WSC 4XX

SHE control panel

Operating manual / Technical information

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Attention!
Adherence to the following information is mandatory:

Only allow correspondingly trained, qualified and skilled personnel to carry out installation work.

Reliable operation and the avoidance of damage and hazards is only guaranteed if installation and settings are carried out carefully in accordance with these instructions.

Check the technical data on the system plate.

Hazards to persons ensuing from flaps and wings operated by electric motors.

The forces occurring in the automatic mode can be such that parts of the body could get crushed. When opened, actuators could protrude into the room.
For this reason, measures have to be taken prior to starting up the actuators which exclude the danger of injury.

With wings tilting inwards or outwards, the wing must be protected from hinging down once the actuator is unhooked (e.g. for window cleaning). For safety reasons we recommend the use of catching shears.

In the event that wings or flaps are subjected to high wind loads, we recommend to connect the central control unit to a wind detector which will automatically close the flaps.

The fastening methods are exclusively intended for the intended use for which they are designed The manufacturer does not assume any liability for possible damage resulting from inappropriate use.

230V AC dangerous voltage
Can cause death, severe injury or considerable damage to assets.
The connection of the control system is reserved for qualified personnel.
Disconnect all poles of the unit from the supply voltage prior to opening, installation or assembling. Adhere to the VDE regulations.

Field of application
The central control system is exclusively designed for the automatic closing of smoke extraction systems, windows, flaps or doors.
Always check that your system meets the valid regulations.
Pay particular attention to the opening cross section, the opening time and opening speed. The cable cross sections depend on the cable length and current consumption (amperage).

Maintenance work
Where devices are used in smoke and heat extraction systems, ensure that they are checked, maintained and, if necessary, repaired at least once per year.
Remove all soiling from the devices,
check the fastening and clamping screws for firm seating. Trial run the entire system.
Defective devices may only be repaired in our factory.
Only use original spare parts.
The supplied accumulators are subject to regular checks and must be replaced every 4 years.

Cable routing and electrical connection
Fuse the 230V AC power supply cable separately on site. **Leave the insulation of the power supply cable in place up to the mains terminal.**
Adhere to the DIN and VDE regulations (Germany) or equivalent in your country.
Establish the cable types, if necessary, with the local approval bodies or the fire protection authority.
Do not conceal flexible cables. Junction box must be accessible for maintenance purposes.
Disconnect all poles of the mains voltage and the accumulators prior to starting maintenance work or making changes to the system.
Secure the system to prevent unintentional switching on again.
Design cable types, lengths and cross sections in accordance with the technical information.
Route all low voltage cables (24V DC) separate from the power current cables.

Manufacturer's declaration
The devices have been inspected and manufactured in accordance with the European directives.
A corresponding manufacturer's declaration is available.
You are only authorised to use the devices if a conformity declaration is issued for the entire system.

Assembly instructions, installation

Always have assembly, installation, repair and maintenance of smoke and heat extraction systems carried out by qualified personnel trained for this purpose.

Rules to be adhered to for setting up and installation

The following safety relevant rules have to be adhered to when planning the use of a smoke and heat extraction system and its set-up and installation:

- The Provincial Building Ordinance of the provinces,
- the regulations of the competent fire protection authority,

Accident prevention regulations

Adhere to the general accident prevention regulations (APR), the APR for power operated windows and doors, and the installation rules in your country.

CAUTION:

Live components are directly accessible after opening the system housing. Isolate the system from the mains supply voltage and from the accumulator supply voltage prior to removing an assembly group.

- Adhere to the installation instructions and your local energy providers;
- Select the place of installation such that free access is guaranteed for maintenance purposes;
- Route the cables in the building according to the regulations outlined below;
- Take the calculation of the actuator supply cable lengths into account when laying the cables;
- Connect the cables in accordance with the drawings provided by the manufacturer;
- Charge the accumulators for approx. 8 hours when installed prior to starting up the system;
- Check all system functions.

Electric cable routing for smoke and heat extraction systems

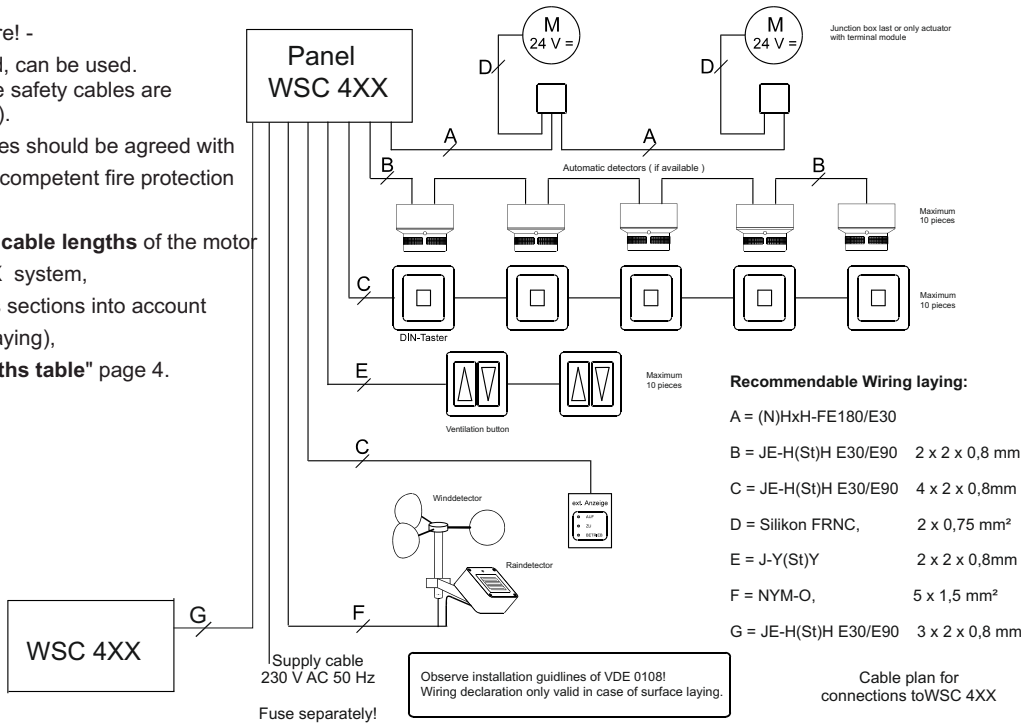
Electrical cables always have to be laid in accordance with the national and local rules in your country.

Do not use the green/yellow wire! -

Cables of type NYM, concealed, can be used. For surface laying, halogen free safety cables are recommended (see cable plan).

If possible, the use of cable types should be agreed with the Technical Services and the competent fire protection authority.

For the maximum **permissible cable lengths** of the motor supply cables for the WSC 4XX system, taking the specified cable cross sections into account (cable information for surface laying), please refer to the "**Cable lengths table**" page 4.



Recommendable Wiring laying:

A = (N)HxH-FE180/E30

B = JE-H(St)H E30/E90 2 x 2 x 0,8 mm

C = JE-H(St)H E30/E90 4 x 2 x 0,8mm

D = Silikon FRNC, 2 x 0,75 mm²

E = J-Y(St)Y 2 x 2 x 0,8mm

F = NYM-O, 5 x 1,5 mm²

G = JE-H(St)H E30/E90 3 x 2 x 0,8 mm

Cable plan for connections toWSC 4XX

Electrical cables for smoke and heat extraction (SHE) systems

All electrical cables must be routed in accordance with the individually valid VDE regulations.

Cable function retention
The current cable system directive (German LAR) is decisive for the cable quality and the corresponding type of routing.
The sample cable system directive (German MLAR) issued in March 2000 was published in each German province as the cable system directive (German LAR). These province regulations, in their individually latest versions, define the safety standards for electrical installations and represent, as such, the state of the art.
Function retention of the E30 classification is sufficient for natural smoke extraction systems. These cables have to be tested and must be approved in accordance with DIN 4102, Part 12. Cable routing has to be carried out according to the specifications of the cable manufacturers using the corresponding fastening materials. Function retention for SHE cables is not required if all cable paths are monitored by smoke detectors which, when tripped, cause the automatic detector to open the SHE system.

For function retention purposes, concealed routing does not represent an approved type of routing as suggested by DIN 4102, Part 12. Function retention is also only ensured by cables of the E30 classification, or if the room is monitored by smoke detectors.

The cable network for SHE systems (“cable system”) terminates at the interface (junction box) of the actuator! The flexible, heat resistant connection cable of the SHE actuator is part of the system component 'electric motor controlled actuator' and is not part of the electrical installation!

In all cases, we recommend to coordinate the type of cable routing with the competent fire protection authorities, even if the LARs are introduced as technical construction regulation in the provinces concerned.

Cable length table
For the maximum permissible cable lengths or the SHE centre unit in conjunction with the standard actuators, taking into account the specified line cross sections, please refer to the following table:

Maximum motor current per group module: 8 A (**Note**: Note the overall capacity/rating of the SHE centre unit!)

Maximum cable length: (always routed from the central control panel to the **last** junction box)
Actuating current: Sum of all motor currents per group module

Note: Do not use the PE wire / green/yellow wire!
Per motor supply line, 3 wires are required (2 wires current carrying /1 wire for monitoring)

Cross section	*3 wire 1.5 mm²*	*5 wire 1.5 mm²* 2 wires in parallel	*3 wire 2.5 mm²*	*5 wire 2.5 mm²* 2 wires in parallel	*3 wire 4 mm²*	*3 wire 6 mm²*
Actuator current in amps						
1	84.00m	168.00m	140.00m	280.00m	224.00m	336.00m
2	42,00m	84.00m	70,00m	140.00m	112.00m	168.00m
3	28.00m	56.00m	46,67m	93,33m	74,67m	112.00m
4	21,00m	42,00m	35,00m	70,00m	56.00m	84.00m
5	16,80m	33,60m	28,00m	56.00m	44,80m	67,20m
6	14,00m	28.00m	23,33m	46,67m	37,33m	56.00m
7	12.00m	24.00m	20,00m	40.00m	32.00m	48.00m
8	10,50m	21,00m	17,50m	35,00m	28.00m	42,00m

(The information is valid for ambient temperatures of 25°C)

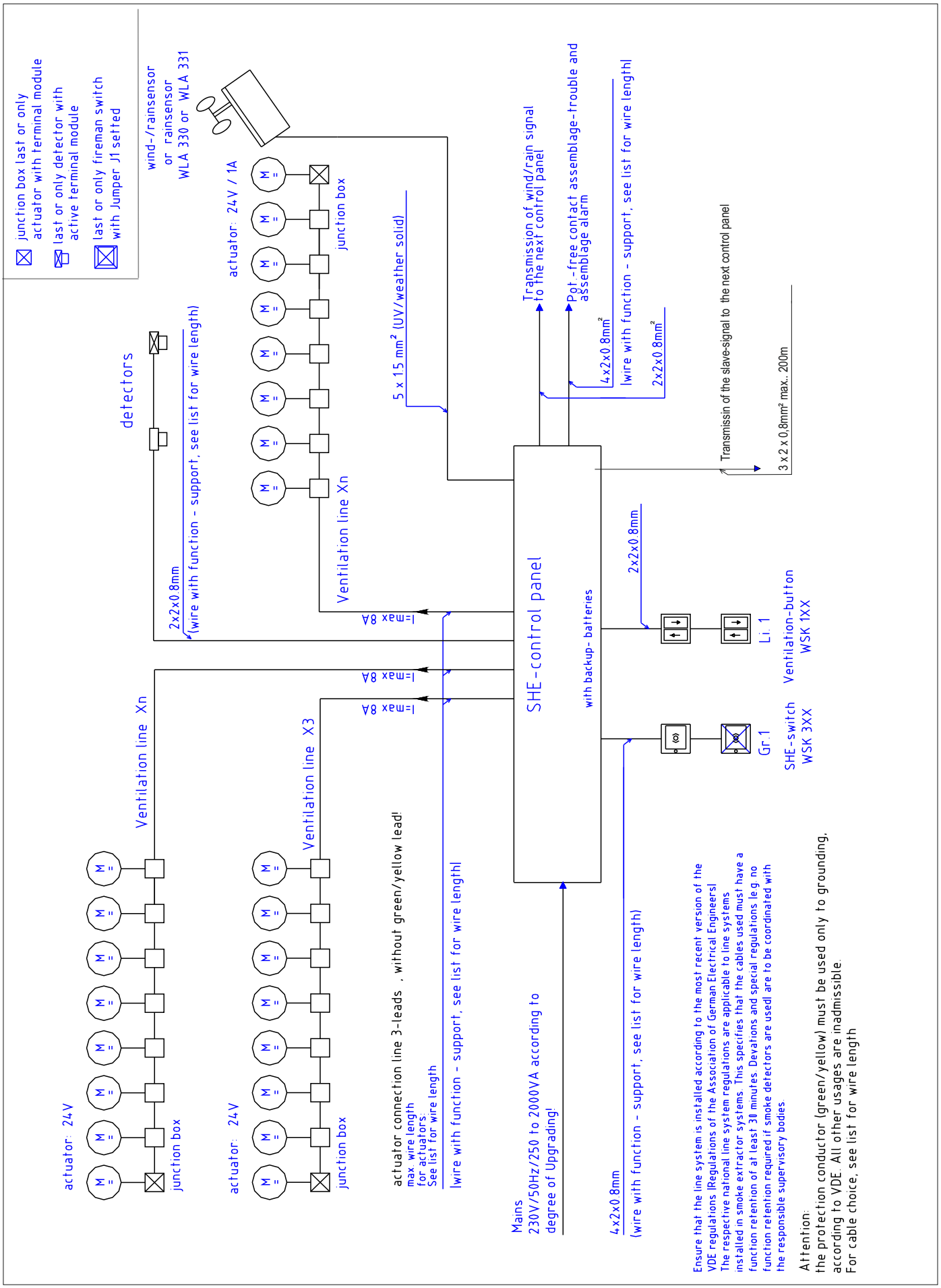
Formula for the calculation of the maximum cable length
Maximum permissible voltage drop in the cable UL: 2 Volt

$$\text{max. cable length} = \frac{\text{permissible voltage drop}(\mathbf{UL}) \times \text{conductivity of copper}(\mathbf{56}) \times \text{cable cross section}(\mathbf{a})}{\text{max. actuator current total }(\mathbf{I})\text{ in amps } \mathbf{x\ 2}}$$

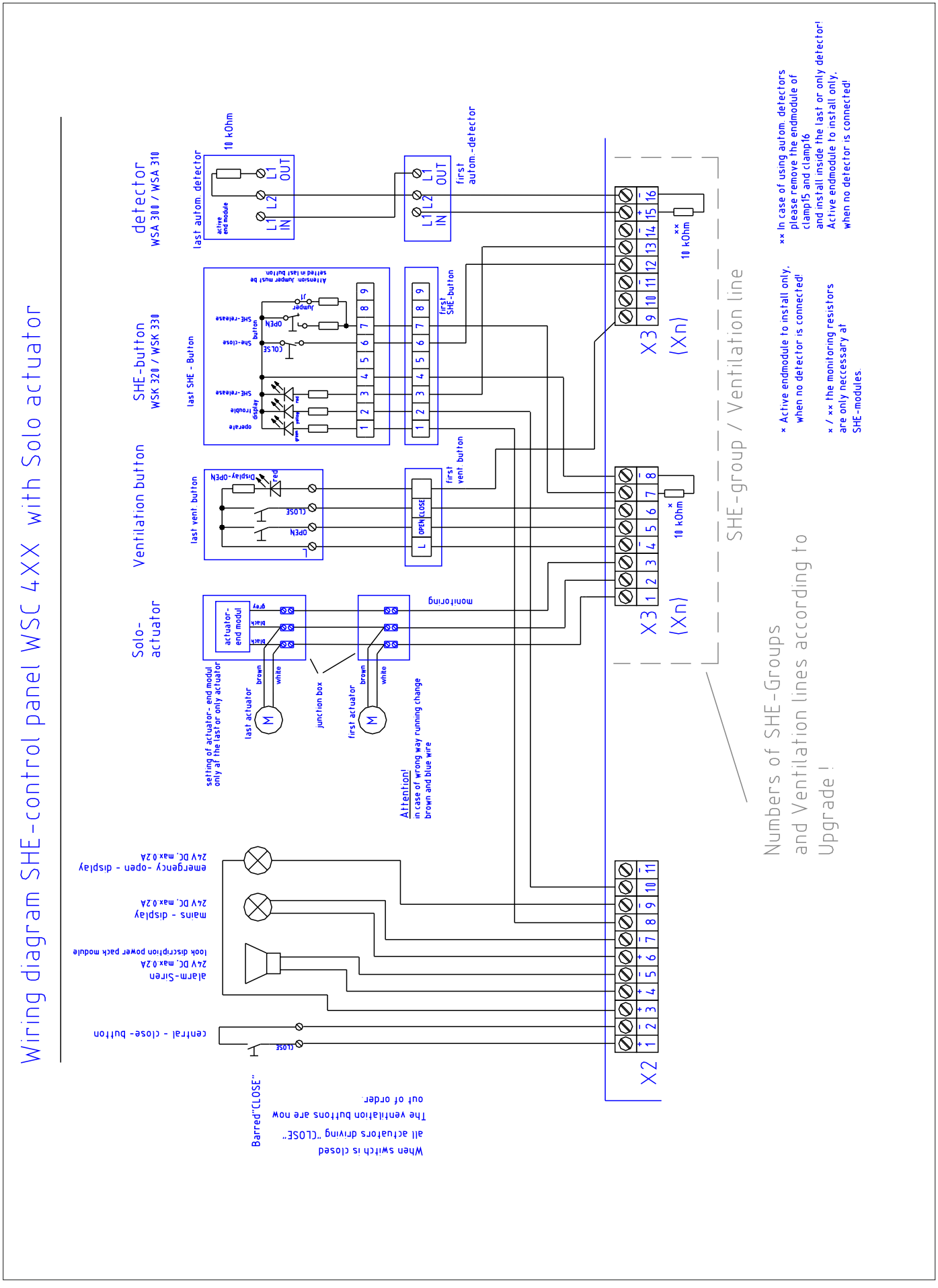
Permissible cable length for the SHE system button supply cable when using 4x2x0.8mm **up to 200m**

The motor connection cable length to the junction box (or control module) must not exceed **10 m**.

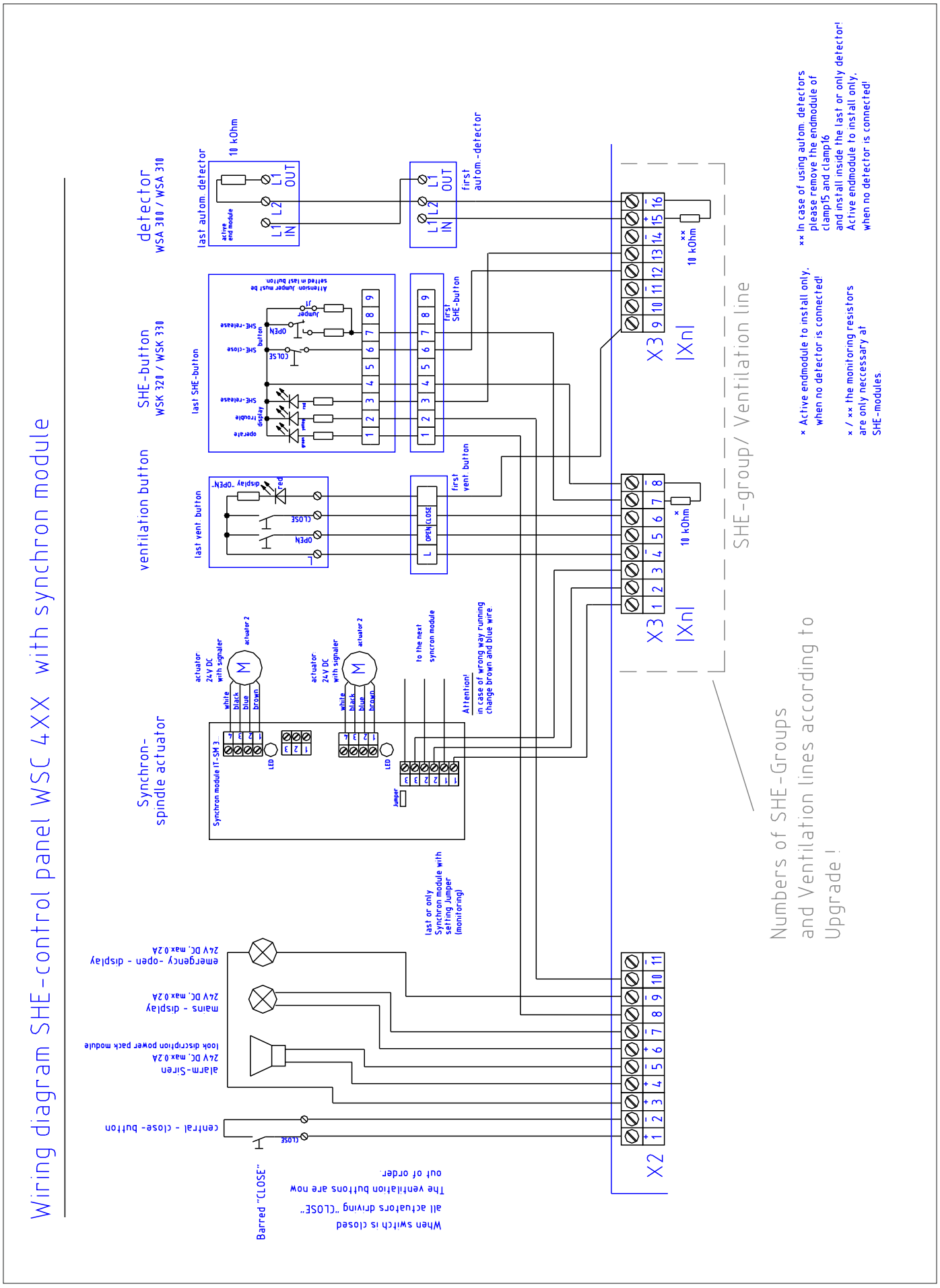
Cable plan WSC 4XX



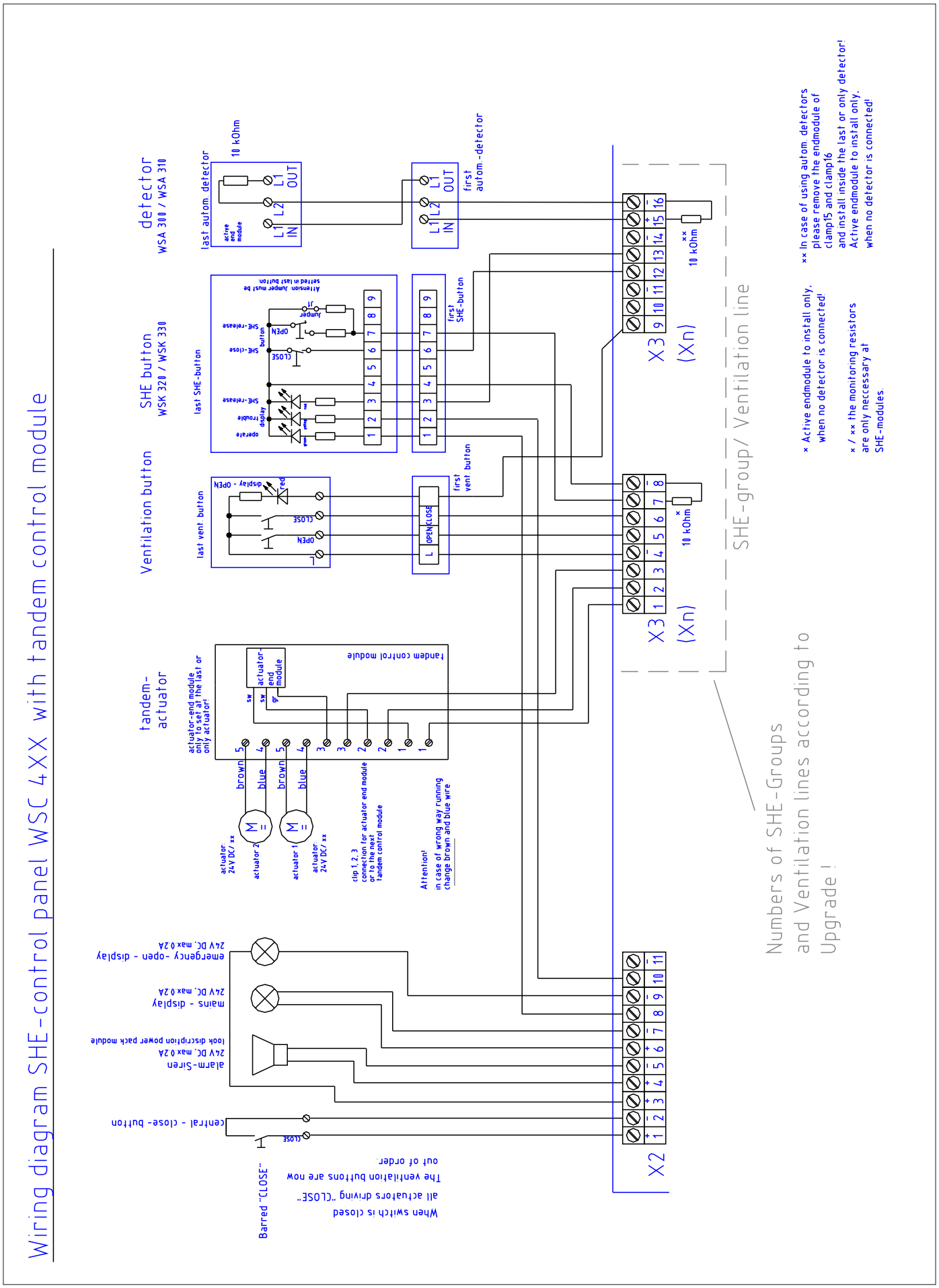
Wiring diagram WSC 4XXwith Solo actuator



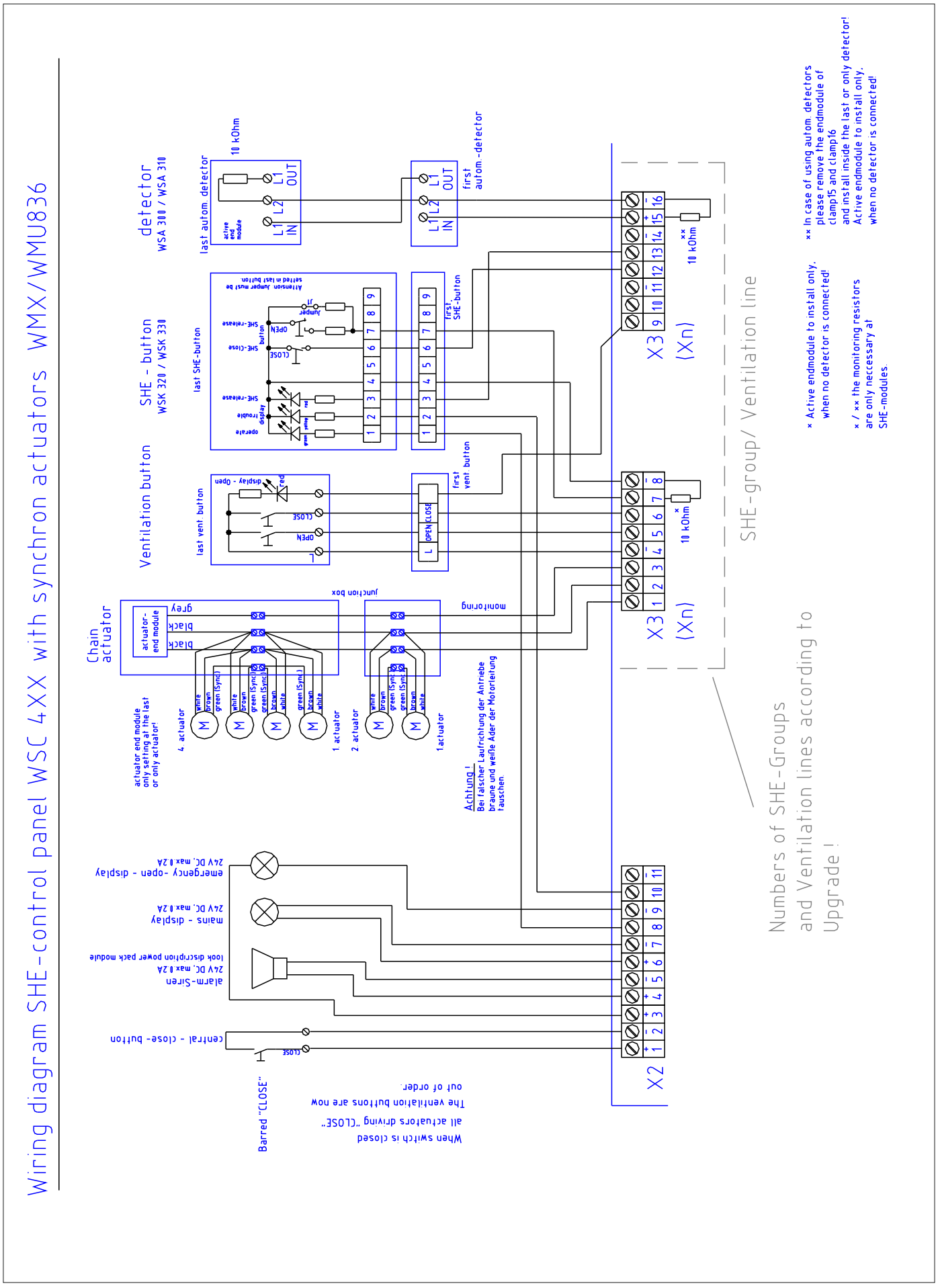
Wiring diagram WSC 4XX with Synchron module



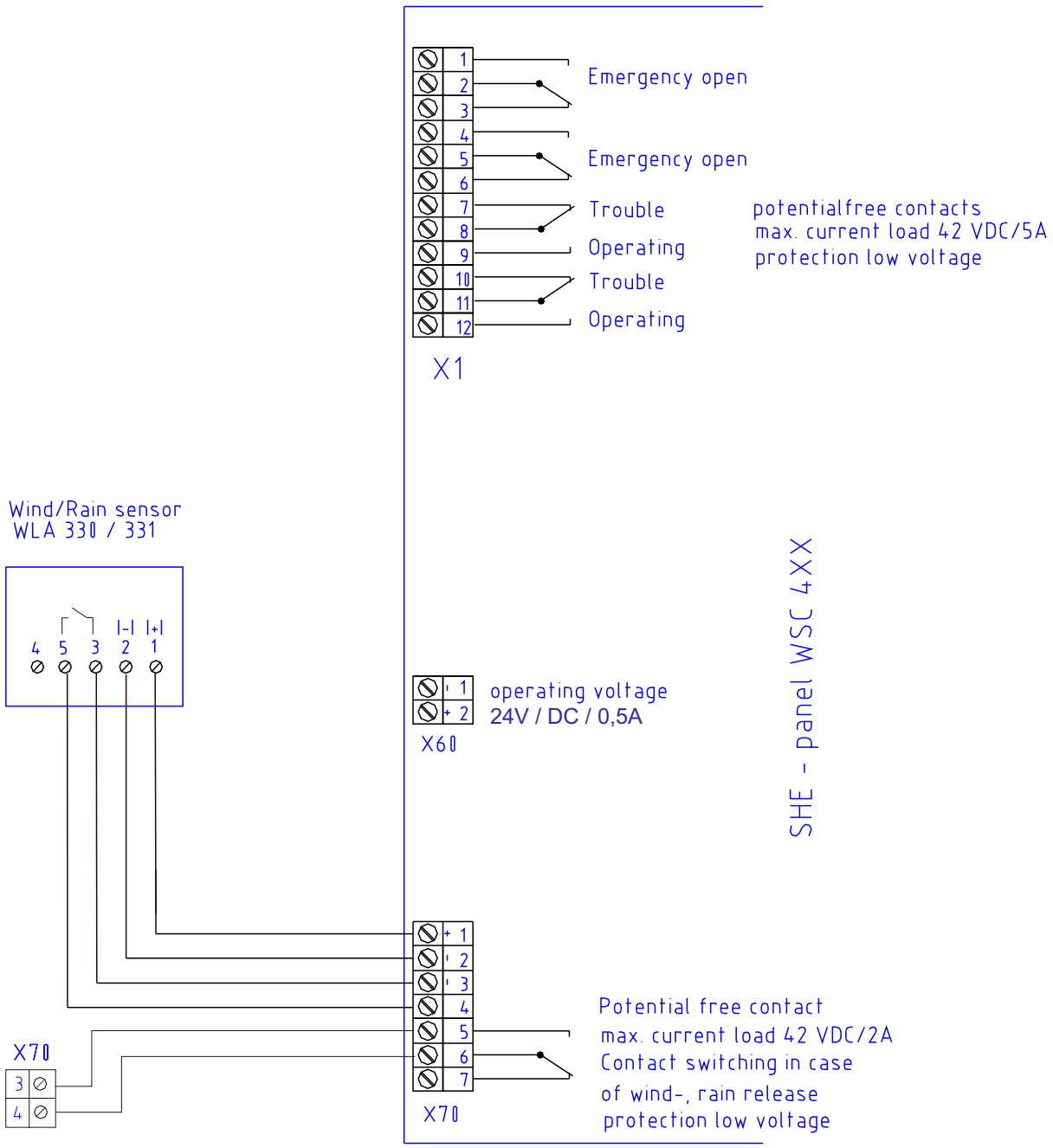
Wiring diagram WSC 4XX with tandem control module



Wiring diagram WSC 4XX WMX / WMU

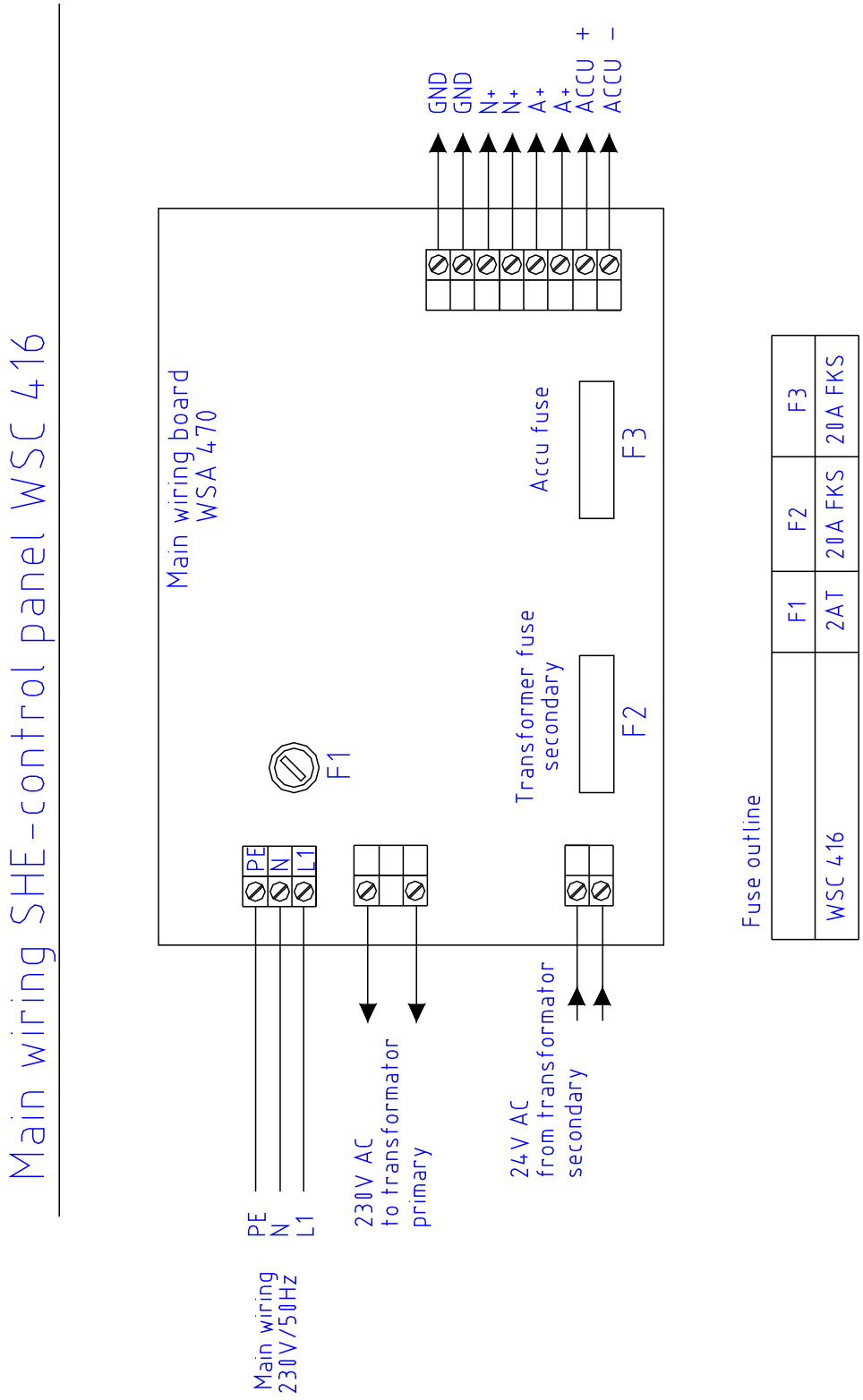


Wiring diagram SHE - panel WSC 4XX
wind/rain sensor and potentialfree contact / signals

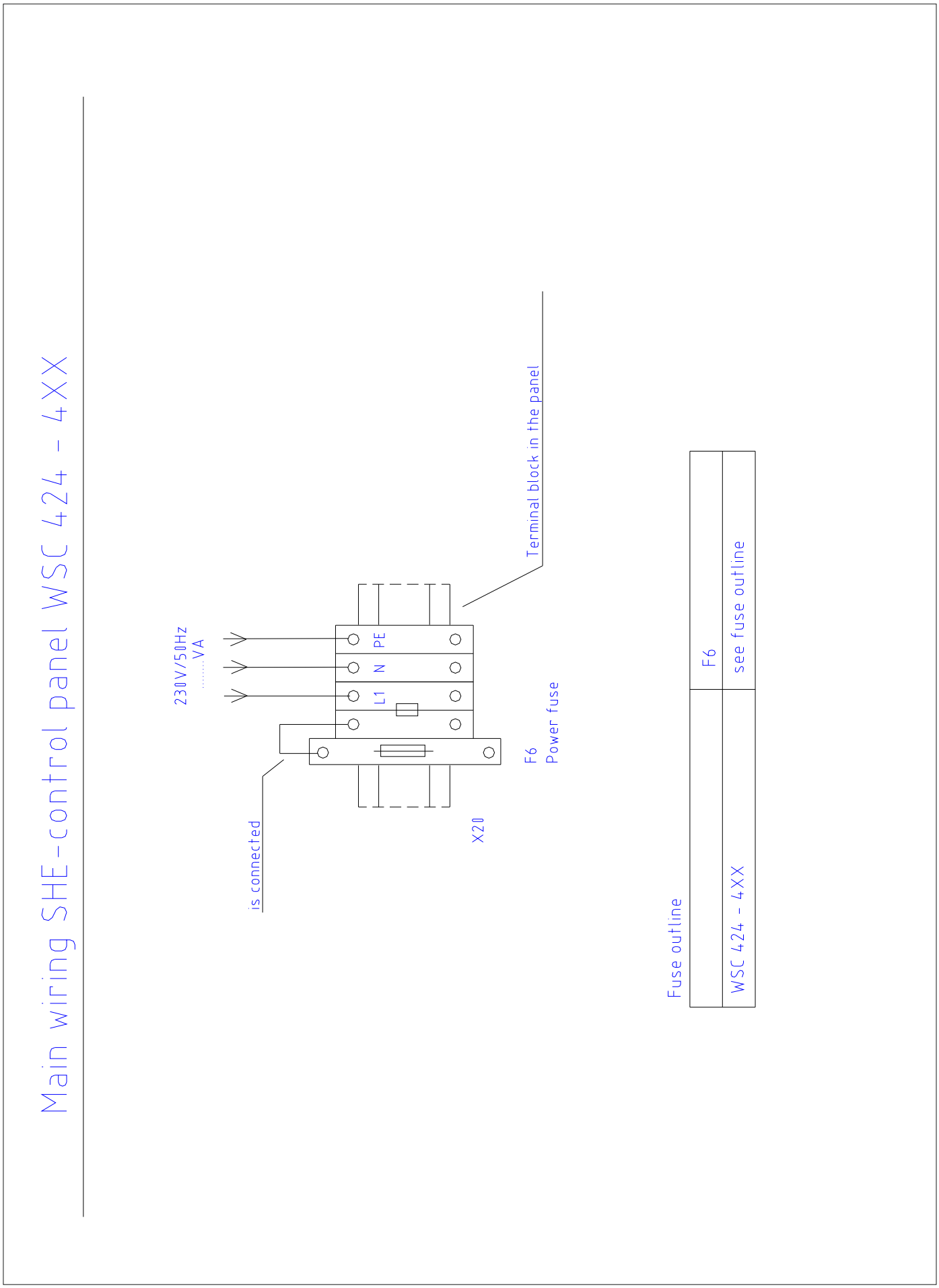


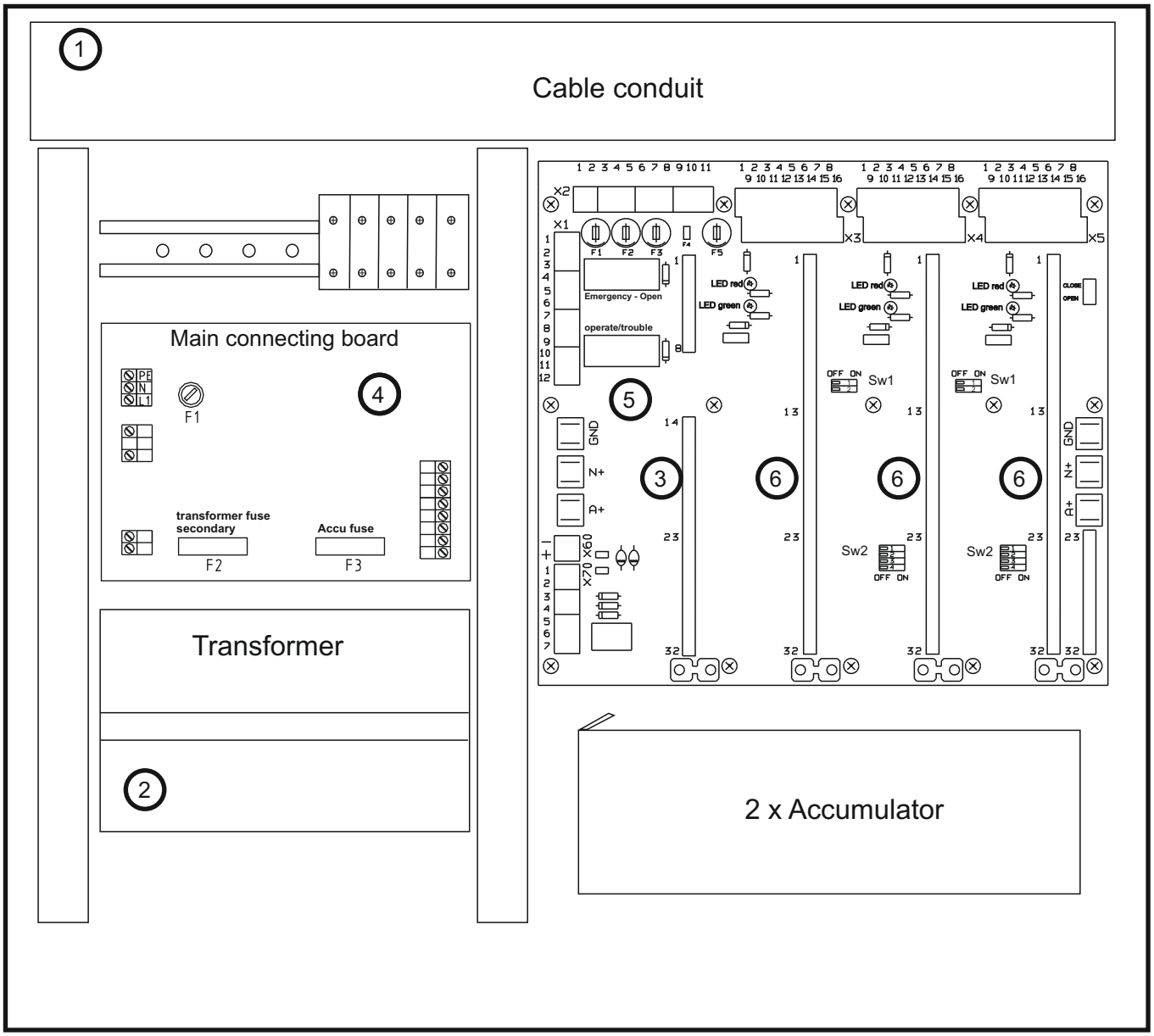
Next panel
Transmission of wind/rainsignal

Wiring diagram WSC 416 Main wiring

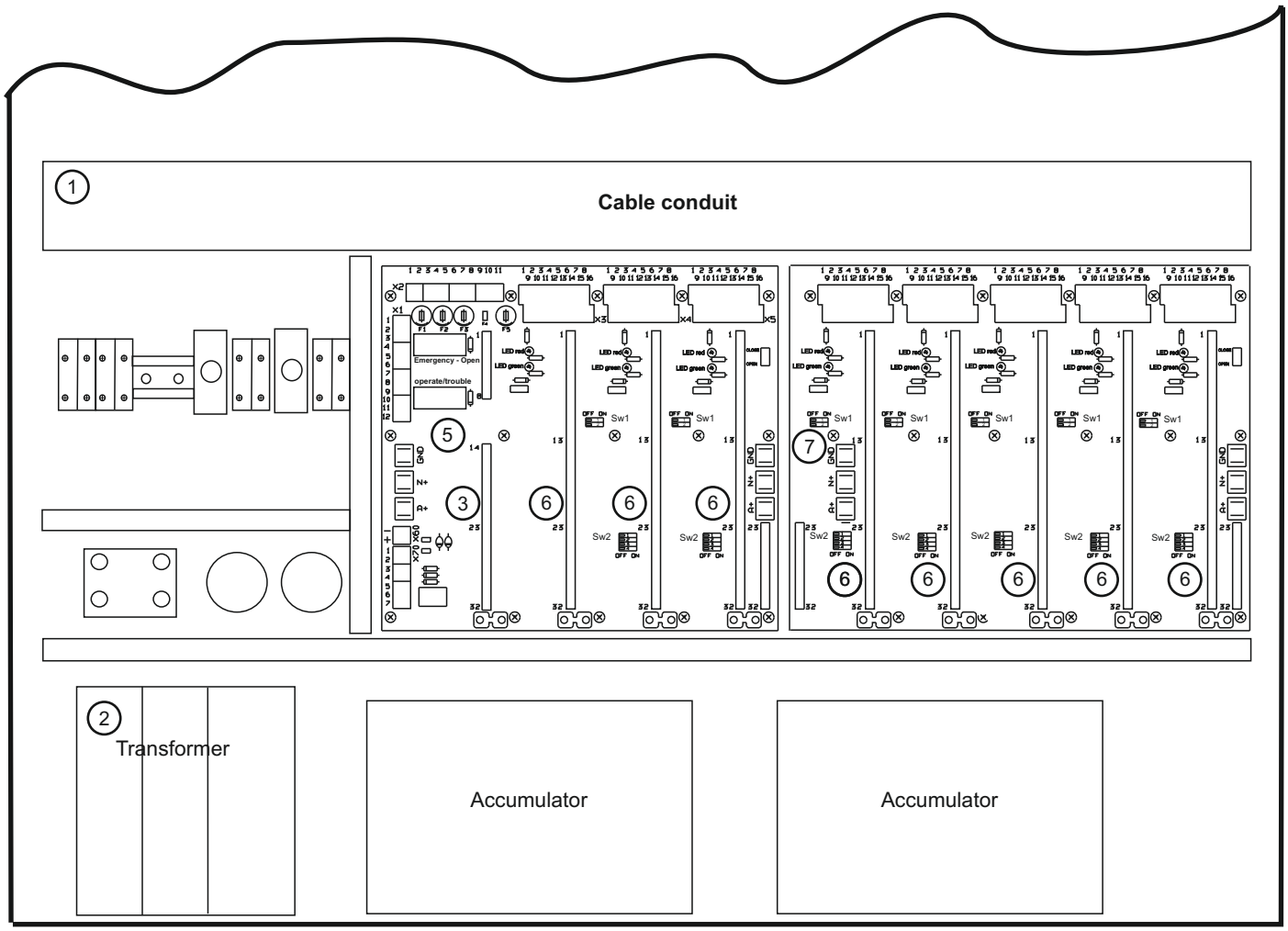


Wiring diagram WSC 424 - 4XX Main wiring





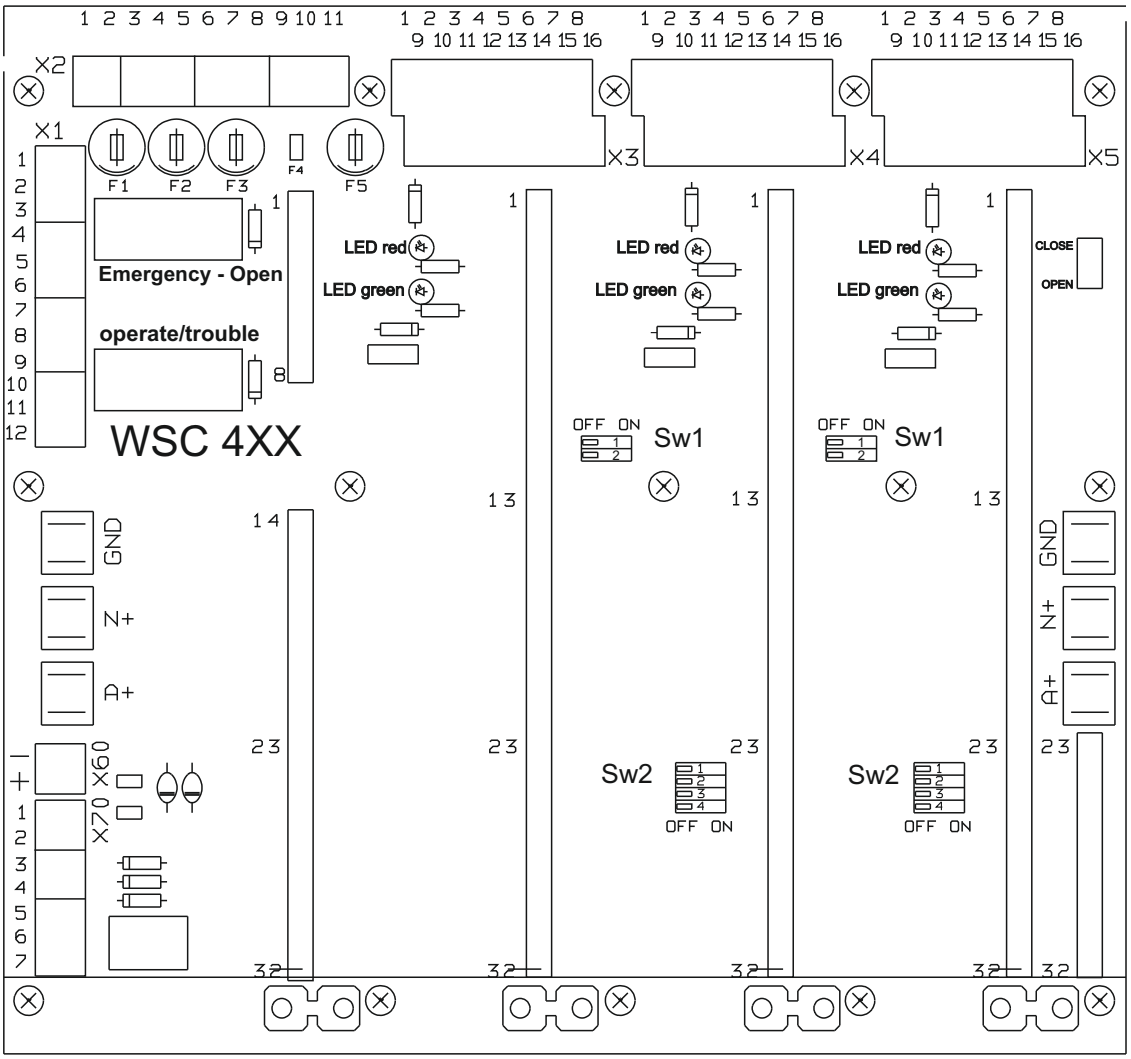
1. Cable Conduit
2. Transformer
3. Power supply card WSA 471
4. Main connecting board WSA 470
5. main card WSC 4xx
6. Module slots



1. Cable conduit
2. Transformer
3. Power suply card WSA 471
5. Main connecting board WSC 4xx
6. Module slots
7. Control panel extension WSA 44X

Technical function discription /technical information

Basic PCB WSC 4XX



By delivery status the SHE group modules WSA 411 are placed beginning from the left in module place 1 futher to the right. Modules WSA 421 are placed directly behind the SHE-group modules. If the main configuration will be changed, the assignment of the SHE-groups and ventilation lines must be resetted by DIP-switch Sw1 und Sw2 on the main board.

For a SHE-group with several ventilation lines the ventilation line groups WSA 421 must be ranged directly behind the SHE -group modules WSA 411 the connection of the functions will be realized by DIP-switch Sw1 and Sw2.

** Attention: Assure that all 4 DIP-switches of the group Sw1and Sw2 be ON or OFF!

		Function	Switch-position ON	Switch position OFF
Sw1	Switch1	ventilation “CLOSE”	ventilation shared	ventilation seperat
	Switch 2	ventilation “OPEN”		
Sw2	Switch 1	emergency OPEN	SHE shared	SHE seperat
	Switch 2	emergency CLOSE		
	Switch 3	actuator fault		
	Switch 4	Earth(mass) ventilation (from SHE-group module)		

Master-slave coupling of 2 WSC 4XX-control panels

With a master-slave coupling two smoke ventilation group modules in two different SHE-control panels can be coupled into only one SHE-group.

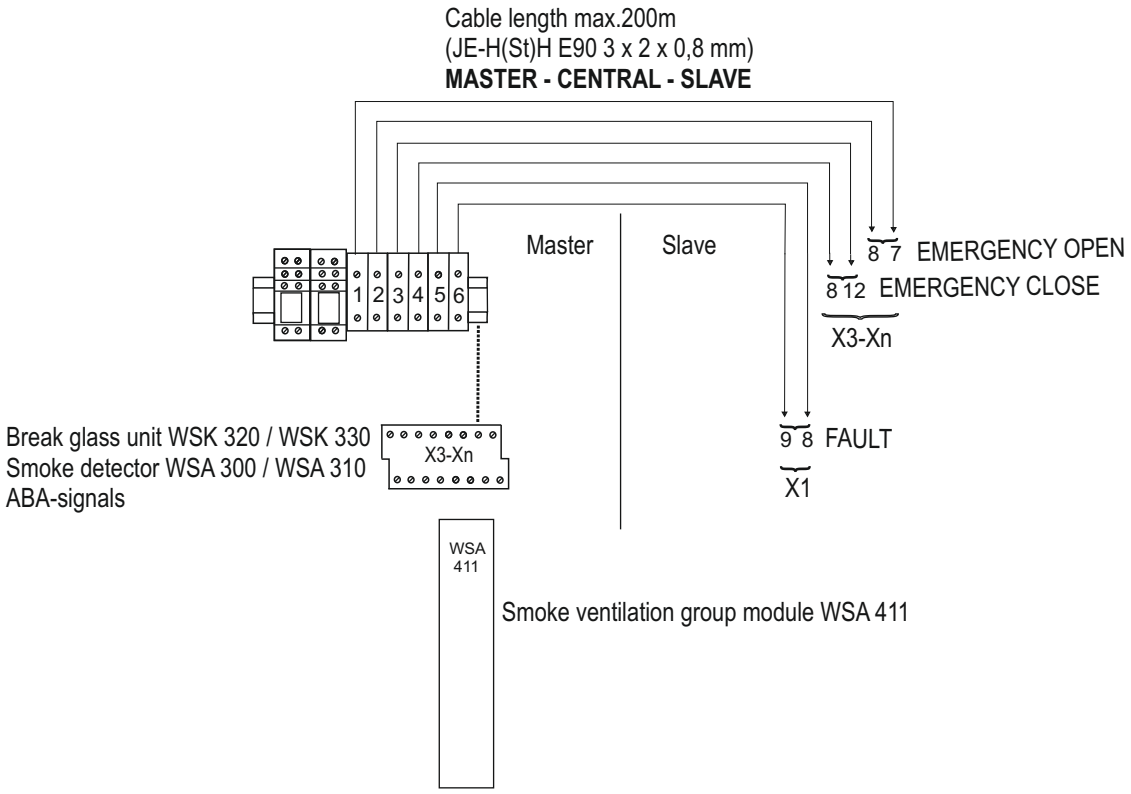
The master control panel is extended with relay-modules built in the production.
The master control panel is a “WSC 4XX XX XXC 0101”.
The “C” at 8’th place indicates it is a master control panel.

When two SHE-control panels are coupled in a master-slave connection, it is possible to operate *all* the motors with signals from the sensors coupled to the master control panel and to operate *single* motors with the signals from the sensors coupled to the slave control panel.

On the break glass unit, which is coupled to the smoke ventillation group module in the master control unit, it is possible to activate the emergency-open and -close of the motors coupled to the slave control unit.

If a fault occurs in the slave coupling, a FAULTsignal will be sent from the slave-central to the master-central and the FAULTsignal is shown in the master-slave “Break glass unit”

If more than 2 master-slave panels are to be coupled, all the control panels except the last one are to be built as master control panels.

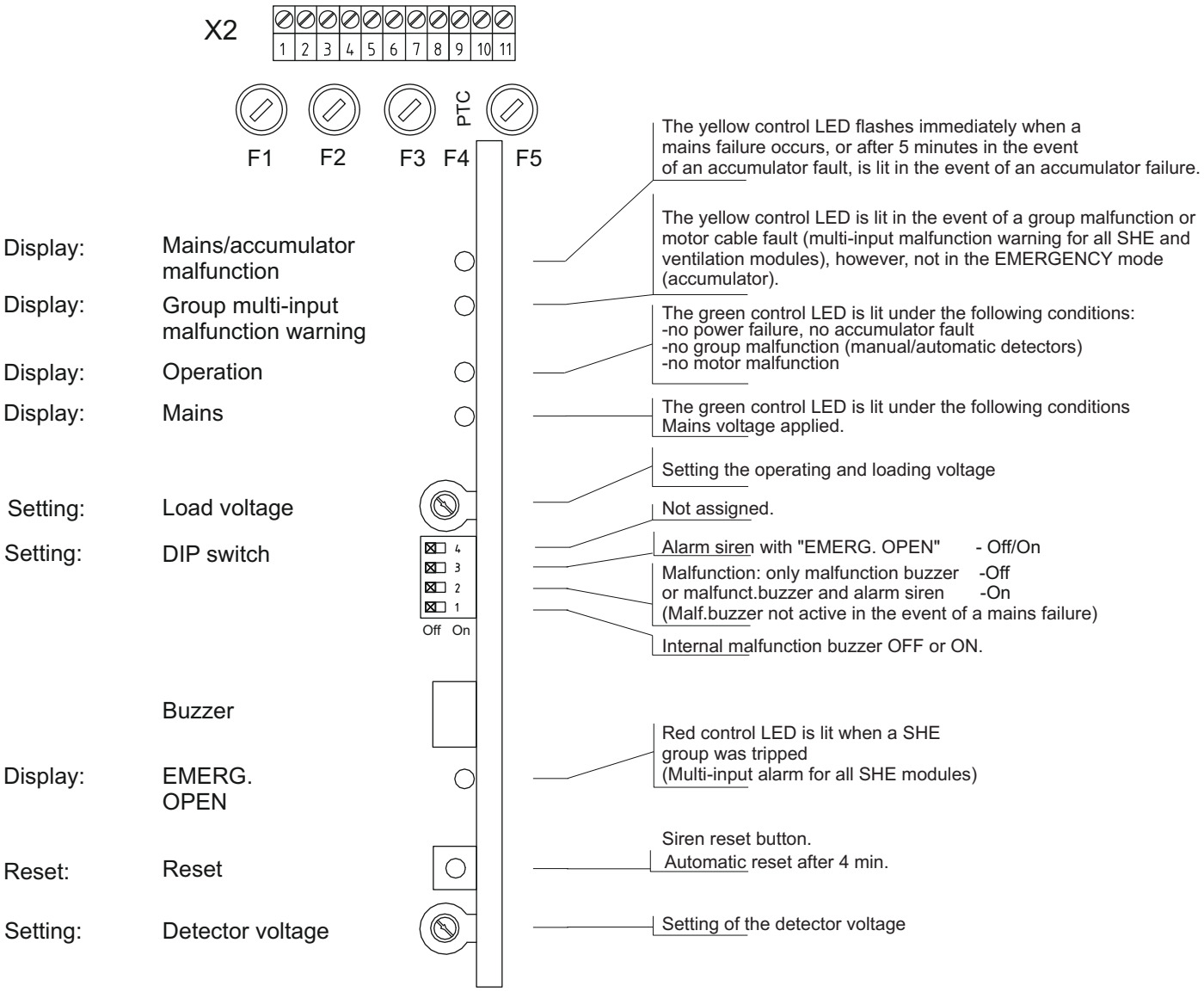


Technical function discription /technical information

Power pack module WSA 471

Setting and display elements

The power pack module is equipped with the following operating and display elements



For the setting of the detector voltage and checking and setting the accumulator mode and the loading voltage for smoke and heat extraction systems, please refer to the following pages.

Malfunction message and its remedy

Malfunction: The yellow control LED "Mains/accumulator" malfunction flashes immediately if no mains voltage is applied to the basic PCB of the WSC 4XX, or after 5 min, when the set loading voltage is lower than 26V.
The LED has steady light in the event of an accumulator malfunction.

Remedy:
- Ensure that mains voltage is applied to the connection elements of the basic PCB.
- Ensure that the set loading voltage exists and is correctly set.
- Ensure that the accumulators including the bridging cables are connected.

Malfunction: The yellow control LED "Group multi-input malfunction warning" is lit when one of the detectors or actuators connected to WSC 4XX has a fault
(this malfunction message is not available when the system is in its accumulator mode).

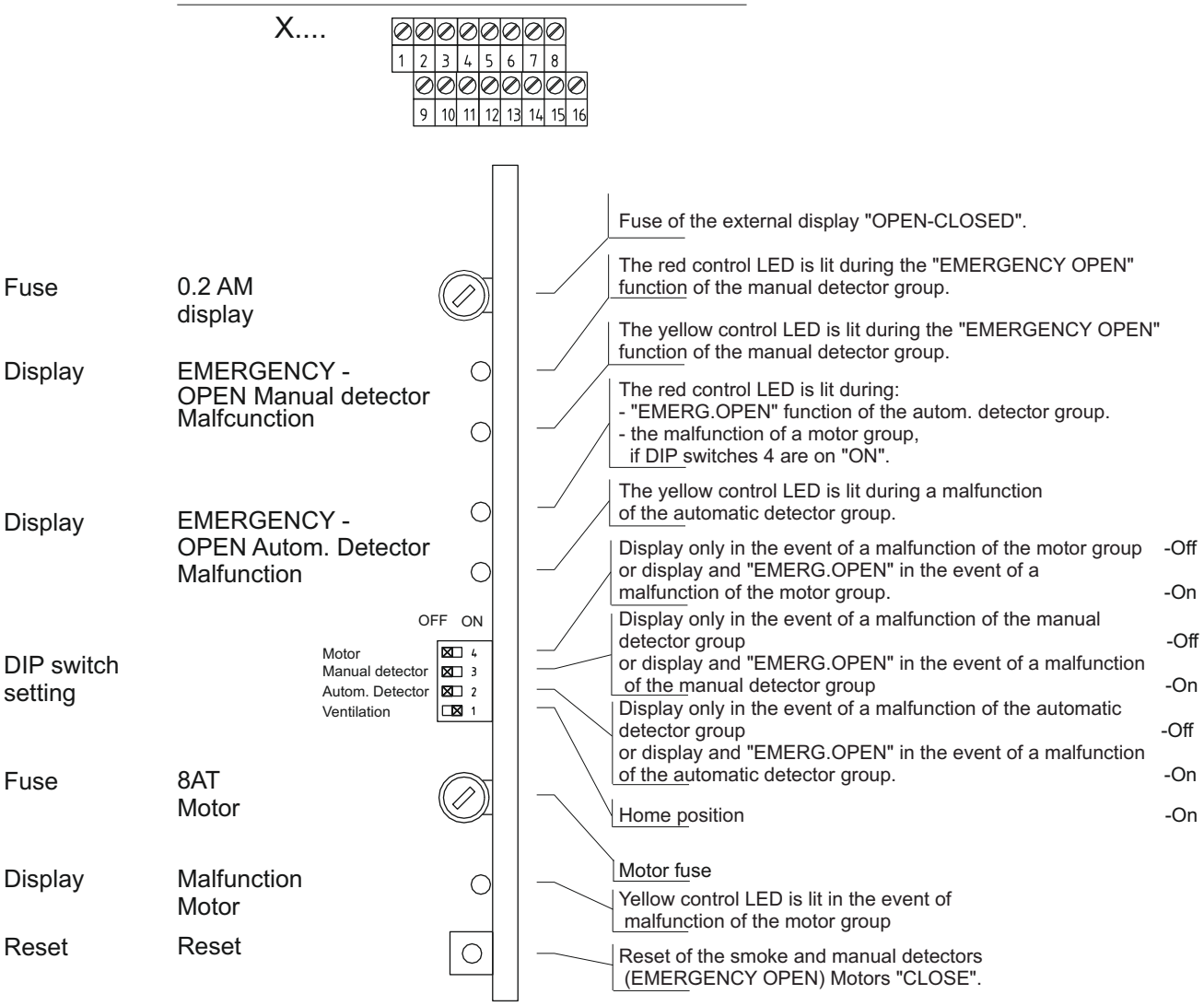
Remedy:
- Ensure that the corresponding detector voltage is applied to the measuring point (see setting of the detector/loading voltage).
- Check the end modules (detectors/actuators) and jumpers (SHE operating point).
- Cable check of all detectors and actuators.

Technical function discription /technical information

SHE-group module WSA 411

Setting and display elements

The SHE group module WSA 411 is equipped with the following operating and display elements.



Malfunction message and its remedy

Malfunction: The yellow control LED "Manual detector malfunction" is lit when the manual detector group monitored by the rest current is interrupted/disturbed.

Remedy:
- Ensure that the corresponding detector voltage is applied to the measuring point (see setting of the load voltage).
- Check the connection of the termination resistor (10K Ohm).
- Check the cables of all buttons/keys.

Malfunction: The yellow control LED "Automatic detector malfunction" is lit when the detector group monitored by the rest current is interrupted/disturbed.

Remedy:
- Ensure that the corresponding group voltage is applied to the measuring point (see setting of the load voltage).
- Check the connection of the termination resistor (10K Ohm).
- Check the cables of automatic detectors.

Malfunction: The yellow control LED "Motor malfunction" is lit when one of the connected motors has a malfunction.

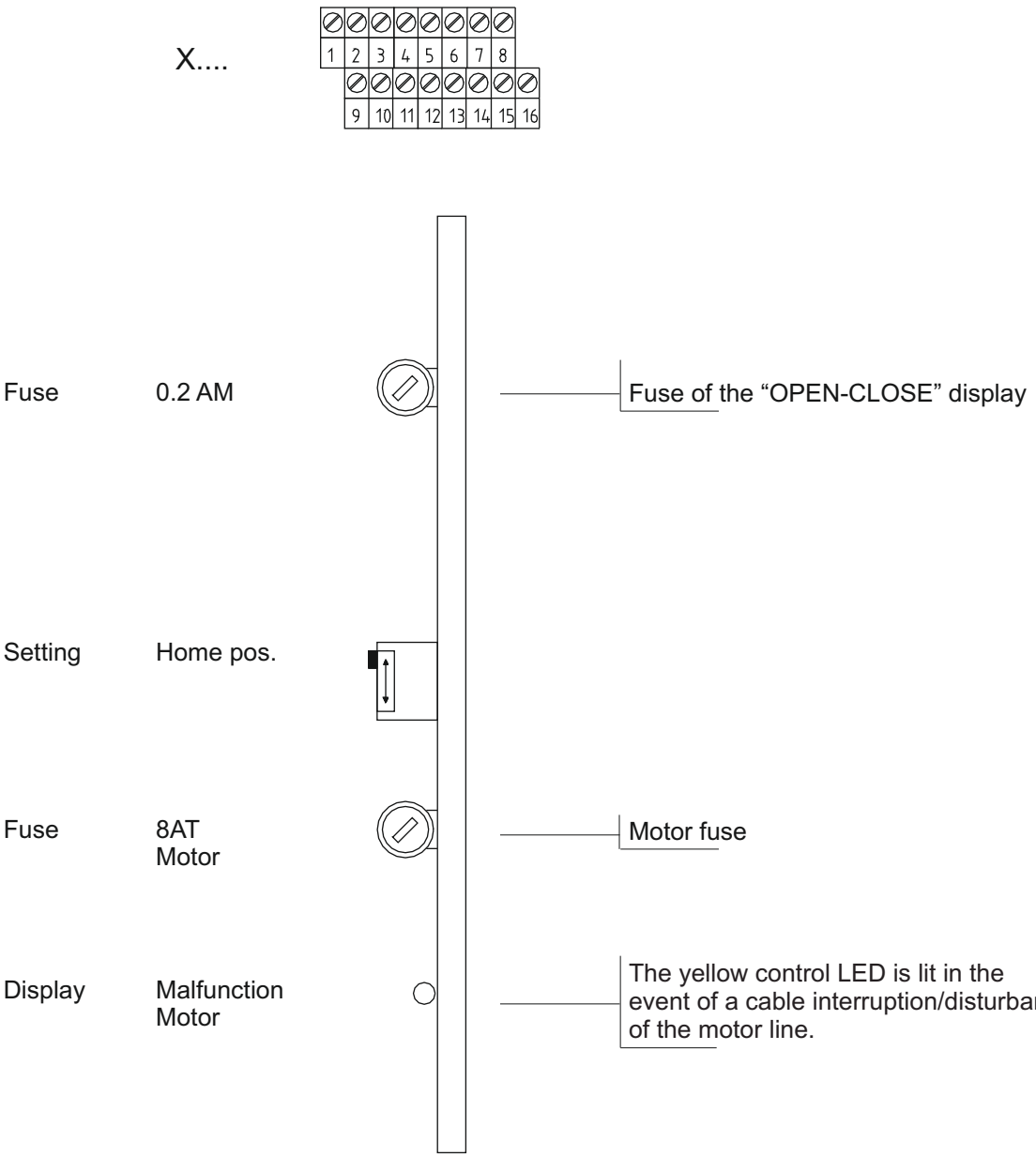
Remedy:
- Check the motor fuse.
- Check the connections of the motor end module in the last or only drive.
- Check the cables of all drives.

Technical function discription /technical information

Ventilation line module WSA 421

Setting and display elements

The ventilation control module WSA 421 includes the following operating and display elements:



Malfunction message and its remedy

Malfunction: The yellow control LED **"Motor malfunction"** is lit when one of the connected motors has a malfunction.

Remedy:
- Check the motor fuse.
- Check the connections of the motor end module in the last or only motor.
- Check the cables of all motors.

Technical function discription /technical information

Gap-ventilation line module WSA 404

Function

It is not always necessary for an electric actuator to open a ventilation unit (window or light dome) by ist full stroke
Sometimes a small gap is sufficient for ventilation purposes.

This module enables time-controlled limitation of the actuator stroke.

The module does not affect the actuator when an “EMERGENCY OPEN” function is triggered, in this case, the actuator opens by the maximum stroke.

The gap ventilation module can be connected to all SHE systems.
The module has to be installed between the SHE panel and the ventilation switch, timer or temperature sensor.

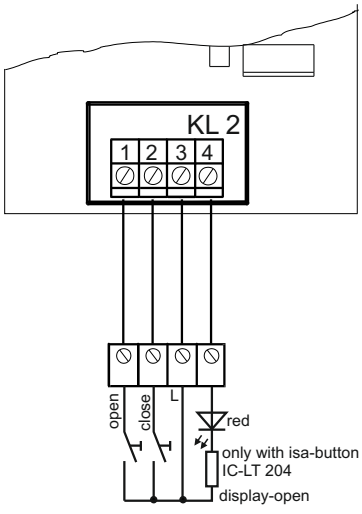
The power supply will be provided by the control panel or an external power supply unit.

The opening time can be set in a range of
1 - 60 sec. / 2 - 120 sec.
(with activated Jumper J1).

The status “OPEN” will be visualized by a steady red LED,
the status “CLOSE” will be visualized by a steady green LED.
Flash light during operation.

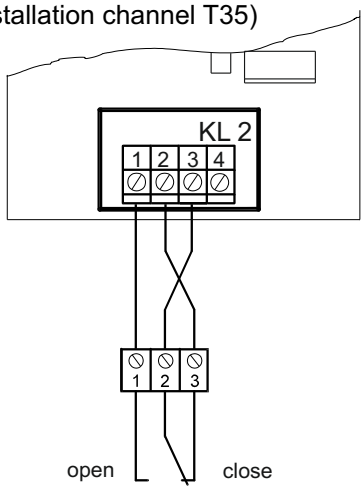
Technical data:

Supply voltage:	18 – 36VDC
Current consumption:	approx. 10mA
OPEN-CLOSE contacts:	zero potential contacts max 1A at 30V
Input:	
Operating input:	TTL-Level, low active
CLOSE signal input:	12 – 36 VDC, zero potential (unpoled)
Time range:	1 – 60 sec / 2 – 120 sec. (activated Jumper J1)
Casing (WxHxD):	49 x 50 x 96mm (for installation channel T35)



Ventilation push button

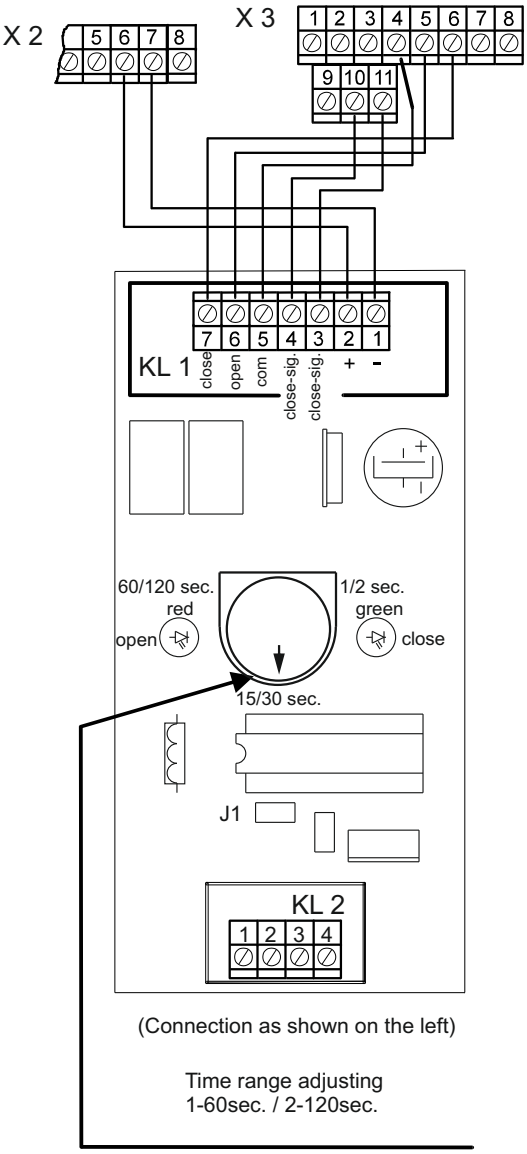
or



Temperature sensor
Timer

SHE-Panel WSC 4XX

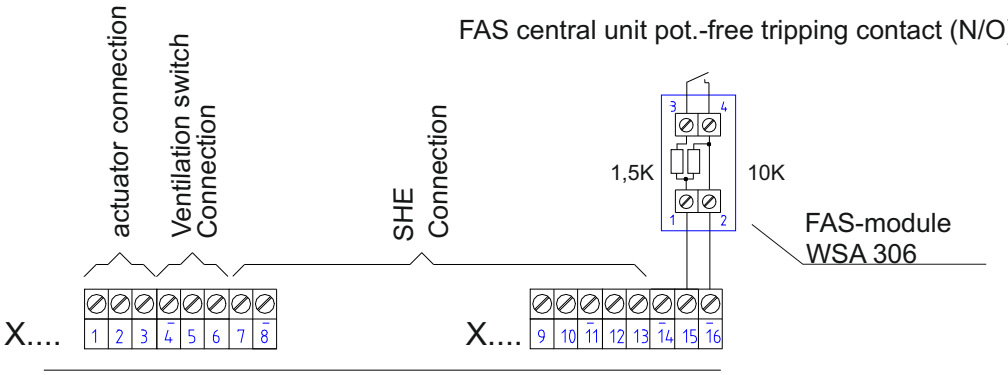
The Ventilation function must be in self-hold-modus



Connection schematic
gap-ventilation-module
WSA 4XX

Technical function discription /technical information

Connection of the external fire alarm system WSA 306



General information
The smoke detector input can be used for transmitting on a signal from an external fire detecting system (FAS) . This requires a potential-free FAS contact and the FAS module (green).

FAS OPEN function
To generate a trip (EMERGENCY OPEN) of the SHE group actuate the potential-free contact in the FAS. All SHE actuators “OPEN” automatically. The ventilation buttons are now out of operation.

Resetting the FAS OPEN function
Once the FAS central unit has been reset (tripping contact open again), actuate the CLOSED button on the main operating panel of the SHE system or the Reset button in the central unit
The SHE actuators "CLOSE" and the ventilation buttons are operational again.

Malfunction message and its remedy
Malfunction:

Malfunction: The yellow control LED **“Malfunction (automatic detector)”** is lit when the group FAS connection, monitored by a closed-circuit current, is interrupted / faulty.

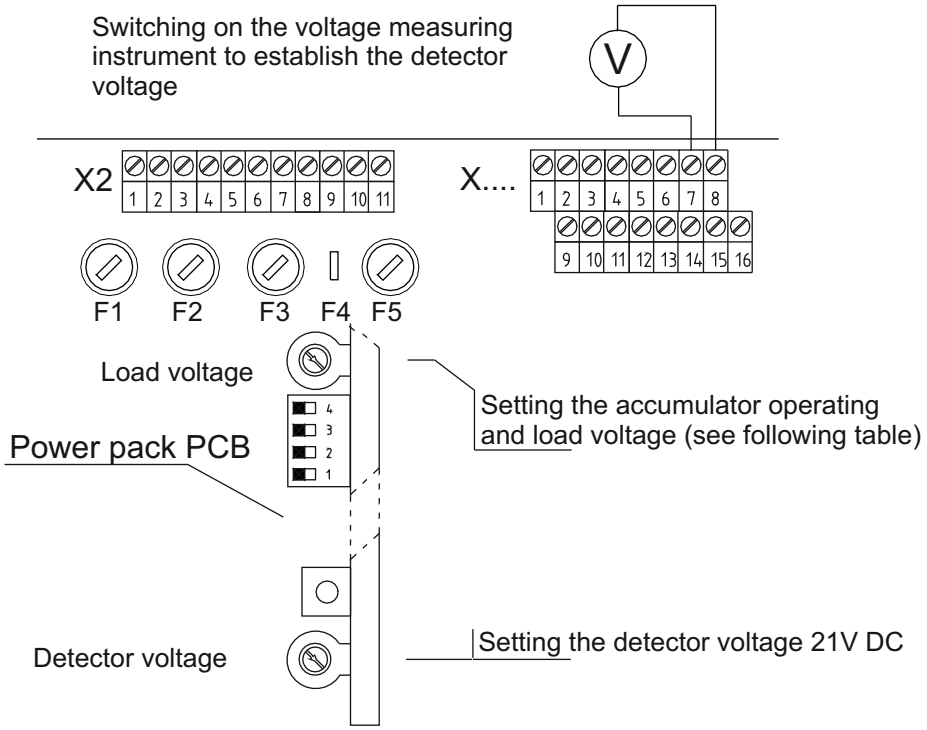
Remedy:
- Ensure that the detector voltage is applied to the measuring point (see Setting the load voltage).
- Check the connection of the terminal resistor (FAS module).
- Check the cables to the FAS.

Technical function discription /technical information

Setting the detector and accumulator voltage

The detector voltage must be 21V DC (±5%).

This is directly controlled by the controller on the power pack module. The measurement is made at X..... terminal 7/8 of a SHE group module WSA 411



The **accumulator load voltage** depends on the capacity of the accumulators installed.
For the required values please refer to the following point. Only correct the regulation in the event of discrepancies.

Checking and setting the accumulator operating and load voltage

Only allow trained and authorised personnel to carry out maintenance work on smoke and heat extraction systems.

The accumulators used do not require maintenance throughout their operating life. For maintenance, check the load and accumulator voltages at regular intervals

With the accumulator connected, the accumulator voltage must be between 27.6 Volt and 27.7 Volt.

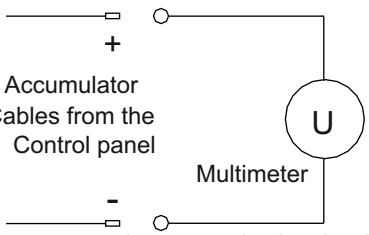
Attention: The accumulator load voltage is set to $_{U}$TU = 25°C. Correct the setting should the temperature deviate.

The load voltage depends on the type of accumulator used and can be taken from the following table:

Control panel	Capacity	1,2Ah - 6Ah	10Ah - 65Ah
WSC 4XX	Load voltage	27,7V	27,8V

Setting the load voltage:

- Provide a digital multimeter with at least a $3^{3}/_{4}$ digit display
- Disconnect the accumulator and connect the multimeter to the accumulator cables.



Set the load voltage according to the above table, knowing that accumulators start gassing once the load voltage is exceeded, which reduces the accumulator capacity. An insufficient load voltage prevents a full charge which means that in an emergency the energy available will not be sufficient.

Start up WSC 4XX

General information

The and heat extraction system (SHE) panel unit WSC 4XX is not equipped with a main switch. For this reason, we recommend to circuit the supply voltage (230V/400V AC) via an external or on site pre-fuse.
(230V = 1 pole / 400V = 3 pole)

Please check the following:

- the settings of the slide switches on the main PCB
- the settings of the detector voltage as well as the accumulator operating and charging voltage,
- the accumulator charge status. To secure the emergency power supply, charge the accumulators for approx. 8 hours when installed, prior to them being operated.
- actuator voltage in open circuit. If the value exceeds 32V the primary input on the transformator must be moved from 230V to 241V or +20V.

The SHE system is operational once the final configuration is reached after the installation of required and, if necessary, corresponding plug-in assembly groups, and following the setting of all desired functions and the above checks.

Operation

The system is factory-programmed in accordance with the customer's requirements. Operation of the system by the user/owner's instructed personnel is then restricted to the following operating modes:

- **Opening the smoke extractions in the event of a fire:**

By actuating the „OPEN“ button in the SHE system button or by pressing the DIN button as well as by automatic detectors and when a signal arrives from external fire detecting systems.

- **Closing the smoke extractions following an „EMERGENCY OPEN":**

By actuating the „CLOSED“ button in the SHE system button or by pressing the „Reset“ button on the SHE group module WSA 411(IT-M22/101) and subsequently pressing the ventilation button „CLOSED“.

- **Ventilation function:**

OPEN/CLOSED	The motorised actuators of the smoke extractions run in the corresponding directions after actuating the direction key (or) in the ventilation button.
STOP	The actuators stop at their current position after pressing both direction keys at the ventilation button simultaneously. (Only possible with LT buttons with stop function!)

Operating control

Please refer to the signal LED's at the front panels of the individual modules or various connected signal units for the operating control and the message about the operating status of the entire system.

Review of fuses WSC 4XX

Review of fuses WSC 416, 16A

	Fuses on the main connection PCB	
F1	Power fuse	T 2,0A
F2	Secondary fuse, mains transformer	20A FKS
F3	Accumulator main and charge fuse	20A FKS
	Pre-fuse in the distribution	4A autom.cut out with characteristic type C
	Fuses on the main PCB	
F1	Fuse, emergency open display - external	F 0,2A
F2	Fuse, siren	F 0,2A
F3	Fuse, mains display	F 0,2A
F4	Fuse, operating display	PTC
F5	Fuse, multi-input malfunction	F 0,5A

Fuse of the displays on the SHE module	M 0,2A
Fuse of the motors on the SHE module	T 8A
Fuse of the displays on the ventilation module	M 0,2A
Fuse of the motors on the ventilation module	T 8A

Review of fuses WSC 4XX, 24 to 64 A

F1	Fuse, emergency open display - external	F 0,2A
F2	Fuse, siren	F 0,2A
F3	Fuse, mains display	F 0,2A
F4	Fuse, operating display	PTC
F5	Fuse, multi-input malfunction	F 0,5A
F6	Power fuse	For the value, please refer to the table below
F7	Accumulator main and charge fuse	For the value, please refer to the table below
F8	Secondary fuse, mains transformer	For the value, please refer to the table below

Centre unit	Rated current	Rated capacity	F6	F7	F8	Pre-fuse in the distribution
WSC 416	16A	400VA	T 2,0	20A FKS Neozed	20A FKS Neozed	4A autom. cut out
WSC 424	24A	630VA	T3,15A	25A FKS Neozed	25A FKS Neozed	4A autom. cut out
WSC 432	32A	800VA	T 4,0A	35A FKS Neozed	35A FKS Neozed	6A autom. cut out
WSC 448	48A	1600VA	T 8,0A	50A FKS Neozed	50A FKS Neozed	10A autom. cut out
WSC 464	64A	1600VA	T 8,0A	63A FKS Neozed	63A FKS Neozed	10A autom. cut out with characteristic Type C

Maintenance and repair WSC 4XX

We recommend to carry out maintenance and a function check of the entire smoke and heat extraction (SHE) system at regular intervals. Perform the maintenance in accordance with DIN 18232, the VdS regulations, the sample construction regulations and the manufacturer guidelines at intervals of one year; we recommend to carry out the function check at one month intervals.

Only allow specially trained personnel to carry out the checks.
To be able to carry out the maintenance and repair work on the SHE system, isolate the system from the supply voltage (230 V AC) by actuating an external or customer-supplied, two-pole or all-pole cut-out switch.

Work to be performed at the SHE control panel

- Check the mains voltage (230 V AC),
- check the firm seating of all terminal connections,
- check cables and connection wires for damage,
- check the displays and keys on the modules,
- check all fuses in the centre unit,
- check the line voltage,
- check the accumulator voltage (should there be a deviation from the existing mains voltage, correct the voltage value by regulation),
- check the installation date of the accumulator and, if necessary, replace (replacement becomes due four years after the accumulator installation date),
- dispose of used accumulators in accordance with the regulations,
- note the replacement date on the accumulator.

Replacement of modules

Depending on its equipment version, the system includes a certain number of modules which have to be either removed to change the system and/or to be additionally installed or to be replaced during repair.
During repair with the system configuration **unchanged**:

- isolate the system or disconnect it from the mains **and** the accumulators,
- pull out the plug-in group, insert replacement assembly group.

If the system configuration has to be changed or **extended**:

- isolate the system or disconnect it from the mains **and** the accumulators,
- pull out the plug-in assembly group and/or insert the new assembly group,
- set the miniature slide valves on the main PCB in accordance with the instructions.

On the actuators

- check the actuators for perfect function and condition,
- check the motor end module for correct connection,
- check flaps, windows, domes etc. for smooth operation,
- check the direction of movement of the actuators when the „OPEN“ or „CLOSED“ button is actuated,
- clean actuators when soiled,
- check consoles and fasteners for firm seating and condition.

At the detectors

- check the function of all DIN buttons and ventilation buttons. (Do the actuators move in the direction shown on the buttons?)
- check the displays in the keys,
- replace defective glass covers or damaged components,
- check the function of smoke detectors with test gas and thermal maximum detectors using a hot air hair dryer.
- Does the red LED light up once the smoke detectors have tripped?
- Remove soiled or defective smoke detectors and return same to the manufacturer for repair or cleaning.