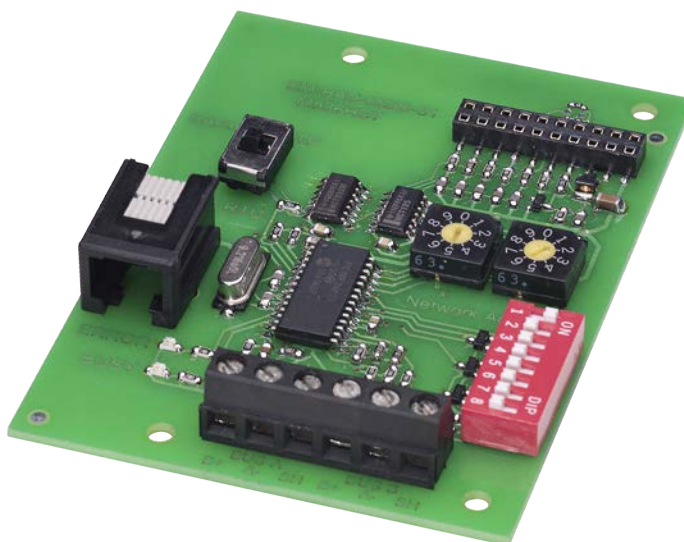




Expansion module

EM-BAC-MOD-01

Description of data points for BACnet/MS/TP or
Modbus RTU interface for EASYLAB/TROX UNIVERSAL
Firmware from 4.1 onwards



Read the instructions prior to performing any task!

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About this manual

The expansion module EM-BAC-MOD is used to integrate the following devices into a BACnet (MS/TP) or a Modbus (RTU) network and in this way connect them to the central BMS:

- EASYLAB controller TCU3
- EASYLAB adapter modules TAM
- TROX UNIVERSAL CONTROLLER

This configuration manual is an addition to the installation manual and contains information on how to configure EM-BAC-MOD as an interface to the central BMS.

Illustrations in this manual are mainly for information and may differ from the actual design of EM-BAC-MOD.

Other applicable documentation

In addition to these instructions, the following documents apply:

- Installation manual for expansion module EM-BAC-MOD
- Documentation on
 - EASYLAB controller TCU3
 - Adapter module TAM
 - TROX UNIVERSAL CONTROLLER
- Project-specific wiring documents, if any

TROX Technical Service

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

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

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- Non-compliance with this manual
- Incorrect use
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- Unauthorised modifications
- Technical changes
- Use of non-approved replacement parts

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1 Security

Safety notes

Symbols are used in this manual to alert readers to areas of potential hazard. Signal words express the degree of the hazard.

DANGER!

Imminently hazardous situation which is due to live components and which, if not avoided, will result in death or serious injury due to electrical voltage.

DANGER!

Imminently hazardous situation which, if not avoided, will result in death or serious injury.

NOTICE!

Potentially hazardous situation which, if not avoided, may result in property damage.

ENVIRONMENT!

Environmental pollution hazard.

1.1 Correct use

Expansion module EM-BAC-MOD provides a BACnet MS/TP or Modbus RTU interface for EASYLAB base components as well as for the TROX UNIVERSAL CONTROLLER.

Use the expansion module for the following devices:

- EASYLAB controller TCU3
- EASYLAB adapter module TAM
- TROX UNIVERSAL CONTROLLER

1.1.1 Incorrect use

Do not use the expansion module for areas of application that are not described in this manual.

Do not use the expansion module:

- outdoors
- in wet areas
- in areas with potentially explosive atmospheres

Residual risks

Failure of the network interface does not affect the control function of the volume flow controller but does affect data exchange with the central BMS. Safety-related applications require further precautions.

1.2 Safety signs

The following symbols and signs are usually found in the work area. They apply to the very location where they are found.

Electrical voltage



Location where a hazard due to electrical voltage exists.

Earthing



This symbol marks all equipotential bonding connection points on EM-BAC-MOD.

1.3 Residual risks

EM-BAC-MOD is a state-of-the-art product and meets current safety requirements. Residual risks cannot be excluded, however, and you should proceed with caution.

Always observe the safety notes in this manual to reduce health hazards and prevent any hazardous situations.

Electric current

DANGER!

Danger of death due to electric current!

Danger of death if live components are touched.

- Switch off the supply voltage and secure it against being switched on again before working on the unit.
- Only skilled qualified electricians are allowed to work on live components.
- Equipotential bonding is required.

1.4 Risk of damage to property

Temperature differences

! NOTICE!

Risk of damage to property due to large temperature differences

If EM-BAC-MOD has been kept in an unheated area, condensation may form and damage the electronic components beyond repair.

- Let EM-BAC-MOD warm up to room temperature before you install it.

Electrostatic charge

! NOTICE!

Risk of damage to property due to electrostatic charge

Electrostatic charge can damage the electronics of the expansion module.

- Before you remove the expansion module from its protective wrapping, touch an equipotentially bonded metal surface, e.g. a water pipe, for electrical earthing.
- Avoid skin contact with any components or printed circuits on the expansion module or the main PCB.
- Wear conductive footwear and antistatic clothing.

1.5 System owner's responsibility

System owner's obligations

EM-BAC-MOD is intended for commercial use. The system owner is therefore subject to the legal obligations of occupational health and safety regulations.

In addition to the safety notes in this manual, the applicable regulations for safety, accident prevention and environmental protection must also be complied with.

1.6 Qualified staff

Qualification

The work described in this manual has to be carried out by individuals with the qualification, training, knowledge and experience described below:

Network administrator

Network administrators design, install, configure and maintain the IT infrastructure in companies or organisations.

Any work has to be carried out by individuals who can be expected to carry out their assigned duties reliably. Individuals whose reaction time is delayed due to alcohol, drugs or other medication must not carry out any work.

1.7 Environmental protection

The following substances and materials which are hazardous to the environment are used:

Electrical and electronic parts

Electrical and electronic parts may contain toxic materials and substances. These parts have to be disposed of separately from other waste, i.e. taken to your local reuse and recycling centre or disposed of by a specialist disposal company.

Batteries

Batteries contain toxic heavy metals. They are hazardous waste and must be taken to a hazardous waste collection point or disposed of by a specialist company.

2 Configuration

Before you use EM-BAC-MOD as a BACnet or Modbus interface module, you have to configure it to the actual application. To do so, use the switches on the interface module.

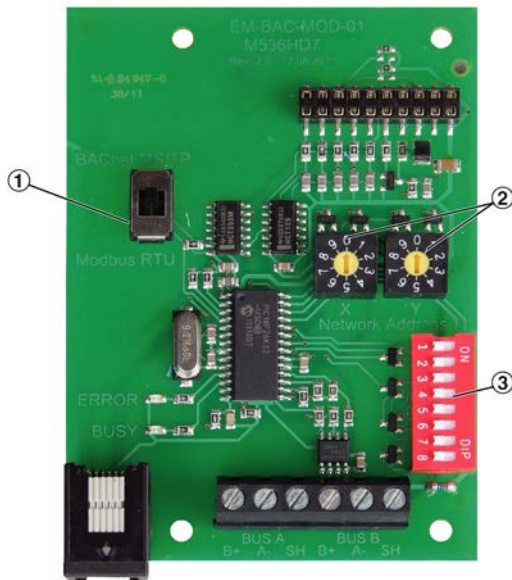


Fig. 1: EM-BAC-MOD

- ① Switch to select BACnet MS/TP or Modbus RTU protocol
- ② Switches to set the network addresses, 01-99
- ③ DIP switch to set communication parameters

Setting the protocol type

- 1. ▶ Use the slide switch ① to set the BACnet MS/TP or Modbus RTU protocol.

Setting the network address

- 2. ▶ Use the two address code switches X and Y ② to set a network address (01 to 99). Address 00 is reserved for broadcast mode.

A maximum of 32 devices (network addresses) can be operated on one network segment. **Caution:** a different network address must be set for every device.

Setting the device family

- 3. ▶ If the device is to be used with an EASYLAB/ TROX UNIVERSAL controller or a adapter module TAM, use the DIP switch ③ to set switch S1 to Off.

Communication parameters

- 4. ▶ Use the DIP switch ③ to set the following parameters:

S2 + S3 - Transmission speed EIA-485

S5 + S6 - Parity

S8 - Terminal resistor

Ask the responsible specialist consultant for the values to be set.

Setting the transmission speed for BACnet

BACnet	S2	S3
9600 Bd	Off	Off
19200 Bd	On	Off
38400 Bd	Off	On
76800 Bd	On	On

Setting the transmission speed for Modbus

Modbus	S2	S3
9600 Bd	Off	Off
19200 Bd	On	Off
38400 Bd	Off	On
57600 Bd	On	On

Setting parity

Parity	S5	S6
None	Off	Off
None	On	Off
Odd	Off	On
Even	On	On

Terminal resistor for EIA-485 network from rev. 2

Terminal resistor	S8
Disabled	Off
Enabled	On

3 Commissioning

Personnel:

- Network administrator

Once you have set the configuration switch to adapt EM-BAC-MOD to the network, the controller and the network can be commissioned.

Commissioning a BACnet or Modbus network requires specialist knowledge as well as special network adapters and software. Only specialist personnel should do the commissioning.

3.1 Required TCU3 software version

The expansion module EM-BAC-MOD with firmware 4.1 requires the following software versions:

- EASYLAB or adapter module TAM
 - Software version 8.0 or higher
- TROX UNIVERSAL CONTROLLER
 - Software version 2.1 or higher

The software version is displayed in the EasyConnect software, 'Diagnosis', 'Basic Device' line.

A product sticker on the main PCB also carries the software version number (only for version 3 or higher).

With earlier software versions there is no data exchange between the expansion module EM-BAC-MOD and controller. This means that the network is not able to read out current values from the controller or to send any values.



You need not adapt the controller configuration with the EasyConnect configuration software for the expansion module to work.

4 Interface information

4.1 BACnet interface

Application

The expansion module EM-BAC-MOD supports the following BACnet interface functions in the BACnet protocol settings:

- Native BACnet, i.e. the BACnet interface is implemented on the field module (EASYLAB volume flow controller)
- External hardware components such as physical gateways are not required
- BACnet interface documentation includes the following documents: Protocol Implementation Conformance Statement (PICS), BACnet Interoperability Building Blocks Supported (BIBBS), as well as a description of the device object and the supported objects

Abbreviations

EASYLAB:

FH - Fume cupboard controller

RR - Room controller for supply air or extract air (RS, RE, PC)

RR RMF - Room controller with active room management function

EC, SC - Single controller for supply air or extract air (EC, SC)

TAM - Adapter module

TAM RMF - Adapter module with active room management function

WR - Defaults for the volume flow controller or room, from the central BMS

RD - Data provided by the volume flow controller or room

TROX UNIVERSAL CONTROLLER:

RS/RE - Volume flow controllers for supply or extract air

RS/RE RMF - Volume flow controller with active room management function

PR*/PD* - Room pressure controller or duct for supply or extract air

PR*/PD* RMF - Room pressure controller or duct with active room management function

BACnet PICS (Protocol Implementation Conformance Statement) – Overview

Principal categories	Values
Date	2019-04-03
Vendor name	TROX GmbH
Vendor identifier	329
Product name	EM-BAC-MOD
Model no.	M536HD7
Application	4.1
Firmware Revision	4.1
BACnet Protocol Revision	12
Standardised Device Profile	BACnet Application Specific Controller (B-ASC)
Segmentation Capability	No
Data Link Layer Options	MS/TP master (Clause 9), Baudrates 9600, 19200, 38400, 76800
Device Address Binding	No
Network Security Options	Non-secure device – capable of operating without BACnet network security
Character Sets Supported	ISO 10646 (UTF-8)

Configuration switches

Hexadecimal Switches X, Y	Network address			
DIP Switch 1	OFF	ON		
Controller	EASYLAB TCU3	Other		
DIP Switch 2	OFF	ON	OFF	ON
DIP Switch 3	OFF	OFF	ON	ON
Baud rate	9600	19200	38400	76800

BIBBS - BACnet Interoperability Building Blocks Supported

Data Sharing-ReadProperty-B	DS-RP-B
Data Sharing-WriteProperty-B	DS-WP-B
Data Sharing-COV-Unsolicited-B	DS-COVU-B
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-ReinitialiseDevice-B	DM-RD-B

DeviceObject

Property	Value	Access
Object identifier	Device instance; default instance = 32900 + set network address	WR, RD; E
Object name	Default="EM-BACnet"; project-specific description can be entered, 62 characters max.	WR, RD; E
Object type	Device (8)	RD
System_Status	OPERATIONAL (0)	RD
Vendor_Name	"TROX GmbH"	RD
Vendor_Identifier	329	RD
Model_Name	"EM-BAC-MOD"	RD
Description	Default = "EASYLAB"; description can be entered, 126 characters max.	WR, RD; E
Location	Default = ""; description can be entered, 62 characters max.	WR, RD; E
Firmware_Revision	"4.1" (EASYLAB)	RD
Application_Software_Version	"4.1" (EASYLAB)	RD
Protocol_Version	1	RD
Protocol_Revision	12	RD
Protocol Services Supported	Who-is, who-has, read-property, write-property, device-communication-control, reinitialise-device	RD

Property	Value	Access
Protocol_Object_Types_Supported	DEVICE, ANALOG_VALUE, BINARY_VALUE, MULTI-STATE_VALUE	RD
Object_List	EASYLAB: device, analogue-value 1...36, binary-value 1...30, multistate-value 1...8	RD
Max_ADPU_Length_Accepted	480	RD
Segmentation_Supported	NO_SEGMENTATION (3)	RD
APDU_Timeout	10000	RD
Number_Of_APDU_Retries	3	RD
Device_Address_Binding	-	RD
Database_Revision	0	RD
Description	Controller Type "EASYLAB"	RD
Max_Master	Default 127	WR, RD; E
Max_Info_Frames	Default 1	WR, RD; E

Multistate Value Objects

Instance	Description	Unit										Access	Support COV
		TCU3				TAM		TROX UNIVERSAL					
		Available with equipment function											
		FH	RR	RR RMF	EC, SC	TAM	TAM RMF	RS/RE	RS/RE RMF	PR*/PD*	PR*/PD* RMF		
1	COVU mode	x	x	x	x	x	x		x		x	WR, RD	N
2	Mode	x ¹		x			x		x		x	WR, RD	
3	ModeAct	x	x	x	x				x		x	RD	N
4	RoomModeAct			x			x	x	x	x	x	RD	N
5	SwitchPos	x										RD	N
6	Sunblind			x			x		x		x	WR, RD	N
7	SC_SetLock-HighPrio	not used											
8	SC_GetLock-HighPrio	not used											

¹ only for individually selected operating mode (stand-alone operation)

Abbreviations ↪ on page 9

Analogue Value Objects

Instance	Description	Unit	Unit										Access	Support COV
			TCU3				TAM		TROX UNIVERSAL					
			Available with equipment function											
			FH	RR	RR RMF	EC, SC	TAM	TAM RMF	RS/RE	RS/RE RMF	PR*/PD*	PR*/PD* RMF		
1	VolflowSet	l/s (87)	x	x	x	x		x	x	x			RD	N
2	VolflowAct	l/s (87)	x	x	x	x		x	x	x	x	x	RD	N
3	VolTotalExh	l/s (87)	x	x	x	x	x	x	x	x	x	x	RD	N
4	VolTotalSup	l/s (87)	x	x	x	x	x	x	x	x	x	x	RD	N
5	PressSet	pa (53)			x			x			x	x	RD	N
6	PressAct	pa (53)			x			x			x	x	RD	N
7	VelocitySet	m/s (74)	x										RD	N
8	VelocityAct	m/s (74)	x										RD	N
9	WireSensorPos	% (98)	x										RD	N
10	DampPos	% (98)	x	x	x	x			x	x	x	x	RD	N
11	Damp-PosMax_FH	% (98)	x	x	x	x	x	x					RD	N
12	Damp-PosMin_FH	% (98)	x	x	x	x	x	x					RD	N
13	Damp-PosMax_RE	% (98)	x	x	x	x	x	x	x	x	x	x	RD	N
14	Damp-PosMin_RE	% (98)	x	x	x	x	x	x	x	x	x	x	RD	N
15	Damp-PosMax_TE	% (98)	x	x	x	x	x	x	x	x	x	x	RD	N
16	Damp-PosMin_TE	% (98)	x	x	x	x	x	x	x	x	x	x	RD	N
17	Damp-PosMax_RS	% (98)	x	x	x	x	x	x	x	x	x	x	RD	N
18	Damp-PosMin_RS	% (98)	x	x	x	x	x	x	x	x	x	x	RD	N
19	VolOffset_T	% (98)			x			x					WR, RD	N
20	VolOffset_P	% (98)			x			x					WR, RD	N

Abbreviations  on page 9

Instanc e	Description	Unit	Unit											Acc- ess	Sup- port COV
			TCU3				TAM		TROX UNIVERSAL						
			Available with equipment function												
			FH	RR	RR RMF	EC, SC	TAM	TAM RMF	RS/ RE	RS/RE RMF	PR*/ PD*	PR*/PD* RMF			
21	SystemDe- vices	– (95)	x	x	x	x	x	x	x	x	x	x	x	RD	N
22	VolflowExh	l/s (87)	x	x	x		x	x	x	x	x	x	x	WR, RD	N
23	VolflowSup	l/s (87)	x	x	x		x	x	x	x	x	x	x	WR, RD	N
24	SC_SetPos	% (98)	not used												
25	SC_GetPos	% (98)	not used												
26	Damp- PosMax_EC	% (98)	x	x	x	x	x	x						RD	N
27	Damp- PosMin_EC	% (98)	x	x	x	x	x	x						RD	N
28	Damp- PosMax_SC	% (98)	x	x	x	x	x	x						RD	N
29	Damp- PosMin_SC	% (98)	x	x	x	x	x	x						RD	N
30	Damp- PosMax_TS	% (98)	x	x	x	x	x	x						RD	N
31	Damp- PosMin_TS	% (98)	x	x	x	x	x	x						RD	N
32	VolflowSet_R	l/s (87)									x		x	WR, RD	N
33	PressSet_R	pa (57)										x	x	WR, RD	N
34	Volt_AI2	volt (5)	x	x	x	x	x	x						RD	N
35	Volt_AI3	volt (5)	x	x	x	x	x	x						RD	N
36	Volt_AO2	volt (5)	x	x	x	x	x	x						WR, RD	N

Abbreviations ↪ on page 9

Binary Value Objects

In-stance	Description	Unit										Access	Support COV
		TCU3				TAM		TROX UNIVERSAL					
		Available with equipment function											
		FH	RR	RR RMF	EC, SC	TAM	TAM RMF	RS/RE	RS/RE RMF	PR*/PD*	PR*/PD* RMF		
1	LocalAlarm (COVU)	x	x	x	x	x	x	x	x	x	x	RD	
2	SummaryAlarm (COVU)			x			x	x	x	x	x	RD	
3	PressAlarm (COVU)			x			x	x	x	x	x	RD	
4	ManOP_Disable	x ¹		x			x		x		x	WR, RD	
5	PressSetSel			x			x					WR, RD	
6	DI1	x	x	x	x	x	x	x	x	x	x	RD	
7	DI2	x	x	x	x	x	x	x	x	x	x	RD	
8	DI3	x	x	x	x	x	x	x	x	x	x	RD	
9	DI4	x	x	x	x	x	x	x	x	x	x	RD	
10	DI5	x	x	x	x	x	x	x	x	x	x	RD	
11	DI6	x	x	x	x	x	x	x	x	x	x	RD	
12	DO1	x	x	x	x	x	x	x	x	x	x	RD	
13	DO2	x	x	x	x	x	x	x	x	x	x	RD	
14	DO3	x	x	x	x	x	x	x	x	x	x	RD	
15	DO4	x	x	x	x	x	x	x	x	x	x	RD	
16	DO5	x	x	x	x	x	x	x	x	x	x	RD	
17	DO6	x	x	x	x	x	x	x	x	x	x	RD	
18	SC_Alarm	not used											
19	DO1_Set	x	x	x	x	x	x	x	x	x	x	WR, RD	
20	DO2_Set	x	x	x	x	x	x	x	x	x	x	WR, RD	
21	DO3_Set	x	x	x	x	x	x	x	x	x	x	WR, RD	
22	DO4_Set	x	x	x	x	x	x	x	x	x	x	WR, RD	
23	DO5_Set	x	x	x	x	x	x	x	x	x	x	WR, RD	
24	DO6_Set	x	x	x	x	x	x	x	x	x	x	WR, RD	

¹ only for individually selected operating mode (stand-alone operation)

Abbreviations ↗ on page 9

In-stance	Description	Unit										Access	Support COV
		TCU3				TAM		TROX UNIVERSAL					
		Available with equipment function											
		FH	RR	RR RMF	EC, SC	TAM	TAM RMF	RS/RE	RS/RE RMF	PR*/PD*	PR*/PD* RMF		
25	DO1_SetBy-Local	x	x	x	x	x	x	x	x	x	x	RD	
26	DO2_SetBy-Local	x	x	x	x	x	x	x	x	x	x	RD	
27	DO3_SetBy-Local	x	x	x	x	x	x	x	x	x	x	RD	
28	DO4_SetBy-Local	x	x	x	x	x	x	x	x	x	x	RD	
29	DO5_SetBy-Local	x	x	x	x	x	x	x	x	x	x	RD	
30	DO6_SetBy-Local	x	x	x	x	x	x	x	x	x	x	RD	

¹ only for individually selected operating mode (stand-alone operation)

Abbreviations ↗ on page 9

4.2 Modbus interface

Application

The expansion module EM-BAC-MOD supports the following Modbus interface functions in the Modbus protocol settings:

- Modbus is an open serial master-slave communication protocol which has become a de facto standard for the industry
- The master (e.g. central BMS) can address a number of slaves (EASYLAB volume flow controllers) and use Modbus functions to request information from individual data points
- Data access is based on numbered data registers which the master has to define in order to request data using Modbus functions
- The slave responds by either returning the requested information or an exception code (error)
- Example: The `Read Holding Registers` function (register no. 3) returns the volume flow rate actual value of the addressed controller
- General information for a Modbus device can be read out using the `Read Device Identification` function

- RR RMF - Room controller with active room management function
- EC, SC - Single controller for supply air or extract air (EC, SC)
- TAM - Adapter module
- TAM RMF - Adapter module with active room management function
- WR - Defaults for the volume flow controller or room, from the central BMS
- RD - Data provided by the volume flow controller or room

TROX UNIVERSAL CONTROLLER:

- RS/RE - Volume flow controllers for supply or extract air
- RS/RE RMF - Volume flow controller with active room management function
- PR*/PD* - Room pressure controller or duct for supply or extract air
- PR*/PD* RMF - Room pressure controller or duct with active room management function

Abbreviations

EASYLAB:

- FH - Fume cupboard controller
- RR - Room controller for supply air or extract air (RS, RE, PC)

Modbus functions

Function no.	Designation	Meaning
1 (0x01)	Read Coils	Read states of 1 to 8 bits according to bit list
3 (0x03)	Read Holding Registers	Read several consecutive registers
4 (0x04)	Read Input Registers	Read several consecutive registers
5 (0x05)	Write Single Coil	Write state of a single bit
6 (0x06)	Write Single Register	Write single register
8 (0x08)	Diagnostics	Check Modbus communication
16 (0x10)	Write Multiple Registers	Write several consecutive registers
43 (0x2B)	Read Device Identification	Read identification data for the device
14 (0x0E)	Read Device Identification	Read identification data for the device

Exception codes

Codes	Designation	Meaning
1	Illegal Function Code	Unknown function or subfunction code
2	Illegal Data Address	Invalid register address
3	Illegal Data Value	Inconsistent coding for number of registers/bytes, data value

Exception codes (error codes) are returned in case of invalid function or register access.

Register list for Read*Registers and Write***Registers functions**

Register		Unit										Access	Support COV
		TCU3				TAM		TROX UNIVERSAL					
		Available with equipment function											
No.	Description	FH	RR	RR-RMF	EC, SC	TAM	TAM-RMF	RS/RE	RS/RE RMF	PR*/PD*	PR*/PD* RMF		
0	Mode	x ¹		x			x		x		x	WR	N
1	ManOP_Disable	x ¹		x			x		x		x	WR	N
2	ModeAct	x	x	x	x				x		x	RD	N
3	VolflowAct	x	x	x	x			x	x	x	x	RD	N
4	VolflowSet	x	x	x	x			x	x			RD	N
5	VelocityAct	x										RD	N
6	VelocitySet	x										RD	N
7	VolTotalExh	x	x	x	x	x	x	x	x	x	x	RD	N
8	VolTotalSup	x	x	x	x	x	x	x	x	x	x	RD	N
9	VolOffset_T			x			x					WR	N
10	VolOffset_P			x			x					WR	N
11	PressAct			x			x			x	x	RD	N
12	PressSet			x			x			x	x	RD	N
13	PressSetSel			x			x					WR	N
14	DampPos	x	x	x	x			x	x	x	x	RD	N
15	Damp-PosMax_FH - Value	x	x	x	x	x	x					RD	N
16	Damp-PosMax_FH - Status	x	x	x	x	x	x					RD	N
17	Damp-PosMin_FH - Value	x	x	x	x	x	x					RD	N

¹ only for individually selected operating mode (stand-alone operation)

Abbreviations ↪ 'Abbreviations' on page 9

Modbus interface

Register		Unit										Access	Support COV
		TCU3				TAM		TROX UNIVERSAL					
		Available with equipment function											
No.	Description	FH	RR	RR-RMF	EC, SC	TAM	TAM-RMF	RS/RE	RS/RE RMF	PR*/PD*	PR*/PD* RMF		
18	Damp-PosMin_FH - Status	x	x	x	x	x	x					RD	N
19	Damp-PosMax_RE - Value	x	x	x	x	x	x	x	x	x	x	RD	N
20	Damp-PosMax_RE - Status	x	x	x	x	x	x	x	x	x	x	RD	N
21	Damp-PosMin_RE - Value	x	x	x	x	x	x	x	x	x	x	RD	N
22	Damp-PosMin_RE - Status	x	x	x	x	x	x	x	x	x	x	RD	N
23	Damp-PosMax_TE - Value	x	x	x	x	x	x	x	x	x	x	RD	N
24	Damp-PosMax_TE - Status	x	x	x	x	x	x	x	x	x	x	RD	N
25	Damp-PosMin_TE - Value	x	x	x	x	x	x	x	x	x	x	RD	N
26	Damp-PosMin_TE - Status	x	x	x	x	x	x	x	x	x	x	RD	N
27	Damp-PosMax_RS - Value	x	x	x	x	x	x	x	x	x	x	RD	N
28	Damp-PosMax_RS - Status	x	x	x	x	x	x	x	x	x	x	RD	N
29	Damp-PosMin_RS - Value	x	x	x	x	x	x	x	x	x	x	RD	N
30	Damp-PosMin_RS - Status	x	x	x	x	x	x	x	x	x	x	RD	N
31	LocalAlarm	x	x	x	x	x	x	x	x	x	x	RD	Y
32	SummaryAlarm			x			x	x	x	x	x	RD	Y
33	PressAlarm			x			x	x	x	x	x	RD	Y

¹ only for individually selected operating mode (stand-alone operation)

Abbreviations ↪ 'Abbreviations' on page 9

Register		Unit										Access	Support COV
		TCU3				TAM		TROY UNIVERSAL					
		Available with equipment function											
No.	Description	FH	RR	RR-RMF	EC, SC	TAM	TAM-RMF	RS/RE	RS/RE RMF	PR*/PD*	PR*/PD* RMF		
34	WireSensorPos	x										RD	N
35	SwitchPos	x										RD	N
36	RoomModeAct			x			x	x	x	x	x	RD	N
37	SystemDevices	x	x	x	x	x	x	x	x	x	x	RD	N
38	SunBlind			x			x		x		x	WR	N
39	StateDI	x	x	x	x	x	x	x	x	x	x	RD	N
40	StateDO	x	x	x	x	x	x	x	x	x	x	RD	N
41	VolflowExh	x	x	x		x	x	x	x	x	x	WR	N
42	VolflowSup	x	x	x		x	x	x	x	x	x	WR	N
43	SC_SetLockHigh-Prio	not used											
44	SC_GetLockHigh-Prio	not used											
45	SC_SetPos - Value	not used											
46	SC_SetPos - Status	not used											
47	SC_GetPos	not used											
48	SC_Alarm	not used											
49	DampPosMax_EC - Value	x	x	x	x	x	x					RD	N
50	DampPosMax_EC - Status	x	x	x	x	x	x					RD	N
51	DampPosMin_EC - Value	x	x	x	x	x	x					RD	N
52	DampPosMin_EC - Status	x	x	x	x	x	x					RD	N
53	DampPosMax_SC - Value	x	x	x	x	x	x					RD	N
54	DampPosMax_SC - Status	x	x	x	x	x	x					RD	N
55	DampPosMin_SC - Value	x	x	x	x	x	x					RD	N
56	DampPosMin_SC - Status	x	x	x	x	x	x					RD	N
57	DampPosMax_TS - Value	x	x	x	x	x	x					RD	N

¹ only for individually selected operating mode (stand-alone operation)

Abbreviations ↪ 'Abbreviations' on page 9

Modbus interface

Register		Unit										Access	Support COV
		TCU3				TAM		TROX UNIVERSAL					
		Available with equipment function											
No.	Description	FH	RR	RR-RMF	EC, SC	TAM	TAM-RMF	RS/RE	RS/RE RMF	PR*/PD*	PR*/PD* RMF		
58	DampPosMax_TS - Status	x	x	x	x	x	x					RD	N
59	DampPosMin_TS - Value	x	x	x	x	x	x					RD	N
60	DampPosMin_TS - Status	x	x	x	x	x	x	x	x	x	x	RD	N
61	DO_Set	x	x	x	x	x	x	x	x	x	x	WR	N
62	DO_SetByLocal	x	x	x	x	x	x	x	x	x	x	RD	N
63	VolfowSet_R								x		x	WR, RD	N
64	PressSet_R									x	x	WR, RD	N
65	Volt_AI2	x	x	x	x	x	x					RD	N
66	Volt_AI3	x	x	x	x	x	x					RD	N
67	Volt_AO2	x	x	x	x	x	x					WR, RD	N

¹ only for individually selected operating mode (stand-alone operation)

Abbreviations ↪ 'Abbreviations' on page 9

4.3 Data points – detailed description

The following is a detailed description of the information that each data point provides; input variables and output variables are described separately:

- Name of data point
- Access as viewed from the central BMS
 - WR – Defaults for the volume flow controller or room, from the central BMS
 - RD – Data provided by the volume flow controller or room
- List of volume flow controller equipment functions for which the variable is available
 - FH – Fume cupboard controller
 - RR – Room controller for supply air or extract air (RS, RE, PC)
 - RR RMF – Room controller with active room management function
 - EC, SC – Single controller for supply air or extract air (EC, SC)
 - TAM – Adapter module
 - TAM RMF – Adapter module with active room management function
- Unit of measure (applies only to BACnet objects of type Analogue Value Object)
- Function and special functional values with their meaning
- Access to the data point using a BACnet object or Modbus register

TROX UNIVERSAL CONTROLLER:

RS/RE	- Volume flow controllers for supply or extract air
RS/RE RMF	- Volume flow controller with active room management function
PR*/PD*	- Room pressure controller or duct for supply or extract air
PR*/PD* RMF	- Room pressure controller or duct with active room management function

4.3.1 Input variables

COVO mode (only BACnet)

BMS access: WR RD

Equipment function: FH, RR, RR with RMF, EC, SC, TAM, TAM with RMF

Function

- BACnet control function used to indicate how unsolicited Change of Value notifications (COVU), that are used to mark some Binary Value Objects, should be sent

Data point

- BACnet: Multistate Value Object - Instance 1
 - 1 = no broadcast
 - 2 = local broadcast (only local in the MS/TP network of EM-BAC-MOD)
 - 3 = global broadcast (in all networks)

MODE

BMS access: WR RD

Equipment function:

- EASYLAB
 - FH, RR with RMFM, TAM with RMF
- TROX UNIVERSAL
 - RE/RS with RMF, PR*/PD* with RMF

Function

- FH: Operating mode default setting for a single fume cupboard controller, only with individual operating mode default setting (stand-alone operation)
- RMF: Operating mode default setting for the entire room



- *The valid binding of the input variable results in a valid operating mode default setting via BACnet or Modbus*
- *The invalid binding or no setting does not lead to any operating mode default setting in the controller or room.*
- *Which operating mode is then used depends on the default options available on the controller*

Functional values (BACnet / Modbus)

- 1/0 = No default: The central BMS does not default an operating mode for the controller or room. The operating mode is set locally, e.g. on the room control panel, on the fume cupboard control panel, or using switch contacts.
If the operating mode is not set locally, the controller activates standard mode.
- 2/1 = Standard mode: Normal operation in the day-time (in Germany: usually according to DIN 1946, part 7, 25 m³/h extract air per m² main useful floor area)
- 3/2 = Reduced operation: Low mode in comparison to standard mode, e.g. as a night-time setback
- 4/3 = Increased operation: High mode in comparison to standard mode, e.g. in an emergency
- 5/4 = Shut-off: Shut-off of the volume flow controller, e.g. to save energy at night or to shut down the system
- 6/5 = OPEN position: Open position of the volume flow controller

Data point

- BACnet: Multistate Value Object – Instance 2
- Modbus: Register 0

Sunblind

BMS access: WR RD

Equipment function:

- EASYLAB
 - FH, RR with RMF, TAM with RMF
- TROX UNIVERSAL
 - RE/RS with RMF, PR*/PD* with RMF

Function

- Control input signal for shading, connected to the controller or adapter module
- Switch outputs DO5 and DO6 will be used
- This BACnet or Modbus default overrides any other defaults from the local room control panel

Data point

- BACnet: Multistate Value Object – Instance 6
 - 1 = No default
 - 2 = Close blinds (activate switch output DO6)
 - 3 = Open blinds (activate switch output DO5)
- Modbus: Register 38
 - 0 = Close blinds
 - 1 = Open blinds
 - 0xFF = No default

SC_SetLockHighPrio

Equipment function: not available

VolOffset_T

BMS access: WR RD

Equipment function:

- EASYLAB
 - RR with RMF, TAM with RMF
- TROX UNIVERSAL
 - not used

Unit/value range:

- BACnet: Percentage value in increments of 0.5 %
- Modbus: 0–200 (200 corresponds to 100 %)

Function

- Signalling of an external volume flow rate shift, e.g. for adjusting the room air change rate or for external temperature control
- The shift signal is transferred as a percentage value of a volume flow rate change range that has been configured in the controller

Data point

- BACnet: Analog Value Object – Instance 19
- Modbus: Register 9

VolOffset_P

BMS access: WR RD

Equipment function:

- EASYLAB
 - RR with RMF, TAM with RMF
- TROX UNIVERSAL
 - not used

Unit/value range:

- BACnet: Percentage value in increments of 0.5 %
- Modbus: 0–200 (200 corresponds to 100%)

Function

- Signalling of a flow rate setpoint shift for external differential pressure control
- The shift signal is transferred as a percentage value of a volume flow rate change range that has been configured in the controller

Data point

- BACnet: Analog Value Object – Instance 20
- Modbus: Register 10

VolflowExh

BMS access: WR RD

Equipment function:

- EASYLAB
 - FH, RR, RR with RMF, TAM, TAM with RMF
- TROX UNIVERSAL
 - RE/RS, RE/RS with RMF, PR*/PD*, PR*/PD* with RMF

Unit: l/s

Function

- Integration of an extract air flow into the room balance of the system
- This default volume flow is considered for all volume flow calculations (balance and setpoint values)

Data point

- BACnet: Analog Value Object – Instance 22
- Modbus: Register 41

VolflowSup

BMS access: WR RD

Equipment function:

- EASYLAB
 - FH, RR, RR with RMF, TAM, TAM with RMF
- TROX UNIVERSAL
 - RE/RS, RE/RS with RMF, PR*/PD*, PR*/PD* with RMF

Unit: l/s

Function

- Integration of a supply air flow into the room balance of the system
- This default volume flow is considered for all volume flow calculations (balance and setpoint values)

Data point

- BACnet: Analog Value Object – Instance 23
- Modbus: Register 42

SC_SetPos

Equipment function: not available

VolflowSet_R

BMS access: WR RD

Equipment function:

- EASYLAB
 - not used
- TROX UNIVERSAL
 - RE/RS, RE/RS with RMF, PR*/PD*, PR*/PD* with RMF

Unit: l/s

Function

- Default setting of volume flow rate setpoint (room), only for standard mode

Data point

- BACnet: Analog Value Object – Instance 32
- Modbus: Register 63

PressSet_R

BMS access: WR RD

Equipment function:

- EASYLAB
 - not used
- TROX UNIVERSAL
 - PR*/PD*, PR*/PD* with RMF

Unit: Pa

Function

- Local default setting of room pressure or duct pressure setpoint value

Data point

- BACnet: Analog Value Object – Instance 33
- Modbus: Register 64

Volt_AO2

BMS access: WR RD

Equipment function:

- EASYLAB
 - FH, RR, RR with RMF, EC, SC, TAM, TAM with RMF
- TROX UNIVERSAL
 - not used

Unit: V DC

Function

- Enabling/disabling manual control
- Upon enabling manual control the corresponding symbol appears on the control panel.
- Default setting of voltage for analogue output AO2
- 0 – 10 V DC, in increments of 0.1 V

Data point

- BACnet: Analog Value Object – Instance 36
- Modbus: Register 67

ManOp_Disable

BMS access: WR RD

Equipment function:

- EASYLAB
 - FH, RR with RMF, TAM with RMF
- TROX UNIVERSAL
 - RE/RS with RMF, PR*/PD* with RMF

Function

- Enabling/disabling manual control
- Upon enabling manual control the corresponding symbol appears on the control panel.



For further information on manual control please refer to the EASYLAB design manual.

- FH: Operating mode default setting for a fume cupboard controller, only with individual operating mode default setting (stand-alone operation)
- RMF: operating mode default setting for the entire room

Functional values

- 0: Manual control has been enabled on the control panel.
Operating mode defaults set on DI override BACnet or Modbus defaults.
- 1: Manual control has been disabled on the control panel.
Operating mode default settings from BACnet or Modbus have the highest priority.

Data point

- BACnet: Binary Value Object – Instance 4
- Modbus: Bit list - bit 0 or register 1

PressSetSel

BMS access: WR RD

Equipment function:

- EASYLAB
 - RR with RMF, TAM with RMF
- TROX UNIVERSAL
 - not used

Function

- Input for switching between two pressure set points when differential pressure control of the system is activated (setpoint values stored in the room management function).

Functional values

- 0: Use differential pressure setpoint 1
- 1: Use differential pressure setpoint 2

Data point

- BACnet: Binary Value Object – Instance 5
- Modbus: Bit list - bit 1 or register 13

DO*_Set (BACnet) / DO_Set (Modbus)

BMS access: WR RD

Equipment function:

- EASYLAB
 - FH, RR, RR with RMF, EC, SC, TAM, TAM with RMF
- TROX UNIVERSAL
 - RE/RS, RE/RS with RMF, PR*/PD*, PR*/PD* with RMF

Function

- Control input signal for unused switch outputs DO1 – DO6 of the controller or adapter module

Data point

- BACnet: Binary Value Object – Instance 19 (DO1_Set) – Instance 24 (DO6_Set)
 - 0 = output inactive
 - 1 = output active
- Modbus: Register 61 – bit 0 (DO1_Set) – bit 5 (DO6_Set)
 - Bit not set = output inactive
 - Bit set = output active

4.3.2 Output variables

ReadDeviceIdentification (only Modbus)

BMS access: RD

Equipment function: FH, RR, RR with RMF, EC, SC, TAM, TAM with RMF

Function

- Provides status information for the Modbus device

Data point

- BACnet : see Device Object description [↪ on page 10](#)
- Modbus: Device response
 - Byte 0: Slave Address 1-99
 - Byte 1: Function Code 0x2B
 - Byte 3: Read Device ID Code 0x01
 - Byte 4: Conformity Level 0x01
 - Byte 5: More Follows 0x00
 - Byte 6: Next Object ID 0x00
 - Byte 7: Number of Objects 0x03
 - Byte 8: ID: VendorName 0x00
 - Byte 9: Obj-Length 9
 - Byte 10-18: Obj-Value "TROX GmbH"
 - Byte 19 ID: ProductCode 0x01
 - Byte 20: Obj-Length 23
 - Byte 21-43: Obj-Value "EM-BAC-MOD - EASYLAB"
 - Byte 44 ID: MajMinRevision 0x02
 - Byte 45: Obj-Length 4
 - Byte 46-49: Obj-Value "V3.0"

ModeAct

BMS access: RD

Equipment function:

- EASYLAB
 - FH, RR, RR with RMF, EC, SC
- TROX UNIVERSAL
 - RE/RS with RMF, PR*/PD* with RMF

Function

- Output of the operating mode of the volume flow controller



For more information on each operating mode see the description of the 'Mode' input variable [↪ Chapter 4.3.1 'Input variables' on page 21](#) .

Functional values (BACnet / Modbus)

- 1/0 = No default
- 2/1 = Standard mode
- 3/2 = Reduced operation
- 4/3 = Increased operation
- 5/4 = Shut-off
- 6/5 = OPEN position

Data point

- BACnet: Multistate Value Object – Instance 3
- Modbus: Register 2

RoomModeAct

BMS access: RD

Equipment function:

- EASYLAB
 - RR with RMF, TAM with RMF
- TROX UNIVERSAL
 - RE/RS, RE/RS with RMF, PR*/PD*, PR*/PD* with RMF

Function

- Output of the room operating mode



For more information on each operating mode see the description of the 'Mode' input variable

Functional values (BACnet / Modbus)

- 1/0 = No default
- 2/1 = Standard mode
- 3/2 = Reduced operation
- 4/3 = Increased operation
- 5/4 = Shut-off
- 6/5 = OPEN position

Data point

- BACnet: Multistate Value Object – Instance 4
- Modbus: Register 36

SwitchPos

BMS access: RD

Equipment function:

- EASYLAB
 - FH
- TROX UNIVERSAL
 - not used

Function

- Output of the current switching step of the fume cupboard as a numeric value if the fume cupboard controller is equipped with switch contacts for 2-point or 3-point control (FH2P, FH-3P)

Data point

- BACnet:
 - Multistate Value Object – Instance 5
 - 1 = invalid state
 - 2 = switching step 1
 - 3 = switching step 2
 - 4 = switching step 3
- Modbus:
 - Register 35
 - 0 = invalid state
 - 1 = switching step 1
 - 2 = switching step 2
 - 3 = switching step 3

SC_GetLockHighPrio

Equipment function: not available

VolflowSet

BMS access: RD

Equipment function:

- EASYLAB
 - FH, RR, RR with RMF, EC, SC
- TROX UNIVERSAL
 - RE/RS, RE/RS with RMF

Unit: l/s

Function

- Output of the volume flow rate setpoint value for the volume flow controller

Data point

- BACnet: Analog Value Object – Instance 1
- Modbus: Register 4

VolflowAct

BMS access: RD

Equipment function:

- EASYLAB
 - FH, RR, RR with RMF, EC, SC
- TROX UNIVERSAL
 - RE/RS, RE/RS with RMF, PR*/PD*, PR*/PD* with RMF

Unit: l/s

Function

- Output of the volume flow rate actual value of the volume flow controller

Data point

- BACnet: Analog Value Object – Instance 2
- Modbus: Register 3

VolTotalExh

BMS access: RD

Equipment function:

- EASYLAB
 - FH, RR, RR with RMF, EC, SC, TAM, TAM with RMF
- TROX UNIVERSAL
 - RE/RS, RE/RS with RMF, PR*/PD*, PR*/PD* with RMF

Unit: l/s

Function

- Output of the total extract air volume flow rate of an room



This includes the extract air volume flow rates of all fume cupboards and extract air controllers as well as any additional extract air volume flow rates (constant and variable) from other controllers.

Data point

- BACnet: Analog Value Object – Instance 3
- Modbus: Register 7

VolTotalSup

BMS access: RD

Equipment function:

- EASYLAB
 - FH, RR, RR with RMF, EC, SC, TAM, TAM with RMF
- TROX UNIVERSAL
 - RE/RS, RE/RS with RMF, PR*/PD*, PR*/PD* with RMF

Unit: l/s

Function

- Output of the total supply air flow rate of an room



This includes the supply air volume flow rates of all supply air controllers as well as any additional supply air volume flow rates (constant and variable).

Data point

- BACnet: Analog Value Object – Instance 4
- Modbus: Register 8

PressSet

BMS access: RD

Equipment function:

- EASYLAB
 - RR with RMF, TAM with RMF
- TROX UNIVERSAL
 - PR*/PD*, PR*/PD* with RMF

Unit: Pa

Function

- Output of the differential pressure control setpoint value within the system

Data point

- BACnet: Analog Value Object – Instance 5
- Modbus: Register 12

PressAct

BMS access: RD

Equipment function:

- EASYLAB
 - RR with RMF, TAM with RMF
- TROX UNIVERSAL
 - PR*/PD*, PR*/PD* with RMF

Unit: Pa

Function

- Output of the differential pressure control actual value within the system



The actual value is recorded by a differential pressure transducer connected to the RR with RMF or to the TAM with RMF.

Data point

- BACnet: Analog Value Object – Instance 6
- Modbus: Register 11

VelocitySet

BMS access: RD

Equipment function:

- EASYLAB
 - FH
- TROX UNIVERSAL
 - not used

Unit: m/s

Function

- Output of the face velocity setpoint value if the fume cupboard controller is equipped with a face velocity transducer (FH-VS)

Data point

- BACnet: Analog Value Object – Instance 7
- Modbus: Register 6

VelocityAct

BMS access: RD

Equipment function:

- EASYLAB
 - FH
- TROX UNIVERSAL
 - not used

Unit: m/s

Function

- Output of the face velocity actual value if the fume cupboard controller is equipped with a face velocity transducer (FH-VS)

Data point

- BACnet: Analog Value Object – Instance 8
- Modbus: Register 5

WireSensorPos

BMS access: RD

Equipment function:

- EASYLAB
 - FH
- TROX UNIVERSAL
 - not used

Unit/value range:

- BACnet: Percentage value in increments of 0.5 %
- Modbus: 0–200 (200 corresponds to 100 %)

Function

- Output of the sash position of the fume cupboard as a percentage value between the closed position (0 %) and the open position (100 %) (Applies only if the fume cupboard controller is equipped with a sash distance sensor (FH-DS, FH-DV, FH-VD))

Data point

- BACnet: Analog Value Object – Instance 9
- Modbus: Register 34

SystemDevices

BMS access: RD

Equipment function:

- EASYLAB
 - FH, RR, RR with RMF, EC, SC, TAM, TAM with RMF
- TROX UNIVERSAL
 - RE/RS, RE/RS with RMF, PR*/PD*, PR*/PD* with RMF

Function

- Number of identified EASYLAB system components

Data point

- BACnet: Analog Value Object – Instance 21
- Modbus Register 37

SC_GetPos

Equipment function: not available

Volt_AI2

BMS access: RD

Equipment function:

- EASYLAB
 - FH, RR, RR with RMF, EC, SC, TAM, TAM with RMF
- TROX UNIVERSAL
 - not used

Unit: V DC

Function

- Output of the voltage at analogue input AI2
- 0 – 10 V DC, in increments of 0.1 V

Data point

- BACnet: Analogue Value Object – Instance 34
- Modbus: Register 65

Volt_AI3

BMS access: RD

Equipment function:

- EASYLAB
 - FH, RR, RR with RMF, EC, SC, TAM, TAM with RMF
- TROX UNIVERSAL
 - not used

Unit: V DC

Function

- Output of the voltage at analogue input AI3
- 0 – 10 V DC, in increments of 0.1 V

Data point

- BACnet: Analogue Value Object – Instance 35
- Modbus: Register 66

LocalAlarm

BMS access: RD

Equipment function:

- EASYLAB
 - FH, RR, RR with RMF, EC, SC, TAM, TAM with RMF
- TROX UNIVERSAL
 - RE/RS, RE/RS with RMF, PR*/PD*, PR*/PD* with RMF

Function

- Output of a local alarm for a fume cupboard controller, extract air controller, supply air controller, room controller or TAM



Alarm conditions can be defined using the EasyConnect configuration software.

Functional values

- 0 = No local alarm
- 1 = Local alarm

Data point

- BACnet: Binary Value Object – Instance 1
- Modbus: Bit list - bit 2 or register 31

SummaryAlarm

BMS access: RD

Equipment function:

- EASYLAB
 - RR with RMF, TAM with RMF
- TROX UNIVERSAL
 - RE/RS with RMF, PR*/PD* with RMF

Function

- Output of a consolidated alarm



An alarm signal is generated when a controller emits an alarm or fault message.

Alarm conditions can be defined using the EasyConnect configuration software.

Standard configuration: volume flow rate alarm.

Functional values

- 0 = No consolidated alarm
- 1 = Consolidated alarm

Data point

- BACnet: Binary Value Object – Instance 2
- Modbus: Bit list - bit 3 or register 32

PressAlarm

BMS access: RD

Equipment function:

- EASYLAB
 - RR with RMF, TAM with RMF
- TROX UNIVERSAL
 - RE/RS with RMF, PR*/PD* with RMF

Function

- Output of a room pressure alarm when room pressure control is active



Alarm conditions can be defined using the EasyConnect configuration software.

Functional values

- 0 = No differential pressure alarm
- 1 = Differential pressure alarm

Data point

- BACnet: Binary Value Object – Instance 3
- Modbus: Bit list - bit 4 or register 33

DI* (BACnet), StateDI (Modbus)

BMS access: RD

Equipment function:

- EASYLAB
 - FH, RR, RR with RMF, EC, SC, TAM, TAM with RMF
- TROX UNIVERSAL
 - RE/RS, RE/RS with RMF, PR*/PD*, PR*/PD* with RMF

Function

- Status of digital inputs DI1 – DI6 of the controller or adapter module

Data point

- BACnet: Binary Value Object – Instance 6 (DI1) – Instance 11 (DI6)
 - 0 = inactive
 - 1 = active
- Modbus: Register 39, bit 0 (DI1) – bit 5 (DI6)
 - Bit not set = inactive
 - Bit set = active

DO* (BACnet), StateDO (Modbus)

BMS access: RD

Equipment function:

- EASYLAB
 - FH, RR, RR with RMF, EC, SC, TAM, TAM with RMF
- TROX UNIVERSAL
 - RE/RS, RE/RS with RMF, PR*/PD*, PR*/PD* with RMF

Function

- Status of digital outputs DO1 – DO6 of the controller or adapter module

Data point

- BACnet: Binary Value Object – Instance 12 (DO1) – Instance 17 (DO6)
 - 0 = inactive
 - 1 = active
- Modbus: Register 40, bit 0 (DO1) – bit 5 (DO6)
 - Bit not set = inactive
 - Bit set = active

SC_Alarm

Equipment function: not available

DO*_SetByLocal (BACnet), DO_SetByLocal (Modbus)

BMS access: RD

Equipment function:

- EASYLAB
 - FH, RR, RR with RMF, EC, SC, TAM, TAM with RMF
- TROX UNIVERSAL
 - RE/RS, RE/RS with RMF, PR*/PD*, PR*/PD* with RMF

Function

- Feedback from the controller about switch outputs DO1 ... DO6 used by the controller or adapter module

Data point

- BACnet: Binary Value Object – Instance 25 (DO1_Setby-Local) – Instance 30 (DO6_SetbyLocal)
 - 0 = output inactive
 - 1 = output active
- Modbus: Register 62, bit 0 (DO1_Set) – bit 5 (DO6_Set)
 - Bit not set = output inactive
 - Bit set = output active

DampPos

BMS access: RD

Equipment function:

- EASYLAB
 - FH, RR, RR with RMF, EC, SC
- TROX UNIVERSAL
 - RE/RS, RE/RS with RMF, PR*/PD*, PR*/PD* with RMF

Unit: %

Value range:

- BACnet: Percentage value in increments of 0.5 %
- Modbus: 0–200 (200 corresponds to 100 %)

Function

- Output of the damper blade position¹

Data point

- BACnet: Analog Value Object – Instance 10
- Modbus: Register 14

DampPosMax_FH

BMS access: RD

Equipment function:

- EASYLAB
 - FH, RR, RR with RMF, EC, SC, TAM, TAM with RMF
- TROX UNIVERSAL
 - not used

Unit: %

Value range:

- BACnet: Percentage value in increments of 0.5 %
- Modbus: 0–200 (200 corresponds to 100 %)

Function

- Output of the damper blade position of the fume cupboard controller with the widest open damper blade^{1,2,4}
- For the evaluation of the damper blade positions in separate extract air systems (2 fans), i.e. fume cupboard extract air and room extract air

Data point

- BACnet: Analog Value Object – Instance 11 – value and event state
- Modbus: Register 15 (value) and register 16 (event state)

DampPosMin_FH

BMS access: RD

Equipment function:

- EASYLAB
 - FH, RR, RR with RMF, EC, SC, TAM, TAM with RMF
- TROX UNIVERSAL
 - not used

Unit: %

Value range:

- BACnet: Percentage value in increments of 0.5 %
- Modbus: 0–200 (200 corresponds to 100 %)

Function

- Output of the damper blade position of the fume cupboard controller with the least wide open damper blade^{1,2,5}
- For the evaluation of the damper blade positions in separate extract air systems (2 fans), i.e. fume cupboard extract air and room extract air

Data point

- BACnet: Analog Value Object – Instance 12 – value and event state
- Modbus: Register 17 (value) and register 18 (event state)

DampPosMax_RE

BMS access: RD

Equipment function:

- EASYLAB
 - FH, RR, RR with RMF, EC, SC, TAM, TAM with RMF
- TROX UNIVERSAL
 - RE/RS, RE/RS with RMF, PR*/PD*, PR*/PD* with RMF

Unit: %

Value range:

- BACnet: Percentage value in increments of 0.5 %
- Modbus: 0–200 (200 corresponds to 100 %)

Function

- Output of the damper blade position of the room extract air controller with the widest open damper blade ^{1, 2, 4}
- For the evaluation of the damper blade positions in separate extract air systems (2 fans), i.e. fume cupboard extract air and room extract air

Data point

- BACnet: Analog Value Object – Instance 13 – value and event state
- Modbus: Register 19 (value) and register 20 (event state)

DampPosMin_RE

BMS access: RD

Equipment function:

- EASYLAB
 - FH, RR, RR with RMF, EC, SC, TAM, TAM with RMF
- TROX UNIVERSAL
 - RE/RS, RE/RS with RMF, PR*/PD*, PR*/PD* with RMF

Unit: %

Value range:

- BACnet: percentage value in 0.5 % increments
- Modbus: 0–200 (200 corresponds to 100 %)

Function

- Output of the damper blade position of the room extract air controller with the least wide open damper blade ^{1, 2, 5}
- For the evaluation of the damper blade positions in separate extract air systems (2 fans), i.e. fume cupboard extract air and room extract air

Data point

- BACnet: Analog Value Object – Instance 14 – value and event state
- Modbus: Register 21 (value) and register 22 (event state)

DampPosMax_TE

BMS access: RD

Equipment function:

- EASYLAB
 - FH, RR, RR with RMF, EC, SC, TAM, TAM with RMF
- TROX UNIVERSAL
 - RE/RS, RE/RS with RMF, PR*/PD*, PR*/PD* with RMF

Unit: %

Value range:

- BACnet: Percentage value in increments of 0.5 %
- Modbus: 0–200 (200 corresponds to 100 %)

Function

- Output of the damper blade position of the fume cupboard, extract air or room extract air controller with the widest open damper blade ^{1, 3, 4}
- For the evaluation of the damper blade positions in the extract air system (1 fan) for fume cupboard and room extract air
- **For UNIVERSAL:** output of the damper blade position of the extract air room pressure controller in the system with the widest open damper blade ^{1, 3, 4}

Data point

- BACnet: Analog Value Object – Instance 15 – value and event state
- Modbus: Register 23 (value) and register 24 (event state)

DampPosMin_TE

BMS access: RD

Equipment function:

- EASYLAB
 - FH, RR, RR with RMF, EC, SC, TAM, TAM with RMF
- TROX UNIVERSAL
 - RE/RS, RE/RS with RMF, PR*/PD*, PR*/PD* with RMF

Unit: %

Value range:

- BACnet: Percentage value in increments of 0.5 %
- Modbus: 0–200 (200 corresponds to 100 %)

Function

- Output of the damper blade position of the fume cupboard, extract air or room extract air controller with the least wide open damper blade ^{1, 3, 5}
- For the evaluation of the damper blade positions in the extract air system (1 fan) for fume cupboard and room extract air
- **For UNIVERSAL:** output of the damper blade position of the extract air room pressure controller in the system with the widest closed damper blade ^{1, 3, 4}

Data point

- BACnet: Analog Value Object – Instance 16 – value and event state
- Modbus: Register 25 (value) and register 26 (event state)

DampPosMax_RS

BMS access: RD

Equipment function:

- EASYLAB
 - FH, RR, RR with RMF, EC, SC, TAM, TAM with RMF
- TROX UNIVERSAL
 - RE/RS, RE/RS with RMF, PR*/PD*, PR*/PD* with RMF

Unit: %

Value range:

- BACnet: Percentage value in increments of 0.5 %
- Modbus: 0–200 (200 corresponds to 100 %)

Function

- Output of the damper blade position of the room supply air controller with the widest open damper blade ^{1,4}

Data point

- BACnet: Analog Value Object – Instance 17 – value and event state
- Modbus: Register 27 (value) and register 28 (event state)

DampPosMin_RS

BMS access: RD

Equipment function:

- EASYLAB
 - FH, RR, RR with RMF, EC, SC, TAM, TAM with RMF
- TROX UNIVERSAL
 - RE/RS, RE/RS with RMF, PR*/PD*, PR*/PD* with RMF

Unit:

Value range:

- BACnet: Percentage value in increments of 0.5 %
- Modbus: 0–200 (200 corresponds to 100 %)

Function

- Output of the damper blade position of the room supply air controller with the least wide open damper blade ^{1,5}

Data point

- BACnet: Analog Value Object – Instance 18 – value and event state
- Modbus: Register 29 (value) and register 30 (event state)

DampPosMax_EC

BMS access: RD

Equipment function:

- EASYLAB
 - FH, RR, RR with RMF, EC, SC, TAM, TAM with RMF
- TROX UNIVERSAL
 - not used

Unit: %

Value range:

- BACnet: Percentage value in increments of 0.5 %
- Modbus: 0–200 (200 corresponds to 100 %)

Function

- Output of the damper blade position of the room extract air controller with the widest open damper blade ^{1,4}

Data point

- BACnet: Analog Value Object – Instance 26 – value and event state
- Modbus: Register 49 (value) and register 50 (event state)

DampPosMin_EC

BMS access: RD

Equipment function:

- EASYLAB
 - FH, RR, RR with RMF, EC, SC, TAM, TAM with RMF
- TROX UNIVERSAL
 - not used

Unit: %

Value range:

- BACnet: Percentage value in increments of 0.5 %
- Modbus: 0–200 (200 corresponds to 100 %)

Function

- Output of the damper blade position of the room extract air controller with the least wide open damper blade ^{1,5}

Data point

- BACnet: Analog Value Object – Instance 27 – value and event state
- Modbus: Register 51 (value) and register 52 (event state)

DampPosMax_SC

BMS access: RD

Equipment function:

- EASYLAB
 - FH, RR, RR with RMF, EC, SC, TAM, TAM with RMF
- TROX UNIVERSAL
 - not used

Unit: %

Value range:

- BACnet: Percentage value in increments of 0.5 %
- Modbus: 0–200 (200 corresponds to 100 %)

Function

- Output of the damper blade position of the supply air controller with the widest open damper blade ^{1,4}

Data point

- BACnet: Analog Value Object – Instance 28 – value and event state
- Modbus: Register 53 (value) and register 54 (event state)

DampPosMin_SC

BMS access: RD

Equipment function:

- EASYLAB
 - FH, RR, RR with RMF, EC, SC, TAM, TAM with RMF
- TROX UNIVERSAL
 - not used

Unit: %

Value range:

- BACnet: Percentage value in increments of 0.5 %
- Modbus: 0–200 (200 corresponds to 100 %)

Function

- Output of the damper blade position of the supply air controller with the least wide open damper blade ^{1,5}

Data point

- BACnet: Analog Value Object – Instance 29 – value and event state
- Modbus: Register 55 (value) and register 56 (event state)

DampPosMax_TS

BMS access: RD

Equipment function:

- EASYLAB
 - FH, RR, RR with RMF, EC, SC, TAM, TAM with RMF
- TROX UNIVERSAL
 - RE/RS, RE/RS with RMF, PR*/PD*, PR*/PD* with RMF

Unit: %

Value range:

- BACnet: Percentage value in increments of 0.5 %
- Modbus: 0–200 (200 corresponds to 100 %)

Function

- Output of the damper blade position of the supply air or room supply air controller with the widest open damper blade ^{1,4}
- **For UNIVERSAL:** output of the damper blade position of the supply air duct pressure controller in the system with the widest open damper blade ^{1,3,4}

Data point

- BACnet: Analog Value Object – Instance 30 – value and event state
- Modbus: Register 57 (value) and register 58 (event state)

DampPosMin_TS

BMS access: RD

Equipment function:

- EASYLAB
 - FH, RR, RR with RMF, EC, SC, TAM, TAM with RMF
- TROX UNIVERSAL
 - RE/RS, RE/RS with RMF, PR*/PD*, PR*/PD* with RMF

Unit: %

Value range:

- BACnet: Percentage value in increments of 0.5 %
- Modbus: 0–200 (200 corresponds to 100 %)

Function

- Output of the damper blade position of the supply air or room supply air controller with the least wide open damper blade ^{1, 5}
- **For UNIVERSAL:** output of the damper blade position of the supply air duct pressure controller in the system with the widest closed damper blade ^{1, 3, 4}

Data point

- BACnet: Analog Value Object – Instance 31 – value and event state
- Modbus: Register 59 (value) and register 60 (event state)

¹ Damper blade positions DampPos**_** are transmitted as a percentage value between 0% (closed) and 100% (open).

² The output variables DampPosMax_FH, DampPosMin_FH, DampPosMax_EC, and DampPosMin_EC, as well as DampPosMax_RE and DampPosMin_RE are provided for the evaluation of the damper blade positions in separate extract air systems (3 fans) for fume cupboards, extract air and room extract air.

³ The output variables DampPosMax_TE and DampPosMin_TE are provided for the evaluation of the damper blade positions in the extract air system (1 fan) for fume cupboards, extract air and room extract air.

⁴ Status information for damper blade positions DampPosMax_**

- BACnet
 - Functional value = 1: All damper blades in OPEN position (special operating mode, value = 100%). Override not possible
 - Functional value = 2: All damper blades in standard operating mode. Override possible
 - Functional value = 3: At least one damper blade in OPEN position (special operating mode)
- Modbus Register: 16, 20, 24, 28
 - Event state = 0: All damper blades in standard operating mode. Override possible
 - Event state = -1 (FF): All damper blades in OPEN position (special operating mode, value = 100 %). Override not possible
 - Event state = 1: At least one damper blade in OPEN position (special operating mode)

⁵ Status information for damper blade positions DampPosMin_**

- BACnet
 - Functional value = 1: All damper blades in shut-off mode (special operating mode, value = 0%). Override not possible
 - Functional value = 2: All damper blades in standard operating mode. Override possible
 - Functional value = 3: At least one damper blade in shut-off mode (special operating mode)
- Modbus Register: 18, 22, 26, 30
 - Event state = 0: All damper blades in standard operating mode. Override possible
 - Event state = -1 (FF): All damper blades in shut-off mode (special operating mode, value = 0 %). Override not possible
 - Event state = 1: At least one damper blade in shut-off mode (special operating mode)

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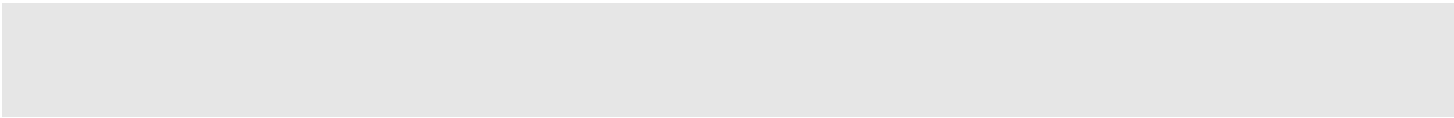
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