

Smoke and heat unit EN 2.5A-1-1



2.5 A max. nominal motor current at 24 V DC
1 ventilation group
1 RWA group

Technical documentation



WINDOWDRIVES
BSC TECHNOLOGY

Contents

1	Device view	3
1.1	Control unit overview.....	3
1.2	Assembly instructions	4
1.3	Differentiation between 2.5A-1-1 Standard and Basic	5
2	Installation.....	6
2.1	General	6
2.2	Regulations and installation instructions	6
2.3	Accident prevention regulations	6
2.4	Layout of a control unit.....	6
2.5	Connection of the motorised openers.....	7
2.5.1	Determination of the conductor cross sectional area.....	7
2.5.2	Cable types.....	7
2.6	Signal relays.....	8
2.7	Connecting the rechargeable batteries.....	9
2.8	Connection and adjustment of the wind/rain sensor WRF 501	10
2.8.1	Setting instructions for the wind/rain sensor 501.....	11
3	Functional description	12
3.1	Smoke and heat vent (triggered) operation	12
3.1.1	FAS (fire alarm system) input.....	12
3.1.2	Automatic detector line.....	13
3.2	Ventilation mode	13
3.3	Open display	13
3.4	Stroke limitation	14
3.5	Automatic closing.....	14
3.6	24V output (switched)	14
3.7	Buzzer output.....	14
4	Commissioning	15
5	Operation	17
5.1	Display and control elements on the board.....	17
5.2	Definition of LEDs flashing / blinking.....	18
5.3	Explanation of the function and control elements	18
5.4	Acoustic signals.....	20
5.5	Fuses on the board	21
5.6	Delivery condition	21
6	Programming.....	22
6.1	Menu overview	23
7	Fault-finding / troubleshooting.....	29
8	Maintenance.....	31
9	Technical data.....	32
9.1	Housing of type 2.5A-1-1-Basic.....	32
9.2	Housing of type 2.5A-1-1	32
9.3	Common technical data	32
9.3.1	Dimensioning the rechargeable battery capacities	33
10	Circuit diagrams.....	34
Figure 1: Device view control unit.....		3
Figure 2: Housing interlocking		4
Figure 3: Device view control unit EN 2.5A-1-1		5
Figure 4: Device view control unit EN 2.5A-1-1-Basic		5
Figure 5: View of batteries		9
Figure 6: Connection of wind/rain sensor WRF 501 or rain sensor RS 501		10
Figure 7: Operating switch		11
Figure 8: Buttons on the board.....		11
Figure 9: Displays on the board		11
Figure 10: Display and control elements.....		17
Figure 12: Fuses on the board		21
Figure 13: Display and control elements.....		22

1 DEVICE VIEW

1.1 Control unit overview

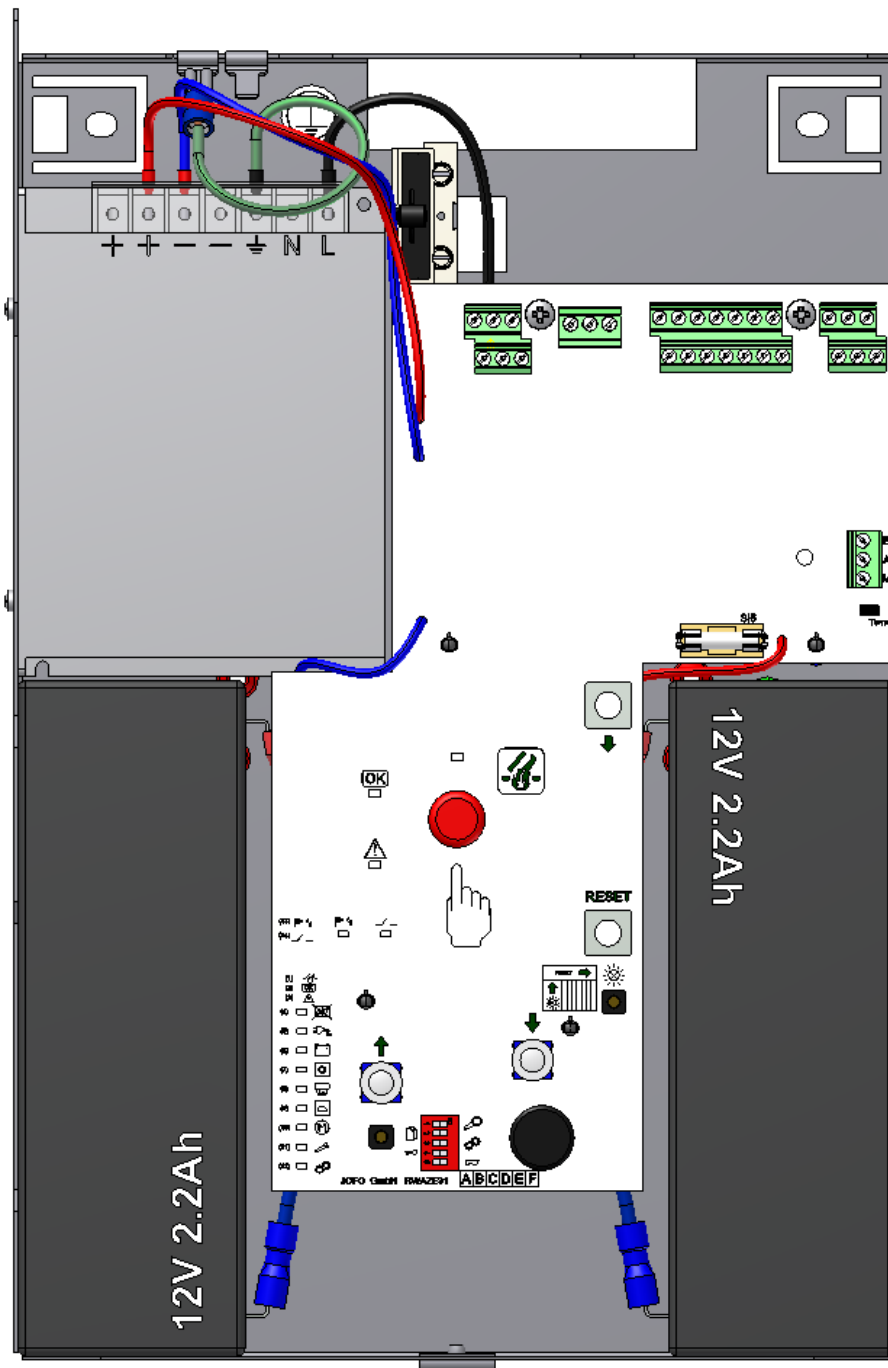


Figure 1: Device view control unit

1.2 Assembly instructions

Assembly per VdS 2221: 2000-04

It must be possible to actuate the manual control device from a safe location in the event of fire.

The manual control device must be ...

... highly visible when installed.

... freely accessible.

... marked with an additional information sign in accordance with DIN 4066 if necessary.

... installed such that the **pushbutton is located $1.4\text{ m} \pm 0.2\text{ m}$** above the upper edge of the finished flooring (UEFF).

... sufficiently illuminated by daylight or another source of light.

If safety lighting is present then this must also illuminate the manual control device.

... installed in the vicinity of a door if possible.

Assembly/disassembly - control unit

Before assembly and for the subsequent installation of the control unit, it is necessary to **actuate** the **interlocking latch (B)** to separate the **control unit housing (A)** from the **mounting plate (C)** with the aid of a suitable tool (D).

Sequence:

- 1.) Press lightly on the **interlocking latch (B)** beneath the **control unit**, to disengage the **control unit housing (A)**.
At the same time, **pivot** the **control unit housing (A)** forwards, **lift** and **slide it upwards**.
- 2.) Lift the **control unit housing (A)** out of the attachment and set it aside.
(if necessary, first release the earth cable from the **mounting plate (C)**)
- 3.) Fasten **mounting plate (C)** with the help of the drill template.
(For mounting height, see above)
- 4.) Perform the **installation**.
- 5.) Insert rechargeable batteries and put the **control unit** into operation.
- 6.) Connect earth cable from the **control unit housing (A)** with the **mounting plate (C)**.
- 7.) Guide **control unit housing (A)** over **mounting plate (C)**, **attach** and **pivot** into the interlocking position until the **interlocking latch (B)** latches securely

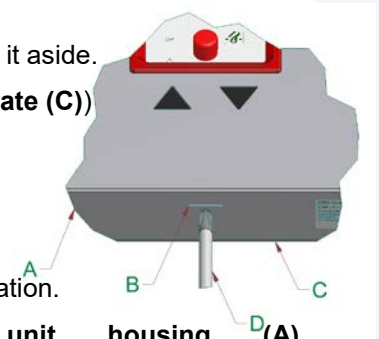


Figure 2: Housing interlocking

1.3 Differentiation between 2.5A-1-1 Standard and Basic

The standard version is equipped with controls on the front of the housing.

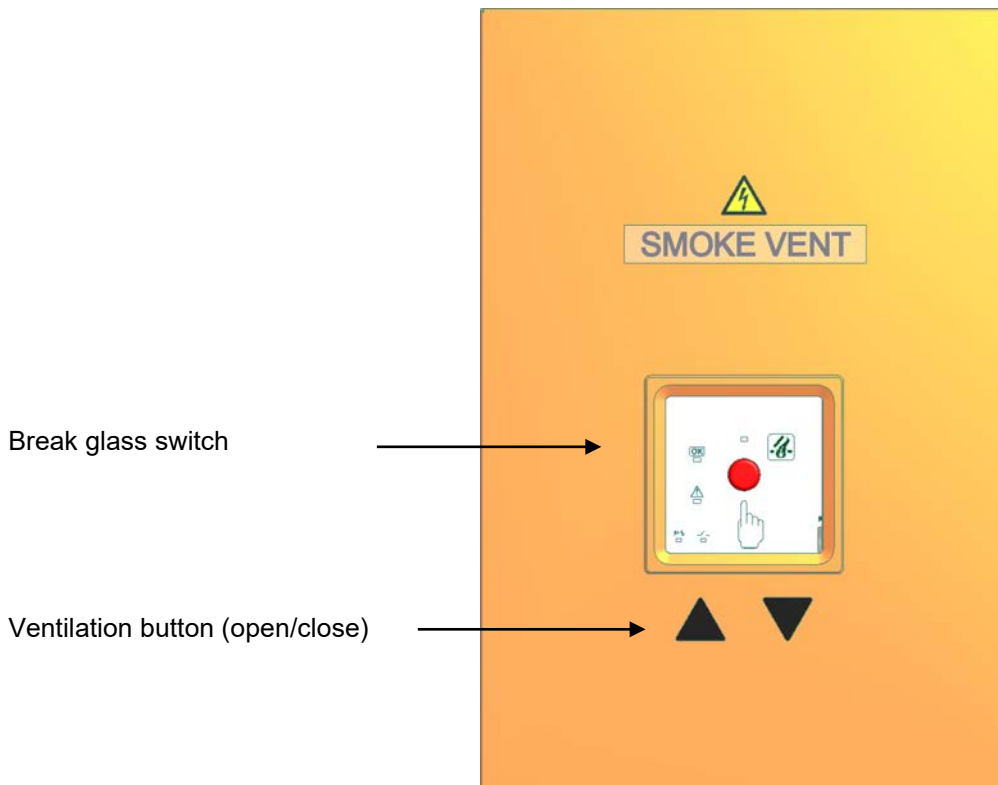


Figure 3: Device view control unit EN 2.5A-1-1



Figure 4: Device view control unit EN 2.5A-1-1-Basic

2 INSTALLATION

2.1 General

Installation, commissioning, repair and maintenance of the RWS control unit may only be undertaken by trained specialist personnel. The control unit has been developed, based on EN 12101 parts 9 and 10.

2.2 Regulations and installation instructions

With installation, integration and commissioning, the following regulations and instructions should be observed:

- State building regulations
- DIN 18232 – Constructional fire protection in industrial buildings
- VdS – directive 2098
- Regulations from the fire protection authority responsible
- The directive ZH 1/494 for powered windows, doors and gates
- VDE 0100, VDE 0108
- The regulations from the energy supply company (EVU) responsible
- Installation location for the control unit should be selected such that it is freely accessible for subsequent maintenance and repair
- The housing should be fastened to the wall
- An external disconnecting device must be provided for the 230V AC supply line.

2.3 Accident prevention regulations

The general accident prevention regulations for powered windows, doors and gates and the installation regulations from the German electrical engineering association [VDE] must be observed.

Important warnings

Before removing a component, the system must be completely de-energised.

- **First, disconnect the rechargeable batteries**
- **Then switch off the mains power supply**
- **To protect the electronic components, the installation technician must electrostatically discharge themselves → (by touching the earth connection with a finger) prior to working on the circuit boards**
- **When switching back on again, the voltages must be applied again in reverse order**

2.4 Layout of a control unit

The control unit has **1** motor line, **1** manual alarm line, **1** automatic alarm line and an input for the FAS (central fire alarm system) and therefore offers the possibility to connect the following equipment:

- **Motors:** The motor line can be loaded with a nominal current of up to 2.5A. Due to the start-up currents of the motors, when selecting motors for connection consult with the manufacturer.
- **Detectors:** Up to 5 break glass switches can be connected to the manual alarm line. Up to 10 automatic alarms [optical smoke detectors, max. heat detectors or differential heat detectors] can be connected to the automatic alarm line, individually or using dual detector interconnections.

2.5 Connection of the motorised openers

The control unit has one motor line, which is designed for the connection of 24 V motors. A maximum nominal output current of 2.5A must not be exceeded. Due to the motor start-up currents that arise, it is possible that the nominal current may be exceeded. It is therefore essential to consult with the control unit manufacturer when selecting the motors for connection.

It is possible to select the type of line monitoring in the set-up menu. In the default position, it is possible to choose between two different motor line monitoring options:

- 1.) Dual-wire monitoring with the capacitor in the motor line. This type of monitoring must be approved by the manufacturer.
- 2.) With the help of a 33k Ohm resistor (in the bag enclosed), the M+ signal (terminal 11) on the last drive is looped back to the third motor supply conductor, which must be connected to terminal 13.

2.5.1 Determination of the conductor cross sectional area

When using motorised openers, the length of the motor lines is restricted due to voltage losses. Here, the nominal current of the connected drives and the cross sectional area of the conductor are critical for the maximum permissible line length.

The following table shows the maximum permissible line length depending on the **nominal current of the motorised opener connected** and the cross sectional area of the conductor:

Current draw (I) per motor line in [A]	Number of conductor cores required (without protective conductor)	Max. permissible single line length to the last motor in [m]
1.0A	2 x 1.5mm ²	84
1.0A	2 x 2.5mm ²	140
1.0A	2 x 4.0mm ²	224
1.5A	2 x 1.5mm ²	56
1.5A	2 x 2.5mm ²	93
1.5A	2 x 4.0mm ²	150
2.0A	2 x 1.5mm ²	42
2.0A	2 x 2.5mm ²	70
2.0A	2 x 4.0mm ²	112
2.5A	2 x 1.5mm ²	33
2.5A	2 x 2.5mm ²	56
2.5A	2 x 4.0mm ²	89

2.5.2 Cable types

All cable types must be ratified with the authorities responsible and the fire protection authorities or the local fire department in all instances.

2.6 Signal relays

2 relays, each with a potential-free changeover contact, are provided for passing on status signals from the control unit.

The 1st. signal relay is pre-programmed as a fault relay (terminals, 5, 6, 7) and serves to pass on fault signals.

The 2nd signal relay is pre-programmed as a triggering relay (terminals, 8, 9, 10) and serves to pass on triggering.

The switching powers can be found in the "Technical details" chapter.

In normal condition:

- **The Fault relay is energised and drops out in the event of a fault.**
- **The triggering relay is de-energised and engages in the event of a fault.**

<u>Contact closed:</u>	Term. 7 + 5:	Fault
	Term. 7 + 6:	No fault
	Term. 10 + 8:	No triggering
	Term. 10 + 9:	Triggering

The function of the signal relays can be changed in the set-up mode.

The following functions can be set:

Function	Contact position	Information
1. Signal relays		
Terminals 5,6 and 7		
Fault	7 + 5	Fault active
	7 + 6	Normal operation with no fault
Wind-rain forwarding	7 + 5	Vent. forbidden active
	7 + 6	Ventilation allowed
Triggering relay	7 + 5	Normal operation with no triggering
	7 + 6	Triggering
2. Signal relays		
Terminals 8, 9 and 10		
Fault	10 + 8	Fault active
	10 + 9	Normal operation with no fault
Wind-rain forwarding	10 + 8	Vent. forbidden active
	10 + 9	Ventilation allowed
Triggering relay	10 + 8	Normal operation with no triggering
	10 + 9	Triggering active

2.7 Connecting the rechargeable batteries

When connecting the rechargeable batteries care should be taken to ensure the polarity is correct. **Incorrect connection can result in the circuit board being destroyed immediately.** The red line always represents the positive terminal connection and the blue line always represents the negative terminal connection of the rechargeable battery. The connection lugs on the rechargeable batteries are colour-coded accordingly. The connection line between two rechargeable batteries is also implemented as a blue line. This connects a positive terminal with a negative terminal of another rechargeable battery respectively.

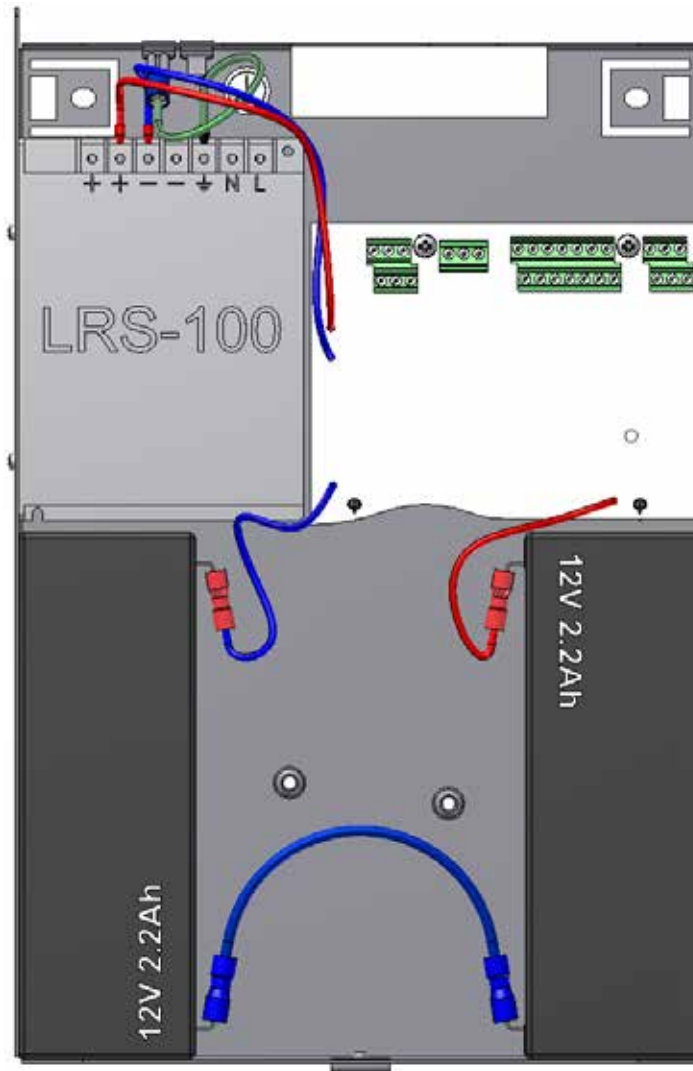


Figure 5: View of batteries

The emergency power supply comprises two 12 V rechargeable batteries, connected in series so that the voltages add up to 24 V. The negative terminal of the first battery should be connected to the positive terminal of the second battery for this purpose. The two remaining free terminals are then connected to the connection wires from the circuit board.

(Red → Plus / Blue → Minus)

2.8 Connection and adjustment of the wind/rain sensor WRF 501

The following figure shows the connection of the wind/rain sensor WRF 501 with the control unit.

The wind/rain sensor can be connected directly to the control unit. An WR-MOD is not required.

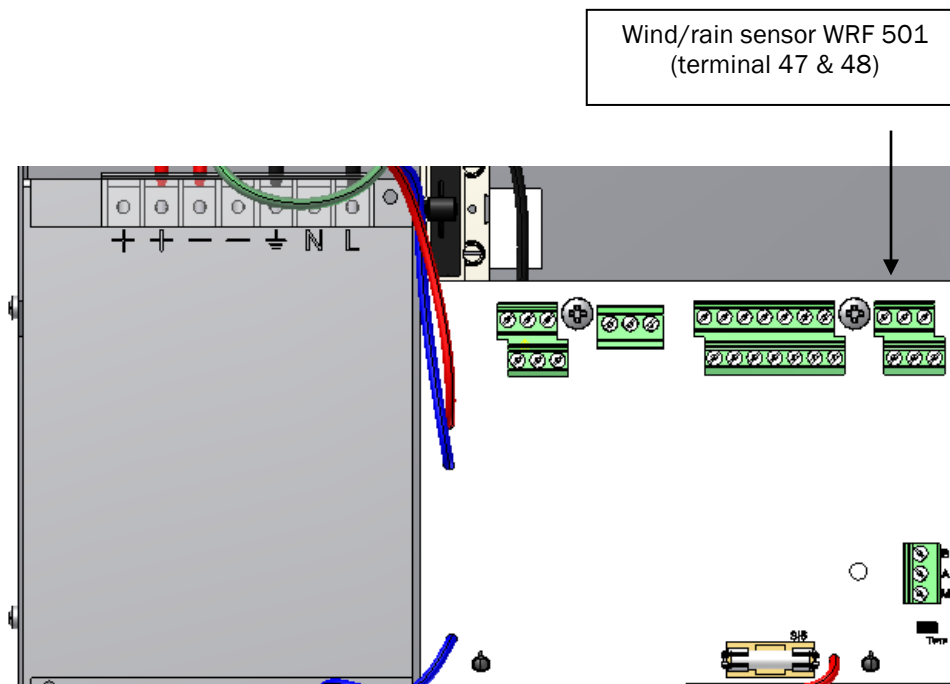


Figure 6: Connection of wind/rain sensor WRF 501 or rain sensor RS 501

The wind/rain sensor WRF 501 or rain sensor RS 501 serves to expand the ventilation function of the control unit. Here, automatic closure of the electrically operated ventilation units is initiated with the onset of rain, snow or wind.

If an active adverse weather alarm is detected, the daily ventilation of the control unit is prohibited. If communication with an external WRF 501 is disrupted, the error status also results in the ventilation function being prohibited. With the help of the operating mode switch  this prohibition can be rescinded again (see chapter 6), if the adverse weather signal / error is no longer present.

Behaviour with wind and rain can be set in the function menu. This includes:

- Setting the wind threshold
- Setting the wind switch-on delay
- Setting the sensitivity to rain/snow
- Switching off the wind/rain function
- In the delivery state, functionality via the wind and rain sensor WRF 501 is deactivated. The control unit is pre-set for a potential-free NO contact with the information adverse weather alarm.

2.8.1 Setting instructions for the wind/rain sensor 501

The “Function menu” is shown in chapter 7.1. A demonstration of how to operate the menu is provided here. As an example, it is intended that the wind and rain sensor WRF 501 be connected with a wind trigger threshold of 5m/s and a 5s switch-on delay. The rain sensitivity should be set to “low”.

Setting takes place using the Dip switch  (2) and the buttons “Reset” and .

Feedback is displayed on the control unit by the LEDs. The first three LEDs are located in the break glass switch field and the others to the left of it.

1st step (activation of the function menu)

The function switch  (2) is switched to the right, to the “ON” position. After switching on the function menu, the LED  (5) flickers.

Figure 7: Operating switch

2nd step (setting the wind trigger threshold)

Pressing the “Reset” button once causes the LED  (4) to flicker.

Following the table in chapter 7.1, it is possible to set the wind trigger threshold in (m/s) in this way. Pressing the button  three times activates the LED  (10), which stands for the value 5m/s. The first value is now set.

3rd step (setting the switch-on delay)

The wind switch-on delay is now set in seconds, by pressing the “Reset” button once. The LEDs

 (4) and  (5) now flicker. Now press the  button once and the LED  (12) also flickers. This equates to a switch-on delay of 5s.

Figure 8: Buttons on the board

4th step (setting the rain sensitivity)

Pressing the “Reset” button again causes the LED  to flicker. Pressing the  button three times causes the LED  (10) to flicker. (Rain sensitivity set to low).

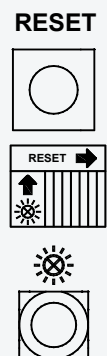
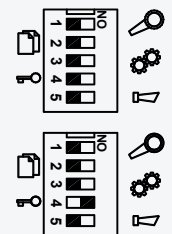
5th step

The setting is now complete. It is now necessary to turn the function switch  back to the left, to the “OFF” position. A short tone sounds and the LEDs stop flickering. The LEDs have now returned to their normal display mode.

If the LEDs should stop flickering during setting, the control unit has exited the function menu. This is an automatic process whereby the control unit switches over to normal mode if no change takes place in set-up mode for one minute. The changes that have already been fully implemented are accepted.

If the changes have not been fully implemented then the switch  must be turned off and on again, in order to open the function menu once more. It is then possible to implement any settings that are still outstanding.

Figure 9: Displays on the board



3 FUNCTIONAL DESCRIPTION

The control unit is a smoke and heat vent control unit with an emergency power supply for 72h in the event of a power outage. It is used to open and close electric motor-driven smoke vents in the event of a fire, and also for everyday ventilation.

The functional description will be kept quite general at this point. The functions of the individual operating controls and display elements will be described in more detail in the next section.

A distinction is made between two basic operating modes:

3.1 Smoke and heat vent (triggered) operation

In the event of a fire (triggered by an RWA pushbutton, smoke detector or heat detector, or the fire alarm system), the connected opening elements are actuated. (The direction of travel with actuation can be set in set-up (see chapter 7.1)). The rechargeable batteries guarantee that after 72h of power outage the system can still perform three load operations (open twice/close once) (Alarm operation). Triggering can be initiated manually by pressing the "Trigger" pushbutton on the control unit, the external break glass switches, or automatically when one of the automatic detectors or the fire alarm system is triggered. Triggering is also guaranteed for 72h of power outage. With an Alarm trigger, the motors are supplied with voltage for 38 minutes and a new open pulse is generated every 90 seconds.

If necessary, or when the fire brigade so desires, the connected opening elements can be given a Reset command and then close again. To do this, the smoke and heat vent alarm triggering must first be acknowledged by pressing the "Reset button" on the smoke and heat vent button or on the circuit board. Then the opening elements can be closed again by pressing the "Close button" on the control unit or the "Close button" in an break glass switch 6 or 6A ("A" stands for acoustics/buzzer in the button).

Alarm operation always has priority over ventilation mode, i.e. operation in ventilation mode is not possible if an Alarm trigger is present.

3.1.1 FAS (fire alarm system) input

Via this monitored input, the triggering of a fire alarm system FAS is transferred to the control unit via a potential-free NO contact. When the contact opens again, the control unit can be switched back to normal operation via reset.

In the set-up menu it is possible to influence the Alarm as follows using the function (FAS options).

Setting	"no autom. reset"	After the FAS contact opens, the Alarm remains triggered.
Setting	"autom. reset"	After the FAS contact opens, the Alarm trigger is deleted.
Setting	"autom. reset and close"	After the FAS contact opens, the Alarm trigger is deleted and the drives close.

3.1.2 Automatic detector line

Up to ten automatic detectors can be connected to this monitored input.

If at least one detector is active, it passes the information on to the control unit, which then triggers. The detector is reset via a control unit reset command.

It is possible to expand detector triggering in the set-up menu.

Individual triggering: If a detector is activated, the control unit triggers.

Dual detector interconnection: If the first detector is activated, the LED  (1) blinks. This does not yet trigger the control unit!
 A second detector must also trigger within 30 minutes for the control unit to react. Otherwise the first detector will be deleted after 30 minutes.
 This reduces the likelihood of erroneous triggering.

Dual detector interconnection with warning:

In addition to dual detector interconnection, the potential-free signal relay/relays (set as fault contact in the setting) is/are switched after the first automatic detector triggers and the LED  (3) flashes. We therefore refer to this as a warning.

3.2 Ventilation mode

Four different ventilation modes (continuous / push open only / push open and close / no ventilation function) can be set on the board. The setting is implemented in the function menu (see "Programming" chapter).

The connected opening elements can be opened and closed by means of the individual ventilation push-buttons. In "Continuous" mode, pressing the Open pushbutton at the ventilation pushbutton once moves the motor to the Open end position, and pressing the Close pushbutton once moves it to the Closed end position. Both pushbuttons can be pressed simultaneously to hold the motor in an intermediate position. In "Push open only" mode, the motor is moved in the Open direction only so long as the Open pushbutton on the ventilation pushbutton is held pressed. If the Close pushbutton on the ventilation pushbutton is pressed, the motor moves to its Closed end position. In "Push open and close" mode, the drive also moves in Close direction. In "No ventilation function" mode, the ventilation button input "Open" has no function. Likewise, there is no Close control in the event of a power outage. This function is only necessary for the control of CO₂ triggers and pressurised gas generators.

If a wind/rain sensor is connected, its function has priority over normal ventilation mode, i.e. in the event of a rain/wind alarm the connected opening elements are closed automatically, and can only be opened again manually after the rain/wind alarm has dropped out. Operation in ventilation mode is not possible during a power outage and all drives are closed automatically.

3.3 Open display

The control unit has one output for an open display of the motor line (terminal 49). If the connected drive moves Open, the display/output is switched on. If the connected drive is actuated in the Close direction for a minimum of 90 seconds, the Open display extinguishes. The Open display works without feedback from the drive by assuming that the drive is closed if it runs in the Close direction without interruption for min. 90 seconds. The Open display is then switched off. Each time the drive is actuated in the open direction, the Open display is switched on again. Additionally, an Open display " - " is visible in the window.

3.4 Stroke limitation

In addition to the other ventilation settings, stroke limitation can be set in the set-up menu. The opening duration can be set in steps of between 5s and 60s. If the ventilation pushbutton is moved to Open, the motor is actuated only for the opening time period set.

If the opening time limit is reached, it is possible to operate the motor for the set time in the Open direction once more, before it is blocked in the Open direction. It can only be driven open again if it has first been driven in the closed direction, whereby it cannot exceed its maximum limit again.

Example:

- time set = 15 seconds
- the motor runs open twice for 15 seconds with the ventilation button
- then it is run in the close direction for 5 seconds
- the motor can now be driven open for max. 5 seconds

3.5 Automatic closing

A further setting in the function menu is automatic closing. Here, the motor is automatically closed after the set time, if no new ventilation command has been issued in the meantime.

The time for this can be set between 15 minutes and 120 minutes. The time starts after the last actuation command (open/stop or reset after triggering).

3.6 24V output (switched)

Furthermore, the control unit is equipped with a 24V output (terminal 33 / 34), which can be loaded with a maximum 0.5A. This can be used for example as a supply for an external signalling unit or similar. The output is always active if the mains supply is connected. However, in order to avoid loading the rechargeable battery with a power outage, this output is switched off immediately if the main power supply fails.

3.7 Buzzer output

The buzzers in the break glass switches 6A and 7A ("A" stands for acoustics/buzzer in the button) are actuated via the buzzer output (terminal 42). With triggering, these issue an intermittent sound. They sound constantly with an active fault. With a mains power failure, the buzzer only sounds every 15 seconds to avoid loading the battery unnecessarily. However, the buzzer can be switched off at any time by pressing the Reset ⇌ button.

4 COMMISSIONING

If all external devices are connected, the wiring has been checked once again and the rechargeable batteries charged, the commissioning can be undertaken.

First, the power supply must be assured. Only once the mains power supply is connected may the rechargeable batteries be connected. The green  LEDs in the control unit and in the break glass switch 6(A) and the Open display LED light up.

When connecting the rechargeable batteries care should be taken to ensure the polarity is correct. Incorrect connection can result in the circuit board being destroyed immediately.

The control unit is now ready for use and the functions can be checked in turn. For a detailed description of the display statuses of the control unit, see chapter 6.1.

The following functions must be checked during the commissioning:

The slide switch  must be set to ON for the buzzer to be switched on (chapter 6.1).

Ventilation function:

Push ventilation button in Open direction		-	Motors drive open
Push ventilation buttons in Open and Close directions simultaneously		-	Motors stop
Push ventilation button in Close direction		-	Motors drive closed
If WRF501 present:	Push ventilation button in Open direction	-	Motors drive open
	Trigger of rain signalling	-	Motors drive closed

Alarm function (triggered by alarm pushbutton, automatic detector or fire alarm system contact):

Set the operating mode switch  to the "ON" position and trigger the alarm with the red  button on the board	- The green LED  on the board flashes (test mode) - All motors drive open - The red LEDs  on the board and in the break glass switches flash - The buzzer sounds with an alternating frequency
Bring the alarm back to operational readiness with the "Reset" button on the board. Subsequently drive the motors closed with the "Close" button on the board. (Operating mode switch  remains in the "ON" position)	- The green LED  on the board flashes (test mode) - The red LED  extinguishes - The buzzer falls silent - All motors drive closed
Initiate an alarm trigger on all break glass switches by actuating the "Trigger" button (Operating mode switch  remains in "ON" position)	- The green LED  on the board flashes (test mode) - All motors drive open - The red LEDs  on the board and in the break glass switches flash - The amber LED  on the board lights up - The buzzer sounds with an alternating frequency
Bring the control unit back to operational readiness with the "Reset" button on the board. Then drive the motors closed with the "Close" button on the break glass switch (Operating mode switch  remains in "ON" position)	- The green LED  on the board flashes (test mode) - All motors drive closed - The red LED  extinguishes - The buzzer falls silent
Initiate a trigger on the type ECO automatic detector with the test unit for detector series type ECO 1000RTU (operating mode switch  remains in the "ON" position)	- The green LED  on the board flashes (test mode) - All motors drive open - The red LEDs  on the board and in the break glass switch flash - The amber LED  on the board lights up - The buzzer sounds with an alternating frequency

Bring the control unit back to operational readiness with the "Reset" button on the board. Subsequently drive the motors closed with the "Close" button on the board. (Operating mode switch  back to "OFF" position)	cy - All motors drive closed - The red LED  extinguishes - The buzzer falls silent - The green LED  on the board lights up constantly (normal mode)
---	---

5 OPERATION

5.1 Display and control elements on the board

The control unit has a number of operator controls and displays on the board, thus providing a clear, detailed indication of the individual operating states and faults. The operator control elements can be used to make various settings and activate various functions on the control unit. The following figure shows the control elements on the control unit board:

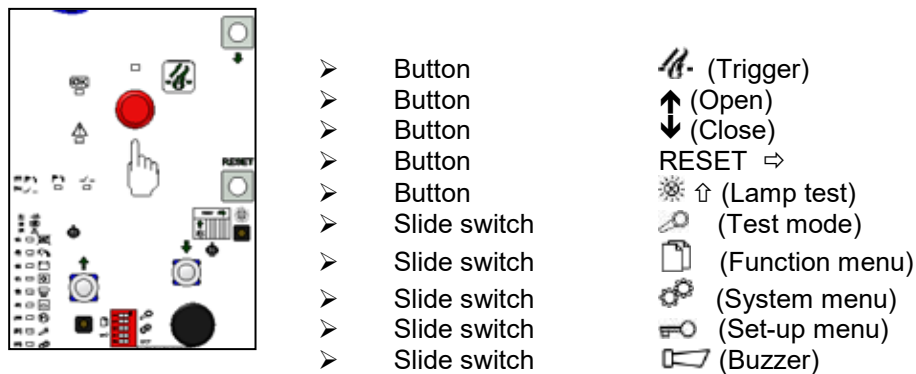


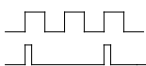
Figure 10: Display and control elements

The following display elements are also available:

- | | | | |
|------|---|------------------|--|
| (1) |  | → Red LED (1) | Triggering |
| (2) |  | → Green LED (2) | Operation |
| (3) |  | → Amber LED (3) | Fault |
| (4) |  | → Amber LED (4) | Vent. forbidden |
| (5) |  | → Amber LED (5) | HEV (main power supply (24V DC - mains adapter)) |
| (6) |  | → Amber LED (6) | EEV (stand-by power supply (24V rechargeable batteries)) |
| (7) |  | → Amber LED (7) | Break glass switch |
| (8) |  | → Amber LED (8) | Automatic detector |
| (9) |  | → Amber LED (9) | FAS(fire alarm system) |
| (10) |  | → Amber LED (10) | Motor |
| (11) |  | → Amber LED (11) | Maintenance |
| (12) |  | → Amber LED (12) | Sys (manufacturer information) |
| (13) |  | → Amber LED (13) | Wind and rain signalling |
| (14) |  | → Green LED (14) | Open display |

5.2 Definition of LEDs flashing / blinking

The LEDs can flash, blink or light up constantly to display various states. Flashing occurs as a regular switching on and off of the LED, whereby the switch-on and switch-off time is equal. When blinking, the LED appears to go out, although it switches on again at regular intervals for a brief moment. The switch-off time is significantly greater, so that one "blinking" process takes place for every two "flashing" processes.

Flashing 

> Light is switched on and off for equal periods of time

Blinking 

> The light is switched on for significantly less time than the subsequent light off time.

5.3 Explanation of the function and control elements

The following table shows an overview of the various functions and settings for the individual control elements on the board:

Operation	Function / effect
Pressing the button 	- All motors drive open (set-up setting, see chapter 7.1) - The red LEDs  on the board and in the break glass switches flashes - The buzzer sounds with an alternating frequency - Automatic trigger forwarding with signal relay active
Pressing the "RESET" button	- Alarm triggering is reset - The buzzer falls silent - Automatic trigger forwarding with signal relay inactive - The red LED  on the board and in the break glass switches extinguishes
Pressing the button 	- All motors drive open (only if no adverse weather alarm / power outage is present) - The Open display lights up.
Pressing the button 	- All motors drive closed (only if no Alarm triggering is present) - After 90s the Open display extinguishes.
Pressing the button 	- All LEDs on the board and in the connected break glass switches illuminate. They extinguish again after pressing the "Reset" button - The buzzer sounds as long as the  button is pressed and the slide switch is set to  ON. - After ca. 15 min the lamp test ends automatically
Set slide switch  to "ON" position	- The control unit is in test mode - The green LED  on the board flashes - Automatic trigger forwarding with signal relay is inactive - In the event of a mains power failure, the diagnostics LEDs can be activated on the board - Reset of the adverse weather alarm

Set slide switch  to "OFF" position	- Control unit in normal operating mode - The signal relay will be switched in the event of a triggering
Slide switch  in "ON" position	- Start function menu (ON) > some LEDs flash very quickly
Slide switch  in "OFF" position	- Exit function menu (OFF)
Slide switch  in "ON" position	- Manufacturer function
Slide switch  in "OFF" position	- Manufacturer function
Slide switch  in ON position [Actuate RESET button and  button simultaneously]	- Set-up mode active (see programming) - Some LEDs flash very quickly
Slide switch  in OFF position	- Normal operating mode
Slide switch  in "ON" position	- The internal buzzer sounds with triggers, faults and acknowledgements.
Slide switch  in "OFF" position	- The internal buzzer is not sounded

The following table provides an overview of the various display statuses of the individual display elements on the board:

Display	Meaning	Status
	Operation	- Illuminates steadily so long as there is no fault identified (normal operation) - Flashes in test mode - Extinguishes in the event of an active fault or maintenance being due -
	Triggering	- Flashes with Alarm triggering - Blinks with automatic detectors set with dual detector interconnection when one has triggered. -
	Fault	- Flashes with the detection of a fault - Flashes in the event of maintenance being due (see "Maintenance" LED) - Flashes with automatic detectors set with dual detector interconnection, with warning when one has triggered. - Blinks in the event of a mains power failure
	Vent. forbidden	- Illuminates steadily with active central Closed signal
	Open display	- Illuminates steadily if motors are driven out or are not driven in safely
	Main power supply	- Flashes with deviating main power supply - Blinks with overload of the main power supply
	Rechargeable battery	- Illuminates steadily if the rechargeable battery voltage is too high - Blinks if the rechargeable battery voltage is too low / rechargeable batteries are missing / defective fuse / polarity reversal of rechargeable batteries.
	Break switch glass	- Illuminates steadily in the event of a triggering via an external break glass switch - Flashes in the event of a wire break - Blinks in the event of a wiring short-circuit

	Autom. detector	- Illuminates steadily in the event of a triggering via an external autom. detector - Flashes in the event of a wire break - Blinks in the event of a wiring short-circuit
	FAS Fire alarm unit Fire alarm system	- Illuminates steadily in the event of a triggering via the external fire alarm system (FAS). - Flashes in the event of a wire break - Blinks in the event of a wiring short-circuit
	Motor line	- Fault in motor line - Flashes in the event of a wire break - (Motor line short circuit / overload)
	Maintenance	Test switch in "OFF" position
		- Illuminates steadily in the event of maintenance being due
		Test switch in "ON" position Blinks with active warning counter, maintenance is not yet necessary. (This is a functional check)
	Manufacturer information	- Illuminates steadily > Manufacturer information - Flashes > Manufacturer information - Blinks > Manufacturer information
	Adverse weather alarm	- Illuminates steadily in the event of adverse weather alarm - Flashes in the event of a wire break - Blinks if the wind wheel turns

5.4 Acoustic signals

During operation, the alarm outputs acoustic signals via the buzzer, providing information about the fault conditions and the actions to be carried out:

Attention!

In order to hear the signal tones, the slide switch  must be in the "ON" position!

Steady tone:

Fault condition (the LEDs provide information regarding the cause) Or  button is pressed (all LEDs light up).

Steady tone with changing (alternating) frequency:

Break glass switch state. The red "Trigger" LED flashes.

1x long beep (confirmation signal)

Once set-up mode is exited, the settings have been applied.

5.5 Fuses on the board

Fuses are installed on the control unit board to protect the electronics. The following table shows the function and value of the fuses:

Designation:	Function:	Value:
SI	Primary supply	2.5A slow blow
SI5	Rechargeable battery	2.5A slow blow

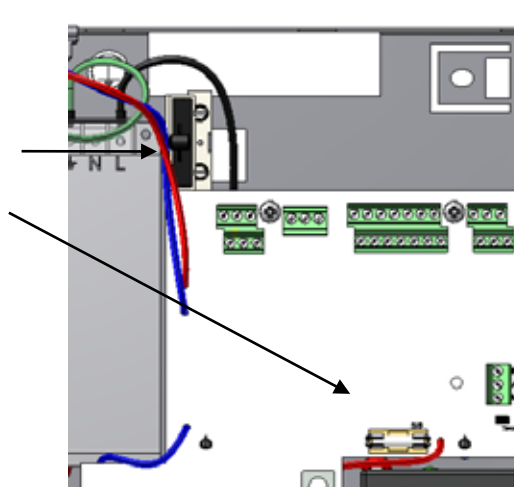


Figure 12: Fuses on the board

5.6 Delivery condition

Because of the many options described here for setting the parameters of the control unit, the state of the control unit at the time of delivery is summarised in tabular form for some of the functions:

Slide switch 	"Test" slide switch in " OFF " position → Automatic trigger forwarding in alarm case
Slide switch 	Slide switch in " OFF " position
Slide switch 	Slide switch in " OFF " position
Slide switch 	Slide switch in " OFF " position
Slide switch 	Slide switch is in " ON " position, so that the buzzer is active.
The following functions or settings are set in programming mode:	
Ventilation mode	Set to "Continuous"
Series resistance – break glass switch and fire alarm system (function 0R / 18K)	Set to "18k Ohm" (short circuit monitoring of the lines activated)
Detector interconnections	Set to 1 detector interconnection
Triggering with detector faults	Switched off
Signal relay 1	Fault signalling
Signal relay 2	Trigger forwarding

6 PROGRAMMING

Many special functions and settings can be programmed in the Mode menu:

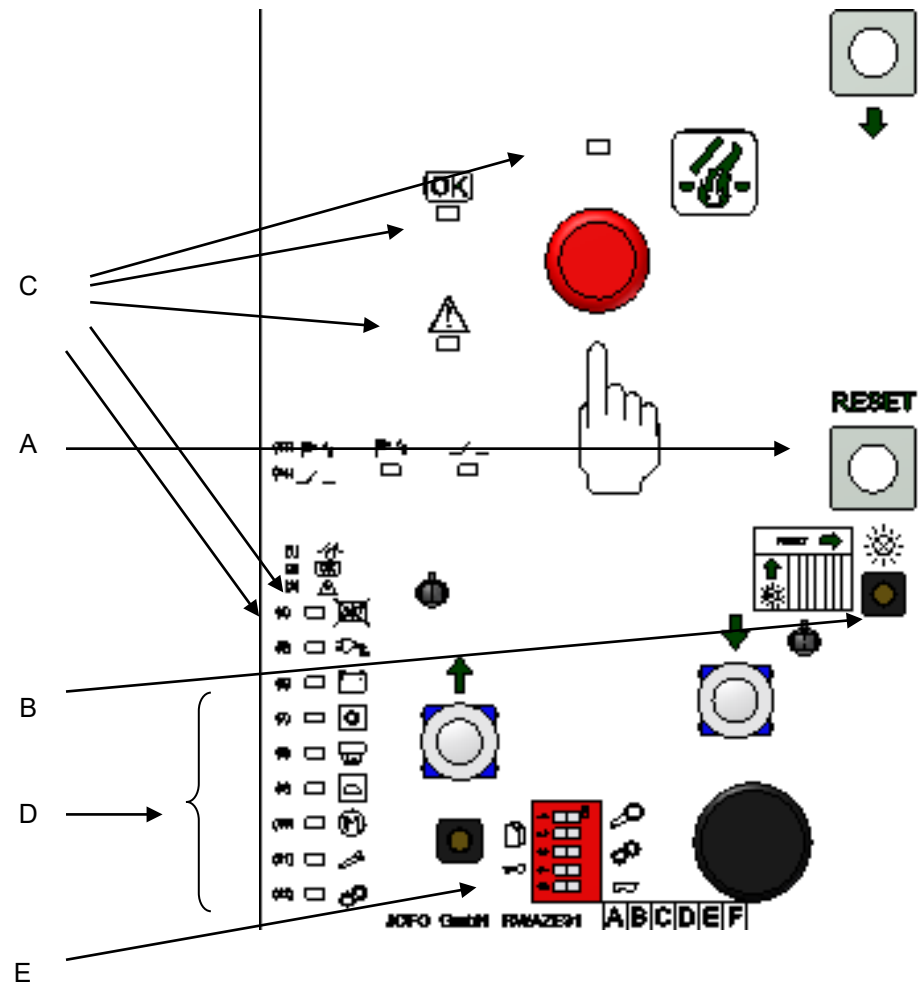


Figure 13: Display and control elements

- A = Function switch „RESET“
- B = Selection switch „☀“
- C = Monitoring of the function LEDs 1-5
- D = Monitoring from the selected variation of the function LEDs 6-12
- E = DIP switch

Changes to the functions are carried out via the two buttons “RESET” and ☀ on the board and displayed via the LEDs:

6.1 Menu overview

The first five LEDs from  to  indicate which function is selected and the seven lower LEDs from  to  indicate which setting this function currently has.

Function menu (following software version V2.07)

The slide switch  is provided for this. It must be set to ON for changing the programming. A few LEDs on the board now flash in a very fast rhythm, in order to indicate that the function menu is switched on.

LED	Function				
	Ventilation function continuous / or push operation	Wind threshold (m/s)	Wind switch-on delay (s)	Rain sensitivity	Automatic closing (min)
(1) 	•	•	•	•	•
(2) 	•	•	•	•	•
(3) 	•	•	•		
(4) 	•			•	•
(5) 		•		•	
 LED flashes • LED dark					
Setting					
(6) 	-	20	-	-	-
(7) 	-	15	-	-	-
(8) 	-	10	30	-	-
(9) 	-	7	20	-	120
(10) 	No ventilation function	5	15	Low	60
(11) 	OPEN/CLOSE momentary	4	10	Moderate	30
(12) 	Only OPEN momentary	3	5	High	15
(All 7 LEDs off)	Constant	OFF	0	OFF	OFF

The functions can be selected with the two board buttons "RESET →" and  and their settings changed:

"RESET →" button Next function (one column to the right in the "Function" table)

 " " button Setting one position higher (one line higher in the "Setting" table)

Any setting change is adopted by the control unit immediately, however, to protect the changed setting(s) from the effects of a power outage the slide switch  must be set to OFF again! The mode menu is exited automatically and the settings saved ca. 60s after the last press of a button.

Set-up menu part 1

Many special functions and settings can be programmed in the SETUP menu:

The slide switch  is provided for this. It must be set to ON to change the programming, whilst simultaneously pressing the "Reset" and  buttons.

A few LEDs on the board now flash in a very fast rhythm, in order to indicate that the set-up menu is switched on.

LED			Function				
			Function of the signal relays		Stroke limitation in the ventilation function	Type of motor line monitoring	Max. actuator opening time
			1. relay (fault)	2. relay (alarm)			
	1		●	●	●	●	●
	2		●	●	●	●	●
	3		●	●	●	☀	☀
	4		●	☀	☀	●	●
	5		☀	●	☀	●	☀
			(☀ LED flashes ● LED off)				
↑ 			Setting				
	6		-	-	60 s	-	-
	7		-	-	45 s	-	-
	8		CLOSE ALARM		35 s	-	-
	9		RESET ALARM		25 s	-	-
	10		ALARM trigger	ALARM trigger 5s momentary pulse	15 s	-	8 Min. without restart
	11		Wind/rain / mains failure	ALARM trigger Continuous signal	8 – 9 s	-	90 s without restart
	12		Fault output only after 30s	Wind/rain / mains failure	5 – 6 s	2 wire to 1st motor	8 Min.
LED 6 - 12 off			Fault output	Fault output	Off	2-wire (C) or 3-wire (33k)	90 s

The functions can be selected with the two board buttons "RESET →" and   and their settings changed:

"RESET →" button

Next function (one column to the right in the "Function" table)

  button
Setting one position higher (one line higher in the table)

Setting one position higher (one line higher in the "Setting" table)

Any setting change is adopted by the control unit immediately, however, to protect the changed setting(s) from the effects of a power outage the slide switch  must be set to OFF again!

The mode menu is exited automatically and the setting saved ca. 60s after the last press of a button.

Set-up menu part 2

LED			Function				
			Magnet device	Alarm via the break glass switch	Alarm via the FAS input	FAS input function	Alarm of the automatic detector with a fault
	1		•	•	•	•	•
	2		•	•	☀	☀	☀
	3		☀	☀	•	•	•
	4		☀	☀	•	•	☀
	5		•	☀	•	☀	•
			(☀ LED flashes • LED off)				
↑			Setting				
	6		-	-	-	-	-
	7		-	-	-	-	-
	8		-	-	normally closed contact	-	-
	9		-	-	With quiescent current	-	-
	10		-	-	With operational current	Edge evaluation	-
	11		open & close	with fault	with fault	Autom. reset and CLOSE	-
	12		only open	with short-circuit	with short-circuit	Autom. reset	on
LED 6 - 12 off			off	with 18 kΩ	with 18 kΩ	No autom. reset	off

The functions can be selected with the two board buttons "RESET →" and  ↑ and their settings changed:

"RESET →" button

Next function (one column to the right in the "Function" table)

 ↑ button

Setting one position higher (one line higher in the table)

"Setting"

Any setting change is adopted by the control unit immediately, however, to protect the changed setting(s) from the effects of a power outage the slide switch  must be set to OFF again!

The mode menu is exited automatically and the setting saved ca. 60s after the last press of a button.

Set-up menu part 3

LED			Function				
			Number of automatic detectors	Detector inter-connections	Buzzer output	Direction of travel with alarm	External wind/rain contact
	1		•	•	•	☀	☀
	2		☀	☀	☀	•	•
	3		•	☀	☀	•	•
	4		☀	•	☀	•	•
	5		☀	•	☀	•	☀
			(☀ LED flashes • LED off)				
↑ 			Setting				
	6		-	-	-	-	-
	7		-	-	-	-	-
	8		-	-	-	-	-
	9		-	-	-	-	-
	10		-	-	Continuous signal only with alarm	-	-
	11		-	Dual detector interconnection with warning	Continuous signal only with fault	-	-
	12		-	Dual detector interconnection	Continuous signal	close	NC
LED 6 - 12 off			ECO 1 - 10	Individual alarm	both active	open	NO

The functions can be selected with the two board buttons "RESET →" and  ↑ and their settings changed:

"RESET →" button

Next function (one column to the right in the "Function" table)

 ↑ button
Setting one position higher (one line higher in the "Setting" table)

Any setting change is adopted by the control unit immediately, however, to protect the changed setting(s) from the effects of a power outage the slide switch  must be set to OFF again!

The mode menu is exited automatically and the setting saved ca. 60s after the last press of a button.

Setup menu part 4

LED			Function				
			Roof access	Bus address		Actuator speed	Bus-alarm-function
				1. Nr.	2. Nr.		
	1						
	2		•	•	•	•	•
	3		•	•			
	4				•	•	
	5		•		•		•
			(☀ LED flashes • LED off)				
↑			Settings				
	6		-	7 - X	X - 7	-	-
	7		-	6 - X	X - 6	-	-
	8		-	5 - X	X - 5	-	-
	9		-	4 - X	X - 4	-	off
	10		-	3 - X	X - 3	-	only receiving
	11		-	2 - X	X - 2	Low speed while comfort signals	Alarm and Weather signals only sending
☀	12		on	1 - X	X - 1	Low speed while comfort or weather signals	only sending
	LED 6 – 12 off		off	off	X - 0	normal	send and receive

The functions can be selected with the two board buttons "RESET ➔" and  ↑ and their settings changed:

"RESET ➔" button

Next function (one column to the right in the "Function" table)

 ↑ " " button

Setting one position higher (one line higher in the "Setting" table)

Any setting change is adopted by the control unit immediately, however, to protect the changed setting(s) from the effects of a power outage the slide switch  must be set to OFF again!

The mode menu is exited automatically and the setting saved ca. 60s after the last press of a button.

Setup-menu part 5

LED			Function				
			Bus weather function	Automatically closing after Reset			
	1						
	2		•				
	3			•			
	4			•			
	5			•			
			(☀ LED flashes • LED off)				
 			Settings				
	6		-	-			
	7		-	-			
	8		-	-			
	9		-	-			
	10		off	-			
	11		only receiving	-			
	12		only sending	on			
LED 6 - 12 off			send and receive	off			

The functions can be selected with the two board buttons "RESET →" and   and their settings changed:

"RESET →" button

Next function (one column to the right in the "Function" table)

  " button

Setting one position higher (one line higher in the "Setting" table)

Any setting change is adopted by the control unit immediately, however, to protect the changed setting(s) from the effects of a power outage the slide switch  must be set to OFF again!

The mode menu is exited automatically and the setting saved ca. 60s after the last press of a button.

7 FAULT-FINDING / TROUBLESHOOTING

Many faults can be detected and localised with the help of the diagnostics LEDs on the board. It may not be possible to diagnose faults arising due to the incorrect wiring of components. If functional errors should arise that cannot be identified with the help of the diagnostics LEDs, the first course of action is to check the wiring to the external components.

If the control unit detects a fault, the green LED  and the amber LED  flashes or blinks (see chapter 6.1).

LED display	Cause	Remedial measure
LED (3)  <u>blinks</u>	Mains power supply failure detected	➤ Check mains power supply (230VAC) ➤ Check output voltage of the switching power supply (24VDC)
LED (4)  <u>lights up</u>	Active wind or rain signalling	➤ Wait until adverse weather signal has dropped off
	Fault on wind/rain system (LED (13)  <u>flashes</u>)	➤ Check wind or rain detectors connected
LED (5)  <u>flashes</u>	Main power supply not correct	➤ Check mains power supply (230V AC) ➤ Check output voltage of the switching power supply (24V DC)
LED (5)  <u>blinks</u>	Mains adapter overloaded	➤ Check motor load (short circuit)
LED (6)  <u>lights up</u>	Rechargeable battery voltage too high	➤ Check rechargeable battery voltage
LED (6)  <u>blinks</u>	Rechargeable battery voltage too low / no voltage	➤ Check rechargeable battery voltage ➤ Check fuse ➤ Check rechargeable battery connection (reverse polarity)
LED (7)  <u>flashes</u>	Line break in the break glass switch line	➤ Terminate RWA button line with 33KΩ resistor ➤ Check cable for break
LED (7)  <u>blinks</u>	Short circuit in the break glass switch line	➤ Check cable for short circuit
LED (8)  <u>flashes</u>	Line break in the automatic detector line	➤ Terminate automatic detector line with 33K resistor ➤ (Setup setting) ➤ Check cable for break
LED (8)  <u>blinks</u>	Short circuit in the automatic detector line	➤ Check cable for short circuit
LED (9)  <u>flashes</u>	Line break in the FAS line	➤ Terminate FAS line with 33KΩ resistor ➤ Check cable for break
LED (9)  <u>blinks</u>	Short circuit in the FAS line	➤ Check cable for short circuit

LED (10)  <u>flashes</u>	Fault in the motor line	➤ Check cable for short circuit ➤ Check cable for break
	Use of an external drive	➤ Use three-wire connection ➤ With two-wire connection, connect diode module upstream of the motor
LED (11)  <u>lights up</u>	Maintenance necessary	➤ Inform customer support
LED (13)  <u>flashes</u>	Fault in the WRF line	➤ Check cable for break / short circuit

Malfunction	Cause	Remedial measure
Connected automatic detectors are not triggered.	Incorrect wiring	➤ Check wiring of the connections and rectify faults
Fault at break glass switch	Incorrect wiring	➤ Check wiring
Automatic detectors trigger immediately.	Incorrect wiring	➤ Reverse polarity, switch connections

8 MAINTENANCE

Smoke and heat vent systems are safety systems intended to protect human lives, health, and material property.

For this reason, maintenance of the smoke and heat vent system must be carried out at regular intervals, at least once per year, in accordance with DIN 18232, the VdS directives, and the manufacturer's guidelines. Functional testing, operational readiness, maintenance and any repairs on the smoke and heat vent system may only be carried out by authorised specialists.

To protect the electronic components, the installation technician must electrostatically discharge themselves → (by touching the earth connection with a finger) prior to working on the circuit boards

Attention!!

Consult with us before carrying out a functional test of the system if the triggers or faults are forwarded on to the fire brigade or building control system by means of the integrated signalling relays.

Control unit:

- Visual check of the control unit
- Check mains voltage 230 V AC
- Check all fuses
- Check rechargeable batteries (ca. 27.6V / but not below 24V)
- The rechargeable batteries must be replaced after no more than 4 years and the old rechargeable batteries disposed of in the prescribed manner
- Deep-discharged rechargeable batteries must be replaced immediately! (Cannot be recharged)
- Check all terminal connections are firmly seated
- Check cabling for damage
- Carry out a functional check (see chapter 4 Commissioning), setting the  slide switch to the "ON" position beforehand
- Check control unit functions by actuating or triggering all connected external break glass switch, automatic detectors or ventilation buttons.
- Check display elements of the externally connected break glass switch and automatic detectors
- Check the fault and trigger forwarding lines - set the  slide switch to the "OFF" position for this (if necessary inform control centre)
- The smoke detectors from the ECO range are subject to DIN 14675. This states that they are permitted to remain in use for eight years. After this, they must be replaced so that the system function remains intact.

9 TECHNICAL DATA

9.1 Housing of type 2.5A-1-1-Basic

Type:	Control unit EN 24V 2.5A-1-1 Basic
Housing:	Sheet steel housing with spring clip
	Dimensions W/H/D: 242/360/50 [mm]
	Colour: Traffic white (RAL9016)

9.2 Housing of type 2.5A-1-1

Type:	Control unit EN 24V 2.5A-1-1
Housing:	Sheet steel housing with spring clip
	Dimensions W/H/D: 242/360/50 [mm]
	Colour: Orange (RAL2011)

9.3 Common technical data

Type of protection:	IP 30
Temperature range:	-5°C to 40°C (environmental class 1 per EN12101-9)
Nominal voltage:	230 V AC / 50 Hz
Nominal power:	90 W
Nominal rechargeable battery voltage:	24 V DC (2 x 12 V DC)
Nominal rechargeable battery capacity:	1.9 to 2.3 Ah
Switching power, motor line:	max. 2.5 A nominal current
Switch-on duration (duty cycle):	Max. 30% duty cycle (with 10 mins. cycle times)
Number of motor lines:	1
Number of ventilation groups:	1
Number of trigger lines:	1
Number of fire alarm sys. lines:	1
Number of Break glass switches:	Max. 5 units 6, 6A, 7 or 7A (A stands for acoustics in the button)
Number of automatic detectors:	1 – 10 units Smoke detector ECO1003, max. heat detector ECO1005T, 1004T
OPEN display output:	24 V DC, max. 50 mA
Switched 24V output:	0.5 A (switches off with emergency current operation)

Terminals:

Motor terminals:	4 mm ² (fine-wire) 6 mm ² (rigid)
Mains connection terminals:	2.5 mm ²
Misc. terminals:	1.5 mm ² (fine-wire) 2.5 mm ² (rigid)

Line monitoring:	Motor line for wire break
	Break glass switch line for wire break and short circuit
	Fire alarm sys. line for wire break and short circuit
	Detector line for wire break and short circuit
	Rechargeable battery line for wire break / rechargeable battery voltage
	Mains voltage
Signal relays:	2 x potential-free, changeover contacts
	Switching power (60 V AC or 24 V DC / 0.5 A)

9.3.1 Dimensioning the rechargeable battery capacities

If the mains power supply for the control unit drops out, the motor output is controlled in the Close direction for 90 seconds. The system current drops to the quiescent current of ca. 7mA.

For an EN drive (60 second drive time), this results in the following rechargeable battery capacities being required:

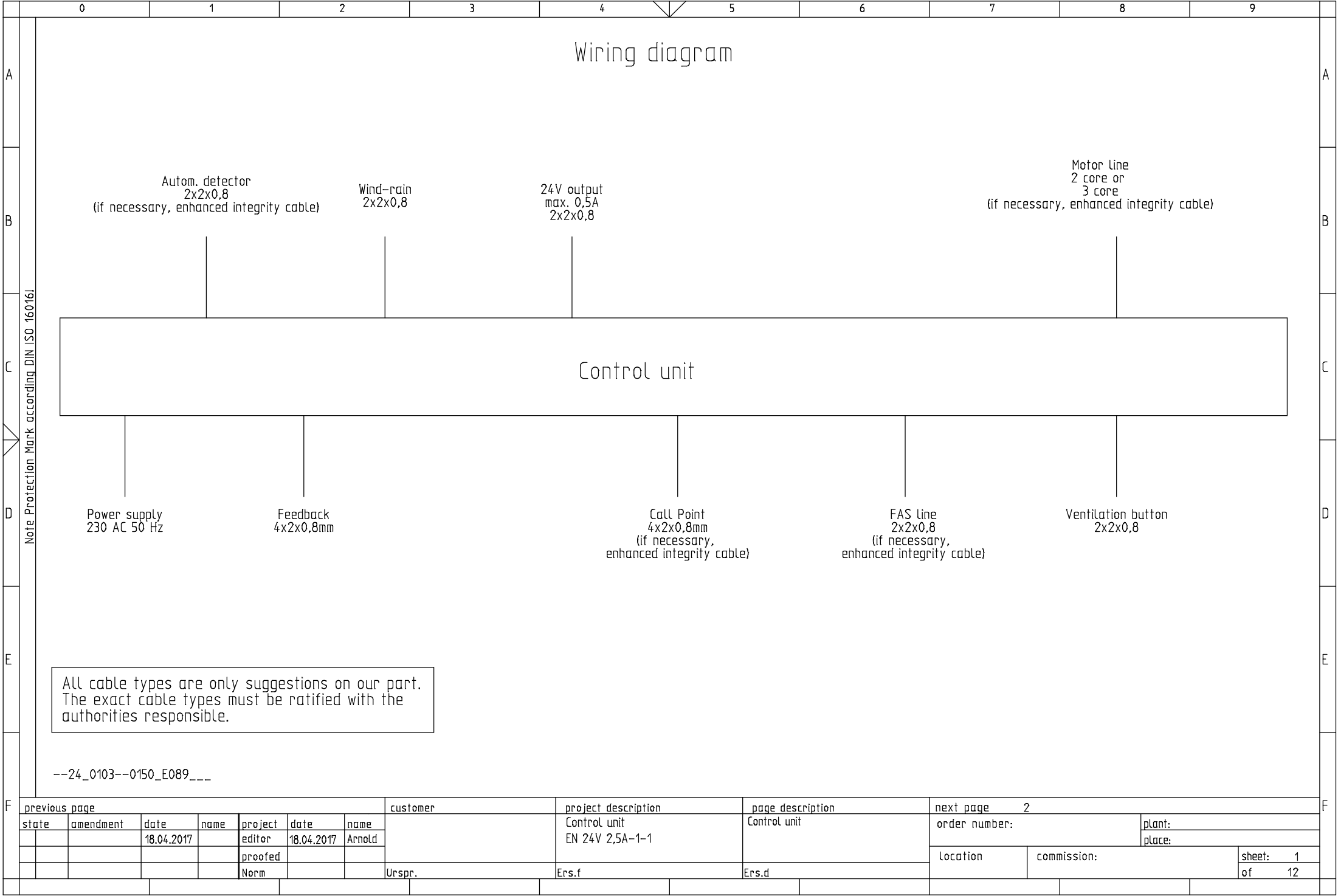
Emergency power supply		72 h	* 0.007 A	= 0.5 Ah
Alarm Open (100%)	60 s	* 2.5 A		= 0.042 Ah
Close (33%)	60 s	* 0.85 A		= 0.015Ah
Alarm Open (100%)	60 s	* 2.5 A		= 0.042 Ah
Total capacity				<u>= 0.6 Ah</u>

With a 30% safety margin this results in a value of 0.8 Ah.

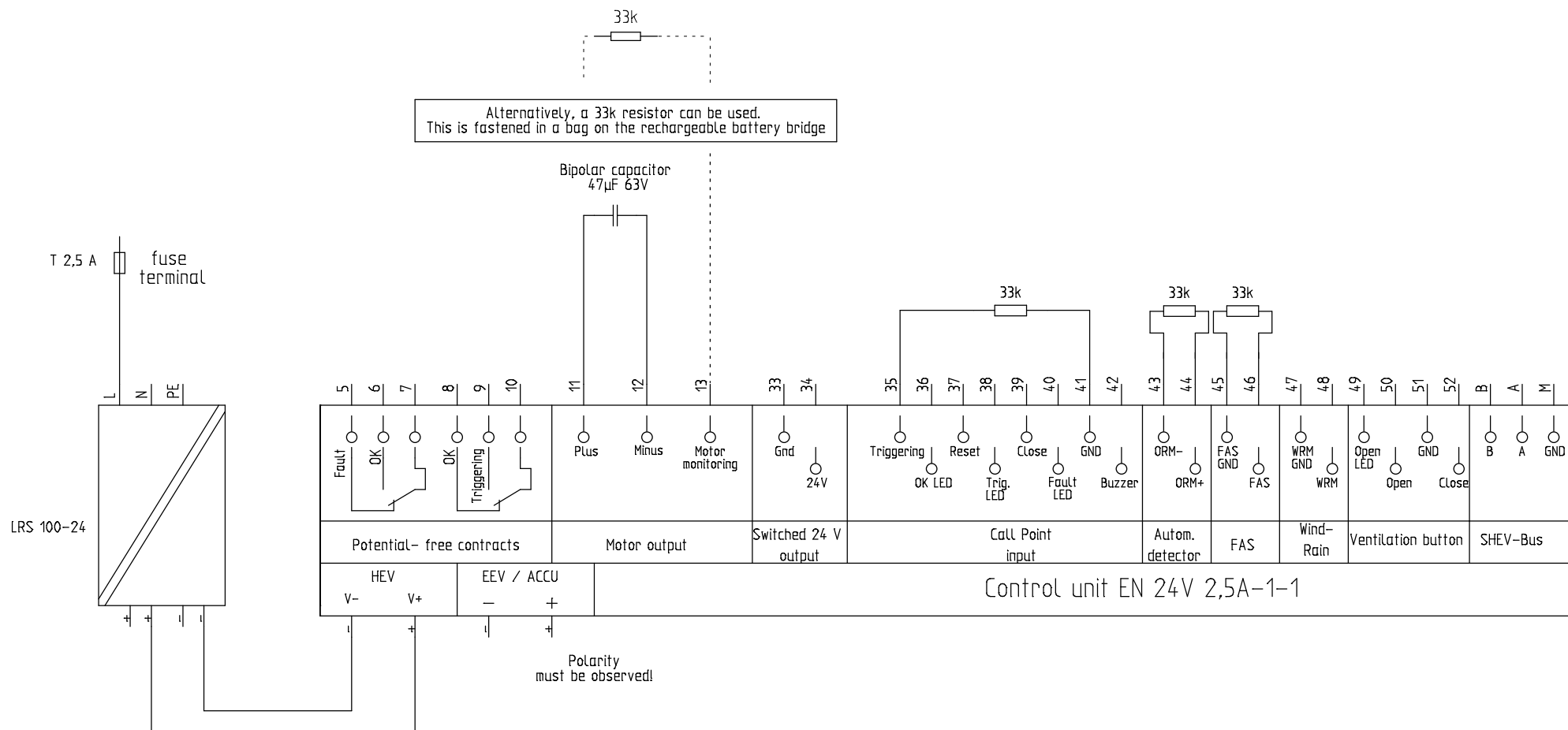
The 1.9 to 2.2 Ah rechargeable battery selected therefore offers sufficient reserves!

Remark:

The currents quoted are the currents flowing from the rechargeable battery. The motors connected must not exceed the prescribed load limit of max. 2.5A nominal current.



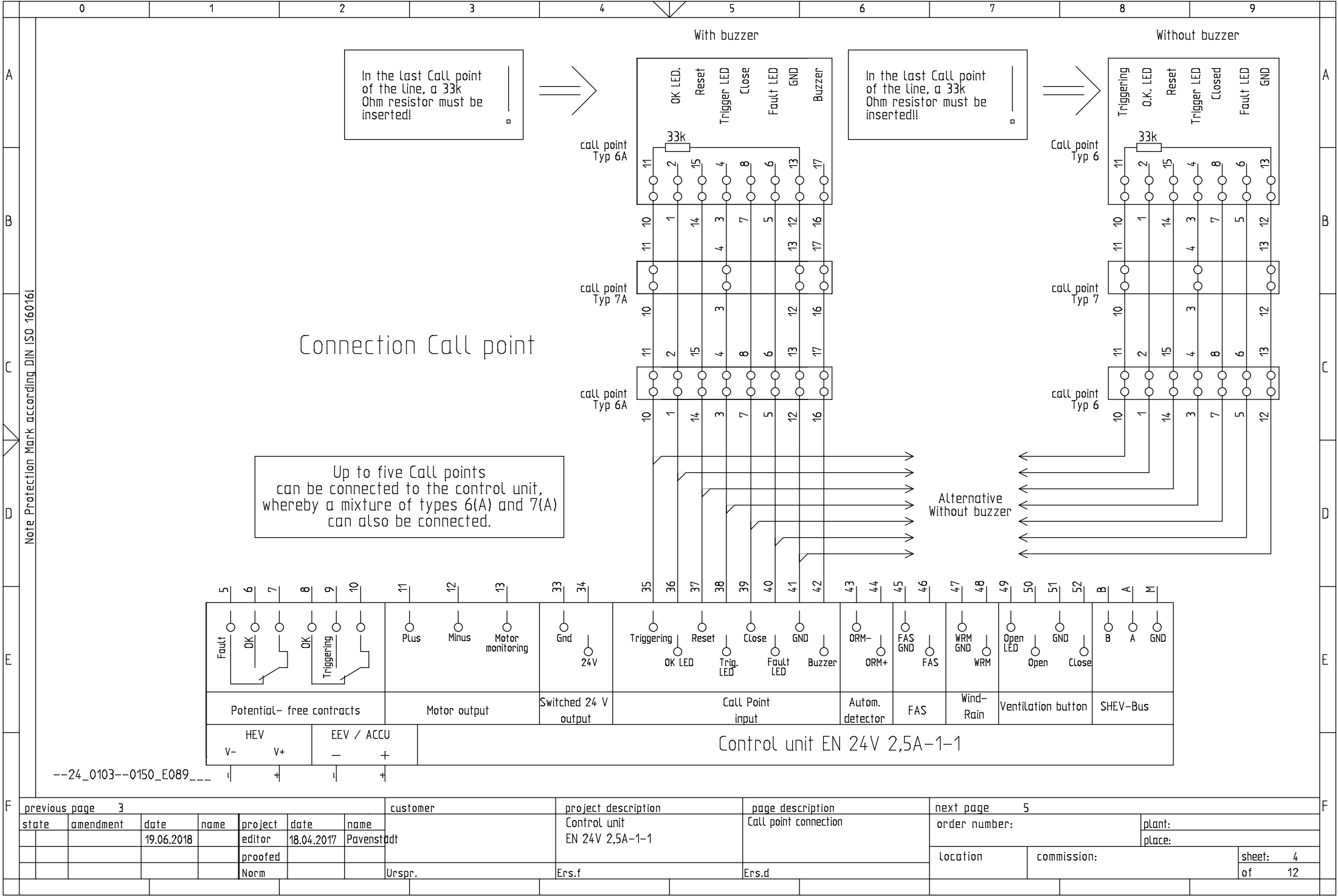
General view of the control unit / delivery condition



--24_0103--0150_E089_--

previous page 1							customer	project description Control unit EN 24V 2,5A-1-1	page description General view	next page 3			
state	amendment	date	name	project	date	name				order number:		plant:	
		19.06.2018		editor	18.04.2017	Arnold						place:	
				proofed						Location		commission:	
				Norm			Urspr.	Ers.f	Ers.d			sheet: 2	
												of 12	

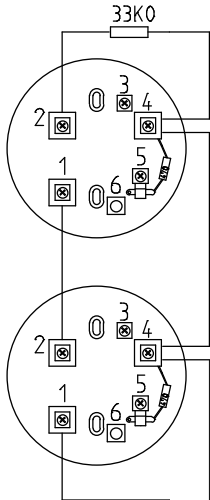
previous page 2							customer	project description Control unit EN 24V 2,5A-1-1	page description Control unit Mains connection Rechargeable batteries connection	next page 4				F
state	amendment	date	name	project	date	name				order number:		plant:		
		19.06.2018		editor	18.04.2017	Arnold						place:		
				proofed						Location		commission:		
				Norm			Urspr.	Ers.f	Ers.d			of 12		



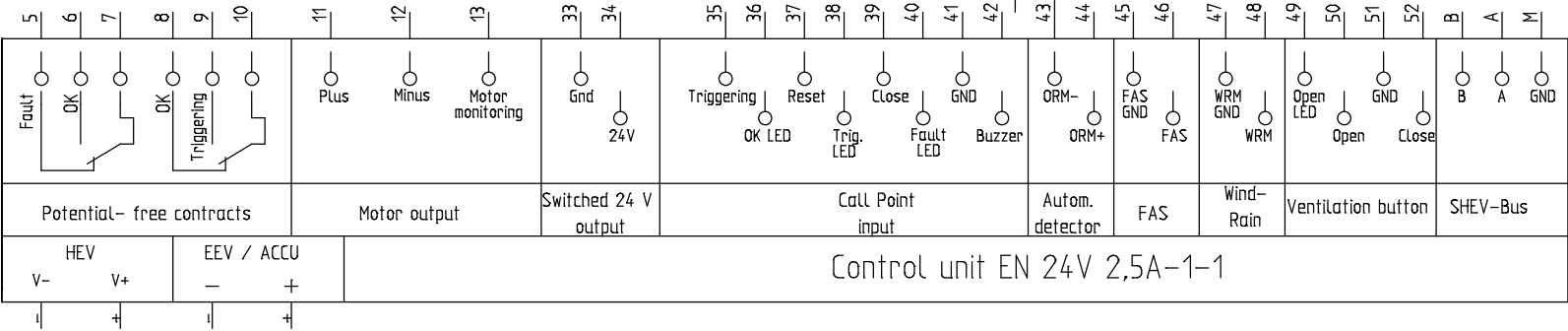
Connection autom. detector

Up to 10 units in one line

in the last detector
of the line, a 33k
Ohm resistor must be
inserted!



ECO 1003 optical smoke detector
ECO 1004T 78°C maximum heat detector
ECO 1005T 58°C maximum heat detector



--24_0103--0150_E089_--

previous page 4							customer		project description		page description		next page 6	
state	amendment	date	name	project	date	name	Control unit EN 24V 2,5A-1-1		Automatic detector		order number:		plant:	
		19.06.2018		editor	18.04.2017	Pavenstadt							place:	
				proofed							Location		commission:	
				Norm			Urspr.		Ers.f		Ers.d		sheet: 5	
													of 12	

previous page 5							customer	project description Control unit EN 24V 2,5A-1-1	page description FAS input 24 V output	next page 7			
state	amendment	date	name	project	date	name				order number:		plant:	
		19.06.2018		editor	18.04.2017	Pavenst						place:	
				proofed						Location		commission:	
				Norm			Urspr.	Ers.f	Ers.d			sheet: 6	
												of 12	

1

1

1

[illegible][illegible]

Connection ventilation button

Dual rocker without mutual interlocking

Ventilation button

Number max 8 Units

Max. output power of the

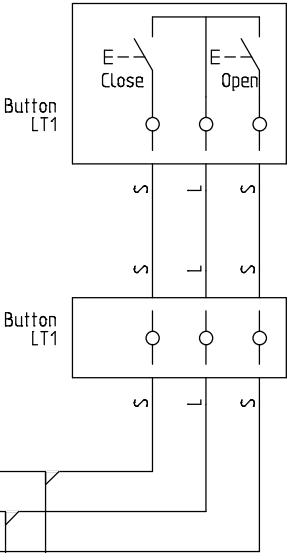
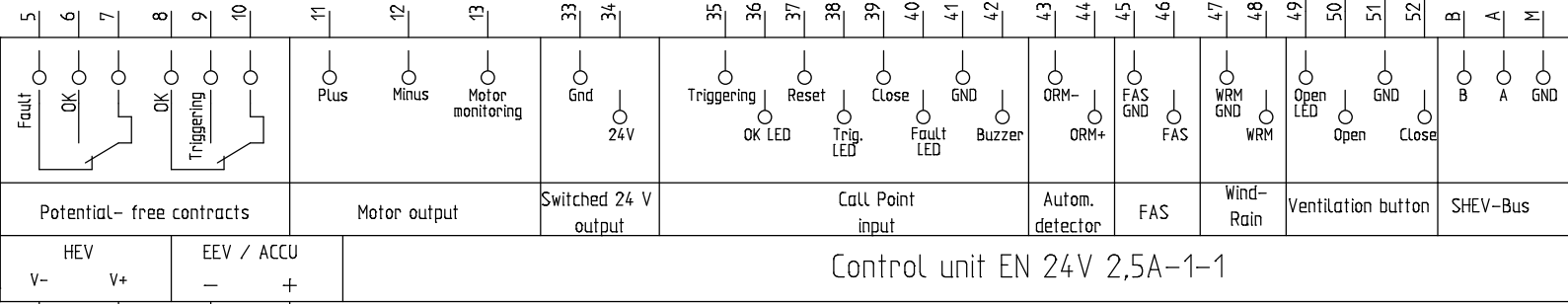
Open display output

at 24V DC / 50mA is 1.2W

Ventilation button without LED

Arbitrary number

Open/closed/ Stop



Note Protection Mark according DIN ISO 16016l

--24_0103--0150_E089_--

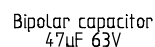
previous page 7							customer		project description		page description		next page 9	
state	amendment	date	name	project	date	name	Control unit EN 24V 2,5A-1-1		Ventilation button		order number:		plant:	
		19.06.2018		editor	18.04.2017	Pavenstadt							place:	
				proofed							Location		commission:	
				Norm			Urspr.		Ers.f		Ers.d		sheet: 8	
													of 12	

sheet:	9
of	12

Synchro - operation
JM-DC - SYN- ...

In the last load disconnect, the capacitor for the feedback must be connected

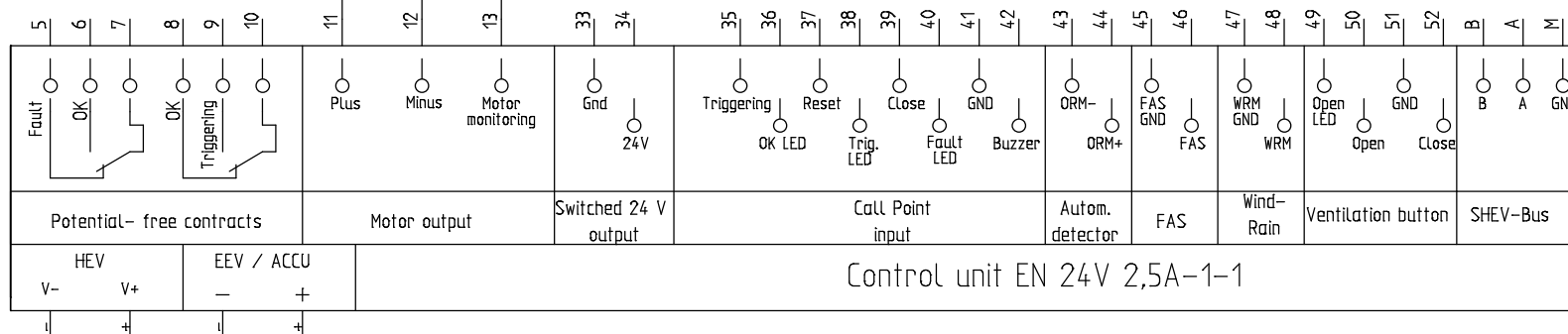
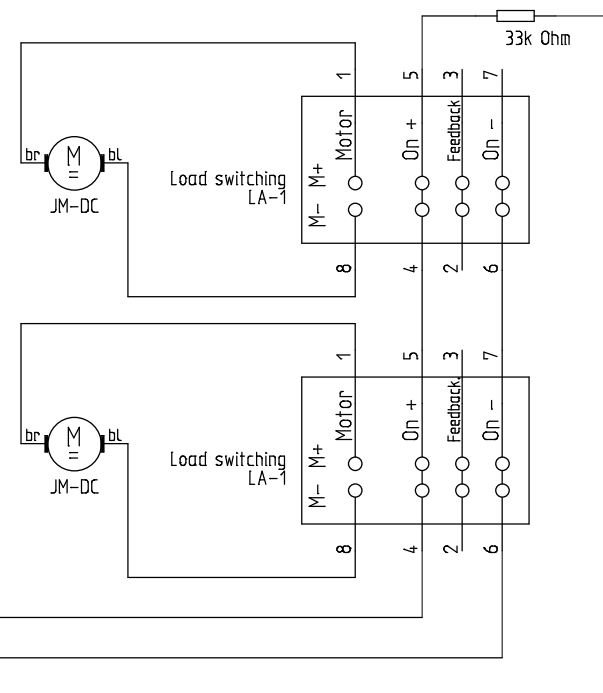
LA-SYN 0,55A - 2,5A



2 drives
on one window
Total current max. 2,5A

Solo - operation
with external LA-1 und JM-DC -

In the last load disconnect, the resistor for the feedback must be connected.



--24_0103--0150_E089_--

