iSMA-B-2D1B

User Manual

B-2D1B, B-2D1B-WD, B-2D, B-2D-WD

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1 Introduction

1.1 Revision history

Rev	Date	Description
1.0	2017.08.16	First edition

Table 1 Revision history

1.2 Safety rules

- Please note: incorrect wiring of this product can cause its damage and may result in other hazards. Make sure the product has been correctly wired before turning the power ON.
- Before wiring, or removing / mounting the product, be sure to turn the power OFF. Failure to do so might cause electric shock.
- Do not touch electrically charged parts such as the power terminals. Doing so might cause electric shock.
- Do not disassemble the product. Doing so might cause electric shock or faulty operation.
- Use the product within the operating ranges recommended in the specification (temperature, humidity, voltage, shock, mounting direction, atmosphere etc.). Failure to do so might cause fire or faulty operation.
- Tighten the wires firmly to the terminal. Insufficient tightening of the wires to the terminal might cause fire.

1.3 Technical specifications

Power supply	Voltage	230 V AC ± 10%
	Power consumption	Max 8 VA at iSMA-B-2D1B Max 7 VA at iSMA-B-2D
Special Inputs	Dry contact input	Output current ~0.2 mA
Digital Inputs	Type	Dry contact
	Max input frequency	100 Hz
Blind Output (relay) B-2D1B-(WD) only	Resistive load	max. 1.5 A at 230 V AC
	Inductive load AC3	max. 1.5 A at 230 V AC
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 Failsafe Receiver (Bus Open, Bus Shorted, Bus Idle)
	Communication protocols	Modbus RTU, Modbus 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 No	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 (B-2D(1B)-WD only)
	Maximum cable size	2.5 mm^2
Dimension	Width	124 mm
	Length	137 mm
	Height	55 mm

Table 2 Technical specifications

1.4 Dimensions

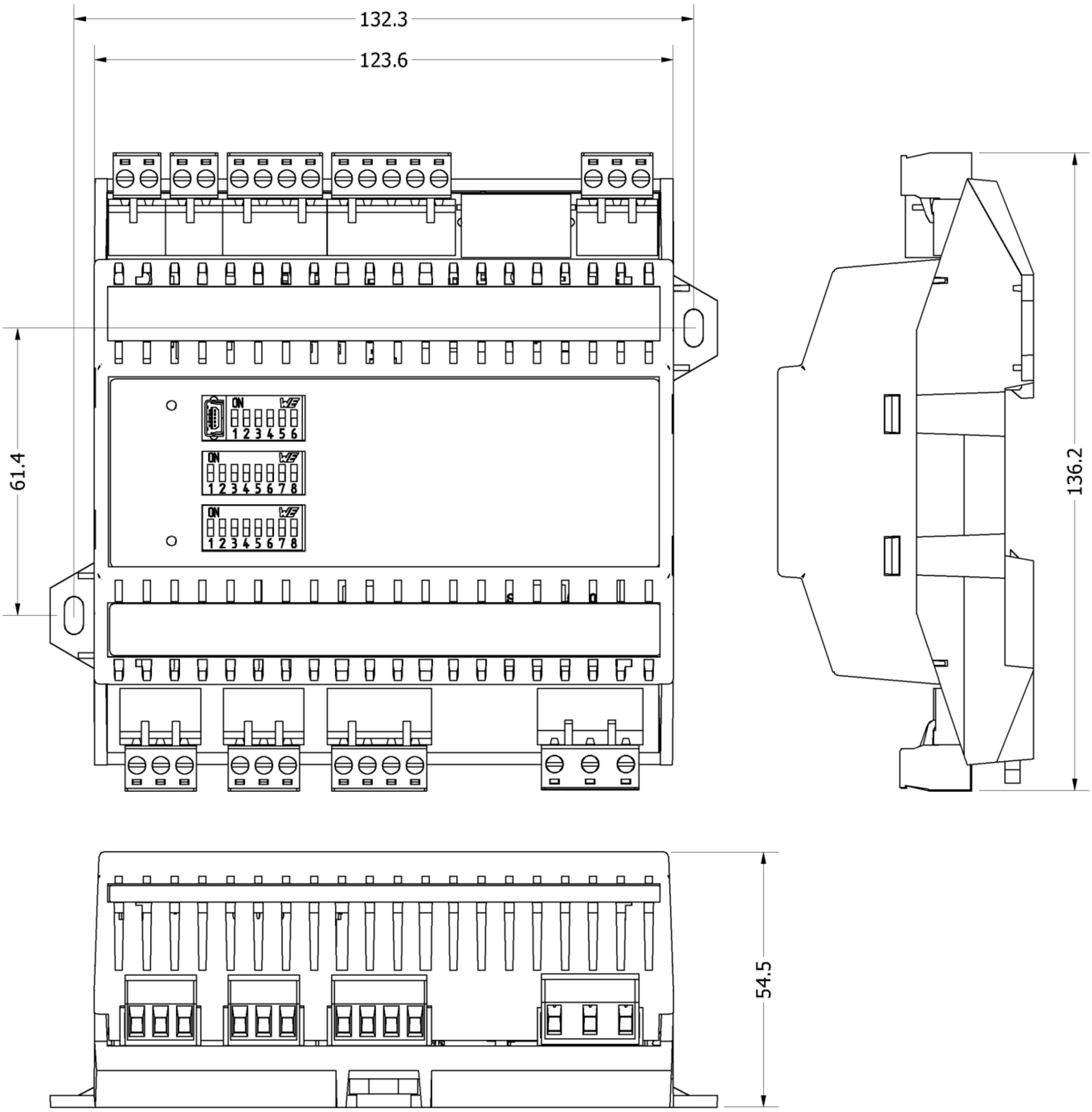


Figure 1 Dimensions of iSMA-B-2D(1B)

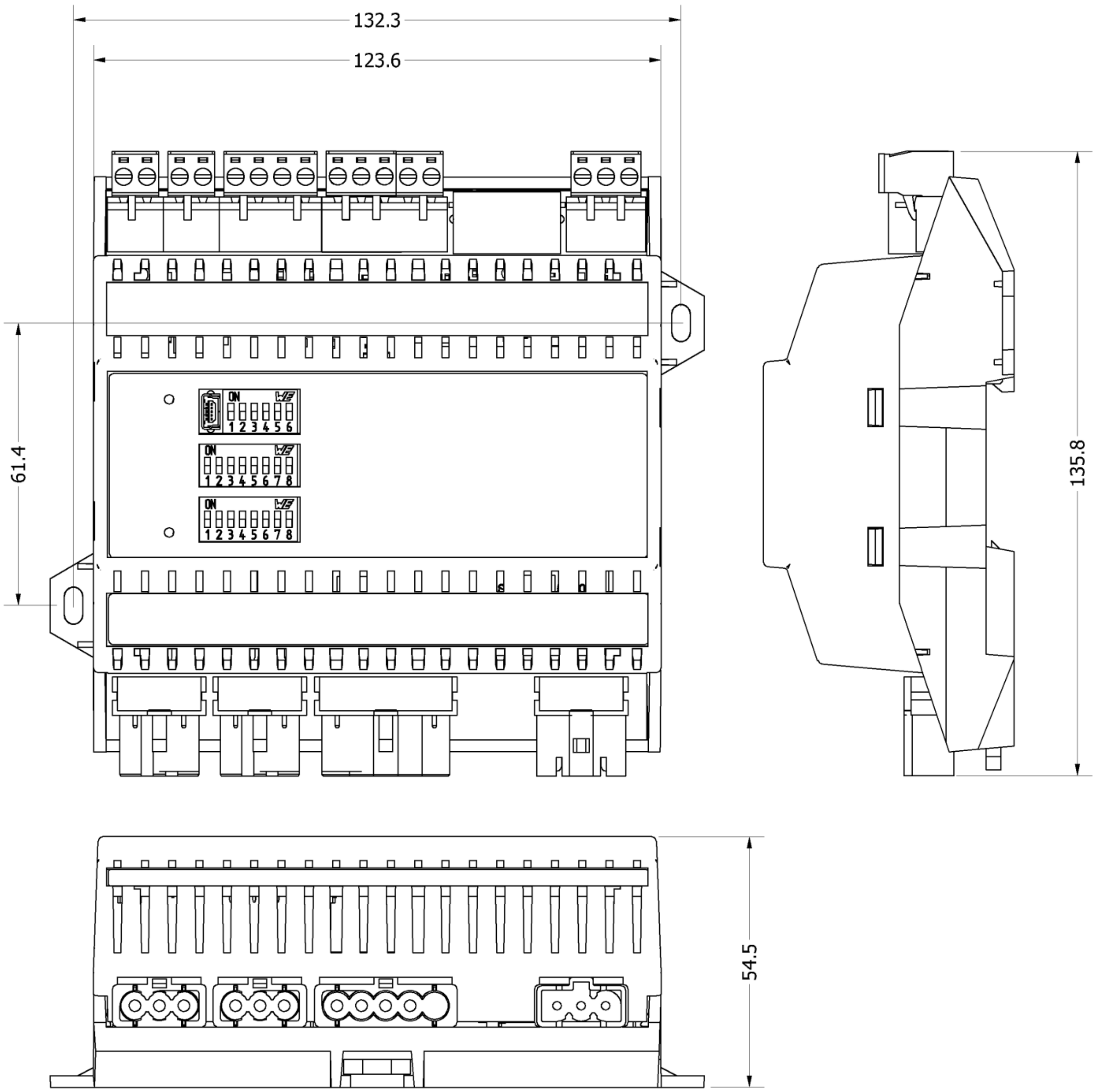


Figure 2 Dimensions of iSMA-B-2D1B-WD

2 Hardware specifications

2.1 Terminals and internal connection scheme

There are 4 types of hardware available:

- iSMA-B-2D
- iSMA-B-2D-WD
- iSMA-B-2D1B
- iSMA-B-2D1B-WD

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

2.1.1 iSMA-B-2D-(WD)

iSMA-B-2D-(WD) is equipped with 230 V AC power supply and 2x 230 V AC Normal Closed Light Outputs for the lamps power supplying power when the lighting is controlled by 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 ON/OFF light control mode.

The controller is equipped with 24 V DC power supply dedicated for power supplying 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 the outputs is 8 A!

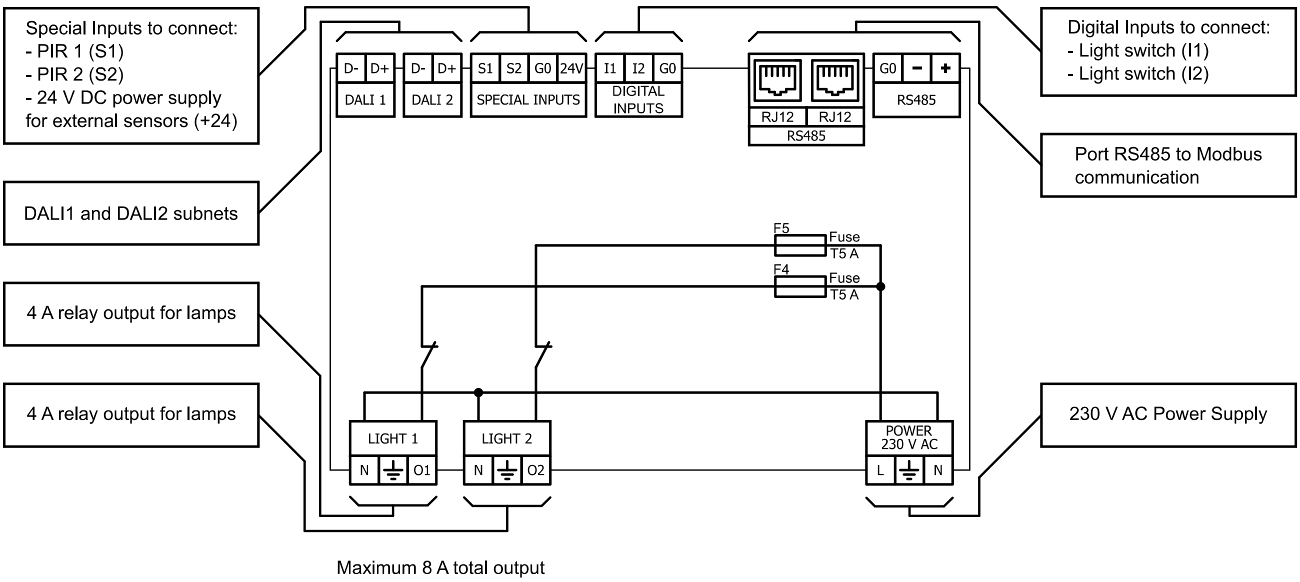


Figure 3 iSMA-B-2D-(WD) terminals and internal connections view

2.1.2 iSMA-B-2D1B-(WD)

iSMA-B-2D1B-(WD) is equipped with a 230 V AC power supply and 2x 230 V AC Normal Closed Light Outputs for the lamps for power supplying when the lighting is controlled with DALI network, and one double Blind Output dedicated to blind/shutter control. All these 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 ON/OFF light control mode.

The controller is equipped with a 24 V DC power supply dedicated for power supplying motion sensors\presence detectors which need an external power supply.

Input section consists of 2x Special Inputs dedicated for motion sensors / presence detectors connection and 4x Digital Inputs for connecting the switches.

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

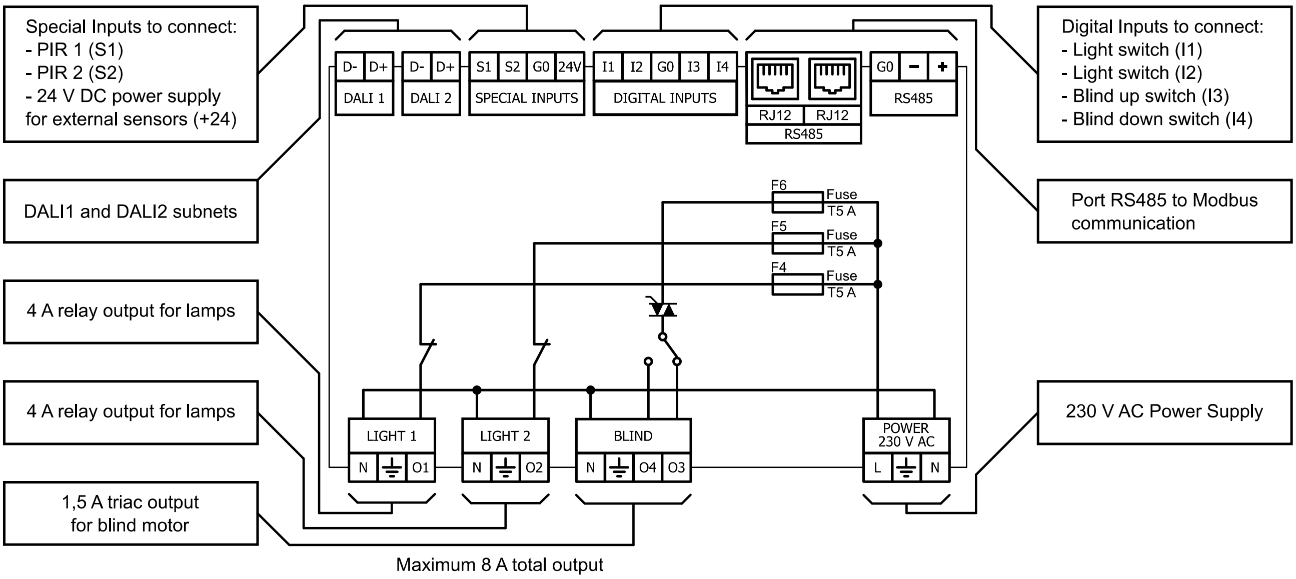


Figure 4 iSMA-B-2D1B-(WD) terminals and internal connection view

2.2 Power supply connection

2.2.1 230 V AC Power Supply

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

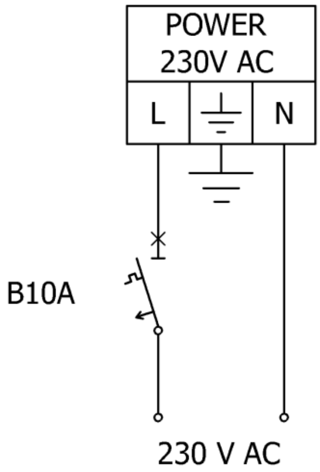


Figure 5 230 V AC power supply connection

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

2.2.2 24 V DC Power Supply for external equipment

The device is equipped with 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 nearby the Special Input connectors.

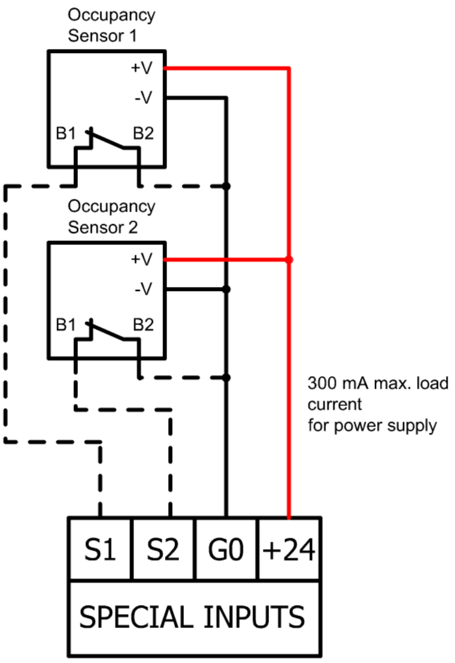


Figure 6 24V DC power supply output connection

2.3 Connecting the communication bus (RS485)

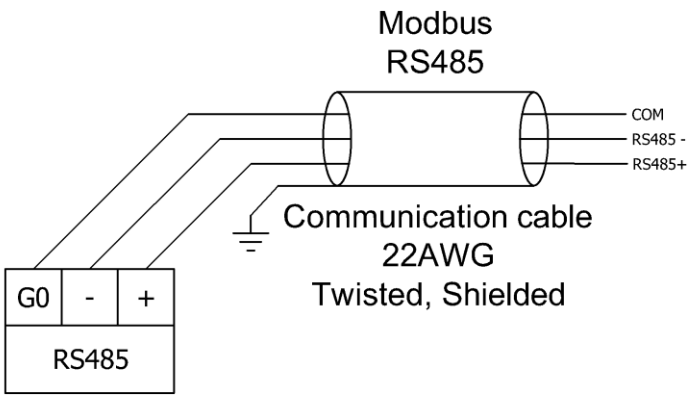


Figure 7 RS485 connection

2.3.1 RS485 Grounding and shielding

The device may be exposed to electromagnetic environment. The electromagnetic radiation may induce electrical noise into both power and signal lines, as well as direct radiation into the device, with negative effects for the operation of the device. Appropriate grounding, shielding, and other protective measures should be taken at the installation stage to prevent undesirable effects. Preventive measures include grounding the control cabinets, shield-grounding the cables, using protective elements for electromagnetic switching devices, using correct wiring and appropriate selection of types and cross sections of cables.

2.3.2 RS485 network termination

The transmission line often creates communication problems. These problems include reflections and signal attenuation.

To eliminate the presence of reflections at the ends of the bus cable, it must be terminated at both ends with a resistor across the line. The resistor value has to be the same as the characteristic impedance of the bus cable. Both ends must be terminated since the propagation is bidirectional. In case of an RS485 twisted pair cable, the termination is typically 120 Ω.

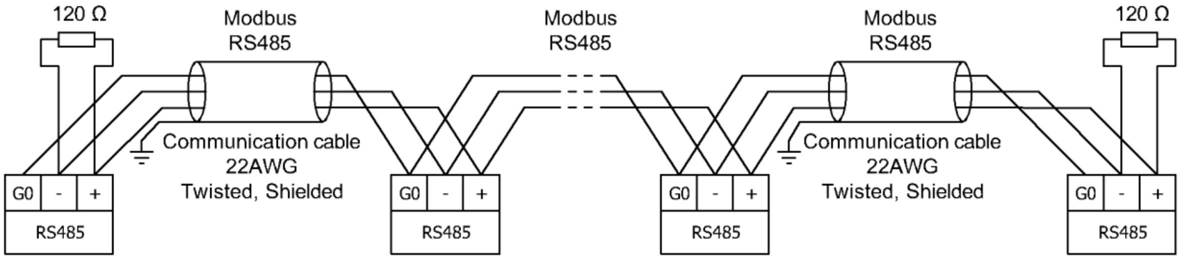


Figure 8 RS485 termination

2.4 RJ12 socket connection

The device is equipped with two parallel sockets with the same pin configuration. These sockets provide communication via 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.

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

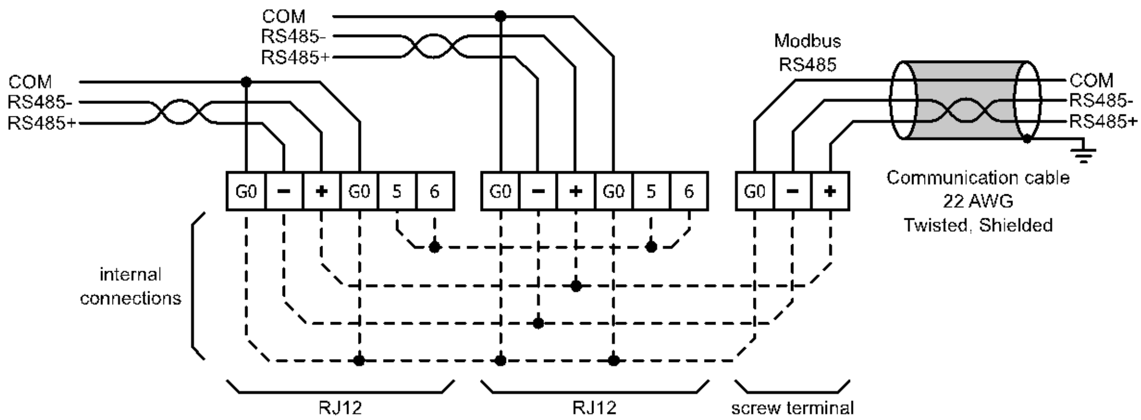
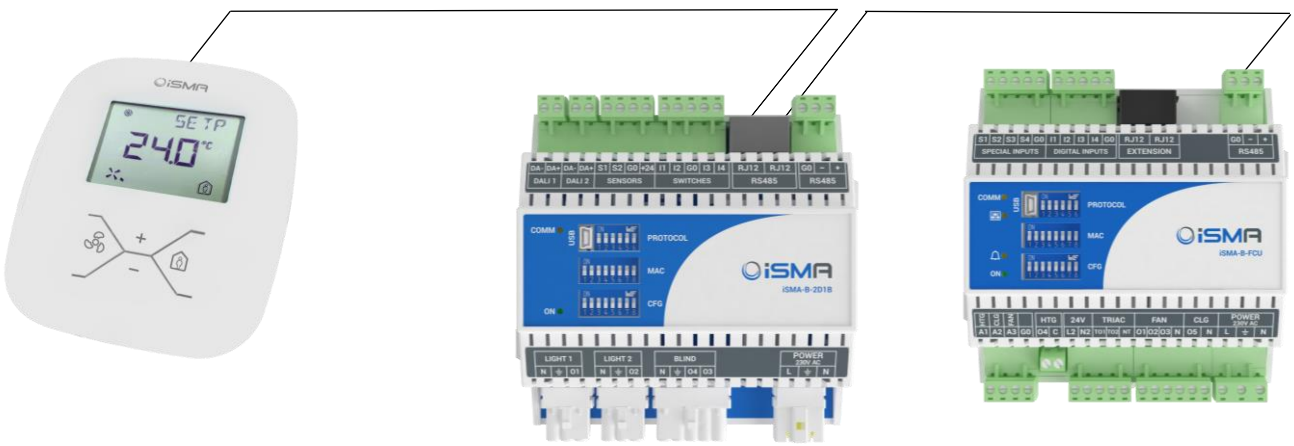


Figure 9 Internal connection between RJ12 sockets and the main RS485 socket

Power supply transferred over RJ12



LP 2D1B FCU

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

RJ12 pins are presented in the figure below.

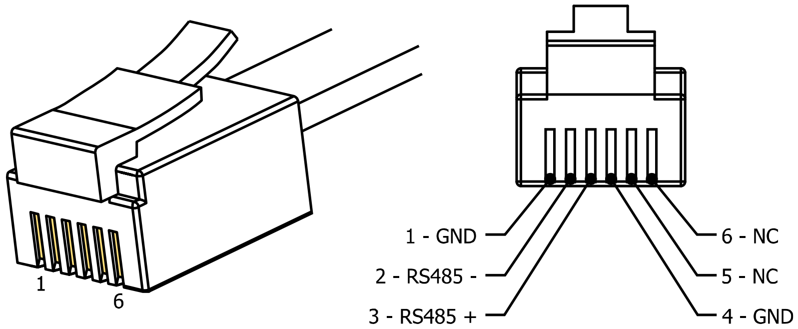


Figure 11 RJ12 pin description

When 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.

2.5 Mini USB Port

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

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

WARNING! When using USB port as the power supply for the device, it is not possible to commission and/or to manage DALI network(s)!

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 COMM 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.

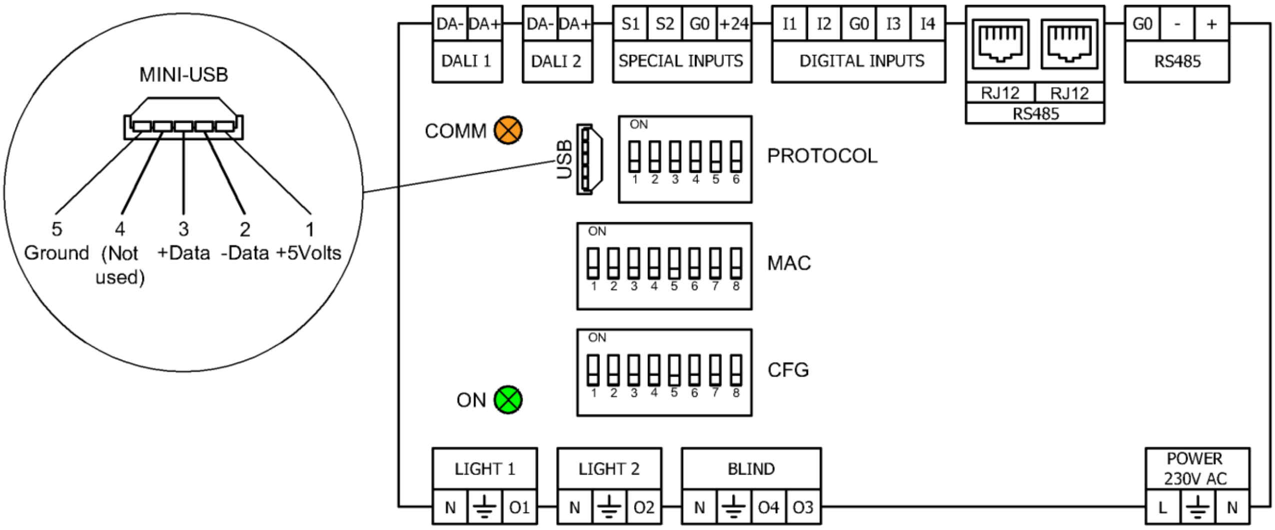


Figure 12 Mini-USB port pinout and LEDs

2.6 Setting Controller Address

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

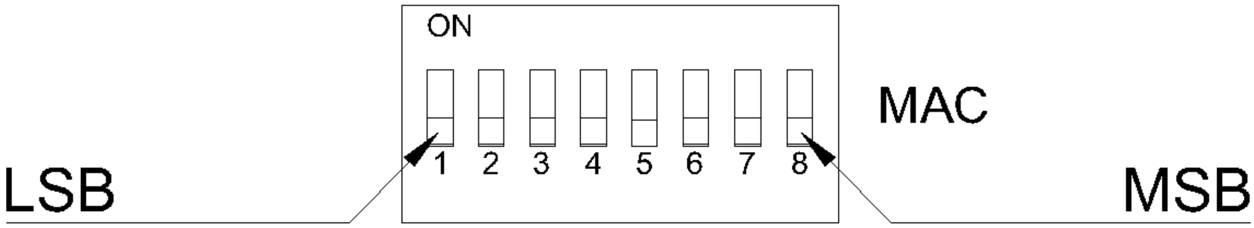


Figure 13 MAC Dip Switch

Dip 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
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 3 Setting the address with Dip Switch MAC

Example: Setting the device address to 83.

Address 83 contains the following multiplicity of the number 2:

83 = 1 + 2 + 16 + 64.

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 4 Configuration of the MAC DIP switch for address 83

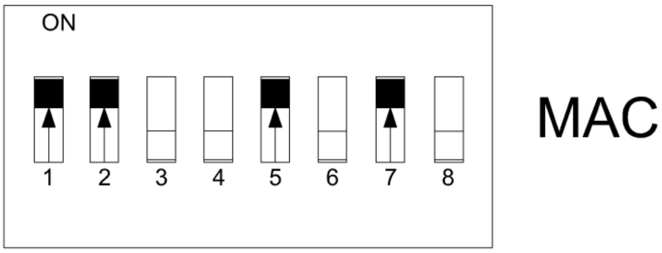


Figure 14 MAC DIP switch with address 83

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

2.7 Baud rate selection

Transmission baud rate is determined by S3 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 5 Baud rate selection

2.8 Protocol selection

Protocol selection is performed with sections 4 and 5 of switch S3 in accordance with the table below:

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

Table 6 Protocol selection

2.9 Restoring the default settings

WARNING! Be careful with using this function! All the registers are set back to their default settings, including I/O, DALI Interfaces, Blind Control, 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 ON position
3. Turn on the power supply, 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.

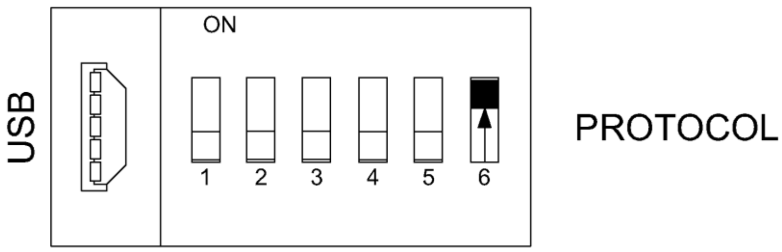


Figure 15 DIP-switch for restoring the default settings

2.10 The Default Settings

When 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
BLIND		
BLIND UP TIME	40601	0
BLIND DOWN TIME	40617	0
BLIND STATE	40649	0

BLIND OFF DELAY	40665	5
SLATS OPENING TIME	40633	1000
SLATS STATE	40657	0
SLATS NUMBER OF STEPS	40673	10
SLATS BLOCKING LOCAL	40600 bit 0	0 (UNBLOCKED)

Table 7 Default Settings

2.11 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 the commands that ballasts need to recognize in order to be considered 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 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 chapter.

The device allows for controlling DALI ballasts without 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.

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

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

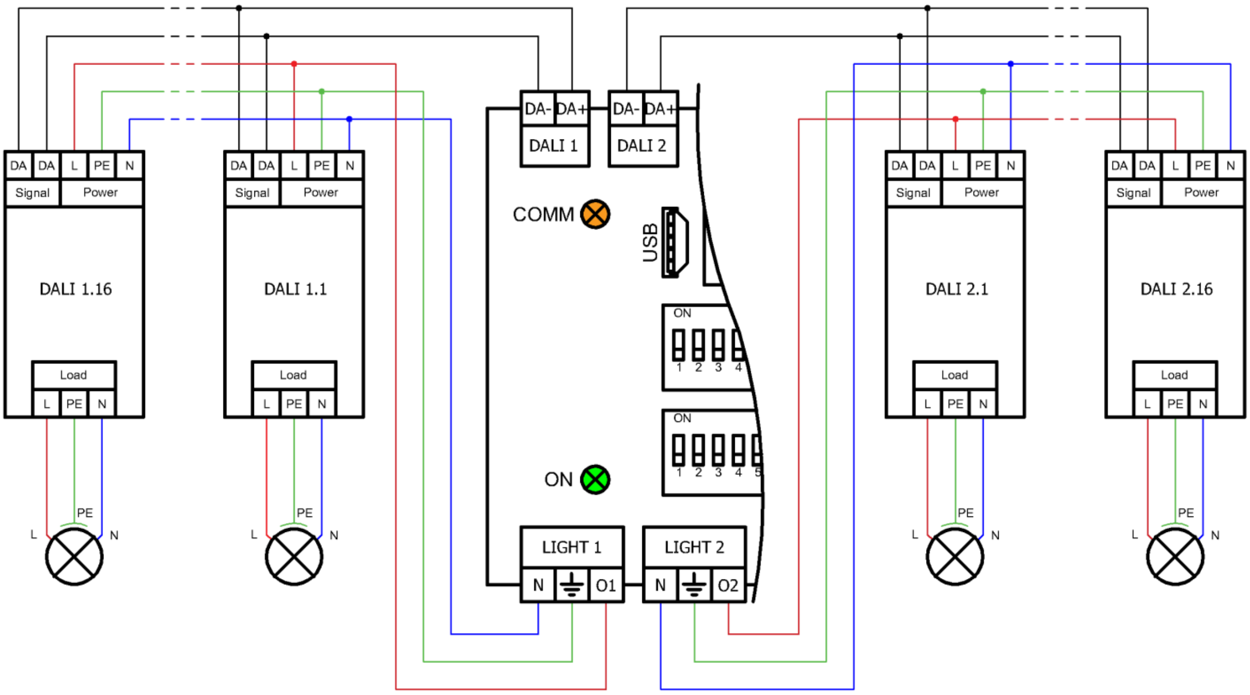


Figure 16 Connection of ballasts and lamps to the device.

2.12 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 (light or Blind Output (iSMA-B-2D1B-(WD)).

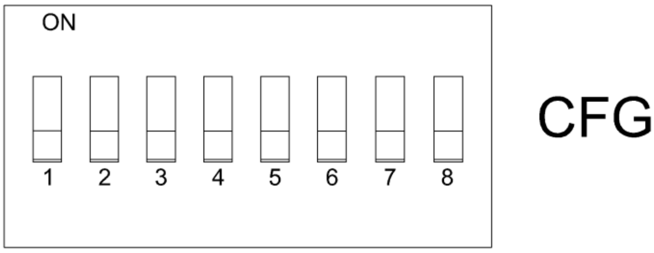


Figure 172 CFG DIP-switch

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 **DI1, DI2**	Changing between bistable and monostable switches connected to the Digital Input no 1 and 2
	Off	**Monostable** switches connected to Digital Inputs **DI1, DI2**	
2	On	Digital Input **DI1** controls **DALI1** and **DALI2** networks	Changing between the control modes of the Digital Input no 1
	Off	Digital Input **DI1** 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 **DI2** controls **DALI1** and **DALI2** networks	Changing between the control modes of the Digital Input no 2
	Off	Digital Input **DI2** controls only **DALI2** network	
5	On	Digital Input **SI2** controls **DALI1** and **DALI2** networks	Changing between the control modes of the Special Input no 2
	Off	Digital Input **SI2** controls only **DALI2** network	
6	On	Light control with **Light Outputs**	Changing between light control modes
	Off	Light control with **DALI**	
7	On	**Bistable** switches connected to Digital Inputs **DI3, DI4**	Changing between bistable and monostable switches connected to the Digital Input no 3 and 4
	Off	**Monostable** switches connected to Digital Inputs **DI3, DI4**	
8	On	**Blind Output** controls shutters (**slats** control)	Changing between control object type connected to the Blind Output
	Off	**Blind Output** controls blinds (without slats control)	

Table 8 CFG DIP-Switch Configuration

2.13 I/O

The device is equipped with inputs for two different purposes.

The two Digital Inputs **DI1 and DI2** 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, DI1/DI2 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 are designed for blind control (up and down movement). In case of blind/shutter control, up and down switches can be connected

The two Special inputs **SI1 and SI2** are designed for connecting motion sensors / presence detectors in order to use them in the light control algorithm.

The device is equipped with three types of outputs: 2 Light Outputs, 1 Blind Output, 1 Power Supply Output 24 V DC.

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

The light and Blind Outputs are fuse-protected.

WARNING! The maximum current for the Light Outputs, Blind Output, and 24 V DC Power Supply Output is **8 A!**

2.13.1 Special Inputs

The device is equipped with 2 Special Inputs.

SI1 and SI2 are designed for to controlling the light by connecting motion sensors or presence detectors. The way of connecting the signals is presented in the figure below.

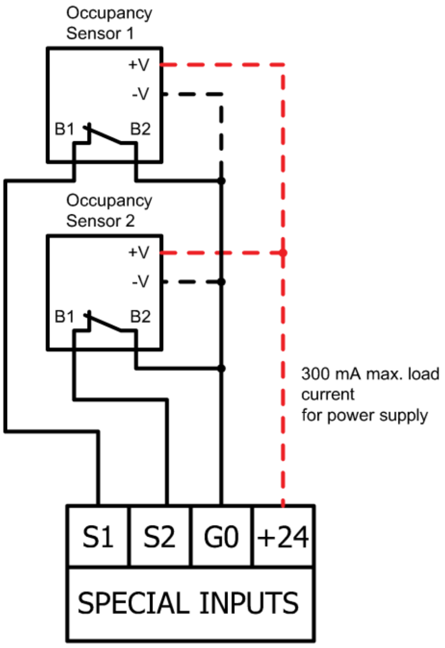


Figure 38 Connection of Special Inputs Dry Contact

2.13.2 Digital Inputs

The device is equipped with 4 Digital Inputs.

DI1 and DI2 are dedicated to control the light by connecting monostable or bistable switches.

DI3 and DI4 are used for double-switch connection in order to control blind/shutter (up and down movement).

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

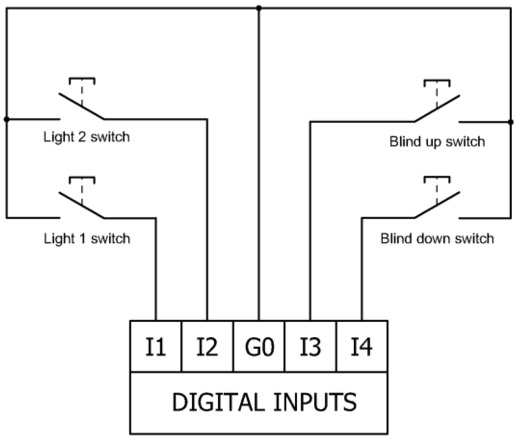


Figure 49 Connection of Digital Inputs Dry Contact

2.13.3 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 CFG DIP-switch segment no 6 (see CFG DIP-switch).

The light outputs are implemented in order to provide the opportunity to supply the lamps controlled by the DALI Interface with power. It allows for having full control over the lighting inside the one controller, without the necessity of supplying the lamps from the external source.

In addition, the Light Outputs work as Output Relays in 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 you have to remember that the maximum load current for the Light Output 1, Light Output 2, Blind Output, 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.

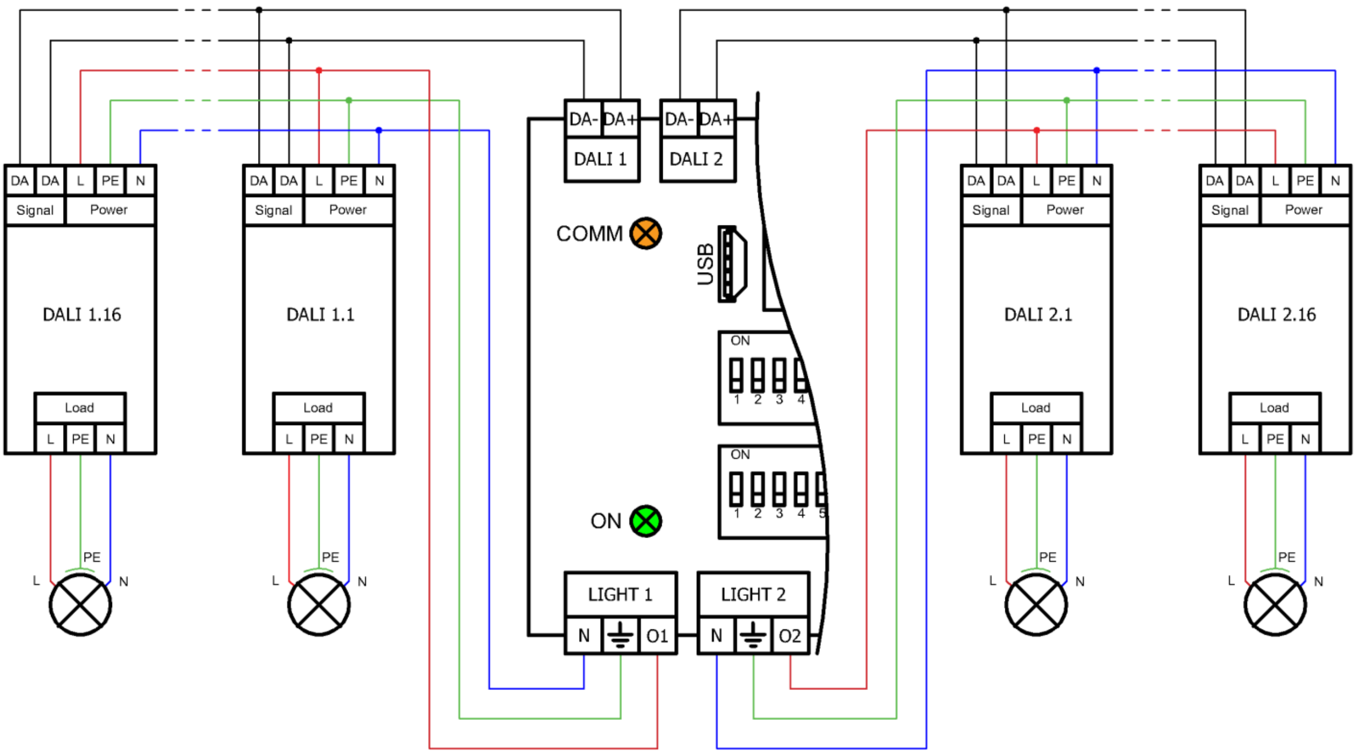


Figure 20 Connecting the ballasts to the LIGHT Outputs in DALI Control Mode

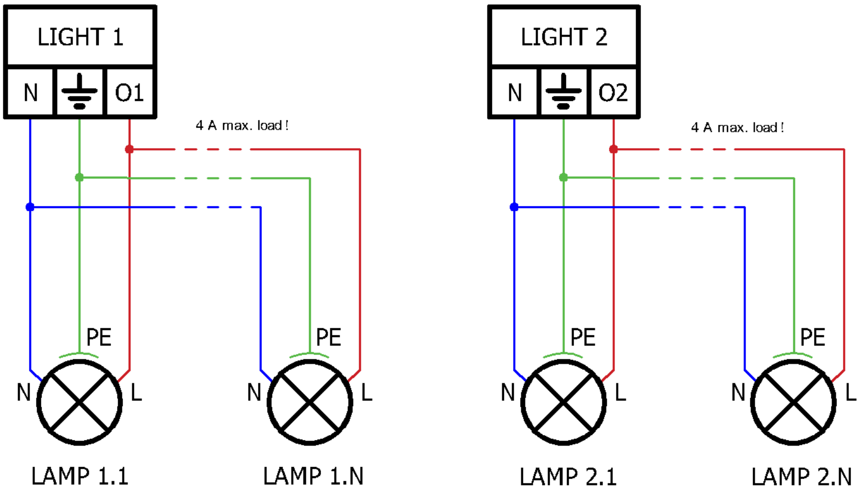


Figure 21 Connecting the lamps to the LIGHT Outputs in ON/OFF Control Mode

2.13.4 Blind Output (-2D1B-(WD) version only)

The iSMA-B-2D1B-(WD) device has one double Blind Output dedicated for blind/shutter control. Double 230 V AC Blind Output allows for controlling up and down movement of the blind/shutter.

The maximum load current of the output is 1.5 A.

WARNING! The maximum load current for the Light Outputs, Blind Output, and 24 V DC Power Supply Output is 8 A!

The status of a particular relay in the Blind Output (up and down movement) depends on in-built control algorithm, which is directly related to the states of Digital Inputs DI3 and DI4 (which can be changed by physical switches or by appropriate Modbus register commands). For more information, please refer to chapter 'Blind control function'.

The way of connecting a motor to the Blind Output is presented in the figure below.

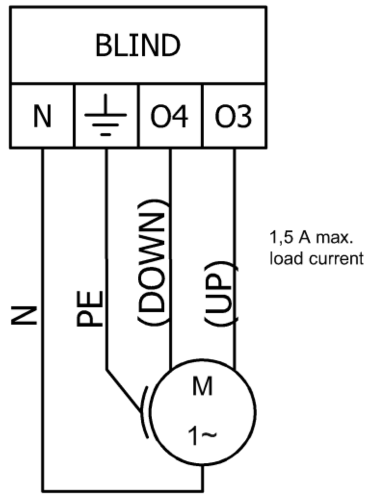


Figure 22 Connection of the Motor with the Blind Output

2.13.5 24 V DC Power Supply Output

The device is equipped with 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 the 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, Blind Output, and 24 V DC Power Supply Output is 8 A!

The 24 V DC Power Supply Input 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.

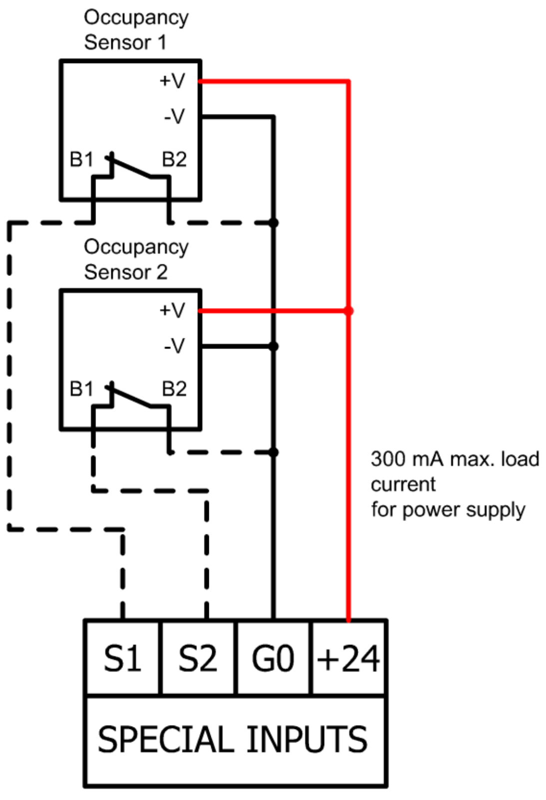


Figure 23 Exemplary occupancy sensors for 24V DC power supply

3 Device Control Application

The device has been built in order to control light and a blind/shutter 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 for connecting the presence detectors and light switches. A dedicated DIP-switch allows for activating a predefined inputs configuration. A brand new 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 the unique plug & play type device designed for DALI network control.
In addition, iSMA-B-2D1B-(WD) has a blind/shutter control function implemented, which allows for controlling a blind/shutter with a common double-switch.

3.1 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, Interfaces DALI1 and DALI2 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 when 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 the Special Inputs) or switches (connected to Digital Inputs).

3.1.1 Monostable switch control

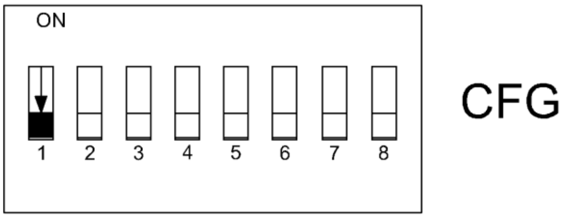


Figure 24 Monostable buttons connected to DI1 and DI2

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

a) DALIX_BROADCAST_LAST_SCENE command is recalled when DALIX_ON_OFF_STATE is 0 (INACTIVE) and the raising edge of the signal on Digital Input X is detected.

In that case, 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 SI*X*_DELAY_OFF_TIME register (where *X* is a particular number of 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 impulse on Digital Input, which results in sending DALIX_BROADCAST_OFF command.

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

In that case DALIX_ON_OFF_STATE register is set to 0 (INACTIVE).

Pushing and holding the switch when DALIX_ON_OFF_STATE is 1 (ACTIVE) results in broadcast dimming the light with the step defined in DALI*X*_FADE_RATE register until the ballasts achieve the minimum level stored in 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.

3.1.2 Bistable switch control

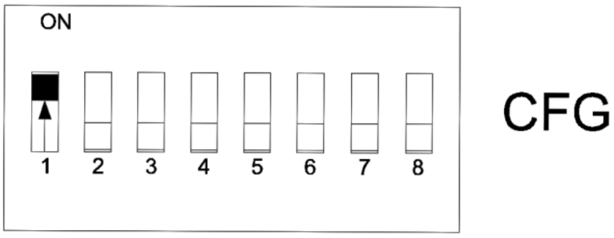


Figure 25 Bistable buttons connected to DI1 and DI2

Bistable switches have two stable states. Depending on the actual state of 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:

a) DALIX_BROADCAST_LAST_SCENE command is recalled when DALIX_ON_OFF_STATE is 0 (INACTIVE) and the raising edge of the signal on Digital Input X is detected.

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

b) 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 that case the register DALIX_ON_OFF_STATE is set to 0 (INACTIVE).

3.1.3 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 Normal Closed mode (NC). In case of the necessity of changing PIR working mode from NC to NO, the value of SI1_PIR_TYPE register needs to be changed.

a) If the motion sensor / presence detector connected to the Special Input X detects a motion and 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 SI*X*_DELAY_OFF_TIME register. When the time ends, 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.

b) If 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 DALIX_BROADCAST_OFF command).

   The motion sensor / presence detector can be activated again by another signal on 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 SI*X*_BLOCKING register bit to active. The function of deactivating the motion sensor / presence detector can be useful when 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.

3.1.4 Multi DALI interface control

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

With appropriate DIP-switch CFG configuration, the user can to 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 multi control allows for extending the number of ballasts belonging to one DALI group. With multi-control 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.

a) 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)

b) When the motion sensor / presence detector detects any motion, 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 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 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. CFG DIP-switch configuration should be set as in the figure below:

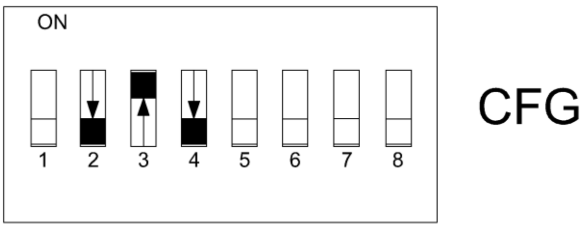


Figure 26 Motion sensor connected to Special Input 1 controls two DALI interfaces in a group,

push buttons connected to Digital Input 1 and Digital Input 2 control two Interfaces separately.

3.2 ON/OFF Light Control

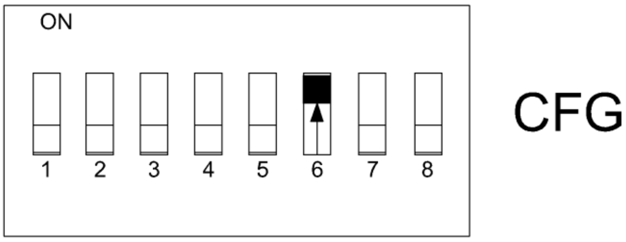


Figure 27 ON/OFF light control DIP-Switch CFG configuration

With 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 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 DALI Interface control mode:

a) DALIX_ON_OFF_STATE, where X is the number of the Light Output (40254 bit 0, 40255 bit 0)

b) DALIX_BROADCAST_LAST_SCENE, where X is the number of the Light Output (40254 bit 1, 40255 bit 1)

c) 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 the Special Inputs) or switches (connected to Digital Inputs) in the same way as it is in case of DALI interface control, but instead of sending DALI commands the device changes the state of the Light Outputs 1 and 2.

3.2.1 Monostable switch control

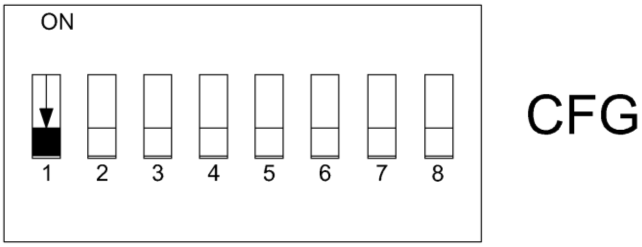


Figure 28 Monostable buttons connected to DI1 and DI2

Monostable switches cause a short-time impulse which closes the loop of the Digital Input. Depending on the actual state of Light Output X, a single impulse on Digital Input X opens or closes the circuit in Light Output X

a) Circuit close (ON) is recalled when the Light Output X is open (OFF) and the raising edge of the signal on Digital Input X is detected.

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

b) Circuit open (OFF) is recalled when the Light Output X is closed (ON) and the raising edge of the signal on Digital Input X is detected.

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

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

3.2.2 Bistable switch control

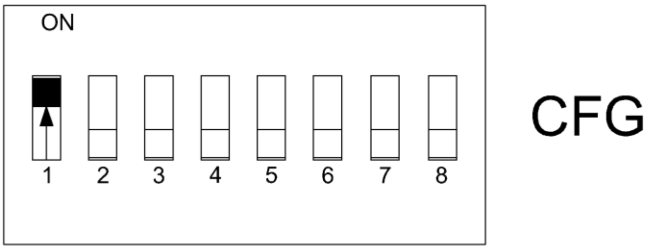


Figure 29 Bistable buttons connected to DI1 and DI2

Bistable switches have two stable states. Depending on the actual state of DALI Group Status X, changing using bistable switch state connected to the Digital Input X opens or closes the relay circuit in Light Output X:

a) Circuit close (ON) is recalled in when the relay circuit is open (OFF) and the raising edge of the signal on Digital Input X is detected.

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

b) Circuit open (OFF) is recalled in case when the relay circuit is closed (ON) and the raising edge of the signal on Digital Input X is detected.

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

3.2.3 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 of the necessity of changing PIR working mode from NC to NO, the value of the register SI1_PIR_TYPE needs to be changed.

a) If the motion sensor / presence detector connected to the Special Input X detects
a motion and 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 SI*X*_DELAY_OFF_TIME register. When the time elapsed 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.

b) In case when DALI X Group Status is activated by the signal from the motion sensor / presence detector, it can be overridden by the signal from switch(s) connected to Digital Input X.

The motion sensor / presence detector functioning can be activated again by another signal on 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 SI*X*_BLOCKING register bit to active. The function of deactivating a motion sensor / presence detector can be useful when 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 DIP CFG Configuration. For more details, please refer to chapter Multi Light Output Control.

3.2.4 Multi Light Output control

The device allows for controlling two Light Outputs LIGHT 1 and LIGHT 2 simultaneously.

With proper DIP-switch CFG 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 single Light Output in ON\OFF Light Control Mode.

a) 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).

b) When the motion sensor / presence detector detects any motion, the device opens the circuit only in the Light Output with DALIX_ON_OFF_STATE inactive and not overridden by 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. CFG DIP-switch configuration should be set as it is in the figure below:

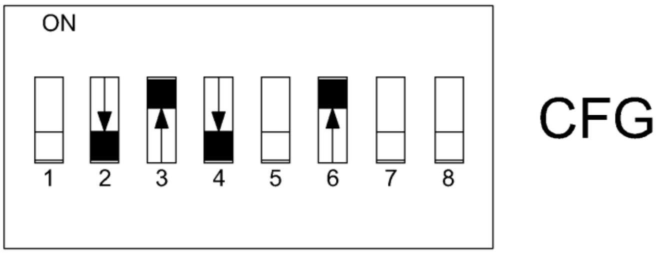


Figure 30 Motion sensor connected to Special Input 1 controls two Light Outputs in a group,

two pushbuttons connected to Digital Input 1 and Digital Input 2 control each output separately.

3.3 Blind/shutter control (iSMA-B-2D1B-(WD) version only)

iSMA-B-2D1B device is equipped one output for controlling blind/shutter with bistable or monostable switch(es) or/and appropriate Modbus registers values.

3.3.1 Monostable switch control

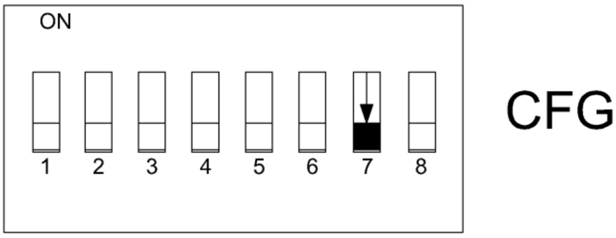


Figure 32 Monostable buttons connected to DI3 and DI4

Monostable switches cause an impulse and close the loop of the Digital Inputs. Monostable switches connected to the particular Digital Inputs DI3 and DI4 send the following commands to the blind/shutter motor through the dedicated Digital Output(s) DO3 and DO4:

1. Monostable switch connected to Digital Input no 3

   a) Single short pushing the switch (< 350 ms) results in moving the slats with the value calculated with registers SLATS_OPENING_TIME and SLATS_NUMBER_OF_STEPS.

   DI3 has a direct connection to DO3 which is dedicated to connecting the motor that opens the shutter.

   Example:

   Default value of register SLATS_NUMBER_OF_STEPS register is 10. It means that the slats move from 0% to 100% in 10 steps. In that case, each step corresponds to 10% of full range of the possible movement of the slats. So the single short click of monostable switch. By default moves the slats by 10% of the full moving range.

   The time needed for the shutter motor to move the slats from 0% to 100% is determined in SLATS_OPENING_TIME register and it can be changed by overwriting the register manually or automatically by slats calibration procedure (read more SLATS CALIBRATION PROCEDURE). By default, the time of opening the slats is 1 second.

   When the slats reach the full moving range position, a single pushing the monostable switch opens the shutter (provided that the shutter is not fully open).

   b) When the monostable switch is pushed longer than 350 ms (but < 2 s), it opens the shutter to the maximum open position (BLIND_STATE register = 100%). DI3 has a direct impact on DO3, dedicated for connecting the motor which opens the shutters.

The time needed for the shutter motor to move from 0% to 100 % is set in BLIND_UP_TIME register and it can be changed by overwriting the register manually or automatically with shutter calibration procedure (read more: BLIND CALIBRATION PROCEDURE).

In addition to BLIND_UP_TIME, the shutter is pulled up with the value stored in BLIND_OFF_DELAY register (By default 5% of the BLIND_UP_TIME). When the BLIND_UP_TIME ends, the shutter motor runs longer by the time value calculated by BLIND_OFF_DELAY in order to ensure that the shutter is fully open. The function was implemented because the shutter control is based on the time, but not on the position sensor.

A short single push of push any switch (raising edge of the signal, connected to DI3 or DI4) stops the shutter and sets the slats in the position set in the SLATS_STATE register.

c) The monostable switch pushed longer than 2 seconds opens the shutter. Releasing the switch stops the movement of the shutter and sets the slats in the position set in the SLATS_STATE register. DI3 has a direct impact on DO3 which connects the motor, which opens the shutter.

The blind position is calculated proportionally to the time of pushing the monostable switch and BLIND_UP_TIME register value.

Example:

The switch is pushed for 5 seconds. The BLIND_UP_TIME value is 20 seconds.

In that case, the position of the blind is 15% open because the shutter starts opening after 2 seconds of pushing the monostable switch, therefore the shutter moves 3 seconds. If the full full opening time is 20 seconds, the shutter position is 3/20 = 15% open.

2. Monostable switch connected to Digital Input No. 4

a) A single short push of the switch (< 350 ms) results in moving the slats with the value calculated by using SLATS_OPENING_TIME and SLATS_NUMBER_OF_STEPS registers. DI4 has a direct impact on DO4 which connects the motor in such a way that it closes the shutter.

Example:

The default value of the SLATS_NUMBER_OF_STEPS register is 10. It means that the slats move from 100% to 0% in 10 steps. In that case, each step corresponds to 10% of full range of the possible movement of the slats. So the single short click of monostable switch. By default closes the slats in 10% of the full moving range.

The time necessary for the shutter motor to move the slats from 100% to 0% is set in SLATS_OPENING_TIME register and it can be changed by overwriting the register manually or automatically with slats calibration procedure (read more SLATS CALIBRATION PROCEDURE). By default, the time of closing the slats is 1 second.

When the slats reach the full moving range position, a single push of the monostable switch effects in closing the shutter (provided that the shutter is not fully closed).

b) When the monostable switch is pushed for longer than 350 ms (but < 2 s), it sets the shutter in the fully closed position (BLIND_STATUS register = 0 %). DI4 has a direct impact on DO4, which connects the motor closing the shutter.

The time needed for the shutter motor to move from 100% to 0% is set in BLIND_DOWN_TIME register and it can be changed by overwriting the register manually or automatically with shutter calibration procedure (read more BLINDS CALIBRATION PROCEDURE).

In addition to BLIND_DOWN_TIME, the shutter is pulled up with the value set in BLIND_OFF_DELAY register (By default 5% of the BLIND_DOWN_TIME). When the BLIND_DOWN_TIME ends, the shutter motor runs longer by the time value calculated by BLIND_OFF_DELAY in order to ensure that the shutter is fully closed. The function was implemented because the shutter control is based on the time, but not on the position sensor.

A single short push of any of the switches (raising edge of the signal, connected to DI3 or DI4) results in stopping the shutter and setting the slats in the position set in the SLATS_STATE register.

c) The monostable switch pushed for longer than 2 seconds closes the shutter. Releasing the switch stops the shutter and sets the slats in the position set in the SLATS_STATE register. DI4 has a direct impact on DO4 connecting the motor which closes the shutter.

The position of the blind is calculated proportionally to the time of pushing the monostable switch and BLIND_DOWN_TIME register value.

Example:

The switch is pushed for 5 seconds. The BLIND_DOWN_TIME value is 19 seconds.

The shutter starts opening after 2 seconds of pushing the monostable switch, therefore the shutter is moving for 3 seconds. In that case, provided that the full closing time is 20 seconds, the shutter position is 3/19 = 16% closed.

3.3.2 Bistable switch control

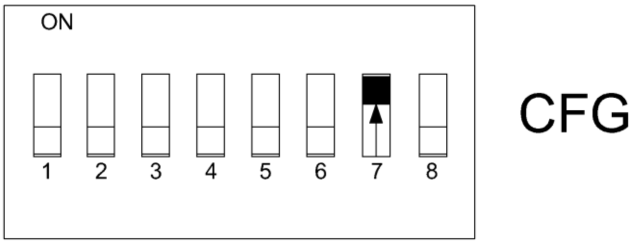


Figure 31 Bistable buttons connected to DI3 and DI4

Bistable switches have two stable states. Bistable switches connected to Digital Inputs DI3 and DI4 send the following commands to the blind/shutter through the dedicated Digital Outputs DO3 and DO4:

a) BLIND UP - closed circuit on the DI3 closes the circuit on the DO3. The blind motor should be connected to DO3 in such a manner that the motor opens the controlled Blind.

The open circuit on the DI3 opens the circuit on the DO3. In that case there is no movement of the Blind motor. If the bistable switch changes its state during the movement of the blind motor, the controlled blind stops.

b) BLIND DOWN - closed circuit on the DI4 closes the circuit on the DO4. The blind motor should be connected to DO4 in in such a manner so that the motor closes the controlled blind.

The open circuit on the DI4 opens the circuit on the DO4. In that case there is no movement of the blind motor. If the bistable switch changes its state during the movement of the blind motor, the controlled blind stops.

WARNING! It is highly recommended to use the changeover bistable switches. It prevents the user from closing both Digital Outputs circuits at the same time and protects the motor from damage.

Note! Please note that in addition to common single bistable switches, there are 3-states bistable switches available on the market, which can be a good replacement for single bistable switches.

3.3.3 BLINDS CALIBRATION PROCEDURE

The calibration process is necessary always when the blind/shutter is used for the first time or when there is a need of recalibration or the command restoring the default settings is invoked. The process records the time values in BLIND_UP_TIME and BLIND_DOWN_TIME registers (By default values in the registers is 0).

The difference between BLIND_UP_TIME\BLIND_DOWN_TIME values from the first calibration and recalibration process cannot be greater than 20%.

The calibration can be done by using monostable switches or three-state bistable switches.

1. To begin the calibration process the blind/shutter should be in the closed position.

2. From the closed position blind/shutter needs to be raised to the desired maximum open position.

3. Blind/shutter needs to be lowered back to the closed position.

4. Points No. 2 and 3 need to be repeated.

Conditions which have to be fulfilled for the calibration to succeed:

1. Difference between the two opening time values cannot be higher than 20%.

2. Difference between the two closing time values cannot be higher than 20%.

Example: The first opening time is 20 seconds. The second one has to be no more than 24 seconds and not less than 16 seconds

3. Each opening/closing movement has to be initiated within 3 seconds after stopping the previous one.

If the the above conditions are met, the opening time values and the closing time values are averaged and written to the BLIND_UP_TIME and BLIND_DOWN_TIME registers. This is indicated by a quick up and down movement of the slats in case of the shutter control or quick up and down movement of the blind.

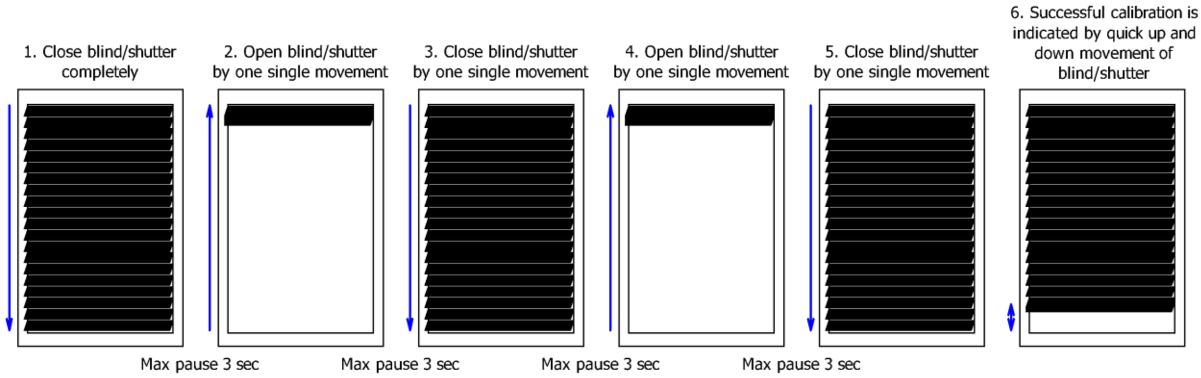


Figure 33 Blind shutter calibration procedure

3.3.4 SLATS CALIBRATION PROCEDURE

The calibration process is necessary in case when the time of slats opening is different than the default value stored in SLATS_OPENING_TIME register (1 second).

Calibration can be performed with monostable switches.

1. To begin the calibration process, the slats should be completely rotated down as presented on the figure (position 1).

2. From this position, the slats need to be completely rotated up (position 2 on the figure) by pressing the up switch shortly. Each press of the switch rotates the slats by a step proportional to the value stored in SLATS_OPENING_TIME.

3. The slats need to be rotated down back to position 1.

4. Points no. 2 and 3 need to be repeated.

Conditions necessary for the calibration to succeed:

1. Number of up/down steps to rotate the slats completely must be equal.

2. Number of up/down steps to rotate the slats completely must be greater than 5 and lower than 15.

3. Each opening/closing movement has to be initiated within 3 seconds after stopping the previous one.

4. Each rotation movement has to be initiated within 3 seconds after stopping the previous one.

5. SLATS_NUMBER_OF_STEPS register needs to be set at the default value of 10 steps.

If the above conditions are met, the new opening time value is calculated by multiplying the old SLATS_OPENING_TIME by the number of opening / closing steps used in calibration and then dividing it by 10.

Example: SLATS_OPENING_TIME value is 1000 ms. Twelve steps are needed to completely rotate the slats in the calibration process. The new value stored in the register is: (1000 ms * 12) / 10, which equals 1200 ms.

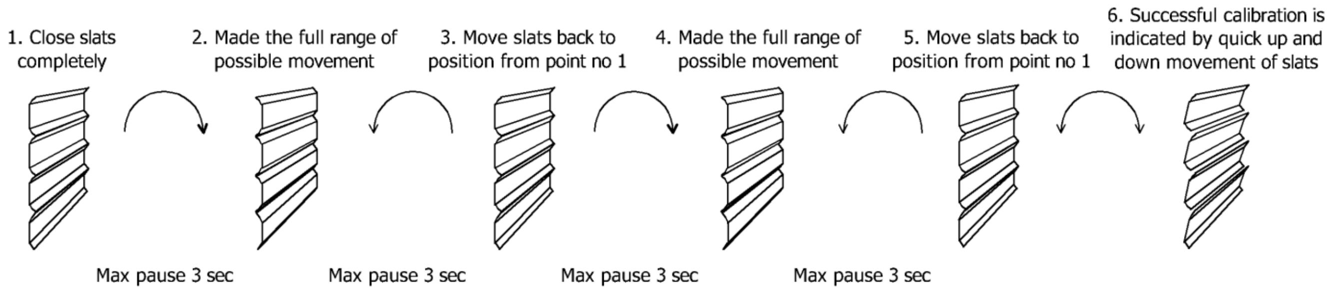


Figure 34 Slats calibration procedure

4 Modbus registers

4.1 Configuration registers

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

4.1.1 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 1 Version type register

Example:

In register 30001, 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 ($0x0A_{16} = 10_{10}$)

4.1.2 VERSION_TYPE - Device actions (40001)

Setting register 40001 according to the table below will enable 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 10 Device actions

4.1.3 ADDR_DIPSWITCH (30002)

The register contains the number which represents the Controller Address set by Dip switch MAC.

4.1.4 DIPSWITCH_CFG_REGISTER (30003)

The register contains an integer value representing actual configuration of DIP-Switch CFG.

4.1.5 RECEIVED_FRAMES_COUNTER (30004)

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.).

4.1.6 ERROR_FRAMES_COUNTER (30006)

A 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.).

4.1.7 TRANSMITTED_FRAME_COUNTER (30008)

A 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.).

4.1.8 UP_TIME (30012)

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

4.1.9 BAUD_RATE (40017)

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

$$\text{Baud rate} = \text{register value} \cdot 10$$

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

4.1.10 STOP_BITS (30018)

Number of stop bits is constant and equals 1.

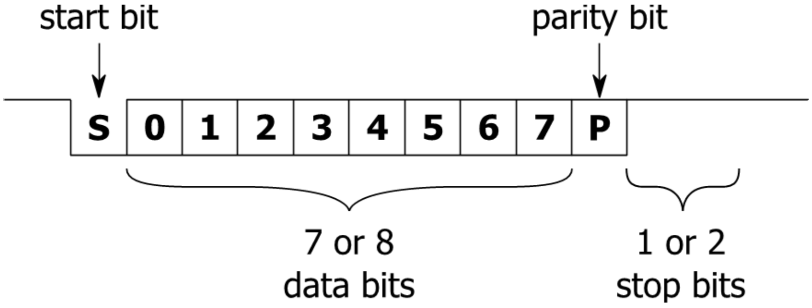


Figure 33 Modbus message frame

4.1.11 DATA_BITS (30019)

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

4.1.12 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.

4.1.13 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 protocol Modbus RTU).

4.1.14 DIPSWITCH_CFG_REGISTER (30156)

The register contains an integer value representing actual configuration of DIP-Switch CFG.

4.1.14.1 DI1_DI2_SWITCH_TYPE (30156) bit 0

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

When the bit is active (bit 0=1) then Digital inputs 1 and 2 are dedicated to work with bistable switches.

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

4.1.14.2 DI1_CONTROL_MODE (30156) bit 1

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

When the bit is active (bit 1=1), Digital input 1 controls DALI1 and DALI2 Interfaces (Light Output 1 and Light Output 2)

When the bit is inactive (bit 1=0), Digital input 1 controls DALI1 Interface (Light Output 1).

4.1.14.3 SI1_CONTROL_MODE (30156) bit 2

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

When the bit is active (bit 2=1), Special Input 1 controls DALI1 and DALI2 Interfaces (Light Output 1 and Light Output 2)

When the bit is inactive (bit 2=0), Special input 1 controls DALI1 Interface (Light Output 1).

4.1.14.4 DI2_CONTROL_MODE (30156) bit 3

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

When the bit is active (bit 3=1), Digital input 2 controls DALI1 and DALI2 Interfaces (Light Output 1 and Light Output 2)

When the bit is inactive (bit 3=0) , Digital input 2 controls DALI2 Interface (Light Output 2).

4.1.14.5 SI2_CONTROL_MODE (30156) bit 4

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

When the bit is active (bit 4=1), Special Input 2 controls DALI1 and DALI2 Interfaces (Light Output 1 and Light Output 2)

When the bit is inactive (bit 4=0), Special input 2 controls DALI2 Interface (Light Output 2).

4.1.14.6 LIGHT_CONTROL_MODE (30156) bit 5

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

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

When the bit is inactive (bit 5=0), DALI Interface control mode is active (Single or Multi).

4.1.14.7 DI3_DI4_SWITCH_TYPE (30156) bit 6

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

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

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

4.1.14.8 BLIND_CONTROL_MODE (30156) bit 7

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

When the bit is active (bit 7=1), Blind Output is dedicated to control the blinds (without slats control).

When the bit is inactive (bit 7=0), Blind Output is dedicated to control the shutters (slats control).

4.2 I/O registers

4.2.1 DIGITAL_OUTPUTS_STATUS_REGISTER (30042)

The register contains an integer value representing the states of Digital Outputs (DO1 – DO2).

4.2.1.1 LIGHT1_STATUS_O1 (30042) bit 0

The bit state shows the actual state of the Light Output 1.

When the bit is active (bit 0=1), the circuit of Light Output 1 relay is closed. When the bit is inactive (bit 0=0) the circuit of Light Output 1 relay is open.

4.2.1.2 LIGHT2_STATUS_O2 (30042) bit 1

The bit state shows the actual state of the Light Output 2.

When the bit is active (bit 1=1), the circuit of Light Output 2 relay is closed. When the bit is inactive (bit 1=0), the circuit of the Output 2 relay is open.

4.2.1.1 BLIND_UP_STATUS_O3 (30042) bit 2

The bit state shows the actual state of the Blind Output O3.

When the bit is active (bit 1=1), the circuit of Blind Output O3 relay is closed. When the bit is inactive (bit 1=0), the circuit of Blind Output O3 relay is open.

4.2.1.1 BLIND_DOWN_STATUS_O4 (30042) bit 3

The bit state shows the actual state of Blind Output O4.

When the bit is active (bit 1=1), the circuit of Blind Output O4 relay is closed. When the bit is inactive (bit 1 =0), the circuit of Blind Output O4 relay is open.

4.2.2 DIGITAL_INPUTS_STATUS_REGISTER (30041)

The register contains an integer value representing the states of all Digital Inputs (DI1 – DI4).

4.2.2.1 DI1_STATUS (30041) bit 0

The bit state shows the actual state of Digital Input 1.

When the bit is active (bit 0 =1), Digital Input 1 is active (closed circuit). When the bit is inactive (bit 0=0). Digital Input 1 is inactive (open circuit).

4.2.2.2 DI2_STATUS (30041) bit 1

The bit state shows the actual state of Digital Input 2.

When the bit is active (bit 1=1), Digital Input 2 is active (closed circuit). When the bit is inactive (bit 1=0), Digital input 2 is inactive (open circuit).

4.2.2.3 DI3_STATUS (30041) bit 2

The bit state shows the actual state of Digital Input 3.

When the bit is active (bit 2=1), Digital Input 3 is active (closed circuit). When the bit is inactive (bit 2=0), Digital input 3 is inactive (open circuit).

4.2.2.4 DI4_STATUS (30041) bit 3

The bit state shows the actual state of Digital Input 4.

When the bit is active (bit 3=1), Digital Input 4 is active (closed circuit). When the bit is inactive (bit 3=0), Digital Input 4 is inactive (open circuit).

4.2.3 DIGITAL_INPUTS_COMMAND_REGISTER (40101)

The register contains an integer value representing command states of all Digital Inputs (DI1 – DI4). Digital Input Command simulates physical signal on Digital Input (closed or open loop). The feature can be useful for signal test, emergency use in case of a switch failure, or for remote control from BMS.

4.2.3.1 DI1_COMMAND (40101) bit 0

The bit overrides the signal from Digital Input 1. The command simulates the physical signal on DI1 from BMS.

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

4.2.3.2 DI2_COMMAND (40101) bit 1

The bit overrides the signal from Digital Input 2. The command simulates the physical signal on DI2 from BMS.

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

4.2.3.3 DI3_COMMAND (40101) bit 2

The bit overrides the signal from Digital Input 3. The command simulates the physical signal on DI3 from BMS.

When the bit is active (bit 2=1) then Digital Input 3 is overridden and considered as active (closed circuit). When the bit is inactive (bit 2=0) then Digital input 3 is overridden and considered as inactive (open circuit).

4.2.3.4 DI4_COMMAND (40101) bit 3

The bit overrides a signal from Digital Input 4. Command is dedicated to simulate the physical signal on DI4 from BMS.

When the bit is active (bit 3=1), Digital Input 4 is overridden and considered as active (closed circuit). When the bit is inactive (bit 3=0), Digital Input 4 is overridden and considered inactive (open circuit).

4.2.4 DIGITAL_INPUTS_BLOCKING_REGISTER (40102)

Register contains an integer value allowing to block all Digital Inputs (DI1 – DI4). By default, all the Digital Inputs are unblocked (all the bits of the register are inactive (0)). The feature allows to block particular Digital Input in order to hold the functioning of manual control the light (or blind) by switch(es). The function can be useful in the open spaces or common use areas where the manual switching the light needs to be disabled for example after the working hours.

4.2.4.1 DI1_BLOCKING (40102) bit 0

When the bit is active (bit 0=1), Digital Input 1 is blocked. Any signal appearing on Digital Input 1 has no effect on control algorithm.

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

4.2.4.2 DI2_BLOCKING (40102) bit 1

When the bit is active (bit 1=1), Digital Input 2 is blocked. Any signal appearing on Digital Input 2 has no effect on control algorithm.

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

4.2.4.3 DI3_BLOCKING (40102) bit 2

When the bit is active (bit 2=1), Digital Input 3 is blocked. Any signal appearing on Digital Input 3 has no effect on control algorithm.

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

4.2.4.4 DI4_BLOCKING (40102) bit 3

When the bit is active (bit 3=1), Digital Input 4 is blocked. Any signal appearing on Digital Input 4 has no effect on control algorithm.

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

4.2.5 SPECIAL_INPUTS_STATUS_REGISTER (30043)

The register contains an integer value representing the physical states of Special Inputs (SI1 and SI2).

4.2.5.1 SI1_STATUS (30043) bit 0

Bit state shows the actual physical state of Special Input 1 (without DelayOFF time consideration).

When the bit is active (bit 0=1), Special Input 1 is active (closed circuit). When the bit is inactive (bit 0=0), Special input 1 is inactive (open circuit).

4.2.5.2 SI2_STATUS (30043) bit 1

The state of the bit shows the actual physical state of Special Input 2 (without DelayOFF time consideration).

When the bit is active (bit 1=1), Special Input 2 is active (closed circuit). When the bit is inactive (bit 1=0), Special input 2 is inactive (open circuit).

4.2.6 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 11 SI1 PIR type register

4.2.7 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 12 SI1 PIR type register

4.2.8 SI1_DELAY_OFF_TIME (40107)

The register contains an integer value representing a time value in seconds.

The Delay OFF time stored in this register is a minimal time when the light is ON after a motion detection by motion sensor/presence detector connected to Special Input 1.

In the other words – when there is no motion during period of time stored in this register the light is switched OFF. The default value is 300 seconds.

4.2.9 SI2_DELAY_OFF_TIME (40108)

The register contains an integer value representing a time value in seconds.

The Delay OFF time stored in this register is a minimal time when the light is ON after a motion detection by motion sensor/presence detector connected to Special Input 1.

In the other words – when there is no motion during period of time stored in this register the light is switched OFF. The default value is 300 seconds.

4.2.10 SI_PIR_STATUS (30148)

The register contains an integer value representing states of Special Inputs (SI1 and SI2) including DELAY_OFF_TIME.

4.2.11 SI1_PIR_STATUS (30148) bit 0

The bit state shows the actual state of Special Input 1 with DelayOFF time consideration.

When the bit is active (bit 0=1), Special Input 1 is active (closed circuit). When the bit is inactive (bit 0=0), Special input 1 is inactive (open circuit).

4.2.12 SI2_PIR_STATUS (30148) bit 1

The bit state shows the actual state of Special Input 2 with DelayOFF time consideration.

When the bit is active (bit 4=1), Special Input 2 is active (closed circuit). When the bit is inactive (bit 4=0), Special input 2 is inactive (open circuit).

4.3 DALI registers

4.3.1 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 both DALI interfaces in order to allow for the use of the only one single register in BMS to control DALI Network.

4.3.1.1 DALI1_ON_OFF_STATE (40253) bit 0

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

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

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

The bit allows to read actual state of the ballasts connected to 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, what makes it easier to create a visualization and limit the number of variables.

4.3.1.2 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 in case when there is a need of light up all the ballasts connected to DALI 1 interface remotely from BMS also without a discovery procedure (all the ballasts connected to 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 what can be really useful in case of creating a visualization.

4.3.1.3 DALI1_BROADCAST_OFF (40253) bit 2

The raising edge of the bit sends the OFF Command to DALI 1 Interface to all the ballasts connected to the interface. The command is useful in case when there is a need of turn OFF all the ballasts connected to DALI 1 interface remotely from BMS also without a discovery procedure (all the ballasts connected to 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 activation only the one single bit what can be really useful in case of creating a visualization.

4.3.1.1 DI1_COMMAND (40253) bit 3

The bit overrides a signal from Digital Input 1. The command simulates the physical signal on DI1 from BMS.

When the bit is active (bit 3=1), Digital Input 1 is overridden and considered as active (closed circuit). When the bit is inactive (bit 3=0), Digital input 1 is overridden and considered as inactive (open circuit).

4.3.1.2 DALI2_ON_OFF_STATE (40253) bit 4

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

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

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

The bit allows for reading actual state of the ballasts connected to DALI 2 and sending BROADCAST_OFF and BROADCAST_LAST_SCENE commands to DALI 2 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.

4.3.1.3 DALI2_BROADCAST_LAST_SCENE (40253) bit 5

The raising edge of the bit sends the Last Scene Command to DALI 2 Interface to all the ballasts connected to the interface. The command is useful in case when there is a need of light up all the ballasts connected to the DALI 2 Interface remotely from BMS also without
a discovery procedure (all the ballasts connected to 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 the one single bit what can be really useful in case of creating a visualization.

4.3.1.4 DALI2_BROADCAST_OFF (40253) bit 6

The raising edge of the bit sends the OFF Command to DALI 2 Interface to all the ballasts connected to the interface. The command is useful in case when there is a need of turn OFF all the ballasts connected to the DALI 2 Interface remotely from BMS also without a discovery procedure (all the ballasts connected to 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 the one single bit what can be really useful in case of creating a visualization.

4.3.1.5 DI2_COMMAND (40253) bit 7

The bit overrides a signal from Digital Input 2. The command is dedicated to simulate the physical signal on DI2 from BMS.

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

4.3.2 DALI1_RECEIVED_FRAMES_COUNTER (30229)

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

4.3.3 DALI1_ERROR_FRAMES_COUNTER (30237)

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

4.3.4 DALI1_TRANSMITTED_FRAMES_COUNTER (30245)

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

4.3.5 DALI1_CFG_REGISTER (40254)

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

4.3.5.1 DALI1_ON_OFF_STATE (40254) bit 0

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

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

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

The bit allows to read actual state of the ballasts connected to 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.

4.3.5.2 DALI1_BROADCAST_LAST_SCENE (40254) 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 in case when there is a need of light up all the ballasts connected to DALI 1 interface remotely from BMS also without a discovery procedure (all the ballasts connected to 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 the one single bit what can be really useful in case of creating a visualization.

4.3.5.3 DALI1_BROADCAST_OFF (40254) bit 2

The raising edge of the bit sends the OFF Command to DALI 1 Interface to all the ballasts connected to the interface. The command is useful in case when there is a need of turn OFF all the ballasts connected to DALI 1 interface remotely from BMS also without a discovery procedure (all the ballasts connected to 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 the one single bit what can be really useful in case of creating a visualization.

4.3.5.1 SI1_BLOCKING (40254) bit 3

The bit allows to activating / deactivating a motion sensor / presence detector operating with connection to Special Input 1.

When 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.

When 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).

4.3.5.2 DI1_DIMMING_OFF (40254) bit 4

The bit allows for activating / deactivating a dimming function assigned with Digital

Input 1.

When the bit is active (bit 4=1), the dimming function for the switch(es) connected to Digital Input 1 is disabled.

When the bit is inactive (bit 4=0), the dimming function for the switch(es) connected to Digital Input 1 is enabled.

The switch holds the function to switch ON or OFF the lighting only the dimming function is disabled.

4.3.6 DALI1_DIMMING_STATE (40266)

The register contains an integer value representing the Dimming State of the ballasts connected to DALI1 Interface.

The command is useful in case when there is a need of dim all the ballasts to the specific level remotely from BMS also without a discovery procedure (all the ballasts connected to DALI 1 Interface react to Dimming State even if the short addresses of the ballasts are unknown).

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

4.3.7 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 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 the open spaces where the brightness level need to be set individually. The user can adjust most convenient fade rate to the 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 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 13 Fade rate register values

In case when DALI1 is controlled together with DALI2 Interface by DI2, DALI1_FADE_RATE register is blocked and the fade rate value from DALI2_FADE_RATE register is considered in the control algorithm.

4.3.8 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 when the 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.

When DALI1 is controlled together with DALI2 Interface by DI2, DALI1_FADE_TIME register is blocked and the fade time value from DALI2_FADE_TIME register is considered in control algorithm.

4.3.9 DALI1_POWER_ON_LEVEL (40470)

The register contains an integer value representing the value sent to the ballasts connected to DALI 1 Interface and stored in the memory of the 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).

4.3.10 DALI1_SYSTEM_FAILURE_LEVEL (40474)

The register contains an integer value representing the value sent to the ballasts connected to DALI 1 Interface and stored in the memory of the ballasts. In 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).

4.3.11 DALI2_RECEIVED_FRAMES_COUNTER (30231)

A 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.

4.3.12 DALI2_ERROR_FRAMES_COUNTER (30239)

A 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.

4.3.13 DALI2_TRANSMITTED_FRAMES_COUNTER (30247)

A 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.

4.3.14 DALI2_CFG_REGISTER (40255)

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

4.3.14.1 DALI2_ON_OFF_STATE (40255) bit 0

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

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

When the bit is inactive (bit 0=0), DALI 2 Interface is OFF, what means that the ballast are OFF. Changing bit state to 1 (active) sends DALI2_BROADCAST_LAST_SCENE command into the network.

The bit allows to read the actual state of the ballasts connected to DALI 2 interface as well as send BROADCAST_OFF and BROADCAST_LAST_SCENE commands to the DALI 2 Network. This functionality allows to use 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.

4.3.14.2 DALI2_BROADCAST_LAST_SCENE (40255) bit 1

The raising edge of the bit sends the Last Scene Command to DALI 2 Interface to all the ballasts connected to the interface. The command is useful when there is a need of light up all the ballasts connected to the DALI 2 Interface remotely from BMS also without a discovery procedure (all the ballasts connected to 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 the one single bit what can be really useful in case of creating a visualization.

4.3.14.3 DALI2_BROADCAST_OFF (40255) bit 2

The raising edge of the bit sends the OFF Command to DALI 2 Interface to all the ballasts connected to the interface. The command is useful in case when there is a need of turn OFF all the ballasts connected to the DALI 2 Interface remotely from BMS also without a discovery procedure (all the ballasts connected to 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 the one single bit which can be really useful in case of creating a visualization.

4.3.14.4 SI2_BLOCKING (40255) bit 3

The bit allows for activating / deactivating a motion sensor / presence detector functioning connected to Special Input 2.

When 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.

When 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).

4.3.14.5 DI2_DIMMING_OFF (40255) bit 4

The bit allows for activating / deactivating a dimming function assigned with Digital Input 2.

When the bit is active (bit 4=1), the dimming function for the switch(es) connected to Digital Input 2 is disabled.

When the bit is inactive (bit 4=0), the dimming function for the switch(es) connected to Digital Input 2 is enabled.

The switch holds the function to switch ON or OFF the lighting only the dimming function is disabled.

4.3.15 DALI2_DIMMING_STATE (40267)

The register contains an integer value representing the Dimming State value sent to DALI 2 Interface to all the ballasts connected to the interface.

The command is useful in case when there is a need of light up all the ballasts to the specific level remotely without a discovery procedure (all the ballasts connected to DALI 2 Interface react for Dimming State even if the short addresses of the ballasts are unknown).

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

4.3.16 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 DALI 2 Interface.

The fade rate allows to change a dimming speed what effects 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 the requirements the 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 when DALI2 is controlled together with DALI1 Interface by DI1 then DALI2_FADE_RATE register is blocked and the fade rate value from DALI1_FADE_RATE register is considered in control algorithm.

4.3.17 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 when the 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.

When DALI2 is controlled together with DALI1 Interface by DI1, DALI2_FADE_TIME register is blocked and the fade time value from DALI1_FADE_TIME register is considered in control algorithm.

4.3.18 DALI2_POWER_ON_LEVEL (40471)

The register contains an integer value representing the value sent to the ballasts connected to DALI 2 Interface and stored in the memory of the 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).

4.3.19 DALI2_SYSTEM_FAILURE_LEVEL (40475)

The register contains an integer value representing the value sent to the ballasts connected to 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).

4.4 Blind Control registers

4.4.1 BLIND_UP_TIME (40601)

The register contains an integer value representing the value of time which is needed to open the blind/shutter from 0% to 100% in milliseconds. The register value can be overwritten directly from BMS or set automatically with the Blind Calibration procedure (See chapter BLINDS CALIBRATION PROCEDURE). By default, the register value is 0 ms.

4.4.2 BLIND_DOWN_TIME (40617)

The register contains an integer value representing the value of time which is needed to close the blind/shutter from 100% to 0% in milliseconds. The register value can be overwritten directly from BMS or set automatically with the Blind Calibration procedure (See chapter BLINDS CALIBRATION PROCEDURE). By default, the register value is 0 ms.

4.4.3 SLATS_OPENING_TIME (40633)

The register contains an integer value representing the value of time which is needed to move the slats in full range of possible movement in milliseconds. The register value can be overwritten directly from BMS or set automatically with the Slats Calibration procedure (See chapter SLATS CALIBRATION PROCEDURE). By default, the register value is 1000 ms.

4.4.4 BLIND_STATE (40649)

The register value represents the actual state of the Blind/shutter from 0% to 100%.

Value 100% means that the blind/shutter is fully open. The value 0 % means that the blind/shutter is fully closed.

When the blind goes up, the state is displayed basing on the BLIND_UP_TIME register value.

When the blind goes down, the state is displayed basing on the BLIND_DOWN_TIME register value. By default, the state value is 0%.

4.4.5 SLATS_STATE (40657)

The register value represents the actual state of the slats from 0% to 100%.

Please notice that normally the slats are fully closed when the state is 0% or 100%. It means that position full open is reached when the SLATS_STATE register is 50%.

The status displaying based on the SLATS_OPENING_TIME register value, therefore by default it is adjusted to 1 second full range movement time.

A different value in the SLATS_OPENING_TIME register has impact on the SLATS_STATE value calculation. By default, the state value is 0%.

4.4.6 BLIND_OFF_DELAY (40665)

The register value represents the time value expressed in % of the BLIND_UP_TIME/ BLIND_DOWN_TIME depending on whether the blind/shutter goes up or down. By default, the register value is 5%. The function is activated only when the blind/shutter is set to full open/closed positions. In that case, by default, the blind/shutter motor runs 5% longer than it is set in the BLIND_UP_TIME/ BLIND_DOWN_TIME. The function is made in order to ensure that the blind/shutter achieves full open/closed positions in case when during the long-term operation the blind/shutter becomes not calibrated or there are some mechanical failures of the motor.

4.4.7 SLATS_NUMBER_OF STEPS (40673)

The register value represents a number of steps which is needed to change the slats position from 0% to 100% (full range movement). The possible values are from 1 to 10. Number 1 means that the slats do the full range movement with the single short click of the monostable switch (for details see Monostable switch control chapter). Number 10, which is the maximum, means that slats needs 10 similar motor movements (clicks of the monostable switch) to go from 0% position to 100% position (full range movement). The default value of the register is 10.

4.4.8 SLATS_BLOCKING_LOCAL (40600) bit 0

The bit allows for activating / deactivating the slats control by local physical switches. The function is useful when the slats opening level is set from BMS and there is no need to change it locally. In that case the locally connected switches control the shutter in the same way as it is in the blind control mode.

When the bit is active (bit 0=1), the slats control function by using the physical switches is blocked.

When the bit is active (bit 0=0), the slats control function by using the physical switches is unblocked.

The default value is 0 (inactive) – the slats can be controlled by the physical switches.

5 DALI Network Advanced Control

When 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 the ballasts connected to the particular interfaces.

To activate commissioning of the DALI Network the Discovery function need to be activated. When 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 Discovery function are described below.

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

If there is a possibility that some of the ballast has short addresses assigned already (for example from the previous Discover Process) then the function CLEAR_SHORT_ADDRESSES has to be invoked first.

Registers DALIX_DISCOVERY_PROGRESS indicate the current status of the Discovery Process.

If there is a need to add new ballast to the existing network (already discovered), function ADD_NEW_BALLAST 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 when 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.

5.1 DALI1_CFG_REGISTER(40254)

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

5.1.1 DALI1_ALL_BALLASTS_RESET (40254) bit 11

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

ALL_BALLASTS_RESET function set back all parameters stored in the ballasts connected to DALI 1 Interface to the factory settings. The function can be useful when possible problems with the ballasts appears (ballasts does not react to the DALI commands or stay in the faulty states).

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

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

5.1.2 DALI1_DISCOVER_NEW_INITIALIZATION (40254) bit 12

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

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

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

5.1.3 DALI1_REPLACE_BALLAST (40254) bit 13

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

When 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 the 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.

5.1.4 DALI1_ADD_NEW_BALLAST (40254) bit 14

The bit allows for sending ADD_NEW_BALLAST command with a special function which allows to find new ballasts (not previously addressed) from all the ballasts connected to 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 the new ballasts are addresses with the first possible address. All the ballasts which were addressed before sending ADD_NEW_BALLAST keep their addresses.

Example:

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

The two new ballasts are connected to DALI 1 interface.

The ADD_NEW_BALLAST is initiated.

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

5.1.5 DALI1_CLEAR_SHORT_ADDRESSES (40254) bit 15

The bit allows to send CLEAR_SHORT_ADDRESSES which allows to find all the ballasts connected to 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 the short addresses of all the ballasts connected to DALI 1 Interface are deleted.

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

5.2 DALI2_CFG_REGISTER (40255)

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

5.2.1 DALI2_ALL_BALLASTS_RESET (40255) bit 11

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

ALL_BALLASTS_RESET function set back all parameters stored in the ballasts connected to DALI 2 Interface to the factory settings. The function can be useful when possible problems with the ballasts appears (ballasts does not react for the DALI commands or stay in the faulty states).

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

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

5.2.2 DALI2_DISCOVER_NEW_INITIALIZATION (40255) bit 12

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

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

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

5.2.3 DALI2_REPLACE_BALLAST (40255) bit 13

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

When DALI2_FAULT_STATUS_REGISTER value is different than 0 then the raising edge of the bit sends the REPLACE_BALLAST command to the ballasts.

All the 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 the 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.

5.2.4 DALI2_ADD_NEW_BALLAST (40255) bit 14

The bit allows to send ADD_NEW_BALLAST command with a special function which allows to find new ballasts (not previously addressed) from all the ballasts connected to 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 the new ballasts are addresses with the first possible address. All the ballasts which were addressed before sending ADD_NEW_BALLAST keep their addresses.

Example:

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

The two new ballasts are connected to the DALI 2 Interface.

The ADD_NEW_BALLAST is initiated.

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

5.2.5 DALI2_CLEAR_SHORT_ADDRESSES (40255) bit 15

The bit allows to send CLEAR_SHORT_ADDRESSES which allows to find all the ballasts connected to 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 the short addresses of all the ballasts connected to DALI 2 Interface are deleted.

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

5.3 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 DALI 1 interface.

5.4 DALI2_DISCOVERY_PROGRESS (30226)

Register contains a percentage value from 0 to 100 %, which presents the actual progress of the Discovery Process initiated on the DALI 2 Interface.

5.5 Modbus 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 the Modbus registers which are available only after commissioning are described below:

5.5.1 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 14 DALI 1 Actual Ballast Level registers

5.5.2 DALI2_BALLAST_ACTUAL_LEVEL (30177 - 30192)

Registers contains information about Actual brightness level from minimum 0 to maximum 254 of the particular ballast connected to 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 15 DALI 2 Actual Ballast Level registers

5.5.3 DALI1_BLINK (40262)

Each bit of the register activates a blinking of the particular ballast assigned to that bit. It is possible to start blinking the several ballasts in the same time. The function is useful during the commissioning of 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
…	…	….
14	Ballast 15 Blinking	Ballast 15 Normal
15	Ballast 16 Blinking	Ballast 16 Normal

Table 16 DALI 1 Blink register structure

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

5.5.4 DALI2_BLINK (40263)

Each bit of the register activates a blinking of the particular ballast assigned to that bit. It is possible to start blinking the 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 17 DALI 1 Blink register structure

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

5.5.5 DALI1_BALLAST_SETPOINT (40270-40285)

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

When there is a need of setting particular ballast brightness level inside the DALI 1 Network remotely from BMS, it is possible to do so using DALI1_BALLASTX_SETPOINT registers.

When 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.

Minimum value 0 means that the ballasts send OFF command to the lamps, maximum value 254 means 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 18 DALI 1 Ballast Setpoint registers

5.5.6 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.

When 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.

When 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, register bit DI2_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.

Min. value 0 means that the ballast lights with the minimal brightness, maximum value 254 means 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 19 DALI 2 Ballast Setpoint registers

5.5.7 DALI1_BALLAST_MIN (40334-40349)

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

Minimum value 0 means that the ballast minimal value is the same as in case of OFF Command (ballast is OFF), 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). Minimal 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 the 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 20 DALI 1 Ballast MIN values registers

5.5.8 DALI2_BALLAST_MIN (40350-40365)

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

Minimum value 0 means that the ballast minimal value is the same as in case of OFF Command (ballast is OFF), maximum value 253 means that ballast cannot be dimmed in practice (the ballast setpoint value 254 means max. possible factory brightness level of the ballast). Minimal 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 the 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 21 DALI 2 Ballast MIN values registers

5.5.9 DALI1_BALLAST_MAX (40398-40413)

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

Maximum value 1 means that ballast cannot be lighted up in practice (the ballast setpoint value 0 means that the ballast is OFF). Maximal 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 the 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 22 DALI 1 Ballast MAX values registers

5.5.10 DALI2_BALLAST_MAX (40414-40429)

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

Maximum value 1 means that ballast cannot be lighted up in practice (the ballast setpoint value 0 means that the ballast is OFF). Maximal 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 the 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 23 DALI 2 Ballast MAX values registers

5.5.11 DALI1_NUMBER_OF_BALLASTS (30258)

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

5.5.12 DALI2_NUMBER_OF_BALLASTS (30259)

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

5.5.13 DALI1_FAULT_STATUS_REGISTER (30157)

The register contains an integer value representing common fault status from all the ballasts connected to 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 24 DALI Fault register structure

5.5.14 DALI2_FAULT_STATUS_REGISTER (30158)

The register contains an integer value representing common fault status from all the 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 25 DALI Fault register structure

6 Modbus registers table

Modbus Address	Dec addr	Hex addr	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 dipswitches
30003	2	0x2	CFG DIPSWITCH	Read Only	Configuration selected by CFG dipswitches
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
30042	41	0x29	DIGITAL OUTPUTS STATUS	Read Only	Bit0 – Light 1 Status O1 Bit1 – Light 2 Status O2 Bit2 – Blind UP Status O3 Bit3 – Blind DOWN Status O4
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)

Modbus Address	Dec addr	Hex addr	Register name	Access	Description
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
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) Bit7 – BLIND_CONTROL_MODE (0 -blind ; 1 - shutter)
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

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)
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)
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
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

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)
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
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)
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)
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)
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)
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)
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)
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)

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.
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.

40600	599	0x257	SLATS BLOCKING COIL REG	Read/Write Memory	Value range 0 – 1. (0 – short press control slats; 1 – short press is in middle press function mode) Bit0 – SLATS 1 blocking local
40601	600	0x258	BLIND UP TIME	Read/Write Memory	Blind opening time – could be set from BMS. Default value – 0 ms.
40617	616	0x268	BLIND DOWN TIME	Read/Write Memory	Blind closing time – could be set from BMS. Default value – 0 ms.
40633	632	0x278	SLATS OPENING TIME	Read/Write Memory	Slats full opening time – could be set only from BMS. Default value – 1000 ms.
40649	648	0x288	BLIND STATE	Read/Write Memory	Value range 0-100%.
40657	656	0x290	SLATS STATE	Read/Write Memory	Value range 0-100%.
40665	664	0x298	BLIND_OFF_DELAY	Read/Write Memory	Blind\Shutter pull up time Value range 0 – 100 (5 - default value)
40673	672	0x2A0	SLATS NUMBER OF STEPS	Read/Write Memory	Value range 1-10. (10 - default value)