 3/A) faces the wall. The openings for the air (Fig. 3/2 and Fig. 3/4) must be aligned with the prepared openings in the external wall; adjust the feet if necessary.
2. ▶ Use suitable screws ( $\varnothing$  6 mm) for the provided fixing holes (Fig. 3/1) to fix the unit to the external wall.
3. ▶ Adjust the feet (Fig. 3/5), then tighten the nuts.
4. ▶ Protect the ventilation unit with the optional outer casing or by an other outer casing provided by others. Screw-fix the two fixing brackets (Fig. 3/6) to the outer casing.

The outer casing must prevent unauthorised individuals from reaching into the unit and from being injured (e.g. by electric shock). Make sure that the air can circulate around the unit even with the outer casing.

The interior of the ventilation unit must remain accessible for maintenance.

**! NOTICE!**

**Contamination**

If there is a lengthy gap between installation and commissioning of the unit, we recommend the following measures in order to avoid cumbersome cleaning procedures at the time of commissioning.

- Cover all openings of the unit, e.g. with plastic foil, to prevent the ingress of dust.
- Remove the filters and store them in a dry place, protected from dust; cover the filter openings.
- Switch off the power supply to the unit.

## 4.3 Connecting the water pipes

### Personnel:

- HVAC technician

### Protective equipment:

- Industrial safety helmet
- Safety shoes
- Protective gloves

### General information

- Using flexible hoses (accessories) instead of rigid water pipes to connect the heat exchanger will make it easier to clean the heat exchanger.
- Components such as valves and lockshields are factory fitted but you will have to tighten them at the time of installation.
- Control valves are fitted in the return pipe, lockshields in the flow pipe; this improves the control behaviour.
- Units with a condensate drip tray (optional) require a drainage pipe and a drain trap (by others).
- Control valves, gate valves and safety valves are required; if they are not part of the supply package, they have to be provided by others.
- Drain valves and vent valves are required; if they are not part of the supply package, they have to be provided by others.
- As a last step, check all connections to make sure they do not leak.
- We recommend insulating the pipes in order to prevent energy losses.

### ! NOTICE!

#### Temperatures below the dew point

Temperatures below the dew point should be avoided as they lead to condensation which may cause damage to the building structure.

Interfaces	Dimensions	Connection options:
Chilled water/hot water connection	G 1/2" union nut and flat seal, SW24	Screw connection (rigid) Flexible hoses (accessory)
Condensate drain (optional)	Spigot Ø12 mm	Hose (by others)

### Marking of 2-pipe heat exchangers

Symbol	Connection	Type of valve <sup>1</sup>	Operating mode
V (blue)	Chilled water or hot water flow	Lockshield	Cooling or heating <sup>2</sup>
R (blue)	Chilled water or hot water return	Control valve	

1) Only units with FSL-CONTROL II.

2) A three-way valve allows for both heating and cooling.

### Marking of 4-pipe heat exchangers

Symbol	Connection	Type of valve <sup>2</sup>	Operating mode
V (blue)	Chilled water flow	Lockshield	Cooling
R (blue)	Chilled water return		
V (red)	Hot water flow	Lockshield	Heating
R (red)	Chilled water return	Control valve	

1) Only units with FSL-CONTROL II.

Ensure that the surfaces are clean

1. ▶ Insert seal and tighten screw connection by hand.

### ! NOTICE!

Heat exchanger and pipes may easily become damaged.

Always use a suitable tool to counter the tightening force in order to prevent any damage.

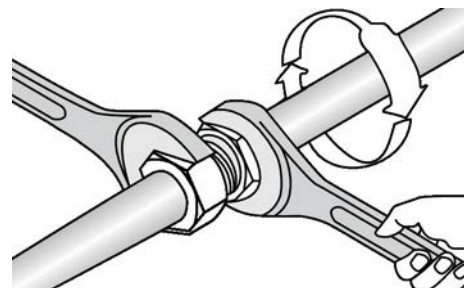


Fig. 4: Tightening the connection

2. ▶ Tighten threaded connections, including valves and lockshields, with a spanner.

**! NOTICE!****Subzero temperatures will damage the heat exchanger!**

Only fill the heat exchanger if there is no danger of freezing.

3. ▶ Fill the heat exchanger and vent it. To fill the system, use clean tap water (pH value 6.5 to 9) or a water glycol mixture (max. 30 % glycol). Heat exchangers are fitted with bleed screws for venting.
4. ▶ Check the system for leaks immediately after installation and then at regular intervals.

## 4.4 Making electrical connections

**! DANGER!****Electric shock hazard! Electrical equipment carries a dangerous electrical voltage!**

- Only skilled qualified electricians are allowed to work on the electrical system and to connect the unit to the mains.
- Disconnect the cable from the mains (all phases) and secure the unit against inadvertently being switched on again.
- Ensure that no voltage is present.
- Carry out assembly or connection jobs only as long as no voltage is present.

### Notes on the electrical installation

Any cables must be designed for the supply voltage for which they will be used. The length and cross section as well as any contact resistance may increase voltage losses. The power rating of each unit must also be considered. A skilled qualified electrician has to select the correct cable types and sizes. This job must only be carried out by specialist electrical companies.

- For the electrical connection comply with any applicable regulations and follow the code of good practice. Be sure to comply with the applicable VDE guidelines and local regulations.
- The connection data can be found on the rating plate or in the wiring diagrams.
- Protect any connections from physical damage.
- Lead cables through the cable glands on the ventilation unit.
- If any maintenance jobs have to be carried out, the unit first has to be de-energised (all phases). No voltage must be present. Separators can be used (e.g. fuses or RCBOs), minimum distance between contacts: 3 mm.
- For units without integral controls from TROX follow the instructions of the controls provider.

### Notes on control panels

Select an installation location where the control panel is not affected by disturbances. Avoid solar gain and draughts.

Seal the end of the conduit in the junction box as otherwise a draught could occur in the conduit and affect the measurement results.

### 4.4.1 Wiring

#### Personnel:

- Skilled qualified electrician

**! DANGER!**

Danger of electric shock! Do not touch any live components! Electrical equipment carries a dangerous electrical voltage.

- Only skilled qualified electricians are allowed to work on the electrical system.
- Switch off the power supply before working on any electrical equipment.

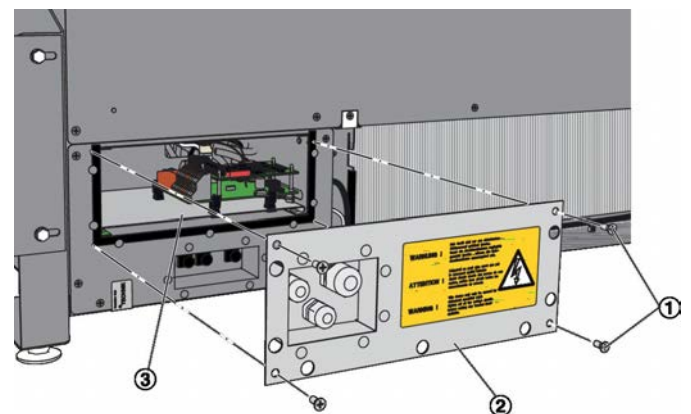


Fig. 5: Electrical connections

1. ▶ Take off the controls access panel (Fig. 5/2); to do so, loosen the Phillips screws (Fig. 5/1), then remove the panel. To make the connections, pull out the tray (Fig. 5/3).
2. ▶ Connect the ventilation unit according to the wiring diagram.
  - Stand-alone operation ↪ 16
  - Integration with the central BMS ↪ 19

## 4.4.1.1 Stand-alone operation

### Wiring diagram, unit with digital control panel

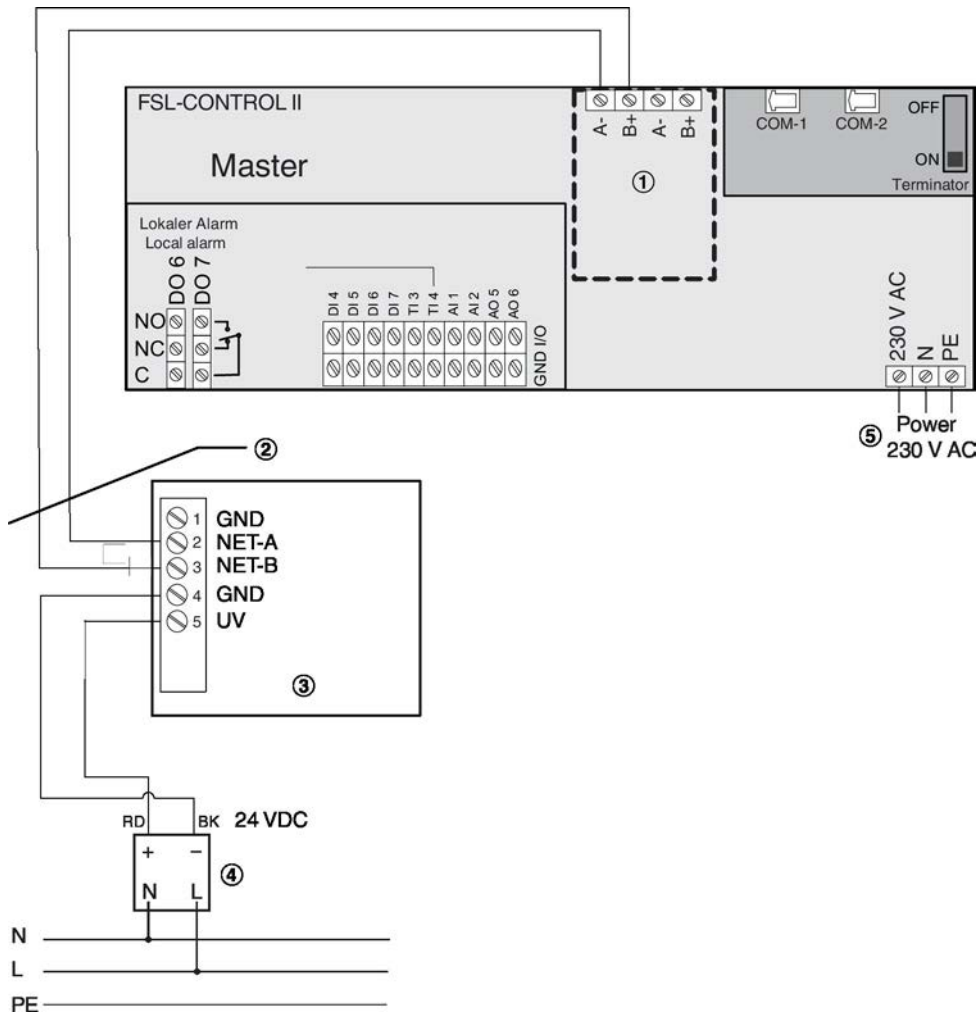


Fig. 6: Wiring diagram, stand-alone operation (without central BMS)

- ① LonWorks (FTT10) interface, ⚡ 22
- ② JY(St)Y 2 × 2 × 0.8, 10 m max. (use only twisted pair for LON-A and LON-B)
- ③ Digital control panel
- ④ Power supply unit, 24 V DC (optional or to be provided by others)
- ⑤ Connecting cable, e.g. Ölflex Classic 100 3G 0.75 or equivalent (by others)



**Important note:**

The digital control panel is a dedicated device to be used with the ventilation unit (master). Both carry the same serial number, which is found on the rating plate (ventilation unit) or on the packaging (control panel).

Use any control panel only for a ventilation unit with the same serial number.



**Digital control panel**

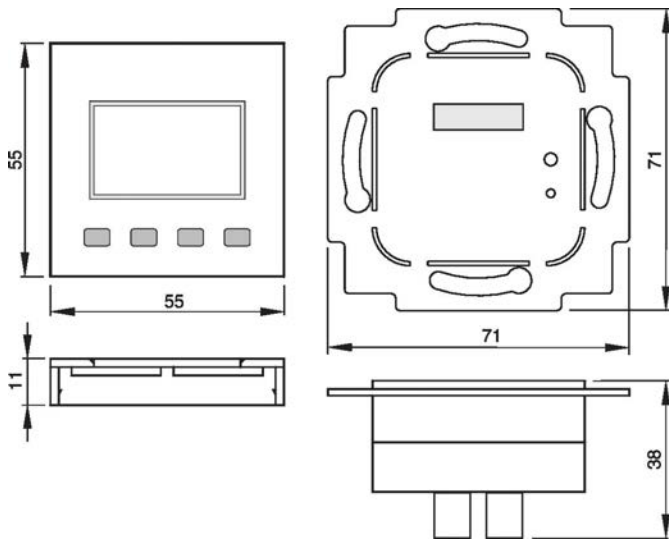


Fig. 7: Dimensions

Note: The overall dimensions depend on the frame that has been selected for the switch.

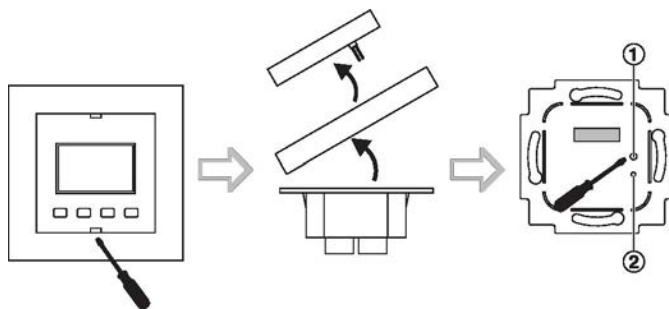


Fig. 8

- 1 Service push button
- 2 Service LED

**Notes on installation**

The control panel is suitable for installation on a junction box. You can connect the bus cable to the control panel with a screw terminal. For pre-wiring you can remove the screw terminal from the panel.

We recommend using deep junction boxes as they provide more space for cables.

Attach the LON interface card to the screws (by others) in the junction box; max. torque for the screws is 0.8 Nm. Place the mounting ring of the LON interface card flat on the face of the wall; do not cover it with paint or wallpaper.

**Technical data**

Supply voltage	15...24 V= (±10%) or 24 V~ (±10%)
Power consumption	1.3 W / 1.5 VA
Interface	FTT, free topology
Measuring range	0...+50 °C
Accuracy (21 °C)	±0.5 K
Response time	Time constant $t_{63}$ 15 minutes
Screw terminals	1.5 mm <sup>2</sup> max.
Protection level	IP 30 to EN 60529
Ambient temperature	0...50 °C
Transport	-10...50 °C / max. 85% rh, no condensation

## Wiring diagram, unit with analogue control panel

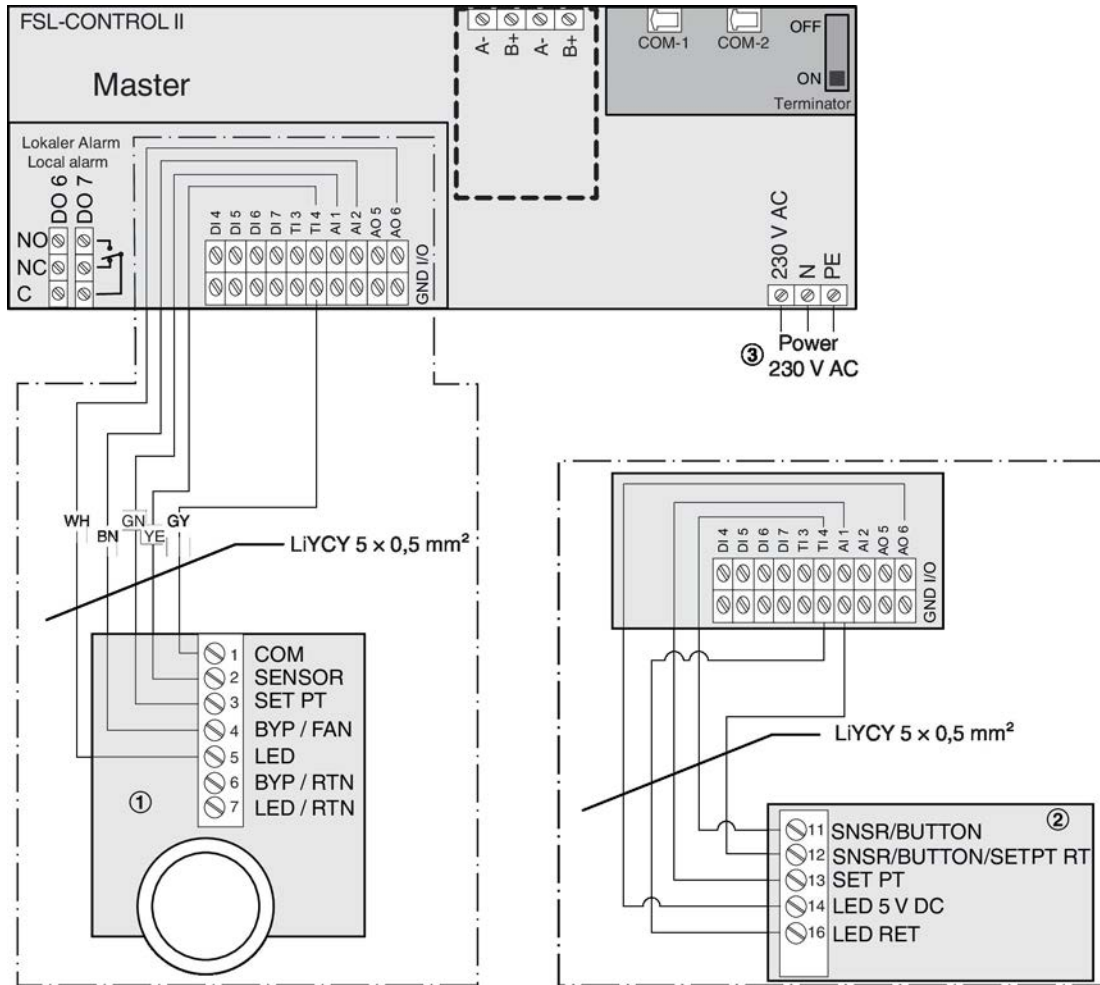


Fig. 9: Wiring diagram for analogue control panels

- ① Control panel with 0-1-2-3-AUTO selector switch
- ② Control panel without selector switch
- ③ Connecting cable, e.g. Ölflex Classic 100 3G 0.75 or equivalent (by others)

4.4.1.2 Integration with a central BMS

Wiring example for three interconnected FSL-CONTROL II controllers in a control zone

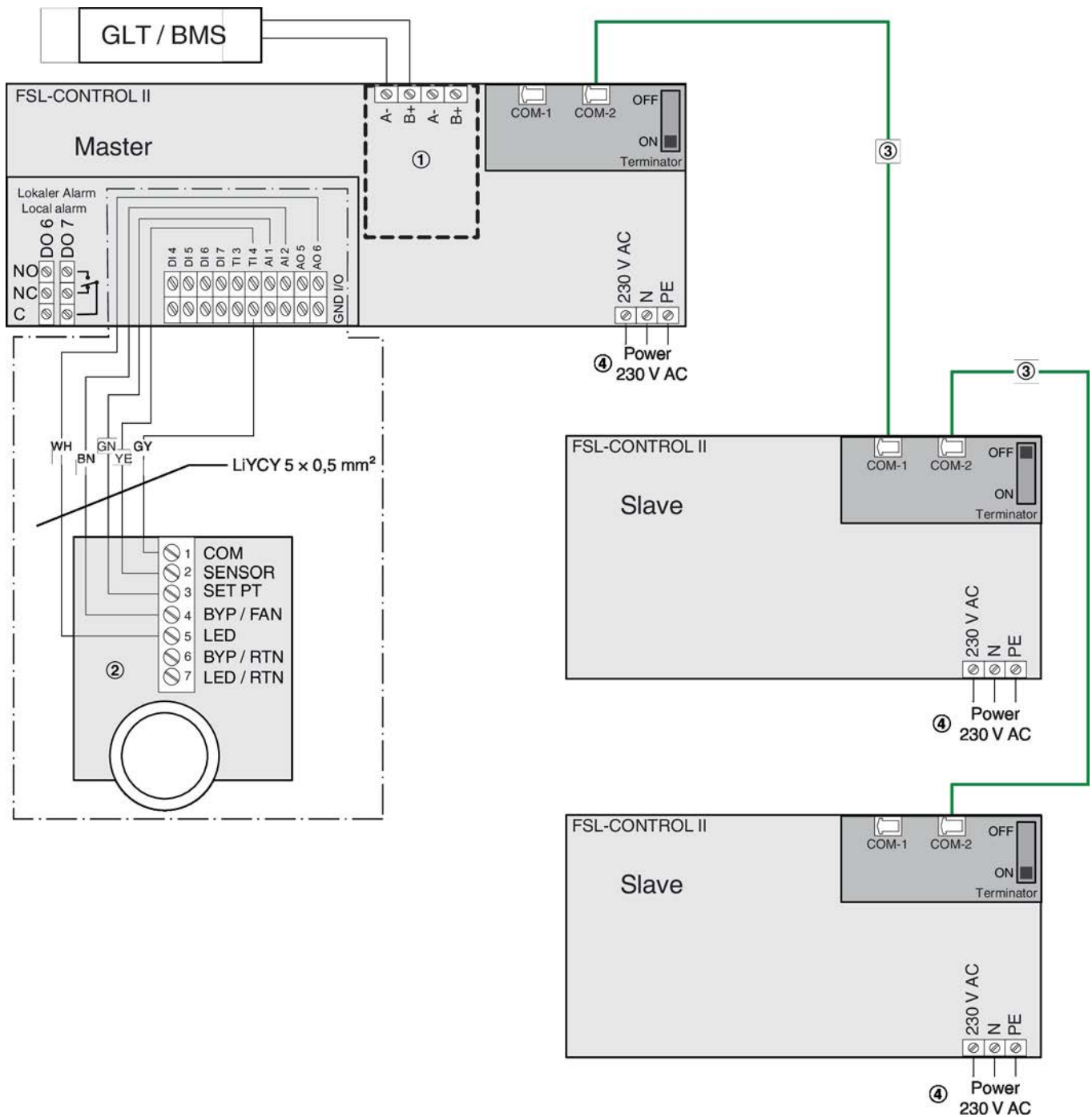


Fig. 10: Wiring diagram: Interconnected FSL-CONTROL II controllers

- ① LonWorks (FTT10) interface or BACnet MS/TP or Modbus RTU interface (optional) ⚡ 21
- ② Analogue control panel with or without selector switch (a digital control panel can be used only for stand-alone operation of the ventilation unit)
- ③ Patch cable (by others, at least cat. 5)
- ④ Connecting cable, e.g. Ölflex Classic 100 3G 0.75 or equivalent (by others)

## 4.4.2 FSL-CONTROL II communication

### 4.4.2.1 Several controllers in a control zone

Connect FSL-CONTROL II controllers (master-slave) within a control zone with a standard network cable (RJ45, to be provided by others).

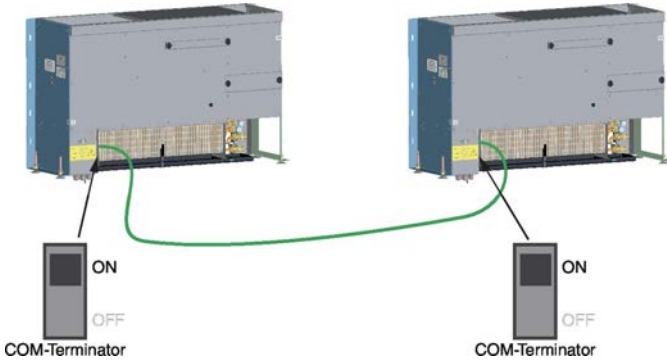


Fig. 11: FSL-CONTROL II communication of 2 units



Fig. 12: FSL-CONTROL II communication of 3 units

- Up to 15 FSL-CONTROL II controllers for a control zone (1 × master, 14 × slave)
- Up to 300 m network cable for each control zone
- Network cable type SF-UTP (braided and with foil), to ISO IEC 11801 (2002), as a patch cable with RJ45 plugs on both ends, or from a roll, at least cat. 5
- Activate terminal resistors on the first and last controllers on the communication cable

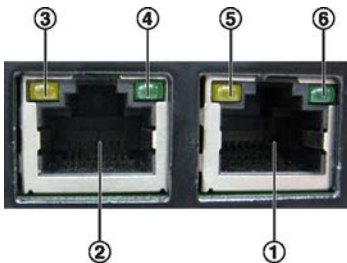


Fig. 13: Sockets and LEDs

- ① Port COM-1
- ② Port COM-2
- ③ LED for communication cable termination
- ④ Spare
- ⑤ LED - Data reception
- ⑥ LED - Heartbeat

### LEDs

Termination (yellow)

ON - Cable termination is enabled

OFF - Cable termination is disabled

Data reception (yellow)

ON (blinking) - Data reception in progress

OFF - No data reception

Heartbeat (green)

ON (blinking) - Normal controller operation

OFF - Device not ready

### Terminal resistor / termination

Fault-free data exchange between the controllers requires that both ends of the communication cable are terminated.

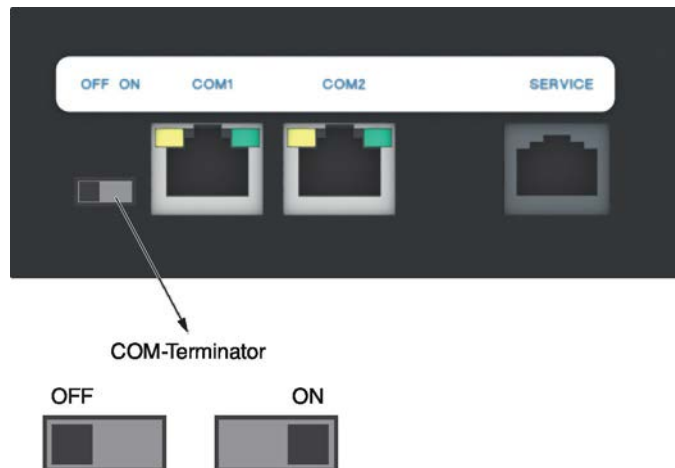


Fig. 14: COM terminal resistor

COM terminal resistor

OFF - Cable termination is disabled

ON - Cable termination is enabled

#### 4.4.2.2 Network with several control zones

##### Building a network

You may interconnect control zones by making use of a standard network such as LON FTT10, BACnet MS/TP or Modbus RTU. This requires a bus interface card to be connected to the FSL-CONTROL II master controller.

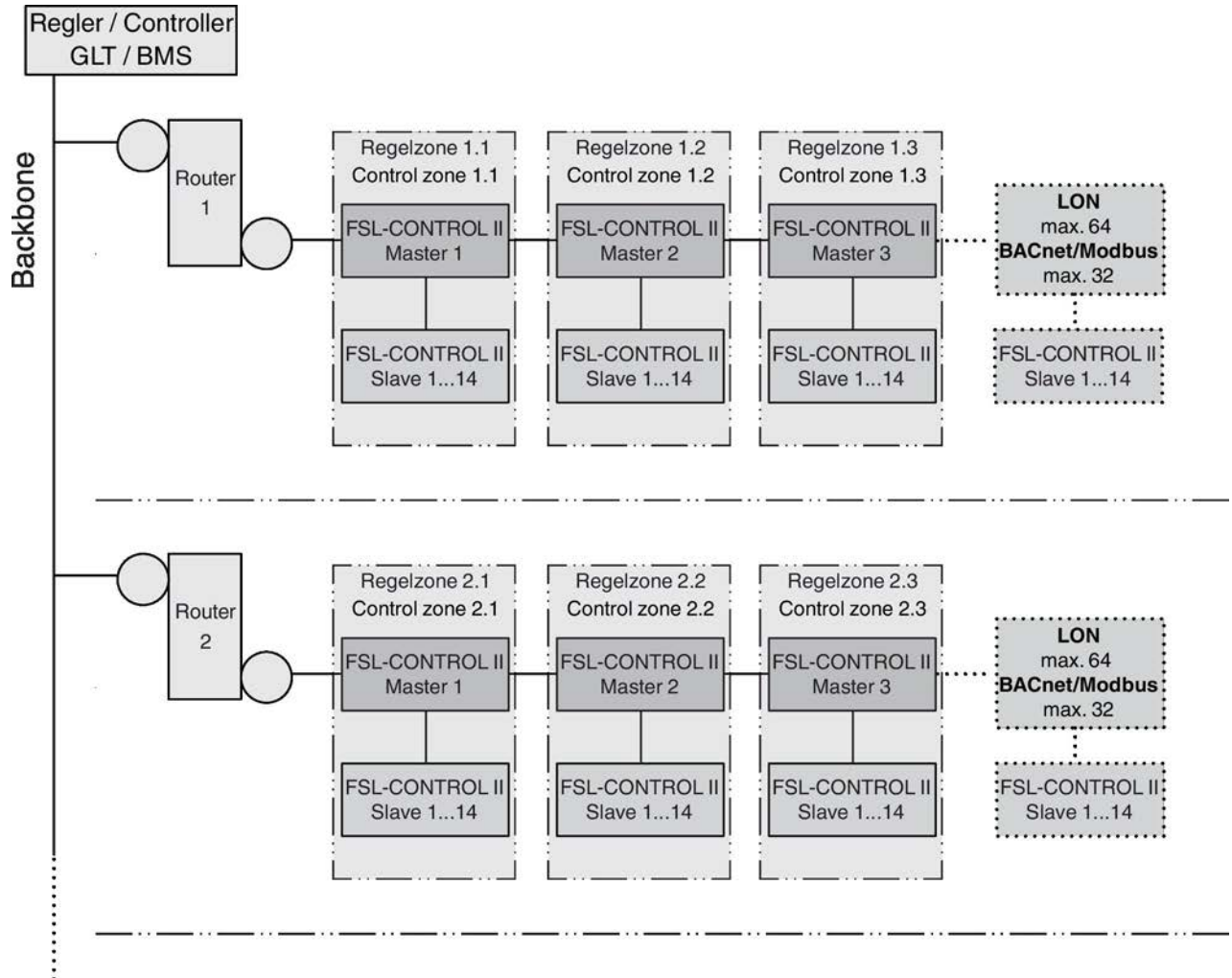


Fig. 15: FSL-CONTROL II, building a network



*If the master controller is integrated with a central BMS (by others), it acts as a slave within the bus network, but as a master within the FSL-CONTROL II system.*

## 4.4.2.2.1 Integration with a bus communication system (by others)

### LonWorks interface card (FTT10)

#### Connecting the communication cables

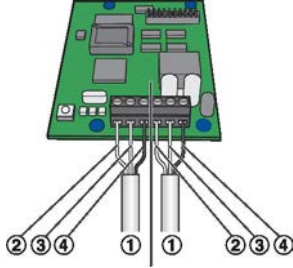


Fig. 16: Wiring the LonWorks interface card

- ① Bus
- ② LON A
- ③ LON B
- ④ SH (shield)

The LonWorks interface card has terminals for two bus cables of a LonWorks network. Depending on the network topology, controllers at the end of a chain may be connected to one bus, controllers at other positions in the chain may be connected to two buses.

1. ▶ Strip the insulation from the bus cable (at least two wires), insert the bare wires into the terminals and tighten the screws by hand.
2. ▶ Fix the data cables to the casing using the wire clamping bracket.
3. ▶ Connect the shield of shielded cables to the SH terminals.

Within a chain (channel) connect the shield only at one point to the earth. Earthing the shield at every controller will lead to voltage disturbances.

4. ▶ To avoid reflections at the end of a chain (channel), use a terminal resistor.

#### Recommended bus cables

Bus cables to TIA 568A, category 5

- Belden 8471 or 85102
- Cables to DOCSIS specification level IV
- JY(St)Y 2×2×0.8 (use only twisted pair for LON-A and LON-B)

### Commissioning

#### Personnel:

- Network administrator

#### Materials:

- Software, e.g. Echelon or LonMaker
- Application software, download from [www.troxtechnik.com](http://www.troxtechnik.com)

1. ▶ **Commissioning:** Press the service pin push button and download the application software for the LonWorks node.
2. ▶ **Binding:** Create the logical bindings for the network variables to be transferred by the LonWorks interface card (expansion module). As an alternative, use polling.
3. ▶ **Configuration:** If necessary, adjust the configuration.
4. ▶ Configure data points

### BACnet MS/TP or Modbus RTU interface card

#### Connecting the bus cables

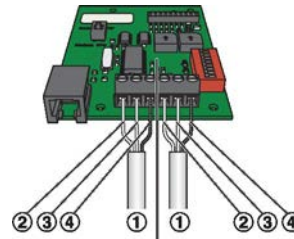


Fig. 17: Wiring the BACnet MS/TP or Modbus RTU interface card

- ① Bus cable
- ② B+ (EIA-485)
- ③ A- (EIA-485)
- ④ SH (shield)

The interface card has terminals for two cables of an EIA-485 network. A maximum of 32 units can be operated on one network segment.

- ▶ Strip the insulation from the bus cable (at least two wires), insert the bare wires into the terminals and tighten the screws by hand.

Make sure that the polarity of the conductor pairs is correct. Incorrect polarity will result in inverted data signals and hence communication errors.

- ▶ Fix the bus cables to the casing using the wire clamping bracket.
- ▶ Connect the shield of shielded cables to the SH terminals.

Within a chain (channel) connect the shield only at one point to the earth. Earthing the shield at every controller will lead to voltage disturbances.

- ▶ To avoid cable reflections, network segments must be terminated at both ends with 120 Ω bus terminal resistors. Alternatively, the terminal resistors can be enabled or disabled on the PCB.

### Recommended bus cables

Twisted Pair, e.g. JY(St)Y 2 × 2 × 0.8 (use only twisted pair for B+ and A-)

### Hardware configuration

Before you use a BACnet MS/TP or Modbus RTU interface card, you have to configure it to the actual application. To do so, use the switches on the interface card.

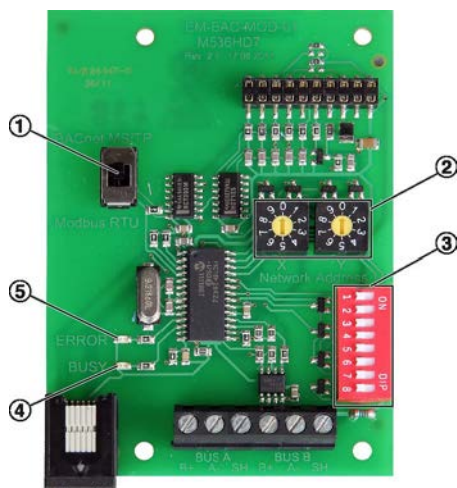


Fig. 18: BACnet MS/TP or Modbus RTU interface card

- ① Slide switch for setting the protocol type
- ② Rotary switch for setting the network address
- ③ DIP switch for setting the communications parameters
- ④ BUSY-LED (green): On = supply voltage OK, blinking = communication in progress
- ⑤ ERROR-LED (red): On = communication error

### Setting the protocol type

Use the slide switch (Fig. 18/1) to set the BACnet MS/TP or Modbus RTU protocol.

### Setting the network address

Use the two address code switches X and Y (Fig. 18/2) to set a network address (01 to 99). Address 00 is reserved for broadcast mode. A maximum of 32 controllers (network addresses) can be operated on one network segment. Each device requires a different network address.

### Transmission speed (EIA-485)

BACnet	Modbus	S2	S3
9600 Bd	9600 Bd	Off	Off
19200 Bd	19200 Bd	On	Off
38400 Bd	38400 Bd	Off	On
76800 Bd	57600 Bd	On	On

### Parity

Parity	S5	S6
None	Off	Off
None	On	Off
Odd	Off	On
Even	On	On

### Terminal resistor for EIA-485 network

Terminal resistor	S8
Disabled	Off
Enabled	On

### Commissioning

#### Personnel:

- Network administrator
  - ▶ Configuration of data points depending on protocol type
    - BACnet -
    - Modbus RTU -

## 5 Initial commissioning

### Personnel:

- Skilled qualified electrician

Before initial commissioning:

- Remove protective film, if any.
- Ensure that the unit is clean. If necessary, clean the casing and the inlet and outlet openings from dust.
- Connecting water pipes professionally:
  - Ensure that all heat exchangers are clean and free from residues and foreign matter.
  - Ensure that the water system including the heat exchanger has been filled and vented.
  - Check operating pressure and temperature; ensure that there are no leaks.
  - If the unit has a condensate drain, check and ensure that the drain is tight.
- Making electrical connections professionally:
  - Check and ensure that the actual supply voltage is the same as the one given on the rating plate.
  - Ensure that the ventilation unit has been correctly earthed.
- Check filters for correct fit and contamination  
↳ *'Checking and replacing the filter' on page 29.*  
Should the filters have been contaminated even before installation, replace them.

For commissioning see also VDI 6022, part 1 – 'Hygiene requirements for ventilation and air-conditioning systems and units'.

1. ▶ Switch on the power supply.
  - ⇒ The ventilation unit is on.
2. ▶ Configure the control of the ventilation unit, if necessary.

### Control of ventilation units

For units with the integral FSL-CONTROL II control system ↳ Installation and configuration manual, FSL-CONTROL II single room control.

For units without integral controls from TROX follow the instructions of the controls provider.



## 6 Control panel settings

### 6.1 Analogue control panel

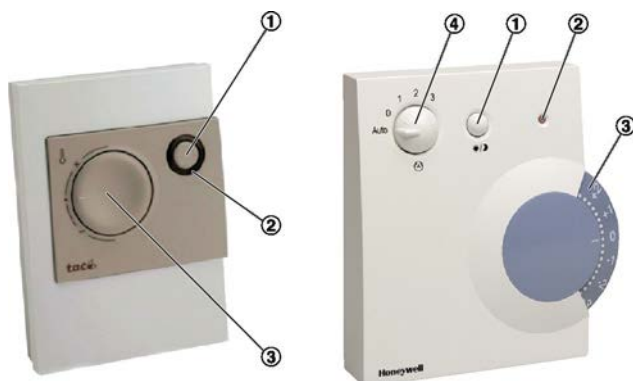


Fig. 19: Control panels

- ① Occupancy push button
- ② LED
- ③ Setpoint value adjuster
- ④ Fan stage selector

Function	Description	LED
Occupied/ Unoccupied <sup>1</sup>	If you want to change the operating mode from 'Occupied' to 'Standby' or vice versa, press the Occupancy push button briefly.  This allows you, for example, to manually switch to 'Standby' mode when the room is not occupied.  Start-up delay: 1 to 2 minutes in summer, 6 to 7 minutes in winter.	Standby: LED off Occupied: LED on
Boost	If you want to activate or deactivate rapid ventilation of the room, keep the Occupancy push button pressed for some time.	LED blinks slowly
Overtime <sup>1</sup>	If you want to manually switch on the Overtime function while the system is in 'Standby' or 'Unoccupied' mode, press the Occupancy push button briefly.  This allows you to set the ventilation unit to 'Occupied' mode for a previously set period of time if, for example, overtime is required after the regular office hours.  The overtime period can be configured. After the set period the unit resumes the previous operating mode (RTC/central BMS).	Standby: LED off Overtime: LED on
Filter change	Double blinking of the LED indicates that a filter change is required (the number of operating hours can be configured; factory setting: after 2500 h).  Use the FSL-CONNECT software to reset the counter after a filter change.	LED double blinking  This function overrides all other LED signals.
Alarm	Frost alarm and hardware alarm.	LED blinks rapidly

1) The room control panel is factory set to either the 'Occupied/Unoccupied' function or the 'Overtime' function. If you need to change this setting, contact the TROX Technical Service.

## 6.2 Digital control panel

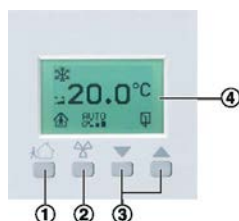


Fig. 20: Digital control panel

Push button Function	Settings	Display ④	Description
① Operating mode	Occupied		The 'Occupied' mode is used for occupied rooms.
	Unoccupied		The 'Unoccupied' mode is used for unoccupied rooms.
	Boost		'Boost' is used to increase ventilation, e.g. during breaks.
② Ventilation	Automatic	AUTO	Automatically controlled ventilation.
	Off		Ventilation off.
	Stage 1		Manual ventilation control at the lowest level.
	Stage 2		Manual ventilation control at a medium level.
	Stage 3		Manual ventilation control at the highest level.
③ Temperature	▲		Used to increase the setpoint temperature.
	▼		Used to reduce the setpoint temperature.
Room temperature	–	20.0 °C	Displays the actual room temperature.
Frost protection	–		Indicates that the frost protection function is active, i.e. that the ventilation unit is protected from frost damage at low temperatures.
Filters	–		Indicates that a filter change is due; the number of operating hours after which a filter should be changed can be configured (the factory setting is 2500 h).  Use the FSL-CONNECT software to reset the counter after a filter change.
Windows	–		Indicates that a window is open. The corresponding window contact signal has been received. The ventilation unit is automatically switched off as a consequence.

## 7 Control of the ventilation unit

### Control of ventilation units

For units with the integral FSL-CONTROL II control system → Installation and configuration manual, FSL-CONTROL II single room control.

For units without integral controls from TROX follow the instructions of the controls provider.

## 8 Maintenance and cleaning

### DANGER!

Danger of electric shock! Do not touch any live components! Electrical equipment carries a dangerous electrical voltage.

Switch off the supply voltage and secure it against being inadvertently switched on again before working on the unit.

### WARNING!

Risk of burning or scalding! The heat exchanger is hot! Before you work on a heat exchanger, switch it off and leave it to cool.

- Carefully clean the heat exchanger with an industrial vacuum cleaner. Be careful to not damage the fins. We recommend using a soft brush on the suction inlet.
- Rinse the recuperative heat exchanger with hot water (40 °C max.), e.g. by using a commercially available shower head.
  - Do not use organic solvents (such as acetone or methanol) to clean the heat exchanger.
  - Do not put the recuperative heat exchanger into a dishwasher.

### Maintenance

The level of contamination of a ventilation unit depends to a large part on the location of the building and on the length of daily use of the unit.

The system owner should therefore set maintenance intervals based on the hygiene requirements. The legal hygiene requirements have to be met.

An increased dust exposure due to construction work is to be expected during the first three months after initial commissioning; this is why filters should be replaced after three months, and the unit should be cleaned.

We also recommend you to randomly check the contamination level of filters every three months during the first year and use the result as a basis for setting further maintenance intervals.

Operational reliability requires that the necessary maintenance measures are taken in the suggested maintenance intervals, ☞ *'Maintenance measures'* on page 49

### Hygiene inspection

A hygiene inspection to VDI 6022 is due every three years. Hygiene inspections have to be carried out by sufficiently qualified individuals and on a random selection of typical ventilation units. If any hygiene issues are detected, all decentralised ventilation units have to be cleaned.

### Cleaning

- Cleaning intervals to VDI 6022.
- Clean all surfaces with a damp (not wet) cloth.
- Use only common household cleaners, do not use any caustic, scouring or otherwise aggressive cleaning agents.

## 8.1 Maintenance

### 8.1.1 Checking and replacing the filter

**Personnel:**

- Facility manager

**Special tool:**

- Commercially available vacuum cleaner



**Risk of allergic reaction to filter dust!**

- Wear a dust mask when you change a filter.

Filters have to be changed after a year or if they no longer meet the technical or hygienic requirements.

Use only original filters. Replacement filters can be ordered from the manufacturer; state the filter material number in your order (see page 2). The filter material number is given in the replacement parts list ☞ 35 and on the filter itself.

1. ▶



**DANGER!**  
Danger of electric shock! Do not touch any live components! Electrical equipment carries a dangerous electrical voltage.

- Switch off the power supply before you carry out maintenance or cleaning.
- Only skilled qualified electricians are allowed to work on the electrical system.

Switch off the supply voltage and secure it against being switched on again before cleaning the unit.

2. ▶ The ventilation unit has been protected by an outer casing (by others). Access to the outer casing has to be provided for any work.

#### Checking and replacing the fine dust filter

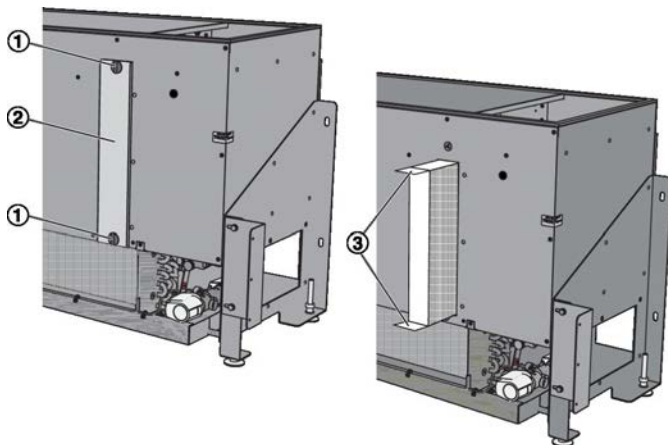


Fig. 21: Fine dust filter

3. ▶ Open the fasteners (Fig. 21/1) by turning them (¼), then remove the filter chamber cover (Fig. 21/2).
- Hold the filter by the lugs (Fig. 21/3) and pull it from the filter chamber.
4. ▶ Check the filter for damage, contamination and deposits.
5. ▶ Remove contamination in the ventilation unit with a commercially available vacuum cleaner.
6. ▶ If the filter is intact, free of contamination or deposits, and if it has been used less than 1 year, put it back into the filter chamber.

If the filter has already been used for a year or if it does no longer meet the technical or hygiene requirements, replace it.



*When you insert a filter, make sure that the two lugs (Fig. 21/3) stick out from the filter chamber and that the writing is legible.*

*Once inserted, the filter must be flush with the surface as otherwise air will bypass the filter.*

7. ▶ Insert the filter chamber cover and close the fasteners.

#### Checking and replacing the coarse dust filter

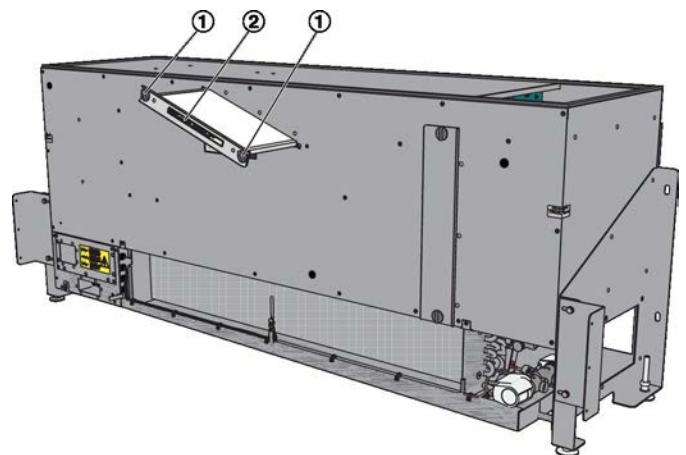


Fig. 22: SCHOOLAIR-B coarse dust filter

8. ▶ Open the fasteners (Fig. 22/1) by turning them (¼) and remove the filter (Fig. 22/2).
9. ▶ Check the filter for damage, contamination and deposits.
10. ▶ Remove contamination in the ventilation unit with a commercially available vacuum cleaner.
11. ▶ If the filter is intact, free of contamination or deposits, and if it has been used less than 1 year, put it back into the filter chamber.

If the filter has already been used for a year or if it does no longer meet the technical or hygiene requirements, replace it.

## Closing the outer casing

12. ▶ Close the outer casing after you have changed the filter.
  13. ▶ Switch on the power supply.
  14. ▶ If the filter operating hours counter in FSL-CONTROL II is used, reset it after a filter change ↪ Installation and configuration manual FSL CONTROL II.
- ⇒ Filter change is complete.



Dispose of used filters with residual waste.

## 8.1.2 Cleaning the recuperative heat exchanger

### 8.1.2.1 Opening the cover plate

#### Personnel:

- Facility manager

#### Preparation

#### 1. ▶



#### DANGER!

Danger of electric shock! Do not touch any live components! Electrical equipment carries a dangerous electrical voltage.

- Switch off the power supply before you carry out maintenance or cleaning.
- Only skilled qualified electricians are allowed to work on the electrical system.

Switch off the supply voltage and secure it against being switched on again before working on the unit.

2. ▶ The ventilation unit has been protected by an outer casing (by others). Access to the outer casing has to be provided for any work.

#### Removing the cover plate

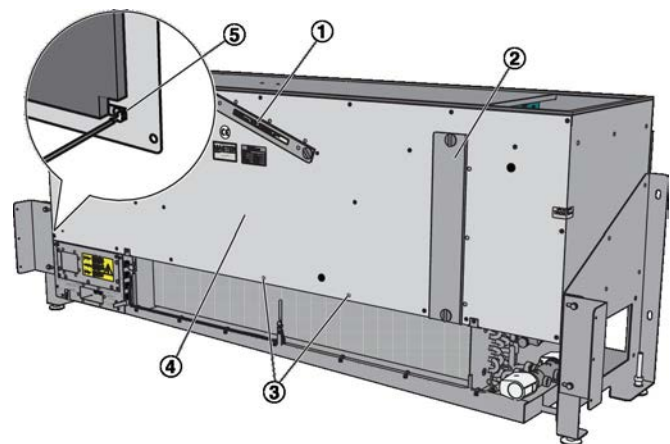


Fig. 23: Removing the cover plate

3. ▶ Remove the coarse dust filter (Fig. 23/1), and remove the cover (Fig. 23/2) from the fine dust filter chamber ↪ on page 29.
4. ▶ Remove the cover plate (Fig. 23/4) by loosening all the Phillips screws (Fig. 23/3) on the plate.

Disconnect the protective conductor (Fig. 23/5) when you remove the plate.

⇒ The cover plate has been removed.

**! NOTICE!****Risk of damage due to incorrect handling.**

Be careful to not damage the glass fibre fabric or the insulation when you clean or maintain the unit after the cover plate has been opened or removed.

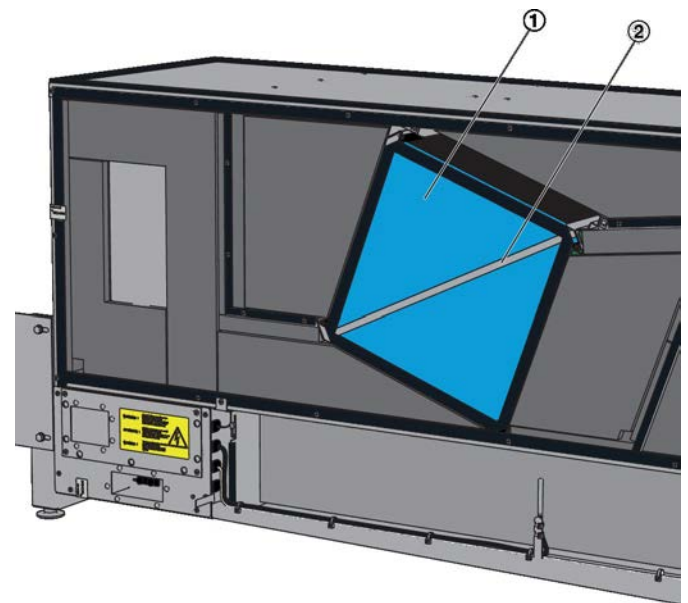
**8.1.2.2 Cleaning the recuperative heat exchanger**

Fig. 24: Cleaning the recuperative heat exchanger

**Personnel:**

- Skilled qualified electrician

**Special tool:**

- Commercially available vacuum cleaner

## 1. ▶

**! DANGER!**

Danger of electric shock! Do not touch any live components! Electrical equipment carries a dangerous electrical voltage.

- Switch off the power supply before you carry out maintenance or cleaning.
- Only skilled qualified electricians are allowed to work on the electrical system.

Switch off the supply voltage and secure it against being switched on again before working on the unit.

## 2. ▶ Remove the cover plate, ↪ on page 30.

## 3. ▶ Grasp the recuperative heat exchanger (Fig. 24/1) by the lug (Fig. 24/2) and pull it out.

## 4. ▶

**! NOTICE!****Risk of damage to the recuperative heat exchanger**

- Do not use organic solvents (such as acetone or methanol) to clean the heat exchanger.
- Do not put the recuperative heat exchanger into a dishwasher.

Rinse the recuperative heat exchanger (Fig. 24/1) with hot water (40 °C max.), e.g. by using a commercially available shower head.

5. ▶ Put the recuperative heat exchanger into an upright position and let it dry out over night.
6. ▶ Remove contamination in the ventilation unit with a commercially available vacuum cleaner.
7. ▶ Dust seals with talcum powder.
8. ▶ Place the recuperative heat exchanger onto the rails and push it back into the opening.
9. ▶ Fixing the cover plate, ↪ on page 32.

## ! NOTICE!

Be sure to insert the protective conductor (Fig. 24/5) when you fix the cover plate.

10. ▶ Switch on the power supply.
  - ⇒ The recuperative heat exchanger has been cleaned.

### 8.1.2.3 Closing the cover plate

#### Personnel:

- Facility manager

Maintenance is complete and all parts have been correctly replaced.

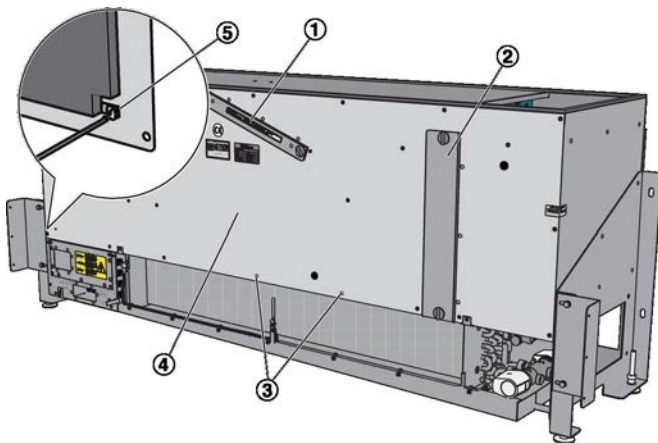


Fig. 25: Fixing the cover plate

1. ▶ Attach the protective earth conductor (Fig. 25/5) to the cover plate (Fig. 25/4), then put the cover plate back on the ventilation unit. Fix the cover plate with the Phillips screws (Fig. 25/3).
2. ▶ Replace (Fig. 25/2) the coarse dust filter (Fig. 25/1) and fix the cover of the fine dust filter Fig. 25.
3. ▶ Switch on the power supply.
  - ⇒ The cover plate has been fixed and the power supply has been switched on.



### 8.1.3 Cleaning the heat exchanger and condensate drip tray

#### Personnel:

- Facility manager

#### Special tool:

- Commercially available vacuum cleaner or air compressor

Check the heat exchanger for contamination at least every 12 months. Clean the heat exchanger, if necessary.



Keep the heat exchanger clean as contamination will impair the efficiency of the ventilation unit.

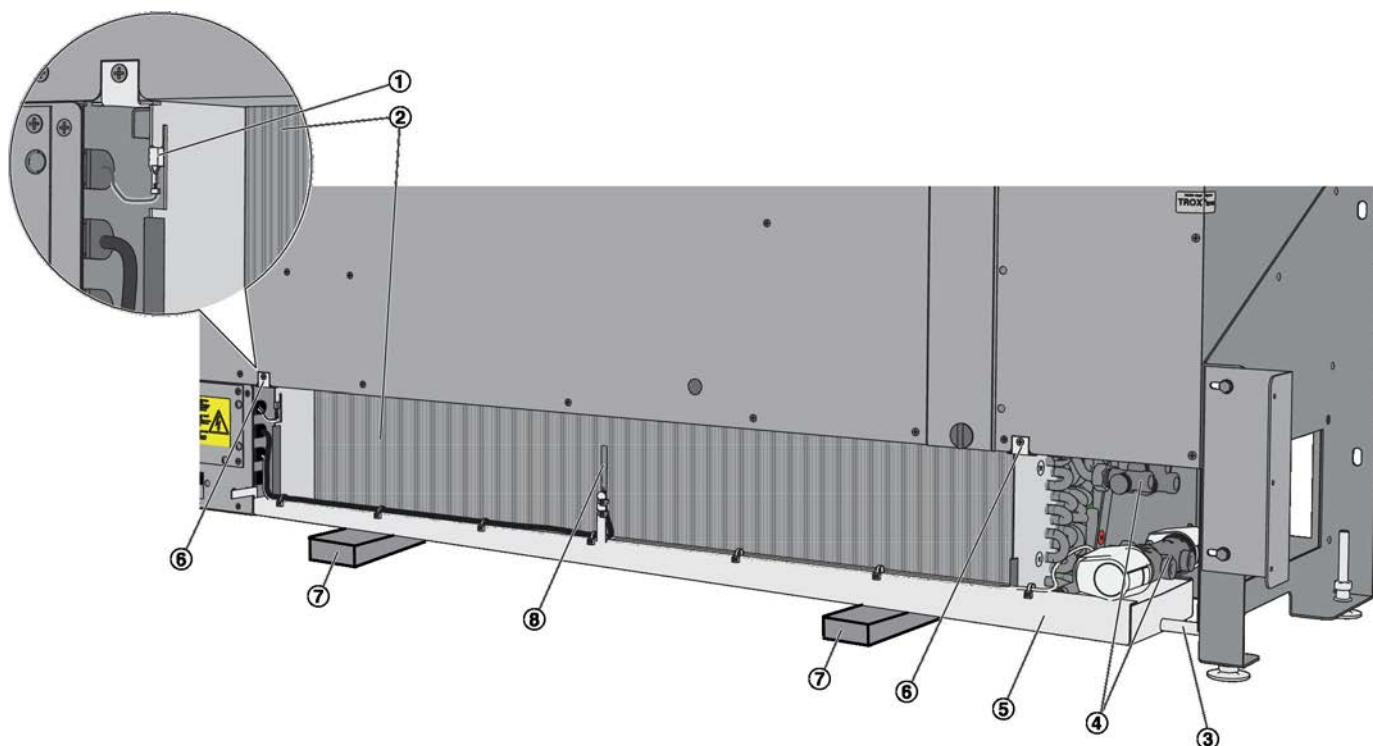


Fig. 26: Removing the heat exchanger

1. ▶



#### DANGER!

Danger of electric shock! Do not touch any live components! Electrical equipment carries a dangerous electrical voltage.

- Switch off the power supply before you carry out maintenance or cleaning.
- Only skilled qualified electricians are allowed to work on the electrical system.

Switch off the supply voltage and secure it against being switched on again before working on the unit.

- ▶ The ventilation unit has been protected by an outer casing (by others). Access to the casing has to be provided for cleaning.
- ▶ Remove the protective earth conductor (Fig. 26/1) from the heat exchanger (Fig. 26/2).
- ▶ Remove the supply air temperature sensor (Fig. 26/8) and the connecting cable; cut off the cable ties to do so. Remove the cables for the fans, if any.
- ▶ Depressurise the water-side connections (Fig. 26/4) and open the screw connections on the heat exchanger.



*If you use flexible hoses (optional), you can clean the heat exchanger without removing the water-side connections.*

6. ▶ To prevent the heat exchanger and the condensate drip tray (Fig. 26/5) from crashing onto the floor, support them, e.g. with two blocks of wood.(Fig. 26/7).

Loosen the two Phillips screws of the heat exchanger fixing brackets (Fig. 26/6), then carefully lower the heat exchanger with the condensate drip tray. Pull the heat exchanger and the condensate drip tray towards you and out of the casing.

### Cleaning the heat exchanger

7. ▶ Use a commercially available vacuum cleaner or compressed air to remove contamination from the heat exchanger.

### ! NOTICE!

Be careful to not damage the fins of the heat exchanger.

### Cleaning the condensate drip tray

8. ▶ ■ Clean the condensate drip tray (Fig. 26/5) with a commercially available cleaner or disinfectant.  
■ Check that the condensate drain (Fig. 26/3) (optional) is not blocked.
9. ▶ Re-install the heat exchanger with the condensate drip tray by following the steps in reverse order. Fix the temperature sensor and the wires.
- 10.▶ If necessary, refill the water system (operating pressure) and check for leaks.
- 12.▶ Switch on the power supply.  
⇒ Cleaning of the heat exchanger and condensate drip tray is complete.

## 8.2 Replacement parts list



### Ordering replacement parts

You can identify order-specific components of the ventilation unit either by a code on the component itself or by the commission number on the rating plate ↪ 'Rating plate' on page 42. TROX Service: ↪ 'TROX Technical Service' on page 3

Name	Replacement part no.	Page
F7 outdoor air filter	FP-F7-NWO/320x404x50/STR	↪ 29
G3 extract air filter	FMP-G3-C03/PADx397x283	↪ 29
Centrifugal fan (supply air)	M546FG0	↪ 36
Centrifugal fan (extract air)		↪ 37
Actuator for outdoor air damper	M466EQ6	↪ 38
Actuator for exhaust air damper		↪ 39
Actuator for bypass damper	A00000018566	↪ 40
Recuperative heat exchanger	M432HX9	↪ 31
2-pipe or 4-pipe heat exchanger	Depending on order	
Outdoor air temperature sensor	M546EI5	
Supply air temperature sensor		
Valve actuator FSL-CONTROL II	Depending on order	
Straight-way valve	Depending on order	
Lockshield	M431AQ4	
SKM module for controlling the dampers	M536ED0	↪ 41
FSL-CONTROL II control module	M536ED8	
FSL-CONTROL II master module	M536ED9	
RTC (real-time clock) expansion module	M536EE0	
VOC sensor	M546GA7	

## 8.3 Repair

The damper actuators and the fans are maintenance-free. If a component is defective, however, it has to be replaced. Replacement parts are listed in the replacement parts list and may be ordered from the TROX Service, ☎ 3

For information on replacing components see:

- Replacing the supply air fan, ☎ 36
- Replacing the extract air fan, ☎ 37
- Replacing the actuator on the outdoor air damper, ☎ 38
- Replacing the actuator on the exhaust air damper, ☎ 39
- Replacing the actuator on the bypass damper, ☎ 40
- Replacing the control module for actuators, ☎ 41

### 8.3.1 Replacing the supply air fan

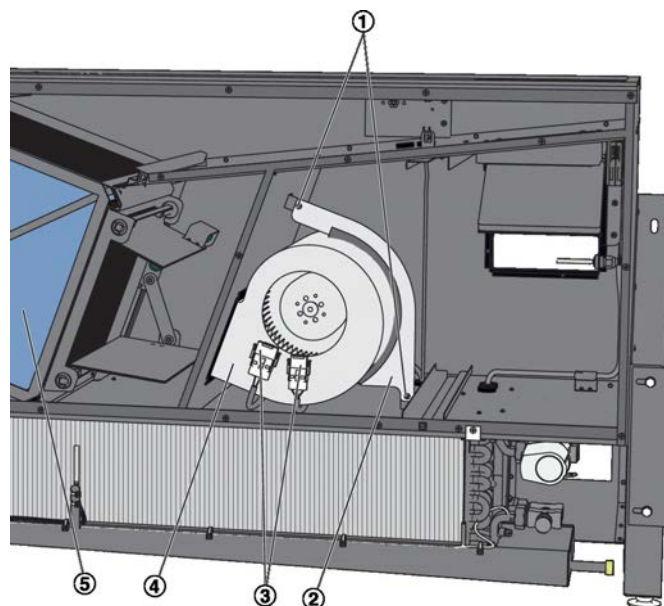


Fig. 27: Replacing the supply air fan

#### Personnel:

- Skilled qualified electrician

#### Special tool:

- Commercially available vacuum cleaner

1. ▶

#### DANGER!

Danger of electric shock! Do not touch any live components! Electrical equipment carries a dangerous electrical voltage.

- Switch off the power supply before you carry out maintenance or cleaning.
- Only skilled qualified electricians are allowed to work on the electrical system.

Switch off the supply voltage and secure it against being switched on again before working on the unit.

2. ▶ Removing the cover plate ☎ 'Opening the cover plate' on page 30.

The supply air fan is installed to the right of the recuperative heat exchanger (Fig. 27/5).

3. ▶ Pull out the fine dust filter and leave it in a clean place ☎ on page 29.

4. ▶ Pull out the two plugs of the fan connecting cable (Fig. 27/3).

5. ▶ Demount the retaining bracket for the fan (Fig. 27/2) by loosening the two Phillips screws (Fig. 27/1).

6. ▶ Remove the fan (Fig. 27/4).

7. ▶ Remove contamination in the casing with a vacuum cleaner, then put in the new fan. Re-install the unit by following the steps in reverse order.
8. ▶ Fixing the cover plate, ↪ 'Closing the cover plate' on page 32.

**! NOTICE!**

Be sure to insert the protective earth conductor when you fix the cover plate.

9. ▶ Switch on the power supply.  
⇒ The supply air fan has been replaced.

### 8.3.2 Replacing the extract air fan

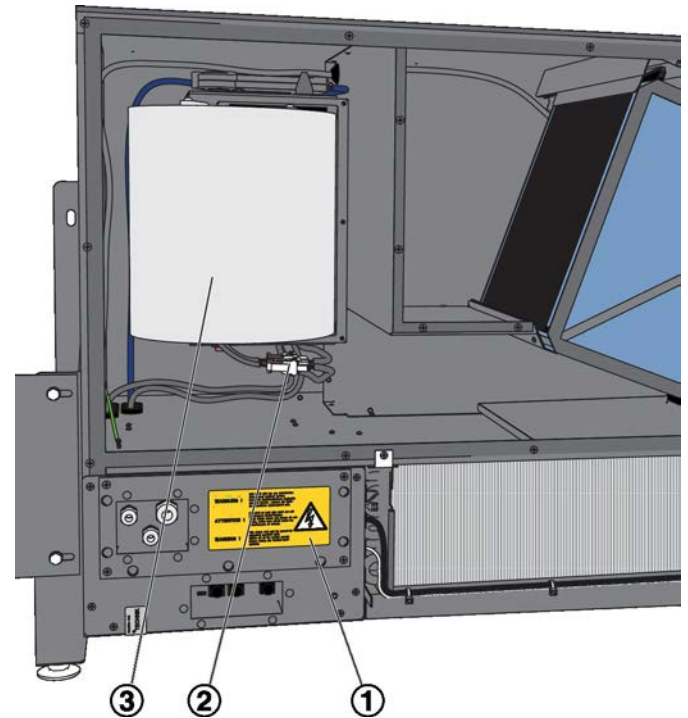


Fig. 28: Replacing the extract air fan

**Personnel:**

- Skilled qualified electrician

**Special tool:**

- Commercially available vacuum cleaner

1. ▶

**! DANGER!**

Danger of electric shock! Do not touch any live components! Electrical equipment carries a dangerous electrical voltage.

- Switch off the power supply before you carry out maintenance or cleaning.
- Only skilled qualified electricians are allowed to work on the electrical system.

Switch off the supply voltage and secure it against being switched on again before working on the unit.

2. ▶ Removing the cover plate ↪ 'Opening the cover plate' on page 30.  
The extract air fan is installed above the electrical connections (Fig. 28/1).
3. ▶ Pull out the two plugs of the fan connecting cable (Fig. 28/2).
4. ▶ Carefully pull out the fan (Fig. 28/).
5. ▶ Remove contamination in the casing with a vacuum cleaner, then put in the new fan. Re-install the unit by following the steps in reverse order.

6. ▶ Fixing the cover plate, ↪ 'Closing the cover plate' on page 32.

**! NOTICE!**

Be sure to insert the protective earth conductor when you fix the cover plate.

7. ▶ Switch on the power supply.  
⇒ The extract air fan has been replaced.

## 8.3.3 Replacing the actuator on the outdoor air damper

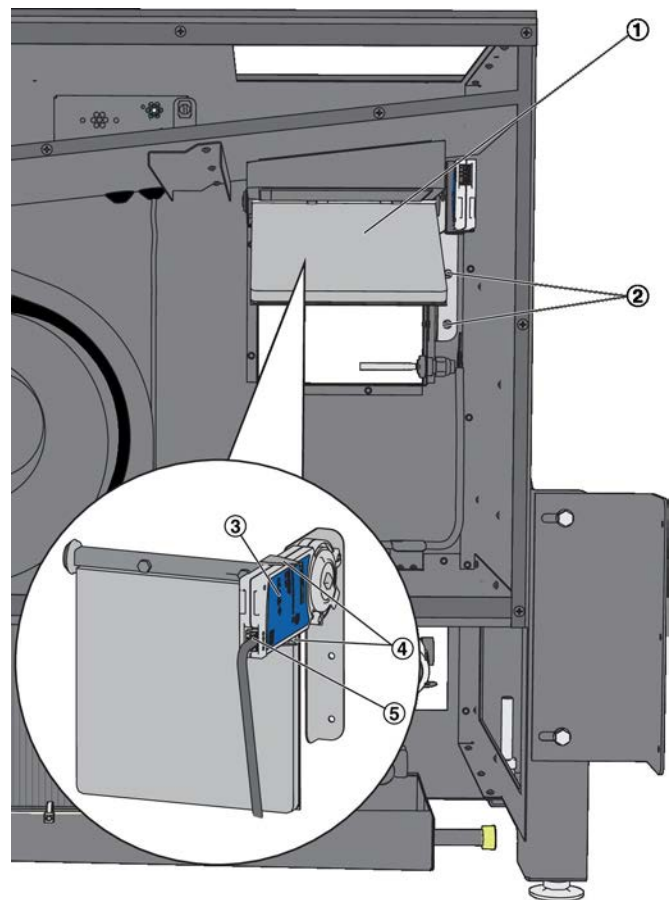


Fig. 29: Replacing an actuator

**Personnel:**

- Skilled qualified electrician

1. ▶

**! DANGER!**

Danger of electric shock! Do not touch any live components! Electrical equipment carries a dangerous electrical voltage.

- Switch off the power supply before you carry out maintenance or cleaning.
- Only skilled qualified electricians are allowed to work on the electrical system.

Switch off the supply voltage and secure it against being switched on again before working on the unit.

2. ▶ Removing the cover plate ↪ 'Opening the cover plate' on page 30.

The outdoor air damper is installed on the right side of the ventilation unit.

3. ▶ Pull out the fine dust filter and leave it in a clean place ↪ on page 29.

4. ▶ Loosen the two Phillips screws (Fig. 29/2).

5. ▶ Remove the entire outdoor air damper assembly (Fig. 29/1).
6. ▶ Remove the plug of the connecting cable (Fig. 29/5) from the actuator (Fig. 29/3).
7. ▶ Release the actuator from the retaining bracket (Fig. 29/4) and fit a new actuator.

Re-install the assembly by following the steps in reverse order.

8. ▶ Fixing the cover plate, ↪ 'Closing the cover plate' on page 32.

### ! NOTICE!

Be sure to insert the protective earth conductor when you fix the cover plate.

9. ▶ Switch on the power supply.
  - ⇒ The actuator has been replaced.

## 8.3.4 Replacing the actuator on the exhaust air damper

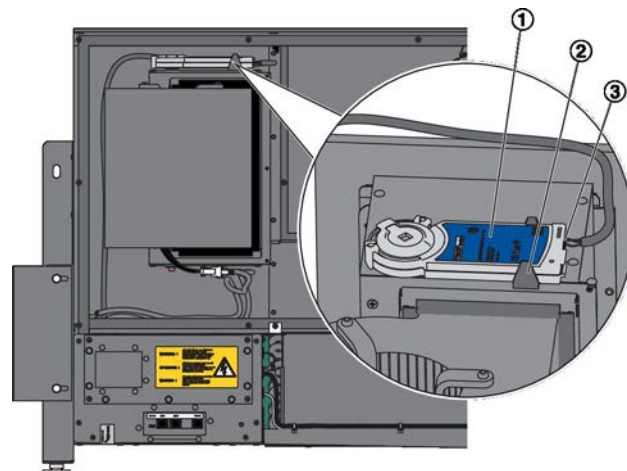


Fig. 30: Replacing an actuator

### Personnel:

- Skilled qualified electrician

1. ▶

### ! DANGER!

Danger of electric shock! Do not touch any live components! Electrical equipment carries a dangerous electrical voltage.

- Switch off the power supply before you carry out maintenance or cleaning.
- Only skilled qualified electricians are allowed to work on the electrical system.

Switch off the supply voltage and secure it against being switched on again before working on the unit.

2. ▶ Removing the cover plate ↪ 'Opening the cover plate' on page 30.
3. ▶ Remove the plug of the connecting cable (Fig. 30/3) from the actuator (Fig. 30/1).
4. ▶ Release the actuator from the retaining bracket (Fig. 30/2) by pulling it up from the top, then replace it with a new actuator.
5. ▶ Plug the connecting cable into the actuator.
6. ▶ Fixing the cover plate, ↪ 'Closing the cover plate' on page 32.

### ! NOTICE!

Be sure to insert the protective earth conductor when you fix the cover plate.

7. ▶ Switch on the power supply.
  - ⇒ The actuator has been replaced.

## 8.3.5 Replacing the actuator on the bypass damper

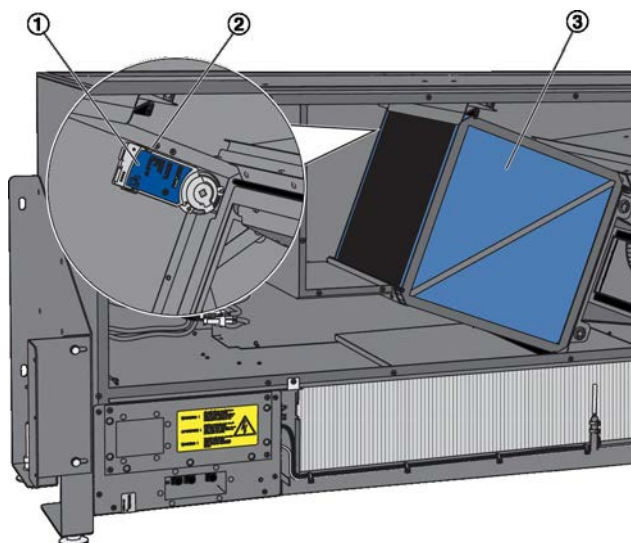


Fig. 31: Replacing an actuator

### Personnel:

- Skilled qualified electrician

### Special tool:

- Commercially available vacuum cleaner

1. ▶

### DANGER!

Danger of electric shock! Do not touch any live components! Electrical equipment carries a dangerous electrical voltage.

- Switch off the power supply before you carry out maintenance or cleaning.
- Only skilled qualified electricians are allowed to work on the electrical system.

Switch off the supply voltage and secure it against being switched on again before working on the unit.

- ▶ Removing the cover plate ↪ 'Opening the cover plate' on page 30.
- ▶ Remove the recuperative heat exchanger (Fig. 31/3).
- ▶ Remove the plug of the connecting cable from the actuator (Fig. 31/1).
- ▶ Remove the actuator from the retaining bracket (Fig. 31/2) and from drive shaft of the bypass damper.
- ▶ Hold the new actuator in the same position as the one you have removed, then push it onto the drive shaft.
- ▶ Plug in the connecting cable and push the recuperative heat exchanger back into the casing.
- ▶ Fixing the cover plate, ↪ 'Closing the cover plate' on page 32.

### NOTICE!

Be sure to insert the protective earth conductor when you fix the cover plate.

- ▶ Switch on the power supply.
  - ⇒ The actuator has been replaced.



### 8.3.6 Replacing the control module for actuators

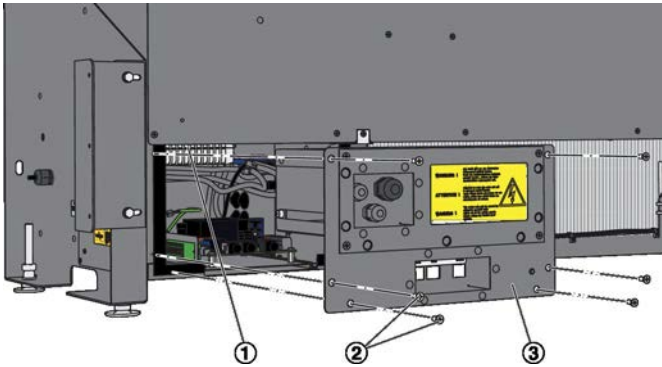


Fig. 32: Replacing the control module

#### Personnel:

- Skilled qualified electrician

#### 1. ▶



#### **DANGER!**

Danger of electric shock! Do not touch any live components! Electrical equipment carries a dangerous electrical voltage.

- Switch off the power supply before you carry out maintenance or cleaning.
- Only skilled qualified electricians are allowed to work on the electrical system.

Switch off the supply voltage and secure it against being switched on again before working on the unit.

2. ▶ Pull the communication cables from the sockets and open the cable glands, if necessary.
3. ▶ Take off the controls access panel (Fig. 32/3); to do so, loosen the Phillips screws (Fig. 32/2), then remove the panel.

While doing so, remove the protective conductor.

4. ▶ Pull out the control module (Fig. 32/1).
5. ▶ Remove the connecting cables for the actuators by removing the plugs from above.
6. ▶ Replace the module.

Re-install the unit by following the steps in reverse order.



#### **NOTICE!**

Be sure to insert the protective conductor when you fix the inspection access panel.

7. ▶ Switch on the power supply.

⇒ The control module has been replaced.

## 9 Technical data

### 9.1 General data

**Technical data sheets**

An illustration and the technical data have already been provided for information and acceptance by the customer. We recommend that you keep those documents with this manual.

Data	Value	Unit
Max. operating pressure, water side	6	bar
Max. operating temperature	75	°C
Max. operating temperature with flexible connecting hoses	55	°C
Supply voltage	230 ±10%	V AC
Supply voltage, frequency	50/60	Hz
Power consumption (nominal volume flow rate)	39	W
Rating	117	VA
Protection level	IP 21	
Weight	80	kg

### Rating plate



Fig. 33: The rating plate is affixed to the cover plate.

- ① Type of unit
- ② Year of manufacture
- ③ Commissioning no.
- ④ Serial number
- ⑤ Supply voltage
- ⑥ Max. power consumption
- ⑦ Protection level
- ⑧ Max. water temperature
- ⑨ Max. operating pressure
- ⑩ Supply air filter class
- ⑪ Extract air filter class

## 9.2 Performance data

### SCHOOLAIR-B with 4-pipe heat exchanger

Volume flow rate	m³/h	Supply air			
		150	200	250	320
Total cooling capacity	W	680	910	1130	1400
Room cooling capacity	W	401	534	668	812
Temperature of the air in the unit	°C	32.0	32.0	32.0	32.0
Relative humidity	%	40.0	40.0	40.0	40.0
Water content of the dry air	g/kg	11.9	11.9	11.9	11.9
Supply air temperature	°C	18.0	18.0	18.0	18.0
Condensation	g/h	0	0	0	0
Chilled water flow rate	l/h	100	150	180	220
Water temperature, inlet	°C	16	16	16	16
Water temperature, outlet	°C	21.9	21.2	21.4	21.5
Pressure drop – water side	kPa	<3	<6	<9	<12
Total heating capacity (without heat recovery)	W	2800	3760	4630	5730
Room heating capacity	W	877	1189	1420	1646
Temperature of the air in the unit	°C	-12.0	-12.0	-12.0	-12.0
Supply air temperature	°C	37.5	37.8	37.0	35.4
Hot water flow rate	l/h	70	110	150	200
Water temperature, inlet	°C	60	60	60	60
Water temperature, outlet	°C	25.0	30.1	33.0	34.9
Pressure drop – water side	kPa	<3	<5	<7	<12

The table values are just examples and may differ for bespoke units.

Heat recovery has not been accounted for.

Values for cooling are based on a water glycol mixture with 40% glycol.

#### Calculation conditions

- **Cooling (summer):**
  - Outdoor air temperature: 32 °C
  - Rel. humidity: 40%
  - Room temperature: 26 °C
- **Heating (winter):**
  - Outdoor air temperature: -12 °C, 90% rh
  - Room temperature: 20 °C

## SCHOOLAIR-B with 2-pipe heat exchanger

Volume flow rate	m³/h	Supply air			
		150	200	250	320
Total heating capacity (without heat recovery)	W	2730	3680	4550	5650
Room heating capacity	W	817	1122	1353	1582
Temperature of the air in the unit	°C	-12.0	-12.0	-12.0	-12.0
Supply air temperature	°C	36.3	36.8	36.2	34.8
Hot water flow rate	l/h	75	110	150	200
Water temperature, inlet	°C	60	60	60	60
Water temperature, outlet	°C	28.1	30.8	33.5	35.3
Pressure drop – water side	kPa	<3	<3	<3	<5

The table values are just examples and may differ for bespoke units.

Heat recovery has not been accounted for.

### Calculation conditions

- **Heating (winter):**
  - Outdoor air temperature: -12 °C, 90% rh
  - Room temperature: 20 °C

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## Appendix

## EU declaration of conformity



## EC declaration of conformity

according to the EU Machinery Directive 2006/42/EG, Annex II, 1.A

**Manufacturer:**

TROX GmbH  
Heinrich-Trox-Platz  
D-47504 Neukirchen-Vluyn

**Authorised for technical documentation:**

TROX GmbH  
Produktmanagement  
Heinrich-Trox-Platz  
D-47504 Neukirchen-Vluyn

**Description and identification of the machinery:**

Product: Decentralised Ventilation System  
Type: TROX-SCHOOLAIR-B

**We herewith declare, that the machinery is in compliance with all relevant provisions of the following EU Directives:**

2006/42/EG:2006-05-17 EU Machinery Directive 2006/42/EG  
2004/108/EG: (Electromagnetic compatibility) Directive 2004/108/EC of the European Parliament and of the Council of 15 December 2004 on the approximation of the laws of the Member States relating to electromagnetic compatibility and repealing Directive 89/336/EEC  
2006/95/EG: (Voltage limits) Directive of the European Parliament and of the Council of 12 December 2006 on the harmonisation of the laws of Member States relating to electrical equipment designed for use within certain voltage limits (codified version)

Neukirchen-Vluyn, 14.07.2011

Prof. Dr.-Ing. Dirk Müller  
Chief Technical Officer

ppa. Siegfried Walter  
Head of Product Management

Declaration of hygiene conformity



Declaration of Hygiene Conformity

Decentralised Ventilation Units
Types SCHOOLAIR-B · SCHOOLAIR-D · SCHOOLAIR-V

Object of the inspection

TROX GmbH, Heinrich-Trox-Platz, D-47504 Neukirchen-Vluyn, Germany, hereby confirm that the decentralised ventilation units of types SCHOOLAIR-B/-D/-V meet the hygiene requirements specified by the standards and regulations listed below.

- European standard
- EN 13779 (09/2007)
• German standards
- VDI 6022, part 1 (07/2011)
- VDI 6035 (09/2009)
• Austrian standards
- ÖNORM H 6021 (09/2003)
• Swiss SWKI regulations
- VA104-01 (04/2006)

For the purpose of this declaration of conformity a sample of each type mentioned above was viewed at the TROX GmbH factory, Heinrich-Trox-Platz, 47504 Neukirchen-Vluyn, Germany, and related data sheets, technical literature, and inspection reports were appraised.

Summary of the test result

The examination of the above-mentioned sample equipment and the appraisal of the available documents have shown that the hygiene requirements specified by the above-mentioned standards and regulations are met.

We hereby confirm that the decentralised ventilation units of types SCHOOLAIR-B/-D/-V meet the hygiene requirements of the specified standards and regulations.

Neukirchen-Vluyn, Germany, 08 November 2011

Handwritten signature of Dirk Scherder



Dipl.-Ing. Dirk Scherder
trained according to VDI 6022, category A
Product Management

Handwritten signature of Jan Heymann

Dipl.-Ing. Jan Heymann
Manager Quality Systems

Certificate



## Commissioning report/Maintenance report

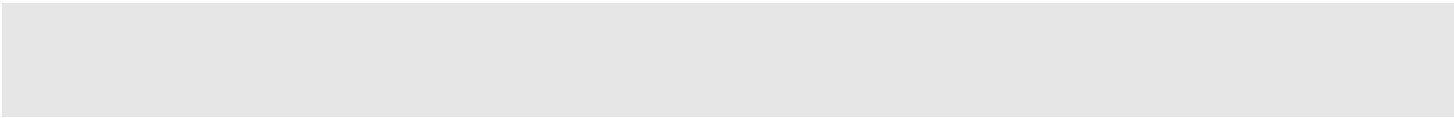
<b>Building:</b>	<b>Floor:</b>	<b>Unit:</b>
<b>Commissioning:</b> <input type="checkbox"/>	<b>Maintenance:</b> <input type="checkbox"/>	<b>Date:</b> __ . __ . 20__

### Maintenance measures

Item to be checked	Measures	Intervall [months]			Done	
		6	12	24	Yes	No
Cleaning the ventilation unit	Remove dust and contamination from the casing and from the air passages inside the unit.		X		<input type="checkbox"/>	<input type="checkbox"/>
Checking air terminal units in the external wall for damage and corrosion (random check)	Clean; if necessary, repair.		X		<input type="checkbox"/>	<input type="checkbox"/>
Checking the heat exchanger, condensate drip tray and condensate drain (random check)	Check for corrosion and hygiene; clean 🔧 33	X <sup>1</sup>	X		<input type="checkbox"/>	<input type="checkbox"/>
Checking outdoor air and exhaust air openings for leakages (random check)	In case of visible leakages: adjust the damper opening angle, replace the actuator, clean		X		<input type="checkbox"/>	<input type="checkbox"/>
	Check if the damper blade closes in case of a power failure			X	<input type="checkbox"/>	<input type="checkbox"/>
Checking filters after any pressure drop, based on hygiene conditions, based on operating time (random checks)	Replace the filter medium, clean the filter chamber, check seals 🔧 29	X <sup>1</sup>	X		<input type="checkbox"/>	<input type="checkbox"/>
Checking the recuperative heat exchanger (random check)	Check seals, adjust or replace if necessary; clean the recuperative heat exchanger; check and clean water drain 🔧 31	X <sup>1</sup>	X		<input type="checkbox"/>	<input type="checkbox"/>
Checking fan functions (random check)	Different speeds			X	<input type="checkbox"/>	<input type="checkbox"/>
Checking release of the frost protection function for heat exchangers	Let the supply air temperature sensor cool down to a value below the release temperature and see if the ventilation unit is switched off as a consequence		X		<input type="checkbox"/>	<input type="checkbox"/>
Checking valves for function and leakages (random check)	Check whether the heating and cooling valves open and close correctly and whether the effect of the actuator action is correct			X	<input type="checkbox"/>	<input type="checkbox"/>
Checking the control panel (random check)	Check switching function, setpoint shift			X	<input type="checkbox"/>	<input type="checkbox"/>
Checking control units (random check)	Check circuits, control signals; adjust them if necessary			X	<input type="checkbox"/>	<input type="checkbox"/>

1) if condensation forms

<b>Comment:</b>	
<b>Next mainenance scheduled for:</b>	
<b>Signature:</b> (Technician)	
<b>Company:</b> (Stamp)	



**TROX<sup>®</sup> TECHNIK**

The art of handling air

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