Smoke and Heat Ventilation
Pneumatic - Electronic
Control Systems

Installation and Operating instructions

Version 3/18a

SHEVS Control

RWD 2 a

K + G Tectronic GmbH • In der Krause 48
52249 Eschweiler • Deutschland / Germany
☏ +49 (0) 24 03 / 99 50 - 0 • FAX +49 (0) 24 03 / 655 30
✉ Info@kg-tectronic.de • www.kg-tectronic.de

GRASL Pneumatic-Mechanik GmbH • Europastraße 1
3454 Reidling • Österreich / Austria
☏ +43 (0) 22 76 / 21 200 - 0 • FAX +43 (0) 22 76 / 21 200 - 99
✉ Office@graslrwa.at • www.graslrwa.at

A600235

CE

Contents

Please read these instructions carefully.

Work at the Control may be performed only by qualified personnel.

Symbols used:

OK = Trouble-free operation	= Button / travelling command "OPEN"	= Warning tone / buzzer
= Alarm	= Button / travelling command "CLOSED"	= Strobe
= Malfunction	= "OPEN" position	= Ventilation position
= Maintenance	= Wind	= Ventilation time
	= Rain	
= Automatic fire detector	= Manual call point	F = Fire Alarm Control Panel (FACP)

1 Concept of Control

- Control for installation of a decentralised SHE system with 24 V- actuators. Very short cable paths and small cross-sections to the actuators by placing the Control close to the SHV
- Integrated power supply built according to DIN EN 12101-10
- Control unit built according to prEN 12101-9
- 60 Controls can be arranged in up to 9 SHE groups in one monitored bus system. Each SHE group can contain up to 9 ventilation groups, 19 ventilation groups are possible in SHE group 1. The configuration is done using rotary switches
- An operating unit **SD 2** (accessory) is required for operating the bus system. It is also used for configuring the parameters, operation and status display. The operating unit can be plugged directly into any system controller or into a device socket. Optionally, a second operating unit can also be used.
- Automatic fire detectors, manual call points, Fire Alarm Control Panel (FACP), operating unit, Wind and Rain Control (WRC), external warning devices etc. can be connected to the nearest Control within the SHE group, whereby ventilation buttons can be freely selected from within the ventilation group
- Four signalling lines:
  - Line : automatic fire detector or FACP
  - Line : Manual call point **RT 2** or **RT 4** (main alarm point RT 2/4-*-BS or secondary alarm point RT 2/4-*). Connectable types see section 6 “Technical Data”
  - Line In1: Local alarm (thermal switch, roof access switch)
  - Line In2: Additional function (wind vane or sunshade control, separate documentation)
- Reset the alarm / detector using the button in the main alarm point or in the Control
- Selectable functions:
  - “Auto Close” (automatic closure after resetting an alarm)
  - “Malfunction = Alarm” (alarm in case of malfunction in a signalling line or the bus system)
  - “Automatic OFF” (automatic travel commands - apart from the alarm - are disabled).
  - “Thermal Alarm” (local alarm on exceeding an enclosure inside temperature of 70 °C)
  - “2-detector-dependency” (2-detector dependency for automatic fire detector in line)
  - “WRC” (The Control reacts to the closing command of a wind and rain control)
- Possibility of connecting ventilation button, also with indication of position
- Adjustable ventilation position and ventilation time
- Possibility of connecting an external wind and rain control, e.g., type **WRS** (for each SHE group to be controlled, a separate contact is required). Internal wind and rain control optional
- Internal service display for indicating the detailed status
- Pluggable terminal blocks (apart from actuator output)
- The use of K + G / Grasl actuators is recommended. When controlling 3rd party actuators, compatibility is to be checked. Also note section 6 “Technical Data” for this
- Connectable actuators: 24 V- actuators, travelling time for full stroke at rated load (total travelling time) < 4 minutes
- When directly changing the direction of travel, the actuators are stopped briefly before changing the direction
- Sheet steel enclosure, light grey (RAL 7035)

1.1 Options / Accessories

- **BA-T:** Terminator at the end of the bus system. 2 pieces required
- **BA-V:** Distribution box with 4 connection points for splitting the bus system
- **BA-SD:** Device socket for operating unit **SD 2**
- **SD 2:** Operating unit. Required for operating the bus system
- **BA-L1** / **BA-L2:** Connection cable for the operating unit (length 1 m / 2 m)
- **PK:** One potential-free contact (PFC) for forwarding alarm signals or requests to systems with sun protection (Sequence Control) (selectable). Another PFC for forwarding malfunction signals or indication of position OPEN (selectable)
- **WTM:** Outputs for controlling external warning devices in the case of alarm or malfunction
- **WRM:** Internal wind and rain control. Connection of wind sensor **WM** and/or rain sensor **RS** is required (accessory)

The PK and WTM options cannot be provided at the same time!

2 Putting into service / putting out of service

Work at the Control may be performed only by qualified personnel!
Before starting any work, it is mandatory to deflect static charge!
We do not assume any guarantee or liability for defects caused by faulty connection.

ℹ *Planning and design of SHEVS require observation of the following rules, as far as applicable: National building codes/model building code and regulations of local building and fire safety authorities, VDE regulations (particularly VDE 0100, 0108 and 0833), VdS Guidelines 2098 and 2221, DIN 18232, EN 12101, DIN 4102, model line systems policy.*

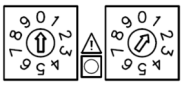
2.1 Installation / putting into service

❗ *Perform work at the Control only in de-energised condition!*
Actuators may not be driven with external power supply (e.g., external accumulators), if they are already connected to the Control. This can lead to defects in the power output.

ℹ *It is advisable to assemble all the controls when installing the system and wire them according to the connection diagrams. The bus system must be provided with two **BA-T** bus terminators. Then the Controls of the system can be put into operation one by one.*

- Fasten the enclosure securely using suitable mounting material. Pass the connection cables through the holes provided.
- With the **Address** rotary switches, a different address has to be configured for each Control. The addresses 01 to 60 are allowed. Factory setting: 01.

  ℹ *The address can be changed any time.*
  If the Control is switched on, the µC-Reset *button must be pressed briefly.*
  If the address is not allowed, the indicator ⚠ flashes.



- Make function settings (see 3.2).
- Turn on line voltage. The indicators and the service display light up briefly. Subsequently, the indicator ⚠ flickers for about 15 s (calibration process). If the indicator ⚠ is permanently lit, there is a malfunction in a signal line (see 5). The service display remains on for 120 s.
- Insert the accumulators in the enclosure as illustrated on the “Line voltage, installation, accumulators” plan, secure with the fixing strips and connect them.
- The indicator OK lights up, the indicator ⚠ extinguishes, the system is ready for operation. If malfunction is still displayed, follow the instructions in section 5 “Detection of fault / Troubleshooting”. If necessary, decommission the Control again (see 2.2).
- While putting into service, check all functions and indicators of the Control and its components. The individual functions are described in section 3 (also simulate malfunctions and check detection, see 5).
- After putting into service, completely close all actuators (press button ▽).

ℹ *The operating unit **SD 2** is useful for configuration and status display while putting the system into service. Please refer to the relevant operation manual.*

ℹ *After about 24 hours of continuous operation without mains failure, the accumulators are sufficiently charged to achieve the full standby time in case of mains failure.*

2.2 Putting out of service

- Disconnect the accumulators from the Control (e.g., disconnect the accumulator connection line).
  ℹ *Charged accumulators have a shelf-life of about 6 months. In the case of longer storage, they must be recharged.*
- Switch off line voltage.

ℹ *The bus system detects the Control failure and an malfunction is displayed. If a Control is removed from the system for a long duration or permanently, it can be reconfigured (automatically) using the operating unit **SD 2**; the system runs smoothly again.*

3 Functions and operation

Before touching the control elements in the Control it is mandatory to deflect static charge!

3.1 Indicators / control elements of the Control

- **Indicators on the logic board:**
  - OK (green): **Trouble-free operation**. Is extinguished when it detects a malfunction.
  - (red): **Alarm** (lights up), **local alarm** (blinks) **pre-alarm** (flashes)
  - ⚠ (yellow): **Malfunction**.
  - (blue): **Wind and rain control (WRC)** is active.
  - (blue): **Maintenance is due** (flashes) or **maintenance mode enabled** (lights up).
  - (red): **Service display**, see 5.2.
  - △ / ▽ (blue): **Travel command in OPEN or CLOSE** direction active.
- **Control elements on the logic board:**
  - **Button *Reset***: To reset the alarm function.
  - **Button *Reset***: To switch off the warning tone.
  - **Button** (ventilation position) and **potentiometer** (ventilation time): see 3.5.2 and 3.5.3.
  - **Button *Test***: Switching to accumulator mode and running the alarm function in the SHE group for maintenance purposes. Buzzers are not activated in the process.
  - **Button *µC-Reset*:** For change of address and service purposes

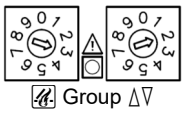
3.2 Selectable functions

- **"Auto Close"** DIP switch **1**:
  In position ON, the actuators are automatically closed after resetting an alarm. When the function responds, ventilation can be resumed only after 4 minutes.
  Factory setting: ON (automatic closure is activated).
- **"Malfunction = Alarm"** DIP switch **2**:
  In position ON, the alarm function is executed in the SHE group upon malfunction of a signal line (see 3.4). Upon malfunction of the bus system (wire-break or short-circuit in the bus line, failure of a Control), the alarm function is executed throughout the bus system after a delay of 15 minutes. Please see note in section 2.2. The alarm can also be reset by pressing the button *Reset* in a main alarm point or the Control before eliminating the malfunction.
  Factory setting: OFF (no alarm in the case of malfunction).

  The function has to be configured identically in all the Controls of the bus system.
- **"Automatic OFF"** DIP switch **3**:
  In position ON, the following automatic functions are disabled: Auto Close, ventilation position and ventilation time, repetition of cycle ▽ and closing in the case of mains failure or active wind and rain control. Actuators operate during ventilator operation only if a button △ / ▽ is pressed. The indication of position is deactivated.
  Factory setting: OFF (automatic enabled).
- **"Thermal Alarm"** DIP switch **4**:
  In position ON, the alarm function (see 3.4) in the affected Control is executed when the inside temperature of the enclosure exceeds 70 °C (local alarm). The indicators blink.
  Factory setting: OFF (no alarm when 70 °C is exceeded).
- **"2-detector-dependency"** DIP switch **5**:
  In position ON, two automatic fire detectors must have responded in line before the alarm function is executed (see 3.4).
  The pre-alarm is active as soon as the first automatic detector has responded. The indicators flash and the manual call points with buzzer emit an intermittent sound.
  Recalibration takes place automatically as soon as the switch position is altered (see 2.1).
  Factory setting: OFF (no 2-detector-dependency in line).

  Observe altered terminating resistance when function is enabled (see terminal diagram).
- **"WRC"** DIP switch **6**:
  In position ON, the actuators close automatically if a wind and rain control is activated.
  Factory setting: ON (automatic close in the case of active wind and rain control).
- DIP switch **7** and **8**: Do not change setting. Factory setting: OFF

- **"Group configuration"** rotary switch **Group** △▽:
  Using the rotary switch Group △▽, the configuration of the SHE and ventilations groups of the bus system are set. In the adjacent example, SHE group 3 and under it ventilation group 2 is set. The values 1 - 9 can be set for the SHE and ventilation groups. Factory setting: 1 1.



  ℹ *The group configuration can be changed at any time, the change is automatically activated after a few seconds. If the configuration is not allowed, the indicator ⚠ flashes.*

  ℹ *19 ventilation groups are possible in SHE group 1. For ventilation groups from 10, put the SHE group switch to 0 (e.g., setting 0 3 corresponds to SHE group 1 and under it ventilation group 13). The values 0 - 9 can be set for the ventilation groups.*

- Rotary switch **address** please see 2.1.
- **"Option PK"** switch **S1** and **S2**:
  - Switch S1 in position (factory setting): The first contact of the option PK switches in case of alarm.
    Switch S1 in position : Using the contact for systems with sunshade (sequence control), separate documentation.
  - Switch S2 in position ⚠ (factory setting): The second contact of the option PK switches in case of malfunction.
    Switch S2 in position : Using the contact to forward the indication of position. The contact is operated when a travel command is activated in the OPEN direction. In the case of a travel command in the CLOSED direction, the contact returns to its neutral position after 4 minutes at the latest.

3.3 Indicators / functions of the manual call points

- For activation and reset, see 3.4.
- **Indicators:**
  - (red, **RT 2/4-***): **Alarm** of the SHE group (see 3.4).
  - OK (green, **RT 2/4-*-BS**): **Trouble-free operation**. Extinguishes when a malfunction is detected.
  - ⚠ (yellow, **RT 2/4-*-BS**): **Malfunction** of the SHE group (see 5).
- **Button *Reset*** (**RT 2/4-*-BS**): Resetting the alarm function (accessible after opening the door with a key).
- Manual call point with buzzer for alarm and malfunction signal (**RT 2/4 -*- BS-AA)**:
  The buzzer emits a continuous tone in the case of alarm or local alarm, and an continuous tone in the case of pre-alarm or malfunction. The warning tone is switched off by pressing the button *Reset* .

3.4 Alarm functions

During the execution of an alarm function the ventilation functions are disabled.

- **Alarm function:** Upon detecting an alarm, the actuators of the SHE group are fully opened. The indicators light up and the manual call points with buzzer emit a continuous sound. Repetition of cycle △ is executed for 30 minutes (open, close briefly, open again). The alarm is forwarded to all Controls in the SHE group.

  ℹ *In the case of alarm signal in line In1 (see below) or thermal alarm (see 3.2), the alarm function is not forwarded to other Controls (local alarm). In this case the indicators blink.*

- **Resetting alarm function:** Resetting is done by briefly pressing the button *Reset* in a main alarm point or the Control. Then the indicators will go out. The resetting can also be done using the operating unit **SD 2**.

  ℹ *If, after an alarm has been reset, it is closed by pressing button ▽, ventilation can be resumed only after 4 minutes.*

- **Manual call points:** For manual alarm signal, break open the glass of the manual call point and press the control button until the indicator confirms the detection of the alarm.
  For maintenance work, the door of the manual call point can be opened with a key.
- **Automatic fire detectors:** The alarm signal is given out automatically based on smoke and/or heat detection depending on the detector type. If an automatic fire detector responds again after the resetting, the reset step should be repeated (smoke particles may still be present in the detector).

- **Fire Alarm Control Panel (FACP):** When the FACP generates an alarm signal, the alarm function is executed. The alarm is reset at the FACP.
- **Line In1:** If there is an alarm signal in line In1, the alarm function is executed in the affected Control (local alarm).

ℹ *Other alarm functions ("Malfunction = Alarm", "Thermal Alarm", "2-detector-dependency", "Auto Close") see 3.2.*

3.5 Ventilation functions

ℹ *The ventilation position, the ventilation time and the wind and rain control are disabled as long as the function "Automatic OFF" is enabled (see 3.2). Actuators operate only if a button △ / ▽ is pressed.*

❗ *When performing ventilation functions, do not exceed the duty cycle of the actuator output and the actuators.*

3.5.1 Manual ventilation

- After briefly pressing a ventilation button (△ / ▽), the actuators of the ventilation group travel up to the end position or the set ventilation position (see 3.5.2). Pressing it again stops the actuators. By pressing the button for the reverse direction of travel, the travelling direction is reversed after a brief stop.
- When pressed longer (> 1 s), the actuators travel as long as the button remains pressed. It is also possible to travel up to the end position or up to the set ventilation position.

3.5.2 Setting the ventilation position

ℹ *This setting can be made only when the system has no malfunctions and WRC is not active. Initially, all actuators must be completely closed and the travel command ▽ must be terminated.*

- Set the travelling times towards OPEN and CLOSED to define the desired ventilation position. Factory setting: 15 s travelling time OPEN, 30 s travelling time CLOSE.
  - Enabling / disabling the ventilation position: Press button for longer than 3 s. (enabled) or (disabled) is shown briefly in the display.
  - Reset to factory setting: Press button for longer than 6 s. The display briefly shows .
- Setting the travelling times:
  - Briefly press the button to enter programming mode (display:).
  - Briefly press the button to extend the actuators. When reaching the desired ventilation position, press the button again.
  - Briefly press the button to retract the actuators. When all actuators are fully retracted, press the button again. The display is extinguished.
  - The actuators automatically travel to the ventilation position for verification and then close again.

  ℹ *The programming mode is cancelled automatically after 15 minutes without button activity or manually by double clicking on the button* Reset .

ℹ *The setting can also be done using the operating unit **SD 2**. It is possible to set the travelling times at the same time for all Controls of a ventilation or SHE group or even for the entire bus system.*

3.5.3 Setting the ventilation time

- Use a screwdriver to set the ventilation time at the potentiometer to 5 to 30 minutes. The actuators close automatically at the end of the set time. Turn left to disable ventilation time (= factory setting).

ℹ *The ventilation time can also be set using the operating unit **SD 2** .*

3.5.4 Indication of position in the ventilation button

- The indicator
  - lights up: Actuators are in OPEN position
  - flickers: A travel command is active
  - blinks: Wind and rain control is active

  In the case of a travel command towards CLOSED, the display goes out latest after 4 minutes.

ℹ *If the "Automatic off" function is enabled (see 3.2), the indicator is disabled.*

3.5.5 External Wind and Rain Control (WRC)

- If the wind and rain control is active, the actuators are closed automatically. The ventilation functions are disabled. The indicator on the logic board lights up (enabled locally) / blinks (enabled by the bus), until the WRC releases the ventilation functions once again. An alarm has priority. Observe setting of the function “WRC” (see 3.2).

3.6 Repetition of cycle ▽

- If not all actuators are properly closed (e.g., actuator has switched off due to a gust of wind), the repetition of cycle function can be enabled by briefly pressing the ventilation button ▽. The actuators are briefly opened and following the closing command is activated once again.

  ℹ *Observe setting of the function “Automatic OFF” (see 3.2).*

3.7 Mains failure

- In the case of mains failure, the accumulators cannot be charged, but they provide the operating power for the standby time. Actuators in ventilation position are closed and pressing the ventilation button △ is ignored. Alarm functions are not affected by the mains failure.
  The mains failure must be rectified immediately to prevent the deep-discharge protection from responding, to recharge the accumulators, and to ensure safe functioning of the system.

  ℹ *Observe setting of the function “Automatic OFF” (see 3.2).*

- **Deep-discharge protection:** If the accumulators are in critical condition, the device is **switched off** completely. However, a low quiescent current still flows (in addition to the natural self-discharge). Therefore, the risk exists of permanent damage to the accumulators after just a few days without recharging.

4 Maintenance

- In the course of maintenance - unless other local regulations apply - check all the functions and displays of the device and the components at least once a year. This also includes checking the terminal points, connection cables, indicators and fuses, and cleaning of various components, if necessary.
  The individual functions are described in section 3. Likewise simulate the malfunctions of the signal lines and power supply and check the detection (see 5).

  ℹ *All the functions of the controls can also be executed using the operating unit **SD 2**.*

- **Indication of due maintenance**
  If the maintenance company has enabled this function, the indicator 🔧 flashes after about 11 months of service life. After about 14 months, the overdue maintenance leads to the display of a malfunction ⚠.

- **Accumulators:**
  - Check the accumulators **at least once a year** for proper functioning. They should be replaced following a typical service life of 3, but no more than 4 years in an ambient temperature of 20 °C. The service life falls by 1 year for every 10 °C rise in ambient temperature!
  - Checking the accumulators:
    Press the button *Test* (a test alarm is executed in accumulator mode in the SHE group) and the actuators are completely opened. If the accumulator voltage drops too low during this, the accumulators are defective. A malfunction will be displayed until the accumulators have been replaced.
    After testing the accumulators, reset the alarm testing (press button *Reset* briefly) and close all actuators again.
    Carry out the test in each SHE group. The test can also be carried out using the operating unit **SD 2**.
    ℹ *A quick check of the accumulators with less load takes place automatically every 60 minutes.*
  - The end user, i.e., the final owner, must return used batteries / accumulators to a distributor or public waste management authorities. This obligation to return applies regardless of whether it is a private or commercial end user.

- If controls need to be put out of service / temporarily shut down, **the accumulators have to be disconnected** and the line voltage has to be switched off! Please see note in section 2.2.
- Accumulators that are charged but not yet connected have a shelf-life of about 6 months. In the case of longer storage, they must be recharged.

*In the case of direct driving of actuators, e.g., with external accumulators during installation or maintenance work, **the actuators must be disconnected from the Control**! Otherwise, this can lead to defects in the power output.*

5 Detection of fault / Troubleshooting

5.1 General instructions

Occurrence of a malfunction is indicated by flashing of the indicator ⚠ on the logic board and in the main alarm points. With the help of the service display, the cause can be limited (see 5.2).

*All the malfunction signals of the bus system can be displayed in detail using the operating unit **SD 2**.*

- The following are detected as **malfunctions**:
  - Accumulator or mains failure, accumulator polarity reversed, power supply malfunction
  - Failure of the fuses F1, F2.1, F2.2
  - Wire-break or short-circuit of signal lines
  - Wire-break or short-circuit of the actuator line (unbranched common line)
  - Wire-break or short-circuit of the bus cable, Control failure
  - Incorrect group or address setting
  - An operating unit has not been detected for more than 6 minutes
  - Maintenance overdue (if enabled)
- Notify the maintenance company in the case of malfunctions.
- **Spare material:** in the Control, there is a bag of spare fuses and resistors.
- **Automatic calibration in case of malfunction of the signal line ⊟:** After rectifying a prolonged malfunction, the line is automatically recalibrated. The status light ⚠ flickers for about 15 s. If the status light ⚠ then is permanently lit, there is another malfunction.
  Brief malfunctions (< 10 minutes) do not result in enabling the calibration process (e.g., maintenance activity such as the brief removal of a detector to check the malfunction display).

5.2 Service display

- Operating conditions can be accurately displayed with the help of the service display.
  The display is switched off in normal condition. It can be switched on for 120 s by pressing the button *Reset* for 4 s.
- If there is no alarm / malfunction signal, the memory of the display can be displayed for 1 s by briefly pressing the button *Reset* (alarm memory) or the button *Reset* (fault memory).
- In the case of alarm /malfunction, the display is switched on automatically, but switched off again after 10 s in the case of mains failure. In this case, it may be switched on again for 10 s by pressing the button *Reset* for 4 s.

Operating conditions:

Display	Description
01	Mains failure or fuse F1 blown
02	Fault in power supply unit
11	Wire-break of accumulators
21	Actuator output 1: Fuse F2.1 blown
22	Actuator output 2: Fuse F2.2 blown
31	Actuator output 1: Wire-break / Short-circuit
32	Actuator output 2: Wire-break / Short-circuit
41	Line : Alarm
42	Line : Wire-break
43	Line : Short-circuit
44	Line : undefined [1]
51	Line : Alarm
52	Line : Wire-break
53	Line : Short-circuit
54	Line : undefined
61	Line In1: Alarm
62	Line In1: Wire-break
63	Line In1: Short circuit
64	Line In1: undefined
71	Line In2: Message
72	Line In2: Wire-break
73	Line In2: Short circuit
74	Line In2: undefined

Display	Description
8	“Malfunction = Alarm” active
A	Bus system malfunction [2]
b	Assign the address several times
c	Group or address setting incorrect
C	“Automatic Off” with changeover contact
E	Setting Ventilation position disabled
L	Setting Ventilation position
n	Line : Pre-alarm
P	Changeover contact for ventilation detected
q	Alarm by internal thermal sensor
t	Accumulator test active
U	Accumulator is defective
y	Accumulator polarity reversed
--	Memory alarm/malfunction empty
r	Button *Reset* : Short-circuit
J	Button *Reset* : Short-circuit
H	Test alarm active
Ξ	Maintenance is due
Ex	Error (x), service required

Accumulator-charging phases:
[I.] = I-charging, [U.] = U-charging, [t.] = trickle charging, [n.] = standby, [.] = no charging.

[1] *In case of display 44 check, whether the proper terminating resistor was used (see connection diagram).*
[2] *Wire-break or short-circuit, operating unit SD 2 or registered Control not found.*

6 Technical Data

6.1 Version

Type	RWD 2-10a	RWD 2-20a
Part number	8101 2110 0000	8101 2120 0000
Output current	10 A (24 V⎓ / 240 W)	20 A (24 V⎓ / 480 W)
Current input	1.2 A / 230 V~	2.3 A / 230 V~
Dimensions in mm (W x H x D)	480 x 310 x 180	
Accumulators (VRLA-AGM), VdS approved	2 x 7 Ah / 12 V	2 x 12 Ah / 12 V
Use only supplied or approved accumulators. See compatibility list on: www.kg-tectronic.de (Electronics - System Accessories - Accumulators)		

The requirements of Directives 2014/35/EU and 2014/30/EU are met. CE

6.2 Performance data and characteristics

General

Line voltage supply Internal supply voltage / standby time	115 - 230 V~ / 50 - 60 Hz 24 V⎓ / 72 h (mains failure)
Cable entry through membrane grommets (from above)	9x M16, 2x M20, 2x M25
Environmental class 1 / III (EN 12101-10 / VdS 2581) Maximum continuous ambient temperature Relative humidity Enclosure protection rating	-5 °C … +75 °C [3] +50 °C [3] 20 % … 80 %, non-condensing IP30
Installation dimensions, see “Line voltage, Installation, Accumulators” diagram. Not suitable for outdoor use. Protect from direct sunlight, humidity and excessive formation of dust! Preferably, the installation should be carried out in dry, heated rooms.	

Signal lines

Line monitoring	wire-break, short-circuit
Line ▭: Automatic fire detector: Smoke detector / heat detector (**RM 2** / **TM 2** or **RM 3** / **TM 3**) or Fire Alarm Control Panel	 20 pieces, of which max. 10 heat detectors [4] NC / NO contact
Line ⊡, manual call point: – **RT 2/4-*** – **RT 2/4-*-BS** – **RT 2/4-*-BS-AA**	 total of 10 pieces, of which max. 3 pieces with buzzer 🔊
Line In1 (local alarm) Line In2 (additional function)	NC / NO contact NC / NO contact

Inputs / Outputs

Ventilation button **LT** △ ▽ Ventilation button **LT x-A** △ ▽	unlimited 10 pieces
Wind and Rain Control (type **WRS**)	NC contact [5]

[3] *Observe notes on the service life of the accumulators (see 4)*
[4] *Heat detector:* **TM 2-D** (65-55000-122), **TM 2-M** (65-55000-137), **TM 3-D** (FD-851RE), **TM 3-M** (FD-851HTE), **RM 3-OT** (SD-851-TE),
Optical detector: **RM 2-O** (65-55000-317), **RM 3-O** (SD-851-E)
[5] *In the WRC, a separate contact is required for each bus system to be controlled*

Bus System

Bus type	LON
Termination	2x BA-T (2x 100 µF / 105 Ω)
Possible topologies (even mixed)	Ring, Line, Bus, Tree
Operating unit **SD 2**	1 piece required, 2 pieces can be used
Maximum number of controls of type **RWD 2**	60 pieces
Maximum cable length	2500 m
Cable type: H[2 x 02YS 0.57 mm/AWG23(ST) + 2 x 2Y 0.8 mm/AWG20], e.g., ConCab CC-LON-BUS-C-935 (Part no. 93512312006)	

Actuator output

Rated voltage	24 V⎓ (+6 V / -4 V)
Operating mode / duty cycle	S3 30 %
Maximum cross-section of the supply line	4x 6 mm² (rigid)
Permissible voltage drop from Control to actuator	1 V at full load
Line monitoring (un-branched common line)	wire-breakage, short-circuit
Permitted total output current: **RWD 2-10a** (1 output) **RWD 2-20a** (2 outputs)	max. 10 A Total max. 20 A, per output max. 16 A

Allowed cable length with simple arrangement without extensive branching of the actuators

Current / Cross section	2.0 A	4.0 A	6.0 A	8.0 A	10.0 A	12.0 A	14.0 A	16.0 A
2 x 1.5 mm²	22 m	11 m	7 m	5 m	4 m	4 m	3 m	3 m
2 x 2.5 mm²	36 m	18 m	12 m	9 m	7 m	6 m	5 m	5 m
2 x 4.0 mm²	58 m	29 m	19 m	15 m	12 m	10 m	8 m	7 m
2 x 6.0 mm²	87 m	44 m	29 m	22 m	17 m	15 m	12 m	11 m
4 x 1.5 mm²	44 m	22 m	15 m	11 m	9 m	7 m	6 m	5 m
4 x 2.5 mm²	73 m	36 m	24 m	18 m	15 m	12 m	10 m	9 m
4 x 4.0 mm²	116 m	58 m	39 m	29 m	23 m	19 m	17 m	15 m
4 x 6.0 mm²	174 m	87 m	58 m	44 m	35 m	29 m	25 m	22 m

When 4 cores are used, connect 2 cores each in parallel.

Fuses

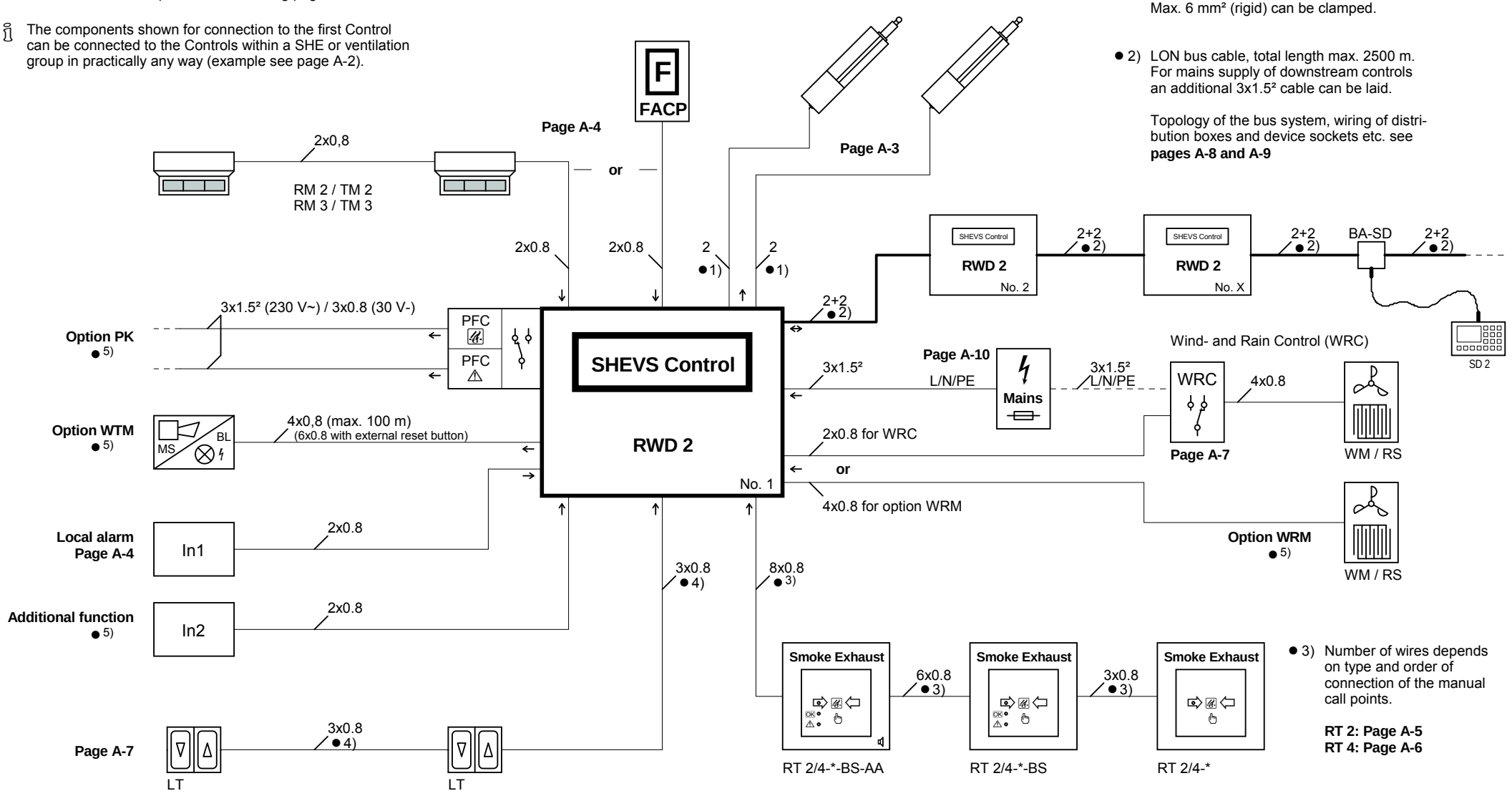
	RWD 2-10a	**RWD 2-20a**
Mains primary (miniature fuse 5 x 20 mm)	F1: T 3.15 A	F1: T 3.15 A
Actuators (mini blade fuse 11 mm)	F2.1: 20 A	F2.1: 20 A F2.2: 20 A

SHEVS Control RWD 2a

System diagram (please consider local conditions / components)

Detailed connection examples on the following pages.

ℹ The components shown for connection to the first Control can be connected to the Controls within a SHE or ventilation group in practically any way (example see page A-2).



● 1) For the permitted cable length, see section "Technical Data". Max. 6 mm² (rigid) can be clamped.

● 2) LON bus cable, total length max. 2500 m. For mains supply of downstream controls an additional 3x1.5² cable can be laid.

Topology of the bus system, wiring of distribution boxes and device sockets etc. see **pages A-8 and A-9**

● 3) Number of wires depends on type and order of connection of the manual call points.

RT 2: Page A-5
RT 4: Page A-6

● 4) 4x0.8 for LT x-A

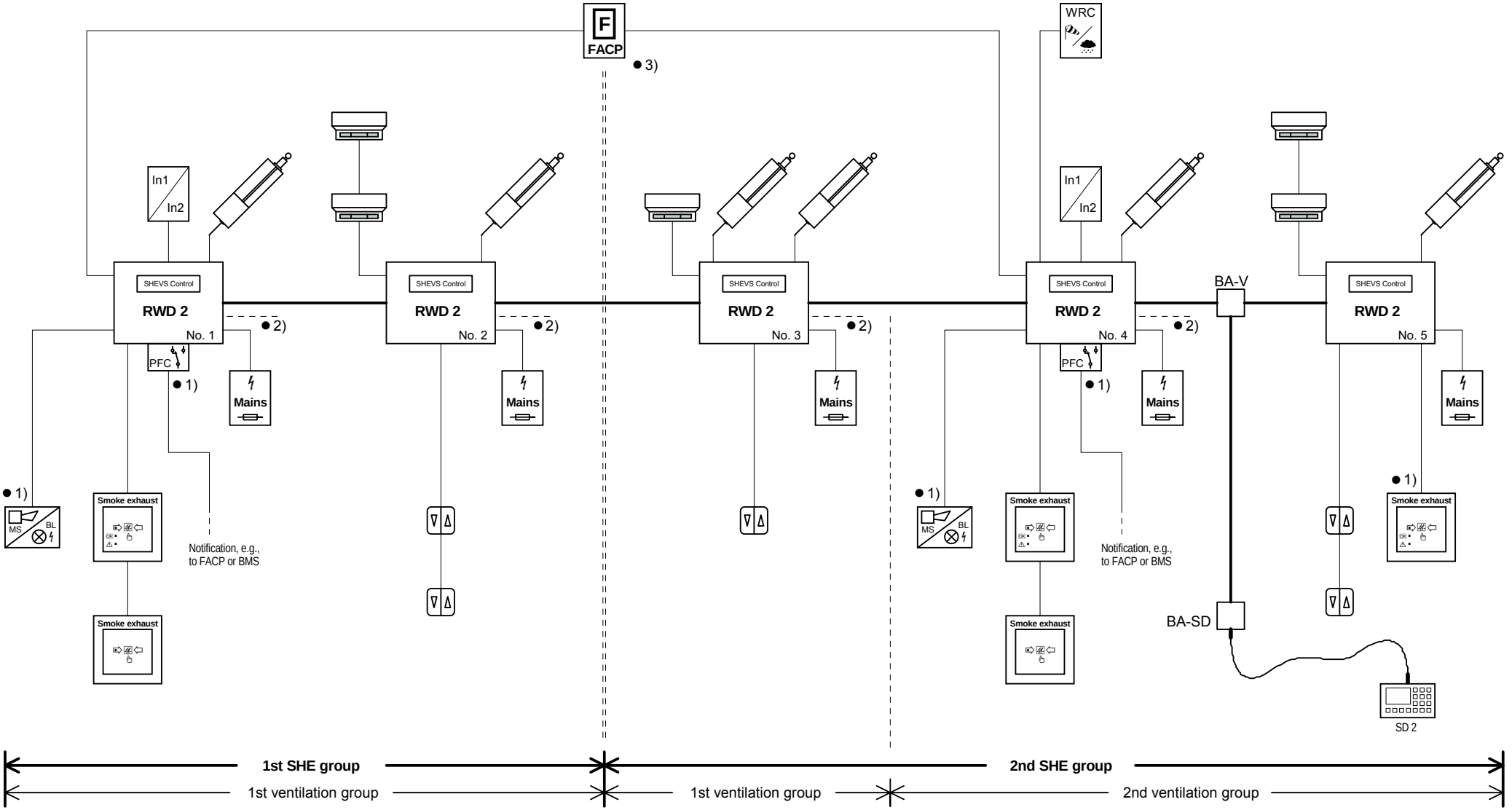
Cable types (examples):
Bus cable: H[2 x 02YS AWG23(ST) + 2 x 2Y AWG20]
Signal lines: J-Y(St)Y 2x2x0.8 - 4x2x0.8
Mains: NYM-J 3x1.5 mm²
PFC: NYM-J 4x1.5 mm² / NYM-O 3x1.5 mm²

● 5) Separate documentation

General: cable length max. 400 m, if not specified otherwise.

SHEVS Control RWD 2a

Example of a system with 2 SHE groups and 3 ventilation groups



● 1) Additional equipment required (option PK / WTM).

● 2) Connection facility for mains supply of downstream Controls available. Total current consumption max. 16 A / 230 V~.

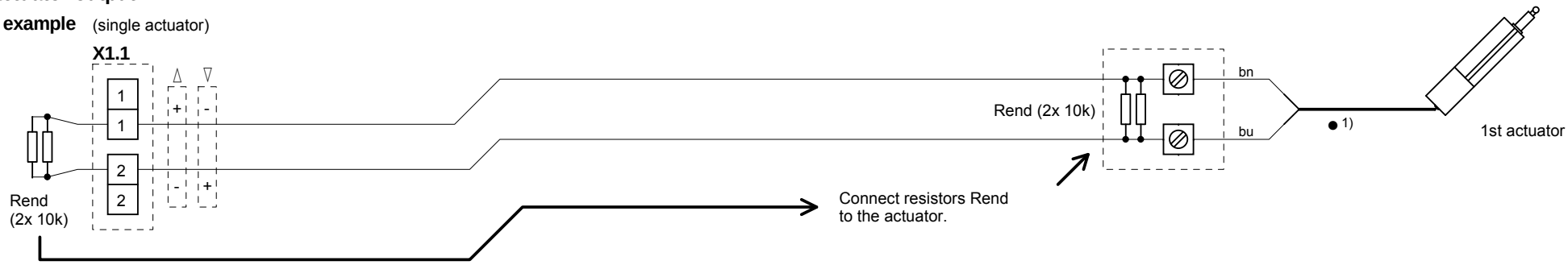
● 3) The FACP must have a separate contact for each SHE group to be controlled.

SHEVS Control RWD 2a

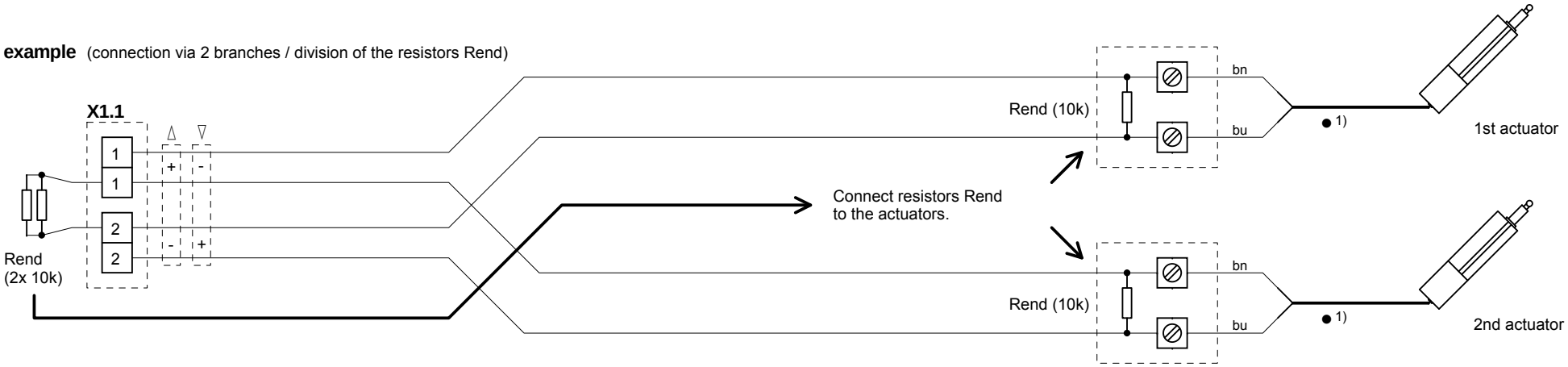
24 V- actuators

1st actuator output

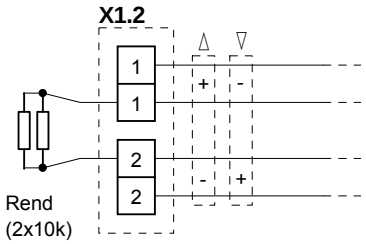
1st example (single actuator)



2nd example (connection via 2 branches / division of the resistors Rend)



2nd actuator output (RWD 2-20a only)



2nd actuator output

The connection is made as shown for the 1st output, but using terminal strip X1.2.

● 1) In the case of wrong travelling sense, reverse polarity of actuator cable.

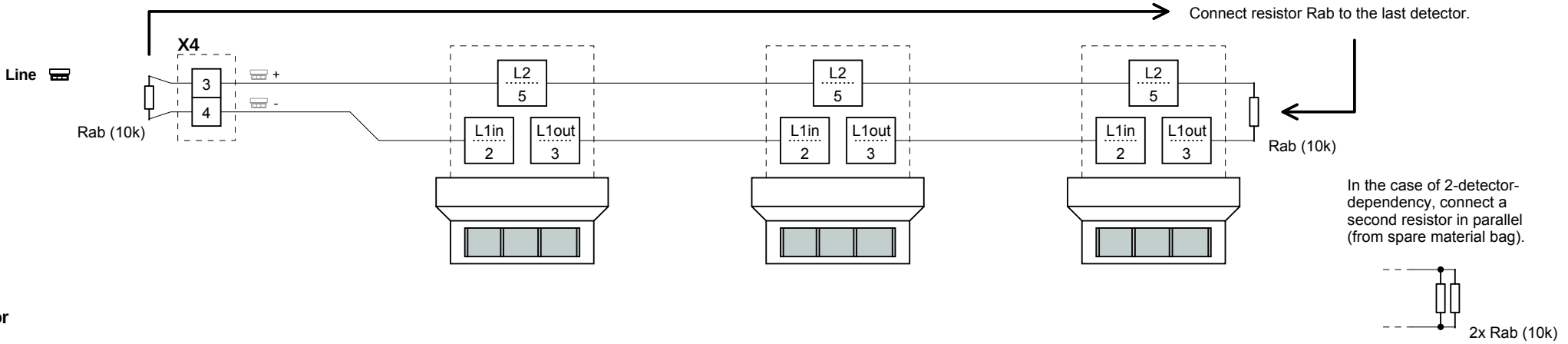
! In the case of direct control of actuators, e.g., with external accumulators during installation or maintenance work, the actuators must be disconnected from the Control!

Colour code for resistors: 10k = brown/black/black/red

SHEVS Control RWD 2a

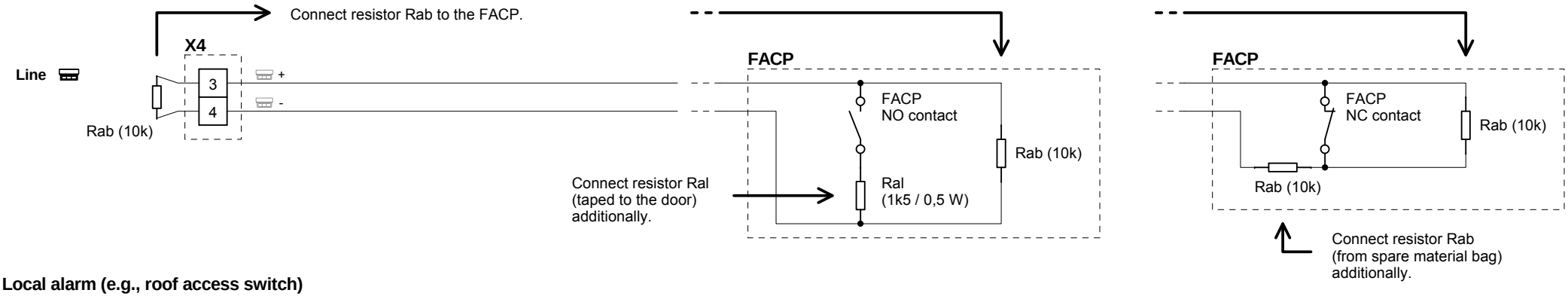
Automatic fire detectors or Fire Alarm Control Panel (FACP), local alarm

Automatic fire detectors RM 2 / TM 2 (terminals L1 in, L1 out and L2) **or RM 3 / TM 3** (terminals 2, 3 and 5)

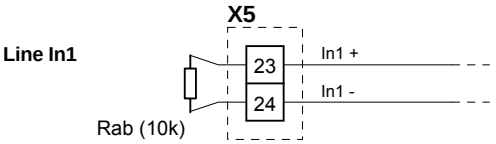


or

Fire Alarm Control Panel (FACP)



Local alarm (e.g., roof access switch)



The connection is made as shown above for the FACP.

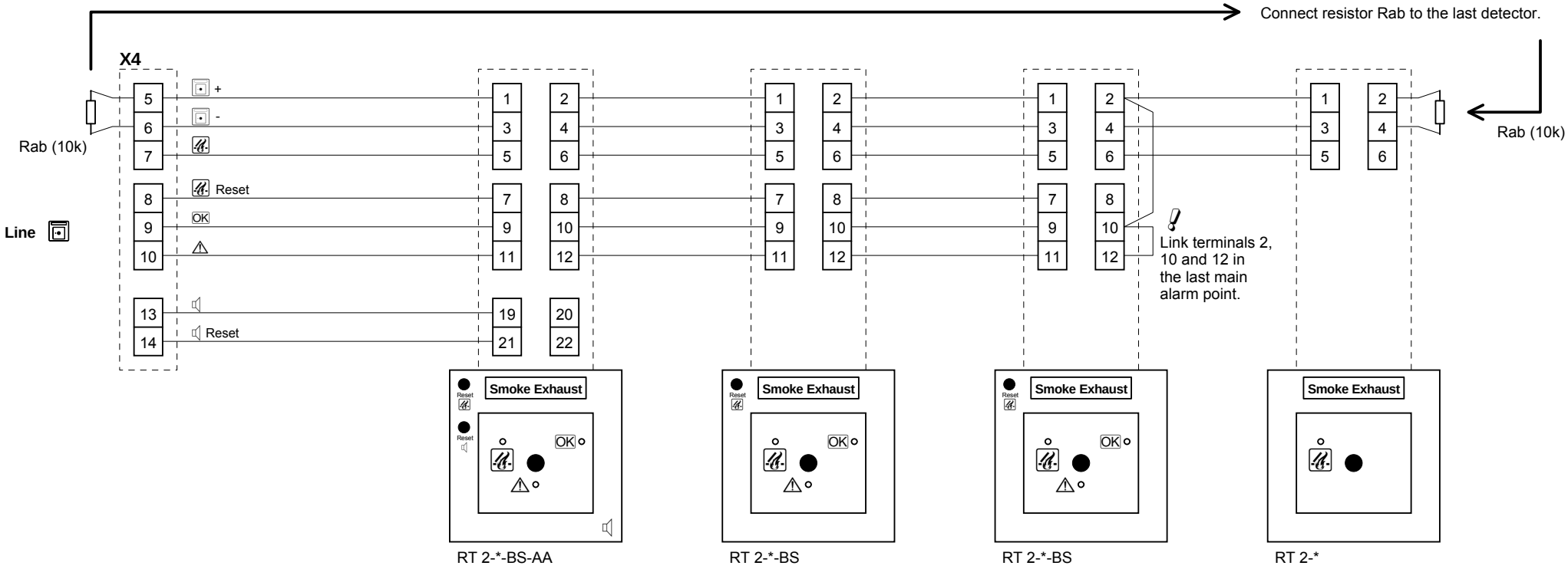
The module MA (accessory) can be used for more convenient connection of a normally open or normally closed contact to terminal strips X4 or X5. The required resistors are already present on the module and do not have to be wired specifically.

Colour code for resistors: 10k = brown/black/black/red 1k5 = brown/green/black/brown

SHEVS Control RWD 2a

Manual call points RT 2

(Manual call points RT 4 see page A-6)

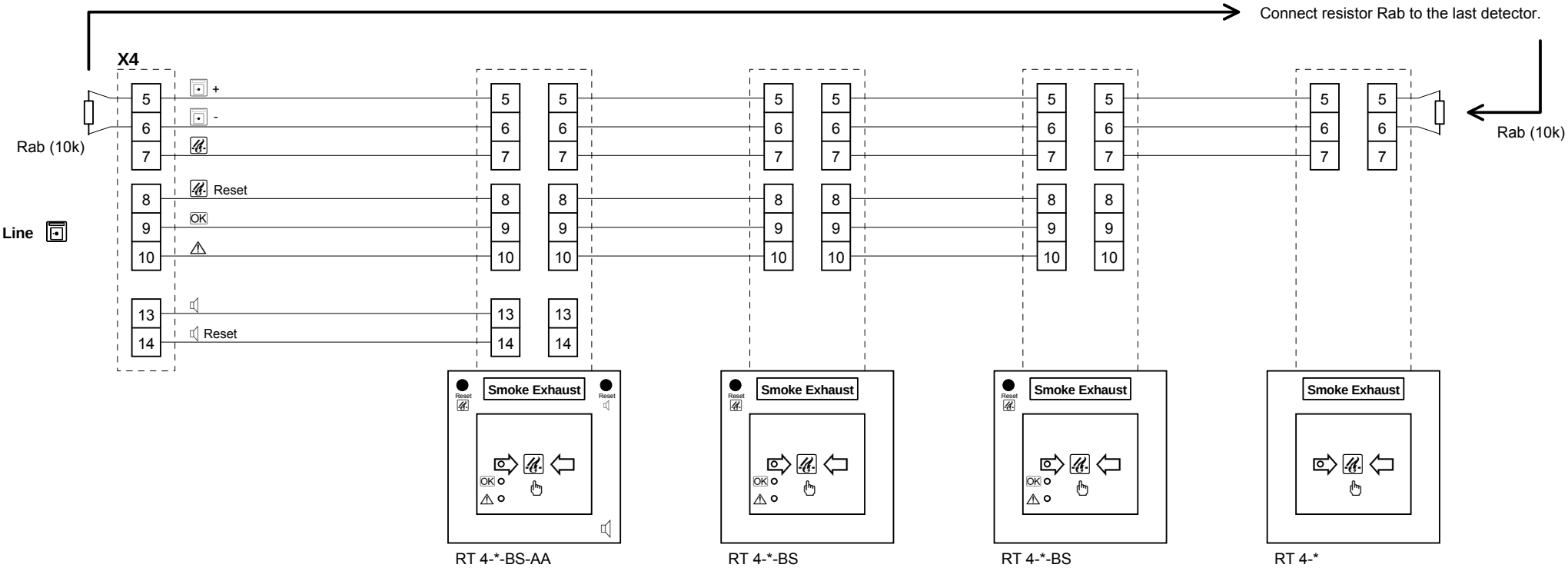


Colour code for resistors: 10k = brown/black/black/red

SHEVS Control RWD 2a

Manual call points RT 4

(Manual call points RT 2 see page A-5)

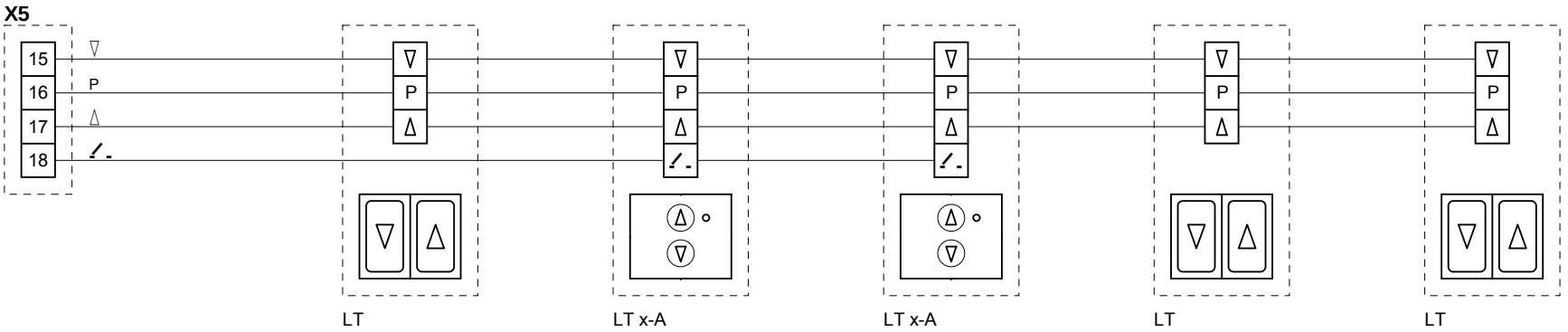


Colour code for resistors: 10k = brown/black/black/red

SHEVS Control RWD 2a

Ventilation buttons, external Wind- and Rain Control

Ventilation buttons



External Wind- and Rain Control

● 1)

WRS 2	x	y
Output contact 1	5	6
Output contact 2	8	9
Output contact 3	11	12
Output contact 4	14	15

Use a separate contact for each bus system to be controlled!

SHEVS Control RWD 2a

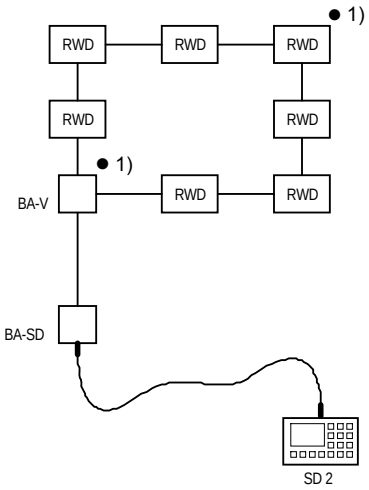
Topology of the bus system and bus termination

The bus system can be implemented in the topologies shown - also mixed.
A double termination must be carried out, ideally at the most distant points of the system.

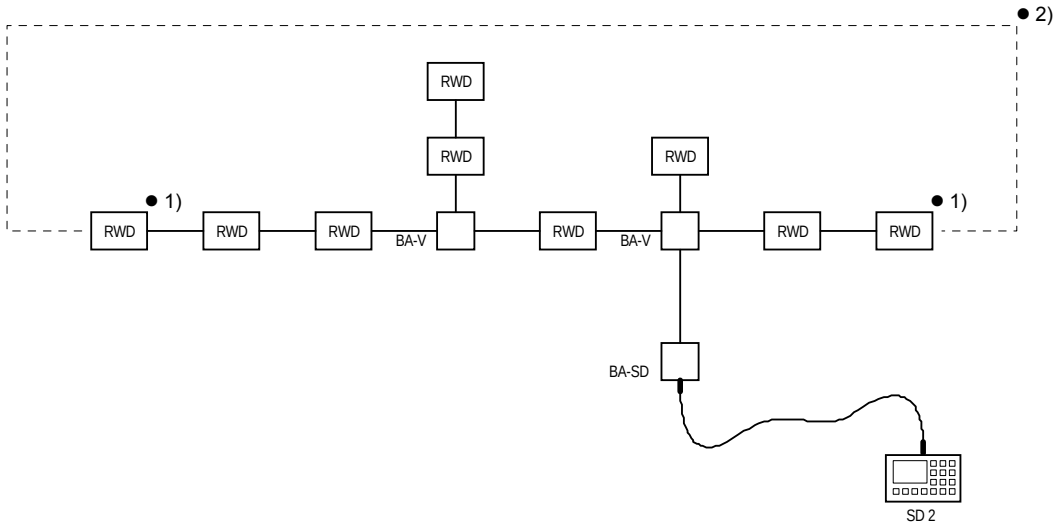
The ring topology is recommended (or mixed topology closed to a ring, see example 2).

ring line bus tree

Example 1: Ring topology



Example 2: Mixed topology



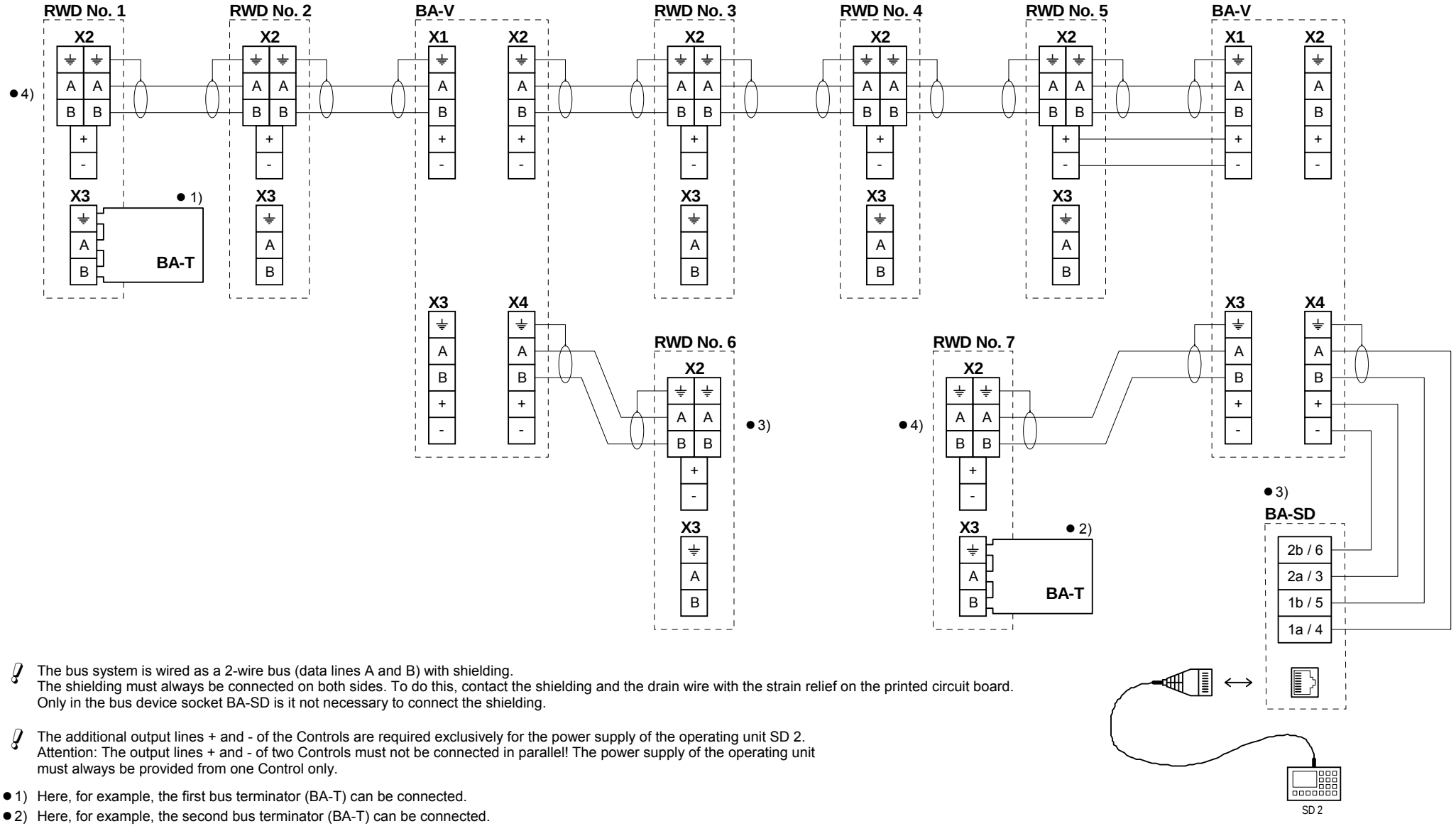
ℹ Bus distribution boxes BA-V serve to continue / branch the bus and / or to connect bus device sockets BA-SD.
The operating unit SD 2 can be plugged into the bus device socket BA-SD. Hence, it is recommended to install a bus device socket, e.g. in the building services room.
Depending on requirements, additional sockets can be installed in the building in places with a good view of the smoke vents.
The operating unit SD 2 can also be plugged directly into any control of the bus system for maintenance / installation purposes.

● 1) Here, for example, connect the bus terminators (BA-T) (at the most distant points of the bus system).
Terminators BA-T can be connected in Controls RWD 2 or bus distribution boxes BA-V.

● 2) To increase reliability, this system can be closed to form a ring.

SHEVS Control RWD 2a

Wiring of the bus system (example)



The bus system is wired as a 2-wire bus (data lines A and B) with shielding.
The shielding must always be connected on both sides. To do this, contact the shielding and the drain wire with the strain relief on the printed circuit board.
Only in the bus device socket BA-SD is it not necessary to connect the shielding.

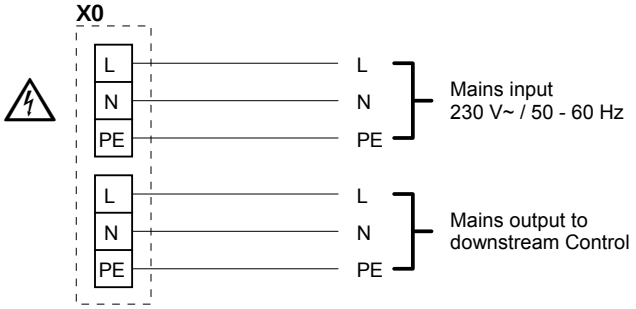
The additional output lines + and - of the Controls are required exclusively for the power supply of the operating unit SD 2.
Attention: The output lines + and - of two Controls must not be connected in parallel! The power supply of the operating unit must always be provided from one Control only.

- ● 1) Here, for example, the first bus terminator (BA-T) can be connected.
- ● 2) Here, for example, the second bus terminator (BA-T) can be connected.
- ● 3) If the bus is not continued, the bus device socket BA-SD can also be connected directly in a Control.
- ● 4) To increase reliability, this system can be closed to form a ring (e.g., connect RWD No. 1 with RWD No. 7).
  With it, check at which point the second bus termination (BA-T) should be connected.

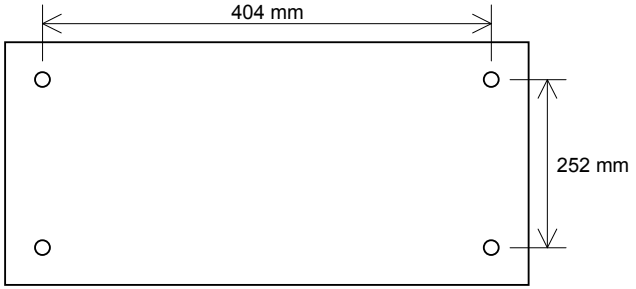
SHEVS Control RWD 2a

Line voltage, mounting, accumulators

Line voltage:

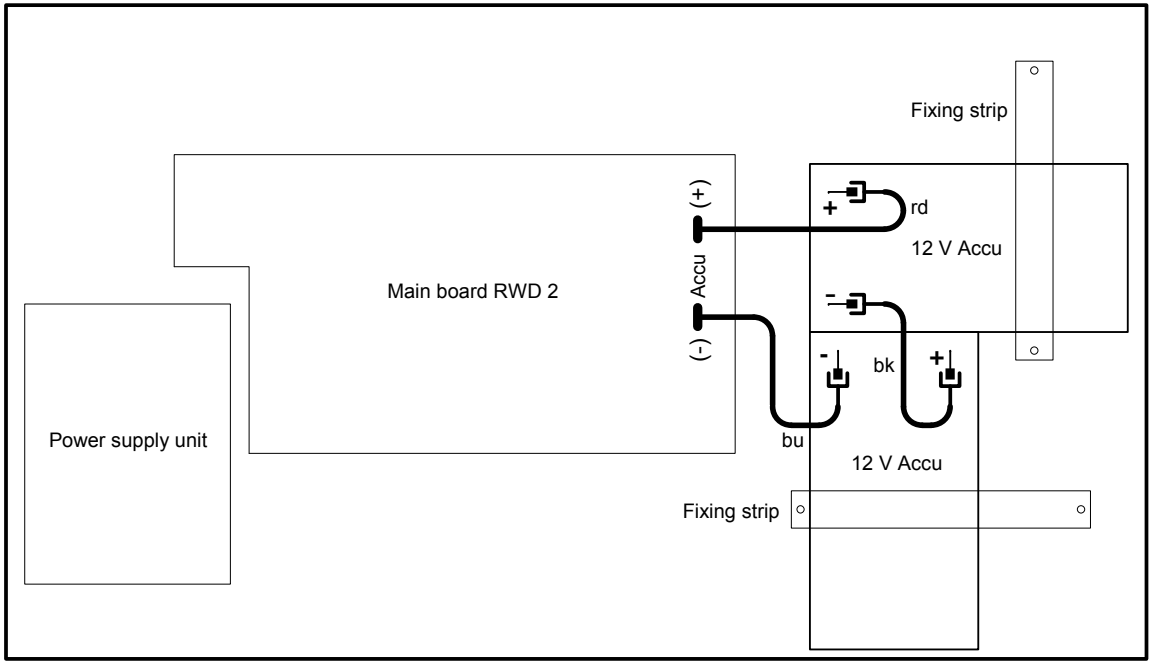


Mounting:

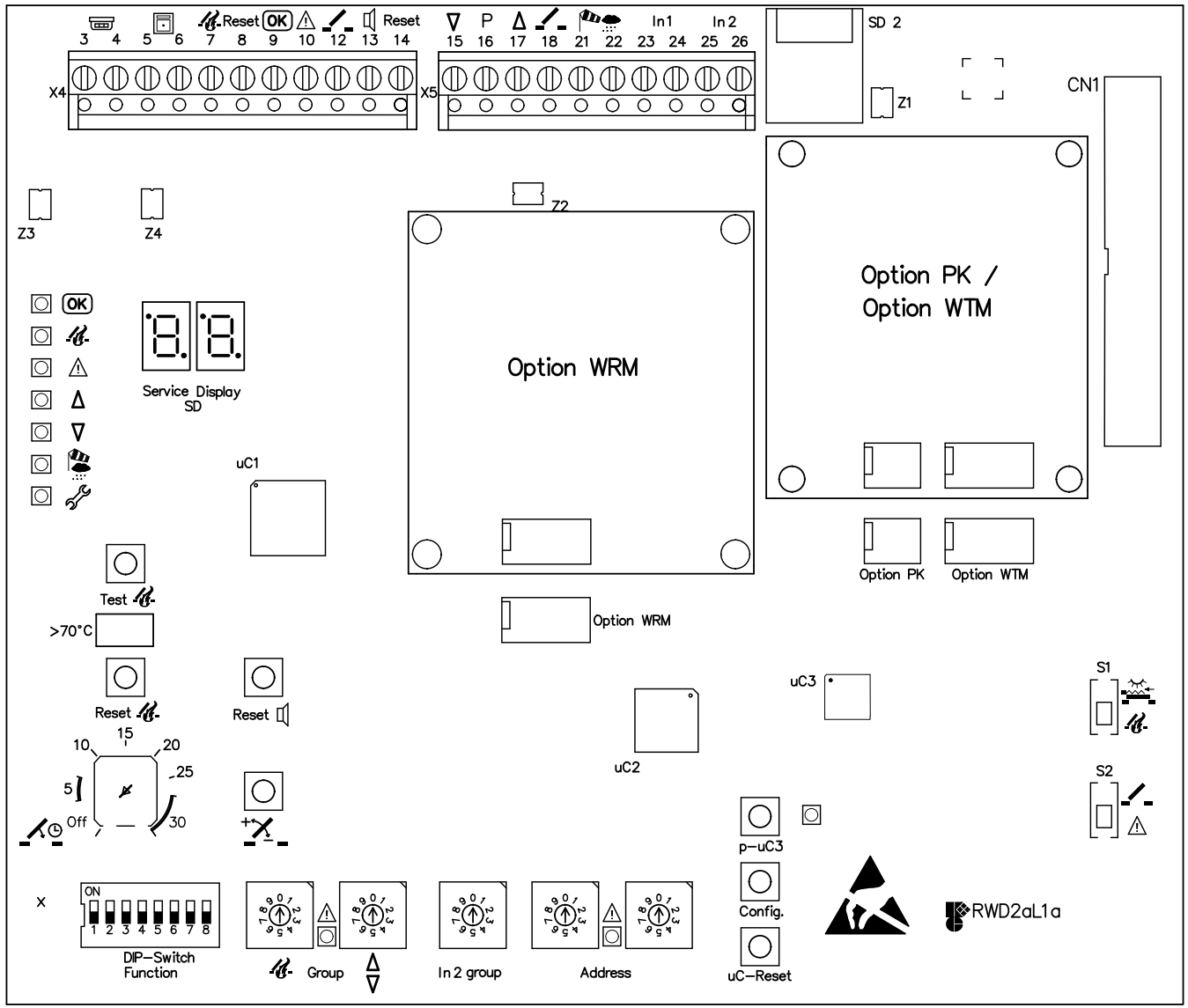


Accumulators:

Insert the accumulators in the enclosure as illustrated, secure them with the fixing strips and connect them.



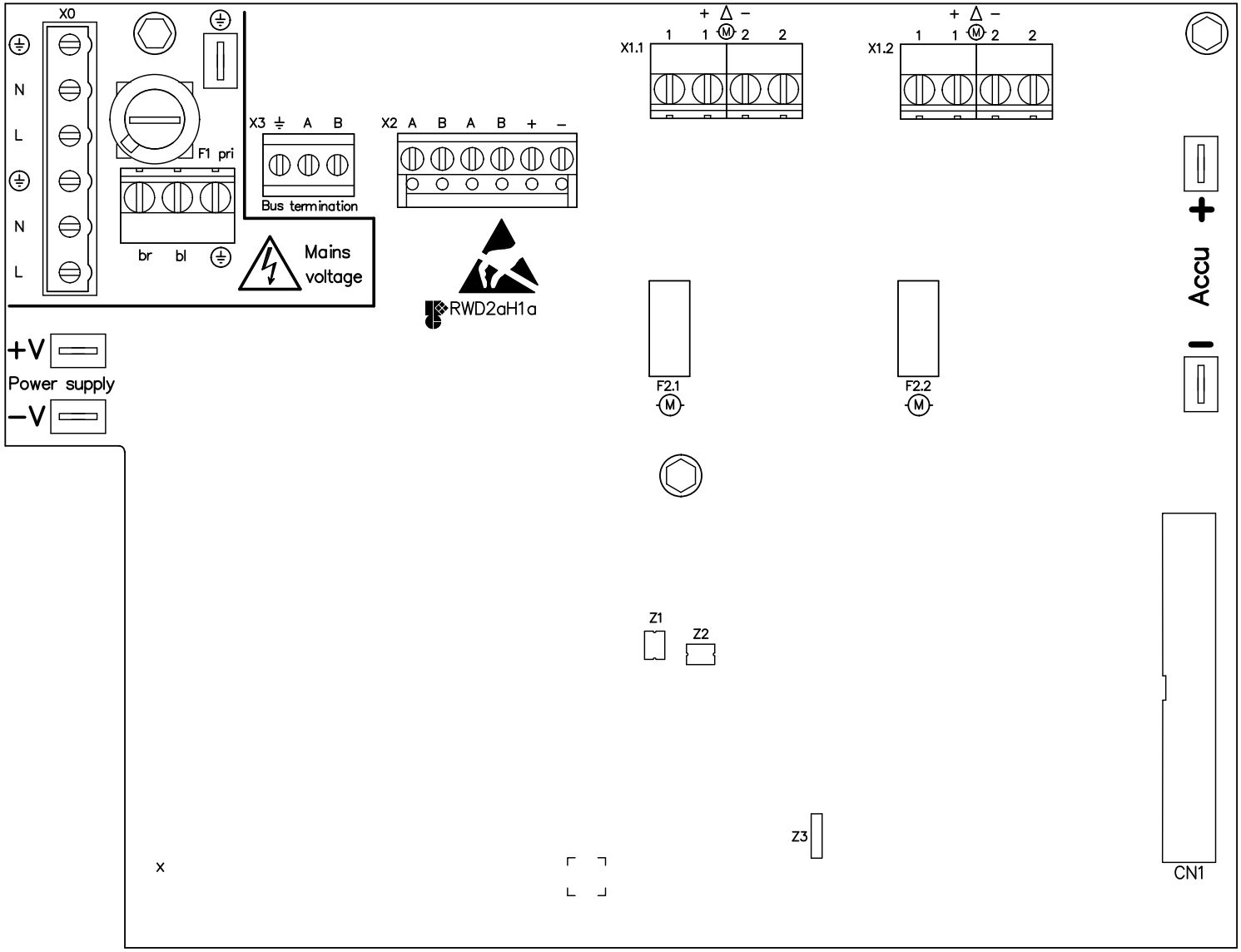
When putting into / out of service, observe the operating instructions!
Be sure to unplug the accumulators if mains voltage supply is cut out for a longer time.



DIP-Switch

1: Auto Close
2: Malfunction = Alarm
3: Automatic OFF
4: Thermal Alarm
5: 2-detector-dependency
6: WRC
7: Do not change setting
8: Do not change setting

SHEVS Control RWD 2a			
Layout diagram 1 (logic board, options)			
RWD2aA11.pcb	Ver. 1/18	Mo	24 Apr. 2018



Fuses

F1:	T 3,15 A	Primary mains
F2.1:	20 A	Output 1
F2.2:	20 A	Output 2 (RWD 2–20a only)

SHEVS Control RWD 2a			
Layout diagram 2 (main board)			
RWD2aA12.pcb	Ver. 1/18	Mo	24 Apr. 2018