

DALI 2 standard dimmer at 12 / 48 Vdc with 4 channels

Code: EK-GD1-DL-4-LV



Datasheet STEKGD1DL4LV_EN

DALI 2 standard bus device with 4 channels and 12/48 Vdc power supply, to control the brightness of LED sources, dimmable in PWM modulation.



Description

The ekinex standard DALI 2 4-channel dimmer EK-GD1-DL-4-LV allows the control of brightness, temperature and color of LED loads from 12 to 48 Vdc in constant voltage, dimmable in PWM modulation.

The device is powered at 12 / 48Vdc and complies with the new "flicker-free" standard. The bus input is DALI-2 with reference to the IEC 62386 standard. It is also equipped with the "4 in 1" function for controlling the RGBW color (DALI DT6), the color temperature in dynamic white TW (DALI DT8), on 4 independent channels or a single channel.

The DT6 / DT8 setting takes place via a dip-switch selector, positioned under the upper plastic cover. The dimmer has an integrated bus communication module, DALI 2 certified.



Warning! Dimmers require to use a power supply in accordance with EN 61347-2-13, such as the Mean Well mod. HLG-480H-24A.

Main functional characteristics

- Memory function configurable via DALI bus: it stores the last brightness level, in case of power failure
- Soft switching on and off
- Brightness adjustment to full power off (dim-to-dark)
- Min. brightness level: 0.1%
- DALI-settable dimming curve: linear/quadratic/exponential
- On and off times settable via DALI
- Optimized output curve
- Button for mode change and / or DT6 / DT8 selection (depending on the device version)
- Status LED (switch to stand-by after 1 minute)

Technical data

Inputs

- Input (constant voltage): 12 / 48 Vdc
- Supply voltage: min: 10.8 Vdc .. max: 52.8 Vdc
- Power absorbed while awaiting command: <500 mW
- DALI 2 bus input with reference to IEC 62386 standard

Outputs

- PWM voltage output 12/48 Vdc
- Output current from 0 A to 20 A (4x max. 5 A)
- Rated power @ 12V: 120W
- Rated power @ 24V: 240W
- Rated power @ 48V: 480W



Note: values for output current and nominal power have to be intended as maximum values, depending on the ventilation conditions. The reported values are measured with a room temperature of 40 °C

Dimming

- "Flicker-free" PWM modulation: adjustable with 300/600/1200/2000 Hz values
- PWM resolution: 16 bits
- PWM dimming range: 0.1-100%

Environmental conditions and other characteristics

- Operating temperature: -20 °C ... + 40 °C
- Storage temperature: - 40 °C ... + 60 °C
- Transport temperature: - 40 °C ... + 60 °C
- Maximum case temperature (t_c): 80 °C
- Relative humidity: 93% non-condensing
- Protection degree IP10 (device installed)
- Wiring: 1.5 mm² solid – 1.0 mm² stranded, 16-17 AWG
- Stripping: 5.0 - 6.0 mm
- Housing in plastic material
- Device suitable for installation in panels/cabinets 4 UM
- Safety class II
- Weight: 200 g
- Dimensions (LxHxP): 72 x 91 x 62 mm

Protections

The device is equipped with the following protections:

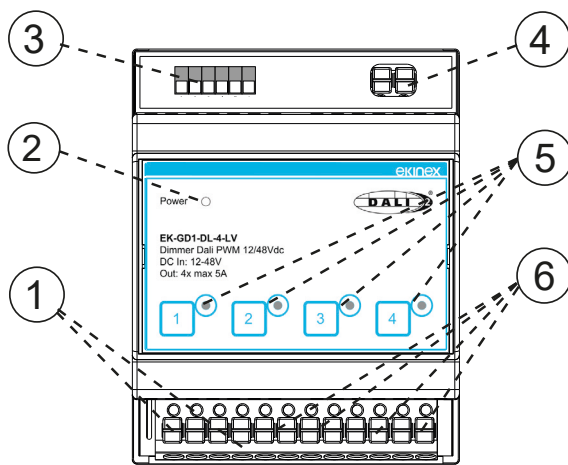
- OVP Over voltage protection¹
- RVP Reverse polarity protection¹
- OCP Open circuit protection

1) Control logic protection only

Control, signaling and connection elements

The device has a spring terminal for connecting the 12/48 Vdc input power supply (1) and output loads (6), and a spring terminal for connecting the DALI line (4).

There is also a status LED (2) and a dip-switch selector for DT6 / DT8 configuration (3), located under the upper removable cover. There are also status LEDs for each channel (5). By pressing one of the buttons associated with the channel, the connected load flashes.



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Nr.	Label	Connections
1	DC IN (+)	DC (+) input
	DC IN (-)	DC (-) input
2	Power	Status LED
3	-	DT6 / DT8 dip-switch selector (under the removable cover)
4	DA	DALI pole 1
	DA	DALI pole 2
5	-	Active channel button and LED
6	LED OUT X (+)	Output x (+)
	LED OUT X (-)	Output x (-)

The meaning of the status LED (2) is as follows:

- Green steady on: normal operation and DALI line present
- Green flashing 1 time/sec: DALI line missing
- Green flashing every 0.5 sec: generic output error

The selection of the DT6 or DT8 Tunable White configuration takes place using the selector (3), positioned under the removable cover.

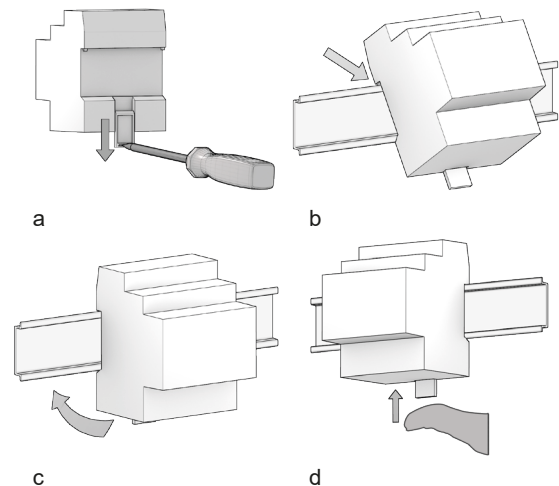
Mounting

The devices have degree of protection IP10, and are therefore suitable for use in dry interior rooms. The mounting must be performed on a profiled rail according to EN 60715 inside electrical distribution panels and cabinets.

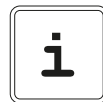
To disassemble the device, to have first to disconnect the inputs, outputs and power supply.

When assembling, make sure to leave only the front panel accessible; all other sides must not be accessible. Proceed as follows:

- with the aid of a tool bring the locking device in the fully lowered position (a);
- place the upper edge of the rear inner profile on the upper edge of the rail (b);
- rotate the device towards the rail (c);
- push the locking device upward until it stops (d).



To remove the device, be sure that inputs, outputs, and the input power supply have been disconnected. Then use a screwdriver to slide down the locking device and remove the device from the rail.



Note. When mounting the device in boards and cabinets it shall be provided the necessary ventilation so that the temperature can be kept within the operating range of the device.

Setup and installation

The steps to setup the device are as follows:

- connect the load LEDs to the output terminal blocks "LED OUT" of the device.
- connect the local command (where available) to the PUSH input for "stand-alone" mode and / or connect the DALI bus to the related DA terminal blocks;
- connect the 12/48 Vdc power supply to the terminal blocks "DC IN" of the device.

DALI bus line and command connections

The connection to the DALI bus network and the local commands is done via the spring terminal, located on the front of the device in the upper part.

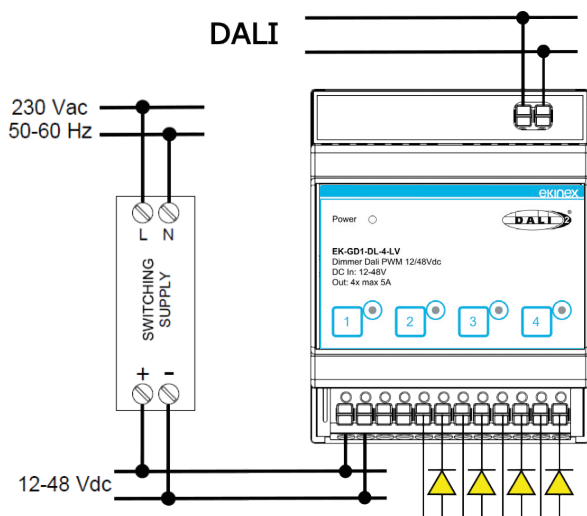
The length and type of the connection cables to the DALI bus must be compliant with the protocol specification and the present regulations and they should be isolated from every wiring or parts at voltage not SELV. Use double insulated shielded and twisted cables.

All the devices and the control signal connected to the DALI bus and to the local command (where available) must be SELV (the devices connected must be SELV or supply a SELV signal).

INSTALLATION TECHNICAL NOTES



- Installation and maintenance must be performed only if the power supply has been turned off.
- Installation and maintenance must only be performed by qualified personnel in compliance with current regulations.
- The product must be installed inside an electrical panel protected against overvoltages.
- The product must be installed in a vertical position with the front / label facing the front or in a horizontal position with the front / label facing upwards. Other product installation positions are not allowed. The bottom position with the front panel / label facing down is not allowed.
- Keep separated the circuits at 230V and the circuits not SELV from circuits to low voltage (SELV) and from any connection with this product. It is absolutely forbidden to connect, for any reason whatsoever, directly or indirectly, the 230V mains voltage to the bus or to other parts of the circuit.



Installation scheme for EK-GD1-DL-4-LV

Characteristics of the DALI terminal block

- Spring tightening of the conductors
- Bus wiring: 1.5 mm² solid – 1.0 mm² stranded – 16 - 17 AWG
- Conductor stripping recommended: 5.0 - 6.0 mm
- Length of bus connection cables < 25 m

Connection of power supply and LEDs

For the power supply use SELV power suppliers with limited current, short circuit protection only and the power must be correctly dimensioned. In case of usage of a power supplier with ground terminals, all points of the protective earth (PE = Protection Earth) must be connected to a valid and certified protection earth.

The power supply must be dimensioned according to the load connected to the device. If the power supply is oversized with respect to the maximum absorbed current, then insert a protection against over-current between the power supply and the device.

Characteristics of the supply and LEDs terminal block

- Spring tightening of the conductors
- Power and LEDs wiring: 1.5 mm² solid – 1.0 mm² stranded – 16 - 17 AWG
- Power and LEDs stripping recommended approx.: 5.0 - 6.0 mm

Output

The length of the connection cables between the product and the LED module must be less than 30m; the cables must be correctly dimensioned and they should be isolated from every wiring or parts at not-SELV voltage. It is preferable to use shielded and twisted cables.

If you want to use connection cables between the product and the LED modules over 10m, the installer must ensure the proper functioning of the system. In any case, the connection between the product and the LED modules must not exceed 30 m.

Configuration and commissioning

Configuration and commissioning activities of the device must be carried out according to the design of the building automation system done by qualified planners.

For commissioning the device the following activities are required:

- make the electrical connections as indicated above;
- power up the bus;
- carry out the device programming, as described below.

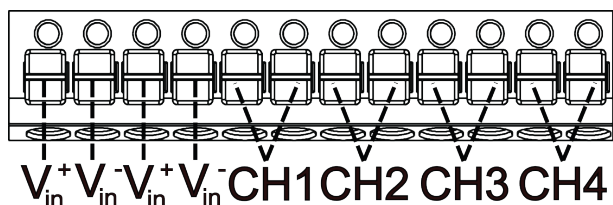
Programming

The device is equipped with a dip-switch, located under the front cover, for setting the operating mode. Remove the upper part of the cover to access the dip-switch, levering with a screwdriver as shown in the figure.



The configuration is shown in the table.

Configuration	Settings
	DT6 White Dimming 4 independent channels
	DT8 Tunable White Dimming - CH1, CH3 warm white - CH2, CH4 cold white
	DT6 2-channels DALI Dimming: - CH1+CH3 coupled - CH2+CH4 coupled
	DT6 1-channel DALI Dimming All outputs are identical
	Not used
	Not used
	Enables / disables the "short circuit detection" function for the connection of capacitive loads

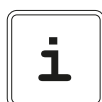


The enabling / disabling of the "short circuit detection" function is used when the connected loads are spotlights powered at 12/24 Vdc, which inside have a voltage-current converter and therefore an inductive or capacitive load. In this case, for dimming it is necessary to disable the "short circuit detection" function.

Status LED

The meaning of the status LED on the front of the device is as follows:

- Green steady on: normal operation and DALI line present
- Green flashing 1 time/sec: DALI line missing
- Green flashing every 0.5 sec: generic output error



Note. The programming of the parameters mentioned above must be carried out only during the programming phase. If the customer has a DALI programmer / master, he can reprogram them as he wishes.

Configuration change

Subsequently, it is possible to change the device configuration and addressing using an application for parameterization, for example by downloading the ekinex CGEKBG1TP software to the PC which allows you to:

- configure the DALI system and define its parameters;
- set the DALI devices (groups, scenarios, IDs, etc.);
- test the communication on the DALI bus;
- update the device.

The software can be downloaded from the website www.ekinex.com and its use is described in the application manual of the ekinex EK-BG1-TP DALI Gateway. The software works with Microsoft Windows (7 and later).



Note. For the CGEKBG1TP configuration software to work, it may be necessary to install .NET Framework 4, which can be downloaded freely from the Microsoft website.

DALI System fail function

For each device it is possible to set the "system failure" parameter, that is the brightness level at which the LED load is set, in case of DALI bus outage.

This setting can be done using a DALI programmer such as USB DALI interface Tridonic, Lunatone DALI Cockpit or similar.

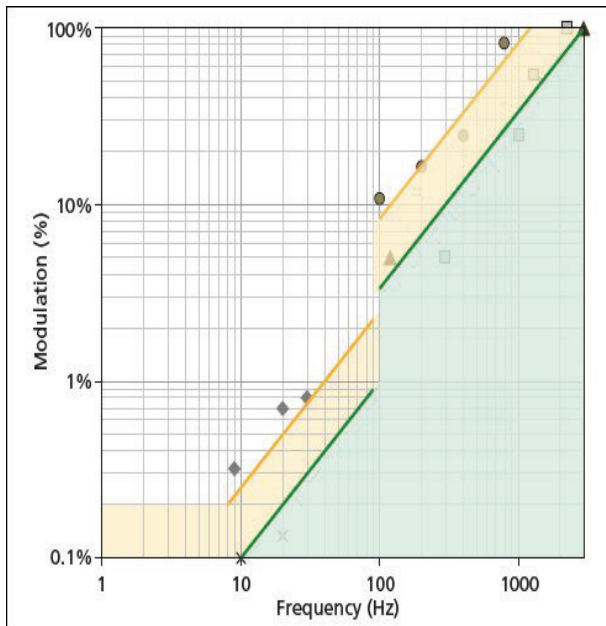
The range of brightness values is from 0 to 254 (100%).

If the value 255 (MASK) is set, the last brightness value is restored.



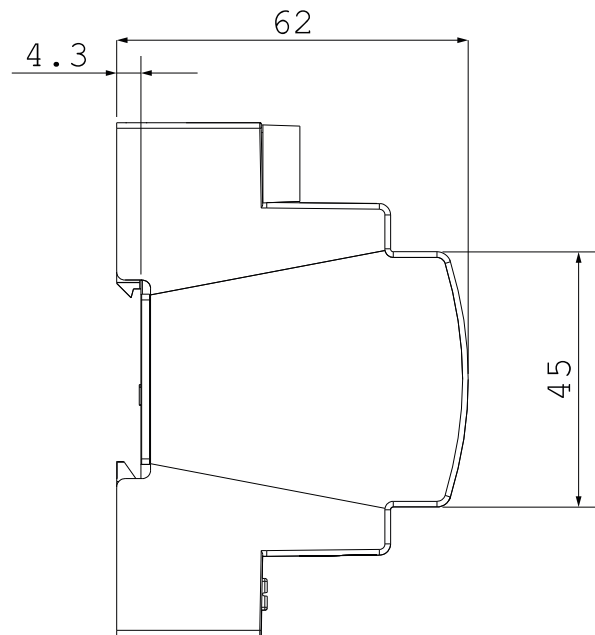
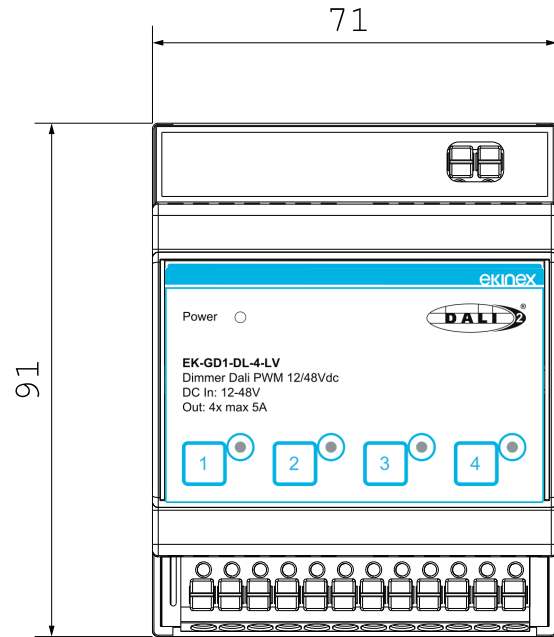
Flickering

The graph below shows the flickering limit curves across the entire frequency range, distinguishing areas with low or no visible risk to people's health (yellow area) from areas with no observable effect (green area).



Depending on the sensitivity and frequency, these disturbances can cause damage to people's well-being. It is proven that while very high frequencies have no effect on well-being, while those below 120 Hz do. The IEEE 1789-2015 standard provides comprehensive recommendations for reducing health risk for people.

Dimensions [mm]



Marks

- CE: the device complies with the Electromagnetic Compatibility Directive (2014/30/EU), the Low Voltage Directive (2014/35/EU) and the RoHS III Directive (2011/65/EU).
- Reference Standards: EN 61347-1:2015, EN 61347-2-13, EN 55015:2013+A1:2015, EN 61547:2009, EN 50581:2012, IEC/EN 62386-101/102/207, IEC/EN 60929-E.2.1.

References

- IEC/EN 62386-101 - Digital addressable lighting interface, General requirements - System
- IEC/EN 62386-102 Digital addressable lighting interface, General requirements - Control gear
- IEC/EN 62386-207 Digital addressable lighting interface, Particular requirements for control gear – LED modules (device type 6).
- IEC 60929-E.2.1 Control interface for controllable ballasts - control by DC voltage - functional specification

Maintenance

The device is maintenance-free. To clean use a dry cloth. It must be avoided the use of solvents or other aggressive substances.

Disposal



At the end of its useful life the product described in this datasheet is classified as waste from electronic equipment in accordance with the European Directive 2012/19/EU (WEEE recast), and cannot be disposed together with the municipal undifferentiated solid waste.



Warning! Incorrect disposal of this product may cause serious damage to the environment and human health. Please be informed about the correct disposal procedures for waste collecting and processing provided by local authorities.

Document

This technical data sheet refers to release A1.0 of the ekinex® device code. EK-GD1-DL-4-LV and is available for download on the website www.ekinex.com in PDF format (Portable Data Format).

File name	Device release	Update
STEKGD1DL4LV_EN_v.1.3.pdf	A1.0	12 / 2023

Warnings

- Installation, electrical connection, configuration and commissioning of the device can only be carried out by qualified personnel in compliance with the applicable technical standards and laws of the respective countries
- Opening the housing of the device causes the immediate end of the warranty period
- In case of tampering, the compliance with the essential requirements of the applicable directives, for which the device has been certified, is no longer guaranteed
- ekinex® defective devices must be returned to the manufacturer at the following address: Ekinex S.p.A. Via Novara 35, I-28010 Vaprio d'Agogna (NO) Italy

Other information

- The instruction sheet must be delivered to the end customer with the project documentation
- For further information on the product, please contact the ekinex® technical support at the e-mail address: support@ekinex.com or visit the website www.ekinex.com

- Each ekinex® device has a unique serial number on the label. The serial number can be used by installers or system integrators for documentation purposes and has to be added in each communication addressed to the EKINEX technical support in case of malfunctioning of the device
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