

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**

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 Lumatone DALI USB interface and DALI-Cockpit Software Tool.
- New: NFC variant for simple, contactless configuration with the Lumatone 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



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)	1.7 mA
max. current consumption DALI (22,5V)	2 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	50cm

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:

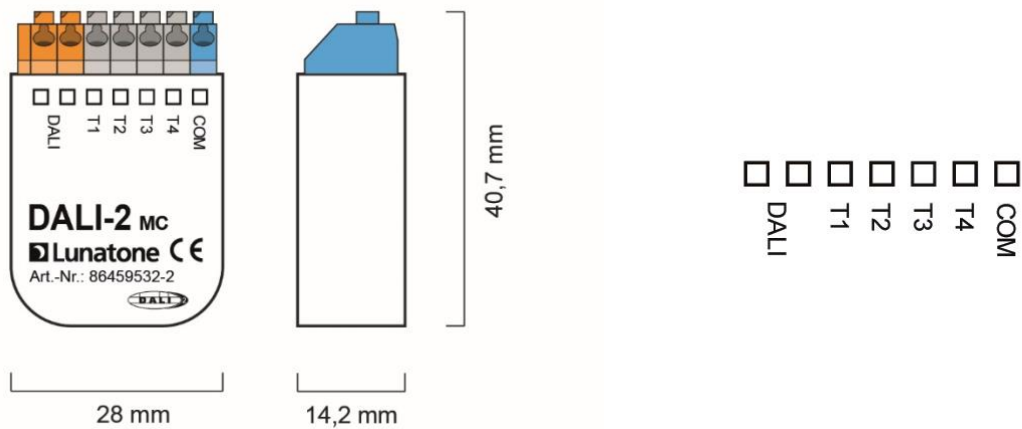
dimensions (l x w x h)	40mm x 28mm x 15mm
mounting	back box installation, installation in protection class II devices
rated maximum temperature tc	75°C
expected life time	200.000h
protection class	SKII (when used/installed as intended)
protection degree housing	IP40
protection degree terminals	IP20

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

connection plan

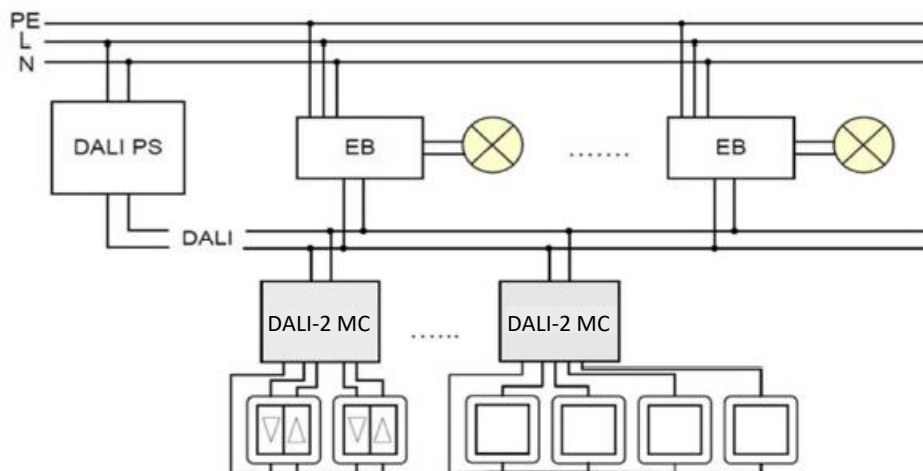


Fig. 1 Typical Application

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.
- The maximum cable length of the button connections is 50cm. 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).

Typical application

see Fig. 1. page 4

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 USB, 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.

identifies and adds the input connections (T1 to T4 on the device) to the device list.

- Physical selection: At the end of the addressing process, by double-clicking the physical button, the DALI Cockpit

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.

The screenshot shows the DALI-2 MC hardware on the left and its software configuration interface on the right. The hardware has terminals for DALI, T1, T2, T3, T4, and COM. The software interface is divided into sections: Device Info, General, Application, and Instances. Annotations with blue boxes and lines point to specific features:

- device information**: Points to the 'Device Info' section of the software interface.
- Settings instances**: Points to the 'Instances' tab in the software interface.
- Settings Application Controller**: Points to the 'Application Controller Enable' checkbox in the 'DALI-2 Control Device Parameters' section.
- Optional description / information about the device**: Points to the 'Device Description' field, which contains 'Office 1'.
- Switching on / off instances and application controller**: Points to the 'Enable All Instances' checkbox in the 'DALI-2 Control Device Parameters' section.

Fig.2: General Settings

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.

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

The image shows a screenshot of the configuration interface for a DALI-2 MC device. On the left is a photograph of the physical device, a grey rectangular unit with a terminal block and a button. The main interface is divided into 'Device Info' and 'Application' sections. The 'Device Info' section contains fields for Name, Manufacturer, DALI Device Type, DALI Type, Article Number, Serial Number, Short Address, GTIN, and FW Ver. The 'Application' section is further divided into 'General' and 'Application' tabs. Under 'Application', there are tabs for 'Input 1', 'Input 2', 'Input 3', and 'Input 4'. Below these are 'Standard config' and 'Alternative config' tabs. The 'Destination Addresses' section has a table with columns for 'Group' and 'Group 0 (G0)'. The 'Function' section includes a dropdown menu, checkboxes for 'sending ON AND STEP UP as Start-Cmd', 'Dim Up', and 'Dim Down'. The 'Command X' section has dropdowns for 'Light Level (DAP)', 'Light Level' (set to 100%), and 'Fade time' (set to 0.7 sec). The 'Command Y' section has a dropdown menu set to 'RECALL MIN LEVEL'. The 'Interpret scene commands as:' section has radio buttons for 'On', 'Off', and 'Ignore' (which is selected). Blue callout boxes with arrows point to various parts of the interface: 'Destination Addresses' points to the table; 'Button function' points to the 'Function' dropdown; 'DALI command / function' points to the 'Command X' dropdown; 'Settings for each input' points to the 'Input 1-4' tabs; 'alternative configuration can be activated and deactivated by scene commands or input 4' points to the 'Alternative config' tab; and 'interpretation of scene command for toggle functions' points to the 'Interpret scene commands as:' section.

Fig. 3: Application: Application Controller

Configure inputs 1-4

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)

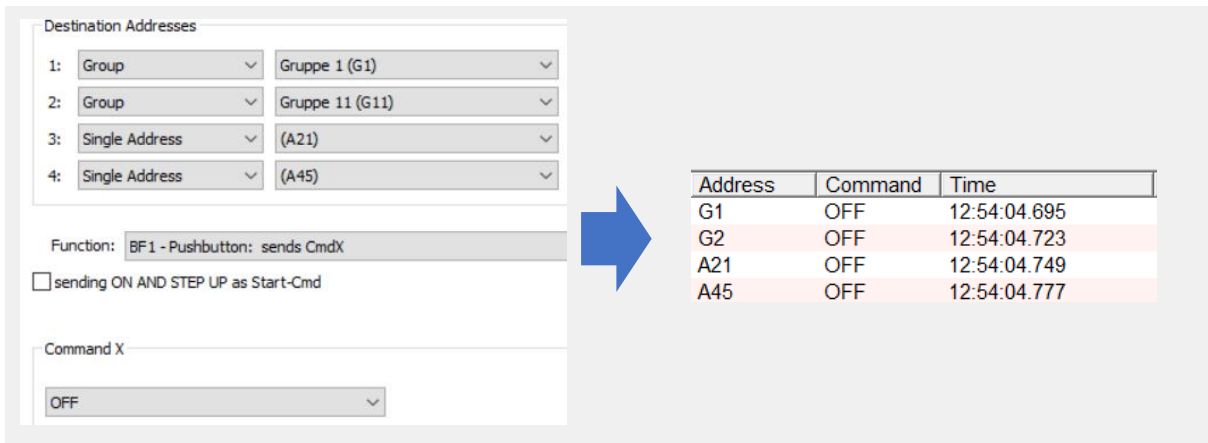


Fig.4 Example: Addressing Inputs 1-4 – sequentially processed

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**):

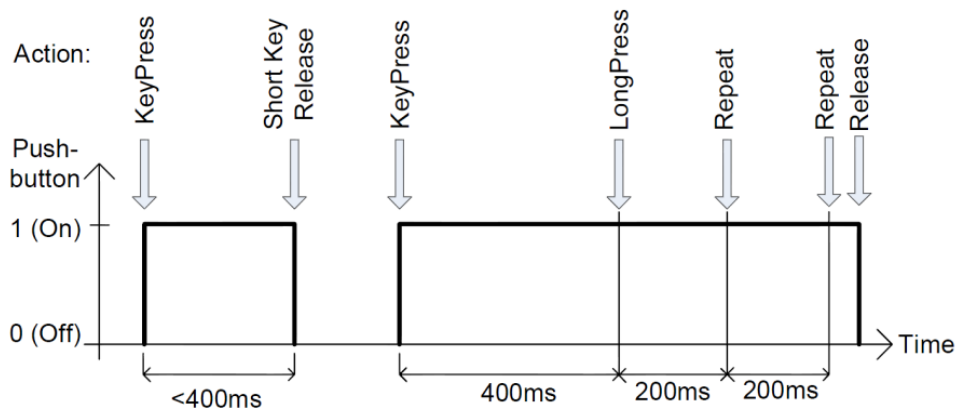



Fig.5 Key Events

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 (BF)	event: key press	event: release after short press	event: 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 after long press delay	switch to 2 different levels
3	CmdX	-	CmdY	CmdY	sends CmdX on key press sends CmdY with 200ms repetition after long press delay	switch on and dim
4	CmdX / CmdY toggle	-	-	-	sends CmdX and CmdY alternating on key press	toggle push button (impulse switch)
5	CmdX / CmdY toggle	-	-	-	CmdX/Y depending on bus status	changeover push button
6		CmdX / CmdY toggle-	ON and STEPUP	UP / DOWN	CmdX/Y depending on bus status , UP/DOWN alternating, ON AND STEPUP, if bus state is OFF before UP	push and dim button
7	CmdX	CmdY (any release)	-	-	sends CmdX on press (“switch on”-transition), sends CmdY on release (“switch off”-transition)	switch
8	CmdX / CmdY toggle	CmdX / CmdY toggle (any release)	-	-	sends CmdX/Y on press or release (“switch on/off” -transition) depending on bus status	changeover switch
9	CmdX	-	-	-	Staircase control. CmdY is sent after a programmable delay.	staircase control
10	-	CmdX	CmdY	CmdY	CmdX after short press, CmdY for repeat	push and dim button
11	CmdX	-	-	CmdY	Sends CmdX; repeats CmdY without long press delay	push and dim button
12	CmdX	CmdY	-	CmdX	CmdX with repeat; if button is released within short press time, CmdY is sent	dim button
13	CmdX	CmdY		COOLER/WARMER	Alternating COOLER / WARMER	Tunable white dim button

Tab. 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:

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

Tab. 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:

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.
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.

Tab. 3

New: 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.

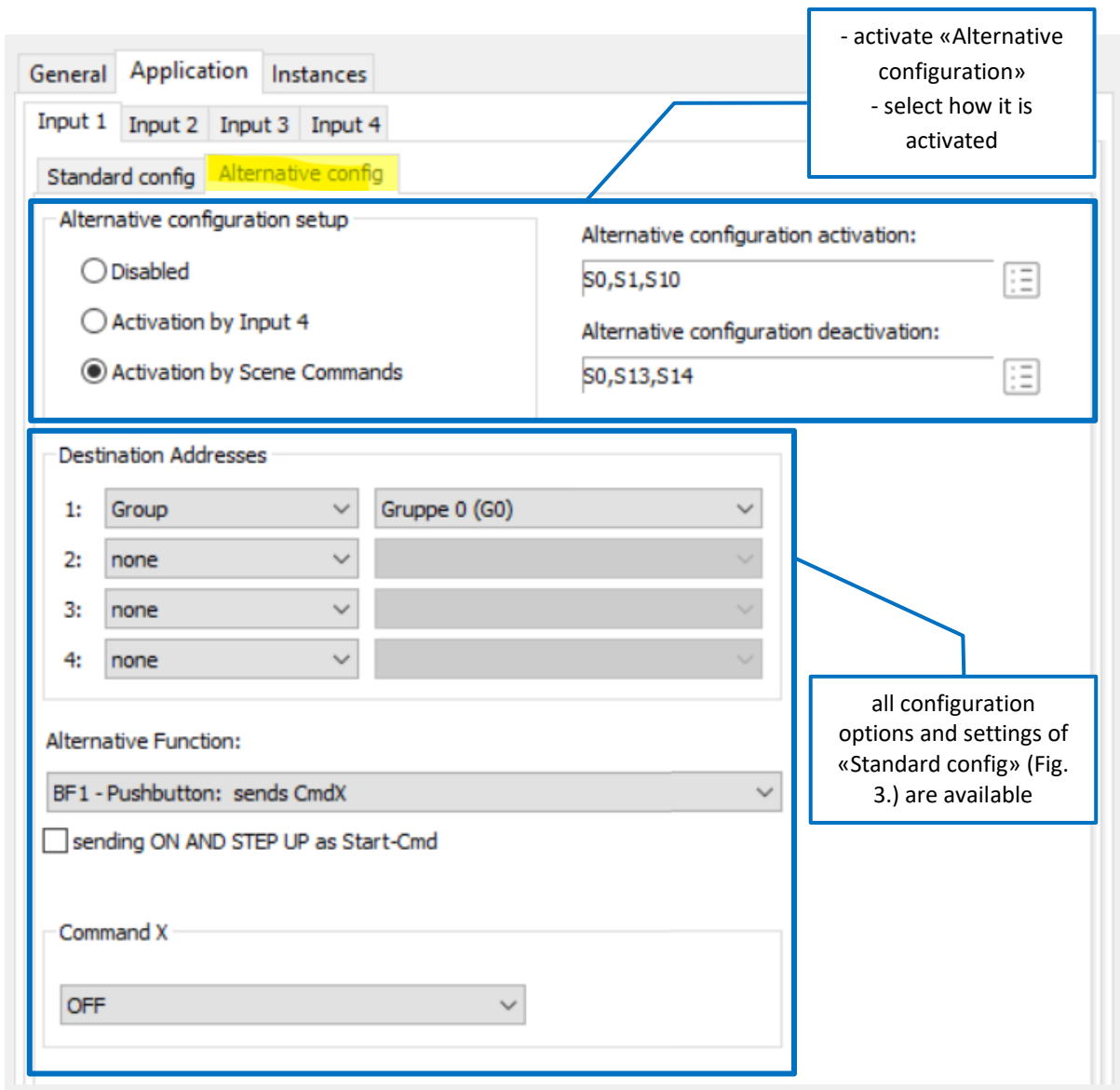


Fig. 7 Settings for the alternative configuration

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

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).

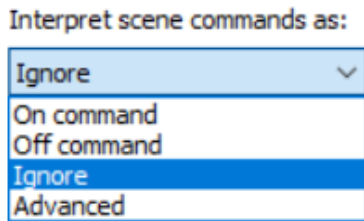


Fig. 8

factory default setting:

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

factory default setting:

Destination address: broadcast

Input T1: BF6 - dimming button depending on the lighting status, RECALL MAX / OFF and UP / DOWN

Input T2: BF10 button - short press: maximum, long press: dim up

Input T3: BF10 button - short press: switch off, long press: dim down

Input T4: BF13 - Tunable White dimming button - alternating COOLER / WARMER

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

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.

Tab.4

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.

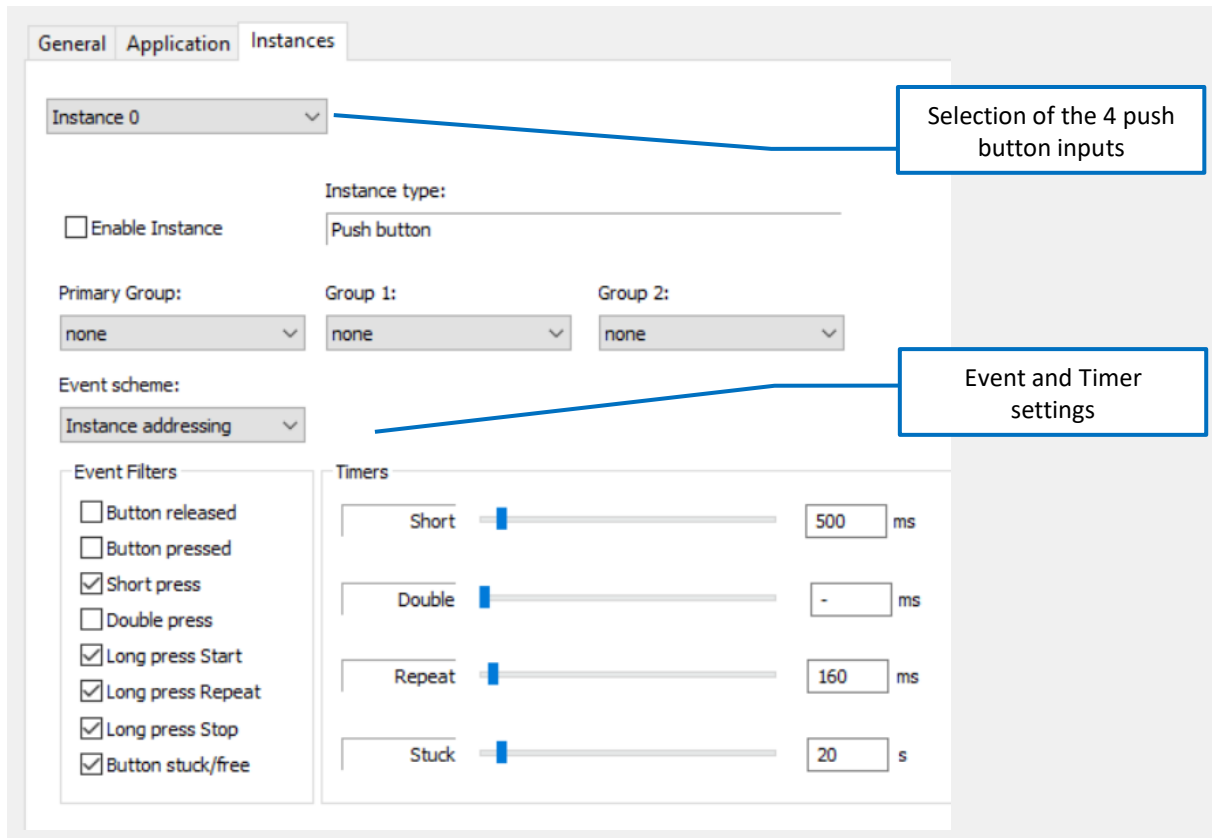


Fig. 9 Instance Settings

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



Fig. 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.



Fig. 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:



Fig. 12

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

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.

The screenshot shows the configuration interface for a DALI-2 MC device. The top section, 'DALI-2 MC', displays the device image and key information: 'set description', 'Firmware V1.0', 'http://www.lunatone.com', 'Article Nr. 86459532-NFC', and 'Serial Nr. 81604388773'. Below this is the 'Addressing' section, where the 'Address' is set to 3 (with an increment of 4) and 'Control Device Groups' is set to none. The 'Device Settings' section is currently set to 'Input 1'. It includes a 'Destination Address' table with dropdowns for groups 1-4 (all set to none), a 'Function' dropdown set to 'BF1: PUSH BUTTON - sends CmdX', an unchecked checkbox for 'ON AND STEP UP as start cmd', and a 'CmdX (On Command)' dropdown set to 'RECALL MAX LEVEL'. A 'SAVE TO DEVICE' button is at the bottom.

Callout boxes on the left side of the screen provide the following explanations:

- device information:** Points to the top section of the device details.
- device address:** Points to the 'Address' field in the Addressing section.
- Device settings of the 4 push button inputs:** Points to the 'Destination Address' table.
- selection which push button input (T1 - T4) should be configured:** Points to the 'Input 1' tab.
- Destination addresses:** Points to the dropdown menus in the Destination Address table.
- selection of button function behaviour:** Points to the 'Function' dropdown.
- DALI command / function:** Points to the 'BF1: PUSH BUTTON - sends CmdX' option.
- "Save to device":** parameters are saved on the device: Points to the 'SAVE TO DEVICE' button.

Macros and instances cannot be set via NFC.

Fig. 13

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

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/download-s-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



Disclaimer

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