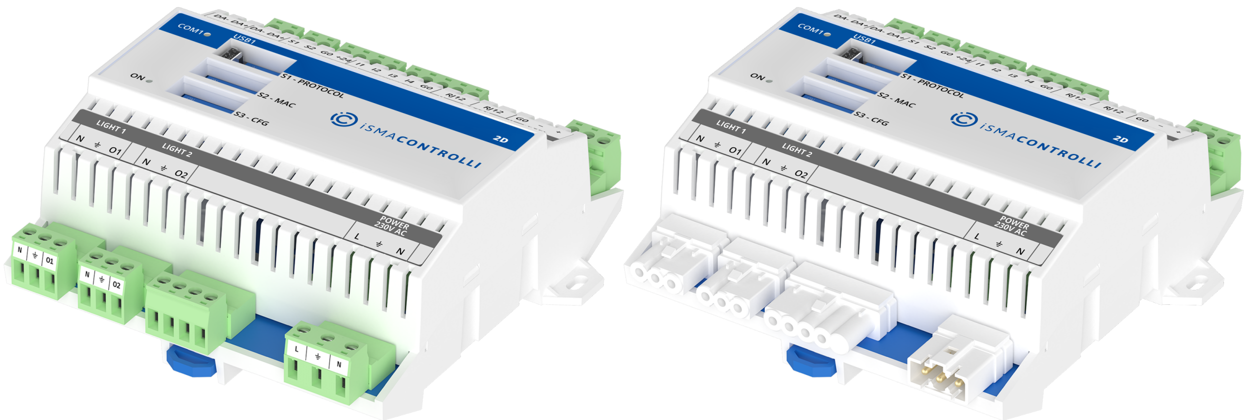
iSMA-B-2D

User Manual

2D(-WD)



iSMA CONTROLLI S.p.A. - Via Carlo Levi 52, 16010 Sant'Olcese (GE) - Italy | support@ismacontrolli.com

Table of Contents

1 Introduction

The iSMA-B-2D device has been built in order to control the light in a single space in the building. The device is designed for controlling two separate DALI light areas with up to 32 DALI ballasts (16 ballasts for each DALI interface). Two built-in special inputs and two digital inputs are designed to connect the presence detectors and light switches. A dedicated DIP switch allows for activating a predefined inputs configuration. The device allows for controlling DALI ballasts by a common light switch and a common presence detector without the need of programming, which makes the device a unique plug & play type device designed for DALI network control.

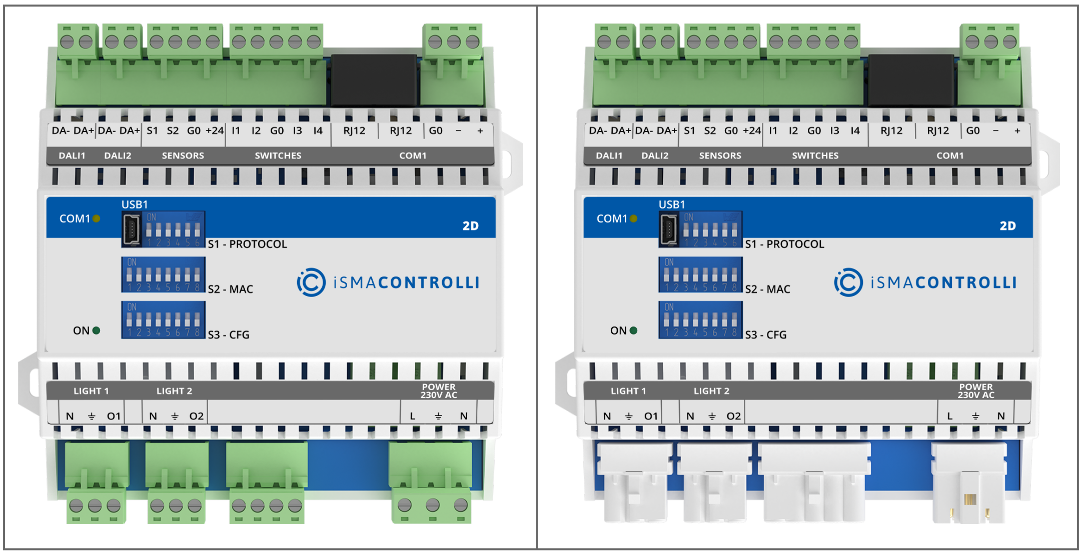


Table 1. 2D controller

1.1 Revision History

Rev.	Date	Description
1.0	29 Mar 2021	First edition
1.1	4 May 2021	New renders
1.2	25 May 2022	Rebranded; corrections in the Sensors and Switches section (digital input number)

Table 2. Revision history

2 Safety Rules

- Improper wiring of the product can damage it and lead to other hazards. Make sure that the product has been correctly wired before turning the power on.
- Before wiring or removing/mounting the product, make sure to turn the power off. Failure to do so might cause an electric shock.
- Do not touch electrically charged parts such as power terminals. Doing so might cause an electric shock.
- Do not disassemble the product. Doing so might cause an electric shock or faulty operation.
- Use the product only within the operating ranges recommended in the specification (temperature, humidity, voltage, shock, mounting direction, atmosphere, etc.). Failure to do so might cause a fire or faulty operation.
- Firmly tighten the wires to the terminal. Failure to do so might cause a fire.
- Avoid installing the product in close proximity to high-power electrical devices and cables, inductive loads, and switching devices. Proximity of such objects may cause an uncontrolled interference, resulting in an instable operation of the product.
- Proper arrangement of the power and signal cabling affects the operation of the entire control system. Avoid laying the power and signal wiring in parallel cable trays. It can cause interferences in monitored and control signals.
- It is recommended to power controllers/modules with AC/DC power suppliers. They provide better and more stable insulation for devices compared to AC/AC transformer systems, which transmit disturbances and transient phenomena like surges and bursts to devices. They also isolate products from inductive phenomena from other transformers and loads.
- Power supply systems for the product should be protected by external devices limiting overvoltage and effects of lightning discharges.
- Avoid powering the product and its controlled/monitored devices, especially high power and inductive loads, from a single power source. Powering devices from a single power source causes a risk of introducing disturbances from the loads to the control devices.
- If an AC/AC transformer is used to supply control devices, it is strongly recommended to use a maximum 100 VA Class 2 transformer to avoid unwanted inductive effects, which are dangerous for devices.
- Long monitoring and control lines may cause loops in connection with the shared power supply, causing disturbances in the operation of devices, including external communication. It is recommended to use galvanic separators.
- To protect signal and communication lines against external electromagnetic interferences, use properly grounded shielded cables and ferrite beads.
- Switching the digital output relays of large (exceeding specification) inductive loads can cause interference pulses to the electronics installed inside the product. Therefore, it is recommended to use external relays/contactors, etc. to switch such loads. The use of controllers with triac outputs also limits similar overvoltage phenomena.

- Many cases of disturbances and overvoltage in control systems are generated by switched, inductive loads supplied by alternating mains voltage (AC 120/230 V). If they do not have appropriate built-in noise reduction circuits, it is recommended to use external circuits such as snubbers, varistors, or protection diodes to limit these effects.

3 Technical Specification

Power Supply	Voltage	230 V AC ± 10%
	Power consumption	Max. 7 VA
Special Inputs	Dry contact input	Output current ~0.2 mA
Digital Inputs	Type	Dry contact
	Max. input frequency	100 Hz
Light Outputs (Relays)	Resistive load	Max. 2 x 4 A at 230 V AC
Power Supply Output	Voltage	24 V DC, max. 80 mA
RS485 Interface	RS485	Up to 128 devices Fail-safe receiver (bus open, bus shorted, bus idle)
	Communication protocols	Modbus RTU/ASCII
	Baud rate	From 2400 to 115200 set by switch
	Address	0 to 254 set by DIP switch
RJ12 Interface	RS485	Up to 128 devices
	Communication protocol	Modbus RTU/ASCII
	Baud rate	From 2400 to 115200
DALI Interface	DALI version	1.0
	Max. ballasts number	16
	Max. power supply	40 mA
USB	USB	Mini USB 2.0
Ingress Protection	IP	IP40
Temperature	Storage	– 40°C to +85°C
	Operating	0°C to +50°C
Humidity	Relative	5% to 95%
Connectors	Inputs/outputs Power supply and communication	Pluggable screw terminals Wieland type (iSMA-B-2D-WD only)
	Max. cable size	2.5 mm^2

Dimension	Width	124 mm
	Length	137 mm
	Height	55 mm

Table 3. Technical specification

4 Hardware Specification

4.1 Dimensions

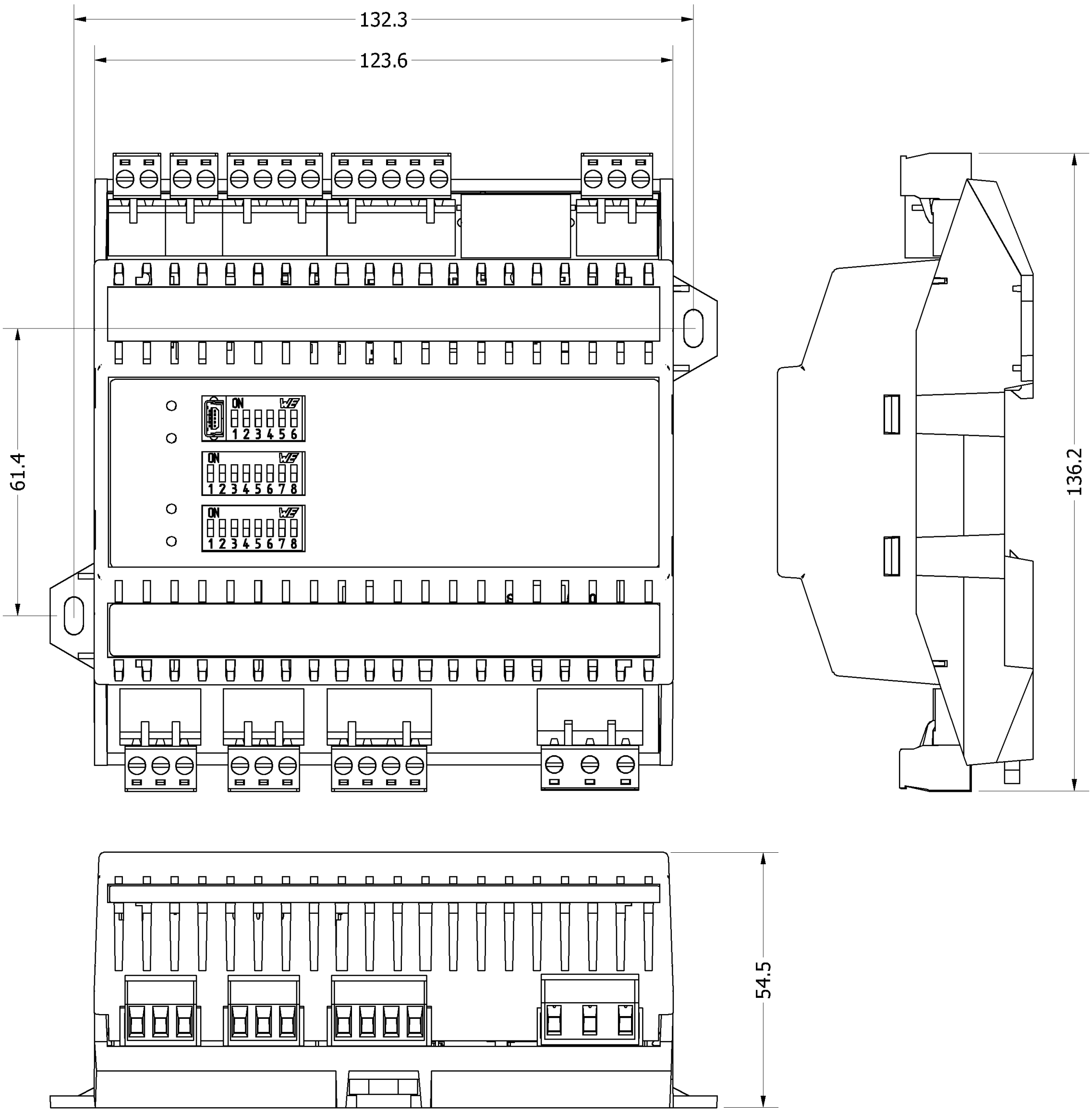


Figure 1. Dimensions of iSMA-B-2D

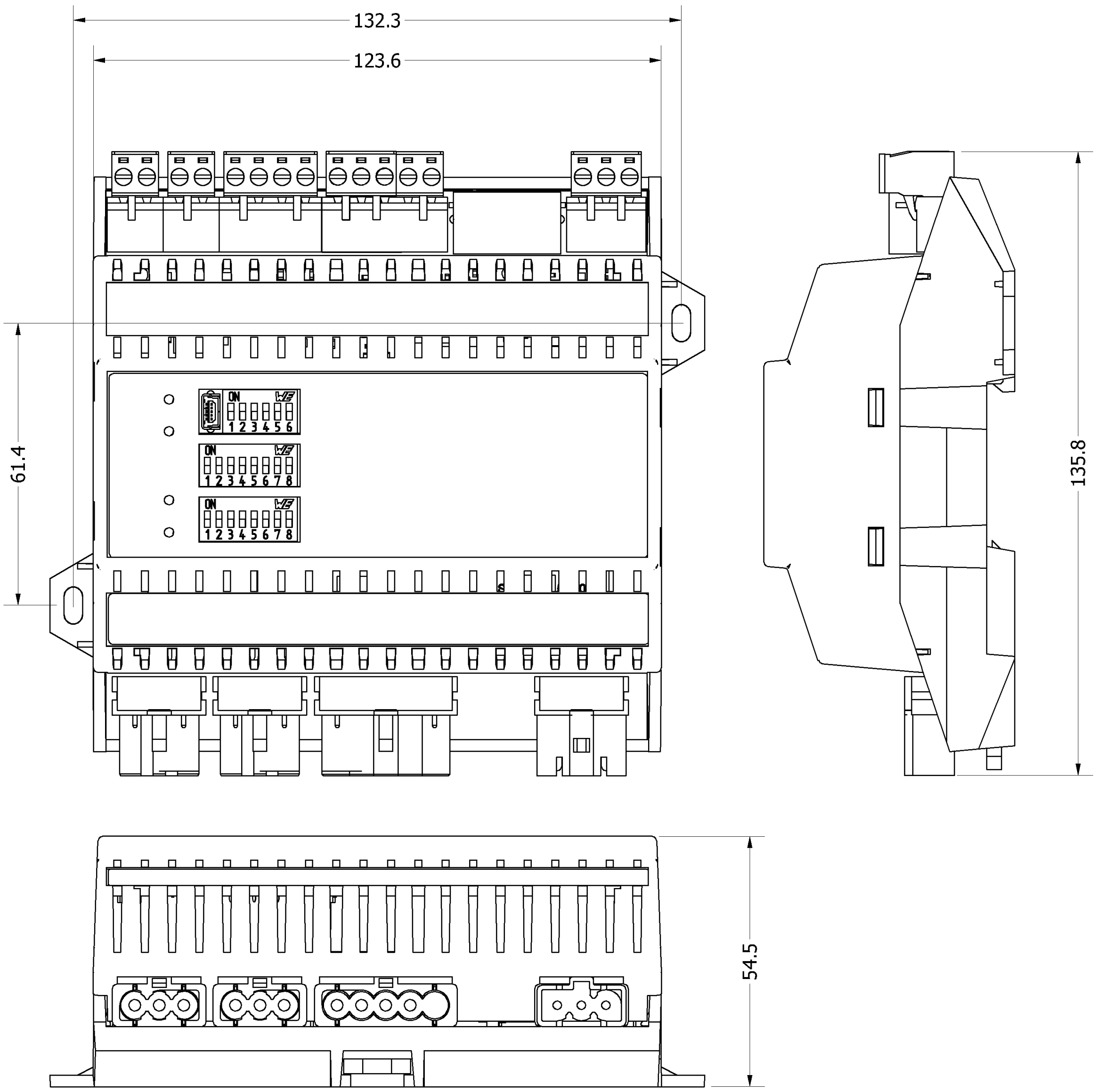


Figure 2. Dimensions of iSMA-B-2D-WD

4.2 Power Supply

The device is designed to work with 230 V AC power supply. Appropriate circuit breaker for overcurrent protection is 10 A class B.

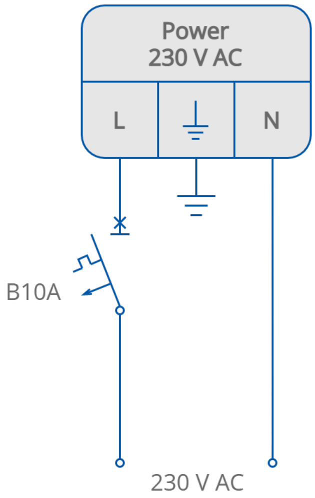


Figure 3. 230 V AC power supply connection

WARNING! The maximum current for all the outputs is 8 A!

4.2.1 24 V DC Power Supply for External Equipment

The device is equipped with a 24 V DC 80 mA power supply output dedicated to power motion sensors / presence detectors, which require an external power supply.

The 24 V DC power supply terminal connection is labeled +24, G0, and it is placed next to the special input connectors.

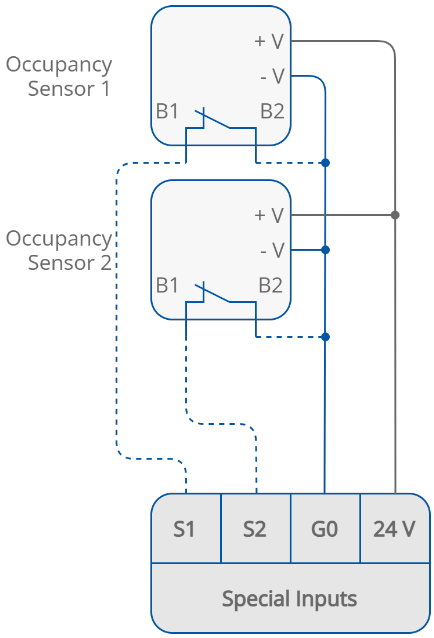


Figure 4. 24 V DC power supply connection

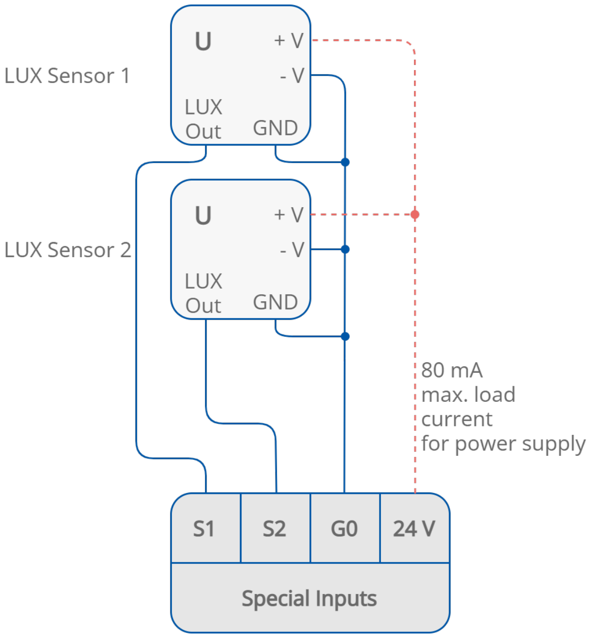


Figure 5. 24 V DC power supply connection

4.3 Terminals and Internal Connections

There are 2 types of hardware available:

- iSMA-B-2D;
- iSMA-B-2D-WD;

The -WD part in the device name indicates that instead of the screw terminals, the Wieland type connectors are used for 230 V AC power supply and light output.

4.3.1 iSMA-B-2D-(WD)

The iSMA-B-2D-(WD) device is equipped with a 230 V AC power supply and 2 x 230 V AC normal closed light outputs for the lamps power supply if the lighting is controlled by the DALI network. The light outputs are fuse protected and connected to the controller's main power supply as presented in the figure below.

In addition, the light outputs work as relays in the ON/OFF light control mode.

The controller is equipped with a 24 V DC power supply dedicated for power supply of motion sensors / presence detectors, which require an external power supply.

Inputs section consists of 2 special inputs dedicated for motion sensors / presence detectors connection and 2 digital inputs for connecting the switches.

> WARNING! The maximum current for all outputs is 8 A!

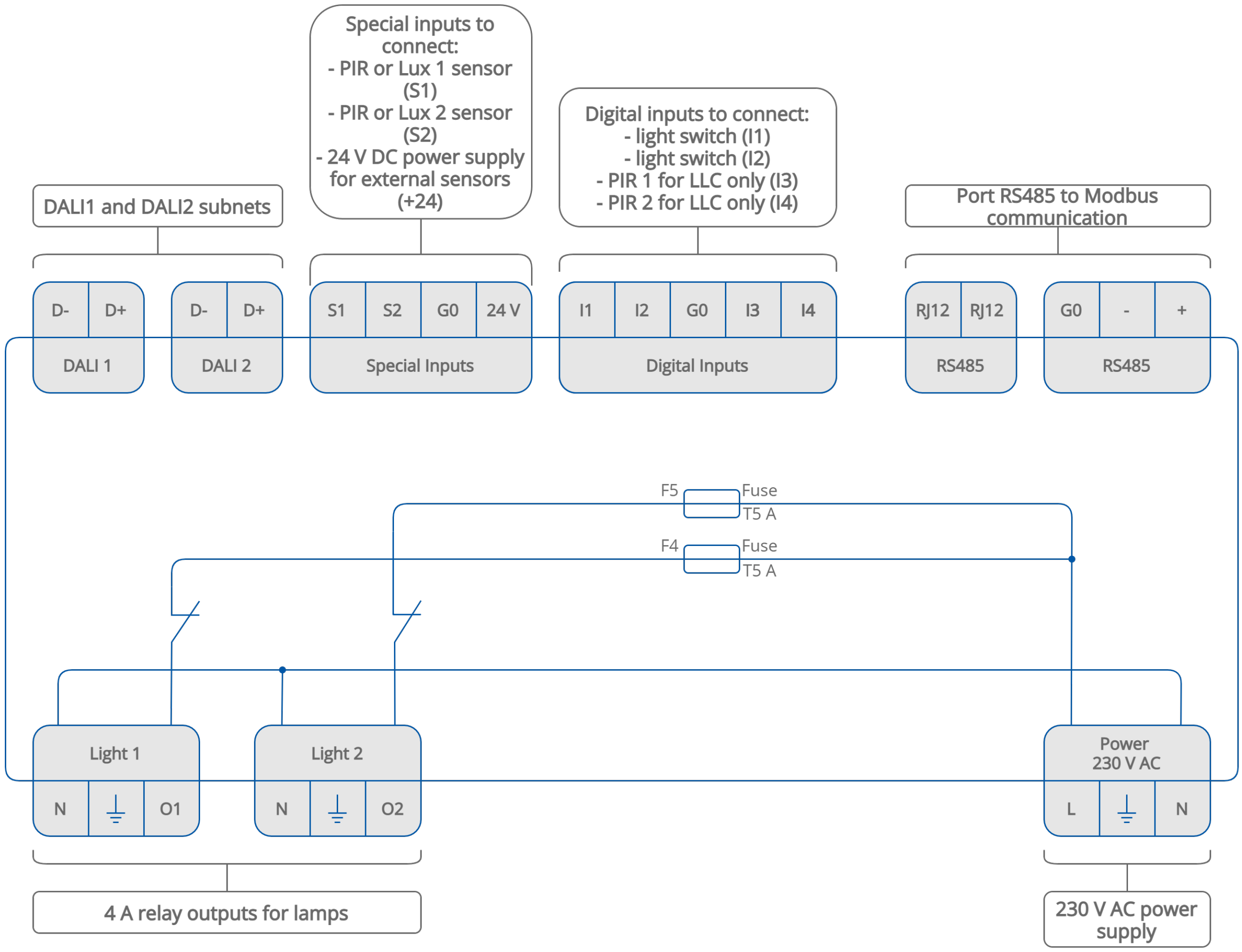


Figure 6. iSMA-B-2D-WD terminals and internal connections

4.4 RS485 Communication

4.4.1 Connecting RS485 Communication Bus

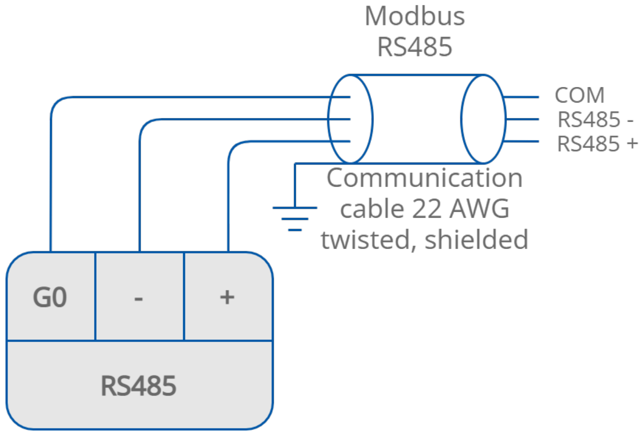


Figure 7. RS485 connection

4.4.2 RS485 Grounding and Shielding

In most cases controllers are installed in enclosures along with other devices, which generate electromagnetic radiation (for example, relays, contactors, transformers, motor invertors, etc.). Such electromagnetic radiation can induce electrical noise into both power and signal lines, as well as direct radiation into the controller, causing negative effects on the system. For this reason, an appropriate grounding, shielding, and other protective steps should be taken at the installation stage to prevent negative electromagnetic radiation effects, for example:

- control cabinet grounding;
- cable shield grounding;
- using protective elements for electromagnetic switching devices;
- proper wiring;
- consideration of cable types and their cross sections;
- and other.

4.4.3 RS485 Network Termination

Transmission line effects often present problems for data communication networks. These problems include reflections and signal attenuation.

To eliminate the presence of reflections of signal from the end of the cable, the cable must be terminated at both ends with a resistor across the line adequate to its characteristic impedance. Both ends must be terminated since the propagation is bidirectional. In case of an RS485 twisted pair cable this termination is typically 120 Ω.

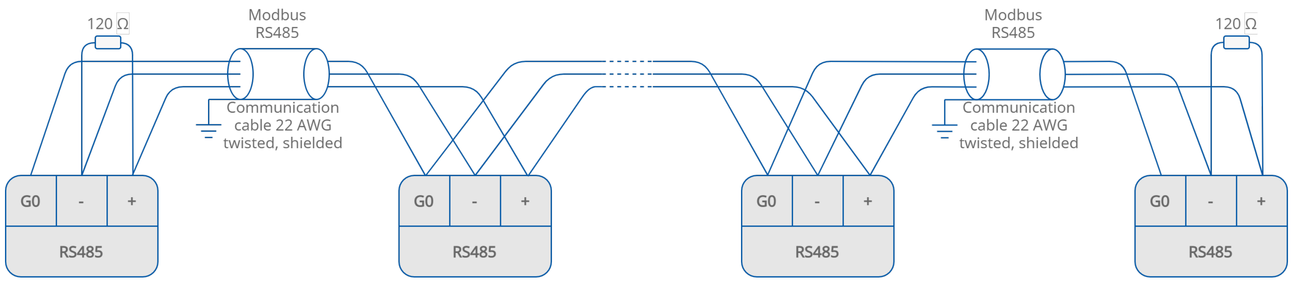


Figure 8. RS485 termination

4.5 RJ12

The device is equipped with two parallel sockets with the same pin configuration. These sockets provide communication via the Modbus RTU protocol. The communication pins are internally connected with the main RS485 interface and they have the same functionality. RJ12 sockets are designed for providing an easy connection with devices such as iSMA-B-FCU or iSMA-B-LP.

The RJ12 socket can also transfer power supply through the pins no. 4, 5, and 6, which are internally connected, for example, with the iSMA-B-FCU unit (see the figure below). Before connecting the devices powered from the RJ12 socket, it is necessary to calculate the power load of all the devices.

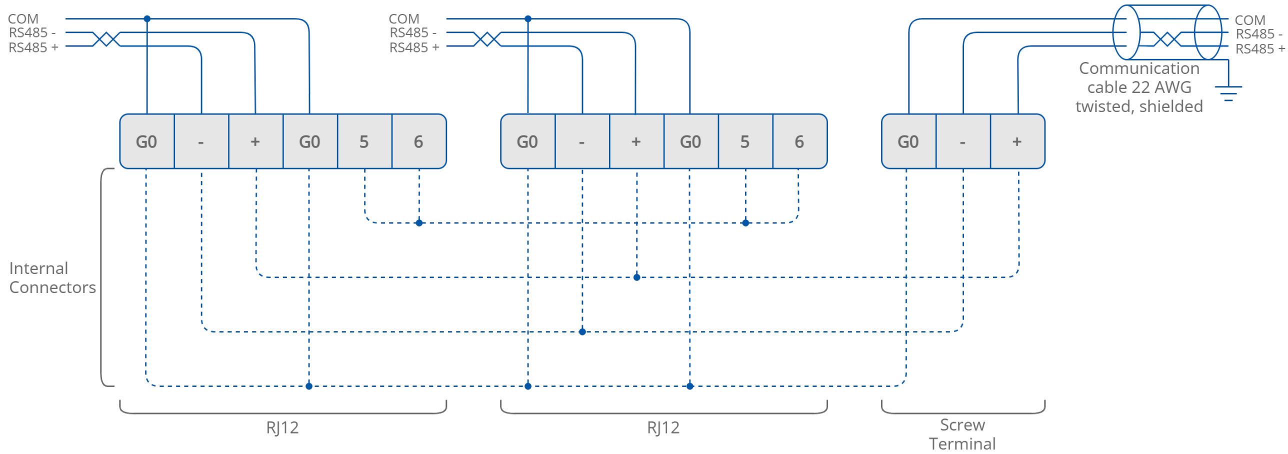


Figure 9. Internal connections between RJ12 sockets and a main RS485 socket

Power supply transferred over RJ12:

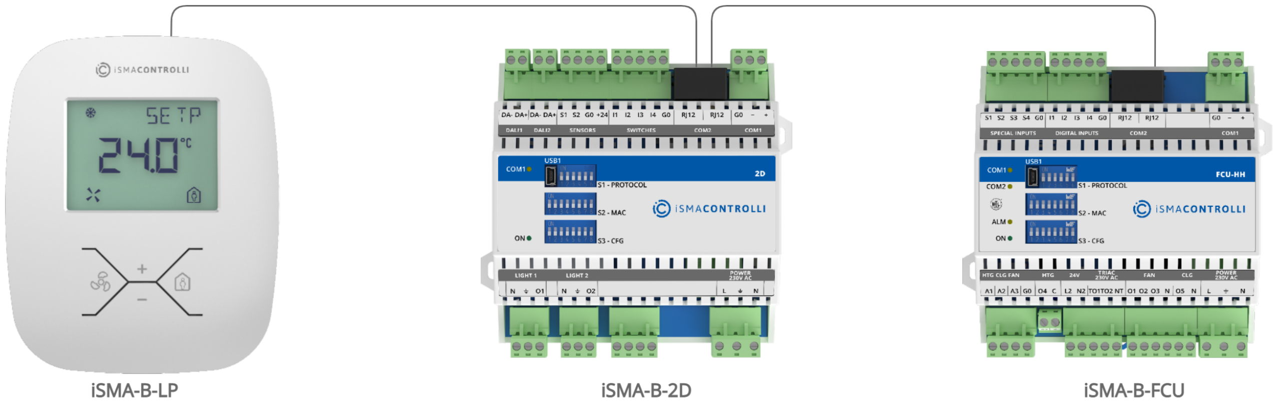


Figure 10. Connection of the iSMA-B-LP and iSMA-B-FCU with RJ12 connectors

RJ12 pins are presented in the figure below.

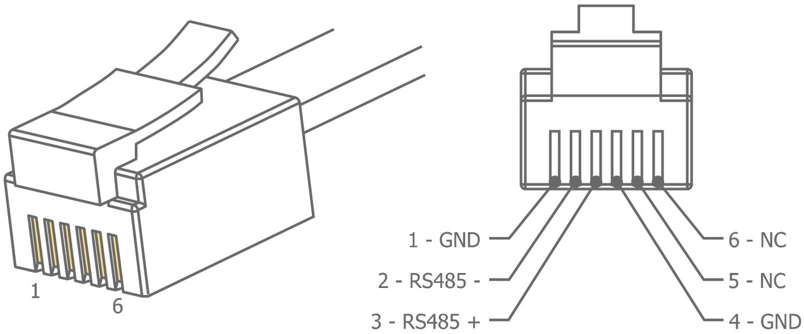


Figure 11. RJ12 pins

If the bus length is up to 100 m, it is recommended to use standard category 3, 4, or 6 wire straight telephone cable without crossing (for example, YTLYP 6x0.12).

For longer bus cables, it is recommended to use twisted shielded Modbus standard cable.

4.6 Front Panel and DIP Switches

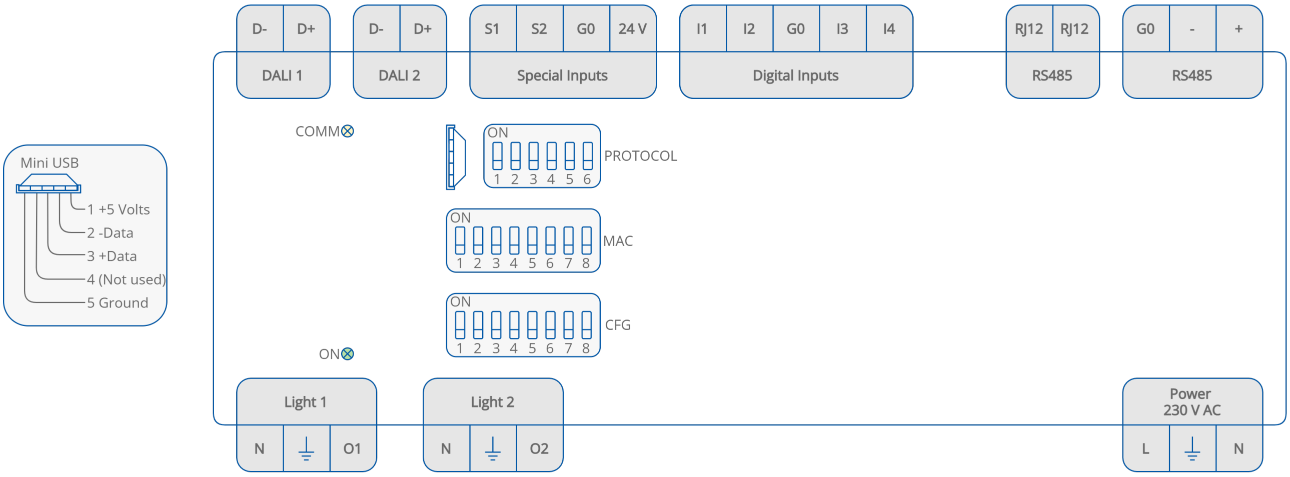


Figure 12. Front panel

4.6.1 USB1 Port

The device is equipped with a built-in mini USB port dedicated for managing controller firmware and for diagnostics.

The USB1 port provides also the power supply for device, which might be useful during the process of starting front panel LED functions.

> WARNING! If the USB1 port is used as the power supply for the device, it is not possible to commission and/or to manage DALI network(s)!

4.6.2 LED

The device is equipped with four LEDs for quick status checking and diagnostics:

- The power LED ON lights up (green) and then turns the power supply on.
- The communication LED COM1 lights up (orange) for 20 ms after receiving/sending each package through the main RS485 port. As long as the device receives/sends packages, the communication LED blinks continuously.

4.6.3 DIP Switches

The iSMA-B-2D1B device is equipped with 3 DIP switches on its front panel:

- 6-position S1 - PROTOCOL DIP switch;
- 8-position S2 - MAC DIP switch;
- 8-position S3 - CFG DIP switch.

S1 PROTOCOL DIP Switch: Baud Rate Selection

Transmission baud rate is determined by the S1 switch (sections 1, 2, and 3) in accordance with the following table:

1	2	3	Baud Rate
OFF (0)	OFF (0)	OFF (0)	Defined by the user
OFF (0)	OFF (0)	ON (1)	76800
OFF (0)	ON (1)	OFF (0)	4800
OFF (0)	ON (1)	ON (1)	9600
ON (1)	OFF (0)	OFF (0)	19200
ON (1)	OFF (0)	ON (1)	38400
ON (1)	ON (1)	OFF (0)	57600
ON (1)	ON (1)	ON (1)	115200

Table 4. Baud rate selection

S1 PROTOCOL DIP Switch: Protocol Selection

Protocol selection is performed with sections 4 and 5 of the S1 DIP switch in accordance with the table below:

4	5	Protocol
OFF (0)	OFF (0)	Modbus RTU
OFF (0)	ON (1)	Modbus ASCII

Table 5. Protocol selection

S2 MAC DIP Switch: Setting Controller Address

The controller address is setting using the S2 MAC DIP switch. The way of setting the address is presented in the below figure and table. The whole addressing table is presented in the separate chapter MAC DIP SWITCH addressing table.

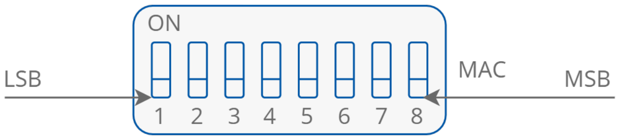


Figure 13. MAC DIP switch

Switch No.	Position	Function
1	On	Add 1 to Address
	Off	Add 0 to Address
2	On	Add 2 to Address
	Off	Add 0 to Address

Switch No.	Position	Function
3	On	Add 4 to Address
	Off	Add 0 to Address
4	On	Add 8 to Address
	Off	Add 0 to Address
5	On	Add 16 to Address
	Off	Add 0 to Address
6	On	Add 32 to Address
	Off	Add 0 to Address
7	On	Add 64 to Address
	Off	Add 0 to Address
8	On	Add 128 to Address
	Off	Add 0 to Address

Table 6. Setting an address with the MAC DIP switch

Example: Setting the address to 83

Address 83 contains the following multiplicity of the number 2:

83 = 1 + 2 + 16 + 64.

The MAC DIP switch settings are presented in the table below.

Address	S1	S2	S3	S4	S5	S6	S7	S8
83	On	On			On		On	

Table 7. Configuration of the MAC DIP switch for an 83 address

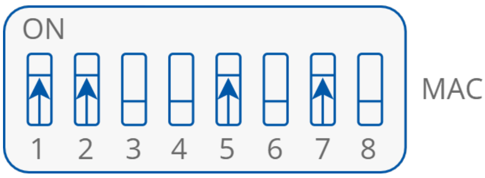


Figure 14. Setting an 83 address on the MAC DIP switch

WARNING! Do not set address 255 (all switches in on position). This address setting is reserved for system operation.

S3 CFG DIP Switch

The device is equipped with an 8-position CFG DIP switch on the top panel. Each segment of the CFG determines the operation mode, including the operating of special and digital inputs according to the interactions with the outputs.

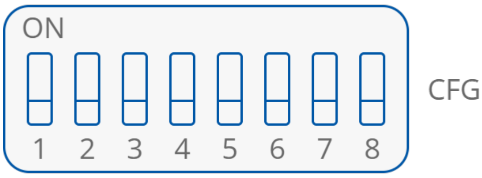


Figure 15. CFG DIP switch

The relation between particular inputs and outputs with the assigned CFG DIP switch configuration is presented in the table below:

DIP Switch No.	Position	Function	Description
1	On	**Bistable** switches connected to digital inputs **I1, I2**	Changing between bistable and monostable switches connected to the digital input no. 1 and 2
	Off	**Monostable** switches connected to Digital Inputs **I1, I2**	
2	On	Digital input **I1** controls **DALI1** and **DALI2** networks	Changing between the control modes of the digital input no. 1
	Off	Digital input **I1** controls only **DALI1** network	
3	On	Special input **SI1** controls **DALI1** and **DALI2** networks	Changing between the control modes of the special input no. 1
	Off	Special input **SI1** controls only **DALI1** network	
4	On	Digital input **I2** controls **DALI1** and **DALI2** networks	Changing between the control modes of the digital input no. 2
	Off	Digital input **I2** controls only **DALI2** network	
5	On	Special input **SI2** controls **DALI1** and **DALI2** networks	Changing between the control modes of the special input no. 2
	Off	Special input **SI2** controls only **DALI2** network	
6	On	Light control with **light outputs**	Changing between light control modes
	Off	Light control with **DALI**	

DIP Switch No.	Position	Function	Description
7	On	**Bistable** switches connected to digital inputs **I3, I4**	Changing between bistable and monostable switches connected to the digital input no. 3 and 4
	Off	**Monostable** switches connected to digital inputs **I3, I4**	
8	On	Light level control mode activated	Changing light level control mode activation
	Off	Light level control mode inactive	

Table 8. The CFG DIP switch configuration

4.7 Default Settings

If the device is used for the first time or the default settings have just been restored, the following default settings are active:

Communication		
Register	Number	Default Value
BAUD RATE	40017	76800
STOP BITS	40018	1
DATA BITS	40019	8
PARITY BITS	40020	0
REPLY DELAY	40021	0
COUNTERS	30004-30012	0
I/O		
DI BLOCKING	40102	0 (UNBLOCKED)
DI DIMMING OFF	40254-40255 bit 4	0 (ON)
SI PIR TYPE	40103-40104	6 (NC)
SI DELAY OFF TIME	40107-40108	300
SI BLOCKING	40254-40255 bit 3	0 (UNBLOCKED)
DALI1 + DALI2		
ON OFF STATE	40253 (40254 bit 0)	0

COUNTERS	30229-30247	0
DIMMING STATE	40266-40267	0
FADE RATE	40462-40463	7
FADE TIME	40466-40467	0
POWER ON LEVEL	40470-40471	254
SYSTEM FAILURE LEVEL	40474-40475	254
BALLASTS SETPOINT	40270-40301	254
BALLASTS MIN	40334-40365	0
BALLASTS MAX	40398-40429	254
NUMBER OF BALLASTS	30258-30259	0
LLC		
LLC SETPOINT ZONE 1	40489	1000 lx
LLC SETPOINT ZONE 2	40490	1000 lx
LLC ZONE COUNT	40493	2
LUX MIN SENSOR 1	40494	0 lx
LUX MIN SENSOR 2	40495	0 lx
LUX MAX SENSOR 1	40498	3000 lx
LUX MAX SENSOR 2	40499	3000 lx
LLC OFFSET	40478	0
LUX SENSOR TYPE 1	40502	0 (0-10 V)
LUX SENSOR TYPE 2	40503	0 (0-10 V)
LUX SENSOR ENABLE	40506	3 (BOTH ENABLED)
LLC PIR 1 DIMM TIME	40485	0 s
LLC PIR 2 DIMM TIME	40486	0 s
LLC PIR 1 DIMM LEVEL	40481	20 %
LLC PIR 2 DIMM LEVEL	40482	20 %
LLC KP ZONE 1	40507	0,021

LLC KP ZONE 2	40509	0,021
LLC KI ZONE 1	40515	0,007
LLC KI ZONE 2	40517	0,007
LLC KD ZONE 1	40523	0,012
LLC KD ZONE 2	40525	0,012

Table 9. Default values

4.7.1 Restoring Default Settings

WARNING! Be careful with using this function! All registers are set back to their default settings, including I/O, DALI interfaces, and communication parameters!

To restore the default device settings, please follow the steps below:

1. Turn off the power supply.
2. Set section 6 of the PROTOCOL DIP switch to the ON
3. Turn on the power supply, wait until the power LED is blinking.
4. Switch section 6 of the PROTOCOL DIP switch to the OFF position to restore the default settings. To cancel the reset procedure, turn off the power and switch section 6 of the PROTOCOL DIP switch to the OFF position.

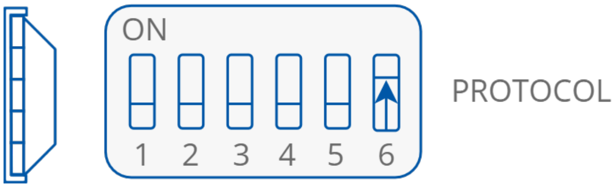


Figure 16. DIP switch for restoring default settings

4.8 DALI Interface

DALI is an abbreviation for Digital Addressable Lighting Interface.

In this protocol, DALI devices communicate with each other.

In other words, DALI is the language in which DALI devices talk to each other.

DALI (Digital Addressable Lighting Interface) is a two-way communication system using digital technology to control lighting. An international standard for communication, DALI, defines commands that ballasts need to recognize in order to be considered as DALI ballasts. The system allows individual ballasts to “talk” to the user and allows the user to “talk” back via DALI controllers, computers equipped with appropriate software, or building management systems (BMS).

The device is equipped with two separate DALI interface connectors, DALI1 and DALI2, for connecting DALI ballasts.

It is possible to connect up to 16 ballasts to one single DALI interface, therefore two separated DALI interfaces allow for connecting up to 32 ballasts grouped into two separated DALI loops.

Each DALI interface has an internal power supply with the maximum current load up to 40 mA.

230 V AC power may be supplied to the lights with light outputs. For details, please refer to Light Outputs section.

The device allows for controlling DALI ballasts without any commissioning process. By default, the device uses DALI broadcast command, which allows for controlling the ballasts connected to a particular interface as a one single DALI group without a discover process. This feature makes the device a unique plug & play type device.

If the user needs to have more detailed information about each ballast or wishes to specify parameters like setpoint, minimum or maximum brightness level, then the discover process is required.

The way of connecting the ballasts to DALI interfaces is presented in the figure below.

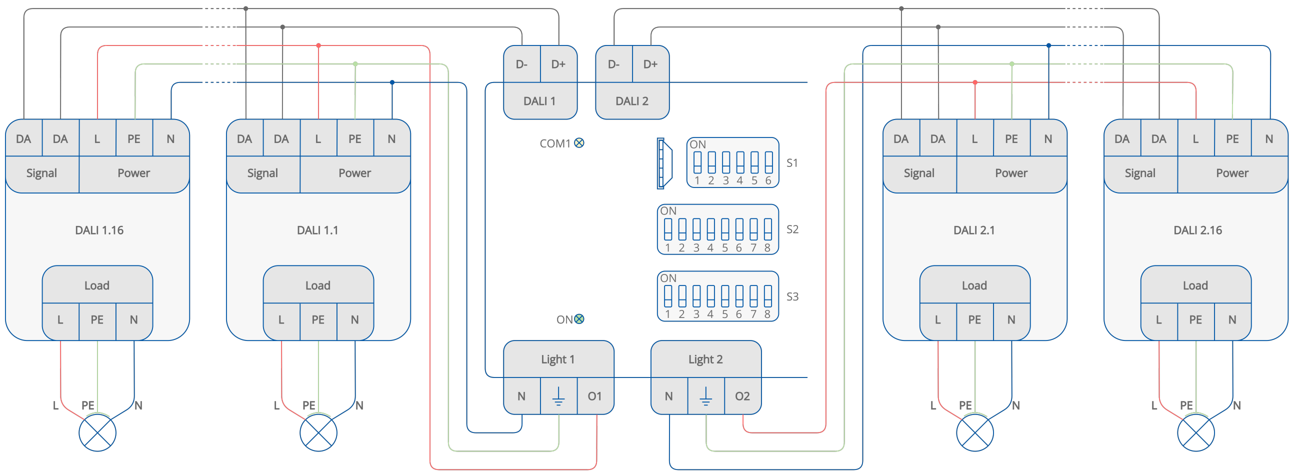


Figure 17. Connection and ballasts and lamps to the device

5 Inputs and Outputs

The device is equipped with inputs for two different purposes.

The two digital inputs, I1 and I2, are designed for physical ON/OFF switches connection, both monostable or bistable type, in order to control the DALI ballasts connected to DALI1/DALI2 terminals. Depending on a particular CFG DIP switch configuration, I1/I2 can control single DALI network or both DALI1 and DALI2 networks simultaneously. For details, please refer to the table in CFG DIP switch chapter.

The other two digital inputs, I3 and I 4, are designed for connecting PIR sensors in the light level control mode only.

The two special inputs, S1 and S2, are designed for connecting motion sensors/presence detectors in order to use them in the light control algorithm. If the device is set to the light level control mode, the S1 and S2 special inputs are to connect level intensity sensors.

The device is equipped with two types of outputs: 2 light outputs and 1 power supply output (24 V DC).

Each of the outputs has a different purpose and a maximum available load.

The light outputs are fuse-protected.

> WARNING! The maximum current for the light outputs and 24 V DC power supply output is 8 A!

5.1 Special Inputs

The device is equipped with 2 special inputs.

The S1 and S2 inputs are designed to control the light by connecting motion sensors or presence detectors. The way of connecting the signals is presented in the figure below.

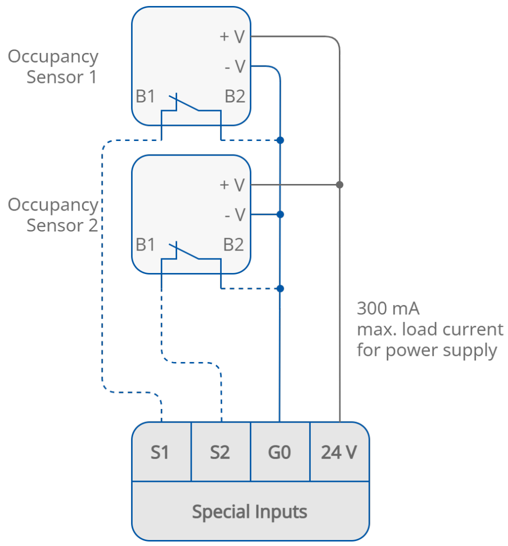


Figure 18. Special inputs connection

5.2 Digital Inputs

The device is equipped with 4 digital inputs.

The I1 and I2 inputs are dedicated to control the light by connecting monostable or bistable switches. The I3 and I4 inputs are used to connect occupancy sensors (or occupancy sensor and light 2 control switch) in the LLC mode. In case the LLC mode is set to operate in 1 zone, the I4 input can be used for switching the light, using the light 2 relay output. Each pulse on I4 (pushing the monostable button) switches on or off the light 2 output.

The way of connecting signals is presented in the figure below.

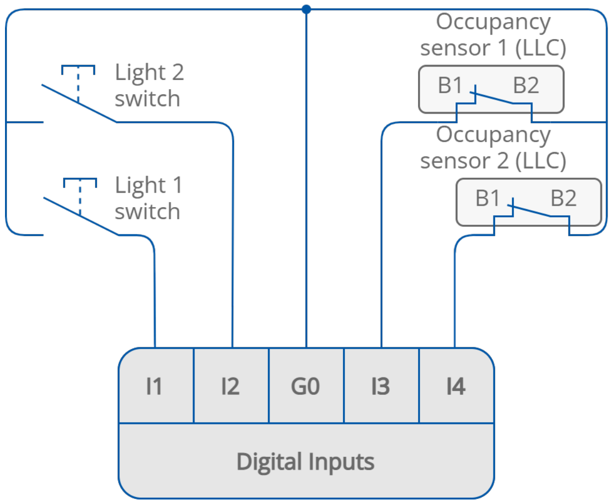


Figure 19. Connection of digital inputs dry contact

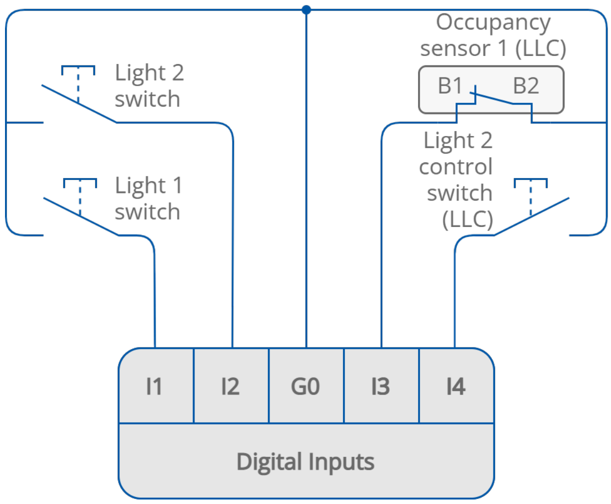


Figure 20. Connection of digital inputs with the light 2 control switch in the LLC mode

5.3 Light Outputs

The device is equipped with two 230 V AC light outputs, light 1 and light 2, which can have different functionality depending on the chosen lighting control mode–DALI mode or ON/OFF mode. To switch between ON/OFF control and DALI mode, please use the CFG DIP switch section no. 6.

The light outputs are implemented in order to provide the opportunity to supply the lamps controlled by the DALI interface with power. It allows to have full control over the lighting within one controller, no need to supply the lamps from the external source.

In addition, the light outputs work as output relays in the ON/OFF lighting control mode. Both of the outputs are fuse-protected and the maximum load for the single output is 4 A.

Note: The maximum load for both of the light outputs is 2x 4 A, but the maximum load current for the light output 1, light output 2, and 24 V DC power supply output is 8 A!

The way of connecting power supply line for the ballasts to the light outputs is presented in the figure below.

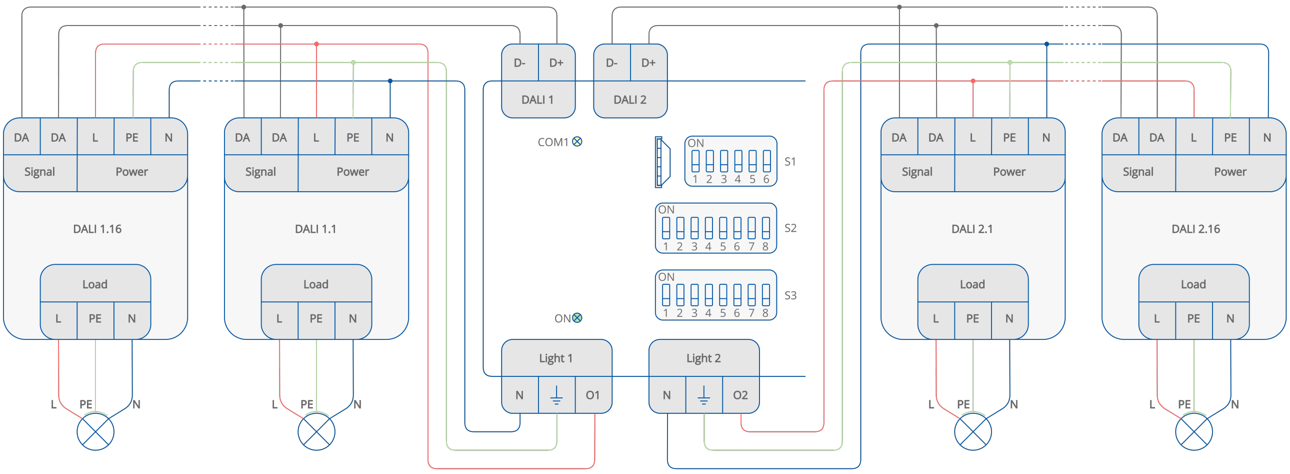


Figure 21. Connecting ballasts to light outputs in the DALI control mode

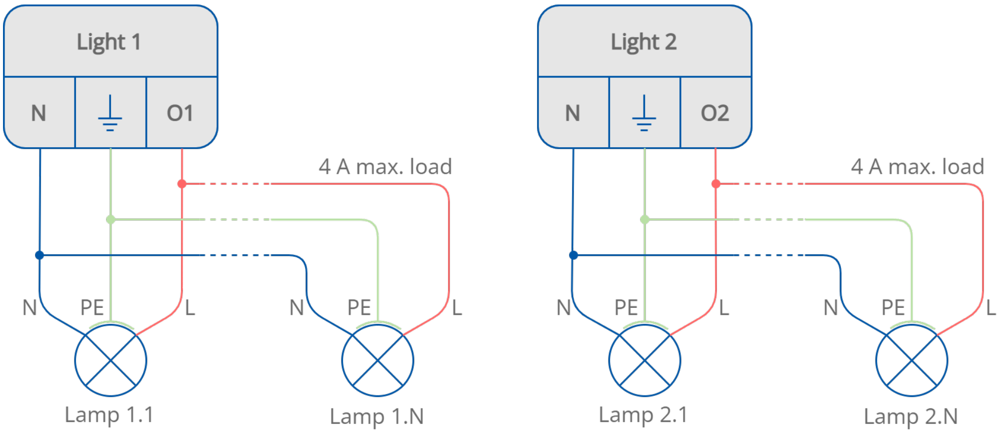


Figure 22. Connecting lamps to light outputs in the On/Off control mode

5.4 24 V DC Power Supply Output

The device is equipped with a 24 V DC output for providing power for motion sensors or presence detectors, which demand additional supply. The 24 V DC output is a part of the special inputs block, and it is dedicated specially for providing power for motion sensors / presence detectors connected to special inputs. The maximum load current of all the connected devices must not exceed 300 mA.

WARNING! The maximum load current for the light outputs and 24 V DC power supply output is 8 A!

The 24 V DC power supply output allows for supplying devices with power without the need to use external DC power supply.

The way of connecting an external motion sensor / presence detector to the special input with 24 V DC power supply output is presented in the figure below.

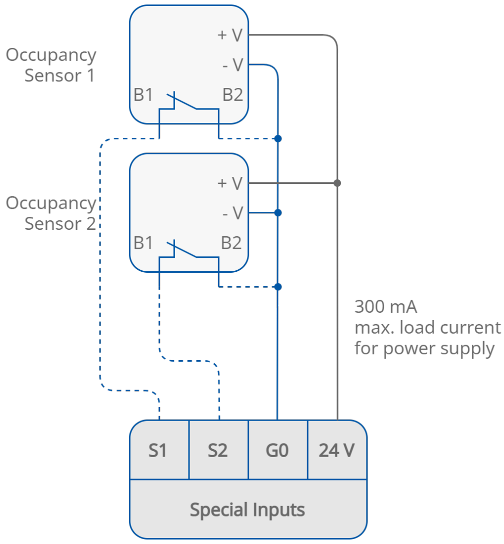


Figure 23. Example of connecting sensors to 24 V DC power supply outputs

6 Control Application

The iSMA-B-2D-(WD) device has been built in order to control the light in a single space in the building. The device is designed for controlling two separate DALI light areas with up to 32 DALI ballasts (16 ballasts for each DALI interface). Two built-in special inputs and two digital inputs are designed to connect the presence detectors and light switches. A dedicated DIP switch allows for activating a predefined inputs configuration. The device allows for controlling DALI ballasts by a common light switch and a common presence detector without the need of programming, which makes the device a unique plug & play type device designed for DALI network control.

In addition, the iSMA-B-2D-(WD) device has a light level control function implemented, which allows for controlling light level in up to 2 separate zones and automatic dimming/ switching off the light in empty spaces.

6.1 DALI Light Control

The device has two separate DALI interfaces. They can be controlled with dedicated Modbus registers separately or simultaneously, in accordance with the CFG DIP switch setting.

In case of a single DALI network control, DALI1 and DALI2 interfaces are controlled exactly in the same way. This means that DALI1 has exactly the same control algorithm and implemented functions as DALI2.

The DALI interface commands are sent to the connected DALI ballasts if the Modbus registers responsible for particular DALI Interface are changed or by means of physical external devices such as motion sensor / presence detector (connected to special inputs) or switches (connected to digital inputs).

6.1.1 Monostable Switch Control

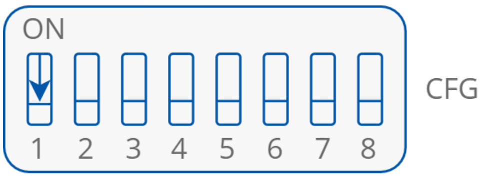


Figure 24. Monostable switch control configuration

Monostable switches cause a short-time impulse, which closes the loop of the digital input. Depending on the actual state of the DALIX_ON_OFF_STATE, a single impulse on the digital input X sends commands DALIX_BROADCAST_LAST_SCENE or DALIX_BROADCAST_OFF to the DALI X interface (where X is a particular number of DALI interface–1 or 2):

- DALIX_BROADCAST_LAST_SCENE command is recalled if the DALIX_ON_OFF_STATE is 0 (INACTIVE) and the raising edge of the signal on digital input X is detected.

In such case, the DALIX_ON_OFF_STATE register is set to 1 (ACTIVE).

The falling edge of the signal on digital input X starts counting down the time stored in SIX_DELAY_OFF_TIME register (where *X* is a particular number of the DALI interface–1 or 2). When the time ends, DALIX_BROADCAST_OFF command is sent to DALI Interface X.

Time counting can be interrupted by sending another pulse on the digital input, which results in sending the DALIX_BROADCAST_OFF command.

- DALIX_BROADCAST_OFF command is recalled if the DALIX_ON_OFF_STATE is 1 (ACTIVE) and the raising edge of the signal on digital input X is detected.

In such case, the DALIX_ON_OFF_STATE register is set to 0 (INACTIVE).

Pushing and holding the switch if the DALIX_ON_OFF_STATE is 1 (ACTIVE) results in broadcast dimming the light with the step defined in the DALIX_FADE_RATE register until the ballasts achieve the minimum level stored in the DALIX_BALLAST_MIN registers.

Releasing the switch sets a new scene for the ballasts and stops dimming.

Ballasts are set to the required brightness level.

Subsequent pushing and holding the switch dims the ballasts in the opposite direction until they achieve the maximum level stored in DALIX_BALLAST_MAX registers.

6.1.2 Bistable Switch Control

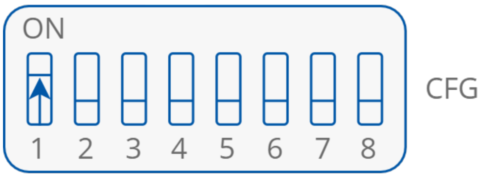


Figure 25. Bistable switch control configuration

Bistable switches have two stable states. Depending on the actual state of the DALIX_ON_OFF_STATE, changing the state of the bistable switch connected to the digital input X sends commands DALIX_BROADCAST_LAST_SCENE or DALIX_BROADCAST_OFF to the DALI network X:

- DALIX_BROADCAST_LAST_SCENE command is recalled if the DALIX_ON_OFF_STATE is 0 (INACTIVE) and the raising edge of the signal on digital input X is detected.

In such case, the DALIX_ON_OFF_STATE register is set to 1 (ACTIVE).

- DALIX_BROADCAST_OFF command is recalled when DALIX_ON_OFF_STATE X is 1 (ACTIVE) and the falling edge of the signal on Digital Input X is detected.

In such case, the DALIX_ON_OFF_STATE register is set to 0 (INACTIVE).

6.1.3 Motion Sensor/Presence Detector Control

To activate a motion sensor / presence detector to the control algorithm, the user needs only to connect the sensor to one of the special inputs, S1 or S2. By default, special inputs work in the normal closed mode (NC). In case there is a need to change the PIR working mode from NC to NO, the value of SI1_PIR_TYPE register needs to be changed.

- If the motion sensor / presence detector connected to the special input X detects a motion and the DALIX_ON_OFF_STATE is 0, the DALIX_BROADCAST_LAST_SCENE command is sent to the interface X.

A counter starts counting down the time stored in the SIX_DELAY_OFF_TIME register. When the time ends, the DALIX_BROADCAST_OFF command is sent to the DALI X Interface. Time counting can be interrupted when another motion is detected, restarting the time counter. In practice, it means that time counting begins when the last motion detected by the motion sensor / presence detector disappears.

- If the DALIX_ON_OFF_STATE is activated by the signal from the motion sensor / presence detector, it can be overridden by the signal from switch(es) connected to digital input X (send the DALIX_BROADCAST_OFF command).

The motion sensor / presence detector can be activated again by another signal on the digital input X or by resetting the power supply.

It is possible to block the motion sensor / presence detector functioning by changing the state of the SIX_BLOCKING register bit to active. The function of deactivating the motion sensor / presence detector can be useful if the motion sensor / presence detector cannot have any impact on the lighting, for example, after the normal working hours.

Single motion sensor connected to one of the special inputs can control two interfaces simultaneously. In order to do so, the user needs to apply an appropriate DIP CFG configuration. For more details, please refer to chapter Multi DALI interface control.

6.1.4 DALI Interface Multicontrol

The device allows for controlling two DALI interfaces, DALI1 and DALI2, simultaneously.

With appropriate CFG DIP switch configuration, the user can control two interfaces with only one special input and\or digital input in a freely chosen configuration. Both special inputs and digital inputs can control DALI 1 and DALI 2 together as a single group.

The feature of multicontrol allows for extending the number of ballasts belonging to one DALI group. With the multicontrol function, it is possible to control up to 32 DALI ballasts divided only in the physical layer into two groups up to 16 ballasts each.

The control algorithm in case of using switches or motion sensors/presence detectors is similar as in case of single DALI interface control.

- DALIX_BROADCAST_OFF is sent only to the interface with the DALIX_ON_OFF_STATE active (the one of the DALIX_ON_OFF_STATE can be set in OFF by switch)
- If the motion sensor/presence detector detects any motion, the DALIX_BROADCAST_LAST_SCENE command is sent only to the DALIX_ON_OFF_STATE, which is inactive and not overridden by switch (one of the DALIX_ON_OFF_STATE can be switched OFF with a switch).

Example:

In a room, there is one motion sensor / presence detector connected to the special input 1, and two switches, one connected to the digital input 1 and the other connected to the digital input 2. The motion sensor / presence detector should control two DALI interfaces in a group, and the switches should control two interfaces separately. The CFG DIP switch configuration should be set as in the figure below:

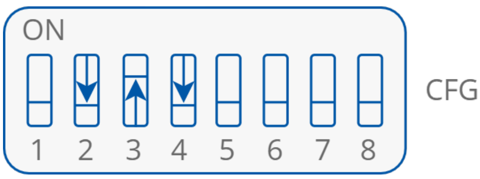


Figure 26. Multicontrol configuration

6.2 ON/OFF Light Control

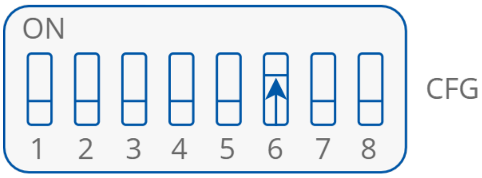


Figure 27. On/Off light control configuration

With the CFG DIP switch configuration shown in the figure above, the device does not send any DALI commands. Instead of that, the lighting is controlled by light outputs, LIGHT 1 and LIGHT 2, and the device operates in the ON/OFF light control mode.

In this control mode, it is possible to read or read/write the following Modbus registers, which can be found also in the DALI interface control mode:

- DALIX_ON_OFF_STATE, where X is the number of the light output (40254 bit 0, 40255 bit 0);
- DALIX_BROADCAST_LAST_SCENE, where X is the number of the light output (40254 bit 1, 40255 bit 1);
- DALIX_BROADCAST_OFF, where X is the number of the light output (40254 bit 2, 40255 bit 2).

The particular states of the light outputs are determined by means of physical motion sensor / presence detector (connected to special inputs) or switches (connected to digital inputs) in the same way as it is in case of the DALI interface control, but instead of sending DALI commands the device changes the state of the light outputs 1 and 2.

6.2.1 Monostable Switch Control

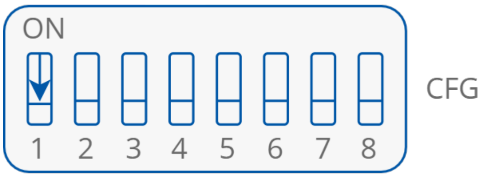


Figure 28. Monostable switch control configuration

Monostable switches cause a short-time pulse, which closes the loop of the digital input. Depending on the actual state of the light output X, a single pulse on the digital input X opens or closes the circuit in the light output X:

- Circuit close (ON) is recalled if the light output X is open (OFF) and the raising edge of the signal on digital input X is detected.

In such case, the DALIX_ON_OFF_STATE register is set to 1 (ACTIVE).

- Circuit open (OFF) is recalled if the light output X is closed (ON) and the raising edge of the signal on digital input X is detected.

In such case, the DALIX_ON_OFF_STATE register is set to 0 (INACTIVE).

Dimming/lighting up the ballasts in the ON/OFF light control mode is unavailable.

6.2.2 Bistable Switch Control

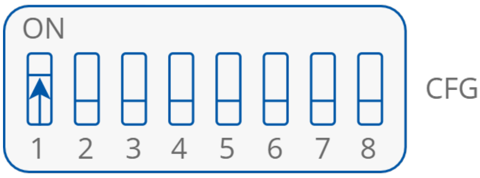


Figure 29. Bistable switch control configuration

Bistable switches have two stable states. Depending on the actual state of the DALI Group Status X, changing using bistable switch state connected to the digital input X opens or closes the relay circuit in the light output X:

- Circuit close (ON) is recalled if the relay circuit is open (OFF) and the raising edge of the signal on the digital input X is detected.

In such case, the DALI X Group Status register is set to 1 (ACTIVE).

- Circuit open (OFF) is recalled if the relay circuit is closed (ON) and the raising edge of the signal on the digital input X is detected.

In such case, the DALI X Group Status register is set to 0 (INACTIVE).

6.2.3 Motion Sensor/Presence Detector Control

To activate a motion sensor/presence detector to the control algorithm the user needs only to connect the sensor to the one of the special input S1 or S2. By default, the special inputs work in normal closed mode (NC). In case there is a need to change the PIR working mode from NC to NO, the value of the SI1_PIR_TYPE register needs to be changed.

- If the motion sensor/presence detector connected to the special input X detects a motion, and the DALI Group Status X is 0, the relay circuit of the light output X closes (ON).

The counter starts counting down the time stored in the SIX_DELAY_OFF_TIME register. If the time elapses, then the circuit of the light output X opens. Time counting can be interrupted by the detection of another motion, which results in restarting the time counter. In practice, it means that the time counting begins when the last motion detected by the motion sensor/presence detector disappears.

- In case if the DALI X Group Status is activated by the signal from the motion sensor/ presence detector, it can be overridden by the signal from switch(es) connected to the digital input X.

The motion sensor/presence detector functioning can be activated again by another signal on the digital input X or by power supply reset.

It is possible to block the motion sensor/presence detector functioning by changing the state of the SIX_BLOCKING register bit to active. The function of deactivating a motion sensor/presence detector can be useful if the motion sensor\presence detector cannot have any impact on the lighting, for example, after normal working hours.

Single motion sensor connected to one of the special inputs can control two light outputs simultaneously. In order to do so, the user needs to apply an appropriate CFG DIP configuration. For more details, please refer to chapter Multi Light Output Control.

6.2.4 Light Output Multicontrol

The device allows to control two light outputs, LIGHT 1 and LIGHT 2, simultaneously.

With a proper CFG DIP switch configuration, the user can control two outputs by only one special input and/or digital input in a freely chosen configuration. Both special inputs and digital inputs can control LIGHT 1 and LIGHT 2 together as a single group.

Control algorithm in case of using switches or motion sensors\presence detectors is similar as it is by using a single light output in the ON\OFF Light Control Mode.

- The device closes the circuit only in the light output with the DALIX_ON_OFF_STATE active (where X is a number of the output; one of the light output circuit can be already closed by switch).
- If the motion sensor/presence detector detects any motion, the device opens the circuit only in the light output with the DALIX_ON_OFF_STATE inactive and not overridden by the switch (where X is a number of the output, one of the light output circuits can be already closed or open by switch).

Example:

In the room there is one motion sensor/presence detector connected to the special input 1 and two switches, one connected to the digital input 1 and the other to the digital input 2. The motion sensor / presence detector should control two light outputs, light 1 and light 2, in a group and the switches should control each output separately. The CFG DIP switch configuration should be set as it is in the figure below:

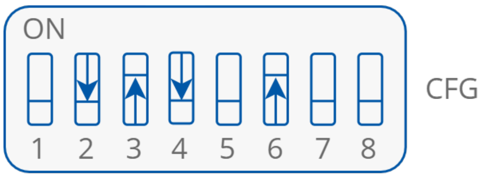


Figure 30. Multicontrol configuration

6.3 Light Level Control

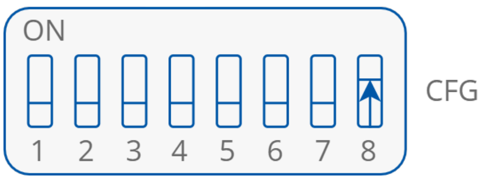


Figure 31. LLC mode configuration

The light level control is a mechanism that allows for automatic (yet, adjustable) control of light level in two lighting zones, using 2 light sensors. The algorithm keeps light intensity on the setpoint level in a room automatically, based on the PID algorithm, using light sensors with standardized output connected to the iSMA-B-2D controller. The value of present light intensity is transmitted to the controller, which recognizes a need to increase or decrease DALI ballasts control level to keep desired level of light intensity if surrounding conditions change.

The LLC mode requires setting the 8th section on the CFG DIP switch to on.

6.3.1 Sensors

Light sensors are required to be used for the LLC function to operate properly. There are seven parameters to be set for light sensors (configurable in the iSMA Configurator software):

- LUX_SENSOR_TYPE_1, LUX_SENSOR_TYPE_2: define types of lux sensors used;
- LUX_MIN_SENSOR_1, LUX_MAX_SENSOR_1: define minimum and maximum lux values for zone 1;
- LUX_MIN_SENSOR_2, LUX_MAX_SENSOR_2: define minimum and maximum lux values for zone 2;
- LUX_SENSOR_ENABLE: enables each sensor with specific bit state.

6.3.2 Switches

Switches connected to the I1 and I2 inputs control DALI1 and DALI2 buses ballasts. A short press pulse causes switching on and off the ballasts. A long press causes changing the setpoint of the specific zone, which in final effect results in smoothly controlling the light intensity.

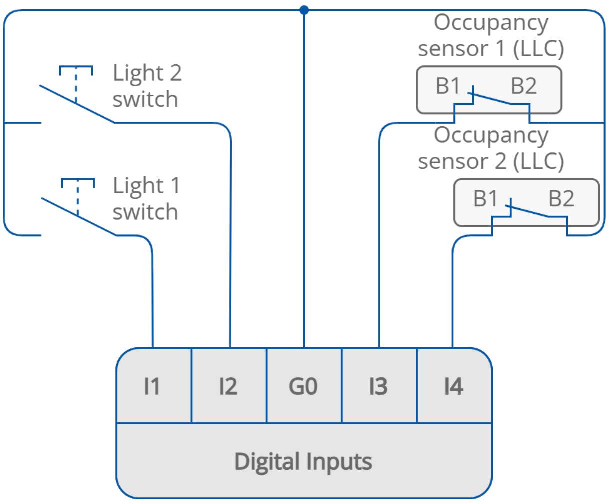


Figure 32. Switches and sensors connected to digital inputs

In case the LLC mode is set to operate in 1 zone, the I4 input can be used for switching the light, using the light 2 relay output. Each pulse on I4 (pushing the monostable button) switches on or off the light 2 output.

Note: The light 2 output is switched off automatically if DALI1 and DALI2 buses are switched off with a switch connected to I1, however, it happens **only** if the CFG DIP switch in section 2 (I1 Control mode) is set to on. In order to switch the light 2 output back on, the switch connected to I4 has to be switched.

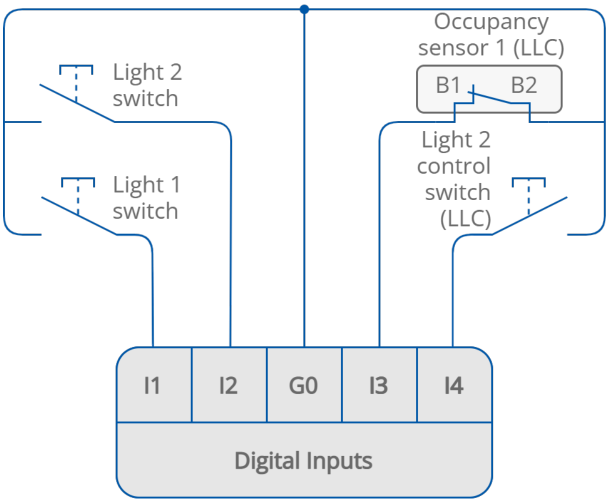


Figure 33. The light 2 control switch connected to I4

6.3.3 Zones

The light level control mechanism allows to control up to two lighting zones. The LLC_ZONE_COUNT parameter defines if one or two zones are controlled with the LLC:

- 1 zone only, using 1 light level sensor with a possibility to separate DALI ballasts for:
    - first sub-zone, which is directly controlled with the light setpoint value (DALI 1 bus), using the sensor value from the S1 input as reference;
    - second sub-zone, which is controlled with the light setpoint value with offset (DALI 2 bus), still using the sensor value from the S1 input as reference;

Note: The offset value is set in the LLC_OFFSET parameter, accessible in the iSMA Configurator, LLC tab.

- 2 separated zones, where each zone has a separated control loop, and 2 light level sensors are used, connected to the S1 input (loop for the DALI 1 bus) and to S2 input (loop for the DALI 2 bus).

Note: If the LLC mode is set to 1 zone, the I4 input can be used for switching the light using the light 2 relay output. Each pulse on the I4 input (pushing the monostable button) switches on or off the light 2 output.

6.3.4 Dimming

The LLC mode provides a feature of automatic dimming if there is no one present in a room. In case the presence detector informs the room is empty, the LLC setpoint is automatically decreased to save energy consumption: if the PIR sensor does not detect presence for the time specified in the LLC_PIR_1_DIMM_TIME parameter, the setpoint is internally changed to the percent value LLC_PIR_1_DIMM_LEVEL of the basic value from the LLC_SETPOINT_ZONE_1.

Also, the LLC mode allows to switch off the light if the presence sensor detects no movement after the time specified for dimming. In case the dimming time expires, the second timer starts to count down the time to switch off the light completely. This time is set in the SI1_DELAY_OFF_TIME parameter. This feature works accordingly in 2 zones mode, using the LLC_PIR_2_DIMM_TIME and LLC_PIR_2_DIMM_LEVEL parameters with reference to the LLC_SETPOINT_ZONE_2 and SI2_DELAY_OFF_TIME parameters.

Adjusting Dimming PID Algorithm

Dimming is controlled with the internal PID algorithm. It is adjusted to fit most internal spaces conditions, however, it can be individually set using the following parameters:

- For zone 1: LLC_KP_ZONE_1, LLC_KI_ZONE_1, and LLC_KD_ZONE_1;
- For zone 2: LLC_KP_ZONE_2, LLC_KI_ZONE_2, and LLC_KD_ZONE_2.

The parameters define proportional, internal, and derivative gains of the loop algorithm, which controls dimming. They are accessible in the iSMA Configurator, LLC tab.

6.3.5 Using LLC

In order to use the LLC mechanism, the iSMA Configurator software is required (versions from 2.2). To start using the LLC, follow the below steps:

Step 1: Set the 8th section in the CFG DIP switch of the iSMA-B-2D device to on.

Step 2: Start the iSMA Configurator software and connect the iSMA-B-2D device to configure the LLC mechanism on.

Step 3: Go to the Lighting 1 and Lighting 2 tabs, and check if the Lighting Mode is set to LLC Mode. If not, check if the 8th section in the CFG DIP switch is in on position.

Step 4: Discover DALI ballasts.

Step 5: Go to the LLC tab:

- Set the LLC Zone Count field to 1 or 2, depending on the number of zones that should be controlled separately;
- Set the desired setpoint value for each zone;
- In case of using 2 DALI buses with 1 light level sensor (1 zone with two sub-zones), set the control offset value for sub-zone.

Step 6: Go to the PIR sensor tab:

- Set the PIR sensor type (NO, NC);
- Set the PIR Dimm Time and PIR Dimm Level for using the auto-dimming feature; leave 0 if the feature is not to be used.

Step 7: Go to the LUX Sensors tab:

- Set the light level sensor type compliant with the sensor output (e.g., 0-10 V);
- Set the light level sensors parameters (minimum and maximum lux values);
- Connect the sensor(s) and check the read lux values.

Step 8: The LLC mechanism is configured and ready to be used.

6.3.6 LLC Mode in iSMA Configurator

The iSMA Configurator offers some specific features to manage the light level control mode in the iSMA-B-2D device. There are five specifically designed tabs to configure lighting, occupancy and lux sensors settings to enable proper operation of the LLC mechanism.

Lighting 1 and Lighting 2 Tabs

In the LLC mode both Lighting tabs work the same as in the DALI mode with 2 differences:

- The Lighting mode field now reads the LLC mode if the iSMA-B-2D device is set to LLC;
- Both Dimming State and Setpoint fields for separate ballasts are read-only.

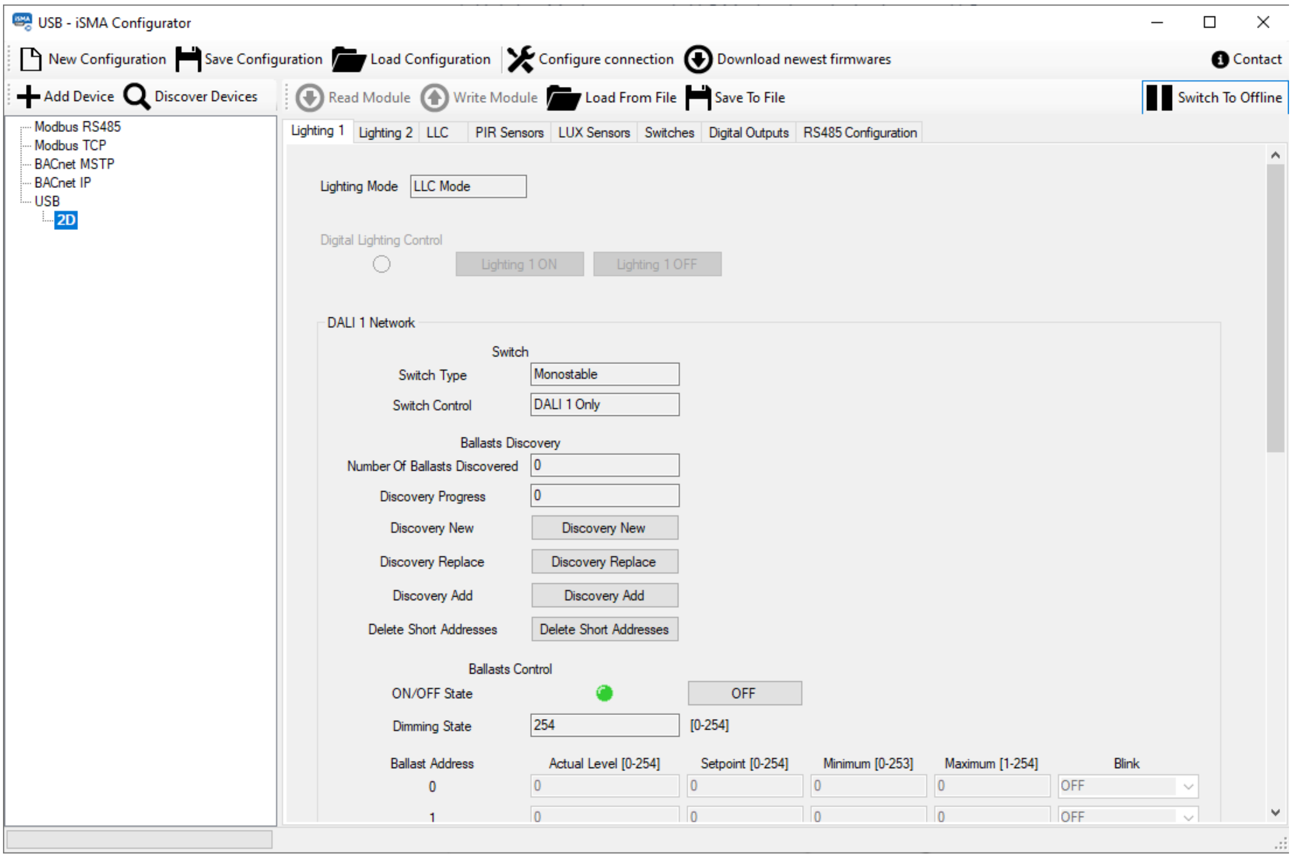


Figure 34. Lighting tabs 1 and 2 for devices working in the LLC mode

LLC Tab

The LLC tab includes fields to configure parameters of the light level control mode. Each of these parameters has a default value set for the automatic algorithm that normally operates the LLC mode; this specifically refers to the Kp, Ki, Kd, and Offset parameters, which configure the operation of the PID loop controlling the LLC algorithm.

- LLC Zone Count: switches between 1 and 2 zones;
- Setpoint (for each zone): sets the setpoint value for the light intensity;
- Kp (for each zone): adjusts the proportional response of the PID controller;
- Ki (for each zone): adjusts the integral response of the PID controller;
- Kd (for each zone): adjusts the derivative response of the PID controller;
- Offset (for zone 2): sets the output offset between DALI lines in single zone mode.

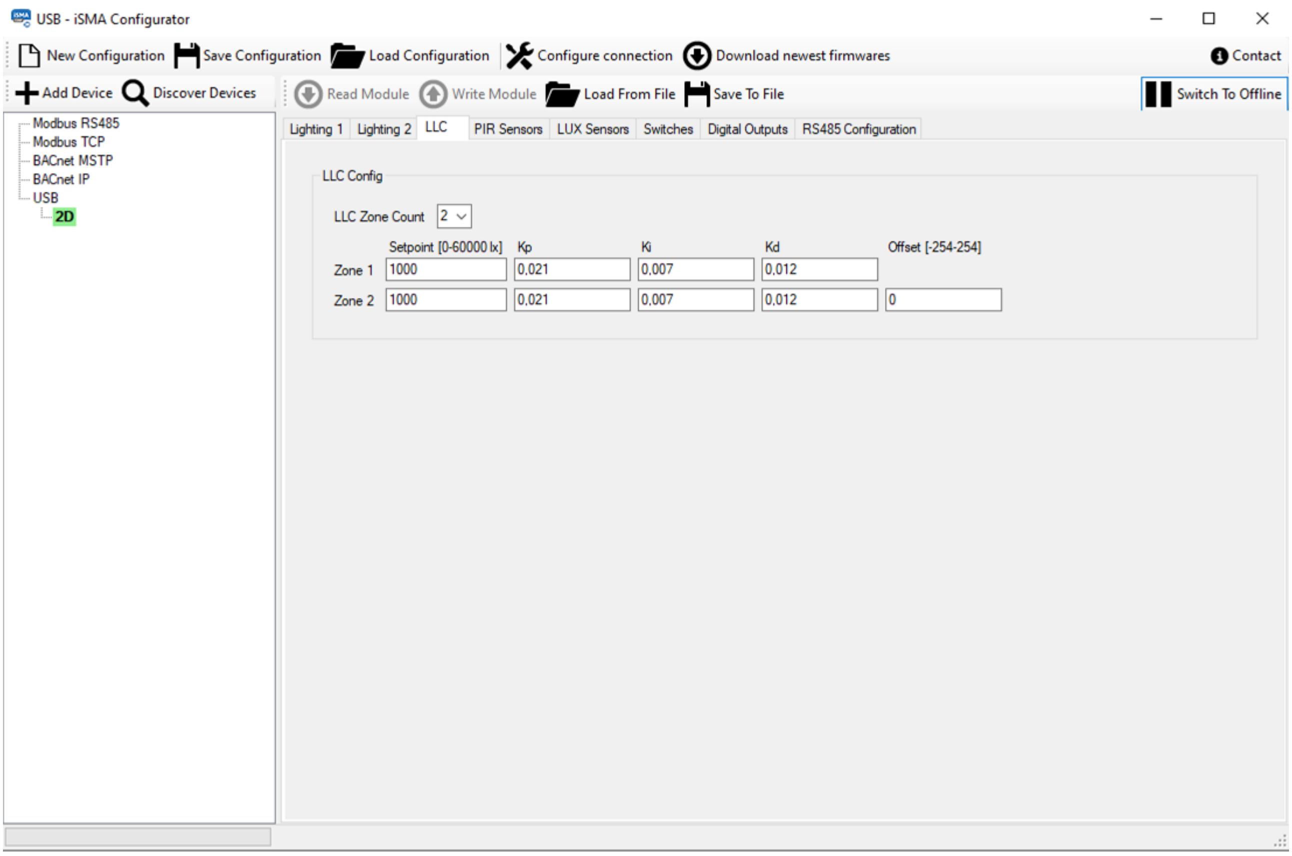


Figure 35. The LLC tab

PIR Sensors Tab

The PIR Sensors tab allows to set parameters for each sensor connected to digital inputs:

- Input Name: displays inputs that PIR sensors should be connected to: if the LLC mode is enabled, the DI3, DI4 are displayed, in other modes DI1, DI2 are displayed;
- Input State: displays a current physical state of the input;
- Input Blocking: blocks or unblocks the input;
- PIR Type: sets the input type (NC/NO);
- Control Mode: displays the DALI line, which the sensor corresponds to;
- PIR Off Delay: sets the time without PIR detection (counted from finished dimming), after which the light should be turned off;
- PIR Dimm Time: sets the time without PIR detection, after which the light dims to the set level;
- PIR Dimm Level: sets the proportional level to which the light should get dimmed;
- PIR Status: displays the sensors statuses.

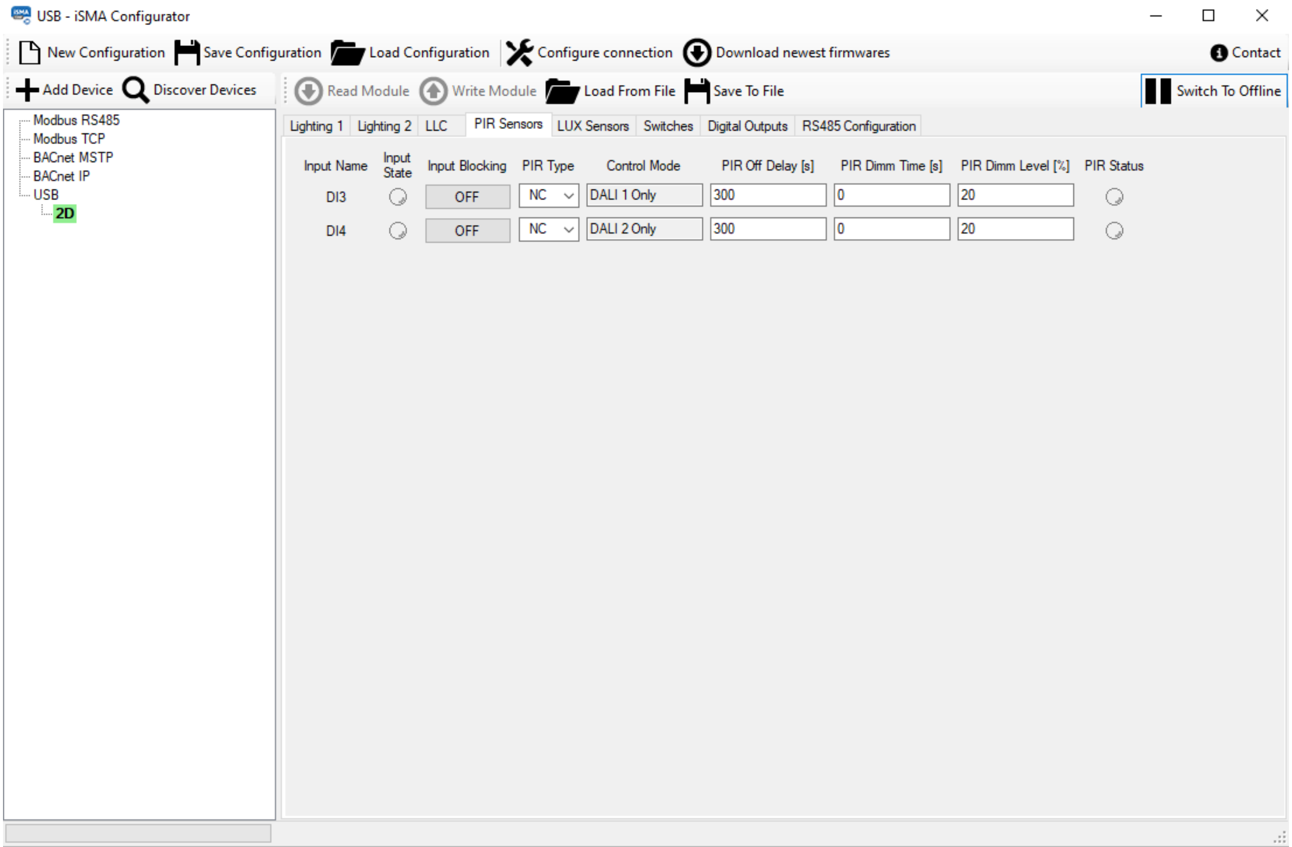


Figure 36. The PIR sensors tab

LUX Sensors Tab

New tab was added titled “LUX Sensors” for configuring lux sensors parameters with following fields:

- Input Name: displays inputs that lux sensors should be connected to: S1, S2 for the LLC mode, ‘-‘ for both sensors otherwise;
- Input value: displays the current state read from the input;
- Sensor Type: sets the sensors type:
  - Available options: 0-10 V, 0-5 V, 2-10 V, 0-20 mA, 4-20 mA;
- Enable: enables or disables individual sensors;
- Min: sets the low limit of lux sensors read range;
- Max: sets the high limit of lux sensors read range;
- Lux: displays the lux value read from the sensor.

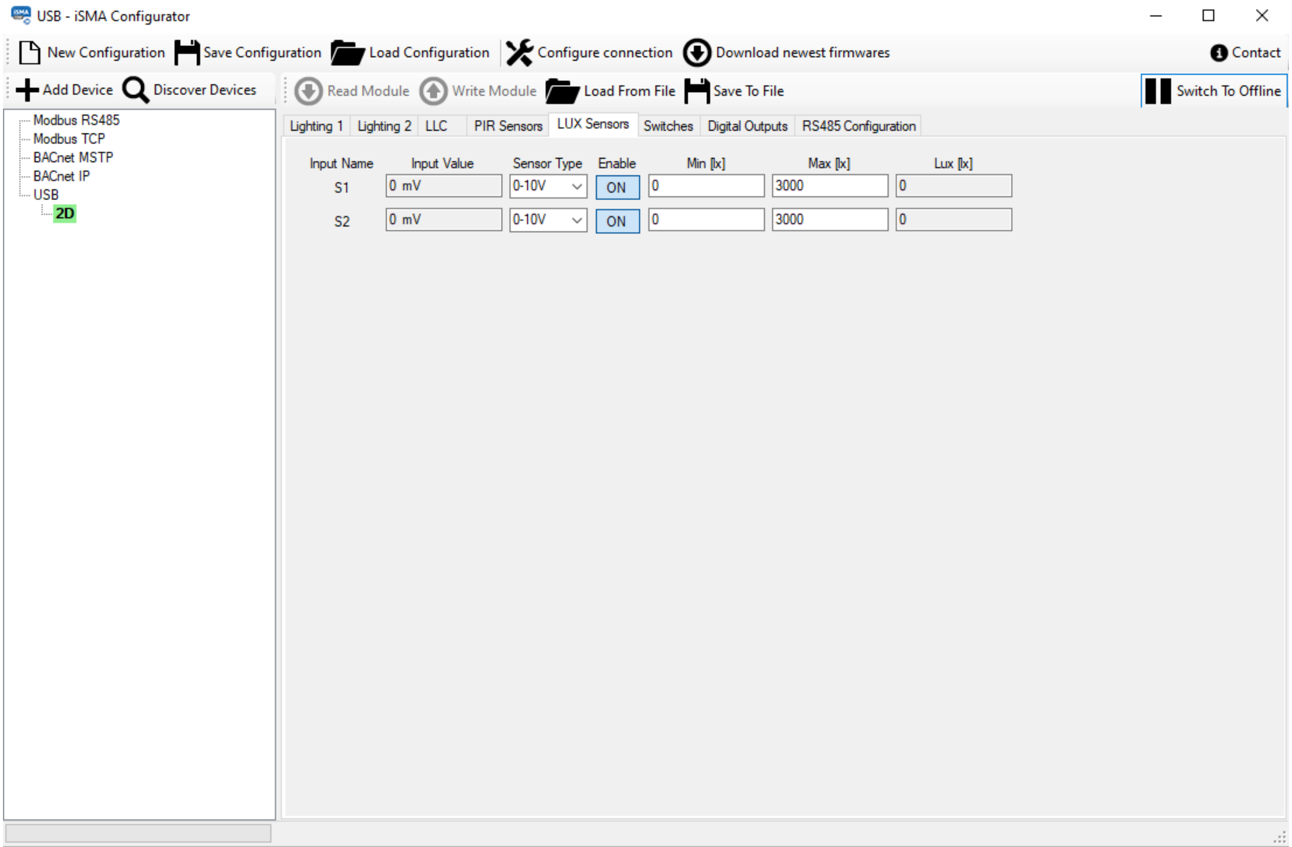


Figure 37. The LUX sensors tab

7 Modbus Registers

This section outlines all Modbus registers available for the iSMA-B-2D(-WD) device.

7.1 Configuration Registers

> WARNING! Changing the parameters concerning the transmission configuration (except for registers which value is read from the switch) only takes effect after restarting the unit.

7.1.1 VERSION_TYPE (30001)

In this register the type and firmware version of the module are encoded.

Low byte contains information about the type of module. High byte contains the module firmware version multiplied by 10.

Value	Type
114_{10} ($0x72_{16}$)	2D1B-(WD)
115_{10} ($0x73_{16}$)	2D-(WD)

Table 10. Version Type register

Example:

In the 30001register, there is a following number: 29194_{10} = $0x720A_{16}$. It means that it is a iSMA-B-2D1B (0x72) with firmware in version 1.0 ($0x0A_{16}$ = 10_{10}).

VERSION_TYPE: Device Actions (40001)

Setting the 40001 register according to the table below enables 1 of 4 available actions: reset module, reload settings, set to default, and enter bootloader.

Value	Action
511	Reset
767	Reload settings
1023	Set to default
1279	Enter Bootloader

Table 11. Device actions

7.1.2 ADDR_DIPSWITCH (30002)

The register contains the number which represents the controller address set by the MAC DIP switch.

7.1.3 DIPSWITCH_CFG_REGISTER (30003)

The register contains an integer value representing actual configuration of the CFG DIP switch.

7.1.4 RECEIVED_FRAMES_COUNTER (30004)

The 32-bit register with the number of valid Modbus received messages by the device from last powered up. The value is reset after power cycle or after changing transmission parameters (speed, stop bits, parity, etc.).

7.1.5 ERROR_FRAMES_COUNTER (30006)

The 32-bit register with the number of Modbus errors sent by the device recently powered up. The value is reset after power cycle or after changing transmission parameters (speed, stop bits, parity, etc.).

7.1.6 TRANSMITTED_FRAME_COUNTER (30008)

The 32-bit register with the number of Modbus messages sent by the device recently powered up. The value is reset after power cycle or after changing transmission parameters (speed, stop bits, parity, etc.).

7.1.7 UP_TIME (30012)

The 16-bit register contains information about device working time, in seconds, from the last power up or reset.

7.1.8 BAUD_RATE (40017)

If sections 1, 2, and 3 of S3 switch are in off position, the baud rate is determined in accordance with this register. Baud rate is determined by the following formula:

Baud rate = register value • 10

The default value of the register is 7680 (76800 bps).

7.1.9 STOP_BITS (30018)

The number of stop bits is constant and equals 1.

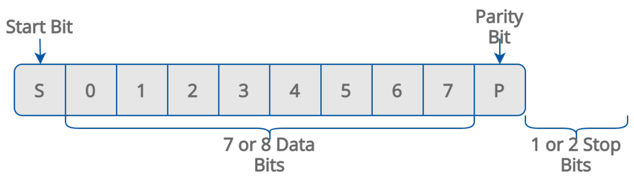


Figure 38. Modbus frame

7.1.10 DATA_BITS (30019)

The number of the data bits is constant and equals 8.

7.1.11 PARITY_BITS (30020)

The type of parity bit is constant and it is 0. It means that there is no parity bit in the Modbus message frame.

7.1.12 REPLY_DELAY (40021)

The value of this 16-bits register determines the number of milliseconds to wait before the unit answers the question. This time is used to extend the interval between question and answer. The default value of 0 means no delay (the answer is sent when the 3.5 character is required by the Modbus RTU protocol).

7.1.13 DIPSWITCH_CFG_REGISTER (30156)

The register contains an integer value representing actual configuration of the CFG DIP switch.

DI1_DI2_SWITCH_TYPE (30156) Bit 0

The bit state shows the actual physical state of the segment 1 in the CFG DIP switch.

If the bit is active (bit 0=1), the digital inputs 1 and 2 are dedicated to work with bistable switches.

If the bit is inactive (bit 0=0), the digital inputs 1 and 2 are dedicated to work with monostable switches.

DI1_CONTROL_MODE (30156) Bit 1

The bit state shows the actual physical state of the segment 2 in the CFG DIP switch.

If the bit is active (bit 1=1), the digital input 1 controls DALI1 and DALI2 interfaces (light output 1 and light output 2).

If the bit is inactive (bit 1=0), the digital input 1 controls the DALI1 Interface (light output 1).

SI1_CONTROL_MODE (30156) Bit 2

The bit state shows the actual physical state of the segment 3 in the DIP switch CFG.

If the bit is active (bit 2=1), the special input 1 controls DALI1 and DALI2 interfaces (light output 1 and light output 2).

If the bit is inactive (bit 2=0), the special input 1 controls the DALI1 interface (light output 1).

DI2_CONTROL_MODE (30156) Bit 3

The bit state shows the actual physical state of the segment 4 in the CFG DIP switch.

If the bit is active (bit 3=1), the digital input 2 controls DALI1 and DALI2 interfaces (light output 1 and light output 2).

If the bit is inactive (bit 3=0), the digital input 2 controls the DALI2 interface (light output 2).

SI2_CONTROL_MODE (30156) Bit 4

The bit state shows the actual physical state of the segment 5 in the CFG DIP switch.

If the bit is active (bit 4=1), the special input 2 controls DALI1 and DALI2 interfaces (light output 1 and light output 2)

If the bit is inactive (bit 4=0), the special input 2 controls the DALI2 interface (light output 2).

LIGHT_CONTROL_MODE (30156) Bit 5

The bit state shows the actual physical state of the segment 6 in the CFG DIP switch.

If the bit is active (bit 5=1), the ON/OFF light control mode is active.

If the bit is inactive (bit 5=0), the DALI interface control mode is active (single or multi).

DI3_DI4_SWITCH_TYPE (30156) Bit 6

The bit state shows the actual physical state of the segment 7 in the CFG DIP switch.

If the bit is active (bit 6=1), digital inputs 3 and 4 are dedicated to work with bistable switches.

If the bit is inactive (bit 6=0), digital inputs 3 and 4 are dedicated to work with monostable switches.

LIGHT_LEVEL_CONTROL_MODE (30156) Bit 7

The bit state shows the actual physical state of the segment 8 in the CFG DIP switch.

If the bit is active (bit 7=1), the light level control mode is activated.

If the bit is inactive (bit 7=0), the device operates with its standard algorithm.

7.2 I/O Registers

7.2.1 DIGITAL_OUTPUTS_STATUS_REGISTER (30042)

The register contains an integer value representing the states of digital outputs (O1-O2).

LIGHT1_STATUS_O1 (30042) Bit 0

If the bit is active (bit 0=1), the circuit of the light output 1 relay is closed. If the bit is inactive (bit 0=0), the circuit of the light output 1 relay is open.

LIGHT2_STATUS_O2 (30042) Bit 1

If the bit is active (bit 1=1), the circuit of the light output 2 relay is closed. If the bit is inactive (bit 1=0), the circuit of the light output 2 relay is open.

7.2.2 DIGITAL_INPUTS_STATUS_REGISTER (30041)

The register contains an integer value representing the states of all digital inputs (I1-I4).

DI1_STATUS (30041) Bit 0

If the bit is active (bit 0 =1), the digital input 1 is active (closed circuit). If the bit is inactive (bit 0=0), the digital input 1 is inactive (open circuit).

DI2_STATUS (30041) Bit 1

If the bit is active (bit 1=1), the digital input 2 is active (closed circuit). If the bit is inactive (bit 1=0), the digital input 2 is inactive (open circuit).

DI3_STATUS (30041) Bit 2

If the bit is active (bit 2=1), the digital input 3 is active (closed circuit). If the bit is inactive (bit 2=0), the digital input 3 is inactive (open circuit).

DI4_STATUS (30041) Bit 3

If the bit is active (bit 3=1), the digital input 4 is active (closed circuit). If the bit is inactive (bit 3=0), the digital input 4 is inactive (open circuit).

7.2.3 DIGITAL_INPUTS_COMMAND_REGISTER (40101)

The register contains an integer value representing command states of all digital inputs (I1-I4). The Digital Input Command simulates physical signal on the digital input (closed or open loop). The feature can be useful for the signal test, emergency use in case of a switch failure, or for remote control from BMS.

DI1_COMMAND (40101) Bit 0

If the bit is active (bit 0=1), the digital Input 1 is overridden and considered active (closed circuit). If the bit is inactive (bit 0=0), the digital input 1 is overridden and considered inactive (open circuit).

DI2_COMMAND (40101) Bit 1

If the bit is active (bit 1=1), the digital input 2 is overridden and considered active (closed circuit). If the bit is inactive (bit 1=0), the digital input 2 is overridden and considered inactive (open circuit).

DI3_COMMAND (40101) Bit 2

If the bit is active (bit 2=1), then the digital input 3 is overridden and considered active (closed circuit). If the bit is inactive (bit 2=0), then the digital input 3 is overridden and considered inactive (open circuit).

DI4_COMMAND (40101) Bit 3

If the bit is active (bit 3=1), the digital input 4 is overridden and considered active (closed circuit). If the bit is inactive (bit 3=0), the digital input 4 is overridden and considered inactive (open circuit).

7.2.4 DIGITAL_INPUTS_BLOCKING_REGISTER (40102)

The register contains an integer value allowing to block all digital inputs (I1-I4). By default, all digital inputs are unblocked (all bits of the register are inactive (0)). The feature allows to block a particular digital input in order to withhold the functioning of manual control of light. The function can be useful in open spaces or common use areas, where the manual switching of light needs to be disabled, for example, after working hours.

DI1_BLOCKING (40102) Bit 0

DI2_BLOCKING (40102) Bit 1

If the bit is inactive (bit 1=0), the igital input 2 works in normal mode, which means that changes on the digital input 2 (opening and closing the circuit) have impact on the control algorithm.

DI3_BLOCKING (40102) Bit 2

If the bit is inactive (bit 2=0), the digital input 3 works in normal mode, which means that changes on the digital input 3 (opening and closing the circuit) have impact on the control algorithm.

DI4_BLOCKING (40102) Bit 3

If the bit is inactive (bit 3=0), the digital input 4 works in normal mode, which means that changes on the digital input 4 (opening and closing the circuit) have impact on the control algorithm.

7.2.5 SPECIAL_INPUTS_STATUS_REGISTER (30043)

The register contains an integer value representing the physical states of special inputs (S1 and S2).

SI1_STATUS (30043) Bit 0

If the bit is active (bit 0=1), the special input 1 is active (closed circuit). If the bit is inactive (bit 0=0), the special input 1 is inactive (open circuit).

SI2_STATUS (30043) Bit 1

If the bit is active (bit 1=1), the special input 2 is active (closed circuit). If the bit is inactive (bit 1=0), the special input 2 is inactive (open circuit).

7.2.6 SI1_PIR_TYPE (40103)

The register contains an integer value representing the type of motion sensor/presence detector, which is connected to the special input 1. By default, the motion sensor/ presence detector is set as normal closed type, but it can be changed in accordance with the table below:

Value	Type
5	NO
6 (default)	NC

Table 12. SI1 PIR type register

7.2.7 SI2_PIR_TYPE (40104)

The register contains an integer value representing the type of motion sensor/presence detector, which is connected to the special input 2. By default, the motion sensor/ presence detector is set as normal closed type, but it can be changed in accordance with the table below:

Value	Type
5	NO
6 (default)	NC

Table 13. SI2 PIR type register

7.2.8 SI1_DELAY_OFF_TIME (40107)

If there is no motion during the period of time stored in this register, the light is switched OFF. The default value is 300 seconds.

7.2.9 SI2_DELAY_OFF_TIME (40108)

7.2.10 SI_PIR_STATUS (30148)

The register contains an integer value representing states of special inputs (S1 and S2) including the DELAY_OFF_TIME.

SI1_PIR_STATUS (30148) Bit 0

If the bit is active (bit 0=1), the special input 1 is active (closed circuit). If the bit is inactive (bit 0=0), the special input 1 is inactive (open circuit).

SI2_PIR_STATUS (30148) Bit 1

If the bit is active (bit 4=1), the special input 2 is active (closed circuit). If the bit is inactive (bit 4=0), the special input 2 is inactive (open circuit).

7.3 DALI Registers

7.3.1 DALI_COMMAND_REGISTER (40253)

The register contains an integer value representing actual configuration of particular functions assigned to the DALI interfaces. The register contains statuses and commands of both DALI interfaces in order to allow for the use of the only one register in the BMS to control the DALI network.

DALI1_ON_OFF_STATE (40253) Bit 0

The bit state shows the actual state of the DALI 1 interface.

If the bit is active (bit 0=1), the DALI 1 interface is ON, which means that the ballasts are set in a scene. Changing the bit state to 0 (inactive) sends the DALI1_BROADCAST_OFF command into the network.

If the bit is inactive (bit 0 =0), the DALI 1 interface is OFF, which means that the ballast are OFF. Changing the bit state to 1 (active) sends the DALI1_BROADCAST_LAST_SCENE command into the network.

The bit allows to read actual state of the ballasts connected to the DALI 1 interface and to send BROADCAST_OFF and BROADCAST_LAST_SCENE commands to the DALI 1 network. This functionality allows for using the only one single bit to read status and write commands, which makes it easier to create a visualization and limit the number of variables.

DALI1_BROADCAST_LAST_SCENE (40253) Bit 1

The raising edge of the bit sends the Last Scene Command to DALI 1 Interface to all the ballasts connected to the interface. The command is useful if there is a need of light up all ballasts connected to the DALI 1 interface remotely from BMS also without a discovery procedure (all ballasts connected to the DALI 1 interface react for Broadcast Last Scene even if short addresses of the ballasts are unknown). The command allows for recalling the last scene by activating only the one single bit, which can be really useful in case of creating a visualization.

DALI1_BROADCAST_OFF (40253) Bit 2

The raising edge of the bit sends the OFF command to the DALI 1 interface to all ballasts connected to the interface. The command is useful if there is a need of turn off all ballasts connected to the DALI 1 interface remotely from BMS also without a discovery procedure (all ballasts connected to the DALI 1 interface react for Broadcast OFF even if short addresses of the ballasts are unknown). The command allows for recalling the last scene by activating only one bit, which can be really useful in case of creating a visualization.

DI1_COMMAND (40253) Bit 3

The bit overrides a signal from the digital input 1. The command simulates the physical signal on I1 from BMS.

If the bit is active (bit 3=1), the digital input 1 is overridden and considered active (closed circuit). If the bit is inactive (bit 3=0), the digital input 1 is overridden and considered inactive (open circuit).

DALI2_ON_OFF_STATE (40253) Bit 4

The bit state shows the actual state of the DALI 2 interface.

If the bit is active (bit 0=1), the DALI 2 interface is ON, which means that the ballasts are set in a scene. Changing the bit state to 0 (inactive) sends the DALI2_BROADCAST_OFF command into the network.

If the bit is inactive (bit 0=0), the DALI 2 interface is off, which means that the ballast are off. Changing the bit state to 1(active) sends the DALI2_BROADCAST_LAST_SCENE command into the network.

The bit allows for reading actual state of ballasts connected to DALI 2 and sending BROADCAST_OFF and BROADCAST_LAST_SCENE commands to the DALI 2 network. This functionality allows for using only one bit to read status and write commands, which makes it easier to create a visualization and limit the number of variables.

DALI2_BROADCAST_LAST_SCENE (40253) Bit 5

The raising edge of the bit sends the Last Scene Command to the DALI 2 interface to all ballasts connected to the interface. The command is useful if there is a need of light up all ballasts connected to the DALI 2 interface remotely from BMS also without a discovery procedure (all ballasts connected to the DALI 2 interface react to Broadcast Last Scene even if short addresses of the ballasts are unknown). The command allows for recalling the last scene by activating only one bit, which can be really useful in case of creating a visualization.

DALI2_BROADCAST_OFF (40253) Bit 6

The raising edge of the bit sends the OFF command to the DALI 2 interface to all ballasts connected to the interface. The command is useful if there is a need of turn off all ballasts connected to the DALI 2 interface remotely from BMS also without a discovery procedure (all ballasts connected to the DALI 2 interface react to Broadcast OFF even if short addresses of the ballasts are unknown). The command allows to recall the last scene by activating only one bit, which can be really useful in case of creating a visualization.

DI2_COMMAND (40253) Bit 7

The bit overrides a signal from the digital input 2. The command is dedicated to simulate the physical signal on I2 from BMS.

If the bit is active (bit 7=1), the digital input 2 is overridden and considered as active (closed circuit). If the bit is inactive (bit 7=0), the digital input 2 is overridden and considered inactive (open circuit).

7.3.2 DALI1_RECEIVED_FRAMES_COUNTER (30229)

The 32-bit register with the number of valid DALI receives messages by the device from the ballasts since the last powered up through the DALI 1 interface.

7.3.3 DALI1_ERROR_FRAMES_COUNTER (30237)

The 32-bit register with DALI messages with the number of error received by the device from the ballasts since the last powered up through the DALI 1 interface.

7.3.4 DALI1_TRANSMITTED_FRAMES_COUNTER (30245)

The 32-bit register with the number of transmitted DALI messages sent by the device to the ballasts since the last powered up through the DALI 1 interface.

7.3.5 DALI1_CFG_REGISTER (40254)

The register contains an integer value representing actual configuration of particular functions assigned to the DALI 1 interface.

DALI1_ON_OFF_STATE (40254) Bit 0

The bit state shows the actual state of the DALI 1 interface.

If the bit is active (bit 0=1), the DALI 1 interface is on, which means that the ballast are set in a scene. Changing the bit state to 0 (inactive) sends the DALI1_BROADCAST_OFF command into the network.

If the bit is inactive (bit 0 =0), the DALI 1 interface is off, which means that the ballast are off. Changing the bit state to 1 (active) sends the DALI1_BROADCAST_LAST_SCENE command into the network.

The bit allows to read actual state of the ballasts connected to the DALI 1 interface and to send BROADCAST_OFF and BROADCAST_LAST_SCENE commands to the DALI 1 network. This functionality allows for using the only one single bit to read status and write commands, which makes it easier to create a visualization and limit the number of variables.

DALI1_BROADCAST_LAST_SCENE (40254) Bit 1

The raising edge of the bit sends the Last Scene Command to the DALI 1 interface to all ballasts connected to the interface. The command is useful if there is a need of light up all ballasts connected to the DALI 1 interface remotely from BMS also without a discovery procedure (all ballasts connected to the DALI 1 interface react to Broadcast Last Scene even if short addresses of the ballasts are unknown). The command allows for recalling the last scene by activating only one bit, which can be really useful in case of creating a visualization.

DALI1_BROADCAST_OFF (40254) Bit 2

The raising edge of the bit sends the OFF command to the DALI 1 interface to all ballasts connected to the interface. The command is useful if there is a need of turn off all ballasts connected to the DALI 1 interface remotely from BMS also without a discovery procedure (all ballasts connected to the DALI 1 interface react for Broadcast OFF even if the short addresses of the ballasts are unknown). The command allows for recalling the last scene by activating only one bit, which can be really useful in case of creating a visualization.

SI1_BLOCKING (40254) Bit 3

The bit allows to activating / deactivating a motion sensor / presence detector operating with connection to the special input 1.

If the bit is active (bit 3=1), the motion sensor / presence detector connected to the special input 1 is active and its signal has an impact on the control algorithm.

If the bit is inactive (bit 3=0), the motion sensor / presence detector connected to the special input 1 is inactive and its signal does not have impact on the control algorithm. The default value is 1 (active).

DI1_DIMMING_OFF (40254) Bit 4

The bit allows for activating / deactivating a dimming function assigned with the digital input 1.

If the bit is active (bit 4=1), the dimming function for the switch(es) connected to the digital input 1 is disabled.

If the bit is inactive (bit 4=0), the dimming function for the switch(es) connected to the digital input 1 is enabled.

The switch holds the function to switch on or off the lighting only the dimming function is disabled.

7.3.6 DALI1_DIMMING_STATE (40266)

The register contains an integer value representing the dimming state of ballasts connected to the DALI1 interface.

The command is useful if there is a need of dim all ballasts to the specific level remotely from BMS also without a discovery procedure (all ballasts connected to the DALI 1 interface react to dimming state even if the short addresses of the ballasts are unknown).

The minimum value of 0 means that all the ballasts are off, the maximum value of 254 means the maximum possible brightness level of the ballasts. By default, the register value is 0.

7.3.7 DALI1_FADE_RATE (40462)

The register contains an integer value representing the fade value in steps per seconds that are performed in response to fade command executed by switches controlling the ballasts connected to the DALI 1 interface.

The fade rate allows to change the precision of brightness level setting from switches. The function can be useful in the areas where the ballasts need to be dimmed, for example, in open spaces where the brightness level need to be set individually. The user can adjust most convenient fade rate to requirements and find the most optimal compromise between the time and the precision of changing the brightness level.

Appropriate number represents the time in seconds, which is needed to fade up / down the ballasts between the minimal brightness value and the maximal brightness value.

The fade rate is expressed in steps per second. The table below shows the register values assigned to the number of steps per seconds, which is valid during the dimming procedure. The minimum and maximum values create a range which sets the number of possible steps.

For example:

Minimum ballast value = 0

Maximum ballast value = 254

There are 254 possible steps.

The Fade Rate register value 1 (358 steps per second) means that dimming / lighting up procedure takes less than one second.

The Fade Rate register value 15 (2.8 steps per second) means that dimming / lighting up procedure takes about 254 / 2.8 = 90.5 seconds (Fade Time).

Register Value	Fade Time (Seconds)	Fade Rate (Steps/Seconds)
0	No fade	Not applicable
1	0,7	358
2	1,0	253
3	1,4	179
4	2,0	127
5	2,8	89,4
6	4,0	63,3
7(default)	5,7	44,7
8	8,0	31,6
9	11,3	22,4
10	16,0	15,8
11	22,6	11,2
12	32,0	7,9
13	45,3	5,6
14	64,0	4,0
15	90,5	2,8

Table 14. Fade rate register values

In case if the DALI1 is controlled together with the DALI2 interface by I2, the DALI1_FADE_RATE register is blocked and the fade rate value from the DALI2_FADE_RATE register is considered in the control algorithm.

7.3.8 DALI1_FADE_TIME (40466)

The register contains an integer value representing the value of time which is needed for the ballasts to change the brightness level from minimum to maximum or opposite. The Fade Time is used by a control algorithm in case if commands assigned with changing the ballasts setpoint are send by BMS. These commands are: DALI1_ON_OFF_STATE, DALI1_BROADCAST_LAST_SCENE, DALI1_BROADCAST_OFF, DALI1_BALLAST_SETPOINT.

Possible register values with the assign fade time values are presented in table above.

If the DALI1 is controlled together with the DALI2 interface by I2, the DALI1_FADE_TIME register is blocked and the fade time value from the DALI2_FADE_TIME register is considered in the control algorithm.

7.3.9 DALI1_POWER_ON_LEVEL (40470)

The register contains an integer value representing the value sent to the ballasts connected to the DALI 1 interface and stored in the memory of ballasts. In case of the power supply of the lamps, recovery of the ballasts is accompanied with sending POWER_ON_LEVEL value to the lamps. The default value is 254 (maximum possible brightness of the ballasts).

7.3.10 DALI1_SYSTEM_FAILURE_LEVEL (40474)

The register contains an integer value representing the value sent to ballasts connected to DALI 1 interface and stored in the memory of the ballasts. In case of system malfunction (for example, the DALI line interruption, DALI power supply failure, etc.), the ballasts send the SYSTEM_FAILURE_LEVEL value to the lamps. The default value is 254 (maximum possible brightness of the ballasts).

7.3.11 DALI2_RECEIVED_FRAMES_COUNTER (30231)

The 32-bit register with the number of valid DALI received messages by the device from the ballasts since the last powered up through the DALI 2 interface.

7.3.12 DALI2_ERROR_FRAMES_COUNTER (30239)

The 32-bit register with the number of error DALI received messages by the device from the ballasts since the last powered up through the DALI 2 interface.

7.3.13 DALI2_TRANSMITTED_FRAMES_COUNTER (30247)

The 32-bit register with the number of transmitted DALI messages sent by the device to the ballasts since the last powered up through the DALI 2 interface.

7.3.14 DALI2_CFG_REGISTER (40255)

The register contains an integer value representing actual configuration of particular functions assigned to the DALI 2 interface.

DALI2_ON_OFF_STATE (40255) Bit 0

The bit state shows the actual state of the DALI 2 interface.

If the bit is active (bit 0=1), the DALI 2 interface is on, which means that ballasts are set in a scene. Changing the bit state to 0 (inactive) sends the DALI2_BROADCAST_OFF command into the network.

If the bit is inactive (bit 0=0), the DALI 2 interface is off, which means that ballasts are off. Changing the bit state to 1 (active) sends the DALI2_BROADCAST_LAST_SCENE command into the network.

The bit allows to read the actual state of the ballasts connected to the DALI 2 interface as well as send BROADCAST_OFF and BROADCAST_LAST_SCENE commands to the DALI 2 network. This functionality allows to use only one bit to read status and write commands, which makes it easier to create a visualization and limit the number of variables.

DALI2_BROADCAST_LAST_SCENE (40255) Bit 1

The raising edge of the bit sends the Last Scene Command to DALI 2 interface to all ballasts connected to the interface. The command is useful if there is a need of light up all ballasts connected to the DALI 2 interface remotely from BMS also without a discovery procedure (all the ballasts connected to the DALI 2 interface react to Broadcast Last Scene even if the short addresses of the ballasts are unknown). The command allows to recall the last scene by activation only one bit, which can be really useful in case of creating a visualization.

DALI2_BROADCAST_OFF (40255) Bit 2

The raising edge of the bit sends the OFF command to the DALI 2 interface to all the ballasts connected to the interface. The command is useful if there is a need of turn off all ballasts connected to the DALI 2 interface remotely from BMS also without a discovery procedure (all ballasts connected to the DALI 2 interface react for Broadcast OFF even if the short addresses of the ballasts are unknown). The command allows to recall the last scene by activation only one bit, which can be really useful in case of creating a visualization.

SI2_BLOCKING (40255) Bit 3

The bit allows for activating / deactivating a motion sensor / presence detector functioning connected to the special input 2.

If the bit is active (bit 3=1), the motion sensor / presence detector connected to the special input 2 is active and its signal has impact on the control algorithm.

If the bit is inactive (bit 3=0), the motion sensor / presence detector connected to the special input 2 is inactive and its signal does not have impact the control algorithm. The default value is 1 (active).

DI2_DIMMING_OFF (40255) Bit 4

The bit allows for activating / deactivating a dimming function assigned with the digital input 2.

If the bit is active (bit 4=1), the dimming function for the switch(es) connected to the digital input 2 is disabled.

If the bit is inactive (bit 4=0), the dimming function for the switch(es) connected to the digital input 2 is enabled.

The switch holds the function to switch on or off the lighting only the dimming function is disabled.

7.3.15 DALI2_DIMMING_STATE (40267)

The register contains an integer value representing the dimming state value sent to the DALI 2 interface to all ballasts connected to the interface.

The command is useful if there is a need of light up all the ballasts to the specific level remotely without a discovery procedure (all the ballasts connected to the DALI 2 interface react for dimming state even if the short addresses of the ballasts are unknown).

The minimum value of 0 means that all the ballasts light with the minimal brightness, the maximum value of 254 means the maximum possible brightness level of the ballasts. By default, the register value is 0.

7.3.16 DALI2_FADE_RATE (40463)

The register contains an integer value representing the fade value in steps per seconds that are performed in response to fade command executed by switches controlling the ballasts connected to the DALI 2 interface.

The fade rate allows to change a dimming speed, which results in increasing the precision of brightness level setting. The function can be useful in the areas where the ballasts need to be dimmed, for example, in the case of meetings with video presentations, etc. The user can adjust the fade rate, which is best for requirements, and find the most optimal compromise between the time and the precision of brightness level of the ballasts.

Appropriate number select the time which is needed to dim / light up the ballasts from the minimal brightness value to the maximal brightness value.

The fade rate can be expressed also in steps per second. The table below shows the register values assigned to the number of steps per seconds which is valid during dimming / lighting up procedure. The minimum and maximum values create a range, which sets the number of possible steps.

For example:

Minimum ballast value = 0

Maximum ballast value = 254

The number of possible steps is 254 (0.254)

The Fade Rate register value 1 (358 steps per second) means that dimming / lighting up procedure takes less than one second.

The Fade Rate register value 15 (2.8 steps per second) means that dimming / lighting up procedure takes about 254 / 2.8 = 90.5 seconds (Fade Time)

In case if DALI2 is controlled together with the DALI1 interface by I1, then the DALI2_FADE_RATE register is blocked and the fade rate value from the DALI1_FADE_RATE register is considered in the control algorithm.

7.3.17 DALI2_FADE_TIME (40467)

The register contains an integer value representing the value of time, which is needed for the ballasts to change the brightness level from minimum to maximum or opposite. The Fade Time is used by a control algorithm in case if commands assigned with changing the ballasts setpoint are send by BMS. These commands are: DALI2_ON_OFF_STATE, DALI2_BROADCAST_LAST_SCENE, DALI2_BROADCAST_OFF, and DALI2_BALLAST_SETPOINT.

Possible register values with the assign fade time values are presented in the table above.

If DALI2 is controlled together with the DALI1 interface by I1, the DALI2_FADE_TIME register is blocked and the fade time value from the DALI1_FADE_TIME register is considered in the control algorithm.

7.3.18 DALI2_POWER_ON_LEVEL (40471)

The register contains an integer value representing the value sent to ballasts connected to the DALI 2 interface and stored in the memory of ballasts. In the case of lamps power supply recovery, the ballasts send the POWER_ON_LEVEL value to the lamps. The default value is 254 (maximum possible brightness of the ballasts).

7.3.19 DALI2_SYSTEM_FAILURE_LEVEL (40475)

The register contains an integer value representing the value sent to ballasts connected to the DALI 2 interface and stored in the memory of the ballasts. In the case of system malfunction (for example, DALI line interruption, DALI power supply failure, etc.) the ballasts send the SYSTEM_FAILURE_LEVEL value to the lamps. The default value is 254 (maximum possible brightness of the ballasts).

7.3.20 DALI Network Advanced Control

If the device is brand new, it is possible to control DALI ballasts connected to DALI1 or DALI2 interfaces without any commissioning by sending Broadcast Commands to all ballasts connected to the particular interfaces.

To activate commissioning of the DALI network, the discovery function needs to be activated. If the discovery is done the device allows to control and maintain particular ballast (for example, read the status, set the minimum or maximum of the brightness level).

The registers assigned with the discovery function are described below.

The new DALI network needs to be discovered by DISCOVER_NEW_INITIALIZATION. The function addresses all ballasts connected to the DALI X interface, which have no short addresses assigned.

If there is a possibility that any ballast has a short address already assigned (for example, from a previous discovery process), then the CLEAR_SHORT_ADDRESSES function has to be invoked first.

DALIX_DISCOVERY_PROGRESS registers indicate the current status of the discovery process.

If there is a need to add a new ballast to the existing network (already discovered), the ADD_NEW_BALLAST function should be invoked. The function allows to address an additional ballast with the first available short address.

The REPLACE_BALLAST procedure can be used in the case if the ballast connected to one of the DALI interface runs into the faulty state. Newly connected ballast receives the same short address as the faulty ballast had before replacement.

DALI1_CFG_REGISTER (40254)

The register contains an integer value representing actual configuration of particular functions assigned to the DALI 1 interface.

DALI1_ALL_BALLASTS_RESET (40254) Bit 11

> WARNING! Be careful using this function! All parameters of all ballasts will be set to the factory default settings! After reset, a new commissioning process will be necessary!

The ALL_BALLASTS_RESET function sets back all parameters stored in the ballasts connected to the DALI 1 interface to the factory settings. The function can be useful if possible problems with the ballasts appear (ballasts do not react to DALI commands or stay in the faulty states).

The bit allows to send ALL_BALLASTS_RESET command to all ballasts connected to the DALI 1 interface.

The raising edge of the bit sends the ALL_BALLASTS_RESET command to the ballasts.

DALI1_DISCOVER_NEW_INITIALIZATION (40254) Bit 12

The DISCOVER_NEW_INITIALIZATION function is used if the user would like to commission a new DALI network. If the DALI network is undiscovered (the device has no information about short addresses) some functions are unavailable, especially these which are directly assigned with a single ballast control. The discovering allows to address all the unaddressed ballast connected to the DALI 1 interface and control each ballast individually.

The bit allows to send DISCOVER_NEW_INITIALIZATION to all the ballasts connected to the DALI 1 interface.

The raising edge of the bit sends the DISCOVER_NEW_INITIALIZATION to the ballasts. All ballasts are addressed with a short address randomly. This means that each DISCOVER_NEW_INITIALIZATION sets a new short addressing configuration of the ballasts.

DALI1_REPLACE_BALLAST (40254) Bit 13

The bit allows to send the REPLACE_BALLAST command, which allows to find and replace the ballast with a faulty state among all ballasts connected to the DALI 1 interface. The function can be useful if there is a need of replacing faulty ballasts or when there is a rearrangement of the DALI network (for example, in case of rooms adaptation for a new tenant).

If the DALI1_FAULT_STATUS_REGISTER value is different than 0 then the raising edge of the bit sends the REPLACE_BALLAST command to the ballasts.

All ballasts with faulty states are replaced with a newly connected ballasts. The new ballasts are addressed from the same set of addresses as the faulty ballasts had before replacement. This means that only short addresses of the faulty ballasts are available to reassign them to the new ballasts. The short addresses are assigned to the new ballasts randomly.

In case of replacing more than one faulty ballast, in order to have full control over new ballasts addressing process, it is recommended to replace the ballasts one by one to avoid random assignation of the short addresses.

Example:

Ballasts with a short addresses no. 2 and 4 are in faulty states (DALI1_FAULT_STATUS register bits no 1 and 3 are true).

The faulty ballasts are replaced with new ballasts.

After sending REPLACE_BALLAST, the new ballasts (without short addresses) are addressed with a short addresses no. 2 and 4 randomly.

To avoid random assignation of the addresses, only the ballast No. 2 must to be replaced first. The new ballast which is a replacement for ballast No. 2 receives the same address no 2.

Ballast no. 4 needs to be replaced in the next step.

DALI1_ADD_NEW_BALLAST (40254) Bit 14

The bit allows for sending the ADD_NEW_BALLAST command with a special function, which allows to find new ballasts (not previously addressed) from all ballasts connected to the DALI 1 interface and to address them with a first possible address (from 1 to 16).

The raising edge of the bit sends the ADD_NEW_BALLAST to the ballasts. All new ballasts are addresses with the first possible address. All ballasts, which were addressed before sending ADD_NEW_BALLAST, keep their addresses.

Example:

Seven ballasts connected to the DALI 1 interface are addressed with the addresses from 1 to 7.

Two new ballasts are connected to the DALI 1 interface.

The ADD_NEW_BALLAST is initiated.

Two new ballasts are addressed with the addresses 8 and 9 (first free).

DALI1_CLEAR_SHORT_ADDRESSES (40254) Bit 15

The bit allows to send the CLEAR_SHORT_ADDRESSES, which allows to find all ballasts connected to the DALI 1 interface and delete short addresses of all of them.

The raising edge of the bit sends the CLEAR_SHORT_ADDRESSES to the ballasts. All short addresses of all ballasts connected to the DALI 1 interface are deleted.

> WARNING! Be careful using this function! All short addresses of all ballasts will be deleted!

DALI2_CFG_REGISTER (40255)

The register contains an integer value representing actual configuration of particular functions assigned to the DALI 2 interface.

DALI2_ALL_BALLASTS_RESET (40255) Bit 11

> WARNING! Be careful using this function! All parameters of all ballasts will be set to the factory default settings! After reset, a new commissioning process will be necessary!

The ALL_BALLASTS_RESET function sets back all parameters stored in ballasts connected to the DALI 2 interface to the factory settings. The function can be useful if possible problems with the ballasts appear (ballasts do not react for DALI commands or stay in the faulty states).

The bit allows to send the ALL_BALLASTS_RESET command to all ballasts connected to the DALI 2 interface.

The raising edge of the bit sends the ALL_BALLASTS_RESET command to the ballasts.

DALI2_DISCOVER_NEW_INITIALIZATION (40255) Bit 12

The DISCOVER_NEW_INITIALIZATION function is used if the user would like to commission a new DALI network. If the DALI network is undiscovered (the device has no information about short addresses) some functions are unavailable, especially these which are directly assigned with a single ballast control. The discovering allows to address all the unaddressed ballast connected to the DALI 2 interface and control each ballast individually.

The bit allows to send the DISCOVER_NEW_INITIALIZATION to all ballasts connected to the DALI 2 interface.

The raising edge of the bit sends the DISCOVER_NEW_INITIALIZATION to ballasts. All ballasts are addressed with a short address randomly. It means that each DISCOVER_NEW_INITIALIZATION sets a new short addressing configuration of the ballasts.

DALI2_REPLACE_BALLAST (40255) Bit 13

The bit allows to send the REPLACE_BALLAST command, which allows to find and replace the ballast with a faulty state among all ballasts connected to the DALI 2 interface. The function can be useful if there is a need of replacing faulty ballasts or if there is a rearrangement of the DALI network (for example, in case of rooms adaptation for a new tenant).

If DALI2_FAULT_STATUS_REGISTER value is different from 0, then the raising edge of the bit sends the REPLACE_BALLAST command to the ballasts.

All ballasts with faulty states are replaced with a newly connected ballasts. The new ballasts are addressed from the same set of addresses as the faulty ballasts had before replacement. This means that only short addresses of the faulty ballasts are available to reassign them to the new ballasts. The short addresses are assigned to the new ballasts randomly.

In case of replacing more than one faulty ballast, in order to have full control over new ballasts addressing process, it is recommended to replace the ballasts one by one to avoid assigning the short addresses randomly.

Example:

Ballasts with a short addresses no. 2 and 4 are in faulty states (DALI2_FAULT_STATUS register bits no. 1 and 3 are true).

The faulty ballasts are replaced with new ballasts.

After sending REPLACE_BALLAST, the new ballasts (without short addresses) are addressed with short addresses no. 2 and 4 randomly.

To avoid random assignation of the addresses, only the ballast no. 2 must to be replaced first. The new ballast, which is a replacement for ballast no. 2, receives the same address as no. 2.

Ballast no. 4 needs to be replaced in the next step.

DALI2_ADD_NEW_BALLAST (40255) Bit 14

The bit allows to send the ADD_NEW_BALLAST command with a special function, which allows to find new ballasts (not previously addressed) from all ballasts connected to the DALI 2 interface and to address them with a first possible address (from 1 to 16).

The raising edge of the bit sends the ADD_NEW_BALLAST to the ballasts. All new ballasts are addresses with the first possible address. All ballasts, which were addressed before sending the ADD_NEW_BALLAST, keep their addresses.

Example:

Seven ballasts connected to the DALI 2 interface have the addresses from 1 to 7.

Two new ballasts are connected to the DALI 2 Interface.

The ADD_NEW_BALLAST is initiated.

Two new ballasts are addressed with the addresses 8 and 9 (first free).

DALI2_CLEAR_SHORT_ADDRESSES (40255) Bit 15

The bit allows to send the CLEAR_SHORT_ADDRESSES, which allows to find all ballasts connected to the DALI 2 interface and delete short addresses of all of them.

The raising edge of the bit sends the CLEAR_SHORT_ADDRESSES to the ballasts. All short addresses of all ballasts connected to the DALI 2 interface are deleted.

> WARNING! Be careful using this function! All short addresses of all ballasts will be deleted!

DALI1_DISCOVERY_PROGRESS (30225)

The register contains a percentage value from 0 to 100%, which presents the actual progress of the discovery process initiated on the DALI 1 interface.

DALI2_DISCOVERY_PROGRESS (30226)

The register contains a percentage value from 0 to 100%, which presents the actual progress of the discovery process initiated on the DALI 2 interface.

7.3.21 DALI Registers Available Only After DALI X Network Commissioning

Some of the device functions and registers assigned with DALI network(s), DALI1 or DALI2, are available only after the DALI X network commissioning process.

All Modbus registers, which are available only after commissioning, are described below.

DALI1_BALLAST_ACTUAL_LEVEL (30161- 30176)

The register contains information about actual brightness level from minimum 0 to maximum 254 of the particular ballast. Each register is assigned to the ballast number according to the following table:

Register No.	Ballast No.
30161	Ballast 1
30162	Ballast 2
…	…
30175	Ballast 15
30176	Ballast 16

Table 15. DALI1 Actual Ballast Level register

DALI2_BALLAST_ACTUAL_LEVEL (30177 - 30192)

The register contains information about actual brightness level from minimum 0 to maximum 254 of the particular ballast connected to the DALI 2 interface. Each register is assigned to the ballast number according to the following table:

Register No.	Ballast No.
30177	Ballast 1
30178	Ballast 2
…	…
30191	Ballast 15
30192	Ballast 16

Table 16. DALI2 Actual Ballasts Level register

DALI1_BLINK (40262)

Each bit of the register activates blinking of the particular ballast assigned to the bit. It is possible to start blinking of several ballasts at the same time. The function is useful during the commissioning of the DALI network, including ballasts addressing (discover process) to localize the specific lamp in order to appropriate visualization in BMS. To do so, appropriate bits have to be activated according to the table below:

Bit No.	Active (1)	Inactive (0)
0	Ballast 1 Blinking	Ballast 1 Normal
1	Ballast 2 Blinking	Ballast 2 Normal

Bit No.	Active (1)	Inactive (0)
...	...	....
14	Ballast 15 Blinking	Ballast 15 Normal
15	Ballast 16 Blinking	Ballast 16 Normal

Table 17. DALI1 Blink register structure

To stop blinking, the ballasts the particular bits have to be set to 0. The default value is 0.

DALI2_BLINK (40263)

Each bit of the register activates blinking of the particular ballast assigned to the bit. It is possible to start blinking of several ballasts in the same time. The function is useful during the DALI network commissioning including ballasts addressing (discover process) to localize the specific lamp in order to appropriate visualization in BMS. To do so, appropriate bits have to be activated according to the table below:

Bit No.	Active (1)	Inactive (0)
0	Ballast 1 Blinking	Ballast 1 Normal
1	Ballast 2 Blinking	Ballast 2 Normal
...	...	....
14	Ballast 15 Blinking	Ballast 15 Normal
15	Ballast 16 Blinking	Ballast 16 Normal

Table 18. DALI2 Blink register structure

To stop blinking the ballasts the particular bits have to be set to 0. The default value is 0.

DALI1_BALLAST_SETPOINT (40270-40285)

Registers contain integer values, which represent the setpoint values sent to the particular ballasts connected to the DALI 1 interface in accordance with the table below.

If there is a need to set particular ballast brightness level in the DALI 1 network remotely from BMS, it is possible to use the DALI1_BALLASTX_SETPOINT registers.

If the ballasts brightness levels are set individually for each ballast by BALLAST_SETPOINT registers, there could be a need to hold this particular scene without a possibility to change the brightness level by switches. To deactivate the dimming function for switches, a register bit DI1_DIMMING_OFF has to be activated.

The function can be useful especially in the open spaces, where the brightness level needs to be set individually inside the single DALI network.

The minimum value 0 means that the ballasts send OFF command to the lamps, the maximum value 254 means the maximum possible brightness level of the ballast. By default, the register value is 0.

Register No.	Ballast No.
40270	Ballast 1
40271	Ballast 2
...	...
40284	Ballast 15
40285	Ballast 16

Table 19. DALI1 Ballast Setpoint register

DALI2_BALLAST_SETPOINT (40286-40301)

The register contain integer values representing the setpoint values sent to the particular ballasts connected to the DALI 2 interface in accordance with the table below.

If there is a need to set particular ballast brightness level inside the DALI 2 network remotely from BMS, it is possible to do so using DALI2_BALLASTX_SETPOINT registers.

If the ballasts brightness levels are set individually for each ballast by BALLAST_SETPOINT registers, there could be a need to hold this particular scene without a possibility to change the brightness level by switches. To deactivate a dimming function for switches, the DI2_DIMMING_OFF register bit has to be activated.

The function can be useful especially in the open spaces, where the brightness level needs to be set individually in the single DALI network.

The minimum. value 0 means that the ballast lights with the minimum brightness, the maximum value 254 means the maximum possible brightness level of the ballast. By default, the register value is 0.

Register No.	Ballast No.
40286	Ballast 1
40287	Ballast 2
...	...
40300	Ballast 15
40301	Ballast 16

Table 20. DALI2 Ballast Setpoint register

DALI1_BALLAST_MIN (40334-40349)

The register contain integer values, which represent the minimal brightness levels for the particular ballasts connected to the DALI 1 interface, in accordance with the table below.

The minimum value 0 means that the ballast minimum value is the same as in case of the OFF command (ballast is off), the maximum value 253 means that ballast cannot be dimmed in practice (the ballast setpoint value 254 means maximum possible factory brightness level of the ballast). The minimum value determines a low limit of dimming the ballast, both by dimming procedure initiated by monostable switch (writing down a lower value than it is stored in the register sets the ballast brightness level on the value of the register). By default, all registers values are 0.

Register No.	Ballast No.
40334	Ballast 1 MIN Value
40335	Ballast 2 MIN Value
...	...
40348	Ballast 15 MIN Value
40349	Ballast 16 MIN Value

Table 21. DALI1 Ballast MIN values register

DALI2_BALLAST_MIN (40350-40365)

The registers contain integer values, which represent the minimum brightness levels for the particular ballasts connected to the DALI 2 interface in accordance to the table below.

The minimum value 0 means that the ballast minimum value is the same as in case of the OFF command (ballast is off), the maximum value 253 means that ballast cannot be dimmed in practice (the ballast setpoint value 254 means the maximum possible factory brightness level of the ballast). The minimum value determines a low limit of dimming the ballast, both by dimming procedure initiated by monostable switch (writing down a lower value than it is stored in the register sets the ballast brightness level on the value of the register). By default, all registers values are 0.

Register No.	Ballast No.
40350	Ballast 1 MIN Value
40351	Ballast 2 MIN Value
...	...
40364	Ballast 15 MIN Value
40365	Ballast 16 MIN Value

Table 22. DALI2 Ballast MIN values register

DALI1_BALLAST_MAX (40398-40413)

Registers contain integer values, which represent the maximum brightness levels for the particular ballasts connected to the DALI 1 interface according to the table below.

The maximum value 1 means that ballast cannot be lighted up in practice (the ballast setpoint value 0 means that the ballast is off). The maximum value determines a high limit of lighting up the ballast, both by lighting up procedure initiated by monostable switch (writing down a higher value than it is stored in the register sets the ballast brightness level on the value of the register). By default, all registers values are 254.

Register No.	Ballast No.
40398	Ballast 1 MAX Value
40399	Ballast 2 MAX Value
...	...
40412	Ballast 15 MAX Value
40413	Ballast 16 MAX Value

Table 23. DALI1 Ballast Max values register

DALI2_BALLAST_MAX (40414-40429)

The registers contain integer values, which represent the maximum brightness levels for the particular ballasts connected to the DALI 2 interface according to the table below.

The maximum value 1 means that ballast cannot be lighted up in practice (the ballast setpoint value 0 means that the ballast is off). The maximum value determines a high limit of lighting up the ballast, both by lighting up procedure initiated by monostable switch (writing down a higher value than it is stored in the register sets the ballast brightness level on the value of the register). By default, all registers values are 254.

Register No.	Ballast No.
40414	Ballast 1 MAX Value
40415	Ballast 2 MAX Value
...	...
40428	Ballast 15 MAX Value
40429	Ballast 16 MAX Value

Table 24. DALI2 Ballast Max values register

DALI1_NUMBER_OF_BALLASTS (30258)

The register contains an integer value representing the number of ballasts connected to the DALI 1 interface with the short addresses given during the one of the discovery process (NEW_INITIALIZATION, REPLACE_BALLAST, ADD_NEW_BALLAST).

DALI2_NUMBER_OF_BALLASTS (30259)

The register contains an integer value representing the number of ballasts connected to the DALI 2 interface with the short addresses given during the one of the discovery process (NEW_INITIALIZATION, REPLACE_BALLAST, ADD_NEW_BALLAST).

DALI1_FAULT_STATUS_REGISTER (30157)

The register contains an integer value representing common fault status from all ballasts connected to the DALI 1 interface. Each bit of the register represents a fault state of the particular ballast in accordance with the following table:

Bit No.	Active (1)	Inactive (0)
0	Ballast 1 Fault	Ballast 1 Normal
1	Ballast 2 Fault	Ballast 2 Normal
...	...	....
14	Ballast 15 Fault	Ballast 15 Normal
15	Ballast 16 Fault	Ballast 16 Normal

Table 25. DALI Fault register structure

DALI2_FAULT_STATUS_REGISTER (30158)

The register contains an integer value representing common fault status from all ballasts connected to the DALI 2 interface. Each bit of the register represents a fault state of the particular ballast in accordance with the following table:

Bit No.	Active (1)	Inactive (0)
0	Ballast 1 Fault	Ballast 1 Normal
1	Ballast 2 Fault	Ballast 2 Normal
...	...	....
14	Ballast 15 Fault	Ballast 15 Normal
15	Ballast 16 Fault	Ballast 16 Normal

Table 26. DALI Fault register structure

7.4 Light Level Control Registers

7.4.1 LLC_SETPOINT_ZONE_1 (40489)

The register contains the setpoint value of the light level for zone 1. By default, the setpoint is 1000 lx.

7.4.2 LLC_SETPOINT_ZONE_2 (40490)

The register contains the quantity of zones to be controlled separately. By default, the register is set to two zones.

7.4.3 LUX_MIN_SENSOR_1 (40494)

The register sets the minimum value of the light level sensor for zone 1. By default, the minimum value is set to 0 lx.

7.4.4 LUX_MIN_SENSOR_2 (40495)

The register sets the minimum value of the light level sensor for zone 2. By default, the minimum value is set to 0 lx.

7.4.5 LUX_MAX_SENSOR_1 (40498)

The register sets the maximum value of the light level sensor for zone 1. By default, the maximum value is set to 3000 lx.

7.4.6 LUX_MAX_SENSOR_2 (40499)

The register sets the maximum value of the light level sensor for zone 2. By default, the maximum value is set to 3000 lx.

7.4.7 LLC_OFFSET (40478)

The register sets the offset value between the control signal on the DALI2 bus in reference to the DALI1 bus. By default, the offset value is set to 0.

7.4.8 LUX_SENSOR_TYPE_1 (40502)

The registers sets the special input mode used to read the signal from the lux level sensor 1. By default, the special input mode is set to 0-10 V.

7.4.9 LUX_SENSOR_TYPE_2 (40503)

The registers sets the special input mode used to read the signal from the lux level sensor 2. By default, the special input mode is set to 0-10 V.

7.4.10 LUX_SENSOR_ENABLE (40506)

The register value enables either lux level sensor:

- bit 0: LUX_SENSOR_1_ENABLE;
- bit 1: LUX_SENSOR_2_ENABLE.

By default, the register is set to bit 1.

LLC_PIR_1_DIMM_TIME (40485)

The register sets the time, which–upon expiring–dims the light in the zone 1 if the presence sensor detects no movement. By default, the time is set to 0 s.

7.4.11 LLC_PIR_2_DIMM_TIME (40486)

The register sets the time, which–upon expiring–dims the light in the zone 2 if the presence sensor detects no movement. By default, the time is set to 0 s.

7.4.12 LLC_PIR_1_DIMM_LEVEL (40481)

The register contains the dimmed light level after counting down the time set in the LLC_PIR_1_DIMM_TIME register. By default, the dimmed light level is set to 20%.

7.4.13 LLC_PIR_2_DIMM_LEVEL (40482)

The register contains the dimmed light level after counting down the time set in the LLC_PIR_2_DIMM_TIME register. By default, the dimmed light level is set to 20%.

7.4.14 LLC_KP_ZONE_1 (40507)

The 32-bit register contains the proportional gain of the PID controller for zone 1. By default, the value is set to 0,021.

7.4.15 LLC_KP_ZONE_2 (40509)

The 32-bit register contains the proportional gain of the PID controller for zone 2. By default, the value is set to 0,021.

7.4.16 LLC_KI_ZONE_1 (40515)

The 32-bit register contains the integral gain of the PID controller for zone 1. By default, the value is set to 0,007.

7.4.17 LLC_KI_ZONE_2 (40517)

The 32-bit register contains the integral gain of the PID controller for zone 2. By default, the value is set to 0,007.

7.4.18 LLC_KD_ZONE_1 (40523)

The 32-bit register contains the derivative gain of the PID controller for zone 1. By default, the value is set to 0,012.

7.4.19 LLC_KD_ZONE_2 (40525)

The 32-bit register contains the derivative gain of the PID controller for zone 2. By default, the value is set to 0,012.

7.4.20 LUX_STATUS_1 (40681)

The read-only register shows the lux light intensity value from the sensor connected to S1.

7.4.21 LUX_STATUS_2 (40682)

The read-only register shows the lux light intensity value from the sensor connected to S2.

7.4.22 LUX_SENSOR_VOLTAGE_1 (40132)

The read-only register shows the voltage value on the S1 special input (expressed in millivolts).

7.4.23 LUX_SENSOR_VOLTAGE_2 (40133)

The read-only register shows the voltage value on the S2 special input (expressed in millivolts).

7.5 List of Modbus Registers

Modbus Address	Decimal Address	Hex Address	Register Name	Access	Description
40001	0	0x0	VERSION TYPE	Read/Write Memory	First byte means a version and another one a type of device. Allows to enable 1 of 4 device actions.
30002	1	0x1	ADDRESS DIPSWITCH	Read-only	Address selected by address DIP switches
30003	2	0x2	CFG DIPSWITCH	Read-only	Configuration selected by CFG DIP switches
30004	3	0x3	RECEIVED FRAMES COUNTER	Read-only	Number of received frames
30006	5	0x5	ERROR FRAMES COUNTER	Read-only	Number of error frames
30008	7	0x7	TRANSMITTED FRAMES COUNTER	Read-only	Number of transmitted frames
30012	11	0xB	UP TIME	Read-only	Controller up time
40017	16	0x10	BAUD RATE	Read/Write Memory	The default value is 76800
30018	17	0x11	STOP BITS	Read-only	The constant value is 1
30019	18	0x12	DATA BITS	Read-only	The constant value is 8
30020	19	0x13	PARITY BITS	Read-only	The constant value is 0(none)
40021	20	0x14	REPLY DELAY	Read/Write Memory	The default value is 0
30041	40	0x28	DIGITAL INPUTS STATUS	Read-only	Bit0 – DI1 Status Bit1 – DI2 Status Bit2 – DI3 Status Bit3 – DI4 Status

Modbus Address	Decimal Address	Hex Address	Register Name	Access	Description
30042	41	0x29	DIGITAL OUTPUTS STATUS	Read-only	Bit0 – Light 1 Status O1 Bit1 – Light 2 Status O2
30043	42	0x2A	SPECIAL INPUTS STATUS	Read-only	Bit0 – SI1 Status Bit1 – SI2 Status
40101	100	0x64	DIGITAL COMMANDS	Read/Write	Bit0 – DI1 Command Bit1 – DI2 Command Bit2 – DI3 Command Bit3 – DI4 Command
40102	101	0x65	DIGITAL INPUT BLOCKING	Read/Write Memory	Value range from 0 to 1 (0 – no blocking; 1 – blocked) Bit0 – DI1 Blocking Bit1 – DI2 Blocking Bit2 – DI3 Blocking Bit3 – DI4 Blocking
40103	102	0x66	SPECIAL INPUT 1 PIR TYPE	Read/Write Memory	Value range from 5 to 6. 5 – time relay NO, 6 – time relay NC (default value)
40104	103	0x67	SPECIAL INPUT 2 PIR TYPE	Read/Write Memory	Value range from 5 to 6. 5 – time relay NO, 6 – time relay NC (default value)
40107	106	0x6A	SPECIAL INPUT 1 DELAY OFF TIME	Read/Write Memory	Value range from 0 to 65535 seconds. The default value is 300s.
40108	107	0x6B	SPECIAL INPUT 2 DELAY OFF TIME	Read/Write Memory	Value range from 0 to 65535 seconds. The default value is 300s.
30148	147	0x93	SPECIAL INPUTS PIR STATUS	Read-only	Bit0 – SI1 PIR Status Bit1 – SI2 PIR Status

Modbus Address	Decimal Address	Hex Address	Register Name	Access	Description
30156	155	0x9B	DIPSWITCH_CFG_REGISTER	Read-only	Value range 0-1. Bit0 – DI1_DI2_SWITCH_TYPE (0 – monostable; 1 – bistable) Bit1 – DI1_CONTROL_MODE (0 - DALI 1 only; 1 - DALI 1 + DALI2) Bit2 – SI1_CONTROL_MODE (0 - DALI 1 only; 1 - DALI 1 + DALI2) Bit3 – DI2_CONTROL_MODE (0 - DALI 2 only; 1 - DALI 1 + DALI2) Bit4 – SI2_CONTROL_MODE (0 - DALI 2 only; 1 - DALI 1 + DALI2) Bit5 - LIGHT_CONTROL_MODE (0 – DALI mode; 1 – ON/ OFF mode) Bit6 – DI3_DI4_SWITCH_TYPE (0 – monostable; 1 – bistable)
30157	156	0x9C	DALI1 FAULT STATUS REGISTER	Read-only	Ballasts fault status storage (0 – no fault, 1 – fault) Bit0 – Ballast 1 fault Bit1 – Ballast 2 fault Bit2 – Ballast 3 fault Bit3 – Ballast 4 fault Bit4 – Ballast 5 fault Bit5 – Ballast 6 fault Bit6 – Ballast 7 fault Bit7 – Ballast 8 fault Bit8 – Ballast 9 fault Bit9 – Ballast 10 fault Bit10 – Ballast 11 fault Bit11 – Ballast 12 fault Bit12 – Ballast 13 fault Bit13 – Ballast 14 fault Bit14 – Ballast 15 fault Bit15 – Ballast 16 fault

Modbus Address	Decimal Address	Hex Address	Register Name	Access	Description
30158	157	0x9D	DALI2 FAULT STATUS REGISTER	Read-only	Ballasts fault status storage (0 – no fault, 1 – fault) Bit0 – Ballast 1 fault Bit1 – Ballast 2 fault Bit2 – Ballast 3 fault Bit3 – Ballast 4 fault Bit4 – Ballast 5 fault Bit5 – Ballast 6 fault Bit6 – Ballast 7 fault Bit7 – Ballast 8 fault Bit8 – Ballast 9 fault Bit9 – Ballast 10 fault Bit10 – Ballast 11 fault Bit11 – Ballast 12 fault Bit12 – Ballast 13 fault Bit13 – Ballast 14 fault Bit14 – Ballast 15 fault Bit15 – Ballast 16 fault
30161	160	0xA0	DALI1 BALLAST 1 ACTUAL LEVEL	Read-only	Actual BALLAST1 state. Value range 0-255. (255 - fault)
30162	161	0xA1	DALI1 BALLAST 2 ACTUAL LEVEL	Read-only	Actual BALLAST2 state. Value range 0-255. (255 - fault)
30163	162	0xA2	DALI1 BALLAST 3 ACTUAL LEVEL	Read-only	Actual BALLAST3 state. Value range 0-255. (255 - fault)
30164	163	0xA3	DALI1 BALLAST 4 ACTUAL LEVEL	Read-only	Actual BALLAST4 state. Value range 0-255. (255 - fault)
30165	164	0xA4	DALI1 BALLAST 5 ACTUAL LEVEL	Read-only	Actual BALLAST5 state. Value range 0-255. (255 - fault)
30166	165	0xA5	DALI1 BALLAST 6 ACTUAL LEVEL	Read-only	Actual BALLAST6 state. Value range 0-255. (255 - fault)
30167	166	0xA6	DALI1 BALLAST 7 ACTUAL LEVEL	Read-only	Actual BALLAST7 state. Value range 0-255. (255 - fault)
30168	167	0xA7	DALI1 BALLAST 8 ACTUAL LEVEL	Read-only	Actual BALLAST8 state. Value range 0-255. (255 - fault)

Modbus Address	Decimal Address	Hex Address	Register Name	Access	Description
30169	168	0xA8	DALI1 BALLAST 9 ACTUAL LEVEL	Read-only	Actual BALLAST9 state. Value range 0-255. (255 - fault)
30170	169	0xA9	DALI1 BALLAST 10 ACTUAL LEVEL	Read-only	Actual BALLAST10 state. Value range 0-255. (255 - fault)
30171	170	0xAA	DALI1 BALLAST 11 ACTUAL LEVEL	Read-only	Actual BALLAST11 state. Value range 0-255. (255 - fault)
30172	171	0xAB	DALI1 BALLAST 12 ACTUAL LEVEL	Read-only	Actual BALLAST12 state. Value range 0-255. (255 - fault)
30173	172	0xAC	DALI1 BALLAST 13 ACTUAL LEVEL	Read-only	Actual BALLAST13 state. Value range 0-255. (255 - fault)
30174	173	0xAD	DALI1 BALLAST 14 ACTUAL LEVEL	Read-only	Actual BALLAST14 state. Value range 0-255. (255 - fault)
30175	174	0xAE	DALI1 BALLAST 15 ACTUAL LEVEL	Read-only	Actual BALLAST15 state. Value range 0-255. (255 - fault)
30176	175	0xAF	DALI1 BALLAST 16 ACTUAL LEVEL	Read-only	Actual BALLAST16 state. Value range 0-255. (255 - fault)
30177	176	0xB0	DALI2 BALLAST 1 ACTUAL LEVEL	Read-only	Actual BALLAST1 state. Value range 0-255. (255 - fault)
30178	177	0xB1	DALI2 BALLAST 2 ACTUAL LEVEL	Read-only	Actual BALLAST2 state. Value range 0-255. (255 - fault)
30179	178	0xB2	DALI2 BALLAST 3 ACTUAL LEVEL	Read-only	Actual BALLAST3 state. Value range 0-255. (255 - fault)
30180	179	0xB3	DALI2 BALLAST 4 ACTUAL LEVEL	Read-only	Actual BALLAST4 state. Value range 0-255. (255 - fault)
30181	180	0xB4	DALI2 BALLAST 5 ACTUAL LEVEL	Read-only	Actual BALLAST5 state. Value range 0-255. (255 - fault)

Modbus Address	Decimal Address	Hex Address	Register Name	Access	Description
30182	181	0xB5	DALI2 BALLAST 6 ACTUAL LEVEL	Read-only	Actual BALLAST6 state. Value range 0-255. (255 - fault)
30183	182	0xB6	DALI2 BALLAST 7 ACTUAL LEVEL	Read-only	Actual BALLAST7 state. Value range 0-255. (255 - fault)
30184	183	0xB7	DALI2 BALLAST 8 ACTUAL LEVEL	Read-only	Actual BALLAST8 state. Value range 0-255. (255 - fault)
30185	184	0xB8	DALI2 BALLAST 9 ACTUAL LEVEL	Read-only	Actual BALLAST9 state. Value range 0-255. (255 - fault)
30186	185	0xB9	DALI2 BALLAST 10 ACTUAL LEVEL	Read-only	Actual BALLAST10 state. Value range 0-255. (255 - fault)
30187	186	0xBA	DALI2 BALLAST 11 ACTUAL LEVEL	Read-only	Actual BALLAST11 state. Value range 0-255. (255 - fault)
30188	187	0xBB	DALI2 BALLAST 12 ACTUAL LEVEL	Read-only	Actual BALLAST12 state. Value range 0-255. (255 - fault)
30189	188	0xBC	DALI2 BALLAST 13 ACTUAL LEVEL	Read-only	Actual BALLAST13 state. Value range 0-255. (255 - fault)
30190	189	0xBD	DALI2 BALLAST 14 ACTUAL LEVEL	Read-only	Actual BALLAST14 state. Value range 0-255. (255 - fault)
30191	190	0xBE	DALI2 BALLAST 15 ACTUAL LEVEL	Read-only	Actual BALLAST15 state. Value range 0-255. (255 - fault)
30192	191	0xBF	DALI2 BALLAST 16 ACTUAL LEVEL	Read-only	Actual BALLAST16 state. Value range 0-255. (255 - fault)
30225	224	0xE0	DALI1 DISCOVERY PROGRESS	Read-only	Value range 0-100%.
30226	225	0xE1	DALI2 DISCOVERY PROGRESS	Read-only	Value range 0-100%.
30229	228	0xE4	DALI1 RECEIVED FRAMES COUNTER	Read-only	Number of correct answers from ballasts on DALI1 interface

Modbus Address	Decimal Address	Hex Address	Register Name	Access	Description
30231	230	0xE6	DALI2 RECEIVED FRAMES COUNTER	Read-only	Number of correct answers from ballasts on DALI2 interface
30237	236	0xEC	DALI1 ERROR FRAMES COUNTER	Read-only	Number of incorrect answers from ballasts on DALI1 interface
30239	238	0xEE	DALI2 ERROR FRAMES COUNTER	Read-only	Number of incorrect answers from ballasts on DALI2 interface
30245	244	0xF4	DALI1 TRANSMITTED FRAMES COUNTER	Read-only	Number of send commands to ballasts on DALI1 interface
30247	246	0xF6	DALI2 TRANSMITTED FRAMES COUNTER	Read-only	Number of send commands to ballasts on DALI2 interface
40253	252	0xFC	DALI COMMAND REGISTER	Read/Write Memory	Value range 0-1. (0 – OFF (default); 1 – ON) Bit0 – DALI1 ON/OFF state Bit1 – DALI1 Broadcast Last Scene Bit2 – DALI1 Broadcast OFF Bit3 – DI1 Command Bit4 – DALI2 ON/OFF state Bit5 – DALI2 Broadcast Last Scene Bit6 – DALI2 Broadcast OFF Bit7 – DI2 Command

Modbus Address	Decimal Address	Hex Address	Register Name	Access	Description
40254	253	0xFD	DALI1 CFG REGISTER	Read/Write Memory	Value range 0-1. Bit0 – DALI1 ON/OFF state (0 – OFF (default); 1 – ON) Bit1 – Broadcast Last Scene (0 – OFF (default); 1 – ON) Bit2 – Broadcast OFF (0 – OFF (default); 1 – ON) Bit3 – SI1 Blocking (0 – OFF; 1 – ON (default)) Bit4 – DI1 Dimming OFF (0 – Active (default); 1 – Inactive) Bit11 – All ballasts reset (0 – OFF (default); 1 – ON) Bit12 – Discover new initialization (0 – OFF (default); 1 – ON) Bit13 – Replace ballast (0 – OFF (default); 1 – ON) Bit14 – Add new ballast (0 – OFF (default); 1 – ON) Bit15 – Clear short addresses (0 – OFF (default); 1 – ON)
40255	254	0xFE	DALI2 CFG REGISTER	Read/Write Memory	Value range 0-1. Bit0 – DALI1 ON/OFF state (0 – OFF (default); 1 – ON) Bit1 – Broadcast Last Scene (0 – OFF (default); 1 – ON) Bit2 – Broadcast OFF (0 – OFF (default); 1 – ON) Bit3 – SI1 Blocking (0 – OFF; 1 – ON (default)) Bit4 – DI1 Dimming OFF (0 – Active (default); 1 – Inactive) Bit11 – All ballasts reset (0 – OFF (default); 1 – ON) Bit12 – Discover new initialization (0 – OFF (default); 1 – ON) Bit13 – Replace ballast (0 – OFF (default); 1 – ON) Bit14 – Add new ballast (0 – OFF (default); 1 – ON) Bit15 – Clear short addresses (0 – OFF (default); 1 – ON)

Modbus Address	Decimal Address	Hex Address	Register Name	Access	Description
40258	257	0x101	DALI1 NUMBER OF BALLASTS	Read-only	Give the number of detected ballasts on DALI1 interface
40259	258	0x102	DALI2 NUMBER OF BALLASTS	Read-only	Give the number of detected ballasts on DALI2 interface
40262	261	0x105	DALI1 BLINK REGISTER	Read/Write Memory	Ballasts blinking procedure. Value 1 will turn ON blinking until value 0 would be send or device would be reset. Bit0 – Ballast 1 blink Bit1 – Ballast 2 blink Bit2 – Ballast 3 blink Bit3 – Ballast 4 blink Bit4 – Ballast 5 blink Bit5 – Ballast 6 blink Bit6 – Ballast 7 blink Bit7 – Ballast 8 blink Bit8 – Ballast 9 blink Bit9 – Ballast 10 blink Bit10 – Ballast 11 blink Bit11 – Ballast 12 blink Bit12 – Ballast 13 blink Bit13 – Ballast 14 blink Bit14 – Ballast 15 blink Bit15 – Ballast 16 blink

Modbus Address	Decimal Address	Hex Address	Register Name	Access	Description
40263	262	0x106	DALI2 BLINK REGISTER	Read/Write Memory	Ballasts blinking procedure. Value 1 will turn ON blinking until value 0 would be send or device would be reset. Bit0 – Ballast 1 blink Bit1 – Ballast 2 blink Bit2 – Ballast 3 blink Bit3 – Ballast 4 blink Bit4 – Ballast 5 blink Bit5 – Ballast 6 blink Bit6 – Ballast 7 blink Bit7 – Ballast 8 blink Bit8 – Ballast 9 blink Bit9 – Ballast 10 blink Bit10 – Ballast 11 blink Bit11 – Ballast 12 blink Bit12 – Ballast 13 blink Bit13 – Ballast 14 blink Bit14 – Ballast 15 blink Bit15 – Ballast 16 blink
40266	265	0x109	DALI1 DIMMING STATE	Read/Write Memory	Value is set from BMS – send after every value change. 255 – will stop fade if it is in process and stops there. Value range 0 - 255.
40267	266	0x10A	DALI2 DIMMING STATE	Read/Write Memory	Value is set from BMS – send after every value change. 255 – will stop fade if it is in process and stops there. Value range 0 - 255.
40270	269	0x10D	DALI1 BALLAST1 SETPOINT	Read/Write Memory	Value range 1-254. (254 – default)
40271	270	0x10E	DALI1 BALLAST2 SETPOINT	Read/Write Memory	Value range 1-254. (254 – default)
40272	271	0x10F	DALI1 BALLAST3 SETPOINT	Read/Write Memory	Value range 1-254. (254 – default)
40273	272	0x110	DALI1 BALLAST4 SETPOINT	Read/Write Memory	Value range 1-254. (254 – default)
40274	273	0x111	DALI1 BALLAST5 SETPOINT	Read/Write Memory	Value range 1-254. (254 – default)

Modbus Address	Decimal Address	Hex Address	Register Name	Access	Description
40275	274	0x112	DALI1 BALLAST6 SETPOINT	Read/Write Memory	Value range 1-254. (254 – default)
40276	275	0x113	DALI1 BALLAST7 SETPOINT	Read/Write Memory	Value range 1-254. (254 – default)
40277	276	0x114	DALI1 BALLAST8 SETPOINT	Read/Write Memory	Value range 1-254. (254 – default)
40278	277	0x115	DALI1 BALLAST9 SETPOINT	Read/Write Memory	Value range 1-254. (254 – default)
40279	278	0x116	DALI1 BALLAST10 SETPOINT	Read/Write Memory	Value range 1-254. (254 – default)
40280	279	0x117	DALI1 BALLAST11 SETPOINT	Read/Write Memory	Value range 1-254. (254 – default)
40281	280	0x118	DALI1 BALLAST12 SETPOINT	Read/Write Memory	Value range 1-254. (254 – default)
40282	281	0x119	DALI1 BALLAST13 SETPOINT	Read/Write Memory	Value range 1-254. (254 – default)
40283	282	0x11A	DALI1 BALLAST14 SETPOINT	Read/Write Memory	Value range 1-254. (254 – default)
40284	283	0x11B	DALI1 BALLAST15 SETPOINT	Read/Write Memory	Value range 1-254. (254 – default)
40285	284	0x11C	DALI1 BALLAST16 SETPOINT	Read/Write Memory	Value range 1-254. (254 – default)
40286	285	0x11D	DALI2 BALLAST1 SETPOINT	Read/Write Memory	Value range 1-254. (254 – default)
40287	286	0x11E	DALI2 BALLAST2 SETPOINT	Read/Write Memory	Value range 1-254. (254 – default)
40288	287	0x11F	DALI2 BALLAST3 SETPOINT	Read/Write Memory	Value range 1-254. (254 – default)
40289	288	0x120	DALI2 BALLAST4 SETPOINT	Read/Write Memory	Value range 1-254. (254 – default)
40290	289	0x121	DALI2 BALLAST5 SETPOINT	Read/Write Memory	Value range 1-254. (254 – default)
40291	290	0x122	DALI2 BALLAST6 SETPOINT	Read/Write Memory	Value range 1-254. (254 – default)
40292	291	0x123	DALI2 BALLAST7 SETPOINT	Read/Write Memory	Value range 1-254. (254 – default)

Modbus Address	Decimal Address	Hex Address	Register Name	Access	Description
40293	292	0x124	DALI2 BALLAST8 SETPOINT	Read/Write Memory	Value range 1-254. (254 – default)
40294	293	0x125	DALI2 BALLAST9 SETPOINT	Read/Write Memory	Value range 1-254. (254 – default)
40295	294	0x126	DALI2 BALLAST10 SETPOINT	Read/Write Memory	Value range 1-254. (254 – default)
40296	295	0x127	DALI2 BALLAST11 SETPOINT	Read/Write Memory	Value range 1-254. (254 – default)
40297	296	0x128	DALI2 BALLAST12 SETPOINT	Read/Write Memory	Value range 1-254. (254 – default)
40298	297	0x129	DALI2 BALLAST13 SETPOINT	Read/Write Memory	Value range 1-254. (254 – default)
40299	298	0x12A	DALI2 BALLAST14 SETPOINT	Read/Write Memory	Value range 1-254. (254 – default)
40300	299	0x12B	DALI2 BALLAST15 SETPOINT	Read/Write Memory	Value range 1-254. (254 – default)
40301	300	0x12C	DALI2 BALLAST16 SETPOINT	Read/Write Memory	Value range 1-254. (254 – default)
40334	333	0x14D	DALI1 BALLAST1 MIN	Read/Write Memory	Minimum setpoint value. Value range 0-253. (0 – default)
40335	334	0x14E	DALI1 BALLAST2 MIN	Read/Write Memory	Minimum setpoint value. Value range 0-253. (0 – default)
40336	335	0x14F	DALI1 BALLAST3 MIN	Read/Write Memory	Minimum setpoint value. Value range 0-253. (0 – default)
40337	336	0x150	DALI1 BALLAST4 MIN	Read/Write Memory	Minimum setpoint value. Value range 0-253. (0 – default)
40338	337	0x151	DALI1 BALLAST5 MIN	Read/Write Memory	Minimum setpoint value. Value range 0-253. (0 – default)
40339	338	0x152	DALI1 BALLAST6 MIN	Read/Write Memory	Minimum setpoint value. Value range 0-253. (0 – default)

Modbus Address	Decimal Address	Hex Address	Register Name	Access	Description
40340	339	0x153	DALI1 BALLAST7 MIN	Read/Write Memory	Minimum setpoint value. Value range 0-253. (0 – default)
40341	340	0x154	DALI1 BALLAST8 MIN	Read/Write Memory	Minimum setpoint value. Value range 0-253. (0 – default)
40342	341	0x155	DALI1 BALLAST9 MIN	Read/Write Memory	Minimum setpoint value. Value range 0-253. (0 – default)
40343	342	0x156	DALI1 BALLAST10 MIN	Read/Write Memory	Minimum setpoint value. Value range 0-253. (0 – default)
40344	343	0x157	DALI1 BALLAST11 MIN	Read/Write Memory	Minimum setpoint value. Value range 0-253. (0 – default)
40345	344	0x158	DALI1 BALLAST12 MIN	Read/Write Memory	Minimum setpoint value. Value range 0-253. (0 – default)
40346	345	0x159	DALI1 BALLAST13 MIN	Read/Write Memory	Minimum setpoint value. Value range 0-253. (0 – default)
40347	346	0x15A	DALI1 BALLAST14 MIN	Read/Write Memory	Minimum setpoint value. Value range 0-253. (0 – default)
40348	347	0x15B	DALI1 BALLAST15 MIN	Read/Write Memory	Minimum setpoint value. Value range 0-253. (0 – default)
40349	348	0x15C	DALI1 BALLAST16 MIN	Read/Write Memory	Minimum setpoint value. Value range 0-253. (0 – default)
40350	349	0x15D	DALI2 BALLAST1 MIN	Read/Write Memory	Minimum setpoint value. Value range 0-253. (0 – default)
40351	350	0x15E	DALI2 BALLAST2 MIN	Read/Write Memory	Minimum setpoint value. Value range 0-253. (0 – default)
40352	351	0x15F	DALI2 BALLAST3 MIN	Read/Write Memory	Minimum setpoint value. Value range 0-253. (0 – default)

Modbus Address	Decimal Address	Hex Address	Register Name	Access	Description
40353	352	0x160	DALI2 BALLAST4 MIN	Read/Write Memory	Minimum setpoint value. Value range 0-253. (0 – default)
40354	353	0x161	DALI2 BALLAST5 MIN	Read/Write Memory	Minimum setpoint value. Value range 0-253. (0 – default)
40355	354	0x162	DALI2 BALLAST6 MIN	Read/Write Memory	Minimum setpoint value. Value range 0-253. (0 – default)
40356	355	0x163	DALI2 BALLAST7 MIN	Read/Write Memory	Minimum setpoint value. Value range 0-253. (0 – default)
40357	356	0x164	DALI2 BALLAST8 MIN	Read/Write Memory	Minimum setpoint value. Value range 0-253. (0 – default)
40358	357	0x165	DALI2 BALLAST9 MIN	Read/Write Memory	Minimum setpoint value. Value range 0-253. (0 – default)
40359	358	0x166	DALI2 BALLAST10 MIN	Read/Write Memory	Minimum setpoint value. Value range 0-253. (0 – default)
40360	359	0x167	DALI2 BALLAST11 MIN	Read/Write Memory	Minimum setpoint value. Value range 0-253. (0 – default)
40361	360	0x168	DALI2 BALLAST12 MIN	Read/Write Memory	Minimum setpoint value. Value range 0-253. (0 – default)
40362	361	0x169	DALI2 BALLAST13 MIN	Read/Write Memory	Minimum setpoint value. Value range 0-253. (0 – default)
40363	362	0x16A	DALI2 BALLAST14 MIN	Read/Write Memory	Minimum setpoint value. Value range 0-253. (0 – default)
40364	363	0x16B	DALI2 BALLAST15 MIN	Read/Write Memory	Minimum setpoint value. Value range 0-253. (0 – default)
40365	364	0x16C	DALI2 BALLAST16 MIN	Read/Write Memory	Minimum setpoint value. Value range 0-253. (0 – default)

Modbus Address	Decimal Address	Hex Address	Register Name	Access	Description
40398	397	0x18D	DALI1 BALLAST1 MAX	Read/Write Memory	Maximum setpoint value. Value range 1-254. (254 – default)
40399	398	0x18E	DALI1 BALLAST2 MAX	Read/Write Memory	Maximum setpoint value. Value range 1-254. (254 – default)
40400	399	0x18F	DALI1 BALLAST3 MAX	Read/Write Memory	Maximum setpoint value. Value range 1-254. (254 – default)
40401	400	0x190	DALI1 BALLAST4 MAX	Read/Write Memory	Maximum setpoint value. Value range 1-254. (254 – default)
40402	401	0x191	DALI1 BALLAST5 MAX	Read/Write Memory	Maximum setpoint value. Value range 1-254. (254 – default)
40403	402	0x192	DALI1 BALLAST6 MAX	Read/Write Memory	Maximum setpoint value. Value range 1-254. (254 – default)
40404	403	0x193	DALI1 BALLAST7 MAX	Read/Write Memory	Maximum setpoint value. Value range 1-254. (254 – default)
40405	404	0x194	DALI1 BALLAST8 MAX	Read/Write Memory	Maximum setpoint value. Value range 1-254. (254 – default)
40406	405	0x195	DALI1 BALLAST9 MAX	Read/Write Memory	Maximum setpoint value. Value range 1-254. (254 – default)
40407	406	0x196	DALI1 BALLAST10 MAX	Read/Write Memory	Maximum setpoint value. Value range 1-254. (254 – default)
40408	407	0x197	DALI1 BALLAST11 MAX	Read/Write Memory	Maximum setpoint value. Value range 1-254. (254 – default)
40409	408	0x198	DALI1 BALLAST12 MAX	Read/Write Memory	Maximum setpoint value. Value range 1-254. (254 – default)
40410	409	0x199	DALI1 BALLAST13 MAX	Read/Write Memory	Maximum setpoint value. Value range 1-254. (254 – default)

Modbus Address	Decimal Address	Hex Address	Register Name	Access	Description
40411	410	0x19A	DALI1 BALLAST14 MAX	Read/Write Memory	Maximum setpoint value. Value range 1-254. (254 – default)
40412	411	0x19B	DALI1 BALLAST15 MAX	Read/Write Memory	Maximum setpoint value. Value range 1-254. (254 – default)
40413	412	0x19C	DALI1 BALLAST16 MAX	Read/Write Memory	Maximum setpoint value. Value range 1-254. (254 – default)
40414	413	0x19D	DALI2 BALLAST1 MAX	Read/Write Memory	Maximum setpoint value. Value range 1-254. (254 – default)
40415	414	0x19E	DALI2 BALLAST2 MAX	Read/Write Memory	Maximum setpoint value. Value range 1-254. (254 – default)
40416	415	0x19F	DALI2 BALLAST3 MAX	Read/Write Memory	Maximum setpoint value. Value range 1-254. (254 – default)
40417	416	0x1A0	DALI2 BALLAST4 MAX	Read/Write Memory	Maximum setpoint value. Value range 1-254. (254 – default)
40418	417	0x1A1	DALI2 BALLAST5 MAX	Read/Write Memory	Maximum setpoint value. Value range 1-254. (254 – default)
40419	418	0x1A2	DALI2 BALLAST6 MAX	Read/Write Memory	Maximum setpoint value. Value range 1-254. (254 – default)
40420	419	0x1A3	DALI2 BALLAST7 MAX	Read/Write Memory	Maximum setpoint value. Value range 1-254. (254 – default)
40421	420	0x1A4	DALI2 BALLAST8 MAX	Read/Write Memory	Maximum setpoint value. Value range 1-254. (254 – default)
40422	421	0x1A5	DALI2 BALLAST9 MAX	Read/Write Memory	Maximum setpoint value. Value range 1-254. (254 – default)
40423	422	0x1A6	DALI2 BALLAST10 MAX	Read/Write Memory	Maximum setpoint value. Value range 1-254. (254 – default)

Modbus Address	Decimal Address	Hex Address	Register Name	Access	Description
40424	423	0x1A7	DALI2 BALLAST11 MAX	Read/Write Memory	Maximum setpoint value. Value range 1-254. (254 – default)
40425	424	0x1A8	DALI2 BALLAST12 MAX	Read/Write Memory	Maximum setpoint value. Value range 1-254. (254 – default)
40426	425	0x1A9	DALI2 BALLAST13 MAX	Read/Write Memory	Maximum setpoint value. Value range 1-254. (254 – default)
40427	426	0x1AA	DALI2 BALLAST14 MAX	Read/Write Memory	Maximum setpoint value. Value range 1-254. (254 – default)
40428	427	0x1AB	DALI2 BALLAST15 MAX	Read/Write Memory	Maximum setpoint value. Value range 1-254. (254 – default)
40429	428	0x1AC	DALI2 BALLAST16 MAX	Read/Write Memory	Maximum setpoint value. Value range 1-254. (254 – default)
40462	461	0x1CD	DALI1 FADE RATE	Read/Write Memory	Dimming speed. Value range 1-15. (1 – from MIN to MAX in 0.7 sec; 15 – from MIN to MAX in 90 sec)
40463	462	0x1CD	DALI2 FADE RATE	Read/Write Memory	Dimming speed. Value range 1-15. (1 – from MIN to MAX in 0.7 sec; 15 – from MIN to MAX in 90 sec)
40466	465	0x1D1	DALI1 FADE TIME	Read/Write Memory	Setpoint change speed. Value range 0-15. (0 – no transition; 15 – transition from one state to another state in 90 sec)
40467	466	0x1D2	DALI2 FADE TIME	Read/Write Memory	Setpoint change speed. Value range 0-15. (0 – no transition; 15 – transition from one state to another state in 90 sec)
40470	469	0x1D5	DALI1 POWER ON LEVEL	Read/Write Memory	Ballasts setpoint after power supply. Value range 0-254.
40471	470	0x1D6	DALI2 POWER ON LEVEL	Read/Write Memory	Ballasts setpoint after power supply. Value range 0-254.

Modbus Address	Decimal Address	Hex Address	Register Name	Access	Description
40474	473	0x1D9	DALI1 SYSTEM FAILURE LEVEL	Read/Write Memory	Ballasts setpoint after DALI interface failure or disconnect from it. Value range 0-254.
40475	474	0x1DA	DALI2 SYSTEM FAILURE LEVEL	Read/Write Memory	Ballasts setpoint after DALI interface failure or disconnect from it. Value range 0-254.
40489	488	0x1E8	LLC_SETPOINT_ZONE_1	Read/write	Setpoint value of the light level for zone 1 Value range: 0-60000 lx Default: 1000 lx
40490	489	0x1E9	LLC_SETPOINT_ZONE_2	Read/write	Setpoint value of the light level for zone 2 Value range: 0-60000 lx Default: 1000 lx
40493	492	0x1EC	LLC_ZONE_COUNT	Read/write	Quantity of zones to be controlled separately Value range: 1/2 Default: 2
40494	493	0x1ED	LUX_MIN_SENSOR_1	Read/write	Minimum value of the light level sensor for zone 1 Value range: 0-60000 lx Default: 0 lx
40495	494	0x1EE	LUX_MIN_SENSOR_2	Read/write	Minimum value of the light level sensor for zone 2 Value range: 0-60000 lx Default: 0 lx
40498	497	0x1F1	LUX_MAX_SENSOR_1	Read/write	Maximum value of the light level sensor for zone 1 Value range: 0-60000 lx Default: 3000 lx
40499	498	0x1F2	LUX_MAX_SENSOR_2	Read/write	Maximum value of the light level sensor for zone 2 Value range: 0-60000 lx Default: 3000 lx

Modbus Address	Decimal Address	Hex Address	Register Name	Access	Description
40478	477	0x1DD	LLC_OFFSET	Read/write	Offset value between the values controlled on the DALI2 bus in reference to the DALI1 bus Value range: -254 - 254 Default: 0
40502	501	0x1F5	LUX_SENSOR_TYPE_1	Read/write	Special input mode used to read the signal from the lux level sensor 1 Value range: 0-10 V [0], 0-5 V [1], 2-10 V [2], 0-20 mA [3], 4-20 mA [4] Default: 0-10 V
40503	502	0x1F6	LUX_SENSOR_TYPE_2	Read/write	Special input mode used to read the signal from the lux level sensor 2 Value range: 0-10 V [0], 0-5 V [1], 2-10 V [2], 0-20 mA [3], 4-20 mA [4] Default: 0-10 V
40506	505	0x1F9	LUX_SENSOR_ENABLE	Read/write	Enables either lux level sensor Value range: 0/1 Default: 1
40485	484	0x1E4	LLC_PIR_1_DIMM_TIME	Read/write	Time, which, upon expiring, dims the light in the zone 1 if the presence sensor detects no movement Value range: 0-65535 s Default: 0
40486	485	0x1E5	LLC_PIR_2_DIMM_TIME	Read/write	Time, which, upon expiring, dims the light in the zone 2 if the presence sensor detects no movement Value range: 0-65535 s Default: 0
40481	480	0x1E0	LLC_PIR_1_DIMM_LEVEL	Read/write	Dimmed light level after counting down the time set in the LLC_PIR_1_DIMM_TIME register Value range: 0-65535% Default: 20%

Modbus Address	Decimal Address	Hex Address	Register Name	Access	Description
40482	481	0x1E1	LLC_PIR_2_DIMM_LEVEL	Read/write	Dimmed light level after counting down the time set in the LLC_PIR_2_DIMM_TIME register Value range: 0-100% Default: 20%
40507	506	0x1FA	LLC_KP_ZONE_1	Read/write	Proportional gain of the PID controller for zone 1 Default: 0,021
40509	508	0x1FC	LLC_KP_ZONE_2	Read/write	Proportional gain of the PID controller for zone 2 Default: 0,021
40515	514	0x202	LLC_KI_ZONE_1	Read/write	Integral gain of the PID controller for zone 1 Default: 0,007
40517	516	0x204	LLC_KI_ZONE_2	Read/write	Integral gain of the PID controller for zone 2 Default: 0,007
40523	522	0x20A	LLC_KD_ZONE_1	Read/write	Derivative gain of the PID controller for zone 1 Default: 0,012
40525	524	0x20C	LLC_KD_ZONE_2	Read/write	Derivative gain of the PID controller for zone 2 Default: 0,012
40681	680	0x2A8	LUX_STATUS_1	Read-only	Light intensity value read from S1
40682	681	0x2A9	LUX_STATUS_2	Read-only	Light intensity value read from S2

Table 27. List of Modbus registers