Installation and configuration manual GB/en

Single room control system

FSL-CONTROL III

for decentralised ventilation units

Read the instructions prior to performing any task!

TROX® TECHNIK

The art of handling air

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General information

About this manual

This manual enables personnel to correctly install and configure FSL-CONTROL III for the control of TROX decentralised ventilation units.

This manual is intended for use by network administrators, instructed 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

- Operating and installation manual for the decentralised ventilation unit
- Project-specific documents (if any)

Copyright

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

Online	www.troxtechnik.com
Phone	+49 2845 202-400

Limitation of liability

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.

The manufacturer does not accept any liability for damages resulting from:

- Non-compliance with this manual
- Incorrect use
- Operation or handling by untrained individuals
- Unauthorised modifications
- Technical changes
- Use of non-approved replacement parts

The actual scope of delivery may differ from the information in this manual for bespoke constructions, additional order options or as a result of recent technical changes.

The obligations agreed in the order, the general terms and conditions, the manufacturer's terms of delivery, and the legal regulations in effect at the time the contract is signed shall apply.

We reserve the right to make technical changes.

Defects liability

For details regarding defects liability please refer to section "VI. Warranty Claims" of the Delivery Terms of TROX GmbH.

The General Delivery Terms of TROX GmbH can be found on the Internet at www.trox.de.

Table of contents

1 Safety

1.1 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. ▸ Loosen 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)

1.2 Correct use

The FSL-CONTROL III controller is designed exclusively for the control of TROX decentralised ventilation units.

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.

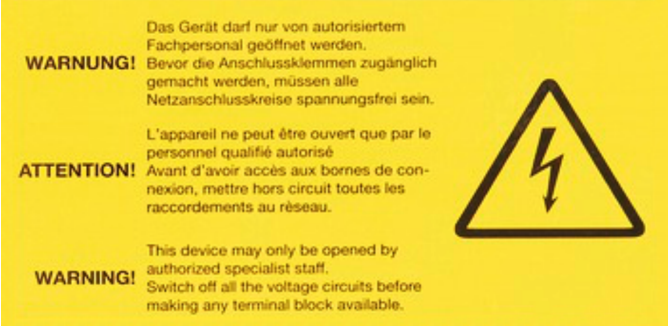
1.3 Safety signs

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.

1.4 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.

1.5 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:

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 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 being switched on accidentally.
- 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

Use only cables that are 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 guidelines for working on electrical and electronic equipment as well as with any applicabe local regulations.
- The connection data can be found on the rating plate or in the wiring diagrams.
- Protect any connections from physical damage.
- Feed cables through the cable glands on the ventilation unit.
- Ensure that the unit can be de-energised (all phases) for maintenance such that no voltage is present. This requires separators (e.g. fuses or RCBOs); the distance between contacts should be at least 3 mm.
- For units without integral controls from TROX follow the instructions of the controls provider.

2.1 Wiring

Personnel:

- Skilled qualified electrician

▸ Connect the ventilation unit according to the wiring diagrams. The position of the electrical connections (terminal box) can be found in the device-specific documentation.

2.1.1 Connection of the supply voltage

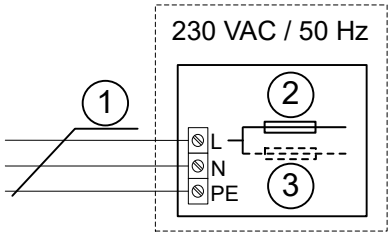


Fig. 1: Connection of the supply voltage

1 Connecting cable Ölflex Classic 100 3G 1.5 mm² ca. 1.0 m (supply package TROX)
2 Fuse 3.15 A
3 SCHOOLAIR-V-HV-EH only: fuse 9.0 A

DANGER!

Risk to life from electrical voltage!

The control box may not be opened, it is used for the internal electrical wiring and may only be opened by TROX Service personnel.

The electrical connection is made with the connecting cable leading from the control box.

2.1.2 Connection of the control panel

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.

Honeywell, 5-stage (0, 1, 2, 3, AUTO)

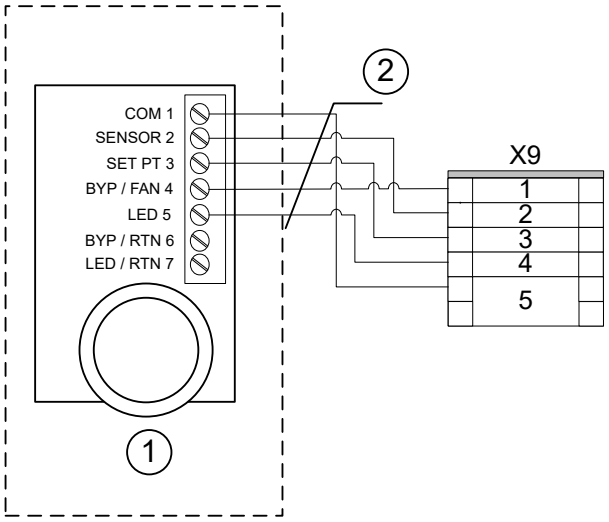


Fig. 2: Wiring of Honeywell control panel, 5-stage to terminal X9

1 Control panel with selector switch, for surface mounting, type: T7460F1000, TROX order no. M546FB8
2 LiYCY 5 x 0.5 mm² shielded (by others)

Schneider, without selector switch

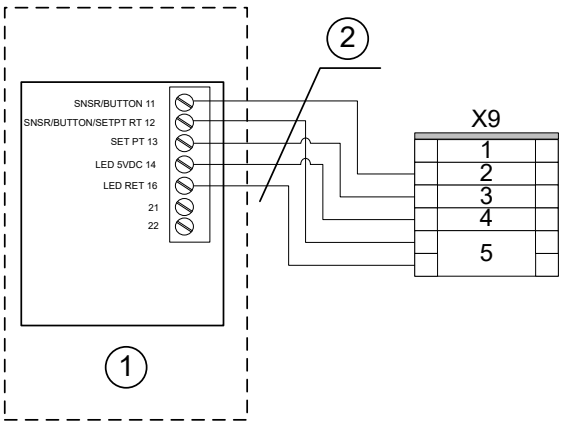


Fig. 3: Wiring of control panel STR 504 to terminal X9

1 Control panel without selector switch, for surface mounting, type: STR 504 TROX order no. M536BA4
2 LiYCY 5 x 0.5 mm² shielded (by others)

Titec, without selector switch

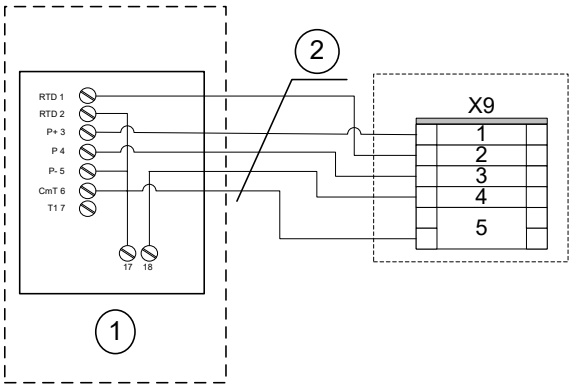


Fig. 4: Wiring of control panel Titec RTF3-NTC20k-P5k-T-L to terminal X9

1 Control panel without selector switch, type RTF3-NTC20k-P5k-T-L for surface mounting, TROX order no. A00000059067
2 LiYCY 5 x 0.5 mm² shielded (by others)

Thermokon, without selector switch

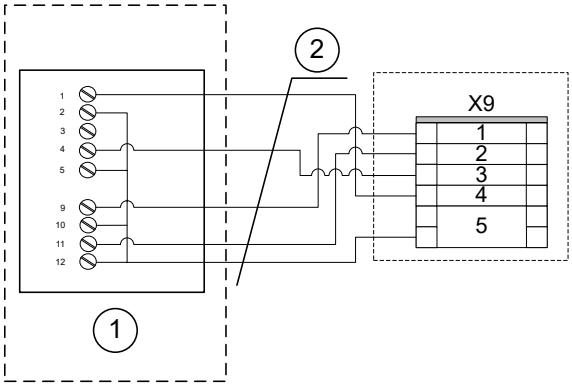


Fig. 5: Wiring of Thermokon control panel to terminal X9

1 Control panel without selector switch for surface mounting, type WRF04 PTD NTC 20k 5k gn, TROX order no. A00000079777
2 LiYCY 5 x 0.5 mm² shielded (by others)

Titec, without selector switch, Berker S.1

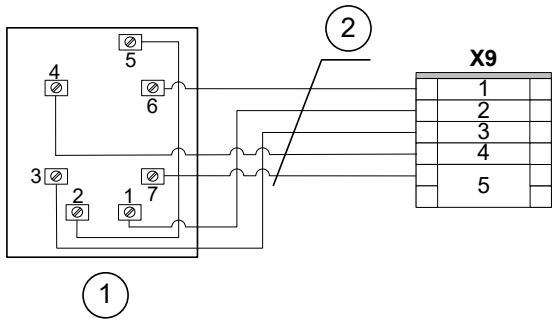


Fig. 6: Wiring of Berker S.1 control panel to terminal X9

1 Control panel without selector switch, flush mounted for switch programme Berker BS1 type: BS1-NTC10k-P5-T-L, TROX order no. A00000074476
2 LiYCY 5 x 0.5 mm² shielded (by others)

Thermokon, without selector switch, Berker S.1

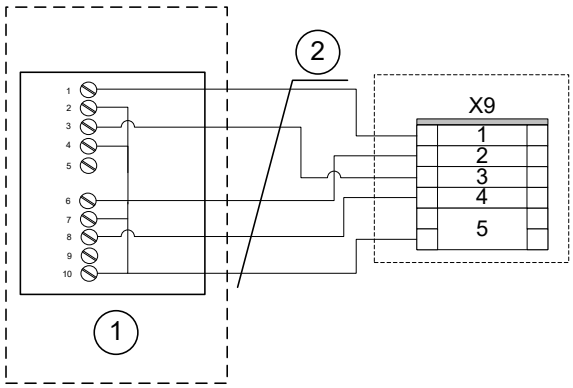


Fig. 7: Wiring of Thermokon control panel to terminal X9

1 Control panel without selector switch, for flush mounting, suitable for switch programme Berker S.1, type WRF07 PTD NTC 20k BType6 5k gn, TROX order no. A00000079778
2 LiYCY 5 x 0.5 mm² shielded (by others)

Thermokon, without selector switch, Busch Jäger Futura

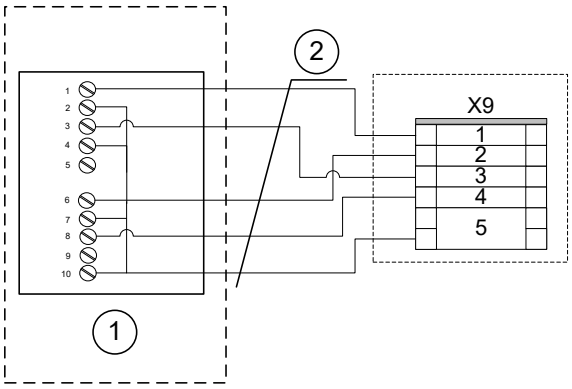


Fig. 8: Wiring of Thermokon control panel to terminal X9

1 Control panel without selector switch, for flush mounting, suitable for switch programme Busch Jäger Futura, type WRF07 PTD NTC 20k BType6 5k gn, TROX order no. A00000079779
2 LiYCY 5 x 0.5 mm² shielded (by others)

2.1.3 Connection of room temperature sensor

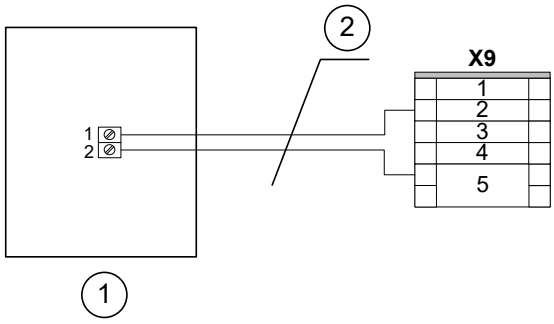


Fig. 9: Connection of room temperature sensor

1 Room temperature sensor, type RTF3-NTC10k, TROX order no. A00000059069
2 LiYCY 5 x 0.5 mm² shielded (by others)

2.1.4 Connection of external inputs and outputs

External switch inputs

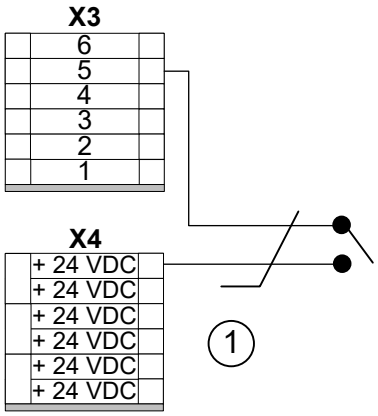


Fig. 10: Wiring example of window contact

1 Connecting cable LiYCY 2 x 0.5 mm² (by others)

Terminal connections X3

No.	Function	Switch	
		Open	Closed
1	Fume cupboard switch	Inactive	Active
2	Changeover [1]	Heating	Cooling
3	Operating enable	Off	Automatic
4	Fire emergency stop [1]	Off	Automatic
5	Window contact [1]	Off	Automatic
6	PIR sensor	Valid operating mode	Occupied

1 cable break safety device

External switch outputs

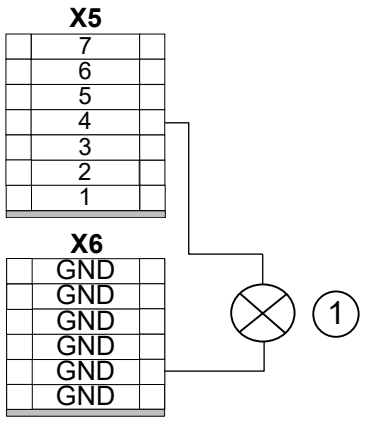


Fig. 11: Wiring example B alarm

1 Connecting cable LiYCY 2 x 0.5 mm² (by others)

Terminal connections X5

No.	Connection	Voltage / Current consumption
1	Requirements of coolant [1]	24 VDC, max. 250 mA
2	Requirements of heat transfer fluid [1]	
3	Operational readiness	
4	B alarm	
5	A alarm	
6	Enable heating ceiling	
7	Enable chilled ceiling	

1 changeover mode only

2.1.5 Communication FSL-CONTROL III

2.1.5.1 Several controllers in a control zone

Up to 11 FSL-CONTROL III devices can be connected in one control zone (1 master device and up to 10 slave devices).

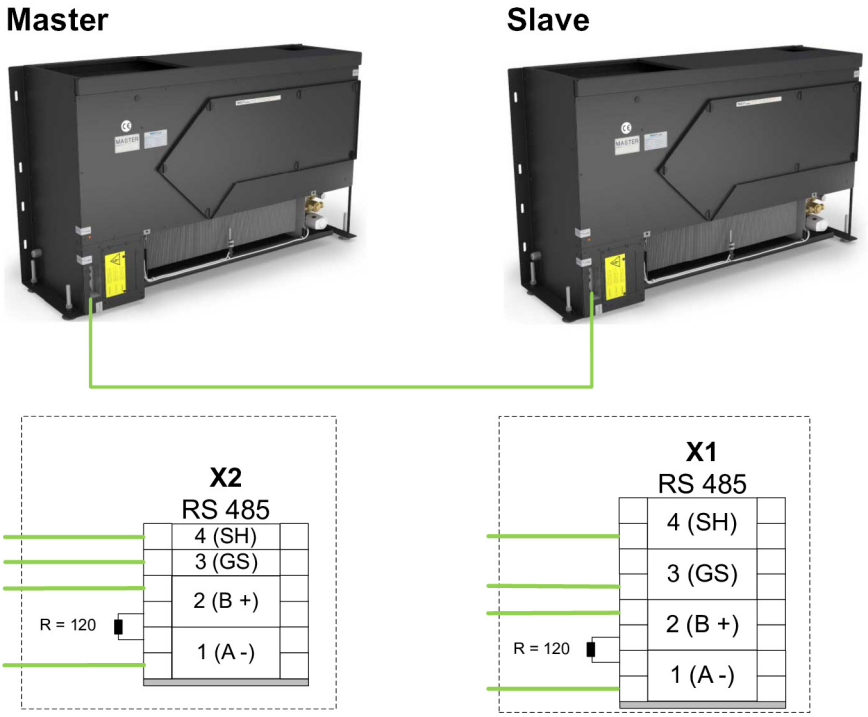


Fig. 12: FSL-CONTROL III communication 2 devices

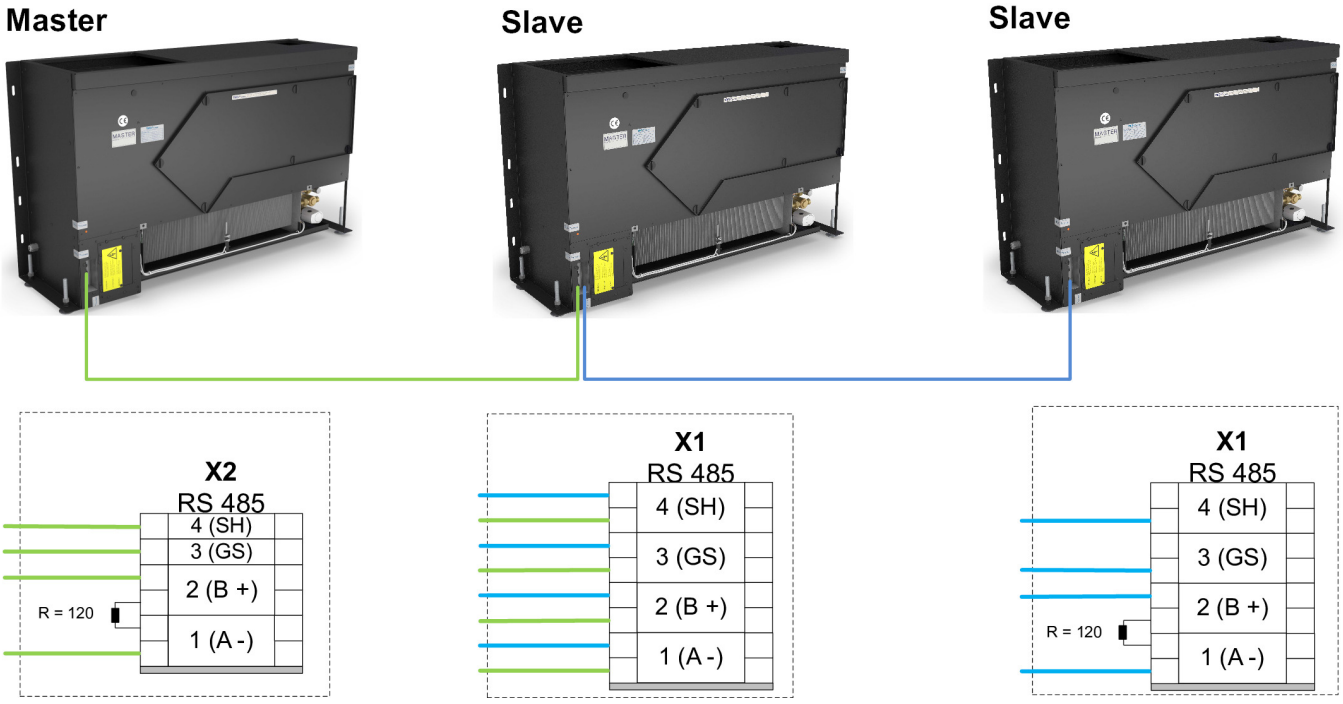


Fig. 13: FSL-CONTROL III communication 3 devices

The master device must be installed on one of the two ends of the network (as the first or last device).

Terminal resistor

For smooth data exchange between the controllers, a resistance of 120 Ohm must be set on the first and last subscriber, remove the resistances in the other devices (if available).

Installation location of terminal resistor Fig. 12, Fig. 13

Master devices - Terminal block X2, terminals 1 and 2

Slave devices - Terminal block X1, terminals 1 and 2

Information on network connection

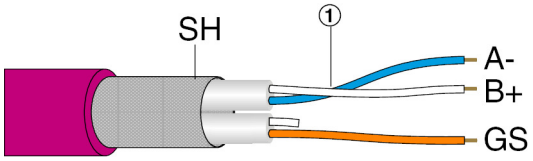


Fig. 14: Wiring

All network connections via shielded cables.

Note: For A- and B+, use a twisted pair ①!

Recommended network cable (by others): e.g. Unitronic BUS LD 2 x 2 x 0.25 mm² or equivalent

2.1.5.2 Network with several control zones

Building a network

Control zones can be networked using one of four existing network protocols (Modbus RTU, Modbus TCP, BACnet MS/TP or BACnet IP). This requires a bus interface card to be connected to the FSL-CONTROL III master controller in the factory.

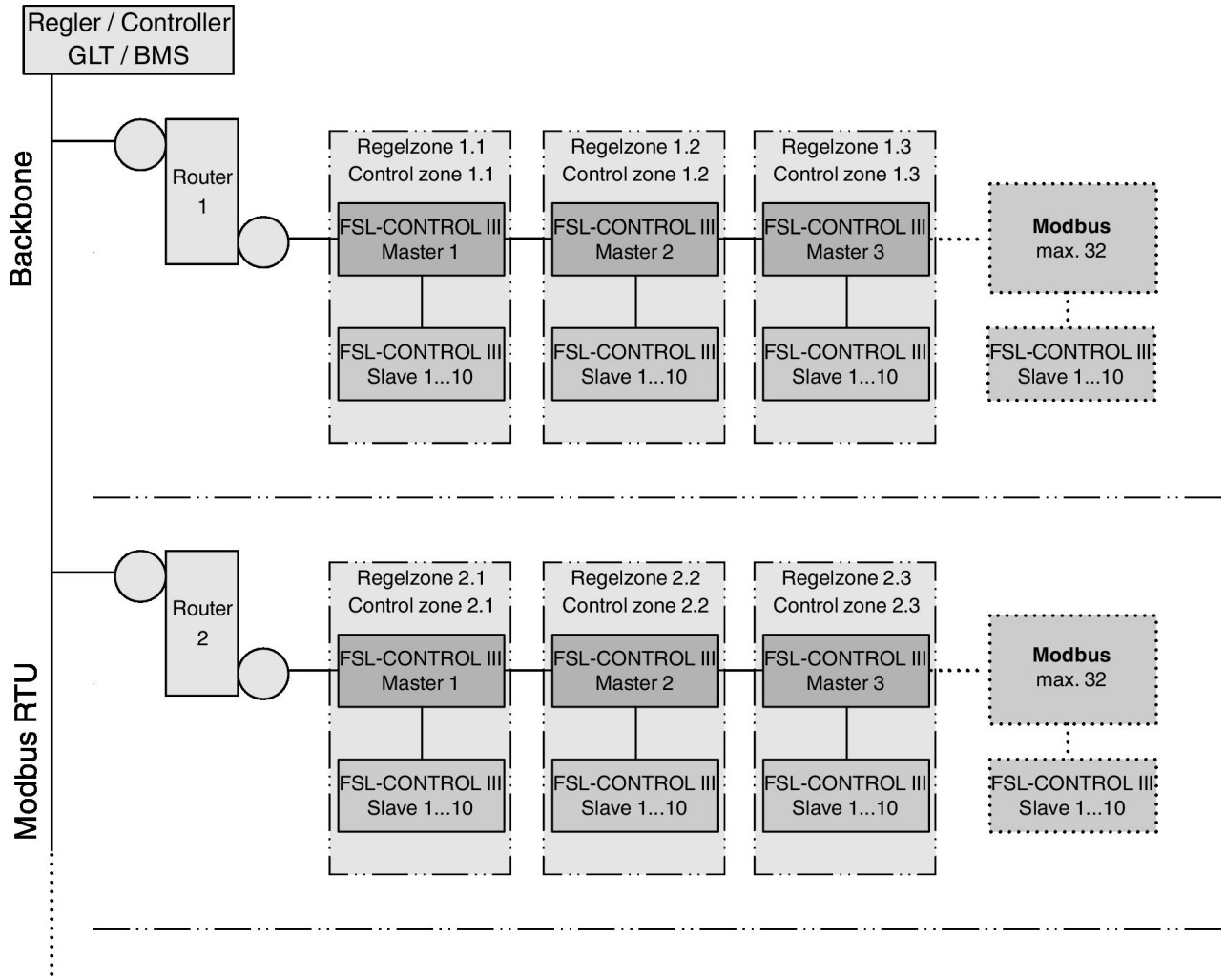


Fig. 15: FSL-CONTROL III network configuration, example Modbus RTU; BACnet MS/TP

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

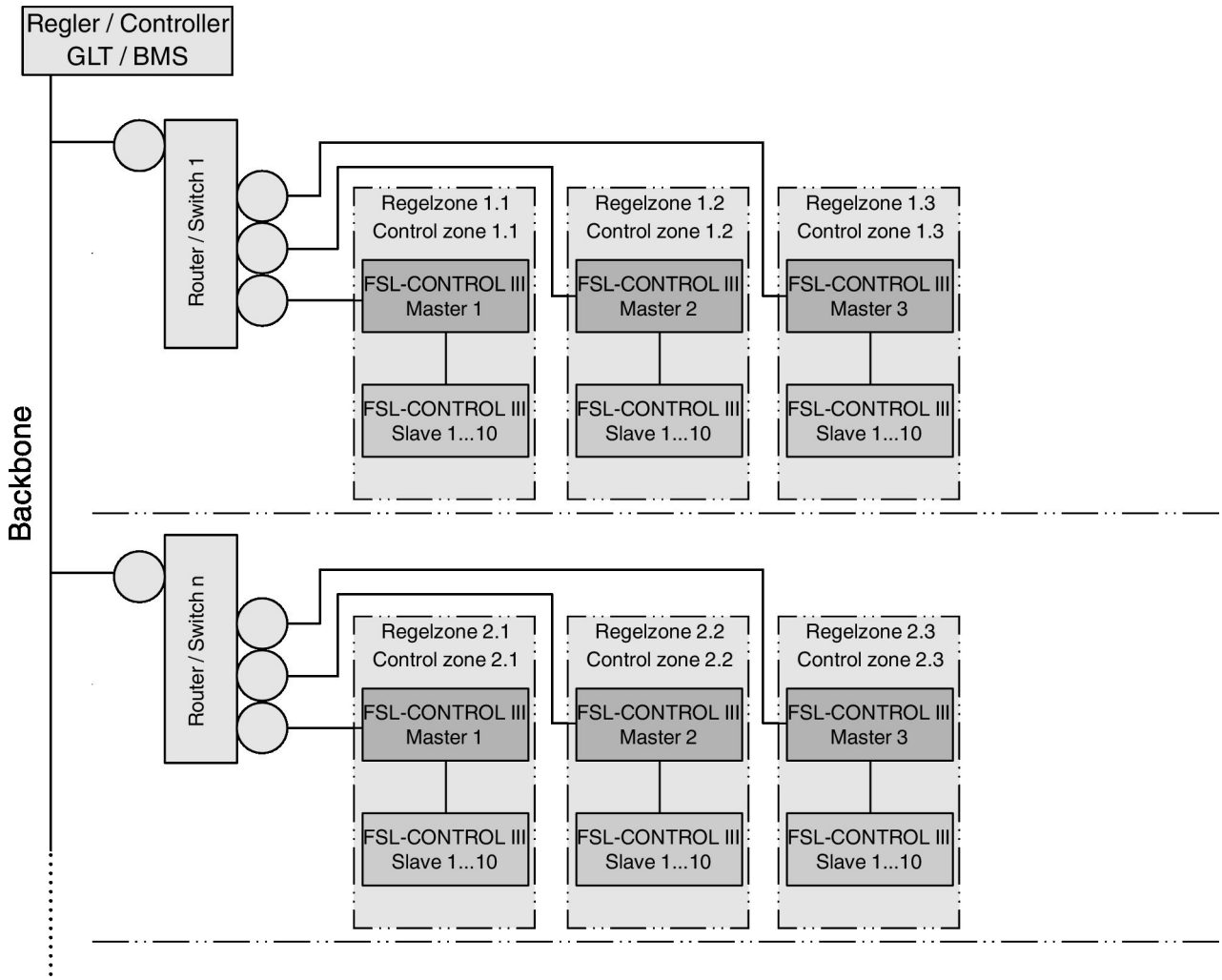


Fig. 16: FSL-CONTROL III network configuration, Modbus TCP; BACnet IP

2.2 Connection to the central building management system (central BMS)

2.2.1 Modbus RTU / BACnet MS/TP

Connection of data cables

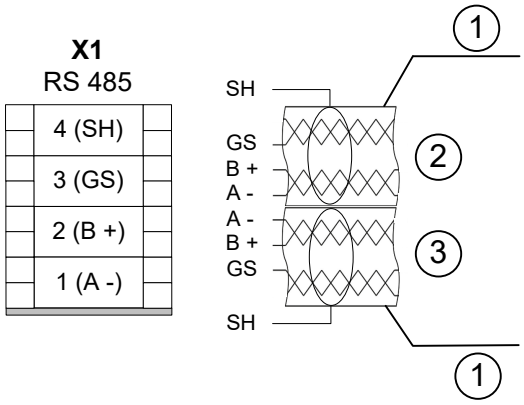


Fig. 17: Connection of central BMS to the master device with Modbus RTU / BACnet MS/TP interface

1 Network cable Unitronic BUS LD 2 x 2 x 0.22 (or equivalent, by others)
2 (coming) from the central building management system
3 (going) to the next BUS subscriber of the central BMS
Count up the terminal position from the grey end plate (direction of the arrow)

The Modbus RTU / BACnet MS/TP interface has terminals for max. two cables of an EIA-485 network. A maximum of 32 devices can be operated on one network segment.

Personnel:

- Network administrator

Materials:

- Software for bus communication
- Browser

1. ▸ Strip the insulation from the cable (at least three wires), insert the bare wires into the terminals and tighten the screws by hand (only use twisted pair for B+ and A-).

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

2. ▸ Fix the data cables to the casing using the wire clamping bracket.

3. ▸ Connect the shield to the SH terminals.

   Note: 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 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

Unitronic BUS LD 2 x 2 x 0.22 (or equivalent)

2.2.2 Modbus TCP / BACnet IP

Connection of data cables

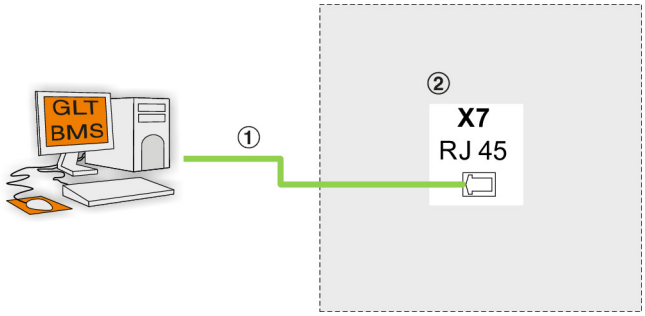


Fig. 18: Connection of central BMS to the master device with Modbus TCP / BACnet IP interface

1 Network cable (coming) from the central building management system
Network cable min. Cat 5e RJ45 (or equivalent, by others)
2 Terminal block X7 RJ45 interface

The devices have an RJ45 interface for star-shaped connection of devices to a Modbus TCP / BACnet IP network.

Personnel:

- Network administrator

Materials:

- Software for bus communication
- Browser

▸ Insert the RJ45 connector for the cable into the intended bush (X7).

Each master must be connected with a separate cable.

Special feature of external control box e. g. FSL-U-ZAS, FSL-U-SEK)

To simplify maintenance, the connection X7 is placed in the ventilation unit and is already connected to the control box with a network cable. The devices can be connected to the central BMS with the aid of the network cable. If the network cable is too short, this can be extended.

Recommended bus cables

Network cable min. Cat. 5e RJ45

2.2.2.1 Setting the network address

Personnel:

- Network administrator

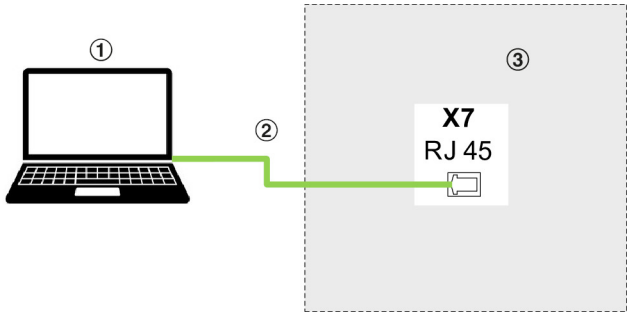


Fig. 19: Connect laptop to the ventilation unit

1 Mobile computer with Ethernet interface
2 Network cable min. Cat 5e RJ45
3 Junction box for network cable

Before operation, the interface for the devices must be adapted to the existing network structure. The configuration is carries out via the browser, *Chapter 4.3.5 "Configuration of ➔ interfaces" on page 34*.

Factory settings SL1 connection X1 serial bus

Address	Name	Value
16124	Address	1
16129	Baud rate X1	2
16126	Data bits X1	8
16127	Stop bits X1	1
16128	Parity X1	2

Master device configuration of the serial connection to the central BMS (Modbus RTU, BACnet MS/TP)

Address of terminal X1

This is used for the addressing of all master devices in the network. Each device is given a unique address. In a network segment, a maximum of 32 network addresses (devices) can be used. The permitted address range is 1 – 128.

For setting information, see *'Settings SL1 connection X1 serial bus' on page 34*

Slave device configuration for connection to the master device

Address of terminal X1

This is used for the addressing of the slave devices in the master / slave network. If only one slave is connected to a master device, no settings are needed. If several slave devices (max. 10 units) are connected to a master device, each slave device must be given a unique address.

Addressing example:

Slave 1 - Value `2` Modbus address 2

Slave 2 - Value `3` Modbus address 3

Slave n - Value `n+1` Modbus address n+1

Slave 10 - Value `11` Modbus address 11

Settings X1 *'Settings SL1 connection X1 serial bus' on page 34*

Address	Name	Value
16129	Baud rate ⇒ 38400 Baud **Note:** No settings are needed, for communication between the master and slave, only 38400 baud is supported.	2
16126	Data bits The FSL-CONTROL III controller only supports 8 data bits.	8
16127	Stop bits The FSL-CONTROL III controller only supports 1 stop bit.	1
16128	Parity ⇒ Even **Note:** No settings required. Only Even is used for communication between master and slave.	2

Modbus address terminal X2

The following settings are factory set and do not need to be changed.

Address	Name	Value
15774	Modbus address terminal X2	1

3 Control of the ventilation unit

3.1 FSL-CONTROL III controller

System overview

FSL-CONTROL III is a dedicated single room control system for decentralised TROX ventilation systems.

The FSL-CONTROL III controller can be used to combine the following concepts:

- Room temperature control using the room or extract air temperature
- Control of the supply air temperature (isothermal)
- Room air quality control (optional)

3.1.1 Control components

The modular design of the hardware allows for adding optional equipment to the range of functions of the FSL-CONTROL III controller.

Fig. 20: Controller, valve with thermoelectric actuator

Basic equipment

- Controller for master or slave operation
- Heating and/or cooling valves including thermoelectic actuators and lockshields
- Supply air temperature sensor

Optional equipment

- Control panel including setpoint value adjuster and room temperature sensor
- Outdoor air temperature sensor
- Air quality sensor (CO_2 / VOC)
- Time programme
- Valve actuators
- Pressure-independent control valve
- Interfaces to the central building management system
  - Modbus RTU interface
  - Modbus TCP interface
  - BACnet MS/TP interface card
  - BACnet IP interface
  - Digital switch contacts (inputs and outputs)

3.1.2 Functional description

3.1.2.1 General

The FSL-CONTROL III controller is used to control various parameters for individual rooms.

It is primarily used to control the room temperature, i.e. to maintain the set parameters and a comfortable room climate. Alternatively, the supply air can be provided to the room with a constant temperature. With an air quality sensor (optional) it is possible to control the fresh air flow rate based on the air quality.

Configuration in the web browser

The devices are configured using the IP interface and web browser.

3.1.2.2 Room temperature control

The FSL-CONTROL III controller ensures that the comfort temperature range for each operating mode is maintained. Cascade control ensures that the comfort temperature range is quickly achieved. The supply air temperature is controlled within the set range and with internal and external loads being accounted for. This is how the comfort requirements are met.

Room temperature control requires that the following values are measured:

- Room temperature, e.g. from an optional control panel or from the central BMS
- Outdoor air temperature, e.g. from the central BMS or from an optional temperature sensor in the outdoor air intake of the master unit
- Supply air temperature

Room temperature control works best when the room temperature is measured at a carefully selected point. The control panel is ideally installed about 1.5 m above the floor. Select an installation location where the control equipment is not affected by disturbances (e.g. solar gain or draughts). We recommend adjusting the flow temperature based on the outdoor temperature in heating and in cooling mode.

Sample standard factory settings for room temperature control

Settings	Operating mode	
	Occupied	Unoccupied
Room temperature setpoint value, heating	21.8 °C	18.0 °C
Room temperature setpoint value, cooling	22.2 °C	28.0 °C
Comfort temperature range	21.8 °C – 22.2 °C	18.0 °C – 28.0 °C
Upper limit of supply air temperature (heating)	42.0 °C	42.0 °C
Lower limit of supply air temperature (cooling)	18.0 °C	13.0 °C

Demand-based settings

These factory settings have been selected for their energy efficiency but can be changed in the web browser.

For a comfortable room climate the supply air temperature in 'Occupied' mode should be at least 18 °C. In heating mode a comfortable room climate can be achieved with supply air temperatures of up to 42 °C.

The minimum permitted supply air temperature for night ventilation is 2K under the supply air temperature threshold for unoccupied mode.

To prevent the system from constantly changing between heating and cooling mode, the room temperature is not controlled to a fixed value, but within a comfort temperature range.

When cooling, the room temperature setpoint value depends on:

- Room temperature
- Operating mode
- Temperature offset (central BMS & control panel)
- Outdoor air temperature

When heating, the room temperature setpoint value depends on:

- Room temperature
- Operating mode
- Temperature offset (central BMS & control panel)
- Outdoor air temperature
- Winter compensation

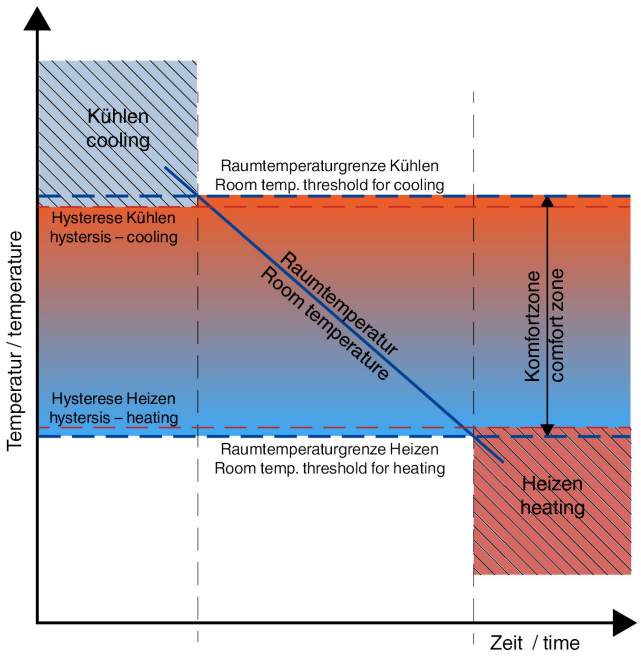


Fig. 21: Room temperature control

Control response for room temperature outside the comfort temperature range:

Room temperature	Control response
Below comfort temperature range	Heating active, the room temperature setpoint value for heating is set.
Above comfort temperature range	Cooling active, the room temperature setpoint value for cooling is set.

If the room temperature is within the comfort temperature range, the room temperature setpoint value is set depending on the outside air temperature.

Control response for room temperature within the comfort temperature range:

Outdoor air temperature	Control response
Below comfort temperature range	Heating active, the room temperature setpoint value for heating is set.
Above comfort temperature range	Cooling active, the room temperature setpoint value for cooling is set.

If the outdoor air temperature is also within the comfort temperature range, the room temperature setpoint value is based on the cooling and heating sequence.

If the room temperature setpoint value is changed on a room control panel (e.g. by entering +2 K), both room temperature limits and hence the comfort temperature range are also changed (e.g. by +2 K) as a consequence.

If the operating mode is set to 'Occupied', the temperature control is suspended as soon as the room temperature is within the comfort temperature range.

3.1.2.3 Constant bypass on heat recovery unit

The ventilation units that are equipped with a cross flow or cross counter flow heat recovery unit have a constant bypass (0…100%). The bypass is controlled automatically.

The bypass is used to reach the supply air temperature setpoint value in heating and cooling mode and for the "Night purge" function. The volume flow rate to be heated by the heat recovery unit is controlled by the bypass.

If, for example, the outdoor temperature is low, but an internal space has to be cooled anyway, use of the cooling coil can be reduced to a minimum as only a small portion or even no portion of the air has to pass the heat recovery unit.

3.1.2.4 Rotary heat recovery unit

In ventilation units with a rotary heat recovery unit, the rotor speed is automatically adjusted so that the supply air temperature setpoint value can be reached. During "Night purge", the rotary motion of the rotor is switched off.

Due to variable control, use of the cooling coil can be reduced to a minimum in transition times, i.e. if the outdoor temperature is low but the internal space has to be cooled anyway.

3.1.2.5 Fan stages

The FSL-CONTROL III controller automatically selects the correct fan stage based on temperature control or indoor air quality (optional). The fan stage can also be pre-set by the central BMS (by others) or from a control panel.

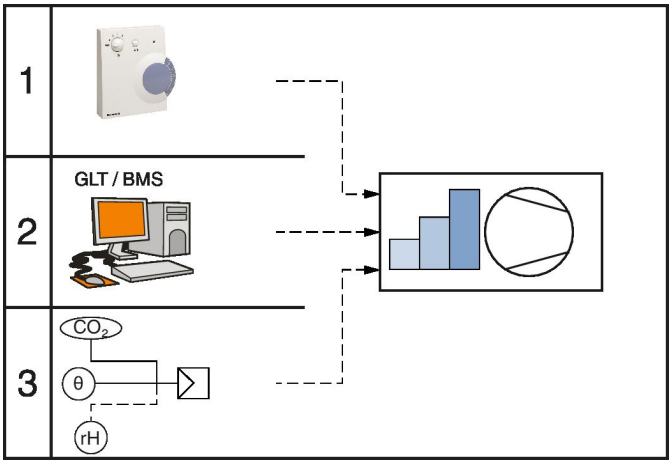


Fig. 22: Fan stages – priority

3.1.2.6 Air quality control (optional)

Air quality control means that the outdoor air flow rate is controlled based on the room air quality.

This type of control is only possible with an air quality sensor (optional equipment or by others). The internal sensor optionally detects the CO_2 concentration or the VOC content of the extract air. Air quality control is always active in the *'Occupied'* operating mode. In the *'Unoccupied'* operating mode, air quality control is inactive.

Air quality control – factory settings

CO_2 value [ppm]	Fan stage	
	Outdoor air	Secondary air
< 500		1-3
500 – 750	1	
750 – 900	2	
> 900	3	

The system owner can adjust the air quality values.

Secondary air and outdoor air modes

If the current measured value of the indoor air quality is under the first limit while the bypass is inactive, this means that secondary air operation is active. As soon as the configured limit of air quality for fan stage 1 is exceeded, the unit automatically switches to outdoor air mode. Preset minimum periods of time ensure that not too many quick changes between the fan stages occur.

3.1.2.7 Operating modes / operating mode override

Automatic operating modes:

- Standby
- Occupied
- Unoccupied

Operating mode override:

- Boost
- Exercise
- Night purge
- Fan force

With an operating mode override, the current automatic operating mode is overridden.
Once this override has been completed, the device returns to automatic mode.

The specified operating modes and overrides can be set using the optional real-time clock and the central BMS. In addition, the Occupied and Unoccupied operating modes as well as the Boost and Exercise overrides can be activated from the control panel.

Various comfort temperature ranges can be defined for the operating modes Occupied and Unoccupied. You can define daily schedules and enter a start time for each operating mode. Using the optional real time clock (RTC) allows for defining 10 switching points per day. If no RTC is used, operating modes must be changed by the central BMS or on the control panel. The comfort temperature range for the Occupied mode can be modified on the control panel and by the central BMS.

Standby operating mode

Standby is selected if the room is not occupied and the ventilation units are not used to maintain the temperature, e.g. at night.

Recommended:

Standby is used exclusively to protect the device. It should be selected for periods of prolonged downtime, e.g. vacation periods, as long as the building protection is ensured by other heat sources.

Occupied operating mode

The Occupied mode is used for occupied rooms.

The following parameters can be set:

- Comfort temperature range for the Occupied mode
- Supply air temperature limits for heating/cooling

Recommended

All-day use (e.g. 7am to 5 pm)

Unoccupied operating mode

The Unoccupied mode is used for unoccupied rooms.

The following parameters can be set:

- Comfort temperature range for Unoccupied mode
- Supply air temperature limits for heating/cooling

Unoccupied

– *This operating mode is used to protect the building; it is required for night purge.*
– *Air quality control is not possible with this operating mode.*

Boost operating mode override

Boost can be selected to quickly ventilate a room, e.g. during break times. The device ensures supply air/extract air operation to improve the indoor air quality. Afterwards, the device returns to the Occupied operating mode.

The following parameters can be set:

- Fan setting (default: stage 4)
- Duration (default: 15 mins)

Boost

Boost mode can be enabled using the control panel or central BMS. The same setpoint values that are used for Occupied mode are used for the comfort temperature range and supply air temperature limits.

Exercise operating mode override

Exercise can be selected if acoustically optimised operation is required. The device conveys a slightly reduced volume flow rate in supply air/extract air operation to improve the indoor air quality. Afterwards, the device returns to the Occupied operating mode.

The following parameters can be set:

- Fan setting (default: stage 2)
- Duration (default: 60 mins)

Exercise

Exercise mode can be enabled using the room control panel or the central BMS The same setpoint values that are used for Occupied mode are used for the comfort temperature range and supply air temperature limits.

Nigh purge operating mode override

With the Night purge function, the room is passively cooled with outdoor air. The minimum supply air temperature corresponds to the supply air temperature limit for heating in Unoccupied mode of -2K. The fans are controlled in the configured stage for night ventilation. The max. fan stage for Unoccupied operating mode is ignored for the duration of night ventilation.

The following conditions must be simultaneously fulfilled:

- Night purge is activated
- The current month is in the range Start – End – Month (default: May – September)
- Activated by RTC, central BMS or DI
- Outdoor air temperature > minimum outdoor air temperature for Night purge (default = 12 °C)
- Outdoor air temperature < as a setpoint value for cooling in the Occupied operating mode

- Outdoor air temperature < current room temperature
- Supply air temperature > minimum supply air temperature limit for heating in the Unoccupied operating mode

The Night purge function ends when one of the following conditions are fulfilled:

- Frost protection
- Window contact
- Fire protection
- Fan force
- Switch of operating mode to Standby or Occupied
- Switch of operating mode to Off or Manual

Note

When the Night purge operating mode override ends, the device switches to Unoccupied. Secondary air units do not execute this override.

Fan force override (fume cupboard switching)

With the Fan force function, there is an override of the fans via the DI, RTC or central BMS. For the duration of the activation, the fans are operated separately from one another in a configurable stage for supply air and extract air.

Fume cupboards

Fume cupboards, e.g. in seminar rooms, can dissipate high volume flow rates. Override control can help to achieve balanced volume flow rates.

The volume flow rates of fume cupboards must be specified when planning devices.

When Fan force is active, the Occupancy button and the default fan setting are deactivated on the control panel.

3.1.2.8 Functions

The following functions of control are factory set on the basis of customer-specific requirements. TROX HGI Service can change the factory settings at a later stage.

3.1.2.8.1 Winter compensation

Winter compensation is the automatic adjustment of the comfort temperature range depending on the outdoor air temperature.

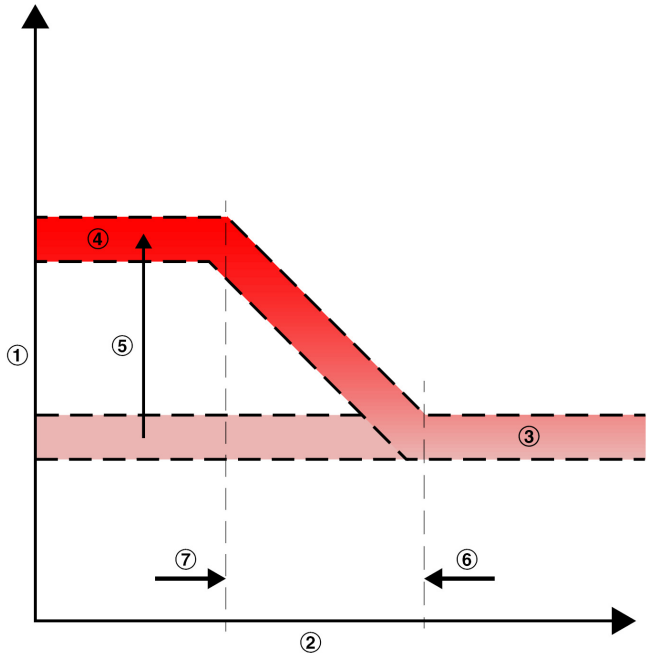


Fig. 23: Sample configuration of winter compensation

1 Room temperature setpoint value
2 Outdoor air temperature
3 Comfort temperature range without winter compensation
4 Comfort temperature range with winter compensation
5 Max. increase in setpoint value
Default temperature for winter compensation start
Maximum winter compensation

Recommended

Winter compensation active

3.1.2.8.2 Minimum fan stages

The minimum ventilation stage function enables forced ventilation in the various operating modes. There is a choice between fan stages 0-5 for operation of the device in the respective operating mode.

Recommended

– *Occupied – fan stage 1*
– *Unoccupied – fan stage 0*

3.1.2.8.3 Secondary air function

If the room air quality is good, the controller switches to secondary air mode, which is more energy efficient. The shut-off dampers are closed and the supply air fan remains switched on.

The controller compares the indoor air quality limit value to the ACTUAL values measured by the air quality sensor and switches automatically between outdoor air and secondary air mode.

Secondary air mode is an option and only possible with air quality measurement (integral function or as a data point of the central BMS).

The secondary air function is not available for all unit variants.

Recommended

Limit value: 500 ppm

3.1.2.8.4 Frost protection

The FSL-CONTROL III controller has frost protection functions to protect the building and device. When the temperature of the outdoor air, supply air or room is too low, frost protection is implemented.

The device carries out the following actions:

- Operating mode = Automatic
- Operating mode = Standby
- Outdoor air and exhaust air dampers closed
- Fan(s) switched off
- Heating valve 100% open

Room temperature frost protection

Devices with room temperature control have the room temperaturefrost protection function. Room temperaturefrost protection is dependent on the room temperature that is either measured by the control panel or by the central BMS as a data point. When the room temperature (central BMS) or measured room temperatures are below a pre-set limit (default = 8 °C), the frost protection function is activated and the actions described above are executed. The device will only return to its original configuration after a configured waiting period (default =360 s) and when a room temperature of at least 1 K (configurable) over the room temperaturefrost limit is reached.

Recommended

Room temperature limit: 8 °C

For connection to the central BMS: ensure transmission of data points!

Supply air temperature frost protection

To prevent the heat exchanger from freezing and becoming damaged as a consequence, the supply air temperature is measured immediately after the heat exchanger. When the pre-set limit for the supply air temperature Frost 1 (default = 12 °C) is not reached, the Frost 1 supply air temperature alarm is activated. Other actions are not executed at this temperature. If the temperature does not reach the pre-set Frost 2 supply air temperature limit (default = 8 °C), the frost protection function is activated and the actions described above are executed. The device will only return to its original configuration after a configured waiting period (default = 360 s) and when the supply air temperature goes above the supply air temperature Frost 2 limit, with a minimum difference of 1 K (configurable).

Recommended

Frost 1 supply air temperature limit: 12 °C

Frost 2 supply air temperature limit: 8 °C

Frost protection

If the outdoor temperature is ≤ -20 °C (can be configured), the ventilation unit is switched off to protect the device components when operating temperatures are too low.

Recommended

Limit value: -20 °C

Heat recovery frost protection

When outdoor air temperatures are low (default = -6 °C depending on the heat recovery unit used), there is the risk that the heat recovery unit will no longer provide ventilation or provide insufficient ventilation on the extract air side due to condensate.

The controller opens the motorised bypass damper to completely bypass the heat recovery. The bypass remains open until the outdoor air temperature has risen to at least 1 K (can be configured) above the limit.

Recommendation depending on the type of heat recovery unit

Cross flow: -6 °C

Cross counterflow: -4 °C

Heat recovery all year round

In devices with a condensate drain, the heat recovery unit can also be operated when outdoor air temperatures are low. Here, there is a regular switch between supply/extract air operation and secondary air operation. During secondary air operation, ice that has formed could melt and drain off. The device then returns to supply air and extract air operation. A drain for condensate is therefore essential.

3.1.2.8.5 Priming (start-up delay in winter)

To prevent frost damage to heat exchangers after a device restart, ending of the frost protection function or a switch of fan stage from 0 to 1 in supply/extract air operation, the ventilation unit has a start-up delay in winter function. With this function, the device primes during the winter months (November to March, configurable) or when outdoor air temperatures are under 3 °C (configurable) with the heating coil switched on.

The start-up delay in winter is executed before commissioning of the fans when one of the following conditions are fulfilled:

- Current month is between November and March
- Outdoor air temperature < limit (default = 3 °C)

To heat the heating coil, the heating coil is 100% opened for 300 seconds (configurable). Ventilation units with constant bypass close the bypass, devices with rotary heat recovery units switch on the rotor. Once the pre-heating time has ended, the heating valve is limited for 45 seconds to 60% (configurable). The device then returns to the specified operating mode.

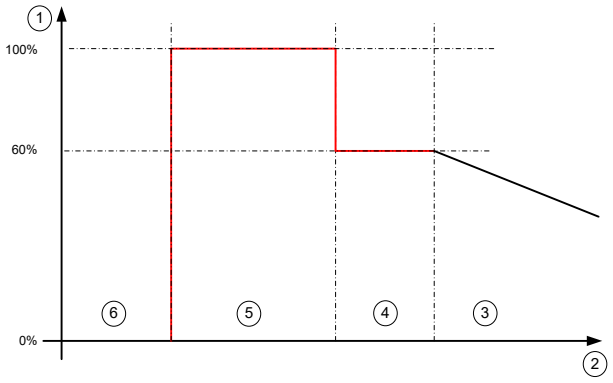


Fig. 24: Diagram of heating valve control signal

1 Control signal
2 Time
3 Control
4 Limitation
5 Priming
6 Standby

Recommended

– *Limit temperature for outdoor air: 5 °C (all year)*
– *Duration of priming: 300 seconds*
– *Duration of limitation: 45 seconds*
– *Valve setting limitation: 60%*

3.1.2.8.6 Night purge

With the Night purge function, the building can be cooled at night during the summer as long as the outdoor air offers sufficient cooling potential.

The following requirements must be fulfilled:

- Night purge is configured in the device
- Current month is in the start-end-month range for Night purge
- Activated by RTC, central BMS or DI
- Outdoor air temperature < setpoint value for cooling for Occupied mode (difference can be configured)
- Outdoor air temperature < room temperature (difference can be configured)
- Outdoor air temperature > minimum outdoor air temperature for Night purge (default = 8 °C, configurable) supply air temperature > minimum supply air temperature - heating limit in Unoccupied mode -2K

ENVIRONMENT!

Saving energy

Night purge provides a high energy savings potential as rooms can be 'pre-cooled' at night without using a cooling coil.

Recommended

– *Highest fan stage*
– *Start month: May*
– *End month: October*

3.1.2.8.7 Filter change alert

The *'Monitoring filter replacement interval'* function (i.e. filter change alert) alerts users in each of the following cases that a filter change is due:

- The number of operating hours exceeds the preset value (factory set to 2500 h, adjustable)
- The differential pressure at the outdoor air filter exceeds the preset value (only for unit variants *-HE and *-HV)

The need for a filter change is signalled by a double flashing of the LED on the control panel or in the web browser via "Operating hours of remaining filter time" (11251)

Note

If the permitted differential pressure on the outdoor air filter is exceeded, the "Operating hours of remaining filter time" (11251) is reset to 0 h in the software.

Differential pressure monitoring

The ventilation units (master only) variants *-HE and *-HV come with a differential pressure monitoring function. This function monitors the differential pressure of the outdoor air filter up to the nominal air volume (usually stage 3) If the differential pressure exceeds the preset value for at least 30 minutes, the filter change alert is activated (see above). In the Boost, Fan force and Night purge operating mode overrides, the differential pressure monitoring function is inactive to prevent unnecessary filter changes.

Filter checks

Differential pressure monitoring is not supposed to replace any regular checks of the outdoor air filter or checks due to hygiene reasons.

Resetting the filter change alert

The filter change interval has to be reset after each filter change using one of the following methods:

- On the analogue control panel -> press and hold the Occupied button (for 15 - 20 sec.)
- In the web browser *'menu*
  ➔ *Reset filter hours, address 10006'*
- Central BMS by others

3.1.2.8.8 Fan force

'Fan force override (fume cupboard switching)' on page 21

3.1.2.9 Interfaces

Master devices have 6 digital inputs and 7 digital outputs. All contacts can be configured as NO or NC contacts. You can use these for the following functions, for example:

- Digital inputs
  - **Window contact:** As soon as a monitored window is opened, the master and slave devices in the room are switched off (default: normally open).
  - **Changeover function:** Allows for changing from heating to cooling and vice versa in 2-pipe-heat exchangers (default: normally closed).
  - **Fire emergency stop:** Master and slave devices are switched off if a signal is received at the corresponding input (default: normally open).
  - **PIR:** manual activation of Occupied operating mode (default: normally closed) e.g. by a PIR sensor.
  - **Fume cupboard switching:** manual activation of Fan force (default: normally closed).
  - **Enable:** enable operation of the device. If there is no Enable, the device cannot be put into operation (higher-level OFF)

Digital inputs

Wiring of digital inputs with 24 VDC 2.5 mA for connecting volt-free contacts.

- Digital outputs
  - **A alarm**
  - **B alarm**
  - **Secondary cooling system:** enable for chilled ceiling
  - **Secondary heating system:** enable for heating system
  - **Operational (standby) message**
  - **Heat transfer fluid requirements:**for changeover mode
  - **Coolant requirements:** for changeover mode

Digital outputs:

Permitted load of digital outputs: 24 VDC / 250 mA.

4 Description of software

To set up the FSL-CONTROL III controller, a PC can be connected to the ventilation unit using the IP interface. Typically, the ventilation units are integrated into the building network via the BUS interface during installation. The devices can then be reached by the central BMS computer.

The control parameters are set and configured in the web browser. The web browser is also used for maintenance work.

To connect a PC to the FSL-CONTROL III controller, a patch cable is needed.

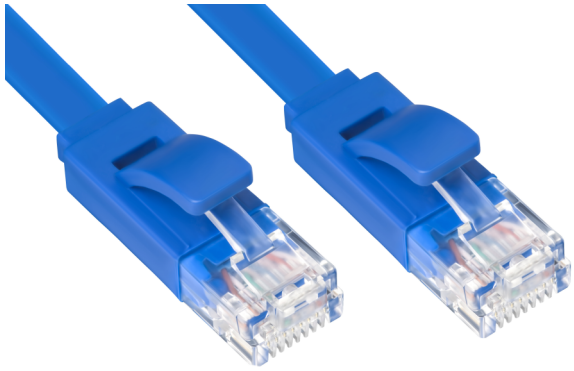


Fig. 25: Patch cable min. cat. 5 S/FTP RJ45

Standard network address

To call up the software to the address line of the browser, enter the IP address of the FSL-CONTROL III controller.

Factory settings:

- *IP address master:* `10.2.100.242`
- *IP address slave:* `10.2.100.243`
- *User name:* `TROX`
- *Password:* `FSL`
- *IP gateway:* `10.2.20.1`
- *Subnet mask:* `255.255.255.0`

The FSL-CONTROL III controller does not have a DHCP, if necessary change the DHCP settings of the Ethernet connection.

4.1 Start screen – Diagnostics

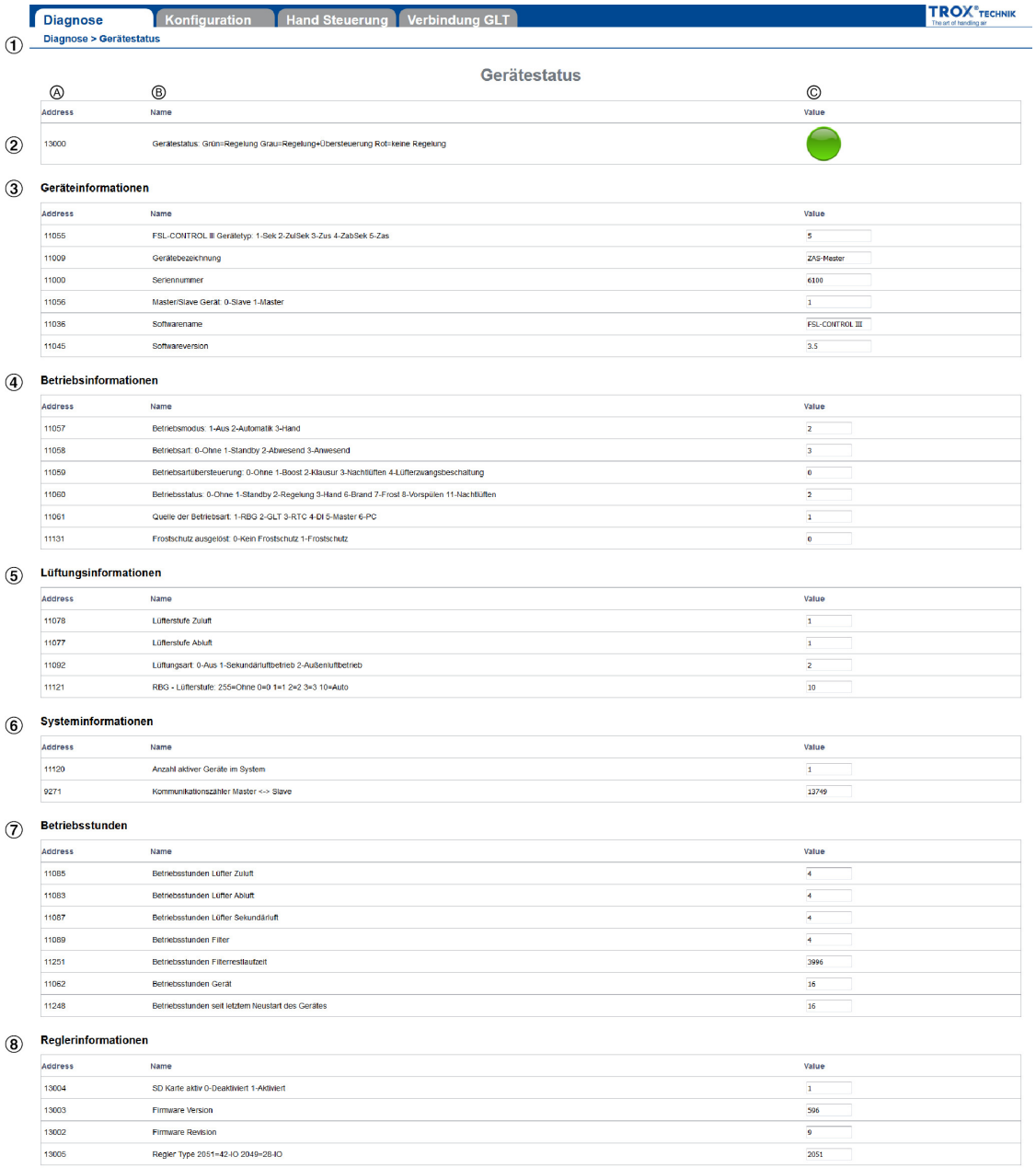


Fig. 26: Start screen for web browser FSL-CONTROL III

① Main menu, Diagnostics, Configuration, Manual (Control), (Connection to) Central BMS
② Display of device status in traffic light form
③ Display of device information
④ Display of operating information
⑤ Display of ventilation information
⑥ Display of system information
⑦ Display of operating hours
⑧ Display of controller information
A Modbus register
B Description
C Value / condition

Main menu structure

Diagnosis	Configuration	Manual	Connection to central BMS
▪ Device status ▪ Temperature control ▪ Fan control ▪ Alarms and filter reset	▪ Device description ▪ Temperature control ▪ Time programme ▪ Fan control ▪ Interfaces	▪ Commands	▪ Device => central BMS ▪ Central BMS => device

Menu items with *+ are protected with a password and are only available to TROX Service.

4.2 Diagnostics menu

4.2.1 *'Device status ➔ diagnostics'*

Device status

Address	Name	Value	Explanation
13000	Device status	Green	▪ Automatic mode ▪ Device OK
		Grey	▪ Override active ▪ Device OK
		Red	Device inactive (e.g. as a result of frost protection)

Device information

Address	Name
11055	**Display of device type** 1 = Secondary air unit 2 = Supply and secondary air unit with option of changeover to secondary air 3 = Supply air and secondary air unit 4 = Supply air and extract air unit with heat recovery and option of changeover to secondary air 5 = Supply air and extract air unit with heat recovery and secondary air mixture
11009	**Device description** Individual device description
11000	**Serial number** Serial number of the device
11056	**Master / slave** 0 = Slave device 1 = Master device
11036	**Software name** `FSL-CONTROL III`
11045	**Software version** Display of software version

Operating information

Address	Explanation
11057	**Operating mode** 1 = Off 2 = Automatic mode 3 = Manual mode
11058	**Operating mode** 0 = No default 1 = Standby 2 = Unoccupied 3 = Occupied
11059	**Operating mode override** 0 = No override active 1 = Boost activated 2 = Exercise activated 3 = Night purge activated 4 = Fan force activated
11060	**Operating state** 0 = None 1 = Standby 2 = Control 3 = Manual mode 6 = Fire emergency stop 7 = Frost alarm 8 = Priming 11 = Night purge

Address	Explanation
11061	**Setting of operating mode by…** 1 = Control panel 2 = Central BMS 3 = Real time clock 4 = Digital input 5 = Master 6 = PC
11131	**Frost protection** 0 = Frost protection inactive 1 = Frost protection active

Ventilation information

Address	Explanation
11078	**Supply air fan stage** Setting of active fan stage for supply air fan.
11077	**Extract air fan stage** Setting of active fan stage for extract air fan
11092	**Type of ventilation** 0 = Off 1 = Secondary air operation 2 = Outdoor air operation
11121	**Specification of the fan stages for TROX control panels** 255 = None (control panel without stage selector) 1 = 0 2 = 1 3 = 2 4 = 3 10 = Automatic

System information

Address	Explanation
11120	**Number of active devices in the system** Display of recognised master-slave devices in the TROX network
9271	**Communication counter master–slave** Used for monitoring communication between the master device and the connected slave devices

Operating information

Address	Explanation
11085	**Operating hours of supply air fan** Display of operating hours of supply air fan
11083	**Operating hours of extract air fan** Display of operating hours of extract air fan.
11087	**Operating hours of secondary air fan** Display of operating hours of secondary air fan (if available)
11089	**Operating hours of filter** Display of operating hours of outdoor air filter.
11062	**Operating hours of device** Display of total operating hours of the ventilation unit.
11248	**Operating hours since the device was last restarted** Display of operating hours since the device was last restarted.

Controller information

Address	Explanation
13004	**SD card** 0 = SD card inactive 1 = SD card active
13003	**Firmware version** Output of the current controller firmware
13002	**Firmware revision** Output of the current controller revision
13005	**Controller type** Output of the controller type

4.2.2 *'Temperature control ➔ diagnostics'*

Temperature control

Address	Explanation
7305	Output of the configured control strategy 0 = Supply air temperature control 1 = Room temperature control 2 = Extract air temperature control
11104	Output of the current control sequence 1 = Cooling 2 = Cooling with heat recovery 3 = Heating with heat recovery 4 = Heating
11133	Output of current outdoor air temperature
11138	Output of current flow temperature

Address	Explanation
11137	Output of current return temperature
11124	Output of the temperature offset configured on the control panel

Temperature sensor

If there is no measured value, e.g. no temperature sensor, the value 32767 is output.

Room / supply air temperatures

Address	Name
11095	Upper temperature limit for cooling, comfort temperature range [1/10 °C]
11096	Lower temperature limit for heating, comfort temperature range [1/10 °C]
11134	Room temperature actual value [1/10 °C]
11093	Room temperature setpoint value [1/10 °C]
11132	Supply air temperature actual value [1/10 °C]
11097	Supply air temperature setpoint value [1/10°C]

Variables

Address	Name
11140	Actual value of heating valve control [1/10%] *
11141	Actual value of cooling valve control [1/10%] *
11145	Actual value of bypass damper control [1/10%] Bypass or RWT [1/10%] heat recovery*
*Display depends on the device equipment	

4.2.3 *'Fan control ➔ diagnostics'*

Type of ventilation

Address	Name
11092	**Type of ventilation:** 0 = Off 1 = Secondary air operation 2 = Outdoor air operation
11198	**Fresh air dampers position** 0 = Closed 1 = Open
11078	Output of calculated fan stage supply air
11077	Output of calculated fan stage extract air
11079	Output of calculated fan stage secondary air
11081	Output of supply air fan speed [1/min]
11080	Output of extract air fan speed [1/min

Fan stages

Address	Name
11106	Fan stages from temperature control
11107	Fan stages from humidity control
11111	Fan stage from air quality control

Humidity/air quality measured values

Address	Name
11110	Room air humidity [%]
11113	Room air quality [ppm]

4.2.4 *'Alarms and filter reset ➔ diagnostics'*

Reset filter hours

Reset filter hours

Address	Name
10006	Reset filter hours: 0 = No default 1 = Reset

A alarm standby

Address	Name
11252	A alarm fan block – device in standby 0 = Inactive 1 = Active

A alarm

Category A alarms can sometimes result in devices being switched off.

The alarm is always output in the form of a consolidated alarm (address 11160) and individually (address 11146 – 11159).

This is a 16-digit bit string made up of all category A alarms. It is output as a decimal number that must be converted to the binary number system. The following alarms are shown depending on the bit used:

Bit 0 = Master – save version conflict
Bit 1 = Currently not in use
Bit 2 = Currently not in use
Bit 3 = FREE
Bit 4 = Group alarm of connected slave devices when there is an A alarm
Bit 5 = Supply air fan blockage
Bit 6 = Extract air fan blockage
Bit 7 = Secondary air fan blockage
Bit 8 = Currently not in use
Bit 9 = Supply air temperature sensor measured value outside tolerance
Bit 10 = Fire emergency stop
Bit 11 = Indoor air temperature sensor measured value outside tolerance
Bit 12 = Mixed flow air distribution temperature sensor measured value outside tolerance
Bit 13 = Outdoor air temperature sensor measured value outside tolerance
Bit 14 = Currently not in use
Bit 15 = Currently not in use

Examples:

1) **Address 11160** ⇒ 32 (decimal) ⇒ 0000000000**1**0000 (binary)

Bit 5 = 1 ⇒ Supply air fan blockage

2) **Address 11160** ⇒ 8224 (decimal) ⇒ 0000**1**0000**1**0000 (binary)

Bit 5 = 1 ⇒ Supply air fan blockage

Bit 11 = 1 ⇒ Indoor air temperature sensor measured value outside tolerance

The alarms of category A are individually listed below.

Alarm status of the respective alarms

Value 0 - No alarm

Value 1 - Alarm present

A alarm

Address	Name
11160	Alarm A consolidated alarm, see above for description
11146	Master – slave version conflict
11147	No communication with expansion module
11150	Group alarm A alarms slaves (A1,A2,A3.. > 0)
11151	Supply air fan blockage
11152	Extract air fan blockage
11153	Secondary air fan blockage
11154	Flow monitor triggered (electric air heater)
11156	Fire protection
11155	Supply air temperature sensor measured value outside tolerance
11157	Indoor air temperature sensor measured value outside tolerance
11158	Mixed air temperature sensor measured value outside tolerance
11159	Outdoor air temperature sensor measured value outside tolerance

B alarm

If there is an alarm in category B, an alert is issued. The devices continue to run in the current operating mode.

The alarm is always output in the form of a consolidated alarm (address 11173) and individually (address 11161 – 11171). 11173 consolidated alarm.

This is a 16-digit bit string made up of all category B alarms. It is output as a decimal number that must be converted to the binary number system. The following alarms are shown depending on the bit used:

Bit 0 = No heat transfer fluid / coolant
Bit 1 = Filter change / filter pressure monitoring triggered
Bit 2 = Frost return temperature
Bit 3 = Frost outdoor air temperature
Bit 4 = Frost indoor / extract air temperature
Bit 5 = Frost 1 supply air temperature (< 12°C)

Bit 6 = Frost 2 supply air temperature (< 8°C)
Bit 7 = Extract air temperature sensor measured value outside tolerance
Bit 8 = Return air temperature sensor measured value outside tolerance
Bit 9 = Flow temperature sensor measured value outside tolerance
Bit 10 = Humidity sensor measured value outside tolerance
Bit 11 = Air quality sensor measured value outside tolerance
Bit 12 = Currently not in use
Bit 13 = Currently not in use
Bit 14 = Currently not in use
Bit 15 = Currently not in use

Examples

1) **Address 11173** ⇒ 32 (decimal) ⇒ 0000000000**1**0000 (binary)

Bit 5 = 1 ⇒Frost 1 supply air temperature

2) **Address 11173** ⇒ 8224 (decimal) ⇒ 0000**1**000000**1**0000 (binary)

Bit 5 = 1 ⇒ Frost 1 supply air temperature

Bit 11 = 1 ⇒ Air quality sensor measured value outside tolerance

B alarm

Address	Name
11173	Alarm B consolidated alarm
11161	No heat transfer fluid / coolant
11162	Filter change reached or pressure monitoring triggered
11163	Frost return temperature
11164	Frost outdoor temperature
11165	Frost indoor / extract air temperature
11166	Frost supply air temperature 1 (limit 12°C)
11167	Frost supply air temperature 2 (limit 8°C)
11168	Extract air temperature sensor measured value outside tolerance
11169	Return air temperature sensor measured value outside tolerance
11170	Flow temperature sensor measured value outside tolerance
11172	Humidity sensor measured value outside tolerance
11171	Air quality sensor measured value outside tolerance

4.3 Configuration menu

4.3.1 *'Configuration ➔ device description'*

Address	Name
17009	Entry of project-specific device description (max.16 characters)

4.3.2 *'Configuration ➔ temperature control'*

Temperature setpoint values

Entry of temperature setpoint values for heating and cooling for Occupied and Unoccupied modes. The range between the setpoint value for heating and the setpoint value for cooling is the comfort temperature range.

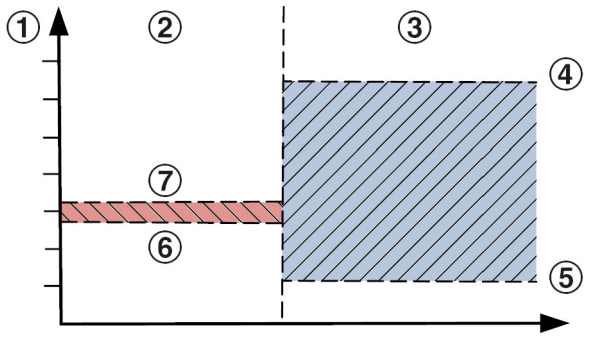


Fig. 27: Comfort temperature range

Red Comfort temperature range for Occupied
Blue Comfort temperature range for Unoccupied
1 Room temperature setpoint value
2 Occupied
3 Unoccupied
4 Cooling setpoint value for Unoccupied
5 Heating setpoint value Unoccupied
6 Heating setpoint value for Occupied
7 Cooling setpoint value for Occupied

Address	Name
17322	Cooling temperature setpoint value for Occupied
17323	Heating temperature setpoint value for Occupied
17324	Cooling temperature setpoint value for Unoccupied
17325	Heating temperature setpoint value for Unoccupied

For values marked with [1/10 °C], the values are always entered with a factor of 10.

***Example:** 17322 cooling temperature setpoint value for Occupied = 26 °C*

***Entry** : 260*

Supply air temperature limits

Entry of minimum and maximum supply air temperature for Occupied and Unoccupied modes.

Address	Name
17311	Supply air temperature upper limit for Unoccupied
17309	Supply air temperature lower limit for Unoccupied
17310	Supply air temperature upper limit for Occupied
17308	Supply air temperature lower limit for Occupied

Winter compensation

Entry of parameters for the winter compensation function.

Address	Name
11478	Activation of winter compensation 0 = Winter compensation inactive 1 = Winter compensation active
17479	Entry of start temperature
17480	Entry of end temperature
17481	Entry of maximum setpoint value increase

Temperature sensor offset

The temperature sensor offset is used as a corrective value when there are temperature deviations.

The entered value is a constant and always has the same effect.

Recommendation: Offset = 0

Address	Name
17273	Entry of supply air temperature sensor correction
17276	Entry of room temperature sensor correction

4.3.3 *'Configuration of ➔ time programme'*

Current date and time on the device

Display of the date and time saved on the FSL-CONTROL III controller.

Set internal clock

Decentralised ventilation unit from TROX can be delivered from the factory with the pre-set date and time. However, it can be necessary to change settings or correct deviations.

Address	Name
10008	Default current date
10010	Default current time
10007	Set date and time 0 = No takeover 1 = Transfer to the controller
18077	Summertime setting 0 = Inactive 1 = Active

Number format

Date: ddmmyy [6 digits without separators]

Time: hhmmss [6 digits without separators]

The data is taken over by entering "1" and Return in the input field (address 10007).

Weekly program

An individual profile can be selected for each weekday.

Address	Name
18000	Profile for Monday
18001	Profile for Tuesday
18002	Profile for Wednesday
18003	Profile for Thursday
18004	Profile for Friday

Address	Name
18005	Profile for Saturday
18006	Profile for Sunday

Profile 1 – 7

For each profile, 10 different switching points can be freely selected.

The following operating modes and overrides are available:

1 - Standby

2 - Unoccupied

3 - Occupied

4 - Boost

5 - Exercise

6 - Night purge

7 - Fan force

Address	Name
18007	Switching point 1
18008	Switching point 2
18009	Switching point 3
18010	Switching point 4
18011	Switching point 5
18012	Switching point 6
18013	Switching point 7
18014	Switching point 8
18015	Switching point 9
18016	Switching point 10

Always start the profile entry at 00:00 in 'Unoccupied' mode,

We recommend separate profiles for weekdays, weekends and holidays.

For supply air temperature control, please replace the operating mode 'Unoccupied' with 'Standby'. The switching points are always active until the following switching point is reached.

Entry is always a combination of time and operating mode or override.

Prefixed zeros are not displayed after entry.

***Example 1**: entry of Unoccupied at 00:00*

Entry = `00002` Display = `2`

***Example 2:** Entry of Night purge at 02:00*

Entry = `2006` Display = `2006`

Example for office

Office times from 08.00 – 17.00

00.00 - Start Unoccupied ⇒ 2

02.00 - Start Night purge ⇒ 2006

05.00 - End Night purge (Unoccupied) ⇒ 5002

07.00 - Pre-tempering (Occupied) ⇒ 7003

07.45 - Flush with fresh air (Boost) ⇒ 7454

08.00 - Normal operation (Occupied) ⇒ 8003

12.30 - Lunch (Unoccupied) ⇒ 12302

13.30 - Normal operation (Occupied) ⇒ 13303

17.00 - Unoccupied ⇒ 17002

21.00 - Rep. Unoccupied ⇒ 21002

Further information

3.1.2.7 'Operating modes / operating mode override' on page 19

4.3.4 *'Configuration of ➔ fan control'*

Air quality control (optional)

Air quality control means that the outdoor air flow rate is controlled based on the room air quality.

This type of control is only possible with an air quality sensor (optional equipment or by others). The internal sensor optionally detects the CO_2 concentration or the VOC content of the extract air. Air quality control is always active in the *'Occupied'* operating mode. In the *'Unoccupied'* operating mode, air quality control is inactive.

Activation of the function in the *'Unoccupied'* operating mode in address line 17378.

The switching thresholds apply for both *'Occupied'* and *'Unoccupied'* operating modes. If a switching threshold is exceeded, the configured fan stage is activated.

> ***Secondary air function***
>
> *For devices with secondary air switching, second ary operation is active until the 1st switching threshold is reached. If the air quality measured value exceeds the 1st switching threshold, supply air and extract air operation is activated. When the other switching thresholds are reached, the fan speed is increased.*

Address	Name
17378	Enable air quality control in Unoccupied 0 = Inactive 1 = Active
17380	1st switching threshold for air quality 0..2000ppm
17381	2nd switching threshold for air quality 0..2000ppm
17382	3rd switching threshold for air quality 0..2000ppm
17383	4th switching threshold for air quality 0..2000ppm
17384	5th switching threshold for air quality 0..2000ppm

> ***Recommended***
>
> *Limit value 1st fan stage: 500 ppm*
>
> *Limit value 2nd fan stage: 750 ppm*
>
> *Limit value 3rd fan stage: 900 ppm*
>
> *Limit value 4th fan stage: 2100 ppm*
>
> *Limit value 5th fan stage: 2100 ppm*

Humidity control

Humidity control is currently not supported.

4.3.5 *'Configuration of ➔ interfaces'*

Address	Name
10003	Device re-start 0 = No default 1 = Re-start

> ***Device re-start***
>
> *To change some settings, the controller will need to be re-started. To re-start, enter `1` in the input field for address 10003 and confirm with Return.*

Slave devices

Address	Name
17048	Number of connected sale devices [0..10] 0 = Inactive 1 = Active

Settings SL1 connection X1 serial bus

The connection SL1 / terminal X1 is used in master devices to connect devices to the central building management system.

1 – 127 is available as the address range. A serial bus string can consist of max. 32 subscribers. With slave devices, the master device is connected at connections SL1 / terminal X1.

> ***Factory-set Modbus address***
>
> *Modbus address 2 is entered in the factory. In the case of connection from a master device to exactly 1 slave device, no settings are required. If several slave devices are connected to a master device: for every slave device connected, the Modbus address is incremented by "1".*
>
> *Example slave 1 = Modbus address terminal X1 = 2*
>
> *Slave 2 = Modbus address terminal X1 = 3*
>
> *Slave n = Modbus address terminal X1 = n + 1*

Adr.	Name	Explanation
16124	Entry of Modbus address terminal X1	
16125	Serial protocol type 3 = Modbus RTU 4 = BACnet MS/TP	
16129	Baud rate X1 (RS485-1) 0 = 9600 1 = 19200 2 = 38400 3 = 57600 4 = 76800 Baud	For master devices that correspond to the serial bus system provided by others For slave devices, the baud rate is exclusively 38400 baud (value = 2).

Adr.	Name	Explanation
16126	Data bits X1 (RS485-1)	For master devices that correspond to the serial bus system provided by others For salve devices, the number of data bits is exclusively 8 (value = 8).
16127	Stop bits X1 (RS485-1)	For master devices that correspond to the serial bus system provided by others For slave devices, the number of stop bits is exclusively 1 (value = 1).
16128	Parity X1 (RS485-1) 0 = Neutral 1 = Odd 2 = Even	For master devices that correspond to the serial bus system provided by others For slave devices, the parity is exclusively Even (value = 2)

Settings SL2 connection X2 serial bus

The connection SL 2 / terminal X2 is used for master devices to connect the first slave devices

The Modbus address SL 2 / terminal X2 is always 1, no settings are needed.

Address	Name
15774	Address

IP address

The input fields are used to set the IP address of the FSL-CONTROL III controller. For the entry, the IP address is divided into four address blocks (points).

Entry of IP address

IP-Adresse: 10.2.100.242

IP-Adressblock: 1 2 3 4

IP address factory setting

Master devices - 10.2.100.242

Slave devices - 10.2.100.243

Address	Name
15798	IP address block 1
15799	IP address block 2
15800	IP address block 3
15801	IP address block 4

Access with PC and web browser

Connect the ventilation unit and PC with a patch cable and enter the IP address into the address line of the web browser to get access to the ventilation unit. Here, conditions can be checked, values can be read out and settings can be configured.

IP gateway

The address of the IP gateway is entered in the input fields. The input syntax follows the IP address, see above.

Address	Name
15802	IP gateway block 1
15803	IP gateway block 2
15804	IP gateway block 3
15805	IP gateway block 4

IP network mask

The address of the IP network mask is entered in the input fields. The input syntax follows the IP address, see above.

Address	Name
15802	IP network mask block 1
15803	IP network mask block 2
15804	IP network mask block 3
15805	IP network mask block 4

BACnet

If `FSLCONTROLIII` is selected as the BACnet ObjectName, the BACnet identifier is created in accordance with the following logic:

BACnetAdresse (address 17565) + end IP address (address 15801)

This ensures uniqueness in the network.

In addition, the BACnet identifier and BACnet Object_Name can be used for their own settings. Please ensure uniqueness in the network.

Address	Name
17565	BACnet identifier
17570	BACnet ObjektName

4.4 Manual control menu

4.4.1 *'Manual control ➔ commands'*

Safety instructions for manual control

NOTICE!

Damage to property due to manual control!

In manual control, the safety functions are disabled. The device must be permanently monitored, e.g. as the frost protection monitoring function is disabled.

Manual control

The purpose of manual control is to control actuators individually and to check their functioning. Entries are made exclusively via the web browser. The function test of actuators is carried out on site at the device.

To end manual control, enter `2` (auto) in the address field (address 10000) and then restart the device. To restart the device, enter `1` in the input field (address 10003) and confirm with the Return key.

Hydraulic balancing

For commissioning, the values can be opened in the manual control operating mode for hydraulic balancing.

Address	Name
10000	Operating mode: 0 = No default 1 = Off 2 = Auto 3 = Manual
10003	Device restart: 0 = No default 1 = Restart

Device status operating mode *'Off'*

Fans	- Off
Shut-off dampers	- Closed
Valves	- Closed
Frost protection monitoring	- active
Digital inputs	- Switching deactivated

Reset filter hours

After a filter change, the operating hours counter can be reset using this function.

Address	Name
10006	Reset filter operating hours 0 = No default 1 = Perform reset

Variables of actuators (only in manual operating mode)

The actuators can be individually started in the manual control operating mode using the following functions.

Address	Name
10012	Bypass/RWT 0..100 [%]
10013	Outside damper 0/100 [%] 0 = Closed 100 = Open
10015	Heating valve 0..100 [%]
10016	Cooling valve 0..100 [%]
10017	Supply air fan Stage 0..5 or information in percent 6..100 [%]
10018	Extract air fan Stage 0..5 or information in percent 6..100 [%]
10019	Secondary air fan Stage 0..5 or information in percent 6..100 [%]

4.5 Menu for connection to central BMS

The ventilation units can be connected to the central BMS using Modbus RTU, Modbus TCP, BACnet MS/TP or BACnet IP. All the available data points are displayed via the menu for connection to central BMS. The address in the tables corresponds to the Modbus address.

4.5.1 Connection to the central BMS via Modbus

4.5.1.1 Communication commands

Settings for communication via Modbus:

- *Chapter 2.2.2 'Modbus TCP / BACnet IP' on page 15*
- IP address for Modbus TCP *'IP address' on page 35*
- Enter `502` as the port.

The following commands are supported by the controller:

Modbus command	Description
03 (0x03)	Read holding registers
16 (0x10)	Write multiple holding registers

4.5.2 *'Connection to central BMS ➔ device => central BMS'*

Depending on the software used for communication with the central BMS, an offset must be set and thereby reduce the address by 1.

Example: *Query of operating status*

Software used = Modbus Poll

Address tab = 9102

The following table shows all data points that can be accessed via the web server. The data points are the same as the ones in the Modbus protocol.

No.	Address	Name	Notes
1	9100	eOutOperatingMode Operating mode	Output Operating mode 1 = Off 2 = Automatic mode 3 = Manual mode
2	9101	eOutOperatingType Operating mode	Output Operating mode 0 = No operating mode 1 = Standby 2 = Unoccupied 3 = Occupied
3	9102	fOutOperatingTypeOverriding Operating mode override	Output Operating mode override 0 = No operating mode override 1 = Boost 2 = Exercise 3 = Night purge 4 = Fan force
4	9103	fOutOperatingState Operating state	Output Operating state 1 = Standby 2 = Control 3 = Manual mode 6 = Fire emergency stop 7 = Frost protection 8 = Priming
5	9104	eOutVentilationType Type of ventilation	Output Type of ventilation 0 = No ventilation 1 = Secondary air operation 2 = Outdoor air operation
6	9105	fOutTempSupply Actual supply air temperature	Measured value = value 1/10, example: Value 185 ⇒ measured value = 18.5 °C Value = 32767 = Measured value not available
7	9106	fOutTempOda Current outdoor air temperature	Measured value = Value 1/10, example: Value 125 ⇒ measured value = 12.5 °C Value = 32767 = Measured value not available
8	9107	fOutTempRoom Room temperature actual value	Measured value = Value 1/10, example: Value 225 ⇒ measured value = 22.5 °C Value = 32767 = Measured value not available
9	9108	fOutTempReturnFlow Current return temperature	Measured value = Value 1/10, example: Value 335 ⇒ measured value = 33.5 °C Value = 32767 = Measured value not available

No.	Address	Name	Notes
10	9109	fOutTempFlow Current flow temperature	Measured value = Value 1/10, example: Value 600 ⇒ measured value = 60 °C Value = 32767 = Measured value not available
11	9110	fOutTempOffset Current room / supply air temperature offset	Offset = Value 1/10, example: Value 10⇒ Offset = 1 °C Value = 32767 = Measured value not available
12	9111	bOutExtratime Overtime activation	Output Overtime activation 0 = Disabled 1 = Enabled
13	9112	fOutTempRangeCooling Temperature upper limit, cooling	Temperature limit = Value 1/10, example: Value 420 ⇒ upper limit = 42 °C
14	9113	fOutTempRangeHeating Temperature lower limit, heating	Temperature limit = Value 1/10, example: Value 180 ⇒ upper limit = 18 °C
15	9114	fOutTempSetPointSupply Supply air temperature setpoint value	Supply air temperature setpoint value = Value 1/10, example: Value 250 ⇒ supply air temperature setpoint value = 25 °C
16	9115	fOutFanLevel Fan stage	Ausgabe Fan stage 2 = Stage 1 manual mode 3 = Stage 2 manual mode 4 = Stage 3 manual mode 5 = Stage 4 manual mode 6 = Stage 5 manual mode 8 = Stage 1 automatic mode 9 = Stage 2 automatic mode 10 = Stage 3 automatic mode 11 = Stage 4 automatic mode 12 = Stage 5 automatic mode
17	9116	fOutHumidityRoom Current room humidity	Room air humidity in % = Value, example: Value 50 ⇒ room air humidity = 50% Value 32767 = Measured value not available
18	9117	fOutAirQualityRoom Current indoor air quality	Indoor air quality in ppm or ppm CO^2 equivalent = Value, example: Value 580 ⇒ indoor air quality = 580ppm Value 32767 = Measured value not available
19	9118	fOutVolumeFlowOda Fresh air volume flow rate	Output Current fresh air volume flow rate in [l/s]
20	9119	fOutVolumeFlowExhaust Extract air flow rate	Output of current extract air volume flow rate in [l/s]
21	9120	fOutAlarmA Alarm A consolidated alarm	Output Consolidated alarm as bit string
22	9121	fOutAlarmB Alarm B consolidated alarm	Output Consolidated alarm as bit string
24	9123	bOutWindow Window contact	Ausgabe Window contact 0 = Inactive 1 = Active
25	9124	bOutFire Fire alarm	Output Fire emegerncy stop 0 = Inactive 1 = Active

No.	Address	Name	Notes
26	9125	fOutSystemDevices Number of devices in the system	Output of device number in the network Example 1 master + 1 slave output = 2
27	9126	eOutDemandRoom Room requirements	Output of heating and cooling requirements for room 1 = Room must be heated 2 = Room must be cooled
28	9127	eOutDemandValve Valve requirements	Output of heating and cooling requirements for implementing the supply air temperature 1 = Supply air is heated 2 = Supply air is cooled
29	9128	fOutValvePositionHeatingMaster Control of master heating valve	Output Control of heating valve = Value 1/10, example: Value = 400 ⇒ control = 40 %
30	9129	fOutValvePositionCoolingMaster Control of master cooling valve	Output Control of cooling valve = Value 1/10, example: Value = 400 ⇒ control = 40 %
31	9130	fOutTempSupplySlave01 Supply air temperature slave 1	Display of current supply air temperature slave (x) = Value 1/10, example: Value 275 ⇒ measured value = 27.5 °C Value = 32767 = Measured value not available
32	9131	fOutTempSupplySlave02 Supply air temperature slave 2	
33	9132	fOutTempSupplySlave03 Supply air temperature slave 3	
34	9133	fOutTempSupplySlave04 Supply air temperature slave 4	
35	9134	fOutTempSupplySlave05 Supply air temperature slave 5	
36	9135	fOutTempSupplySlave06 Supply air temperature slave 6	
37	9136	fOutTempSupplySlave07 Supply air temperature slave 7	
38	9137	fOutTempSupplySlave08 Supply air temperature slave 8	
39	9138	fOutTempSupplySlave09 Supply air temperature slave 9	
40	9139	fOutTempSupplySlave10 Supply air temperature slave 10	
41	9140	fOutValvePositionHeatingSlave01 Heating valve slave 1	Display of current control of heating valve slave (x) = Value 1/10, example: Value 250 ⇒ control = 25% Value = 32767 = Measured value not available
42	9141	fOutValvePositionHeatingSlave02 Heating valve slave 2	
43	9142	fOutValvePositionHeatingSlave03 Heating valve slave 3	

No.	Address	Name	Notes
44	9143	fOutValvePositionHeatingSlave04 Heating valve slave 4	
45	9144	fOutValvePositionHeatingSlave05 Heizventil Slave 5	
46	9145	fOutValvePositionHeatingSlave06 Heating valve slave 6	
47	9146	fOutValvePositionHeatingSlave07 Heizventil Slave 7	
48	9147	fOutValvePositionHeatingSlave08 Heating valve slave 8	
49	9148	fOutValvePositionHeatingSlave09 Heizventil Slave 9	
50	9149	fOutValvePositionHeatingSlave10 Heating valve slave 10	
51	9150	fOutValvePositionCoolingSlave01 Cooling valve slave 1	Display of current control of cooling valve slave (x) = Value 1/10, example: Value `650` ⇒ control = 65% Value = `32767` = Measured value not available
52	9151	fOutValvePositionCoolingSlave02 Cooling valve slave 2	
53	9152	fOutValvePositionCoolingSlave03 Cooling valve slave 3	
54	9153	fOutValvePositionCoolingSlave04 Cooling valve slave 4	
55	9154	fOutValvePositionCoolingSlave05 Cooling valve slave 5	
56	9155	fOutValvePositionCoolingSlave06 Cooling valve slave 6	
57	9156	fOutValvePositionCoolingSlave07 Cooling valve slave 7	
58	9157	fOutValvePositionCoolingSlave08 Cooling valve slave 8	
59	9158	fOutValvePositionCoolingSlave09 Cooling valve slave 9	
60	9159	fOutValvePositionCoolingSlave10 Cooling valve slave 10	

4.5.3 *'Connection to central BMS ➔ central BMS => device'*

The following table shows all data points that can be sent from the central BMS to the device.

Note: For test purposes, entries can be made directly in the web browser if the central BMS has not yet been connected. For example, communication with the central BMS can be tested without the central BMS being completed. In some instances, data points are reset to the value 32767 after entry and processing. To check that a command has been taken over, the corresponding diagnostics page is provided.

No.	Address	Name	Notes
1	9000	eInOperatingMode Default Operating mode	Default Operating mode 1 = Off 2 = Automatic mode
2	9001	eInOperatingType Default Operating mode	Specification of operating mode 1 = Standby 2 = Unoccupied 3 = Occupied
3	9002	eInOperatingTypOverinding Operating mode override	Default Operating mode override 0 = No operating mode override 1 = Boost 2 = Exercise 3 = Night purge 4 = Fan Force (fume cupboard switching)
4	9003	fInPvTempOda current Outdoor air temperature	Default Current outdoor air temperature = Value 1/10, example: Value 125 ⇒ default = 12.5 °C
5	9004	fInSpTempRangeCooling Temperature limit cooling	Default Temperature limit cooling = Value 1/10, example: Value 225 ⇒ default = 22.5 °C
6	9005	fInSpTempRangeHeating Temperature limit heating	Default Temperature limit heating = Value 1/10, example: Value 218 ⇒ default = 21.8 °C
7	9006	fInPvTempRoom Room temperature actual value	Default Current room temperature = Value 1/10, example: Value 235 ⇒ default = 23.5 °C
8	9007	fInSPTempRoom Room air temperature setpoint	Default Room air temperature setpoint = Value 1/10, example: Value 220 ⇒ default = 22,0 °C
9	9008	fInSpOffsetRoom Offset to the room temperature setpoint	Default Offset to the room temperature setpoint = Value 1/10, example: Value 10⇒ Offset = 1 °C
10	9009	fInSpTempSupplyAir Supply air temperature setpoint value	Transmission of supply air temperature setpoint value = Value 1/10, example: Value 230 ⇒ default = 23 °C
11	9010	fInSpOffsetSuppyAir Offset to the supply air temperature setpoint	Default Offset to the supply air temperature setpoint = Value 1/10, example: Value 10⇒ Offset = 1 °C
12	9011	fInPvHumRoom Current rel. relative room air humidity	Default Current relative room air humidity in % = Value, example: Value 45 ⇒ room air humidity = 45%

No.	Address	Name	Notes
13	9012	eInChangeOver Changeover mode	Message on the medium 1 = Heat transfer fluid present 2 = Coolant present
14	9013	fInSpFanLevel Fan stage	Default Fan stage 1 = Stage 1 2 = Stage 2 3 = Stage 3 4 = Stage 4 5 = Stage 5
15	9014	fInPvAqRoom Indoor air quality (internal)	Default Indoor air quality (internal)
16	9015	fInPvAqOda Outdoor air quality (external)	Default Outdoor air quality (external)
17	9016	fInPvVolumeFlowDifference Volume flow rate difference	Default Volume flow rate difference
18	9017	bInFire Fire emergency stop	Default Fire emergency stop 0 = Inactive 1 = Active
19	9018	bInWindow Window contact	Default Window contact 0 = Inactive 1 = Active
20	9020	bInExtratime Overtime	Overtime function activation 0 = Inactive 1 = Active
21	9021	bInFilterReset Default Filter reset	0 = Disabled 1 = Enabled

4.5.4 Connection to central BMS via BACnet

4.5.4.1 Protocol Implementation Conformance Statement (PICS)

The data points of the BACnet protocol are described in this chapter.

The BACnet capabilities of the FSL-CONTROL III controller are described below.

Date	-	2020-01-10
Vendor name	-	Schneider Electric
Product name	-	M172
Application software version	-	1.0
Firmware revision	-	596.9
BACnet Protocol Revision	-	12

Product description

- Schneider Electric BACnet IP and MS/TP Interface

BACnet Standardized Device Profile (Annex L):

- BACnet Advanced Application Controller (B-AAC)

List all BACnet Interoperability Building Blocks Supported (Annex K):

- Data Sharing-ReadProperty-B (DS-RP-B)
- Data Sharing-WriteProperty-B (DS-WP-B)
- Data Sharing-ReadPropertyMultiple-B (DS-RPM-B)
- Data Sharing-WritePropertyMultiple-B (DS-WPM-B)
- Data Sharing-COV-B (DS-COV-B)

Segmentation Capability

- Able to transmit segmented messages Window Size 1476 Byte/seg

Standard Object Types Supported

- Analogue Input
- Analogue Output
- Analogue Value
- Binary Value
- Calendar
- Device
- Multistate Input
- Multistate Value
- Notification class
- Schedule

Data Link Layer Options

- BACnet IP, 100 MBPS
- MS/TP master (Clause 9), baud rate(s): 9600, 19200, 38400, 56700, 76800

Device Address Binding

- Static device binding not supported

Networking Options

- BACnet/IP Broadcast Management Device (BBMD)
  The BBMD support registrations by Foreign Devices.

Network Security Options:

- Non-secure Device - is capable of operating without BACnet Network Security

Character Sets Supported

- Indicating support for multiple character sets does not imply that they can all be supported simultaneously.
  – ISO 8859-1

Description of device object

Property	Remark / Value	RW
Object_Identifier	device, default instance: Address X1 + IP-Address	RW-E
Object_Name	"FSLCONTROLIII" +Address X1+ IP-Address or Free Text	RW-E
Object_Type	DEVICE (8)	R
System_Status	OPERATIONAL (0)	R
Vendor_Name	“Schneider Electric”	R
Vendor_Identifier	10	R
Model_Name	M172	R
Firmware_Revision	“596.9”	R
Application_Software_Version	“1.0”	R
Protocol_Version 1 R	1	R
Protocol_Revision	12	R
Protocol_Services_Supported	read-property, write-property, device-communication-control, reinitialize-device, who-has, who-is	R
Protocol_Object_Types_Supported	DEVICE, ANALOG_INPUT,ANALOG_VALUE, BINARY_VALUE, MULTISTATE_INPUT,MULTI-STATE_VALUE	R
Object_List	device, analog-input 0…50, analog value 0..13,	R
Max_APDU_Length_Accepted	binary-value 0 …7, multistate_input 0…4; multistate-value 0…3	R
Segmentation_Supported	1476	R
APDU_Timeout	NO_SEGMENTATION (3)	R
Number_Of_APDU_Retries	3000	R
Device_Address_Binding	3	R
Database_Revision	-	R
Description Controller Type	0	R
Max_Master default	default 127	RW-E
Max_Info_Frames	default 1	RW-E

R:Read Property, W: Write Property, -E: Storage in EEPROM

Note

Object name
FSLCONTROLIII is pre-set as the object name (Object_Name).
3.1.2.9 ‘Interfaces’ on page 24.

Object Identifier
If FSLCONTROLIII is selected as the object name, the object identifier (Object_Identifier) is created according to the following logic: Object_Identifier = address X1 (17565) + end IP address (address 15801) This ensures uniqueness in the network.

Example:
Address X1 = 1
IP end address = 242
Object_Identifier = 1242

4.5.4.2 Communication from device to central BMS

Display of all data points that can be transferred via BACnet from the device to the central building management system.

Analogue Input Object

Property	Remark / Value	RW
Object_Identifier	Analog Input Value, instance 1 … 50	R
Object_Name		R
Object_Type	ANALOG_INPUT_VALUE (0)	R
Present_Value		R
Status_Flags	IN_ALARM:	
Vendor_Identifier	FAULT:	
Model_Name	OVERRIDDEN:	
Firmware_Revision	OUT_OF_SERVICE:	
Event_State	NORMAL (0)	R
Out_Of_Service	FALSE (0)	R
Units		R

R:Read Property, W: Write Property

Inst.	Object_Name	Object_Description_DE	Units	Initial Present_Value	Present_Value
0	fOutTempSupply	Output Supply air temperature	degrees Celsius (62)	327.67	R
1	fOutTempOda	Output Outdoor air temperature	degrees Celsius (62)	327.67	R
2	fOutTempRoom	Output Room temperature	degrees Celsius (62)	327.67	R
3	fOutTempReturnFlow	Output Return temperature	degrees Celsius (62)	327.67	R
4	fOutTempFlow	Output Flow temperature	degrees Celsius (62)	327.67	R
5	fOutTempOffset	Output Temperature offset	degrees Kelvin (63)	327.67	R
6	fOutTempRangeCooling	Output Temperature upper limit	degrees Celsius (62)	327.67	R
7	fOutTempRangeHeating	Output Temperature lower limit	degrees Celsius (62)	327.67	R
8	fOutTempSetPointSupply	Output Supply air setpoint temperature	degrees Celsius (62)	327.67	R
9	fOutHumidityRoom	Output Relative humidity	percent relative humidity (29)	327.67	R
10	fOutAirQualityRoom	Output Air quality	parts per million (96)	65535	R

Inst.	Object_Name	Object_Description_DE	Units	Initial Present_Value	Present_Value
11	fOutVolumeFlowOda	Output Supply air flow rate	l/s (87)	65535	R
12	fOutVolumeFlowExhaust	Output Extract air flow rate	l/s (87)	65535	R
13	fOutSystemDevices	Output Number of connected devices	no units (95)	327.67	R
14	fOutValvePositionHeatingMaster	Output Control of master heating valve	percent (98)	327.67	R
15	fOutValvePositionCoolingMaster	Output Control of master cooling valve	percent (98)	327.67	R
16	fOutAlarmA	Output Consolidated alarm A	no units (95)	327.67	R
17	fOutAlarmB	Output Consolidated alarm B	no units (95)	327.67	R
18	fOutTempSupplySlave01	Output Supply air temperature slave 01	degrees Celsius (62)	327.67	R
19	fOutValvePositionHeatingSlave01	Output Control of heating valve slave 1	percent (98)	327.67	R
20	fOutValvePositionCoolingSlave01	Output Control of cooling valve slave 1	percent (98)	327.67	R
21	fOutValvePositionCoolingSlave02	Output Control of cooling valve slave 2	percent (98)	327.67	R
22	fOutValvePositionHeatingSlave02	Output Control of heating valve slave 2	percent (98)	327.67	R
23	fOutTempSupplySlave02	Output Supply air temperature slave 2	degrees Celsius (62)	327.67	R
24	fOutTempSupplySlave03	Output Supply air temperature slave 3	degrees Celsius (62)	327.67	R
25	fOutValvePositionHeatingSlave03	Output Control of heating valve slave 3	percent (98)	327.67	R
26	fOutValvePositionCoolingSlave03	Output Control of cooling valve slave 3	percent (98)	327.67	R
27	fOutOperatingTypeOverriding	Output Operating mode override 0 "None" 1 "Boost" 2 "Exercise" 3 "Night purge" 4 "Fan-Force"	no units (95)	327.67	R
28	fOutOperatingState	Output Operate state 1 "Standby" 2 "Control" 3 "Manual" 6 "Fire protection" 7 "Frost protection" 8 "Start-up circuitry"	no units (95)	327.67	R

Inst.	Object_Name	Object_Description_DE	Units	Initial Present_Value	Present_Value
29	fOutFanLevel	Output Fan stage 1 "0_Manual" 2 "1_Manual" 3 "2_Manual" 4 "3_Manual" 5 "4_Manual" 6 "5_Manual" 7 "0_AUTO" 8 "1_AUTO" 9 "2_AUTO" 10 "3_AUTO" 11 "4_AUTO" 12 "5_AUTO"	no units (95)	327.67	R
30	fOutValvePositionHeatingSlave04	Output Control of heating valve slave 4	percent (98)	327.67	R
31	fOutValvePositionHeatingSlave05	Output Control of heating valve slave 5	percent (98)	327.67	R
32	fOutValvePositionHeatingSlave06	Output Control of heating valve slave 6	percent (98)	327.67	R
33	fOutValvePositionHeatingSlave07	Output Control of heating valve slave 7	percent (98)	327.67	R
34	fOutValvePositionHeatingSlave08	Output Control of heating valve slave 8	percent (98)	327.67	R
35	fOutValvePositionHeatingSlave09	Output Control of heating valve slave 9	percent (98)	327.67	R
36	fOutValvePositionHeatingSlave10	Output Control of heating valve slave 10	percent (98)	327.67	R
37	fOutValvePositionCoolingSlave04	Output Control of cooling valve slave 4	percent (98)	327.67	R
38	fOutValvePositionCoolingSlave05	Output Control of cooling valve slave 5	percent (98)	327.67	R
39	fOutValvePositionCoolingSlave06	Output Control of cooling valve slave 6	percent (98)	327.67	R
40	fOutValvePositionCoolingSlave07	Output Control of cooling valve slave 7	percent (98)	327.67	R
41	fOutValvePositionCoolingSlave08	Output Control of cooling valve slave 8	percent (98)	327.67	R
42	fOutValvePositionCoolingSlave09	Output Control of cooling valve slave 9	percent (98)	327.67	R
43	fOutValvePositionCoolingSlave10	Output Control of cooling valve slave 10	percent (98)	327.67	R
44	fOutTempSupplySlave04	Output Supply air temperature slave 4	degrees Celsius (62)	327.67	R
45	fOutTempSupplySlave05	Output Supply air temperature slave 5	degrees Celsius (62)	327.67	R
46	fOutTempSupplySlave06	Output Supply air temperature slave 6	degrees Celsius (62)	327.67	R
47	fOutTempSupplySlave07	Output Supply air temperature slave 7	degrees Celsius (62)	327.67	R
48	fOutTempSupplySlave08	Output Supply air temperature slave 8	degrees Celsius (62)	327.67	R

Inst.	Object_Name	Object_Description_DE	Units	Initial Present_Value	Present_Value
49	fOutTempSupplySlave09	Output Supply air temperature slave 9	degrees Celsius (62)	327.67	R
50	fOutTempSupplySlave10	Output Supply air temperature slave 10	degrees Celsius (62)	327.67	R

Binary Value

Property	Remark / Value	RW
Object_Identifier	binary-output, instance 1 … 7	R
Object_Name		R
Object_Type	BINARY_VALUE (5)	R
Present_Value	INACTIV (0, Initial) / ACTIVE (1)	
Status_Flags	IN_ALARM: 0 FAULT: 0 OVERRIDDEN: 0 OUT_OF_SERVICE: 0	R
Event_State	NORMAL (0)	R
Out_Of_Service	FALSE (0)	R
Inactive_Text		
Active_Text		R

R: Read Property, W: Write Property, COVU: Unsolicited Change of Value Notification

Inst.	Object_Name	Object_Description_DE	Inactive_Text	Active Text	Present_Value
5	bOutFire	Output Fire emegerncy stop	"normal"	"fire"	R
6	bOutWindow	Ausgabe Window contact	"closed"	"open"	R
7	bOutExtratime	Ausgabe Überstunden	"inactive"	"active"	R

Multistate Input Object

Property	Remark / Value	RW
Object_Identifier	Multistate-Input Value, instance 0 … 4	R
Object_Name		R
Object_Type	MULTISTATE_INPUT_VALUE (7)	R
Present_Value	State	
Status_Flags	IN_ALARM: 0 FAULT: 0 OVERRIDDEN: 0 OUT_OF_SERVICE: 0	
Event_State	NORMAL (0)	
Out_Of_Service	FALSE (0)	
Number_Of_States		
State_Text		R

R: Read Property, W: Write Property, -E: Storage in EEPROM

Inst.	Object_Name	Object_Description_DE	Number_Of_States	State	Initial Present_Value	Present_Value
0	eOutOperatingMode	Output Operating mode	3	1	"Off"	R
				2	"Automatic"	
				3	"Manually"	
1	eOutOperatingType	Output Operating mode	4	0	"None"	R
				1	"Standby"	
				2	"Unoccupied"	
				3	"Occupied"	
2	eOutVentilationType	Output Type of ventilation	3	0	"None"	R
				1	"Secondary Air"	
				2	"Outside Air"	
3	eOutDemandRoom	Room requirements	3	1	"None"	R
				2	"Heating"	
				3	"Cooling"	
4	eOutDemandValve	Valve requirements	3	1	"None"	R
				2	"Heating"	
				3	"Cooling"	

4.5.4.3 Communication from central BMS to device

Display of all data points that can be transferred via BACnet from the central building management system to the devices.

Analog Value Object

Property	Remark / Value	RW
Object_Identifier	Analog-Value, Instance 0 … 13	R
Object_Name		R
Object_Type	ANALOG_VALUE (2)	R
Present_Value		R
Status_Flags	IN_ALARM: 0 FAULT: 0 OVERRIDDEN: 0 OUT_OF_SERVICE: 0	
Vendor_Identifier	NORMAL (0)	
Model_Name	FALSE (0)	
Firmware_Revision		
Event_State	Analog-Value, Instance 0 … 13	R
Out_Of_Service		R
Units		R

R:Read Property, W: Write Property

Inst.	Object_Name	Object_Description_DE	Units	Initial Present_Value	Present_Value
0	fInPVTempODA	Default Current outdoor air temperature	degrees Celsius (62)	327.67	RW
1	fInPVTempRangeCooling	Default Temperature limit cooling	degrees Celsius (62)	327.67	RW
2	fInPVTempRangeHeating	Default Temperature limit heating	degrees Celsius (62)	327.67	RW
3	fInPVTempRoom	Default current room temperature	degrees Celsius (62)	327.67	RW
4	fInSPTempRoom	Default Room temperature setpoint value	degrees Celsius (62)	327.67	RW
5	fInSPOffsetRoom	Default Offset to the room temperature setpoint value	degrees Kelvin (63)	327.67	RW
6	fInSPTempSupplyAir	Default Supply air temperature setpoint value (only in combination with supply air temperature control)	degrees Celsius (62)	327.67	RW

Inst.	Object_Name	Object_Description_DE	Units	Initial Present_Value	Present_Value
7	fInSPOffsetSupplyAir	Default Offset supply air temperature setpoint value (only in combination with supply air temperature control)	degrees Kelvin (63)	327.67	RW
8	fInPvHumidityRoom	Default Current humidity of indoor air	percent relative humidity (29)	327.67	RW
9	fInSpFanLevel	Default Fan stage 1 "Stage 1" 2 "Stage 2" 3 "Stage 3" 4 "Stage 4" 5 "Stage 5"	no units (95)	327.67	RW
10	fInPvAirQualityqRoom	Default Indoor air quality	parts per million (96)	65535	RW
11	fInPvAirQualityOda	Default Outdoor air quality	parts per million (96)	65535	RW
12	fInPvVolumeFlowDifference	Default Volume flow rate difference	l/s (87)	65535	RW
13	fInPvOperatingTypeOverriding	Default Operating mode override 0 "Disabled" 2 "Boost" 3 "Exercise" 4 "Night purge" 5 "Fan force (fume cupboard switching)"	no units (95)	327.67	RW

Binary Value Objects

Property	Remark / Value	RW
Object_Identifier	Binary-Value, instance 0 … 7	R
Object_Name		R
Object_Type	BINARY_VALUE (5)	R
Present_Value	INACTIVE (0, Initial) / ACTIVE (1)	
Status_Flags	IN_ALARM: 0 FAULT: 0 OVERRIDDEN: 0 OUT_OF_SERVICE: 0	
Event_State	NORMAL (0)	R
Out_Of_Service	FALSE (0)	R
Units		R

R: Read Property, W: Write Property, COVU: Unsolicited Change of Value Notification

Inst.	Object_Name	Object_Description_DE	Inactive_Text	Active Text	Present_Value
0	bInFire	Default Fire emergency stop	"normal"	"fire"	RW
1	bInWindow	Default Window contact	"closed"	"open"	RW
2	bInExtratime	Default Overtime	"inactive"	"active"	RW
3	bInFilterReset	Default Filter change	"inactive"	"reset"	RW
4	bInCondensation	Default Condensation	"inactive"	"active"	RW

Multistate Value

Property	Remark / Value	RW
Object_Identifier	Multistate-Value, instance 0 … 3	R
Object_Name		R
Object_Type	MULTISTATE_VALUE (9)	R
Present_Value	State	
Status_Flags	IN_ALARM: 0 FAULT: 0 OVERRIDDEN: 0 OUT_OF_SERVICE: 0	R
Event_State	NORMAL (0)	R
Out_Of_Service	FALSE (0)	R
Units R		R

R: Read Property, W: Write Property, -E: Storage in EEPROM

Inst.	Object_Name	Object_Description_DE	Number_Of_States	State	State_Text	Present_Value
0	eInOperatingMode	Default Operating mode	3	1	"invalid"	RW
				2	"off"	
				3 (initial)	"automatic"	
1	eInOperatingType	Default Operating mode	4	0	"invalid"	RW
				1	"standby"	
				2	"unoccupied"	
				3	"occupied"	
2	eInChangeOver	Default Changeover	2	0	invalid	RW
				1	"warm water"	
				2	"cooling water"	
3	eInCovMode	Default COV Mode	4	1	"invalid"	RW-E
				2	"disabled"	
				3	"local broadcast"	
				4	"global broadcast"	

5 Control panel

5.1 Overview of control panels

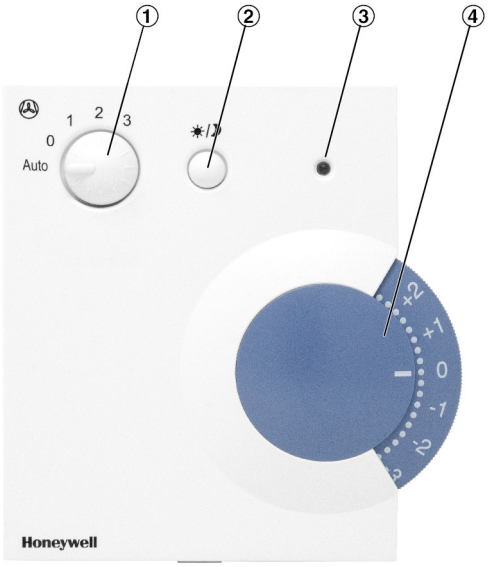


Fig. 28: Control panel with stage selector, for surface mounting, type: T760F1000 article number: M546FB8

① Fan stage selector
② Push button
③ LED
④ Setpoint value adjuster

Fig. 29: Control panel without selector switch, for surface mounting, type: Schneider STR 504 article number: M536BA4

② Push button
③ LED
④ Setpoint value adjuster

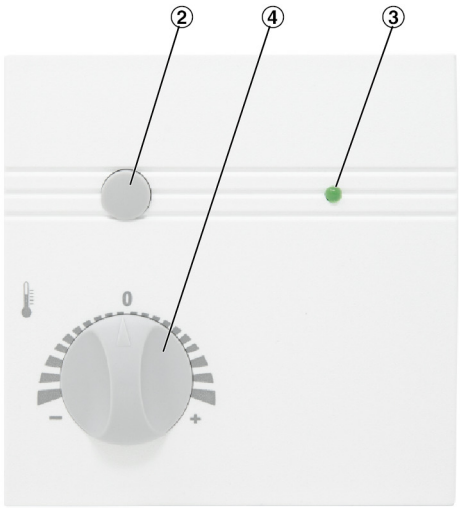


Fig. 30: Control panel without selector switch, for surface mounting, type: WRF04 PTD NTC 20k 5k gn, article number: A00000079777

② Push button
③ LED
④ Setpoint value adjuster

Fig. 31: Control panel without selector switch, for surface mounting, type: RTF3-NTC10kP5-T-L article number: A00000059067

② Push button
③ LED
④ Setpoint value adjuster

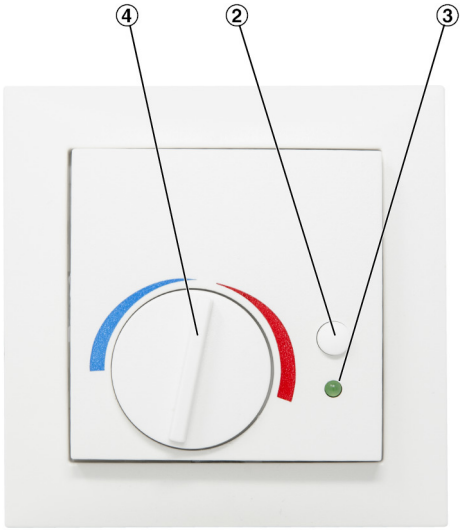


Fig. 32: Control panel without selector switch, for flush mounting, suitable for switch programme Berker S.1, type: WRF07 PTD NTC20k BType6 5k gn, article number: A00000079778

② Push button
③ LED
④ Setpoint value adjuster

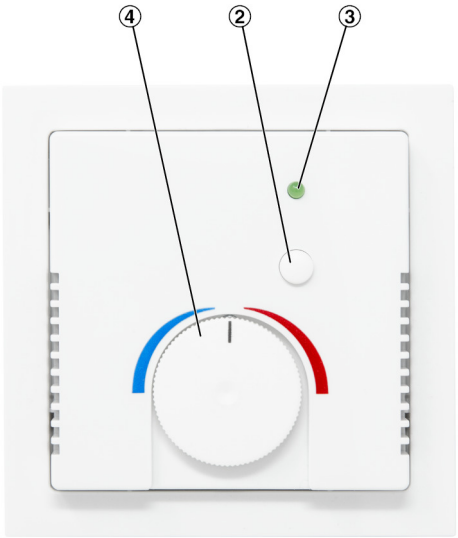


Fig. 33: "Fig. 34: Control panel without selector switch, for flush mounting, suitable for switch programme Busch Jäger Future linear type: WRF07 PTD NTC20k BType6 5k gn, article number: A00000079779

② Push button
③ LED
④ Setpoint value adjuster

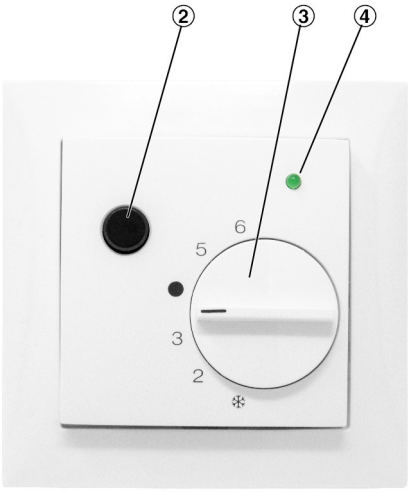


Fig. 34: Control panel without selector switch, for flush mounting, suitable for switch programme Berker S.1, type: BS1-NTC10kP5-T-L article number: A00000074476

② Push button
③ LED
④ Setpoint value adjuster

5.2 Control panel settings

Function	Description	LED
Ventilation stages[1]	With the aid of the stage selector, the ventilation stage can be freely selected. The following functions are available: ■ Automatic (recommended), fan stages are automatically selected from the temperature control and air quality control (optional) - ■ 0: The device switches to Standby mode ■ 1: Fan stage 1 is selected ■ 2: Fan stage 2 is selected ■ 3: Fan stage 3 is selected Note: After activation of Standby mode and subsequent switch to a fan stage or Automatic, the ventilation unit must also be switched to Occupied (using the Occupancy button or central BMS).	
Occupied/ Unoccupied [2]	If you want to change the operating mode from *'Occupied'* to *'Unoccupied'* or vice versa, press the Occupancy push button briefly. This allows you, for example, to manually switch to *'Unoccupied'* mode when the room is not occupied.. Start-up delay: 1 to 2 minutes in summer, 6 to 7 minutes in winter.	Unoccupied: LED off Occupied: LED on
Overtime [2]	If you want to manually switch on the Overtime function while the system is in *'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 regular office hours. The overtime period can be configured. After the set period the unit resumes the previous operating mode (RTC/central BMS).	Unoccupied: LED off Overtime: LED on
Boost	If you want to activate or deactivate rapid ventilation of the room, keep the Occupancy push button pressed (for 2-5 seconds).	LED flashes once per second
Exercise	For quiet work, the silence in the room is estimated. Pressing the Occupancy button (7-10 seconds), the Exercise function is activated.	LED flashes twice per second
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). Units with differential pressure sensor: Activated if the preset maximum differential pressure or the preset number of operating hours is reached. To reset the number of operating hours, either keep the occupancy push button pressed (> 10 sec) or use the web server	LED double blinking
Alarm	Frost alarm and hardware alarm.	LED flashes twice per second

1) The stage selector is only available for the following control panels: - type: T760F1000, article number: M546FB8

2) The button on the control panel can either be used to switch between Occupied and Unoccupied or activate the overtime function. The configuration is carried out using the web browser and can be performed by personnel from TROX GmbH or TROX HGI

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TROX® TECHNIK

The art of handling air

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