

Mounting- and Operating Instructions

ELS 220

Decentralized emergency lighting system



en-GB

INOTEC
Sicherheitstechnik GmbH



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1 Introduction

This manual is aimed only at qualified electricians with the additional qualification “Working on Live Parts” (“Skilled Worker”). Other people may not carry out any work on the system.

The manual contains important information on the entire product life cycle.

The system may only be commissioned when

- you have read this manual in full.
- you have completely understood the contents of the manual.

If you have any questions, please contact our service network. You can reach it at these addresses:

Tel: +49 (0)2938 9730-777

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Email: kundendienst@inotec-licht.de

1.1 Explanation of symbols

DANGER

Safety-critical information.

Non-compliance will lead to death or severe injury.

- ▶ Always follow the information provided.

WARNING

Safety-critical information.

Non-compliance can lead to death or severe injury.

- ▶ Always follow the information provided.

CAUTION

Safety-critical information.

Non-compliance can lead to injury.

- ▶ Always follow the information provided.



NOTICE

Non-compliance can lead to material damage and compromise the product's functionality.



2 Safety

DANGER

Lethal electric shocks!

Electrical components in the control cabinet have a lethal voltage.

- ▶ Disconnect the device from the power supply (mains and battery voltage) before working on it or replacing components (see *Switching the system off (38)*).

DANGER

Lethal electric shocks!

The batteries are always at a hazardous voltage.

- ▶ Only qualified staff may carry out work on the battery sets.
- ▶ Disconnect the device from the power supply (mains and battery voltage) before working on it or replacing components (see *Switching the system off (38)*).

DANGER

Burns caused by arcing!

If the fuses have been installed, when the last pole is connected there will be a discharge with the complete connected load.

- ▶ Pay attention to the correct poling of the batteries.

DANGER

Burns caused by arcing!

If the device is not switched off and there is mains voltage, the charging unit charges, which may result in arcing.

- ▶ Pay attention to the correct poling of the batteries.

DANGER

Burns caused by arcing!

Never switch the mains voltage and the battery power supply on or off under load as this can lead to arcing.

- ▶ Before switching off the mains voltage and the battery power supply, switch off the final circuits, e.g. by blocking the system.

**! WARNING****Burns from hot batteries!**

Defects or short circuits allow high currents to flow which can heat up the batteries considerably.

- ▶ When working on batteries, wear suitable protective equipment in order to avoid burns. Observe the battery manufacturer's instructions.

! WARNING**Danger from incorrect use!**

If unauthorised person have access to the system there is a considerable potential for danger.

- ▶ Make sure that unauthorised persons have no access to the system. Always lock the cabinet.

! WARNING**Dangers from incorrect repair work!**

Incorrect repair work can result in significant dangers.

- ▶ Only qualified staff may carry out work on the system.

! WARNING**Danger from incorrect or faulty spare parts!**

Incorrect or faulty spare parts are a potential source of fire and can cause electric shocks. They can lead to faulty operation or functional failure of the system.

- ▶ Only use INOTEC original spare parts.

! WARNING**Dangers from damaged parts!**

Damaged parts are a potential source of fire and can cause electric shocks. They can lead to faulty operation or functional failure of the system.

- ▶ If you identify damage, do not use the device. Replace the damaged parts as quickly as possible.

! CAUTION**Risk of crushing**

The electronics cabinet has a high dead weight. If the electronics cabinet slips out of your grip when lifting, injuries can occur.

- ▶ The electronics cabinet is always to be lifted by at least two people.
- ▶ Always wear protective gloves and safety shoes when moving the cabinets.



CAUTION

Risk of crushing!

The batteries have a high dead weight.

- ▶ Heavy batteries are always to be lifted by at least two people.
- ▶ Always wear protective gloves and safety shoes when moving the batteries.

CAUTION

Risk of crushing

The device can severely injure people if it falls over.

- ▶ Fasten the device only to a wall that is capable of supporting its weight, on a level floor capable of supporting the load. Use only fixing materials with sufficient load capacity.



NOTICE

Do not place anything in front of the cabinet door. You must have access to the interior of the cabinet at all times.



NOTICE

Electrical components such as LEDs are sensitive to electrostatic discharges and can be damaged even by touching the connections.

Take appropriate protective measures when working on the system.



3 Product Description

The INOTEC ELS 220 is a decentralised emergency lighting system. It is used for supply in the event of a main-db failure and to monitor 230 V safety and emergency exit luminaires.

The ELS 220 is operated via the integral TFT controller. The device controller is programmed using the INOTEC configurator software from a USB memory device or directly through a LAN interface. The TFT controller allows text information on SKUs, modules and luminaires to be saved. The programming is stored in the non-volatile memory. It can still be retrieved even in the power supply fails.

Manual tests can be carried out at any time for verification. Automatic tests can be selected at freely programmable times. The test results and changes in status are saved to the integral test log book and can be retrieved at any time. The test log book is stored in the non-volatile memory. Entries can still be retrieved even in the power supply fails.

Volt-free signalling contacts are installed as standard in the ELS 220 and provide information on up to five statuses (operation, battery operation, failure, option 1, option 2). Using these signalling contacts, the ELS 220 can also be blocked from a central point. When using a mimic panel (MTB), this is done using the key-operated switch integrated in the MTB.

The ELS 220 can be expanded by the following functions with optional modules:

- Connecting three-phase monitoring (DPÜ) to monitor the general power supply or its sub-distribution boards. In the event of a phase failing, the ELS 220 switches the emergency lighting on. If a bus connection is not used, the DPÜ is connected by a 24 V current loop which is monitored for interruptions and (optionally) for short circuits. The DPÜ/B with bus connection reports a phase failure to the ELS 220 via the current loop or by means of the bus connection. The message displayed in the TFT controller contains the DPÜ address and failed phase.
- Light sequence switching (LSA) LLOQ appropriately programmed circuits to be switched by means of light switches. They are connected via the three-conductor system bus. The ELS 220 supports a maximum of three LSA 8 with eight input switches and eight LSA 3.1 with three input switches. LSA modules are available with either 24 V or 230 V inputs. One LSA 8 is already installed in the system.

The switching mode for each individual circuit can be programmed as required from the integral controller:

- Maintained light
- Non-maintained light
- Switched maintained light
- Joker mode
- ~Switched Joker mode

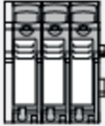
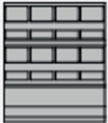




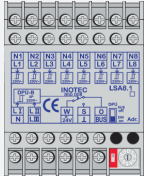
Up to 20 luminaires can be connected to each circuit and monitored individually. At the maximum configuration, the controller with a maximum of 8 circuits can therefore monitor a maximum of 160 luminaires.

Communication between the circuit and luminaires is carried out without any additional data cabling. In Joker mode, the switching mode (non-maintained or maintained light) is assigned to the luminaire module via a microswitch. The relevant luminaire address is forwarded to the module address switches. An optional sense input on the luminaire module allows the luminaires to be switched locally.



3.1 Device overview

Components may vary from the figure below depending on the model. Images not to scale.

Schematic representation	Description
	Mains L, PE, N
	Terminals
	Mains connection
	Circuit module EP 4x 2 A
	Charge control
	Battery fuse 40 A
	LSA 8 module




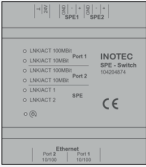
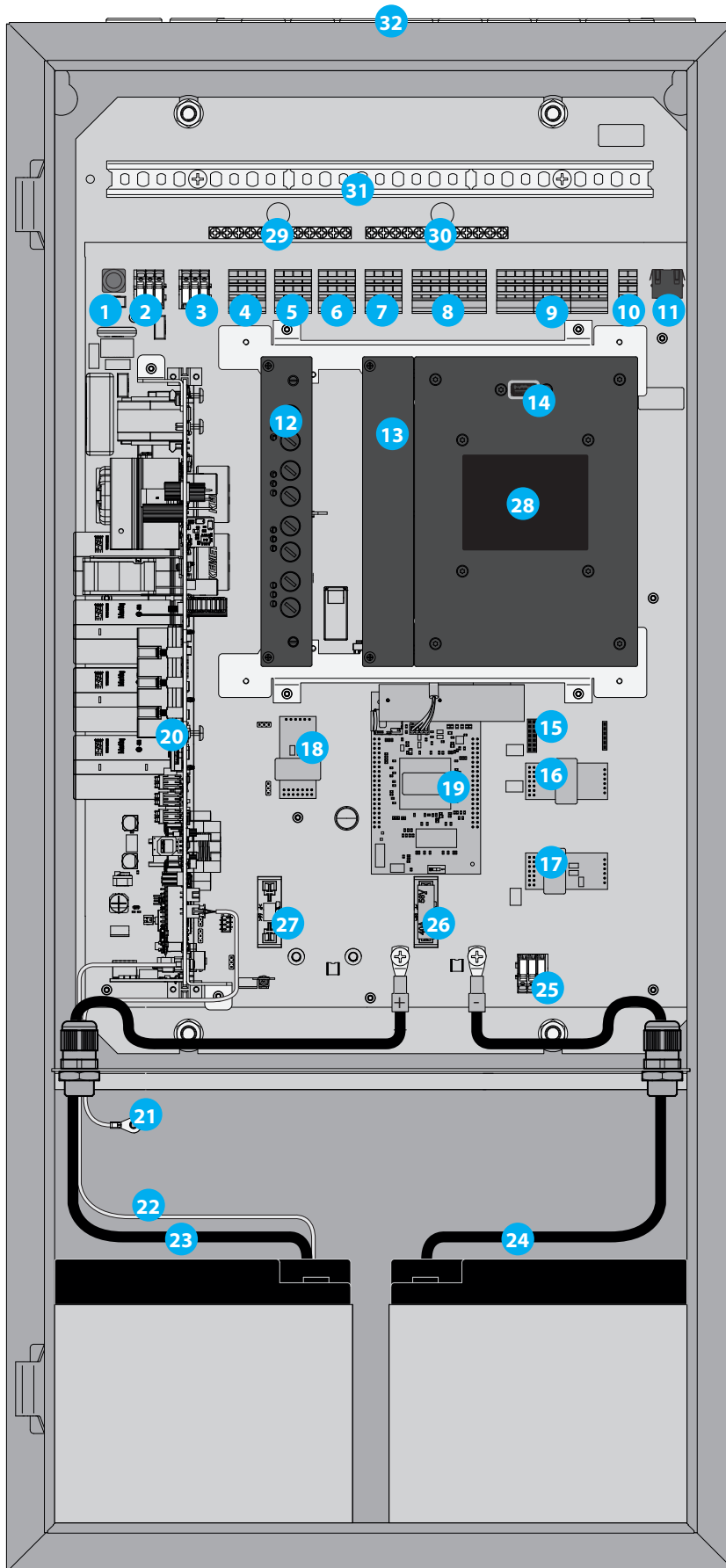
Schematic representation	Description
	LSA 3 module
	DPÜ module
	DPÜ/B.2
	SPE switch



Illustration 1: Exterior view ELS 220







1	Mains input fuse	2	Mains
3	No function assigned	4	Emergency lighting circuits 230 V, No.: 1 - 2
5	Emergency lighting circuits 230 V, No.: 3 - 4	6	Emergency lighting circuits 230 V, No.: 5 - 6
7	Emergency lighting circuits 230 V, No.: 7 - 8	8	Light sequence switching contacts 1 - 8
9	Volt-free contacts for status messages and BUS discharges for IB2 and RTG	10	Current loops and remote switch terminals
11	RJ45 network port	12	Changeover device EP 4x 2 A
13	Optional slot for further changeover device EP 4x 2 A	14	USB port
15	Optional module slot	16	RTG bus card
17	External IB Bus for DPÜ and LSA	18	Internal IB Bus
19	CPU	20	Charge control
21	Temperature sensor	22	Centre tap
23	Battery cable plus	24	Battery cable minus
25	24-V-/1-A output	26	Battery fuse string 1
27	Battery fuse string 2	28	Display
29	Earth cable connecting terminal emergency lighting circuits	30	Earth cable connecting terminal LSA
31	Cable rail	32	Cable inlet

3.2 Intended use

The ELS 220 is used only for the supply, control and monitoring of safety and emergency exit luminaires. It may operate only luminaires produced by INOTEC or which correspond to the normative and technical provisions for emergency lighting.

Any other usage is regarded as not as intended. The operating safety of the product is only ensured if it is used for its intended use.

Unauthorised constructional modifications are not permitted.

INOTEC Sicherheitstechnik GmbH accepts no liability for damage to people or property caused by use for purposes other than the intended purpose.



NOTICE

The device must be used in accordance with its intended purpose and only in a faultless, undamaged condition. National and regional safety and accident prevention regulations applicable in the place of deployment must be observed during installation and operation of this device.



4 Transport and storage

4.1 Delivery checks

- ▶ On delivery, immediately check that the device and all components are complete and with no external damage.
- ▶ Report any obvious damage immediately to the carrier as we do not accept late complaints.

4.2 Storage

Until the device is installed, store it indoors in a dry, dust-free environment under the following ambient conditions:

- permissible ambient temperature : -5 °C – +25 °C
- Permissible ambient humidity : maximum 85 %, non-condensing
- Store the batteries uncharged for a maximum of three months at a temperature of less than maximum 25 °C. Higher temperatures make the service life shorter.
- Disconnect the battery circuit by removing the battery fuse if the mains supply is interrupted for a long period.
- If batteries are stored or taken out of operation for a longer period, they must be housed fully charged in a dry, frost-free room. All batteries must be recharged after six months at the latest to prevent damage.



5 Installation

CAUTION

Risk of crushing

The electronics cabinet has a high dead weight. If the electronics cabinet slips out of your grip when lifting, injuries can occur.

- ▶ The electronics cabinet is always to be lifted by at least two people.
- ▶ Always wear protective gloves and safety shoes when moving the cabinets.

CAUTION

Risk of crushing

The device can severely injure people if it falls over.

- ▶ Fasten the device only to a wall that is capable of supporting its weight, on a level floor capable of supporting the load. Use only fixing materials with sufficient load capacity.

NOTICE

The side clearance to adjacent components, walls or, for example, cable ducts must be at least 5 cm.

NOTICE

Please use the enclosed protective cover to protect the electronics against dirt. Remove the protective cover before commissioning.

The ELS 220 steel sheet housing wall mounting has cable inlets on the top. There are three M25 cable inlet grommets and 25 M20 cable inlet grommets.

The dimensions for the drilled holes are included in the drawing.

- ▶ Fit the fixing screws and, where applicable, additional fixing material, into the wall.
- ▶ Hang the ELS 220 and tighten the fixing screws.

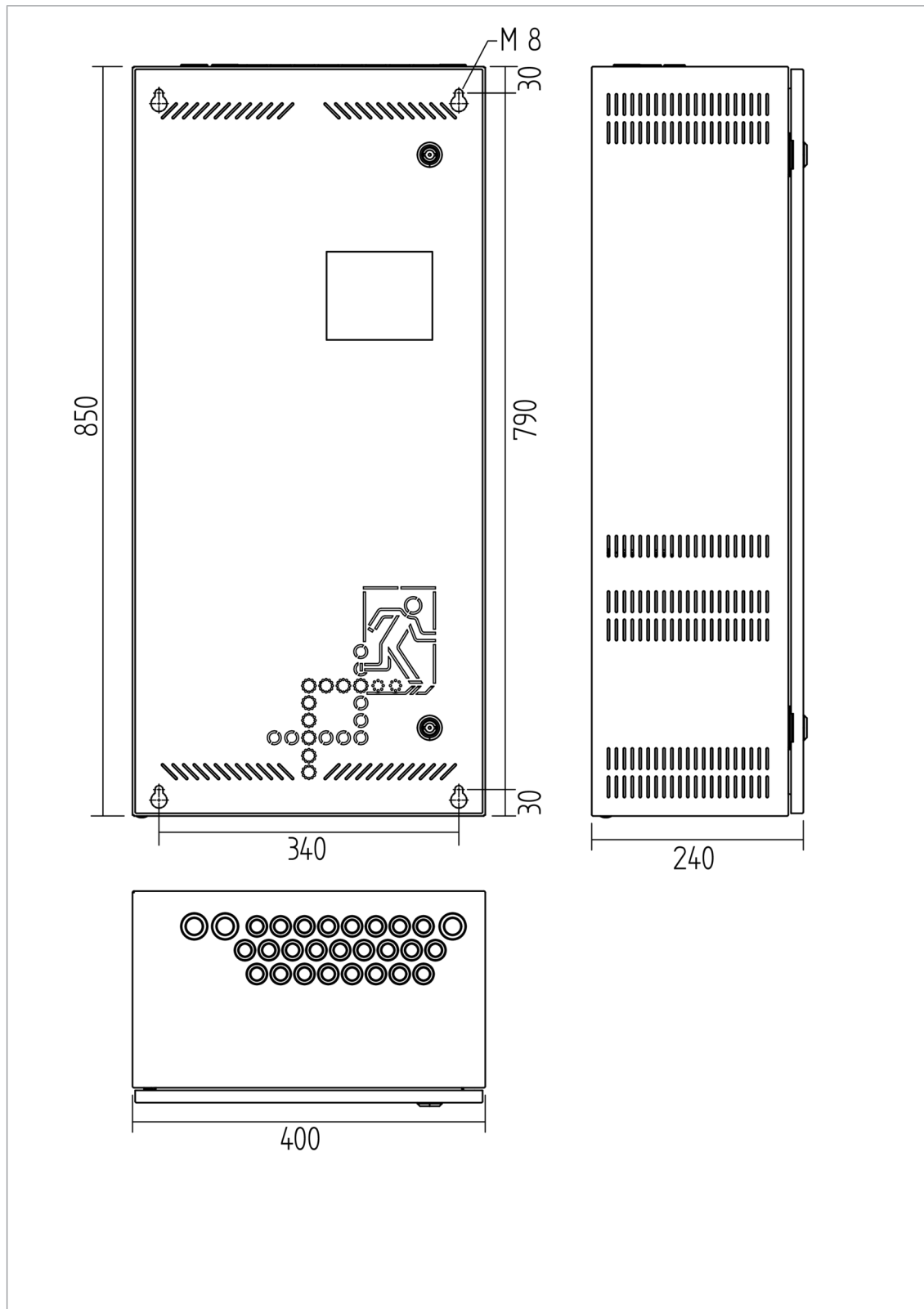


Illustration 2: ELS 220 dimensional drawing



5.1 Fitting the Battery

DANGER

Burns caused by arcing!

If the fuses have been installed, when the last pole is connected there will be a discharge with the complete connected load.

- ▶ Pay attention to the correct poling of the batteries.

DANGER

Burns caused by arcing!

If the device is not switched off and there is mains voltage, the charging unit charges, which may result in arcing.

- ▶ Pay attention to the correct poling of the batteries.

WARNING

Dangers from damaged parts!

Damaged parts are a potential source of fire and can cause electric shocks. They can lead to faulty operation or functional failure of the system.

- ▶ If you identify damage, do not use the device. Replace the damaged parts as quickly as possible.



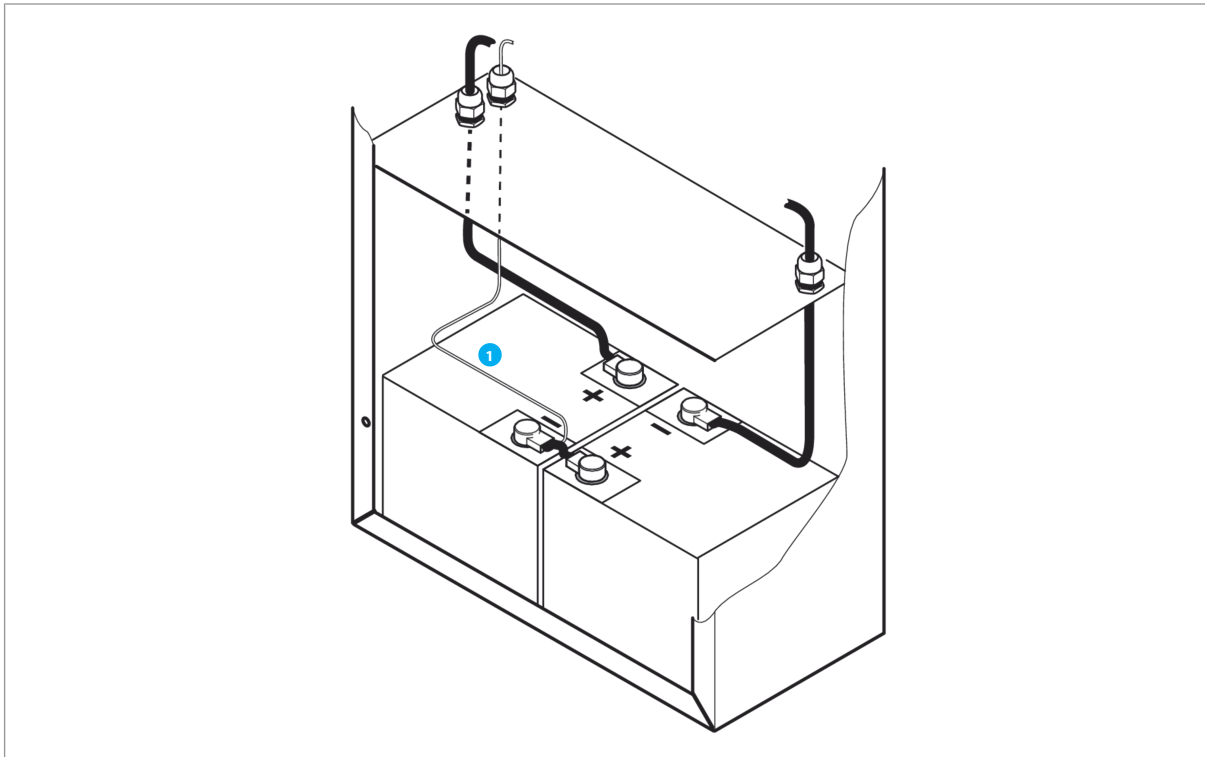
NOTICE

Note the battery instructions supplied. The battery instructions are part of this manual.

The batteries must correspond to one of these standards:

EN 60896-11	Stationary lead acid batteries – part 11: Vented types – General requirements and methods of tests
EN 60896-21	Stationary lead acid batteries – part 21: Valve regulated types – Methods of test
EN 60896-22	Stationary lead acid batteries – part 22: Valve regulated types – Methods of test

- ▶ Fit the battery according to the following illustration. You will also find the illustration on the inside of the control cabinet door.



1 Centre clip

- ▶ Remove the battery fuse after fitting.
- ▶ According to the drawing, connect the batteries with the connecting cable plugged in on one side in the factory.
- ▶ Connect the central clip.
- ▶ Do not insert the battery fuse or commission the system according to the instructions until the installation of the entire system is complete.



NOTICE

The central clip must be connected, otherwise the charging unit does not power up completely.



6 Electrical Connection

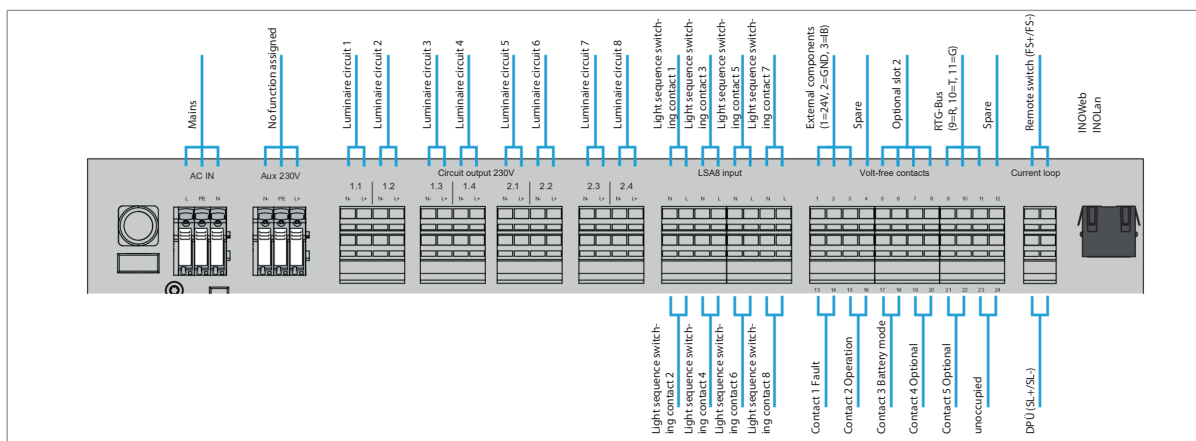


Illustration 3: ELS 220 terminal



NOTICE

Use the protective cover during installation work. It protects conductive parts of the electronics being damaged by short circuits and acts as additional terminal labelling.
The assembly protection must be removed before commissioning.



6.1 ELS 220 System Cabelling

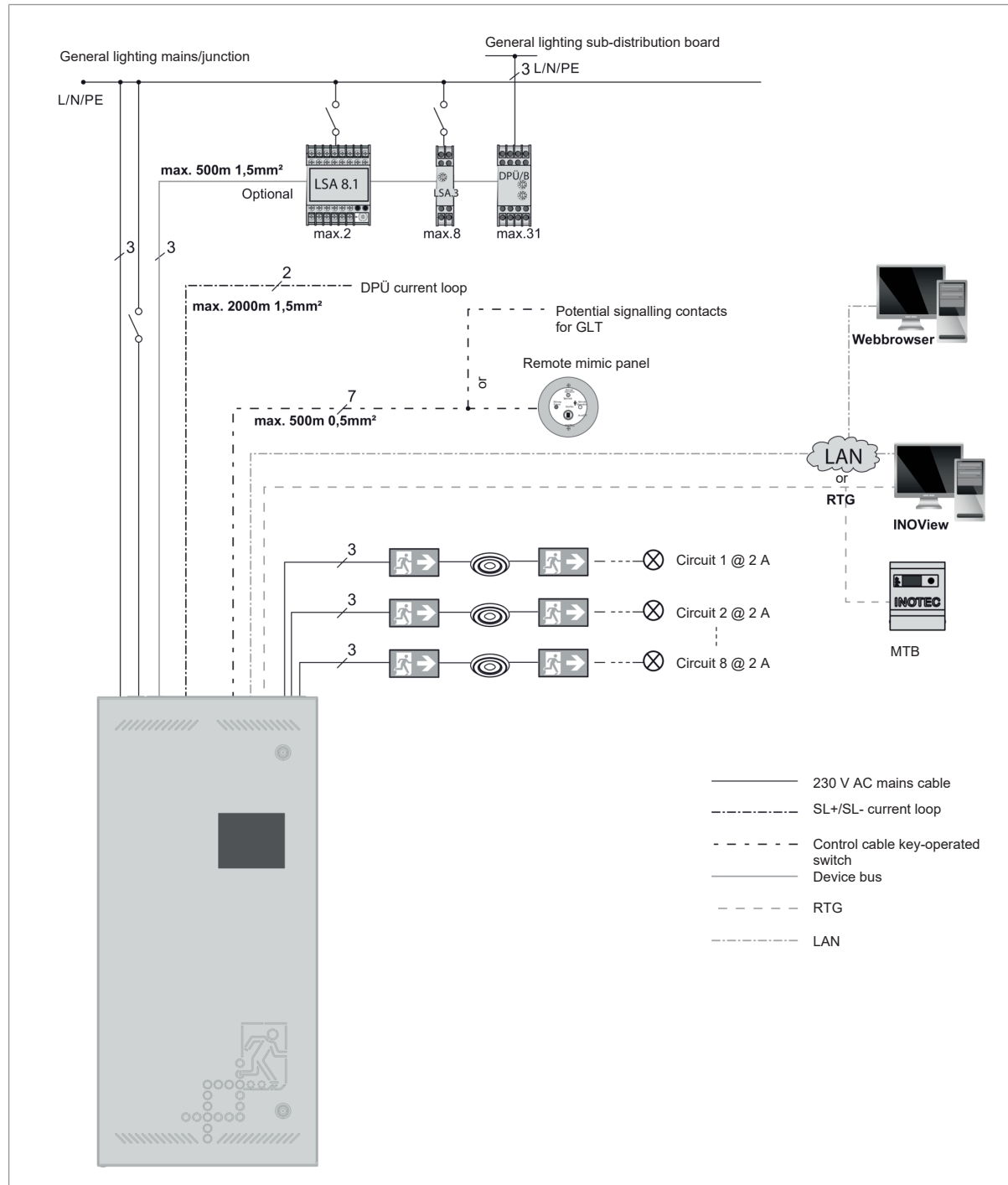


Illustration 4: ELS 220 system cabelling



6.2 Connecting the IB2 device bus

The IB2 is the second 'internal' device bus. The emergency lighting systems can communicate with the external components, such as LSA 8 (light sequence switching module with 8 channels), LSA 3 (light sequence switching module with 3 channels) or DPÜ/B using it.

- ▶ Connect the external Bus-compatible components to the IB terminals, earth and +24 V on the terminal block.
- ▶ In the ELS 220, the connections are on the upper terminal strip (see *ELS 220 terminal (21)*):
 - 1 = +24 V
 - 2 = GND
 - 3 = IB

6.3 Connecting the external RTG data bus

The external RTG data bus provides a connection for higher-level monitoring devices, such as the MTB or the INOView monitoring software.

- ▶ Connect the RTG to the R, T and G terminals on the terminal block.
- ▶ In the ELS 220, the connections are on the top terminal strip (see *ELS 220 terminal (21)*):
 - 9 = R (red)
 - 10 = T (black)
 - 11 = G (blue)



NOTICE

The maximum length of the BUS data line (IB + RTG) is 500 m for a minimum cross section of 0.5 mm².

6.4 Connect the light sequence switching module LSA 3.1/LSA 8.1

The LSA light sequence switching module allows the standby luminaires to be switched along with the general lighting.



WARNING

External voltage on the 230 V LSA contacts after switching off the system!

There may be voltage on the 230 V LSA contacts even after the system has been switched off.

- ▶ Measure the contacts of the internal LSA. If there is external voltage there, switch it off.



6.4.1 LSA 3.1

A maximum of eight LSA 3.1 modules can be connected per controller. Each module has three input channels. The LSA 3.1 is available with input switches with 24 V DC (item number: 850 017) or 230 V AC (item number: 850 010).



NOTICE

Only use the LSA 3.1 light sequence switching module on the IB2 device bus.



NOTICE

The light sequence switching module LSA 3.1 has a shared neutral wire N for input switches L1, L2 and L3.

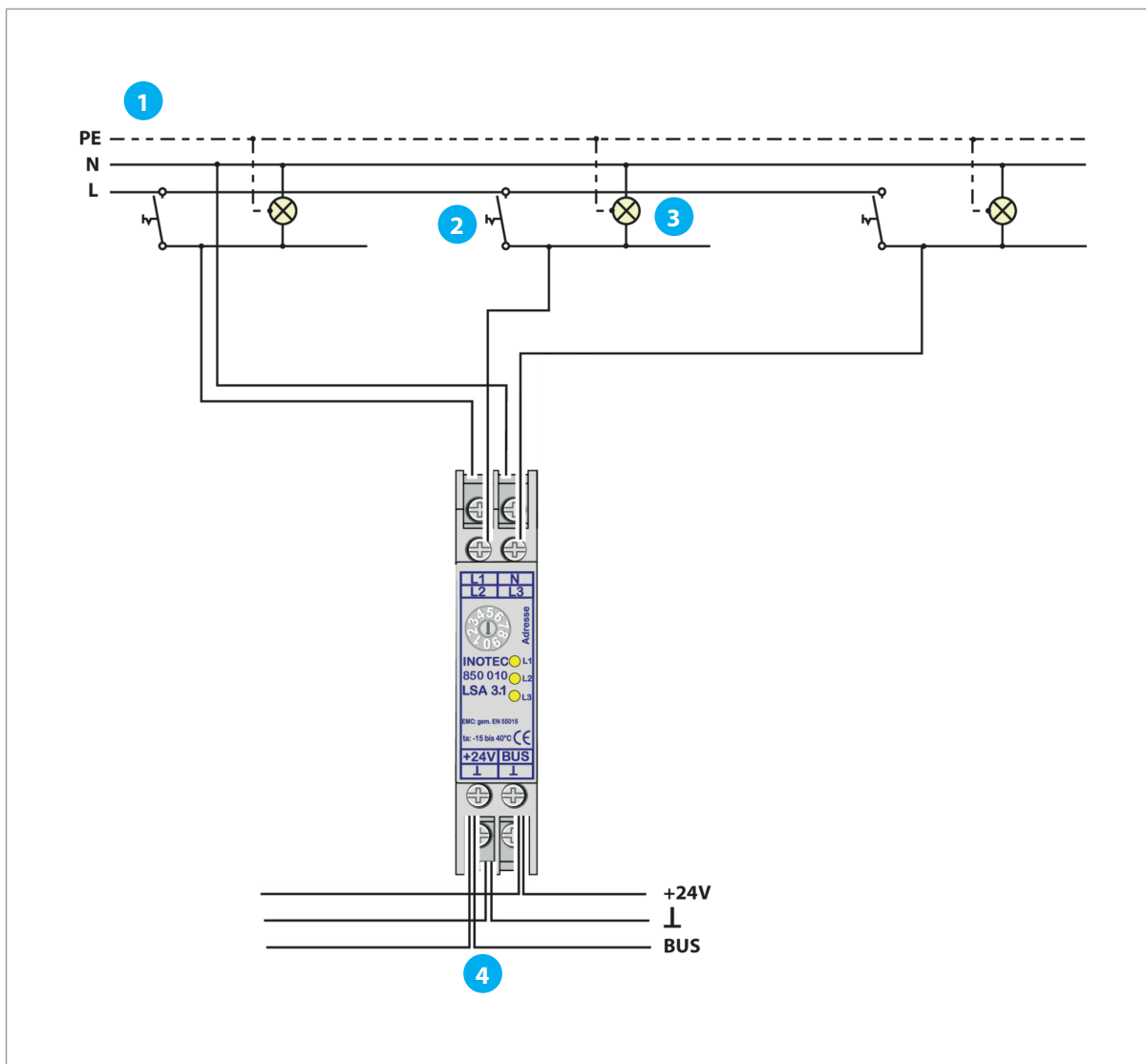


Illustration 5: LSA 3.1 230 V

1	General lighting circuit	2	Switches on the general lighting circuit
3	General lighting	4	Internal wiring

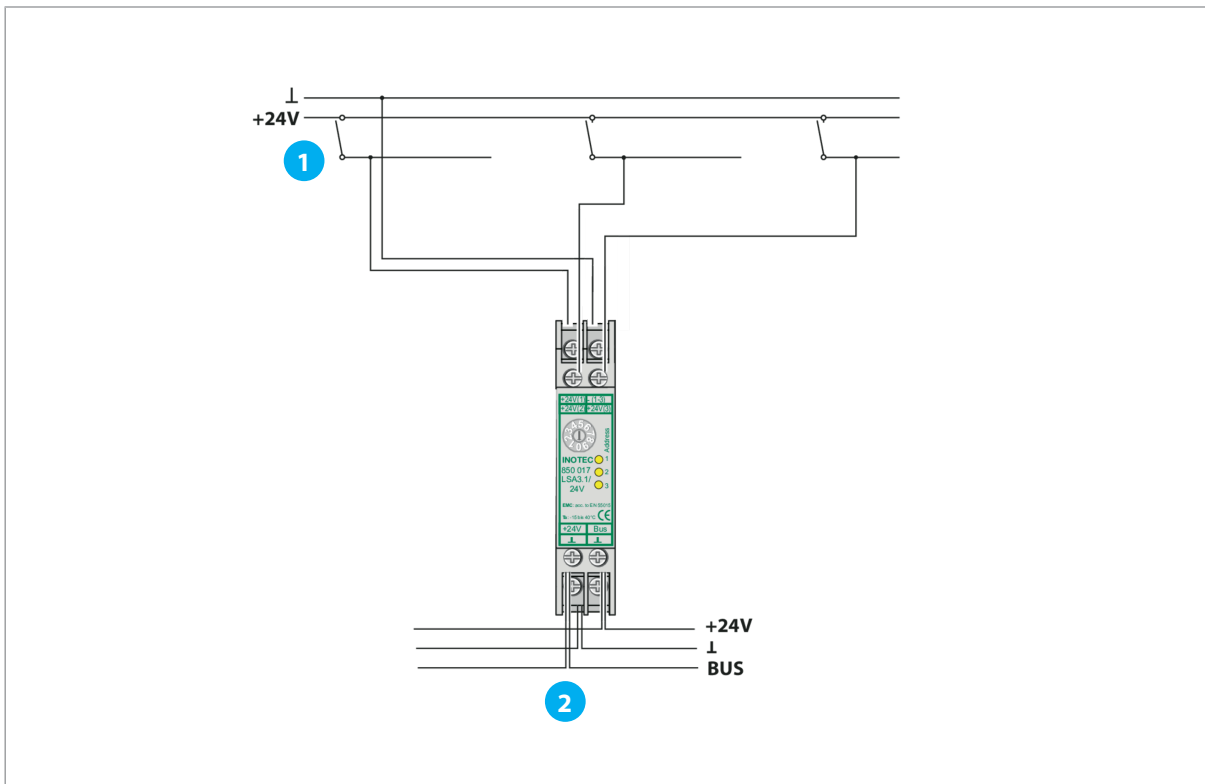


Illustration 6: LSA 3.1 24 V

1 24 V control circuit

2 Internal wiring



6.4.2 LSA 8.1

A maximum of three LSA 8.1 modules can be connected per controller. Each module has eight galvanically separated input channels as well as integral bus-enabled three-phase monitoring (DPÜ/B). The LSA 8.1 is available with 24 V DC (item number: 850 007) or 230 V AC (item number: 850 008) input switches.

In decentralised systems, the first LSA 8.1 is installed in the device (see *ELS 220 terminal (21)*).



NOTICE

Only use the LSA 8.1 light sequence switching module on the IB1 or IB2 device bus.

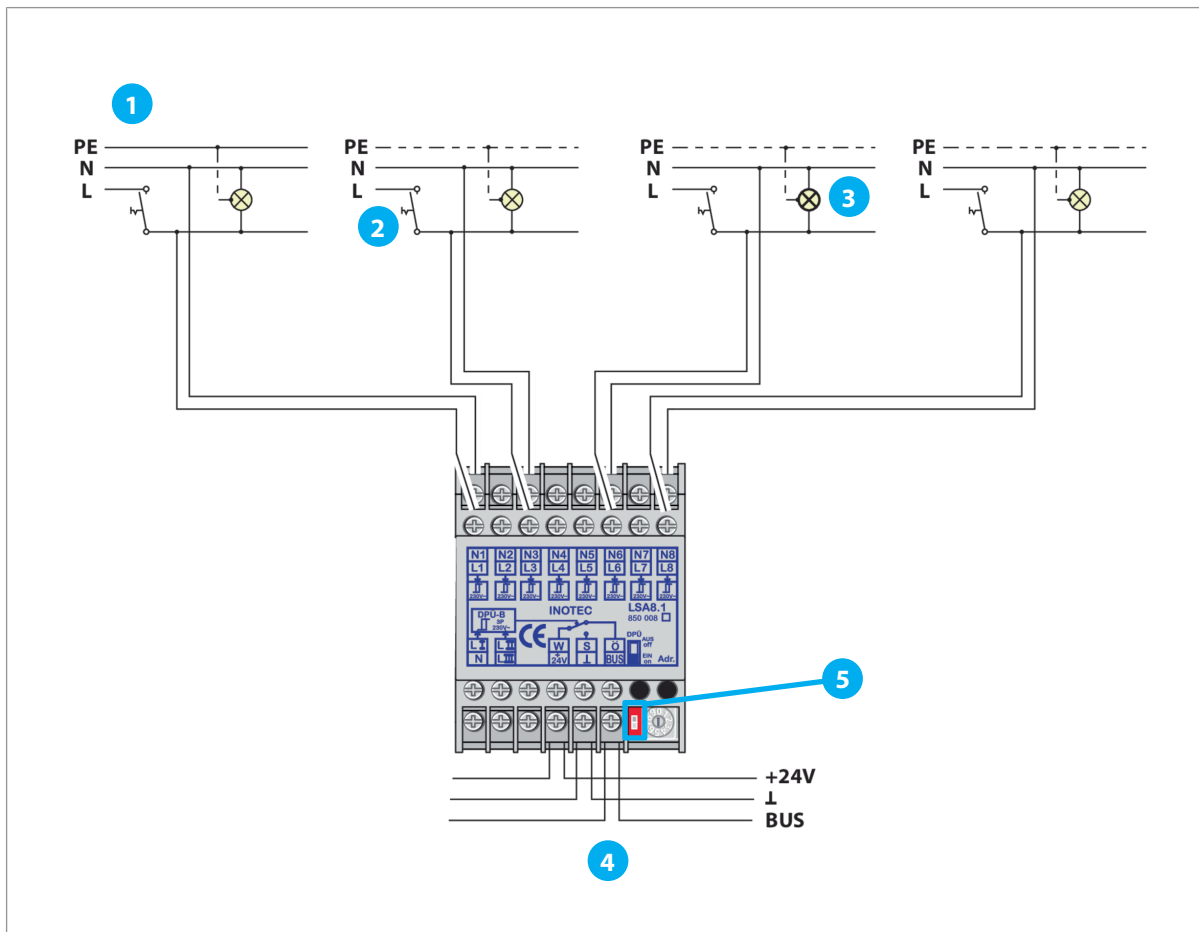


Illustration 7: LSA 8.1 230 V

1	General lighting circuit	2	Switches on the general lighting circuit
3	General lighting	4	Internal wiring
5	DPÜ microswitch on/off		

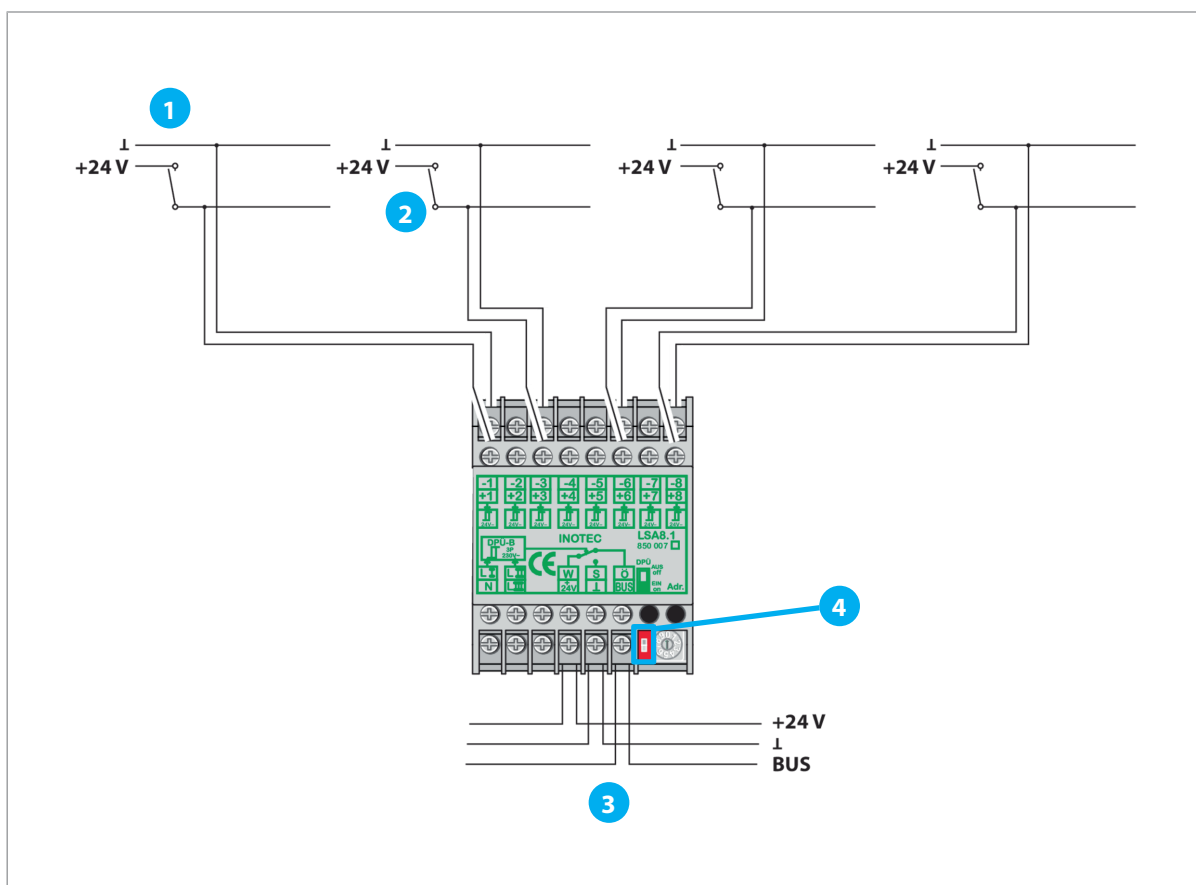


Illustration 8: LSA 8.1 24 V

1	General lighting circuit	2	Switches on the general lighting circuit
3	Internal wiring	4	DPÜ microswitch on/off

6.4.2.1 Integral DPÜ/B

- ▶ To activate the integrated DPÜ/B, set the DPÜ microswitch to "ON".
- ▶ To program the DPÜ/B proceed as described in the *TFT Controller manual*.



NOTICE

The pre-set address of the LSA 8.1 module pre-set in the TFT controller is also the address of the DPÜ/B.



6.5 Connecting the DPÜ three-phase monitoring

The DPÜ three-phase monitoring (item number: 890 400) monitors the mains voltage and the sub-distribution boards for the general lighting. The DPÜ modules can be installed directly in the sub-distribution boards.

- ▶ Remove the jumper on the SL+/SL- terminals.
- ▶ Close the 24 V current loop on the SL+/SL- terminals.



NOTICE

If you monitor multiple sub-distribution boards with one DPÜ module, you will have to wire the contacts for the current loop in series.

If the power fails on a sub-distribution board, switch all connected luminaires to maintained light mode. The message *sub-distribution board power failure* (see *TFT Controller manual*) appears in the controller.

6.6 DPÜ/B.2 three-phase monitoring

The DPÜ/B.2 three-phase monitoring (item number: 890 417) monitors the mains voltage and the sub-distribution boards for the general lighting. The DPÜ/B.2 modules can be installed directly in the sub-distribution boards. The modules are queried via the bus.

If the power fails on a sub-distribution board (SL+/SL- is interrupted), switch all connected luminaires to maintained light mode. The message *sub-distribution board power failure* (see *TFT Controller manual*) appears in the controller. The failed sub-distribution board and all destination data can be displayed in the controller using BUS communication.

The DPÜ/B.2 allows the emergency lighting to be delayed after the mains power is restored using the selectable delay function. The delay can be set to 0, 5, 10 or 15 minutes. The LEDs of the failed phases flash during the delay. Once mains power is restored, the signalling contacts and the message *Sub-db failure* are reset via the bus to the programmed delay time.

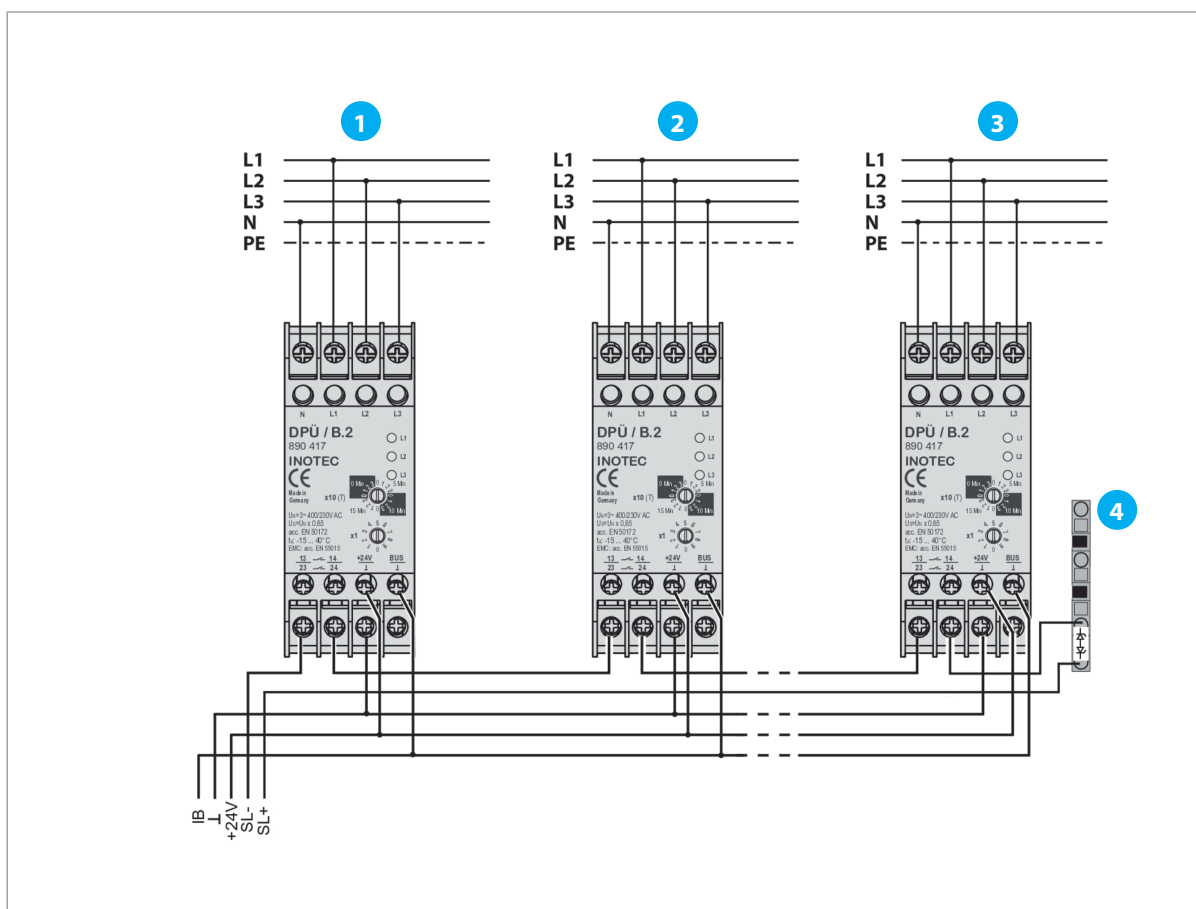


Illustration 9: DPÜ/B.2 with zener closure diodes

1	UV 1, SUB DB 1	2	UV 2, SUB DB 2
3	UV ..., SUB DB ... (max. 31)	4	Zener closure diodes (parts number: 101524543) on the last DPÜ

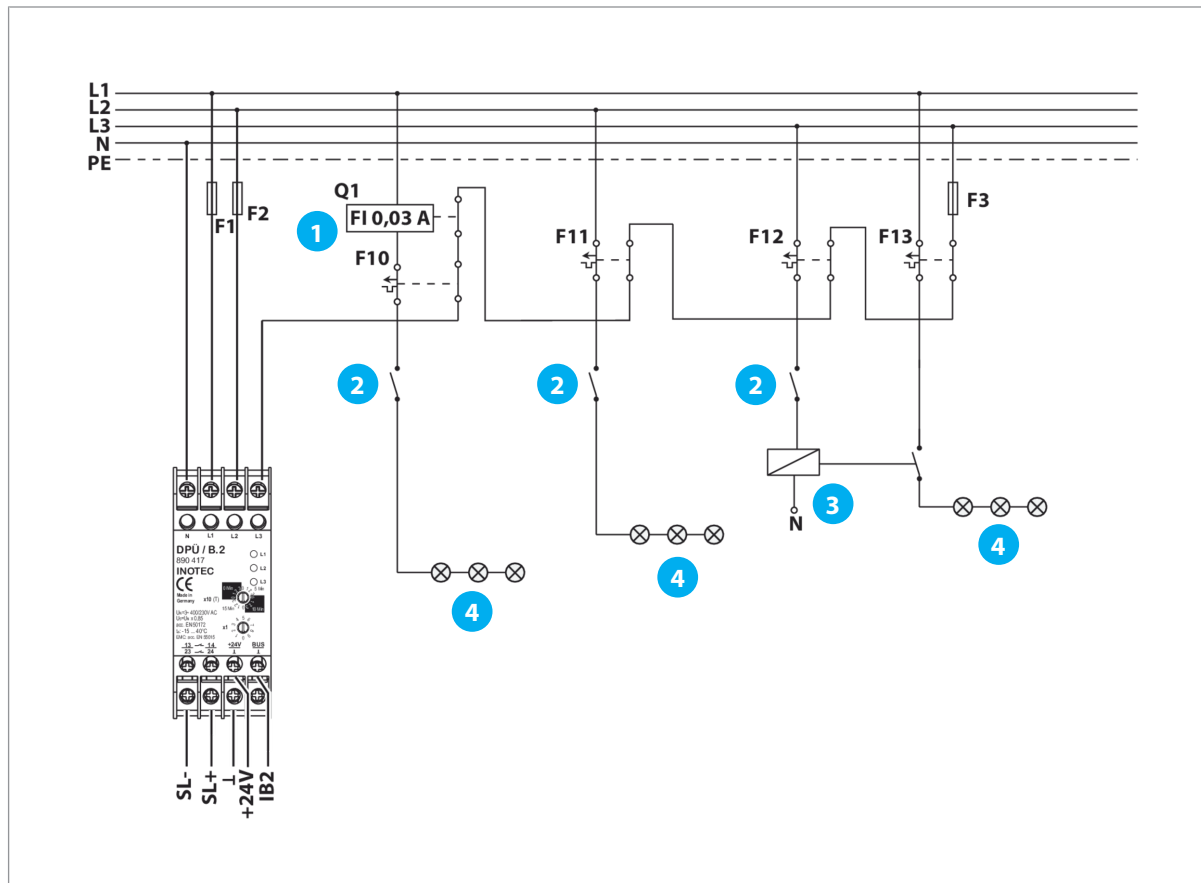


Illustration 10: DPÜ/B.2

1	General lighting fuses	2	Switch
3	Auxiliary contact protection	4	General lighting



NOTICE

The internal device bus must be connected to supply the DPÜ/B.2 and to display the available phases. If the device bus is interrupted, the message *Communications error* appears in the controller. The emergency lighting switches on.



6.7 MTB Key-Operated Switch Table

- ▶ Connect the MTB key-operated switch to the system signalling contacts according to MTB manual supplied.



NOTICE

With a cross section of 0.5 mm², the line length between system and the MTB may not exceed 500 m.

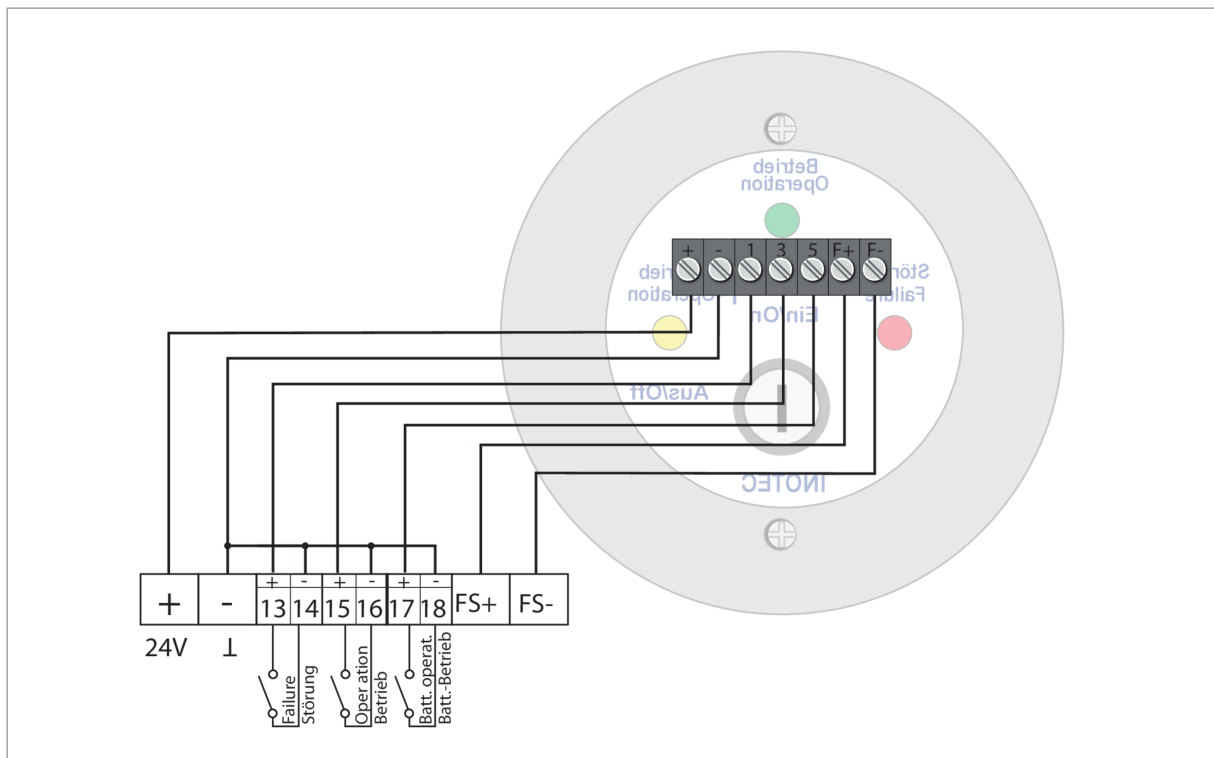


Illustration 11: MTB connection

The MTB has the following status displays on the front panel:

Display	Explanation
Green LED	Operation
Yellow LED	Battery operation/emergency power mode
Red LED	Failure
Key-operated switch ON	The system is blocked
Key-operated switch OFF	The system is released

To block the system, follow the instructions from the TFT controller manual.



6.8 Final Circuits

! DANGER

Lethal electric shocks!

The batteries are always at a hazardous voltage.

- ▶ Only qualified staff may carry out work on the battery sets.
- ▶ Disconnect the device from the power supply (mains and battery voltage) before working on it or replacing components (see *Switching the system off (38)*).

! DANGER

Lethal electric shocks!

Electrical components in the control cabinet have a lethal voltage.

- ▶ Disconnect the device from the power supply (mains and battery voltage) before working on it or replacing components (see *Switching the system off (38)*).

The ELS 220 has up to 8 circuits. Up to 160 luminaires can be monitored on them. Up to 20 luminaires can be connected per circuit.

Each of the circuits can be loaded with up to 2 A/230 V.

Each luminaire must be assigned to a clear address with the address switch. The luminaire is displayed in the controller via this address (see *TFT Controller manual*).

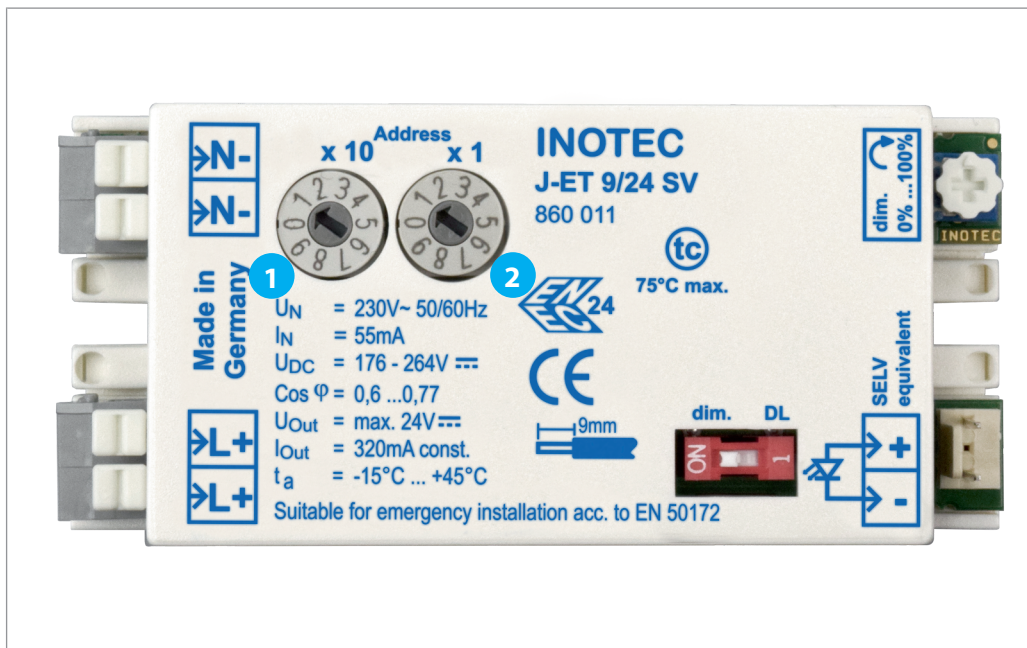


Illustration 12: Address Switch Sample Illustration: Here, the luminaire has the address 11.

1 Address switch ten digits

2 Address switch one digit



6.9 24 V Current Loop

Connect the SL+/SL- terminals to the closer of the DPÜ to switch the safety luminaires in a sub-distribution board in the event of a power failure.



NOTICE

When monitoring several sub-distribution boards, the contacts for the current loop must be switched in sequence.

The 24 V current loop must be monitored for short circuits and interruptions by a monitoring loop function. For this, connect a zener closure diode in the loop concerned.



NOTICE

The zener closure diode must be installed on the last DPÜ module in series to the last switch contact.



NOTICE

After verification, bridge the current loop until the end of assembly. This prevents the system from being switched on if a fuse is switched off during work.



NOTICE

If several systems are to be switched on simultaneously in the event of a sub-db failure, the optional signalling contact can be connected to the current loop of the following system. Zener closure diodes can be used to monitor the circuits for short circuits and interruptions.



6.10 Interfaces

6.10.1 INOWeb

You can check the status of the device with the INOWeb module integrated in the TFT controller using a network connection. After entering the IP address in a web browser, the status of the system and any monitored luminaires is displayed as a graphic.

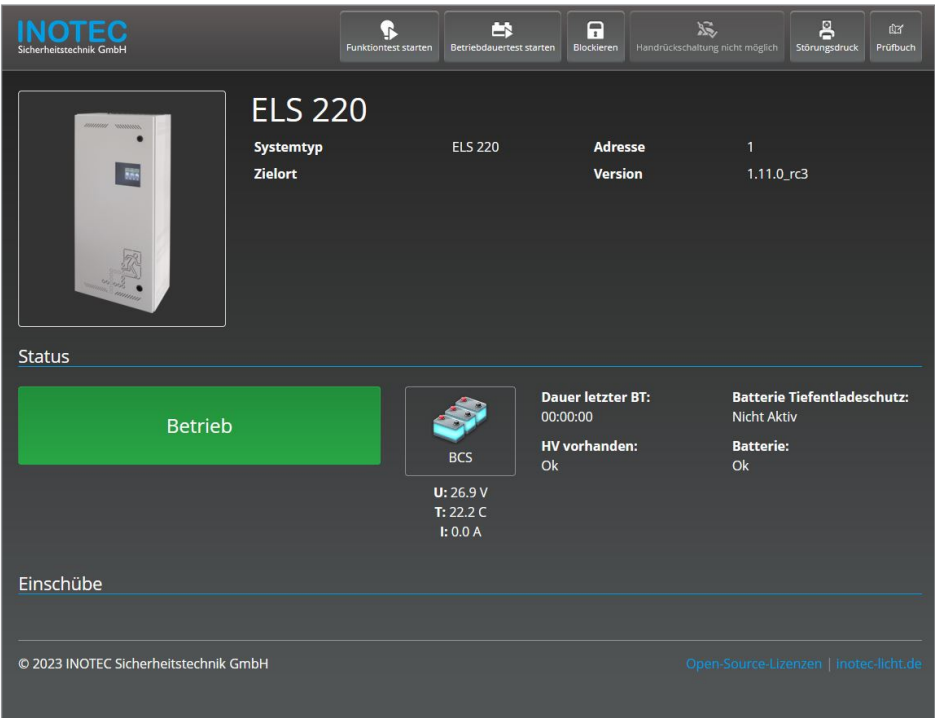


Illustration 13: INOWeb ELS 220

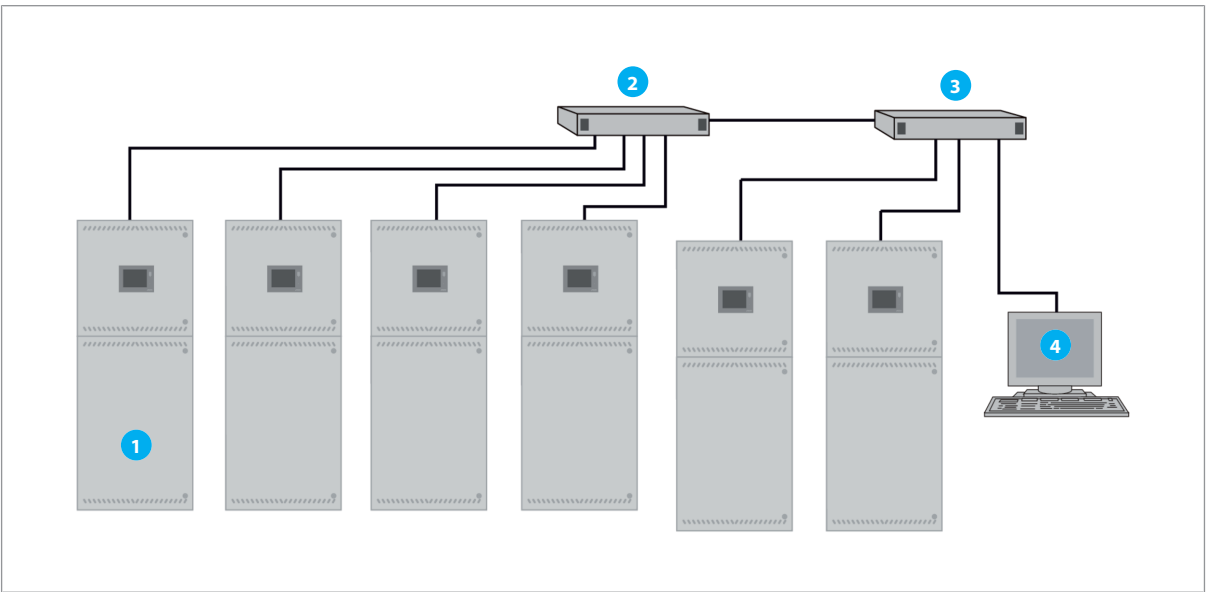


Illustration 14: Communication between emergency lighting devices and INOWeb

1	Emergency lighting device	2	HUB/switch
3	HUB/switch	4	INOWeb control

**NOTICE**

Poor cable quality can lead to communication problems. Use at least CAT 5 quality Ethernet cables.

**NOTICE**

If the cable is too long, communication problems can occur. Ensure each individual cable is no longer than 100 m.

6.10.2 INOLan

With the INOLan interface, it is possible to display the ELS 220 in the INOView software. Configuration using a network (FTP) is also possible.

**NOTICE**

If an external INOLan module is used, the INOLan.2 module must be used. Configuration using the network (FTP) is then possible.

6.10.3 SPE Switch

With the SPE switch (item number: 104204874), the cable length within the network can be increased. Several switches can be connected to each other.

With a cable length of up to 1,000 m, a transmission speed of 10 or 100 MBit/s is possible. Monitoring and visualisation with the INOView software is thus possible even over greater distances.

The switch is mounted on the top-hat rail and connected with RJ45 connections.

Refer to the SPE Switch manual for information about the installation, connection and operation.



7 Commissioning

7.1 Before Commissioning



DANGER

Burns caused by arcing!

Never switch the mains voltage and the battery power supply on or off under load as this can lead to arcing.

- ▶ Before switching off the mains voltage and the battery power supply, switch off the final circuits, e.g. by blocking the system.



NOTICE

Insert the front panel and screw it to the system before you commission the system.

7.1.1 Check connections

- ▶ Make sure that the mains cable is correctly connected to the L, PE and N (AC IN) terminals.
- ▶ Ensure the polarity of the batteries is correct before inserting the battery fuses.
- ▶ Check whether the battery connections are tightened according to the torque stated in the battery manual.
- ▶ Check all components for mechanical damage.
- ▶ Check the BUS data lines and the data lines are correctly connected.
- ▶ Check the BUS data lines and the data lines have the correct polarity.
- ▶ Check external subassemblies are correctly connected.
- ▶ Check whether the DPÜ current loop (SL+/SL-) is connected correctly.



NOTICE

If the current loop is not connected via DPÜ modules in sub-distribution boards, the system immediately switches to *Sub-db failure sub-distribution board* mode.

7.1.2 Carrying out insulation measuring



NOTICE

As per DIN VDE V 0108-100-1, carry out insulation measuring on the final circuits in accordance with DIN VDE 0100-600 before commissioning.



NOTICE

The measuring voltage may not exceed 500 V DC. The measuring current may not exceed 1 mA.

**NOTICE**

The measuring devices used must comply with DIN VDE 0413.

- ▶ Disconnect the system from the power supply and secure it against being switched on again.
- ▶ Take the insulation measurement at the terminals of the final circuit.

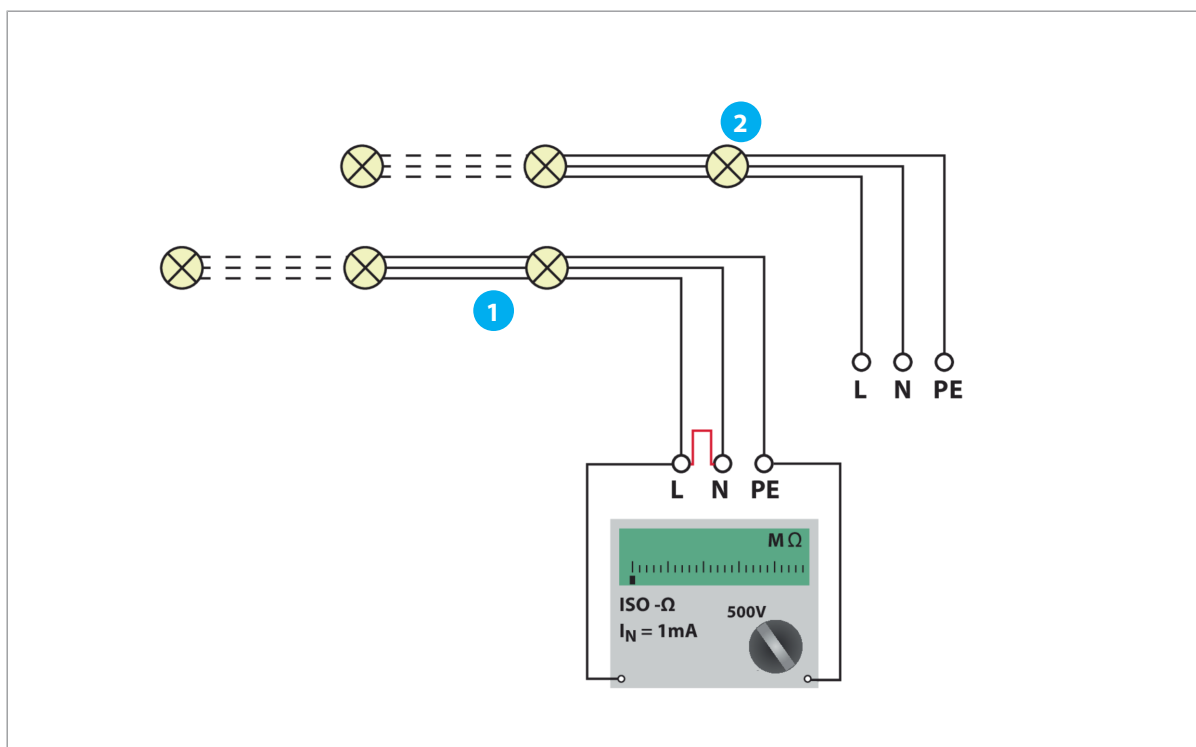


Illustration 15: Final circuit insulation measuring

1 Final circuit 1.1

2 Final circuit 1.2

Proceed as follows for all final circuits to be tested:

- ▶ Bridge L and N on the final circuit.
 - ▶▶ This protects active components from being damaged by the measurement.
- ▶ Take the insulation measurement for the final circuit.

Once the insulation measuring has been successfully passed:

- ▶ Remove the bridge between the L and N in the final circuit.
- ▶ Switch the power supply to the system back on.



7.2 Switching the system on

- ▶ Switch on the mains voltage.
- ▶ Insert the battery fuses.
 - ▶▶ The controller initialises itself and displays the current operating status.
- ▶ Complete the necessary settings in the software (see *TFT Controller manual*).
- ▶ Check the device in accordance with the standards specified in section *Initial test (40)*.



NOTICE

Before the first function test, the batteries must charge for at least 24 hours.

7.3 Complete basic settings

- ▶ If more than one ELS 220 systems is used, assign a unique system number (1 – 63) to each controller.
- ▶ Program the automatic function test (see *TFT Controller manual*).
 - ▶▶ The normative requirements of the weekly function inspection of the emergency lighting system are met.
- ▶ Block the system (emergency lighting and maintained light) in operational downtimes to protect the back-up power source against inadvertently discharging.
 - ▶▶ The service life of the battery increases.

7.4 Switching the system off



WARNING

External voltage on the 230 V LSA contacts after switching off the system!

There may be voltage on the 230 V LSA contacts even after the system has been switched off.

- ▶ Measure the contacts of the internal LSA. If there is external voltage there, switch it off.

- ▶ Block the system.
- ▶ Block emergency lighting and maintained light (see *TFT Controller manual*).
- ▶ Remove the battery fuses.
- ▶ Switch off the mains voltage.





NOTICE

Block the device to prevent the device inadvertently switching to battery operation when switching off or removing battery fuses. Blocking the system prevents switching to battery operation in the event of a power failure.



8 Status displays and programming

8.1 Change-over device

Icon	LED colour	LED behaviour	Explanation
F	Red	Permanently lit	Luminaire failure
F	Red	Flashing at 3-second intervals	Overloaded circuit
F	Red	Flashing for 0.5 seconds	No output voltage in Joker mode
F	Red	Flashing in 1 second intervals	Bus failure
	Yellow	Permanently lit	Non-maintained light switched on
	Yellow	Permanently lit	Maintained light switched on



9 Tests

- ▶ Test the device in accordance with valid national and regional standards and regulations in force at the place of deployment.

The following information does not claim to be complete.



NOTICE

Inspections may be carried out only by a specialist for emergency electric power supplies according to VDE 0558-508:2022-10.

9.1 Initial test

- ▶ Charge the batteries for at least 24 hours before the initial functional test.
- ▶ Test the device in accordance with the following standards.
 - DIN EN 1838 (Applied Lighting Technology – Emergency Lighting)
 - DIN 5035-6 (Lighting with Artificial Light - Part 6: Measuring and Evaluation)
 - VDE 0100-560 (Erection of Low-Voltage Installations – Part: 5-56: Installations for Safety Purposes)
 - VDE 0100-600 (Erection of Low-Voltage Installations – Part 6: Inspections)
 - VDE 0100-718 (Erection of Low-Voltage Installations – Part 7-718: Requirements for Business Premises, Rooms and Systems of a Special Kind – Public Institutions and Workplaces)
 - VDE V 0108-100-1 (Safety Lighting Systems – Part 100-1: Proposals for Supplementary Specifications to EN 50172:2004)

9.2 Periodic tests

- ▶ Conduct periodic tests in line with the valid national and regional regulations in force at the place of deployment.
- ▶ Document the relevant tests with the date and result of the test in the system log book.



WARNING

Functional failure of the system!

The battery is discharged to deep discharge protection during the battery duration test. Its full output capacity is achieved only after complete recharging.

- ▶ Only carry out the battery duration test if the risk of a power failure is low and you have taken the appropriate safety measures.



NOTICE

Automatic test devices must comply with DIN EN 62034.



9.2.1 Daily checks

- ▶ Complete a visual inspection of the device displays every day to confirm the system is ready for use.



NOTICE

If the operating status is constantly monitored by, for example, a remote mimic panel (MTB), the device does not have to be tested directly. The following operating statuses must be transferred to the monitoring equipment: *System ready for use*, *system in emergency lighting mode* and *System failure*.

9.2.2 Weekly tests

- ▶ Switch to the power source every week for safety purposes.
- ▶ Check the function of every safety luminaire.
- ▶ Carry out a functional test using remote monitoring or from the controller (see *TFT Steuerteil manual*).

9.2.3 Monthly tests



NOTICE

A power supply failure for the general lighting is simulated during a functional test.

- ▶ Carry out a functional test every month.
- ▶ Run all safety luminaires in battery operation mode during the functional test.
- ▶ Check the function of every safety luminaire.
- ▶ Reinstate the power supply to the general lighting.
- ▶ Check the functionality of the monitoring equipment for the device.

9.2.4 Six-monthly tests

- ▶ Carry out a functional test of the insulation monitoring systems every six months (see *TFT Controller manual*).



9.2.5 Annual tests



NOTICE

Annual tests may not be carried out automatically.



NOTICE

The battery duration test checks battery capacity for the rated operating time.



NOTICE

Start the battery duration tests at the user's site outside operating hours or at a time when there is minimum risk to the user. Alternatively, position temporary back-up lighting, as the back-up power source may not be able to provide sufficient energy for the lighting for the entire recharging time.

- ▶ Carry out an annual battery duration test via remote monitoring or from the controller to check the rated service time for the safety luminaires.
- ▶ Check the function of every safety luminaire.
- ▶ Clean dirty safety luminaires.
- ▶ Replace faulty safety luminaires.
- ▶ Check every safety luminaire for the required service life.
- ▶ Reinstate the power supply to the general lighting.
- ▶ Check the functionality of the charging system.

Also document the inspection with the inspection stickers supplied in the inside of the cabinet door.

9.2.6 Checks every three years

Measure the illumination level of the safety lighting in accordance with DIN EN 1838 at least every three years.

9.3 Battery inspection and battery monitoring

Test the batteries and control gear (battery charger, ventilation) regularly in accordance with DIN EN IEC 624852.



DANGER

Lethal electric shocks!

Electrical components in the control cabinet have a lethal voltage.

- ▶ Disconnect the device from the power supply (mains and battery voltage) before working on it or replacing components (see *Switching the system off (38)*).



NOTICE

When inspecting the batteries, observe the battery manufacturer's requirements as well. The specific inspection points can deviate from the items below.



- ▶ Check the following points (also follow the battery manufacturer's installation and operating manual):
 - Voltage setting of the charging device
 - Voltages for the individual battery blocks and the overall battery
 - Electrolyte density and electrolyte level (if applicable)
 - Cleanliness and tightness
 - Connectors securely seated
 - Ventilation
 - Plugs or valves
 - Battery temperature
- ▶ Replace any defective battery blocks.

**NOTICE**

The batteries used should have an age difference of less than one year. With a voltage difference of more than 2.5 V, the message *Asymmetric battery* appears in the controller.

With an unequal load, the running time of the batteries reduces. Replace all batteries used at the same time to ensure the supply of the safety and emergency exit luminaires.

9.4 Reports for repeat tests

9.4.1 Test report

- ▶ Document the repeat tests and results in the log book.
- ▶ Keep log books for at least four years.

**NOTICE**

You can use the INOTEC log book folder 'Safety lighting log book' for manual log book entries and for reporting modifications.

**NOTICE**

Potential warranty claims require written proof of annual maintenance.

9.4.2 Battery inspection sheets

The written proof of annual maintenance must include the following values for the start and end of loading:

- Room temperature
- Charging voltage/charging current
- Discharge current
- Voltage at the individual battery blocks and the entire battery

**NOTICE**

Potential warranty claims require written proof of annual maintenance.



10 Technical Specifications

10.1 All Variants

Rated voltage	1~N/PE 230V 50/60Hz
Rated current	3.0 A
maximum output	500 W
Battery supply voltage	24 V DC
maximum number of circuits	8
maximum number of luminaires per circuit	20
maximum number of LSA 3.1 modules supported	8
maximum number of LSA 8 modules supported	3
Cable inlets	25x M20, 3x M25
maximum feeder size for the feeder in mm²	4
maximum feeder size of the 24 V current loop in mm²	2.5
maximum feeder size of the final circuits in mm²	2.5
maximum feeder size of the light sequence switching in mm²	2.5
maximum feeder size of the signalling contacts in mm²	2.5
Dimensions H x W x D in mm	850 x 400 x 240
permissible ambient temperature	-5 °C – +25 °C
Permissible ambient humidity	maximum 85 %, non-condensing
Protection class	I
Protection category	IP31
Color	RAL 7035

10.2 ELS 220

10.2.1 ELS 220/500 26 Ah, ELS 220/500 40 Ah

	ELS 220/500 26 Ah	ELS 220/500 40 Ah
maximum discharge current 1 h	1.13 A	1.84 A
maximum discharge current 1.5 h	0.80 A	1.33 A
maximum discharge current 2 h	0.64 A	1.04 A
maximum discharge current 3 h	0.44 A	0.70 A
maximum discharge current 8 h	0.16 A	0.31 A
installed battery capacity	26 Ah	40 Ah



	ELS 220/500 26 Ah	ELS 220/500 40 Ah
Battery charger	2.6 A	4 A
Weight in kg	approx. 40	approx. 52

10.2.2 Permissible Types of Change-Over Devices for ELS 220

Change-over device / type	Number of final circuits	Maximum load of the final circuits
EP 4x 2 A	4	2 A

10.3 Components

10.3.1 Light sequence switching module LSA 3.1

10.3.1.1 LSA 3.1 230V

Rated voltage	230 V AC
permissible ambient temperature	-15 °C – +40 °C
Housing material	Thermoplast V0
Protection class	II
Protection category	IP20 (terminal)/IP40 (housing)
Earth wire connection in mm²	2.5 (solid-core) or 1.5 (stranded with cable end sleeve)
EMC protection	as per EN 55015
Dimensions H x W x D in mm	90 x 17.5 x 59

10.3.1.2 LSA 3.1 24V

Rated voltage	24 V DC
permissible ambient temperature	-15 °C – +40 °C
Housing material	Thermoplast V0
Protection class	III
Protection category	IP20 (terminal)/IP40 (housing)
Earth wire connection in mm²	2.5 (solid-core) or 1.5 (stranded with cable end sleeve)
EMC protection	as per EN 55015
Dimensions H x W x D in mm	90 x 17.5 x 59



10.3.2 Light sequence switching module 8.1

10.3.2.1 LSA 8.1 230 V

Rated voltage	230 V AC
permissible ambient temperature	-15 °C – +40 °C
Housing material	Thermoplast V0
Protection class	II
Protection category	IP20
Earth wire connection in mm²	2.5 (solid-core) or 1.5 (stranded with cable end sleeve)
EMC protection	as per EN 55015
Dimensions H x W x D in mm	90 x 71.5 x 59

10.3.3 DPÜ

10.3.3.1 DPÜ

Rated voltage U_n	230 V AC / 400 V AC
Overload capacity	1.1 U_n continuous
Rated consumption	approx. 2 VA
Rated frequency	50/60 Hz
Response value	0.85 U_n
Contact configuration	1 changeover contact
I_{\max} contact	30 V DC, 1 A/230 V AC, 0.5 A (resistive load)
Rating	Continuous operation
permissible ambient temperature	-20 °C – +40 °C
Protection category	IP20 (terminal)/IP40 (housing)
Housing material	Thermoplast V0
Earth wire connection in mm²	2.5 (solid-core) or 1.5 (stranded with cable end sleeve)
EMC protection	as per EN 55015
Dimensions H x W x D in mm	90 x 17.5 x 59

10.3.3.2 DPÜ/B.2

Rated voltage U_n	230 V AC / 400 V AC
Overload capacity	1.1 U_n continuous
Current consumption	10 mA
Rated frequency	50/60 Hz
Response value	0.85 U_n
Contact configuration	2 closers
I_{\max} contact	30 V DC, 1 A
Rating	Continuous operation



Bus connection	Internal device bus (IB)
Address range	1 ... 31
permissible ambient temperature	-15 °C – +40 °C
Protection category	IP20 (terminal)/IP40 (housing)
Housing material	Thermoplast V0
Earth wire connection in mm²	2.5 (solid-core) or 1.5 (stranded with cable end sleeve)
EMC protection	as per EN 55015
Dimensions H x W x D in mm	90 x 36 x 59

10.3.4 MTB Key-Operated Switch Table

Type of installation	Wall or flush mounted
Protection category	IP30
Housing material	Stainless steel/aluminium velour lacquered
Dimensions diameter x depth (wall mounting) in mm	90 x 43
Dimensions diameter x depth (flush mounting) in mm	90 x 56.5 (hole cut-out: 74 mm, installation depth 50 mm)

10.3.5 SPE Switch

Rated voltage	24 V DC
Current consumption	35 mA
maximum power loss	1 W
Earth wire connection in mm²	1.5
permissible ambient temperature	-15 °C – +40 °C
Protection class	III
Protection category	IP20
Housing material	Thermoplast V0
Dimensions H x W x D in mm	91 x 71 x 57.5



11 Spare parts

WARNING

Danger from incorrect or faulty spare parts!

Incorrect or faulty spare parts are a potential source of fire and can cause electric shocks. They can lead to faulty operation or functional failure of the system.

- ▶ Only use INOTEC original spare parts.

We only guarantee that INOTEC original spare parts fully comply with the safety requirements. Warranty, service and liability claims are void if unsuitable spare parts are used.

Contact our Service Network, stating the following information




- Project name
- Device type and serial number from the rating plate
- A short description of the failure
- Plain text information from the controller

. You can reach it at following addresses:

Tel: +49 (0)2938 9730-777

Fax: +49 (0)2938 9730-642

Email: kundendienst@inotec-licht.de

1 ELS 220		Dezentrales Notlichtsystem Local emergency lighting system		
2 ELS 220/500 26Ah IP31 850x400x240		Anlage gem./ Build to EN 50171 / 50172		
Teil / Item: 3 104504766		System geprüft / System checked		SNR / Serial: 4 2400003257
U _N Netz / Mains: 230V ~50/60Hz I _N Netz / Mains: 2,8A Ladeteil / Charger: 2,6A U _{Batt.} Kapazität / 24V / 26Ah Capacity: Schutzklasse / Class: I Schutzart / Category: IP31		10.06.2024 Datum / Date Unterschrift / Signature		
INOTEC Sicherheitstechnik GmbH Made in Germany		Inbetriebnahme / Commissioning Datum / Date Unterschrift / Signature		
				5 

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Fax +49 2938 9730-29 · info@inotec-licht.de · www.inotec-licht.de

Illustration 16: ELS rating plate example picture

1	Serial number	2	Part number
3	Part number	4	Serial number
5	Manual QR code		



12 Disposal

Batteries and electronic components we have supplied can be returned to us.

Otherwise, you will have to dispose of the batteries and electronic components in accordance with national regional standards and regulations for the disposal of used batteries and electronic components.



13 Appendix

13.1 Documentation

Further information on the ELS systems can be found at <https://inot.ec/systeme> and via the QR code.



This includes:

- Housing views
- Wiring diagrams
- Terminal schemes

The information is available in the following file formats:

- PDF
- DXF
- DWG
- WSCAD

13.2 Wire lengths

The following maximum wire lengths must not be exceeded:

Components	Minimum wire cross section	Maximum wire length
24 V current loop	0.5 mm ²	500 m
	1.5 mm ²	2000 m
RTG bus	0.5 mm ² /1.5 mm ²	500 m
Device bus IB	0.5 mm ² /1.5 mm ²	



NOTICE

Different buses must be routed in separate lines. Otherwise, communication failures may occur.



13.2.1 Maximum voltage drop of 10 %

The information in the following table refers to a specific branch.

Number of DPÜ/B.2 on IB2 or IB3	Minimum wire cross section	Maximum wire length*
5	0.5 mm ²	500 m
	1.5 mm ²	
10	0.5 mm ²	336 m
	1.5 mm ²	500 m
20	0.5 mm ²	224 m
	1.5 mm ²	500 m
25	0.5 mm ²	134 m
	1.5 mm ²	403 m
30	0.5 mm ²	112 m
	1.5 mm ²	336 m
31	0.5 mm ²	108 m
	1.5 mm ²	325 m

* The maximum wiring length is the maximum overall length for all line strands including branch lines.



NOTICE

Line lengths may not exceed 500 m. Longer line lengths may cause communication failures.



Glossary

Blocking

Serves to shut down power consumers as required in normal / mains operation. Setting the function in the controller of the emergency lighting system.

1. Option: Remote switch blocks maintained light (DL): Power consumers are switched off, but are switched on automatically when emergency lighting is required. 2. Option: Remote switch blocks emergency lighting (NL) and maintained light (DL): Power consumers remain switched off, even when emergency lighting is required (setting complies with regulations).

Current loop

Series connection of volt-free contacts of three-phase monitors, low-voltage monitoring devices and/or secondary contacts for monitoring sub-distribution boards of the general lighting system and its lighting circuits (SL+/ SL-).

DPÜ/B

Three-phase monitor with integrated bus connection to the device bus of the emergency lighting system.

Emergency Lighting Delay

When this function is activated, all connected emergency luminaires remain switched on for the preset time when the emergency lighting device switches back to normal operation after a main-db failure or a sub-db failure.

Final circuit

The emergency luminaires are connected to the final circuits on an emergency lighting system. The type and number of final circuits depends on the type of device. The maximum number of emergency luminaires depends on the final circuit and the valid national regulations.

Function test

Tests the function of the emergency lighting device and the power consumers in DC mode when emergency lighting is required.

IB

Internal device BUS for connecting INOTEC modules (circuits, LSA, DPÜ/B, etc.).

Indicator panel

External device for central display of device-relevant modes "Operation", "Battery operation", "Failure".

INOTEC Configurator

Software to configure emergency lighting systems on a PC.

INOView

Software for monitoring the system status right up to the luminaire level.

INOWeb

Ethernet module with integral web server. Facilitates access to the device status from a web browser.

Joker

Patented circuit for simultaneously operating non-maintained and maintained luminaires in one final circuit.

Light sequence switching module

Module for switching final circuits or luminaires in final circuits using switch inputs in the module.

Logbook

Documentation of all events and messages of the emergency lighting device. This can be kept electronically or manually.

LSA 3

Light switching module with 3 input channels.

LSA 8

Light switching module with 8 input channels.

**Non-maintained light**

Emergency lighting / circuit is switched off in mains operation and is switched on in emergency operation.

RTG bus

BUS system developed by INOTEC for monitoring emergency lighting devices with other INOTEC systems or software. Serial report or interface for visualising the system. Can also be displayed via the Ethernet or a network. Colour coding: red (R), black (T), blue (G)

Switched maintained light

Mode for final circuits or luminaires in the final circuit that are switched with the general lighting via LSA 3, LSA 8 or DPÜ/B during mains operation.

TFT Controller

Integrated controller software with touch display to control emergency lighting systems.

Three-phase monitor

Module for monitoring the voltage of the three phases (L1, L2, L3, N) of sub-distribution boards / general lighting circuits. If one of the 3 connected phases fails, all power consumers are switched on.



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