



SAFETY WITH VENTILATION POWER
GEZE CONTROL TECHNOLOGY FOR
SMOKE AND HEAT EXTRACTION SYSTEMS



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GEZE RWA smoke and heat extraction systems – safety with ventilation power

GEZE offers solutions for a variety of different requirements for anything to do with the opening and closing of windows. Our wide product range covers a wide choice of drive systems for daily ventilation to complete fresh air and exhaust air solutions to ensure safe and efficient smoke and heat extraction (NRA) as well intelligent control unit systems – **safety with ventilation power**.

At GEZE, we pride ourselves on a holistic approach – from planning over technical implementation to maintenance support.



FOREWORD



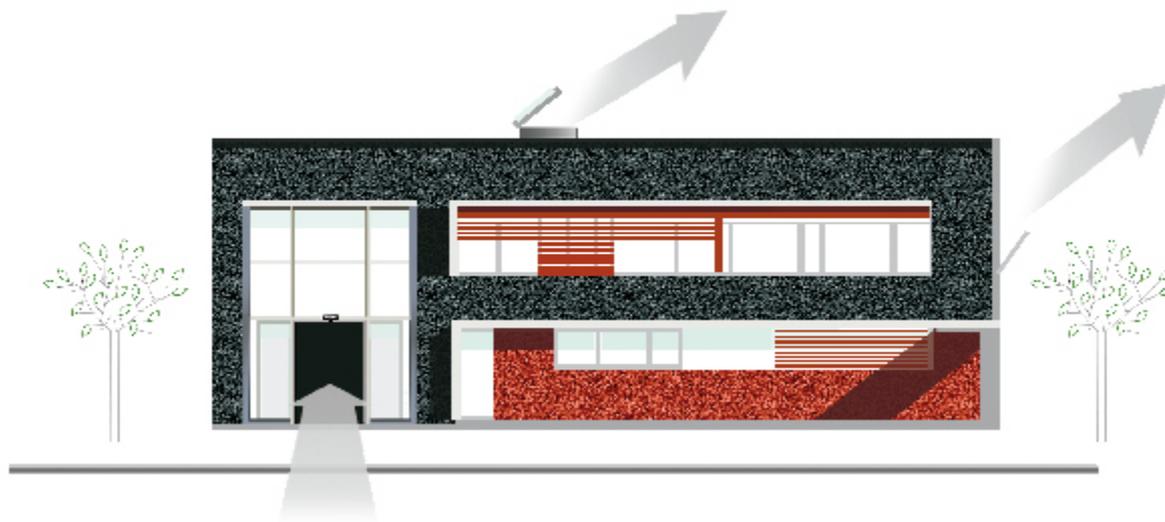
Fire protection includes both “fire defence” and “preventative fire protection”:

- **Fire defence:** The term “fire defence” or “fire protection” refers to all measures, which fight the danger for life, health and material goods in case of a fire.
- **Preventative fire protection:** This includes all measures, which prevent a fire from starting and/or spreading and keep escape routes clear. It aims at preventing a fire from spreading for as long as possible in order for people to escape and give fire fighters time to allow people to safely vacate a burning building.

The RWA smoke and heat extraction system is a “preventative fire protection measure”, which saves lives in the event of a fire. Building law, special building codes and the technical legislation of the German government and federal states form its legal foundation.

A fire generates a large amount of heat, smoke and hot fumes. The most important task of a RWA system is to conduct these combustion products away from the building quickly and effectively. Rooms and buildings without a heat and smoke extraction system rapidly fill up with toxic fumes in the event of a fire.

In buildings without a RWA system, the danger for victims and emergency personnel is multiplied, as the lack of a heat and extraction system quickly allows the fire to get out of control and the impenetrable smoke layer makes an active or passive rescue impossible.



GEZE RWA SYSTEMS

RWA system components

Electromechanical drives

Electromechanical drives are used to open and close the intake and extraction areas in the RWA system and for ventilation. Drives can be function-tested at any time without material usage. Thanks to the construction and design of the SHEV, these drives can be used for any window or frame profile and offer flexible installation options with any profile system.

Electric control

The control unit features two independent energy supplies (mains and battery), which ensure operation in any situation. The functional reliability of all lines and release mechanisms is monitored. In the event of a fire, automatic fire detectors or an external fire alarm system (BMA) ensure a swift activation through the parameter smoke. Additionally, there is a variety of comfort ventilation options available, such as automatic or temporary ventilation or a stroke-arresting device in the ventilation area for daily ventilation as required.

RWA openings can be actuated in relation to the wind direction to ensure that smoke is extracted via the downwind side of the building.

The manual electric control device

The manual electric control device is used for manual activation of the RWA system and for display of operating and alarm conditions.

Automatic detectors and sensors

Various sensors and detectors offer safety functions or allow for comfortable, natural ventilation. Wind, rain and temperature sensors and controllers are used for automatic ventilation and weather control. Thanks to the GLT, sensors from other systems can be used to control the RWA and ventilation system.

Smoke and temperature detectors or heat differential detector are designed to detect a fire and automatically trigger smoke extractors.

If the system is also to be used for ventilation, further components, such as vent switches, must be selected. If the alarm is activated, the windows open at their full opening angle. In this case, the vent switches are deactivated. The windows are closed via the RWA sensor or the alarm reset function in the control unit. These functions are controlled through the RWA control unit, which supplies electricity to the system components and bridges power failures. The main components and functions of an RWA system are detailed below.

GEZE EMERGENCY POWER SUPPLY UNITS

GEZE RWA SYSTEMS

System structure - functional description

In essence, an electric RWA control system consists of the components detailed in the illustration below. The system covers two large task areas: **Emergencies** and daily **ventilation**.

A GEZE RWA system is suitable for the everyday airing of rooms as well as smoke extraction in the event of a fire. The emergency power supply unit controls the smoke and heat extraction. Windows, smoke flaps or dome lights are opened or closed by electric drives.

For airing and ventilation, the system is controlled by a vent switch, rain/wind control or timer and in the event of a fire either manually via the RWA sensor or automatically via smoke and/or heat differential detector. In addition, optional alarm signals can be connected.

Exhaust air system



Spindle drive



Spindle drive opening and locking system



Chain drive

Fresh air system



Retractable arm drive

Signal inputs



Rain/wind control



Ventilation group



Timer

Alarm group



RWA sensor

RWA systems consist of at least the following

- The opening system (fresh and exhaust air)
- The emergency power unit
- RWA switch
- An automatic trigger, e.g. smoke detector

Further components are optional.

GEZE RWA emergency power supply unit E260 N

Central control units for single components

The E260 N RWA emergency power unit is the central control unit, to which various components are connected. It controls these components and supplies them with power. In the event of a fire, they are activated by automatic smoke detectors, manual RWA switches or external alarm sensors. When activated, the RWA openings are opened or closed, depending on the configuration of the RWA emergency power unit. Drives on windows and smoke extraction openings can be controlled via vent switches for normal ventilation use. The RWA function overrides the ventilation function.

GEZE RWA E260 N



PRODUCT FEATURES

- All emergency power supply units E260 N are VdS-certified and tested in accordance with DIN EN 12101-10
- Mains voltage: 230 V AC 50 Hz
- Output voltage: 24 V (20–30 V) DC, residual ripple: < 20%
- Emergency power supply minimum 72 hours via 2 x 12 V lead battery
- All functions maintained even with emergency power supply; in battery operation, only one ventilation option (window OPEN) is no longer possible
- Individual protection of motor groups, line and battery control
- Pile direction of drives adjustable in case of alarm (simple jumper adjustment)
- LED display for operation and fault indicator
- Protection class: IP 54
- Ambient temperature: -5 °C to +40 °C

CONNECTING POSSIBILITIES

RWA EMERGENCY POWER SUPPLY UNITS E260 N2/1 - N12/2

- Up to four groups, depending on type of emergency power unit
- Up to 20 RM1003 smoke detectors and/or WM1005 heat differential detectors
- Up to 10 FT4 – 24 V DC RWA sensors
- Adjustable opening duration for ventilation/airing
- Three vent switches with LED per group / any number without LED
- Optional retrofitting with additional board for the potential-free status contacts: alarm (horn), fault (warning light), window OPEN (warning light)
- Input for BMZ signal, line controlled

RWA EMERGENCY POWER SUPPLY UNITS E260 N32/2 - N32/8

- Up to eight drive groups
- 15 FT4 – 24 V DC RWA sensors, up to 30 in connection with a second alarm group
- 20 RM1003 smoke detectors and/or WM1005 heat differential detectors, up to 40 in connection with a second alarm group
- Three vent switches with LED per group / any number without LED
- Adjustable opening duration for ventilation/airing
- Inputs for rain/wind control
- Protection class: IP 54
- Second alarm group (optional)
- Up to 30 systems can be linked (optional)
- Input for BMZ signal, line controlled
- Automatic maintenance light

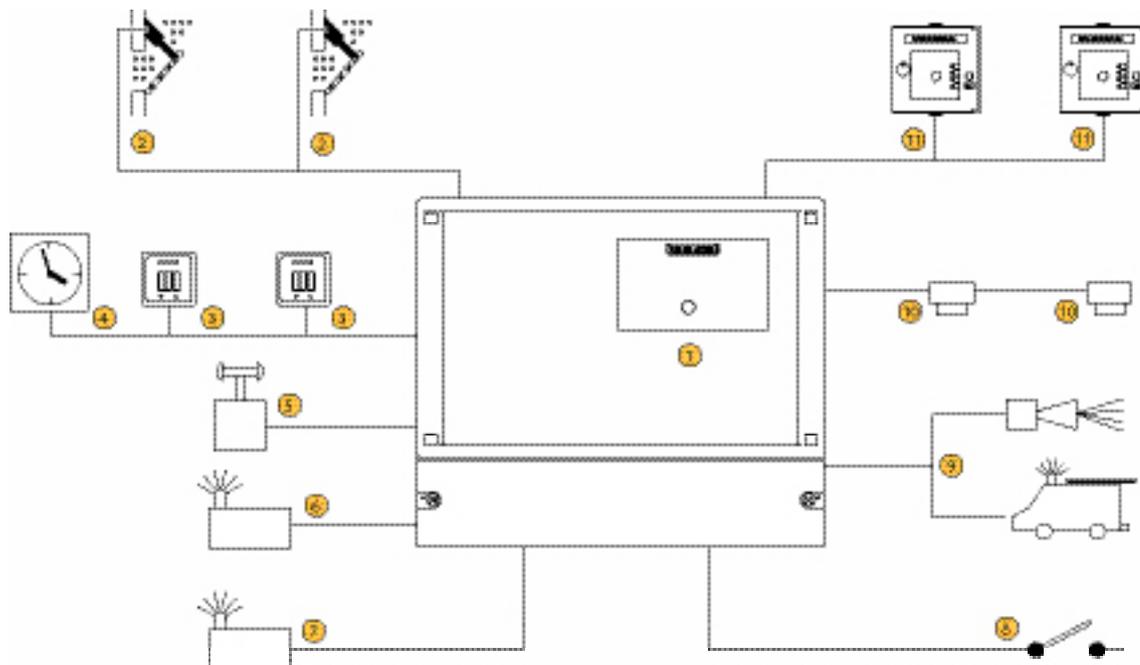
GEZE EMERGENCY POWER SUPPLY UNITS

Overview of E260 N emergency power control units

The type designation of the E260 N RWA emergency power control unit shows the maximum permissible output current of the drives and maximum number of connected ventilator groups. All E260 N emergency power supply units are VdS-certified and tested in accordance with DIN EN 12101-10.

GEZE RWA E260	N2/1 VdS	N4/1 – N4/2 VdS	N8/1 – N8/4 VdS	N12/2 VdS	N32/2 – N32/8 VdS
Dimensions (W x H x D)	256 x 217 x 112 mm	295 x 261 x 112 mm	362 x 319 x 131 mm	362 x 319 x 131 mm	600 x 600 x 210 mm
Number of ventilator groups	max. 1	1-2	1-4	1-2	2-8
Output current	max. 2.0 A	max. 4.0 A	max. 7.5 A	max. 12 A	max. 32 A
RWA sensors	max. 4 in line	max. 10 in line	max. 10 in line	max. 10 in line	max. 15 in line
Smoke detectors	max. 10 in line	max. 10 in line	max. 10 in line	max. 20 in line	max. 20 in line
Heat differential detectors	max. 10 in line	max. 10 in line	max. 10 in line	max. 20 in line	max. 20 in line
Available signal inputs	Rain/wind control and external fire alarm system (potential-free)				
Performance data transformer/battery	80 VA / 1.2 Ah	130 VA / 2.1 Ah	260 VA / 6-7.2 Ah	480 VA / 6-7.2 Ah	1400 VA / 17 Ah
Terminal cross-section	Control line max. 2.5 mm ² and motor line max. 4.0 mm ²				

CONNECTING POSSIBILITIES



Components

- ① RWA emergency power control unit
- ② Window and smoke vent flap drives
- ③ Vent switches
- ④ Timer
- ⑤ Rain/wind control
- ⑥ Window OPEN signal (optional)
- ⑦ Fault signal (optional)
- ⑧ External fire detection system alarm
- ⑨ Alarm signal (alarm retransmission) (optional)
- ⑩ Smoke detector and heat differential detector
- ⑪ RWA sensors

GEZE RWA modular BUS control unit MBZ300

RWA BUS control unit MBZ300 – modular, flexible and easy to handle

The RWA emergency control unit is the central control unit. It controls all connected components, supplies them with power and bridges power failures. If the alarm is activated, the windows and smoke extraction openings are automatically opened or closed, depending on the configuration of the RWA emergency power control unit. With the MBZ300, the drives on windows and smoke extraction openings can also be controlled for daily ventilation/airing. The MBZ300 emergency power control unit is a piece of state-of-the-art technology and complies with all relevant safety regulations.

GEZE MBZ 300



GEZE MBZ300 modular principle

Thanks to the optional software configuration and the modules' extensive application area, special applications require a minimum amount of special installations in the control unit. The modules can be mounted on a standard DIN rail (TS 35). If the module is connected correctly, it is recognised via BUS and automatically integrated into the system. Faulty connections are indicated by a fast blinking operating display or the relevant fault display. The modular system allows a variable and object-related design of fire areas and ventilation groups.

PRODUCT FEATURES

- Control of electrically motorised 24V DC drives for smoke and heat extraction in the event of a fire
- Natural ventilation control
- Internal BUS system for a modular infrastructure
- Modular, expandable
 - Ventilator groups
 - Alarm groups
 - Output current
 - Wind direction dependent activation
 - CAN connection
- Integration in an external BUS system (e.g. CAN) possible
- 30 control units can be linked on one bus
- Can be configured without a PC
- Direct operation on the modules
- LED display mode can be adjusted in the RWA sensors
- USB interface for configuration and control of the central unit via Software for updates and saving of user information
- Release and supply of pressured gas generators and magnetic clamps possible
- Processing of actuation signals from manual and automatic fire detectors and fire alarm systems
- Manual and automatic ventilation control (via vent switches, wind/rain sensors, room temperature sensors etc.)
- Optional special software for maintenance, configuration and update for Windows 2000 / XP / VISTA (via USB connection)
- Compatibility in accordance with EN 12101-10, 12101-9 and 12101-2
- NRA/RWA battery operation in case of mains power supply failure
- Line control for all manual and automatic detectors and drive lines
- Visual operation and fault signals to allow swift fault detection
- Digital storage of important operating states and service settings

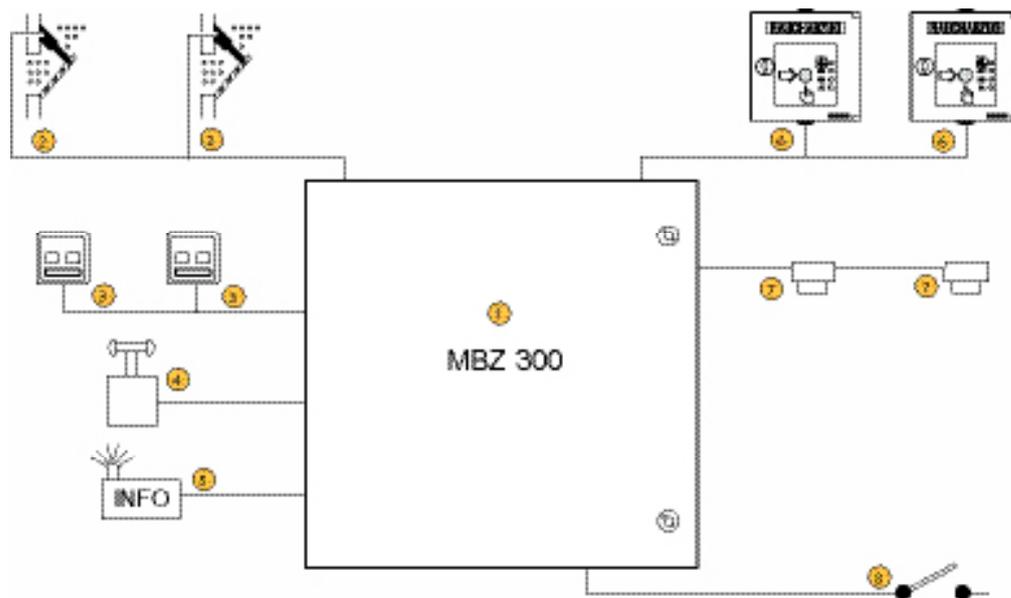
GEZE EMERGENCY POWER SUPPLY UNITS

PRODUCT FEATURES

- PM power module to control mains and battery voltage, charging circuit and battery
- PME power module extension to control more than one power supply adaptor (max. 3 power supply adaptors 24 A for 72 A)
- CM control module for the connection of manual and automatic fire detectors and external EMERGENCY OPEN actuation signals; with USB connection; input central ventilation sensor for all ventilator groups
- SM sensor module with connection options, for example CM control module. The sensor module requires a control module; central ventilation sensor input for the fire area
- DM drive module for max. 10 A drive current for connection of 24 V DC drives, sensors and control units. With appropriate programming, the pressured gas generators or magnetic clamps can be actuated and/or supplied; with inhibiting input potential-free for mapping of sequence controls, for example
- WM weather module for operation of wind and rain sensors and the wind direction dependent opening and closing of smoke extractors in the event of a fire
- Temperature sensor for temperature-controlled battery charging

All units are housed in a contained a sealable surface-mounted casing made from enamelled steel plate (RAL 7035) with lock insert (two-way key bit, 3 mm), protection class IP 54. The casing dimensions are the same for all control unit versions.

OVERVIEW MBZ 300



Components	
①	MBZ300 RWA modular bus control unit
②	Window and smoke vent flap drives
③	Vent switch
④	Rain/wind control
⑤	Alarm and fault signals
⑥	RWA sensors
⑦	Smoke detectors and heat differential detectors
⑧	External fire detection system alarm

GEZE MBZ300 components

Power supply (depending on version)

- 1 power supply adaptor 10 A and 2 emergency power batteries 12 V (minimum)
- 1 power supply adaptor 24 A and 2 emergency power batteries 12 V
- 2 power supply adaptors 24 A and 2 emergency power batteries 12 V
- 3 power supply adaptors 24 A (=72 A) and 2 emergency power batteries 12 V

Modules



PM power module

GEZE PM power module

24 A or 10 A for one fire area (depending on power supply adaptor)

- Monitors the energy supply
- Charge controller
- Automatic switch between mains and battery operation



PME power module extension

GEZE PME power module extension

24 A or 10 A additional (depending on power supply adaptor)

- Monitors the energy supply
- Automatic switch between mains and battery operation



CM control module

GEZE CM control module

Exactly one CM control module required for the first fire area:

- 3 detector lines for FT4, smoke detector, external BMZ signal
- USB port
- Status contact for fault or alarm
- Central ventilation sensor
- Ventilation control commands of the CM override sensor module commands (other fire areas)



SM sensor module

GEZE SM sensor module

For additional fire areas:

- Detector lines (max. 3) and
- Central ventilation sensor for the fire area
(ventilation control commands override control module commands)



DM drive module

GEZE DM drive module

- Drive line to max. 10 A
(with the relevant software configuration, pressured gas generators or retention magnets can be actuated)
- Connection of vent switches and operating status displays
- Connection of reed-contacts for sequential control, for example

GEZE WM weather module

No more than one weather module required:

- Connection of wind and rain sensors
- Wind direction transmitter for wind direction dependent activation

Module configuration

The control unit has been configured in the factory. The configuration can be modified by instructed experts via an optional software programme. The configuration can be done simply through a PC via the USB connection integrated in the CM.

Main configuration features:

- Grouping and combination of ventilation groups
- Catch or deadman operation of vent switches
- Priority of ventilation controls (the vent switch on the CM control module is superior by default)
- Free grouping and combination of fire areas (the DM module which is subordinated to the CM control module or SM sensor module forms one activation mechanism by default)
- Function of LED outputs on the DM
- Connection of pressurised gas generators or retention magnets instead of drives to the DM drive module
- End position signal of drives on the DM drive module
- Mapping of sequence controls with 2 end position evaluations
- Setting for wind direction dependent opening and closing in the event of a fire
- Wind speed threshold for automatic closing
- Wind and rain sensor display mode

Additional features with optional software:

- Saving and recording for commissioning and maintenance, display of recorded faults

Overview of technical data for emergency power control unit MBZ300

GEZE RWA MBZ 300	N10	N24	N48K	N48G	N72
Switch cabinet dimensions (W x H x D)	400 x 500 x 200 mm	600 x 600 x 250 mm	600 x 600 x 250 mm	600 x 800 x 250 mm	600 x 800 x 250 mm
Output current for drives	max. 10 A	max. 24 A	max. 48 A	max. 48 A	max. 72 A
Power supplies (integrated)	1 x 10 A	1 x 24 A	2 x 24 A	2 x 24 A	3 x 24 A
Modules (integrated) PME power module extension	○	○	● 1 PME	● 1 PME	● 2 PME
PM power module	● 1 PM	● 1 PM	● 1 PM	● 1 PM	● 1 PM
CM control module	● 1 CM	● 1 CM	● 1 CM	● 1 CM	● 1 CM
DM drive module	● 1 DM	● 3 DM	● 6 DM	● 6 DM	● 9 DM
Fire areas	1	1	1	1	1
Ventilation groups	1	3	6	6	9
Space for additional modules	8	18	5	13	8
Battery (insertable)	12 Ah	17 Ah (24 Ah, 38 Ah)	24 Ah (38 Ah)	24 Ah (38 Ah)	38 Ah
Battery connection	Flat-pin plug 6.3 mm	MS5 ring terminal	MS5 ring terminal	MS5 ring terminal	MS5 ring terminal

● = Yes ○ = No

Expandability

- Further ventilation groups by installing additional DM drive modules
- Further fire areas or alarm lines by installing additional SM sensor modules

Equipment and configuration

Overview modules and components

- PM power module
- PME power module extension
- CM control module
- SM sensor module
- DM drive module
- WM weather module
- Power supply 10 A, PS10A
- Power supply 24 A, PS24A

Minimum and maximum equipment

- The minimum equipment consists of 1 switch mains adaptor, 1 PM power module, 1 CM control module and 1 DM drive module
- The maximum equipment can consist of up to 64 bus modules with max. 72 A (3 switch mains adapters at 24 A each).
For higher power requirements, several control units can be configured as one unit via the software.

Deciding on the correct design

Switch mains adaptors and power modules

The number of required switch mains adaptors and possibly PME power extensions depends on the maximum drive current. The PM power module is always required. For each additional switch mains adaptor, another PME will be required.

Determine the following based on the maximum power requirement:

- Number of switch mains adaptors (10 A or 24 A, max. 3 switch mains adaptors)
- Number of power module extensions (PME, 24 A max. each, 1 per switch mains adaptor, max. 1 PM + 2 PME).
- Battery types for emergency power supply

Batteries for emergency power supply

Consider the following when choosing the battery:

- Bridging time for emergency power operation in case of power failure
- Max. drive current
- Number and types of modules
- Number of connected detectors

The emergency power supply must be guaranteed for 72 h and motor operation must be possible for a further 180 h after that (2 x opening and 1 x closing) at maximum motor current. This is taken into consideration for the following examples.

Examples for choosing the required battery capacity for MBZ300 standard control units:

Battery capacity	N10	N24	N48K	N48G	N72
12 Ah	Motor current: 10 A 1 x SM, 5 x DM 20 x RWA sensors 30 x smoke detectors	○	○	○	○
17 Ah	○	Motor current: 24 A 1 x SM, 8 x DM 30 x RWA sensors 30 x smoke detectors	○	○	○
24 Ah	○	Motor current: 24 A 4 x SM, 12 x DM 40 x RWA sensors 60 x smoke detectors	Motor current: 48 A 1 x SM, 9 x DM 30 x RWA sensors 40 x smoke detectors	Motor current: 48 A 1 x SM, 9 x DM 30 x RWA sensors 40 x smoke detectors	○
38 Ah	○	Motor current: 24 A 8 x SM, 24 x DM 60 x RWA sensors 60 x smoke detectors	Motor current: 48 A 5 x SM, 22 x DM 60 x RWA sensors 60 x smoke detectors	Motor current: 48 A 5 x SM, 22 x DM 60 x RWA sensors 60 x smoke detectors	Motor current: 72 A 3 x SM, 18 x DM 40 x RWA sensors 60 x smoke detectors

● = Yes ○ = No

For different combinations, the required capacity must be calculated.

GEZE EMERGENCY POWER SUPPLY UNITS

DM drive module for ventilation groups

One DM drive module provides a maximum of 10 A for the connection of a ventilation group.

Worked sample

Power requirement	Drive module 10 A	Switch power supplies	Power modules
16 A	2 (20 A)	1 x 24 A	1 (PM)
30 A	3 (30 A)	1 x 24 A + 1 x 10 A	2 (PM + PME)

CM control module and SM sensor module

A CM control module is required in any case, as this monitors the first fire area. For each additional fire area, another SM sensor module is required.

WM weather module

A WM weather module is needed for wind direction dependent activation. Weather signals for closing during ventilation can also be added to the central sensor input on the CM.

Casing

The casing dimension depends on the number and arrangement of modules, the number of required switch power supplies and size of the batteries.

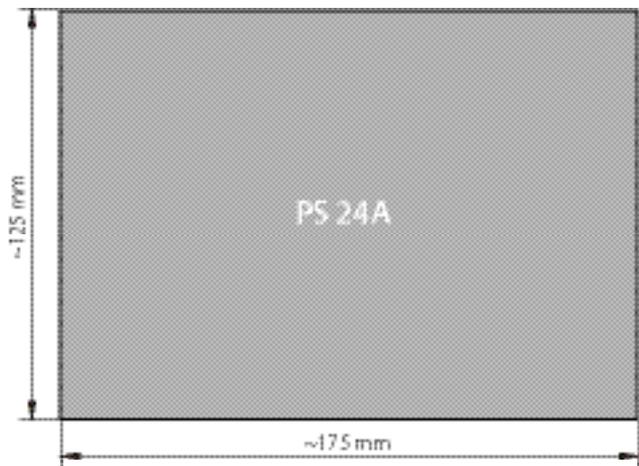
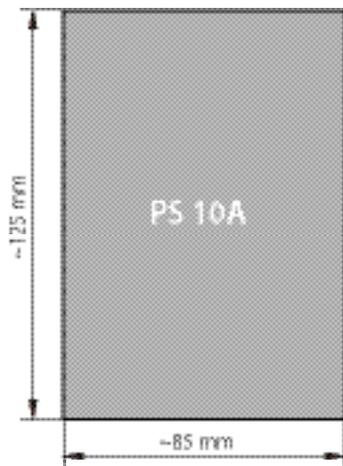
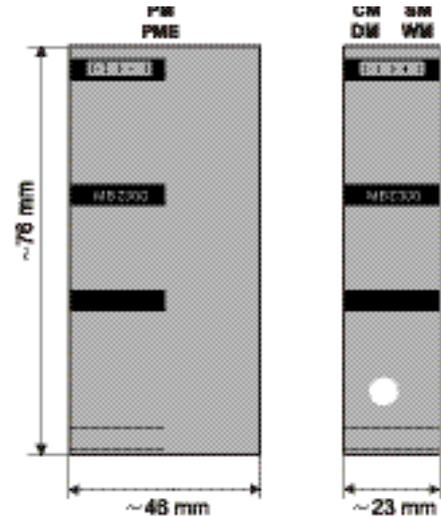
Space requirements of modules and components on the DIN rail (width)

Modules

- CM control module, SM sensor module, DM drive module, WM weather module: approx. 23 mm
- PM power module, PME power extension module: approx. 46 mm

Examples

- PM, CM and DM (minimum equipment):
 $46 + 23 + 23 = 92$ mm
 – or –
 with WM:
 $92 + 23 = 115$ mm



Note: If only one switch power supply with 10 A is used, its space requirement on the DIN rail is added to that of the modules. Otherwise, switch power supplies are on a separate DIN rail.

Battery dimensions

Battery type	Nominal voltage	Capacity	Length	Width	Height	Weight	Pole type
NP 12-12	12 V	12 Ah	151 mm	98 mm	97,5 mm	4.09 kg	6.3 mm
NP 17-12 I	12 V	17 Ah	181 mm	76 mm	167 mm	5.97 kg	M5
NP 24-12 I	12 V	24 Ah	166 mm	175 mm	125 mm	8.92 kg	M5
NP 38-12 I	12 V	38 Ah	197 mm	165 mm	170 mm	13.93 kg	M5

These dimensions apply for 1 battery. Two batteries are needed per control unit.

Connection of the MBZ control unit

The following module connection types apply:

Supply voltage

- PM power module
- PME power module extension
- DM drive module

BUS connection (ribbon cable)

- All modules (only connection with PME – PM on top of module, remaining modules underneath)

External components

- Sensors, drives etc. (push terminal on top of the module)

ORDER INFORMATION – COMPONENTS GEZE EMERGENCY POWER CONTROL UNIT MBZ300

Description	Illustration No.	Id. No.
GEZE emergency power control unit MBZ300 N10	37103-0-010	135366
GEZE emergency power control unit MBZ300 N24	37103-0-011	135367
GEZE emergency power control unit MBZ300 N48K	37103-0-012	135368
GEZE emergency power control unit MBZ300 N148G	37103-0-013	135966
GEZE emergency power control unit MBZ300 N72	37103-0-014	135967
PS 10A power supply	37103-0-008	134333
PS 24A power supply	37103-0-009	134334
PM power module	37103-0-005	134320
PME power module extension	37103-0-006	134331
CM control module	37103-0-001	134316
DM drive module	37103-0-002	134317
SM sensor module	37103-0-003	134318
WM weather module	37103-0-007	134332
CAN module	37103-0-004	134319
12Ah battery set	37103-0-024	020494
17Ah battery set	37103-0-016	111537
24Ah battery set	37103-0-025	020497
38Ah battery set	37103-0-027	135694
MBZ300 spare resistors	37103-1-0124	136448
MBZ300 spare fuses	37103-1-0125	137245
MBZ300 spare resistors	37103-1-0126	137246

Possible combinations of RWA systems

RWA system in combination with a shutter system

For this combination, a sequence control *) is required. This control should ensure that the windows do not open when the shades are down and vice versa (i.e. the shutter system should not obscure/close, whilst the windows are open).

When the windows are opened for airing/ventilation or if the alarm is activated, the emergency power control unit issues a signal to the shutter system in order to open the shades. Only when a customer-supplied limit switch (potential-free opener) on the shutter system signals to the control unit that the shades are fully open, a fitted spindle drive, for example, can be deployed (window opens).

For closing, this process is reversed: Only when the limit switch on the window drive signals to the control unit that the windows are closed, the shutter system can obscure. If the window drive or shutter system does not receive any signals, the windows remain open or closed (STOP).

*) Not a fixed unit, consists of on-site wiring of relays

RWA system in combination with mechanical smoke extraction

Mechanical smoke extraction works independently of a natural smoke extraction system. Nevertheless, there are applications, in which the exhaust air of a smoke and heat extraction system is realised with fans and the fresh air via natural RWAs. Fans, for example, should only start when the fresh air windows are fully open (due to underpressure). In this case, the fans only start, when they receive a potential-free signal from the RWA control unit (external alarm).

Connecting RWA systems to BUS systems

As most systems feature so-called output modules (actuators) with potential-free switch contacts, GEZE RWA systems can be connected to customer-supplied BUS systems such as EIB, LON, CAN etc.

Connecting possibilities:

Alarm function

- As a rule, at least one RWA sensor should be connected
- If desired, the smoke detector can be connected independently from the BUS system
- For "ALARM OPEN", a potential-free closing contact can be connected to the BMZ output (impulse signal is sufficient)
- For "CLOSE/RESET after alarm", a potential-free closing contact is connected parallel to the "CLOSE button" in the RWA sensor (cl. 1 and cl. 4); one impulse signal is sufficient, the motors automatically move into their end position

Ventilation function, OPEN/CLOSE only without STOP

One potential-free closing contact is connected per ventilation group between cl. 1 and cl. 2 (direction OPEN) and cl.1 and cl. 3 (direction CLOSE); one impulse signal is sufficient, the motors automatically move into their end position.

Ventilation function, OPEN/CLOSE and STOP

One potential-free closing contact is connected per ventilation group between cl. 1 and cl. 2 (direction OPEN) and cl.1 and cl. 3 (direction CLOSE) and one potential-free opening contact per ventilation group between cl.1 and cl. 4 (STOP function).

Rain/wind control

The rain/wind control requires a potential-free closing contact. When this signal is present, any ventilation functions are ineffective.

Feedback

The following signals are available potential-free through the additional board "status contacts":

- Alarm, after alarm activation through RWA sensor or smoke detector or BMZ
- Fault, as collective error message for all recordable faults
- Window OPEN

Actuation devices

Actuation devices

Application area: Manual alarm activation:



RWA sensor FT4

GEZE RWA sensor FT4/24 V DC-VdS

RWA sensors FT4 with push button lock are designed for manual alarm activation in the event of a fire. The surface-mounted casing is made of durable aluminium diecast with a replaceable glass pane in accordance with DIN 14655. This casing offers clear quality benefits in terms of protection against vandalism and is particularly recommended for public buildings and institutions.

- Easily recognisable actuation through push button lock
- Max. switching capacity: 100 mA 24 V DC
- Alarm reset button
- With operating mode LEDs
- Flush-mounted

Installation recommendations

- Distance of push button switch to floor 1.4 ±20 cm
- Visible position in stairway or corridor
- RWA sensor must not be covered by door leaves

Description	Version	Id. No.
RWA sensor FT4 VdS-certified	Orange RAL 2011	099561
	Red RAL 3001	106380
RWA sensor FT4	Grey RAL 7035	106382
	Blue RAL 5015	106381
	Yellow RAL 1021	106885

Actuation devices

Actuation devices

Application area: Automatic alarm activation



RM 1003 smoke detector

GEZE smoke detector RM 1003/24 V DC-VdS

The automatic smoke detector type 1003 with VdS certification works according to the optical principle of diffused light and automatically activates the RWA in the event of a fire. With VdS certification. Dimensions: 42 mm x ø 102 mm, weight 120 g

- Air speeds in accordance with DIN EN 54 part 7
- Operating voltage 8 V to 30 V
- Individual display with red LED
- Ambient temperature -20 °C to +60 °C

Note:

Smoke detectors should not be used when operational disturbance variables such as dust, smoke or steam are expected.

Description	Id. No.
RM 1003 smoke detector VdS-certified	112877



WM 1005 heat differential detector

GEZE heat differential detector WM 1005/24 V DC-VdSr

The heat differential detector type 1005 with VdS certification works according to the functional principle of semiconductor temperature sensors. The response values are temperature increase and the temperature threshold of the ambient temperature. With VdS certification. Dimensions: 42 mm x ø 102 mm, weight 120 g

- Operating voltage 8 V to 30 V
- Individual display with red LED
- Ambient temperature -20 °C to +60 °C

Note:

Heat differential detectors should not be used, when fluctuations in operational fluctuations are expected.

Description	Id. No.
WM 1005 heat differential detector VdS-certified	112878

Actuation devices

Ventilation use

Application area: Electric RWA with additional ventilator function



LTA-24 vent switch

GEZE vent switch AS 500 LTA-24

- 24 V mains voltage
- Triple button
- With "Open-Stop-Close" function buttons
- With "Open-Close" LEDs
- Flush-mounted

Description	Id. No.
AS500 LTA-24 vent switch	118473



LTA-24-SCT vent switch

GEZE vent switch AS 500 LTA-24-SCT

- 24 V mains voltage
- Triple button
- With "Open-Stop-Close" function buttons
- With "Open-Close" LEDs
- Combined with key operated switch
- Dual frame
- Flush-mounted

Description	Id. No.
AS500 LTA-24-SCT vent switch	127176



LTA-230 vent switch

GEZE vent switch AS 500 LTA-230

- 230 V
- Triple button
- With "Open-Stop-Close" function buttons
- Flush-mounted

Description	Id. No.
AS500 LTA-230 vent switch	118474



LTA-230-SCT vent switch

GEZE vent switch AS 500 LTA-230-SCT

- 230 V
- Triple button
- With "Open-Stop-Close" function buttons
- Combined with key operated switch
- Dual frame
- Flush-mounted

Description	Id. No.
AS500 LTA-230-SCT vent switch	118475

Actuation devices

Ventilation use

Application area: Electric RWA with additional ventilator function



LTA-LSA vent switch

GEZE vent switch AS 500 LTA-LSA

- 230 V
- Triple button
- With "Open-Close" function buttons
- With choice of switch or engage function
- Flush-mounted

Description	Id. No.
AS 500 LTA-LSA vent switch	118476



LTA-24-AZ vent switch

GEZE vent switch AS 500 LTA-24-AZ

- To be used for MBZ
- 24 V mains voltage
- Dual switch
- With "Open-Close" function buttons
- Flush-mounted

Description	Id. No.
GEZE AS 500 LTA-24-AZ vent switch	129393



Key-operated switch SCT

GEZE key-operated switch SCT

- Flush-mounted
- Supplied without profile cylinder

Description	Id. No.
SCT key-operated switch single pin	117996
SCT key-operated switch 2 pin	118478

Actuation devices



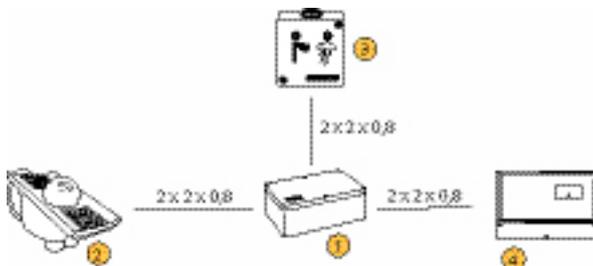
Control unit with evaluation electronics, weather station



Optical display unit

GEZE rain/wind control

The rain/wind control can be connected to several control units without an additional relay (loop through signal). A customer-supplied rain/wind control unit may also be used; this requires a potential-free closing contact on-site.



Components

- ① Control unit with evaluation electronics
- ② Weather station
- ③ Optical display unit
- ④ Transmission to the emergency power control unit via a potential-free switch contact

Control unit with evaluation electronics

The control unit consists of a power supply unit with electronic evaluation system and potential-free switch contacts with microcontroller control of the rain/wind signals. Evaluation can be individual or joint. The weather station is supplied by a 24 V DC/GND/signal input.

Weather station

The weather station unit consists of rain, wind and temperature sensors. The wind is measured electrically by a heated ceramic wire, eliminating the need for traditional mechanical measurement through wind vanes. The rain is measured through a gold-plated conductor path on the surface, which measures even very light rainfall.

If the rain/wind rain control is triggered, the connected vent switches are blocked and all connected drives activated in "CLOSE" direction. However, an alarm takes precedence over the rain/wind control, i.e. the windows are opened in case of an alarm, even if the rain/wind control is active (windows are not closed). The switch point of the wind speed sensor can be set between 1 and 15 m/s.

Description	Id. No.
Rain/wind control (weather station plus evaluation electronics)	091529
Visual display for visual signals during rain and/or wind activity	029238



E70 room temperature controller

GEZE room temperature controller E70

The E70 room temperature controller is used to control interior rooms. The temperature switch point can be set between 5 °C and 30 °C.

Description	Id. No.
E70 room temperature controller	079087

Timer

The connection of a timer allows windows to be opened or closed at pre-set times. A timer can be connected to every vent switch line; this must be set to an impulse signal rather than a continuous signal. Timer and vent switch control elements with equal rights, i.e. the RWA emergency power control unit follows the last signal.

Wiring diagrams and cable plans

Cable lengths and cross-sections

The required cable cross-section between the electric drive and the emergency power supply unit is dependent on the current consumption of the drives and the relevant cable length. As these values vary for each application and we cannot use different terminals for each specific central unit, we supply the central units

- E260 with terminals for cable cross-sections of 4 mm²,
- MBZ300 with terminals for cable cross-sections of 2.5 mm².

The cross-section must be calculated through the formula below and must be adhered to in order to keep the total line resistance and hence the resistance drop at the motors low. It is not calculated from the maximum current.

It is therefore permissible and common to connect cables with a cross-section of 4 mm² (E260) or 2.5 mm² (MBZ300) to the control units; for E260, the cables are split accordingly in an additional distributor box (inside or outside the control unit, close to the control unit).

The DIN rail inside the MBZ300 offers plenty of space to allow the distribution via serial terminals. There is no need for an additional distributor box in this case. From this distributor, large cable cross-sections (with long cable lengths) can be used.

General formula for the required cable cross-section in relation to cable length and total current:

$$\text{Required cable cross-section} = \frac{\text{cable length} \times \text{total current of all drives}}{73}$$

Maximum permissible cable length in relation to total current and cable cross-section

Cross-section	E260 N2 to N32/MBZ300				
	1A	2A	4A	6A	10A
1.5 mm ²	100 m	50 m	25 m	16 m	10 m
2.5 mm ²	180 m	90 m	45 m	30 m	18 m
4.0 mm ²	280 m	140 m	70 m	45 m	28 m

Minimum cross-section: 1.5 mm²

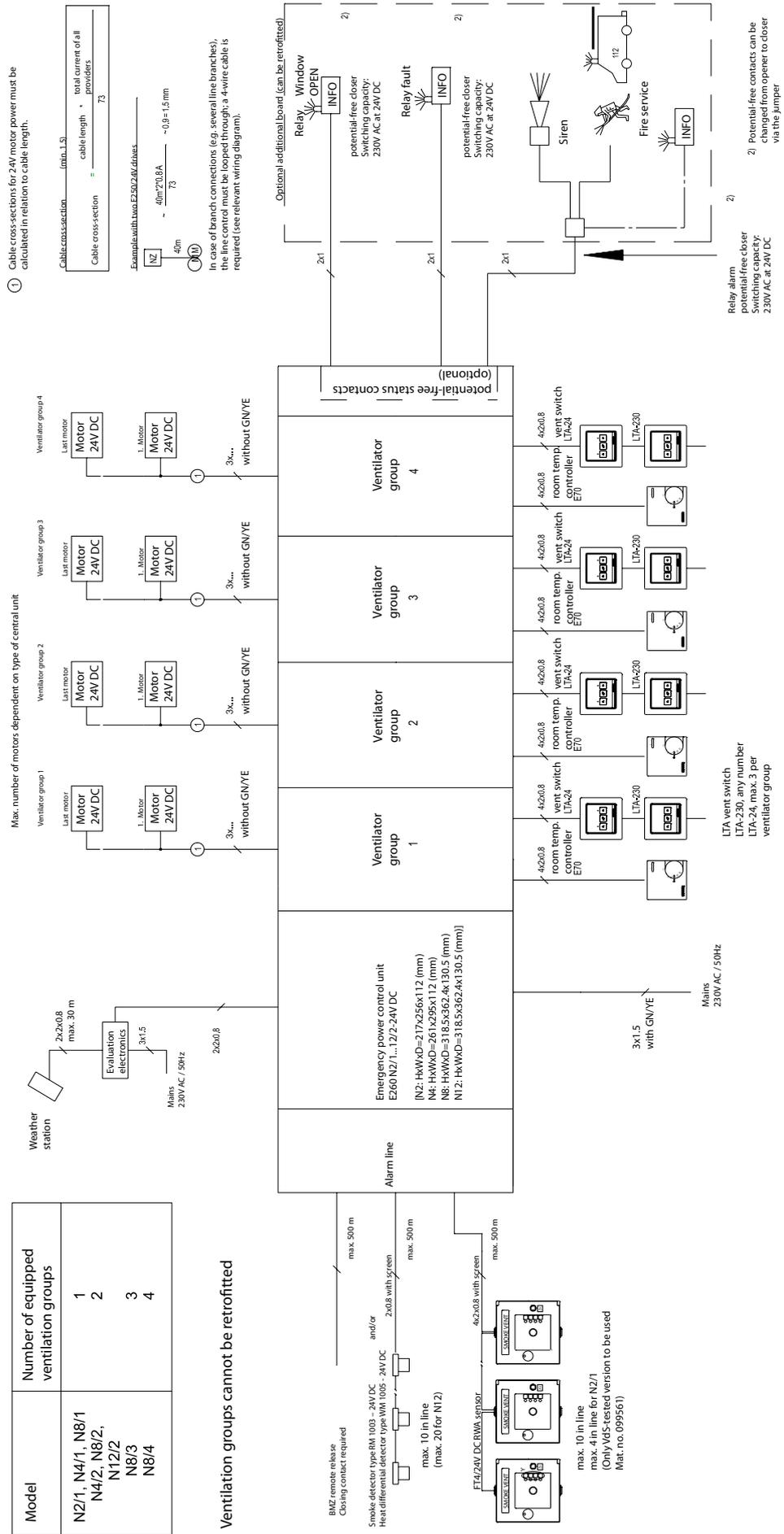
Maximum cross-section: 4.0 mm² for E260
2.5 mm² for MBZ300

Caption to wiring diagrams

Cable cross-sections for 24 V motor power must be calculated in relation to cable length. Minimum cable cross-section 1.5 mm². In case of branch connections (e.g. several line branches), the line control must be looped through; a 4-wire cable is required (see relevant wiring diagram).

E260 wiring diagrams

Drawing no. 37101-9-0951

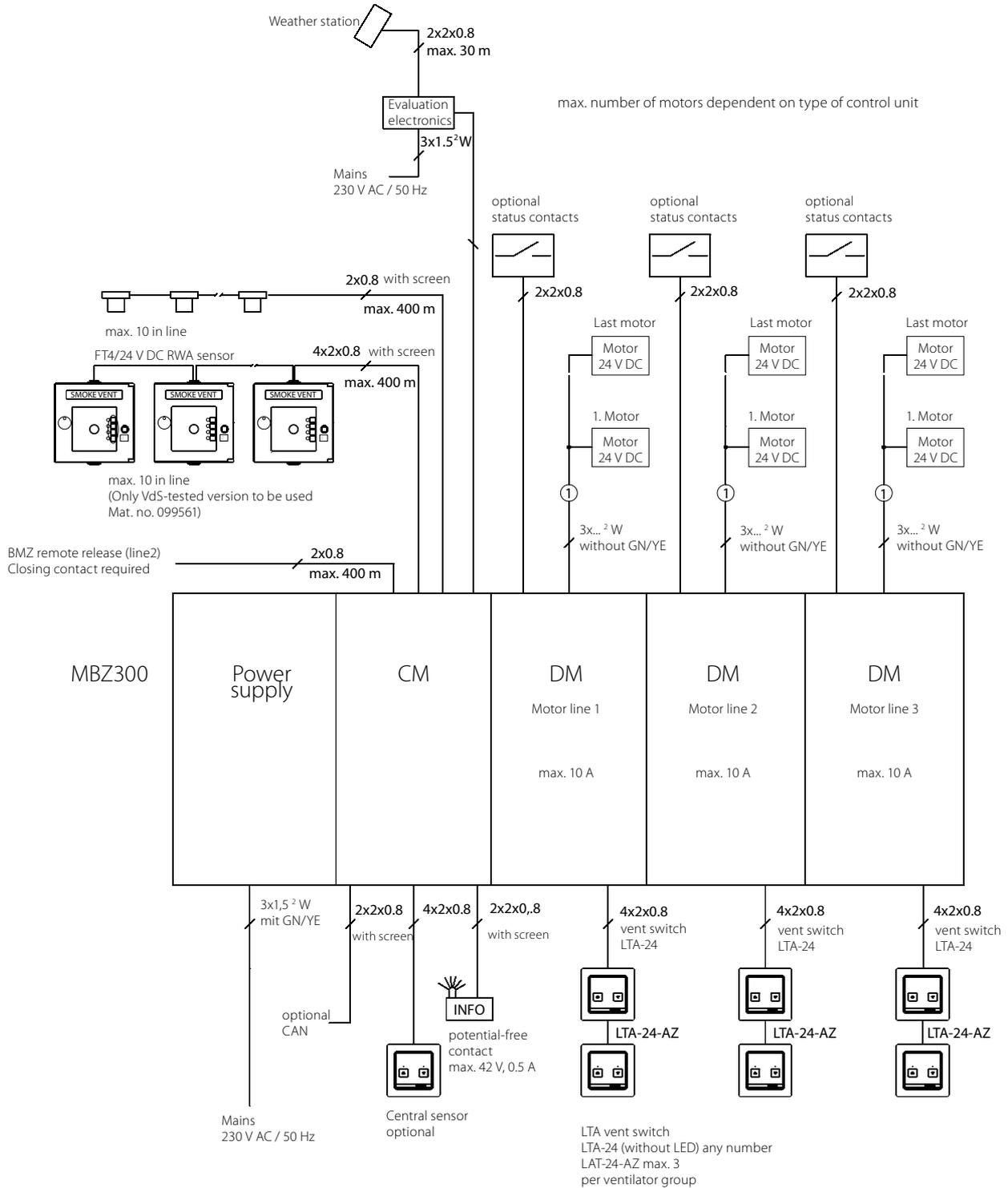


Wiring diagram E260 N2/1 to N12/2 24 V DC – Vds emergency power supply units

GEZE EMERGENCY POWER SUPPLY UNITS

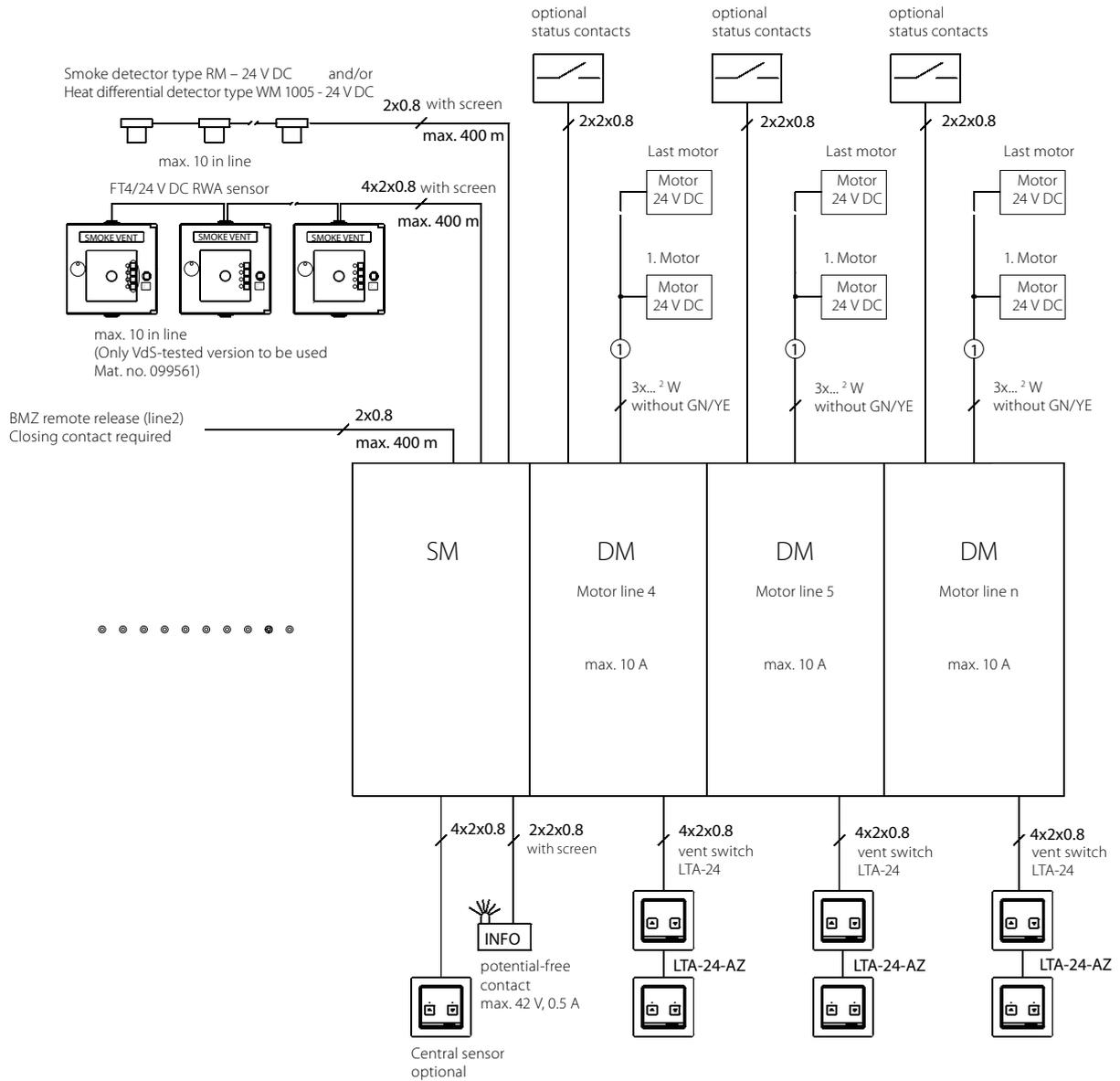
Wiring diagram MBZ300 emergency power supply units

Drawing no. 37101-9-0951



The number of motor lines, ventilator groups, alarm lines and connectable motors is dependent on the configuration of the control unit. (Please note limit of applicability!)

GEZE EMERGENCY POWER SUPPLY UNITS



LEGAL PRINCIPLES RWA**Legal principles RWA ^{*)}****Building law**

Building law has the following objectives:

- Prevent fires from starting
- Prevent fires from spreading
- Secure rescue routes
- Facilitate fire-fighting measures
- Limit environmental pollution in the form of emission of toxic substances, water contamination

*) Please note: This information applies to Germany; it might vary in other countries.

German building legislation is divided into building law and building products law. These are further explained below:

BUILDING LAW**Building law**

Building law centrally governs fire protection regulation for buildings. Because building law is part of the legislation of the individual German federal states, every state has its own regional building law. The same applies to special building codes. This legislation governs all buildings and special buildings regulations. The various codes provide recommendations for the dimensions of smoke conductors and smoke vents. The following section provides an overview of these codes:

MBO:

The model building regulation (MBO) is the jointly developed common foundation for regional building law. It contains fire protection objectives, general statutory requirements that must be followed for all buildings.

Model building regulation (MBO) para. 3, sec. 1 (version November 2002)

“Works shall be arranged, erected, modified and maintained in such a way that public safety and order, in particular human life, health and natural resources, are not endangered.”

Model building regulation (MBO) para. 14 (version November 2002)

“Building works shall be arranged, erected, modified and maintained in such a way that the origin and spread of fire and smoke can be prevented and the rescue of humans and animals as well as effective fire-fighting measures are facilitated in the event of a fire.”

The general requirements of the MBO are analogously adopted by regional building law and substantiated with further requirements in the legal texts of the relevant building regulation and its supplementary provisions for special buildings. The federal states' special building codes, too, are based on this model code. In addition, public-law and private guidelines apply.

For this reason, the following tables can only give an overview and it is essential to also consider the provisions of the respective federal state, in which a physical structure is to be erected.

Model building regulation (MBO) para. 35, sec. 8 (version November 2002)

“Essential stairwells must be ventilated. On each level above ground level, they must feature windows leading directly outside with a free cross-section of at least 0.5 m² which can be opened. Essential internal stairwells and essential stairwells in buildings of more than 13 m height (in accordance with para. 2, sect. 3, clause 3) require an opening for smoke conduction at their highest point, which must have a free cross-section of at least 1 m²; this must be accessible for opening from the ground level as well as from the top landing.”

Model building regulation (MBO) para. 37, sec. 4 (version November 2002)

“Every basement level without windows must have at least one outdoor opening to facilitate smoke conduction. Joint basement lightwells for several basement levels are not permissible.”

Model building regulation (MBO) para. 39, sec. 3 (version November 2002)

“Elevator shafts must be ventilated and have an opening for smoke conduction with a free cross-section of at least 2.5% of the base area and a minimum of 0.1 m². The smoke release openings must be positioned in such a way that the smoke release is not affected by the wind.”

Model building regulation (MBO) para. 51 (version November 2002)

In order to meet the general requirements of para 3, sect. 1, special constructions can be subject to special “requirements. (...)”

11. In terms of ventilation and smoke conduction (...).”

BUILDING LAW**Requirements of MBO and LBO relating to smoke extraction and ventilation**

The following table provides an overview of the requirements of the various regional building laws with regards to smoke conduction in stairwells. For information on smoke conduction and ventilation in base-ment levels and elevator shafts, please consult GEZE GmbH.

Note:

Find below extracts of current regulations. Please note that these are subject to constant updates.

German state	Pro- vision	Date of issue	Use of smoke conduction	Location of smoke conduction	Size of smoke conduction	Location of operating points	Ventilation
	Model building regu- lation (MBO)	Version November 2000	For essential internal stairwells and essential stairwells in buildings of more than 13m	At highest point	With a free cross- section of at least 1 m ²	Ground level and top landing	Essential stairwells: On each level above ground windows leading directly out- side with a free cross-section of at least 0.5 m ² which can be opened
Baden- Württem- berg	Regional building regula- tion (LBO)	Version November 2000	No provision for smoke conduction/ smoke extraction -> only for special constructions				Sufficient ventilation toilet + bathrooms
Bavaria 2008	Regional building regula- tion (LBO)	14 July 2007	For essential internal stairwells and essential stairwells in buildings of more than 13 m	At highest point	With a free cross- section of at least 1 m ²	Ground level and top landing	Essential stairwells: On each level above ground windows leading directly out- side with a free cross-section of at least 0.5 m ² which can be opened
Berlin	Regional building regula- tion (LBO)	11 June 2006	For essential internal stairwells and essential stairwells in buildings of more than 13 m	At highest point	With a free cross- section of at least 1 m ²	Ground level and top landing	Essential stairwells: On each level above ground level windows leading directly outside of at least 0.6 m x 0.9 m (width x height) which can be opened and feature a window sill of not more than 1.2 m
Brandenburg	Regional building regula- tion (LBO)	16 July 2003	For essential internal stairwells and essential stairwells in buildings of more than 13m. Not for residential buildings with less than 2 apartments	At highest point	With a free cross- section of at least 1 m ²	Ground level and top landing	Essential stairwells: On each level above ground windows leading directly out- side with a free cross-section of at least 0.5 m ² which can be opened
Bremen	Regional building regula- tion (LBO)	27 March 1995	Buildings with more than 5 storeys above ground level as well as internal stairwells	At highest point of stairwell	With a free cross- section of at least 5% of the base area and a mini- mum of 1 m ²	Ground level and top landing Fur- ther operating points might be approved.	Stairwells on exterior walls: On each level above ground level windows leading directly outside of at least 0.6 m x 0.9 m (width x height) which can be opened and feature a window sill of not more than 1.2 m

– continued overleaf –

BUILDING LAW

Requirements of MBO and LBO relating to smoke extraction and ventilation

– continued –

German state	Pro- vision	Date of issue	Use of smoke conduction	Location of smoke conduction	Size of smoke conduction	Location of operating points	Ventilation
Hamburg	Regional building regulation (LBO)	14 December 2005	For essential internal stairwells and essential stairwells in buildings of more than 13m	At highest position	With a free cross-section of at least 1 m ²	Ground level and top landing	Essential stairwells: On each level above ground windows leading directly outside with a free cross-section of at least 0.5 m ² which can be opened
Hesse	Regional building regulation (LBO)	18 June 2002	For essential internal stairwells in class 5 buildings	At highest position	With a free cross-section of at least 1 m ²	Ground level and top landing	Essential stairwells: On each level above ground windows leading directly outside with a free cross-section of at least 0.5 m ² which can be opened
Mecklenburg-Vorpommern	Regional building regulation (LBO)	18 April 2006	For essential internal stairwells and essential stairwells in buildings of more than 13 m	At highest position	With a free cross-section of at least 1 m ²	Ground level and top landing	Essential stairwells: On each level above ground windows leading directly outside with a free cross-section of at least 0.5 m ² which can be opened
Lower Saxony	Regional building regulation (LBO)	Version November 2000	No information on smoke conduction/smoke extraction				Stairwells must be ventilated
North Rhine-Westphalia	Regional building regulation (LBO)	1 March 2000	Buildings with more than 5 storeys above ground level as well as essential internal stairwells	At highest position of stairwell	With a free cross-section of at least 5% of the base area and a minimum of 1 m ²	Ground level and top landing Further operating points might be approved.	Essential stairwells: On each level above ground windows leading directly outside with a free cross-section of at least 0.5 m ² which can be opened
Rhineland-Palatinate	Regional building regulation (LBO)	24 November 1998	Buildings with more than 5 storeys above ground level as well as essential stairwells, which are not located on the outside wall	At highest position of stairwell	With a free cross-section of at least 5% of the base area and a minimum of 1 m ²	Ground level and top landing Further operating points might be approved.	Stairwells must be ventilated. Essential stairwells on exterior walls for building class 4 + 5 must have on each level above ground level windows leading directly outside of at least 0.6 m x 0.9 m (width x height) which can be opened and a window sill of not more than 1.2 m
Saarland	Regional building regulation (LBO)	18 February 2004	For essential internal stairwells and essential stairwells in buildings of more than 13 m height.	At highest position of stairwell	With a free cross-section of at least 1 m ²	Ground level and top landing	Essential stairwells: On each level above ground windows leading directly outside with a free cross-section of at least 0.5 m ² which can be opened
Saxony	Regional building regulation (LBO)	28 May 2004	For essential internal stairwells and essential stairwells in buildings of more than 13 m height.	At highest position	With a free cross-section of at least 1 m ²	Ground level and top landing	Essential stairwells: On each level above ground windows leading directly outside with a free cross-section of at least 0.5 m ² which can be opened
Saxony-Anhalt	Regional building regulation (LBO)	20 December 2005	For essential internal stairwells and essential stairwells in buildings of more than 13 m height.	At highest position of stairwell	With a free cross-section of at least 1 m ²	Ground level and top landing	Essential stairwells: On each level above ground windows leading directly outside with a free cross-section of at least 0.5 m ² which can be opened
Schleswig-Holstein	Regional building regulation (LBO)	10 January 2000	Buildings with more than 5 storeys above ground level as well as essential internal stairwells	At highest position of stairwell	With a free cross-section of at least 5 % of the surface area, but at least 1 m ²	Ground level and top landing Further operating points might be approved.	Stairwells on exterior walls: On each level above ground level windows leading directly outside of at least 0.6 m x 0.9 m (width x height) which can be opened and feature a window sill of not more than 1.2m
Thuringia	Regional building regulation (LBO)	16 March 2004	For essential internal stairwells and essential stairwells in buildings of more than 13 m height.	At highest position of stairwell	With a free cross-section of at least 1 m ²	Ground level and top landing	Essential stairwells: On each level above ground windows leading directly outside with a free cross-section of at least 0.5 m ² which can be opened

BUILDING LAW

Requirements of model special building regulations

The following special constructions require special regulations:

- High-rise buildings
- Lodgings
- Shops
- Places of public assembly
- Schools
- Hospitals
- Industrial buildings

Note:

Find below extracts of current regulations. Please note that these will be constantly updated.

Special building code	Date of issue	Building type
Model school building code	Version July 1998	Smoke conduction
Model shop building code	Version September 1995	Smoke conduction and ventilation
Model public assembly building code	Version June 2006	Smoke extraction, smoke conduction and ventilation
Model hospital building code	Version December 1976	Smoke extraction and ventilation
Model industrial building code	Version March 2000	Smoke conduction, smoke extraction and ventilation
Model high-rise building code	Version May 1981	Smoke conduction, smoke extraction and ventilation

BUILDING PRODUCT LAW

Building product law

Building product law governs the requirements for building products:

EN 12101 part 10 and prEN 12101 part 9

Legal principles

EN 12101 parts 9 and 10 define the requirements for building products, control boards and energy supplies for RWA systems and govern testing, classification and CE labelling. CE labelling aims to facilitate the import and export of goods within the European Union.

Certification in accordance with EN 12101 part 10 and prEN 12101 part 9
The conformity procedure of EN 12101-9 and 10 is detailed in Annex ZA.

Product	Intended use	Certificate of conformity system
Control boards and energy supplies for RWA systems	Fire protection	1

Annex ZA of this standard is compulsory for:

- Initial type testing (ITT)
- Factory production control (FPC)
- Initial visit and ongoing external quality control by notified body

Further directives are the **MLAR** (example guidelines in fire protection concerning power supply cable layouts) and **DIN VDE 0833: MLAR requirement for cables (version March 2000)**.

According to the example directive for power supply cable layouts (MLAR), functional integrity of the E30 classification is sufficient for natural smoke extraction systems. Such cables must be tested and approved according to DIN 4102 part 12. Furthermore, cables must be laid in accordance with the specifications of the cable manufacturers and using the relevant fastening materials.

Exemptions pursuant to MLAR (version March 2000)

The functional integrity of RWA cables can be foregone if an early fire recognition trigger with the parameter SMOKE (smoke detector) monitors the entire cable run and the activation of the automatic sensor causes the RWA to open. In practice, this means that rooms, which house a RWA cable and RWA components must be monitored by a smoke detector, if the cable is not to be E30 compliant.

Flush-mounted installation

It must be considered that a flush-mounted installation does not constitute compliance with DIN 4102 part 12 with regards to functional integrity. If flush-mounted cables are to satisfy the requirements of functional integrity, they must also comply with the classification E30 or the room must be monitored by with smoke detectors.

Operating time

Referring to **DIN VDE 0833-2 (6.1.6 / 2004)**, the RWA system must "be maintainable for at least 72 hours" in the event of a power failure.

SERVICING AND MAINTENANCE

Servicing and maintenance

In accordance with MBO, builders and/or owners have a basic obligation to keep a building properly maintained, as "works...() shall be arranged, erected, modified and maintained in such a way that public safety and order, in particular human life, health and natural resources, are not endangered." Building products may not be used without proper maintenance procedures in place (**cf. para. 3, sect. 1 and 2 MBO**).

The builder or client has sole responsibility for ensuring servicing work, maintenance and inspections are carried out. All components must be checked for damage or deformation on a regular basis. The operator of an RWA system is obligated to put in place all safety measures required to avert risks to persons and objects in the building.

By ensuring the correct functioning of smoke and heat extraction systems through regular servicing work, the operator considerably reduces the actual risk of damage and, at the same time, his or her liability in the event of damage. By adopting this practice, he/she will be able to document at any time that he/she has met his/her obligations in terms of keeping RWA systems fit and ready for operation.

Examples of laws and regulations

German Basic Law art. 2:

"Every person shall have the right to life and physical integrity."

Model building regulation (MBO) para. 3, sec. 1 (version November 2002)

"Works shall be arranged, erected, modified and maintained in such a way that public safety and order, in particular human life, health and natural resources, are not endangered."

Model building regulation (MBO) para. 14 (version November 2002)

"Building works shall be arranged, erected, modified and maintained in such a way that the origin and spread of fire and smoke can be prevented and the rescue of humans and animals as well as effective fire-fighting measures are facilitated in the event of a fire."

**SERVICING AND
MAINTENANCE****DIN VDE 0833-1 (5.3.4 / 2003)**

“Servicing work must be carried out according to the manufacturer’s specifications, with site-specific operating conditions taken into consideration – but at least once a year.”

DIN 18232 part 2 (version November 2007)

The functional capacity and operational readiness of extraction systems and their operation and control elements, opening units, power supplies and accessories must be inspected, serviced and, if necessary, repaired at regular intervals as stipulated by the manufacturer (as a rule, once a year). These inspections and servicing procedures must be recorded in a logbook. Inspections must only be carried out by companies qualified in dealing with natural smoke extraction systems.

Ordinance on Monitoring Home Automation Systems

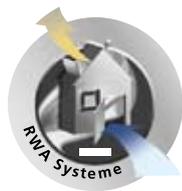
In addition to regular annual maintenance, RWA systems in so-called physical structures of special type and use (such as office buildings, places of public assembly, car parks) are inspected every three years by a building law/state-approved expert. Regular servicing is a major prerequisite of these compulsory inspections. The maintenance company usually assumes the operator’s responsibility to provide suitable technical staff for the inspection of the system by experts. The regulations for the inspection of technical systems of the various German federal states contain special provisions for servicing and maintenance requirements.

Thus, the following rules should be followed with regards to the servicing and maintenance of RWA systems:

- RWA systems must be maintained and, if required, serviced at least once a year.
- Maintenance must be carried out by technical experts. Proof of this expertise must be given. Experts must be authorised by GEZE.
- Inspections must be recorded in a logbook.

Support during installation and commissioning

GEZE offers consultation support through authorised partner companies or the parent company itself. The installation and functional testing of a smoke and heat extraction system must always be carried out by the manufacturer or a specialist company authorised by the manufacturer. This ensures that system-relevant functions are correctly fulfilled. The RWA system must be approved by an expert.



Design steps for an RWA system

Calculation of smoke extraction area

A 'smoke outlet' means a smoke removal system in the event of fire (heat smoke removal) as a result of which a stable, low-smoke layer develops close to the ground which enables the safe use of emergency exits. The system creates a stable, low-smoke layer of air in vicinity to the ground, which facilitates the use of escape and rescue routes. In accordance with DIN EN 12101 part 2, a SHEV must always be used in Germany if a natural „smoke outlet“ is required by construction regulations.

The smoke extraction system is used to extract the cold smoke, which tends to linger in a building after a fire. This building product is not safety-related and is listed in Building Code part C.

The smoke extraction area is calculated for each smoke area on the basis of the measurement group, the room height and the height of the low-smoke layer from the relevant table 3 of DIN 18232 part 2. The total smoke extraction area is then divided by the relevant number of façade openings and skylights (smoke extraction system: natural smoke extraction).

The appropriate rules, which are stipulated by the regulation, must be followed.

The façade openings, which have been calculated through this formula, should be installed with a distance of no more than 0.5 m between the upper edge and the ceiling in at least two opposing external walls of a smoke area. The façade openings must be positioned entirely in the smoke layer; the lower edge of the exhaust air opening should be positioned at least 0.5 m above the boundary to the calculated low-smoke layer (according to table 3, DIN 18232 part 2).

Calculation of intake opening

The intake openings must be positioned entirely in the low-smoke layer and measure at least 1.5 times the size of the extraction area. In addition, the correction factors detailed in DIN EN 18232-2 must be considered.

The top edge of the intake opening must be at least 1 m away from the smoke layer boundary. In the vicinity of doors or windows with a maximum width of 1.25 m, this clearance can be reduced to 0.5 m. In any case, it must be ensured that the inflowing air does not flow directly into the smoke gas layer and causes the smoke gases to mix. The fresh air must be conducted into the building close to the ground and with maximum possible distance to the smoke gas layer.

Various systems are available as drive units for exhaust and fresh air openings. State of the art linear, spindle, scissor and chain drives tried and tested in many practical applications. These systems are available in various performance classes. The choice of the right drive for the relevant opening system (dependent on dimensions, weight, installation type) will ensure many years of functional reliability.

Control design

The RWA emergency power supply unit is the central control unit, to which various components are connected. This unit ensures the power supply of the RWA openings with batteries for at least 72 h in the event of a fire. Thus, the current consumption of the different system components must be considered in the planning phase and the performance class of the central control unit chosen accordingly.

Planning and cabling

According to the example directive for power supply cable layouts (MLAR), functional integrity of the E30 classification is sufficient for natural smoke extraction systems. Such cables must be tested and approved in accordance with DIN 4102 part 12. Furthermore, cables must be laid in accordance with the specifications of the cable manufacturers and using the relevant fastening materials.

Exemptions pursuant to MLAR (version March 2000)

The functional integrity of RWA cables can be foregone if an early fire recognition trigger with the parameter SMOKE (smoke detector) monitors the entire cable run and the activation of the automatic sensor causes the RWA to open. In practice, this means that rooms, which house a RWA cable and RWA components, must be monitored by a smoke detector, if the cable is not to be E30-compliant.

Flush-mounted installation: It must be considered that a flush-mounted installation does not constitute compliance with DIN 4102 part 12 with regards to functional integrity. If flush-mounted cables are to satisfy the requirements of functional integrity, they must also comply with the classification E30 or the room must be secured with smoke detectors.

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