



# General Wiring Notes

## TROX UNIVERSAL Controller TCU3



Last update  
19. February 2024

### Notes

The options contained in these wiring instructions can be activated and parameterized with the EasyConnect software. It is not possible to set the controller parameters individually at the factory.

### Applicable documents

Further information see leaflets and assembly instructions of

- TROX UNIVERSAL Controller TCU3
- Expansion modules EM-TRF or EM-TRF-USV, EM-LON, EM-AUTOZERO, EM-BAC-MOD-01, EM-IP
- Sensors/Transducers for room and duct pressure control
- Control panel BE-LCD, CP-TOUCH

### General safety instructions

Recognised codes of engineering practice, especially the safety requirements and accident prevention regulations must be observed when performing all assembly, wiring and commissioning procedures.

Only specially trained and qualified personnel are permitted to perform the assembly, wiring and commissioning. The electrical installations must be implemented in compliance with the current valid EN / VDE / DIN and local electrical regulations.

#### Danger:

##### Electric shock by touching live parts.

Electrical devices may cause electrical hazards during operation

Before installation/assembly works begin:

**Disconnect all poles or switch off supply voltage of TROX UNIVERSAL controller.  
Protect power supply against unauthorised or unintended restart.**

All installation operations may only start after these safety operations.





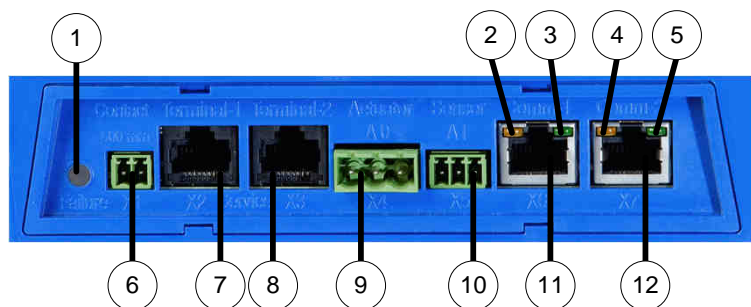
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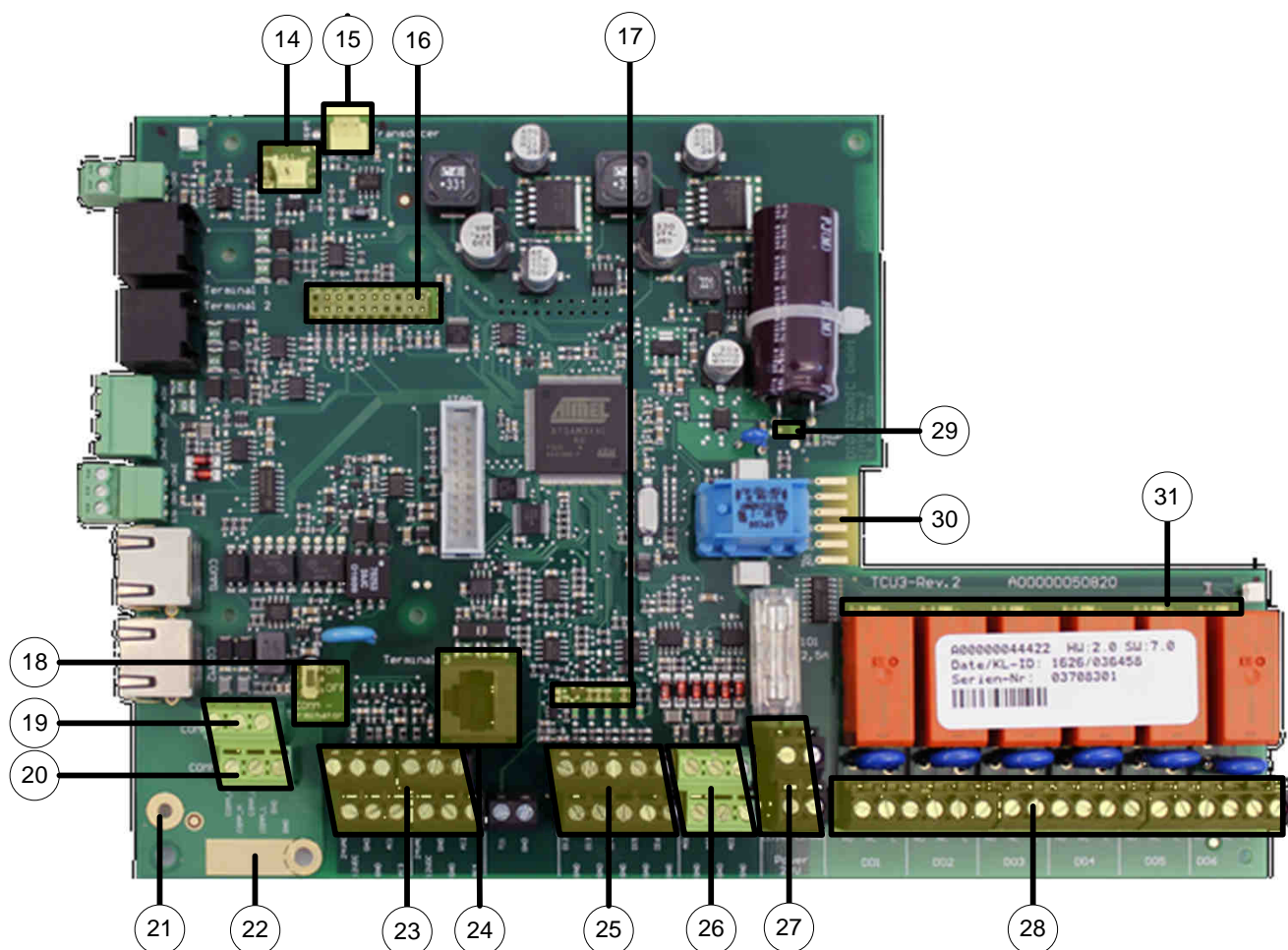


## Exterior sockets / Indicators:

Left box side



## Interior sockets / Indicators:



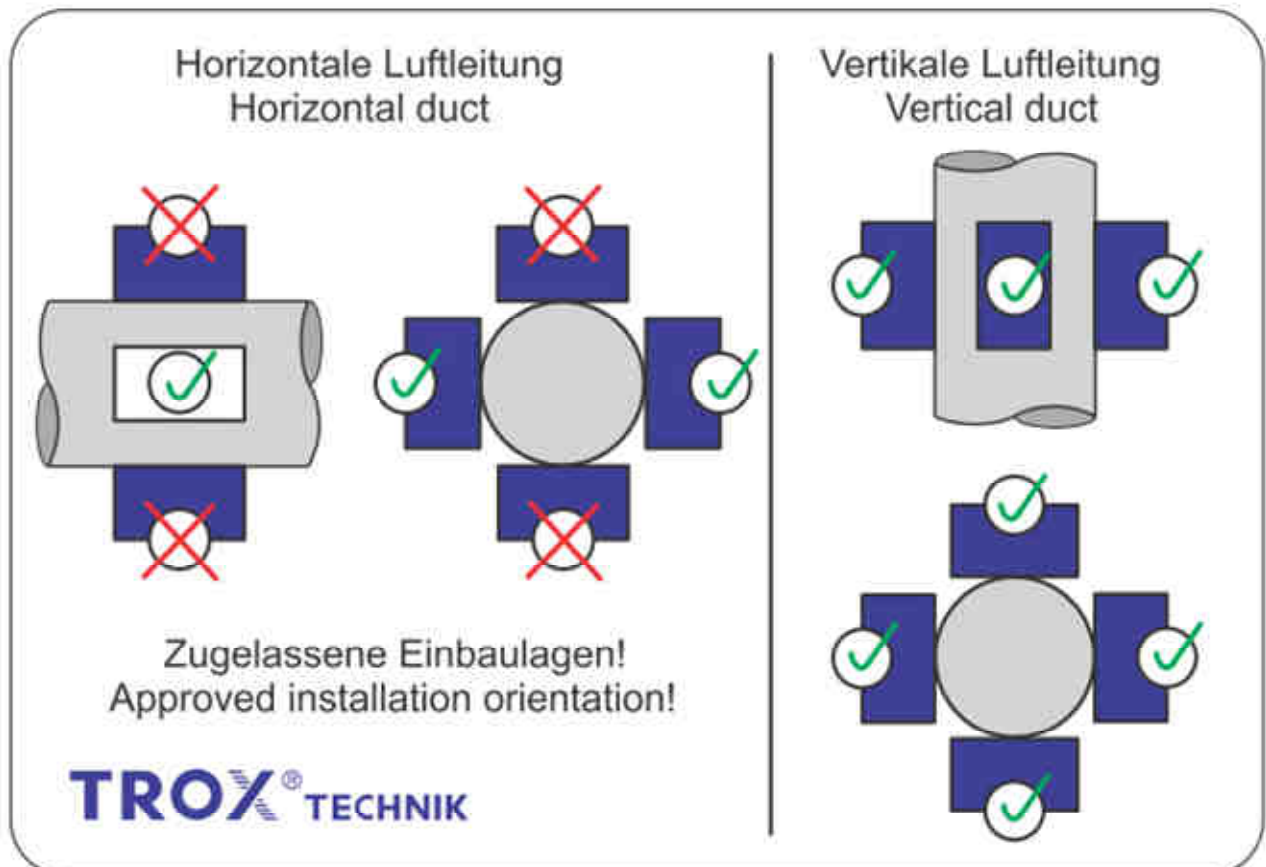
- 1 Red error indicator
- 2 Yellow indicator - Network termination activated
- 3 Green indicator (Reserved)
- 4 Yellow indicator CL-Network data received
- 5 Green indicator Controller operation (Heartbeat)
- 6 Socket X1 DI1 - Sash contact 500 mm
- 7 Socket X2 Control panel 1
- 8 Socket X3 Control panel 2
- 9 Socket X4 A04 Actuator
- 10 Socket X5 AI5 - Face velocity transducer
- 11 Socket X6 Communication line 1 - RJ45
- 12 Socket X7 Communication line 2 - RJ45

- 14 Socket Magnetic valve EM-AUTOZERO
- 15 Socket AI1 for internal volume flow transducer
- 16 Expansion slot for LonWorks®, BACnet, Modbus interface with EM-LON, EM-BAC-MOD-01
- 17 Optical status indicators of digital inputs
- 18 Activation switch for CL network termination
- 19 Screw terminals for communication line 1
- 20 Screw terminals for communication line 2

- 21 PE connection
- 22 Clamp / Connection pad for cable shield
- 23 Screw terminals Analogue inputs AI1...AI4
- 24 connection digital actuator
- 25 Screw terminals Digital inputs DI2...DI6
- 26 Screw terminals Analogue outputs AO1...AO3
- 27 Screw terminals Power supply 24 V AC / DC
- 28 Screw terminals Digital outputs DO1... DO6
- 29 Green indicator 24 V ok
- 30 Connection pad for Expansion module mains supply
- 31 Optical indicators for switching state of digital outputs



## Please observe installation orientation



### Explanation:

The TROX UNIVERSAL controller TCU3 may only be installed as follows:

#### at horizontal ducts: (Left image part)

The installation is only approved at the duct sides - an installation above or below the duct is not allowed.

#### at vertical ducts: (Right image part)

In this case all installation orientations are approved.

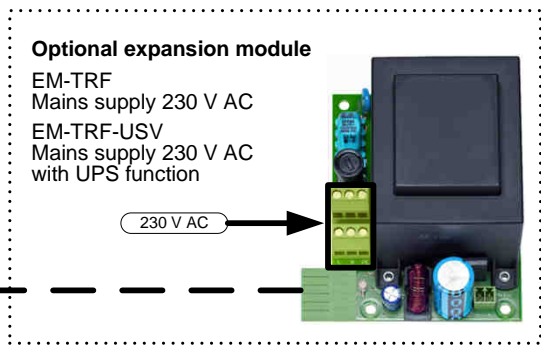
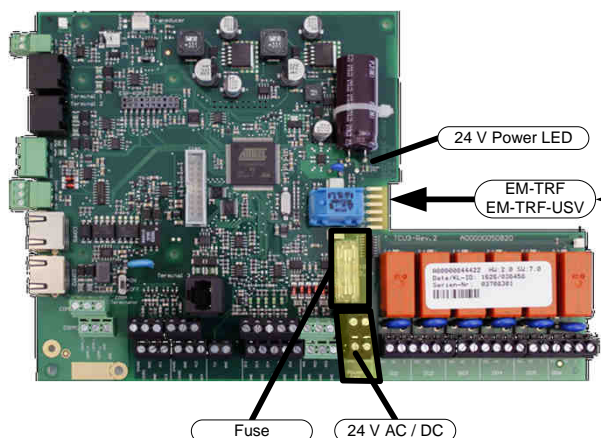
**The described installation orientation must be applied.**

**Otherwise accurate volume flow measuring is not possible.**



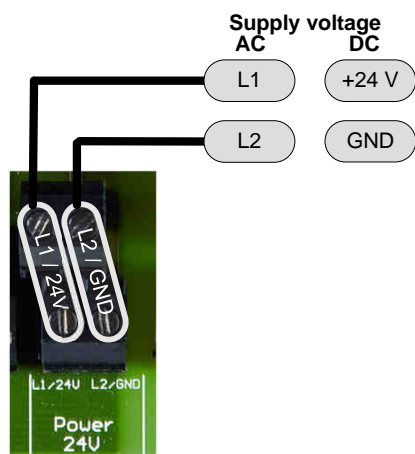


## Power supply



24 V Power LED: On = Supply voltage ok  
Off = Supply voltage not ok

## Supply voltage 24 V AC / DC



### Technical data:

- Supply voltage 24 V AC  $\pm$  15% 50-60 Hz
- Supply voltage 24 V DC  $\pm$  15%
- Fuse 2A slow, 250 V; glass tube fuse 5x20 mm
- Power consumption up to 40 VA (Maximum configuration)  
Maximum power consumption is determined by the individual controller configuration.  
Typical configurations will lead to following values:

Volume flow or pressure controller with standard actuator	up to 15 VA
Volume flow or pressure controller with spring return actuator	up to 20 VA
Volume flow or pressure controller with fast running actuator	up to 29 VA
Room control panel	plus 4 VA
room or duct pressure sensor PT699	plus 1 VA

### Important wiring instructions:

#### Observe polarity

Polarity of DC and AC supply voltage has to be strictly complied for all controllers during wiring.  
Never connect 24 V AC and DC at same time

#### Limited wiring in a row

Power supply wiring in a row (via double terminals) is only approved for a maximum of 5 controllers!

#### Supply voltage at analogue inputs for supply of sensor/transducer

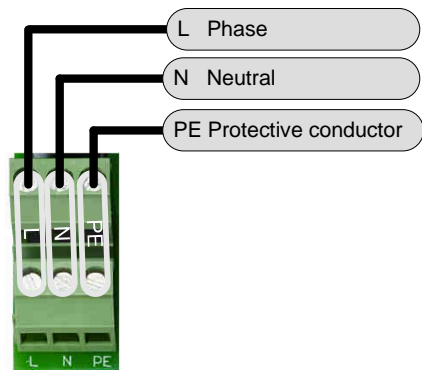
Type of used controller power supply (AC/DC) will influence type of provided power supply at analogue inputs:

- TCU3 Power supply 24 V AC  $\rightarrow$  Provided sensor supply at AI1-AI5 is 24 V AC
- TCU3 Power supply 24 V DC  $\rightarrow$  Provided sensor supply at AI1-AI5 is 24 V DC

This may require attention for connected sensors.

## Mains supply voltage 230 V AC

Alternative power supply  
(only with expansion module EM-TRF or EM-TRF-USV)



### Technical data:

- Supply voltage 230 V AC  $\pm$  20% 50-60 Hz
- Fuse 500 mA slow, 250 V
- Power consumption up to 40 VA (Maximum configuration)

### Important wiring instruction:

- Never connect 230 V and 24 V supply voltage simultaneous at one controller.
- Never connect 24 V supply voltage at controller with built in expansion module EM-TRF or EM-TRF-USV

#### Supply voltage at analogue inputs for supply of sensor/transducer

TCU3 Power supply 230V AC  $\rightarrow$  Provided sensor supply at AI1-AI5 is 24 V DC (with EM-TRF, EM-TRF-USV)

This may require attention for connected sensors.



## Communication line (CL)

For Plug- & Play data exchange between the controllers within one TROX UNIVERSAL CONTROLLER system



## Technical data:

- Maximum device no. within one system: 24
- Maximum total length: 300 m
- Network cable type **SF-UTP** (braid + foil shield) according ISO IEC 11801 (2002)  
patch cable with RJ45 plug connectors on both sides or cable from a reel; e.g. Cat 5
- Activate termination resistor at the beginning and the end of the controller communication line CL.

### Note:

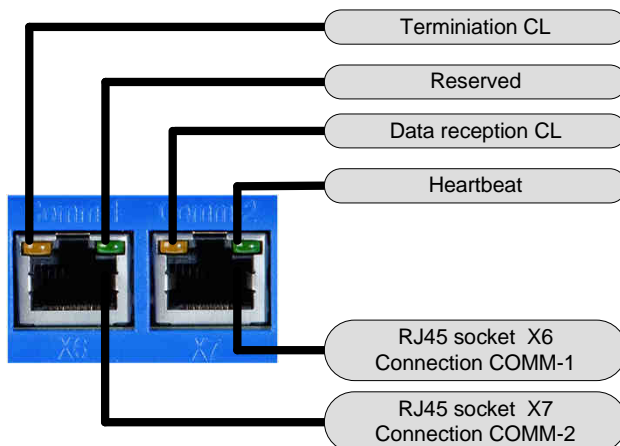
Use always green patch cables for the communication line CL

Aim:

Simple determination of communication line cable (green) and control panel connecting cable (blue)



## CL - Connection sockets and indicators



### Termination indicator

Yellow = Termination active    Off = Termination inactive

### Data reception CL

Yellow / blinking = Data received

### Heartbeat

Green slow blinking = Normal controller operation  
Green off = Device not operable

Default socket communication line 1

Default socket communication line 2

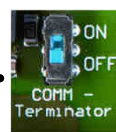
## CL - Termination resistor



Activation switch  
CL termination

### Termination of communication line CL

For a correct data exchange of the controllers is a termination on both ends of the communication line required.



ON = Termination activated  
OFF = Termination deactivated





## Communication line (CL)

### CL - Screw terminals as an alternative wiring option:

For data exchange via network cable from a reel as an alternative to patch cables

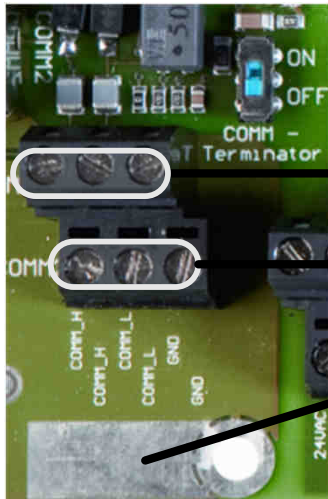
#### Important wiring note:



For port COMM1 or COMM2 on one controller use either the RJ45 sockets with patch cable **or** the screw terminals with network cable from a reel to built up the communication line CL.

#### Technical data:

- Maximum device no. within one system: 24
- Maximum total length: 300 m
- Network cable type **SF-UTP** (braid + foil shield) according ISO IEC 11801 (2002) cable on a reel; e.g. Cat 5
- Activate termination resistor at the beginning and the end of the controller communication line CL.



Screw terminals COMM1  
COMM-H / COMM-L / GND

Replaces RJ45 socket X6 of COMM-1

Screw terminals COMM2  
COMM-H / COMM-L / GND

Replaces RJ45 socket X7 of COMM-2

Shielding contact area



#### Wiring notes:

- Uses either screw terminals or RJ45 sockets of one controller.
- Use always two cores for each signal
- Use clamp to contact cable shielding with shielding contact area on the controller PCB

#### Wire assignment as follows:

Screw terminal TCU3	Cable core (Color coding according EIA/TIA568B)		
GND	blue	and	white/blue
COMM_H	white/orange	and	white/green
COMM_L	orange	and	green



## Communication system - Communication line (CL) and it's termination

### Important notes for system design



- Up to 24 TROX UNIVERSAL controller can be connected together  
 RS: supply air controller RE: exhaust air controller  
 PRS: room pressure controller supply air, PRE: room pressure controller exhaust air,  
 PDS: duct pressure controller supply air, PDE: duct pressure controller exhaust air

- Any order of devices at communication line is allowed
- Maximum length of the communication line CL: 300m.
- Use network cable type SF-UTP acc. ISO IEC 11801 (braid+foil shielded e.g. CAT 5)

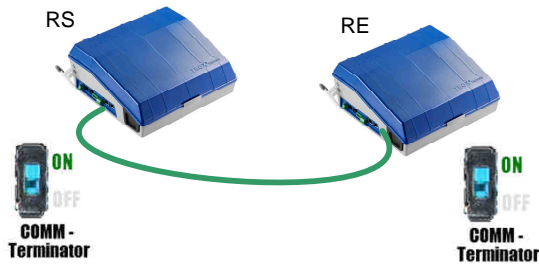
- Communication line termination at the beginning and the end by activating the switch COMM-Terminator on the TROX UNIVERSAL CONTROLLER main board (see examples below)



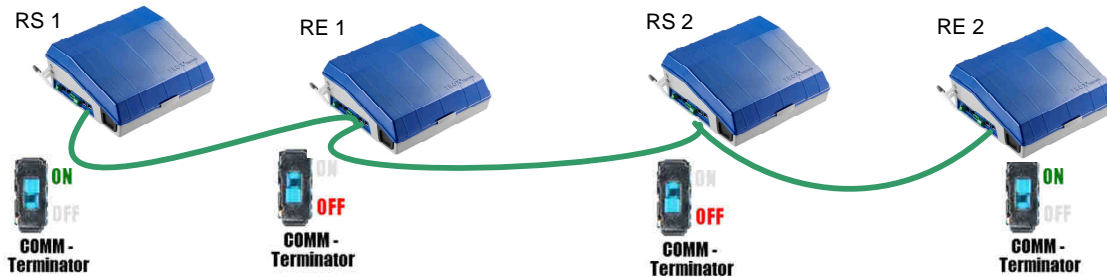
Termination switch on the pcb

Symbol activated / deactivated

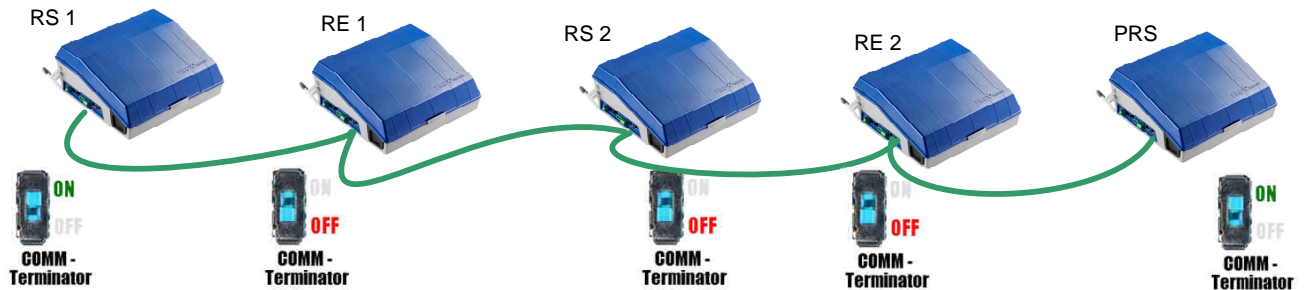
### Example 1: Supply and exhaust air controller



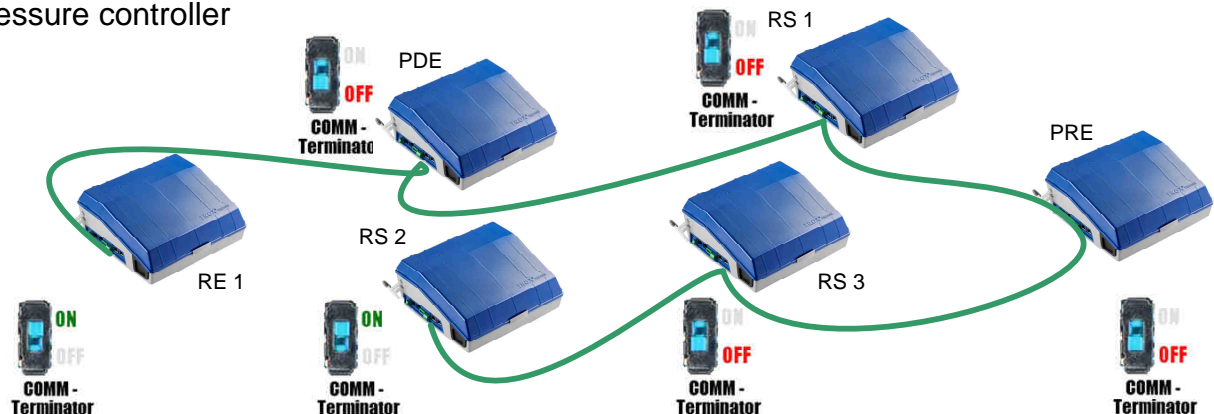
### Example 2: Two supply air controller with two exhaust air controller



### Example 3: Two supply air with two exhaust air controller and room pressure controller



### Example 4: Three supply air with one exhaust air controller, one duct pressure and one room pressure controller







## Room-Management-Function

The Room-Management-Function (RMF) is a software option to realize room based functions with the TROX UNIVERSAL CONTROLLER System:

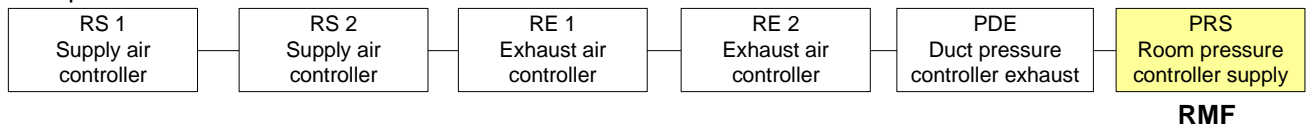
- Centralized interchange point for wiring of room functions
- Connection of room control panels
- Centralized configuration of room parameters and functions
- Monitoring of room functions

### Technical data:

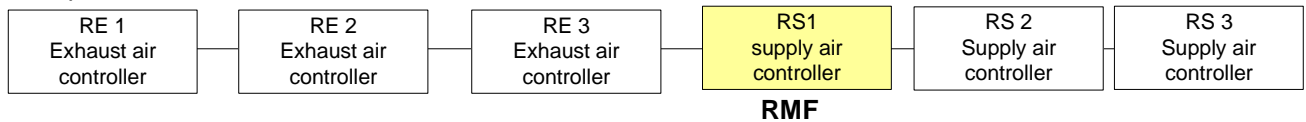
- RMF can be activated on any TROX UNIVERSAL CONTROLLER (Supply or Extract air) .
- RMF activation is only allowed on exactly one TROX UNIVERSAL CONTROLLER in a system of max. 24 controller.
- RMF can be activated with the TROX UNIVERSAL CONTROLLER configuration software EasyConnect V8.0 and higher.



#### Example 1:



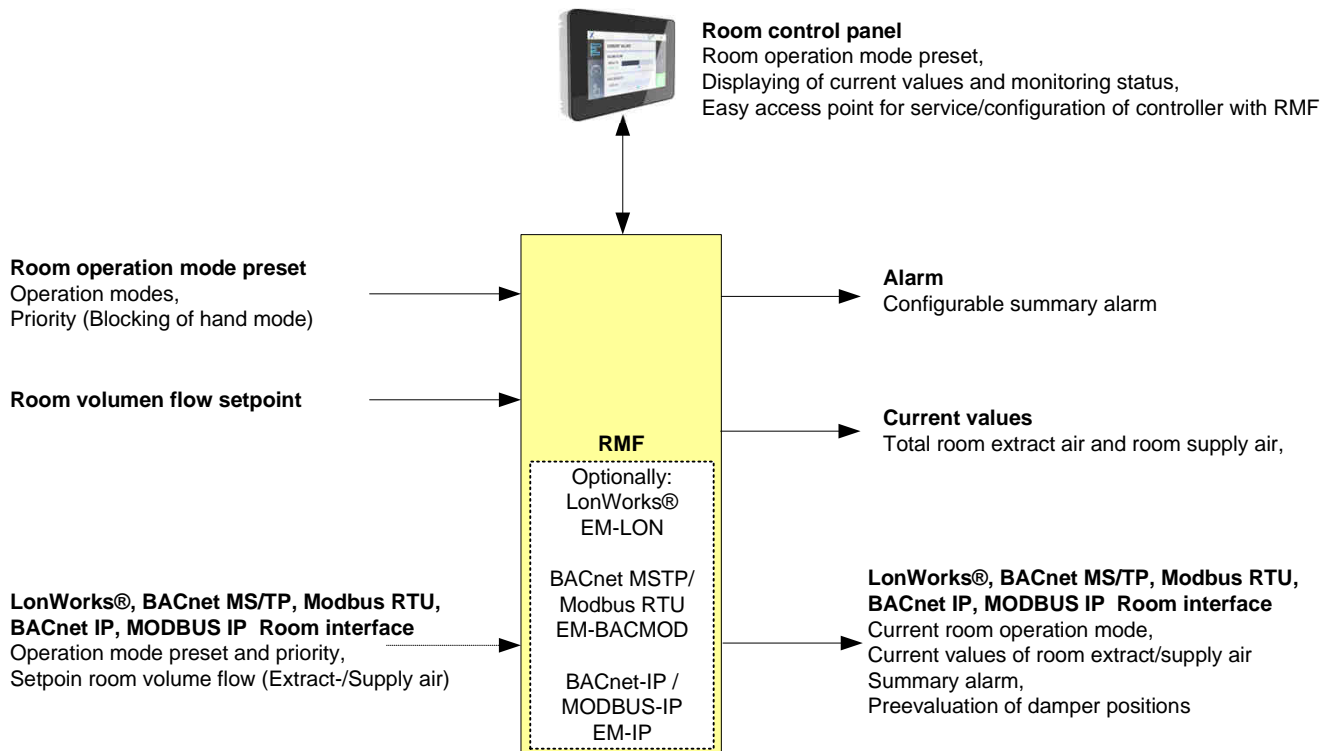
#### Example 2:



### RMF relevance for wiring

The selection of the controller with RMF is relevant for the wiring of room based functions and signals. An Exception are the pressure controller room and duct. All pressure relevant parts have to be connected directly to the pressure controller.

Following signals and the room control panel have to be connected at the controller with the RMF:





## Connection of control panels



### Note:

Use always blue patch cables for the control panels

Aim:

Simple determination of communication line cable (green) and control panel connecting cable (blue)



RJ45 socket X3  
Control panel #2

RJ45 socket X2  
Control panel #1



## Room control panel:



CP-Touch

### Technical data:

- Useable only at room controllers with activated Room-Management-Function
- Admitted is only control panel type BE-LCD and CP-TOUCH
- Up to two control panels can be connected to one controller
- 5 m connection cable blue included in the delivery
- Optionallly connection cable up to 40 m useable:  
Network cable type **SF-UTP** acc. ISO IEC 11801 (braid+foil shielded) with RJ45 connectors on both sides, e.g. patch cable Cat 5
- Plug in connection cable on back side of control panel

### Note:

Room control panels can only be used at room controllers with activated Room-Management-Function (RMF).



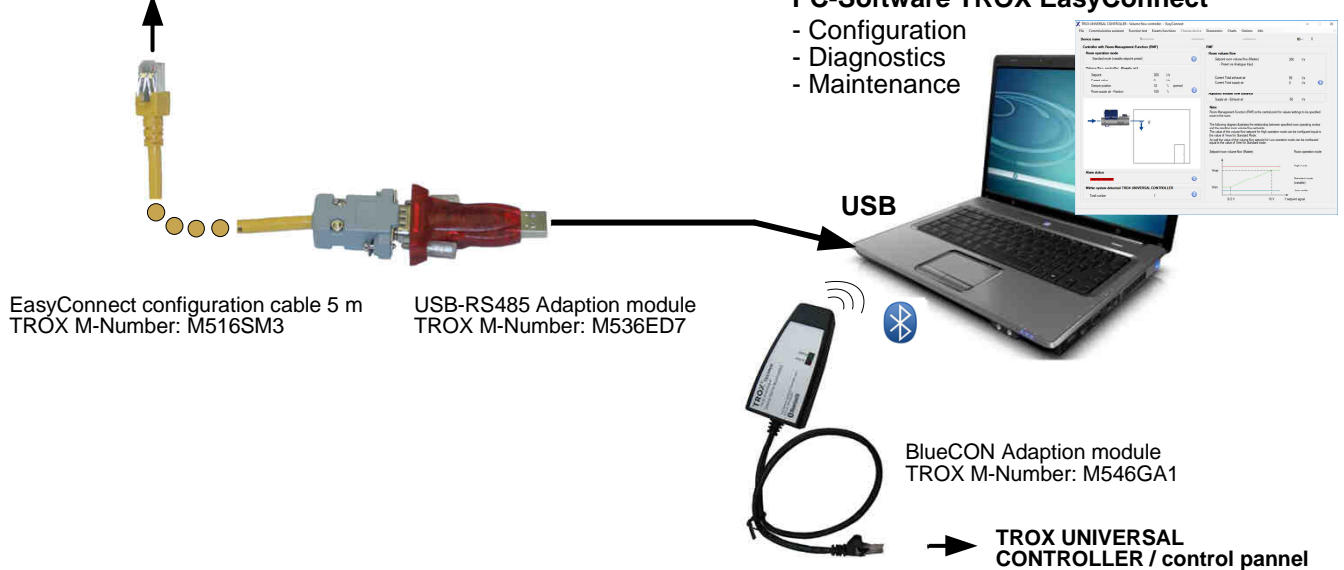


## Connection of TCU3 and PC for TROX EasyConnect-Software

TROX UNIVERSAL Controller /  
Control panel

**PC-Software TROX EasyConnect**

- Configuration
- Diagnostics
- Maintenance



EasyConnect configuration cable 5 m  
TROX M-Number: M516SM3

USB-RS485 Adaption module  
TROX M-Number: M536ED7

BlueCON Adaption module  
TROX M-Number: M546GA1

**Complete package 1:**  
Order Code: **EasyConnect-CAB**

EasyConnect Software +  
Configuration cable + USB-RS485 Adaption module +  
Programming adapter (For System EASYLAB requires)  
TROX Number: B588NF4

**Complete package 2:**  
Order Code: **EasyConnect-BC**

Alternatively you can use the Bluetooth Adaption module BlueCON for a wireless connection between TROX UNIVERSAL CONTROLLER and PC with EasyConnect software. The BlueCON module replaces the USB-RS485 Adaption module and the cable.

EasyConnect Software + Bluetooth Adaption module BlueCON +  
Programming adapter (For System EASYLAB requires)  
TROX Number: B588NF5

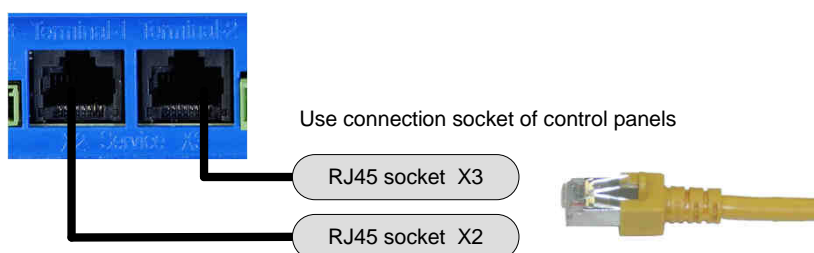
## Connection via control panels

**CP-TOUCH**



room control panel at TROX  
UNIVERSAL CONTROLLER

## Connection directly via TROX UNIVERSAL controller



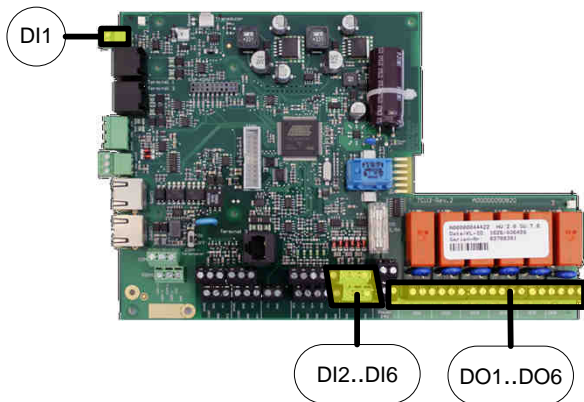
Use connection socket of control panels

RJ45 socket X3

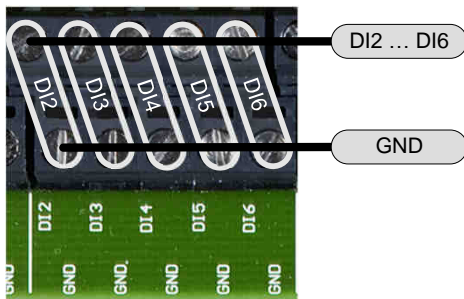
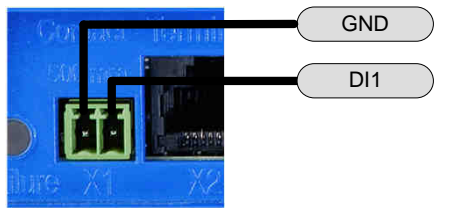
RJ45 socket X2



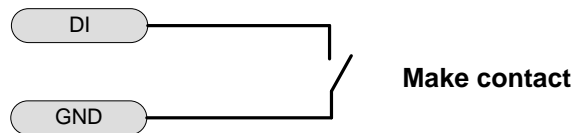
## Digital inputs (DI) / Digital outputs (DO)



### Digital inputs DI1 ... DI6



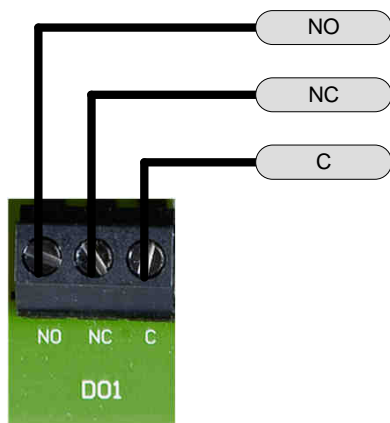
Typical applications: Reading of switch contacts



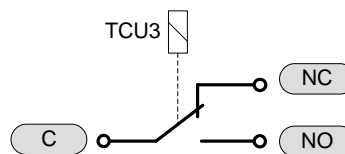
#### Connector for DI1:

- Phoenix MC 1,5/ 2-ST-3,5 Phoenix-No. 1840366 (included in the delivery)  
TroX material number: A00000040301
- Phoenix MCVR 1,5/ 2-ST-3,5 Phoenix-No. 1863152 (by customer)
- Phoenix MCVW 1,5/ 2-ST-3,5 Phoenix-No. 1862852 (by customer)

### Digital outputs DO1 ... DO6



Typical application: Special functions / Alarm relay



#### Technical data:

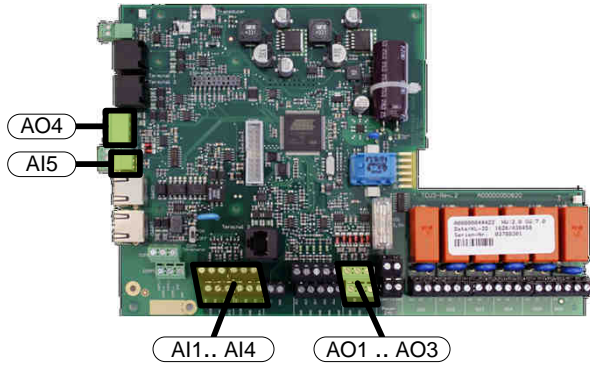
Electrical rating of contacts and pcb: 230 V AC max. 8 A

#### Additional note to alarm relay effect:

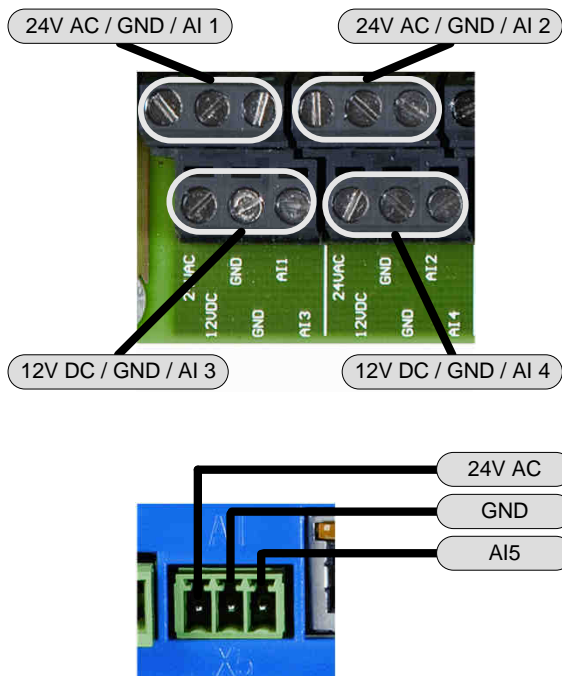
- Alarm relay released → Alarm state
- Alarm relay activated → No alarm state



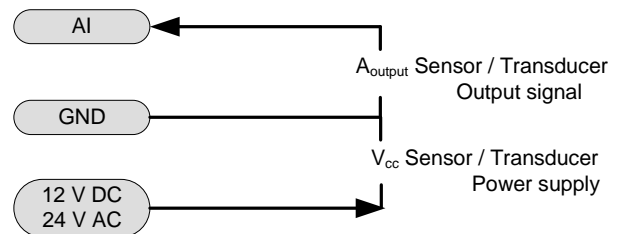
## Analogue inputs (AI) / Analogue outputs (AO)



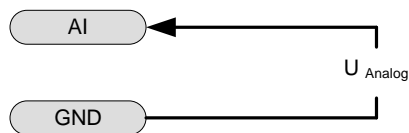
### Analogue inputs AI1 ... AI5



### Typical application: Sensor/Transducer integration



### Typical application: Signal integration



### Technical data:

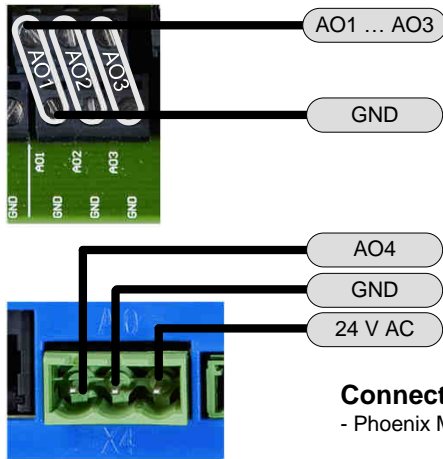
- Input voltage range 0-10 V DC
- Characteristic freely configurable
- Input resistance > 100kOhm

### Connector for AI5:

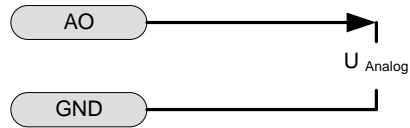
- Phoenix MC 1,5/ 3-ST-3,5 Phoenix-No. 1701879 (included in the delivery)  
TroX material number: A00000040302
- Phoenix MCVR 1,5/ 3-ST-3,5 Phoenix-No. 1863165 (by customer)
- Phoenix MCVW 1,5/ 3-ST-3,5 Phoenix-No. 1862865 (by customer)



### Analogue outputs AO1 ... AO4



### Typical application: Signal transmission output



#### Technical data:

- Output voltage range 0-10 V DC
- Characteristic freely configurable
- Maximum output load 10 mA

#### Connector for AO4:

- Phoenix MVSTBR 2,5 /3-ST-5,08 Phoenix-No. 1792252 (included in the delivery)
- Trox material number: M516EE1

### Terminal 3 (connection TROX HPD)

use: connection off digital actuator TROX HPD



**Important note:**  
Actuator TROX HPD may be connected only to terminal 3!



## Input / Output assignment – Volume flow controller supply and exhaust air (RS/RE)

Digital inputs DI	
DI 1	not used
DI 2	not used <i>(Default at RMF: Room operation mode - reduced mode (Vmin))</i>
DI 3	not used <i>(Default at RMF: Room operation mode - high mode (Vmax))</i>
DI 4	not used <i>(Default at RMF: Room operation mode – shut off mode)</i>
DI 5	not used <i>(Default at RMF: Room operation mode – open mode)</i>
DI 6	not used <i>(Default at RMF: Room operation mode – Standard mode(variable))</i>
<p><i>DI2 – DI6 Room operation mode setting could only configure on the RMF. The last switched-on state is adopted (push-button function). If the switch function is desired, DI6 must be wired permanently.</i></p> <p><i>The state of the inputs could be transmitted by the expansion module LON / BACnet / MODBUS</i></p>	

Digital outputs DO	
DO 1	Alarm relay <sup>(1)</sup>
DO 2	interior light - On / Off over room control panel <i>(only at RMF, if configured; else unused)</i>
DO 3	Sun blind – Open <i>(only at RMF, always activ at RMF, else unused)</i>
DO 4	Sun blind – Close <i>(only at RMF, always activ at RMF, else unused)</i>
DO 5	Room mode dependent <i>(if configured; else unused)</i>
DO 6	Room mode dependent <i>(if configured; else unused)</i>
<p><i>(1) Alarm state = Relay released</i></p> <p><b>Unused</b> outputs relays could be energized via the expansion module LON / BACnet / MODBUS</p>	

Analogue inputs AI	
AI 1	Internal volume flow transducer <i>(current volume flow measurement)</i>
AI 2	External room volume flow setpoint <i>(only at RMF)</i>
AI 3	<b>unused</b> <i>integration of variable volume flow (characteristic configurable)</i>
AI 4	<b>unused</b> <i>integration of variable volume flow (characteristic configurable)</i>
AI 5	<b>unused</b> <i>integration of variable volume flow (characteristic configurable)</i>
<p><b>Unused</b> inputs can be configured with EasyConnect software for integration of variable volume flow into room balance</p>	

Analogue outputs AO	
AO 1	Current volume flow of controller
AO 2	Volume flow setpoint for tracking controller <i>(only at RMF, output characteristic configurable)</i>
AO 3	Damper position of controller
AO 4	Damper actuator



## Input / Output assignment –room pressure controller (PRS/PRE)

Digital inputs DI		
DI 1	Door contact	(configurable; else not used, without function)
DI 2	not used	(Default at RMF: Room operation mode - reduced mode (Vmin))
DI 3	not used	(Default at RMF: Room operation mode - high mode (Vmax))
DI 4	not used	(Default at RMF: Room operation mode – shut off mode)
DI 5	not used	(Default at RMF: Room operation mode – open mode)
DI 6	not used	(Default at RMF: Room operation mode – Standard mode(variable))
<p>DI2 – DI6 Room operation mode setting could only configure on the RMF. The last switched-on state is adopted (push-button function). If the switch function is desired, DI6 must be wired permanently.</p> <p>The state of the inputs could be transmitted by the expansion module LON / BACnet / MODBUS</p>		

Digital outputs DO	
DO 1	Alarm relay <sup>(1)</sup>
DO 2	interior light - On / Off over room control panel
DO 3	Sun blind – Open (only at RMF, always activ at RMF, else <b>unused</b> )
DO 4	Sun blind – Close (only at RMF, always activ at RMF, else <b>unused</b> )
DO 5	Room mode dependent (if configured; else <b>unused</b> )
DO 6	Room mode dependent (if configured; else <b>unused</b> )
<p><sup>(1)</sup> Alarm state = Relay released</p> <p><b>Unused</b> outputs relays could be energized via the expansion module LON / BACnet / MODBUS</p>	

Analogue inputs AI	
AI 1	Internal volume flow transducer (current volume flow measurement) (only with option V)
AI 2	External room volume flow setpoint (only at RMF)
AI 3	<b>unused</b> integration of variable volume flow (characteristic configurable)
AI 4	External setpoint room pressure
AI 5	Current Room pressure sensor
<p><b>Unused</b> inputs can be configured with EasyConnect software for integration of variable volume flow into room balance</p>	

Analogue outputs AO	
AO 1	Current volume flow of controller (only with option V)
AO 2	Current room pressure
AO 3	Damper position of controller
AO 4	Damper actuator





## Input / Output assignment - Room Controller

Note:

Some assignments are only available on room controllers with activated Room-Management-Function (RMF)

Digital inputs DI	
DI 1	Not used
DI 2	not used <i>(Default at RMF: Room operation mode - reduced mode (Vmin))</i>
DI 3	not used <i>(Default at RMF: Room operation mode - high mode (Vmax))</i>
DI 4	not used <i>(Default at RMF: Room operation mode – shut off mode)</i>
DI 5	not used <i>(Default at RMF: Room operation mode – open mode)</i>
DI 6	not used <i>(Default at RMF: Room operation mode – Standard mode(variable))</i>
<p><i>DI2 – DI6 Room operation mode setting could only configure on the RMF. The last switched-on state is adopted (push-button function). If the switch function is desired, DI6 must be wired permanently.</i></p> <p><i>The state of the inputs could be transmitted by the expansion module LON / BACnet / MODBUS</i></p>	

Digital outputs DO	
DO 1	Alarm relay <sup>(1)</sup>
DO 2	interior light - On / Off over room control panel
DO 3	Sun blind – Open <i>(only at RMF, always activ at RMF, else unused)</i>
DO 4	Sun blind – Close <i>(only at RMF, always activ at RMF, else unused)</i>
DO 5	Room mode dependent <i>(if configured; else unused)</i>
DO 6	Room mode dependent <i>(if configured; else unused)</i>
<p><i><sup>(1)</sup> Alarm state = Relay released</i></p> <p><b>Unused</b> outputs relays could be energized via the expansion module LON / BACnet / MODBUS</p>	

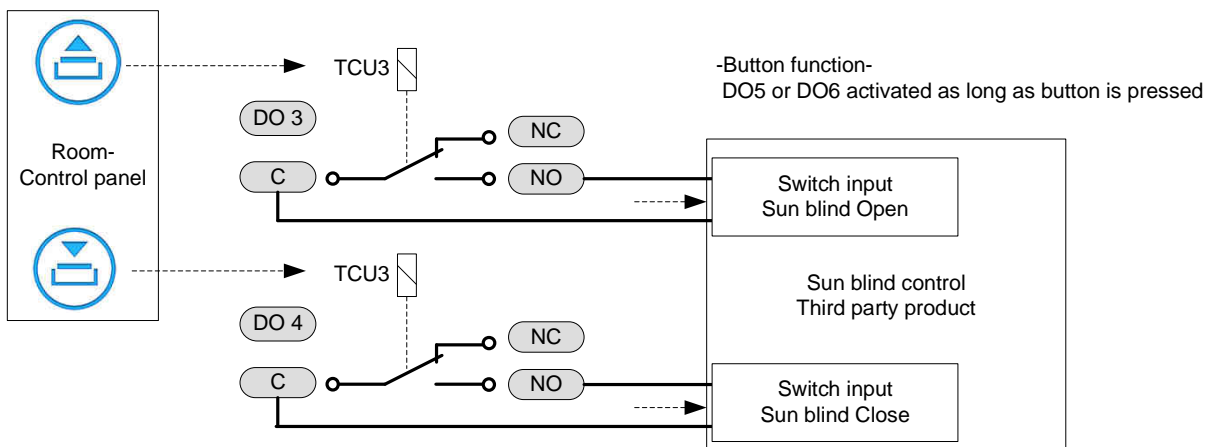
Analogue inputs AI	
AI 1	Internal volume flow transducer (current volume flow measurement) <i>(only with option V)</i>
AI 2	External room volume flow setpoint <i>(only at RMF, if configured; else unused)</i>
AI 3	<b>unused</b> <i>integration of variable volume flow (characteristic configurable)</i>
AI 4	External setpoint room pressure
AI 5	Current Room pressure sensor
<p><b>Unused</b> inputs can be configured with EasyConnect software for integration of variable volume flow into room balance</p>	

Analogue outputs AO	
AO 1	Current volume flow of controller <i>(only with option V)</i>
AO 2	Current duct pressure
AO 3	Damper position of controller
AO 4	Damper actuator

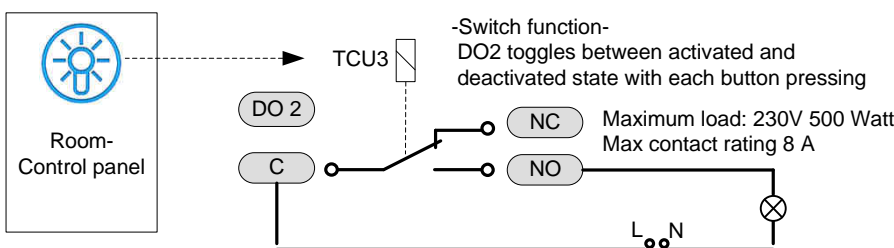


## Special functions – TROX UNIVERSAL CONTROLLER

### Control of on-site provided sun blind control device (only at room controller with activated RMF)



### Control of on-site provided lighting / device (only at room controller with activated RMF)

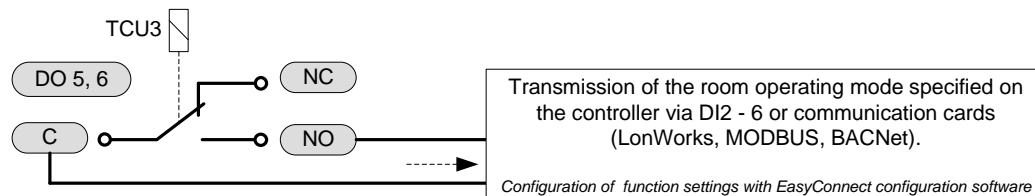


For safety reasons the TCU3 casing must be locked in such a way that it can only be opened with a tool when a 230 V power supply is connected.

A safety latch with a sticker is available, which can be ordered under EM-TRF-Zubehoer (A0000055540).

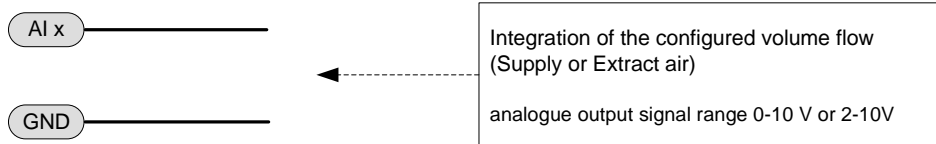
When delivered with transformer module EM-TRF or EM-TRF-USV, this is installed and is not required additionally.

### Room mode depending switching



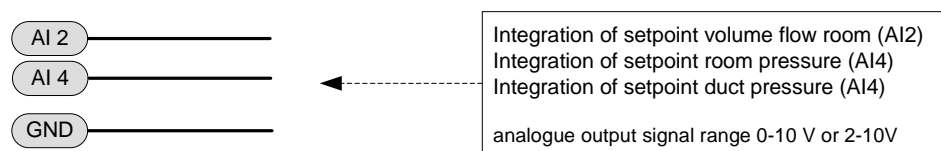
Notes: Function is not available if sun blind control is activated  
Activation and setting of the function with EasyConnect configuration software

### Integration of variable volume flows into room balance



Notes: Function is available on all unused analogue inputs AI by connecting an analogue signal with 0-10 V.  
Configuration of function setting with EasyConnect configuration software  
Analogue input, characteristic and required volume flow values (Extract or supply air) which should be integrated into the room balance must be configured.

### External setpoint room volume flow, room pressure or duct pressure



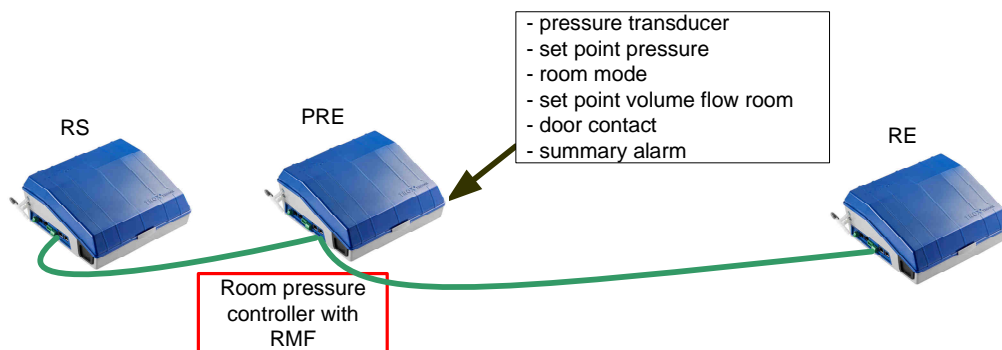


## pressure control

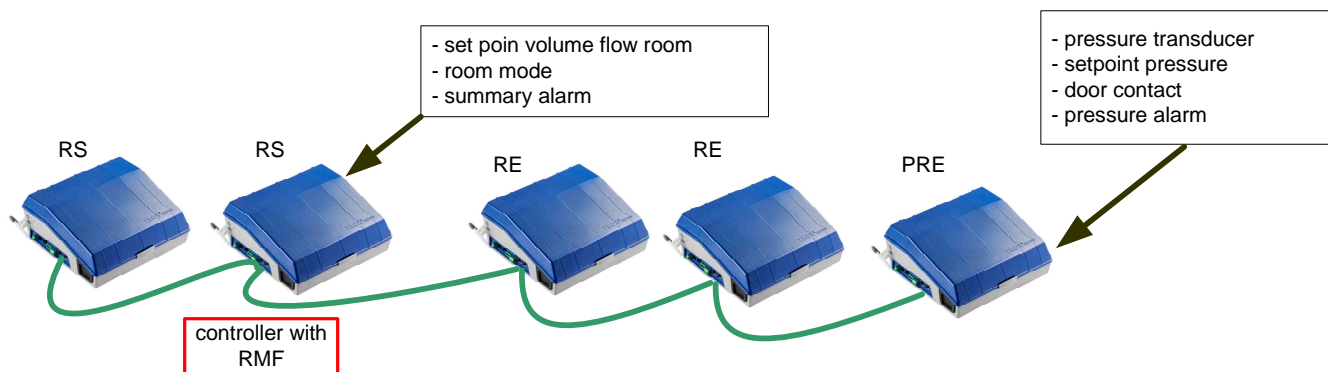
- room Pressure or duct pressure control via supply or exhaust air controller
- Current pressure signal integrateable via analogue signal 0-10V; Characteristic configurable
- 1 fix setpoint configurable within the controller
- variable Setpoint pressure via analogy signal 0-10 or 2-10 V (AI4) or alternativ via expansion modul LonWorks®, BACnet MS/TP, Modbus-RTU, BACnet IP, Modbus IP
- Special functions via door switch contact at DI1 configurable (Alarmhandling, Ccontrol behaviour)
- current values about room or duct pressure via analogy signal 0-10 or 2-10 V (AI4) or alternativ via expansion modul LonWorks®, BACnet MS/TP, Modbus-RTU Schnittstelle, BACnet IP, Modbus IP
- all connections and configurations for the pressure controll have to be done at the related pressure controller

## System design - Pressure control

### Example 1: RMF-Function activated on pressure controller

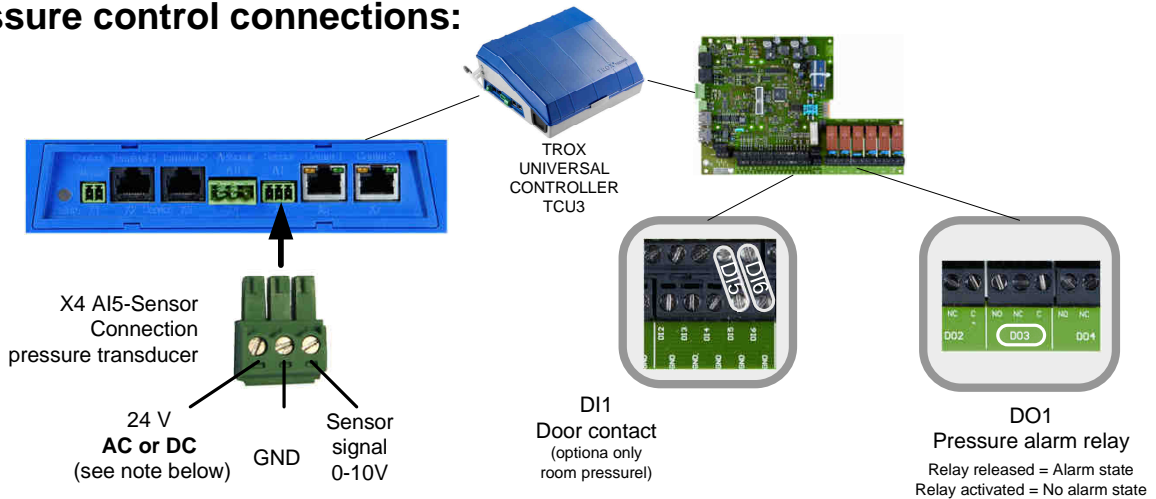


### Example 2: RMF-Function activated on other room volume flow controller





**Pressure control connections:**



**Power supply for pressure transducer**

The power supply of the pressure transducer **can** be provided by the EASYLAB TCU3 via 24V connector of analogue input X5 AI Sensor.

**Important:**

- TCU3 supplied with 24 V AC → Connector 24V of X5 AI Sensor provides 24V AC
- TCU3 supplied with 24 V DC → Connector 24V of X5 AI Sensor provides 24V DC
- TCU3 supplied with 230V AC → Connector 24V of X5 AI Sensor provides 24V DC.

The above mentioned different supply voltage types must be observed depending on selected pressure transducer type.

**Huba Pressure transducer type 699**

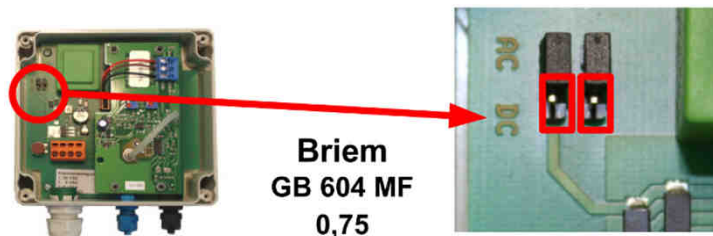
This transducer is approved for AC and DC power supply type. Therefore no adaption is required.



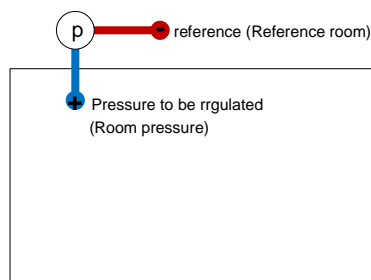
**Briem Pressure transducer type GB604 MF 0,75**

This transducer is approved for AC and DC power supply type. Therefore no adaption is required.

Old Briem transducer must be manually adapted to the power supply type. Default delivery setting ist AC supply. Using a 230 V AC supply for the TCU3 via EM-TRF or EM-TRF-USV or 24 V DC supply implies a manual change of the supply to DC type. Therefore change jumper setting from AC to DC within the Briem transducer casing.



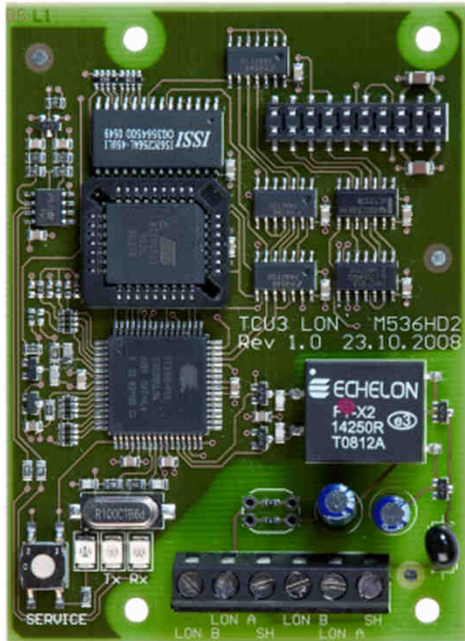
**Tubing**





## LonWorks®-Interface

## (Expansion module EM-LON)



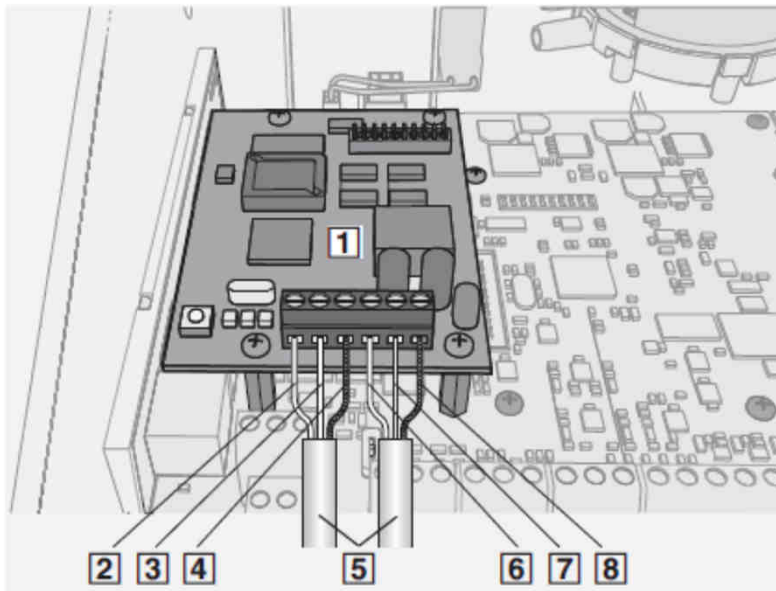
### Technical data:

- LonWorks®-Interface FT10
- Network structure: Free Topology / Twisted Pair
- Simple network integration via internal connected double terminals
- Service-Key
- Status-LED for Service key, data transmission and data reception
- Mounting of expansion module within TROX UNIVERSAL controller
- Supply voltage 5 V DC provided by TROX UNIVERSAL controller
- Each network segment must be terminated with network terminator
- The maximum number of network devices is based on the LonWorks® specifications from Echelon. There are no additional restrictions by TROX.

### Data interface: Standard Network Variable Types (SNVT)

- Different data points according to controller device type:
  - Room controller / room controller with activated Room-Management-Function (RMF) or room / duct pressure controller with or without RMF
  - Usage on controller with activated RMF
    - > Access to data points of room
  - Usage on controller without RMF
    - > Access to data points of single controller

### Connection assignment:



- 1 Expansion module EM-LON
- 2 LON-B
- 3 LON-A
- 4 Shield
- 5 Network cable(s)
- 6 LON-B
- 7 LON-A
- 8 Shield

Expansion module built into TROX UNIVERSAL controller box

### Network cable types:

Following cable types are recommended for LonWorks®-networks by Echelon:

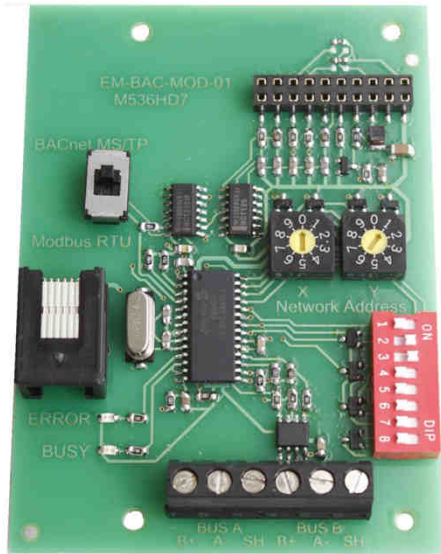
- TIA 568A Category 5
- 8471 oder 85102 (Belden)
- Level IV cable
- JY(St)Y 2x2x0,8 (use only twisted wire pairs for LON-A and LON-B)

**For more details see assembly and operating instruction manual of EM-LON.**

**The EM-LON extension module is only available as a spare part since 2022 (note availability of goods).**



## BACnet MS/TP interface (Expansion module EM-BAC-MOD-01) Modbus RTU interface



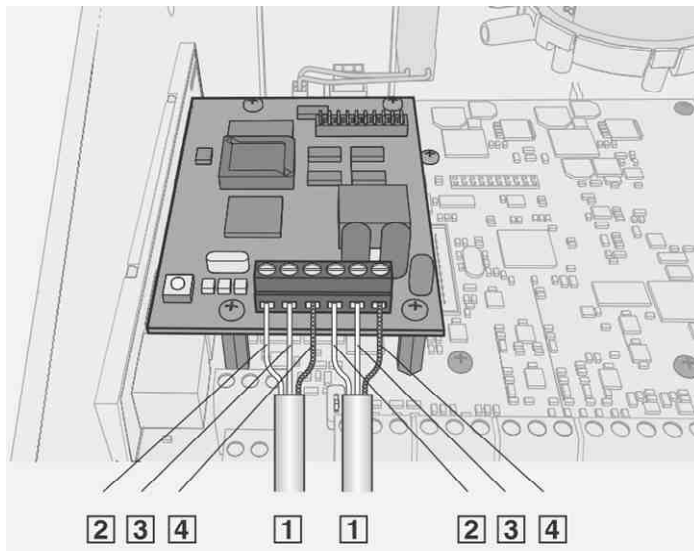
### Technical data:

- BACnet MS/TP interface or Modbus RTU interface selectable via configuration switch
  - Configurable network address and communication parameter
  - Simple network integration via internal connected double terminals
  - Status-LED for display of data transfer and communication error
  - Mounting of expansion module within TROX UNIVERSAL controller box
  - Supply voltage 5 V DC provided by TROX UNIVERSAL controller
  - Current regulations for network design and number of network device must be observed: BACnet Standard 135-2004 Modbus according EIA-485
- In particular this includes:
- Network topology with simple line structure
  - Usage of twisted pair copper cables with shielding
  - Compliance of polarity A- and B+ for all network devices
  - 120 Ohm resistor for network termination at first and last network device
  - Network BIAS resistor for BACnet networks
  - Max. 32 network devices in each network segment
  - Configuration of individuell network address for each device

### Data interface:

- BACnet objects according PICS documentation or Modbus data registers
  - Different data points according to controller device type:  
Room controller / room controller with activated Room-Management Function (RMF) or room / duct pressure controller with or without RMF
- Usage on controller with activated RMF  
-> Access to data points of room
- Usage on controller without RMF  
-> Access to data points of single controller

### Connection assignment:



- 1 Expansion module EM-BAC-MOD-01  
PCB illustration differs a little from original;  
(Screw terminal representation is correct, see photo above)
- 2 B+ EIA-485
- 3 A- EIA-485
- 4 Shielding
- 5 Network cables
- 6 B+ EIA-485
- 7 A- EIA-485
- 8 Shielding

Expansion module built into TROX UNIVERSAL controller box

Further details can be found in the mounting and operating instructions for the EM-BACMOD expansion module.



**BACnet IP interface  
Modbus IP interface**

**(Expansion module EM-IP)**



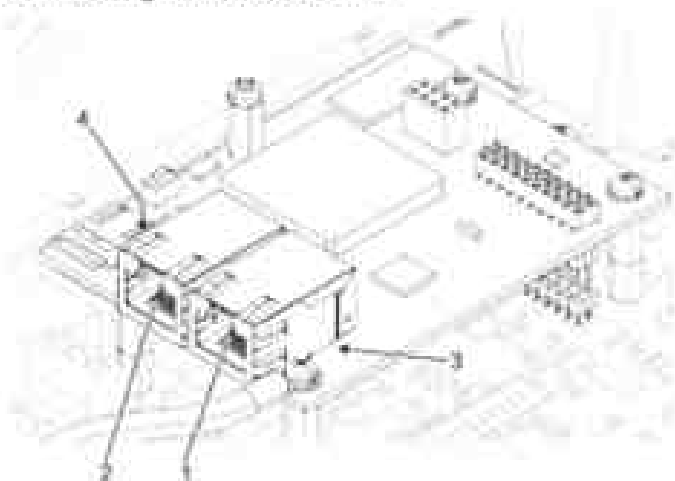
**Technical data:**

- BACnet IP interface or Modbus IP interface selectable via configuration switch
- Configurable network address and communication parameter
- Two RJ45 10/100Mbit Ethernet connection socket. (daisy chain connection up to 5 EM-IP cards possible).
- Status-LED for display of data transfer and communication error
- Mounting of expansion module within TROX UNIVERSAL controller box
- Supply voltage 5 V DC provided by TROX UNIVERSAL controller
- Current regulations for network design and number of network device must be observed:  
In particular this includes:
  - Network topology
  - Usage of Patch cable cat 5e with shielding
  - Max 100 m cable length

**Data interface:**

- BACnet objects according PICS documentation or Modbus data registers
- Different data points according to controller device type:  
Room controller / room controller with activated Room-Management Function (RMF) or room / duct pressure controller with or without RMF  
Usage on controller with activated RMF
  - > Access to data points of roomUsage on controller without RMF
  - > Access to data points of single controller

**Connecting the network cable**



- 1 Ethernet sockets LAN 1
- 2 Ethernet sockets LAN 2
- 3 LED status displays LAN 1
- 4 LED status displays LAN 2

EM-IP has two RJ45-10/100 Mbit Ethernet sockets, LAN 1 and LAN 2 (Fig. 13/1 and 2), which are managed by the integral Ethernet switch.

This allows for establishing a daisy chain on an Ethernet port of the IP network.

Further details can be found in the mounting and operating instructions for the EM-IP expansion module.