

DALI-2 MC1L

Datasheet

Multi Control Module



Programmable DALI control module
with switching input for mains
voltage



Art. Nr. 86458507-1L-2

Art. Nr. 86458507-1L-PS

DALI-2 MC1L Control Device

Overview

- DALI-2 control module with 2 switching inputs for mains voltage
- Version with integrated DALI Bus power supply (50mA) – article number: 86458507-1L-PS
- galvanic isolation between switching input and DALI-line
- application controller: different DALI commands, destination addresses and switching modes can be assigned to each input.
- multi-master capability, several modules can be installed on the same DALI-line.
- DALI DT8 support for adjustable white luminaires with the help of special macros
- A DALI-2 pushbutton instance is available for an easy integration (according to IEC62386-301)
- short button press, long button press (with repetition for dimming) and «toggle» are supported
- Suitable for push-buttons, as well as switches
- adjustable “power-up” functionality
- Alternative button function: A second function can be assigned to each input. Activated / deactivated via a scene command. Thus, offering an easy solution to the partition wall problem.
- the function of the switching input can be configured with the help of the DALI Cockpit and a suitable interface module (e.g. [DALI-2 USB](#); [DALI USB](#), [DALI-2 WLAN](#), [DALI-2 Display](#), [DALI-2 IoT](#), [DALI 4Net](#), [DALI SCI RS232](#)).
- suitable for installation in protection class II devices or back box installation
- DALI-2 control unit according to IEC62386-103



Specification, Characteristics

type	DALI-2 MC1L	DALI-2 MC1L PS
article number	86458507-1L-2	86458507-1L-PS
input: L, N		
input type	--	supply, mains- voltage
marking terminals	--	L, N
input voltage range	--	120Vac ... 240Vac
max. input supply current	--	40mA (@120Vac), 20mA (@240Vac)
input supply frequency	--	50Hz / 60Hz

max. power consumption	--	1 W (bus load dependent)
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switching input: LT1, N

input type	switching input for mains voltage	
number of inputs	1	
marking input terminals	LT1, N	
input voltage range	230Vac +10% / -15%	
input frequency	50Hz ... 60Hz	
control impulse length min.	40ms	
control impulse length for long press	>500ms	
trip point, threshold	approx.180Veff	
input resistance	175kΩ (withstands 6kV surge pulses)	
cable capacitance max.	10nF	
wire length max.	100m @100pF/m	

DALI interface: DA, DA

output type	DALI interface	DALI interface, DALI power supply
marking terminals	DA, DA	DA+, DA-
voltage range	9,5Vdc ... 22,5Vdc (according to IEC62386)	12V ... 20,5Vdc (according to IEC62386)
guaranteed output current	--	50 mA
max. output current	--	240 mA (an additional external DALI bus supply is not possible)
input current	4.6mA	--
overvoltage withstand capability	up to 250Vac	
DALI address	none	
DALI-2 address	1	

insulation data:

impulse voltage category	II	
pollution degree	2	
rated insulation voltage	250V	
rated impulse withstanding voltage	4kV	
insulation DALI / mains	reinforced isolation	
insulation test voltage DALI / mains	3000VAC	

environmental conditions:

storing and transportation temperature	-20°C ... +75°C	
operational ambient temperature	-20°C ... +75°C	-20°C ... +55°C
rel. humidity, none condensing	15% ... 90%	

general data:

dimensions (l x w x h)	59mm x 33mm x 15mm	
mounting	back box installation installation in protection class II devices	
rated maximum temperature tc	75°C	
expected life time at 65°C	100.000 h	
protection class	II in intended use	
protection degree housing	IP40	

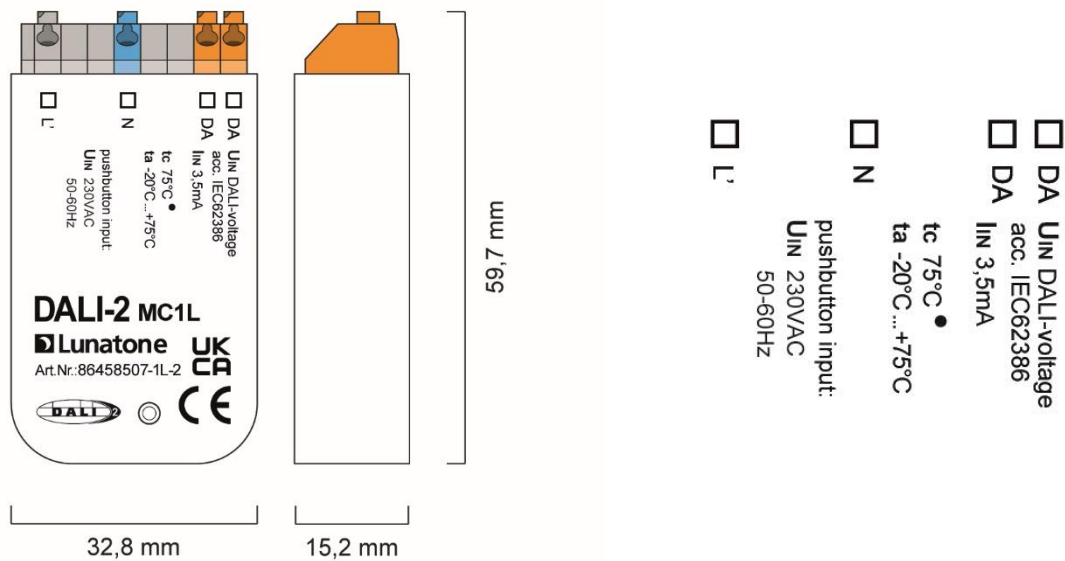
protection degree terminals	IP20
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terminals:

connection type	spring terminal connectors
wire size solid core	0,5 ... 1,5 mm ² (AWG 20 ... AWG 16)
wire size fine wired	0,5 ... 1,5 mm ² (AWG 20 ...AWG 16)
wire size using wire end ferrule	0,25 ... 1 mm ²
stripping length	8,5 ... 9,5 mm / 0,33 ... 0,37 inch
release of wire	push button

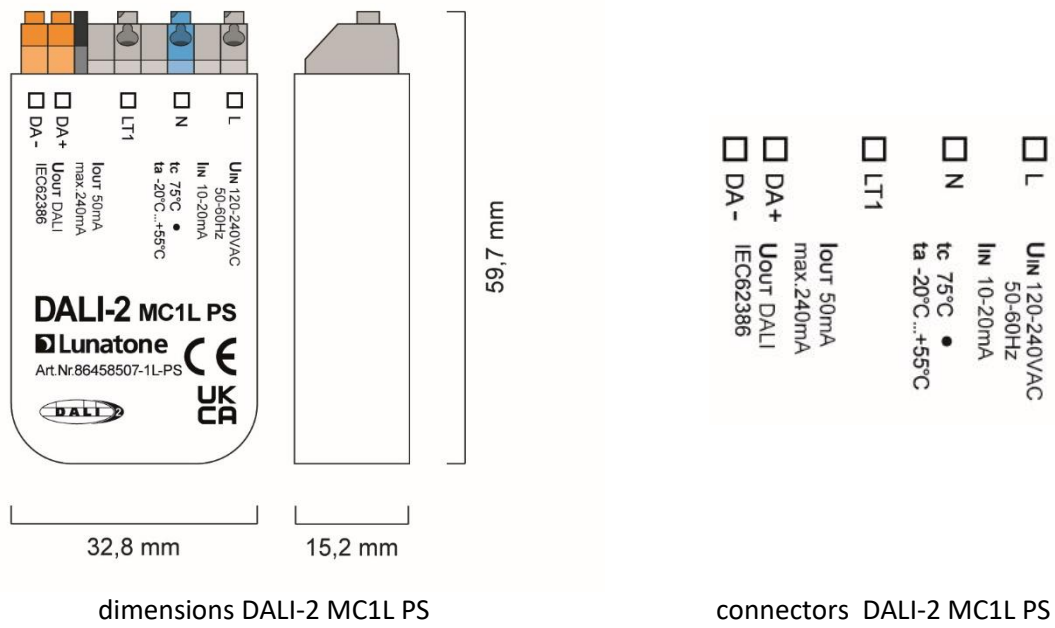
standards:

DALI	EN 62386-101 EN 62386-103 EN 62386-301
EMC	EN 61547 EN50015 / IEC CISPR15
safety	EN 61347-2-11 EN 61347-1
markings	CE, UKCA



dimensions DALI-2 MC1L

connectors DALI-2 MC1L



dimensions DALI-2 MC1L PS

connectors DALI-2 MC1L PS

Factory Default Settings

A basic configuration is already implemented on delivery (factory default setting). If necessary, this can be changed and adapted.

application controller	active
instances – event messages	inactive
effective range	Broadcast
button function	BF6: short press: toggle CmdX/CmdY -long press: toggle UP/DOWN
command X (CmdX)	RECALL MAX
command Y (CmdY)	OFF
command on power up	none
alternative configuration	disabled

Typical Application

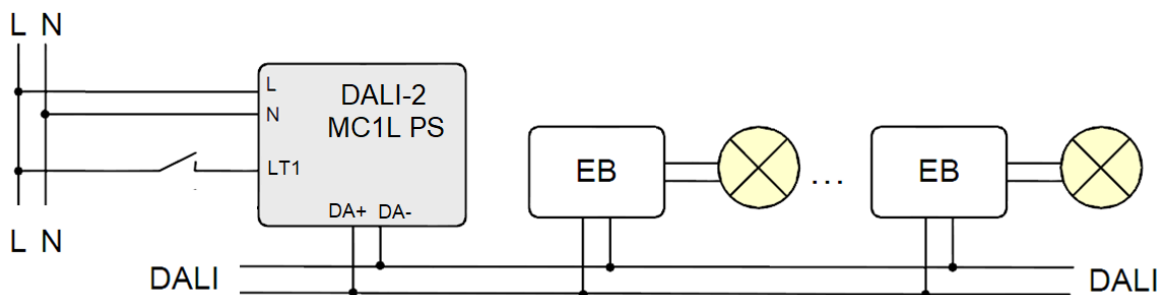


Fig. Fig. 1. Typical Application, wiring diagram **DALI-2 MC1L PS**

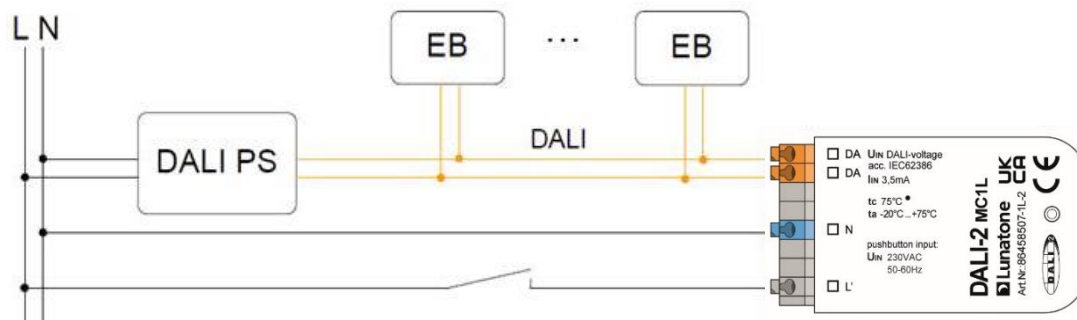


Fig. 2. Typical Application, wiring diagram **DALI-2 MC1L**

Installation

- The DALI-2 MC1L and DALI-2 MC1L PS are intended for back box installation or for integration in protection class 2 devices (ensure proper working cable relief for installation in protection class II equipment).
- The **DALI-2 MC1L** is powered by the DALI-line – no separate power supply needed.
- **DALI-2 MC1L**: the connection to the DALI-line is polarity free.
- The **DALI-2 MC1L PS** has an integrated DALI bus power supply (50mA). No additional DALI bus power supply may be connected. If additional ballasts are required on the DALI bus, a [DALI Expander](#) (Art. No. 89453847) can be used.
- **DALI-2 MC1L PS**: The polarity of the output voltage is marked on the housing (DA+, DA-)
- **DALI-2 MC1L PS**: connect power supply terminals L and N to mains voltage according to the labelling.
- Switching input LT1 is intended for use with line voltage, it is galvanically separated from the DALI-line.
- 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.
- The DALI wiring can be realised with standard low-voltage installation material. No special cables are required.

- The DALI-interface can handle mains voltage, protecting the device in case of wrong wiring.
- Possible wiring topology of the DALI-line: Line, Tree, Star
- Only 1 wire may be connected to each terminal. When using double wire end ferrules, the connection capacity of the terminal must be considered.
- The DALI line may be routed together with the mains voltage (in one cable or as single wires in a tube)
- Release of wires with push button



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).

default see section “Factory Default Settings”, page 5.

- Addressing and changes to the factory settings, such as setting the effective range and functions, are possible with the Software tool DALI Cockpit (Windows PC).
- 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-2 MC1L is automatically recognised by the DALI Cockpit during the addressing process and listed in the device overview. Effective range and desired functions can then be assigned to each input.
- The addressing is done according to the DALI-2 specification and the device receives a corresponding address.
- For localisation a buzzer is integrated in each DALI-2 MC1L PS device, or alternatively, a serial number visible in the DALI Cockpit “device info” is attached on the device.
- Physical selection: At the end of the addressing process, by double-clicking the physical button, the DALI Cockpit identifies and adds the input connections (LT1, LT2 respectively) to the device list.
- Instance: Instance parameters can be configured according to IEC 62386-301.

Commissioning

- After installation the DALI-2 MC1L can already be used with the factory default settings. For an Overview of the factory

Operation and function

The DALI-2 MC1L and DALI MC1L PS are universal modules to control DALI-compatible

lights. The function of each push button input can be set individually.

As with other Lunatone control devices, the settings can be made with the DALI Cockpit Software tool.

It is necessary to distinguish between application controller and DALI-2 instances.


The application controller gives direct DALI control commands that are immediately executed by the DALI drivers. Configuration of the application is described in the section “Application Controller: Configuration of input LT1” on page 8

The DALI-2 instances generate event messages that are interpreted and processed by higher-level control units (WAGO, Beckhoff, LUNATONE DALI-2 KNX gateway).

(General information on the DALI-2 instance mode: https://www.lunatone.com/wp-content/uploads/2021/10/DALI-2_Instance-Guide_EN_M0024.pdf)

Configuration of the DALI-2 MC1L instances is described in section: “DALI-2 Instances” on page 14.

The Application controller and instances can be active at the same time.

 **Additional Information:** A deactivated Application Controller is indicated in the DALI Cockpit device tree with: **A**.

A device with active instances is indicated with: **i**

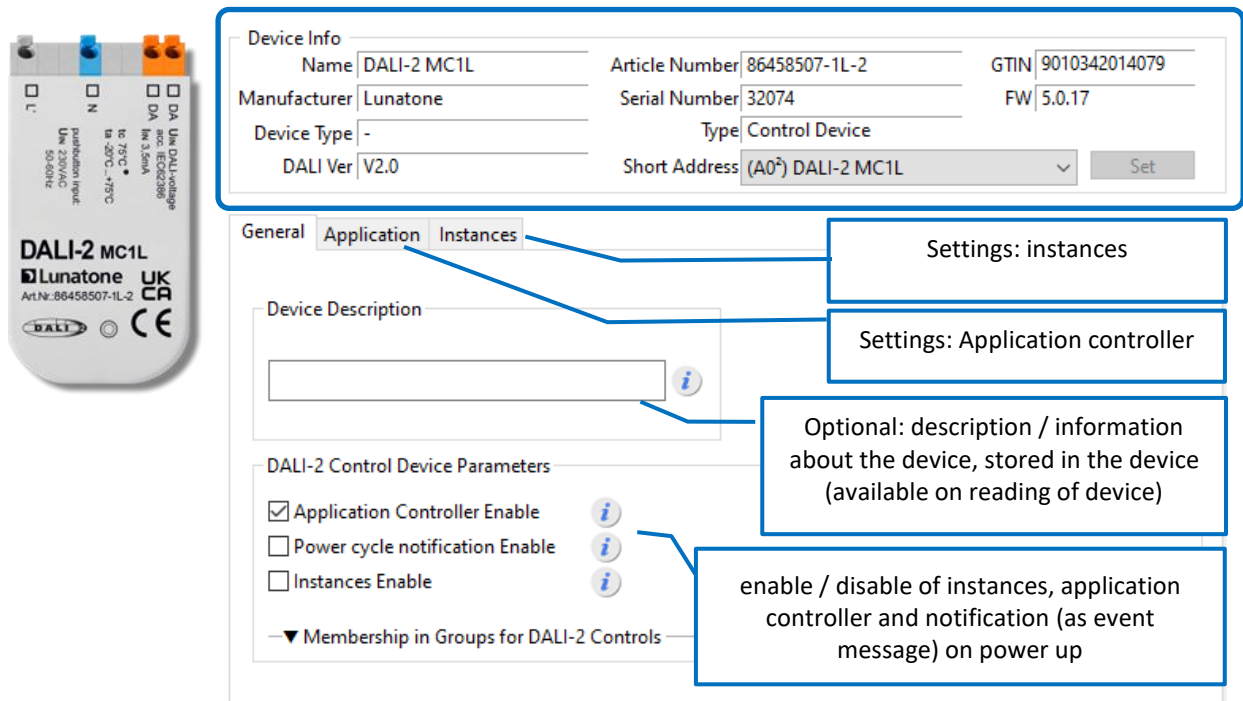


Fig.3: General Settings

Application Controller: Configuration of input LT1

The image shows a DALI-2 MC1L device and its configuration interface. The device is a small grey PCB with three terminals (L, N, DA) and technical specifications. The screenshot shows the 'Application' tab with various settings. Blue callout boxes point to specific features:

- destination addresses**: Points to the 'Destination Addresses' table with 4 rows.
- button function**: Points to the 'Function' dropdown menu.
- DALI command / function**: Points to the 'Command X' and 'Command Y' dropdown menus.
- settings for each input**: Points to the 'Input 1' header.
- alternative configuration can be activated and deactivated by scene commands**: Points to the 'Alternative config' tab.
- interpretation of scene command for toggle functions**: Points to the 'Interpret scene commands as' dropdown menu.
- command that is sent on device power up**: Points to the 'Actions After Power Up' dropdown menu.

Fig. 4: Application: Application Controller

Destination address / effective range

Here you can set which devices are affected by the button function. Possible destination addresses:

- Broadcast (an alle)
- DALI group (0 - 15)
- DALI single address (0 - 63)

Up to 4 different target addresses can be defined for each button input. When the button is pressed the target addresses 1 to 4 will be processed sequentially (see Fig. 4)

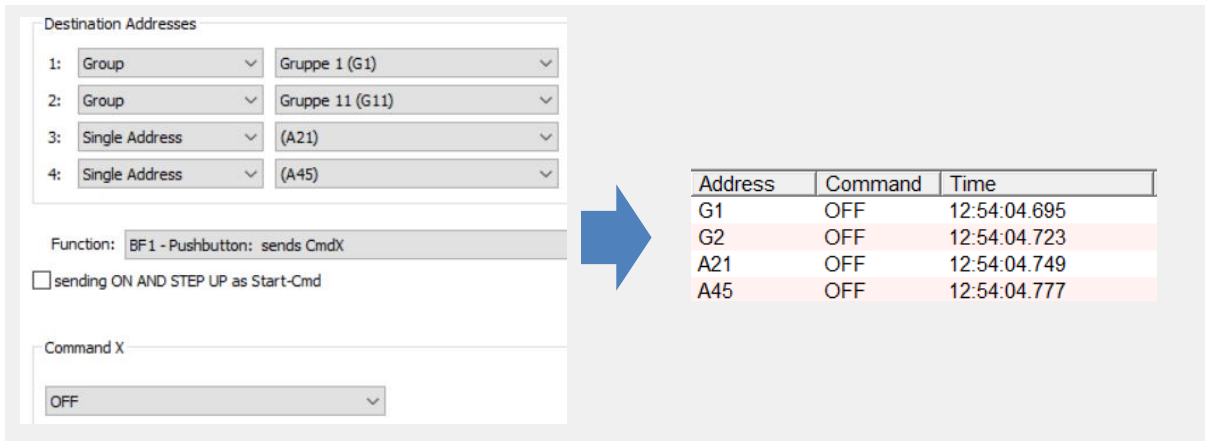


Fig.5 Example: Addresses 1-4 are sequentially processed

Button Function (BF)

Various "Button Functions" (BF) can be assigned to the individual buttons. The "Button Function" defines the behaviour of a button. A short or long press of the button can trigger different DALI commands. A toggle

function (switching between on and off) is also possible.

Key presses (short / long) are queried according to the following timing diagram and translated into internal signals (**key events**):

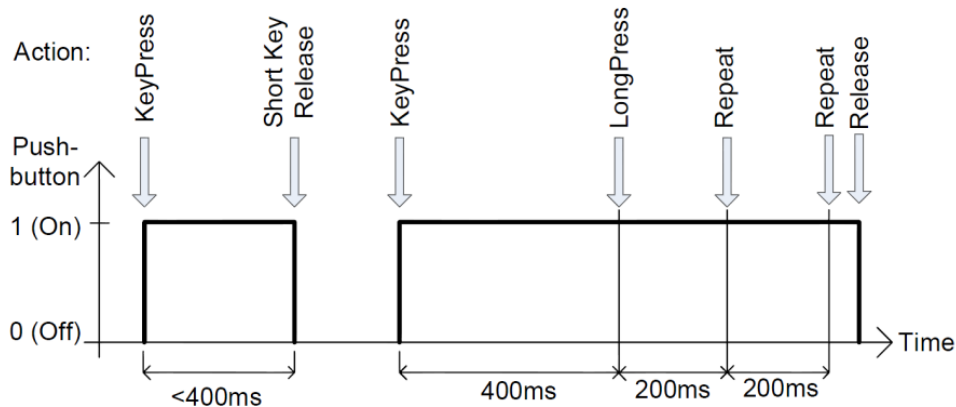


Fig.6 Key Events

The following table (Table 1.) shows how the selected "Button Function" (lines 0 to 13) sends the commands **CmdX** and **CmdY** in connection with the "Key Events" (see Fig. 5). CmdX and CmdY refer to DALI commands.

Note: The DALI commands are transmitted to all assigned target addresses.

button function number	event: press	event: short press (release)	event: long press	event: extra-long press	event: repeat	function	typical application
0	-	-	-	-	-	-	-
1	CmdX	-	-	-	-	sends CmdX on key press	master off
2	CmdX	-	CmdY	-	-	sends CmdX on key press sends CmdY on long key press	switch to 2 different levels
3	-	CmdX	-	CmdY	-	sends CmdX on key press sends CmdY on extra-long key press	store level as scene
4	CmdX / CmdY toggle	-	-	-	-	sends alternating CmdX and CmdY on key press	toggle push button
5	CmdX / CmdY toggle	-	-	-	-	sends CmdX or CmdY on key press depending on bus status	changeover button
6	-	CmdX / CmdY toggle	UP / DOWN	-	UP / DOWN	sends CmdX or CmdY on short key press depending on bus status sends alternating UP or DOWN on long press and repeat	push and dim
7	CmdX CmdY on any release	-	-	-	-	sends CmdX on key press sends CmdY on key release (after any duration)	switch
8	CmdX / CmdY toggle CmdY / CmdX toggle on any release	-	-	-	-	sends CmdX or CmdY on key press depending on bus status sends CmdY or CmdX on key release (after any duration) depending on bus status	changeover switch
9	CmdX CmdY on delay	-	-	-	-	sends CmdX on key press sends CmdY after a programmable delay	staircase control
10	-	CmdX	CmdY	-	CmdY	sends CmdX on short key press sends CmdY on long key press sends CmdY on repeat	push and dim
11	CmdX	-	-	-	CmdY	sends CmdX on key press sends CmdY on repeat	push and dim
13	-	CmdX / CmdY toggle	-	-	WARMER / COOLER	sends CmdX or CmdY on short key press depending on bus status sends alternating WARMER or COOLER on repeat	tunable white dim

Table. 1

Commands

The actual action (which function is triggered when pressing a button) is determined by the button function and command assigned to the button.

In most cases, an X command (CmdX), and also a Y command (CmdY) can be selected. The following options are available: see table 2.

Depending on the selected command, additional input fields might appear for further settings:

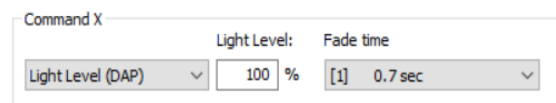


Fig. 7 Example for CmdX: DAP additional inputs: Light Level and Fade time

Predefined macros

Macros are predefined/ user defined command sequences that can be triggered by a single button press.

The following macros are available, see table 3.

Command number	Command name	action / function
no Nr.	DIRECT ARC POWER	direct arc power Level in %
0	OFF	off
1	UP	dim up (using fade rate)
2	DOWN	dim down (using fade rate)
3	STEP UP	increases light level by one increment
4	STEP DOWN	decreases light level by one increment
5	RECALL MAX	recalls MAX value
6	RECALL MIN	recalls MIN value
7	STEP DOWN AND OFF	decreases light level by one increment, if value at MIN switch off
8	ON AND STEP UP	increases light level by one increment, if OFF switch on
10	GOTO LAST ACTIVE LEVEL (DALI 2)	DALI-2-Cmd for switching on to the last active level (Memory-Function)
16-31	GO TO SCENE	go to scene 0-15

Table. 2

Nr	Makro	Function
M1	Go Home	Light dims down to DAP 0 with predefined fade time, then fade time is set back to a programmable value
M2	Sequential Scenes	A list of the scenes can be defined; the scene is switched with each button press.
M3	Dynamic Scenes	A dynamic sequence of up to 16 scenes can be defined, including custom fade times and delays.
M4	Save actual light level as scene	When triggered the current level is saved in a scene (options: light level, RGB colour value, WAF colour value or colour temperature).
M5	User Defined Cmd-List	A user-defined macro script with up to 19 commands is executed.
M6	TC cooler	Activates the DT8 mode and sends the command "COOLER" 3 times.
M7	TC warmer	Activates the DT8 mode and sends the command "WARMER" 3 times.
M8	Send RGB +	Activates the DT8 mode and sends an ascending RGB colour table value.
M9	Send RGB -	Activates the DT8 mode and sends a descending RGB colour table value.
M10	Delayed Off	Sends a DAP level and after a delay the OFF command. DAP level and delay are user defined.

Table. 3

Interpretation of scene commands when using toggle function

In order to correctly trigger the on and off commands with the toggle function, scene calls must be interpreted correctly. It is possible to set whether a scene should be interpreted as Off or On (Fig 8).

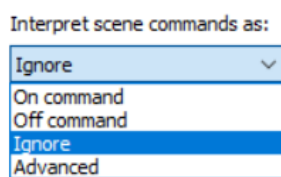


Fig. 8

Behaviour on power-up

The behaviour when the device starts up can be defined for each input. The following settings are possible:

- No action: (the device starts and only sends commands when triggered by the input)
- Sending a scene or OFF command with or without a delay after start (maximum delay: 7 seconds)

Alternative Configuration

An alternative/second configuration can be made for each button. All previously explained configuration options and settings are available. The alternative configuration can be recalled with a scene command. Activate / deactivate the "Alternative Configuration":

- **"Disabled"**: the function is switched off, there is only the standard configuration
- **"Activation by Scene Commands"**: scenes can be selected which will activate / deactivate the alternative configuration

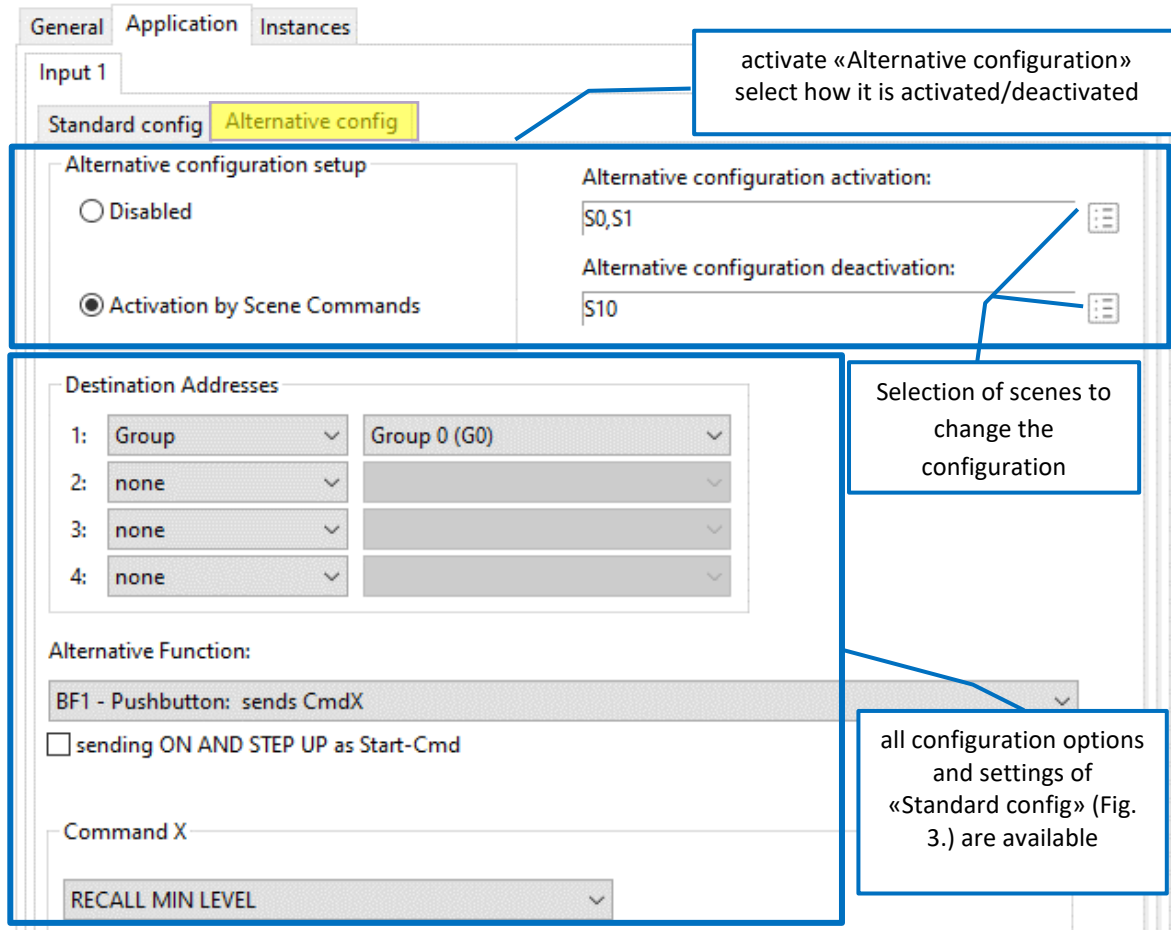


Fig. 9 Settings for the alternative configuration

DALI-2 Instances

In this operating mode, no DALI control commands are sent on the bus, but DALI-2 event messages for DALI-2 compatible central control systems.

The DALI-2 MC1L and DALI-2 MC1L PS support 1 instance of type 1 (IEC62386-30, Input Devices - Push Button), which is assigned to the button input:

instance 0 | input Lt1

As defined in the standard, the following events are supported and sent on the DALI bus as INPUT NOTIFICATIONS, see table 4.

Further parameters of the instance 0 are: event filter, event timer settings (short timer, double timer, repeat timer, stuck timer), which can be configured via the DALI Cockpit Software, see figure 9.

General information on the DALI-2 instance mode and the instance types, event settings, event schemas etc. can be found in the instance guide:

https://www.lunatone.com/wp-content/uploads/2021/10/DALI-2_Instance-Guide_EN_M0024.pdf

Event name	Event Information	Description
Button released	00 0000 0000b	The button is released
Button pressed	00 0000 0001b	The button is pressed
Short press	00 0000 0010b	The button is pressed and released, without being pressed quickly again (in case of double press enabled), or the button is pressed and quickly released (in case of double press disabled)
Double press	00 0000 0101b	The button is pressed and released, quickly followed by another button press
Long press start	00 0000 1001b	The button is pressed without releasing it
Long press repeat	00 0000 1011b	Following a long press start condition the button is still pressed, the event occurs at regular intervals as long as the condition holds
Long press stop	00 0000 1100b	Following a long press start condition, the button is released
Button free	00 0000 1110b	The button has been stuck and is now released
Button stuck	00 0000 1111b	The button has been pressed for a very long time and is assumed stuck.

Table.4

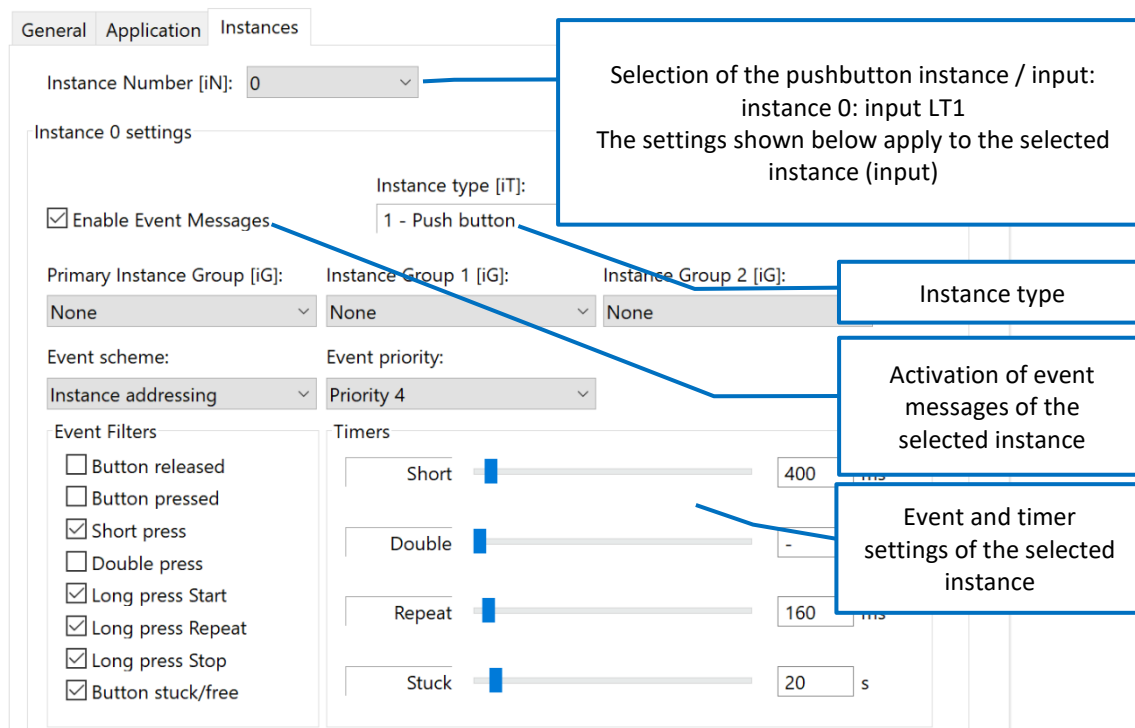


Fig. 10 Instance settings

Purchase Information

Art.Nr. 86458507-1L-2 DALI-2 MC1L, DALI Control device with 1 switching input for mains voltage, back box installation and class II device integration

Art.Nr. 86458507-1L-PS DALI-2 MC1L PS, DALI Control device with 1 switching input for mains voltage, with integrated DALI bus power supply (50mA), back box installation and class II device integration



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.

Additional Information and Equipment

DALI Cockpit - free configuration software for DALI systems

<https://www.lunatone.com/en/product/dali-cockpit/>

Lunatone DALI products

<https://www.lunatone.com/en>

Lunatone Datasheets and Manuals

<https://www.lunatone.com/en/downloads-a-z/>

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