DALI 4Ch LED Dimmer CC

Datasheet

Control Gear

4-channel LED Dimmer (CC, DT6)

common plus connector
Art. Nr. 89453855-250 (250mA)
Art. Nr. 89453855-350 (350mA)
Art. Nr. 89453855-500 (500mA)

common minus connector
Art. Nr. 89453855-250GM (250mA)
Art. Nr. 89453855-350GM (350mA)
Art. Nr. 89453855-500GM (500mA)
Art. Nr. 89453855-700GM (700mA)

DALI 4Ch LED Dimmer CC Control Gear

Overview

- 4 channel DALI LED-Dimmer
- suitable for constant current LED-modules
- **Operating Mode DT6**: individual channel control via 4 DALI addresses
- **Operating Mode Colour&Dim**: control by 2 DALI-addresses, one for adjusting the light level and one for adjusting the colour
- **SwitchDim2**: 2 switch-inputs offer control of light level and colour without DALI, device can be alternatively controlled directly by a motion sensor (corridor function)
- 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 with common plus connector with constant currents up to 500mA
- types with common minus connector (GM) with constant currents up to 700mA
- independent control gear, suitable for integration in luminaires (protection class II) and remote ceiling
- supply voltage 12V to 48V DC
- output voltage up to 45VDC
- short circuit protection
- low standby power consumption
- high efficiency
- configuration via PC-software DALI-Cockpit and DALI USB-interface
- user-friendly factory default settings

Specification, Characteristics

common plus connector

type	**DALI 4Ch 250mA GP**	**DALI 4Ch 350mA GP**	**DALI 4Ch 500mA GP**
article number	89453855-250	89453855-350	89453855-500

supply: V+, V-			
type of input	supply, DC		
marking terminals	V+, V-		
supply voltage V_{in}	12V DC … 48V DC (SELV)		
max. input current I_{in_max}	1000mA	1400mA	2000mA
rated power	48W	67W	96W
standby power consumption	180mW @12V		
power on behaviour	configurable via DALI: 0%-100% or last actual level		

input: DA, DA	
input type	DALI, control input
marking terminals	DA, DA
input voltage range	9,5V … 22,5V (according to IEC62386-101)
max. current consumption DALI	2mA
overvoltage protection	250V
number of DALI-addresses	operating mode DT6: 4 operating mode Colour&Dim: 2

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-, Ch3-, Ch4-			
output type	LED dimmer, constant current PWM		
marking terminals	LED+, Ch1-, Ch2-, Ch3-, Ch4-		
number of outputs	4		
PWM frequency	FW: < 4.6. 122Hz/244Hz/488Hz/976Hz FW: >= 4.6: 250Hz/ 500Hz / 1kHz		
output voltage range V_{led}	3V-45V (at 48V supply)		
max. output current per channel I_{led}	250mA	350mA	500mA
max. output power per channel	11,25W	15,75W	22,5W
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 insulation
DALI <-> SwDim2	no insulation
DALI/SwDim2 <-> output/supply	reinforced isolation
DALI/SwDim2 <-> housing	reinforced isolation
Insulation test voltage	3000V a.c.

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

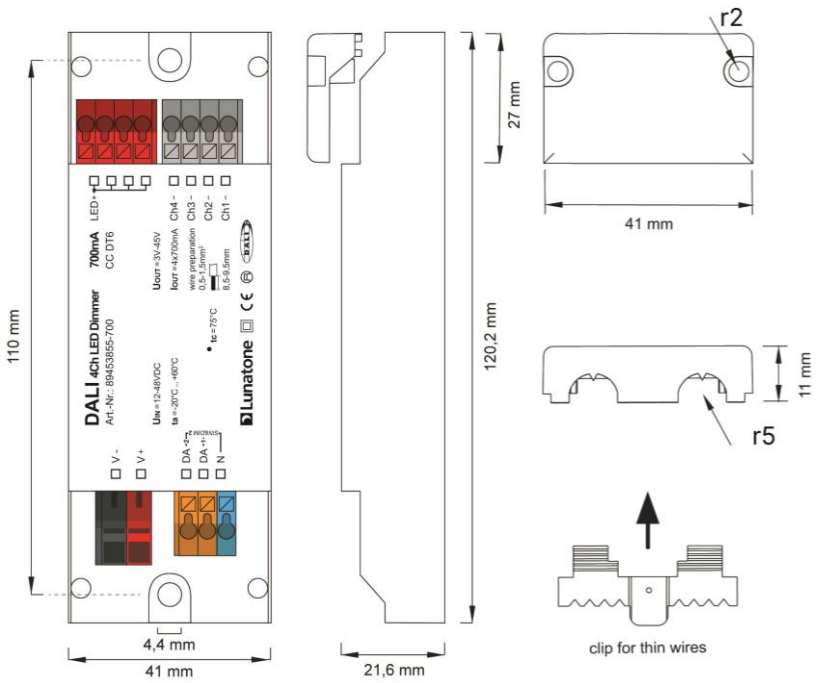
general data	
dimensions (l x w x h)	120mmx41mmx22 mm
mounting	remote ceiling, integration in class II luminaires
rated maximum temperature tc	75°C
expected lifetime (T<Tc)	100.000h
housing material	PC, class V0
protection class	II in intended use
protection degree housing	IP40
protection degree terminals	IP20

terminals: V+, V-	
connection type	spring terminal connector (cage clamp)
wire size solid core	0,08 … 2,5 mm^2 (AWG28 … AWG12)
wire size fine wired	0,08 … 2,5 mm^2 (AWG28 … AWG12)
wire size using wire end ferrule	0,25 … 1 mm^2
stripping length	5 … 6 mm / 0,2 … 0,24 inch
housing material	PA66, class V0
actuation type	operating tool

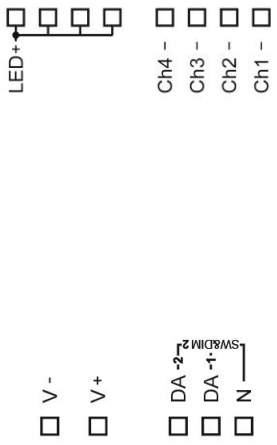
terminals: DA, DA, N, LED+, Ch1-, Ch2-, Ch3-, Ch4-	
connection type	spring terminal connector (push in cage clamp)
wire size solid core	0,2 … 1,5 mm^2 (AWG24 … AWG16)
wire size fine wired	0,2 … 1,5 mm^2 (AWG24 … AWG16)
wire size using wire end ferrule	0,25 … 1 mm^2
stripping length	8,5 … 9,5 mm / 0,33 … 0,37 inch
housing material	PA66, class V0
actuation type	push button

standards	
DALI	EN 62386-101, EN 62386-102, EN 62386-207
EMC	EN 61547 EN 55015 / IEC CISPR15
electrical safety	EN 61347-2-13 EN 61357-1
markings	CE, UKCA, DALI-2

on request: output currents from 100mA to 500mA available



dimensions common plus connector type



connection plan

common minus connector (GM)

type	**DALI 4Ch 250mA GM**	**DALI 4Ch 350mA GM**	**DALI 4Ch 500mA GM**	**DALI 4Ch 700mA GM**
article number	89453855-250GM	89453855-350GM	89453855-500GM	89453855-700GM

supply: V+, V-

type of input	supply, DC			
marking terminals	V+, V-			
supply voltage V_{in}	12V DC … 48V DC (SELV)			
max. input current I_{in_max}	1000mA	1400mA	2000mA	2800mA
rated power	48W	67W	96W	134W
standby power consumption	180mW @12V			
power on behaviour	configurable via DALI: 0%-100% or last actual level			

input: DA, DA

input type	DALI, control input
marking terminals	DA, DA
input voltage range	9,5V … 22,5V (according to IEC62386-101)
max. current consumption DALI	2mA
overvoltage protection	up to 250V
number of DALI-addresses	operating mode DT6: 4 operating mode Colour&Dim: 2

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+, Ch3+, Ch4+

output type	LED dimmer, constant current PWM			
marking terminals	LED-, Ch1+, Ch2+, Ch3+, Ch4+			
number of outputs	4			
PWM frequency	FW: < 4.6. 122Hz/244Hz/488Hz/976Hz FW: >= 4.6: 250Hz/ 500Hz / 1kHz			
output voltage range V_{led}	3V-45V (at 48V supply)			
max. output current per channel I_{led}	250mA	350mA	500mA	700mA
max. output power per channel	11,25W	15,75W	22,5W	31,5W
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 <-> SwDim2	no insolation
DALI/SwDim2 <-> output/supply	reinforced isolation
DALI/SwDim2 <-> housing	reinforced isolation
Insulation test voltage	3000V a.c.

environmental conditions:

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

general data

dimensions (l x w x h)	120mmx41mmx22 mm
mounting	remote ceiling, integration in class II luminaires
rated maximum temperature tc	75°C
expected lifetime (T<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 … 2,5 mm^2 (AWG28 … AWG12)
wire size fine wired	0,08 … 2,5 mm^2 (AWG28 … AWG12)

wire size using wire end ferrule	0,25 … 1 mm²
stripping length	5 … 6 mm / 0,2 … 0,24 inch
housing material	PA66, class V0
actuation type	operating tool

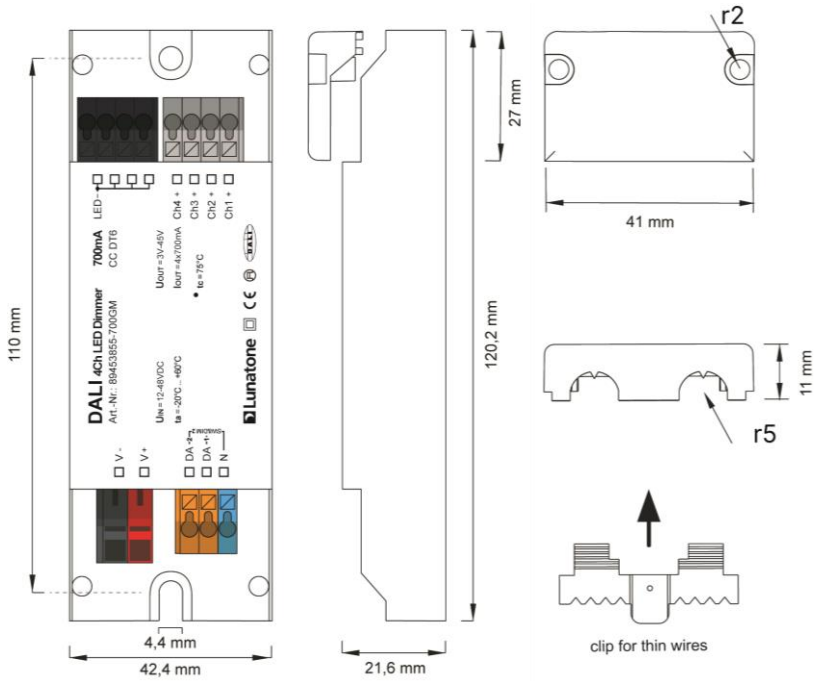
terminals: DA, DA, N, LED+, Ch1-, Ch2-, Ch3-, Ch4-

connection type	spring terminal connector (push in cage clamp)
wire size solid core	0,2 … 1,5 mm² (AWG24 … AWG16)
wire size fine wired	0,2 … 1,5 mm² (AWG24 … AWG16)
wire size using wire end ferrule	0,25 … 1 mm²
stripping length	8,5 … 9,5 mm / 0,33 … 0,37 inch
housing material	PA66, class V0
actuation type	push button

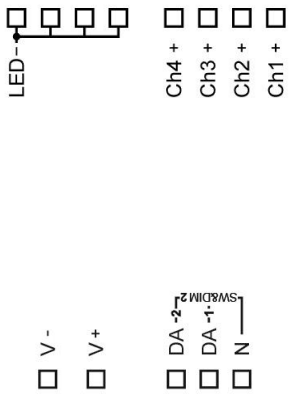
standards:

DALI	EN 62386-101, EN 62386-102, EN 62386-207
EMC	EN 61547 EN 55015 / IEC CISPR15
electrical safety	EN 61347-2-13 EN 61357-1
markings	CE, UKCA, DALI-2

on request: output currents from 100mA to 700mA available



dimensions GM



connection plan GM

Installation

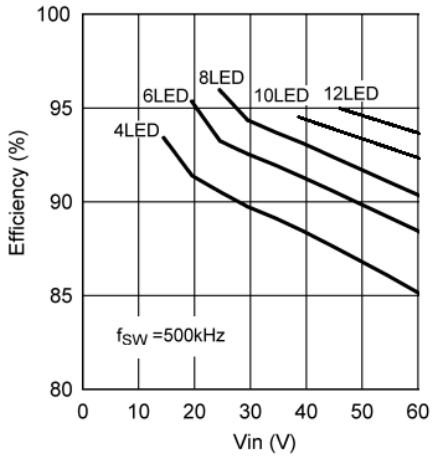
- The DALI 4Ch LED Dimmer is an independent control gear, it is suitable for remote ceiling and integration in luminaires
- Ensure proper working cable relief for installation in protection class II equipment
- The wiring should be carried out as a permanent installation in a dry and clean environment.
- 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).

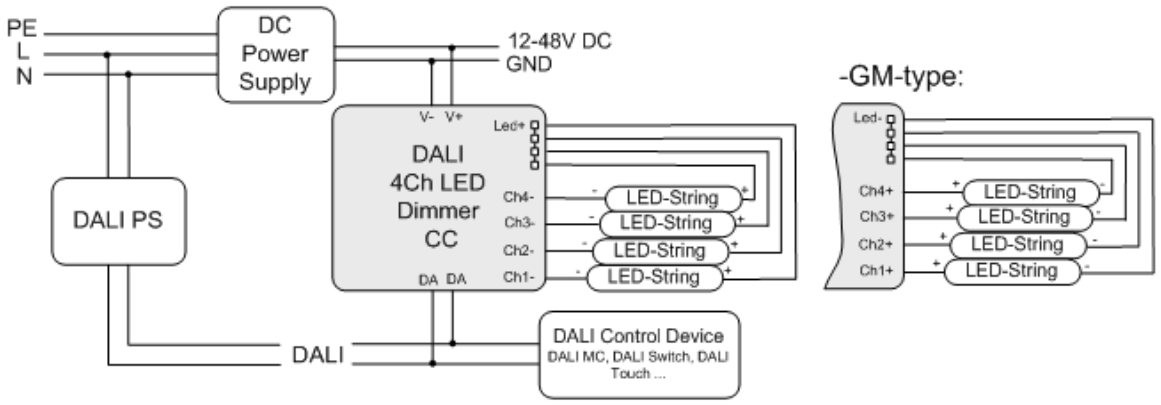
Hint:
For highest efficiency the input voltage should range from 3V to 10V above the rated LED-voltage:

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



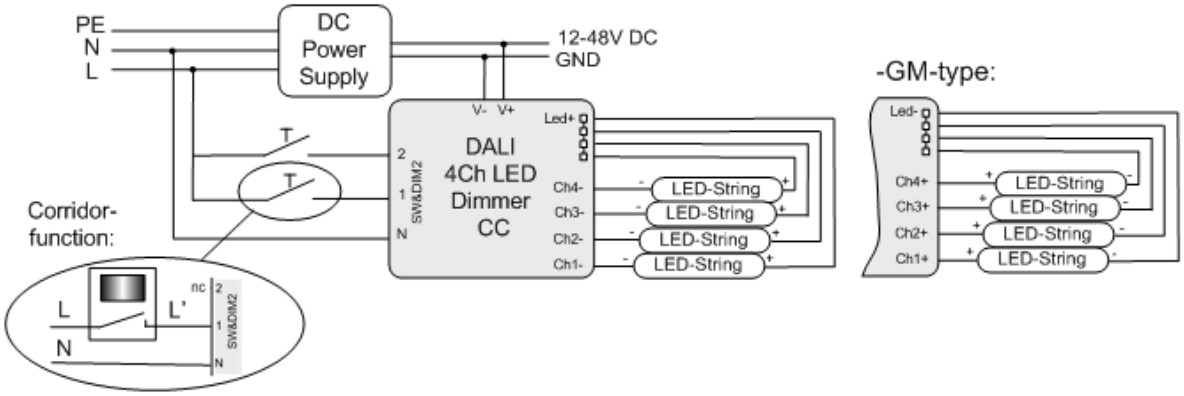
Application Example

Control via DALI



Control via SwitchDim2

- use of 2 push buttons or
- alternatively using of a motion sensor with relay (SwD1)



Commissioning

- After connection the 2Ch Dimmer is ready to use. Delivery default settings see page 14

- The DALI-2 2Ch Dimmer 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 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 11 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.

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

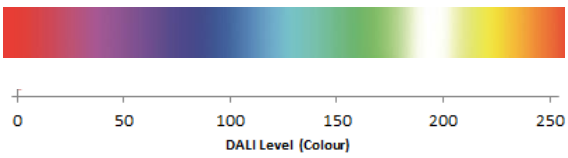
SwD1: light level
short press: On/Off
long press: dimming
SwD2: scene selector (short press)
scene pre-set see Table 1, page 15

Colour&Dim
This operating mode is suitable for operating RGBW—luminaires. Two DALI-addresses are used, the first to control the light level and the second for changing the distribution on the output channels (e.g. for colour adjustments).

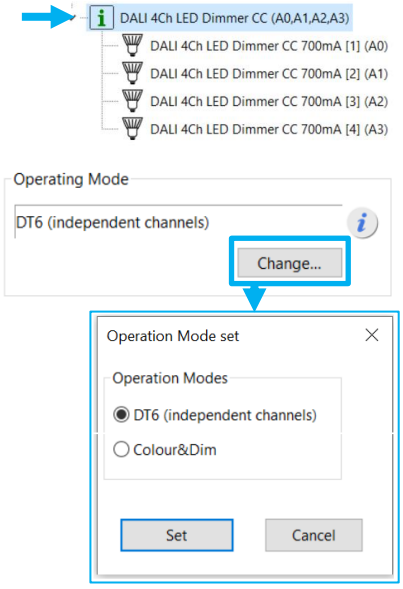
The Colour&Dim mode allows colour adjustments without affecting the light level and vice versa. For each channel only DALI-standard commands like dim up/down but also DAP are used. Thus the device can be used with all common controls and gateways (e.g. KNX). The Colour&Dim mode provides an alternative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

Can be operated via DALI or SwitchDim2:

DALI-address 1, SwD1: light level
DALI-address 2, SwD2: colour



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
0	DT6 (factory default)
0x90	DT6
0x93	Colour&Dim

DALI Cockpit: General Settings

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

- *DT6:* 4 sliders for the light level of each channel
- *Colour&Dim:* a slider for level and colour in the operating mode

Additionally the following configurations can be made:

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 below.

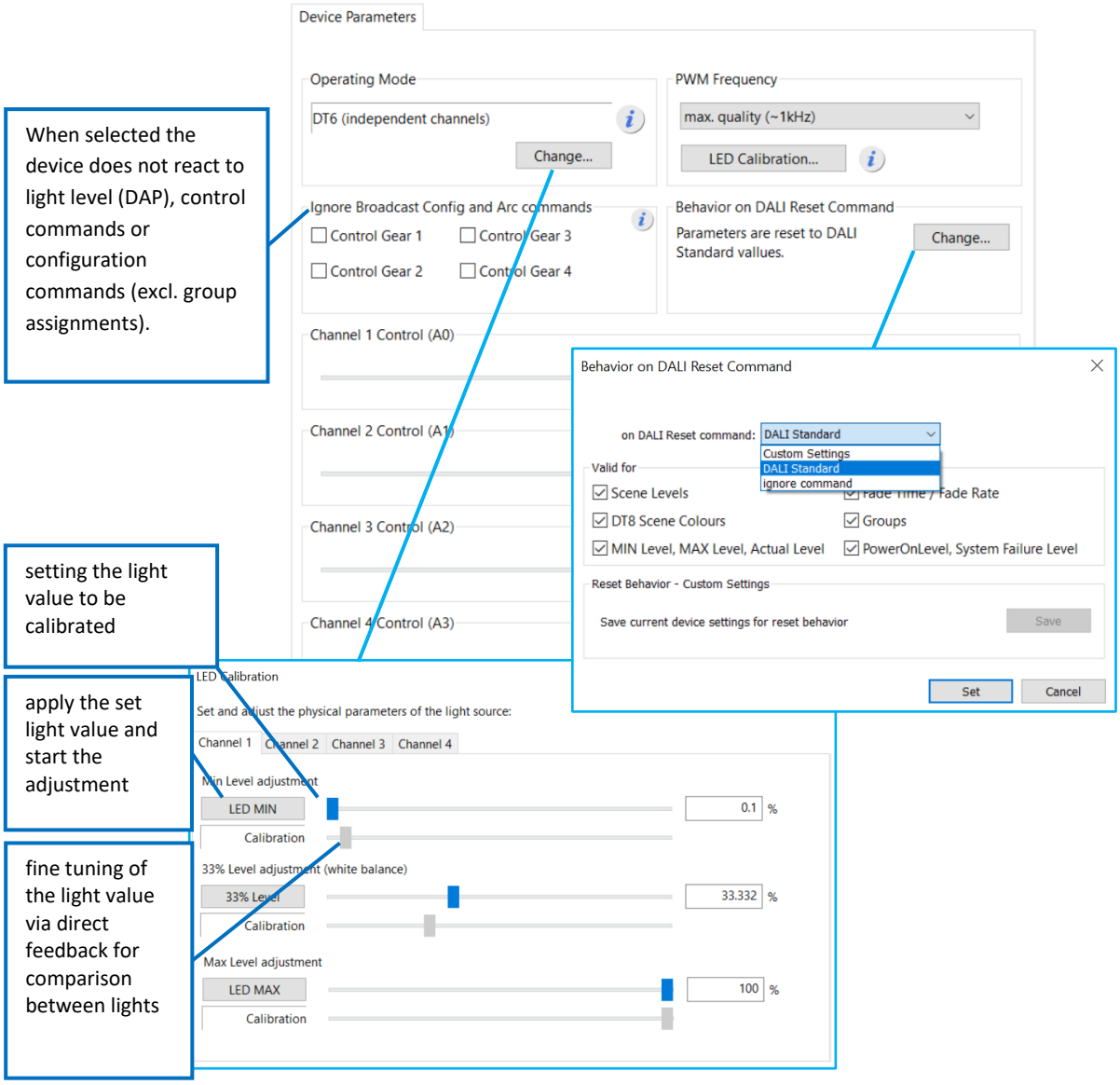
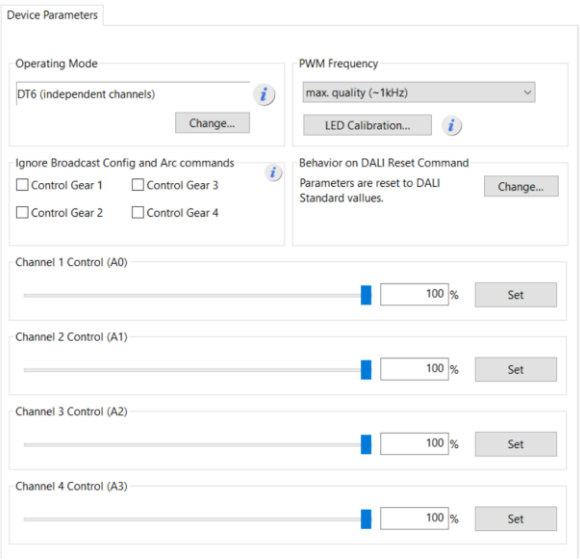
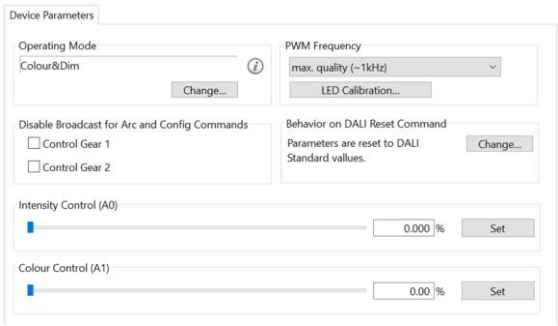


Figure 1 Cockpit overview page – LED calibration and settable RESET behaviour

Overview page operating mode DT6

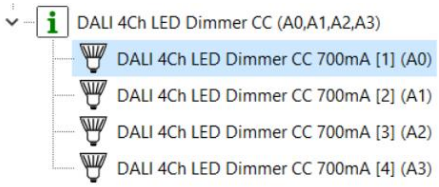


Overview page operating mode Colour&Dim



DALI Cockpit: Additional Settings

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

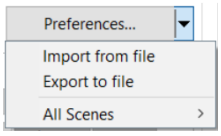


For each address the group membership can be set as well as scene values and DALI-parameters. In Colour&Dim operating mode, all values assigned to channel 2 are representing colours.

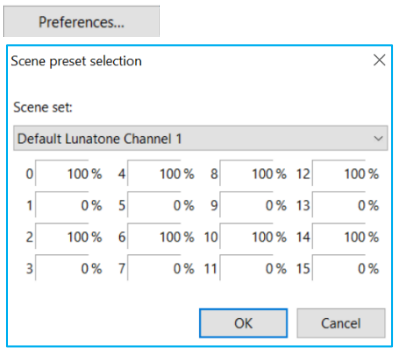
Figure 2 on page 14 shows the settings for each channel for both operating modes DT6 and Colour&Dim.

Scene settings

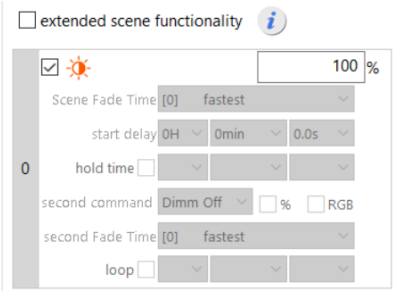
Via the arrow button the scene settings can be imported and exported.

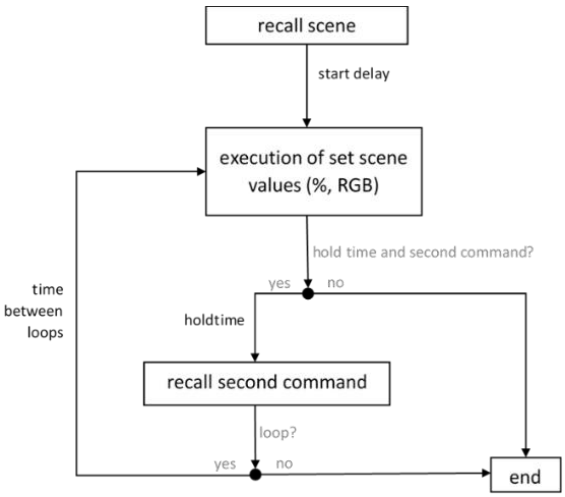


Via the button „Preferences“ the default scene settings can be loaded.



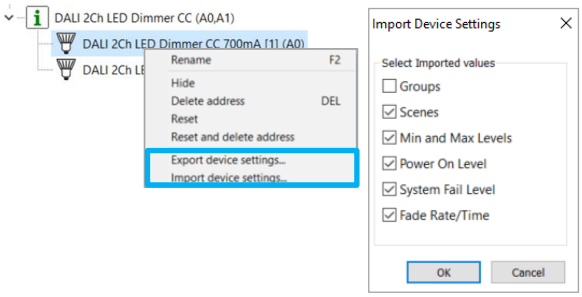
From FW 6.0 on, extended scene settings can be configured. With extended scenes it is possible to automatically change between 2 scene values (once or looped). Thereby enabling configuration of blinking lights, time delayed switch off or light repetitions, as well as traveling lights with multiple dimmers.





Import/Export settings

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



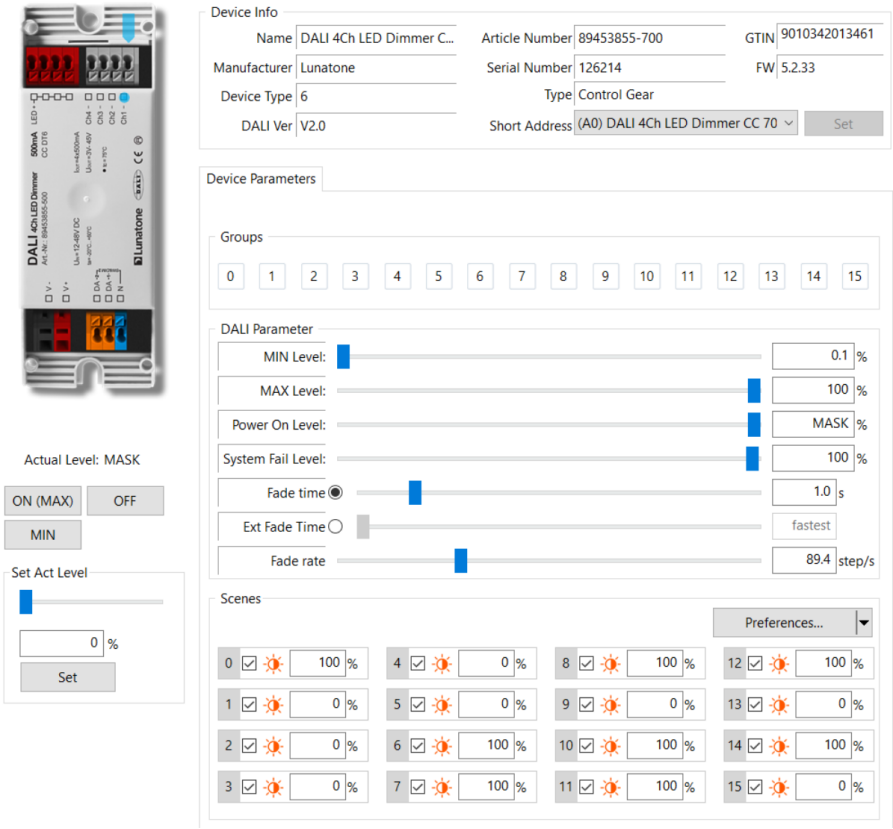


Figure 2 Cockpit settings for each channel

Factory Default Settings

Before the initial addressing is performed, the device can already be controlled by group addresses. 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 DALI-norm values are summarised in *Table 1* below.

	Delivery default	**DALI norm**
Operating mode	DT6	---
SwitchDim2	SwD1: light level SwD2: scene selector	---
Min Level	0.1%	0.1%
Max Level	100%	100%
Power On Level	Last light level = 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	122Hz or. 1kHz from FW 4.6 on	---
Control before initial addressing	G0 – channel1 G1 – channel2 G2 – channel3 G3 – channel4	none

Scene values	Scene	Ch1	Ch2	Ch3	Ch4	All scenes MASK
	0	100%	0%	0%	0%	
	1	0%	100%	0%	0%	
	2	0%	0%	100%	0%	
	3	0%	0%	0%	100%	
	4	0%	0%	100%	100%	
	5	0%	100%	0%	100%	
	6	100%	0%	0%	100%	
	7	100%	0%	100%	0%	
	8	100%	100%	0%	0%	
	9	0%	100%	100%	0%	
	10	100%	0%	100%	100%	
	11	100%	100%	0%	100%	
	12	100%	100%	100%	0%	
	13	0%	100%	100%	100%	
	14	100%	100%	100%	100%	
	15	0%	0%	0%	0%	
Behaviour on DALI RESET command	set DALI Standard values, see column 2					---

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

Purchase Order Information

Art.Nr. 89453855-xxx
DALI 4Ch LED Dimmer CC
constant current xxx mA - 100mA-500mA,
common plus connector,
supply 12V-48V DC,
output voltage range 3V-45V DC,
SwitchDim2,
remote ceiling & integration in luminaires

Art.Nr. 89453855-xxxGM
DALI 4Ch LED Dimmer CC
constant current xxx mA - 100mA-700mA,
common minus connector,
supply 12V-48V DC,
output voltage range 3V-45V DC,
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
https://www.lunatone.com/en/

DALI-Cockpit – free configuration tool from Lunatone for DALI systems
https://www.lunatone.com/en/product/dali-cockpit/

Contact

Technical Support: support@lunatone.com

Requests: sales@lunatone.com

www.lunatone.com

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.

