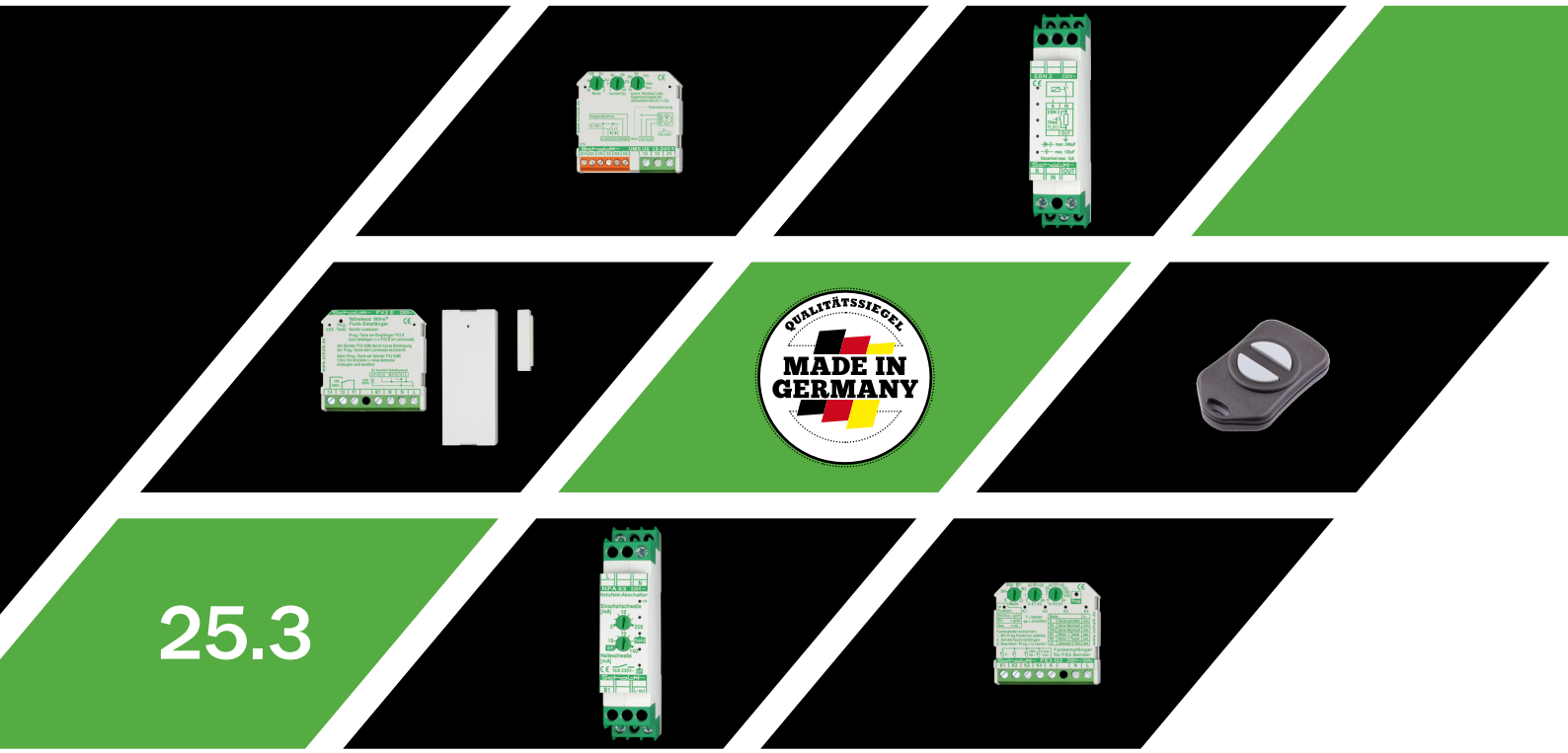
Schalk
STEUERUNGSTECHNIK GmbH

Development and production of electronic control systems for industrial automation and building services

Product catalog



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www.schalk.de

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Schalk
STEUERUNGSTECHNIK GmbH

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The company

Schalk Steuerungstechnik is a medium-sized company from the Allgäu (Bavaria, Germany), which was founded in 1983. Innovation and quality are the guidelines of our actions.
You will find electronic control components for building services and industrial automation.
We have designed the electronic devices for you in such a way that, on the one hand, they are equipped with the highest technical standards, but at the same time very user-friendly, uncomplicated and therefore particularly easy to operate. With our products you can combine high energy savings, easy use and a good price/performance ratio!
We develop and manufacture our products in the Allgäu. In this way we support the domestic economy and offer you reliable and sustainable products with the highest quality and innovation standards. This is what the quality seal "Made in Germany" stands for.
Have we aroused your interest or do you have any questions or a specific request? Get in touch with us! Our whole team is at your disposal, takes care of you directly and personally and helps you to find an optimal solution.

Chronicle of the company

1983
Founding of the company and development of the first intelligent staircase light timer that can be switched off at any time with long-term switchover via push button.

In the following years
Development of the first single-module mains field disconnector

Development of the first central impulse switch with optical decoupling of control and load circuits

Development of the multifunctional motor control unit for roller shutter controls

Introduction of the convenient current measuring relay series

Development of mains monitoring relays and inrush current limiters

Introduction of the new radio control system, with which roller shutter, gate, blind and light controls, etc. can be easily implemented

Development of the mains field disconnector for flush-mounting and the safety staircase light timer

Launch of the unique 12-clamp modular housing series with a width of only one division unit

The groundbreaking Wireless Wire® connector system enables wireless radio transmission of switching states, serving as a control line replacement

Introduction of wind/light/temperature/current measuring relays

Development of an active isolating relay, which enables the control of mains voltage consumers by low voltage contacts, whereby the necessary safety low voltage is generated internally

Introduction of the supply and exhaust air set (cable and radio variants) for safe operation of room air-dependent fireplaces

Introduction of the first pole reversing relay for DC motors

Further development of the popular electronic touch dimmer to support future light sources (LED, ESL, etc.)

Schalk
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↘ Since 1983 we have been developing and manufacturing in the Allgäu

»Our **name** stands for **Innovation.**«

Schalk
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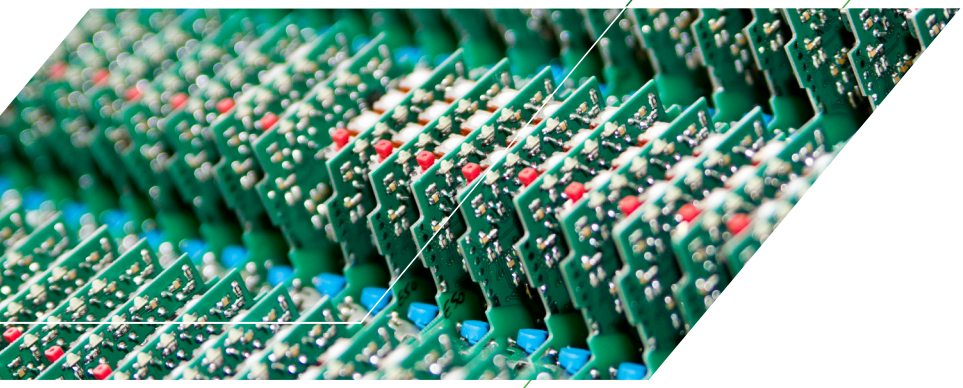

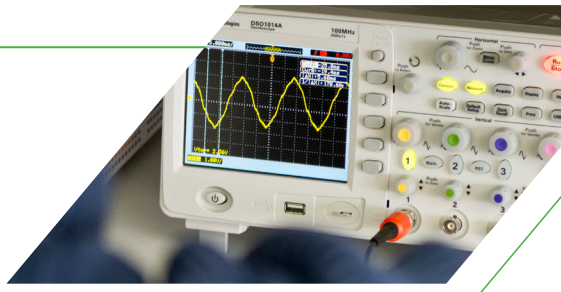

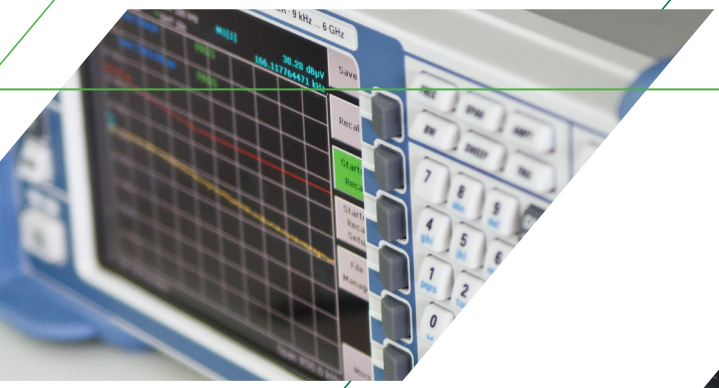

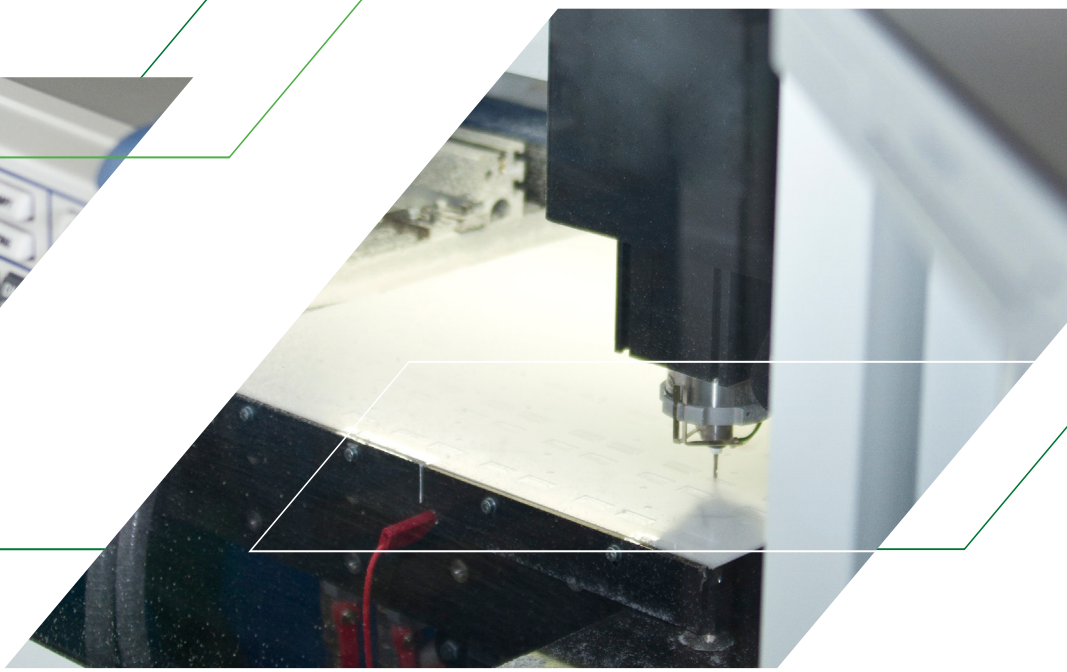

Radio switching system

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Radio transmitter, 32-channel FS3 HC

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The hand-held radio transmitter FS3 HC serves as remote control for our receiver relays and our radio dimmer. It impresses with its high-quality appearance and is easy to operate due to its dimensions and rubberized keys.
It has 8 send buttons and 4 level buttons, so that a total of up to 32 consumers can be addressed directly. 4 LEDs are used for function display.
Due to its splash-proof housing (IP65), this transmitter is also suitable for harsh environments.
The transmission power allows a free field range of at least 50m.

New function "Favourites level" (from production date 11/2015):
It is now optionally possible to determine a favorites level, to which the system automatically jumps back after approx. 30s of inactivity.

Matching products: Radio receivers/radio dimmers FE3/FD3 series, repeater FV2 R

FS3HCB	FS3 HC	IP65, 3V DC, dark grey, incl. batt.	135x45x15mm

Radio transmitter, 8-channel FS3 H8

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This radio transmitter serves as remote control for all radio receiver switches from the FE3 series and for the radio dimmers.
The 8 buttons of the hand-held transmitter can be used to address 8 different switching points with the same address. Transmitter and receiver do not require a line of sight.

The transmission power allows a free field range of at least 50m.

Matching products: Radio receivers/radio dimmers FE3/FD3 series, repeater FV2 R

FS3H8B	FS3 H8	3V DC, grey, incl. batt.	100x31x15mm

Radio hand-held transmitter FS3 HS 1 / FS3 HS 2 / FS3 HS 4

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The key fob radio transmitter FS3 HS serves as a handy remote control for Schalk receiver relays and radio dimmers. Available in the versions FS3 HS 1 (1 button), FS3 HS 2 (2 buttons) and FS3 HS 4 (4 buttons).
A DIP switch is used to set the transmission address. In addition, the level with the key number can be set compatible to our other handheld transmitters, if they are used in parallel. The transmitting power allows a free field range of at least 30m.

Also available as Mini-Funk Set MFS 2, consisting of FS3 HS 2 and FE3 SE (230V AC)

Matching products: Radio receiver/radio dimmer FE3-/FD3-series, repeater FV2 R

FS3HS1B	FS3 HS 1	1 channel, 3V DC, incl. battery	57x35x11mm
FS3HS2B	FS3 HS 2	2 channel, 3V DC, incl. battery	57x35x11mm
FS3HS4B	FS3 HS 4	4 channel, 3V DC, incl. battery	57x35x11mm

Surface-mounted 1-channel push-button radio transmitter FS3 A1

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The flat pushbutton radio transmitter can be mounted almost anywhere, either with screws or with the supplied adhesive pads.
The transmission power allows a free field range of at least 50m.

Matching products: Radio receivers/radio dimmers FE3/FD3 series, repeater FV2 R

FS3A1B	FS3 A1	3V DC, white, incl. batt.	80x80x15mm

Radio transmitter, 4-channel FS3 U4

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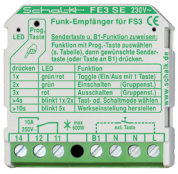
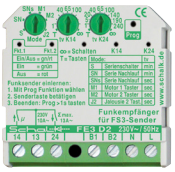
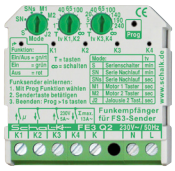
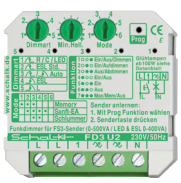
Radio transmitter for installation e.g. behind a pushbutton of the existing switch range, suitable for control by up to 4 external pushbuttons.
By the possibility to transmit in intervals, this device is also suitable for transmitting long lasting switching states (e.g. motion detector, timer, thermostats etc.). For this operating mode, a switch-of delay corresponding to the transmission interval can be set on the assigned radio receivers.

The 3V DC version is supplied with battery and can therefore be operated directly.

Matching products: Radio receivers/radio dimmers FE3/FD3 series, repeater FV2 R

FS3U49	FS3 U4 (230V AC)	230V AC	43x43x18.5mm
FS3U4V	FS3 U4 (12-24V UC)	12-24V AC	43x43x18.5mm
FS3U4B	FS3 U4 (3V DC)	3V DC, incl. batt.	43x43x18.5mm

Radio switching system

Page		Item no.	Type	Specs	Dimensions
31				**Radio-controlled switch with 1 relay FE3 SE** With the FE3 SE radio receiver switch, electrical equipment (lamps, touch dimmers, door openers, etc.) can be controlled wirelessly by means of a Schalk radio hand-held or flush-mounted transmitter in switch or push-button mode. The FE3 SE radio receiver switch has a potential-free changeover contact. Due to its low height of 18.5mm it fits behind almost any flush-mounted switch box insert. The 3 functions (toggle, on, off) can be assigned to any transmitter button. The "Toggle" function (alternately on-off) is used for individual control. The "On" and "Off" functions can also be used to switch several receivers together (group control). The function for wired input B1 is also freely selectable. *Also available as mini radio set MFS 2, consisting of FS3 HS 2 and FE3 SE (230V AC)* Matching products: Radio transmitter FS3-series, repeater FV2 R		
		FE3SE9	FE3 SE (230V AC)	230V AC, 1 CO 10A, 1 VO	43x43x18.5mm
		FE3SE2	FE3 SE (12V UC)	12V UC, 1 CO 10A, 1 VO	43x43x18.5mm
25				**Radio receiver switch 1 CO contact, with time functions/2 local inputs FE3 S2** The FE3 S2 radio receiver switch has a potential-free change-over contact which can be switched wirelessly via the Schalk handheld transmitters or flush-mounted transmitters of the FS3 series. The 3 functions "On/Off", "On", "Off" can be assigned to any transmitter button or a wired push-button input B1/B2. The "On/Off" function (alternately On/Off via one button) is used for individual control. The "On" and "Off" functions can also be used to switch several receivers together (group or central control). The relay can be operated in switching or push-button mode (with or without time lapse). In push-button mode, door openers or push-button dimmers can then also be controlled, for example. Matching products: Radio transmitter FS3-series, repeater FV2 R		
		FE3S29	FE3 S2	230V AC, 1 CO potential-free 10A, 2 VO	43x43x18.5mm
35				**Radio receiver switch 2 NO contacts, with time functions/2 local inputs FE3 D2** The FE3 D2 radio receiver switch has two potential-free change-over contacts which can be switched wirelessly via the Schalk handheld transmitters or flush-mounted transmitters of the FS3 series. The 3 functions "On/Off", "On", "Off" can be assigned to any transmitter button or a wired push-button input B1/B2. The "On/Off" function (alternately On/Off via one button) is used for individual control. The "On" and "Off" functions can also be used to switch several receivers together (group or central control). The relay can be operated in switching or push-button mode (with or without time lapse). In addition, the receiver has special motor operating modes (roller shutters, blinds, gates, etc.) in which the relays are automatically locked against each other. Matching products: Radio transmitter FS3-series, repeater FV2 R		
		FE3D29	FE3 D2	230V AC, 2 NO 10A, 2 VO	43x43x18.5mm
41				**Radio receiver switch 4 NO contacts, with timer and motor control functions FE3 Q2** The extremely compact FE3 Q2 radio receiver switch with 4 relays together with the radio transmitters of the FS3 series enables the wireless switching of electrical equipment. It can be used as a series switch, for transmission of contact states or for motor and blind control. Radio transmitters for local control or for group/central control can be taught-in using various teach-in functions. 1- or 2-button control possible. With four powerful 5A relays, the FE3 Q2 can switch either 4 individual consumers (e.g. lamps, fans, pumps, etc.) or 2 motors each with 2 running directions such as shutters, blinds and gates. Additional time functions enable automatic switching after a set (post-) running time has elapsed. Matching products: Radio transmitter FS3-series, repeater FV2 R		
		FE3Q29	FE3 Q2	230V AC, 4 NO 5A, t_V=0.15s-240min	43x43x18.5mm
47				**Wireless universal dimmer with additional functions, also for LED/ESL FD3 U2** With the electronic radio universal touch dimmer FD3 U2 in an extremely compact box installation housing, almost all light sources (LED, energy-saving, incandescent lamps, LV halogen lamps with Tronic or wound transformers, HV halogen lamps) that are suitable for phase on or phase off control can be dimmed. The correct dimming mode can be detected automatically or manually set to phase leading or phase trailing edge. A special ESL dimming mode also generates an ignition and warm-up phase for compact fluorescent lamps ("energy-saving lamps"). **The button input and the radio functions are individually programmable (7 switching and dimming functions). This makes individual control and group control very flexible (on or two-button control, on/off switching with/without dimming function, etc.). The activation of brightness memory, snooze and soft ON/OFF functions, and the adjustment of the minimum brightness are carried out directly via the adjusters.** Matching products: Radio transmitter FS3-series, repeater FV2 R		
		FD3U29	FD3 U2	230V AC, 0-500VA	43x43x18.5mm

Radio switching system

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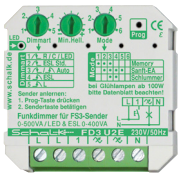
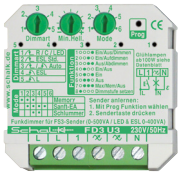
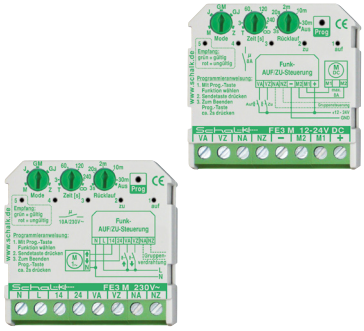
					
			Wireless universal dimmer, also for LED/ESL FD3 U2E With the electronic radio universal touch dimmer FD3 U2E in an extremely compact box installation housing, almost all light sources (LED, energy-saving, incandescent lamps, LV halogen lamps with Tronic or wound transformers, HV halogen lamps) that are suitable for phase on or phase off control can be dimmed. The correct dimming mode can be detected automatically or manually set to phase leading or phase trailing edge. A special ESL dimming mode also generates an ignition and warm-up phase for compact fluorescent lamps ("energy-saving lamps"). **The dimmer can be easily operated via the push-button input and a radio transmitter: press briefly = on or off, press and hold = up or down. A radio transmitter button can be taught-in very easily. No further programming necessary. The activation of brightness memory, snooze and soft ON/OFF functions, and the adjustment of the minimum brightness are carried out directly via the adjusters.** Matching products: Radio transmitter FS3-series, repeater FV2 R		53
	FD3U2E9	FD3 U2E	230V AC, 0-500VA	43x43x18.5mm	
					
			Wireless universal dimmer w. add. functions & Fx3smart, also for LED/ESL FD3 U3 With the electronic radio universal touch dimmer FD3 U3 in an extremely compact box installation housing, almost all light sources (LED, energy-saving, incandescent lamps, LV halogen lamps with Tronic or wound transformers, HV halogen lamps) that are suitable for phase on or phase off control can be dimmed. The correct dimming mode can be detected automatically or manually set to phase leading or phase trailing edge. A special ESL dimming mode also generates an ignition and warm-up phase for compact fluorescent lamps ("energy-saving lamps"). Fx3smart **In addition to the functions of the FD3 U2, this dimmer has a special function for controlling defined dimming values (0-100%). This enables integration into smart home systems with app control (e.g. for predefined lighting scenes).** Matching products: Radio transmitter FS3-series, repeater FV2 R		47
	FD3U39	FD3 U3	230V AC, 0-500VA, with Fx3smart	43x43x18.5mm	
					
			Radio open/close control FE3 M Together with the transmitters of the FS3 series, the FE3 M radio receiver is a universally applicable motor controller, e.g. for roller shutters and blinds, shutters, roof windows, smoke extraction hoods in fire protection systems, door drives, valve controls, etc. Both an one-button and two-button motor control is supported. The overriding auxiliary inputs allows several FE3 M units to be grouped together in group control or central control configurations. The motor run time can be limited to prevent motor overload due to mechanical jamming or other causes. A convenient and configurable automatic closing function ensures that skylights or other fixtures are not inadvertently left open. In louvre blind mode the louvres can be adjusted precisely or automatically returned to a defined angle after switch-off. Matching products: Radio transmitter FS3-series, repeater FV2 R		59
	FE3M0K	FE3 M (12-24V DC)	12-24V DC, 2 NO contacts	43x43x18.5mm	
	FE3M09	FE3 M (230V AC)	230V AC, 2 NO contacts	43x43x18.5mm	

Schalk
STEUERUNGSTECHNIK GmbH

Ventilation/exhaust-fan set to control fume extraction hood

! Safe protection from carbon monoxide poisoning

- ✓ Operation compliant with §4 of the German fire protection regulation
- ✓ Wireless or cable connection
- ✓ Professional, unobstrusive installation - no adapters needed!

The air extraction hood is only released when a window is opened - which ensures that ventilation is optimal.
This prevent the poisonous smoke from the air in the room with the fire source being "sucked in" (and entering the living space).

QR-Info

Radio connection set: ZAS F

FV2 E (flush-mount relay) + FV2 SM (window contact-radio transmitter) for monitoring one window

Monitoring several windows requires a combination of one FV2 EL and up to four FV2 SM contacts

Cable set: ZAS K2

ATR U2 (flush-mount relay) + MKW 1 (Window contact) for monitoring one window

To monitor several windows, simply switch other MKW1 contacts in parallel

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Handheld radio transmitter FS3 HC

8 send buttons and 4 level buttons
Splash-proof (IP65) handheld transmitter for control of up to 32 device functions

Special features

- Up to 32 consumers directly switchable
- Splash-proof housing IP65
- Address adjustable (6561 possibilities)
- Versatile receiver relays and dimmers available
- Free field range 50 m
- Standard 3V lithium battery (CR 2032)
- Battery protection (switches off automatically after 45s)
- Battery life >10,000 operations
- Function and level display by 4 LEDs

General information

The hand-held radio transmitter FS3 HC serves as remote control for our receiver relays and our radio dimmer. It has 8 send buttons and 4 level buttons, so that a total of up to 32 consumers can be addressed directly. There is a 8-bit DIP switch in the battery compartment to adjust the transmission address. The transmission power allows a free field range of 50 m.

Applications

Any electrical loads (lamps, shutters, blinds, fans, etc.) can be controlled with the associated receiver relays. A 500 W universal dimmer from Schalk is also available as receiver.

Operation

Each button of the hand-held transmitter can be assigned to any function of the receiver. The functions of the receivers are very versatile. For example, a relay of a receiver can be switched "alternately on/off" with a push-button. With the "definite switch-on" and "definite switch-off" functions, several receivers can be switched in groups. In addition, Schalk receivers have convenient functions for motor control (roller shutters, blinds, gates, etc.). For lighting control we also offer a radio universal dimmer with various control options.

Set address:
(8-bit tri-state DIP switch in battery compartment)
The address establishes the basic assignment to the receiver. Several transmitters with the same address can address the same receivers. Each individual DIP switch has 3 positions. The middle position is also valid, resulting in 6561 adjustment options. If the address is changed, the transmitter must be taught-in again at the receiver.

Examples for setting the send address:

Factory setting
(all on "-")

random example
(one of 6561 possibilities)

Select level:
(Level buttons A, B, C, D)
To change the level, press the corresponding button for at least 2s. The corresponding LED then flashes 3 times briefly. If only the currently set layer is to be displayed, press one of the 4 layer buttons briefly. The corresponding LED then flashes 3 times briefly. Transmission only takes place when one of the 8 send buttons is pressed.

Special "Favorite level" function:
This optionally adjustable function makes it possible to automatically reset the transmission level to a preset level after 30s of inactivity (favorite level). This function thus prevents operating errors due to an inadvertently adjusted transmission level.

Activate favorite level:
If the two level buttons A and D are pressed simultaneously for 5s, the setting mode for the favourite level is activated (this is indicated by an LED running light).
Now one of the 4 layer buttons must be pressed within 10 chaser periods to select it as the favourite layer. The corresponding LED lights up briefly for the selected level.

Deactivate favorite level (=factory settings / after battery change):
If the two level buttons B and C are pressed simultaneously for 5s, the favourite level is deleted and the transmission level is reset to A. The corresponding LED A then flashes 5 times briefly. The transmission level is no longer changed automatically.

Displays the current send- and favorites level:
If one of the four level buttons is pressed briefly, the current transmission level is signalled first (corresponding LED flashes twice briefly), and then - if available - the favourite level (corresponding LED flashes once long).

The special "Favourite level" function is available for FS3 HC hand-held transmitters with production date after week 50/2015.

Technical data

Radio signal	433.92 MHz OOK PWM <10 mW
Buttons	4 level and 8 send buttons
Selectable addresses:	6561 (via DIP switch)
Battery type	3V 230 mAh lithium CR2032
Battery life	>10,000 switching cycles of 1 s each
Ambient temperature	10 to +45°C
Dimensions / weight:	135 x 45 x 15 mm, 65g
Protection class	IP65 (splash-proof)
Color	dark grey (green buttons, white print)

Compatible devices: Radio receiver/transmitter of the FE3 / FD3 / FS3 series, radio repeater FV2 R

Order data

Item no.	EAN	Type	Designation
FS3HCB	4 046929 101202	FS3 HC	Hand-held radio transmitter 32 channels, 3V DC, IP65, incl. battery

Accessories

Item no.	EAN	Type	Designation
BFS03B	4 046929 901062	BFS 03	Battery for radio transmitter 3V (CR2032)

01/06/2017

Handheld radio transmitter FS3 H8

8 buttons
Compact hand-held transmitter for controlling up to 8 devices/functions

Special features

- 8 buttons (control up to 8 electrical loads)
- Levels A-D compatible to FS3 HC adjustable
- Address can be set with 6561 possibilities
- Versatile receiver relays and dimmers available
- Free field range 50 m
- Low current consumption
- Standard 3V lithium battery (CR 2032)
- Battery protection (switches off automatically after 45s)
- Battery life >10,000 operations
- Ergonomic housing with LED function display

General information

The hand-held radio transmitter FS3 H8 serves as remote control for our receiver relays and our radio dimmer. Up to 8 electrical loads can be switched with the 8 buttons. There is a 10-bit DIP switch in the battery compartment. Bits 1-8 define the transmission address, bits 9 and 10 are used to set the levels A-D compatible to our remote control FS3 HC. The transmission power allows a free field range of 50 m.

Applications

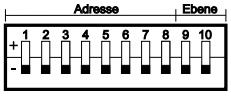
Any electrical loads (lamps, shutters, blinds, fans, etc.) can be controlled with the associated receiver relays. A 500 W universal dimmer from Schalk is also available as receiver.

Operation

The sent protocols consist of address, level and channel (=button). Address and level are set by a DIP switch in the battery compartment. As soon as a button is pressed, protocols are sent continuously for a maximum of 45 seconds. The function of the protocols (toggling, dimming or switching) is defined at the receiver. In addition, receivers can be controlled individually as well as in groups.

Configurations:

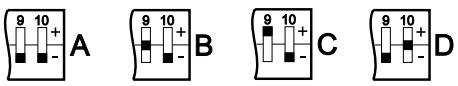
Set address (tri-State DIP switch bits 1-8)
The address establishes the basic assignment to the receiver. Several transmitters with the same address can address the same receivers. Each individual DIP switch has 3 positions. The middle position is also valid, resulting in 6561 adjustment options.



Tri-state DIP switch:
In factory settings all DIP switches are set to "-".

Set level (tri-state DIP switch bits 9-10)
This makes the FS3 H8 compatible with the hand-held transmitter FS3 HC, which can perform 32 functions directly (using additional 4 level keys).

Set level A-D compatible to FS3 HC:



Older devices are compatible with level A.

Technical data

Radio signal	433.92 MHz OOK PWM <10 mW
Buttons	8
Selectable addresses:	6561 (via DIP switch)
Selectable levels	4 (via DIP switches)
Battery type	3 V 230 mAh lithium CR2032
Battery life	>10,000 switching cycles of 1 s each
Ambient temperature	10 to +45°C
Dimensions / weight:	100 x 31 x 15mm³, 35g
Color	dark grey (green buttons, white print)

Compatible devices: Radio receiver/transmitter of the FE3 / FD3 / FS3 series, radio repeater FV2 R

Order data

Item no.	EAN	Type	Designation
FS3H8B	4 046929 101004	FS3 H8	Hand-held radio transmitter 8 channels, 3V DC, incl. battery

Accessories

Item no.	EAN	Type	Designation
BFS03B	4 046929 901062	BFS 03	Battery for radio transmitter 3V (CR2032)

01/06/2017

Mini radio hand transmitter FS3 HS 1 / FS3 HS 2 / FS3 HS 4

Key fob radio remote control in versions with 1, 2 or 4 buttons
Small handheld transmitter in keychain format for controlling up to 4 consumers

Special features

- Key fob housing
- Address, level and key number compatible with other Schalk radio transmitters can be set (FS3 HS 4, others see below)
- versatile receiver relays and dimmers available
- Free field range 30 m
- Standard 3 V lithium battery (CR 2032)
- Battery protection (automatically switches off after 45s continuous transmission)
- Battery life >10,000 cycles

General information

The mini radio hand transmitter FS3 HS (1/2/4) serves as remote control for our receiver relays. A DIP switch is used to set the transmission address (if necessary, the level and the key number compatible with our other radio transmitters). The transmission power enables a free field range of 30 m.

Applications

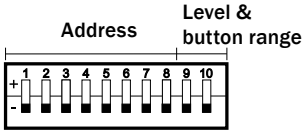
Any electrical loads (lamps, shutters, blinds, fans, etc.) can be controlled with the associated receiver relays. In combination with the FE3 SE receiver switch (available as mini radio set MFS 2), the hand-held transmitter is ideally suited as a replacement for defective garage door radio controls, an universal dimmer from Schalk is also available as receiver.

Operation

Each button of the handheld transmitter can be assigned to any function of the receiver. The functions of the receivers are very versatile. For example, a relay of a receiver can be switched "alternately on/off" with a push-button. With the "definite switch-on" and "definite switch-off" functions, several receivers can be switched in groups. In addition, Schalk receivers have convenient functions for motor control (roller shutters, blinds, gates, etc.).

Configurations

Settings on the Tri-State DIP switch:
So that the FS3 HS can reproduce any radio command of our other (larger) radio transmitters, settings must be made. The 10-bit tri-state DIP switch is used to set the address and level with key range.

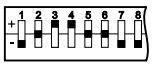


In the factory setting, the FS3 HS emulates the buttons 1-4 on level A (related to the Schalk transmitters with 8 push buttons)

Set address:
(Tri-State DIP switch bits 1-8)
The address establishes the basic assignment to the receiver. Several transmitters with the same address can address the same receivers. Each individual DIP switch has 3 positions. The middle position is also valid, resulting in 6561 adjustment options. If the address is changed, the transmitter must be taught-in again at the receiver.

Examples for setting the send address:

Factory settings (all "-")



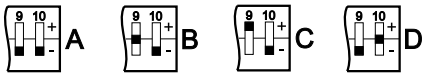
Example setting

Set the level and key area:
(Tri-State DIP switch bits 9 and 10)

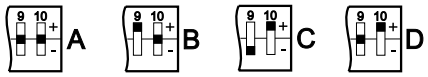
This adjustment is only necessary if other transmitters with more than 4 keys are operated on the same receiver!

Herewith the FS3 HS is compatible to the hand-held transmitter FS3 H8 (8 transmit keys) and also to the hand-held transmitter FS3 HC, which can execute 32 functions directly by means of 4 level keys and 8 transmit keys.

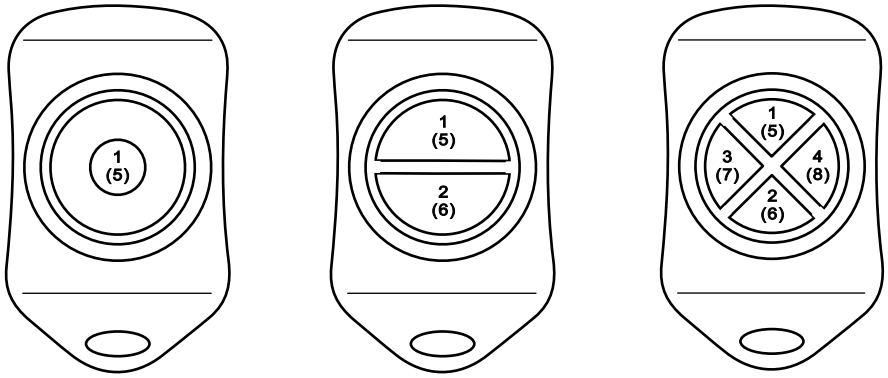
Select level A-D and simulate buttons 1-4.



Select level A-D and simulate buttons 5-8.



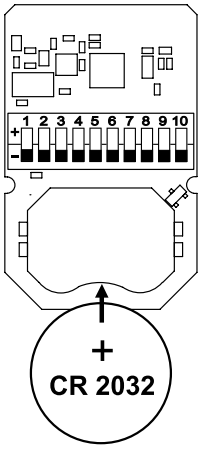
Position of the keys (see remote control FS3 H8 and FS3 HC):
Depending on DIP switch setting: Keys 1-4 (or 5-8)



Important: only with the FS3 HS 4 can all 8 keys of a large handheld transmitter be simulated (FS3 HS 2: only key 1 or 5, FS3HS 2: only key 1+2 or 5+6)

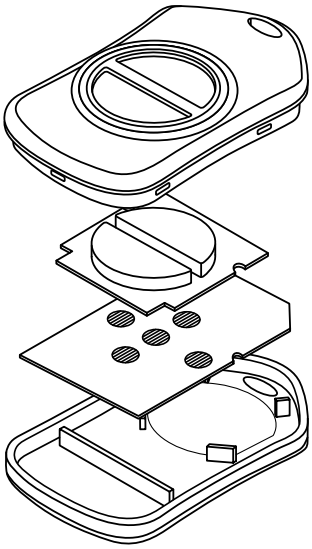
Battery replacement:
Electrostatic discharge and dirt/dust should be avoided during installation.

To open the case with a wide, flat, non-sharp-edged object in the slot between the top and bottom of the case, turn the case by levering it open.



If necessary, make settings on the DIP switch (see above)

Insert the battery into the holder. Positive pole on top! The electronics are protected against accidental polarity reversal.



Insert key mat (note the grooves on the housing edge!)

Insert electronic assembly (place the empty side on the keypad)

Place the lower shell evenly over the edge of the upper shell and press together until it snaps into place.

Technical data

Radio signal	433.92 MHz OOK PWM <10 mW
Selectable addresses:	6561 (via DIP switch)
Selectable levels	4 (via DIP switches)
Battery type	3V 230 mAh lithium CR2032
Battery life	>10,000 switching cycles of 1 s each
Ambient temperature	-10 to +45°C
Dimensions / weight:	57 x 35 x 11mm³, 15g
Color	black housing, grey buttons

Compatible devices: Radio receiver/transmitter of the FE3 / FD3 / FS3 series, radio repeater FV2 R

Order data

Item no.	EAN	Type	Designation
FS3HS1B	4 046929 101394	FS3 HS 1	Mini wireless remote control 1-channel 3V DC, incl. Batt.
FS3HS2B	4 046929 101400	FS3 HS 2	Mini remote control 2-channel 3V DC, incl. Batt.
FS3HS4B	4 046929 101417	FS3 HS 4	Mini wireless remote control 4-channel 3V DC, incl. Batt.
MFS209	4 046929 101424	MFS 2	Mini radio set, receiver FE3 SE (230V AC) + transmitter FS3 HS 2

Accessories

tem no.	EAN	Type	Designation
BFS03B	4 046929 901062	BFS 03	Replacement battery CR2032

2019-09-01

Surface-mounted pushbutton radio transmitter FS3 A1

1 channel
Radio button (white) for controlling one consumer, suitable for universal adhesive or screw mounting

Special features

- Compatible with all radio transmitters of the FS3 series
- Versatile receiver relays and dimmers available
- Free-field range: min. 50 m
- Battery protection (switches off automatically after 45s)
- Battery life >20,000 operations
- Easy mounting (adhesive strips or screws)
- Shapely neutral design

General information

The flat pushbutton radio transmitter FS3 A1 is suitable for the Schalk receiver relays of the FE3 series and the radio dimmers. It can also map any channel of the other handheld transmitters from the FS3 series. The transmission power allows a free field range of at least 50 m.

Applications

Any electrical loads (lamps, shutters, blinds, fans, etc.) can be controlled with the associated receiver relays. A 500 W radio universal dimmer from Schalk is also available.

Operation

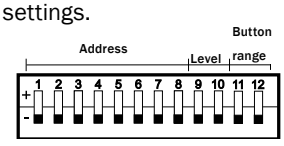
Address, channel (see buttons 1-8 for multi-channel remote controls) and, if necessary, level are set at a tristate DIP switch. As discharge protection for the battery, the transmission time is limited to max. 45s. When the rocker is removed, a red LED indicates the sending process. The function of the transmitter signal (switch on/off, buttons or dimming) is determined at the receiver. In addition, receivers can be controlled individually as well as in groups.

Installation instructions for optimum range:
Do not mount the FS3 A1 on metal surfaces, as the transmitting power is greatly reduced.

Configurations

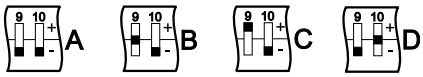
By default, the transmitter and receiver are already assigned to each other.

Set address (tri-State DIP switch bits 1-8):
Several transmitters with the same address can address the same receivers. Each individual DIP switch has 3 positions (the middle position is also valid). There are 6561 possible settings.

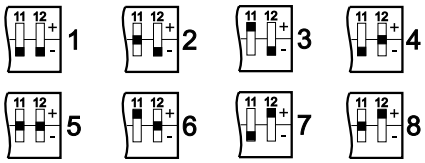


Tri-state DIP switch:
In factory settings
all DIP switches are set to "-".

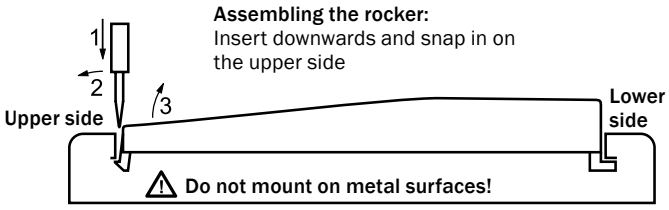
Set level A-D (tri-state DIP switch bits 9-10):
This makes the FS3 A1 compatible with the hand-held transmitter FS3 HC, which can perform 32 functions directly (using 4 level keys).



Set button range (tri-State DIP switch bits 11-12):
The FS3 A1 can emulate all 8 send buttons of FS3 series transmitters.



Removing the rocker:
Use a flat screwdriver to carefully lever the hook in the middle of the upper edge downwards and remove the rocker to the front.



Inserting the battery: Positive pole up!

Technical data

Radio signal	433.92 MHz OOK PWM <10 mW
Selectable addresses:	6561 (via DIP switch)
Selectable levels	4 (via DIP switches)
Selectable channels	8 (via DIP switches)
Battery type	3V 230 mAh lithium CR2032
Battery life	>20,000 switching cycles of 1 s each
Ambient temperature	10 to +45°C
Dimensions / weight:	80 x 80 x 15mm³, 60g
Color	white

Compatible devices: Radio receiver/transmitter of the FE3 / FD3 / FS3 series, radio repeater FV2 R

Order data

Item no.	EAN	Type	Designation
FS3A1B	4 046929 101004	FS3 A1	Surface-mounted transmitter 1 channel, 3V DC, incl. battery

Accessories

Item no.	EAN	Type	Designation
BFS03B	4 046929 901062	BFS 03	Battery for radio transmitter 3V (CR2032)

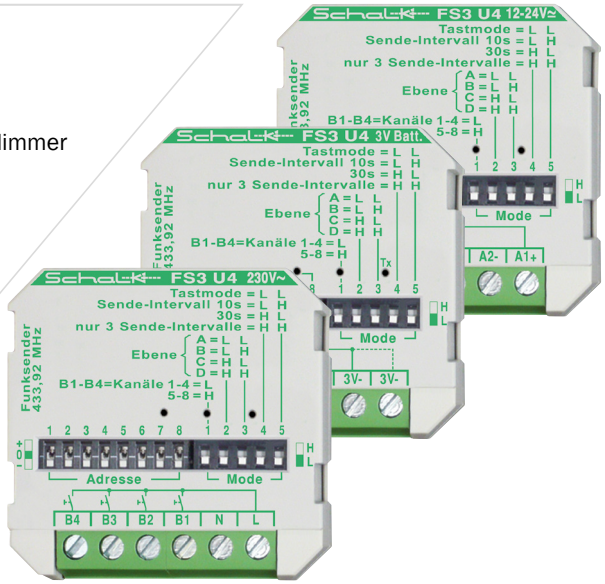
2017-06-01

Radio transmitter FS3 U4

Radio transmitter (for installation in flush-mounted switch boxes) with 4 inputs for controlling Fx3 radio receivers. This allows buttons from the existing switch range to be used.

Special features

- 4 inputs for external (wired) buttons
- Fully compatible with FS3/FE3/FD3 series transmitter/receiver/dimmer
- Address can be set with 6561 possibilities
- 3 operating modes:
  - pushbutton mode
  - Interval transmission with 10s or 30s
  - only 3 transmission intervals with 10s
- Free field range 50m (no external antenna)
- Small housing (receiver fits in flush-mounted switch box)
- 3 variants (230V AC, 12-24V UC, 3V DC battery)



General information

The radio transmitter FS3 U4 controls Schalk-radio receiver relays and dimmers of the Fx3 series. There are 4 inputs for wired buttons.
The send address is set with a DIP switch. With the "Mode" DIP switch, the transmitter can be adjusted so that all keys/ levels of our hand-held transmitters can be simulated.
In "push-button mode", the FS3 U4 behaves like a hand-held transmitter. In the "interval transmission" operating mode, switching states (motion detectors, heating thermostats, etc.) that are present for a long time can also be transmitted without interfering other radio links. The "only 3 transmission intervals" mode enables, for example, the central control of roller shutters via a simple clock relay. These can then be operated on site again 3 intervals (30 s) after the time switch signal, although the contact is still present.

Applications

Especially when retrofitting existing installations, wireless signal transmission is often the only economical and technically feasible solution.
With the corresponding receiver switches and dimmers, almost any electrical loads can be controlled.

Operation

The sent protocols consist of address, level and channel (=button).

Select the address (8-bit tri-state DIP switch):
(see DIP switch in the battery compartment of the handheld transmitter)
The address establishes the basic assignment to the receiver. Several transmitters with the same address can address the same receivers. Each individual DIP switch has 3 positions. The middle position is also valid, resulting in 6561 adjustment options. By default, all address DIP switches are set to "-". Our radio receiver relays are also delivered with this address preconfigured.

Select channel (mode switch 1):
(cf. buttons 1-8 of the remote control)
L= Inputs B1-B4 correspond to keys 1-4
H= Inputs B1-B4 correspond to keys 5-8

Select level (mode switch 2,3):
(see level keys A-D of the remote control FS3 HC)
This makes the FS3 U4 compatible with the hand-held transmitter FS3 HC, which can perform 32 functions directly (using 4 level keys).

Older devices are compatible with level A.
L, L = Level A L, H = Level B
H, L = Level C H, H = Level D

Select operating mode (mode switch 4,5):
(pushbutton mode or interval transmission)
L, L = pushbutton mode
L, H = interval transmissions every 10s
H, L = interval transmissions every 30s
H, H = only 3 transmission intervals with 10s

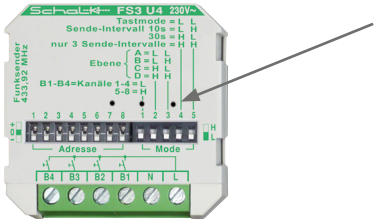
Operating modes:

Pushbutton mode:
This operating mode is identical to the hand-held transmitter. As soon as an input is present, the status of all 4 inputs (B1-B4) is continuously transmitted simultaneously in a protocol. The transmission time is limited to 45s.

Interval transmission with 10s or 30s:
This operating mode is used to transmit long-lasting switching states (e.g. heating thermostats). The receiver relay is operated in after-run mode and drops out with a corresponding delay when no more signals arrive from the transmitter. In this way, several transmitters can be operated simultaneously, since the transmission time is limited to a short refresh signal. Protocols are sent for each "on" signal edge at inputs B1-B4 and additionally at intervals of 10s or 30s. A separate protocol is transmitted for each active input.

Only 3 transmission intervals:
Same as interval transmission, but only 3 transmission intervals are generated with 10s from the last single edge.
If, for example, awnings are to be controlled via a shading sensor, they can be controlled on site again 30s after the switching edge on the sensor.

LED indication



LED on: at least one input is active
LED flickers: Sending is active

Info *Since the carrier frequency is always the same, the transmitter signals mix when several transmitters transmit simultaneously and are no longer recognized by the receiver. For this reason, longstanding switching states must be transmitted by means of interval transmissions. At longer intervals, the probability of short-term overlaps is lower.*

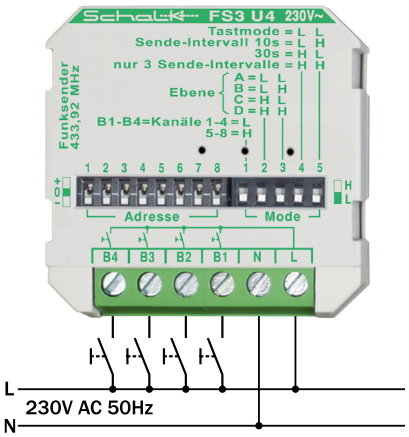
Info *With the 3V battery version, it does not make sense to connect switches (or the "interval transmission" mode), as the power consumption during transmission is too high for sufficient battery life.*

Range notes:

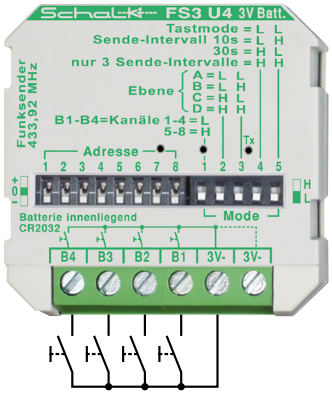
The free field range with the above transmitters is at least 50 m. However, the range may be reduced considerably by walls, concrete ceilings, metal surfaces, damp soil, etc. For optimum wireless range, we recommend an installation height of at least 1 m above ground level. The antenna is located behind the front of the housing. If transmitter and receiver are aligned, the range can usually be significantly improved. A favourable orientation may have to be determined by trial and error.

Connection examples

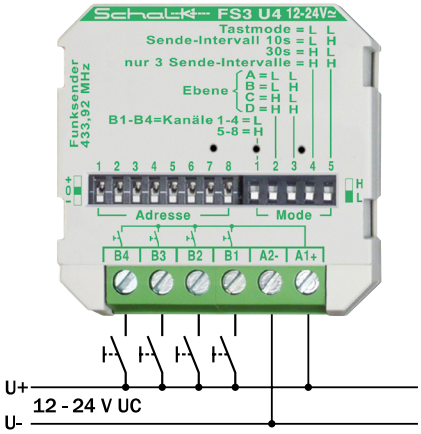
FS3 U4 (230V AC)



FS3 U4 (3V DC)

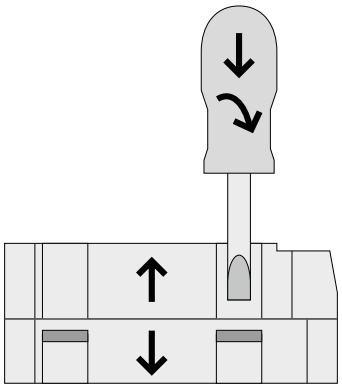


FS3 U4 (12-24V UC)

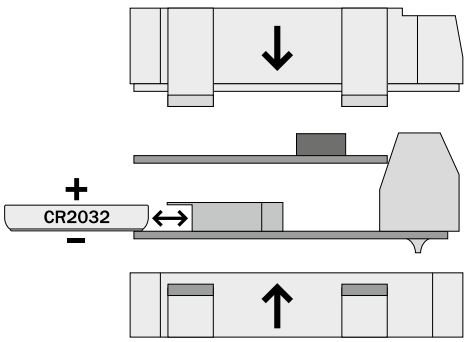


Battery replacement FS3 U4 (3V DC)

1



2



Technical data

Radio signal	433.92 MHz OOK PWM <10 mW		
Selectable addresses:	6561 (tri-state DIP switch)		
Selectable levels	A, B, C, D (compatible with FS3 HC)		
Channel assignment	1-4 or 5-8		
Operating voltage and power consumption	FS3 U49 FS3 U4V FS3 U4B	230V AC 50/60 Hz 12-24V UC 3V DC (CR2032)	200mW 1..6mW (standby) / 60..120mW (transmit) 15µW (standby), >10.000 switching cycles of 1 s each

230 V AC variant:

Line capacity (L-Bx)	approx. 10 nF
Glow lamps (L-Bx)	max. 5 pc. (1 mA each)
Ambient temp.	-10°C to +45°C
Connection terminals	Socket terminals with captive screws M3
Clamping range	0.5 mm² - 2.5 mm²
Strip length	6.5 mm - 7.0 mm
Screwing torque	0.50 Nm
Mounting orientation	If necessary, alignment to the receiver
External dimensions	43 x 43 x 18,5 mm³
Weight	30 g
RAL colour	grey 7035 / green 6029

Compatible devices: Radio receiver/transmitter of the FE3 / FD3 / FS3 series, radio repeater FV2 R

Order data

Item no.	EAN	Type	Designation
FS3U49	4 046929 101011	FS3 U4 (230V AC)	Radio transmitter, 4-channel 230V AC (FMD)
FS3U4B	4 046929 101387	FS3 U4 (3V DC)	Radio transmitter 4 channel, 3V DC, incl. battery (FMD)
FS3U4V	4 046929 101028	FS3 U4 (12-24V UC)	Radio transmitter, 4-channel 12-24V UC (FMD)

Accessories

Item no.	EAN	Type	Designation
HC3500	4 046929 901062	HC 35	Top-hat rail clip
BFS03B	4 046929 901062	BFS 03	Battery for radio transmitter 3V (CR2032)

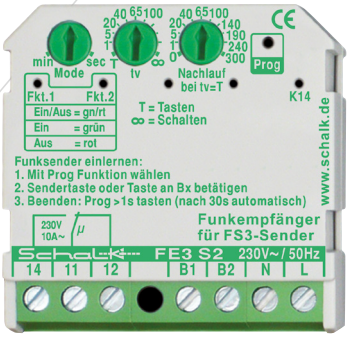
2017-10-01

Radio controlled switch FE3 S2

1 Relay, with timer functions
Radio receiver with one relay (potential-free changeover contact). Support for pushbutton or switch mode, with timer functions and group control. Two programmable inputs for wired pushbuttons.

Special features

- 3 operating modes:
  pushbutton mode, switch mode with and without timer functions (configurable timeout 1 -240 minutes or seconds)
- 3 programmable functions (On, Off, On/Off) for local, group and central control
- 2 freely programmable inputs for local pushbuttons
- Time stretch function (can be used for retriggering by a periodic transmitter)
- Free-field range 50m
- Antenna built into housing
- Repeater available to increase range
- Very small enclosure fits in flush mounted switch boxes
- Potential-free changeover contact for 10A/250V AC



General information

The FE3 S2 radio remote-control receiver switch is equipped with a potential-free changeover contact that can be used for wireless switching with the FS3 series of hand-held or fixed-mounted radio transmitters. The 3 functions („On/Off“, „On“, „Off“) can be assigned to any of the transmitter buttons or one of the wired pushbutton inputs B1/B2. The „On/Off“ function (toggling on and off using a single button) is used for individual control. Using the dedicated „On“ and „Off“ functions, several receivers can be switched simultaneously (for example for group or centralized control).
The relay can be operated in switch mode or pushbutton mode (with or without timer functions). Pushbutton mode can be used for example, to control a door opener or a push-button dimmer.

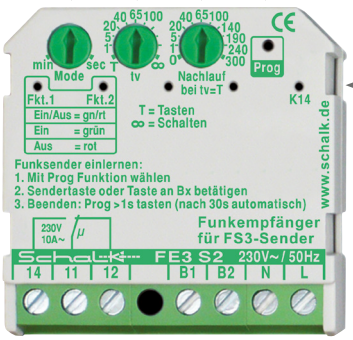
Application

Wireless control of lamps, pushbutton dimmers, ventilators, signal emitters etc.

Operation

The „Mode“ setting selects the switch duration in minutes or seconds. The „tv“ setting selects 3 operating modes: Pushbutton, switching with timer functions, switching only (without timer function).
The „time stretch in pushbutton mode“ provides an easy way to implement a long contact time for use with a transmitter in periodic mode. When the „tv“ setting is set to „T“ then the „time stretch in pushbutton mode“ always acts in retrigger mode. If signals are no longer received from the transmitter, then the FE3 S2 switches off after the timeout.

1. Default setting and installation
1.1 Controls and displays



„Mode“ setting:
Time scale setting :

min	all timer settings in minutes
sec	all timer settings in seconds

„tv“ setting:
Relay timeout setting:

T	Pushbutton mode (relay only switched on during transmission)
1...240	Switch mode with timeout in seconds, the relay then automatically switches off
∞	Switch mode without timeout (all changes to the switch state are done manually)

„Nachlauf bei tv=T“ („Time stretch when tv=T“) setting:
Sets the timeout of the relay when the „tv“ setting is set to „T“ (pushbutton mode):

0...300	Timeout, after which the relay is automatically deactivated

In this operating mode each „On/Off signal acts a retrigger. A dedicated „Off“ signal causes the relay to switch off.

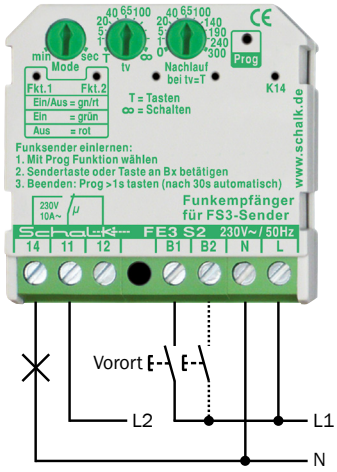
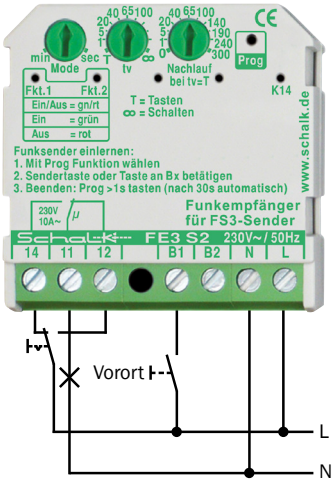
„Prog“ programming button:
This button is used to enable/disable programming mode, select programming functions or restore the factory default settings (refer to the section on programming)

LEDs: Fkt. 1, Fkt. 2, K14:
In normal operation (switch mode):

„K14“	Indicates if the relay is switched on. This LED blinks when the timer is running
„Fkt 1“/“Fkt 2“	When a valid address code is received (programmed transmitter) the „Fkt 1“ lights green, the LED lights red if it receives an unknown address code. In programming mode, these LEDs indicate the function to be programmed (see „Programmable Functions“ table)

Legend:
○ LED off
● LED lights red
◐ LED blinks red
● LED lights green
◐ LED blinks green
◐ LED alternately blinks red/green

1.2 Installation

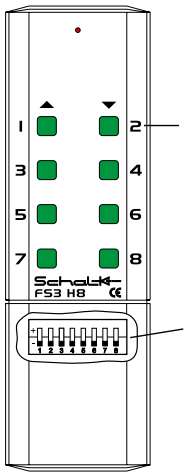
Ex.: Lighting control (different phases possible)	Ex.: Changeover contact
	

Due the potential-free changeover contact, consumers supplied by phases different from the operating voltage can also be switched

2. Programming

2.1 Factory settings

Transmitters and receivers are factory-configured with a standard address (transmitter: all DIP switches in low position"-"/ Receiver: responds to transmitter in factory setting), so that the K14 relay can be switched on and off with pushbutton 1 of the remote control (if it is also configured in the factory setting).



Pushbutton number
In the factory setting, pushbutton 1 switches relay K14 on.

Address switches
In the factory setting, all DIP switches are in „-" position"

When several transmitter/receiver combinations are used together, they must be separated by configuring the addresses in order to prevent any interference.

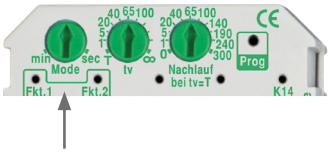
Resetting the radio receiver to the factory settings:
To restore the factory settings, hold down the Prog button for 10s until the „Fkt1" LED blinks red five times (●○○○○).

Functions in factory setting (= delivery state):

Radio function	„Switch On/Off" function via pushbutton 1 of a transmitter in factory setting
Input B1	"Switch On/Off" function via pushbutton wired to B1
Input B2	"Switch Off" function via pushbutton wired to B2

To also **delete all the programmed radio transmitters and functions** (also including the standard addresses and B1/B2 functions) hold down the Prog pushbutton for 20s until all LEDs blink (●●●●●). As a result, the receiver will no longer react to any radio transmitter/local pushbuttons until they have been explicitly programmed again.
To **delete an individual programmed function**, select this function and hold down the Prog button for 5s until the „Function" LED blinks red three times (●○○○○).

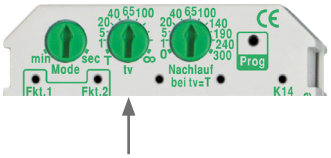
2.2 Selecting the operating mode



Select the desired timescale using the leftmost rotary switch. Select either:

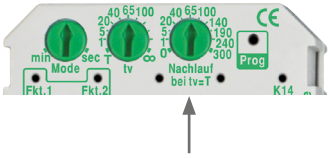
min	All time settings in minutes
sec	All time settings in seconds

2.3 Configuring the timeouts



Select the desired function with the middle rotary switch „tv“:

T	Pushbutton mode Relay only switched on during transmission Optionally with timeout (see rightmost rotary switch)
1...240	Switch mode with timeout in seconds or minutes, after which the relay is automatically deactivated
∞	Switch mode without timeout (all changes to the switch state are done manually)



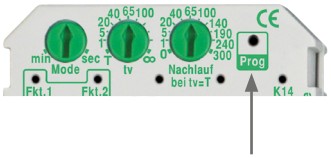
If the „T“ pushbutton mode is selected with the middle rotary switch, now select the desired timeout delay:

0...300	Timeout in seconds or minutes, after which the relay is automatically deactivated. Setting „0“ has the effect that the relay is only switched on during transmission.

In this operating mode every „On” or „On/Off“ signal transmitted acts as a retrigger (only a dedicated „Off“ signal causes the relay to switch off). For example, this can be used to easily send long switch states from a periodic transmitter and prevent the relay from becoming deactivated between refresh signals.

2.4 Programming radio transmitters/functions

To enable specific remote control buttons (or the push buttons wired to inputs B1 or B2) to execute the desired function on the FE3 S2, these have first to be programmed.



Programming procedure:

1. With the help of a pointed object, press 1 to 6 times on the „Prog“ button of the FE3 S2 to select the desired function (the „Programmable functions“ table shows the different functions using the LED display.
2. Briefly press the desired pushbutton on the remote control or the wired push-button: the K14 LED blinks if the reception is valid, indicating that the Function/Address code has been programmed.
3. Now either exit programming mode by pressing the Prog button for approx. 2s until all LEDs are off (programming mode also switches off automatically after approx. 20s of inactivity), or else select another function by pressing briefly on the Prog button, and assign another pushbutton to it.

If any particular function (for example Function 1 „On/Off“ is addressed by two transmitters with different addresses, then the first transmitter must be programmed on Function 1, the second transmitter programmed on Function 4. Function 4-6 thus enable the functions to be assigned a second time by other transmitters.

Table: Programmable functions

No.	LED display Fkt. 1 · Fkt. 2 · not used · not used · K14	Pushbutton function depending on the configured operating mode
1	🟢🔴 ○ ○ ○ 🔴	K14 On/Off
2	🟢 ○ ○ ○ 🔴	K14 On
3	🔴 ○ ○ ○ 🔴	K14 Off
4	○ 🟢🔴 ○ ○ 🔴	K14 On/Off
5	○ 🟢 ○ ○ 🔴	K14 On
6	○ 🔴 ○ ○ 🔴	K14 Off

2.5 Programming example

Programming example: Assign the „On/Off“ function (1-pushbutton-control) to button 5 of a remote control transmitter and assign the „Off“ function to the local input B2

1. Press once briefly on the Prog button to select Function No. 1
   LED Fkt. 1 blinks red/green; and LED K14 lights red (🟢🔴 ○ ○ ○ 🔴)
2. Press button 5 on the transmitter to assign the function to it
   LED K14 blinks => Function 1 has been programmed (🟢🔴 ○ ○ ○ 🟢🔴)
3. Press briefly twice on the Prog button, to select Function 3
   LED Fkt. 1 and LED K14 light red (🔴 ○ ○ ○ 🔴)
4. Press briefly on the wired pushbutton on B2 to assign the function to it
   LED K14 blinks => Function 3 has been programmed (🔴 ○ ○ ○ 🟢🔴)
5. Then hold down the Prog button for 2s (or wait 20s) to quit programming mode

For group/central switching, the FE3 S2 must be programmed with dedicated „On“ or „Off» switching functions, assigning different pushbuttons (on the radio transmitter or the wired pushbuttons on B1/B2) to each function.

Note

Recommendation on transmission range
The free-field range is a minimum of 50 meters. However it may in some cases be strongly reduced by walls, concrete ceilings, metal surfaces, bushes, or damp soil. Radio or electrical interference from other electrical devices reduces the receiver sensitivity.
Measures for improving the range:
- Optimize the alignment of the transmitter and receiver in relation to each other
- Do not install the transmitter/receiver at ground level (recommendation: at least 1m above ground level)
- Do not install the receiver on a metal surface and keep the top of the housing free of wiring (antenna on the upper surface of the floor)

Technical data

Reception frequency	433.92 MHz
Modulation type	OOK PWM
Operating voltage	230V AC 50/60Hz
Power consumption	0.6W
Line capacity (L-B1/B2)	15nF (approx. 50m NYM)
Glow lamps (L-B1/B2)	Max. 2x 1 mA glow lamps
Relay contacts	1 changeover 10A 250V AC, potential-free (KLS 8mm)
Switching capacity	See relay contact datasheet
Ambient temp.	-10°C to +45°C
Connections	Socket terminals with captive screws M3
Clamping range	0.5 mm^2 - 2.5 mm^2
Strip length	6.5 mm - 7.0 mm
Screwing torque	0.50 Nm
Installation position	If necessary directed at transmitter
External dimensions	43 x 43 x 18.5 mm^3
Weight	37g
Color (RAL)	Gray 7035 / green 6029

Compatible devices: FE3- / FD3- / FS3 Series radio receivers/-transmitters, FV2 Radio repeater

Ordering information

Part No.	EAN	Type	Description
FE3S29	4 046929 101356	FE3 S2	Radio receiver switch, 1 changeover potential free, 230 VAC (flush mounting)

Accessories

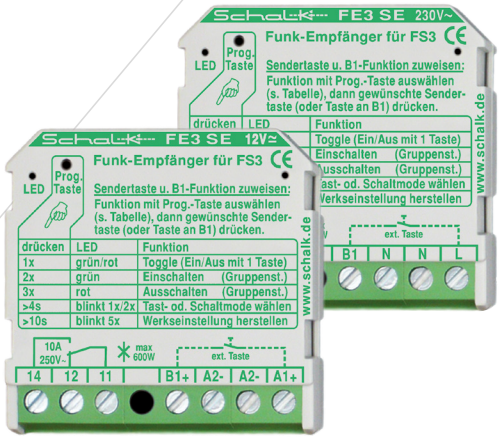
Part No.	EAN	Type	Description
HC3500	4 046929 901048	HC 35	Top hat rail clip

Radio-controlled switch FE3 SE

1 relay, low height
Simple radio receiver with one relay. Push-button or switch mode and group control possible.
Connection option for wired local push-button.

Special features

- Operating modes: Switching or push-button mode
- Individual and group control possible
  (Toggle, On, Off functions can be taught-in)
- Free field range 50 m
- Antenna integrated in the housing
- Repeater available to increase range
- small housing for flush-mounted switch box (H = 18.5 mm)
- potential-free change-over contact 10 A 250 V AC
- Input for wired push-button



General information

The FE3 SE radio receiver switch has a potential-free change-over contact which can be switched wirelessly via the Schalk handheld transmitters or flush-mounted transmitters of the FS3 series. The 3 functions (toggle, on, off) can be assigned to any transmitter button. The "Toggle" function (alternately on-off) is used for individual control. The "On" and "Off" functions can also be used to switch several receivers together. The function for input B1 is also freely selectable. The relay can also be operated in switching or push-button mode. In push-button mode, door openers or push-button dimmers can then also be controlled, for example.

Applications

Wireless switch: Lamps, fans, horns, push-button dimmers, door openers, etc.

Operation

Assign transmitter buttons:
Select one of the functions toggle, on or off by briefly pressing the "Prog." button.
The selected function is indicated by the LED:
Toggle = LED lights alternately green-red
Ein (On) = LED lights up green
Aus (Off) = LED lights red
Then press the desired button on the transmitter. When the LED goes out, the transmitter button has been accepted for this function.

Assign function for B1 input:
Select one of the functions toggle, on or off by briefly pressing the "Prog." button. Then press the button connected to B1.

Select the operating mode “push-button” or “switching”:
Press the "Prog." button for more than 5s. The LED then flashes once (= push-button mode) or twice (= switching mode).

Restore factory settings:
Press the "Prog." button for more than 10s. The LED then flashes red five times. Now the FE3 SE can be switched via button 1 of the transmitter if all address switches are set to "-". The B1 input is set to toggle.

To additionally **delete all taught-in radio transmitters and functions** (including the standard addresses and B1 functionality), hold the programming button pressed for 20s until the LED flashes red 10 times. As a result, the receiver no longer reacts to radio transmitter/wired push-button as long as they are not explicitly taught-in again.

LED status (red or green)
Indicates the selected function in programming mode (see above).

Indication of radio reception:
- flickers red = reception of unknown Schalk-protocols
- flickering green = reception of taught-in Schalk-protocols

Programming instructions

- Select function (if necessary, press the "Prog." key several times briefly)
  → selected function is indicated by LED
- Press the button on the transmitter.
  →LED goes out (transmitter code is automatically accepted)

B1 input (for connecting a wired push-button):
One of the functions Toggle, On or Off can be assigned to input B1. To do this, select the desired function with the "Prog." button and then briefly press the button connected to B1. A continuous signal at input B1 blocks radio reception. Thus, for example, the relay contact can be disabled or permanently switched on at certain times via a time switch.

Optimize range:
The free field range with the above transmitters is at least 50 m. However, the range may be reduced considerably by walls, concrete ceilings, metal surfaces, damp soil, etc. Insufficient range can also have the following causes:

- Alignment of transmitter and receiver to each other unfavourable
- Transmitter and receiver mounted too close to the ground (min. 1 m above ground is recommended)
- Devices mounted on metal surfaces (radio signal is heavily attenuated)
- Radio or mains interference from other electrical devices reduce receiver sensitivity

Programming example

Assign button 3 of a remote control to the toggle function
(toggle = switch on/off with the same button)

1. Briefly press the "Prog." button on the receiver (FE3 SE).
   → LED flashes alternately red/green
2. Press button 3 on the remote control
   → The LED on the receiver goes out.

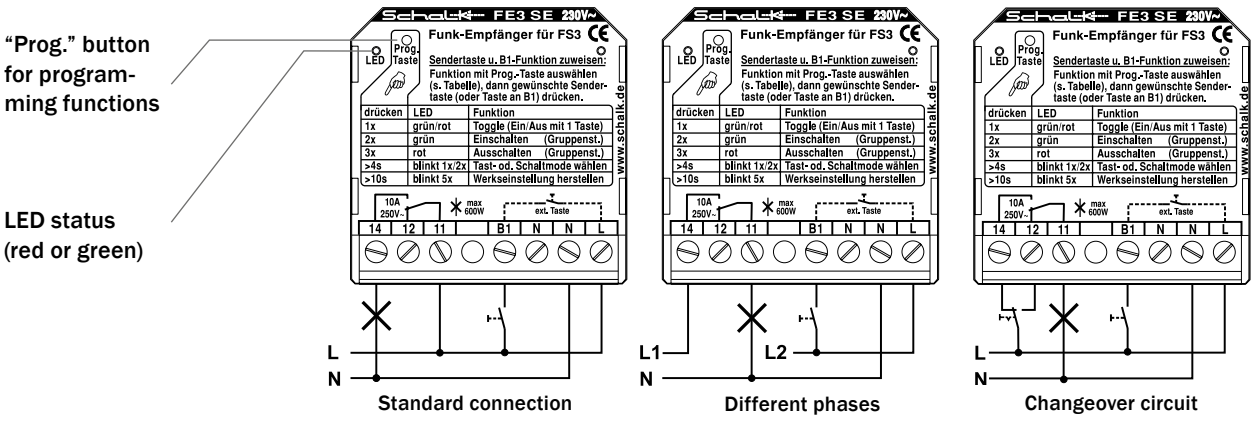
If the relay only is energised as long as the button on the transmitter is pressed, the receiver must still be switched from push-button to switching mode as follows:

- Press “Prog.” button on receiver (FE3 SE) longer than 4s
  → LED flashes 2 times green = switching mode

Further information see also data sheet "Practical tips for the Schalk radio control system".

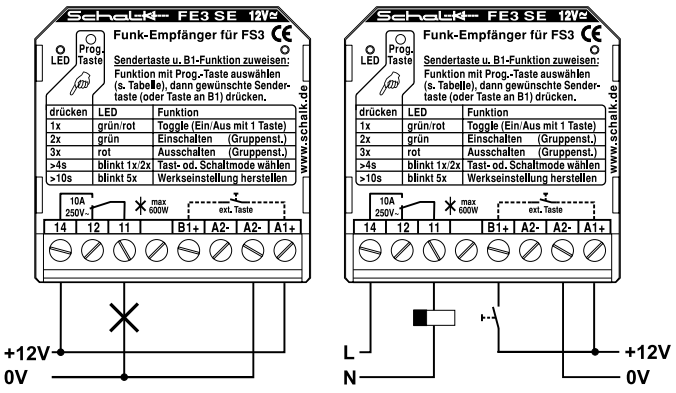
Connection examples

230 V AC variant



Standard connection | Different phases | Changeover circuit

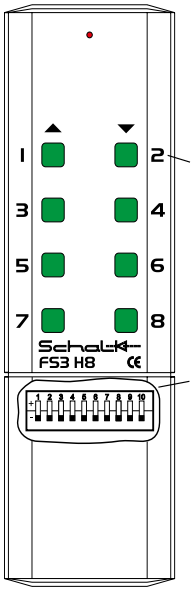
12V UC variant



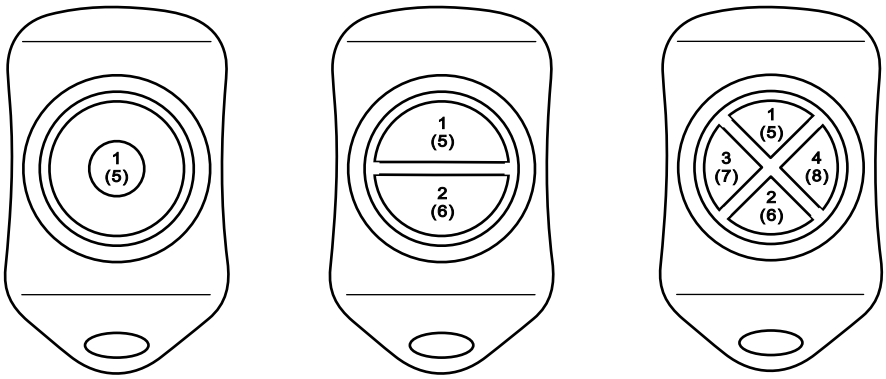
Switch additional vehicle interior lighting

Control courtyard light by time switch via 12V door intercom system

Example: FS3 H8



Example: FS3 HS 1/2/4



Technical data

Receiving frequency	433.92MHz
Modulation type	OOK PWM
Functionalities	Toggle, On, Off teachable
Operating voltage:	230 V AC 50/60Hz
Power consumption:	0.5W

Input B1:

Line capacitance (L-B1)	max. 4nF
Glow lamps (L-B1)	max. 1 pc. (1 mA)
Relay contact	1 change-over contact 10A 250V AC, potential-free, KLS 8mm
Switch rating	see "Relay contacts" data sheet
Ambient temp.	-10°C to +45°C
Connection terminals	Socket terminals with captive screws M3
Clamping range	0.5 mm² - 2.5 mm²
Strip length	6.5 mm - 7.0 mm
Screwing torque	0.50 Nm
Mounting orientation	If necessary, alignment to the transmitter
External dimensions	43 x 43 x 18,5mm³
Weight	34g
RAL colour	grey 7035 / green 6029

Order data

Item no.	EAN	Type	Designation
FE3SE9	4 046929 101226	FE3 SE (230V AC)	Radio-controlled switch, 1-channel 230V AC (FMD)
FE3SE2	4 046929 101295	FE3 SE (12V UC)	Radio-controlled switch, 1-channel 12V UC (FMD)
MFS209	4 046929 101424	MFS 2	Mini radio set, consisting of FE3 SE (230V) and FS3 HS 2

Accessories

Item no.	EAN	Type	Designation
HC3500	4 046929 901048	HC 35	Top-hat rail clip

Compatible devices: Radio receiver/transmitter of the FE3 / FD3 / FS3 series, radio repeater FV2 R

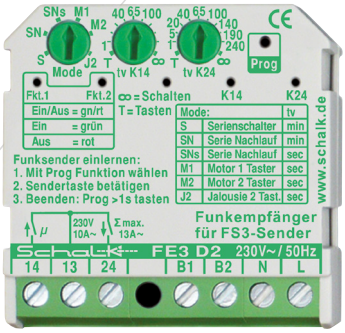
2017-05-01

Radio-controlled switch FE3 D2

2 relays, with timer functions and additional operating modes
Compact receiver with 2 relays. Special operating modes for motor controls (roller shutters, blinds, gateways, etc.). Pushbutton or switch modes with timer functions and group control. Two programmable inputs for wired pushbuttons.

Special features

- 6 operating modes for: serial connection, contact status transmission as well as motor and blind controls
- runtime modes: pushbutton mode, switching with or without time monitoring
- transmitter button functions: *„defined On“* and *„defined Off“* or *„one-button On/Off“* programmable
- 2 freely programmable inputs for local pushbuttons
- Free-field range 50m
- Antenna built into housing
- Repeater available to increase range
- Very small enclosure fits in flush mounted switch boxes
- 2 potential-free normally open contacts for 10A/250V AC



General information

The FE3 S2 radio remote-control receiver switch is equipped with two potential-free closing contacts that can be used for wireless switching with the FS3 series of hand-held or fixed-mounted radio transmitters. The 3 functions („On/Off“, „On“, „Off“) can be assigned to any of the transmitter buttons or one of the wired pushbutton inputs B1/B2. The „On/Off“ function (toggling on and off using a single button) is used for individual control. Using the dedicated „On“ and „Off“ functions, several receivers can be switched simultaneously (for example for group or centralized control).
The relay can be operated in switch mode or pushbutton mode (with or without timer functions). Pushbutton mode can be used for example, to control a door opener or a push-button dimmer.

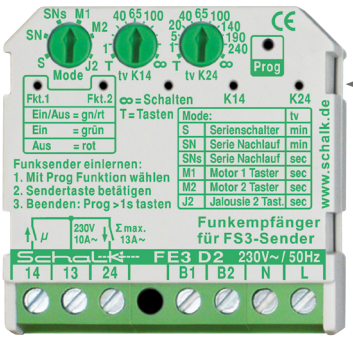
Application

Wireless control of lamps, motors (roller shutters, blinds, gateways, ventilators ...).

Function

In serial switch operation mode the relays can be operated in “push-button mode” or in “switching mode”, with or without time monitoring. In motor operating modes M1 and M2, the relays are interlocked.
In M1 mode (1-button motor control) one transmitter button generates the switching sequence “Up, Stop, Down, Stop”.
In M2 mode (2-button motor control) two transmitter buttons (one for each direction) generate the switching sequence „Up, Stop“ and „Down, Stop“ respectively.
In mode J2 (2-button blind control), the blades‘ angle can be exactly adjusted by the „short-push mode“ (short push <1s), or set to a defined angle after moving up or down.
Using the dedicated „On“ and „Off“ functions, several receivers can be switched simultaneously (for example for group or centralized control).
The „time stretch in pushbutton mode“ (in modes SN and SNs) provides an easy way to implement a long contact time for use with a transmitter in periodic mode. The run-time set here is used to bridge the time until an new transmitter signal retriggers a new switch period. If signals are no longer received from the transmitter, then the FE3 D2 switches off after the timeout. (eg used for motion detectors, heating thermostats, etc.).

1. Default setting and installation
1.1 Controls and displays



„Mode“ setting:

S **Serial switch:** The hold time in minutes can be set separately (see “Runtime setting”).

SN **Serial switch with after-run time (in minutes):** The after-run time in minutes can be set separately (see “Runtime setting”). “ON” and „ON/OFF“ functions have a re-triggering operation.

SNs **Serial switch with after-run time (in seconds):** Same as the SN mode, but the after-run time is adjustable in seconds.

M1 **Motor control:** 1-button motor control. One transmitter button generates the switching sequence “Up, Stop, Down, Stop”. Run-time in seconds.

M2 **Motor control:** 2-button motor control. Two transmitter buttons (one for each direction) generate the switching sequence „Up, Stop“ and „Down, Stop“ respectively. Run-time in seconds.

J2 **Blind control:** 2-button blind control with short push mode (short push, <1s) for easy adjustment of blade angle. The blind runtime (starting after long push of the button >1s) can be set up using dial „tv K14“. The counter-direction pulse is adjusted using the right-hand dial „tv K24“ (a special scale from 0 to 1.2s applies here). The counter-direction pulse starts once the blind has stopped.

Each mode change causes the relays to switch off and LED „Fkt. 1“ blinks red once.

„tv K14“ setting:

Sets the timeout of the relay K14. *(Special function in J2 mode: here timeouts for both relays K14 and K24 are set simultaneously)*

T	Pushbutton mode (relay only switched on during transmission)
1...240	Switch mode with timeout in seconds, the relay then automatically switches off
∞	Switch mode without timeout (all changes to the switch state are done manually)

„tv K24“ setting:

Sets the timeout of the relay K14. *(Special function in J2 mode: here this dial sets the counter-direction pulse using special scale 0 to 1.2s)*

T	Pushbutton mode (relay only switched on during transmission)
1...240	Switch mode with timeout in seconds, the relay then automatically switches off
∞	Switch mode without timeout (all changes to the switch state are done manually)

„Prog“ programming button:

This button is used to enable/disable programming mode, select programming functions or restore the factory default settings (refer to the section on programming)

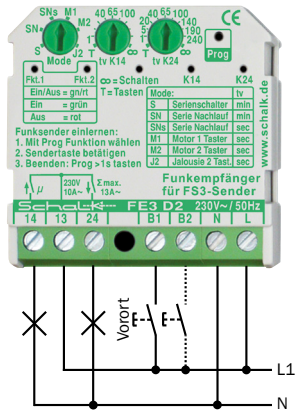
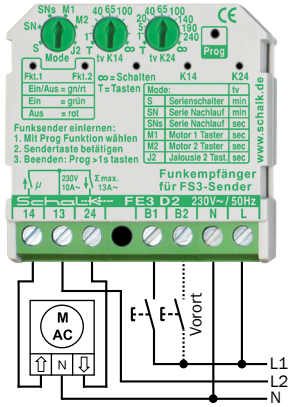
LEDs: Fkt. 1, Fkt. 2, K14, K24:

In normal operation (switch mode):

„K14“	Indicates if the relay is switched on. This LED blinks when the timer is running
„K24“	Indicates if the relay is switched on. This LED blinks when the timer is running
„Fkt. 1“ / „Fkt. 2“	When a valid address code is received (programmed transmitter) the „Fkt 1“ lights green, the LED lights red if it receives an unknown address code. In programming mode, these LEDs indicate the function to be programmed (see „Programmable Functions“ table)

Legend:
- ○ LED off
- ● LED lights red
- ◐ LED blinks red
- ● LED lights green
- ◐ LED blinks green
- ◐ LED alternately blinks red/green

1.2 Installation

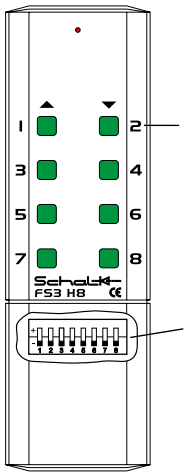
Ex.: Lighting control	Ex.: motor control (different phases possible)
	

Due the potential-free changeover contact, consumers supplied by phases different from the operating voltage can also be switched

2. Programming

2.1 Factory settings

Transmitters and receivers are factory-configured with a standard address (transmitter: all DIP switches in low position"-"/ Receiver: responds to transmitter in factory setting), so that the K14 relay can be switched on and off with pushbutton 1 and K24 relay with pushbutton 1 of the remote control (if it is also configured in the factory setting).



Pushbutton number
In the factory setting, pushbutton 1 switches relay K14 on.

Address switches
In the factory setting, all DIP switches are in „-" position"

When several transmitter/receiver combinations are used together, they must be separated by configuring the addresses in order to prevent any interference.

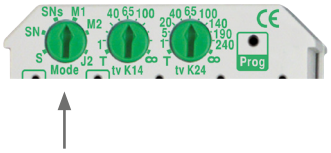
Resetting the radio receiver to the factory settings:
To restore the factory settings, hold down the Prog button for 10s until the „Fkt1" LED blinks red five times (●○○○○).

Functions in factory setting (= delivery state):

Radio function	„Switch On/Off" function via pushbutton 1 (switches K14) and via pushbutton 2 (switches K24) of a transmitter in factory setting
Input B1	"Switch On/Off" function via pushbutton wired to B1
Input B2	"Switch Off" function via pushbutton wired to B2

To also **delete all the programmed radio transmitters and functions** (also including the standard addresses and B1/B2 functions) hold down the Prog pushbutton for 20s until all LEDs blink (●●●●●). As a result, the receiver will no longer react to any radio transmitter/local pushbuttons until they have been explicitly programmed again.
To **delete an individual programmed function**, select this function and hold down the Prog button for 5s until the „Function" LED blinks red three times (●○○○○).

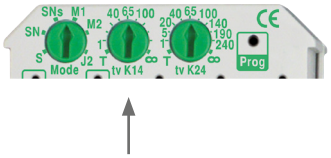
2.2 Selecting the operating mode



Select the desired operating mode using the leftmost rotary switch:
S, **SN**, **SNs**, **M1**, **M2** or **J2** (description see 1.1)

In motor control modes (M1, M2, J2) the following applies:
Up = K14 on, Down = K24 on, Stop = both relays off.
The running direction is switched after a 0.5 second pause.

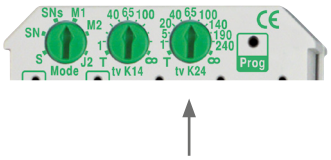
2.3 Configuring the timeouts



Select the desired timeout function for relay K14 with the middle rotary switch „tv K14“:
T (Pushbutton mode), **1...240** (Switch mode with timeout in seconds or minutes, depending on operating mode) or ∞ (Switch mode without timeout)

Operating mode „J2“: here the setting applies for both relays K14 and K24.

Operating mode „SN“ or „SNs“: in this operating mode every „On” or „On/Off“ signal transmitted acts as a retrigger (only a dedicated „Off“ signal causes the relay to switch off). For example, this can be used to easily send long switch states from a periodic transmitter and prevent the relay from becoming deactivated between refresh signals.

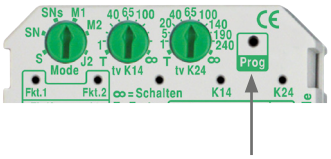


Select the desired timeout function for relay K24 with the middle rotary switch „tv K24“:
T (Pushbutton mode), **1...240** (Switch mode with timeout in seconds or minutes, depending on operating mode) or ∞ (Switch mode without timeout)

In blind mode J2, a special assignment of dials is used:
tv K14 = blind runtime for all 2 relays
tv K24 = counter-direction pulse period: position T=deactivated, or 0.2 to 1.2s, only active when „tv K14“ is set to 1...240

2.4 Programming radio transmitters/functions

To enable specific remote control buttons (or the push buttons wired to inputs B1 or B2) to execute the desired function on the FE3 D2, these have first to be programmed.



Programming procedure:

1. With the help of a pointed object, press 1 to 12 times on the „Prog“ button of the FE3 D2 to select the desired function (the „Programmable functions“ table shows the different functions using the LED display.
2. Briefly press the desired pushbutton on the remote control or the wired pushbutton: the K14 or K24 LED blinks if the reception is valid, indicating that the function/address code has been programmed.
3. Now either exit programming mode by pressing the Prog button for approx. 2s until all LEDs are off (programming mode also switches off automatically after approx. 20s of inactivity), or else select another function by pressing briefly on the Prog button, and assign another pushbutton to it.

If any particular function (for example Function 1 „On/Off“ in operating mode „S“) is addressed by two transmitters with different addresses, then the first transmitter must be programmed on Function 1, the second transmitter programmed on Function 7. Function 7-12 thus enable the functions to be assigned a second time by other transmitters.

Table: Programmable functions

	No.	LED indicator Fkt. 1 / Fkt. 2 / not used / K14 / K24	Pushbutton function depending on the configured operating mode S (serial switch)	SN, SNs (serial switch with after-run time)	M1 (1-button motor control)	M2, J2 (2-button motor control)
Transmitter 1	1	◐ ○ ○ ● ○	K14 On/Off	K14 On	Up-Stop-Down-Stop	Up-Stop
	2	◐ ○ ○ ○ ●	K24 On/Off	K24 On	-	Down-Stop
	3	● ○ ○ ● ○	K14 On	K14 On	Up	Up
	4	● ○ ○ ○ ●	K24 On	K24 On	Down	Down
	5	● ○ ○ ● ○	K14 Off	K14 Off	Stop	Stop
	6	● ○ ○ ○ ●	K24 Off	K24 Off	-	-
Transmitter 2	7	○ ◐ ○ ● ○	K14 On/Off	K14 On	Up-Stop-Down-Stop	Up-Stop
	8	○ ◐ ○ ○ ●	K24 On/Off	K24 On	-	Down-Stop
	9	○ ● ○ ● ○	K14 On	K14 On	Up	Up
	10	○ ● ○ ○ ●	K24 On	K24 On	Down	Down
	11	○ ● ○ ● ○	K14 Off	K14 Off	Stop	Stop
	12	○ ● ○ ○ ●	K24 Off	K24 Off	-	-

Note

Special behavior when programming functions 7-12 to on inputs B1 or B2:
Here the button functions of the operating modes S, SN and SNs apply ***for both relays simultaneously.***
Thus one button connected to both inputs B1 and B2 could switch both relays simultaneously.

2.5 Programming example

Assing transmitter buttons to functions:
Assign the „K14 On/Off“ function (1-pushbutton-control) to button 5 of a remote control transmitter and assign the „K24 On/Off“ function to button 6:

1. Press once briefly on the Prog button, to select Function No 1
   LED Fkt. 1 blinks red/green; and LED K14 lights red (◐ ○ ○ ● ○)
2. Press button 5 on the transmitter to assign the function to it
   LED K14 blinks => Function 1 has been programmed (◐ ○ ○ ◐ ○)
3. Press once briefly on the Prog button, to select next Function No 2
   LED Fkt. 1 blinks red/green; and LED K24 lights red (◐ ○ ○ ○ ●)
4. Press button 6 on the transmitter to assign the function to it
   LED K24 blinks => Function 1 has been programmed (◐ ○ ○ ○ ◐)
5. Then hold down the Prog button for 2s (or wait 20s) to quit programming mode

Group/central switching using a seperate transmitter:
Assign functions 11 and 12 („K14 Off“ and „K24 Off“ = group control) to another transmitter on button 8:

1. Press briefly on the Prog button 11 times to select Function No. 11
   LED „Fkt. 2“ and LED K14 light red (○ ● ○ ● ○)
2. Press button 8 on the transmitter to assign the function to it
   LED K14 blinks => Function 11 has been programmed (○ ● ○ ◐ ○)
3. Press once briefly on the Prog button, to select next Function No 12
   LED „Fkt. 2“ and LED K24 light red (○ ● ○ ○ ●)
4. Press once again button 8 on the transmitter to assign the function to it
   LED K24 blinks => FFunction 12 has been programmed (○ ● ○ ○ ◐)
5. Then hold down the Prog button for 2s (or wait 20s) to quit programming mode

Note

Recommendation on transmission range
The free-field range is a minimum of 50 meters. However it may in some cases be strongly reduced by walls, concrete ceilings, metal surfaces, bushes, or damp soil. Radio or electrical interference from other electrical devices reduces the receiver sensitivity.
Measures for improving the range:
- Optimize the alignment of the transmitter and receiver in relation to each other
- Do not install the transmitter/receiver at ground level (recommendation: at least 1m above ground level)
- Do not install the receiver on a metal surface and keep the top of the housing free of wiring (antenna on the upper surface of the floor)

Technical data

Reception frequency	433.92 MHz
Modulation type	OOK PWM
Operating voltage	230V AC 50/60Hz
Power consumption	0.4W
Line capacity (L-B1/B2)	15nF (ca. 50m NYM)
Glow lamps (L-B1/B2)	Max. 2x 1 mA glow lamps
Relay contacts	2 normally open contacts 10A 250V AC, potential-free (partial connected) (KLS 8mm)
Switching capacity	See relay contact datasheet
Ambient temp.	-10°C to +45°C
Connections	Socket terminals with captive screws M3
Clamping range	0.5 mm^2 - 2.5 mm^2
Strip length	6.5 mm - 7.0 mm
Screwing torque	0.50 Nm
Installation position	If necessary directed at transmitter
External dimensions	43 x 43 x 18.5 mm^3
Weight	37g
Color (RAL)	Gray 7035 / green 6029

Compatible devices: FE3- / FD3- / FS3 Series radio receivers/-transmitters, FV2 Radio repeater

Ordering information

Part No.	EAN	Type	Description
FE3D29	4 046929 101363	FE3 D2	Radio receiver switch, 2 NO potential free, 230 VAC (flush mounting)

Accessories

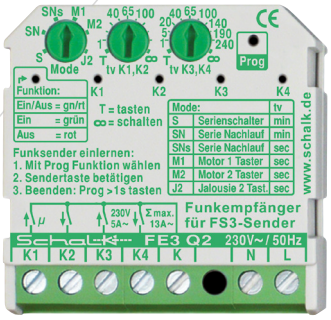
Part No.	EAN	Type	Description
HC3500	4 046929 901048	HC 35	Top hat rail clip

Radio-controlled switch FE3 Q2

4 relays, potential-free
Compact radio receiver with four relays. Special operating modes for motor controls (roller shutters, blinds, gateways, etc.). Buttons and switching with time functions and group control functions are possible.

Special features

- 4 relay contacts (closing contact 5A 250V AC, potential-free) (e.g. 4 lights or 2 motors controllable per radio)
- 6 operating modes for: serial connection, contact status transmission as well as motor and blind controls
- runtime modes: pushbutton mode, switching with or without time monitoring
- transmitter button functions: *„defined On“* and *„defined Off“* or *„one-button On/Off“* programmable
- open air range of 50m
- antenna integrated into the housing
- Repeater available for increasing the range
- especially small case (fits into UP switch box)
- low power consumption



General information

The 4-relay radio controlled switch FE3 Q2, together with Series FS3 radio transmitters, enables wireless switching of electrical equipment (even without line-of-sight connection). It can be applied as a serial switch, for transmitting contact statuses or for controlling motors and blinds. The device distinguishes switching functions “ON/OFF“ (alternating ON/OFF by means of one transmitter button = 1-button control), as well as „defined ON” and „defined OFF” (both by means of separate transmitter buttons = 2-button control). The various functions are programmable.

Application

Wireless control of lights, motors (roller shutters, blinds, gateways, ventilators ...).

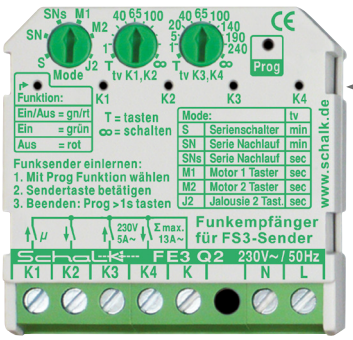
Function

Each of the four relays can be operated in “push-button mode” or in “switching mode”, with or without time monitoring. By means of dials tv-K1, K2 and tv-K3, K4, you can adjust the after-run time separately for two relays.
The FE3 Q2 has six basic operating modes. The four relays are switchable independently on each other as serial switches (S, SN, SNs). In serial switch operating modes SN and SNs (with after-run time), the “ON” function operates as a re-triggering function.

In motor operating modes M1 and M2, the relays are interlocked. Additionally, the device has some functions implemented that allow comfortable control of roller shutters, blinds, canopies, skylights, etc. (separately or in groups). Thus, for example, in operating mode „M1“ (1-button motor operation), the switching sequence “up, stop, down, stop” is generated with one transmitter button, whereas the defined commands for “up“, “down” and “stop” can be programmed for group control. For blind control, the blades can be exactly adjusted by the „short-push mode“, or set to a defined angle when switched off (for this function, the counter-direction pulse must be activated).

1. Basic settings and installation

1.1 Control and indicating elements for basic settings



„Mode“ control:
The operating mode is set as follows:

S **Serial switch**
SN **Serial switch with after-run (time setting in minutes)**
SNs **Serial switch with after-run (time setting in seconds)**
M1 **1-button motor control**
M2 **2-button motor control**
J2 **2-button blind control** (with short push mode and possible counter direction pulse)

All relays are switched off after mode change. After mode or hold time change, the “Funktion” LED flashes red once

Runtime control „tv K1, K2“ and „tv K3, K4“:
This control is used to set the runtime in pairs for relays K1, K2 and K3, K4:

T Push-button mode (relay is only on while transmission is on)
1...240 Switching mode with runtime in seconds, relay is automatically powered off afterwards
∞ Switching mode without time lapse (every status change is effected manually)

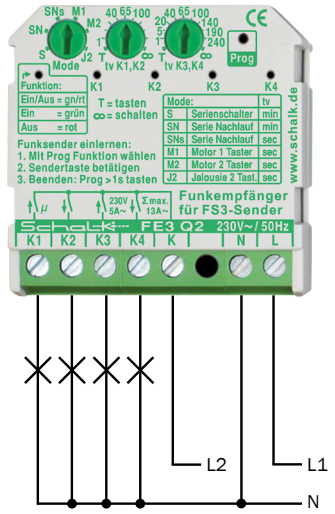
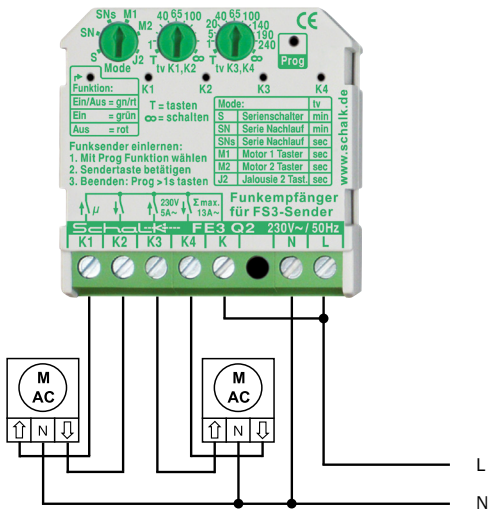
Programming button „Prog“:
This button is used for activating/deactivating the programming mode, selecting programming functions or for restoring default settings (see „Programming“)

LEDs: Funktion, K1, K2, K3, K4:
In normal mode (switching mode):
- LED „Funktion“ indicates radio reception:
When a valid operating code is received (programmed transmitter), the LED lights green, when unknown operating codes are received, the LED lights red and green simultaneously
- LEDs K1 to K4 indicate the switching status:
they flash when switching with time lapse and light constantly when switching without time lapse

In programming mode:
LEDs indicate the function being programmed (see table: “Programmable functions”)

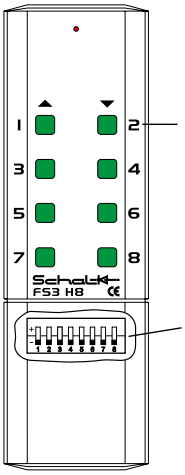
LED legend:
○ LED off
● LED glows red
◍ LED flashes red
● LED glows green
◍ LED flashes green
◍ LED flashes alternately red/green

1.2 Installation

Example: Light control	Example: Roller shutter control
	

2. Programming

2.1 Default settings



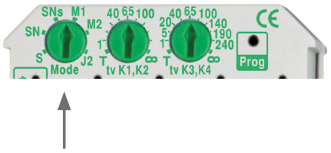
Transmitters and receivers have been attributed a default standard address (transmitter: all DIP switches in bottom position "-" / receivers: react to transmitters in default setting) so that the relays K1 to K4 can be switched on and off by means of buttons 1 to 4 on a remote control device (which is also in a default setting mode).

Button number
In default settings, buttons 1...4 switch the relays 1...4
For group switching „defined on" or „defined off" can be programmed with various buttons on FE3 Q2.

Address dials
In default setting mode, all DIP switches are in position "-"

Restoring a radio controlled switch to the default settings:
To restore the default settings, push and hold the „Prog" button for 10 seconds. Once the „Funktion" LED has flashed red five times (◔○○○○), the process is completed
If you additionally wish to delete all programmed radio transmitters/functions (including default addresses), push and hold the „Prog" button for 20 seconds, until all LEDs have flashed five times (◔◔◔◔◔). Thereupon, the receiver no longer reacts to any radio transmitters, until they have been explicitly re-programmed.

2.2 Operating mode selection



Use the left-hand side dial for selecting the desired operating mode. The following options are available:

S serial switch: The hold time in minutes can be set separately per relay group K1, K2 and K3, K4 (see “Runtime setting”).

SN serial switch with after-run time (in minutes): The after-run time in minutes can be set separately per relay group K1, K2 and K3, K4 (see “Runtime setting”). “ON” functions have a re-triggering operation.

SNs serial switch with after-run time (in seconds): Same as the SN mode, but the after-run time is adjustable in seconds.

M1 motor control: 1-button motor control (functions 1 and 3). In „ON/OFF Kx“ function mode, a transmitter button generates the switching sequence “Up, Stop, Down, Stop” and thus it can operate in both travel directions. Functions 5-9 and 11 with their defined switching commands are suitable for central or group controls.

M2 motor control: 2-button motor control (functions 1-4). In “ON/OFF Kx” function mode, two transmitter buttons (one for each direction) generate the switching sequence „Up, Stop“ and „Down, Stop“ respectively. Functions 5-9 and 11 with their defined switching commands are suitable for central or group controls.

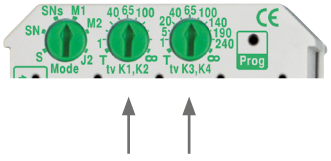
J2 blind control: 2-button blind control with short push mode (short push, <1s) for easy adjustment of blade angle (functions 1-4). The blind runtime (starting after long push of the button >2s) can be set up using dial „tv K1, K2“. The counter-direction pulse is adjusted using the right-hand dial „tv K3, K4“ (a special scale from 0.2 to 1.2s applies here). The counter-direction pulse starts once the blind has stopped.

The following switching statuses apply in the motor/blind controls:
UP = K1, K3 on
DOWN = K2, K4 on
STOP = K1, K2 and K3, K4 off
The running direction is switched after a 0.5 second pause.

2.3 Runtime setting

In operating modes S, SN, SNs, M1 and M2, the after-run time can be adjusted in pairs for relays K1, K2 and K3, K4.

In blind mode J2, a special assignment of dials is used:
tv K1,K2 = blind runtime for all 4 relays
tv K3,K4 = counter-direction pulse period: position T=deactivated, or 0.2 to 1.2s, *only active when tv K1,K2 is set to 1...240*



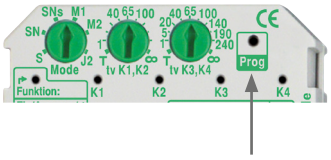
Push mode (position “T”)
The relay is on only as long as the transmitter button is pressed

Switching mode with time lapse (position 1..240)
After pre-set of time lapsing, the relay will be automatically powered off. In modes S and SN, the scale value gives the runtime in minutes; in SNs, M1, M2 and J2 in seconds (in mode J2, the scale 0.2 to 1.2s applies additionally to the right-hand dial in mode J2)

Switching mode without time lapse (position ∞)
Only manual deactivation is possible

2.4 Radio transmitters programming with function programming

To allow a specific button of a radio transmitter to execute a desired function on FE3 Q2, the button must be first programmed.



Programming procedure:

1. Use a pointed element to shortly push once to twelve times the programming button (“Prog”) on FE3 Q2 to select the desired function (the “Programmable Functions” table shows the possible functions using the LED indicator)
2. Push shortly the desired button on the transmitter: one of the LEDs K1...K4 flashes after valid reception, which means that the function/reaction code has been adopted.
3. Now either push and hold the „Prog“ button for approx. 2 seconds to terminate programming until all LEDs go off (the programming mode will be automatically turned off after 20 seconds of inactivity), or push the „Prog“ button shortly to select another function, and, to do so, programme another button on the radio transmitter.

Programming example: “Attribute buttons 5 to 8 of a manual radio transmitter to the corresponding functions“

1. Push the Prog button shortly: LED “Funktion” flashes red and green and LED K1 lights red (●● ○○○)
2. Push button 5 on the transmitter: LED K1 flashes => Function 1 has been programmed (●● ○○○)
3. Push the Prog button shortly again: LED “Function” flashes red and green and LED K2 lights red (●○ ●○○)
4. Push button 6 on the transmitter: LED K2 flashes => Function 2 has been programmed (●○ ●○○)
5. Push the Prog button shortly again: LED “Funktion” flashes red and green and LED K3 lights red (●○○ ●○)
6. Push button 7 on the transmitter: LED K3 flashes => Function 3 has been programmed (●○○ ●○)
7. Push the Prog button shortly again: LED “Function” flashes red and green and LED K4 lights red (●○○○ ●)
8. Push button 8 on the transmitter: LED K4 flashes => Function 4 has been programmed (●○○○ ●)
9. Hold the Prog button for approx. 2 seconds to leave the programming mode => all LEDs will go off (○○○○○)

Table: Programmable functions

No.	LED indicator Funktion K1 K2 K3 K4	Button function depends on the set operating mode S (serial switch)	SN, SNs (serial switch with after-run time)	M1 (1-button motor control)	M2, J2 (2-button motor control)
1	●● ○○○	K1 On/Off	K1 On	Up-Stop-Down-Stop (Motor 1)	Up-Stop (Motor 1)
2	●○ ●○○	K2 On/Off	K2 On	-	Down-Stop (Motor 1)
3	●○○ ●○	K3 On/Off	K3 On	Up-Stop-Down-Stop (Motor 2)	Up-Stop (Motor 2)
4	●○○○ ●	K4 On/Off	K4 On	-	Down-Stop (Motor 2)
5	●● ○○○	K1 On	K1 On	Up (Motor 1)	Up (Motor 1)
6	●○ ●○○	K2 On	K2 On	Down (Motor 1)	Down (Motor 1)
7	●○○ ●○	K3 On	K3 On	Up (Motor 2)	Up (Motor 2)
8	●○○○ ●	K4 On	K4 On	Down (Motor 2)	Down (Motor 2)
9	●● ○○○	K1 Off	K1 Off	Stop (Motor 1)	Stop (Motor 1)
10	●○ ●○○	K2 Off	K2 Off	-	-
11	●○○ ●○	K3 Off	K3 Off	Stop (Motor 2)	Stop (Motor 2)
12	●○○○ ●	K4 Off	K4 Off	-	-

Info

Notes on active range

The free-field range is at least 50 meters. However, the radio signal can be strongly weakened by walls, concrete ceiling slabs, metal surfaces, bushes or humid soil. Radio signal or network disruptions by other electrical devices reduce the receiver's sensitivity.

Actions for improving the active range:

- *Optimization of mutual position alignment of transmitter and receiver*
- *Do not mount the transmitter/receiver close to the ground (recommendation: maintain at least a 1 m distance from the ground)*
- *Do not mount the receiver on metal surfaces and keep the top case area free from wires (antenna on the bottom side up)*

Technical Data

Receiving frequency	433,92 MHz
Type of modulation	OOK PWM
Operating codes (12 functions)	programmable by transmitter
Operating voltage	230V AC 50/60Hz
Power consumption	0.5W
Relay contacts	4 normally open contacts 5A 250V AC, potential-free (Creeping/air gaps 6mm)
Switching capacity	see Relay Contacts Data Sheet
Ambient temperature	-10°C to +45°C
Connections	Socket terminals with captive screws M3
Clamping range	0.5 mm^2 - 2.5 mm^2
Strip length	6.5 mm - 7.0 mm
Screwing torque	0.50 Nm
Mounting position	possible alignment to transmitter
Outer dimensions	43 x 43 x 18.5 mm^3
Weight	40g
RAL colour	grey 7035 / green 6029

Compatible devices: Radio receivers / transmitters series FE3- / FD3- / FS3, radio repeaters FV2 R

Order data

Item no.	EAN	Type	Item designation
FE3Q29	4 046929 101349	FE3 Q2	Radio controlled switch, 4 relay, 230V AC (FMD)

Accessories

Item no.	EAN	Type	Item designation
HC3500	4 046929 901048	HC 35	Top-hat rail clip

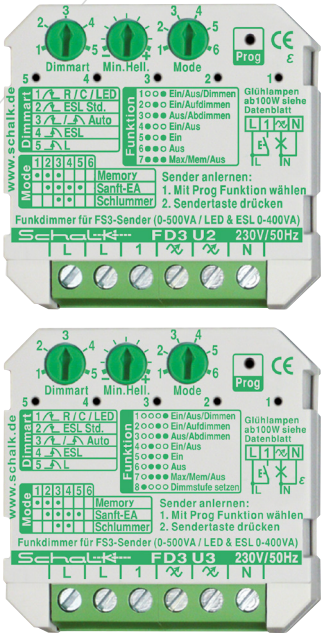
Wireless Universal Dimmer FD3 U2
Wireless Universal Dimmer FD3 U3 (Fx3smart)

for FS3-transmitters for installation in electrical boxes/flush-mounting (UP), with additional programmable functions

General purpose, very compact, user-friendly electronic (wireless) pushbutton dimmer for a wide variety of lamps (LED, CFL, incandescent, LV halogen with electronic or wound transformer, HV halogen)

Besondere Merkmale

- **Dims suitable dimmable LED lamps, CFLs, incandescent lamps, LV halogen lamps with electronic or wound transformers and HV halogen lamps**
- **Range of dimming modes:**
  forward phase control, reverse phase control, automatic detection of wound transformers, CFLs with delay for ignition and warm-up
- **Electronic short-circuit and overload protection**
- **Rated load for HV/LV incandescent lamps:**
  up to 500VA (up to 4x 500VA with power expansion)
- **Rated load for LED/CFL:**
  up to 400VA with reverse phase control
- **Suitable for use with switches from diverse product lines**
- **Suitable for individual or group control**
- **1 button input and wireless transmitter buttons, individually programmable (7 different functions settable)**
  Only FD3 U3: special function for App-control
- **Different operating modes possible:**
  brightness memory, soft on/off, slumber, discreet dim in, sync, etc.



General information

The FD3 U2 electronic universal pushbutton dimmer, with an extremely compact box installation housing, can dim virtually any type of lamp (LED, CFL, incandescent, LV halogen with electronic or wound transformer,
HV halogen) that is suitable for forward or reverse phase control.
The correct dimming mode can be detected automatically, or it can be set manually to forward or reverse phase control. A special CFL dimming mode additionally provides an ignition and warm-up delay for compact fluorescent lamps (“energy-saving lamps”).
The button input and the functions of the wireless transmitter buttons are individually programmable. This makes both individual control and group control possible in a very flexible manner (one or two button control, on/off switching with/without dimming function, etc.). In addition, brightness memory, slumber function or soft on/off function can be specified.

The compact dimensions of the FD3 U2 allow it be installed in electrical boxes behind a button switch from any desired product line, making it equally suitable for new installations as well as for maintenance-free replacement of existing or defective rotary or button dimmers.

Operation

Standard function in single button mode: a short button press toggles the lamp; a long press increases or reduces the brightness.

Additional functions

“Switch on / dim up”, “switch off / dim down” functions: These allow the dimmer to be controlled using 2 wireless buttons (in contrast to single button control). Ideally suited to group control of several dimmers because the commands are unambiguous.
“Only switch on/off”, “only switch on”, “only switch off” functions: These pure switching functions can be used to switch the dimmer on or off without permitting adjustment of the brightness. In addition, since a defined initial brightness can be specified, these functions are ideal for public buildings, for example.
“Switching sequence” function: An input that is programmed in this way goes through the switching sequence maximum brightness - saved brightness - off when the button is pressed.
“Slumber function” (e.g. as an aid to help children fall asleep):
When this function is activated by dimming the lamp, the light level is dimmed down very slowly, with a duration that depends on the brightness at the start of dimming (duration from maximum brightness: 60 min).

"Discreet dim up"
In response to a long button press when the lamp is off, the dimmer switches on and dims up from the minimum brightness.
"Sync"
If several dimmers are controlled by a single button, they may become unsynchronised because the button command (toggle) is not unambiguous.
Synchronisation is achieved by holding the button pressed long enough (approximately 10 s) for all dimmers to dim down to minimum brightness and then stop at maximum brightness (maximum level).

Definition of terms:

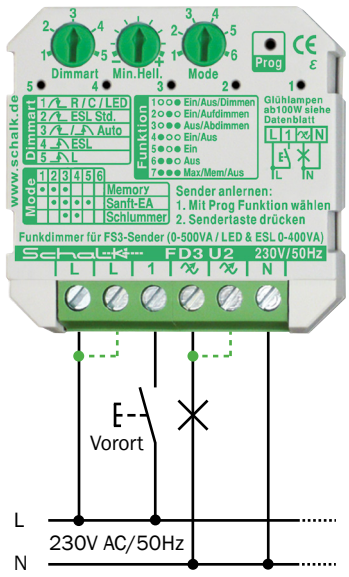
Dim in	Increase brightness from the off state (starting at minimum brightness if so configured)
Dim out	Reduce brightness to the off state
Mem/Memory	Brightness memory – the last set brightness is saved on switch-off and restored on the next switch-on
Sync	Synchronise – restore the synchronisation of several linked dimmers operated by a single button or signal
input*Soft on/off*	Soft on/off switching
Slumber	Function for automatic, very slow dimming down (duration depends on starting brightness; max. 1 hour)
CFL	Compact fluorescent lamp (energy-saving lamp)
Electronic load	Any lamp with an electronic ballast or electronic transformer
Toggle	Switch on and off with a single button or signal input
HV incandescent lamps	Incandescent lamps operated directly from 230V without a transformer
LV incandescent lamps	Low voltage incandescent lamps (e.g. 12V) requiring a transformer (electronic or wound)

Installation

The FD3 U2 wireless dimmer has a neutral line connection, so the lower load limit is 0VA. However, the dimmer must be operated without a neutral connection with incandescent lamp loads over 100W to avoid EMC problems. In this case the neutral terminal is jumpered to the load output. This has no effect on operation.

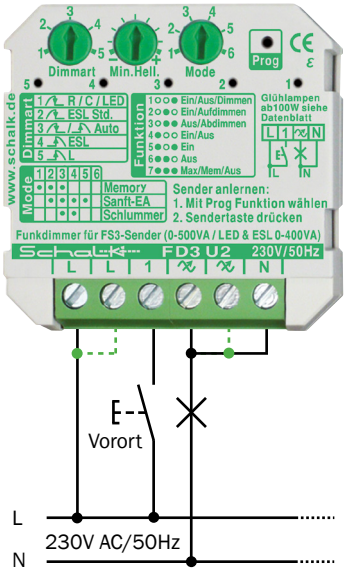
Standard connection

For dimmable LED, CFL and LV halogen lamps (with electronic or wound transformers) up to the maximum rated load, and for HV halogen and incandescent lamps up to 100W



Connection without neutral line

For HV halogen and incandescent lamps over 100W

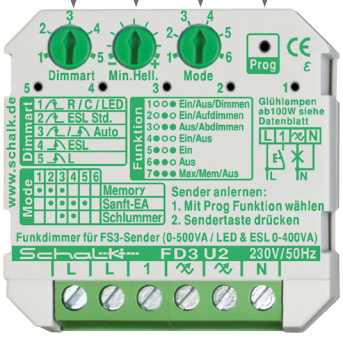


------- optional

Caution! ***The dimmed phase must not be switched separately (secondary side), as this can damage the dimmer! Only switch and dim the connected luminaire circuit with the dimmer itself!***

Settings and initial use

Controls and indicators:



„Dimmart“ = dimming mode control:
Used to select a suitable dimming mode for the lamp (see “Setting the dimming mode”)

„Min.Hell.“ = minimal brightness control:
Used to set the minimum lamp brightness (see “Setting the minimum brightness”)

“Mode” control:
Used to set the operating mode (see “Setting the operating mode”)

“Prog” programming button:
This button is used to perform configuration of the wireless transmitter. (see “Configuring wireless transmitters”)

LEDs 1-5:
This LED shows the device status (operating state, selected function in programming mode, fault codes).

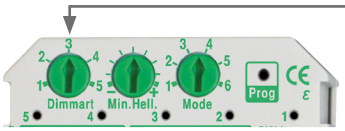
Legend:
- ○ LED off
- ● LED glows red
- ◍ LED flashes red
- ● LED glows green
- ◍ LED flashes green
- ◍ LED flashes alternately red/green

1. Setting the dimming mode

⌐∿ = forward phase control

∿⌐ = reverse phase control

Set the “Dimmart” control to a dimming mode suitable for the lamp (see table)



All suitable dimmable lamps can usually be operated in dimming mode 3 (Automatic).
Exceptions:
- Dimming mode 5 must be selected for lamps with wound transformers in a circuit with an automatic demand switch (use with wireless operation is not practical).
- Dimming mode 2 (or if appropriate mode 4) must be selected for CFLs (compact fluorescent lamps) which require an igniti on and warm-up time.

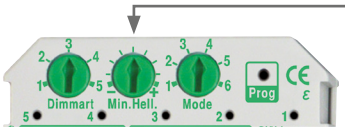
Dimming mode	Description
1: ∿⌐ R / C / LED	Reverse phase control. For incandescent lamps, HV halogen lamps, LV halogen lamps with
2: ∿⌐ ESL Std.	Reverse phase control with CFL mode. For dimmable CFLs which require an ignition and
3: ∿⌐ / ⌐∿ Auto	In this mode, almost all loads are dimmed with reverse phase control, switching automatically to forward phase control only for wound transformers ***Not suitable for lamps with wound transformers that are located in a circuit with an automatic demand switch - use dimming mode 5 in this case.***
4: ⌐∿ ESL	Forward phase control with CFL mode. For dimmable CFLs which require an ignition and warm-up time, and when dimming mode 2 does not provide smooth dimming.
5: ⌐∿ L	Forward phase control. For dimming lamps with wound transformers that are located in a circuit with an automatic demand switch

CFL mode (dimming modes 2 and 4)
Most CFLs need full mains voltage for ignition. For this reason, this mode provides an ignition phase at half brightness before adjusting to the last (saved) brightness level. A warm-up phase with elevated minimum brightness is also provided because most CFLs have significantly reduced minimum dimming capability (without going out) when cold. The minimum brightness is gradually reduced to the normal value during the warm-up phase. The warm-up time depends on the off time, so the full warm-up time (max. 1 minute) is only used when the lamp has been off for an extended time. If a CFL is switched off at very low brightness and then switched on again when cold, the previous minimum brightness will be attained only after the warm-up phase.

Automatic detection of wound transformers (dimming mode 3)
Wound transformers must be dimmed with forward phase control because reverse phase control generates inductive reverse voltages that can destroy the dimmer if it does not detect them and switch off on time.
In this dimming mode the dimmer automatically changes to forward phase control after being switched on as soon as overvoltages (not yet dangerous) are detected. This setting is retained until loss of mains voltage. This dimming mode is not suitable for use with automatic demand switches because the mains voltage is always disconnected after the lights are switched off.

2. Setting the minimum brightness

The minimum brightness should be set depending on the lamp so that the on state of the lamp can still be recognised at minimum brightness.



Switch on the dimmer and dim down as far as possible. Then set the minimum brightness to the desired level with the “Min.Hell.” control.

3. Configuring wireless transmitters and programming

The FD3 U2 has 7 different functions; each of these can be assigned arbitrarily to the wired button input 1 or to one of the wireless transmitter buttons. The FD3 U2 is configured with the default settings when it is delivered.
The FD3 U3 has the additional function 8: „Dimmstufe setzen“ („Set dimming value“) for controlling by smartphone app via external gateways (like Mediola smart home gateway). To activate this function, see special SmartHome application examples and instructions.

3.1 Default settings

In its default configuration, the FD3 U2 already responds to button 1 / channel 1 from transmitters that are also configured with their default settings (address: DIP switches 1-8 in position “-”, level “A”, channel 1). The dimmer can already be switched on/off (brief push) or up/down dimmed (long push) using button 1 on the transmitter (corresponds to pre-defined function 1: “Switching on/off and dimming”). The same functionality is also assigned to a wired button on terminal 1.

Input 1	Function: Toggling and dimming
Button 1 of a wireless transmitter with default settings	Function: Toggling and dimming

Restore default settings:
Press and hold the Prog button for 10s until LED 5 flashes red five times (transmitters on functions 2-7 that have already been configured will not be deleted)

Delete default settings + all wireless transmitters:
Keep the Prog button pressed for 20s until LED 5 flashes red, first five times, and then ten times. Wireless operation is then not possible until the device is reconfigured for wireless transmitters.

3.2. Configuring for wireless transmitters

If a function that differs from the default settings is to be assigned to input 1, or if new wireless transmitter buttons are to be configured for special functions, these functions / transmitter buttons must be programmed.

Configuration process:

1. Keep pressing the “Prog” button until the desired function is selected ⟶ LEDs 1-3 are lit depending on the chosen function
   (see Table “Configurable functions”)
2. Briefly press the desired button on the wireless transmitter or on wired input 1. (LED 5 glows green when receiving signal) ⟶ LED display goes out
   Press “Prog” for 2s to exit programming mode immediately.

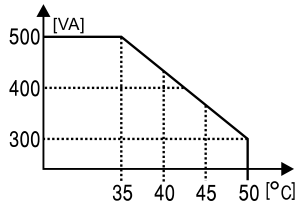
Table: Configurable functions

LED display 4 3 2 1	Function	Description
○○○●	**1: Toggle and dim**	Short button press = toggle; long button press = dim up/down
○○●○	**2: Switch on / dim up**	Short button press = switch on; long button press = dim up
○○●●	**3: Switch off / dim down**	Short button press = switch off; long button press = dim down
○●○○	**4: Only toggle (= pulse switch)**	Short button press = toggle (dimming not possible)
○●○●	**5: Only switch on**	Short button press = switch on (dimming not possible)
○●●○	**6: Only switch off**	Short button press = switch off (dimming not possible)
○●●●	**7: Switch sequence (maximum-memory-off)**	Briefly press several times for switching sequence: maximum brightness ⟶ saved brightness ⟶ off
●○○○	**8*): Set dimming value**	Set defined dimming value (0-100%) (e.g. by app)

Info *Functions 2, 3, 5 and 6 are optimally suited to two-button operation or group control of several dimmers because these commands are unambiguous. This ensures that asynchronous operation cannot occur.*
**) The function 8 is available exclusively in the FD3 U3.*

Ambient conditions and troubleshooting

Allowable load:



The efficiency of wound transformers and electronic loads (LEDs, CFLs and electronic transformers) must be taken into account. The (primary) VA value is the critical parameter for the dimmer. Electronic loads must be approved by the manufacturer for dimming with forward or reverse phase control dimmers.
The dimmer heats up during operation, depending on the connected load. The connected load must be reduced if this heat cannot be dissipated adequately. Do not mount dimmers close to heat sources.

Fig.: Maximum allowable load versus ambient temperature (with adequate air circulation)

LED status display:

The LED is lit red in the on state (going out briefly during the on/off ramp, going out every 1s during Slumber mode, and going out every 2s during the CFL warm-up phase). If a valid radio signal is received, it is (in addition) lit green. When input 1 receives a signal, the LED flickers green.
If a fault occurs, it displays a fault code.

Fault codes: (LED flashes 1 to 9 times, followed each time by a brief pause)	
1	Overload >500VA
2	Overtemperature
3	Overcurrent (short circuit)
4	Transformer reverse voltage
5	Transformer saturation (unbalanced load)
6	Overload >900VA
7	Mains overvoltage
8	Synchronisation error
9	Memory error

Info *There is a restart lockout interval of up to 10 seconds after an overload, overtemperature, overcurrent or overvoltage condition to allow the heated components to cool down.*

General information:
Lamps approved for the same dimming mode can usually be used together. Incandescent lamps may always be operated in parallel. However, functional impairments occur fairly often when electronic loads from different manufacturers are operated in parallel, due to mutual interference of manufacturer-specific ballasts and/or electronic transformers. Wound transformers may not be combined with electronic loads. The dimmer is designed to work with as many different types of lamps as possible. However, it is not possible to guarantee trouble-free operation of every dimmable lamp with the dimmer, since this can be affected by the design or construction of the lamp ballast or transformer. Flickering or erratic dimming in the low brightness range with LED lamps and CFLs is usually due to the lamp being designed for higher minimum input power. We recommend raising the minimum brightness setting in such cases. Ripple control signals from electricity plants can lead to perceptible flickering of the lighting. The magnitude of this effect varies from one region to the next.

Technical data

Supply voltage	230V AC 50Hz
Power consumption	0.6W in off state
Power dissipation	2,4W with 500VA load
Rated load	
Incandescent, HV and LV halogen lamps, wound or electronic transformers	500VA at ambient temperatures up to 35°C 300VA at ambient temperatures up to 50°C
LED/CFL	Up to 400VA (lamps of the same make recommended) *Differences in manufacture-specific ballast or electronic transformer circuitry may lead to restrictions on load capacity, the maximum number of lamps or the dimming and/or switching functions*
Input 1:	
Wiring capacitance on terminal 1	100nF max.
Glow lamp load on terminal 1	20mA max.
Receiving frequency	433.92MHz
Modulation type	OOK PWM
Mounting position	Oriented towards transmitter if necessary
Ambient temperatures	-10°C to +50°C (reduced power above +35°C)
Connections	Socket terminals with captive screws M3
Clamping range	0.5 mm² - 2.5 mm²
Strip length	6.5 mm - 7.0 mm
Screwing torque	0.50 Nm
Outside dimensions	43x43x18.5mm³
Weight	35g
RAL colour	Grey 7035 / Green 6029

Compatible devices: FE3 / FD3 / FS3 series radio transceiver, FV2 R radio repeater

Info **Also available as a simplified variant without special functions (see FD3 U2E)**

Order data

Item no.	EAN	Type	Description
FD3U29	4 046929 101301	FD3 U2	Wireless universal dimmer 230V AC (UP) with additional functions, also for LED/CFL
FD3U39	4 046929 101370	FD3 U3	Wireless universal dimmer 230V AC (UP), Fx3smart, also for LED

Accessories

Item no.	EAN	Type	Description
HC3500	4 046929 901048	HC 35	Top-hat rail clip 35mm

2017-05-01

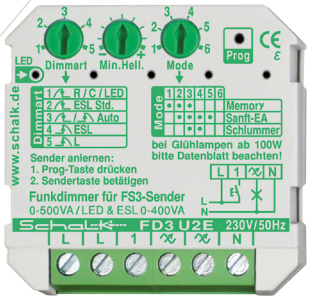
Wireless Universal Dimmer FD3 U2E

for FS3-transmitters for installation in electrical boxes/flush-mounting (UP)

General purpose, very compact, user-friendly electronic (wireless) pushbutton dimmer for a wide variety of lamps (LED, CFL, incandescent, LV halogen with electronic or wound transformer, HV halogen)

Special features

- **Dims suitable dimmable LED lamps, CFLs, incandescent lamps, LV halogen lamps with electronic or wound transformers and HV halogen lamps**
- **Range of dimming modes: forward phase control, reverse phase control, automatic detection of wound transformers, CFLs with delay for ignition and warm-up**
- **Electronic short-circuit and overload protection**
- **Rated load for HV/LV incandescent lamps: up to 500VA (up to 4x 500VA with power expansion)**
- **Rated load for LED/CFL: up to 400VA with reverse phase control**
- **Suitable for use with switches from diverse product lines**
- **Very simple wireless transmitter configuration**
- **Operated using one button (wireless and/or wired**
- **pushbutton): short button press = toggle; long button press = dim up/down**



General information

The FD3 U2E wireless universal pushbutton dimmer can dim a wide variety of lamps (LED, CFL, incandescent, LV halogen with electronic or wound transformer, HV halogen).
Along with automatic detection of wound transformers (“Auto” dimming mode), the dimming mode can be set manually to forward or reverse phase control if necessary (especially for lamps with electronic ballasts or electronic transformers). A special CFL dimming mode additionally provides an ignition and warm-up delay for compact fluorescent lamps (“energy-saving lamps”)
The compact dimensions of the FD3 U2E allow it be installed in electrical boxes behind a button switch from any desired product line, making it equally suitable for new installations as well as for maintenance-free replacement of existing or defective rotary or button dimmers.

Operation

A short button press toggles the lamp; a long press increases or reduces the brightness.

Functions

“Slumber” function (e.g. as an aid to help children fall asleep)
When this function is activated by dimming the lamp, the light level is dimmed down very slowly, with a duration that depends on the brightness at the start of dimming (duration from maximum brightness: 60 min.).

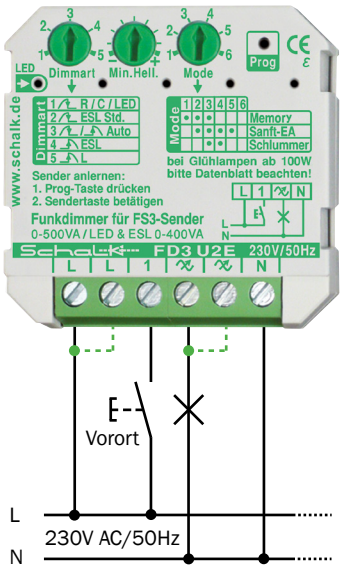
“Discreet dim in” function
In response to a long button press when the lamp is off, the dimmer switches on and dims up from the minimum brightness.

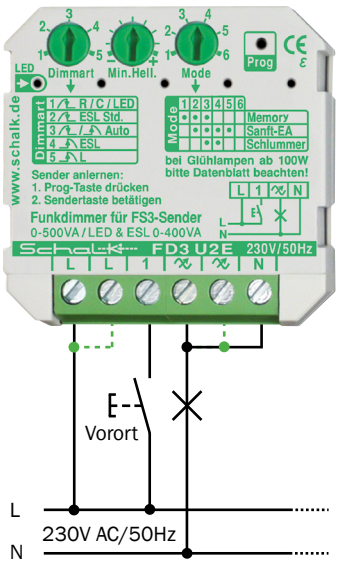
„Sync“ function
If several dimmers are controlled by a single button, they may become unsynchronised because the button command (toggle) is not unambiguous.
Synchronisation is achieved by holding the button pressed long enough (approximately 10 s) for all dimmers to dim down to minimum brightness and then stop at maximum brightness (maximum level).

Installation

The FD3 U2E dimmer has a neutral line connection, so the lower load limit is 0VA. However, the dimmer must be operated without a neutral connection with (HV) incandescent lamp loads over 100W to avoid EMC problems. In this case the neutral terminal is jumpered to the load output. This has no effect on operation.

Standard connection	Connection without neutral line
For dimmable LED, CFL and LV halogen lamps (with electronic or wound transformers) up to the maximum rated load, and for HV halogen and incandescent lamps up to 100W	For HV halogen and incandescent lamps over 100W





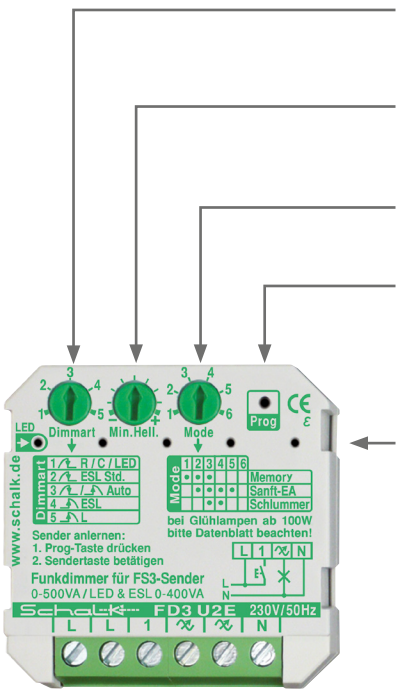
Optional; for improved heat dissipation with heavy loads

Caution!

The dimmed phase must not be switched separately (secondary side), as this can damage the dimmer! Only switch and dim the connected luminaire circuit with the dimmer itself!

Settings and initial use

Controls and indicators:



„Dimmart“ = dimming mode control:
Used to select a suitable dimming mode for the lamp (see “Setting the dimming mode”)

„Min.Hell.“ = minimal brightness control:
Used to set the minimum lamp brightness (see “Setting the minimum brightness”)

“Mode” control:
Used to set the operating mode (see “Setting the operating mode”)

“Prog” programming button:
This button is used to perform configuration of the wireless transmitter. (see “Configuring wireless transmitters”)

LED:
This LED shows the device status (operating state / fault codes).

Legend:
- ○ LED off
- ● LED glows red
- ◔ LED flashes red
- ● LED glows green
- ◔ LED flashes green
- ◔ LED flashes alternately red/green

1. Setting the dimming mode

⌐ = forward phase control ⌐ = reverse phase control

Set the “Dimmart” control to a dimming mode suitable for the lamp (see table)

All suitable dimmable lamps can usually be operated in dimming mode 3 (Automatic).
Exceptions:

- Dimming mode 5 must be selected for lamps with wound transformers in a circuit with an automatic demand switch (use with wireless operation is not practical).
- Dimming mode 2 (or if appropriate mode 4) must be selected for CFLs (compact fluorescent lamps) which require an igniti on and warm-up time.

Dimming mode	Description
1: ⌐ R / C / LED	Reverse phase control. For incandescent lamps, HV halogen lamps, LV halogen lamps with
2: ⌐ ESL Std.	Reverse phase control with CFL mode. For dimmable CFLs which require an ignition and
3: ⌐ / ⌐ Auto	In this mode, almost all loads are dimmed with reverse phase control, switching automatically to forward phase control only for wound transformers ***Not suitable for lamps with wound transformers that are located in a circuit with an automatic demand switch - use dimming mode 5 in this case.***
4: ⌐ ESL	Forward phase control with CFL mode. For dimmable CFLs which require an ignition and warm-up time, and when dimming mode 2 does not provide smooth dimming.
5: ⌐ L	Forward phase control. For dimming lamps with wound transformers that are located in a circuit with an automatic demand switch

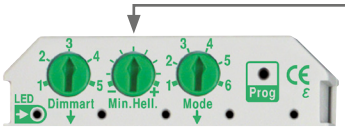
CFL mode (dimming modes 2 and 4)
Most CFLs need full mains voltage for ignition. For this reason, this mode provides an ignition phase at half brightness before adjusting to the last (saved) brightness level. A warm-up phase with elevated minimum brightness is also provided because most CFLs have significantly reduced minimum dimming capability (without going out) when cold. The minimum brightness is gradually reduced to the normal value during the warm-up phase. The warm-up time depends on the off time, so the full warm-up time (max. 1 minute) is only used when the lamp has been off for an extended time. If a CFL is switched off at very low brightness and then switched on again when cold, the previous minimum brightness will be attained only after the warm-up phase.

Automatic detection of wound transformers (dimming mode 3)
Wound transformers must be dimmed with forward phase control because reverse phase control generates inductive reverse voltages that can destroy the dimmer if it does not detect them and switch off on time.
In this dimming mode the dimmer automatically changes to forward phase control after being switched on as soon as overvoltages (not yet dangerous) are detected. This setting is retained until loss of mains voltage. This dimming mode is not suitable for use with automatic demand switches because the mains voltage is always disconnected after the lights are switched off.

2. Setting the minimum brightness

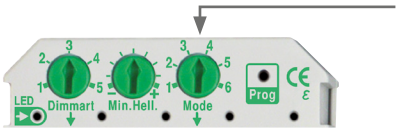
The minimum brightness should be set depending on the lamp so that the on state of the lamp can still be recognised at minimum brightness.

Switch on the dimmer and dim down as far as possible. Then set the minimum brightness to the desired level with the “Min.Hell.” control.



3. Setting the operating mode

Various special functions can be activated or combined using the operating mode setting.



Mode	1	2	3	4	5	6
Memory	•	•	•			
Sanft-EA		•	•	•	•	
Schlummer			•	•		

„•“ = activated

„Memory“ (=brightness memory)
If activated, the dimmer switches on at the last (saved) brightness level; otherwise at maximum brightness

„Sanft-EA“ (=soft on/off)
Soft switch-on and switch-off if activated (prolongs lamp life)

„Schlummer“ (=slumber)
If activated, the Slumber function can be used.

The LED briefly flashes red each time the operating mode changes.

4. Configuring wireless transmitters

The FD3 U2E has a wired control input (terminal 1) and a “wireless input”.
In its default configuration, the FD3 U2E already responds to button 1 / channel 1 from transmitters that are also configured with their default settings (address: DIP switches 1-8 in position “-”, level “A”, channel 1). The dimmer can already be switched on/off (short push) or up/down dimmed (long push) using button 1 on the transmitter. Similarly, a wired button on terminal 1 may also be used for switching and dimming (as described above).
You can find an overview of the default settings in Section 5.

Configuration process:
1) Press the Prog button briefly ⟶ LED lights up
2) Press the desired button on the wireless transmitter ⟶ LED goes out

5. Default settings

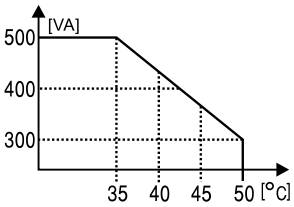
The FD3 U2E is configured with the default settings when it is delivered. The following settings are pre-defined in this configuration:

Input 1	Function: Toggling and dimming
Button 1 of a wireless transmitter with default settings	Function: Toggling and dimming

Restore default settings:
Press and hold the Prog button **for 10s** until the LED flashes 5 times.

Ambient conditions and troubleshooting

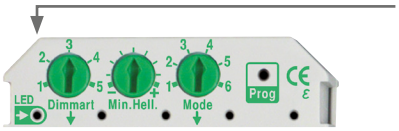
Allowable load:



The efficiency of wound transformers and electronic loads (LEDs, CFLs and electronic transformers) must be taken into account. The (primary) VA value is the critical parameter for the dimmer. Electronic loads must be approved by the manufacturer for dimming with forward or reverse phase control dimmers.
The dimmer heats up during operation, depending on the connected load. The connected load must be reduced if this heat cannot be dissipated adequately. Do not mount dimmers close to heat sources.

Fig.: Maximum allowable load versus ambient temperature (with adequate air circulation)

LED status display:



The LED is lit red in the on state (going out briefly during the on/off ramp, going out every 1s during Slumber mode, and going out every 2s during the CFL warm-up phase). If a valid radio signal is received, it is (in addition) lit green. When input 1 receives a signal, the LED flickers green.
If a fault occurs, it displays a fault code.

Fault codes: (LED flashes 1 to 9 times, followed each time by a brief pause)	
1	Overload >500VA
2	Overtemperature
3	Overcurrent (short circuit)
4	Transformer reverse voltage
5	Transformer saturation (unbalanced load)
6	Overload >900VA
7	Mains overvoltage
8	Synchronisation error
9	Memory error

Info *There is a restart lockout interval of up to 10 seconds after an overload, overtemperature, overcurrent or overvoltage condition to allow the heated components to cool down.*

Definition of terms:

Dim in	Increase brightness from the off state (starting at minimum brightness if so configured)
Dim out	Reduce brightness to the off state
Mem/Memory	Brightness memory – the last set brightness is saved on switch-off and restored on the next switch-on
Sync	Synchronise – restore the synchronisation of several linked dimmers operated by a single button or signal
input*Soft on/off*	Soft on/off switching
Slumber	Function for automatic, very slow dimming down (duration depends on starting brightness; max. 1 hour)
CFL	Compact fluorescent lamp (energy-saving lamp)
Electronic load	Any lamp with an electronic ballast or electronic transformer
Toggle	Switch on and off with a single button or signal input
HV incandescent lamps	Incandescent lamps operated directly from 230V without a transformer
LV incandescent lamps	Low voltage incandescent lamps (e.g. 12V) requiring a transformer (electronic or wound)

General information:

Lamps approved for the same dimming mode can usually be used together. Incandescent lamps may always be operated in parallel. However, functional impairments occur fairly often when electronic loads from different manufacturers are operated in parallel, due to mutual interference of manufacturer-specific ballasts and/or electronic transformers. Wound transformers may not be combined with electronic loads. The dimmer is designed to work with as many different types of lamps as possible. However, it is not possible to guarantee trouble-free operation of every dimmable lamp with the dimmer, since this can be affected by the design or construction of the lamp ballast or transformer. Flickering or erratic dimming in the low brightness range with LED lamps and CFLs is usually due to the lamp being designed for higher minimum input power. We recommend raising the minimum brightness setting in such cases. Ripple control signals from electricity plants can lead to perceptible flickering of the lighting. The magnitude of this effect varies from one region to the next.

Technical data

Supply voltage	230V AC 50Hz
Power consumption	0.6W in off state
Power dissipation	2W with 500VA load
Rated load	
Incandescent, HV and LV halogen lamps, wound or electronic transformers	500VA at ambient temperatures up to 35°C 300VA at ambient temperatures up to 50°C
LED/CFL	Up to 400VA (lamps of the same make recommended) *Differences in manufacture-specific ballast or electronic transformer circuitry may lead to restrictions on load capacity, the maximum number of lamps or the dimming and/or switching functions*
Input 1:	
Wiring capacitance on terminal 1	100nF max.
Glow lamp load on terminal 1	20mA max.
Receiving frequency	433.92MHz
Modulation type	OOK PWM
Mounting position	Oriented towards transmitter if necessary
Ambient temperatures	-10°C to +50°C (reduced power above +35°C)
Connections	Socket terminals with captive screws M3
Clamping range	0.5 mm² - 2.5 mm²
Strip length	6.5 mm - 7.0 mm
Screwing torque	0.50 Nm
Outside dimensions	43x43x18.5mm³
Weight	35g
RAL colour	Grey 7035 / Green 6029

Compatible devices: FE3 / FD3 / FS3 series radio transceiver, FV2 R radio repeater

Info **Also available as a variant with programmable special functions (see FD3 U2) or as a variant without wireless control (see ETD U2)**

Order data

Item no.	EAN	Type	Description
FD3U2E9	4 046929 101332	FD3 U2E	Wireless universal dimmer 230V AC (UP), also for LED/CFL

Accessories

Item no.	EAN	Type	Description
HC3500	4 046929 901048	HC 35	Top-hat rail clip 35mm

2017-05-01

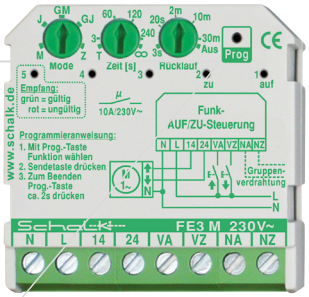
Wireless motor controller FE3 M

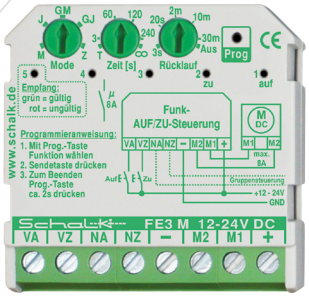
with up/down (open/close) function for installation in electrical boxes (UP)
Variants: 230V AC for AC motors, 12-24V DC for DC motors

For convenient (wireless) control of roller shutters and louver blinds, hinged shutters, skylights, smoke extractor hoods in fire protection systems, gate drives, valve controls, etc.

Special features

- **One or two button control**
- **Auxiliary inputs for group and central control**
- **Electronic pushbutton interlock**
  hence normal pushbuttons can be used
- **Special louver blind mode**
  allows easy louver adjustment
- **Automatic closing function (with adjustable time)**
  with run time doubled by longer button press
- **2 differently addressed transmitters configurable**
  (e.g. for single and group/central control; arbitrarily extendible with additional transmitters with the same addressing)
- **Motor protection by limiting the run time**
- **Antenna integrated into the housing**
- **Functions for local, group and auxiliary inputs**
- **configurable**
- **Open air range of 50m (FV2 R repeater available)**





General information

Used with the transmitters of the FS3 series, the FE3 M wireless receiver is a universally applicable motor controller for clockwise and anti-clockwise rotation. It can be implemented as either a one-button two-button motor controller. Using the higher priority auxiliary inputs, it is possible to combine several FE3 M controllers to form group and central control systems.
The motor run time can be limited, e.g. to prevent overloading the motor in the event of mechanical jamming.
A convenient, automatic and adjustable closing function prevents e.g. inadvertently leaving a skylight open. In the case of louver blind controls, the individual louvers can be exactly adjusted or automatically set to a predefined angle on switching off.

Application

Roller shutters and louver blinds, hinged shutters, skylights, smoke extractor hoods in fire protection systems, gate drives, valve controls, etc.

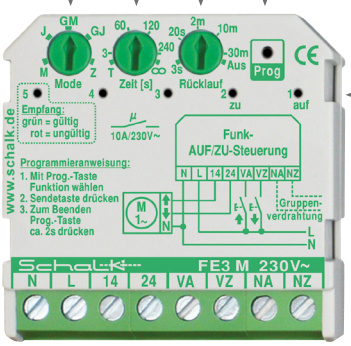
Operation

The FE3 M can be actuated wirelessly as well as by means of commercially available pushbuttons. These buttons do not require any mechanical interlock.
Briefly pressing the button on local input VA (Local Open) or VZ (Local Close) causes the drive to begin moving in the selected direction and then stop after the preset run time (or prior to that if stopped by the limit switch integrated into the motor).
Pressing the button (on VA or VZ) again during the run time immediately stops the motor.
In the case of one-button motor control, both local inputs are actuated at the same time using just one button (by bridging VA and VZ). In this type of control system, the direction changes after each press of the button (Open-Stop-Close-Stop).
By using the auxiliary inputs NA (Open) and NZ (Close), any number of drives can be opened or closed simultaneously in a defined process, regardless of their current status. When activated via an auxiliary input, the motor only runs while the actuation command from the upstream group control unit is active. If NA and NZ are active at the same time, NA has priority. While NA or NZ is active, the local inputs remain disabled.
If the FE3 M is used as a group control unit, the auxiliary inputs are not timer-controlled. This allows the subordinate control units to be maintained in a desired position for any required duration (e.g. by a wind monitor).
In the louver blind mode, the running drive is immediately stopped again after a short press of a local input button. Pressing the button for longer (>1s) then causes the drive to continue running until its end position or the end of its run

time. This mode enables the user to adjust the louvers of the blind by using short (<1s) button presses. In the case of single-button motor control, the direction of rotation of the motor is not changed if the button is pressed repeatedly in rapid succession. This feature enables louver blind louvers to be more easily adjusted.
If automatic reverse is set, the drive begins to move in the closed direction after the preset reverse delay time has elapsed. If VA is activated for longer than 2s, the reverse delay is doubled. In louver blind mode, instead of the closing function, a counter-direction pulse is set to ensure automatic positioning of the louvers after a motor stop.
The "Motor centrally controllable by pushbutton" (Z) is provided to enable simple central control in smaller systems without an upstream group control unit. In this case, the auxiliary inputs NA and NZ can be actuated by pushbuttons in the same way as the local inputs, but the auxiliary inputs have priority.

1. Basic configuration and installation

1.1 Controls and indicators for basic configuration



„Mode" control:
The operating mode is set as follows:

M	Motor control: short push for OPEN, CLOSE or STOP
J	Louvre blind control: short push for fine adjustment of the louver angle or STOP; long push for OPEN, CLOSE
GM	Group controller for motor control* (no time control) GJ Group controller for louver blind control* (no time control)
Z	Motor centrally controllable by pushbutton (all inputs are operated using buttons)

** In GM and GJ modes, the relay outputs M1 and M2 (14 and 24) are always active so long as an auxiliary input remains activated. This means that higher priority actuation (with disabling of local inputs) by sensors (e.g. wind monitor, rain sensor etc.) is possible.*

Control „Zeit [s]" (=time):
The motor run time is set as follows:

T	Pushbutton mode (motor only runs while input is actuated)
3...240	Motor run time in seconds
∞	No run time limit

Control „Rücklauf" (=reverse):
The automatic reverse/closing function is set as follows:

In mode „M" (motor control):	Time for automatic closing function **3s..30min**, or **off** (function deactivated)
In mode „J" (louver blind control):	Duration of the counter-direction pulse **0.1s to 1.3s** (scale does not apply here!), or **off** (function deactivated)

Programming button „Prog":
This button is used to activate/deactivate programming mode and to select the programming functions.

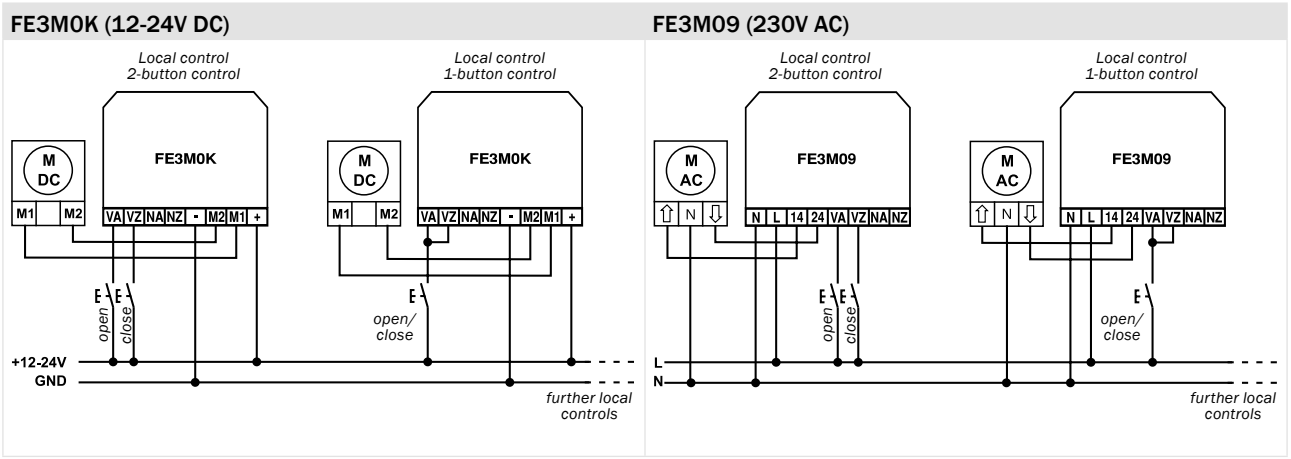
LED's 1-5:
These LEDs show device status (operating state, selected function in programming mode, fault codes).

Legend:
- ○ LED off
- ● LED glows red
- ◔ LED flashed red
- ● LED glows green
- ◔ LED flashes green
- ◔ LED flashes alternately red/green

Inputs:

VA/VZ:	Local inputs for OPEN (VA) and CLOSE (VZ) push-buttons
NA/NZ:	Auxiliary inputs for central/group control inputs OPEN (NA) and CLOSE (NZ)

1.2 Installation: Example connection of wireless roller shutter controller

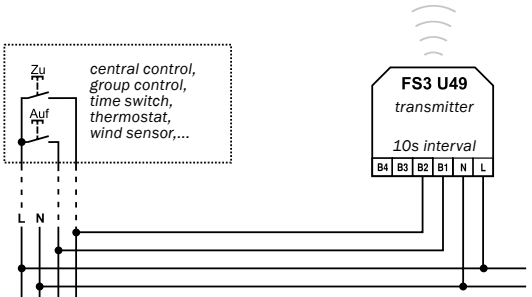


Info

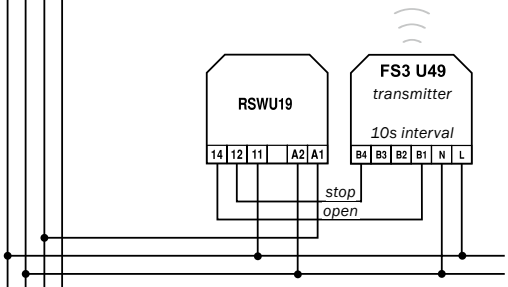
The configurable functions NA (auxiliary input OPEN) and NZ (auxiliary input CLOSE) are used for wireless transmission of long-duration switch states (e.g. wind monitors, twilight sensors, motion detectors, temperature sensors).
When used in conjunction with a time interval transmitter (FS3 U4), the FE3 M receiver continues to operate, deactivating after a 30s delay when no more signals are received from the transmitter. The N-Stop function may be used in conjunction with a changeover relay (see the connection example on the right) if the run-on time needs to be interrupted before it has fully elapsed.

Attention!

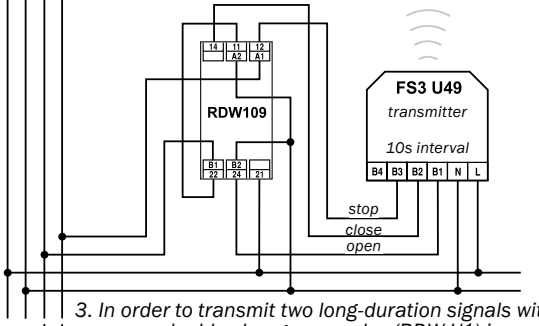
The supply voltage and the control voltage must be in phase!



1. Transmission of a long-duration signal in combination with a time interval transmitter (FS3U4) – FE3M with 30s run-on time.



2. For the transmission of a long-duration signal without run-on, a changeover relay (RSW U1) is needed in addition to the time interval transmitter (FS3 U4).



3. In order to transmit two long-duration signals without run-on, a double changeover relay (RDW U1) is needed in addition to the time interval transmitter (FS3 U4).

Information on signal range

The open air signal range is at least 50 metres. However, the radio signal may be strongly attenuated by walls, concrete ceilings, metal surfaces, bushes and damp soil. Aligning the transmitter and the receiver with one another can significantly increase the signal range.
Radio or mains interference by other electrical appliances will reduce the sensitivity of the receiver.

2. Programming

2.1 Default settings

The transmitter and the receiver are given a standard address at the factory so that the two running directions OPEN and CLOSE are available immediately after electrical connection by using buttons 1 and 2 on a handheld transmitter that also has the default settings. In programming mode, the available functions can be assigned to any of the transmitter buttons.

Resetting to factory defaults:
To restore the factory default settings, press and hold the Prog button for 10s. Once LEDs 5 and 1 have blinked five times (◐ ○ ○ ○ ◐), the procedure is finished.
If all the configured addresses / wireless transmitters are also to be deleted, keep the programming button pressed for 20s until all LEDs have blinked five times (◐ ◐ ◐ ◐ ◐).

2.2 Configuring for wireless transmitters and programming functions

For a particular button on a wireless transmitter to be able to execute a desired function on the FE3 M, the device must first be configured accordingly.

To do this, use the following procedure:

1. Select the desired function by repeatedly pressing the programming key (“Prog”) on the FE3 M (the “Configurable functions” table shows the 18 possible functions).
2. Briefly press the desired button on the transmitter, and the LEDs for the selected function will start to flash, meaning that the function has been accepted.
   Attention: If the address is already in use, all the LEDs will light up red (● ● ● ● ●). This prevents a transmitter button from being assigned twice. Try using a different button on the transmitter, or delete this button beforehand (see below).
3. Now either press and hold the Prog button for about 2s until all the LEDs go out to finish programming (configuration mode terminates automatically after 20s), or select another function by briefly pressing the Prog button in order to configure the device for another button on the wireless transmitter.

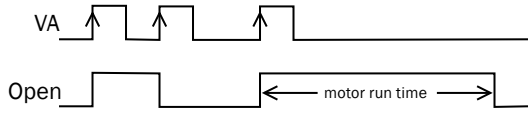
If a button for which the wireless transmitter has been configured (= address) is to be deleted, select the function that is assigned to it, and then press the Prog button for about 5s until LEDs 4, 3 and 2 (○ ◐ ◐ ◐ ○) flash five times.

Table: Configurable functions

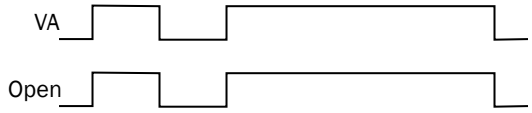
	LED display 5 4 3 2 1	Function	Description
Transmitter 1	◐ ○ ○ ○ ●	**1: Open/Stop**	Local control function VA, Open/Stop
	◐ ○ ○ ● ○	**2: Close/Stop**	Local control local function VZ, Close/Stop
	◐ ○ ● ○ ○	**3: Open/Stop/Close/Stop**	One-button control, Open/Stop/Close/Stop
	● ○ ○ ○ ●	**4: Open**	Group control, Open (not retriggerable)
	● ○ ○ ● ○	**5: Close**	Group control, Close (not retriggerable)
	● ○ ● ○ ○	**6: Stop**	Stop (does not apply to auxiliary inputs)
	● ○ ○ ○ ●	**7: N-Open**	Auxiliary Open, 30s run-on time (only in combination with a time interval transmitter
	● ○ ○ ● ○	**8: N-Close**	Auxiliary Close, 30s run-on time (only in combination with a time interval transmitter
	● ○ ● ○ ○	**9: N-Stop**	Auxiliary Stop, (the Stop command only applies to N-Open and N-Close)
Transmitter 2	○ ◐ ○ ○ ●	**10: Open/Stop**	Local control function VA, Open/Stop
	○ ◐ ○ ● ○	**11: Close/Stop**	Local control local function VZ, Close/Stop
	○ ◐ ● ○ ○	**12: Open/Stop/Close/Stop**	One-button control, Open/Stop/Close/Stop
	○ ● ○ ○ ●	**13: Open**	Group control, Open (not retriggerable)
	○ ● ○ ● ○	**14: Close**	Group control, Close (not retriggerable)
	○ ● ● ○ ○	**15: Stop**	Stop (does not apply to auxiliary inputs)
	○ ● ○ ○ ●	**16: N-Open**	Auxiliary Open, 30s run-on time (only in combination with a time interval transmitter
	○ ● ○ ● ○	**17: N-Close**	Auxiliary Close, 30s run-on time (only in combination with a time interval transmitter
	○ ● ● ○ ○	**18: N-Stop**	Auxiliary Stop, (the Stop command only applies to N-Open and N-Close)

Function diagrams

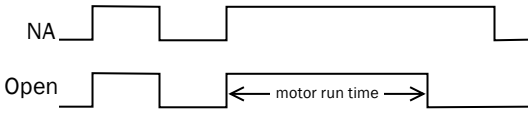
All operating modes and set motor run time:
Local inputs are edge-triggered and timer-controlled.



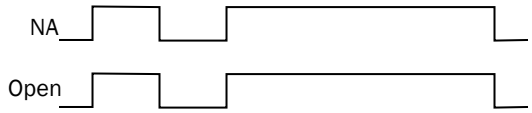
Motor run time in button mode: Local inputs are level-triggered and not timer-controlled.



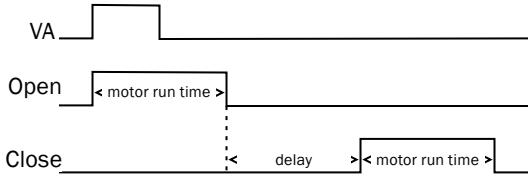
Operating modes M and J with motor run time:
Auxiliary inputs are level-triggered and timer-controlled.



Operating modes GM and GJ or motor run time in button mode: Auxiliary inputs are level-triggered and not timer-controlled.

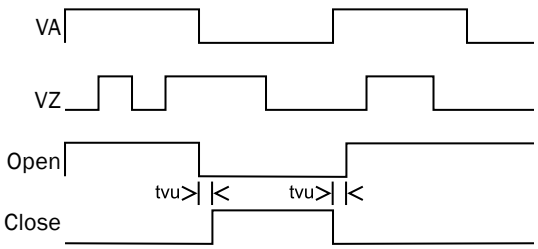


When automatic reverse is set, the reverse delay time begins at the end of the motor run time.

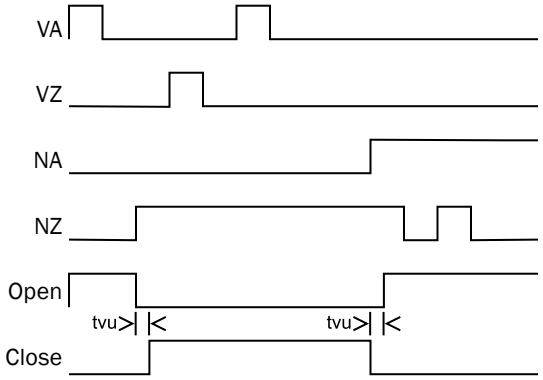


t_{vu} = changeover delay (0.6s) between Open and Close to protect the motor (from mechanical stresses).

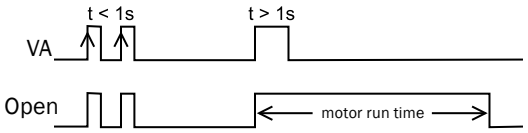
While one local button is pressed, the other local button is ignored.



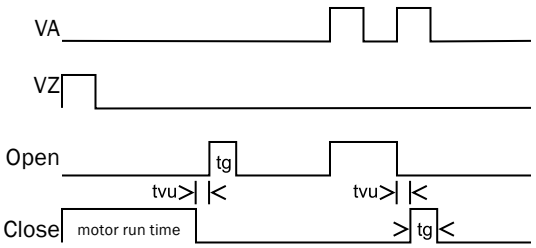
While auxiliary inputs are active, local inputs are ignored. NA has priority over NZ.



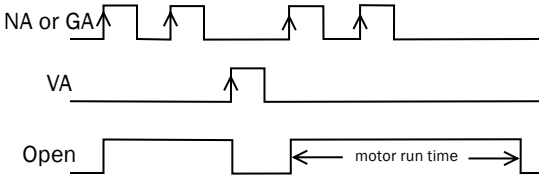
Louver blind mode: Local inputs are level-controlled for short button presses and edge-controlled for long button presses.



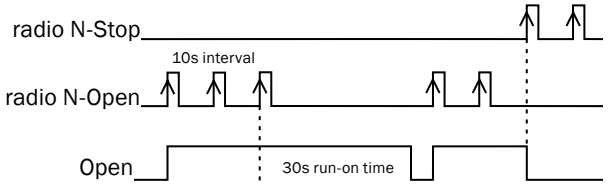
Louver blind counter-rotation (tg) set: Counter-rotation is triggered by a timeout of VZ or by a manual stop with VA or VZ.



Operating mode Z with motor run time: Auxiliary inputs are edge-triggered and timer-controlled.



The configurable functions Auxiliary-OPEN (N-Open) and Auxiliary-CLOSE (N-Close) have a fixed run-on time of 30 seconds. This run-on time can be interrupted by the Auxiliary-Stop function before it has fully elapsed if required!



LED status display

LED display 5 4 3 2 1	Meaning
● ○ ○ ○ ○	Valid address received
● ○ ○ ○ ○	Invalid address received
◐ ○ ○ ○ ●	Configurable function selected (see Table: Configurable functions)
◐ ○ ○ ○ ◐	Configurable function has been accepted
○ ○ ○ ◐ ○	Flashes rapidly: CLOSE run time is activated
○ ○ ○ ◐ ○	Flashes slowly: CLOSE reverse is activated
○ ○ ○ ◐ ○	Lit but goes out briefly: NZ is active
○ ○ ○ ● ○	Continuously lit: No CLOSE run time activated
○ ○ ○ ○ ◐	Flashes rapidly: OPEN run time is activated
○ ○ ○ ○ ◐	Flashes slowly: OPEN reverse is activated Lit
○ ○ ○ ○ ◐	but goes out briefly: NA is active
○ ○ ○ ○ ●	Continuously lit: No OPEN run time activated
◐ ○ ○ ○ ◐	Flash 5 times: Default settings have been restored
○ ◐ ◐ ◐ ○	Flash 5 times: Selected addresses have been deleted
◐ ◐ ◐ ◐ ◐	Flash 5 times: All addresses have been deleted
● ● ● ● ●	If all the LEDs light up red during configuration, the device was not configured for the currently selected transmitter button because that button is already present.

Technical data

Supply voltage for FE3M09	230V 50/60Hz ±10%
Relay voltage for FE3M09	10A 250V AC
Supply voltage for FE3M0K	12-24V DC ±10%
Relay voltage for FE3M0K	12-24V DC max. 8A
Received signal	433,92 MHz OOK PWM
Actuation voltage	Same as supply voltage
Power consumption	Active 0,75W / Passive 0,25W
Run time	3-240s
Automatic reverse time	3s-30min
Counter-direction pulse	0.1-1.3s
Relay changeover delay	0.6s
Ambient temperature	-10°C to +45°C
Connections	Socket terminals with captive screws M3
Clamping range	0.5 mm² - 2.5 mm²
Strip length	6.5 mm - 7.0 mm
Screwing torque	0.50 Nm
Outside dimensions	43x43x18.5mm³
Weight	35g
RAL colour	Grey 7035 / Green 6029

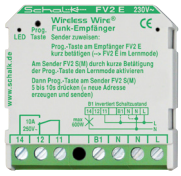
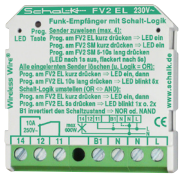
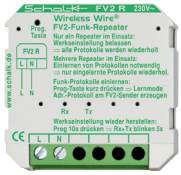
Order data

Item no.	EAN	Type	Item designation
FE3M09	4 046929 101318	FE3 M (230V AC)	Wireless OPEN/CLOSE controller 230V AC (UP), with additional wired external control inputs VA/VZ, NA/NZ
FE3M0K	4 046929 101325	FE3 M (12-24V DC)	Wireless OPEN/CLOSE controller 12-24V DC (UP), with additional wired external control inputs VA/VZ, NA/NZ

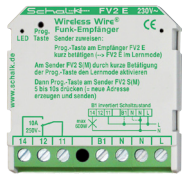
Compatible devices: FE3 / FD3 / FS3 series radio transceiver, FV2 R radio repeater

Info **Also available as a variant without wireless control; see UMS U5 and DMS U5**

Radio connection system Wireless Wire®

	Item no.	Type	Specs	Dimensions	Page
			**FV2 E radio connection receiver (for use with FV2 transmitter)** The radio connection system FV2 is optimized for wireless transmission of switch states in combination with battery driven transmitters. Radio connection receiver for the FV2 system with potential-free 10A change-over contact. In conjunction with the battery driven magnetic contact transmitter FV2 SM, it is thus possible, for example, to implement the supply air monitoring (frequently required for enclosed rooms when operating exhaust fans) with little effort.		67
	Matching products: Radio connection transmitter FV2-series, repeater FV2 R				
	FV2E09	FV2 E	230V AC, 1 CO 10A, potential-free	43x43x18.5mm	
			**FV2 EL radio connection receiver (for use with up to 4 FV2 transmitters)** Radio connection receiver for the FV2 system with potential-free 10A change-over contact. In conjunction with the battery driven magnetic contact transmitter FV2 SM, it is thus possible, for example, to implement the supply air monitoring (frequently required for enclosed rooms when operating exhaust fans) with little effort. **With the FV2 EL, the additional switching logic functions (OR, NOR, AND, NAND) enable simultaneous evaluation of up to 4 transmitters.**		79
	Matching products: Radio connection transmitter FV2-series, repeater FV2 R				
	FV2EL9	FV2 EL	230V AC, 1 CO 10A, potential-free, w. logic func.	43x43x18.5mm	
			**Radio repeater FV2 R for FV2 and Fx3 system** The FV2 R radio repeater extends the range of the FV2 radio connector system and the Fx3 radio switching system (FE3/FS3/FD3/FD3 series) by retransmitting incoming radio signals through the repeater. Optimum placement between transmitter and receiver can thus double the range.		71
	FV2R09	FV2 R	230V AC	43x43x18.5mm	
			**Radio connector transmitter FV2 S with 4 inputs** The FV2 S radio connector transmitter has 4 inputs to which external contacts can be connected. Any change to the inputs of the FV2 S transmitter is transmitted directly via radio to the relay contact of one or more FV2 E receivers. Available in 230V AC and 3V DC versions (battery operated, standard button cell CR2032).		67
	Matching products: Radio connection transmitter FV2-series, repeater FV2 R				
	FV2S09	FV2 S (230V AC)	230V AC	43x43x18.5mm	
	FV2S0B	FV2 S (3V DC batt.)	3V DC, incl. batt.	43x43x18.5mm	
			**Radio connector transmitter with magnetic contact FV2 SM (e.g. for windows)** Battery-powered transmitter with magnetic contact for monitoring windows, doors, etc.. In conjunction with the FV2 E, it is thus possible, for example, to implement the supply air monitoring (frequently required for enclosed rooms when operating exhaust fans) with little effort.		75
	Matching products: Radio connection transmitter FV2-series, repeater FV2 R				
	FV2SMB	FV2 SM	3V DC, incl. batt.	59.5x23.3x15.3mm	

Radio connection system Wireless Wire®

Page		Item no.	Type	Specs	Dimensions
75	  			**Radio supply/exhaust air set ZAS F (consisting of FV2 E/FV2 SM)** The ZAS F supply air exhaust set is ideally suited for supply air monitoring when operating extractor hoods in accordance with §4 of the Firing Ordinance. Minimal installation effort. Long battery life due to optimised radio technology. *Also available as wired version ZAS K2 - see "Motor controls".*	
		ZASF09	ZAS F	230V AC	see separate products

Wireless Wire® Radio connection system

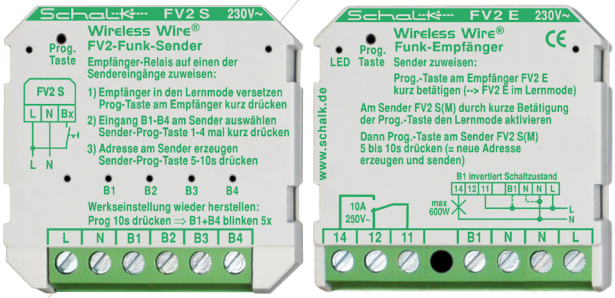
FV2 S
Transmitter with 4 inputs

FV2 E
Receiver with 1 relay output

Compact system for wireless transmission of switching states (wireless cable substitute)

Special features

- simple application as line replacement (input state at the transmitter is transmitted to the relay contact on the receiver)
- point-to-multipoint connection is also possible (one transmitter input controls several receivers)
- several radio connections can be installed next to each other (devices addressable)
- Transmitter with 230 V AC or with battery supply available
- Free field range 50 m (no external antenna)
- Repeater available to increase range
- Small housing (receiver fits in flush-mounted switch box)



General information

The wireless connection system FV2 is optimized for wireless transmission of switch states. Any change to the inputs of the FV2 S transmitter is transmitted directly via radio to the relay contact of one or more FV2 E receivers.
The devices can be addressed so that several radio connections of this type can also be operated next to each other.
Radio signals are sent when changes are made to the inputs and in time intervals. This enables the receiver to detect transmission problems and switch off automatically in the event of an error.

Applications

Extension of existing electrical installations, e.g. B. switch on additional lamps with an existing lamp, transfer the contact of a motion detector to several lamps, transfer the status of a heating thermostat to a control valve, transmit status and fault signals (door open, heating off, etc.) wirelessly.

Operation

Transmitter and receiver are factory-set with standard addressing and already react to each other after the electrical connection. Re-addressing of the devices is only necessary if several FV2 systems are installed within the same radio range.

Each input on the FV2 S can switch one or more receivers FV2 E specifically. If the receiver does not receive a valid radio signal for 270s, it switches the relay off automatically. LEDs indicate switching edges on the transmitter and valid radio signals on the receiver.

Initial operation:

The factory default setting is: As soon as the transmitter and receiver are powered on, the relay in the receiver can be controlled via input B1 of the transmitter. The inputs B2 .. B4 of the transmitter are only activated after addressing.

Addressing:
Assign a receiver FV2 E to one of the 4 inputs on the transmitter FV2 S.

1. First, the **receiver** is switched to learning mode by briefly pressing the “Prog.” button → The LED on the receiver lights up.

2. Then select the desired input **on the transmitter** by briefly pressing the “Prog.” button once or several times. → corresponding LED (B1 .. B4) on the transmitter lights up.

3.1 Assigning the **first receiver:**
Now press the programming button **on the transmitter** again and hold it pressed for more than 5s (the LED assigned to the input goes out after 1s and starts flickering after 5s - a new address is generated **during flickering**).
Now release the programming button → new address is transmitted to the receiver

3.2 Assigning **additional receivers:**
Now press the programming button **on the transmitter** again, keep it pressed for more than 1 second, and release it as soon as the LED goes out.
(when the button is released, the address already present is transmitted to the receiver. This means that several receivers can be switched via one input)

Reset to factory settings (FV2 S):
Press the programming button 10s until the LEDs B1 + B4 flash 5 times. Then input B1 sends with standard address and inputs B2 to B4 are inactive.

Reset to factory settings (FV2 E):
Press the “Prog.” button for 10s until the red LED flashes 5 times. The receiver then reacts to transmitters in the factory setting.

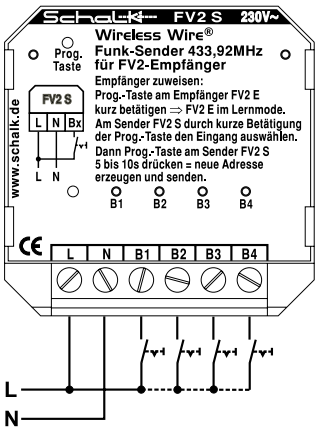
Notes regarding range:
The antenna of the devices is located just above the bottom of the housing and runs along the right and top edges of the housing. This area must have sufficient distance to metal surfaces. Since the radiation is not homogeneous, the range can be significantly improved by aligning the devices (to be determined in the experiment). The installation site should be at least 1 m above ground level.

For a good radio range and reliable radio reception, please observe in general:
- Do not mount radio modules directly on metal surfaces
- Avoid metallic housings and shields
- Install at highest possible locations (>1m above ground)
- Align transmitter and receiver optimally to each other
- Please note: damp or steel-reinforced walls and ceilings, moist soil, etc. attenuate any wireless radiation

Other electronic consumers (ballasts, switching power supplies, power regulators, etc.) may cause locally limited radio interference in individual cases.
In the event of a fault, please try to establish sufficient distance to an affected radio module.

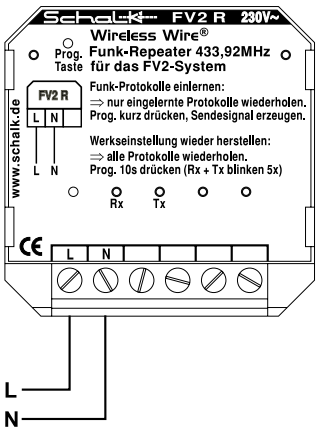
Electrical connection

Transmitter, 230V AC



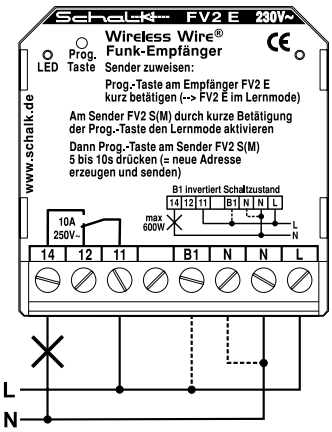
50m free-field range

Repeater, 230V AC

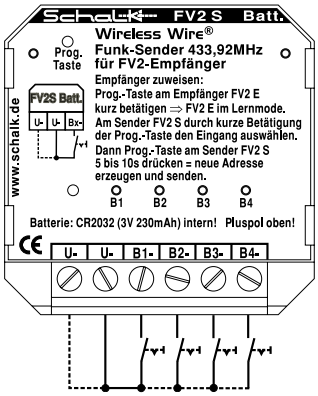


50m free-field range

Receiver, 230V AC



Transmitter, 3C DC battery



50m free-field range

Technical data

Wireless signal	433,92 MHz OOK PWM
Free field range	50 m
Ambient temp.	-10°C to +45°C
Connection terminals	Socket terminals with captive screws M3
Clamping range	0.5 mm² - 2.5 mm²
Strip length	6.5 mm - 7.0 mm
Screwing torque	0.50 Nm
Mounting orientation	If necessary, align the receiver with the transmitter (for better range)
Dimensions / weight	43 x 43 x 18,5 mm³ / 22 .. 33 g
RAL colour	grey 7035 / green 6029

FV2 S 230 V AC

Supply voltage	230 V AC 50/60 Hz 0.2 W
Eingangsimpedanz (Bx-N)	200 kΩ
Line capacity (L-Bx)	approx. 10 nF
Glow lamps (L-Bx)	max. 1 pc. (1 mA each)

FV2 S batt.

Supply voltage	internal button cell CR2032 Lithium battery 3 V 230 mAh
Battery life	typically 2 years

FV2 E

Supply voltage	230 V AC 50/60 Hz 0.7 W
Relay contact	1 change-over contact 10 A / 250 V AC potential-free (8 mm KLS)
Switch rating	see "Relay contacts" data sheet

Compatible devices: Radio connection receiver/transmitter of the FV2 series, radio repeater FV2 R

Order data

Item no.	EAN	Type	Designation
FV2S09	4 046929 101264	FV2 S (230V AC)	Radio transmitter with 4 inputs, 230V AC (FMD)
FV2S0B	4 046929 101271	FV2 S (3V DC)	Radio transmitter with 4 inputs, 3V DC, incl. batt. (FMD)
FV2E09	4 046929 101189	FV2 E	Radio-controlled switch, 1 CO contact 230V AC, 10A (FMD)

Accessories

Item no.	EAN	Type	Designation
HC3500	4 046929 901048	HC 35	DIN rail clip for flush-mounted housings

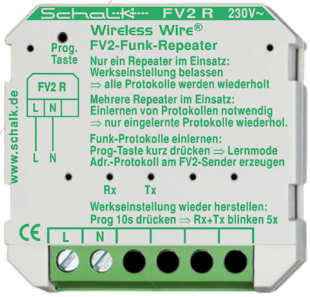
2017-08-01

Radio repeater FV2 R

For increasing the range of all Fx3 (FE3, FD3, FS3) and FV2 radio systems

Special features

- Increases the radio range
- Compatible with all Schalk radio transmitters and receivers of the series Fx3 and FV2
- No external antenna necessary
- Compact housing for flush-mounted boxes
- Simple setup



General information

The radio repeater FV2 R is used to extend the range of the Schalk radio systems.
The FV2 R receives already attenuated radio protocols and then transmits them again with full transmission power.

Applications

Increase of the radio range for all current Schalk radio systems.

Operation

All radio protocols (factory setting) or only specially trained radio protocols can be repeated.

Installation and configuration

In most applications it is recommended to operate the repeater directly in its factory setting.

The special teaching of radio protocols is only necessary if disturbing radio overlays of several simultaneously responding radio repeaters (e.g. from neighbouring installations within radio range) can occur. As soon as at least one radio protocol has been tuned in, the repeater reacts only to the tuned in radio protocols.
A disturbing, simultaneous response of several repeaters can thus be specifically excluded.
Cascading of several repeaters is not possible!

Teaching radio protocols

Teaching in with a transmitter from the FS3 series:
1) By briefly pressing the "Prog." key on the FV2 R, the programming mode is activated. LED Rx lights up green.
2) On the transmitter, press the send button to be programmed briefly.

The Rx LED on the repeater goes out when a valid signal is received. The teach-in process is thus successfully completed.
If the repeater cannot receive a valid radio protocol within 20s, the teach-in process is automatically aborted.
In this way, up to 12 response codes can be learned.

Teach-in process with magnetic contact transmitter FV2 SM:
1) By briefly pressing the "Prog." key on the FV2 R, the programming mode is activated. LED Rx lights up green.
2) Briefly press the programming button in the open transmitter. The LED in the transmitter starts to light red.
3) Now press the programming button in the transmitter again and keep it pressed until the red LED goes out.

The Rx LED on the repeater goes out when a valid signal is received. The teach-in process is thus successfully completed.
If the repeater cannot receive a valid radio protocol within 20s, the teach-in process is automatically aborted.

Teach-in process with transmitter FV2 S:
1) By briefly pressing the "Prog." key on the FV2 R, the programming mode is activated. LED Rx lights up green.
2) At the transmitter by repeatedly briefly pressing the “Prog." button, select the radio channel to be tuned in (B1 to B4) The corresponding LED lights red.
3) Now press the"Prog." button on the transmitter again and keep it pressed until the red LED goes out.

The Rx LED on the repeater goes out when a valid signal is received. The teach-in process is thus successfully completed.
If the repeater cannot receive a valid radio protocol within 20s, the teach-in process is automatically aborted.
A maximum of 12 different radio protocols can be tuned in.
The Rx-LED and Tx-LED flash twice simultaneously if an attempt is made to learn more than 12 radio protocols.

Deleting radio protocols

Delete the last taught-in radio protocol:
1) By briefly pressing the "Prog." key on the FV2 R, the programming mode is activated. LED Rx lights up green.
2) Now press the"Prog." button on the transmitter for more than 5s. The Rx and Tx LEDs flash 3 times to confirm.

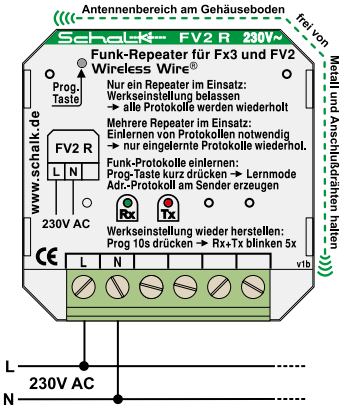
Delete all taught-in radio protocols (restore factory settings):
If the repeater is not in teach-in mode and the "Prog.” button is pressed for longer than 10s, all taught-in radio protocols are deleted. The repeater is thus reset to its factory setting.
The Rx and Tx LEDs flash 5 times to confirm.

LED function display

Tx-LED flickers red:
Valid radio protocols are received and transmitted (normal repeater operation).

Rx-LED flickers green:
Unlearned radio protocols are received correctly, but not forwarded.

Electrical connection and range optimization

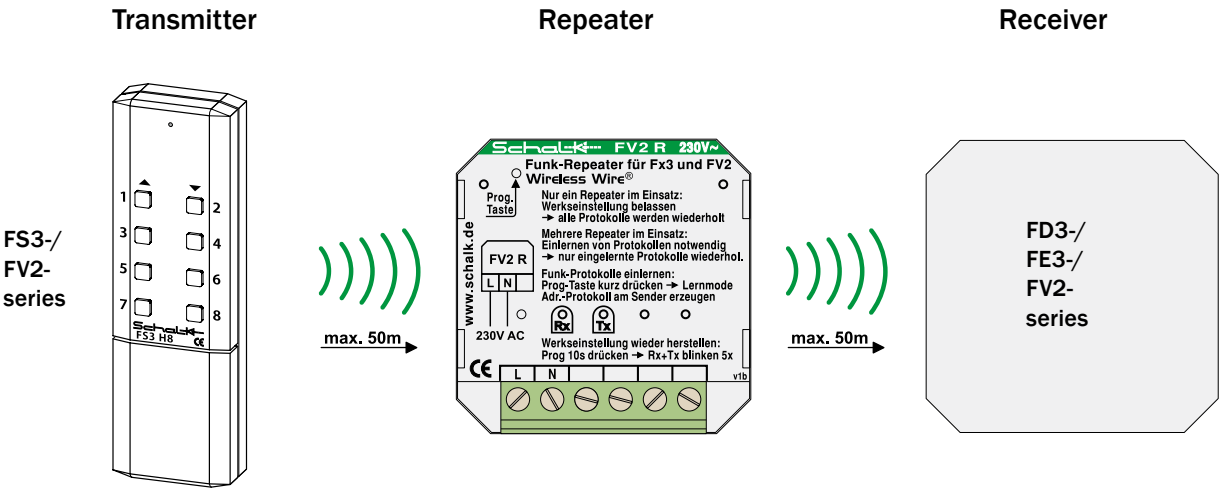


Notes on wireless range:
The antenna of the devices is located just above the bottom of the housing and runs along the right and top edges of the housing. This area must have sufficient distance to metal surfaces. Since the radiation is not homogeneous, the range can be significantly improved by aligning the devices (to be determined in the experiment). The installation site should be at least 1 m above ground level.

For a good radio range and reliable radio reception, please observe in general:
- Do not mount radio modules directly on metal surfaces.
- Avoid metallic housings and shields
- Align transmitter and receiver optimally to each other
- Install at highest possible locations (>1m above ground)
- Please note: damp or steel-reinforced walls and ceilings, moist soil, etc. attenuate any wireless radiation

Other electronic consumers (ballasts, switching power supplies, power regulators, etc.) may cause locally limited radio interference in individual cases.
In the event of a fault, please try to establish sufficient distance to an affected radio module.

Compatibility



All radio transmitters of the device series Fx3 (= FS3, FD3) and FV2 are compatible with the radio repeater FV2 R

Technical data

Radio frequency	433.92 MHz
Modulation	OOK PWM
Response codes	Factory setting: unlimited Special setting: max. 12 can be taught-in
Wireless range	50m in free field (1m above ground)
Operating voltage:	230 V AC / 50Hz
Power consumption:	0.6W
Ambient temp.	-10°C to +45°C
Connection terminals	Socket terminals with captive screws M3
Clamping range	0.5 mm² - 2.5 mm²
Strip length	6.5 mm - 7.0 mm
Screwing torque	0.50 Nm
Mounting orientation	arbitrarily
External dimensions	43 x 43 x 18,5mm³
Weight	24g
RAL colour	grey 7035 / green 6029

Compatible devices: Radio receiver/transmitter of the FE3 / FD3 / FS3 series, radio repeater FV2 R

Order data

Item no.	EAN	Type	Designation
FV2R09	4 046929 101288	FV2 R	Radio repeater for FV2/Fx3 systems, 230V AC (FMD)

Accessories

Item no.	EAN	Type	Designation
HC3500	4 046929 901048	HC 35	DIN rail clip for flush-mounted housings

2017-08-01

Wireless Wire® Radio ventilation/exhaust-fan set

ZAS F constisting of:
FV2 SM Radio transmitter with magnet contact
FV2 E Radio receiver with relay output

Radio ventilation/exhaust-fan set for controlling exhaust air systems in conjunction with room air-dependent fireplaces According to Ordinance on Firing Installations (German “FeuVO”)

Special features

- Battery-operated transmitter and magnet easy to install (with double adhesive strip)
- Magnetic contact status of the transmitter can be sent wirelessly to one or more receivers
- Receiver with potential-free relay contact
- Several radio connections can be installed next to each other (devices addressable)
- Free field range > 30 m (no external antenna)
- Receiver fits in flush-mounted switch box

General information

The battery-operated FV2 SM transmitter can detect mechanical position states (windows, doors, etc.) via a magnet and transmit them as a radio signal to the associated FV2 E receiver. Any change to the transmitter's magnetic contact is immediately transmitted to the relay contact of one or more receivers. The devices can be addressed so that several radio connections of this type can also be operated next to each other. Radio protocols are only sent in the event of changes and for safety reasons in defined time intervals. By default, the transmitter and receiver are already assigned to each other. Addressing only needs to be changed if several transmitters are in the range of coverage.

Applications

Window monitoring in connection with fume hoods (§4 Firing Ordinance (Germany)), monitoring of doors, windows, gates, flaps, etc. (theft protection, alarm and status messages)

Operation

The FV2 SM transmitter with associated magnet is attached most simply with the double adhesive strips already attached. For problematic surfaces, fastening can also be done with screws.

The receiver FV2 E can, for example, be installed in a flush-mounted switch box. The switching logic is freely selectable due to its potential-free change-over contact. In addition, the switching logic can be inverted at input B1 (B1 to L), as the relay naturally drops out in the event of a power failure. The relay also de-energizes (break contact closes) if no radio signal is received for at least 270s.
Addressing is done by putting the receiver into learning mode and generating a new address at the transmitter, which is then sent to the receiver. Several receivers can also be assigned to a transmitter (point-to-multipoint connection).

Initial operation:
We recommend not to install the FV2 SM transmitter for range tests for the time being. The FV2 E receiver must be powered (at least L and N already connected).

Open the transmitter housing (slightly lever back one of the two hooks with a slotted screwdriver) and insert the battery with the correct polarity (+ pole up).
By default, the transmitter and receiver are already assigned to each other. Addressing only needs to be changed if several transmitters are in the range of coverage.

In the transmitter, the button next to the battery holder is used together with an LED to generate a new address and to transmit this address to a receiver.
When addressing, a distinction must be made between assigning only one receiver to a sender or several receivers.
The learning mode is switched on or off at the receiver with the “Prog.” button (can be activated through a small opening in the housing). The LED to the left of the programming button lights red when learning mode is activated. This LED also indicates whether radio reception is OK. If a valid radio signal is received, it flashes green. When the taught-in radio signal is received, it flashes red.

Addressing:
Assign the first receiver (with creation of a new sender address):
- Press the programming button on the receiver briefly = turn receiver into learning mode → LED lights up
- Briefly press the “Prog.” button on the transmitter = turn transmitter into learning mode → LED lights up
- press the “Prog.” button on the transmitter for 5 to 10s (LED goes out after 1s and begins to flicker after 5s) = create a new sender address and send it to the receiver → LED on receiver goes out

Assigning additional receivers:
(Sender address may no longer be changed)
- Briefly press the “Prog.” button on the receiver = turn receiver into learning mode → LED lights up
- Briefly press the “Prog.” button on the transmitter = turn transmitter into learning mode → LED lights up
- press the “Prog.” button on the transmitter until the LED goes out (1 to 2s) = transmit existing sender address to receiver → LED on receiver goes out

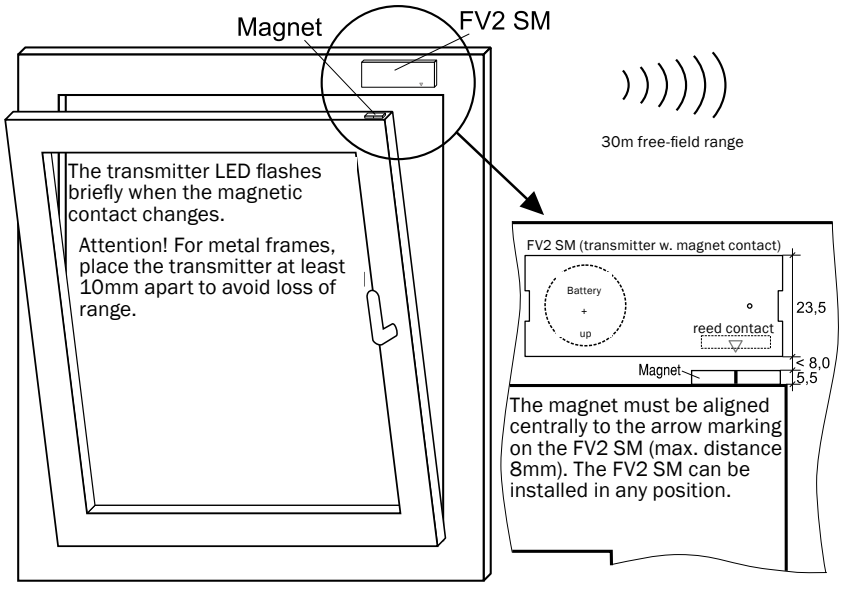
Reset to factory settings (FV2 SM):
Press the "Prog.” button for more than 10s.

Reset to factory settings (FV2 E):
Press the “Prog.” button for 10s until the red LED flashes 5 times.
The receiver then reacts to transmitters in the factory setting.

Range notes:
The range of the radio signal in free field is at least 30 m. However, the signal is sometimes strongly dampened by obstacles (walls, concrete ceilings, metal surfaces, damp bushes, etc.). It is therefore advisable to test the range before mechanically fixing the devices. The alignment of the devices to each other also has a significant effect on the range, since the antenna is integrated in the device in each case and is thus also aligned. An installation close to ground is also unfavourable (we recommend at least 1 m above ground). Sometimes interference from electrical devices can reduce the range (switching power supplies, DC motors). Further information can be found on our data sheet "Practical tips for the radio control system".

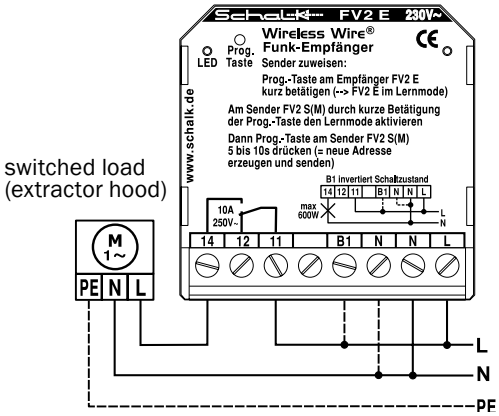
Installation

Mounting the FV2 SM transmitter:
Mounting directly on metal window frames is unfavourable, because of loss of range!



Caution ***When used as supply air monitoring it must be ensured that sufficient fresh air can always flow in through the opened window!*** *If the monitored window has a roller shutter, it must be ensured that even if the shutter is closed, fresh air can still flow in! For electrically operated systems, e.g. the limit switch can be adjusted accordingly. For manually actuated roller shutters, a mechanical limit stop must be installed.*

Connecting the FV2 E receiver:
Mounting inside closed metal housings usually leads to a total loss of function due to loss of range!

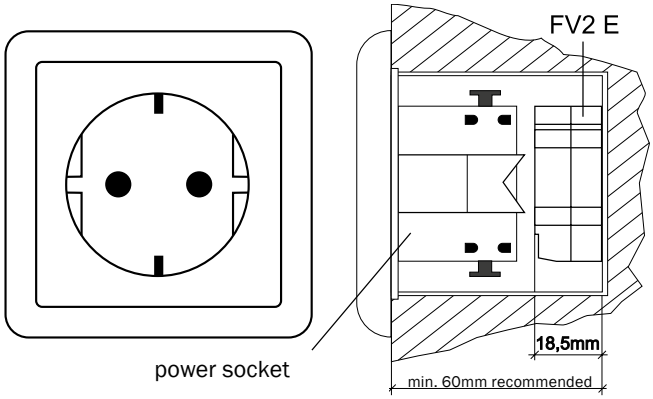


The receiver LED flashes green shortly after receiving a radio signal (but lights red in learning mode, the learning mode is switched on and off using the programming button).

Example of use: switched socket for extractor fan

The FV2 E can be installed behind a socket to be switched.

Avoid shielding by metallic surfaces!



Technical data

Radio frequency	433.92 MHz
Modulation	OOK PWM
Range	> 30 m in free field
Ambient temp.	-10°C to +45°C
Mounting orientation	If necessary, align the receiver with the transmitter (for better range)

Transmitter FV2 SM:

Battery type	Lithium CR2032
Battery life	typically 2 to 3 years (depending on switching frequency)
External dimensions	59,5 x 23,3 x 15,3 mm³
Weight	15 g
External dimensions (magnet)	22,2 x 11,2 x 5,5 mm³
Weight (magnet)	3 g
RAL colour	white / green 6029

Receiver FV2 E:

Operating voltage:	230 V AC 50/60 Hz
Power consumption:	0.6 W
Relay contact	1 change-over contact 10 A / 250 V AC potential-free (8 mm KLS)
Switch rating	see "Relay contacts" data sheet
Connection terminals	Socket terminals with captive screws M3
Clamping range	0.5 mm² - 2.5 mm²
Strip length	6.5 mm - 7.0 mm
Screwing torque	0.50 Nm
External dimensions	43 x 43 x 18,5 mm³
Weight	33 g
RAL colour	grey 7035 / green 6029

Order data

Item no.	EAN	Type	Designation
FV2SMB	4 046929 101172	FV2 SM	FV2 SM Transmitter with magnetic contact
MIG100	4 046929 901109	MIG 1	Replacement magnet in housing, self-adhesive for MKW 1/FV2 SM
FV2E09	4 046929 101189	FV2 E	FV2 receiver 230 V AC, 1 relay
ZASF09	4 046929 101196	ZAS F	Radio ventilation/exhaust-fan set (consisting of FV2 SM and FV2 E

Accessories

Item no.	EAN	Type	Designation
HC3500	4 046929 901048	HC 35	DIN rail clip for flush-mounted housings

01/06/2017

Wireless Wire® Radio-connection system

FV2 SM
Transmitter with magnetic contact

FV2 EL
Receiver with logic functions (1 relay)

Radio-connection receiver for monitoring up to four magnetic contact transmitters (for fume hood control, theft protection, window monitoring, etc.)

Special features

- Battery-operated transmitter and magnet easy to install (with double adhesive strip)
- One transmitter can control several receivers
- One receiver can learn up to 4 transmitters (switching logic OR, NOR, AND or NAND selectable, the switching states of the individual transmitters are logically linked)
- Relay contact in the receiver potential-free
- Several FV2 systems can be installed side by side
- Free field range > 30 m (no external antenna)
- Receiver fits in flush-mounted switch box (h = 18.5 mm)

General information

The battery-operated FV2 SM transmitter detects mechanical position states (windows, doors, etc.) via a magnet and transmits them to one or more FV2 EL receivers.
In addition, the FV2 EL receiver can detect the switching states of up to 4 different transmitters and switch the relay depending on the set logic (OR, NOR, AND or NAND). Several FV2 systems can also be operated side by side. The default address is assigned to the transmitter and receiver in factory settings Addressing only needs to be changed if several transmitters are in the range of coverage.

Applications

Monitoring of windows, doors, gates, flaps, etc.
(theft protection, alarm and status messages).
Extractor hoods in connection with firing systems
(ensure supply air in accordance with §4 Firing Ordinance (Germany)).

Examples of switching logic:

OR: Fume hood is released as soon as one of several windows is opened.
NOR: Enable heating only if all windows are closed.
AND: Only enable fume hood if 2 transmitters (for one window) report open (ensure ensure a minimum opening angle).

Operation

The FV2 EL receiver always switches through when the switching states of the taught-in transmitters, logically linked with one another, enable the relay contact (with OR, if 1 transmitter signals "on" / with AND, if all transmitters signal "on"). If input B1 is bridged to L, the switching logic (→ NOR and NAND) is inverted. In the event of a fault (e.g. empty battery in the transmitter), the relay contact drops out if no signal has been received from a transmitter for 5 minutes. Transmitters are assigned via a teach-in process at the receiver.

Initial operation:
We recommend not to install the FV2 SM transmitter for range tests for the time being.
First supply the FV2 EL receiver with power. Open the transmitter housing (slightly lever back one of the two hooks with a slotted screwdriver) and insert the battery with the correct polarity (+ pole up).

Addressing:
In the factory setting, the transmitter and receiver are provided with a standard address, so that the devices already react to each other (play with magnet on the transmitter for testing).
The addressing must only be changed if several transmitters are within the range range or several transmitters are to be taught-in on the FV2 EL.

One FV2 SM transmitter is able to switch one or more FV2 EL receivers.

Assign the first receiver:
(with creation of a new sender address)
- Set receiver FV2 EL to learning mode (briefly press the programming key → LED lights red).
- Set the FV2 SM transmitter to teach-in mode (briefly press the button in the transmitter → LED in the transmitter lights red).
- Press the button in the transmitter for 5 to 10s (the LED goes out after 1s and begins to flicker after 5s) = create a new transmitter address and transmit it to the receiver. → LED in the receiver goes out

Assigning additional receivers:
(Sender address may no longer be changed)
- Set receiver FV2 EL to learning mode (briefly press the programming key → LED lights red).
- Set the FV2 SM transmitter to teach-in mode (briefly press the button in the transmitter → LED in the transmitter lights red).
- Press the button in the transmitter for 2s (LED goes out after 1s) to transfer existing address to receiver → the LED in the receiver goes out.

One receiver FV2 EL should react to 1-4 transmitters FV2 SM (switching logic OR, NOR, AND or NAND):
If the addressing of the FV2 EL differs from the factory setting, all taught-in protocols must first be deleted.

Deletion of all aught-in protocols for FV2 EL:
- Set receiver FV2 EL to learning mode (briefly press the “Prog.” button → LED lights red).
- Then press the programming button for 10s until the LED flashes red 5 times (after 5s the LED flashes 1 or 2 times and then remains off for 5s).

Teaching-in one or more transmitters on the FV2 EL:
- Set receiver FV2 EL to learning mode (briefly press the “Prog:” button → LED lights red).
- Set the FV2 SM transmitter to teach-in mode (briefly press the button in the transmitter → LED in the transmitter lights red).
- Press the key in the transmitter either for 2s (= send existing address to the receiver) or for 5 to 10s (= generate new address and send to the receiver). After receiving the transmitter address, the LED in the receiver goes out. If the station table in the FV2 EL is full (4 stations/transmitters have already been taught in), the LED flashes red/green three times.

Switching the logic of the receiver FV2 EL:
- Set receiver FV2 EL to learning mode (briefly press the “Prog.” button → LED lights red).
- Then press the programming button for 5s → LED flashes 1 time red (OR logic) or 2 times red (AND logic). If input B1 is bridged to L, the relay state is inverted → OR becomes NOR, AND becomes NAND.

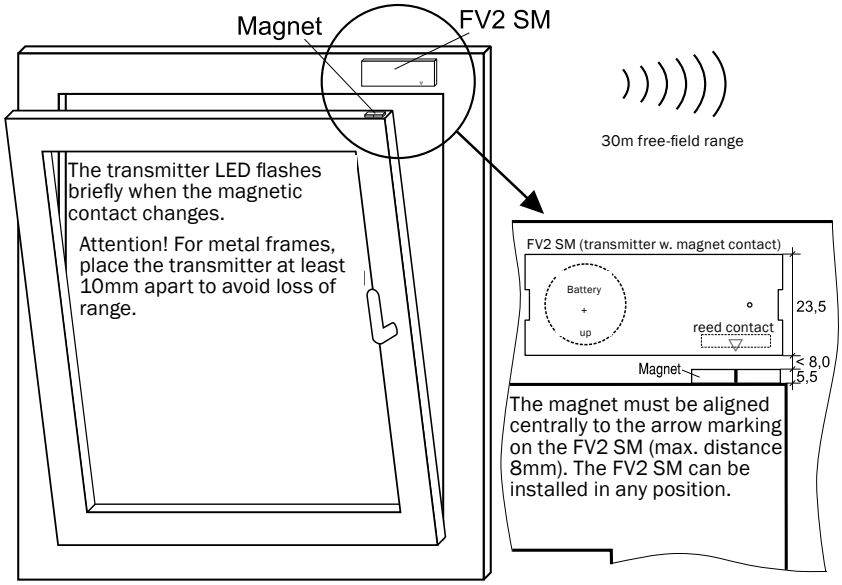
Behaviour of the receiver FV2 EL in the event of an error:
(e.g. empty battery of transmitter)
If no signal is received from one of the taught-in transmitters for 300s, the relay switches off. Exception for OR logic: relay switches off if no "ON" signal has been received from any of the taught-in transmitters for 300s.

Behaviour of the FV2 EL after a power failure:
After a power failure, the relay on the receiver only switches on when an "ON" signal has been received from all taught-in transmitters.
This can take up to 60s (= max. transmission interval). Only with OR logic does the receiver react to the first "ON" signal received from a transmitter.

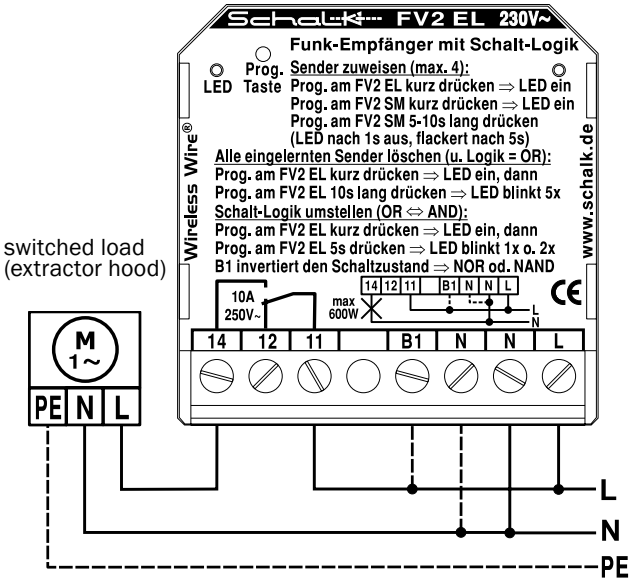
Range notes:
The range of the radio signal in free field is at least 30 m. However, the signal is sometimes strongly dampened by obstacles (walls, concrete ceilings, metal surfaces, damp bushes, etc.). Sometimes interference from electrical devices can reduce the range (switching power supplies, DC motors). Since the alignment of the devices to each other also plays a role, it is advisable to test the radio reception before mechanical fixing.

Mounting the FV2 SM transmitter:

The transmitter LED flashes briefly each time the magnetic contact changes



Connecting the FV2 EL receiver:



Technical data

Radio signal	433,92 MHz OOK PWM
Range	> 30 m in free field
Ambient temp.	-10°C to +45°C
Mounting orientation	If necessary, align the receiver with the transmitter (for better range)

Transmitter FV2 SM:

Battery type	Lithium CR2032
Battery life	typically 2 to 3 years (depending on switching frequency)
External dimensions	59,5 x 23,3 x 15,3 mm^3
Outside dimensions (magnet)	22,2 x 11,2 x 5,5 mm^3
Weight (magnet)	15 g (3 g)
RAL colour	white / green 6029

Receiver FV2 EL:

Operating voltage:	230 V AC 50/60 Hz
Power consumption:	0.6 W
Relay contact	1 change-over contact 10 A / 250 V AC potential-free (8 mm KLS)
Switch rating	see "Relay contacts" data sheet
Connection terminals	Socket terminals with captive screws M3
Clamping range	0.5 mm^2 - 2.5 mm^2
Strip length	6.5 mm - 7.0 mm
Screwing torque	0.50 Nm
External dimensions	43 x 43 x 18,5 mm^3
Weight	33 g
RAL colour	grey 7035 / green 6029

Order data

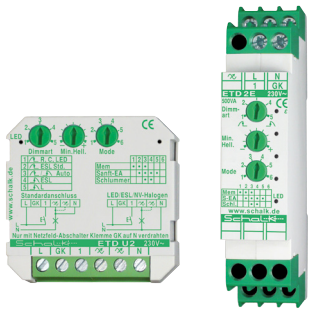
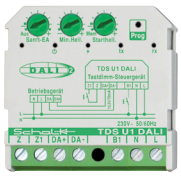
Item no.	EAN	Type	Designation
FV2SMB	4 046929 101172	FV2 SM	Radio transmitter with magnetic contact 3V DC, incl. batt.
FV2EL9	4 046929 101240	FV2 EL	Radio receiver with logic functions 230V AC (UP), 1 CO 10A

Accessories

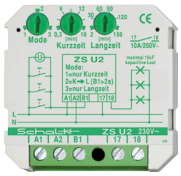
Item no.	EAN	Type	Designation
HC3500	4 046929 901048	HC 35	DIN rail clip for flush-mounted housings

01/06/2017

Light timer switches, dimmers

	Item no.	Type	Specs	Dimensions	Page
					
Universal push-button dimmer ETD U2 / ETD 2E, also for LED/ESL The ETD U2 electronic universal touch dimmer can be used to dim a wide variety of light sources (LED, energy-saving, incandescent, LV halogen lamps with Tronic or wound transformers, HV halogen lamps). In addition to automatic load detection, the dimming mode can also be set manually to phase cut-off or phase cut-off if required. Due to the compact housing dimensions, the ETD U2 can be installed directly in the installation boxes of the existing switch range behind a push-button, and is therefore equally suitable for original equipment and as a maintenance-free replacement for defective rotary or push-button dimmers. **Also available as radio dimmer - see "Radio control system".** The ETD 2E is identical in function to the ETD U2, but has a DIN-rail mountable in-line housing.	ETDU29	ETD U2	230V AC, 0-500VA	43x43x18.5mm	85
	ETD2E9	ETD 2E	230V AC, 0-500VA	18x55mm	
					
Universal push-button dimmer ETD 2, also for LED/ESL, w. central inputs, var. modes The ETD U2 electronic universal push-button dimmer can be used to dim a wide variety of light sources (LED, energy-saving, incandescent, LV halogen lamps with Tronic or wound transformers, HV halogen lamps). In addition to automatic load detection, the dimming mode can also be set manually to phase cut-off or phase cut-off if required. The additional galvanically isolated control inputs enable the realization of a central control, or e.g. also the additional control by motion detectors. A wide variety of lighting functions can be set by means of optionally programmable operating modes. An additional button in the device allows direct operation at the installation location.	ETD209	ETD 2	230V AC, 0-500VA, with ZI, ZE, ZA	18x55mm	91
NEW 					
Push-button dimmer control unit DALI with integrated power supply (230V AC, UP) Compact, easy-to-install DALI-2 certified control unit with integrated power supply (for supplying up to 35 DALI operating devices), for converting tactile into DALI protocols (broadcast mode). Short press = switch ON/OFF, longer press = dim UP/DOWN. Suitable for lamps with dimmable DALI ballast. No DALI programming tool required.	TDSU1D9	TDS U1 DALI	DALI-2 certified, 230V AC, single-master	43x43x18.5mm	99
					
Light timer pulse switch ZS 2 with 3 modes The light timer pulse switch ("pulse switch") ZS 2 enables convenient switching of the lighting. The lighting duration is simply set via the connected buttons: - Press for less than 2 seconds: Light "ON", preset short time (0.2-18 minutes) starts - Press for more than 2 seconds: Changeover to long-term operation, preset long-term (0.25 - 150 minutes) starts Both operating modes can be interrupted by pressing the button again. Two additional operating modes enable long-term switching to be disabled.	ZS2009	ZS 2	230V AC, 1 NO 16A, pot.-free, tv=0.2s-150min	18x55mm	103
					
Light timer pulse switch ZSK 2 with 3 modes and central pulse input Same function as ZS 2, but with an additional, galvanically isolated external voltage input (8V-230V UC). Thus controllable without coupling relays, e.g. from a door intercom system.	ZSK209	ZSK 2	230V AC, 1 NO 16A, tv=0.2s-150min	18x55mm	103

Light timer switches, dimmers

Page		Item no.	Type	Specs	Dimensions
103		**Light timer pulse switch ZSZ 2 with 3 modes and central inputs ZI, ZE, ZA** Same function as ZSK 2, but with 2 additional inputs for central ON/OFF.			
		ZSZ209	ZSZ 2	230V AC, 1 NO 16A, tv=0.2s-150min	18x55mm
107		**Light timer pulse switch ZS U2 with 3 modes (FMD)** The ZS U2 combines a high degree of comfort, flexibility and functionality with simple handling and operation. By pressing the light button for a short or longer time, you can choose between two independently adjustable time ranges. This enables individually configurable short-term / long-term switching within a range of 0.25 to 150 minutes. Due to its compact dimensions, it can also be installed in switch boxes and is therefore also suitable for renovating old buildings.			
		ZSU209	ZS U2	230V AC, 1 NO 10A, tv=0.3s-150min	43x43x18.5mm

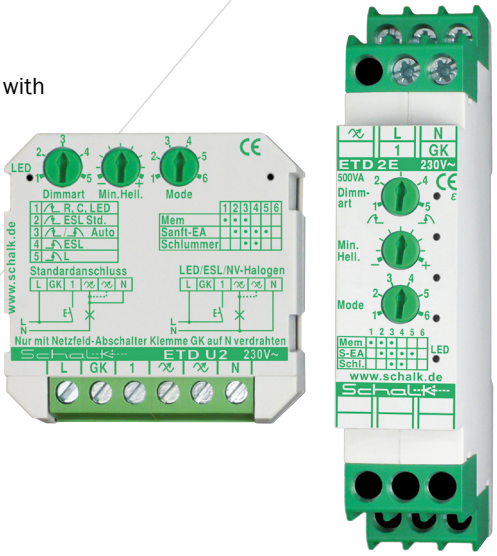
Universal pushbutton dimmer

ETD U2 (Flush mount version)
ETD 2E (Rail mount version)

General purpose, user-friendly electronic pushbutton dimmer for a wide variety of lamps (LED, CFL, incandescent, LV halogen with electronic or wound transformer, HV halogen)

Special features

- Dims suitable LED lamps, CFLs, incandescent lamps, LV halogen lamps with electronic or wound transformers and HV halogen lamps
- Dimming modes:
  forward phase control, reverse phase control, automatic detection of wound transformers, CFLs with delay for ignition and warm-up
- Electronic short-circuit and overload protection
- Suitable for use with automatic demand switches – built-in base load and brightness memory
- Rated load for HV/LV incandescent lamps:
  up to 500 VA (up to 4x 500 VA with power expansion)
- Rated load for LED/CFL: up to 400 VA with reverse phase control
- Suitable for use with switches from diverse product lines



General information

The ETD U2 and ETD 2E universal pushbutton dimmers can dim a wide variety of lamps (LED, CFL, incandescent, LV halogen with electronic or wound transformer, HV halogen). Along with automatic detection of wound transformers in Auto dimming mode, the dimming mode can be set manually to forward or reverse phase control if necessary (especially for lamps with electronic ballasts or electronic transformers). A special CFL dimming mode additionally provides an ignition and warm-up delay for compact fluorescent lamps.
The compact dimensions of the ETD U2 allow it be installed in electrical boxes behind a button switch from any desired product line, making it equally suitable for new installations as well as maintenance-free replacement of existing or defective rotary or button dimmers.

Operation

A short button press toggles the lamp; a long press increases or reduces the brightness.

Extra functions

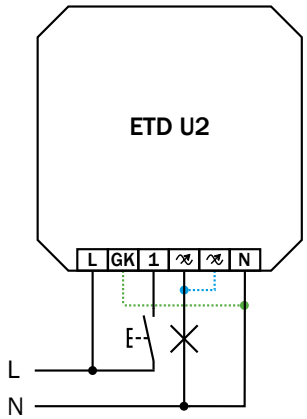
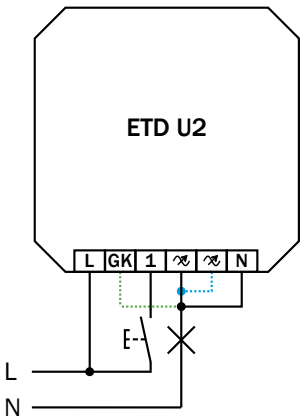
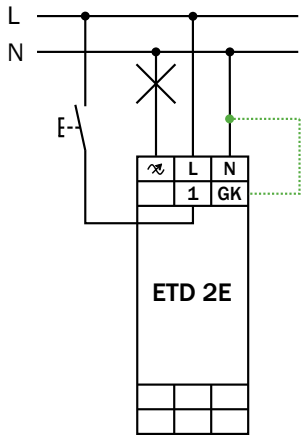
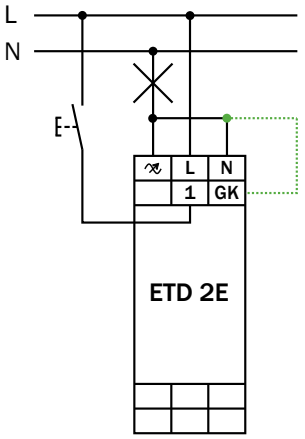
Slumber („Schlummer“) (e.g. for helping children get to sleep)
When this function is activated by dimming the lamp, the light level is dimmed down very slowly, with a duration that depends on the brightness at the start of dimming (duration from maximum brightness: 60 min).

Discreet dim up („Diskret Eindimmen“)
In response to a long button press when the lamp is off, the dimmer switches on and dims up from the minimum brightness.

Sync
If several dimmers are controlled by a single button, they may become unsynchronised because the button command (toggle) is not unambiguous. Synchronisation is achieved by holding the button pressed long enough (approximately 10 s) for all dimmers to dim down to minimum brightness and then stop at maximum brightness (maximum level).

Installation

The ETD U2 and ETD 2E dimmers have a neutral line connection, so the lower load limit is 0 VA. However, the dimmer must be operated without a neutral connection with incandescent lamp loads over 100 W to avoid EMC problems. In this case the neutral terminal is jumpered to the load output. This has no effect on operation.
If the dimmer is used in a circuit with an automatic demand switch, the integrated base load (GK terminal) must be connected to the N terminal (and thus to the load terminal as well with incandescent lamps over 100 W).

Standard connection	Connection without neutral line
For dimmable LED, CFL and LV halogen lamps (with electronic or wound transformers) up to the maximum rated load, and for HV halogen and incandescent lamps up to 100 W	For HV halogen and incandescent lamps over 100 W
	
	

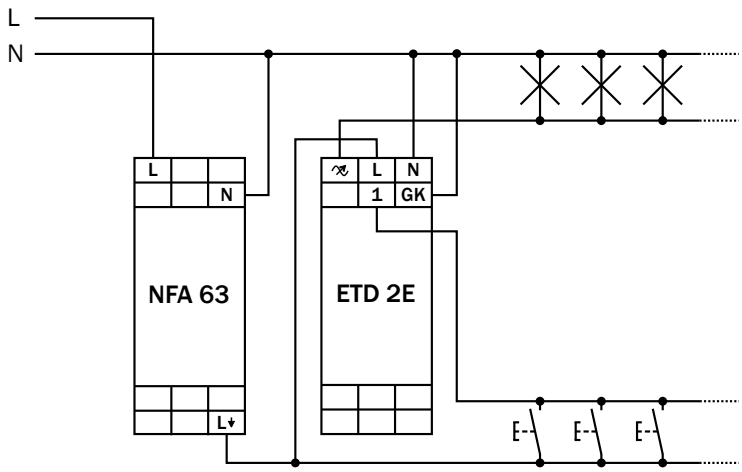
------- Optional; for improved heat dissipation with heavy loads

------- Optional; only necessary with an automatic demand switch

Caution!

The dimmed phase must not be switched separately (secondary side), as this can damage the dimmer! Only switch and dim the connected luminaire circuit with the dimmer itself!

ETD 2E with an automatic demand switch



General information:
Lamps approved for the same dimming mode can usually be used together. Incandescent lamps may always be operated in parallel. However, functional impairments occur fairly often when electronic loads from different manufacturers are operated in parallel, due to mutual interference of manufacturer-specific ballasts and/or electronic transformers. Wound transformers may not be combined with electronic loads.
The dimmer is designed to work with as many different types of lamps as possible. However, it is not possible to guarantee trouble-free operation of every dimmable lamp with the dimmer, since this can be affected by the design or construction of the lamp ballast or transformer.
Flickering or erratic dimming in the low brightness range with LED lamps and CFLs is usually due to the lamp being designed for higher minimum input power. We recommend raising the minimum brightness setting in such cases.
Ripple control signals from electricity plants can lead to perceptible flickering of the lighting. The magnitude of this effect varies from one region to the next.

Settings and initial use
1. Setting the dimming mode

Set the „Dimming Mode“ control to a dimming mode suitable for the lamp (see table)

Dimmart (= dimming mode)

= **forward phase control**
= **reverse phase control**

All suitable dimmable lamps can usually be operated in dimming mode 3 (Automatic).
Exceptions:
- Dimming mode 5 must be selected for lamps with wound transformers in a circuit with an automatic demand switch.
- Dimming mode 2 (or if appropriate mode 4) must be selected for CFLs which require an ignition and warm-up time.

„Dimmart“ (dimming mode)	Description
1: Reverse phase control	For incandescent lamps, HV halogen lamps, LV halogen lamps with electronic transformers, and dimmable LED lamps
2: Reverse phase control with CFL mode	For dimmable CFLs which require an ignition and warm-up time
3: Automatic	For dimming nearly all loads with reverse phase control (with automatic change to forward phase control for wound transformers) *Not suitable for lamps with wound transformers in a circuit with an automatic demand switch; select dimming mode 5 instead.*
4: Forward phase control with CFL mode	For dimmable CFLs which require an ignition and warm-up time, and when dimming mode 2 does not provide smooth dimming.
5: Forward phase control	For dimming lamps with wound transformers located in a circuit with an automatic demand switch

CFL mode (dimming modes 2 and 4)
Most CFLs need full mains voltage for ignition. For this reason, this mode provides an ignition phase at half brightness before adjusting to the last (saved) brightness level. A warm-up phase with elevated minimum brightness is also provided because most CFLs have significantly reduced minimum dimming capability (without going out) when cold. The minimum brightness is gradually reduced to the normal value during the warm-up phase. The warm-up time depends on the off time, so the full warm-up time (max. 1 minute) is only used when the lamp has been off for an extended time. If a CFL is switched off at very low brightness and then switched on again when cold, the previous minimum brightness will be attained only after the warm-up phase.

Automatic detection of wound transformers (dimming mode 3)
Wound transformers must be dimmed with forward phase control because reverse phase control generates inductive reverse voltages that can destroy the dimmer if it does not detect them and switch off on time.
In this dimming mode the dimmer automatically changes to forward phase control after being switched on as soon as overvoltages (not yet dangerous) are detected. This setting is retained until loss of mains voltage. This dimming mode is not suitable for use with automatic demand switches because the mains voltage is always disconnected after the lights are switched off.

2. Setting the dimming mode

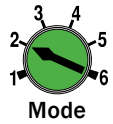
The minimum brightness should be set depending on the lamp so that the on state of the lamp can still be recognised at minimum brightness.

Min. Hell. (= Min. Brightness)

Switch on the dimmer and dim down as far as possible. Then set the minimum brightness to the desired level with the „Min. Brightness“ control.

3. Setting the operating mode

Various special functions can be activated or combined using the operating mode setting.



Mode	1	2	3	4	5	6
Mem	•	•	•			
Sanft-EA (= soft on/off)		•	•	•	•	
Schlummer (= slumber)			•	•		

„•“ = activated

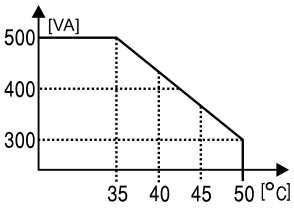
„Mem“ (Memory)
If activated, the dimmer switches on at the last (saved) brightness level; otherwise at maximum brightness

„Sanft E/A“ (= soft on/off):
Soft switch-on and switch-off if activated (prolongs lamp life)

„Schlummer“ (= slumber)
If activated, the Slumber function can be used (see „Extra functions“)

Ambient conditions and troubleshooting

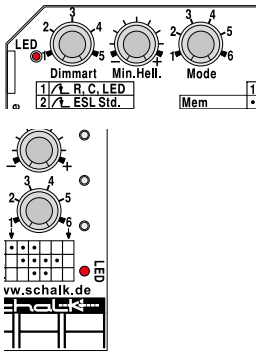
Zulässige Belastung:



Maximal zulässige Last in Abh. der Umgebungstemperatur (bei ausreichender Luftzirkulation)

The efficiency of wound transformers and electronic loads (LEDs, CFLs and electronic transformers) must be taken into account. The (primary) VA value is the critical parameter for the dimmer. Electronic loads must be approved by the manufacturer for dimming with forward or reverse phase control dimmers.
The dimmer heats up during operation, depending on the connected load. The connected load must be reduced if this heat cannot be dissipated adequately. Do not mount dimmers close to heat sources.

LED status display



The LED is lit in the On state. In the Off state it blinks intermittently if the dimming mode or the operating mode has been changed. If a fault occurs, it displays a fault code.

Fault codes: (LED blinks periodically 1 to 9 times)	
1	Overload >500VA
2	Overtemperature
3	Overcurrent (short-circuit)
4	Transformer reverse voltage
5	Transformer saturation (unbalanced load)
6	Overload > 900 VA
7	Mains overvoltage
8	Synchronisation fault
9	Memory fault

There is a restart lockout interval of up to 10 seconds after an overload, overtemperature, overcurrent or overvoltage condition to allow the heated components to cool down.

Technical data

Operating voltage	230V AC 50 Hz
Power consumption	0.3 W in off state
Power dissipation	2 W max. with 500 VA load
Rated load	
Incandescent, HV and LV halogen lamps, wound or electronic transformers	500 VA with ambient temperatures up to 35°C; 300 VA with ambient temperatures up to 50°C
LED/CFL	Up to 400 VA (lamps of the same make recommended). **Differences in manufacture-specific ballast or electronic transformer circuitry may lead to restrictions on load capacity, the maximum number of lamps or the dimming and/or switching functions.**
Bursting strength	Compliant with EN 61000-4-4 Level 2
Surge resistance	Compliant with EN 61000-4-5 Level 2
EMC	Compliant with EN 55015
Ambient temperature range	-10°C to +50°C (reduced power above +35°C)
Insulating housing	Non-flammable acc. to VDE 0304 Part 3, Level FV D
Wiring capacitance on terminal 1	max. 100 nF
Glow lamp load on terminal 1	max. 20 mA

ETD U2

Outside dimensions	43 x 43 x 18.5 mm³
Weight	35 g
Connections	Terminals with captive screws M3.0 2 x 1.5mm² / 1 x 2.5mm²

ETD 2E

Mounting	Click-mount on standard 35-mm rail (EN 50022)
Outside dimensions	18 x 88(45) x 58 mm³
Installation depth	55 mm
Weight	80 g
Connections	Terminals with captive screws M3.5; 4x 1.5 mm2 / 2x 2.5 mm2 / 1x4 mm2
RAL colour	Grey 7035 / Green 6029

Order data

Item no.	EAN	Type	Item designation
ETDU29	4 046929 201100	ETD U2	Universal Pushbutton Dimmer (UP), 230 V AC, 0–500 VA, also for LED/CFL
ETD2E9	4 046929 201117	ETD 2E	Universal Pushbutton Dimmer (REB), 230 V AC, 0–500 VA, also for LED/CFL

Universal pushbutton dimmer ETD 2

(Rail mount version)

With central control inputs, front button and various operating modes and functions

General purpose, user-friendly electronic pushbutton dimmer for a wide variety of lamps (LED, CFL, incandescent, LV halogen with electronic or wound transformer, HV halogen)

Special features

- Dims suitable LED lamps, CFLs, incandescent lamps, LV halogen lamps with electronic or wound transformers and HV halogen lamps
- Dimming modes: forward phase control, reverse phase control, automatic detection of wound transformers, special dimming mode for CFLs (with delay for ignition and warm-up)
- Electronic short-circuit and overload protection
- Suitable for use with automatic demand switches – built-in base load and brightness memory
- Rated load for HV/LV incandescent lamps: up to 500 VA (up to 4x 500 VA with power extension)
- Rated load for LED/CFL: up to 400 VA with reverse phase control
- Three inputs (1, Z1, Z2) and additional front button individually programmable
- Z1 & Z2 electrically isolated, controllable using 8-230V UC
- Various configurable operating modes and functions: slumber, discrete dim up, sync, twilight/dawn simulation, minimum lighting (emergency lighting function), timer, pulse switching (like true pulse switches), etc.

General information

The ETD 2 electronic universal pushbutton dimmer can dim virtually any type of lamp (LED, CFL, incandescent, LV halogen with electronic or wound transformer, HV halogen) suitable for forward or reverse phase control.
Along with automatic detection of wound transformers in Auto dimming mode, the dimming mode can be set manually to forward or reverse phase control if necessary (especially for lamps with electronic ballasts). A special CFL dimming mode additionally provides an ignition and warm-up delay for compact fluorescent lamps.
The ETD 2 has two extra electrically isolated inputs that can also be used for group control. It can also be operated directly using a front button. All three inputs and the front button are individually programmable. This allows the dimmer to be switched and dimmed with one button, or alternatively with two buttons. Pure switching functions are also available. The memory function, slumber function, run time, soft up and down ramps, and initial brightness can also be configured.

Operation

A short button press toggles the lamp; a long press increases or reduces the brightness. Brief pauses at minimum and maximum brightness simplify setting the range limits.
Using special operating modes, a wide variety of functions can be assigned independently to inputs 1, Z1 and Z2 and the front button.

Switching functions

Switch on / dim up, switch off / dim down With this function the dimmer can also be controlled with two buttons. These two functions are additionally ideal for group control of several dimmers because they are unique.
Only toggle, only switch on, only switch off These pure switching functions allow the dimmer to be switched with one or two buttons (including group control) without changing the brightness. A defined initial brightness can also be set, making this function ideal for use in locations such as public buildings.
Switching sequence A suitably programmed input cycles through the switching sequence „maximum brightness, memory brightness, off“ with successive button presses.
Timer Ideal for controlling the dimmer with a timer. Since the on ramp and off ramp times can be set up to 30 minutes, this can also be used to simulate twilight. To enable the dimmer to be operated from the other inputs despite the constant connection to the timer contact, the dimmer only responds to pulse edges (signal level changes) with this function.

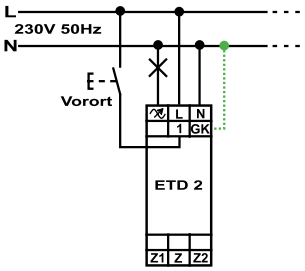
Slumber (e.g. for helping children get to sleep) When this function is activated by dimming the lamp, the light level is dimmed down very slowly, with a duration that depends on the brightness at the start of dimming (duration from maximum brightness: 60 min).
Discreet dim up In response to a long button press when the lamp is off, the dimmer switches on and dims up from the minimum brightness.
Sync If several dimmers are controlled by a single button, they may become unsynchronised because the button command (toggle) is not unambiguous. Synchronisation is achieved by holding the button pressed long enough (approximately 10 s) for all dimmers to dim down to minimum brightness and then stop at maximum brightness (maximum level).

Installation

The ETD 2 dimmer has a neutral line connection, so the lower load limit is 0 VA. However, the dimmer must be operated without a neutral connection with incandescent lamp loads over 100 W to avoid EMC problems. In this case the neutral terminal is jumpered to the load output. This has no effect on operation. If the dimmer is used in a circuit with an automatic demand switch, the integrated base load (GK terminal) must be connected to the N terminal (and thus to the load terminal as well with incandescent lamps over 100 W).

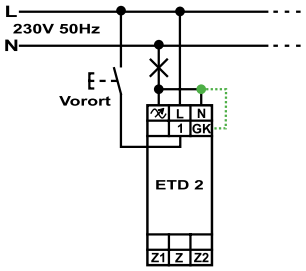
Standard connection

For dimmable LED, CFL and LV halogen lamps (with electronic or wound transformers) up to the maximum rated load, and for HV halogen and incandescent lamps up to 100 W

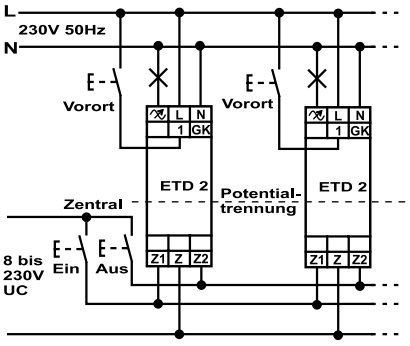


Connection without neutral line

For HV halogen and incandescent lamps over 100 W

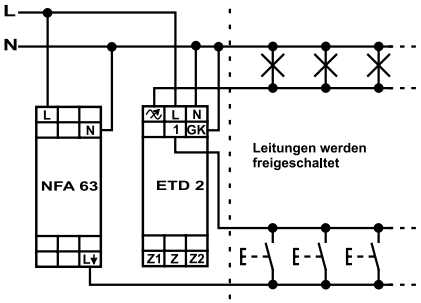


Connection with central control



Connection with an automatic demand switch

For incandescent lamps over 100 W

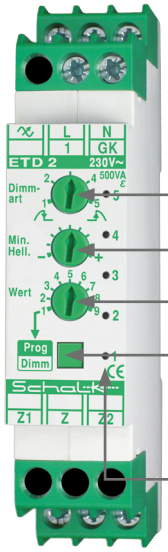


------- Optional; only necessary with an automatic demand switch

Caution! ***The dimmed phase must not be switched separately (secondary side), as this can damage the dimmer! Only switch and dim the connected luminaire circuit with the dimmer itself!***

Settings and initial use

Controls and indicators:



„Dimmart“ („Dimming Mode“ control):
Used to select a suitable dimming mode for the lamp (see „Setting the dimming mode“)

„Min. Hell“ („Min. Brightness“ control):
Used to set the minimum lamp brightness (see „Setting the minimum brightness“)

„Wert“ („Value“ control):
Used to make settings in programming mode (run time, on and off ramp times, initial brightness)

Front button
Used in normal mode as a local dimming button and in programming mode as a setting button

LED‘s 1-5:
These LEDs show device status (operating state, selected function in programming mode, fault codes)

LED states:
○ LED off
● LED on
◔ LED blinking

Inputs:

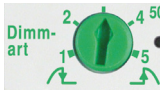
1	push button input (230V AC)
Z1	input 1 (8-230V UC)
Z2	input 2 (8-230V UC)

Definition of terms:

Dim on	Increase brightness from the off state (starting at minimum brightness if so configured)
Dim off	Reduce brightness to the off state
Mem/Memory	Brightness memory – the last set brightness is saved on switch-off and restored on the next switch-on
Sync	Synchronise – restore the synchronisation of several linked dimmers operated by a single button or signal input
Soft on/off	Soft on/off switching
Slumber	Function for very slow automatic dimming down (duration depends on starting brightness; max. 1 hour)
CFL	Compact fluorescent lamp
Electronic load	Any lamp with an electronic ballast or electronic transformer
Toggle	Switch on and off with a single button or signal input
HV incandescent lamps	Incandescent lamps operated directly from 230 V without a transformer
LV incandescent lamps	Low voltage incandescent lamps (e.g. 12 V) requiring a transformer (electronic or wound)

1. Setting the dimming mode

Set the „Dimming Mode“ control to a dimming mode suitable for the lamp (see table)



= **forward phase control**
= **reverse phase control**

Dimmart (= dimming mode)

All suitable dimmable lamps can usually be operated in dimming mode 3 (Automatic).
Exceptions:
- Dimming mode 5 must be selected for lamps with wound transformers in a circuit with an automatic demand switch.
- Dimming mode 2 (or if appropriate mode 4) must be selected for CFLs which require an ignition and warm-up time.

„Dimmart“ (dimming mode)	Description
1: Reverse phase control	For incandescent lamps, HV halogen lamps, LV halogen lamps with electronic transformers, and dimmable LED lamps
2: Reverse phase control with CFL mode	For dimmable CFLs which require an ignition and warm-up time
3: Automatic	For dimming nearly all loads with reverse phase control (with automatic change to forward phase control for wound transformers) *Not suitable for lamps with wound transformers in a circuit with an automatic demand switch; select dimming mode 5 instead.*
4: Forward phase control with CFL mode	For dimmable CFLs which require an ignition and warm-up time, and when dimming mode 2 does not provide smooth dimming.
5: Forward phase control	For dimming lamps with wound transformers located in a circuit with an automatic demand switch

CFL mode (dimming modes 2 and 4)
Most CFLs need full mains voltage for ignition. For this reason, this mode provides an ignition phase at half brightness before adjusting to the last (saved) brightness level. A warm-up phase with elevated minimum brightness is also provided because most CFLs have significantly reduced minimum dimming capability (without going out) when cold. The minimum brightness is gradually reduced to the normal value during the warm-up phase. The warm-up time depends on the off time, so the full warm-up time (max. 1 minute) is only used when the lamp has been off for an extended time. If a CFL is switched off at very low brightness and then switched on again when cold, the previous minimum brightness will be attained only after the warm-up phase.

Automatic detection of wound transformers (dimming mode 3)
Wound transformers must be dimmed with forward phase control because reverse phase control generates inductive reverse voltages that can destroy the dimmer if it does not detect them and switch off on time.
In this dimming mode the dimmer automatically changes to forward phase control after being switched on as soon as overvoltages (not yet dangerous) are detected. This setting is retained until loss of mains voltage. This dimming mode is not suitable for use with automatic demand switches because the mains voltage is always disconnected after the lights are switched off.

2. Setting the dimming mode

The minimum brightness should be set depending on the lamp so that the on state of the lamp can still be recognised at minimum brightness.

Switch on the dimmer and dim down as far as possible. Then set the minimum brightness to the desired level with the „Min. Brightness“ control.

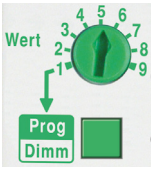
Min. Hell. = Min. Brightness control

3. Programming the functions and settings

Functions and additional options or settings can be assigned independently to the three inputs (1, Z1 and Z2) and the front button.

„Value“ control and front button

The „Value“ control is used to enable programming mode (turned to the left stop) and to set values for functions 13 to 16. The range of values depends on the selected function; see the „Settings“ table on the next page for suitable values for functions 13 to 15.



Value

Front button

Programming:
To enable programming mode, first **turn the „Value“ control to the left stop („Prog“)**. Then **press the front button for 2 seconds** to enter function selection mode. LED 1 lights up to indicate that function 1 is selected.

Now select a specific **function (1–21) by pressing the front button repeatedly** (if function 13–16 or 21 is selected, the value is taken directly from the position of the „Value“ control) and then **assign an input (1, Z1 or Z2) by briefly activating the input**. Note: The front button must be held for 2 seconds to assign the selected function to the front button.

Function selection mode is exited automatically after 20 seconds. Normal operation of the dimmer is not possible as long as the „Value“ control is in the „Prog“ position. After completing programming, turn the „Value“ control back from the „Prog“ position to exit programming mode and enable normal dimmer operation.

Programmable functions

LED display 5 4 3 2 1	Function	Description
○○○○●	**1: Toggling and dimming**	Brief button press = toggle; long button press = dim up/down
○○○●○	**2: Switch on / dim up**	Short button press = switch on; long button press = dim up
○○○●●	**3: Switch off / dim down**	Short button press = switch off; long button press = dim down
○○●○○	**4: Only toggle (pulse switch)**	Short button press = toggle (dimming not possible)
○○●○●	**5: Only switch on**	Short button press = switch on (dimming not possible)
○○●●○	**6: Only switch off**	Short button press = switch off (dimming not possible)
○○●●●	**7: Switching sequence (max. / memory / off)**	Repeated short button presses actuate the switching sequence: maximum brightness → memory brightness → off
○●○○○	**8: Timer**	Switching input signal level (edge triggered): on = switch on; off = switch off
○●○○●	**9: Option: Brightness memory**	On = switch on with previous brightness; Off = switch on with maximum brightness
○●○●○	**10: Option: Slumber**	On = slumber mode enabled; Off = slumber mode disabled
○●○●●	**11: Option: Time scale (ramp time)**	On = on/off ramp time settable up to 30 s; Off = on/off ramp time settable up to 30 min
○●●○○	**12: Option: Minimum lighting level**	On = dim down/ switch off stops at minimum brightness; Off = dim down / switch off stops in off state
○●●○●	**13: Setting: Run time**	The run time can be set up to 300 min with the „Value“ control
○●●●○	**14: Setting: Switch-on ramp**	The switch-on ramp time can be set with the „Value“ control up to 30 s or 30 min, depending on the setting in function 11
○●●●●	**15: Setting: Switch-off ramp**	The switch-off ramp time can be set with the „Value“ control up to 30 s or 30 min, depending on the setting of function 11
●○○○○	**16: Setting: Initial brightness**	Set the initial brightness with the „Value“ control (the dimmer switches on for this)
●○○○●	**17: Default settings**	Press the front button for 10 seconds to return all settings to the default values
●○○●○	**18: force OFF**	while this input is active, the dimmer remains in off state
●○○●●	**19: force minimum brightness**	while this input is active, a switch-off signal (via other control inputs) will cause the dimmer to dim to minimum brightness, but never completely switches off („emergency light function“)

LED display 5 4 3 2 1	Function	Description
●○●○○	**20: force ON (defined brightness)**	while this input is active, the dimmer remains switched ON at defined brightness (set by the „Value“ control)
●○●○●	**21: dim to defined brightness**	a pulse signal at this input causes the dimmer to dim to a defined brightness (set by the „Value“ control)

Table: Settings

Value	With function 14 or 15: **Short on/off ramp [s]** Prerequisite: Function 11 enabled	With function 14 or 15: **Long on/off ramp [min]** Prerequisite: Function 11 disabled	With function **13: Run time [min]**
1	1	0	0
2	2	4	12
3	3	8	30
4	4	11	55
5	6	15	90
6	13	19	130
7	19	23	180
8	23	27	240
9	30	30	300

Table: adjustment aid (function 13)

Run time [min]	Blink ratio LED ON/OFF [s]
> 0	0.1 / 0.1
> 6	0.1 / 0.2
> 12	0.1 / 0.4
> 30	0.1 / 0.8

Programming example

Assign the following functionality to button input 1:
Function 4: Only toggle (pulse switch) with option 12: Minimum lighting level
(this function is useful in locations such as corridors where it should not be possible to switch off the lighting completely with the normal light switch, such as in senior care facilities)

Turn the „Value“ control to the „Prog“ position (left stop) to enable programming mode.
To enter programming mode, press and hold the front button for 2 s until LED 1 lights up (function 1 selected).
Press the front button three times to select function 4 (LED 3 lit).
Briefly press the button connected to input 1 to assign the selected function to this input.
All LEDs go dark. Function selection mode has been exited.
To return to function selection mode, press and hold the front button for 2 s again until LED 1 lights up (function 1 selected).
Press the front button eleven times to select function 12 (LEDs 3 and 4 lit).
Briefly press the button connected to input 1 to activate the minimum lighting option.
All LEDs go dark. Function selection mode has been exited.

As long as the „Value“ control is in the „Prog“ position, normal dimmer operation is not possible. After completing programming, turn the „Value“ control back from the „Prog“ position to exit programming mode and enable normal dimmer operation.

Default settings

The following functions are preset in the default configuration:

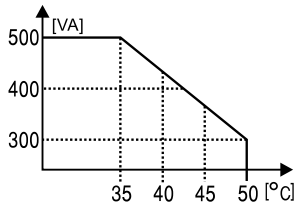
Front button Function 1: Toggling and dimming
Input 1 Function 1: Toggling and dimming
Input Z1 Function 5: Only switch-on
Input Z2 Function 6: Only switch-off
Options Memory always enabled, start and stop ramps set to minimum value (1 s) (function 11 activated). All other functions are deactivated.

Restoring default settings:
Turn the „Value“ control to the „Prog“ position (left stop) to enable programming mode.
To enter programming mode, press and hold the front button for 2 s until LED 1 lights up (function 1 selected).
Press the front button sixteen times to select function 17 (LEDs 1 and 5 lit).
Press and hold the front button longer than 10 seconds to restore the default settings.

As long as the „Value“ control is in the „Prog“ position, normal dimmer operation is not possible. After completing programming, turn the „Value“ control back from the „Prog“ position to exit programming mode and enable normal dimmer operation.

Ambient conditions and troubleshooting

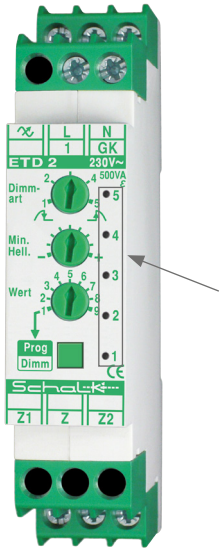
Allowable load:



Maximum allowable load versus ambient temperature (with adequate air circulation)

The efficiency of wound transformers and electronic loads (LEDs, CFLs and electronic transformers) must be taken into account. The (primary) VA value is the critical parameter for the dimmer. Electronic loads must be approved by the manufacturer for dimming with forward or reverse phase control dimmers.
The dimmer heats up during operation, depending on the connected load. The connected load must be reduced if this heat cannot be dissipated adequately. Do not mount dimmers immediately next to each other or next to heat sources; always leave a gap.

LED status display:



LED display in normal operation

LED display	Description
LEDs lit continuously	Display of selected function in programming mode
LEDs blink quickly	Display of function assigned to currently activated input
LEDs blink every 3 seconds	Fault display (see table below)
LEDs light up in fast sequence (5...1)	Run time expiring
LEDs light up in slow sequence (2...4)	Up ramp active (brightness increased to nominal level)
LEDs light up in slow sequence (4...2)	Down ramp active (brightness reduced to off state)
LEDs 2 and 4 blink alternately	On state without run time (nominal brightness already reached)
LED 5 blinks intermittently	Dimming mode has been changed

LED display in fault mode

LED display 1 2 3 4 5	Fault
◐○○○○	**1: Overload > 500 VA**
○◐○○○	**2: Overtemperature**
◐◐○○○	**3: Overcurrent (short-circuit)**
○○◐○○	**4: Transformer reverse voltage**
◐○◐○○	**5: Transformer saturation (unbalanced load)**
○◐◐○○	**6: Overload > 900 VA**
◐◐◐○○	**7: Mains overvoltage**
○○○◐○	**8: Synchronisation fault**
◐○○◐○	**9: Memory fault**
○◐○◐○	**10: Current peaks (to high capacitive load at LEDs/forward phase control operation)**

There is a restart lockout interval of up to 10 seconds after an overload, overtemperature, overcurrent or overvoltage condition to allow the heated components to cool down.

General information

Lamps approved for the same dimming mode can usually be used together. Incandescent lamps may always be operated in parallel. However, functional impairments occur fairly often when electronic loads from different manufacturers are operated in parallel, due to mutual interference of manufacturer-specific ballasts and/or electronic transformers. Wound transformers may not be combined with electronic loads.
The dimmer is designed to work with as many different types of lamps as possible. However, it is not possible to guarantee trouble-free operation of every dimmable lamp with the dimmer, since this can be affected by the design or construction of the lamp ballast or transformer.
Flickering or erratic dimming in the low brightness range with LED lamps and CFLs is usually due to the lamp being designed for higher minimum input power. We recommend raising the minimum brightness setting in such cases.
Ripple control signals from electricity plants can lead to perceptible flickering of the lighting. The magnitude of this effect varies from one region to the next.

Technical data

Operating voltage	230V AC 50 Hz
Power consumption	0.3 W in off state
Power dissipation	max. 2W bei 500VA Last
Rated load	
Incandescent, HV and LV halogen lamps, wound or electronic transformers	500 VA with ambient temperatures up to 35°C; 300 VA with ambient temperatures up to 50°C
LED/CFL	Up to 400 VA (lamps of the same make recommended). **Differences in manufacture-specific ballast or electronic transformer circuitry may lead to restrictions on load capacity, the maximum number of lamps or the dimming and/or switching functions.**
Input 1:	
Wiring capacitance on terminal 1	max. 100 nF
Glow lamp load on terminal 1	max. 20 mA
Inputs Z1, Z2:	
Wiring capacitance on terminal Z1/Z2	max. 20nF
Glow lamp load on terminal Z1/Z2	max. 1mA
Ambient temperature range	-10°C to +50°C (reduced power above +35°C)
Connections	Socket terminals with captive screws M3.5
Clamping range	0.5 mm² - 4.0 mm²
Strip length	6.0 mm - 6.5 mm
Screwing torque	0.80 Nm
Mounting	Click-mount on standard 35-mm rail (EN 60715)
Outside dimensions	18 x 88(45) x 58 mm
Weight	80 g
Installation depth	55 mm
RAL colour	Grey 7035 / Green 6029

Order data

Item no.	EAN	Typ e	Item designation
ETD209	4 046929 201124	ETD 2	Universal Pushbutton Dimmer (REB), also for LED/CFL, with Z input

2017-05-01

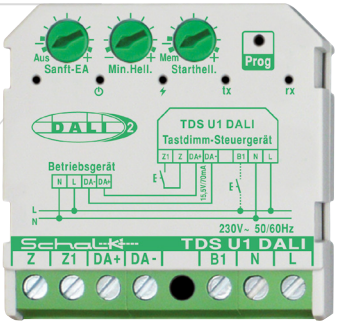
Push-button dimmer control unit DALI with integrated power supply TDS U1 DALI

(flush-mounted version)

Compact, easy-to-install DALI-2 certified control unit with integrated power supply, for the conversion of tactile commands into DALI protocols (broadcast mode). Short press = switch ON/OFF, longer press = dim UP/DOWN. Suitable for lamps with dimmable DALI ballast.

Special features TDS U1 DALI

- DALI-2 certified single-master control device
- dims suitable DALI control gear units
- integrated DALI power supply (maximum 70mA) for powering up to 35 DALI control gear units
- can be used independently of the installed switch series
- for broadcast operation (central telegram)
- no DALI programming tool required



General information

Suitable DALI lamps can be easily dimmed with the push-button dimmer control unit.
The settings for soft on/off, minimum brightness and start brightness make programming superfluous. The behaviour after mains interruption can be set ("OFF" or "ON with start brightness").
Thanks to the compact housing dimensions, the TDS U1 DALI can be mounted directly in the installation boxes behind a push-button of any switch series.

Functional description

Short push-button action at input Z1 (potential-free) or B1 (230V AC) switches the lighting on or off, long push-button action dims the lighting up or down. The dimming direction changes automatically with each long key-press.

Additional functions

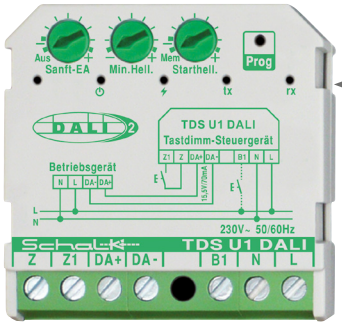
Function “discretet dim-on”
If the key is pressed for a long time when the device is switched off, the dimmer switches on and dims up from minimum brightness.

Function "Behaviour after mains interruption"
The behaviour after mains interruption can be individually adapted by a simple programming procedure. You can select between two settings by briefly pressing the programming button several times:

- Mode 1 / LED "rx" lights (○○○○●):
  Lighting switches to the start brightness preset in the TDS U1 DALI.
- Mode 2 / LED "tx" lights (○○○●○):
  Lighting remains off.

Info **To accept a changed setting, press the programming button for more than 2s. If there is no user interaction for 10 seconds, the programming process is otherwise terminated automatically (without saving the change).**

Controls and indicators



Adjuster for soft on/off ("Sanft-EA"):
Setting range 0 - 8s
Setting the switch-on and switch-off speed ("ramp slope"). In the "Off" position, the "Soft On/Off" function is deactivated.

Adjuster for minimum brightness ("Min.Hell"):
Adjustment range 1% - 70%
As soon as the adjuster is pressed, the lighting is activated and the minimum brightness can be set as desired.

Adjusts the start brightness ("Starthell."):
Adjustment range 1% - 100%
As soon as the adjuster is pressed, the lighting is activated and the minimum brightness can be set as desired.
In the "Mem" mode, the TDS U1 DALI always switches on with the brightness last set.

Programming button ("Prog"):
Setting "Behaviour after mains interruption"
Mode 1: Switching on with preset start brightness
Mode 2: Lighting remains off.

LED's:
Operation LED (⏻ "):
Indicates the operating status of the device.

Status LED („ϟ„):
Indicates an error condition.

Transmit LED ("tx"):
The LED is lit while the TDS U1 is sending DALI protocols on the DALI bus.

Receive LED ("rx"):
The LED is lit while the TDS U1 is receiving DALI protocols on the DALI bus.

LED status indicator

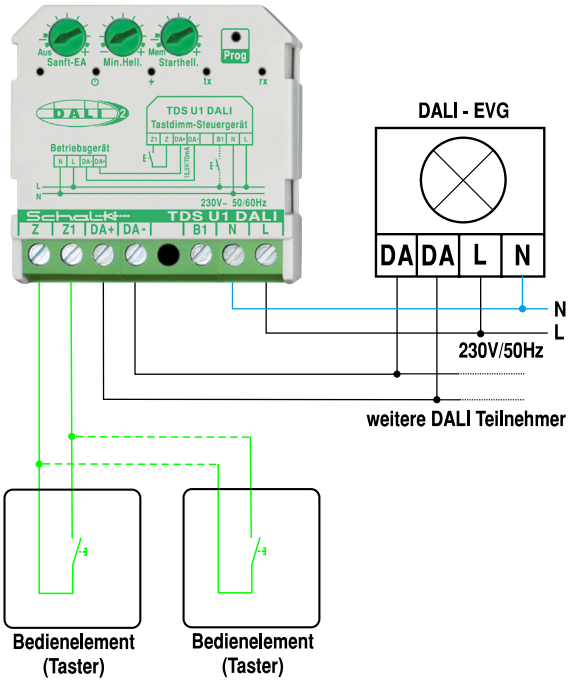
LED indication ⏻ ϟ rx tx	Description
○ ● ○ ○	DALI bus overloaded (<12V) - no operation possible! (supp. Power supply necessary)
● ● ○ ○	Overvoltage on the DALI-BUS (>22V) - no operation possible!
○ ○ ○ ●	Mode 1 (when voltage returns: Device switches on with start brightness
○ ○ ● ○	Mode 2 (when voltage returns: Device remains switched off)
● ○ ○ ●	Received DALI protocol
● ○ ● ○	DALI protocol sent
● ○ ○ ○	general operating status (standby)
● ● ○ ●	received DALI protocol undefined (lights up 5s after)
● ● ● ○	DALI bus occupied (lights up 5s after)
◐ ○ ○ ○	Optical detent (adjuster has been actuated)

Legend:
○ LED off
● LED lights red
◐ LED flashes red
● LED lights up green
◐ LED flashes green
◐ LED flashes alternately red/green

Connection examples

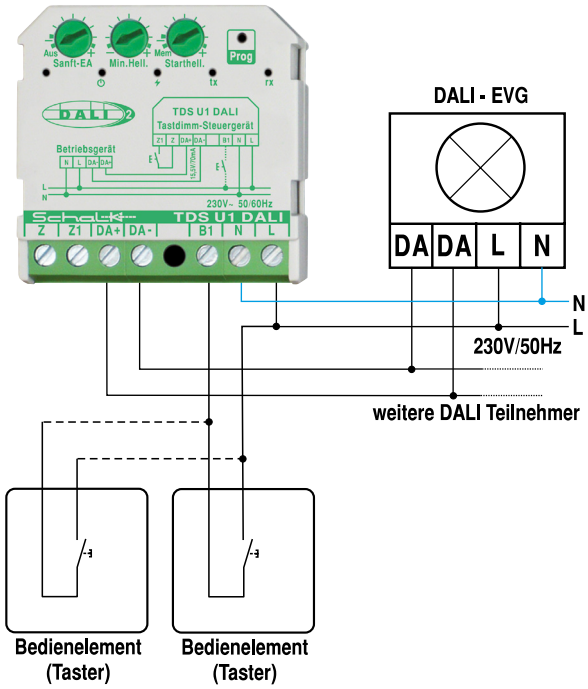
Standard connection

The push-button dimmer control unit TDS U1 DALI is operated via push-button input Z1 (potential-free push-button)



Connection optional

The use of the B1 input (230V AC) is advantageous for longer probe cables.



Info

TDS U1 DALI is a single master application controller and cannot be combined with control units from other manufacturers! A TDS U1 DALI is able to supply up to 35 DALI devices (2mA each).

Technical data

Operating voltage:	230 V 50/60 Hz 10 %
DALI interface	15.5 V, 70 mA typ. (max 110 mA), DA+ / DA-
Start-up	1s
Current consumption	3 mA
Inputs	Z1 (potential-free, against Z) B1 (230V AC = operating voltage)
Number of possible DALI operating devices	max. 35
Ambient temperature	-10°C to +45°C
Insulation	Basic insulation 3mm according to IEC 60928
Connection terminals	Socket terminals with captive screws M3
Clamping range	0.5 mm² - 2.5 mm²
Strip length	6.5 mm - 7.0 mm
Screwing torque	0.50 Nm
Mounting orientation	arbitrarily
External dimensions	43 x 43 x 18,5 mm
Weight	35 g
RAL colour	grey 7035 / green 6029

Order data

Item no.	EAN	Type	Designation
TDSU1D9	4 046929 201131	TDS U1 DALI (230V AC)	Push-button dimmer control unit DALI (230V AC, FMD), integrated power supply

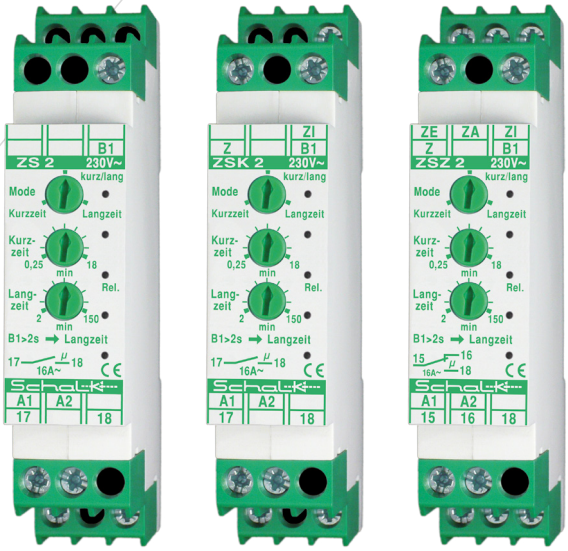
2019-01-10

Light timer pulse switch ZS 2 / ZSK 2 / ZSZ 2

Pulse switch (pulse switch) with running time setting and convenient long-term switch-over via light switches for lighting control. External voltage inputs / central control inputs available for ZSK 2, ZSZ 2.

Special features

- High operating comfort
- 2 running times separately adjustable
- Long-term switch-over via light switch
- 3 operating modes:
  - short term only
  - short- / long-term
  - long-term only
- Galvanically isolated external voltage inputs from 8-230V UC for ZSK 2 and ZSZ 2
- Central on/off switching for ZSZ 2
- Can be switched off at any time via light switch
- Potential-free 16A switching contact



General information

The ZS(X) 2 combines a high degree of comfort, flexibility and functionality with simple handling and operation. By pressing the light button for a short or longer time, you can choose between two independently adjustable time ranges. This enables individually configurable short-term / long-term switching within a range of 0.25 to 150 minutes. By pressing the light button again, the consumers are switched off immediately. Two operating modes enable long-term switching to be disabled.
Another special feature of the ZSK 2 is an additional external voltage input which is galvanically isolated from the other inputs and outputs and can be controlled, for example, by a door intercom system without coupling relay.
ZSZ 2 same as ZSK 2, but with additional inputs for central switch-on and switch-off.

Applications

For lighting control in all areas that are only used temporarily (staircase, yard area, garage, storage rooms, basement, bathroom, WC, etc.), both in private and public areas (schools, kindergartens, etc.), general control technology.

Operation

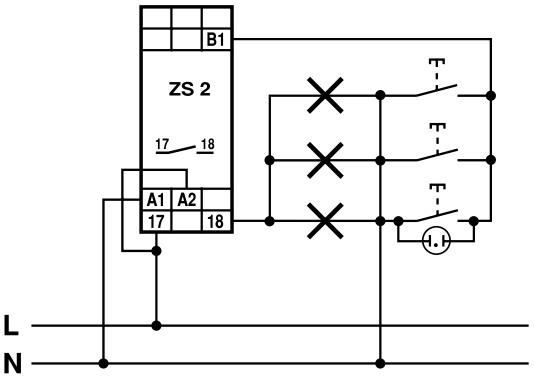
Use the Mode rotary switch to select one of the following 3 operating modes:

Short- / long-term
Switch from short time to long time by pressing B1 for a longer time (approx. 2 seconds)

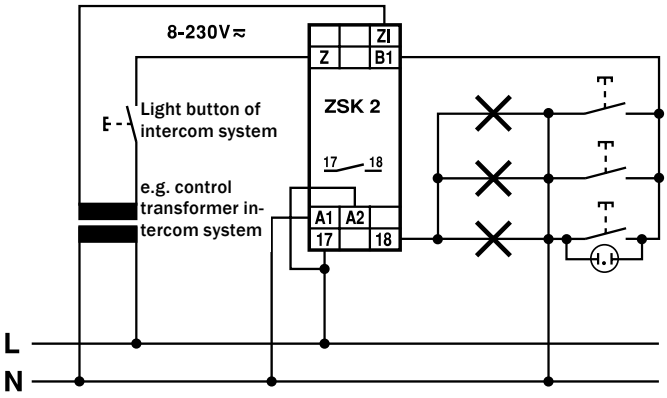
Short-term
Running time adjustable from 0.25 to 18 minutes

Long-term
Running time adjustable from 2 to 150 minutes

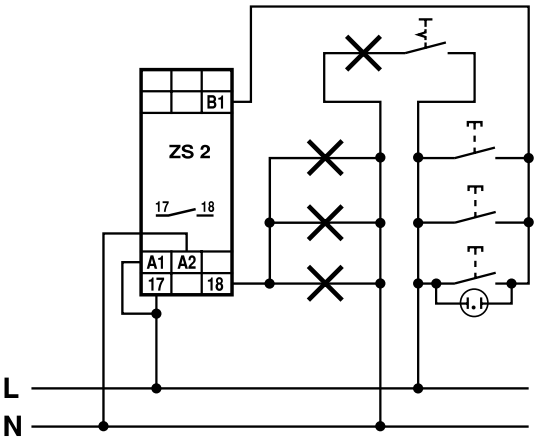
Example connections ZS(X) 2



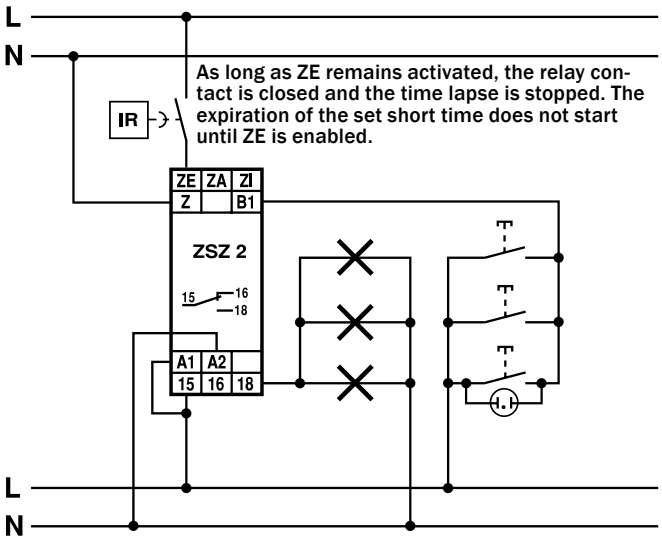
3-wire connection



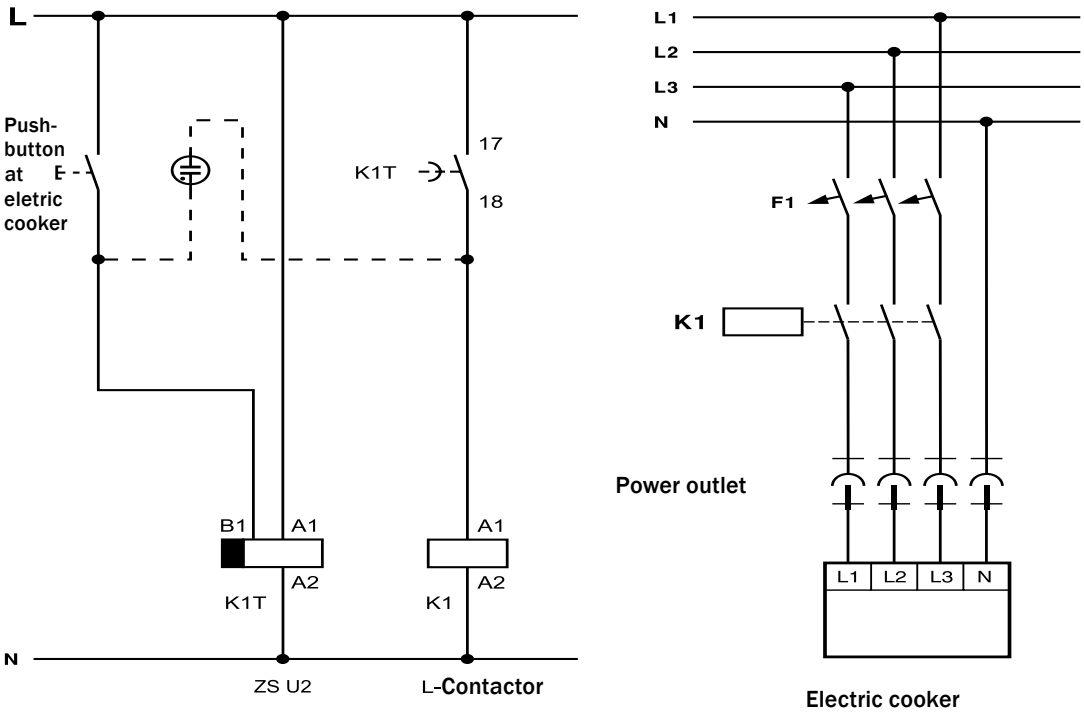
Connection of an intercom system



4-wire connection



Connection of a motion detector



Switching off a three-phase current cable by means of light timer pulse switch ZS 2

For short energy requirements (e.g. 15 minutes), press the button briefly. If the consumer (electric cooker etc.) is used for a longer period of time, the button must be pressed for more than 2 seconds, so that the ZS 2 switches to long-term operation and remains switched on for up to 2.5 hours. It can also be switched off again at any time during long-term operation. The power line is therefore only live when energy is really needed.

Applications:
In apartments for the elderly, outdoor sockets, etc.

Function ZS(x) 2 at B1 and ZI

Button press	Run time
<2s	0.25 - 18 min
>2s	2 - 150 min
2nd time	Off

Technical data

Operating voltage:	230V 50/60Hz 10 %
Power consumption:	approx. 0.6 W
max. glow lamp load	20mA
max. line capacitance	800nF
External voltage inputs ZS(X) 2	8V-230V UC
Relay output	1 NO contact (for ZSZ209: 1 change-over contact) potential-free (6 mm creepage and clearance distance)
max. switching voltage	250V AC
max. continuous current	16A
Contact rating	See data sheet “Relay contact load ratings”
Ambient temperature	-10°C to +45°C
Connection terminals	Socket terminals with captive screws M3.5
Clamping range	0.5 mm² - 4.0 mm²
Strip length	6.0 mm - 6.5 mm
Screwing torque	0.80 Nm
Mounting	Click-mount on standard 35-mm rail (EN 60715)
External dimensions	18 x 88 (45) x 58 mm³
Installation depth	55 mm
Weight	approx. 80g
RAL colour	grey 7035 / green 6029

Order data

Item no.	EAN	Type	Designation
ZS2009	4 046929 201032	ZS 2	Light timer pulse switch for 230V with 3 modes
ZSK209	4 046929 201056	ZSK 2	Light timer pulse switch for 230V with 3 modes and external voltage input ZI
ZSZ209	4 046929 201063	ZSZ 2	Light timer pulse switch for 230V with 3 modes, ZI, ZE, ZA

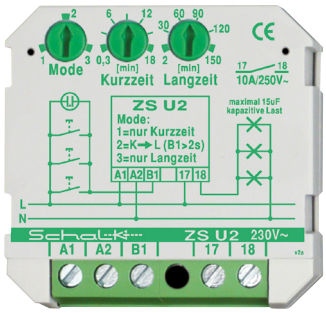
01/10/2017

Light timer pulse switch ZS U2

for installation in switch or junction boxes
Flush-mounting pulse switch (pulse current switch) with running time setting and convenient long-term switching via light switch for lighting control.

Special features

- small installation dimensions
- very low power consumption
- 2 running times separately adjustable
- long-term switch-over via light switch
- 3 operating modes:
  - short term only
  - short- / long-term
  - long-term only
- can be switched off at any time via light switch
- potential-free 10 A switching contact



General information

The ZS U2 combines a high degree of comfort, flexibility and functionality with simple handling and operation.

By pressing the light button for a short or longer time, you can choose between two individually adjustable running times at any time.

This enables individually configurable short-term / long-term switching within a range of 0.25 to 150 minutes.

The consumers can also be switched off directly at any time by pressing the light button again.
If required, the short-term / long-term switching can also be deactivated by means of adjustable operating modes.
Thanks to its small installation dimensions, the ZS U2 can be installed in switch boxes behind a conventional push-button and is therefore particularly well suited for renovating old buildings.

Applications

Briefly frequented rooms, e.g. staircase, garage, storage rooms, yard area, general push-button-controlled lighting technology etc.

Operation

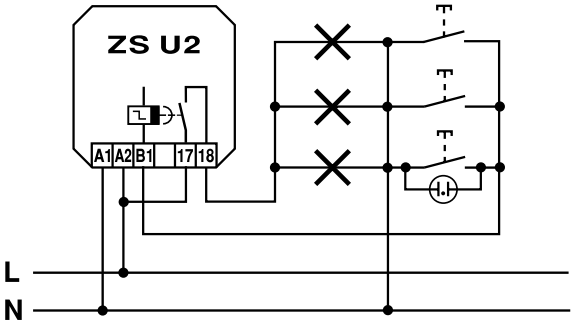
Use the Mode rotary switch to select one of the following 3 operating modes:

Mode 1 = short-term only
Running time adjustable from 0.25 to 18 minutes

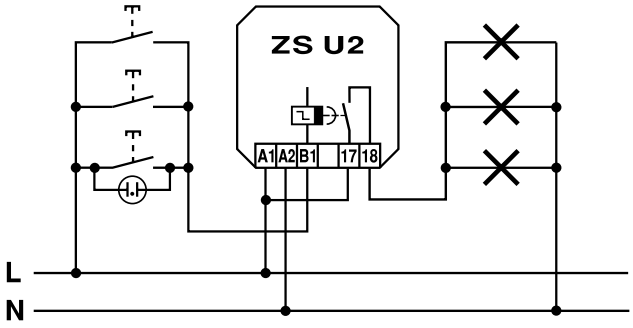
Mode 2 = Short- or long-term switchable
Switching-over from short-term to long-term by pressing B1 for a longer time (approx. 2 seconds)

Mode 3 = long-term only
Running time adjustable from 2 to 150 minutes

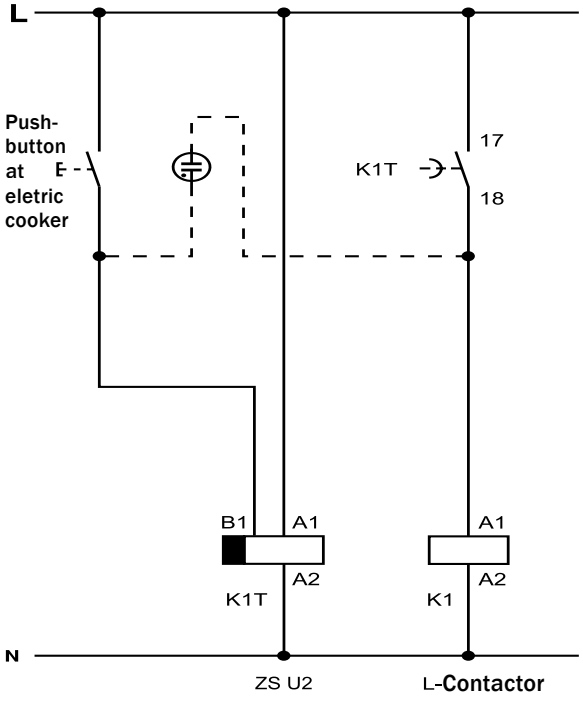
ZS U2 onnection examples

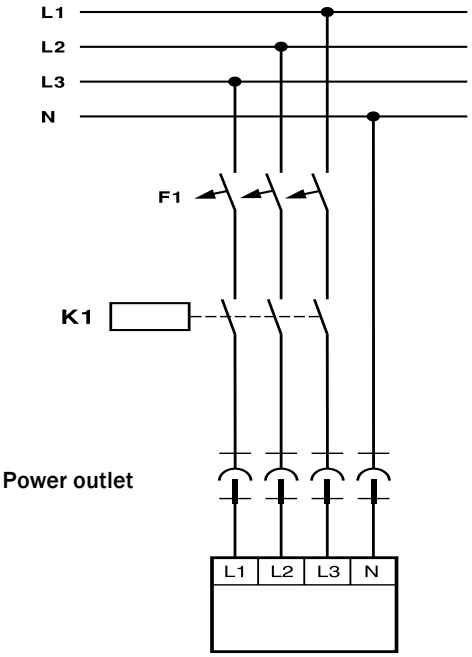


3-wire connection



4-wire connection





Electric cooker

Switching off a three-phase current cable by means of light timer pulse switch ZS U2

For short energy requirements (e.g. 15 minutes), press the button briefly. If the consumer (electric cooker etc.) is used for a longer period of time, the button must be pressed for more than 2 seconds, so that the ZS U2 switches to long-term operation and remains switched on for up to 2.5 hours. It can also be switched off again at any time during long-term operation. The power line is therefore only live when energy is really needed.

Applications:

In apartments for the elderly, outdoor sockets, etc.

Function ZS U2

Button press	Run time
<2s	0.25 - 18 min
>2s	2 - 150 min
2nd time	Off

Technical data

Operating voltage:	230 V 50 / 60 Hz 10 %
Power consumption:	approx. 0.35 W
max. glow lamp load	approx. 10 mA
max. line capacitance	approx. 50 nF
Relay contact	NO contact 250 V AC / 10 A (potential-free with 8 mm clearance and creepage distance)
Switch rating	see data sheet: “Relay contact rating"
Ambient temperature	-10°C to +45°C
Connection terminals	Socket terminals with captive screws M3
Clamping range	0.5 mm² - 2.5 mm²
Strip length	6.5 mm - 7.0 mm
Screwing torque	0.50 Nm
Mounting orientation	arbitrarily
External dimensions	43 x 43 x 18,5 mm
Weight	approx. 40 g
RAL colour	grey 7035 / green 6029

Order data

Item no.	EAN	Type	Designation
ZSU209	4 046929 201049	ZS U2	Light timer pulse switch for 230 V with 3 modes

2017-06-01

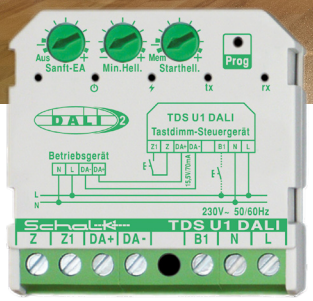
Schalk
STEUERUNGSTECHNIK GmbH

Push-button dimmer control unit for DALI luminaires: TDS U1 DALI

Control light at the touch of a button

Short keystroke: Switching on/off
Longer keystroke: Dimming up/down

- ✓ Independent of switch series
- ✓ Simple installation, no programming required
- ✓ Integrated DALI bus power supply
- ✓ Broadcast to all DALI bus participants



The minimum brightness, start brightness and on/off ramp can be adjusted. In addition, the power-on behaviour can be specified.
The DALI-2-certified TDS U1 DALI control unit can supply up to 35 DALI control gear units via the integrated power supply.

QR-Info

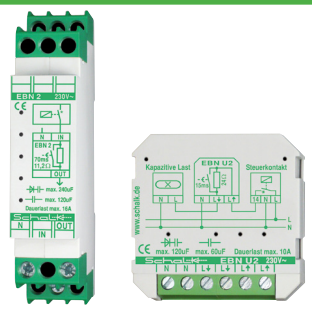
TDS U1 DALI

Push-button dimmer control unit DALI (230V AC, UP), integrated power supply

DALI-dimmable lamps/control gears required - please ask the lamp manufacturer for details!

Schalk Steuerungstechnik GmbH ▪ Am Stellwinkel 2 ▪ 87784 Westerheim
Phone +49 8336 8044-0 ▪ Fax +49 8336 8044-33 ▪ info@schalk.de ▪ www.schalk.de

Measuring relays

	Item no.	Type	Specs	Dimensions	Page
					
Switch-on inrush current limiter EBN 2 / EBN U2 The EBN 2 or the compact flush-mounted version EBN U2 are used when relay contacts are welded by high inrush current peaks. Electronic ballasts, fluorescent lamps, energy saving lamps etc. and of course the use of compensation capacitors cause inrush current peaks of well over 100A! If the EBN 2 / EBN U2 is connected downstream of the endangered contacts, current peaks are reduced to an uncritical value.	EBN209	EBN 2	230V AC, 1 NO 16A, tv=70ms	18x55mm	145
	EBNU29	EBN U2	230V AC, 1 NO 10A, tv=15ms	43x43x18.5mm	
NEW 					
Limit-value switch for light (shade/twilight) GSL 2 The GSL 2 is a universal limit value switch for brightness monitoring. With two separate setting ranges of 1-70 lux for twilight monitoring and 20,000-100,000 lux for shading monitoring, a wide variety of applications (control of shading systems, light-dependent roller shutter/blind control, simple light sensor evaluation of downstream controls such as PLCs, etc.) can be implemented. 2 operating modes and an automatically generated counter-rotating pulse ensure quick and easy integration in a large number of systems. Matching product: Light sensor SL 2	GSL209	GSL 2	230V AC, 1-70Lux / 20,000-100,000Lux	18x55mm	133
NEW 					
Lichtsensor SL 2 Lichtsensor mit Clip-Halterung. Geeignet für Grenzwertschalter oder sensorgesteuerte Motorsteuerung.	SL2000	SL 2	Lichtsensor mit Clip-Halterung, IP65, PG9	ca. 65x21mm	133
					
Limit-value switch for liquid GSF 2 The GSF 2 limit switches can be used on many sides, yet are uncomplicated and easy to use. The connected sensor is supplied directly by the limit switch with a potential-free low voltage (PELV). The use of an additional power supply is therefore not necessary. The GSF 2 in conjunction with the immersion sensor SF 1 is used for monitoring liquid levels. Matching product: Liquid sensor SF 1	GSF209	GSF 2	230V AC, 1 CO potential-free 16A,	18x55mm	139
Liquid sensor SF 1 Liquid immersion sensor SF 1 for conductive liquids. Suitable for the GSF 2 limit switch.					139
					
	SF1000	SF 1	Immersion sensor, min. measuring level 2mm	45x10mm	

Measuring relays

Page		Item no.	Type	Specs	Dimensions
139		**Limit-value switch for rain GSR 2** The GSR 2 is used in conjunction with the SR 1 sensor for rain detection. Matching product: Rain sensor SR 1			
		GSR209	GSR 2	230V AC, 2000-80000 Lux	18x55mm
139		**Rain sensor SR 1** Capacitive rain sensor SR 1 with combined wall/mast mount. Suitable for the GSR 2 limit switch.			
		SR1000	SR 1	Rain sensor	58x64x35mm
137		**Limit-value switch for liquid level measurement GSP 2** The limit switch GSP 2 is used for level monitoring of conductive liquids. In combination with 3 immersion electrodes a minimum and a maximum liquid level can be monitored. Automatic filling or emptying can be controlled with the GSP 2 via the potential-free 10A change-over contact. Matching products: Level sensor for 1 electrode Level sensor for 3 electrodes			
		GSP209	GSP 2	230V AC, 1 CO 10A,	18x55mm
137		**Level sensor for single electrode SP 1** Screw-in holder for one electrode (electrode not included). Cables with up to 6mm outer diameter can be connected. For electrodes with M4 male thread. **Level sensor for 3 electrodes SP 3** Screw-in holder for three electrodes (electrodes not included) with M4 male thread.			
		SP1000	SP 1	Thread 3/8" (16,67mm), 1 x M4 (electrode)	approx. 71x39x22mm
		SP3000	SP 3	Thread 2" (59,61mm), 3 x M4 (electrodes)	approx. 71x91x91mm

Measuring relays

Item no.	Type	Specs	Dimensions	Page
NEW 	**Limit-value switch for wind GSW 4** The GSW 4 is an universal limit switches for wind monitoring. In conjunction with the wind sensor SW 4, a wind force range of 2 - 8 (approx. 10-70 km/h) can be measured. The wind sensor is supplied potential-free by the GSW 4 (10V DC PELV), so no external power supply is required. Matching product: Wind sensor SW 4			141
GSW409	GSW 4	230V AC, 1 NO 10A	18x55mm	
NEW 	**Wind sensor SW 4** Wind sensor with articular mount			141
SW4000	SW 4	Reed contact pulser	250x125x85mm	
	**Current measuring relay IMR 3** The IMR 3 is used when loads are to be switched on or off depending on a defined alternating current, e.g. automatic switching on of an extraction system in wood processing plants. The potential-free monitoring of a given power consumption for signalling and monitoring systems is also possible. Flexible use due to potential-free change-over contact. Matching product: Current transformer IW 32 for extending the measuring range up to 60A			115
IMR309	IMR 3	230V AC, 1 CO potential-free 16A, 20mA-16A	18x55mm	
	**Current window measuring relay IMR F1** The current window measuring relay IMR F1 is used for current monitoring of AC loads. The adjustable switching thresholds "I Low" and “I High", a precisely definable current window is monitored. Matching product: Current transformer IW 32 for extending the measuring range up to 60A			119
IMRF19	IMR F1	230V AC, 1 CO potential-free 16A, 20mA-16A	18x55mm	
	**Ring-type current transformer IW 32** The IW 32 extends the measuring range of IMR 3 and IMR F1 from 16 A to 60 A.			115
IW3200	IW 32	Ratio 30:1, diameter 10mm	32x32x15.5mm	

Measuring relays

Page		Item no.	Type	Specs	Dimensions
123					
		Mains monitoring relay NKR 5 The NKR 5 mains monitoring relay is used to monitor the phase voltages of one- up to three-phase networks. When used in a three-phase network, the phase position can also be monitored. The switching threshold can be set freely from 150 to 230V or to a defined fixed value of 196V (DIN VDE 0107 or DIN VDE 0108). The phase voltages and the direction of the rotating field are displayed on the NKR 5 via LEDs. A phase failure is stored optically by a flashing LED. The relay switches on either automatically after power returns or only after acknowledgement by the internal or an external push-button.			
		NKR509	NKR 5	230V AC, 1 CO potential-free 10A, error memory	18x55mm
127					
		Mains monitoring relay for voltage window measurement NKR F1 The NKR F1 monitors 1- to 3-phase networks for phase position, overvoltage and undervoltage. This makes it possible to react to neutral line interruptions and the overvoltages that usually occur. Consequential damage in electrical systems can thus be prevented. The response time to mains errors is adjustable from 0.1s to 5s. The relay switches on again either automatically after an error condition or only after acknowledgement by an external button.			
		NKRF19	NKR F1	230V AC, 1 CO pot.-free 10A, U_{var}=170-300V	18x55mm

Current measuring relay IMR 3

with 3 measuring ranges and adjustable switch-off delay

Ring-type current transformer IW 32

Ratio 30:1 / Measuring range up to 60 A

Current-dependent switching of consumers, e.g. for switching-on the dust exhaust system when starting wood processing machines

Special features

- 3 measuring ranges: 20 mA-0.2 A / 0.2-2 A / 1.6-16 A
  (extendable via external current transformer)
- Measuring circuit galvanically isolated
- Holding threshold display
- adjustable hysteresis
- Adjustable switch-off dela
- Output contacts potential-free

General information

The current measuring relay IMR 3 is used where loads are switched on or off depending on a defined alternating current. The potential-free monitoring of a preset power consumption for signalling and monitoring systems is also possible.
Supply voltage, measuring input and relay output are each galvanically isolated from each other.

Applications

Current-dependent switching in control, signalling and monitoring systems. E.g. control an dust eshaust system in wood processing plants, depending on the switching status of various machines.

Operation

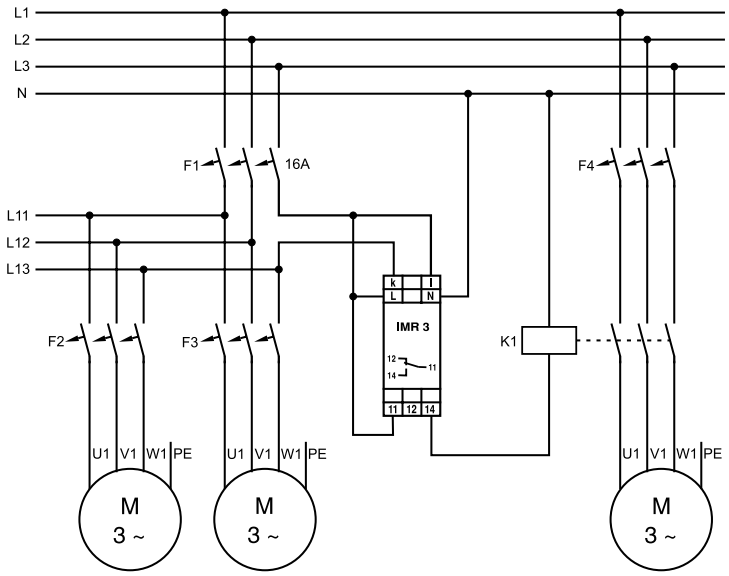
The supply voltage of IMR 3 is applied to terminals L and N. The alternating current to be measured is conducted via the potential-free current measuring input (terminals k and l). The phase position is irrelevant here.
The required measuring range (0.2 A, 2 A or 16 A) is set via a rotary switch on the front panel.
Regardless of the selected measuring range, however, the current via terminals l and k can be up to 16 A at all times. An external current transformer (e.g. IW 32 for up to 60 A) can also be connected upstream for the detection of larger currents.

The desired switching-on threshold (within the selected measuring range) can be set exactly with the "Ion" controller. The setting range is 10% to 100% of the measuring range. Thus currents from 20mA to 16A can be detected.

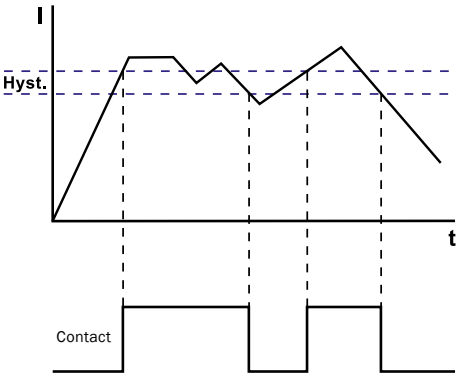
With the aid of the adjustable hysteresis, the switch-off threshold can be set up to 50% below the value of the switch-on threshold. This results in a very wide holding range if required. This ensures stable switching behaviour even under difficult measuring conditions.

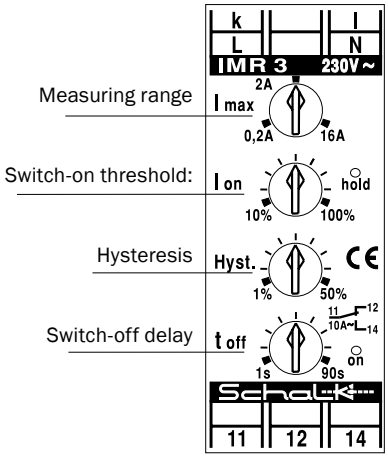
With the “toff” controller, the IMR 3 can still set a switch-off delay in the range from 1s to 90s.
The"hold" LED indicates whether the measured current is within the set range and thus serves as a setting aid.
The "on" LED indicates the current switching state of the relay.

Connection example

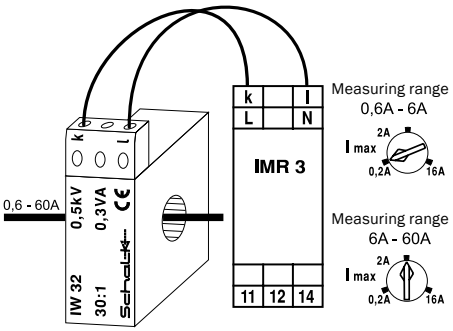


Functional diagrams IMR 3





IMR 3 control elements



IMR 3 measurement up to 60 A with IW 32

Technical Data IMR 3

Operating voltage:	230 V 50/60 Hz 10 %
Power consumption:	approx. 0.65 W
Measuring range	20 mA-0,2 A / 0,2 A-2 A / 1,6 A-16 A
Switch-on threshold:	10-100 % of the measuring range
Hysteresis	1-50 % of the switch-on threshold
Switch-on delay	approx. 0.5s
Switch-off delay	adjustable 1-90s
Relay output	1 CO contacts potential-free 10 A 250 V AC
Connection terminals	Socket terminals with captive screws M3.5
Clamping range	0.5 mm^2 - 4.0 mm^2
Strip length	6.0 mm - 6.5 mm
Screwing torque	0.80 Nm
Mounting	Click-mount on standard 35-mm rail (EN 60715)
External dimensions	18 x 88(45) x 58 mm
Installation depth	55 mm
Transformer input	max. 16 A / 250 V~ (100 % ED)
max. switching capacity	see "Relay contacts" data sheet
Mounting orientation	arbitrarily
Ambient temperature	-10°C to +45°C
RAL colour	grey 7035 / green 6029
Weight	approx. 80 g

Technical Data IW 32

Transformer ratio	30:1
Measuring range	0,6 A-60 A
Accuracy class	1
Nominal power	1.5 VA
Line resistance	max. 0.25 Ω (corresponds approx. 10 m supply cable with 2 x 1.5 mm^2)
Housing dimensions	32 x 32 x 15,5 mm^3
Hole diameters	10 mm

Order data

Item no.	EAN	Type	Designation
IMR309	4 046929 301008	IMR 3	Current measuring relay, 230V AC, 3 measuring ranges 0.02-16A
IW3200	4 046929 901031	IW 32	Ring-type current transformer 30:1

2019-09-01

Current window measuring relay IMR F1

with 3 measuring ranges and adjustable switch-on delay

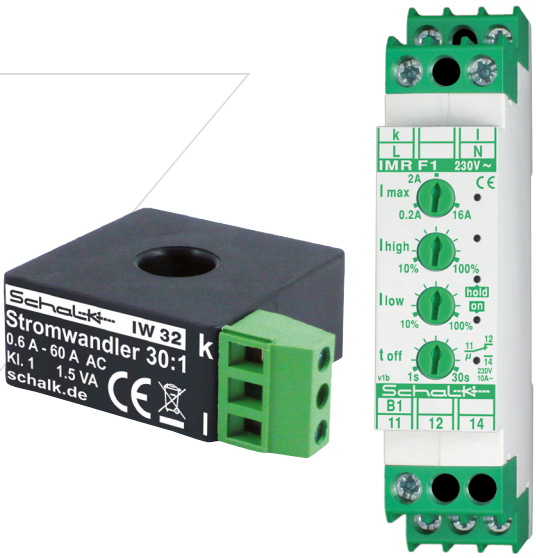
Ring-type current transformer IW 32

Ratio 30:1 / Measuring range up to 60 A

Current monitoring of AC loads, with two adjustable switching thresholds, e.g. for safety shutdown in the event of under- or overcurrent).

Special features

- 3 measuring ranges 20 mA-0.2 A/ 0.2-2 A/ 1.6-16 A (extendible via ext. current transformers)
- Measuring circuit galvanically isolated
- Output contacts (change-over contact 16 A) potential-free
- Adjustable response time
- Switching status display
- Holding threshold display
- very low power consumption



General information

The current window measuring relay IMR F1 is used for current monitoring of AC loads. The "I Low" and "I High" switching thresholds, which can be set independently of one another, monitor a precisely definable current window. If the consumer to be monitored leaves this set current range, the relay drops out after an adjustable response time has elapsed.
The potential-free change-over contact can be used to switch on warning devices, for example, or the monitored consumer itself can be switched off directly. Input B1 can be used to trigger a switch-on pulse in order to put the affected consumer back into operation after it has been switched off.
The IW 32 current transformer available as an accessory extends the maximum possible measuring range from 16 A to 60 A.

Applications

Current monitoring of AC loads such as e.g. machines, drives, switchgear, etc.

Operation

The supply voltage of IMR 3 is applied to terminals L and N. The alternating current to be measured is conducted via the potential-free current measuring input (terminals k and l). The required measuring range (0.2 A, 2 A or 16 A) is set via a rotary switch on the front panel. An external current transformer (e.g. IW 32 for up to 60 A) can also be connected upstream for the detection of larger currents.

With the "I high" and "I low" controllers, an exactly definable current window can now be set within the selected measuring range.

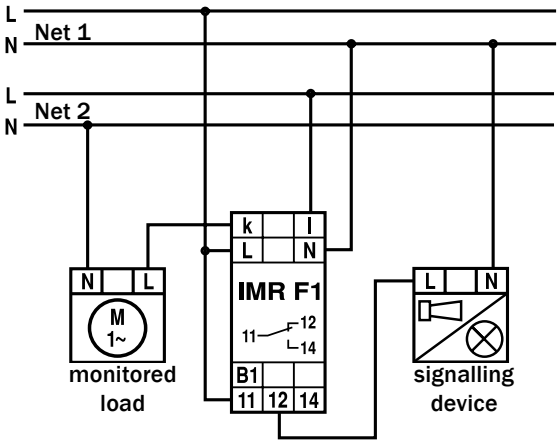
If the measured current is within the set window, the "hold" LED starts to light up and the relay contact is switched.

The active relay contact is indicated by the "on" LED. If the current consumption of the load leaves the set window, the "hold" LED goes out and the relay is switched off after the adjustable response time (1s - 30s).

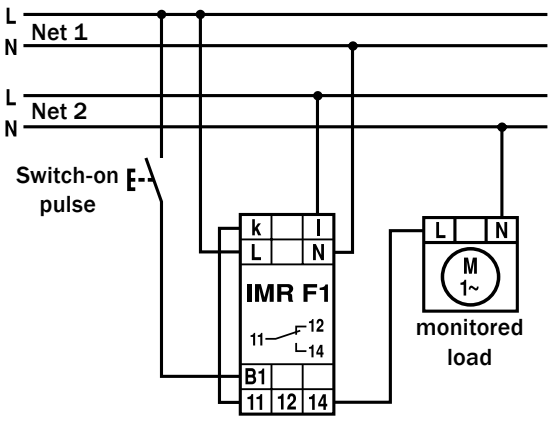
In order to achieve an automatic switch-off of the monitored consumer, it only has to be routed via the normally open contact of the IMR F1. A switch-on pulse is generated by controlling input B1 (relay contact is briefly closed). This means that the monitored load can be put back into operation without any problems after it has been switched off.

The duration of this switch-on pulse corresponds to the set response time and can therefore be adapted to the conditions in the system.

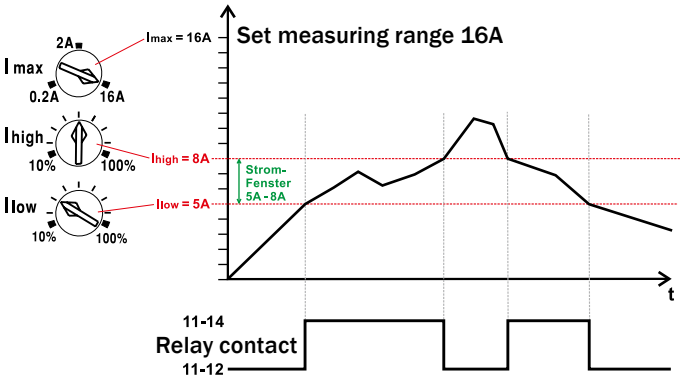
Current monitoring with signalling



Current monitoring with switch-off

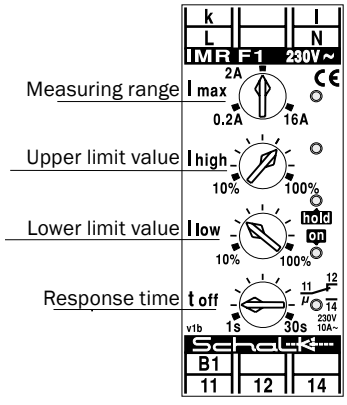


Configuration example with functional diagram

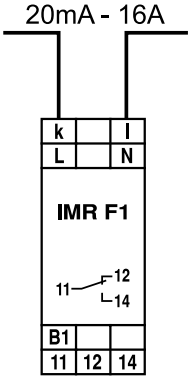


Info: Irrespective of the set measuring range and the set current window, the current to be measured via the connections k and l may be permanently 16A.

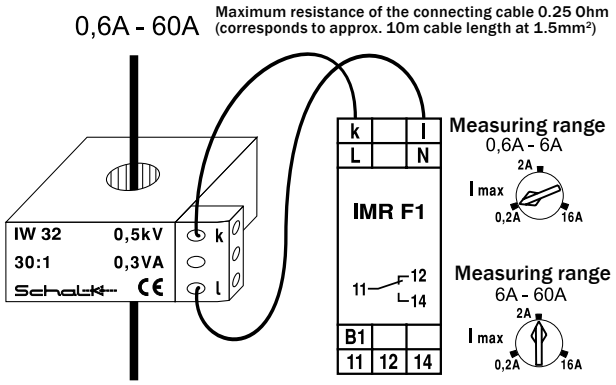
Control elements



Example: direct measurement



Example: with IW 32 (ratio 30:1/max. 60A)



Technical Data IMR F1

Operating voltage:	230 V 50/60 Hz 10%
Power consumption:	approx. 0.6 W
Measuring range	20 mA-0.2 A / 0.2-2 A / 1.6-16 A (AC 50/60 Hz)
Lower limit (I low)	10-100 % of the measuring range
Upper limit value (I high)	10-100 % of the measuring range
Switch-on delay	approx. 1 s
Response time	adjustable from 1s - 30s
Transformer input	potential-free
- continuous current max.	16 A
- voltage max.	400 V
- higher measuring currents	60 A via external converter IW 32
Relay output	1 CO potential-free
- switching voltage max.	250 V
- continuous current max.	16 A
- switching capacity max.	3500 VA
- electrical service life	1 x 10^5 cycles
Ambient temperature	-10°C to +45°C
Connection terminals	Socket terminals with captive screws M3.5
Clamping range	0.5 mm^2 - 4.0 mm^2
Strip length	6.0 mm - 6.5 mm
Screwing torque	0.80 Nm
Mounting orientation	arbitrarily
Mounting	Click-mount on standard 35-mm rail (EN 60715)
External dimensions	18 x 88 (45) x 58 mm
Installation depth	55 mm
Weight	approx. 80 g
RAL colour	grey 7035

Technical data IW 32

Transformer ratio	30:1
Measuring range	max. 60 A
Nominal power	0.3 VA
Line resistance	max. 0.25 Ohm (approx. 10 m cable with 1.5 mm^2)
Housing dimensions	32 x 32 x 15,5 mm^3
Hole diameters	10 mm

Order data

Item no.	EAN	Type	Designation
IMRF19	4 046929 301022	IMR F1	Current window measuring relay 230V AC, 3 measuring ranges 0.02 - 16A
IW3200	4 046929 901031	IW 32	Ring-type current transformer 30:1

2018-12-01

Mains monitoring relay NKR 5

Monitoring of 1- or 3-phase networks (voltage, rotary field direction). Adjustable acknowledgement function and connection possibility of an external push-button

Special features

- Mains monitoring for 1 to 3 phases according to DIN VDE 0107 or DIN VDE 0108
- adjustable monitoring voltage
- Monitoring status indicated by LEDs
- Rotary field monitoring can be switched on
- Restart interlock can be activated
- Functional check
- Operation via external button possible
- Potential-free change-over contact 250V / 10A
- Low power consumption
- Low wiring effort in single-phase networks

General information

The NKR 5 mains monitoring relay is used to monitor the phase voltages of one- up to three-phase networks. When used in a three-phase network, the phase position can also be monitored.
The switching threshold can be set freely from 150 to 230 V or to a defined fixed value of 196 V (DIN VDE 0107 or DIN VDE 0108).
The phase voltages and the direction of the rotating field are displayed on the NKR 5 via LEDs. A phase failure is optically stored by a flashing LED, so that the phase causing the fault can be determined even after a power recovery. The relay switches on either automatically after power returns or only after acknowledgement (restart interlock). The error case can be simulated via the internal or an external push-button and the circuit can thus be tested.

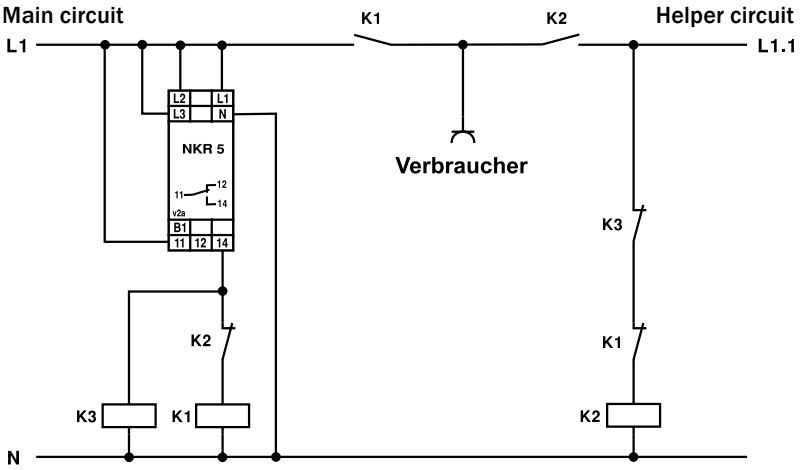
Applications

Public buildings, rooms with public traffic, med. used rooms etc..

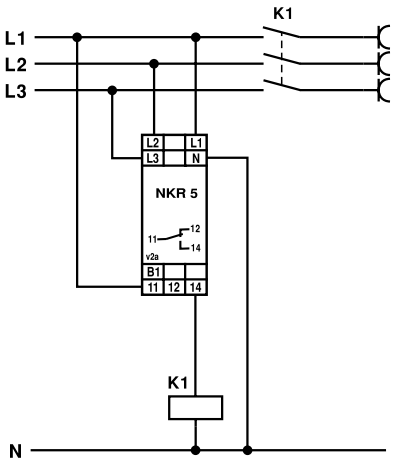
Operation

If the voltage at one of the 3 monitoring inputs drops below the set value or the rotary field direction (only for rotary field monitoring) is not clockwise, the relay drops out with a delay of 0.5s (contact 11-14 open). The voltage must be 5 % higher than the set value (hysteresis) to switch on again. If the rotary field monitoring is set, the rotary field must also be clockwise and if the restart interlock is active, the acknowledgement button must also be pressed for the relay to switch on again.
The LEDs L1 - L3 start flashing as soon as the respective phase voltage exceeds the switch-on threshold. Each flashing LED changes to continuous light by briefly pressing a button. If a phase voltage falls below the switch-off threshold, the respective LED goes out. If the phase voltage exceeds the switch-on threshold again, the LED starts flashing again. This makes it possible to determine which phase caused the fault. The rotary field LED is only active when the rotary field monitoring is set. If the field is clockwise, the LED lights up, if the field is counterclockwise, the LED flashes. By pressing the button for longer than 3s, the NKR 5 goes into test operation. The relay drops out so that the following circuit can be tested.

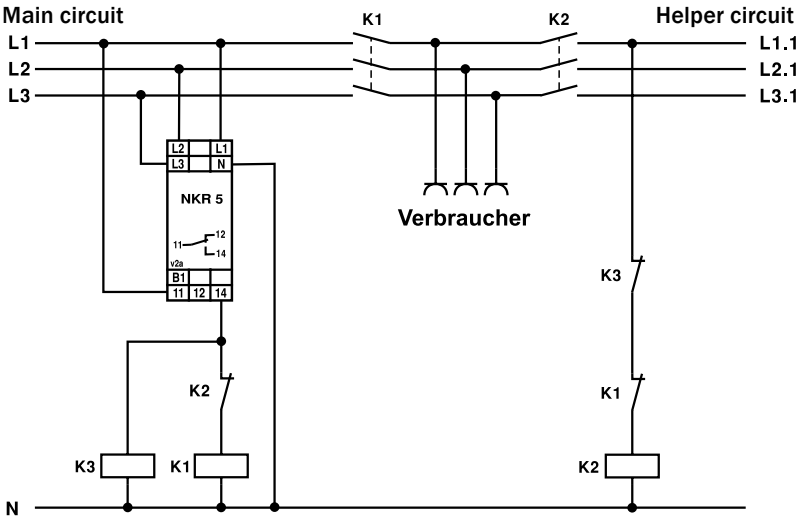
Connection example



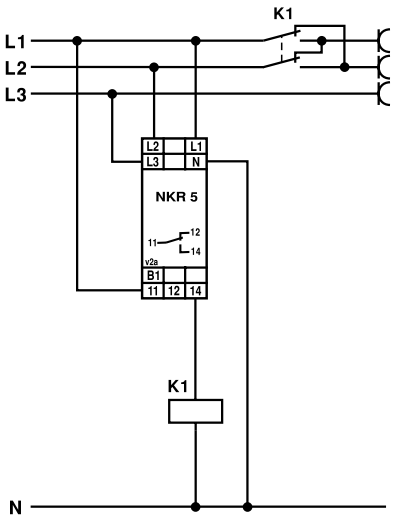
Automatic mains switchover, 1-phase



Motor protection (against wrong start and 2-phase operation)



Automatic mains switchover, 3-phase



Automatic rotary field switching

Operating modes

U	= Voltage monitoring (L1 - L3)
U↻	= Voltage monitoring with rotary field monitoring
U Q	= Voltage monitoring with restart interlock
U↻Q	= Voltage monitoring with rotary field monitoring and restart interlock

Technical data

Operating voltage:	140-250 V 50/60 Hz
Power consumption:	approx. 0.6W
Switch-off threshold	150-230 Veff / 196 Veff
Switch-on threshold:	Switch-off threshold + 5 %
Switch-off delay	0.5s
Switch-on criterion	U > Switch-on threshold at all 3 inputs or clockwise rotating field
Switch-off criterion	U < Switch-off threshold at least at one of three inputs or no clockwise rotating field, neutral conductor interruption is not monitored
Control voltage for B1	230V AC
Line capacitance (B1)	approx. 10 nF
Relay contacts	1 change-over contact 10A / 250V AC potential-free
Switch rating	see data sheet: “Relay contact rating"
Ambient temperature	-10°C to +45°C
Connection terminals	Socket terminals with captive screws M3.5
Clamping range	0.5 mm² - 4.0 mm²
Strip length	6.0 mm - 6.5 mm
Screwing torque	0.80 Nm
Mounting orientation	arbitrarily
Mounting	Click-mount on standard 35-mm rail (EN 60715)
External dimensions	18 x 88 (45) x 58 mm
Installation depth	55 mm
Weight	approx. 90 g
RAL colour	grey 7035

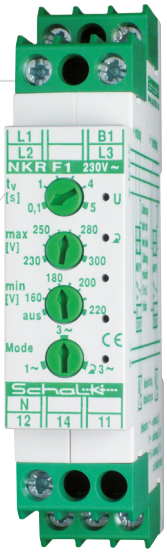
Order data

Item no.	EAN	Type	Designation
NKR509	4 046929 301046	NKR 5	Mains monitoring relay for 1 to 3 phases 230V AC

2017-06-01

Mains monitoring relay NKR F1

Monitoring of 1- or 3-phase networks (under- or overvoltage, rotary field direction).
Adjustable acknowledgement function via external button.



Special features

- Mains monitoring for 1 to 3 phases according to DIN VDE 0107 or DIN VDE 0108
- Monitoring of under- and overvoltage (voltage window)
- Rotary field monitoring can be switched on
- Restart interlock can be activated
- Adjustable response time (0.1-5s)
- Potential-free changeover contact
- Low wiring effort in single-phase networks

General information

The NKR F1 mains monitoring relay is used to monitor the phase voltages of one- up to three-phase networks. When used in a three-phase network, the phase position can also be monitored. Both undervoltage and overvoltage are monitored (voltage window).
The switching thresholds are adjustable: Undervoltage 160-220 V, overvoltage 230 - 300 V.
The response time (relay switch-off delay tv) is adjustable from 0.1 to 5s.
The NKR F1 detects the overvoltages that occur when the neutral conductor is interrupted, thus preventing damage to subsequent devices.

Applications

Emergency power supply, mobile electrical systems, building site power distribution systems, construction machinery, stage equipment, etc.

Operation

If one of the monitored voltages falls below the set minimum voltage or exceeds the set maximum voltage, the relay drops out with the delay tv (0.1 - 5s).
If the supply voltage L1 fails, the relay always drops out within 0.1s. For overvoltage protection, the set reaction time of the NKR F1 must be considered. Consumers which must not be exposed to overvoltage during this time must be protected accordingly (e.g. surge arresters).

To switch on, the monitored phase voltages must exceed or fall below the minimum and maximum values by 5 % (hysteresis) and at the same time voltage must be applied to input B1. Thus the relay switches on either only after acknowledgement with a button on B1, or automatically (B1 bridged with L1) with correct voltage. If the relay is switched on, the LED lights up and if there is an overvoltage, the LED flashes.
There are 3 operating modes available.

Operating mode "1-phase":
Only the voltage at L1 is monitored. L2 and L3 are not wired here.
Operating mode "3-phase":
The voltage at L1 - L3 is monitored.
Operating mode "3-phase with rotating field":
In addition to the voltages L1 - L3, the rotating field is also monitored.

If a clockwise rotating field is present, the rotating field LED lights up and the relay can switch on. With a counterclockwise rotating field, the LED flashes and the relay switches off. If the minimum voltage adjuster is in the "off" position, no undervoltage is monitored. The relay switches on as soon as a sufficient supply voltage (approx. 150 V) is applied to L1. An acknowledgement at B1 is not required here when the supply voltage is switched on. Only if the relay has not switched on or off due to a detected overvoltage, an acknowledgement at B1 is required.

Connection examples

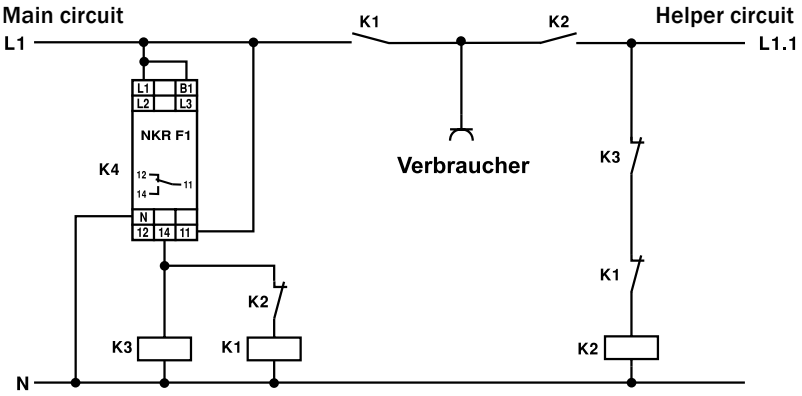


Fig. 1: Automatic mains switchover, 1-phase

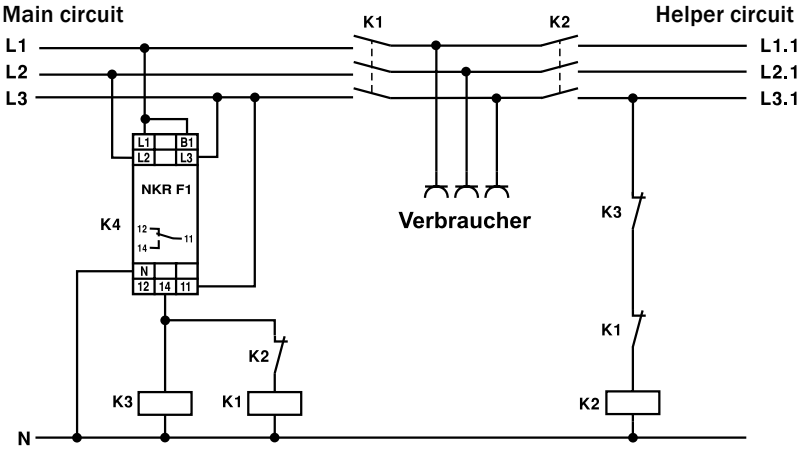


Fig. 2: Automatic mains switchover, 3-phase

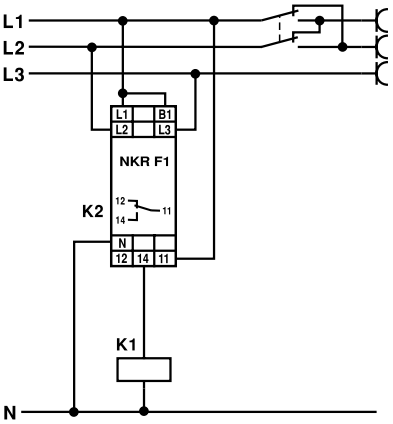


Fig. 3: Automatic rotary field switching

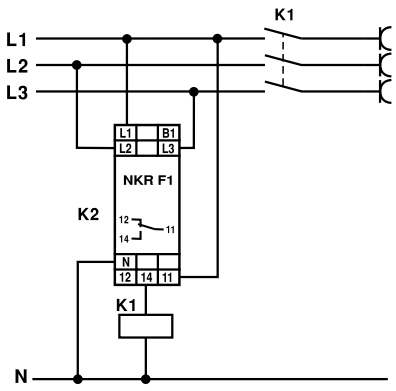


Fig. 4: Motor protection (against wrong start and 2-phase operation)

Operationg modes

1~	= single-phase voltage monitoring (L1)
3~	= three-phase voltage monitoring (L1 - L3)
3~↻	= three-phase voltage monitoring with rotary field monitoring

Technical data

Operating voltage:	150-400V 50/60Hz
Power consumption:	approx. 1W
Switch-off threshold	U_{min} 160-220V_{eff} U_{max} 230-300V_{eff}
Switch-on threshold:	U_{min} 160-220V_{eff} +5% U_{max} 230-300V_{eff} +5%
Switch-off delay	0.1 - 5s at L1 failure 0.1s
Control voltage for B1	230 V AC
Relay contacts	1 change-over contact 10 A / 230V AC potential-free
Switch rating	see data sheet: “Relay contact rating"
Ambient temperature	-10°C to +45°C
Connection terminals	Socket terminals with captive screws M3.5
Clamping range	0.5 mm² - 4.0 mm²
Strip length	6.0 mm - 6.5 mm
Screwing torque	0.80 Nm
Mounting orientation	arbitrarily
Mounting	Click-mount on standard 35-mm rail (EN 60715)
External dimensions	18 x 88 (45) x 58 mm
Installation depth	55 mm
Weight	approx. 90 g
RAL colour	grey 7035

Technical data

Item no.	EAN	Type	Designation
NKRF19	4 046929 301060	NKR F1	Mains monitoring relay for over- and undervoltage, 3 x 230/400V AC

2017-08-01

System Design: Limit Switches

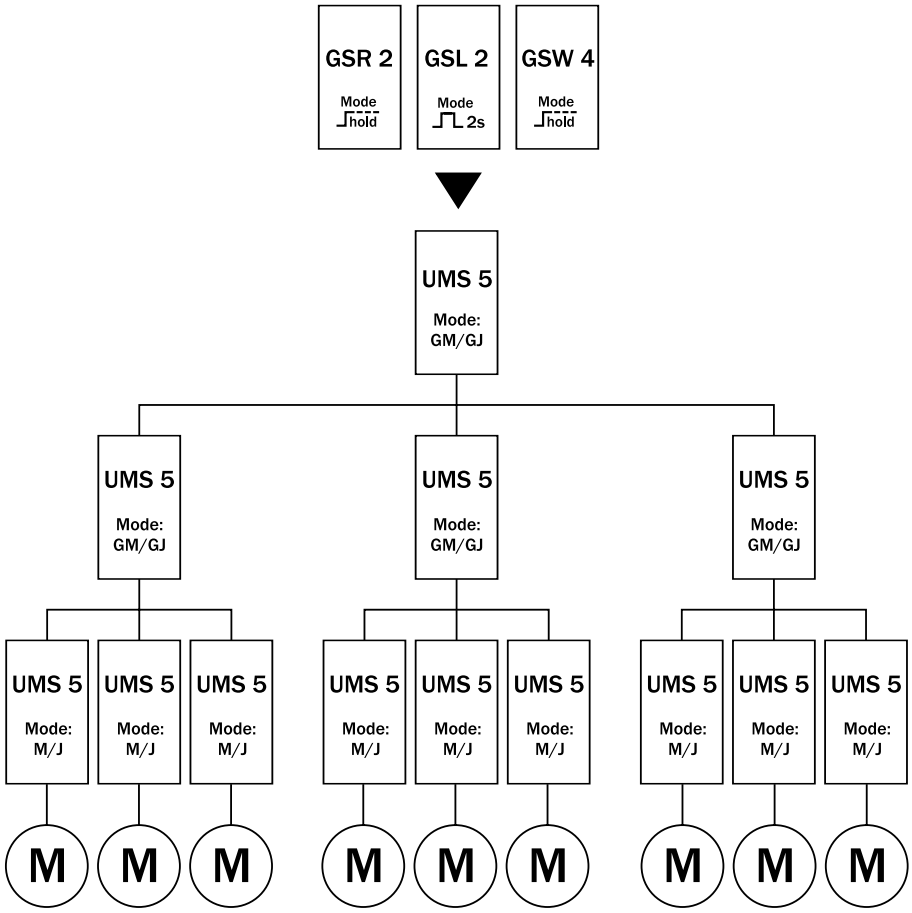
In combination with UMS 5 or UMS U5 open/close controller

Limit switches
for rain, light or wind

Central controller
The central controller is actuated by sensors and associated limit switches

Group controllers
are actuated by the central controller and push-buttons

Local controllers
The individual local controllers are actuated by the group controller and their own push-buttons



Local controllers

Each UMS 5 controls a drive through outputs 14 and 24. It is actuated by signals on the local inputs (VA and VZ) from conventional double push-buttons. Travel direction interlocking and run time limiting are ensured by the UMS 5.

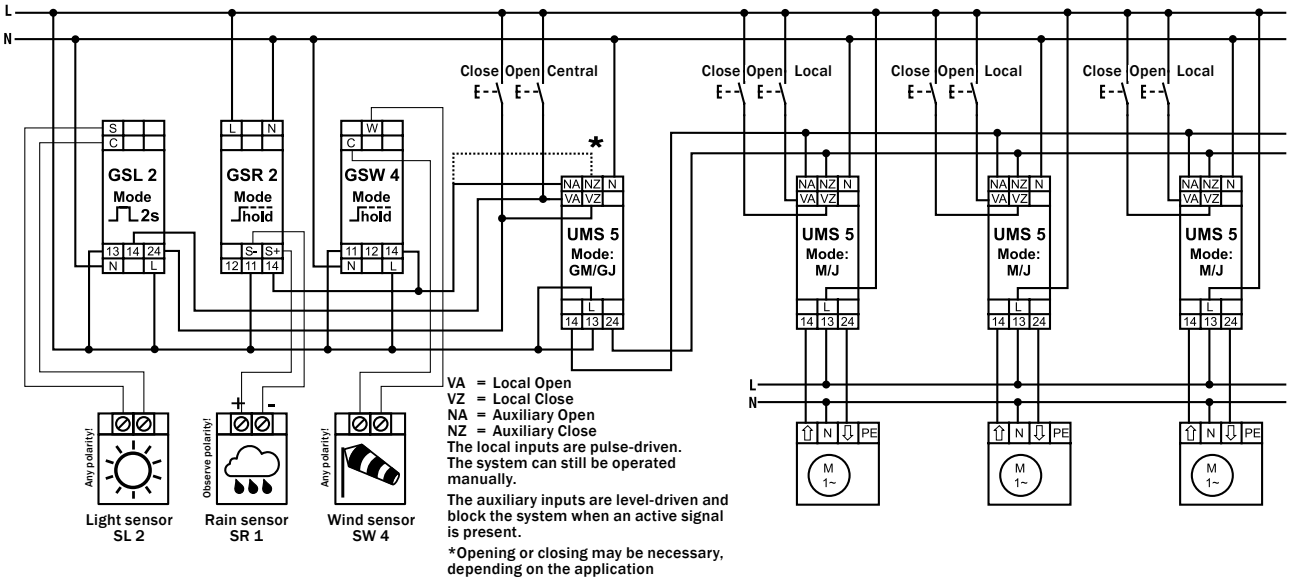
Group and central controllers

Several UMS 5 units can be grouped together by simply connecting their auxiliary inputs (NA and NZ) in parallel. They can be actuated jointly by connecting another (higher-level) controller ahead of them. This creates a **group**.
Group controllers can in turn be grouped together in the same way and actuated jointly by a higher-level controller. This further grouping is called **central control**.

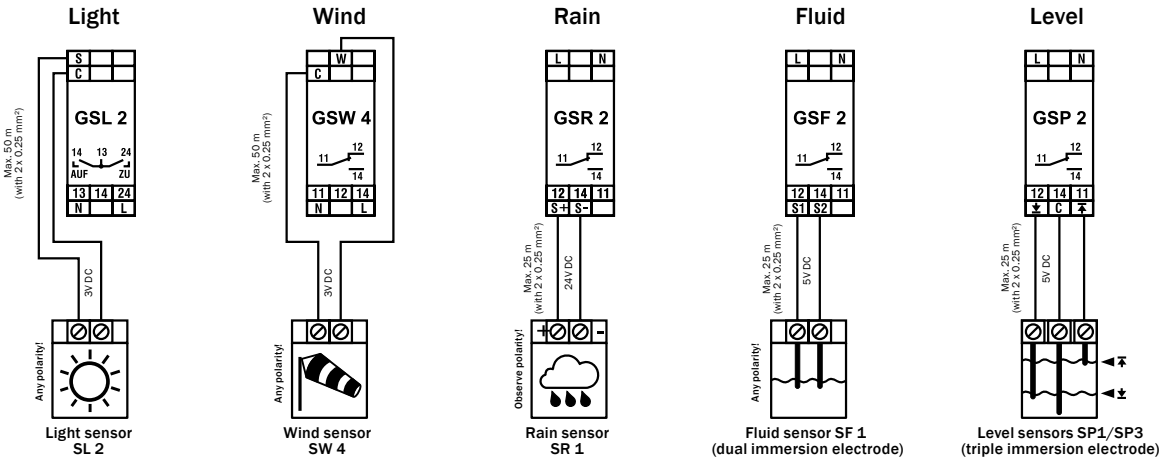
Rain, wind and light

The various limit switches are connected to the VA/VZ or NA/NZ inputs of the central controller.
Safety-related actuation signals for rain or wind **must be connected to the auxiliary inputs as continuous signals**. This ensures that the system is locked out for optimal protection against user errors.
Actuation signals not related to safety, such as automatic shading or twilight operation, **are connected to the local inputs as momentary pulse signals**.
In this case the system remains fully under control of the user.

Examples of light, rain and wind limit switches connected to a central controller

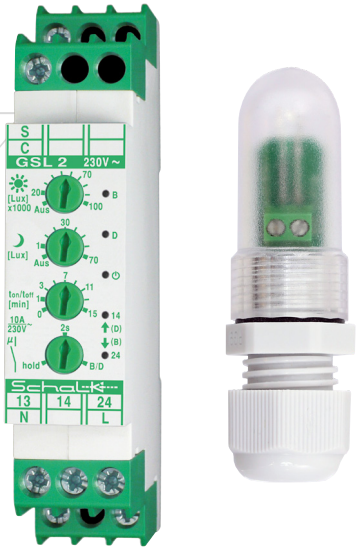


Overview of available limit switches and sensors



Limit switch for light intensity GSL 2
Light sensor SL 2

Combined brightness detection (2 separate adjustment ranges: twilight 1-70 lux/ shade 20,000-100,000 lux) for controlling shading solutions or twilight-dependent control for lighting or OPEN/CLOSE motor control applications, etc, with internally-generated sensor supply voltage.



Special features

- potential-free relay contacts
- galvanically isolated sensor inputs (PELV)
- configurable response delay
- configurable momentary or permanent control
- automatic reverse pulse
- display for switch threshold and switch state
- direct output of switch thresholds in B/D mode (one relay output each for shading and twilight)

General

The GSL 2 is a universally applicable limit switch for brightness monitoring.
With two separate adjustment ranges from 1-70 lux for twilight monitoring and 20,000-100,000 lux for shade monitoring, the switch can be used for many different applications (shading systems control, brightness-dependent louver/shutter control, simple detection of light sensors from downstream controls such as SPS, etc.) The two operating modes and an automatically generated reverse pulse make it easy to integrate into a wide range of applications.

Applications

Shading and twilight switch for light or OPEN/CLOSE controls, louver and blind automation, detection of light sensors for downstream controls.

Functional description

The two top setting are used to adjust the desired switch thresholds (in lux) for shade and twilight. The separate LEDs for shade or twilight are used to help to make the adjustment. They start flashing as soon as the brightness detected by the light sensor goes above or below the setting.

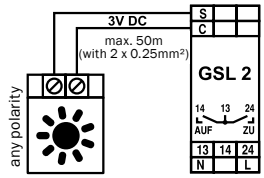
With the „ton/toff‘ setting, a response delay can be set to switch the relay outputs after a time delay.

The bottom setting selects the operating mode:

2s	only a short (2s) pulse is generated at the corresponding relay output
hold	the relay output remains switched until the input value changes again
B/D	in this mode the sensor state is directly output to the corresponding relay output (K14 = twilight, K24 = shade)

The state of each relay is displayed on the “K14” and “K24” LEDs respectively.

Example

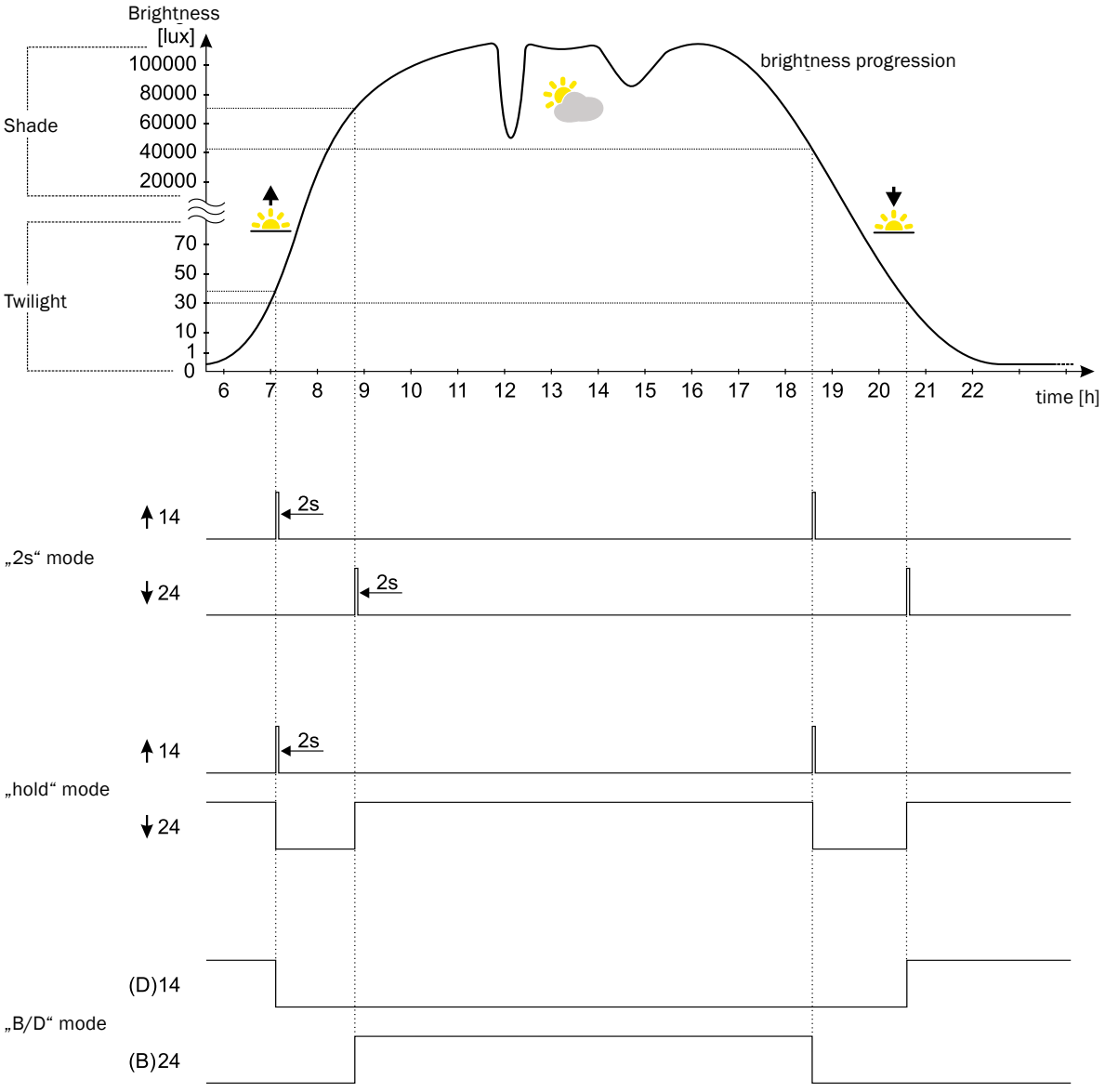


Light sensor SL 2

Fig. 1: Light sensor connection

Functional diagram:

Example: ton/toff = 0; Shade = 70000 lux; Twilight = 30 lux



Technical data GSL 2

Operating voltage	230V 50/60Hz 10 %
Power consumption	0.6W
Adjustment ranges	shade: 20.000-100.000 lux / twilight: 1-70 lux
Switching hysteresis	shade: 40% / twilight: 20%
Response delay	0=OFF or 1-15min
Relay switching dead time	0.6s
Sensor voltage	3.3V DC PELV (short-circuit proof)
Relay outputs	2 NO 10A/250V AC potential-free
Relay contact rating	see data sheet “Relay contact load ratings”
Ambient temperature	-10°C to +45°C
Connections	Cage clamp terminals with captive screws M3.5
Clamping range	0.5 mm² - 4.0 mm²
Strip length	6.0 mm - 6.5 mm
Screwing torque	0.80 Nm
Installation position	arbitrary
Fixing	Snap-on mounting on 35mm top-hat rail according to EN 60715
Outside dimensions	18 x 88 (45) x 58 mm
Installed depth	55 mm
Weight	approx. 75g
RAL colour	grey 7035 / green 6029

Technische Daten SL 2

Sensor type	Phototransistor
Protection class	IP65
Screw connection	PG9
Maximum line length	max. 50m (at 2 x 0.25mm²)
Dimensions	ca. 65 x 21mm

Order data

Part no.	EAN	Type	Description
GSL209	4 046929 301381	GSL 2	Grenzwertschalter für Licht (Beschattung/Dämmerung) 230V AC, 2 Schließer 10A pf
SL2000	4 046929 301398	SL 2	Lichtsensor mit Clip-Halterung

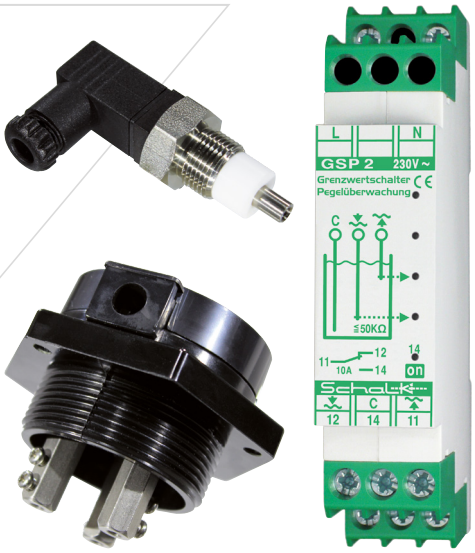
2019-06-01

Limit-value switch for liquid level GSP 2
Level sensors SP 1/SP 3

Evaluation electronics for level sensors for monitoring water levels, dry run protection for pumps, overflow protection, etc. for conductive liquids

Special features

- Potential-free changeover contact
- Water level display via LED
- Switching status display via LED
- No external power supply necessary
- Simplest installation and handling



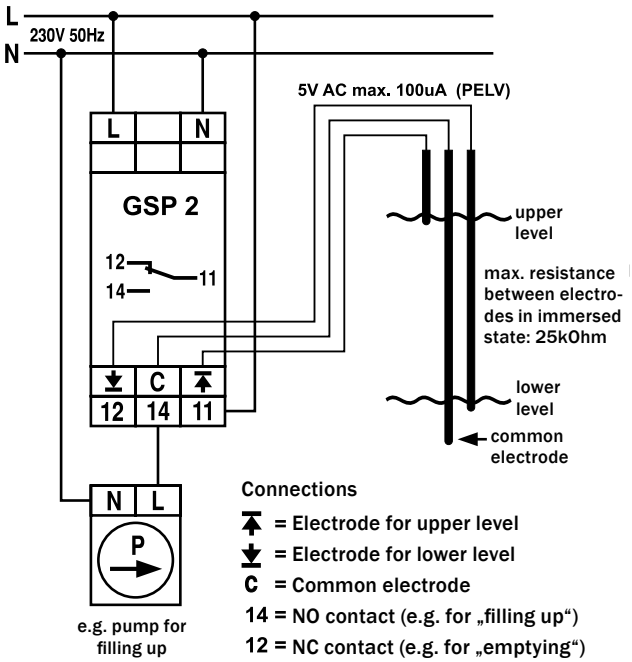
General information

The limit switch GSP 2 is used for level monitoring of conductive liquids.
In combination with 3 immersion electrodes a minimum and a maximum liquid level can be monitored.
Automatic filling or emptying can be controlled with the GSP 2 via the potential-free 10A change-over contact.

Functional description

If the level at the lower measuring electrode falls below the level, the relay contact is switched on.
When the level reaches the upper measuring electrode, the relay contact is switched off again.
Filling can thus be automated via the NO contact (11-14) and automatic emptying can be controlled via the NC contact (11-12).
For optimum control, the exceeding of the water levels as well as the relay switching status is indicated by separate LEDs.
The resistance value between the electrodes must not exceed 25KΩ

Connection example



Technical data GSP 2

Operating voltage:	230V AC 50/60 Hz 10%
Power consumption:	0.6W
Response time	< 0,5s
Sensor voltage	5V AC (PELV)
Measuring current	max. 100µA
Response threshold	approx. 25kΩ
Relay output	1 CO contact potential-free 10 A 250 V AC
Contact rating	See data sheet “Relay contact load ratings”
Ambient temperature	-10°C to +45°C
Connection terminals	Socket terminals with captive screws M3.5
Clamping range	0.5 mm² - 4.0 mm²
Strip length	6.0 mm - 6.5 mm
Screwing torque	0.80 Nm
Mounting orientation	max. 100nF
RAL colour	grey 7035 / green 6029
Weight	approx. 75g

Technical data SP 1

Thread	3/8" (16,67mm) male thread, 1 x M4 female thread for electrode
Dimensions	approx. 71x39x22mm
Weight	approx. 50g

Technical data SP 3

Thread	2" (59,61mm) male thread, 3 x M4 female thread for electrode
Dimensions	approx. 71x91x91mm
Weight	approx. 200g

Order data

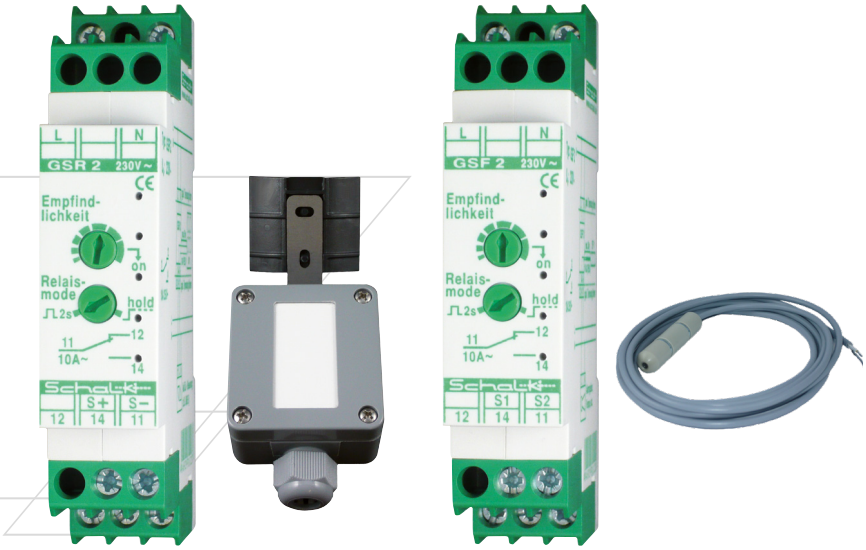
Item no.	EAN	Type	Designation
GSP209	4 046929 301299	GSP 2	Limit value switch for water level
SP1000	4 046929 301305	SP 1	Level sensor for single electrode
SP3000	4 046929 301312	SP 3	Level sensor for 3 electrodes

2017-08-01

Limit-value switch for rain GSR 2
Rain sensor SR 1

Limit-value switch for liquid GSF 2
Liquid sensor SF 1

Electronic evaluation device with internally generated sensor supply voltage to protect against damage from liquids.



Special features

- Potential-free changeover contact
- Potential-free sensor supply (PELV)
- Display for switching threshold
- Very low power consumption
- Simplest installation and handling

General information

The GSR 2 and GSF 2 limit switches can be used on many sides, yet are uncomplicated and easy to use. The GSR 2 is used in conjunction with the SR 1 sensor for rain detection. The GSF 2 in conjunction with the immersion sensor SF 1 is used for monitoring liquid levels.
The connected sensor is supplied directly by the limit switch with a potential-free low voltage (PELV). The use of an additional power supply is therefore not necessary.

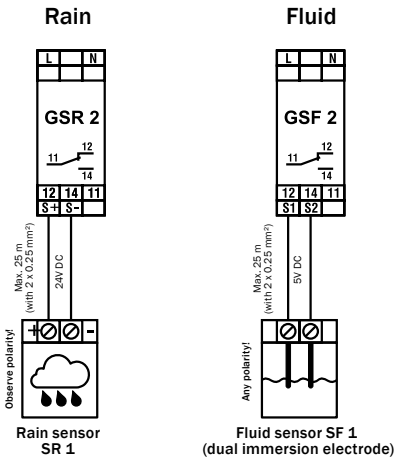
Applications

Protection against rainwater damage, level monitoring, dry-running protection, etc.

Operation

Exceeding the set sensitivity is immediately indicated by the "hold" LED. At the same time, the relay contact is also activated.
Depending on the "Relay mode" setting, the relay is only energised for 2 seconds or remains switched through during the entire signalling phase.
For example, subsequent controls can still be operated if required, or control via the limit switch has priority.
The fixed follow-up time of 30s ensures a continuously stable switching state even if the switching threshold is not reached for a short time.

Example connections



Technical data GSR 2 / GSF 2

Operating voltage:	230 V 50/60 Hz 10 %
Power consumption:	GSR 2: 1,2 W GSF 2: 0.4 W
Switch-off delay	30s
Sensor supply	**GSR 2:** approx. 24 V DC (PELV) **GSF 2:** approx. 1 V AC (PELV)
Relay output	1 CO 250 V AC potential-free, 10 A
Contact rating	see data sheet: “Relay contact rating"
Ambient temperature	-10°C to +45°C
Connection terminals	Socket terminals with captive screws M3.5
Clamping range	0.5 mm² - 4.0 mm²
Strip length	6.0 mm - 6.5 mm
Screwing torque	0.80 Nm
Mounting orientation	arbitrarily
RAL colour	grey 7035 / green 6029
Weight	approx. 75 g

Technical data SR 1

Type of sensor	capacitive with heated surface
Heating capacity	approx. 0.6 W
Mounting	Mounting bracket for wall or mast mounting
Feed line	max. 25 m (with 2 x 0.25 mm²)
Dimensions	64 x 58 x 34 mm
RAL colour	grey 7035
Weight	approx. 90 g

Technical data SF 1

Type of sensor	Resistance immersion sensor
Feed line	2 m (extendable to max. 25 m)
Dimensions	l=45 mm ∅=10 mm
RAL colour	grey 7035
Weight	approx. 25 g
RAL colour	grey 7035

Order data

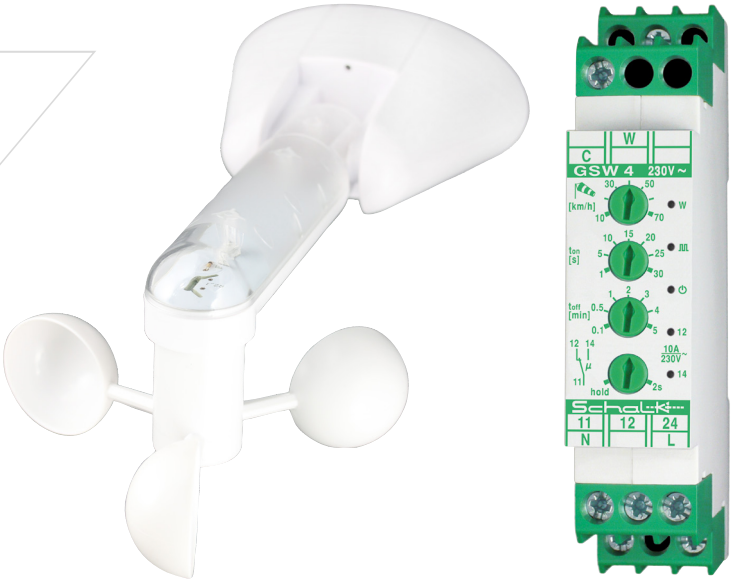
Item no.	EAN	Type	Designation
GSR209	4 046929 301237	GSR 2	Limit-value switch for rain
SR1000	4 046929 301244	SR 1	Rain sensor
GSF209	4 046929 301220	GSF 2	Limit-value switch for liquid
SF1000	4 046929 301251	SF 1	Liquid sensor

2017-08-01

Limit switch for wind GSW 4
Wind sensor SW 4

(Rail mount version)

Electronic monitoring for prevention of storm damage, for example to exterior louvers, awnings or equipment potentially subject to wind hazards.



Special features

- Potential free relay contacts
- Galvanically isolated sensor inputs (PELV)
- Configurable running time
- Switch threshold display
- Low power consumption

General

The GSW 4 is an universally applicable limit switche for wind monitoring.
Combined with the SW 4 wind sensor, wind forces of 2-8 (c. 10-70 km/h) can be detected. The sensor is supplied by the limit switch with a potential-free low voltage (PELV).

Applications

Prevention of storm damage to electrically-driven exterior louvers, awnings, etc.

Functional description

The GSW 4 limit switch dynamically adjusts the switch response delay "t_{on}" (the greater the wind exceeding the threshold, the shorter the configured response time). When the wind force exceeds the threshold, this is displayed by flashing the „W" LED. After expiry of the configured response delay "t_{on}" the contact is switched.

Depending on the relay mode setting, the relay either stays active for 2 seconds („2s") or it remains permanently switched during the storm phase („hold").

The configurable after-run time "t_{off}" maintains a stable switching state even if the threshold is briefly underrun.

The state of each relay is displayed on the "12" and "14" LEDs respectively.
The pulse LED (⎍) indicates the current wind pulses, and the power LED (⏻) indicates the operating state.

The details of each operating mode can be seen from the functional diagrams.

Example

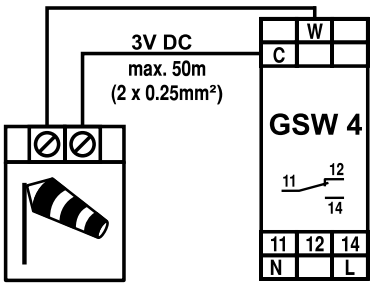
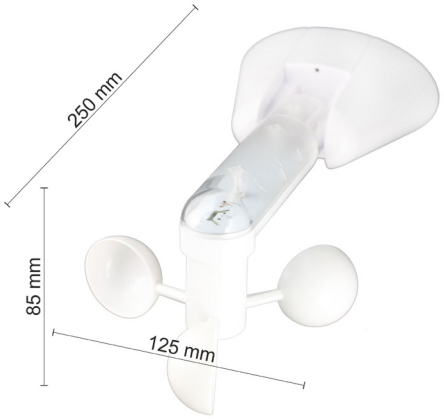


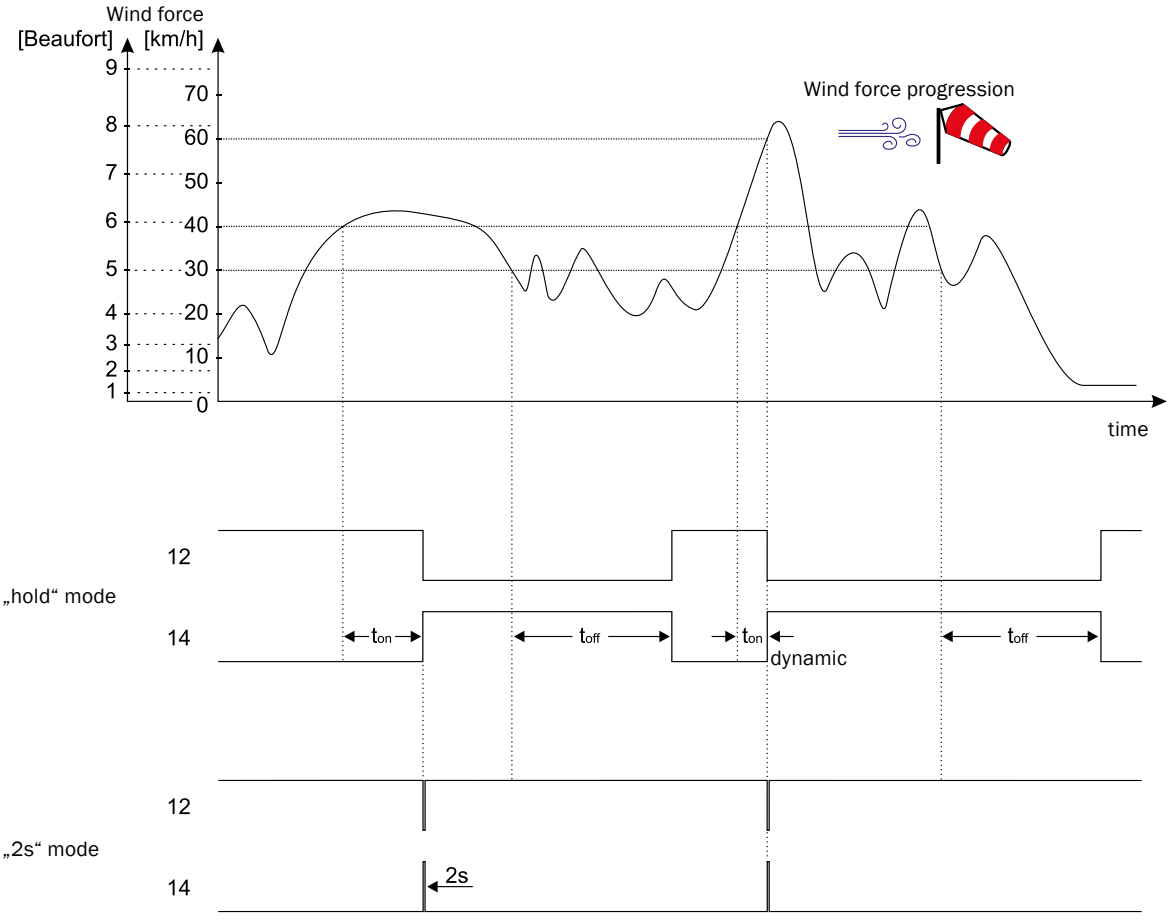
Fig. 1: Wind sensor connection

Wind sensor dimension



Timing diagram

Example: t_{on} = 15s, t_{off} = 30s, wind force threshold = 40 km/h



Beaufort scale by phenomenological criteria:

Wind speed [Bft]	Wind speed [km/h]	Designation	Effect on land
0	0-1	Calm	Calm. Smoke rises vertically.
1	1-5	Light air	Smoke drift indicates wind direction. Leaves and wind vanes are stationary.
2	6-11	Light breeze	Wind felt on exposed skin. Leaves rustle. Wind vanes begin to move.
3	12-19	Gentle breeze	Leaves and small twigs constantly moving, light flags extended.
4	20-28	Moderate breeze	Dust and loose paper raised. Small branches begin to move.
5	29-38	Fresh breeze	Branches of a moderate size move. Small trees in leaf begin to sway.
6	39-49	Strong breeze	Large branches in motion. Whistling heard in overhead wires. Umbrella use becomes difficult. Empty plastic bins tip over.
7	50-61	High wind	Whole trees in motion. Effort needed to walk against the wind.
8	62-74	Gale, fresh gale	Some twigs broken from trees. Cars veer on road. Progress on foot is seriously impeded.
9	75-88	Strong/severe gale	Some branches break off trees, and some small trees blow over. Construction/temporary signs and barricades blow over.

GSW 4 technical data

Operating voltage	230V 50/60Hz 10%
Power consumption	approx. 0.6 W
Measuring range	wind force 2-8 (approx. 10-70 km/h)
Switching hysteresis	approx. 25 %
Response time	adjustable 1-30s (dynamical)
After-run time	adjustable 6-300s
Sensor supply voltage	3.3V DC (PELV) (GSW U2: 10V)
Relay output	1 CO 10A/250V AC
Relay contact rating	see data sheet “Relay contact load ratings”
Ambient temperature	-10°C to +45°C
Connections	Socket terminals with captive screws M3.5
Clamping range	0.5 mm² - 4.0 mm²
Strip length	6.0 mm - 6.5 mm
Screwing torque	0.80 Nm
Installation orientation	any
Mounting	Click-mount on standard 35-mm rail (EN 60715)
Dimensions	18x88(45)x58mm
RAL colour	grey 7035 / green 6029

SW 4 technical data

Wind sensor type	Reed contact pulse transducer
Connecting cable	max. 50 m (with 2 x 0,25 mm²)
Dimensions	approx. 250 x 125 x 85 mm

Order data

Part no.	EAN	Type	Description
GSW409	4 046929 301374	GSW 4	Wind switch, 230V AC 10A, 1 CO potential-free
SW4000	4 046929 301367	SW 4	Wind sensor with articular mount

2019-05-01

Schalk
STEUERUNGSTECHNIK GmbH

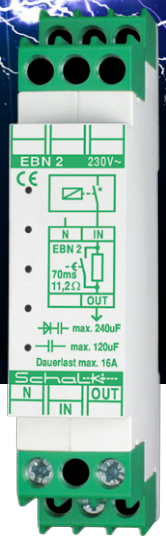
MADE IN GERMANY

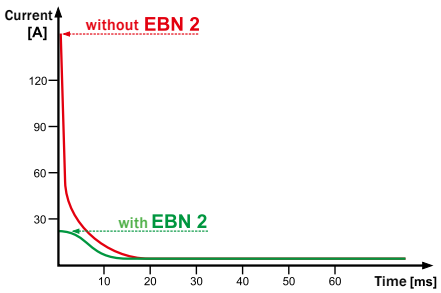
Power-on surge limiter

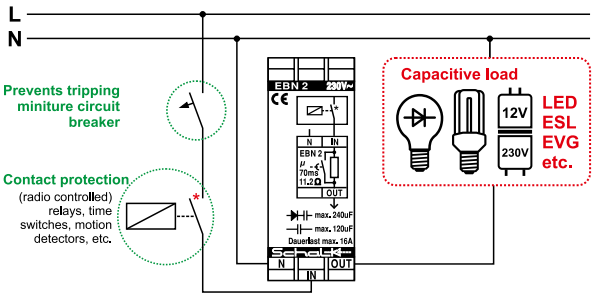
Protection for upstream relay contacts

Power-on surge under control!

- limits capacitive inrush currents, prevents relay contacts sticking
- simple installation upstream of load
- Rail-mounting or flush-mounting versions







Modern energy-saving lamps such as LED bulbs or energy saving bulbs (and almost all electronic power supplies or ballasts) cause extremely high inrush currents up to 100A due to their capacitive switch-on characteristic! These current peaks often result in glued or welded relay contacts.

QR-Info

EBN 2

Rail-mounting version for up to 16A continuous load

EBN U2

Flush-mounting version (installation socket) for up to 10A continuous load

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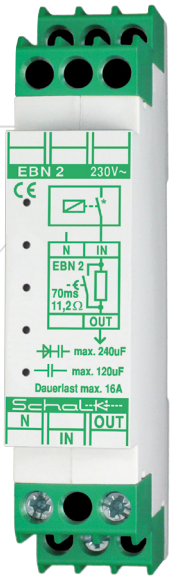
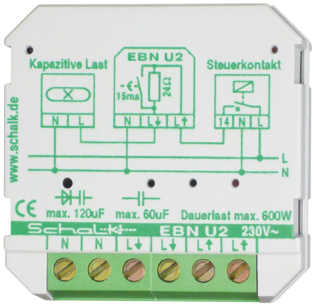
Inrush current limiter EBN 2
EBN U2

Protection device for upstream relay contacts by suppression of inrush current

Special features

- limits capacitive switch-on currents
- prevents relay contacts sticking
- prevents tripping the L5 circuit breaker
- suitable for all types of lamps and ballasts
- also ideal for LED bulbs
- simple installation upstream of load
- very low power consumption





General

Modern energy-saving lamps such as LED bulbs or energy saving bulbs (and almost all electronic power supplies or ballasts) cause extremely high inrush currents due to their capacitive switch-on characteristic.
These current peaks usually mean an unacceptably high contact load at relay-switched lighting technology.
Defects (glued or welded) relay contacts result in increasing costs in modern lighting systems.
In larger systems this inrush currents may also result in tripping of circuit breakers.
The EBN 2 and EBN U2 suppress completely and reliable these capacitive inrush currents and thus allow long-term trouble-free operation of relay-switched lighting systems.

Application

Relay-switched lighting systems with LED's, energy-saving lamps, fluorescent bulbs or electronic ballasts.

Operation

The switch-on pulse current limiter EBN 2 is simply connected downstream of the relay contact to be protected.
By briefly connecting a limiting resistor into the circuit, the switch-on current peaks are reduced to a non-critical value.

In determining the effective limitable capacitive load, the distinction must be drawn between C-load connected directly to the mains voltage (e.g. parallel-compensated fluorescent lamps) and C-load connected downstream of a rectifier (e.g. energy-saving bulbs and electronic ballasts, LED's).
The capacity specification for the EBN 2 and EBN U2 are practical recommendations. Also much larger capacitive loads can be connected to the EBN, but in these cases, there full effectiveness of the current limiting can not be guaranteed absolutely.
The EBN 2 can be permanently loaded with 16A, the compact flush mounted variant EBN U2 is designed for 10A continuous load.
EBN 2 and EBN U2 can be generally applied even with inductive inrush current, if the duration of the current limiting (EBN 2 = 70ms / EBN U2 = 15ms) is sufficient for the particular application.

Exemplary current waveform without / with current limiter

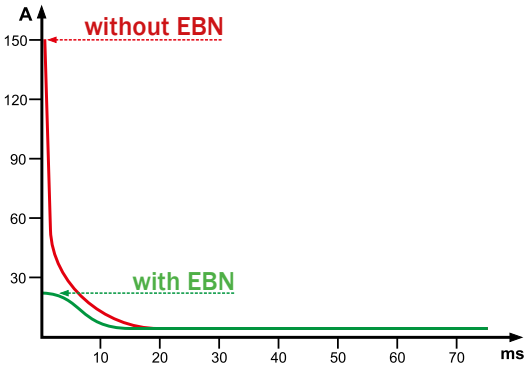
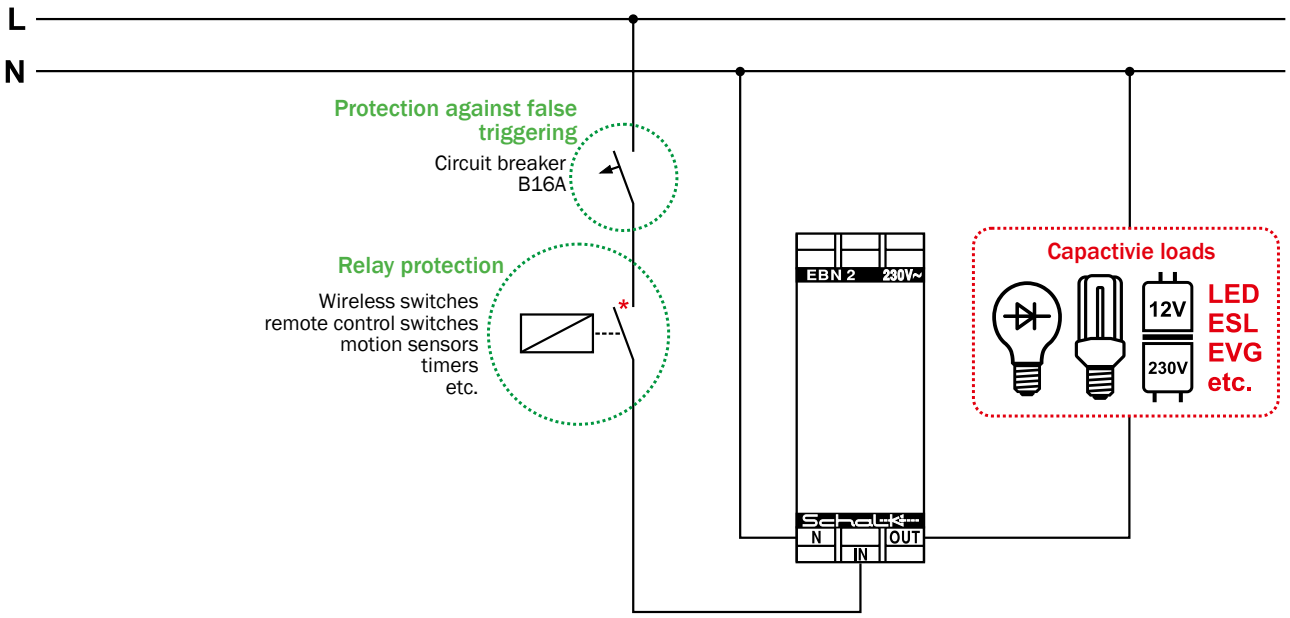


Fig.: Typical current waveform at high capacitive load by parallel connection of several LED lamps

Installation:



Caution! ***A current limiter must always be operated on full rated voltage! It may, for example, not be operated at a dimmer's dimmed phase output.***

Technical data EBN 2 / EBN U2

Operating voltage	230V 50/60 Hz 10 %
Max. switching frequency	6 switching cycles / min
Electrical service life	1 x 10^5 switching cycles
Ambient temperature	-10°C bis +45°C
Colour conforming to RAL	Gray 7035 / Green 6029

Technical data EBN 2

Power consumption	approx. 0,6 W
Limiting resistor	11.2 Ω
Limiting duration	approx. 70 ms
Max. capacitive load	120 uF direct on mains 240 uF behind rectifier
Max. continuous load	16 A
Surge resistance	3000V (1.2/50us) according to EN 61000-4-5
Connections	Socket terminals with captive screws M3.5
Clamping range	0.5 mm² - 4.0 mm²
Strip length	6.0 mm - 6.5 mm
Screwing torque	0.80 Nm
Mounting	Click-mount on standard 35-mm rail (EN 60715)
Outside dimensions	18 x 88(45) x 58 mm³
Weight	approx. 74 g

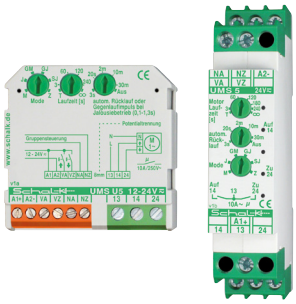
Technical data EBN U2

Power consumption	approx. 0,3 W
Limiting resistor	24 Ω
Limiting duration	approx. 15 ms
Max. capacitive load	60 uF direct on mains 120 uF behind rectifier
Max. continuous load	10 A
Connections	Socket terminals with captive screws M3
Clamping range	0.5 mm² - 2.5 mm²
Strip length	6.5 mm - 7.0 mm
Screwing torque	0.50 Nm
Outside dimensions	43 x 43 x 18.5 mm³
Weight	approx. 38g

Order data

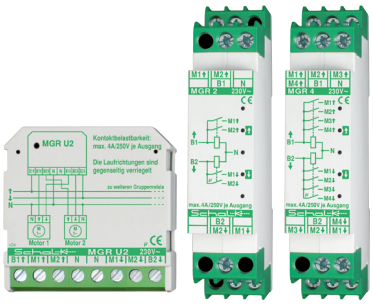
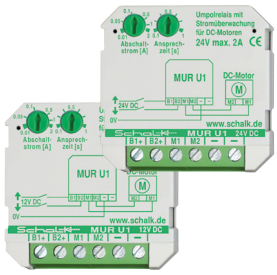
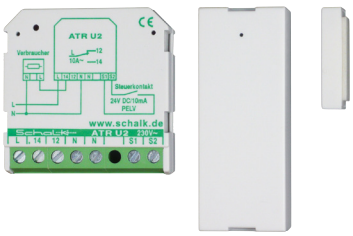
Item no.	EAN	Type	Item designation
EBN209	4 046929 301183	EBN 2	Inrush current limiter 230V AC
EBNU29	4 046929 301190	EBN U2	Inrush current limiter 230V AC (flush-mounted)

Motor controllers

	Item no.	Type	Specs	Dimensions	Page
NEW			**DC blind control with fan-out function DJS U6 / DJS 6 (12-24V DC)**		151
			The DJS 6 / DJS U6 electronic controllers are general-purpose DC motor controllers for clockwise or anti-clockwise operation, e.g. for blinds, venetian blinds, privacy blinds, etc. The control unit can be used for all types of blinds. Both a single and a two-button motor control can be realized. The overriding auxiliary inputs make it possible to combine several DJS modules into group and central controls. The motor running time can be limited in time to avoid overloading the motor, e.g. in the event of mechanical blockage. With blind control, the slats can be precisely adjusted or automatically adjusted to a certain angle after switching off. The SJ mode (louvre blind privacy mode) enables blinds to be operated gently for the motor. With the AF (fan out) option, the slats are moved once OPEN and again CLOSED after a longer period of closing run time. This corrects any misalignment of individual slats that may occur with certain blind types. The DC motor controls are also ideally suited for controlling micro motors such as those used in window-integrated blinds (in the space between the panes).		
	DJS60K	DJS 6	12-24V DC, 2 NO contacts 8A	18x55mm	
	DJSU6K	DJS U6	12-24V DC, 2 NO contacts 8A (FMD)	43x43x18.5mm	
			**OPEN/CLOSE control for DC motors DMS U5 / DMS 5**		157
			The DMS 5 / DMS U5 electronic controllers are general-purpose DC motor controllers for clockwise or anti-clockwise operation. Both an one-button and two-button motor control is supported. The overriding auxiliary inputs allows several DMS units to be grouped together in group control or central control configurations. The motor run time can be limited to prevent motor overload due to mechanical jamming or other causes. A convenient and configurable automatic closing function ensures that skylights or other fixtures are not inadvertently left open. In louvre blind mode the louvres can be adjusted precisely or automatically returned to a defined angle after switch-off. **The new SJ mode enables blinds to be operated in a motor-protective manner for privacy protection tasks.** The DC motor controllers are also ideally suited for controlling miniature motors, such as those used in window-integrated blinds (in the space between the panes).		
	DMS50K	DMS 5	12-24V DC, 2 NO contacts 8A	18x55mm	
	DMSU5K	DMS U5	12-24V DC, 2 NO contacts 8A	43x43x18.5mm	
			**OPEN/CLOSE control for AC motors UMS U5 (230V AC) / UMS 5 (230V AC)**		175
			The UMS 5 / UMS U5 electronic controllers are general-purpose AC motor controllers for clockwise or anti-clockwise operation. Both an one-button and two-button motor control is supported. The overriding auxiliary inputs allows several DMS units to be grouped together in group control or central control configurations. The motor run time can be limited to prevent motor overload due to mechanical jamming or other causes. A convenient and configurable automatic closing function ensures that skylights or other fixtures are not inadvertently left open. In louvre blind mode the louvres can be adjusted precisely or automatically returned to a defined angle after switch-off. **The new SJ mode enables blinds to be operated in a motor-protective manner for privacy protection tasks.** The compact flush-mounted version UMS U5 (230V AC) has the same functionality as the rail mounted variant UMS 5, but the relay contacts are not potential-free.		
	UMS509	UMS 5 (230V AC)	230V AC, 2 NO potential-free 10A	18x55mm	
	UMSU59	UMS U5 (230V AC)	230V AC, 2 NO 10A	43x43x18.5mm	
			**OPEN/CLOSE control for AC motors UMS U5 (12-24V UC) / UMS 5 (24V UC)**		175
			The UMS 5 / UMS U5 electronic controllers are general-purpose AC motor controllers for clockwise or anti-clockwise operation. Both an one-button and two-button motor control is supported. The overriding auxiliary inputs allows several DMS units to be grouped together in group control or central control configurations. The motor run time can be limited to prevent motor overload due to mechanical jamming or other causes. A convenient and configurable automatic closing function ensures that skylights or other fixtures are not inadvertently left open. In louvre blind mode the louvres can be adjusted precisely or automatically returned to a defined angle after switch-off. **The new SJ mode enables blinds to be operated in a motor-protective manner for privacy protection tasks.** The UMS U5 (12-24V UC) is ideal for installations in which many motors have to be controlled with different phase power supply.		
	UMS504	UMS 5 (24V UC)	24V UC, 2 NO potential-free 10A	18x55mm	
	UMSU5V	UMS U5 (12-24V UC)	12-24V UC, 2 NO potential-free 10A	43x43x18.5mm	
			**OPEN/CLOSE control for AC motors UMS 5P (with 12-230V UC auxiliary inputs)**		175
			The UMS 5P electronic controllers is a general-purpose AC motor controller for clockwise or anti-clockwise operation. Both an one-button and two-button motor control is supported. The overriding auxiliary inputs allows several UMS 5P units to be grouped together in group control or central control configurations. The motor run time can be limited to prevent motor overload due to mechanical jamming or other causes. A convenient and configurable automatic closing function ensures that skylights or other fixtures are not inadvertently left open. In louvre blind mode the louvres can be adjusted precisely or automatically returned to a defined angle after switch-off. **The UMS 5P has galvanically isolated extension inputs NA/NZ (12-230V UC), which allow easy integration into existing or future automation systems (e.g. PLC, etc.).** **It also has a compatibility mode (mode: U4) compatible to earlier UMS 4 controllers to enable a problem-free replacement installation if necessary.**		
	UMS5P9	UMS 5P	230V AC, 2 NO potential-free 10A, NA/NZ 12-230V UC	18x55mm	

For combination with limit switches for twilight, wind, rain, etc. see "System design: limit switches" on page 131

Motor controllers

Page		Item no.	Type	Specs	Dimensions
161		**Motor group relay MGR U2 / MGR 2 / MGR 4 (for 2 or 4 motors)** The motor group relay enables several roller shutter or blind motors to be electrically connected in parallel on one control unit. This makes it easy and cost-effective to combine several drives into a group that can be operated together without having to use a separate controller for each individual drive. The MGR U2 (flush-mounted version) and MGR 2 (in-line installation version) have 2 complete OPEN/CLOSE outputs for the direct connection of 2 motors, the MGR 4 has 4 OPEN/CLOSE outputs for 4 motors. A mutual interlocking of the outputs also ensures that only one running direction can be switched through to the motors at a time.			
		MGRU29	MGR U2	for 2 motors (UP)	43x43x18.5mm
		MGR209	MGR 2	for 2 motors	18x55mm
		MGR409	MGR 4	for 4 motors	18x55mm
165		**Motor reversing relay MUR U1** Microdrives are increasingly being used in building automation. Such very compact drive systems usually work with DC motors and can therefore not be operated with conventional controls designed for AC motors. The MUR U1 takes over the necessary conversion from AC control to DC drive. A reverse polarity logic is used to reverse the direction of travel, and an adjustable cut-off current in conjunction with the adjustable response time ensures an exactly adjustable and safe limit switch-off. The MUR U1 is available in versions for 12V DC or 24V DC.			
		MURU12	MUR U1 (12V DC)	12V DC, current limitation 10mA-2A adjustable	43x43x18.5mm
		MURU14	MUR U1 (24V DC)	24V DC, current limitation 10mA-2A adjustable	43x43x18.5mm
167		**Sensor-controlled motor control (wind/light/twilight) SMS U2** The SMS U2 is used together with the SW 4 wind sensor and the SL 2 light sensor for safe and convenient control of awnings or external blinds. When the sun intensity is high, the awning is extended automatically, and retracted again when the brightness decreases (this automatic function can also be deactivated). If the wind speed is too high, the awning is retracted automatically. Buttons for direct OPEN/CLOSE operation can be connected. The automatic shading system can be deactivated for a certain period of time by pressing an operating button for a longer period of time. Wind monitoring always has priority, thus ensuring system safety even in the event of incorrect operation. Matching products: SW 4 (wind sensor with articular mount), SL 2 (light sensor). See chapter „Measuring relays“.			
		SMSU29	SMS U2	230V AC, 2 NO contacts 4A (FMD)	43x43x18.5mm
167		**Sensor-controlled motor control (wind/light/twilight) SMS 2** The SMS 2 is used together with the SW 4 wind sensor and the SL 2 light sensor for safe and convenient control of awnings or external blinds. When the sun intensity is high, the awning is extended automatically, and retracted again when the brightness decreases (this automatic function can also be deactivated). If the wind speed is too high, the awning is retracted automatically. The SMS 2 also has an integrated twilight function and a blind counter-bend. Buttons for direct OPEN/CLOSE operation can be connected. The automatic shading system can be deactivated for a certain period of time by pressing an operating button for a longer period of time. Wind monitoring always has priority, so system safety is guaranteed even in the event of incorrect operation. Matching products: SW 4 (wind sensor with articular mount), SL 2 (light sensor). See chapter „Measuring relays“.			
		SMS209	SMS 2	230V AC, 2 Schließer 4A (REB), m. Dämmerung.	18x55mm
195		**Ventilation/exhaust air set ZAS K2 (consisting of ATR U2 and MKW 1)** ZAS K2 is a complete set of devices, consisting of the active isolating relay ATR U2 and the magnetic contact MKW 1. The set is ideally suited for supply air monitoring when operating extractor hoods in accordance with §4 of the Firing Ordinance (Germany). *Also available as radio-controlled version ZAS F (e.g. for retrofitting without cable laying) (see "Radio connection system")*			
		ZASK29	ZAS K2	ATR U2: 230V AC, MKW 1: reed contact 1 CO	see separate products

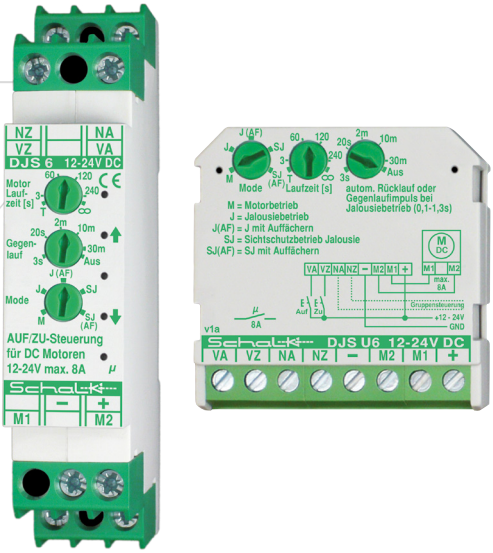
For combination with limit switches for twilight, wind, rain, etc. see “System design: limit switches” on page 131

Blind control for 12-24V DC drives

DJS 6
DJS U6

With auxiliary inputs for group and central control

Convenient DC motor control with electronic push-button interlock and run-time limiting, suitable for DC-powered louver blinds, etc.



Special features

- One-button or two-button actuation
- Electronic button interlock enables use of normal push-buttons
- Specific louver blind modes: Easily adjustable louvre blades, privacy screen function, fan-out function
- Automatic closing with configurable closing time
- Run-time limiting for motor protection
- Available as rail mounting or flush mounting version

General information

The DJS 6 / DJS U6 electronic controllers are general-purpose DC motor controllers for clockwise or anti-clockwise operation. Both an one-button and two-button motor control is supported.

The overriding auxiliary inputs allows several DJS units to be grouped together in group control or central control configurations.

The motor run time can be limited to prevent motor overload due to mechanical jamming or other causes. A convenient and configurable automatic closing function ensures that skylights or other fixtures are not inadvertently left open. In louvre blind mode the louvres can be adjusted precisely or automatically returned to a defined angle after switch-off.

Applications

Control of blinds with DC motors, e.g. window-integrated blinds, privacy blinds, outdoor blinds etc.

Operation

The DJS module is actuated by standard push-buttons with no need for mechanical interlocking.

The desired operation direction is selected by a short pulse (momentary-action signal) from a push-button connected to the VA (local input for Open) or VZ (local input for Close) input. The drive runs to its end stop and the configured time expires.

A subsequent pulse on the VA or VZ input while the drive is running stops the motor. For one-button motor control it is also possible to actuate both local inputs at the same time with just one push-button (not in SJ mode). With this actuation arrangement, each button pulse changes the direction (Open–Stop–Close–Stop).

The auxiliary inputs NA (Open) and NZ (Close) allow any desired number of drives to be operated simultaneously in the opening or closing direction, regardless of their current state. When actuated by the auxiliary inputs, the motor runs only as long as the actuation signal from the higher-level group controller is active. The NA input has priority when NA and NZ signals are active at the same time. The local inputs are blocked as long as NA or NZ is active.

A DMS 5 or DMS U5 is required as the group control unit, as this series has special group control modes. There is no time monitoring of the auxiliary inputs. This allows the lower-level controllers to be held in the desired position for an indefinite period (e.g. wind sensors).

In blind operating mode, the slat angle can be adjusted with a short push pulse (<1s). With a longer pulse the drive continues running to the end position. In one-button louver blind mode, the direction of motion is not altered by a sequence of short pulses. Here again, this makes it easy to adjust the slat angle.

If automatic closing is enabled, the drive starts moving in the closing direction after the set closing time delay. The time-out is started by the signal on the VA local input.

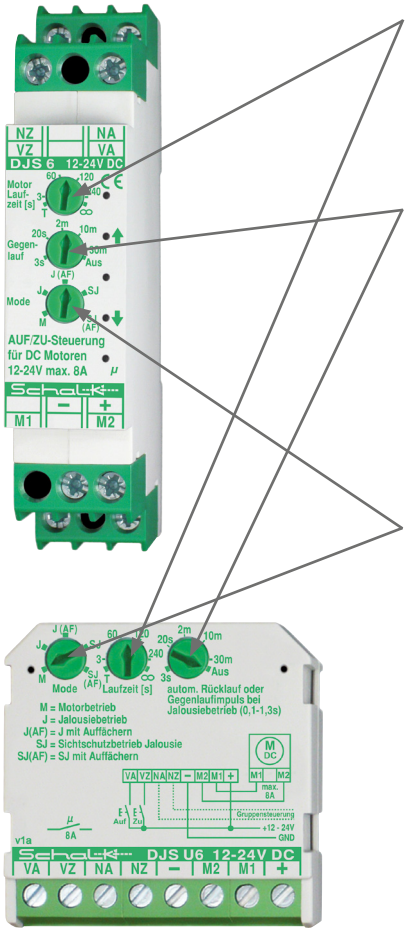
If the signal on the VA input is active longer than 2 seconds, the closing time is doubled. In louver blind mode a reverse

pulse is configured instead of the closing function, so that the blind slats are automatically reset after the motor stops.

In SJ mode (louvre blind privacy) a short push-button signal on the VA or VZ local input changes the angle of the blind slats, for example from vertical to horizontal (privacy on/off). The motor run time for this angle adjustment can be set from 0.1 to 1.8s. A triple button press initiates the full motor run time (setting range 3 to 240 s).

With the AF option (fan out), the blind slats are moved once OPEN and again CLOSED after a longer run time (>5s) (duration in each direction: 2s). This corrects any misalignment of individual slats that may occur with certain types of blinds. The individual functions can also be taken from the function diagrams.

Controls and indicators



Motor run time setting „Motor-Laufzeit“:
This sets the motor run time:

T	Push-button mode (motor only runs as long as the inputs are controlled)
3–240	Motor run time in seconds
∞	No run time limit

Automatic closing time setting „autom. Rücklauf“:
This sets the automatic closing time, reverse pulse time or louvre run time:
In "M" mode (motor control):
Time for automatic closing function **3s..30min**, or **Off** (function deactivated)

In"J" mode (blind control):
Duration of reverse pulse 0.1 to 1.3 s or Off (function disabled)

In "SJ" mode (louvre blind privacy mode):
Slat run time **0.1s to 1.8s**

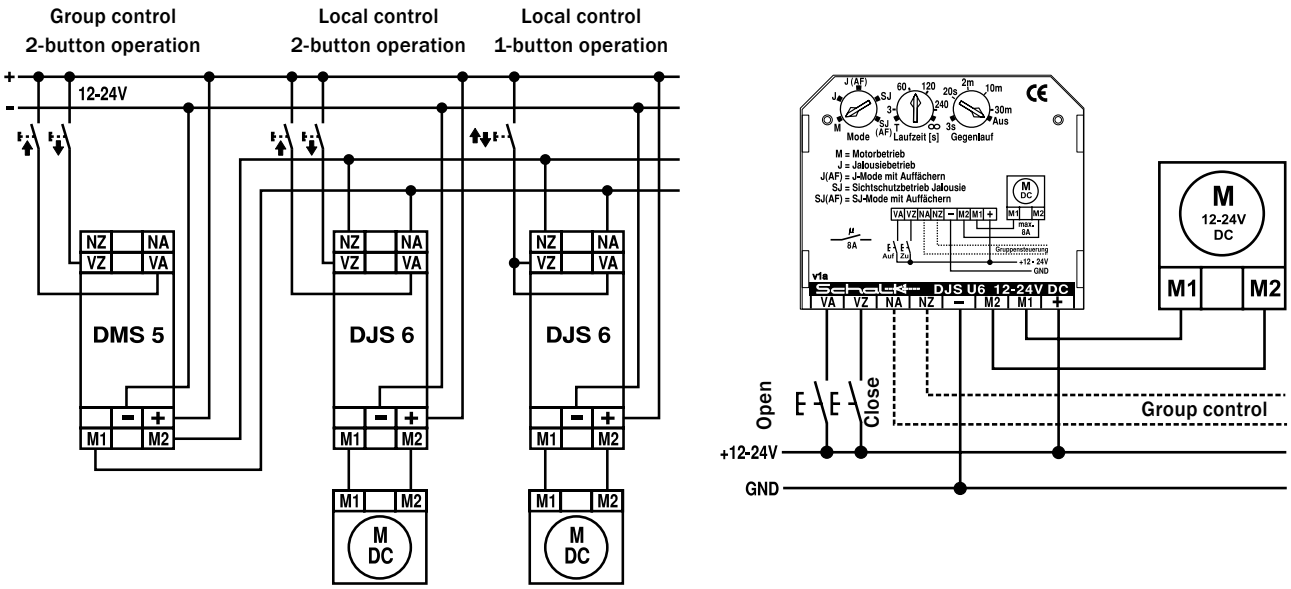
Mode setting "Mode”:
This sets the operating mode:

M	Motor control (short button press for Open, Close or Stop)
J	Louvre blind control (short button press for fine adjustment of louvre angle or STOP; long button press for open/close)
J (AF)	Blind control with fan-out function*
SJ	Louvre blind privacy (short button press sets privacy on or off; triple button press to adjust blind position) causes the blind to move)
SJ (AF)	Louvre blind privacy with fan-out function*

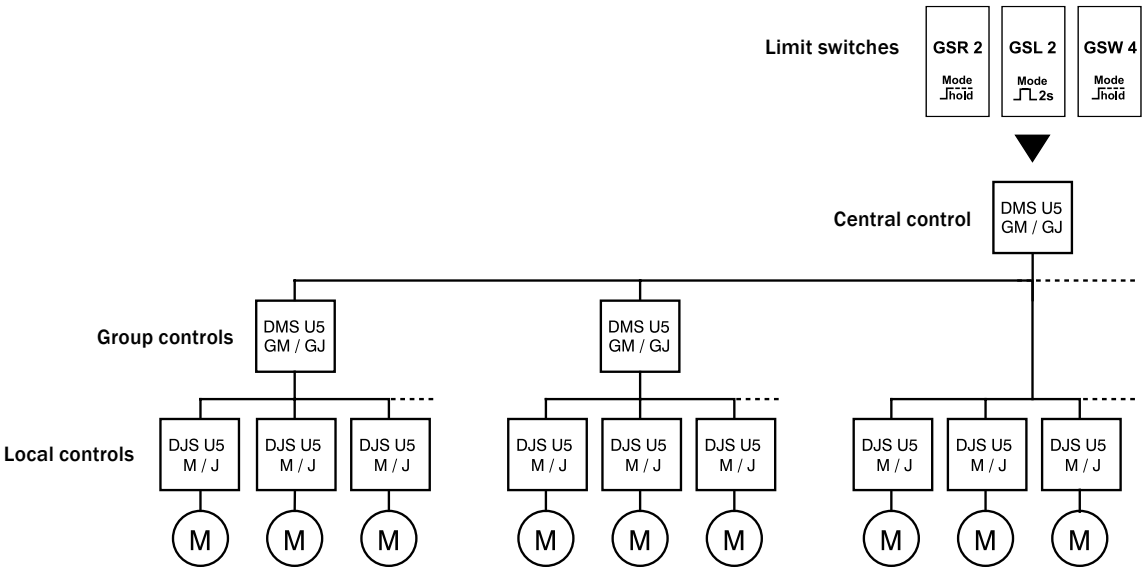
** At the end of a longer (>5s in CLOSE direction) operating time, the slats are briefly moved OPEN and then CLOSED again in order to achieve uniform slat alignment.*

Status indicator LEDs:
Legend:
○ LED off
● LED lights red
◍ LED flashes red
● LED lights up green
◍ LED flashes green
◍ LED flashes alternately red/green

Connection examples



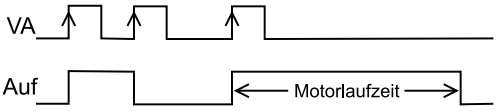
Basic circuit diagram for group/central control



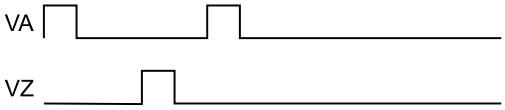
Caution *Due to the supply voltage tolerance of ±10%, a regulated power supply unit must be used - unregulated power supplies cause high voltage peaks, which can destroy the device!*

Functional diagrams DJS 6 / DJS U6

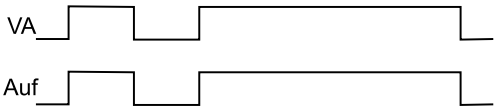
All operating modes and set motor running time: local inputs are edge-triggered and time-monitored

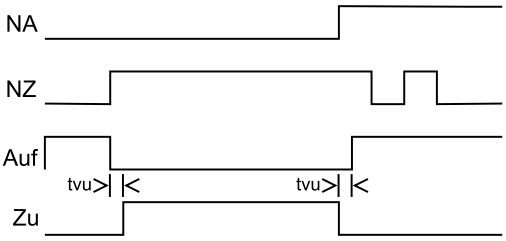


Local inputs are ignored as long as auxiliary inputs are active. NA overrides NZ.

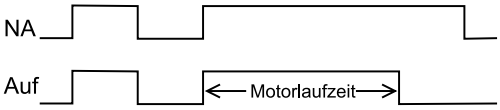


Motor running time in pushbutton mode: **local inputs are level-controlled and not time-monitored.**

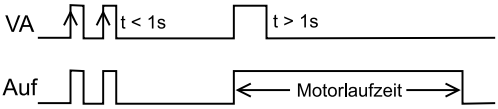




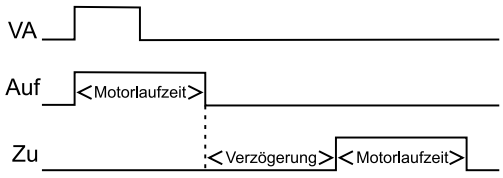
Operating modes M and J with motor running time: Auxiliary inputs are level-controlled and time-monitored.



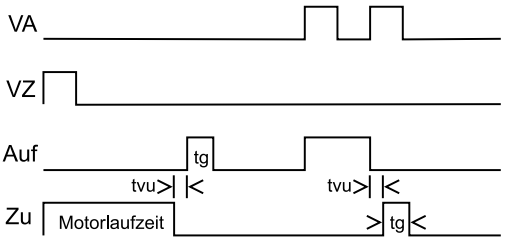
Louver blind mode “J”: local inputs are level-controlled in response to short press of button and edge-controlled when button held down.



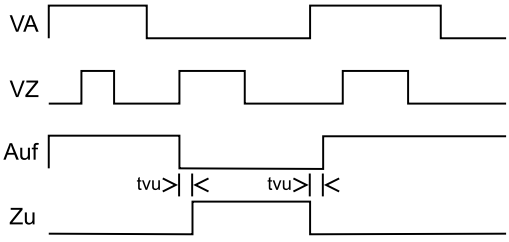
In the case of automatic return, the return delay begins at the end of the motor running time.



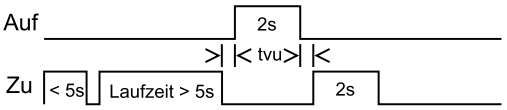
Set louver blind counter-run (tg): Counter-running is triggered by timeout of VZ or by manual stop at VA or VZ.



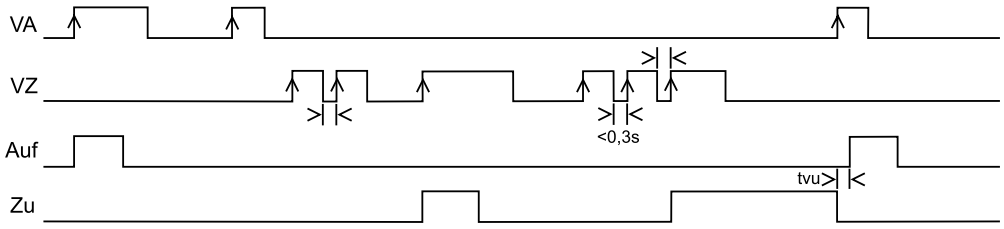
tvu = Switchover pause (0.6s) between K14 and K24 for motor protection (mechanical stress release). As one local button is active, the other local button is ignored.



With the AF option (fan out), the blind slats are moved once OPEN and again CLOSED after a longer run time (>5s) (duration in each direction: 2s). This ensures that the slats are correctly aligned again.



Operating mode SJ: The local inputs switch on the selected direction of travel only once with a simple or long keystroke. A triple button press initiates the full motor run time. The running direction "CLOSE" lasts 25% longer than the running direction "OPEN", so that a defined starting position is given for different running times.Closing run time (longer than the opening run time (K14), to ensure a defined starting position for the next turn.



Technical data

Operating voltage:	12-24 V DC ±10% (regulated power supply required)
Control voltage	= operating voltage
Power consumption:	max. 0.6 W
Run time	3 - 240s
Automatic closing time	3s - 30 min
Reverse pulse	0.1 - 1.3s
Relay switching dead time	0.6 s
Relay output	12-24 V DC max. 8 A
Ambient temperature	-10°C to +45°C
DJS 6 mounting	Click-mount on standard 35-mm rail (EN 60715)
DJS U6 connections:	
- Connection terminals	Socket terminals with captive screws M3.5
- Clamping range	0.5 mm^2 - 4.0 mm^2
- Strip length	6.0 mm - 6.5 mm
- Screwing torque	0.80 Nm
DJS U6 connections:	
- Connection terminals	Socket terminals with captive screws M3
- Clamping range	0.5 mm^2 - 2.5 mm^2
- Strip length	6.5 mm - 7.0 mm
- Screwing torque	0.50 Nm
DJS 6 outside dimensions	18 x 88 (45) x 58 mm^3
DJS 6 installed depth	55 mm
DJS U6 outside dimensions	43 x 43 x 18,5 mm
RAL colour	grey 7035 / green 6029

Order data

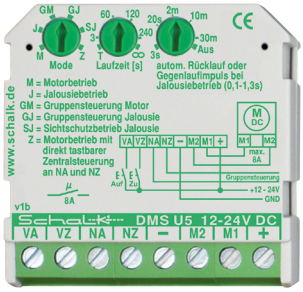
Item no.	EAN	Type	Designation
DJS60K	4 046929 401203	DJS 6	DC blind control with fan-out function, 12-24V DC
DJSU6K	4 046929 401197	DJS U6	DC blind control (flush-mount) with fan-out function, 12-24V DC

01/10/2019

Open/Close controller for 12–24V DC drives

DMS 5 (rail mounting version)
DMS U5 (flush mounting version)

With auxiliary inputs for group and central control
Convenient DC motor control with electronic push-button interlock and run-time limiting, suitable for DC-powered louver blinds or skylights, etc.



Special features

- One-button or two-button actuation
- Electronic button interlock enables use of normal push-buttons
- Specific louver blind modes for convenient louver adjustment and privacy function
- Automatic closing with configurable closing time; long button press doubles closing time
- Run-time limiting for motor protection

General information

The DMS 5 and DMS U5 electronic controllers are general-purpose DC motor controllers for clockwise or anti-clockwise operation. They support both one-button and two-button motor control.
The overriding auxiliary inputs allows several DMS 5 or DMS U5 units to be grouped together in group control or central control configurations.
The motor run time can be limited to prevent motor overload due to mechanical jamming or other causes. A convenient and configurable automatic closing function ensures that skylights or other fixtures are not inadvertently left open. In louver blind mode the louvers can be adjusted precisely or automatically returned to a defined angle after switch-off.

Applications

Roller shutters and louver blinds, shutters, skylights, smoke extraction hoods in fire protection systems, door drives, valve drives, etc.

Operation

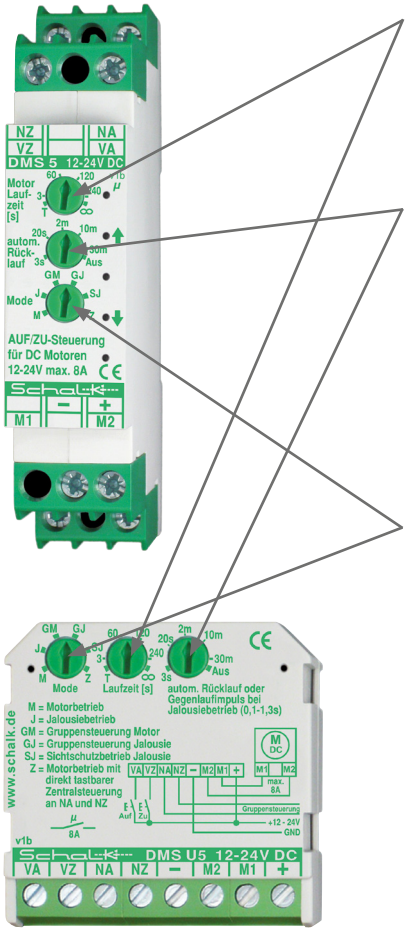
The DMS U5 is actuated by standard push-buttons with no need for mechanical interlocking.
The desired operation direction is selected by a short pulse (momentary-action signal) from a push-button connected to the VA (Local Open) or VZ (Local Close) input. The drive runs to its end stop and the configured time expires.
A subsequent pulse on the VA or VZ input while the drive is running stops the motor. For **one-button motor control** it is also possible to actuate both local inputs at the same time with just one push-button (not in SJ mode). With this actuation arrangement, each button pulse changes the direction (Open–Stop–Close–Stop).
The auxiliary inputs NA (Open) and NZ (Close) allow any desired number of drives to be operated simultaneously in the opening or closing direction, regardless of their current state. When actuated by the auxiliary inputs, the motor runs only as long as the actuation signal from the higher-level group controller is active. The NA input has priority when NA and NZ signals are active at the same time. The local inputs are blocked as long as NA or NZ is active.
When the DMS 5 or DMS U5 is used as a **group controller**, there is no time monitoring of the auxiliary inputs. This allows the lower-level controllers to be held in the desired position for an indefinite period (e.g. wind sensors).
In **louver blind mode** the drive is stopped immediately after a short pulse is applied to a local input. With a longer pulse the drive continues running to the end position. This enables louver angle adjustment by short button presses. In one-button louver blind mode, the direction of motion is not altered by a sequence of short pulses. Here again, this makes it easy to adjust the louvers.
If automatic closing is enabled, the drive starts moving in the closing direction after the set closing time delay. The time-out is started by the signal on the VA local input.
If the signal on the VA input is active longer than 2 seconds, the closing time is doubled. In louver blind mode a reverse pulse is configured instead of the closing function, so that

the louvers are automatically reset after the motor stops.

Central push-button motor control mode (Z) enables simple central control in relatively small systems without a higher-level group controller. The auxiliary inputs can be actuated by push-buttons in the same way as the local inputs, but they take priority.

In **SJ mode (louver blind privacy)** a short push-button signal on the VA or VZ local input changes the angle of the louvers, for example from vertical to horizontal (privacy on/off). The motor run time for this angle adjustment can be set from 0.1 to 1.4 s. A triple button press initiates the full motor run time (setting range 3 to 240 s).

Controls and indicators



Motor run time setting „Motor-Laufzeit [s]“:
This sets the motor run time:

T	Button mode (motor runs only when an input signal is active)
3...240	Motor run time in seconds
∞	No run time limit

Automatic closing time setting „autom. Rücklauf“:
This sets the automatic closing time, reverse pulse time or louver run time:
In motor control mode (M):
Time for automatic closing function **3 s to 30 min** or **Off** (function disabled)
In louver blind control mode (J):
Duration of reverse pulse 0.1 to 1.3 s or Off (function disabled)

In louver blind privacy mode (SJ):
*Louver run time **0.1 to 1.4 s***

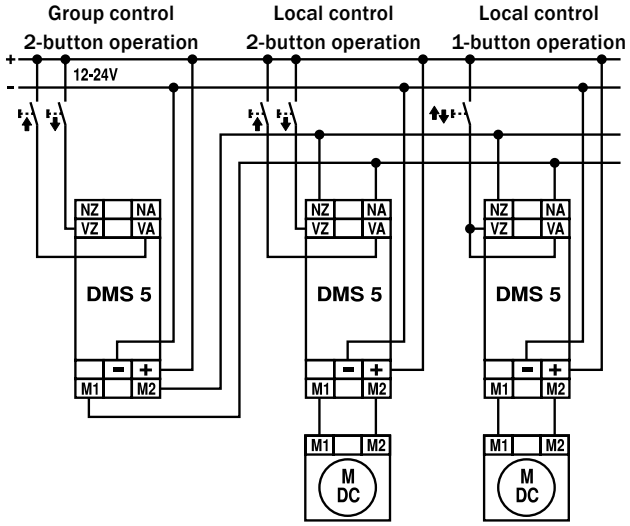
Mode setting „Mode“:
This sets the operating mode:

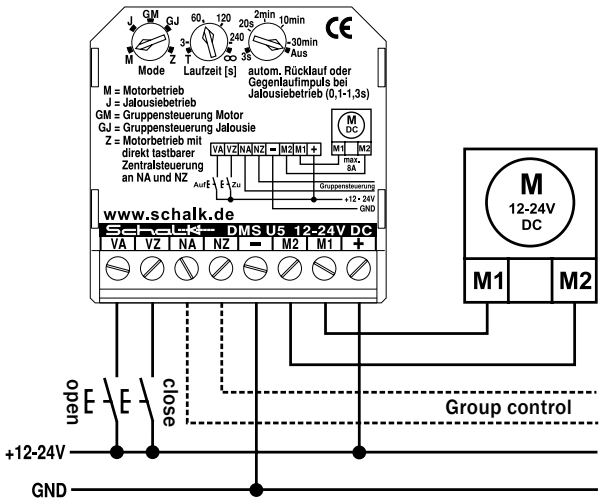
M	Motor control (short button press for Open, Close or Stop)
J	Louver blind control (short button press for fine adjustment of louver angle or stop; long but ton press for open/close)
GM	Group device for motor control* (no time monitoring)
GJ	Group device for louver blind control* (no time monitoring)
SJ	Louver blind privacy (short button press sets privacy on or off; triple button press to adjust blind position)
Z	Central push-button motor control (all inputs operated by push-buttons)

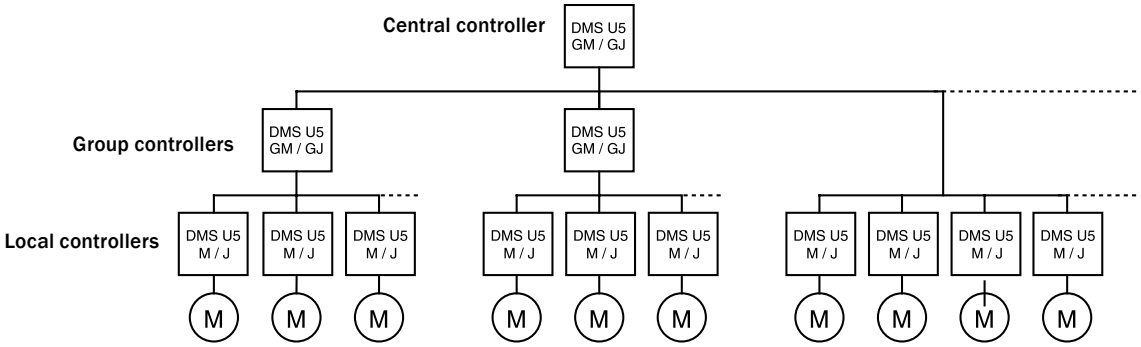
** In mode GM or GJ, relay output M1 or M2 (14 or 24) is continuously closed as long as an active signal is present on an auxiliary input. This enables override actuation (with local inputs blocked) by sensors (wind sensor, rain sensor, etc.).*

Status indicator LEDs
○ LED off
● LED lit red
◍ LED blinks red
● LED lit green
◍ LED blinks green
◍ LED blinks alternating red/green

Example connection diagram







Attention! ***Due to the supply voltage tolerance of ± 10% it is mandatory to use a regulated power supply - unregulated power supplies cause high voltage spikes which can destroy the device!***

Technical data

Operating voltage	12-24 V DC ±10% **(regulated power supply)**
Control voltage	Same as operating voltage
Power consumption	max. 0.6 W
Run time	3-240 s
Automatic closing time	3 s to 30 min
Reverse pulse	0.1-1.3 s
Relay switching dead time	0.6 s
Relay output	12-24 V DC, max. 8 A
Ambient temperature	-10°C to+45°C
DMS 5 mounting	Click-mount on standard 35-mm rail (EN 60715)
DMS 5:	
- Connections	Socket terminals with captive screws M3.5
- Clamping range	0.5 mm^2 - 4.0 mm^2
- Strip length	6.0 mm - 6.5 mm
- Screwing torque	0.80 Nm
DMS U5:	
- Connections	Socket terminals with captive screws M3
- Clamping range	0.5 mm^2 - 2.5 mm^2
- Strip length	6.5 mm - 7.0 mm
- Screwing torque	0.50 Nm
DMS 5 outside dimensions	18 x 88 (45) x 58 mm^3
DMS 5 installed depth	55 mm
DMS U5 outside dimensions	43 x 43 x 18,5 mm
RAL colour	Grey 7035 / Green 6029

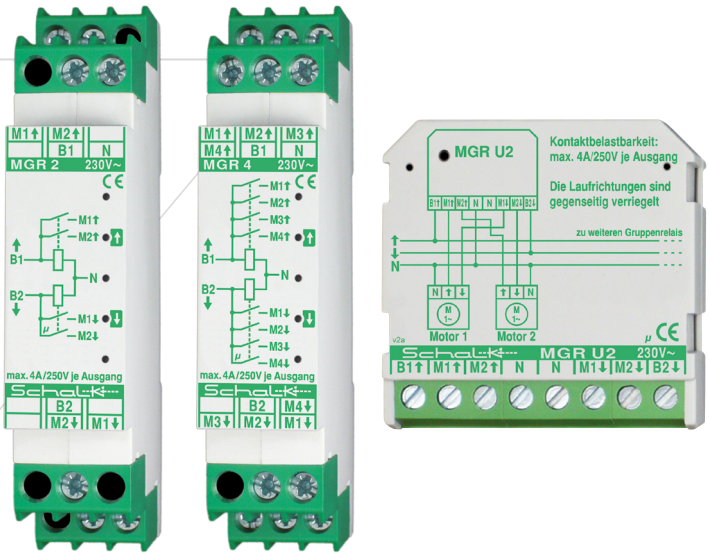
Order data

Part no.	EAN	Type	Designation
DMS50K	4 046929 401104	DMS 5	Open/close controller 12-24V DC
DMSU5K	4 046929 401098	DMS U5	Open/close controller (UP) 12-24V DC

Motor-Group-Relay

MGR U2 (flush mounting version)
MGR 2 (rail mounting version, 4 relays)
MGR 4 (rail mounting version, 8 relays)

For electrical decoupling of motors for roller shades or awnings connected in parallel



Special features

- Interlocked outputs
- Very compact package
- Can be connected in parallel
- Easy installation

General information

Direct parallel connection of open/close drives is usually not permissible due to undesirable reverse voltages. Mutual electrical decoupling of the motors is therefore necessary to enable parallel configurations.
The motor group relays in the MGR series are specifically designed for this electrical decoupling of motors in parallel configurations. This allows two or four motors to be operated simultaneously with a minimum of wiring effort. Furthermore, several MGR relays can be connected in parallel if it is necessary to operate significantly more drives in parallel.
Thanks to the very compact package and easy wiring, even relatively large motor groups can be installed very easily, neatly and economically.
In addition, interlocking of the run direction ensures that the connected motors cannot be switched to run in both directions at the same time.

Application

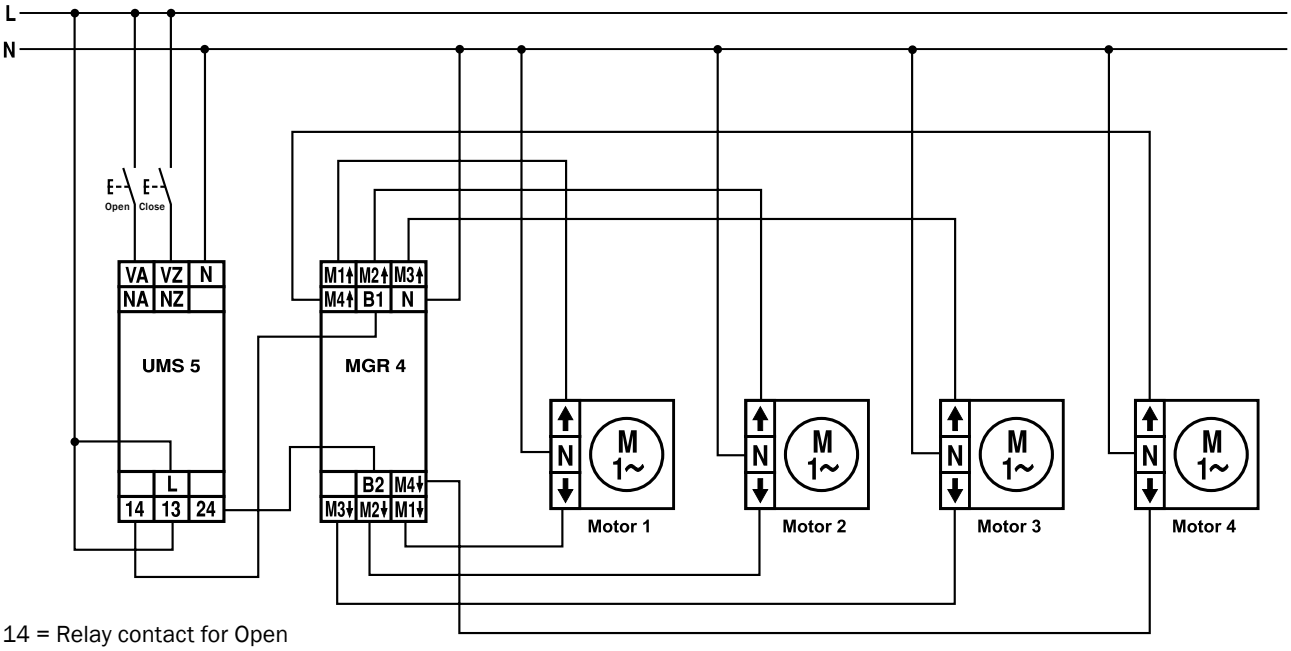
Electrically correct and therefore reliable parallel connection of open/close drives (230V AC).

Operation

The control device is connected to the control inputs B1 (Open) and B2 (Close). The control signals may come from a simple Open/Close switch or from the outputs of an electronic controller, such as the Schalk Universal Motor Controller UMS 5 or UMS U5.
Up to four drives can be connected to the MGR motor outputs M1 to M4, depending on the relay type.
If it is necessary to operate more than four drives in parallel, the control inputs of several MGR relays can easily be connected in parallel.
In addition, interlocking of the run direction ensures that even with control devices that are not inherently safe (such as simple series switches) the motors cannot be switched to run in both directions at the same time.

Example connection diagram

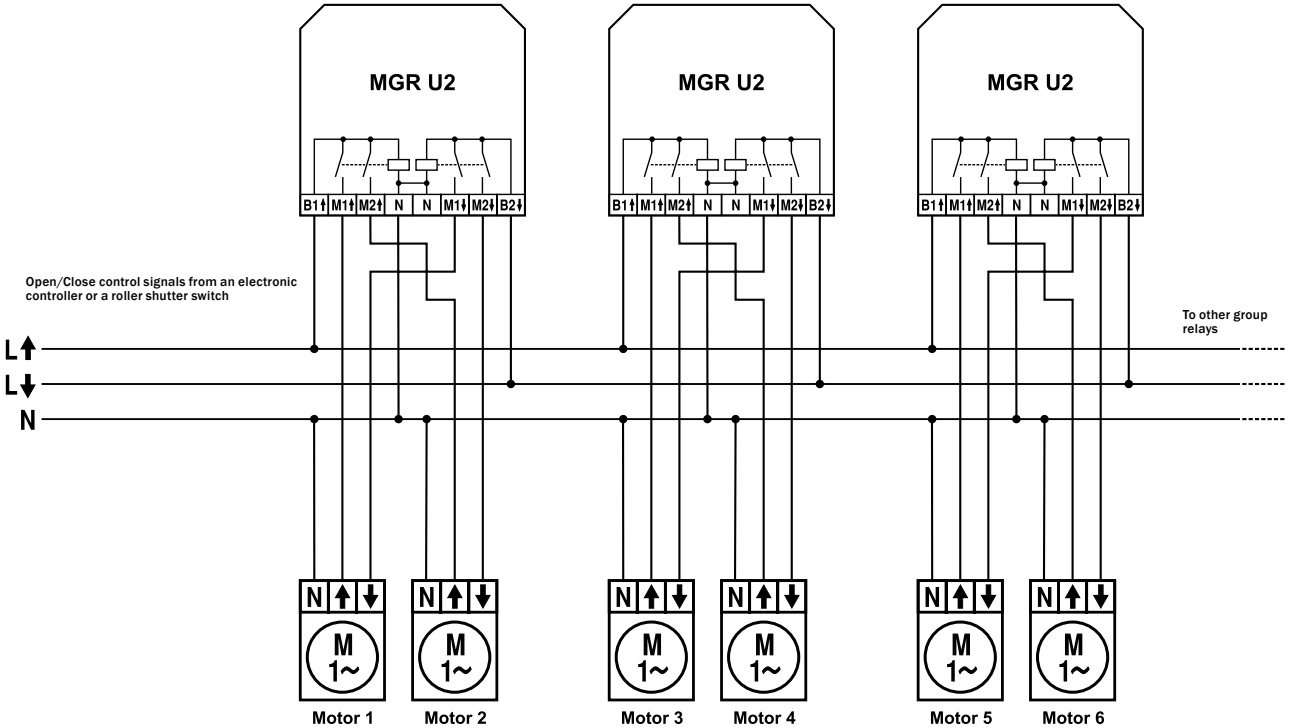
MGR 4: parallel operation of four motors from one controller (e.g. UMS 5)



14 = Relay contact for Open
24 = Relay contact for Close

Info *The signals on the control inputs of the MGR may have 100% duty cycle. This allows the relay to be controlled by conventional roller shutter switches if necessary.*

MGR U2: parallel operation of six motors in cascade



General technical data

Operating voltage	230V 50Hz 10%
Switch rating	See data sheet “Relay contact load ratings”
Ambient temperature	-10°C to +45°C
RAL colour	Grey 7035 / Green 6029

MGR 4 technical data

Power consumption	approx. 0.6 W
Relay contacts	8 NO contacts 4 A / 250 V AC
Connections	Socket terminals with captive screws M3.5
Clamping range	0.5 mm² - 4.0 mm²
Strip length	6.0 mm - 6.5 mm
Screwing torque	0.80 Nm
Mounting	Click-mount on standard 35-mm rail (EN 60715)
Outside dimensions	18 x 88 (45) x 58 mm
Installation depth	55 mm
Weight	approx. 90 g

MGR 2 technical data

Power consumption	approx. 0.3 W
Relay contacts	4 NO contacts 4 A / 250 V AC
Connections	Socket terminals with captive screws M3.5
Clamping range	0.5 mm² - 4.0 mm²
Strip length	6.0 mm - 6.5 mm
Screwing torque	0.80 Nm
Mounting	Click-mount on standard 35-mm rail (EN 60715)
Outside dimensions	18 x 88 (45) x 58 mm
Installation depth	55 mm
Weight	approx. 70 g

MGR U2 technical data

Power consumption	approx. 0.3 W
Relay contacts	4 NO contacts 4 A / 250 V AC
Connections	Socket terminals with captive screws M3
Clamping range	0.5 mm² - 2.5 mm²
Strip length	6.5 mm - 7.0 mm
Screwing torque	0.50 Nm
Outside dimensions	43 x 43 x 18.5 mm
Weight	approx. 40 g

Order data

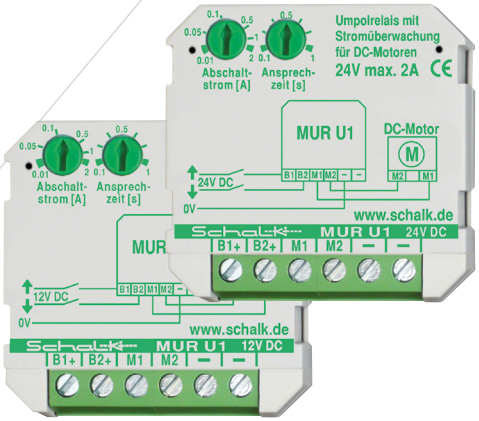
Part no.	EAN	Type	Designation
MGRU29	4 046929 401050	MGR U2	Motor group relay, 230V AC, 4 NO (for 2 motors) (FMD)
MGR209	4 046929 401142	MGR 2	Motor group relay, 230V AC, 4 NO (for 2 motors)
MGR409	4 046929 401159	MGR 4	Motor group relay, 230V AC, 8 NO (for 4 motors)

Motor reversing relay MUR U1

Control relay for DC motors with pole reversal function and current monitoring for limit switching. Versions for 12V and 24V.

Special features

- Adjustable current monitoring and adjustable response time for exact limit switching
- No continuous supply necessary, therefore easy installation
- Variants for 12 V and 24 V available
- Very compact design



General information

Microdrives are increasingly being used in building automation. Such very compact drive systems usually work with DC motors and can therefore not be operated with conventional controls designed for AC motors.

The MUR U1 takes over the necessary conversion from AC control to DC drive. A reverse polarity logic is used to reverse the direction of travel, and an adjustable cut-off current in conjunction with the adjustable response time ensures an exactly adjustable and safe limit switch-off.

Applications

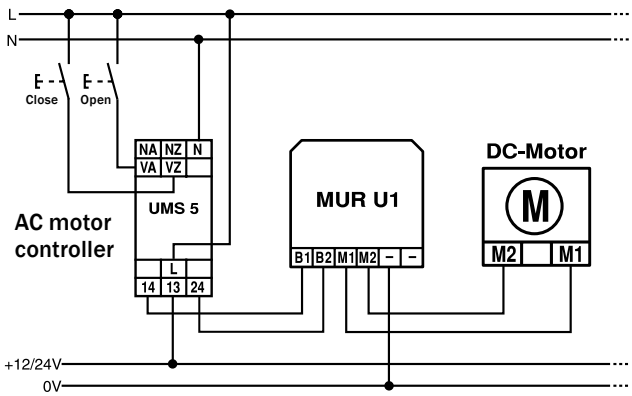
Conversion of AC controls to DC drives, e.g. for interior blinds, window openers and other modern small drives.

Operation

Depending on the control at inputs B1+ or B2+, a correspondingly polarized output voltage is available at motor outputs M1 and M2.

To ensure a safe and also fast limit stop for drives without their own limit switches, the cut-off current is set just so high that the drive is not switched off when the motor is running freely. The response delay is then reset so far that the starting current increase of the connected motor is still safely overcome.

Connection example



Technical data

Operating voltage:	12 V or 24 V DC
Power consumption:	0.3 W
Switch rating	max. 2 A
Current limiting	adjustable: 10 mA - 2 A
Response time	adjustable: 0,1s - 1s
Ambient temperature	-10°C to +45°C
Connection terminals	Socket terminals with captive screws M3
Clamping range	0.5 mm² - 2.5 mm²
Strip length	6.5 mm - 7.0 mm
Screwing torque	0.50 Nm
Mounting orientation	arbitrarily
External dimensions	43 x 43 x 18,5 mm
Weight	approx. 40 g
RAL colour	grey 7035 / green 6029

Order data

Item no.	EAN	Type	Designation
MURU14	4 046929 401074	MUR U1 (24V DC)	Motor reversing relay, 24V DC, 10mA - 2A
MURU12	4 046929 401067	MUR U1 (12V DC)	Motor reversing relay, 12V DC, 10mA - 2A

2017-08-01

Sensor-driven motor controller (wind/light)

SMS 2 (rail mounting version)
SMS U2 (flush mounting version)

Wind sensor SW 4 / light sensor SL 2

Compact, easily installed awning controller with integrated wind and light sensing. Automatic shading control and protection against awning damage from high wind speed.

Special features

- Comfort and security control
- Integrated sensor power source (PELV); no external power supply necessary
- Can also be used as a group controller for lower-level roller shutter or louver blind controllers
- Low power consumption
- SMS 2 features:
  - Additional automatic twilight function
  - Floating relay contacts
  - Automatic reverse function (louvre blinds)

General information

The SMS 2 or SMS U2 are used together with the SW 4 wind sensor and the SL 2 light sensor for safe and convenient control of awnings or external blinds.
When the sun intensity is high, the awning is extended automatically, and retracted again when the brightness decreases (this automatic function can also be deactivated).
If the wind speed is too high, the awning is retracted automatically.
The SMS 2 also has an integrated twilight function and a blind reverse function.
Buttons for direct OPEN/CLOSE operation can be connected. The automatic shading system can be deactivated for a certain period of time by pressing an operating button for a longer period of time.
Wind monitoring always has priority, so system safety is guaranteed even in the event of incorrect operation.

Applications

Convenient automatic shading control with additional protection against wind damage to electrically operated awnings.
SMS 2 has an additional automatic twilight function for nighttime room darkening.

Operation

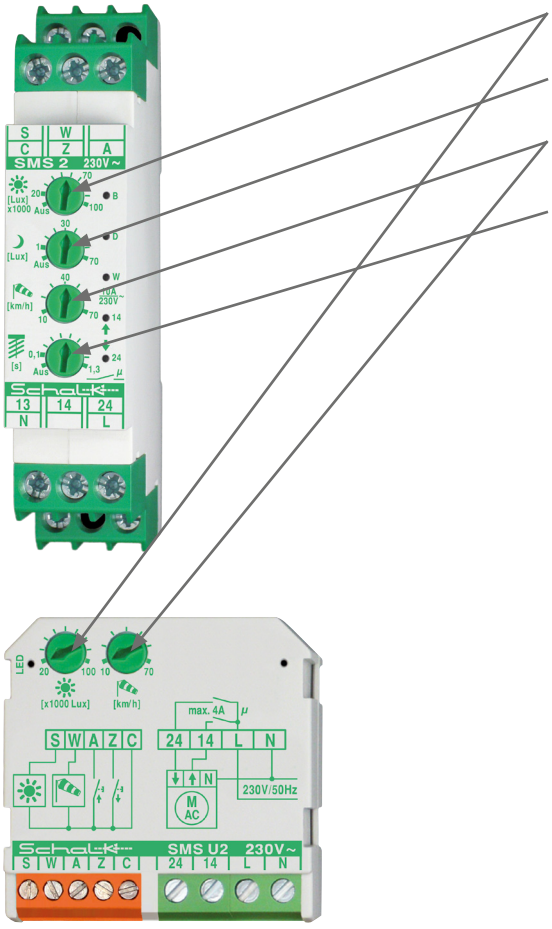
The desired response thresholds are set with the „Sun“ and „Wind“ (and „Twilight“ at SMS 2) settings.
When a set limit value is exceeded, the control LED starts flashing and the awning is activated after the response time has elapsed. The details of the individual operating modes can be found in the function diagrams.
The awning can also be operated manually by a directly connected dual push-button (without mutual interlock). The response time of the automatic shading function is reset after each manual operation.

In order to manually force the awning to remain stable for a long period of time, a long press (5 seconds) of the OPEN or CLOSE button can completely deactivate the sun automation for 5 hours. Pressing the button during this time reactivates the automatic sunshade function.

Important: Counter-rotation of the blinds must be deactivated!

The automatic wind control always remains active and always works with absolute priority. This means that the system cannot be endangered by excessive wind - even in the event of accidental incorrect operation.
The reaction time in the event of wind is pre-programmed and is 1 - 15 seconds, depending on the amount of excess wind. The response time when reaching sun light intensitiy threshold can be individually adjusted by a simple programming procedure (factory setting 10 min.).
The motor running time can also be programmed for individual adaptation to the awning used (factory setting 90s).
If the SMS 2 or SMS U2 is used as group control, this can also be set in a programming process. In this case, the controller only releases the outputs as soon as the wind level falls below the set limit value.

Controls and indicators



Light intensity threshold setting
Setting range 20,000 –100,000 lx

Twilight threshold setting (SMS 2 only)
Setting range 1 – 70 lx

Wind speed threshold setting
Setting range 10 – 70 km/h

Adjuster for counter-rotation of blinds (SMS 2 only)
Duration of the counter-flow pulse 0.1 - 1.3s or Off (function deactivated)

Status indicator LEDs:
SMS U2: A blinking red LED (◔) W indicates wind speed above the threshold level; blinking green (◔) indicates brightness above the threshold level.

SMS 2: Blinking red (◔) with LED W indicates wind speed above the threshold level, with LED B light level above the brightness threshold, and with LED D light level below the twilight threshold.
LEDs 14 and 24 indicate the corresponding motion direction.

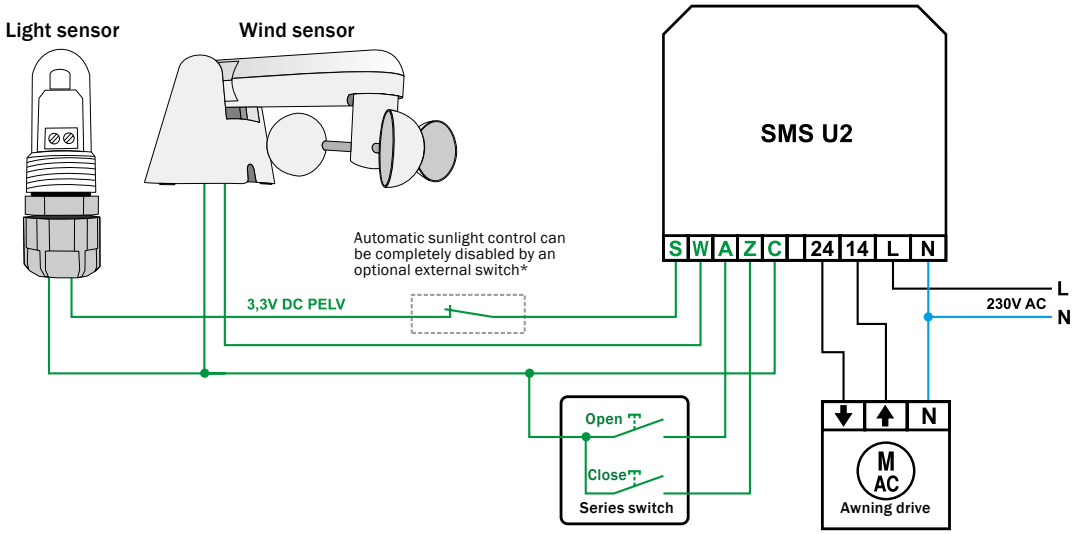
Status indicator LEDs
○ LED off
● LED lit red
◔ LED blinks red
● LED lit green
◔ LED blinks green
◔ LED blinks alternating red/green

Installation

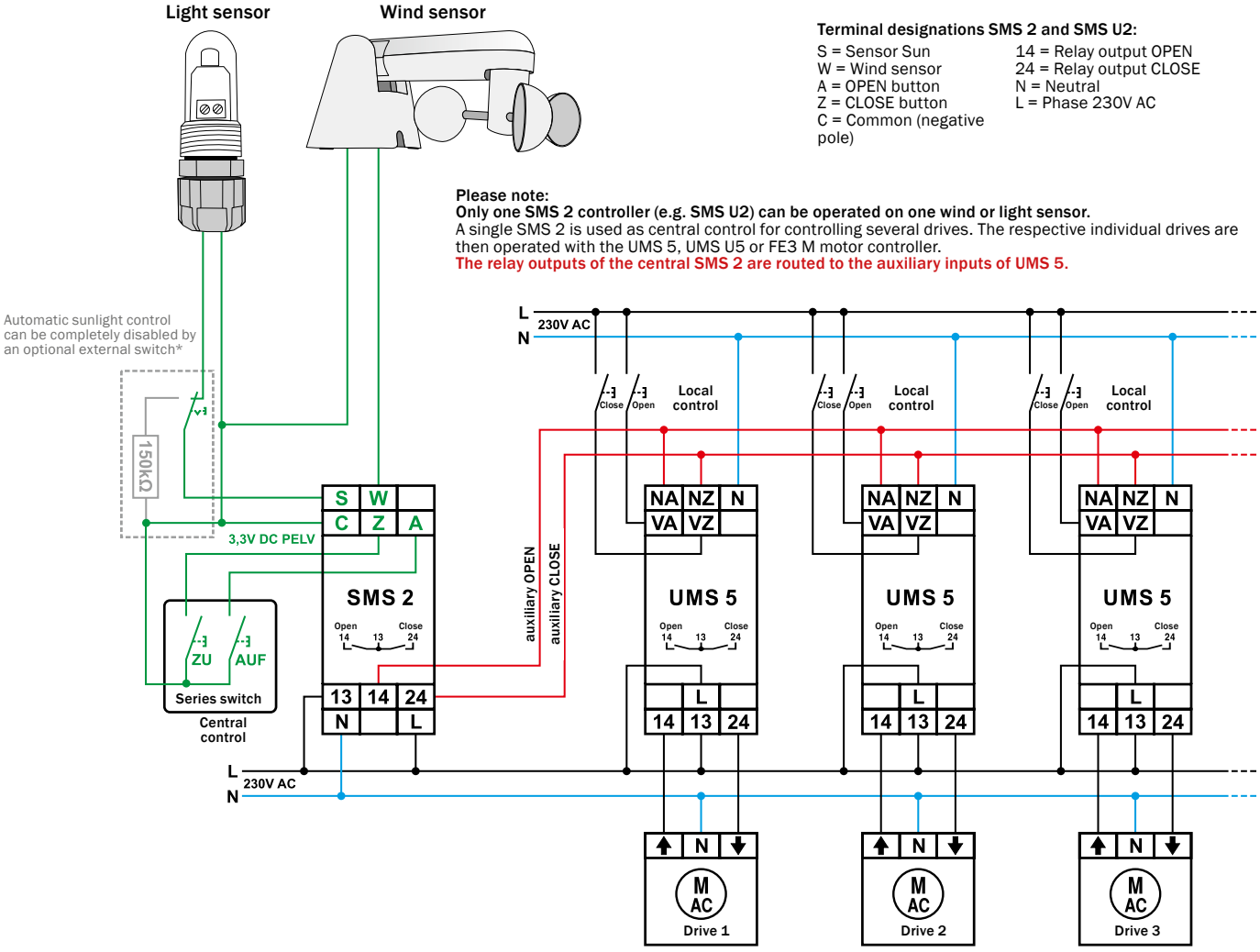
Connection example: SMS U2 as awning control

The SMS 2 controller monitors 3 adjustable parameters: Wind, shading and twilight. Shading or twilight can also be deactivated individually if required (the flush-mounted version SMS U2 does not have the twilight function).

For low voltage wiring (shown in green) control or data cables such as I-Y(St)Y 2x2x0.6 can be used (length max. 50m). The low voltage for the sensor supply is generated directly in SMS 2 (SMS 2. An additional external power supply is not required.



Connection example: SMS 1



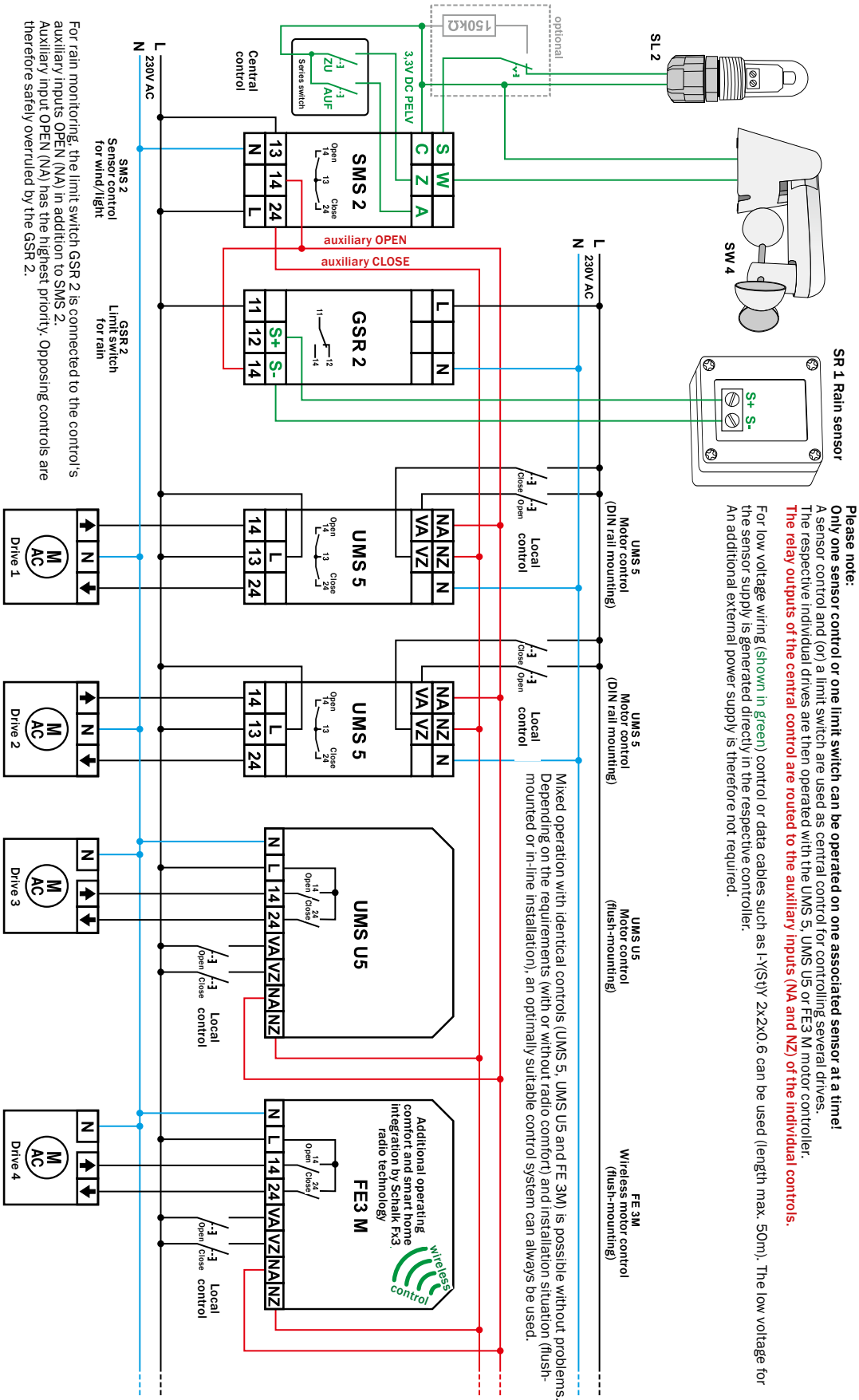
Terminal designations SMS 2 and SMS U2:

S = Sensor Sun
W = Wind sensor
A = OPEN button
Z = CLOSE button
C = Common (negative pole)
14 = Relay output OPEN
24 = Relay output CLOSE
N = Neutral
L = Phase 230V AC

Please note:
Only one SMS 2 controller (e.g. SMS U2) can be operated on one wind or light sensor.
A single SMS 2 is used as central control for controlling several drives. The respective individual drives are then operated with the UMS 5, UMS U5 or FE3 M motor controller.
The relay outputs of the central SMS 2 are routed to the auxiliary inputs of UMS 5.

*) If required, a switch can be integrated into the sensor cable to permanently switch off the automatic shading and twilight control.
For SMS U2 (without twilight function) a simple switch is sufficient. For SMS 2 (with twilight function), a changeover switch must be used to switch to a 150kΩ resistor in order to prevent the twilight function from responding.
This type of switch-off only deactivates the sun automation. The safety-relevant wind monitoring remains fully functional.

Application example: SMS 2 in combination with GSR 2 (limit switch for rain) as central control for light, wind and rain monitoring



Please note:
Only one sensor control or one limit switch can be operated on one associated sensor at a time!
A sensor control and (or) a limit switch are used as central control for controlling several drives.
The respective individual drives are then operated with the UMS 5, UMS U5 or FE3 M motor controller.
The relay outputs of the central control are routed to the auxiliary inputs (NA and NZ) of the individual controls.

For low voltage wiring (shown in green) control or data cables such as I-Y(St)Y 2x2x0.6 can be used (length max. 50m). The low voltage for the sensor supply is generated directly in the respective controller.
An additional external power supply is therefore not required.

For rain monitoring, the limit switch GSR 2 is connected to the control's auxiliary inputs OPEN (NA) in addition to SMS 2.
Auxiliary input OPEN (NA) has the highest priority. Opposing controls are therefore safely overruled by the GSR 2.

Mixed operation with identical controls (UMS 5, UMS U5 and FE 3M) is possible without problems. Depending on the requirements (with or without radio comfort) and installation situation (flush-mounted or in-line installation), an optimally suitable control system can always be used.

Configuration and commissioning

First configure the threshold values and sensor type using the corresponding controls (see “Controls and indicators”). The following settings only have to be configured if the factory default settings are not suitable (see “Factory default settings”).

Attention! **Note: The awning must be in the home position (fully retracted) for this.**

1) Press and hold the OPEN and CLOSE inputs at the same time for 10 seconds
This activates programming mode with the programming process.

Step 1: Adjust the response time for shading (and for twilight with SMS 2)
(SMS U2: LED lit green / SMS 2: LEDs B and D lit red)
The factory default response time is 10 minutes. This can be increased incrementally by pressing the OPEN button or decreased incrementally by pressing the CLOSE button. To skip this setting, go directly to Step 2.
One button press corresponds to 1 minute response time
(Setting range: 1–60 min)

2) Briefly press the OPEN and CLOSE buttons at the same time
This takes you to the second programming step and saves any previous settings you have made.

Step 2: Adjust the motor run time
(SMS U2: LED lit red / SMS 2: LED W lit red)
The factory default motor run time is 90 seconds. If the awning should only be extended to a specific position in automatic mode, all you have to do here is to extend it to this position by pressing the OPEN or CLOSE buttons. To skip this setting, go directly to Step 3.
(Setting range: 1–240 s)

3) Briefly press the OPEN and CLOSE buttons at the same time
This takes you to the third programming step and saves any previous settings you have made.

Step 3: Enable or disable group mode
(SMS U2: LED lit red-green / SMS 2: LEDs B, D and W lit red)
Group mode is disabled by default (factory setting). Press the OPEN button to enable group mode, or press the CLOSE button to disable group mode.

4) Briefly press the OPEN and CLOSE buttons at the same time
This exits programming mode and saves any previous settings you have made.

Factory default settings

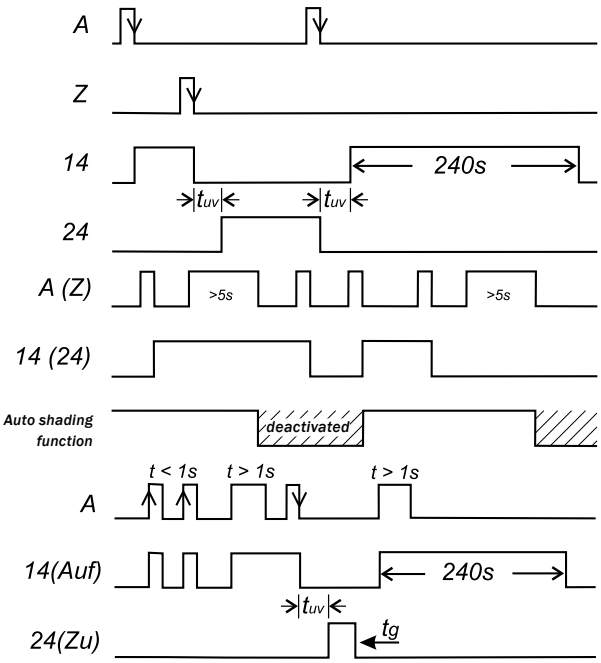
The following default values are configured in the factory:
- Response time for sun exposure: 10min
- Motor run time: 90s
- Group mode disabled

Restoring factory default settings:
If the controller is accidentally misconfigured, this can be corrected by restoring the factory default settings.
To do this, press the **OPEN** and **CLOSE** buttons at the same time **for 20 seconds** until the LED blinks green and red (on the SMS 2, all LEDs will blink).

Info After 30 seconds in setting mode with no button press, setting mode is exited automatically and all settings made up to that point are accepted.
- Terminal 14 retracts or raises the awning (OPEN button)
- Terminal 24 extends or lowers the awning (CLOSE button)

Functional diagrams

The local inputs „OPEN“ (A) or „CLOSE“ (Z) are edge-controlled and react with the falling edge.
A t_{uv}=0.6s pause when switching between 14 and 24 serves to protect the awning motor.

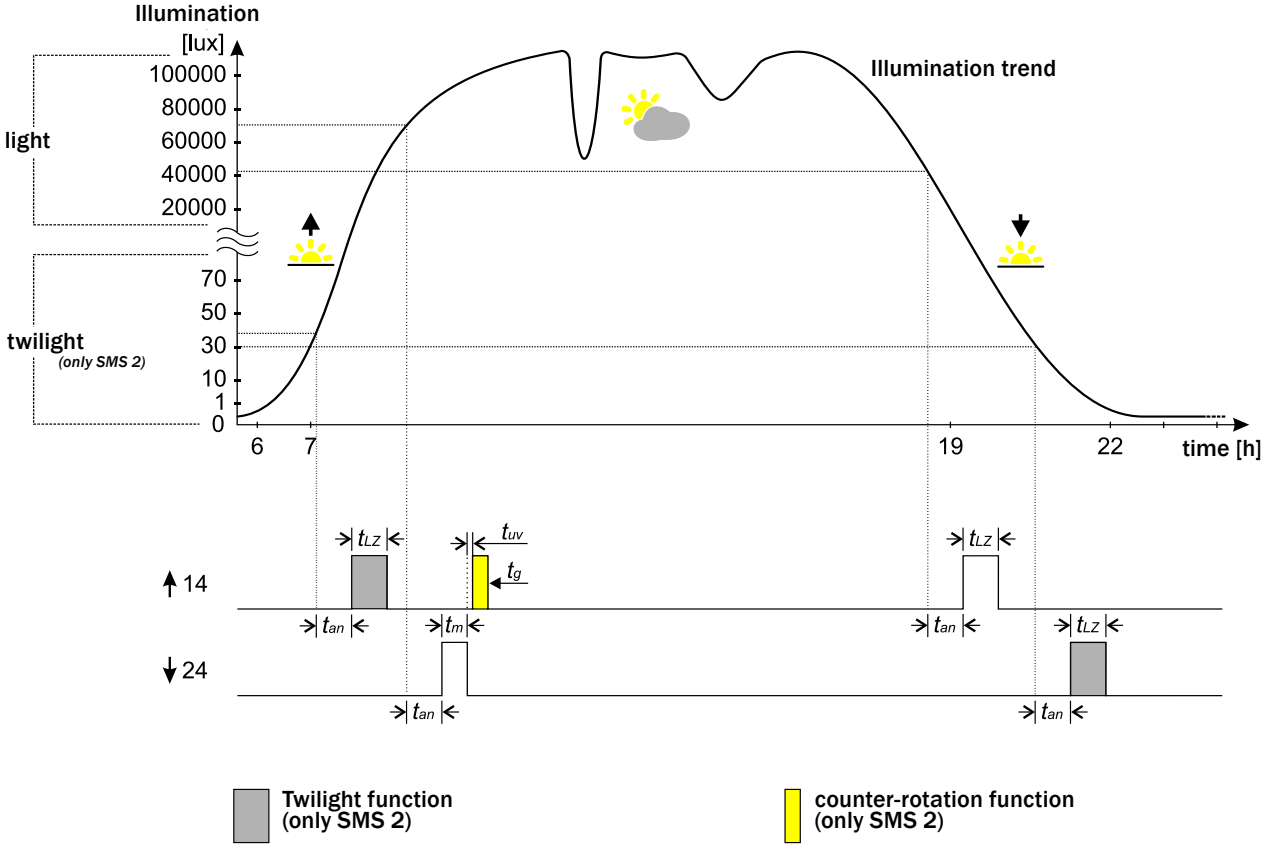


The automatic shading system can be completely deactivated for 5 hours by pressing the button (A or Z) for 5 seconds. After this time has elapsed (or previously by pressing the awning again), the automatic system is reactivated.
Info: Counter-rotation of the blinds must be deactivated!

Blind counter-rotation function (SMS 2 only):
Local inputs are level-controlled when the button is pressed briefly and edge-controlled when the button is pressed long. Countercurrent pulse (tg) is triggered during shading (see running time diagram for sun) or by manual stop with A or Z.

Running time diagram „Sun

Example: light = 70000lx; twilight = 30lx (only SMS 2); t_{LZ} = 240s (programmed)
t_{an} = 10min (response time, user programmable); t_m = 90s (motor run time, user programmable), blind auto-revers time (only SMS 2) t_g = 0,7s (adjustable)

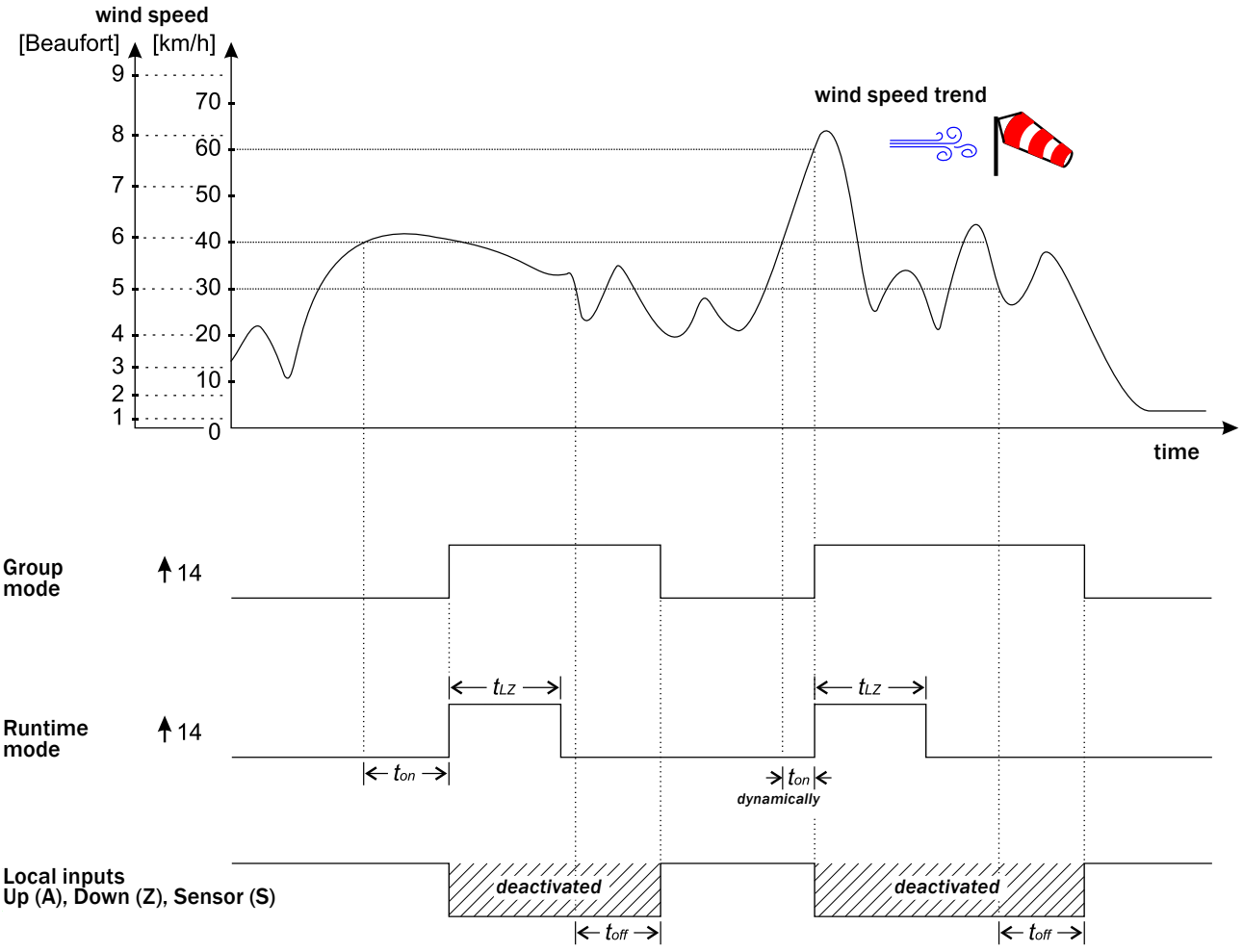


When the wind speed (frequency of the wind sensor pulse signal W) rises above the set threshold level, the local OPEN (A) and CLOSE (Z) inputs are completely blocked. The light sensor (S) also has no effect on the controller under this condition. The inputs are enabled again after the wind speed drops below the set threshold level.

The SMS 2 dynamically adjusts the response delay for wind „t_{on}“ (that means the higher the wind speed overstepping, the shorter the response time).

Runtime diagram „Wind

Example: t_{on} = 15s (dynamically); t_{off} = 15s (fixed);t_{LZ} = 240s (programmed); signal threshold wind = 40 km/h



Beaufort scale by phenomenological criteria:

(only SMS 1)

Wind speed [Bft]	Wind speed [km/h]	Designation	Effect on land
0	0-1	Calm	Calm. Smoke rises vertically.
1	1-5	Light air	Smoke drift indicates wind direction. Leaves and wind vanes are stationary.
2	6-11	Light breeze	Wind felt on exposed skin. Leaves rustle. Wind vanes begin to move.
3	12-19	Gentle breeze	Leaves and small twigs constantly moving, light flags extended.
4	20-28	Moderate breeze	Dust and loose paper raised. Small branches begin to move.
5	29-38	Fresh breeze	Branches of a moderate size move. Small trees in leaf begin to sway.
6	39-49	Strong breeze	Large branches in motion. Whistling heard in overhead wires. Umbrella use becomes difficult. Empty plastic bins tip over.
7	50-61	High wind	Whole trees in motion. Effort needed to walk against the wind.
8	62-74	Gale, fresh gale	Some twigs broken from trees. Cars veer on road. Progress on foot is seriously impeded.
9	75-88	Strong/severe gale	Some branches break off trees, and some small trees blow over. Construction/temporary signs and barricades blow over.

SMS 2 / SMS U2 technical data

Operating voltage	230V 50/60Hz 10 %
Power consumption	approx. 0.66 W
Wind measuring range	10-70 km/h
Wind switching hysteresis	25 %
Wind response time	15s (dynamically)
Sun measuring range	Light intensity: 20000Lux - 100000Lux / Twilight: 1Lux - 70Lux
Sun switching hysteresis	Light intensity: 40 % / Twilight: 20%
Sun response time	10 min (1...60min programmable)
Motor run time	90s (1...240s programmable)
Relay switching dead time	0.6s
Sensor supply voltage	3.3V DC (PELV)
Ambient temperature	-10°C to +45°C
Installation orientation	Any
RAL colour	Grey 7035 / Green 6029

SMS U2:

Relay output	2 NO contacts 4A/250V AC
Auto-reverse time	0,7s (0.1 to 2.4s programmable)
AC Connections	Socket terminals with captive screws M3
- Clamping range	0.5 mm² - 2.5 mm²
- Strip length	6.5 mm - 7.0 mm
- Screwing torque	0.50 Nm
PELV Connections	Socket terminals with captive screws M2
- Clamping range	0.25 mm² - 1.5 mm²
- Strip length	6.0 mm - 6.5 mm
- Screwing torque	0.20 Nm
Dimensions	43 x 43 x 18.5mm³

SMS 2:

Relay output	2 NO contacts potential-free, 10A/250V AC
Auto-reverse time	0,7s (0.1 to 2.4s programmable)
Mounting	Snap-on mounting on 35mm top-hat rail according to EN 60715
Connection terminals	Cage clamp terminals with captive screws M3.5
Clamping range	0.5 mm² - 4.0 mm²
Strip length	6.0 mm - 6.5 mm
Screwing torque	0.80 Nm
Dimensions	18 x 88(45) x 58mm³

Technical data SW 4

Sensor type	Reed contact pulse generator
Feed line	max. 50m (at 2 x 0.25mm²)
Dimensions	ca. 85 x 125 x 250mm³

Technical data SL 2

Sensor type	Phototransistor
Feed line	max. 50m (with 2 x 0.25mm²), screw connection: PG9
Protection class	IP65
Dimensions	ca. 65 x 20mm³

Order data

Part no.	EAN	Type	Designation
SMSU29	4 046929 401180	SMS U2	Sensor-controlled motor control (wind/light), 230V AC (FMD)
SMS209	4 046929 401173	SMS 2	Sensor-controlled motor control (wind/light), 230V AC (REB)
SW4000	4 046929 301367	SW 4	Wind sensor with articular mount
SL2000	4 046929 301398	SL 2	Light sensor with clip bracket

2019-06-01

Open/close controller for AC drives

UMS 5
(rail mounting versions: 230V AC, 24V UC)

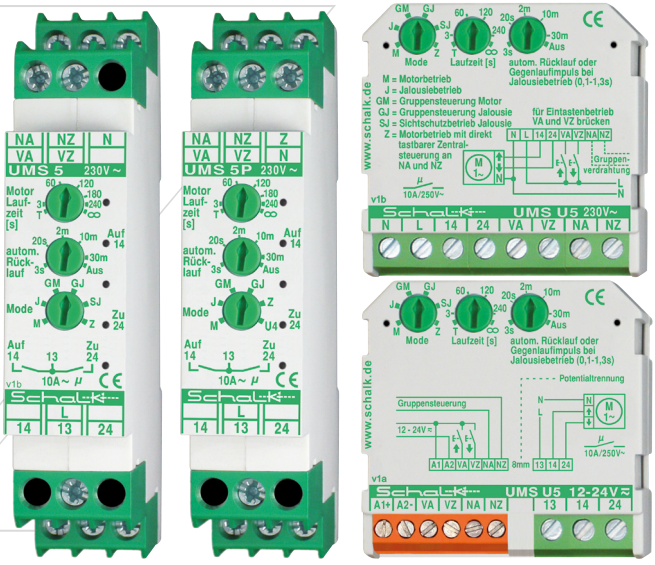
UMS U5
(flush mounting version: 230V AC, 12-24V UC)

UMS 5P
(rail mounting version 230V AC, electrically isolated auxiliary inputs)

Universal motor controller for **AC motors** (roller shutters and louver blinds, hinged shutters, skylights, smoke extractor hoods in fire protection systems, gate drives, valve controls, etc.) with auxiliary inputs for group and central control

Special features

- very low power consumption:
  only 0.2W passive / 0.4W active
- positioning of blinds also by group or central control
- One or two button control
- Electronic button interlock
  enables use of normal push-buttons
- UMS 5: potential-free output contacts
- UMS 5P: galvanically isolated auxiliary inputs für Universalspannung 12-230V UC
- Specific louvre blind modes
  for convenient louver adjustment and privacy function
- Automatic closing function
  with configurable closing time; long button press doubles closing time
- Run-time limiting for motor protection
- rail and flush mounting versions available



General information

The UMS electronic controllers are general-purpose AC motor controllers for clockwise or anti-clockwise operation. They support both one-button and two-button motor control.
The overriding auxiliary inputs allows several UMS units to be grouped together in group control or central control configurations.
The motor run time can be limited to prevent motor overload due to mechanical jamming or other causes. A convenient and configurable automatic closing function ensures that skylights or other fixtures are not inadvertently left open. In louvre blind mode the louvres can be adjusted precisely or automatically returned to a defined angle after switch-off.

Applications

Roller shutters and louvre blinds, shutters, skylights, smoke extraction hoods in fire protection systems, door drives, valve drives, etc.

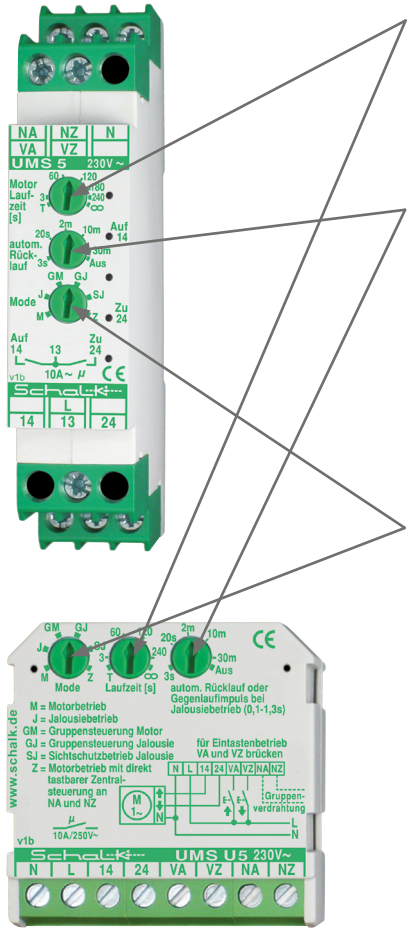
Operation

The UMS is actuated by standard push-buttons with no need for mechanical interlocking.
The desired operation direction is selected by a short pulse (momentary-action signal) from a push-button connected to the VA (local input for Open) or VZ (local input for Close) input. The drive runs to its end stop and the configured time expires.
A subsequent pulse on the VA or VZ input while the drive is running stops the motor. For **one-button motor control** it is also possible to actuate both local inputs at the same time with just one push-button (not in SJ mode). With this actuation arrangement, each button pulse changes the direction (Open–Stop–Close–Stop).
The **auxiliary inputs** NA (Open) and NZ (Close) allow any desired number of drives to be operated simultaneously in the opening or closing direction, regardless of their current state. When actuated by the auxiliary inputs, the motor runs only as long as the actuation signal from the higher-level group controller is active. The NA input has priority when NA and NZ signals are active at the same time. The local inputs are blocked as long as NA or NZ is active.
When the UMS is used as a **group controller**, there is no time monitoring of the auxiliary inputs. This allows the lower-level controllers to be held in the desired position for an indefinite period (e.g. wind sensors).
In **louver blind mode** the drive is stopped immediately after a short pulse is applied to a local input. With a longer pulse the drive continues running to the end position. This enables louver angle adjustment by short button presses. In one-button louver blind mode, the direction of motion is not altered by a sequence of short pulses. Here again, this makes it easy to adjust the louvers.
In **SJ mode (louvre blind privacy)** a short push-button signal on the VA or VZ local input changes the angle of the louvers,

for example from vertical to horizontal (privacy on/off). The motor run time for this angle adjustment can be set from 0.1 to 1.4 s. A triple button press initiates the full motor run time (setting range 3 to 240 s).
If **automatic closing** is enabled, the drive starts moving in the closing direction after the set closing time delay. The time-out is started by the signal on the VA local input.
If the signal on the VA input is active longer than 2 seconds, the closing time is doubled. In louver blind mode a reverse pulse is configured instead of the closing function, so that the louvers are automatically reset after the motor stops.

Central push-button motor control mode (**Z**) enables simple central control in relatively small systems without a higher-level group controller. The auxiliary inputs can be actuated by push-buttons in the same way as the local inputs, but they take priority.

Controls and indicators



Motor run time setting „Motor-Laufzeit“:
This sets the motor run time:

T	Button mode (motor runs only when an input signal is active)
3–240	Motor run time in seconds
∞	No run time limit

Automatic closing time setting „autom. Rücklauf“:
This sets the automatic closing time, reverse pulse time or louvre run time:
In motor control mode (M):
Time for automatic closing function **3 s to 30 min** or **Off** (function disabled)

In louvre blind control mode (J):
Duration of reverse pulse **0.1 to 1.3 s** or **Off** (function disabled)

In louvre blind privacy mode (SJ):
Louvre run time **0.1 to 1.4 s**

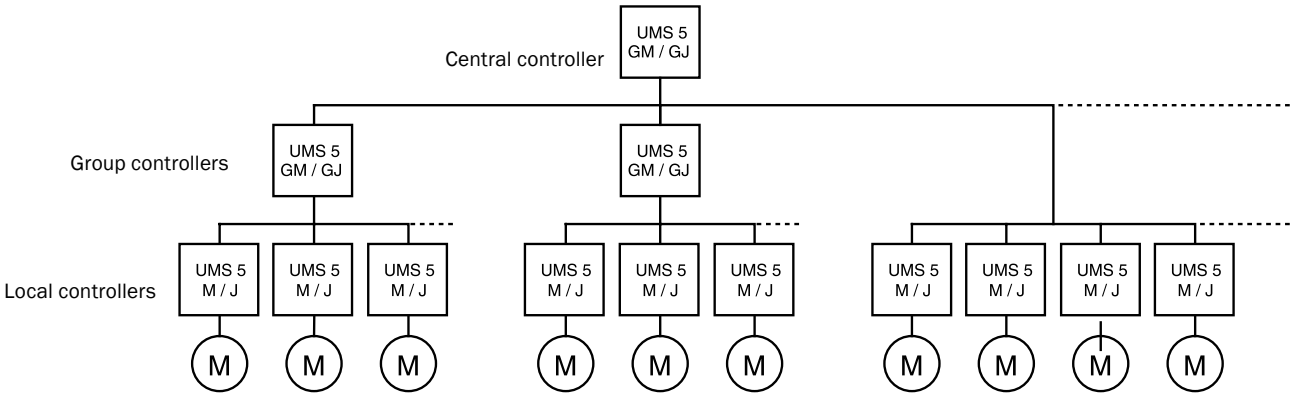
Mode setting „Mode“:
This sets the operating mode:

M	Motor control (short button press for Open, Close or Stop)
J	Louvre blind control (short button press for fine adjustment of louvre angle or stop; long but ton press for open/close)
GM	Group device for motor control* (no time monitoring)
GJ	Group device for louvre blind control* (no time monitoring)
SJ	**Only UMS 5/U5:** Louvre blind privacy (short button press sets privacy on or off; triple button press to adjust blind position)
Z	Central push-button motor control (all inputs operated by push-buttons)
U4	**Only UMS 5P:** mode for downwards compatibility to UMS 4

Status indicator LEDs:
- ○ LED off
- ● LED lit red
- ◐ LED blinks red
- ● LED lit green
- ◐ LED blinks green
- ◐ LED blinks alternating red/green

** In mode GM or GJ, relay output M1 or M2 (14 or 24) is continuously closed as long as an active signal is present on an auxiliary input. This enables override actuation (with local inputs blocked) by sensors (wind sensor, rain sensor, etc.).*
In mode „U4“ the UMS 5P behaves as the former model UMS 4, and therfore can be used as a replacement device or for extension of older equipment. In this mode, the motor only stops when button is pressed at VA or VZ, and doesn‘t change direction.

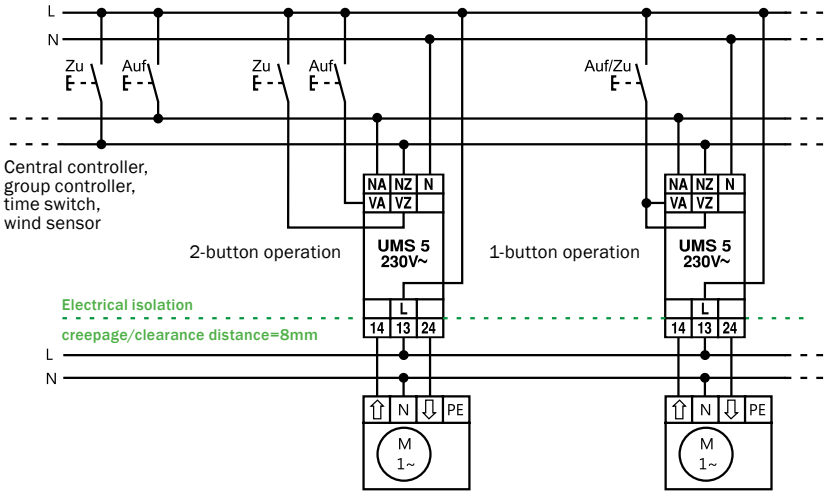
Basic circuit diagram for group/central control



Example connection diagrams

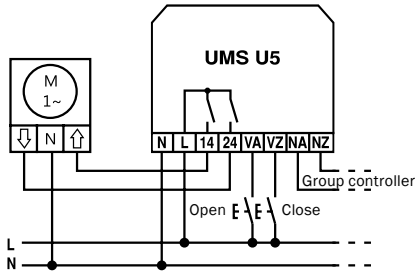
2-button operation oder 1-button operation

UMS 5 (230V AC):



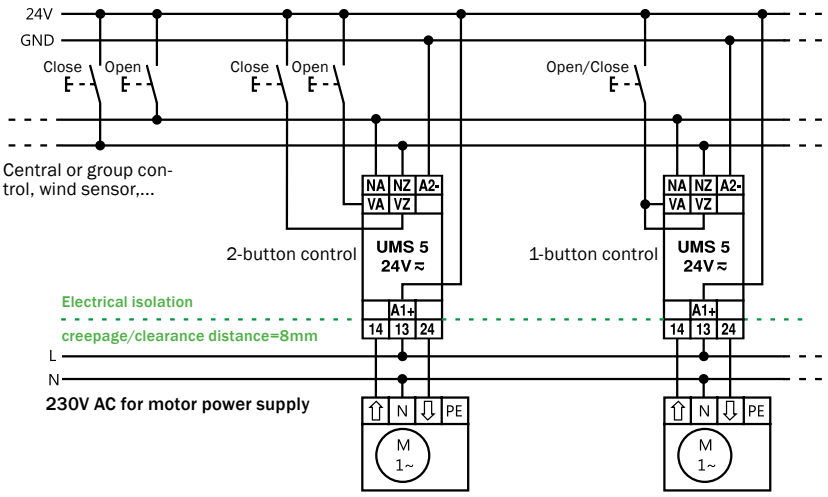
The UMS 5 (230V AC) model supports the assignment of different phases for the supply voltage, the local inputs and auxiliary inputs.

UMS U5 (230V AC):

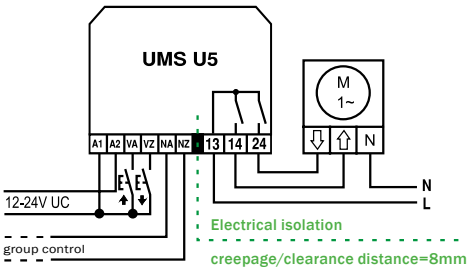


Attention! ***For UMS U5 supply voltage and control voltages must be identical (same phase).***

UMS 5 (24V UC):

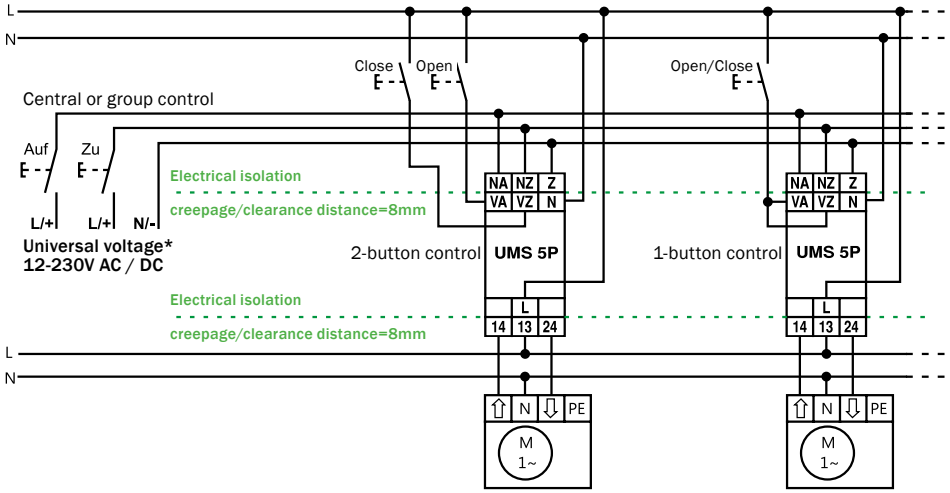


UMS U5 (24V UC):



The (24V UC variant (UMS504) and the 12-24V UC variant (UMSU5V)-need 24V respectively 12-24V UC both for supply and control voltage. However the potential-free relay contacts can drive 230V motors.

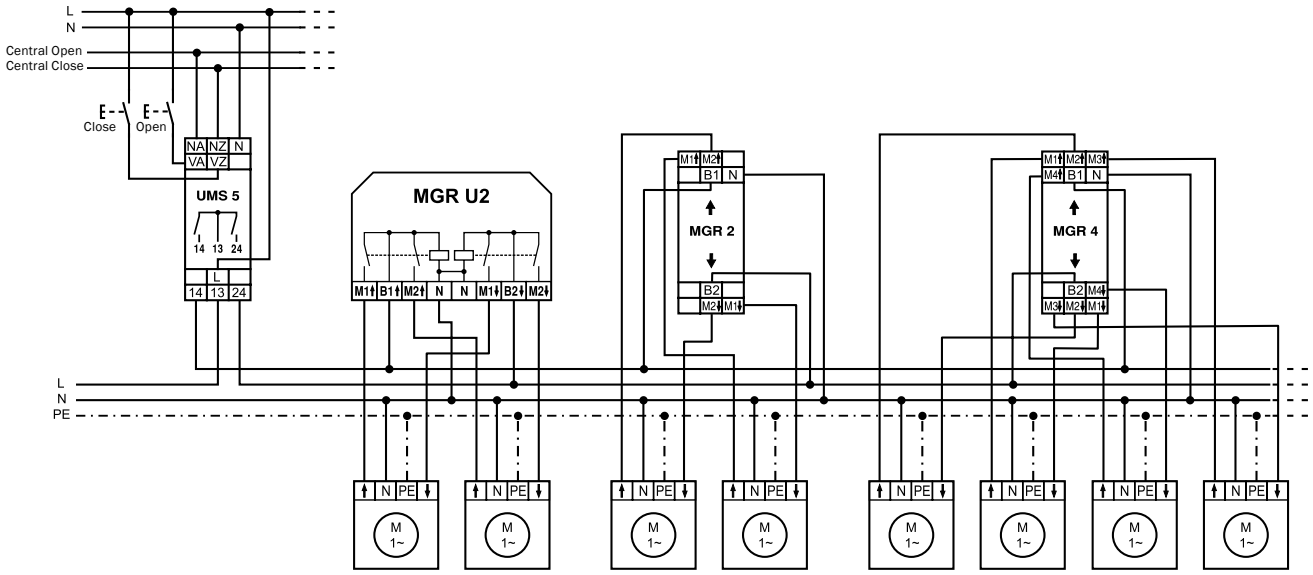
UMS 5P (230V AC)



The UMS 5P auxiliary inputs are electrically isolated. The auxiliary inputs can thus also be controlled from different phases of the power network. Allowed control voltage: 12V - 230V AC or DC.

Info *The electrically isolated auxiliary inputs of the UMS 5P should not be permanently actuated when driven with 230V, since this leads to increased heating.*

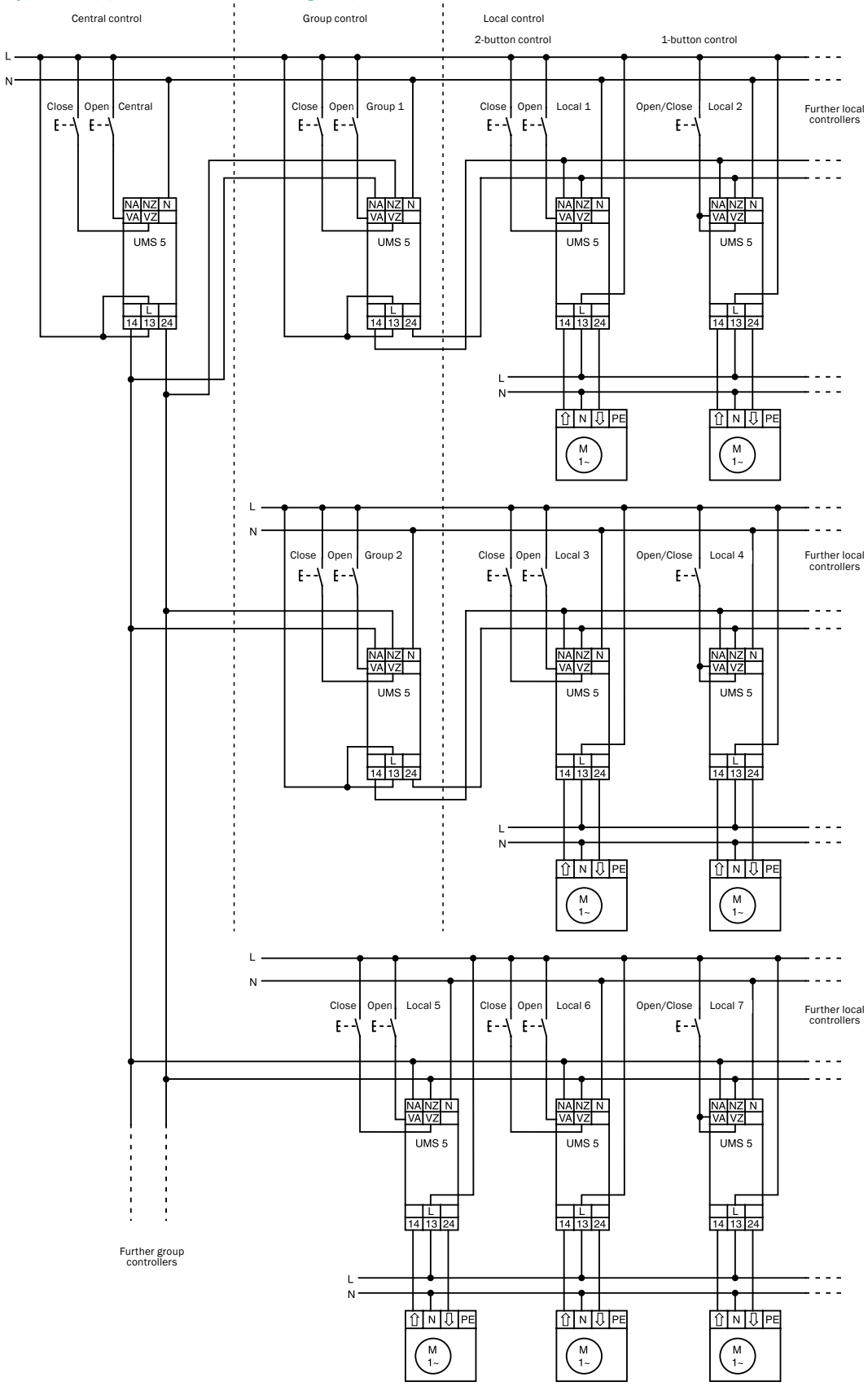
Several motors controlled by one UMS 5 - decoupled with MGR U2



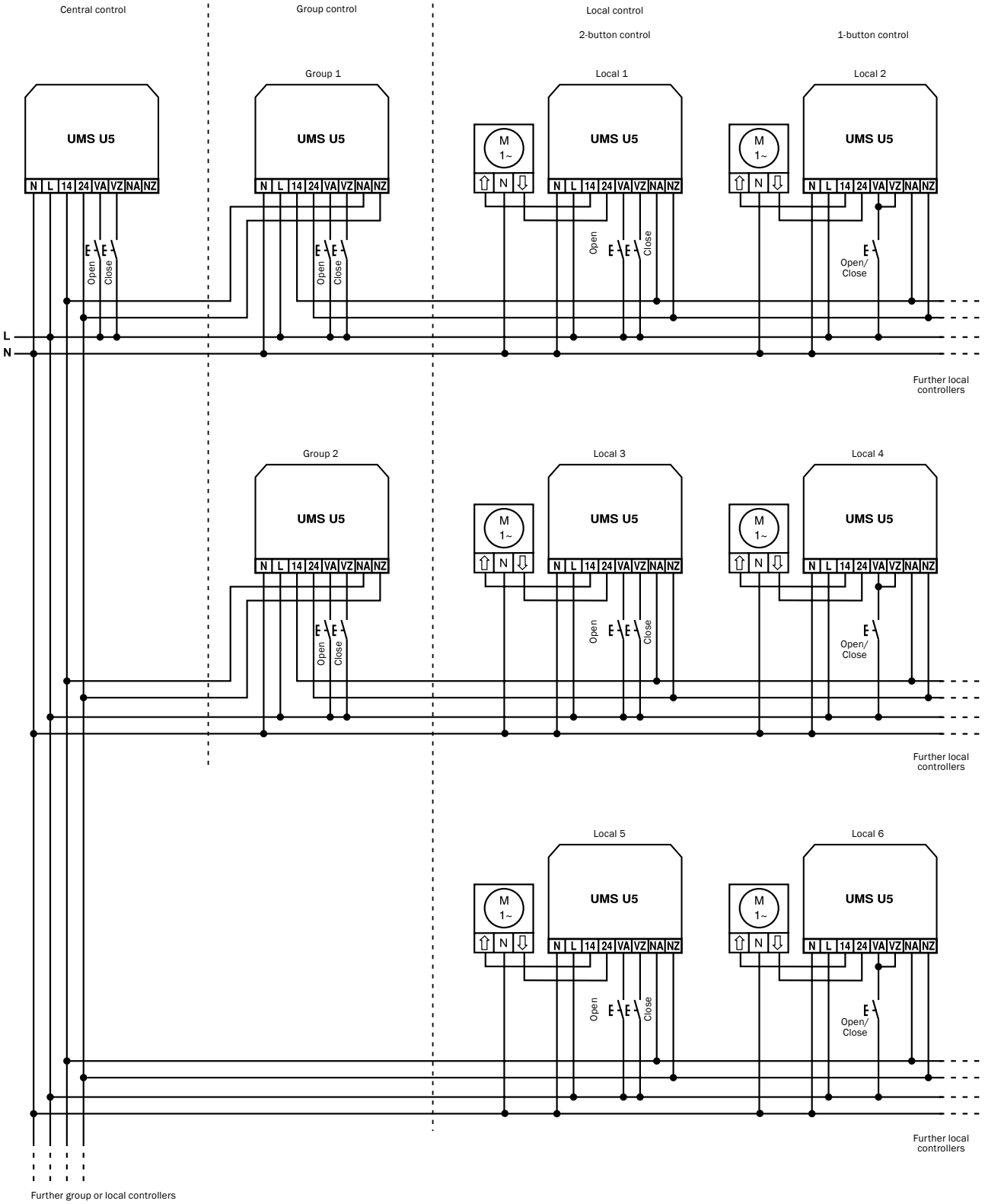
Attention!

Roller shutters or louver blind motors with mechanical limit-switches must as a rule not be electrically connected directly in parallel, because due to the different motor running times the limit-switches of some motors may be reached while other motors are still running. The motors that are already switched off would then receive inductive voltage at the counterwinding from the motors that are still running, which can lead to destruction of the limit switches. The devices of the MGR series provide an extremely simple method of achieving a (functional) parallel circuit: e.g. an MGR U2 is simply inserted upstream of each motor.

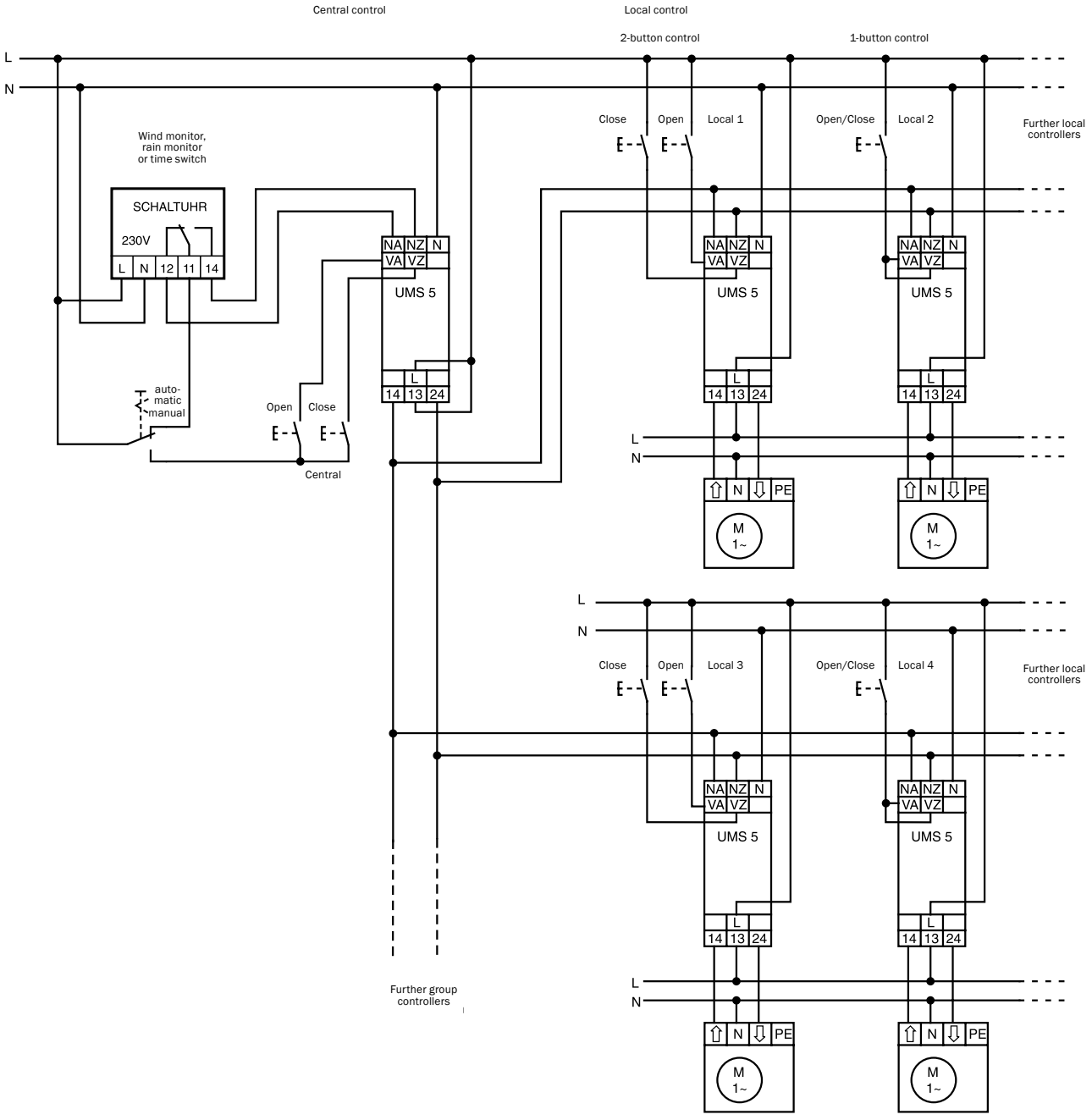
Typical application: UMS 5 in group and central control



Typical application: UMS U5 (230V AC) in group and central control



Typical application: UMS 5 central control with manual or automatic operation



System Design: Limit Switches

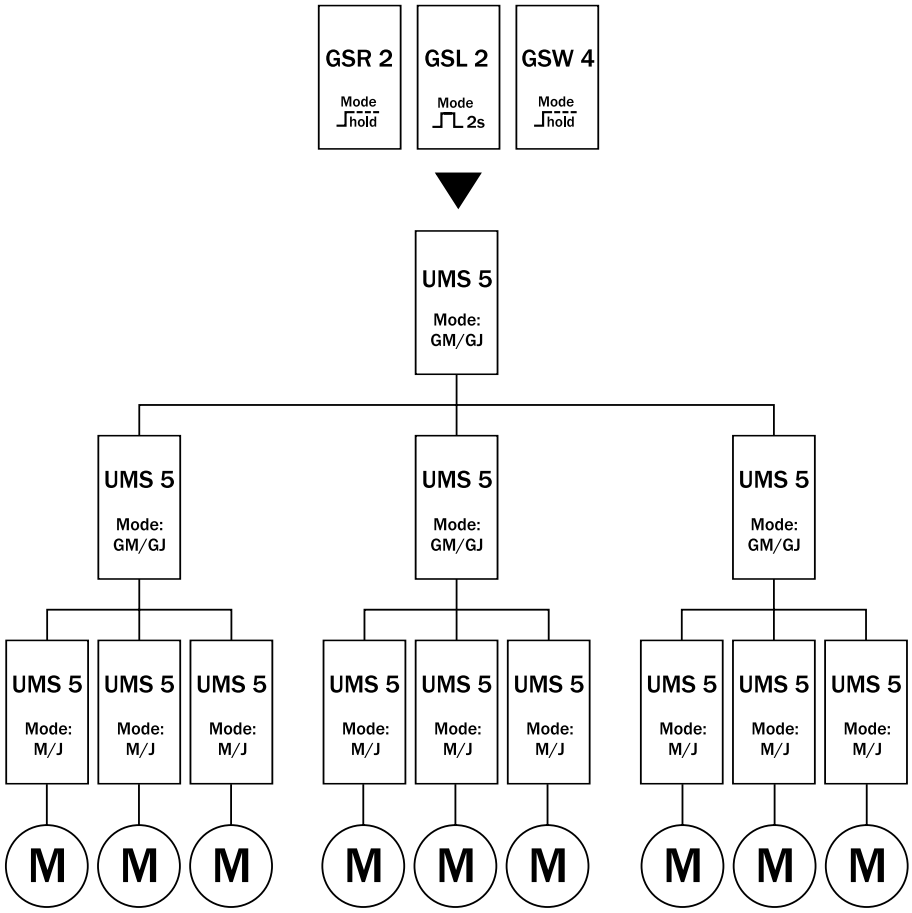
In combination with UMS 5 or UMS U5 open/close controller

Limit switches
for rain, light or wind

Central controller
The central controller is actuated by sensors and associated limit switches

Group controllers
are actuated by the central controller and push-buttons

Local controllers
The individual local controllers are actuated by the group controller and their own push-buttons



Local controllers

Each UMS 5 controls a drive through outputs 14 and 24. It is actuated by signals on the local inputs (VA and VZ) from conventional double push-buttons. Travel direction interlocking and run time limiting are ensured by the UMS 5.

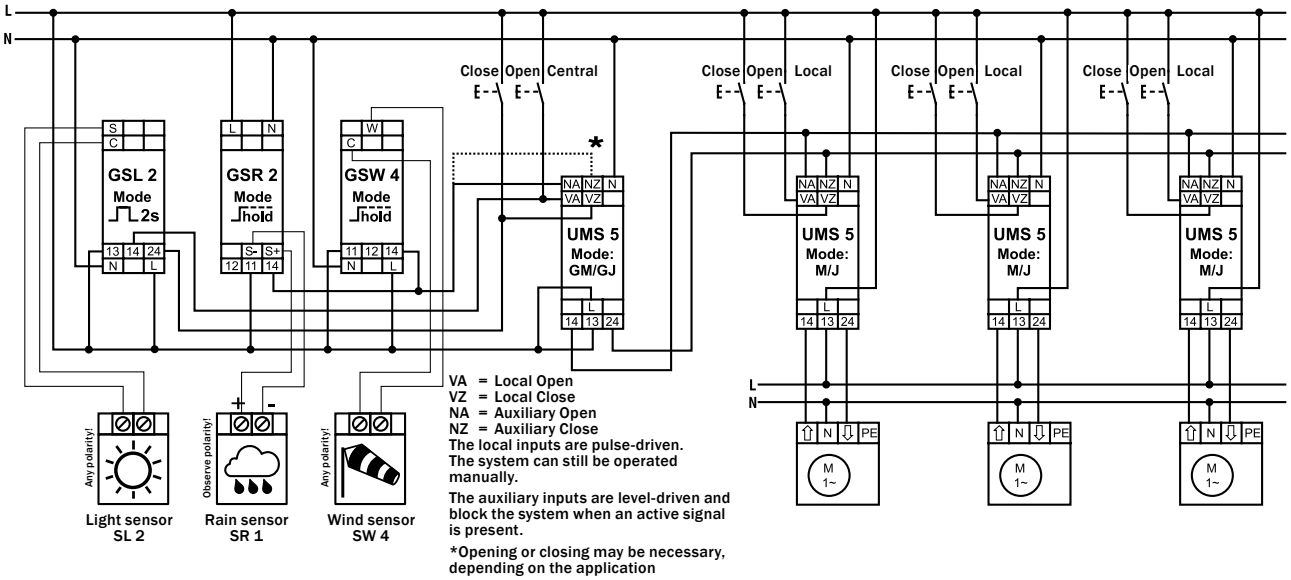
Group and central controllers

Several UMS 5 units can be grouped together by simply connecting their auxiliary inputs (NA and NZ) in parallel. They can be actuated jointly by connecting another (higher-level) controller ahead of them. This creates a **group**.
Group controllers can in turn be grouped together in the same way and actuated jointly by a higher-level controller. This further grouping is called **central control**.

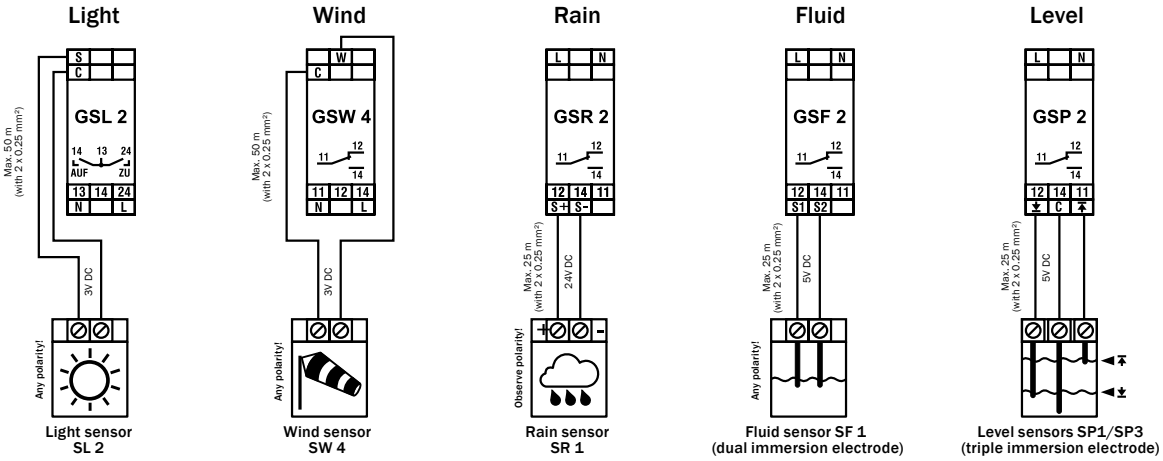
Rain, wind and light

The various limit switches are connected to the VA/VZ or NA/NZ inputs of the central controller.
Safety-related actuation signals for rain or wind **must be connected to the auxiliary inputs as continuous signals**. This ensures that the system is locked out for optimal protection against user errors.
Actuation signals not related to safety, such as automatic shading or twilight operation, **are connected to the local inputs as momentary pulse signals**.
In this case the system remains fully under control of the user.

Examples of light, rain and wind limit switches connected to a central controller

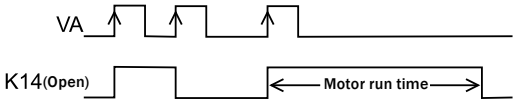


Overview of available limit switches and sensors

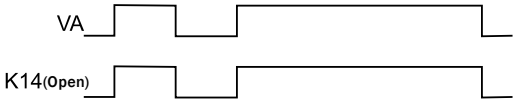


UMS 5 / UMS U5 function diagrams

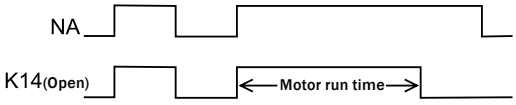
All operating modes and set motor running time: local inputs are edge-triggered and time-monitored



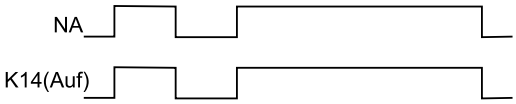
Motor running time in pushbutton mode: local inputs are level-controlled and **not** time-monitored



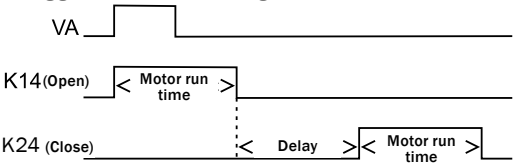
Operating modes M and J with motor running time: auxiliary inputs are level-controlled and time-monitored



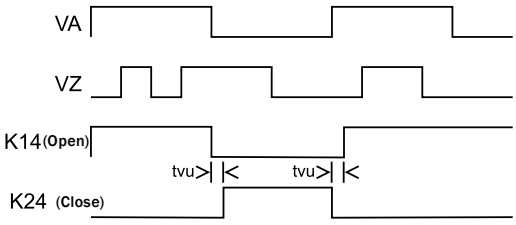
Modes GM and GJ or motor running time set to „T“: auxiliary inputs are level-controlled and not time-monitored



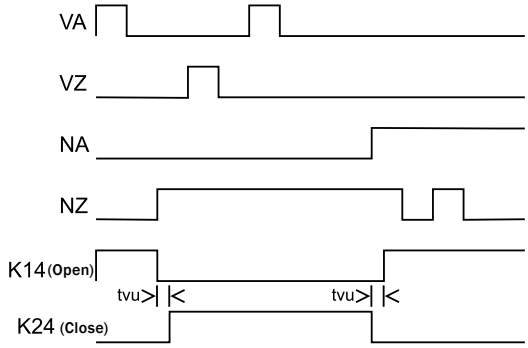
When a reverse pulse time is set, the reversal is started or retriggered after releasing VA



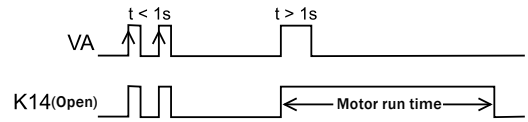
tvu = Switchover pause (0.6s) between K14 and K24 for motor protection (mechanical stress release). As one local button is active, the other local button is ignored:



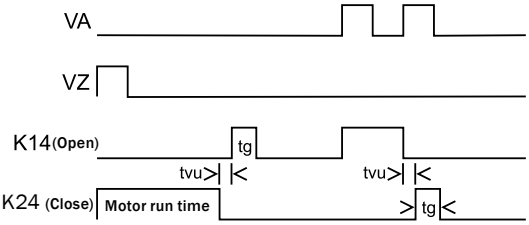
As one local button is active, the other local button is ignored. NA overrides NZ:



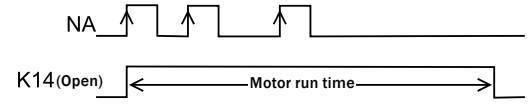
Louver blind mode: local inputs are level-controlled in response to short press of button and edge-controlled when button held down



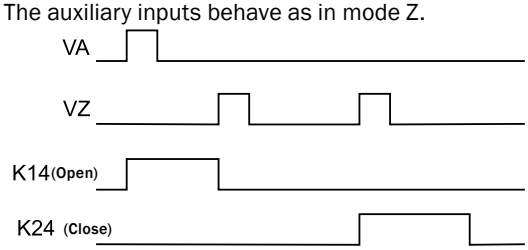
Set louver blind counter-run: counter-running (t_g) is triggered by timeout of VZ or by manual stop



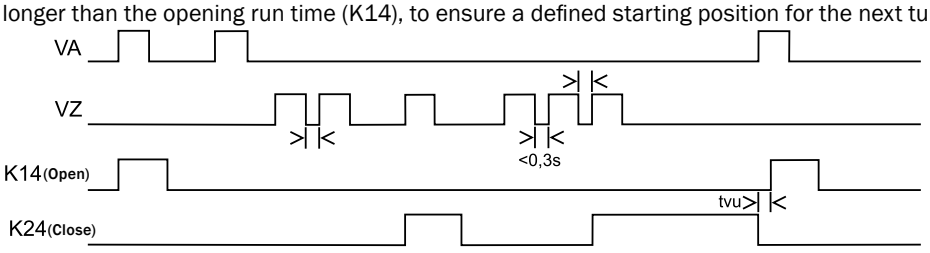
Operating mode Z with motor running time: auxiliary inputs are edge-controlled and time-monitored



U4 mode (applies only to UMS 5P): When actuating VA and VZ alternately, the motor will not directly turn direction but stops the motor. The auxiliary inputs behave as in mode Z.



Mode SJ (**does not apply UMS 5P**):
Actuating a local input once, the motor will start turning in the selected direction with the set duration (0.1 to 1.4s). Actuating a local input 3 times in direct succession, the set motor run time (3 to 240s) is started. Closing run time (K24) lasts 25% longer than the opening run time (K14), to ensure a defined starting position for the next turn.



Technical data

Operating voltage	230 V 50/60 Hz 10% respectively 24 V DC/AC 10 %
Control voltage	= operating voltage **Only UMS 5P**: NA/NZ inputs are 12-230V UC capable
Power consumption	passive: 0.2W / active: 0.4W
Run time	3 - 240s
Automatic closing time	3s - 30min
Reverse pulse	0.1 - 1.3s
Relay switching dead time	0.6s
Relay output UMS 5	2 NO potential-free 10A 250V AC
Relay output UMS U5	2 NO on operating voltage 10A 250V AC
Switch rating	See data sheet “Relay contact load ratings”
Ambient temperature	-10°C to +45°C
UMS 5 mounting	Click-mount on standard 35-mm rail (EN 60715)
UMS 5 Connections	Socket terminals with captive screws M3.5
- Clamping range	0.5 mm² - 4.0 mm²
- Strip length	6.0 mm - 6.5 mm
- Screwing torque	0.80 Nm
UMS U5 Connections	Socket terminals with captive screws M3
- Clamping range	0.5 mm² - 2.5 mm²
- Strip length	6.5 mm - 7.0 mm
- Screwing torque	0.50 Nm
UMS 5 outside dimensions	18 x 88 (45) x 58 mm³
UMS 5 installed depth	55 mm
UMS U5 outside dimensions	43 x 43 x 18,5 mm³
UMS 5 weight	approx. 80g
UMS U5 weight	approx. 45g
RAL colour	Grey 7035 / Green 6029

Order data

Part no.	EAN	Type	Designation
UMS504	4 046929 401012	UMS 5 (24V UC)	Open/Close-controller 24V UC, 2 NO pf 10A/250V AC
UMS509	4 046929 401029	UMS 5 (230V AC)	Open/Close-controller 230V AC, 2 NO pf 10A/250V AC
UMSU59	4 046929 401036	UMS U5 (230V AC)	Open/Close-controller 230V AC (UP), 2 NO 10A/230V AC
UMSU5V	4 046929 401166	UMS U5 (12-24V UC)	Open/Close-controller 12-24V UC (UP), 2 NO 10A/230V AC
UMS5P9	4 046929 401128	UMS 5P	Open/Close-controller 230V AC, 2 NO pf 10A/250V AC, NA/NZ 12-230V UC

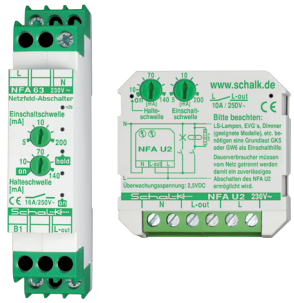
Info **The UMS U5 is also available as a variant with additionally integrated radio control, see type FE3 M**

Accessories

Part no.	EAN	Type	Designation
MGRU29	4 046929 401050	MGR U2	Motor group relay, 230V AC, 4 NO (for 2 motors) (FMD)
MGR209	4 046929 401142	MGR 2	Motor group relay, 230V AC, 4 NO (for 2 motors)
MGR409	4 046929 401159	MGR 4	Motor group relay, 230V AC, 8 NO (for 4 motors)

2017-05-01

Mains-field disconnector

	Item no.	Type	Specs	Dimensions	Page
	**Automatic mains-field disconnector NFA 63 / NFA U2** The NFA automatic mains field disconnector monitors the circuit and switches off the mains voltage as soon as the last load is switched off. This also switches off the corresponding electric fields. The use of such devices is particularly recommended for bedroom circuits (quiet zones). The NFA 63 is simply connected downstream of the circuit breaker (max. 16A) of the corresponding circuit. With the very compact flush-mounted version NFA U2, installation in a junction box enables a circuit to be divided into a monitored and a continuously supplied part, which can considerably simplify installation, especially in older systems.				189
	NFA639	NFA 63	230V AC, 1 NO 16A, $U_ü$=2.5V DC	18x55mm	
	NFAU29	NFA U2	230V AC, 1 NO 10A, $U_ü$=2.5V DC	43x43x18.5mm	
	**Basic-load resistor GW 6** for direct installation in consumers with limited space.				191
	GW6009	GW 6	230V AC, I_e/I_d 140/2mA	8x5x45mm	

Schalk
STEUERUNGSTECHNIK GmbH

Mains field disconnector
... for healthy sleep!

Reliably prevents disturbance from alternating electrical fields

- 2.5V DC control voltage only
- Easy to configure (switch on/holding threshold)
- High switching performance
- Perfectly functional with Schalk dimmers
- Can also be used with LED lighting

Lines connected to the mains continuously generate an alternating electric field, that is even further disturbed by other influences (photovoltaics inverter, etc.). The type of alternating electrical field can have a negative influence on the human organism, according to various studies.

The Schalk mains field disconnector prevents this reliably, by switching off the mains voltage source, in the bedrooms for example, as soon as no more consumers are active. Whenever it is needed (when a light switch is pressed, for example) the mains voltage is automatically switched on again.

QR-Info

Flush-mount version: NFA U2

Compact: easy to install as a upgrade to an existing installation

Rail-mount version NFA 63

Convenient: with an additional control input (for example for a timer)

Schalk Steuerungstechnik GmbH ▪ Am Stellwinkel 2 ▪ 87784 Westerheim
Phone +49 8336 8044-0 ▪ Fax +49 8336 8044-33 ▪ info@schalk.de ▪ www.schalk.de

Automatic mains-field disconnector NFA 63 / NFA U2

Mains-field disconnector for eliminating electromagnetic fields e.g. in bedrooms. Only 2.5V monitoring DC voltage

Special features

- Only 2.5V DC monitoring voltage
- Separately adjustable switching and holding thresholds
- Switch status display by LED
- Holding threshold display by LED
- Additional control input for NFA 63
- High switching capacity
- Disconnected phase at low resistance to N potential

General information

The NFA mains-field disconnector monitors the electric circuit and disconnects the mains voltage as soon as the last load is switched off, thereby also eliminating electrical fields. This function is important, because in view of modern scientific findings the damaging effects of electric fields on the human organism should no longer be ignored.

The use of these devices is especially recommended for bedroom circuits (rest areas). The NFA 63 is simply connected downstream of the automatic circuit breaker of the relevant circuit.

In the case of the NFA U2, the demand switch is installed in a junction box, so that a circuit can be split into a monitored section and a permanently powered section. This configuration can greatly simplify installation, in particular in older systems.

Functional description

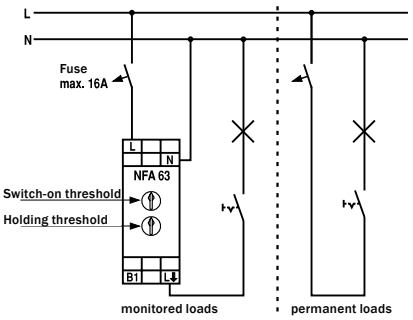
When disconnected from the power supply, a direct voltage of only 2.5V is applied at the output of the NFA. If a load is then switched on, with a power consumption above the set switch-on threshold, the circuit is switched over to the mains supply voltage. The “on” LED indicates the ON state. The “hold” LED shows when the current exceeds or falls below the “holding” threshold, thereby assisting the user to set up the system correctly.

When the power consumption drops below the set holding threshold after the connected loads have been switched off, the demand switch returns the circuit to monitoring mode after a brief delay.

The NFA 63 has an additional control input (B1) to enable switching on by external actuation. With this feature, for example, a fixed power supply can be ensured at specific times of the day by means of a time switch.

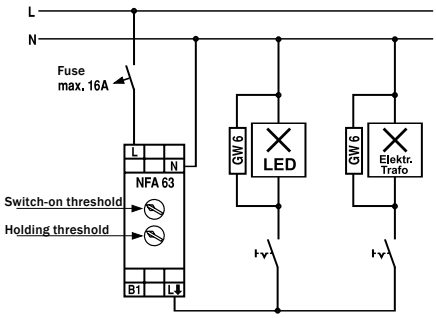
Typical applications and accessories

Fig.1: Disconnection of individual circuits



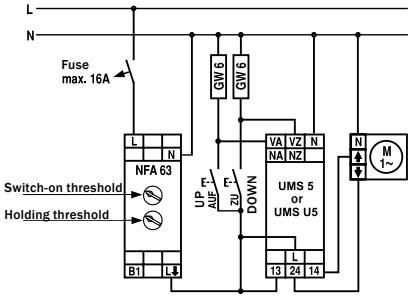
Permanent loads that are required to provide guaranteed uninterrupted operation (e.g. telephone, motion sensor, refrigerator etc.) must not be connected to a demand switch.

Fig.2: LED lamps or electronic ballasts



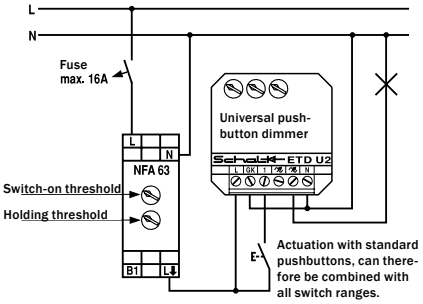
LED lamps and lamps with electronic ballasts (low-voltage halogen lamps, fluorescent lamps, energy-saving lamps etc.) generally require an additionally switched base load as switch-on aid. Conventional transformers can be operated without base load.

Fig.3: Motor controllers and NFA



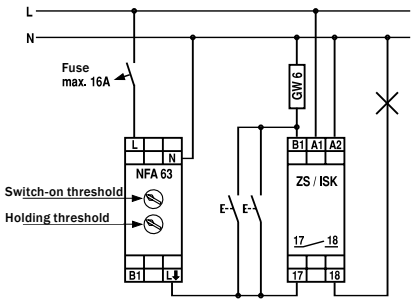
The Schalk UMS 5 and UMS U5 universal motor controls can also be operated in combination with the NFA.
For this purpose, a separate basic load resistor must be installed for the OPEN button and for the CLOSE button respectively.

Fig.4: ETD U2 pushbutton dimmer and NFA



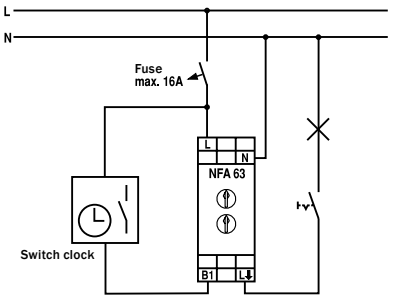
The ETD U2 universal pushbutton dimmer has a compact flush-mounting housing for combination with every range of switches. With its built-in base load and mains-independent brightness memory, it is ideal for operation with a mainsfield disconnector.

Fig.5: Time or pulse switch connected to NFA



Electronic timer switches or pulse switches generally remain permanently connected to the power supply. However, the load circuit and light switches can be supplied via the NFA . In this case, a base load must be energised from the connected push buttons.

Fig 6: Combination with switch clock



The NFA 63 can be activated via input B1 by an external trigger. With this feature, for example, a fixed voltage supply can also be guaranteed at specific times of day by means of a switch clock.

Important notes

Permanent loads, such as motion sensor, refrigerator, telephone, alarm-radio etc. require a continuous power supply in order to operate correctly and can therefore not be operated at a mains field disconnector. A permanent supply must be provided by a dedicated circuit (Fig. 1).
LEDs, energy saving lamps, fluorescent lamps and other lamps with electronic ballasts can not be adequate energised by the monitoring voltage (2.5V DC) of the NFA! To ensure that these components are reliable switched on, a base load of type GW 6 must be simultaneously switched (Fig. 2).
Pushbutton / touch dimmers of other manufacturers are usually not suitable. Consequently, the use of the Schalk Universal Pushbutton Dimmer ETD U2, ETD 2 or ETD 2E with built-in base load are recommended (Fig. 4)
Many devices when switched off are no longer disconnected from the mains (stand-by mode). Due to their constant current consumption, these loads prevent reliable mains disconnection by the NFA demand switch.
Inductive quiescent current consumption by mains power adapters results in cyclic operation (constant on/off switching) of the NFA. Con-sequently, with this type of devices, correct operation of the NFA can only be ensured by an intermediary switch in the supply line or by a switchable power socket.
Small loads (less than approx. 3W) or loads with electronic power control, such as vacuum cleaners or power drills, can be reliably operated with the use of the base load adapter plug. In this case, the adapter serves as permanent load booster in order to maintain the NFA continuously in the ON state.
After operation, the adapter plug must be un-plugged together with the load in order to restore the automatic circuit disconnection function of the demand switch.

Optimal setting of the NFA:
1. Turn off all consumer loads of the connected circuit
2. Set „Switch-on threshold“ („Einschaltschwelle“) control to the center position
3. Set the „Holding threshold“ („Halteschwelle“) control to the leftmost position. The NFA now turns on the mains voltage. The LED „hold“ (indicates the stop threshold) and the LED „on“ (indicates the switching state) light up.
4. Slowly turn the „Holding threshold“ („Halteschwelle“) control to the right until the „hold“ LED goes off completely. The NFA is now adjusted to its optimal holding threshold.

When the switch-off delay (approx. 8s) has elapsed, the NFA switches off the mains voltage and is thus ready for operation.

If the NFA only switches on delayed or not at all when switching on small loads, then the „Switch-on threshold“ („Einschaltschwelle“) must be set further to the left (= higher sensitivity).

If the NFA tends to turn itself on or turns on and off permanentely, the „Switch-on threshold“ („Einschaltschwelle“) must be set further to the right (= lower sensitivity).

Caution! *In the case of unloaded circuits, only a monitoring voltage of 2.5V DC is applied. This is not displayed by phase testers. However, touching the line conductor could cause the NFA to connect through the mains voltage and thus lead to a power accident!*

Accessories

Item no.	Type	Specifications	
GW6009	Base load resistor GW 6 for operating immers, floures-cent lamps, electronic ballasts etc	Operating voltage: 230V 50/60Hz, Switch-on current: 140mA, Continous current: 2mA	

Order data

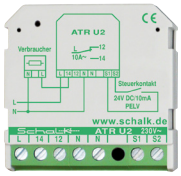
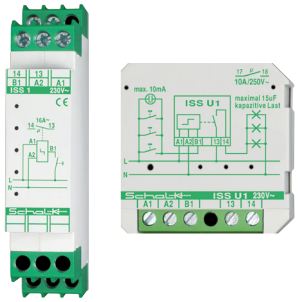
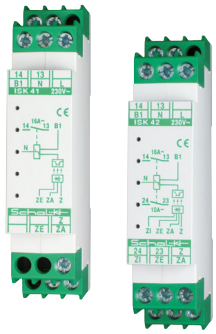
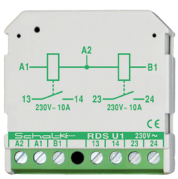
Operating voltage:	230 V 50/60 Hz 10 %
Monitoring voltage:	2.5 V DC
Switch-on threshold:	5 mA - 200 mA
Holding threshold	5 mA - 140 mA
Switch-on delay	approx. 0.1s
Switch-off delay	approx. 8s
Power consumption:	0.8 W [0.6 W]
capacitive load on Lout	max. 1.5 uF
capacitive load at B1	approx. 10 nF
Relay output	1 NO contact 16 A [10 A]
Contact rating	see data sheet: “Relay contact rating"
Ambient temperature	-10°C to +45°C
NFA 63 connections:	
- Connection terminals	Socket terminals with captive screws M3.5
- Clamping range	0.5 mm² - 4.0 mm²
- Strip length	6.0 mm - 6.5 mm
- Screwing torque	0.80 Nm
NFA U2 connections:	
- Connection terminals	Socket terminals with captive screws M3
- Clamping range	0.5 mm² - 2.5 mm²
- Strip length	6.5 mm - 7.0 mm
- Screwing torque	0.50 Nm
Mounting orientation	arbitrarily
Mounting	Click-mount on standard 35-mm rail (EN 60715)
External dimensions	18 x 88 (45) x 58 mm [43 x 43 x 18 mm]
Installation depth	55 mm
Weight	approx. 70 g [approx. 40 g]
RAL colour	grey 7035 / green 6029

Order data

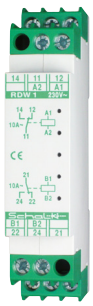
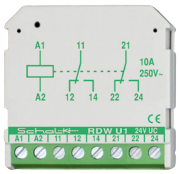
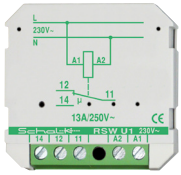
Item no.	EAN	Type	Designation
NFA639	4 046929 501033	NFA 63	Automatic mains field disconnector, 230V AC
NFAU29	4 046929 501019	NFA U2	Automatic mains field disconnector, 230V AC (FMD)
GW6009	4 046929 501064	GW 6	Base load resistor 230V AC, 140/2mA

2018-06-01

Relays, pulse switches

	Item no.	Type	Specs	Dimensions	Page
					
Active isolating relay ATR U2 The active isolating relay enables mains voltage consumers to be switched very easily using extra-low voltage contacts. There is no need for a power supply unit to control the relay coil, a the relay generates the necessary control voltage (24V DC PELV) internally. In conjunction with the MKW 1 magnetic contact, it is thus possible, for example, to implement the supply air monitoring (frequently required for enclosed rooms when operating exhaust fans) with little effort. Due to the 10A change-over contact the ATR U2 is also very versatile for other applications. *See also: Ventilation/exhaust air set (wired) ZAS K2*					195
	ATRU29	ATR U2	230V AC, 1 CO 10A,	43x43x18.5mm	
					
Energy storage relay ESR 1 By using a mechanical latch, contactors can be kept energieless in the switched state. However, this energy-saving operation is not always applicable. For example, if a contactor has to automatically return to the switched-off state when the mains voltage fails, mechanical interlocking was previously not applicable. The ESR 1 generates a switch-on pulse and stores energy. This means that it can not only bring a contactor into the mechanical interlock, but also reliably and automatically release it again when the mains voltage is lost.					199
	ESR109	ESR 1	230V AC	18x55mm	
					
Impulse switch ISS 1 / ISS U1 The electronically controlled pulse switches ISS 1 and ISS U1 can also be used without problems where conventional, electromechanical pulse relays are perceived as disturbingly loud due to their very quiet switching behaviour. The flush-mounted version ISS U1 is also suitable for simple retrofitting of existing systems or for renovating old buildings and can be used in switch or junction boxes due to its small dimensions.					209
	ISS109	ISS 1	230V AC, 1 NO 16A, potential-free	18x55mm	
	ISSU19	ISS U1	230V AC, 1 NO 10A, potential-free	43x43x18.5mm	
					
Central pulse switch ISK 41 In electrical installations with several sub-distribution boards and residual current circuit breakers, the ISK 41 / 42 pulse switches developed for this purpose can be used to create an economical central ON-OFF control system. The central control inputs are galvanically isolated from the inputs and outputs on the supply side and can be controlled with voltages of 8-230V AC or DC. **Central pulse switch ISK 42 with additional contact and ZI** The ISK 42 also has a second potential-free relay contact (10A NO contact) and a central pulse input.					203
	ISK419	ISK 41	230V AC, 1 NO 16A, potential-free	18x55mm	
	ISK429	ISK 42	230V AC, 2 NO 16A/10A, potential-free	18x55mm	
					
Double relay RDS U1 Compact switching relay for installation in boxes with low power dissipation and two separate magnet systems. Two potential-free NO contacts with 10A each.					211
	RDSU19	RDS U1	230V AC, 2 NO 10A, potential-free	43x43x18.5mm	

Relays, pulse switches

Page		Item no.	Type	Specs	Dimensions
213		**Double relay RDW 1** Switching relay for rail mounting with low power dissipation and two separate magnet systems. Two change-over contacts 10A each.			
		RDW104	RDW 1 (24V UC)	24V UC, 2 CO potential-free 10A	18x55mm
		RDW109	RDW 1 (230V AC)	230V AC, 2 CO potential-free 10A,	18x55mm
215		**Double relay RDW U1** Compact 24V UC switching relay for installation in boxes with low power dissipation and two separate magnet systems. Two change-over contacts 10A each.			
		RDWU14	RDW U1	24V UC, 2 CO potential-free 10A (FMD)	43x43x18.5mm
217		**Quadruple relay RQS 1** Switching relay for rail mounting with low power dissipation and four separate magnet systems. Also suitable as extension relay for roller shutter controls or as space-saving coupling relay (1 module width = 18 mm).			
		RQS104	RQS 1 (24V UC)	24V UC, 4 NO 10A, potential-free	18x55mm
		RQS109	RQS 1 (230V AC)	230V AC, 4 NO 10A, potential-free	18x55mm
221	 	**Switching and control relay RSW 1 / RSW U1** Switching relays with low control and power dissipation. High continuous load capacity due to 16A change-over contact. Also available as compact flush-mounted version RSW U1 with 13A NO contact.			
		RSW102	RSW 1(12V UC)	12V UC, 1 CO 16A,	18x55mm
		RSW104	RSW 1 (24V UC)	24V UC, 1 CO 16A	18x55mm
		RSW109	RSW 1 (230V AC)	230V AC, 1 CO 16A	18x55mm
		RSWU12	RSW U1 (12V UC)	12V UC, 1 NO 13A	43x43x18.5mm
		RSWU14	RSW U1 (24V UC)	24V UC, 1 NO 13A	43x43x18.5mm
		RSWU19	RSW U1 (230V AC)	230V AC, 1 NO 13A	43x43x18.5mm
223		**Universal switching and control relay RSW 2** The automatic voltage adjustment in the range of 12V to 230V (DC or AC) ensures that the right relay is always at hand. With a switching capacity of 16A at 250V, the RSW 2 is also suitable for higher switching currents.			
		RSW20U	RSW 2 (12-230V UC)	12-230V UC, 1 CO 16A, potential-free	18x55mm

Ventilation/exhaust air set (wired) ZAS K2

consisting of:

Active isolating relay ATR U2

with change-over contact 10 A for potential separated contact conversion with internally generated control voltage (PELV)

Magnetic contact MKW 1

Universally applicable change-over contact for monitoring windows, doors, etc.

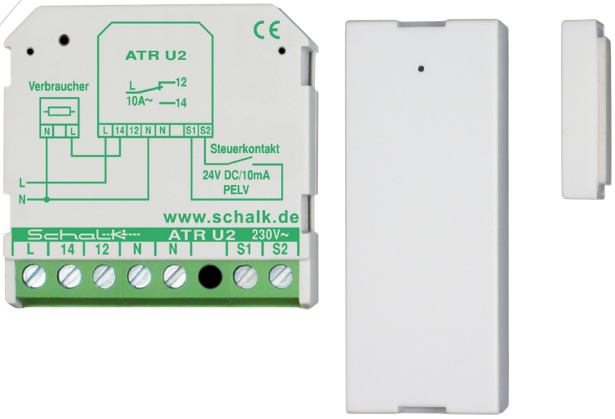
Ventilation/exhaust-fan set (wired) for controlling exhaust air systems in conjunction with room air-dependent fireplaces (Germany: according to §4 FeuVO)

Special features ATR U2

- no external control voltage required
- very compact design
- very low power consumption
- quick and uncomplicated installation

Special features MKW 1

- Internal spring-loaded terminals
- quick and easy installation



General information

The active isolating relay enables mains voltage consumers to be switched very easily using extra-low voltage contacts. There is no need for a power supply unit, as the relay generates the necessary control voltage (24V DC PELV) internally. In conjunction with the MKW 1 magnetic contact, it is thus possible, for example, to implement the supply air monitoring (frequently required for enclosed rooms when operating exhaust fans) with little effort. Due to the change-over contact the ATR U2 is extremely versatile.

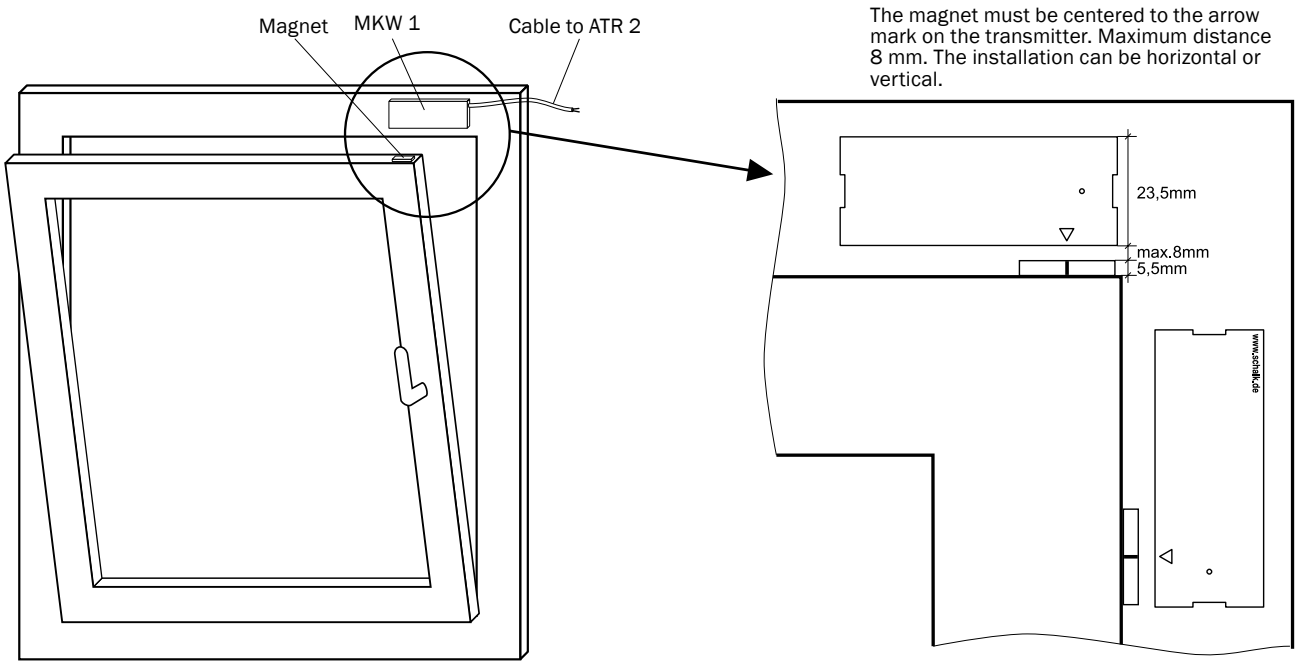
Applications

Window monitoring in connection with fume hoods, signal circuits, alarm messages, door monitoring, theft protection, etc.

Operation

On the mains voltage side, the ATR is continuously supplied via terminals L and N. If terminals S1 and S2 are bridged on the low voltage side, relay contact 14 is switched through. The terminal voltage between S1 and S2 is 24 V DC (PELV). The control current is 10 mA.

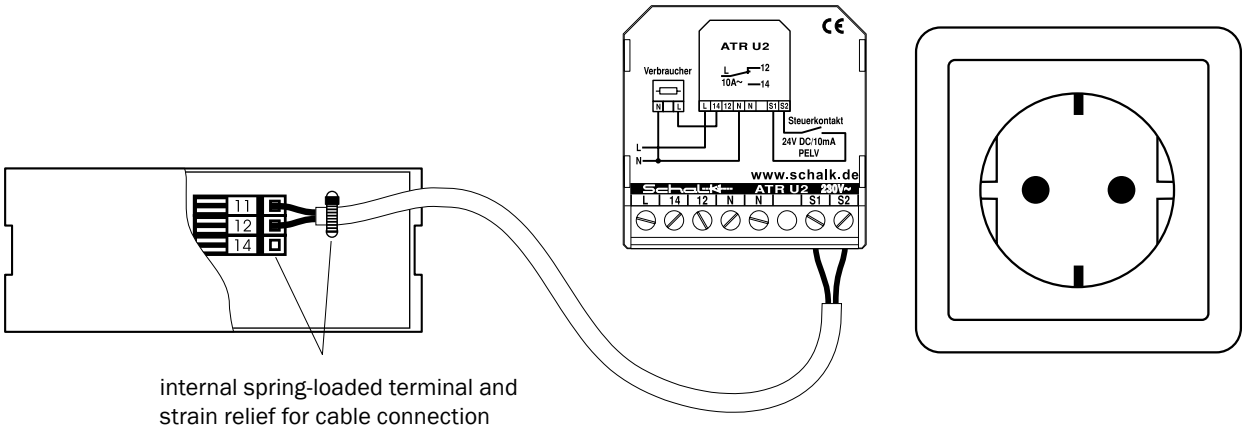
Installation



Caution ***When used as supply air monitoring it must be ensured that sufficient fresh air can always flow in through the opened window!*** *If the monitored window has a roller shutter, it must be ensured that even if the shutter is closed, fresh air can still flow in! For electrically operated systems, e.g. the limit switch can be adjusted accordingly. For manually actuated roller shutters, a mechanical limit stop must be installed.*

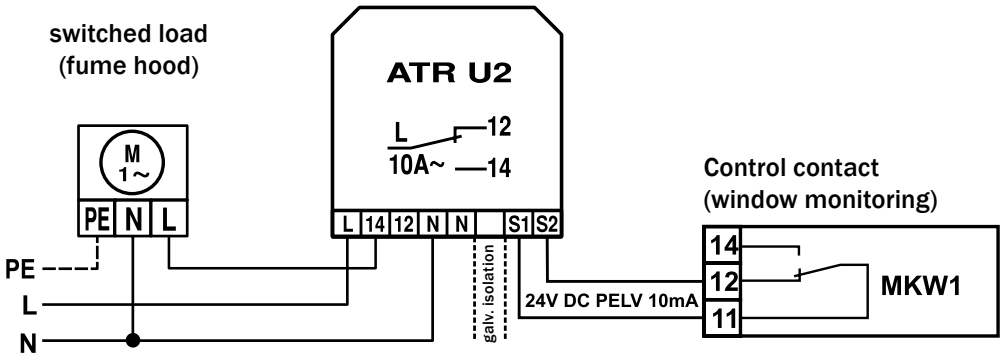
Example of use

Switched socket for fume hood - the ATR can be installed behind the socket to be switched

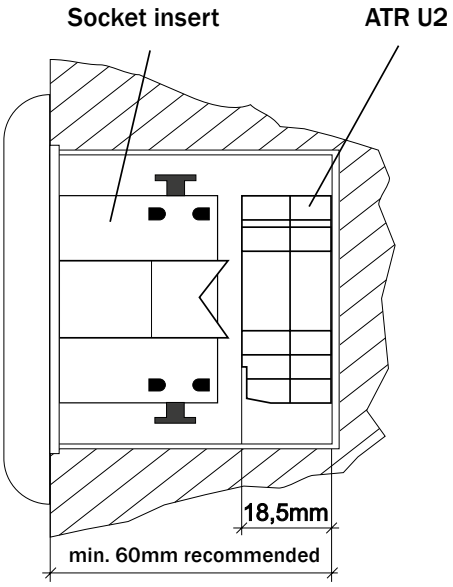


internal spring-loaded terminal and
strain relief for cable connection

Connection example



The normally closed contact MKW 1 is used to control an extractor hood (OPEN window > magnetic contact closed > fume hood in operation)



Technical data ATR U2

Operating voltage:	230 V 50/60 Hz 10 %
Power consumption:	approx. 0.4 W
Voltage / current at control input	24 V DC (PELV) at 10 mA
Relay output	1 CO 230V, 10 A
Switch rating AC	max. 2000 W
Glow lamp load	max. 600 W
Electrical service life	min. 100.000 switching cycles
Ambient temp.	-10°C to +45°C
Connection terminals	Socket terminals with captive screws M3
Clamping range	0.5 mm² - 2.5 mm²
Strip length	6.5 mm - 7.0 mm
Screwing torque	0.50 Nm
Mounting orientation	arbitrarily
External dimensions	43 x 43 x 18,5 mm
Weight	approx. 40 g
RAL colour	grey 7035 / green 6029

Technical data MKW 1

Contact type	Reed contact change-over contact
Switching voltage	max. 24V AC/DC
Switching current	max. 250 mA
Switch rating	max. 3 W
Connection terminals	Spring clamp terminal with actuating slide
Cable cross-section	0.08 mm² - 0.5 mm²
MKW 1 outside dimensions	59.5 x 23.3 x 15.3 mm
Outside dimensions (magnet)	22.2 x 11.2 x 5.5 mm

Order data

Item no.	EAN	Type	Designation
ATRU29	4 046929 601160	ATR U2	Active isolating relay 230V AC / 24V DC PELV, 1 change-over contact
MKW104	4 046929 901079	MKW 1	Magnetic contact, 1 CO 24V UC
MIG100	4 046929 901109	MIG 1	Replacement magnet in housing, self-adhesive for MKW 1/FV2 SM
ZASK29	4 046929 401081	ZAS K2	Ventilation/exhaust air set consisting of ATR U2 and MKW 1

2017-06-01

Energy storage relay ESR 1

To switch off a latched contactor after supply voltage failure (e.g. to activate an emergency power supply) and to save energy and prevent humming noise in the living area by eliminating the permanent contactor holding power.

Special features

- Control relays for mechanical interlocking of contactors.
- Generates a switch-on pulse for the contactor coil and stores energy for releasing the latch in the event of a power failure.
- Enables a significant energy saving due to the omission of the holding power.

General information

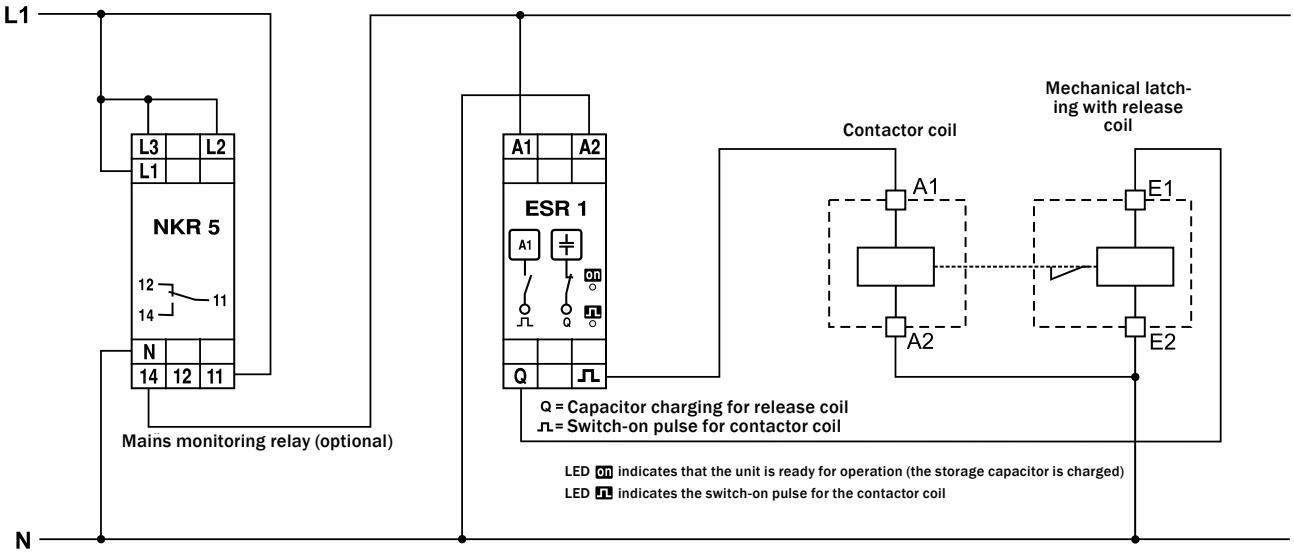
By using a mechanical latch, contactors can be kept energieless in the switched state.
However, this energy-saving operation is not always applicable.
For example, if a contactor has to automatically return to the switched-off state when the mains voltage fails, mechanical interlocking was previously not applicable.
The ESR 1 generates a switch-on pulse and stores energy.
This means that it can not only bring a contactor into the mechanical interlock, but also reliably and automatically release it again when the mains voltage is lost.

Operation

When the mains voltage is applied to terminals **A1** and **A2** , the ESR 1 loads its integrated storage capacitor and simultaneously generates a short switch-on pulse (0.5 s) at output **Π** to energise the contactor coil.
The contactor is now held powerless in the switched through state by snapping in its attached mechanical latch.
If the mains supply fails, the capacitor charge stored in the ESR 1 is switched through to output **Q** .
The release coil connected to terminal **Q** is energized and the latch released.
The contactor returns to its rest position.

Connection example

Energy-saving operation of a contactor by mechanical latching.
The contactor coil is tightened by means of a switch-on pulse and the latch is released automatically in the event of a power failure.



Please note:

If the system is to switch off at an exactly defined undervoltage, a mains monitoring relay must be used in accordance with the connection example.

The ESR 1 has been successfully tested with various contactors and latches. However, in exceptional cases, stiff locking (e.g. due to mechanical tolerances) can prevent reliable unlocking.
The functional safety of the release must therefore be sufficiently tested before initial operation of the system.

Technical data

Supply voltage	230 V/50 Hz
Power consumption:	approx. 0.6 W
Storage capacitor	10 uF
Pulse delay (capacitor charging time)	200 ms
Pulse duration	500 ms
Current carrying capacity at terminal Q	1 A
Current carrying capacity at terminal П	8 A
Switching frequency:	max. 10 switching cycles/min
Ambient temperature	-10°C to +45°C
Connection terminals	Socket terminals with captive screws M3.5
Clamping range	0.5 mm^2 - 4.0 mm^2
Strip length	6.0 mm - 6.5 mm
Screwing torque	0.80 Nm
Mounting orientation	arbitrarily
Mounting	Click-mount on standard 35-mm rail (EN 60715)
External dimensions	18 x 88 (45) x 58 mm^3
Installation depth	55mm
Weight	approx. 90 g
RAL colour	grey 7035

Order data

Item no.	EAN	Type	Designation
ESR109	4 046929 601177	ESR 1	Energy storage relay 230V AC

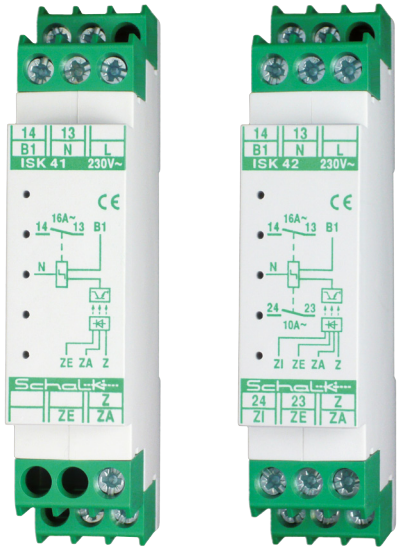
2017-08-01

Central pulse switch ISK 41 / ISK 42

Impulse switch with galvanically isolated (central) control inputs and additional signalling contact (ISK 42)

Special features

- Galvanic isolation of the central control inputs through optocouplers
- Wide central control voltage range
- Double-contact version for signalling amenities



General information

In electrical installations with several sub-distribution boards and residual current circuit breakers, the ISK 41, ISK 42 switchgear developed for this purpose can be used to create an economical central ON-OFF control system.
The central control inputs are galvanically isolated from the inputs and outputs on the supply side by optocouplers.
Up to 2 potential-free NO contacts are available on the output side.
In contrast to conventional pulse switches with central control, ISK 41 and ISK 42 can thus be connected between different networks, RCDs or potentials without decoupling relays.

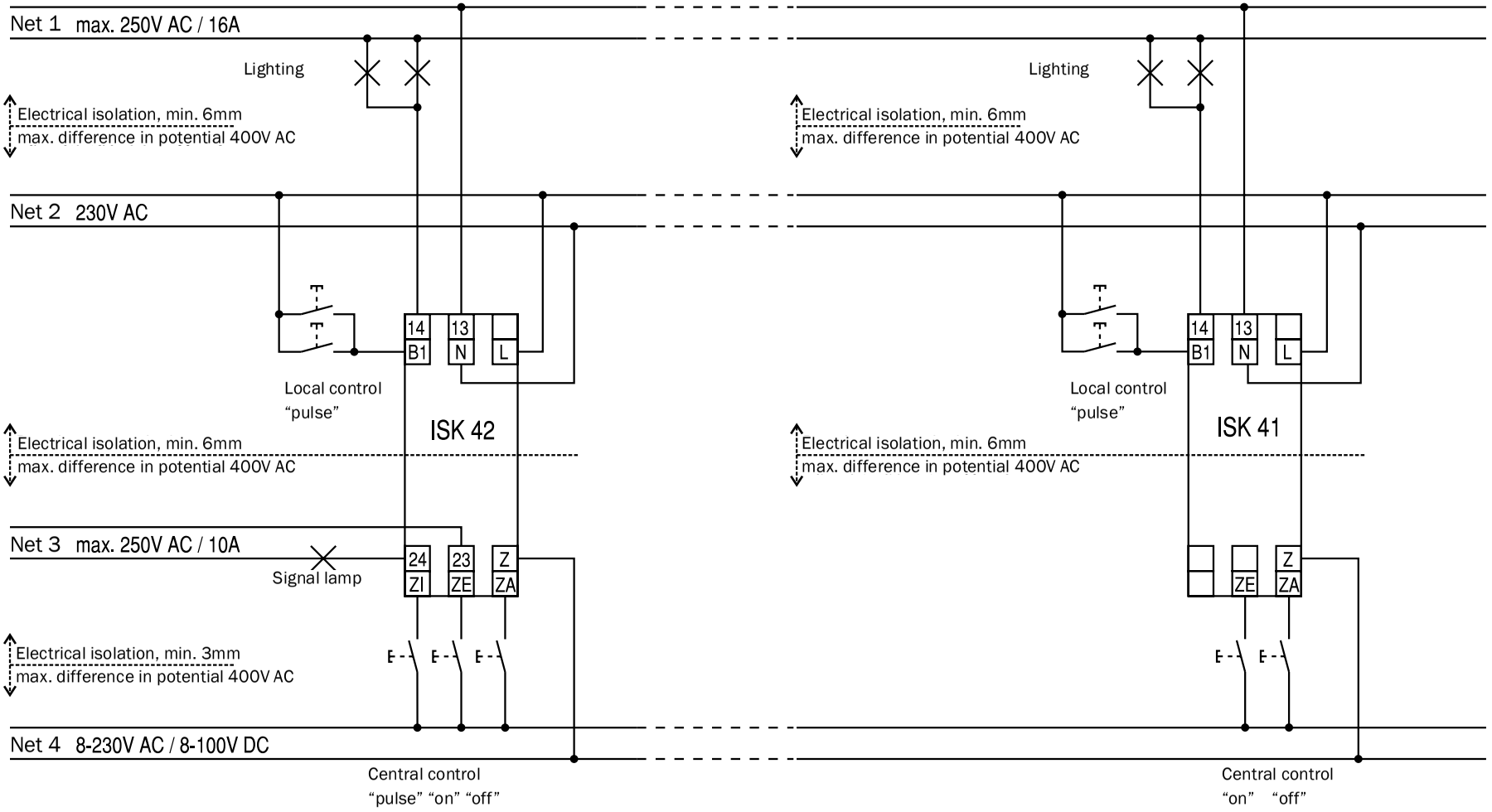
Applications

Central lighting activation by means of burglar alarm systems with presence detectors, central lighting on/off switching of building sections by means of central panel, time switch or twilight switch.

Operation

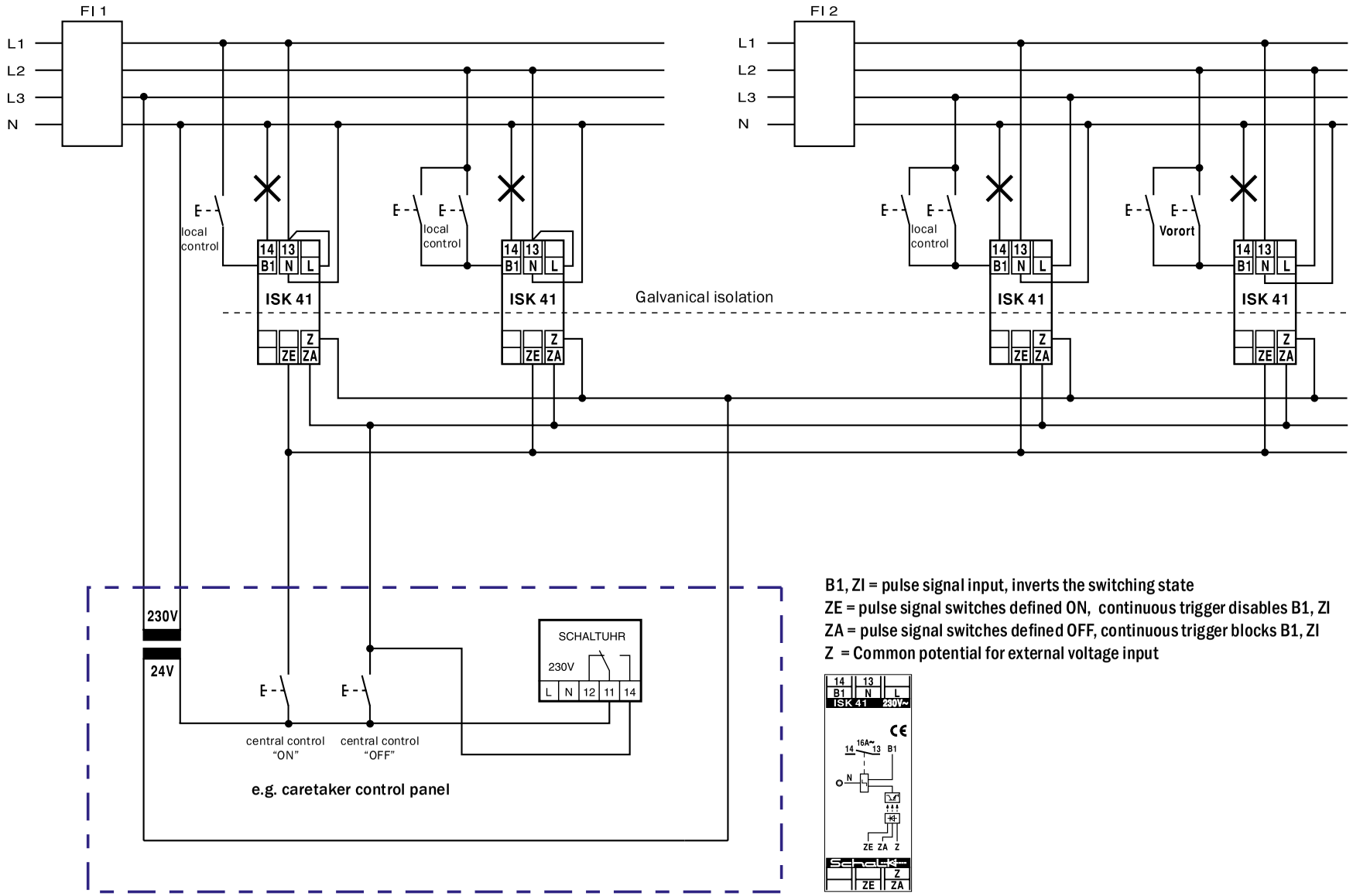
The respective switching state is changed by a short signal on terminal B1.
The centrally defined ON and OFF switching of any number of central pulse switches is possible via the central control connections ZE and ZA, irrespective of the respective switching position. ZE has priority over B1 and ZA has priority over B1 and ZE. This makes it possible to maintain a defined switching state by continuous trigger of ZE or ZA.
The ISK 42 also has a central pulse input and a potential-free NO contact for signalling devices.

Connection example ISK 42



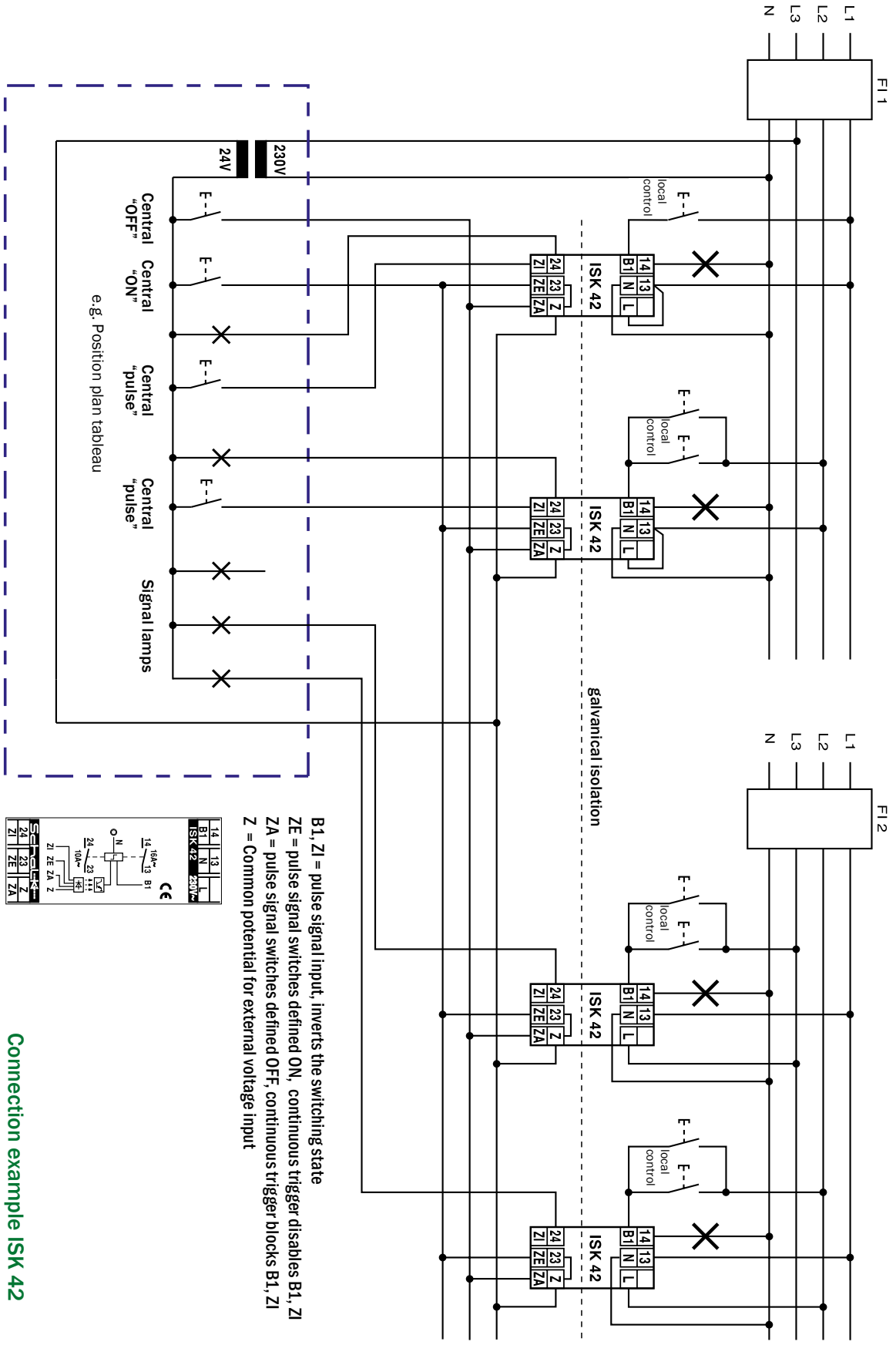
Connection example ISK 41

Central or local "pulse" ZI: inverts the switching state (Off -> On / On -> Off)
Central "On" ZE: switches on in a defined manner; "Pulse" is disabled when continuously triggered
Central "Off" ZE: Switches off in a defined manner; "Pulse" and "On" are disabled when continuously triggered



B1, ZI = pulse signal input, inverts the switching state
ZE = pulse signal switches defined ON, continuous trigger disables B1, ZI
ZA = pulse signal switches defined OFF, continuous trigger blocks B1, ZI
Z = Common potential for external voltage input

Connection example ISK 41



B1, ZI = pulse signal input, inverts the switching state
ZE = pulse signal switches defined ON, continuous trigger disables B1, ZI
ZA = pulse signal switches defined OFF, continuous trigger blocks B1, ZI
Z = Common potential for external voltage input

Connection example ISK 42

Technical data

Operating voltage:	230 V 50/60 Hz 10 %
Power consumption:	approx. 0.6 W
Control voltage for central inputs	8 V - 230 V UC
max. line capacitance	470 nF (B1) 25 nF (ZA, ZE, ZI at 230 V AC)
Relay contact (13, 14)	1 NO potential-free
Switching voltage max.	250 V AC
Continuous current max.	16 A
Contact rating	see data sheet: “Relay contacts”
Signal contact (23,24)	1 NO potential-free (only ISK 42)
Switching voltage max.	250 V AC
Continuous current max.	10 A
Contact rating	see "Relay contacts" data sheet
Ambient temperature	-10°C to +45°C
Connection terminals	Socket terminals with captive screws M3.5
Clamping range	0.5 mm² - 4.0 mm²
Strip length	6.0 mm - 6.5 mm
Screwing torque	0.80 Nm
Mounting orientation	arbitrarily
Mounting	Click-mount on standard 35-mm rail (EN 60715)
External dimensions	18 x 88 (45) x 58 mm³
Installation depth	55 mm
Weight	approx. 90 g
RAL colour	grey 7035

Order data

Item no.	EAN	Type	Designation
ISK419	4 046929 601030	ISK 41	Central pulse switch with 2 electrically isolated inputs ZE, ZA
ISK429	4 046929 601047	ISK 42	Central pulse switch with ZE, ZA, ZI and 2 relay contacts

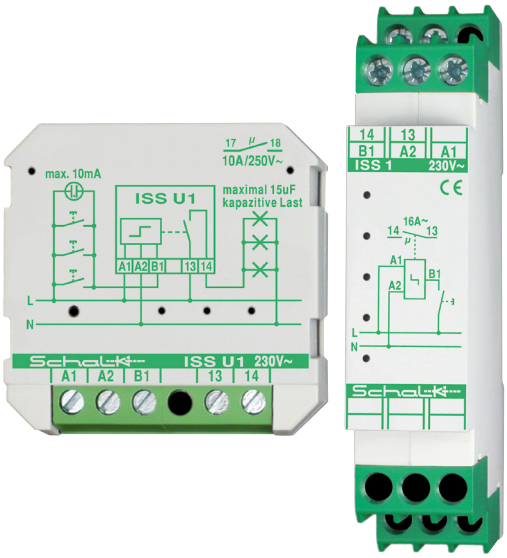
2017-08-01

Impulse switch ISS 1 / ISS U1

Impulse switch (pulse switch) with quiet switching behaviour

Special features

- Small installation dimensions
- Potential-free switching contact
- Very low noise switching



General information

The electronically controlled pulse switches ISS 1 and ISS U1 can also be used without problems where conventional, electromechanical pulse relays are perceived as disturbingly loud due to their very quiet switching behaviour. The flush-mounted version ISS U1 is also suitable for simple retrofitting of existing systems or for renovating old buildings and can be used in switch or junction boxes due to its small dimensions.

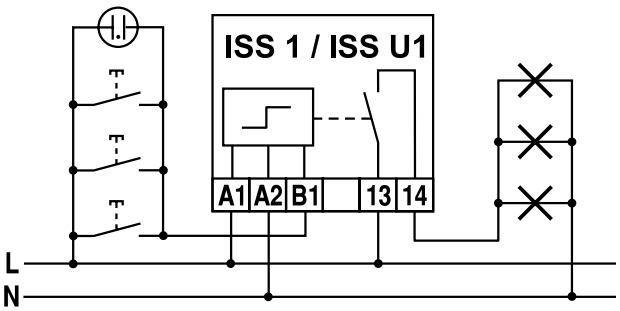
Applications

General push-button-controlled switching and lighting technology.

Operation

After applying the supply voltage to A1 and A2, the switching state can be changed permanently by a push pulse to B1.

Connection example



Common technical data

Operating voltage:	230 V 50/60 Hz 10 %
Switch rating	see data sheet: “Relay contact rating"
Ambient temperature	-10°C to +45°C
RAL colour	grey 7035 / green 6029

Technical data ISS 1

Power consumption:	approx. 0.6 W
Relay contact	1 NO contact potential-free 16 A 250 V AC
max. glow lamp load	20 mA
max. line capacitance	470 nF
Connection terminals	Socket terminals with captive screws M3.5
Clamping range	0.5 mm² - 4.0 mm²
Strip length	6.0 mm - 6.5 mm
Screwing torque	0.80 Nm
External dimensions	18 x 88 (45) x 58 mm³
Installation depth	55 mm
Weight	approx. 80 g

Technical data ISS U1

Power consumption:	approx. 0.4 W
Relay contact	1 NO contact potential-free 10 A 250 V AC
max. glow lamp load	10 mA
max. line capacitance	60 nF
Connection terminals	Socket terminals with captive screws M3
Clamping range	0.5 mm² - 2.5 mm²
Strip length	6.5 mm - 7.0 mm
Screwing torque	0.50 Nm
External dimensions	43 x 43 x 18,5 mm
Weight	approx. 40 g

Order data

Item no.	EAN	Type	Designation
ISS109	4 046929 601016	ISS 1	Impulse switch, 230V AC, 1 NO 16A
ISSU19	4 046929 601023	ISS U1	Impulse switch, 230V AC, 1 NO 10A (FMD)

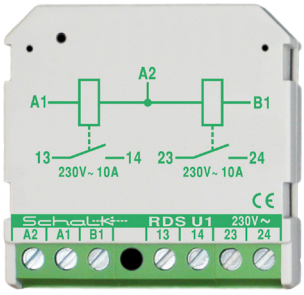
2017-08-01

Double relay RDS U1

Switching and control relay with two floating, monostable relay outputs (normally open contacts)

Special features

- Two separate electromagnet systems in a very compact UP housing
- Low power dissipation
- Very quiet switching



General information

The RDS U1 dual monostable relay is designed for general control applications.
The **creepage an clearance distance** between the control inputs and the floating normally-open contacts is 8 mm. The creepage distance and air gap between the two normally-open contacts is 3 mm.

Applications

Automation systems, building services, industrial control systems, and many others.

Operation

The monostable relays are driven over terminals A2, B2 and A2.
Two floating normally-open contacts (13 and 14 or 23 and 24) are available at the output.

Technical data

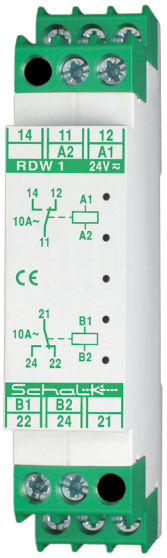
Supply voltage	230 V AC / 50 Hz / 10%
Current consumption per relay	10 mA
Power dissipation per relay	approx. 0.3 W
Relay output	Two floating normally-open contacts
Switching voltage	max. 250 V AC
Continuous current	max. 10 A
AC switch rating	max. 2,000 VA
Incandescent lamp load	max. 600 W
DC switch rating	max. 300 W
Electrical lifetime	1 x 105 switch cycles
Ambient temperature	-10 °C to+45 °C
Connections	Socket terminals with captive screws M3
Clamping range	0.5 mm^2 - 2.5 mm^2
Strip length	6.5 mm - 7.0 mm
Screwing torque	0.50 Nm
Installation orientation	Any
Outside dimensions	43 x 43 x 18.5 mm^3
Weight	approx. 40 g
RAL colour	Grey 7035

Technical data

Part no.	EAN	Type	Designation
RDSU19	4 046929 601191	RDS U1	Dual relay 230VAC, 2 floating NO contacts 10A (UP)

Double relay RDW 1

Switching and control relay with two potential-free, monostable relay outputs and switching status indication via LED.



Special features

- 2 separate magnet systems in one module width
- Low power dissipation
- also available in 230 V AC
- Switching status display via LED
- Very low noise switching

General information

The monostable double relay RDW 1 was developed for general control technology.
The creepage and clearance distance between the potential-free changeover contacts and the control inputs, as well as between the two control coils, is 8 mm (max. voltage difference 400 V AC).

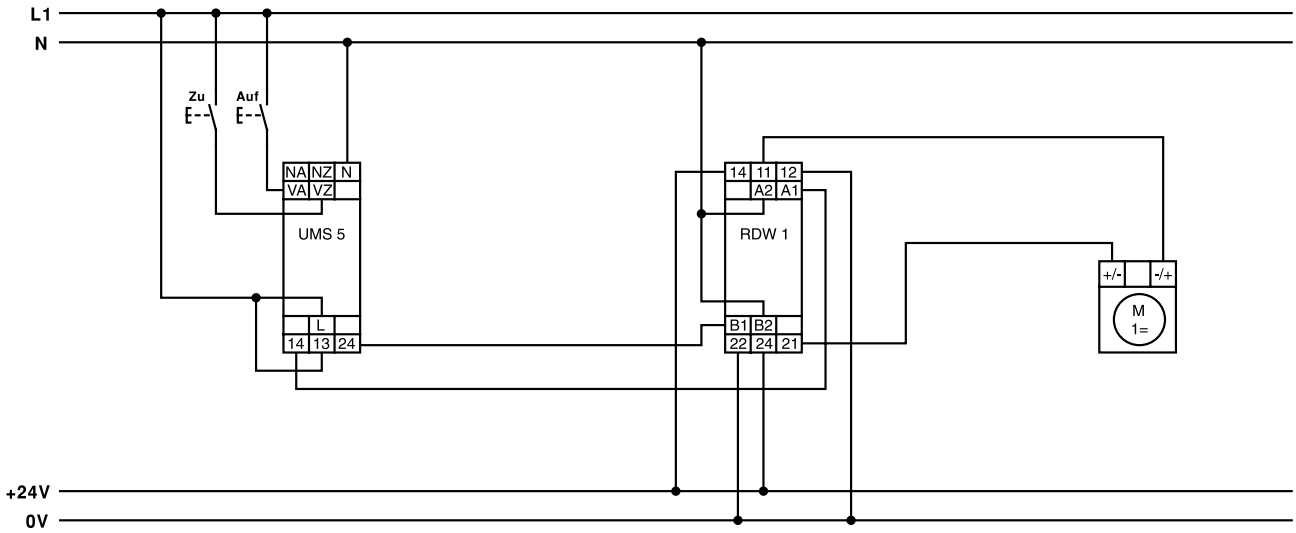
Applications

For example reversing circuit for DC motor (tilt window drive), building services, industrial control technology and many more.

Operation

The monostable relays are controlled via terminals A1, A2 or B1, B2.
On the output side, 2 potential-free change-over contacts (11, 12, 14 or 21, 22, 24) are available.
2 LEDs indicate the switching status.

Connection example RDW 1 - Direction change of a DC motor by reversing polarity



Common technical data

max. voltage between contact and control input	400 V AC
Relay output	2 CO potential-free
Switching voltage	max. 250 V AC
Continuous current	max. 10 A
Switch rating AC	max. 2500 VA
Glow lamp load	max. 600 W
Switch rating DC	max. 300 W
Electrical service life	1 x 10^5 cycles
Parallel compensation for fluorescent lamps	not allowed
Ambient temperature	-10°C to +45°C
Connection terminals	Socket terminals with captive screws M3.5
Clamping range	0.5 mm² - 4.0 mm²
Strip length	6.0 mm - 6.5 mm
Screwing torque	0.80 Nm
Mounting orientation	arbitrarily
Mounting	Click-mount on standard 35-mm rail (EN 60715)
External dimensions	18 x 88 (45) x 58 mm³
Installation depth	55 mm
Weight	approx. 80 g
RAL colour	grey 7035 / green 6029

Technical data (24V UC)

Supply voltage	24 V 20 %
Current consumption per relay	10 mA
Power loss per relay	0.25 W
Line capacity	approx. 150 nF

Technical data RDW 1 (230V AC)

Supply voltage	230 V~ 10 %
Current consumption per relay	10 mA
Power loss per relay	0.25 W
Line capacity	approx. 20 nF

Order data

Item no.	EAN	Type	Designation
RDW104	4 046929 601054	RDW 1 (24V UC)	Double relay 2 x 24V UC, 2 CO 10A
RDW109	4 046929 601061	RDW 1 (230V AC)	Double relay 2x230V AC, 2 CO 10A

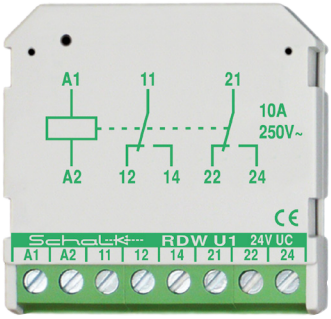
2017-08-01

Double relay RDW U1 24V UC

Switching and control relay with two potential-free change-over contacts (monostable)

Special features

- 2 potential-free change-over contacts
- Very low noise switching



General information

The monostable double relay RDW U1 was developed for general control technology.
The creepage and clearance distance between the control input and the potential-free changeover contacts is 3 mm, the creepage and clearance distance between the two changeover contacts is also 3 mm.

Applications

Automation, building services, industrial control technology, etc.

Operation

The monostable relay is controlled via terminals A1 and A2 with 24V UC.
On the output side, 2 potential-free change-over contacts (11, 12, 14 or 21, 22, 24) are available.

Technical data

Supply voltage	24V UC
Current consumption	20 mA
Power dissipation	0.48 W
Relay output	2 CO potential-free
Continuous current	max. 10A
Switch rating AC	max. 2000VA
Glow lamp load	max. 600W
Switch rating DC	max. 300W
Capacitive load	max. 15uF
Electrical endurance	1 x 10^5 cycles
Ambient temperature	-10°C to +45°C
Connection terminals	Socket terminals with captive screws M3
Clamping range	0.5 mm^2 - 2.5 mm^2
Strip length	6.5 mm - 7.0 mm
Screwing torque	0.50 Nm
Mounting orientation	arbitrarily
External dimensions	43 x 43 x 18,5mm
Weight	38g
RAL colour	grey 7035

Order data

Item no.	EAN	Type	Designation
RDWU14	4 046929 601184	RDW U1 (24V UC)	Double relay 24V UC, 2 CO potential-free 10A (FMD)

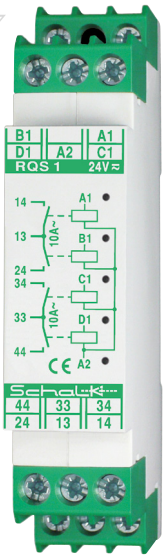
2017-08-01

Quadruple relay RQS 1

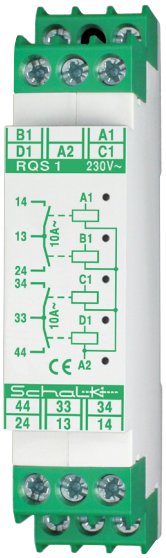
Switching and control relay with 4 potential-free, monostable relay outputs within one module width, and switching status indication via LED.

Special features

- 4 relays in one module width
- Low power dissipation
- also available in 230 V AC
- Switching status display via LED
- Very low noise switching



4 x 24V UC



4 x 230V AC

General information

The monostable quadruple relay RQS 1 was developed for general control technology.
The creepage and clearance distance between control inputs and NO contacts is 8 mm (max. voltage difference 400 V AC). The creepage and clearance distance between the NO contacts is 3 mm (max. voltage difference 230 V AC).

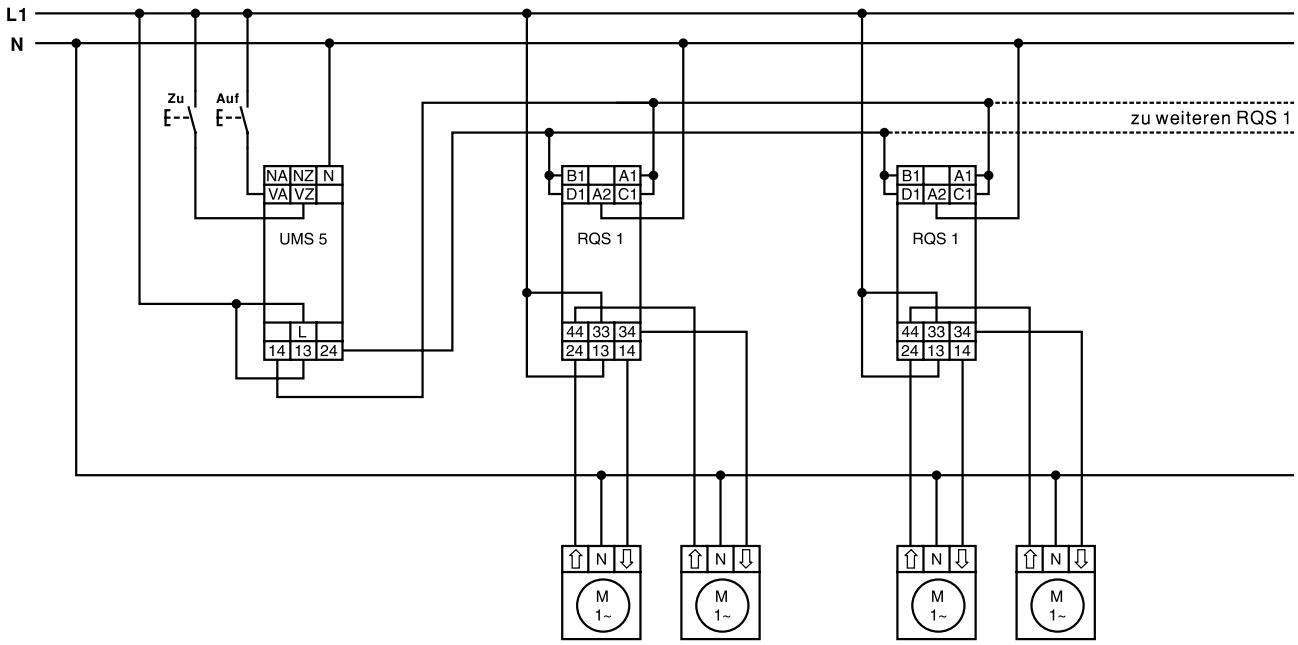
Applications

Expansion relays for roller shutter controls, building services, industrial control technology and many more.

Operation

The monostable relays are controlled via terminals A1, B1, C1 or D1.. The common connection is terminal A2.
On the output side, 4 NO contacts (14, 24, 34, 44) with two common connections (13, 33) are available (2 switching groups with 2 NO contacts each).
4 LEDs indicate the switching status.

Connection example RQS 1 - Parallel operation of AC motors



Common technical data

max. voltage between contact and control input	400 V AC
Relay output	4 normally open contacts
Switching voltage	max. 250 V AC
Continuous current	max. 10 A
Switch rating AC	max. 2500 VA
Glow lamp load	max. 600 W
Switch rating DC	max. 300 W
Electrical service life	1 x 10^5 cycles
Parallel compensation for fluorescent lamps	not allowed
Ambient temperature	-10°C to +45°C
Connection terminals	Socket terminals with captive screws M3.5
Clamping range	0.5 mm^2 - 4.0 mm^2
Strip length	6.0 mm - 6.5 mm
Screwing torque	0.80 Nm
Mounting orientation	arbitrarily
Mounting	Click-mount on standard 35-mm rail (EN 60715)
External dimensions	18 x 88(45) x 58 mm^3
Installation depth	55 mm
Weight	approx. 100 g
RAL colour	grey 7035

Technical data RQS 1 (230V AC)

Supply voltage	230V~ 10%
Current consumption per relay	9 mA
Power loss per relay	0.4 W
Line capacity	approx. 15 nF

Technical data RQS 1 (24V UC)

Supply voltage	24V 20%
Current consumption per relay	10 mA
Power loss per relay	0.25 W
Line capacity	approx. 100 nF

Order data

Item no.	EAN	Type	Designation
RQS104	4 046929 601078	RQS 1 (24V UC)	Quadruple relay 4x24V UC, 4 NO 10A
RQS109	4 046929 601085	RQS 1 (230V AC)	Quadruple relay 4x230V AC, 4 NO 10A

2017-08-01

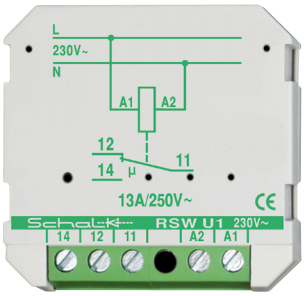
Switching and control relay

RSW 1 (Rail-mounting version)
RSW U1 (Flush-mounting version)

Switching and control relay with one relay output for high switching currents and switching status indication via LED.

Special features

- Low power dissipation
- High switching capacity
- 3 operating voltage ranges
- Very low noise switching



General information

The monostable switching relays RSW 1 and RSW U1 were developed for general control technology.
With a switching capacity of 16A at RSW 1 and 13A at RSW U1, the relays can also withstand high currents.
Both relays have a potential-free changeover contact (8mm creepage and clearance distance).

Applications

Automation, building services, industrial control technology, etc.

Operation

The monostable RSW 1 switching relay must be controlled via terminals A1 and A2 as usual. An LED signals the switching status (RSW 1 only).

Common technical data

Power consumption:	12V UC / 45mA 24VUC / 25mA 230V AC / 25mA (5.8VA/0.6W)
Relay output	1 CO potential-free
max. switching voltage	250V AC
Electrical service life	1 x 10^5 cycles
Contact rating	siehe Datenblatt „Belastbarkeit der Relaiskontakte“
Ambient temperature	-10°C to +45°C
Mounting orientation	arbitrarily
RAL colour	grey 7035 / green 6029

Technical data RSW 1

Max. continuous current	16A
Connection terminals	Socket terminals with captive screws M3.5
Clamping range	0.5 mm² - 4.0 mm²
Strip length	6.0 mm - 6.5 mm
Screwing torque	0.80 Nm
External dimensions	18 x 88 (45) x 58 mm
Weight	approx. 75 g

Technical data RSW U1

Max. continuous current	13A
Connection terminals	Socket terminals with captive screws M3
Clamping range	0.5 mm² - 2.5 mm²
Strip length	6.5 mm - 7.0 mm
Screwing torque	0.50 Nm
Relay output	1 CO potential-free
Mounting orientation	arbitrarily
External dimensions	43 x 43 x 18,5 mm
Weight	approx. 40 g

Order data

Item no.	EAN	Type	Designation
RSW102	4 046929 601122	RSW 1 (12V UC)	Switching and control relay 12V UC, 1 CO 16A
RSW104	4 046929 601139	RSW 1 (24V UC)	Switching and control relay 24V UC, 1 CO 16A
RSW109	4 046929 601146	RSW 1 (230V AC)	Switching and control relay 230V UC, 1 CO 16A
RSWU12	4 046929 601207	RSW U1 (12V UC)	Switching and control relay 12V UC, 1 CO 13A (FMD)
RSWU14	4 046929 601214	RSW U1 (24V UC)	Switching and control relay 24V UC, 1 CO 13A (FMD)
RSWU19	4 046929 601221	RSW U1 (230V AC)	Switching and control relay 230V AC, 1 CO 13A (FMD)

2017-08-01

Switching and control relay RSW 2

Universal voltage switching and control relay with one relay output and automatic adjustment of the input voltage from 12 - 230V (AC or DC), with switching status indication via LED.

Special features

- Automatic voltage adjustment 12-230 V
- Operation with DC or AC voltage
- Switching status display via LED
- Very low noise switching

General information

The monostable universal voltage relay RSW 2 was developed for versatile use in general control and installation technology.
The automatic voltage adjustment in the range of 12 V to 230 V (DC or AC) ensures that the right relay is always at hand. With a switching capacity of 16A at 250 V, the RSW 2 is also suitable for higher switching currents. Thus, this modern relay offers the user a high degree of flexibility and economy.

Applications

Building services, industrial control technology, solar systems, automotive technology and many more.

Operation

The RSW 2 is controlled via terminals A1 and A2. The power consumption is between 0.4 and 1.2 W, depending on the supply voltage.

An LED signals the switching status.
Any control voltage change may take place in the controlled state. It should only be noted that the relay contact switches off for a few seconds in the event of a rapid change from high voltage to low voltage.

Technical data

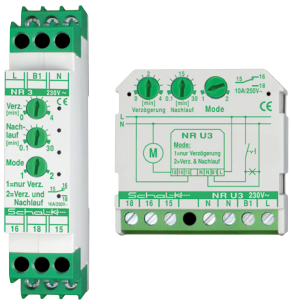
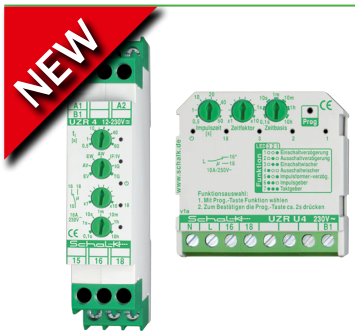
Power consumption:	0.4 - 1.2 W (at 12 - 230 V)
Power consumption at 12 V	40 mA
Power consumption at 230 V	6 mA
Relay output	1 CO potential-free
max. voltage between contact and control input	400 V AC
max. switching voltage	250 V AC
max. continuous current	16 A
max. switching capacity AC	3500 VA
max. glow lamp load	1000 W
max. switching capacity DC	350 W
max. capacitive load	40 uF
Ambient temperature	-10°C to +45°C
Connection terminals	Socket terminals with captive screws M3.5
Clamping range	0.5 mm² - 4.0 mm²
Strip length	6.0 mm - 6.5 mm
Screwing torque	0.80 Nm
Mounting orientation	arbitrarily
Mounting	Click-mount on standard 35-mm rail (EN 60715)
External dimensions	18 x 88 (45) x 58 mm
Installation depth	55 mm
Weight	approx. 80 g
RAL colour	grey 7035 / green 6029

Order data

Item no.	EAN	Type	Designation
RSW20U	4 046929 601153	RSW 2	Switching and control relay 12-230V UC 1 CO 250V/16A

2017-08-01

Timer relays, clock generators

	Item no.	Type	Specs	Dimensions	Page
	**Time-delay relay with adjustable switch-on delay NR 3 / NR U3** The time-delay relays NR 3 and NR U3 are electronic time switches with potential-free change-over contact for delayed switching on and off of secondary consumers. If required, NR 3 and NR U3 can also be used as pure switch-on delays without follow-up time. Due to these selectable operating modes and the running times that can be set within a wide range, these devices can be used in a wide variety of applications.				227
	NR3009	NR 3	230V AC, 1 CO 16A	18x55mm	
	NRU309	NR U3	230V AC, 1 CO 10A	43x43x18.5mm	
	**Multifunction timing relay UZR 4 / UZR U4** With the multifunction timing relay UZR 4, the following time functions can be realized: Switch-on delay, switch-off delay, switch-on wiper, switch-off wiper, pulse delay, pulse shaper, pulse generator, clock generator. Exact and stepless time setting from 0.1s to 100h possible. Due to the wide supply voltage range from 12 to 230V UC and the potential-free relay contact (change-over contact, 16A), the UZR 4 can be used universally. The compact UZR U4 for 230V AC is suitable for installation in boxes or in confined spaces.				229
	UZR40U	UZR 4 (12-230V UC)	12-230V UC, 1 NO potential-free 16A	18x55mm	
	UZRU49	UZR U4 (230V AC)	230V AC, 1 CO 10A	43x43x18.5mm	

Timer relays, clock generators

Page	Item no.	Type	Specs	Dimensions

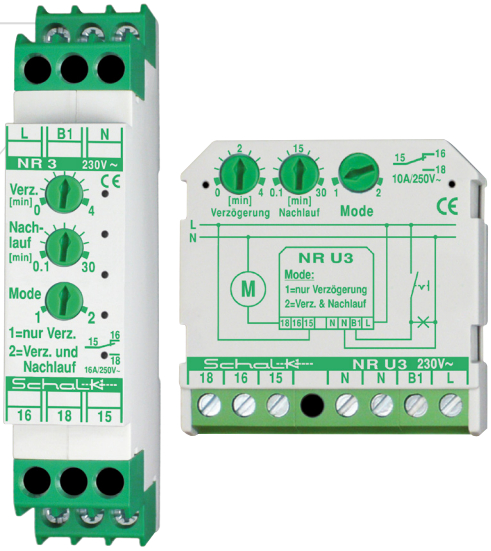
Time-delay relay with on-/off-delay

NR 3 (Rail-mounting version)
NR U3 (Flush-mounting version)

For delayed switching of consumers, e.g. fans in bath/WC, etc. Can be used as switch-on and/or switch-on delay relay.

Special features

- 2 operating modes - therefore also usable as pure switch-on delay
- Flexibly adjustable time ranges
- Galvanically isolated change-over contact
- Low power dissipation



General information

The time-delay relays NR 3 and NR U3 are electronic time switches with potential-free change-over contact for delayed switching on and off of secondary consumers.
If required, NR 3 and NR U3 can also be used as pure switch-on delays without follow-up time.
Due to these selectable operating modes and the running times that can be set within a wide range, these devices can be used in a wide variety of applications.

Applications

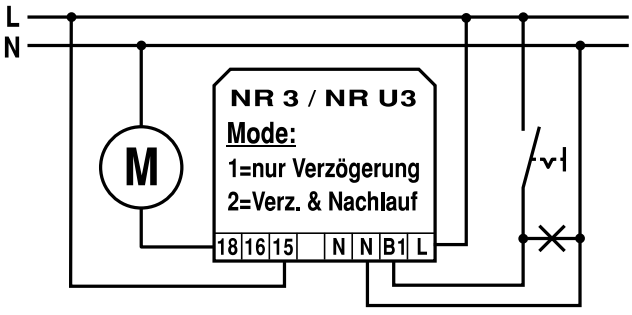
Automatic ventilation of windowless rooms, delayed switching on and off of all kinds of consumers, etc.

Operation

Mode 1 = switch-on delay only
Signal on B1 starts the time lapse. After the set delay time has elapsed, the relay contact is closed. The after-run time is suppressed, and the relay contact is thus opened again immediately when the signal on B1 is no longer present.
If L and B1 are bridged, the switch-on delay is also safely started in this operating mode by applying the supply voltage.

Mode 2 - Switch-on delay and switch-off delay:
Signal on B1 starts the time lapse. After the set delay time has elapsed, the relay contact is closed. When signal on B1 is no longer present, after-run time is started and the relay contact drops when end of time is reached. In this operating mode, the after-run time is started when the supply voltage is applied.

Connection example



Common technical data

Operating voltage:	230 V 50/60 Hz 10%
Power consumption:	approx. 0.4 W
Switch-on delay	approx. 0.3s - 4min
Switch-off delay	approx. 6s - 30min
Switch rating	see data sheet: “Relay contact rating"
Glow lamp load (B1)	max. 5 mA
Line capacitance (B1)	approx. 20 nF
Ambient temperature	-10°C to +45°C
Mounting orientation	arbitrarily
RAL colour	grey 7035 / green 6029

Technical Data NR 3

Relay contact	1 change-over contact 16 A / 250 V AC potential-free
Connection terminals	Socket terminals with captive screws M3.5
Clamping range	0.5 mm² - 4.0 mm²
Strip length	6.0 mm - 6.5 mm
Screwing torque	0.80 Nm
External dimensions	18 x 88 (45) x 58 mm

Technical Data NR U3

Relay contact	1 change-over contact 10 A / 250 V AC potential-free
Connection terminals	Socket terminals with captive screws M3
Clamping range	0.5 mm² - 2.5 mm²
Strip length	6.5 mm - 7.0 mm
Screwing torque	0.50 Nm
External dimensions	43 x 43 x 18,5 mm

Order data

Item no.	EAN	Type	Designation
NR3009	4 046929 801096	NR 3	Time-delay relay with on-/off-delay, 230V AC, 1 CO 16A pf
NRU309	4 046929 801089	NR U3	Time-delay relay with on-/off-delay, 230V AC, 1 CO 10A pf (FMD)

2017-06-01

Multifunction time relay UZR 4 UZR U4

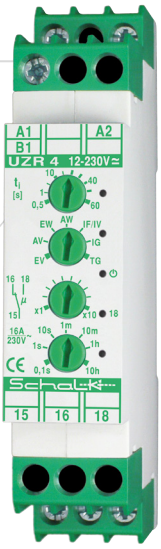
(Rail mount version)

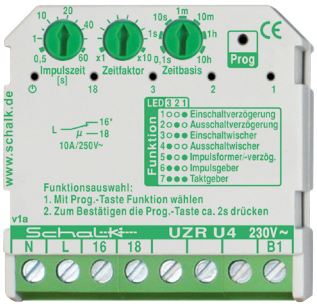
(Flush mount version)

Universal time relay with 8 time functions in a flexible universal voltage variant UZR 4 (12-230V UC) or compact flush mount version UZR U4 (230V AC).

Special features

- 8 selectable time functions
- time adjustable from 0.1s to 100h
- exact time setting through selectable time ranges and continuous adjustment
- Relay contacts:
  UZR 4: potential-free changeover contact (16A)
  UZR U4: changeover contact*) (10A)
- wide input voltage range 12-230V (UZR 4)





General

The following time functions can be implemented with the multifunction relay:

- switch-on delay
- switch-off delay
- fleeting contact ON switch
- fleeting contact OFF switch
- pulse delay
- pulse shaper
- pulse generator
- clock signal generator

Time can be exactly, continuously adjusted from 0.1s to 100h. The UZR 4 has a wide supply voltage range from 12 to 230V UC and a potential-free relay output (changeover contact) making it universally applicable.
The compact flush-mount variant UZR U4 is supplied with 230V AC.

Applications

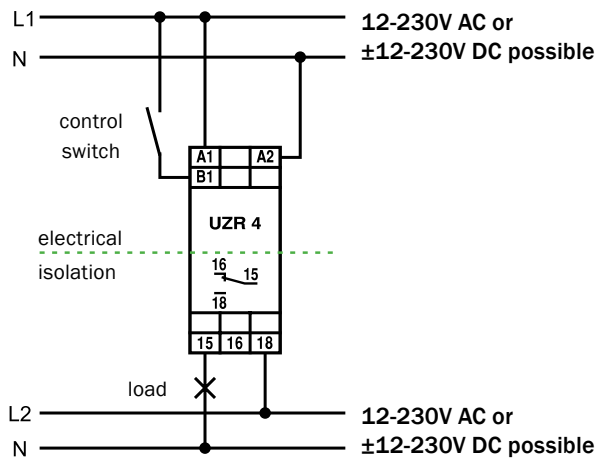
Home automation, industrial control, solar systems, automotive technology, etc.

Functional description

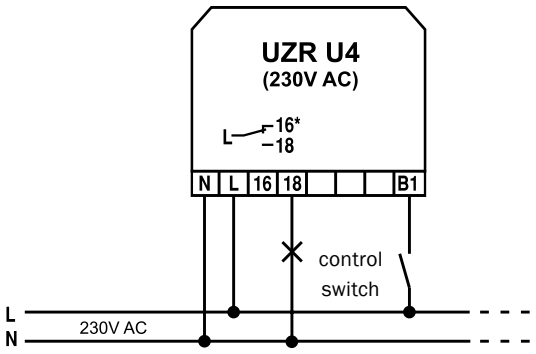
The multifunction relay is controlled by the power supply in the following modes: EV (switch-on delay), EW (fleeting contact ON switch), IG (pulse generator) and TG (timebase generator). The time starts running when the power supply voltage is applied.
In all other modes the time starts running when triggered by control input B1. The details of each operating mode can be seen from the functional diagrams
.

Connection examples

UZR 4 for 12-230V UC

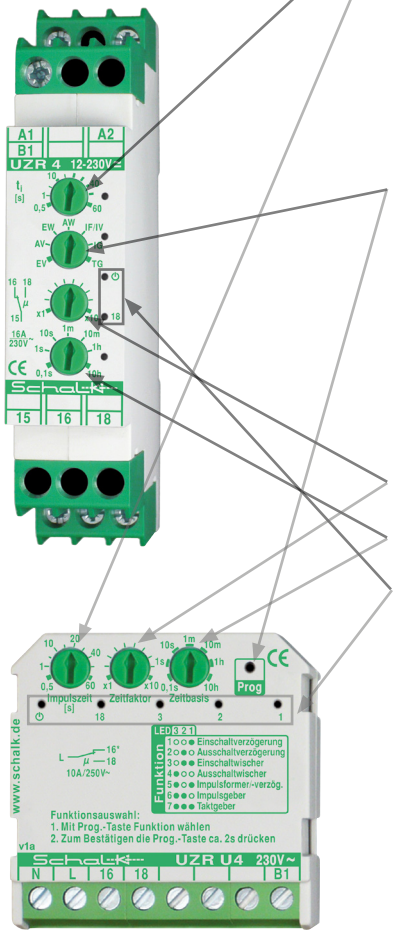


UZR U4 for 230V AC

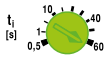


Setup and installation

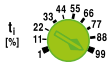
Operator controls and displays:



„Pulse time“ setting:
This sets the pulse duration on the one hand and on the other hand sets the pulse/pause ratio (dual functionality):
In IF/IV, IG modes:
Scaling: Pulse duration (range 0.5 - 60s)



In TG mode:
Scaling: Pulse/pause ratio (range 1 - 99%):



„Operating mode“ setting:
UZR U4: the mode is selected with the „Prog“ button and set with a 2s keypress!

EV	switch-on delay
AV	switch-off delay
EW	fleeting contact ON switch
AW	fleeting contact OFF switch
IF/IV	pulse shaper/pulse delay
IG	pulse generator
TG	clock signal generator

„Time factor“ (multiplier) setting

„Timebase“ setting

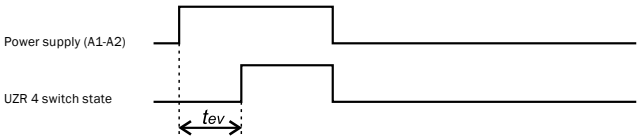
LEDs:
„Power ON“:
This indicates the operating state of the UZR 4. This LED is also used to optically indicate when the control settings are in place (operating mode, time factor and timebase). When the setting is moved out of an input range, the LED goes off for a short time (c. 100ms).
UZR U4 : the green LED indicates the operating state and the optical feedback. The red LED indicates when control settings take place.
„18“ (relay ON):
This indicates the status of the relay. Flashes while time lapses.
„3“, „2“, „1“ (only UZR U4):
These LEDs indicate the selected operating mode

Legend:

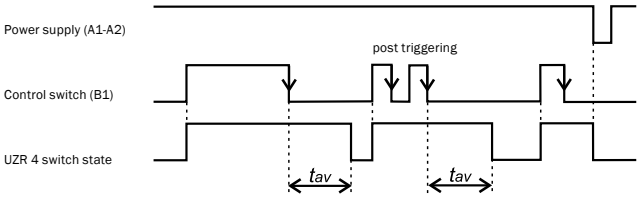
○ LED off	● LED steady on green
● LED steady on red	◔ LED flashes green
◔ LED flashes red	◔ LED flashes alternately red/green

Settings (with description of operating modes/functional diagrams)

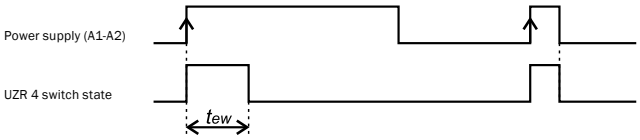
EV: switch-on delay
After the power supply is applied, the relay rises after the delay t_{ev}.
t_{ev} = „timebase“ x „time factor“ (= 0.1s...100h)



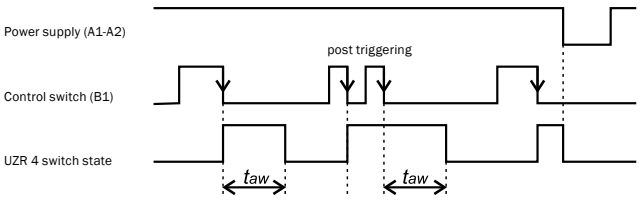
AV: switch-off delay
The delay rises on the positive edge of B1 and starts on the negative edge of delay t_{av}. After the delay expires the relay drops. The time can meanwhile be post-triggered by B1.
t_{av} = „timebase“ x „time factor“ (= 0.1s...100h)



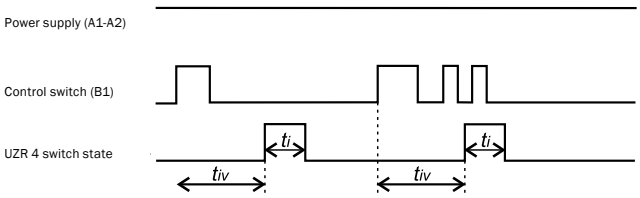
EW: fleeting contact ON switch
After the power supply is applied, the relay rises for the configured time t_{ew} and drops after this time is over.
t_{ew} = „timebase“ x „time factor“ (= 0.1s...100h)



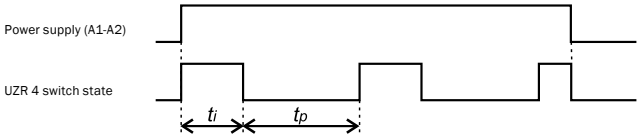
AW: fleeting contact OFF switch
The relay rises on the negative edge of B1 and falls after the configured time t_{aw} has elapsed. The time can meanwhile be post triggered by B1.
t_{aw} = „timebase“ x „time factor“ (= 0.1s...100h)



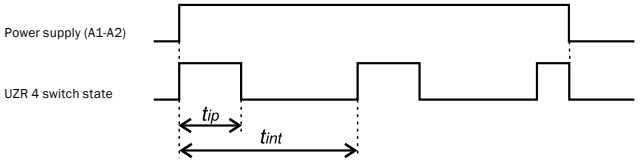
IF/IV: Pulse shaper/pulse delay
Shapes the pulse on B1, by delaying it for a set time t_{iv} and adjusting its length to the set time value t_i. If no delay is wanted, set t_{iv} to the minimum value (0.1s). No post triggering, as long as t_i and t_{iv} have not yet expired.
t_i = „pulse length“ (0.5s...60s)
t_{iv} = „timebase“ x „time factor“ (= 0.1s...100h)



IG: pulse generator
A clock signal with a configurable pulse length t_i and a separately configurable pause t_p. (B1 open => Start of pulse, B1 jumpered to A1 => Start of pause)
t_i = „pulse length“ (0.5s...60s)
t_p = „timebase“ x „time factor“ (= 0.1s...100h)



TG: clock signal generator
Clock signal generator with configurable pulse/pause ratio p_{ip} and separately configurable interval duration t_{int}.
Example procedure for „Switching on the light for approx. 7 minutes every hour“:
First set the interval duration t_{int} (1 hour) then the pulse/pause ratio p_{ip} to 11% (first marker in the scale) (11% x 60min = approx. 7min).
(B1 open => Start of pulse , B1 jumpered to A1 => Start of pause)
p_{ip} = „pulse time“ setting with scaling: Pulse/pause ratio (1%...99%)
t_{int} = „timebase“ x „time factor“ (= 0.1s...100h)
Important:
If the interval duration is configured as less than 1s, the „Power ON“-LED starts flickering and the relay becomes deactivated because this setting is forbidden!



Technical data

Power consumption	passive: 0.7W active: 1.2W
Max. load at B1	1 glow lamp / 22nF
Adjustable time range	0.1s to 100h
Switching voltage max.	250V AC
Switch rating	See data sheet “Relay contact load ratings”
Ambient temperature	-10°C to +45°C
RAL colour	Grey 7035 / Green 6029

Technical data UZR 4

Operating voltage	12-230V UC ±10%
Relay output	1 changeover contact, potential-free
Continuous current max.	16A
Connections	Socket terminals with captive screws M3.5
Clamping range	0.5 mm² - 4.0 mm²
Strip length	6.0 mm - 6.5 mm
Screwing torque	0.80 Nm
Befestigung	Schnappbefestigung auf 35mm Hutschiene nach EN 60715
Outside dimension	18 x 88 (45) x 58 mm
Weight	approx. 80g

Technical data UZR U4

Operating voltage	230V AC ±10%
Relay output	1 changeover contact*)
Continuous current max.	10A
Connections	Socket terminals with captive screws M3
Clamping range	0.5 mm² - 2.5 mm²
Strip length	6.5 mm - 7.0 mm
Screwing torque	0.50 Nm
Outside dimensions	43 x 43 x 18.5 mm³
Weight	approx. 43g

Info

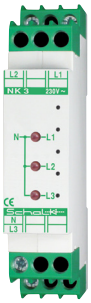
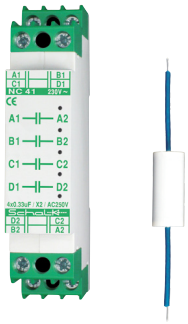
**) The UZR U4 has a simulated changeover contact, which internally consists of two normally open contacts. Thus, in the unpowered state none of the contacts 16 and 18 is switch through!*

Order data

Part no.	EAN	Type	Description
UZR40U	4 046929 801102	UZR 4 (12-230V UC)	Multifunction timing relay, 12-230V UC, 1 CO 16A
UZRU49	4 046929 801119	UZR U4 (230V AC)	Multifunction timing relay (FMD), 230V AC, 1 CO 10A

2017-05-01

Accessories

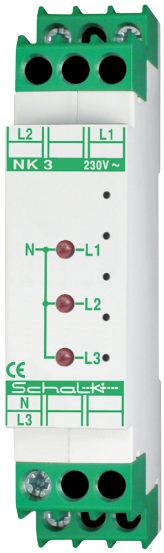
	Item no.	Type	Specs	Dimensions	Page
					
Mains monitor NK 3 This device has three LEDs on the front side with which the three phase conductors L1; L2; L3 are optically monitored against the neutral conductor N in a three-phase network. Fuse, phase failure and signal monitoring can thus be implemented in all control cabinets and distributions.	NK3009	NK 3	230/400V 50-60Hz 10 %	18x55mm	235
					
Mains capacitance NC 41 The NC 41 is used when the glow lamp load in a push-button cable is too high or when the cable capacitance is too high. A capacitor from the button input to N or L compensates for this effect. Rail mounting version with four independent mains capacitors X2.					237
Mains capacitance NC 1 The NC 1 is used to compensate for glow lamp loads. Single capacitor e.g. for flush-mounting.	NC4109	NC 41	230V AC, 4 x 330nF	18x55mm	
	NC1009	NC 1	230V AC, 330nF	11.3x25.6x11.3mm	
					
Magnetic contact 1 CO MKW 1 (incl. magnet MIG 1) Universally applicable change-over contact (incl. magnet) MKW 1 for monitoring windows, doors etc. Internal spring-loaded terminals. Including adhesive pads.					195
Replacement magnet in housing (separate) MIG 1 Single spare magnet MIG 1, self-adhesive, for MKW 1/FV2 SM	MKW104	MKW 1	max. 24V AC/DC, reed contact, 1 CO	59,5 x 23,3 x 15,3 mm	
	MIG100	MIG 1	Replacement magnet in housing	22,2 x 11,2 x 5,5 mm	
DIN rail clip HC 35 With this clip, flush-mounting devices (without own snap-on clamp) can be mounted on 35mm DIN raill. Including adhesive pads.					
					
	HC3500	HC 35	for 35mm DIN rail, incl. adhesive pads	38x30x6mm	
Battery 3V DC CR2032 BFS 03 Lithium button cell 3V for battery-operated radio transmitters					
					
	BFS03B	BFS 03	3V DC, lithium button cell CR2032	20x3.2mm	

Accessories

Page	Item no.	Type	Specs	Dimensions

Mains monitor NK 3

For optical fuse, phase failure and signal monitoring in control cabinets and distributions

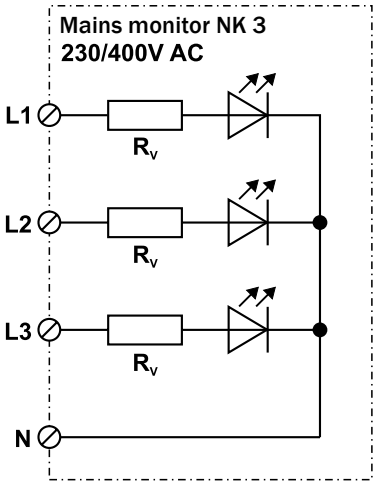


General information

The NK 3 mains control has 3 clearly visible LEDs mounted on the front. These LEDs are used for optical monitoring of the three phase conductors against the neutral conductor in a 230 V / 400 V three-phase network.
Of course, there can also be three independent 230 V AC voltages can be indicated by the NK 3.

Applications

Optical fuse, phase failure and signal monitoring in control cabinets and distributions



Technical data

Operating voltage:	230 / 400 V 50-60 Hz 10 %
Power consumption per LED	approx. 60 mW
Ambient temperature	-10°C to +45°C
Connection terminals	Socket terminals with captive screws M3.5
Clamping range	0.5 mm² - 4.0 mm²
Strip length	6.0 mm - 6.5 mm
Screwing torque	0.80 Nm
External dimensions	18 x 88 (45) x 58 mm
RAL colour	grey 7035 / green 6029

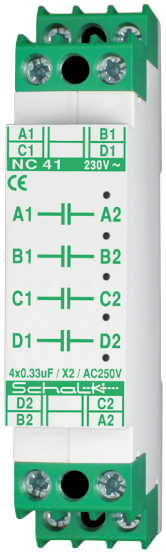
Technical data

Item no.	EAN	Type	Designation
NK3009	4 046929 901017	NK 3	Mains monitor 230 / 400 V AC

2017-08-01

Mains capacitance NC 41 / NC 1

For deriving parasitic currents with long cable lengths (capacitive coupling) and if the glow lamp load is too high.



NC 41

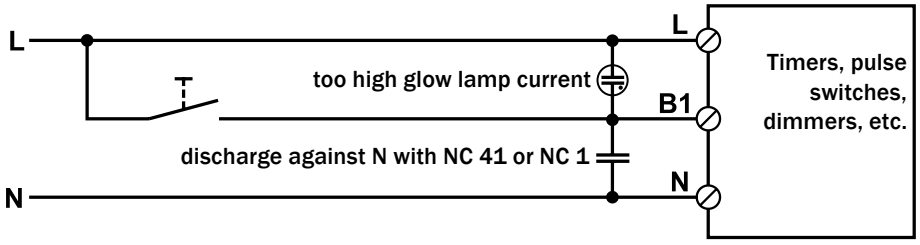
NC 1

General information

If the permissible glow lamp load or the maximum capacitive load (cable length) of a control input is exceeded, this inevitably leads to faulty switching behaviour due to interference currents.
The NC 41 contains four independent class X2 mains capacitors and can therefore be used to conduct such parasitic currents to the neutral conductor several times. The NC 1 can be used as a single discharge capacitor in confined spaces.

Applications

For deriving parasitic currents when the glow lamp load and/or line capacitance is too high.



Technical data

Operating voltage:	230 V 50-60 Hz 10 %
Individual capacity	330 nF (Class X2)
Ambient temperature	-10°C to +45°C
Connection terminals	Socket terminals with captive screws M3.5
Clamping range	0.5 mm² - 4.0 mm²
Strip length	6.0 mm - 6.5 mm
Screwing torque	0.80 Nm
External dimensions	18 x 88 (45) x 58 mm
RAL colour	grey 7035 / green 6029

Order data

Item no.	EAN	Type	Designation
NC4109	4 046929 901024	NC 41	Mains capacity 230V AC, 4x330nF/250V (REB)
NC1009	4 046929 901086	NC 1	Mains capacity 230V AC, 1x330nF

2017-08-01

Appendix:
Relay contact rating

Contact type	Normally open contact	Normally closed contact	Normally open contact	Normally closed contact	Normally open contact	Normally closed contact
Rated current (max. continuous current)	16 A	16 A	10 A	10 A	6 A	6 A
Contact material	AgSnO2					
Contact gap	0.5 mm					
min. switching voltage / switching current (#3)	5 V / 10 mA				12 V / 500 mA	
max. switching voltage	440 V~ / 250 V-				250 V~	
max. inrush current (1ms)	50 A		30 A		18 A	
max. inrush current (5s)	25 A		14 A		8 A	
max. switching capacity 230 V~ resistive load (nominal load)	3500 W		2000 W		1300 W	
max. switching capacity 230 V~ incandescent lamps	1000 W		600 W		500 W	
max. switching capacity 230 V~ fluorescent lamps (#1)	250 VA		140 VA		90 VA	
max. switching capacity 230 V~ ECG's (#1)	100 VA		60 VA		30 VA	
max. switching capacity 230 V~ fluorescent lamps, ECGs with EBN 2	1000 VA		600 VA		400 VA	
max. switching capacity 230 V~ inductive load (cos φ = 0.6)	650 VA		370 VA		220 VA	
max. capacitive load	30 uF		15 uF		10 uF	
max. switching capacity DC (#2)	350 W		250 W		150 W	
Mechanical service life (switching cycles)	10^7					
Service life at rated load[switching cycles]	10^5					
max. switching frequency	900/h		900/h		360/h	

#1 With capacitive inrush current (parallel-compensated LS lamps, ECGs), contact protection is required from maximum capacitive load e.g. EBN 2 (inrush current limiter connected downstream; series resistor 12 Ω bridged after 15 ms) for ECGs typically 3...6 uF are parallel to the input

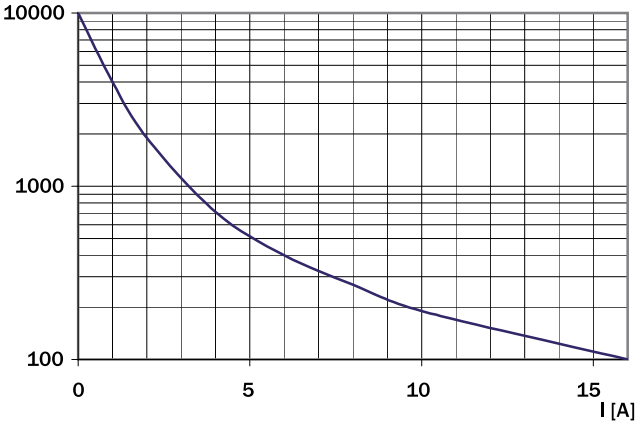
#2 with sufficient spark suppression (see load limit curve for DC voltage)

#3 depending on switching frequency and ambient conditions

Appendix:
Relay contact rating

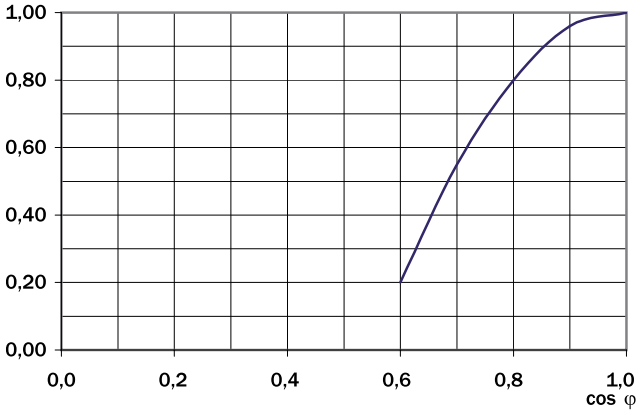
The following diagrams are typical for the NO contact 16A

Switching cycles [x10³]



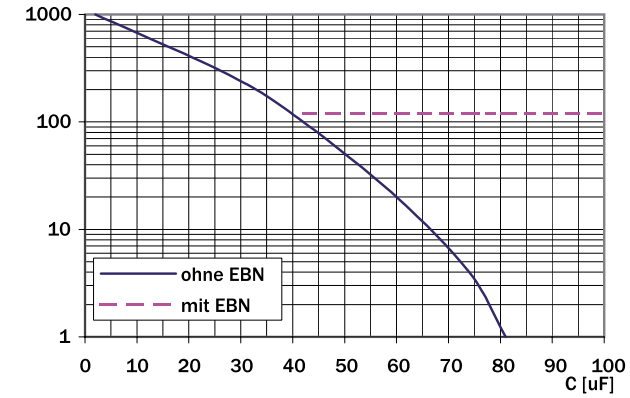
Contact service life with resistive load at 230 V~

Reduction factor



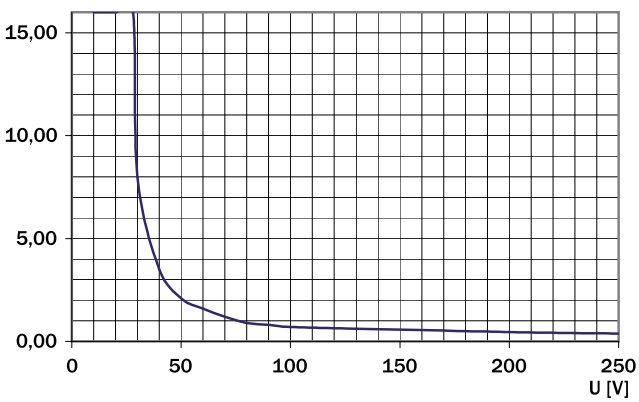
Reduced contact life under inductive load

Switching cycles [x10³]



Contact service life with capacitive load at 230 V~

I [A]



Load limit curve for DC voltage

2017-06-01

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