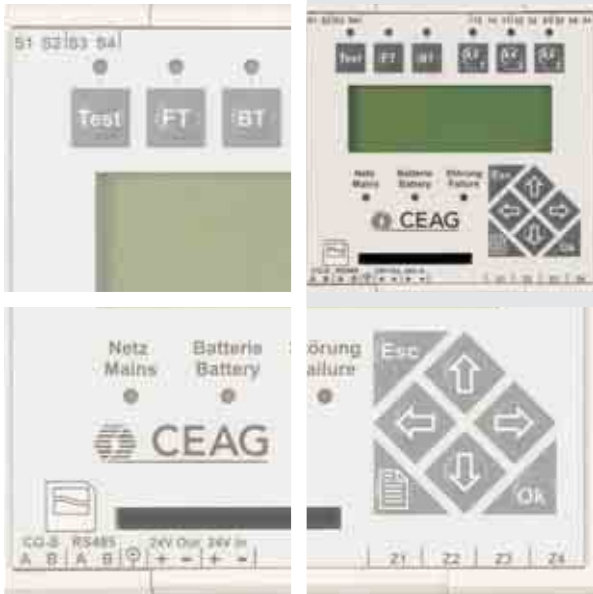


Central Battery System ZB-S with STAR Technology



What is ZB-S?



S = Switching

T = Technology

A = Advanced

R = Revision

Switch to safety!

ZB-S is a logical onward development of the successful ZB 96 Central Battery System. For many years now the ZB 96 system has enjoyed an enviable reputation as a dependable supply and monitoring system, and features the fully automatic **CEWA Guard** function monitoring and individual monitoring system.

The continuing development of this monitoring system has led to the creation of the

**Switching
Technology
Advanced
Revision,**

or **STAR** for short. This new **CG-STAR** technology allows different switching modes to be implemented in one and the same circuit, and the switching mode of each individual luminaire can be re-programmed at any time.

As a result, the new technology offers not just the proven CEWA Guard safety when it comes to operating a safety lighting system, it also gives planners the confidence of knowing that the system can respond and adapt at any time to any changes that are made to a building and its use.

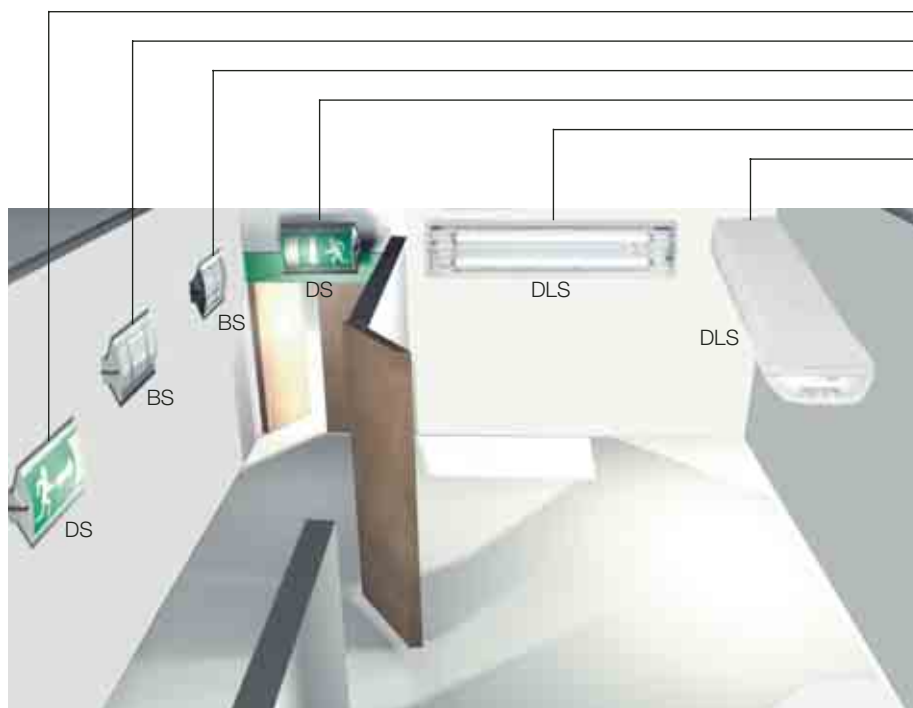
The New STAR-Technology – Easy Planning



Your Advantages:

The number of outgoing circuits needed can be sharply reduced, since continuously operating, stand-by and switchable permanent lighting can be realised in one common circuit.

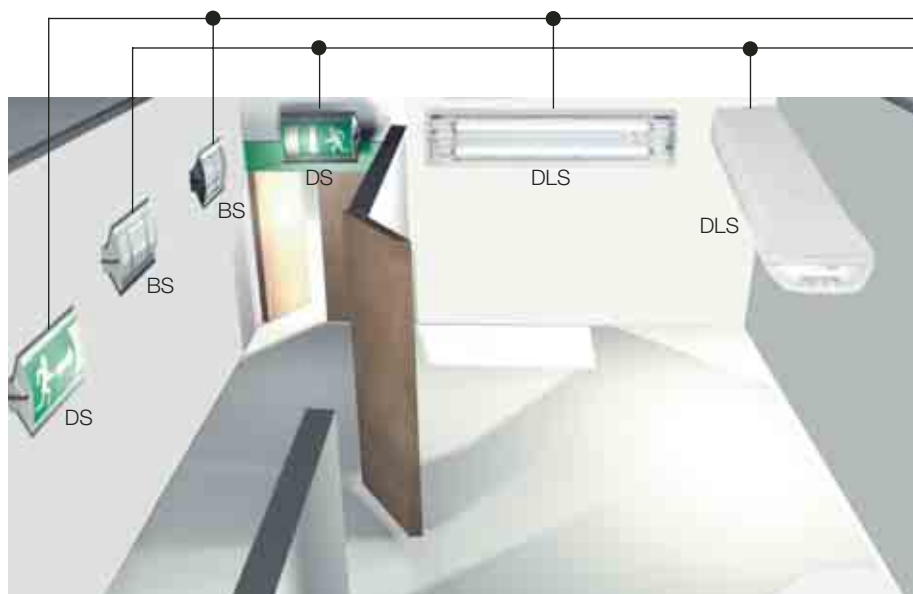
This allows the use of shorter cable distances, reduces installation costs and minimises the effects of burning materials. Any mode of operation can be assigned at a later date – **without encroachment in the lighting installation**. This enables simple project planning without having to take all possible types of operation into account.



Conventional Installation:

- Maintained light 1 (DS)
- Non-maintained light 1 (BS)
- Non-maintained light 2 (BS)
- Maintained light 2 (DS)
- Switched maintained light 1 (DLS)
- Switched maintained light 2 (DLS)

- Each type of switching mode requires two circuits
- Only one type of switching mode is possible per circuit
- Any later modifications involve a large amount of work and expense

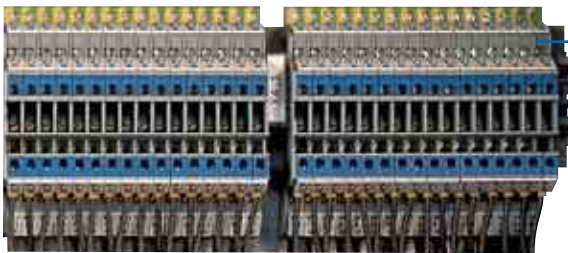
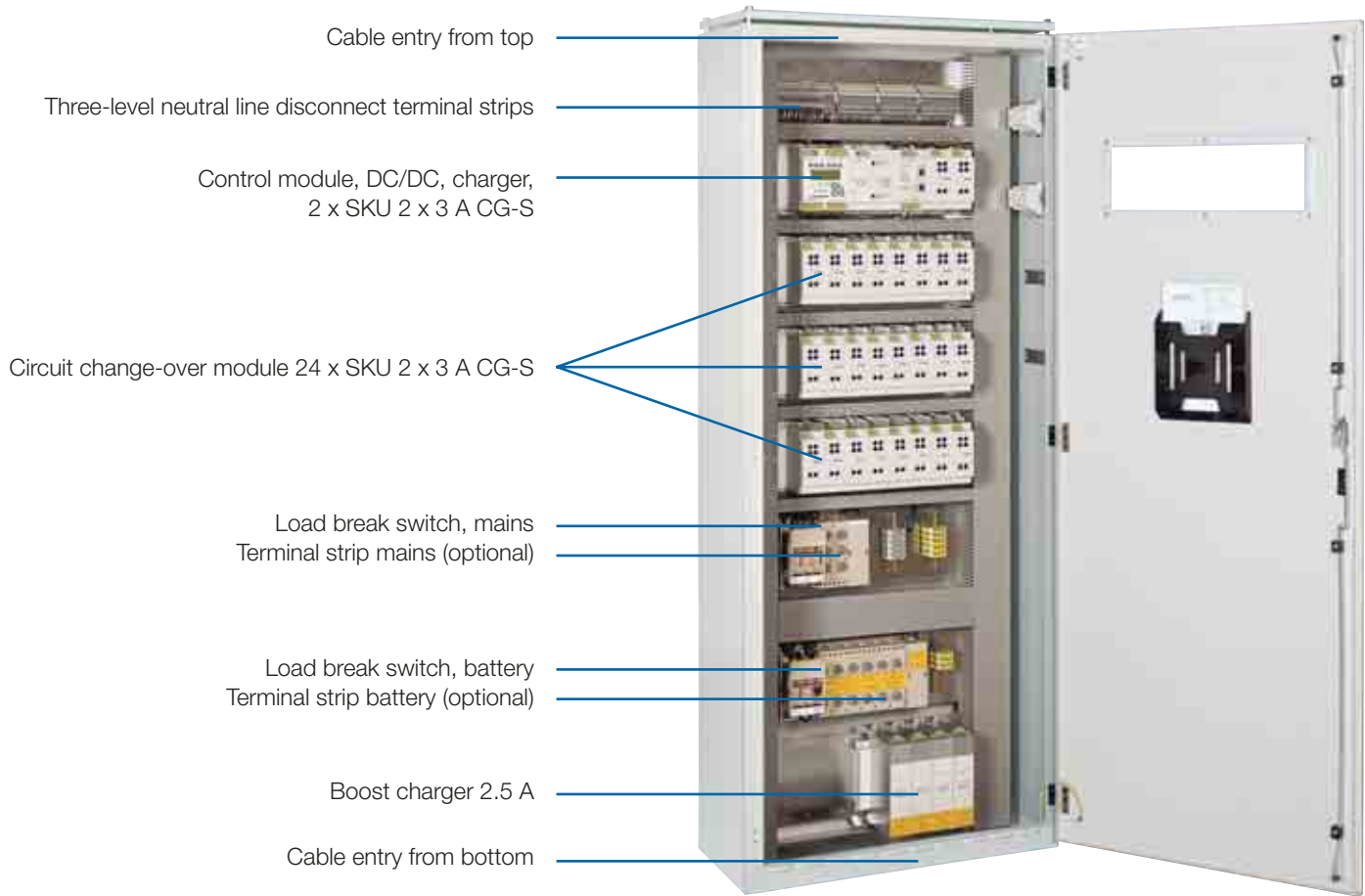


ZB-S Installation with STAR-Technology:

- All types of switching modes
- All types of switching modes

- Only two outgoing circuits for all types of switching modes
- Maintained light, non-maintained light and switched maintained light are possible in one common circuit
- Later circuit modifications do not pose any problems

ZB-S: Inspired engineering for the switch cabinet



Plenty of connection space for convenient wiring

All connections are run to 3-level neutral disconnect terminals at the top of the switch cabinet.

Boost chargers each with a charging current of 2.5 A

The LT.1 2,5A charging module drives the boost chargers to which the standby power batteries that are installed outside the switch cabinet are connected.



ZB-S: Inspired engineering for the switch cabinet

3

Freely programmable control module

separate keys for
Test (emergency function) ■
Function test ■
Duration test ■

Connections for phase monitor and blocking switch with differential loop monitoring

LEDs for operation display

Terminals for data bus

Test book and device configuration easily stored on Smart Media Card. Easy programming from PC using disk adapter and CEAG's software.

Three potential-free alarm contacts, freely assignable

three function keys, freely assignable

4 x 20 character display, backlit, contrast and brightness adjustable

Seven control buttons for user-friendly navigation

four 24 V-inputs, freely allocated

Circuit change-over module SKU CG-S 2 x 3 A

separate fuse protection for mains- and battery operation (two-pole)

fuses on front side of the module, easily accessible

LED display for operation/ON and failure of each circuit

Service key for direct display in clear text at the control module of the change-over module status

External DLS/3PH-Bus-Module

for common switching of safety- and general lighting

Freely programmable assignment of independent DLS inputs (2.5 mm²) per emergency lighting circuit or per light

8 DLS-inputs with LED display

can be used as phase monitor module and for light switch monitoring

Central Battery System ZB-S with STAR Technology Programmable Switching



As well as providing a dependable supply of power (230V AC/220 V DC) to safety and exit luminaires, the ZB-S automatically tests the system and individually monitors each CG-S luminaire (up to 20 per circuit), and it does all this using the power supply cable alone.

The new type of STAR technology allows the switching mode of every connected CG-S luminaire to be freely programmed within a 50 Hz supply network using the central battery system's controller. This means that maintained light, switched maintained light and non-maintained light modes can be combined in one and the same circuit – there is no need for separate data cables!

The control module with its nonvolatile program memory and large LCD display monitors and controls the central battery system. It automatically tests all the functions of the devices and emergency luminaires that are connected to it, and reports any faults that occur.

An integral search function automatically detects all system-dependent luminaires and modules that are assigned an address during installation.

A central monitoring device can be connected via an interface.

- Hybrid operation of all switching modes within a single circuit
- Automatic search function
- Three separate test keys
- Three user-assignable function keys
- Module status can be polled directly
- Plain text display on the control module down to the last luminaire
- When there is a phase-to-ground fault in AC operation, fault-free DC operation can continue
- Flexible data storage for test log and system configuration with Smart Media Card
- Electronic modules wired ready for connection to 3-level isolating neutral terminals 4 mm²
- Individual monitoring of up to 20 emergency luminaires per circuit

Central Battery System ZB-S with STAR Technology



Ordering information

Type	Scope of supply	Order No.
Central battery system ZB-S/26	Central battery system type ZB-S/26 incl. ST-S, LT.1 and DC/DC.2 26 free module slots	4 0071 347 100
Central battery system ZB-S/18	Central battery system type ZB-S/18 incl. ST-S, LT.1 and DC/DC.2 18 free module slots	4 0071 347 101
Central battery system ZB-S/10 C	Central battery system type ZB-S/10 C incl. ST-S, LT.1 and DC/DC.2 10 free module slots	4 0071 347 103
Central battery system ZB-S/10 C6	Central battery system type ZB-S/10 C6 incl. ST-S, LT.1 and DC/DC.2 10 free module slots	4 0071 347 104
Central battery system ZB-S/18 C3	Central battery system type ZB-S/18 C3 incl. ST-S, LT.1 and DC/DC.2 18 free module slots	4 0071 347 105
Central battery system ZB-S/10 C3	Central battery system type ZB-S/10 C3 incl. ST-S, LT.1 and DC/DC.2 10 free module slots	4 0071 347 106
Central battery system ZB-S/LAD	Central battery system type ZB-S/LAD incl. ST-S, LT.1 and DC/DC.2 (2 free module slots possible)	4 0071 347 102
Substation US-S/36	Substation type US-S/36 incl. ST-S and DC/DC.2 36 free module slots	4 0071 347 110
Substation US-S/28	Substation type US-S/28 incl. ST-S and DC/DC.2 28 free module slots	4 0071 347 111
Substation US-S/21	Substation type US-S/21 incl. ST-S and DC/DC.2 21 free module slots	4 0071 347 112
Substation US-S/13	Substation type US-S/13 incl. ST-S and DC/DC.2 13 free module slots	4 0071 347 113
Substation US-S/5	Substation type US-S/5 incl. ST-S and DC/DC.2 5 free module slots	4 0071 347 114
Substation US-S/13 E30	Substation type US-S/13 E30 incl. ST-S and DC/DC.2 13 free module slots	4 0071 347 115
Substation US-S/9 E30	Substation type US-S/9 E30 incl. ST-S and DC/DC.2 9 free module slots	4 0071 347 116

Ordering information for accessories

Type	Order No.
4 off DIN mounting rail incl. fixing accessories	4 0071 347 125
3 off C-section rail incl. fixing accessories	4 0071 347 126
200 mm plinth for ZB-S, depth 400 mm	4 0071 347 121
100 mm plinth for ZB-S, depth 400 mm	4 0071 347 120
200 mm plinth for ZB-S/18C3 and 10C3, depth 300 mm	4 0071 347 122
3-piece baseplate for ZB-S, depth 400 mm, mouse-proof	4 0071 347 124
Cable support rail	4 0071 347 123
Metal flange plate for ZB-S battery cabinet, undrilled	4 0071 346 225
Flange plate with foam rubber for ZB-S battery cabinet	4 0036 070 164
Fireproof dowel M10 for E30 sub-distribution board, pack of 12, for installation in concrete walls	4 0036 070 298
Fireproof sealant, 310 ml cartridge, for sealing E30 fireproof trunking	4 0036 070 297

Table of Covers Technical Data ZB-S

Type	ZB-S/26	ZB-S/18	ZB-S/LAD	ZB-S/10 C	ZB-S/10 C 6	ZB-S/18 C 3
Rated voltage 400/230 V 50 Hz	400/230 V 50 Hz	400/230 V 50 Hz	400/230 V 50 Hz	230 V 50 Hz	230 V 50 Hz	230 V 50 Hz
Modules:						
Control module: ST-S	1	1	1	1	1	1
DC/DC.2-converter	1	1	1	1	1	1
Charging module 2.5 A	1	1	1	1	1	1
Circuit module SKU CG-S	0-26	0-18	0-2 ²	0-10	0-10	0-18
Charging booster 2.5 A	0-6 ¹	0-6 ¹	0-10	0-1 ³	0-2 ⁴	–
Cabinet construction:						
Conductor size for mains and battery supply	50 mm ²	50 mm ²	50 mm ²	16 mm ²	16 mm ²	16 mm ²
Three-phase distribution	yes	yes	yes	no	no	no
Conductor size Outgoing circuits	6 feeders, 16 mm ²	6 feeders, 16 mm ²	15 feeders, 16 mm ²	1 feeder 35 mm ²	1 feeder 35 mm ²	1 feeder 16 mm ²
Max. conductor size Final circuit	4 mm ²	4 mm ²	4 mm ²	4 mm ²	4 mm ²	4 mm ²
Cable entry from top	yes	yes	yes ⁷	yes	yes	yes
Cable entry from bottom	yes	yes	yes ⁷	no	no	no
Enclosure class	IP 21	IP 21	IP 21	IP 21	IP 21	IP 21
Dimensions H x W x D (mm)	2050 x 800 x 400	2050 x 800 x 400	2050 x 800 x 400	2050 x 800 x 400	2050 x 800 x 600	1800 x 600 x 300
Base (optional)	100/200	100/200	100/200	200	–	200
Lock	3 mm two-way	3 mm two-way	3 mm two-way	3 mm two-way	3 mm two-way	3 mm two-way
Battery capacity, installed in:						
Compact cabinet	–	–	–	5.5-52 Ah	5.5-80 Ah	5.5-24 Ah
Battery cabinet	24-390 Ah ⁶	24-390 Ah ⁶	24-390 Ah ⁶	–	–	–
Battery rack	24-390 Ah ⁶	24-390 Ah ⁶	24-390 Ah ⁶	–	–	–

Other battery sizes on application

¹ When 6 boosters are fitted, a double bus carrier is necessary.

² Up to 8 boost chargers are possible when 2 SKU are fitted.

³ When 1 booster is fitted a single booster adapter is necessary.

Table of Covers Technical Data ZB-S

ZB-S/10 C3	US-S/36	US-S/28	US-S/21	US-S/13	US-S/5	US-S/13 E30
230 V 50 Hz	400/230 V 50 Hz	400/230 V 50 Hz	230 V 50 Hz	230 V 50 Hz	230 V 50 Hz	230 V 50 Hz
1	1	1	1	1	1	1
1	1-2	1-2	1	1	1	1
1	–	–	–	–	–	–
0-10	0-36 ⁵	0-28 ⁵	0-21	0-13	0-5	0-13
–	–	–	–	–	–	–
16 mm ²	35 mm ²	35 mm ²	35 mm ²	16 mm ²	16 mm ²	16 mm ²
no	yes	yes	no	no	no	no
1 feeder 16 mm ²	–	–	–	–	–	–
4 mm ²	4 mm ²	4 mm ²	4 mm ²	4 mm ²	4 mm ²	4 mm ²
yes	yes	yes	yes	yes	yes	yes
no	yes	yes	no	no	no	no
IP 21	IP 21	IP 21	IP 54	IP 54	IP 54	IP 41
1800 x 600 x 300	2050 x 800 x 400	2050 x 800 x 400	1200 x 600 x 300	800 x 600 x 250	600 x 400 x 250	–
200	100/200	100/200	300	–	–	–
3 mm two-way	3 mm two-way	3 mm two-way	3 mm two-way	3 mm two-way	3 mm two-way	3 mm two-way
5.5-24 Ah	–	–	–	–	–	–
–	–	–	–	–	–	–
–	–	–	–	–	–	–

⁴ When 2 boosters are fitted a double booster adapter is necessary.

⁵ The DC/DC.2 converter can supply up to 26 SKU CG-S. A second DC/DC.2 converter for 27 SKU and more is necessary.

⁶ Higher battery capacities ≥ 130 Ah are achieved by connecting several battery sets in parallel.

⁷ Please indicate the cable entry when planning the system.

ZB-S System Components and Options



For ease of installation, all modules are provided with plug-in terminals. Thereby, the modules can easily be replaced.

All modules wired ready for connection to 3-level isolating neutral terminals 4 mm². The operating elements and displays as well as the fuses are easily accessible on the front of the modules.

All modules are mounted by means of two quick-fixing devices so that their replacement is no problem at all. Care has to be taken that the removed modules are again fitted in the same place.



- Plug-in terminals for easy installation
- Later extension no problem
- Easily accessible fuses
- Quick-fixing devices for easy mounting

ZB-S

System Components and Options

Control module



A freely programmable control module with non-volatile program memory and 4-line alphanumeric display monitors and controls the central battery system. All functions such as charging, mains/emergency lighting selection and deep discharge protection of the devices and the emergency luminaires are tested automatically. Any faults that occur are signalled immediately. An interface enables a central monitoring facility to be connected. In the event of a short circuit or open circuit in current loops, differential monitors immediately power on the system (maintained light) or put the system in readiness.

- Nonvolatile memory
- Automatic luminaire search function
- Individual luminaire monitoring
- Automatic DLS/TLS search function
- Selective manual reset/circuit
- Selective emergency light/circuit
- Password function
- Final circuit fuse monitoring
- Module-selective battery operation
- Control module with multi-master-mode M³

Sealed keypad with 3 keys for:



- Test (mains failure - battery operation)
- Function test start / cancel
- Operating duration test start / cancel

3 freely assignable function keys for:



- System disable/enable
- Manual reset
- Cancel function test
- Show fault list
- Maintained light off/on
- Power on complete safety lighting system (continuity lighting)
- Mains failure simulation UV-A (emergency operation)
- Reset deep discharge protection
- Find insulation failure
- Service Pin Message

7 control keys

for user-friendly navigation



LED indicators for:



- Mains
- Battery
- Fault

Display:

4 x 20 characters, backlit, program adjustable contrast and brightness.

Displays include:

- Date/Time
- Charging malfunction
- Deep discharge protection
- Battery voltage/charge current (+)
- Battery discharge current in test or failure (-)
- Manual reset
- Test mode
- Delay-time on mains return (remaining time in min.)
- Luminaire failure with location label
- Insulation fault with circuit indication
- Failure mains sub DB (with location label)
- Failure/programming information

Connections:

- Connection for disable switch:

Control loops for blocking the installation during factory shutdowns with differential loop monitoring for short-circuit and open circuit detection.

Differential monitoring: Short-circuit or open circuit result in readiness for operation of the system.

- Connection for phase monitor:

24V current loop for requesting emergency lighting using differential loop monitoring for the detection of short-circuit and open circuits.

Differential monitoring: Short-circuit or open circuit result in the immediate power on (maintained light) of the system.

- Connection for floating signalling contacts and buzzer:

3 floating relays, each 1x UM, 24V 0.5A; buzzer

One or more of 11 different signals can be assigned to each floating contact or to the buzzer. Freely programmable, DIN VDE 0108 requirement can be called at any time as a preset.

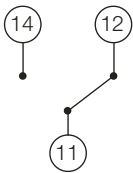
- Connection for analog inputs:

4 off freely assignable 24 V analog inputs, can be programmed negated and non negated, e.g. for start / cancel function test, start / cancel operating duration test, disable / enable system, manual reset, maintained light on / off, power on safety lighting as continuity lighting.

ZB-S System Components and Options



Programmable signalling contacts, each:
1 x changer / 1 x 24 / 0 V and 0.5 A



Technical data

Display	4 x 20 character display, program adjustable contrast
Illumination	backlighting, program adjustable brightness
Keypad	sealed, with 6 function and 7 control keys
Readout	Battery voltage Battery charge current (+) Battery discharge current in test or failure (-) Charge fault Luminaire failure with location label Deep discharge protection Manual reset Delay-time on mains return Failure mains sub DB (with location label) Test mode Date/Time Insulation fault with circuit label Failure information Programming information
Status	- Mains - Battery - Controller

Potential-free signal contacts, buzzer

3 floating relays, each 1 x UM, 24 V 0.5 A; buzzer
Freely programmable, VDE 0108 requirement can be called at any time as a preset.

Status	11/12/14 Group fault	21/22/24 Ready	31/32/33 Battery operation (Emerg operation)
Mains operation	-	X	-
Mains failure	-	-	X
Mains failure S3-S4/LON	-	-	X
Charge failure	X	-	-
Converter failure	X	-	-
Luminaire failure	X	-	-
Group failure	X	-	-
Deep discharge protection	X	-	-
Insul. monitor	X	-	-
Function test	-	X	X
Operating duration test	-	X	X
Contact assignment	11/14: N/C 11/12: N/O	21/24: N/C 21/22: N/O	31/34: N/C 31/32: N/O

X = active = 11/14 + 21/24 + 31/34 closed

Ordering details

Type	Model	Order No.
Control module ZB-S compl. with SMC	Plug-in module all devices	4 0071 347 050

ZB-S System Components and Options



8-MB-SMC

Smart Media Card

Flexible data storage with 8 MB capacity for system and log book configuration, e.g. of the mandatory archiving of log book information for a minimum of 2 years.

The system can also be programmed at any PC using optional floppy disk adapter and CEAG software. Texts can also be entered on the control module in the switch cabinet.

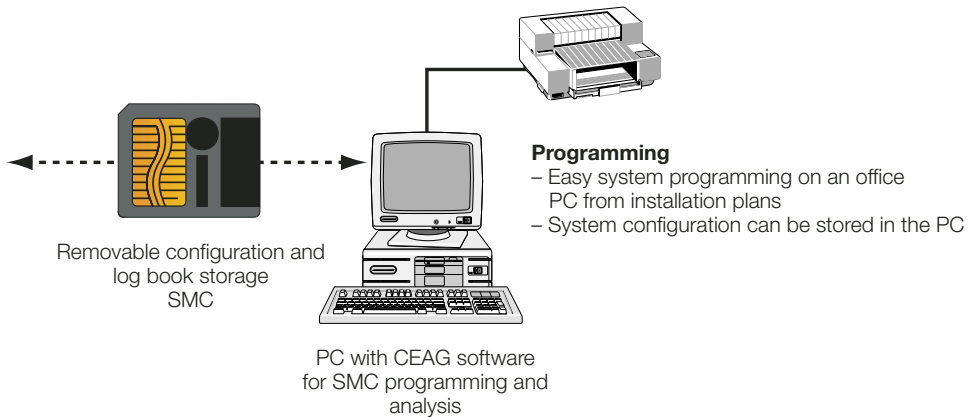
Storage of:

- 360.000 log book entries
- Location texts for the luminaires (20 characters per luminaire)
- Location texts of external modules such as phase monitor, DLS, TLS (20 characters per module)
- Circuit names (20 characters per circuit)
- System name (20 characters)

Ordering details

Type	Model	Order No.
Smart media card	Smart media card formatted for ZB-S	4 0071 347 153
Adapter 3,5"	Floppy disk adapter for smart media card	4 0064 079 894
Software	Software for external programming of the ZB-S via PC	4 0071 347 152

Basic information about the SMC (Smart Media Card)



ZB-S

System Components and Options



DC-DC converter.2

DC/DC Converter.2

The DC/DC converter.2 converts the 220 V DC battery voltage to 24 V DC and 6 V DC to supply the modules and processor.

A number of converters can be connected in parallel 6 V internal:

- Supplies 26 SKUs CG-S 2 x 3 A
- Incoming supply can be run via AC/AC
- Rectifier in the DC/DC converter for AC supply

Technical data

Fusing	2 AT/250 V, 6.3 x 32
24 V external	20 W continuous rating Outgoing circuit with front panel connector Isolated voltage
24 V internal	100 W continuous rating 140 W peak rating (20 ms) Supplies max. 26 SKUs

Ordering details

Type	Order No.
DC/DC converter.2	4 0071 347 071



Charging modul LT.1 2,5 A

Charging module LT.1 2,5 A

The charging section is used to recharge 220 V batteries. The charging current is 2,5 A. Additional boost chargers with a charging current of 2,5 A are used for higher battery ratings. The boosters are driven by the LT.1 2,5 A. Signals such as failure, insulation fault and boost charging can be transmitted with the charger's

floating signalling contacts. A display on the actual device indicates the current battery capacity (Capacity > 10 %, > 50 %, 100 %). The built-in insulation monitor reports an insulation fault between battery + and PE or battery - and PE.

Technical data

Charging characteristic	IU
Terminals	2.5 mm ² rigid and flexible
Mains fuse	6,3 AT/250 V/5 x 20
Battery fuse	3,15 AT/250 V/5 x 20
End-of-charge voltage	Boost charge 248 V DC Trickle charge 240 V DC
Max. charging current	Charg. mod. LT 2.5 2.5 A Booster 2.5 A
Deep discharge protection	183.6 V DC
Floating signalling contacts	11, 12, 21, 22, 31, 32 0.5 A/24 V AC DC

Ordering details

Type	Scope of supply	Order No.
LT.1 2,5 A	Plug-in module	4 0071 346 555
Boost charger 2,5	Separate module	4 0071 346 345

ZB-S

System Components and Options



SKU CG-S 2 x 3 A

SKU CG-S 2 x 3 A

Hybrid operation of maintained light, non-maintained light and switched maintained light in a single circuit can be programmed with no additional data cable.

- Up to 20 luminaires can be monitored individually
- Individual selection per AC/DC circuit
- Separate fusing for mains and battery operation

- When there is a phase-to-ground fault in AC operation, fault-free DC operation can continue
- Easy access to fuses
- LED indicates fault and Run/ON for each circuit
- Supplies ballast luminaires and incandescent lamps
- Service-friendly modular units are wired up and ready to connect to 3-tier disconnect neutral terminals 4 mm²

Technical data

Fusing	5 AT/250 V, 6.3 x 32
Continuous current rating	3 A per circuit
Max. inrush current	250 A/ms per circuit
Typical switch over time	AC/DC approx. 200 ms

Ordering details

Type	Scope of supply	Order No.
SKU	Circuit changer SKU CG-S 2 x 3 A	4 0071 347 051



SKU CG-S 1 x 6 A

SKU CG-S 1 x 6 A

Hybrid operation of maintained light, non-maintained light and switched maintained light in a single circuit can be programmed with no additional data cable.

- Up to 20 luminaires can be monitored individually
- Separate fusing for mains and battery operation

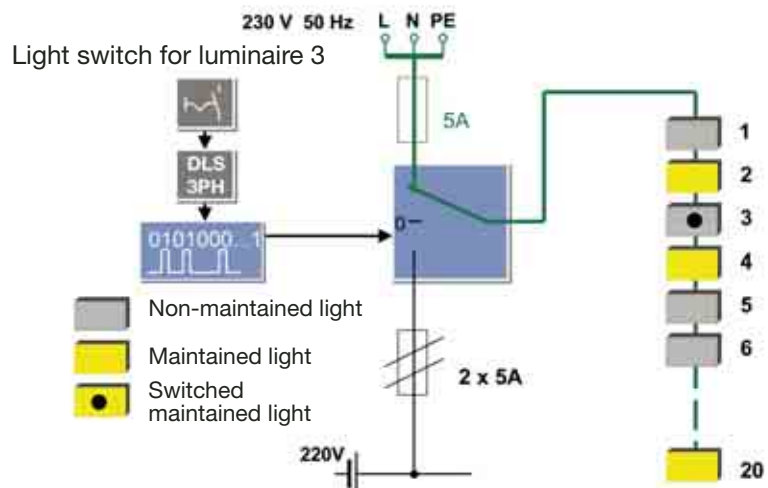
- When there is a phase-to-ground fault in AC operation, fault-free DC operation can continue
- Easy access to fuses
- LED indicates fault and Run/ON for each circuit
- Supplies ballast luminaires and incandescent lamps
- Service-friendly modular units are wired up and ready to connect to 3-tier disconnect neutral terminals 4 mm²

Technical data

Fusing	10 AT/250 V, 6.3 x 32
Continuous current rating	6 A
Max. inrush current	250 A/ms
Typical switch over time	AC/DC approx. 200 ms

Ordering details

Type	Scope of supply	Order No.
SKU	Circuit changer SKU CG-S 1 x 6 A	4 0071 347 345



Operation of the STAR Technology

ZB-S

System Components and Options



SKU CG 2 x 3 A

SKU CG 2 x 3 A

- Change-over module SKU, module without S-Function
- Up to 20 luminaires can be monitored individually
 - Individual selection per AC/DC circuit
 - Separate fusing for mains and battery operation
 - When there is a phase-to-ground fault in AC operation, fault-free DC operation can continue

- Easy access to fuses
- LED indicates fault and Run/ON for each circuit
- Supplies ballast luminaires and incandescent lamps
- Service-friendly modular units are wired up and ready to connect to 3-tier disconnect neutral terminals 4 mm²

Technical data

Fusing	5 AT/250 V, 6.3 x 32
Continuous current rating	3 A per circuit
Max. inrush current	120 A/ms per circuit
Typical switch over time	AC/DC approx. 200 ms

Ordering details

Type	Scope of supply	Order No.
SKU	Circuit changer SKU CG 2 x 3 A	4 0071 347 290



SKU CG 1 x 6 A

SKU CG 1 x 6 A

- Change-over module SKU, module without S-Function
- Up to 20 luminaires can be monitored individually
 - Individual selection per AC/DC circuit
 - Separate fusing for mains and battery operation

- When there is a phase-to-ground fault in AC operation, fault-free DC operation can continue
- LED indicates fault and Run/ON
- Supplies ballast luminaires and incandescent lamps
- Service-friendly modular units are wired up and ready to connect to 3-tier disconnect neutral terminals 4 mm²

Technical data

Fusing	10 AT/250 V, 6.3 x 32
Continuous current rating	6 A
Max. inrush current	180 A/ms
Typical switch over time	AC/DC approx. 200 ms

Ordering details

Type	Scope of supply	Order No.
SKU	Circuit changer SKU CG 1 x 6 A	4 0071 347 346

ZB-S System Components and Options



Printer PD 3

Printer PD 3

The printer logs and memorizes all function tests and mains failures of a ZB-S cover or a substation. After the performance of an automatic function test, the results are printed out in plain text stating also the time and date. The printing is made automatic by each entry into the log book of the control module. A mains failure is also logged with time and date.

The printer documents the operational state of emergency luminaires of a emergency lighting supply system. By means of the printer, the maintenance cost of an emergency lighting system can be reduced, since information on possible failures of the luminaires (e. g. defective lamp) is printed out in detail.

Technical data

Printer paper	woodfree printing paper
Paper width	57.5 mm
Max. dia. of the paper rol	61 mm
Core hole dia.	12 mm

Ordering details

Type	Scope of supply	Order No.
PD 3	Plug-in module	4 0071 347 316
Spare part	1 roll printer paper	4 0078 079 666
Spare part packet	1 inle ribbon and 1 roll printer paper	4 0071 346 042



CG IV relay module

CG IV relay module

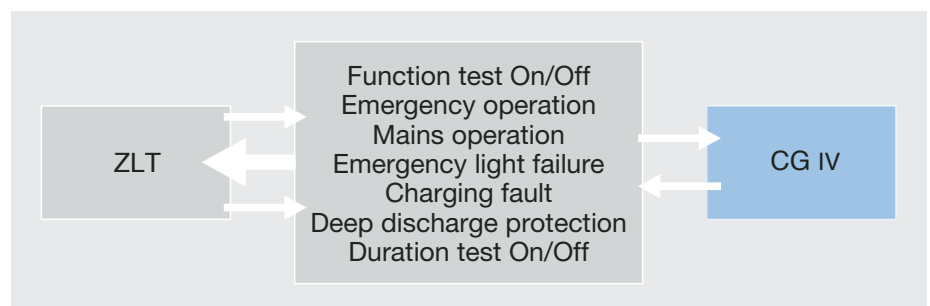
The bipolar CG IV relay module transmits data and operational states of the covers/substations to a central building management system.

Technical data

Terminals/plug-in terminals	2.5 mm ² rigid and flexible
Switching capacity of the contacts	24 V/0.5 A AC DC

Ordering details

Type	Scope of supply	Order No.
CG IV	Plug-in module	4 0071 343 971

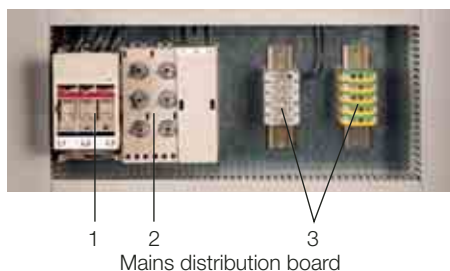


ZB-S System Components and Options

Mains distribution board

The mains supply to a ZB-S/26 or ZB-S/18 system comes via a modular mains distribution board. This includes a size 00C load disconnector (1) with a maximum conductor size of 50 mm² (torque rating 3 Nm) and allows the connection of up to 6 slave stations to modular size D02-E18 outgoing mains circuits (2) with the necessary terminals for neutral and ground (3).

The same mains distribution boards must also be used three-phase for feeders to powerful slave-stations (accommodates up to 2 slave stations in this case). The components are simply plugged on from the front and securely contacted. The mains power supplies for the smaller systems are assembled in the conventional way.



Mains distribution module D02-E18

Technical data

Current rating	63 A
Rated operating voltage	400 V
Box terminal for circular conductor	up to 16 mm ²
Material	Polyamide (PA 6.6), 30 % glass-fibre-reinforced
Scope of supply	includes 3 screw caps E18 and 3 x 25 A D02 fuse-links

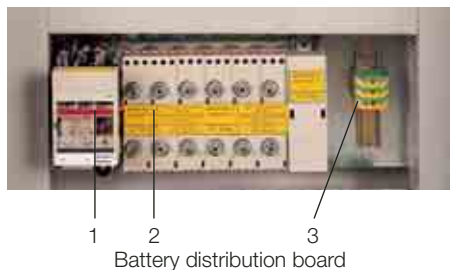
Ordering details

Type	Scope of supply	Order No.
Mains distribution module for busbar mounting	includes 3 screw caps E18 and 3 x 25 A D02 fuse-links	4 0071 347 160

Battery distribution board

The battery supply to a ZB-S/26 or ZB-S/18 system comes via a modular battery distribution board. This includes a size 00C load disconnector (1) with a maximum conductor size of 50 mm² (torque rating 3 Nm) and allows the connection of up to 6 slave stations to modular

size D02-E18 outgoing battery circuits (2) with related terminals for ground (3). The components are simply plugged on from the front and securely contacted. The battery power supplies for the smaller systems are assembled in the conventional way.



Battery distribution module D02-E18

Technical data

Current rating	63 A
Rated operating voltage	400 V
Box terminal for circular conductor	up to 16 mm ²
Material	Polyamide (PA 6.6), 30 % glass-fibre-reinforced
Scope of supply	includes 2 screw caps E18 and 2 x 25 A D02 fuse-links

Ordering details

Type	Scope of supply	Order No.
Battery distribution module for busbar mounting	includes 2 screw caps E18 and 2 x 25 A D02 fuse-links	4 0071 347 161

Technical data

Busbar guard	
Cover strip for clip-mounting to the trunking section	Ready cut to module width
Material	Hard PVC

Ordering details

Type	Scope of supply	Order No.
Busbar cover strip	Cover strip in module width for clip mounting to the trunking section	4 0071 347 162

ZB-S System Components and Options



Boost charger 2.5 A

Charging booster

As well as the charging module of the ZB-S Central Battery System, boost chargers must be individually installed to achieve the battery recharge time required by statute for configured battery sets.

The number of additional boosters that are required for your configuration will be found in Tables 4 (to VDE 0108) and 4a (to DIN EN 50171) on page 30 of this catalogue.

Technical data

Charge current	2.5 A
The booster must be used in conjunction with the LT.1 charger (4 0071 346 555)	
The booster cuts in when boost charging is active and the charging voltage is < 247 V	

Ordering details

Type	Scope of supply	Order No.
Boost charger new	Boost charger 2.5 A (only in conjunction with LT.1 charger Order No. 4 0071 346 555)	4 0071 346 345



Booster rack, 4-way



Booster rack, 2-way

Booster rack

A 4-way booster rack with 3-phase supply is mounted in system types ZB-S/26 and ZB-S/18. It is for supplying the 2.5 A boost chargers only!

The optional 2-way booster rack can be used to expand the system to 6 slots.

Technical data

Supply voltage	400 V AC/220 V DC
3-phase split slots	
Conductor size	4 mm ² max.

Ordering details

Type	Scope of supply	Order No.
Booster rack, 4-way	Unit accommodates 4 x 2.5 A boost chargers for ZB-S/26 and ZB-S/18	4 0071 347 043
Booster rack, 2-way	Unit accommodates 2 extra 2.5 A boost chargers for ZB-S/26 and ZB-S/18 (only in conjunction with 4 0071 347 043)	4 0071 347 130

Booster rack, compact

The compact version of the booster rack is intended for use in ZB-S compact systems. The single and double compact booster racks have

been designed for system types ZB-S/10 C and ZB-S/10 C6 respectively. They are for supplying the 2.5 A boost chargers only!

Technical data

Supply voltage	230 V AC/220 V DC
Conductor size	2.5 mm ² max.

Ordering details

Type	Scope of supply	Order No.
Booster rack, single compact	Unit accommodates 1 x 2.5 A boost charger for ZB-S/10 C	4 0071 347 167
Booster rack, double compact	Unit accommodates 2 x 2.5 A boost chargers for ZB-S/10 C6	4 0071 347 130



Booster rack, single, compact

ZB-S System Components and Options

Connection terminals

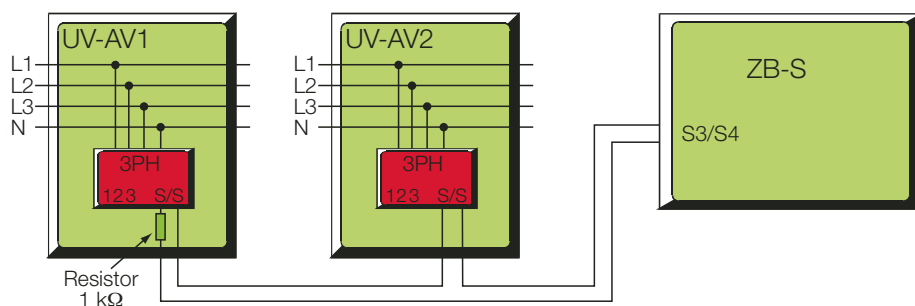


Terminals up to 4 mm² rigid or flexible are provided for connecting the external phase monitors, monitoring equipment and control units.

Terminals up to 4 mm² on DIN rail for rigid or flexible cables are provided for connecting the final circuits.

The terminals are designed as 3-level neutral disconnect terminal.

Current loop



24 V current loop for emergency lighting request using differential loop monitoring for **short-circuit and open circuit detection**.

Differential monitoring: A short or open circuit causes the system to energise immediately (maintained light).

Phase monitor switch closed (1 kΩ): Normal system mode

Three-phase monitor

When one phase fails, the module switches a relay contact and interrupts the standard electronic 24 V current loop in the ZB-S cover and/or the US-S substations.

The emergency luminaires in non-maintained mode are switched to mains operation, if the mains voltage still applies to the ZB-S cover (MDB).



Three-phase monitor

Technical data

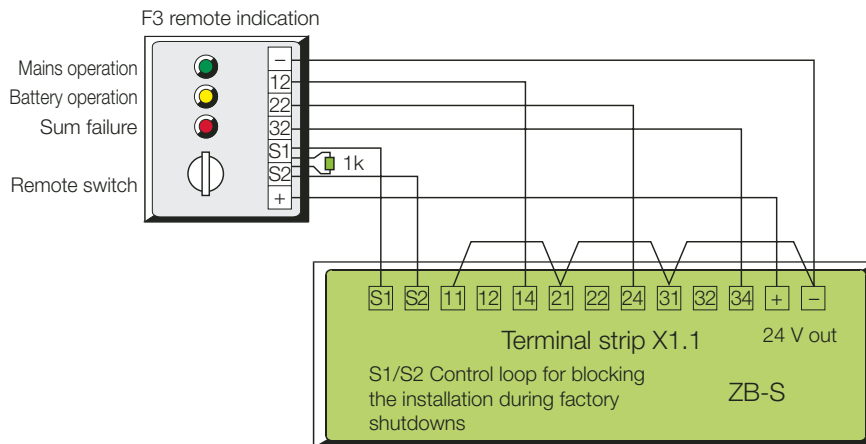
Dimensions (mm) (h x w x d)	85 x 52,5 x 65
Enclosure	Plastic
Terminals	2,5 mm ² rigid and flexible
Type of mounting	DIN rail
Contact 1, 2, 3, S, S	0.5 A/24 V AC/DC

Ordering details

Type	Scope of supply	Order No.
Three-phase monitor	Module ready for mounting	4 0071 343 430

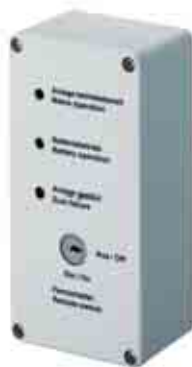
ZB-S System Components and Options

Remote switch



Control loop for blocking the installation during factory shutdowns with differential loop monitoring for **short-circuit and open circuit detection**.

Differential monitoring:	A short-circuit or open circuit causes the system to be enabled.
F3 switch closed:	System ready
F3 switch open (1 kΩ):	System blocked



F3 remote indication



F3 remote indication flush-mounted



AC Module

F3 remote indication

Operating from a battery supply, the F3 remote indication ensures the display of important operational information also in a mains fail condition. By means of the built-in key-operated switch, the connected ZB/US-S systems can be

centrally put out of operation. Thereby, the F3 remote indication complies with DIN VDE 0108 part 1, para. 6.4.3.11 which permits a remote control only if the operation by unauthorized persons is prevented.

Technical data

Terminals surface-mounted	2.5 mm ² rigid and flexible
Dimensions (mm) (h x w x d)	160 x 80 x 55
Terminals flush-mounted	1.5 mm ² rigid and 1 mm ² flexible
Dimensions (mm) (h x w x d)	80 x 80 x 55

Ordering details

Type	Scope of supply	Order No.
F3 remote indication	Module	4 0071 338 497
F3-remote indication flush-mounted	Performance for installation in the flush-mounted switch receptively empty space box acc. DIN VDE 0606	4 0071 347 490

AC Module

Together with the DC/DC converter, the optional AC module supplies the internal system

voltage when the battery supply is isolated, e.g. for maintenance.

Technical data

Constructed to	EN 61558/VDE 570
Rated voltage	230 V 50 Hz
Nominal power	240 VA
Fusing	1.6 A

Ordering details

Type	Scope of supply	Order No.
AC Module	External transformer module AC/AC converter 240 VA incl. fitting adapter	4 0071 347 162

ZB-S System Components and Options



External DLS/3Ph-Bus-Module

The DLS/3PH bus module can be used as a phase monitor and for light switch polling for the common switching of safety and general lighting systems. The housing is suitable for DIN rail mounting.

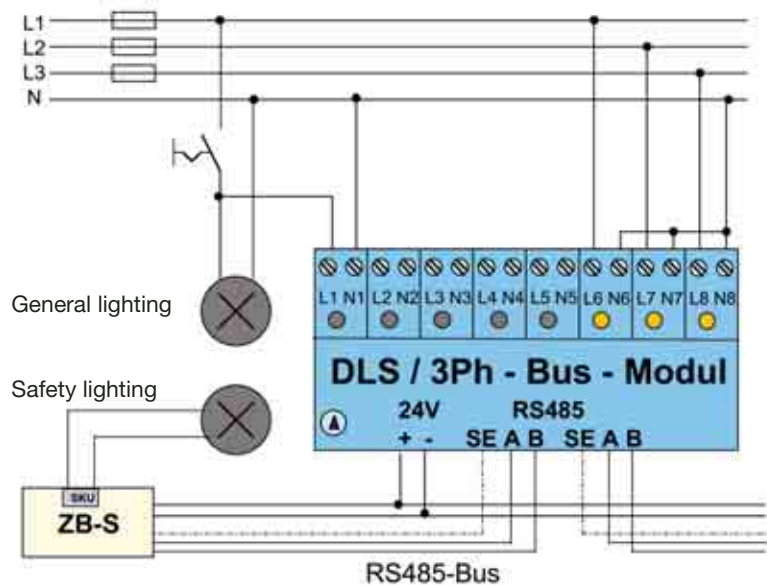
The module has a service button, an RS 485 bus port (integral 120 Ohm bus load resistor) with 24 V module supply, and is addressed with encoding switches. Coloured LEDs indicate fault, ON status and operation.

Technical data

Device supply	24 V DC (min. 19 V, max. 30 V)
Power consumption (all 8 channels connected)	20 mA ± 5 mA
Degree of protection	IP 20
Insulation class	I
Ambient temperature	-10 ° to + 40 °C
Input channels 8 (optionally isolated)	UN = 230 V
DLS (channel 1-8)	> 195 V -> ON < 138 V -> OFF
3PH (channel 6-8)	> 195 V -> ON < 138 V -> OFF
Light switch inputs	8 off with LED display, or 5 off with 3-phase monitor (selector)
Monitoring threshold	60 - 85 % U _{Nom} (meets DIN EN 60598-2-22)
Data bus	RS 485
Address range	1-25
Weight	0.2 kg
Dimensions (l x w x h) mm	105 x 85 x 60
Mounting	DIN rail
Supply terminals/plug-on terminals	2.5 mm ² rigid and flexible

Ordering details

Type	Scope of supply	Order No.
DLS/3Ph-Bus-Module	Module for DIN rail mounting	4 0071 346 955
DLS/3Ph-Bus-Module inverse	Module for DIN rail mounting with inverse switching logic	4 0071 347 455
DIN rails	4 off DIN rails for mounting external modules in the switch cabinet incl. fixing accessories	4 0071 347 125



ZB-S System Components and Options



External TLS-Bus-Module

The TLS bus module is used to poll stairwell light switches, to supply the glow lamps in mains and emergency operation and for the common switching of safety and general lighting. The housing is suitable for DIN rail mounting.

The module has a service button, an RS 485 bus port (integral 120 Ohm bus load resistor),

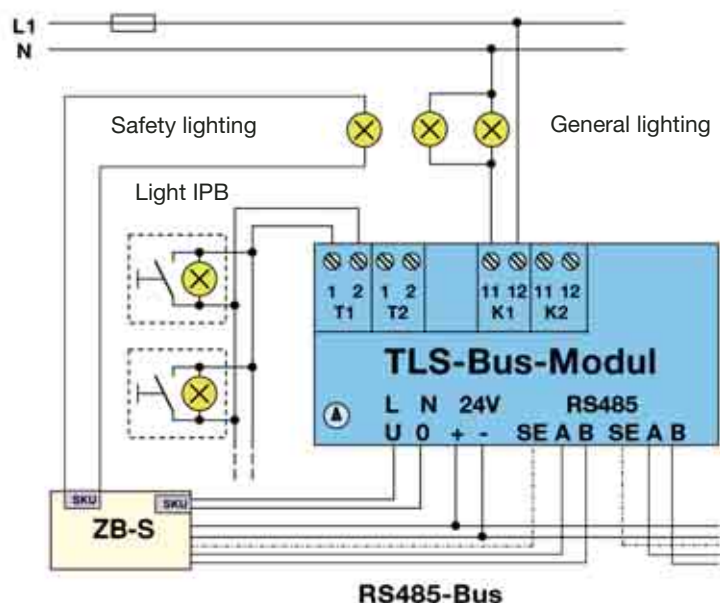
24 V module supply, and generates the glow lamp voltage. It also has a glow lamp flash function (30 s before On-time timeout). The TLS bus module is addressed with encoding switches. Coloured LEDs indicate fault, ON status and operation.

Technical data

Device supply	24 V DC (min. 19 V, max. 30 V)
Power consumption at 24 V	Standby 10 mA ± 3 mA 1 button pushed 35 mA ± 5 mA 2 buttons pushed 60 mA ± 6 mA
Degree of protection	IP 20
Insulation class	I
Ambient temperature	-10 °C to + 40 °C
Connection T1/T2	max. 50 mA each e.g. 50 pushbuttons with 1 mA glow lamp
Connection K1/K2	10 A/250 V AC Making current max. 120 A/ms
Data bus	RS 485
Address range	1-25
Weight	0.2 kg
Dimensions (l x w x h) mm	105 x 85 x 60
Mounting	DIN rail
Supply terminals/plug-in terminals	2.5 mm ² rigid and flexible
Number of IPB inputs	2 off incl. glow lamp supply (max. 50 mA)
Load circuits for general lighting	2 off (10 A/120 A/ms)
Variable On-time	1 to 15 min.

Ordering details

Type	Scope of supply	Order No.
TLS-Bus-Module	Module for DIN rail mounting	4 0071 346 965
DIN rails	4 off DIN rails for mounting external modules in the switch cabinet incl. fixing accessories	4 0071 347 125



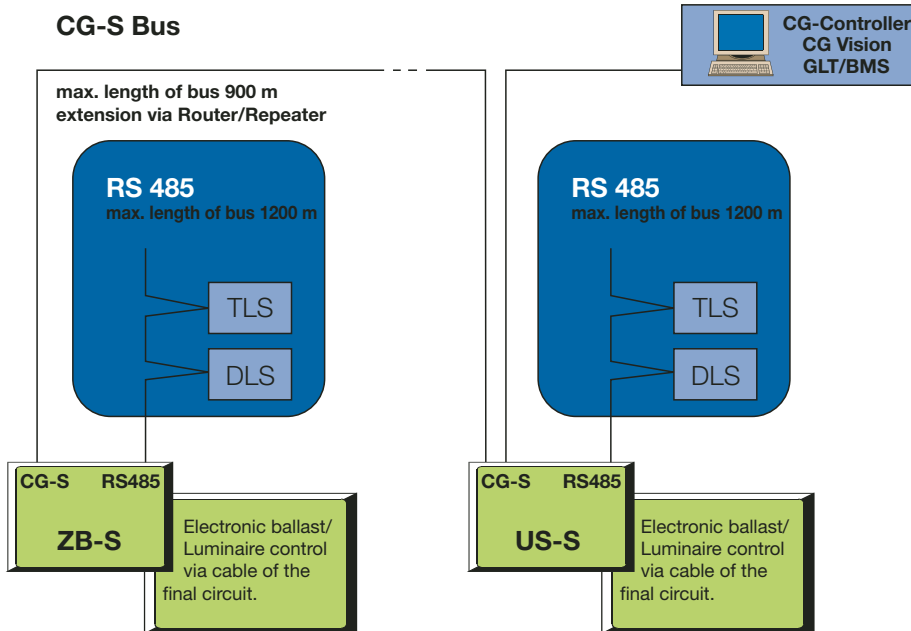
ZB-S Bus technology

Bus technology according to RS 485

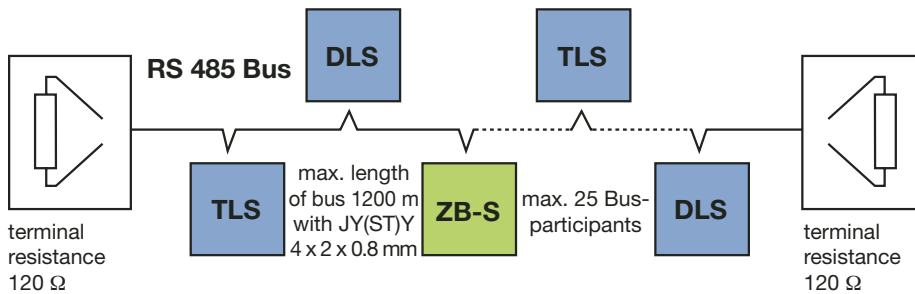
An RS 485 bus is used for data communication with external bus modules (DLS/3PH or TLS).

A connection to a central building services management system (BMS) can be made with the CG-S bus.

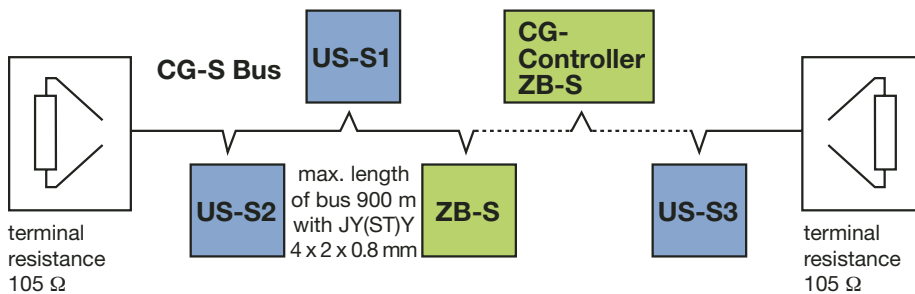
An isolated 24V/0.5 A power supply (SELV) is available for the external modules. The maximum line length depends on the required power and the conductor size.



Overall structure of the bus system for communication with external switching modules and master control system



RS485 bus for communication with external CG-S modules (DLS/3PH or TLS bus module). The terminating resistor (120 Ω , 0.5 W) can be connected in the modules. The ZB-S control cabinet also includes a resistor. This must be mounted in the ZB-S system if only one cable is laid.



CG-S bus for communication by ZB-S or US-S systems with a CG controller ZB-S



Notes:

- Bus topology: linear, double terminated (no spur lines allowed)
- The absolutely essential terminating resistors are supplied in a plastic pack in the control cabinet.
- Cable type (minimum requirement): JY(ST)Y 4 x 2 x 0.8 mm (twisted pair, screened)
- The conductor size required for the 24 V bus voltage will depend on the line length and the number of bus modules ($U_{min} = 19$ V DC)
- DLS = external maintained light switching module (DLS/3PH bus module)
- TLS = external stairwell light switching module
- BMS = Building Management System

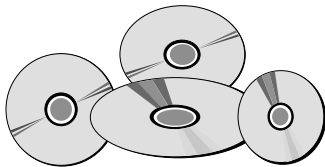
ZB-S CG-Controller



CG-controller ZB-S



8 MB Smart Media Card



CG-Controller ZB-S

For the central monitoring of ZB-S, the novel CEAG CG-Controller offers a variety of new features:

- Housing: degree of protection IP 65
- Control and monitoring of up to 32 emergency supply systems
- 8 MB memory card for the storage of systems configuration, luminaire designation and log book
- Programming of the CG-Controller via PC preprogrammed memory card via 8 MB SMC can be realized using a 3,5" adapter disk
- log book acc. to VDE 0108/10.89: Storage of results of functional tests carried out for a period of 2 years
- Storage of luminaire designation for 6400 luminaires with 20 digits
- Volt-free contact freely programmable for:
 - charging fault
 - luminaire fault
 - ISO failure
 - power failure or
 - battery operation

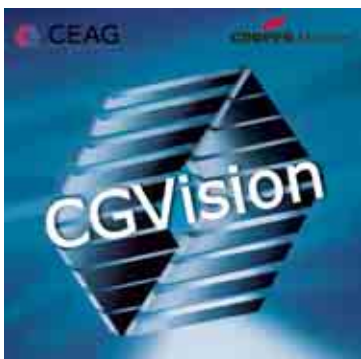
Technical data

Dimensions (mm) (H x W x D)	184 x 240 x 112
Enclosure	Plastic RAL 7035, with clear cover
Degree of protection (IEC 529)	IP 65
Supply voltage	230 V 50/60 Hz/24 V DC
Insulation class	II
Ambient temperature	-5 °C to + 40 °C
Connection terminals/plug-in terminals	2.5 mm ² rigid and flexible
Display	Illuminated, alphanumeric 4 x 20 characters
Keyboard	membrane keypad 4 x 4
Volt-free contact	1 x UM, 24 V 0.5 A; freely programmable

Ordering details

Type	Supply source	Order No.
CG-Controller ZB-S	Controller in enclosure incl. CG-S BUS-interface	4 0071 347 135
Storage card interface (SMC)	Storage card reader, ready for mounting CG-Controller ZB-S	4 0071 346 474
Storage card SMC	Storage card, 8 MB, 3.3 V formatted for CG-Controller ZB-S	4 0071 347 145
Adapter 3.5"	Floppy disk adapter for smart media card	4 0064 079 894
CG-S BUS component	Router for CG-S BUS for DIN rail mounting	4 0071 347 142
CG-S BUS component	Repeater for CG-S BUS for DIN rail mounting	4 0071 347 143
Software	PC software for ZB-S, for alternative programming of the system configuration on PC. For Windows 95 and higher	4 0071 347 152

CG Vision

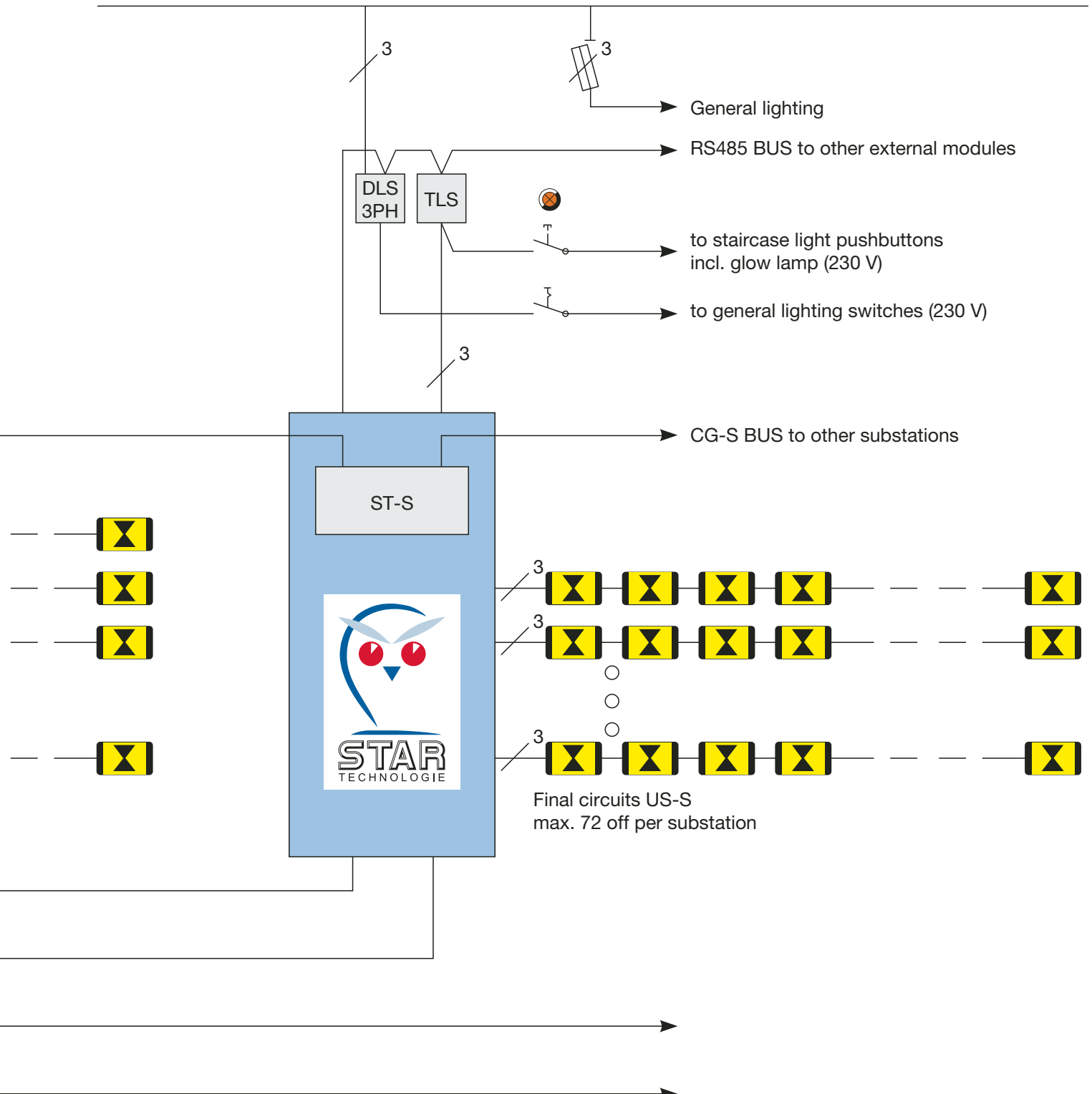


Fully automatic visual display, monitoring and programming software for standard PCs with Windows 2000™ or Windows XP™ Professional operating system, allows retrieval of detailed system-information about CG-S Bus technology at any time with just one bus line. Simple menu-assisted operation with short-info display. The CG-S Bus technology provides a continuous presence of the current operating status of all connected systems, with a continuous display of the last 5 events. Special features:

- Up to 480 emergency lighting devices can be monitored and programmed
- Emergency luminaires can be turned off in CG Vision via STAR technology
- Programmable external LON switches on circuits
- User can enter his own texts, e.g. for location labelling
- Localised fault messages for each emergency light circuit and safety/exit luminaires, giving location in plain text.
- Continuously updated information about charger and battery
- Storage and retrieval of all log book data over a period of at least 2 years
- Additional data storage on external magnetic media is possible at any time
- User-programmable function and duration test

ZB-S Installation Example

Sub distribution board general lighting



3

Substation US-S

Planning and Layout of the ZB-S Emergency Lighting Supply System

Based on the data given in the tables, planning the ZB-S central battery system can easily and quickly be carried out.

We recommend the following procedure:

1 Calculation of the required battery capacity and number of additional boost charging units.

The number of required emergency luminaires is known from the emergency lighting design with the engineering guides which is included in part 1 of this catalogue.

Example: The following number of luminaires has been calculated for the emergency lighting of a meeting hall (3 h rated duration and 10 h recharge period).

100 pcs. 57011 CG each 30 mA	10 circuits =	
	= 3.00 A	5 modules
		SKU CG-S 2 x 3 A
280 pcs. 55011 CG each 30 mA	28 circuits =	
	= 8.40 A	14 modules
		SKU CG-S 2 x 3 A
120 pcs. EVG 13.2 each 47 mA	12 circuits =	
for 11 W TC-E	= 5.64 A	6 modules
		SKU CG-S 2 x 3 A
Drawn battery current	= 17.04 A	50 circuits =
		25 modules
		SKU CG-S 2 x 3 A

Based on table 2 and depending on the required rated duration (1 h or 3 h), the battery capacity is to be calculated, depending on the maximum discharge current that has been determined on the basis of the total current drawn from the battery by all consumers. In the above example, the battery current drawn totals 17.04 A. For a required rated duration of 3 h, the 80 Ah battery is selected. The max. discharge current is 21.7 A for 3 hours.

In order to ensure the required recharge period of 10 h, 2 boost charging units will have to be installed according to table 3.

2 Fuse protection of the mains input

In order to determine the fuse in the main distribution board of the general power supply, you must know the total connected load of the ZB-S system. It is made up of the sum of mains connected loads of the individual luminaires and consumers (see table 1 and 6) and of the ratings of the charging unit (charging module 2.5 A and boost charging unit 2.5 A).

Example:

100 pcs. 57011 CG each 16 VA	= 1.60 kVA
280 pcs. 55011 CG each 16 VA	= 4.48 kVA
120 pcs. EVG 13.2	
for 11 W TC-E each 22.5 VA	= 2.70 kVA
	= 8.78 kVA
LT 2,5 charging unit has 1 kVA	
Boost charging unit has 1 kVA (2x)	= 3.00 kVA
Total connected load	= 11.78 kVA

Fuse protection in the mains distribution board of the general power supply (MDB):
Load break switch 63 A acc. to table 7 for connected loads of from 11 to 14 kVA.

Electronic Ballast

230 V AC/220 V DC

EVG 13.2 CG-S / EVG 18 CG-S / EVG 18 C CG-S

N-EVG 126 CG-S / N-EVG 136 CG-S / N-EVG 158 CG-S



EVG 13.2 CG-S,
EVG 18 CG-S, EVG 18C CG-S

Dimensions (mm)
EVG 13.2 CG

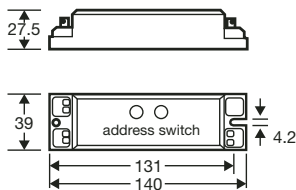


Table 1

Electrical data EVG 13.2 CG-S, EVG 13.2, EVG 18 CG-S and EVG 18C CG-S for mains and battery operation

International term	Lamp cap	Type of EVG ...	Lamp load in [W]	Power consumption for battery-operation in [A] ¹⁾	Power consumption in [VA]	Inrush current [A/ms]
T 16	G 5	13.2 CG-S	4	0.020	10	3
		13.2 CG-S	6	0.025	12	3
		13.2 CG-S	8	0.030	16	3
		13.2 CG-S	13	0.050	25	3
TC-SEL	2 G 7	13.2 CG-S	5	0.020	11	3
		13.2 CG-S	7	0.025	13	3
		13.2 CG-S	9	0.032	16	3
		13.2 CG-S	11	0.047	22.5	3
TC-DEL	G 24 q-1	13.2 CG-S	10	0.040	17.5	3
		13.2 CG-S	13	0.050	25	3
		18C CG-S	18	0.070	32.2	8
TC-TEL	GX 24 q-1	13.2 CG-S	13	0.050	25	3
		18C CG-S	18	0.070	32.2	8
T 26	G 13	18 CG-S	18	0.070	32.2	8
TC-F	2 G 10	18 CG-S	18	0.070	32.2	8
		18 CG-S	18	0.070	32.2	8
TC-L	2 G 11	18 CG-S	18	0.070	32.2	8

¹⁾ for luminous flux $\Phi_E/\Phi_N = 75\%$

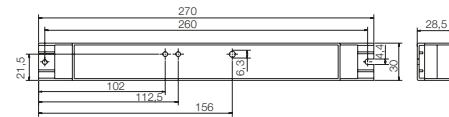
Table 1.1 / Electrical data N-EVG 126 CG-S, N-EVG 136 CG-S and N-EVG 158 CG-S for mains and battery operation

International term	T 26	TC-TEL	TC-DEL
Lamp cap	G 13	GX 24 q-3	G 24 q-3
Type N-EVG ...	158 CG-S	136 CG-S	126 CG-S
Lamp load	58 W	36 W	26 W
Current consumption in A at battery operation in switch position (Luminous flux Φ_E/Φ_N in %)			
0 (100%)	0.264	0.176	0.134
1 (90%)	0.241	0.159	0.124
2 (80%)	0.228	0.141	0.117
3 (70%)	0.198	0.127	0.103
4 (60%)	0.164	0.100	0.097
5 (50%)	0.154	0.092	0.089
6 (40%)	0.132	0.085	0.083
7 (30%)	0.100	0.080	0.078
Power consumption in VA	62.7	38.7	34.2
Inrush current [A/ms]	10	10	10

Table 1.2 Current ratings of incandescent and tungsten halogen lamps

220 V incandescent lamps (AGL)			12 V tungsten halogen lamps with 220 V electronic transformer		
	Φ_{rated}	Current consumption from the battery	Lamp-rating	Current rating from the battery	Mains connected load
7 W	30 lm	30 mA	20 W	115 mA	33.6 VA
15 W	90 lm	70 mA	35 W	200 mA	58.0 VA
25 W	230 lm	110 mA	50 W	285 mA	84.0 VA
40 W	430 lm	180 mA	75 W	420 mA	72.6 VA
60 W	730 lm	270 mA	100 W	570 mA	168.0 VA
75 W	960 lm	340 mA			
100 W	1380 lm	450 mA			

Dimensions (mm)



Tables

Calculation of the required battery capacity of maintenance free, sealed 216 V lead-acid gas recombination batteries (higher capacities on request)

Battery capacity	Ah	5,5	8,5	12	24	32	52	55	65	80	100	130	160	195	240	260	300	390
max. discharge current [A] with rated operating time [h]	1h ¹⁾	3.36	4.69	6.77	14.50	20.80	35.00	35.00	39.40	49.60	58.00	78.80	99.20	118.20	148.80	157.60	174.00	236.40
	1h ²⁾	3.19	4.51	6.21	13.30	20.20	33.00	33.00	36.10	47.00	56.00	72.30	94.00	108.30	141.00	144.40	168.00	216.90
	3h ¹⁾	1.56	2.19	2.92	6.24	9.30	14.90	14.90	16.90	21.70	23.00	33.80	43.40	50.70	65.10	67.60	69.00	101.40
	3h ²⁾	1.51	2.14	2.75	5.71	9.10	14.30	14.30	15.50	20.50	25.00	30.90	41.00	46.50	61.50	62.00	75.00	92.70
	8h ¹⁾	0.68	1.00	1.36	2.76	3.90	6.70	6.70	7.48	9.70	12.00	15.00	19.40	22.44	29.10	29.92	36.00	45.00
	8h ²⁾	0.67	0.99	1.32	2.54	3.70	6.50	6.50	6.89	9.30	11.00	13.80	18.60	20.67	27.90	27.56	33.00	41.40

¹⁾ acc. VDE 0108 discharge to 1.70 V/cell / ²⁾ acc. DIN EN 50171 discharge to 1.80 V/cell / ³⁾ Special design

Calculation of charging current [A] acc. VDE 0108 for recharging of:

Recharging cycle [h]	Ah	5,5	8,5	12	24	32	52	55	65	80	100	130	160	195	240	260	300	390
10 hours / 90 %	1	0.34	0.53	0.75	1.49	1.99	3.23	3.42	4.04	4.97	6.21	8.07	9.94	12.11	14.90	16.15	18.63	24.22
	3	0.46	0.70	0.99	1.99	2.65	4.31	4.55	5.38	6.62	8.28	10.76	13.25	16.15	19.87	21.53	24.84	32.29
	8	0.51	0.79	1.12	2.24	2.96	4.84	5.12	6.05	7.45	9.32	12.11	14.90	18.16	22.36	24.22	27.95	36.33
20 hours / 90 %	1	0.17	0.26	0.37	0.75	0.99	1.61	1.71	2.02	2.48	3.11	4.04	4.97	6.05	7.45	8.07	9.32	12.11
	3	0.23	0.35	0.50	0.99	1.32	2.15	2.28	2.69	3.31	4.14	5.38	6.62	8.07	9.94	10.76	12.42	16.15
	8	0.26	0.40	0.56	1.12	1.49	2.42	2.56	3.03	3.73	4.66	6.05	7.45	9.06	11.18	12.11	13.97	18.16

Calculation of charging current [A] acc. DIN EN 50171 for recharging of:

Recharging cycle [h]	Ah	5,5	8,5	12	24	32	52	55	65	80	100	130	160	195	240	260	300	390
12 hours / 80 %	1	0.25	0.39	0.55	1.10	1.47	2.39	2.53	2.99	3.68	4.60	5.98	7.36	8.97	11.04	11.96	13.80	17.94
	3	0.34	0.52	0.74	1.47	1.96	3.19	3.37	3.99	4.91	6.13	7.97	9.81	11.96	14.72	15.95	18.40	23.92
	8	0.38	0.59	0.83	1.66	2.21	3.59	3.80	4.49	5.52	6.90	8.97	11.04	13.46	16.56	17.94	20.70	26.91

Additional number of 2.5 A boost charging units for recharge period acc. VDE 0108 of:

Recharging cycle [h]	Ah	5,5	8,5	12	24	32	52	55	65	80	100	130	160	195	240	260	300	390
10 hours / 90 %	1	0	0	0	0	0	1	1	1	1	2	3	3	4	5	6	7	9
	3	0	0	0	0	1	1	1	2	2	3	4	5	6	7	8	9	12
	8	0	0	0	0	1	1	2	2	3	4	5	7	8	9	11	14	
20 hours / 90 %	1	0	0	0	0	0	0	0	0	0	1	1	1	2	2	3	3	4
	3	0	0	0	0	0	0	0	1	1	1	2	2	3	3	4	4	6
	8	0	0	0	0	0	0	1	1	1	1	2	2	3	4	4	5	7

Additional number of 2.5 A boost charging units for recharge period acc. DIN EN 50171 of:

Recharging cycle [h]	Ah	5,5	8,5	12	24	32	52	55	65	80	100	130	160	195	240	260	300	390
12 hours / 80 %	1	0	0	0	0	0	0	1	1	1	1	2	2	3	4	4	5	7
	3	0	0	0	0	0	1	1	1	1	2	3	3	4	5	6	7	9
	8	0	0	0	0	0	1	1	1	2	2	3	4	5	6	7	8	10

Number of battery cabinets; battery weight

Recharging cycle [h]	Ah	5,5	8,5	12	24	32	52	55	65	80	100	130	160	195	240	260	300	390
No. of battery cabinet (weight approx. 150 kg) per cabinet		1*	1*	1*	1*	1*	1*	1*	1*	1*	2	2	2	3	3	4	6	6
Total weight per battery set approx. kg		45	65	100	165	243	325	396	420	540	720	840	1080	1260	1620	1680	2160	2520

* ZB-S/10C, ZB-S/10C6, ZB-S/18C3 and ZB-S/10C3 battery cabinet is included

Connected loads of the charging unit to determine the mains fuse

No. of boost charging units	0	1	2	3	4	5
single-phase mains connection	1 kVA	2 kVA	3 kVA	4 kVA	5 kVA	6 kVA
3-phase mains connection	1 kVA	2 kVA	2 kVA	2 kVA	3 kVA	3 kVA

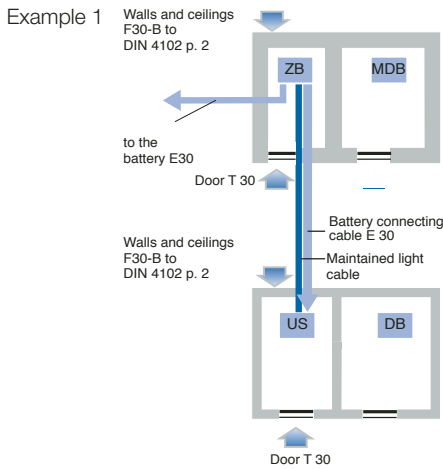
Total connected load	bis 8 kVA	8-11 kVA	11-14 kVA	14-18 kVA	18-22 kVA
Fuse protection (load break switch)	35 A	50 A	63 A	80 A	100 A

To allow for the permissible voltage drop, the cable has to be dimensioned according to the distance and connected load.

Max. voltage drop of mains line to substation: 3 %

Max. voltage drop of battery line to substation: 3 %

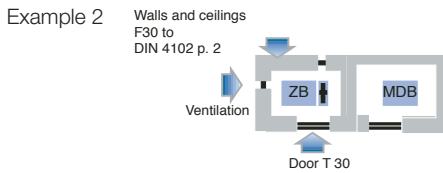
ZB-S Accomodation



A number of rules and regulations apply to the accommodation of central battery systems, in particular the DIN VDE 0108, DIN EN 50272, part 2, MLAR and LBO. Depending on the constructional circumstances, the following possibilities of accommodation result from these rules and regulations.

Example 1:
Main distribution board of the general Lighting power supply (MDB) and main distribution board of the emergency Lighting power supply (ZB) in an electrical room.

In case of an accommodation acc. to example 1, attention must be paid that the MDB and ZB are isolated from each other so that arcing is safely prevented.



Example 2:
Main distribution board of the emergency Lighting power supply (ZB) including the battery, in a separate electrical room.

Ventilation of electrical rooms

Dimensioning of the ventilation acc. to DIN EN 50272-2
(The known DIN VDE 0510 part 2 is since 01.04.2003 nonstandard.)

The ventilation of rooms, cabinets or containers in the inside of which batteries are operated, is considered sufficient, if a min. air volume flow is ensured that has been calculated according to the following formula:

$$Q = 0,05 \times n \times I_{gas} \times C_N \times 10^{-3} \text{ [m}^3/\text{h]}$$

Q = needed air volume flow, in m³/h

0.05 = fixed factor

n = no. of accumulator cells

I_{gas} = current in mA per Ah, fits 8 mA per Ah

for I_{boost} with VRLA batteries

C_N = capacity C₁₀ for lead acid at 20 °C

Example for a ZB cover with 160 Ah lead-acid battery.

$$Q = 0.05 \times n \times I_{gas} \times C_N \times 10^{-3}$$

$$Q = 0.05 \times 108 \times 8 \times 160 \times 10^{-3} \text{ m}^3/\text{h}$$

$$Q = 6.912 \text{ m}^3/\text{h}$$

In order to ensure the air volume flow of 2.16 m³/h, the air inlets and outlets in the electrical distribution room must have the following min. cross-sections acc. to DIN EN 50272 part 2.

Vent cross-section of the air inlets and outlets:

$$A \geq 28 \times Q$$

$$A \geq 28 \times 6.912 \text{ m}^3/\text{h}$$

$$A \geq 193.54 \text{ cm}^2$$

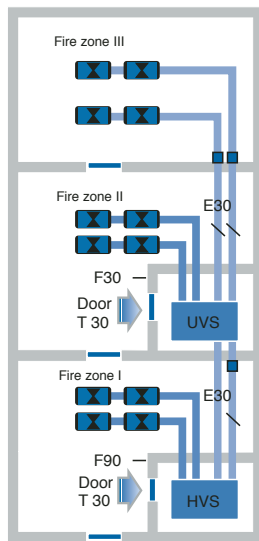
The required vents in the F90 walls must be guarded by fire protection measures, e. g. F90 fire shutters.

As the calculation shows, the use of even the largest battery does not require an elaborate technical ventilation (e.g. explosion protected fans).

Due to the installed low maintenance, sealed lead acid gas recombination batteries no further special constructional requirements such as a floor resistant to electrolyte or a floor covering (tiles) etc. have to be met.

VRLA valve regulated lead acid monobloc batteries can operate in any position. Exemption on top.

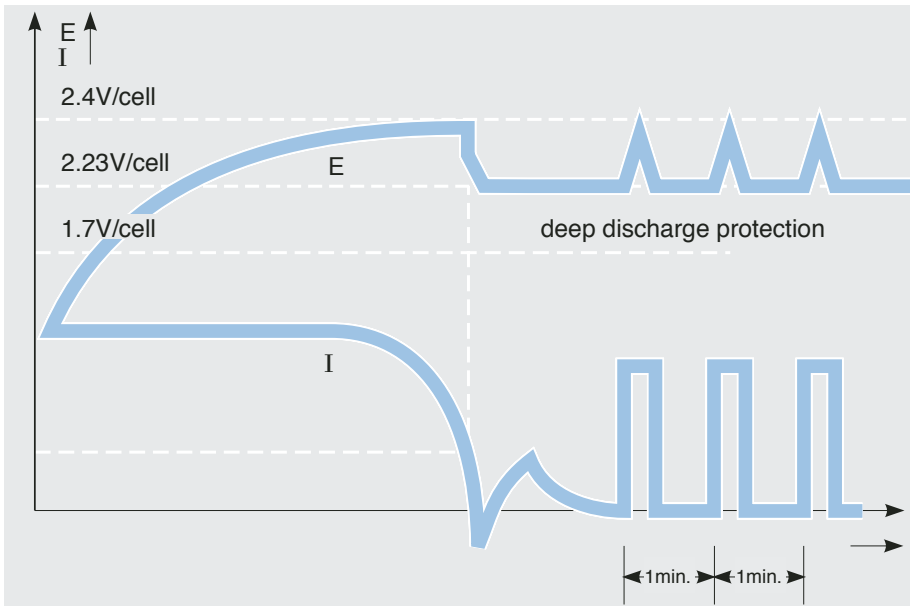
Example for the possible accommodation of a ZB-S and laying of cables which, however, depend on the building's use.



Calculation of ventilation of electrical rooms acc. DIN EN 50272-2 (calculated for boost charge):

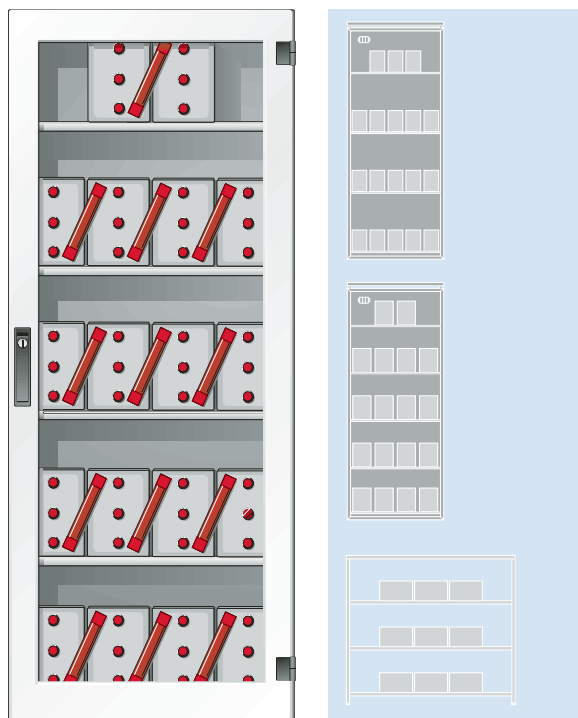
Battery 216 V	5,5	8,5	12	24	32	52	55	65	80	100	130	160	195	240	260	300	390
Air volume flow req. for the ventilation of the place of installation [m ³ /h]	0.24	0.37	0.52	1.04	1.38	2.25	2.38	2.81	3.46	4.32	5.62	6.91	8.42	10.37	11.23	12.96	16.85
Vent cross-section of the air inlets and outlets of the place of installation [cm ²]	6.65	10.28	14.52	29.03	38.71	62.90	66.53	78.62	96.77	120.96	157.25	193.54	235.87	290.30	314.50	362.88	471.74

Battery Charging Technology of ZB-S



Assets of the environmentally friendly battery technology:

- low-maintenance, leak-proof gas recombination battery block
- extremely low gassing due to antimony-free alloys and an internal recombination of the generated oxygen
- design life: 10 years
- density of acid between 1.24 kg/l and 1.26 kg/l
- design acc. to DIN
- electrolyte and aerial oxygen proof pole bushing
- low self-discharge, therefore the possibility of long rest periods during transport and storage



The patented CEAG charge monitoring method enables the recognition of:

- a blown fuse
- a failure in the charging circuit
- a faulty charging unit
- missing batteries
- battery voltage monitoring