EXPANSION MODULE TYPE EM-IP

BACNET-IP-SCHNITTSTELLE

Modbus®

MODBUS-IP-SCHNITTSTELLE

EM-IP

BACNET/IP INTERFACE, MODBUS/IP INTERFACE, AND WEBSERVER FOR EASYLAB CONTROLLERS AND TAM ADAPTER MODULES

Expansion module for EASYLAB fume cupboard controllers, room controllers and TAM adapter modules, for the integration of rooms or individual volume flow controllers with the central BMS, and for accessing the above mentioned devices using the integral webserver.

- Change between BACnet/IP and Modbus/IP using the integral webserver
- BACnet Application Specific Controller (B-ASC) according to Annex L
- Trend logging, alarming and scheduling for selected data points
- BACnet/IP (Annex J based on IPv4)
- BACnet/IP interface by integrating the expansion module with EASYLAB components
- Modbus interface with individual data registers
- Modbus/IP (according to IEC 61158)
- Easy retrofitting
- Two RJ45 10/100 Mbit Ethernet connections (daisy chain is possible)
- Multi functional Reset push button
- Power and status indicator lights
- MicroSD card as persistent data store for firmware, trend logging,

alarming, scheduling and help files
- Real time clock expansion module (RTC) (optional)

Application ⧉

Application

- Expansion module Type EM-IP for the EASYLAB system
- BACnet/IP or Modbus/IP interface to the central BMS
- Integral webserver for configuring EM-IP
- Display of the principal device data on the web UI
- BACnet trend logging, alarming and scheduling for selected data points
- Data points for individual controllers or for the room
- Room interface: Default setting of room operating modes within the EASYLAB system, increase or reduction of the air change rate, readout of the actual room operating values or evaluated damper blade positions, consolidated alarms, volume flow rates and alarms for all EASYLAB controllers in a room
- Controller interface: Operating mode default setting for a single fume cupboard controller, readout of individual operating values such as volume flow rates for single controllers, or individual alarms
- Can be used with fume cupboard, supply air, extract air or differential pressure controller EASYLAB TCU3 and with adapter module TAM
- For use in laboratories, clean rooms in the pharmaceutical and semiconductor industries, operating theatres, intensive care units, and offices with very demanding control requirements
- Factory mounted or for retrofitting into the EASYLAB base component casing

Special characteristics

- Ready for installation, can be easily connected to the main PCB
- Interface for IP-based networks BACnet/IP and Modbus/IP
- BACnet Application Specific Controller (B-ASC) according to Annex L
- Connection for access to BACnet/IP network, Modbus/IP network or integral webserver
- BACnet/IP Protocol Revision 7.0
- Only standard BACnet objects or Modbus registers are used for communication
- Data interface for an EASYLAB controller or for an EASYLAB room with different functional profiles
- Multi functional Reset push button
- All settings for alarming, trend logging, event logging, notifications and scheduling can be accessed and changed using the integral webserver (no configuration software required)
- 2 GB microSD card for firmware, trend logging, event logging and alarming
- With BACnet Broadcast Managment Device (BBMD) function
- Foreign devices are supported
- Firmware is updated using the webserver

Description ⧉

Parts and characteristics

- Microprocessor with setup programme stored in nonvolatile memory
- Two RJ45 10/100 Mbit Ethernet connections for accessing the BACnet/IP network, the Modbus/IP network or the integral webserver (EM-IP modules can be linked by a daisy chain)
- Daisy chain function can be switched off
- Reset push button for resetting EM-IP using the web UI, for activating two IP configurations and for restarting the module
- One LED each for power and status

Construction features

- PCB dimensions and fixing points correspond to the EASYLAB main PCB and the casing
- Fixing with screws
- Pin header to connect the module to the main PCB of the TCU3 or TAM

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Functional description

Expansion module EM-IP is used to integrate EASYLAB controllers Type TCU3 or EASYLAB adapter modules Type TAM into an IP-based network and connect them to the central BMS using the BACnet/IP or Modbus/IP protocol.

The BACnet or Modbus interface supports the EASYLAB room operating mode concept. It is possible to set operating mode defaults in order to control different volume flow rates for daytime and night-time operation; it is also possible to increase or reduce the air change rate (volume flow rate setpoint change), e.g. to influence the room temperature.

Using the BACnet or Modbus interface, an individual alarm management system can be set up by consolidating configurable EASYLAB alarms. The interface also enables the transfer of actual operating values such as volume flow rates and damper blade position for a controller or for all controllers in a room.

BACnet/IP mode and the webserver allow for trend logging, alarming and scheduling for selected data points. The integral microSD card is used for trend logging. The integral webserver is used to configure EM-IP, to access trend logs and event logs, and to enter controller data using the web UI.

The optional real time clock (RTC) expansion module can be used for trend logging or event logging if, for example, EM-IP is not integrated with a network of if no time server is available in the network.

EM-IP
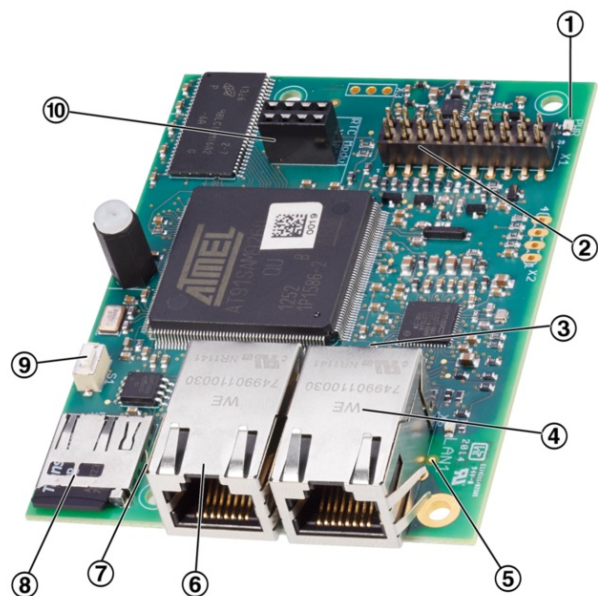
① Power LED
② Plug base for connection with the EASYLAB main PCB
③ Status LED
④ RJ45 sockets for Ethernet cabling (LAN 2)
⑤ LED LAN 1
⑥ RJ45 sockets for Ethernet cabling (LAN 1)
⑦ LED LAN 2
⑧ Slot for microSD card
⑨ Reset push button, also for switching the DHCP client on/off
⑩ Plug base for optional RTC module (real time clock)

Dimensions (B × H × T)	65 × 15 × 90 mm
Supply voltage (from the controller TCU3 or adapter module TAM)	5 V DC
Acceptable temperature range for storage	–10 to 70 °C
Acceptable temperature range for operation	10 – 50 °C
Maximum humidity, non-condensing, for storage and operation	<90 %
Protection level	IP 20
Persistent data store for firmware, logging objects and help files	2 GB microSD card

Expansion module to supplement an EASYLAB base component (controller TCU3 or adapter module TAM) with a BACnet/IP or Modbus/IP interface to link rooms or individual volume flow controllers to the central BMS.

Expansion module includes an interface for IP-based networks; switching between BACnet/IP and Modbus/IP is possible. All settings for alarming, trend logging, event logging, notifications and scheduling can be accessed and changed using the integral webserver.

Special characteristics

- Ready for installation, can be easily connected to the main PCB
- Interface for IP-based networks BACnet/IP and Modbus/IP
- BACnet Application Specific Controller (B-ASC) according to Annex L
- Connection for access to BACnet/IP network, Modbus/IP network or integral webserver
- BACnet/IP Protocol Revision 7.0
- Only standard BACnet objects or Modbus registers are used for communication
- Data interface for an EASYLAB controller or for an EASYLAB room with different functional profiles
- Multi functional Reset push button
- All settings for alarming, trend logging, event logging, notifications and scheduling can be accessed and changed using the integral webserver (no configuration software required)
- 2 GB microSD card for firmware, trend logging, event logging and alarming
- With BACnet Broadcast Managment Device (BBMD) function
- Foreign devices are supported
- Firmware is updated using the webserver

Technical data

- Dimensions (B × H × T): 65 × 15 × 90 mm
- Supply voltage (from the controller TCU3 or adapter module TAM): 5 V DC
- Acceptable temperature range for storage: –10 to 70 °C
- Acceptable temperature range for operation: 10 to 50 °C
- Maximum humidity, non-condensing, for storage and operation: <90 %
- Protection level: IP 20
- Persistent data store for firmware, logging objects and help files: 2 GB

Data points for a single controller

- Volume flow rate actual and setpoint values
- Damper blade position
- Operating mode
- Alarm/status messages
- Total supply air and total extract air actual values (room), and all individual volume flow rate values
- Evaluated damper blade positions for all controllers in a room
- Number of controllers
- Integration of volume flows

Additional data points for a fume cupboard controller

- Operating mode default setting for the fume cupboard controller equipped with the expansion module
- Selection of priority for operating mode default setting
- Face velocity actual value and setpoint value (only for fume cupboard controllers with face velocity transducer, equipment function FH-VS)

Data points for an EASYLAB room

- Operating mode default setting for the room: Just one data point is required to set the default operating mode for all controllers in a room
- Selection of priority for operating mode default setting (central BMS or room)
- Room operating mode

- Volume flow rate setpoint change (by the central BMS, for example) for an external temperature or differential pressure control
- Setpoint value switching for differential pressure control: Switching between two differential pressure setpoint values
- Total supply air and total extract air actual values (room), and all individual volume flow rate values
- Evaluated damper blade positions for all controllers in a room
- Room differential pressure actual and setpoint values
- Room pressure alarm
- Number of controllers within the EASYLAB system
- Integration of volume flows
- Status of the digital inputs and outputs
- Configurable consolidated alarm (operating statuses, hardware faults)

BACnet Interoperability Building Blocks Supported

- Data Sharing-ReadProperty-B: DS-RP-B
- Data Sharing-ReadProperty-Multiple-B: DS-RPM-B
- Data Sharing-WriteProperty-B: DS-WP-B
- Data Sharing-WritePropertyMultiple-B: DS-WPM-B
- Data Sharing-COV-B: DS-COV-B

- Alarm and Event-Notification-Internal-B: AE-N-I-B
- Alarm and Event-Acknowledge-B: AE-ACK-B
- Alarm and Event-Alarm-Summary-B: AE-ASUM-B
- Alarm and Event-Enrollment-Summary-B: AE-ESUM-B
- Alarm and Event-Event-Information-B: AE-INFO-B
- Alarm and Event-Event-Log-Internal-B: AE-EL-I-B

- Scheduling-Weekly-Schedule-Internal-B: SCHED-WS-I-B

- Trending-Viewing-and-Modifying-Trends-Internal-B: T-VMT-I-B
- Trending-Automatic-Trend-Retrieval-B: T-ATR-B

- Device Management-Dynamic Device Binding-A: DM-DDB-A
- Device Management-Dynamic Device Binding-B: DM-DDB-B
- Device Management-Dynamic Object Binding-B: DM-DOB-B
- Device Management-DeviceCommunicationControl-B: DM-DCC-B
- Device Management-TimeSynchronization-B: DM-TS-B
- Device Management-UTCTimeSynchronization-B: DM-UTC-B
- Device Management-ReinitializeDevice-B: DM-RD-B
- Device Management-List Manipulation-B: DM-LM-B
- Device Management-Restart-B: DM-R-B

Order code detail for control component ELAB (TCU3) or TAM

ELAB / ...I... / ...
ELAB / ...R... / ...

Expansion modules
I   EM-IP: EM-IP for BACnet/IP,
      Modbus/IP and webserver
R   EM-IP + RTC: EM-IP for BACnet/IP,
      Modbus/IP, webserver and RTC module

Expansion module EM-IP for retrofit

EM – IP
EM – RTC