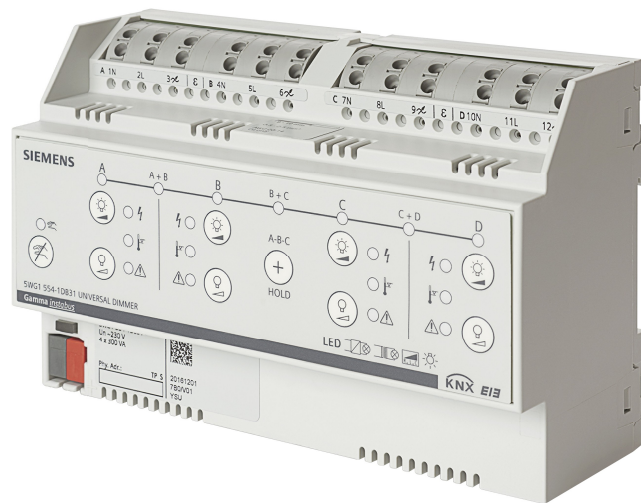# SIEMENS

Universal dimmer N 554D31, 4 x 300 VA / 1x 1000 VA, AC 230 V

Universal dimmer N 554D31

- Control of dimmable lamps, including LED without minimum load
- Output capacity: 4 x 300 VA, with channel bundling up to 1000 VA
- Protection against short circuit, overload and over temperature
- Direct operation for efficient installation

Functions with configuration with ETS

- Configurable dimming curves for optimal dimming behavior
- Operating hours counter with threshold overrun warning
- Integrated 8-bit scene control and assign of each output to up to 8 scenes

Type	Description	Article number
N 554D31	Universal dimmer	5WG1554-1DB31

Use

The universal dimmer is used for switching, dimming and scene control in building automation. Device control is conducted via KNX.

The universal dimmer can be used to switch and dim resistive, inductive and capacitive loads.

At each output channel of the universal dimmer, a load of up to 300 VA can be connected.

Neighboring outputs can be bundled (connected in parallel). With channel bundling of all four outputs, a load of up to 1000 VA can be connected to the universal dimmer.

The universal dimmer is designed for installation on a DIN rail.

Technical design

Position and function of the connections and labeling
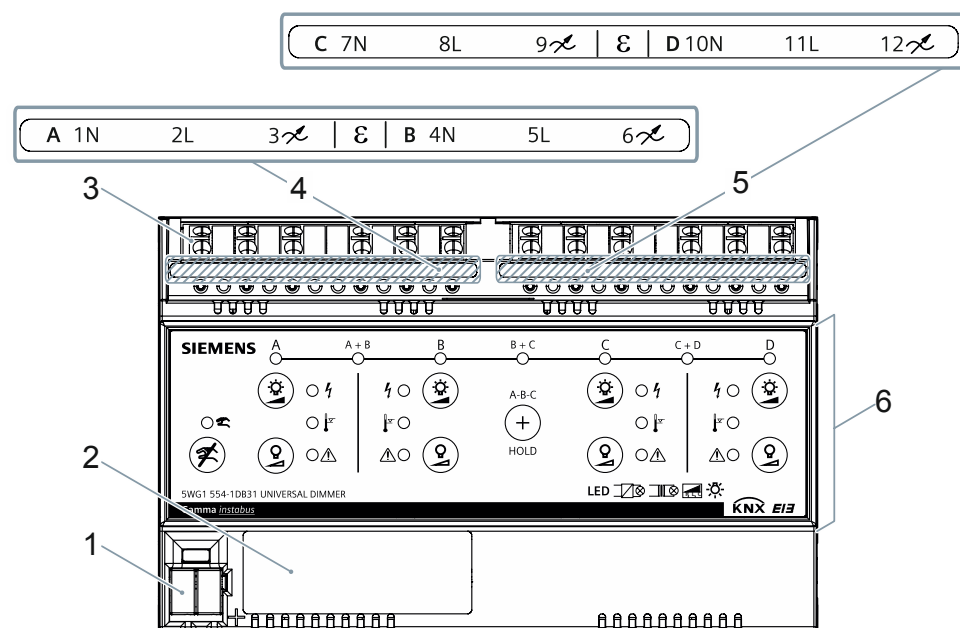
Pos.	Element	Function
1	KNX bus terminal blocks, screwless	Connect KNX bus
2	Product label field	Write individual address
3	Connection terminals	Connect loads (phases and neutral conductors)
4	Labeling of the connections to channel A and B	
5	Labeling of the connections to channel C and D	
6	Membrane keypad	Execute direct operation Configure channel bundling Display status of the universal dimmer
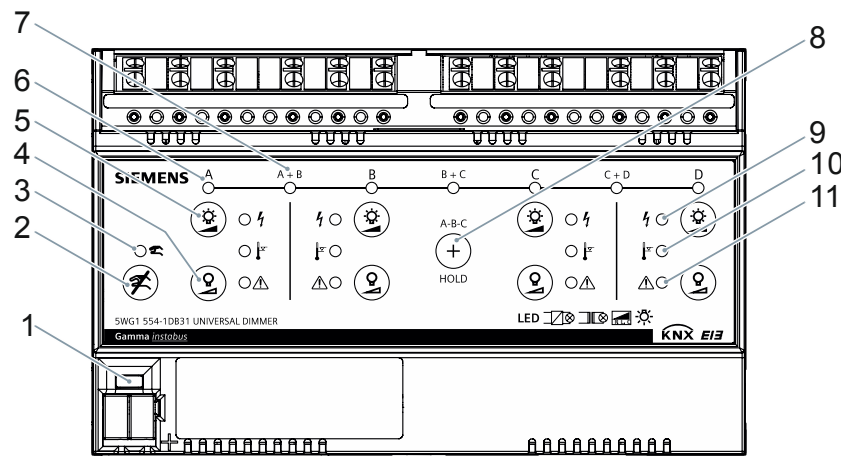
Pos.	Operating or display elements	Function
1	LED (red) Button: Learn mode	Short press of button (< 1 s): → Activate learn mode, display status (LED on = active) Very long press of button (> 20 s) → Reset to delivery state (LED starts blinking after 20 s)
2	Button: Deactivate direct operation	Deactivate direct operation for all channels
3	LED (yellow): Direct operation active	LED flashes when direct operation is active for at least one channel.
4*	Button: Switch off Dim darker Channel A	Short press of button (< 1 s): → **Switch off** channel A and → activate direct operation for channel A Long press of button (> 1 s): → Dim channel A darker and → activate direct operation for channel A
5*	Button: Switch on Dim brighter Channel A	Short press of button (< 1 s): → **Switch on** channel A and → activate direct operation for channel A Long press of button (> 1 s): → Dim channel A brighter and → activate direct operation for channel A
6*	LED (red): Channel A	LED lit: Channel switched on (dimming value > 0). LED off: Channel switched off (dimming value = 0). LED lights up with brief interruptions: Channel switched on in direct operation. LED flashing: Channel switched off in direct operation.
7*	LED (red): Channel bundling A + B	LED lit: Channels A and B are bundled and higher output values can be achieved. LED off: Channel A and B are not bundled.
8	Button: +	Preselection button for bundling / separating neighboring channels in combination with button 5 of channel A, B or C (only in delivery state)
9	LED (red): Short circuit	Short circuit detected at load output
10	LED (red): Overtemperature, overload	Overtemperature or overload detected at the load output

Pos.	Operating or display elements	Function
11	LED (red): Channel failure	Power failure, error detected on channel (channel not ready)

*The description of channels 4, 5, 6 and 7 applies analogously for the corresponding buttons/LEDs of channels B, C and D.

At each channel of the universal dimmer, loads of up to 300 VA can be connected.
Neighboring channels can be bundled into groups of 2, 3, or 4 channels (connected in parallel). With channel bundling of all four outputs, loads of up to 1000 VA can be connected to the universal dimmer.

In the delivery state, channel bundling can be conducted directly on the device without software. Ultimately the configuration of the channel bundling is defined via the ETS software.

The following channel bundling options are possible:
- A+B|C|D
- A+B|C+D
- A|B+C|D
- A|B|C+D
- A+B+C|D
- A|B+C+D
- A+B+C+D

The following circuit diagrams show four of the possible bundling variants.

	DANGER
⚡	• Make sure that it is always the same load types that are connected to a channel! • Ensure that it is always only one phase (L1, L2 or L3) that is connected to the single channel or bundled channels!

| Example	Description	Maximum connection capacity
1	Operation without channel bundling of the outputs	A, B, C, D: 300 VA
2	Channel A and B with channel bundling	A + B: 500 VA C, D: 300 VA
3	Channels A, B and C with channel bundling	A + B + C: 750 VA D: 300 VA
4	Channels A, B, C and D with channel bundling	A + B + C + D: 1000 VA

Example 1: No channel bundling
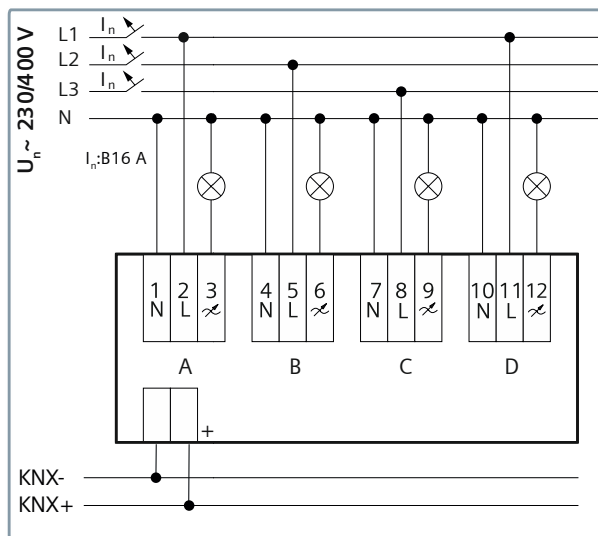
Example 2: Channel bundling of channel A and B
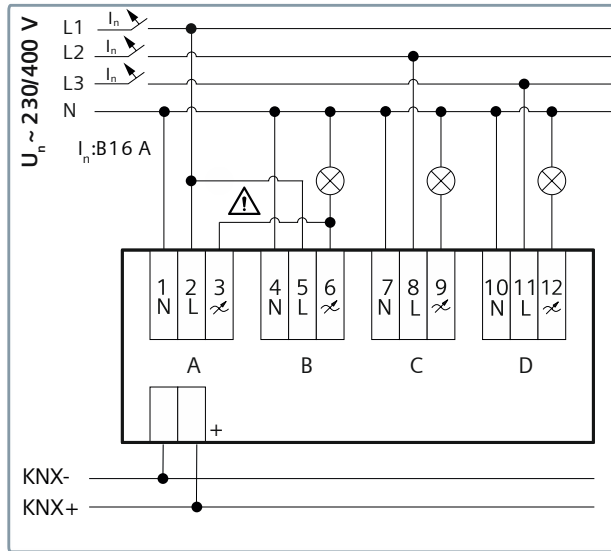
Example 3: Channel bundling of channel A, B and C
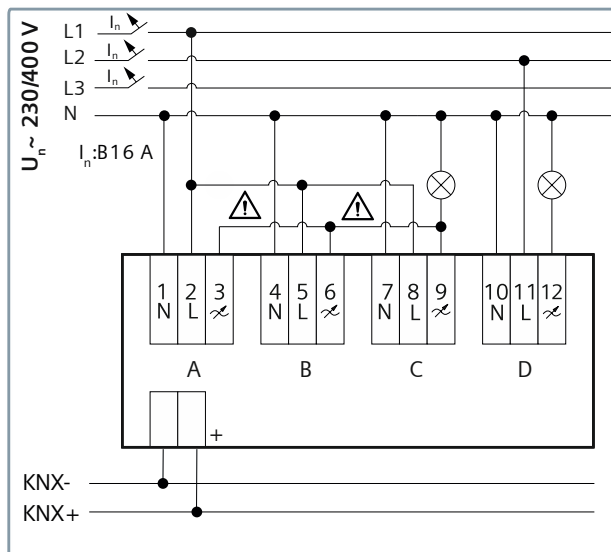
Example 4: Channel bundling of channel A, B, C and D
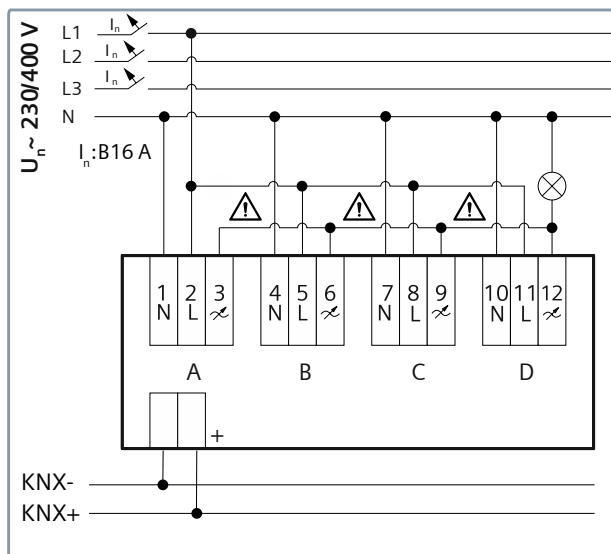
Power supply	
KNX bus voltage	DC 24 V (DC 21 V ... 30 V)
KNX bus current	7.5 mA
Voltage	AC 230 V
Supply frequency	50 ... 60 Hz

Outputs	
Rated voltage	AC 230 V
Rated current (per output)	1.3 A @ $\cos\varphi$ = 1.0
Rated frequency	50 Hz ... 60 Hz
Power loss (per output with rated output)	1.7 W (maximum)

Connection capacity				
		With channel bundling of		
Load type	Per channel	2 channels	3 channels	4 channels
Incandescent lamps	300 W	500 W	750 W	1000 W
High voltage halogen lamps	300 W	500 W	750 W	1000 W
Low voltage halogen lamps with electronic transformers	300 VA	500 VA	750 VA	1000 VA
Low voltage halogen lamps with magnetic transformers	240 VA	400 VA	600 VA	800 VA
Dimmable energy-saving lamps (CFL)	45 VA	80 VA	120 VA	160 VA
Dimmable LED Operating mode: Trailing edge operation	200 VA*)	300 VA*)	450 VA*)	550 VA*)
Dimmable LED Operating mode: Leading edge	60 VA*)	100 VA*)	140 VA*)	180 VA*)

*) The max. total power depends on the lamp type and control mode. All information refers to the main installation location of the universal dimmer. Load terminals top, KNX terminals bottom.
For all other installation locations, the power must be reduced to 80% of the specified values.

Physical specifications	
Housing material	Plastic
Dimensions	Rail-mounted device in N dimension Width 8 TE (1 TE = 18 mm) Length 90 mm Height 61 mm
Weight	310 g
Fire load	6 MJ

Environmental conditions	
Ambient temperature in operation	-5 °C ... +45 °C
Storage temperature	-20 °C ... +70 °C
Transport temperature	-25 °C ... +70 °C
Rel. humidity (non-condensing)	5 % ... 95 %
Climatic withstand capability	EN 50428

Protection settings	
Degree of pollution (according to IEC 60664-1)	2
Overvoltage category (according to IEC 60664-1)	III
Protection class (according to EN 60529)	IP 20
Electrical safety, bus	Safety extra low voltage SELV DC 24V
Electrical safety, device fulfills	EN 50428
EMC compatibility	EN 50428

Reliability	
Failure rate (at 40°C)	940 fit

Building site function

The building site function makes it possible to switch building site lighting on and off without the universal dimmer having to be configured with the ETS. In the delivery state, the building site function of the universal dimmer is activated.

Direct operation via the membrane keypad

After the installation, the individual channels of the dimmer can be tested directly on the universal dimmer. Prior configuration via the software is not necessary for this.
In the delivery state, direct operation is activated without a time limit.
After configuration, direct operation is limited to the configured time limit.

Operation mode for load control

The universal dimmer supports two kinds of operation modes:
- **Leading edge:**
  – For inductive or resistive loads.
  – To achieve a better or more uniform dimming behavior with LED.
  – Prescribed for inductive loads.
- **Trailing edge:**
  – For capacitive or resistive loads.
  – For controlling more lamps and higher loads as less power loss is generated.

Automatic load detection

When initializing the control electronics and when loading the ETS parameters, automatic load detection is executed. The universal dimmer automatically adapts the type of operating mode at an output to the connected load.

Resetting the universal dimmer to factory default settings

A very long push of the programming button (> 20 s) resets the universal dimmer to the factory settings. The building site function and direct operation are re-activated. Channel bundling can now again be conducted directly on the universal dimmer.

Protection against short circuit

In a short-circuit condition the universal 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.
With channel bundling, there is no automatic attempt to switch back on.

Protection against overload/overtemperature

In case the maximum permissible temperature is exceeded, which also can indicate an overload, the universal dimmer turns off immediately. If after 1 minute the universal 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

The influence of ripple control signals is compensated in order to reduce flickering of the lamps.
In order to ensure mostly undisturbed operation in electrical systems without a synchronous connection to the power grid, the universal dimmer is less sensitive to frequency fluctuations in the system.

Version of the Engineering Tool Software and application program

Application	Version
Engineering Tool Software (ETS)	ETS 4.2 and up
Application program	9A0401

Behavior with bus voltage failure/recovery

When bus voltage is lost, the current switch status and dimming value status are permanently saved. When bus voltage is recovered, these values are restored.

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

Behavior on unloading the application program

If the application program is unloaded by the universal dimmer with ETS, the universal dimmer has no further function and must be reprogrammed.

Timer functions

When configuring the dimmer with ETS, 2 different times and night mode can be programmed. It is possible to set delayed switching on/on and a warning before switching off occurs.

Overrides

Via ETS it is possible to activate up to seven different override function blocks for the universal dimmer to override the automation functions.

Switch cycle and operating hours count

To monitor use, with the right configuration it is possible to count and display the switch cycles and operating hours of the dimmer.

8-bit scene control

Using 8-bit scene control, current brightness values or switching states can be assigned to a scene and activated again later through the scene.
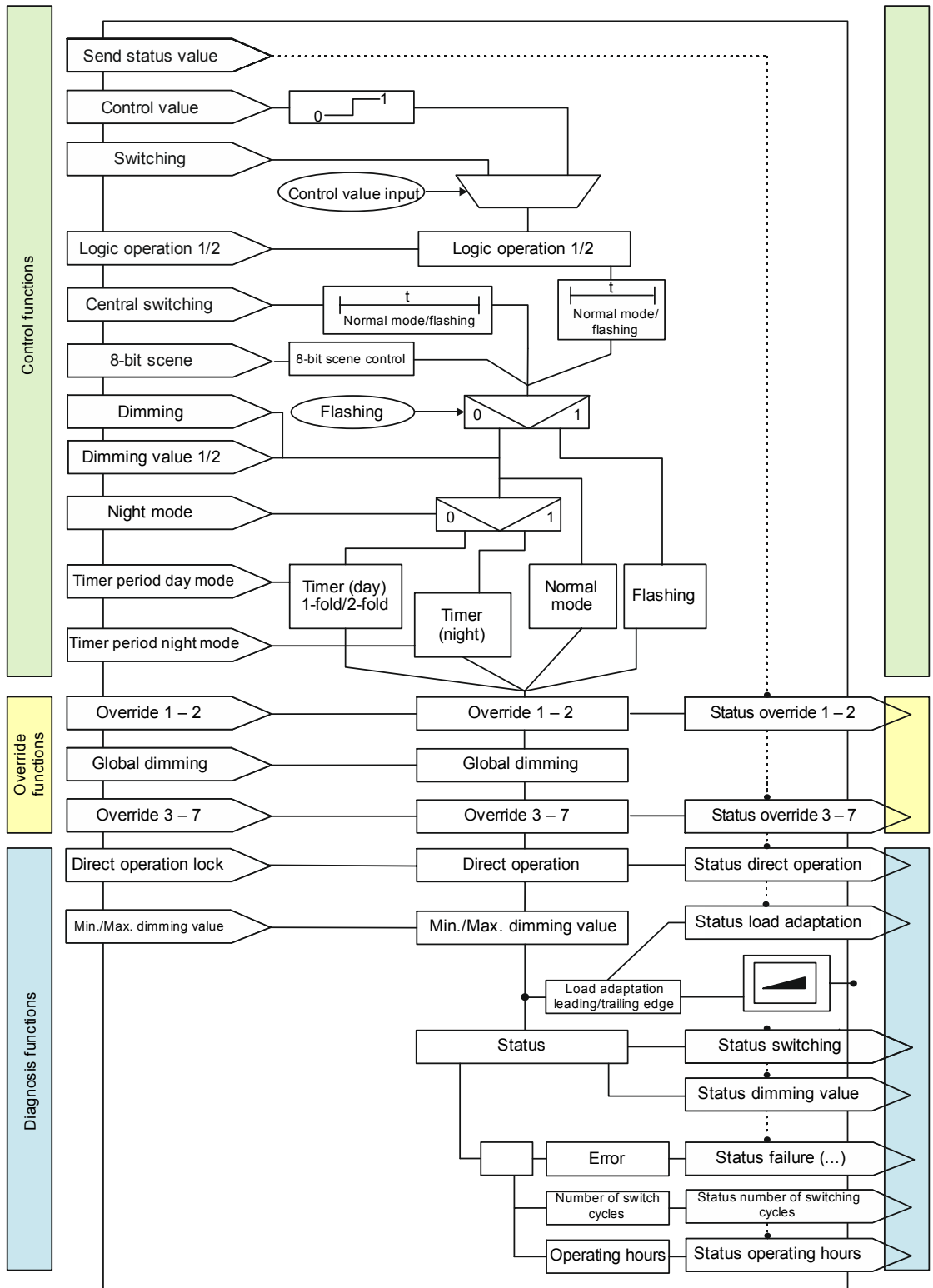
Adjusting the dimming behavior of LED lamps

With the parameter settings the dimming behavior of LEDs can be adapted to the behavior of incandescent lamps.

- With "minimum dimming value" and "maximum dimming value," the area ion which the LEDs are to be visibly dimmed can be set for each channel.
- Some LEDs can only be dimmed if the "maximum dimming value" is set to lower than 100 %.
- Some LED can be only turned on with a higher brightness value, so the LED driver gets enough power to turn on the light. This can be achieved with the parameter "Start on value." Then the brightness can be dimmed down to a lower dimming value.
- The dimmer contains preconfigured dimming curve with which the behavior of LED lamps can be enhanced. It is also possible to adjust the dimming curves freely if none of the preset dimming curves produce the desired result.

Schematic design of a dimming channel:

The following schema shows the functions of the dimmer in a logical overview.

Control functions

- Send status value
- Control value — 0 ⌐ 1
- Switching
  - Control value input → Control value input
- Logic operation 1/2 → Logic operation 1/2
- Central switching → [t] Normal mode/flashing → [t] Normal mode/ flashing
- 8-bit scene → 8-bit scene control
- Dimming → Flashing → 0 ▽ 1
- Dimming value 1/2
- Night mode → 0 ▽ 1
- Timer period day mode → Timer (day) 1-fold/2-fold
  - Timer (night)
  - Normal mode
  - Flashing

Override functions

Override 1 – 2	Override 1 – 2	Status override 1 – 2
Global dimming	Global dimming	
Override 3 – 7	Override 3 – 7	Status override 3 – 7

Diagnosis functions

| Direct operation lock | Direct operation | Status direct operation |
| Min./Max. dimming value | Min./Max. dimming value | Status load adaptation |

- Load adaptation leading/trailing edge → [▟]
- Status → Status switching
- Status dimming value
- Error → Status failure (…)
- Number of switch cycles → Status number of switching cycles
- Operating hours → Status operating hours

Notes

Safety

	DANGER
	• The universal dimmer should only be installed and put into operation by a certified electrician. • Ensure that the universal dimmer can be activated. • Do not open the housing of the universal dimmer. • Only use loads that are approved for dimming operation. • Only use conventional transformers that 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. • Do not operate inductive loads in trailing edge mode. • Ensure that it is always only one phase (L1, L2 or L3) that is connected to the single channel or parallel-connected channels!

Installation notes

The universal dimmer can be used for fixed installations in interior spaces, for installations in dry locations within distribution boards or small casings with DIN rail EN 60715-TH35.

Dimmable LEDs and energy saving lamps (ESLs)

When connecting LED lamps, LED drivers and energy-saving lamps, it must be ensured that they are designed for dimming and which operating mode (leading edge mode or trailing edge mode) is used. Manufacturers indicate whether a lamp is dimmable or not with a symbol on the package.
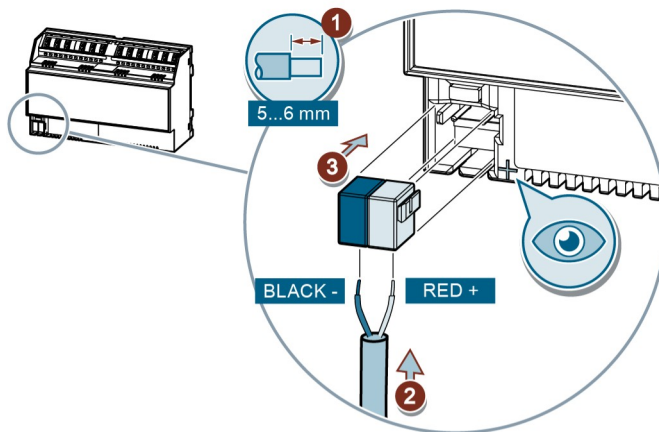

Manufacturers also specify the recommended operating mode on the package. Irrespective of which operating mode is set by the device for automatic load detection, the operating mode specified by the manufacturer must always be selected.

Connecting loads
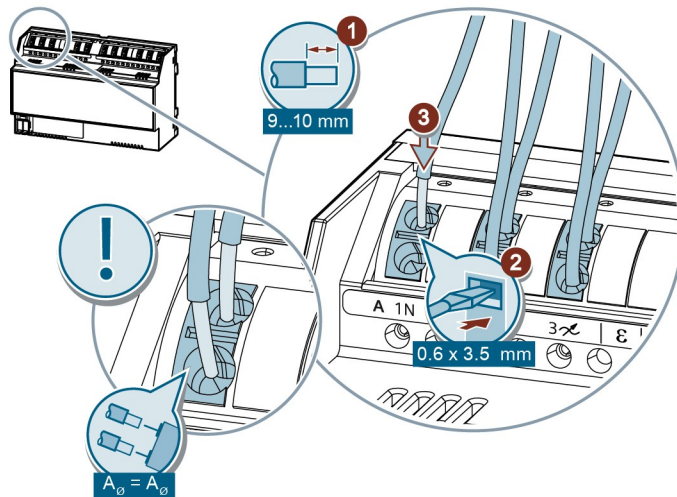
Cu		A_Q
⚪		0.5 ... 2.5 mm²
⚫		2.5 mm²

Connecting KNX

BLACK -   RED +

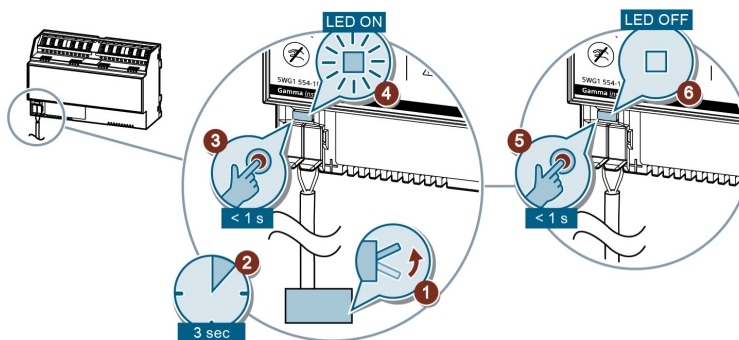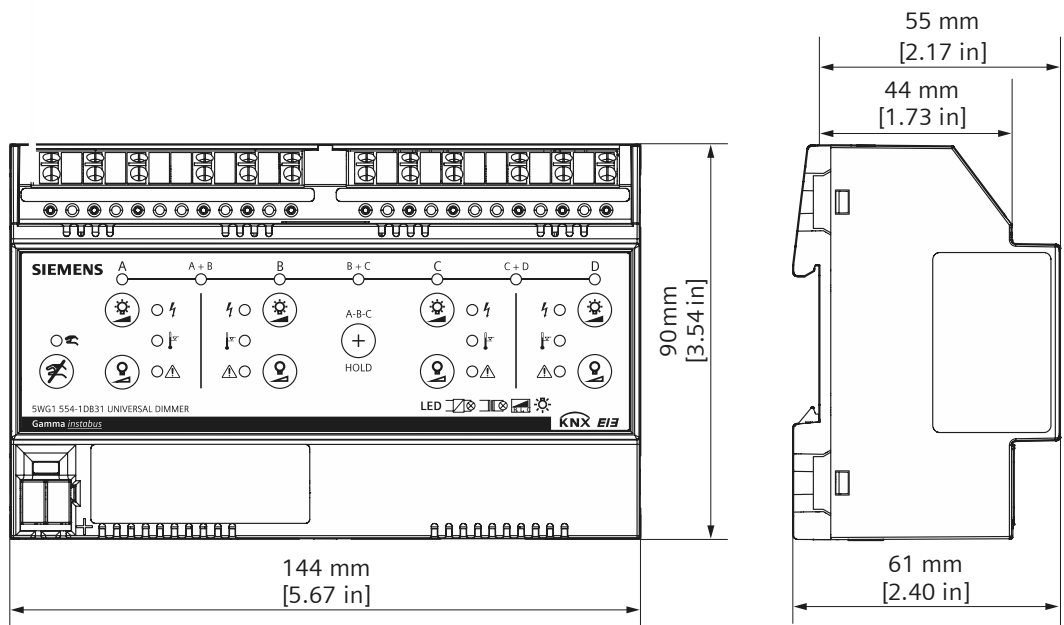| Cu	
⚪	0.6 – 0.8 mm

Test of KNX 24VDC type SELV

This test can be used to check whether the bus connection cable is connected with the correct polarity and whether the universal dimmer is supplied with bus voltage.

13 / 15

Update: http://www.siemens.com/gamma-td

DS01

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Subject to change

Support

General information
- 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.
  ☎ +49 911 895-7222
  🖷 +49 911 895-7223
  ✉ support.automation@siemens.com

http://www.siemens.com/automation/support-request