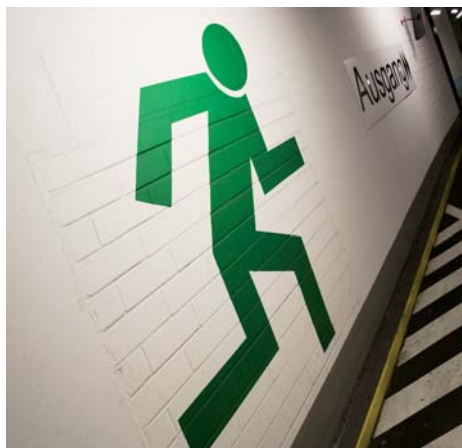


# GFS

# NETLIGHT

## Emergency lighting

Emergency lighting system  
with distributed intelligence



- **Systems engineering**
- **Lighting technology**
- **Backup power supply systems**



# NETLIGHT

## Contents

	Page
<b>Systems engineering</b>	<b>3</b>
<b>Lighting technology</b>	<b>4</b>
<b>Backup power supply systems</b>	<b>5</b>
<b>Light control modules</b>	<b>6</b>
<b>Luminaire modules</b>	<b>8</b>
<b>Charging modules</b>	<b>10</b>
<b>Visualization</b>	<b>12</b>
<b>Accessories</b>	<b>13</b>
<b>Enclosures</b>	<b>14</b>
<b>System overview</b>	<b>16</b>
<b>Configuration tool</b>	<b>18</b>



- Distributed intelligence thanks to unlimited master domains
- High-tech light control technology
- All types of luminaires can be wired into a single circuit
- Any backup power modality desired can be used
- Grouped batteries can be used
- Patented differential code shift keying (DCSK) luminaire management





# NETLIGHT

## Systems engineering

The Netlight system opens up countless design options, and thus improves the safety of a building's technical systems.

### Benefits at a glance

- Promotes optimal installation design via sub-master domain segmentation
- Sub-master domains comprise standalone installation islands with dedicated bus systems (module buses)
- The master device and master comprises a "control station" that communicates with the installation islands via the master bus
- A master bus can be outfitted with a master and up to 30 sub-masters
- Each master or sub-master module bus can be outfitted with up to 60 modules
- Each sub-master can be outfitted with a dedicated backup power switching device
- Each sub-master can be outfitted with a dedicated battery and battery charger, or another backup power solution.

The advantages of using our Netlight system particularly come to the fore during the installation planning phase. Operational safety is assured already in the planning phase, thanks to the countless design options afforded by the system, including the following: careful sub-master domain allocation; the fact that any backup power modality solution and an unlimited number of such solutions can be used; and the option to use local standalone batteries.

**Netlight allows for the realization of optimal individualized solutions.**

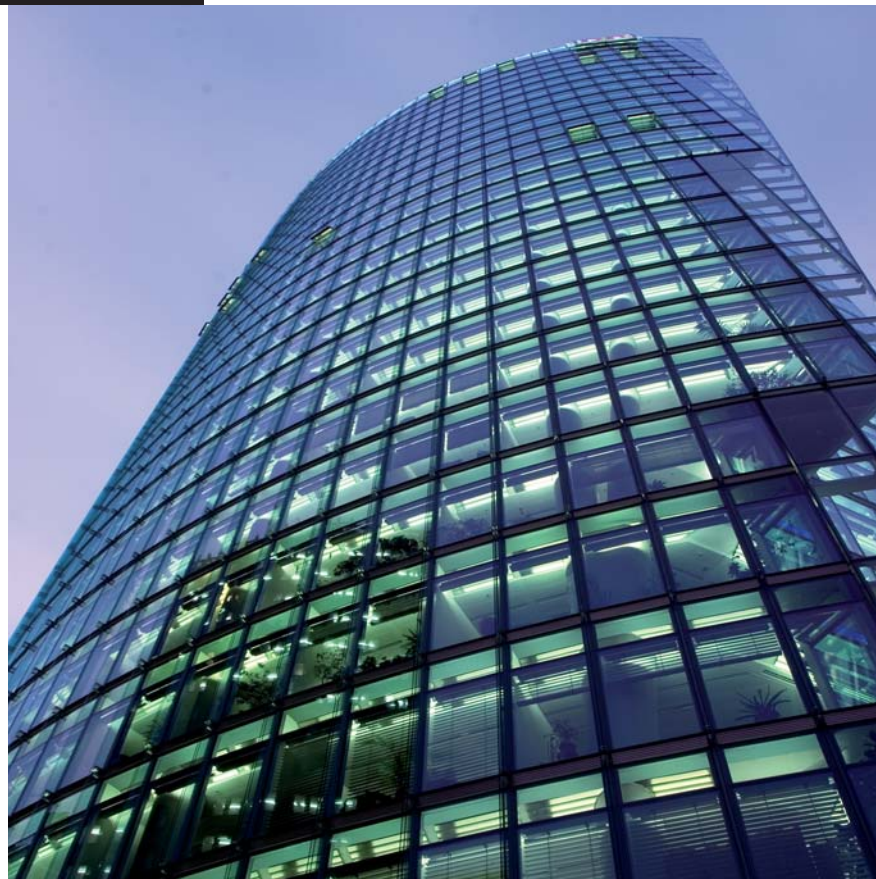


# NETLIGHT



## Lighting technology

Our Netlight system offers designers countless ways to integrate emergency lighting inconspicuously into a building's overall lighting system, and to activate emergency lighting using the general lighting installation.



### Benefits at a glance

#### ■ 5 available luminaire types

- DS Maintained, e.g. exit sign luminaire
- GDS Switched maintained, e.g. exit sign luminaire that can be switched off
- BS Non-maintained, e.g. emergency luminaire
- GBS Switched non-maintained, e.g. emergency luminaire that is integrated into the general lighting system
- AB General lighting\*

#### ■ 7 switching functions

- Activation of locally delimited emergency lighting
- Activation via general lighting installation
- Deactivation of any zone desired
- Manual non-maintained luminaire confirmation of an unlimited number of assignable non-maintained luminaires
- Any given type of luminaire can be activated throughout the lighting system
- Luminaire-test initiation
- Function-test initiation

#### ■ 7 Circuit options

- Control and monitoring of single luminaires
- Mixed operation (maintained and switched non-maintained/non-maintained) with single luminaire monitoring
- Mixed operation (maintained and switched non-maintained/non-maintained) with circuit monitoring
- maintained luminaire type with single luminaire monitoring
- non-maintained luminaire type with single luminaire monitoring
- maintained luminaire type and circuit monitoring
- non-maintained luminaire type and circuit monitoring.

#### ■ switching functions or local emergency operations

- per circuit
- per individual luminaire (in cases where luminaires are managed individually)

#### ■ Up to 20 luminaires can be integrated into each type of circuit



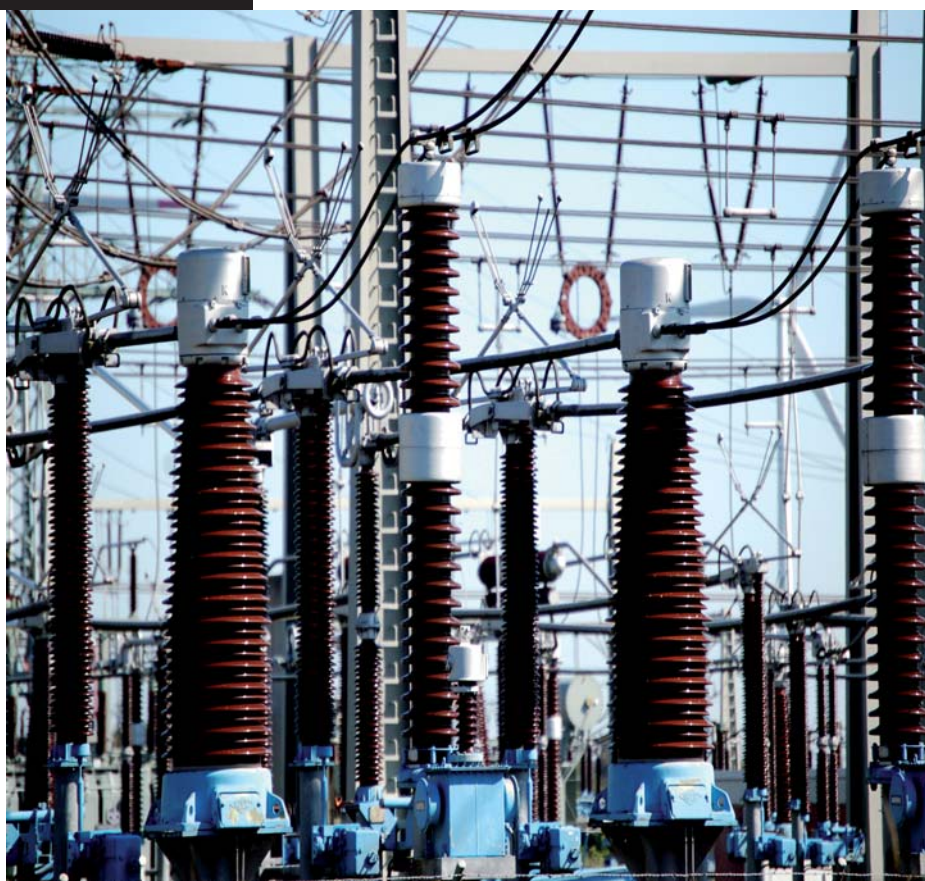


# NETLIGHT



## Backup power supplies and battery chargers

The Netlight system opens up numerous options that do not impose any restrictions on emergency-power system planning.



### Benefits at a glance

- Backup power supply options:
  - Central battery
  - A series of batteries assigned to two or more groups of sub-masters and circuits
  - Diesel generators, with or without auxiliary batteries, for short-term emergency power
  - Installation of a second (redundant) grid connection
  - The aforementioned solutions can be combined at will
- Battery chargers can be installed up to 800 meters away from the relevant masters and sub-masters
- General/emergency switching equipment is installed in the master/sub-master cabinet
- Installation of a redundant grid connection can be realized only using a central battery system
- Battery chargers are available in single-, two- or three-phase versions. High capacity chargers come in a fully automated version.
- Timer-controlled battery chargers are available on request.

# NETLIGHT

## Light control modules

Central communication modules that enable operation and management of all or part of an installation.

The master connects the Netlight sensors (IOM assemblies) with the circuit modules (actuators), according to a programmable algorithm on its program card.

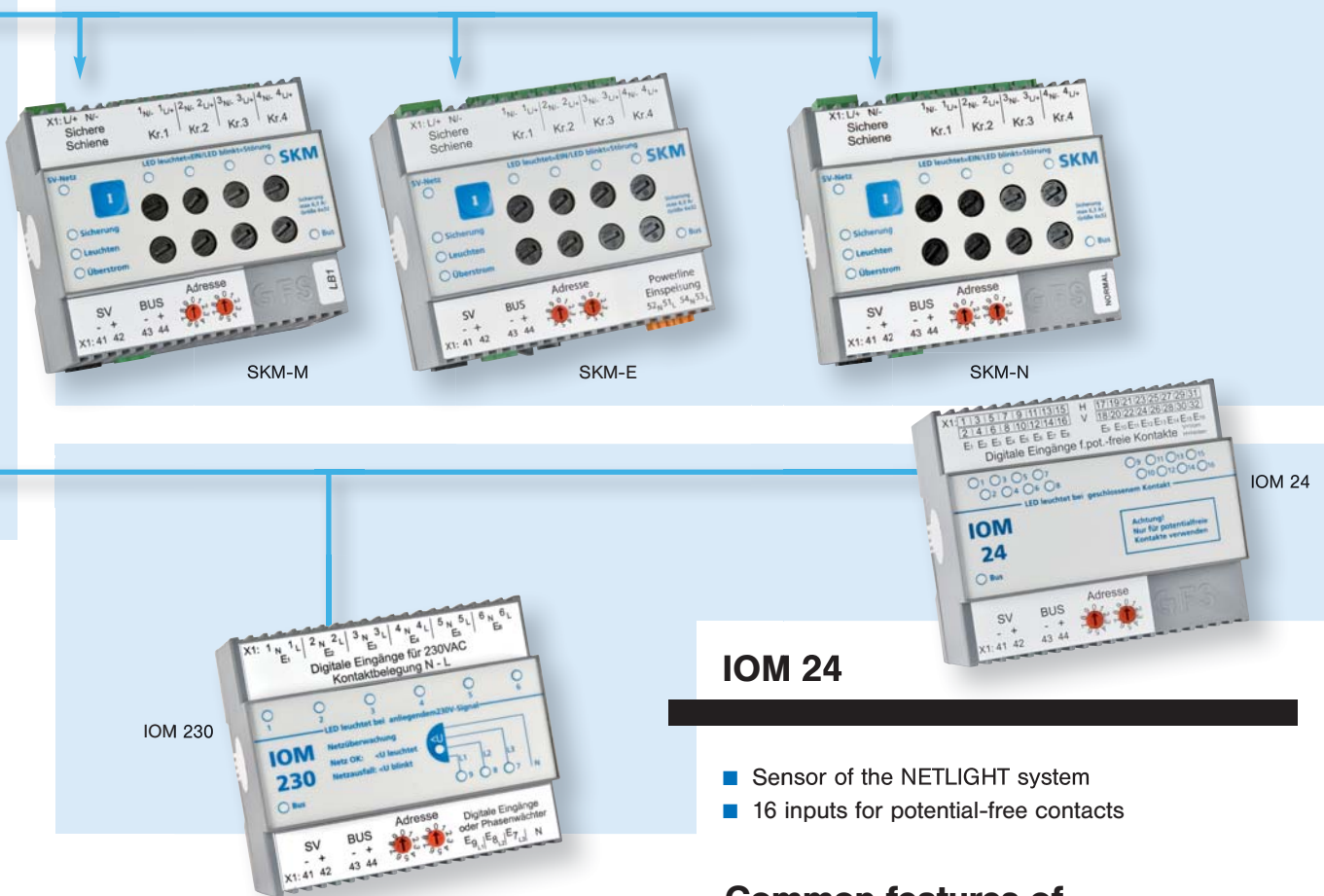


### MASTER

- The master-module central processor runs under a Windows compatible OS. Hence files generated by master modules can be read by any Windows editor; and conversely master module-function program files can be generated by any Windows computer.
- Operating and display interfaces with six membrane keys as follows: four soft keys with menu-controlled functions; a menu key; and a programmable function key.
- Navigation is carried out at three levels, via the following classes of user permissions:
  - Operator
  - Installer
  - Service technician
 All three levels can be protected with separate passwords.
- All system functions and operating data are shown in plain text or as readings.
- The installation can be programmed via the system display or a laptop.
- LED displays for:
  - ON
  - Maintained luminaires ON
  - General lighting grid powers safe track
  - Emergency lighting grid powers safe track
  - Advisories (as key display alerts)
  - Malfunctions (programmable group alarm)
- 8 programmable digital inputs for potential-free contacts
- USB interface for computers
- Interfaces for expansion boxes and printers
- Charging controller interface
- 16 freely programmable date and time switching clocks
- Luminaire module search function via the master menu
- All battery and charging data can be programmed via the master menu
- Freely programmable error display
- Programmable manual and automatic test initiation
- Two electrically isolated master and module bus outputs
- Bus monitoring via a ping solution
- SD card (industrial model) for controller systems

## SKM - Electric Circuit Module

- Actuator of the NETLIGHT system
- Generates 4 luminaire circuits:
  - Each circuit is double-pole protected
  - Current measurement in each circuit
  - Circuit switching and display via LEDs
  - Generation and injection of switching signals for the luminaire modules
  - Circuit error messages and displays
  - Display of DC power and power supply interruption
- Three types of electric circuit modules are available for three different application types:
  - SKM - M (LB1) for mixed operation circuits
  - SKM - E (PLL) for single luminaire control
  - SKM - N (normal) maintained and non-maintained luminaires are separate
- Bus line monitoring and automatic activation of emergency mode in case of communication error.



### IOM 230

- Sensor of the NETLIGHT system
- 9 inputs for feeding different phases directly with 230V AC for fuses monitoring purposes or general lighting light switch sensor
- 3 of these inputs can be programmed for circuit breaker function (single/two/three-phase)
- Bus circuit breakers for integration in general lighting distribution boards with module supply via bus

### IOM 24

- Sensor of the NETLIGHT system
- 16 inputs for potential-free contacts

### Common features of IOM230 and IOM24:

- Each input can be switched via:
  - OPEN – button/key
  - CLOSE – button/key
- Each input can be programmed for:
  - Local emergency mode initiation
  - Switching via general lighting
  - Staircase light management
  - Deactivation functions
  - Stand-by confirmation
  - Timer mode
  - Circuit breaker loop
  - Switching logic: AND, OR, XOR, NAND with second input

2 inputs are required for monitored circuit breaker loops.



# NETLIGHT

## Luminaire modules

A wide range of luminaire modules are available, which allow for efficient customized installations.

### Single luminaire management



#### PLL - luminaire module

- Single luminaire switching and monitoring module
- Luminaire can be switched individually
- AC luminaire monitoring
- Data transfer in AC and/or DC operating mode
- Any given type of luminaire can be programmed
- 32 switching activation modalities
- Extremely short switching delay
- Switching commands ORed
- Local emergency modes ORed
- Luminaire operation in case of communication failure programmable
- No DC backup power supply required





## MSÜ 3S luminaire module

### Mixed operation mode

- Single luminaire switching and monitoring module
- For mixed operation circuits
- Maintained or non-maintained luminaire programmable
- AC switching commands for all non-maintained luminaires in the circuit
- AC luminaire monitoring
- Switch input: 230 V AC
- Luminaire address can be set using rotary encoder
- No DC backup power supply required
- Automatic load calibration
- Compatible with DC modulation EBs

## MSÜ 3 Dali luminaire module

- Single luminaire switching and monitoring module
- For mixed operation circuits
- Maintained or non-maintained luminaire programmable
- AC switching commands for all non-maintained luminaires of the circuit
- AC luminaire monitoring
- Input for DALI bus
- Luminaire address can be set using rotary encoder
- No DC backup power supply required
- Automatic load calibration
- Compatible with DC modulation EBs

## LB 1 luminaire module

- Single luminaire switching and monitoring module
- For mixed operation circuits
- Maintained or non-maintained luminaire programmable
- AC switching commands for all non-maintained luminaires of the circuit
- DC luminaire monitoring
- DC emergency mode
- Switch input: 230 V AC with inverting option
- Luminaire address can be set using rotary encoder
- DC backup power supply required



## MSB 4 luminaire module

- Single luminaire switching module
- For mixed operation circuits
- For circuit monitoring
- For non-maintained luminaires only (Maintained luminaires are to be monitored using MFB5 module)
- AC switching commands for all non-maintained luminaires in the circuit
- Switch input: 230 V AC with inverting option
- No DC backup power supply required



## LÜ 1 luminaire module

- Single luminaire monitoring module
- Can be used separately or in conjunction with PLL or LB1 circuits
- Luminaire monitoring in DC mode
- Luminaire address can be set using rotary encoder
- DC backup power supply required



## MFB 5 luminaire module

- Single luminaire filter module for mixed operation circuits
- For circuit monitoring
- Only for maintained luminaires (Non-maintained luminaires are to be monitored using MSB4 module)





# NETLIGHT

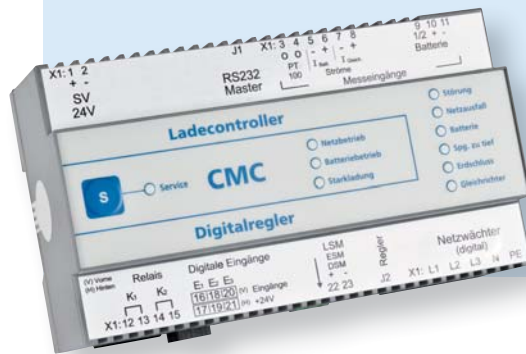
Our charging management controllers (CMCs) provide a complete battery management system with integrated charging regulators and comprehensive battery monitoring.

Each master or sub-master can be allocated a CMC so as to allow for splitting and local distribution of the necessary battery capacity.

The CMC communicates with the master via a charging bus, which thanks to bus amplifiers allows for installation of the CMC up to 800 meters from the master.

Batteries can be installed even farther away from the master and/or sub-master devices.

## Charging modules



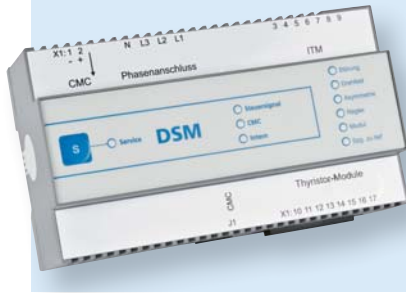
### CMC Charging management controllers (CMCs)

#### CMC charging functions:

- Freely programmable IU characteristics
- Optional temperature controlled charging management
- Optional battery boosting, with programmable operating periods
- Adjustable temperature limits for the battery boosting function
- Optional automatic charging function with programmable start-up dwell times and minimum power outage times
- Optional charging management compensation function
- Manually activatable equalizing charging with locking function

#### CMC battery monitoring functions

- Battery low voltage
- Deep discharge switching threshold
- Battery symmetry (with 30-day activation-delay function)
- Battery operation monitoring also includes circuit breakers
- Battery enclosure fan-controller monitoring
- Grounding monitoring
- Rectifier monitoring with automatic shutdown in the event of a fault
- Grid monitoring

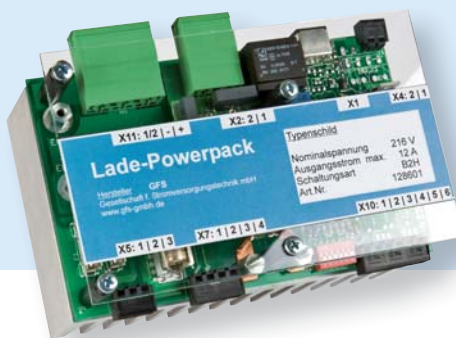


## DSM triphase rectifier control module

Our DSM rectifier control module generates control impulses for a thyristor or IGBT bridge, using CMC current. Bridging is fully controlled.

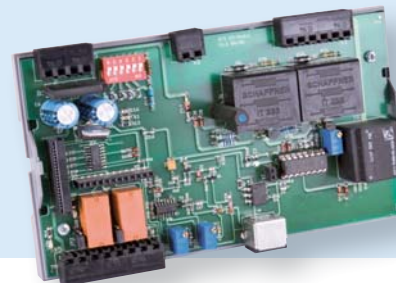
The DSM integrates all functions necessary for triphase charging component monitoring:

- Clockwise rotation monitoring
- Phase symmetry provoked by tripped circuit breakers
- Regulator signal errors
- Module errors
- CMC handshake errors
- Bridge disconnection in the event of a malfunction
- Regulator redundancy supported



## LSM charging rectifier control module

- Compact rectifier with up to 3 kW of output
  - All necessary components integrated into the module
  - A CMC is needed in cases where the LSM is used as a charging regulator
  - Plug and play replacement of the entire module
  - Semi-controlled single-phase bridging using thyristors
  - Cuts out in the event of a malfunction
  - Internal circuit breaker trips in the event of a bridging error
  - Integrated battery voltage monitoring device
- Outputs: 2 A - 5 A - 8 A - 10 A - 12 A



## ESM single-phase rectifier control module

Our ESM rectifier control module generates control impulses for a thyristor or IGBT bridge, using CMC current. Bridging is fully controlled.

- Single-phase bridging (semi- controlled)
- Charging capacity: greater than 3 kW
- Double-phase feeding supported
- CMC handshake errors
- Bridge disconnection in the event of a malfunction
- Regulator redundancy supported





# NETLIGHT

## Visualization

Our Netlight Visu software supports an unlimited number of visualizations on Windows computers via your Ethernet or at any online portal desired.

### Online visualization

- Colour visualization of luminaire type
- Current switching status of each individual luminaire
- Circuit switching mode
- Current switching status of circuits
- Current switching status of IOM inputs
- Emergency or local emergency operation activated
- System fail save operation
- RPM displays
- Battery voltage
- Charge / discharge current
- Current battery capacity
- Timer settings
- Test start
- Test results

### Offline - visualization

- RPM displays
- Battery voltage
- Charge / discharge current
- Current battery capacity
- Timer settings
- Test start
- Test results



IPC-BOX



BVM



LAN-BOX II

### IPC-Box

- Hardware for visualization on industrial computer platform
- Separate LAN networks for NETLIGHT and customer PC
- Switch for NETLIGHT LAN configuration included
- Complete with visualization software and remote control

### BVM

- Module for visualization of system functions via a PC integrated browser
- Activation of luminaire and function tests via browser interface with test result visualization
- Log book contents of any selected date are displayed on the PC

### LAN-BOX II

Ethernet gateway for connecting a master/sub-master to any existing network with proper IP address and integrated hardware firewall.

### KNX Gateway

- System control module for emergency lighting system messages visualization via a KNX building bus
- 20 emergency lighting switching options over KNX bus
- 20 emergency lighting system messages can be visualized on the KNX bus
- 20 emergency lighting system events can be visualized/used on the KNX bus
- KNX bus and NETLIGHT bus are electrically separate



KNX Gateway



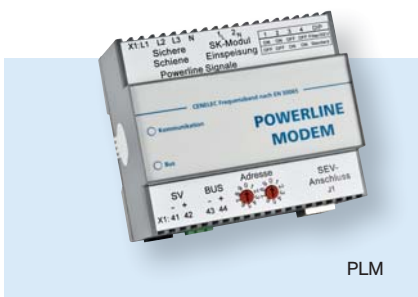
MEM

### MEM

- Customer Mains-input switch module
- Network monitoring programmable: 1...3 phase
- 4 relays for unlimited message and switch functions of the NETLIGHT system
- 4 switch inputs for 230V AC switching signals
- Input status visualization
- Relay status visualization

### PLM Powerline signal modem

- Communication module for PLL luminaire modules for single luminaire control



PLM



INFRA-M

### Protocol printer (without illus.)

Any type of event that must be logged in accordance with the VDE standard is recorded on the master's SD card.

This log file can be selected based on the desired date and be printed by the optionally available integrated TP UP-AF24H printer, by pushing the master's PRINT button. Stand alone devices are available on request.

### UAM PC USB module (without illus.)

allows for the master's USB port to be pulled out to the front side of the device (without illus.)

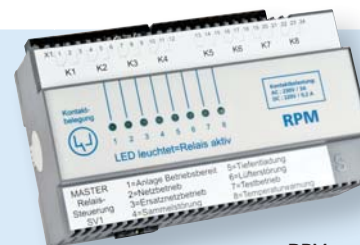
### SVM

**Self-generated power supply module,** available with different output values for supplying power to all modules, switching devices and bus technology. Equipped with deep discharge protection (without illus.)

### RPM Relay processor module

- 8 potential-free relay contacts allow for generation of the following messages:

- System ready
- Grid mode
- Emergency mode
- Group error
- Deep discharge
- Fan error
- Test mode
- Temperature alert



RPM

### INFRA-M Infrastructure module

- Required for each master / sub-master
- Generates the module or master bus
- Ensures supply with self-generated power from both the general and the emergency lighting system
- Activates deep discharge protection on receipt of bus command
- Activates automatic deep discharge protection in case of bus failure

### Fuse box (without illus.)

Comprises all of the required internal device fuses (6x32).



# NETLIGHT

## Enclosures

The Netlight system can be optimally configured at any location thanks to our extensive selection of master, battery, main distribution and sub-distribution enclosures.



Free-standing enclosures available in 600 and 800 mm widths

Attractive wall enclosures for industrial and non-industrial settings

Hybrid enclosures for battery capacities up to 42 Ah

Complete frames for E30 enclosures for DYI installation

E30/90 devices

Enclosures for large chargers and distributors

All sheet steel enclosures are powder coated and have baked-enamel RAL 7035 finishes (custom coatings available on request)



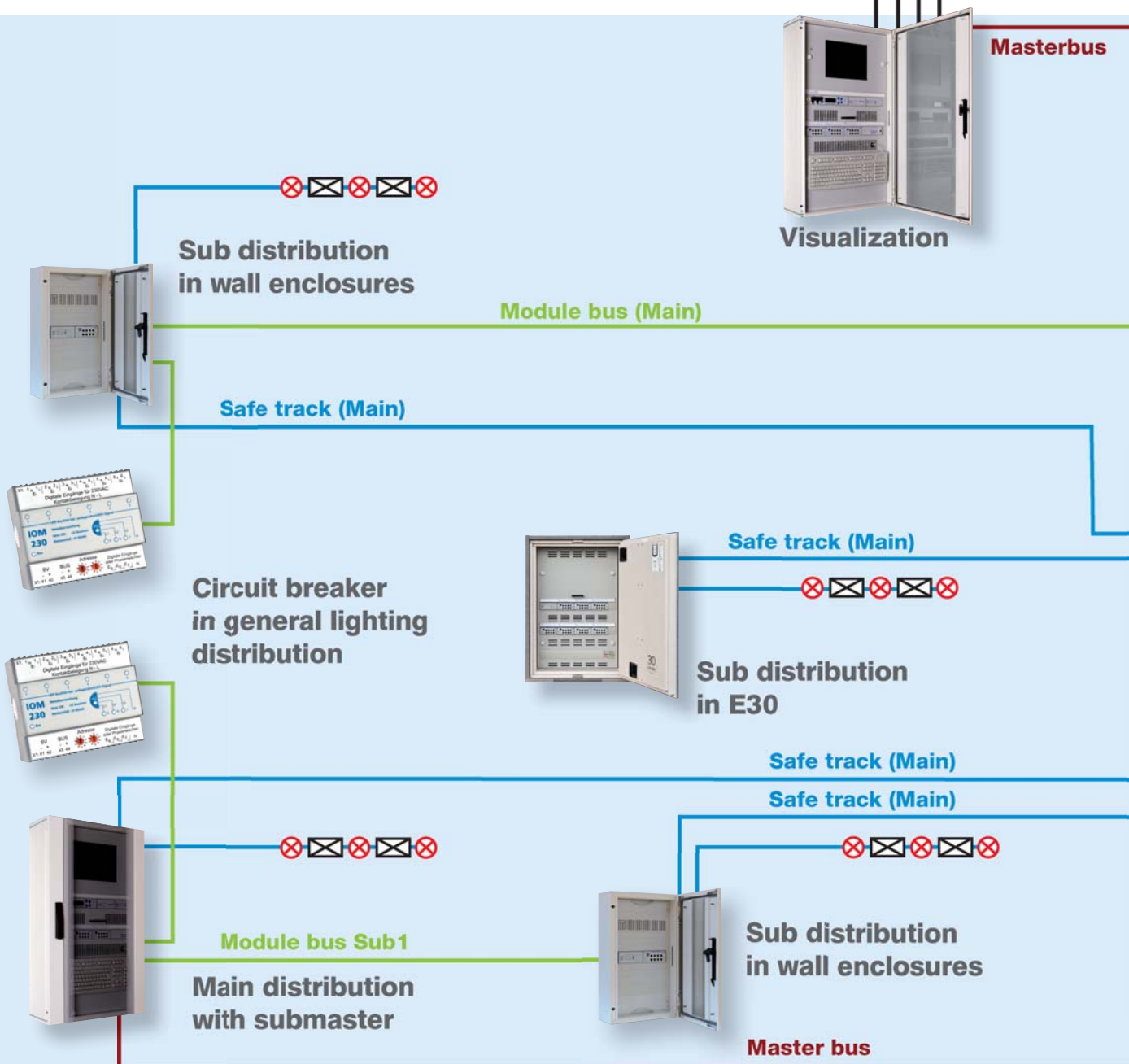
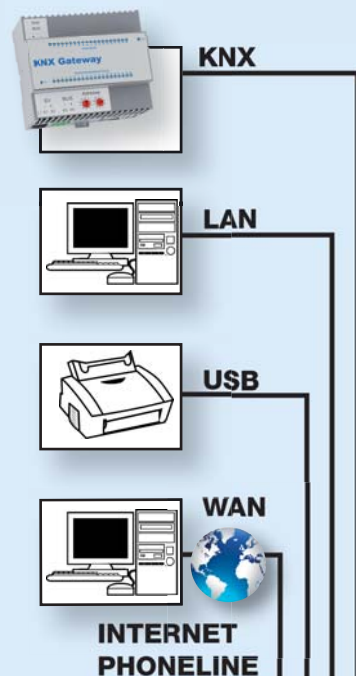
## Dimensions

Master enclosures								
Type	Dimensions (HxWxD) mm	Charger max (A)	Max. output (sub distribution included) KW	SKM modules max.	IOM modules max.	Sub distribution outputs max.	max. grid terminals battery inputs	
NL8.20	1800 x 600 x 450	15	11	10	2	2	5x25 mm <sup>2</sup> / 2x35 mm <sup>2</sup>	
NL8.20+ZS1	1800 x 1200 x 600	30	33	15	2	8	5x70 mm <sup>2</sup> / 2x150 mm <sup>2</sup>	
NL8.20+ZS2	1800 x 1400 x 600	56	50	15	2	14	5x70 mm <sup>2</sup> / 2x150 mm <sup>2</sup>	
NL8.21	1800 x 800 x 600	30	24	15	2	2	5x25 mm <sup>2</sup> / 2x50 mm <sup>2</sup>	
NL8.21	1800 x 800 x 600	30	24	9	2	6	5x25 mm <sup>2</sup> / 2x50 mm <sup>2</sup>	
STK8.21-2G	1800 x 800 x 600	5	11	9	2	2	5x25 mm <sup>2</sup> / 2x35 mm <sup>2</sup>	
HVW20	1000 x 600 x 250	-	5	5	1	-	5x35 mm <sup>2</sup> / 5x35 mm <sup>2</sup>	
HVW20-E30	896 x 496 x 170 (E30-Rahmengestell)	-	5	5	1	-	5x35 mm <sup>2</sup> / 5x35 mm <sup>2</sup>	
Main distribution cabinets for sub distribution and sub-master								
Type	Frame dimensions (HxWxD) mm	Sheet steel cabinet dimensions (HxWxD) mm	E30 cabinet dimensions (HxWxD) mm		Max. output (KW)	SKM modules max.	IOM modules max.	Modules max.
HV7 RG	896 x 496 x 170	-	-		5,2	7	1	7
HV7 SG	-	1000 x 600 x 250	-		5,2	7	1	7
HV7 E30	-	-	1524 / 1024 x 624 x 334		5,2	7	1	7
Sub distribution enclosures (without sub-master)								
Type	Dimensions (HxWxD) mm	Enclosure type		Input terminals Max.	Max. output (KW)	SKM modules max.	IOM modules max.	Modules max.
UV2 PVC	385 x 295 x 110	PVC enclosure		3x 16 mm <sup>2</sup>	4	2	1	2
UV2 RG	596 x 246 x 170	Frame		5x 16 mm <sup>2</sup>	4	2	1	2
UV2 SG	600 x 400 x 250	Sheet steel enclosure		5x 16 mm <sup>2</sup>	4	2	1	2
UV2 MP	350 x 240 x 120	Mounting plate		5x 10 mm <sup>2</sup>	4	2	1	2
UV7 RG	596 x 496 x 170	Frame		5x 35 mm <sup>2</sup>	10	7	2	7
UV7 SG	800 x 600 x 250	Sheet steel enclosure		5x 35 mm <sup>2</sup>	10	7	2	7
UV10 RG	746 x 496 x 170	Frame		5x 35 mm <sup>2</sup>	10	10	2	10
UV10 SG	800 x 600 x 250	Sheet steel enclosure		5x 35 mm <sup>2</sup>	10	10	2	10
UV13 RG	896 x 496 x 170	Frame		5x 16 mm <sup>2</sup>	10	13	2	13
UV13 SG	1000 x 600 x 250	Sheet steel enclosure		5x 16 mm <sup>2</sup>	10	13	2	13
UV15 SG 450	1800 x 600 x 450	Sheet steel enclosure		5x 35 mm <sup>2</sup>	10	15	3	15
UV15 SG 600	1800 x 600 x 600	Sheet steel enclosure		5x 35 mm <sup>2</sup>	10	15	3	15
Fire resistant main distribution and sub-distribution enclosures								
Type	Dimensions (HxWxD) mm			Housing type (30 min fire resistant, available also in E 90 variant)				
UV2 RG-E30	1074 / 574 x 374 x 334			E 30				
UV7 RG-E30	1224 / 724 x 624 x 334			E 30				
UV10 RG-E30	1374 / 874 x 624 x 334			E 30				
UV13 RG-E30	1524 / 1024 x 624 x 334			E 30				
HV7 RG-E30	1524 / 1024 x 624 x 334			E 30				
Battery cabinets								
Type	Dimensions (HxWxD) mm			Battery compartment (HxWxD) mm				
BS 8.20 - 2G	1800 x 600 x 600			1590 x 550 x 550				
BS 8.21 - 2G	1800 x 800 x 600			1590 x 750 x 550				
BS 9.21 - 2G	2000 x 900 x 600			1790 x 850 x 550				
Additional battery cabinets and custom enclosures available on request.								
*Detailed design information: see price list.								
15								

# GFS

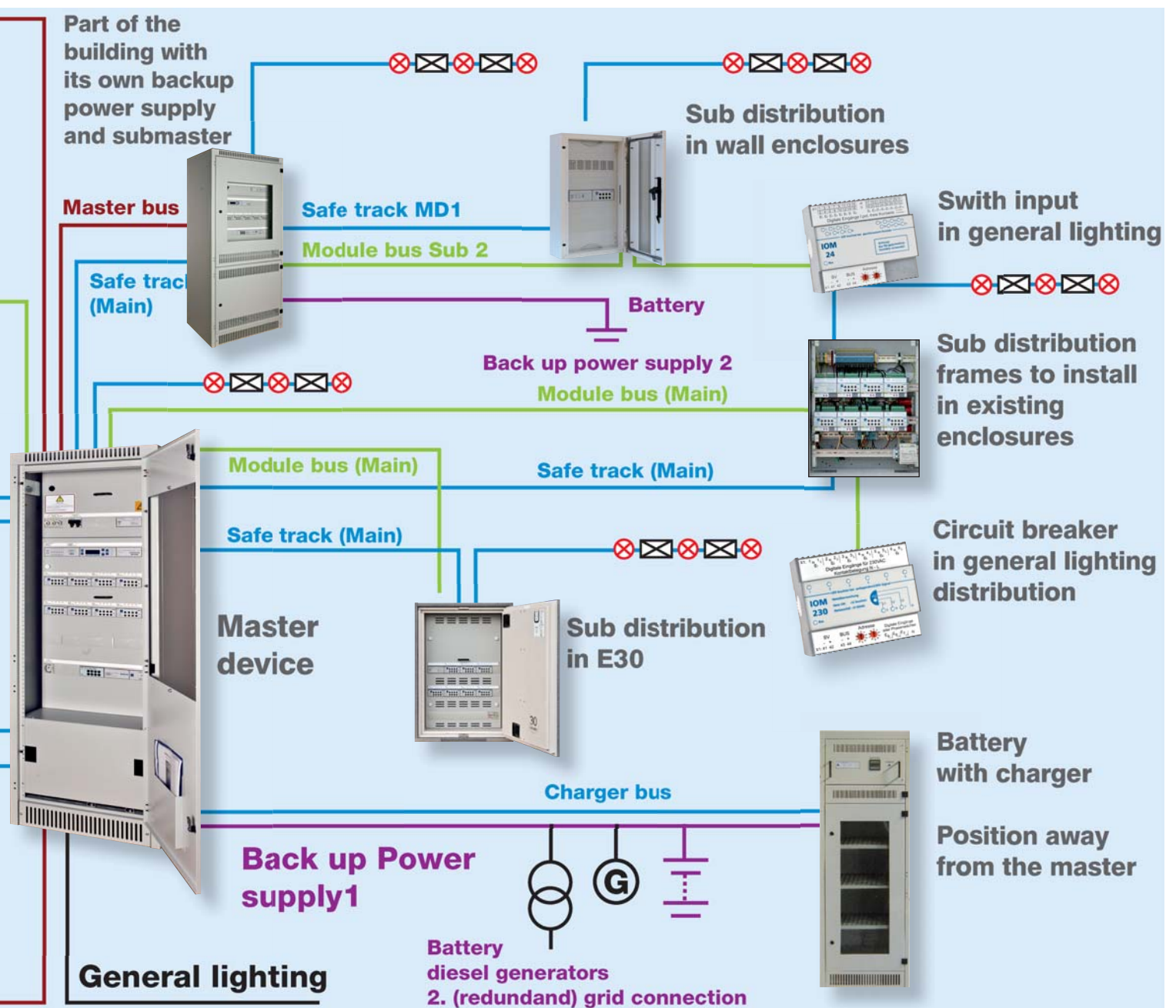
## NETLIGHT

**Emergency lighting system  
with distributed intelligence**



# System overview

- Two backup power supplies in a single system
- Separate secure tracks for main device and main distribution
- Master bus interconnects all masters/sub-masters
- New module bus is generated by each master
- Charging bus between battery/charger and dedicated master
- Wall-mounted visualization cabinet in control room







# NETLIGHT

## NETLIGHT - configuration tool

The planning and commissioning software for NETLIGHT systems and devices can be downloaded as PC tool for Windows OS at:

[www.gfs-gmbh.de/service](http://www.gfs-gmbh.de/service) or installed using a CD.

## Design table



## Service

We provide a wide range of services pertaining to system planning, programming and commissioning.

### Lighting technology modules

Module type	Description	Application	Width mm	Operat. voltage	Power consumption	Digital inputs	Contact voltage	Contact load	Bus voltage	Annotations
<b>MASTER</b>	Master	Master + Submaster	157	26...29V	120 mA	8	24 V DC	24V/ 5mA	24...30V DC	Master address: 00

Module type	Description	Application	Width mm	Operat. voltage	Power consumption	Circuits	Max. protection	Inserted fuse A	Bus voltage	Annotations
<b>SKM-N</b>	Circuit module	Separate circuits for maintained and non-maintained luminaires	105	26...29 V	150 mA	4	6,3 A	5,0	24...30V DC	Fuse size: 6x32
<b>SKM-M</b>	Circuit module	Mixed circuits wit both maintai- ned and non-mained luminaires	105	26...29 V	150 mA	4	5,0 A	5,0	24...30V DC	Fuse size: 6x32
<b>SKM-E</b>	Circuit module	Circuits for single luminaire control	105	26...29 V	150 mA	4	6,3 A	5,0	24...30V DC	Fuse size: 6x32

Module type	Description	Application	Width mm	Operat. voltage	Power consumption	Input voltage	Circuit breakers: phases	Digital inputs	Bus voltage	Annotations
<b>10M 230</b>	Grid power input module	Digital switch inputs and programmable circuit breakers	105	26...29 V	80 mA	230 V AC	1 ... 3	6 ... 9	24...30V DC	More than one phase can be switched

Module type	Description	Application	Width mm	Operat. voltage	Power consumption	Digital inputs	Contact voltage	Contact load	Bus voltage	Annotations
<b>10M 24</b>	Potential-free contact input module	Digital switch inputs	105	26...29 V	100 mA	24 V AC	24V/ 5 mA	16	24...30V DC	Electrically separate inputs

### Luminaire modules

Module type	Description	Application	Length mm	Width mm	Height mm	Switching capacity	Luminaire monitoring	Switch input	Output voltage	Address encoding
<b>PLL</b>	Powerline luminaire	Single luminaire control	155	37	29	120 W	2...120 W	No	sinusoidal	Master or Encoder
<b>LÜ 1</b>	Single luminaire monitoring	Maintained/non-maintained luminaires; maintained in PLL and mixed circuits	81	33	24		2...120 W	No	half-wave	Encoder
<b>LB 1</b>	Single luminaire monitoring	Maintained/non-maintained luminaires; maintained in PLL and mixed circuits	81	33	24	120 W	2...120 W	Yes	half-wave	Encoder
<b>MSÜ 3</b>	Switching and monitoring	Mixed circuits with DC or AC backup power supply for modulation T 5 EBs	81	33	24	120 W	2...120 W	Yes	sinusoidal	Encoder
<b>MSB 4</b>	Switching module	Circuit monitoring	81	33	24	120 W	n/a	Yes	half-wave	n/a
<b>MFB 5</b>	Filter module	Circuit monitoring	40	25	12	n/a	n/a	n/a	sinusoidal	n/a

Charging modules										
Module type	Description	Application	Width mm	Operating voltage	Power consumption	Relay	Switch input	Charging bus format	Regulator voltage	Annotations
<b>CMC</b>	Charging controller	Charging controller and Monitoring	157	26...29 V	300 mA	2	3	RS232	1 ... 10 V	Monitoring
Module type	Description	Application	Abmessung HxBxT in mm	Operating voltage	Nominal current A	Grid current	Grid connection	Regulator module	Regulator voltage	Annotations
<b>LSM</b>	E 230 G 220/ 2	Charging rectifier	100x160x120	230V AC	2	2,8	E 230	CMC	1 ... 10 V	Single board version
<b>LSM</b>	E 230 G 220/ 5	Charging rectifier	100x160x120	230V AC	5	7,1	E 230	CMC	1 ... 10 V	Single board version
<b>LSM</b>	E 230 G 220/ 8	Charging rectifier	100x160x120	230V AC	8	11,3	E 230	CMC	1 ... 10 V	Single board version
<b>LSM</b>	E 230 G 220/ 10	Charging rectifier	100x160x120	230V AC	10	14,1	E 230	CMC	1 ... 10 V	Single board version
<b>LSM</b>	E 230 G 220/ 15	Charging rectifier	100x160x120	230V AC	15	21	E 230	CMC	1 ... 10 V	Single board version
Module type	Description	Application	Width mm	Operating voltage	Nominal current A	Grid current	Grid connection	Regulator module	Regulator voltage	Annotations
<b>DSM</b>	D 400 G 220/ 22	Charging rectifier	157	400V AC	22	12	D 400	CMC	1 ... 10 V	For semi- and fully controlled AC bridges. Bridge + transformer are positioned externally.
<b>DSM</b>	D 400 G 220/ 30	Charging rectifier	157	400V AC	30	16	D 400	CMC	1 ... 10 V	
<b>DSM</b>	D 400 G 220/ 42	Charging rectifier	157	400V AC	42	22	D 400	CMC	1 ... 10 V	
<b>DSM</b>	D 400 G 220/ 56	Charging rectifier	157	400V AC	56	30	D 400	CMC	1 ... 10 V	For special power supplies and large input power.
<b>ESM</b>	Z 230 G 220/ x E 400 G 220/ x	Two-phase charging rectifier	157	230V AC	any	any	E/Z 230	CMC	1 ... 10 V	

Switch-over devices for backup power supply										
Module type	Description	Application	Number of phases	Power in kW	Gen. lighting voltage	Backup battery	Backup AC	Load distribution	Protection	Annotations
<b>UE-NET</b>	UE-NET 2,5	Backup power supply	single-phase	2,5	230 V	220V	230V	single-phase	electr. and mechan. locked	
<b>UE-NET</b>	UE-NET 4,0	Backup power supply	single-phase	4	230 V	220V	230V	single-phase		
<b>UE-NET</b>	UE-NET 5,2	Backup power supply	single-phase	5,2	230 V	220V	230V	single-phase		
<b>UE-NET</b>	UE-NET 8,7	Backup power supply	three-phase	8,7	400 V	220V	400V	asymmetrical	electr. and mechan. locked	Load distribution according to custo- mer specifications
<b>UE-NET</b>	UE-NET 11,0	Backup power supply	three-phase	11	400 V	220V	400V	asymmetrical		
<b>UE-NET</b>	UE-NET 17,0	Backup power supply	three-phase	17	400 V	220V	400V	asymmetrical		
<b>UE-NET</b>	UE-NET 8,7	Backup power supply	three-phase	8,7	400 V	220V	400V	symmetrical	electr. and mechan. locked	
<b>UE-NET</b>	UE-NET 11,0	Backup power supply	three-phase	11	400 V	220V	400V	symmetrical		
<b>UE-NET</b>	UE-NET 15,6	Backup power supply	three-phase	15,6	400 V	220V	400V	symmetrical		
<b>UE-NET</b>	UE-NET 24,0	Backup power supply	three-phase	24	400 V	220V	400V	symmetrical		
<b>UE-NET</b>	UE-NET 33,0	Backup power supply	three-phase	33	400 V	220V	400V	symmetrical		
<b>UE-NET</b>	UE-NET 50,0	Backup power supply	three-phase	50	400 V	220V	400V	symmetrical		

Master module systems									
Module type	Description Master	Application	IOM 230	INFRA-M	BDM	Add. power supply 24V	Bus length Master bus	Bus length Module bus	Annotations
<b>MMS 1</b>	moduls system 1	System without sub-master	1	1			None	up to 400m	
<b>MMS 2</b>	module system 2	System with sub-master(s)	1	1	1	1	up to 400 m	up to 400m	
<b>MMS 3</b>	module system 3	Module bus address extension		1			up to 400 m	up to 400m	
<b>MMS 4</b>	module system 4	For long master bus lengths		1	1	1	up to 800 m	up to 400m	
<b>MMS 5</b>	module system 5	Sub-master with switch-over to backup power supply	1	1			up to 400 m	up to 400m	
<b>MMS 6</b>	module system 6	Identical with MM5, however, for long master bus lengths	1	1	1	1	up to 800 m	up to 400m	Also for master buses
<b>BVS 1</b>	Bus extension kit	For long module buses			1	1		up to 800m	

Bus technology									
Module type	Interconnection	Bus type	Number of modules	Cable type	Cable cores	Transmission rate	Max. individual feed length	Max. double feed length	Besonderheiten
<b>Master bus</b>	All masters/sub- masters are inter- connected	EIB, modified	Master + max. 30 sub-masters	J-Y(St)Y 2x2x0,8 or YCYM 2x2x0.8	4	9600 bps	400 m	800 m	Each master / sub- master has its own module bus  * on site ** e.g. BELDEN 8762 requires 2 x LAN box  Distance depending on optical fibre
<b>Module bus</b>	Master/sub-master with relating modules	EIB, modified	Max. 60 modules		4	9600 bps	400 m	800 m	
<b>Charging bus</b>	Master with CMC	RS232	2	*	6	9600 bps	5 m	nein	
<b>Charging bus</b>	Master with CMC	RS485	2	**	4	9600 bps	800 m	nein	
<b>Charging bus</b>	Master with CMC	Ethernet	2	CAT 7	8	10 Mbps	100 m	nein	
<b>VISU bus</b>	Master/sub-master with VISU box	Ethernet	Max. 31	CAT 7	8	10 Mbps	je 100 m	nein	
<b>VISU bus</b>		Ethernet	Max. 31	LWL	2	10 Mbps	4000 m	nein	



## Innovative power supply systems

### Product portfolio

- Emergency lighting systems
- Installations for energy providers
- Safe power supply for signal installations
- Battery powered central power supply systems
- Safe power supply for operating room luminaires
- Charging systems for traction batteries
- Timer controlled rectifiers
- IGBT rectifiers
- Thyristor rectifiers
- DC-DC converters
- DC switching systems
- AC switching systems
- Battery management electronics
- Solar power pack
- Electronic control devices
- Power supply units
- Transformers
- Control cabinets and special enclosures
- Special devices



All of our products are designed, developed and manufactured in our own plant. That's why we are able to freely choose and optimize any system's parameters and manufacture our products to our customers' specifications.

Our quality management system is ISO 9001 certified.



**GFS Gesellschaft für  
Stromversorgungstechnik mbH**

Nägelsestr. 35  
D-79288 Gottenheim  
Tel.: +49(0)7665/904-0  
Fax: +49(0)7665/41807  
E-mail: [info@gfs-gmbh.de](mailto:info@gfs-gmbh.de)  
[www.gfs-gmbh.de](http://www.gfs-gmbh.de)