Lunatone

DALI-2 PD

Datasheet

Phase Dimmer Module

Phase Dimmer with
DALI control input (DT4)

DALI PD:
Art. Nr. 86458618 (RL)
Art. Nr. 86458619 (RC)
Art. Nr. 86458619-25U (RLC)

DALI PD300:
Art. Nr. 86458618-300 (RL)
Art. Nr. 86458619-300 (RC)
Art. Nr. 86458619-300U (RLC)
Art.Nr. 86458619-300U-HS (RLC HS)

DALI-2 PD Phase Dimmer Module

Overview

- Suitable for dimming of 230V LED-retrofit-bulbs via DALI (Device Type 4 from firmware 3.0 and higher)

- different types for loads from 3W to 25W (PD) for back box installation and for 10-300W (PD300) for remote ceiling and din rail

- trailing edge phase cut dimmer for resistive and capacitive loads, leading edge phase cut dimmer for resistive and inductive loads as well available as universal dimmer

- conversion of the DALI dimlevel into a phase cut controlled voltage (trailing/leading edge)

- the minimum dim level can be set via DALI (MIN LEVEL)

- additional operating mode as switch (DT7 compliant) available with firmware 3.5 and higher

- the module represents a DALI-line client and therefore it has its own DALI-address.

- double DALI terminals - the DALI signal line is connected through.

Specification, Characteristics

type	DALI-2 PD	DALI-2 PD 300W	
article number	86458618 (RL) 86458619 (RC) 86458619-25U (RLC)	86458618–300 (RL) 86458619–300 (RC) 86458619-300U(RLC)	86458619-300U-HS (RLC)

input: L, N

input type	mains	
marking terminals	L, N	
rated input voltage	220-240Vac	
input voltage frequency	50-60 Hz	
max. input power	25W	300W

input: DA, DA

input type	DALI, supply
marking terminals	DA, DA
input voltage range	9,5V … 22,5V
max. current consumption DALI	6mA
number of DALI addresses	1

article number	86458618 (RL) 86458619 (RC) 86458619-25U (RLC)	86458618–300 (RL) 86458619–300 (RC) 86458619-300U(RLC)	86458619-300U-HS (RLC)

output: L', N

output type	trailing/leading edge phase cut of mains		
marking terminals	L', N or. ⌀		
output voltage	like input L,N		
phase cut angle	0°-180°		
output voltage frequency	like input L,N		
max. output current	0.2A Eff ac	1.45A Eff ac	
load range	3-25W	10-300W	
max. length between device and luminaire	50m		

Insulation data

impulse voltage category	II
pollution degree	2
rated insulation voltage	250V
insulation DALI (DA+,DA-) / (L/N/L')	reinforced isolation
insulation test voltage	3000Vac

environmental conditions

storing and transportation temperature	-20°C … +75°C
operational ambient temperature	-20°C … +60°C
Rel. humidity, none condensing	15% … 90%

general data

dimensions (l x w x h)	59x33x15 mm	120x30x22mm	98x17,5x56mm
mounting	built-in, integration in protection class II devices	remote ceiling, integration in protection class II devices	DIN rail, built-in, integration in protection class II devices
rated max. temperature tc	65°C		
expected life time @tc	50.000 h		
protection class	II in intended use		
protection degree housing	IP40		
protection degree terminals	IP20		

terminals

Connection type	spring terminal connector	screw terminal
wire size solid core	0,5 … 1,5 mm² (AWG20 … AWG16)	0,5 … 2,5 mm² (AWG20 … AWG14)
wire size fine wired	0,5 … 1,5 mm² (AWG20 … AWG16)	0,5 … 2,5 mm² (AWG20 … AWG14)
wire size using wire end ferrule	0,25 … 1 mm²	0,25 … 1,5 mm²
stripping length	8,5 … 9,5mm / 0,33 … 0,37inch	7 mm / 0,27 inch
locking torque	-	0,5Nm
actuation type	Push button	screw

standards

DALI	EN 62386-101, EN62386-102, EN62386-205
EMC	EN 61547 EN 50015 / IEC CISPR15
safety	EN 61347-2-11 EN 61347-1
markings	CE

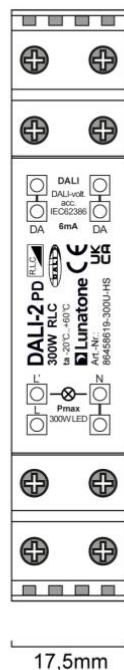**type PD 25W (59x33x15 mm): 86458618 (RL), 86458619 (RC), 86458619-25U (RLC):**

dimensions   connectors
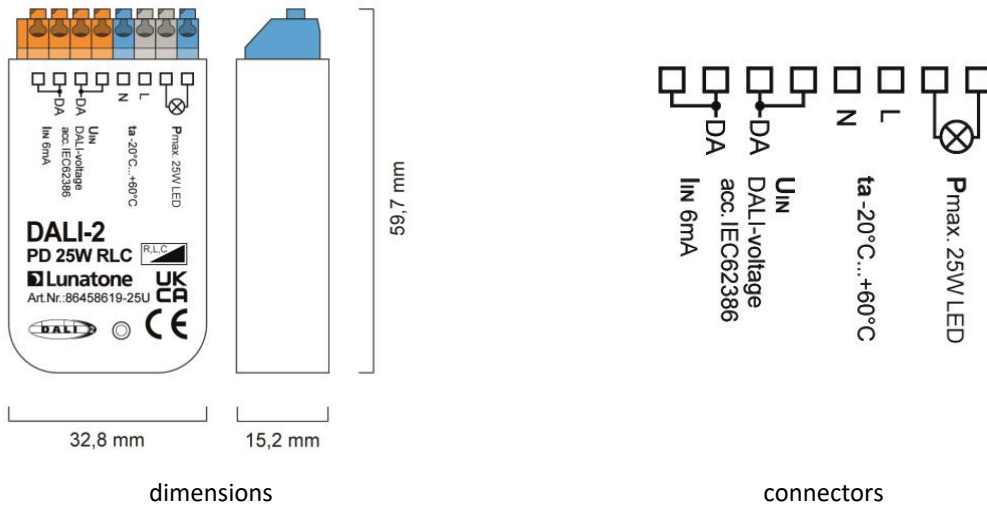
type PD 300W (120x30x22mm): 86458618–300 (RL), 86458619–300 (RC), 86458619-300U(RLC):
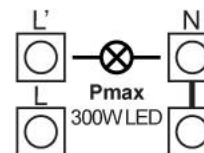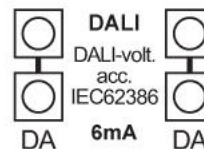

dimensions   connectors
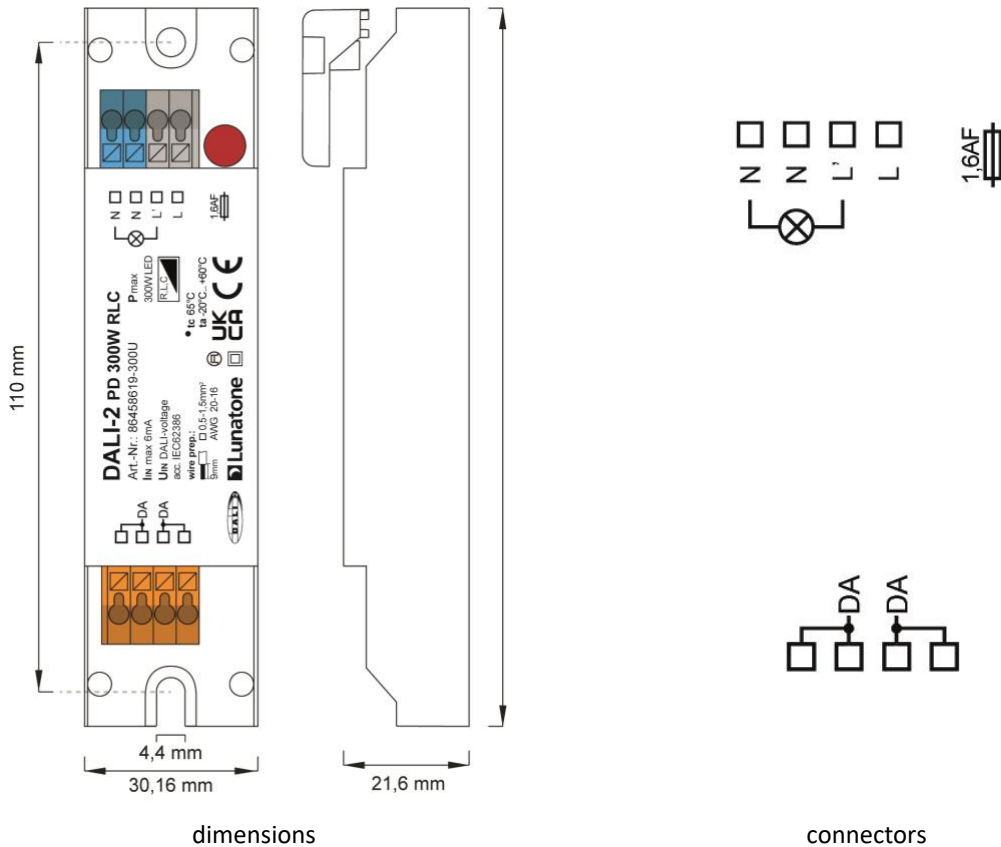
type PD 300W DIN Rail (98x17,5x56mm): 86458619-300U-HS (RLC):
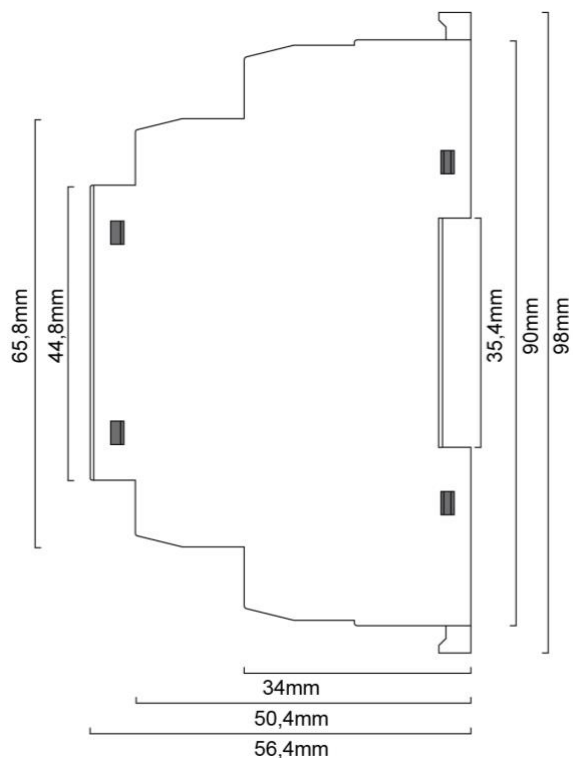
dimensions

connectors

Factory Default Settings

	Factory default settings	DALI standard
Active Operating Mode	DT4	--
Min Level	3% - FW 5.0.: 0.1%	0.1%
Max Level	100%	100%
Power On Level	MASK (= last active value)	100%
Fade Time	No fade	No fade
Fade Rate	44.7 steps/s (= 7) from FW.5.0. on: 89.4steps/s	44.7 steps/s
System Failure Level	100%	100%
Predefined scene values	none (MASK)	none (MASK)
Broadcast control	active	--

Installation

- The DALI PD is suitable for integration in protection class II devices, ensure proper working cable relief for installation.

- The DALI PD300 is an independent control gear and suitable for remote ceiling and integration in luminaires. When used as built-in in protection class II devices proper working cable relief has to be ensured.

- The DALI PD300 (HS-type) is suitable for DIN rail mounting, protection against shock has to be provided by an appropriate enclosure.

- The wiring should be carried out as a permanent installation in a dry and clean environment.

- Installation may only be carried out in a voltage-free state of the system and by qualified specialists. The system must also be switched off when replacing the luminaire.

- National regulations for setting up electrical systems must be followed.

- Connect power supply terminals L and N to mains voltage according to the labelling.

- Connect terminals L' and N or terminal with the light bulb symbol to the load. Ensure that the wiring length to the load does not exceed 50m.

- Only connect luminaires that are in the rated power range of the dimmer and are suitable with respect to the load type. Also consider the power factor of the luminaires (especially for lamps with rated power below 25W).

Attention: the intended use of the DALI PD is dimming of LED-retrofit-luminaires, do not use with halogen lamps or magnetic transformers

- the connection to the DALI-line (DA, DA) is polarity free.

- The DALI PD / DALI PD300 is supplied by the DALI-line (current consumption ~6mA).

- The DALI line may be routed together with the mains voltage (in one cable or as single wires in a tube)

- The DALI-line must not be connected to the mains or extra low voltage systems.

- The DALI wiring can be realised with standard low-voltage installation material. No special cables are required.

- Wiring topology of the DALI-line: Line, Tree, Star

Attention: The DALI-signal is not classified as SELV circuit (Safety Extra Low Voltage). Therefore, the installation regulations for low voltage apply

The voltage drop on the DALI line must not exceed 2V at maximum length (300m) and maximum bus load (250mA).

typical structure
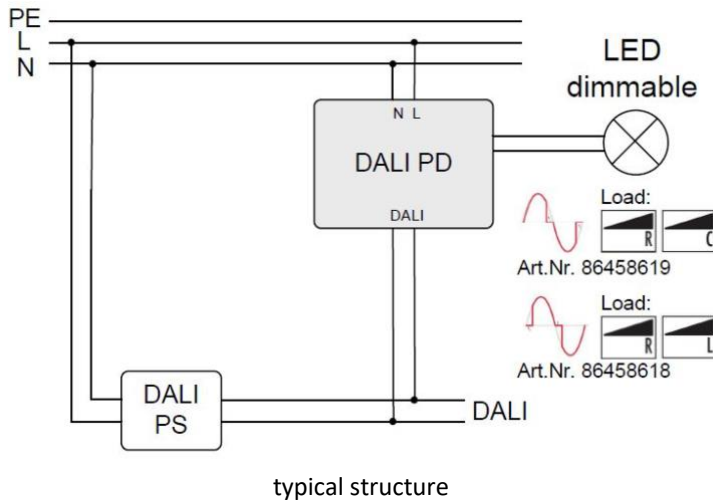
ATTENTION:
Do not apply any potential to the light bulb connector!

Switch off mains supply before replacing the light bulb.

Leading edge phase cut dimmer (Art.Nr. 86458618):

dimmer type	suitable loads		note
R,L	R	L	Not suitable for capacitive loads!

Trailing edge phase cut dimmer (Art.Nr. 86458619):

dimmer type	suitable loads		note
R,C	R	C	Not suitable for inductive loads!

Universal dimmer (Art.Nr 86458619-xxxU):

dimmer type	suitable loads		
R,L,C	R	L	C

ATTENTION: The intended use of DALI PD is dimming of LED-retrofit-luminaires, do not use with halogen lamps or magnetic transformers.

type of dimmers:
Leading edge
Trailing edge
Universal

load:
3-25W: compact housing for back box installation
10-300W: remote ceiling, din rail

When connecting multiple bulbs the same load type has to be used (inductive or capacitive).

info universal dimmer:
suitable for resistive, inductive and capacitive loads.
After mains voltage is supplied the dimmer will recognize the load type and make a decision for leading edge phase cut operation (inductive load) or trailing edge phase cut operation (capacitive load)

Commissioning

- The DALI-PD is ready to use, it is supplied by the DALI-line (current consumption ~6mA)

- The DALI-2 PD can be addressed with the DALI Cockpit PC Software.
  When using the DALI Cockpit Software, the PC must be connected to the DALI bus via a suitable interface module (DALI-2 USB; DALI USB, DALI-2 WLAN, DALI-2 Display, DALI-2 IoT, DALI 4Net, DALI SCI RS232). The DALI PD is automatically recognised by the DALI Cockpit during the addressing process and listed in the device overview.

- Scene values, groups, DALI parameters and device specific settings can be configured in the DALI Cockpit, see section Function below.

Function

Operating Mode DT4

As an interface between classic dimming technology (phase dimming) and DALI, the DALI PD is based on the standard for DALI Control Gears (IEC 62386-102) and Device Type 4 devices (IEC 62386-205).
The DALI PD interface converts the DALI dim level into a voltage signal.
The Universal dimmer (Art.Nr 86458619-xxxU) functions as trailing edge or leading edge dimmer, depending on the load.
The operation mode (trailing/leading edge) can be queried via DALI (DT4). The dimming curve follows a logarithmic characteristic corresponding to DALI. The phase cut control generates a sinusoidal voltage with leading/trailing edge phase cut. The PHYSICAL MINLEVEL is 3%.

Operating Mode DT7

Up from firmware version 3.5 an additional operating mode is supported. Instead of phase dimming (DT4) the device can act as switch (DT7 capable). Hence the switching characteristic is determined by the comparison of the virtual direct arc power level (VDAP) with 4 thresholds.

The virtual dim level (VDAP) is like the dim level of DALI-ballasts and is therefore limited by MINLEVEL and MAXLEVEL and influenced by fade-time and fade-rate.

For each dim direction 2 thresholds can be defined. They are compared with the virtual dim level and as a result the output is switched on or off:

virtual dim direction	comparison of virtual dim level and thresholds	output
UP	VDAP>= UP SwitchOn Threshold	ON
UP	VDAP>= UP SwitchOff Threshold	OFF
DOWN	VDAP<= DOWN SwitchOn Threshold	ON
DOWN	VDAP<= DOWN SwitchOff Threshold	OFF

If a threshold value is set to "MASK" the threshold is inactive and does not influence the relay output.

Some examples of switching characteristics are shown in Figure 1 below.

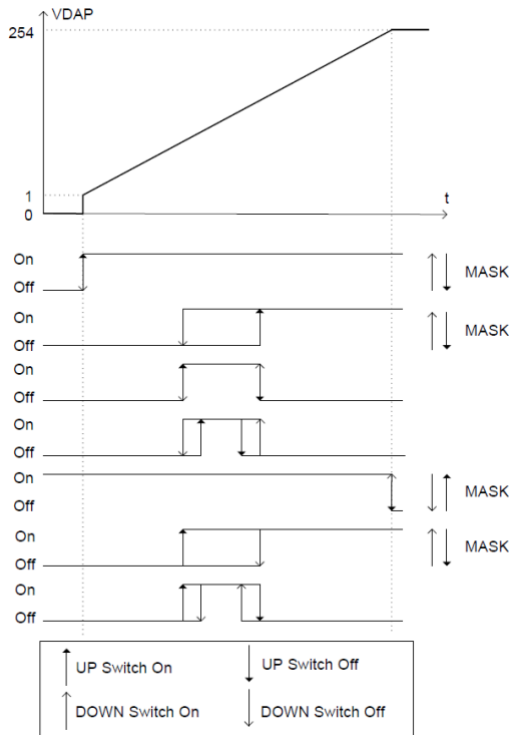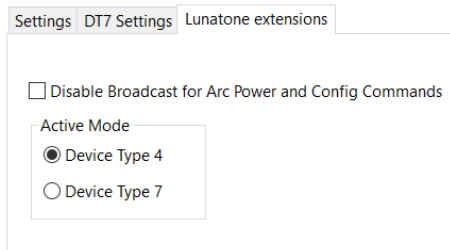With the help of the fade time switch on and switch off delays can be realized.
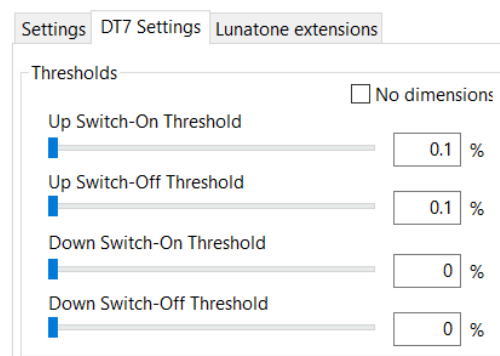
*Figure 1 possible switching characteristics*

Operating Mode Selection

General Settings

The Configuration can be done easily with the help of the DALI Cockpit. See also Figure 2.

Since the device is bus powered the configurable SYSTEM FAILURE LEVEL is only partially supported.
For devices with firmware >4.0 the system failure level can be choose between 0%, 100% and "No change (MASK)".
For previous versions the system failure level is fixed: the DALI PD (25W version) applies 100% at the output, the DALI PD300 (300W version) applies 0% at the output.
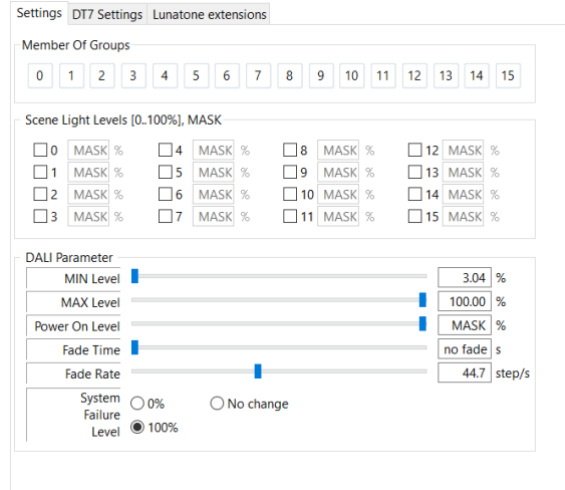
Ignore Broadcast Commands

The "Ignore Broadcast" setting can be used to ensure that the phase dimmer does not respond to broadcast commands on the DALI bus (group assignments are not ignored). The setting is possible in the "Lunatone Features" tab and from FW 5.0 in the "Settings" tab.

Adjustable RESET behaviour (FW 5.0)

From FW 5.0. on the response to a DALI reset command is configurable. The following options are available:

- *Ignore command*: the DALI reset command does not trigger any changes to the device settings

- *DALI standard*: the selected device settings are reset to the values defined in the DALI standard (see table 1 below - second column: DALI standard values)

- *Custom settings*: the current device settings can be saved. With a DALI Reset command, the selected parameters (6 check boxes) are then reset to these saved values.

Calibration - light adjustment (FW 5.0)

From FW version 5.0 on, it is possible to calibrate light sources, with the option: Calibration. The MIN level (default: 0.1%) an intermediate value (default: 33%) and the MAX level (default: 100%) can be adjusted and matched between light sources.

To do this, set the desired level with the upper slider. Apply the value and start the fine adjustment by pressing the button next to it. The appropriate fine adjustments can now be made with the calibration slider below. See also Figure 3.

DALI Cockpit Configuration – FW 5.0 – operating mode DT4

Figure 2 DALI Cockpit settings

Set the light level for calibration

Apply the light level and start adjustment with the button

Fine adjustment of the light – direct feedback for matching of different luminaires

LED Calibration

Set and adjust the physical parameters of the light source:

Min Level adjustment

LED MIN — 0.1 %

Calibration

33% Level adjustment (white balance)

33% Level — 33.332 %

Calibration

Max Level adjustment

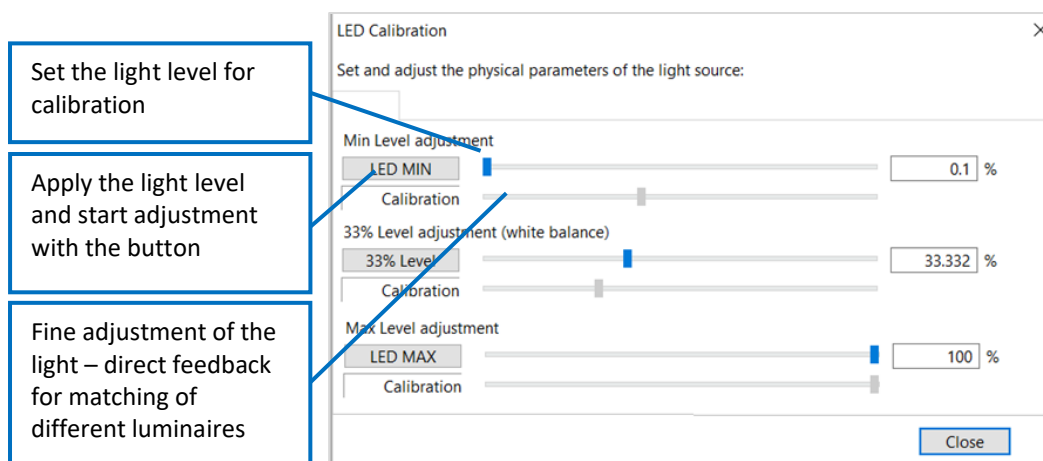LED MAX — 100 %

Calibration

Figure 3 Calibration – light adjustment settings

Purchase Order Information

article number: 864586xx – (extension)

86458618: leading edge dimmer (RL), 3-25W, back box

86458618-300: leading edge dimmer (RL), 10-300W, remote ceiling, din rail type on request

86458619: trailing edge dimmer (RC), 3-25W, back box

86458619-300 trailing edge dimmer (RC), 10-300W, remote ceiling, din rail type on request

86458619-25U: universal dimmer (RLC), 3-25W, back box

86458619-300U: universal dimmer (RLC), 10-300W, remote ceiling

86458619-300U-HS: universal dimmer (RLC), 10-300W, din rail

Additional Information and Equipment

DALI-Cockpit – free configuration tool from Lunatone for DALI systems
http://lunatone.at/en/downloads/Lunatone_DALI-Cockpit.zip

Lunatone DALI products
http://www.lunatone.at/en/

Lunatone datasheets and manuals
http://lunatone.at/en/downloads/

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Disclaimer

Subject to change. Information provided without guarantee. The datasheet refers to the current delivery.

The compatibility with other devices must be tested in advance to the installation.