DALI-2 MC

Datasheet

Multi Control Device

DALI control module with four
potential-free inputs
for push-buttons and switches

Art. Nr. 86459532-2-app
GTIN 9010342013492
factory default setting: **App-Controller activated**

Art. Nr. 86459532-2-int
GTIN 9010342013492
factory default setting**: Instances activated**

Art. Nr. 86459532-NFC
GTIN 9010342012730
factory default setting: **App-Controller activated**

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DALI-2 MC Control Device

Overview

- Compact DALI-2 control module with 4 potential-free inputs
- Multi-master capable: Several modules can be installed within a DALI circuit.
- Different DALI commands can be assigned to each input
- Integrated DALI-2 application controller
- Four DALI-2 pushbutton instances are available for an easy integration
- In addition to the standard DALI commands, the application controller also supports DALI DT8 TC and RGB (W) control
- short button press, long button press (with repetition for dimming) and «toggle» are supported
- Suitable for push-buttons, as well as switches
- New: Alternative button function: A second function can be assigned to each input. Activated / deactivated via a scene command or switch at input 4. Thus, Offering an easy solution to the partition wall problem.
- With the application controller Sequences, macros and other functions can be realized.
- Easy configuration via Lunatone DALI USB interface and DALI-Cockpit Software Tool.
- New: NFC variant for simple, contactless configuration with the Lunatone NFC smartphone app
- 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

DALI-2 MC NFC 86459532-NFC:

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Specification, Characteristics

Type	**DALI-2 MC**	**DALI-2 MC integration**	**DALI-2 MC NFC**
article number	86459532-2-app	86459532-2-int	86459532-NFC
GTIN	GTIN 9010342013492	GTIN 9010342013492	GTIN 9010342012730
factory default setting	App-Controller activated	Instances activated	App-Controller activated

DALI interface, power supply: DA, DA	
output type	DALI, DALI-2, Multimaster
terminal markings	DA, DA
voltage range	9,5V … 22,5Vdc according to IEC62386
typical current consumption DALI (16,5V)	3.3 mA
max. current consumption DALI (22,5V)	3.6 mA
DALI addresses	none
DALI-2 addresses	1

input	
Inputs for	Potential free button/switch
number of inputs	4
marking input terminals	T1, T2, T3, T4, COM
minimum length of control pulse	40ms
control pulse length for long press	configurable: 200-5100ms
max wire length pushbutton input	5m

insulation data:	
impulse voltage category	II
pollution degree	2
rated insulation voltage	250V
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)	41mm x 28mm x 15mm (details below)
mounting	back box installation, installation in protection class II devices
rated maximum temperature tc	75°C
expected life time	200.000h
protection class	SKII (when used/installed as intended)
protection degree housing	IP40
protection degree terminals	IP20

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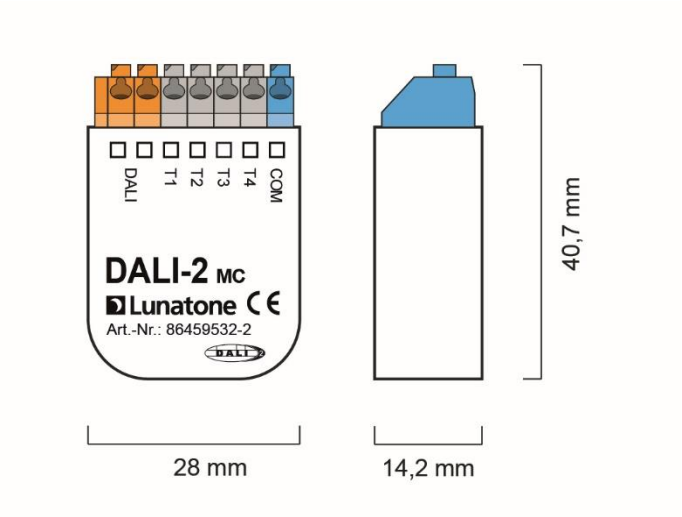
terminals:

connection type	spring terminal connectors
wire size: solid core	0,5 … 1,5 mm² (AWG20 … AWG16)
wire size: fine wired	0,5 … 1,5 mm² (AWG20 …AWG16)
wire size: using wire end ferrule	0,25 … 1 mm²
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	DALI-2, CE, UKCA, RCM, NFC



dimensions

connection plan

Factory Default Settings

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

Version Application controller: art.nr. 86459532-2-app and art.nr. 86459532-NFC

	input 1	input 2	input 3	input 4
application controller	active			
incstances – event messages	inactive	inactive	inactive	inactive
effective range	Broadcast	Broadcast	Broadcast	Broadcast
button function	BF6 Toggle + Dimming	BF10 short and long press	BF10 short and long press	BF13 – Tunablewhite dimming button
command X (CmdX)	RECALL MAX - UP	RECALL MAX	OFF	COOLER
command Y (CmdY)	OFF - DOWN	Dim up	Dim down	WARMER
command on power up	none	none	none	none

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Version Integration: art.nr. 86459532-2-int

	input 1	input 2	input 3	input 4
application controller	inactive			
incstances – event messages	active	active	active	active
effective range	--	--	--	--
button function	--	--	--	--
command X (CmdX)	--	--	--	--
command Y (CmdY)	--	--	--	--

Typical application

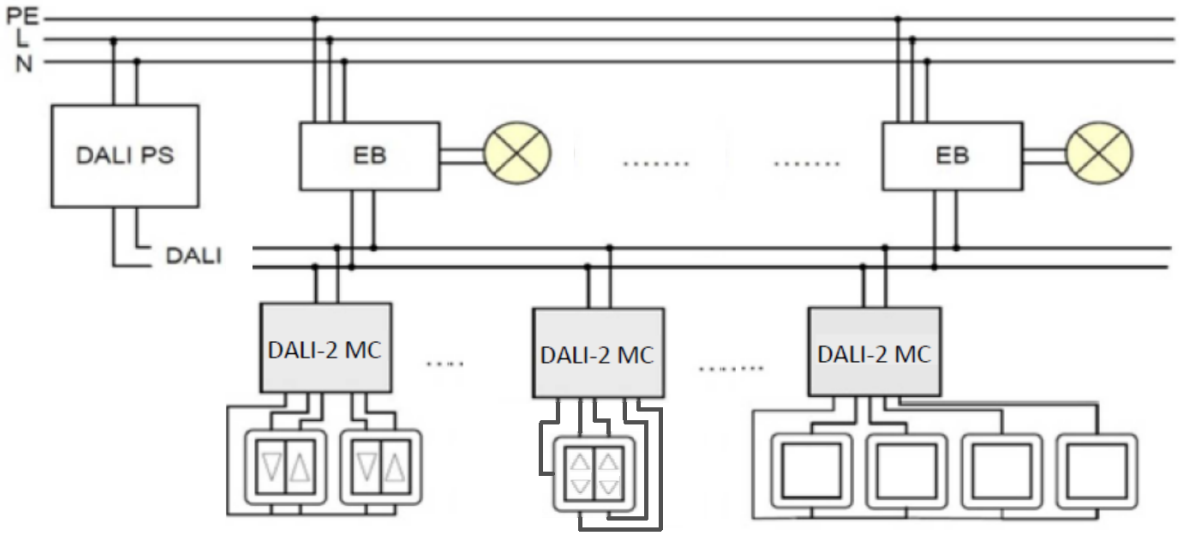

Figure 1 Typical Application

Installation

- The DALI-2 MC can be installed in a flush-mounted installation box
- The device is directly connected and supplied by the DALI bus. A DALI bus power supply (e.g. DALI PS) is required.
- The connection to the DALI terminals can be made regardless of polarity. The bus input is protected against overvoltage (mains voltage).
- 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.
- Only 1 wire may be connected to each terminal. When using double wire end ferrules, the connection capacity of the terminal must be considered.

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- The maximum cable length of the button connections is 5m. If a longer connection line is required, please use DALI MC-4L.

☞ **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.

- DALI-2 MC: 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).

- DALI-2 MC NFC: 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) and the Lunatone DALI NFC smartphone app.

- 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 MC 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 MC 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 (T1 to T4 on the device) to the device list.

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Operation and function

The DALI-2 MC 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 - Configure inputs T1-T4, 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/en/dali-2-factsheet/ section: DALI-2 Instancemode) Configuration of the 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 deactivated Application Controller is indicated in the DALI Cockpit device tree with: A.
A device with active instances is indicated with: i

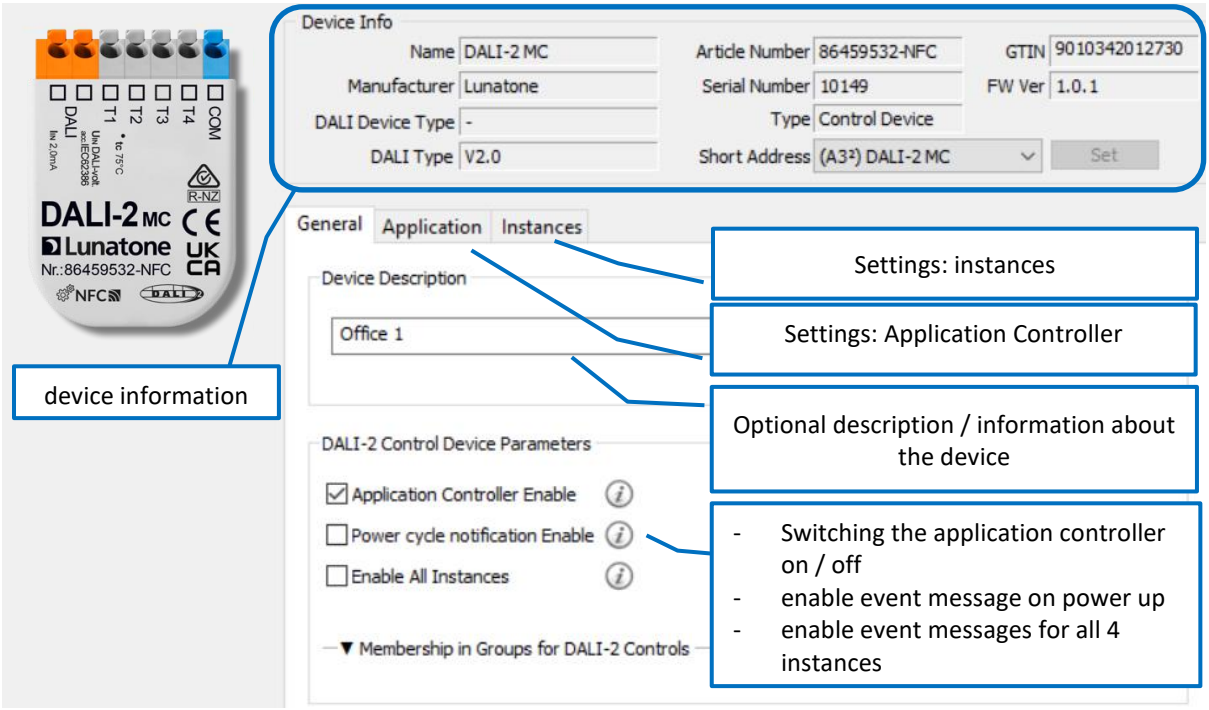

Figure 2 DALI Cockpit General Settings

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Application Controller - Configure inputs T1-T4

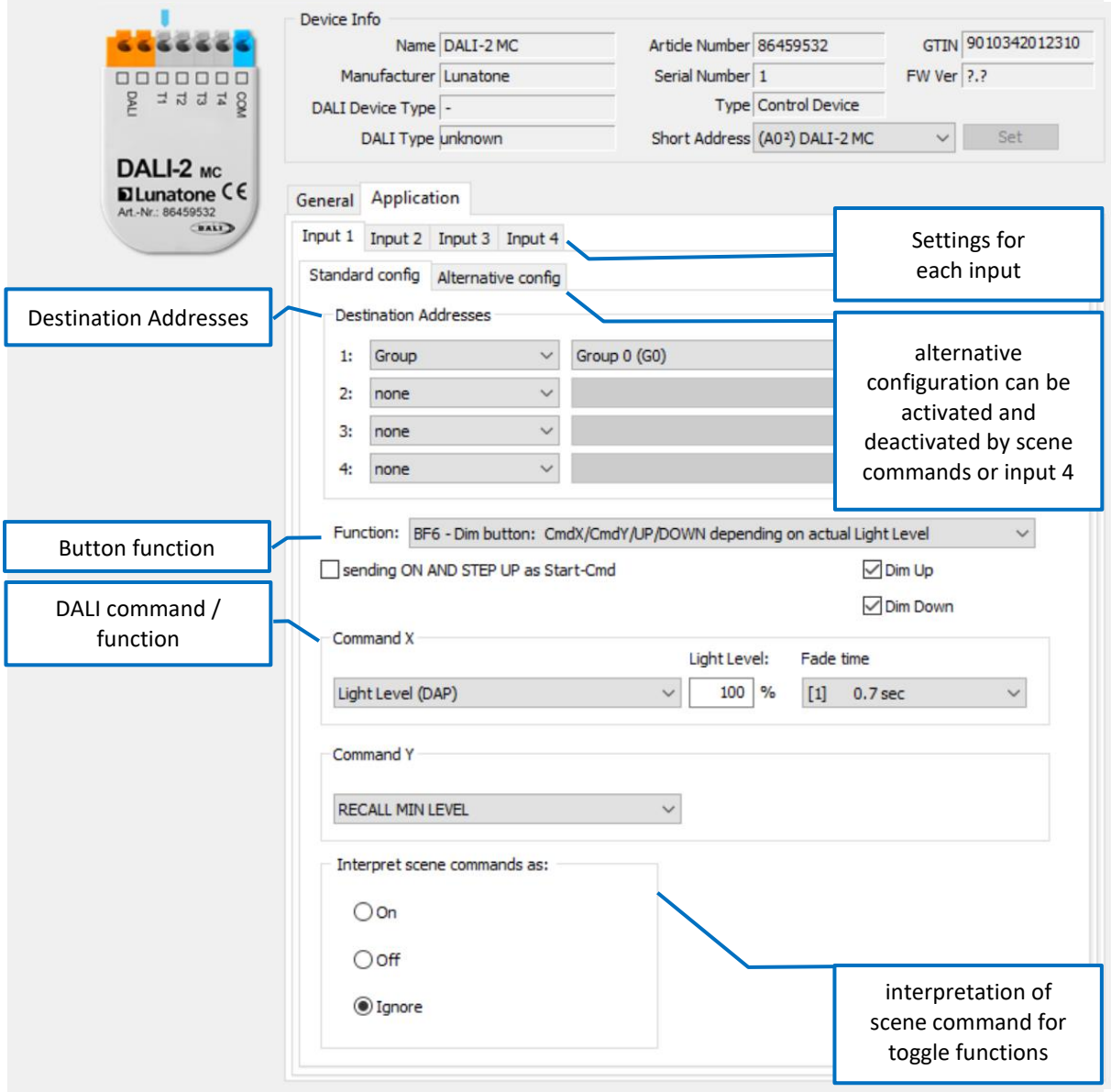

Figure 3: Application: Application Controller

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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)

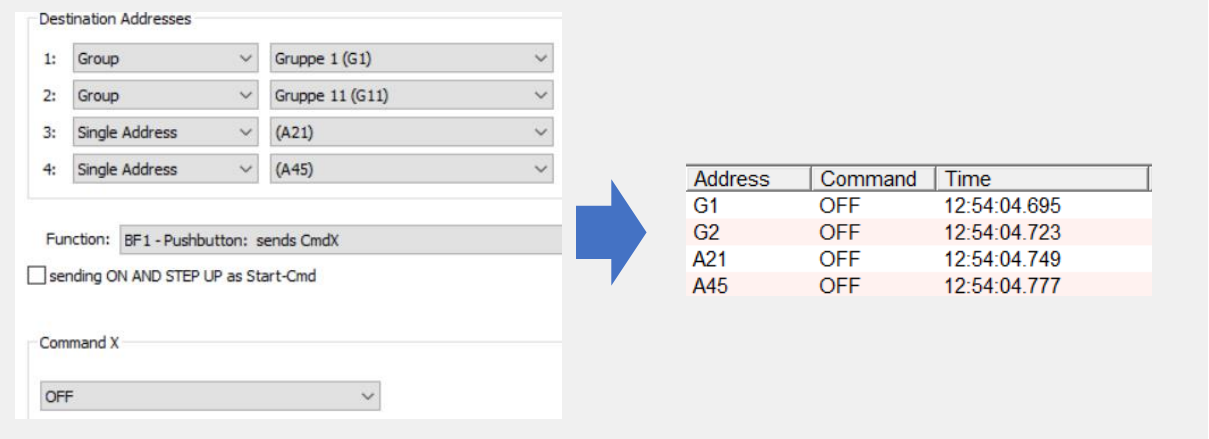

Figure 4 Example: Addressing Inputs 1-4 – sequentially processed

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**):

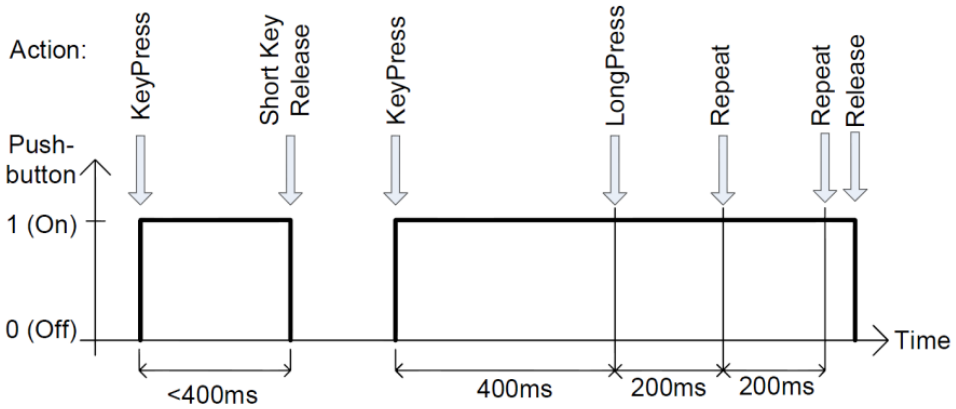

Figure 5 Key Events

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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

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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:

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

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

Figure 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:

Nr	Makro	Funktion
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. (delay up to 3h from firmware 5.0 on)
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 3

From FW 5.0 on Macros M3, M5 and M10 can be configured to be stopped by a scene command or an Off command. When selected the Macros are always stopped on seeing a scene or Off-command sent broadcast, or to the first destination address.

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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 button input 4 or a scene command.

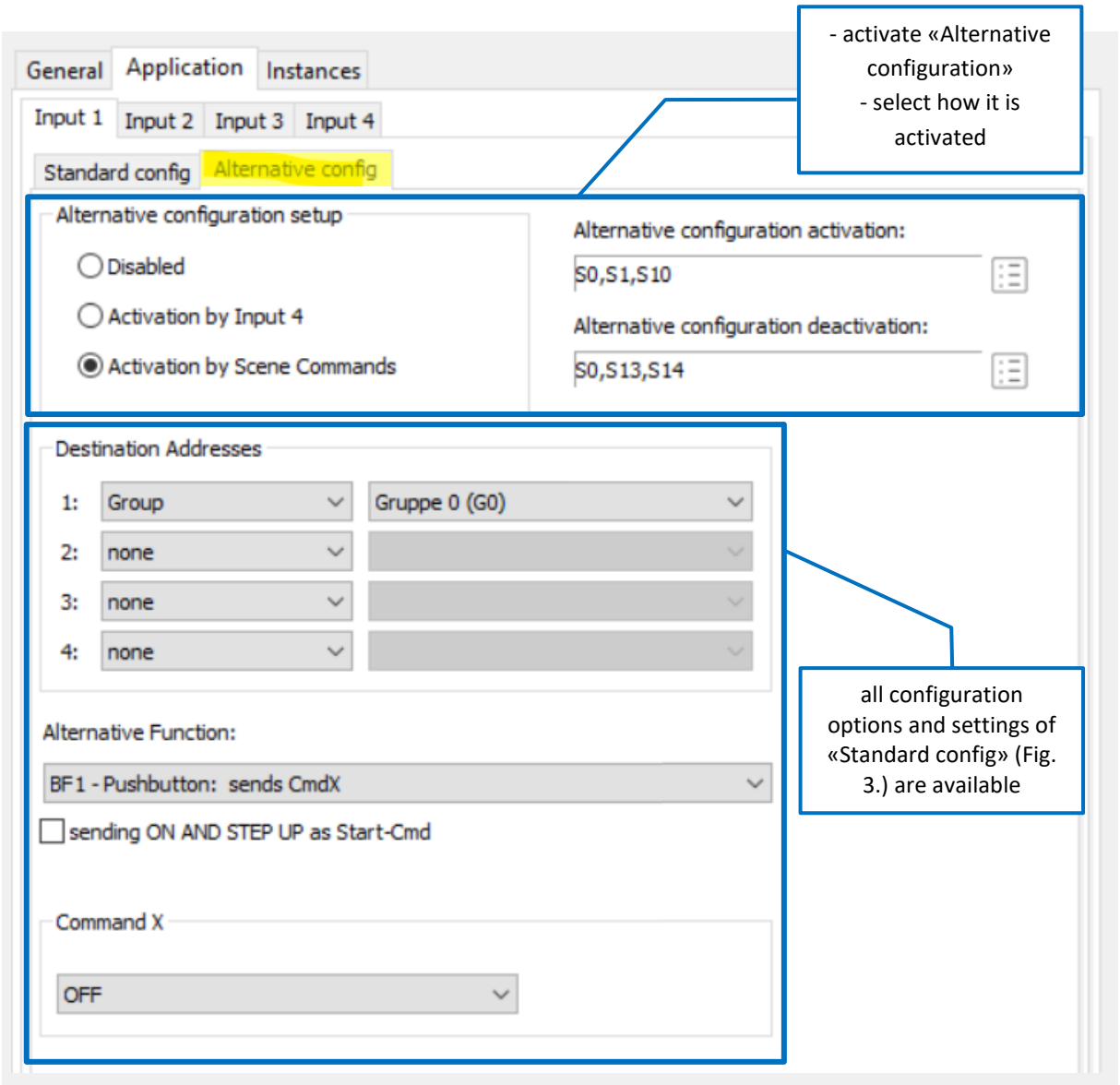

Figure 7 Settings for the alternative configuration

Activate / deactivate the "Alternative Configuration":

- **"Disabled":** the function is switched off, there is only the standard configuration
- **"Activation by Input 4":** the standard and alternative configuration are switched with a button connected to input 4.
- **"Activation by Scene Commands":** scenes can be selected which will activate / deactivate the alternative configuration
  activate: the selected scene commands to the effective range of the standard configuration activate

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the alternative configuration
deactivate: the selected scene commands to the effective range of the standard configuration and the effective range of the alternative configuration deactivate the alternative configuration.

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).

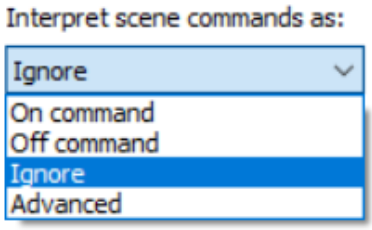

Figure 8.: Scene Interpretation

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 configurable DALI command (light level, OFF, Max, Min, Scene, Go To Last Active Level)

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-MC supports 4 instances of type 1 (IEC62386-301, Input Devices - Push Button), which are assigned to the 4 button inputs

instance 0	input T1
instance 1	input T2
instance 2	input T3
instance 3	input T4

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

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

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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

Which events are sent can be determined using the event filter.

Further parameters of the instances 1-4 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.

Instances can be queried using Query Input Value. Pushbutton instances return the following values in response to a query:

button free	0x00	button not pressed / switch open
button pressed	0xFF	Button pressed / switch closed

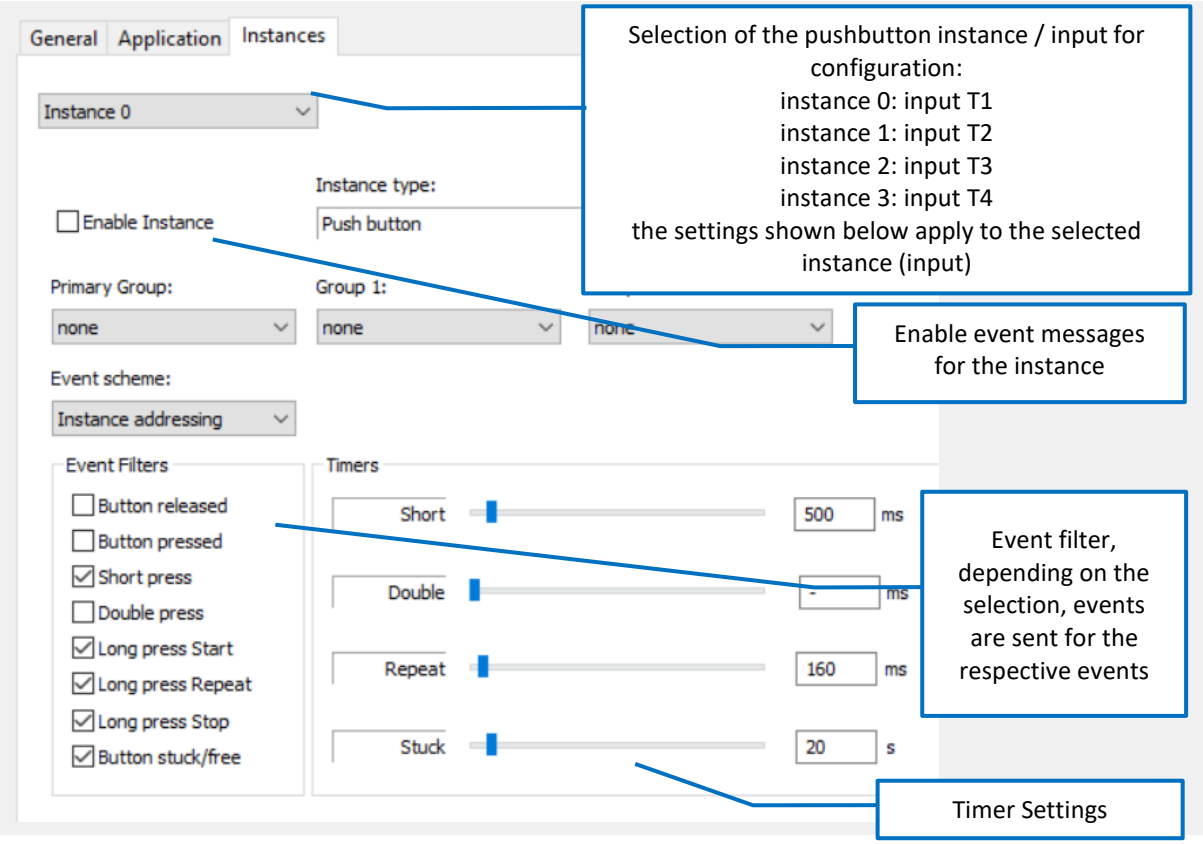

Figure 9: DALI Cockpit Instance Settings

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NFC-Version (Art.Nr.: 86459532-NFC)

Figure 10

In addition to the DALI Cockpit Software, the DALI-2 MC NFC includes a nearfield communication interface. This allows configuration over the NFC interface and a smartphone app.

- The DALI-2 MC does not have to be connected to a DALI power supply for configuration with NFC, it is supplied directly via NFC.
- The functions required to operate the application controller can be configured with the Lunatone DALI NFC App.
- Easy to use smartphone app for quick configuration in the field as well as preparation before installation.
- Fast transfer and copying of device settings

App Download:
The Lunatone "DALI NFC" app is available for Android devices on the Play Store.

Connect:

- Switch on the NFC function and start the "DALI NFC" app.
- This is followed by the request to pair an "NFC-enabled device".
- As soon as the DALI-2 MC NFC is within range (indicated by signal tone / vibration) the device is automatically read out and shown on the display.

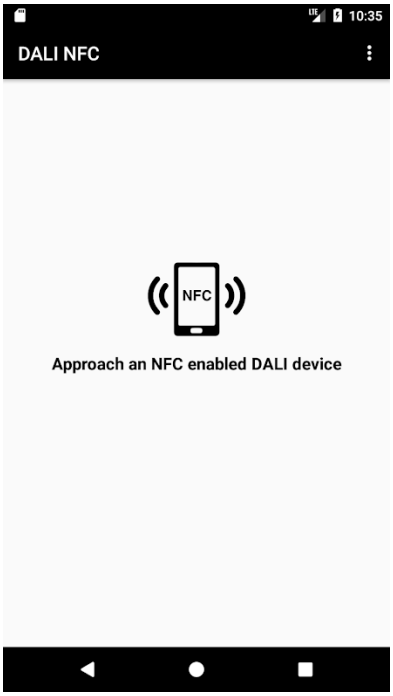

Figure 11 NFC App Start Screen

It is important that the NFC antennas of the two devices are as close as possible to each other. The position of the antenna is marked on the DALI-2-MC-NFC:

Figure 12

For Information on the NFC interface of your smartphone please check the instructions of the device manufacturer.

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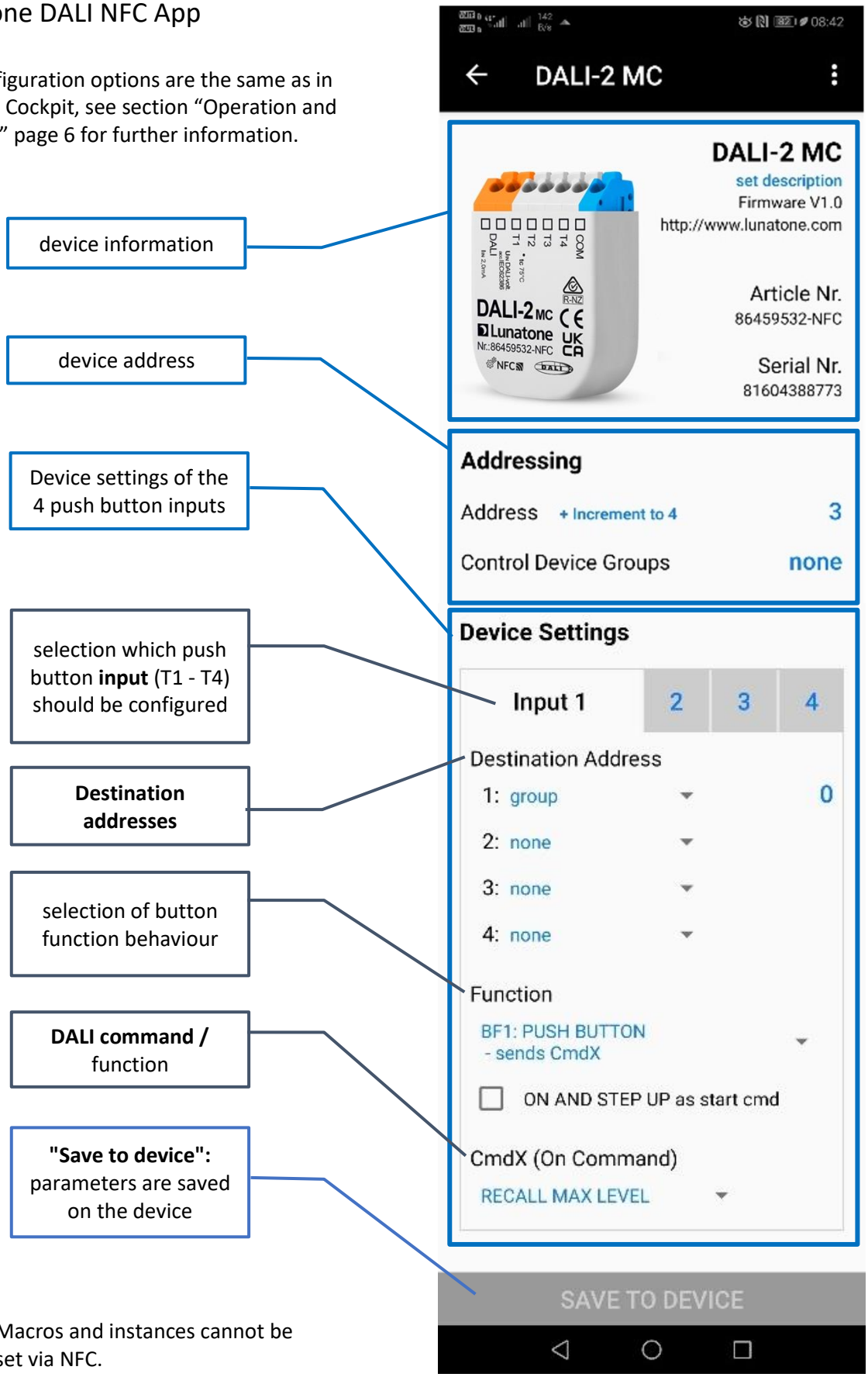
Lunatone DALI NFC App

The configuration options are the same as in the DALI Cockpit, see section “Operation and function” page 6 for further information.



Macros and instances cannot be set via NFC.

Figure 13

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Purchase Information

Art. Nr. 86459532-2-app
DALI-2 MC:
factory default setting: **App-Controller activated**
GTIN 9010342013492

Art. Nr. 86459532-2-int
DALI-2 MC integration:
factory default setting**: instances activated**
GTIN 9010342013492

Art. Nr. 86459532-NFC
DALI-2 MC NFC:
factory default setting: **App-Controller activated**
GTIN 9010342012730
RCM, UKCA

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/

Lunatone DALI NFC App
https://play.google.com/store/apps/details?id=com.lunatone.dalinfc&hl=de

Contact

Technical Support:
support@lunatone.com

Requests: sales@lunatone.com

www.lunatone.com

DALI-2 MC NFC 86459532-NFC:

Disclaimer

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

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

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