# **D** Lunatone

## **DALI-2 2Ch LED Dimmer CC**





## Datasheet

**Control Gear** 

2-channel LED Dimmer (CC, DT6)

common plus connector
Art. Nr. 89453845-350 (350mA)
Art.Nr. 89453845-350DE (350mA)
Art. Nr. 89453845-500 (500mA)
Art. Nr. 89453845-500DE (500mA)
Art. Nr. 89453845-700 (700mA)
Art. Nr. 89453845-1000 (1000mA)

common minus connector Art.Nr. 89453845-350GMDE (350mA) Art.Nr. 89453845-500GMDE (500mA) Art. Nr. 89453845-700GM (700mA) Art. Nr. 89453845-1000GM (1000mA)

## DALI-2 2Ch LED-Dimmer CC Control Gear

#### Overview

- 2 channel DALI LED-Dimmer
- suitable for constant current LEDmodules
- Operating Mode DT6: individual channel control via 2 DALI addresses
- Operating Mode Balance&Dim: control by 2 DALI-addresses, one for adjusting the light level and one for adjusting the channel balance (e.g. colour temperature)
- Operating Mode Dim2Warm: one **DALI-address for simultaneous** adjustment of light level and colour temperature
- **SwitchDim2**: 2 switch-inputs offer control of light level and colour without DALI.
- dimming range 0.1%-100%
- adjustable PWM-frequency (122Hz/244Hz/488Hz/976Hz from FW version 4.6 on changed PWM frequencies: 250Hz / 500Hz / 1kHz)

- types for constant currents of 350mA, 500mA, 700mA and 1000mA
- types with common plus and common minus connector available
- compact types for integration in luminaires or remote ceiling
- supply voltage from 12V to 48V DC
- output voltage up to 45VDC
- integrated short circuit protection
- low standby power consumption
- high efficiency
- configuration via PC-software DALI-Cockpit and DALI interface (e.g. DALI USB)
- user-friendly factory default settings







## Specification, Characteristics

## Common plus connector (GP)

type	DALI 2Ch CC 350/500mA	DALI 2Ch CC 350/500mA DE	DALI 2CH CC 700mA	DALI 2Ch CC 1000mA
article number	89453845-350/	89453845-	89453845-	89453845-
	89453845-500	350DE/500DE	700	1000

#### supply: V+, V- (GND)

cappily: 1 1) 1 (Sitz)					
type of input		supply, DC			
marking terminals	+, GND	+, GND V+, V-			
supply voltage V <sub>in</sub>		12V DC 48V DC (SELV)			
max. input current l <sub>inmax</sub>	700/1000 mA	700/1000mA	1400mA	2000mA	



rated power @12W	8,4/12W	8,4/12W	16,8W	24W	
rated power @48W	33/48W	33/48W	67W	96W	
standby power consumption	~ 180mW @12V				
power on behaviour	configur	able via DALI: 0%-10	0% or last actu	ıal level	
input: DA, DA					
input type		DALI, control	input		
marking terminals		DA, DA			
input voltage range	9,5\	/ 22,5V (according	to IEC62386-1	01)	
current consumption DALI		2mA			
overvoltage protection		250V			
number of DALI-addresses	O	perating mode DT6, I operating mode Di		2	
input: N, SW&DIM2-1, SW&DIM2-2					
Input type	-	Switch	Dim2 control i	nput	
marking terminals	-	N; SW&DIM2	-1 (DA); SW&D	IM2-2 (DA)	
number of inputs	-		2	· · · · · · · · · · · · · · · · · · ·	
input voltage	-	2	30V AC ±10%		
frequency of input voltage	-		50Hz		
control pulse length	-	short press: >	40ms, long pre	ss: > 400ms	
input resistance	-		200kΩ		
max. voltage between inputs	- 230V AC				
output: LED+, Ch1-, Ch2-					
output type	LED dimmer, constant current PWM				
marking terminals	LED+, Ch1-, Ch2-				
number of outputs	2				
PWM frequency	FW: < 4.6. 122Hz/244Hz/488Hz/976Hz FW: ≥ 4.6: 250Hz/ 500Hz / 1kHz				
output voltage range V <sub>led</sub>	3V-45V (at 48V supply)				
max. output current per channel I <sub>led</sub>	350/500 mA	350/500mA	700mA	1000mA	
max. output power per channel @45V	15,75/22,5 W	15,75/22,5 W	31,5 W	45W	
overload protection		yes			
open circuit protection		yes			
short circuit protection		yes			
insulation data					
impulse voltage category		II			
pollution degree		2			
rated insulation voltage		250V			
rated impulse withstanding voltage		4kV			
Isolation			: - ·-		
supply <-> output		no insulat reinforced iso			
DALI/Sw&Dim2 <-> output/supply					
DALI/Sw&Dim2 <-> housing		reinforced iso			
Insulation test voltage		3000VA	L .		
environmental conditions		2000	2000		
operational ambient temperature Ta		-20°C +6	o C		



storing and transportation temperature	-20°C +75°C			
rel. humidity, none condensing	15% 90%			
general data				
dimensions (l x w x h)	59 x 33 x 15mm	120 x 30 x 22mm	120mm x 41mm x 22mm	
mounting	back box	remote ceiling, int	egration in class II luminaires	
rated maximum temperature tc		75°C		
expected lifetime (T <tc)< td=""><td></td><td>&gt;100.000</td><td>h</td></tc)<>		>100.000	h	
housing material		PC, class \	/0	
protection class		II in intended	d use	
protection degree housing		IP40		
protection degree terminals		IP20		
terminals: V+, V-				
connection type		spring termina	al connector (cage clamp)	
wire size solid core		0,08 2,5mm² (AWG 28 AWG 12)		
wire size fine wired	See section	0,08 2,5mm² (AWG 28 AWG 12)		
wire size using wire end ferrule	terminals DA,DA, N, LED+,	0,25 1,5mm²		
stripping length	Ch1-, Ch2-	5 6mm / 0,2 0,24 inch		
housing material		PA66, class V0		
actuation type		operating tool		
terminals: DA, DA, N, LED+, Ch1-, C	h2-			
connection type		terminal connector (	push in cage clamp)	
wire size solid core		0,2 1,5mm² (AWG 24 AWG 16)		
wire size fine wired		0,2 1,5mm² (AWG 24 AWG 16)		
wire size using wire end ferrule		0,25 1m	•	
stripping length		8,5 9,5mm / 0,33 0,37 inch		
housing material		PA66, class V0		
actuation type		push button		
standards	1	·		
DALI	EN 6	2386-101, EN 62386-1	L02, EN 62386-207	
		EN 62380-101, EN 62380-102, EN 62380-207		
EMC		EN 55015 / IEC CISPR15		
electrical safety		EN 61347-2-13		
•		EN 61357-1		
performance		EN 62384		

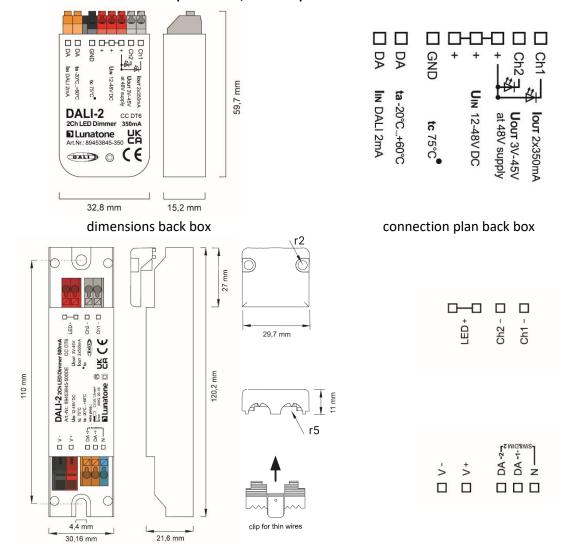
on request: output currents from 100mA to 1000mA available

markings

CE, UKCA, DALI-2



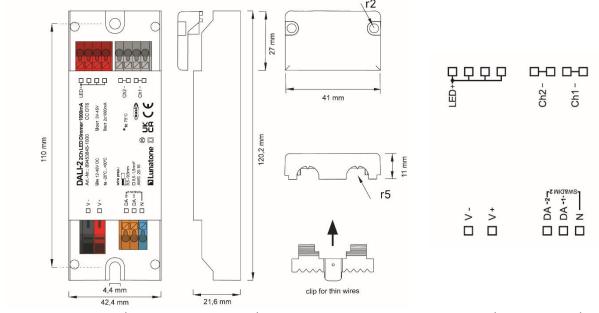
#### Dimensions for constant currents up to 500mA, common plus



dimensions remote ceiling

connection plan remote ceiling

#### Dimensions for constant currents >500mA, common plus



dimensions remote ceiling

connection plan remote ceiling



## Common minus connector (GM)

type	DALI 2CH CC 350/500mA GM DE	DALI 2CH CC 700mA GM	DALI 2Ch CC 1000mA GM	
article number	89453845- 350GMDE/500GMDE 89453845-700GM		89453845-1000GM	
supply: V+, V-				
type of input	supply, DC			
marking terminals	V+, V-			
supply voltage U <sub>in</sub>	12	2V DC 48V DC (SELV)	)	
max. input current I <sub>in_max</sub>	700/1000mA	1400mA	2000mA	
rated power @12V	8,4/12W	16,8W	24W	
rated power @48V	33 /48W	67W	96W	
standby power consumption	,	~ 180 mW @12V		
power on behaviour	configurable vi	a DALI: 0%-100% or la	st actual level	
input: DA, DA		DALL		
input type		DALI, control input		
marking terminals		DA, DA		
input voltage range	9,5V 22,5	5V (according to IEC62	386-101)	
max. current consumption DALI		2mA		
overvoltage protection		250V		
number of DALI-addresses	operating mode DT6, Balance&Dim: 2 operating mode Dim2Warm: 1			
input: N, SW&DIM2-1, SW&DIM2-2				
input type	SwitchDim2 control input			
marking terminals	N; SW&DIM2-1 (DA); SW&DIM2-2 (DA)			
number of inputs	2			
input voltage	230V AC ±10%			
frequency of input voltage		50Hz		
control pulse length	short press: >40ms, long press: > 400ms			
input resistance	200kΩ			
max. voltage between inputs		230V AC		
output: LED-, Ch1+, Ch2+				
output type	LED dim	mer, constant current	PWM	
marking terminals		LED-, Ch1+, Ch2+		
number of outputs		2		
PWM frequency	FW: < 4.6. 122Hz/244Hz/488Hz/976Hz FW: ≥ 4.6: 250Hz/ 500Hz / 1kHz			
output voltage range V <sub>led</sub>	3	V-45V (at 48V supply)		
max. output current per channel I <sub>led</sub>	350/500mA	700mA	1000mA	
max. output power per channel @45V	15,75/22,5W	31,5W	45W	
overload protection		yes		
open circuit protection		yes		
short circuit protection		yes		
insulation data				
impulse voltage category		II		
pollution degree	2			

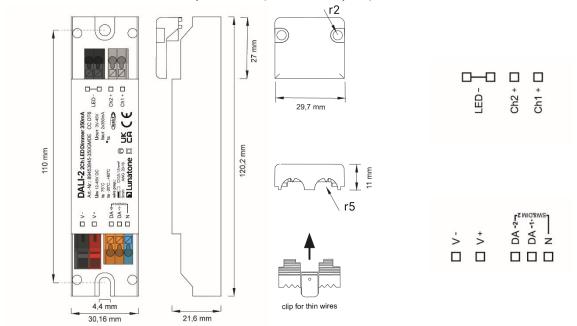


rated insulation voltage	250V			
rated impulse withstanding voltage	4kV			
insulation				
supply <-> output	no insolation			
DALI/Sw&Dim2 <-> output/supply	reinforced isolation			
DALI/Sw&Dim2 <-> housing		reinforced isolation		
Insulation test voltage		3000VAC		
environmental conditions				
operational ambient temperature		-20°C +60°C		
storing and transportation		-20°C +75°C		
temperature				
rel. humidity, none condensing		15% 90%		
general data				
dimensions (l x w x h)	120 x 30 x 22mm	120mm x 41mm x 22mm		
mounting	remote ceiling	g, integration in class II luminaires		
rated maximum temperature tc		75°C		
expected lifetime (T <tc)< td=""><td></td><td>&gt;100.000h</td></tc)<>		>100.000h		
housing material		PC, class V0		
protection class		II in intended use		
protection degree housing		IP40		
protection degree terminals		IP20		
terminals: V+, V-				
connection type	spring terminal connector (cage clamp)			
wire size solid core	0,08 2,5mm² (AWG 28 AWG 12)			
wire size fine wired	0,08 2	,5mm² (AWG 28 AWG 12)		
wire size using wire end ferrule		0,25 1,5mm <sup>2</sup>		
stripping length	5 6mm / 0,2 0,24 inch			
housing material	PA66, class V0			
actuation type		operating tool		
terminals: DA, DA, N, LED-, Ch1+, Ch2+				
connection type	spring termina	al connector (push in cage clamp)		
wire size solid core	0,2 1,	5mm² (AWG 24 AWG 16)		
wire size fine wired	0,2 1,	5mm² (AWG 24 AWG 16)		
wire size using wire end ferrule		0,25 1mm²		
stripping length	8,5	9,5mm / 0,33 0,37 inch		
housing material		PA66, class V0		
actuation type		push button		
standards				
DALI	EN 62386-10	1, EN 62386-102, EN 62386-207		
EMC	FN	EN 61547 N 55015 / IEC CISPR15		
electrical safety		51347-2-13 , EN 61357-1		
performance	214 0	EN 62384		
markings				
markings	CE, UKCA, DALI-2			

on request: output currents from 100mA to 1400mA available



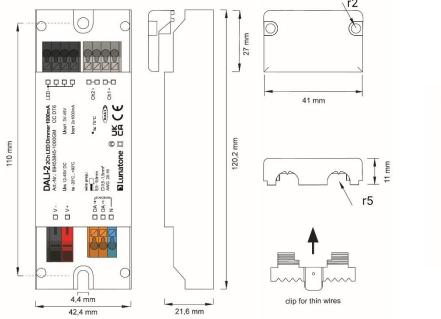
### Dimensions for constant currents up to 500mA (700mA on request), common minus

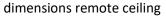


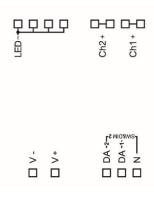
dimensions remote ceiling

connection plan remote ceiling

#### Dimensions for constant currents > 500mA, common minus







connection plan remote ceiling

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#### Installation

- The DALI 2Ch LED Dimmer is an independent control gear, it is suitable for remote ceiling and integration in luminaires.
- Ensure proper working cable relief for installation in protection class II equipment.
- 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.
- National regulations for setting up electrical systems must be followed.
- Connect the terminals V+ and V- only to a DC supply voltage of category SELV (Safety Extra Low Voltage).
- the connection to the DALI-line (DA,DA) is polarity free.
- If used in Sw&Dim2 mode for both inputs the same phase has to be used.
- The DALI-interface can handle mains voltage, protecting the device in case wrong wiring.

- Wiring topology of the DALI-line: line, tree, star
- Connect only one wire on each terminal, if twin ferrules are used take care to the maximum wire size.
- The DALI wiring can be realised with standard low-voltage installation material.
   No special cables are required.
- The DALI line may be routed together with the mains voltage (in one cable or as single wires in a tube).



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



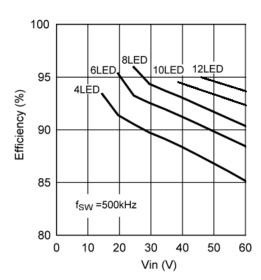
The voltage drop on the DALI line must not exceed 2V at maximum length (300m) and maximum bus load (250mA).



#### Hint:

For highest efficiency the input voltage should range between 3V and 10V above the LED-voltage:

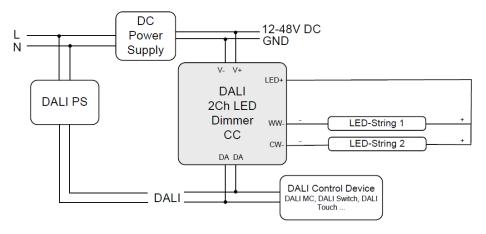
4-6 LEDs: 24V 6-9LEDs: 36V 10-12 LEDS: 48V



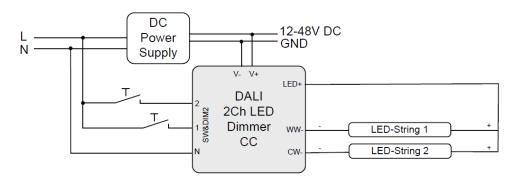
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## **Application Example**

## **DALI** (common plus connector type)



#### SwitchDim2 (common plus connector type)



### Commissioning

- After connection the 2Ch Dimmer is ready to use. Delivery default settings see page 16.
- The DALI-2 2Ch Dimmer can be addressed with the DALI Cockpit PC Software.
   When using the <u>DALI Cockpit Software</u>, the PC must be connected to the DALI bus via a suitable interface module (<u>DALI-2 USB</u>; <u>DALI USB</u>, <u>DALI-2 WLAN</u>, <u>DALI-2 Display</u>, <u>DALI-2 IoT</u>, <u>DALI 4Net</u>, <u>DALI SCI RS232</u>). The DALI Dimmer 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 DALI Cockpit: General Settings page 12 and following.



## **Operating Modes**

The device offers several operating modes:

#### DT6 (factory default)

In this operating mode each channel can be controlled by its own DALI address (Device Type 6). From FW version 4.6 on Lunatone LED Dimmer are DALI 2 compatible and support DALI 2 commands.

**SwitchDim2:** Alternatively, the device can be controlled using 2 switch-inputs for mains voltage (SwitchDim2):

SW&DIM2-1: light level

short press: On/Off long press: dimming

SW&DIM2-2: scene selector (short press) scene pre-set see *Table 1* page 16

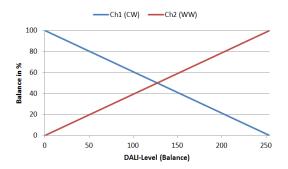
#### Balance&Dim

This operating mode is also suitable for operating tunable white luminaires using two DALI-addresses. The first controls the light level and the second is used for changing the distribution on the output channels (e.g. for tunable white applications or balancing direct/indirect lighting).

The Balance&Dim mode allows colour temperature adjustments without affecting the light level and vice versa. For each channel only DALI-standard commands like dim up/down but also DAP are used. Thus, the device can be used with all common controls and gateways (e.g. KNX). The Balance&Dim mode provides an alternative to the DT8-Tc mode.

#### Can be operated via DALI or SwitchDim2:

DALI-address 1, SW&DIM2-1: light level DALI-address 2, SW&DIM2-2: balance

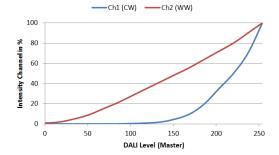


#### Dim2Warm

Both output channels are controlled by one DALI-address or Sw&Dim2-input. The balance is coupled directly to the DALI dim level – the smaller the dim level the warmer the light.

<u>DALI-address / SW&DIM2-1:</u> Dim2Warm (Master)

short press: On/Off long press: dimming



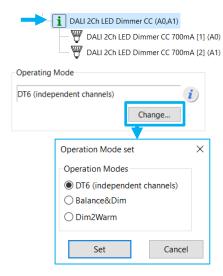
SW&DIM2-2: scene selector

The dim2warm table can be edited in the DALI Cockpit Software – see section DALI Cockpit: General Settings and page 12 (Overview operating mode Dim2Warm).



#### Selection of operating mode

With the help of the PC-software tool DALI-Cockpit the operating mode can be easily set on the general settings page.



Switching between operating modes can also be done with the help of the DALI-command SET OPERATING MODE (IEC 62386-102 Ed.2). When changing the operating mode the number of used DALI-addresses can change as well and this requires a new addressing procedure. In the DALI-Cockpit this address assignment is performed automatically.

#### **Operating Mode:**

Number	Operating Mode
0x0	DT6 (factory default)
0x90	DT6
0x94	Balance&Dim
0x95	Dim2Warm

## **DALI Cockpit: General Settings**

On the overview page respective control elements are available for each operating mode

- DT6: 2 sliders, one for the light level of each respective channel
- Balance&Dim: 2 sliders, one for level and one for balance,
- Dim2Warm: slider for input value adaption and Edit-Function for the Dim2Warm-table.

#### **PWM Frequency**

The PWM frequency can be selected: 122Hz / 244Hz / 488Hz / 976Hz. From FW version 4.6 changed PWM frequencies: 250Hz / 500Hz / 1kHz.

#### **Ignore Broadcast Commands**

The broadcast control of each channel can be deactivated individually. Through selection of "Ignore Broadcast", the respective channel does no longer respond to broadcast commands on the DALI bus (group assignments are not ignored).

#### Adjustable RESET behaviour

From FW 4.6. 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

The dimming range reaches from 0.1% to 100%. From FW version 4.6 on, it is possible to calibrate different light sources, with the option: "LED Calibration".

For each channel, 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, the desired level with the upper slider needs to be set. 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 1

#### Overview operating mode DT6 Overview operating mode Dim2Warm Operating Mode PWM Frequency Operating Mode PWM Frequency max. quality (~1kHz) DT6 (independent channels) max. efficiency (~250Hz) Dim2Warm (i)Change... LED Calibration... Change... LED Calibration... Ignore Broadcast Config and Arc commands Behavior on DALI Reset Command Behavior on DALI Reset Comma Control Gear 1 Parameters are reset to DALI Parameters are reset to DALI Standard vallues. Change... Standard vallues. Control Gear 2 100 % Channel 2 Control (A1) 100 % Set Overview operating mode Balance&Dim 0 % Set Device Parameters Edit Dim2Warm table values Operating Mode PWM Frequency Dim To Warm Table max. efficiency (~250Hz) LED Calibration... 0.155 0.246 0.05 Behavior on DALI Reset Command Ignore Broadcast Config and Arc commands Parameters are reset to DALI Standard vallues. Control Gear 1 Change... 0.623 0.05 7.50 Control Gear 2 1.576 0.25 14.00 6.17 2.50 24.50 . Set Balance Control (A6) Read from device Close 50.00 % 50.00 % \*Change of the Dim2Warm table are being saved via "Save" to the device as other device parameters



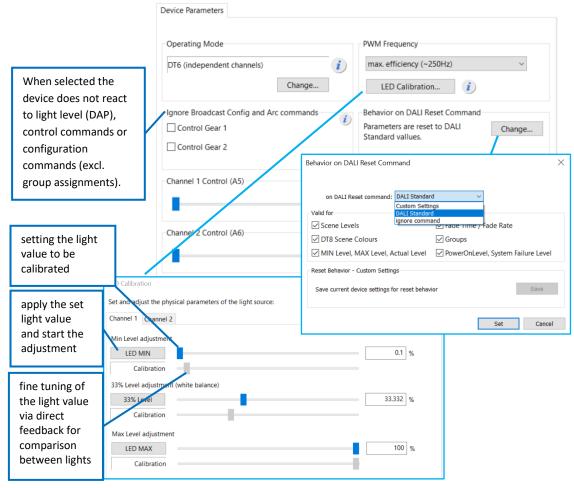
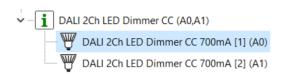


Figure 1 Cockpit overview page – LED calibration and settable RESET behaviour

### **DALI Cockpit: Additional Settings**

Besides the settings on the general page each channel can be selected separately in the component tree for individual configuration.

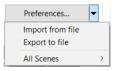


For each address the group membership can be set as well as scene values and DALIparameters. In Balance&Dim operating mode all values assigned to channel 2 are representing the balance.

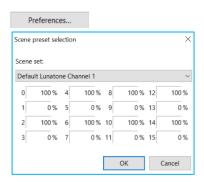
Figure 2 on page 15 shows settings for each channel for all operating modes: DT6, Balance&Dim and Dim2Warm.

#### **Scene settings**

Via the arrow button the scene settings can be imported and exported.

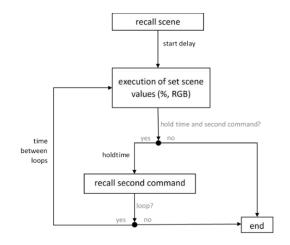


Via the button "Preferences" the default scene settings can be loaded.



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From FW 6.0 on, extended scene settings can be configured. With extended scenes it is possible to automatically change between 2 scene values (once or looped). Thereby enabling configuration of blinking lights, time delayed switch off or light repetitions, as well as traveling lights with multiple dimmers.

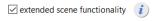




Extended Scenes are available for each of the 16 scenes on the second tab:

Device Parameters Extended Scenes

By enabling the extended scenes these are used instead of the standard scenes on the "Device Parameters" tab



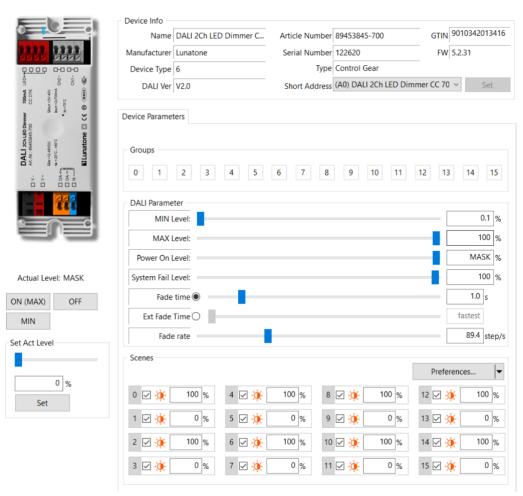
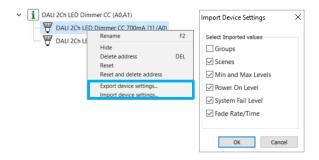


Figure 2 Cockpit settings for each channel



#### **Import/Export settings**

With a right click on the channel in the devicetree overview the device settings can be exported or imported.



## **Factory Default Settings**

Before the initial addressing is performed, the device can already be controlled by group addresses G0 and G1. This predefined grouping will be deleted during the first addressing procedure. Afterwards groups can be assigned as usual (e.g. with the help of the DALI Cockpit).

By sending a DALI-Reset command the device is set to DALI default values as defined in the standard.

The factory default values as well as the DALInorm values are summarised in *Table 1* below.

Table 1 factory default settings column 1, DALI Standard settings column 2

	Delivery def	ault		DALI norm
Operating mode	DT6			N/A (remains unchanged)
SwitchDim2	SW&DIM2-1: light level			N/A (remains unchanged)
	SW&DIM2-2	: scene select	or	
Min Level	0.1%			0.1%
Max Level	100%			100%
PowerOn Level	Last light lev	el (= MASK)		100%
System Failure Level	100%			100%
Fade Time	1s [2]			none
Fade Rate	89.4 steps/s	[5]		44.7 steps/s
PWM-Frequency	FW ≥ 4.6: 1k	Hz		N/A (remains unchanged)
	FW < 4.6: 12	2Hz		
Control before initial addressing	G0 – channe	10		None
	G1 – channe	l 1		
Scene values	Scene	Ch1	Ch2	All scenes MASK
	0	100%	0%	
	1	0%	100%	
	2	100%	0%	
	3	0%	100%	
	4	100%	0%	
	5	0%	100%	
	6	100%	0%	
	7	0%	100%	
	8	100%	0%	
	9	0%	100%	
	10	100%	0%	
	11	0%	100%	
	12	100%	0%	
	13	0%	100%	
	14	100%	0%	
	15	0%	100%	
Behaviour on DALI RESET command	set DALI Star	ndard values,	see column 2	N/A (remains unchanged)



#### **Purchase Order Information**

#### Art.Nr. 89453845-xxx

DALI 2Ch LED Dimmer CC constant current xxxmA – 100mA-500mA, common plus connector, supply 12V-48V DC, output voltage range 3V-45V, back box

#### Art.Nr. 89453845-xxxDE

DALI 2Ch LED Dimmer CC constant current xxxmA - 100mA-500mA, common plus connector, supply 12V-48V DC, output voltage range 3V-45V, SwitchDim2 remote ceiling & integration in luminaires

#### Art.Nr. 89453845-xxx

DALI 2Ch LED Dimmer CC constant current xxxmA - 500mA -1000mA, common plus connector, supply 12V-48V DC, output voltage range 3V-45V, SwitchDim2, remote ceiling & integration in luminaires

#### Art.Nr. 89453845-xxxGMDE:

DALI 2Ch LED Dimmer CC constant current xxxmA - 100mA-500mA, common minus connector, supply 12V-48V DC, output voltage range 3V-45V, SwitchDim2, remote ceiling & integration in luminaires

#### Art.Nr. 89453845-xxxGM:

DALI 2Ch LED Dimmer CC constant current xxxmA - 500mA -1400mA, common minus connector, supply 12V-48V DC, output voltage range 3V-45V, SwitchDim2, remote ceiling & integration in luminaires

# Additional Information and Equipment

Lunatone datasheets and manuals https://www.lunatone.com/en/downloads-a-z/

Lunatone DALI products <a href="https://www.lunatone.com/en/">https://www.lunatone.com/en/</a>

DALI-Cockpit – free configuration tool from Lunatone for DALI systems <a href="https://www.lunatone.com/en/product/dali-cockpit/">https://www.lunatone.com/en/product/dali-cockpit/</a>

#### Contact

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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.