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DALI-2 MC2L PS

Datasheet
Multi Control Device

DALI-2 control module with
two programmable switching
inputs for mains voltage
and integrated
DALI power supply (50mA)

Art. Nr. 86458507-2L-PS
GTIN 9010342014093
factory default: **App-Controller activated**

DALI-2 MC2L PS Control Device

Overview

- DALI-2 control module with 2 switching inputs for mains voltage

- Integrated DALI Bus power supply (50mA)

- galvanic isolation between switching input and DALI-line

- Multi-master capable

- Different DALI commands, destination addresses and switching modes can be assigned to each input

- Integrated DALI-2 application controller

- In addition to the standard DALI commands, the application controller also supports DALI DT8 TC and RGB (W) control

- Two DALI-2 pushbutton instances are available for an easy integration

- short button press, long button press (with repetition for dimming) and «toggle» are supported

- Suitable for push-buttons, as well as switches

- 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.

- With the application controller Sequences, macros and other functions can be realised.

- Easy configuration via Lunatone DALI USB interface and DALI-Cockpit Software Tool (suitable interface modules: DALI-2 USB; DALI USB, DALI-2 WLAN, DALI-2 Display, DALI-2 IoT, DALI 4Net, DALI SCI RS232).

- Easy installation: the device can be installed in a flush-mounted installation box and is supplied via the DALI bus

- DALI-2 control unit according to IEC62386-103

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Specification, Characteristics

type	DALI-2 MC2L PS
article number	86458507-2L-PS
GTIN	9010342014093

DALI interface, power supply: DA+, DA-

output type	DALI, DALI-2, Multi Master, power supply
terminal markings	DA+, DA-
voltage range	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)
DALI addresses	none
DALI-2 addresses	1

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)

switching input: LT1, LT2

Input type	switching input
number of inputs	2
marking input terminals	LT1, LT2
input voltage range	120Vac … 240Vac
frequency of a.c. voltage	50Hz … 60Hz
control impulse length min.	40ms
control impulse length for long press	>500ms
input resistance	660kΩ
wire length max.	10m (up to 50m in an interference-free environment i.e. no parallel power lines)
max. voltage between inputs	230Vac

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

| rel. humidity, not 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	50.000h
protection class	II (when used/installed as intended)
protection degree housing	IP40
protection degree terminals	IP20

terminals

connection type	spring terminal connectors
wire size: solid core	0,5 … 1,5 mm^2 (AWG20 … AWG16)
wire size: fine wired	0,5 … 1,5 mm^2 (AWG20 …AWG16)
wire size: using wire end ferrule	0,25 … 1 mm^2
stripping length	8,5 … 9,5 mm / 0,33 … 0,37 inch
tightening/ release of wire	push mechanism

standards

| DALI	IEC62386-101:2014 IEC62386-103:2014
EMV	EN 61547 EN 50015 / IEC CISPR15
safety	EN 61347-2-11 EN 61347-1
Markings	DALI-2, CE
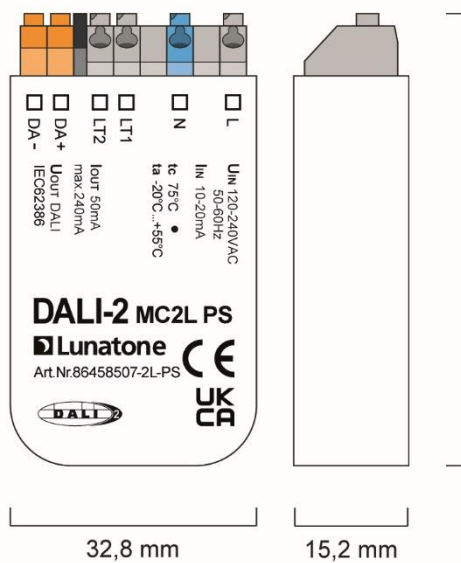
dimensions DALI-2 MC2L PS
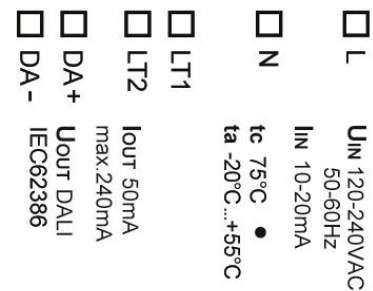
connectors DALI-2 MC2L PS

Factory Default Settings

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

	input LT1	input LT2
application controller	active	
incstances – event messages	inactive	inactive
effective range	Broadcast	Group 0
button function	BF6: short press: toggle CmdX/CmdY long press: toggle UP/DOWN	BF13: short press: toggle CmdX/CmdY long press: toggle COLDER/WARMER
command X (CmdX)	RECALL MAX	None
command Y (CmdY)	OFF	None
command on power up	none	none

Typical Application
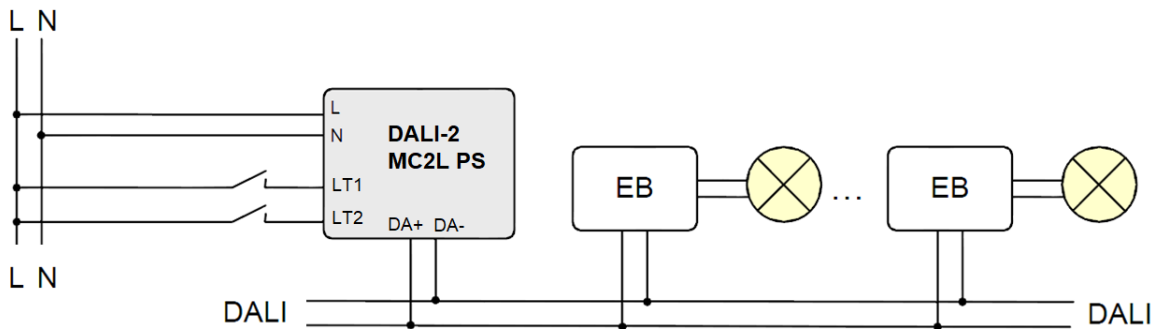
1 Typical Application, wiring diagram

Fig.

Installation

- The DALI-2 MC2L PS can be installed in a flush-mounted installation box

- The DALI-2 MC2L 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.

- The polarity of the output voltage is marked on the housing (DA+, DA-)

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

- Switching inputs are intended for use with line voltage, they are 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.

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- 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.

- 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)

☞ **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).

Addressing and Configuration

- After installation, the device can already be used with the default factory settings. A description of the factory default settings can be found on 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 MC2L PS 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 MC2L PS device. Alternatively, the allocation can also be done via the serial number of 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.

Operation and function

The DALI-2 MC2L PS is a universal module 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.

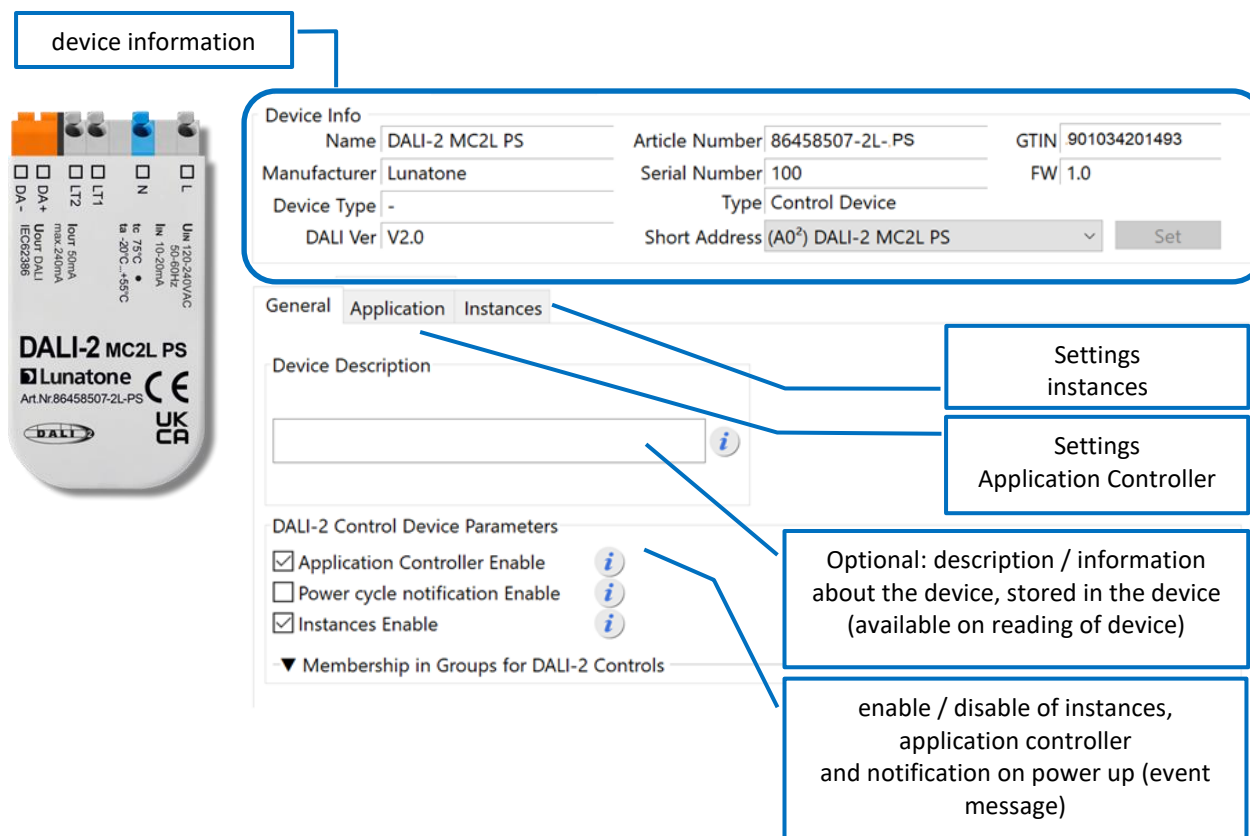**It is necessary to distinguish between application controller and DALI-2 instances.**

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 inputs (LT1, LT2" 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 MC2L instances is described in section: "DALI-2 instances" on page 13.

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

☞ **Additional Information:** A <u>deactivated</u> Application Controller is indicated in the DALI Cockpit device tree with: 🅐. A device with <u>active</u> instances is indicated with: 🛈

device information

Device Info
Name DALI-2 MC2L PS   Article Number 86458507-2L-.PS   GTIN 901034201493
Manufacturer Lunatone   Serial Number 100   FW 1.0
Device Type -   Type Control Device
DALI Ver V2.0   Short Address (A0^2) DALI-2 MC2L PS   Set

General | Application | Instances

Device Description

DALI-2 Control Device Parameters
☑ Application Controller Enable 🛈
☐ Power cycle notification Enable 🛈
☑ Instances Enable 🛈
▼ Membership in Groups for DALI-2 Controls

Settings instances

Settings Application Controller

Optional: description / information about the device, stored in the device (available on reading of device)

enable / disable of instances, application controller and notification on power up (event message)

Fig.2: General Settings

Application Controller: Configuration of inputs (LT1, LT2)

Fig. 3: DALI Cockpit Settings: Application Controller

Destination address / effective range

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

- Broadcast (all)
- 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)
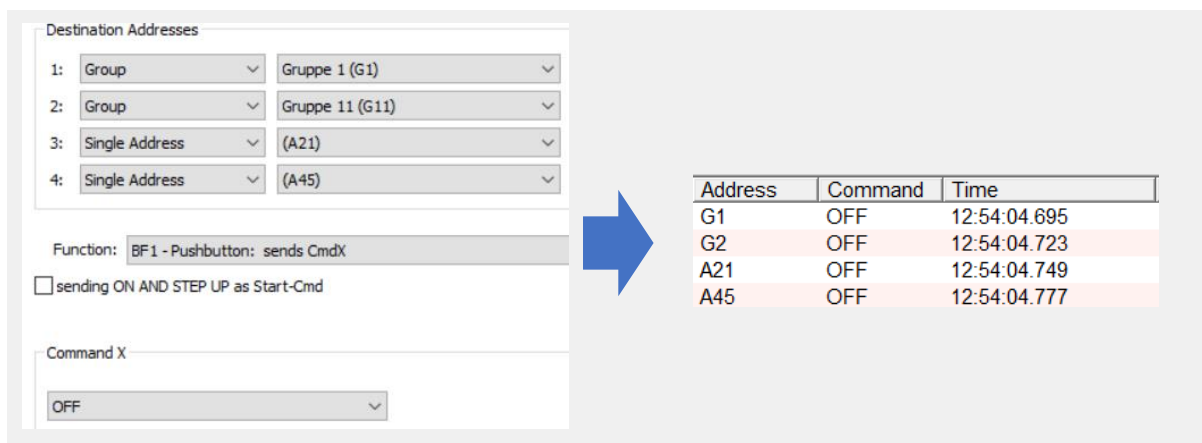
Fig.4 Example: Addresses 1-4 are sequentially processed

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**):
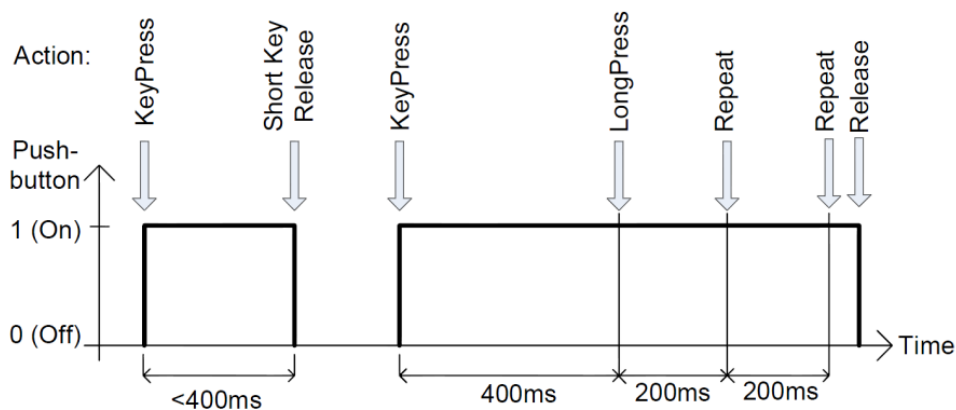

Fig.5 Key Events

The following table 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:
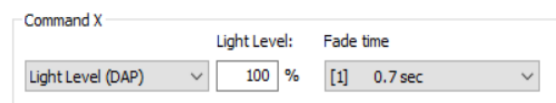

Fig. 6 Example for CmdX: DAP additional inputs: Light Level and Fade time

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 color table value.
M9	Send RGB -	Activates the DT8 mode and sends a descending RGB color table value.
M10	Delayed Off	Sends a DAP level and after a delay the OFF command. DAP level and delay are user defined.

Table.

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).

Interpret scene commands as:

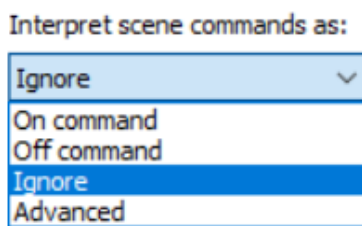Ignore

On command
Off command
Ignore
Advanced

Fig. 8

Behavior on power-up

The behaviour when the device starts 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
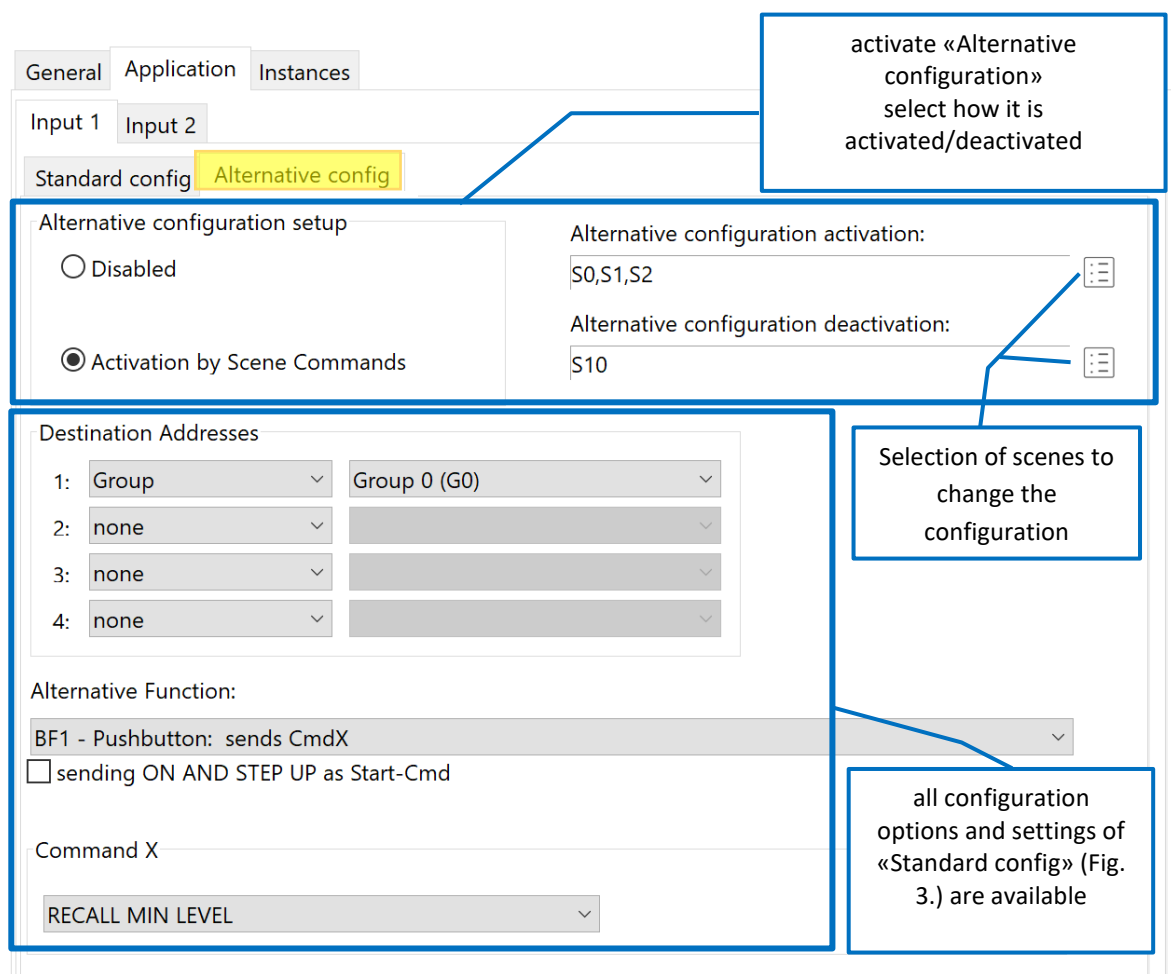

Fig. 7 Settings for the alternative configuration

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-MC2L PS supports 2 instances of type 1 (IEC62386-30, Input Devices - Push Button), which are assigned to the 2 button inputs:

instance 0	input LT1
instance 1	input LT2

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 instances 1 and 2 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

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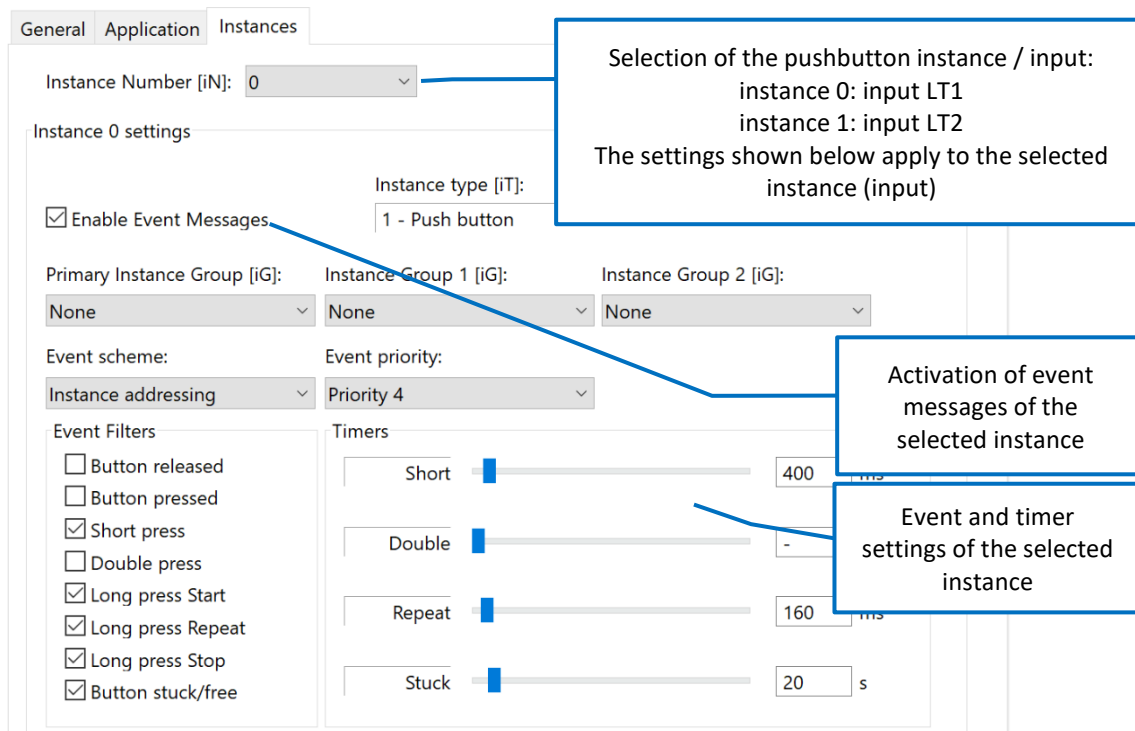
Fig. 9 Instance settings

Purchase Information

Art. Nr. 86458507-2L-PS
DALI-2 MC2L PS
for back box installation
factory default: App-Controller activated
integrated DALI bus power supply (50mA)

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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The function in installations with other devices must be tested for compatibility in advance.