

# WAREMA bus systems

Unlimited possibilities.

*Der SonnenLichtManager*





# Smart Building

## Experience the future



Energy efficiency, comfort, safety and flexibility – these are the requirements placed on modern buildings today. The intelligent WAREMA bus systems meet all these requirements to suit every individual need. This allows all functions in the building to be connected and controlled with ease. Whether sun shading, light, air conditioning, heating or safety systems – with bus systems, each of these power consumers can be centrally controlled via an operating element or even automatically controlled with intelligent sensors. This versatility offers clever solutions for all buildings and applications, whether in a family home or in a large commercial construction projects.

**Limitless comfort – as if by magic.**

Printing errors, changes and deviations from the technical specifications and product presentation are possible due to the individual structural conditions and apply to all the products included in this brochure.



## More comfort

Always enjoy a perfect, feel-good climate with individual automation based on the time of day, position of the sun and weather conditions.



## More safety

Thanks to sophisticated presence simulation and storm damage prevention due to wind monitoring.



## More efficient

Heating, lighting and sun shading control themselves depending on environmental influences and thus save real money.



## More user-friendly

With just one intuitive app for sun shading, lighting and more.





# Control systems for individual sun shading



As a manufacturer of sun shading and control systems for buildings and rooms, WAREMA produces pioneering solutions that are technically superior and are designed to meet the individual needs of your property. This improves the energy efficiency of buildings, helps maintain the value of property and enhances quality of life. This document provides an initial overview and guidance for the various functions and applications of our bus systems.



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# WAREMA bus systems




## Overview



WAREMA bus systems offer a broad range of functions for a room and building automation system that is geared to meet the requirements of the construction project, its user and its owner. The project itself will determine whether KNX with its fixed communication interface, LonWorks® with its adjustable sequence controls or BAline as a functional, highly flexible system is the right choice.





Feature	KNX technology	LonWorks® technology	BAline
			
Product description	from page 14	from page 26	from page 34
<b>Building automation level in acc. with VDI 3814</b> At this level of building automation, (management, automation or field level), the bus system is used.	Field	Automation, field	Automation, field
<b>Typical field of application</b> In this type of construction project or field of application, the system is typically used.	Small and large-scale construction projects	Small and large-scale construction projects	Room automation
<b>Functional flexibility</b> Flexibility of the control for setting functions and using and adapting the communication interface	high	high	maximum
<b>Power consumer control</b> Indicates the flexibility of the control outputs for controlling various power consumers.	low flexibility	low flexibility	high flexibility
<b>Transmitter connection (sensors, operation, etc.)</b> Indicates the flexibility of the control inputs for connecting sensors, control panels and other transmitters.	low flexibility	low flexibility	very high flexibility
<b>Control function simulation</b> The control function can be simulated by this method.	—	offline	offline, online
<b>Space requirement / preferred installation location</b> Preferred installation location/method for the control systems.	Equipment cabinet, surface mounted	Equipment cabinet, surface mounted	Equipment cabinet, floor tank
<b>Openness</b> Indicates the control's conformity to the interface standard (e.g. B. KNX) and/or how open and compatible to other control solutions according to this standard.	complete	complete	complete
<b>Central control unit</b> WAREMA offers this central control for the bus system.	WAREMA climatronic® KNX central weather unit WAREMA KNX Room Controller		—
combinable with	BAline	BAline	KNX & LonWorks®



# WAREMA bus systems

## Control functions



Control function and DIN EN 15232	D	C	B	A
Lighting that can be automatically switched, controlled and dimmed	–	–	•	•
Sun control	–	•	–	–
Slat tracking	–	–	•	•
Shading correction (annual shading)	–	–	•	•
Thermo-automatic (heating and cooling support in unoccupied rooms to use solar gain)	–	–	•	•
Specified for new buildings	–	•	•	•

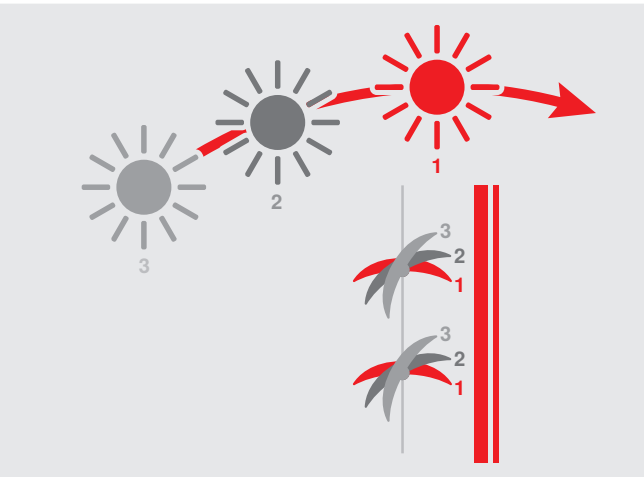
Room automation functions in accordance with VDI 3813-2





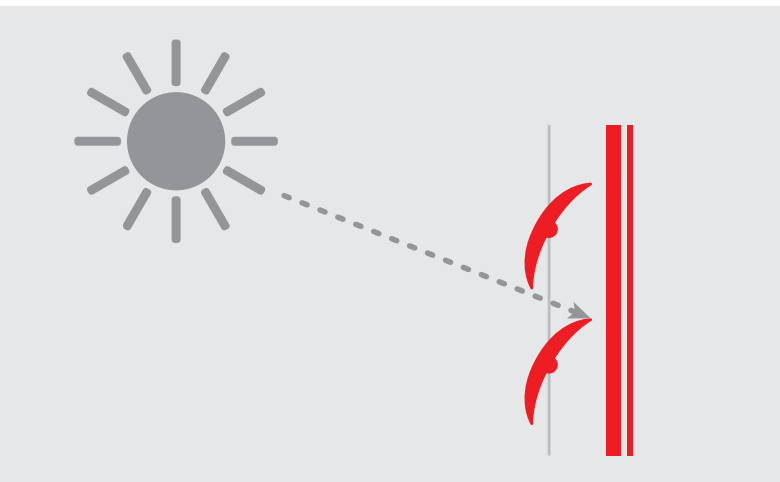
## Individual automation

- Sun control
- Thermo-automatic
- Presence detection
- Monitoring of wind, precipitation and ice
- Scene control
- Time switch
- Control timer



## Slat tracking based on the sun's position

The control system tracks the position and angle of the sun and moves the slats accordingly. It even takes into account sunlight shining in from the side when doing so. This maximises interior daylight without sunrays entering the room directly – ideal for glare-free work. Sensors can also detect the level of brightness in the room to switch artificial lighting on or off as required. Brightness control and slat tracking based on the sun's position work together to keep daylight at the ideal level. At WAREMA, our slat tracking based on the sun's position even exceeds the requirements of VDI 3813.



## Cut-Off

If the sun shading system does not regulate the sunlight entering a room, the temperature can quickly rise above comfortable levels. An ideal slat position (referred to as Cut-Off) keeps out direct sunrays while efficiently illuminating the entire room with diffused daylight. This function automatically adapts to the weather and position of the sun. To prevent glare, the user can close the sun shading slats further, but is unable to open them beyond their Cut-Off position. This reduces the cooling load to the minimum required.

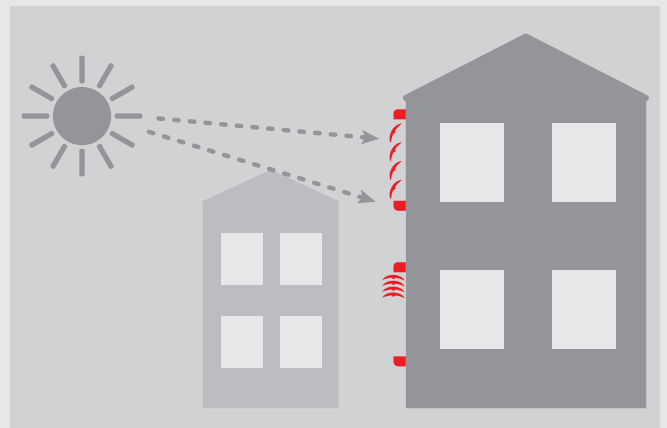
### Annual shading (shading correction)

The bus technology allows adjacent building sections, courtyards and neighbouring developments to be shaded at once. The changes in shadows over the course of the day are calculated and evaluated. The sun shading system behaves as though a sun sensor were fixed to each sun shading product, meaning they provide shade only when direct sunlight falls upon the window.

### Want to know more?

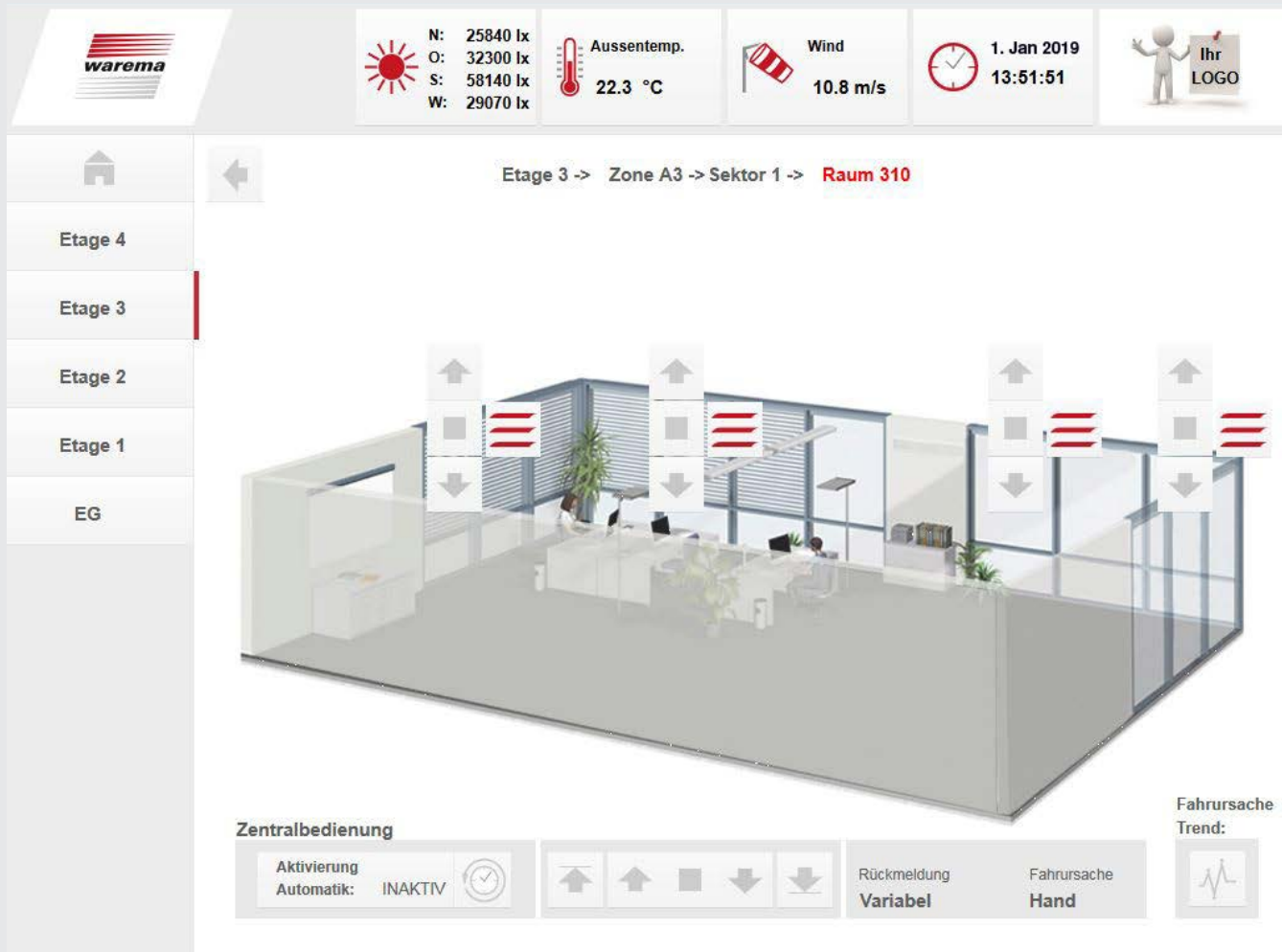
Our short films can provide you with a clear explanation of the multiple uses of our intelligent control functions:

[www.warema.de/funktionsfilme](http://www.warema.de/funktionsfilme)



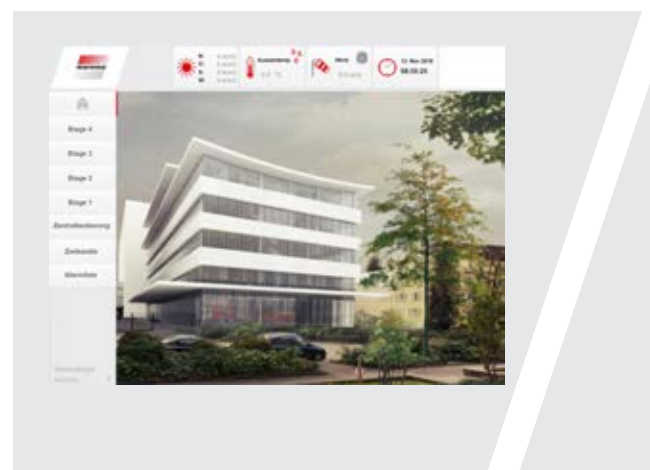
# WAREMA bus systems

## Visualisation and remote access



### Visualisation and operation of KNX and LonWorks® networks

- Project-specific visualisation
- Display of current weather data and time
- Area and room illustrations (with floor plans)
- Manual operation of sun shading products
- Control of each facade
- Trendlogs
- Alarm display

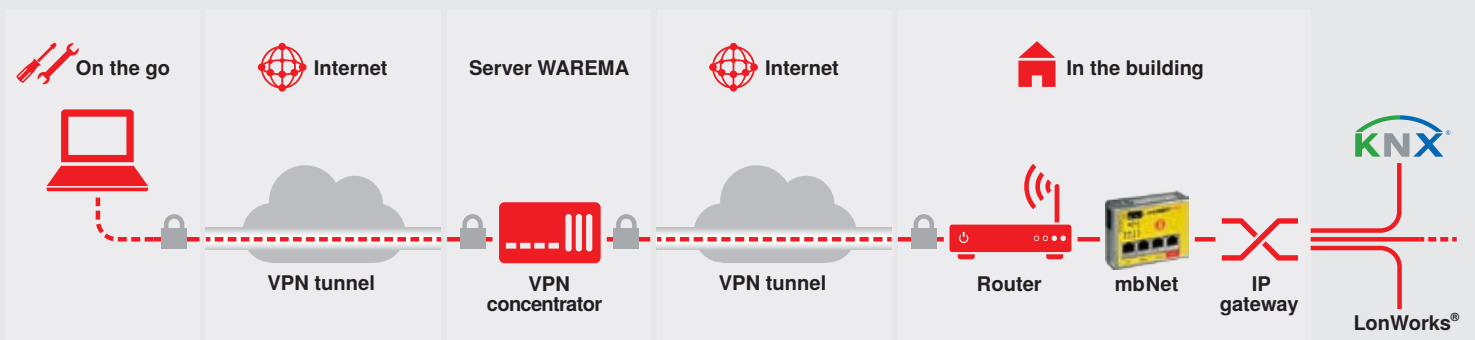






## WAREMA Connect

- Encrypted remote access to WAREMA KNX and LonWorks® control systems
- Remote maintenance by WAREMA possible
- No open incoming ports required, as the connection is established only outward from the property
- Hosting in WAREMA's own network, all connection data is secured on the WAREMA premises
- VPN connection via the OpenVPN (SSL) protocol encrypted connection with AES256
- Connection can be enabled and disabled by the system operator
- Future-proof thanks to IPv6 support
- Alternative connection via mobile



# WAREMA bus systems

## Technical standards and energy efficiency clas



### Functional flexibility

Building and room automation is shaped by continuous development and international standards. WAREMA bus systems use consistently compliant interfaces to ensure functional flexibility and integration into the room automation network. This means that high energy efficiency classes according to DIN EN 15232 can be realised.



ses



## SMI, SMI LoVo

WAREMA bus systems support the use of SMI (Standard Motor Interface) and SMI LoVo, a standardised digital interface between the control and the sun shading drive. Up to 16 SMI or SMI LoVo drives can be connected in parallel and controlled either individually or in up to 16 groups. Each SMI drive has a unique digital address and can be separately controlled and monitored via the bus system. The motor electronics integrated into the drive allow precise positioning of the sun shading system. In addition, SMI sunblind motors are able to work at different speeds – ensuring quiet tilting that doesn't disturb the user.



## DALI

DALI (Digital Addressable Lighting Interface) is a digital, internationally-harmonised control protocol for lighting control. DALI switches and dims a maximum of 64 lamps either together or in up to 16 groups. Signal transmission is bi-directional: the control unit receives immediate feedback at every command.

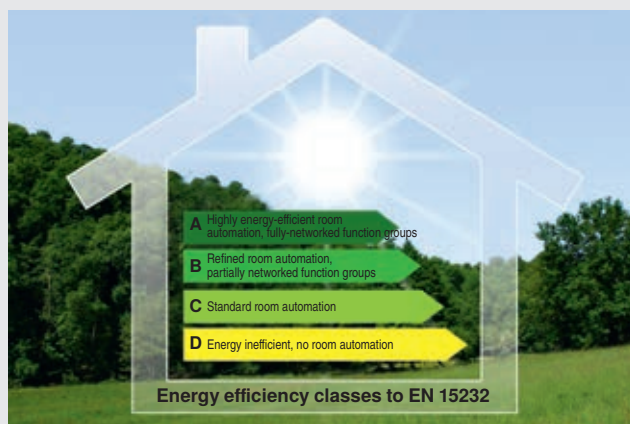


## Local operation and radio remote control

Local control commands are required even when a bus system is used. When scenes are activated or sun shading products are to be individually controlled, for example. In WAREMA bus systems, conventional push buttons, which are connected to the actuators or control centres, are used. The radio signals from the EWFS radio system are fed into the bus system via a gateway. This allows the sun shading products and scenes to be controlled remotely.

## Bus systems and the energy efficiency class

The effects of building and room automation on energy efficiency are addressed in DIN EN 15232. This standard divides non-residential buildings into four energy classes, D to A. Classes A and B, which require "on-demand room automation functions with integrated heating, cooling, ventilation, lighting and sun shading functions", are economically attractive. This can be achieved only with networked building automation control systems, i.e. bus systems. New buildings must conform to at least Class C "motor-drive with automated control".



# KNX technology



## Unlimited possibilities

KNX technology is one of the world's leading control standards in building automation. WAREMA KNX solutions conform to EN 50090 and ISO/IEC 14543 standards. Consequently, they achieve manufacturer-wide building automation across various function groups.

Bus systems complying with the KNX standard allow various function groups within the building to be networked and controlled. In 2017, various models accounted for over 56 % of the total "SmartHome" market value (Source: BSRIA). WAREMA supports the realisation of KNX systems as an experienced partner and solution provider – actively advising from the planning phase onwards or with products that seamlessly integrate into the cross-function group building automation system.



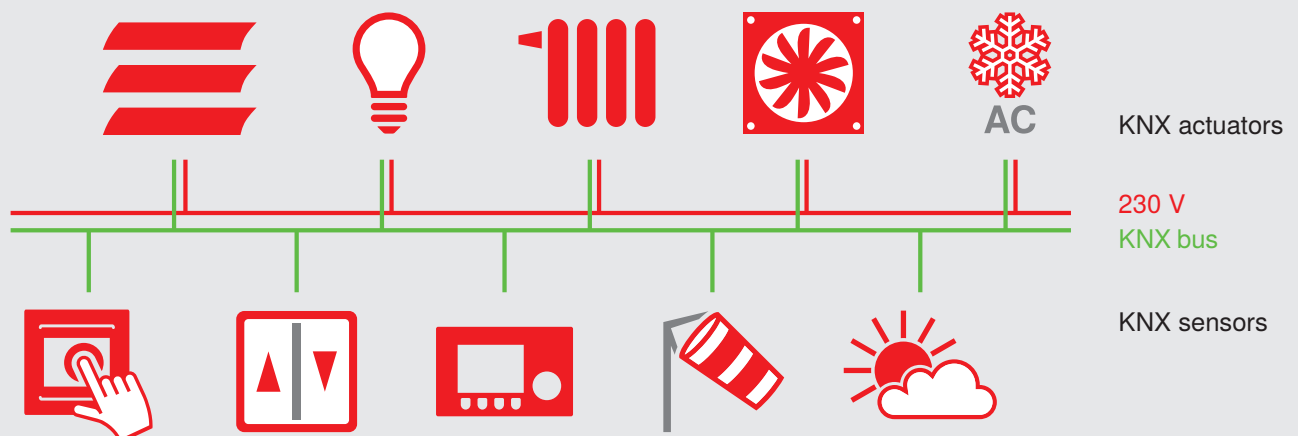


## KNX: an overview

- Combination of any number of products and systems (heating, cooling, light, etc.)
- Interoperability across manufacturers for all available KNX products
- Simple planning for complex requirements
- Flexible expansion with additional components
- Changes in user requirements can be easily implemented via software (ETS); no rewiring necessary

## The benefits speak for themselves

- Perfect working conditions and ideal conditions for relaxation at home
- Reduction in energy costs
- Building energy efficiency class A or B possible
- Individually programmable controls
- Future-proof thanks to the international automation standard
- WAREMA's many years of experience guarantee seamless coordination of sun shading systems with KNX.



# KNX technology

## Sun shading actuators

Manual override  
operation via Blue-  
tooth!



### Highlights

- AP actuators: manual override operation and easy operation of the KNX programming button via smartphone (Bluetooth LE) – suspended ceilings or double floors present no problem during commissioning
- AP actuators: standard (venetian blind) push buttons can be connected via integrated binary inputs (freely available on the bus), status display of the binary inputs in the smartphone app
- REG actuators with the most compact design on the market (8 motor outputs with a modular width of only 6)
- **NEW:** control with SMI drives (see page 18)





KNX SA 4M230 REG



KNX SA 4M230.8 AP



Strain relief AP actuator

## REG and AP actuators

- Control of 2 to 8 sun shading drives with 230 V AC voltage or 4 sun shading drives with 24 V DC voltage (pole changer switching)
- Interchangeable miniature fuses for line protection of connected power consumers
- Spring terminals for easy installation
- Voltage input as screw terminals for flexible extension

## Functions

- Manual override operation at REG actuator via keypad
- Activation or deactivation of the automatic inputs (e.g. sun control, slat tracking)
- Manual operation can be limited through automatic inputs (e.g. cut-off)
- 8 scene objects per output
- Highest safety level thanks to 3 global safety objects and an additional safety object per output:
  - Different priorities considered
  - Cyclical monitoring
- Convenience thanks to integrated status objects: curtain height, slat angle, dwell time active and upper limit position
- Crawling speed at engine start-up can be parameterised
- Maximum telegram rate can be limited globally per actuator
- Factory-set basic parameters for:
  - Venetian blind / external venetian blind
  - Roller shutters / textile sun shading systems
  - Front-mounted awning with ZIP guidance





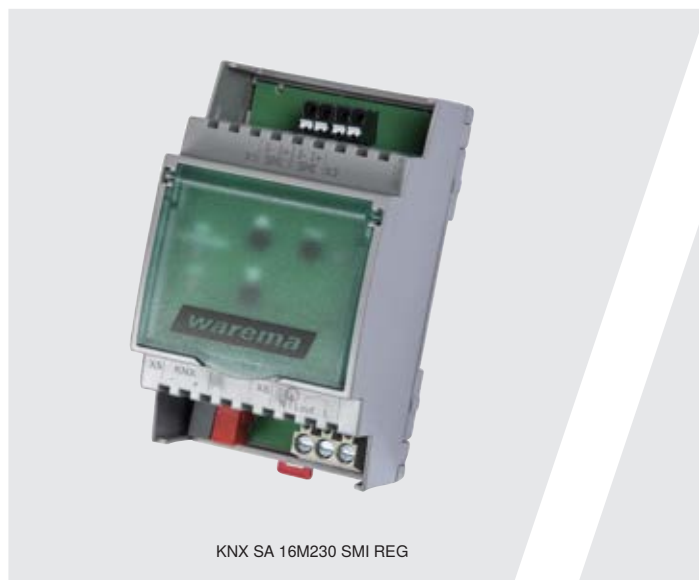
## Bluetooth functionality with SMI REG and AP actuators

### SMI sun shading actuators

- Control of up to 16 SMI and/or SMI LoVo motors in up to 16 groups
- Emergency/manual operation using buttons on the actuator, the ETS DCA app or Bluetooth LE smartphone app
- SMI drives can be optionally switched off via integrated relay to prevent long-term standby current consumption
- Individual motors are automatically parametrised after replacement
- AP actuators with integrated binary inputs for standard (venetian blind) push buttons and replaceable miniature fuses for line protection
- Manual override operation and easy operation of the KNX programming button via smartphone (Bluetooth LE) and buttons on the actuator

#### ETS DCA app for the ETS:

- SMI motor parametrisation
- Emergency/manual operation (SMI Broadcast, group, individual motors)
- Synchronisation of ETS project and actuator (for SMI commissioning via smartphone app)
- Semi-automatic learning of tilting impulse
- Status display of binary inputs



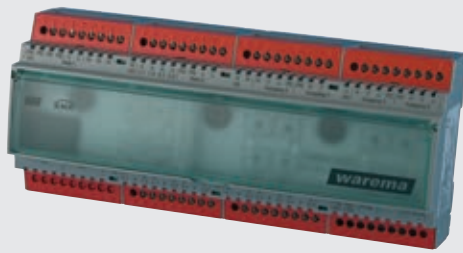
KNX SA 16M230 SMI REG





## KNX MSE 6M230

- Multiple combination actuator for the independent control of 230 V AC sun shading drives and lighting systems
- 12-point binary input available on the KNX bus
- Interchangeable miniature fuses for line protection of connected power consumers



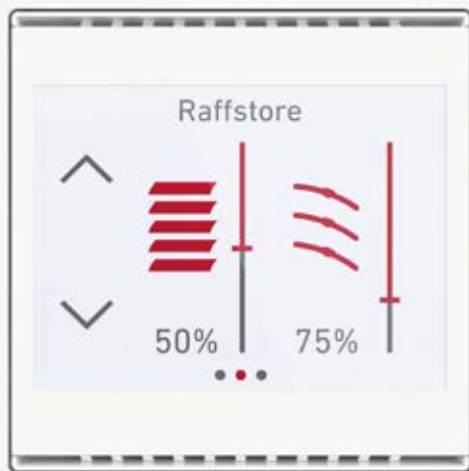
## KNX EWFS Receiver

- Wireless operation of KNX products via EWFS Hand-held transmitters and wall-mounted transmitters as well as EWFS Weather stations
- Venetian blind and roller shutter controller, switching, dimming, scene control and more
- Ideal for retrofitting through installation in flush-mounted box
- Power supply via the KNX bus voltage



## WAREMA KNX Room Controller

- Room temperature sensor with touch display
- Integrated weekly time switch
- Individual configuration of different display and operation sides
- 4 inputs for binary contacts or temperature sensors T-NTC
- Suitable in all standard switch programs for use 55 x 55 mm



# KNX technology

## Overview of actuators

Actuator	Operating voltage	Number of drives	Switching capacity per drive	Number of binary inputs	Manual override operation	Dimension
KNX SA 2M230 REG	230 V AC	2	500 VA with 230 V AC cos φ = 0.6	—	●	4 MW
KNX SA 2M230.4 AP				4	● <sup>1)</sup>	6 MW
KNX SA 4M230 REG		4		—	●	4 MW
KNX SA 4M230.8 AP				8	● <sup>1)</sup>	9 MW
KNX SA 6M230 REG		6		—	●	6 MW
KNX SA 6M230.12 AP				12	● <sup>1)</sup>	12 MW
KNX SA 8M230 REG		8		—	●	6 MW
KNX SA 8M230.16 AP				16	● <sup>1)</sup>	12 MW
KNX MSE 6M230 AP/REG		6 drives or 5 drives + 2 lights or 4 drives + 4 lights		12	●	12 MW
KNX SA 4MDC REG	24 V DC	4	max. 3 A at 24 V DC (72 W)	—	●	4 MW
KNX SA 4MDC.8 AP				8	● <sup>1)</sup>	6 MW
KNX SA 16M230 SMI REG	230 V AC SMI	16	16 x 230 V AC SMI	—	● <sup>2)</sup>	3 MW
KNX SA 16M230.32 SMI AP	230 V AC SMI	16	16 x 230 V AC SMI	32	● <sup>2)</sup>	12 MW
KNX SA 16MDC SMI LoVo REG	SMI LoVo	16	16 x SMI LoVo	—	● <sup>2)</sup>	3 MW
KNX SA 16MDC.32 SMI LoVo AP	SMI LoVo	16	16 x SMI LoVo	32	● <sup>2)</sup>	12 MW
KNX SA 2M100.4 AP	100 V AC	2	200 VA with 100 V AC cos φ = 0.6	4	● <sup>1)</sup>	6 MW
KNX SA 4M100.8 AP		4		8	● <sup>1)</sup>	9 MW
KNX SA 6M100.12 AP		6		12	● <sup>1)</sup>	12 MW

● yes

— no

<sup>1)</sup> via smartphone app

<sup>2)</sup> on the actuator and via smartphone app

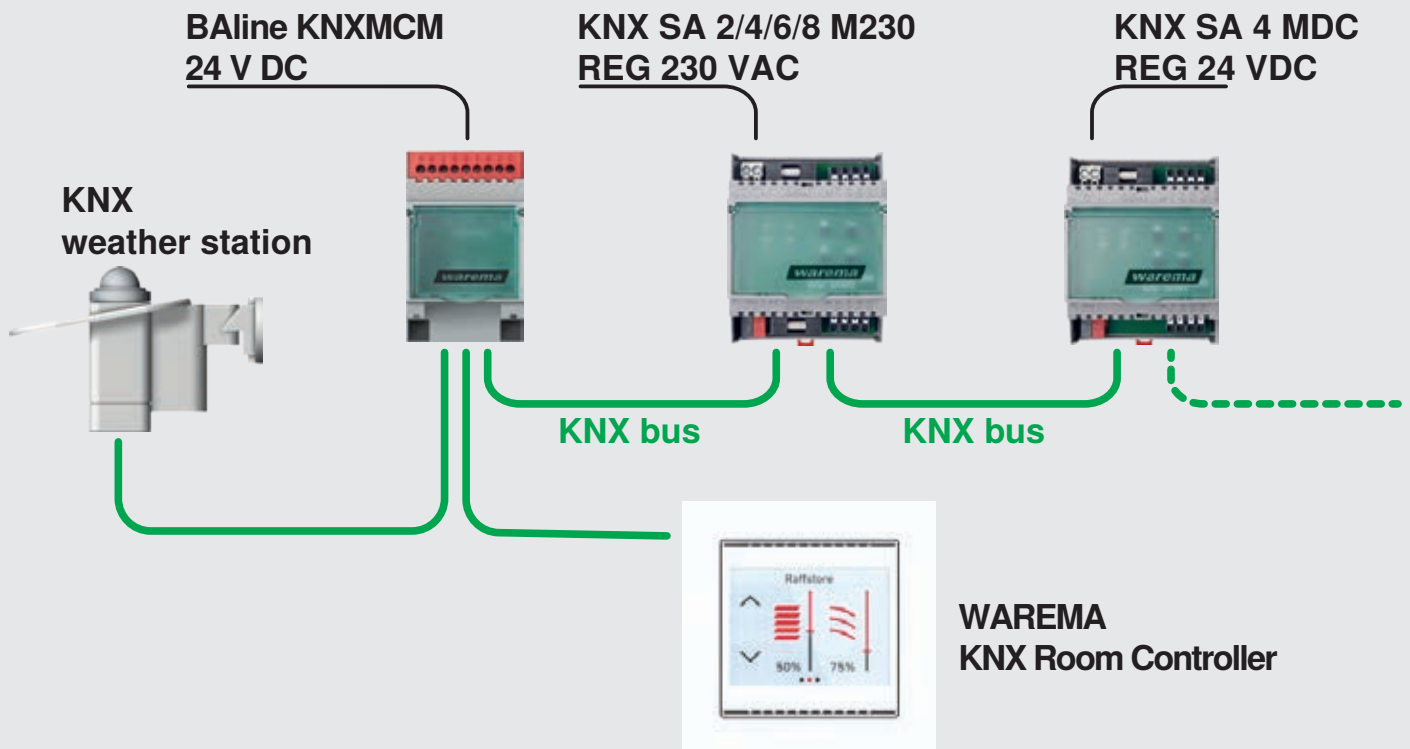






# KNX technology

## Practical application



### Room automation solution

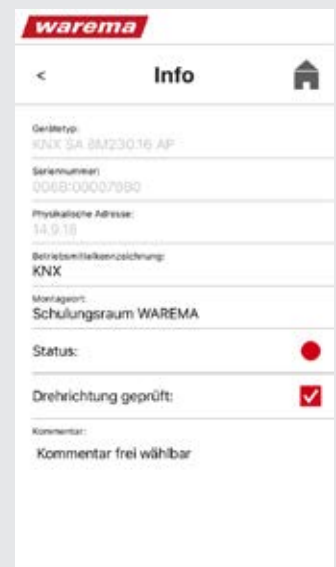
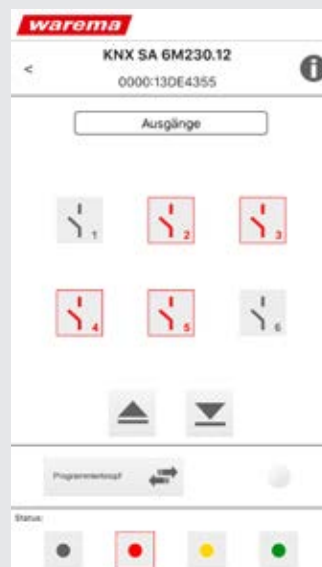
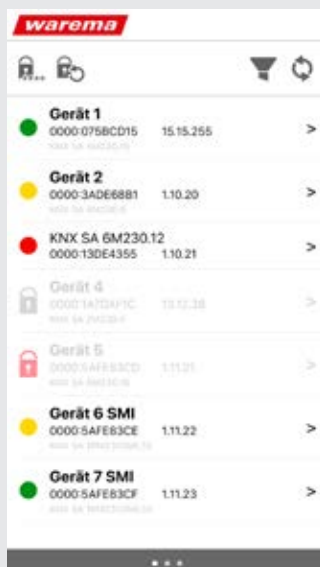
The complete room automation solution for KNX with WAREMA devices allows connected power consumers to be operated and parameterised in up to 64 channels. The sun shading or lighting system is controlled via slat tracking based on the sun's position, dawn/dusk control, scenes and many other functions.





## Actuators with Bluetooth LE – unique benefits

- Available for KNX AP sun shading actuators and all KNX SMI sun shading actuators
- Pressing the KNX programming button
- Status display of binary inputs
- Device access is protected with an access code
- Storage of device information (device status, installation location, equipment identification and note)
- Notes are saved on the smartphone and the actuator
- Commissioning/allocating the SMI drives
- After commissioning, the Bluetooth interface can be deactivated via ETS



Screenshots of the smartphone app

# KNX technology

## WAREMA climatronic® KNX central weather unit



WAREMA climatronic® 3.0 controls sun shading, temperature and light according to environmental conditions in both small and large buildings. Intuitive operation makes it easy to comfortably create your personal ideal climate for work and leisure.

With the KNX Gateway, a complete KNX system is created. Sensors allow for the highest degree of comfort thanks to dawn/dusk control, wind monitoring and slat tracking according to the position of the sun. The KNX Gateway sends time and weather information to the KNX network and thus ensures the perfect indoor climate.





## WAREMA climatronic® KNX central weather unit

- Central weather unit for KNX bus systems for operating the comfort and safety functions without ETS
- Integrated temperature and humidity sensor
- Diverse functionality for a perfect indoor climate
- Energy saving thanks to automatic control
- Simple operation with large 5.7" TFT display
- Control of up to 64 channels
- Operation via EWFS hand-held or wall-mounted transmitter and via smartphone using WAREMA climatronic® web control



## WAREMA climatronic® weather station

- Detects brightness, dawn/dusk, wind speed, wind direction, precipitation, time (DCF77), outside temperature
- Photo sensors for measuring brightness in 4 compass directions
- Up to 3 weather stations can be connected to one WAREMA climatronic®





# LonWorks® technology



LONMARK™

## Individual requirements

LonWorks® technology connects numerous consumers from different function groups to form one decentralised building automation network. WAREMA LonWorks® solutions integrate the sun shading system, lighting and window control into the LON® network. With complex control systems such as slat tracking based on the position of the sun, they optimise the use of sunlight in small and large-scale construction projects.





## LonWorks® at a glance

- Combination of any number of products and systems (heating, cooling, light, etc.)
- Compatibility across manufacturers for all available LonWorks® products
- Changes in user requirements can be easily implemented via software, no rewiring necessary
- Storing individual settings in the LONMSEs allows decentralised signal evaluation and control

## The benefits speak for themselves

- Perfect working conditions and ideal conditions for relaxation at home
- Reduction in energy costs
- Improved user comfort and a high energy efficiency class thanks to extremely efficient building control
- Individually programmable controls
- Future-proof thanks to the international automation standard
- WAREMA's many years of experience guarantee seamless coordination between sun shading systems and LonWorks®





# LonWorks® technology

## System devices



### Highlights

- Individual requirements for room automation are realised with a broad range of WAREMA LonWorks® devices
- Control of sun shading and lighting with 2 to 12-point motor control units and combination actuators
- 230 V AC and 24 V DC motors with and without incremental encoder
- Control of SMI drives





## LonWorks® actuators

- Motor control units for all WAREMA sun shading products and numerous third-party products
- Programmable final state systems for adapting the functionality
- Conventional push buttons connected for cost-efficient operation
- Standardised communication interface

## LONMSE 12M230 SMI

- Control of 12 x 230 V AC SMI sun shading drives, either individually or in up to 12 groups
- 6 conventional sunblind push buttons can be connected
- 12 MW in-series, surface mounted design
- Replaceable miniature fuse for protection of the connected products and flexible motor lines
- SMI voltage can be activated to reduce the standby current.
- Manual override operation



## LONSE III

- Device for coupling meteorological sensors to a LonWorks® network
- Brightness, global radiation, wind speed, wind direction, temperature, DCF77 radio clock, realtime clock, precipitation, acknowledgeable ice alarm
- Sun position calculation



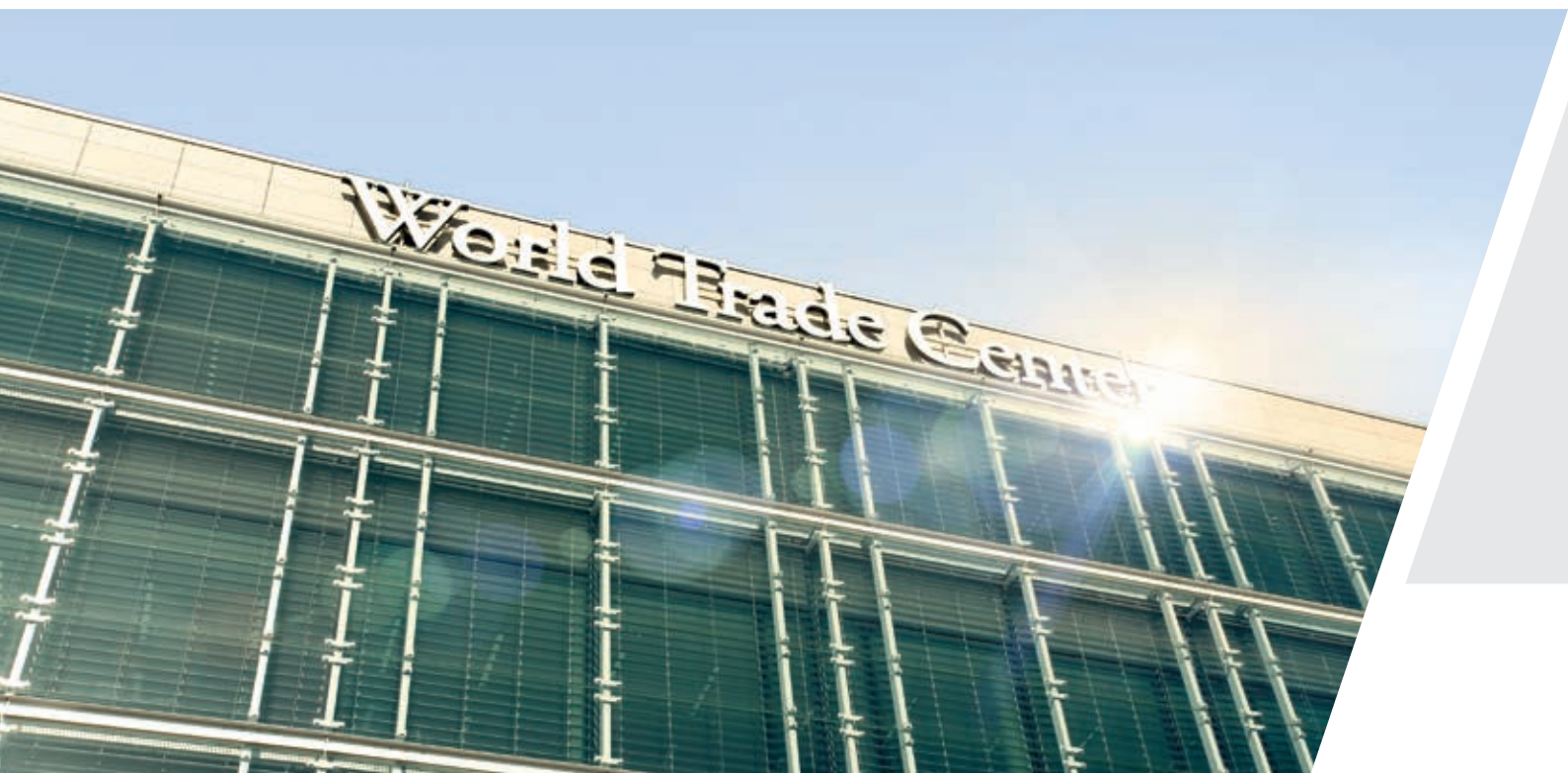
# LonWorks® technology

## Overview of motor control units

Motor control unit	230 V drives, non-floating	Up/down outputs, floating	Incremental encoders	24 V drives, non-floating	Switching capacity per drive	Total power of light 230 V	Final state system, parameterisable functionality	Shading correction, slat tracking, scenes	Cut-Off limit	Switching lights	Number of sunblind push buttons	Number of binary inputs
LONMSE 2M230I	2	—	parameterisable	—	500 VA with 230 V AC $\cos \varphi = 0.6$	—	•	•	•	—	2	2
LONMSE 2MPF	—	2	—	—		—	•	•	•	—		
LONMSE 4M230I	4	—	parameterisable	—		—	•	•	•	—	4	4
LONMSE 4MPF	—	4	—	—		—	•	•	•	—		
LONMSE 4MDCR	—	—	•	4	regulated	—	•	•	•	—		
LONMSE 4MDCB-X	—	—	parameterisable	4	24 V DC not controlled via PWM	—	•	•	•	—		
LONMSE 6M230	6x in 4 groups or 4x + 4x light	—	—	—	500 VA with 230 V AC $\cos \varphi = 0.6$	Halogen floodlight 2 kW Bulbs 2 kW (max. 500 W per output) Fluorescent lamps 162 $\mu$ F, 1.5 kVA	•	•	—	•	6	—
LONMSE 12M230 SMI	12x SMI <sup>1)</sup>	—	—	—	fused with 6.3 AT: 1300 VA not fused: 3500 VA	—	•	•	•	—		

• yes  
— no

<sup>1)</sup> three SMI interfaces







## LONEWFS

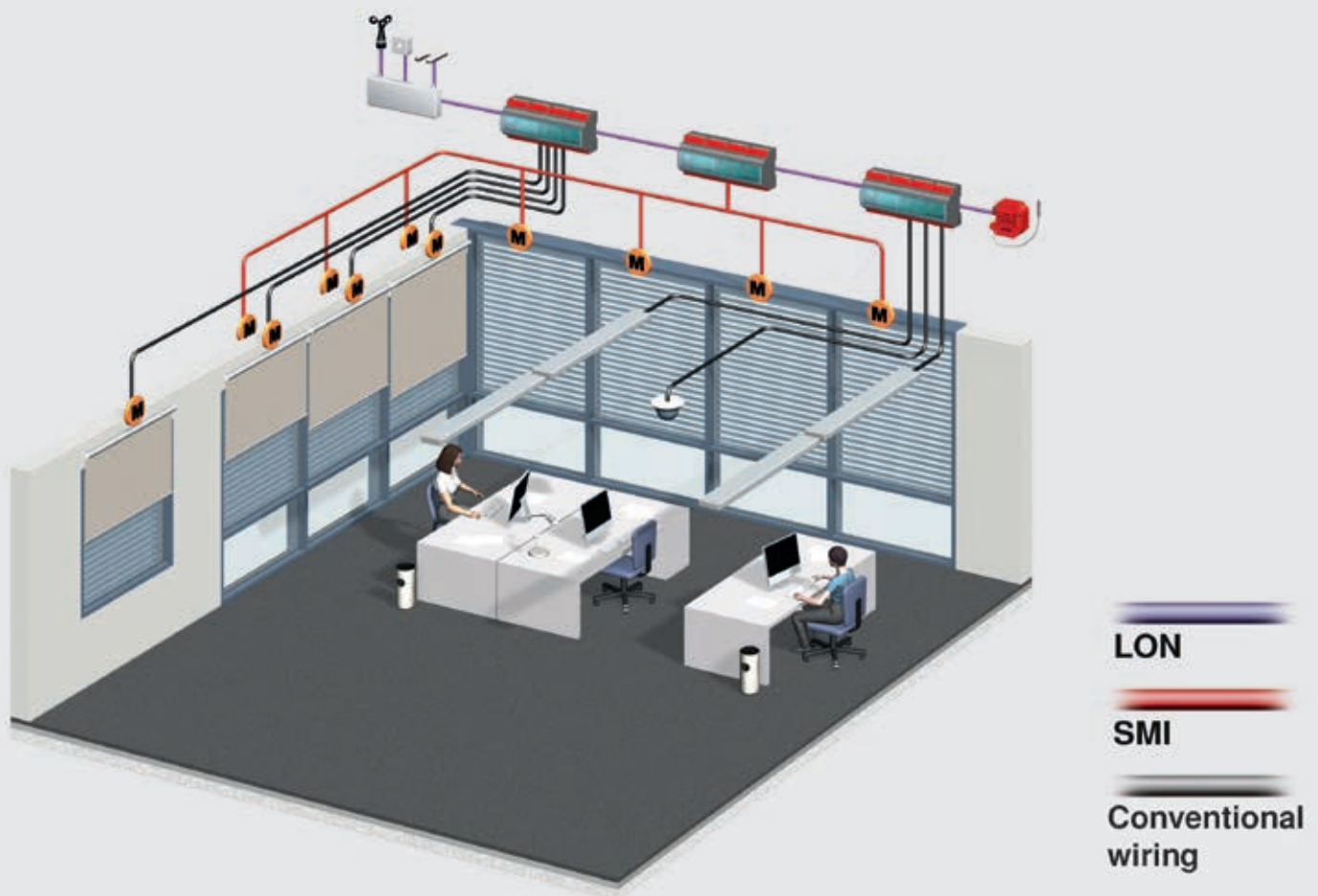
- WAREMA EWFS Receiver for eight transmitters and one weather station
- For operating LonWorks® products:  
Temperature setpoint +/-, open/close ventilation, high/low/stop sun shading system, switch and dim light, scenes, presence

## LONEWFS Receiver

- Wireless operation of LonWorks® products via EWFS hand-held transmitters and wall-mounted transmitters as well as EWFS weather stations
- Venetian blind and roller shutter controller, switching, dimming, scene control and more
- Ideal for retrofitting through installation in flush-mounted box

# LonWorks® technology

## Practical application



WAREMA control systems integrate fully into LonWorks® networks. In offices, they control the sun shading system, lighting and window drives through an automated process. Weather data from a networked weather station are fed into the system, where they are even available to third-party devices. The comfort and safety function actuators can be adapted for various types of use and changes of use. The LonMark® standard permits the integration of third-party units and higher-order systems.



## CONTROL\_Edit

The CONTROL\_EDIT software application can be used to create configuration files for LON<sup>®</sup> actuators (LONMSE). The files contain the basic settings for various parameters. By means of a LNS plug-in, they are imported into the parameterisable LONMSE controller where they determine control behaviour.







## Flexible room automation

- Modularisable control systems allow the seamless combination of different items of equipment in room automation units – based on a single device family
- BAline satisfies the prerequisites for the straightforward planning, configuration and commissioning of complex room automation units
- Energy efficiency, thermal and visual comfort can be brought into harmony via the facade



BAline KNXMCM

## BAline at a glance

Using the bus coupler KNXMCM or LONMCM and the BAline extension modules, a range of power consumers are combined for a bespoke application. This results in an individual room automation solution. Free programming capability and modularity form the basis for the flexibility and future orientation of the system.

Many different standard push buttons, analogue sensors and digital signal transmitters can be connected to the BAline MIOs' universal inputs. This allows for simple control of:

- Sun shading control system 230 V AC, 24 V DC, SMI
- Lighting control DALI, 0-10 V, switching
- Ventilation control, 10 V, Triac

## The benefits speak for themselves

- Freely programmable logic module BAline KNXMCM/ LONMCM for implementing complex function processes and automation processes
- Reduction of energy and operating costs
- Creation of application software using the free BAline Studio software
- Up to 8 different modules (BAline MIOs) can be mounted side-by-side in any order
- Functional safety thanks to simulation before commissioning
- USB interface for programming





# BAline

## Mode components and modules



### Highlights

Numerous devices or sub-systems are combined via the MCM bus coupler and the BAline expansion modules to create a tailored module set. The result is a quickly-adaptable room automation solution for individual usage concepts and functional requirements. Free programming capability and modularity form the basis for the flexibility and future orientation of the system.





## LONMCM

- Freely programmable logic module BAline LONMCM for implementing complex function processes and automation processes
- Reduction of energy and operating costs
- Creation of application software using the free BAline Studio software
- Up to 8 different modules (BAline MIOs) can be mounted side-by-side in any order
- Functional safety thanks to simulation before commissioning
- USB interface for quick programming or via the LON network



## KNXMCM

- Freely programmable logic module BAline KNXMCM for implementing complex function processes and automation processes
- Reduction of energy and operating costs
- Creation of application software using the free BAline Studio software
- Up to 8 different modules (BAline MIOs) can be mounted side-by-side in any order
- Functional safety thanks to simulation before commissioning
- Free management of 500 KNX objects and 100 parameters in to ETS
- USB interface for quick programming or via the KNX network



## Expansion modules (MIOs)

- Expansion modules (MIOs) for connecting different power consumers such as sun shading drives (230 V AC, 24 V DC, SMI), lights (DALI, 0-10 V, switching) and valves (10 V, Triac)
- Universal inputs for connecting standard push buttons, analogue sensors, digital signal transmitters and other devices
- The electrical connections of the inputs and outputs are designed in such a way that additional distributors for connectors may not be required

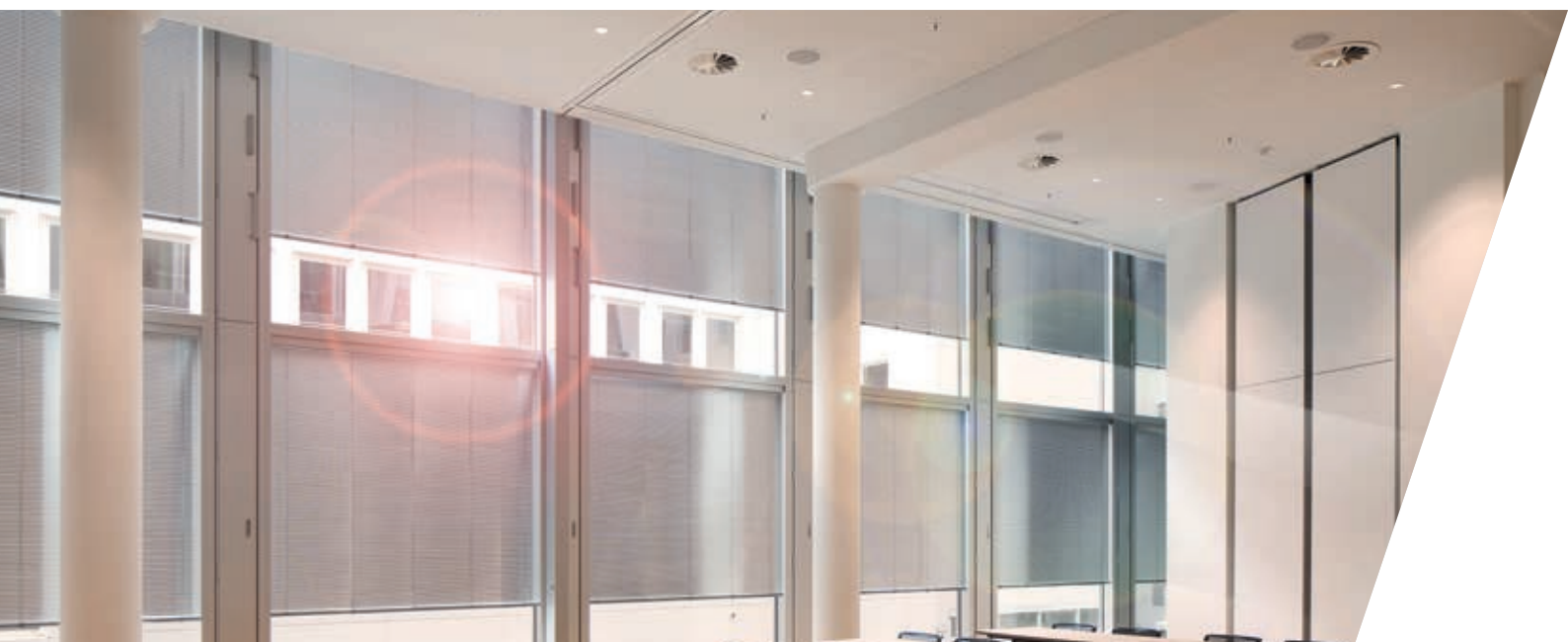




## Overview of modules

Module	Function / power consumer	Switching capacity per output	Undercurrent detection	Connection for incremental encoder	Universal inputs	Manual override operation
MCM	Bus coupler and central module for BAline as LON® or KNX	—	—	—	—	—
MIO 3RPF	Switching of up to 3 floating high-current consumers	2300 VA with 230 V AC cos $\phi$ = 0.6; 144 W with 24 V DC	—	—	—	—
MIO 4R230 4I	Switching of up to 2 sun shading drives or up to 4 connectable power consumers	500 VA with 230 V AC cos $\phi$ = 0.6	—	●	4	—
MIO 4R230C 4I			●	●	4	—
MIO 8R230			—	—	—	—
MIO 8R230 8I			—	●	8	—
MIO 8R230C 8I			●	●	8	—
MIO DAL 8I	DALI controllers for controlling up to 16 DALI groups	—	—	—	8	—
MIO SMI 8I	Control of up to sixteen 230 V AC SMI motors in up to 16 groups	—	—	—	8	—
MIO 4M24 8I	Switching of up to 4 sun shading drives	24 V DC / 72 W per output	—	—	8	—
MIO 4MR24C 8I	Control of up to 4 sun shading drives	24 V DC / 24 W per output	●	●	8	—
MIO 4AO MB	Control of up to 4 analog outputs	0-10 V (resistance $\geq$ 1k $\Omega$ ) or 0-20 mA (resistance $\leq$ 500 $\Omega$ )	—	—	—	●
MIO 4TO MB	Control of up to 4 Triac outputs	24-230 V AC, max. 1.4 A switching current, 0.5 A continuous	—	—	—	●
MIO 8I	Input module	—	—	—	8	—
LONMSE 16M230 SMI LONMSE 16M230 SMI 16I	SMI Combi-actuator (LONMCM basic module and SMI expansion module)	—	—	—	0/16	●

● = present  
— = not present









# BAline

## Configuration and programming software

### Flexible automation

Control experts can use BAline Studio to create function macros with protected content. Your company know-how stays secure. Expert macros can be created from up to 100 different pre-programmed standard modules. The combination of free programming and default settings makes room automation more flexible and speeds up commissioning. At the same time, the level of programming knowledge of the commissioning personnel does not need to be so high.



## Tailored room control

BAline Studio allows the programming of individual room solutions, in which diverse devices engage with one another. And so rooms and zones are provided with their own tailored control software. By simulating programming in BAline Studio, it is possible to know whether all devices and functions are working together as required ahead of commissioning. Room automation is becoming increasingly reliable.

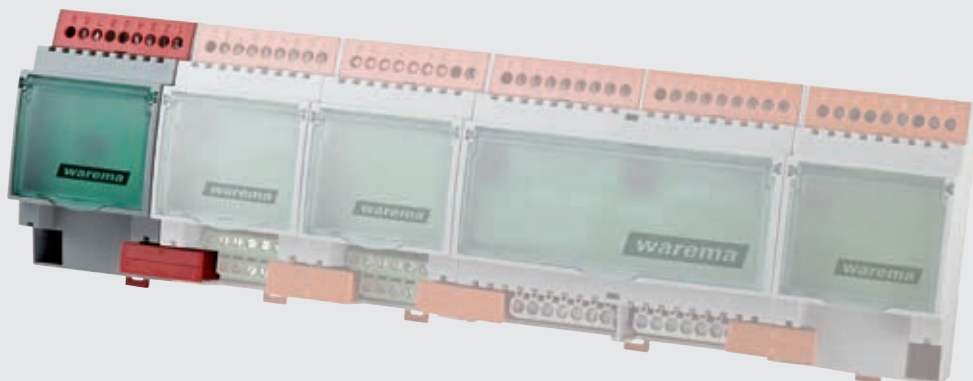
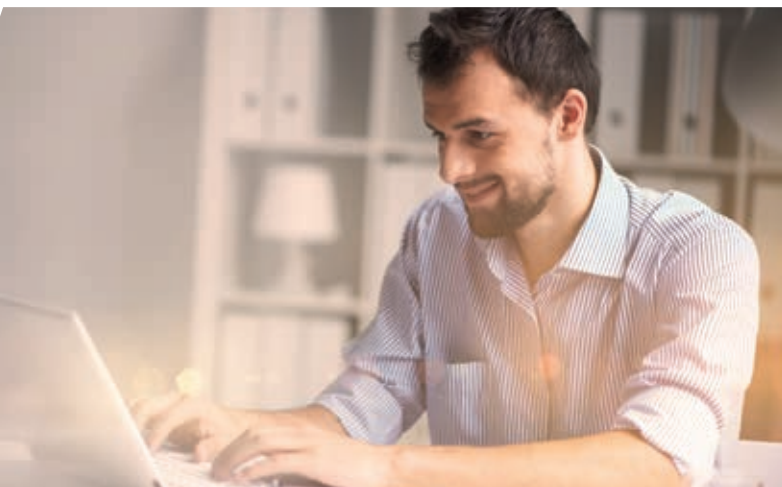
The free programmability and modularity of the BAline systems allows room automation functions and network integration to be planned and executed separately. The BAline Studio graphic PC software can be used to plan, program and simulate the various room solutions within the construction project. The result is an individual control software module for each room and zone solution.

## Features

- Graphic programming interface
- Functional safety thanks to simulation before commissioning
- Programming of control functions, communication interface, sensors and actuators in one tool
- Complex functions grouped into macros
- Macro libraries can be reused by third parties

## BAline workflow

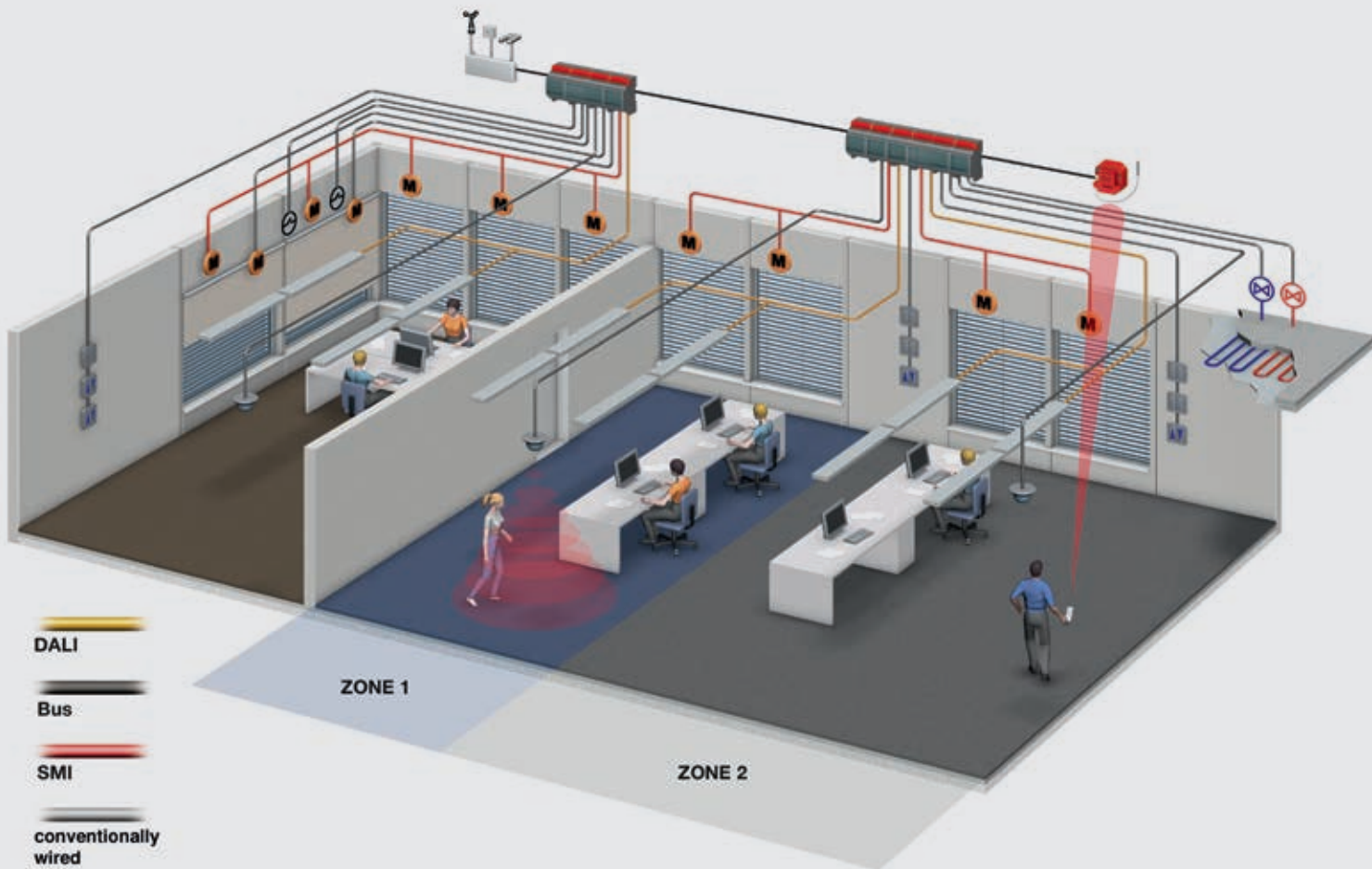
- Group the MIOs (e.g. according to zone concept)
- Graphic design of the control software
- Complex parts of the control software can be grouped into macros (improves clarity, can be reused in other projects)
- Create network data points and the sensors and actuators connected to the MIOs
- Connect the functions to network data points, as well as sensors and actuators
- Simulate the control software
- Load and test the control software
- Integration into the building automation network





# BAline

## Practical application



BAline creates individual room automation and zone solutions that combine various devices to suit functional requirements. This cuts operating and production costs and increases the value creation of the property developers, as well as all other stakeholders. The normative basis for calculating and designing BAline systems is VDI 3813-2. It determines how the functions in room automation solutions are to be described in the planning phase.



## BALine for zone control

- Integrates all function groups of one room section into the room automation system
- Permits flexible room concepts
- Requires only minimum adjustments to the room automation system in case of structural modifications
- Supports individual zoning, by means of window axes, for example

## Zone 1 and 2 each with an MCM

- Parallel use of advanced control technologies (e.g. DALI) and conventional systems (e.g. conventional push buttons)
- Broad range of connectable actuators and sensors creates design scope for device selection and functionality



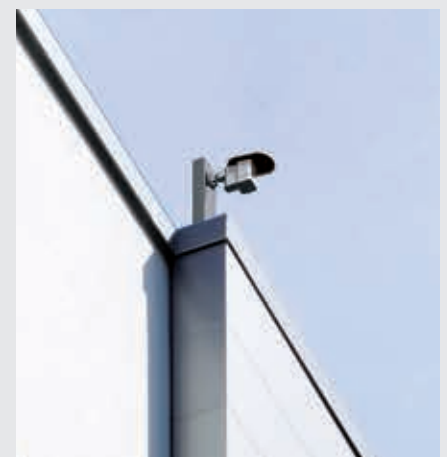
## Zone 3 LONMCM or KNXMCM

- Lighting controlled based on presence
- Presence sensors combine energy efficiency and user comfort better than motion sensors, e.g. the lighting level is maintained even in quiet atmospheres of concentrated work

## Implementation of a wind assessment report

The BALine control is used to implement a wind assessment report. Thanks to precise calculations, the control requires only a single measuring point, which provides the system with information about wind speed and wind direction.

A BALine MCM bus coupler completely replaces the individual wind sensors for the various calculated wind zones. The measuring values are relayed to the freely-programmable BALine MCM logic modules, the system's nerve centre, which converts the measuring values from the wind appraisal reports into move commands for the sun shading system.







# Good to know...

## BAline

Modular control system from  
WAREMA Renkhoff SE.

## DALI

The Digital Addressable Lighting Interface (DALI) is a digital control protocol for controlling lighting systems in buildings, standardised to DIN IEC 60929. It is used, for example, to control electronic ballast for switching and dimming lamps.

## DGNB

Deutsche Gesellschaft für Nachhaltiges Bauen e.V. (German Sustainable Building Council). The abbreviation DGNB is also used colloquially to refer to the "DGNB Handbook of Sustainable Building" or DGNB certificates.

## EWFS

The EWFS radio system permits the unidirectional radio control of sun shading and lighting systems at a transmission frequency of 433.92 MHz.

## KNX

KNX is a field bus standard used primarily in building automation systems and is a technical advancement of the EIB. As part of European Standard EN 50090, KNX has been internationally certified to ISO/IEC 14543-3 since 2006.

## KNX ETS DCA

### (Device Configuration App)

A device-specific app for the ETS to obtain additional functions for the relevant product

## LON® and LonWorks®

LON® (Local Operating Network) is a field bus and used primarily in building automation systems.

LonWorks® technology has been integrated into the international standards ISO/IEC 14908 (Europe), CEA-709 / CEA-852 (USA, GB/Z) as well as 20177-1-2006 (China).

## LonMark®

LonMark® is an international manufacturer-independent organisation. It promotes LonWorks® technology and defines standards and directives for the design and integration of interoperable devices. LonMark®-certified products in accordance with the LonMark® standard.

## MIO

Expansion module of the WAREMA BAline product line for connecting actuators, sensors, push buttons and other devices.

## Motor control unit (MSE)

A motor control unit (MSE) is connected as a control device upstream of one or multiple sun shading product motors. The MSE features application-specific intelligence, depending on the type.

## NV (network variable)

Designation for a LonWorks® data point. An NV describes communication direction, data type and value range.

## Plug-in (LON®)

Manufacturer or product-specific extensions for commissioning software. This plug-in is used mainly to make complex control systems easier to handle.

## External venetian blind/ external venetian blind

External sun shading product, the slat width is between 60 mm and 130 mm.

## SA (sun shading actuator)

KNX Sun shading actuator for controlling sun shading products.

## SMI (Standard Motor Interface)

The SMI is an electrical interface for roller shutter and venetian blind drives for the serial transmission of telegrams.

## Scene

One scene is able to comfortably control several different devices and/or channels. Settings and actions can be assigned to a scene. This allows complex room situations to be retrieved a later time at the press of a button.

## VDI 3813-2

VDI 3813-2 is a generally recognised directive and comprises the methodology for clearly describing room automation functions in the planning phase. Based on an integrated description system, it defines room automation functions across multiple groups to create the basis of standardised planning and design. The directive is aimed at investors, property developers, planners, architects, installers and manufacturers.

## Zone

A zone is a functional and/or planning unit in which various operating states (absence, night setback, comfort operation, etc.) can be established. Rooms can be split into several zones. Each zone contains a defined set of technical room automation devices.



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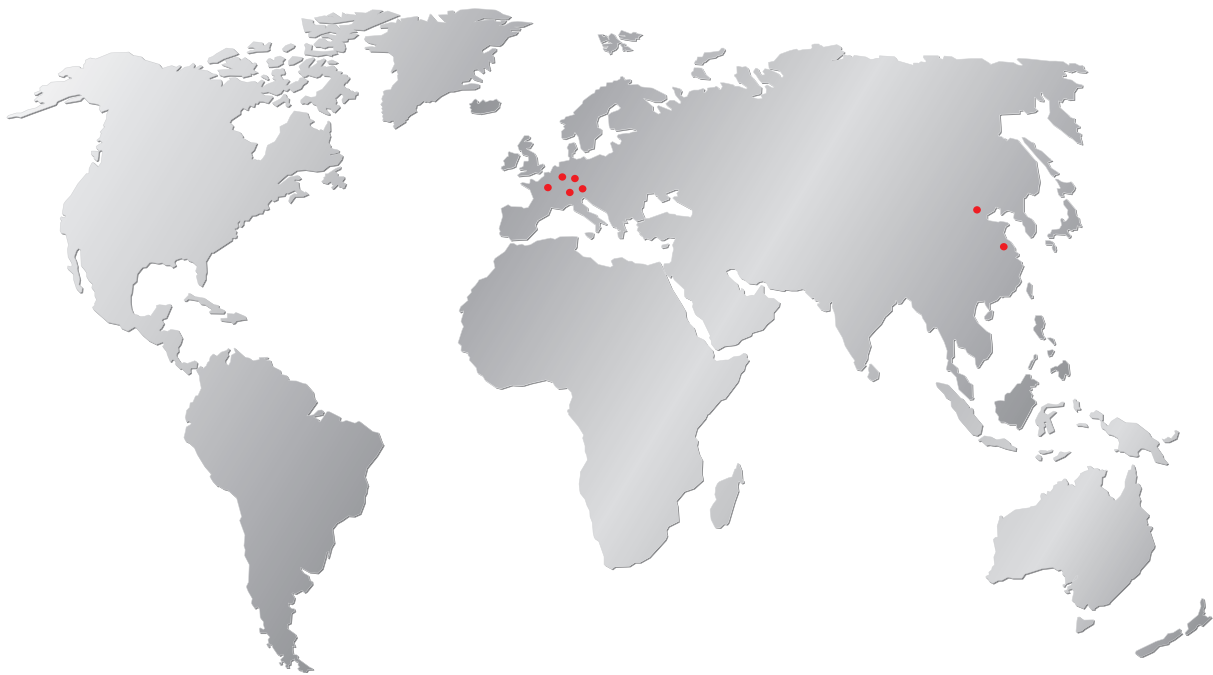
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