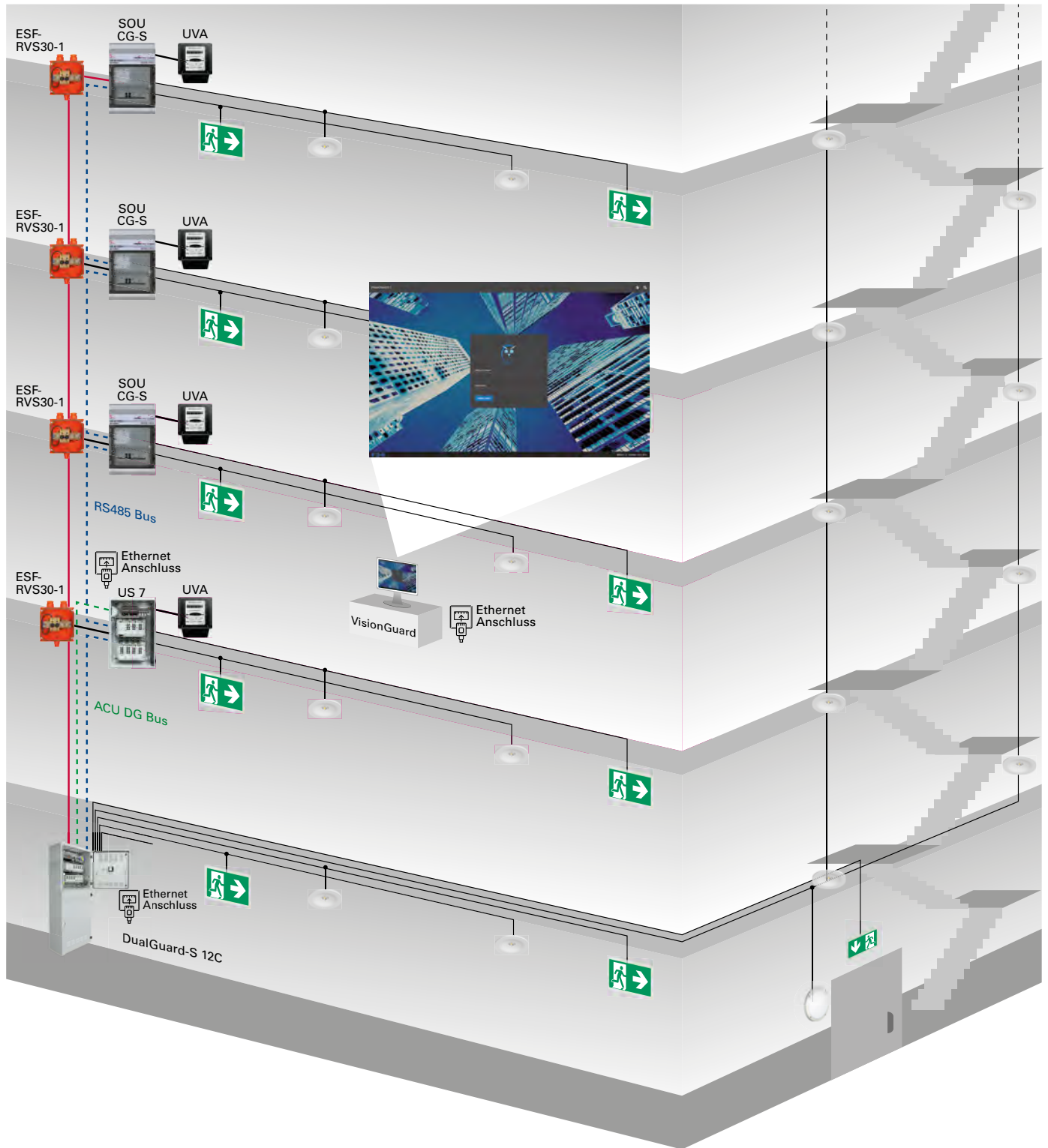


# Installation example

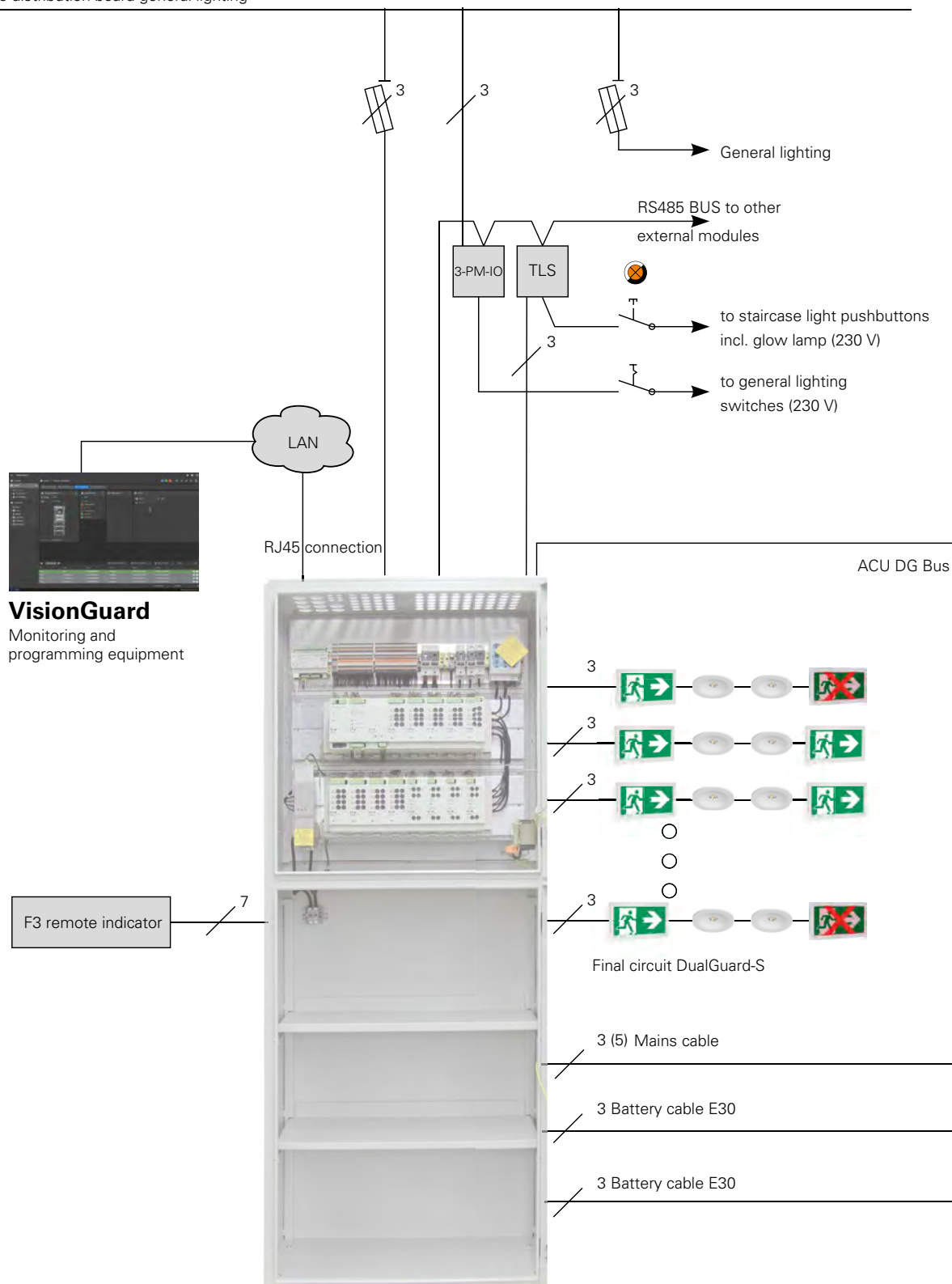
Country-specific regulations and guidelines must be observed when planning and designing the installation.



# DualGuard-S installation example

## DualGuard-S – central battery system

Mains distribution board general lighting

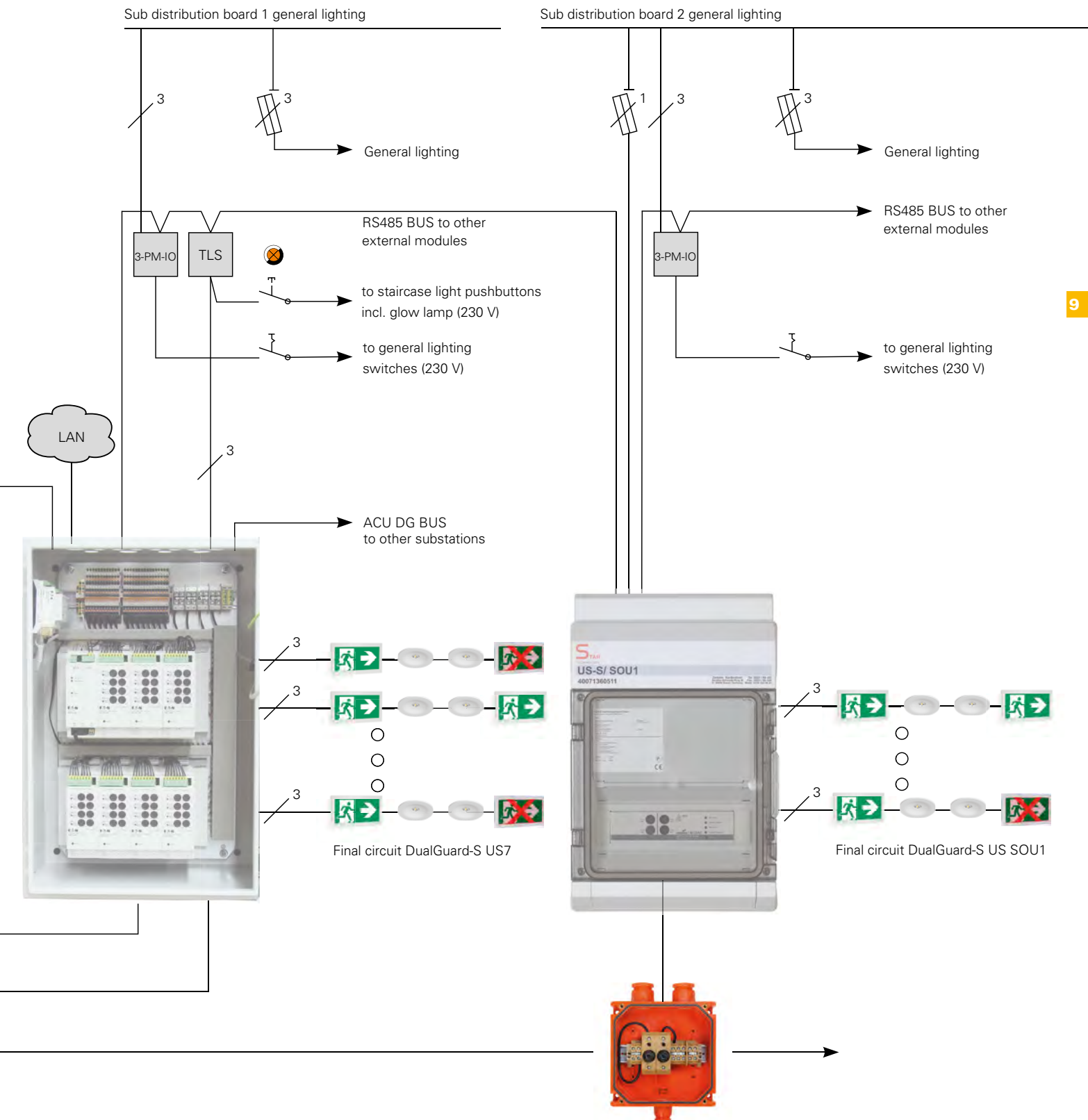


Central battery system DualGuard-S 12C



# DualGuard-S installation example

DualGuard-S – central battery system



9

Substation DualGuard-S US7

Substation DualGuard-S US SOU1

Overview of new DualGuard-S device models

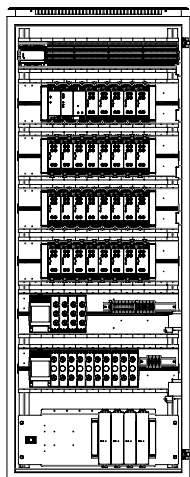


All devices and sub-stations use a modular design. Charging equipment, switching equipment and monitoring equipment form units that operate independently of one another so that the possibility of interactions is excluded. The modular design and the pre-assembled cabinet components guarantee flexible, high-quality implementation. The protection objective of the emergency lighting system is to supply the connected safety lighting system in the event of a general power failure in the primary external power supply. Furthermore, an important function of the emergency lighting system is to ensure the permanent operational capability of all the connected security and LED escape sign luminaires via automatic monitoring.

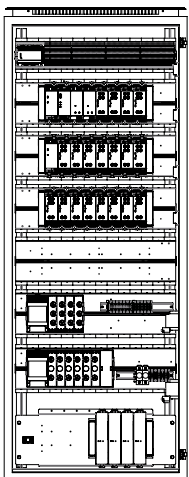
Depending on the project requirement, the correct device model can be chosen from the DualGuard-S product family.

DualGuard-S 28 or DualGuard-S 20

for operation with a maximum of 28 or 20 SKU.1.1 CG-S circuit modules with 88 circuit terminals. Up to 6 sub-stations can be supplied with battery power or main power (up to 6 sub-stations 1-phase, up to 2 sub-stations 3-phase).



DualGuard-S 28



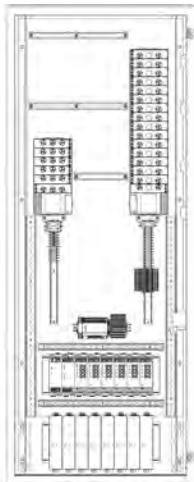
DualGuard-S 20

Order details

Model	Included with delivery	Order no.
DualGuard-S 28	Free-standing cabinet with optimized wiring system for central battery system CEAG DualGuard-S 28, equipped with battery control module (BCM.1), advanced control unit (ACU DG-S) and power supply unit (PSU). For installing a 4.3" or 7" TFT touch display. With extra space for adding a maximum of 88 final circuits, or a maximum of 28 variable circuit boards. Please note! The CM charging modules and the TFT touch display are not part of the cabinet module.	40071362511
DualGuard-S 20	Free-standing cabinet with optimized wiring system for central battery system CEAG DualGuard-S 20, equipped with battery control module (BCM.1), advanced control unit (ACU DG-S) and power supply unit (PSU). For installing a 4.3" or 7" TFT touch display. With extra space for adding a maximum of 88 final circuits, or a maximum of 20 variable circuit boards. Please note! The CM charging modules and the TFT touch display are not part of the cabinet module.	40071362510

DualGuard-S LAD 100

The charging and distribution board supplies up to fifteen 1-phase or five 3-phase sub-stations with mains and battery voltage. In addition, up to four circuit modules can supply and control 16 circuits.



DualGuard-S LAD 100

Order details

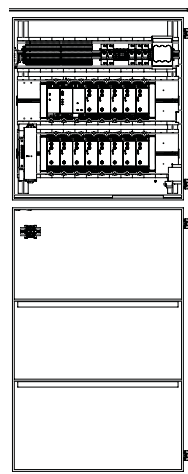
Model	Included with delivery	Order no.
DualGuard-S LAD 100	Free-standing cabinet for central battery system CEAG DualGuard-S LAD 100A, equipped with battery control module (BCM.1), advanced control unit (ACU DG-S) and power supply unit (PSU). For installing a 4.3" or 7" TFT touch display. With extra space for adding a maximum of 16 final circuits, or a maximum of 4 variable circuit boards. Please note! The CM charging modules and the TFT touch display are not part of the cabinet module.	40071362540

# Overview of device models

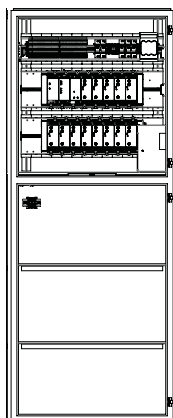
## DualGuard-S – central battery system

### DualGuard-S 12C, DualGuard-S 12C6, DualGuard-S 20C6, DualGuard-S 12C4, DualGuard-S 4C3

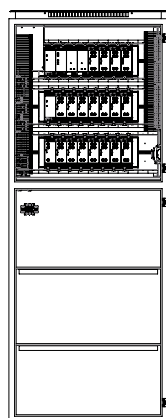
for operation with a maximum of 12 or 20 SKU.1.1 CG-S circuit modules.



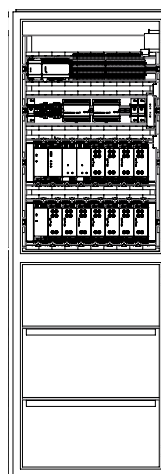
DualGuard-S 12C



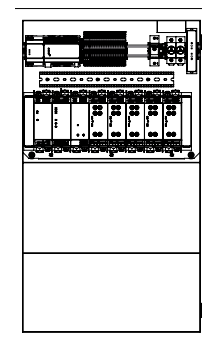
DualGuard-S12C6



DualGuard-S20C6



DualGuard-S12C4



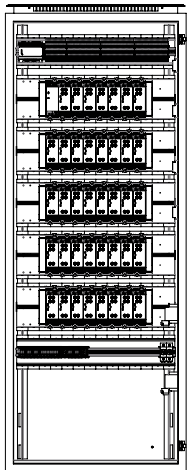
DualGuard-S4C3

### Order details

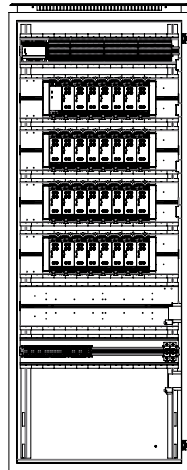
Model	Included with delivery	Order no.
DualGuard-S 12C	Compact cabinet for central battery system CEAG DualGuard-S 12C, equipped with battery control module (BCM.1), advanced control unit (ACU DG-S) and power supply unit (PSU). For installing a 4.3" or 7" TFT touch display. With extra space for adding a maximum of 48 final circuits, or a maximum of 12 variable circuit boards. Please note! The CM charging modules and the TFT touch display are not part of the cabinet module.	40071362520
DualGuard-S12C6	Compact cabinet for central battery system CEAG DualGuard-S 12C6, equipped with battery control module (BCM.1), advanced control unit (ACU DG-S) and power supply unit (PSU). For installing a 4.3" or 7" TFT touch display. With extra space for adding a maximum of 48 final circuits, or a maximum of 12 variable circuit boards. Please note! The CM charging modules and the TFT touch display are not part of the cabinet module.	40071362523
DualGuard-S20C6	Compact cabinet for central battery system CEAG DualGuard-S 20C6, equipped with battery control module (BCM.1), advanced control unit (ACU DG-S) and power supply unit (PSU). For installing a 4.3" or 7" TFT touch display. With extra space for adding a maximum of 68 final circuits, or a maximum of 20 variable circuit boards. Please note! The CM charging modules and the TFT touch display are not part of the cabinet module.	40071362524
DualGuard-S12C4	Compact cabinet for central battery system CEAG DualGuard-S 12C4, equipped with battery control module (BCM.1), advanced control unit (ACU DG-S) and power supply unit (PSU). For installing a 4.3" or 7" TFT touch display. With extra space for adding a maximum of 48 final circuits, or a maximum of 12 variable circuit boards. Please note! The CM charging modules and the TFT touch display are not part of the cabinet module.	40071362521
DualGuard-S4C3	Compact cabinet for central battery system CEAG DualGuard-S 4C3, equipped with battery control module (BCM.1), advanced control unit (ACU DG-S) and power supply unit (PSU). For installing a 4.3" or 7" TFT touch display. With extra space for adding a maximum of 20 final circuits, or a maximum of 4 variable circuit boards. Please note! The CM charging modules and the TFT touch display are not part of the cabinet module.	40071362525

### DualGuard-S US 38, US 30, US 23, US 15, US 7

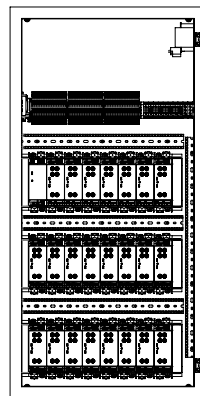
for operation with a maximum of 7, 15, 23, 30 or 38 SKU.1.1 CG-S circuit modules. Charging technology for connected battery emergency power supply not included for these sub-stations; battery and mains power supply takes place via the DualGuard-S system.



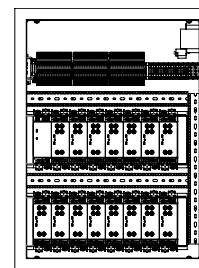
DualGuard-S US 38



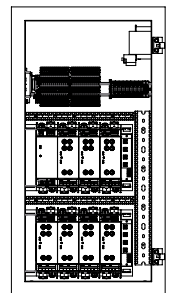
DualGuard-S US 30



DualGuard-S US 23



DualGuard-S US 15



DualGuard-S US 7

### Order details

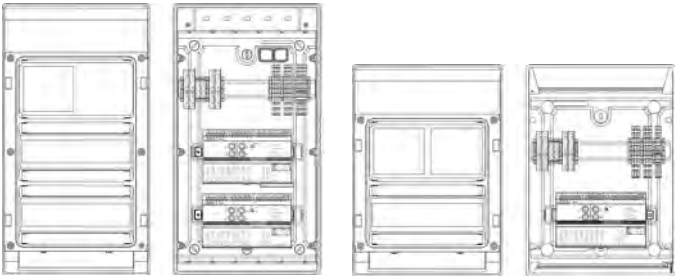
Model	Included with delivery	Order no.
DualGuard-S US 38	Free-standing cabinet for sub-stations CEAG DualGuard-S US-S 38, equipped with advanced control unit (ACU DG-S) and power supply unit (PSU). For installing a 4.3" or 7" TFT touch display. With extra space for adding a maximum of 88 final circuits, or a maximum of 38 variable circuit boards. Please note! The TFT touch display is not part of the cabinet module.	40071362513
DualGuard-S US 30	Free-standing cabinet for sub-stations CEAG DualGuard-S US-S 30, equipped with advanced control unit (ACU DG-S) and power supply unit (PSU). For installing a 4.3" or 7" TFT touch display. With extra space for adding a maximum of 88 final circuits, or a maximum of 30 variable circuit boards. Please note! The TFT touch display is not part of the cabinet module.	40071362512
DualGuard-S US 23	Wall cabinet for CEAG DualGuard-S US-S 23 sub-stations, equipped with advanced control unit (ACU DG-S) and power supply unit (PSU). For installing a 4.3" or 7" TFT touch display. With extra space for adding a maximum of 52 final circuits, or a maximum of 23 variable circuit boards. Please note! The TFT touch display is not part of the cabinet module.	40071362532
DualGuard-S US 15	Wall cabinet for CEAG DualGuard-S US-S 15 sub-stations, equipped with advanced control unit (ACU DG-S) and power supply unit (PSU). For installing a 4.3" or 7" TFT touch display. With extra space for adding a maximum of 32 final circuits, or a maximum of 15 variable circuit boards. Please note! The TFT touch display is not part of the cabinet module.	40071362531
DualGuard-S US 7	Wall cabinet for CEAG DualGuard-S/US-S 7 sub-stations, equipped with advanced control unit (ACU DG-S) and power supply unit (PSU). For installing a 4.3" or 7" TFT touch display. With extra space for adding a maximum of 28 final circuits, or a maximum of 7 variable circuit boards. Please note! The TFT touch display is not part of the cabinet module.	40071362530

# Overview of device models

## DualGuard-S – central battery system

### DualGuard-S US SOU2, US SOU1

for operation with a maximum of 1 or 2 SOU CG-S circuit switching modules. TFT touch display not included for these sub-stations. Battery power supplied via the DualGuard-S system; mains power supplied via the sub-distributor for the general power supply (rental current infeed).



DualGuard-S US SOU2

DualGuard-S US SOU1

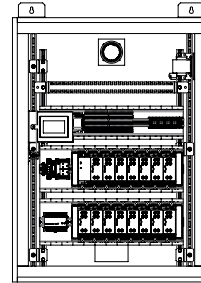
### Order details

Model	Included with delivery	Order no.
DualGuard-S US SOU2	Small distribution board for DualGuard-S/US-S SOU2 sub-stations, equipped with two SOU CG-S 2x4A circuit modules	40071362519
DualGuard-S US SOU1	Small distribution board for DualGuard-S/US-S SOU1 sub-stations, equipped with one SOU CG-S 2x4A circuit module	40071362518

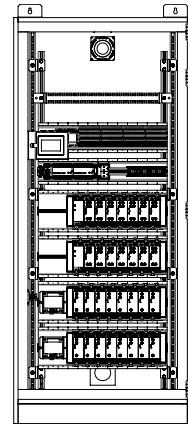


### DualGuard-S ESF15-P, ESF30-P

Electrical distributor with 30 minutes of functional integrity in the event of fire for operation with a maximum of 15 or 30 SKU.1.1 CG-S circuit modules.



DualGuard-S ESF30 15-P



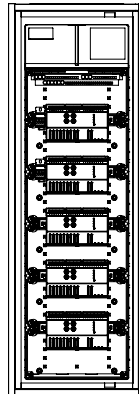
DualGuard-S ESF30 30-P

### Order details

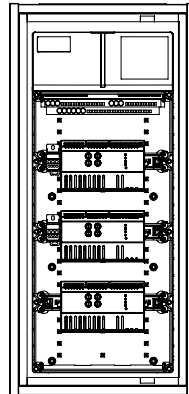
Model	Included with delivery	Order no.
DualGuard-S ESF30 15-P	Wall cabinet for sub-stations with 30 minutes of functional integrity during fire from outside CEAG DualGuard-S ESF30 15-P, equipped with 4.3" TFT touch display, advanced control unit (ACU DG-S) and power supply unit (PSU). With extra space for adding a maximum of 40 final circuits, or a maximum of 15 variable circuit boards.	40071362516
DualGuard-S ESF30 30-P	Free-standing cabinet for sub-stations with 30 minutes of functional integrity during fire from outside CEAG DualGuard-S ESF30 30-P, equipped with 4.3" TFT touch display, advanced control unit (ACU DG-S) and power supply unit (PSU). With extra space for adding a maximum of 58 final circuits, or a maximum of 30 variable circuit boards.	40071362517

### DualGuard-S ESF SOU5, ESF SOU3, ESF SOU2, ESF SOU1

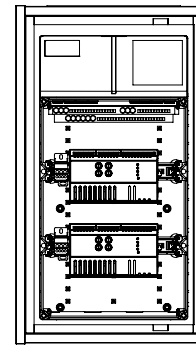
Electric distributor with 30 minutes of functionality in the event of fire for operation with a maximum of 5, 3, 2, 1 SOU CG-S 2 x 4A circuit switching modules.



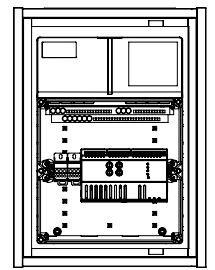
DualGuard-S ESF30 SOU5



DualGuard-S ESF30 SOU3



DualGuard-S ESF30 SOU2



DualGuard-S ESF30 SOU1

### Order details

Model	Included with delivery	Order no.
DualGuard-S ESF30 SOU5	Wall cabinet for sub-stations with 30 minutes of functional integrity during fire from the outside DualGuard-S ESF30 SOU5, equipped with five SOU CG-S 2x4A circuit modules	40071362538
DualGuard-S ESF30 SOU3	Wall cabinet for sub-stations with 30 minutes of functional integrity during fire from outside DualGuard-S ESF30 SOU3, equipped with three SOU CG-S 2x4A circuit modules	40071362537
DualGuard-S ESF30 SOU2	Wall cabinet for sub-stations with 30 minutes of functional integrity during fire from the outside DualGuard-S ESF30 SOU2, equipped with two SOU CG-S 2x4A circuit modules	40071362536
DualGuard-S ESF30 SOU1	Wall cabinet for sub-stations with 30 minutes of functional integrity during fire from the outside DualGuard-S ESF30 SOU1, equipped with one SOU CG-S 2x4A circuit module	40071362535

# TFT touch display 4.3" and 7"

DualGuard-S – central battery system

TFT touch display 4.3" and 7"



## TFT touch display 4.3" and 7"

- Dimmable TFT touch display with 64k colors and 250 cd/m<sup>2</sup> light density
- Touch function across the entire operating surface
- Multi-color icons for status displays, operation and programming
- High performance 32-bit processor, 512MB Ram, 4GB Flash
- Start screen with all essential system information for servicing, technical acceptance, initial operation and maintenance at a glance
- Intuitive menu navigation through operating levels for initial operation, configuration, programming and servicing
- EATON's cyber security for password protection, web access and connectivity
- All operating texts and status information in 19 different languages
- Customer-specific texts can be entered on-site
- USB 2.0 host for use in transmitting data during start-up, configuration modifications, log book and software updates
- Web connection available as standard equipment
- IP65 – Meets the highest standards in terms of quality and service life
- Meets all EMV requirements for industrial and commercial use
- DEKRA system certification documents product quality and compliance with standards for the entire system
- Functionality for 30 minutes in the event of fire verified in a fire test conducted by an independent materials testing institute
- Conforms to RoHS and REACH

Protection class, external	IP65
Ambient temperature range	0 – 50°C
Electromagnetic compatibility	Industrial EN 61000-6-2, Commercial EN 61000-6-3
Relative humidity	10 – 95%, non-condensing
Pollution level	2
Max. power consumption	9.5W

## Order details

Model	Included with delivery	Order no.
HMI module 4.3" SP	4.3" TFT touch display for door installation	40071361644
HMI module 7" SP	7" TFT touch display for door installation	40071361654

ACU DG-S module



## ACU DG-S module

- Compact DIN bars installation
- Dual assignable screw terminals for conductors with the same diameter
- Integrated, switchable bus terminal resistors
- Six freely configurable short-circuit/interruption-tolerant 24V inputs
- Four configurable potential-free signal contacts with separate roots
- Two configurable 24V CD outputs for additional relays
- Color LED indicators for ready status, battery mode, malfunction and scenario active
- Innovative, transmission-safe ACU DG-S bus communication
- Automatic activation of safety lighting following interruption of bus communication
- Functional upon activation of battery deep discharge protection or HMI outage
- Meets all EMV requirements for industrial and commercial use
- DEKRA system certification documents product quality and compliance with standards for the entire system
- Functionality for 30 minutes in the event of fire verified in a fire test conducted by an independent materials testing institute
- Conforms to RoHS and REACH

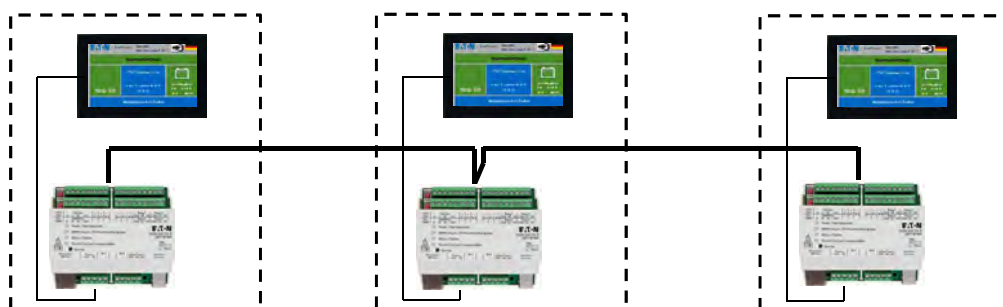
Degree of protection	IP20
Protection class	II
Ambient temperature range	-5°C – +55°C
Relative humidity	10 – 95%, non-condensing
Electromagnetic compatibility	Industrial EN 61000-6-2, Commercial EN 61000-6-3
Max. pollution level	2
Overvoltage category	II for battery circuit
Power consumption	2 W

## Order details

Model	Included with delivery	Order no.
ACU DG-S module	Control module for top-hat rail installation	40071361600

## Wiring diagram: ACU Bus – X2.A

Rated voltage	≤ 30V (SELV)
Rated current	≤ 0.09A short-circuit-proof
Bus topology	Line
Cable type	such as IY(ST)Y 4x2x0.8 mm
Maximum cable length	900 m
Terminating resistor	Switchable via DIL switch on ACU DG-S.
Maximum number of DualGuard-S systems	32



PSU module

DualGuard-S – central battery system

PSU module



PSU module

- Intelligent, automatic bus alarm management in the event of a fault or exceeding limit values
- Expanded DC input voltage range from 173-330V
- Expanded temperature range from 0°C...+55°C
- Maintenance-free, passive ventilation
- Output voltage indication provided by three LEDs
- Outputs switchable in parallel with automatic power control
- Wide finger-safe ventilation slits for optimum heat dissipation
- Simple, time-saving snap-on click installation on device rack
- Meets all EMV requirements for industrial and commercial use
- The DEKRA system certification documents product quality and compliance with standards
- Functionality for 30 minutes in the event of fire verified in a fire test conducted by an independent materials testing institute
- Conforms to RoHS and REACH

Degree of protection	IP20
Protection class	II
Ambient temperature range	0°C – +55°C
Relative humidity	10% – 95%, non-condensing
Air pressure	795... 1080 hPa
Height	≤ 2000 m
Pollution level	2

Order details

Model	Included with delivery	Order no.
PSU module	Power supply module for component rack installation	40071361590

AC trafo



### AC trafo

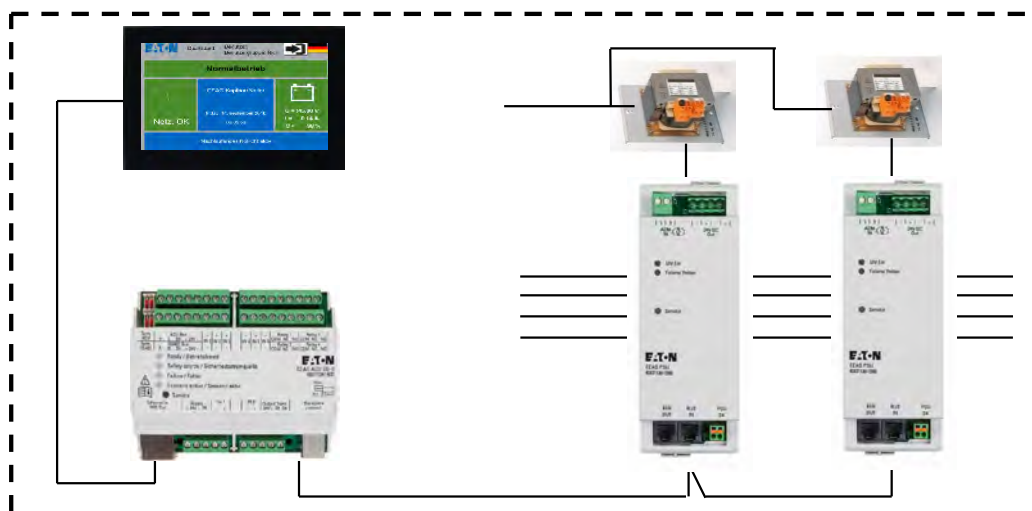
- For mains supply to internal modules
- DEKRA system certification documents product quality and compliance with standards for the entire system
- Functionality for 30 minutes in the event of fire verified in a fire test conducted by an independent materials testing institute
- Conforms to with RoHS and REACH

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Degree of protection	IP20
Protection class	II
Ambient temperature range	0°C – +55°C
Relative humidity	10% – 95%, non-condensing
Air pressure	795...1080 hPa
Height	≤ 2000 m
Pollution level	2

### Order details

Model	Included with delivery	Order no.
AC trafo	Transformer module AC/AC converter 240VA including mounting adapter for top-hat rail installation	40071347162



# BCM.1 module

DualGuard-S – central battery system

BCM.1 module



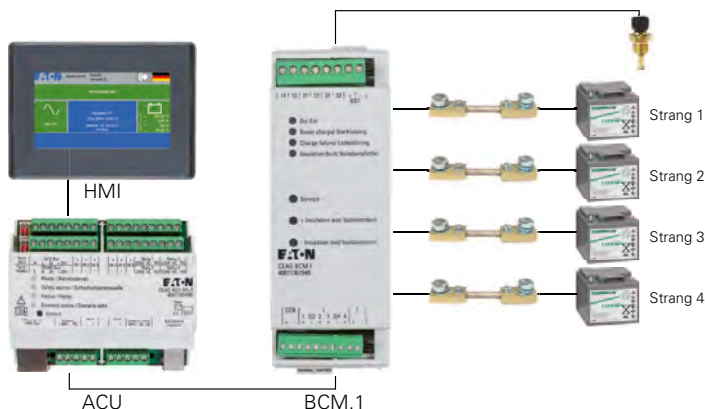
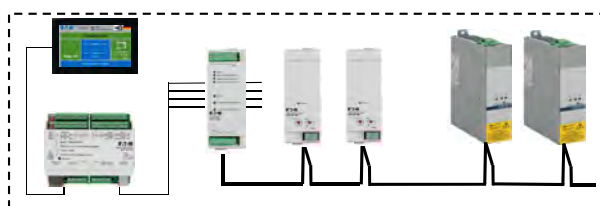
## BCM.1 module

- Automated monitoring of up to four battery arrays
- Temperature-controlled charging control of up to 32 charging modules
- Automated monitoring of each charging module via the CCB bus with individual error warnings via the TFT touch display
- LED display indicating ready, boost charge, charging malfunction and insulation defect
- Individual indication of isolation faults per circuit
- Automatic monitoring of isolation measuring device
- Alternating charging regulation during trickle charging and more than one charging module
- Relay contacts for forwarding of disruption, boost charging and insulation defect
- All module connections are wired to a three level tension-spring installation terminal
- Simple, time-saving snap-on click installation on device rack
- Meets all EMV requirements for industrial and commercial use
- DEKRA system certification documents product quality and compliance with standards for the entire system
- Conforms to RoHS and REACH

Degree of protection	IP20
Protection class	II
Ambient temperature range	-5°C – +55°C
Relative humidity	10% – 95%, non-condensing
Air pressure	795... 1080 hPa
Pollution level	2
Electromagnetic compatibility	Industrial EN 61000-6-2, Commercial EN 61000-6-3

## Order details

Model	Included with delivery	Order no.
BCM.1 module	Battery control module for component rack installation	40071361540





CM.1 1.7A charging module



### CM.1 1.7 A charging module

- Efficient operation by means of alternating activation/deactivation of trickle charge
- Optimum performance through a combination of charging modules 1.7A and 3.4A
- Automated monitoring and temperature-dependent charging regulation through the BCM.1 module and the CCB bus connection
- Automated deactivation of boost charging during outage of room ventilation system
- LED indicator of ready status/malfunction
- Wide finger-safe ventilation slits for optimum heat dissipation
- Simple, time-saving snap-on click installation on device rack
- Meets all EMV requirements for industrial and commercial use
- DEKRA system certification documents product quality and compliance with standards for the entire system
- Conforms to RoHS and REACH

Degree of protection	IP20
Protection class	II
Ambient temperature range	0°C – +55°C
Relative humidity	10% – 95%, non-condensing
Air pressure	795...1080 hPa
Pollution level	2
Electromagnetic compatibility	Industrial EN 61000-6-2, Commercial EN 61000-6-3

### Order details

Model	Included with delivery	Order no.
CM.1 1.7A	1.7A charging module for component rack installation	40071361580

CM 3.4A charging module



### CM 3.4A charging module

- Efficient operation by means of alternating activation/deactivation of trickle charge
- Optimum performance through a combination of 1.7A and 3.4A charging modules
- Automated monitoring and temperature-dependent charging regulation through the BCM.1 module and the CCB bus connection
- Automated deactivation of boost charging during outage of room ventilation system
- LED indicator of ready status/malfunction
- Meets all EMV requirements for industrial and commercial use
- DEKRA system certification documents product quality and compliance with standards for the entire system
- Conforms to RoHS and REACH

Degree of protection:	IP20
Protection class:	I
Ambient temperature:	0°C – +55°C
Relative humidity:	10% – 95%, non-condensing
Air pressure:	795...1080 hPa
Pollution level:	2
Electromagnetic compatibility	Industrial EN 61000-6-2, Commercial EN 61000-6-3

### Order details

Model	Included with delivery	Order no.
CM 3.4A	3.4A charging module for component rack installation	40071360370

# SKU.1 CG-S 4x1.5A circuit switching

DualGuard-S – central battery system

SKU.1 CG-S 4x1.5A



## SKU.1 CG-S 4x1.5A

- CG technology provides for automatic monitoring of up to 20 safety lights and emergency signs without requiring the transmission of additional data for each circuit
- Overload indicator
- Programmable switching for each individual light with no need to make adjustment directly to the light itself
- Automated isolation fault finding
- Assemblies use service-friendly module technology, wired ready for connection to triple-deck 4 mm<sup>2</sup> neutral terminals
- Large finger-safe ventilation slits for optimum heat dissipation
- Simple, time-saving snap-on click installation on device rack
- Wide sign racks for customized labeling
- Meets all EMV requirements for industrial and commercial use
- DEKRA system certification documents product quality and compliance with standards for the entire system
- Functionality for 30 minutes during fire verified in a fire test conducted by an independent materials testing institute
- Conforms to RoHS and REACH

Inputs	
Nominal AC voltage	220-240V
Nominal DC voltage	184-275V
Rated frequency	50 or 60 Hz
Maximum head dissipation capacity:	8 W
Outputs	
Rated current	1.5A
short-circuit current	1500A
Inrush current	60A per circuit/240A per module

## Order details

Model	Included with delivery	Order no.
SKU.1 CG-S 4 x 1.5A	Circuit switching 4 x 1.5A for component rack instal-	40071361550
	lation	

SKU.1 CG-S 2x3A



SKU.1 CG-S 2x3A

- CG technology provides for automatic monitoring of up to 20 safety lights and emergency signs without requiring the transmission of additional data for each circuit
- Overload indicator
- Programmable switching for each individual light with no need to make adjustment directly to the light itself
- Automated isolation fault finding
- Assemblies use service-friendly module technology, wired ready for connection to triple-deck 4 mm<sup>2</sup> neutral terminals
- Wide finger-safe ventilation slits for optimum heat dissipation
- Simple, time-saving snap-on click installation on device rack
- Large sign rack for customized labeling
- Meets all EMV requirements for industrial and commercial use
- DEKRA system certification documents product quality and compliance with standards for the entire system
- Functionality for 30 minutes during fire verified in a fire test conducted by an independent materials testing institute
- Conforms to RoHS and REACH

Nominal AC voltage	220-240V
Nominal DC voltage	184-275V
Rated frequency	50 or 60 Hz
Maximum head dissipation capacity	4 W
Outputs	
Rated current	3A
short-circuit current	1500A
Inrush current	250A per circuit

Order details

Model	Included with delivery	Order no.
SKU.1 CG-S 2 x 3A	Circuit switching 2 x 3A for component rack installation	40071361560

# SKU.1 CG-S 1x6A circuit switching

DualGuard-S – central battery system

SKU.1 CG-S 1x6A



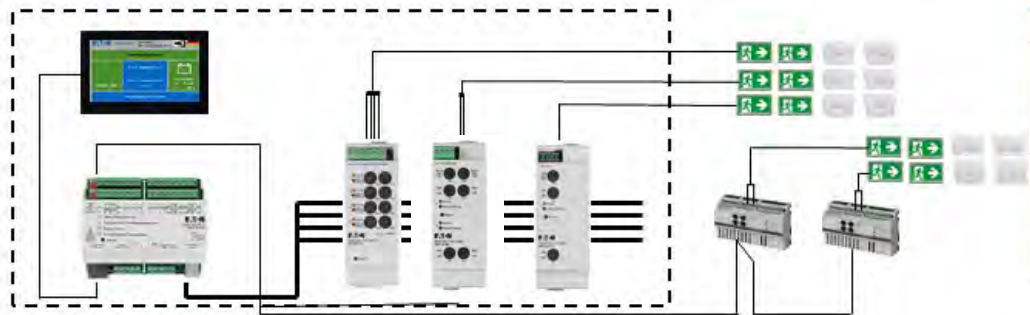
## SKU.1 CG-S 1x6A

- CG technology provides for automatic monitoring of up to 20 safety lights and emergency signs without requiring the transmission of additional data
- Overload indicator
- Programmable switching for each individual light with no need to make adjustment directly to the light itself
- Automated isolation fault finding
- Assemblies use service-friendly module technology, wired ready for connection to triple-deck 4 mm<sup>2</sup> neutral terminals
- Wide finger-safe ventilation slits for optimum heat dissipation
- Simple, time-saving snap-on click installation on device rack
- Large sign rack for customized labeling
- Meets all EMV requirements for industrial and commercial use
- DEKRA system certification documents product quality and compliance with standards for the entire system
- Functionality for 30 minutes during fire verified in a fire test conducted by an independent materials testing institute
- Conforms to RoHS and REACH

Inputs	
Nominal AC voltage	220-240V
Nominal DC voltage	184-275V
Rated frequency	50 or 60 Hz
Maximum head dissipation capacity:	4 W
Output nominal current	6A
short-circuit current	1500A
Inrush current	250A

## Order details

Model	Included with delivery	Order no.
SKU.1 CG-S 1 x 6A	Circuit switching 1 x 6A for component rack installation	40071361570



SOU CG-S 2x4A



### SOU CG-S 2x4 A

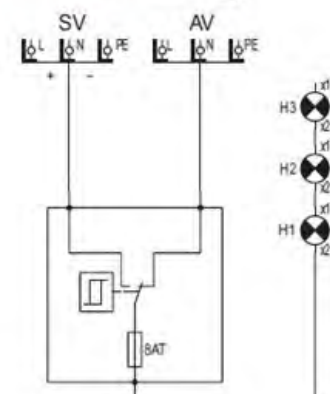
- Separate rental current feed-in
- CG technology provides for automatic monitoring of up to 20 safety lights and emergency signs without requiring the transmission of additional data for each circuit
- Overload indicator
- Programmable switching for each individual light with no need to make adjustment directly to the light itself
- Automated isolation fault finding
- Dual assignable screw terminals for conductors with the same diameter
- All module connections are wired to a triple-deck tension-spring installation terminal
- Large sign rack for customized labeling
- Meets all EMV requirements for industrial and commercial use
- DEKRA system certification documents product quality and compliance with standards for the entire system
- Functionality for 30 minutes during fire verified in a fire test conducted by an independent materials testing institute

### Inputs

Nominal AC voltage	220-240V
Nominal DC voltage	184-275V
Rated frequency	50/60 Hz
Maximum head dissipation capacity:	9 W
Short-circuit current per circuit	1500A
Inrush current	250A per circuit

### Order details

Model	Included with delivery	Order no.
SOU CG-S 2 x 4A	Circuit switching 2 x 4A for top-hat rail installation	40071360430



# CG IV.1 relay module

DualGuard-S – central battery system

CG IV.1 relay module



## CG IV.1 relay module

This module allows for connection of the central battery system to a central control station. Status of key systems reported via potential-free signal contacts. Two input channels available for remote inspection of the central battery system. A function test can be launched via the “FT” input channel, and a duration test (battery test) can be launched via the “BT” input channel. Eight light-emitting diodes indicate system status.

Inputs	
Nominal AC voltage	220-240V
Nominal DC voltage	184-275V
Rated frequency	50 Hz
Outputs	
Rated current/voltage	0.65A/24V

## Order details

Model	Included with delivery	Order no.
CG IV.1	Relay module for component rack installation	40071361620



CG V.1 relay module



CG V.1 relay module

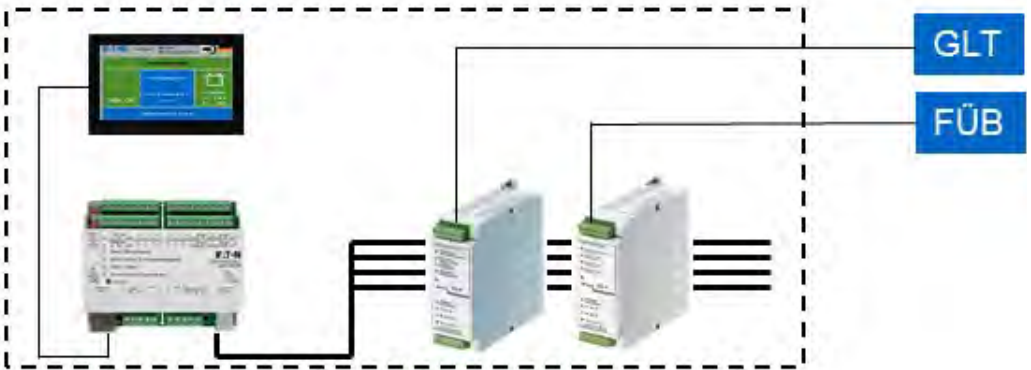
This module allows for connection of the central battery system to a building control system. Status of key systems reported via potential-free signal contacts. Two input channels available for remote inspection of the central battery system. A function test can be launched via the “FT” input channel, and a duration test (battery test) can be launched via the “BT” input channel. Eight light-emitting diodes indicate system status.

Inputs	
Nominal AC voltage	220-240V
Nominal DC voltage	184-275V
Rated frequency	50 Hz
Outputs	
Rated current/voltage	0.65A/24V

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Order details

Model	Included with delivery	Order no.
CG V.1	Relay module for component rack installation	40071361630



# RCM-A remote indication

DualGuard-S – central battery system

RCM-AR flush-mounted



RCM-AS surface-mounted



## RCM-A remote indication

The RCM-A remote display uses a battery power supply to display the the most important system functions safely. A key-operated switch can be used to block emergency lighting operation during periods of inactivity. The remote indicator thus fulfils the requirement that remote switching is only permissible if actuation by Unauthorized persons are not possible. By blocking the emergency operation the battery maintenance charge is not affected. A differential loop monitoring leads to Short-circuit or open-circuit detection to make the system ready for operation. LED indicators: System operational, power source for safety purposes, error.

	RCM-AS surface-mounted	RCM-AR flush-mounted
Mechanic		
Dimensions (W x H x D mm)	80 x 80 x 52	80 x 80 12 (without flush-mounted box) Diameter flush-mounted box: 70 mm Deep flush-mounted box: 64 mm
Weight	0.15 kg	0.16 kg
Degree of protection	IP 20	IP 20
Material	Thermoplast	
Resistant up to Flammability	650°C	
Environment		
Ambient temperature	-5°C ... +35°C	
Storage temperature	-20°C ... +65°C	
Relative humidity	10% ... 95% no condensation	
Air pressure	795 ... 1080 hPa	
EMC		
Interference immunity	EN/IEC 61000-6-2	
Interference radiation	EN/IEC 61000-6-3	
Electrical parameters		
Rated voltage	24 V DC (SELV)	
Degree of pollution	2	
Power consumption	< 1 W	
Installation		
Lead	J-Y(ST)Y 4 x 2 x 0.8	
Max. Cable length	2000 m	

## Ordering details

Type	Scope of supply	Order No.
RCM-AS remote indication	Subassembly for wall mounting	40071362390
RCM-AR remote indication flush-mounted	Component for installation in switch or cavity wall sockets according to DIN VDE 0606	40071362395

3-PM module



### 3-PM voltage monitoring module

To avoid hazards from mains power outages, the functionality of the light distributors for the general lighting must be continuously monitored in order to turn on safety lighting in the event of a disruption. Consequently, CEAG 3-PM modules are an important element of safety systems.

In the event of a phase outage, the CEAG 3-PM module switches a relay contact and interrupts the 24V current loop to the emergency lighting devices. All safety lights set to non-maintained mode are switched to maintained lighting. A second relay contact is used to signal the power failure.

- Test button for a mains emergency light fault, so there is no need to interrupt mains voltage and, therefore, no disruptions to operations in progress
- No E30 wiring by virtue of short-circuit/interruption-tolerant communication. This results in significantly simpler installation and cost savings.
- Does not require that main power to general lighting be shut off during weekly function testing by virtue of simple manual testing of the circuit monitoring function via the test button. This avoids the disruption of operations in progress as well as the resulting costs thereof
- Automatic record keeping in inspection log. The documentation requirements for safety equipment are thus satisfied
- Meets all EMV requirements for industrial and commercial use
- DEKRA system certification documents product quality and compliance with standards for the entire system

Dimensions in mm (W x H x D)	85 x 52.5 x 65/3 TE
Enclosure	Plastic, light gray
Terminals	2.5 mm <sup>2</sup> rigid and flexible
Mounting type	On DIN support rails
Contact	0.5A/24V AC/DC, 1 x normally open, 1 x change-over contact
Threshold	U < 85 % UN

### Order details

Model	Included with delivery	Order no.
CEAG 3-PM module with test button	Circuit monitor module for top-hat rail installation	40071361660

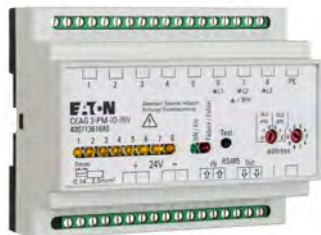
# 3-PM-IO module

DualGuard-S – central battery system

CEAG 3-PM-IO module



CEAG 3-PM-IO-INV module



## External CEAG 3-PM-IO and CEAG 3-PM-IO-INV module

To avoid hazards from mains power outages, the functionality of the light distributors for the general lighting must be continuously monitored in order to turn on safety lighting in the event of a disruption. Consequently, the CEAG 3-PM-IO and CEAG 3-PM-IO-INV modules are an important element of the safety system.

- Test button for mains emergency light fault, so there is no need to interrupt mains voltage and, therefore, no disruptions to operations in progress
- 3-PM-IO module: Eight measurement inputs for monitoring up to three phases and up to five \* light switches
- 3-PM-IO-INV module: Eight inverted measurement inputs for monitoring up to three phases and up to five\* light switches
- Programmable allocation of CEAG 3-PM-IO and CEAG 3-PM-IO-INV modules
- Meets the requirements of future standards. Reduces the risk of cost incurred from retrofitting
- No E30 wiring by virtue of short circuit/interruption-tolerant communication. This results in significantly simpler installation and cost savings.
- Does not require that mains power to general lighting be shut off during weekly function testing by virtue of simple manual testing of the circuit monitoring function via the test button. This avoids the disruption of operations in progress and the resulting costs thereof
- Automatic record keeping in inspection log. The documentation requirements for safety equipment are thus satisfied
- Meets all EMV requirements for industrial and commercial use
- DEKRA system certification documents product quality and compliance with standards for the entire system
- Functionality for 30 minutes during fire verified in a fire test conducted by an independent materials testing institute

\* If the phase monitoring function is not required, all eight measuring inputs can be used for the light switch query

CEAG 3-PM-IO		CEAG 3-PM-IO-INV
Rated voltage of device		24V DC (min. 19V, max. 30V)
Current consumption (all 8 channels connected)		20 mA ± 5 mA
Degree of protection		IP20
Protection class		I
Ambient temperature range		-10° – +40°C.
Input channels 8	8 (potential separated $U_N = 230V$ )	8 (potential separated $U_N = 230V$ )
3-PM (channel 1–8)	3-PM (chan. 1–8) > 195V-> ON	3-PM (chan. 1–8) < 195V-> OFF
3-PH (channel 1–5)	< 138V-> OFF	> 138V-> ON
Data bus/address range		RS 485/1-25
Weight		0.2 kg
Dimensions (L x W x H) mm		105 x 85 x 60
Assembly		DIN rail
Terminals		2.5 mm <sup>2</sup> rigid and flexible

## Order details

Model	Included with delivery	Order no.
CEAG 3-PM-IO module with test button	Module for DIN support rail installation	40071361670
CEAG 3-PM-IO-INV module with test button	Module for DIN support rail installation with inverted input logic	40071361680
DIN support rails	4 DIN support rails for mounting external modules in the switch cabinet including mounting material	40071347125

TLS bus module



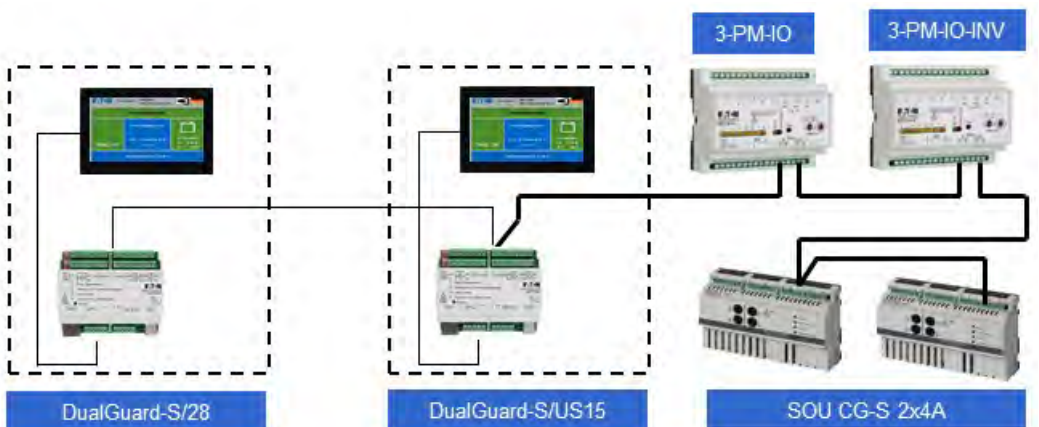
### TLS bus module

This module for installation in general lighting distribution boxes monitors the switching status of buttons for up to two separate stairwell luminaires and transmits the respective switching status to the ACU DG-S module of the DualGuard-S system via an RS485 bus line. In mains and emergency operation, the circuits of the stairwell and emergency lights are operated in accordance with the settings for the CU CG-S control unit. In addition, the switch glow lamps of the connected buttons are supplied in mains and emergency lighting mode.

Power supply for the modules	
Connection voltage	24V DC (19 ... max. 30V)
Cable type	4 x 2 x 0.8 mm IY(ST)Y, twisted pair shielded
(minimum requirement)	
Current consumption	Max. 50mA, depending on the number of
glow lamps for stairwell light switches	
Bus connection	RS 485, Rated voltage: Un = 24V DC
(minimum requirement)	Type of cable: 4 x 2 x 0.8 mm IY(ST)Y, twisted pair shielded
Connection terminal A, B, SE	
Switch outputs	2 rated voltage Ur = 230V, switching current: max. 10A (120A/ms)
Safety class/type	IP20/I
Ambient temp.	-10 ... +40° C
Indicator LEDs:	<ul style="list-style-type: none"> <li>- LED K1 or K2 illuminate when the circuit is closed</li> <li>- LED T1 and T2 illuminate as long as the corresponding button input is activated</li> <li>- LED on/off lit if 24 V DC supply voltage is present and the device is activated via the control</li> <li>- LED fault/failure illuminates if a malfunction has been registered in the module</li> </ul>

### Order details

Model	Included with delivery	Order no.
TLS.1 module	Stairwell light switch module for top-hat rail installation	40071361720



# BDM battery data module

DualGuard-S – central battery system

BDM

## BDM battery data module

The CEAG BDM battery data module automatically records voltage and temperature values during initial operation and recurring tests. In addition, the battery block monitoring system enables automation of the annual operational duration test. The battery charge level is shown as a percentage on the TFT touch display. A potential-free changeover contact reports battery status to a higher-level building services system on an as-needed basis. Warning and alarm signals for deviations from boost charge, trickle charge voltage, discharge voltage and battery block temperature of each individual battery block are displayed and recorded on the TFT touch display as well as through a maximum of 72 battery block sensors. The wireless transfer of sensor data to a BDM module simplifies the installation of BBS battery block sensors because no additional data cable is required. The negative pole temperature reading via the sensor circuit means that there is no need for a direct temperature-conducting connection between the BBS battery block sensor and the battery housing. Status displays that are clearly visible through a robust, trans-luminescent BBS sensor enclosure, which has an integrated, mechanically protected color LED, guarantee clear indications at a glance.

An automated configuration routine using soft addressing and menu navigation of the TFT touch display via user icons makes it very easy to manage the system sensor reports and provides a complete overview.

- Automatic recording of voltage and temperature figures during initial operation
- Wireless data transfer provides for connection to the battery block sensors without the need for an additional data cable
- Potential-free changeover contact for reporting operational status

Dimensions (LxHxD)	90x72x60 mm
Materials	Polycarbonate UL94V-0
Weight	0.06 kg
Assembly	DIN rail snap-on
Degree of protection	IP20
Protection class	II
Ambient temperature range	-5°C – +35°C

## Order details

Model	Included with delivery	Order no.
BDM module	Battery data bus module for top-hat rail installation	40071361780





BBS



### BBS battery block sensor

- Temperature readings are taken from the minus pole via the sensor cable, so no fixed connection is required between the battery block sensor and the battery housing
- Status displays that are clearly visible through a trans-luminescent sensor enclosure with an integrated LED
- Percentage display of the battery charge status in percent on the TFT touch display
- Warning and alarm signals for deviations from boost charge, trickle charge voltage and discharge voltage of each individual battery block on the TFT touch display as well as through the battery block sensor
- Warning and alarm signals for deviations from battery block temperature on the TFT touch display as well as through the battery block sensor

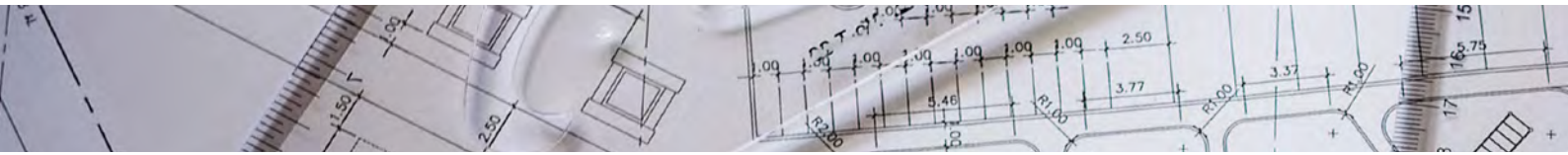
Dimensions (LxHxD)	90x53x17 mm
Materials	Polycarbonate UL94V-0
Weight	0.05 kg
Assembly	on the battery block cover
Degree of protection	IP20
Protection class	II
Ambient temperature range	-5°C – +35°C

### Order details

Model	Included with delivery	Order no.
12V/M6 BBS sensor	Battery block sensor for 12V battery blocks with an M6 connection. 14Ah, 23.3Ah, 32Ah, 39.8Ah, 50.4Ah, 53.7Ah, 66.2Ah, 85.7Ah, 89.4Ah	40071362190
6V/M8 BBS sensor	Battery block sensor for 6V battery blocks with an M8 connection. 118Ah	40071362202

# Configuring the central battery system

DualGuard-S – central battery system



## Configuring the central battery system

The DualGuard-S central battery system can be quickly and easily configured using predetermined data from the tables.

### Recommended procedure:

9

#### Determine the required battery capacity.

The number of safety lights and emergency signs required is determined on the basis of the projected lighting design.

#### Example:

With respect to the safety lighting requirements for one assembly point (3 h rated operating period and 12 h recharging period), the following number of luminaires was determined.

Quantity	Model	Current consumption per light	Total
100	GuideLed 11011	0.011A	1.10A
250	GuideLed SL 13021.1	0.02A	5.00A
100	V-CG-SLI 350	0.043A	4.30A
Total:			10.40A

Depending on the rated operating period required (1, 3 and 8 h), the battery capacity (C10; 1.8V/cell; +20°C) relative to the maximum discharge current – determined via the battery power consumption of all consumers – can be determined using the battery discharge tables. Pursuant to EN 50171, batteries with a duration of at least 10 years at 20°C shall be used. In this example, with a required rated operating period of 3 h, a battery capacity of 39.80 Ah (C10: 1.8V/cell; +20°C) should be selected from the table. The maximum discharge current for 3 hours of discharge is 11.00A.

#### Determining the required number of additional charging modules

Pursuant to EN 50171, 80% of withdrawn capacity must be charged to the discharged batteries within 12 h. In determining the number of additional charging modules, the aging reserve factor of 25% need not be included.

#### Example:

Battery current uptake

= 11.00A for 3 h discharge

Required number of charging modules:

1 x 3.4A according to the charging module table



### Determining the required battery capacity, including the aging allowance.

Since a lead battery that is properly operated generally has a capacity loss of up to 2.5% per year (25% over 10 years), pursuant to EN 50171 this loss of capacity must be allowed for in selecting a battery. The end of the service life has been reached when the battery's rated voltage under the rated load falls below 90%.

#### Example:

Battery current uptake

10.40A + 25%

Aging reserve = 13.00A

Battery U<sub>rated</sub> = 216V

90% U<sub>rated</sub> battery

(108 cells) = 194.4V = **1.8V per cell**

In this example, the battery capacity must be increased from 39.8 Ah to 50.40 Ah. The maximum discharge current for 3 hours of discharge is 13.60A.

*Please note!* – In determining the number of additional charging modules, the aging reserve factor of 25% need not be included.

### Fuse protection of the mains circuit connection

The total connected load of the DualGuard-S system is needed to determine the fuse protection for the general power supply main distributor. This load consists of the sum of the mains connection loads of the individual lights and consumers (see connection values of charging modules CM.1 1.7 A and CM.1 3.4 A).

#### Example:

100 units GuideLed 11011 @ 8VA = 0.80kVA

250 units GuideLed SL 13021.1 @ 8VA = 2.00kVA

100 units V-CG-SLI 350

11.6VA = 1.16kVA

= 3.96kVA

Charge module CM 3.4A

Pzu 0.98kVA = 0.98kVA

**Total connection load = 4.94kVA**

# Order details

## DualGuard-S – central battery system



### Order details

Model	Included with delivery	Order no.
DualGuard-S 28 central battery system	DualGuard-S/28 central battery system including TFT touch display, BCM.1 and PSU, 28 free module slots	40071362511
DualGuard-S 20 central battery system	DualGuard-S/20 central battery system including TFT touch display, BCM.1 and PSU, 20 free module slots	40071362510
DualGuard-S LAD100 central battery system	DualGuard-S LAD 100A central battery system, equipped with battery control module (BCM.1), TFT touch display HMI/ACU DG-S PCU transformer, with sufficient space for adding a maximum of 16 final circuits, or a maximum of 4 variable circuit boards. Please note! The charging modules are not part of the cabinet assembly.	40071362540
DualGuard-S 12C central battery system	DualGuard-S 12C central battery system including TFT touch display, BCM.1 and PSU, 12 free module slots	40071362520
DualGuard-S 20C6 central battery system	DualGuard-S 20C6 central battery system including TFT touch display, BCM.1 and PSU, 20 free module slots	40071362524
DualGuard-S 12C6 central battery system	DualGuard-S 12C6 central battery system including TFT touch display, BCM.1 and PSU, 12 free module slots	40071362523
DualGuard-S 12C4 central battery system	DualGuard-S 12C4 central battery system including TFT touch display, BCM.1 and PSU, 12 free module slots	40071362521
DualGuard-S 4C3 central battery system	DualGuard-S 4C3 central battery system including TFT touch display, BCM.1 and PSU, 4 free module slots	40071362525
DualGuard-S US 38 sub-station	DualGuard-US 38 model sub-station including TFT touch display, 38 free module slots	40071362513
DualGuard-S US 30 sub-station	DualGuard-US 30 model sub-station including TFT touch display, 30 free module slots	40071362512
DualGuard-S US 23 sub-station	DualGuard-US 23 model sub-station including TFT touch display, 23 free module slots	40071362532
DualGuard-S US 15 sub-station	DualGuard-US 15 model sub-station including TFT touch display, 15 free module slots	40071362531
DualGuard-S US 7 sub-station	DualGuard-US 7 model sub-station including TFT touch display, 7 free module slots	40071362530
DualGuard-S SOU2 sub-station	SOU2 model sub-station including 2 x SOU CG-S 2 x 4 A	40071362519
DualGuard-S SOU1 sub-station	SOU1 model sub-station including 1 x SOU CG-S 2 x 4 A	40071362518
E30 junction box ESF-RVS30-1	for SOU small distribution boards with 2 built-in Neozed fuses	40036071032
DualGuard-S ESF30-30-P sub-station	DualGuard-S ESF30-30-P cabinet, equipped with TFT touch display, PSU, with space for adding a maximum of 58 final circuits, but a maximum of 30 variable circuit modules	40071362517
DualGuard-S ESF30 15-P sub-station	DualGuard-S ESF30 15-P cabinet, equipped with TFT touch display, PSU, with space for adding a maximum of 40 final circuits, but a maximum of 15 variable circuit modules	40071362516
ESF30 SOU5 sub-station	ESF30 SOU5 small distribution board, fitted with 5 circuit modules SOU CG-S 2 x 4 A	40071362538
ESF30 SOU3 sub-station	ESF30 SOU3 small distribution board, fitted with 3 circuit modules SOU CG-S 2 x 4 A	40071362537
ESF30 SOU2 sub-station	ESF30 SOU2 small distribution board, fitted with 2 circuit modules SOU CG-S 2 x 4 A	40071362536
ESF30 SOU1 sub-station	ESF30 SOU1 small distribution board, fitted with 1 circuit module SOU CG-S 2 x 4 A	40071362535



## Order details

Model	Included with delivery	Order no.
ESF-RVS30	ESF-RVS30 distribution board for ESF-E30 with 4 built-in D02 Neozed fuses	40071347920
Reductions	M32 to M20 reductions including M20 cable screw fitting for E30 junction box.	40071071033
Base for DualGuard-S 12C4	600 mm x 400 mm x 100 mm base	40071362280
	600 mm x 400 mm x 200 mm base	40071362281
Base for DualGuard-S 28, 20, LAD 100, US 38, US 30 and DualGuard-S 12C	800 mm x 400 mm x 100 mm base	40071362282
	800 mm x 400 mm x 200 mm base	40071362283
Base for DualGuard-S 20C6 und 12C6	800 mm x 600 mm x 100 mm base	40071362284
	800 mm x 600 mm x 200 mm base	40071362285
Grommet Set	for DualGuard-S 12C4	40071362404
	for DualGuard-S 28/20 DG-S US 38/30	40071362405
	for DualGuard-S LAD	40071362406
	for DualGuard-S 20C6	40071362407
	for DualGuard-S 12C6	40071362408
	for DualGuard-S 12C	40071362409
	for DualGuard-S 4C3	40071362410
	for DualGuard-S US23	40071362411
	for DualGuard-S US15	40071362412
	for DualGuard-S US7	40071362413
	for Battery Cab.	40071362414
The DualGuard-S third party certificate includes a higher IP rating, and is no longer valid for use with lower rated roof panels.		
Roof plate with foam rubber flange plates IP 2X	for DualGuard-S 28, 20, US 38 and US 28	40071362441
	for DualGuard-S LAD 100	40071362444
	for DualGuard-S 20C6	40071362445
	for DualGuard-S 12C6	40071362442
	for DualGuard-S 12C	40071362443
	for DualGuard-S 12C4	40071362440
Roof plate with rubber clamp profile IP 2X	for DualGuard-S 28, 20, US 38 and US 28	40071362451
	for DualGuard-S LAD 100	40071362454
	for DualGuard-S 20C6	40071362455
	for DualGuard-S 12C6	40071362452
	for DualGuard-S 12C	40071362453
	for DualGuard-S 12C4	40071362450
Optional IP 31 retrofitting kit	for DualGuard-S 4C3	40071362298
	for DualGuard-S 12C	40071362293
	for DualGuard-S 12C4	40071362290
	for DualGuard-S 12C6	40071362292
	for DualGuard-S 20C6	40071362297
	for DualGuard-S 28, 20, US 38 and 30	40071362291
	for DualGuard-S LAD 100	40071362296
	for DualGuard-S battery cabinets	40071362294
Left-hand hinge position	for DualGuard-S 12C	40071362303
	for DualGuard-S 12C4	40071362300
	for DualGuard-S 12C6	40071362302
	for DualGuard-S 20C6	40071362306
	for DualGuard-S 28, 20, LAD 100, US 38, 30	40071362301

### DualGuard-S compact cabinets

Model	DualGuard-S 28	DualGuard-S 20	DualGuard-S LAD 100
Control section: ACU DG-S & HMI	1	1	1
PSU	1	1	1
BCM.1	1	1	1
SKU.1 CG-S circuit module	0-28	0-20	0-4
CM.1 1.7A charging module	0-1	0-1	0-1
CM.1 3.4A charging module	0-6	0-6	0-8
Cabinet design, electric:			
Rated voltage	400/230V	400/230V	400/230V
Rated frequency	50/60 Hz	50/60 Hz	50/60 Hz
Cable placement and grounding system in mains mode / battery mode	TN-C-S/IT	TN-C-S/IT	TN-C-S/IT
Max. ambient temperature <sup>1</sup>	-5°C to +35°C	-5°C to +35°C	-5°C to +35°C
Protection class	1	1	1
Degree of protection	IP21	IP21	IP21
Max. rated current (mains) [ $\sum$ L1, L2, L3] [A]	80	80	100
Max. rated output (mains) [KW]	18.4	18.4	23
Max. rated current (battery) [A]	80	80	100
Max. rated output (battery) [KW]	17.3	17.3	21.6
Three-phase split	yes	yes	yes
Connection diameter for mains and battery feed	50 mm <sup>2</sup>	50 mm <sup>2</sup>	50 mm <sup>2</sup>
Outlet distributor	0- 6 outlets	0- 6 outlets	0- 15 outlets DC and AC 1-phase, 0-5 outputs AC 3-phase
Terminal capacity	16 mm <sup>2</sup>	16 mm <sup>2</sup>	16 mm <sup>2</sup>
Max. connection diameter final circuit	4 mm <sup>2</sup>	4 mm <sup>2</sup>	4 mm <sup>2</sup>
Max. number of final circuit connections	88	88	16
Cabinet design, mechanical:			
Dimensions H x W x D (mm)	2070 x 800 x 405	2070 x 800 x 405	2040 x 800 x 405
Material/design	Sheet steel/free-standing cabinet	Sheet steel/free-standing cabinet	Sheet steel/free-standing cabinet
Hinge position	Right	Right	Right
Outer finish	Powder coating	Powder coating	Powder coating
Color	RAL 7035	RAL 7035	RAL 7035
Color touch in-door	Yes	Yes	Yes
Partial glazed door	–	–	–
Lock mechanism	3 mm double ward key	3 mm double ward key	3 mm double ward key
cable inlets on top	Yes	Yes	Yes
Cable inlets on bottom	Yes	Yes	Yes
Base (optional)	100/200	100/200	100/200
Weight (w/o battery)	approx. 180 kg	approx. 170 kg	approx. 170 kg
Battery capacity, integrated into:			
Battery cabinet (W x H x D: 2050 x 800 x 400 mm)	23.3-245 Ah	23.3-245 Ah	23.3-308 Ah
Compact cabinet	–	–	–
Battery rack	23.3-245 Ah	23.3-245 Ah	23.3-308 Ah

DualGuard-S 20C6	DualGuard-S 12C6	DualGuard-S 12C	DualGuard-S 12C4	DualGuard-S 4C3
1	1	1	1	1
1	1	1	1	1
1	1	1	1	1
0-20	0-12	0-12	0-12	0-5
0-1	0-1	0-1	0-2	1
0-2	0-2	0-1	–	–
400/230V	230V	230V	230V	230V
50/60 Hz	50/60 Hz	50/60 Hz	50/60 Hz	50/60 Hz
TN-C-S/IT	TN-C-S/IT	TN-C-S/IT	TN-C-S/IT	TN-C-S/IT
-5°C to +35°C	-5°C to +35°C	-5°C to +35°C	-5°C to +35°C	-5°C to +35°C
1	1	1	1	1
IP21	IP21	IP21	IP21	IP21
50	50	35	25	12
14.5	14.5	13.8	5.8	3.5
50	50	35	25	12
13.6	13.6	7.6	5.4	2.6
–	–	–	–	–
35 mm <sup>2</sup>	16 mm <sup>2</sup>	16 mm <sup>2</sup>	16 mm <sup>2</sup>	16 mm <sup>2</sup>
2 outlets	1 outlet	1 outlet	1 outlet	–
35 mm <sup>2</sup>	35 mm <sup>2</sup>	35 mm <sup>2</sup>	16 mm <sup>2</sup>	–
4 mm <sup>2</sup>	4 mm <sup>2</sup>	4 mm <sup>2</sup>	4 mm <sup>2</sup>	4 mm <sup>2</sup>
68	48	48	48	20
2070 x 800 x 605	2040 x 800 x 605	2040 x 800 x 405	1800 x 600 x 405	1000 x 600 x 305
Compact cabinet	Compact cabinet	Compact cabinet	Compact cabinet	Compact cabinet
Right	Right	Right	Right	Right
Powder coating	Powder coating	Powder coating	Powder coating	Powder coating
RAL 7035	RAL 7035	RAL 7035	RAL 7035	RAL 7035
–	–	–	–	–
Yes	Yes	Yes	Yes	Yes
3mm double ward key	3mm double ward key	3mm double ward key	3mm double ward key	3mm double ward key
Yes	Yes	Yes	Yes	Yes
No	No	No	No	No
100/200	100/200	100/200	100/200	–
approx. 205 kg	approx. 206 kg	approx. 155 kg	approx. 115 kg	approx. 50 kg
–	–	–	–	–
5.5-89.4 Ah	5.5-89.4 Ah	23.3-53.7 Ah	5.5-23.3 Ah	5.5-14 Ah
–	–	–	–	–



# Technical data

## DualGuard-S – central battery system

### DualGuard-S US sub-stations

Model	DualGuard-S US 38	DualGuard-S US 30	DualGuard-S US 23	DualGuard-S US 15	DualGuard-S US 7
Modules:					
Control section: ACU DG-S & HMI	1	1	1	1	1
PSU	1	1	1	1	1
SKU.1 CG-S circuit module	0-38	0-30	0-23* <sup>1</sup>	0-15	0-7
Cabinet design, electric:					
Rated voltage	400/230V	400/230V	230V	230V	230V
Rated frequency	50/60 Hz	50/60 Hz	50/60 Hz	50/60 Hz	50/60 Hz
Cable placement and grounding system in mains/battery mode	TN-C-S/IT	TN-C-S/IT	TN-C-S/IT	TN-C-S/IT	TN-C-S/IT
Max. ambient temperature range	-5°C to +35°C	-5°C to +35°C	-5°C to +35°C	-5°C to +35°C	-5°C to +35°C
Protection class	1	1	1	1	1
Degree of protection	IP21	IP21	IP54	IP54	IP54
Max. rated current (mains) [ $\sum$ L1, L2, L3] [A]	80	80	50	50	25
Max. rated output (mains) [KW]	18.4	18.4	11.5	11.5	6.9
Max. rated current (battery) [A]	80	80	50	50	25
Max. rated output (battery) [KW]	17.3	17.3	10.8	10.8	6.5
Three-phase split	Yes	Yes	No	No	No
Connection diameter for mains and battery feed	35 mm <sup>2</sup>	35 mm <sup>2</sup>	35 mm <sup>2</sup>	16 mm <sup>2</sup>	16 mm <sup>2</sup>
Terminal capacity	–	–	–	–	–
Max. connection diameter of final circuit	4 mm <sup>2</sup>	4 mm <sup>2</sup>	4 mm <sup>2</sup>	4 mm <sup>2</sup>	4 mm <sup>2</sup>
Max. number of final circuit connections	88	88	52	32	28
Cabinet design, mechanical:					
Dimensions H x W x D (mm)	2070 x 800 x 405	2070 x 800 x 405	1200 x 600 x 305	800 x 600 x 305	750 x 400 x 305
Material/design	Sheet steel/ free-standing cabinet	Sheet steel/ free-standing cabinet	Sheet steel/wall cabinet	Sheet steel/wall cabinet	Sheet steel/wall cabinet
Hinge position	Right	Right	Right	Right	Right
Outer finish	Powder coating	Powder coating	Powder coating	Powder coating	Powder coating
Color	RAL 7035	RAL 7035	RAL 7035	RAL 7035	RAL 7035
Partial glazed door	Yes	Yes	No	No	No
Lock mechanism	3 mm double ward key	3 mm double ward key	3 mm double ward key	3 mm double ward key	3 mm double ward key
Cable inlets on top	Yes	Yes	Yes	Yes	Yes
Cable inlets on bottom	Yes	Yes	No	No	No
Base (optional)	100/200	100/200	–	–	–
Weight (w/o battery)	approx. 170 kg	approx. 165 kg	approx. 110 kg	approx. 75 kg	approx. 42 kg

\*1 A maximum of 12 SKU.1 CG-S 4 x 1.5 A may be installed.

## DualGuard-S SOU sub-stations

Model	SOU2	SOU1
SKU.1 CG-S *1 circuit module	including 2 x SOU CG-S 2 x 4A	including 1 x SOU CG-S 2 x 4A
Cabinet design, electric:		
Rated voltage	230V	230V
Rated frequency	50/60 Hz	50/60 Hz
Cable placement and grounding system in mains/ battery mode	TN-C-S/IT	TN-C-S/IT
Max. ambient temperature range	-5°C to +35°C	-5°C to +35°C
Protection class	2	2
Degree of protection	IP65	IP65
Max. rated current (mains) $\sum L1, L2, L3$ [A]	16	8
Max. rated output (mains) [KW]	3.6	1.8
Max. rated current (battery) [A]	16	8
Max. rated output (battery) [KW]	3.4	1.7
Three-phase split	No	No
Connection diameter for mains and battery feed	10 mm <sup>2</sup>	10 mm <sup>2</sup>
Max. connection diameter of final circuit	4 mm <sup>2</sup>	4 mm <sup>2</sup>
Max. number of final circuit connections	4	2
Cabinet design, mechanical:		
Dimensions H x W x D (mm)	583 x 295 x 129	458 x 295 x 129
Material/design	Plastic small distribution board	Plastic small distribution board
Hinge position	Right	Right
Color	RAL 7035	RAL 7035
Partial glazed door	Yes	Yes
Lock mechanism	On request	On request
Cable inlets on top	Yes	Yes
Weight (w/o battery)	approx. 8.8 kg	approx. 7.5 kg

# Technical data

## DualGuard-S – central battery system

### DualGuard-S ESF sub-stations

Model	DualGuard-S ESF30 15P	DualGuard-S ESF30 30P
Modules:		
Control section: ACU DG-S & HMI	1	1
PSU	1	1
SKU.1 CG-S 1 x 6A circuit module	0-15	0-30
SKU.1 CG-S 2 x 3A circuit module	0-15	0-30
SKU.1 CG-S 4 x 1.5A circuit module	0-15	0-30
DLS/TLS interface module	1	2
Cabinet design, electric:		
Rated voltage	230V	400/230V
Rated frequency	50/60 Hz	50/60 Hz
Ventilation, decibel level (dB)	55	55
Cable placement and grounding system in mains/battery mode	TN-C-S/IT	TN-C-S/IT
Max. ambient temperature range	-5°C to +35°C	-5°C to +30°C
Protection class	I	I
Degree of protection	IP42	IP42
Max. total rated current [A] relative to ambient temperature		
+25°C		
+30°C	33	48
+35°C	33	48
	33	48
Max. total rated output [A] relative to ambient temperature		
+25°C	7	10.3
+30°C	7	10.3
+35°C	7	10.3
Three-phase split	No	Yes
Connection diameter for mains and battery feed	35 mm <sup>2</sup>	35 mm <sup>2</sup>
Max. connection diameter of final circuit	4 mm <sup>2</sup>	4 mm <sup>2</sup>
Max. number of final circuit connections	40	58
Cabinet design, mechanical:		
Dimensions H x W x D (mm)	1278x918x496	2278x918x604
Material/design	Coated gypsum fiber-board/wall cabinet	Coated gypsum fiber-board/free-standing cabinet
Hinge position	Right	Right
Color	RAL 7035	RAL 7035
Cable entry	From above	From above
Base (optional)	–	– only with base
Weight	210 kg	approx. 330 kg
Licenses/certifications		
ABZ housing including components Z-86.3 ...	requested	requested
ABZ empty housing Z-86.1 ...	Yes	Yes
Summary report for functional integrity fire test MPA NRW	Yes	Yes
VDE certificate	–	–
Specialized company declaration	Yes	Yes

## DualGuard-S ESF sub-stations SOU

Model	ESF30 SOU5	ESF30 SOU3	ESF30 SOU2	ESF30 SOU1
Modules:				
SOU CG-S 2 x 4 A circuit switching module	5	3	2	1
DLS/TLS interface module	2	1	1	–
Cabinet design, electric:				
Rated voltage	230V	230V	230V	230V
Rated frequency	50 or 60 Hz	50 or 60 Hz	50 or 60 Hz	50 or 60 Hz
Ventilation, decibel level (dB)	–	–	–	–
Cable placement and grounding system in mains/battery mode	TN-C-S/IT	TN-C-S/IT	TN-C-S/IT	TN-C-S/IT
Max. ambient temperature range	-5°C to +35°C	-5°C to +35°C	-5°C to +35°C	-5°C to +35°C
Protection class	I	I	I	I
Degree of protection	IP65	IP65	IP65	IP65
Maximum installed heat dissipation performance [W]				
Max. total rated current [A] relative to ambient temperature				
+25°C				
+30°C	33	20	15	8
+35°C	28	17	12	6
	16	10	9	5
Max. total rated output [A] relative to ambient temperature				
+25°C	7.1	4.3	3.2	1.7
+30°C	6.0	3.6	2.5	1.2
+35°C	3.4	2.1	1.3	1.0
Three-phase split	No	No	No	No
Connection diameter for mains and battery feed	10 mm <sup>2</sup>	10 mm <sup>2</sup>	10 mm <sup>2</sup>	10 mm <sup>2</sup>
Max. connection diameter final circuit	4 mm <sup>2</sup>	4 mm <sup>2</sup>	4 mm <sup>2</sup>	4 mm <sup>2</sup>
Max. number of final circuit connections	10	6	4	2
Cabinet design, mechanical:				
Dimensions H x W x D (mm)	1135 x 396 x 230	835 x 396 x 230	685 x 396 x 230	535 x 396 x 230
Material/design	Coated gypsum fiberboard/ wall cabinet	Coated gypsum fiberboard/ wall cabinet	Coated gypsum fiberboard/ wall cabinet	
Hinge position	Left	Left	Left	Left
Color	RAL 7035	RAL 7035	RAL 7035	RAL 7035
Cable entry	From above	From above	From above	From above
Weight (w/o battery)	approx. 81 kg	approx. 61 kg	approx. 51 kg	approx. 34 kg
Licenses/certifications				
ABZ housing including components Z-86.3 ...	–	–	–	–
ABZ empty housing Z-86.1 ...	–	–	–	–
Summary report for functional integrity fire test MPA NRW	Yes	Yes	Yes	Yes
VDE certificate	Yes	Yes	Yes	Yes
Specialized company declaration	–	–	–	–

# Determination of battery capacity

## DualGuard-S – central battery system

**Table 1**

Determining the required battery capacity from maintenance-free AGiV block batteries as per EN 50171 (larger battery capacities on request).

C10 battery capacity at 1.8V/cell and +20°C	Ah	5.5	8.5	14.0	23.3	32.0	39.8	50.4	53.7	66.2	85.7	89.4	106.0	118.0	143.1	155.6	178.8	195.4	245.0	268.2	308.0	357.6	
													1 x 39.8 1 x 66.2		1 x 89.4 1 x 53.7	1 x 89.4 1 x 66.2	2 x 89.4	1 x 89.4 1 x 66.2	1 x 39.8 2 x 89.4	1 x 66.2	3 x 89.4	3 x 89.4 1 x 39.8	4 x 89.4
Max. discharge current [A] at rated operating period [h], 1.8V per cell and +20°C ambient temperature	1.0	3.2	4.5	9.3	15.4	20.2	24.1	30.7	37.9	49.2	52.6	63.8	73.3	85.1	101.7	113.0	127.6	137.1	176.8	191.4	215.5	255.2	
	1.5	2.5	3.4	6.9	11.9	15.0	19.0	22.7	27.6	34.5	38.3	46.1	53.5	60.0	73.7	80.6	92.2	99.6	126.7	138.3	157.3	194.7	
	2.0	2.1	2.9	5.7	9.2	12.3	14.6	18.5	21.5	26.3	31.0	36.0	40.9	46.9	57.5	62.3	72.0	76.9	98.3	108.0	122.6	144.0	
	3.0	1.5	2.1	4.1	6.9	9.1	11.0	13.6	15.8	18.2	23.1	26.5	29.2	33.3	42.3	44.7	53.0	55.7	71.2	79.5	90.5	106.0	
	8.0	0.7	1.0	1.7	2.8	3.7	4.8	5.9	6.6	7.9	10.3	11.0	12.7	14.2	17.6	18.9	22.0	23.7	29.9	33.0	37.8	44.0	

**Special note:** The aging allowance of 25% for the batteries is not included in the discharge current figures.

**Table 2**

Number of 1.7A and 3.4A charging modules given a recharging time as per DIN EN 50171 of:

C10 battery capacity at 1.8V/cell and +20°C	h	A	5.5	8.5	14.0	23.3	32.0	39.8	50.4	53.7	66.2	85.7	89.4	106.0	118.0	143.1	155.6	178.8	195.4	245.0	268.2	308.0	357.6
12 hours/80%	1.0	1.7	1	1	1	1	1	0	0	0	1	1	1	0	0	1	0	0	1	1	1	1	0
		3.4	0	0	0	0	0	1	1	1	1	1	1	2	2	2	3	3	3	4	4	5	6
	1.5	1.7	1	1	1	1	0	0	0	0	1	1	0	0	1	0	0	1	1	1	0	0	1
		3.4	0	0	0	0	1	1	1	1	1	1	2	2	2	3	3	3	3	4	5	6	6
	2.0	1.7	1	1	1	1	0	0	0	0	1	1	0	0	1	0	0	1	0	0	1	0	0
		3.4	0	0	0	0	1	1	1	1	1	1	2	2	2	3	3	3	4	5	5	6	7
	3.0	1.7	1	1	1	1	0	0	0	1	1	1	0	1	1	0	1	0	0	0	1	1	1
		3.4	0	0	0	0	1	1	1	1	1	1	2	2	2	3	3	4	4	5	6	6	7
	8.0	1.7	1	1	1	0	0	0	1	1	1	0	0	1	0	1	0	1	1	0	1	1	1
		3.4	0	0	0	1	1	1	1	1	1	2	2	2	3	3	4	4	4	6	6	7	8

**Table 3**

Number of battery cabinets; battery weight

C10 battery capacity at 1.8V/cell and +20°C	5.5	8.5	14.0	23.3	32.0	39.8	50.4	53.7	66.2	85.7	89.4	106.0	118.0	143.1	155.6	178.8	195.4	245.0	268.2	308.0	357.6
Number of battery cabinets (weight/cabinet approx. 150 kg)	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	3	3	3	4	4
Total weight per battery set approx. kg	45	65	100	180	243	252	351	405	499	527	594	612	900	1000	1093	1296	1354	1687	1782	1782	2376

**Table 4**

Determination of air supply and ventilation in electrical operating rooms according to DIN EN 50272-2 (calculated for boost charge):

216V battery	5.5	8.5	14.0	23.3	32.0	39.8	50.4	53.7	66.2	85.7	89.4	106.0	118.0	143.1	155.6	178.8	195.4	245.0	268.2	308.0	357.6
Air volume flow required to ventilate the installation space [m³/h]	0.24	0.37	0.60	1.01	1.38	1.72	2.18	2.32	2.86	3.70	3.86	4.58	5.10	6.18	6.72	7.72	8.44	10.58	11.59	13.31	15.45
Ventilation cross-section of the inlet and outlet openings of the installation space [cm²]	6.65	10.28	16.93	28.18	38.71	48.14	60.96	64.96	80.08	103.66	108.14	128.22	142.73	173.09	188.21	216.28	236.36	296.35	324.41	372.56	432.55

**Table 5**

Determination of air supply and ventilation in electrical operating rooms according to DIN EN 50272-2 (calculated for boost charge\*):

216V battery	5.5	8.5	14.0	23.3	32.0	39.8	50.4	53.7	66.2	85.7	89.4	106.0	118.0	143.1	155.6	178.8	195.4	245.0	268.2	308.0	357.6
Air volume flow required to ventilate the installation space [m³/h]	0.03	0.05	0.08	0.13	0.17	0.21	0.27	0.29	0.36	0.46	0.48	0.57	0.64	0.77	0.84	0.97	1.06	1.32	1.45	1.66	1.93
Ventilation cross-section of the inlet and outlet openings of the installation space [cm²]	0.83	1.29	2.12	3.52	4.84	6.02	7.62	8.12	10.01	12.96	13.52	16.03	17.84	21.64	23.53	27.03	29.54	37.04	40.55	46.57	54.07



# DualGuard-S with Adaptive evacuation

DualGuard-S – central battery system



System-related measures to guarantee self-rescue in the event of evacuation take top priority in changing risk situations. In combination with GuideLed DXC emergency signs, the AE-CU technology makes it possible to respond in a proactive manner to changing hazard situations such as fire, attacks, or natural disasters. The shortest route out of a building is not always the safest route.

During a hazardous situation, the AE-CU system reliably controls up to 240 adaptive emergency signs via an open circuit- and short circuit-tolerant loop bus.

This approach allows every adaptive emergency sign to be associated with hazard scenarios in a freely programmable manner via the AE-CU.

The control section, which has a non-volatile program memory and a large touch display, automatically monitors and controls all components of the AE-CU system as well as the function of the connected adaptive luminaires. Any faults that occur are shown on the display, reported via signaling contacts, and stored in an inspection log.

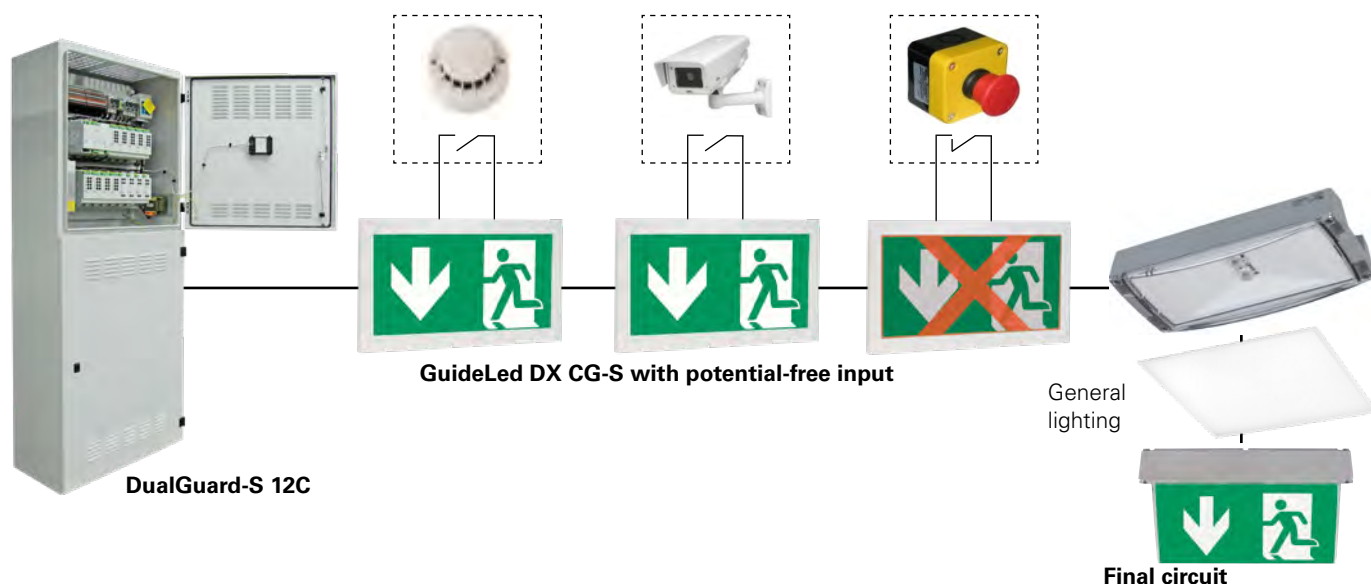
An integrated search function automatically detects all GuideLed DXC emergency signs connected during the installation. It is possible to connect a central visualization system via an interface.



## The solution for simple structured applications

### Control of GuideLed DX luminares via potential-free contacts:

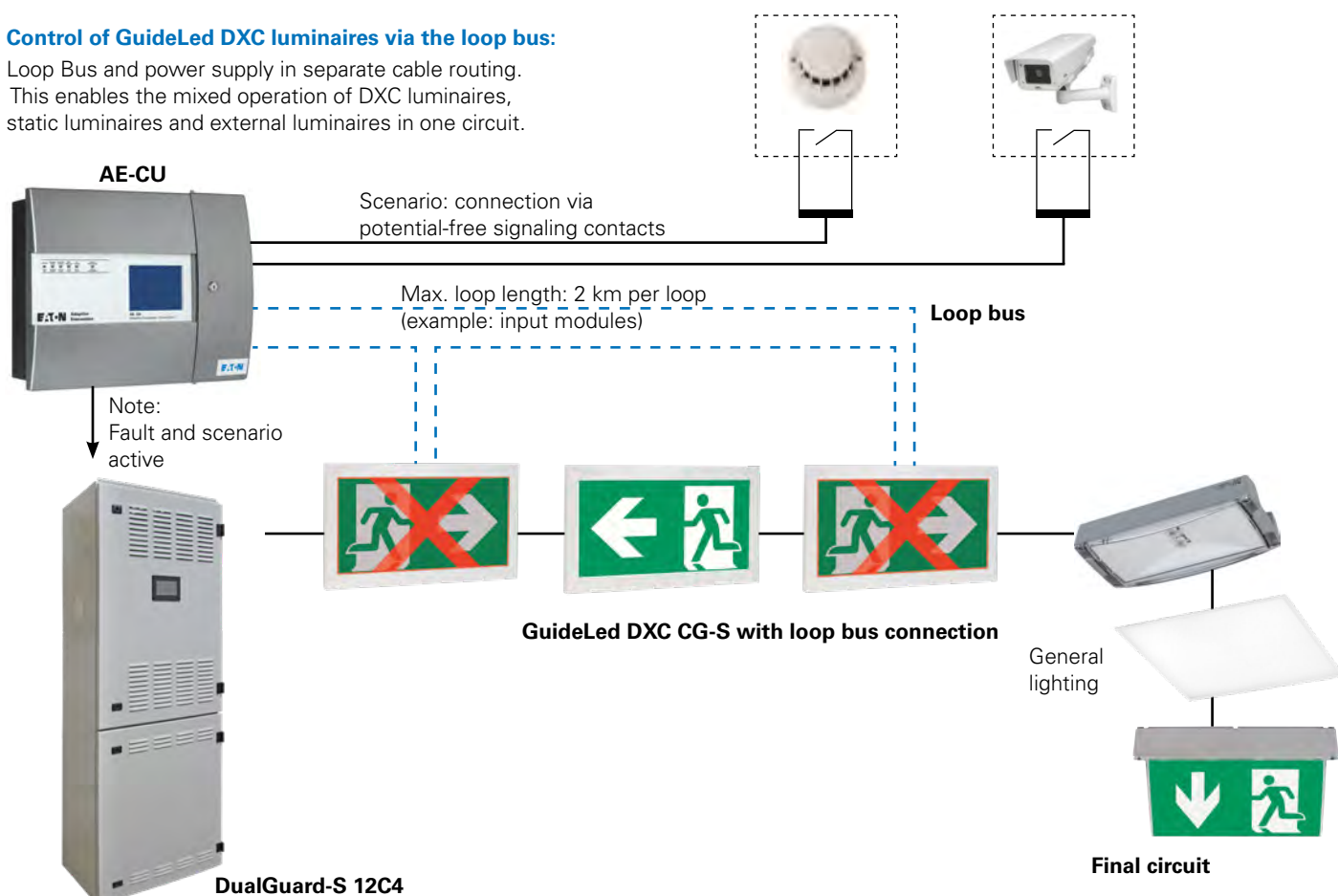
Potential-free contacts of fire detectors, video surveillance systems or key switches to indicate areas as "locked, blocked, or unsafe." Examples include areas to which access is prohibited for a certain period of time due to construction activities or to block elevator access in the event of a fire (special pictogram). Only one control line leads to the emergency sign.



## The solution for simple structured and complex applications

### Control of GuideLed DXC luminares via the loop bus:

Loop Bus and power supply in separate cable routing. This enables the mixed operation of DXC luminares, static luminares and external luminares in one circuit.







Central battery systems AC/DC

**ZB-S** Planned Phase out end of 2020

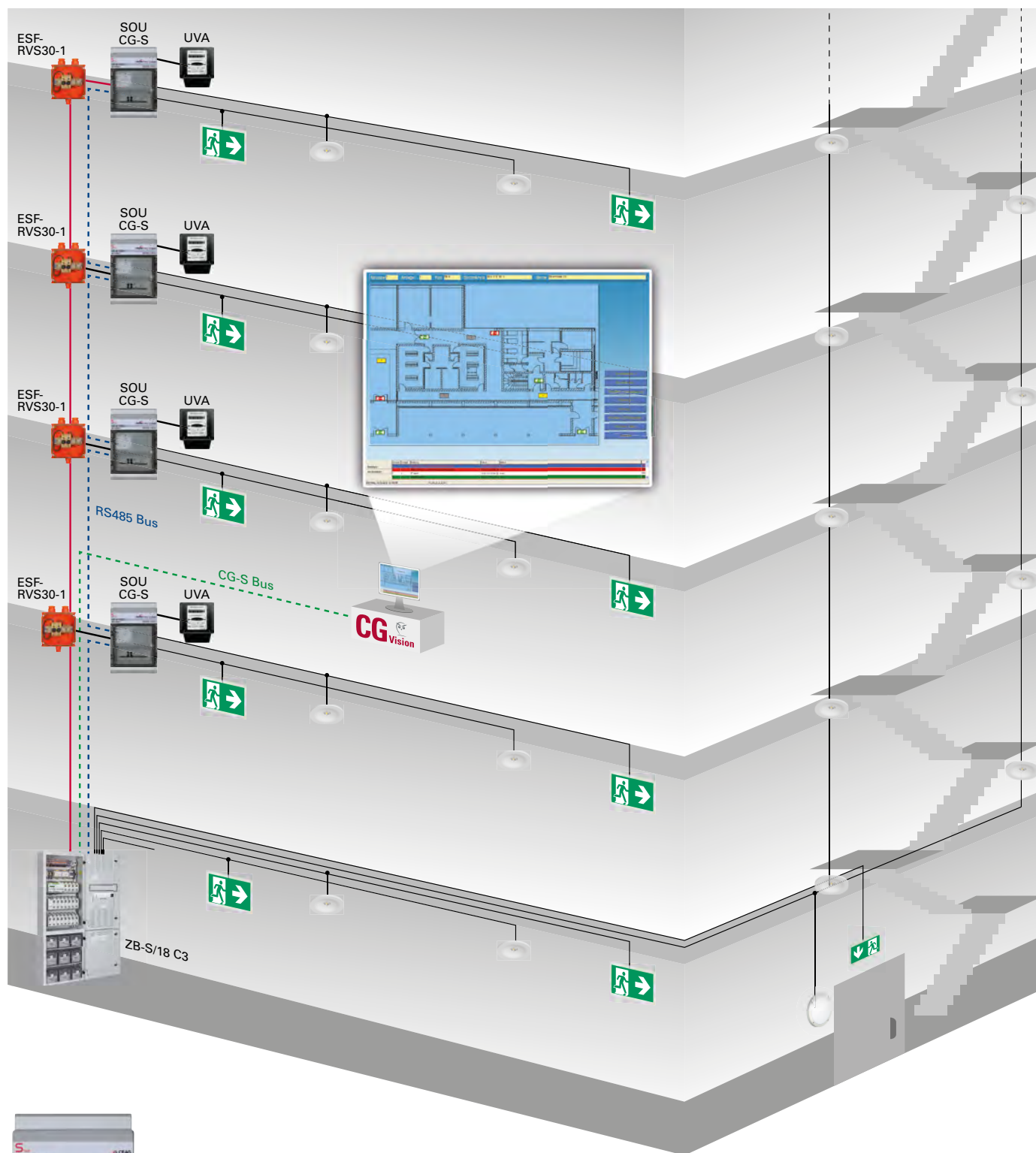
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# Central battery system ZB-S with STAR technology

## Installation example

Please note the country-specific regulations and guidelines for planning and realisation.



### US-S/ SOU1

Distribution board for area by area installation  
allows electricity costs allocation per rental area

# Central battery system ZB-S with single luminaire monitoring and STAR technology

*Planned Phase out end of 2020*

*Our recommendation:*

*Plan the new DualGuard-S system*



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

The STAR technology allows the switching mode of every connected CG-S luminaire to be freely programmed within a 50 or 60 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 graphic display monitors and controls the central battery system. It automatically tests all functions of the devices and emergency luminaires 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.

## Features:

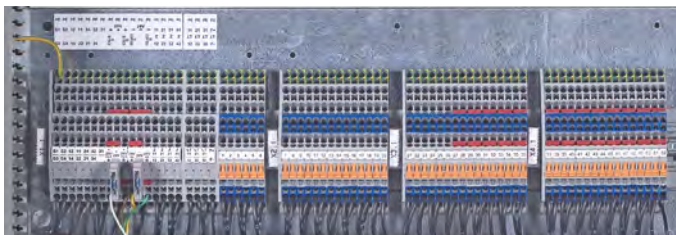
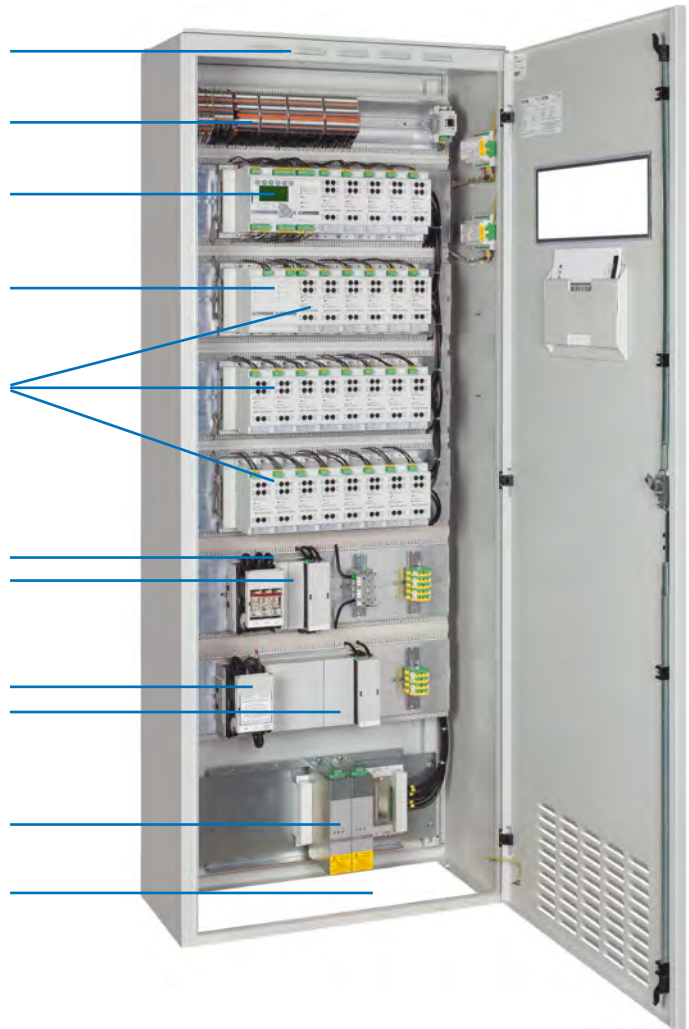
- Shortened inspection effort due to CEWA GUARD technology; automatic function monitoring of up to 20 luminaires per circuit
- Reduced installation expenditures by STAR-technology; freely programmable mixed operation of the switching modes per luminaire in one circuit
- Less installation costs as no data line is required to the luminaires
- Automatic luminaire search function
- Plain text display on the control module down to the last luminaire
- Flexible data storage for test log and system configuration with memory card
- Modular charging technology in the range of 5.5 to 1,000 Ah
- Energy-saving and increased service life via alternating switching of the charging modules and optimised efficiency

# Central battery system ZB-S with STAR technology

Planned Phase out end of 2020

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- Cable entry from top
- 3-tier-installation terminal with tension spring connection and N-isolation
- Control module (CU CG-S), battery control module (BCM), charge module CM 1.7 A, 4 x SKU's
- DC/DC converter (DCM)
- Circuit change-over module 23 x SKU's
- Load break switch, mains
- Terminal strip mains (optional)
- Load break switch, battery
- Terminal strip battery (optional)
- Charging module CM 3,4 A
- Cable entry from bottom



## Plenty of connection space for convenient wiring

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

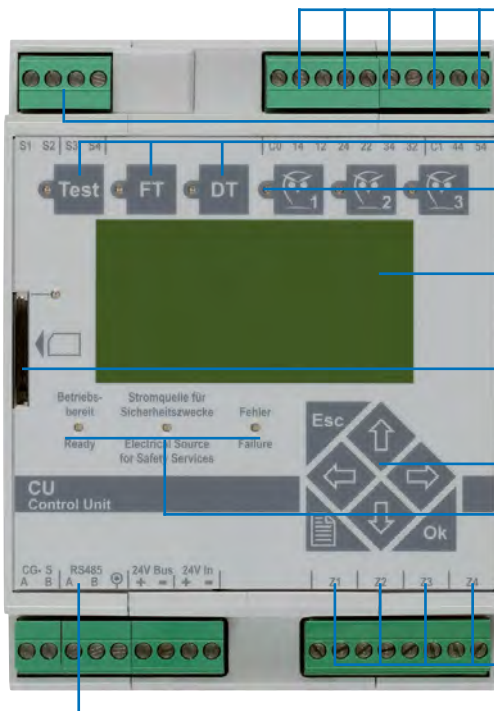
The wiring of the control module and the battery control module is standard. Wiring of the SKUs to 4 mm<sup>2</sup> triple deck installation terminals with spring connection and N disconnect terminal is optional.

## Charge modules CM 3.4 A each with a charging current of 3.4 A

The battery control module (BCM) drives up to 32 Charge modules CM 3.4 A to which the standby power batteries with a rated capacity of up to 1,000 Ah that are installed outside the switch cabinet are connected.



## Freely programmable control module



Connections for phase monitor and blocking switch with differential loop monitoring

three function keys, freely assignable

128 x 64 pixel graphic display, backlit, contrast and brightness adjustable

Seven control buttons for user-friendly navigation

four 24 V-inputs, freely allocated

Three potential-free alarm contacts, freely assignable, two potential-free alarm contacts with definite assignment

separate keys for

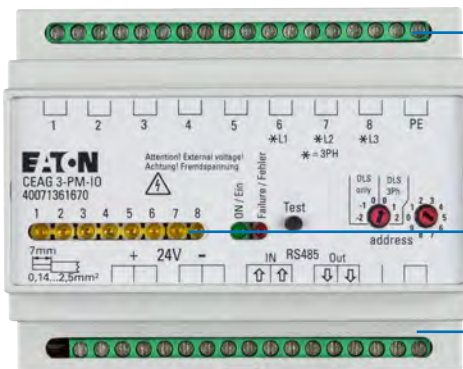
- Test (emergency function)
- Function test
- Duration test

Test book and device configuration easily stored on SD-Card. Easy programming from PC using SD-card-reader and CEAG's software.

LEDs for operation display

Terminals for data bus

## External 3-PM-IO Module for common switching of safety- and general lighting

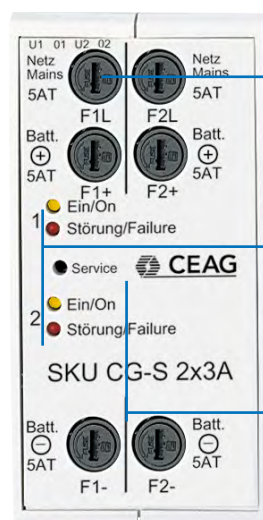


Freely programmable assignment of independent inputs (2.5 mm<sup>2</sup>) per emergency lighting circuit or per light

8 inputs with LED display

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

## 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

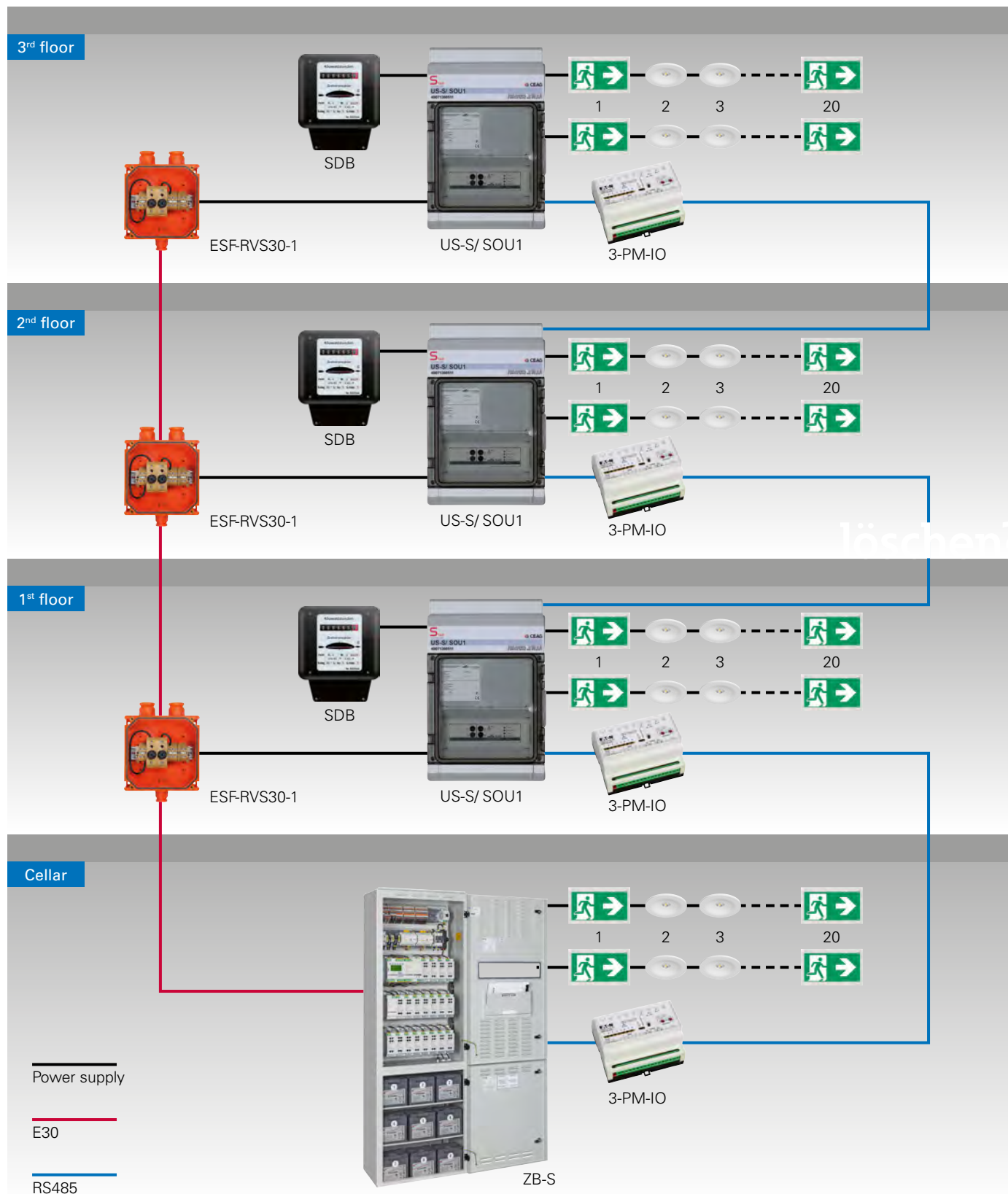
Service key for direct display in clear text at the control module of the change-over module status



# Central battery system ZB-S with STAR technology

Planned Phase out end of 2020

Installation example Emergency lighting system ZB-S with distribution board US-S/ SOU1.  
Please note the country-specific regulations and guidelines for planning and realisation.



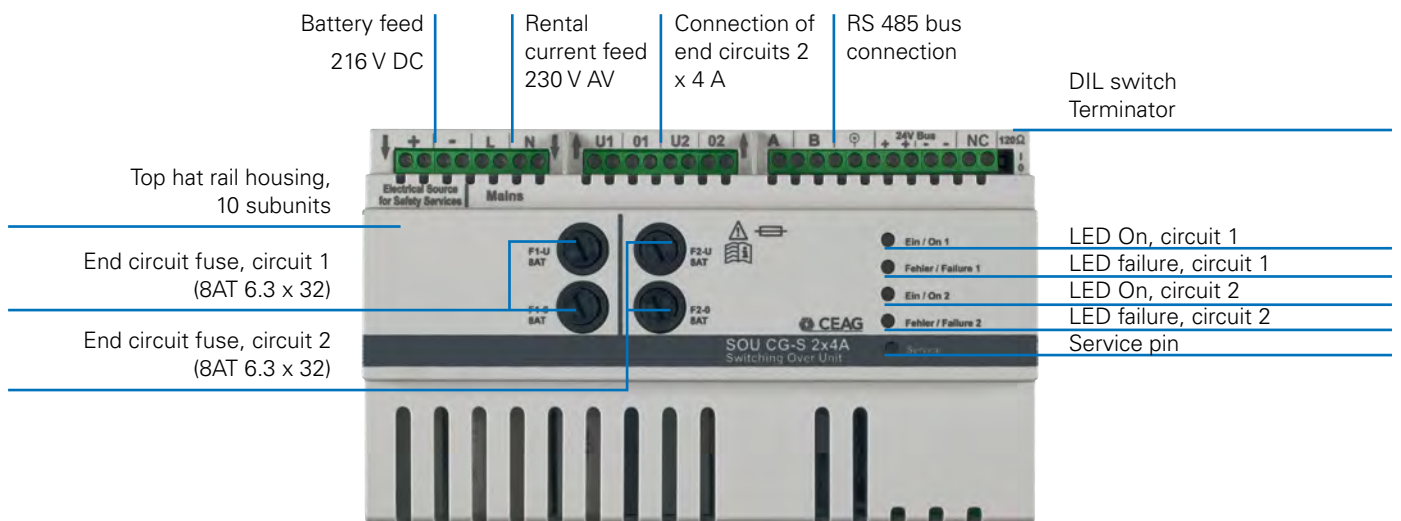


## Distribution Board US-S/ SOU1

- Area by area installation
- Electricity costs allocation per rental area
- Maintained light, non-maintained light and switched maintained light are possible in one common circuit
- Later circuit modifications do not pose any problem

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## Switching over unit SOU CG-S 2 x 4 A



## Safe operation under the most extreme environmental conditions

There are different types of sub-distributors available for compliance with the requirements on functional integrity of MLAR 11/2005.



US-S ESF30 13-P

### Sub-distributor in sheet steel housing

In accordance with the model guideline on fire protection requirements pertaining to wire systems (MLAR specimen guideline on wire systems), version 11/2005, verified by a National Material Testing Office.



Electric distributor with functional integrity

Experimental design for application as an electrical distributor with functional integrity. The functioning of all the installed electronic components was tested in a fire test.

# Central battery system ZB-S with STAR technology

Planned Phase out end of 2020



US-S ESF30 13-P

## Sub-distributor in Priodec housing

In accordance with the model guideline on fire protection requirements pertaining to wire systems (MLAR specimen guideline on wire systems), version 11/2005, verified by a National Material Testing Office.

Approved by the Deutsches Institut für Bautechnik (DIBT- German Institute for Civil Engineering) as an empty enclosure for fire protection with a fire resistance rating of minimum 30 minutes in case of external fire exposure, approval number of the empty enclosure: Z-86.1-46

Functional integrity exceeding 30 minutes is certified in an expert opinion, based on a fire test.



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Please scan the following QR code for direct access:



## Fire test in a video documentation

Please watch the video documentation of the fire test of the types of enclosures presented here:

<http://youtu.be/dk8qieMSiTI>



ESF30 SOU2

## Small distributor

In accordance with the model guideline on fire protection requirements pertaining to wire systems (MLAR specimen guideline on wire systems), version 11/2005, verified by a National Material Testing Office.

Tested by a Material Testing Office (MPA) as an empty fire protection enclosure with a fire resistance rating of minimum 30 minutes in case of an external fire exposure, with fire test number: No. 210006480-01.

Functional integrity exceeding 30 minutes is certified by a VDE certificate, together with an expert opinion relating to the electrical equipment based on a fire test.

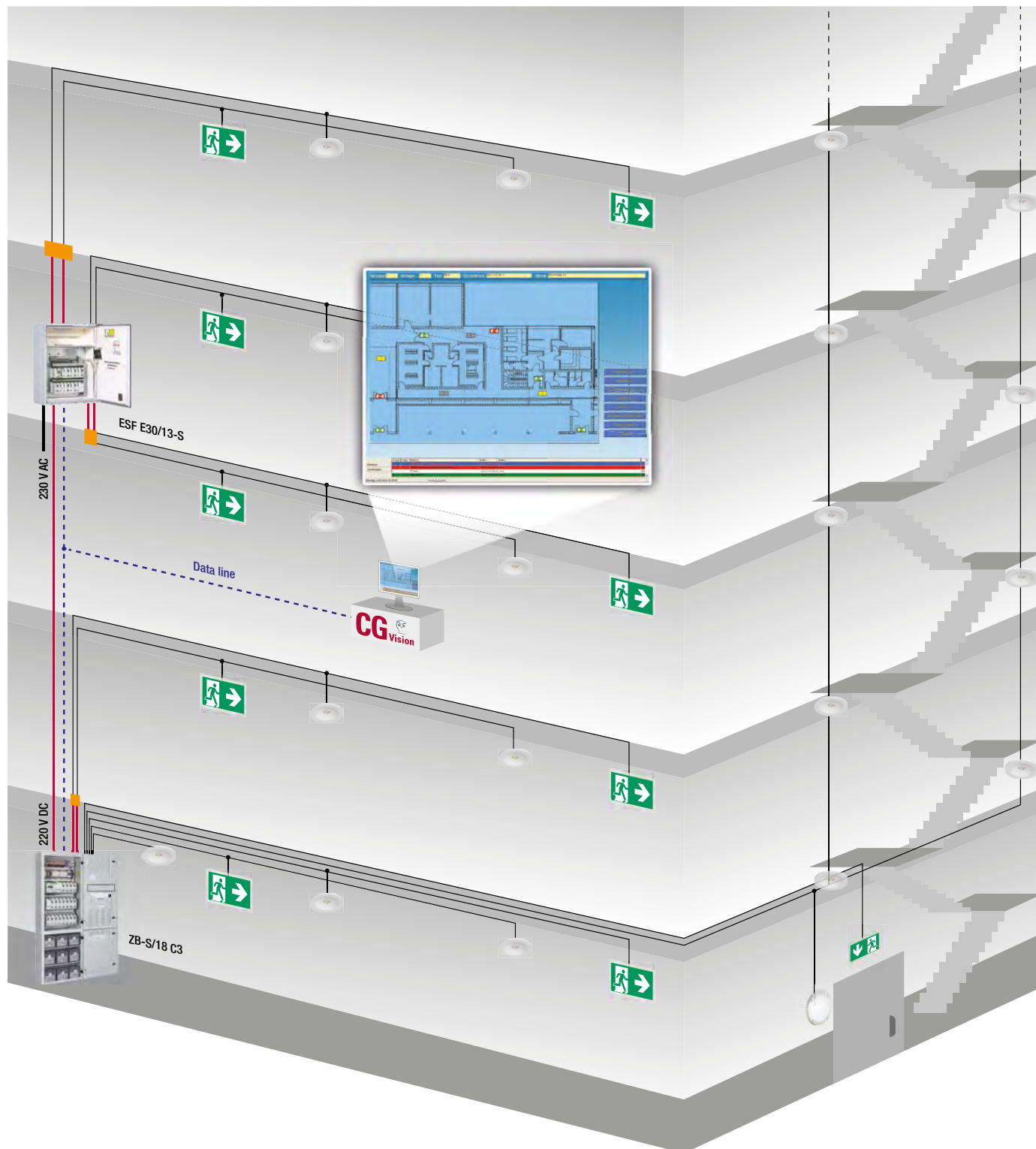




# Central battery system ZB-S with STAR technology

Planned Phase out end of 2020

Please note the country-specific regulations and guidelines for planning and realisation.





## Controle module

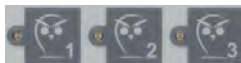
A freely programmable control module with non-volatile program memory and 4-line alpha-numeric graphic display monitors and controls the central battery system. All functions such as charging, mains/ emergency lighting selection and deep discharge protection of the devices and the emergency luminaires 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.

- Non-volatile 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 M<sup>3</sup>



## Sealed keypad with 3 keys for:

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



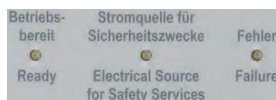
## 3 freely assignable function keys for:

- 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:

- Ready
- Electrical Source for Safety Services
- Failure



## Graphic display:

128 x 64 pixel, 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 immediate power on (maintained light) of the system.

### • Connection for floating signalling contacts and buzzer:

3 relays with common root, each 1x switch-over contact, 24 V 0,5 A.

2 relays with common root, each 1 x make contact, 24V 0.5A;

Buzzer

One or several of 12 various messages can be freely assigned to the three zero-potential contacts and buzzer. DIN VDE specification can be called up at any time as a pre-setting.

### • Connection for analog inputs:

4 of 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.

# Central battery system ZB-S with STAR technology

Planned Phase out end of 2020



Display	128 x 64 pixel graphic 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	– Ready – Electrical Source for Safety Services – Failure

## Potential-free signal contacts, buzzer

3 relays with common potential, 1 x switching contact each, Free programmable, VDE requirement can be called at any time as a preset.

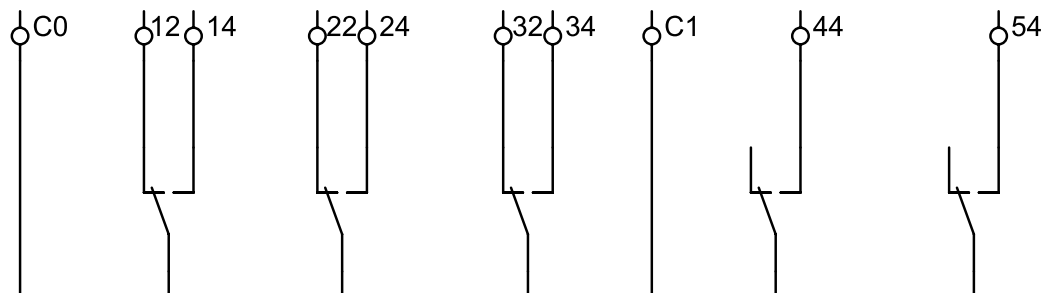
2 relays with common potential, 1 x normally open contact each, 24 V 0.5 A; buzzer.

## ZB-S default setting

Designation	Relay 1 C0/14/12	Relay 2 C0/24/22	Relay 3 C0/34/32	Relay 4 C1/44	Relay 5 C1/54	Buzzer
Mains operation		X				
Mains failure	X		X			
Mains failure UV	X					
Charging fault	X					
Circuit fault	X					
Luminaire fault	X					
Common system fault	X					
Total discharge protection	X					
ISO fault	X					
Function test		X				
Continuous operation test		X				
Device fault						

Permanently configured  
to external buzzer operation  
(analogue to internal buzzer)

Permanently configured for control  
of a technical cabinet ventilation.  
Default setting > 40°C ON < 35°C OFF.



## Ordering details

Type	Model	Order No.
Control module ZB-S for SD-card	Plug-in module	40071360300



SD Card



SD card reader



## Secure-Digital-Card

Flexible data storage for system and log book configuration, e.g. of the mandatory archiving of log book information for a minimum of 4 years.

The system can also be programmed at any PC using optional SD-card reader and CEAG software. Texts can also be entered on the control module in the switch cabinet.

Storage of:

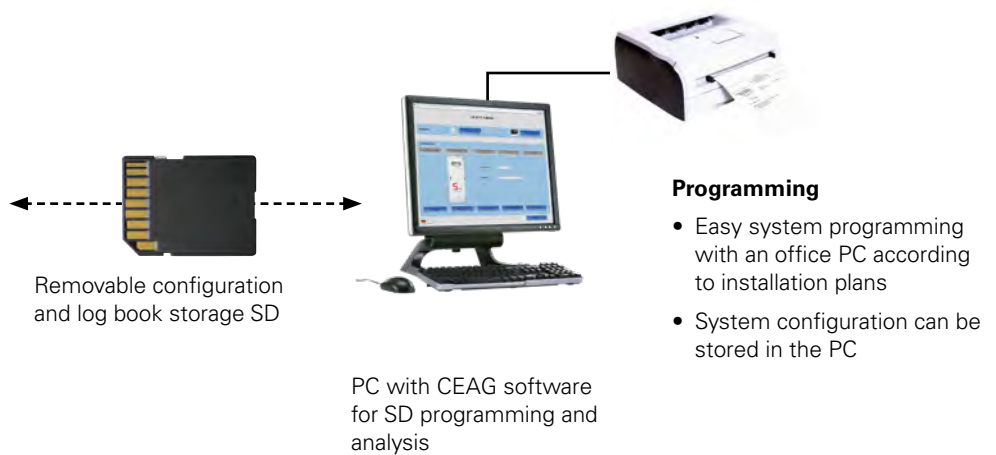
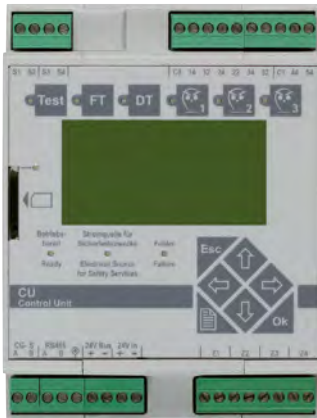
- 360,000 log book entries
- Location texts for the luminaires (20 characters per luminaire)
- Location texts of external modules such as phase monitor, TLS, 3-PM-IO (20 characters per module)
- Circuit names (20 characters per circuit)
- System name (20 characters)

## Ordering details

Type	Model	Order No.
SD card	SD card formatted for ZB-S	40071347911
SD card reader	SD card reader for USB-Port	40064070561
Software	Software for external programming of the ZB-S via PC	40071347152

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## Basic information about the SD card (Secure-Digital-Card)



# Central battery system ZB-S with STAR technology

Planned Phase out end of 2020

DC Converter PSU.1E



## DC Converter PSU.1E

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.

After more than 13 SKU CG-S 4 x 1.5 A or 26 SKU CG-S 2 x 3 A / 1 x 6 A a second DC/DC converter is needed. Please observe that all DC/ DC converters are operated on the same module assembly frame next to each other:

- Supplies 26 SKUs CG-S 2 x 3 A/1 x 6 A or 12 SKUs 4 x 1.5 A
- Incoming supply can be run via AC/AC
- Gear tray mounting

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)

## Ordering details

Type	Order No.
DC Converter PSU.1E	40071361981

AC-Module



## AC-Module

Together with the DC/DC converter.2, the optional AC module supplies the internal system voltage when the battery supply is isolated, e. g. for maintenance.

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-module 240 VA incl. mounting adapter	40071347162

SKU CG-S 4 x 1,5 A



## SKU CG-S 4 x 1,5 A

Hybrid operation of maintained light, non-maintained light and switched maintained light per module can be programmed with no additional data cable.

- Up to 20 luminaires can be monitored individually
- AC/DC switching per module
- Easy access to fuses
- LED indicates fault and Run/ON for each circuit
- Supplies electronic ballast and LED luminaires
- Service-friendly modular units are wired up and ready to connect to 3-tier 4 mm<sup>2</sup> disconnect neutral terminals (optional)
- Gear tray mounting

Fusing	2.5 AT / 6.3 x 32
Continuous current rating	1.5 A per circuit
Max. inrush current*	60 A per circuit/240 A per module
Typical switch over time	AC/DC approx. 450 ms
Own consumption	7.7 W

\* Example: For two circuits => 120 A per circuit  
For four circuits => 60 A per circuit

## Ordering details

Type	Scope of supply	Order No.
SKU	Circuit change over module SKU CG-S 4 x 1.5 A	40071347840
Spare part	Fuse 2.5 AT (6.3 x 32), PU: 10 pcs.	40071070716

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
- AC/DC switching per each circuit
- Separate fusing for mains and battery operation
- Easy access to fuses
- LED indicates fault and Run/ON for each circuit
- Supplies electronic ballast and LED-luminaires
- Service-friendly modular units are wired up and ready to connect to 3-tier 4 mm<sup>2</sup> disconnect neutral terminals (optional)
- Gear tray mounting

Fusing	5 AT / 6.3 x 32
Continuous current rating	3 A per circuit
Max. inrush current	250 A per circuit
Typical switch over time	AC/DC approx. 450 ms
Own consumption	3.85 W

## Ordering details

Type	Scope of supply	Order No.
SKU	Circuit change over module SKU CG-S 2 x 3 A	40071347051
Spare part	Fuse 5.0 AT (6.3 x 32), PU: 10 pcs.	40071689047

# Central battery system ZB-S with STAR technology

Planned Phase out end of 2020

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
- Easy access to fuses
- LED indicates fault and Run/ON for each circuit
- Supplies electronic ballast and LED luminaires
- Service-friendly modular units are wired up and ready to connect to 3-tier 4 mm<sup>2</sup> disconnect neutral terminals (optional)
- Gear tray mounting

Fusing	10 AT / 6.3 x 32
Continuous current rating	6 A per circuit
Max. inrush current	250 A per circuit
Typical switch over time	AC/DC approx. 450 ms
Own consumption	3.85 W

## Ordering details

Type	Scope of supply	Order No.
SKU	Circuit change over module SKU CG-S 1 x 6 A	40071347345
Spare part	Fuse 10 AT (6.3 x 32), PU: 10 pcs.	40071070715

SOU CG-S 2 x 4 A



## SOU CG-S 2 x 4 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
- AC/DC switching per module
- Separate AV-feed for rental current
- Easy access to fuses
- LED indicates fault and Run/ON for each circuit
- Supplies electronic ballast and LED luminaires
- Service-friendly modular units are wired up and ready to connect to 3-tier 4 mm<sup>2</sup> disconnect neutral terminals (optional)
- DIN rail mounting

Fusing	8 AT / 6.3 x 32
Continuous current rating	4 A per circuit
Max. inrush current	250 A per circuit
Typical switch over time	AC/DC approx. 450 ms
Own consumption	≤ 9 W (for 2 x 4 A)
Dimensions	178 x 108 x 60

## Ordering details

Type	Scope of supply	Order No.
SOU CG-S 2 x 4 A	Switching over unit SOU CG 2 x 4 A	40071360430
Spare part	Fuse 8 AT (6.3 x 32), PU: 10 pcs.	40071360484

SKU CG 2 x 3 A



## SKU CG 2 x 3 A

Change-over module SKU, module without STAR Function

- Up to 20 luminaires can be monitored individually
- AC/DC switching per each circuit
- Separate fusing for mains and battery operation
- Easy access to fuses
- LED indicates fault and Run/ON for each circuit
- Supplies electronic ballast and LED-luminaires
- Service-friendly modular units are wired up and ready to connect to 3-tier 4 mm<sup>2</sup> disconnect neutral terminals (optional)
- Gear tray mounting

Fusing	5 AT / 6.3 x 32
Continuous current rating	3 A per circuit
Max. inrush current	120 A per circuit
Typical switch over time	AC/DC approx. 450 ms
Own consumption	3.85 W

## Ordering details

Type	Scope of supply	Order No.
SKU	Circuit change over module SKU CG 2 x 3 A	40071347290
Spare part	Fuse 5 AT (6.3 x 32), PU: 10 pcs.	40071689047

SKU CG 1 x 6 A



## SKU CG 1 x 6 A

Change-over module SKU, module without STAR Function

- Up to 20 luminaires can be monitored individually
- Separate fusing for mains and battery operation
- Easy access to fuses
- LED indicates fault and Run/ON
- Supplies electronic ballast and LED luminaires
- Service-friendly modular units are wired up and ready to connect to 4 mm<sup>2</sup> 3-tier disconnect neutral terminals (optional)
- Gear tray mounting

Fusing	10 AT / 6.3 x 32
Continuous current rating	6 A per circuit
Max. inrush current	180 A per circuit
Typical switch over time	AC/DC approx. 450 ms
Own consumption	3.85 W

## Ordering details

Type	Scope of supply	Order No.
SKU	Circuit change over module SKU CG 1 x 6 A	40071347346
Spare part	Fuse 10 AT (6.3 x 32), PU: 10 pcs.	40071070715

# Central battery system ZB-S with STAR technology

Planned Phase out end of 2020

SWR 150 sinus inverter supplies



## SWR 150

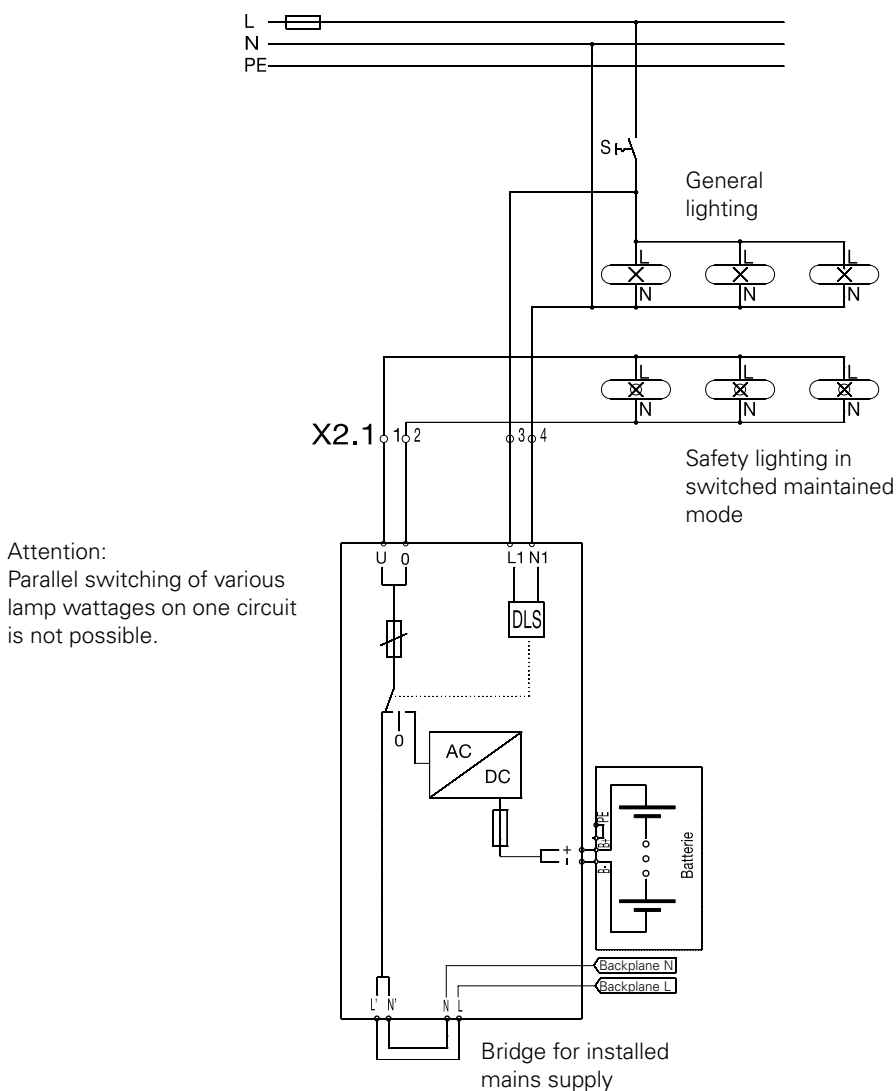
The SWR 150 sinus inverter supplies and monitors emergency luminaires with conventional ballasts. In battery operation, the sinus inverter supplies a sinus voltage of 230 V AC. By altering the frequency of the output sinus voltage, the luminous flux of emergency luminaires with conventional ballast can be regulated in emergency lighting operation so that an optimum utilization of the available power is ensured. The functioning of a connected luminaire is checked by circuit monitoring.

- Gear tray mounting


Slots	1
Fusing	G-Fuse 5 x 20
Max. rated current AC	0.65 A
Max. rated current DC	1.00 A
Max. connection terminals	150 VA
for luminaire	KVG
Rated power DC/DC-converter	2.3 W
Distortion factor	< 5 %

## Ordering details

Type	Scope of supply	Order No.
SWR 150	Indicate light source and luminous flux ratio	40071347960



**Table 1. Battery current consumption values (A) dependent upon number of luminaires and luminous flux ratio (LV%) at 20°C ambient temperature at the luminaire.**

International description		 T5	
Base		G5	
Lamp power (W)		8W-VVG	
Luminous flux ratio (%)	100	51	35
Switch setting	0	4	9
Number of luminaires /			
Current consumption from the battery /	[A] [VA]	[A] [VA]	[A] [VA]
Apparent power			
1	0.175 / 36	0.123 / 19	0.118 / 12
2	0.258 / 72	0.150 / 37	0.090 / 24
3	–	0.213 / 56	0.120 / 36
4	–	0.246 / 74	0.157 / 48
5	–	0.276 / 92	0.192 / 60
6	–	0.322 / 110	0.220 / 71
7	–	–	0.240 / 83
8	–	–	0.260 / 94
9	–	–	0.280 / 105

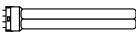
**Table 2. Battery current consumption values (A) dependent upon number of luminaires and luminous flux ratio (LV%) at 20°C ambient temperature at the luminaire.**

International description												T26	
Base												G13	
Lamp power (W)												58	18
Luminous flux ratio (%)												100	87
Switch setting												0	1
Number of luminaires / Current consumption from the battery / Apparent power												[A] [VA]	[A] [VA]
1												0.62 147 0.37 84 0.35 81 0.47 107 0.34 80 0.31 71 0.30 70 0.37 85 0.31 72 0.26 60 0.26 60	
2												– – – – – – – – 0.59 137 0.47 109 0.36 83 – – 0.56 121 0.33 75 0.29 67	
3												– – – – – – – – – – – – – – – – 0.47 108 0.35 82	

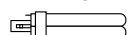
# Central battery system ZB-S with STAR technology

Planned Phase out end of 2020

**Table 3. Battery current consumption values (A) dependent upon number of luminaires and luminous flux ratio (LV%) at 20 °C ambient temperature at the luminaire.**

		TC-L																	
International description																			
Base		2G11																	
Lamp power (W)		36	36	36	24	24	24	24	18	18	18	18	18	18	18	18	18	18	18
Luminous fluxverhältnis (%)		100	59	43	100	73	57	46	100	71	52	47	47	47	47	47	47	47	47
Switch setting		0	5	9	0	3	6	9	0	3	7	9	9	9	9	9	9	9	9
Number of luminaires /																			
Current consumption from the battery /		[A]	[VA]	[A]	[VA]	[A]	[VA]	[A]	[VA]	[A]	[VA]	[A]	[VA]	[A]	[VA]	[A]	[VA]	[A]	[VA]
Apparent power																			
1		0.47	108	0.30	70	0.29	68	0.38	89	0.28	64	0.27	62	0.27	65	0.39	90	0.26	60
2		-	-	0.43	96	0.33	76	-	-	0.42	99	0.34	79	0.32	74	-	-	0.42	98
3		-	-	0.58	135	0.44	103	-	-	0.61	136	0.44	103	0.37	86	-	-	0.57	135
4		-	-	-	-	-	-	-	-	-	-	0.56	130	0.47	105	-	-	-	-

**Table 4. Battery current consumption values (A) dependent upon number of luminaires and luminous flux ratio (LV%) at 20 °C ambient temperature at the luminaire.**

		TC-D																	
International description																			
Base		G24Q1. G24Q2																	
Lamp power (W)		26	26	26	26	18	18	18	18	13	13	13	13	10	10	10	10	10	10
Luminous flux ratio (%)		100	71	61	47	100	79	63	48	100	77	63	42	100	68	52	52	52	52
Switch setting		0	3	5	9	0	2	5	9	0	2	4	9	0	4	9	9	9	9
Number of luminaires /																			
Current consumption from the battery /		[A]	[VA]	[A]	[VA]	[A]	[VA]	[A]	[VA]	[A]	[VA]	[A]	[VA]	[A]	[VA]	[A]	[VA]	[A]	[VA]
Apparent power																			
1		0.36	85	0.28	63	0.27	61	0.27	64	0.30	51	0.26	37	0.24	29	0.23	24	0.26	60
2		-	-	0.39	93	0.35	80	0.33	76	0.47	87	0.35	64	0.29	47	0.28	37	0.39	90
3		-	-	0.54	126	0.45	104	0.36	80	0.65	114	0.48	86	0.36	65	0.32	48	0.53	121
4		-	-	-	-	0.57	132	0.43	97	-	-	0.60	106	0.44	81	0.34	62	-	-
5		-	-	-	-	-	-	-	-	0.71	125	0.53	94	0.40	73	-	-	0.57	130
6		-	-	-	-	-	-	-	-	0.60	108	0.44	83	-	-	-	-	0.52	120
7		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.59	136



PD 3 printer



## PD 3 printer

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 automatic with 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 information on possible failures of the luminaires (e. g. defective lamp) can be printed out in detail.

- Gear tray mounting

Printing paper	Woodfree printer paper
Paper width	57.5 mm
Max. diameter of the paper roll	61 mm
Plug-in module	12 mm

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## Ordering details

Type	Scope of supply	Order No.
PD 3	Plug-in module	40071347316
Spare part	1 roll printing paper	40078079666
Spare part package	1 colour ribbon and 1 roll printing paper	40071346042

# Central battery system ZB-S with STAR technology

Planned Phase out end of 2020

CG IV relay modules



### CG IV / CG V relay modules

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

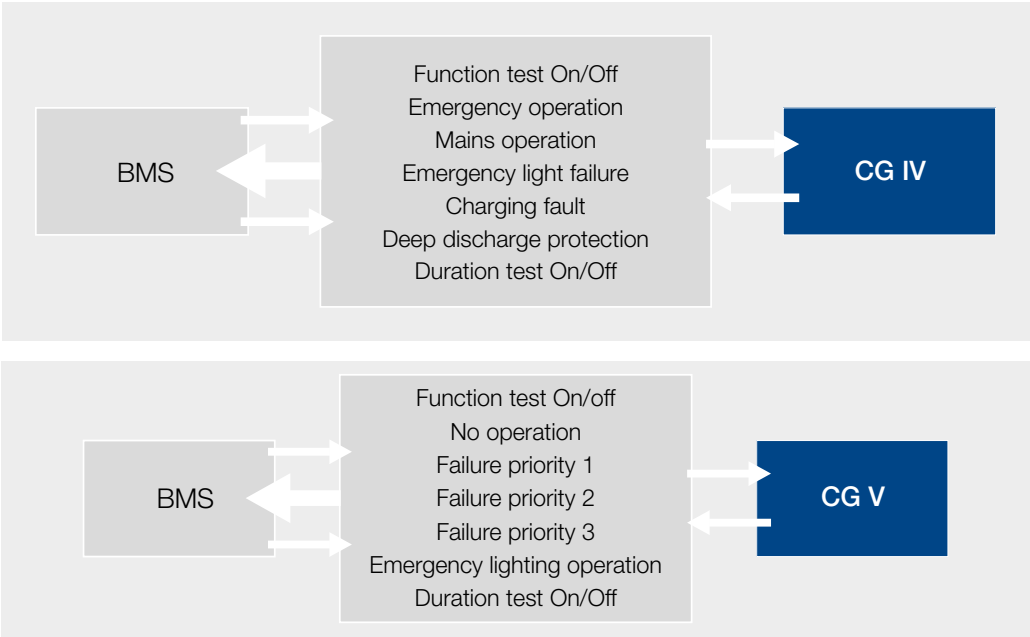
- Gear tray mounting

Connection terminals/Clamp terminals	2.5 mm <sup>2</sup> rigid and flexible
Switching capacity of the contacts	24 V/0.5 A AC DC

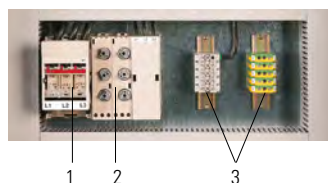
### Ordering details

Type	Scope of supply	Order No.
CG IV	Plug-in module	40071343971
CG V	Plug-in module	40071347800

CG V relay modules



Mains distribution board



## 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 disconnect (1) with a maximum conductor size of 50 mm<sup>2</sup> 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.

Mains distribution module D02-E18

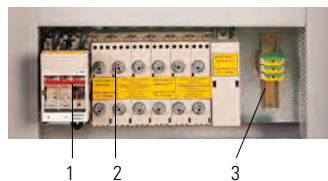


Current rating	63 A
Rated operating voltage	400 V
Box terminal for circulator conductor	to 16 mm <sup>2</sup>
Material	Polyamide (PA 6.6), 30 % glass-fibre-reinforced
Scope of supply	incl. 3 pcs. screw caps E18 and 3 pcs. D02-fuse inserts 25 A

## Ordering details

Type	Scope of supply	Order No.
Mains distribution module for track mounting	incl. 3 pcs. screw caps E18 and 3 pcs. D02-fuse inserts 25 A	40071347160

Battery distribution board



## 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 disconnect (1) with a maximum conductor size of 50 mm<sup>2</sup> 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.

Battery distribution module D02-E18



Current rating	63 A
Rated operating voltage	400 V
Box terminal for circulator conductor	to 16 mm <sup>2</sup>
Material	Polyamide (PA 6.6), 30 % glass-fibre-reinforced
Scope of supply	incl. 2 pcs. screw caps E18 and 2 pcs. D02-fuse inserts 25 A

## Ordering details

Type	Scope of supply	Order No.
Battery distribution module for track mounting	incl. 2 pcs. screw caps E18 and 2 pcs. D02-fuse inserts 25 A	40071347161

## Cover strip

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 at the trunking section	40071347192

# Central battery system ZB-S with STAR technology

Planned Phase out end of 2020

Battery Control Module (BCM.1E)



## Battery Control Modul (BCM.1E)

The BCM.1E battery control module is for control of the CM 1.7 A and CM 3.4 A charging modules via the Charge Control Bus (CCB). Messages such as fault, isolation fault and boost charge can be forwarded via the zero-potential signal contacts of the BCM.1E.

LEDs on the module signal boost charge, charge fault and isolation fault between the battery + and PE or battery – and PE.

For simulating a battery isolation fault there are two buttons: ISO+ and ISO

Charging characteristics	IU
Terminals	2.5 mm <sup>2</sup> rigid and flexible
End-of-charge voltage (factory setting for +20°C)	boost charge 259 V DC trickle charge 248 V DC
Deep discharge protection	183.6 V DC
Potential-free signal contacts	0.5 A/24 V AC/DC

## Ordering details

Type	Scope of supply	Order No.
BCM.1E	Battery Control Module for installation on gear tray	40071361980

Charging module CM 1.7 A



## Charging modules CM 1.7 A and CM 3.4 A

To realise the recharging duration for planned battery sets, the quantity of required charge modules should be used as specified in Table 3 (in this section).

Charging current CM 1.7 A	1.7 A
Charging current CM 3.4 A	3.4 A
Control of the charging modules (32 max.) via the Battery Control Module and the CCB.	
To save energy and extend service life of the charge modules, these are alternatively switched with the float charge.	

## Ordering details

Type	Scope of supply	Order No.
Charging module CM 1,7 A	For installation on gear tray	40071360340
Charging module CM 3.4 A	For installation on separate gear tray	40071360370

Charging module CM 3.4 A



Charging module rack 4-way



Charging module rack 2-way



## Charging module rack

A 4-way Charging module rack with 3-phase supply is mounted in system types ZB-S/26 and ZB-S/18. For supplying the CM 3.4 A boost chargers only!

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

Connection voltage	400 V AC/220 V DC
Slots 3-phase split	
Conductor size	max. 4 mm <sup>2</sup>

## Ordering details

Type	Scope of supply	Order No.
Charging module rack 4-way	Unit accommodates 4 charging modules CM 3.4 A for ZB-S/26 and ZB-S/18	40071347043
Charging module rack 2-way	Unit accommodates 2 additional charging modules CM 3.4 A for ZB-S/26 and ZB-S/18 (only in conjunction with 40071347043)	40071347130

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Charging module rack 1-way, compact



## Charging module rack, compact

The compact version of the Charging module rack is intended for use in ZB-S compact systems. The single and double compact Charging module racks have been designed for system types ZB-S/10 C and ZB-S/10 C6 respectively. These are for supplying CM 3.4 A boost chargers only!

Connection voltage	230 V AC/220 V DC
Conductor size	max. 2.5 mm <sup>2</sup>

## Ordering details

Typ	Lieferumfang	Bestell-Nr.
Charging module rack 1-way	Unit accommodates 1 charging module CM 3.4 A compact for ZB-S/10 C	40071347167
Charging module rack 2-way	Unit accommodates 2 charging modules CM 3.4 A compact for ZB-S/10 C6	40071347130

Connection terminals



## Connection terminals

Standard terminals up to 4 mm<sup>2</sup>, rigid or flexible, are provided for connecting the external phase monitors, monitoring equipment and control units. Optional terminals up to 4 mm<sup>2</sup> on DIN rail for rigid or flexible cables are provided for connecting the final circuits. The terminals are designed as 3-level neutral disconnect terminals.

# Central battery system ZB-S with STAR technology

## Components and options

RCM-AR flush-mounted



RCM-AS surface-mounted



### RCM-A remote indication

The RCM-A remote display uses a battery power supply to display the the most important system functions safely. A key-operated switch can be used to block emergency lighting operation during periods of inactivity. The remote indicator thus fulfils the requirement that remote switching is only permissible if actuation by Unauthorized persons are not possible. By blocking the emergency operation the battery maintenance charge is not affected. A differential loop monitoring leads to Short-circuit or open-circuit detection to make the system ready for operation. LED indicators: System operational, power source for safety purposes, error.

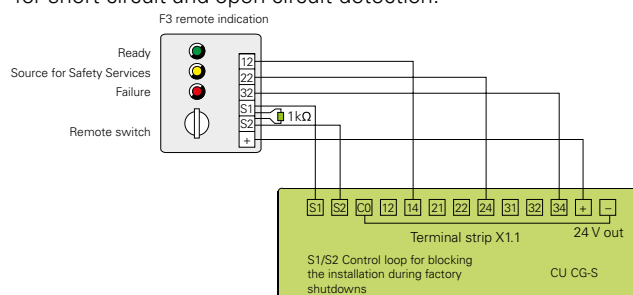
	RCM-AS surface-mounted	RCM-AR flush-mounted
Mechanic		
Dimensions (W x H x D mm)	80 x 80 x 52	80 x 80 12 (without flush-mounted box) Diameter flush-mounted box: 70 mm Deep flush-mounted box: 64 mm
Weight	0.15 kg	0.16 kg
Degree of protection	IP 20	IP 20
Material	Thermoplast	
Resistant up to Flammability	650°C	
Environment		
Ambient temperature	-5°C ... +35°C	
Storage temperature	-20°C ... +65°C	
Relative humidity	10% ... 95% no condensation	
Air pressure	795 ... 1080 hPa	
EMC		
Interference immunity	EN/IEC 61000-6-2	
Interference radiation	EN/IEC 61000-6-3	
Electrical parameters		
Rated voltage	24 V DC (SELV)	
Degree of pollution	2	
Power consumption	< 1 W	
Installation		
Lead	J-Y(ST)Y 4 x 2 x 0.8	
Max. Cable length	2000 m	

### Ordering details

Type	Scope of supply	Order No.
RCM-AS remote indication	Subassembly for wall mounting	40071362390
RCM-AR remote indication flush-mounted	Component for installation in switch or cavity wall sockets according to DIN VDE 0606	40071362395

### 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

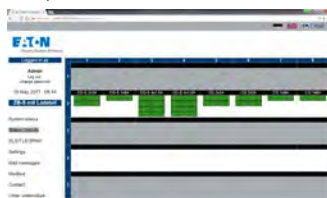
Webmodule CG-S



Example: Device status



Example: SKU-Status



## Cyber Security:

see White Paper WP152002EN  
"Cyber security considerations  
for electrical distribution sys-  
tems"  
[www.eaton.com](http://www.eaton.com)

## Webmodule CG-S (ZB-S/AT-S+)

Webmodule ZB-S/AT-S+ for visualisation and monitoring of a central battery system, type ZB-S/US-S via a local ethernet (LAN) or internet (WWW) with a conventional WEB browser. Access to the web-module via internet (WWW) must be administrated from an IT department on-site. Integrated mail-client for comfortable, event orientated failure information, for up to 5 E-mail recipients. Access via administrator account or guest account, with password protection.

- Easy menu structure
- Any type of display devices can be used with a WEB browser, for example notebook, tablet PC, iPad or smartphone
- Full visualisation and monitoring of a ZB-S (central battery system) via ethernet (LAN) with conventional WEB browser (e.g. Internet Explorer, Firefox etc.)
- Display of all actual operation modes
- Local failure information of each emergency circuit and luminaires with destination information in plain text
- Permanent actual information of the charging unit and battery
- Parallel access to the web module from different workstations possible (max. 8)
- Integrated mail client for comfortable failure notification via encrypted mail
- Type of different failures for the mail transmission is selectable
- Up to 5 mail recipients programmable
- Actualisation cycle of the web browser via the web module is adjustable
- Encrypted transmission
- Authenticated access via administrator account with password protection
- Adjustable guest account with restricted access with password protection
- Static or dynamic (DHCP) IP-addressing possible
- Supports IPv4/IPv6 (Internet Protocol version 4/version 6)
- Any number of modules can be operated in parallel
- Overview display of all active web modules in local ethernet with status display and hyperlink function
- Includes 2 Modbus sockets as standard

Supply voltage device	24 V DC
Rated power	< 1.1 W
Connection	RJ45
Degree of protection	IP20
Weight	0.05 kg
Dimensions	90 x 35 x 31
Enclosure	Polycarbonate

## Ordering details

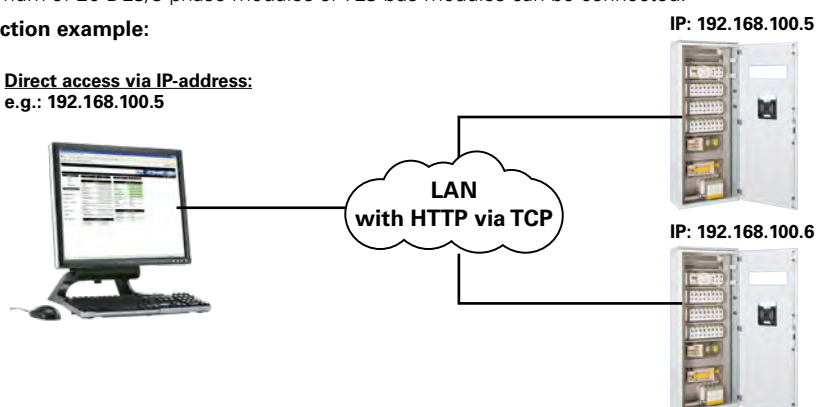
Type	Scope of supply	Order No.
Webmodule CG-S (ZB-S/AT-S+)	Module for DIN-rail mounting, incl. connection without patch line RJ45	40071361383

## Notes:

If a webmodule integrated in the ZB-S is supplied by the DC/DC.2 converter (external 24 V), a maximum of 20 DLS/3-phase modules or TLS bus modules can be connected.

## Connection example:

**Direct access via IP-address:**  
e.g.: 192.168.100.5





# Central battery system ZB-S with STAR technology

Planned Phase out end of 2020

CEAG 3-PM Voltage monitoring module



## CEAG 3-PM Voltage monitoring module

To avoid risks from mains failures, it is necessary to permanently monitor the function of the mains lighting light distributors in order to switch on the safety lighting in the event of a fault. Thus the CEAG 3-PM modules are an important part of the safety system.

If one phase fails, the CEAG 3-PM module switches a relay contact and interrupts the 24 V current loop to the emergency lighting units. All emergency luminaires in stand-by circuit are switched to continuous light. A second relay contact is used to signal the power failure.

- No E30 wiring due to short circuit and interruption tolerant 24V current loop technology.
- Test button for mains/emergency light failure thus no interruption of the mains voltage necessary and thus no failures of the operational processes.

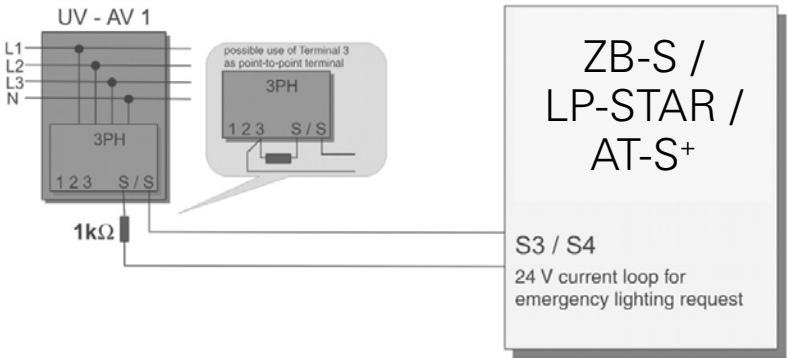
Dimensions mm (H x W x D)	85 x 52.5 x 65, 3 subunits
Enclosure	Plastic, light grey
Connection terminals	2.5 mm <sup>2</sup> rigid and flexible
Type of mounting	DIN mounting rail
Contact	0.5 A/24 V AC/DC, 1 x open contact, 1 x changeover contact
Trigger threshold	$U < 85 \% U_N$

## Ordering details

Type	Scope of supply	Order No.
CEAG 3-PM Modul with Test-Taster	Module ready for mounting	40071361660

## Current loop

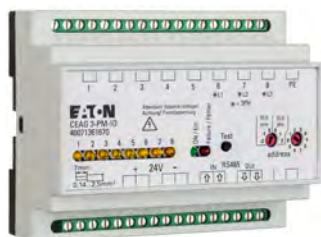
24 V current loop for emergency lighting request using differential loop monitoring for short-circuit and open circuit detection.



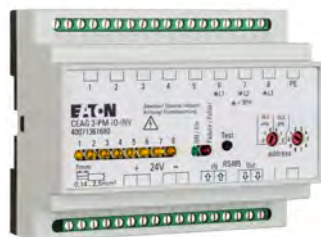
- |                                     |   |
|-------------------------------------|---|
| Differential monitoring:            | A short or open circuit causes the system to energise immediately (maintained light). |
| Phase monitor switch closed (1 kΩ): | Normal system mode  |



CEAG 3-PM-IO Modul



CEAG 3-PM-IO-INV Modul



## External CEAG 3-PM-IO and CEAG 3-PM-IO-INV module

To avoid risks from mains failures, it is necessary to permanently monitor the function of the general lighting light distributors in order to switch on the safety lighting in the event of a fault. Thus, the CEAG 3-PM-IO and CEAG 3-PM-IO-INV modules are an important part of the safety system.

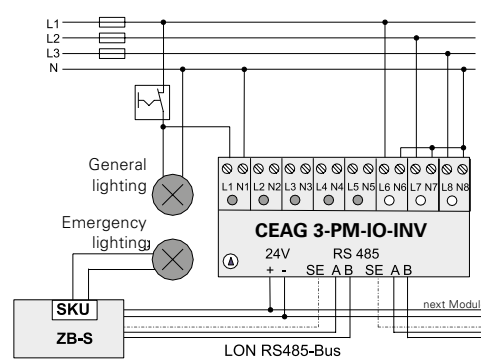
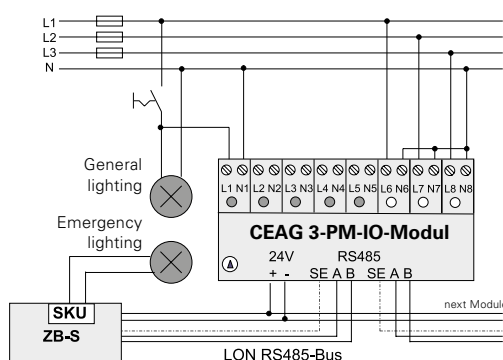
- Permanent function monitoring of the entire system by bus technology
- Automatic logging of all test results in the test log book
- Test button for mains / emergency light failure thus no interruption of the mains voltage necessary and thus no malfunctions of the operational processes
- 3-PM-IO Modul: Eight measurement inputs for monitoring up to three phases and up to five\* light switches
- 3-PM-IO-INV Modul: Eight inverted measurement inputs for monitoring up to three phases and up to five\* light switches
- Freely configurable assignment of the measuring inputs to the emergency lighting
- No E30 wiring of bus illumination due to Fail Save Bus technology

\* If the phase monitor function is not required, all eight measurement inputs can be used for light switch enquiry.

	CEAG 3-PM-IO	CEAG 3-PM-IO-INV
Rated voltage	24 V DC (min. 19 V, max. 30 V)	
Current consumption (all 8 channel connected)	20 mA ± 5 mA	
Degree of protection	IP20	
Insulation class	I	
Ambient temperature	- 10 ° to + 40 °C	
Input channels 8	8 (potential free $U_N = 230$ V)	8 (potential free $U_N = 230$ V)
3-PM (channel 1-8)	3-PM (Chan. 1-8) > 195 V-> ON	3-PM (Chan. 1-8) < 195 V-> OFF
3-PH (channel 1-5)	< 138 V-> OFF	> 138 V-> ON
Data bus / Address range	RS 485 / 1-25	
Weight	0.2 kg	
Dimensions (L x W x H) mm	105 x 85 x 60	
Mounting	DIN-rail	
Connection terminals	2.5 mm <sup>2</sup> rigid and flexible	

## Ordering details

Type	Scope of supply	Order No.
CEAG 3-PM-IO-Modul with Test-Taster	Module for DIN rail mounting	40071361670
CEAG 3-PM-IO-INV-Modul with Test-Taster	Module for DIN rail mounting with inverse switching logic	40071361680
DIN mounting rail	4 pcs. DIN-rails for mounting external modules in the cabinet incl. mounting accessories	40071347125



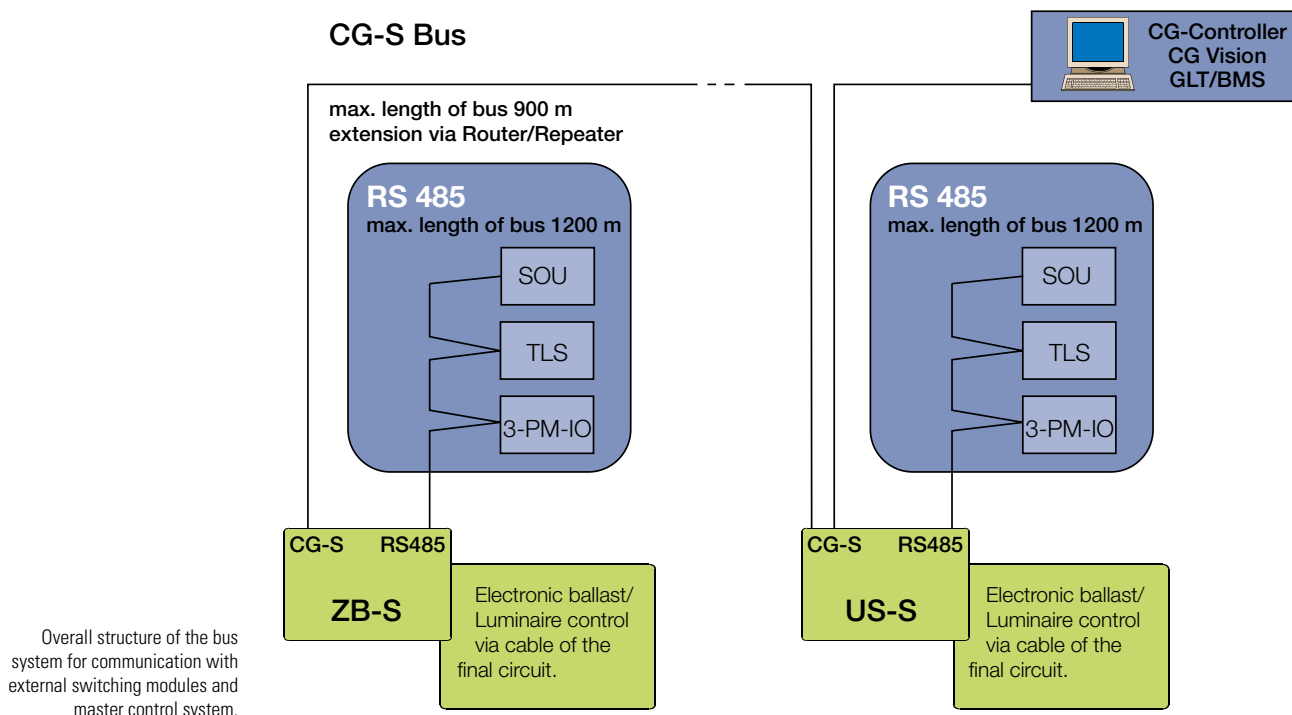
# Central battery system ZB-S with STAR technology

Planned Phase out end of 2020

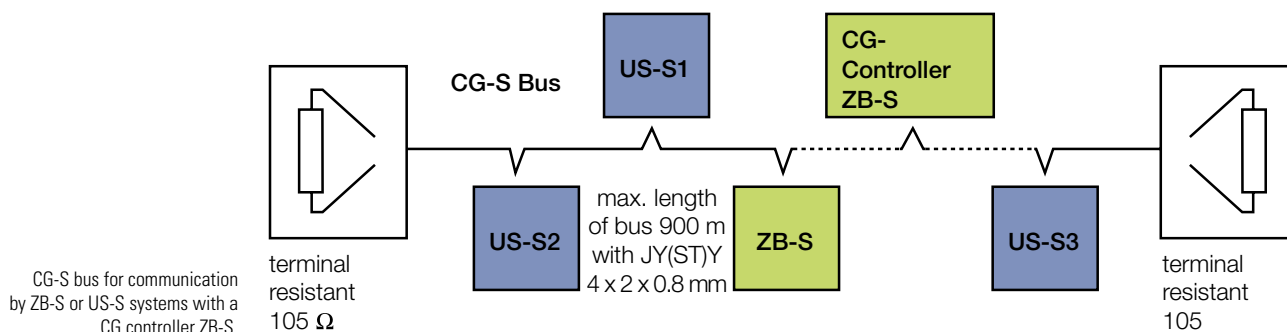
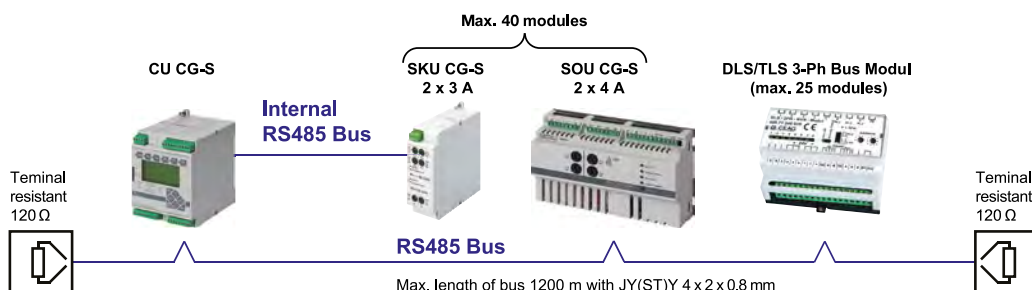
## Bus technology according to RS 485

An RS 485 bus is used for data communication with external bus modules (3-PM-IO 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.

### CG-S Bus

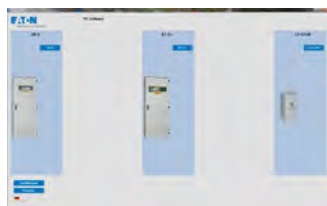


RS485 bus for communication with external modules (3-PM-IO, TLS or SOU CG-S bus module). The terminating resistor (120, 0.5 W) can be connected in the modules. The ZB-S control cabinet also includes a resistor. This must be mounted in the ZB-S system if only one cable is laid.



### 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 ( $U_{min} = 19 \text{ V DC}$ ).
- 3-PM-IO = external maintained light switching module (3-PM-IO bus module)
- TLS = external stairwell light switching module
- BMS = Building Management System



## PC programming software for ZB-S

Programming software for preset memory cards for the quick pre-programming via PC and simple reading and editing of the logbook. For documentation all files are saveable on memory card and hard disk.

Prints for documentation: Detailed prints of the programmed system configuration with the following details:

- individual name of the device
- the date and time of automatic battery duration tests, incl. distance
- the date and time of automatic function tests, incl. distance
- manual reset: yes/no
- delay on mains return: 0-15 min
- selective emergency light: yes/no
- Lon switch: yes/no
- capacity in Ah
- quantity of booster
- rated operation time in h
- min. operation time in %
- assignments of the 3 relays
- assignments of the 3 function keys
- assignments of the 4 option inputs
- number, type and individual name of the bus modules

Detailed print of the programmed electrical circuits (line diagram) with the following details per electrical circuit:

- electrical circuit / SKU number and type
- individual electrical circuit name
- type of monitoring
- switching mode of the electrical circuit
- number of luminaires
- address and individual name per luminaire
- switching mode of each luminaire

Logbook prints with the following options:

- fault event (35 different fault events, separate or completely generic)
- time period of the logbook (date and time)
- individual comment per print
- luminaire failure: Detail of the individual luminaire and electrical circuit names

## Ordering details

Type	Scope of supply	Order No.
Software	PC-Software for ZB-S, for alternative programming of the system configuration on PC	40071347152

# Central battery system ZB-S with STAR technology

Planned Phase out end of 2020 Ordering details



## Ordering details

Type	Scope of supply	Order No.
Central battery system ZB-S/26	Central battery system type ZB-S/26 incl. CU CG-S, BCM and DC/DC.2, 26 free module slots* <sup>1</sup>	40071362905
Central battery system ZB-S/18	Central battery system type ZB-S/18 incl. CU CG-S, BCM and DC/DC.2, 18 free module slots* <sup>1</sup>	40071362906
Central battery system ZB-S/LAD	Central battery system type ZB-S/LAD incl. CU CG-S, BCM and DC/DC.2, (2 free module slots possible)	40071347099
Central battery system ZB-S/10 C	Central battery system type ZB-S/10 C, incl. CU CG-S, BCM and DC/DC.2, 10 free module slots* <sup>1</sup>	40071362900
Central battery system ZB-S/26 C6	Central battery system type ZB-S/26 C6 incl. CU CG-S, BCM and DC/DC.2, 26 free module slots* <sup>1</sup>	40071689064
Central battery system ZB-S/18 C6	Central battery system type ZB-S/18 C6 incl. CU CG-S, BCM and DC/DC.2, 18 free module slots* <sup>1</sup>	40071362904
Central battery system ZB-S/10 C6	Central battery system type ZB-S/10 C6 incl. CU CG-S, BCM and DC/DC.2, 10 free module slots* <sup>1</sup>	40071362903
Central battery system ZB-S/18 C3	Central battery system type ZB-S/18 C3, incl. CU CG-S, BCM and DC/DC.2, 19 free module slots	40071362902
Central battery system ZB-S/10 C3	Central battery system type ZB-S/10 C3, incl. CU CG-S, BCM and DC/DC.2, 11 free module slots	40071362901
Central battery system ZB-S/2 C3	Central battery system type ZB-S/2 C3, incl. CU CG-S, BCM and DC/DC.2, 3 free module slots	40071360201
Substation US-S/36	Substation type US-S/36 incl. CU CG-S and DC/DC.2, 36 free module slots	40071362907
Substation US-S/28	Substation type US-S/28 incl. CU CG-S and DC/DC.2, 28 free module slots	40071362908
Substation US-S/21	Substation type US-S/21 incl. CU CG-S and DC/DC.2, 21 free module slots	40071347088
Substation US-S/13	Substation type US-S/13 incl. CU CG-S and DC/DC.2, 13 free module slots	40071347089
Substation US-S/5	Substation type US-S/5 incl. CU CG-S and DC/DC.2, 5 free module slots	40071347090
Substation US-S/ SOU2	Substation type US-S/ SOU2 <b>incl.</b> 2 x SOU CG-S 2 x 4 A	40071360510
Substation US-S/ SOU1	Substation type US-S/ SOU1 <b>incl.</b> 1 x SOU CG-S 2 x 4 A	40071360511
E30 junction box ESF-RVS30-1	For small cabinets type US-S/SOU with 2 NEOZED fuses inside	40036071032
Substation ESF-E30/13-S	Substation type ESF-E30/13-S, equipped with control module CU CG-S, DC/DC 2-converter, with space reserve for expansion to max. 40 final circuits, but max. 13 variable circuit modules	40071362912
Substation ESF-E30/28-S	Substation type ESF-E30/28-S, equipped with control module CU CG-S, DC/DC 2-converter, with space reserve for expansion to max. 60 final circuits, but max. 28 variable circuit modules	40071362913
Substation US-S ESF30 28-P	Substation type US-S ESF30 28-P incl. control module CU CG-S and DC/DC.2, with space reserve for final assembly up to max. 60 final circuits, however accepts max. 28 variable change-over modules	40071360738
Substation US-S ESF30 13-P	Substation type US-S ESF30 13-P incl. control module CU CG-S and DC/DC.2, with space reserve for final assembly up to max. 40 final circuits, however accepts max. 13 variable change-over modules	40071360737

\*<sup>1</sup> Plus max. two additional slots in correlation of CM 1.7 A and CM 3.4 A placement.

# Central battery system ZB-S with STAR technology

Planned Phase out end of 2020 Ordering details

## Ordering details

Type	Scope of supply	Order No.
Substation US-S ESF30 SOU5	Small distribution board US-S ESF30 SOU5, incl. 5 switching over units SOU CG-S 2 x 4 A	40071360734
Substation US-S ESF30 SOU3	Small distribution board US-S ESF30 SOU3, incl. 3 switching over units SOU CG-S 2 x 4 A	40071360732
Substation US-S ESF30 SOU2	Small distribution board US-S ESF30 SOU2, incl. 2 switching over units SOU CG-S 2 x 4 A	40071360729
Substation US-S ESF30 SOU1	Small distribution board US-S ESF30 SOU1, incl. 1 switching over unit SOU CG-S 2 x 4 A	40071360726
ESF-RVS30	E30 junction box ESF-RVS30 for ESF-E30 with 4 Neozed fuse inside	40071347920
Reduction	Reduction M32 to M20 cable glands for E30 junction boxes incl. M20 cable gland	40071071033
4 pcs. DIN-mounting rail	incl. mounting accessories	40071347125
3 pcs. C-section rail	incl. mounting accessories	40071347126
Base 200 mm	for ZB-S, depth 400 mm	40071361216
Base 100 mm	for ZB-S, depth 400 mm	40071361215
Base 200 mm	for ZB-S/18C3 and 10C3, depth 330 mm	40071360049
Base 800 x 600 x 200 mm	for ZB-S/10C6-18C6 and 26C6	40071361219
3-piece baseplate	for ZB-S, depth 400 mm, mouse-proof	40071347124
Cable support rail		40071347123
Metal flange plate	undrilled for battery cabinet ZB-S	40071346225
Flange plate	for foam rubber for battery cabinet ZB-S	40036070164
Fireproof dowel M10	for E30 substation, Set of = 12 pcs., for installation in concrete walls	40036070298
Optional wall mounting plate for wall mounting for ESF-E30/13-S		40071347726
Door with left hinge for ZB-S/18 and ZB-S/26		40071689081
Door with left hinge for ZB-S/10C3		40071361325
Door with left hinge for ZB-S/10C and ZB-10C6		40071361326
Door with left hinge for battery cabinet		40071689085

9

# Central battery system ZB-S with STAR technology

Planned Phase out end of 2020 Table of covers, technical data ZB-S

Type	ZB-S/26	ZB-S/18	ZB-S/LAD	ZB-S/10 C
Modules:				
Control module: CU CG-S	1	1	1	1
DC/DC.2-converter (DCM)* <sup>5</sup>	1	1	1	1
BCM	1	1	1	1
Circuit module SKU CG-S* <sup>5</sup>	0-26* <sup>8</sup>	0-18* <sup>8</sup>	0-2* <sup>2</sup>	0-10* <sup>8</sup>
Maximum number of SWR 150 due to 100% luminous flux and max. rated power	7	7	2	7
Charging module 1,7 A	0-2	0-2	0-2	0-2
Charging module 3,4 A	0-6* <sup>1</sup>	0-6* <sup>1</sup>	0-8	0-1* <sup>3</sup>
Electrical cabinet construction:				
Rated voltage	400/230 V	400/230 V	400/230 V	230 V
Rated frequency	50/60 Hz	50/60 Hz	50/60 Hz	50/60 Hz
Conductor order and system of earthing in mains power operation/battery operation	TN-C-S / IT	TN-C-S / IT	TN-C-S / IT	TN-C-S / IT
Max. ambient temperature* <sup>9</sup>	-5 °C to +35 °C	-5 °C to +35 °C	-5 °C to +35 °C	-5 °C to +35 °C
Insulation class	1	1	1	1
Degree of protection	IP20	IP20	IP20	IP20
Max. current rating mains [ $\Sigma$ L1, L2, L3] [A]	80	80	100	35
Max. rated power mains [KW]	18.4	18.4	23	13.8
Max. current rating battery [A]	80	80	100	35
Max. rated power battery [KW]	17.3	17.3	21.6	7.6
Three-phase distribution	yes	yes	yes	no
Conductor size for mains and battery supply	50 mm <sup>2</sup>	50 mm <sup>2</sup>	50 mm <sup>2</sup>	16 mm <sup>2</sup>
Outgoing circuits	0- 6 Feeders	0-6 Feeders	0- 15 Feeders	1 Feeder
Conductor size	16 mm <sup>2</sup>	16 mm <sup>2</sup>	16 mm <sup>2</sup>	35 mm <sup>2</sup>
Max. conductor size final circuits	4 mm <sup>2</sup>	4 mm <sup>2</sup>	4 mm <sup>2</sup>	4 mm <sup>2</sup>
Max. number of final circuit terminals	80	68	8	40
Mechanical cabinet construction:				
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
Material / Design	Sheet steel / Cabinet	Sheet steel / Cabinet	Sheet steel / Cabinet	Sheet steel / Compact cabinet
Door stop	right	right	right	right
Outer coating	Textured powder paint	Textured powder paint	Textured powder paint	Textured powder paint
Colour	RAL 7035	RAL 7035	RAL 7035	RAL 7035
Partial viewing door	Yes	Yes	No	Yes
Lock	3 mm Two-way	3 mm Two-way	3 mm Two-way	3 mm Two-way
Cable entry from above	yes	yes	yes* <sup>7</sup>	yes
Cable entry from below	yes	yes	yes* <sup>7</sup>	no
Base (optional)	100/200	100/200	100/200	200
Weight (without batteries)	approx. 180 kg	approx. 170 kg	approx. 170 kg	approx. 155 kg
Battery capacity, installed in:				
Compact cabinet	–	–	–	23.3-53.7 Ah
Battery cabinet	23.3-195.4 Ah	23.3-195.4 Ah	23.3-308 Ah	–
Battery rack	23.3-195.4 Ah	23.3-195.4 Ah	23.3-308 Ah	–

Other battery sizes on application

\*1 When 6 charging modules CM 3,4 A are fitted an additional charging module rack 2-way is necessary.

\*2 Max. 8 charging modules are possible when 2 SKUs are fitted.

\*3 When 1 charging module CM 3,4 A is fitted an additional charging module rack 1-way is necessary.

\*4 When 2 charging modules CM 3,4 A are fitted an additional charging module rack 2-way is necessary. (>240 Ah Special design)

\*5 After more than 12 SKU CG-S 4 x 1.5 A or 26 SKU CG-S 2 x 3 A / 1 x 6 A a second DC/DC converter is needed.  
Please observe that all DC/DC-converter are operated on the same module assembly frame next to each other.

# Central battery system ZB-S with STAR technology

Planned Phase out end of 2020 Table of covers, technical data ZB-S

ZB-S/26 C6	ZB-S/18 C6	ZB-S/10 C6	ZB-S/18 C3	ZB-S/10 C3	ZB-S/2 C3
1	1	1	1	1	1
2	2	1	1	1	1
1	1	1	1	1	1
0-26*8	0-18*8	0-10*8	0-19	0-11	0-3
7	7	7	7	7	2
0-2	0-2	0-2	0-2	0-2	1
0-2*3*4	0-2*3*4	0-2*3*4	–	–	–
400/230 V	400/230 V	230 V	230 V	230 V	230 V
50/60 Hz	50/60 Hz	50/60 Hz	50/60 Hz	50/60 Hz	50/60 Hz
TN-C-S / IT	TN-C-S / IT	TN-C-S / IT	TN-C-S / IT	TN-C-S / IT	TN-C-S / IT
-5 °C to +35 °C	-5 °C to +35 °C	-5 °C to +35 °C	-5 °C to +35 °C	-5 °C to +35 °C	-5 °C to +35 °C
1	1	1	1	1	1
IP20	IP20	IP20	IP20	IP20	IP20
50	50	50	25	25	15
14.5	14.5	14.5	5.8	5.8	3.5
50	50	50	25	25	12
13.6	13.6	13.6	5.4	5.4	2.6
yes	yes	no	no	no	no
35 mm <sup>2</sup>	35 mm <sup>2</sup>	16 mm <sup>2</sup>	16 mm <sup>2</sup>	16 mm <sup>2</sup>	16 mm <sup>2</sup>
2 Feeders	2 Feeders	1 Feeder	1 Feeder	1 Feeder	–
35 mm <sup>2</sup>	35 mm <sup>2</sup>	35 mm <sup>2</sup>	16 mm <sup>2</sup>	16 mm <sup>2</sup>	–
4 mm <sup>2</sup>	4 mm <sup>2</sup>	4 mm <sup>2</sup>	4 mm <sup>2</sup>	4 mm <sup>2</sup>	4 mm <sup>2</sup>
60	60	40	50	40	12
2250 x 800 x 600	2050 x 800 x 600	2050 x 800 x 600	1800 x 600 x 350	1800 x 600 x 350	1000 x 600 x 300
Sheet steel / Compact cabinet	Sheet steel / Compact cabinet	Sheet steel / Compact cabinet	Sheet steel / Compact cabinet	Sheet steel / Compact cabinet	Sheet steel / Compact cabinet
right	right	right	right	right	right
Textured powder paint	Textured powder paint	Textured powder paint	Textured powder paint	Textured powder paint	Textured powder paint
RAL 7035	RAL 7035	RAL 7035	RAL 7035	RAL 7035	RAL 7035
Yes	Yes	Yes	Yes	Yes	No
3 mm	3 mm	3 mm	3 mm	3 mm	3 mm
Two-way	Two-way	Two-way	Two-way	Two-way	Two-way
yes	yes	yes	yes	yes	yes
no	no	no	no	no	no
–	–	–	200	200	–
approx. 250 kg	approx. 205 kg	approx. 206 kg	approx. 120 kg	approx. 115 kg	approx. 50 kg
5.5-89.4 Ah	5.5-89.4 Ah	5.5-89.4 Ah	5.5-23.3 Ah	5.5-23.3 Ah	5.5-14 Ah
–	–	–	–	–	–
–	–	–	–	–	–

\*6 Higher battery capacities =>118 Ah are achieved by connecting several battery sets in parallel.

\*7 Please indicate the cable entry when planning the system.

\*8 Plus max. two additional slots in correlation of CM 1.7 A and CM 3.4 A placement.

\*9 Optimal ambient battery temperature +20 °C.



# Central battery system ZB-S with STAR technology

Planned Phase out end of 2020 Table of covers, technical data ZB-S

Type	US-S/36	US-S/28	US-S/21	US-S/13
Modules:				
Control module: CU CG-S	1	1	1	1
DC/DC.2-converter (DCM)* <sup>1</sup>	1	1	1	1
Circuit module SKU CG-S* <sup>1</sup>	0-36	0-28	0-21	0-13
Maximum number of SWR 150 due to 100% luminous flux and max. rated power	7	7	–	–
Electrical cabinet construction:				
Rated voltage	400/230 V	400/230 V	230 V	230 V
Rated frequency	50/60 Hz	50/60 Hz	50/60 Hz	50/60 Hz
Conductor order and system of earthing in mains power operation/battery operation	TN-C-S / IT	TN-C-S / IT	TN-C-S / IT	TN-C-S / IT
Max. ambient temperature	-5 °C to +35 °C	-5 °C to +35 °C	-5 °C to +35 °C	-5 °C to +35 °C
Insulation class	1	1	1	1
Degree of protection	IP20	IP20	IP54	IP54
Max. current rating mains [ $\sum$ L1, L2, L3] [A]	80	80	50	50
Max. rated power mains [KW]	18.4	18.4	11.5	11.5
Max. current rating battery [A]	80	80	50	50
Max. rated power Battery [KW]	17.3	17.3	10.8	10.8
Three-phase distribution	yes	yes	no	no
Conductor size for mains and battery supply	35 mm <sup>2</sup>	35 mm <sup>2</sup>	35 mm <sup>2</sup>	16 mm <sup>2</sup>
Outgoing circuits	–	–	–	–
Max. conductor size final circuits	4 mm <sup>2</sup>	4 mm <sup>2</sup>	4 mm <sup>2</sup>	4 mm <sup>2</sup>
Max. number of final circuit terminals	80	80	52	24
Mechanical cabinet construction:				
Dimensions H x W x D (mm)	2050 x 800 x 400	2050 x 800 x 400	1200 x 600 x 300	800 x 600 x 250
Material / Design	Sheet steel / Cabinet	Sheet steel / Cabinet	Sheet steel / Wall cabinet	Sheet steel / Wall cabinet
Door stop	right	right	right	right
Outer coating	Textured powder paint	Textured powder paint	Textured powder paint	Textured powder paint
Colour	RAL 7035	RAL 7035	RAL 7035	RAL 7035
Partial viewing door	Yes	Yes	No	No
Lock	3 mm Two-way	3 mm Two-way	3 mm Two-way	3 mm Two-way
Cable entry from above	yes	yes	yes	yes
Cable entry from below	yes	yes	no	no
Base (optional)	100/200	100/200	–	–
Weight (without batteries)	approx. 170 kg	approx. 165 kg	approx. 110 kg	approx. 75 kg

Other battery sizes on application

\*1 After more than 13 SKU CG-S 4 x 1.5 A or 26 SKU CG-S 2 x 3 A / 1 x 6 A a second DC/DC converter is needed.

Please observe that all DC/DC-converters are operated on the same module assembly frame next to each other.

\*2 With admittance no. Z-86.2-1. The supply cabinets ESF-E30 must be mounted on a solid wall with fire resistance of at least 30 minutes.

\*3 The housing has insulation class II. The earth conductor must however be routed in the housing.

\*4 IP54 with optional IP54 hood.

# Central battery system ZB-S with STAR technology

Planned Phase out end of 2020 Table of covers, technical data ZB-S

US-S/5	US-S/ SOU2	US-S/ SOU1
1	–	–
1	–	–
0-5	inkl. 2 x SOU CG-S 2 x 4 A	inkl. 1 x SOU CG-S 2 x 4 A
–	–	–
–	–	–
230 V	230 V	230 V
50/60 Hz	50/60 Hz	50/60 Hz
TN-C-S / IT	TN-C-S / IT	TN-C-S / IT
-5 °C to +35 °C	-5 °C to +35 °C	-5 °C to +35 °C
1	2*3	2*3
IP54	IP65	IP65
25	16	8
6.9	3,6	1,8
25	16	8
6.5	3.4	1.7
no	no	no
16 mm <sup>2</sup>	10 mm <sup>2</sup>	10 mm <sup>2</sup>
–	–	–
4 mm <sup>2</sup>	4 mm <sup>2</sup>	4 mm <sup>2</sup>
20	4	2
600 x 400 x 250	583 x 295 x 129	458 x 295 x 129
Sheet steel / Wall cabinet	Plastic / Small distribution board	Plastic / Small distribution board
right	right	right
Textured powder paint	–	–
RAL 7035	RAL 7035	RAL 7035
No	Yes	Yes
3 mm Two-way	On request	On request
yes	yes	yes
no	no	no
–	–	–
approx. 42 kg	approx. 8.8 kg	approx. 7.5 kg

# Central battery system ZB-S with STAR technology

Planned Phase out end of 2020 Table of covers, technical data ZB-S

Type	US-S ESF30 13-P	US-S ESF30 28-P
Modules:		
Control module: CU CG-S	1	1
DC/DC-2-converter (DCM)* <sup>1</sup>	1	1
Circuit module SKU CG-S 1 x 6 A	0-13	0-28
Circuit module SKU CG-S 2 x 3 A	0-13	0-28
Circuit module SKU CG-S 4 x 1.5 A	0-13* <sup>3</sup>	0-28* <sup>4</sup>
Switching over unit SOU CG-S 2 x 4 A	–	–
Maximum number of SWR 150 due to 100% luminous flux and max. rated power	–	–
Interface module DLS/TLS	2	2
Web module	1	1
Electrical cabinet construction:		
Rated voltage	230 V	400/230 V
Rated frequency	50/60 Hz	50/60 Hz
Artificial ventilation, sound pressure level (dB)	55	55
Conductor order and system of earthing in mains power operation/battery operation	TN-C-S / IT	TN-C-S / IT
Max. ambient temperature	-5 °C to +35 °C	-5 °C to +30 °C
Insulation class	I	I
Degree of protection	IP42	IP42
Maximal permitted heating power loss [W]	45	90
Maximal rated power [A] depending on the ambient temperature		
+25 °C	35 (30)* <sup>6</sup>	40 (45)* <sup>6</sup>
+30 °C	17.3 (30)* <sup>6</sup>	20 (45)* <sup>6</sup>
+35 °C	11 (30)* <sup>6</sup>	– (45)* <sup>6</sup>
Maximal rated power [kW] depending on the ambient temperature		
+25 °C	7.5 (6.4)* <sup>6</sup>	8.6 (9.7)* <sup>6</sup>
+30 °C	3.7 (6.4)* <sup>6</sup>	4.3 (9.7)* <sup>6</sup>
+35 °C	2.3 (6.4)* <sup>6</sup>	– (9.7)* <sup>6</sup>
Three-phase distribution	no	yes
Conductor size for mains and battery supply	35 mm <sup>2</sup>	35 mm <sup>2</sup>
Max. conductor size final circuits	4 mm <sup>2</sup>	4 mm <sup>2</sup>
Max. number of final circuit terminals	40	60
Mechanical cabinet construction:		
Dimensions H x W x D (mm)	1278 x 918 x 496	2278 x 918 x 604
Material / Design	Coated plaster board / Wall cabinet	Coated plaster board / Wall cabinet
Door stop	right	right
Colour		
Cable entry	from above	from above* <sup>7</sup>
Base (optional)	–	– only with base
Weight (without batteries)	approx. 169 kg	approx. 330 kg
Certification / Verification		
ABZ housing including modules	–	–
ABZ housing without modules	yes	yes
Fire test fire protection test report short form MPA NRW	yes	yes
VDE certificate	–	–
Declaration of expert	yes	yes

\*1: After more than 13 SKU CG-S 4 x 1.5 A or 26 SKU CG-S 2 x 3 A / 1 x 6 A a second DC/DC converter is needed.  
Please observe that all DC/DC-converter are operated on the same module assembly frame next to each other.

\*2: Protective isolated acc. to VDE 0106

\*3: Max. 40 circuits. Attention: Please note the maximum rated power!

\*4: Max. 60 circuits. Attention: Please note the maximum rated power!

\*5: Please note: Each DLS module reduces the possible number of SOU modules.

\*6: (...) = Plannings with SKU CG-S 2 x 3 A and SKU CG-S 1 x 6 A modules.

\*7: Cable entry from below on request

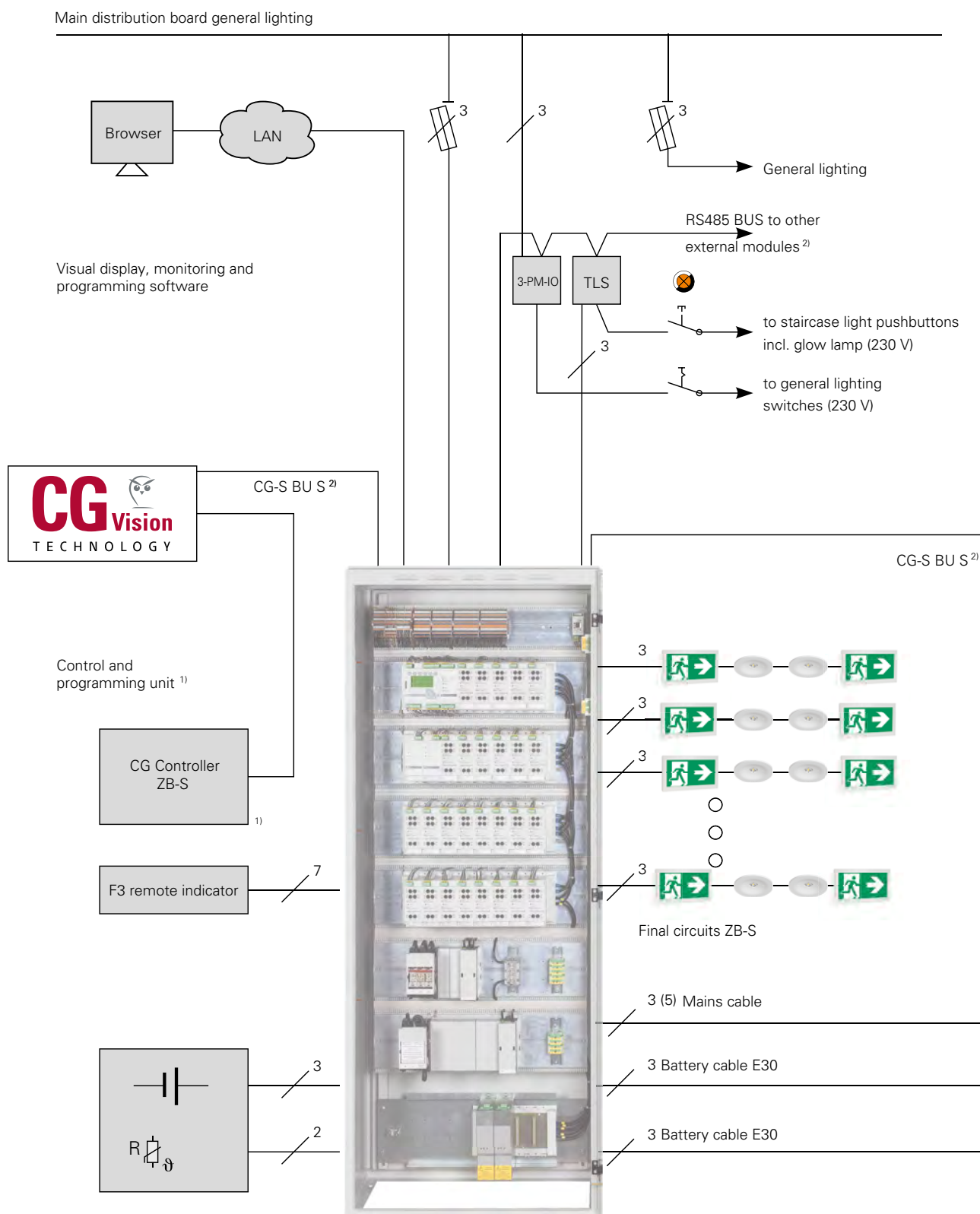
# Central battery system ZB-S with STAR technology

Planned Phase out end of 2020 Table of covers, technical data ZB-S

US-S ESF30 SOU5	US-S ESF30 SOU3	US-S ESF30 SOU2	US-S ESF30 SOU1
–	–	–	–
–	–	–	–
–	–	–	–
–	–	–	–
–	–	–	–
5	3	2	1
–	–	–	–
2*5	1*5	1	–
–	–	–	–
230 V	230 V	230 V	230 V
50 or 60 Hz	50 or 60 Hz	50 or 60 Hz	50 or 60 Hz
–	–	–	–
TN-C-S / IT	TN-C-S / IT	TN-C-S / IT	TN-C-S / IT
-5 °C to +35 °C	-5 °C to +35 °C	-5 °C to +35 °C	-5 °C to +35 °C
I <sup>2</sup>	I <sup>2</sup>	I <sup>2</sup>	I <sup>2</sup>
IP65	IP65	IP65	IP65
–	–	–	–
33	20	15	8
28	17	12	6
16	10	9	5
7.1	4.3	3.2	1.7
6.0	3.6	2.5	1.2
3.4	2.1	1.3	1.0
no	no	no	no
10 mm <sup>2</sup>	10 mm <sup>2</sup>	10 mm <sup>2</sup>	10 mm <sup>2</sup>
4 mm <sup>2</sup>	4 mm <sup>2</sup>	4 mm <sup>2</sup>	4 mm <sup>2</sup>
10	6	4	2
1135 x 396 x 230	835 x 396 x 230	685 x 396 x 230	535 x 396 x 230
Coated plaster board / Wall cabinet	Coated plaster board / Wall cabinet	Coated plaster board / Wall cabinet	Coated plaster board / Wall cabinet
left	left	left	left
from above	from above	from above	from above
–	–	–	–
approx. 81 kg	approx. 61 kg	approx. 51 kg	approx. 34 kg
–	–	–	–
–	–	–	–
yes	yes	yes	yes
yes	yes	yes	yes
yes	yes	yes	yes

# Central battery system ZB-S with STAR technology

Planned Phase out end of 2020 Installation example



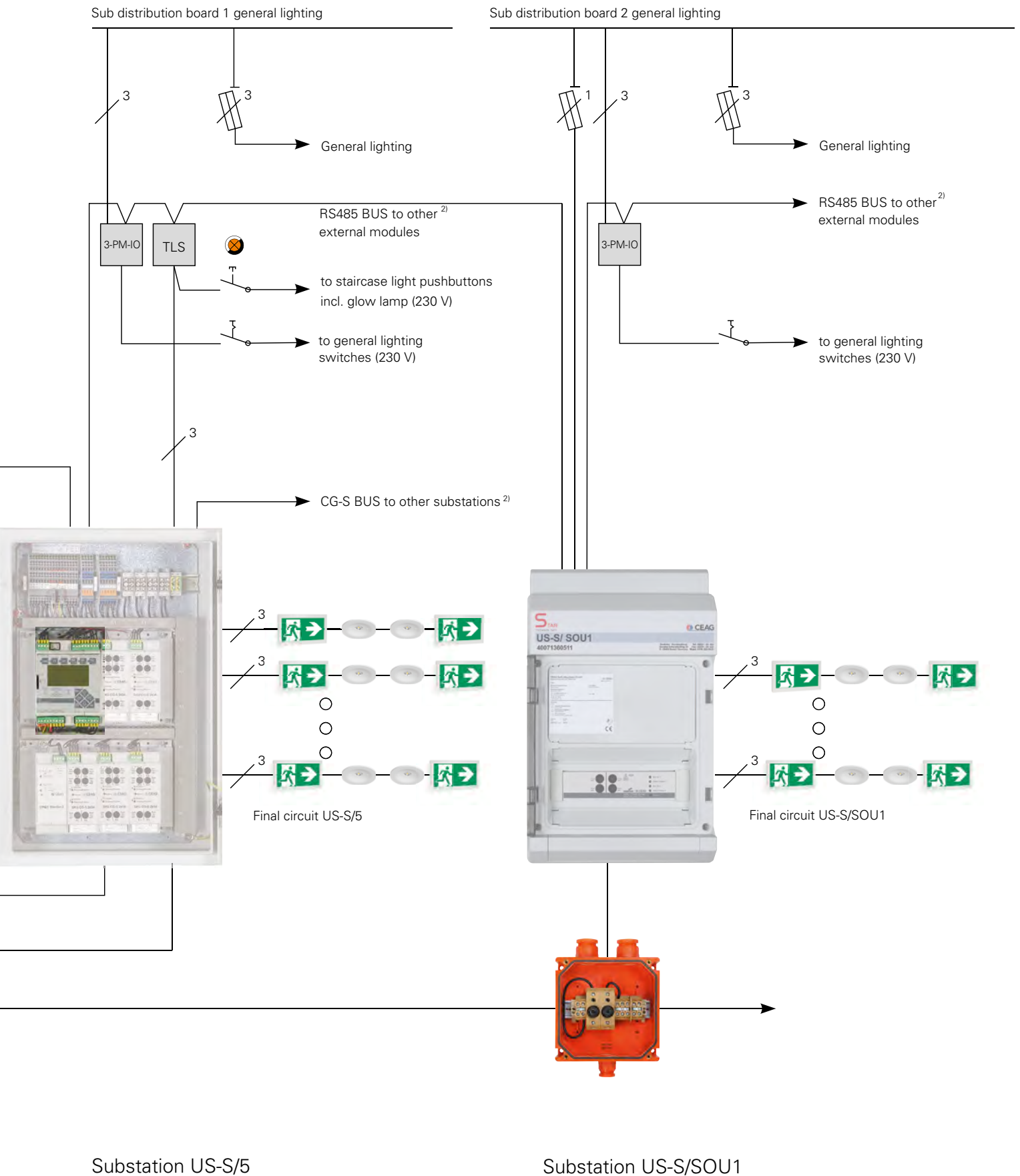
<sup>1)</sup> Operation CG-Controller ZB-S in combination with CG Vision only in observer mode possible. In this operation mode the CG-Controller does not provide the functions log book, next FT and next DT.

<sup>2)</sup> Bus specifications see page ZB-S bus technology

## Central Battery system ZB-S

# Central battery system ZB-S with STAR technology

Planned Phase out end of 2020 Installation example

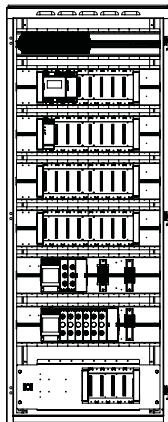


# Central battery system ZB-S with STAR technology

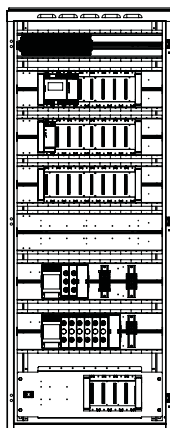
Planned Phase out end of 2020 Appendix overview cabinets

## Central battery systems

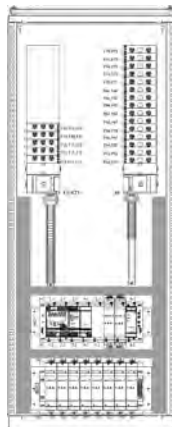
ZB-S/26



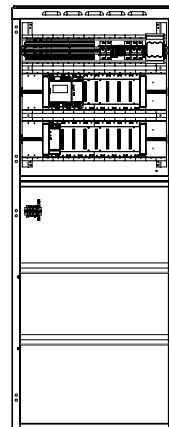
ZB-S/18



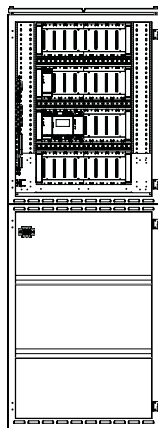
ZB-S/LAD



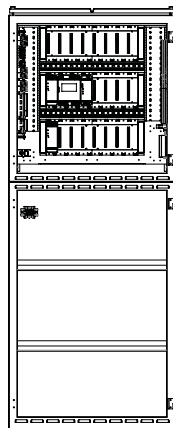
ZB-S/10C



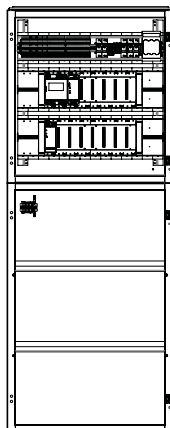
ZB-S/26C6



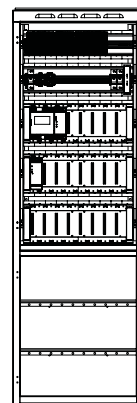
ZB-S/18C6



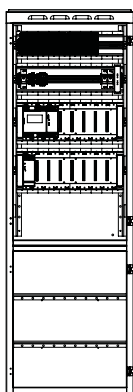
ZB-S/10C6



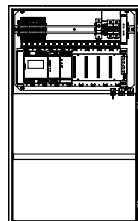
ZB-S/18C3



ZB-S/10C3



ZB-S/2C3



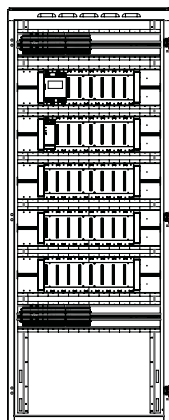


# Central battery system ZB-S with STAR technology

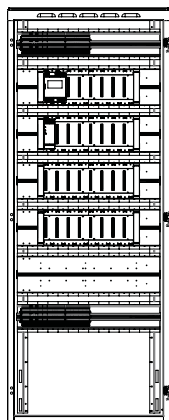
Planned Phase out end of 2020 Appendix overview cabinets

## Substations

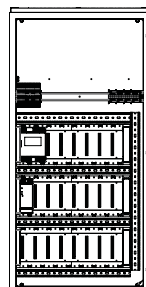
US-S/36



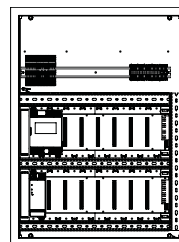
US-S/28



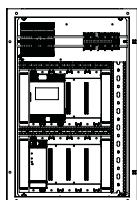
US-S/21



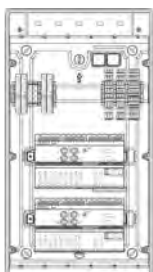
US-S/13



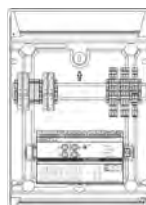
US-S/5



US-S/SOU2

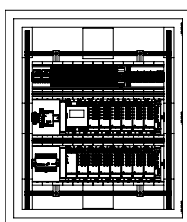


US-S/SOU1

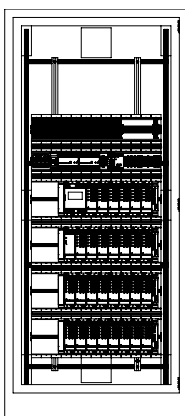


## Substations with functional integrity

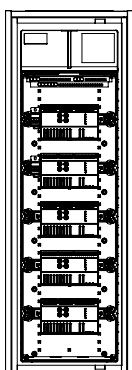
US-S ESF30 13-P



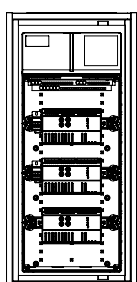
US-S ESF30 28-P



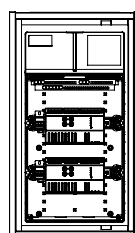
US-S ESF30 SOU5



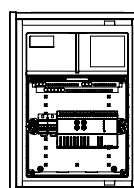
US-S ESF30 SOU3



US-S ESF30 SOU2



US-S ESF30 SOU1







Central battery systems AC/DC

LP-STAR

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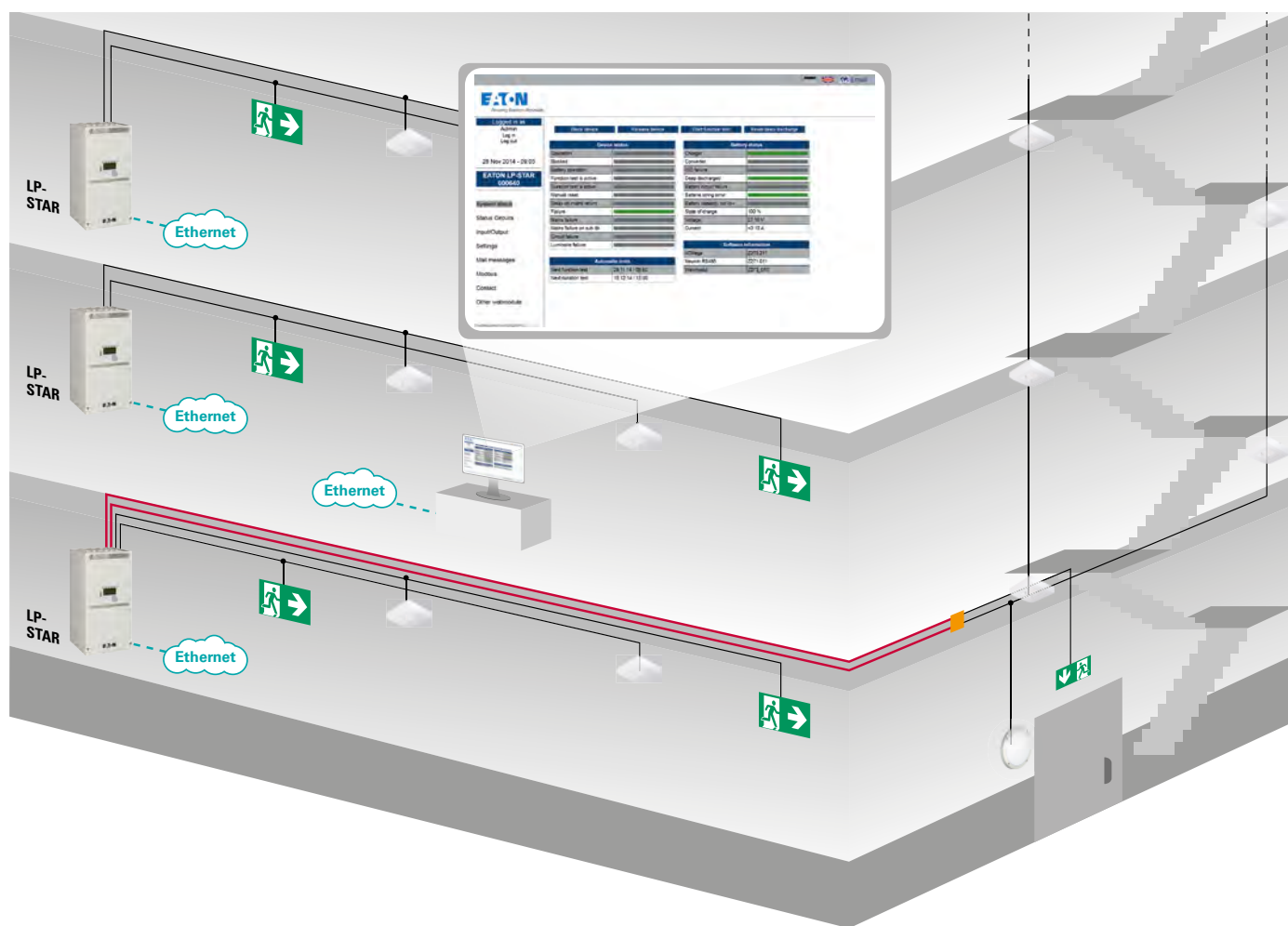
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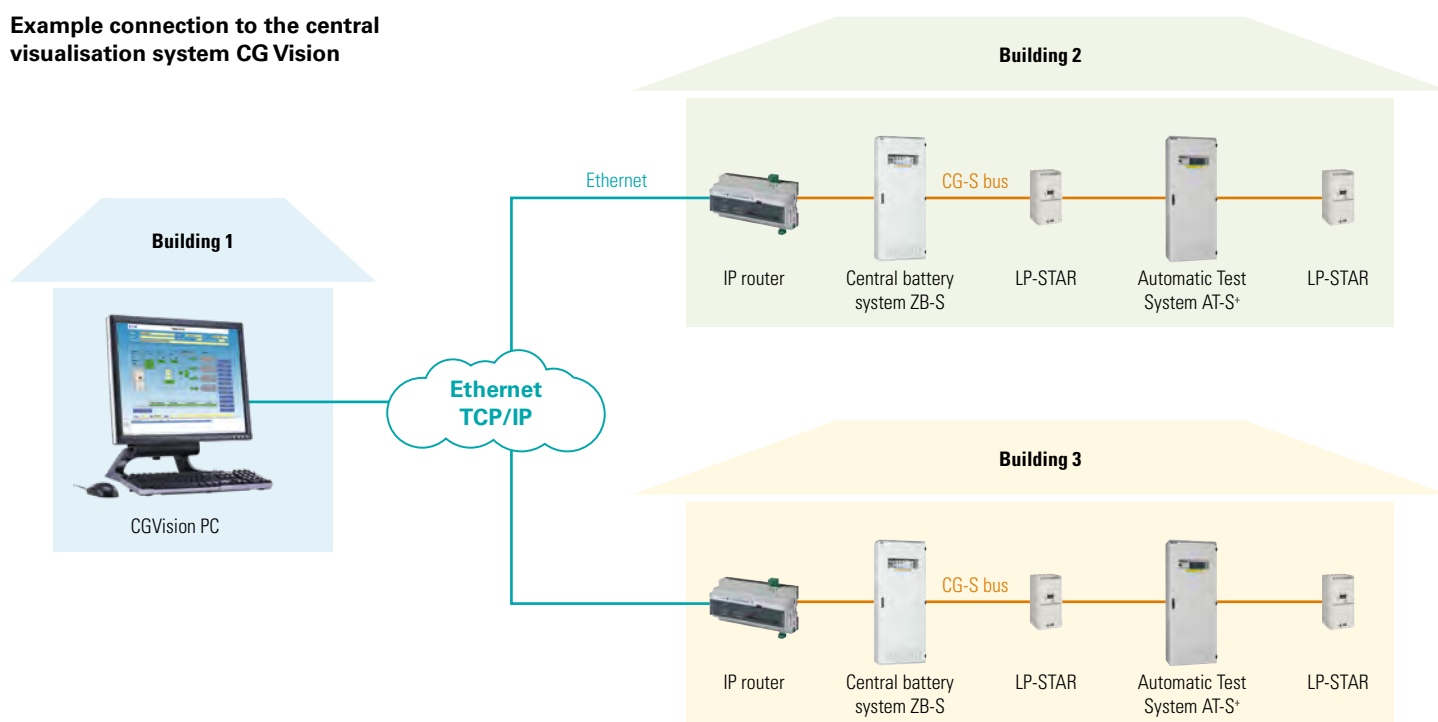
Description ..... 404

# LP-STAR emergency lighting power supply in a compact design

Installation example



Example connection to the central visualisation system CG Vision



## Simple installation and reliable power supply



9

LP-STAR is especially recommended in case of the separate supply of emergency lighting systems of individual fire areas to save on installation costs incurred by installing E30 cabling to cover different fire areas.

The LP-STAR System supplies reliable power to the escape luminaires and exit sign luminaires (230V AC/220 V DC) according to EN 50171. It is suitable for emergency lighting systems according to DIN VDE 0100-560, EN 50172 and V DIN V VDE 0108-100.

The system performs an automatic self-check and monitors all CG-S luminaires connected (up to 20 luminaires per circuit) simply through a feed line. The circuit type of each connected CG-S luminaire can be programmed freely in the 50 Hz or 60 Hz supply network with the control module based on the STAR technology. This means that the same power circuit is used for mixed operation including maintained light, switched maintained light and non-maintained light, all this without an additional data cable!

The control module including a non-volatile program memory as well as a big graphical display that monitors and controls the LP-STAR device and checks all functions of the connected emergency luminaires according to EN 62034 and it reports the operating states of the entire system. The integrated search function detects all luminaires addressed during installation automatically. A central monitoring system can be connected using the optional bus interface.

The main scope for the protection of electrical rooms is the protection of the environment against the hazards involved with technical devices, transformer stations and switching stations of over 1 kV. At the same time, for example in case of fire, the operation of safety-relevant systems, central battery systems and fixed power generators must be maintained for a specific period of time.

The LP-STAR System was designed to meet the requirements concerning batteries and these have been verified according to EN 60950 and EN 50272-2.

### Features

- No special requirements concerning the housing on functionality in case of installation in separate fire areas
- Cost savings as E30 wiring is not required because devices are installed in separate fire areas
- Natural ventilation is generally sufficient due to the closed form and low capacity of batteries
- Additional safety even in case of fire due to the decentralised arrangement of systems
- Simple operation and commissioning based on a smart programming and operating plan
- 230V AC / 220V DC supply voltage selectable to power the escape luminaires and exit sign luminaires to comply with architectural issues
- Standard integrated phase monitor for monitoring general power supply conditions
- Additional phase monitor input including line monitoring for an external phase monitor
- Standard eight digital 230 V input channels for switching each luminaire separately, for example, freely programmable
- Optional webmodule for the automatic monitoring of LP-STAR according to EN 62034
- Optional CG-S interface for connecting to the CG-S bus for CGVision or master/slave operation for connecting several LP-STAR devices
- Shorter inspection time using the CEWA GUARD technology, automatic function monitoring of up to 20 luminaires per circuit
- Reduced installation costs due to the STAR technology, freely programmable mixed operation of switching modes per luminaire in a single circuit without an additional data cable
- Automatic luminaire search function
- Plain text display at the control module for all luminaires
- Flexible data memory for the test log and device configuration using the Secure Digital card
- Absence of retroactive effect of different circuits in case of a short-circuit due to the automatic, selective shut-off function
- EoL shut-off, programmable as standard



# LP-STAR emergency lighting power supply in a compact design

What is STAR?

**S**<sub>TAR</sub>  
TECHNOLOGY

**S** = Switching  
**T** = Technology  
**A** = Advanced  
**R** = Revision

9

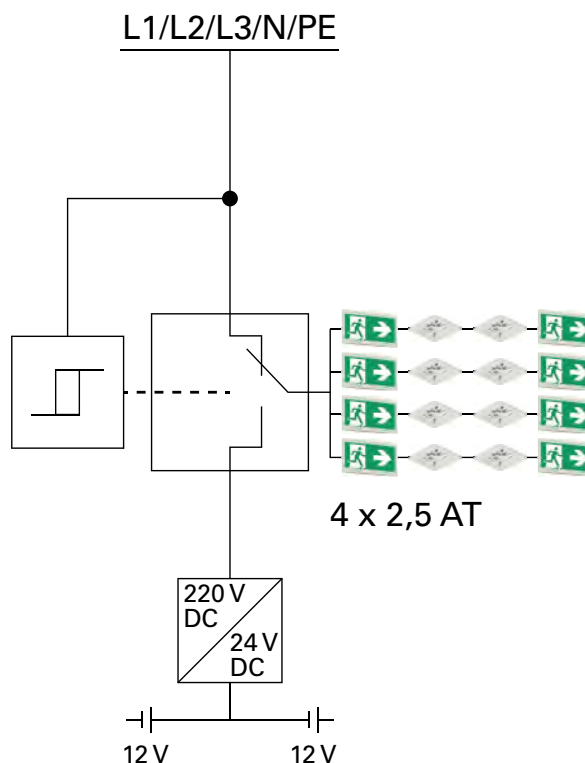
## Switch to safety!

The continuing development of the CEWA GUARD monitoring system has led to the creation of the

**Switching**  
**Technology**  
**Advanced**  
**Revision,**

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

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



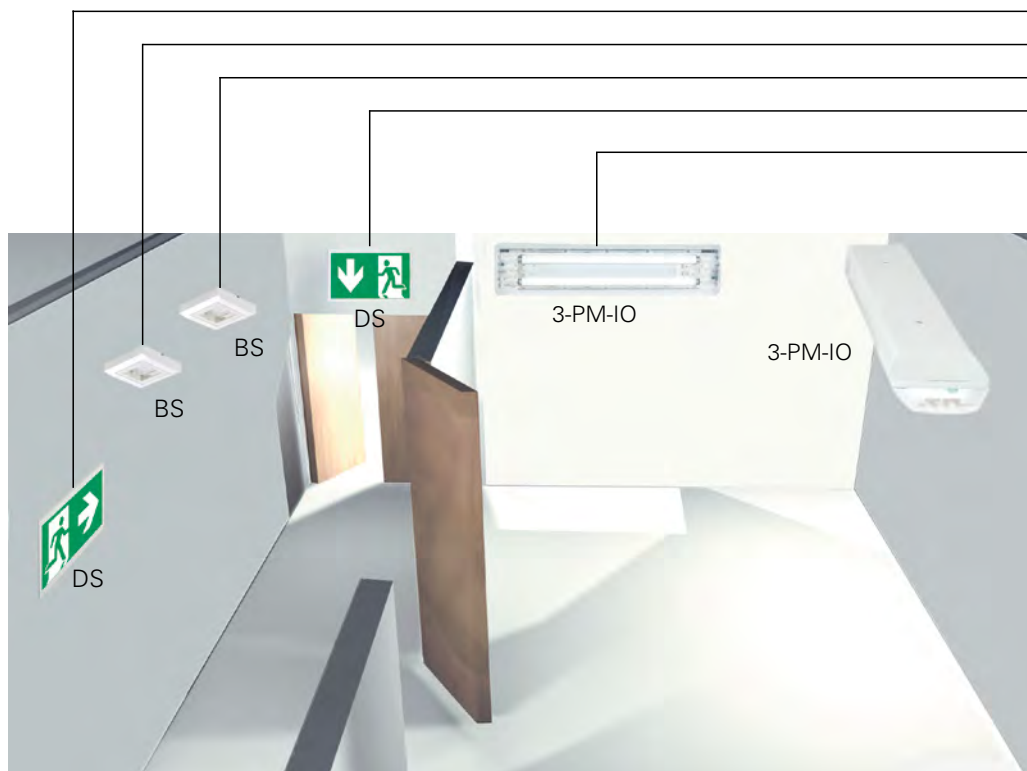
## Your Advantages:

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.

As with CEWA GUARD technology, the patented STAR technology requires no additional data cable to the luminaires.

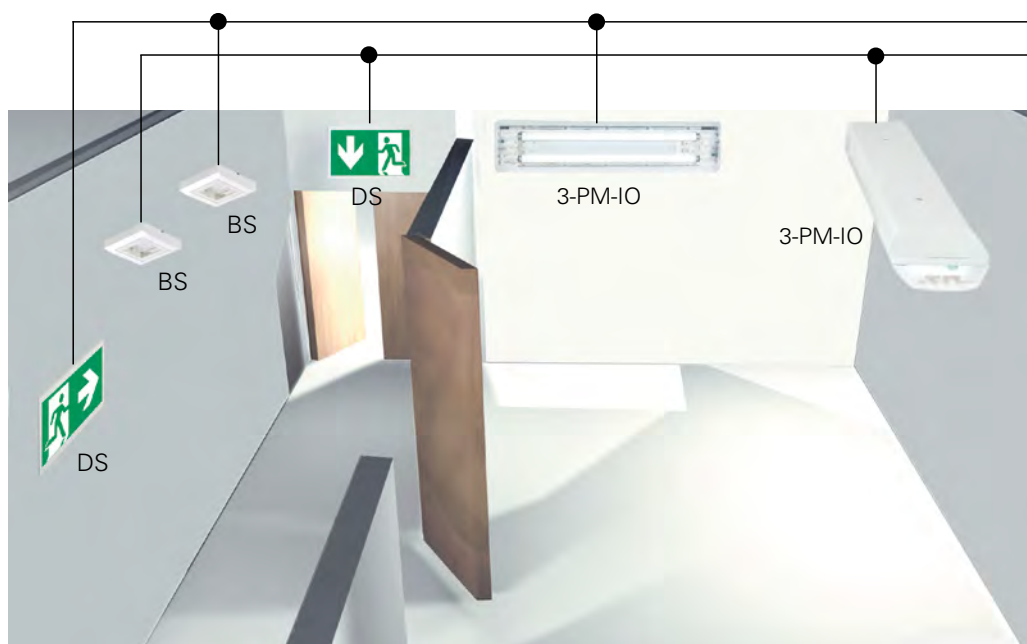
# S

  
**TAR**  
**TECHNOLOGY**


## Conventional Installation:

Maintained light 1 (DS)  
Non-maintained light 1 (BS)  
Non-maintained light 2 (BS)  
Maintained light 2 (DS)  
Switched maintained light 1 (3-PM-IO)  
Switched maintained light (3-PM-IO)

- 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



# LP-STAR emergency lighting power supply in a compact design

Construction

## Overview of connections



### 1 Grid connection terminal

3-phase feed-in incl. phase monitoring function

### 2 Connection for end circuits

Double assignment, 2.5 mm<sup>2</sup> solid/flexible

### 3 Connection for disable switch

Control loop for disabling the system during operating downtimes with differential loop monitoring for short circuit and wire breakage detection. Differential monitoring: Short circuit or interruption lead to the system going into standby.

### 4 24 V connection for external phase monitors

24 V power loop for the emergency luminaires with differential loop monitoring for short circuit and wire breakage detection. Differential monitoring: Short circuit or interruption lead to the system switching on (maintained light) immediately.

### 5 Connection for potential-free indicator contacts and buzzer

4 relays with a separate root, each 1x changeover contact, 24 V 0.5 A.

The four potential-free contacts and the buzzer can be assigned freely to one or several of 12 different messages. The DIN VDE specification can be loaded any time and used as a default setting.

### 6 Connection for digital inputs

8 freely assignable inputs 230V, programmable as inverted and non-inverted for example start/stop function test, start/stop duration test, block/release device, manual reset, turn on/off maintained light, turn on emergency lighting as corridor lighting, for light switch query and switching emergency lighting depending on the general lighting conditions (DLS function).

### 7 Optional interface (factory-installed)

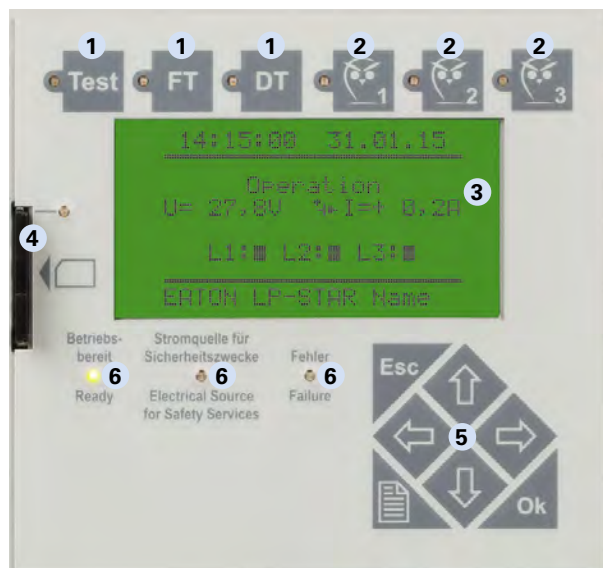
The interface for connecting to a CGVision can be installed on site, see page 13.

### 8 Webmodule connection

### 9 Battery connection, wires 1-4

Maximum 4 sets per 2 battery blocks, 12 V.

## Freely programmable control module



### 1 Separate buttons for:

- Test (emergency luminaire function)
- Function test
- Duration test

### 2 Three freely assignable function keys

### 3 128 x 64 pixel graphical display

Back-lit, adjustable contrast and brightness

### 4 Log book and device configuration

Save the log book and device configuration comfortably on the memory card. Easily programmable on the PC using an SD card reader and the CEAG software.

### 5 Seven control buttons for a user-friendly navigation

### 6 Function display using LEDs



## Control module

A freely programmable control module with a non-volatile program memory and 4-lines, alphanumeric, graphic display monitors and controls the LP-STAR system. All functions such as loading, mains/emergency switch-over and deep discharge protection of devices and the connected emergency luminaires are automatically inspected. The errors are reported immediately. A central monitoring system can be connected using the interface. In case of a short circuit or interruption of control current loops, differential monitoring leads to the system immediately switching on (maintained light) or to the system being put in standby.

- Non-volatile program memory
- Automatic luminaire search function
- Single luminaire monitoring
- Manual reset
- Password function
- Fuse monitoring of the end circuits
- Control module with master/slave function

## Display includes:

- Date/time
- Charge fault
- 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 minutes)
- Luminaire failure with location label
- Insulation fault
- Power failure UV-AV (target location information)
- Failure/programming information



## Sealed keypad with 3 buttons for:

- Test (mains failure- battery operation)
- Start/stop function test
- Start/stop duration test



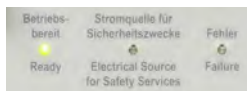
## 3 freely assignable function keys for:

- Block/release device
- Manual reset
- Stop function test
- Display error list
- Turn on/off maintained light
- Turn on complete emergency lighting (continuity lighting)
- Power failure simulation UV-A (emergency operation)
- Confirm deep discharge protection



## 7 control keys

for a user-friendly navigation



## LED indicators for:

- Ready
- Operation through the electrical source for safety services
- Failure



## Graphic display:

128 x 64 pixels, back-lit, program adjustable contrast and brightness.

# LP-STAR emergency lighting power supply in a compact design

## Components and options

Control module



Graphical display	128 x 64 pixel adjustable contrast
Illumination	Adjustable background luminosity
Keypad	Sealed, with 6 function and 7 control keys
Readout	Battery voltage Battery charge current (+) Battery discharge current in test or by failure (-) Charge Fault Luminaire failure with location label Deep discharge protection Manual reset Delay-time on mains return Fault UV-AV (location label) Test mode Date/time Insulation fault with circuit label Failure information Programming information
Status	<ul style="list-style-type: none"><li>• Ready</li><li>• Electrical source for safety services</li><li>• Failure</li></ul>

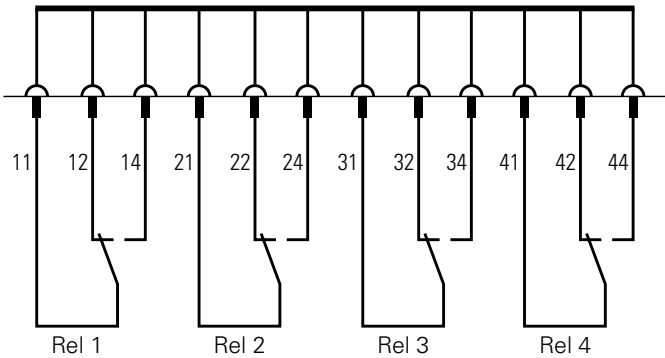
### Potential-free signal contacts, buzzer

4 relays with a common potential, 1x switching contact each, 24 V 0.5 A.

The three potential-free contacts and the buzzer can be assigned freely to one or several of 12 different messages. The DIN VDE specification can be loaded any time and used as a default setting.

### Default settings LP-STAR

Name	Relay 1	Relay 2	Relay 3	Relay 4	Buzzer
Mains operation		X			
Mains failure	X		X		
UV mains failure	X				
Charge fault	X				
Circuit fault	X				
Luminaire fault	X				
Common system fault	X				
Total discharge protection	X				
ISO fault	X				
Function test		X			
Duration test		X			
Device fault					



Note:  
NO = Normal Open (normally open)  
NC = Normal Closed (normally closed)  
The device is fitted with 4 potential-free signal contacts (relay outputs) and an integrated buzzer.  
Signal contacts freely programmable including: 1 x changeover contact 1 x 24 V; 0.5 A capacity

SD card



SD card reader



Secure Digital card

Flexible memory for device and inspection log book configuration, for example for archiving the device configuration and the prescribed inspection log book information over a minimum of 4 years.

The device can be programmed using any PC with the optional SD card reader and the CEAG software. The text messages can be introduced also using the control module.

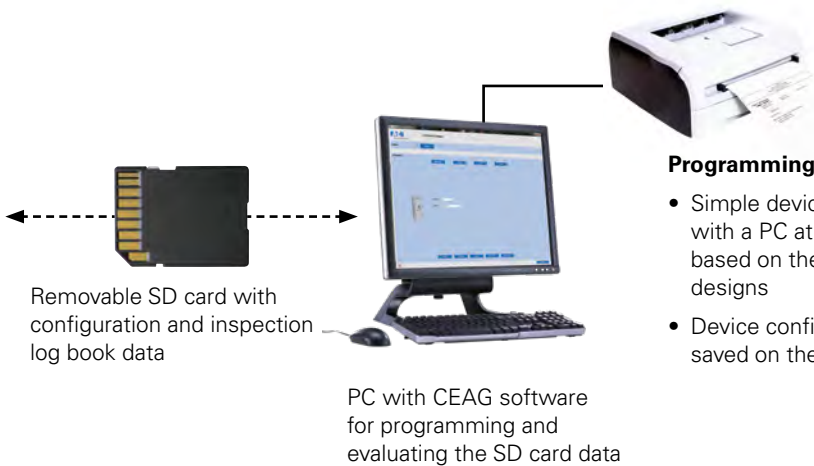
Storing of:

- 360.000 log book entries
- Luminaire target location texts (20 characters per luminaire)
- Circuit names (20 characters per circuit)
- LP-STAR name (20 characters)

Ordering details Replacement SD-Card

Type	Model	Order No.
SD card	SD card formatted for LP-STAR	40071347911
SD card reader	SD card reader for USB port	40064070561

SD card (Secure Digital Card)



Programming

- Simple device programming with a PC at the office based on the installation designs
- Device configuration can be saved on the PC

# LP-STAR emergency lighting power supply in a compact design

## Technical Data

LP-STAR 4-24



### LP-STAR

#### Input

Rated voltage AC	1 ~ 220-240 V
Rated frequency	50/60 Hz
Max. rated current AC	5.5 A
Rated voltage DC	19.2- 28.8 V
Battery	VRLA, 2x6 cells in series, 20 °C

#### Output

Rated voltage AC	220-240 V AC / 220 V DC konstant
Total current	4.7 A AC / 2.45 A DC
Total power	1080 VA / 540 W
Circuit power	345 VA / 330 W
Rated breaking capacity	1500 A @ 300 V DC
Max. rated current	6 W
24 V auxiliary voltage	

LP-STAR 4-48



	LP-STAR 4-12	LP-STAR 4-24	LP-STAR-4-36	LP-STAR-4-48
Circuits	4	4	4	4
Max. battery size (C10; 1.8 V/Z, +20 °C)	2 x 12 V / 12 Ah	4 x 12 V / 12 Ah	6 x 12 V / 12 Ah	8 x 12 V / 12 Ah
Dimensions (W x H x D)	260 x 550 x 260 mm		260 x 730 x 260 mm	
Max. ambient temperature	For storage: -20 °C to + 40 °C, For operation*: -5 °C to + 35 °C			
Sound pressure level at mains operation / emergency mode (converter operation)	0 dB / 50 dB			
Housing colour	RAL 7035			
Degree of protection / insulation class	IP20 / I			
Weight (approx.) without battery	17 kg		21 kg	

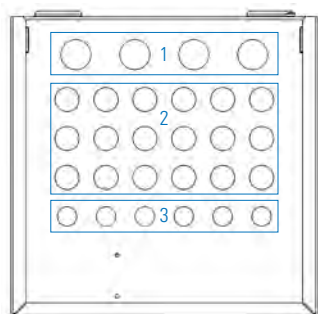
\* Maximum Design Lifetime at +20 °C: 10 years

#### Battery

Rated capacity AhK10, 1.8 V/Z, +20 °C	Dimensions of one battery L x W x H (mm)	Number of batteries U <sub>b</sub> = 12 V pieces	Total weight of all batteries (kg)
10 Y: 12 Ah	152 x 98 x 102	max. 8 pieces	4 pieces: 15.25 8 pieces: 30.50

Pre-cut cable entries LP-STAR

(11)



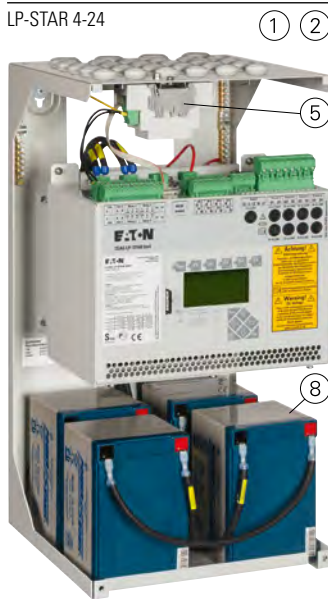
1 = 4 x M25

2 = 18 x M20

3 = 6 x M16



LP-STAR 4-24



LP-STAR 4-48



Optional Webmodule LP-STAR, for expansion



## LP-STAR

### Ordering details

Type	Model	Order No.	Selection
1 LP-STAR 4-12	LP-STAR-4-12, incl. control module, 1 charging unit, 4 circuits and battery packs 2 x 12 V / 12 Ah	40071362120	<input type="checkbox"/>
2 LP-STAR 4-24	LP-STAR-4-24, incl. control module, 1 charging unit, 4 circuits and battery packs 4 x 12 V / 24 Ah	40071362240	<input type="checkbox"/>
3 LP-STAR 4-36	LP-STAR-4-36, incl. control module, 1 charging unit, 4 circuits and battery packs 6 x 12 V / 36 Ah	40071362360	<input type="checkbox"/>
4 LP-STAR 4-48	LP-STAR-4-48, incl. control module, 1 charging unit, 4 circuits and battery packs 8 x 12 V / 48 Ah	40071362480	<input type="checkbox"/>

### Construction group ordering details

Type	Model	Order No.	Selection
5 Webmodule LP-STAR	Module for DIN Rail Mounting, incl. connection line without patch cable RJ45, factory fitted	40071361450	<input type="checkbox"/>
6 Webmodule LP-STAR	Module for DIN Rail Mounting, incl. connection line without patch cable RJ45, for expansion	40071361449	<input type="checkbox"/>
7 CG-S Bus Interface*	Interface* for connection on CGVision or for MasterSlave operation (Connection of more LP-STAR over the CG-S Bus)	40071071178	<input type="checkbox"/>

\* **Attention:** The installation of the CG-S Bus Interface must factory-provided happened. A expansion of the module locally is only possible with exchange of the full CSU module. MasterSlave and CGVision operation isn't possible.

### Battery ordering details

Type	Model	Order No.	Selection
8 12 V/12 Ah	Battery block, period of use: 10 years	40066071147	<input type="checkbox"/>

Period of use specified for a max. battery temperature of +20 °C

### Fuse ordering details

Type	Model	Order No.	Selection
9 Final circuit fuses	2.5 AT / 250 V (packaging unit 10 pieces)	40071361235	<input type="checkbox"/>
10 Mains feed-in circuits	6.3 AT / 250 V (packaging unit 10 pieces)	40071361234	<input type="checkbox"/>

### Accessories ordering details

Type	Model	Order No.	Selection
11 Clamping gland set, 28 pieces	4 x M25, 18 x M20, 6 x M16	40071361159	<input type="checkbox"/>

# LP-STAR emergency lighting power supply in a compact design

## Technical Data

LP-STAR 4-24/IP 54



### LP-STAR IP54

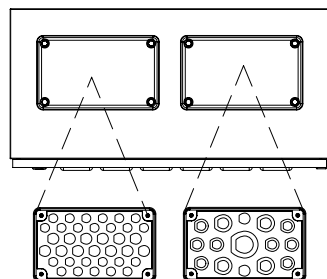
#### Input

Rated voltage AC	1 ~ 220-240 V
Rated frequency	50/60 Hz
Max. rated current AC	5,5 A
Rated voltage DC	19.2- 28.8 V
Battery	VRLA, 2 x 6 cells in series, 20 °C

#### Output

Rated voltage AC AC	220-240 V AC / 220 V DC konstant
Total current	4.7 A AC / 2.45 A DC
Total power	1080 VA / 540 W
Circuit power	345 VA / 330 W
Rated breaking capacity	1500 A @ 300 V DC
Max. rated current 24 V auxiliary voltage	6 W

Pre-cut cable entries LP-STAR



24 x M16  
13 x M20

1 x M50/32  
4 x M32/20  
8 x M25/16  
2 x M20

	LP-STAR 4-12/IP54	LP-STAR 4-24/IP54	LP-STAR 4-36/IP54	LP-STAR 4-48/IP54
Circuits	4	4	4	4
max. battery size (C10; 1,8 V/Z, +20 °C)	2 x 12 V / 12 Ah	4 x 12 V / 12 Ah	6 x 12 V / 12 Ah	8 x 12 V / 12 Ah
Dimensions (W x H x D)	815 x 600 x 300 mm			
Max. ambient temperature	For storage: -20 °C to + 40 °C, For operation*: -5 °C to + 35 °C			
Sound pressure level at mains operation / emergency mode (converter operation)	0 dB / 30 dB			
Housing colour	RAL 7035			
Degree of protection electronic area	IP54			
Degree of protection battery box	IP21			
Degree of protection / insulation class	I			
Weight (approx.) without battery	17,5 kg			

\* Maximum Design Life Time at +20 °C: 10 years

#### Battery

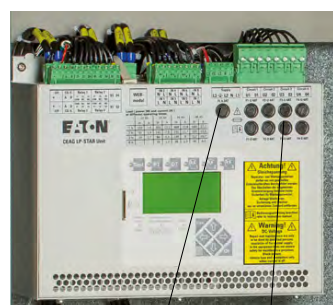
Rated capacity AhK10, 1.8 V/Z, +20 °C	Dimensions of one battery L x W x H (mm)	Number of batteries U <sub>b</sub> = 12 V	Total weight of all batteries (kg)
10 J: 12 Ah	152 x 98 x 102	max. 8 pieces	4 pieces: 15,25 8 pieces: 30,50



LP-STAR 4-48/IP54



Optional Webmodule LP-STAR, for expansion



## LP-STAR IP54

### Ordering details

Type	Model	Order No.	Selection
1 LP-STAR 4-12/IP54	LP-STAR-4-12/IP54, incl. control module, 1 charging unit, 4 circuits, CG-S Bus Interface and battery packs 2 x 12 V / 12 Ah	40071362124	<input type="checkbox"/>
1 LP-STAR 4-24/IP54	LP-STAR-4-24/IP54, incl. control module, 1 charging unit, 4 circuits, CG-S Bus Interface and battery packs 4 x 12 V / 24 Ah	40071362244	<input type="checkbox"/>
1 LP-STAR 4-36/IP54	LP-STAR-4-36/IP54, incl. control module, 1 charging unit, 4 circuits, CG-S Bus Interface and battery packs 6 x 12 V / 36 Ah	40071362364	<input type="checkbox"/>
1 LP-STAR 4-48/IP54	LP-STAR-4-48/IP54, incl. control module, 1 charging unit, 4 circuits, CG-S Bus Interface and battery packs 8 x 12 V / 48 Ah	40071362484	<input type="checkbox"/>

### Construction group ordering details

Type	Model	Order No.	Selection
2 Webmodule LP-STAR	Module for DIN Rail Mounting, incl. connection line without patch cable RJ45, factory fitted	40071361450	<input type="checkbox"/>
3 Webmodule LP-STAR	Module for DIN Rail Mounting, incl. connection line without patch cable RJ45, for expansion	40071361383	<input type="checkbox"/>

### Battery ordering details

Type	Model	Order No.	Selection
4 12 V/12 Ah	Battery block, period of use: 10 years	40066071147	<input type="checkbox"/>

Period of use specified for max. battery temperatur of +20 °C

### Fuse ordering details

Type	Model	Order No.	Selection
5 Final circuit fuses	2.5 AT / 250 V (packaging unit 10 pieces)	40071361235	<input type="checkbox"/>
6 Mains feed-in circuits	6.3 AT / 250 V (packaging unit 10 pieces)	40071361234	<input type="checkbox"/>

# LP-STAR emergency lighting power supply in a compact design

## Technical Data

LP-STAR 4-24 / ESF30



### LP-STAR ESF30

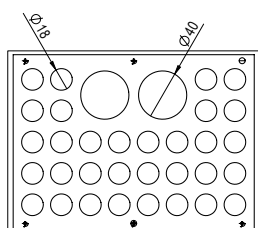
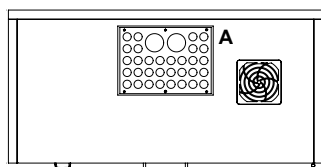
#### Input

Rated voltage AC	1 ~ 220-240 V
Rated frequency	50/60 Hz
Max. rated current AC	5,5 A
Rated voltage DC	19.2- 28.8 V
Battery	VRLA, 2 x 6 cells in series, 20 °C

#### Output

Rated voltage AC	220-240 V AC / 220 V DC konstant
Total current	4.7 A AC / 2.45 A DC
Total power	1080 VA / 540 W
Circuit power	345 VA / 330 W
Rated breaking capacity	1500 A @ 300 V DC
Max. rated current 24 V auxiliary voltage	6 W

Pre-cut cable entries LP-STAR



A (2 : 5)

Number of cable entries:

2 x 40 mm

32 x 18 mm

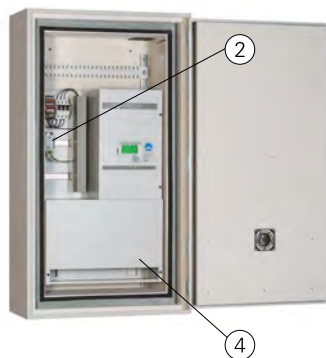
	LP-STAR 4-12 / ESF30	LP-STAR 4-24 / ESF30	LP-STAR 4-36 / ESF30	LP-STAR 4-48 / ESF30
Circuits	4	4	4	4
max. battery size (C10; 1,8 V/Z, +20 °C)	2 x 12 V / 12 Ah	4 x 12 V / 12 Ah	6 x 12 V / 12 Ah	8 x 12 V / 12 Ah
Dimensions (W x H x D)	1238 x 688 x 335 mm			
Max. ambient temperature	For storage: -20 °C to + 40 °C, For operation*: -5 °C to + 35 °C			
Sound pressure level at mains operation / emergency mode (converter operation)	0 dB / 30 dB			
Housing colour	Light grey			
Degree of protection	IP54			
Degree of protection / insulation class	I			
Weight (approx.) without battery	170 kg			

\* Maximum Design Life Time at +20 °C: 10 years

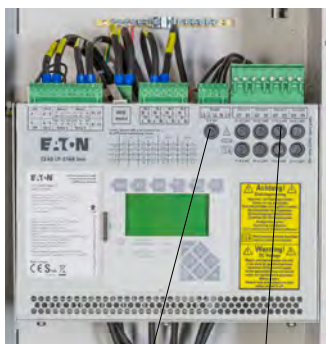
### Battery

Rated capacity AhK10, 1.8 V/Z, +20 °C	Dimensions of one battery L x W x H (mm)	Number of batteries U <sub>B</sub> = 12 V	Total weight of all batteries (kg)
10 J: 12 Ah	152 x 98 x 102	max. 8 pieces	4 pieces: 15,25 8 pieces: 30,50

LP-STAR 4-48/ESF30



Optional Webmodule LP-STAR, for expansion



## LP-STAR ESF30

### Ordering details

Type	Model	Order No.	Selection
1 LP-STAR 4-12/ESF30	LP-STAR-4-12/ESF30, incl. control module, 1 charging unit, 4 circuits, CG-S Bus Interface and battery packs 2 x 12 V / 12 Ah	40071362128	<input type="checkbox"/>
1 LP-STAR 4-24/ESF30	LP-STAR-4-24/ESF30, incl. control module, 1 charging unit, 4 circuits, CG-S Bus Interface and battery packs 4 x 12 V / 24 Ah	40071362248	<input type="checkbox"/>
1 LP-STAR 4-36/ESF30	LP-STAR-4-36/ESF30, incl. control module, 1 charging unit, 4 circuits, CG-S Bus Interface and battery packs 6 x 12 V / 36 Ah	40071362368	<input type="checkbox"/>
1 LP-STAR 4-48/ESF30	LP-STAR-4-48/ESF30, incl. control module, 1 charging unit, 4 circuits, CG-S Bus Interface and battery packs 8 x 12 V / 48 Ah	40071362488	<input type="checkbox"/>

### Construction group ordering details

Type	Model	Order No.	Selection
2 Webmodule LP-STAR	Module for DIN Rail Mounting, incl. connection line without patch cable RJ45, <b>factory fitted or for expansion</b>	40071361383	<input type="checkbox"/>

### Battery ordering details

Type	Model	Order No.	Selection
4 12 V/12 Ah	Battery block, period of use: 10 years	40066071147	<input type="checkbox"/>
Period of use specified for max. battery temperatur of +20 °C			

### Fuse ordering details

Type	Model	Order No.	Selection
5 Final circuit fuses	2.5 AT / 250 V (packaging unit 10 pieces)	40071361235	<input type="checkbox"/>
6 Mains feed-in circuits	6.3 AT / 250 V (packaging unit 10 pieces)	40071361234	<input type="checkbox"/>

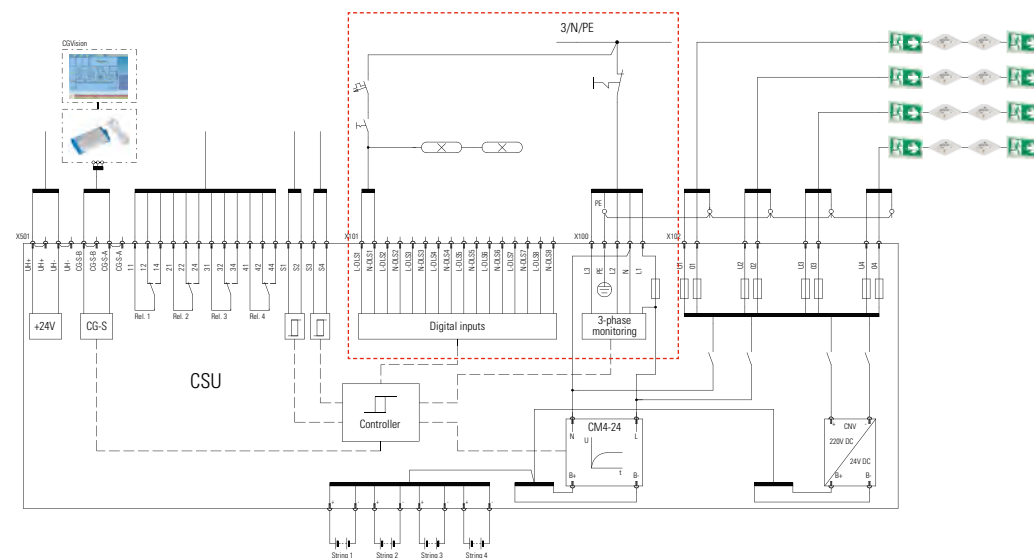
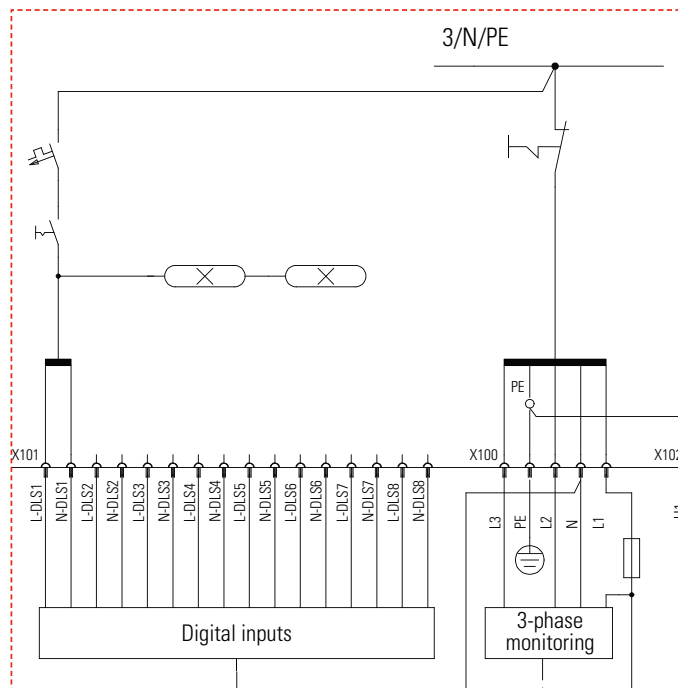
# LP-STAR emergency lighting power supply in a compact design

## Components and options

### Digital inputs, for example light switch query

The standard 8 digital inputs (two for each circuit) can be used to query the switch for the combined switching of emergency and general lighting.

### Schematic diagram



CEAG 3-PM Voltage monitoring module



CEAG 3-PM Voltage monitoring module

To avoid risks from mains failures, it is necessary to permanently monitor the function of the mains lighting light distributors in order to switch on the safety lighting in the event of a fault. Thus the CEAG 3-PM modules are an important part of the safety system.

If one phase fails, the CEAG 3-PM module switches a relay contact and interrupts the 24 V current loop to the emergency lighting units. All emergency luminaires in stand-by circuit are switched to continuous light. A second relay contact is used to signal the power failure.

- No E30 wiring due to short circuit and interruption tolerant 24V current loop technology.
- Test button for mains/emergency light failure thus no interruption of the mains voltage necessary and thus no failures of the operational processes.

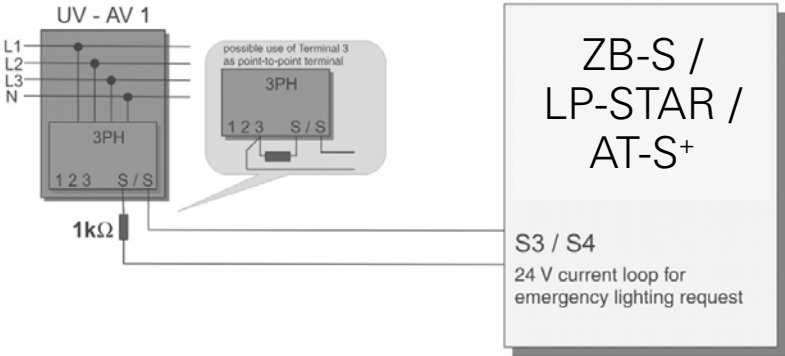
Dimensions mm (H x W x D)	85 x 52.5 x 65, 3 subunits
Enclosure	Plastic, light grey
Connection terminals	2.5 mm² rigid and flexible
Type of mounting	DIN mounting rail
Contact	0.5 A/24 V AC/DC, 1 x open contact, 1 x changeover contact
Trigger threshold	$U < 85 \% U_N$

Ordering details

Type	Scope of supply	Order No.
CEAG 3-PM Modul with Test-Taster	Module ready for mounting	40071361660

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

# LP-STAR emergency lighting power supply in a compact design

## Components and options

RCM-AR flush-mounted



RCM-AS surface-mounted



### RCM-A remote indication

The RCM-A remote display uses a battery power supply to display the the most important system functions safely. A key-operated switch can be used to block emergency lighting operation during periods of inactivity. The remote indicator thus fulfils the requirement that remote switching is only permissible if actuation by Unauthorized persons are not possible. By blocking the emergency operation the battery maintenance charge is not affected. A differential loop monitoring leads to Short-circuit or open-circuit detection to make the system ready for operation. LED indicators: System operational, power source for safety purposes, error.

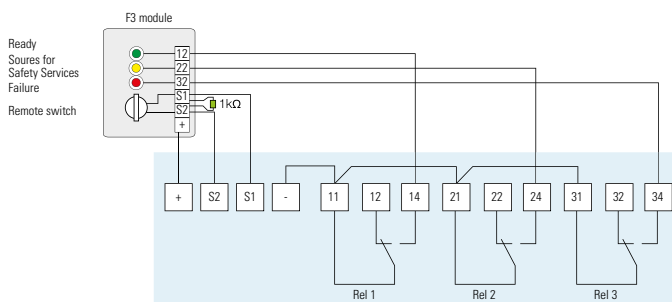
	RCM-AS surface-mounted	RCM-AR flush-mounted
Mechanic		
Dimensions (W x H x D mm)	80 x 80 x 52	80 x 80 12 (without flush-mounted box) Diameter flush-mounted box: 70 mm Deep flush-mounted box: 64 mm
Weight	0.15 kg	0.16 kg
Degree of protection	IP 20	IP 20
Material	Thermoplast	
Resistant up to Flammability	650°C	
Environment		
Ambient temperature	-5°C ... +35°C	
Storage temperature	-20°C ... +65°C	
Relative humidity	10% ... 95% no condensation	
Air pressure	795 ... 1080 hPa	
EMC		
Interference immunity	EN/IEC 61000-6-2	
Interference radiation	EN/IEC 61000-6-3	
Electrical parameters		
Rated voltage	24 V DC (SELV)	
Degree of pollution	2	
Power consumption	< 1 W	
Installation		
Lead	J-Y(ST)Y 4 x 2 x 0.8	
Max. Cable length	2000 m	

### Ordering details

Type	Scope of supply	Order No.
RCM-AS remote indication	Subassembly for wall mounting	40071362390
RCM-AR remote indication flush-mounted	Component for installation in switch or cavity wall sockets according to DIN VDE 0606	40071362395

### Remote switch

Control loop for blocking LP-STAR during operating downtimes with differential loop monitoring for short circuit and wire breakage detection.



Differential monitoring:  
F3 switch closed:  
F3 switch open (1 kΩ):

Short circuit or interruption lead to unlock LP-STAR  
Device ready  
Device blocked

### Webmodule LP-STAR



Example: Device status



Example: Circuit status



### Cyber Security:

see White Paper WP152002EN  
"Cyber security considerations for  
electrical distribution systems"  
[www.eaton.com](http://www.eaton.com)

### Webmodule CG-S (LP-STAR)

Webmodule LP-STAR for visualisation and monitoring an LP-STAR device on the local Ethernet (LAN) or Internet (WWW) with a conventional WEB browser. Access to the webmodule via internet (WWW) must be appropriately administered and set up on site by a competent IT department. Integrated mail program for convenient, event-related error notification via email, for up to 5 email recipients. 1 web-module is required for each LP-STAR device.

- Simple menu navigation
- Any type of display devices can be used with a WEB browser, for example notebook, tablet PC, iPad or smartphone
- Complete visualisation and monitoring of an LP-STAR device through the local Ethernet (LAN) with a regular WEB browser, no additional software required for all functions
- Retrieving and indicating all current operating states
- Localised fault indicators for every emergency luminaire circuit and luminaires with target location information in plain text connected to a function test
- Continuous up-to-date information on charging unit and battery
- Parallel access from various PC workstations to a webmodule possible (max. 8)
- Integrated email program for each webmodule for convenient error notification via email
- Encrypted, adjustable email dispatch acc. to type of error or function test
- Up to 5 email recipients programmable
- Adjustable update cycle for web browser via the webmodule
- Encrypted transmission
- Authenticated access via administrator account with password protection
- Configurable guest account for restricted access with password protection
- Static or dynamic (DHCP) IP addressing possible
- Supports IPv4/IPv6 (Internet Protocol version 4/version 6)
- Any number of webmodules operable in parallel
- Overview of all active webmodules on the local Ethernet with status display and hyperlink function
- Independent parallel operation of a CGVision visualisation possible
- Includes 2 Modbus sockets as standard

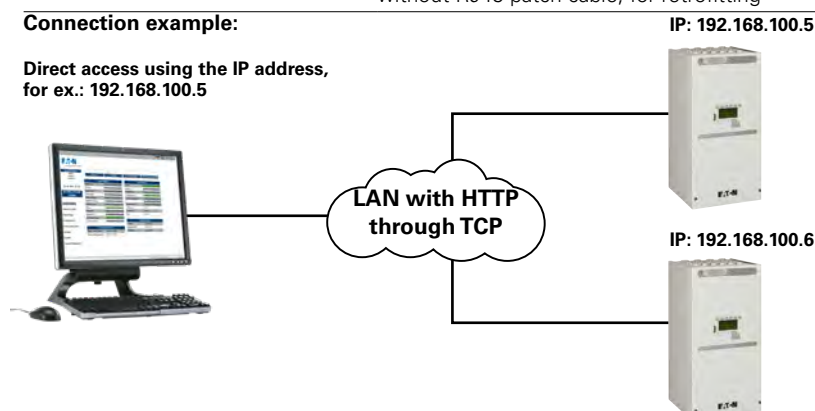
Device supply voltage	24 V DC
Rated power	< 1.1 W
Connection	RJ45
Degree of protection	IP20
Weight	0.05 kg
Dimensions	90 x 35 x 31
Housing	Polycarbonate

### Ordering details

Type	Scope of supply	Order No.
Webmodule CG-S (LP-STAR intern)	Module for DIN rail mounting, incl. connection without RJ45 patch cable, mounted ex works	40071361450
Webmodule CG-S (LP-STAR)	Module for DIN rail mounting, incl. connection without RJ45 patch cable, for retrofitting	40071361449

### Connection example:

Direct access using the IP address,  
for ex.: 192.168.100.5





# LP-STAR emergency lighting power supply in a compact design

Components and options

## CGVision Package III

CGVision Package III (Basic or Pro) includes the CG-S/USB interface (USB box), for connecting the CG-S bus-based emergency luminaire systems like the LP-STAR, ZB-S and AT-S<sup>+</sup> to the CGVision visualisation software using a standard bus cable and an optional CG-S Bus Interface.

Up to 480 devices of the LP-STAR, ZB-S or AT-S<sup>+</sup> systems can be connected, even in mixed mode. However, systems must be assigned to their own device groups in CGVision.

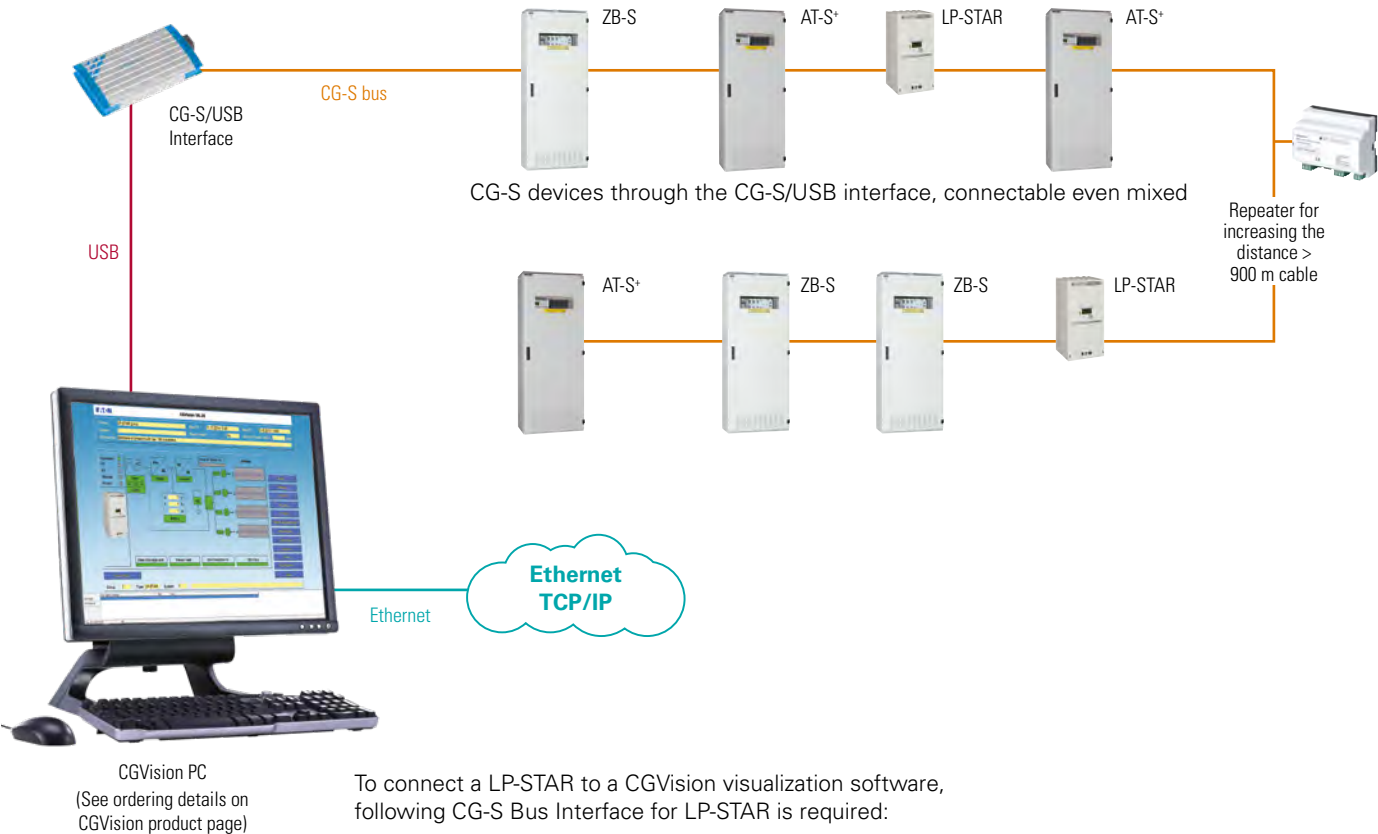
The bus cable can be extended with an optionally available repeater.

The CGVision Package III also includes all dongle licences for EGA devices (ZB96, EuroZB.1, GVL24.1, CG48 or ZVL220), CGLine on CGVision.

### CG-S bus

- Max. bus length: 900 m
- The bus length can be extended using a router/repeater
- Double terminated Bus
- No stub lines allowed
- Recommended cable: JY (ST)Y 4 x 2 x 0.8 mm<sup>2</sup> Ø twisted pair (double twisted pair), shielded
- Termination resistor: 105 Ω on both sides

### CGVision Package III application example



To connect a LP-STAR to a CGVision visualization software, following CG-S Bus Interface for LP-STAR is required:

### Ordering details

Type	Scope of supply	Order No.
CG-S Bus Interface	Plug-in card*	40071071178

\* **Attention:** The CG-S Bus Interface must be installed by the manufacturer. The module can be installed later on site only with the replacement of the entire CSU module.



## PC programming software LP-STAR

Programming software for pre-configured LP-Star memory cards for quick pre-programming on the PC and for easy reading and processing of the inspection log book memory. All data can be saved on the memory card and hard disk for documentation.

Prints for documentation:

Detailed prints of programmed system configuration with the following information:

- Individual device name (20 characters) + 100 characters of additional information
- Date and time of automatic duration test incl. Distance in months
- Date and time of automatic function test incl. Distance in days
- Manual reset: Yes/No
- Delay in mains return: 0-99 min
- LON switch: Yes/No
- Capacity in Ah
- Rated operating time in h
- Operating limit time in %
- Assignments of the 4 relays
- Assignments of the 3 function keys
- Assignments of the 8 optional inputs

Detailed print of the programmed circuits (wiring diagrams) with the following information for each circuit:

- Circuit/ SKU number and type
- Individual circuit name
- Monitoring type for circuit
- Switch type for circuit
- Number of luminaires
- Address and individual name of each luminaire
- Circuit type for each luminaire

Print of inspection log book with following options:

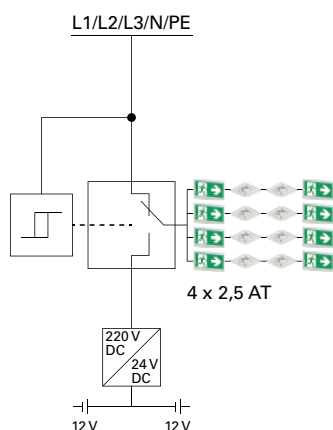
- Fault events (35 various fault events selectable separately or fully)
- Inspection log book period (from – to for date and time)
- Individual comment per print
- For luminaire failure: Information on individual luminaire and circuit names

## Ordering details

Type	Scope of supply	Order No.
Software	PC software for LP-STAR for alternative programming of the system configuration on PC	40071347152

# LP-STAR emergency lighting power supply in a compact design

## Technical Data



### Circuit change-over module

The circuit change-over module supplies 230 V AC in mains operation and 220 V DC in emergency lighting operation to the luminaires of the emergency lighting system according to EN 60598-2-22.


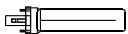
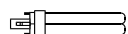

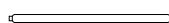

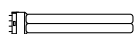
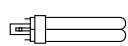

The CEWA GUARD monitoring checks the operation of the connected luminaires. Up to 20 luminaires can be connected.

Mechanical structure	Circuit board
Fuse	2,5 AT / 250 V 5 x 20 mm
Max. operating time in battery operation	Maximum 330 W per circuit and total maximum 540 W for all circuits
Max. power in mains operation	Maximum 345 VA per circuit and total maximum 1080 W for all circuits
Max. inrush current transformer output	250 A
Output voltage	220 V constant
For the luminaires	EVG

Luminaire series	Luminaire type	Power consumption battery operation [W]*	Power consumption mains operation [VA]*	Inrush current [A]
GuideLed	10011 ... 10026 CG-S	1.9	4.0	1.5
	10021 ... 10026 CG-S	2.9	5.5	
	11011 ... 11026 CG-S	2.6	5.0	
	11021 ... 11026 CG-S	4.1	7.1	
	10011 ... 10013 CG-S FSL	4.0	7.2	
	13011.1 ... 13022.1	3,9	8,0	
	13051 ... 13052	5,0	8,5	
	13091.1 ... 13092.1	3,9	8,0	
	13032 ... 13042	5,0	8,5	
	13031 ... 13041	5,0	8,5	
CrystalWay	19021	1,6	3,5	
	19022	3,7	6,5	
Style LED	22011 LED CG-S	4.4	7.6	
	22021 LED CG-S	5.8	9.5	
	51011, 51021 LED CG-S	5.8	9.5	
Spirit LED	Spirit LED 16	1.7	3.8	
	Spirit LED 28	3.7	6.6	
Brillant LED	1503 ... 1803 LED CG-S	2.9	5.5	
	1504 ... 1804 LED CG-S	4.1	7.1	
	1903 LED CG-S	3.0	5.5	
Aluminium housing	70011 LED CG-S	2.0	4.36	
	70021 LED CG-S	3.1	5.8	
	71011 LED CG-S	3.1	5.8	
	71021 LED CG-S	5.8	9.5	
Escape luminaires	3503.1 LED CG-S	4.4	7.6	
	3604.1 LED CG-S	5.8	9.5	
Atlantic	Atlantic LED S CG-S	5.0	8.5	
	Atlantic LED D CG-S	5.0	8.5	
	Atlantic LED R/O/Wand CG-S	5.0	8.5	
i-P65+	i-P65+ L CG-S, i-P65+ H CG-S	9,3	15,6	
46011 LED	46011 LED CG-S	10,3	17,1	
	46011 LED HYG CG-S	10,3	17,1	
	46011 LED LT CG-S	10,5	11,0	

\* Power consumption of the luminaires during battery or mains operation in case of an ambient temperature of +20 °C.

## Connection cable/W for the luminaires with:

International term	Lamp cap	EVG Type EVG ...	Lamp load in [W]	Battery operation P [W] at a luminous flux $K_E/K_{Rated} = 75\%$	Mains operation S [VA]	Inrush current [A]
T 16 	G5	13.3 ...	4	4.4	8	3
		13.3 ...	6	5.5	12	3
		13.3 ...	8	6.6	16	3
		13.3 ...	13	11.0	23	3
TC-SEL 	2G7	13.3 ...	5	4.4	10	3
		13.3 ...	7	5.5	13	3
		13.3 ...	9	6.6	16	3
		13.3 ...	11	8.8	18	3
TC-DEL 	G24q-1	13.3 ...	10	7.7	16	3
		13.3 ...	13	11.0	23	3
TC-TEL 	GX24q-1	13.3 ...	13	11.0	23	3
T 26 	G13	18 ...	18	15.4	30	8
TC-F 	2G10	18 ...	18	15.4	30	8
TC-L 	2G11	18 ...	18	15.4	30	8
TC-DEL 	G24q-2	18C ...	18	15.4	30	8
TC-TEL 	GX24q-2	18C ...	18	15.4	30	8

Continuous output = start output

## N-EVG 54 W V-CG-S



## Rated value N-EVG ... V-CG-S in case of mains and battery operation

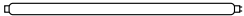
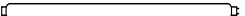
Term	T5	T5	T5	T5	T5	T5
Lamp cap	G5	G5	G5	G5	G5	G5
Type N-EVG ... V-CG-S	14 / 21 / 28 / 35 W	14 / 21 / 28 / 35 W	14 / 21 / 28 / 35 W	14 / 21 / 28 / 35 W	24 / 39 W	24 / 39 W
Lamp load [W]	14	21	28	35	24	39
Battery operation, incl. converter efficiency [W] in switch position (luminous flux $K_E/K_{Rated}$ in %)						
100 %	18	24	33	40	29	42
90 %	15	22	29	35	26	37
80 %	14	20	26	31	22	33
70 %	13	18	24	29	20	29
60 %	11	15	22	24	18	26
50 %	10	14	20	22	15	24
40 %	9	12	18	20	15	22
30 %	8	11	15	18	13	20
Power consumption [VA]	18	25	32	39	28	41
Inrush current [A]	10	10	10	10	10	10
System power lamp + EVG acc. EN 50294 [W]	16	23	30	37	25	41

# LP-STAR emergency lighting power supply in a compact design

## Technical Data

N-EVG 58 W V-CG-S



Term					
Lamp cap	T5	T5	T5	T8	T8
Type N-EVG ... V-CG-S	G5	G5	G5	G13	G13
Lamp load [W]	49W	54W	80W	36W	58W
Power consumption [A] at 220 V battery operation in switch position (luminous flux $K_E/K_{Rated}$ in %)	49	54	80	36	58
100 %	53	57	84	37	55
90 %	46	51	75	33	48
80 %	42	46	66	31	44
70 %	37	40	59	26	40
60 %	33	35	53	24	35
50 %	31	33	46	22	31
40 %	26	29	42	20	29
30 %	24	26	37	18	24
Power consumption [VA]	55	58	85	37	55
Inrush current [A]	10	10	12	10	10
System power lamp + EVG acc. EN 50294 [W]	52	57	84	34	53

**The required battery current is determined based on luminous flux conditions (30% ... 100%).**

Dim mode 30% only down to 10°C, 60% only down to 0°C allowed.

When used outdoors, the 100% setting should only be used.

## Calculation example

The following luminaires should be connected to one power circuit:

8 pieces of GuideLed 10011 CG-S RZ

4 pieces of V-CG-SLI 350

2 pieces of GuideLed SL 13021.1

**There are the following conditions:**

### Battery operation:

max. cont. output: 330 W

### Mains operation:

max. 345 VA apparent power  
max. inrush current 250 A

### max. output:

10011 CG-S: 8 x 1.9 W = 15.2 W

V-CG-SLI 350: 4 x 10.7 W = 42.8 W

13021.1 CG-S: 2 x 3.9 W = 7.8 W

Total = 65.8 W **< 330 W --> OK**

### max. inrush current:

10011 CG-S: 8 x 1.5 A = 12.0 A

V-CG-SLI 350: 4 x 3 A = 12.0 A

13021.1 CG-S: 2 x 1.5 A = 3.0 A

Total = 27.0 A **< 250 A --> OK**

### max. mains power:

10011 CG-S: 8 x 4 VA = 32.0 VA

V-CG-SLI 350: 4 x 11.6 VA = 46.4 VA

13021.1 CG-S: 2 x 8 VA = 16.0 VA

Total = 94.4 VA **< 345 VA --> OK**

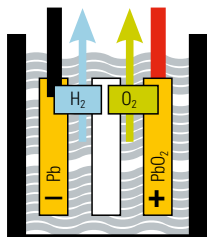
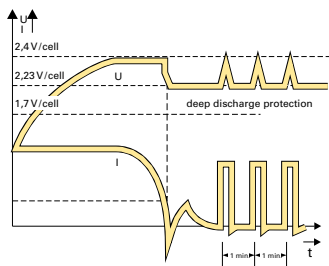
## Attention!

The connected load of all circuits in total may not exceed **540 W** and **1080 VA** per LP-STAR device.

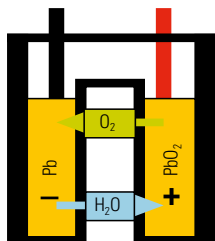
When connecting external modules to the 24 V auxiliary supply, consider power consumption with battery sizing.

# LP-STAR emergency lighting power supply in a compact design

## Components and options



In conventional lead-acid batteries with free electrolyte, water is broken down into oxygen at the positive plate and hydrogen at the negative plate in case of overcharging the battery. To protect the battery from drying, this loss of water must be compensated for at regular intervals.



The extremely low gas emission absorption cells are designed to ensure that the positive plate is charged completely before the negative plate and consequently the released oxygen diffuses to the negative plate. On the negative plate it reacts with the lead to form lead-oxide which in turn reacts with the sulphuric acid electrolyte and forms lead-sulphate and water to prevent any loss of water.

### CM 4-24

The completely sealed lead batteries are charged gradually based on an IU0U charging curve in function of temperature. Boost charge is activated in function of the battery charge level to ensure that the batteries are charged without exceeding the gassings voltage.

The charge monitoring procedure verifies the charging process continuously and it reports any faults immediately, including interruption of the battery circuit, faulty charging unit or a high impedance battery cell.

End-of-charge voltage boost charge at +20 °C	28.8 V
End-of-charge voltage trickle charge at +20 °C	27.6 V
Deep discharge protection [1.6 V/Z]	20.4 V
Maximum charging current	4 A
Maximum rated power at boost charge	130 VA
Maximum rated power at trickle charge	10- 120 VA

### Max. battery discharge power [W] <sup>1)</sup>

Rated operating time	P-Batt min 12 Ah	P-Batt min 24 Ah	P-Batt min 36 Ah	P-Batt min 48 Ah
1.0 h	133 W (7.6 A)	303 W (15.2 A)	468 W (22.8 A)	540 W (27.1 A)
2.0 h	50 W (3.9 A)	142 W (7.8 A)	232 W (11.7 A)	320 W (15.6 A)
3.0 h	24 W (2.7 A)	86 W (5.3 A)	149 W (8.0 A)	212 W (10.7 A)
8.0 h	-	16 W (2.2 A)	38 W (3.3 A)	66 W (4.4 A)

<sup>1)</sup> Values incl. converter efficiency

<sup>c)</sup> = Discharge current

**Important note:** The aging provision for batteries (25 %) is included.

### Evaluation of aeration and deaeration of electrical service rooms according to DIN EN 50272-2

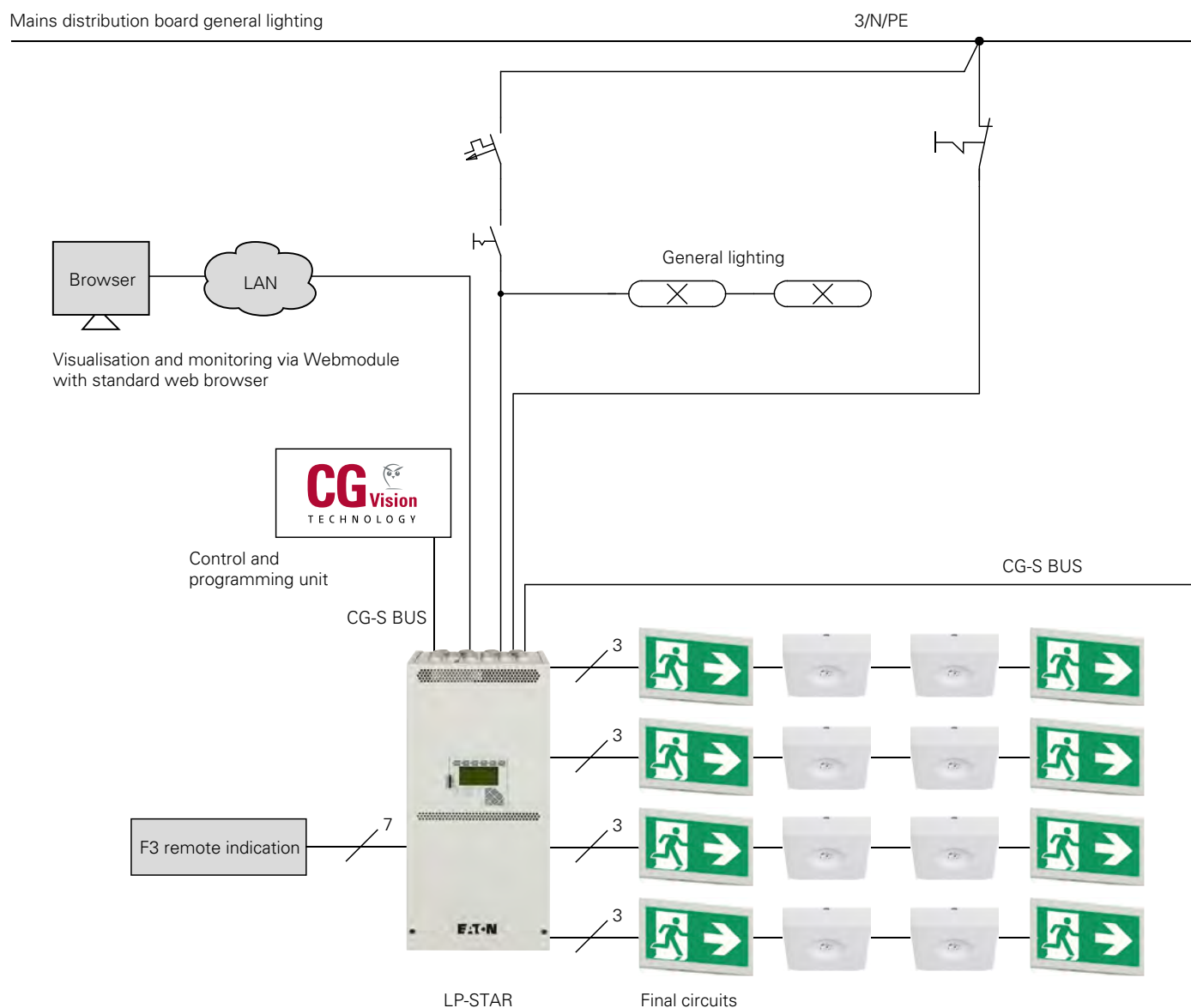
Capacity	12	24	36	48
<b>Air volume flow</b> required for the aeration of the location room [l/h], calculated for boost charge*	57.6	115.2	172.8	230.4
<b>Vent cross-section</b> of the air inlets and outlets of the place of installation [cm <sup>2</sup> ], calculated for boost charge*	1.6	3.2	4.8	6.5
<b>Air volume flow</b> required for the aeration of the location room [l/h], calculated for trickle charge*	7.2	14.4	21.6	28.8
<b>Vent cross-section</b> of the air inlets and outlets of the place of installation room [cm <sup>2</sup> ], calculated for trickle charge*	0.2	0.4	0.6	0.81

\* If boost charge is not frequently used (for example once a month), the air flow rate can be calculated based on the trickle charge current.



# LP-STAR emergency lighting power supply in a compact design

Installation example



9

# LP-STAR emergency lighting power supply in a compact design

## Description

LP-STAR



### LP-STAR emergency lighting power supply in a compact design

Low Power System according to EN 50171 for the power supply of escape luminaires and exit sign luminaires 230V / 216V AC/DC. It is suitable for emergency lighting systems according to DIN VDE 0100-560, EN 50172 and V DIN V VDE 0108-100. With an automatic test device and monitoring and displaying the state and name of individual luminaires connected to system-specific EVG/LED supply module including a monitoring component without an additional data cable.

The switching operation of each escape luminaire and exit sign luminaire with system-specific EVG/LED supply module or monitoring component is programmed freely in the control module without an additional control cable to the luminaires.

The CEAG STAR technology results in a severe reduction of end circuits, because the mixed operation including maintained light, switched maintained light and non-maintained light is implemented in a single circuit.

The control module assigns the different operating modes without any modification of the luminaire installation. The operating modes: non-maintained light or maintained

light cannot be selected at the monitoring module or EVG/LED supply module using slide switches, coding switches or jumpers respectively. The additional costs incurred due to the use of parts made by other manufacturers or additional components on the installation lines cannot be claimed.

Simple connection technology using plug-in, back of hand proof clamp connections.

### Bus technologies

CG-S bus technology based on LONWorks® technology

For data communication a 2-pole, bidirectional CG-S data bus, is integrated optimally in the control module of LP-STAR.

Using the optionally available CG-S Bus Interface, any building control systems based on the LONWorks® technology can communicate with the system on the CG-S bus.

Alternatively, any OPC compatible building control system can be connected to the optionally available OPC server and the Interface-Box using the CG-S bus.

Thus extensive status messages and commands can be queried through the CG-S bus.

The following data can thus be directly communicated:

- Status messages such as device disabled, deep discharge protection, battery interruption, battery voltage, current and temperature, insulation error, charging unit fault, bus communication error, mains failure, circuit faults etc.
- Input commands such as Start function test, Start and cancel duration test, Manual reset, Disable and release system.

16 virtual switching inputs can be used to directly and independently switch circuits or even individual luminaires via external LON sensors.

Interconnection of all LP-STAR distribution boards also possible via various media such as fibre optic cables, Ethernet and LAN using optional components.

Status and error messages can be retrieved for each individual luminaire.

Communication with system-oriented luminaires takes place only through the connected power line.

Using the search function, the luminaires connected to the system addressed during installation are automatically detected.

### Control module

A freely programmable control module with a non-volatile program memory and alphanumeric graphic display monitors and controls the LP-STAR system. All functions such as loading, mains/emergency switch-over and deep discharge protection of devices and the connected emergency luminaires are automatically inspected. Errors arising will be reported immediately.

An interface provides a connection to a central monitoring device.

In case of a short circuit or interruption of control current loops, differential monitoring leads to the system immediately switching on (maintained light) or to the system being put in standby.

Graphical display: 128 x 64 pixels, back-lit, program-adjustable contrast and brightness.

Display values: battery voltage, battery charge current (+), battery charge current in test mode or in case of fault (-), charge fault, luminaire fault with location information in plain text, deep discharge protection, manual reset, delayed emergency light (remaining time in minutes), test mode, date/time, insulation fault, UV-AV fault, fault information, programming information, test log book.

LED displays: System readiness, supply from the source for safety services, failure.

Sealed keypad:

- individual buttons for device test, function test and duration test.
- 3 freely programmable function keys for example: Lock/unlock device, manual reset, turn on/off maintained light, display fault list, turn on/off continuity lighting, simulation mains failure UV.
- 7 control buttons for user-friendly navigation in query and programming mode.

Programming options:

Individual luminaire monitoring, circuit monitoring, individual name (20 characters) per device, circuit, luminaire, device address, selective manual reset, delayed emergency light (1-15 min.), LON switch, timer function, automatic function and duration test, selection of menu language, automatic daylight savings time setting, password protection.

Connection for disable switch: Control loop for disabling the system during operating downtimes with differential loop monitoring for short circuit and wire breakage detection.

Differential monitoring: Short circuit or interruption lead to the system going into standby.

Connection for phase monitor: 24V current loop for emergency light requirement with differential loop monitoring for short circuit and wire breakage detection.

Differential monitoring: Short circuit or interruption lead to the system switching on (maintained light) immediately.

Connection for potential-free indicator contacts, buzzer: 4 potential-free indicator contacts with a separate root. Every potential-free contact can have one or more of the 11 different alerts assigned to it. Freely programmable, DIN VDE specification retrievable at any time as default setting.

Connection for 230 V digital inputs without phase monitor function: 8 freely assignable inputs 230V, programmable as inverted and non-inverted for example for start/stop function test, start/stop duration test, manual reset, turn on/off

maintained light, turn on emergency lighting as continuity lighting.

**Memory card:**  
Memory card for archiving the device configuration and the mandatory inspection log book information over a minimum of 4 years.

**Storing:**

- 360.000 inspection log book entries
- Luminaire target location texts (20 characters per luminaire)
- Circuit names (20 characters per circuit)
- Device name (20 characters)

Using The device can be programmed offline on a PC using the optional CEAG software.

## Charging technology

The sealed maintenance-free lead batteries are charged gradually based on an microprocessor-controlled IU charging curve in function of temperature. Force charge is activated in function of the battery charge level to ensure that the batteries are charged without exceeding the gas development voltage. The charge monitoring procedure verifies the charging process continuously and it reports any faults immediately, including interruption of the battery circuit, faulty charging unit or a high impedance battery cell.

- with ISO test device according to DIN VDE0100 Part 410
- LED displays for charging unit on, boost charge on, insulation fault, charge fault, mains available
- potential-free contacts charge fault, boost charge, insulation fault
- Temperature sensor built into the battery compartment

## Circuit components

The circuit switch-over supplies and monitors emergency luminaires with electronic ballasts for DC operation. The CEWA GUARD monitoring

checks the operation of the connected luminaires.

- Monitoring of up to 20 luminaires per circuit with individual status display
- Mixed operation of continuous lighting, switched maintained light and non-maintained light within a single circuit. (an additional data line to the luminaires is not required)
- Output voltage in battery operation: 220 V DC
- Typical switch-over time mains/battery: 450 ms
- freely programmable for maintained light, switched maintained light or maintained mode
- fuses easily accessible on the front part of the component
- permanent monitoring of fuses
- automatic luminaire search function

## Webmodule

Webmodule for visualising and monitoring a LP-STAR device on the local Ethernet (LAN) or Internet (WWW) with a regular WEB browser. Access to the webmodule via internet (WWW) must be appropriately administered and set up on site by a competent IT department.

Integrated email program for convenient, event-related error notification via email, for up to 5 email recipients.

- Simple menu navigation
- Complete visualisation and monitoring of an LP-STAR through the local Ethernet (LAN) with a regular WEB browser
- Retrieving and indicating all current operating states
- Localised fault indicators for every emergency luminaire circuit and luminaires with target location information in plain text connected to a function test
- Continuous up-to-date information on charging device and battery
- Parallel access from various PC workstations to a web-module possible (max. 8)

- Integrated email program for a convenient error notification via email
- Adjustable email dispatch acc. to type of error or function test
- Up to 5 email recipients programmable
- Adjustable update cycle for web browser via the webmodule
- Authenticated access via administrator account with password protection
- Configurable guest account for restricted access with password protection
- Static or dynamic (DHCP) IP addressing possible
- Any number of webmodules operable in parallel
- Overview of all active web-modules on the Intranet with status display and hyperlink function

Supply voltage: 24V DC  
power consumption: < 1.5W  
Connection: RJ45

Housing made of polycarbonate for installation on DIN rail, 2TE

Dimensions (L x W x H): 90 mm x 35 mm x 58 mm Weight: ca. 100 g Protection rating: IP20

## 24V OGiV block battery

Only closed and non-spillable OGiV batteries are used. Rated operating time 1, 3 and 8 hours respectively

- extremely low gas emissions
- Period of use: 10 years at 20°C
- low self-discharge
- Design according to IEC60896-21/-22
- electrolyte and air oxygen sealed terminals

CEAG is a member of the "Stiftung Gemeinsames Rücknahmesystem Batterien [joint battery recycling programme] (GRS)".

In this manner batteries undergo a controlled and complete recycling cycle. This means that possible polluting

materials are recovered and reused for new products.

Specifications have been quoted based on CEAG products. Specifications can be compared based on this product. The tenderer can submit a tender based on a variant solution including an equivalent product (proof by the tenderer). Detailed product descriptions must be attached to the offer for the evaluation of equivalence:

## References

CEAG Notlichtsysteme GmbH  
Senator-Schwartz-Ring 26  
D-59494 Soest/Germany  
Telephone +49 (0) 2921/69-870  
Fax +49 (0) 2921/69-617  
Internet www.ceag.de  
Email info-n@ceag.de

A ISO 9001 certification must be further provided as proof.

Manufacturers without the ISO 9001 certification are not permitted.

LONWorks®: Registered trademark of the Echelon Corporation





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# Central Battery Systems AC/AC

## Overview

	Central Power System	Low Power System	AC/AC power source	AC/DC power source	DC/DC power source
<b>10.1</b> Loadstar 	●		●		
<b>10.2</b> Easichck 	●1*				
<b>10.3</b> AT-S+ 	●2*				

	Single luminaire monitoring in battery operation (DC)	Freely programmable switching mode in one and the same circuit	STAR technology and single luminaire monitoring in AC operation		
Circuit Monitoring	CEWA GUARD Technology (CG)	STAR Technology (S)	STAR+ Technology (S+)	EasiCheack (EC) Technology	AE-CU Technology
				● 1*	
	●	●	●		

1\* Optional luminaire test system for Loadstar

2\* Luminaire test and controll system for  
external AC safety power supply systems



# Central Battery Systems AC/AC

System Design - Loadstar

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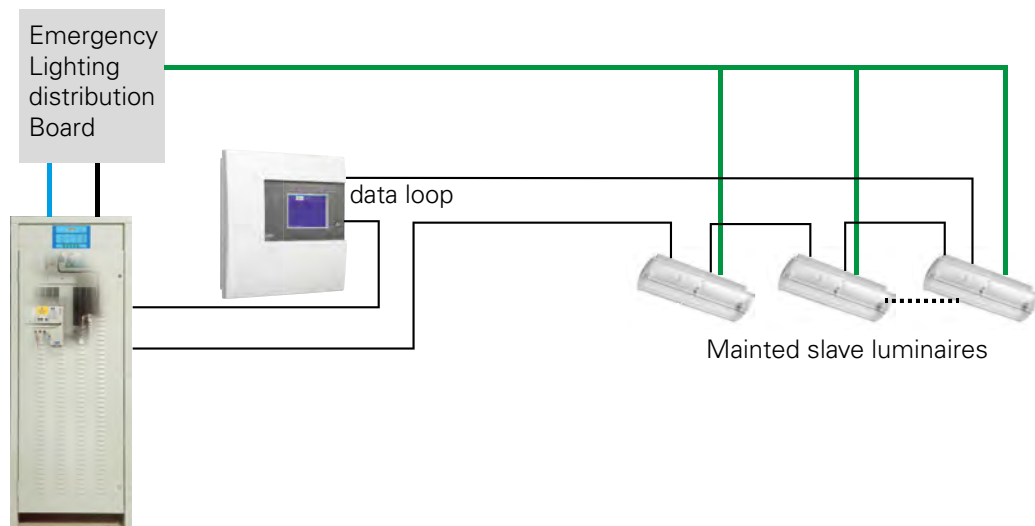


Central battery system based emergency lighting is ideal for medium to large installations. For projects where central control and testing is desirable, a central battery system is a viable and cost effective alternative to self-contained emergency lighting products. The main advantages of central battery systems over self-contained systems are:

- Testing and maintenance is much easier to carry out
- Battery replacement is much quicker and less disruptive
- Battery life is generally 10 years or more
- Luminaires can be centrally controlled
- High light levels can easily be achieved
- The emergency lighting system can be completely unobtrusive

Eaton manufactures a wide range of central battery emergency lighting systems. Standard products include AC/AC static inverter systems, with the addition of a new compact, competitively priced unit for smaller installations. Bespoke systems to suit the exact requirements of the specifier are also available.

To complement the range of central battery systems, Eaton also offers a wide selection of slave luminaires and conversion modules for mains fluorescent and LED luminaires. EasiCheck automatic self-testing can be readily incorporated into central systems.



# System Control and Mode of Operation

It is a requirement of any correctly designed emergency lighting system that the emergency lighting is activated both in the event of complete mains failure, and also in the event of a local mains failure. The emergency lighting system can have luminaires that are maintained or non-maintained. Similarly, the central battery unit can also be maintained or non-maintained operation. The following diagrams explain how activation of the emergency lighting is achieved, using the main types of central battery systems.

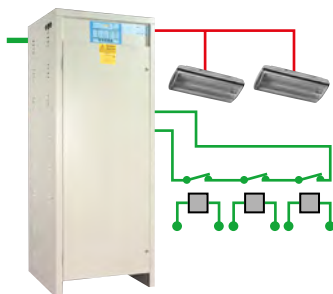
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## Central systems with dedicated slave luminaires

### a. Non-maintained central battery unit with sub-circuit monitors

With this method, relays are used to monitor the normal lighting supplies. The contacts of these relays are wired in a series loop such that in the event of failure of any of the normal lighting supplies, the loop is broken, sending a signal to the central battery unit to activate all of the emergency luminaires. Details of purpose-made remote sub-circuit monitor units can be found in the Loadstar product section.

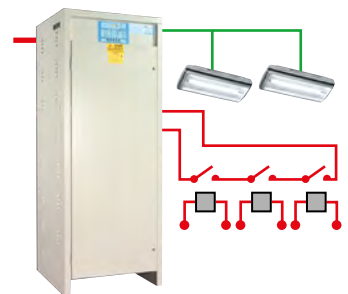
Normal mains healthy condition



Failure of normal lighting final circuit



Total mains failure



KEY

— - LIVE  
— - DEAD

# Central Battery Systems AC/AC

System Design - Loadstar

## b. Maintained central battery unit with the maintained circuit continuously energised

A simple installation where emergency luminaires are illuminated at all material times irrespective of the status of the normal lighting. In the event of a complete mains failure, the slave luminaires are illuminated from the battery supply.

Normal mains healthy condition



Failure of normal lighting final circuit



Total mains failure



KEY

- LIVE

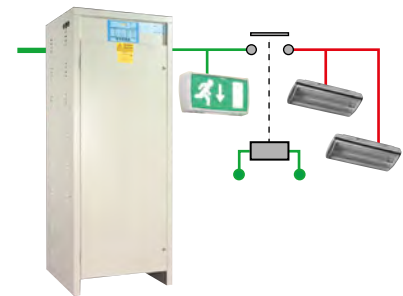
- DEAD

## c. Maintained central battery unit with remote hold off relays

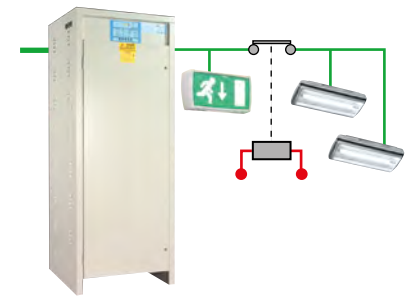
The maintained output from the battery unit is fed to a number of remote hold off relays throughout the building. The coil of the hold off relay is connected to the unswitched side of the local normal lighting supply. Assuming this supply is healthy, the relay will pull in, opening the contacts and preventing power from reaching the slave luminaires. In the event of a local mains failure, the relay drops out, the contacts close and the emergency luminaires in that particular area are illuminated from the maintained circuit of the battery unit.

In the event of a complete mains failure, the system operates in a similar manner, except that the slave luminaires are illuminated from the battery supply. Details of purpose-made remote hold off relays can be found in the Loadstar product section.

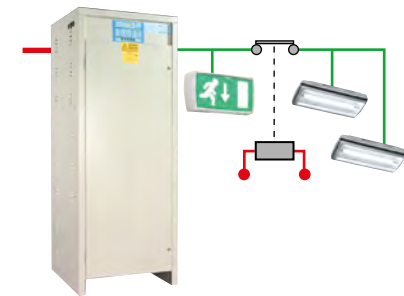
Normal mains healthy condition



Failure of normal lighting final circuit



Total mains failure



KEY

- LIVE

- DEAD

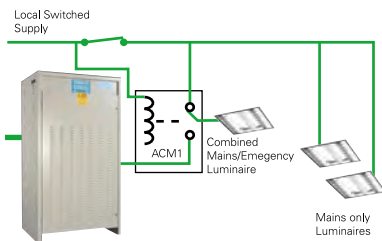
# Central systems with converted mains luminaires

## d. Static inverter unit with conventional mains fittings

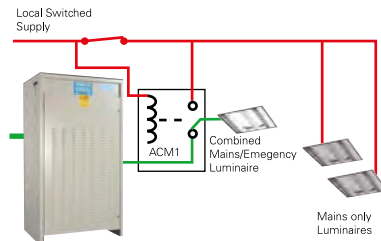
A static inverter runs conventional mains luminaires at full brightness during both mains healthy and mains failure conditions. However, there is usually a requirement for local switching of the luminaires during mains healthy conditions, with automatic illumination in the event of mains failure.

Local switching with automatic illumination in the event of mains failure can be easily achieved by use of the ACM1 module, which is purpose-designed for this application. A detailed description of the ACM1 module, including a typical wiring schematic, can be found on page in Loadstar product section.

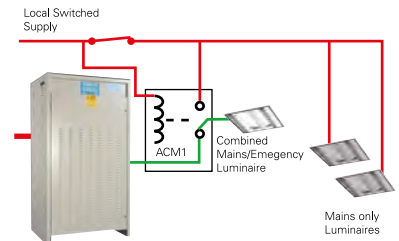
Normal mains healthy condition



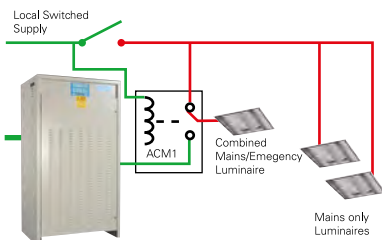
Failure of normal lighting final circuit



Total mains failure



OR



KEY  
— - LIVE  
— - DEAD



Battery Type

Eaton offers a choice of five different battery types:

- Valve regulated lead acid (10 year design life)
- Valve regulated lead acid (3-5 year design life)
- Vented nickel-cadmium
- High performance plante lead acid
- Flat plate lead acid

Each battery type has specific characteristics. The table below (fig. 2) provides a comparative guide to these characteristics. The most popular battery type is valve regulated lead acid with a 10 year design life. This type of battery is used on approximately 90% of projects due to its competitive cost, good life characteristics, ease of maintenance and compact size.

Fig 2. Comparison of Battery Characteristics

Table with 6 columns: Characteristics, Valve Regulated Lead Acid (10 year life), Valve Regulated Lead Acid (3-5 year life), Vented Nickel Cadmium, High Performance Plante Lead Acid, Flat Plate Lead Acid. Rows include Expected life, Capital cost, Maintenance, Resistance to damage and abuse, and Through life costs.

Battery Room Ventilation

Vented batteries, such as nickel cadmium, plante and flat plate lead acid emit potentially explosive gases under charge conditions. Therefore it is important when selecting rooms for emergency lighting central battery systems with these types of battery, to calculate the amount of ventilation required. The required number of air changes per hour (A) is given by the following formula:

A = (0.045 x N x I) / V

- Where:
- N = Number of cells in the battery
- V = Volume of room in cubic metres
- I = Charge rate in Amperes

This formula will give the number of air changes per hour required during boost charge conditions. On float charge (systems are on float charge for most of their service life), the amount of gas emitted is approximately 1.5% of that liberated whilst on boost charge and under most circumstances this will be dissipated by natural ventilation, and will not present a hazard. However, we recommend that the boost charge condition is allowed for at the design stage to ensure the appropriate decision on ventilation requirements is made.

Although Valve Regulated Lead-Acid Batteries require little ventilation under normal operating conditions, it is good practice to apply the formula to calculate the number of air changes required to achieve minimum risk under battery fault or failure conditions. Please refer to: EN IEC 62485-2: 2018.



Installation Notes

- Warning notices should be displayed on entry doors to battery rooms: BATTERY ROOM. EXTINGUISH ALL NAKED LIGHTS BEFORE ENTERING. NO SMOKING

## System Sizing

When sizing the system, it is important to allow for the full input requirement of the light fittings rather than the lamp wattages.

## AC/AC systems

When utilising a static inverter system, the fitting operates at full output during both mains healthy and mains failure conditions. When sizing a suitable static inverter to power a particular load, it is important to consider the input VA and the input (not lamp) wattage of the emergency luminaires. The total VA requirement defines the inverter module size, and the total input wattage defines the battery size.

Therefore, to establish the correct inverter module size, the power factor correction (PFC) rating of the luminaires must be

considered in addition to lamp wattage and control gear losses. High frequency control gear circuits have excellent PFC ratings, usually of around 0.96 to 0.98. This compares with 0.85 to 0.9 for equivalent lamp magnetic control gear circuits. Care should be taken when low wattage compact fluorescent lamps are used, utilising high frequency gear or high PFC versions where possible. Low power factor versions can have PFC ratings of only 0.45 to 0.5, thereby greatly increasing the inverter rating required for the system. If utilising low voltage lighting powered via step-down transformers, it is essential to allow for the efficiency and power factor of the step-down transformers. Table (fig. 3) and graph (fig. 4) illustrate the relationship between wattage and VA rating for a typical system.

Note: EN 60598-2-22 prohibits the use of glow starters in fluorescent luminaires used for emergency lighting.

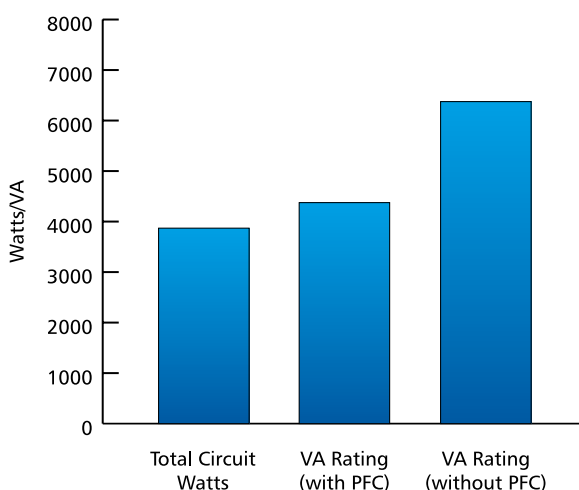
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Fig 3. Typical system. VA rating with and without power factor correction

Qty of Luminaires	Description	Total Circuit Watts	VA Rating (Compact lamps without PFC)	VA Rating (Compact lamps with PFC)
25	1 x 58W T8 (wire wound ballasts)	1725	1925	1925
40	1 x 28W 2D (wire wound ballasts)	1360	2960	1560
15	1 x 16W 2D (wire wound ballasts)	315	690	375
15	1 x 13W TC-D (wire wound ballasts)	270	600	315
5	1 x 40W GLS incandescent	200	200	200
Inverter Rating =		3870	6375	4375

Note: Use of compact fluorescent luminaires with power factor correction (PFC) leads to a reduced inverter module size and therefore savings in space and capital costs

Fig 4. Typical system. VA rating with and without power factor correction



## Additional Considerations

### Spare capacity

With any central battery system it is important to bear in mind that it is difficult to extend the system at a later date unless capacity has been allowed for at the design stage. For this reason, we would strongly recommend that some spare capacity is included when selecting the central battery system rating. Our technical department is available to provide assistance.



# Central Battery Systems AC/AC

## System Design - Loadstar

### Cable sizes

When selecting cable sizes, due regard should be paid to limitations imposed by voltage drop and physical strength. Each conductor shall be of copper, having a nominal cross sectional area of not less than 1mm<sup>2</sup>. Usually (see national requirements) the voltage drop in cables connecting a central battery to a slave luminaire should not exceed 4 % of the system nominal voltage at maximum rated current.

Using copper conductors, volts drop can be calculated per pair of conductors as shown in table fig. 5. Total volts drop on a circuit can be calculated according to the formula:

$$VDT = I \times VDM \times D$$

Where:

- 10
- VDT = volts drop total
  - I = maximum load current
  - VDM = volts drop per ampere per metre (obtained from fig. 5)
  - D = cable run in metres

Example:

Fig. 6 and 7 show an example comparison for a central battery system with a total connected load of 1500W and a 50m run of 16mm<sup>2</sup> cable supplying the luminaires.

This example shows that for this configuration, a 230 V system would be most suitable to meet the requirements of max. 4 % voltage drop. The low current value combined with greater allowable volt drop would enable much smaller cables to be used.

Fig 6.

Comparison Data	24V System	50V System	110V System	230V System
Max. permissible	0.96 V	2.0 V	4.4 V	9.2 V
Volt drop (4 %)				
Total current for total connected load of 1500W	62.5 A	30 A	13.6 A	6.52 A
Actual volt drop for 16 mm <sup>2</sup> cable with 50m length	8.43 V	4.05 V	1.84 V	0.88 V

The use of larger cables or multiple outgoing circuits may permit the use of 24, 50 or 110V systems in the above example.

### Additional Considerations

#### Fire protection of cables

Cables should be routed through areas of low fire risk. The following cables and wiring systems should be used.

- a) Cables with inherently high resistance to attack by fire
- b) Wiring systems with additional fire protection.

Systems should be installed in accordance to the national Regulations. Additional fire protection may apply. For example, if cables are buried in the structure of the building.

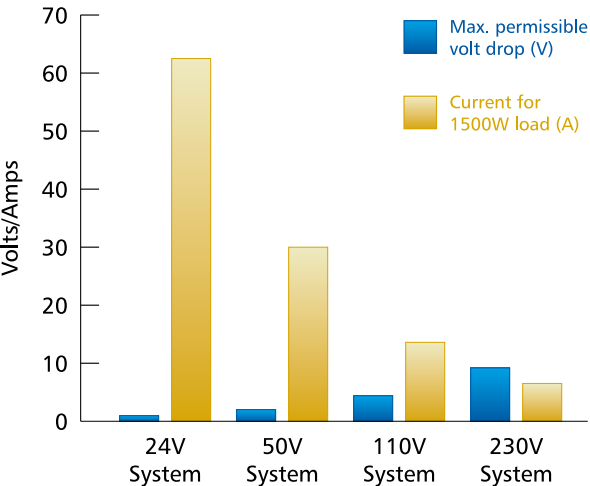
Fig 5.

Nominal Cross Sectional Area	Maximum Current Rating	Volt per Drop per Metre
1.0 mm <sup>2</sup>	14 amps	42 mV
1.5 mm <sup>2</sup>	17 amps	28 mV
2.5 mm <sup>2</sup>	24 amps	17 mV
4.0 mm <sup>2</sup>	32 amps	11 mV
6.0 mm <sup>2</sup>	41 amps	7.1 mV
10.0 mm <sup>2</sup>	55 amps	4.2 mV
16.0 mm <sup>2</sup>	74 amps	2.7 mV

The problems of volt drop can be overcome by:

- Using higher system voltages (= lower currents and therefore lower volt drop)
- Using larger cables (= lower resistance and therefore lower volt drop)
- Using multiple outgoing circuits (= less current per circuit and therefore lower volt drop)

Fig 7.







## Loadstar

The Loadstar range of AC/AC static inverter units offer the opportunity to create a discreet emergency lighting system, utilising suitable standard mains luminaires without modification. Small or decorative compact luminaires can also be easily incorporated. Loadstar AC/AC systems offer many benefits, including higher light levels in emergency mode, as all lamps in the luminaire are usually energised by the emergency supply. Mains voltage and lower currents enable cables of smaller cross sectional area to be used with low voltage AC/DC systems, without unacceptable levels of voltage drop. The proven and reliable modular design ensures a cost effective emergency lighting.

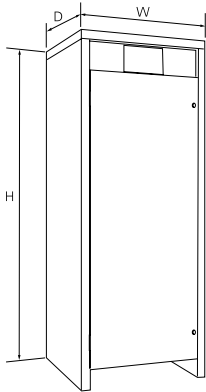
Loadstar AC/AC System



- BSI Kitemarked for peace of mind
- Cost effective modular design
- Standard mains luminaires used for emergency lighting
- Fully complies with EN50171
- Digital display to clearly indicate system status
- EasiCheck compatible versions available
- Low maintenance
- Low running cost due to passive stand-by operation
- Three phase systems available

10

## Dimensions



Cubicle Ref	H (mm)	W (mm)	D (mm)
931	1200	715	755
932	1800	715	755
934	1800	1015	755

Depth of 931/2/4 includes a 75mm spacer fitted to back, to ensure ventilation grilles are not obstructed. Dimensions are for guidance only and may be subject to change.



# System Operation

- In mains healthy condition, the system charges the batteries and stores power, ready for emergency operation
- In mains healthy condition, the power to luminaires designated for emergency use is supplied from the normal mains, via a by-pass contactor inside the cubicle. This may be switched, using a "maintained lights" switch (optional extra) or by use of a remote switch connected to terminals provided
- Local change-over switching can be achieved using an ACM1 module, controlling single or multiple luminaires (if fed from common switched mains supply - max load 750VA). The system will then supply normal mains power or emergency power via the inverter, dependant on status of mains supply at the static inverter
- In the event of a mains failure, the system provides emergency power to dedicated mains slave or designated standard mains luminaires, until mains power is restored (or for the rated duration of the system in the event of extended mains failure)
- Output voltage, from the system via the inverter, is 230V AC nominal
- Standard mains luminaires require no modification to operate with the static inverter (unless ACM1 change-over module is fitted integrally). All lamps in multi-lamp luminaires will be lit during mains failure, unless separate control gear is provided for individual lamps
- Sub-circuit monitoring and hold off relays can be added to the system to energise the emergency luminaires in the event of a localised mains circuit failure, if the ACM1 module is not used

### Energy Efficient Standby Operation

The Loadstar range of AC/AC static inverter systems are designed specifically for long term sustainability, reduced carbon footprint and reduced running cost without compromising on the products performance criteria. Due to the passive stand-by operation of the inverter only operating when required, the quiescent running power is minimised while maximising equipment lifetime and reduced running cost.

# Standard Specification

### • Cubicles

- 1.6mm zinc coated steel panels with powder coat RAL7032 light pebble grey finish
- Plinth base feature to prevent build up of moisture/corrosive materials and aid mechanical handling by fork or pallet truck
- 3 standard size cubicles, for combined charger/inverter/battery, charger/inverter only or battery only
- Small systems require only one cubicle. Larger systems housed in multiple sets (see selection tables)
- Electrical control gear and battery compartments are segregated, with lockable access door(s)
- Battery compartments supplied, where appropriate with separate tiered sections, to enable ease of electrolyte level inspection
- Separate fixed facia panel for mounting control/display panel
- Option of open battery racks on larger systems

### • Battery Charger

- Solid state, constant voltage charge control module
- Fully automatic
- Full recharge within 24 hours of a rated discharge
- Recharge to 80% capacity within 12 hours, complying with EN 50171
- Manual boost switch on systems with vented battery cells
- Current limit facility, preventing overcharging or damage to the system in the event of battery failure or fault
- Outputs have low AC ripple currents for maximum battery life and in compliance with EN 50171
- Input protection by MCB to BS 3871 Part 1 or BS 4752 Part 1

### • Battery

- Systems can be specified with:
  - Valve regulated lead acid
  - Vented nickel cadmium
  - High performance plante
- See selection tables/guides for battery characteristics

### • Fusegear

- Removable industrial HRC fuses

### • Input Circuits

- Cable entry via removable gland plate on top of cubicle
- Single phase 230V  $\pm$  10% AC 50Hz supply. Other input voltages on request
- Input terminals and MCB DIN-rail mounted and easily accessible

### • Load Circuits

- Substantial DIN rail mounted output terminals
- Option of integral distribution board (MCB or HRC fuses)

## • Output

- Systems are available in single phase and true three phase (three phase + neutral) output
- Standard systems offered are designed to 0.85 power factor, however unity power factor systems are available on request
- Option for 50Hz or 60Hz

## • Monitoring Circuits

- Terminals provided for connection of remote monitors and controls

## • Cables

- Compliant with BS 6231

## • Transformer

- Double wound with earth screen to BS 171

## • Rectifier

- Full wave controlled thyristor/diode bridge

## • Contactor

- Mains failure contactor to BS5424 Part 1

## • Temperature Compensation

- All lead acid cell systems supplied with transducer to monitor battery compartment temperature
- Chargers pre-set for optimum performance in 20°C ambient
- Charging voltage automatically adjusted to optimise battery life

## • Low Battery Voltage Disconnect Circuit

- Automatically shuts down the inverter when battery voltage falls below pre-set level, during extended periods of mains supply failure
- Helps prevent potential damage from deep discharge
- Indicator remains lit until mains power restored and reset pressed

## • Inverter

- Extensively proven and reliable modular design
- Systems with ratings up to 4 kVA incorporate a single module rated at 1.25 kVA, 2.5 kVA or 4 kVA
- Larger systems utilise multiple modules in parallel to provide a single common output, equal to sum of individual ratings
- Complies fully with EN50171
- Modules can be quickly and easily removed/replaced, aiding installation and maintenance
- See table for detailed technical specification

## • Test Push Button

- Simulates a mains failure

## • Frequency

- 50 Hz +/- 0.01% (60 Hz option)

## • Metering and Display Panel

Simple and easy to read status display

- LCD meter indicating battery voltage, battery current or battery compartment temperature. Voltage is default, others displayed using push buttons. Display mode indicated by LED:
  - Volts
  - Amps
  - Temperature - lead acid batteries only
- Charger indication LEDs
  - Power On
  - Maintained Lights (maintained systems only)
  - Float Mode
  - Current Limit
  - Full Charge
  - Boost mode (vented battery systems only)
- Alarm indication LEDs
  - Mains Fail
  - Charge Fail
  - Battery High Volts
  - Battery Low Volts
  - DC Earth Fault
  - Deep Discharge Protection (protection circuit has operated)
- Inverter indication LEDs
  - Inverter Running
  - Inverter Overload (optional alarm package)
  - Inverter High Volts (optional alarm package)
  - Inverter Low Volts (optional alarm package)
- Audible alarm fitted internally, with mute button on display plus common volt free contacts for remote signalling of a fault condition and terminals for optional remote alarm unit



# Central Battery Systems AC/AC

## Loadstar AC/AC Systems

Inverter



### Inverter

- To ensure a suitably rated system is selected, list the luminaires to be used, with their characteristics, to determine the wattage and VA power rating of the required inverter
- Where possible, utilise luminaires with high frequency control gear, compact fluorescent luminaires with high power factor correction, or dedicated 230V AC mains slave luminaires, to minimise the required VA rating of the inverter
- Using uncorrected compact fluorescent luminaires with poor power factor, will increase the size of inverter module required, leading to increased capital cost and space requirements
- For details of static inverter systems with ratings above those listed, please contact our central systems technical sales department
- It should be noted that multiple smaller units can often be more cost effective than a single large system. Distribution costs can be substantially reduced by locating units throughout a large building
- Note - systems specified for emergency lighting use should not have other services connected to them

Output Voltage	Pre-settable in the range 220-240V AC. Default setting is 230V AC. Voltage tolerance is 2% on loads of 0-100% of system rating
Frequency	50 or 60Hz. $\pm 0.01\%$ . Standard setting 50Hz. Waveform: Sinusoidal
Voltage Regulation	Static 2%, dynamic 6%
Isolation	2kV rms between input and output terminals
Total Harmonic Distortion	Less than 3% into a linear load
Power Factor	Will supply loads in the 0.3 lag - 0.3 lead range
Overload voltage	200% for 10 seconds, 125% for 20 minutes without reduction in output
Start-up time	Standard 30ms soft start
Noise Level	Less than 55dBA at 1 metre
Efficiency	85 - 89%
Protection	DC input and AC output MCBs DC input reverse polarity protection Short circuit protection Pre-charge protection fuse Reverse-fed mains proof
Low Voltage Shut down	Inverter module(s) automatically shut down when battery discharges to a pre-set level. Re-set is following a combination of the restoration of the mains supply and an increase in battery voltage above the disconnect threshold level
	Residual current drain when the disconnect circuit has operated is less than 1mA per module
Inhibit	An inhibit switch to control the inverter is fitted on a user control pcb in the cubicle
Technology	Pulse width modulation with high frequency switching

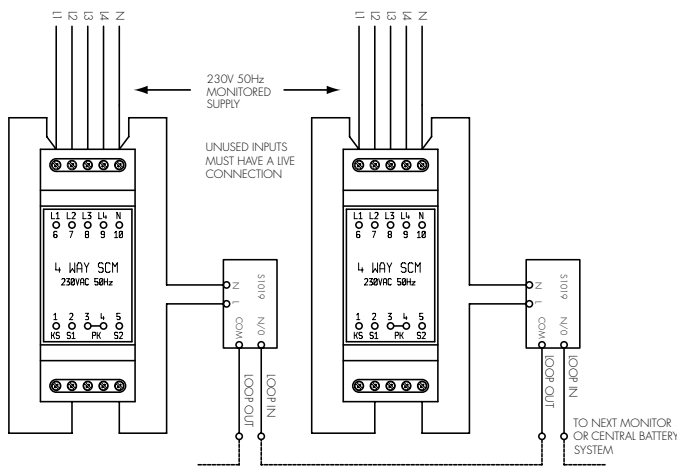
### Remote Alarm Unit



### Remote Alarm Unit

- Visual and audible indication of system fault
- Sounder mute facility
- Surface mounting dimensions: H114 x L114 x D25mm
- Catalogue Number - RAU-2V1

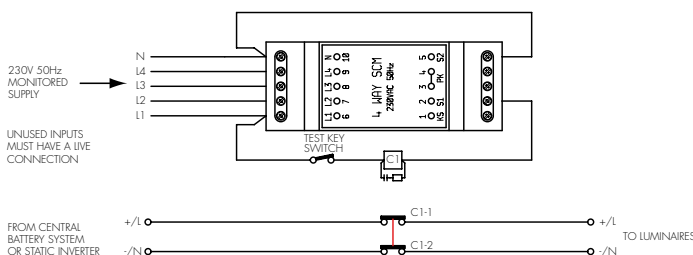
### Typical sub-circuit monitor arrangement



### Sub Circuit Monitor

- Non load switching
- Monitors mains lighting circuits. Provides signal to central battery unit in the event of a sub circuit failure
- Standard units available to monitor 4, 8 or 12 sub circuits
- Multiple units can be used if more than 12 circuits require monitoring
- A keyswitch can be fitted if required to enable simple testing by authorised user
- Unit dimensions: H 250 x L 265 x D 130mm

### Typical hold off relay arrangement



### Hold Off Relay Monitors

- Load switching
- Used to hold off maintained output from static inverter unit, providing non-maintained luminaire operation
- Monitors mains lighting circuits. In the event of a sub circuit failure, contactor drops out, allowing the maintained supply to energise the emergency luminaires
- Standard units available to monitor 4, 8 or 12 sub circuits, however monitors are available with up-to 24 circuits
- A keyswitch or supply healthy indicator can be fitted if required to enable simple testing by authorised user and visual indication of the supply condition
- Unit dimensions: H 250 x L 265 x D 130mm

SCM and HOR units are designed to accept a single common neutral per enclosure, all monitored circuits connected to an individual unit must share a common neutral.

### Ordering details

Type: Number of ways monitored	Order No. of Sub Circuit Monitor	Order No. of Hold Off Relay Monitor
4	1SCM4	1HOR4
8	1SCM8	1HOR8
12	1SCM12	1HOR12

# Central Battery Systems AC/AC

Loadstar AC/AC Systems

**Selection Table: AC/AC SLR Range, 0.85 Power Factor**

System Reference 230V in / 230V out	Inverter Power Rating (kVA)	Output Watts (W)	1 Hour Autonomy	Cubicle Arrangement 2 Hr Autonomy	3 Hr Autonomy
AC1KVA/850/SLR*	1	850	931CBI	931CBI	931CBI
AC2KVA/1700/SLR*	2	1700	931CBI	932CBI	932CBI
AC2.5KVA/2125/SLR*	2.5	2125	931CBI	932CBI	932CBI
AC3KVA/2550/SLR*	3	2550	932CBI	932CBI	932CBI
AC4KVA/3400/SLR*	4	3400	932CBI	932CBI	934CBI
AC5KVA/4250/SLR*	5	4250	934CBI	934CBI	934CBI
AC6KVA/5100/SLR*	6	5100	934CBI	934CBI	932CI + 932B3
AC7.5KVA/6375/SLR*	7.5	6375	934CBI	932CI + 932B3	932CI + 934B2
AC8KVA/6800/SLR*	8	6800	934CBI	932CI + 932B3	932CI + 934B3
AC9KVA/7650/SLR*	9	7650	932CI + 932B3	932CI + 934B2	932CI + 934B3
AC10KVA/8500/SLR*	10	8500	932CI + 932B3	932CI + 934B2	932CI + 934B3
AC11KVA/9350/SLR*	11	9350	932CI + 932B3	932CI + 934B3	932CI + 2 x 932B3
AC12KVA/10200/SLR*	12	10200	932CI + 932B3	932CI + 934B3	932CI + 2 x 932B3
AC13KVA/11050/SLR*	13	11050	932CI + 932B3	932CI + 934B3	932CI + 932B3 + 934B3
AC14KVA/11900/SLR*	14	11900	932CI + 932B3	932CI + 934B3	932CI + 932B3 + 934B3
AC15KVA/12750/SLR*	15	12750	932CI + 932B3	932CI + 2 x 932B3	932CI + 932B3 + 934B3
AC16KVA/13600/SLR*	16	13600	932CI + 934B2	932CI + 2 x 932B3	932CI + 2 x 934B3
AC17.5KVA/14875/SLR*	17.5	14875	934CI + 934B2	934CI + 934B3 + 932B1	934CI + 3 x 932B3
AC18KVA/15300/SLR*	18	15300	934CI + 934B2	934CI + 934B3 + 932B3	934CI + 3 x 932B3
AC19KVA/16150/SLR*	19	16150	934CI + 934B2	934CI + 934B3 + 932B3	934CI + 2 x 934B3
AC20KVA/17000/SLR*	20	17000	934CI + 934B3	934CI + 2 x 934B2	934CI + 932B3 + 2 x 934B3
AC21KVA/17850/SLR*	21	17850	934CI + 932B3 + 932B1	934CI + 2 x 934B2	934CI + 932B3 + 2 x 934B3
AC22KVA/18700/SLR*	22	18700	934CI + 932B3 + 932B1	934CI + 3 x 932B3	934CI + 932B2 + 2 x 934B3
AC23KVA/19550/SLR*	23	19550	934CI + 932B3 + 932B1	934CI + 3 x 932B3	934CI + 932B2 + 2 x 934B3
AC24KVA/20400/SLR*	24	20400	934CI + 934B3	934CI + 3 x 932B3	934CI + 2 x 934B3 + 932B2
AC25KVA/21250/SLR*	25	21250	934FC + 932I + 934B3	934FC + 932I + 3 x 932B3	934FC + 932I + 2 x 934B3 + 932B3

## Factory Fitted Options

### • 3 Phase Failure Monitor

- Detects phase failure and energises the inverter from the battery supply
- Suffix - PM



System Reference 400V in / 400V out	Inverter Power Rating (kVA)	Output Watts (W)	1 Hour Autonomy	Cubicle Arrangement 2 Hr Autonomy	3 Hr Autonomy
AC26KVA/22100/SLR*/ TPN4W	26	22100	934FC + 934I + 2 x 932B3	934FC + 934I + 2 x 934B3	934FC + 934I + 2 x 934B3 + 2 x 932B3
AC28KVA/23800/SLR*/ TPN4W	28	23800	934FC + 934I + 934B3 + 932B1	934FC + 934I + 2 x 934B3 + 932B3	934FC + 934I + 3 x 934B3
AC30KVA/25500/SLR*/ TPN4W	30	25500	934FC + 934I + 2 x 932B3	934FC + 934I + 2 x 934B3 + 932B2	934FC + 934I + 4 x 934B3
AC32KVA/27200/SLR*/ TPN4W	32	27200	934FC + 934I + 934B3 + 932B3	934FC + 934I + 2 x 934B3 + 932B2	934FC + 934I + 4 x 934B3
AC34KVA/28900/SLR*/ TPN4W	34	28900	934FC + 934I + 934B3 + 932B3	934FC + 934I + 2 x 934B3 + 932B3	934FC + 934I + 4 x 934B3 + 934B1
AC36KVA/30600/SLR*/ TPN4W	36	30600	934FC + 934I + 934B3 + 932B3	934FC + 934I + 2 x 934B3 + 932B3	934FC + 934I + 4 x 934B3 + 934B1
AC38KVA/32300/SLR*/ TPN4W	38	32300	934FC + 2 x 932I + 934B3 + 932B3	934FC + 2 x 932I + 3 x 934B3	934FC + 2 x 932I + 4 x 934B3 + 934B1
AC40KVA/34000/SLR*/ TPN4W	40	34000	934FC + 2 x 932I + 2 x 934B3	934FC + 2 x 932I + 3 x 934B3	934FC + 2 x 932I + 5 x 934B3
AC42KVA/35700/SLR*/ TPN4W	42	35700	934FC + 2 x 932I + 3 x 932B3	934FC + 2 x 932I + 4 x 934B3	934FC + 2 x 932I + 3 x 934B3 + 3 x 932B3
AC44KVA/37400/SLR*/ TPN4W	44	37400	934FC + 2 x 932I + 3 x 932B3	934FC + 2 x 932I + 4 x 934B3	934FC + 2 x 932I + 5 x 934B3
AC46KVA/39100/SLR*/ TPN4W	46	39100	934FC + 2 x 932I + 3 x 932B3	934FC + 2 x 932I + 4 x 934B3 + 934B1	934FC + 2 x 932I + 3 x 934B3 + 3 x 932B3
AC48KVA/40800/SLR*/ TPN4W	48	40800	934FC + 2 x 932I + 2 x 934B3 + 932B3	934FC + 2 x 932I + 4 x 934B3 + 934B1	934FC + 2 x 932I + 6 x 934B3
AC50KVA/42500/SLR*/ TPN4W	50	42500	934FC + 934I + 932I + 2 x 934B3 + 932B3	934FC + 934I + 932I + 4 x 934B3 + 934B1	934FC + 934I + 932I + 6 x 934B3
AC52KVA/44200/SLR*/ TPN4W	52	44200	934FC + 934I + 932I + 2 x 934B3 + 932B3	934FC + 934I + 932I + 4 x 934B3 + 934B1	934FC + 934I + 932I + 4 x 934B3 + 4 x 932B3
AC54KVA/45900/SLR*/ TPN4W	54	45900	934FC + 934I + 932I + 2 x 934B3 + 932B2	934FC + 934I + 932I + 4 x 934B3 + 934B1	934FC + 934I + 932I + 4 x 934B3 + 4 x 932B3
AC56KVA/47600/SLR*/ TPN4W	56	47600	934FC + 934I + 932I + 2 x 934B3 + 932B2	934FC + 934I + 932I + 5 x 934B3	934FC + 934I + 932I + 4 x 934B3 + 4 x 932B3
AC58KVA/49300/SLR*/ TPN4W	58	49300	934FC + 934I + 932I + 2 x 934B3 + 932B2	934FC + 934I + 932I + 4 x 934B3 + 934B1	934FC + 934I + 932I + 4 x 934B3 + 4 x 932B3
AC60KVA/51000/SLR*/ TPN4W	60	51000	934FC + 934I + 932I + 2 x 934B3 + 932B3	934FC + 934I + 932I + 4 x 934B3 + 934B1	934FC + 934I + 932I + 4 x 934B3 + 4 x 932B3

\* Denotes the system autonomy i.e. AC1KVA/850/SLR3 = 3Hr Backup Autonomy

≈ Denotes cubicles size/quantity information is available on application

NOTE: The above solutions may change dependant on batteries availability



# Central Battery Systems AC/AC

## Loadstar AC/AC Systems

**Selection Table: AC/AC SLR Range, Unity Power Factor**

System Reference	Inverter Power Rating (kVA)	Output Watts (W)	1 Hour Autonomy	Cubicle Arrangement 2 Hr Autonomy	3 Hr Autonomy
AC1KVA/1000/SLR3*	1.0	1000	≈	≈	≈
AC2KVA/2000/SLR*	2.0	2000	≈	≈	≈
AC2.5KVA/2500/SLR*	2.5	2500	≈	≈	≈
AC3KVA/3000/SLR*	3.0	3000	≈	≈	≈
AC4KVA/4000/SLR*	4.0	4000	≈	≈	≈
AC5KVA/5000/SLR*	5.0	5000	≈	≈	≈
AC6KVA/6000/SLR*	6.0	6000	≈	≈	≈
AC7.5KVA/7500/SLR*	7.5	7500	≈	≈	≈
AC8KVA/8000/SLR*	8.0	8000	≈	≈	≈
AC9KVA/7650/SLR*	9.0	9000	≈	≈	≈
AC10KVA/1000/SLR*	10.0	10000	≈	≈	≈
AC11KVA/11000/SLR*	11.0	11000	≈	≈	≈
AC12KVA/12000/SLR*	12.0	12000	≈	≈	≈
AC13KVA/13000/SLR*	13.0	13000	≈	≈	≈
AC14KVA/14000/SLR*	14.0	14000	≈	≈	≈
AC15KVA/15000/SLR*	15.0	15000	≈	≈	≈
AC16KVA/16000/SLR*	16.0	16000	≈	≈	≈
AC17.5KVA/17500/SLR*	17.5	17500	≈	≈	≈
AC18KVA/18000/SLR*	18.0	18000	≈	≈	≈
AC19KVA/19000/SLR*	19.0	19000	≈	≈	≈
AC20KVA/20000/SLR*	20.0	20000	≈	≈	≈
AC21KVA/21000/SLR*	21.0	21000	≈	≈	≈
AC22KVA/22000/SLR*	22.0	22000	≈	≈	≈
AC23KVA/23000/SLR*	23.0	23000	≈	≈	≈
AC24KVA/24000/SLR*	24.0	24000	≈	≈	≈
AC25KVA/25000/SLR*	25.0	25000	≈	≈	≈
AC26KVA/26000/SLR*	26.0	26000	≈	≈	≈
AC28KVA/28000/SLR*	28.0	28000	≈	≈	≈
AC30KVA/30000/SLR*	30.0	30000	≈	≈	≈
AC32KVA/32000/SLR*	32.0	32000	≈	≈	≈
AC34KVA/34000/SLR*	34.0	34000	≈	≈	≈
AC36KVA/36000/SLR*	36.0	36000	≈	≈	≈
AC38KVA/38000/SLR*	38.0	38000	≈	≈	≈
AC40KVA/40000/SLR*	40.0	40000	≈	≈	≈
AC42KVA/42000/SLR*	42.0	42000	≈	≈	≈
AC44KVA/44000/SLR*	44.0	44000	≈	≈	≈
AC46KVA/46000/SLR*	46.0	46000	≈	≈	≈
AC48KVA/48000/SLR*	48.0	48000	≈	≈	≈
AC50KVA/50000/SLR*	50.0	50000	≈	≈	≈
AC52KVA/52000/SLR*	52.0	52000	≈	≈	≈
AC54KVA/54000/SLR*	54.0	54000	≈	≈	≈
AC56KVA/56000/SLR*	56.0	56000	≈	≈	≈
AC58KVA/58000/SLR*	58.0	58000	≈	≈	≈
AC60KVA/60000/SLR*	60.0	60000	≈	≈	≈

\* Denotes the system autonomy i.e. AC1KVA/850/SLR3 = 3Hr Backup Autonomy

≈ Denotes cubicles size/quantity information is available on application

# Selection Guide Batteries

## Systems with Valve Regulated Lead Acid Batteries

- Compact
- Reliable
- Cost effective
- Maintenance free, 10 year design life batteries
- Low battery voltage disconnect circuit fitted as standard
- Charger temperature compensation fitted as standard

## Systems with Vented Nickel Cadmium Batteries

- Extremely robust over a wide temperature range
- Reliable, with a 25 year service life
- Good "through life" costs
- Resistant to electrical and mechanical abuse
- Can be stored in any state of discharge without damage
- Automatic and manual boost circuits fitted as standard

## Systems with High Performance Plante Batteries

- 20 year service life
- Reliable
- Retains virtually full capacity throughout design life
- Low battery voltage disconnect circuit fitted as standard
- Charger temperature compensation fitted as standard

## AC/NC Range

System Reference	Inverter Power Rating (kVA)	Inverter Wattage
AC/NC Series	1.0 - 25.0	500 - 21250

## AC/HP Range

System Reference	Inverter Power Rating (kVA)	Inverter Wattage
AC/HP Series	1.0 - 25.0	500 - 21250

This guide provides only an overview of possible system configurations. Contact our central systems technical sales department for full details, including cubicle arrangement. 1, 2 or 3 hour autonomy systems available

## Compact AC/AC



Many features normally only associated with larger units are included in the standard specification of the Compact AC/AC static inverter system. The inverter has a rated output of 500VA/400W or 600VA/510W and benefits from 4 independently fused outputs, battery deep discharge protection, automatic temperature compensation and a clear, informative system status display panel. The unit also fully complies with the EN 50171 standard. An output voltage of 230V AC permits any suitable, unmodified mains luminaires to be operated at full output in emergency mode.



### Compact AC/AC

- 500 VA or 600 VA static inverter system
- Compact - ideal for smaller installations
- Fully complies with EN 50171
- Four separately fused outputs
- Digital display to clearly indicate system status
- EasiCheck compatible version available

Compact AC/AC



### General

Cubicle	1.6 mm zinc coated steel panels with powder coat RAL7032 light pebble grey finish. Removable cover retained by screws. Cable entries via removable top gland plate
Batteries	Valve regulated lead acid, 10 year design life

### Charger and controls

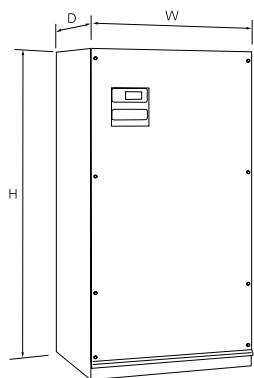
Mains supply	230V $\pm$ 10% AC single phase supply, 50 Hz
Input control	MCB to BS3871 Pt 1, or BS4752 Pt 1
Fusegear	HRC type to BS88
Terminals	DIN-rail mounted near to cable entry
Transformer	Double wound with earth screen
Rectifier	Full wave controlled thyristor/diode bridge
Contactor	Standard contactors comply with requirements of BS5424
Charger	Constant voltage, current limited type with electronic solid state controller. Voltage controlled to within 2% of setting at up to 10% mains supply variations. Full recharge within 24 hours. 80% capacity within 12 hours. Current limit facility
Deep discharge protection	Fitted as standard. Automatic shut down of inverter when battery voltage falls below pre-set level, during extended periods of mains supply failure
Cables	Compliant with BS6231
Load circuits	4 independent fused output circuits
Monitoring circuits	Terminals provided for connection of remote monitors and controls
Temperature compensation	Fitted as standard. Charger voltage is automatically adjusted with reference to ambient temperature to optimise charging and battery life. Pre-set for optimum performance at 20°C
Test push button	Simulates mains failure
Display panel	Composite fascia with LCD display and LED indicators
Alarm warning	Audible alarm fitted internally plus common volt free contacts for remote signalling of a fault condition and terminals for remote alarm unit option

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# Central Battery Systems AC/AC

## Compact AC/AC

Dimensions in mm



H x W x D: 970 x 530 x 400

### Inverter

Output voltage	Pre-settable in the range 220-240V AC. Default setting is 230V AC. Voltage tolerance is 2% on loads of 0-100% of system rating
Frequency	50Hz. $\pm 0.1\%$ . Waveform: Sinusoidal
Voltage regulation	Static 2%, dynamic 6%
Isolation	1kv rms between input and output terminals
Total harmonic distortion	Typically 3% or better. Max. 10%
Power factor	Will supply loads in the 0.7 lag - 0.7 lead range
Overload	200% for 10 seconds, 125% for 20 minutes without reduction in output voltage
Start-up time	Standard 300mS. Soft start
Noise level	Effectively silent on both charge and discharge
Efficiency	83% nominal. Typically 82-85%
Protection	DC input protection. AC output fuses DC input reverse polarity protection Short circuit protection Pre-charge protection fuse
Low voltage shut down	Inverter module automatically shuts down when battery discharges to a pre-set level. Re-set is automatic following the restoration of the mains supply
Inhibit	An inhibit switch to control the inverter is fitted on the main PCB in the cubicle
Technology	Pulse width modulation with high frequency switching

### Ordering details

Type	Inverter Output Rating (VA)	Order No. of Hold Off Relay Monitor
Compact AC/AC 500 VA	500	AC500VA/M3
Compact AC/AC 600 VA	600	AC600VA/M3

## System Operation

- In mains healthy condition, the system charges the batteries and stores power, ready for emergency operation
- In mains healthy condition, the power to luminaires designated for emergency use is supplied from the normal mains via a by-pass contactor inside the cubicle
- In the event of a mains failure, the system provides emergency power to dedicated mains slave or designated standard mains luminaires, until mains power is restored (or for the rated duration of the system in the event of extended mains failure)
- Output voltage, from the system via the inverter, is 230V AC nominal
- Local change-over switching can be effected using an ACM1 module, controlling single or multiple luminaires (if fed from common switched mains supply)
- Suitable standard mains luminaires\* require no modification to operate with the static inverter (unless ACM1 change-over module is integral). All lamps in multi-lamp luminaires will be lit during mains failure, unless separate control gear is provided for individual lamps.  
\*High inrush LED or compact fluorescent may not be suitable
- Sub-circuit monitoring and hold off relays can be added to the system to energise the emergency luminaires in the event of a localised mains circuit failure, if the ACM1 module is not used

## Metering and Display Panel

- Simple and easy to read status display
- LCD meter indicating battery voltage or current reading mode indicated by LED:
  - Volts
  - Amps
- Indication LEDs
  - Power On
  - Battery High/Low Volts
  - Charge Fail
  - Deep Discharge Protection
  - Inverter Running
- Five push buttons
  - 1 Press to Test
  - 2 Read Current
  - 3 Mute Buzzer
  - 4 Deep Discharge Protection Reset
  - 5 (unlabeled)

## Remote Mounted Options

- Remote Alarm Unit
- Sub Circuit Monitor
- Hold Off Relay Monitor
- ACM1s

## Design and Installation Notes

- To ensure the system is suitably rated, list the luminaires to be used, with their characteristics, to ensure the wattage and VA power rating of the inverter is not exceeded
- Using fluorescent luminaires with poor power factor will increase the VA load
- Note - EN 60598-2-22 prohibits the use of glow starters in fluorescent luminaires used for emergency lighting.
- A full set of installation, operating and maintenance instructions is supplied with each system to assist the installer carry out the work efficiently and safely
- Adequate ventilation has been provided in the cubicle to allow a safe dispersal of gases but it is important to remember that when choosing where to locate systems, particularly those with large batteries, attention must be paid to ensuring a build-up of potentially explosive gases is avoided
- Please refer to the system design section for details of ventilation calculations
- Warning notices should be displayed on entry doors to battery rooms:

BATTERY ROOM. EXTINGUISH ALL NAKED LIGHTS BEFORE ENTERING. NO SMOKING







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Central Battery Systems AC/AC

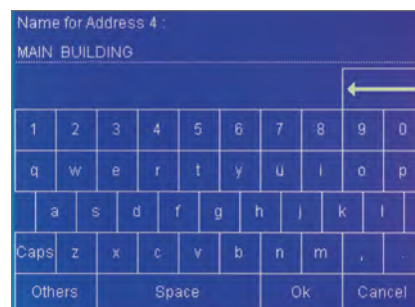
**Easichack**

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# Central Battery Systems AC/AC

EasiCheck 1.5 Slave

## EasiCheck 1.5 Slave



EasiCheck 1.5 Slave is a purpose designed emergency lighting testing system for central battery AC/AC systems, providing a simple to operate, labour saving alternative to manual testing. Avoiding the need for separate secure manual test keys and the need to manually inspect fittings during and after tests, EasiCheck 1.5 automatically tests the emergency lighting luminaires and central battery system at a user controlled, convenient, non-disruptive time, then gathers the test results and displays them in a simple to understand manner at a central control panel. EasiCheck 1.5 has been designed to ensure quick and simple installation, ease of operation and simple system re-configuration. System extensions and changes can easily be incorporated without the need for specialist software or re-programming.

### Features:

- Reduces time and cost of testing and maintenance as required by law
- Testing in compliance with EN50172
- Easy to use touch screen panel
- 250 luminaire capacity per panel
- Stand alone or network up to 63 panels
- Event logs and test reports can be downloaded or printed
- Selection of central monitoring software (text or graphic)

IP20



EasiCheck 1.5 Slave



### EasiCheck 1.5 Slave

The main element of the EC1002TS is a large (120mm x 90mm visible area) touch screen display, which provides comprehensive user information and also acts as a multifunctional keypad.

The EC1002TS touch screen display automatically reconfigures to suit the selected function, for example, if the change device text menu option is selected, the touch screen is automatically formatted as a full QWERTY keyboard to enable fast and simple text entry.

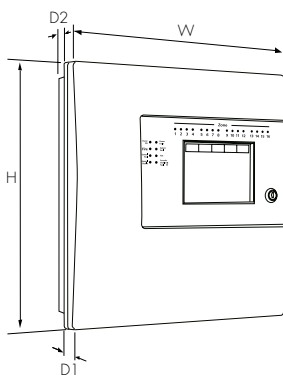
The use of the touch screen display enables a wide range of user and engineering facilities to be incorporated into the panel whilst still offering simple operation. There are a number of system status LEDs (power on, emergency mode, general fault, system fault, comms fault, luminaire fault, test in progress, disable luminaire, fault indication) designed to give clear status information to non-technical users.

Panel is used to facilitate following functions:

- Set up test types and times
- Initiate manual tests
- Display real time single luminaire status
- View fault log/panel configuration
- Download/upload fault log and panel configuration
- Re-configure luminaire text locations for ease of installation and commissioning

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### Dimensions



H: 375 mm  
W: 357 mm  
D1: 50 mm  
D2: 45 mm

An EasiCheck interface module is fitted into all suitable dedicated emergency luminaires and mains luminaires converted for emergency operation.

- Each module shall be addressed using a hand held programmer during installation with a unique address number in the range 0-250
- Every luminaire is connected to a 2 core data BUS cable in a loop configuration, which is linked back to the control panel. A single panel can accommodate up to 250 luminaires
- It is important to maintain accurate 'as fitted' drawings to identify the respective luminaire and its assigned address/location
- Text information can be allocated to each system component
- The panel can then be programmed to carry out automatic test sequences according to EN 50172 or any regional testing regime. Testing can also be initiated manually. All test data is sent back and stored at the control panel. Additionally, the system carries out continuous real time monitoring of all connected devices
- In the event of a fault, the precise location of the device is displayed at the control panel along with accurate details of the nature of the fault, time/date stamp and an alarm is raised
- The system can be enhanced by networking up to 63 panels. Central PC monitoring can also be incorporated

### Ordering details

Type	Order No.
EasiCheck1.5 Slave control panel	EC1002TS
EasiCheck1.5 Slave control panel (networked)	EC1002TSNC
Luminaire interface module with changeover relay	EC141
Luminaire changeover relay (non-monitoring)	EC140
Luminaire interface module	EC125
Hand-held programmer	EC160
Printer	EC170EC2
LON/IP Echelon router	EC400
Fibre optic router	CFSFL01
Network booster	EC460

# Central Battery Systems AC/AC

EasiCheck EC125



EasiCheck EC125



### EasiCheck EC125 SVAEL Addressable Test Interface

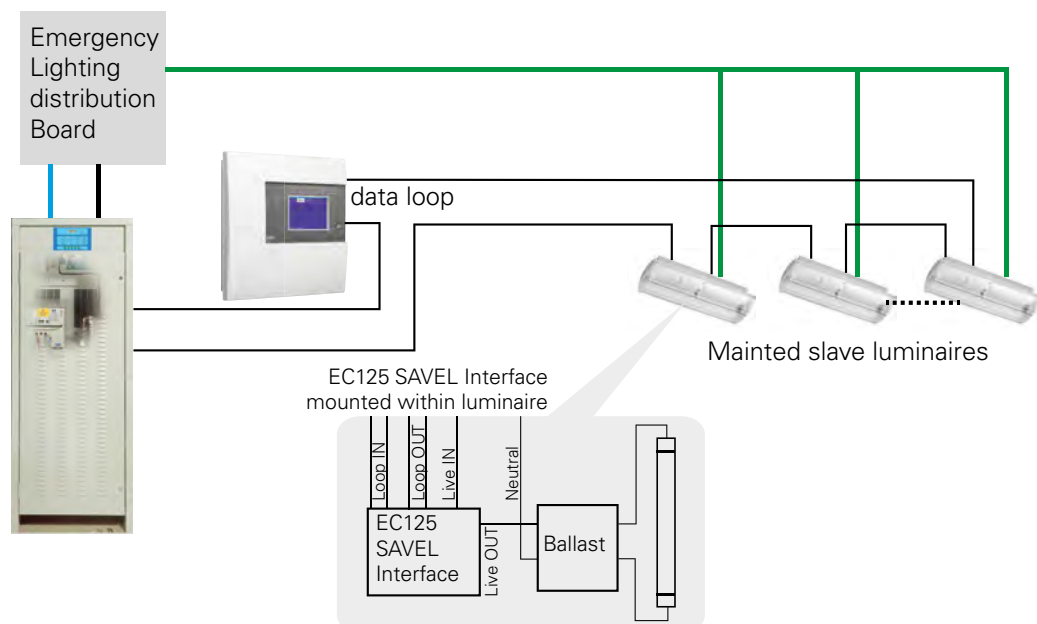
SVAEL interface is fitted within every emergency luminaire on the emergency lighting system to monitor and report the AC current drawn by the luminaire to the EC1002TS panel along with its address/location. In the event of a luminaire reporting incorrect power consumption, the EC1002TS panel displays a fault with audible warning and location of faulty luminaire.

- Compact Design
- can be addressed in the range 0 to 255
- Works on a wide range of luminaires
- Networkable with 32 panels
- Central PC monitoring
- User selectable measuring range (via link)

Enclosure Material	Polycarbonate
Type of mounting	Within mains / slave luminaire
Dimensions in mm (L x H x D)	54 x 38 x 24
Weight	0.1 kg
Communications	Easichack Data Loop
Connections	Max. 1.5 mm <sup>2</sup>
Measurement	AC current
Monitoring range	34 – 250 mA (no link) 250 – 800 mA (link fitted)
Degree of protection	IP20
Temperature Range	0 °C to +40 °C

### Ordering details

Scope of supply	Order No.
Easichack test interface (Slave)	EC125



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