ESYLUX

CONFIGURATION INSTRUCTIONS DALI-2 INPUT DEVICES

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1. Information about the document

1.1 Introduction

These instructions contain detailed information on the configuration, integration and setting options of DALI-2 input devices listed under "1.3 Product identification" on page 4.
The current version of this document is available on the respective product page at www.esylux.com and can be printed out in A4 format.
Read the instructions carefully and observe all safety instructions and warnings.

1.2 Manufacturer's address

ESYLUX GmbH & Co. KG
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1.3 Product identification

These instructions apply to the following products:

Product name
DALI-2 input devices in the COMPACT series
DALI-2 input devices in the COMPACT MINI series
DALI-2 input devices in the FLAT series

The item number and product name are located on the nameplate of the relevant product.

2. Basic safety information

2.1 Safety instructions

Specialist personnel

Electrical devices connected to a 230 V mains supply may only be assembled and commissioned by electrical installation technicians or trained electricians, taking country-specific regulations into account.

DANGER!

Risk of fatal injury from electric shock!

- Observe the five safety rules:

  1. Disconnect the power supply
  2. Secure the power supply from being switched on again
  3. Check that the relevant components have been de-energised
  4. Set up the earthing and short-circuiting mechanisms as required
  5. Cover or isolate neighbouring live parts

- Protect the device with a 10 A circuit breaker.
- Protect the circuit with a residual current device (RCD).
- Observe the contact opening width (µ = < 1.2 mm).

2.2 Intended use

Installation location

DALI-2 input devices in the COMPACT, COMPACT MINI and FLAT series have been designed for integration into a DALI-2 bus system in indoor applications and require an unobstructed view of people. The input devices automatically control the lighting based on movement and ambient light conditions. A DALI-2 bus system provides communication and supplies the power via a DALI-2-enabled application controller (APC) (based on the IEC 62386-101/-103 standard).
Any other use beyond this is considered improper and can lead to personal injury and damage to property.
Observe the short instructions for the relevant product!

2.3 Liability and damages

Warranty

The device must not be changed, modified or painted — doing so will render any warranty claims void.
The manufacturer accepts no liability for damage caused due to **improper** use.
Check the device for damage after unpacking. If the device is damaged, return it to the place of sale.

3. Product description

DALI-2 input devices in the COMPACT, COMPACT MINI and FLAT series have been developed for intelligently controlling lighting groups in accordance with the DALI-2 standard. They have been designed for integration into a DALI-2 bus system in indoor applications.
DALI-2 input devices detect movement, light values or button presses and convert them into DALI-2 information. The control unit (e.g. an APC presence detector) manages all the information and automatically controls the DALI-2 groups based on the information from the DALI-2 input device.

Properties

Main product features:

- Certified in accordance with the DALI-2 standard
- Only suitable for lighting control in conjunction with a DALI-2-enabled application controller
- Integrated motion and light sensor based on the IEC 62386-303/-304 standard
- Inputs for connecting floating buttons based on IEC 62386-301 + IEC 62386-302 (COMPACT and FLAT series)

  CAUTION!

  Do not use external voltage!

- Supply voltage on the DALI-2 bus system
- Integrated motion and light sensor

4. DALI instances

Each sensor input value is assigned to its own DALI-2 instance. They are equipped with corresponding instances depending on the sensor type.

The instances are identified by type and number.

4.1 COMPACT

BMS presence detectors in the COMPACT series with light measurement:

Instance number	Instance type	Description
0	1	Push button input
1	1	Push button input
2	3	Motion detection
3	4	Light measurement
4	2	Switch input
5	2	Switch input

4.2 COMPACT MINI

BMS presence detectors in the COMPACT MINI series with light measurement:

Instance number	Instance type	Description
0	3	Motion detection
1	4	Light measurement

4.3 FLAT

BMS presence detectors in the FLAT series with light measurement:

Instance number	Instance type	Description
0	1	Push button input
1	3	Motion detection

Instance number	Instance type	Description
2	4	Light measurement
3	2	Switch input

5. Activation

Connect the DALI-2 input device to the DALI bus voltage.
A warm-up phase of approx. 25 seconds is initiated.

The signals from the sensor LEDs indicate the following:

- State 1:
  DALI-2 short address already assigned. The blue sensor LED flashes.

- State 2:
  No DALI-2 short address assigned. Blue and red sensor LEDs flash alternately.

6. Factory settings

DALI-2 input devices are pre-configured with optimised DALI-2 settings at the factory. Following a RESET command, all settings are reset to the preset value.

Setting	ESYLUX Value	Reset Value	Description
Hold Timer	90	90	Occupied state in accordance with DALI-2 standard (303 instance) for 90 x 10 s = 15 min
Report Timer	20	20	Occupied state in accordance with DALI-2 standard (303 instance) for 20 x 1 s = 20 s

Setting	ESYLUX Value	Reset Value	Description		
Event Filter	0x03	0x03	0	Occupied event enabled	1 = Yes
			1	Vacant event enabled	1 = Yes
			2	Repeat event enabled	0 = No
			3	Movement event enabled	0 = No
			4	No movement event enabled	0 = No
			5	Reserved	0
			6	Reserved	0
			7	Reserved	0

7. Memory bank 2

The DALI-2 input devices offer configuration/setting elements that have not yet been defined by the IEC-62386 standards.

The following settings can be defined in memory bank 2:

- Sensor LED on/off and sensor LED brightness
- Ambient light sensor (ALS) correction factor
- Sensitivity of the motion sensor (PIR)

The memory bank (memory bank 2) is written or read via standard DALI-2 commands.

7.1 Sensor LED mode

Value (decimal)	Value bits*	Description
0	0000 0000	Sensor LEDs are deactivated. Deactivating the sensor LEDs will hide all sensor LED signals for normal operation. The following events are not hidden: - DALI identification procedure started by the IDENTIFY DEVICE command - The LED sequence displayed during the warm-up phase immediately after switching on - PIR test modes
1	0000 0001	Sensor LEDs are activated. All events are signalled by the sensor LEDs.
2	0000 0010	(Like value = 1)
3	0000 0011	Sensor LEDs are activated. All events are signalled by the sensor LEDs. Deactivating the 303 instance deactivates the signalling of events in the "Motion detection suppressed" category. This is applied if the sensor does not need to indicate any detected movement.

* The sensor LED mode settings provide the setting options listed below, which can be set independently to 1 or 0:

Bit [0] set: LEDs activated.

Bit [1] set: Deactivating the 303 instance also deactivates the signalling of events in the "Motion detection suppressed" category.

7.2 Sensor LED brightness

The sensor LED brightness can be configured from 5 – 100 % with values from 5 … 100. If sensor LEDs are to be deactivated, set the sensor LED mode value to 0.

7.3 ALS correction factor

The ALS correction factor of the ambient light sensor indicates the ratio between the measured value from the ceiling and the value sent to the APC by the DALI-2 input device.
Different reflection behaviour indoors leads to differences in the brightness values from the ceiling and floor. The ALS correction factor is designed to compensate for these differences and can be set between 0.1 … 5.0.

- 0.1 corresponds to value 1 in memory bank 2
- 5.0 corresponds to value 50 in memory bank 2

Factory setting: ALS correction factor = 1

The DALI-2 input device does **not** perform an ALS correction. The light value reported via the DALI-2 bus corresponds to the measured light value from the ceiling.
The light value reported by the DALI-2 input device is limited to 819.0 lux. The reason for this is the 13 bit resolution reported by the DALI 304 instance.

7.4 Determining the ALS correction factor

The ALS correction factor of a single ambient light sensor is measured and determined using a lux meter at two points on the ground floor (100 lux and 500 lux).

- ➢ Dim the lighting until the lux meter indicates a value of 100 lux.
- ➢ Read the lux value measured by the DALI-2 BMS sensors
- ➢ Determine the correction factor for each DALI-2 input device and apply to "ALS 0 correction factor 100 lux" and "ALS 1 correction factor 100 lux".
- ➢ Repeat these steps for 500 lux.

- ✓ The ALS correction factor is determined.

Example:

Brightness value measured using a lux meter on the floor: 100 lx
Brightness value measured by DALI-2 input device from the ceiling: 54 lx

Correction factor = (100/54) = 1.851 → value = 1.9 → memory bank 2 = 19

7.5 Configuring memory bank 2

To configure settings in memory bank 2, use standard DALI-2 commands for reading/writing to memory banks.

The data can be called up via the "READ MEMORY LOCATION (DTR0, DTR1)" command. Write access to NVM data positions is only possible if the memory bank is unlocked (lock byte = 0x55).

Address	Description	Memory type (reference 1)	Value range	Default value	RESET value (reference 2)
0x00	Address of the last accessible memory location	ROM			0x13
0x01	Indicator byte	ROM			0x00
0x02	Memory bank lock byte. Lockable bytes in the memory bank must be read only; the lock byte has a different value to 0x55.	RAM			0xFF
0x03	Memory bank layout/ structure version	ROM			0x01
0x04	LED mode, e.g. LEDs activated, "Motion detection suppressed" signalling deactivated 0 = LEDs deactivated 1 = LEDs activated 3 = LEDs activated, but the "Motion detection suppressed" event is not displayed if the 303 instance is deactivated	NVM	0 … 3	3	No change
0x05	LED brightness in the range 5 %...100 %	NVM	5 … 100	50	No change
0x08, 0x09	ALS 0 - correction factor 100 lux in 1/10 of the measured value	NVM	1 … 50	10	No change
0x0A, 0x0B	ALS 0 - correction factor 500 lux in 1/10 of the measured value	NVM	1 … 50	10	No change

Address	Description	Memory type (reference 1)	Value range	Default value	RESET value (reference 2)
0x0C, 0x0D	ALS 1 - correction factor 100 lux in 1/10 of the measured value	NVM	1…50	10	No change
0x0E, 0x0F	LS 1 - correction factor 500 lux in 1/10 of the measured value	NVM	1…50	10	No change
0x10	PIR sensitivity as in the range 1 %…100 % (reference 3)	NVM	1…100, 254, 255	95	Firmware < V2.1.0: No change Firmware >= V2.1.0: Set to default value due to the implementation of the DALI-2 command
0x11	PIR 1 sensitivity as in the range 1 %…100 % (reference 3)	ROM	1…100, 254, 255	255	No change
0x12	PIR 2 sensitivity as in the range 1 %…100 % (reference 3)	ROM	1…100, 254, 255	255	No change
0x13	PIR 3 sensitivity as in the range 1 %…100 % (reference 3)	ROM	1…100, 254, 255	255	No change

Reference 1:
ROM = Read-only memory, cannot be changed by the user.
NVM = Non-volatile memory, can be changed by the user.

Reference 2:
Value is reset to this default value by the "0xFE 0x10 RESET" DALI command.

Reference 3:
Although some DALI-2 input device models use more than one PIR sensor, the sensitivity of all sensors for the device can only be set to the same value once.

7.6 PIR sensitivity

Memory location 0x10 allows the PIR sensitivity to be read and set from 1 %…100 % – the higher the value, the higher the sensitivity of the sensor.

Special memory location values:

- **254:** This value resets the PIR sensitivity to the factory setting. Subsequent reading operations then report the factory setting until this value is overwritten.
- **255:** This measured value indicates that adjustment of the PIR sensitivity is not supported.

The DiiA has proposed new DALI-2 commands for adjusting the sensitivity of the sensors. As soon as they become available, memory bank 2 will reflect the adjustments made using the new commands.

Any value between 101 and 254 will reset the PIR sensitivity to the factory setting.

8. Technical data

Electrical design	
Control system	DALI-2
Protection class	II
Nominal voltage	9.5 - 22.5 V ⎓
Power consumption	Peak current DALI 12 mA No load current DALI 6 mA
Stand-by consumption	< 0.1 W

Channels (lighting/HVAC)

DALI-2 device type	Input device in accordance with -301 (push button), input device in accordance with -302 (switch, absolute values), input device in accordance with -303 (presence and motion detectors), input device in accordance with -304 (light sensor)