



TROXNETCOM

AS-i System manual version 3.0



TROX[®] TECHNİK
The art of handling air

TROX GmbH
Heinrich-Trox-Platz
47504 Neukirchen-Vluyn, Germany
Germany
Phone: +49 (0) 2845 2020
Fax: +49 (0) 2845 202-265
E-mail: trox-de@troxgroup.de
Internet: <http://www.troxtechnik.com>

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General information

Information about the system manual

This system manual describes the installation of the TROX fieldbus system in AS-i technology and contains instructions for laying cables. A further chapter describes the procedure for commissioning.

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

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

The local regulations for health and safety at work and general safety regulations also apply.

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

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

Other applicable documentation

In addition to this system manual, the following documents must be observed:

- Product information about the system components
- VDMA 24200-1
- VDI 6010 Sheet 1 – 4
- VDE 0100
- Specimen guideline on fire protection requirements pertaining to ventilating machinery (M-LüAR)
- Specimen guideline on fire protection requirements for conduits (MLAR)
- Specimen administrative regulation on technical building regulations (MVV TB)
- Declarations of performance (DoP) of the TROX products to be connected

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

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

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- Use of non-approved replacement parts

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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.

Tips and recommendations



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

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.

Specific safety notes

The following symbol is used to draw attention to specific hazards:

Warning signs	Type of danger
	Warning – danger zone.

1	Safety	7			
1.1	General safety notes	7			
1.2	Correct use	7			
1.3	System owner's obligations	7			
1.4	Safety information	7			
1.5	Qualified staff	7			
2	System components	8			
2.1	AS Interface Controller	8			
2.1.1	Connections and SD card reader	8			
2.1.2	Configuration of AS-i controller TNC-A1412	9			
2.1.3	Ethernet networking components	10			
2.1.4	Profibus® DP networking components	11			
2.2	Controller configuration	12			
2.2.1	Basic settings and testing the TROX firmware	13			
2.2.2	Setting the network address	13			
2.2.3	Setting or switching off controller net- work	13			
2.2.4	Setting the application parameters	14			
2.2.5	Configuration adjustment	14			
2.2.6	Configuration with CSV file	15			
2.2.7	TNC-A1412 configuration using the SD card import	15			
2.3	Fieldbus modules	17			
2.3.1	Addressing of standard modules	17			
2.3.2	Addressing of modules with A/B address	17			
2.3.3	Configuration parameter value ID1	18			
2.4	AS-i modules and applications	18			
2.4.1	Control input signal of fire dampers, mul- tileaf dampers and smoke control dampers	20			
2.4.2	Duct smoke detector	21			
2.4.3	Combination of fire damper and duct smoke detector	22			
2.5	Four-way input module AS-EPR	23			
2.5.1	Damper with pure capturing of the end positions	23			
2.5.2	Settings for AS-EPR	23			
2.5.3	Capture of an end position	23			
2.5.4	Capture of two end positions	24			
2.6	Switch cabinet I/O module TNC-Z0094 ...	25			
2.6.1	External signals – standard variant	25			
2.6.2	External signals – individual configura- tion	26			
2.7	Universal switching module AS-EM/C	27			
2.7.1	Capturing of the end positions with end position switches	27			
2.7.2	Control input signal for fire dampers	29			
2.7.3	Control input signal of multileaf dampers	30			
2.7.4	Control input signal for type KA-EU fire dampers	30			
2.7.5	Connecting a duct smoke detector	31			
2.7.6	Complete system with AS-EM/C mod- ules	31			
2.8	Multi-purpose sections	32			
2.8.1	AS-EM / SIL	32			
2.9	AS-i installation	32			
2.9.1	Cable and bus lengths	32			
2.9.2	AS-i flat cable	33			
2.10	Touch operator display as communica- tion master	35			
2.10.1	Installation of the touch operator dis- play as communication master in switch panel	35			
2.10.2	Connections for networking, accesso- ries and supply	35			
2.10.3	Installation of the Profibus® DP master	36			
2.11	Tips	36			
2.11.1	AS-i contact error	36			
2.11.2	Number of penetrations	36			
2.11.3	AS-i configuration error	36			
3	Operation of controller and touch display ..	37			
3.1	Operation of controller	37			
3.1.1	Controlling graphical user interface	37			
3.1.2	Menu view	38			
3.1.3	Side view	40			
3.1.4	Using web interface of the device	49			
3.1.5	System menu	49			
3.2	Operation of touch display	61			
3.2.1	System monitoring	61			
3.2.2	Acknowledging messages and resetting system	62			
3.2.3	Version query	62			
3.2.4	Password	63			
3.2.5	Manual control	65			
3.2.6	Functional test	67			
3.2.7	Remote access	70			
3.2.8	Configuration and additional functions	71			
4	Commissioning	84			
4.1	Connecting device to networks	84			
4.1.1	PROFIBUS interface	84			
4.1.2	Configuration interface	84			
4.2	"Basic settings" home screen	84			
4.2.1	Changing basic settings of the device ..	84			
4.3	Including AS-i slaves	85			
4.4	Configuring Profibus interface	85			
4.5	Setting Ethernet configuration interface ..	85			
4.6	Exchanging AS-i slave	86			

4.7	IP addresses for controller, Profibus master and touch panel	86
5	Diagnostic lights of the controller	87
5.1	Status LEDs	87
5.1.1	Status LED: basic device	87
5.2	Home screen: status LEDs	87
5.2.1	Status of the web interface	87
5.2.2	Operating mode of the AS-i master	87
5.2.3	Control instance of the AS-i outputs	87
5.2.4	Fieldbus status	87
6	TROXNETCOM Basic User Software	88
6.1	Controller TNC-A1412	88
6.2	Touch operator display with communication master	88
6.3	AS-i modules	88
6.4	Group formation	88
6.4.1	Grouping principle	88
6.4.2	Group formation by addressing	88
6.4.3	Overarching groups	89
6.5	Messages	89
6.5.1	Group messages	89
6.5.2	Controller messages	90
6.6	Manual adjustments	90
6.7	Setting the network behaviour	90
6.7.1	Closing dampers	90
6.7.2	Behaviour in the event of network faults	90
6.7.3	Temporarily ignoring network faults	90
7	Format description of the configuration file (CSV format)	91
8	Description of the central BMS interface MODBUS	94
8.1	MODBUS register diagram	94
8.2	MODBUS register query	96
8.3	MODBUS controller register 0	96
8.4	MODBUS slave register	96
8.5	MODBUS register and central BMS	96
9	Description of the central BMS interface BACnet	97
9.1	BACnet PICS	97
9.2	BACnet interface description	97
9.2.1	Overview	97
9.2.2	Object types and identifiers	97
9.2.3	Intrinsic reporting	98
9.2.4	Keywords for the file bacdesc.csv	99
10	Index	101
	Appendix	103
A	TROXNETCOM BACnet pics	104

1 Safety

1.1 General safety notes

Sharp edges, sharp corners and thin sheet metal parts

CAUTION!

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

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

- Be careful when carrying out any work.
- Wear protective gloves, safety shoes and a hard hat.

Electrical voltage

DANGER!

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

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

1.2 Correct use

The system is used to monitor and control fire protection and smoke extraction systems.

1.3 System owner's obligations

The functional reliability of the fire protection and smoke extraction system is the responsibility of the system owner. The system owner is responsible for creating a maintenance plan, for defining the maintenance goals, and for the functional reliability of the equipment.

1.4 Safety information

Improper installation can lead to failures and malfunctions.

A failure or malfunction of the fire protection and smoke extraction system can pose a hazard to people and property in the event of a fire.

To exclude hazards, only suitably trained and authorised personnel are allowed to carry out the work.

1.5 Qualified staff

WARNING!

Danger of injury due to insufficiently qualified individuals!

Incorrect use may cause considerable injury or damage to property.

- Only specialist personnel must carry out work.

Personnel:

- Skilled qualified electrician
- Specialist personnel

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.

Specialist personnel

Specialist personnel are individuals who have sufficient professional or technical training, knowledge and actual experience to enable them to carry out their assigned duties, understand any potential hazards related to the work under consideration, and recognise and avoid any risks involved.

2 System components

TROXNETCOM fieldbus system AS-i

The TROXNETCOM-AS-i system is based on the standardised industrial technologies AS-Interface and Profibus® DP or MODBUS® TCP.

Fire protection and smoke extraction systems can be set up either as centralised or decentralised and combine one or more controller and power units with modules for capturing the end positions and actuator control, as well as with smoke detector modules and other input and output modules.

A central touch operator display as communication master can control up to 44 controller and power units and can thus map a system with up to 2778 dampers with actuators. The controller network is based either on Ethernet or Profibus® DP.

Profibus communication takes place via a TNC-DP Master Module that communicates with the touch operator display via Ethernet. The TNC-DP Master Module is usually mounted on a DIN rail along with the 24 V DC power supply.

The central touch operator display as communication master has a central network interface to higher-level systems (e.g. central building management system), based on Ethernet with the protocols MODBUS® TCP and BACnet/IP.

2.1 AS Interface Controller

The AS-i field level consists of one or more segments that are controlled by AS-i master interfaces. Up to two segments can be connected to the controller TNC-A1412. If only one controller is used, the system is called "stand-alone". It can be supplemented with a touch operator display as communication master.

If several AS-i controllers should be connected together in one system, a controller network will be created. Networking the controllers requires a touch operator display as communication master. The controller network is based either on Profibus® DP or Ethernet. **The controller TNC-A1412 has the connections for both networks. As a rule, either Profibus DP or Ethernet is used.**

Note

For large controller networks with many controllers, Profibus® DP is usually used because it has significantly lower network setup costs. Ethernet is used for non-decentralised systems.

It is possible to supply the TNC-A1412 controller from the first AS-i power supply unit. This is expressly not recommended, as the controller will also fail if the AS-i voltage fails (e.g. due to work on the AS-i bus).

2.1.1 Connections and SD card reader

The controller TNC-A1412 has terminals for the 24 V DC supply voltage of the controller and the AS-i interfaces.

The interfaces for Profibus and Ethernet use the usual connectors (Profibus connector or RJ45). The Ethernet interface and an SD card reader are located under the cover hood in the lower area of the face plate.



Fig. 1: TNC-A1412

The following cable types are used for wiring the controllers, operating devices and field modules:

- **Profibus DP®:**
02YSY (ST) CY 1 × 2 × 0.64 or
02YSH (ST) CH 1 × 2 × 0.64 (halogen-free)
Profibus TNC-DP connector
- **AS-Interface:**
TNC-A4000 or
NYM-J3 × 1.5
NHXHX E30 3 × 1.5
- **Control line:**
JE-Y (ST) 1 × 2 × 0.8 or
Ölflex Li YY 2 × 0.75
- **Network:**
Connection generally via CAT5 cable with RJ45 connectors

2.1.2 Configuration of AS-i controller TNC-A1412

The controller TNC-A1412 is used as universal controller and is always equipped with two AS-i masters that can be activated.

Configuration of the AS-i masters:

1. ▶ Operation with an active AS-i master
2. ▶ Operation with both AS-i masters

Configuration of the controller network:

1. ▶ Without controller network, "stand-alone" operation
2. ▶ Controller network Profibus[®] DP
3. ▶ Controller network Ethernet

The Ethernet interface is used for diagnostics and configuration and enables networking (controller network Ethernet).

The controller configuration can either be performed locally using function buttons located under the controller display or via a WEB browser connected to the Ethernet interface. The network address (IP address) of the Ethernet interface can be set locally or via WEB browser.

The application can be configured either by assigning AS-i addresses and local inputs on the controller, or by creating a CSV file that can be loaded into the controller via an SD card (FAT32), see [Chapter 2.2.5 'Configuration adjustment'](#) on page 14 .

2.1.2.1 Configuration of the AS-i masters

The first AS-i master is activated ex works and must be connected to an AS-i power supply unit. A second AS-i power supply unit is required for the second AS-i master. By connecting the second power supply unit, the second AS-i master is permanently activated.

Note

Controllers in which both AS-i masters have been activated can be reset to the factory settings by loading the TROXNETCOM Basic User Software.

At least one AS-i module must be connected to every activated AS-i master.

2.1.2.2 "Stand-alone" use

The stand-alone operating mode is activated by setting address 126 of the Profibus[®] DP interface [Chapter 13](#) . This deactivates the Profibus[®] DP interface and the controller can be operated individually. In this operating mode, the Ethernet interface can still be used for diagnostics via a WEB browser. The controller is configured for the stand-alone operating mode ex works.

2.1.2.3 Structure of a network with Ethernet

By setting address 125, see [Chapter 13](#) , the Profibus[®] DP interface is deactivated and the Ethernet interface is activated for operation with MODBUS[®] TCP as the controller networking protocol. The IP address that can be set is used for the connection to the touch operator display as communication master, or an external MODBUS master (TCP client). The controller operates as MODBUS slave and TCP server. In this operating mode too, the Ethernet interface can still be used for diagnostics via a WEB browser, see [Chapter 2.2.6 'Configuration with CSV file'](#) on page 15 . The controller is configured for the stand-alone operating mode ex works.

2.1.2.4 Structure of a network with Profibus[®] DP

The address can be used in the range from 3 to 46, see [Chapter 13](#) . A Profibus[®] DP network consists of a communication master and up to 44 controllers arranged in a line with two master strings for 31 field devices each. This means that 2,778 field devices can be integrated as standard and 26,400 metres of cable can be laid. The connection is therefore from device to device without branches. A terminal resistor is connected at both ends, see [Chapter 2.1.4.2 'Profibus[®] DP terminal resistor'](#) on page 12 . Communication master and controller can be connected at any point in the line. The line can be up to 1200 metres in length. Profibus[®] DP repeaters are available for longer lengths. The controller is configured for the stand-alone operating mode ex works.

Note

The transmission speed of the Profibus[®] DP network depends on the expansion of the network. This is specified on the communication master and automatically recognised by the controllers. The default value is 500 kBaud and is suitable for up to 400 metres.

For longer lengths, there are solutions based on fibre optic technology on the market. The standard cabling described in [chapter 32](#) is based on copper.

2.1.2.5 Use of diagnostics

The diagnostic options are accessible via the menu in the controller display or the Ethernet interface and are called up with a WEB browser; always use an IP address:
The IP address 192.168.0.100 is preset



Fig. 2: Diagnostic functions

The diagnostic functions are described in detail in chapter 3 'Operation of controller and touch display' on page 37.

2.1.3 Ethernet networking components

For networking with Ethernet, suitable cables (CAT5 or better), network sockets and active network components (hub, switch, etc.) are connected together. The general structural instructions apply.

2.1.4 Profibus[®] DP networking components

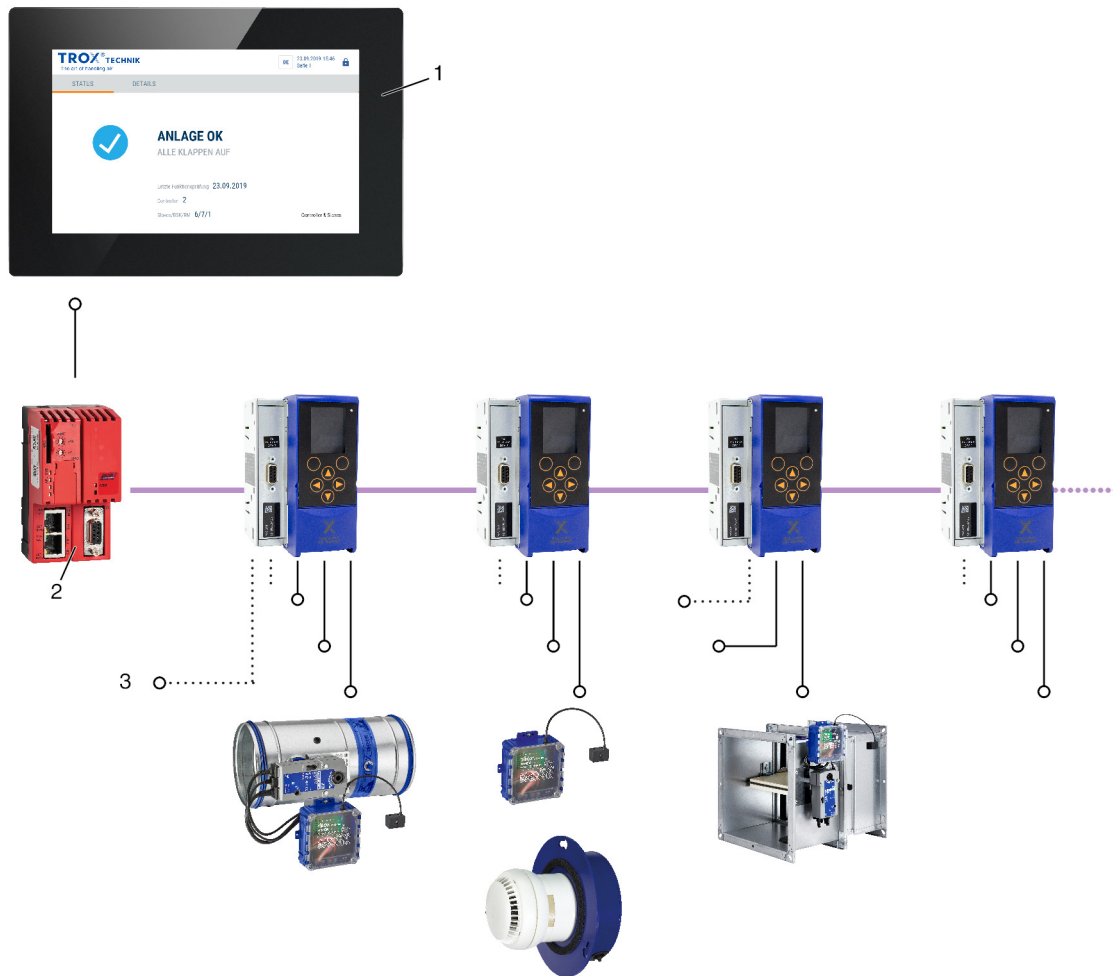


Fig. 3: Profibus[®] DP networking components

- 1 Touch display
- 2 Profibus[®] DP communication master for up to 44 AS-i controllers TNC-A1412
- 3 AS-i controller TNC-A1412 with two AS-i master strings with up to 31 AS-i field modules per AS-i master string

2.1.4.1 Profibus® DP cables and connectors

The recommended violet cable for use with Profibus® DP has the designation 02YSY (ST) CY 1 × 2 × 0.64. The halogen-free variant is called 02YSH (ST) CH 1 × 2 × 0.64. The cable can be obtained from electrical wholesalers.

Note

The use of Profibus® DP cables is highly recommended. Experience shows that other cables cause problems and lead to faults.

Special standard connectors are available for Profibus® DP and match the sockets of the controllers and the communication masters.

Note

Other similar-looking 9-pin D-sub connectors, such as those used for serial communication, must not be used. Using them can lead to faults.

2.1.4.2 Profibus® DP terminal resistor

The Profibus® DP described here with copper cables has a linear topology. A terminal resistor must be set at both end points. The TROX Profibus® DP connector has a switchable terminal resistor. Make sure that the slide switch is set to "ON" at the end points and to "OFF" at all other components.

2.1.4.3 Profibus® DP communication master

The touch operator display as communication master in connection with the gateway TNC-DPMaster can network up to 44 controller units.



Fig. 4: Gateway TNC-DPMaster

2.2 Controller configuration

The following configurations must be made before the AS-i controller can be used:

1. ▶ Setting the network address of the Ethernet interface via WEB browser, or locally on the controller if necessary.
2. ▶ Connection of the AS-i bus line(s) and thus activation of the AS-i interfaces.
3. ▶ Setting or switching off the controller network
4. ▶ Setting the application parameters
5. ▶ Reading in the connected modules

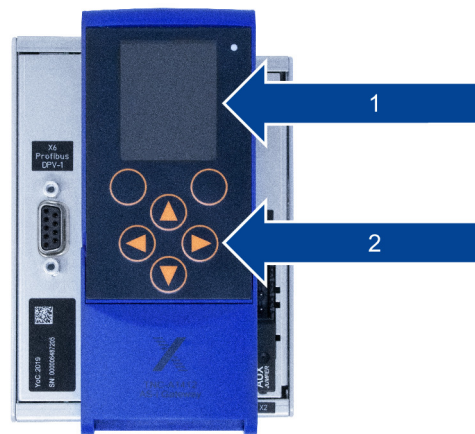





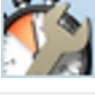





Fig. 5: AS-i controller

- 1 Controller display
- 2 Function buttons

After a restart, the controller display shows various symbols. The function buttons are used to switch between the individual symbols, see [Chapter 3 'Operation of controller and touch display'](#) on page 37.

2.2.1 Basic settings and testing the TROX firmware





Symbol	Meaning
	'System'
	'Settings'
	'Interfaces'
	'Programming interface'
	'Profibus'
	'Quick setup'
	'AS-i 1'
	'AS-i 2'
	'Slaves'

If necessary, the following basic settings must be made on the controller TNC-A1412:





2.2.1.1 Setting the GUI (Graphical User Interface) language

The language is set as follows: press the ▷ and △ keys or the ▷ and ▽ keys at the same time. The language is changed immediately on the displayed page.

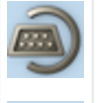




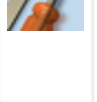
2.2.1.2 Setting the system time (date and time)

Symbol	Work step
	Use the arrow keys to navigate through the menu. Set the date and time in the system menu using a separate menu item.
	1. Select the settings page using the  'System' symbol. 2. Open the  'Settings' symbol (right tab).
	3. Enter the system time
	4. Save settings via the menu item [Accept selection].

2.2.2 Setting the network address

Symbol	Work step
	Use the arrow keys to navigate through the menu.
	Set the network address (IP address) of the Ethernet interface using the local operation menu. 1. Select the  'Interfaces' and  'Programming interface' symbols. 2. Set the 'Configuration interface' in the 'IP SETUP' tab using the values for the IP address and the IP subnet mask. The default settings are: 192.168.0.100 and 255.255.255.0. It is usually not necessary to specify a gateway address. Automatic assignment of the address is excluded, it is defined as a fixed (static) value.
	3. Save changes with [Accept].

2.2.3 Setting or switching off controller network

Symbol	Work step								
	Define the controller network for use with Profibus [®] DP, Ethernet or "stand-alone" by setting the Profibus address (see interface parameters for Profibus [®] DP).								
	1. Set the controller network using the symbols for  'Interfaces',  'Profibus' and  'Settings', or switch it off.								
	<table border="1"> <tr> <td>Profibus address</td> <td>Use</td> </tr> <tr> <td>3 – 46</td> <td>Profibus</td> </tr> <tr> <td>125</td> <td>Stand-alone</td> </tr> <tr> <td>126</td> <td>Ethernet</td> </tr> </table>	Profibus address	Use	3 – 46	Profibus	125	Stand-alone	126	Ethernet
Profibus address	Use								
3 – 46	Profibus								
125	Stand-alone								
126	Ethernet								

2.2.4 Setting the application parameters

The application parameters and the addressing scheme of the modules control the behaviour of the TROX application. The following list contains the parameters that can be used by the user.

Switching between the system and TROXNETCOM software is done by simultaneously pressing the < and > keys.

2.2.4.1 Sequential switching when dampers are released

The parameter is switched on if all fire dampers in a fire damper group should be closed by actuators when one damper is released.

The group's dampers always close upon smoke release or if the fire alarm system signal is given.

2.2.4.2 Maintenance run parameters

The maintenance run closes and opens dampers to check the run time. It is possible that the maximum run times will be exceeded if there are jams, obstructions or the length of the bus line is exceeded.

It is possible to set whether dampers should be tested simultaneously and consecutively and whether dampers that do not pass the test should be closed after the test.

2.2.4.3 Temporary deactivation of the duct smoke detectors

The duct smoke detectors can be deactivated during maintenance. This suppresses the alarm triggering and the dampers remain open. This setting is ineffective for combinations of duct smoke detector and actuator, e.g. for air transfer dampers.









CAUTION!

Deactivating the duct smoke detectors means that the system will no longer function in the manner approved by the test expert!

2.2.4.4 Addressing and group formation

A scheme for addressing is used that allows groups to be defined and linked to fire alarm contacts and deactivation signals. This involves using a group number which is not entered explicitly, but is incremented during reading. This always occurs when a group of duct smoke detector modules and switch cabinet I/O modules is detected. All fire damper modules for dampers with fusible link and dampers with actuator are given the group number. A switch cabinet I/O module at address 31 has a special function: this module is not assigned to any group, but rather processes the fire alarm contact for all of the controller's groups and signals deactivations.

2.2.5 Configuration adjustment

Symbol	Work step
	<p>Use the arrow keys to navigate through the menu.</p> <p>1. To read the connected modules, start the function via the  'Quick setup' symbol.</p>
	<p>2. Reading interfaces. If both AS-i interfaces are activated, both interfaces can be read simultaneously via this function. After reading, all read modules should be checked against the documentation (document lists). If different quantities result, you can find out which modules may be missing by looking at the module lists.</p> <p>3. Call up the list view for each interface as follows:</p> <p>Select the interface from the  'AS-i 1' or  'AS-i 2' menu, after which the slave list is displayed with  'Slaves'.</p>
	
	

2.2.6 Configuration with CSV file

In addition to the local configuration, the controller TNC-A1412 can also be adapted using a configuration file in CSV format. The CSV file is copied into the SD card's root directory. One way of importing the CSV file is via the controller's WEB page:
 e.g. <http://192.168.0.100:8080/csv.htm>
 Alternatively, it is possible to press the ▷ and ▽ keys at the same time to load the CSV file. This process is briefly indicated by a flashing orange dot on the display. Besides the CSV file, the local configuration is also imported. Both provide the group formation.



Fig. 6: Configuration with CSV file

- 1 Controller number
- 2 CSV available
- 3 Import CSV
- 4 CSV config. available
- 5 Group definition
- 6 NO/NC from CSV

If a CSV file has been detected on the SD card, the first checkbox is activated. Following this, the file can be imported using the function "Import CSV". The controller is then restarted.

The configuration can be exported as CSV file on an SD card using the ◀ and ▽ keys.

2.2.7 TNC-A1412 configuration using the SD card import

2.2.7.1 Viewing the controller TNC-A1412

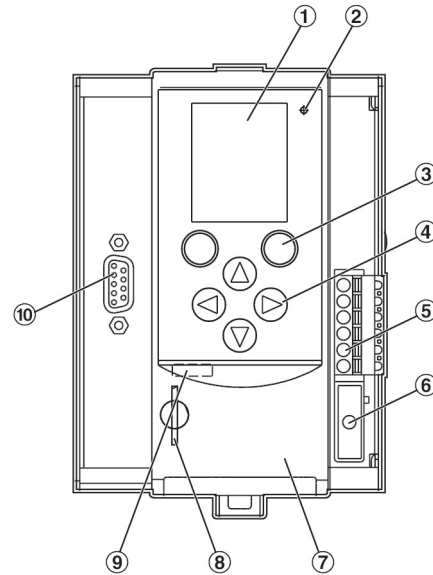


Fig. 7: Device overview

- 1 Display
- 2 Status LED (H1)
- 3 2 function buttons
- 4 4 Arrow keys
- 5 Connection plug (X1) for AS-i 1, AS-i 2, functional earth
- 6 Connection plug (X2) for AUX (here with AUX jumper)
- 7 Front plate
- 8 Slot for SD card (behind the front plate)
- 9 Ethernet configuration interface (X3) (behind the front plate)
- 10 PROFIBUS interface (X6)

2.2.7.2 SD card slot

The SD card slot (8) is located behind the device's front plate. With the help of an SD card, the following actions can be carried out:

- Saving and restoring the device configuration (cloning)
- Importing project-specific parameters

SD card slot	
Media	SD memory cards (max. 32 Gbyte)
Format	SDHC format is supported
Supported file formats	FAT32

2.2.7.3 Keypad

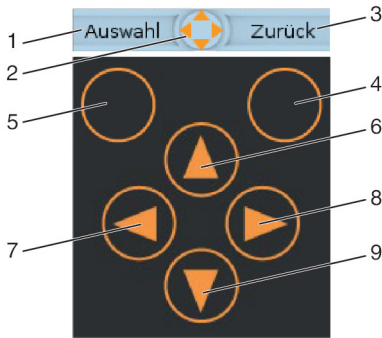


Fig. 8: Controlling the Graphical User Interface

- 1 Labelling of left function button
- 2 Navigation compass
- 3 Labelling of right function button
- 4 Right function button
- 5 Left function button
- 6 Arrow key \triangle
- 7 Arrow key \triangleleft
- 8 Arrow key \triangleright
- 9 Arrow key ∇

2.2.7.4 Information prior to configuring

- The import is only available via the local user interface of the TNC-A1412!
- The SD card must be formatted with the FAT32 file system. SD cards with other file systems are not recognised by the TNC-A1412.
- The device's control functions are not available during the import.
- The device restarts during the import.
- Do not import the device configuration while the system is running!
- Interrupting the import can lead to an incorrect device configuration.
 - Do not disconnect the device from the supply voltage during the import.
 - Do not remove the SD card from the device before the import is complete.
- Before importing, check whether the required device configuration is stored on the SD card.
- Only the device configuration that is to be imported may be saved in the SD card's root directory.
- To enable identification of the saved configuration, the file being imported has the following naming convention:
ifm_Devid_XXXXXXXXXX_YYYYMMDDhhmmss.iconf

Naming convention	Description
DevID	Device part number
XXXXXXXXXX	Device serial number

Naming convention	Description
YYYYMMDDhhmmss	Timestamp of the configuration saved: YYYY = year MM = month DD = day hh = hours mm = minute ss = seconds

Example:
ifm_AC1412_000005941256_20200203022037.iconf

2.2.7.5 Importing the configuration

2.2.7.5.1 Restarting the device

- Insert SD card with stored device configuration into the SD card slot.
- Disconnect device from supply voltage and reconnect to supply voltage.
- Device restarts.

2.2.7.5.2 Select menu page

For display view:





Press the 7 \triangleleft and 8 \triangleright keys on the keypad at the same time.

Controller firmware start screen appears:



Press key 5 to change to the start position of the menu view.

Symbol	Work step
	1. Press key 8 ▷ repeatedly until the 'Quick Setup' symbol is highlighted in orange and then select using key 5.
	2. Select the 'Settings' symbol using the membrane keypad and then switch to the "Configuration" tab using the key 8 ▷.

4. ▶ Press the (-) key to reduce the value of the address.
5. ▶ The value is then written back into the module by pressing the (W) key.
6. ▶ The programmed parameter value can be read out for the test with the (R) key.

2.2.7.5.3 Restoring the device configuration

- Activate "Import config." button.
- Warning message appears.
- Confirm the message with "OK".
- Device configuration is loaded and stored on the device.
- Device restarts.

The import is complete.

2.3 Fieldbus modules

The AS-i modules must be addressed and configured before use. The standard modules use addresses with the values 1 to 31. The modules with A/B addresses can use the values 1A to 31A (use of the B addresses is not supported by the TROXNETCOM Basic user software).

The modules that support the configuration parameter ID1 store a value between 0 and 7, which enables the controller to assign the application function (e.g. fire damper with actuator).

For both activities, the addressing unit TNC-Z0045 is connected to the addressing socket of the module.

CAUTION!

A wired AS-i module is separated from the AS-i bus by connecting the programming cable. When the system is running, this may lead to a system error message and the closing of dampers. After the plug has been disconnected, the connection is re-established; if necessary, the system must be reset (normal operating condition).

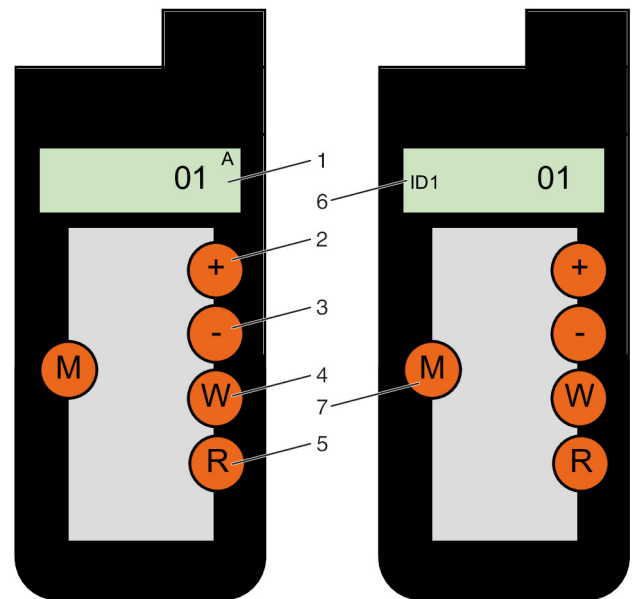


Fig. 9: Addressing device

- 1 Address range
- 2 Value +1
- 3 Value -1
- 4 Write value
- 5 Read value
- 6 Mode
- 7 Changing over mode

Note

The display of the addressing device shows the address without letters A or B.

Error code is listed on the reverse of the addressing unit.

2.3.1 Addressing of standard modules

The addressing device automatically recognises that the module is using the default address.

The addressing has the following steps:

1. ▶ Connect addressing unit and component with addressing cable.
2. ▶ Switch on the device with the (R) key. At the same time the current address is read out.
3. ▶ Press the (+) key to increase the value of the address.

2.3.2 Addressing of modules with A/B address

The module is addressed in a similar way to the addressing of the standard address. The difference is that the displayed address values are supplemented with A or B. The device automatically detects that the module uses A/B addresses.

Note

The controller software only processes A addresses. B addresses are simply ignored.

2.3.3 Configuration parameter value ID1

In addition to addressing, the addressing device is also used for entering configuration parameters ID1.

The configuration process is similar to addressing:

1. ▶ Connect addressing unit and component with addressing cable.
2. ▶ Switch on the device with the (R) key. At the same time the current address is read out.
3. ▶ By pressing the (M) key several times, the ID1 mode is selected and the current value of the configuration parameter is displayed.
4. ▶ Press the (+) key to increase the value.
5. ▶ Press the (-) key to reduce the value of the address.
6. ▶ The value is then written back into the module by pressing the (W) key.
7. ▶ The written configuration parameter ID1 can be read out for the test with the (R) key.

2.4 AS-i modules and applications

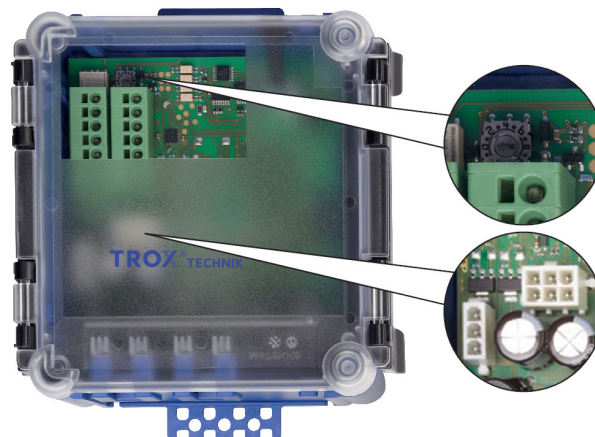


Fig. 10: AS-EM with rotary switch

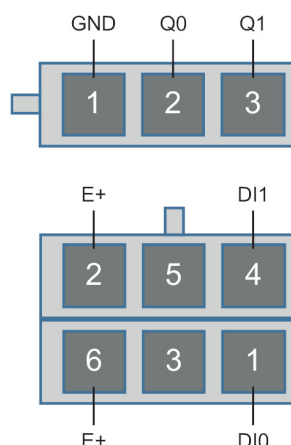


Fig. 11: Plug

TROXNETCOM can be combined with various AS-i modules for the integration of fire dampers with or without actuator, multileaf dampers, smoke control dampers, and other digital actuators and sensors. The voltage supply for all modules comes from AS-i network.

- **AS-i module AS-EM with two outputs with voltage supply and four inputs**
The AS-i module AS-EM is used for fire dampers and multileaf dampers with 24 V BELIMO actuators and it is also used for TROX duct smoke detectors; it captures the status of up to 4 volt-free contacts; it also supplies 24 V DC, up to 0.45 A. It can be parameterised for various applications if the specific application code is entered.
- **AS-i module AS-EM/EK with two outputs with voltage supply and four inputs**
The AS-i module AS-EM/EK is based on AS-i module AS-EM and is used for smoke control dampers with 24V BELIMO actuators; it records the status of up to 4 volt-free contacts; it also supplies 24 V DC, up to 0.45 A. It includes the cable kit and the casing variant for installation in the smoke control damper EK-EU.

- **AS-i module AS-EM/M with two outputs with voltage supply and four inputs and CMOD function**

The AS-i module AS-EM/M can be used for smoke control dampers with CMOD. It allows different opening angles to be set during ventilation mode.
- **AS-i module AS-EM/RS with two outputs buffered using super capacitors and four inputs**

The AS-i module AS-EM/RS is used for special functions; it records the status of up to 4 volt-free contacts; it also supplies 24 V DC, up to 0.45 A. The outputs are provided with super capacitors.
- **AS-i capture module AS-EPR with four inputs**

The AS-i module AS-EPR is used for fire dampers with fusible links and can capture the status of up to 4 volt-free contacts.
- **AS-i module AS-EM/C with two switch outputs and four inputs**

AS-i module AS-EM/C is used for fire dampers, smoke control dampers and multileaf dampers with actuators, fire dampers with fusible links, extract air dampers for commercial kitchens, and dampers with explosion-proof actuators. It has 2 switch relays with common contact and 4 inputs that capture the status of volt-free contacts. It can be parameterised for various applications if the specific application code is entered.
- **Illuminated push button module with 2 push buttons**

The AS-i module TNC-Z0047 is used for system status displays and to acknowledge alarms.
- **AS-i module TNC-Z0094 with four relay changeover outputs and four inputs**

The AS-i module TNC-Z0094 is used to record the status of volt-free contacts (fire alarm) and to signal accordingly (e.g. switch off devices, alarms). It has 4 changeover relays and 4 inputs.

Type	AS-EM	AS-EM/EK	AS-EM/M	AS-EM/RS	AS-EPR	AS-EM/C	TNC-Z0094
Inputs (externally)	4	4	4	4	4	4	4
Outputs	2 (24 V DC)	2 (24 V DC)	2 (24 V DC)	2 (24 V DC) buffered		2 Contacts (NO)	4 change-over contacts
Maximum current [mA]	450	450	450	450	50	50	50
Maximum switching current [A]						2.5	6
Extended addressing	Yes	Yes	Yes	Yes	Yes	Yes	No
Flat cable pick-off	Yes	No	Yes	Yes	Yes	No	No
Protection level	IP 54	IP 54	IP 54	IP 54	IP 54	IP 54	IP 20
AS-i Current consumption [mA]	< 480	< 480	< 480	< 480	< 80	< 60	< 250
Operating temperature [°C]	-5 to 75	-5 to 75	-5 to 75	-5 to 75	-20 to 60	-25 to 50	
Mounting							DIN mounting rail Possible
Casing dimensions B×H×T [mm]	139×159×54	139×159×54	139×159×54	139×159×54	139×159×54	113×113×60	114×50×105

2.4.1 Control input signal of fire dampers, multileaf dampers and smoke control dampers

Product	Actuator OPEN	Actuator CLOSED	End position OPEN	End position CLOSED	Rotary switch	Parameter ID
Fire damper with 24 V spring return actuator	Wire 1 - GND Wire 2 - Q0	not applicable	Wire S4 - DI1	Wire S1 - DI0	0	3
Multileaf damper with 24 V spring return actuator			Wire S6 - E+	Wire S2 - E+		
Multileaf damper with 24 V OPEN/CLOSE actuator	Wire 1 - GND Wire 2 - Q1	Wire 3 - Q0	Wire S4 - DI1	Wire S1 - DI0	0	6
Smoke control damper with 24 V OPEN/CLOSE actuator			Wire S6 - E+	Wire S2 - E+		

The AS-EM or AS-EM/EK module is used for the wiring.

2.4.1.1 Control input signal of fire dampers

The actuator is connected to the module via two connectors.

2.4.1.2 Control input signal of multileaf dampers

Multileaf damper with spring return actuator

The actuator is connected and the end positions are captured via the terminal block in the module.

Multileaf damper with reversible actuator

The actuator is connected and the end positions are captured via the terminal block in the module.

2.4.1.3 Control input signal of smoke control dampers

Note

Smoke control dampers require manual adjustment of the software during commissioning.

Actuators and communication modules are factory tested together; only tested combinations must be used.

The actuator and the end positions are connected to the module via the connectors. The module is located together with the actuator in the casing of the smoke control damper.

Note for terminal connection

If the actuator has no connectors, the actuator cables are connected to the green terminal strip Q0, if necessary Q1, and GND.

The "CLOSED" end position (NO contacts S1 - S2) is connected to DI0/E+, the "OPEN" end position (NO contacts S4 - S6) to DI1/E+.

2.4.1.4 Smoke control damper with modulating position

When smoke control dampers are used, a partial opening can be set by using the AS-i module AS-EM/M. In addition to the "OPEN" and "CLOSED" smoke extraction positions, the ventilation position can be selected by the module.

2.4.2 Duct smoke detector

The same parameter value ID1 = 5 and the rotary switch position = 2 are used for connecting the TROX duct smoke detectors RM-O-3-D and RM-O-VS-D. The duct smoke detectors are supplied by the module. A special cable set is wired in the module and in the duct smoke detector. The cable set with connector and coupling can be separated for easy installation of the duct smoke detector and the module.

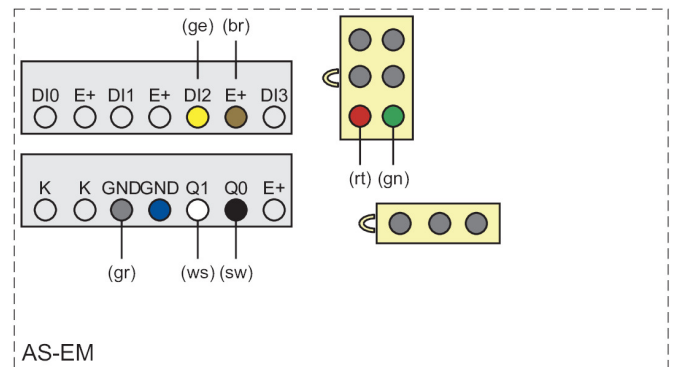


Fig. 12: Connection scheme AS-EM

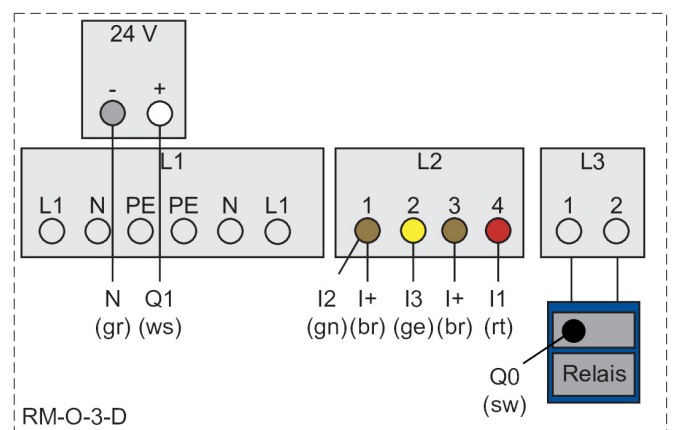


Fig. 13: Connection scheme RM-O-3-D

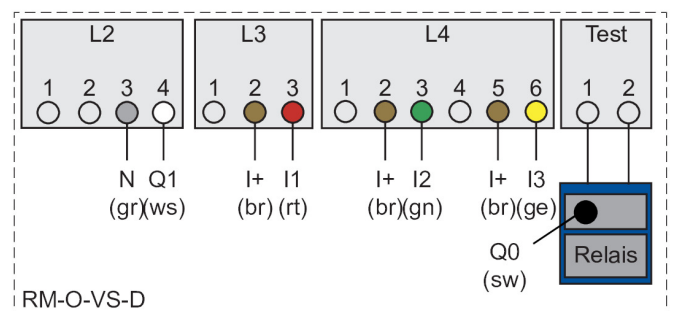


Fig. 14: Connection scheme RM-O-VS-D

Note

To connect the Reset/Test input, a relay is required which is included in the cable set M596ED1.

The duct smoke detector RM-O-3-D has no output for signalling the detected airflow. The input is therefore connected to E+.

The terminals DI0 (red) and DI1 (green) are used for wiring by the customer without the 6-pole connector.

2.4.3 Combination of fire damper and duct smoke detector

The **parameter value ID1 = 3** and the **rotary switch setting = 0** are used to connect a spring return actuator and a TROX duct smoke detector RM-O-3-D. The duct smoke detector is switched into the actuator circuit. The contamination signal is captured via an input. A **manual adjustment** is required for this.

The 6-pin connector with the end position contacts is plugged in. Whereas, the 2-pin connector is removed and connected via a separate terminal.

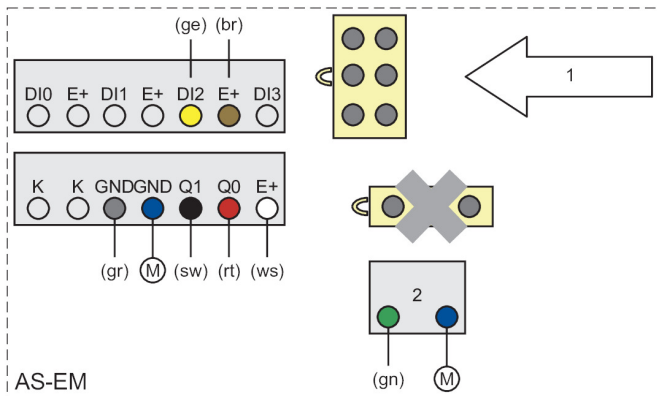


Fig. 15: Connection scheme AS-EM

- 1 6-pole plug
- 2 Terminal
- M Supply cable motor without plug

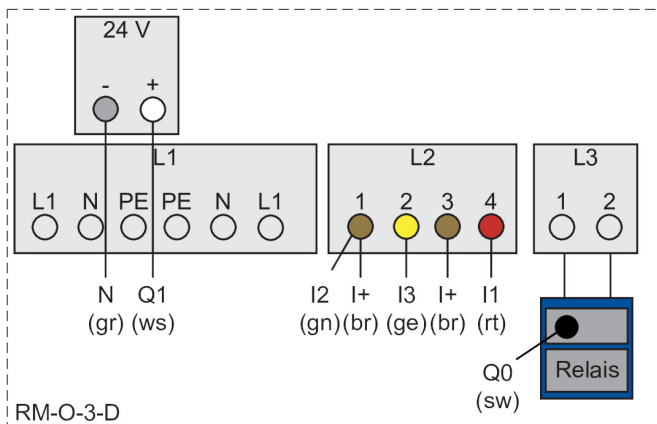


Fig. 16: Connection scheme RM-O-3-D

Note

The combination of fire damper and RM-O-3-D requires a software adjustment if the contamination signal and the smoke release are to be processed in the controller. Without this adjustment, the combination is operated as a fire damper.

The duct smoke detector RM-O-3-D is continuously supplied with 24 V. The switch-on via the AS-i bus is dispensed with.

Connection of the Reset/Test input is not supported. The relay in the cable set M596ED1 is not used.

The alarm output directly interrupts the actuator circuit. The release contact L2-3 is connected to input DI3. This enables differentiation between release by the alarm contact of the duct smoke detector or the thermoelectric release mechanism.

2.5 Four-way input module AS-EPR

2.5.1 Damper with pure capturing of the end positions



Fig. 17: AS-EPR

The AS-EPR field module with 4 inputs is used for the pure capturing of the end positions. The module uses the A/B address and is configured with the configuration parameter ID1.

Control lines are used to extend the cable section at the end position switch. The cable length between limit switch and AS-EPR module can be 30 metres at most.

Note

The wiring diagrams used below show the end position switches in non-actuated state. The used "green - white" cable colour is switched through when the switch is not actuated. "Brown - white" is closed on actuation.

By default, the TROXNETCOM Basic user software processes either the end position "OPEN" or the end position "CLOSED" or captures both end positions. Mixed operation is possible if the controllers are individually programmed for it or the ID1 is set accordingly.

2.5.2 Settings for AS-EPR

For settings of the AS-EPR modules, the controller must be switched to the corresponding Settings menu. This is done by pressing the ▷ and ◁ keys simultaneously. A menu selection is made with the arrow keys and confirmed with OK.

2.5.2.1 Capture of one or two end positions

The first sub-function can be used to select whether all AS-EPR modules connected to the controller should be used for recording 2 or 4 dampers.

2.5.2.2 Text switchover when an end position is captured

When capturing the end positions, it is possible to choose between the texts "CLOSED / NOT CLOSED" and "OPEN / NOT OPEN". This setting applies to all AS-EPR modules and the dampers which are captured with an end position.

2.5.3 Capture of an end position

The capture of one "OPEN" or "CLOSED" end position is wire-break-proof.

The configuration parameter ID1 is set to 1 ex-works.

The Fig. 18 corresponds to the representation that is used for the AS-EPR module of the standard system.

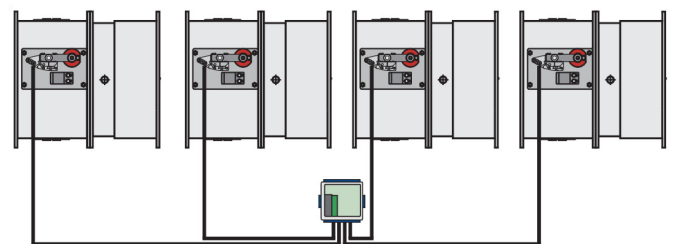


Fig. 18: 4 fire dampers with AS-EPR

Capture of the "CLOSED" end position

The Fig. 19 shows the connecting cable core identification for capturing the "CLOSED" end position of up to 4 fire dampers.

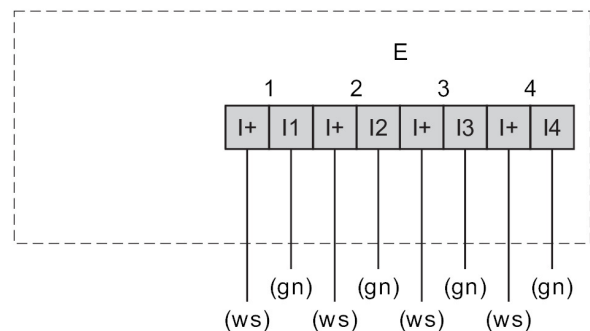


Fig. 19: Capture of 4 "CLOSED" end positions

- E Inputs
- 1 CLOSED 1
- 2 CLOSED 2
- 3 CLOSED 3
- 4 CLOSED 4

Capture of the "OPEN" end position

The Fig. 20 shows the connecting cable core identification for capturing the "OPEN" end position of up to 4 fire dampers.

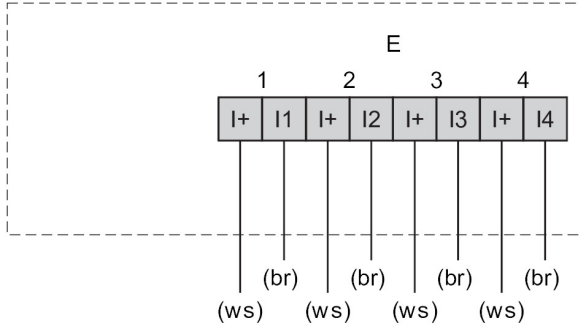


Fig. 20: Capture of 4 "OPEN" end positions

- E Inputs
- 1 OPEN 1
 - 2 OPEN 2
 - 3 OPEN 3
 - 4 OPEN 4

2.5.4 Capture of two end positions

When capturing **two** end positions, the capture of the "OPEN" end position is wire-break-proof. In addition, a manipulation of the damper can be detected if both end positions are signalled, or neither of them is signalled. The configuration parameter ID1 must be set to 2.



Note

If no second damper is captured, a wire jumper must be provided for the "OPEN" end position.

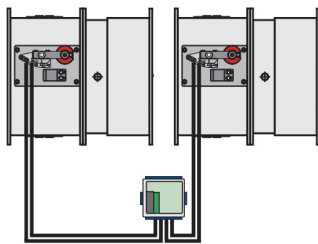


Fig. 21: 2 fire dampers with AS-EPR

Capturing damper blade positions OPEN and CLOSED

The Fig. 22 shows the connecting cable core identification for capturing the "OPEN" and "CLOSED" end positions of two fire dampers.

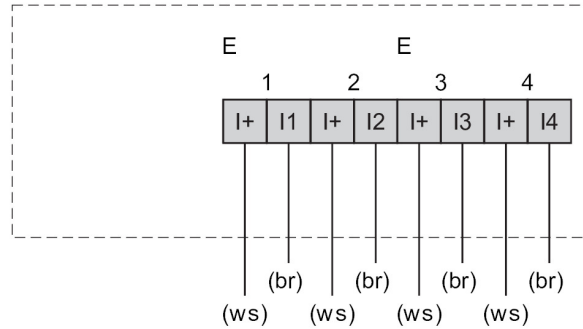


Fig. 22: Capturing damper blade positions OPEN and CLOSED

- E Inputs
- 1 CLOSED 1
 - 2 OPEN 1
 - 3 CLOSED 2
 - 4 OPEN 2

2.6 Switch cabinet I/O module TNC-Z0094

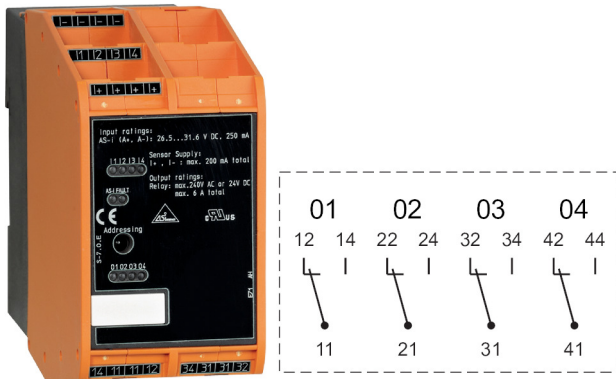


Fig. 23: TNC-Z0094

The digital I/O module TNC-Z0094 for installation in switch cabinets on a DIN mounting rail is used for connecting central fire alarm system/central building management system signals and for signalling messages and deactivations. It has 4 inputs and 4 relay change-over contact outputs. The module uses the standard address, the configuration parameter ID1 is not used.








2.6.1 External signals – standard variant

The TROXNETCOM Basic user software has two standard assignments for the switch cabinet I/O module.

When addresses 1 to 30 are used for the I/O module, groups are formed. The module reports group-specific states or receives group-specific signals. If, on the other hand, address 31 is used for the I/O module, the messages and signals refer to the entire controller.

The table [↗](#) ‘Group-related digital input/output module (slave address 1 – 30)’ on page 25 shows the assignment of the inputs and outputs for the case of group-specific configuration.

Group-related digital input/output module (slave address 1 – 30)









Inputs	Contact	Outputs	Contact
Acknowledge group, if closed NO contact (push button)	 I+ I1	Group OK, if closed	 11 14
Close group, if opened NC contact (or jumper)	 I+ I2	No damper "CLOSED" in group, if closed	 21 24
Test duct smoke detectors in the group when closed NO contact (push button)	 I+ I3	No smoke in group, if closed	 31 34
(free)	I+ I4	No maintenance run in group, if closed	 41 44


Note

The "relay control" setting of the TROXNETCOM Basic user software must be activated for the described purpose.

In addition, by using address 31, a module can be defined that signals or influences conditions for this controller, see [🔗 'Controller-related digital input/output module \(slave address 31\)' on page 26](#).

Controller-related digital input/output module (slave address 31)

Inputs	Contact	Outputs	Contact
Acknowledge group, if closed NO contact (push button)	 I+ I1	Group OK, if closed	 I1 I14
Opening all fire dampers, if closed	 I+ I12	No damper "CLOSED", if closed	 I21 I24
Not closing all fire dampers, if closed	 I+ I13	No smoke, if closed	 I31 I34
Start/stop pulse for maintenance run, if closed NO contact (push button)	 I+ I14	No maintenance run, if closed	 I41 I44









 **Note**

A maximum of one controller-related module with address 31 can be used. The connection can be made either to AS-i master 1 or 2.

2.6.2 External signals – individual configuration

Instead of the standard assignment, the switch cabinet I/O module can be freely parameterised for the system-specific connection of external signals. A configuration file with CSV format is created for this, see [🔗 7 'Format description of the configuration file \(CSV format\)' on page 91](#).

Exemplary assignment for a system-specific digital input/output module (slave address 1 – 31)

Inputs	Contact	Outputs	Contact
Fire alarm system contact group 1 NC contact	 I+ I11	No damper "CLOSED" in group 1, if closed	 I11 I14
Fire alarm system contact group 2 NC contact	 I+ I12	No damper "CLOSED" in group 2, if closed	 I21 I24
Fire alarm system contact group 3 NC contact	 I+ I13	No damper "CLOSED" in group 3, if closed	 I31 I34
Fire alarm system contact group 4 NC contact	 I+ I14	No damper "CLOSED" in group 4, if closed	 I41 I44

2.7 Universal switching module AS-EM/C



Fig. 24: AS-EM/C

The module can be configured for various applications. For this purpose, a configuration parameter ID1 is written into the module besides the AS-i address, see description ↗ 23.

In contrast to the other modules, the lines are connected via terminals. These are designed doubled for the AS-i bus line and the supply voltage for the actuators so that these lines can be looped through.

i Note

The AS-EM/C module can be combined with all TROX AS-i modules. The combination of AS-i Standard and AS-i Basic system covers special structural requirements, e.g. the use of AS-i modules with explosion-proof actuators.

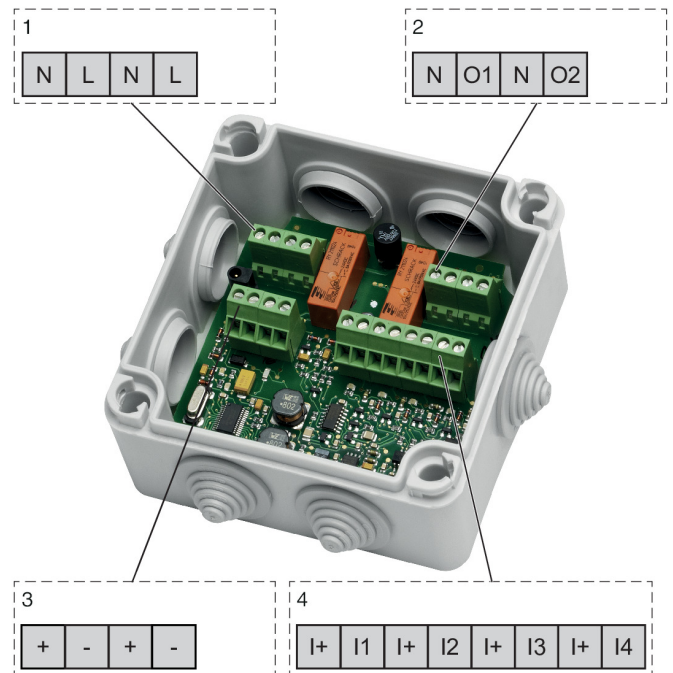


Fig. 25: AS-EM/C terminal designations

- 1 External auxiliary voltage 24 V AC or 24 V AC/DC
- 2 Outputs (external auxiliary voltage)
- 3 AS-i bus line 2 bus cables
- 4 Inputs (internal auxiliary voltage)

i Note

It is recommended that the cable for the separate supply voltage should be laid separately from the data line. Comply with the VDE regulations.

The connection terminals are designed for line cross sections up to 2.5 mm².

2.7.1 Capturing of the end positions with end position switches

2.7.1.1 Mechanical damper with one end position

The capture of **one** "OPEN" or "CLOSED" end position is wire-break-proof.

The configuration parameter ID1 is set to 1.

It is recommended for the "OPEN" end position to be used, because in this way the release of the damper is reliably detected by leaving the "OPEN" position.

i Note

Unused inputs must be provided with a wire jumper or parameterised via the configuration file.

The 24 V extra-low voltage for capturing the end position switches is obtained from AS-i. No external auxiliary voltage is required for this.

Mechanical damper with one "CLOSED" end position

The Fig. 26 shows the connecting cable core identification for capturing the "CLOSED" end position of up to 4 fire dampers.

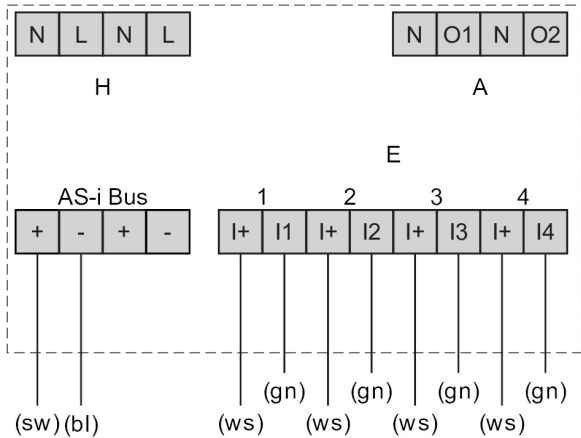


Fig. 26: AS-EM/C-EP4 with ID1 = 1 / "CLOSED" end position

- 1 Fire damper 1
- 2 Fire damper 2
- 3 Fire damper 3
- 4 Fire damper 4
- A Outputs
- E Inputs
- H Auxiliary voltage

Mechanical damper with one "OPEN" end position

The Fig. 27 shows the connecting cable core identification for capturing the "OPEN" end position of up to 4 fire dampers.

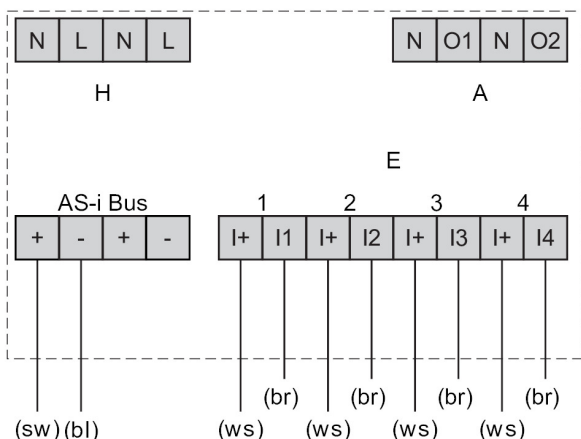


Fig. 27: AS-EM/C-EP4 with ID1 = 1 / "OPEN" end position

- 1 Fire damper 1
- 2 Fire damper 2
- 3 Fire damper 3
- 4 Fire damper 4

- A Outputs
- E Inputs
- H Auxiliary voltage

2.7.1.2 Mechanical damper with two end positions

Both end position switches are captured, the capture of the "OPEN" end position is wire-break-proof. Damage or manipulation of the damper can also be detected. This is the case if both end positions are signalled or neither of the two is signalled.

The configuration parameter ID1 is set to 2.

Note

If no second damper is captured, a wire jumper must be provided for the "OPEN" end position or the configuration file must be parameterised.

The 24 V extra-low voltage for capturing the end position switches is obtained from AS-i. No external auxiliary voltage is required for this.

Capturing damper blade positions OPEN and CLOSED

The figure Fig. 28 shows the connecting cable core identification for capturing both end positions of one or two fire dampers.

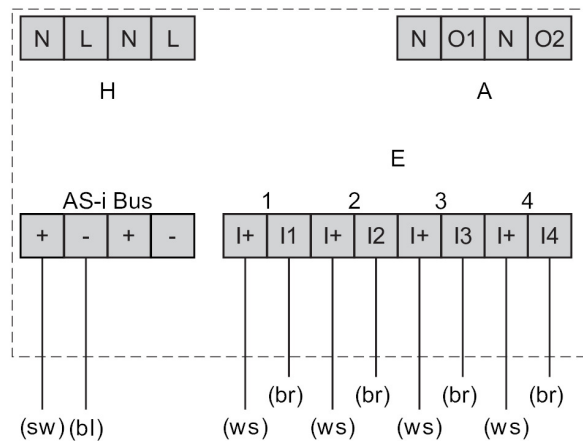


Fig. 28: AS-EM/C-EP with ID1 = 2

- 1 CLOSED 1
- 2 OPEN 1
- 3 CLOSED 2
- 4 OPEN 2
- A Outputs
- E Inputs
- H Auxiliary voltage

2.7.2 Control input signal for fire dampers

The circuit variants AS-EM/C-EM and AS-EM/C-EM2 are used according to the Fig. 29 and Fig. 30 for capturing the "OPEN" and "CLOSED" end positions as well as for the control input signal of the spring return actuator of one or two fire dampers. The spring return actuator is supplied by the separately connected external power supply (24 V AC, 24 V DC or 230 V AC), which is interrupted by a switching relay of the module. The configuration parameter ID1 is set to 3 if only the first damper is connected. The value 4 is set when used with two fire dampers.

Note

The connecting cables of BELIMO actuators use numbering instead of colour coding, which is indicated in the figures with brackets.

The 24 V extra-low voltage for capturing the end position switches is obtained from AS-i. The external auxiliary voltage is only required to supply the actuators.

In contrast to the parts kits for mechanical fire dampers, no jumper is set for the motorised fire dampers if there is no damper 2. The reassignment is done by programming the correct value for the configuration parameter "ID1".

The total current of the outputs can be a maximum of 2 A. If other actuators are used, the maximum total current of 2 A must be observed.

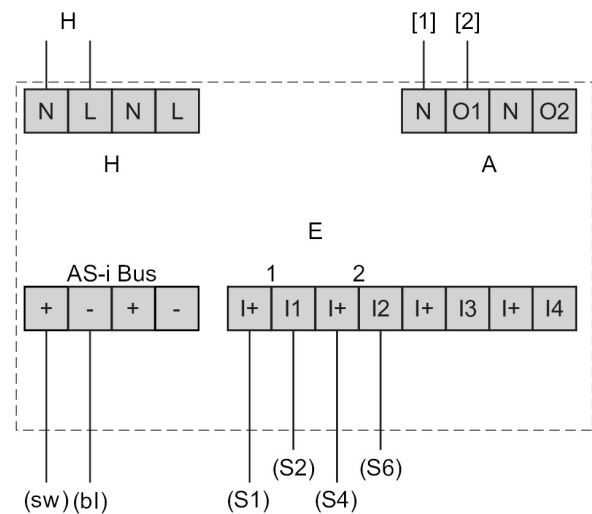


Fig. 29: AS-EM/C-EM with ID1 = 3 (1 fire damper)

- 1 CLOSED
- 2 OPEN
- A Outputs
- E Inputs
- H Auxiliary voltage

Note

The connecting cable core identification for the end position switches of the Schischek ExMax actuator is: CLOSED = [3][4] and OPEN = [6][7].

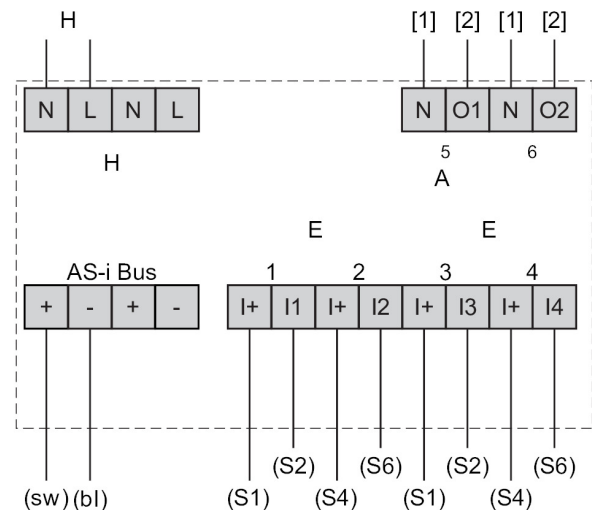


Fig. 30: AS-EM/C-EM2 with ID1 = 4 (2 fire dampers)

- 1 CLOSED 1
- 2 OPEN 1
- 3 CLOSED 2
- 4 OPEN 2
- 5 Fire damper 1
- 6 Fire damper 2
- A Outputs
- E Inputs
- H Auxiliary voltage

2.7.3 Control input signal of multileaf dampers

Multileaf damper with reversible actuator

The actuator for the multileaf damper with reversible actuator requires 2 outputs, as two running directions must be controlled. Consequently, there is only the circuit variant for a multileaf damper with reversible actuator AS-EM/C. The actuator is supplied via the connected external power supply (24 V AC, 24 V DC or 230 V AC).

The configuration parameter ID1 is set to 6.

Note

The connecting cables of BELIMO actuators use numbering instead of colour coding, which is indicated in the figures with brackets.

The 24 V extra-low voltage for capturing the end position switches is obtained from AS-i. The external auxiliary voltage is only required to supply the actuators.

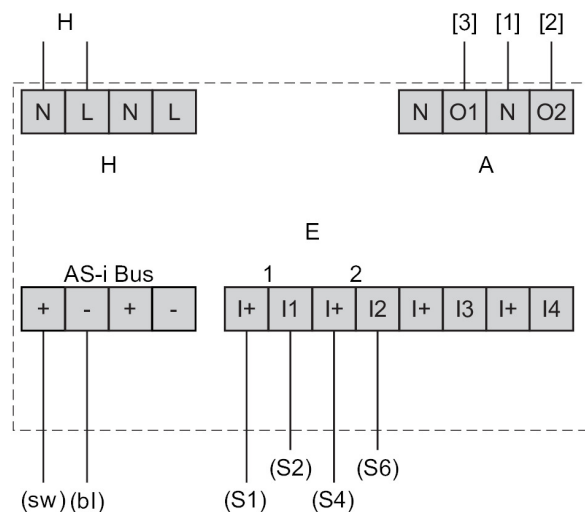


Fig. 31: AS-EM/C with ID1 = 6

- 1 CLOSED
- 2 OPEN
- A Outputs
- E Inputs
- H Auxiliary voltage

2.7.4 Control input signal for type KA-EU fire dampers

The AS-EM/C module is operated without auxiliary voltage as a pure switch for the type KA-EU extract air damper for commercial kitchens with control module FSM 1. The switching contacts O1-L and O2-L switch the inputs "Alarm" (contact 26 - 27) and "Reset" (contact 28 - 27). The "CLOSED" and "OPEN" end positions are signalled via the "CLOSED" fire dampers (contact 12 - 13) or "OPEN" fire damper (contact 15 - 16). The configuration parameter ID1 is set to the value 0, i.e. not used.

Note

The type KA-EU damper for commercial kitchens requires an adaptation of the programming in the control input signal, because instead of levels (actuator on), pulses (alarm and reset) are used.

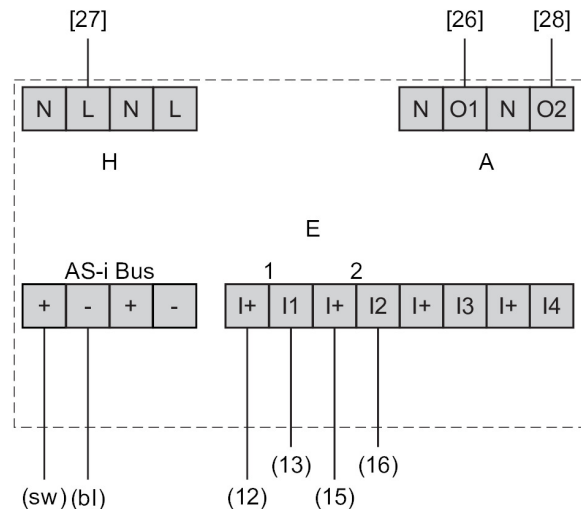


Fig. 32: AS-EM/C for KA-EU / FSM 1

- 1 CLOSED
- 2 OPEN
- A Outputs
- E Inputs
- H Auxiliary voltage

Multileaf damper with spring return actuator

The multileaf damper with spring return actuator is treated like a fire damper.

The configuration parameter ID1 is set to 3 or 4.

2.7.5 Connecting a duct smoke detector

The AS-EM/C-RM variant is used for connecting the TROX duct smoke detectors RM-O-3-D and RM-O-VS-D. For both duct smoke detectors, the same value is used for the configuration parameter "ID1 = 5".

Note

To connect the Reset/Test input, a relay is required.

The duct smoke detector RM-O-3-D has no output for signalling the detected airflow. The input I2 is therefore connected to I+ (jumper).

A separate 24 V DC supply voltage is connected to the module to supply the duct smoke detectors. The 230 V AC supply voltage of the duct smoke detector is not connected. The supply voltage 230 V is not recommended in connection with the universal module.

Note

The 24 V DC terminals of the duct smoke detector only serve to provide the supply voltage for the module. They are not suitable as a voltage source for supplying damper actuators.

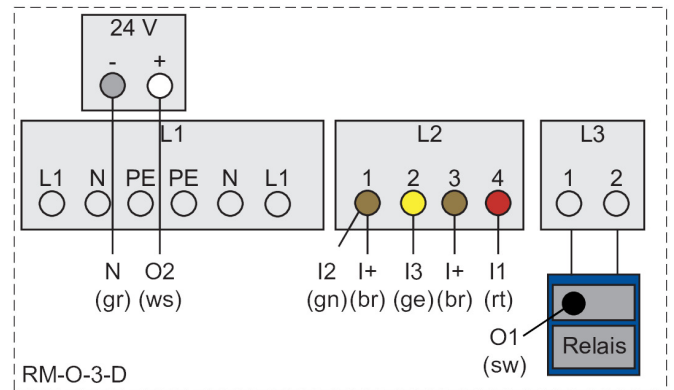


Fig. 34: Connection scheme RM-O-3-D

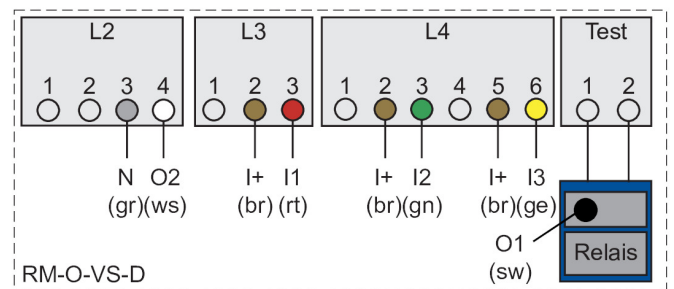


Fig. 35: Connection scheme RM-O-VS-D

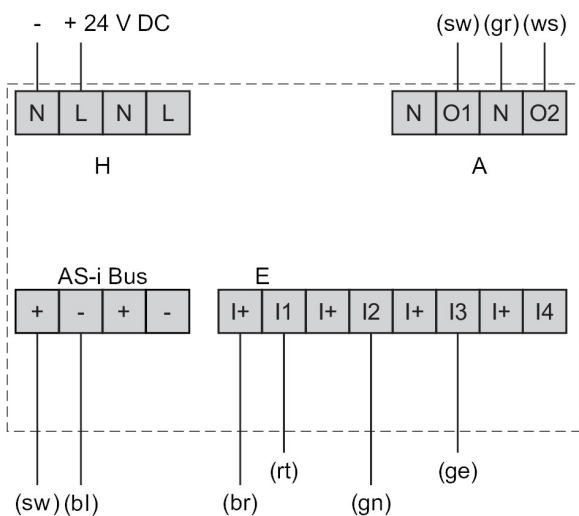


Fig. 33: AS-EM/C-RM

- A Outputs
- E Inputs
- H Auxiliary voltage

2.7.6 Complete system with AS-EM/C modules

Based on the universal switching module AS-EM/C, a complete system can be defined that **does not** supply the actuators via the bus line and requires the actuators to be supplied with a separate feed. This system is referred to as an AS-i BASIC system. Since little or no power is taken from the AS-i bus line, the AS-i power supply unit TNC-A1256 can be used. Twice as many fire dampers with actuator are possible per segment.

In contrast to the standard modules AS-EM and AS-EPR, the module has terminals for conventional cabling with at least 1.5 mm² (e.g. NYM-J 3 × 1.5) and switching relays instead of the power source for the actuator supply.

2.8 Multi-purpose sections

There are further modules that have been developed for special applications.

2.8.1 AS-EM / SIL

The multi-purpose section for EK with SIL2 for smoke control dampers up to SIL2 uses the "AS-i Safety at Work" protocol.

Therefore there are two addresses: the standard address for safe end position capture and the A/B address for control input signal of the actuator.


The configuration parameter ID1 is not used.

The TROXNETCOM Basic user software cannot be used for SIL control input signal.

2.9 AS-i installation

2.9.1 Cable and bus lengths

An AS-i system does not require any particular topology. The lines can be laid in a tree topology that makes the best possible use of the building structure. Flat cable distributors are preferably used for the junctions.

 **Note**
Stars should always be avoided.

The AS-i cable is used for data and energy for AS-i fieldbus modules and the damper actuators (24 V Belimo) or the TROX duct smoke detectors RM-O-3-D and RM-O-VS-D. Due to the optimised data volume, the system is operated with a low bus frequency and can therefore assume any network structure. Moreover, no terminal resistors are required. Starting from the controller with AS-i power supply unit, up to 100 m AS-i cable, including all branches, can be connected to each AS-i master. If longer lengths are required, a repeater (with separate AS-i power supply unit) is set at any position. A new AS-i string with up to 100 metres of AS-i cable is available at the output of the repeater.

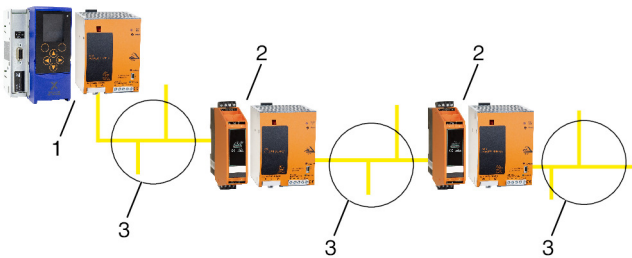


Fig. 36: AS-i installation - cable and bus lengths

- 1 Controller with AS-i power supply unit
- 2 Repeater with AS-i power supply unit
- 3 AS-i cable length 100 m

2.9.1.1 Bus lengths

The following segment bus lengths can be used:

- Standard segment = 100 metres
uses standard cable 2×1.5 for all module types AS-i power supply unit 8 A
- extended segment = 150 metres
uses cable type 2×2.5
uses terminal resistor for all module types AS-i power supply unit 8 A
- long segment = 200 metres
uses standard cable 2×1.5
does not use terminal resistor for AS-EM and the like. AS-i power supply unit 2.8 A

2.9.1.2 Colour codes used

The colour code according to IEC 304 is used to identify cables and lines.

Colour	Colour code	Colour	Colour code
White	ws	Red	rt
Black	sw	Yellow	ge
blue	bl	Green	gn
orange	or	Grey	gr
Brown	br	turquoise	tk
violet	vi	pink	rs

2.9.2 AS-i flat cable

When using the yellow AS-i flat cable, contact is made by the penetration technology described below. This means that the work steps for stripping the cable sheath and pressing on wire end ferrules are omitted. The cable is connected to the modules and flat cable distributors by simply snapping on. Cable clips TNC-70067 can be used for fixing. They have a self-adhesive underside and a drilled hole. If screw terminals are used instead of the insulation displacement connector, e.g. terminal strip in the control box, the cable sheath can be stripped with a stripping tool TNC-70062.

Note

For smoke extract systems, round cables $3 \times 1.5 / 2.5$ with functional integrity, e.g. E90, are used. The AS-i flat cable is preferably used for fire dampers.



Fig. 37: Flat cable TNC-A4000

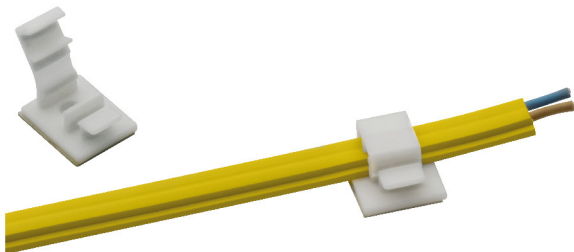


Fig. 38: Cable clip TNC-70067



Fig. 39: Flat cable TNC-A4000 and stripping tool TNC-70062

2.9.2.1 Penetration technology

The contact between modules and flat cable is established by contact blades which pierce the sheath. The correct polarity is ensured by the shape of the module mounting bases and the profile lug of the cable.

The advantages are:

1. ▶ The cable does not need to be set down and cut to length.
2. ▶ No wire end ferrules need to be mounted.
3. ▶ The connection is protected against twisting and is non-interchangeable.
4. ▶ The installation is therefore protected against reverse polarity.

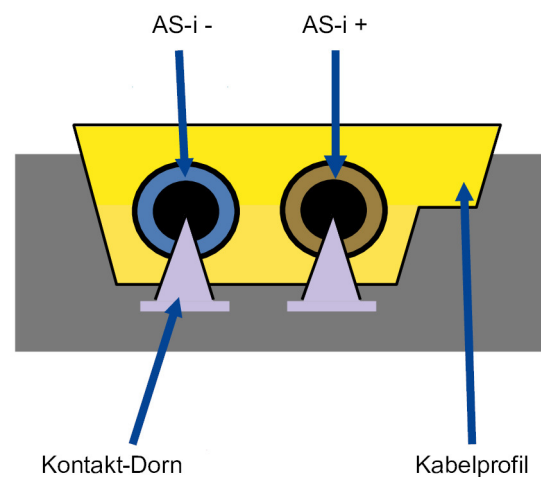


Fig. 40: Penetration technology

Note

Apart from the standard cable 2×1.5 TNC-A4000, cable type TNC-74406 exists with 2×2.5 for extended segments. The accessories TNC-70581, TNC-70413 etc. can be used with both cable types.

2.9.2.2 Flat cable distributor / T-distributor

The use of the flat cable distributor TNC-70581 allows a tree structure to be set up (also called free topology). Distributors may be connected even while a voltage is being applied. The flat cable distributor TNC-70581 has a nominal load capacity of 8 A.

Note

If the flat cable distributor TNC-70581 is used as connecting element for two line ends, the lines are inserted parallel in both positions. Butt joining is not permitted.



Fig. 41: Flat cable distributors TNC-70581

2.9.2.3 Insulation of the cable ends

The open cable ends of the AS-i flat cable should be provided with an end seal TNC-70413.



Fig. 42: End seal TNC-70413

Alternatively, a heat shrink cap TNC-70113 can also be used.



Fig. 43: Heat shrink cap TNC-70113

2.9.2.4 Round lines

Round lines (e.g. NYM 3 × 1.5) are basically suitable for use with AS-i components. The wiring is done conventionally using terminals and distributors.

Note

The protective conductor (green - yellow) is never connected.

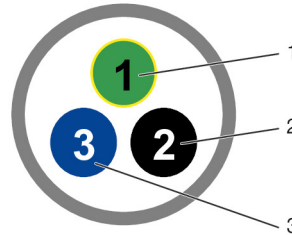


Fig. 44: Round line

- 1 Green - yellow cable: PE / open
- 2 Black cable: AS-i +
- 3 Blue cable: AS-i -

Flat cable connection end seal TNC-70413

2.10 Touch operator display as communication master

The TROX touch operator displays as communication masters have three essential system functions:

1. ▶ Communication master for controller networks (Profibus[®] DP or Ethernet)
2. ▶ Operator interface with the functions:
 - Display of the current status values of all components
 - Messages as chronological list
 - Manual control
 - Functional test with logging
3. ▶ Interface via Ethernet with the protocols MODBUS[®] TCP and BACnet/IP

2.10.1 Installation of the touch operator display as communication master in switch panel

For the installation of the touch operator display as communication master, terminals are used that are provided with pins. They are hooked in the casing and clamp against the blue mounting surface.

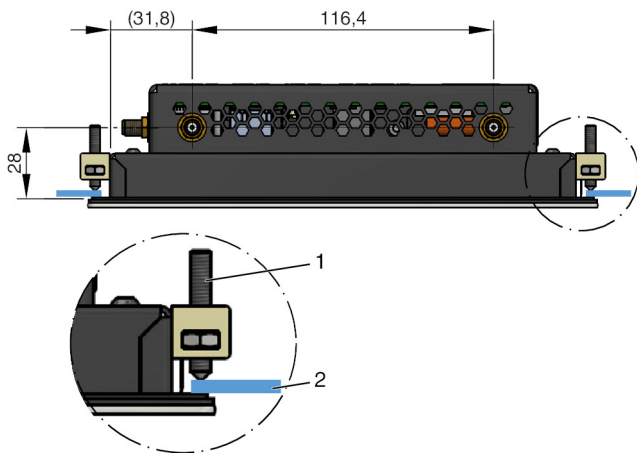


Fig. 45: Touch operator display as communication master

- 1 Fixing pin
- 2 Housing wall

2.10.2 Connections for networking, accessories and supply

The first Ethernet connection is used for controller networking. This can either be connected to the controller TNC-A1412 in MODBUS mode with MODBUS[®] TCP or it uses a gateway TNC-DPMaster. The second network interface is intended for external connections (e.g. the building network). A USB interface is used for the external memory on which, for example, protocols of the functional tests can be stored and imported via the software versions.

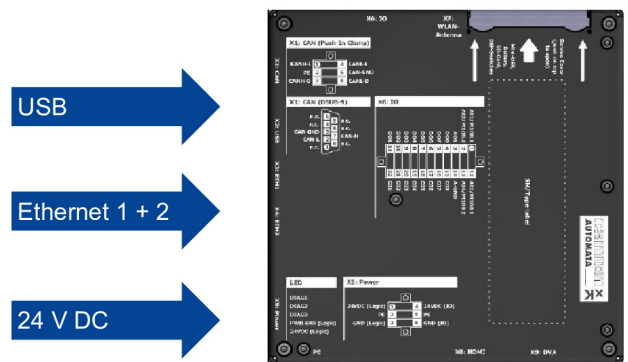


Fig. 46: Touch operator display as communication master

2.10.3 Installation of the Profibus® DP master

A gateway TNC-DP master is used for the controller networking with Profibus® DP. It is connected with 24 V DC, Ethernet and Profibus connector. It is usually mounted on a DIN mounting rail.

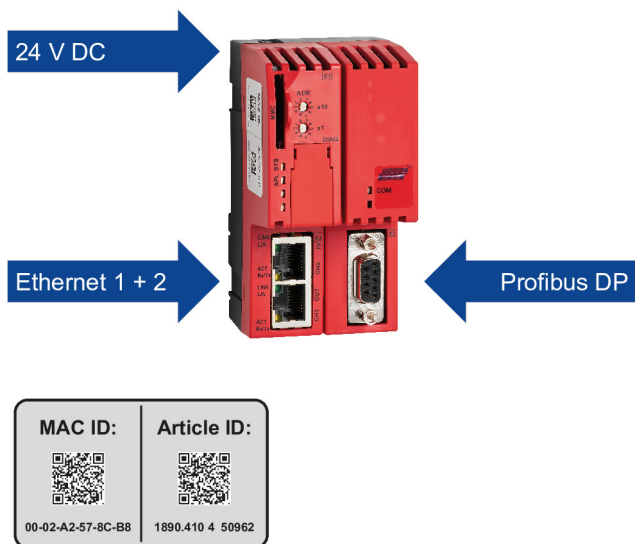


Fig. 47: Profibus® DP master

Note

The operating software for the Profibus® DP master is loaded as communication master from the touch operator display on a restart. No locally stored software is installed. The number of the "Article ID" is used to identify the device.

2.11 Tips

2.11.1 AS-i contact error

In rare cases, transmission on the AS-i system can suffer from faults. Faulty contacting is the main cause of faults. It is essential to observe the instructions in the chapter [2.9 'AS-i installation' on page 32](#).

2.11.2 Number of penetrations

The number of penetrations of the AS-i flat cable is limited. The procedure can be performed five times at the same location. If no contact is made, it is sufficient to move the insulation displacement connector.

2.11.3 AS-i configuration error

If one or more components have been given changed addresses, have been added or removed, this is registered by the controller and indicated with a red signal (CONF/PF). If the cause is known and the system is to be put back into operation in a modified form, the configuration adjustment is carried out as described in the chapter [2.2 'Controller configuration' on page 12](#).

3 Operation of controller and touch display

3.1 Operation of controller

3.1.1 Controlling graphical user interface

The keypad with 6 membrane keys is located below the display. With these keys, the operator controls the graphical user interface of the device. The keypad is closely linked to the navigation status bar.

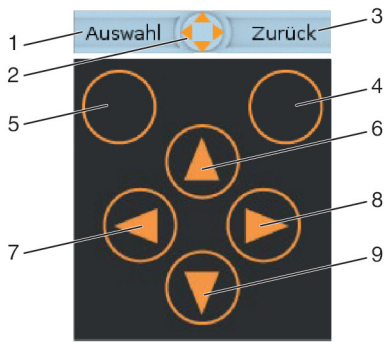


Fig. 48: Controlling graphical user interface

- 1 Labelling of left function button
- 2 Navigation compass
- 3 Labelling of right function button
- 4 Right function button
- 5 Left function button
- 6 Arrow key \triangle [Up]
- 7 Arrow key \triangleleft [Left]
- 8 Arrow key \triangleright [Right]
- 9 Arrow key ∇ [Down]

3.1.1.1 Function buttons

With the 2 **function buttons**, the operator triggers defined actions (e.g. activate checkbox). The assignment of the function buttons depends on the context.

The 2 **text boxes in the navigation status bar** are assigned to the function buttons below. They show which action is triggered by pressing the function button in the current work step. If the function button is not labelled, it has no function in the current operating context.

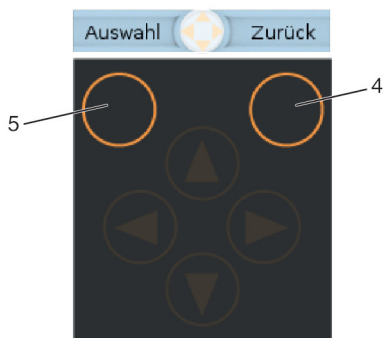


Fig. 49: Function buttons

- 4 Right function button [Back]
- 5 Left function button [Selection]

3.1.1.2 Arrow keys

The 4 **arrow keys** [\triangle], [\triangleright], [∇] and [\triangleleft] have navigation and selection functions.

The **navigation compass** shows which of the 4 arrow keys can be used in the current step.

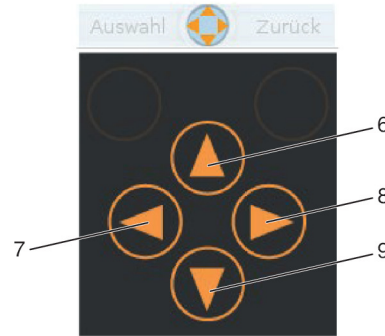


Fig. 50: Navigation compass – arrow keys

- 6 Arrow key \triangle [Up]
- 7 Arrow key \triangleleft [Left]
- 8 Arrow key \triangleright [Right]
- 9 Arrow key ∇ [Down]

Example

Navigation compass	Meaning
	All arrow keys are active and trigger a reaction of the device when activated.
	Only the arrow keys [\triangleright] and [∇] are active and trigger a reaction of the device when activated.

3.1.2 Menu view

In the menu view, the user selects the menu page with the desired operating or display function.

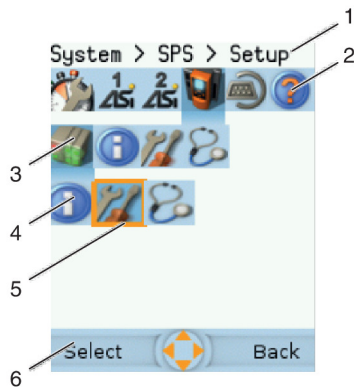


Fig. 51: Menu view

- 1 Info bar
- 2 Main navigation bar
- 3 1st sub-navigation bar
- 4 2nd sub-navigation bar
- 5 Selected menu element (focus)
- 6 Navigation status bar with
 - Labelling of the function buttons
 - Navigation compass

Texts that are too long for the info bar are displayed as scrolling text.

3.1.2.1 Menu navigation

Central control elements in the menu view are the 3 **navigation bars**. They represent the menu structure of the device software. Each navigation bar represents one menu level. The symbols of a navigation bar stand for submenus and menu items.

The following rules apply for menu navigation:

- With [\leftarrow] / [\rightarrow] navigate within a menu level.
 - The selected symbol has the **focus** (= orange frame)
 - If the selected symbol has a submenu, the corresponding **sub-navigation bar** appears automatically.
- With [∇] switch to the next lower menu level.
- With [Δ] switch to the next higher menu level.

In the lowest menu level:

- With function button [*Selection*] Switch to the page of the selected menu item, see **page view** & Chapter 3.1.3 'Side view' on page 40 .

In the main navigation bar:

- With function button [*Back*] Switch back to the start screen, see **start screen** & Chapter 3.1.5.1 'Home screen' on page 49 .

3.1.2.2 Navigation aids

The following screen elements support the menu navigation:

- The **info bar** shows the navigation path of the selected menu symbol.
- The **navigation compass** shows the navigation steps possible in the current position.

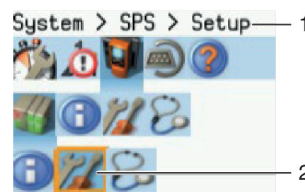


Fig. 52: Navigation aids

- 1 Info bar
Navigation path to the focused menu element:
'System' > 'PLC' > 'Settings'
- 2 Menu element with focus
Navigation path to the focused menu element:
 'System' > 'PLC' > 'Settings'

Example to call up the menu page for the setting options of the device-internal PLC:

Symbol	Work step
	1. Starting position after calling up the menu view.
	2. With [▷] select the menu symbol [System] - Menu symbol [System] has focus. - 1st sub-navigation bar appears.
	3. With [▽] switch to the 1st sub-navigation bar. - Menu symbol [Diagnosis] has focus.
	4. With [◁] select the menu symbol [System] - Menu symbol [PLC] has focus. - 2nd sub-navigation bar appears.
	5. With [▽] switch to the 2nd sub-navigation bar. - Menu symbol [Information] has focus.
	6. With [▷] select the menu symbol [Settings] - Menu symbol [Settings] has focus. With function button [Selection] change to the page view of the menu item. [Settings] - Page shows the configuration options of the device-internal PLC.

3.1.3 Side view

In the page view, the user selects the desired function and carries it out.

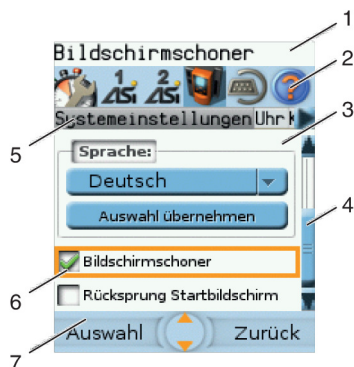


Fig. 53: Side view

- 1 Info bar
- 2 Main navigation bar
- 3 Page
- 4 Scroll bar
- 5 Register
- 6 Page element with focus
- 7 Navigation status bar with
 - Labelling of the function buttons
 - Navigation compass

3.1.3.1 Navigating in a menu page

The page contains elements with which the operator can control the device or retrieve information.

The following ground rules apply for menu navigation:

- With arrow keys [∇] / [Δ] switch between the individual page elements.
 - Selected page element has focus (= orange frame).
- With function button [Back] switch to the tabbed document interface or the menu view.



Rules for the operation of the individual control elements, see **Description of the control elements** 40.

3.1.3.2 Using navigation aids

For better orientation when navigating on a page, use the following aids:

- The [Info bar] shows detailed information about the selected element (focus).



Texts that are too long for the info bar are displayed as scrolling text.

- The active menu symbol in the **main navigation bar** has a dark background.
- If not all elements on a page can be displayed at the same time, a **scroll bar** appears at the right edge of the screen.
- The **navigation compass** shows the navigation possibilities available in the current work step.
- The **text boxes in the navigation status bar** show the current assignment of the function buttons.

3.1.3.3 Description of the control elements

Tabbed document interface/tab

A tabbed document interface groups the functions of a menu page. A tabbed document interface consists of at least 2 tabs. Each tab combines related functions.

Example:

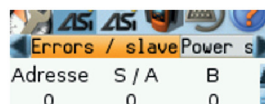


Fig. 54: Tabbed document interface_Tab

- Tab in focus has orange background.
- Info bar shows the name of the active tab (in the example: Errors/slave).
- Symbols [\triangleleft] or [\triangleright] show that there are other tabs to the left or right of the visible tabs.
- Page displays control elements that belong to the tab in focus.

Tabs can have the following coloured backgrounds:

Tabs Background	Description
	Tab has focus
	Tab is active
	Tab is inactive

Operation:**1. ▶ Select menu item**

- Switch to menu item with tabbed document interface.
 - Tabbed document interface appears.
 - The focus is on the left tab.

2. ▶ Select tab

- With arrow key [\triangleleft] / [\triangleright] select desired tab.
 - Selected tab is given focus (= orange background) and displays corresponding functions:

**3. ▶ Activate menu page**

- With function button [*Selection*] change to page that belongs to the active tab.
 - The tabbed document interface remains visible when you change to the page.
 - Active tab is given a grey background:

**4. ▶ Carry out desired functions**

- With arrow key [∇] select and carry out the desired function.

5. ▶ Switch to tabbed document interface

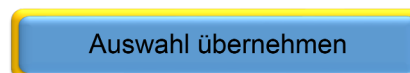
- With function button [*Back*] switch to tabbed document interface.
 - Active tab is given focus (= orange background).

Activate

With a button, the operator can perform a defined action once. The labelling of the button, e.g. "Accept selection", names the action.

Example:**Operation:****1. ▶ Select button**

- With arrow keys [\triangleup] / [∇] select the button.
 - Selected button, e.g. "Accept selection", is given an orange frame:

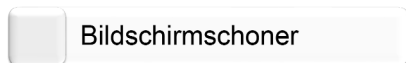
**2. ▶ Activate button**

- With function button [*Selection*] activate selected button.
 - Function is carried out.

Checkbox

A checkbox allows the activation / deactivation of a parameter. A checkbox control element consists of a checkbox and the associated designation, e.g. "Screen saver".

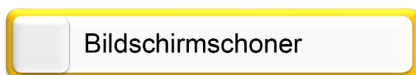
Example:



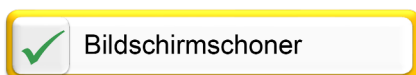
Operation:

1. ▶ Select checkbox

- With arrow key [Δ] / [∇] select checkbox.
- Selected checkbox receives focus (= orange frame):



⇒ OR:



2. ▶ Activate / deactivate checkbox

- Activate / deactivate the selected checkbox with the 'Selection' function button.
- Change of status is displayed:

⇒ Checkbox is activated



OR:

Checkbox is deactivated



The activation/deactivation of a checkbox does not always take effect immediately. Often the change must be confirmed separately (e.g. with the button [Accept selection]).

List

A list provides a set of defined values. The operator can select exactly one value from this set (= selection 1 of n).

Example – List without description:



Example – List with description, e.g. "Filter":



Operation:

1. ▶ Select list

- With arrow key [Δ] / [∇] select list.
- Selected list is given focus (= orange frame) and shows active value, e.g. gateway:



2. ▶ Activate list

- With function button [Selection] open the list.
- Opened list shows the values that can be selected.

3. ▶ Select value

- With arrow key [Δ] / [∇] select the required value in the list.
- Selected value is given orange background:



4. ▶ Accept selected value

- With function button [Selection] accept the selected value.
OR:
With function button [Back] cancel the procedure and close the list.
- List shows selected value.



The set value does not always take effect immediately. Often the change must be confirmed separately (e.g. with the button [Accept selection]).

Slave selector

The slave selector is used to select an AS-i slave or an AS-i address.

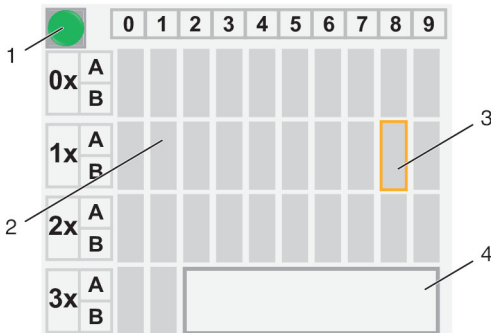


Fig. 55: Slave selector

- 1 Operating mode display of the AS-i master
 - 2 Symbol for AS-i address
 - 3 Selected AS-i address (focus)
 - 4 Status message for selected AS-i address
- The **status LED** shows the active operating mode of the AS-i master:
 - ■ = AS-i master in protected mode
 - ■ = AS-i master in configuration mode
 - Each field represents one **AS-i address**. An AS-i address can be occupied by:
 - Symbol of a single slave
 - Symbol of an A/B slave pair
 - The labelling of the rows and columns helps to determine the AS-i address.

Example:

Address of the selected field in figure

 - Line designation: 1 x (= tens digit of the AS-i address)
 - Column designation: 8 (= ones digit of the AS-i address)
 - Type of slave: single slave (= symbol occupies the address field completely)
 - Resulting AS-i address: 18
 - The symbol of the A/B slave pair appears as soon as an A or B slave is used at this address.

The slave selector is used in the following views:

- Overview of slave status, see **Overview of slave status** ↪ 'Overview of slave status' on page 43 .
- Overview of free slave addresses, see **Overview of free slave addresses** ↪ 'Overview of free slave addresses' on page 45 .

Overview of slave status

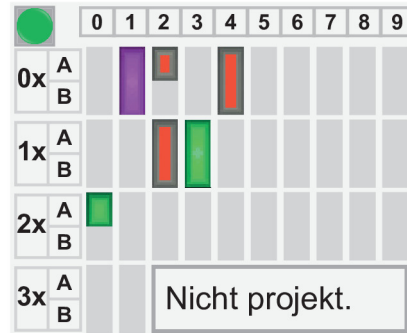


Fig. 56: Overview of slave status

- The slave selector shows an overview of the slaves in the selected AS-i network.
- The symbol colour provides information about the slave status.

Meaning of the symbols and colours, see **Slave status: meaning of colour code and symbols** ↪ 'Slave status: colour code and symbols' on page 44 .
- The text box shows the status of the selected AS-i slave. Possible status messages:
 - *Slave active*
 - *Not config.* (= configuration error)
 - *Double address* (= double address error)
 - *Periphery* (= periphery error)

Operation:

1. ▶ Select AS-i slave

- With arrow keys [Δ], [\triangleright], [∇] and [\triangleleft] select the desired AS-i slave.
 - Selected AS-i slave has focus (= orange frame).
 - The info bar shows the address of the selected AS-i slave.
 - Text box shows status message for a selected AS-i slave.













2. ▶ Activate selected AS-i slave

- With function button [*Selection*] select the AS-i slave and switch to the next menu page.

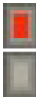


OR:

With function button [*Back*] cancel the procedure and leave the slave selector.

Slave status: colour code and symbols

Single slave	A/B slave	Colour	Meaning
		Grey	No slave detected: Slave address is neither in the LCS nor in the LDS
		Green	Slave is activated (in LAS)
		Red	Configuration error type 1: Slave is configured (in LCS), but not detected (in LDS)
		Yellow	Slave reports a peripheral error
		Pink	Several slaves with same address available (double address error)
		Grey-red	Configuration error type 2: <ul style="list-style-type: none"> ■ detected slave (in LDS) is not configured (in LCS) ■ detected slave has a profile different than configured

Meaning of the colour combinations (example: configuration error type 2)

Symbol	Colour	Meaning
	Grey-red Grey	Configuration error type 2: <ul style="list-style-type: none"> ■ Single slave is configured (in LCS), but not detected (in LDS). ■ Instead, a new A slave with the same address was installed.
	Grey Grey-red	Configuration error type 2: <ul style="list-style-type: none"> ■ Single slave is configured (in LCS), but not detected (in LDS). ■ Instead, a new B slave with the same address was installed.
	Grey-red	Configuration error type 2: <ul style="list-style-type: none"> ■ A or B slave is configured (in LCS), but not detected (in LDS). ■ Instead, a new single slave with the same address was installed.

Overview of free slave addresses

In this view, the slave selector shows the free and occupied AS-i addresses.

		0	1	2	3	4	5	6	7	8	9
0x	A	■	■	■	■	■	■	■	■	■	■
	B	■	■	■	■	■	■	■	■	■	■
1x	A	■	■	■	■	■	■	■	■	■	■
	B	■	■	■	■	■	■	■	■	■	■
2x	A	■	■	■	■	■	■	■	■	■	■
	B	■	■	■	■	■	■	■	■	■	■
3x	A	■	■	Frei							
	B	■	■	Frei							

Fig. 57: Overview of free slave addresses

- The symbol colour provides information about the condition of the AS-i address.
Meaning of the symbols and colours, see **Free slave addresses: colour code and symbols**
↳ 'Free slave addresses: colour code and symbols' on page 46 .
- The text box shows the status of the selected AS-i slave. Possible status messages:
 - Free
 - Slave missing

Operation:







1. ▶ Select AS-i address

- With arrow keys [Δ], [\triangleright], [\triangleleft] and [\triangleleft] select the desired AS-i address.
 - Selected AS-i address has focus (= orange frame).
 - The info bar shows the selected AS-i address.
 - Text box shows status message for a selected AS-i address.









2. ▶ Activate selected AS-i address

- With function button [*Selection*] select the AS-i address and switch to the next menu page.
OR:
With function button [*Back*] cancel the procedure and leave the slave selector.

Free slave addresses: colour code and symbols

Single slave	A/B slave	Colour	Meaning	Prio.
		Grey	Slave address is already occupied.	–
		turquoise	Address is free according to LDS (= no slave detected), however: address already belongs to a stored configuration (= application profile).	1
		Blue	Address is free according to LDS (= no slave detected). Address is not used in any stored configuration (= application profile).	2

Meaning of the colour combinations

Symbol	Colour	Meaning
	Blue Blue	The slave to be addressed is an A/B slave: A and B addresses are free.
	Blue Grey	The slave to be addressed is an A/B slave: <ul style="list-style-type: none"> ■ A address is free. ■ B address is occupied.
	Grey Blue	The slave to be addressed is an A/B slave: <ul style="list-style-type: none"> ■ A address is occupied. ■ B address is free.
	turquoise turquoise	The slave to be addressed is an A/B slave: A and B addresses are free, but are already used in a stored configuration.
	turquoise Grey	The slave to be addressed is an A/B slave: <ul style="list-style-type: none"> ■ A address is free, but is already used in a stored configuration. ■ B address is occupied.
	Grey turquoise	The slave to be addressed is an A/B slave: <ul style="list-style-type: none"> ■ A address is occupied. ■ B address is free, but is already used in a stored configuration.
	turquoise Blue	The slave to be addressed is an A/B slave: <ul style="list-style-type: none"> ■ A address is free, but is already used in a stored configuration. ■ B address is free.
	Blue turquoise	The slave to be addressed is an A/B slave: <ul style="list-style-type: none"> ■ A address is free. ■ B address is free, but is already used in a stored configuration.

Confirmation message

The confirmation message is a security query. It appears when there are far-reaching changes to the system settings. The confirmation message shows the changes made. The operator must acknowledge the changes in order for them to take effect.

Example:



Fig. 58: Confirmation message

- Action: change AS-i slave address from 1a to 1b
- Confirmation message shows:
 - Action (= change AS-i address)
 - Slave address before change (= old: AS-i slave 20a)
 - Slave address before change (= new: AS-i slave 21)
- Input options for operator:
 - Function button [Selection]
 - Function button [Back]

Operation:

1. ▶ Change settings

- Change system setting.
 - Confirmation message appears.

2. ▶ Confirm message

- With function button [Selection] confirm the changes and accept the new value.
OR:
With function button [Back] discard the changes and continue using the old value.
 - Page shows valid settings.

Numeric field

The numeric field can be used for entering integer values. The value range is context-dependent. Numeric fields are components of the following GUI elements:

Example

Control element	Meaning
IP address 	Entry of an IP address (IPv4) in the format [w.x.y.z] <ul style="list-style-type: none"> ■ w x y z = network segments (value range: 0... 255)
Date 	Entry of a date in the format [YYYY-MM-DD] <ul style="list-style-type: none"> ■ YYYY = year (value range: 0000 ... 9999) ■ MM = month (value range: 01 ... 12) ■ DD = day (value range: 01 ... 31)
Time 	Entry of a time in the format [HH:MM:SS] <ul style="list-style-type: none"> ■ HH = hours (value range: 00 ... 12) ■ MM = minutes (value range: 00 59) ■ SS = seconds (value range: 00 ... 59) Numeric field for seconds (SS) cannot be edited!
Analogue value 	Input of an analogue output value in the value range (per numeric field): 0 ... 9

Operation – taking the example of the "Date" numeric field:

1. ▶ Select numeric field

- With arrow key [Δ] / [▽] select the Date control element.
 - Selected Date control element has focus (= orange frame) and displays current date:



2. ▶ Activate editing mode

- With function button [Selection] start the editing mode.
 - Right segment has focus (= orange frame):



3. ▶ Set desired value

- With arrow key [Δ] / [∇] set the desired value step-by-step.
 - Segment shows new value.



By pressing and holding the arrow key [Δ] / [∇] large value ranges can be skipped quickly.

4. ▶ Select next segment

- With arrow key [\leftarrow] / [\rightarrow] select the segment to be edited.
 - Selected segment is given focus (= orange frame):



- ⇒
 - Optional: repeat steps 3 and 4 until all segments have the desired value.

5. ▶ Accept set values

- With function button [*Selection*] accept the set values and exit the editing mode.
OR:
With function button [*Back*] reset the values already set and exit the editing mode.
 - Date control element displays valid date.



The set value does not always take effect immediately. Often the change must be confirmed separately (e.g. with the button [*Accept selection*]).

Binary field

The binary field allows a digital value to be changed place-by-place.

Example:



- Display of the digital value comprising 4 bits:
 - = bit is on (= 1)
 - = bit is off (= 0)
- Hexadecimal display: 0xf = 1111

Operation:

1. ▶ Select binary field

- With arrow key [Δ] / [∇] select the binary field.
 - Selected binary has focus (= orange frame):
 - Control element displays current value (digital and hexadecimal).



2. ▶ Activate editing mode

- With function button [*Selection*] start the editing mode.
 - Right segment has focus (= orange frame):



3. ▶ Set desired value

- With arrow key [Δ] / [∇] set the required value.
 - Control element displays new value in digital and hexadecimal representation.

4. ▶ Select next segment

- With arrow key [\leftarrow] / [\rightarrow] select the segment to be edited.
 - Selected segment has focus (= orange frame):



- ⇒
 - Optional: repeat steps 3 and 4 until all segments have the desired value.

5. ▶ Accept set values

- With function button [*Selection*] accept the set values and exit the editing mode.
OR:
With function button [*Back*] reset the values already set and exit the editing mode.
 - Binary field displays current value (binary and hexadecimal).

3.1.4 Using web interface of the device

The device has an integrated web server. It creates a web interface that allows remote access to the device via web browser. This allows the operator to conveniently configure, parameterise and monitor the device in continuous operation via an Ethernet network.

3.1.4.1 General

The operating concept of the web interface follows the same philosophy as the operating concept of the local display. The web interface uses the same menu structure and the same menu elements and symbols as the graphical user interface of the local display.



Pay attention to the notes on the additional functions of the web interface, see **Additional functions** ↗ 50 .

3.1.4.2 Recommended browsers

Use one of the following Internet browsers to display the web interface correctly:

- Microsoft Internet Explorer (version 8.0 or higher)
- Mozilla Firefox (version 3.5 or higher)

3.1.4.3 Operating notes

Web interface: calling up

- PC / laptop / mobile device: start Internet browser.
- In the Internet browser, enter the IP address of the device in the address line, e.g. `http://192.168.0.100`
- Internet browser shows the home page of the web interface.

3.1.5 System menu

3.1.5.1 Home screen

After the device starts, the home screen of the graphical user interface appears (special case: system start after initial commissioning or firmware update, see **Home screen "Basic settings"** ↗ Chapter 4.2 "Basic settings" home screen' on page 84 . The home screen shows status information of important system components. At the same time, the home screen is the starting point for accessing the menu functions of the TNC-A1412.



Fig. 59: Home screen

- 1 Operating mode of the AS-i master 1, see **Operating mode of the AS-i master** ↗ Chapter 5.2.2 'Operating mode of the AS-i master' on page 87
 - 2 Operating mode of the AS-i master 2, see **Operating mode of the AS-i master** ↗ Chapter 5.2.2 'Operating mode of the AS-i master' on page 87
 - 3 Control instance of the AS-i slave outputs, see **Control instance of the AS-i outputs** ↗ Chapter 5.2.3 'Control instance of the AS-i outputs' on page 87
 - 4 Status of the PROFIBUS connection, see **Fieldbus status** ↗ Chapter 5.2.4 'Fieldbus status' on page 87
- Switch to the menu with the [Menu] function button, see **Menu functions** ↗ Chapter 3.1.5.2 'Menu functions' on page 50 .

3.1.5.2 Menu functions

The main navigation bar of the TNC-A1412 provides access to the following menus:

Symbol	Description
	Access to the most important device functions
	Configuration and diagnosis of the AS-i 1 network (AS-i master, AS-i slaves)
	Configuration and diagnosis of the AS-i 2 network (AS-i master, AS-i slaves) *
	Configuration and diagnosis of the device, control of the device-internal PLC
	Configuration and diagnosis of the interfaces (PROFIBUS, configuration interface), see Interfaces ↗ Chapter 3.1.5.5 'Interfaces' on page 54
	Online Support Centre **
	Control and administration of the ifm system solutions (ifm apps) **, see ifm system solutions ↗ 4 'Commissioning' on page 84

* ... only available for devices with 2 AS-i masters

** ... only available via the web interface of the device

3.1.5.2.1 Additional functions

The web interface offers the following additional functions compared to the user interface of the display:

- Download general station description file (GSD file), see **Downloading GSD file** ↗ on page 59 .
- Accept date and time of a PC / laptop, see **Accepting system time from the PC**.
- Save diagnostic protocol, see **Saving diagnostic protocol**.
- Use ifm system solutions, see **ifm system solutions** ↗ 4 'Commissioning' on page 84 .
- Diagnostic displays, see **Home screen: status LEDs** ↗ Chapter 5.1 'Status LEDs' on page 87 .

3.1.5.3 Quick setup

The menu [*Quick setup*] offers quick access to the most important device functions.

3.1.5.3.1 Quick setup: configuring AS-i networks

In a configuration adjustment, the AS-i master carries out the following actions:

- Storage of the configuration data of all detected AS-i slaves (LDS).
- Transfer of the detected AS-i slaves to the list of configured slaves (LCS).



During a configuration adjustment, all output parameters of the unconnected AS-i slaves are reset to their default value in the AS-i master (single/A slaves = 0xF, B slaves = 0x7).

To carry out the configuration adjustment on AS-i master 1 and/or AS-i master 2:

1. ▶ Select menu page

Symbol	Work step
	'Quick setup' <ul style="list-style-type: none"> ■ Select [<i>Configure all</i>] tab.

2. ▶ Select AS-i master for configuration adjustment

- Set the following parameters as desired:

Parameter	Possible values	
Description		
[AS-i master 1] Select for the configuration adjustment	<input type="checkbox"/>	AS-i master 1 Exclude from the configuration adjustment
	<input checked="" type="checkbox"/>	AS-i master 1 Include in the configuration adjustment
[AS-i master 2] Select for the configuration adjustment (only available for devices with 2 AS-i masters)	<input type="checkbox"/>	AS-i master 2 Exclude from the configuration adjustment
	<input checked="" type="checkbox"/>	AS-i master 2 Include in the configuration adjustment


3. ▶ Start configuration adjustment

- Activate [Start configuration adjustment] button.
 - Selected AS-i masters go into the "configuration mode".
 - A configuration adjustment is carried out on the selected AS-i masters.
 - After the configuration adjustment, the selected AS-i masters go into "protected mode".

3.1.5.3.2 Quick setup: setting PROFIBUS interface

To configure the PROFIBUS interface:

1. ▶ Select menu page

Symbol	Work step
	'Quick setup' <ul style="list-style-type: none"> ▪ Select [Profibus] tab.

2. ▶ Set Profibus address

- In group [Profibus address] set the following parameters as desired:

Parameter	Possible values	
Description		
[PROFIBUS address] of the device	3	Profibus address 3

	124	Profibus address 124
	125	stand-alone
	126	Network with Ethernet

3. ▶ Save changes

- With [Accept] activate the changes.
 - PROFIBUS interface can be reached at the set address.

3.1.5.3.3 Quick setup: setting configuration interface

The device offers the following options for configuring the Ethernet configuration interface (X3):


Configuration possibility	Description
Manually	The operator sets the interface parameters (IP address, net mask, gateway address) manually.
Automatically	Interface parameters are set automatically. The operator can choose between the following protocols: <ul style="list-style-type: none"> - Dynamic Host Configuration Protocol (DHCP) - Zero Configuration Networking (Zeroconf)

i
 To obtain the interface parameters automatically via DHCP, the device must be connected to a DHCP server.

- Connect the configuration interface (X3) to a DHCP server.

To set the IP parameters of the configuration interface:

1. ▶ Select menu page

Symbol	Work step
	'Quick setup' <ul style="list-style-type: none"> ▪ Select [Config interface X3] tab.

2. ▶ Display active settings

- The following parameters show the active settings:

Parameter Description	Possible values	
<i>[Activate obtain IP address autom.,]</i> active method for the configuration of the interface parameters	<input type="checkbox"/>	Manual assignment of the interface parameters by the operator.
	<input checked="" type="checkbox"/>	Automatic assignment of the interface parameters.
<i>[IP status]</i> used configuration protocol	<i>[Static]</i>	The operator sets the IP parameters manually.
	<i>[DHCP]</i>	The IP parameters are set by a DHCP server.
	<i>[Zero-conf]</i>	The IP parameters are set automatically with the Zero-conf protocol.
<i>[IP address]</i> of the interface	e.g. 192.168.0.100	
<i>[Subnet mask]</i> Net mask of the network segment	e.g. 255.255.255.0	
<i>[Gateway address]</i> IP address of the network gateway	e.g. 192.168.0.1	

- Select one of the following actions:
 - Set IP parameters manually: continue with → step 3
 - Set IP parameters automatically: continue with → step 4

3. ▶ Set IP parameters manually

- [Deactivate obtain IP address autom.,]* checkbox.
- Set the following parameters as desired:
 - *[IP address]*
 - *[Subnet mask]*
 - *[Gateway address]*
- With *[Accept]* save the changes.
- Continue with → step 5

4. ▶ Set IP parameters automatically

- [Activate obtain IP address autom.,]* checkbox.
- With *[Accept]* save the changes.
 - Device attempts to obtain IP parameters from a DHCP server.
 - If the configuration of the IP parameters via DHCP server fails, the device generates the IP parameters with the Zeroconf protocol.



The automatic parameter setting of the interface takes about 10 seconds.

5. ▶ Display current settings

- Parameters (→ step 2) show active IP settings of the configuration interface.

3.1.5.4 System

3.1.5.4.1 Settings

Clone device configuration



This function is only available via the local user interface of the device!

The device offers the possibility to create an image of the current device configuration, transfer it to another device and activate it there (clone). The configuration file is exported and imported via an SD card.

A device configuration consists of the following settings:

- System settings
- AS-i 1/AS-i 2 settings
- PROFIBUS settings
- PLC applications (including PLC task configuration, variables and data)



Cloning of a device configuration is only possible if the following conditions are met:

- The firmware versions of the source device and the target device are compatible (compatible = versions match in major release and minor release, e.g. V3.2.1 is compatible with V3.2.2, but: V3.2.1 is incompatible with V3.3.1).
- Source device and target device have the same part number.

Export device configuration

i IMPORTANT

The control functions of the device are not available during the export.
 - Risk of undesirable system behaviour.

- Do not export the device configuration while the system is running!

i IMPORTANT

Interrupting the export can lead to a defective export file.
 - Risk of data loss.

- Do not disconnect the device from the supply voltage during the export.
- Only start export after the boot application has been successfully created.
- Do not remove the SD card from the device before the export is complete.

i

The SD card must be formatted with the FAT32 file system. SD cards with other file systems are not recognised by the TNC-A1412.




To enable identification of the saved configuration, the export file is saved with the following naming convention:

ifm_DevID_XXXXXXXXXX_YYYYMMDDhhmmss.iconf

Naming convention	Description
DevID	Part number of the device
XXXXXXXXXX	Serial number of the device
YYYYMMDDhhmmss	Timestamp of the saving: YYYY = year MM = month DD = day hh = hours mm = minute ss = seconds

To save the current device configuration on an SD card:

1. ▶ Select menu page

Symbol	Work step
	<ul style="list-style-type: none"> 'System' >  'Settings' Select [Configuration] tab.
	

2. ▶ Save device configuration

- Insert a blank, formatted SD card into the device's SD card slot.
- Activate [Export config.] button.
 - Device stores current device configuration on the SD card.

Import device configuration

i IMPORTANT

The control functions of the device are not available during the import. The device restarts during the import.
 - Risk of undesirable system behaviour.

- Do not import the device configuration while the system is running!

i IMPORTANT

Interrupting the import can lead to a faulty device configuration.
 - Risk of data loss.

- Do not disconnect the device from the supply voltage during the import.
- Do not remove the SD card from the device before the import is complete.

i

To prevent an incorrect device configuration from being restored:




- Before the import, check whether the desired device configuration is stored on the SD card (identification of the saved device configuration, see **Exporting device configuration** § 52).
- Only save the device configuration to be imported in the root directory of the SD card.

To transfer a stored device configuration to the device:

1. ▶ Restart device

- Insert SD card with stored device configuration into the SD card slot.
- Disconnect device from supply voltage and reconnect to supply voltage.
 - Device restarts.

2. ▶ Select menu page









Symbol	Work step
	<ul style="list-style-type: none"> ▪ 'System' >  'Settings' ▪ Select [Configuration] tab.
	

3. ▶ Restore device configuration

- Activate [Import config.] button.
 - Warning message appears.
- With [OK] confirm the message.
 - Device configuration is loaded and stored on the device.
 - Device restarts.

3.1.5.5 Interfaces

The menu [Interfaces] provides access to configuration options of the device's interfaces.

Navigation path	Functions
	<ul style="list-style-type: none"> ▪ Configuration interface <ul style="list-style-type: none"> - Set IP parameters manually, see  'Set IP parameters manually' on page 55 - Set IP parameters automatically, see  'Set IP parameters automatically:' on page 55 - Display Ethernet information, see  on page 54
>	
	
	<ul style="list-style-type: none"> ▪ PROFIBUS interface <ul style="list-style-type: none"> - Interfaces: PROFIBUS interface, see  Chapter 3.1.5.5.2 'Interfaces: PROFIBUS interface' on page 56
>	
	

3.1.5.5.1 Interface: configuration interface

The [Configuration interface] menu provides access to settings of the Ethernet configuration interface (X3).




Notes on IP settings

The device offers the following options for configuring the Ethernet configuration interface:

Configuration possibility	Description
Manually	The operator sets the interface parameters (IP address, net mask, gateway address) manually.
Automatically	Interface parameters are set automatically. The operator can choose between the following protocols: <ul style="list-style-type: none"> - Dynamic Host Configuration Protocol (DHCP) - Zero Configuration Networking (Zeroconf)

To display the current configuration method and the active IP parameters of the configuration interface:

1. ▶ Select menu page

Symbol	Work step
	<ul style="list-style-type: none"> ▪ 'Interfaces' >  'Progr. interface' ▪ Select [IP setup] tab.
	

2. ▶ Display active settings

- The following parameters show the active settings:

Parameter	Possible values				
Description					
[Activate obtain IP address autom..] active method for the configuration of the interface parameters	<table border="0"> <tr> <td><input type="checkbox"/></td> <td>Manual assignment of the interface parameters by the operator.</td> </tr> <tr> <td><input checked="" type="checkbox"/></td> <td>Automatic assignment of the interface parameters.</td> </tr> </table>	<input type="checkbox"/>	Manual assignment of the interface parameters by the operator.	<input checked="" type="checkbox"/>	Automatic assignment of the interface parameters.
<input type="checkbox"/>	Manual assignment of the interface parameters by the operator.				
<input checked="" type="checkbox"/>	Automatic assignment of the interface parameters.				

Parameter	Possible values	
Description		
[IP status] used configura- tion protocol	[Static]	The operator sets the IP parameters manually.
	[DHCP]	The IP parameters are set by a DHCP server.
	[Zero-conf]	The IP parameters are set automatically with the Zeroconf protocol.
[IP address] of the interface	e.g. 192.168.0.100	
[Subnet mask] Net mask of the network segment	e.g. 255.255.255.0	
[Gateway address] IP address of the network gateway	e.g. 192.168.0.1	

- Select one of the following actions:
 - Set IP parameters manually, see 'Set IP parameters manually' on page 55 .
 - Set IP parameters automatically, see 'Set IP parameters automatically:' on page 55 .

Set IP parameters manually

1. ▶ Select menu page

Symbol	Work step
	'Interfaces' > 'Progr. interface' <ul style="list-style-type: none"> ■ Select [IP setup] tab.

2. ▶ Deactivate DHCP client

- Deactivate the [Obtain IP address autom.] checkbox, see **Notes on IP settings** on page 54 .
 - IP address fields [IP address], [Subnet mask] and [Gateway address] are editable.

3. ▶ Set IP parameters

- Set the following parameters as required, see **Notes on IP settings** on page 54 .
 - [IP address]
 - [Subnet mask]
 - [Gateway address]

4. ▶ Gateway address

- Activate [Accept] button.
 - Set values are valid.
 - [IP status] shows the active configuration method: [Static]

Set IP parameters automatically:

To obtain the interface parameters automatically via DHCP, the device must be connected to a DHCP server.

- Connect the configuration interface (X3) to a DHCP server.

To set the IP parameters of the configuration interface automatically:

1. ▶ Select menu page

Symbol	Work step
	'Interfaces' > 'Progr. interface' <ul style="list-style-type: none"> ■ Select [IP setup] tab.

2. ▶ Activating the DHCP client

- Activate [Obtain IP address autom.] checkbox, see **Notes on IP settings** on page 54 .

3. ▶ Save changes

- Select [Accept] button.
 - Device attempts to obtain IP parameters from a DHCP server.
 - If the configuration of the IP parameters via DHCP server fails, the device generates the IP parameters with the Zeroconf protocol.
 - [IP address], [Subnet mask] and [Gateway address] show the set IP parameters.
 - Set values are valid.
 - [IP status] shows active configuration method: [DHCP] or [Zeroconf].



The automatic configuration of the IP parameters takes about 10 seconds.

Display Ethernet information

To display Ethernet information about the configuration interface:

1. ▶ Select menu page

Symbol	Work step
	<ul style="list-style-type: none"> 'Interfaces' > 'Progr. interface' Select [Ethernet information] tab.

2. ▶ Display Ethernet information

- Page shows following information:

Name	Description
[MAC-ID]	MAC identification number of the interface

3.1.5.5.2 Interfaces: PROFIBUS interface

The [PROFIBUS] menu provides access to information, settings and diagnostic data of the PROFIBUS interface.

Navigation path	Functions
 > > 	<ul style="list-style-type: none"> PROFIBUS information <ul style="list-style-type: none"> - Display I&M information, on page 56 - Display PROFIBUS data, on page 57 - Display module configuration, on page 59 - Download GSD file, on page 59
 > > 	<ul style="list-style-type: none"> PROFIBUS settings <ul style="list-style-type: none"> - Set PROFIBUS interface, on page 59
 > > 	<ul style="list-style-type: none"> PROFIBUS diagnosis <ul style="list-style-type: none"> - Display diagnostic data, on page 60






PROFIBUS: information

The menu item *[Information]* provides access to information about the PROFIBUS interface.

Display I&M information

To display the I&M information (I&M = Identification & Maintenance):

1. ▶ Select menu page

Symbol	Work step
	'Interfaces' >  'Profibus' >  'Info'
	<ul style="list-style-type: none"> Select <i>[I&M information]</i> tab.
	

2. ▶ Display I&M information






- Page shows following information:

Name	Description
<i>[Manufacturer ID]</i>	Display of the manufacturer ID
<i>[Part number]</i>	Display of the part number of the device
<i>[Serial number]</i>	Display of the serial number
<i>[Hardware version]</i>	Display of the hardware version
<i>[Software version]</i>	Display of the software version
<i>[Revision number]</i>	Display of the revision number
<i>[Profile ID]</i>	Display of the profile ID
<i>[Profile type]</i>	Display of the profile type
<i>[I&M version]</i>	Display of the I&M version

Display PROFIBUS data

To display the PROFIBUS data:

1. ▶ Select menu page

Symbol	Work step
	'Interfaces' >  'Profibus' >  'Info'
	<ul style="list-style-type: none"> Select <i>[I&M information]</i> tab.
	

2. ▶ Display PROFIBUS data






- Page shows following information:

Name	Possible values	
Description		
<i>[[Profibus address]</i> Display of the Profibus address	3 ... 124	
<i>[[Profibus baud rate]</i> Display of the data rate of the PROFIBUS interface	<i>[Unknown]</i>	Device has no connection to the PROFIBUS master
	<i>[9.6 kBits/s]</i>	Baud rate
	... <i>[12 MBits/s]</i>	
<i>[[Analogue channels / I slave]</i> Number of analogue channels per configured input slave	<i>[Unknown]</i>	Device has no connection to the PROFIBUS master
	<i>[1 channel per A/B]</i>	Device has no connection to the PROFIBUS master OR: Channels 1+3 per single slave
	<i>[1 channel]</i>	1 channel per single slave OR: 1 channel per O slave
	<i>[2 channels]</i>	2 channels per single slave OR: 2 channels per A/B slave
	<i>[4 channels]</i>	4 channels per single slave OR: 2 channels per A/B slave
<i>[[Analogue channels / O slave]</i> Number of analogue channels per configured output slave	→ <i>[[Analogue channels / I slave]</i>	
<i>[[Failsafe state]</i> Behaviour of the AS-i outputs in case of an interruption of the PROFIBUS connection	<i>[Clear output]</i>	Switch off AS-i outputs
	<i>[Hold output]</i>	Hold AS-i outputs at the last value
<i>[[Parameter download]</i> Transfer of the parameter data of the AS-i slaves to the device	<input type="checkbox"/>	Parameters are not downloaded, i.e. AS-i slaves are activated with the parameters set on the device.
	<input checked="" type="checkbox"/>	Each time the PROFIBUS connection is established, the AS-i slave parameters are loaded from the PROFIBUS controller onto the device, activated in the slaves and stored in non-volatile memory.
<i>[[Profibus alarms]</i> Transmission of Profibus alarms to the PROFIBUS controller	<input type="checkbox"/>	No PROFIBUS alarms are sent.
	<input checked="" type="checkbox"/>	PROFIBUS alarms are triggered in the PROFIBUS master if an error occurs on the device.
<i>[[Swap IO]</i> Exchange of the nibble in the byte (only concerns digital data in the slots 1...4)	<input type="checkbox"/>	No exchange of the assignment of the slave nibbles in the byte.
	<input checked="" type="checkbox"/>	Exchange of the assignment of the slave nibbles in the byte.

Display module configuration


To display the current configuration of the PROFIBUS modules:

1. ▶ Select menu page

Symbol	Work step
	'Interfaces' >  'Profibus' >  'Info'
	<ul style="list-style-type: none"> Select [Module configuration] tab.
	

2. ▶ Display module configuration


- Page shows active configuration of the PROFIBUS modules.

 *The fieldbus slots can only be configured in the PROFIBUS configuration software.*

PROFIBUS: settings






The [Settings] menu item provides access to the configuration options of the PROFIBUS interface.

Set PROFIBUS interface

 *We recommend setting up the fieldbus on the PROFIBUS controller and transferring the configuration to the device.*

To set up the PROFIBUS interface:

1. ▶ Select menu page

Symbol	Work step
	'Interfaces' >  'Profibus' >  'Settings'
	<ul style="list-style-type: none"> Select [...].
	

2. ▶ Set PROFIBUS address of the device

- Set the following parameters as desired:

Parameter	Possible values	
Description		
[Profibus address]	3	Profibus address 3
Address of the PROFIBUS interface
	126	Profibus address 124

3. ▶ Save changes

- Activate [Accept] button.
 - Set value is valid.






PROFIBUS: diagnosis

The [Diagnostics] menu item provides access to diagnostic data of the PROFIBUS interface:

Display diagnostic data



To display the PROFIBUS diagnostic data:

1. ▶ Select menu page

Symbol	Work step
	<ul style="list-style-type: none"> 'Interfaces' >  'Profibus' >  'Diagnosis' Select [...] tab.
	
	

2. ▶ Display diagnostic data

- Page shows following information:

Name	Possible values	
Description		
<i>[PROFIBUS connection status]</i> Display of the connection status of the PROFIBUS interfaces		
<i>[Status port X6]</i> Connection status of port X6		No connection to the fieldbus controller.
		Connection to the fieldbus controller established.

3.2 Operation of touch display

The touch operator display as communication master uses a graphical user interface that is displayed via a WEB browser. In addition to display functions (monitoring), functional tests and system configurations can also be carried out. Many of these functions are protected by a password.

3.2.1 System monitoring

A main function of the touch operator display as communication master is the system monitoring and the display of the system states. In addition to displaying the summarised system status and the quantities of the connected components, the date of the last functional test is also displayed. This function does not require a password entry. The "Details" and "Controller & Slaves" buttons can be used to display the system messages and individual information of the controllers and connected slave modules.

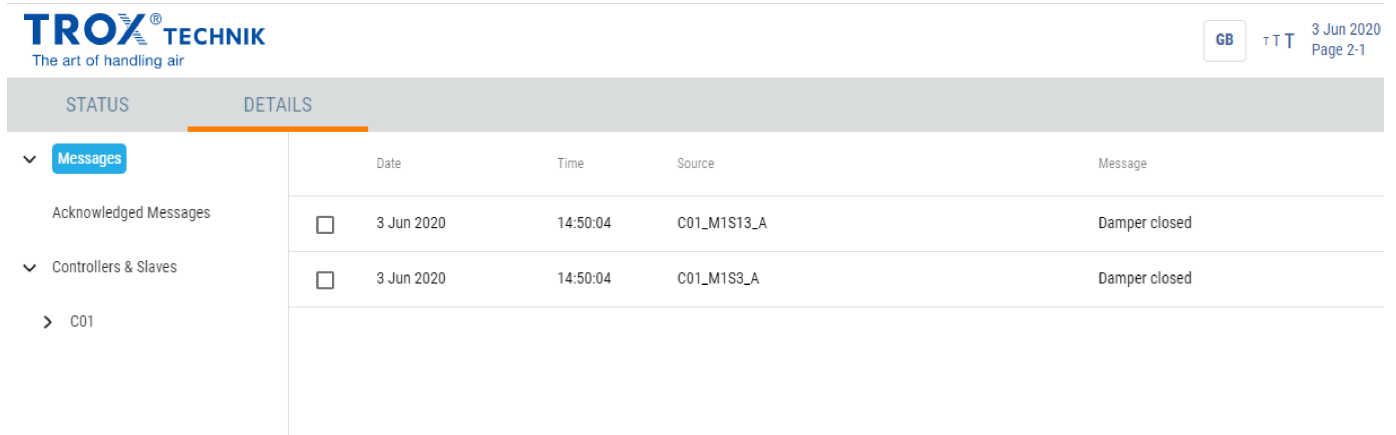


Fig. 60: System monitoring 1

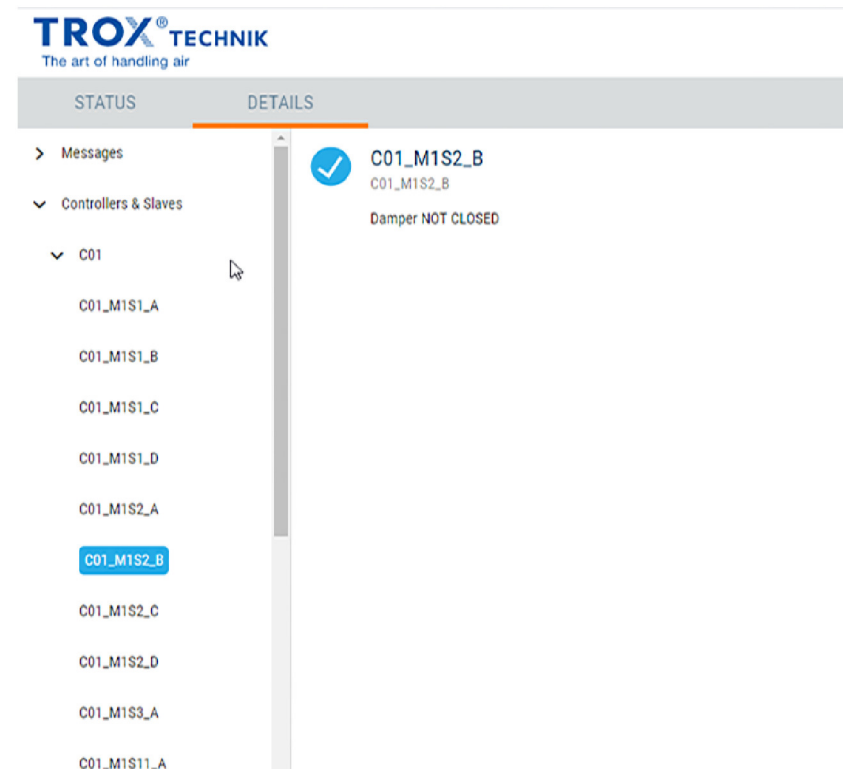


Fig. 61: System monitoring 2

3.2.2 Acknowledging messages and resetting system

If, for example, the system has detected the release of a damper, a corresponding message is displayed and transferred to the table with the messages. It must be acknowledged by the system operator. No password is required. After all messages have been acknowledged, the system is reset.

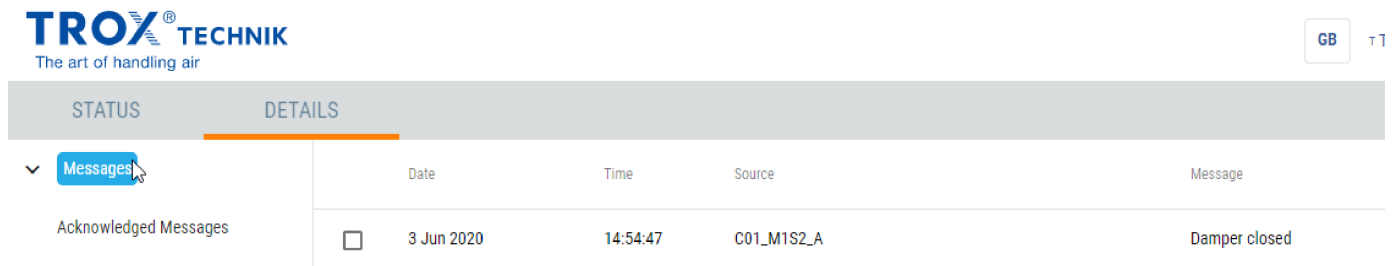


Fig. 62: Acknowledge message

All messages are still displayed in the list for acknowledged messages after acknowledgement. This makes it possible to trace which messages have been displayed in the past.

3.2.3 Version query

The versions of the installed software can be displayed and saved by clicking the TROX symbol.

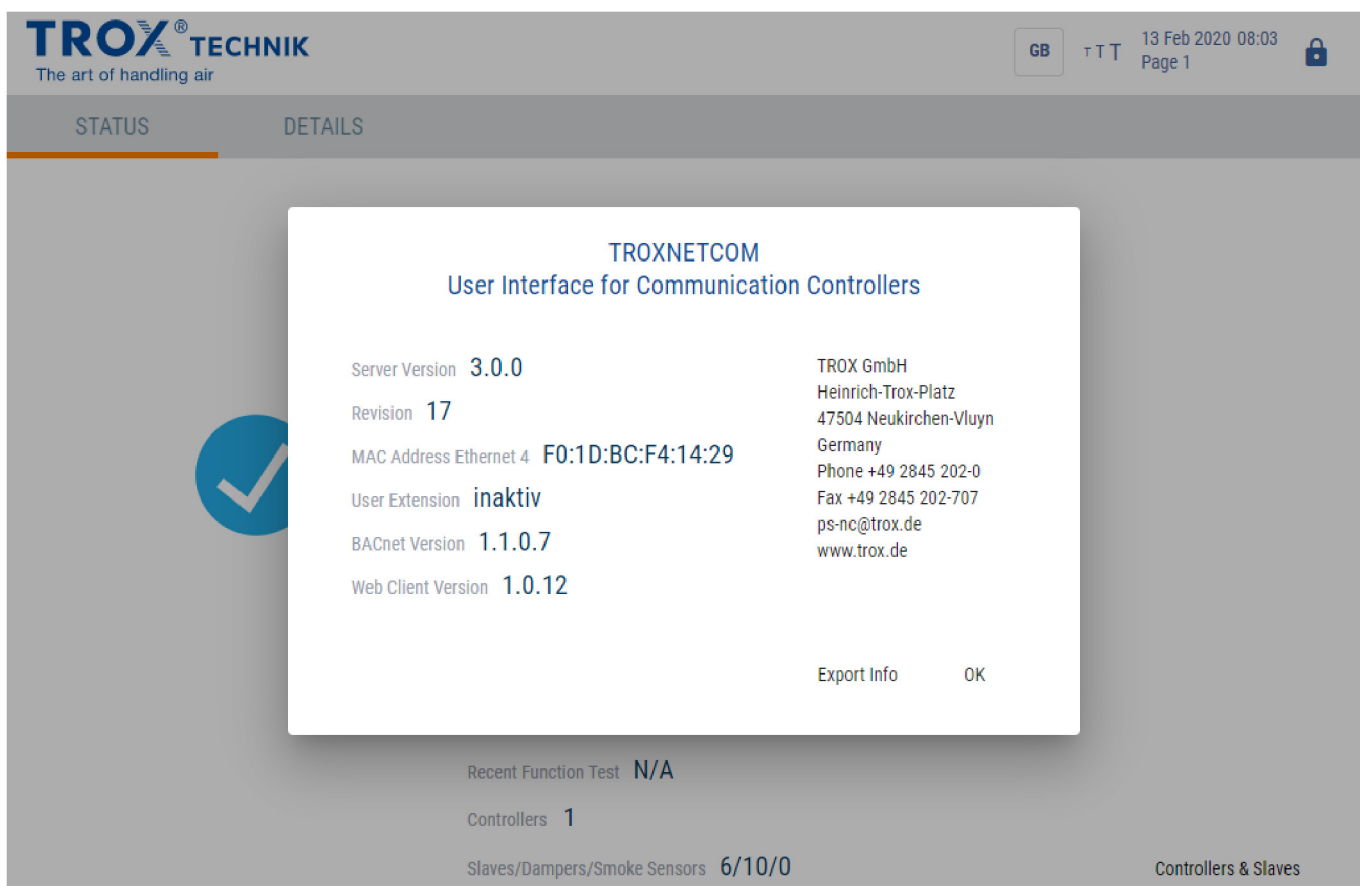


Fig. 63: Version query

3.2.4 Password

There are 4 rights levels:

- Data monitoring (without password)
- Main user (password-protected, default 222)
- Configurator (password-protected, default 333)
- Administrator (password-protected, default 444)

To enter the password, press the lock symbol.

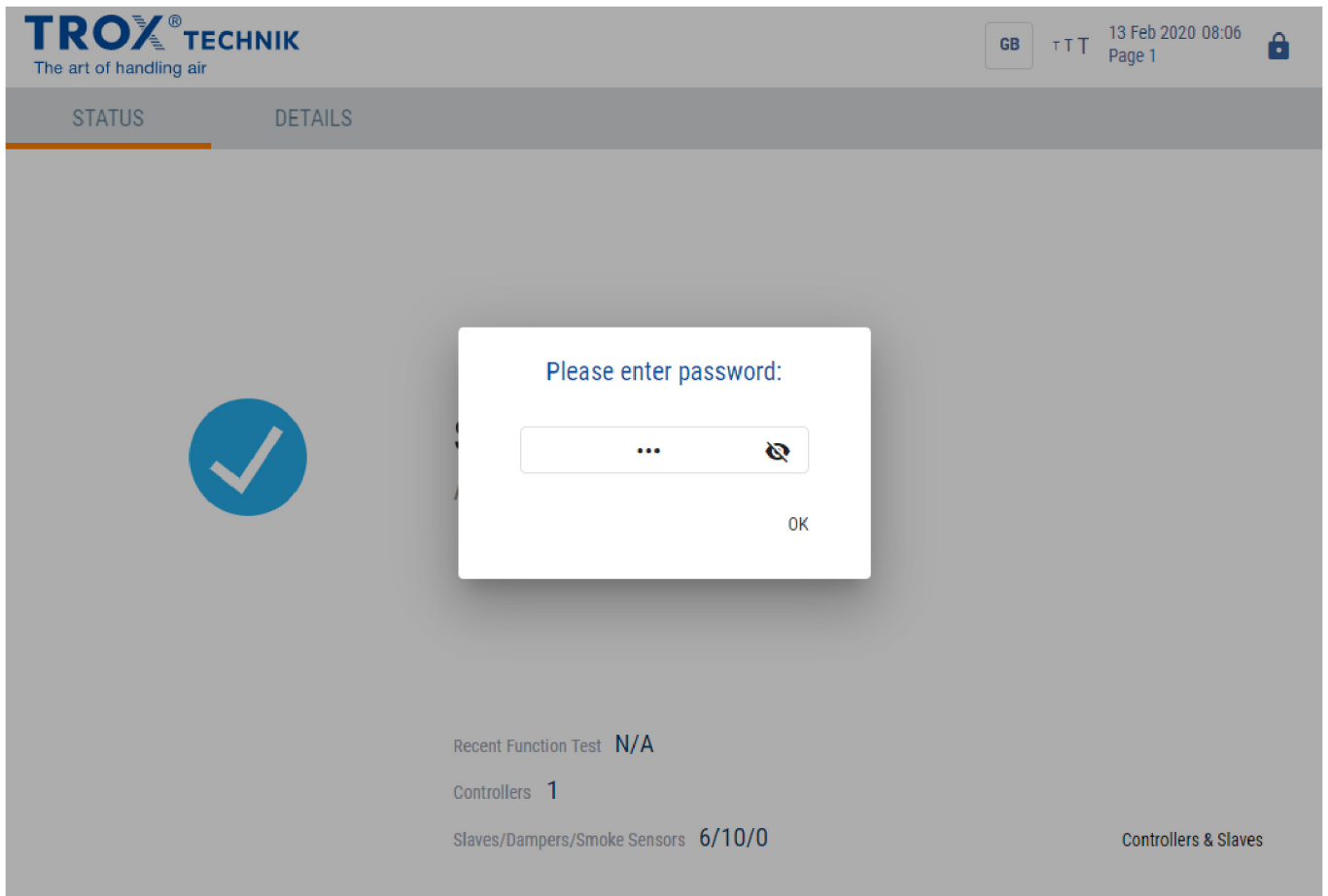


Fig. 64: Password

Further functions become visible after the password has been entered correctly.

STATUS

DETAILS

FUNCTION TEST

CONFIGURATION



SYSTEM OK

ALL DAMPERS OPEN

Recent Function Test **N/A**

Controllers **1**

Slaves/Dampers/Smoke Sensors **6/10/0**

Controllers & Slaves

Fig. 65: Additional functions for Administrator user

3.2.5 Manual control

Manual control allows each damper with actuator to be operated for test purposes and requires at least the rights of the main user. When the first manual intervention is made, manual control is switched on and can be switched off for all manually operated dampers. During manual control, the condition is reported on the home page.

The screenshot shows the TROX TECHNIK home page interface. At the top left is the logo 'TROX® TECHNIK' with the tagline 'The art of handling air'. To the right, there is a language selector 'GB', a user profile icon, and the date/time '13 Feb 2020 08:09' along with 'Page 1' and a lock icon. Below the header is a navigation bar with 'STATUS' (highlighted) and 'DETAILS'. The main content area features a large orange warning triangle icon on the left. To its right, the text reads 'SYSTEM ERROR' in bold, followed by 'ALL DAMPERS OPEN' and 'C01_M1S5_A Manual operation active'. A 'Messages' link is positioned to the right of this text. Below the error message, there are three status indicators: 'Recent Function Test N/A', 'Controllers 0 1' (with a blue checkmark and an orange warning triangle), and 'Slaves/Dampers/Smoke Sensors 6/10/0'. A 'Controllers & Slaves' link is located at the bottom right of this section.

Fig. 66: Home page with active manual control

STATUS	DETAILS	FUNCTION TEST	CONFIGURATION
C01_M1S3_C	C01_M1S5_A C01_M1S5_A		
C01_M1S3_D	Damper OPEN		<input type="button" value="Open"/> <input type="button" value="Close"/>
<input type="button" value="C01_M1S5_A"/>			
C01_M1S7_A			
C01_M1S20_A			
C01_M1S20_B			
C01_M1S20_C			
C01_M1S20_D			
C01_M1S31_A			
C01_M1S31_B			
C01_M1S31_C		<input type="button" value="Switch Off Manual Mode"/>	<input type="button" value="Acknowledge Errors"/>
C01_M1S31_D			

Fig. 67: Manual control

3.2.6 Functional test

The software includes a functional test for dampers with actuator and duct smoke detectors. The "Functional test" button guides the user step-by-step through the three pages with the test parameters.

The screenshot displays the TROX® TECHNIK web interface for a functional test. The top navigation bar includes the TROX logo, a language selector (GB), a user profile icon, and the date/time (13 Feb 2020 08:14) and page number (Page 3-1). Below the navigation bar, there are four tabs: STATUS, DETAILS, FUNCTION TEST (which is active and highlighted with an orange underline), and CONFIGURATION. On the left side, a vertical progress indicator shows three steps: 1 Selected Controllers (active), 2 Set Method, and 3 Start Test. The main content area is titled "Selected Controllers" and contains a checkbox labeled "Select All Controllers" which is checked, and a single controller entry "C01" which is also checked. A blue "Next" button is located at the bottom right of the main content area.

Fig. 68: Functional test - controller selection

STATUS DETAILS **FUNCTION TEST** CONFIGURATION

Selected Controllers

2 Set Method

3 Start Test

Set Method

- Check Dampers
 - Simultaneously Sequentially
 - in all groups
- Check Smoke Sensors
- Schedule Function Test

Previous **Next**

Fig. 69: Functional test - define procedure

STATUS

DETAILS

FUNCTION TEST

CONFIGURATION

Selected Controllers

Set Method

3 Start Test

Start Test

Auditor's Name

Tester

Previous

Start

Fig. 70: Functional test - start test

The access to the result files is described in the [Chapter 3.2.8 'Configuration and additional functions'](#) on page 71 .

3.2.7 Remote access

The user interface can be displayed and operated via a WEB browser. The system only allows one privileged user.

The screenshot displays the TROX® TECHNIK web interface. At the top left is the logo and tagline "The art of handling air". The top right shows a language selector (GB), a user icon (TT), the date and time "3 Jun 2020 14:56", and the page number "Page 4-18" next to a lock icon. Below the header is a navigation bar with four tabs: "STATUS", "DETAILS", "FUNCTION TEST", and "CONFIGURATION". The "CONFIGURATION" tab is active. On the left is a sidebar menu with items: "Controller Settings", "Labels", "Protocols", "Network Adapters", "Fieldbus Adapters", "Control Level" (expanded), "MODBUS Slave", "BACnet", "Web Client" (highlighted with a blue button), and "System settings". The main content area is titled "System settings" and "Web Client". It features a checked checkbox for "Enabled" and a "Network Adapter" dropdown menu currently showing "Ethernet 2". At the bottom right of the main area are "Revert" and "Save" buttons.

Fig. 71: Remote access for web server

3.2.8 Configuration and additional functions

The "Configurator" and "Administrator" rights levels allow configurations and access to additional functions.

The screenshot displays the TROX® TECHNİK web interface. At the top left is the logo and tagline 'The art of handling air'. On the top right, there is a language selector set to 'GB', a user profile icon, and the date/time '3 Jun 2020 14:57' with 'Page 4-1' below it. A navigation bar contains four tabs: 'STATUS', 'DETAILS', 'FUNCTION TEST', and 'CONFIGURATION', with 'CONFIGURATION' being the active tab. A left sidebar lists configuration categories: 'Controller Settings' (highlighted in blue), 'C01', 'Labels', 'Protocols', 'Network Adapters', 'Fieldbus Adapters', 'Control Level', and 'System settings'. The main content area is titled 'Controller Settings' and contains two unchecked checkboxes: 'Group copy' and 'Use segments'. At the bottom right of the main area, there is a 'Rebuild Fieldbus' button.

Fig. 72: Configuration

 **CAUTION!**

Configuration changes are only allowed to be made by trained personnel. Incorrect parameter settings can lead to system failure.

3.2.8.1 Setting controllers

All controllers of the controller network can be managed centrally. It is also possible to specify whether the numbers of the damper groups should be unique across the controllers. This allows groups to be distributed over different controllers and divided into segments.

The following settings can be made across controllers:

- Copying groups
- Ventilation system specific shutdown
- Use of segments



STATUS	DETAILS	FUNCTION TEST	CONFIGURATION
> Controller Settings	Controller Settings		<input type="checkbox"/> Group copy <input type="checkbox"/> Use segments
> Labels			
> Protocols			
> Network Adapters			
> Fieldbus Adapters			
> Control Level			
> System settings			

Rebuild Fieldbus

Fig. 73: Setting function across controllers

Each controller can be activated/deactivated and its parameters set:

- Thermal dampers with 2 end positions: AS-EP
- Thermal dampers with 1 end position: AS-EP4
- Texts for display and log
- Sequential control
- Relay group control
- Behaviour after fault in functional test
- Error suppression
- Deactivation of duct smoke detectors
- Group assignment and activation group B
- Spring return element or reversing drive on AS-EM
- Duct smoke detector control via network
- Ventilation-specific shutdown
- Network monitoring
- Gateway mode for TNC-Z0094

STATUS	DETAILS	FUNCTION TEST	CONFIGURATION
<ul style="list-style-type: none"> ▼ Controller Settings <ul style="list-style-type: none"> C01 > Labels > Protocols > Network Adapters > Fieldbus Adapters > Control Level > System settings 	<p>Controller Settings</p> <p>C01 C01</p> <p><input checked="" type="checkbox"/> Enabled</p> <p>AS-EP-Module</p> <p><input checked="" type="radio"/> AS-EP4 <input type="radio"/> AS-EP</p> <p><input type="checkbox"/> Inverted contacts at AS-EP modules</p> <p>Default text for AS-EP4:</p> <p><input checked="" type="radio"/> "CLOSED/NOT CLOSED" <input type="radio"/> "NOT OPEN/OPEN"</p>		<p>Further Settings</p> <p><input type="checkbox"/> Sequential interlocking active</p> <p><input checked="" type="checkbox"/> Group control via relay contact active</p> <p><input checked="" type="checkbox"/> Close damper after error in operation test</p> <p><input type="checkbox"/> Suppression of error messages when fire dampers are closed intentionally</p> <p><input type="checkbox"/> Ignore smoke detectors</p> <p><input type="checkbox"/> Group A for ventilation systems, group B for smoke detector groups</p> <p><input type="checkbox"/> Group B Active</p> <p><input checked="" type="radio"/> "AS-EM/B" <input type="radio"/> "AS-EM/S"</p> <p><input checked="" type="checkbox"/> Network transmission of smoke alarms to control motor-driven fire dampers</p> <p><input checked="" type="checkbox"/> Ventilation system specific locking after network failure</p> <p><input checked="" type="checkbox"/> Network monitoring active</p> <p><input type="checkbox"/> I/O gateway mode</p>

Fig. 74: Setting controllers

3.2.8.2 Entering and changing designations

The designation for controllers, dampers, duct smoke detectors, etc. can be individualised. The texts in the input fields can be changed for this purpose. If many changes are to be made, a CSV file can be created with the export function for identifiers. After the CSV file has been changed (e.g. with a spreadsheet) it can be reloaded with the import function for identifiers. The export and import of the files are made using a plugged in USB memory.

The change function is suitable for corrections and additions. If all identifiers should be created, export the identifiers as a CSV file, see [75](#). After the changes have been made, the file is read in again (imported).

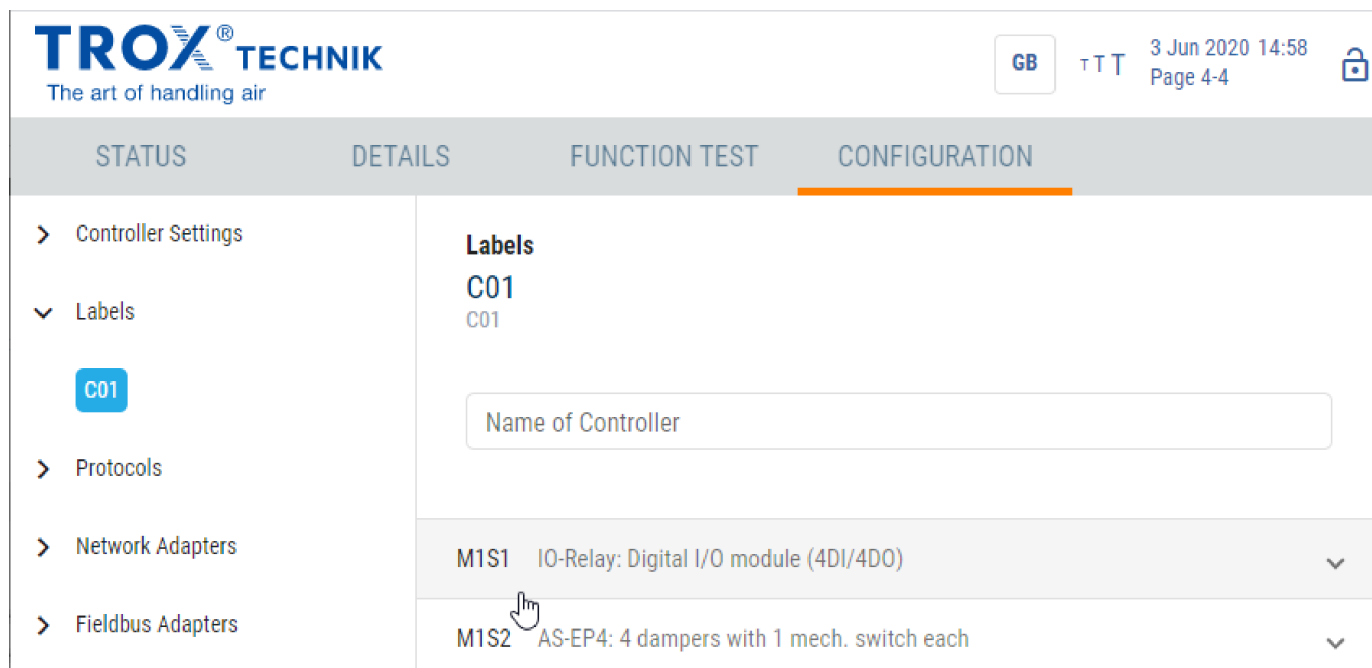


Fig. 75: Editing texts

3.2.8.3 Access to logs

The system logs all messages, the results of functional tests and the sequence of dialog pages. These logs can be exported. These logs are stored on a plugged in USB memory.

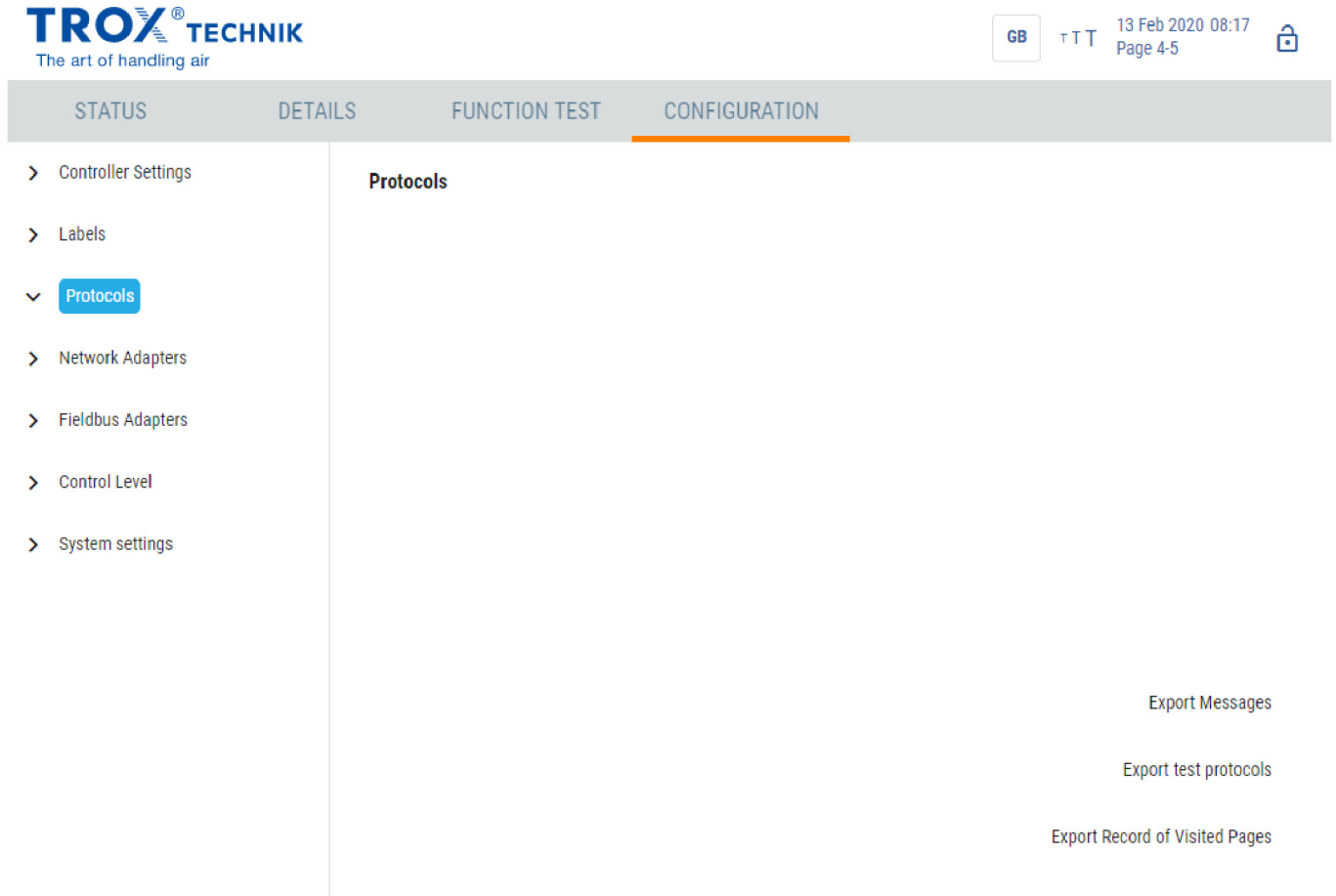


Fig. 76: Access to logs

3.2.8.4 Configuration of the network adapters

The system uses network adapters for communication with controllers, the Profibus[®] DP interface and external devices (e.g. central building management system). A static IP address (with subnet mask and default gateway address) can be set for each adapter or the DHCP protocol can be used. The Profibus[®] DP interface and the controllers are always addressed via a static address.

The screenshot shows the 'CONFIGURATION' tab of the network adapters interface. The table below summarizes the data presented in the interface:

STATUS	DETAILS	FUNCTION TEST	CONFIGURATION
⊖ Network Adapters	<ul style="list-style-type: none"> Ethernet Realtek PCIe GbE Family Controller LAN-Verbindung* 1 Microsoft Wi-Fi Direct Virtual Adapter Bluetooth-Netzwerkverbindung Bluetooth Device (Personal Area Network) 	<ul style="list-style-type: none"> Ethernet 2 Realtek USB GbE Family Controller Ethernet 3 TAP-Windows Adapter V9 	<ul style="list-style-type: none"> WLAN Intel(R) Dual Band Wireless-AC 8265 Ethernet 4 Surface Ethernet Adapter
Ethernet			
Ethernet 2			
WLAN			
LAN-Verbindung* 1			
LAN-Verbindung* 2			
Ethernet 3			
Ethernet 4			
Bluetooth-Netzwerkverbindung			
> Fieldbus Adapters			
> Control Level			
> System settings			

Fig. 77: Configuration of the network adapters

3.2.8.5 Configuration of the Profibus[®] DP interface

The Profibus[®] DP interface communicates as a network participant with the touch operator display as communication master. Only the NetHot S/N is used that is located on the "ArticleID" device sticker. It is the last row of digits, e.g. 50962.

The configuration at restart or after a configuration change takes a few minutes.

The screenshot shows the TROX web interface for configuring the Profibus DP interface. The top navigation bar includes the TROX logo, a language selector (GB), a user icon, and the date/time (13 Feb 2020 08:50) and page number (Page 4-10). Below the navigation bar are tabs for STATUS, DETAILS, FUNCTION TEST, and CONFIGURATION. The CONFIGURATION tab is active, showing a sidebar with navigation options: Controller Settings, Labels, Protocols, Network Adapters, Fieldbus Adapters (expanded), Control Level, MODBUS Slave, BACnet, Web Client, and System settings. The 'C01 PROFIBUS' adapter is selected. The main configuration area is titled 'Fieldbus Adapters' and 'C01 PROFIBUS'. It contains the following fields:

- First Controller: C1
- Number of Controllers: 1
- Network Adapter: Ethernet 4
- NetHost IP Address: 192.168.10.110
- NetHost S/N: 50962
- Baudrate: 500K

At the bottom right of the configuration area, there are two buttons: 'Add another Adapter' and 'Remove Adapter'.

Fig. 78: Configuration of the Profibus[®] DP interface - fieldbus adapter

3.2.8.6 Configuration of the MODBUS® master interface

The MODBUS® master interface is communication master for controller networking with MODBUS® TCP via Ethernet. In addition to the controller designation, the configuration contains the network adapter used for communication and the IP address of the controller.



The screenshot shows a web-based configuration interface. At the top, there are tabs for 'STATUS', 'DETAILS', 'FUNCTION TEST', and 'CONFIGURATION'. The 'CONFIGURATION' tab is selected. On the left, a sidebar lists various network and communication options: Ethernet, Ethernet 2, WLAN, LAN-Verbindung* 1, LAN-Verbindung* 2, Ethernet 3, Ethernet 4, Bluetooth-Netzwerkverbindung, Fieldbus Adapters (expanded), C01 MODBUS-Master (highlighted), Control Level, and System settings. The main content area is titled 'Fieldbus Adapters' and shows the configuration for 'C01 MODBUS-Master'. It includes a 'Controller' field with the value 'C1', a 'Network Adapter' dropdown menu set to 'Ethernet 4', and an 'IP Address Controller' field with the value '192.168.10.220'. At the bottom right of the configuration area, there are two buttons: 'Add another Adapter' and 'Remove Adapter'.

Fig. 79: Configuration of the MODBUS® master interface - fieldbus adapter

3.2.8.7 System settings

The system settings enable, among other things, the time to be set, software updates to be loaded and the BACnet and MODBUS[®] interfaces to the central building management system to be switched on. A special configuration page allows user expansions (software plug-ins) to be loaded. Another setting page is available for changing passwords.

The screenshot displays the TROX TECHNIK web interface. At the top left is the logo 'TROX[®] TECHNIK' with the tagline 'The art of handling air'. On the top right, there is a language selector 'GB', a user profile icon 'TT', the date and time '13 Feb 2020 08:27', and a page number 'Page 4-9' next to a lock icon. Below this is a navigation bar with four tabs: 'STATUS', 'DETAILS', 'FUNCTION TEST', and 'CONFIGURATION'. The 'CONFIGURATION' tab is active and highlighted with an orange underline. On the left side of the configuration page is a vertical menu with the following items: '> Controller Settings', '> Labels', '> Protocols', '> Network Adapters', '> Fieldbus Adapters', '> Control Level', 'System settings' (which is expanded and highlighted in blue), 'User Extension', and 'Passwords'. The main content area of the 'System settings' page is titled 'System settings' and contains three input fields: 'Date' with the value '13/02/2020', 'Time' with the value '08:27', and 'Logout Time' with the value '10 min'. At the bottom right of the page, there is a 'Software Update' button.

Fig. 80: System settings

3.2.8.8 External interfaces

- MODBUS TCP Client/Server
- BACnet/IP (B-ASC)
- WEB interface



GB TTT 13 Feb 2020 08:28
Page 4-17

STATUS	DETAILS	FUNCTION TEST	CONFIGURATION
> Controller Settings	MODBUS Slave Ethernet 4	BACnet Ethernet 4	Web Client Ethernet 4
> Labels			
> Protocols			
> Network Adapters			
> Fieldbus Adapters			
▼ Control Level			
MODBUS Slave			
BACnet			
Web Client			
> System settings			

Fig. 81: Command level

3.2.8.8.1 MODBUS TCP

The network interface and the slave ID are entered to activate the client interface MODBUS TCP.

The screenshot displays the TROX web interface for configuring the MODBUS Slave. At the top left is the TROX logo with the tagline 'The art of handling air'. The top right shows the language 'GB', a user icon, the date '3 Jun 2020 15:02', and the page number 'Page 4-12'. Below the header is a navigation bar with four tabs: 'STATUS', 'DETAILS', 'FUNCTION TEST', and 'CONFIGURATION'. The 'CONFIGURATION' tab is selected and highlighted with an orange underline. On the left side, there is a vertical navigation menu with items: 'Controller Settings', 'Labels', 'Protocols', 'Network Adapters', 'Fieldbus Adapters', 'Control Level' (expanded), 'MODBUS Slave' (highlighted in blue), 'BACnet', 'Web Client', and 'System settings'. The main content area shows 'System settings' and 'MODBUS Slave'. Under 'MODBUS Slave', there is a checked checkbox for 'Enabled'. Below this, there is a dropdown menu for 'Network Adapter' and an input field for 'Slave ID' containing the value '1'. At the bottom right of the configuration area, there is a 'Revert' button.

Fig. 82: Central BMS connection MODBUS TCP

3.2.8.8.2 BACnet/IP

The network interface, port number and device ID are entered to activate the BACnet interface. "Foreign Device" is activated, depending on the environment.

The screenshot shows the TROX® TECHNIK web interface. At the top left is the logo and tagline "The art of handling air". At the top right, there is a language selector set to "GB", a user profile icon, and the date/time "3 Jun 2020 15:03" with "Page 4-13" below it. A navigation bar contains four tabs: "STATUS", "DETAILS", "FUNCTION TEST", and "CONFIGURATION", with "CONFIGURATION" being the active tab. On the left is a sidebar menu with items: "Controller Settings", "Labels", "Protocols", "Network Adapters", "Fieldbus Adapters", "Control Level", "MODBUS Slave", "BACnet" (highlighted in blue), "Web Client", and "System settings". The main content area is titled "System settings" and "BACnet". It contains a checkbox for "Enabled" which is unchecked. Below this is a "Network Adapter" dropdown menu, a "Port Number" input field with the value "47808", and a "Device ID" input field with the value "1". At the bottom of the settings area is another checkbox for "'Foreign Device'" which is unchecked. In the bottom right corner of the settings area, there are two buttons: "Send I-Am" and "Export EPICS and EDE".

Fig. 83: Central BMS connection BACnet/IP

3.2.8.8.3 WEB interface

The network interface is used to activate the WEB server on port 80.

The screenshot shows the TROX WEB interface configuration page. The top left features the TROX[®] TECHNIK logo and the tagline "The art of handling air". The top right displays the language "GB", a font size icon, the date and time "3 Jun 2020 15:04", and the page number "Page 4-18" next to a lock icon. Below the header is a navigation bar with four tabs: "STATUS", "DETAILS", "FUNCTION TEST", and "CONFIGURATION", with "CONFIGURATION" being the active tab. On the left side, there is a sidebar menu with the following items: "Controller Settings", "Labels", "Protocols", "Network Adapters", "Fieldbus Adapters", "Control Level" (expanded), "MODBUS Slave", "BACnet", "Web Client" (highlighted in blue), and "System settings". The main content area is titled "System settings" and "Web Client". It contains a checked checkbox for "Enabled" and a dropdown menu for "Network Adapter" currently set to "Ethernet". At the bottom right of the main area, there are "Revert" and "Save" buttons.

Fig. 84: Remote access

4 Commissioning

4.1 Connecting device to networks

4.1.1 PROFIBUS interface

To connect the device to a PROFIBUS network:

- Integrate the device into the topology of the PROFIBUS network via the PROFIBUS port (X6).

4.1.2 Configuration interface

To access the device via the configuration interface (e.g. web interface, programming interface of the device-internal CODESYS PLC):


- Connect the configuration interface (X3) of the device to the programming PC / laptop directly or via an Ethernet network.

4.2 "Basic settings" home screen

The "Basic settings" home screen appears after the following actions / events:

- Initial commissioning
- Firmware update
- Data loss due to battery failure

"Basic settings" provides access to the basic settings of the device (language of the GUI texts, system time).



On the "Basic settings" home screen, the same operating instructions apply as in the **page view**, see [Chapter 3.1.3 'Side view' on page 40](#).

4.2.1 Changing basic settings of the device

To change the basic settings of the device:

1. Start device

- Connect device to the circuit.
 - Device starts and display shows the "Basic settings" home screen, see Fig. 85.



Fig. 85: "Basic settings" home screen



2. Select language of the GUI tests

- List shows active language.
- With $[\nabla]$ / $[\Delta]$ select the list.
 - Selected list has focus (= orange frame).
- With left function button $[Select]$ open the list.
- With $[\nabla]$ / $[\Delta]$ select the desired language and activate with $[Select]$ button.
 - GUI texts appear in the selected language, see Fig. 85
- With $[Next]$ change to the next page.

3. Setting the system time

Option 1: Set the system time manually

- $[Time]$ and $[Date]$ display the current system time, see Fig. 86
- Deactivate $[Activate NT]$ checkbox.
 - Status LED =
- In group $[Time]$ set the desired time digit by digit.
- In group $[Date]$ set the desired date digit by digit.
- With $[Complete]$ save the changes and switch to the standard home screen.

Option 2: Synchronise system time with NTP server

- Deactivate $[Activate NT]$ checkbox.
 - Status LED =
- Enter the IP address of the NTP server in the IP address box.
- Select the time zone of the NTP server in the list (UTC format), see Fig. 86
 - NTP client of the device synchronises the system time with the selected NTP server.
- Wait until status LED =
- $[Date]$ and $[Time]$ show synchronised values.
- With $[Complete]$ save the changes and switch to the standard home screen.

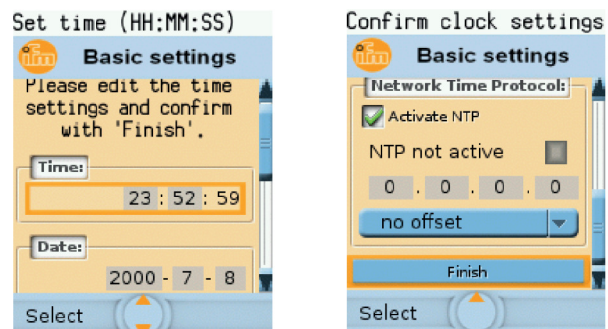


Fig. 86: Setting the system time - option 1 and 2

4.3 Including AS-i slaves

To include AS-i slaves in an AS-i network that is controlled by one of the AS-i masters of the device:

1. ▶ Connect and address AS-i slave

- Connect the AS-i slave to be addressed to the desired AS-i network (AS-i 1 or AS-i 2).
- Assign the desired address to the AS-i slave.
- Optional: repeat step 1 for further AS-i slaves.

2. ▶ Configure AS-i network

- Perform a configuration adjustment on the AS-i master with the newly addressed AS-i slaves, see **Quick setup: configuring AS-i networks** & Chapter 3.1.5.3.1 'Quick setup: configuring AS-i networks' on page 50 .
 - AS-i master transfers the detected slaves (LDS) to the list of configured slaves (LCS).
 - AS-i slaves have a valid address and are included in the AS-i network.

4.4 Configuring Profibus interface



For detailed information on configuring the PROFIBUS network, see the operating manual of the PROFIBUS master.

To include the device in a PROFIBUS network:

1. ▶ Set interface parameters

Symbol	Work step
	<ul style="list-style-type: none"> ■ 'Interfaces' > 'Profibus' > 'Settings' ■ Set interface parameters, see Setting PROFIBUS interface on page 59 .

2. ▶ Set device parameters, fieldbus modules and system behaviour

Symbol	Work step
	<ul style="list-style-type: none"> ■ Set the following parameters in the PROFIBUS configuration software: <ul style="list-style-type: none"> - Device-specific parameters - PROFIBUS modules Set the system behaviour in the PROFIBUS configuration software.

3. ▶ Activate configuration

Symbol	Work step
	<ul style="list-style-type: none"> ■ Save configuration and load it onto the PROFIBUS controller (download). ■ Start PROFIBUS controller. <ul style="list-style-type: none"> - Device is integrated in PROFIBUS network, (→ status LED of the PROFIBUS interface).

4. ▶ Display set configuration on the device

Symbol	Work step
	<ul style="list-style-type: none"> ■ 'Interfaces' > 'Profibus' > 'Info' ■ Select [Profibus data] tab. <ul style="list-style-type: none"> - Page shows saved configuration.

4.5 Setting Ethernet configuration interface

To configure the Ethernet configuration interface (X3):

▶ Configure Ethernet configuration interface (X3)

Symbol	Work step
	<ul style="list-style-type: none"> ■ 'Interfaces' > 'Programming interface' ■ Select [IP setup] tab. ■ Set interface parameters, see Notes on IP settings on page 54 .

4.6 Exchanging AS-i slave

The TNC-A1412 offers the possibility of replacing an AS-i slave with a new AS-i slave in the "protected mode".

Requirements:

- New and old AS-i slaves have the same device profile.
- The new AS-i slave has the address 0.
- [Automatic addressing] parameter is activated.

1. ▶ Remove old AS-i slave

- Disconnect the AS-i slave to be replaced from the AS-i network.
 - TNC-A1412 detects a configuration error and generates a corresponding OSC message.

2. ▶ Install new AS-i slave

- Install new AS-i slave.
 - TNC-A1412 recognises the new AS-i slave and automatically assigns it the address of the old AS-i slave.
 - Error message disappears.
 - New AS-i slave is ready for use.



We highly recommend always using an AS-i addressing device for changes on the AS-i lines.

4.7 IP addresses for controller, Profibus master and touch panel

The following IP addresses are preset:

- 192.168.0.100 controller
- 192.168.0.101 Profibus DP Master
- 192.168.0.119 touch panel LAN 1 (internal)
- 192.168.55.101 touch panel LAN 2 (external)

5 Diagnostic lights of the controller

5.1 Status LEDs

The status LEDs of the device provide information about the current status of system components.

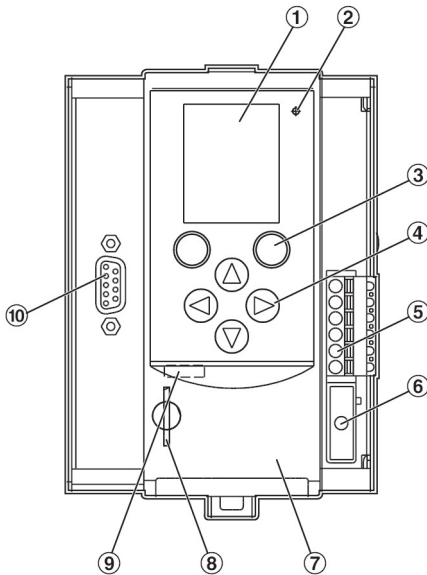


Fig. 87: Device overview

- 1 Display
- 2 Status LED (H1)
- 3 2 function buttons
- 4 4 arrow keys
- 5 Connection plug (X1) for AS-i 1, AS-i 2, functional earth
- 6 Connection plug (X2) for AUX (here with AUX jumper)
- 7 Front plate
- 8 Slot for SD card (behind the front plate)
- 9 Ethernet configuration interface (X3) (behind the front plate)
- 10 PROFIBUS interface (X6)

5.1.1 Status LED: basic device

Status LED			Meaning
H1	Green	on	Device is started and there is no warning or error message.
	Yellow	flashing 0.5 Hz	There is a warning message, but no error message.
	Red	flashing 2 Hz	There is an error message.

5.2 Home screen: status LEDs

The home screen of the graphical user interface provides the following status information, see **Home screen** ↗ 49 .

5.2.1 Status of the web interface

Status LED			Meaning
Web interface status	Red	on	Offline
	Green	on	Online



This function is only available via the web interface of the device, see ↗ Chapter 3.1.4 'Using web interface of the device' on page 49 .

5.2.2 Operating mode of the AS-i master

Status LED			Meaning
AS-i 1 2 operating mode	Yellow	on	Configuration mode
	Green	on	Protected mode

5.2.3 Control instance of the AS-i outputs

Status LED			Meaning
Output check	Yellow	on	Manual Manually with PLC
	Green	on	Gateway Gateway with PLC
	Blue	on	PLC

5.2.4 Fieldbus status

Status LED			Meaning
PROFIBUS	Red	on	PROFIBUS inactive
	Green	on	PROFIBUS active

6 TROXNETCOM Basic User Software

The application software for fire damper systems is part of the TNC-A1412 controller and the touch panel operating displays with communication master.

For the majority of applications, a suitable configuration of the pre-installed application software is sufficient, making programming unnecessary. The configuration options are explained below.

6.1 Controller TNC-A1412

The TROXNETCOM Basic User Software is preinstalled ex-works.

6.2 Touch operator display with communication master

The TROXNETCOM Basic User Software for the touch panel operator displays with communication master is preinstalled ex-works. These devices are suitable as communication masters for controller networking with Profibus® DP in conjunction with the Profibus® DP communication master TNC-DPMaster and as communication master for controller networking with Ethernet based on the MODBUS® TCP protocol. Both variants can be used combined in one system.

The touch panel operator displays with communication master include the central BMS connection via Ethernet based on the MODBUS® TCP and BACnet/IP protocols.

6.3 AS-i modules

The TROXNETCOM Basic User Software recognises the AS-i modules for mechanical dampers (AS-EPR), for motorised dampers and for TROX duct smoke detectors (AS-EM) and for messages and signals (TNC-Z0094) and assigns the specific functions and signal processing to the modules.

For the system structure, groups are defined which divide dampers and duct smoke detectors according to structural conditions. Messages and alarms can be combined per group.

6.4 Group formation

The addressing of the corresponding AS-i modules is used for specifying damper groups and assigning duct smoke detectors and signalling contacts.

6.4.1 Grouping principle

The basic idea is that dampers are always arranged in groups and that common properties are specified for these groups. In the simplest case, this is a common triggering signal for fire in a group of mechanical dampers. In the case of motorised dampers, remote triggering by duct smoke detectors, by external signals or by triggering of other dampers is also assigned.

6.4.2 Group formation by addressing

The method for forming the groups is shown in the adjacent table, which contains all the address locations of an AS-i controller in ascending numerical order. 31 addresses per master are arranged in ascending order in the first table column, with the addresses of the second master following the addresses of the first. The addresses are written to the modules with the addressing device TNC-Z0045, see

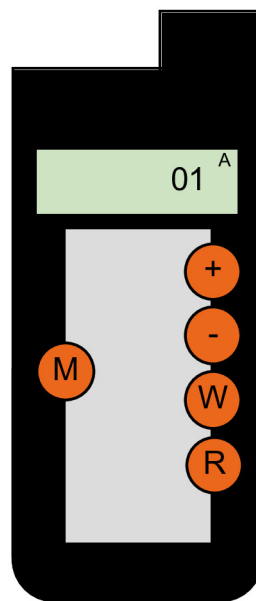


Fig. 88: Addressing device TNC-Z0094

The module types AS-EM for RM and TNC-Z0094 are particularly important for the grouping: One or more modules mark the start of a group. The modules to which the dampers are connected are then lined up (modules AS-EPR and AS-EM).

The group numbers are assigned mandatorily and are not entered. For the sake of clarity, they are shown in the 4th column of the [Table on page 89](#).

Address	Master	Type	Group
1	M1	AS-EM	0
2	M1	AS-EM	0
3	M1		
4	M1	AS-EM for RM	1 ¹
5	M1	TNC-Z0094 ²	1
6	M1	AS-EM	1
7	M1	AS-EM	
...
29	M1		
30	M1	TNC-Z0094 ²	6 ¹
31	M1	AS-EPR	6
1	M2	AS-EPR	6
2	M2	AS-EM	6
3	M2		
4	M2	AS-EM for RM	7 ¹
5	M2	AS-EM	7
6	M2	AS-EM	7
...
29	M2		
30	M2		
31	M2	TNC-Z0094 ³	

¹ New group with AS-EM for RM or TNC-Z0094

² Group messages with TNC-Z0094 before group

³ Central message with TNC-Z0094 on address 31

6.4.3 Overarching groups

If several controllers are connected together, groups with the same group number can occur in different controllers. It can be specified that these group numbers define the same group across multiple controllers. If the "Copy groups" setting is activated on the HMI that serves as the communication master, the information on all groups is made available to all controllers.

The handling of network problems in this context is explained in [Chapter 6.7 'Setting the network behaviour'](#) on page 90.

6.5 Messages








The digital I/O module TNC-Z0094 for installation in switch cabinets on a DIN mounting rail is used for connecting central fire alarm system/central building management system signals and for signalling messages and deactivations. It has 4 inputs and 4 relay change-over contact outputs.

6.5.1 Group messages

If addresses 1 to 30 are used for the TNC-Z0094 I/O module, there must be an assignment to the damper groups formed. The module then reports group-specific states or it receives group-specific signals.

The table below shows the assignment of the inputs and outputs for the case of group-specific configuration.

Group-related digital input/output module (slave address 1 – 30)

Inputs	Contact	Outputs	Contact
Acknowledge group, if closed NO contact (push button)	 I+ I1	Group OK, if closed	 11 14
Close group, if open NC contact (or jumper)	 I+ I2	No damper "CLOSED" in group, if closed	 21 24
Test duct smoke detectors in the group if closed NO contact (push button)	 I+ I3	No smoke in group, if closed	 31 34
(free)	I+ I4	No maintenance run in group, if closed	 41 44

 **Note**

The "relay control" setting of the Basic User Software must be activated for the described purpose.

6.5.2 Controller messages

If address 31 is used for the I/O module TNC-Z0094, the messages and signals refer to the entire controller, see table below

Controller-related digital input/output module (slave address 31)

Inputs	Contact	Outputs	Contact
Acknowledge controller, if closed NO contact (push button)	I+ 11	System OK, if closed	11 14
Close fire dampers, if open NC contact (or jumper)	I+ 12	No damper "CLOSED", if closed	21 24
Close fire dampers with priority, if open NC contact (or jumper)	I+ 13	No smoke, if closed	31 34
Start/stop pulse for maintenance run, if closed NO contact (push button)	I+ 14	No maintenance run, if closed	41 44

Note

A maximum of one controller or system-related module with address 31 can be used. The connection can be made either to AS-i master 1 or 2.

6.6 Manual adjustments

In addition to the described configuration options, which are carried out by addressing the modules, it is also possible to make manual adjustments using the "CodeSys" programming software.

Examples of adaptations:

1. ▶ Simultaneous use of AS-EPR modules for one and two limit switches,
2. ▶ Special assignments of the TNC-Z0094 modules,
3. ▶ Definition of the second group,
4. ▶ Designation texts for field modules and controllers and
5. ▶ use of field modules that are not automatically detected (AS-EM for extract air dampers for commercial kitchens, smoke control dampers, etc.).

6.7 Setting the network behaviour

In addition to the configuration by addressing the field modules, there are settings for the controller software that influence certain properties. The settings are carried out via the keypad of the controller or – if available – via the operating device and are partly described in the manual. For the exchange of information between the controllers via the Profibus® DP network, there are further setting parameters that enable the response options to be influenced in the event of faults and interruptions of the network.

6.7.1 Closing dampers

This behaviour can be activated for each controller to enable duct smoke detectors to close dampers via the network. The menu for this is "Network operation".

6.7.2 Behaviour in the event of network faults

If duct smoke detectors can close dampers via the network, it is possible to define that, in case of network faults, the dampers which are closed are the ones which the duct smoke detector can only reach via the network. The menu for this is "LAS shutdown".

Note

A network fault is only detected after a duration of 3 minutes. In this way, the system reacts robustly to sporadic faults, for example in relation with maintenance measures.

6.7.3 Temporarily ignoring network faults

The detection of network faults can be overridden if, in the course of maintenance work or for test purposes, the network should be taken out of operation without the aforementioned triggering of dampers. The menu for this is "Network guard".

Note

The controller software recognises further setting parameters that are only used in connection with manual adjustments.

7 Format description of the configuration file (CSV format)

The CSV file for the controller configuration can be easily created and edited with a spreadsheet program (e.g. Excel).

In addition to the information in the fields, which is interpreted as CSV ("comma separated values"), rows in which the first column begins with a hash # are simply ignored. The content of these rows is only a comment.

The following applies to all other rows: columns A to V contain relevant information, although many of these columns are optional, i.e. they do not have to be filled with values.

The individual columns and rows have the following meaning (default assignments are underlined):

Column	Optional	Meaning
A		Internal controller number, values 1 – 44
B		Controller designation (label), text string
C		AS-i master number, values 1 + 2
D		Slave number (derived from AS-i address), values 1 – 31 <u>default address 1 – 31</u> , extended address 1A – 31A
E		Device number, values A, B, C or D
F		Slave designation, text string
G	x	Slave type number, values 1 – 17 (no default value). The meaning of the type number is taken from the table ↗ on page 92 .
H	x	<u>NC</u> / NO contact with mechanical limit switches
I	x	IP address for controller (<u>192.169.0.55</u>) with controller networking MODBUS [®] TCP via Ethernet
J	x	Group for device A (no default value)
K	x	Group for device B (no default value)
L	x	Group for device C (no default value)
M	x	Group for device D (no default value)
N	x	Configuration of the I/O module TNC-Z0094 (<u>0 = automatic configuration</u> , 1 = manual configuration)
O	x	Group assignment for I1 and O1 (no default value)
P	x	Group assignment for I2 and O2 (no default value)
Q	x	Group assignment for I3 and O3 (no default value)
R	x	Group assignment for I4 and O4 (no default value)
S	x	Input logic I1 (<u>0 = NO contact</u> , 1 = NC contact)
T	x	Input logic I2 (<u>0 = NO contact</u> , 1 = NC contact)
U	x	Input logic I3 (<u>0 = NO contact</u> , 1 = NC contact)
V	x	Input logic I4 (<u>0 = NO contact</u> , 1 = NC contact)

The type number assigns a module processing to the particular slave address.

Type number	Module
1	AS-EP (2 fire dampers with "OPEN" + "CLOSED")
3	AS-EM (1 fire damper with actuator)
4	AS-EP4 (4 fire dampers with one end position switch)
5	AS-EM (RM-O-VS-D / ZA11)
7	AS-EM (JZ with actuator)
8	AS-EM (JZ-RS, reversing actuator)
9	AS-EM (EK, reversing actuator)
10	Illuminated button module (2 illuminated buttons)
11	AS-EP1 (1 fire damper with one end position switch)
12	AS-EP2 (2 fire dampers with one end position switch)
13	AS-EP3 (3 fire dampers with one end position switch)
14	AS-EM/C (2 fire dampers with actuator)
15	I/O module TNC-Z0094
17	AS-EM (RM-O-3-D / ZA11)

Example

Controller	Name	Master	Slave	Device	Name	Type	Group	MODBUS IP address
1	Controller 1 basement							
1		1	1	A	C01_M1S1_A	3	1	
1		1	2	A	C01_M1S2_A	3	1	
1		1	3	A	C01_M1S3_A	3	1	
1		1	4	A	C01_M1S4_A	3	1	
1		1	5	A	C01_M1S5_A	3	1	
1		1	6	A	C01_M1S6_A	3	1	
1		1	7	A	C01_M1S7_A	3	1	
1		1	8	A	C01_M1S8_A	3	1	
1		1	9	A	C01_M1S9_A	3	1	
1		1	10	A	C01_M1S10_A	3	1	
1		1	11	A	C01_M1S11_A	3	1	
1		1	12	A	C01_M1S12_A	3	1	
1		1	13	A	C01_M1S13_A	3	1	
1		1	14	A	C01_M1S14_A	3	1	
1		1	15	A	C01_M1S15_A	3	1	
1		1	16	A	C01_M1S16_A	3	1	
1		1	17	A	C01_M1S17_A	3	1	
1		1	30	A	BMA alarm basement	15	1	
1		1	30	B	BMA alarm ground floor		2	
1		1	30	C	BMA alarm 1st floor		3	

8 Description of the central BMS interface MODBUS

8.1 MODBUS register diagram

The MODBUS registers are counted sequentially starting with the number 0 through all controllers. The following formula is used for this:

$$\text{Reg} = (\text{C} - 1) * 66 + (\text{M} - 1) * 31 + (\text{S} - 1) + 3$$

Controller number C: 1 to 28

AS-i master number M: 1 or 2

AS-i slave address S: 1 to 31

Before the registers of the AS-i slave modules, there are registers for each controller with contents that are assigned to the controller as a whole.

The register contents which are usually important for the query by a central BMS/DDC are marked below:

MODBUS register no.	Module type	BIT 15	BIT 14	BIT 13	BIT 12	BIT 11	BIT 10	BIT 9	BIT 8	Comment
0	–	First start buffer	Setting suppress EM	Smoke sensor pollution	Smoke sensor error	Damper switch error	Damper timeout error	Damper closed	All dampers open	
1	–	spare / frei	spare / frei	spare / frei	spare / frei	spare / frei	spare / frei	spare / frei	spare / frei	
2	–	spare / frei	Gateway mode of IO-modules	Ventilation system-specific locking in case of network failure	AS-EM/B: ON AS-EM/S: OFF	Network monitor active	Group B active	GAVS active	SSNet-Control active	

MODBUS register no.	Module type	BIT 7	BIT 6	BIT 5	BIT 4	BIT 3	BIT 2	BIT 1	BIT 0	Comment
0	–	Central error AS-i line 2	Central error AS-i line 1	AS-i config Err	AS-i power-fail	AS-i off-line	CPU active	Error	Run_OK / no errors	S-M
1	–	Data transfer active	AS-i protection mode	Smoke extraction / Entrauchung	Ignore smoke sensors	Fire	Manual operation active	Reset / Test all smoke sensors	Acknowledge / Quitting	S-M

S-M = collective messages

St-M = Status messages about controller settings

C 1 = Controller 1

M 1 = Master 1

S 1 – 8 = Slave 1 – 8

MODBUS register no.	Module type	BIT 7	BIT 6	BIT 5	BIT 4	BIT 3	BIT 2	BIT 1	BIT 0	Comment
2	–	Ignoring of smoke sensors active	Standard maintenance active	CDdDT active (Close damper if error during damper test)	Control of groups via relay contacts active	Sequential interlocking (Folgeschaltung) active	Text_AS EP4 active	AS_EP_InvertC active	AS_EP_4 active	St-M
3	I/O relay	spare / frei	AS-i Cfg Err Slv A	spare / frei	spare / frei	Input 4	Input 3	Input 2	Input 1	C 1 M1 S 1
4	AS-EM/B	spare / frei	AS-i Cfg Err Slv A	spare / frei	TimeOut OR SwitchE rr A	spare / frei	spare / frei	Open A	Closed A	C 1 M1 S 2
5	AS-EM/B	spare / frei	AS-i Cfg Err Slv A	spare / frei	TimeOut OR SwitchE rr A	spare / frei	spare / frei	Open A	Closed A	C 1 M1 S 3
8	AS-RM/BD	spare / frei	spare / frei	spare / frei	spare / frei	SysErr / AS-i Cfg	Pollution detected	Airflow detected	Smoke detected	C 1 M1 S 6
9	AS-EM/B	spare / frei	AS-i Cfg Err Slv A	spare / frei	TimeOut OR SwitchE rr A	spare / frei	spare / frei	Open A	Closed A	C 1 M1 S 7
10	AS-EM/B	spare / frei	AS-i Cfg Err Slv A	spare / frei	TimeOut OR SwitchE rr A	spare / frei	spare / frei	Open A	Closed A	C 1 M1 S 8
3	AS-EM/B	spare / frei	AS-i Cfg Err Slv A	spare / frei	TimeOut OR SwitchE rr A	spare / frei	spare / frei	Open A	Closed A	C 1 M1 S 1
4	AS-EM/2	spare / frei	AS-i Cfg Err Slv A	TimeOut OR SwitchE rr B	TimeOut OR SwitchE rr A	Open B	Closed B	Open A	Closed A	C 1 M1 S 2
5	AS-EP4	spare / frei	AS-i Cfg Err Slv A	spare / frei	spare / frei	NOT Closed D	NOT Closed C	NOT Closed B	NOT Closed A	C 1 M1 S 3
6	AS-EP	spare / frei	AS-i Cfg Err Slv A	TimeOut OR SwitchE rr B	TimeOut OR SwitchE rr A	Open B	Closed B	Open A	Closed A	C 1 M1 S 4

S-M = collective messages

St-M = Status messages about controller settings

C 1 = Controller 1

M 1 = Master 1

S 1 – 8 = Slave 1 – 8

8.2 MODBUS register query

The register contents are queried exclusively with MODBUS function code 3 (simultaneous reading of one or more 16-bit registers, a.k.a. "WORD").

8.3 MODBUS controller register 0

ControllerReg0 = (C - 1) * 66

This register contains the accumulated conditions of a controller:

Bit 0: **OK**

Bit 8: All dampers open

Bit 9: At least one damper closed

Bit 10: At least one damper has runtime error

Bit 11: At least one damper has end position error (manipulation)

Bit 12: At least one duct smoke detector shows triggering

Bit 13: At least one duct smoke detector shows contamination warning

As a rule, **OK** is checked for all controllers. The slave information is only evaluated in case of an error.

8.4 MODBUS slave register

Reg = (C - 1) * 66 + (M - 1) * 31 + (S - 1) + 3

This register contains the condition of a slave module. Only damper and smoke detector modules are of interest here.

Damper module:

Bit 0: Damper closed

Bit 1: Damper open

Bit 4: Runtime error or end position error (manipulation)

Bit 6: System error AS-i (module no longer recognised)

Duct smoke detector module:

Bit 0: Duct smoke detector triggered

Bit 2: Duct smoke detector contaminated

Bit 3: System error AS-i (module no longer recognised)

8.5 MODBUS register and central BMS

The specified registers are the register addresses used by the TROX operating device. These are not necessarily identical with the register addresses used by a central building management system. For example, certain devices work with an address offset that must be added to the actual register address.

9 Description of the central BMS interface BACnet

9.1 BACnet PICS

BACnet pics see appendix.

9.2 BACnet interface description

9.2.1 Overview

The TROXNETCOM communication master can manage up to 28 AS-i controllers with up to 62 AS-i slaves each. Up to 31 slaves per controller are assigned to what are referred to as master 1 or master 2. The actual number of AS-i controllers and AS-i slaves depends on the respective installation.

From the point of view of BACnet, the TROXNETCOM communication master behaves like a server that can map the signal conditions of each slave in addition to messages across controllers and collective messages, as well as setting data of the individual controllers.

9.2.2 Object types and identifiers

The Binary Input and Multistate Input object types are used to provide this data. The meaning of the conditions depends on the type of the respective slave (e.g. single and double motorised damper, duct smoke detector, smoke control damper with additional functions).

To ensure a clear nomenclature, we have organised the Object_Identifier in such a way that you can draw conclusions about the respective AS-i controller and AS-i slave. This allows subsequent system extensions without changing existing object IDs.

The possible object IDs are listed in the [Table on page 99](#): The wildcards x, y, z and d have the following meaning:

- x: Controller number (1 – 44)
- y: Master number (1 – 2)
- z: Slave number (1 – 31)
- d: Device (1 – 4 corresponds to A – D in this case)

Example 1:

The status of damper B of slave 4 at controller 14, master 2 is assigned to Object_Identifier 1420421.

Using the "Who Has" service, the individual objects can be identified by their name. Project-specific names can be stored in the TROXNETCOM communication master for the individual controllers and dampers. If such names are assigned, they are also used for the Object_Name BACnet property. The name is followed – separated by an underscore – by an indication of the data type of (e.g. State, Error, Battery_Low).

Example 2:

The damper from example 1 has the project-specific name "19.ZU.BSK.06" assigned to it. The status of this damper can be queried in BACnet via the Object_Name "19.ZU.BSK.06_State".

If no project-specific name is assigned to the damper, it is given the standard logical name Cxx_MySz_d as Object_Name, where xx is the controller number, y the master number, z the slave number and d the device.

Example 3:

No project-specific name is assigned to the damper from example 1. Its status is thus accessible via the "Who Has" BACnet service using "C14_M2S4_B_State".

Furthermore, individual actions (such as acknowledging, starting and stopping a function test) should be triggered in the TROXNETCOM communication controller via BACnet. We have chosen Binary Output as data type for this task.

The AtomicReadFile service with the File object type can be used to read logging data (test logs, message log, log of visited pages).

The [Table on page 99](#) provides an overview of the objects used. The "Keyword in bacdesc.csv" column specifies keywords for the user-defined translation of the BACnet properties Description, ActiveText, InactiveText and StateText. Please see the notes below in this regard:

- a) If a file named "bacdesc.csv" exists in the program directory (parallel to TROXNETCOM.exe), texts contained in that are used for the BACnet properties Description, ActiveText, InactiveText and StateText when starting and restarting the BACnet driver.
- b) The file can be transferred using the update function.
- c) Each line contains key/value assignments (separated by semicolons). The semicolon is not allowed within an entry. Each row contains the columns "Keyword;Description;ActiveText;InactiveText" for binary objects and the columns "Keyword;Description;StateText1;StateText2;StateText3 etc." for multistate objects..
- d) The unique identifiers for controllers and dampers are always used in the key column ("Cxx" or "Cxx_MySz_d").
- e) The default description is used for all objects that have no assignment in "bacdesc.csv". Partial assignments (e.g. description only) are also accepted.

9.2.3 Intrinsic reporting

The TROXNETCOM communication master supports both COV (Change of Value) alarms and intrinsic reporting.

For this purpose, an instance of the Notification Class type is assigned to the Binary Input and Multistate Input objects, in which, in addition to other settings, it is possible to specify which recipients should receive the alarm and under which conditions (event types, schedule, alarm retention time) events are created.

32 instances of the Notification Class type are available for the configuration of events, i.e. 32 different alarm scenarios can be implemented simultaneously.

The TO-OFFNORMAL and TO-NORMAL events are available as conditions for the generation of alarms.

A TO-OFFNORMAL event is generated under the following circumstances:

- a) The PresentValue must have the AlarmValue value at least for the TimeDelay duration AND
- b) The TO-OFFNORMAL flag must be set in EventEnable.

After the PresentValue has assumed the value of AlarmValue, the TO-NORMAL event is generated under the following circumstances:

- a) The PresentValue must deviate from the AlarmValue value at least for the TimeDelay duration AND
- b) The TO-NORMAL flag must be set in EventEnable.

The 'UnconfirmedEventNotification' and 'ConfirmedEventNotification' services, with which the TROXNETCOM communication master informs the participants about the alarms, are responsible for the actual alarm process.

The AckRequired property in the Notification Class is writable and disabled by default for all state transitions (F, F, F). When AckRequired is activated, the TROXNETCOM communication master accepts the acknowledgement from the AcknowledgeAlarm Service and processes it according to the specification.

Important: The acknowledgement via AcknowledgeAlarm has **no** influence on the error status of the dampers and smoke detectors; these can only be acknowledged via the Acknowledge_All collective command (Binary Output 1).

9.2.4 Keywords for the file bacdesc.csv

Object_Type (Object type)	Object_Identifier (Object ID)	Object_Name (Object name)	Description	Keyword in bacdesc.csv
Device	Device ID	Description	System name	Device_Description
Binary output	1	Acknowledge_All	Acknowledgement across controllers (edge-controlled)	Acknowledge_All
	2	Start_Test	Start/stop functional test (edge-controlled)	Start_Test
Binary Input (for explanations, see above)	1	Network_Error	Network error	Network_Error
	2	Any_Controller_Error	Error on at least one controller	Any_Controller_Error
	3	Any_Damper_Closed	At least one damper failed	Any_Damper_Closed
	4	Any_Smoke_Sensor _Triggered	At least one duct smoke detector triggered	Any_Smoke_Sensor _Triggered
	5	Any-Test_Active	Functional test active	Any-Test_Active
	xyzzd3	Cxx_MySz_d_Open	Damper OPEN	Cxx_MySz_d_Open
	xyzzd4	Cxx_MySz_d_Closed	Damper CLOSED	Cxx_MySz_d_Closed
	xyzzd1	<i>For EK02:</i> Cxx_MySz_d_ Battery_Low	Battery alarm	Cxx_MySz_d_ Battery_Low
	xyzzd2	Cxx_MySz_d_Fire	Thermoelectric con- tact closed	Cxx_MySz_d_Fire
	xyzzd1	<i>For duct smoke detectors:</i> Cxx_MySz_d_ Pollution	Contamination > 70%	Cxx_MySz_d_ Pollution
	xyzzd2	Cxx_MySz_d_No_ Airflow	Airflow too low	Cxx_MySz_d_No_ Airflow

Object_Type (Object type)	Object_Identifier (Object ID)	Object_Name (Object name)	Description	Keyword in bacdesc.csv
Multistate Input (for explanations, see above)	x	Cxx_Error <i>States:</i> OK CPU_Inactive ASi_Error Runtime_Error Switch_Error	Collective error on the controller <i>States:</i> OK CPU inactive AS-i error Runtime error Switch error	Cxx_Error
	xyzzd1	Cxx_MySz_d_State <i>Dampers:</i> Open Closed Running <i>Smoke sensors:</i> No_Smoke Smoke	Status <i>For dampers:</i> OPEN CLOSED MOVING <i>For duct smoke detectors:</i> NO SMOKE SMOKE	Cxx_MySz_d_State
	xyzzd2	Cxx_MySz_d_Error <i>States:</i> OK ASi_Error Runtime_Error Manipulation	Errors <i>States:</i> OK AS-i error Runtime error Manipulation	Cxx_MySz_d_Error
File	1	Messages	Message log	
	2	Visited_Pages	Log of sites visited	
	101 – 120	Protocol_01 – Protocol_20	Log of Functional test as XML file	
Notification class (for explanations, see above)	1 – 32	Description	Description of the alarm-issuing instance	Notification_ Class_Description

10 Index

A

Addressing.....	12
Addressing scheme.....	12
Air transfer damper.....	12
Application parameters.....	12
AS-i 1.....	12
AS-i 2.....	12
AS-i bus line.....	12
AS-i Field levels.....	8
AS-i interface.....	12
AS-i Master.....	8
AS-i Master interface.....	8
AS-i Master string.....	8
AS Interface Controller.....	8

C

Communication master.....	8
Configuration.....	12
Configuration adjustment.....	12
Configuration interface.....	12
Controller network.....	8, 12
Controller networking.....	8
Controller TNC-A1412.....	8
Control line.....	8
Copyright.....	3
CSV file.....	12
CSV format.....	12

D

Deactivation signal.....	12
Defects liability.....	3
Diagnosis.....	8
Duct smoke detector module.....	12
Duct smoke detectors.....	12

E

Ethernet.....	8
Ethernet interface.....	8, 12
Ethernet networking components.....	8
Ethernet segment.....	8

F

Field device.....	8
Field modules.....	8
Fire alarm contact.....	12
Fire damper.....	12

G

Gateway address.....	12
Gateway TNC-DPMaster.....	8
GUI (Graphical User Interface).....	12

H

Hotline.....	3
--------------	---

I

Interfaces.....	12
IP address.....	8, 12
IP subnet mask.....	12

L

Language.....	12
Limitation of liability.....	3
Line topology.....	8

M

Maintenance run parameters.....	12
Master string.....	8
MODBUS®TCP.....	8

N

Network address.....	12
Network socket.....	8

O

Operation menu.....	12
Other applicable documentation.....	3

P

Personnel.....	7
Profibus.....	12
Profibus® DP.....	8
Profibus® DP Communication master.....	8
Profibus® DP-Repeater.....	8
Profibus address.....	8, 12
Programming interface.....	12

Q

Quick setup.....	12
------------------	----

R

Run time.....	12
---------------	----

S

SD card reader.....	8
Service.....	3
Settings.....	12
Slaves.....	12
Switch cabinet I/O module.....	12
Symbols.....	4
System.....	12
System owner's obligations.....	7
System time.....	12

T

Technical Service.....	3
Terminal resistor.....	8
Touch display.....	8
Touch operator display.....	8
TROX firmware.....	12

TROXNETCOM

BACnet pics.....	104
TROXNETCOM fieldbus system AS-i.....	8

W

WEB browser.....	8, 12
------------------	-------

Appendix

A TROXNETCOM BACnet pics

ANNEX A - PROTOCOL IMPLEMENTATION CONFORMANCE STATEMENT (NORMATIVE)

(This annex is part of this Standard and is required for its use.)

BACnet Protocol Implementation Conformance Statement

Date: 2015/03/16

Vendor Name: TROX GmbH, Neukirchen-Vluyn, Germany

Product Name: TROXNETCOM AS-Interface Communication Controller

Product Model/ Number: Communication Controller

Application Software Version: 2.0.0

Firmware Revision: 1.1.0.7

BACnet Protocol Revision: 1.6

Product Description:

The TROXNETCOM AS-Interface Communication Controller for the TROXNETCOM AS-i fire damper system.

BACnet Standardized Device Profile (Annex L):

- BACnet Operator Workstation (B-OWS)
- BACnet Building Controller (B-BC)
- BACnet Advanced Application Controller (B-AAC)
- BACnet Application Specific Controller (B-ASC)
- BACnet Smart Sensor (B-SS)
- BACnet Smart Actuator (B-SA)

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

1. Data Sharing BIBBs

Data Sharing Read Property-B	DS RP-B
Data Sharing Read Property-Multiple-B	DS-RPM-B
Data Sharing Write-Property-B	DS-WP-B
Data Sharing Change-Of-Value-B	DS-COV-B

2. Alarm / Event BIBBs

Alarm and Event-Notification Internal-B	AE-N-I-B
Alarm and Event-ACK-B	AE-ACK-B
Alarm and Event-Information-B	AE-INFO-B

3. Scheduling BIBBs

None

4. Trending BIBBs

None

5. Device Management BIBBs

Device Management Dynamic-Device-Binding-B	DM-DDB-B
Device Management Dynamic-Object-Binding-B	DM-DOB-B
Device Management Device-Communication-Control-B	DM-DCC-B
Device Management-List Manipulation-B	DM-LM-B
Device Management Time-Synchronisation-B	DM-TS-B
Device Management UTC-Time-Synchronisation-B	DM-UTC-B
Device Management Reinitialize-Device	DM-RD-B

6. Network Management BIBBs

None

Segmentation Capability:

- Able to transmit segmented messages Window Size: 4
- Able to receive segmented messages

Standard Object Types Supported:

An object type is supported if it may be present in the device. For each standard Object Type supported provide the following data:

- 1) Whether objects of this type are dynamically creatable using the CreateObject service
- 2) Whether objects of this type are dynamically deletable using the DeleteObject service
- 3) List of the optional properties supported
- 4) List of all properties that are writable where not otherwise required by this standard
- 5) List of proprietary properties and for each its property identifier, datatype, and meaning
- 6) List of any property range restrictions

1) 2) None of the objects are dynamically creatable nor deletable.

5) There are no proprietary properties in the objects.

3) 4) 6) See the following table describing the supported objects:

- Binary Input
- Binary Output
- Device
- File
- Multistate Input

Object-Type	Optional properties supported	Writeable properties	Property Range Restrictions
Binary Input	Description Inactive_Text Active_Text	Out_Of_Service Notification_Class Event_Enable Notify_Type	
Binary Output	Description Inactive_Text Active_Text	Present_Value Out_Of_Service	
Device	Description Local_Time Local_Date UTC_Offset Daylight_Savings_Status	Object_Identifier Number_Of_APDU_Retries APDU_Timeout APDU_Segment_Timeout	
File	Description	Archive	
Multistate Input	Description State_Text	Out_Of_Service Notification_Class Event_Enable Notify_Type	
Notification Class	Description	Ack_Required Priority Recipient_List	

Data Link Layer Options:

- BACnet IP, (Annex J)
- BACnet IP, (Annex J), Foreign Device
- ISO 8802-3, Ethernet (Clause 7)
- ANSI/ATA 878.1, 2.5 Mb. ARCNET (Clause 8)
- ANSI/ATA 878.1, RS-485 ARCNET (Clause 8), baud rate(s) _____
- MS/TP master (Clause 9), baud rate(s): _____
- MS/TP slave (Clause 9), baud rate(s): _____
- Point-To-Point, EIA 232 (Clause 10), baud rate(s): _____
- Point-To-Point, modem, (Clause 10), baud rate(s): _____
- LonTalk, (Clause 11), medium: _____
- Other: _____

Device Address Binding:

Is static device binding supported?
(This is currently necessary for two-way communication with MS/TP slaves and certain other devices.)

Yes No

Networking Options:

- Router, Clause 6 - List all routing configurations, e.g., ARCNET-Ethernet, Ethernet-MS/TP, etc.
- Annex H, BACnet Tunneling Router over IP
- BACnet/IP Broadcast Management Device (BBMD)
Does the BBMD support registrations by Foreign Devices? Yes No

Character Sets Supported:

Indicating support for multiple character sets does not imply that they can all be supported simultaneously.

- ANSI X3.4
- IBM/Microsoft DBCS
- ISO 8859-1
- ISO 10646 (UCS-2)
- ISO 10646 (UCS-4)
- JIS C 6226

If this product is a communication gateway, describe the types of non-BACnet equipment/networks(s) that the gateway supports:
