

# Controller

## Type TAM



### Adapter module for the expansion of the EASYLAB system

Adapter module as an interface between fume cupboard control and room control, and to the central BMS

- Plug and play communication with up to 23 EASYLAB controllers, fume cupboard controllers, or room controllers
- Additional data points for the integration of other variable and constant volume flow rates into the room balance, e.g. controllers or fume hoods
- Can be set up as room interface to the central BMS
- Connection of a room control panel for the signalling and use of room functions
- Used when fume cupboards are used in a room

#### Expansion options

- Connection to the mains (230 V)
- Expansion modules with LonWorks, BACnet or Modbus standard interfaces to the central BMS
- Room control panels for operating mode default setting

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## Application

### Application

- Adapter module Type TAM for the expansion of the EASYLAB system, in particular for the integration of fume cupboards
- Interface between fume cupboard control and room control
- Interface to the central BMS, voltage signals 0 – 10 V or with expansion modules for LonWorks, BACnet, Modbus
- Very simple commissioning: automatic controller identification, no component addressing required (plug and play communication), configuration software with interactive menu navigation and extended diagnostic functions
- Project-specific configuration using expansion modules and room control panels
- Numerous options for the integration of additional volume flows into the room balance
- Room management function (RMF) can be activated
- For use in laboratories, clean rooms in the pharmaceutical and semiconductor industries, operating theatres, intensive care units, and offices with very demanding control

requirements

### Special characteristics

- Plug and play communication with automatic controller identification, no component addressing required
- Modular system for functional expansion
- Connections and status displays on the outside of the controller casing
- Project-specific adjustments using adaptable room control panels
- Project-specific adjustments can be achieved with configurable special functions, monitoring, and alarm signalling
- Permanent function monitoring of the system
- Very simple commissioning, configuration changes and diagnosis
- Centralised configuring and permanent signalling of room settings (room management function)
- EasyConnect configuration software enables interactive navigation (also wireless)
- Factory tested and configured with project-specific parameters

## Description

### Operating modes

- LAB: extract air led system for laboratories
- CLR: supply air led system for clean rooms
- LAB/CLR-RMF: System with active room management function

### Parts and characteristics

- Microprocessor system with programme and system data stored in nonvolatile memory
- Double-stack terminal block for supply voltage connection
- Connections for two control panels
- Connection of communication line to plug socket or screw terminals
- Digital outputs with screw terminals
- Digital inputs with screw terminals or plug socket
- Analog inputs with screw terminals or plug socket
- Analog outputs with screw terminals
- Integral terminal resistor for the communication line

- Alarm indicator lights on both sides of the casing
- Status indicator lights (heartbeat, communication and terminal resistor)

### Attachments

- Expansion modules are factory mounted or can be fitted at a later stage
- T: EM-TRF, power supply unit for connecting the controller to the 230 V AC mains voltage
  - U: EM-TRF-USV, power supply unit for connecting the controller to the 230 V AC mains voltage and to ensure uninterrupted power supply
  - L: EM-LON, LonWorks FTT-10A interface
  - B: EM-BAC-MOD-01, interface configured for BACnet MS/TP
  - M: EM-BAC-MOD-01, interface configured for Modbus RTU

### Useful additions

- BE-LCD-01: Control panel for fume cupboard

- control and room control (only for operating mode ...-RMF)
- Differential pressure transducers: Static differential pressure transducers for room pressure control or duct pressure control
- EasyConnect: Configuration software for the commissioning and diagnosis of EASYLAB components

#### **Construction features**

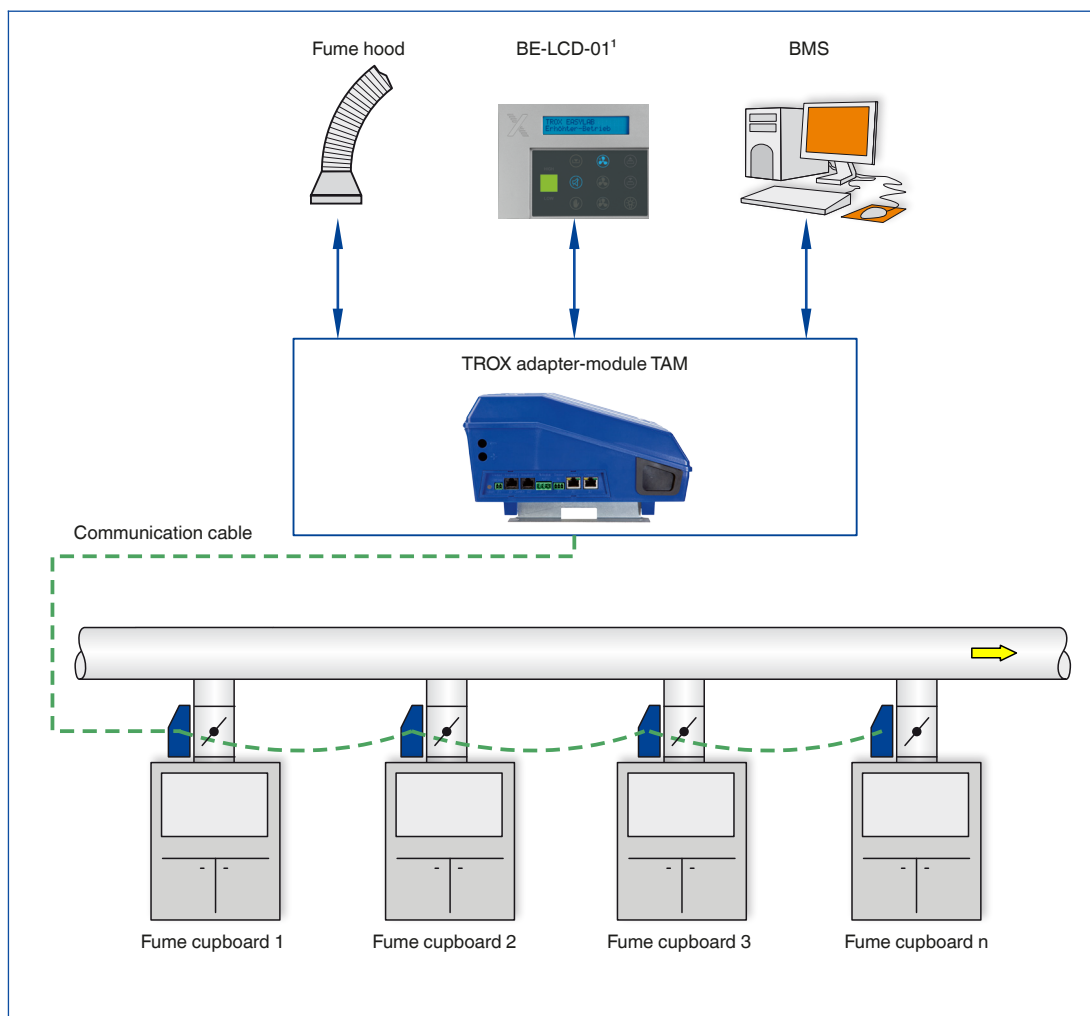
- Main PCB and expansion modules in one casing
- Angle bracket for fixing the casing in a switch

- cabinet or to a wall or ceiling
- Casing can be opened without tools, except for TAM with EM-TRF or EM-TRF-USV
- Pin header socket for the connection of expansion modules
- Plug sockets for the most important connections on the outside of the casing

#### **Materials and surfaces**

- Casing made of ABS plastic, blue (RAL 5002)

Expansion of the EASYLAB system using the TAM adapter module



<sup>1</sup> only for a TAM with active room management function

**Volume flow rate consolidated signal**

The adapter module consolidates signals from all connected controllers and provides this consolidated signal as a voltage signal; with expansion modules EM-LON and EM-BAC-MOD-01 the signal is provided as network variable. Supply air and extract air signals are considered.

**Variable volume flows**

- The system considers up to 23 EASYLAB controllers that are connected to the communication line
- The system considers up to 5 voltage signals that are connected to the analog inputs
- The system considers up to 2 network

variables, transferred via a LonWorks, BACnet, or Modbus interface

**Constant volume flows**

- The system considers up to 6 configurable constant volume flow rates, connected to the digital inputs

**Room management function**

- The room management function can be activated using the adapter module
- For fume cupboards, the room management function can only be activated on the TAM adapter module

<b>Supply voltage</b>	24 V AC $\pm$ 15 %; 230 V AC as option; 50/60 Hz
<b>Power rating</b>	35 VA fume cupboard controller with control panel; 29 VA room controller; 33 VA room controller with room control panel; max. 40 VA with all expansion modules
<b>Micro fuse</b>	2 A, slow blow, 250 V
<b>Actuator</b>	Fast-running high-precision actuator, running time for 90° is 3 s
<b>Operating temperature</b>	10 – 50 °C
<b>IEC protection class</b>	III (protective extra-low voltage)
<b>Protection level</b>	IP 20
<b>EC conformity</b>	EMC according to 2014/30/EU
<b>Weight</b>	1.4 kg

<b>Recovery time</b>	500 ms
<b>2 interfaces for communication line</b>	Network cable SF-UTP, 300 m max.; up to 24 devices
<b>2 interfaces for control panels</b>	Network cable SF-UTP, 40 m max.
<b>6 digital outputs</b>	Relay with make/break contact, 250 V, 8 A; switch-on current 12 A
<b>6 digital inputs</b>	for volt-free switch contacts; can be configured as make or break contacts
<b>5 analog inputs</b>	0 – 10 V, input resistance > 100 k $\Omega$ , characteristic can be configured
<b>4 analog outputs</b>	0 – 10 V, 10 mA max., characteristic can be configured

This specification text describes the general properties of the product. Texts for variants can be generated with our Easy Product Finder design programme.

Adapter module for the EASYLAB system as an interface between fume cupboard control and room control

Control electronics using a microprocessor, with configuration settings stored in EEPROM memory and hence safe in case of a power failure.

Connections for all important communication and peripheral devices are located on the outside of the casing and hence easily accessible. Indicator lights on the outside of the casing for alarms (on both sides), controller function (heartbeat), and communication.

Communication system with plug-in communication lines, automatic connection setup without manual network configuration, easy to expand with additional controllers (usually without integration issues).

Integration of variable or constant volume flow rates in the room balance using analog signals, switch contacts or constant values. Signalling of volume flow rate consolidated signals, faults, and status messages to central BMS with analog or switch outputs.

5 analog inputs for the integration of variable volume flows.

6 volt-free digital inputs for the integration of constant flows and/or the control of special functions.

Analog output for signalling the total volume flow rate of the room (supply air or extract air)

Digital output for an alarm; alarm conditions can be configured.

Supply voltage 24 V AC

### Special characteristics

- Plug and play communication with automatic controller identification, no component addressing required
- Modular system for functional expansion
- Connections and status displays on the outside of the controller casing

- Project-specific adjustments using adaptable room control panels
- Project-specific adjustments can be achieved with configurable special functions, monitoring, and alarm signalling
- Permanent function monitoring of the system
- Very simple commissioning, configuration changes and diagnosis
- Centralised configuring and permanent signalling of room settings (room management function)
- EasyConnect configuration software enables interactive navigation (also wireless)
- Factory tested and configured with project-specific parameters

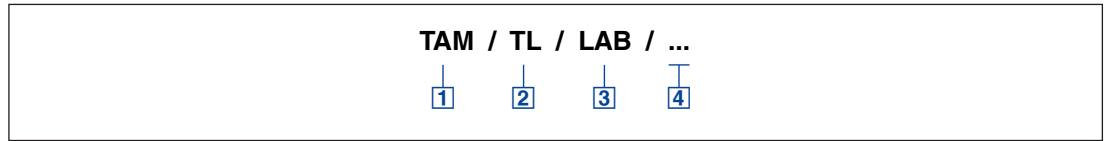
### Materials and surfaces

- Casing made of ABS plastic, blue (RAL 5002)

### Additional functions with active room management function

- Connection of one or two adaptable EASYLAB control panels BE-LCD-01 with optical and acoustic signalling
- The alarm sound can be suppressed or its duration limited; alarm signalling is configurable, e.g. suppressing alarms for certain operating modes or consolidating alarms from different levels
- Operating mode default setting by the central BMS and/or room control panel with flexible suppression and prioritisation options
- Supported special operating modes: increased operation, reduced operation, shut-off, and open position
- Operating mode default setting for all controllers in the room
- Central interface for individual faults
- Monitoring of room functions
- Centralised configuring of room parameters

TAM



**1** Type

**TAM** Adapter module

**2** Expansion modules

Option 1: Supply voltage

No entry: 24 V AC

**T** EM-TRF for 230 V AC

**U** EM-TRF-USV for 230 V AC, provides uninterruptible power supply (UPS)

Option 2: Communication interface

No entry: none

**L** EM-LON for LonWorks-FTT-10A

**B** EM-BAC-MOD-01 for BACnet MS/TP

**M** EM-BAC-MOD-01 for Modbus RTU

**I** EM-IP for BACnet/IP, Modbus/IP and webserver

**R** EM-IP with real time clock

**3** Operating mode

**LAB** Extract air led system (laboratories)

**LAB-RMF** Extract air led system with active room management function (laboratories)

**CLR** Supply air led system (clean room)

**CLR-RMF** Supply air led system with active room management function

**Order example: TAM/T/LAB**

**Expansion modules**

**LAB**

EM-TRF for supply voltage

Extract air led system

**4** Operating values [m<sup>3</sup>/h or l/s, Pa]

Only with operating mode LAB-RMF or CLR-RMF

**V1** Total room extract air/supply air – standard mode

**V2** Total room extract air/supply air – reduced operation

**V3** Total room extract air/supply air – increased operation

**V4** Constant supply air

**V5** Constant extract air

**V6** Supply air/extract air difference

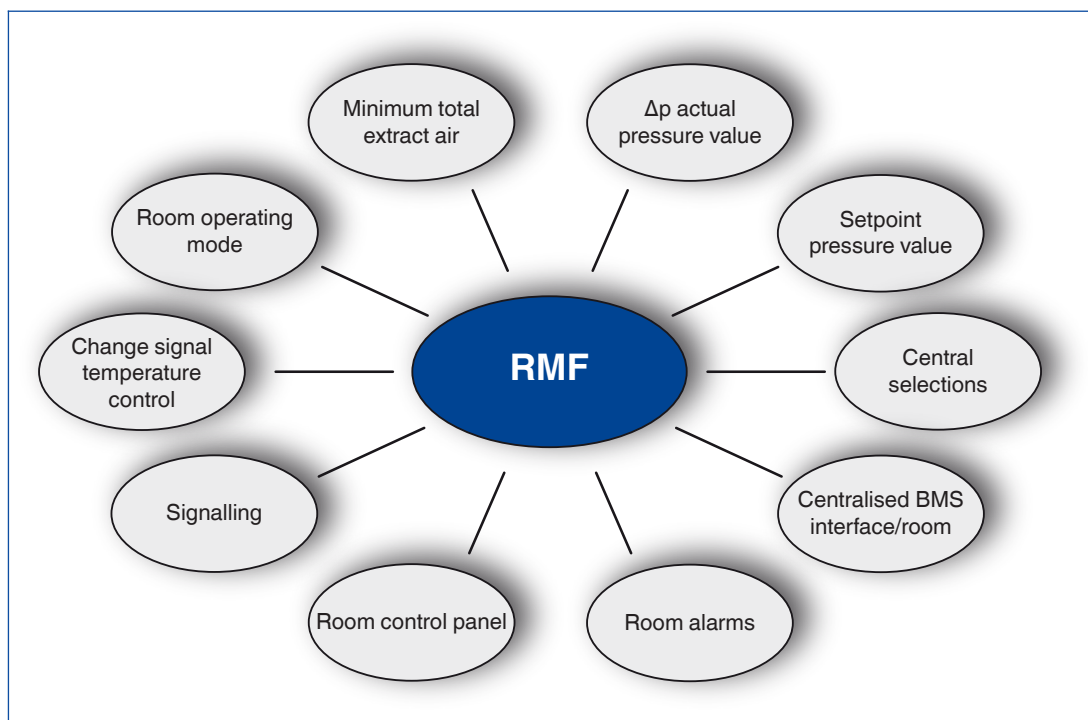
**Δp<sub>soil</sub>** Setpoint pressure (only with differential pressure control)

**Useful additions:**

Control panel for fume cupboard controller, for displaying the functions of the control system according to EN 14175

**BE-TCU-LON-II** 40-character display

Room management function RMF



**Application**

- The room management function is a software option that provides functions for the entire room
- Within an EASYLAB system with a maximum of 24 controllers, the room management function is activated on one controller – supply air controller TCU3, extract air controller TCU3, or TAM adapter module
- For fume cupboards, the room management function can only be activated on the TAM adapter module
- Factory set parameters for the room management function
- On-site activation using the EasyConnect configuration software

**Central interface point for room functions**

- Room operating mode default setting for all controllers in the room; priority can be selected
- Room operating mode default setting using switch contacts LonWorks, BACnet, Modbus, or room control panel
- Volume flow rate setpoint change based on temperature control
- Volume flow rate setpoint change based on external differential pressure control
- Connection of a room pressure transducer, door contact, and setpoint value switching contact for internal differential pressure control
- Control input signal for sun protection/blinds (to be provided by others) and lighting

**Centralised configuring of the room parameters and functions**

- Default setting for the minimum total extract air or the minimum total supply air for the room
- Default setting for the supply air-extract air difference
- Default setting for differential pressure control parameters
- Incorporation of constant, non-switched volume flow rates
- Extract air balance optimisation

**Monitoring of room functions**

- Exceeding of the specified total extract air (monitoring of diversity) or limitation of the specified total extract air (diversity control)

**Configurable consolidated alarms**

- Consolidated alarm means that all alarms for all controllers of an EASYLAB system are consolidated

**Use of room control panels**

- Connection of 2 BE-LCD-01 room control panels
- Status display for the volume flow rate or differential pressure control of a room, e.g. pressure setpoint value and pressure actual value
- Display of actual room parameters, e.g. the actual and setpoint values for the total extract air flow rate
- Service interface for accessing room parameters
- Control of sun protection/blinds (to be provided by others) and lighting



## Inputs

5 analog inputs

- Analog inputs with configurable characteristics for the integration of variable air volume flows

6 digital inputs

- Digital inputs for the integration of constant volume flow rates using switch contacts

## Outputs

1 analog output

- Total extract air flow rate, total supply air flow rate, or total supply air flow rate setpoint value (setpoint value: only for extract air led system)

1 digital output

- Alarm state of the adapter module

## Expansion modules as interfaces to the central BMS

- LonWorks FTT-10A (EM-LON)
- BACnet MS/TP (EM-BAC-MOD-01)

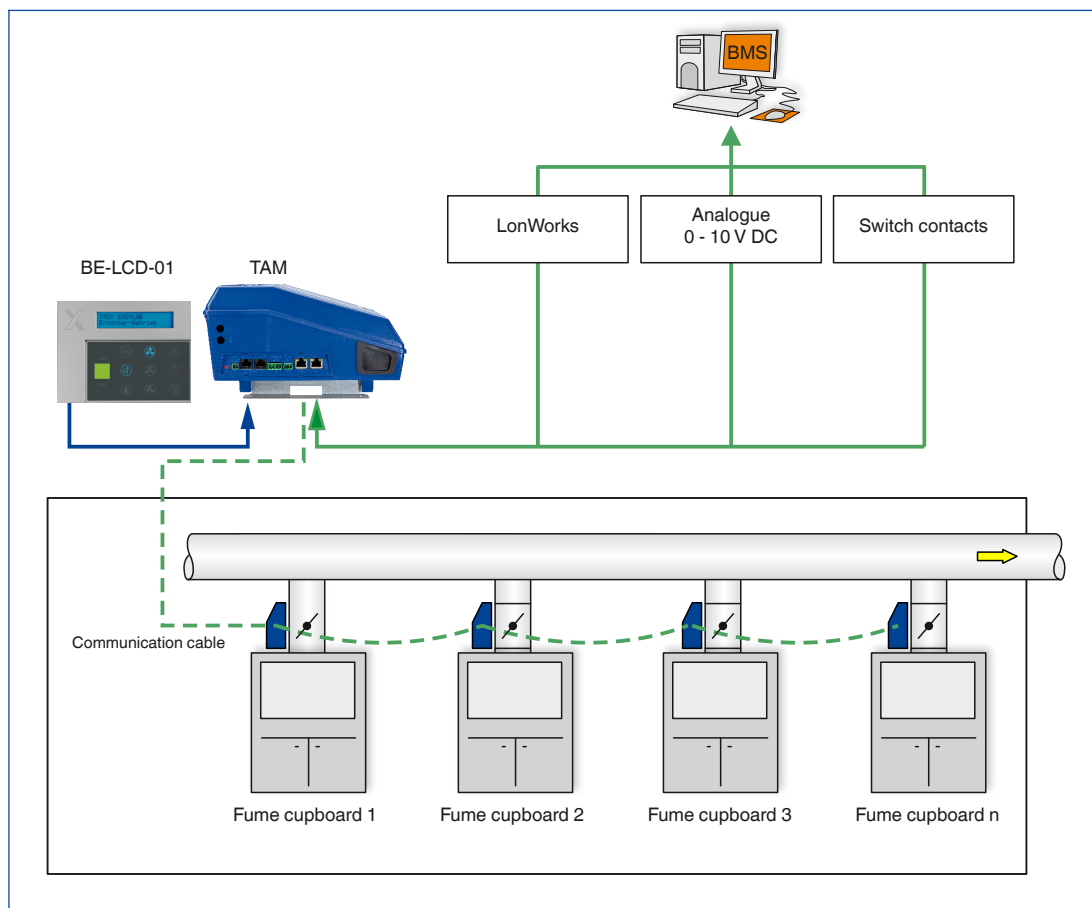
- Modbus RTU (EM-BAC-MOD-01)
- BACNET-IP (EM-IP)
- Modbus-IP (EM-IP)
- Webserver (EM-IP)

The following operating values and fault messages of the adapter module are transferred via the network:

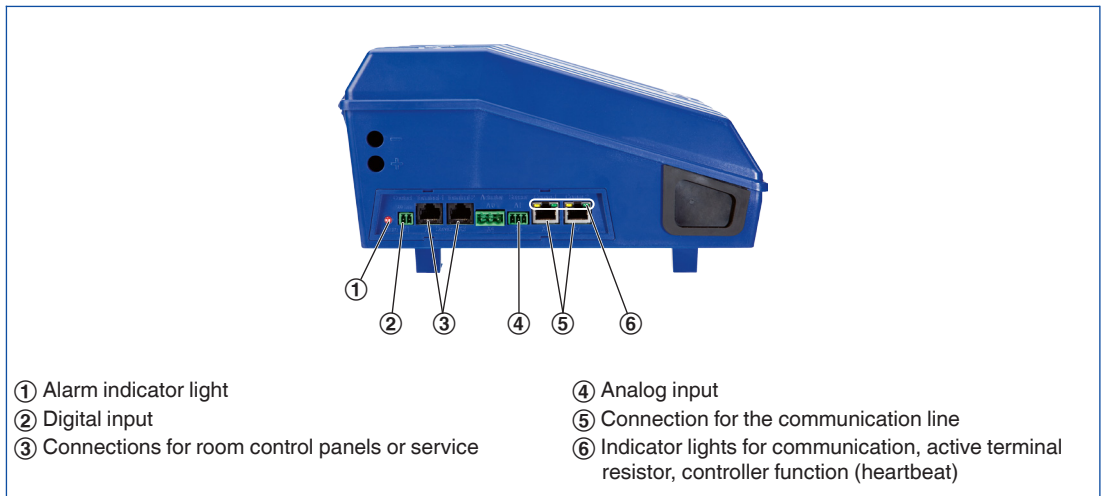
- Alarm state
- Switching state of the digital inputs and outputs
- Number of controllers within the EASYLAB system
- Total extract air flow rates and/or total supply air flow rates
- Evaluated damper blade positions within the system

In addition, extract air or supply air volume flows can be permanently integrated into the room balance.

## TAM interfaces



Connections and status displays – TAM



**Installation and commissioning**

- Use the angle bracket to fix the casing in a switch cabinet or to a wall or ceiling
- Connect communication line and activate terminal resistors at both ends
- Component addressing and network management tool are not required
- If necessary, make adjustments using the EasyConnect configuration software

## Control panel features

- Push buttons and functions can be configured individually
- Easy to use – available function buttons are visible, unavailable function buttons are not visible
- Buttons for available functions are blue
- Buttons for active functions are white

- Integral service socket for configuration and diagnosis of the controller

## BE-LCD-01

- Display of actual values, setpoint values, and status messages as text
- Text displays in several languages

## EASYLAB control panel BE-LCD-01, display and control elements

