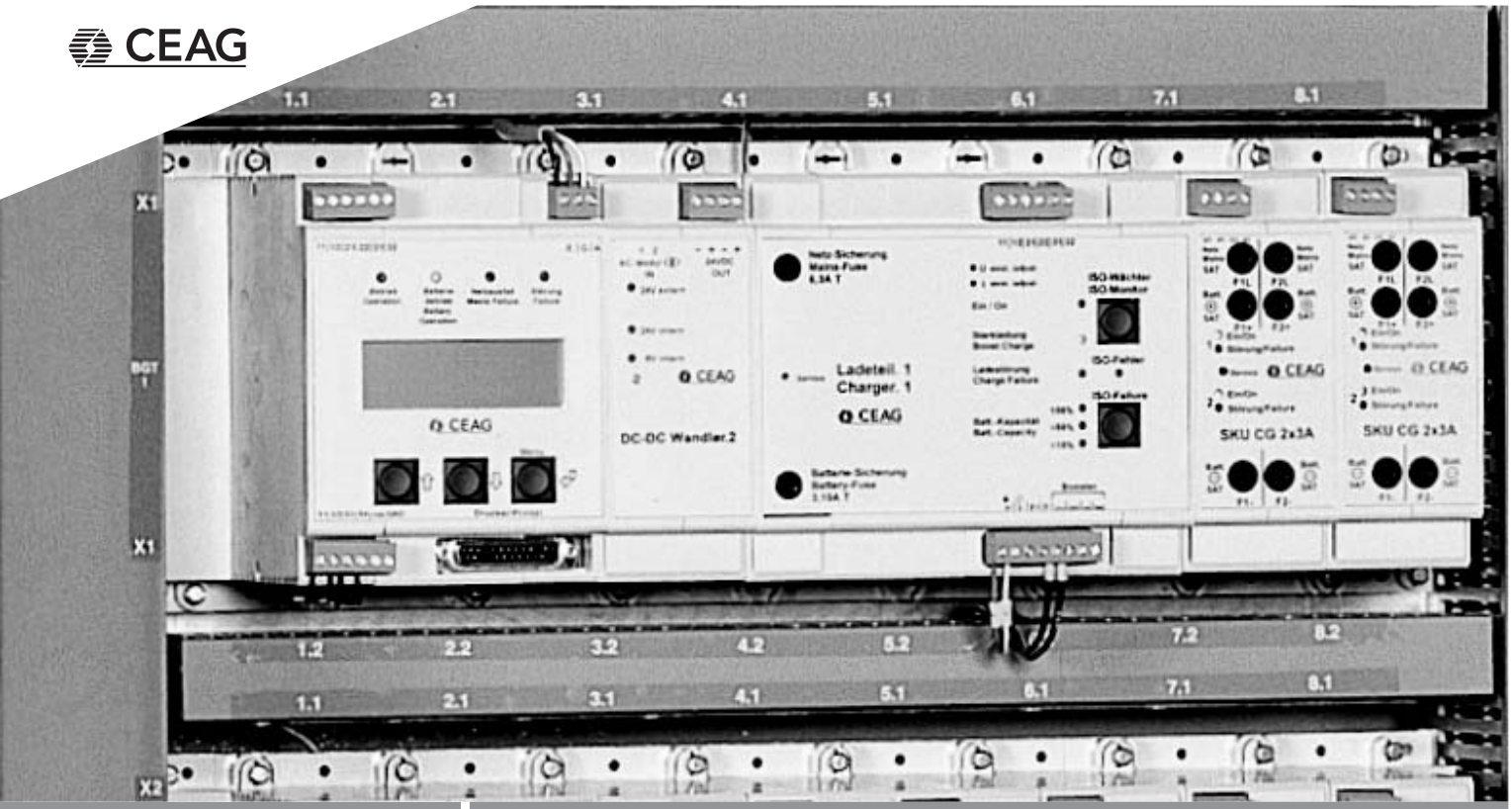
CEAG



Mounting and Operating Instructions

Central Battery System ZB96 / US96

Target group, part 1: Qualified electrician acc. to DIN VDE 0105, part 1

Target group, part 2: Electrical instructed persons

COOPER Safety

Mounting and Operating Manual
Central Battery System ZB 96
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1 Important Notes

Mounting work must only be carried out by skilled electrical personnel (see IN VDE 0105 Part 1; the Accident Prevention Rules BGV A4 of the (German) Trade Workers' Compensation Association (Hauptverband der gewerblichen Berufsgenossenschaften) or equivalent provisions and guidelines applicable in the country where the system is installed and operated).
Other persons may perform the work described in this manual only if

- they have been expertly instructed and trained,
- their tasks and activities have been accurately defined and understood,
- the work is carried out under the supervision of expert electrical personnel.

When working with this manual the following notes provided with attention-attracting graphical symbols and identifiers (eg Note) shall be carefully observed:

Note:
indicates important hints and advice in connection with handling or manipulating the appliances or plant units described.

Attention!
draws attention to dangerous situations that may result in damage to plants or plant units as well as environmental hazards.

Warning!
draws attention to dangerous situations that may result in personal injuries or major damage to plants or plant units as well as major environmental damage.

Danger!
draws attention to dangerous situations that may result in life-threatening personal injuries or most serious damage that consequentially may endanger persons or the environment.

Moreover, when using this mounting and operating manual observe the following:

Warning!
The figures and elementary diagrams in this mounting and operating manual sometimes serve the sole purpose of providing elucidation on the subject matter described. Wherever

- **dimensionally true work is to be performed or**
- **precise drawings or circuit diagrams tailored to local needs are required,**

the drawings and diagrams especially prepared for the lighting system must be strictly adhered to.

Note:
In the event a polyphase operation is not at all or only conditionally allowed, observance of the applicable national rules and regulations is to be viewed as a prerequisite in the sense of the Intended Use Paragraph (see 8 Intended Use).

Warning!
Only perform work for which you are adequately qualified and specifically trained in the framework of local and operational needs! Work necessary for extensions, retrofits or repairs that has not been described in this manual must be carried out by specially trained expert service personnel (to be delegated by CEAG as manufacturer or sales and service companies authorized by CEAG)!

Attention!
When performing work on the unit ESD protection rules must be observed!

2 Product Description

The central battery system serves for the battery-backed control and emergency supply of an emergency lighting system.

The functions of the individual circuits are defined with the help of a user-friendly parameterization system.
Three operating modes can be set:
❒ Individual monitoring

Requirements: Electronic ballasts/modules of type CG (CEWA GUARD) must be used.

❒ Non maintained light
❒ Maintained light
❒ Switched Maintained light

These operating modes enable the emergency lighting system to be activated as follows:

❒ **Non maintained light:** The emergency lighing is switched on
  – if the general lighting system fails due to the general power supply being interrupted,
  – when functional or duration testing has been activated manually or automatically.

❒ **Maintained light:** The emergency lights are always on.

❒ **Switched Maintained light:** The emergency lighing is switched on
  – if the general lighting system fails due to the general power supply being interrupted,
  – when functional or duration testing has been activated manually or automatically,
  – as a result of switching checks (eg initiated by DLS modules).

All settings are saved to a non-volatile memory so that they are not lost in case the entire power supply (230 V mains and battery backup) is down.

Low-maintenance batteries are used to power the emergency lighting system in the event the normal 230 V power supply system is on failure.
During normal operation the system monitors the batteries' charging condition and, whenever needed, performs charging as necessary.

The system has been designed and manufactured in conformity with the following EU guidelines:
❒ Low-voltage guideline 73/23/EWG as amended by guideline 93/68/EWG
❒ Guideline 89/336/EWG on electromagnetic compatibility
Details of national (DIN), European (EN) and international (IEC) standards complied with are included in the unit's CE Statement of Compliance.

Warning!
Since the central battery system is an important component within a facility's security system, any planning, commissioning and parameterization activities have to be performed by experts perfectly familiar with the related safety equipment and systems.

Fig. 1: ZB96 of type ZB 96/200S and for operation with a battery capacity of up to 240 Ah and up to 26 SKU CG modules

Fig. 2: ZB 96 of type ZB 96/ LAD for operation with battery capacities of up to 240 Ah and up to 10 charging boosters 2.5 A.
This unit is capable of powering up to 15 type US 96 substations with 230 V mains and battery power.

To suit local conditions a number of different system configurations are employed. These standardized configurations are identified, for example, as follows:

❒ ZB 96/200S or ZB 96/200
To operate max. 26 or 18 circuit modules type SKU CG. Up to 6 substations US 96 can be supplied with battery and mains power (up to 6 substations, single-phase).

❒ ZB 96/LAD
These are designed as charging and monitoring units for the mains and Battery supply of a greater number of substations type US 96. Up to two SKU CG modules can be energized and controlled.

❒ ZB 96/200C, ZB 96/188C
Designed (as regards dimensions) to be operated in conjunction with CEAG compact battery cabinets (max. 10 or 18 SKU CG modules).

❒ US 96/200 or US 96/80
Designed as substations for operation with max. 36, 13 etc. circuit modules types SKU CG to perform only control and monitoring tasks for subsystems of the lighting equipment.
These substations do not provide for charging means for the connected battery emergency supply ; the battery and Mains supply is effected via the ZB 96 system.
What is included in this manual also applies analogously to the US 96 configurations listed under «3 Technical Data».

For emergency power supply CEAG battery cabinets or racks are employed. The storage capacity of the battery banks to be connected (battery cabinets or racks) is governed, inter alia, by the available charging capacity (see configurations listed under«3 Technical Data»).

Notes:

❒ Planning and design information can be seen from the CEAG catalog „Safety Luminaires and Safety Lighting Systems“ as amended under catchwords / chapters such as:
- Equipment Overview / Technical Data
- Planning
- Equipment Possibilities
- Inquiry Texts

❒ Under the heading «Components and Options» brief characteristics, technical data and ordering numbers for modules and supplements can be found that may be operated via a ZB96 or US96 system.

❒ Moreover, CEAG offers consultation and training services for planning, set-up and operation of lighting systems comprising the ZB96 system.

❒ For relevant information please visit our website www.ceag.de.

A ZB 96 system supplies and monitors lighting/emergency lighting circuits comprising luminaires and electronic ballasts included in the CEAG Safety Luminaires Program. For emergency power supply battery cabinets from the CEAL supply program can be used having a storage capacity of up to 240 Ah (see standard cabinet types under „3 Technical Data“.

In case luminaires are used that are fitted with
- CEAG-EVG ... CG,
- N-EVG with CG or
- 2L-CG , 2L-CG-SUW, 2L-CG-SK for third-party ballasts

each luminaire can be individually monitored since these ballasts are capable of being addressed (up to 20 luminaires for each circuit).
Data exchange between luminaire ballast and the system ZB 96 control unit does not require an additional data line but takes place via the existing luminaire circuits.

The following supplementary functions can be realized:

- ❒ Connecting CEAG 3-phase detectors (3PhW) to monitor the general supply system or its subdistribution boards. This enables a mains-to-emergency power switchover in case a phase of the general mains supply for general lighting purposes fails.
  – When using conventional CEAG 3-phase detectors in distribution boards signallingis effected via a 24-V current loop (connections S3 / S4 on the ST 20 control unit).

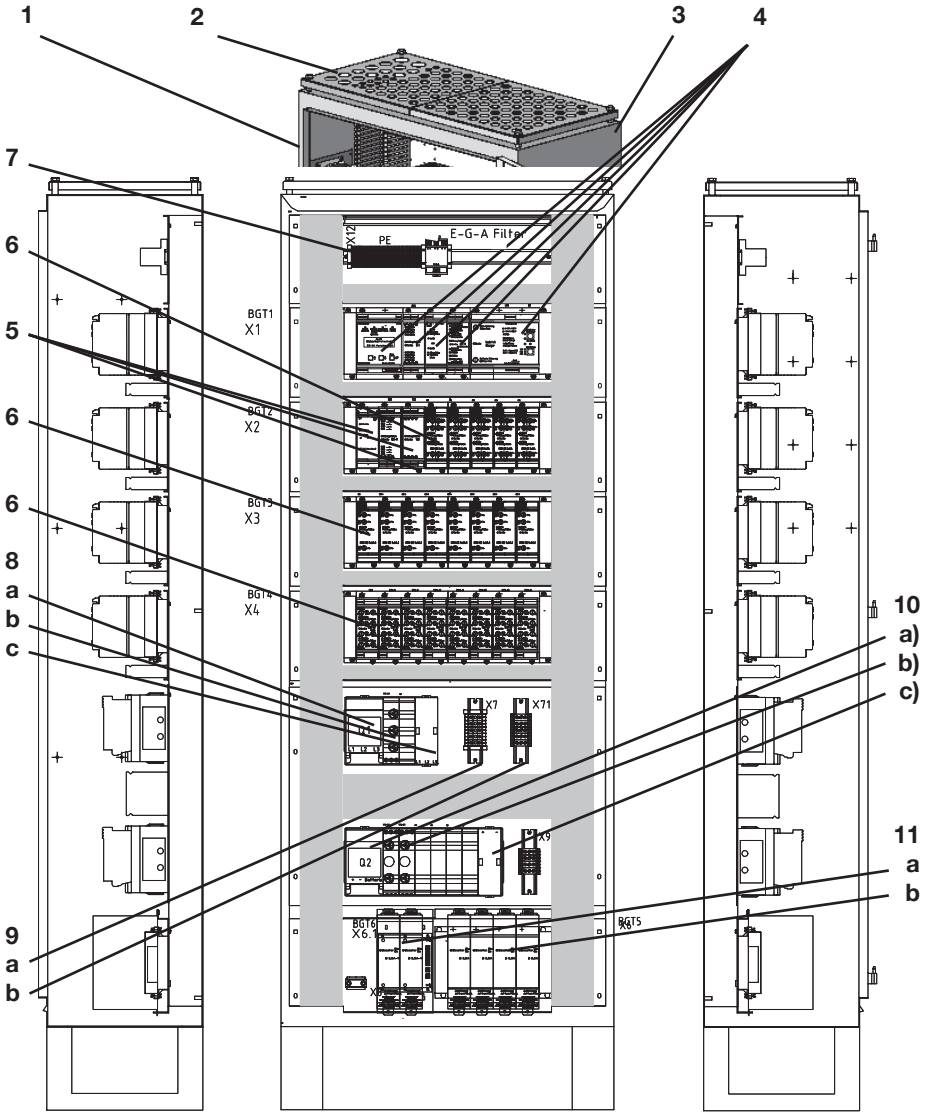
  Depending on its settings the ST 20 control unit will then control the emergency lighting circuits and signals are transmitted to a higher-ranking annunciator (F3 module or CG controller) or to a building automation system or the E/G/A bus.
- ❒ Monitoring the switching state of switches to enable local control of the general lighting system via DLS modules (see circuit diagrams under „11.7 Mounting and connection of Internal Modules“ et sqq.). Depending on its settings the control unit will then switch the relevant circuits „ON“ or „OFF“.
- ❒ Monitoring the switching states of staircase buttons for general lighting purposes by means of TLS modules. Similar to the above mentioned DLS modules the current switching states are transmitted to enable the respective emergency lighting circuits to be controlled.
- ❒ Floating signalling contacts of the ST 20 control unit:
  Via 3 signalling relay contacts on the ST 20 control unit the system's operating state can be detected and indicated for example via the LEDs of a CEAG F3 remote indication unit. The maximum load rating of the connections for these signalling contacts is 24 V AC/DC and 0.5 A; the maximum line length is 1000 m.
- ❒ Functional monitoring via a higher-ranking supervision system.
  For this purpose CEAG emergency lighting systems offer a CG controller or the CG Vision supervisory system.

  Further information in this context can be taken from the CEAG catalog or respective operating manuals.
- ❒ Connection of a CEAG F3 remote indicator unit (with key-operated switch).
  This device combines a status indication via the signalling contacts of the ST 20 control unit and a key-operated switch to deactivate/block the emergency lighting system.
  Messages indicated:
  – System operative
  – Battery operation
  – System on failure

  This F3 remote indicating unit may have a line length of up to 1000 m. The maximum cross sectional area is 2.5 mm².

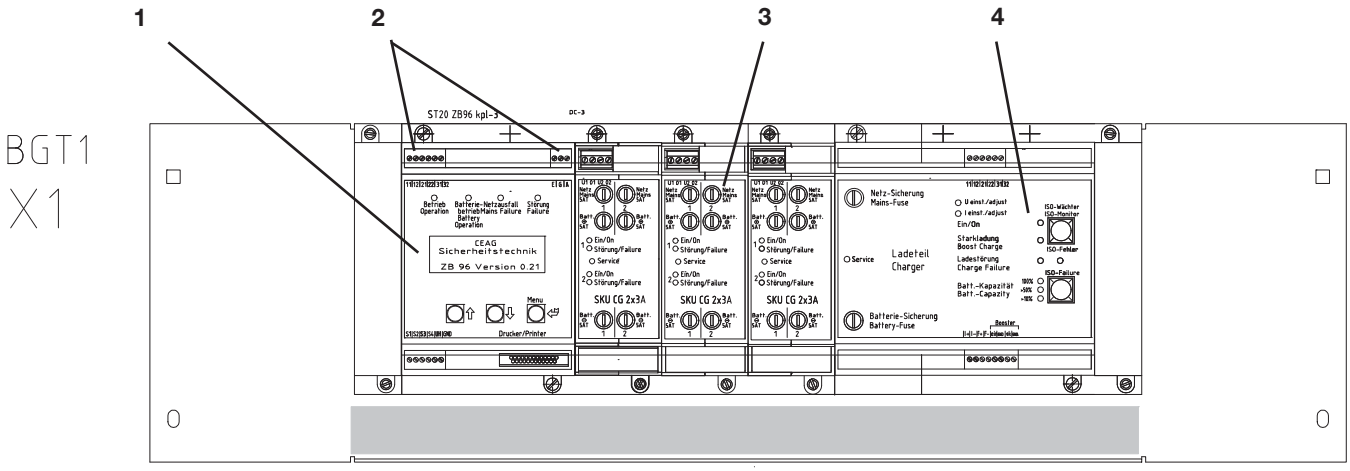
Note:
In the Federal Republic of Germany a remote indicating system must be mounted in permanently attended place as prescribed by DIN VDE 0108. Make sure to observe any national regulations ruling in the country where the lighting system is to be operated.

Fig. 3: Example of a control cabinet layout (ZB 96/200S)



1: **Control cabinet** including:
2: Top cover with prepunched cable glands for M type glands (eg. for end circuit leads and/or the supply of US 96 substations)
3: Control cabinet with mounted components (examples - right-hand door hinge)
4: **Control unit, DLS** and 2 slots for **LON module and CGIV module** as well as **charger** (battery monitoring and charging control).
5: **DC/DC converter** (for internal power supply to electronic compontents), **DLS, SDS 8 or TLS modules**
6: **3 x 8 slots SKU CG 2 x 3 A, SKU CG 1 x 6 A or SKU CG 4 x 1 A**
7: Terminal block for connection of emergency lighting circuit protective conductor
8: (a) Load-break switch/lv hrc fuses (mains), (b) outgoing distributor/mains optional for up to 6 US 96 substations (1-phase) and (c) distributor (mains) for the ZB 96 control cabinet
9: Terminals for (a) N and (b) PE for mains supply and distribution
10: (a) Load-break switch/lv hrc fuses (batteries), (b) outgoing distributor (batteries) optional for up to 6 US 96 substations and (c) distributor (batteries) for the ZB 96 control cabinet
11: (a) Mounting rack with (b) 4 charging boosters 2.5 A (further booster units optional)

Fig. 4: Detail view of control unit, charging unit and SKU CG circuit changeover



1: Control unit **ZB 96**
2: Pluggable screw terminal blocks, removable for installation/removal of modules, used for all cabinet assemblies [1])

3: Power changeover modules SKU for circuit changeover, two modules of type SKU CG 2 x 3 A are shown [1])

4: Charging unit LT.1 2.5 A [3]) for charging and monitoring pertinent battery banks

[1]) External incoming and outgoing lines are connected to the modules. The protective conductor is connected to terminal strip X12
[2]) For further details and technical description consult current issue of CEAG catalog „Safety Luminaires and Safety Lighting Systems“.
[3]) In case of higher battery capacity additional charging boosters are needed (see Fig.3, Item 12). Booster controls is effected via charging unit LT.1 2.5 A (see Item 4 above).

ZB 96 system components:

Control unit ST 20

Circuit changeover modules SKU CG 2 x 3 A

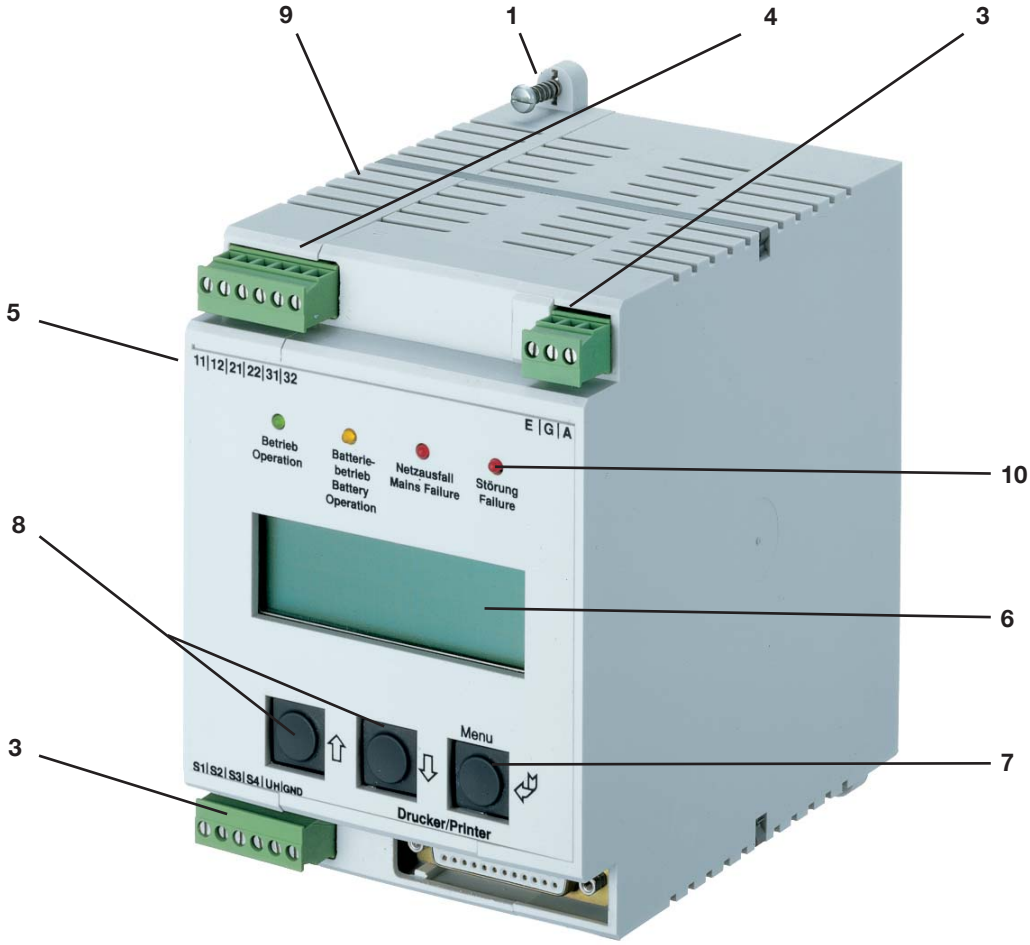
DLS, SDS 8 module and TLS, LON and CGIV module

DC/DC converter.2

Charging unit LT.1 2,5 A

Event printer PD 2

Fig. 8: Detail view of control unit ST 20 (terminal blocks on module serve to facilitate mounting and removal of the module.



1: Control unit housing

2: Safety screw for the plug-type control unit module

3: 24V query contacts for blocking the system via remote switches (S1/S2) and emergency light request (S3/S4), eg. through a (conventional) CEAG 3-phase detector.

4: Floating signalling relay contacts 1 ... 3, with contact assignment NC open (11/12), NO open (21/22) and (31/32)

5: Contact identification for the signalling relay contacts (see Item 5), eg. for remote indication (mains operation / battery operation / fault) or freely configurable signalling behavior (default settings as per DIN VDE 108 available) as needed for higher-ranking building automation purposes.

6: LC backlit display (4 lines, 20 characters each)

7: Menu button
The „menu“ button serves for central battery system programming. Pressing the button causes menu items to be shown on the display which can be selected via the
„UP (🡅)“ and „DOWN (🡇)“ buttons.

8: „UP (🡅)“, „DOWN (🡇)“ buttons
These buttons serve programming or status inquiry selection purposes.

9: E/G/A bus connections
Up to 256 devices can be centrally connected to the monitoring/supervision system (CG Vision) via these terminals.

10: LEDs for operating status indication

Green LED - Operation -
is illuminated when the unit is operative.

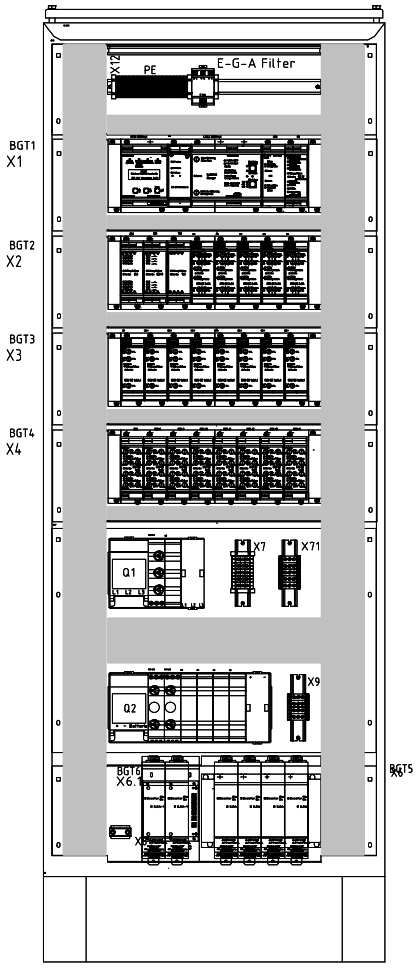
Yellow LED - Battery operation - is illuminated if the battery powers the safety lighting system.

Red LED - Mains failure -
is illuminated if the external phase detectors signal mains failure via the 24-V monitoring loop or in case the mains supplying the ZB 96 is down.

Red LED - Fault -
is illumianted if a centralized alarm/ fault exists. The cause of the fault is shown on the display.

3 Technical Data

Fig. 9: Inside view of ZB 96/200S



ZB 96 Control Cabinet		ZB 96/200S	ZB 96/200	ZB 96/LAD
Rated operating voltage:		---------- 400/230 V 50/60 Hz ----------		
Control unit ZB 96		1	1	1
DC/DC converter.2		1	1	1
Charging unit LT.1 2,5 A		1	1	1
Circuit module SKU CG		0 - 26	0 - 18	0 - 2 [1])
Charging booster 2.5 A		0 - 6 [2])	0 - 6 [2])	0 - 10 [1])
Outgoing distributor, 1-phase (optional)				
outgoing circuits		0 - 6 [3])	0 - 6 [3])	0 - 15
Dimensions (mm)	W	800	800	800
	H	2050	2050	2050
	D	400	400	400
plus optional base (mm)	H	100/200	100/200	100/200
Weight (depends on components mounted)			upon request	
Adm. system temperature ranges:		storage	-20 °C to + 40 °C	dtto.
		operation	-5 °C to + 35 °C	dtto.
Batteries:		Nominal temperature		+ 20 °C [5])
Enclosure type as per DIN EN 60 529		IP 21	IP 21	IP 21
Prot. class as per DIN EN 60 598		I	I	I
3-phase system division		Wiring block	Wiring block	Wiring block
Cable entry at top/bottom possible		yes / yes	yes / yes	yes / yes
Conductor size [4])				
Battery and mains lead	up to	50 mm^2	50 mm^2	50 mm^2
Outgoing distributor	up to	16 mm^2	16 mm^2	16 mm^2
Final circuits	up to	2.5 mm^2	2.5 mm^2	2.5 mm^2
Control unit ZB 96		up to 2.5 mm^2 conductor size		
Battery supply via CEAG standard				
battery cabinet		1-fold	23.3 - 80 Ah [6])	
(W x D x H, in mm) 800 x 400 x 2050		2-fold	118 - 167 Ah [6]) [5])	

[1]) when mounting 2 SKUs only a max.of 8 charging boosters can be used
[2]) when mounting 6 charging boosters an additional booster carrier, 2-fold, must be arranged
[3]) for 1-phase operation (for 3-phase operation 0-2 outgoing circuits)
[4]) Conductor sizes of the connecting leads must be selected to suit the type of Mains supply and requirements of the consumer circuits in line with the applicable regulations and standards (ruling at the operating location of the plant)
[5]) The optimum operating temperature is +20 °C. Lower temperatures will impair the available capacity. Higher temperatures will reduce the usability period. The technical data apply to a nominal temperature of +20 °C.
[6]) The battery capacity may be raised to 240 Ah by a connection in parallel.

Fig.10: Cable entries are prepunched (here ZB 96/200S, other types, eg. sponge rubber, are available on request)

1 = M40/M32
2 = M32
3 = M16
4 = M20/M25

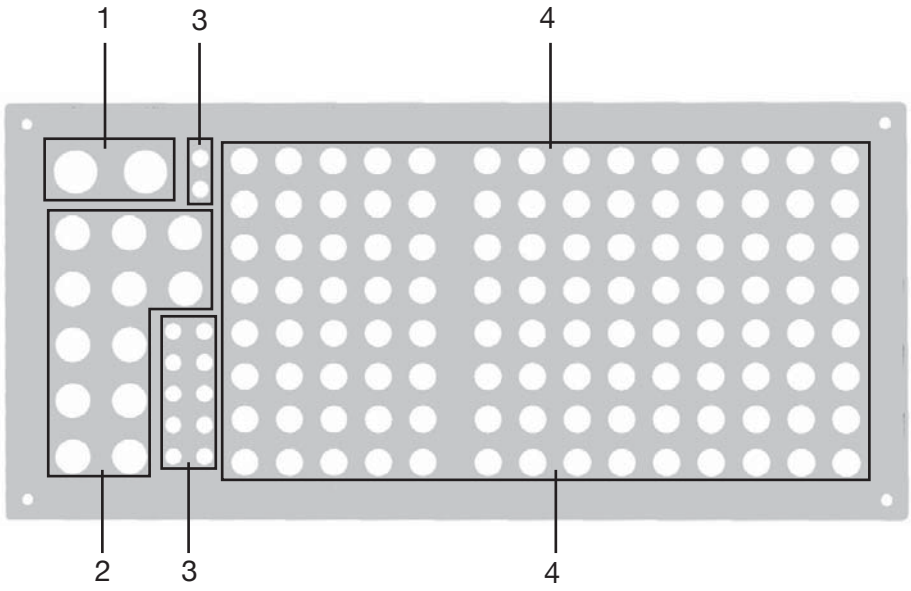
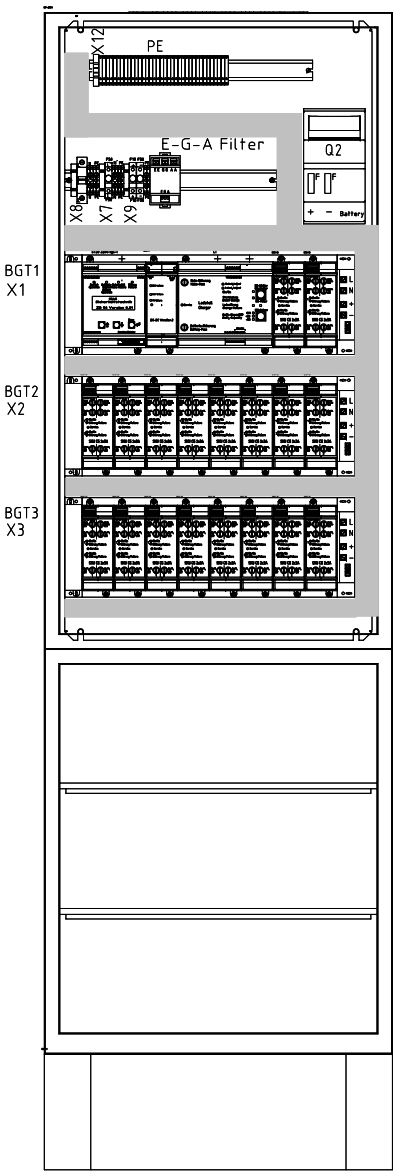


Fig. 9a: Inside view of ZB 96/188C



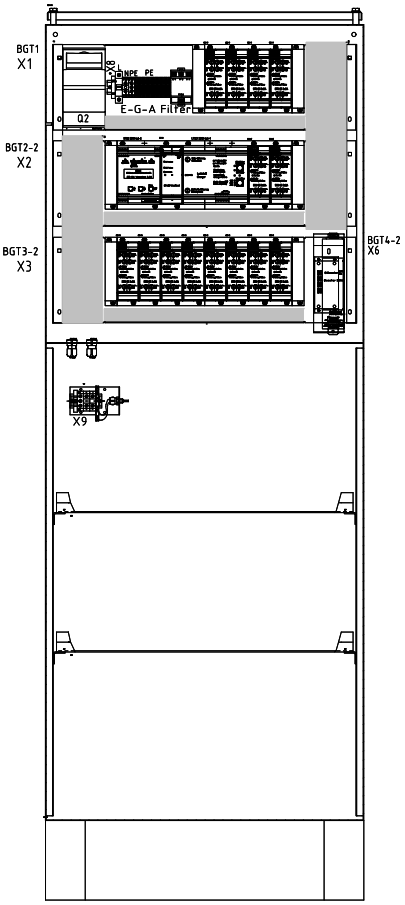
Compact Control Cabinet		ZB 96/200C	/260C	/188C	/180C
Rated operating voltage:		----------	**230 V 50/60 Hz**		----------
Control unit ZB96		1	1	1	1
DC/DC converter.2		1	1	1	1
Charging unit 2.5 A		1	1	1	1
Circuit module SKU CG		0 - 10	0 - 10	0 - 18	0 - 10
Charging booster 2.5 A		0 - 1 [7])	0 - 2 [8])	none	none
Outgoing distributor, 1-phase, outgoing circuits		2	2 [7])	1	1
Dimensions (mm)	W	800	800	600	600
	H	2050	2050	1800	1800
	D	400	600	300	300
plus optional base (mm)	H	200	–	200	200
Weight (depends on outfit)		upon request			
Adm. system temperature ranges:		storage	-20 °C to + 40 °C		dtto.
		operation	-5 °C to + 35 °C		dtto.
Batteries:		Nominal temperature	+ 20 °C [5])		
Enclosure type (DIN EN 60 529)		IP 21	IP 21	IP 21	IP21-
Prot. class as per DIN EN 60 598		I	I	I	I
3-phase system division		no	no	no	no
Cable entry at top/bottom possible		yes / no	yes / no	yes / no	yes/no
Conductor size [4])					
Battery and mains lead	up to	16 mm²	16 mm²	16 mm²	16 mm²
Outgoing distributor	up to	35 mm²	35 mm²	16 mm²	16 mm²
Final circuits		up to 2.5 mm²			
Control unit ST20		up to 2.5 mm² conductor size			
Battery supply via CEAG compact battery cabinet (W x D x H in mm)	(Ah)	5.5 - 49.5 see applicable mounting and operating manual	5.5 - 83.5	5.5 - 23.3	5.5-23.3

[7]) When mounting up to 1 charging booster a 1-fold charging booster adapter must be provided.
[8]) When mounting up to 2 charging booster a 2-fold charging booster adapter must be provided.

Attention!
When planning the equipment and during subsequent operation make sure that

- ❒ the systems are sufficiently cooled (compare remarks under „Adm. temperature ranges“),
- ❒ environmental requirements are met as per type of enclosure and protection class (regarding protection against contact with live components and ingress of dust, foreign materials or moisture),
- ❒ the line length of an emergency lighting circuit up to the last luminaire of the circuit does not exceed the admissible line length.

Fig. 9a: Inside view of ZB 96/204C



Compact Control Cabinet		ZB 96/204C	/264C
Rated operating voltage:		----------	**230 V 50/60 Hz** ----------
Control unit ZB 96		1	1
DC/DC converter.2		1	1
Charging unit LT.1 2.5 A		1	1
Circuit module SKU CG		0 - 14	0 - 14
Charging booster 2.5 A		0 - 1 [7])	0 - 2 [8])
Outgoing distributor, 1-phase, outgoing circuits		-	-
Dimensions (mm)	W	800	800
	H	2050	2050
	D	400	600
plus optional base (mm)	H	200	–
Weight (depends on components mounted)		upon request	
Adm. system temperature range:		storage	-20 °C to + 40 °C
		operation	-5 °C to + 35 °C
Batteries:		Nominal temperature	+ 20 °C [5])
Enclosure type as per DIN EN 60 529		IP 21	IP 21
Prot. class as per DIN EN 60 598		I	I
3-phase system division		no	no
Cable entry at top/bottom possible		yes / no	yes / no
Conductor size [4])			
Battery and mains lead	up to	16 mm²	16 mm²
Outgoing distributor	up to	-	-
Final circuits	up to	2.5 mm²	2.5 mm²
Control unit ST 20		up to 2.5 mm² conductor size	
Battery supply via CEAG compact battery cabinet (Ah)		5.5 - 49.5	5.5 - 83.5
(W x D x H in mm)		see pertinent mounting and operating manual	

[7]) When mounting up to 1 charging booster a 1-fold charging booster adapter must be provided.
[8]) When mounting up to 2 charging booster a 2-fold charging booster adapter must be provided.

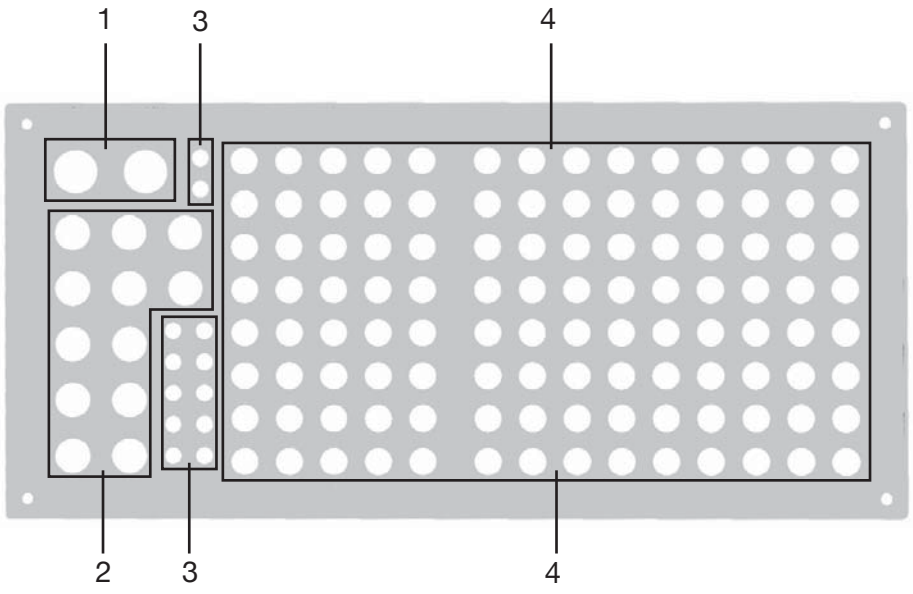
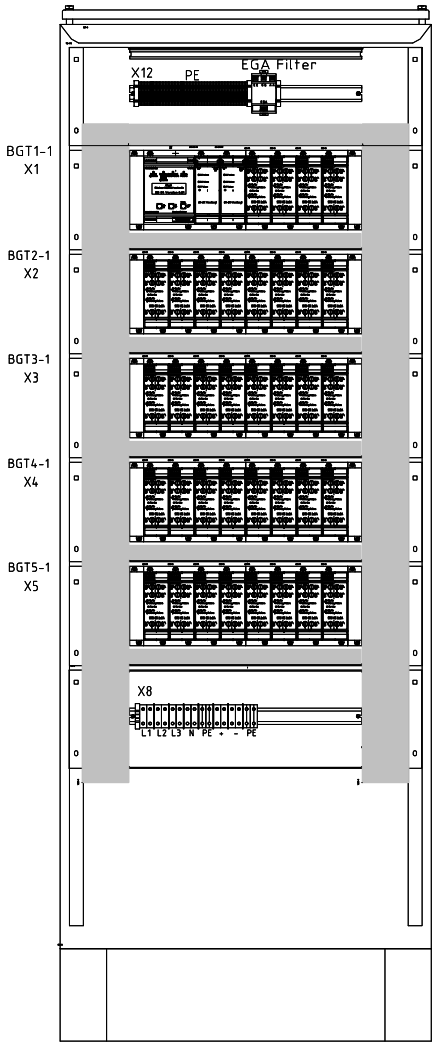


Fig.10: Cable entries are prepunched (here ZB 96/204C, other types, eg. sponge rubber, are available on request)

1 = M40/M32
2 = M32
3 = M16
4 = M20/M25

Fig.11: Inside view of US96/200



Substation US 96		US 96/200	US96/120
Rated operating voltage:		**---------- 230 V 50/60 Hz ----------**	
Control unit ST 20		1	1
DC/DC converter (model DC/DC.2)		1 - 2	1
Charging unit LT.1 2.5 A		none	none
Circuit module SKU CG		0 - 36 [1])	0 - 21
Charging booster 2.5 A		none	none
Outgoing distributor (opt.) outgoing circuits		none	none
Dimensions (mm)	W	800	600
	H	2050	1200
	D	400	300
plus optional base (mm)	H	100 / 200	300
Weight (depends on components mounted)			upon request
Adm. system temperature ranges:		storage	-20 °C to + 40 °C
		operation	-5 °C bis + 35 °C
Batteries:		----------	----------
Enclosure type as per DIN EN 60 529		IP 21	IP 54
Prot. class as per DIN EN 60 598		1	1
3-phase system division		no	no
Cable entry			
at top/bottom possible		yes / yes	yes / no
Conductor size [2])			
Battery and mains lead	up to	35 mm²	35 mm²
Outgoing distributor	up to	–	–
Final circuits	up to	2.5 mm²	2.5 mm²
Control unit ST 20		up to 2.5 mm² conductor size	
Battery and Mains supply		via outgoing distributor in a ZB 96 control cabinet	

[1]) One DC/DC.2 converter can supply operating voltage to a max. of 26 modules; for more than 26 modules an additional DC/DC.2 converter must be installed.
[2]) Conductor sizes of the connecting leads must be selected to suit the type of Mains supply and requirements of the consumer circuits in line with the applicable regulations and standards (ruling at the operating location of the plant).

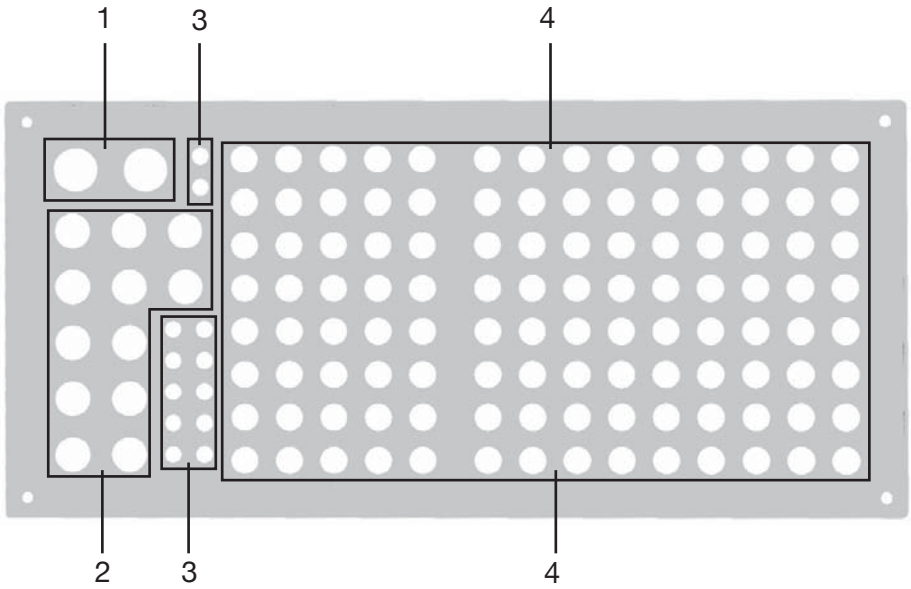


Fig.12: Cable entries are prepunched (other types, eg. sponge rubber, are available on request)

1 = M40/M32
2 = M32
3 = M16
4 = M20/M25

Substation US 96			US 96/80	US 96/60	US 96/85 E30[4]
Rated operating voltage:			---------- 230 V 50/60 Hz ----------		
Control unit ST 20			1	1	1
DC/DC converter (model DC/DC.2)			1	1	1
Charging unit LT.1 2.5 A			none	none	none
Circuit module SKU CG			0 - 13	0 - 5	0 - 17
Charging booster 2.5 A			none	none	none
Outgoing distributor	outgoing circuits		none	none	none
Dimensions (mm)		W	600	400	920
		H	800	600	950
		D	250	250	400
plus optional base (mm)		H	–	–	–
Weight (depending on components mounted)				upon request	
Adm. system temperature range:			storage	-20 °C to + 40 °C	
			operation	-5 °C to + 35 °C	
Batteries:			----------		
Enclosure type as per DIN EN 60 529			IP 54	IP 54	IP 41
Protection class as per DIN EN 60 598			1	1	1
3-phase system division			no	no	no
Cable entry					
at top/bottom possible			yes / no	yes / no	yes / no
Conductor size [2])					
Battery and mains lead	up to		35 mm^2	16 mm^2	16 mm^2
Outgoing distributor	up to		–	–	–
Final circuits	up to		2.5 mm^2	2.5 mm^2	2.5 mm^2
Control unit ST 20			up to 2.5 mm^2 conductor size		
Battery and Mains supply			via outgoing distributors in a ZB 96 control cabinet		

The technical data apply to a nominal temperature of +20 °C.

[2]) Conductor sizes of the connecting leads must be selected to suit the type of Mains supply and requirements of the consumer circuits in line with the applicable regulations and standards (ruling at the operating location of the plant).

[4]) E30 means fire protection class 30 prescribing functions to be maintained for at least 30 minutes (verified by a state-certified materials testing institute of the Federal Republic of Germany based on DIN 4102 part 2 and part 12).

Attention!
When planning the equipment and during subsequent operation make sure that

- ❒ **the systems are sufficiently cooled (compare remarks under „Adm. temperature ranges“),**
- ❒ **environmental requirements are met as per type of enclosure and protection class (regarding protection against contact with live components and ingress of dust, foreign materials or moisture),**
- ❒ **the line length of a lighting circuit up to the last luminaire of the circuit does not exceed the admissible line length.**

4 Batteries for Emergency Power Supply

CEAG offers battery cabinets of various sizes and accommodating various components. Low-maintenance batteries according to EUROBAT standard are provided the service life of which exceeds 10 years if handled and operated properly and with circumspection. Regarding design and type these CEAG approved batteries meet all the requirements applicable in the Federal Republic of Germany to safety lighting systems prescribed by building laws (EN 50272 and EN 60896-2). In this context our operating instructions for battery cabinets 400 71 860 035 and for battery racks 400 71 860 036 must also be observed.

CEAG standard battery cabinets

Capacity range	24 to 240 Ah [1])
Rated voltage	216 V DC
Dimensions	(depends on type) vary [2])
Weight	(depends on type) varies [2])

CEAG compact battery cabinets

Capacity range	5.5 to 80 Ah
Rated voltage	216 V DC
Dimensions (depends on type)	vary [2])
Weight (depends on type)	varies [2])

CEAG-Batteriegestelle

Capacity range	24 to 240 Ah [1])
Rated voltage	216 V DC
Dimensions (depends on type)	vary [3])
Weight (depends on type)	varies [3])

Battery operating temperature

The optimum operating temperature is +20 °C. Niedrigere Lower temperatures will impair the available capacity. Higher temperatures will reduce the usability period. The technical data apply to a nominal temperature of +20 °C.

[1]) By connecting several battery sets in parallel battery capacities exceeding 118 Ah can be obtained.
[2]) See CEAG Installation Instructions for battery cabinets (400 71 860 035)
[3]) See CEAG Installation Instructions for battery racks (400 71 860 036)

4.1 Tending and Checking Batteries

Inspection

The following minimum inspection instructions must be observed to ensure the full service life of the batteries. In case of records being incomplete and/or failure to carry out battery inspections the warranty may become void or legally ineffective.

The following shall be measured and recorded at least every 6 months:

1. Voltage of individual battery blocks with charger being switched off.
2. Floating operation voltage of the individual battery blocks.
3. Floating operation voltage of the battery system.

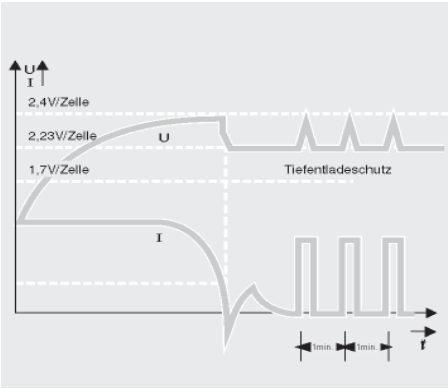
Annual checks:

1. Semi-annual inspections must be repeated.
2. All connections must be checked for cleanliness, continuity and resistance.
3. All connections must be retightened as recommended using a torque wrench.
4. Checking the set-up and accommodation of the batteries.
5. Checking ventilation effectiveness.
6. The batteries must be discharged and their condition inspected as prescribed by VDE 0108.

Battery charging

The low-maintenance batteries offered by CEAG are properly charged to suit temperature requirements and according to the adjacent I/U charging characteristics. To suit the respective battery charging condition high-rate charging (via boosters) is carried out so that the batteries are quickly charged without the gassing voltage being exceeded.
The patented charging supervision process serves to permanently check the charging operation and immediately report faults such as battery circuit interruption, defect charger unit or high-resistance cells.

Fig. 14: Charging characteristic



Remarks: No gas will escape under normal charging conditions. Distilled water for make-up purposes cannot be filled in since the batteries are permanently sealed. Higher temperatures will shorten the battery service life (cf. „Battery operating temperature“ on the preceding page).

Attention!

- ❒ **Batteries for emergency operation must only be stored for a period not exceeding three months without being charged!**
- ❒ **If the mains power to the ZB 96 central battery system is interrupted for more than three days the battery circuits must be disconnected (remove battery fuse). This work must exclusively be performed by skilled electrical personnel (cf. „12.5 Testing / Replacing Fuses“).**

5 Modules Functioning

5.1 Functions of Charging Unit LT.1 2.5 A

Control elements

Charging unit LT.1 2.5 A has the following control elements:

❒ End of charge voltage
The final charging voltage and charging current are set in the Factory using two potentiometers on the faceplate.

❒ Service button
Behind the bore identified „Service“ there is a button which must be actuated for basic programming of the system. Basic programming is carried out in the Factory.

❒ ISO monitor button
As per VDE 0108 Part 1 a testing device must be provided by means of which the line isolation monitor functioning can be verified:
Upper button pressed = Iso failure batt. +
Lower button pressed = Iso failure batt. -

Indicating elements

❒ „On“ LED
The LED is on if the charger is in operation. Failure of the LED to light up means
- the charger is on failure or
- mains voltage is interrupted or
- function testing has been initiated.

❒ „Boost charge“ LED
The „Boost charge“ LED lights up during high-rate charging, eg. after a mains failure or duration testing.

❒ „Charge fault“ LED
The „Charge failure“ LED lights up if the charger, the charging boosters, or batteries are on failure. Further fault messages can be seen via the control unit.

❒ „Battery capacity“ LED
The LEDs show the remaining capacity in percent. As long as the battery capacity has no defined value (battery full, flat) or a „Battery interruption“ failure is encountered the „> 10 %“ LED flashes.

Fuse protection

Two fuses are provided on the faceplate of the charging unit:

❒ On mains fuse 6.3 AT

❒ On charging fuse 3.15 AT

Connection Terminals

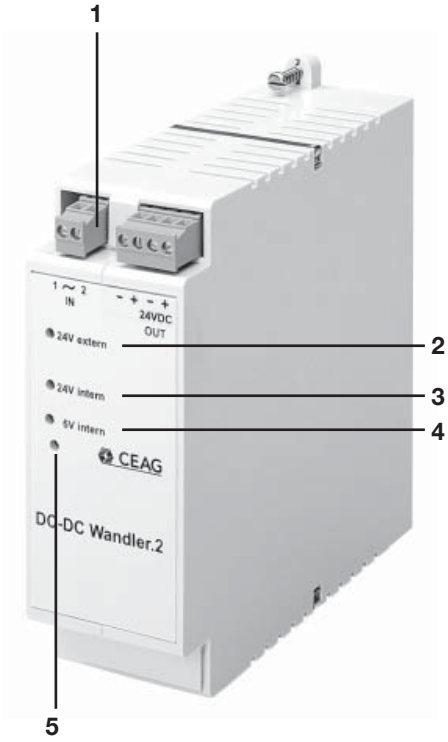
The terminals are of push-lock type.

ⓘ Note:
To facilitate installation the terminals may be removed.

❒ Floating signaling contacts
Potential-free signals can be transmitted via terminals „11-12“, „21-22“, „31-32“.
Contact „11/12“ is closed in case of failures.
Contact „21/22“ is closed in case of an isolation failure.
Contact „31/32“ is closed in case of high-rate charging.

❒ Temperature sensor
An external temperature sensor is to be connected to terminals „F+“ and „F-“.
A shielded 2-wire lead must be used for temperature sensor connection. Due to the measuring current being very small a conductor size of 0.5 mm^2 will be sufficient for line lenghts < 50 m.

❒ Booster status signals
Booster status signals are transmitted to the control unit via terminals „I+, I-, ein, GND, ok, GND“.



1: **Feed for optional AC module**

2: **LED „24 V extern“**

3: **LED „24 V intern“**

4: **LED „6 V intern“**

5: **Bore with „Service PIN“ button**

5.2 Functions of the DC/DC converter.2

This module supplies 24 V- and 6 V direct voltage to the central battery system.

Light-emitting diodes

❒ **LED „24 V extern“**
This LED lights up if an external 24-V DC voltage is applied to the „24VDC OUT“ terminals.

❒ **LED „24 V intern“**
This LED lights up if the internal 24 V DC voltage is applied to the ZB 96 system.

❒ **LED „6 V intern“**
LED lights up if the internal 6 V supply voltage is applied.

Control elements

The button „Service PIN“ is located in the bore.

Additional features:

❒ **External 24 V**
– 20 W continuous rating
– Output via front-side plug
– Voltage electrically isolated

❒ **Internal 24 V**
– 100 W continuous rating
– 140 W Peak rating (20 msec.)
– Feeding a maximum of 26 SKU of type CG

❒ **Connection in parallel**
possible for several converters!

❒ **Feed-in via AC/AC converter**
possible to enable external mains supply.

Fig. 13:
Components of ST 20 control unit

5.3 Functions of the ST 20 Control Unit

Freely programmable control

with non-volatile program memory for progamming and user-specific parameterization purposes.

Internal log book recording

The ST 20 control unit saves the log book as per DIN VDE 0108 specifications.

Control

❒ **On the unit's front side**
The menu-supported control of the ST 20 and lighting system takes place via
– Keyboard and
– LC display (4 lines, 20 characters each, adjustable backlit)

❒ **Local switch operation**
of a combined general/emergency lighting system can be provided by means of DLS and TLS modules.

Configuration

❒ **On the unit's front side**
via keyboard and LC display.
Various user-defined adjustments can be made with the aid of menu-based parameterization capabilities.

Communication and control

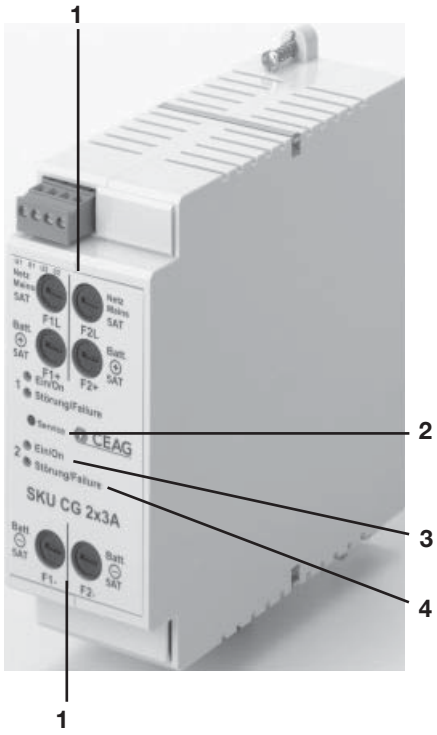
❒ **Printer interface**
DB 25 Centronics

Storage

❒ **Internal**
via a non-volatile memory in the ST 20 control unit.

Connections

❒ **Pluggable screw terminal blocks**
provided on the unit enable components to be easily installed or removed.

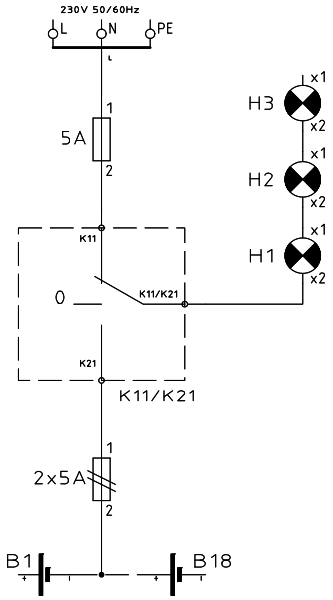


1: Fuses

2: „Service-PIN“ button

3: LED „ON“

4: LED „Failure“



5.4 Functions of Circuit Changeover SKU CG 2 x 3 A

Fuses

On the circuit changeover unit's faceplate 3 outgoing fuses 5 AT / 250 V are arranged for each circuit.

Size of fuses:
6.3 mm x 32 mm, sand-filled.

Attention!
Rated current must not exceed 3 A per circuit!

Control elements

❒ **Service-PIN**
Adjacent to „Service“ inscription there is a button which must be actuated for basic programming of the system. Basic programming is carried out in the Factory.

Indicating elements

❒ **LED „ON“**
This LED lights up if voltage is applied to the outgoing terminals.

❒ **LED „Failure“**
This LED lights up if one or more luminaires are on failure.

Modules of circuit changeover units SKU CG 2 x 3 A

- ❒ (2 circuits of 3 A rated current each)
- ❒ The circuit module is connected to the control unit via the bus.
- ❒ An address is assigned via the control unit when basic configuration takes place. This is done in the Factory.
- ❒ All functions such as switching method or monitoring functions can be programmed via the control unit.
- ❒ If the changeover unit is retrofitted or replaced programming has to be modified as necessary.

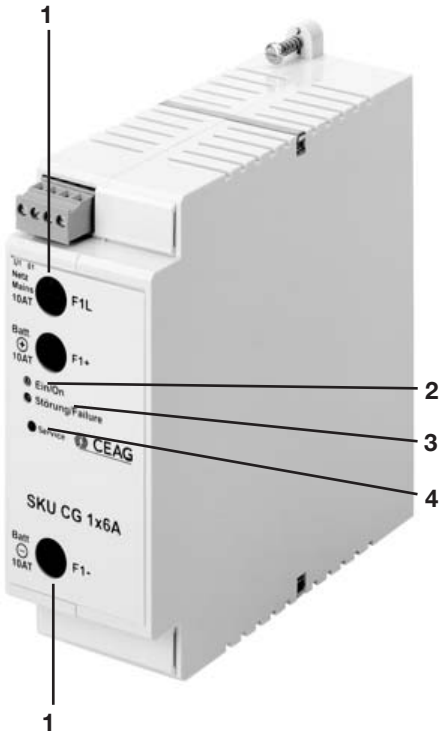
Additional features

- ❒ **Individual monitoring**
  of a maximum of 20 luminaires
- ❒ **Changing over individual circuits**
- ❒ **Separate fuse protection for mains and battery operation**
- ❒ **In case of one-pole ground leakage**
  during AC operation DC operation may continue without problems
- ❒ **Fuses are easily accessible**
- ❒ **Continuous current per circuit**
  3 A
- ❒ **Making current per circuit**
  120 A/ms
- ❒ **Typical changeover time**
  AC/DC 200 ms

Notes:
In the development and advancement of modules for a system family (in this case the SKU modules for the ZB 96 system) CEAG-Notlichtsysteme GmbH takes measures to ensure downward compatibility with respect to the control software of the modules, their application and control.

❒ When using modules of current development status as well as modules of older design always observe for safety reasons the technical documentation accompanying these modules.

❒ In case of doubt contact the Customer Service of CEAG Notlichtsysteme GmbH.



1: Fuses

2: LED „ON“

3: LED „Failure“

4: „Service-PIN“ button

5.5 Functions of Circuit Changeover SKU CG 1 x 6

Fuses

On the circuit changeover unit's face-plate 3 outgoing fuses 10 AT / 250 V are arranged.

Size of fuses:
6.3 mm x 32 mm, sand-filled.

Attention!
Rated current must not exceed 6 A per circuit!

Control elements

❒ **Service-PIN**
Adjacent to „Service“ inscription there is a button which must be actuated for basic programming of the system. Basic programming is carried out in the Factory.

Indicating elements

❒ **LED „ON“**
This LED lights up if voltage is applied to the outgoing terminals.

❒ **LED „Failure“**
This LED lights up if one or more luminairs are on failure.

Additional features

❒ **Individual monitoring**
of a maximum of 20 luminaires

❒ **Separate fuse protection for mains and battery operation**

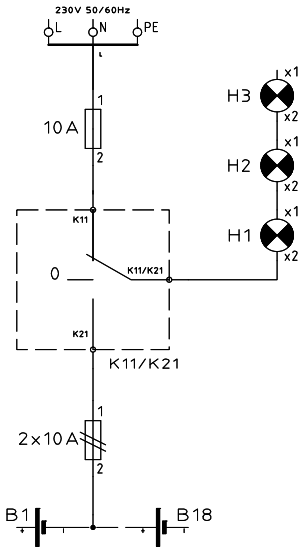
❒ **In case of one-pole ground leakage**
during AC operation DC operation may continue without problems

❒ **Fuses are easily accessible**

❒ **Continuous current 6 A**

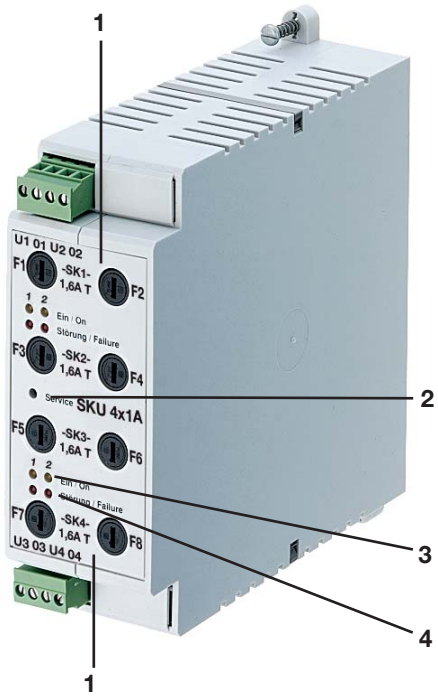
❒ **Making current**
180 A/ms

❒ **Typical changeover time**
AC/DC 200 ms



Attention!
When replacing an SKU of older type by a new SKU module it is to be ensured that due to increased rated current requirements higher-rated fuses must be mounted for each circuit (loop impedance as per DIN VDE 0100)!

5.6 Functions of Circuit Changeover SKU CG 4 x 1 A



1: Fuses

2: „Service-PIN“ button

3: LED „ON“

4: LED „Failure“

Fuses

On the circuit changeover unit’s faceplate 8 outgoing fuses 1.6 AT / 250 V are arranged.

Size of fuses:
6.3 mm x 32 mm, sand-filled.

Attention!
Rated current must not exceed 1 A per circuit!

Control elements

❒ **Service-PIN**
Adjacent to „Service“ inscription there is a button which must be actuated for basic programming of the system. Basic programming is carried out in the Factory.

Indicating elements

❒ **LED „ON“**
This LED lights up if voltage is applied to the outgoing terminals.

❒ **LED „Failure“**
This LED lights up if one or more luminairs are on failure.

Additional features

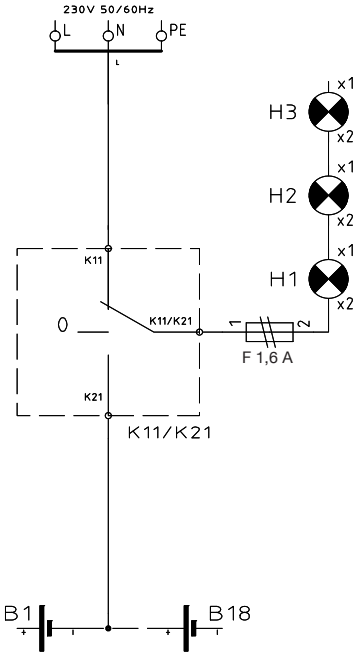
❒ **Individual monitoring**
of a maximum of 20 luminaires

❒ **Fuses are easily accessible**

❒ **Continuous current 1 A**

❒ **Making current**
60 A/ms

❒ **Typical changeover time**
AC/DC 200 ms



5.7 Circuit Changeover Units at a Glance

At the present time the following SKU modules are available for the ZB 96 system:

SKU CG 2 x 3 A	**ZB 96**		**new!**
Number of circuits	2	w/o switching function for CG-S-EVGs	
Rated current per circuit	3 A	Dimensions and weight	abt. 0.61 kg
Fuse protection per circuit	5 A	H x W X D (in mm)	170 x 55 x 155
Max. inrush peak current	120 A/1 ms	Module width	1 TE
Max. conductor size	2.5 mm²		
Typical changeover time	200 ms		
Reference number			400 71 347 305

SKU CG 1 x 6 A	**ZB 96**		**new!**
Number of circuits	1	w/o switching function for CG-S-EVGs	
Rated current	6 A	Dimensions and weight	abt. 0.47 kg
Fuse protection	10 A	H x W X D (in mm)	170 x 55 x 155
Max. inrush peak current	180 A/1 ms	Module width	1 TE
Max. conductor size	2.5 mm²		
Typical changeover time	200 ms		
Reference number			400 71 347 347

SKU CG 4 x 1 A	**ZB 96**		
Number of circuits	4	w/o switching function for CG-S-EVGs	
Rated current	1 A	Dimensions and weight	abt. 0.47 kg
Fuse protection	1,6 A	H x W X D (in mm)	170 x 55 x 155
Max. inrush peak current	60 A/1 ms	Module width	1 TE
Max. conductor size	2.5 mm²		
Typical changeover time	200 ms		
Reference number			400 71 346 600

Attention!
The information given in the table is for guidance only. Always observe the operating instructions accompanying the units.

Notes:
Further info on the current supply program and background information on the ZB 96 safety lighting system are given in the brochures and leaflets of CEAG Notlichtsysteme GmbH.

❒ When using modules of current development status as well as modules of older design always observe for safety reasons the technical documentation accompanying these modules.

❒ In cases of doubt - especially where plant or workplace safety issues are concerned - please contact the Customer Service Department of CEAG Notlichtsysteme GmbH or our representative in your vicinity.

❒ On the display of the ZB 96 control units the current SKU modules of the respective series are shown, i.e. an SKU module appears, for example, on the control unit's LCD with its correct identification when registering with the system.

❒ This applies similarly for higher-ranking supervision systems, parameterization software and CG modules with individual monitoring feature.

5.8 Functions of Event Printer PD 2

Description

This module is a 4-dot matrix printer for alphanumeric characters, line width is 24 characters. The paper width is 57 mm.

The module may be mounted on any free slot of the subrack (BGT). Normally, module slots 7 and 8 on the BGT1 are assigned for this purpose.

Power supply to the printer and communication with the ST 20 control unit takes place via the (rear) contacts of the printer and subrack contacts.

Note:
When the printer has been registered and activated via the control software all entries recorded for the test log are printed out on the paper mounted.

Configuration

Briefly press the „menu“ button. Having entered the protocol type it can be selected whether data of the last 10 incidents, the last 30 days, the last 24 months or of a specific date shall be printed. How to proceed further can be seen from the flowchart.

Control

❒ **Printer function**
An event can be printed after the relevant menu item has been selected. Such a selection may include the event type and the period which is to be printed out. For printing periods selections include „last x incidents“, „last x days” and „last x months“.
Protocol printing FT /BT:
- Mains failure
- Blocking.

❒ **Replacing printing paper rolls or ink ribbon**

Attention!
For replacement of the printing paper rolls or ink ribbon the event printer PD2 must be removed from the subrack.

How this is done is described in detail in the instructions accompanying the device.

❒ **Storage capability**
The event printer serves to store and print the testing results. Results of functional testing are transmitted from the control unit to the event printer. If functional testing is initiated manually the test results are printed immediately. Results of all other tests initiated automatically by the control unit are saved.
Saved data can be printed after the appropriate selection has been made. The minimum storage period is two years so that the prescribed test book is substituted.

Indicating elements

❒ **LED «Druckt / busy»**
This LED lights up if the event printer processes a printing job.

5.9 Print-out - Event Printer PD 2

Print-out

Function test
Date: dd.mm.yy
Time: hh.mm
Charging current = ...A
Ubatt = ...V
Isolation o.k.
Booster o.k.
Charging unit o.k.

BGT 2 slot 07 circuit 01
Circuit on failure
I(required)=2.0; I(actual)=1.2

BGT 2 = Subrack 2

Slot 07 = 7th circuit changeover

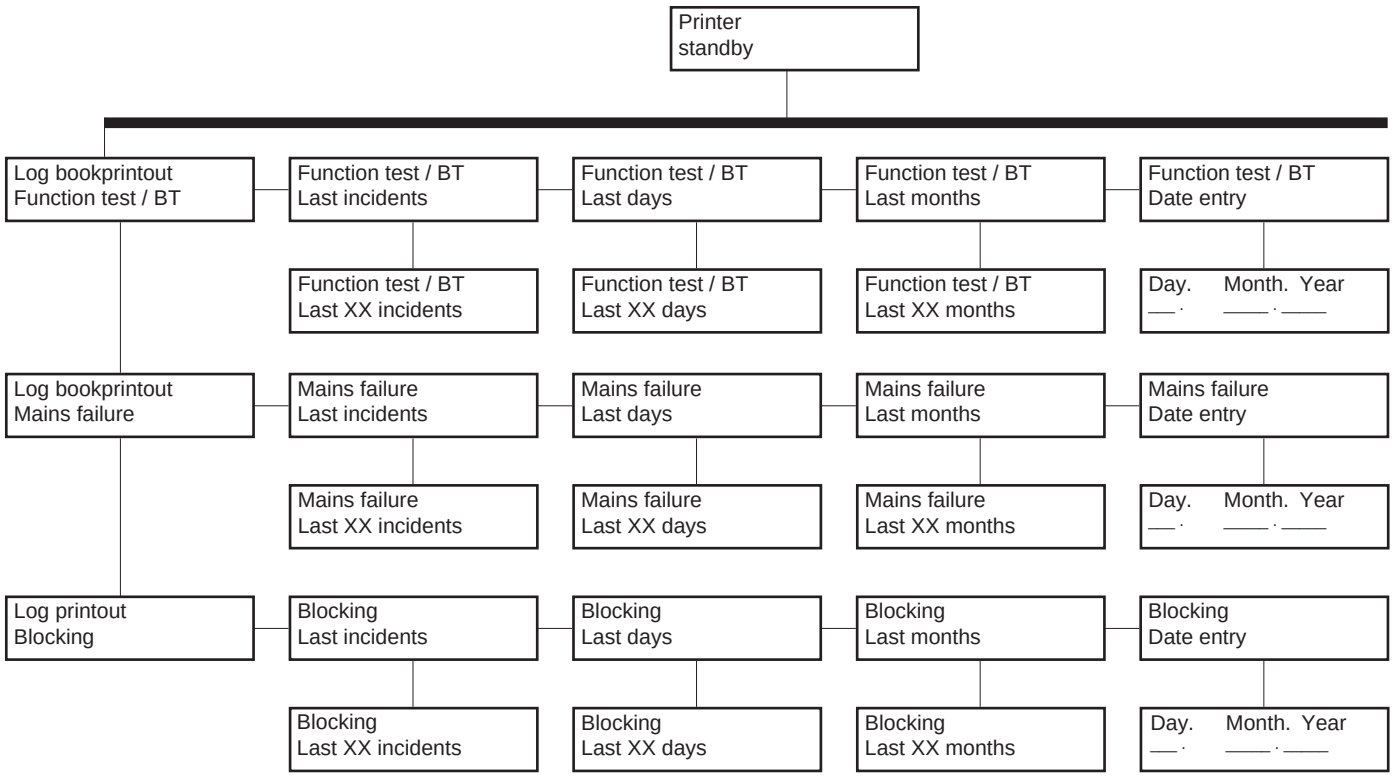
Circuit 02 = 2nd circuit

1... = Luminaires 1 to 12

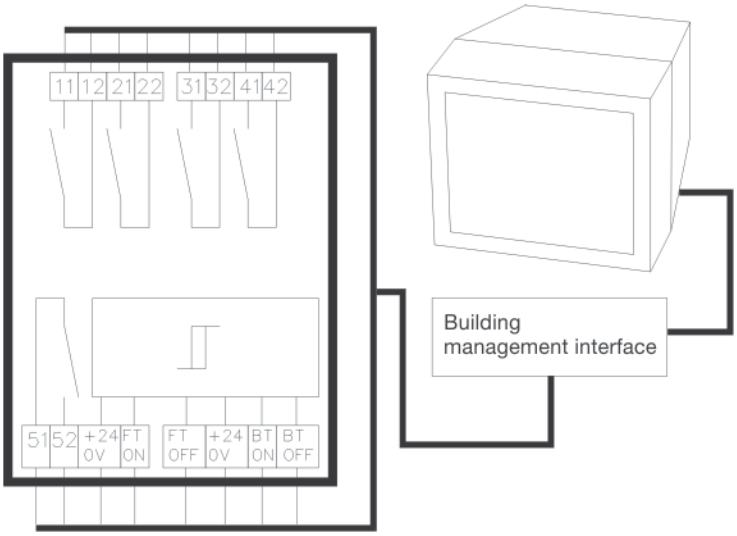
S = Failure

I(required) =
Current value measured on faultless circuit

I(actual)=
Current value acutally detected and falling below the maximum admissible percentage deviation



5.10 Function of the Relay Module CG IV



Connection Relay module CG IV

This subassembly allows the connection of the central battery system to a central control station (ZLT) or building management system (BMS). The most important system states are transmitted via potential-free signalling contacts. There are two input channels for the remote monitoring of the central battery system. A functional test can be initiated via the input channel „FT“ and a continuous operation test (battery test) can be initiated via the input channel „DT“. Eight LEDs indicate the state of the system.

Function of relay contacts

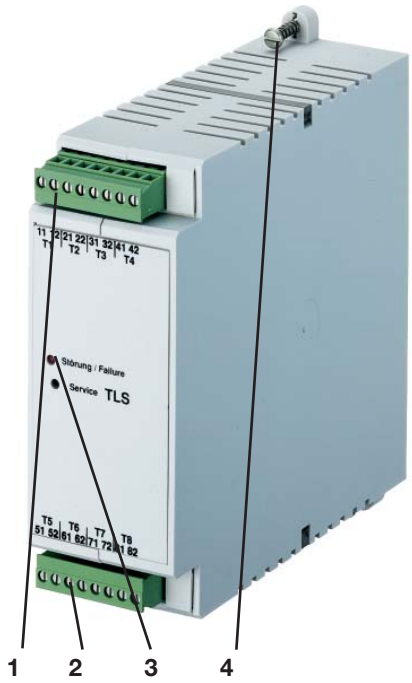
	11/12	21/22	31/32	41/42	51/52
Deep-discharging protection	ON	------	------	------	------
Emergency lighting fault	------	ON	------	------	------
Charging fault	------	------	ON	------	------
Battery operation	------	------	------	ON	------
Mains operation	------	------	------	------	ON

Switching capacity of contacts: 24V/0.5A AC/DC

Function of command contacts

	+24/0V	FT ON	+24/0V	FT Off	+24V/0V	BT ON	+24/0V	BT OFF
Function test On	▬	▬						
Function test Off				▬	▬			
Battery duration test On					▬	▬		
Battery duration test Off							▬	▬

The desired function can be activated with an impulse of min. 20ms/24V.
If a further function or duration test should be done the function /- duration test has to be reset with an impulse.



Item 1: top terminal strip
Item 2: bottom terminal strip
Item 3: Indicating LEDs
LED „Störung / Failure“ lights up if a fault has been detected in the module
Item 4: Fixing element (fastening screw) for the module.

5.11 Functions of the TLS Switching Module

Description

This module enables time-controlled switching (1 to 15 minutes) of the final circuits during mains and battery operation.
Via the TLSs input channels up to eight button circuits can be queried. Via an inverter arranged in the module the illuminated buttons are powered in mains as well as battery operation. The number of buttons that can be connected has been indicated in the table below. A maximum of one input channel of the TLS can be assigned to each final circuit via the freely programmable control unit of the ZB 96.

Technical Data

❒ **Connections**
– Terminals 2.5 mm², rigid and flexible

❒ **Button inputs**
– Max. 8 button inputs with:
– 1 mA glow lamp 50 pcs.
– 0.8 mA glow lamp 62 pcs.
– 0.4 mA glow lamp 125 pcs.
per button input

TLS switching module

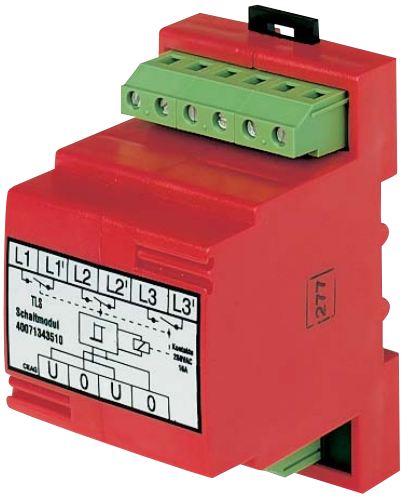
If general and safety luminaires are to be controlled by the same buttons (without additional installation expense) a TLS switching module can be mounted in the lighting distribution systems. Control is effected via a circuit changeover unit (SKU CG).

Technical Data

❒ **Connection**
– Terminals: 2.5 mm²
– Dimensions (H x W x D) mm:
84 x 52 x 64

❒ **Switching capacity**
– 3 x 16 A

Note:
As regards planning and use of the module please refer to the technical documentation supplied with the modules and brochures and leaflets of CEAG Notlichtsysteme GmbH.



5.12 Functions of Maintained light Switch Checking DLS

Item 1: top terminal strip for (monitoring) inputs
Item 2: bottom terminal strip
Item 3: Indicating LEDs
LEDs 1 ... 8 light up if the circuit is closed or the monitored supply voltage is applied, LED „Störung / Failure“ lights up if a fault is detected in the module
Item 4: Fixing element (fastening screw) for the module.

Description

This electronic monitoring module serves for (light) switch checking purposes. During mains operation luminaires of the general and safety lighting systems are switched in line with switch positions and adjustments of the ZB 96 control unit. During emergency operation (eg. after monitored phases of the Mains supply system have failed) the circuits of the safety lighting system are operated as per the settings made on the ZB 96 control unit.

Technical Data

❒ **Connection**
– Terminals 2.5 mm², rigid and flexible.

❒ **Number of light switch inputs**
– up to 8, electrically isolated
– Rated voltage U_n = 230 V

Application:

❒ **Installation in the ZB 96 (US 96) control cabinet**
to facilitate maintenance efforts

Notes:
❒ Please observe info on bus technology and shielding as detailed on the following pages.

❒ As regards planning and use of the module please refer to the technical documentation supplied with the modules and brochures and leaflets of CEAG Notlichtsysteme GmbH.

5.13 Functions of the SDS 8 Switching Module

Description

Monitoring module SDS 8 is an optional component that can be mounted in the central battery system. SDS 8 enables the emergency lighting system to be selectively switch on. Via the eight input channels of the SDS 8 up to 8 current loops of external phase monitors can be supervised. The phase monitor built into the general power supply distributor makes sure that the safety lighting is activated when the general power supply fails. To assign the eight input channels the freely programmable control unit of the central battery system is employed. A maximum of two input channels of the SDS 8 can be assigned to each emergency lighting circuit.

Technical Data

❒ **Connection**
– Terminals 2.5 mm², rigid and flexible.

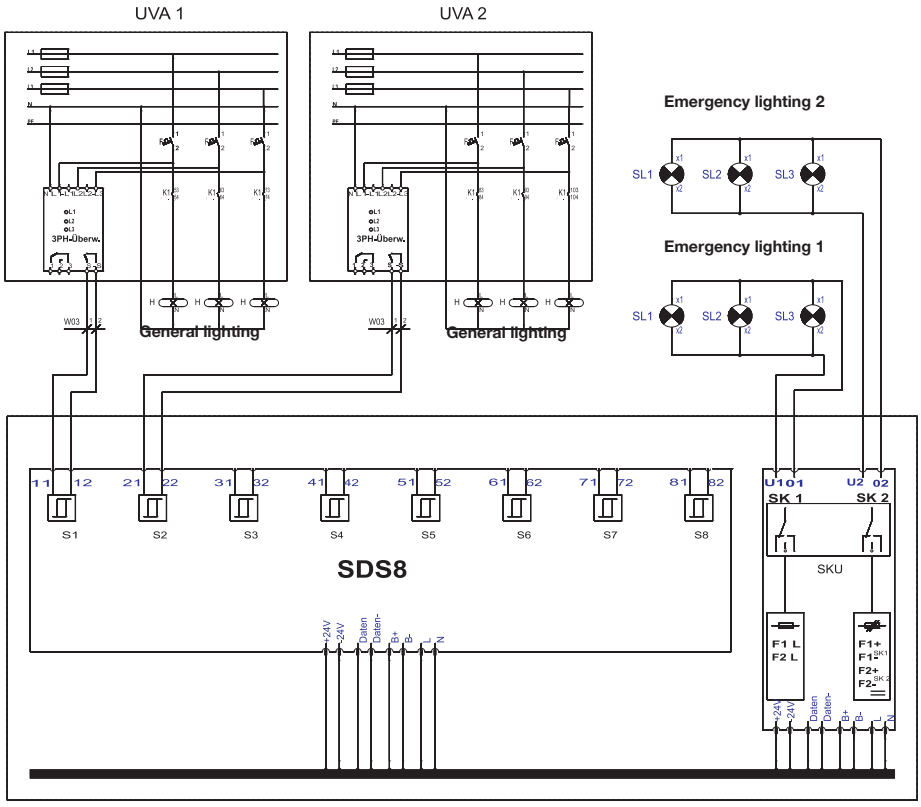
❒ **Number of switch inputs**
– up to 8, electrically isolated

Application example

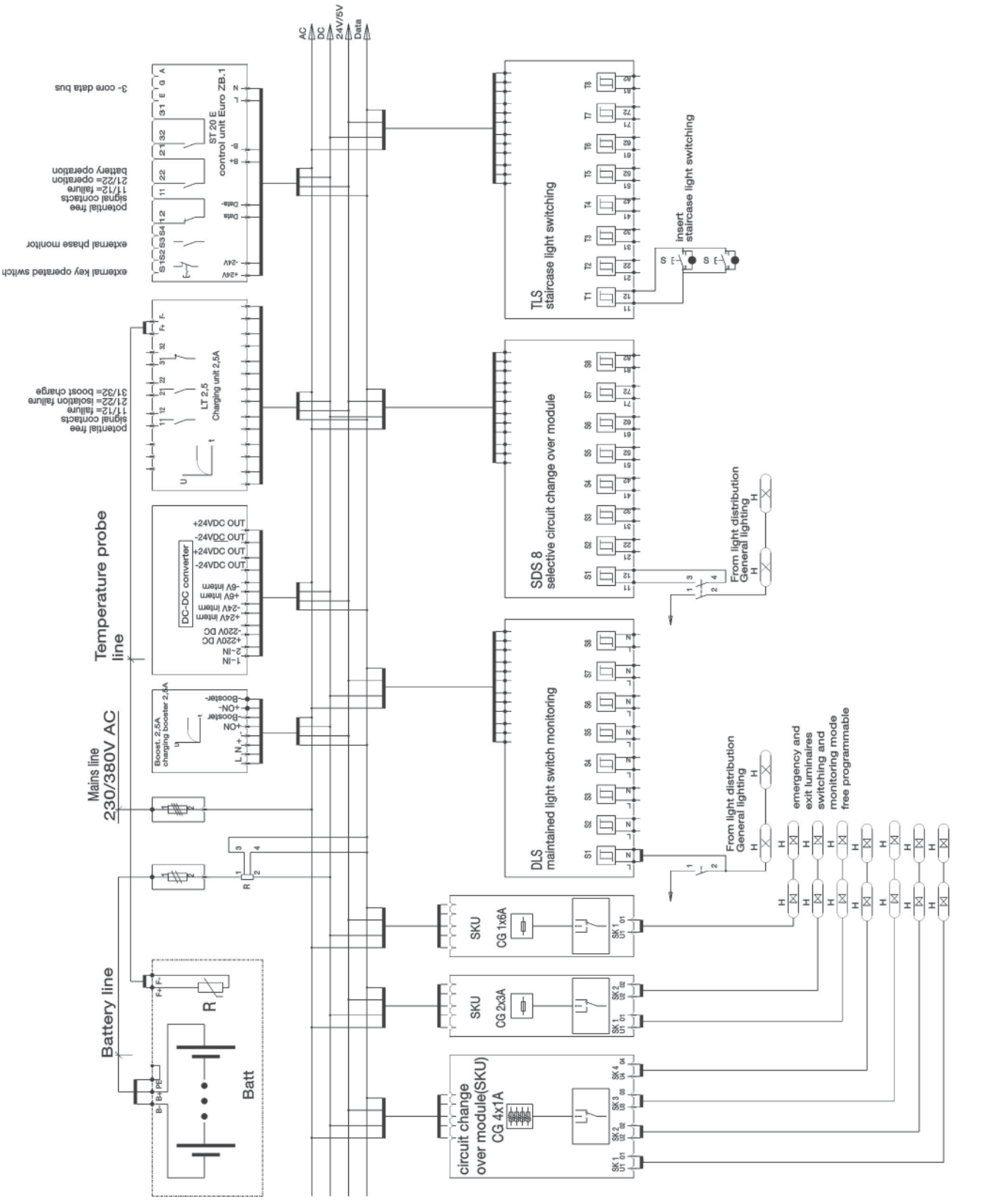
❒ Two distributors of the general power supply system shall be supervised such that if one of the distributors fails only the emergency light in the zone of this distributor is switched on. For this purpose a phase monitor must be installed in each of the distributors.

The phase monitors and the SDS 8 module are connected with each other via a 2-wire 24-V loop. If distributor 1 fails the 24-V current loop to the SDS 8 module „channel S1; terminals 11-12“ is interrupted.
All safety light circuits assigned to this input channel of the SDS 8 module via the control unit are switched from standby to Maintained light. If the mains supply to the central battery system fails altogether all final circuits are switch on and powered at 220-V direct voltage.

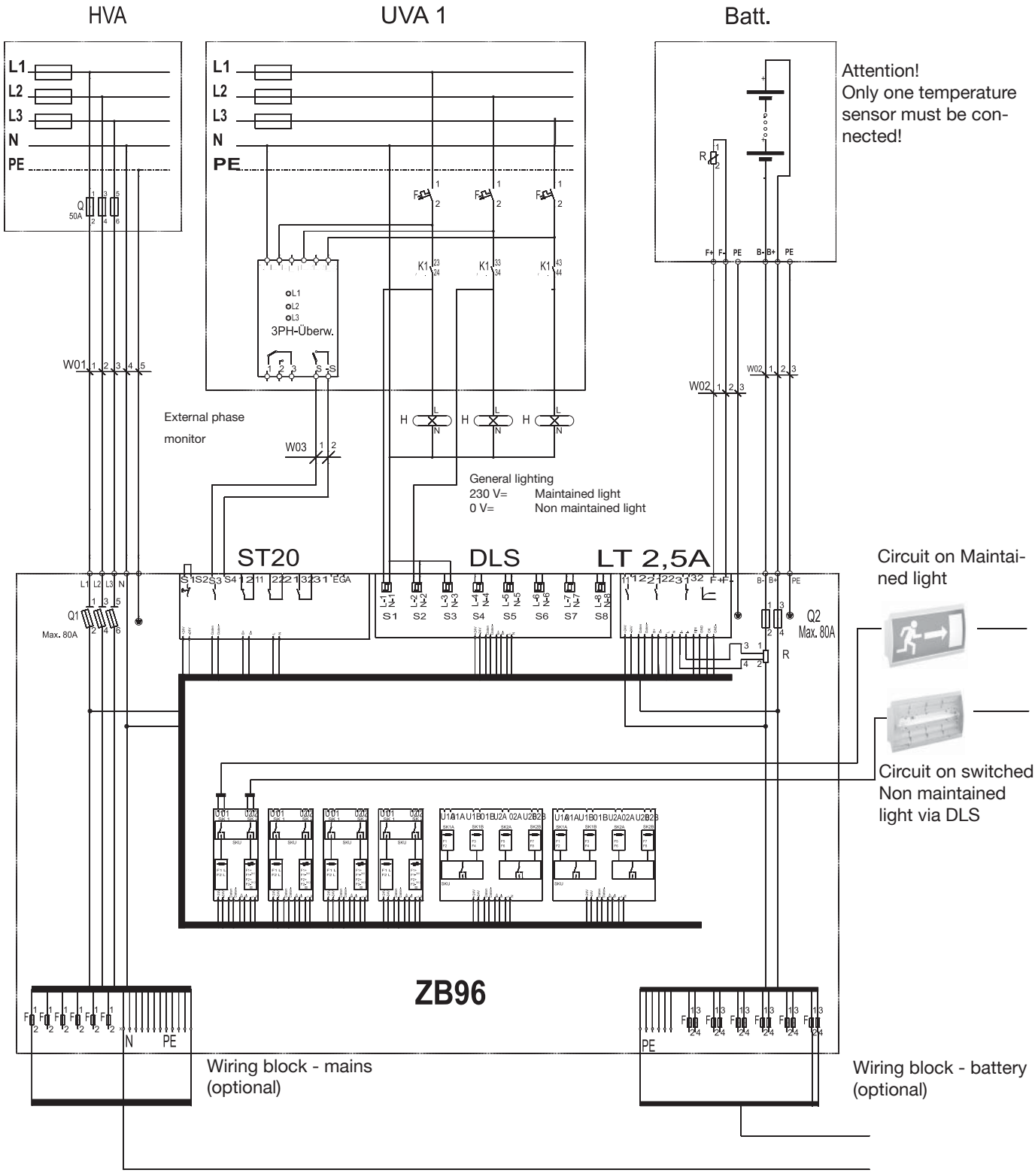
Item 1: Top terminal strip for the (monitoring) inputs
Item 2: bottom terminal strip
Item 3: Indicating LEDs
LEDs 1 ... 8 light up if the circuit is closed .
LED „Störung/Failure“ lights up if a fault has been detected in the module.
Item 4: Fixing element (fastening screw) for the module.



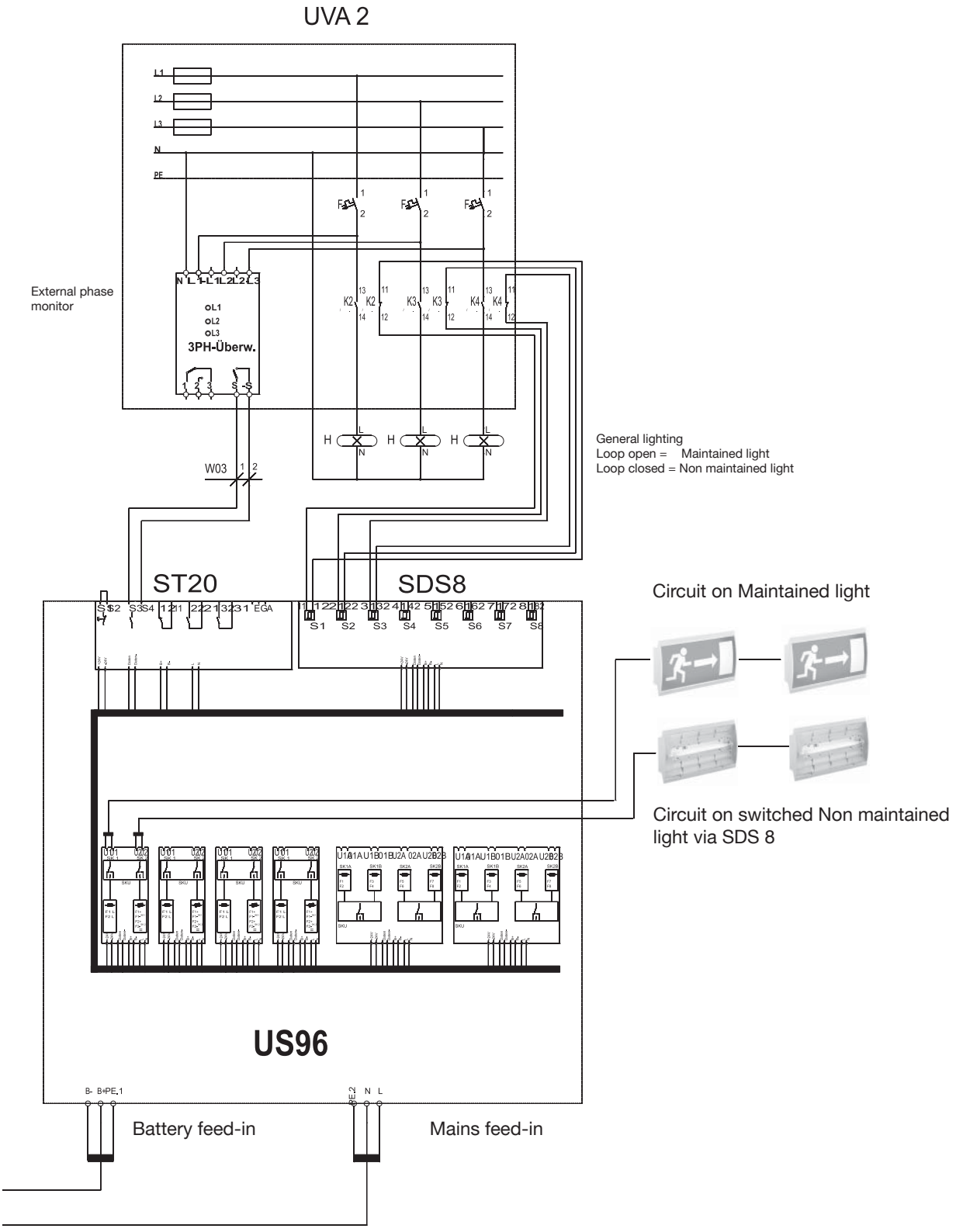
6 Block diagram



6.1 Installation Example ZB 96



6.2.1 Installation Example US 96



7 Important Notes on Safety at Work and Safe Operation of the Emergency Lighting System ZB 96

Warning!
This system forms part of the emergency and general lighting equipment and as such is an important safety component of a building or operation. Any unauthorized or makeshift (inexpert) work carried out on the system may result in a failure of the general or emergency lighting installation and thus cause

- **significant danger to persons,**
- **significant damage to machinery and plant units,**
- **malfunctions and interruption of the production sequence.**

After the system has been mounted, connected and commissioned only the following work is required during normal operation:

- Monitoring and logging of the system functions
- Safeguarding actions in the case of malfunctions
- Carrying out inspections and safety checks prescribed by law and regulations

Notes:

- Observe the national legislation and guidelines with respect to the design and control of a plant forming part of general and emergency lighting systems.
- Observe the national legislation and guidelines with respect to inspections and safety checks (eg. for function and operating duration testing).

Organization and monitoring of this work is the duty of the safety lighting system owner!
The following is to be laid down in writing and the relevant documents must always be available:

- Type and scope of work
- Documentation of the work results
- Responsibility and authorization regarding work to be performed
  - Who is allowed to perform a certain task?
  - Who has to monitor the work performed?
- Duty to alert (eg. in case of faults or function testing)
- Organizational measures when work is carried out on the lighting system. This may include, inter alia:
  - Information and reporting duty regarding start, duration and end of the work concerned
  - Safety measures to be taken during work: e.g. standby lighting, disconnecting the power supply, safeguards to prevent accidental restarting (eg. removing fuses, lock-outs, danger signs)
  - Protection and safety equipment for personnel carrying out work on the plant (eg. suitable working clothes and PPE)
  - Protection and safety measures to rule out danger caused by neighboring plant units (eg. providing safety fences, barriers, securing traffic routes)

Moreover, observe what has been said regarding target groups and use of this Operating Manual under „7 Important Notes“ and „8 Intended Use“.
Inspections and safety checks have to be performed exclusively by authorized expert staff that must also issue the required documentation (to satisfy national legislation and rules).

Note:
If the safety lighting system or programming requires modification or in the event of safety checks to be performed, please contact the respective branch of CEAG or consult experts of authorized institutes.

8 Intended Use

CE

Attention!
CEAG Notlichtsysteme GmbH will not assume any liability and/or warranty for shortcomings relating to the supply and installation of CEAG safety lighting systems and luminaires that may arise due to other standards and regulations prescribed for or applicable to overall installation packages of which CEAG products form part.
❒ In addition, be sure to observe all laws, standards and guidelines applicable in the country where the equipment is mounted and operated.

Warning!
When planning a lighting system of which the ZB 96 systems forms part please check initially whether the planned electrical installations meet the environmental requirements of the respective mounting location. Special ambient conditions (eg. hazardous areas or zones where aggressive atmosphere prevails) call for special equipment and installations.

Notes:
❒ Only CG luminaires/ballasts from CEAG Notlichtsysteme GmbH ensure that all functions are available when operating the components within a ZB 96 system.
When using other ballasts please check if they are suitable for safety lighting systems and operation within a ZB 96 system!

❒ The optimum battery operating temperature for emergency lighting supply is +20 °C.
Lower temperatures will impair the available capacity.
Higher temperatures will reduce the usability period.
The technical data apply to a nominal temperature of +20 °C.

The central battery systems ZB 96 and US 96 are intended for monitoring and controlling lighting plants for general and emergency lighting purposes.

The system operates under program control. Setting parameters must exclusively be carried out by expert personnel having special knowledge of statutory and technical fundamentals governing the erection and operation of lighting systems.

The system has been designed and built to reflect the latest technical rules with respect to system safety.

The extensive use of electronic devices has significantly increased in the last few years so that the resultant radio interference may cause major problems as every electronic unit, machine or system transmits interference of various kind.
Such interference may cause hazards particularly in highly automated industrial environments. It may lead to malfunctions or even failure of entire plant units. Due to superimposition of different kinds of interference the total radiation interference level will increase and requires systems and components to be protected against electromagnetic impairment. Especially in the field of industrial process technology is instrumentation equipment interference immunity a must. Therefore, all electronic units and appliances must have CE certification.

CEAG products meet the requirements laid down in EU Directives 89/336/EWG (EMC Directive) and 73/23/EWG as amended by the 93/68/EWG Directive (Low Voltage Directive) and are approved to bear the CE symbol. If luminaires with electronic ballasts satisfy the EMC rules interference caused by the high-frequency operation of the ballasts is well within statutory limits. Nevertheless, it cannot be ruled out that electronic devices may be affected in exceptional cases. Basically, only HF paging systems (in the MHz range) must be employed. No reliable operation is possible if inductive paging systems (25-40kHz) are used.

Nevertheless, danger may arise during plant operation
- ❒ to personnel if the safety instructions are disregarded,
- ❒ if the unit is used for other than the intended purpose.

Therefore, operate the system and any system component attached only when in perfect technical condition and observe
- ❒ the safety and danger notes included in this mounting and operating manual,
- ❒ work procedures and safety instructions prescribed by the plant Owner/Operator,
- ❒ the installation and operating data listed in Chapter 3 „Technical Data“ und in CEAG catalog „Safety Luminaires and Safety Lighting Systems“.

Malfunctions that may impede the functioning or safety of the plant must at once be reported to the respective level of the plant management and have to be eliminated without delay.

The working and safety rules and regulations are to be observed as laid down in this mounting and operating manual and furthermore as they arise from
- ❒ organizational measures initiated by the Plant Management as described under
  - – „1 Important Notes“,
  - – „4 Important Notes on Safety at Work and Safe Operation of the Emergency Lighting System ZB 96“
- ❒ as well as from the general and specific accident prevention rules and regulations.

CEAG will not assume any warranty or liability for damage or consequential damage occurring as a result of
- ❒ using the system for other than the intended purpose,
- ❒ disregarding rules and regulations governing the safe operation of the system,
- ❒ unauthorized or inexpert modifications to
  – the connections and settings of the system,
  – or the programming of the system,
- ❒ operating devices or device groups in conjunction with the ZB 96 system that are unsuited or not permitted.

9 Transport, Storage and Disposal

The batteries for safety lighting purposes are supplied together with the battery cabinets employed.
As regards transport and storage of the batteries please follow the instructions issued by the battery manufacturer and instructions for the battery cabinets.

Attention!

- **Batteries for emergency operation must only be stored for a period not exceeding three months without being charged!**
- **If the mains power to the ZB 96 system is interrupted for more than three days the battery circuit must be disconnected (remove battery fuse). This work must exclusively be performed by skilled electrical personnel (cf. „Testing / Replacing Fuses“).**

The following must be observed when handling and storing the equipment:

- Always handle and store the ZB 96 system in upright position (see markings and tilting indicator on the package).
- Observe the technical specifications under „Technical Data“ governing ambient conditions when handling and storing the system. The storage location should be dry and clean. Avoid the ingress of dust and moisture and rule out condensate formation due to moisture during transport and storage (cf. data specified under „Technical Data“ with respect to admissible ambient temperatures, type of enclosure, and protection class).
- Make sure that all transportation routes
  - are unobstructed (sufficient width and inside height for all handling movements),
  - allow for sufficient escape space for persons in case loads tip over or slide off,
  - have adequate carrying capability (for load, transport packing and transportation means),

  and that the transport routes are suited for the transportation means used with respect to gradient and surface characteristics (eg. non-skid texture, eveness and other obstacles).
- Only use
  - handling means (eg. hoisting cars, forklift trucks etc.),
  - lifting tackle (spreader beams, chains, ropes etc.)
  - and securing elements (wedges, squared timber, guide, bracing and safety ropes etc.)

  that are in proper technical condition and have adequate carrying capacity.
- Observe all instructions regarding handling conditions, transport position, attachment points on the packing and on the unit/control cabinet.
- Handling/transportation work must only be performed by personnel familiar with applicable methods and signals and capable of carrying out this work expertly and in compliance with safety rules and regulations.

Disposal:

- Packing materials are not to be viewed as garbage but are valuable substances that have to be processed by suitable recycling measures to render them suited for reuse.
  Please follow any national guidelines and provisions governing the disposal of packing material!
- Batteries and electronic components contain substances that cause health and environmental risk and damage if not disposed of expertly. Therefore, strictly observe the national guidelines and provisions governing the disposal of used batteries and electronic scrap.

CEAG has obtained the recycling certificate issued by INTERSEROH GmbH.

INTERSEROH RECYCLING

Contract number No. 85405 applies. This ensures that registered packings are utilized in terms of material exploitation with the requirements of the Packing Ordinance being fully met. INTERSEROH collecting stations are obliged to dispose of CEAG packings free of charge.

RCD In = 10mA
max. line length = 500m
RCD In = 15mA
max. line length = 750m
RCD In = 30mA
max. line length = 1500m
RCD In = 300mA
max. line length = 15000m

Table 1: Example 1

10 Mounting

When delivered to the customer the equipment shown in this mounting and operating manual may differ in terms of modules fitted. Characteristics of customer-specific designs are described in project documents to be ordered separately.

Warning!

❒ **Work on the general supply network and laying of power, signalling and control lines/ cabling as well as connection of the battery supply must only be carried out by skilled electrical personnel.**

❒ **Take all measures required to warrant safety at the workplace!**
Aside from adhering to general technical standards and practices this also applies to the instructions given in Chapters 1 and 7 to 9 of this manual.

Notes!

❒ Laying of connecting lines must exclusively be performed in conformity with applicable guidelines and standards of electrical engineering (eg. DIN VDE 100 standards series).

❒ In addition please observe all national guidelines and provisions ruling in the country where the plant is erected and operated.

❒ Secure all line entry and exit points of the control cabinet by means of M-glands or rubber seals provided for this purpose to prevent mechanical line damage or ingress of moisture.

Attention!

❒ Using RCD´s in the mains lead to protect against indirect contact acc. to VDE 100 part 410, please observe the following:

- Activation in consequence of installation failures
- Activation in consequence of outer actions
- Activation in consequence of capacitive leakage current

Attend to the right residual current operated device (RCD) during designing and construction. When using RCDs in the network supply observe the following:

Capacitive leakage current
When selecting RCDs, the outgoing line lengths have to be implicated.
Example 1: System with 17 circuits à 100m line length and a RCD with 30mA release current in the feeder! (s. table 1)
The total maximum line length exceeds the value of 1500m and can activate a RCD by grid-bound capacitive leakage currents!

Maximum number of user
In general, the insulating resistance has to be 0.5m with a supply voltage of 230 V AC. Inversely that means that a leakage current of < 0.5mA (230 V/0.5m) per user is permitted.
Example 2: A system with 17 circuits and 10 luminaires per circuit and a 30mA RCD in the feeder.

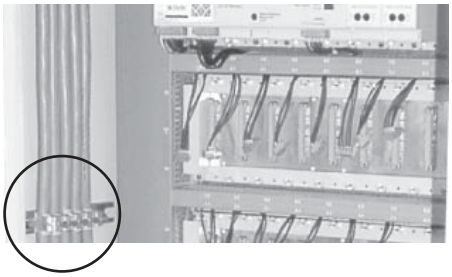
17 x 10 x 0.5mA = 85mA leakage current

If the addition of the single permitted leakage currents of the connected user to the RCD exceeds 30mA an activation of the RCD can be caused.

❒ Only electronic ballasts and luminaires of a rated operating voltage of 230 V AC (50/60 Hz) and 220 V DC must be connected to the outputs for the emergency lighting/final circuits of the ZB 96 system!

Danger!
When batteries or battery-fed parts of the system are improperly handled injuries or danger to life may arise due to high currents or electric arcs momentarily developing upon battery discharge.
It is mandatory that the instructions in this manual relating to disconnection or connection of batteries are strictly observed (cf. Connecting the Battery supply).
Make sure polarity is correctly observed when connecting the battery banks (battery cabinets / racks)!

Fig. 18: Overview of the control cabinet with top PE terminal block (1) for signalling lines and final circuits, the fused isolators (with distributors) for mains(2) and battery supply (3) and cable ducts (4) of the control cabinet



Attention!

- **Short-circuits and wrong polarity may cause damage to the battery bank or installations of a ZB 96 or US 96 system.**
- **When working on electrical systems (eg. connecting control or signalling lines) or electronic systems (eg. inserting or withdrawing modules in the control cabinet) ESD precautionary measures must be taken!**

10.1 Mounting the Control Cabinet

The control cabinets must be mounted on level and sustainable ground (adequate load-carrying capacity).

System components may be added or replaced at a later date; a description of such work on cabinet internals is not included in this manual because associated actions must be left to specially trained CEAG personnel.

- ☞ As regards transportation and storage please follow the instructions given in Chapter 9 „“Transport, Storage and Disposal“. These instructions apply as well to short-term transport or storage during mounting!
- ☞ Carry out preparatory work at the place where the system is to be mounted. The mounting location must be plane and level. Bores are provided in the baseplate for ground attachment or bolting down on a pedestal or base.
- ☞ Disconnect all connecting lines and leads (mains and battery supply) and safeguard them against accidental reclosing (eg. remove all fuses and take appropriate precautionary measures on the general mains supply distributor and battery bank by providing warning signs and/or lockouts).
- ☞ When laying the connecting lines (mains and battery supply) make adequate length allowance (eg. for routing within the cable ducts of the control cabinet) up to the mounting location of the control cabinet. This work must be carried out expertly and according to applicable technical guidelines and standards!
- ☞ Secure all line entry points with the M-glands provided.
- ☞ Make sure connecting lines are routed through the cable ducst of the control cabinet as far as feasible.

In Fig. 18, bottom left, the outgoing leads for mains and battery supply of substations are attached to the cabinet wall via C profiles (reference No. 400 71 347 126) and appropriate cable clamps.

Do not allow connecting lines/leads to be laid loosely in a make-shift manner!

11 Installation of Emergency Lighting System

Mounting and connection of the emergency lighting system has not been described in this manual.

- ☞ Perform the respective work as per applicable electrical engineering regulations and standards as well as technical documentation provided for the components and equipment used.

Fig. 19: Position of load-break switch (1) (terminal and fuse box for mains supply) and terminal blocks (2) and (3) for the connection and distribution of the N- and PE lines

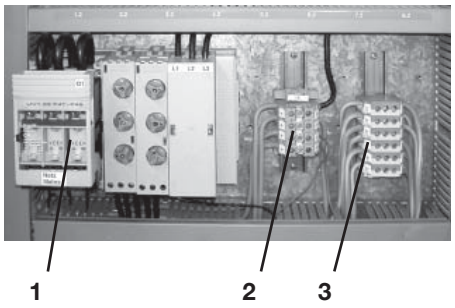


Fig. 20: Load-break switch hinged open to the front (1) with mains fuses (2) for lines L1, L2 and L3 and
Item 3: Outgoing distributor (mains)
Item 4: Cabinet distributor (mains)

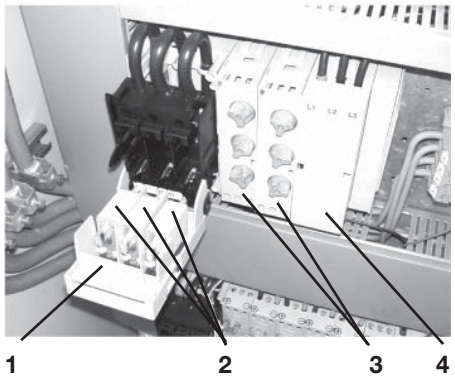
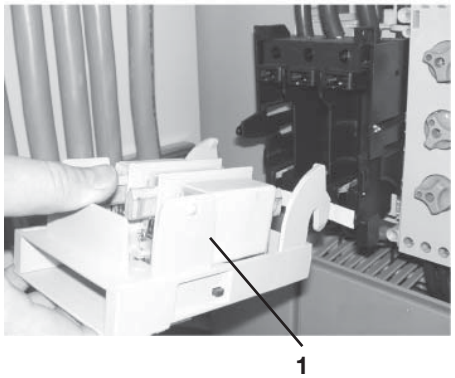


Fig. 21: Lift load-break switch upwards (1) to make connection terminals (Fig. 22) accessible



11.1 Connection of the Mains supply to ZB 96

Power is supplied to a ZB 96 system via the general power system or the batteries of a battery bank (battery cabinet or rack).

In case of a 1-phase operation only a load-current line is connected to the system and the input terminals (see Fig. 22, Item 2) are bridged on the isolator.

Note:
Only carry out the connecting work described here.
Switching on and testing the power supply systems is described in Chapter 12 „Commissioning and Miscellaneous Work“!

☞ Connect the lines for mains supply to the ZB 96 control cabinet as follows:
- Make sure the system and incoming feeders have been disconnected and safeguarded (cf. Chapter 12)!
- Connect the protective conductor to the PE terminal block (Fig.19, Item 3).
- Connect the neutral conductor to the N terminal block (Fig.19, Item 2).
- Connect the load lines to the L terminals (Fig. 22, Item 2) of the load-break switch.

11.2 Mains Connections to Substations US 96

Substations US 96 are energized via the power supply of the pertinent ZB 96 system (see outgoing distributor in Fig. 20, Item 3 and outgoing lines in Fig. 22, Item 4).
An outgoing distributor (reference No. 400 71 347 160) can be employed for three 1-phase power supply systems.

Notes:
❒ Only carry out the connecting work described here. Switching on and testing the power supply systems is described in Chapter 12 „Commissioning and Miscellaneous Work“!

❒ To facilitate work outgoing distributors may be removed from the conductor rail in forward direction after the catch on the top casing wall is released (see arrow in Fig. 23).
After the outgoing lines have been hooked up the outgoing distributor can be replaced in position on the conductor rail and carefully snapped into place.

☞ Connect the lines for mains supply to a US 96 substation as follows:
- Make sure the system and incoming feeders have been disconnected and safeguarded (cf. Chapter 12)!
- Lay the incoming lines to/within the ZB 96 control cabinet and in its cable ducts (Fig. 18, Item 3 and Fig.22, Item 3) and to/within the control cabinet of the US 96 substation.
- Connect the protective conductor (PE conductor) to the terminal block (Fig.19, Item 3).
- Connect the N conductor to the terminal block (Fig.19, Item 2).
- Connect the L conductors to the terminals of the outgoing distributor (Fig. 20, Item 3).

Note:
The mains supply is hooked up within the control cabinet of the US 96 substations, as described under 11.2.

Fig. 22: Connections with load-break switch cover removed
Item 1: Connection lines for conductor rail (mains) located behind
Item 2: Incoming feed lines of mains supply to the ZB 96 station
Item 3: Outgoing lines for mains supply from the US 96 substations

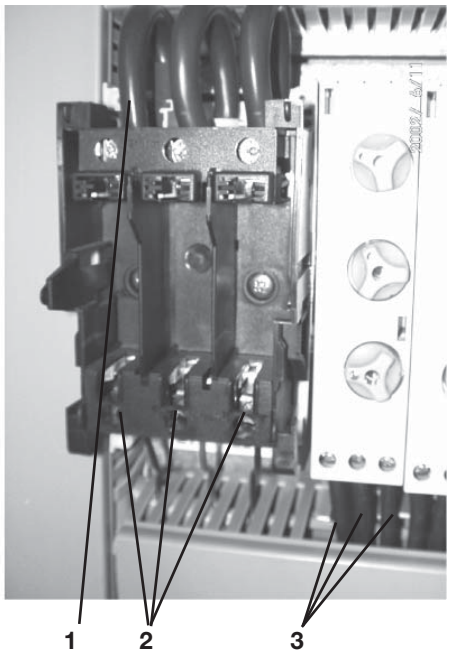
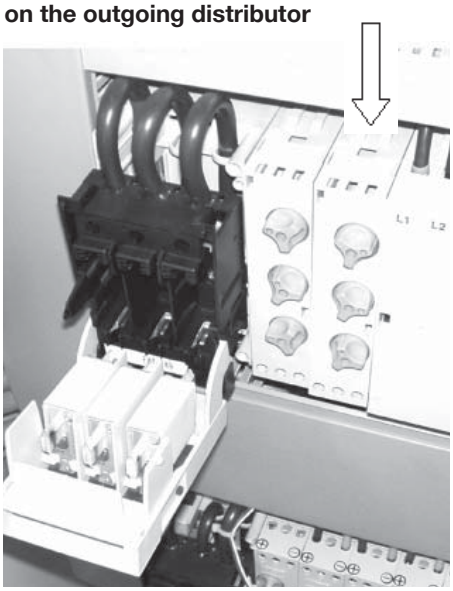


Fig. 23: Location of the casing catch on the outgoing distributor



11.3 Connecting the Battery Supply

Observe the data sheets of the battery manufacturer CEAG has included in the supply of the battery banks!
Take all statutory rules and ordinances into account that apply at the place where the emergency lighting system is operated!

Notes:
❒ Standard supply of CEAG battery cabinets includes a cabinet terminal block where the connecting lines (+/–) for battery supply and a temperature sensor (F+/F–) are hooked up (see Fig. 24).
The PE connection serves to safeguard against current-carrying parts of the battery cabinet (see „Installation Instructions for Battery Cabinets and Battery Racks“).

❒ The supply of battery racks and battery cabinets does not include the connecting lines to the end poles of the interconnected/ coupled batteries.

❒ In case of battery racks the connecting terminal block (Fig. 24) is not part of the supply scope.

❒ CEAG recommends the installation of a battery power distributor with isolator and fuses for the battery circuit (see „Installation Instructions for Battery Power Distributor“) which enables the terminals of the connecting lines to the ZB 96 control cabinet to be safely isolated/disconnected.

❒ The battery connecting lines (for the ZB 96 control cabinet and its US 96 substations) must be laid according to DIN VDE 0100 T520 to prevent earth leakage and short circuits!

❒ Make sure the conductor size of the lines suits the expected flow of power to the consumers connected.

❒ Only one temperature sensor (F+ / F-) must be connected to the charger unit LT.1 2.5 A of a ZB 96 control cabinet. Its line must be routed separately to the battery bank. For this purpose a 2-wire lead can be employed the cross sectional area of which can be 0.5 mm^2 for lengths < 50 m.

Warning!
The battery supply is effected at 216 V DC nominal! Improper use or manipulation may result in perilous electrical shocks or burns (due to arcing)!
- ❒ **Make sure polarity is correct when connecting the battery banks.**
- ❒ **Make sure to first switch off all connected loads („System blocking“) to avoid arcing when the battery circuit is disconnected (or connected)!**

Note:
Observe the following connection sequence:
– Connect the cable provided with a „+“ identification to the positive terminal of the battery bank.
– Connect the cable provided with a „-“ identification to the negative terminal of the battery bank.

The reverse order shall apply when disconnecting the battery supply.

Fig. 24: Schematic view of the cabinet terminal block of a CEAG battery cabinet

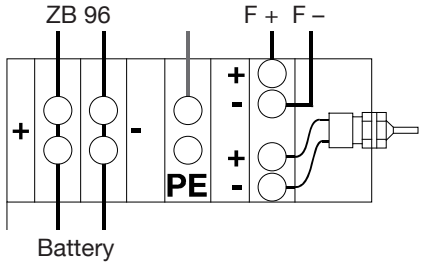


Abb. 25: Location of the load-break switch
Item 1: Location of load-break switch for battery supply
Item 2: Outgoing distributors (Batt)
Item 3: Cabinet distributor (Batt)

Always observe warning notes!

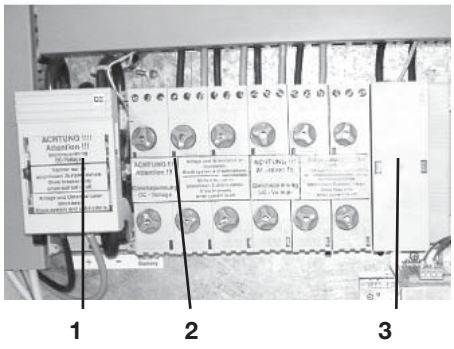
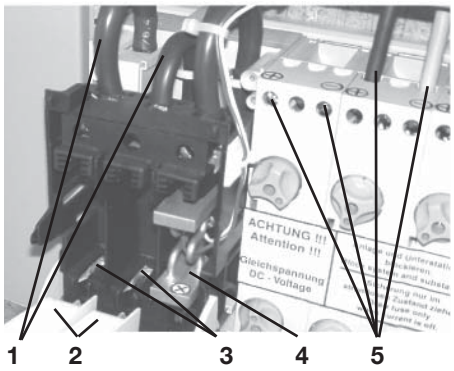


Fig. 26: Open load-break switch (Batt) with

Item 1: Connecting lines for conductor rails (Batt) located behind
Item 2: Fuses (Batt)
Item 3: Connections (+ / –) for battery supply
Item 4: Shunt for battery current measurement
Item 5: Terminals (+ / –) and outgoing lines for battery supply to US 96 substations



11.4 Connecting the Power Supply of a ZB 96 Station

The modules of the ZB 96 control cabinet (and US 96) and the emergency lighting system circuits (controlled via the SKU modules) are energized via the power supply lines. Moreover, the connected battery banks are charged in this way controlled via the charging unit.

Only if the control (at the central battery system ZB 96 and its substations US 96) has been blocked may the battery supply connections be safely switched off by means of the load-break switch (Batt). Only after the mains supply has been switched off are charging booster and all circuits of the SKUs in deenergized state.

Warning!
Please note that starting out from the battery bank (battery cabinet / rack) the connecting lines may still be alive!

Notes:
❒ Only carry out the connecting work described here. Switching on and testing the power supply systems is described in Chapter 12 „Commissioning and Miscellaneous Work“!

❒ Connections (+ / –) are accessible after the movable part of the load-break switch (Batt) has been removed (to be taken off as illustrated in Fig. 21).

☞ Connect the lines for battery supply to the ZB 96 control cabinet as follows:

- Make sure the system and incoming feeders have been disconnected and safeguarded (cf. Chapter 12)!
- Connect the positive conductor to the positive terminal of the load-break switch (Fig. 26, Item 3).
- Connect the negative conductor to the negative terminal of the load-break switch (Fig. 26, Item 3).

11.5 Connecting the Power Supply of a US 96 Substation

Substations US 96 are energized via the power supply of the pertinent ZB 96 system (see outgoing distributor in Fig. 25, Item 2 and outgoing lines in Fig. 26, Item 5).
An outgoing distributor (reference No. 400 71 347 161) can be employed for a battery supply system.
The middle terminal and pertinent fuse remain unused!

Notes:
❒ Only carry out the connecting work described here. Switching on and testing the power supply systems is described in Chapter 12 „Commissioning and Miscellaneous Work“!

❒ To facilitate work outgoing distributors may be removed from the conductor rail in forward direction after the catch on the casing bottom has been released. After the outgoing lines have been hooked up the outgoing distributor can be replaced in position on the conductor rail and snapped into place.

☞ Connect the lines for battery supply to a US 96 substation as follows:
- Make sure the system and incoming feeders have been disconnected and safeguarded (cf. Chapter 12)!
- Lay the incoming lines to/within the ZB 96 control cabinet and in its cable ducts (Fig. 18, Item 3 and Fig. 22, Item 3) and to/within the control cabinet of the US 96 substation.
- Connect the positive conductor to the positive terminal of the outgoing distributor (Fig. 26, Item 5).
- Connect the negative conductor to the negative terminal of the outgoing distributor (Fig. 26, Item 5).

Note:
The battery supply is hooked up within the control cabinet of the US 96 substations, as described under Pt. 11.5.

Fig. 27: Position of the terminal block for connection PE terminals of final circuits in a ZB 96 control cabinet

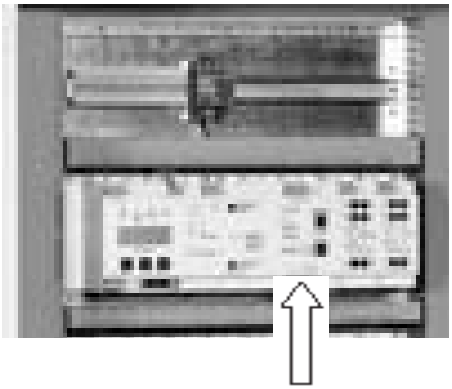
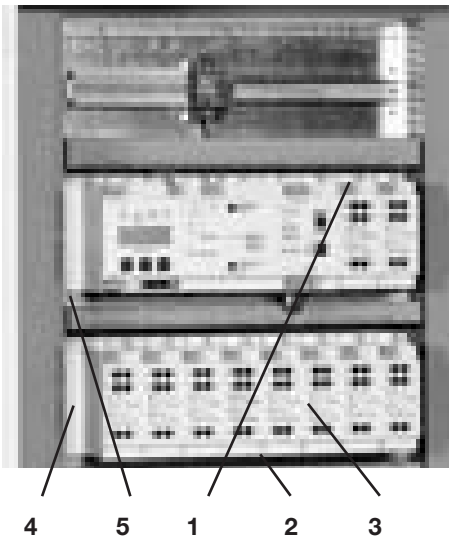


Fig. 28: BGT 1 (subrack accommodating modules) and BGT 2 (with 8 free slots)



Item 1: Pluggable terminal block with module connections (fitted)

Item 2: Bottom fixing means (fastening screw) for the SKU module

Item 3: BGT 2 subrack with 8 slots for max. 8 modules

Item 4 : Cover for terminals (L, N, + and – and further plug-in base connections) of subrack BGT 2

Item 5: Upper cover fixing screw

11.6 Connection of a Temperature Sensor

Attention:
Only one temperature sensor must be connected to the system.

For emergency lighting systems with central battery a temperature sensor (for battery bank temperature monitoring) is prescribed for the ZB 96 central battery system.

Connection to the charger unit is in the control cabinet via terminals „F+“ and „F-“ on charger unit LT.1 2.5 A (white arrow in Fig. 27/bottom, not with compact plant systems).

☞ Lay the temperature monitoring lead between battery bank and control cabinet ZB 96 and connect it within the control cabinet on the charger unit LT.1 2.5 A (Fig. 27).

11.7 Mounting and Connection of Internal Modules

Attention!
SKU modules must never be plugged in or removed in „On“ switching state! Deactivate an SKU module via the ST 20 control unit before removing or mounting it for testing, inspection or other purposes.
For removal or retrofitting work the control system must be blocked to prevent active circuits from being switched on when plugging in an SKU module.

All modules for the ZB 96 control cabinet (US 96) are mounted on a subrack (BGT). Plug-in bases are provided onto which the modules are mounted; locking pins make sure the modules are held in their correct position (see Fig. 28, Item 4). Moreover, mains or battery power is supplied to the modules via these plug-in sockets .

For ease of mounting/removal connections to these modules are via pluggable screw terminal blocks which can be plugged into or removed from the front of the modules. External incoming and outgoing leads are connected via these pluggable screw terminal blocks on the module (cf. Figure 27 or Figure 3, Items 6 and 7).

Notes:
❒ The circuit numbers and indicated switching outputs of the SKUs shown on the indicating display of the ST 20 control unit correspond to the selection of the slots of the subracks.

❒ In order that replaced SKUs function properly within the control system they have to be identified, activated and parameterized by means of the control software (circuit and luminaire setup).

Fig. 29: DLS module

11.8 Connection of a DSL Module

For each switching command a line must be laid between control cabinet (ZB 96 or US 96) and the distributor for the mains supply (of the circuits monitored).

Figure 31 shows the schematic circuit diagram of a DLS module.

The terminal assignment can be seen in figure 30.

Leads having a conductor size of up to 2.5 mm² may be connected to the terminals.

Fig. 30: Terminal assignment on DLS module (top/bottom)

Fig. 31: Schematic circuit diagram of a DLS module.
All eight inputs can be wired like input 1 (L1, N1).

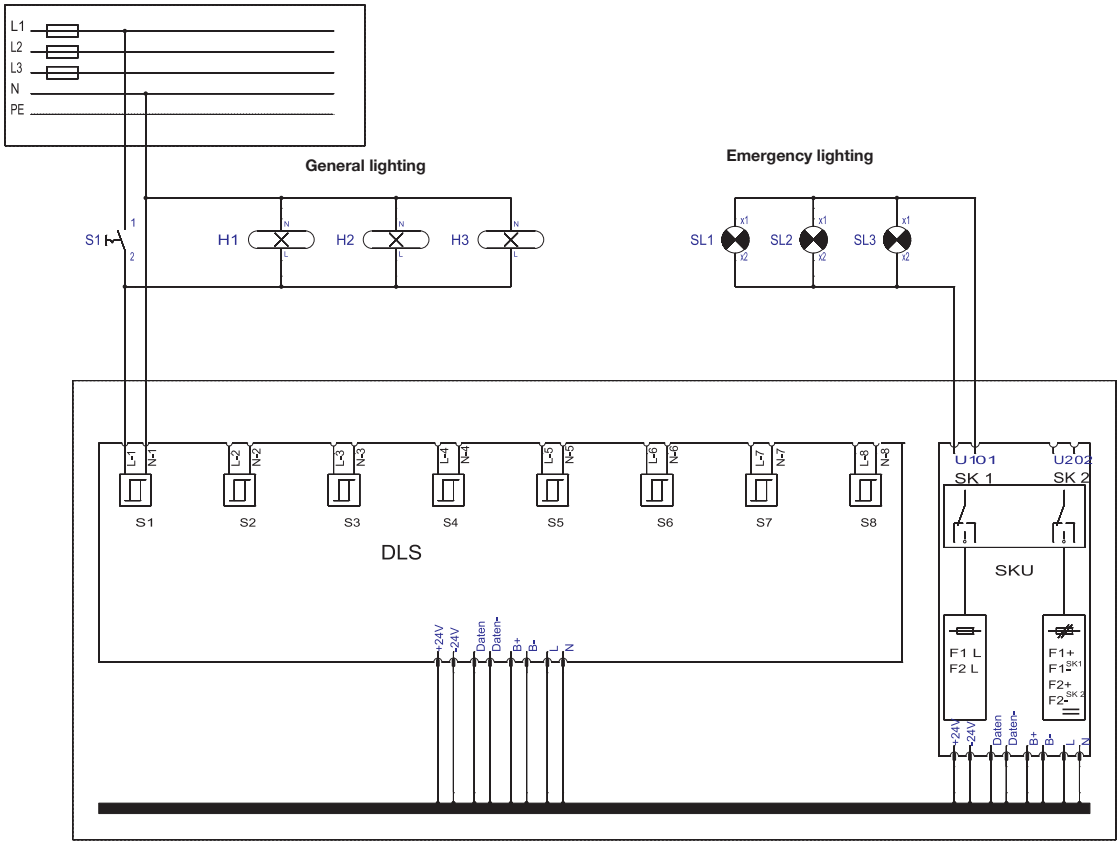


Fig. 32: SDS module with terminal assignment on module (top/bottom)

11.9 Connection of SDS 8 Modules

For each switching command a line must be laid between control cabinet (ZB 96 or US 96) and the distributor for the mains supply (of the circuits monitored).

Figure 33 shows the schematic circuit diagram of an SDS module.

The terminal assignment can be seen in figure 32.

Leads having a conductor size of up to 2.5 mm² may be connected to the terminals.

Fig. 33: Schematic circuit diagram of an SDS module. All eight inputs can be wired like input S1 (S1, S2).

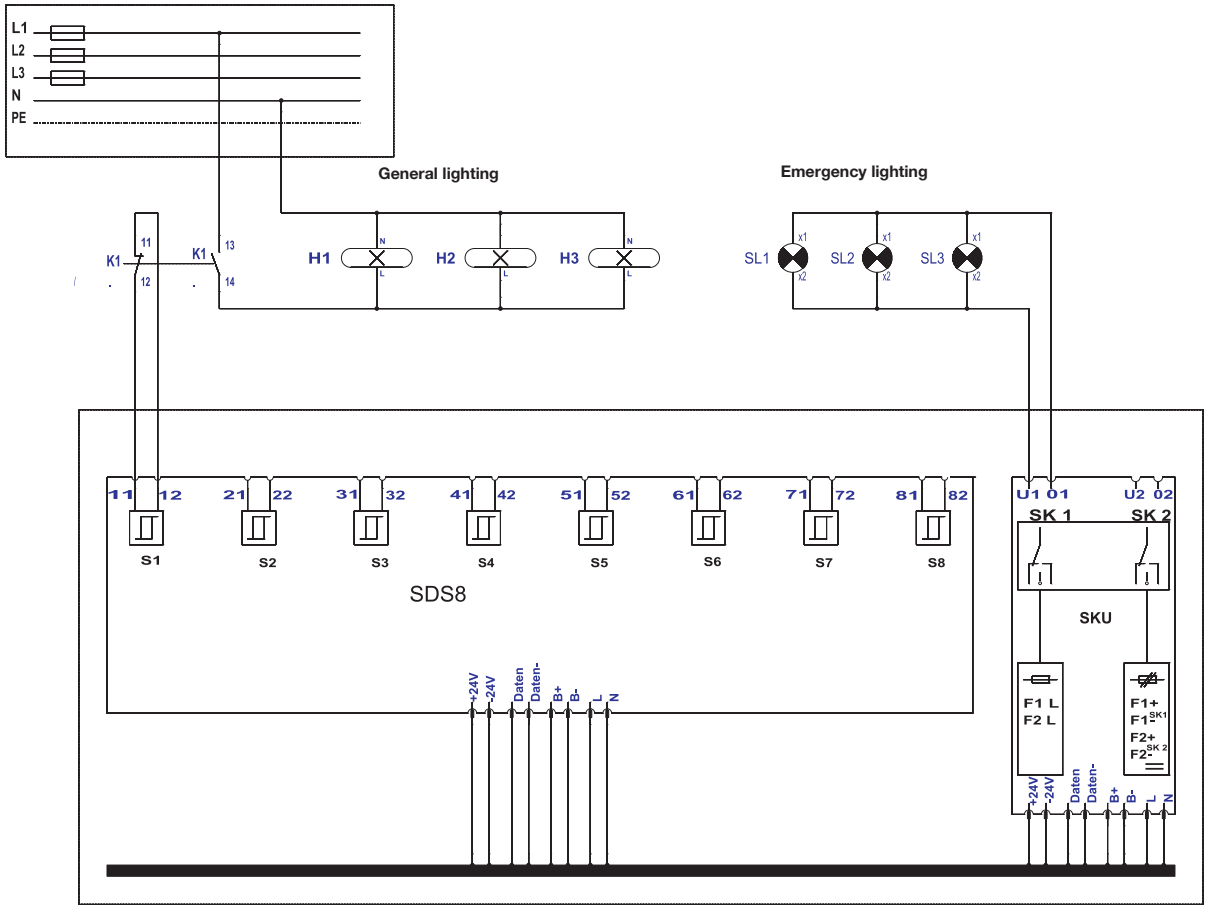


Fig. 34: TLS module with terminal assignment on module (top/bottom)

11.10 Connection of TLS Modules

The staircase lighting switching mode must be programmed via the freely programmable control unit of the changeover system.

If the changeover devices are connected to a CG Vision (CEWA GUARD programming and monitoring system) programming can be done via CG Vision (refer to the CG Vision operating instructions). Via the staircase lighting control optionally integrated into the ZB 96 the general lighting and the emergency lighting systems may be switched on by means of external switches within an adjustable time frame (1 to 15 minutes).

No. of switches per TLS input:

Mom. contact switch	Number
1 mA m.c. switch	50 pcs.
0.8 mA m.c. switch	62 pcs.
0.4 mA m.c. switch	125 pcs.

Figure 35 shows the schematic circuit diagram of a TLS module.

The terminal assignment can be seen in figure 34.

Leads having a conductor size of up to 2.5 mm² may be connected to the terminals.

Fig. 35: Schematic circuit diagram of a TLS module. All eight inputs can be wired like input T1 (11, 12).

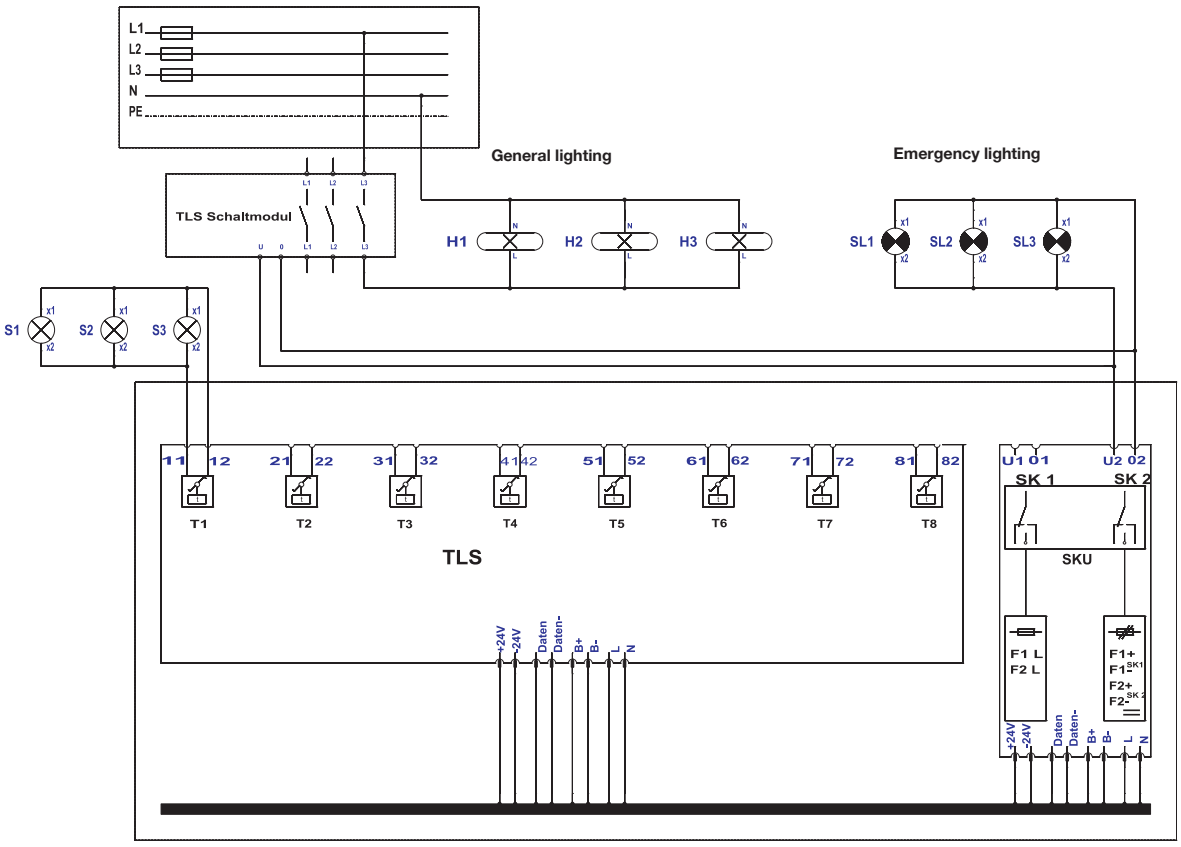


Fig. 36:
CEAG 3-phase monitor

11.11 Mounting and Connection of a CEAG 3-phase monitor with 24 V loop

These devices are of slide-on built-in type for mounting in a control cabinet/ subdistributor.
They are fixed to a 35-mm carrier rail according to DIN EN 50 022.

- ☞ Mount the device onto the carrier rail at the desired location.
  Carefully snap the device in place.
- ☞ Connecting leads are wired to the screw terminals on the device (see Fig. 36 and single-line diagrams below).

Connection in control cabinet ZB 96 (US 96) is effected on a control unit ST20 (S3 / S4) for external connections (Fig. 8, Item 3).

Notes:

❒ If several subdistributors have to be monitored, additional devices must be hooked up and connected to the other devices in a 24-V loop (see Fig. 38).

❒ If less than 3 phases have to be monitored by one 3-phase monitoring unit, the remaining inputs of the 3-phase monitoring unit must be bridged.

Fig.37: Single-line diagram of CEAG 3-phase monitoring with 24 V control loop for safety light requests

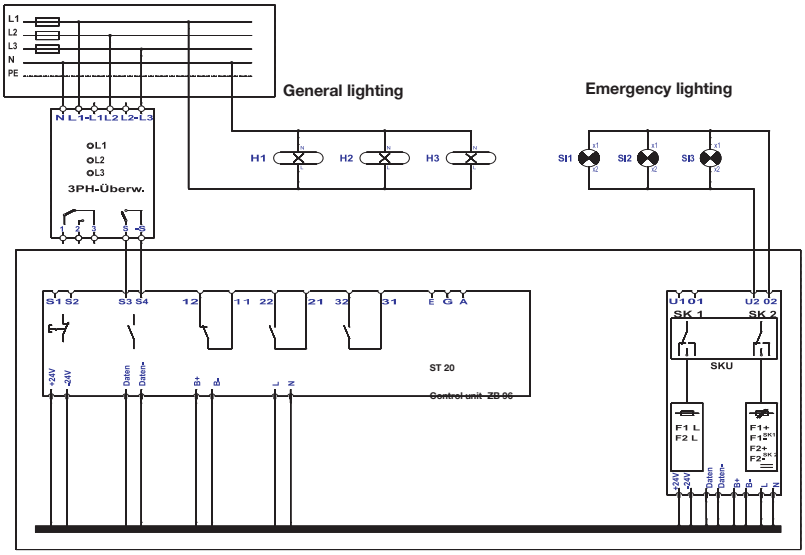


Fig. 38: Single-line diagram showing connection of several CEAG 3-phase monitoring units

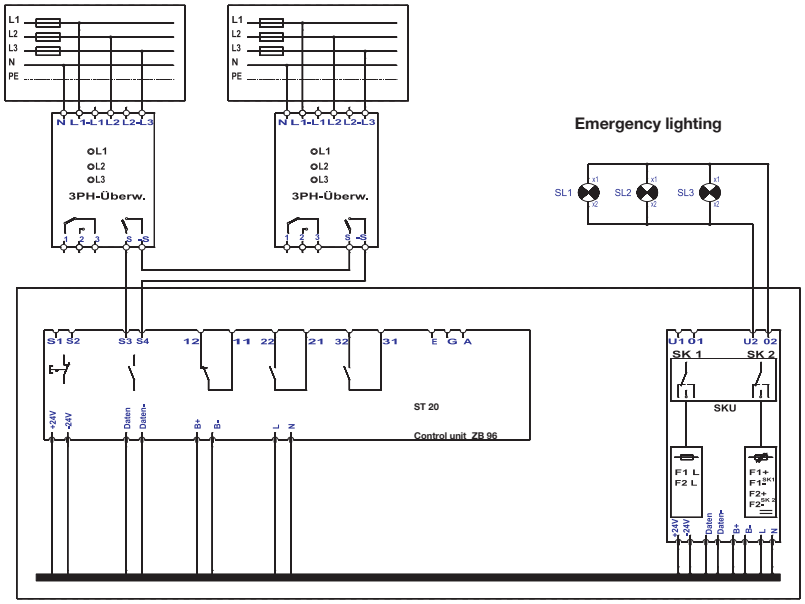
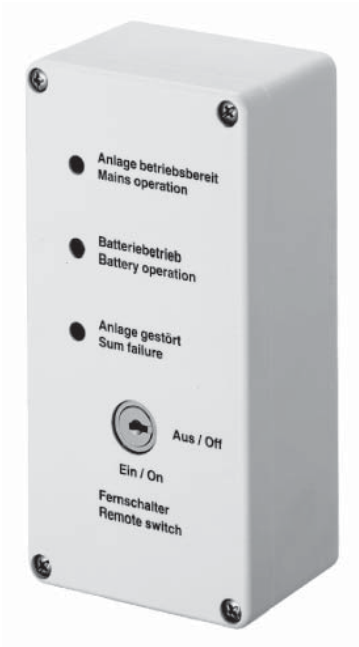


Fig. 39: Remote switch/F3 module



11.12 Connection of a Remote Switch/F3 Remote Indicating Unit

Connections are made as per Figure 40 (single-line diagram) as well as field installation diagrams and drawings.

The CEAG F3 remote switch is powered via the 24-V voltage supply system of the ZB 96 (or US 96).

Attention!
Do not use an external 24-V voltage supply!

Note:
❒ Observe national rules and regulations governing the indicating and signalling behavior when using a remote switch or a remote indicator for emergency lighting systems.

❒ Observe the instructions in the Technical Documentation as provided by the manufacturer of the CEAG F3 remote indicator.

Completing Mounting Work

- ☞ Check all the wiring by way of applicable plans and drawings for plantsite installation.
- ☞ Make sure that all connections have been securely tightened.
- ☞ Remove all unused cables, insulating and fastening material as well as all tools and packaging material.

Fig. 40: Sinle-line diagram of a remote switch as 24-V control loop for system blocking (eg. during operational downtimes)

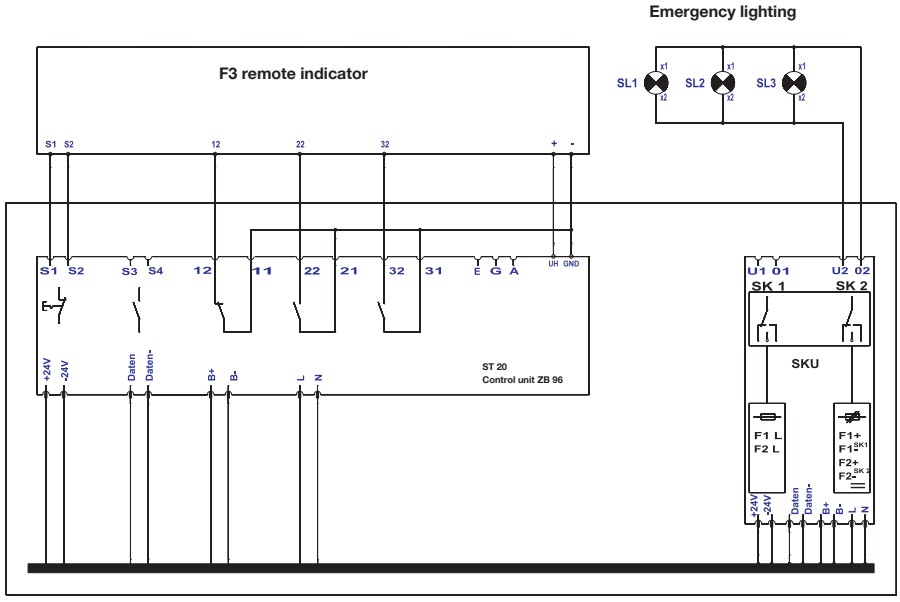
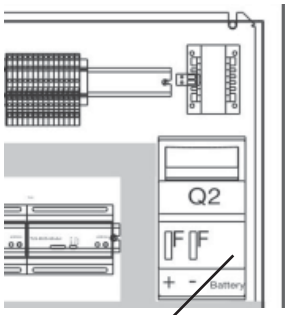
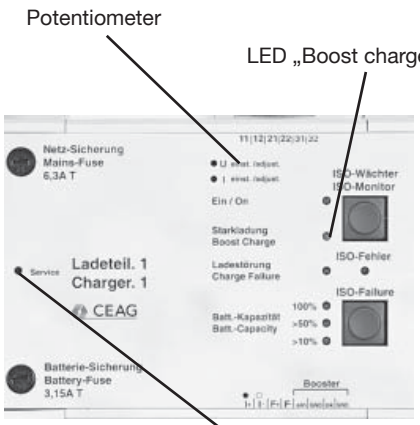


Fig. 41: The F3 remote indicating unit is also available for mounting into switches or cavity boxes as per DIN VDE 0606.



Open battery disconnector unencumbered!



12 Commissioning and Further Work

Warning!

- **Commissioning or re-starting (after retrofitting or maintenance/repairs) of the emergency lighting system or the ZB 96 system must only be performed by skilled ectrical personnel having special knowledge of the legal and technical prerequisites governing the set-up and operation of emergency/ safety lighing system and the design and control of the equipment dealt with here.**
- **Work on the general supply network and laying of power, signalling and control lines/ cabling as well as connection of the battery supply must only be carried out by skilled electrical personnel.**
- **Take all measures required to warrant safety at the workplace! Aside from observing general technical standards and practices this also applies to the instructions given in Chapter 1, Chapters 4 to 6 and what has been specified and laid down in Chapter 7 „Mounting“.**

Notes:

- Laying of connecting lines must exclusively be performed in conformity with applicable guidelines and standards of electrical engineering (eg. DIN VDE 0100 standards series).
- In addition please observe all national guidelines and provisions ruling in the country where the plant is erected and operated.

Attention!

- **Never switch the mains or battery supply on or off under load. In both cases the system must have been blocked first via the ST 20 control unit (or a remote switch).**
- **The control software and its latest switching state are stored in non-volatile memory.**

12.1 Tripple Charge Voltage

The setting of the tripple charge-voltage Adjustment work at the system must only be done by skilled electricians!
When central battery systems are supplied without battery of the type of battery is unknown the tripple charge-voltage is set up with the factory default of 247.8V at +20°C (means 2.29 V/Z). According to the type of battery the tripple charge-voltage must be fitted at face.

Adjust the tripple charge-voltage as follows:

1. Isolate battery circuit.
2. Switch on mains
3. Adjustment of the tripple charge-voltage may not occur during boost charge period. To ensure that the boost charge period is not active wait until the LED „Boost charge“ on the charging unit.1, 2.5 A, is off! This procedure can last for some minutes.
4. Connect a voltmeter in parallel to the charging circuit.
5. Push the service pin at the charging unit and read the ambient temperature at the control module ST 20.

Attention: The temperature sensor must be connected!

6. Depending on the ambient temperature set up the tripple charge-voltage at the po tentiometer „U adjust“ according to the specifications of the manufacturer.

- **When working on electrical systems (eg. connecting control or signalling lines) or electronic systems (eg. inserting or withdrawing modules in the control cabinet) the following is to be observed:**
  - **ESD precautionary measures and**
  - **the technical documentation for the equipment!**

Notes:

- Performing the work described below requires knowledge of how to operate the ZB 96 system (cf. „14 Controlling a ZB 96 (US 96) Central Battery System“).

12.2 Disconnecting/Switching-on an Emergency Lighting System under Battery supply

❒ Many work items necessitate disconnection of the sytem for safety reasons (or to protect modules and components). As the system is reversed to battery supply when the mains power is switched off certain work procedures have to be followed as described hereunder.

⚠ **Danger!**
Turning the mains supply on or off within the pertinent distributor should never take place under load (ie. when final circuits are switched on)!

If the power supply to the general lighting system or the mains supply of the emergency lighting system fails or is switched off the emergency lighting system control will reverse to battery supply. In this case a voltage of 216 V DC is applied, so take care:

⚠ **Danger!**
Never disconnect or connect lines under load to the battery bank (battery cabinet or battery rack)!

The same applies if the load-break switch for battery supply in the control cabinet (ZB 96 / US 96) is opened (or closed) under load!

☞ Before disconnecting the emergency lighting system on the distributor of the general mains supply and/or the connections of the battery bank for battery supply make sure to block the plant as described in Section 12.3.

☞ Following this, first disconnect the battery supply and then disconnect the main power supply.

☞ Take safety measures to ensure that plant remains disconnected as long as you work on the system or until the operationally safe state of the system has been restored.

⚠ **Attention!**
In case several systems (ZB 96 with US 96 substations) are supplied with power from a battery bank all systems must first be blocked!

Start with disconnecting the lowest level of the US 96 substations before you disconnect the ZB 96 central battery system!

☞ Before re-connecting the battery supply at the connections of the battery bank switch on the mains supply system and make sure that the system is blocked (see 26). Following this, you may switch on the battery supply on the battery bank.

12.3 Disconnecting/Switching-on a ZB 96 Control Cabinet or US 96

The above instructions apply analogously in case that the mains supply and/ or battery supply of a ZB 96 or US 96 control cabinet shall be disconnected or switched on.

☞ Do not switch the mains supply of a control cabinet (ZB 96 or US 96) off or on under load (ie. with the final circuits being switched on).

☞ Do not switch the battery supply of a control cabinet (ZB 96 or US 96) off or on under load (ie. with the final circuits being switched on).

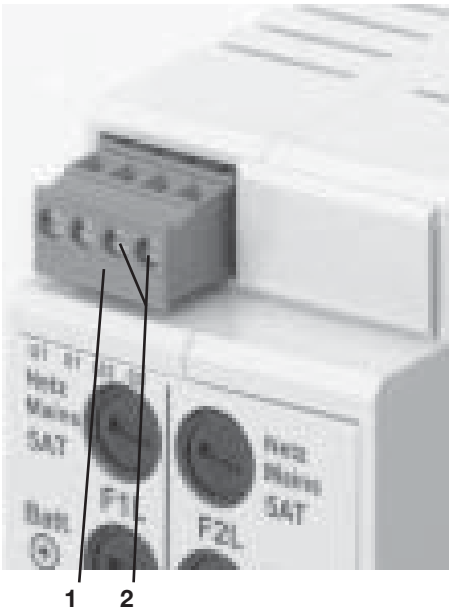
☞ Before you disconnect or switch on the mains and/or battery supply make sure that the control system has been blocked (see 12.3).

12.4 Block/Release the Control of a ZB 96 Control Cabinet or US 96

This is done via the menu item „Block/ Release Unit“ in menu 25 „Blocking, Acknowledgement“ of the control software.

Fig. 42: Insulation Testing

Fig. 42 a: Extract terminal block (1) and short circuits (2)



12.5 Checking all Connections

- ☞ Check whether the entire system has been disconnected and take safety measures to ensure system stays disconnected.
  Do not switch the power supply on before all work items have been completed.
- ☞ Check condition of all connections and lines/leads based on the emergency lighting system's drawings and diagrams as well whether installation work has been carried out in line with applicable standards and guidelines.
- ☞ Check all connections and screwed glands/unions for tight seating.
- ☞ Check whether all cable entry points are firmly seated and tight.

Voltage testing

- ❒ Input terminal voltage and final circuits must only be measured by skilled electrical personnel!
- ❒ Beware of and take measures to avoid danger associated with measurements on polyphase power supply systems!
- ❒ Only use measuring devices having adequate dielectric strength and current carrying capacity.
- ❒ All measurements to be taken on internal installations must be left to authorized CEAG service personnel!

Insulation testing

- ☞ Check whether the entire system has been disconnected and take safety measures to ensure system stays disconnected.
  Do not switch the power supply on before all work items have been completed.

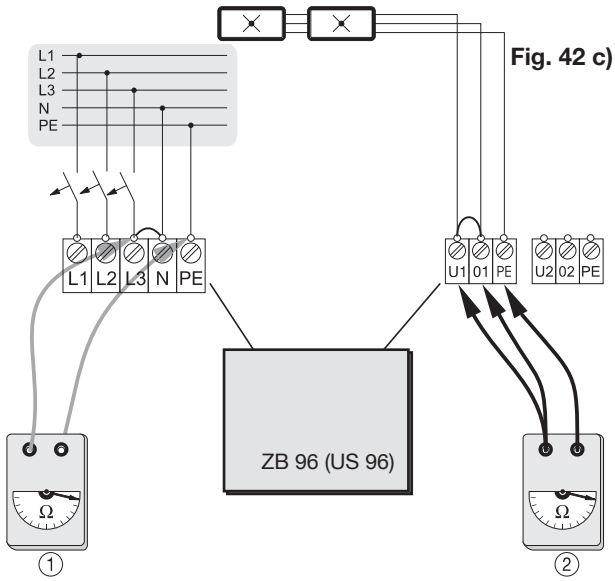
Danger!
Insulation tests must only be carried out between protective conductor PE and <u>any</u> phase conductor L1, L2 or L3 as well as between protective conductor PE and neutral conductor N. If circuits contain electronic components phase and neutral conductors must be connected with each other during measurements.

Measuring voltage max. 500 V DC
Measuring current 1mA

Only use measuring/testing devices meeting requirements specified in DIN VDE 0413.

- ☞ Disconnect connection lines for mains and battery supply.
- ☞ Bridge connections <u>L and N of the control cabinet</u> on terminals of the mains supply/outgoing distributors [1]).
- ☞ Make insulation tests as per adjacent Fig. 42b on
  – connections of mains supply (L/N) against PE for the ZB 96 control cabinet and its outgoing distributors
  – und and analogously on the US 96 substations.
- ☞ On ZB 96 control cabinet (or US 96) bridge connections <u>U1 / 01 etc.</u> on the outgoing terminals of the final circuits of the cabinet (see Fig. 42a) and make insulation tests of the final circuits U1/01 or U2/02 against PE as shown in the adjacent Fig. 42c. [1])
- ☞ Having completed insulation testing remove bridges on terminals L/ N (on mains supply and outgoing distributors) as well as U1 / 01 (etc.) on terminals of the final circuits.
- ☞ Re-connect all disconnected leads/ lines.

Fig. 42 b) Fig. 42 c)



[1]) Bridging L / N and/ or U1 / 01 (...) will prevent active components of the ZB 96 (US 96)control cabinet's electronic equipment and luminaires (ballasts) from being damaged!

12.6 Testing/Replacing Fuses

The fuses for mains and battery supply are arranged in the pertinent load-break switches (Fig. 3, Items 9 and 11) or on the battery bank.
Moreover, in the SKU modules fuses are provided for the final circuits with individual circuits being fuse-protected in other modules.

Warning!
Exclusively open the load-break switches if the system (ZB 96 control cabinet and any US 96 subsystems) has been disconnected first (see Section 12.2 „Disconnecting/Switching-on an Emergency Lighting System und Battery supply“).

Attention!
Never remove fuses under load on SKU modules or on the charger unit LT.1 2.5 A!

Testing the fuses of the mains and battery supply systems

For this purpose the control system of the ZB 96 control cabinet and US 96 subsystems, if any, must be blocked.

- ☞ Proceed as outlined under Section 12.2 „Disconnecting/Switching-on a ZB 96 Control Cabinet or US 96“.
- ☞ Open the load-break switch for the mains and battery supply.
- ☞ On the ZB 96 control cabinet and US 96 subsystems, if any, check whether all fuses in the load-break switch for mains and battery supply
  - meet the prescribed technical specifications and
  - have been correctly inserted/ mounted
  - are free from defects.

Testing the fuses on the charger unit LT.1 2.5 A

To de-energize these modules the control system of the ZB 96 control cabinet and US 96 subsystems, if any, must be blokked and disconnected (see Section 12.3).

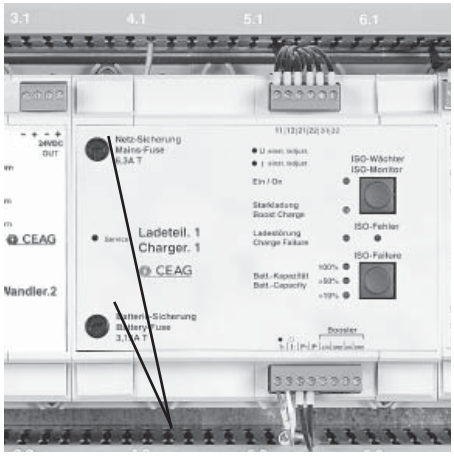
- ☞ Proceed as outlined under Section 12.2 „Disconnecting/Switching-on an Emergency Lighting System under Battery supply“.
- ☞ Press to overcome a slight spring pressure and rotate counterclockwise briefly to unlatch the cover.
  Removing the cover causes the fuse contact with the unit’s circuitry to be interrupted; the fuse can be extracted in forward direction.
- ☞ Check whether all fuses
  - meet the prescribed technical specifications (imprinted on the front of the unit adjacent to the relevant fuse cover), and
  - are correctly mounted and free from defects.
- ☞ Insert the (spare) fuse into its holder and press the fuse cover home in locked position, then briefly turn clockwise to secure it.

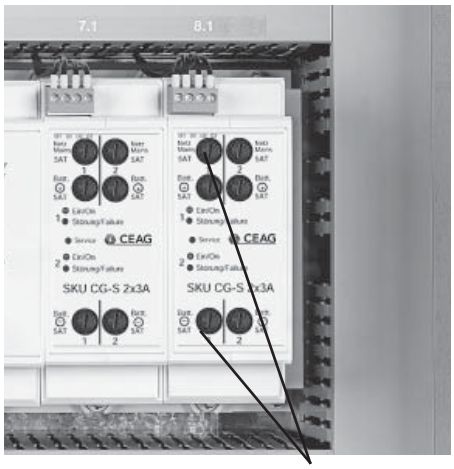
Testing the fuses on SKU modules

For safety reasons all SKU modules should first be disconnected (de-energized) by blocking the control system of the relevant ZB 96 control cabinet (US 96) (see Section 26).

As regards testing or replacing fuses proceed as described against 12.5.

Fig. 43: Location of fuses on charger unit LT.1 2.5A





Example for an SKU module CG 2 x 3 A

Fig. 44: SKU CG 2 x 3 A

Fig. 44a: SKU CG 1 x 6 A

12.7 Checking and Replacing Modules

Attention!
SKU modules must never be plugged in or removed in „On“ switching state!
Deactivate an SKU module via the ST 20 control unit before removing it for testing, inspection or other purposes.
For mounting work the control system must be blocked to prevent active circuits from being switched on when plugging in an SKU module.

Figure 44 shows a SKU CG 2 x 3 A. These SKU bus modules combine two circuit changeover units into a single device. As regards look and location of the indicating and control elements refer to Chapter 14 „Control“. These modules are also available with a single circuit (refer to Fig.: 44a SKU CG 1 x 6 A).

As regards mounting and removing an SKU unit proceed as described against „11.7 Mounting and Connection of Internal Modules“.
For replacements, extensions or for testing purposes SKU modules have to be exchanged or added.
In this context observe the following:

- The circuit numbers and indicated switching outputs of the SKUs shown on the indicating display of the ST 20 control unit correspond to the selection of the slots of the subracks (BGTs).
- In order that replaced SKUs function properly within the control system they have to be identified, activated and parameterized by means of the control software.

Checking and replacing control unit, DC/DC converter or charger unit

As regards look and location of the indicating and control elements refer to Chapter 14 „Control“.

With respect to mounting and removing a module proceed as described against „11.7 Mounting and Connection of Internal Modules“.

Attention!
The modules listed in the header of this section must only be plugged in or removed in de-energized state!
More detailed info on the subject is given in Section 12 „Disconnecting/Switching-on an Emergency Lighting System under Battery supply“

Fig. 45: TLS module

Item 1: Upper terminal block
Item 2: Lower terminal block
Item 3: Indicating LED -
LED „Störung/Failure“ lights up if module malfunction has been detected
Item 4: Fixing element (fastening screw) for the SKU module

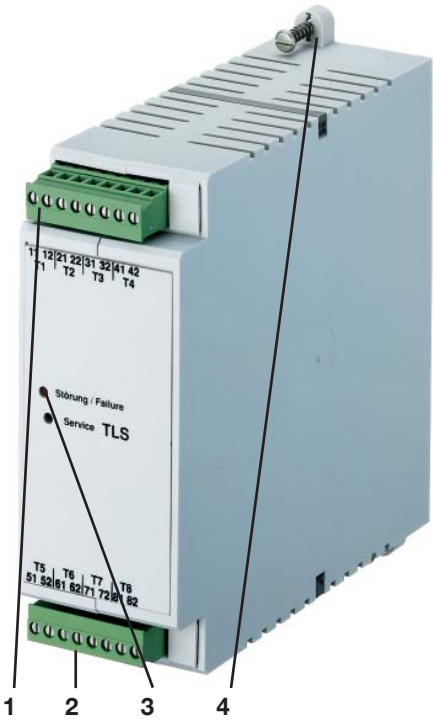


Fig. 46: Control and indicating elements on DLS/3Ph bus modules

Item 1: Upper terminal block for the (monitoring) inputs
Item 2: Lower terminal block
Item 3: Indicating LEDs
LEDs 1 ... 8 light up if the circuit has been closed
LED „Störung/Failure“ lights up if module malfunction has been detected
Item 4: Fixing element (fastening screw) for the SKU module

13 Switching the System ON

Note:
For the sequence of actions listed below it has been assumed that the system (ZB 96 including US 96 substations) has first been blocked and disconnected from the power.
It has further been assumed that the control software parameters previously set as well as the relevant switching states have not be changed in the meantime!
In case of doubt observe the detailed description given in Section 12 „Disconnecting / Switching-on an Emergency Lighting System under Battery supply“.

☞ Switch on the mains supply of the ZB 96 control cabinet and its US 96 substations via the load-break switches.

☞ Make sure the control system of the ZB 96 control cabinet and its subsystems (US 96), if any, has been blocked.
This is done via the menu item „Block/enable Unit“ in menu 25 „Blocking, Acknowledgment“ of the control software.

Take precautionary measures to secure this system state against unauthorized changes!

☞ Switch on the battery supply of the ZB 96 control cabinet and its US 96 substations via the load-break switches.

☞ Operate the controls via menu item „Enable unit“.

14 Controlling a ZB 96 (US 96) Central Battery System

There are several levels of control for a ZB 96 or US 96 system. A distinction is to be made between

- ❒controlling and checking the system during operation (testing or normal operating modes), and
- ❒setting up the system based on prescribed data (parameterization of the ST 20 control unit) for emergency lighting circuits and freely assignable functions and function keys of the control unit.

Controlling and checking the system during operation may be performed via

- ❒the keys and display/LED indicators of the modules in the control cabinet (ST 20, DC/DC converters, charger unit, installed SKUs),
- ❒remote indicating units or CG controller
- ❒F3 module or via a building automation system (GLT).

Setting up the system (and making changes to parameterization) may be done

- ❒directly on the control unit in the ZB 96 control cabinet (or US 96)
- ❒or via E/G/A BUS and CG Vision using a commercially available PC with a CEAG configuration software for the ZB 96 system.

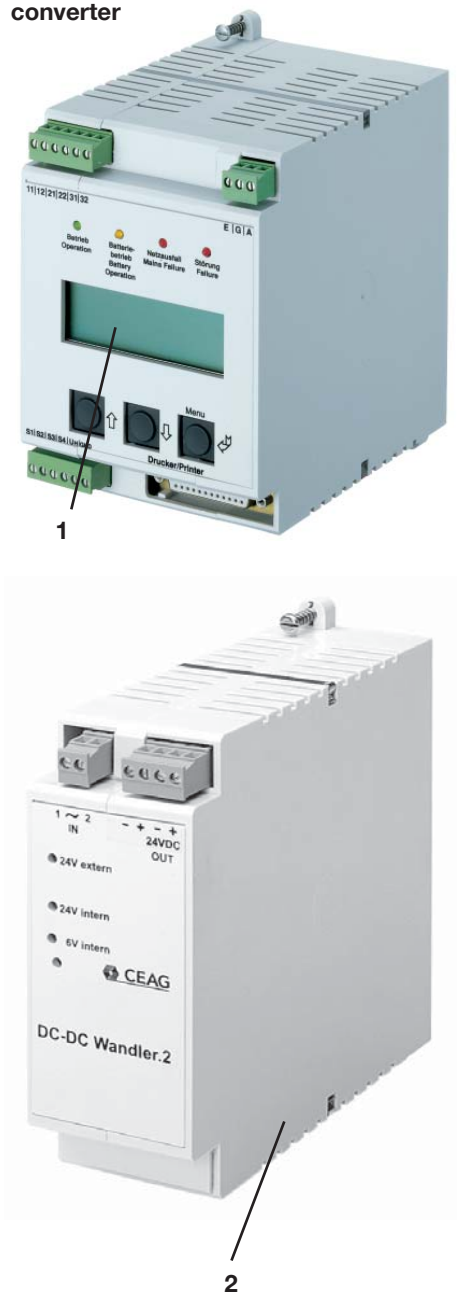
Note:
The following descriptions do not form part of this manual because they call for comprehensive instructions within the framework of the technical documentation issued for these systems:

- ❒ Controlling and checking the systems via F3 module, CG controller or building automation systems (GLT).

To be able to control and check the system within the scope outlined above during operation (testing or normal operating modes) knowledge of the following is required:

- ❒ Controlling the ST 20 control unit in the control cabinet,
- ❒ Key functions and display/LED indicators of the remaining modules in the control cabinet of a ZB 96 or US 96 system and
- ❒ How to deal with some hardware components (checking and replacing fuses or checking and replacing modules).

Fig. 47: Control unit and DC/DC converter



14.1 Control and Indicating Elements of the Modules

All modules of the control cabinets are provided with LEDs indicating the operating status of the functions assigned to them.
Red LEDs indicate for the assigned functions that a fault or malfunction has occurred.
If none of the LEDs on a module are illuminated the power supply to the module has probably been interrupted.

Note:
The ST 20 control unit has various diagnosis functions as well as control menus to detect and remedy operational disturbances. First avail yourself of these capabilities before you take action to interfere with the settings and parameters of the modules and final circuits. Take special care to observe the following remarks!

Warning!
Work on the electrical installations must only be carried out by skilled electrical personnel trained in the specifics of general and emergency lighing systems! This applies as well to checking or replacing fuses. Perform relevant work as described against „12 Commissioning and Further Work“.
When replacing fuses make sure to use only those fuses indicated on the module or in the pertinent technical documentation as regards type and rating!

Note that electrical arcing or shocks may be encountered if an insolator of the battery supply is opened before the system (and pertinent substations, if any) have been correctly blocked and disconnected from the mains supply. Moreover, electric shocks or short circuits may arise if work is carried out on final circuits that have not been disconnected from the supply before. It must also be considered in what way lighting in building zones may be affected when you interrupt the power supply to final circuits.

DC/DC converter

This module (Fig. 47) energizes the electronic components of the control cabinet at the required operating voltage (24 V and 6 V DC). Voltage supply is achieved via the batteries independently of the mains supply.
The LEDs (2) light up if voltage has been applied.

Fig. 48: Charging unit

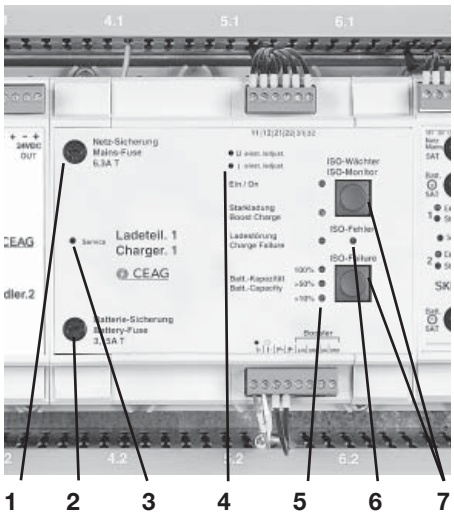


Fig. 49: SKUs for final circuits

ST 20 Control unit

The control unit functions (Fig. 47, Item 1 and Fig. 50) are described in detail on the following pages.

Charging unit

This module (Fig. 48) checks the charging condition of the batteries and controls their charging process. Fuse (1) protects the charging unit against failures of the mains supply. Fuse (2) protects the battery circuit of the charging unit.
The settings to be applied via the Service button (3) and adjustments (4) are made in the Factory or by trained Service personnel during maintenance work.
LEDs (5) indicate the operating state of the charger (from top): Operational readiness (lit LED), boost charge active, battery capacity (at 100, 50 or 10 %).LED (6) and button (7) are used with the installed isolation monitor for ISO failure, Batt.+ and ISO failure, Batt.– (as per DIN VDE 0108 Part 1).

SKUs of final circuits

The circuit changeover modules energize and monitor safety luminaires with electronic ballasts for DC operation.
The CEWA GUARD monitoring system verifies the correct functioning of the connected luminaires. Up to 20 luminaires can be connected. Output voltage for battery operation: 220 V DC

- Changing over individual emergency lighting circuits;
- Freely programming light, switched maintained light or non-maintained light;
- Separate fuse protection for mains and battery operation (two pole)
- Fuses (1) on front of the modules easily accessible;
- In case of one-pole ground leakage during AC operation DC operation may continue without problems
- LED indications (2) for failure and operation „EIN/On“ for each circuit;

Log printer

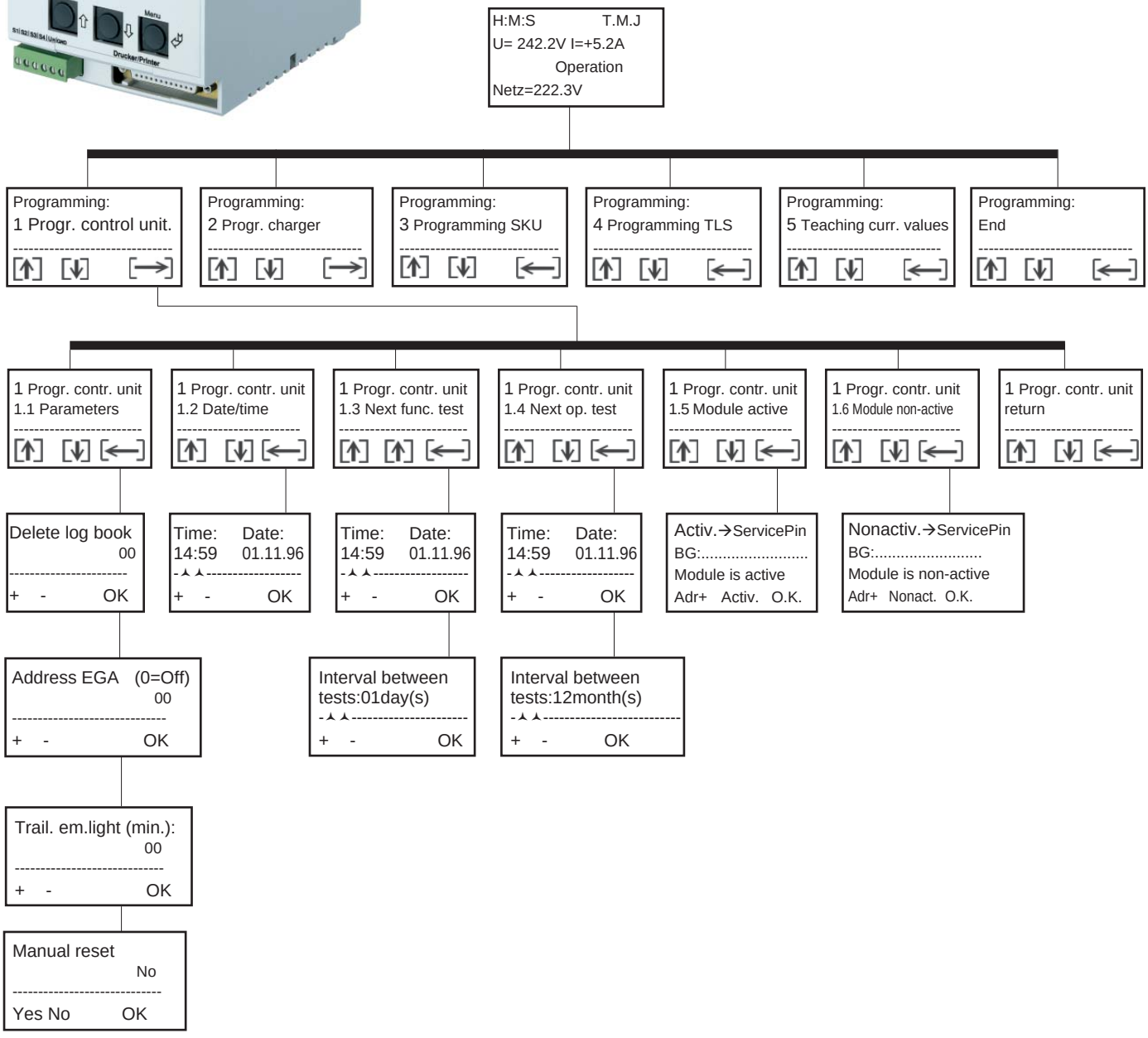
The printer can be mounted on the subrack BGT1, controlled and logged on or off via the control software of the ST 20 (eg. when paper rolls or printer ribbons must be replaced and require the printer to removed /replaced).

15 Programming the ST 20 Control Unit

The following functions can be programmed:

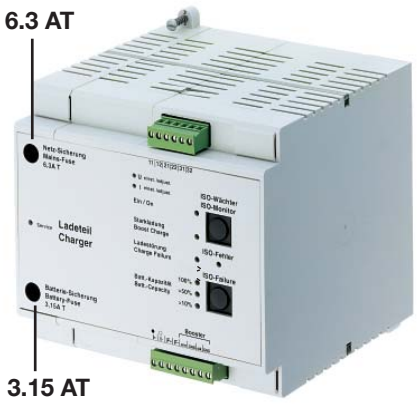
- Menu 1.1 Parameters, delete log book, unit address, trailing emergency light, manual resetting
- Menu 1.2 Date/time
  Current time
  Current date
- Menu 1.3 Next function test
  Starting time
  Intervals in days
- Menu 1.4 Next operating duration test
  Starting time
  Intervals in months
- Menu 1.5 Active module
- Menu 1.6 Non-active module

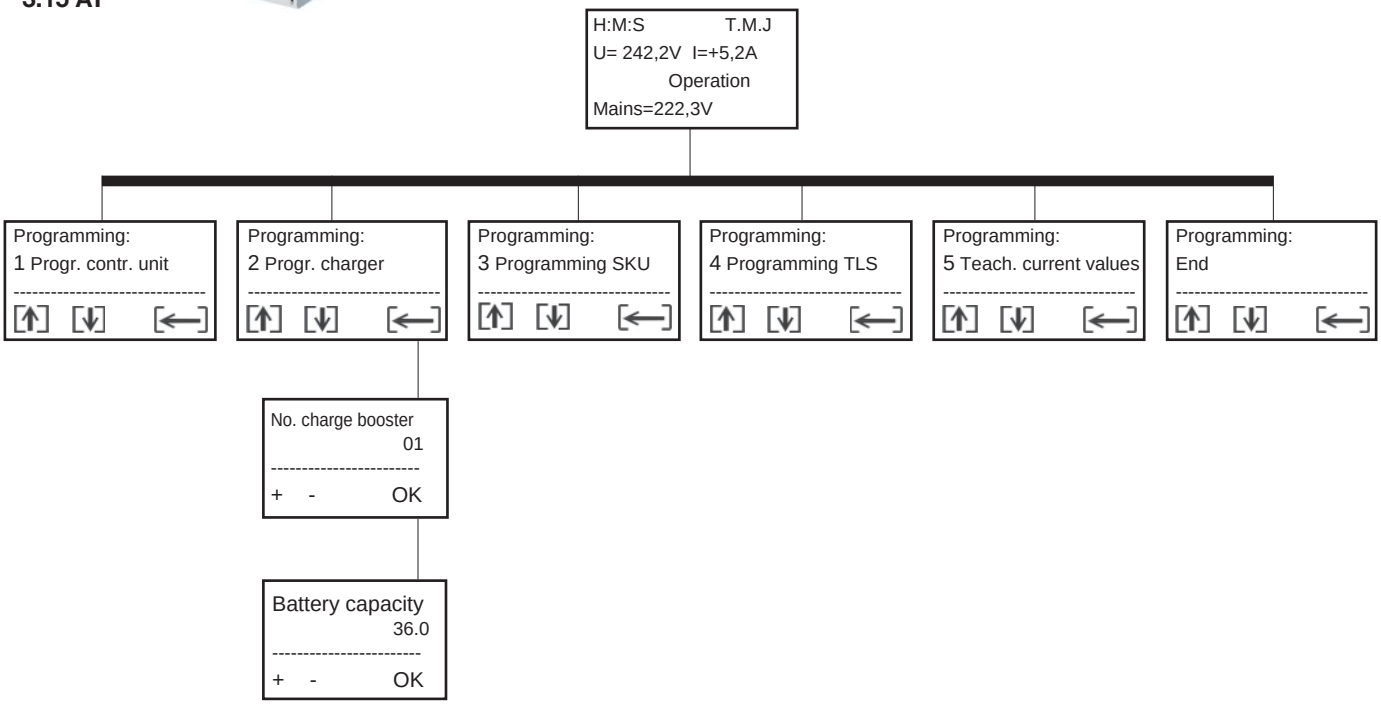
Defining a starting time (date and time) of the first FT and the time-log (1...14 days) of the following FTs!
(Factory setting: every 7 days)



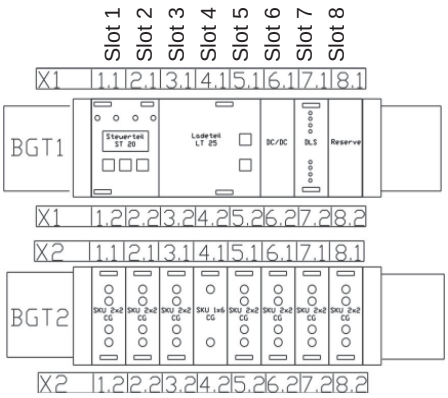
16 Programming the Charger Unit

The following functions can be programmed:
The number (1 to 5) of the built-in charge boosters must be entered first.
Following this, the capacity of the connected battery must be entered.





The circuit module 1 x 6 A (SKU1x6 CG) on the sixth slot of the subrack 2 shall be reprogrammed.

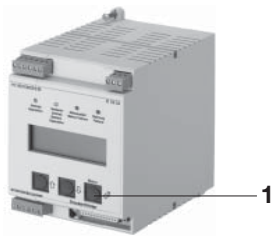


The luminaires in this circuit (10 pcs.) are equipped with an individual monitoring module and shall be monitored separately. The programming steps necessary for this can be seen from the flow chart.

17 Individual Monitoring of the Final Circuits

The systems are delivered with programming being effected in the Factory. The type of monitoring can be ordered as desired, either individual monitoring or circuit monitoring.
The individual monitoring variant allows both monitoring types to be programmed while the circuit-monitored variant only provides for the circuit monitoring function.
If a circuit changeover 4 x 1 A function is used the output voltage is monitored.

In case the order for the plant does not specify how many luminaires are connected within the respective circuits all luminaire addresses per circuit are set to be non-active. The exact number of luminaires connected must then be programmed.
The example given here serves to explain how the factory settings can be changed.

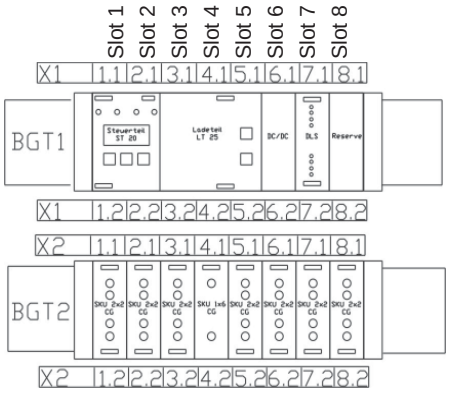


Press menu button (Item 1) on the control unit for > 5 sec. Via programming item 3 (programming SKU) the monitoring function can be programmed.

Use arrow button to select programming item 3. Press the + button to select the circuit that shall be programmed.

Use arrow → button to select the desired luminaire (X) and use on/off button to determine whether the luminaire is to be monitored individually. Select as desired and then press OK to confirm.

18 Monitoring of the Final Circuit



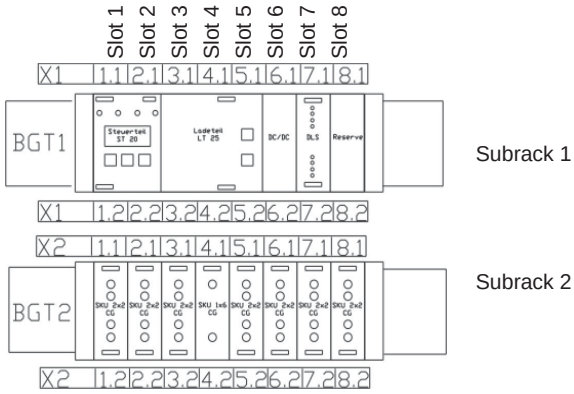
The systems are delivered with programming being effected in the Factory. The type of monitoring can be ordered as desired, either individual monitoring or circuit monitoring. The individual monitoring variant allows both monitoring types to be programmed while the circuit-monitored variant only provides for the circuit monitoring function.

If a circuit changeover 4 x 1 A function is used the output voltage is monitored. The example given here serves to explain how the factory-settings can be changed. The circuit module 1 x 6 A (SKU1x6 CG) on the sixth slot of the subrack 2 shall be reprogrammed. For the circuit individual monitoring shall be applied in lieu of circuit monitoring. The programming steps necessary for this can be seen from the flow chart.

Press menu button (Item 1) on the control unit for > 5 sec.
Select programming item 3 via the +/- button and press the - button.
Press the + button to select the circuit that shall be programmed.
Press the menu button until the menu item „Individual monitoring“ has been selected.
Now press the No button and then confirm by pressing the menu button.

Enter deviating value in % via the +/- button. Press OK to confirm. Current setpoint measurement is activated via program item 5 „Teach. curr. values“.

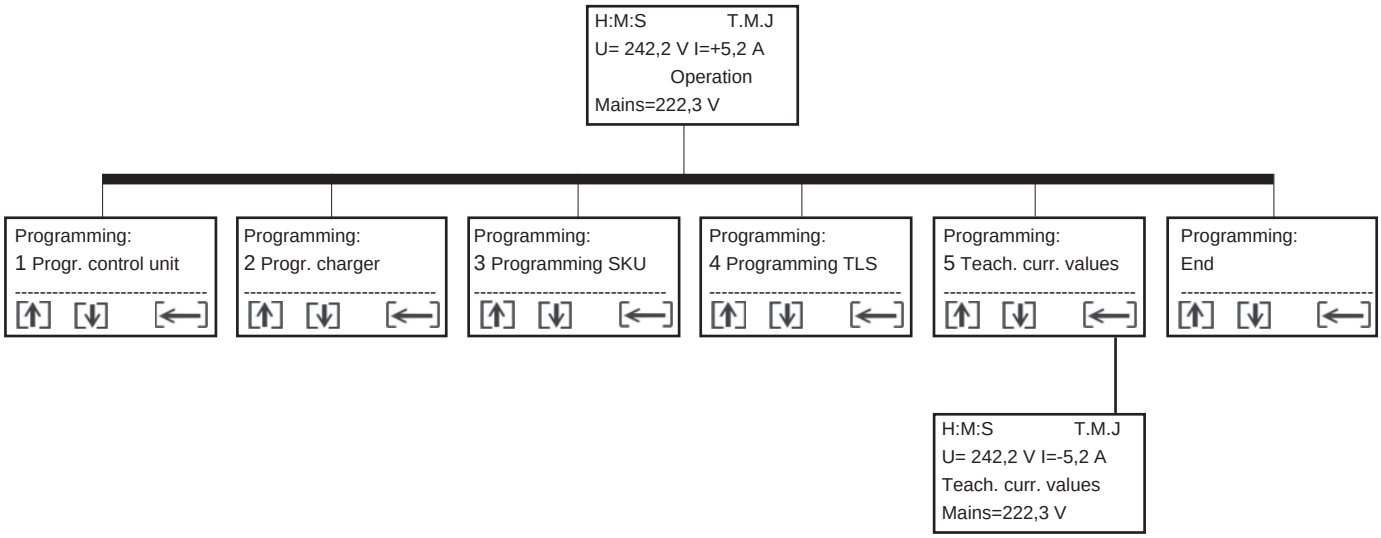
19 Programming the Circuit Monitoring Function

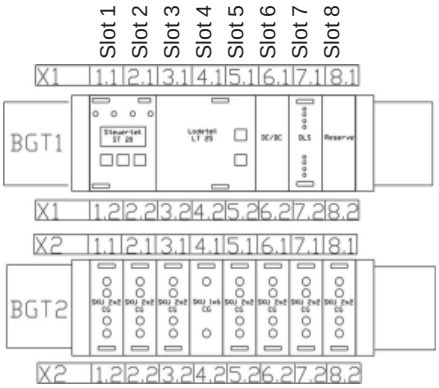


Subrack 1

Subrack 2

After the maximum deviating value has been entered via programming item 3 „Programming SKU“ the current must be measured with the system being in full operating mode. Current measurement is initiated by pressing the ← button and takes about 1 minute.





20 Programming the Final Circuit Switching Variants

The systems are delivered with programming being effected in the Factory. The equipment is delivered with the maintained light switching state being activated. This means all circuits are switched on when the system operates on mains or battery supply.

The example given here serves to explain how the factory setting of a circuit can be changed from maintained to non-maintained lighting.

The circuit module 1 x 6 A (SKU CG 1 x 6 A.1) on the sixth slot of the subrack 2 shall be reprogrammed from maintained to non-maintained light.
The programming steps necessary for this can be seen from the flow chart.

Press menu button (Item 1) on the control unit for > 5 sec. Following programming path 3 „Programming Circuit Modules“ the circuit switching variant as well as monitoring can be set.

Use arrow button to select programming item 3. Press the + button to select the circuit that shall be programmed.

Press the Yes button to select the switching variant „Non-maintained light“ and confirm by pressing OK.

21 Programming Final Circuits to Switched Maintained light

In another example it shall be demonstrated how the factory setting of a circuit switching variant can be reprogrammed from maintained to switched maintained light. A total of 32 input channels can be assigned.

Example:
The circuit module 1 x 6 A (SKU CG 1 x 6 A.1) on Slot 4 of subrack 2 shall be reprogrammed from maintained to switched maintained light. To enable the circuits to be switched via external switching functions in mains operating mode a circuit DLS module (subrack 1 slot 7) must be installed in the system as an option. The DLS maintained light switch checking function has a total of 8 input channels. One light switch can be connected per input channel. The assignment, ie. which circuit of the safety lighting system is to be switched via this input channel, can be freely selected with the help of the control unit.

The programming steps necessary for this can be seen from the flow chart.

A total of 32 inputs can be assigned through the options DLS (maintained light switch chekking function, staircase light switching system). Each module has two input channels (max.). Care must be taken during programming that the 32 inputs are assigned consecutively.

Example:
The first module is a DLS. The second module is a TLS. Taking this example inputs 1 through 8 would be assigned to the DLS module.
The 8 input channels of the TLS module would be assigned to inputs 9 through 16.

Press menu button (Item 1) on the control unit for > 5 sec. Use arrow button to select programming item 3.
Press the + button to select the circuit that shall be programmed.
In this example it is circuit 1 of circuit module 1 x 6 A on slot 6 of subrack 2 (see figure).

Enter „No“ for switching variants non-permantent light, maintained light, timer 1 and timer 2 and press OK to confirm.

Use the plus button to select the input channel via which the circuit is to be controlled.

22 Programming Final Circuits to Selective Em. Lighting Changeover (SDS 8)

In another example it shall be demonstrated how the factory-programmed circuits can be reprogrammed from maintained light to selective emergency lighting changeover. A total of 32 input channels can be assigned.

Example:
The circuit module 1 x 6 A (SKU CG 1 x 6 A.1) on Slot 4 of subrack 2 shall be reprogrammed from maintained light to selective emergency light changeover. To enable the circuits to be selectively switched into emergency lighting mode an SDS 8 relay module (subrack 1 slot 7) must be installed in the system as an option.

The SDS 8 relay module has a total of 8 input channels. A floating contact of the external phase monitors can be connected per input channel. The assignment, ie. which circuit of the safety lighting system is to be switched via this input channel, can be freely selected with the help of the control unit.
The programming steps necessary for this can be seen from the flow chart.

A total of 32 inputs can be assigned through the options SDS 8 (selective emergency light changeover), DLS (maintained light switch checking function), and TLS (staircase light switching system). Each module has 8 input channels (max.). Care must be taken during programming that the 32 inputs are assigned consecutively.

Example:
The first module is an SDS 8, the second module is a TLS. Taking this example inputs 1 through 8 would be assigned to the SDS 8 module. The 8 input channels of the TLS module would then be assigned to inputs 9 through 16.

Press menu button (Item 1) on the control unit for > 5 sec. Use arrow button to select programming item 3.
Press the + button to select the circuit that shall be programmed. In this example it is circuit 1 of circuit module 1 x 6 A on slot 6 of subrack 2 (see figure).

Enter „No“ for switching variants non-permantent light, maintained light, timer 1 and timer 2 and press OK to confirm.

Use the plus button to select the input channel via which the circuit is to be selectively switched to safety lighting mode.

X = activate
\- = not activated

23 Programming Final Circuits to Staircase Lighting (TLS)

By a further example given here it shall be explained how the factory setting of a circuit switching variant can be changed from maintained to staircase lighting operation. A total of 32 input channels can be assigned.

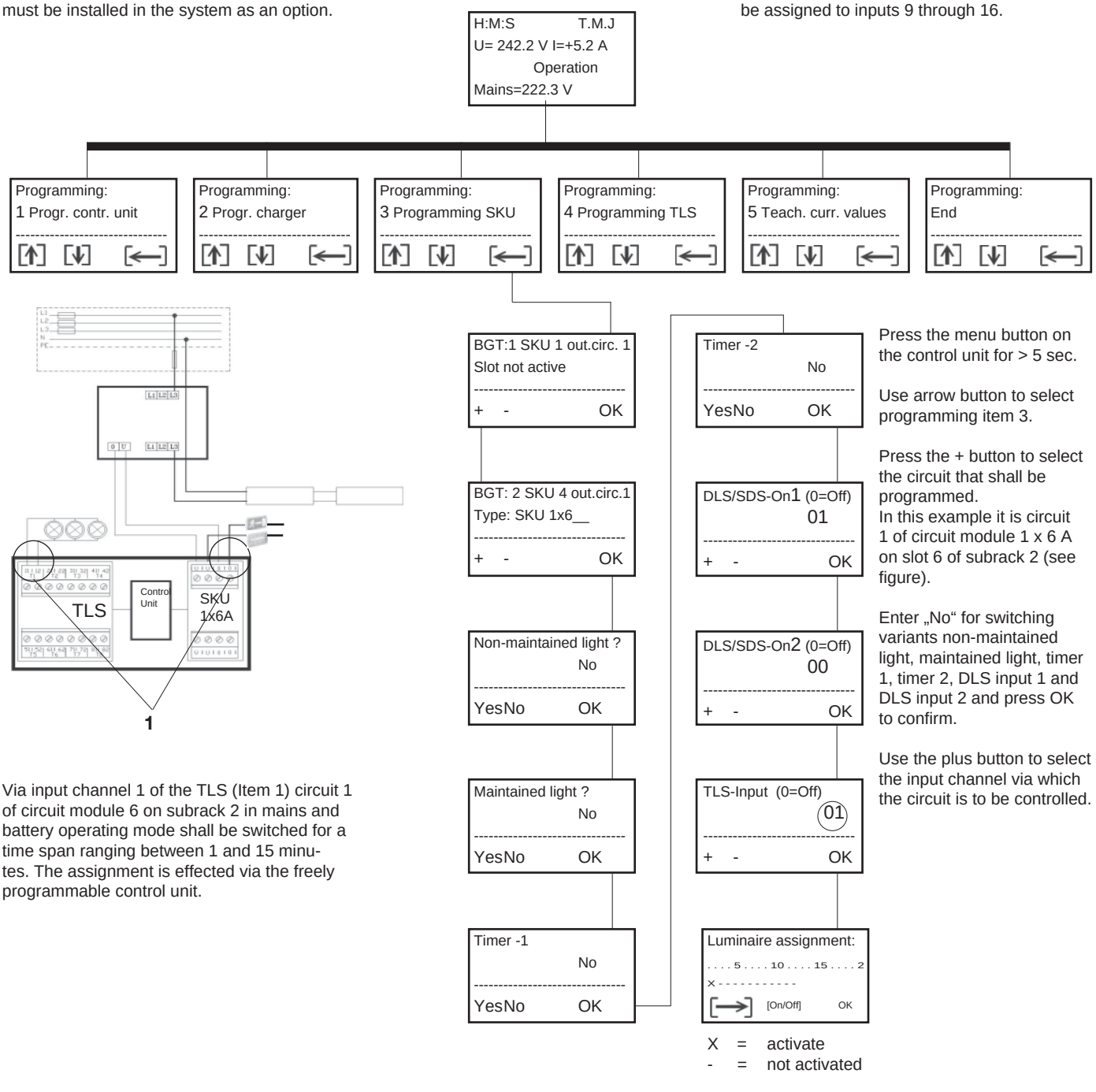
Example:
The circuit module 1 x 6 A (SKU CG 1 x 6 A.1) on Slot 4 of subrack 2 shall be reprogrammed from maintained light to staircase lighting mode. To enable the circuits to be switched via external switching functions in mains operating mode a circuit TLS module (subrack 1 slot 7) must be installed in the system as an option.

The TLS staircase lighting function has a total of 8 input channels. For power supply to the glow lamps in the illuminated buttons 0.05 A is available per input channel. The assignment, ie. which circuit of the safety lighting system is to be switched via this input channel, can be freely selected with the help of the control unit.

The programming steps necessary for this can be seen from the flow chart.

A total of 32 inputs can be assigned through the options DLS (maintained light switch chekking function), TLS (staircase light switching system). Each module has 8 input channels (max.).
Care must be taken during programming that the 32 inputs are assigned consecutively.

Example:
The first module is a DLS. The second module is a TLS. Taking this example inputs 1 through 8 would be assigned to the DLS module. The 8 input channels of the TLS module would then be assigned to inputs 9 through 16.



Via input channel 1 of the TLS (Item 1) circuit 1 of circuit module 6 on subrack 2 in mains and battery operating mode shall be switched for a time span ranging between 1 and 15 minutes. The assignment is effected via the freely programmable control unit.

Press the menu button on the control unit for > 5 sec.

Use arrow button to select programming item 3.

Press the + button to select the circuit that shall be programmed.
In this example it is circuit 1 of circuit module 1 x 6 A on slot 6 of subrack 2 (see figure).

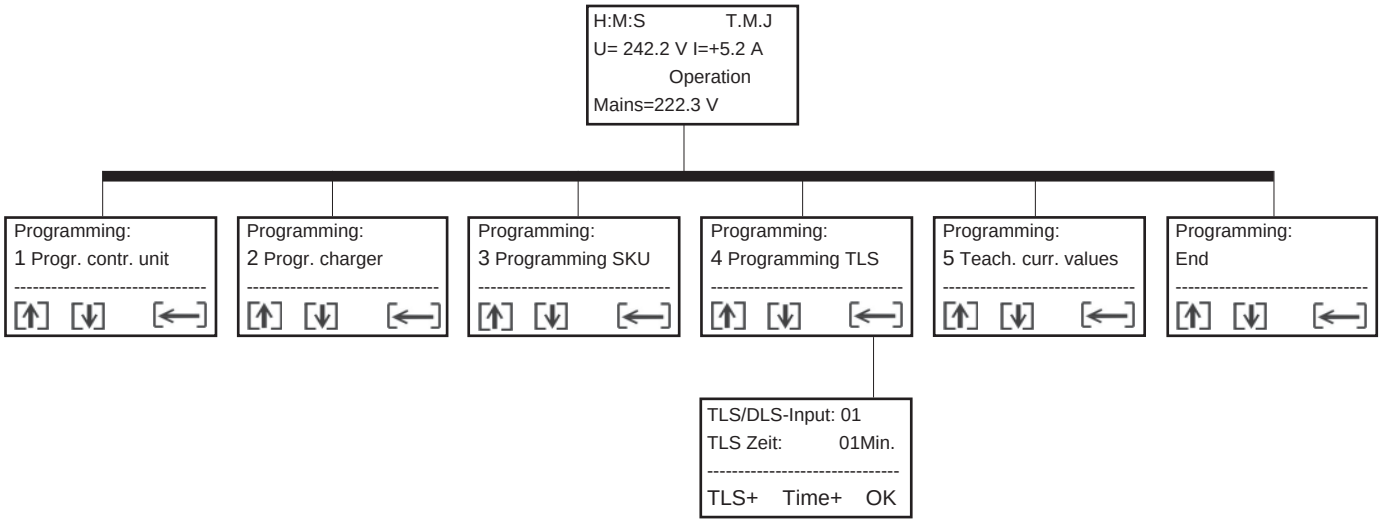
Enter „No“ for switching variants non-maintained light, maintained light, timer 1, timer 2, DLS input 1 and DLS input 2 and press OK to confirm.

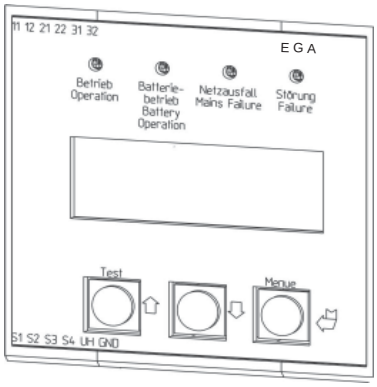
Use the plus button to select the input channel via which the circuit is to be controlled.

X = activate
- = not activated

24 Programming Staircase Lighting Cut-in Times

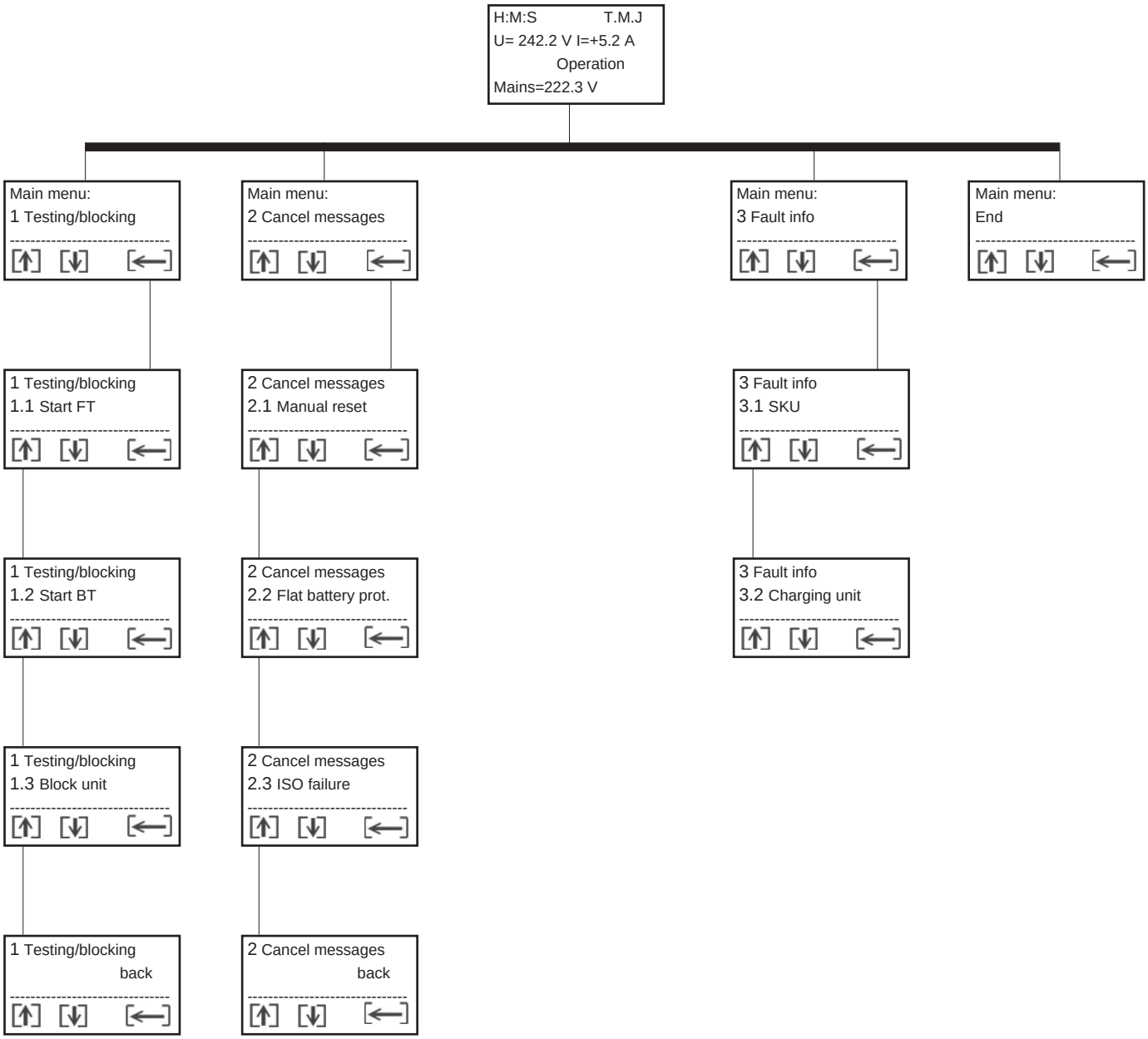
In this part of the program the cut-in times must be set/programmed.





25 Troubleshooting Overview Chart

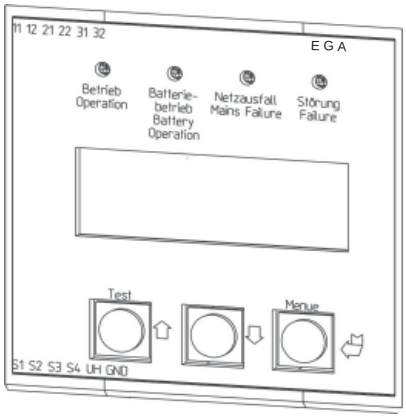
On the following pages various functions are explained which can be selected by briefly pressing the menu button.
These functions are as follows: First, manual function testing of the central battery sytem; second, acknowledgment of fault messages; and third, blocking the mains-emergency light function of the central battery system.

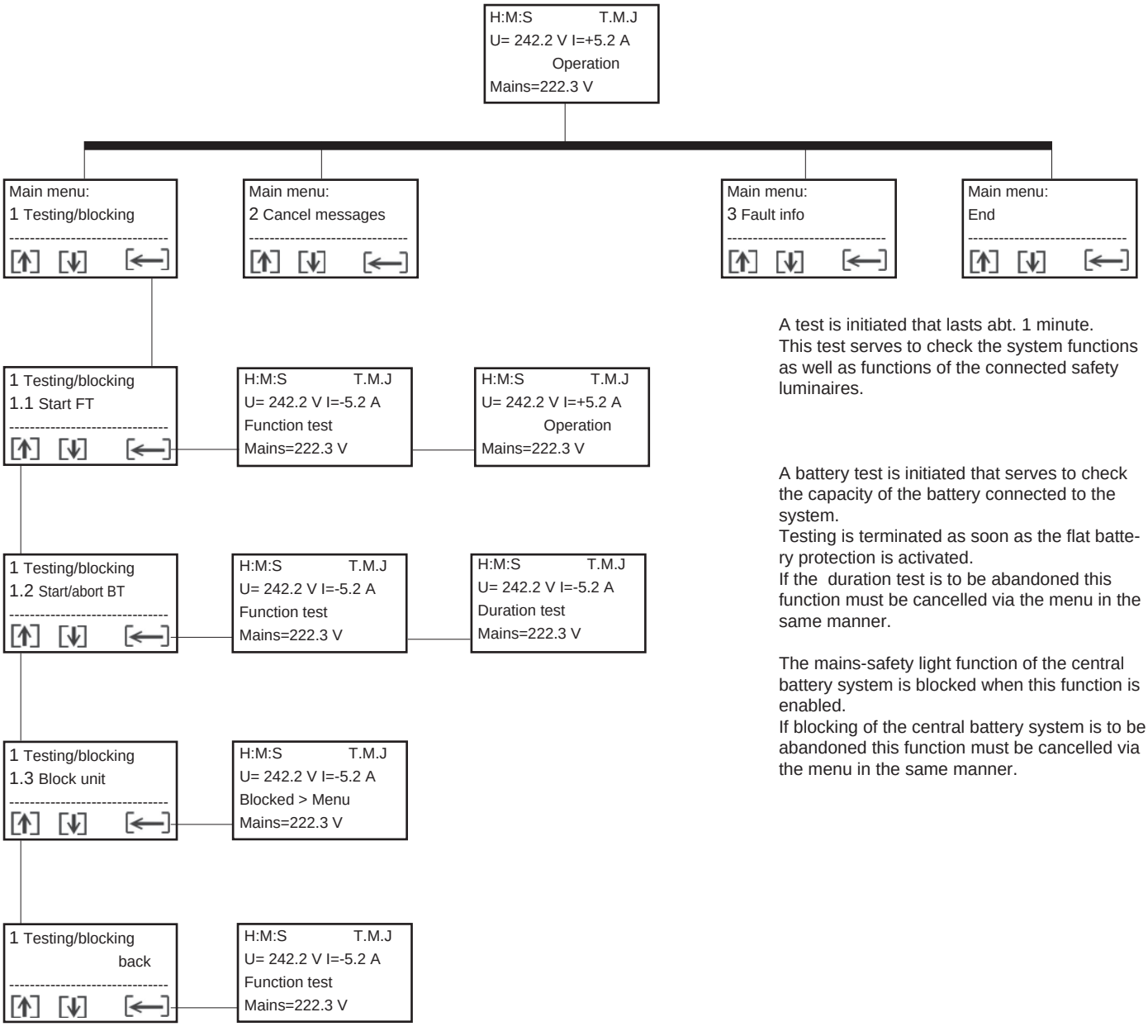


26 Starting Function/Duration Test and Blocking the System

Briefly press the „menu“ button. Use the arrow keys of menu 1 to select Testing/Blocking.

How to proceed further can be seen from the flowchart.



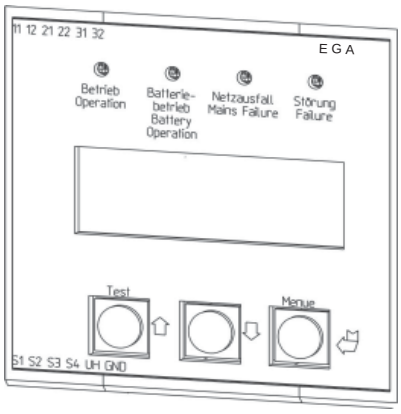


A test is initiated that lasts abt. 1 minute.
This test serves to check the system functions as well as functions of the connected safety luminaires.

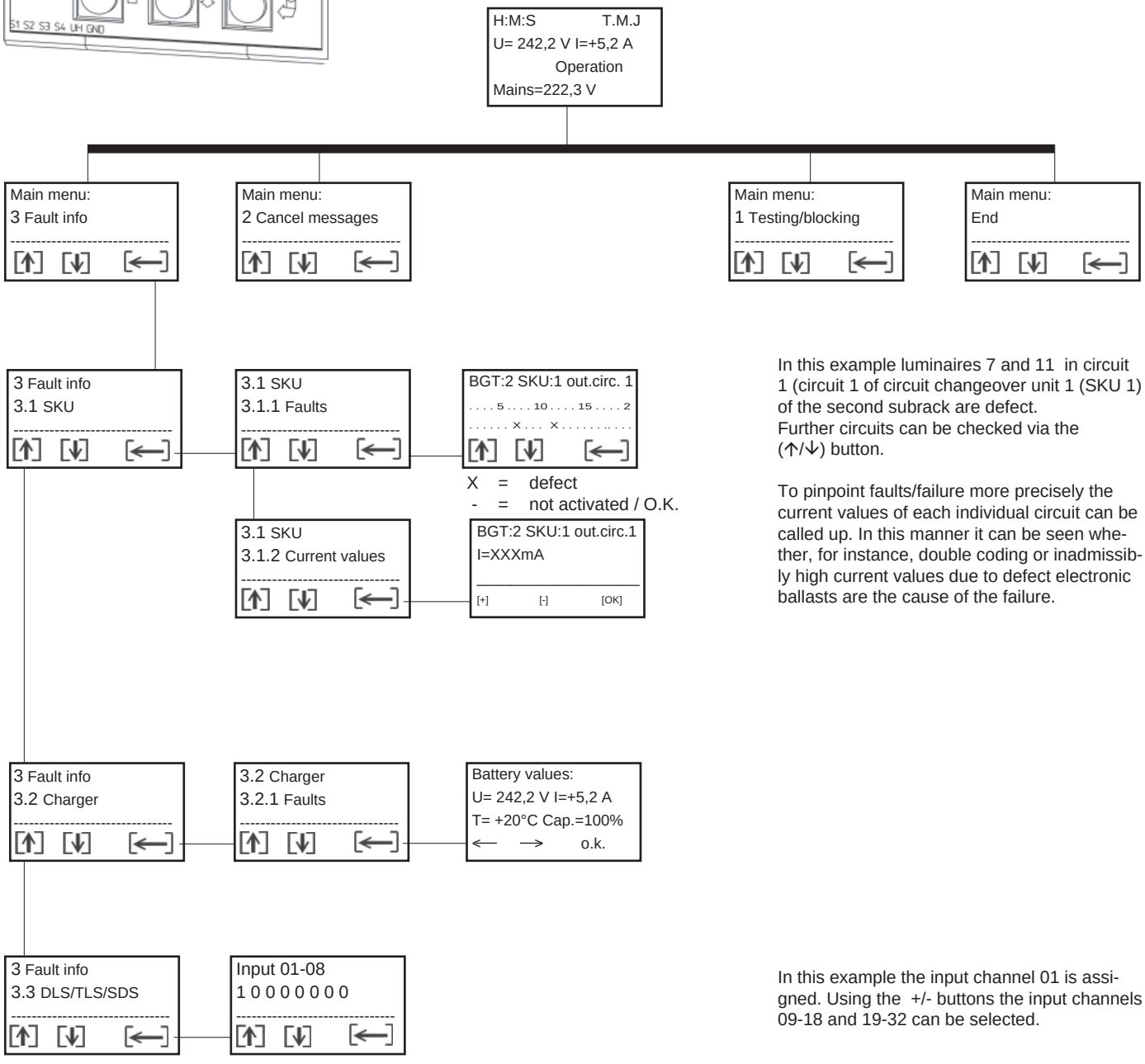
A battery test is initiated that serves to check the capacity of the battery connected to the system.
Testing is terminated as soon as the flat battery protection is activated.
If the duration test is to be abandoned this function must be cancelled via the menu in the same manner.

The mains-safety light function of the central battery system is blocked when this function is enabled.
If blocking of the central battery system is to be abandoned this function must be cancelled via the menu in the same manner.

27 Function Test Assessment



As a result of a function test faults/disturbances are shown on the display; faults found in the battery circuit are reported immediately.
Briefly press the „menu“ button.
Press the arrow keys to select menu 3 „Fault info“.
How to proceed further can be seen from the flowchart.



In this example luminaires 7 and 11 in circuit 1 (circuit 1 of circuit changeover unit 1 (SKU 1) of the second subrack are defect.
Further circuits can be checked via the (↑/↓) button.

To pinpoint faults/failure more precisely the current values of each individual circuit can be called up. In this manner it can be seen whether, for instance, double coding or inadmissibly high current values due to defect electronic ballasts are the cause of the failure.

In this example the input channel 01 is assigned. Using the +/- buttons the input channels 09-18 and 19-32 can be selected.

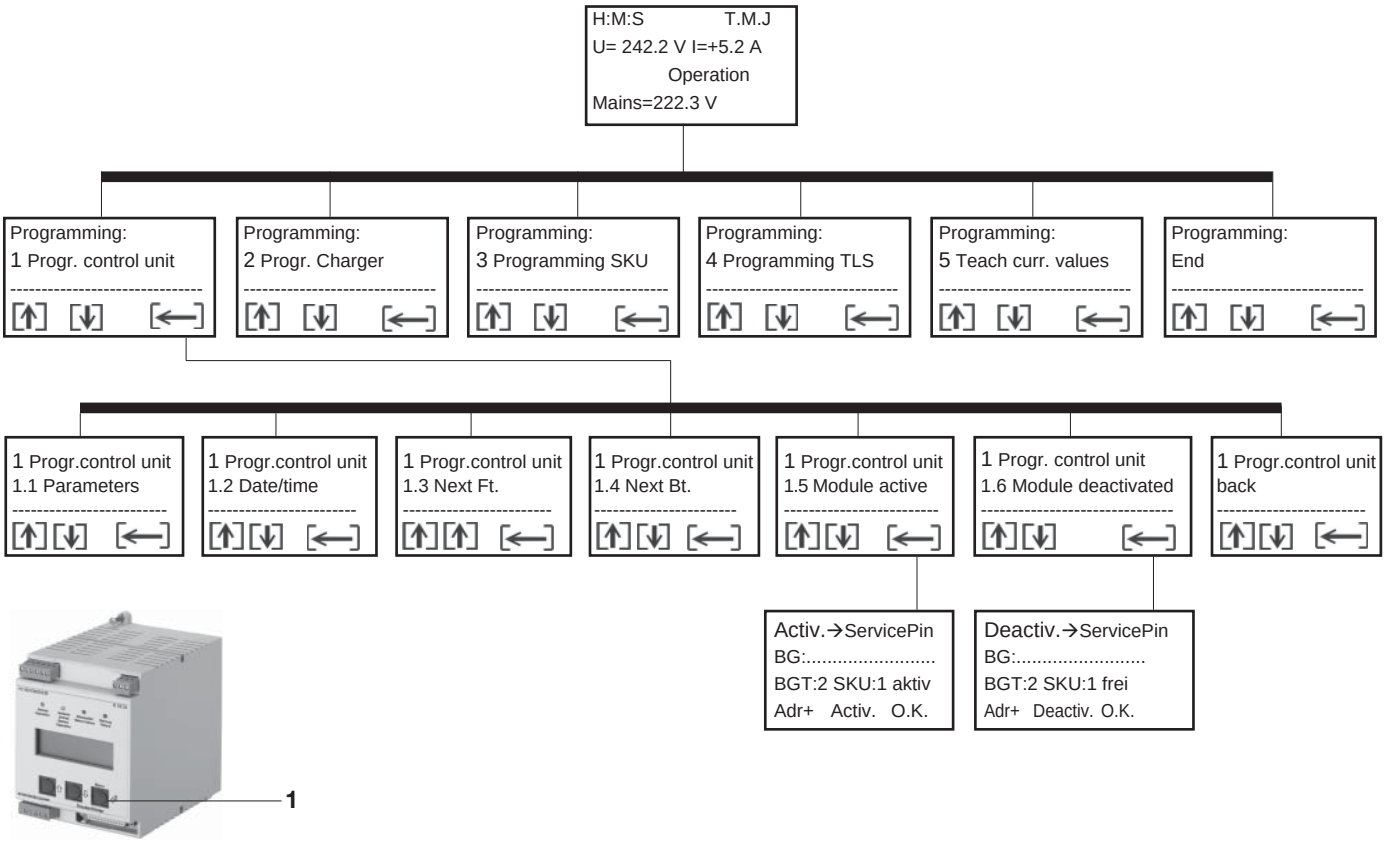
28 Replacing Modules

Mounting modules

- Disconnect the system from the supply
- Mount the module
- Cut in the voltage supply
- Select menu item 1.5 (Active module)
- Use the Service Pin on that module
- Using the menu determine the address and the module slot
- Select the „active“ function
- When the installation of the module has been successful the message „active“ appears on the display and the red-flashing LED of the built-in module must be off.

Removing modules

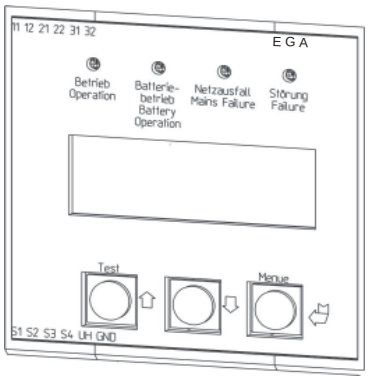
- Select menu item 1.6 (deactivated module)
- Using the menu determine the address and the slot of the module to be removed
- Select the „deactivated“ function
- When the module has been successfully uninstalled the message „free“ appears on the display and the LED of the built-in module must flash red.
- Disconnect the system from the supply
- Remove the module
- Cut in the voltage supply

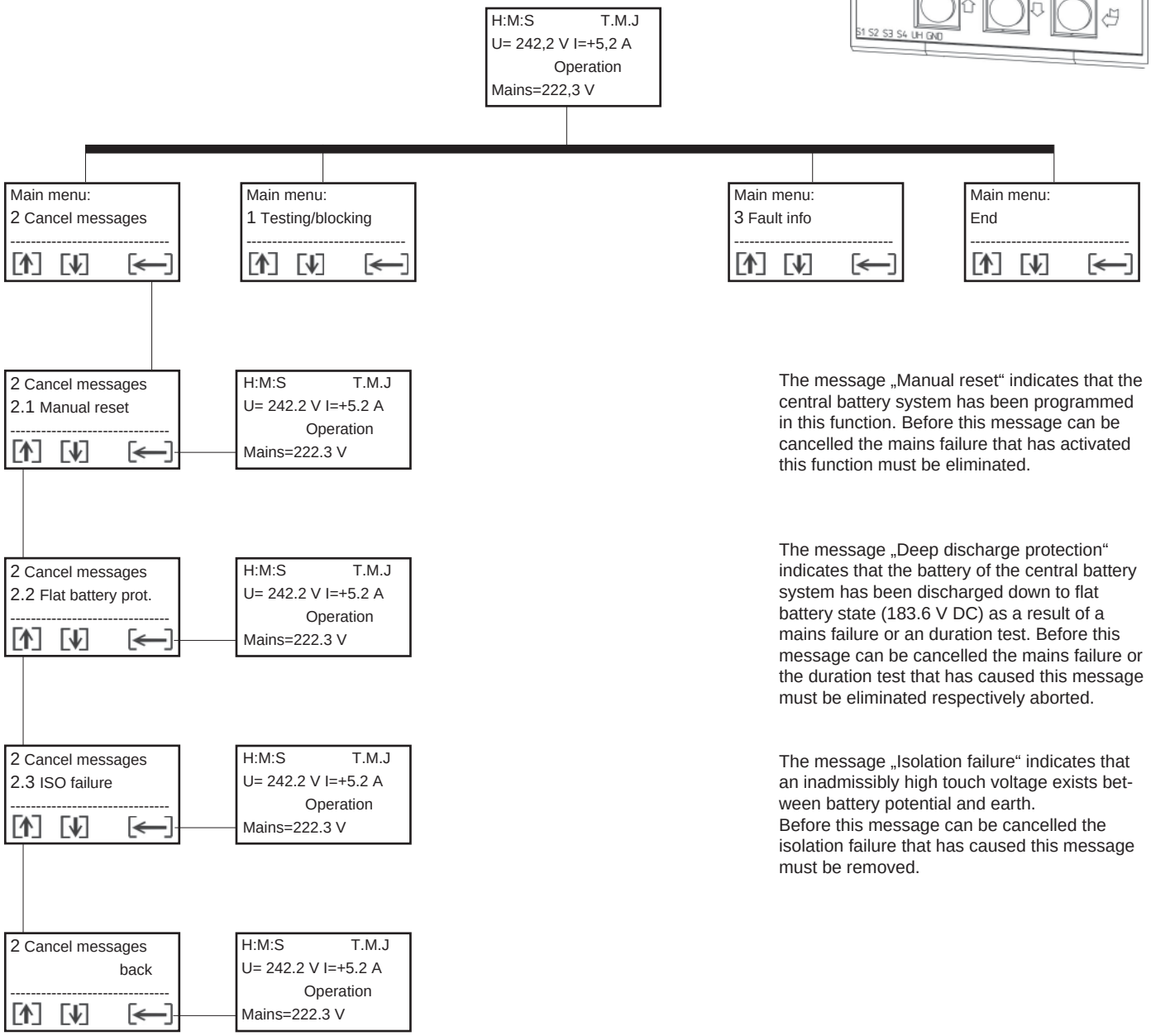


Press menu button (Item 1) on the control unit for > 5 sec.
Use arrow button to select programming item 1.
Following this call submenu 1.5 or 1.6.

29 Cancel Fault Messages after Remedial Action

After remedial action has been taken fault messages/indications that may still be present can be cancelled.
Briefly press the „menu“ button.
Press the arrow keys to select menu 2 „Cancel messages“.
How to proceed further can be seen from the flowchart.





The message „Manual reset“ indicates that the central battery system has been programmed in this function. Before this message can be cancelled the mains failure that has activated this function must be eliminated.

The message „Deep discharge protection“ indicates that the battery of the central battery system has been discharged down to flat battery state (183.6 V DC) as a result of a mains failure or an duration test. Before this message can be cancelled the mains failure or the duration test that has caused this message must be eliminated respectively aborted.

The message „Isolation failure“ indicates that an inadmissibly high touch voltage exists between battery potential and earth.
Before this message can be cancelled the isolation failure that has caused this message must be removed.

30 VDE Requirements Governing Telecommunication Contacts and Buzzers

The system has 3 floating signalling contacts (relay outputs) and a buzzer built into the unit.

Max. Contact strain: 24 V; 0.5 A

Rest position of relais contacts:
11/12 = closed
21/22 = open
31/32 = open

Contacts:	**11/12**	**21/22**	**31/32**
Signalling status:	Collective fault	Operational readiness	Battery operation
Operating status:			
Mains operation	0	X	0
Mains failure	0	0	X
Charging failure	X	X	0
Circuit failure	X	X	0
Luminaire failure	X	X	0
Sum failure	X	X	0
ISO failure	0	X	0
Function test	0	0	X
Duration test	0	0	X

X = closed
0 = open

Note:
Observe national rules and regulations governing the indicating and signalling behaviour when using a remote switch or a remote indicator for emergency lighting systems.

Date:	Device address:
Time:	Name of the system:

31 Luminaire Position Plans

Luminaire	20	
Switch 1		
Switch 2		
Luminaire	19	
Switch 1		
Switch 2		
Luminaire	18	
Switch 1		
Switch 2		
Luminaire	17	
Switch 1		
Switch 2		
Luminaire	16	
Switch 1		
Switch 2		
Luminaire	15	
Switch 1		
Switch 2		
Luminaire	14	
Switch 1		
Switch 2		
Luminaire	13	
Switch 1		
Switch 2		
Luminaire	12	
Switch 1		
Switch 2		
Luminaire	11	
Switch 1		
Switch 2		

Luminaire	10	
Switch 1		
Switch 2		
Luminaire	9	
Switch 1		
Switch 2		
Luminaire	8	
Switch 1		
Switch 2		
Luminaire	7	
Switch 1		
Switch 2		
Luminaire	6	
Switch 1		
Switch 2		
Luminaire	5	
Switch 1		
Switch 2		
Luminaire	4	
Switch 1		
Switch 2		
Luminaire	3	
Switch 1		
Switch 2		
Luminaire	2	
Switch 1		
Switch 2		
Luminaire	1	
Switch 1		
Switch 2		

Circuit name:	
Switch 1:	
Switch 2:	
Monitoring mode:	
Installed wattage (W):	
Installed load (VA)	

Customer Service Order

from:	Requisition No.

We herewith place the following service order with CEAG Notlichtsysteme GmbH

Customer:	
Address:	
ZIP&City:	
Person to contact:	
Phone No.:	Fax No.:
Customer No.:	Customer Order No.:
Customer Signature:	

Location:	
Address:	
ZIP&City:	
Person to contact:	
Phone No.:	Fax No.:
Date required:	

Repair: ☐	Programming & Orientation: ☐
Maintenance: ☐	Miscellaneous: ☐ (see remarks)

To be filled in by CEAG:

Invoicing: ☐	Lumpsum cost:
Free of charge: ☐	To be fixed by ZKD: ☐

CEAG Order No.:	Type of plant:
Remarks:	

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59494 Soest
Germany

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