

Universal Dimmer N 528D01, 2 x 300VA , AC 230 V 5WG1 528-1DB01



Universal Dimmer for switching or dimming
of dimmable lamps

- Supports dimmable lamps including LED
- Output load up to 2 x 300 VA individually or 1 x 500 VA
- No minimum load required
- Operation mode leading or trailing edge
- Automatic load detection
- Protected for short circuit, over load and temperature with LED indication

Functions with commissioning with ETS

- Operating hours counter with threshold overrun warning
- Switching cycle counter with threshold overrun warning
- Integrated 8-bit scene control and assign of each output to up to 8 scenes

The universal dimmer is a 4 MU-wide device for DIN-rail mounting with N-system dimensions. It is designed for lighting control, i.e. for switching and dimming resistive, inductive or capacitive loads ranging up to 300 VA with 230V AC, 50/60 Hz per output. The bus is connected via a bus terminal block. The device electronics are supplied via the bus voltage.

Application

The device can be connected with loads on two outputs or for a higher load only with one output. A minimum load is not required.

Fig. 1 shows a 2-channel application with two independent controlled outputs. Optional a 1-channel application uses only one output A or B with higher load.

Note: Neutral (N) is not connected internally. External connection is needed for each channel.

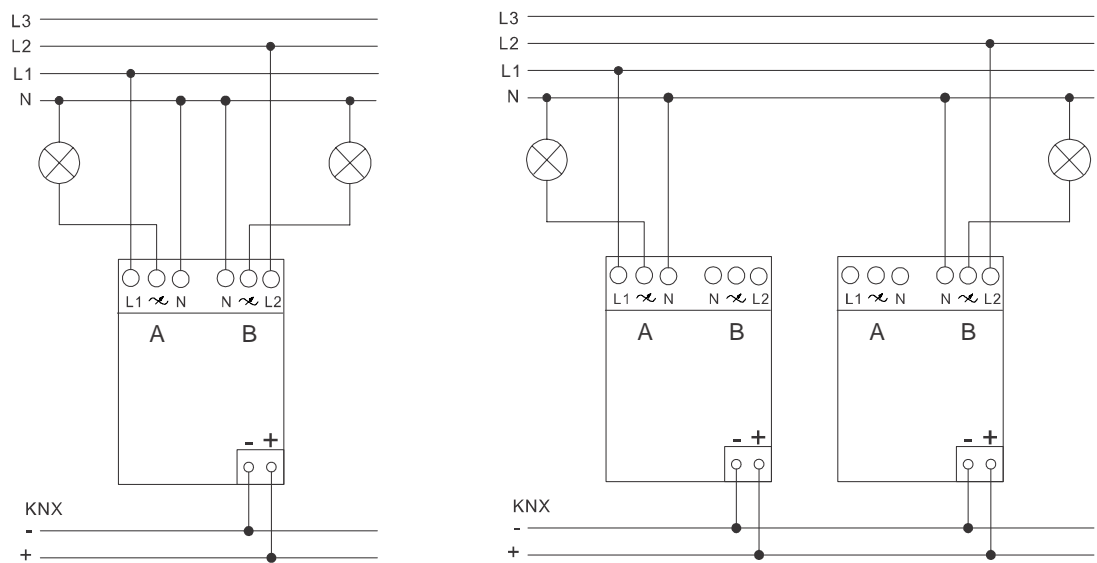


Fig. 1 Schematic applications

Types summary

Type	Article number	Description	Applications	KNX PL-Link
N 528D01	5WG1 528-1DB01	Universal Dimmer	<ul style="list-style-type: none"> • Switching • Dimming • Scene control 	Yes

Operating elements

- A1, A2 Terminals channel A, B
- B1, B2 Status LED channel A, B
- C LED for indicating normal operating mode (LED off) or addressing mode (LED on); returns to normal operating mode automatically after receiving the physical address
- D Learning button for switching between normal operating mode and addressing mode and for receiving the physical address
- E Label for physical address
- F Bus terminal block

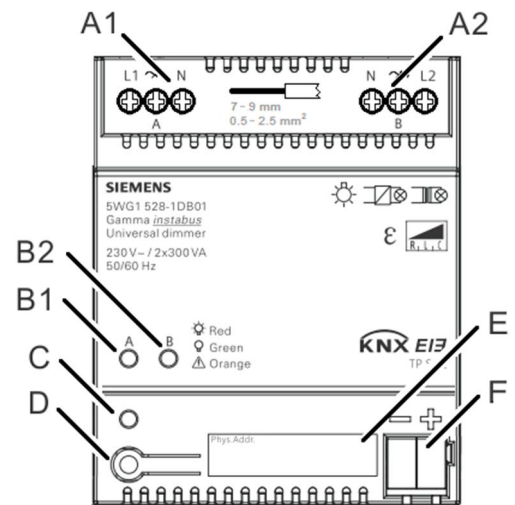


Fig. 2 Location of operating elements

Protection against short-circuit

In a short-circuit condition the dimmer turns the load off for 3 seconds and automatically tries to switch the output on to the currently set dimming value. If the short-circuit condition still persists the output is turned off permanently. Turn the output on again by receiving a telegram "on" or dimming value >0.

Protection against over temperature / overload

In case the maximum permissible temperature is exceeded, which also can indicate an overload, the dimmer turns off immediately. If after 1 minute the dimmer has cooled down sufficiently, it automatically dims back to the currently set dimming value, if there was received a telegram turn "on" or a dimming value > 0.

Immunity to ripple control signals and electrical grid frequency fluctuations

In the ex-factory settings the influence of ripple control signals is compensated to reduce flickering of the lamp. This measure increases the influence of electrical grid frequency fluctuations on the brightness of the lamp. A mostly undisturbed operation for an electrical system without a synchronous connection to the electrical grid can be achieved when the ripple control compensation is disabled via the associated parameter. The dimmer becomes less sensible to frequency fluctuations in the electrical system. Yet, ripple control signals will lead to an increased flickering of the load.

The device is configured and commissioned with Engineering Tool Software (ETS) version ETS4 or higher. With the ETS (Engineering Tool Software) the specific parameters and addresses are assigned appropriately, and downloaded into the device.

The actuator output may be set to one of the following operating modes:

- Normal mode
- 1-level time switch mode
- 2-level time switch mode
- Flashing

Dependent on the selected operating mode, objects for the functions switching, dimming brighter / darker and dimming value are available for the actuator output.

Furthermore, if required, time-limited switching instead of permanent switching on can be enabled for each channel via an optional "Night mode" object (e.g. for lighting while cleaning), if needed with a warning before switching off by multiple switching the output off and on (flashing).

Dependent on the configuration, additional objects are available for the output channel for the functions locking and status request.

The following schema shows the named features in a logical overview.

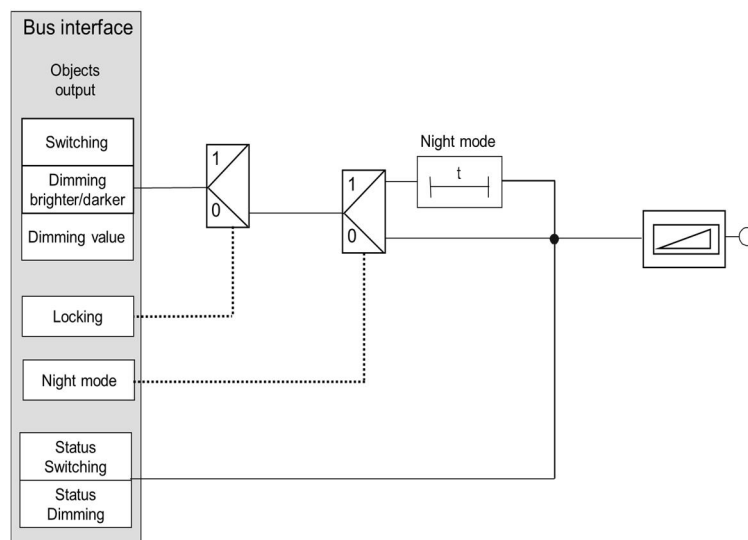


Fig. 3 Schematic design of a dimming actuator channel

The application program includes optional a switching cycle and operating hours count with threshold monitoring for each output and an integrated 8-bit scene control, in which each output can be incorporated into up to 8 scenes.

Behavior on bus voltage failure / recovery

On bus voltage failure the current switching status and dimming values are saved for restoration on bus voltage recovery.

On bus voltage recovery the configured actions are executed and, if applicable, new status values are reported.

Building site function

The building site function provided ex-factory enables switching the building site lighting on and off via bus wall switches and actuators, even if these devices have not yet been commissioned with ETS.

Behaviour on unloading the application program

When the application program is unloaded with ETS the device does not function.

Resetting the device to factory default settings

A very long push of the programming button (> 20 s) effects a reset to factory settings. This is indicated by constant flashing for 8 seconds.

All configuration settings are lost. The building site function is re-activated.

Functions with commissioning with Desigo Room Automation

Additional information like Desigo system description, product catalog for Room automation etc. is available here:



www.siemens.com/bt/en/desigo-tra

Product documentation

Additional information like operating and mounting instruction, application program description, Product database, additional software, product image, CE declaration etc. is available here:

<http://www.siemens.com/gamma-td>

Security

 	<p>DANGER</p> <ul style="list-style-type: none"> • The device must be mounted and commissioned by an authorized electrician. • A safety disconnection of the device must be possible. • The device must not be opened. • Use only loads that allow dimming operations. • Conventional transformers may be used. If they comply with the relevant standards and contain a thermal fuse. • For planning and construction of electric installations, the relevant guidelines, regulations and standards of the respective country are to be considered. - Connecting inductive loads together with capacitive or resistive loads to the same dimmer output is not permitted and leads to damage or destruction of the universal dimmer! - Dimming of inductive loads with trailing edge mode could damage the device.
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Indication LED

The channel A/B LED indicates the status and error messages.

Indicator	Description
Off	Device is not powered by KNX.
Red, on	Channel output is turned on.
Green, on	Channel output is turned off.
Orange, 0.2 Hz	Channel failure / power failure
Orange, 0.5 Hz	Overtemperature: temperature too high
Orange, 1 Hz	Over load: load too high
Orange, 5 Hz	Short circuit: current too high

Note:

- In case of exceeded temperature, overload, or short circuit, the dimmer turns off the output. Restart the dimmer by using an "on" or "dimming value > 0" command.
- In case of overtemperature, wait at least 1 minute and then restart the dimmer (cooling down time).

Note:

- Trailing edge mode occurs sometimes with a limited dimming range and an irregular dimming curve, but with less power-loss. Manual adjustment of control mode (trailing /leading edge) or min./max. dimming value is possible by Software.

Commissioning of dimmable LED and CFL

Not all LED and CFL are dimmable, because they have electronic components included. Only dimmable lamps can be dimmed properly. Lamp manufactures note this feature on lamps, on packages or in the datasheets. The maximum load also depends on operating mode, current peak.



Dimmable LED



CFL



LED retrofit



LED driver

Fig. 4 Dimmable LED and CFL

LED driver can control LED via constant current or voltage and are similar to "Low voltage halogen lamps with electronic transformers"

LED "Retrofit" lamps have a built-in LED driver, replace mostly incandescent lamps and fit into standard sockets (E27, E14, ...).

Operation mode for load control

Always prefer the recommended operation mode of the lamp manufacturer.

Universal dimmers support two kinds of operation modes:

- Leading Edge:
Mostly used to get a proper dimming behavior and the lamp can be dimmed very smooth.
- Trailing Edge:
Mostly used to control more or higher load at the output, because there is less power-loss.

Note:

Dimming of inductive loads with trailing edge mode is not permitted.

Automatic load detection

The universal dimmer sets LED mostly in "Trailing edge mode". Via parameter settings the mode can be changed in two options:

- optimized dimming behavior
- less power-loss to control higher loads.

Dimming behavior

With the parameter settings the dimming behavior of LED can be optimized to behavior of incandescent lamps.

- With "Minimum dimming value" and "Maximum dimming value" the range of viewable brightness changes of the LED can be adjusted.
- Some LED work properly only, if the "maximum dimming value" is set to less 100%.
- With "Start on value" some LED can be only turned on with a higher brightness value, so the LED driver gets enough power to turn on the light. Then the brightness can be dimmed down to a lower level.

The device is intended to be used for permanent interior installations in dry locations within distribution boards or small casings with DIN rail EN 60715-TH35-7.5.

Mounting and connection

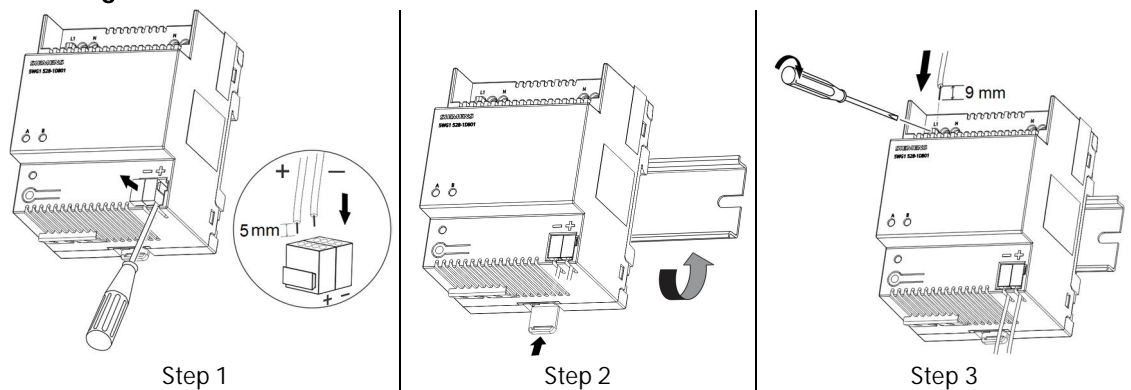


Fig. 5 Mounting and connection

Dismounting

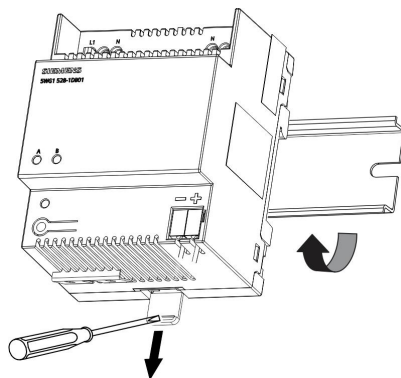


Fig. 6 Dismounting

Commissioning

The learning button is used to switch between different operational modes.

Press and hold <2 s:

- Enable addressing mode. The programming LED is on. After receiving a physical address, the dimmer returns to normal mode.
- Return to normal mode from other modes. (Programming LED is off).

Press and hold >5 s and <20 s:

Enable connection test for commissioning with Desigo.

Press and hold >20 s:

Reset the dimmer to factory settings. Programming LED flashes 8 s.

Note: All configurations are lost. The building site function is re-activated.

Power supply	
KNX bus voltage	DC 24V (DC 21...30V)
KNX bus current	Typical 5 mA, max. 8 mA.
Rated voltage	230V AC +10%/-15%, 50/60 Hz
Rated current	2-channel: 2 x 1.3 A @ $\cos\Phi=1.0$ 1-channel: 1 x 2.2 A @ $\cos\Phi=1.0$

Load output (at 35°C operating temperature; derating to 80% at 45°C)		
Typical lamp types	Use of	
	2 channels	1 channel
Incandescent lamps	300 W	500 W
High voltage halogen lamps	300 W	500 W
Low voltage halogen lamps with electronic transformers	300 VA	500 VA
Low voltage halogen lamps with magnetic transformers	240 VA	400 VA
Dimmable energy-saving lamps (CFL)	≤45 VA ^{*)}	≤75 VA ^{*)}
Dimmable LED	≤100 VA ^{*)}	≤200 VA ^{*)}

^{*)} The max. total power depends on the lamp type and control mode (leading/ trailing edge).

The following figure shows the maximum load output of the dimmer at different operating temperatures.

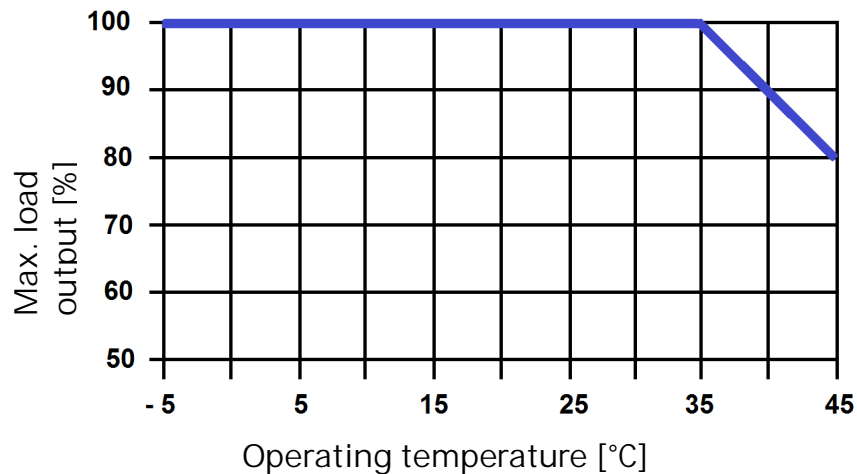


Fig. 7 max. load output derating diagram

Connections	
KNX bus line	Bus terminal block, screwless, conductor cross-section 0.6 ... 0.8 mm Ø single core, insulation strip length 5 mm
Load connections	Screw-type terminals, insulation strip length 7... 9 mm The following conductor cross-sections are permitted: 0.5... 4.0 mm ² single core, 0.5... 2.5 mm ² finely stranded

Physical Specifications	
Housing	plastic
Dimensions	72 x 90 x 55 mm
Mounting	DIN-rail EN 60715-TH35-7,5
Weight	approx. 220 g
Fire load	approx. 2 MJ
Power loss if output is off	0.9 W / channel

Environmental conditions	
Ambient temperature in operation	-5°C...+45°C
Storage temperature	-20°C...+70°C
Relative humidity (non-condensing)	5 % to 95 %
Climatic withstand capability	EN50491-2
Reliability	Failure rate: 1501 fit at 40°C

Standards	
Degree of pollution (according to IEC 60664-1)	2
Overvoltage category (according to IEC 60664-1)	III
Protection class (according to EN 60529)	IP20
Reliability	Failure rate: 1501 fit at 40°C

Standards	
Electrical Safety <ul style="list-style-type: none"> · Bus · Devices covers · Electromagnetic compatibility 	<ul style="list-style-type: none"> · Safety extra low voltage SELV DC 24 V · EN 50428 · EN 50428
Markings	KNX EIB
CE mark	Complies with the EMC regulations (residential and functional buildings), low voltage regulations and RoHS Directive

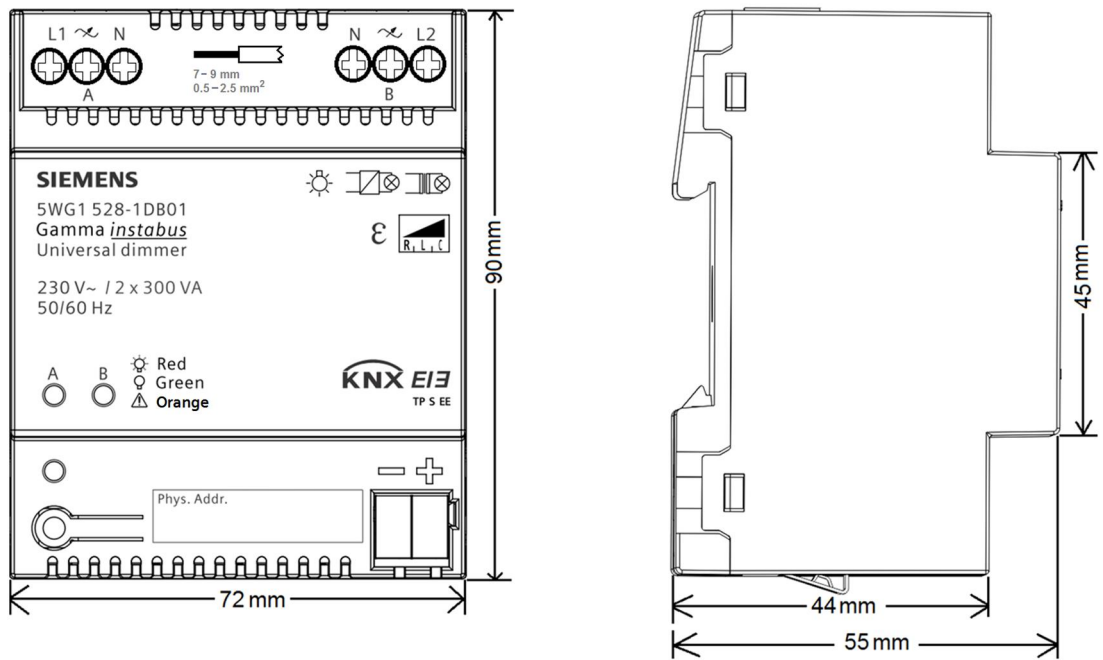


Fig. 8 Dimensions

Support

- The operating instructions must be handed over to the client.
 - A faulty device shall be returned with a Return Good Note for Service provided by the appropriate Siemens sales office.
 - If you have further questions concerning the product, please contact our technical support.
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- www.siemens.de/automation/support-request