Decentralised operating and monitoring systems
TNC-EASYCONTROL

System for controlling and monitoring motorised fire dampers

Stand-alone solution for controlling and monitoring up to 12 motorised fire dampers or up to 24 damper blade end positions

- Easy electrical installation using coded plug connections
- Pre-installed application software
- No additional programming required
- Improves the fire safety

LED/buzzer combination

TNC-EC-AZM
display module

6

Description

Decentralised operating and monitoring system TNC-EASYCONTROL

Application

- TNC-EASYCONTROL, for controlling and monitoring motorised fire dampers
- Control of up to 6 motorised fire dampers with 24 V DC (up to 12 fire dampers with parallel operation); alternatively for capturing the end positions of up to 12 mechanical dampers with one limit switch (up to 24 limit switches with parallel operation)
- Topology: star-shaped with 4-wire line
- Processing of a signal from the smoke detector or central fire alarm system
- Automated and time-controlled function test using timer, or external control by central BMS and manual triggering
- Menu-driven operation and error display using integrated LCD and softkeys
- Manual control (OPEN/CLOSE) of individual fire dampers
- Power supply unit 230 V AC/24 V DC, week timer, terminal strip for external connections
- Simple plug-in connection

Order code

TNC – EC – Z00
1 2

1 Type

TNC-EC-Z00 – Z03	(standard construction)
TNC-EC-GP	(main PCB)
TNC-EC-AZM	(display module)

2 Accessories

Z00	Standard construction, encased
Z01	Standard construction with signal lamp
Z02	Standard construction with display module
Z03	Standard construction with signal lamp and display module

6

Description

Decentralised operating and monitoring system TNC-EASYCONTROL

Application

- Control system encased in sheet steel casing with cutout window, including power supply unit and timer, completely wired and ready for plug-in
- Stand-alone solution for controlling and monitoring of up to 6 motorised fire dampers with 24 V DC (up to 12 fire dampers with parallel operation); alternatively for capturing the end positions of up to 12 mechanical dampers with one limit switch (up to 24 limit switches with parallel operation)
- With pre-installed user software, ready to use
- Topology: star-shaped with 4-wire line
- Manual control (OPEN/CLOSE) of individual fire dampers
- Monitoring of the fire damper opening and closure times
- Automated and time-controlled function test using timer, or external control by central BMS and manual triggering
- Output of alarm messages: fire, smoke, fire damper closed, fault during function test, running/limit switch faults, smoke detector contamination
- Menu-driven operation using integral LCD and softkeys on the main PCB, signalling with LEDs

Accessories

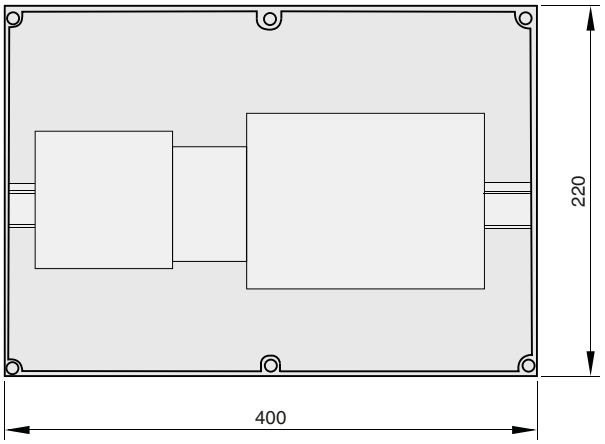
Z01
- LED/buzzer combination for alarm signalling
- Mounted into the cover plate and completely wired (ready to use)

Z02
- 2.8 inch colour LCD, mounted into the cover plate and completely wired (ready to use)
- For displaying damper blade positions
- For controlling individual fire dampers
- For starting a functional test

Z03
- 2.8 inch colour LCD and LED/buzzer combination

Dimensions

TNC-EC-Z00–Z03



Specification text

Standard description (characteristics)

For controlling and monitoring up to 6 motorised fire dampers (24 V DC) - or up to 12 fire dampers with parallel operation); alternatively for capturing one end position each for up to 12 mechanical dampers (up to 24 limit switches with parallel operation); complete with switching power supply unit and timer in a sheet steel casing, powder-coated RAL 9010 and with an acrylic glass window.
- With pre-installed user software, ready to use
- CAN bus interface for the connection of an external operating and display unit
- Supply voltage: 230 V AC ±10 %
- Power consumption: <150 mA (without external load)
- Dimensions: 400 × 220 × 84 mm (B × H × T)
- Installation: on a wall
- IP protection level: IP 40
- Power supply: 230 V AC/50 Hz
- Operating manual
- Make: TROX GmbH or equivalent
- Type:TNC-EC-Z0*

Accessories

Z01
Z02
Z03

Description

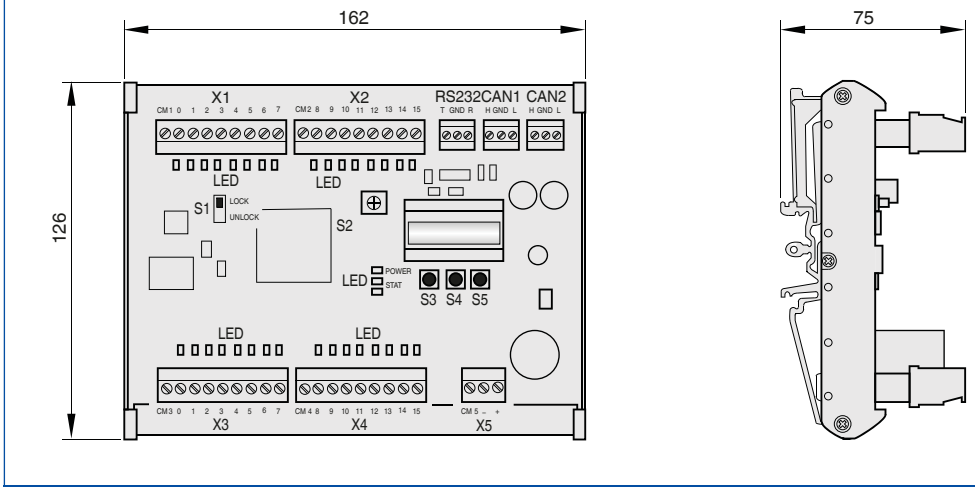
TNC-EC-GP

Application

- Single PCB control for installation on a mounting rail
- Stand-alone solution for controlling and monitoring of up to 6 motorised fire dampers with 24 V DC (up to 12 fire dampers with parallel operation); alternatively for capturing the end positions of up to 12 mechanical dampers with one limit switch (up to 24 limit switches with parallel operation)
- With pre-installed user software, ready to use
- Menu-driven operation using integral LCD and softkeys on the main PCB, signalling with LEDs
- Topology: star-shaped with 4-wire line
- Processing of a signal from the smoke detector or central fire alarm system (smoke detection, contamination of smoke detector)
- Manual control (OPEN/CLOSE) of individual fire dampers
- Automatic function test

Dimensions

TNC-EC-GP



Specification text

Standard description (characteristics)

Single PCB control for controlling and monitoring of up to 6 motorised fire dampers with 24 V DC (up to 12 fire dampers with parallel operation); alternatively for capturing the end positions of up to 12 mechanical dampers with one limit switch (up to 24 limit switches with parallel operation)

- With pre-installed user software
- CAN bus interface for the connection of an external operating and display unit
- Supply voltage: 24 V DC, –15 to 25 %
- Power consumption: <150 mA (without external load)
- Dimensions: 162 × 126 × 75 mm (B × H × T)
- Installation: on mounting rail
- Make: TROX GmbH or equivalent
- Type: TNC-EC-GP

Description

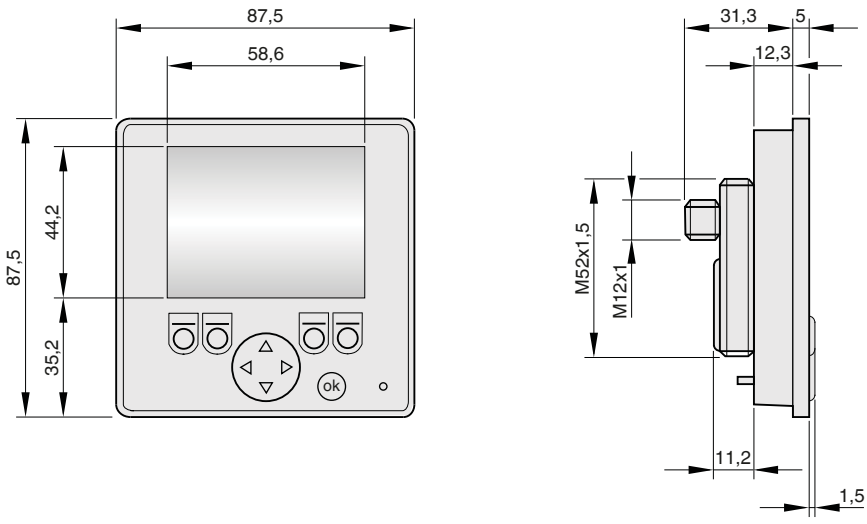
TNC-EC-AZM
display module

Application

- Display module for menu-driven operation and error display
- 2.8 inch colour LED and backlit function buttons with rocker switch for cursor allow for menu-driven operation and error display
- Language selection (German, English, Finnish; other languages upon request)
- Connecting cable for data and supply voltage, standard length of 5 m
- Menu-driven function test
- Manual control of fire dampers
- Password protection

Dimensions

TNC-EC-AZM



Specification text

Standard description (characteristics)

Menu-driven operation and display
of the TNC-EASYCONTROL control system

- 2.8 inch colour LCD with 5 function buttons and rocker switch for cursor
- Language selection (for operation and display): German, English, Finnish
- CAN bus interface
- Supply voltage: 8 – 32 V DC
- Power consumption: 70 mA at 24 V DC
- Dimensions: 87.5 × 87.5 × 37.5 mm (B × H × T)
- Casing: plastic, black
- Degree of protection: IP 67 when installed in the front panel of the casing, otherwise IP 65
- Operating manual
- Make: TROX GmbH or equivalent
- Type: TNC-EC-AZM

Technical data

Main PCB

Electrical design	16 inputs/outputs
Supply voltage	24 V DC, –15 to 25 %
Current consumption	< 150 mA
Operating temperature	0 to 40 °C
Construction	Open PCB
IP protection level	IP 00
Dimensions B x H x T	162 × 126 × 75 mm
Connection	Screw terminals
Fixing	On mounting rail (if mounted with casing)
Program memory	256 kB
Data memory	SRAM 2 × 128 kByte, EEPROM 1 kByte 256 kB
Interface	1× RS232C, 9.6 kBaud, CAN1, CAN2, CANopen protocol
Status display	Power LED - green; status LEDs - green and red; programmed 8-digit LCD
Operating buttons	3 softkeys
Inputs IN 0 – IN 15	
Number of inputs	16, common reference point (GND)
Display	Yellow LED
Input voltage	24 V DC nominal
Input current	Typically 10 mA
Activation level high	15 – 30 V DC
Deactivation level low	0 – 5.5 V DC
Outputs OUT 0 – OUT 15	
Number of outputs	16 (2 × 8), 24 V DC for 8 outputs each
Display	Red LED
Switching voltage	12 – 34 V DC, 24 V DC nominal
Switching current	1.1 A per output
Coincidence factor	100 %
Short circuit protection	>6 A (electronic) per channel

Switching power supply unit

Input voltage (N, L)	90 – 264 V AC
Output voltage	24 – 28 V DC (adjustable)
Output current	4.2 A
Internal fuse, input	T3.15A/250 V AC
External fuse, output	T4 A/24 V DC (fuse holder in switch box)
Ambient temperature	–25 to 71 °C
IP protection level	IP 20
Dimensions B x H x T	91 × 90 × 57 mm
Connection	Screw terminals up to 2.5 mm^2
Fixing	On mounting rail

Casing

Dimensions (B × H × T)	400 × 220 × 84 mm
Casing material	Galvanised sheet steel, powder-coated RAL 9010
Inspection window	Plexiglass XT, colourless
Components	Installed on mounting rail
IP protection level	IP 40

Timer

Number of contacts	1 changeover contacts
Supply	230 V AC (50/60 Hz)
Shortest switching time	30 min
Cycle precision	1 s/day
Ambient temperature	–20 – 50 °C
IP protection level	IP 20
Battery life	6 years
Battery type	CR 2032, 3 V, 230 mAh
EMC immunity to interference	EN 61000-4-2 to -4-6
Fixing	On mounting rail

Display module

Display	2.8" TFT colour LCD
Resolution	320 × 240 pixels
Colours	256
Backlighting	LED
Dimensions (B x H x T)	87.5 × 87.5 × 37.7 mm
Casing material	Plastic, black
Buttons	5 function buttons
Rocker switch	Cursor functions (UP, DOWN, LEFT, RIGHT)
IP protection level	IP 67 when installed in the front panel of the casing, otherwise IP 65
Operating temperature	–20 to 30 °C
Supply voltage	8 to 32 V DC
Current consumption	70 mA at 24 V DC
CAN interface	CANopen protocol

Signal lamp

Casing	PC-ABS-Blend
Dome cap	PC, transparent
Illumination pattern	LED continuous
Type of tone	Continuous tone
Dimensions (Ø × H)	49.5 × 75 mm
Noise level	80 dB
Tone frequency	3 kHz
Switch-on current	0.5 A
Current consumption	80 mA
Supply voltage	24 V DC
IP protection level	IP 65
Service life	50,000 h
Connection	Plug with screw terminal, max. 0.5 mm^2

Description

TP043EC

Application

- 4.3" MMI system for display and operation, also as communication master for up to three TNC-EASYCONTROL units
- ModBus TCP and BACnet/IP interfaces for integration with central BMS
- With integral TNC Basic User Software/EC

Order code

TNC043EC

1

1 Type

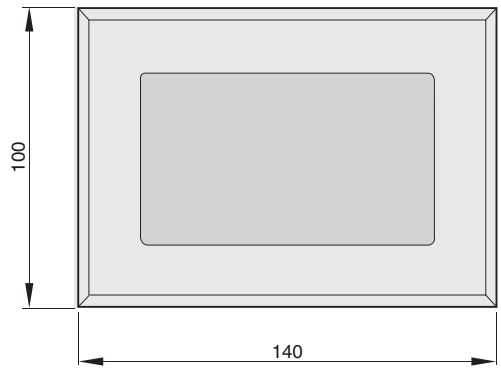
TP043EC

Technical data

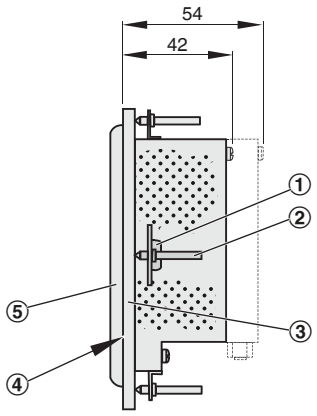
Description	TP043N
Display	TFT (colour)
Operation	Touch screen
Resolution	480 × 272 pixels
Display angle vertical/horizontal	120/150°
Display area B × H	53.8 × 95 mm
Diagonal	4.3"
Casing	Galvanised sheet steel
Front material	Aluminium, anodised (natural colour)
Front B × H × T	140 × 100 × 5 mm
Cut-out B × H	132 × 92 mm
Installation depth without plug attached	Approx. 42 mm
IP protection level	Front IP 65, back IP 20
Total weight	Approx. 590 g
Interfaces	CAN bus Ethernet, USB
Memory	32 MB flash, 64 MB flash SDRAM, 512 KB SRAM, battery pack
Temperature range for operation	0 – 50 °C
Temperature range for storage	–25 to 70 °C
Rel. humidity for operation and storage	20 – 85 %, non-condensing
Supply voltage	24 V DC (SELV/PELV to EN 61131)
Residual ripple	Max. 10 %
Minimum voltage	18 V
Maximum voltage	30 V
Current consumption (typically 24 V)	0.3 A
Current consumption (max.)	0.4 A
Power required	7.2 W
EMC immunity	EN 6100-4-2 to 4-6
Vibration	EN 60068-2-6
Shock	EN 60068-2-27

Dimensions

TP43AT



TP43AT



① Mounting bracket
② Threaded pin
③ Mounting area 1 to 6 mm thick
④ Perimeter seal
⑤ Front plate

Specification text

Standard description (characteristics)

MMI system for display and operation,
also as communication master
for up to three TNC-EASYCONTROL units

- 4.3 " colour display, touch screen
- Interfaces: ModBus RTU/TCP and BACnet/IP interfaces for integration with the central BMS
- With Basic User Software/EC for controlling and for the display of all system status values
- Automatic function test, including documentation
- Real time clock
- Ethernet, USB
- Dimensions of front panel (B × H × T): 140 × 100 × 5 mm
- IP protection level: Front IP 65; back IP 20
- Supply voltage 24 V DC
- Make: TROX GmbH or equivalent
- Type: TP043EC

Description

TNC-LINKBOX

Application

Module to be combined
with TNC-EASYCONTROL for the control
of motorised fire dampers and for capturing
the damper blade end positions.

- Easy and quick connection of actuator cables to TNC-EASYCONTROL (als connection box or linkbox)
- 24 V DC power supply to actuator
- Ready to be used with actuators with AMP plug
- Capturing damper blade positions OPEN and CLOSED
- Parallel operation of two damper actuators (as distribution box)
- Easy function change using a jumper on the PCB

Order code

TNC – Linkbox

[1]

[1] Type

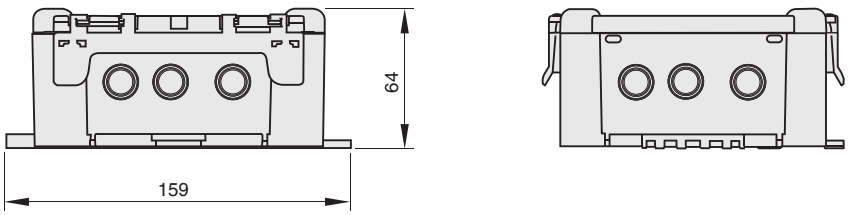
TNC-Linkbox

Technical data

Description	TNC LINKBOX
Supply voltage	24 V DC
Current consumption	≤ 850 mA
IEC protection class	IP 42
Double-stack terminal block	4-pole; 0.12 – 1.5 mm²
AMP-Mate-N-LOK socket	Control cable, 3-pole; end positions, 6-pole

Dimensions

EASYCONTROL TNC Linkbox



Specification text

Standard description (characteristics)

Module used to connect the actuator control
cables to TNC-EASYCONTROL;
if two motorised fire dampers are used
simultaneously, the LINKBOX acts as a distributor.
Can be attached to fire dampers
with a mounting bracket (accessory ZA14)

- Supply voltage: 24 V DC
- Current consumption: ≤ 850 mA
- Ambient temperature: –5 to 75 °C
- IP protection level: IP 42
- Make: TROX GmbH or equivalent
- Type: TNC-LINKBOX

TROXNETCOM
Basic information and nomenclature

- Communication systems for fire protection systems
- Colour codes according to IEC 60757
- AS-Interface
- LON

Basic information and nomenclature

Description

Information and communication are becoming more and more important in today's world. People not only want more information, they also want more detailed information. This development is also visible in building automation, and there is no end in sight. A building becomes 'transparent' through distributed intelligence and new decentralised communication systems.

These new technologies allow us to develop bespoke system solutions for various building services and to integrate them with building management systems. In this way, the best solutions for the different building services can be combined to create the best possible overall solution. Decentralised communication systems offer you the most advanced technology for your application requirements.

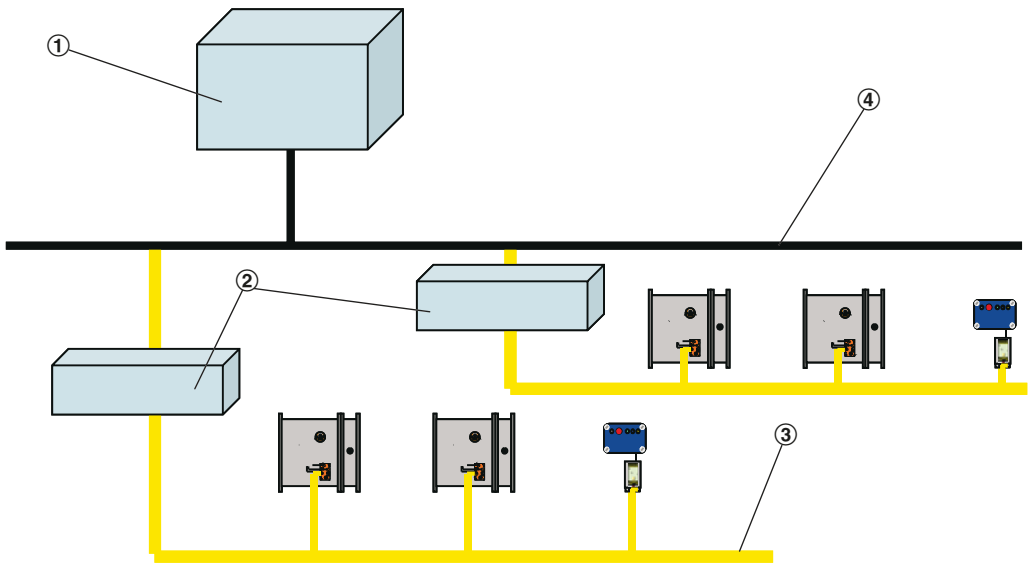
Communication systems for fire protection systems

The functional safety of programmable electronic systems is becoming more and more important in fire protection and is implemented with regard to protection goals and risks. According to IEC 61508, the requirements for these systems are based on a risk analysis. Components are given an SIL rating (safety integrity level) and must meet the corresponding requirements to ensure safety even in case of a malfunction.

General advantages of decentralised bus systems

It is no longer necessary to wire every single actuator and every single controller. Modern bus systems only need one bus cable, and in some cases a supply cable, to connect all components. This saves not only installation time but also cables, connectors, terminal blocks, and control cabinet space. It also drastically reduces the fire load and the installation costs. All signals from all components on a bus can be retrieved and recorded by the central unit. Inspection is simplified, and measurement and control can be optimised.

Communications system



① Central BMS
② Base station
③ Bus
④ Field bus

Wiring

Colour codes according to IEC 60757

Code	Colour
BK	black
BN	brown
RD	red
OG	orange
YE	yellow
GN	green
BU	blue

Colour codes according to IEC 60757

Code	Colour
VT	violet
GY	grey
WH	white
PK	pink
TQ	turquoise
GNYE	green-yellow

Description

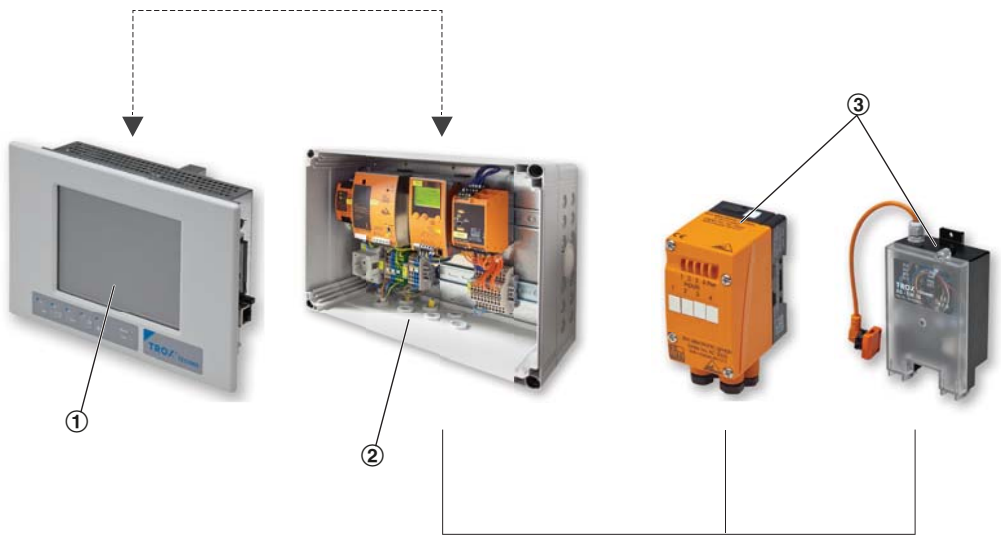
The AS interface is a world-standard bus system according to EN 50295 and IEC 62026-2.
It enables the integration of different components (modules) in a network regardless of the manufacturer and the design.
The modules control actuators and/or receive signals from sensors. TROX provides a system for controlling fire dampers, smoke protection dampers and smoke control dampers based on the AS-i standard. TROX modules are characterised by a wide spectrum of functions yet simple cabling.

Special characteristics

- Data exchange and power supply with just one cable
- Central control of actuators and monitoring of damper blade positions and duct smoke detectors
- Simple commissioning using standardised software
- Automatic function test including data logging

The system

Communications system



① Communication master
② Controller units (master)
③ Modules (slaves)

The communication master is the central display and control panel for the entire system.

- Connection of up to 28 controller and power units
- Display of operating status
- Operation of actuators
- Menu-driven operation in case of errors or malfunctions
- System configuration at the time of commissioning
- Logging of function tests and error messages

The controller and power unit combines the control functions, the power supply, and the data exchange for all components on the bus.

- The controller and power unit is installed near the modules, e.g. as a floor distributor
- With TNC Basic User Software for fire and smoke protection
- Communication interface to higher level systems (BACnet/Modbus)
- Display, also for operation
- Units with: 1 master – for 31 modules, 2 masters – for 62 modules

The modules establish the link between the measurement and control signals (sensors and actuators) and the network on the so-called field level. A module provides the supply voltage for the operation of actuators.

- Modules can be part of a fire damper or used separately to connect one or more fire dampers
- Integrated monitoring function, e.g. for running time
- Connection to the bus cable is with a flat cable insulation displacement connector

Description

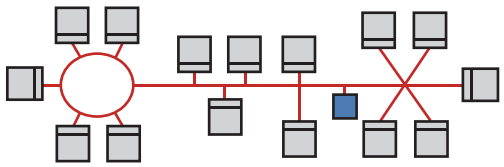
LON indicates a standard local operating network system with manufacturer-independent communications. Data is transferred by a microprocessor supplied by Echelon Corporation using a unified protocol. LonMark defines standards to ensure product compatibility. TROX offers components that meet LON standards. TROX modules are characterised by a wide spectrum of functions yet simple cabling.

Special characteristics

- Data exchange and power supply can be achieved with just one cable
- Decentralised structure with high operational reliability
- Standardised data transfer
- Manufacturer-independent compatibility

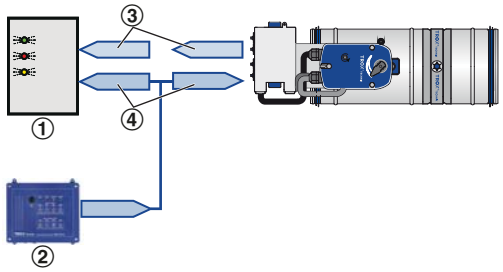
The system

Network topology



Free topology

Binding network variables



① Switch cabinet
② Duct smoke detector
③ Damper blade position
④ Alarm

Network

The local operating level (subnet) consists of the modules (nodes) and free topology data cables. A subnet can consist of up to 64 nodes or, alternatively, can be extended to 128 nodes using a repeater or router. Physical data transfer is via systems with or without a transfer of supply voltage. All nodes of a subnet must comply with the system. In larger networks the routers link the subnets with each other. The routers communicate with each other via the backbone, on a separate network level. Central monitoring of a LON network is possible and is connected to the backbone or above it.

Data exchange

Network variables are used for the communication between the nodes. These variables ensure unambiguous data exchange between the nodes. For commissioning, it is necessary to link the network variables between the nodes (binding). Project software is used to link the outputs of a node to the inputs of other nodes. Binding information is transferred to the subnet. Binding is carried out by a system integrator.