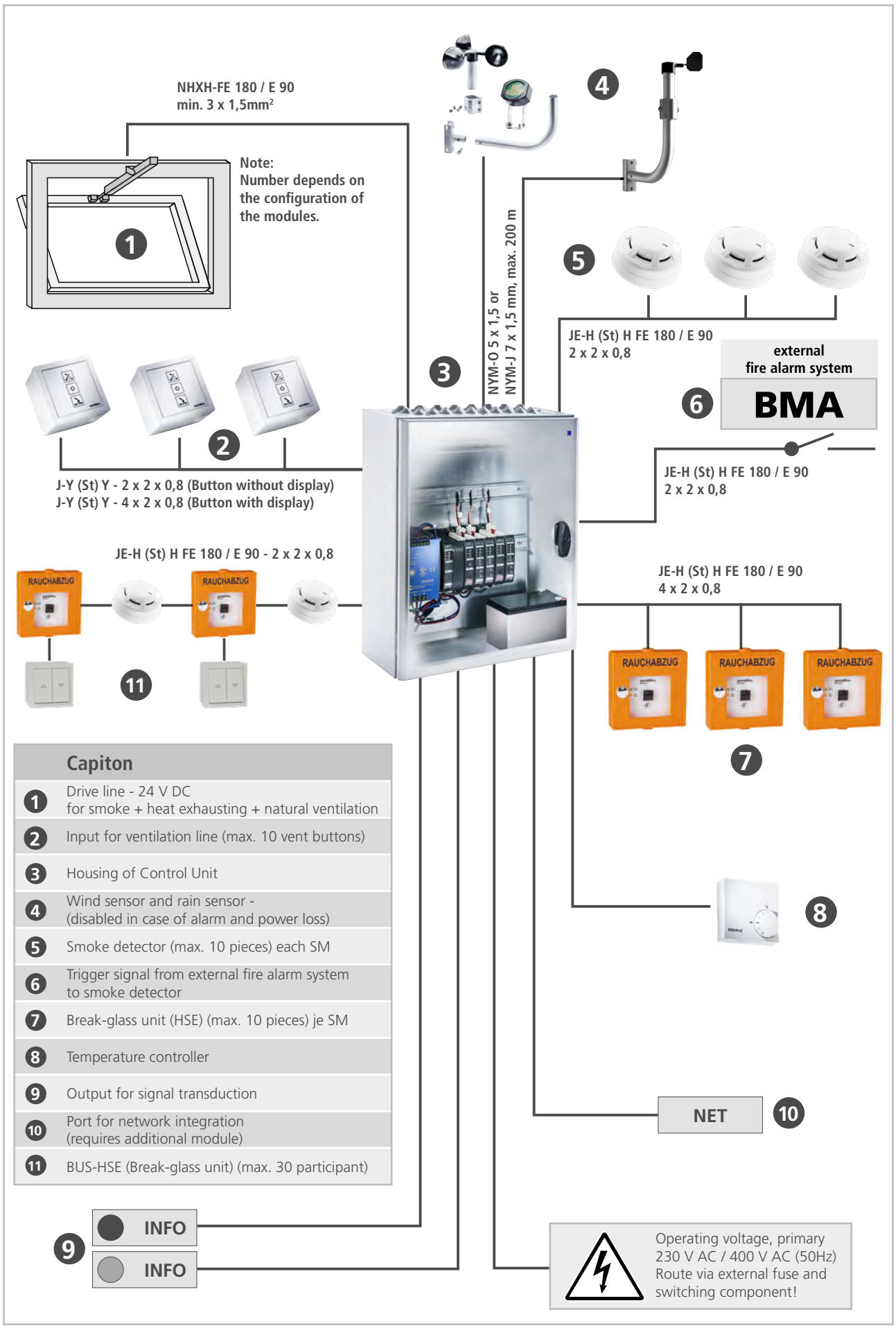
For this product series, a Type III Environmental Product Declaration (EPD) was issued according to ISO 14025 and EN 15804.

The LCA results of the different product types are listed at the end of this product catalogue. The EPD documents can be viewed or downloaded from our homepage **www.aumueller-gmbh.de**.

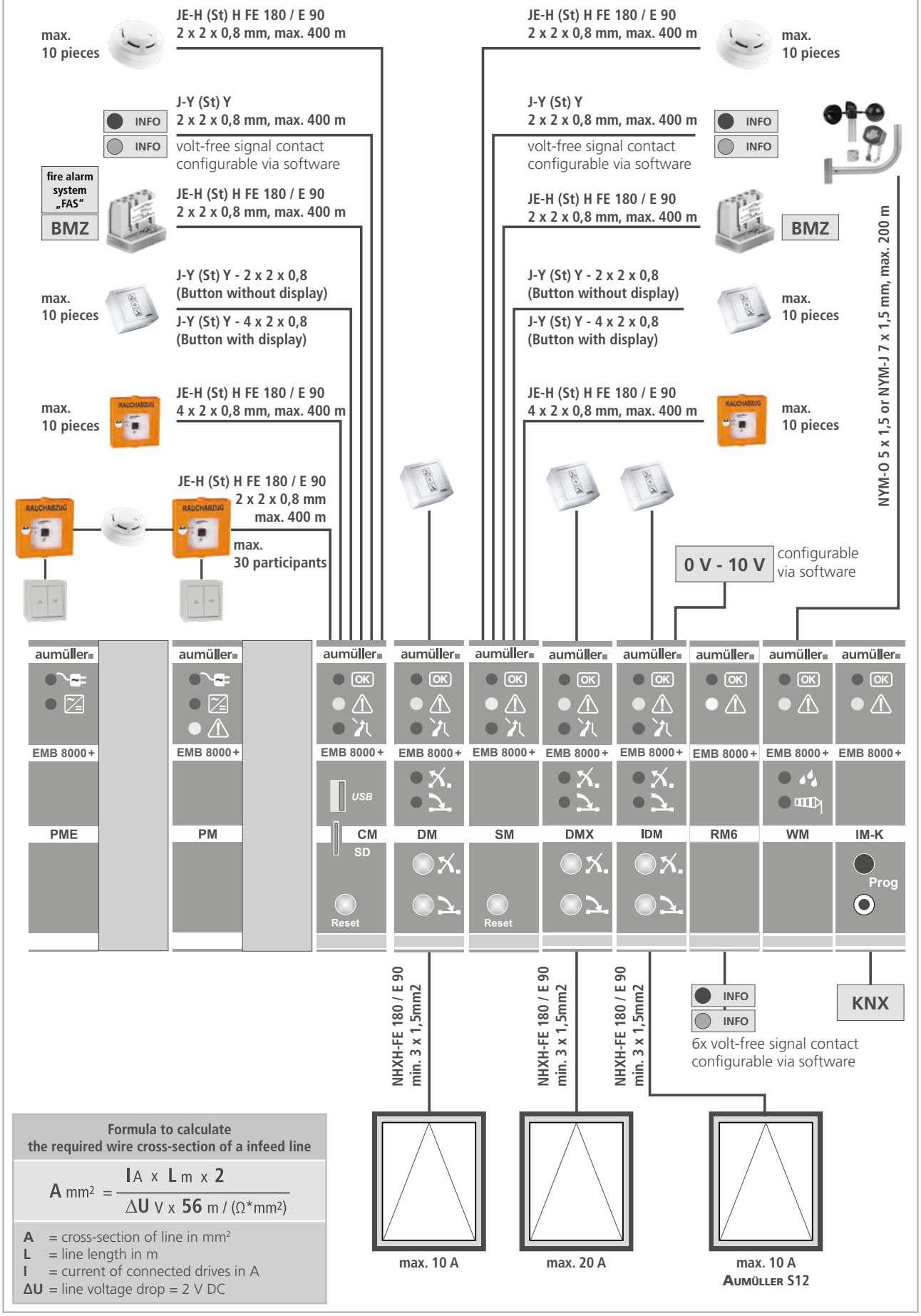
PRODUCT FEATURES EMB 8000+

- Modular control panel with digital bus technology and power supply for 24 V DC drives for use in smoke and heat exhausting ventilation (SHEV) and in controlled natural ventilation systems
- Control panel compliant with prEN 12101-9 / ISO 21927-9
- Power supply compliant with EN 12101-10 (except EMB8000+ 5A)
- Low residual ripple output voltage (<2 Vpp) - compatible with all common drives
- Easy and space saving installation on 35-mm snap-on mounting rail with many combination options
- Easy configuration of SHEV and ventilation groups by selective lining up of the modules
- Control- and Sensor-Module with 3 monitored detector lines with different priorities for connecting with:
  - Manual break-glass unit (HSE)
  - Automatic smoke and heat detectors
  - Control signal from fire alarm system (FAS)
- Drive-Module with monitored line outputs for connection of drives up to 20 A
- Relay-Module for the evaluation and transsmision of events (emergency open signal, fault signal, feedback signals)
- Weather-Module for connection with wind speed sensors, wind direction sensors and rain sensors
- Network-Modules for connection and integration with building management systems (CAN, KNX)
- All ventilation button inputs with OPEN-STOP-CLOSE function and adjustable priorities
- Clear operating and display elements
- Extensive settings of the basic functions via software offered by download free of charge
- Special functions programmable via extra costs software license as in the following:
  - Service and maintenance intervals
  - Changes of priorities, switching-thresholds and switch-off times
  - Deactivation of the detector lines or of their monitoring
  - Control of the alarm functions by a volt-free contact of the fire alarm system (FAS)
  - Network integration
- Steel sheet housing, protection class IP40 / IP54 alternatively available with wall fixing brackets, cable exit from above
- Prepared for connection of backup batteries (72 hours)
- VdS certification no.: G 512005 (except EMB8000+ 5A)
- In the state of delivery, the interconnection of SHEV and ventilation groups can be configured - by targeted lining up of the modules - without software.
- System components for individual assembly consisting of functional basic control units each with one SHEV and one ventilation group, as well as a variety of modules and components that can be ordered either as factory-installed or for customer-side yourself installation.
- Software licences for enabling and configuration of complex integrated special functions as well as for the interconnection of multiple control units to a network with higher-ranking funktions for SHEV, ventilation and weather groups
- Fully assembled and configured - at the factory or by self-expansion.
- Fully assembled and configured from the factory or for self-removal
- Individual customization through extensive software options

SCOPE OF THE CONFIGURATION SOFTWARE EMB 8000+		
Functions	Standard	Lizenz
Load configuration / Safe / Safe as	✓	✓
View, save and print system status	✓	✓
Set thresholds and on-off delay of wind sensor	--	✓
Create PDF of the configuration	✓	✓
System configuration / Load settings / Save settings	✓	✓
Read RealTime LOG-Data	✓	✓
Set Password for control unit	--	✓
Edit RealTime LOG-Data	--	✓
Firmware update	--	✓
Configure switching thresholds and on-off delay of the wind sensor	--	✓
Configure switching thresholds of wind direction sensor	--	✓
System time synchronisation / updating	--	✓
Backup battery monitoring: Performance and fault indications (active, windows OPEN / CLOSE)	--	✓
Set backup battery type and charging characteristics (temperature dependent / constant)	--	✓
Power supply loss: Performance and fault indication (Energy saving mode, CLOSE, ventilation mode)	--	✓
Ventilation push button in dead-man or jog-switch mode (OPEN or/and CLOSE direction)	--	✓
Ventilation push button as one rocker push-button (OPEN/STOP or CLOSE/STOP with one button)	--	✓
Set step-automatic in OPEN-direction (Automatic enabled / Time setting)	--	✓
Enable reset of smoke detector lines with emergency-CLOSE button	--	✓
Enable control of smoke detector line by fire alarm system „FAS“	--	✓
Disable alarms caused by detector line monitoring failures (Automatic and manual detectors)	--	✓
Disable fault detection of detector lines (Automatic and manual detectors)	--	✓
Set functions of PM, CM and SM relay contact	--	✓
Set service and maintenance interval and system behaviour	--	✓
Set drive line mode for use with motors, magnets or gas pressure generators	--	✓
Disable retriggering of drive line in alarm mode	--	✓
Set switch-off time of drive lines	--	✓
Enable and set automatic time-controlled drive line closing mode for ventilation purpose	--	✓
Enable drive closing mode on primary power loss	--	✓
Set drive run time and opening stroke limit for ventilation purpose	--	✓
Set failures of drive line monitoring as alarm signal	--	✓
Set drive running direction in alarm mode from open to close	--	✓
Set signal input of DM drive line (feedback input / inhibiting input)	--	✓
Set wind direction dependent OPENING / CLOSING of drive lines	--	✓
Reset switch positions to the status before the weather control were activated	--	✓
Set emergency close button from jog-switch mode to dead-man mode	--	✓
Set functions of RM6 relays	--	✓
Set assignment of detector and drive lines to SHEV, ventilation and weather groups	--	✓
Interconnection of several control units to a network with higher-ranking functions	--	✓
Integration into digital networks (CAN, KNX) (requires additional modules)	--	✓



Capiton	
1	Drive line - 24 V DC for smoke + heat exhausting + natural ventilation
2	Input for ventilation line (max. 10 vent buttons)
3	Housing of Control Unit
4	Wind sensor and rain sensor - (disabled in case of alarm and power loss)
5	Smoke detector (max. 10 pieces) each SM
6	Trigger signal from external fire alarm system to smoke detector
7	Break-glass unit (HSE) (max. 10 pieces) je SM
8	Temperature controller
9	Output for signal transduction
10	Port for network integration (requires additional module)
11	BUS-HSE (Break-glass unit) (max. 30 participant)



Formula to calculate the required wire cross-section of a infeed line

$$A\ mm^2 = \frac{I_A \times L_m \times 2}{\Delta U\ V \times 56\ m / (\Omega * mm^2)}$$

A = cross-section of line in mm²
L = line length in m
I = current of connected drives in A
ΔU = line voltage drop = 2 V DC

IMPORTANT NOTES

The modular design of EMB 8000+ in combination which digital network technology make it possible for our customers to size, assemble and configures the control units by themselves.
For this **Aumüller** is providing the required hardware and software.

The minimum equipment of a fully functional Control Unit:

- 1x Switch mode power supply PS 5 A up to 24 A – the installation up to 3 identical power supplies up to a maximum of 72 A is possible
- 2x Accumulators 12 V DC from 7 Ah to 38 Ah to ensure the emergency power supply for 72 hours
- 1x Power-Module PM for the charging control of accumulators – completed with up to 2 Power-Module-Extensions PME
- 1x Control-Module CM with 3 detector input lines for automatic and manual smoke detectors and 1 ventilation button input line
- 1x Drive-Module DM, IDM or DMX for connection of drives with a total current consumption of 10 A respectively 20 A and 1 ventilation button input line

The control units on the following pages are intended for individual configuration and are prepared for 1 SHEV group with 1 ventilation line (10 A or 20 A) and are pre-programmed for basic functions.
Aumüller does not assume any liability for further changes and configurations of these control units.

PLANNING NOTES

The build-in modules of EMB 8000+ are connected to each other and communicate via the digital network bus. On delivery respectively as long as the delivered software configuration is not changed, the modules are self-learning. SHEV groups can be easily and felxibel configured by selective lining up of the modules. A new SHEV group is created by adding a Sensor-Module (SM) into the row. All following Drive-Modules (DM / DMX) belong to the new SHEV group.

In the Control Units with several switch mode power supplies in one housing (48 A and 72 A), the interconnection of Drive-Modules (DM / DMX) and their total current consumption has to be adapted to the current consumption of the individual switch mode power supply at which they are connected. This can be done by replugging the power supply of the modules. The SHEV group to which the DM / DMX belongs is irrelevant. To ensure the optimum of safety in case of a failure of a switch mode power supply, it is recommended to power the DM/DMX of one SHEV group from only one switch mode power supply. The maximum switching capacity of the DM-modules is to be noted.

Due to the compact design of the modules, the module connection terminals for peripheral devices are limited to 1 mm² and for drive lines to 2,5 mm² rigid wire conductors. The cross sections of the wires between control unit and drives depend on the cable length, the current consumption as well as the voltage drop on the line. A 35-mm snap-on mounting rail is provided inside the housing, for additional bigger connection terminals if the required cable cross section is larger than the module-own connection terminals. Suitable connection terminals will be found under „accessories“. The cross sections of the cables may be calculated with the formula indicated in chart 5.

EXPANSION LIMITATIONS / SYSTEM LIMITS

The following key data must be taken into account when dimensioning SHEV Control Units:

- Number of smoke detectors per CM / SM 10 piece
- Number of break-glass units per CM / SM 10 piece
- Number of digital trigger units per CM 30 piece
- Number of smoke detectors per control unit 60 piece
- Number of break-glass units per control unit 60 piece
- Own power consumption per Control Unit (see chart 3 at the following page)
- Accumulator capacity / max. power consumption per Control Unit (see chart 3 at the following page)
- Dimensions of housing
- Cable entries

All values in the tables refer to the maximum assignment of the module inputs / outputs. The current values are given for maintaining the emergency power supply over a period of 72 hours. Other calculation bases on request.

The sum of the self-consumption of all modules in a Control Unit must not exceed the maximum permissible current of the Control Unit. To calculate the total power consumption, the individual consumption of the installed modules must be added.

The details of the outer diameter of cables refer to the cable types common in Germany. The wire cross-sections are given in mm². To maintain the electrical protection class of the Control Unit housing, only one cable is permitted per cable entry.
For checking purposes, the total number of cables required must be determined in accordance with Table 1 and coordinated with the number of cable entries in the Control Units from Table 4.

Due to the hardware and software, the EMB8000 + is limited by the following points. Configuration using the software is guaranteed within these limits.

1. A maximum of 50 modules per Control Unit (including CM, excluding PM and PMEs).
   The following maximum number of modules of the same type are supported per control center (in the network).

Module	Maximum per Control Unit	Maximum per network
PME	2	60
PM	1	30
CM+	1	30
SM	20	570
DM	40	570
DMX	10	300
IDM	30	300
230 V DM Vent	20	570
RM6	20	570
WM	1	2
IMK	2	5

2. A maximum of 30 Conrol Unit in the network.
3. A maximum of 600 modules in the network (including CMs, excluding PMs and PMEs) e.g.: 30 Control Units with 20 modules or 12 Control Units with 50 modules.
4. 150 Can actuators (*) are supported without blocking the triggering CMs. Each additional Can actuator results in a recording delay of 9 ms.

   (*) Can actuator is an actuator in another Control Unit than the one in which the sensor is located.

CONFIGURATION AND PARAMETERIZATION

The basic configuration software for EMB 8000+ Control Units is available download on (free of charge for):

www.aumueller-gmbh.de/downloads/software/ . . .

For the configuration of special functions or integration of Control Units into networks, a software license (with extra costs) is required.

CHART 1: PARAMETER OF MODULES EMB 8000+

Features					Cables for inputs and outputs							
Module	Module width [mm]	Module units [ME]	Internal current consumption [mA]	Cable entries when using all inputs/outputs [pcs.]	Smoke detectors, FAS	Manual detectors Break-glass units	Drive line	Ventilation button with display	Ventilation button w/o display, other inputs	Volt free contact, drive feedback signal	Wind/Rain/Wind direction	Power supply
PM	46	2	16,0	1								1
PME	46	2	0,0	0								
CM+	23	1	34,1	5	2	1			1	1		
SM	23	1	12,6	5	2	1			1	1		
DM	23	1	5,3	3			1	1		1		
230 V DM	23	1	7,0	3			1	1		1		
DMX	46	2	5,3	3			1	1		1		
IDM	23	1	6,0	5			1	1		1		
RM6	23	1	5,3	1						1–6		
IM-K	23	1	6,0	10								
WM	23	1	13,0	4					2	1	1	
Rec. Number of wires (w/o protective earth conductor)					4	8	4	8	4	4	7	3

CHART 2: INTERNAL CURRENT CONSUMPTION OF BACKUP BATTERY POWERD DETECTORS

Break-glass main unit	**HSE**	**1,2 mA**
Break-glass seccondary unit	**HSE-N**	**0,0 mA**
Smoke detector	**ORM**	**0,1 mA**
Wind direction sensor	**WRG**	**7,1 mA**
BUS Break-glass main unit	**BUS-HSE**	**2,8 mA**
BUS Smoke detector	**BUS-RM**	**1,0 mA**

CHART 3: MAXIMUM CURRENT CONSUMPTION PER CONTROL UNIT

PS / Battery	7 Ah	12 Ah	17 Ah	24 Ah	38 Ah
10 A		**120 mA**	**140 mA**	**240 mA**	**350 mA**
24 A		**70 mA**	**120 mA**	**200 mA**	**300 mA**
48 A			**80 mA**	**170 mA**	**300 mA**
72 A				**100 mA**	**300 mA**

CHART 4: DIMENSIONS OF CONNECTION TERMINALS (pull spring feed through terminal blocks)

Terminal size [mm]	6 mm²	10 mm²	16 mm²	End bracket
Cross section of the wire (rigid wire)	0,13–6 mm²	2,5–10 mm²	4–16 mm²	
External width (feed through terminal)	6 mm	10 mm	12 mm	8 mm
Width of set with 5 terminals + end bracket	38 mm	58 mm		

CHART 5: CALCULATION OF DRIVE CABLES

A = 2 * L * I / (56 * ΔU)

A	Cross section of wire [mm²]
L	Length of the line [m]
I	Current of the drives [A]
ΔU	Voltage drop on the line [V] = max. 2 V

1. Calculation of the output current

How big is the current consumption of all the drives within the system?

Example:
There are 12 facade windows each with 2 drives * 1 A and
3 roof windows each with 1 drive * 2 A.
Solution:
Required current: 12 * 2 * 1 A + 3 * 2 A = 30 A
Used Control Unit with **48 A**

2. Number of vent groups / current per group

1. How many vent groups are required?
2. Which vent group need more than 10 A, which less than 10 A?

Example:
The windows are partitioned in 3 groups:
2 facade groups each with 6 windows * 2 A = 2 * 12 A
1 roof group with 3 windows * 2 A = 1 * 6 A
Solution:
There are 2 DMX und 1 DM required.
When a **basic control unit with 48 A and DMX** should be used,
in additional: **1 DMX and 1 DM**

⚠ In each basic control unit 1 DM / IDM or 1 DMX is included!

3. Number of SHEV groups

How many fire groups / SHEV groups are required?

Example:
in case of fire all 3 window groups should open simultanously within one SEV group.
Solution:
No additional **SM** is required.

⚠ In each basic control unit 1 CM is included for 1 SHEV group!
Any further SHEV group (or fire sector) requires 1 SM.

4. Wind / Rain detection

1. Should the windows to be closed automatically in case of wind/rain ?
2. In the case of a fire alarm should the windows be controlled wind direction dependent ?

Example:
All 3 window groups should be closed in case of wind/rain.
No wind direction control is required.
Solution:
1 WM is required.

⚠ For the configuration of the wind dependent control, a subject to charges licence for the configuration software EMB8000+ is required and a training by AUMÜLLER is strongly recommend!
The wind/rain sensores are to be ordered separately.

5. Transmission of status messages

Are volt free contacts required for the transmission of status messages to external devices?

Example:
A possible malfunction of the control unit should be transmitted to the building management system.
Solution:
1 RM6 is required.

⚠ Every RM6 has 6 volt free change over contacts.
For the configuration of RM6 a subject to charges licence for the configuration software EMB8000+ is required and a training by AUMÜLLER is strongly recommend!

6. Calculation of the cable cross section

Which cross section (A) will be needed for single wires due to the formula from chart 5?

Example:
Cable length between control unit and junction box:
Window group 1 = 35 m (12 A)
Window group 2 = 45 m (12 A)
Window group 3 = 75 m (6 A)
Solution:
Window group 1: A = 2 * 35 m * 12 A / (56 * 2) = 7,5 mm²
Window group 2: A = 2 * 45 m * 12 A / (56 * 2) = 9,7 mm²
Window group 3: A = 2 * 75 m * 6 A / (56 * 2) = 8,0 mm²
For all the drive cables **terminals 10 mm²** are required.

⚠ The wire cross sections depends on the drive current, the cable length and the voltage drop (max. 2 V allowed).
The cables to the drives of SHEV systems must be fire resistant.
It is not allowed to use the green and yellow protective conductor for other purposes!
The next larger cross section is always to be chosen!
If the cross section of the cables are too large, the drives must be partitioned onto additonal DM(X) modules.

7. Mounting of additional clamps

Are the terminal clamps of the modules big enough to connect the required cable cross sections or are additonal clamps required?

Example:
All 3 DM(X) modules should be equipped with 10 mm² terminals.
The feedback contact of the WM module and all 6 RM6 outputs should be wired on 6 mm² terminals.
Solution:
In total are required:
3 DM(X) * 5 = **15 terminals** for the drive lines and
(1 + 6 ontacts) * 3 = **21 terminals** for the sensor lines.

A

⚠ When mounting a DMX, output terminals for the drive lines are absolutely neccessary!
The terminals are available for 6/10/16 mm². For each drive line the use of 5 terminals is reccomended, to connect all the cable cores.
Clamps up to 6 mm² are needed for the detection lines and for the feedback contacts.
The number of the clamps is to be determinated due to the EMB8000+ description or due to the installed cables.

A

8. Current consumption of the modules / battery capacity

Which battery capacity is needed to cover the current consumption of the used components (modules, sensors, etc.) according to chart 1?

Example:
The configurated system with 48 A power supply contains:
1 PM, 1 PME, 1 CM, 2 DMX , 1 DM, 1 WM and 1 RM6
Components as in the following are connected in additional:
10 breck-glass units (HSE) and 20 smoke detectors
Solution:

1 PM	= 1 * 16,1 mA = 16,1 mA
1 CM+	= 1 * 34,1 mA = 34,1 mA
2 DMX	= 2 * 5,3 mA = 10,6 mA
1 DM	= 1 * 5,3 mA = 5,3 mA
1 WM	= 1 * 13,0 mA = 13,0 mA
1 RM6	= 1 * 5,3 mA = 5,3 mA
TOTAL:	= 70,9 mA internal consumption for modules
10 HSE	= 10 * 1,2 mA = 12,0 mA
20 Rauchmelder	= 20 * 0,1 mA = 2,0 mA
TOTAL:	= 14 mA internal consumption for add. components
TOTAL SUM:	= **84,9 mA current consumption.**

Due to chart 3 a **battery capacity** (2 batteries 12 V) is required for a 48 A control unit..

⚠ In every standard or basic control unit 1 PM (PME) and 1 CM are included. Their power consumption is to be considered! The power consumption of additional built-in devices, which are feeded with backup power from the control unit, has to be considered into the calculation as well!

9. Size of the housing

How much space is required for the modules, additional devices and terminals (see Basic Control Units)?

Example:
Additional components needed for the basic control unit:
1x DMX, 1x DM, 1x WM and **1x RM6** as well as **15 terminals** for drive lines and **21 terminals** for sensor lines.
Solution:

1 DMX	= 2 ME
1 DM	= 1 ME
1 WM	= 1 ME
1 RM6	= 1 ME
TOTAL:	= **5 free ME for modules**
15 terminals 10 mm² * 10 mm	= 150 mm + end bracket 8 mm = 158 mm
21 terminals 6 mm² * 6 mm	= 126 mm + end bracket 8 mm = 134 mm
TOTAL:	= **292 mm free snap-on mounting rail for terminals**

⚠ It is necessary to have one end bracket for every terminal block. The end bracket is included in delivery.

10. Selection of the basic control unit

Which control unit fulfils the criteria?

Example:

Output current:	48 A
Type of DM:	DMX
Housing for:	5 free ME
	292 mm free mounting rail

Solution:
The basic control unit **48 A with DMX** and standard housing **600 x 600 x 250 mm** - part-no.: 688348-9502 offers space for 8 ME and contains 500 mm snap-on mounting rail.

⚠ The basic control units differ to the current consumption, the size of housing and the type of used DM (DM for 10 A or DMX for 20 A). The size of housing must be equal or less to the values stated in the price list articles!

Factory fitted or self installation

Purchase order of a factory fitted customized control unit (at Aumüller)

Place an order for an expandable basic version control unit + factory fitted modules

1	Basic Control Unit 48 A, DMX, standard housing	688348-9502
1	DMX	688255-9
1	DM	688250-9
1	WM	688180-9
1	RM6	688200-9
15	Terminals for drive line (10 mm²)	659903
21	Terminals for sensor line (6 mm²)	659902
2	Batteries 24 Ah	544000
	Factory fitted configuration	688930

Purchase order of single components for the customer-side self installation

Place an order for an expandable basic version control unit + modules for self installation

1	Basic Control Unit 48 A, DMX, standard housing	688348-9502
1	DMX	688255
1	DM	688250
1	WM	688180
1	RM6	688200
3	Terminal sets 5 x 10 mm² for drive line	659908
5	Terminal sets 5 x 6 mm² for sensor line	659906
2	Batteries 24 Ah	544000

Configuration software is required to configurate RM6!