D Lunatone





rotary switch

Datasheet Control Device

Rotary knob for controlling light level, colour and colour temperature in DALI, DALI-2-systems











Art. Nr. 86459822-NFC Art. Nr. 86459822-NFC-CH

all versions available with bus power supply (70mA): -PS

cover and rotary knob: see purchase order information at end of the document



2

DALI-2 ROT Control Module

Overview

- DALI-2 control module for switching, dimming, colour and colour temperature control.
- Individual DALI Commands and operating modes can be assigned to the push and rotary button.
- Multiple Operating modes for dimming and switching:
- Operating mode for brightness control





 Operating mode for control of brightness and colour temperature of DT8 tuneable white luminaires (TW)







 Operating mode for control of light level and colour of DT8 RGBluminaires (RGB)







 operating mode for control of light level and colour as well as white channel of DT8 RGBW-luminaires (RGBW)









- operating mode for control of Lunatone LED-Dimmer in the operating modes Balance&Dim and Colour&Dim (BD/CD).
- operating mode sending DALI-2 event messages (D2I) – Instance mode for integration in central control systems

- Multi-master capable, multiple modules can be installed on one DALIline.
- factory settings allow easy application
- easy configuration via DALI USB interface and DALI-Cockpit software tool or directly with the help of the mobile phone app "DALI-NFC"
- the module is supplied directly by the DALI-line, no additional supply required
- double DALI terminals for easy looping of the bus connection
- simple installation, (even with bus power supply), in a standard back box (version for Swiss back box -CH)
- Versions with integrated bus power supply 70mA, article number addition -PS
- suitable to be used with cover and knob of most common manufacturers, but also available as accessory
- beeper for localisation
- DALI-2 control device according to standard IEC 62386-103.













Specification, Characteristics

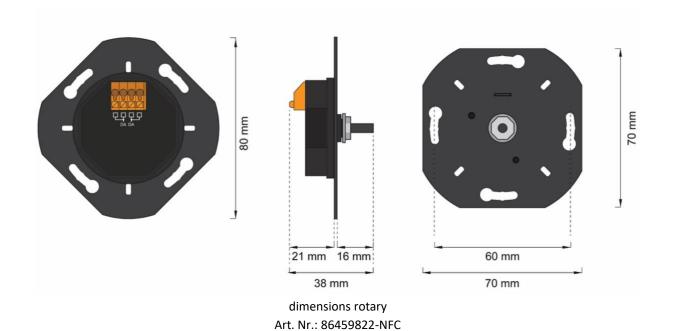
type	DALI-2 ROT NFC	
article number	86459822 -NFC	
GTIN	9010342010309	
Functionality &	 I: Intensity – Switch&Dim (factory default) TW: Intensity & TunableWhite RGB: Intensity & RGB 	
operating modes	4. RGBW: Intensity & RGBW	
	5. D2I: DALI-2 Instancemode	
	6. BD/CD: Balance&Dim / Colour&Dim	
DALI-interface, supply:		
input type	DALI, supply	
Marking	DA, DA	
input voltage range	9,5V 22,5Vdc according to IEC62386	
typ. current consumption DALI (at 16,5V)	4 mA	
max. current consumption DALI (at 22,5V)	5 mA	
addresses for control gear	0	
addresses for control devices	1	
environmental conditions:		
storing and transportation temperature	-20°C +75°C	
operational ambient temperature	-20°C +75°C	
rel. humidity, none condensing	15% 90%	
general data:		
dimensions	70mm x 70mm x 45mm	
shaft diameter	4mm, adapter with 6mm	
mounting / intended use	back box	
protection class	II in intended use	
protection degree housing	IP40	
protection degree terminals	IP20	
manual control	rotary knob with integrated pushbutton function	
Max start up time	150ms	
terminals:		
connection type	spring terminal connector	
wire size solid core	0,5 1,5 mm² (AWG20 AWG16)	
wire size fine core	0,5 1,5 mm² (AWG20AWG16)	
wire size using wire end ferrule	0,25 1 mm²	
stripping length	8,5 9,5 mm / 0,33 0,37 inch	
standards:		
DALI	IEC62386-101:2014 IEC62386-103:2014	
EMC	EN 61547	
	EN 50015 / IEC CISPR15	

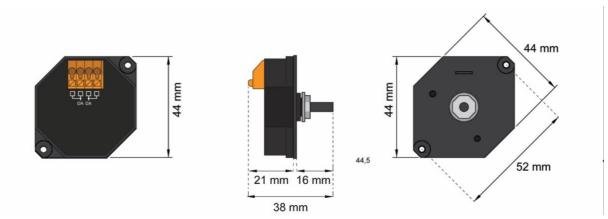


safety	EN 61347-2-11
	EN 61347-1
markings	DALI-2, CE

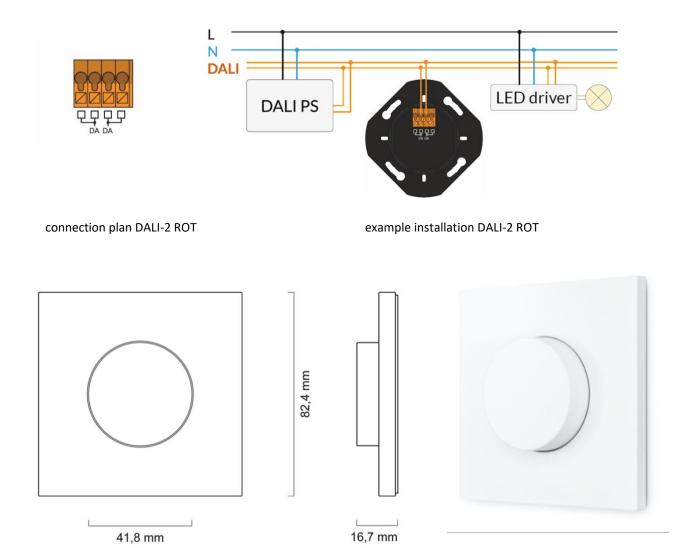
Installation Variants:

type	DALI-2 ROT	DALI-2 ROT CH	
installation	for European back box	for Swiss back box	
	(screw spacing 60mm)	(screw spacing 52mm)	
article number	86459822-NFC	86459822-NFC-CH	





dimensions rotary - version for swiss back box Art. Nr.: 86459822-NFC-CH



dimensions rotary cover Lunatone (-Z04 & -Z05)

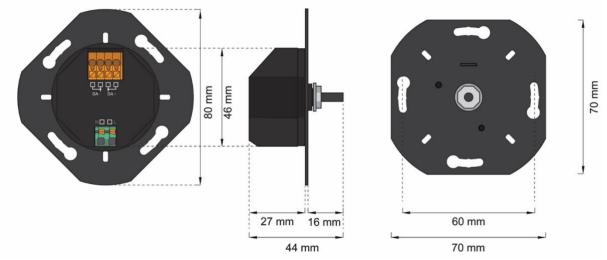
Specification, Characteristics – DALI-2 ROT PS

Version with integrated bus power supply (70mA). If not stated otherwise in the table below all information for standard version applies – all ROT versions are available with integrated power supply 70mA.

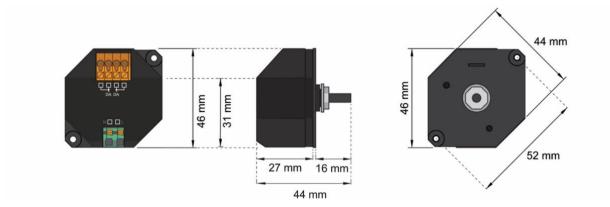
type	DALI-2 ROT PS	
article number	86459822-NFC-PS	
article number	86459822-NFC-CH-PS	
input L,N		
input type	supply, mains-voltage	_
markings	N, L	_
input voltage range	230V AC	_
max. input supply current	17 mA	_
Input supply frequency	50Hz / 60Hz	_
power consumption max.	2W	
start-up time	<250ms	_



output DA+, DA-		
output type	DALI	
markings	DA-, DA+	
output voltage range	12Vdc 20,5 Vdc	
guaranteed DALI supply current	70mA	
max. DALI supply current	80mA	
Open circuit proof	yes	
Short circuit proof	yes	
insulation data		
Impulse voltage category	II	
Pollution degree	2	
Rated insulation voltage	250V	
Rated impulse withstanding voltage	4 kV	
Insulation DALI / mains	reinforced isolation	
Insulation test voltage DALI /mains	3000 V a.c.	
general data:		
dimensions	70mm x 70mm x 60mm	

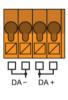


dimensions DALI-2 ROT NFC PS Art. Nr.: 86459822-NFC-PS



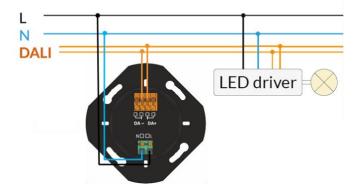
dimensions DALI-2 ROT NFC PS CH Art. Nr.: 86459822-NFC-CH-PS







connection plan DALI-2 ROT PS



example installation DALI-2 ROT PS

Installation

- The DALI-2 ROT is intended for mounting on a flush mounted box or on a cavity wall
- Subsequent assembly of the cover. The device is available with or without a cover and can be combined with covers of common manufacturers. The shaft diameter is 4 mm (or 6mm with adapter)
- The DALI ROT module is connected and supplied directly by the DALI-line (typ. current consumption: 1.6 mA). If no DALI ROT PS is used a general DALI bus power supply (e.g., DALI PS) is required.
- **DALI ROT PS**: If 2 or more bus power supplies are on the same DALI bus, they need to be connected with the same polarity! (connectors marked with DA+, DA-), see Figure 1, page 8.

It is possible to connect multiple PS to one DALI line, but the sum of all maximum supply currents must not exceed 250 mA!

- DALI-2 ROT (and ROT PS with no additional DALI PS): 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.



Multiple DALI ROT modules and DALI luminaires can be connected to a DALIline.



Attention: The DALI-signal is not classified as SELV circuit (Safety Extra Low Voltage). Therefore, the installation regulations for low voltage apply.



Note: The cross section: the voltage drop on the DALI line must not exceed 2V at maximum length (300m) and maximum bus load (250mA)

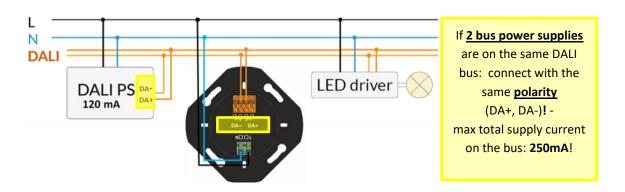


Figure 1. Installation Example DALI-2 ROT PS with additional DALI PS on the DALI Bus

Set Up

After installation, the device can be operated with the factory default settings. For simple installations, the basic setting is usually sufficient. In default mode (delivery state) the light is controlled broadcast, factory default settings see page 17

Addressing and changes to the settings, such as setting the effective range and functions, are possible with the Software tool DALI Cockpit (Windows PC) as well as with the "DALI-NFC" mobile phone 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 ROT is automatically recognized by the DALI Cockpit during the addressing process and listed in the device overview.

The addressing is done according to the DALI-2 specification and the device receives a corresponding address.

The device has a buzzer for localization. Alternatively, the device can also be identified by the serial number on the housing. (The serial number is displayed in the DALI Cockpit in the section "device info" at the top, see also Figure 2, page 9)



Application and Function

The DALI-2 ROT is a rotary switch and is used to adjust brightness, colour temperature or colour on DALI-compatible luminaries. The function is determined by the selection of the operating mode.

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). (Operating mode 5: Instance mode)

DALI-Cockpit:

Addressing and device configurations can be done with the DALI Cockpit Software tool and a suitable interface module (DALI USB, DALI 4Net, DALI SCI RS232).

With the selection of the device in the component tree, the DALI ROT settings page is shown. The settings page is split in two tabs: one for general settings (see Figure 2) and one for application settings (see Figure 3 on page 16).

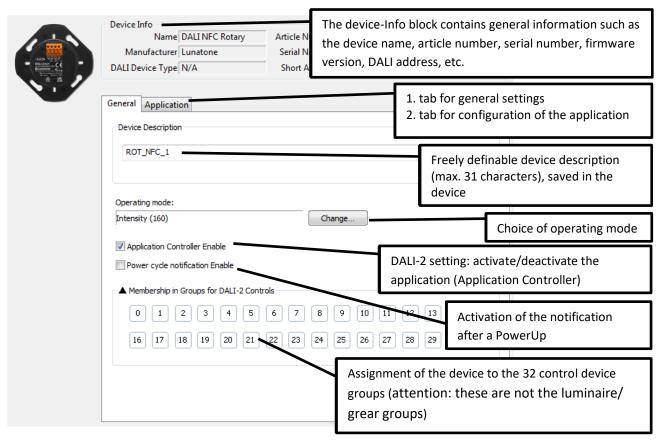


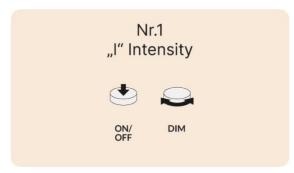
Figure 2. DALI Cockpit: general Configuration options – Tab: "General"



Operating Modes

The operating mode can be selected with the DALI-Cockpit or DALI-NFC app or switched with another control device using the DALI command SET OPERATING MODE.

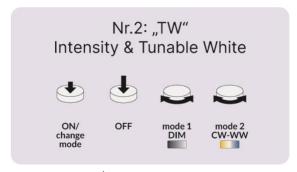
6 available operating modes:



press: ON/OFF rotate: dimming

activate with SET OPERATING MODE: 0xA0 or

0x0 (default)



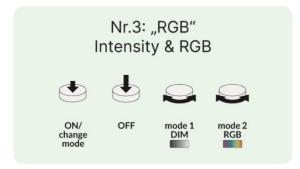
short press: ON/CHANGE MODE

long press OFF

mode 1 rotate: dimming

mode 2 rotate: colour temperature

activate with SET OPERATING MODE: 0xA1

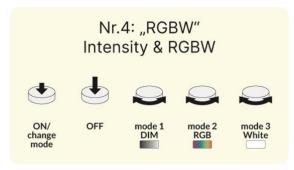


short press: ON/CHANGE MODE

long press OFF

mode 1 rotate: dimming mode 2 rotate: colour

activate with SET OPERATING MODE: 0xA2



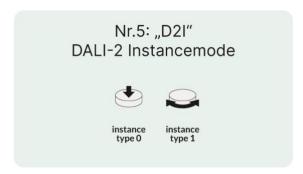
short press: ON/CHANGE MODE

long press OFF

mode 1 rotate: dimming mode 2 rotate: colour

mode 3 rotate: white channel

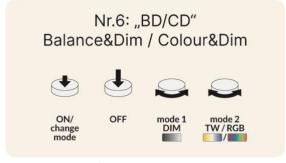
activate with SET OPERATING MODE: 0xA3



press: instance 0, push button rotate: instance 1, generic, event messages for start rotate clockwise, start rotate counterclockwise,

stop rotate

activate with SET OPERATING MODE: 0xA4



Short press: ON/ CHANGE MODE

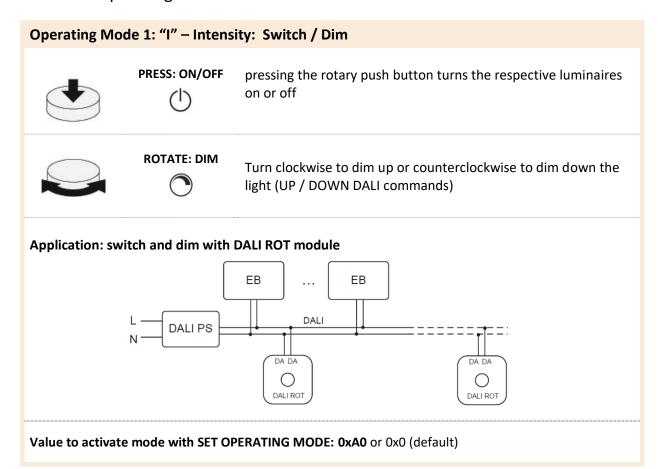
long press: OFF

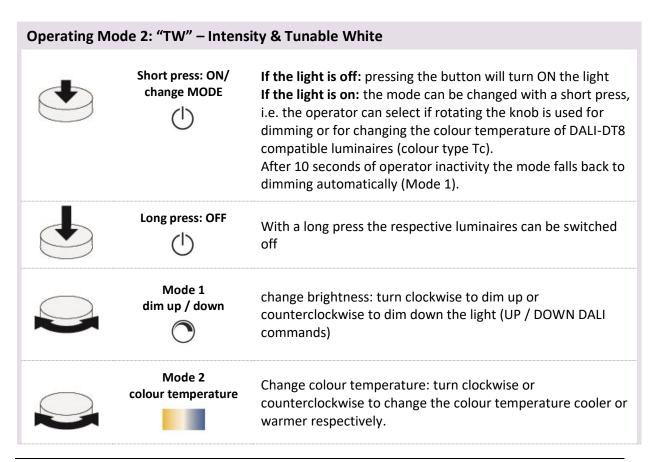
Mode 1 rotate: dimming

Mode 2 rotate: colour/colour temperature activate with SET OPERATING MODE: 0xA5

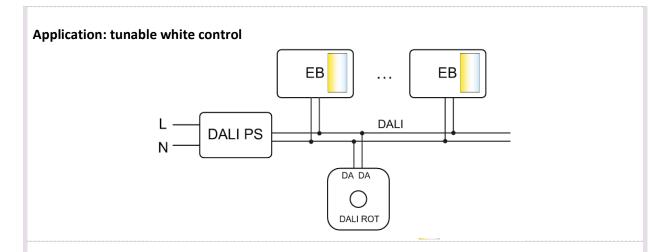


Details to Operating Modes

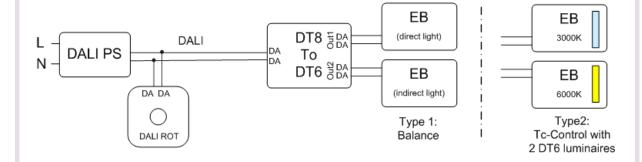








DT8toDT6: With the help of a DT8toDT6-converter the colour temperature (balance) on conventionally DALI-controlled single luminaires (DT6) can be adjusted. Even the balance between direct and indirect can be adapted.



application: balance- and level control of direct and indirect lighting (type 1) or tunable white and level control of 2 conventional DT6-luminaires (type 2) with the help of a DT8toDT6 converter

Value to activate mode with SET OPERATING MODE: 0xA1

Operating Mode 3: "RGB" – Intensity & RGB



Short press: ON/ change MODE



If the light is off: pressing the button will turn ON the light If the light is on: the mode can be changed by a short press, i.e., the operator can select if rotating the knob is used for dimming or for changing the colour of DALI DT8 compliant RGB luminaires (colour type RGBWAF).

After 10 seconds of operator inactivity there the mode falls back to dimming automatically (Mode 1).

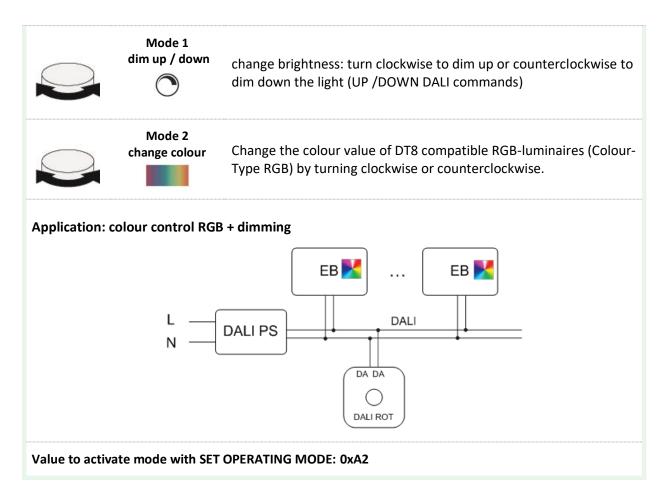


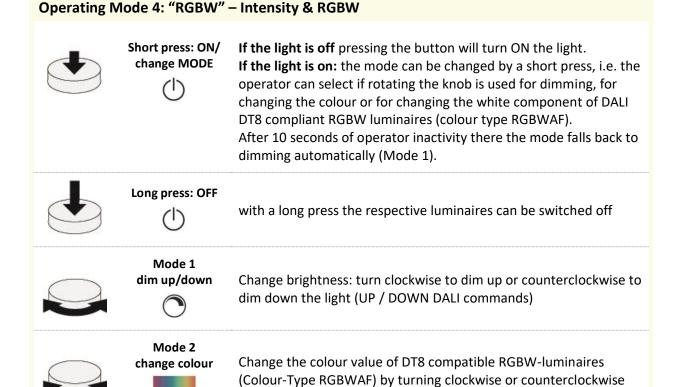
Long press: OFF



With a long press the respective luminaires can be switched off







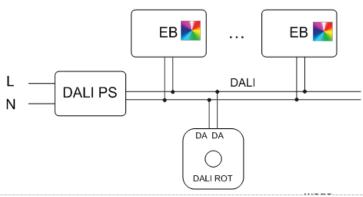




Mode 2 change white

Reduce or increase the white channel brightness of DT8 compatible RGBW-luminaires (Colour-Type RGBWAF) value by turning clockwise or counterclockwise respectively

application: colour control RGB+W and dimming



Lunatone RGBW-LED-dimmer provide various output modes, hence intensity of RGB and white component can be controlled together or separated.

Value to activate mode with SET OPERATING MODE: 0xA3

Operating Mode 5: "D2I" - DALI-2 Instancemode

In this operating mode the luminaires are not controlled directly by the DALI ROT, it is suitable for integration in DALI-2 capable central control systems. The DALI ROT uses event messages to inform about operator actions on the input device. These messages have to be evaluated by other control devices.

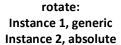
The DALI ROT provides 3 instances, more information in section Instances page 17



press: Instance 0, push button



The first instance (instance 0) is assigned to the push button function and uses instance type 1 (according IEC62386-301: particular requirements – input devices – push buttons).



The second instance (instance 1) is assigned to the rotation of the knob and uses instance type 0 (according IEC62386-103, general purpose).



event messages for start rotation (clock counter clock wise) stop rotation



The third instance (instance 2) is second instance is as well assigned to the rotation of the knob and uses instance type 2 (according IEC62386-302: Particular requirements – input devices – absolute input devices) with 8Bit resolution – hence it represents an alternative option for evaluating the rotation of the knob.

Value to activate mode with SET OPERATING MODE: 0xA4



Operating Mode 6: "BD/CD" – Balance&Dim/Colour&Dim

This operating mode works only in combination with Lunatone LED-Dimmer, which support operating mode Balance&Dim (2Ch or CW-WW Dimmer) or Colour/Dim (3Ch, 4Ch, RGB or RGBW Dimmer). In difference to DT8-Colour Control using an extended command set, the devices provide a second DALI-address that which is used to change colour temperature and or colour. Therefore standard DALI-commands like UP/DOWN can be used.

Depending on the device either the control of colour temperature or colour is possible

This operating mode needs to be set for the LED Dimmer via the DALI Cockpit Software. The correct addresses for the brightness channel and the colour temperature / colour channel can then be entered for control with the rotary



Short press: ON/ change MODE



If the light is off: pressing the button will turn ON the light If the light is on: the mode can be changed by a short press, i.e., the operator can select if rotating the knob is used for dimming or for changing the colour temperature / colour. After 10 seconds of operator inactivity there the mode falls back to dimming automatically (Mode 1).



long press:

OFF

with a long press the respective luminaires can be switched off



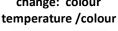
Mode 1 dim up/down



Change brightness: turn clockwise to dim up or counterclockwise to dim down the light (UP / DOWN DALI commands)



Mode 2 change: colour





turning clockwise or counterclockwise changes the colour or colour temperature depending on the controlled ballast (3Ch, 4Ch, RGB, RGBW or 2Ch CW-WW)

Value to activate mode with SET OPERATING MODE: 0xA5



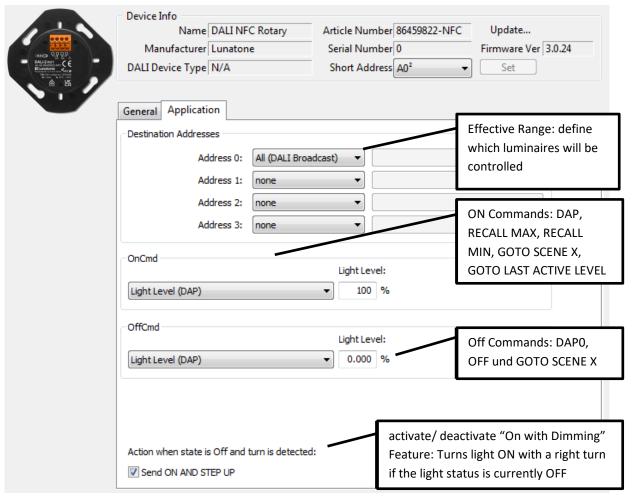


Figure 3 DALI Cockpit configuration of the application – Tab: "Application"

Destination address / effective range

defines which devices are affected by the commands sent. Possible destination addresses:

-	Broadcast	(to 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. In operating modes 1-4 (Intensity, Tunable White, RGB and RGBW) commands are sent to all destination addresses. However, it is

recommended to use only one address entries for colour control.

In the operating modes Balance&Dim / Colour&Dim the first address is used for brightness, the second for colour temperature / colour. Destination address 3 and 4 are not used.

Commands

Which commands are sent when pressing the pushbutton can be defined with the OnCmd and OffCmd.



On Commands (OnCmd):

Command	Description
	specify the light level
DIRECT ARC POWER	in %
RECALL MAX	Recalls light level MAX
RECALL MIN	Recalls light level MIN
	command for DALI2
GOTO LAST ACTIVE	gears – recalls last
LEVEL	active light level
	Recalls respective
GO TO SCENE _	scene (0-15)

Off Commands (OffCmd)

Command	Description
	specification of the
DIRECT ARC POWER 0	light level as 0%
OFF	Turns light off
	Recalls respective
GO TO SCENE X	scene (0-15)

Factory Default Settings

The DALI-2 ROT is delivered with these settings:

Operating Mode 1: "I" – Intensity:

Destination: Broadcast **On-Command**: DAP 100% **Off-Command**: DAP 0%

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.

To make the DALI-2 instances available, the device must be used in operating mode 5 (DALI operating mode 0xA4). This can be set in the DALI Cockput or by using the DALI command SET OPERATING MODE

The DALI-2 ROT supports 3 instances:

- Instance 0 push button function, instance type: Input Devices - Push Button (instance type 1, IEC62386-301)
 event information see table 1, page 18
- Instance 1 rotary movement, instance type: General Purpose (Instance type 0 IEC62386-103), event information see table 2, page 18
- Instance 2 rotary movement, instance type: Input Devices - Absolute Input Devices (instance type 2, IEC62386-302) 8 bit resolution, as an alternative evaluation of the rotary movement.

As defined in the standard, the following events are supported and placed on the DALI bus as INPUT NOTIFICATIONs

Further parameters of the instances 0-2 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 4, page 18).



Instance Type 1 – Pushbutton:

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	
		double press is 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 1 event information Instance 0 - pushbutton

Instance Type 0 - General Purpose:

Event name	Event Information	Description
Rotation Clockwise	00 0000 0000b	The rotary knob has started to rotate
Started		clockwise
Rotation Counterclockwise	00 0000 0001b	The rotary knob has started to rotate
Started		counterclockwise
Rotation Stopped	00 0000 0010b	The rotation of the rotary knob has stopped

Table 2. Event information Instance 1 – general purpose

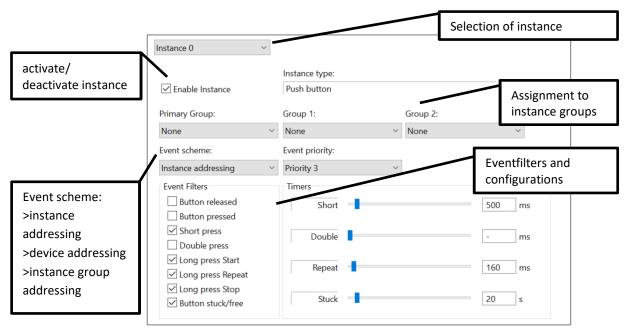


Figure 4 Configuration of : Instances of the DALI-2 ROT in operating mode D2I - Instancemode

Lunatone

NFC-Version DALI-2 ROT NFC (article number: 86459822-NFC)



The DALI-2 ROT NFC includes a nearfield communication interface. This allows easy configuration over the NFC interface with a smartphone app, during installation.

- The DALI-2 ROT NFC 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 ROT NFC is within range (indicated by signal tone / vibration) the device is automatically read out and shown on the display.



The NFC antenna of the DALI-2 ROT NFC is located on the back side of the device





It is important that the NFC antennas of the two devices are as close as possible to each other.



For the application to work your smartphone needs to support NFC. Information on the NFC interface of your smartphone please check the instructions of the device manufacturer.

D Lunatone

Lunatone DALI NFC App

The settings are the same as in the DALI Cockpit

Available configurations:

- Read out and assign DALI-2 control device address
- Assign to control device groups
- Choose the operating mode
- For operating modes 1-4 and 6:
 Effective range,

ON commands:

DAP,

RECALL MAX,

RECALL MIN,

GOTO SCENE X,

GOTO LAST ACTIVE LEVEL

OFF commands:

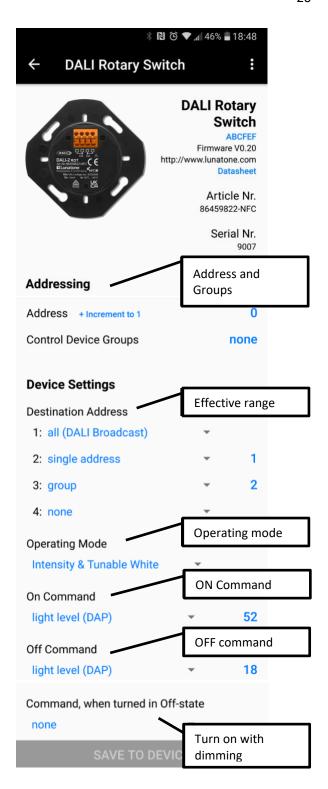
DAPO,

OFF,

GOTO SCENE X

 On with Dimming" Feature: Turns light ON with a right turn if the light status is currently OFF

Settings for instances (operating mode 5 – Instance mode) cannot be made with the DALI NFC mobile app.





Purchase Order Information

Art.Nr. 86459822-NFC: DALI-2 ROT NFC, operating mode "I"-Intensity, rotary switch insert for switching, dimming and colour temperature adjustment in DALI systems

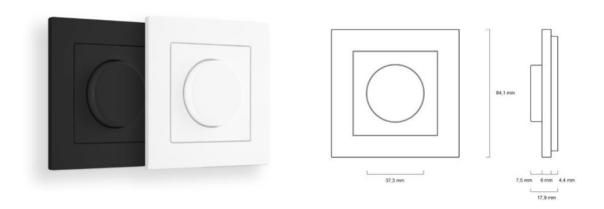
Art.Nr. 86459822-NFC-PS: DALI-2 ROT NFC PS, with integrated bus power supply

Art.Nr. 86459822-NFC-CH: DALI-2 ROT NFC CH, version for Swiss back box installation (Feller)

Art.Nr. 86459822-NFC-CH-PS: DALI-2 ROT NFC CH PS, with integrated bus power supply 70mA, for Swiss back box installation (Feller)

DALI-2 ROT integrated: version without application controller: Art. Nr. 86459822-D2 https://www.lunatone.com/wp-content/uploads/2018/03/86459822-D2 DALI ROT INT EN D0089.pdf

Accessory:

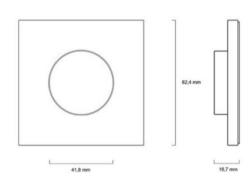


Art.Nr. 86459822-Z01: cover and rotary knob, alpine white, Jung Series A Art.Nr. 86459822-Z02: cover and rotary knob, black, Jung Series A



Art.Nr. 86459822-Z03: Adapter 6mm (for combination of the DALI-2 ROT with covers/rotary knobs of other manufacturers anticipating a bigger axis diameter)





Art.Nr. 86459822-Z04: cover and rotary knob, white (RAL9016)

Art.Nr. 86459822-Z05: cover and rotary knob, black



Additional Information and Equipment

DALI-Cockpit – free configuration tool from Lunatone 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/

Contact

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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.