



## Lift Smoke Control **LSC-M**

System for Lift Shaft and  
Staircase Smoke Vent

Instruction for use



<b>1.0 Lift Shaft Smoke Vent .....</b>	<b>3</b>
1.1 Legal Aspects.....	3
1.2 One System many Advantages.....	4
1.3 Solutions for every Case of Application .....	5
<b>2.0 Introduction to SHEV Systems .....</b>	<b>6</b>
2.1 Details to the Product.....	6
2.2 Details about Mounting .....	6
2.3 Safety Notes .....	6
2.4 Maintenance .....	7
2.5 Guarantee .....	7
<b>3.0 System Overview .....</b>	<b>8</b>
3.1 Functional Principle.....	9
3.2 Why Smoke Suction?.....	10
3.3 Wiring Plan Lift Shaft.....	11
3.4 Wiring Plan Staircase.....	12
3.5 Cable for D+H Smoke and Heat Vent Systems .....	13
3.6 Line lengths and Cross sections .....	13
3.7 Project Planning of Smoke Suction System.....	14
<b>4.0 Tube System .....</b>	<b>15</b>
4.1 Mounting of Tube System .....	16
4.2 Mounting of Reflux Valve at Suction Tube End .....	17
4.3 Pipe Clamps.....	18
4.4 Checking of Tube System .....	18
4.5 Tube Project Planning Guideline.....	19
4.6 Suction Openings.....	20
4.7 Air Filter LF-AD .....	21
4.8 Free-Blowing Device .....	22
4.9 Titanus Pipe-Clean.....	22

## 5.0 Central Appliance LSC 44-M4 .....23

5.1	Mounting Place LSC 44-M4 .....	23
5.2	Inside Design of Control Center .....	24
5.3	SHEV Control Panel of Type RZN 4404-M VdS .....	25
5.4	View motherboard RZN 4404-M VdS.....	26
5.5	Standard Connection with RT 43-H/-N.....	27
5.6	Parallel Connection of RT 43-H/-N.....	28
5.7	Codification of Group 1 and 2 .....	29
5.8	Codification of Line 1 and 2 .....	30
5.9	Codification of Control Panel .....	31
5.10	Factory preset of the DIP-Switch .....	32
5.11	Delivery Condition .....	32
5.12	LSC-System for ventilating purposes as well.....	33
5.13	Emergency Power Accumulators .....	33
5.14	Smoke Suction System of Type MICRO-SENS® .....	34
5.15	Plug and Play-Initiation-Airflow Alignment .....	35
5.16	Central Module LSM 44 .....	36
5.17	View motherboard LSM 44.....	36
5.18	DIP-Switch S1 .....	37
5.19	DIP-Switch S2 .....	37
5.20	Connection Signalling Lift / External Signals .....	38
5.21	Connection BMS/ RM/ RT .....	39
5.22	Connection REM/ LT/ MOT/ BZ/ BL .....	40

## 6.0 Smoke Vent Device / Connecting Elements .....41

6.1	Louvre Drive.....	41
6.2	Domelight.....	41
6.3	Informations for Mounting of Louvres / Domelight .....	42
6.4	Display Panel EF 43-LSC .....	42
6.5	Key-operated vent button SLT 42 .....	43
6.6	Fire detector FO 1362.....	44-45
6.7	Smoke vent button RT 43-H-LSC .....	46
6.8	Smoke vent button RT 43-H/-N.....	47
6.9	Alarm Series B/SE 24 .....	48
6.10	Flashing light BL 41.....	48
6.11	General display panel SF 43.....	48

## 1.0 Lift Shaft Smoke Vent

The State Building Regulations demand, that smoke vent in lift shafts is ensured in case of fire. By the Energy Saving Regulation EnEV is simultaneously demanded, that building external areas must be constructed in such a way, that they are permanent air-tight according to the state of the art.

With LSC D+H offers a special system, which will provide smoke vent of lift shafts in case of fire by

using electric motor controlled louvres, windows or domelights. The smoke vent flaps, normally closed, will simultaneously prevent an unnecessary loss of thermal energy, caused by uncontrolled escaping of heated air out of the building.

Consequently energy can be saved, ventilation controlled and smoke vent ensured in case of fire.

## 1.1 Legal Aspects



### Legal Aspects

- **Energy Saving Regulation EnEV 10/2007**  
§ 6 tightness, minimum change of air  
(1) Buildings to be erected must be constructed in such a way, that the heat transferring external area, including the joints, will be permanently airtight sealed according to the state of art. (...)
- **Operational Safety Regulation**
- **State Building Regulations (LBO)**
- **Lift Guideline 95/16 of the EC**
- **DIN VDI 6017 Behaviour of Lifts in case of Fire**
- **EU guideline DIN V 18599**  
energetic valuation of buildings

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For details see document O00110!

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## 1.2 One System many Advantages

**LSC - Lift Control is an energy-optimized system for smoke vent and ventilation of lift shafts.**

### Lower Thermal Energy Costs

Operators and users must rethink their attitude towards energy consumption forced by the continuous high oil price as well as generally increasing energy costs.

The D+H system LSC avoids unnecessary losses of energy, because a permanent opening in the top end area of the lift shaft is avoided and with this, an uncontrolled ventilation of the building will be prevented.

The result:

Operating expenses will be noticeably reduced.

### Better Building-Energy Pass

An optimized thermal insulation will lead as well to better values in the building-energy pass, which will be successively prepared for all buildings.

This will have a positive effect on the image of a building.

From this will result better rentability, not least because of lower additional costs. This will have a positive influence on the building value as well.

### Less draught in a staircase

The closed smoke vent openings will lessen the draught in the staircase and thereby the thermal comfort will be improved for the user.

Possible whistling sounds will be additionally avoided, caused by a too high flow of air.

### Early Evacuation

A fire will be already recognized during a fire formation through the smoke suction system used. People in the lift can be moved earlier therefore to the smokefree evacuating level.

### Maintenance direct at Control System

The mechanic will not need access to the shaft for maintenance and cleaning. This will be directly carried out at the control system.

### New!

### Integrated Staircase SHEV-System

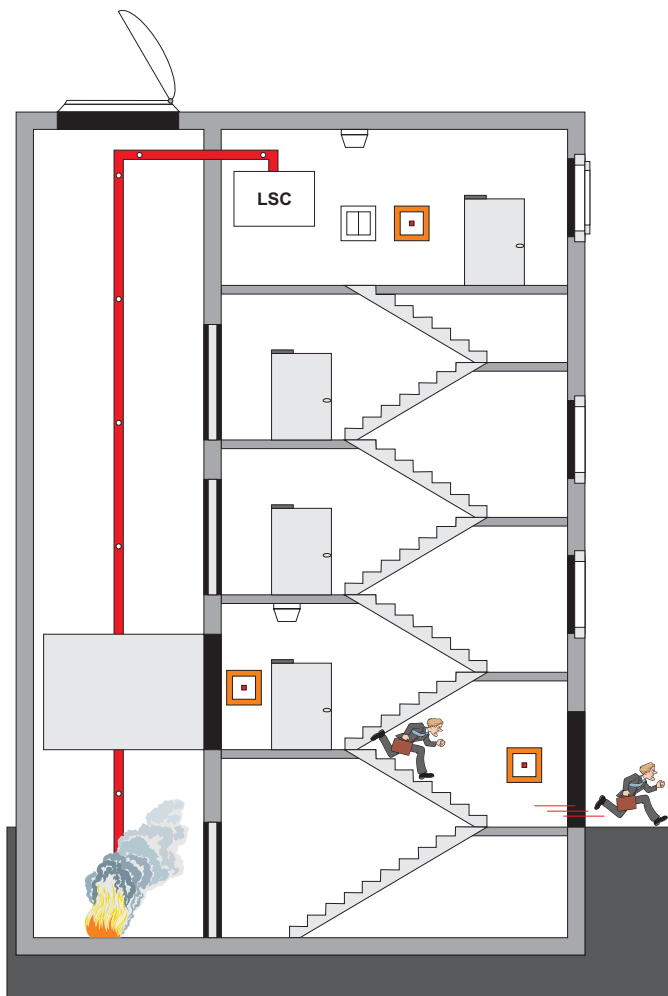
The flexible SHEV-compact control system combines simultaneously two functions:

- the lift shaft smoke vent
- the staircase SHEV-system

Both the requirements will be met with this intelligent control unit. Both the fire lobbies will be triggered and monitored separately from one another.

This system is a compact unit in one housing with low mounting expenditure and at reasonable maintenance costs. It has a high degree of equipment and operating convenience.

## 1.3 Solution for every Application



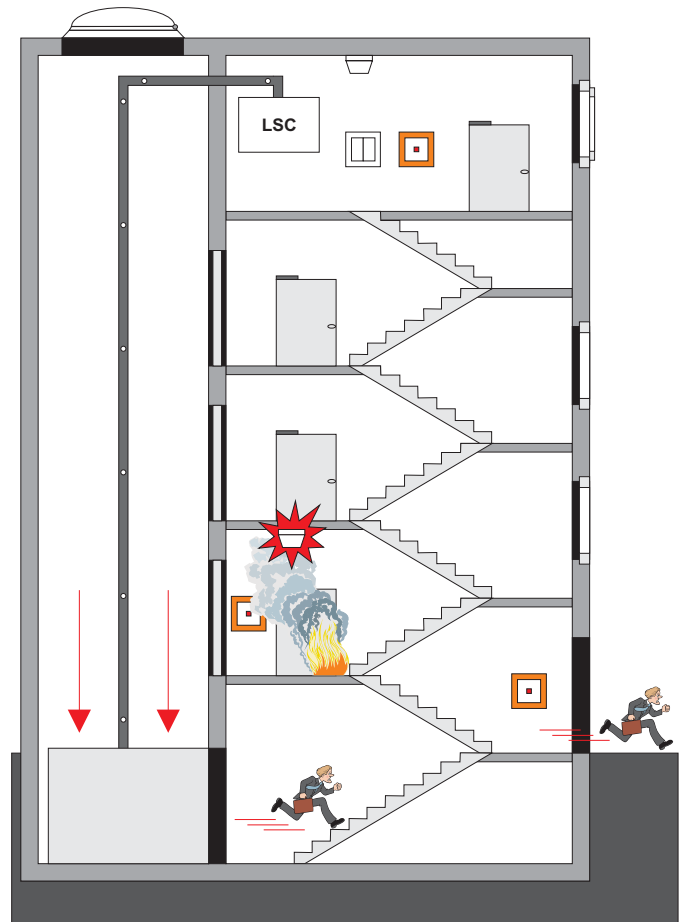
Detection of a fire will occur by a **smoke suction system in the lift shaft and a smoke detector in the staircase.**

For the **lift shaft** a smoke suction system has been connected by the Lift Smoke Control System LSC 44-M4. The entire lift shaft will be constantly monitored through a tube with suction openings, vertically installed in the lift shaft.

In addition to fire detection in the lift shaft, the different exit levels will be monitored here by smoke detectors.

In case of fire (or for ventilation purposes) a smoke vent opening in the upper area of the lift shaft will be opened by an electric motor driven drive.

A signal will be additionally given to the lift control, apart from the release of the SHEV function, which will run the lift to the predetermined main evacuating level. This will be usually the main entrance area.



The integrated **SHEV staircase system** will monitor the adjacent staircase. The smoke detector, installed at the top end area of the staircase, will detect the fire smoke in the staircase and open automatically the smoke vent flap in the staircase.

The SHEV-function can be triggered additionally as well via two manually operated SHEV-buttons. The staircase SHEV-system will run absolutely independent from the lift shaft smoke vent.

Consequently, fire smoke will be early and reliably recognized even under difficult conditions.

Evacuating of persons, who possibly are in a lift, is of particular significance in public buildings, where a lot of people are coming and going.



## 2.0 Introduction to SHEV Systems

**Smoke and heat vent systems (SHEVs) are very important elements of structural preventive fire protection.**

Smoke and heat vent systems are appliances of preventive fire protection. They fulfil important functions in case of fire as there are: protection of human life by creating a smokefree layer, by which

escape and rescue routes will be kept free for the fire brigade. Consequential damages by conflagration gases are reduced and therefore considerable material assets are often protected from destruction. Precondition for this is, that the system will function absolutely reliable in a case of fire.

## 2.1 Details to the Product

This SHEV-system has been constructed in accordance with the latest state of the art and science. In case of professional mounting and maintenance it is of high operating safety. Nevertheless, there can dangers arise from the product, if by unqualified personell used inexpertly or not in accordance with the regulations.

Unauthorized modifications and alterations at the SHEV-system are **not allowed** for safety reasons. This operating instruction must be **read through carefully** before installation. Keep to the instruction.  
**Please observe in any case the safety notes.**

## 2.2 Details about Mounting



**Safety system for protecting human life and material assets! Once a year functional testing by a specialist company authorized by the manufacturer.**

Connection, mounting and functional testing by a specialist company authorized by the manufacturer.

Green control diodes in the buttons must constantly lighten, otherwise see "Informations for Starting". Repair power failure at once. Instructions of the fire protection authorities must be always observed.

Should special problems arise during mounting or operation, with which is not extensively enough dealt with in the operating instructions, so please for your own safety do not hesitate to consult with the manufacturer.

Apart from suction tubes with reflux valve and air recirculation, **no components will be installed in the lift shaft!** Acceptance by an expert can be can be only obtained with this precondition as well as with simple and economical maintenance warranted.

## 2.3 Safety Notes



### **Danger of Injury or Life!**

Working on the **central appliance** is only allowed, if this is **switched idle**. This includes distribution voltage with 230V alternating voltage as well as emergency power supply with 24V direct voltage.

Only electrical specialist companies are authorized to install these systems, who have electrical specialist staff with relevant experiences in installing danger alarm systems or smoke and heat vent systems. Only these ones can take on responsibility for functioning, and can ensure product liability for the whole system (see product liability law BGBL.I S.2198 and BGB (bodily injury, compensation for damage). Therefore, regular maintenance and checking of functional readiness is imperative and has to be ensured. These

standard requirements are demanded according to regulations of the DIN, of the Association of German Insurer against damage of property (VdS) and the respective local authorities.

In spite of greatest possible care we can not accept responsibility for this document. All informations given are no warranted qualification in the sense of § 434 BGB.

Current directions of the authorities and the VDE-regulations must be taken into account during the entire mounting and installation of the system. Regulations of the local EVU must be additionally observed. Furthermore, individual working steps must be coordinated with the management of works.



## 2.4 Maintenance

Smoke and heat vent systems must be maintained at annual intervals by authorized specialist companies according to DIN 18232 section 2 paragraph 10.2, and VDE 0833 section 1 paragraph 5.3.4 for alarm systems and manufacturer guidelines.

**Once a year by a specialist company, who is authorized by the appliance manufacturer.**

Renew test badge, keep control book.

The respective current D+H maintenance instruction is decisive.

D+H authorized expert companies have been specially trained by D+H for carrying out expertly this maintenance, and they get automatically the latest maintenance instructions.

Following tests must be carried out in the course of maintenance:

- Outside examination/ inspection of system components
- Measuring of insulation resistances
- Checking of all relevant power supply units
- Functional testing of connected system components
- Record of competent carrying-out of maintenance, and designation according to directions

**Only regular and professional maintenance warrants the necessary and permanent functional safety.**

Only authorized specialist companies are allowed to install and maintain smoke and heat vent systems and system components, constructed and distributed by **D+H Mechatronic AG**. All **D+H Mechatronic AG** partners belong to these authorized specialist companies, who regularly undergo an in-house training to ensure their qualification and experience.

According to DIN VDE 0108 section 1 paragraph 9.1.1 accumulators for emergency supply (lead accumulators) must be checked every six months by a person, who has been introduced to this task, and once a year, maintenance must be carried out by specialist companies.

Accumulator types, which are used for **D+H Mechatronic AG** smoke and heat vent systems must be VdS approved, and must be released by **D+H Mechatronic AG** to use in smoke and heat vent systems.

According to DIN 18232 section 2 paragraph 10.2 the tests must be put down in an operational book, which the operator/ building owner must present to the building supervision authority on request.

This operational book is available at **D+H Mechatronic AG** (Ord.-No.: 68.700.15)

Executed maintenance must be proved by a **D+H Mechatronic AG** maintenance/ and testing confirmation.

Observe regulations for danger warning systems VDE 0833, guidelines for electrical systems VdS 2221, DIN 18232 for smoke and heat vent systems, regulations of the local fire-brigade and of EVU for connection to mains supply.

## 2.5 Guarantee

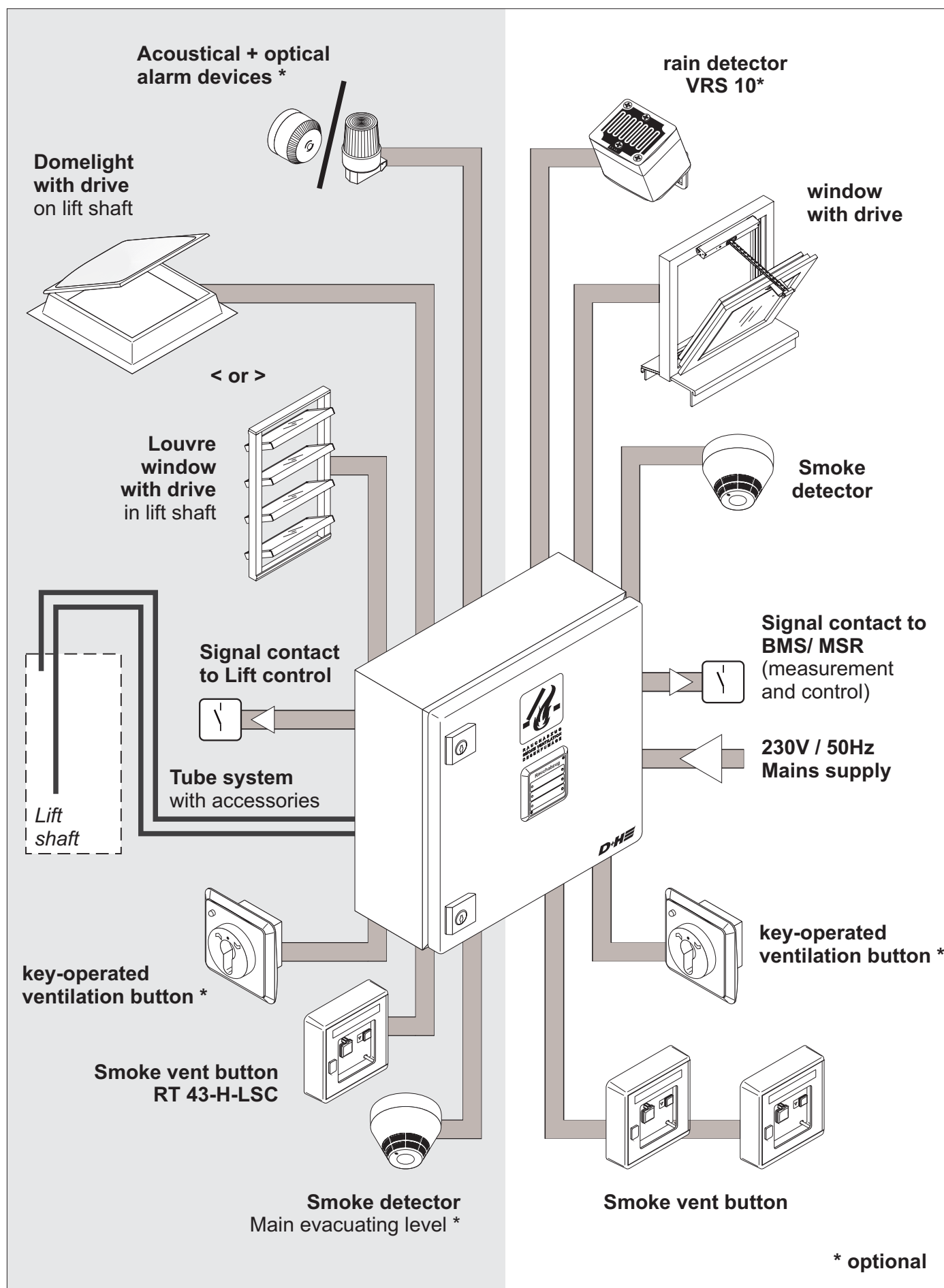
You will get **2 years** guarantee for all D+H products from date of verified handing over of the system up to maximal 3 years after date of delivery, when mounting and starting has been carried out by a D+H authorized **distributor**.

D+H guarantee is expired, with connection of D+H components with external systems or with mixing of D+H products with parts of other manufacturers.

# 3.0 System Overview

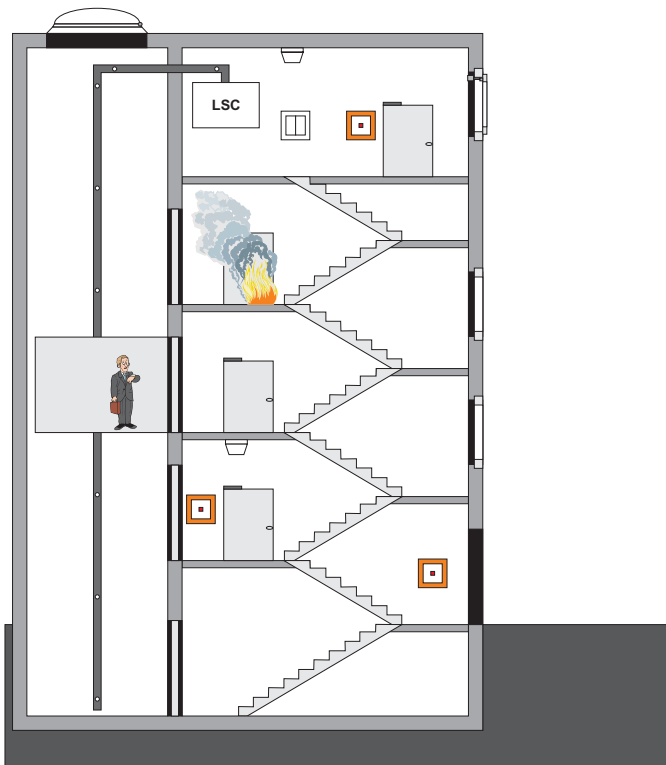
## Lift Shaft

## Staircase

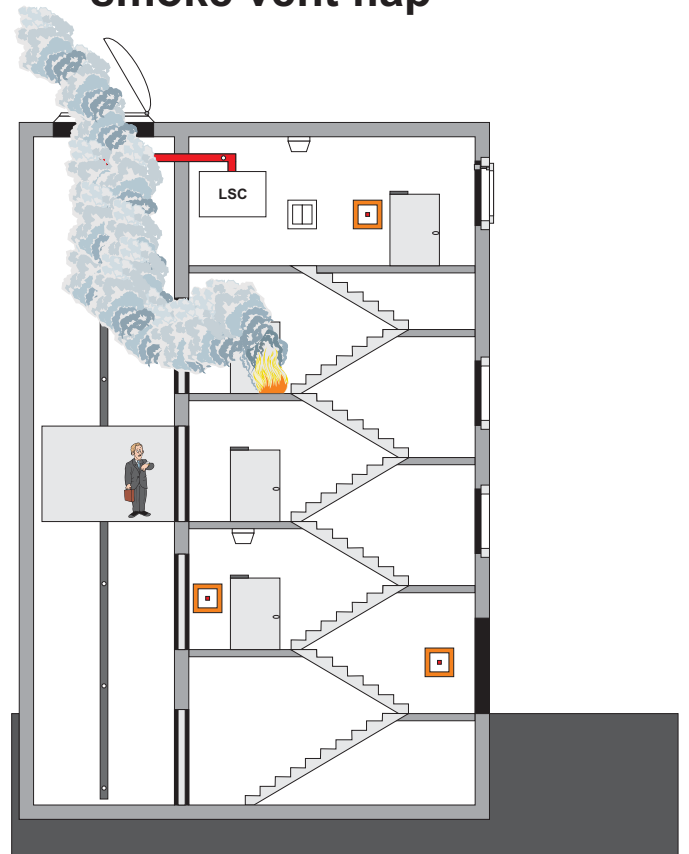


## 3.1 Functional Principle

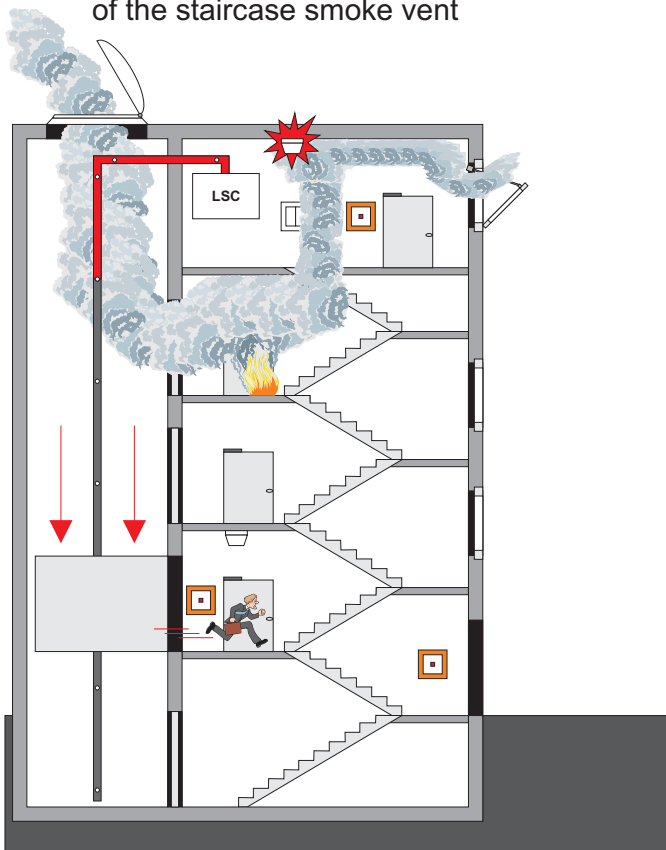
### 1 Smoke recognition



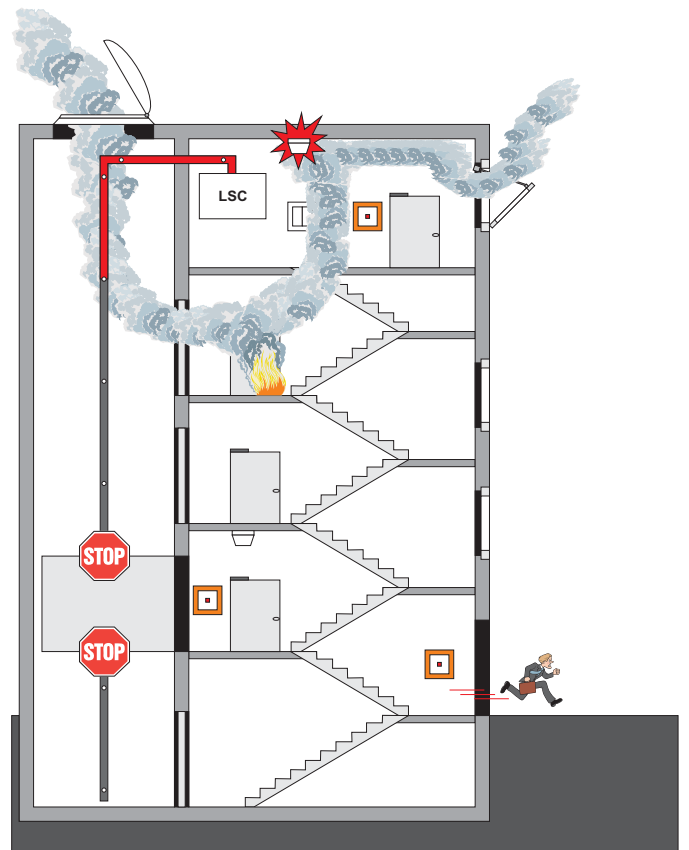
### 2 Opening of the smoke vent flap



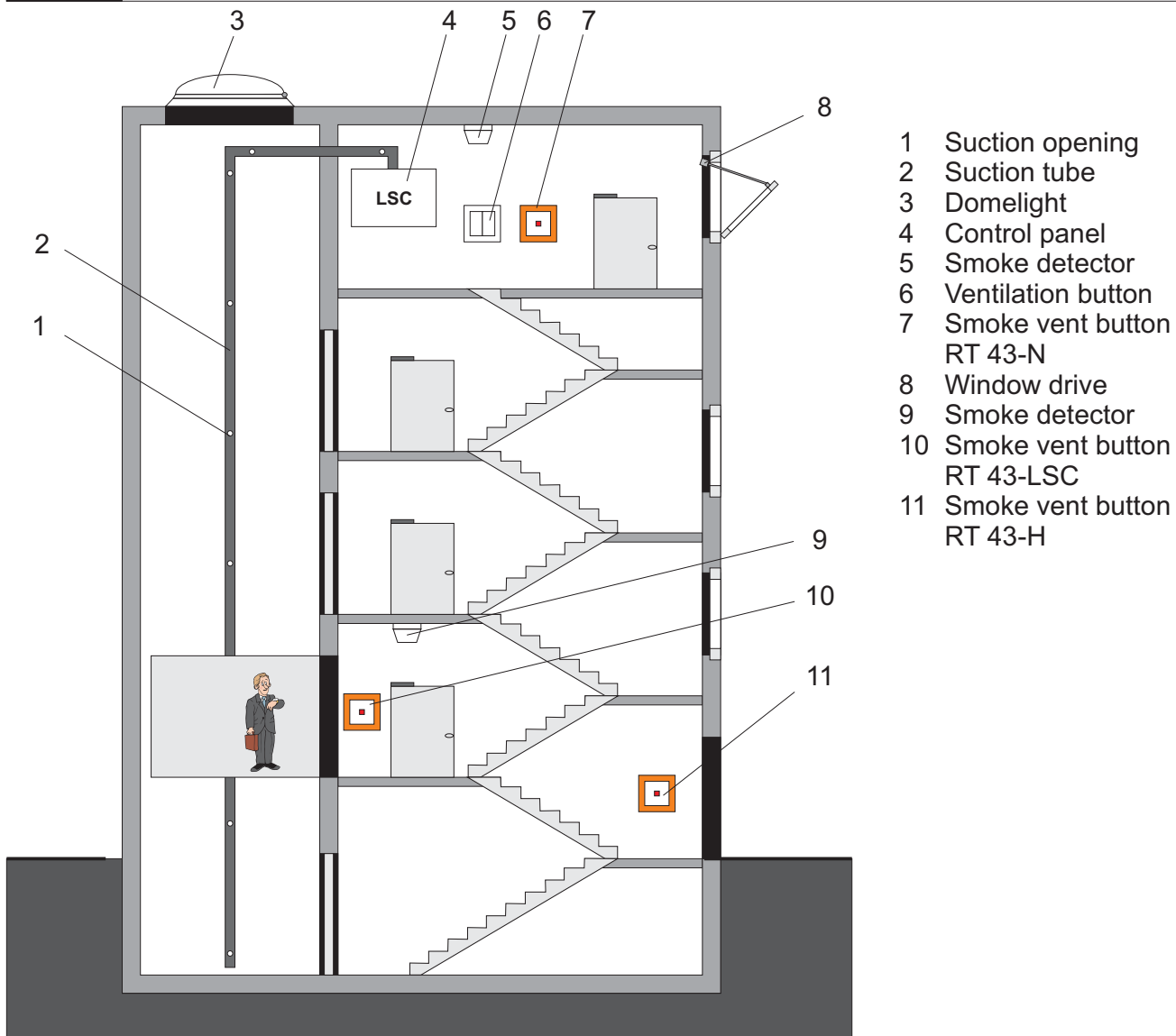
### 3 Evacuating travels of lift car and activation of the staircase smoke vent



### 4 Prevention of further lift car travels



## 3.2 Why Smoke Suction?



Taking samples of air through smoke suction over the complete height of the lift shaft will prevent spurious release and allow earlier reliably detecting of smoke.

Optical smoke detectors can not be used, because of whirling caused by the lift car, and danger of dirt accumulation in the lift shaft, as the danger of spurious release would be very high. On top of that, a smoke detector according to the standard DIN VDE 0833-2 + EN 54-7 in the elevator shaft can not be used, because the inflow of the smoke detector can not occur freely!

Smoke will be recognized earlier through selective suction on the individual floor levels and the lift will be automatically run to the main evacuation level.

No interruption of lift operation necessary during maintenance.

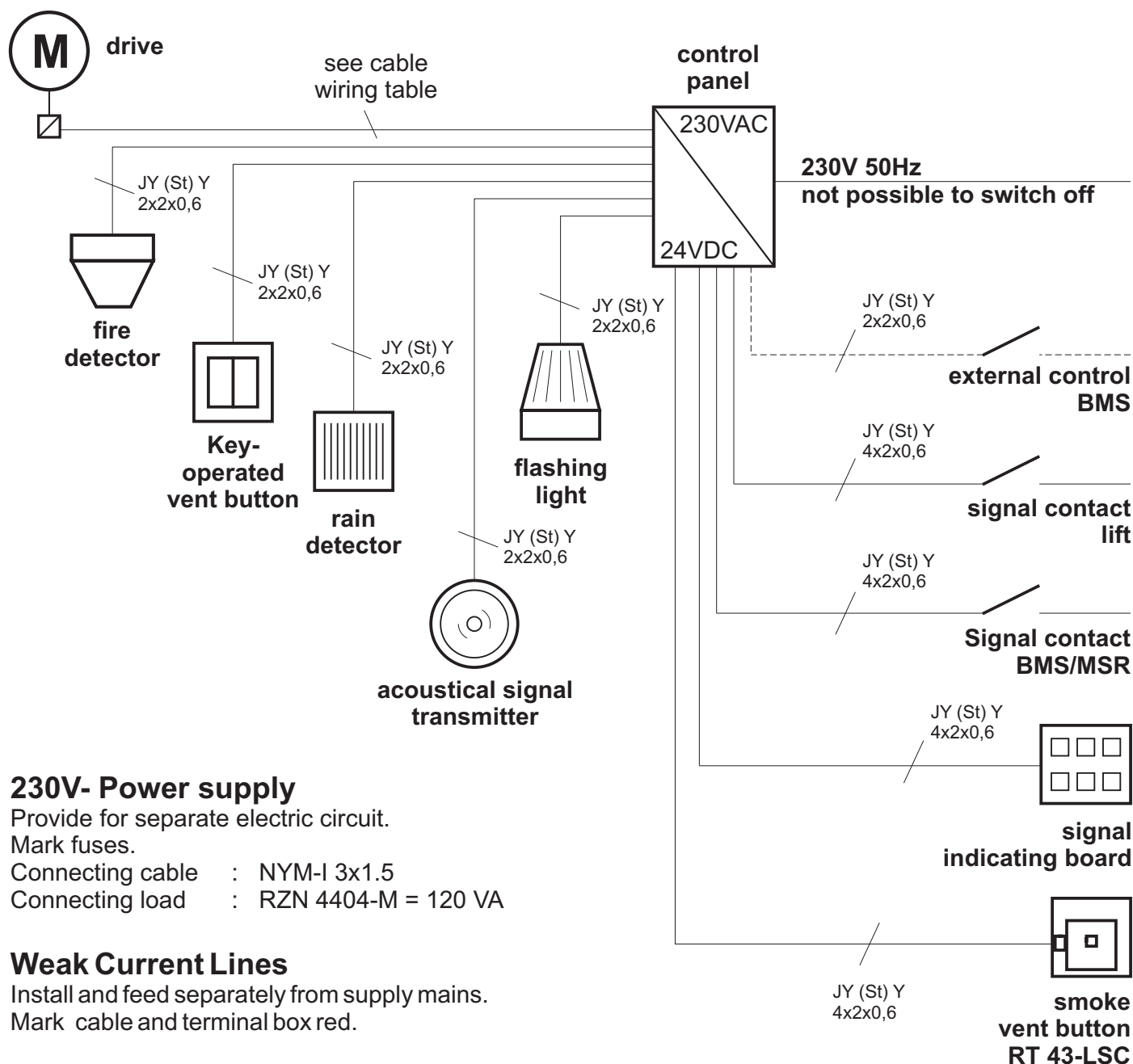
In the LSC-system is an “extended fire control” integrated. In this process, the predetermined main evacuation level will be monitored by an optical

smoke detector in front of the landing entrance. If this smoke detector will release, the lift will be run to the second evacuation level (will be defined by customer from the operating authority and the local fire protection)

Furthermore, SHEV-alarm can be triggered as well by the smoke detector on the main evacuating level and the smoke vent flap in the lift shaft will be opened. Release will be effected in dependence of the DIP-switch setting (S1) on pcb LSM 44. In case of SHEV-alarm the electric motor driven opening drive will be triggered by a re-clocking operation. With this the drives will be triggered again and again in regular intervals. Consequently the opening drives, which may have been blocked first, for example by icing or stuck seals, will be nevertheless opened.

The same functionality is ensured also for the control part of the staircase SHEV-system.

### 3.3 Wiring Plan Lift Shaft



#### Symbol Description



LSC 44-M4 surface type  
 600x600x210 (230VAC/ 24VDC)  
 near the lift shaft



Smoke vent button (RT 43-LSC)  
 surface 24 VDC circa 1,5m above  
 upper edge firm flooring (by customer  
 55mm flush socket)



Vent button 24 VDC (e.g. LT 43) circa  
 1,2 above upper edge firm flooring (at  
 flush type by others 55mm flush  
 socket)



Fire detector 24 VDC  
 (e.g. FO 1362 or FT 1262)



flashing  
 light



acoustical  
 signal transmitter



signal  
 indicating board

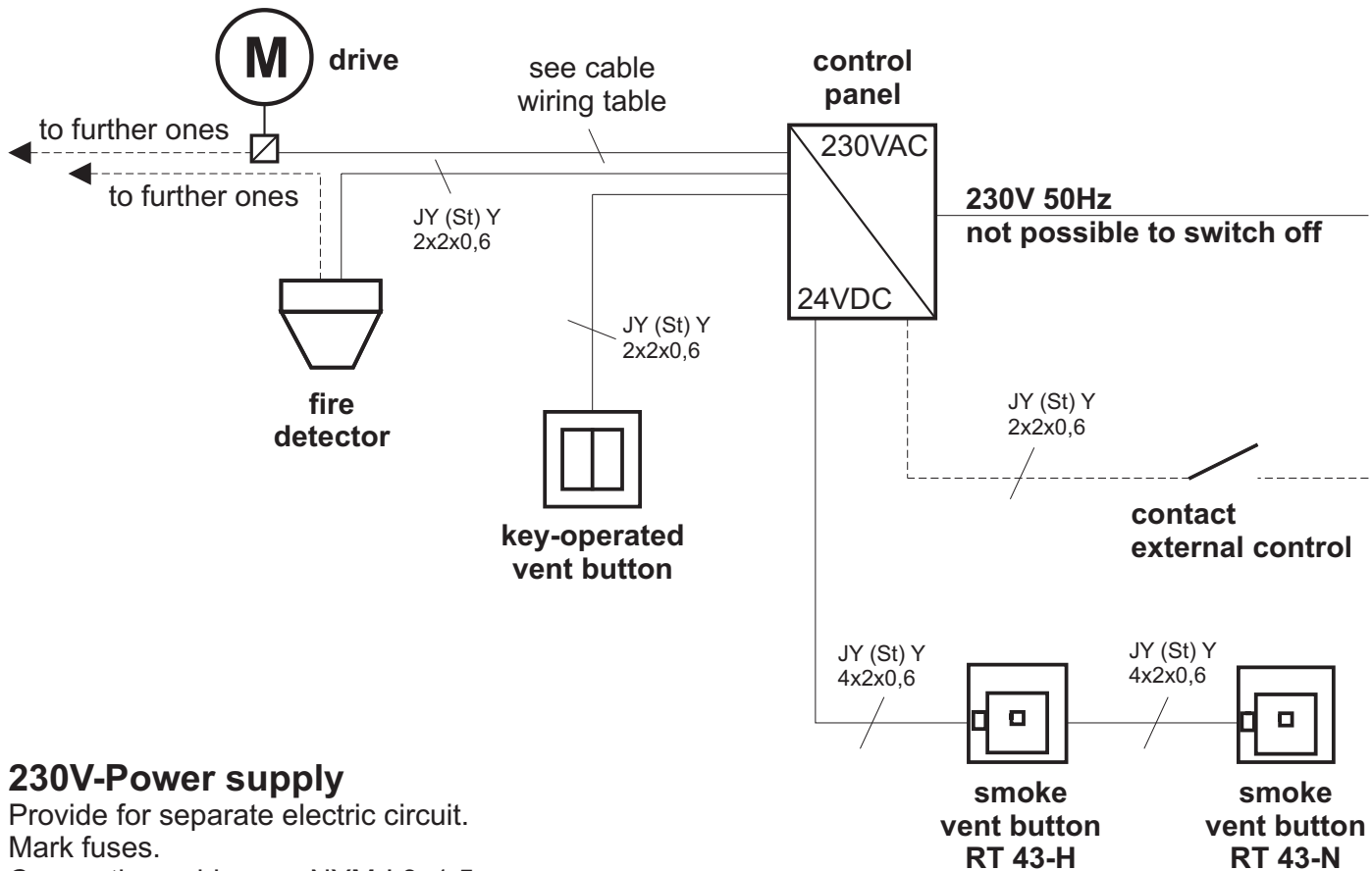


rain  
 detector



Drive 24 VDC at smoke vent flap (lines  
 must end in flush mounted distribution  
 box, see symbols above).

## 3.4 Wiring Plan Staircase



### 230V-Power supply

Provide for separate electric circuit.

Mark fuses.

Connecting cable : NYM-I 3x1.5

Connecting load : RZN 4404-M = 120 VA

### Weak Current Lines

Install and feed separately from supply mains.

Mark cable and terminal box red.

### Symbol Description



LSC 44-M4 surface type 600x600x210 (230VAC/ 24VDC) near the lift shaft



Smoke vent button (RT 43-H/N) surface 24 VDC circa 1,5m above upper edge firm flooring (by customer 55mm flush socket)



Vent button 24 VDC (e.g. LT 43) circa 1,2 above upper edge firm flooring (at flush type by others 55mm flush socket)



Drive 24 VDC at smoke vent flap in the staircase (lines must end in flush mounted distribution box, see symbols above).



Rain detector 24VDC (FO 1362) at the top end of the staircase



## 3.5 Cable for D+H Smoke and Heat Vent Systems

The smoke vent control panel is designed for opening smoke vent devices, which operate by thermal ascending force and by automatic fire recognition devices (thermal detector, smoke detector), and they release either self-acting or manual by smoke detectors at an early stage of a fire, and remain in opened position without further power consumption. In these cases, functioning preservation of the electrical line system is required only at an early stage of fire. Protected wiring is required with protection against mechanical damages according to DIN 18232 section 2.7.2.4.

### Control Cable (Group):

Cable from the smoke vent control panel to connection of drive (drive lines have a monitoring wire, in which fire recognition devices (thermal maximal detector e.g. THE) can be looped-in):

- Safety line, with functional conservation ... E30, according to DIN 4102\* or standard guidelines for line systems MLAR.

### Detector Cables (Line):

The detector cables are monitored for short circuit and for break.

The opening device is automatically triggered and opens up in case of fault, when DIP-switch 3 is on ON.

Smoke vent button cable and cable of automatic detectors:

- weak current sheathed flexible cable YR 6 x 0.8 or
- house wiring cable IY(ST)Y 4 x 2 x 0.6

### Cables through areas not monitored:

An increased time of functioning of the cable can be required, when drive lines are installed through building parts, which are not monitored.

- Safety line with functional conservation ... E90, according to DIN 4102\* or standard guidelines for line systems MLAR.

(see supplementary sheet 1 to DIN VDE 0108)

\* Notice: No type designation is given for these cables, because of a large variety on the market. Please consult your D+H distributor about these.

## 3.6 Line lengths and Cross sections

Type		LSC 44-M4							
drive	0,5A	1	2	3	4	5	6	7	8
	1A		1		2		3		4
	3 x 1,5mm <sup>2</sup>	240	120	80	60	48	40	34	30
	3 x 2,5mm <sup>2</sup>	400	200	130	100	80	65	55	50
	5 x 2,5mm <sup>2</sup>	800	400	260	200	160	130	110	100

Number of wires and cross-sections indicated, refer to required lines only. In case of using a line with earthed conductor (green/ yellow), this one will not be counted in and must not be wired.

$$\text{cross section (mm}^2\text{)} = \frac{\text{plain cable length (m)} \times \text{number of drives}}{80^{**}}$$

\* connect in parallel 2 wires for each drive line

\*\* only valid for drives with 1A actuating current. Use „160“ for drives with 0,5A actuating current and „230“ for drives with 0,35A actuating current.

## 3.7 Project Planning of Smoke Suction System

### Regulations

The following project planning regulation is orientated to the system limitations of TITANUS MICRO-SENS. In this connection, respective national regulations of the states in the valid version each must be observed. The project planning must be adapted to these standards.

#### In Germany

DIN VDE 0833 part 1 and 2 “alarm systems for fire, burglary and raid”.

Additional provisions for construction of fire alarm systems, which are issued from the fire management of the fire brigades, from the inspection of works or from the building right authorities, which are only of local validity.

#### With VdS-Systems

“Guideline for automatic fire alarm systems, planning and installation” VdS Schadenverhütung GmbH (VdS 2095).

#### With CEA-Requirement

The CEA-guideline 4022 “Requirements and test methods for aspirating smoke detectors” demands a recognition of an airflow disturbance, if a 50% change of the main airflow arises. In addition, the size of suction openings has been laid down on at least 2.0 mm Ø.

#### With Project Planning Limitations

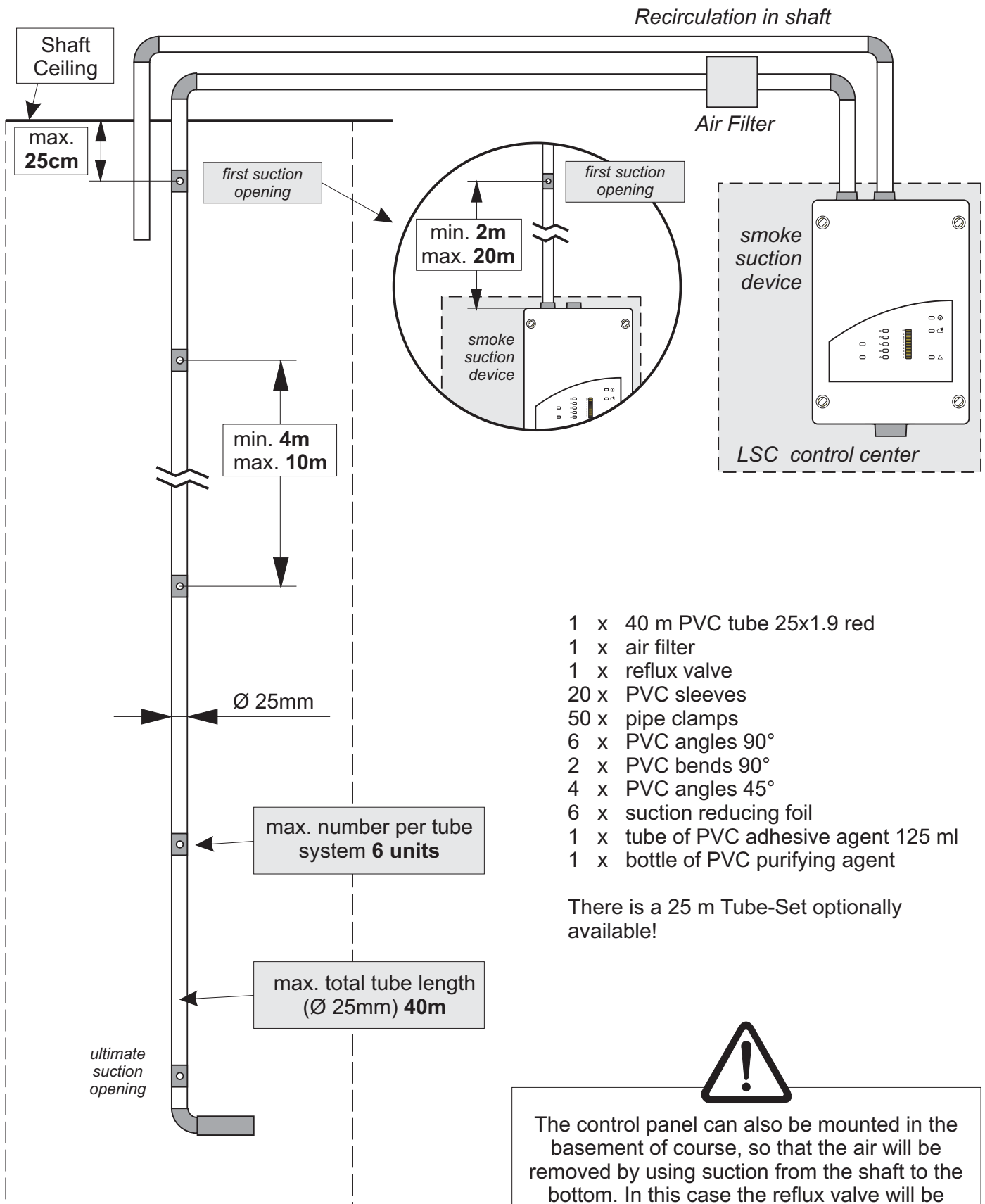
The project planning limitations according to chapter 4.5 have to be taken into account within this project planning.

Maximum monitoring area of a suction opening corresponds to the monitoring area of a point indicator according to the regulations of the respective national standards.

## 4.0 Tube System

The tube system serves for a defined air sampling from the monitoring area and consists of different components.

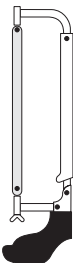
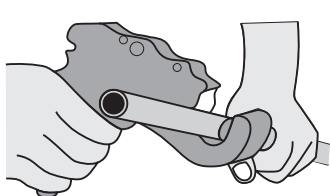
A simplified project planning will be applied in equipment protection and in conveniences of small dimensions.



## 4.1 Mounting of Tube System

The tube system shall be put together according to the requisition by the project and with observance of the project planning guidelines.

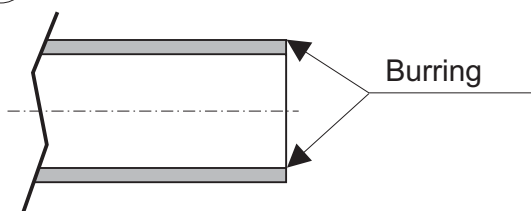
- 1 Cut tubes to length**  
(pipe cutter or pipe shears 38mm/  
metal cutting saw)



**Suction tube (PVC)** (optional available)  
R-2519, R-3218, R-4019)

**Suction tube halogen free**  
ABSR-2518, ABSR-3220, ABSR-4025

- 2 Burring**



Minimize tube lengths and changes of direction. **Angles** (see fig. 1 on the right) have an extremely high air flow resistance. Therefore use these only at places, where they are inevitable for structural reasons. If necessary, the tube length must be reduced in proportion to the angles used.

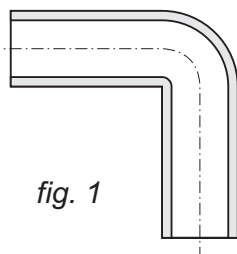


fig. 1

**Bends** (see fig. 2 on the right) shall be always preferred to angles. A too high number of bends and angles will lessen the velocity of air in the suction tube and by this, detection time will be increased.

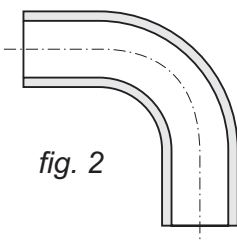
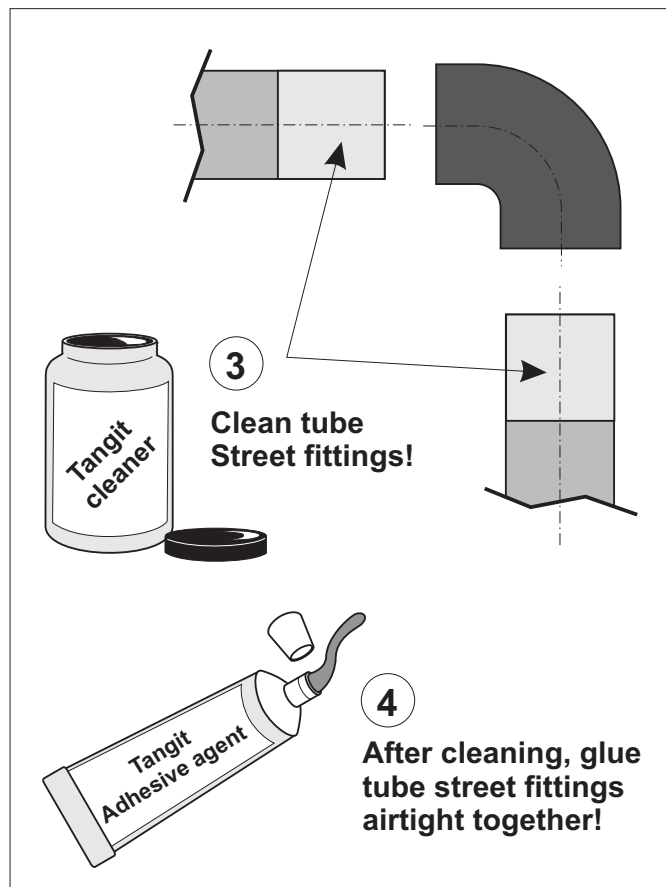


fig. 2



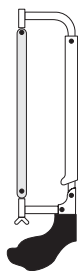
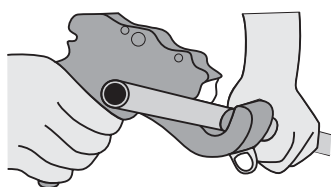
If angles and bends are used, the maximum total length of the tube system will be reduced.

### Standard Value

- a bend corresponds to a straight tube length of 0,3m.
- an angle corresponds to a straight tube length of 1,5m.

## 4.2 Mounting of Reflux Valve at Suction Tube End

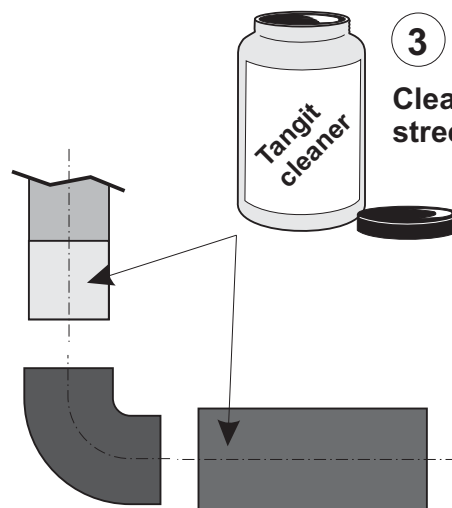
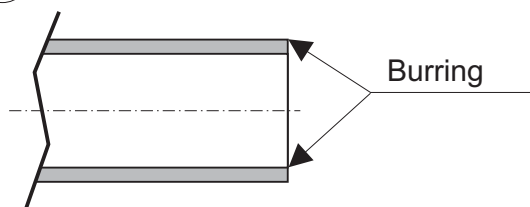
- 1** Cut tubes to length  
(pipe cutter or pipe shears 38mm /  
metal cutting saw)



**Suction tube (PVC-red)**  
R-2519, R-3218, R-4019

**Suction tube halogen free (optional available)**  
ABSR-2518, ABSR-3220, ABSR-4025

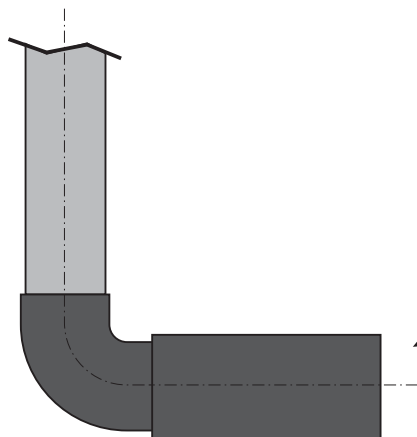
- 2** Burring



- 3** Clean tube  
street fittings!

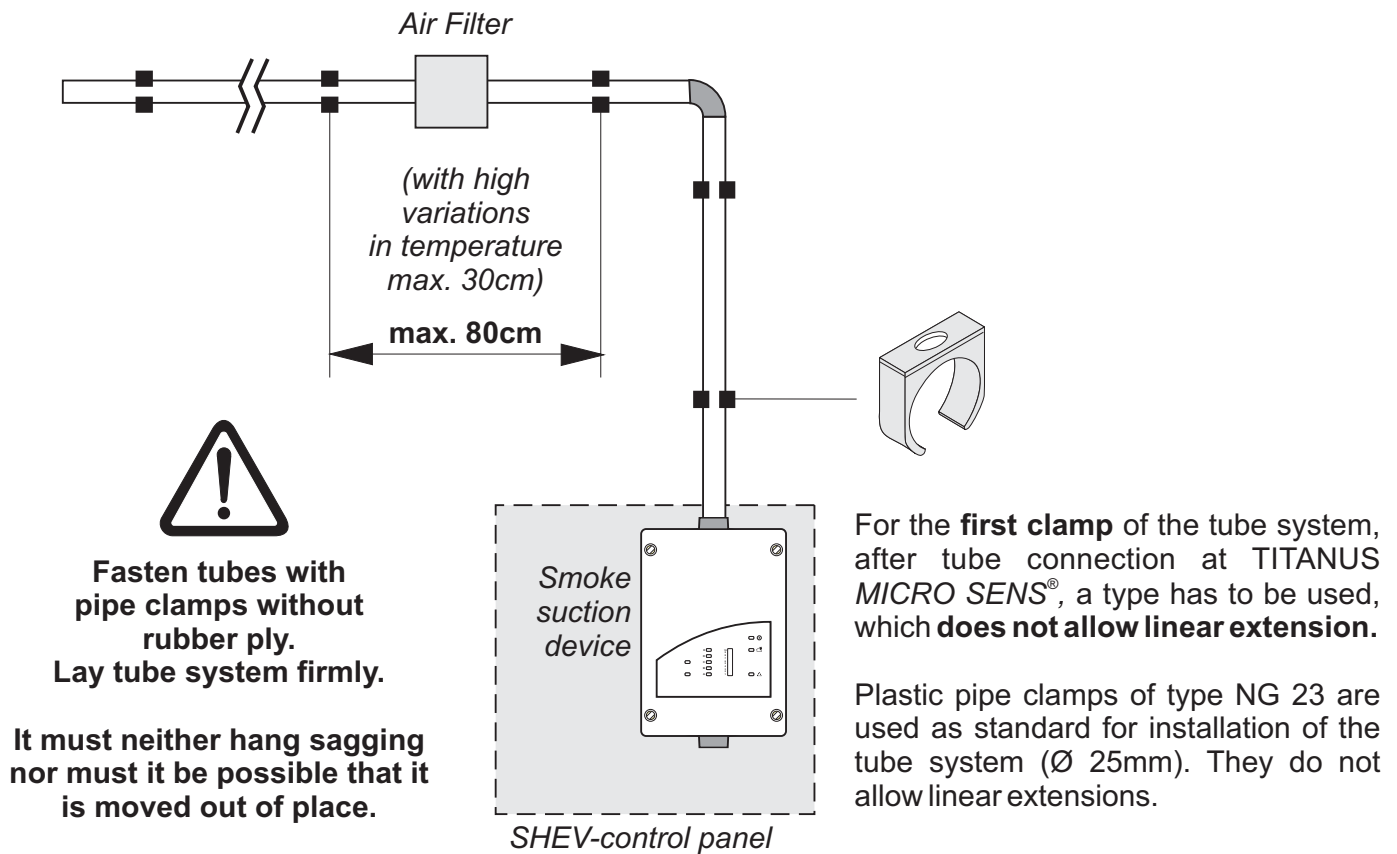


- 4** After cleaning,  
glue tube street  
fittings airtight  
together!



**Mount reflux valve,  
always horizontally  
if used in lift shaft,  
that dust and dirt will  
not be necessarily whirled up  
in the shaft pit with blowing  
through of the tube system.**

## 4.3 Pipe Clamps



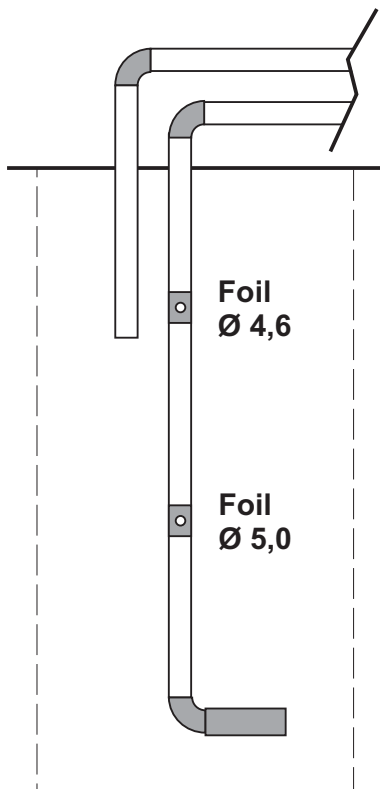
## 4.4 Checking of Tube Systems

- for leakages (e.g. by damages)
- for faulty connections
- for correct project planning of suction openings
- check with critical applications safe detection with response tests apart from this check, whether an air throughput is available on the individual suction openings.
- The ventilator voltage can be infinitely increased from 9V (standard) up to 13.5V in order to increase the velocity of air flow in the tube system in critical areas.
- If the tube system does not meet the project planning guidelines, as described here, because of structural facts, it must be separately calculated by D+H for the respective conditions.

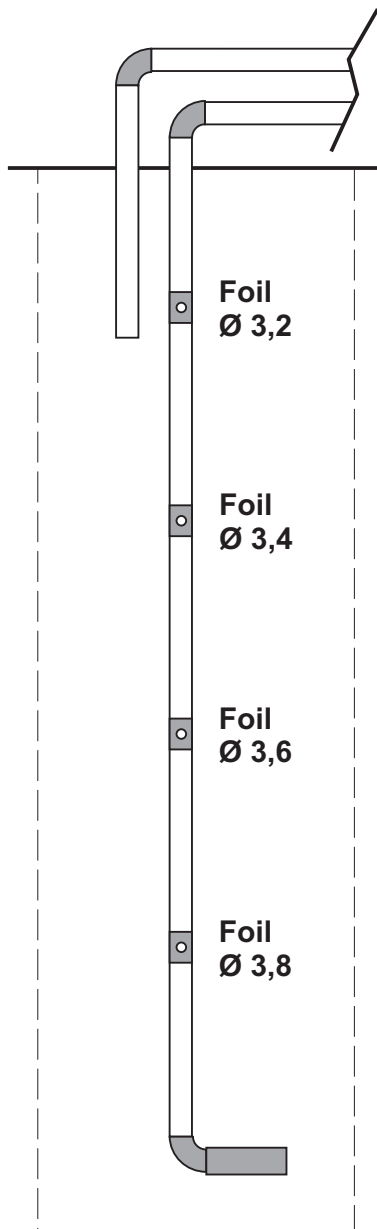


## 4.5 Tube Project Planning Guideline

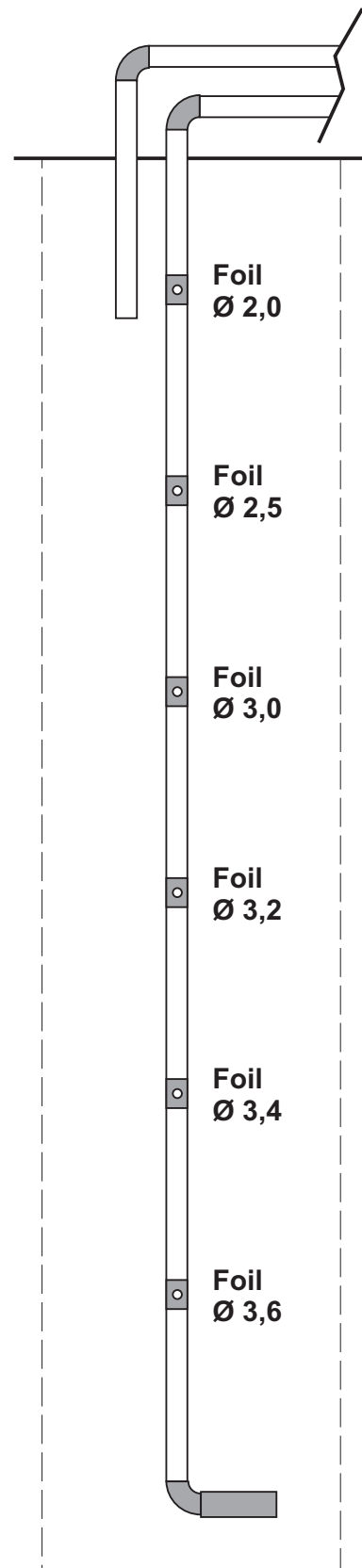
**Tube length < 15m**  
**2 borings**  
 (pre-drill Ø 10mm)



**Tube length 15-25m**  
**4 borings**  
 (pre-drill Ø 10mm)



**Tube length 25-40m**  
**6 borings**  
 (pre-drill Ø 10mm)

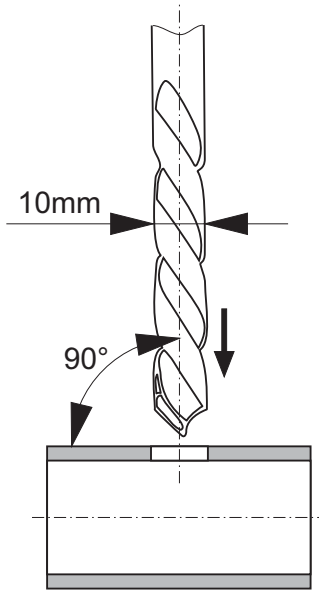


## 4.6 Suction Openings

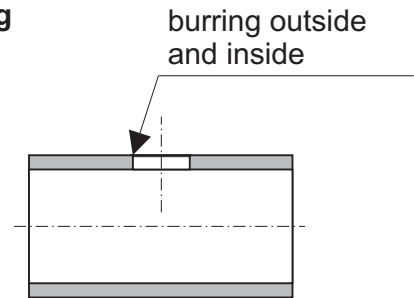
Chose set-up of suction opening (suction boring) and position of tube system according to the

requisition of the project and with observing of the project planning guidelines.

### 1 bore 10mm hole



### 2 Burring

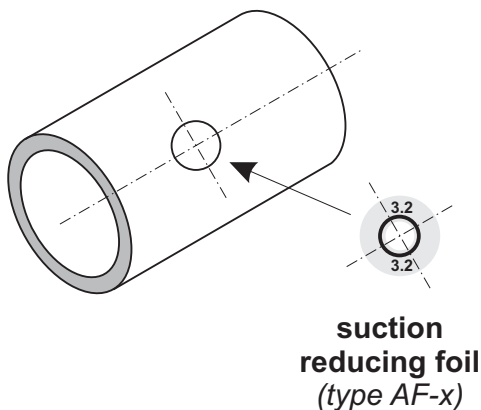


### 3

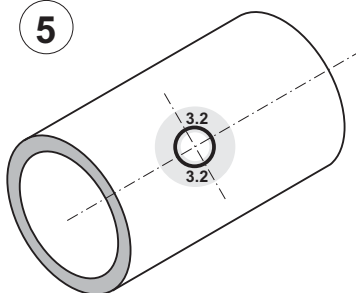
Afterwards clean boring area from fat and dust over entire tube surfaces



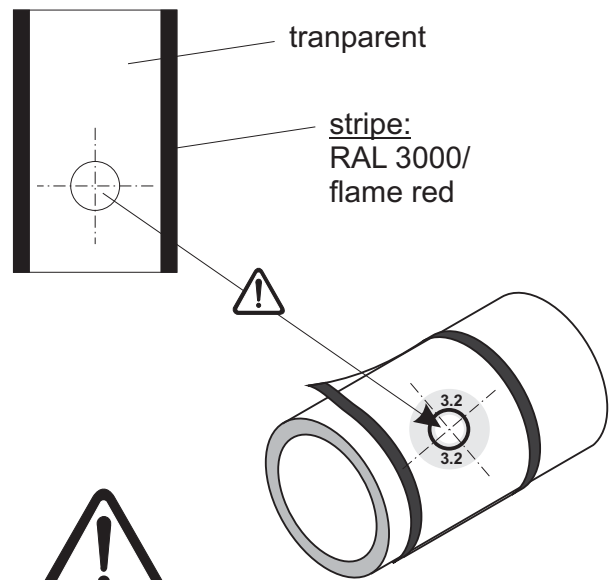
### 4 Glue on suction reducing foil



### 5



### 6 Glue on revenue stamp (type AF-BR) over suction reducing foil



The holes of the suction reducing foil and the revenue stamp must be exactly over the suction boring.  
The diameter of opening in the suction reducing foil must not be changed.

For keeping the adherend of foils dust- and fat free, avoid any touching.

## 4.7 Air Filter LF-AD



### Mounting

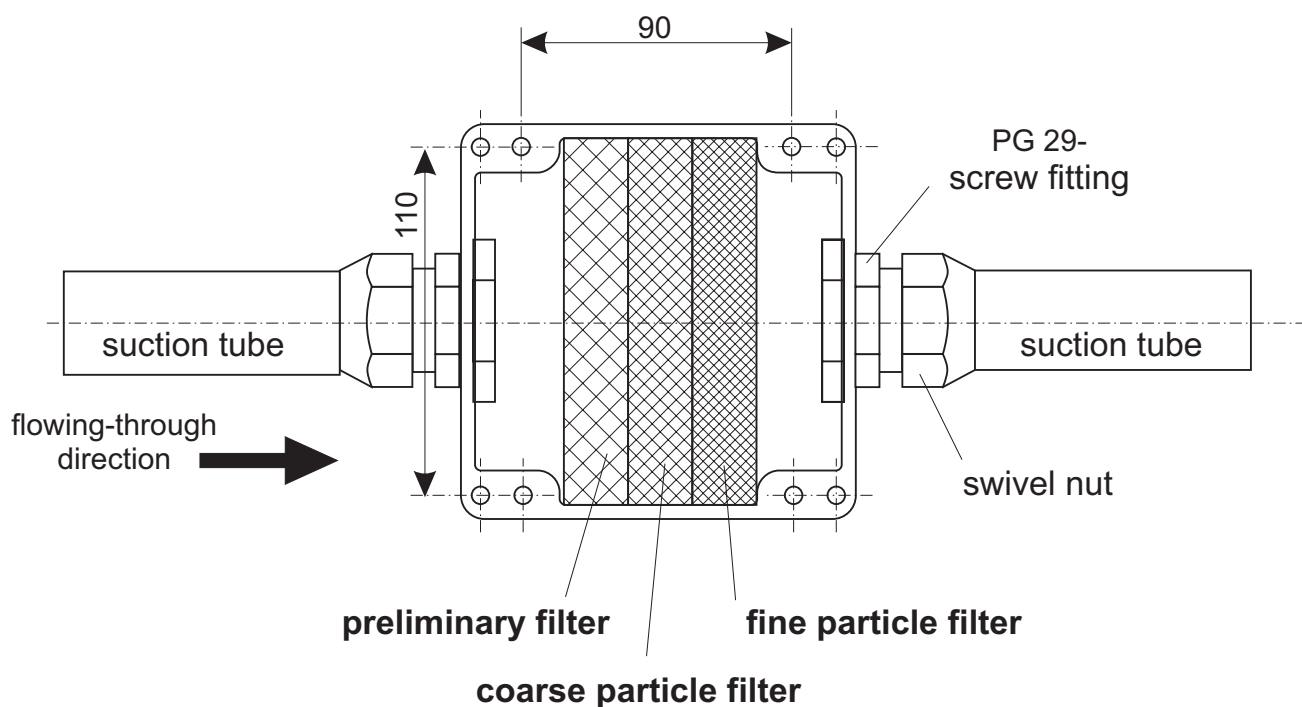
1. Unscrew swivel nut of PG29-screw fittings
2. Stick suction tubes into both sides
3. Screw down again swivel nuts
4. Screw filter housing directly on wall with housing lower part



Observe flowing-through direction of the filter with mounting!  
(label on housing outside)

### Exchange of Air Filters

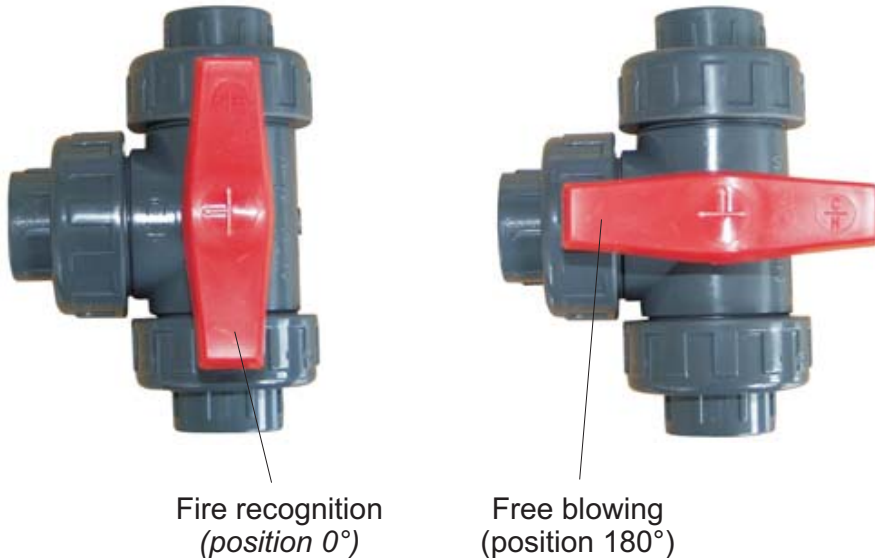
1. Unscrew the 4 screws on housing cover
2. Remove housing cover
3. Remove filter elements
4. Clean carefully housing inside from dust deposits
5. Put in new filter elements in correct order (*see indicating label on housing bottom*)
6. Place housing cover upon housing and screw down again



## 4.8 Free-Blowing Device

In areas, in which increased dust particles are to be expected, a blowing free of the suction tube system and its suction openings can be necessary.

Change-over will take place between fire recognition (*position 0°*) and free-blowing (*position 180°*).



**Separate the TITANUS MICRO-SENS® from tube system before blowing free of the tube system, because otherwise the air flow detector will be damaged.**

### Free-blowing process of tube system

1. Connect compressed air supply via the free connection to the three-way ball valve in LSC control box.
2. Separate the *MICRO-SENS®* from the tube system before blowing free of the tube system by using the three-way ball valve. For this, switch over the lever of the ball valve from operating position 0° to position 180°.
3. Blow through the tube system for 6 minutes through the compressed-air device.  
(3 minutes blowing through, 3 minutes suction)
4. Place lever of ball valve in 90° position. In this position, the device will be neither connected with the tube system nor with the connection of the compressed-air device.
5. Wait for approx. 20 seconds! Whirled up dust and dirt will settle in the lift shaft and can no longer be removed by using suction via the smoke suction system.
6. Connect again the blown-free tube system within further 10 seconds with the *MICRO-SENS®*. For this, place ball valve again on position 0°.

## 4.9 Titanus Pipe•Clean



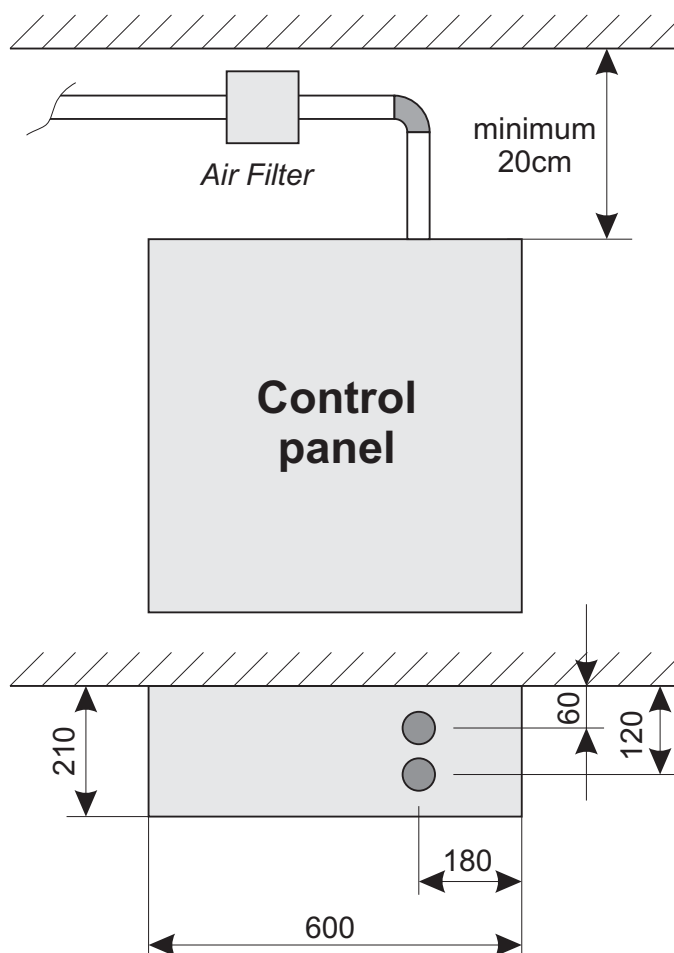
A specially developed tube cleaning device for blowing-through of the suction tube in a lift shaft. The compressed-air device will be operated with 230V. Only with this efficient compressed-air device is a building-up of a sufficient pressure volume possible for best possible cleaning.

The compressed-air device is available at D+H with the designation Pipe•Clean.

## 5.0 Central Appliance LSC 44-M4



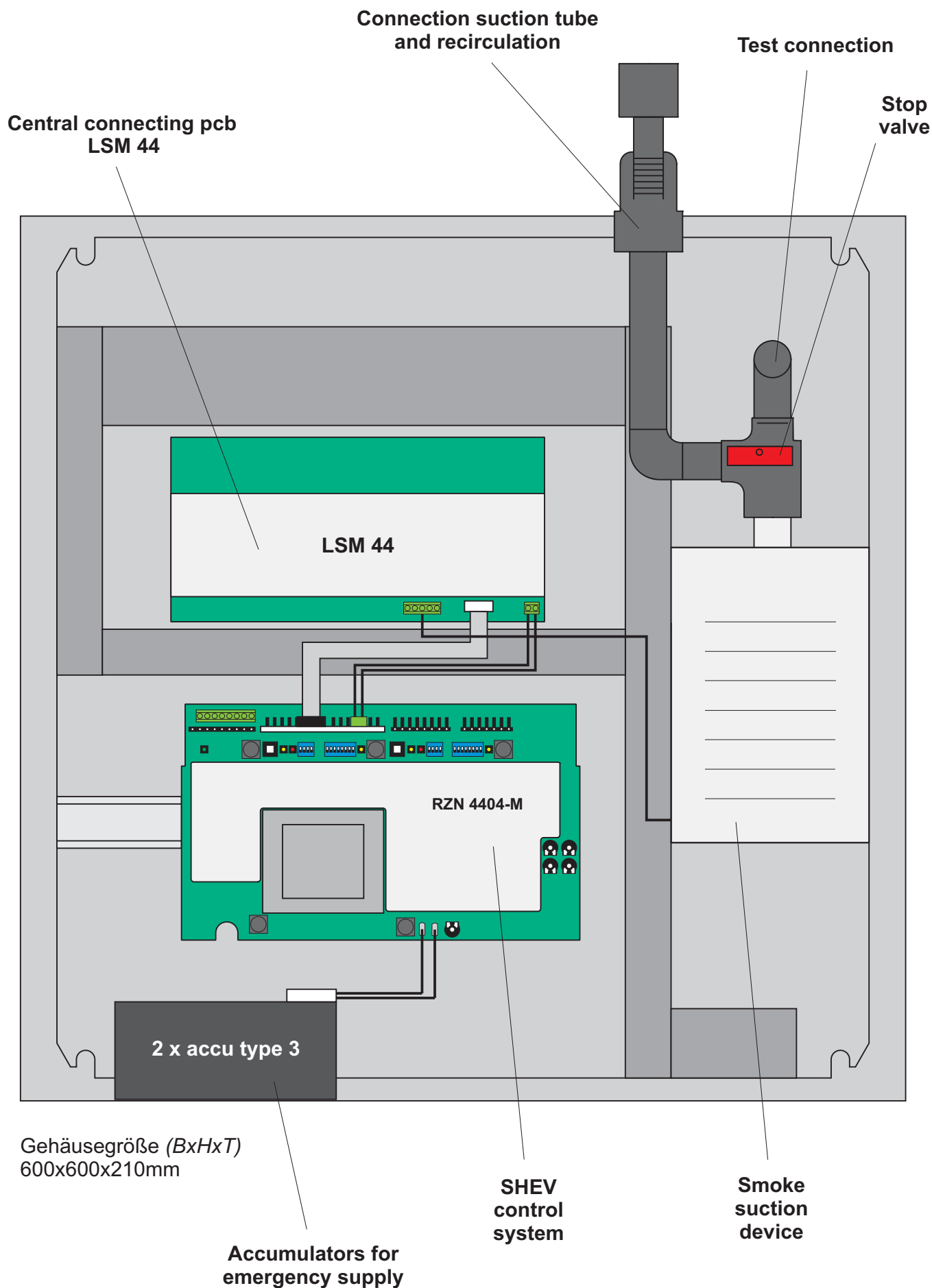
## 5.1 Mounting Place LSC 44-M4



- Displays must be easy visible
- in proximity of the shaft, however not in the lift shaft!
- protected and easy accessible for maintenance
- not in **opening area** of doors



## 5.2 Inside Design of Control Center





## 5.3 SHEV Control Panel of Type LSM 44-M4

The SHEV- control panel of type RZN 4404-M VdS is the core piece of an electric motor driven smoke and heat vent system. It will receive instructions from externally connected manual or automatic

transmitters, will process them and run open and closed the electric drives in smoke vent devices. The SHEV-control panel can be used for ventilation as well.



### Technical Data

Control panel type : LSC 44  
 Rated voltage : 230 V AC,  $\pm 10\%$ , 50 Hz  
 Rated capacity : 32 VA  
 Current consumption : 0,13 A  
 Input : 29,4 VA  
 Annual consumption : 110 kWh

Protective category : I  
 Fire resistance : -5 to +40 °C  
 Protective system : IP 54

Class of rating  
 - Monitoring : Continuous duty  
 - Emergency state/  
 Ventilation : Short-time duty

Output voltage : 24 V DC /  
 res. ripple <10%

Safe output  
 - rated current : 4 A

VdS approval No : G 506001

### 24V - Emergency Supply

Emergency power supply for 72 hours  
**Use VdS approved storage batteries only!**

2x 12V / 7,0Ah  $\pm 15\%$

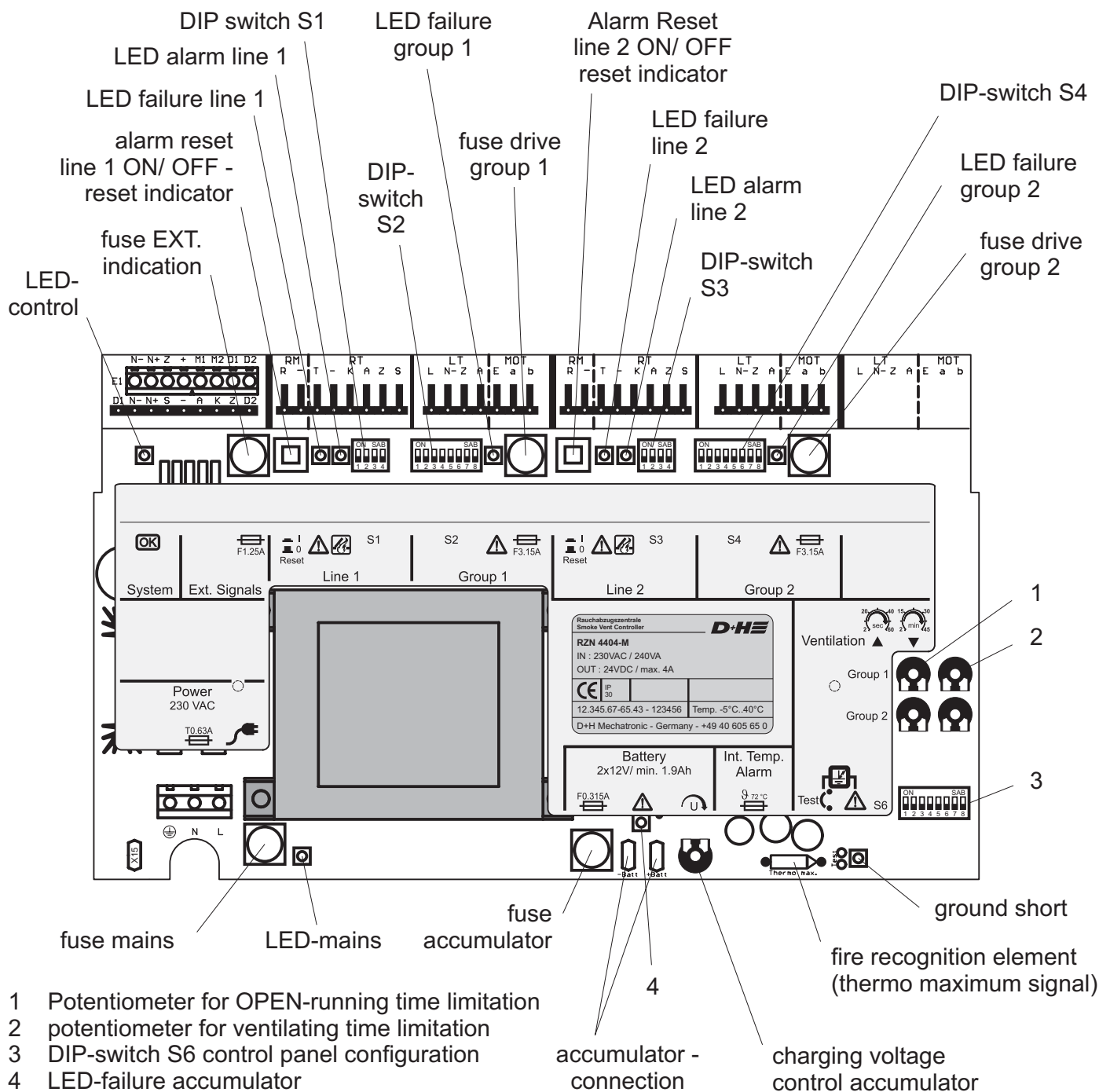
### Accumulator Control TID

**T Temperature-guided**  
 Charging of accumulator

**I Impedance measuring**  
 Internal resistance of accumulator will be measured cyclically.  
 For example, if a total discharged accumulator is connected to the control panel  
 = malfunction (LED on PCB)

**D Discharge control**  
 In case of power failure and total discharge of accumulator, the control panel will switch off. In this case, smoke vent is no longer ensured. In this case a malfunction will be no more indicated either.

## 5.4 View motherboard RZN 4404-M VdS



### Piktograph explanation

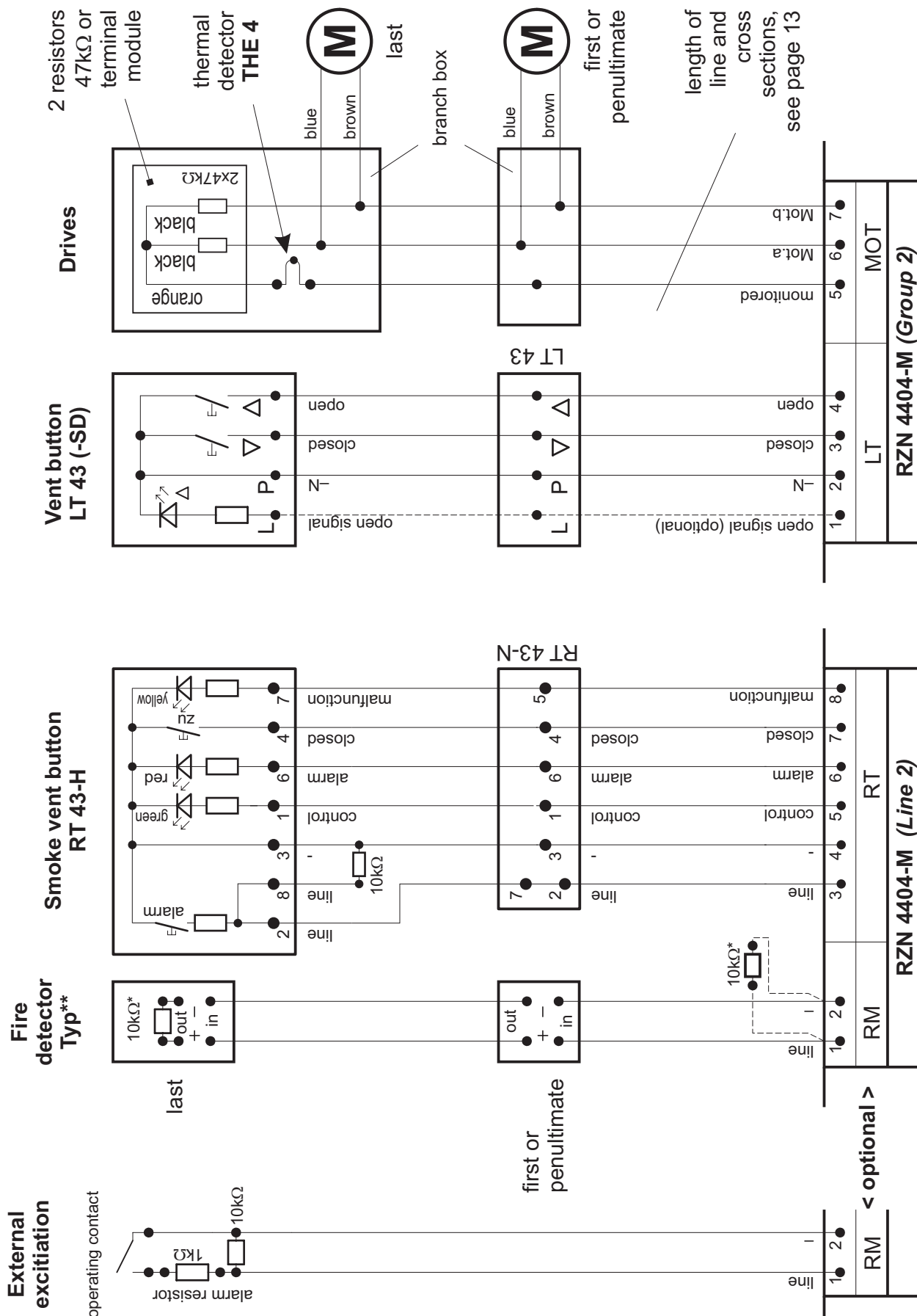
	Smoke and heat vent alarm
	Control panel O.K.
	Mains supply
	Vent button function "ON"
	Ventilation-/SHEV-key function "Closed"
	Failure
	Charging voltage controller

	Regulator for OPEN-running time limitation
	Regulator for ventilation time limitation
	Fuse
	Reset
	Ground short

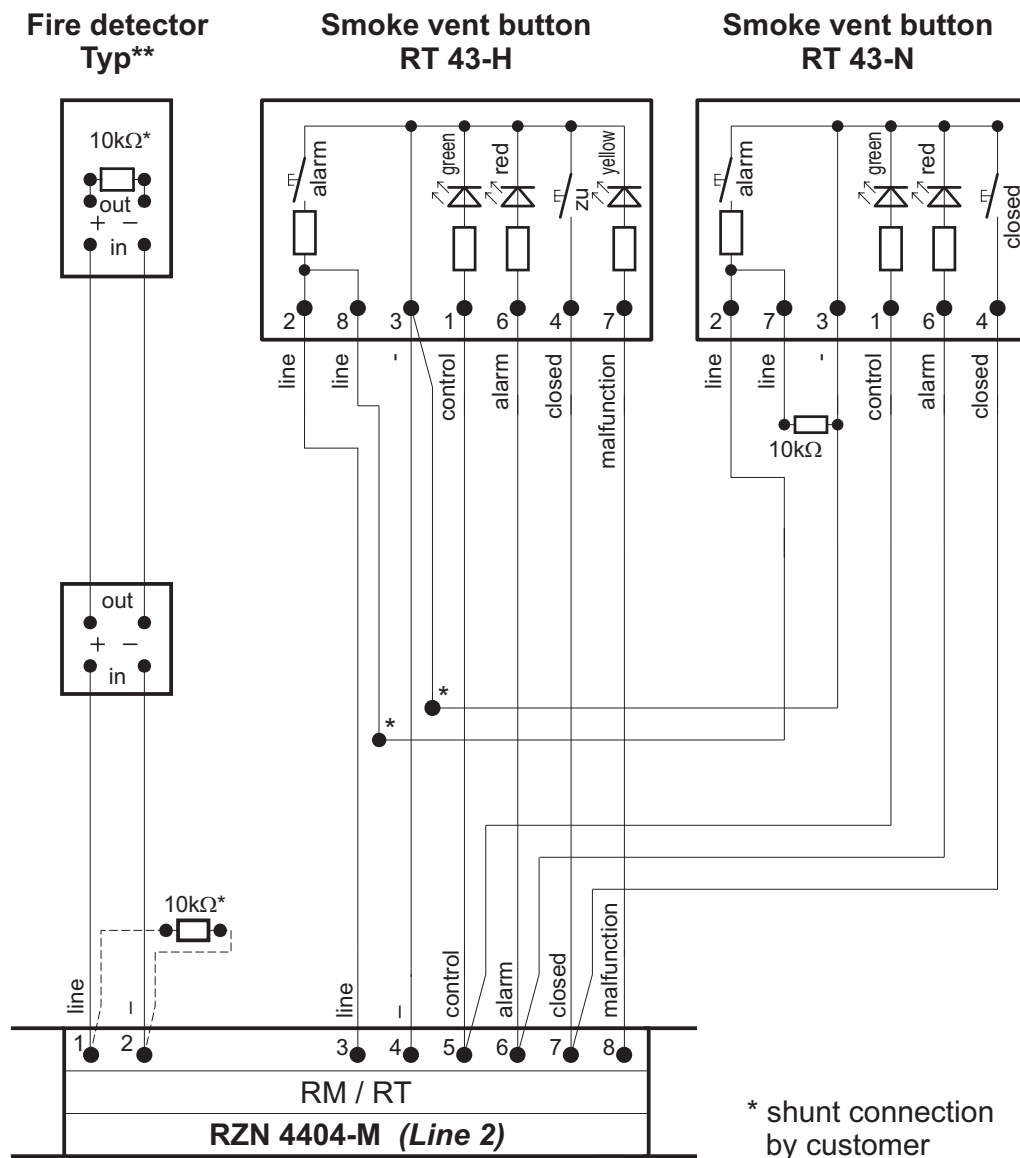
## 5.5 Standard Connection with RT 43-H/-N

The connection for the external components of the staircase SHEV-system will be connected to line 2 and group 2 on the central PCB RZN 4404-M.

(The LSM-module for the lift shaft smoke vent is connected to line 1 and group 1)

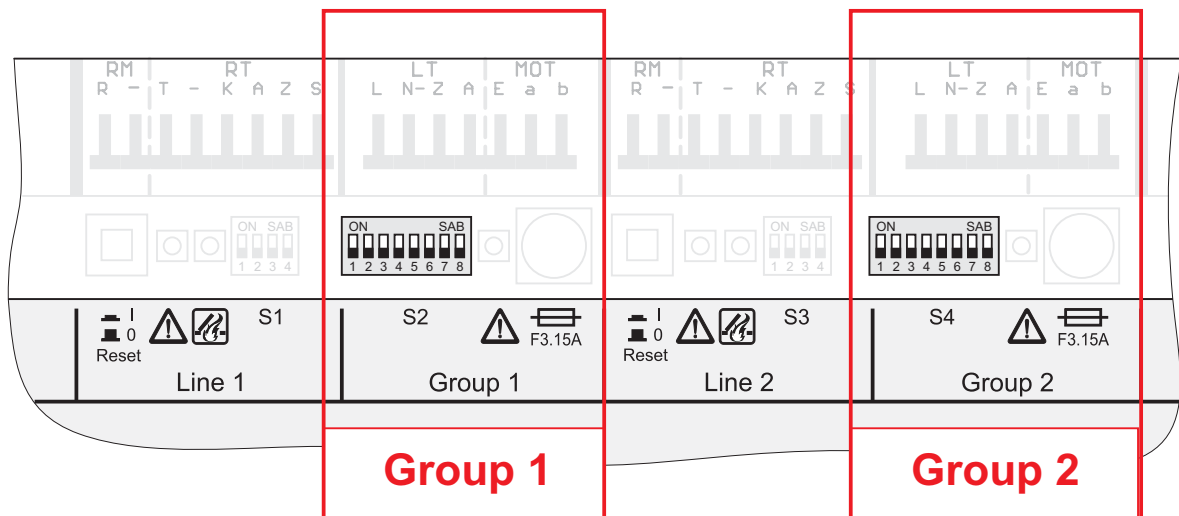




## 5.6 Parallel Connection of RT 43-H/-N



## 5.7 Codification of Group 1 and 2

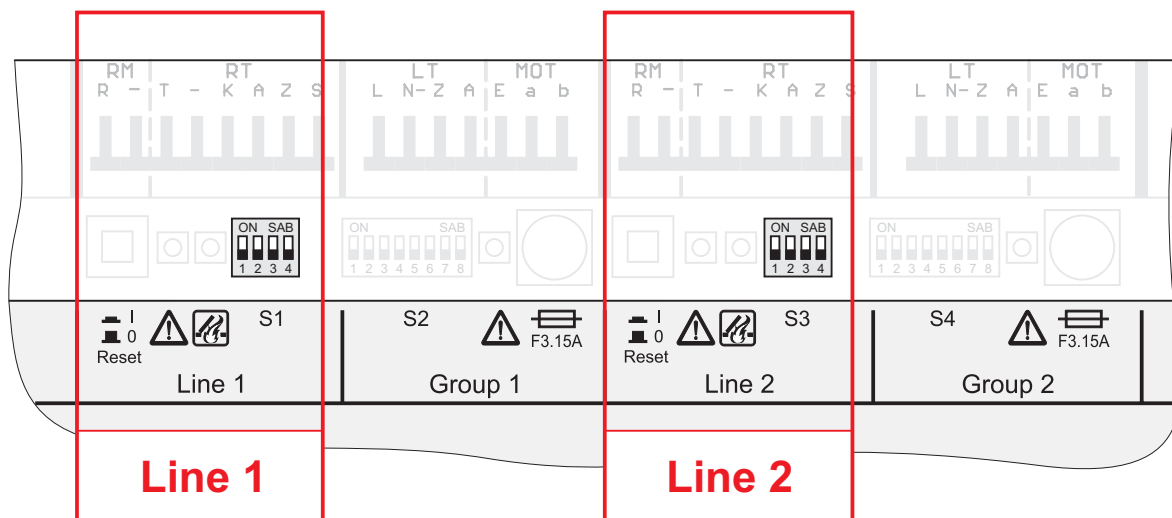
Following functionings can be set with **DIP switch S2/ S4** on motherboard.



<b>Switch 1 on ON =</b>	<b>OPEN - running time limitation</b> Using a potentiometer, running time in Open direction can be Limited. If the vent button is actuated in Open direction, the drive will run open as long as the running time is set.	
<b>Switch 2 on ON =</b>	<b>Ventilation time limitation</b> <i>Only possible in conjunction with group-DIP-switches 4 = ON (storage operation in CLOSED-direction)!</i> Using a potentiometer, ventilation time can be set. Drives will automatically close again, after the adjusted time has expired.	
<b>Switch 3 on ON =</b>	<b>OPEN - retrigging</b> <i>Only possible in conjunction with group-DIP-switch 1 = ON (OPEN-running time limitation)!</i> If Dip switch 1 is switched on ON, the OPEN-running time limitation can be retrigged again.	
<b>Switch 4 on ON =</b>	<b>Storage operation in CLOSED-direction</b> Press ventilating button ▽ 1x shortly > the drive will be closing up to its final position	
<b>Switch 4 on OFF =</b>	<b>Key operation in CLOSED-direction</b> The drives will be closing only so long as the ventilating button ▽ is pressed.	
<b>Switch 5 on ON =</b>	<b>Storage operation in OPEN-direction</b> Press ventilating button △ 1x shortly > the drive will run open up to its final position.	
<b>Switch 5 on OFF =</b>	<b>Key operation in OPEN-direction</b> The drives will run open only so long as the ventilating button △ is pressed.	
<b>Switch 6 on ON =</b>	<b>Group CLOSED in case of alarm</b> The group will be closing in case of alarm!	
<b>Switch 7 on ON =</b>	<b>Group fault on alarm</b> The control panel will be switched on alarm, that means, the <b>smoke vent opens</b> in case of <b>group fault</b> (e.g. in case of an interrupted control line).	
<b>Switch 8 on ON =</b>	<b>Alarm re-clocking</b> The smoke vent is triggered for a duration of 30 minutes in intervals of 2 minutes according to VdS 2581. <i>See page 10 about this.</i>	

## 5.8 Codification of Line 1 and 2

Following functionings can be set with **DIP switch S1/ S3** on motherboard.



**Switch 1 on ON = Two-smoke detectors dependency** (*Only in conjunction with FO 1362*)  
 Alarm will be triggered only, if at least two smoke detectors of one line respond.  
 False alarm of one smoke detector will be prevented.  
*See also page 18 about this.*  
**Attention!** Two smoke detectors in one room must be always installed.  
 If only one smoke detector is connected to one line, switch is on OFF!

**Switch 2 on ON = Smoke detector alarm can be reset only in control panel**  
 Smoke detector alarm can **not** be reset by single pressing on button in smoke vent button.  
**Dip switch 2 must be switched on OFF, when remote reset is desired of smoke detectors by the smoke vent button.**

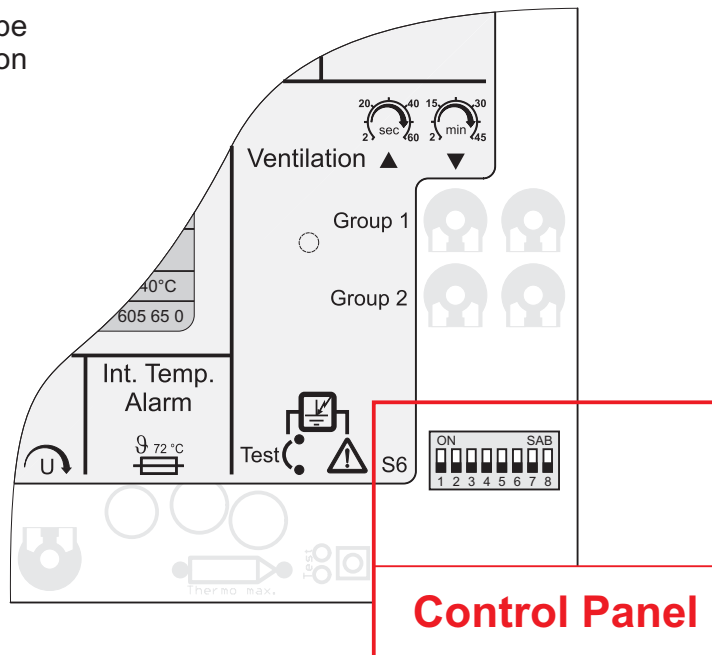
**Switch 3 on ON = Line fault = alarm**  
 The control panel will be switched on alarm, that means the **smoke vent opens** at a **line fault** (e.g. at an interrupted detector line or short circuit).

**Switch 4 = idle**



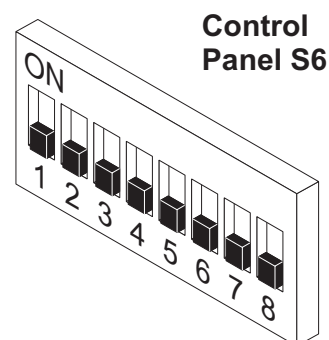
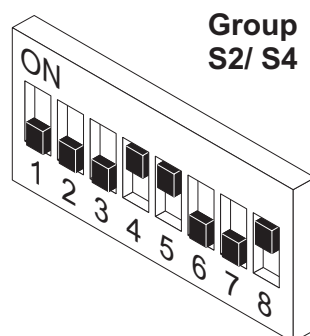
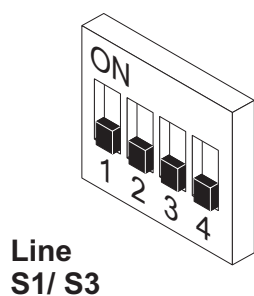
## 5.9 Codification of Control Panel

Following functionings can be set with **DIP switch S6** on motherboard.



<b>Switch 1 on ON</b>	<b>= Line 2 on group 3</b> Line 2 is also effective on group 3
<b>Switch 1 on OFF</b>	<b>= Group 3 is independent of line 2</b>
<b>Switch 2 on ON</b>	<b>= Central alarm</b> In case of alarm of one line, the other line will be set on alarm as well
<b>Switch 3 on ON</b>	<b>= Power failure-CLOSED</b> If the power supply breaks down, the drive will close. Only when group-DIP switch 4 (key operation in CLOSED-direction) = <b>ON</b>
<b>Switch 4 on ON</b>	<b>= Bus control</b> Factory-setting must be on <b>“OFF”</b>
<b>Switch 5</b>	<b>= idle</b>
<b>Switch 6 on ON</b>	<b>= LED Test / Reset WDT error (Watch Dog Timer)</b> Actuate DIP-switch (ON / OFF). LED's will light up for 3 seconds in control panel
<b>Switch 7</b>	<b>= idle</b>
<b>Switch 8</b>	<b>= idle</b>

## 5.10 Factory preset of the DIP-Switch



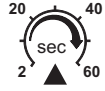

## 5.11 Delivery Condition

	Switch	Delivery condition		Conf. at starting		Function
		ON	OFF	ON	OFF	
S1 Line 1	1		X			Two-smoke detectors dependency
	2		X			Smoke detector alarm only to be reset in control panel
	3		X			Line fault = Alarm
	4		X			Idle
S2 Group 1	1		X			OPEN-running time limitation
	2		X			Ventilating time limitation
	3		X			OPEN-retriggering
	4	X				Duty cycle in CLOSED-direction
	5	X				Duty cycle in OPEN-direction
	6		X			Group CLOSED in case of alarm
	7		X			Group fault on alarm
	8	X				Alarm re-clocking
S3 Line 2	1		X			Two-smoke detectors dependency
	2		X			Smoke detector alarm only to be reset in control panel
	3		X			Line fault = Alarm
	4		X			Idle
S4 Group 2	1		X			OPEN-running time limitation
	2		X			Ventilating time limitation
	3		X			OPEN-retriggering
	4	X				Duty cycle in CLOSED-direction
	5	X				Duty cycle in OPEN-direction
	6		X			Group CLOSED in case of alarm
	7		X			Group fault on alarm
	8	X				Alarm re-clocking
S6 Control panel	1		X			Line 2 on group 3
	2		X			Central alarm
	3		X			Power failure-CLOSED
	4		X			Bus Control
	5		X			Idle
	6		X			LED Test / Reset WDT error (watch dog timer)
	7		X			Idle
	8		X			Idle

## 5.12 LSC-System for ventilation purposes as well

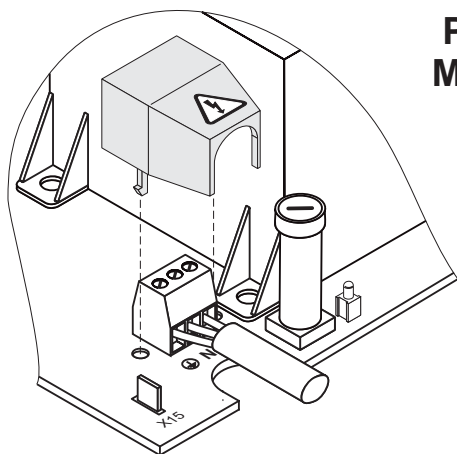
The system facilitates to use the SHEV-system for ventilation purposes as well. This will be effected via ventilation button or a floating contact in neutral position of another control system. A time-controlled automatic closing of the SHEV-system can be programmed, if required.

The possibility of ventilation will be automatically blocked in any kind of malfunction. Possibility of selecting different variants via codification of the control panel. Following ventilation functions can be set with DIP-switch S1 on the motherboard of RZN 44004-M for example:

<b>DIP-Switch 1 on ON</b>	<b>= OPEN-running time limitation</b> Using a potentiometer, running time in Open direction can be limited. If the vent button is actuated in Open direction, The drive will run open as long as the running time is set.	
<b>DIP-Switch 2 on ON</b>	<b>= Ventilation time limitation</b> Using a potentiometer, ventilation time can be set. Drives will automatically close again, after the adjusted time has expired.	

Automatic ventilation can be optionally realized via timer.

## 5.13 Emergency Power Accumulators



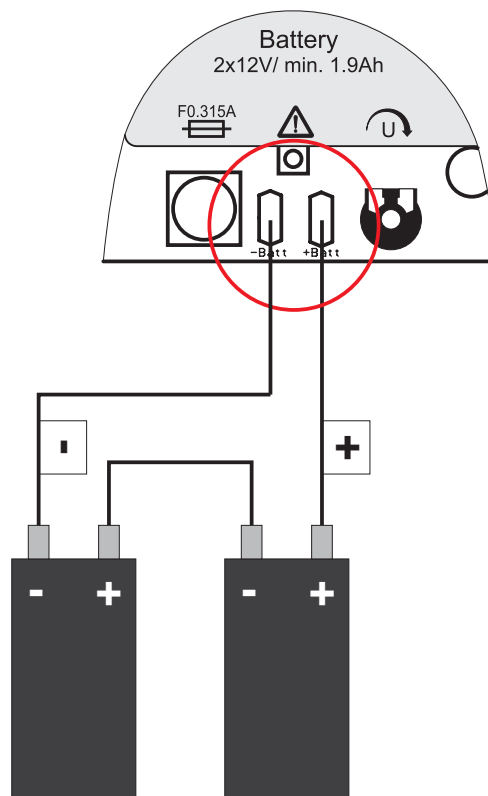
**Putting on of Mains Supply**

Putting on of the mains supply will be effected via terminals L1, N and PE. It will be protected by a fuse for feeble currents. Check distribution voltage after connecting.



### Attention

- Wrong polarization will result in damages both at accumulator unit and control panel.
- Accumulators are maintenance-free and **must be exchanged every 4 years**.
- Only accumulators authorized by the manufacturer are permitted to use. Date of installation must be noted down on accumulators.



### Connection

The device is equipped with 2 emergency power accumulators à 12V, which will be connected in series with a bridge (2x12V=24V)

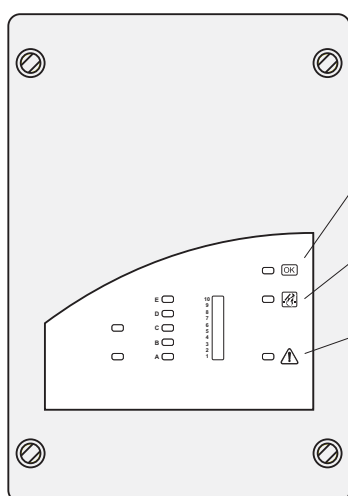
## 5.14 Smoke Suction System of Type MICRO-SENS®



### Content

- **Detector module** for recognition of smoke aerosols
- **Airflow detector** for monitoring of tube system on break and choking (*the airflow detector is integrated in detector module*).
- **Suction unit** for transport of air samples to detector module.

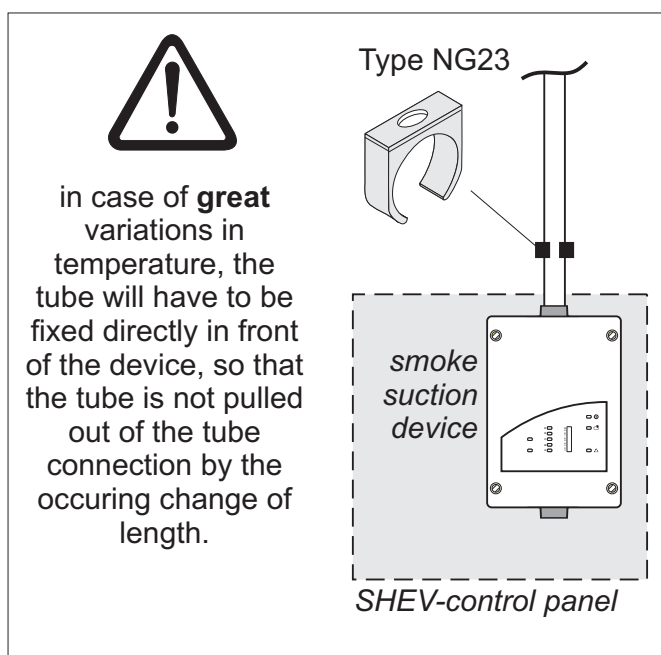
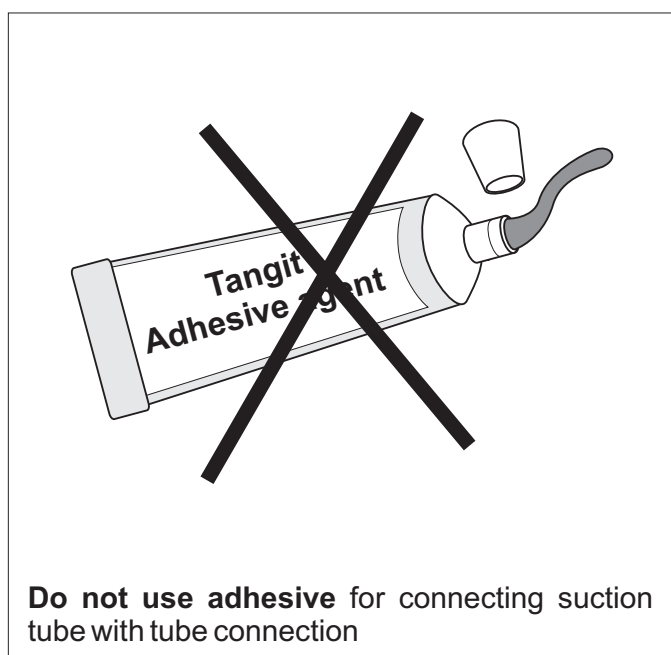
### Display



	LED lightens	LED does not lighten
OK	<b>LED "OPERATION"</b>	
	MICRO-SENS® is operable	Power supply disturbed
	<b>LED "ALARM"</b>	
	Alarm release through detector module	- no alarm -
	<b>LED- "MALFUNCTION"</b>	
	Malfunction in tube system - failure of ventilator or - malfunction in detector module Transmission of malfunction from MICRO-SENS® will take place with a time delay of 2 minutes.	- no malfunction -  After malfunction has been eliminated, it can last up to 2 minutes until the LED will extinguish.

## Connection of Suction Tube to LSC 44

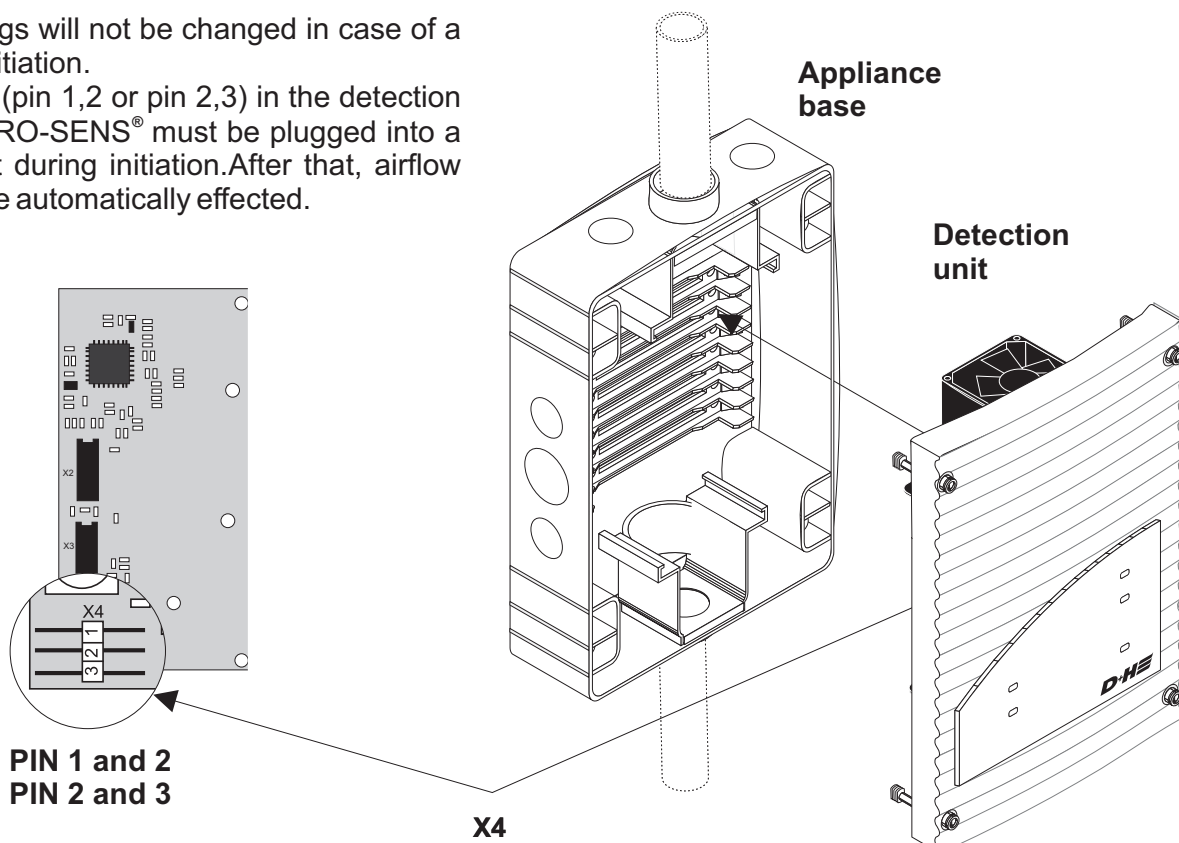
Put suction tube in tube connection at housing of LSC 44



## 5.15 Plug and Play-Initiation-Airflow-Alignment

Standard settings will not be changed in case of a plug and play initiation.

The jumper X4 (pin 1,2 or pin 2,3) in the detection unit of the MICRO-SENS® must be plugged into a different socket during initiation. After that, airflow alignment will be automatically effected.



During initialization of the TITANUS MICRO-SENS® the green operational indicator will be flashing. If the initialization is terminated, the operational indicator will change to steady burning light. The airflow of the TITANUS MICRO-SENS® shall not be influenced during the initialization process.

**Airflow initialization of the TITANUS MICRO-SENS® has been successfully terminated, if for a period of 2 minutes following condition is existing:**

- no lift is going
- temperature is varying by less than 0.1K
- airflow is not too strongly varying (temperature adjustment)
- ventilator voltage can be adjusted according to the regulations, ventilator and ventilator power pack are working normally.

**Airflow initialization will be immediately interrupted, if one of following faults will occur**

- measurement of temperature is faulty
- airflow measurement is faulty
- ventilator control faulty

Alarm detection will be fully operative during the learning process. During this period the operational indicator will flash and no airflow influences shall occur.

After termination of initialization, the operational indicator will change to steady burning light and the airflow detector has its set point determined for the connected tube system.

### Initiation with diagnosis tool

Presettings are changeable in case of initiation with a diagnosis tool. Then an airflow alignment can be carried out dependent or independent on air pressure.

Initialization of the airflow will be started by means of the diagnosis tool.

After the initiation is completed, a test record can be generated using the diagnosis tool.

The diagnosis tool is optionally available at D+H Mechatronic under the designation DIAG 3.

### Testing of TITANUS MICRO-SENS®

After successful conclusion of the initialization, the function can be tested by injecting smoke of a cigarette or a joss stick into the tube suction hole.

## 5.16 Central Module LSM 44

- Integrated LSC-module for user specific modifications
- function selection via DIP-switches with **pilot indicators**
- all required connecting terminals are **centrally on this module**
- ventilation operation selectable via ventilation button or external contacts of BMS.
- integrated functional and theft monitoring of the smoke detector on the main evacuating level.

**In case of alarm, the lift control will be selected by means of a floating contacts in neutral position. These contacts have following functions**

- alarm evaluation lift shaft
- floating contact in neutral position for fault message
- alarm evaluation smoke detector evacuating level.

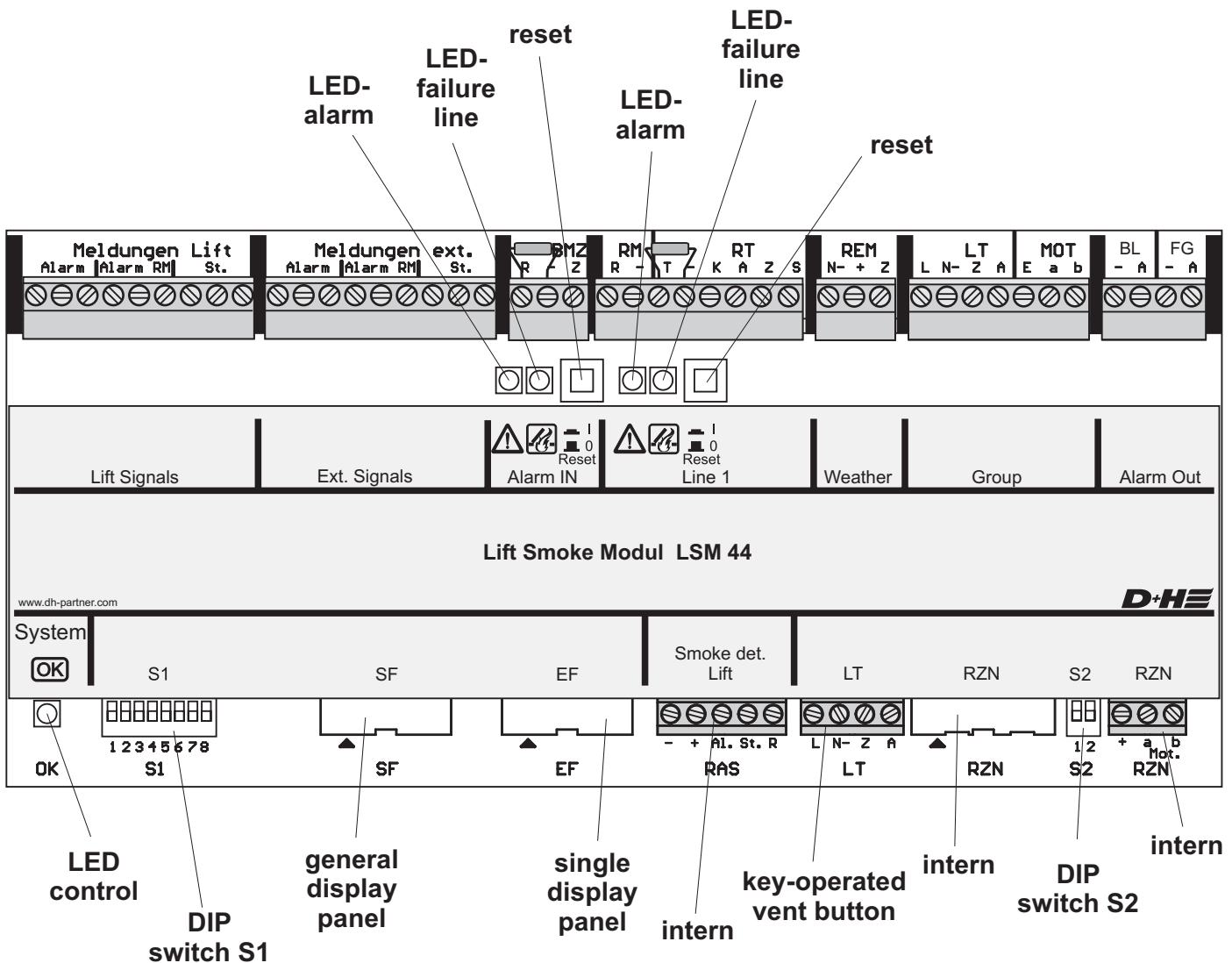
**Furthermore, following functions are available**

- timer for emergency supply time of the
- **RAS-Sytem** (0 3 6 72 hours)
- timer for siren alarm
- **flap will open automatically in case of power failure**
- flap will be closed as soon as **supply voltage is available again.**

**Optional Connection Components**

- rain detector
- thermostat
- timer
- external indicating / control panels
- optical and acoustical alarm
- extension of emergency supply time up to max. 72 hours possible on request

## 5.17 View motherboard LSM 44



## 5.18 DIP Switch S1

**DIP Switch 1 on ON** = Alarm smoke detector on first evacuating level will release SHEV-alarm  
**DIP Switch 1 on OFF** = Alarm smoke detector on first evacuating level will be only indicated as floating in neutral position

**DIP Switch 2 on ON** = Alarm smoke detector on first evacuating level will be indicated on low tension side for acoustic alarm devices.  
**DIP Switch 2 on OFF** = will not be indicated

**DIP Switch 3 on ON** = SHEV-alarm will be indicated on low tension side for acoustic alarm devices  
**DIP Switch 3 on OFF** = will not be indicated

**DIP Switch 4 and 5** = Setting of duration for acoustic alarm

4	5	time
OFF	OFF	30 seconds
ON	OFF	1 minute
OFF	ON	2 minutes
ON	ON	3 minutes

**DIP Switch 6 and 7** = The RAS-system will be after a power failure duration of

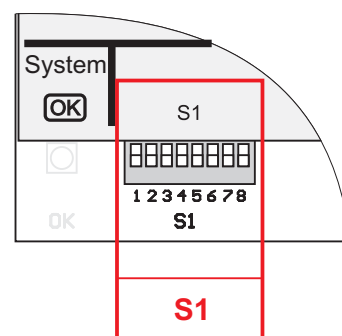
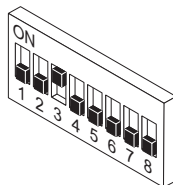
6	7	time
OFF	OFF	1 minute
ON	OFF	3 hours
OFF	ON	6 hours
ON	ON	72 hours

optional on request

Emergency power supplied via build-in accumulators

**DIP Switch 8** = not connected

**Delivery state**

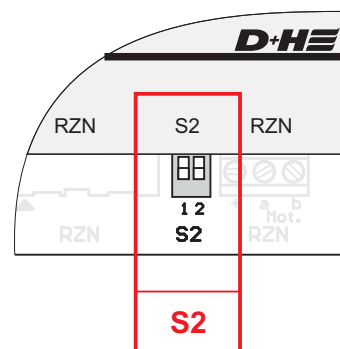


## 5.19 DIP Switch S2

**DIP Switch 1 on ON** = Flap will be opened, if no power supply available (power failure)

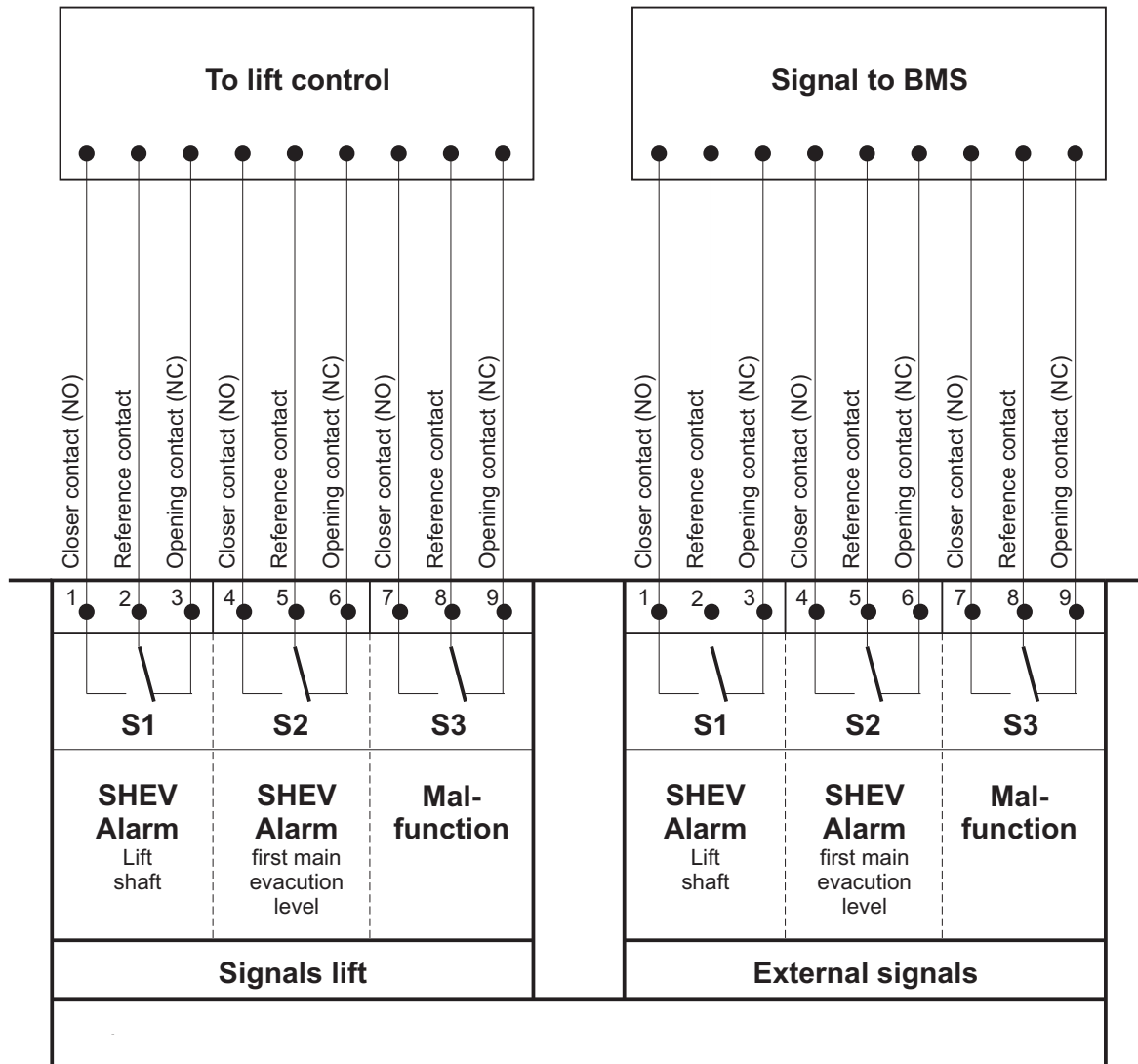
**DIP Switch 2 on ON** = Flap will be closed as soon as power supply is available again

**Delivery state**





## 5.20 Connection Signalling Lift / External Signals



### Floating contacts in neutral position

With floating contacts in neutral position for

- **malfunction**
- **SHEV- alarm lift shaft**
- **SHEV-alarm first main evacuation level**

the total informations of the central device can be passed on to lift control.

#### SHEV-Alarm

With release through SHEV-buttons, smoke suction system in lift shaft or through floating contacts in neutral position.

#### SHEV-Alarm (main evacuation level)

With release through smoke detector on main evacuation level

#### Malfunction

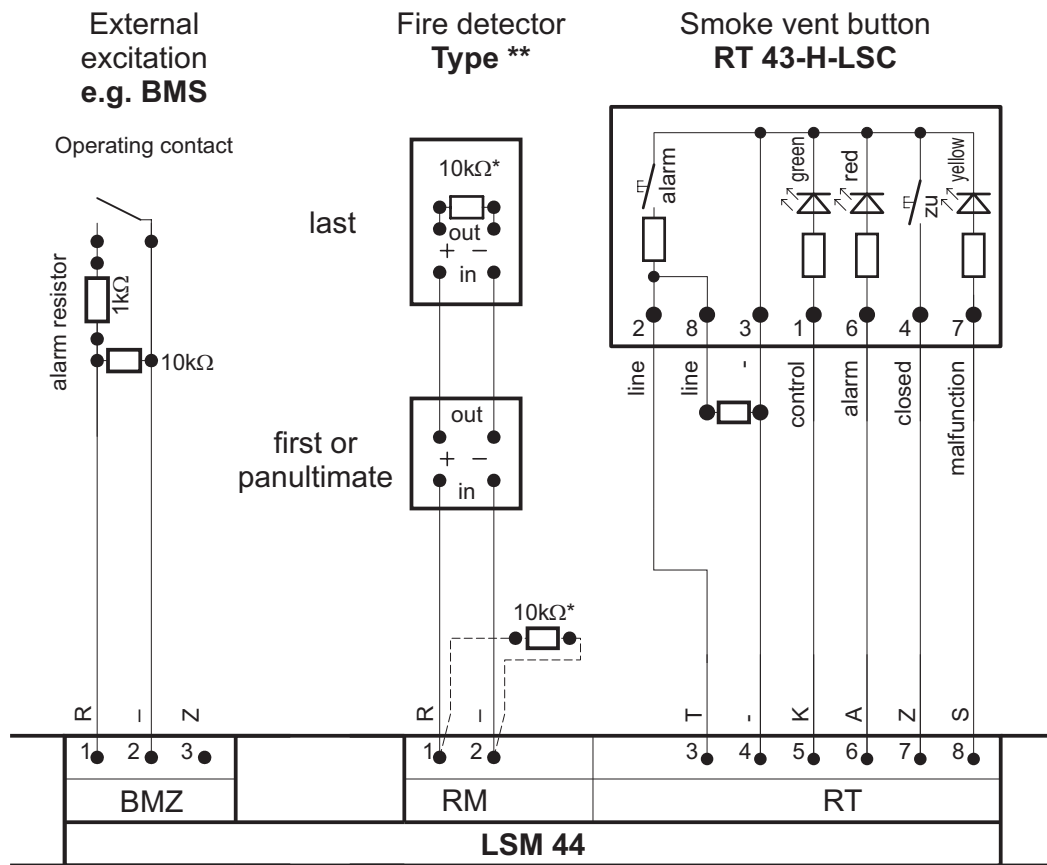
With release through short to ground, interruption of motor- or battery circuit as well as interruption or short circuit of the SHEV-button, smoke detector circuits or of the automatic smoke suction system.

The floating contact can be loaded with each 1A/ 60 VDC.

## 5.21 Connection BMS/ RM/ RT

SHEV-alarm can be released via floating contact in neutral position of a BMS.

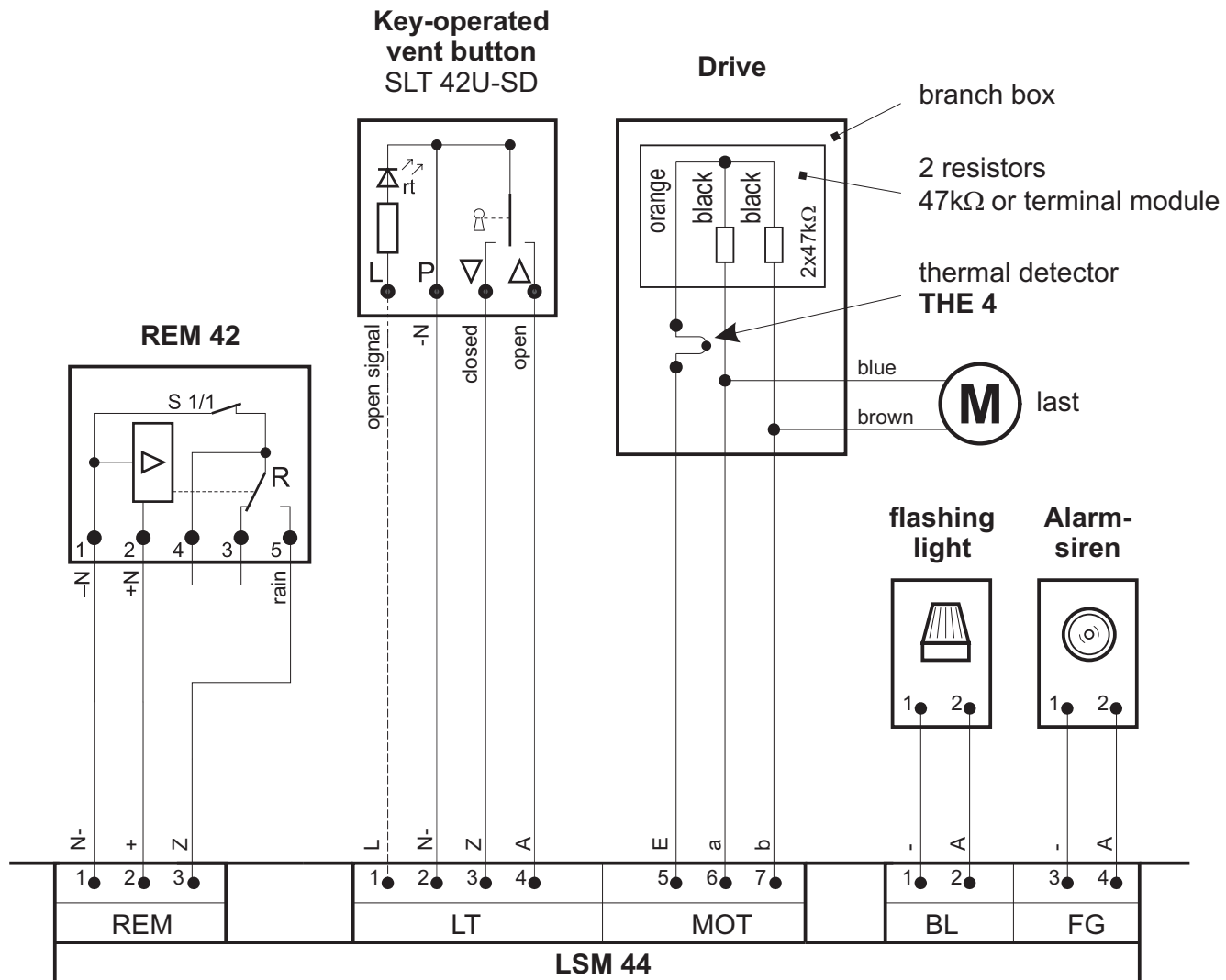
Possibility of ventilation will be automatically closed in case of SHEV-alarm.



**\* Terminal resistors for line monitoring:**  
They are pinched in control panel for transport. Take it off there and connect according to plan. Terminal resistors must remain at binder RM 1,2, when no fire detector or external control exists.

**\*\* Fire detectors**  
Only D+H system approved detectors must be used

## 5.22 Connection REM/ LT/ MOT/ BZ/ BL



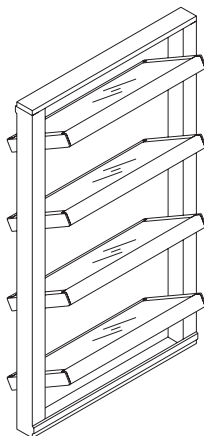
## 6.0 Smoke Vent Device / Connecting Elements

Safe and reliable opening of the smoke vent elements in the top end of the lift shaft is of central significance in case of fire. The well tried D+H SHEV-drives, triggered from the LSC-system will

ensure reliable opening of domelights respectively louvre windows. Different operational elements and detectors are available for release and operation of the LSC-system.

### 6.1 Louvre Drive

Louvre windows with the electric motor driven drive serve for carrying-off of conflagration gases and for ventilation purposes. They are made of heat separated aluminium profiles with insulating glazing. Through this, a good heat insulation will be achieved in closed condition. The louvres will close flush with the frame outside.



Open geometric ventilation area:  
of approx. 0,1m<sup>2</sup> or 0,3m<sup>2</sup>  
insulating glazing with a thickness  
of maximum 24mm.

Heat protection glass ex works:  
UV test certificate = 1,1W/qmk, UV BAZ = 1,2  
W/qmk, Ug rated value = 1,2 W/qmk

Surface:  
fittings and frames Alu E6 EV-1

Element overall size (w x h):  
600 x 300mm or 600 x 752mm  
Different sizes, colours and  
designs possible on request.

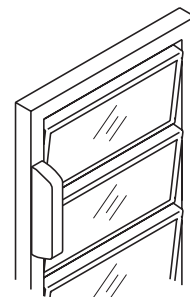
#### Mounting Frame

Delivery of a louvre window is always carried out with pre-assembled mounting frame. The louvre window will be pushed into an existing shell opening inside.

The frame is made of aluminium-L profiles. The rest flange width is wraparound approx. 46mm. Flange fastening holes must be drilled by self.

#### Louvre Drive

The louvre window will be opened and closed by a 24V drive with integrated electronic limit stop.

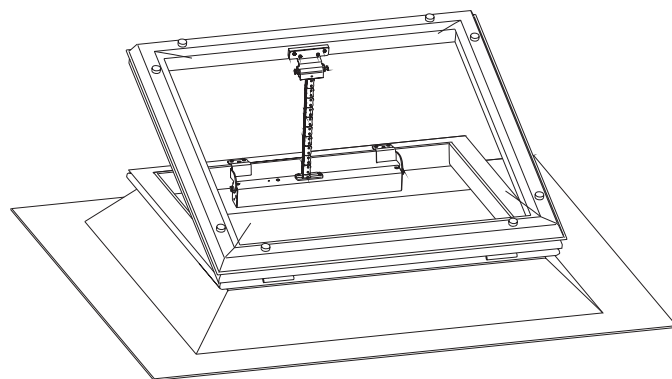


### 6.2 Domelight

The domelight with electric motor driven drive serves for carrying off of conflagration gases and for ventilation purposes.

It has a rated quantity of 900x600mm and a PVC-upstand of 15-30cm height for a connection appropriate for the material involved to the roof area.

The domelight consists of double pane opaline acrylic glass. It represents an open geometric vent area of approx. 0.3 m<sup>2</sup>.



#### Chain drive

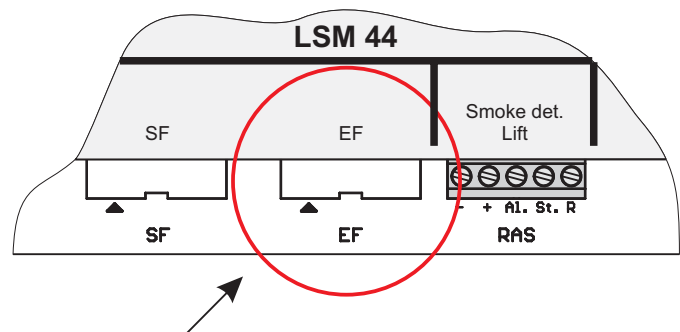
Type KA 32, 500 mm opening width, 24VDC with integrated limit stop, with VdS-approval.

## 6.3 Informations for Mounting of Louvre/ Domelight

- Domelight or louvre must be handled by trained specialists from the roofer- and window building trade.
- Mechanic installers must show their qualification according to the guideline of the German employer's liability insurance association in the field of power operated windows, doors and gates.
- They must be familiar with the relevant working regulations, rules for prevention of accidents and generally recognized rules of technique (e.g. VDE-rules, DIN-standards, etc.), so that the operating safety of the system will be ensured.
- Louvre windows must be always vertically installed. No mechanical stress must be exercised on the louvres by mounting.
- Alterations or repairs on the system must be only carried-out by the manufacturer. Alterations of the system, taken on one's own, are **forbidden**.  
The manufacturer will be not liable for damages, which result from changes not authorized.  
**The warranty will extinguish.**
- Highly electromagnetic fields are to be avoided in proximity of the smoke vent device.
- The smoke vent device must not be subject to shocks, concussions or vibrations.
- Furthermore, the smoke vent device must be protected against humidity like weather. This is especially important during bedding at building site and during installation!

## 6.4 Display Panel EF 43-LSC

The indication display is mounted on the door of the control panel. Here the user will get all important informations at a glance (e.g. in-house electrician, caretaker and the like).



### Connection

Via flat cable directly into the contact point EF of the module LSM 44



## 6.5 Key-operated vent button SLT 42

The key-operated vent button serve to manually open and close a ventilation group.

### SLT 42A-SD

- key-operated vent button in surface moistureproof design for profile semicylinder
- with integrated LED-visual display OPEN
- profile semicylinder not included in extent of supply



Functions : OPEN - CLOSED  
(storage operation) via  
key-operated single-pole  
change-over contact

Protective system : IP 54

Colour : light grey

### Control-LED-Display in Ventilation Button

This LED will lighten, if the drive will be run OPEN in ventilation operation. It will extinguish again, if the drive is in closed position.

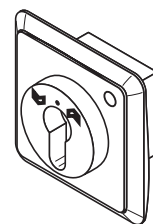
### Ventilation Excitation by Others

The vent button can be alternatively activated as well via floating contact in neutral position of another control system like e.g. a Building Management System (BMS).

Contact configuration to external ventilation excitation via e.g. BMS/MSR by others. A timer can be connected as well to this contact for automatic ventilation function.

### SLT 42U-SD

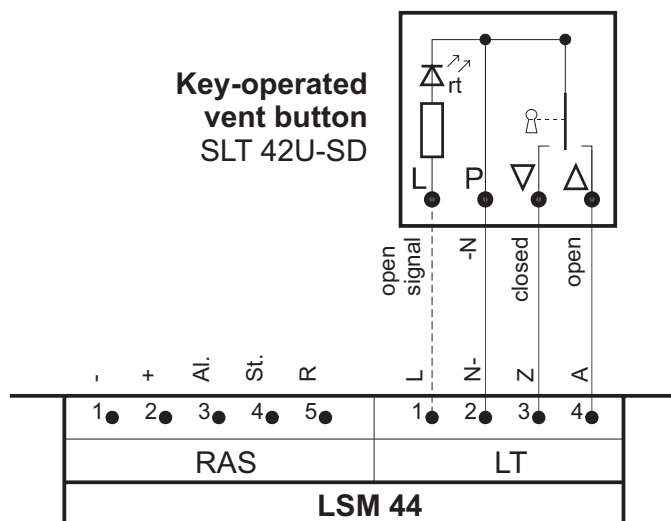
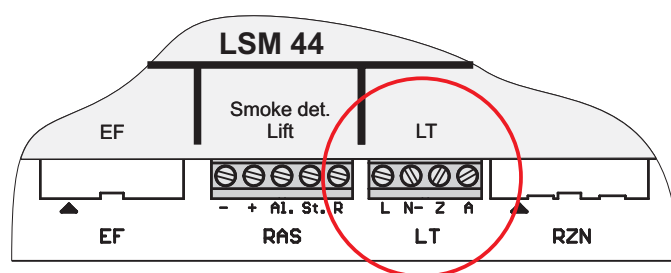
- key-operated vent button in flush mounted design
- with integrated LED-visual display OPEN
- mounted in recessed 55mm flush socket, flush socket and semicylinder not included in extent of supply



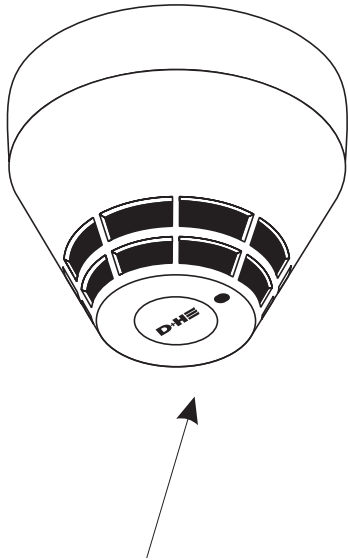
Functions : OPEN - CLOSED  
(storage operation) via  
key-operated single-pole  
change-over contact

Colour : white

### Connection



## 6.6 Fire detector FO 1362



If this LED lightens, release has been taken place through **this** automatic detector.  
Release will be reset via "Closed-Reset"-button in a SHEV-button.

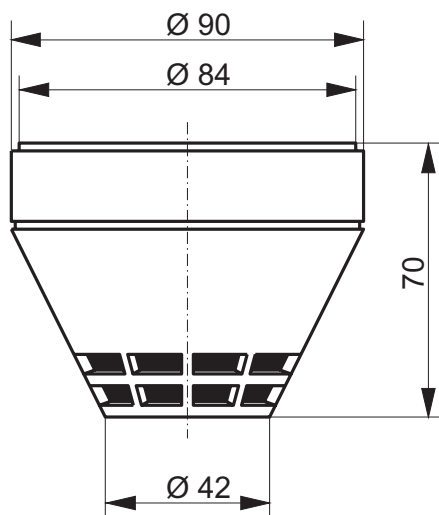
The detector consists of the base with the connections and the detector upper part with evaluation unit. Detector base and upper part are connected via a bajonet catch (a quarter turning).

The smoke detector must be horizontally placed at the highest point underneath the ceiling in proximity of the landing entrance on the first main evacuation level.

**See also instruction for use of FO 1362**

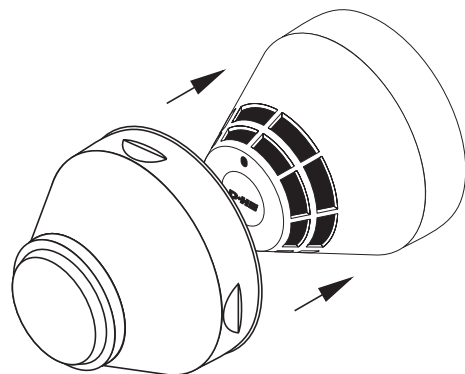
### Technical Data

Operating voltage	: 8 V - 28 VDC
Rest current	: <55µA
Alarm current	: 9.2mA ±1 mA
Alarm display	: LED rot
Storing temperature	: -25 to +75 °C
Working temperature	: -20 to +72 °C
Protective system	: IP40 (with PG-basel IP42)
Housing	: ABS synthetic, white
Technical design	: EN 54, part 7
VdS approval	: G29226 (O-1362)



### Mounting

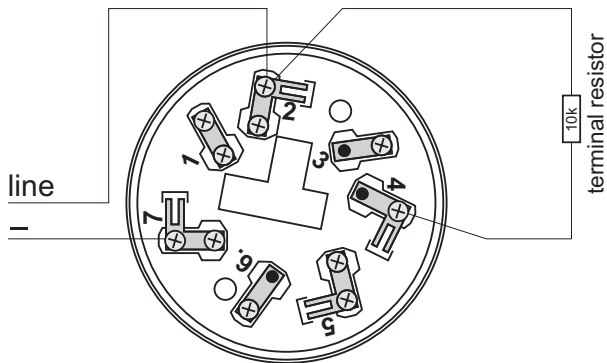
- Fasten detector with 2 screws
- Close cable bushings, which are not used
- A protective cap is available for avoiding dirt accumulation during construction (*see figure*)



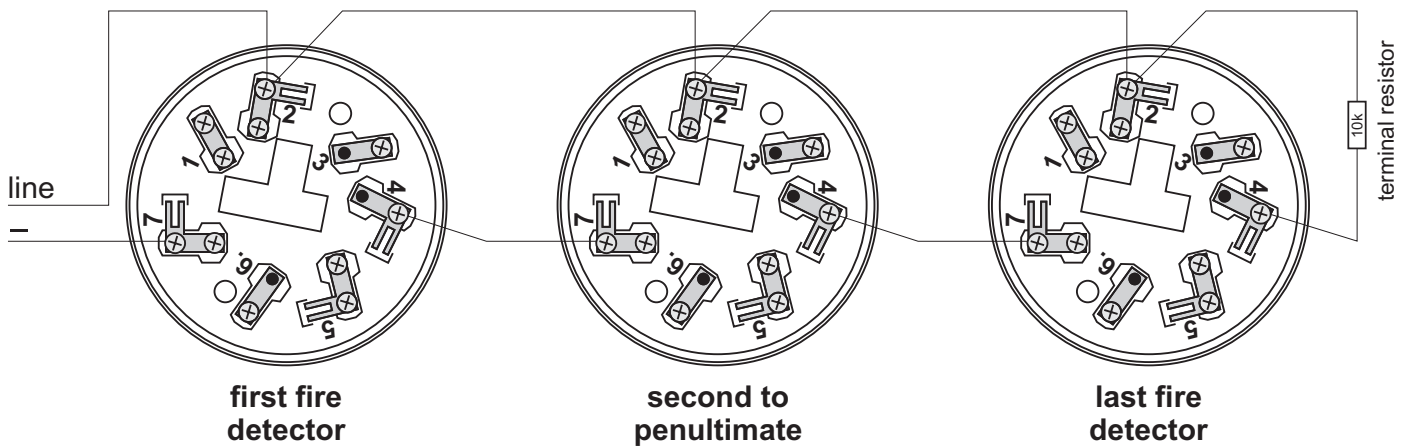


## 6.6 Fire detector FO 1362

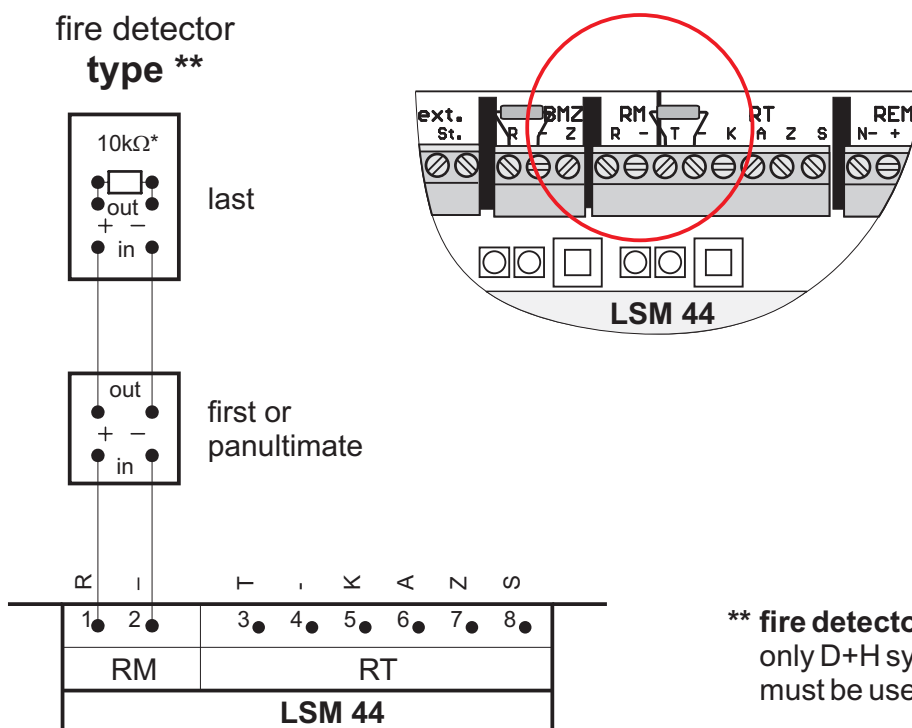
### Connection of one fire detector



### Connection of several fire detectors

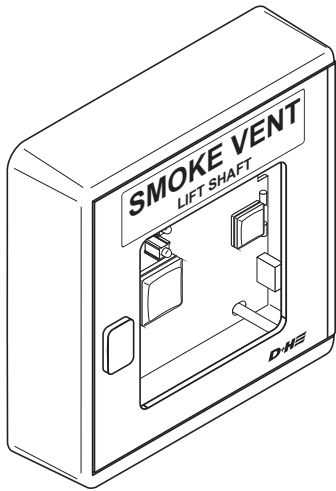


### Connection to Control Panel



**\*\* fire detectors**  
only D+H system approved detectors  
must be used

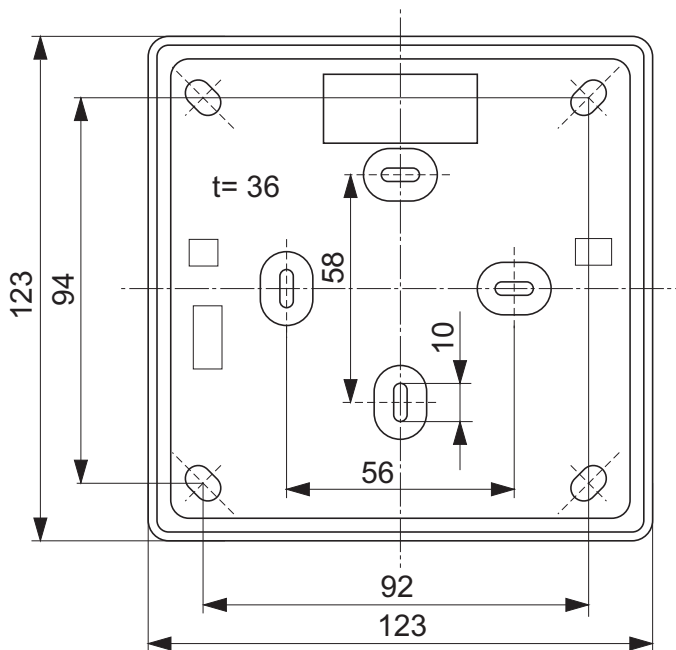
## 6.7 Smoke vent button RT 43-H-LSC



### Technical Data

Voltage : 24V ±4V  
 Alarm circuit : 20 mA  
 Temperature range : -5°C to +40°C

### Mounting



### Mounting height

1.5m above upper edge of flooring.

### Fastening

With plug screws 4,5x40mm diagonal or direct on 55mm flush socket with 2 screws.

### Housing colour

Standard:  
 deep orange (RAL 2011) according to VdS 2592.  
 However, locally variant, other colours can be demanded.  
 Please consult your D+H partner.

46/48 LSC 44-M4 **D+H**

### Application

green OK	red 	yellow * 	meaning
	—	—	system is operable
		—	alarm
— **	—		malfunction



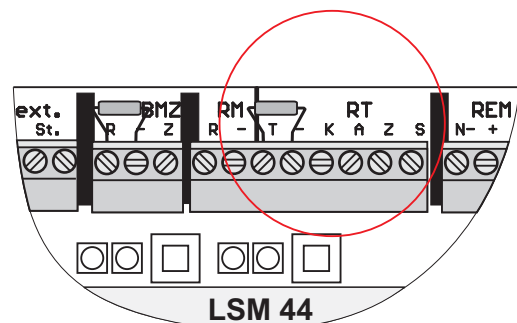
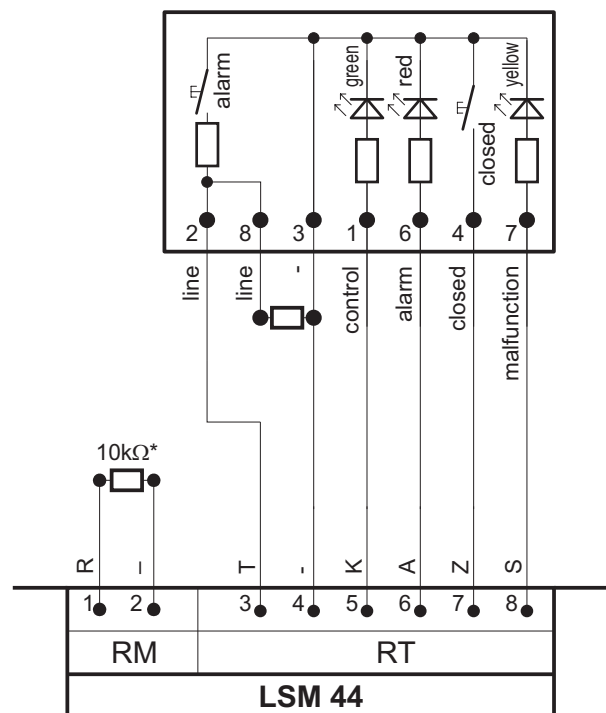
LED  
flashes



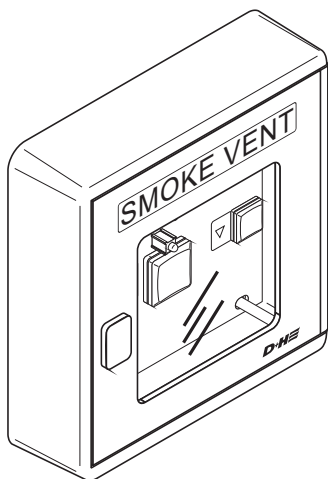
LED  
lightens

### Connection

Smoke vent button  
RT 43-H-LSC



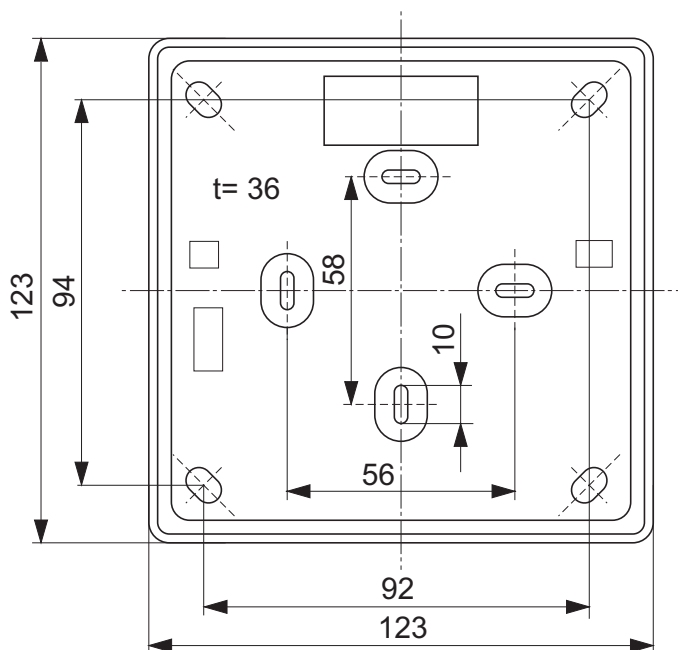
## 6.8 Smoke vent button RT 43-H-LSC



### Technical Data

Voltage : 24V ±4V  
 Alarm circuit : 20 mA  
 Temperature range : -5°C to +40°C

### Mounting



### Mounting height

1.5m above upper edge of flooring.

### Fastening

With plug screws 4,5x40mm diagonal or direct on 55mm flush socket with 2 screws.

### Housing colour

Standard:  
 deep orange (RAL 2011) according to VdS 2592.  
 However, locally variant, other colours can be demanded.  
 Please consult your D+H partner.

### Application

green OK	red !	yellow *	meaning
	—	—	system is operable
		—	alarm
— **	—		malfunction

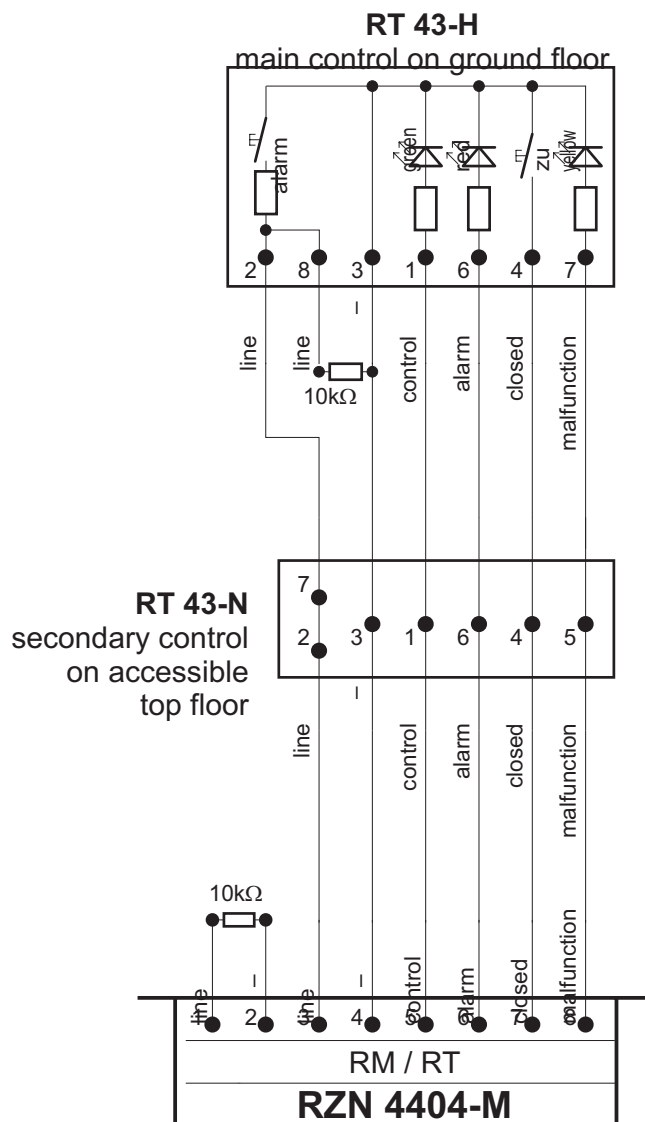


LED  
flashes

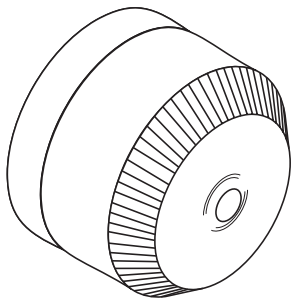


LED  
lightens

### Connection

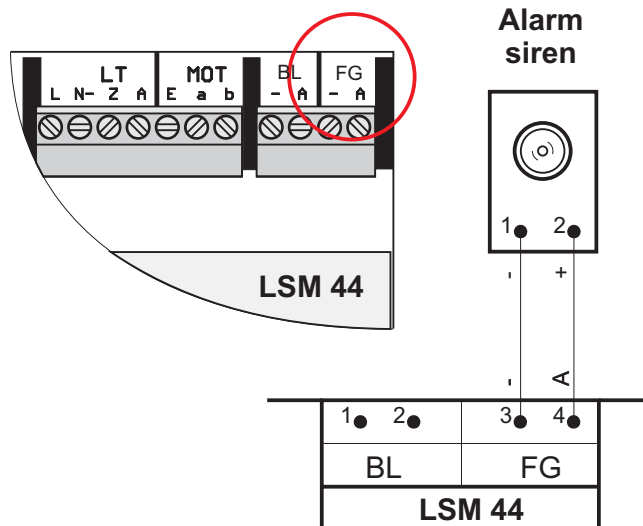


## 6.9 Alarm Siren B/SE 24

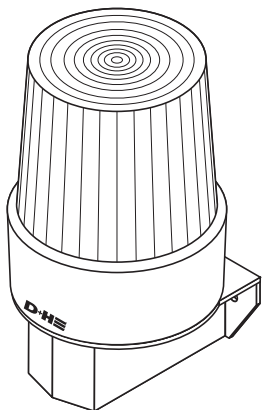


### Technical Data

Power supply : 10-28V/ 0,03A  
 Loudness : 80-116dB, adjustable  
 Dimensions : ø 92mm, height 75mm  
 Protective system : IP 54  
 Colour : red



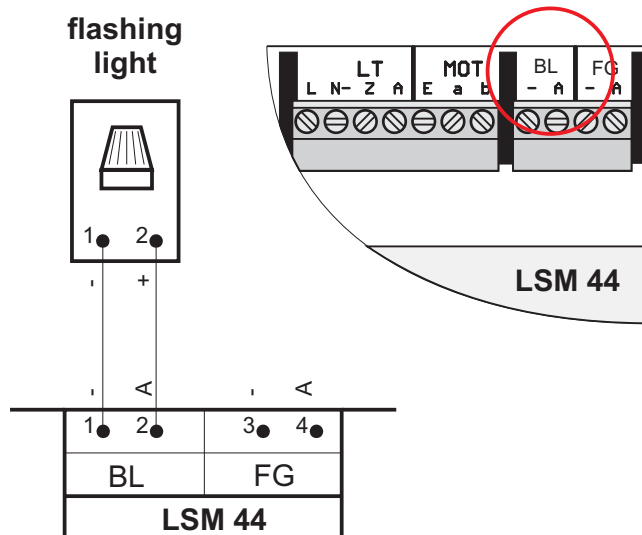
## 6.10 Flashing light BL 41



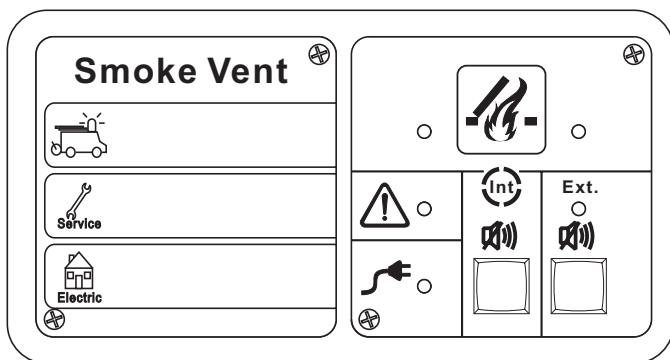
- grey with orange dome
- suitable for outside mounting

### Technical Data

Power supply : 24V/ 0,25A



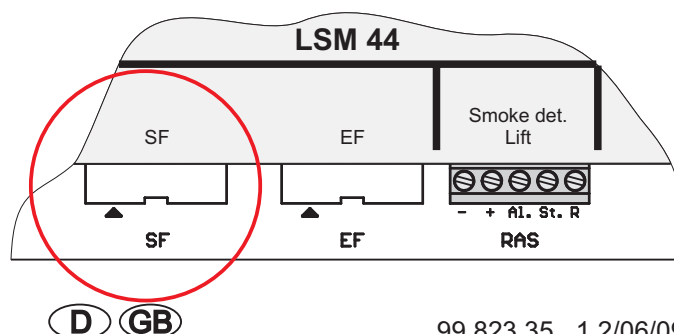
## 6.11 General display panel SF 43



- Display panel for optical and acoustical indication of general alarm and general fault.
- Optical indication of power failure
- Type SF 43-AZ with cut off button for external alarm devices.

### Connection

Via flat cable directly into contact point SF of the module LSM 44





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