MES-DI-16 KNX / MESBUS powered 16 channel digital input controller

User Manual

Document number: 02_01_01_05_16_Rev1_10_23

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Messung Systems Pvt. Ltd.
501 Lunkad Sky Vista, Viman Nagar, Pune 411 014, **India.**
T: +91 20 6649 2800 | e: info@messung.com | www.ourican.com

1. Introduction

1.1. Features

MES-DI-16 is a 16 channel digital input controller operating on the KNX /MESBUS bus with the following salient features:

- 16 individual binary non-isolated inputs such as pushbuttons or switches
- LED status indicator for individual input channels
- Suitable for Switching, Dimming, Shutter, Fan and Scene control
- Din rail mount assembly
- Total data saving on KNX bus failure
- Powered and addressed using the KNX or MESBUS bus.
- Programming button with LED indicator
- Programmed via ETS software
- Mounting on a 35 mm DIN rail
- CE marked

1.2. Application

MES-DI-16 has 16 non-isolated binary inputs for the KNX or MESBUS bus automation. Typical inputs include pushbuttons and switches.

1.3. Functionalities

MES-DI-16 has the following functionalities:

- Pushbutton
- Switch
- Dimmer
- Shutter
- Scene
- 1-Byte Constant (Percentage)
- 1-Byte Constant (Unsigned)

1.4. Appearance and features

MES-DI-16 is housed in an ABS plastic enclosure of 71 mm width X 91 mm height X 62 mm depth. The enclosure is mounted on a 35 mm DIN rail, secured by spring loaded retention clip. The enclosure has terminals on the upper and lower edge, with wire entry from the top or bottom.

External digital inputs (DI) connect to the MES-DI-16 controller via two groups of terminals. Of these, DI1 to DI8 terminals locate on the top of enclosure while DI9 to DI16 terminals locate on the bottom of the enclosure.

For the sake of connecting convenience, +5 Volts DC source is provided on the top as well as bottom terminals. The two + 5 Volts supplies are not isolated from each other and connect internally.

Table 1.1: Parts description, refer to the figures below

No.	Part	Function
1.	DI1 to DI8	Connector for DI1 to DI8
2.	5 V output	Connector for 5 Volts DC + output
3.	DI9 to DI16	Connector for DI9 to DI16
4.	5 V output	Connector for 5 Volts DC + output
5.	KNX / MESBUS connectors	Connectors for KNX / MESBUS bus.
6.	Input LEDs for DI1 to DI8	Indication LEDs for individual channels
7.	Input LEDs for DI9 to DI16	Indication LEDs for individual channels
8.	Power LED	Red LED illuminates when power is supplied to the device.
9.	Programming button	Push button for initializing the programming mode.
10.	Programming LED	Red LED illuminates when the device is in the programing mode.
11.	Retention clip	Secures the device to the DIN rail.
12.	Cover for terminal	Removable cover to ease connection with wires.

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1.4.1. Features

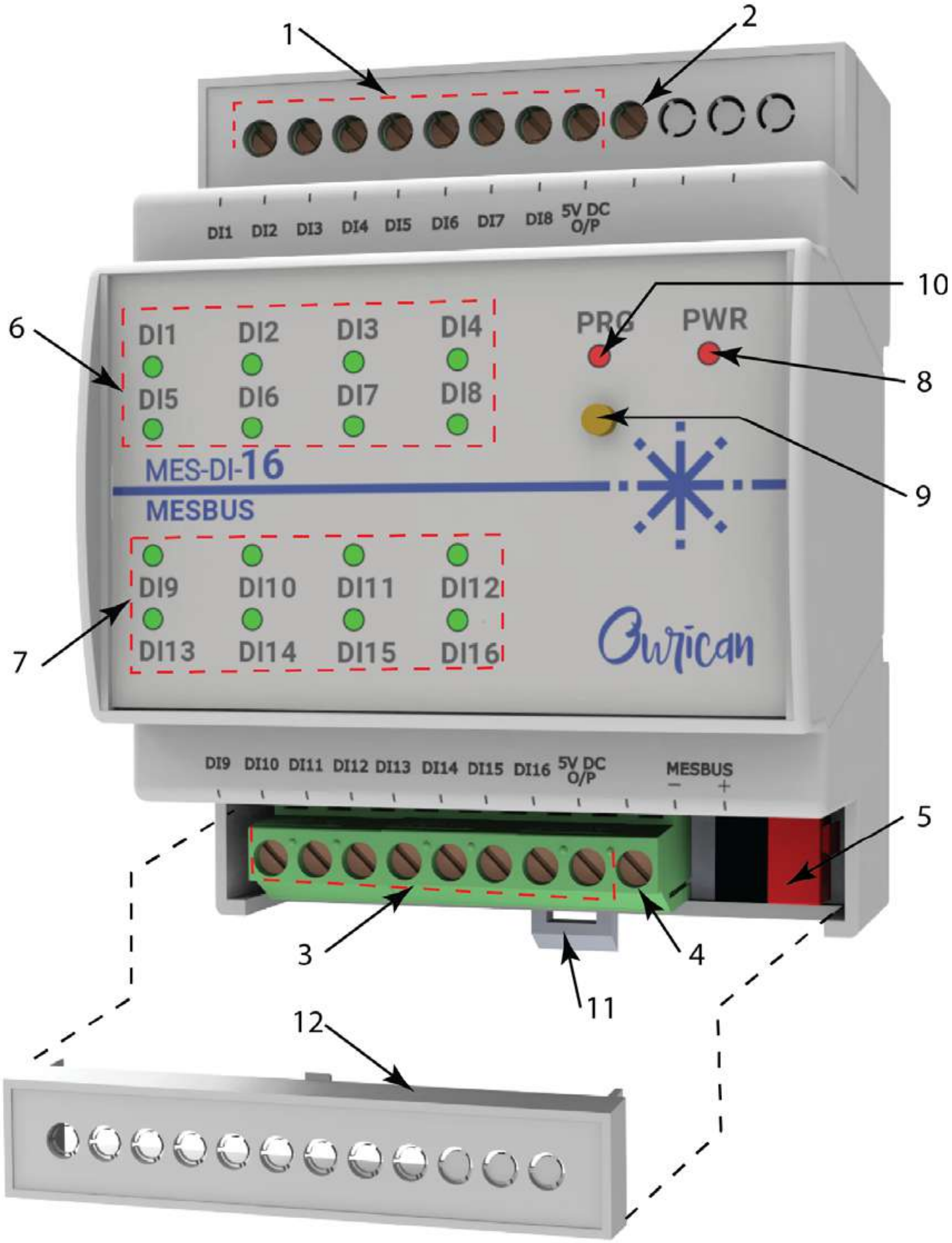

Figure 1-1: MES-DI-16

1.5. Installation

Note

Install the MES-DI-16 in an suitable electrical panel that protects the device from dust, dripping liquids, condensation, and vermin.

1. Engage the slot at the rear of the device into the upper edge of the DIN rail **1**. *See “Installing on the DIN rail” on page 8.*
2. Use a flat screwdriver to pull the spring-loaded retention clip **2** and position the device parallel to the DIN rail.
3. Release spring-loaded retention clip **2** to secure the device on the DIN rail. *See “Securing the device on the DIN rail” on page 9.*
4. To remove the device from the DIN rail **1**, reverse the above steps.

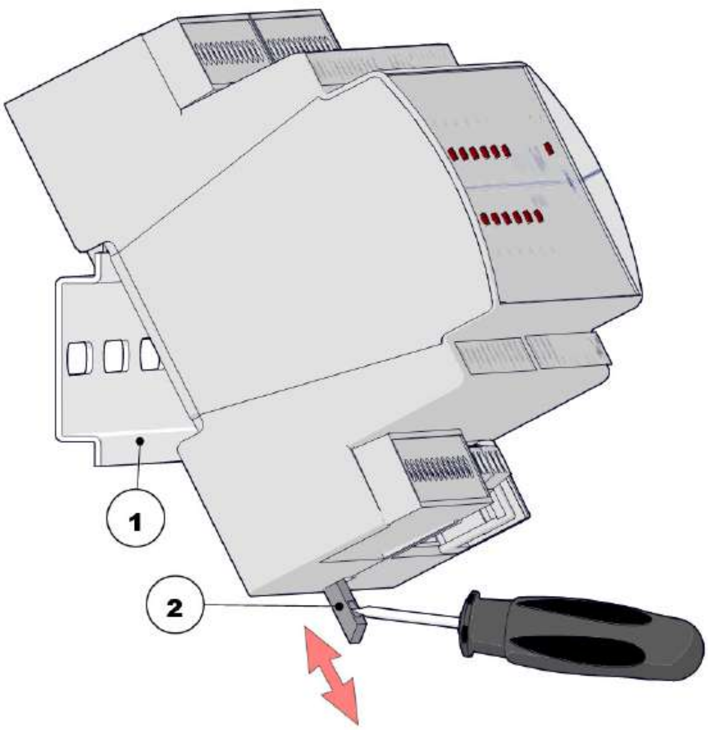

Figure 1-2: Installing on the DIN rail

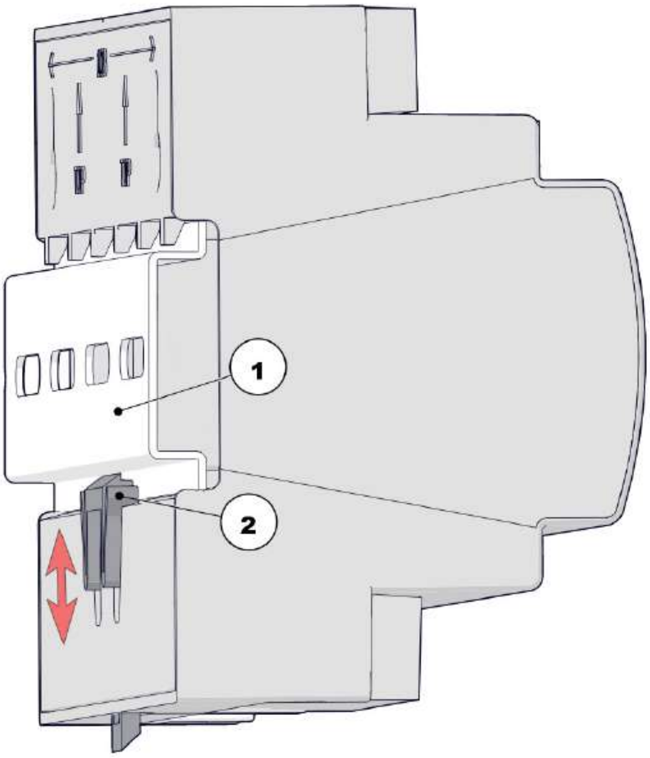

Figure 1-3: Securing the device on the DIN rail

1.6. Connections

1.6.1. About connections

- MES-DI-16 uses the standard KNX connector for connecting to the KNX / MESBUS bus.
- MES-DI-16 is powered through the KNX / MESBUS bus. The device does not need a separate power supply. Ensure adequate wire thickness for connecting the input.

Caution

Connect the +5 Volts DC supply only to potential free external pushbuttons or switches. The two + 5 VDC terminals are not isolated from each other and are connected internally. To avoid electrical shock to the users or damage to the device, do not connect the + 5 V terminal to the KNX / MESBUS bus or any other potential.

Caution

Connect the KNX / MESBUS terminals only to the bus cables and to no other power supply or potential, or non-KNX / MESBUS compliant devices.

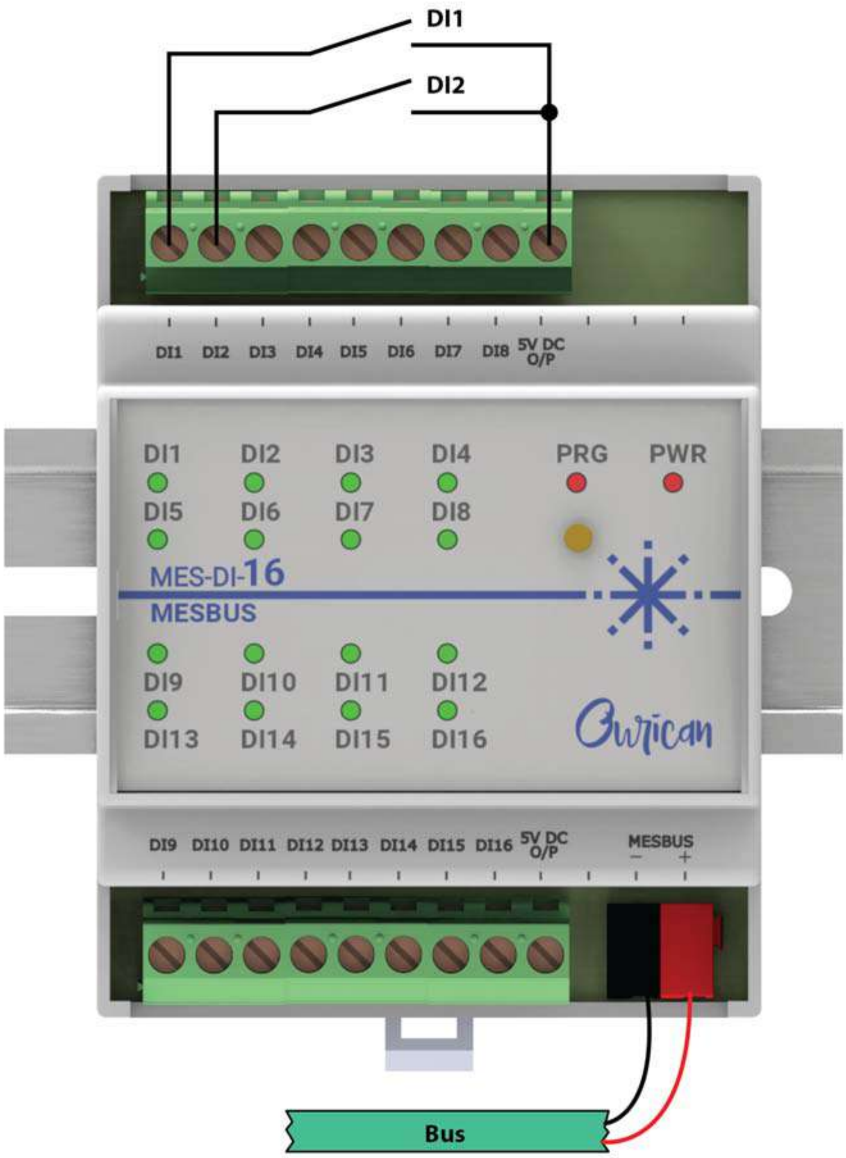

Figure 1-4: Connections of MES-DI-16 (only DI1 and DI2 shown with connections)

Caution

Isolate the supply from source, before commencing work on connections.

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Caution

Danger of electrical shock to the users or damage to the device may occur if the controller is connected to any other power supply or potential to the KNX / MESBUS terminals.

Caution

Only trained and qualified personnel should do the electrical wiring.

1.6.2. Connection procedure

1. Connect the KNX cables as per polarity indicated in connection diagram.
2. Connect the **Black wire** to the **Black terminal**, and the **Red wire** to the **Red terminal**.
   - Reversing the connection does not result in any damage.
   - The MES-DI-16 will not operate with a reversed bus connection.
3. Connect one terminal of the switch/pushbutton to 5V and other to the digital input.

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2. Configuration

2.1. Enable the inputs

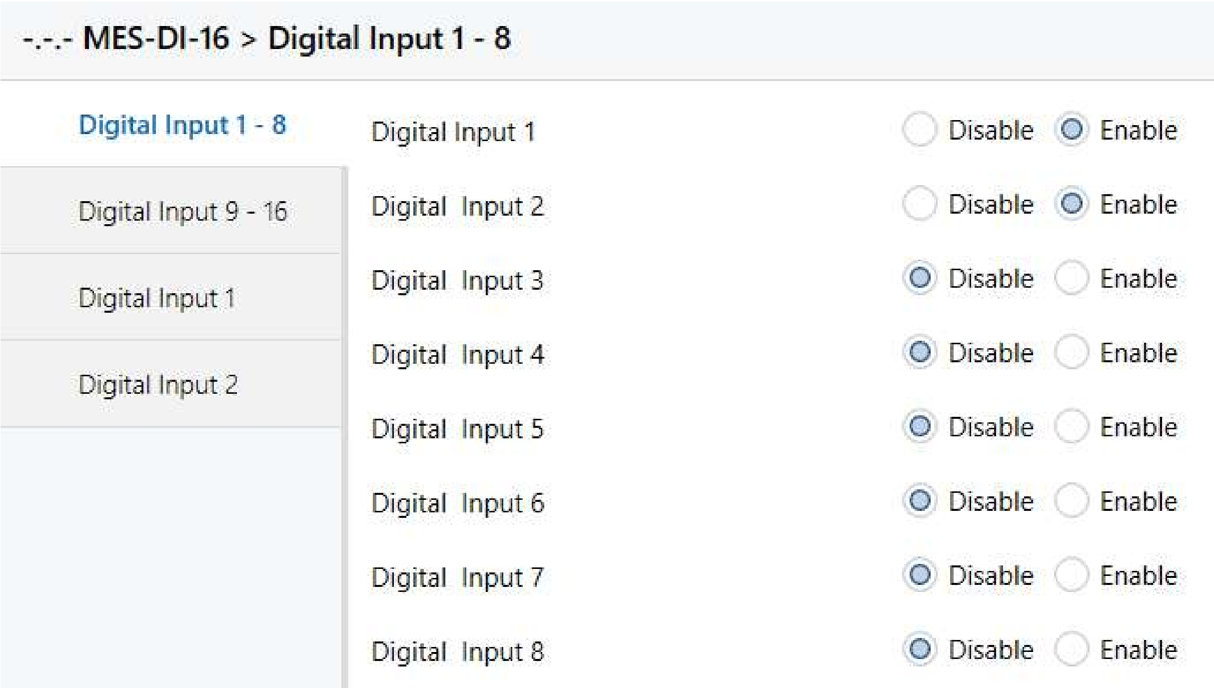

Figure 2-1: Enable in inputs

1. Click the **Digital Input 1-8** tab to **Enable** or **Disable** the DI 1 to DI 8.
2. Similarly, click the **Digital Input 9-16** tab to **Enable** or **Disable** the DI 9 to DI 16.

2.2. Configure for Pushbutton

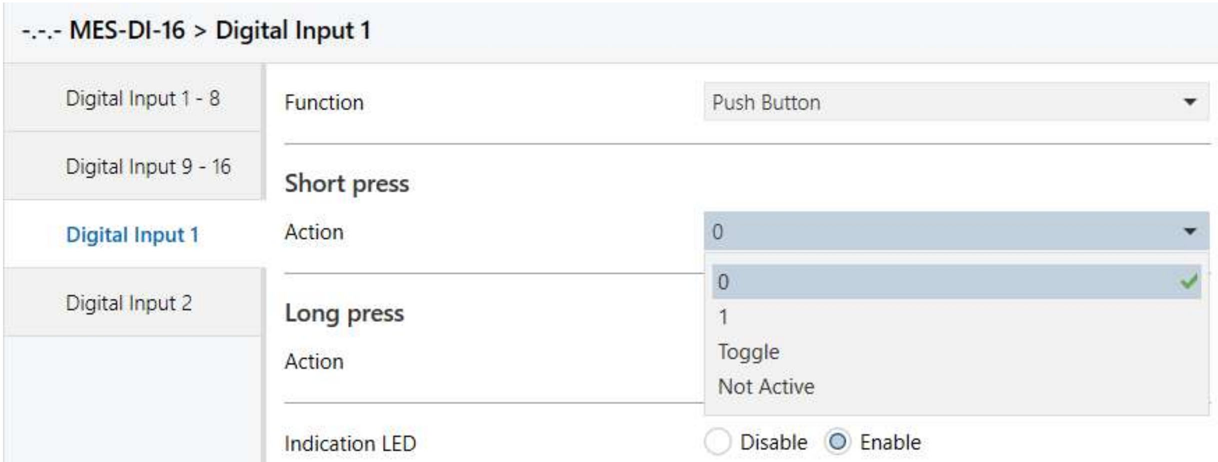

Figure 2-2: Configure pushbutton for Short press

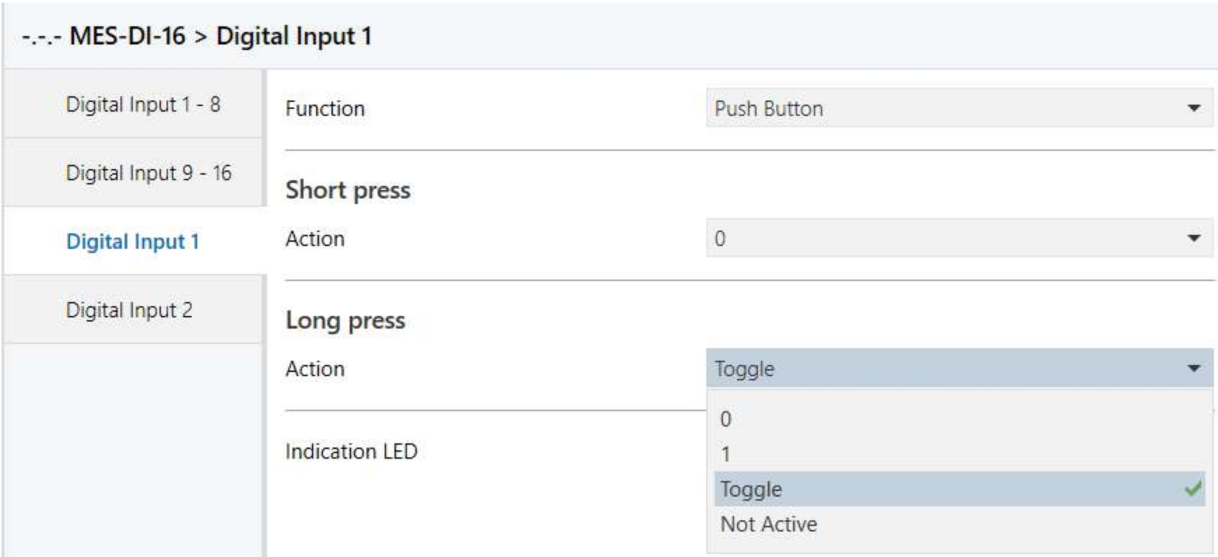

Figure 2-3: Configure pushbutton for Long press

Table 2.1: Functionalities for pushbutton

	Value Selection	Function performed
Short Press	0	Send value 0 (OFF) on the KNX bus
	1	Send value 1 (ON) on the KNX bus
	Toggle	Send value 0/1 (Toggle) on the KNX bus
	Not Active	No action

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Table 2.1: Functionalities for pushbutton (Continued)

	Value Selection	Function performed
Long Press	0	Value 0 (OFF) will be sent on KNX bus
	1	Value 1 (ON) will be sent on KNX bus
	Toggle	Value 0/1 (Toggle) will be sent on KNX bus
	Not Active	No action

2.3. Configure for Switch

Note

The switch action can be triggered on rising edge and falling edge.

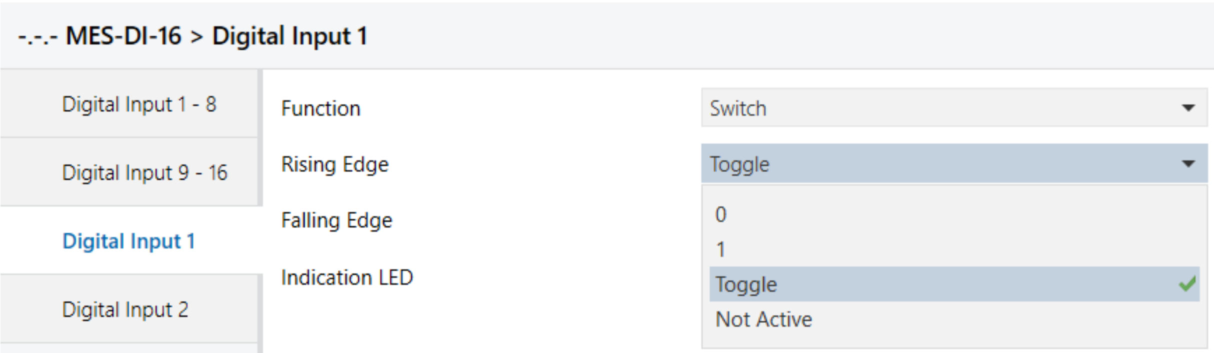

Figure 2-4: Configure switch for rising edge

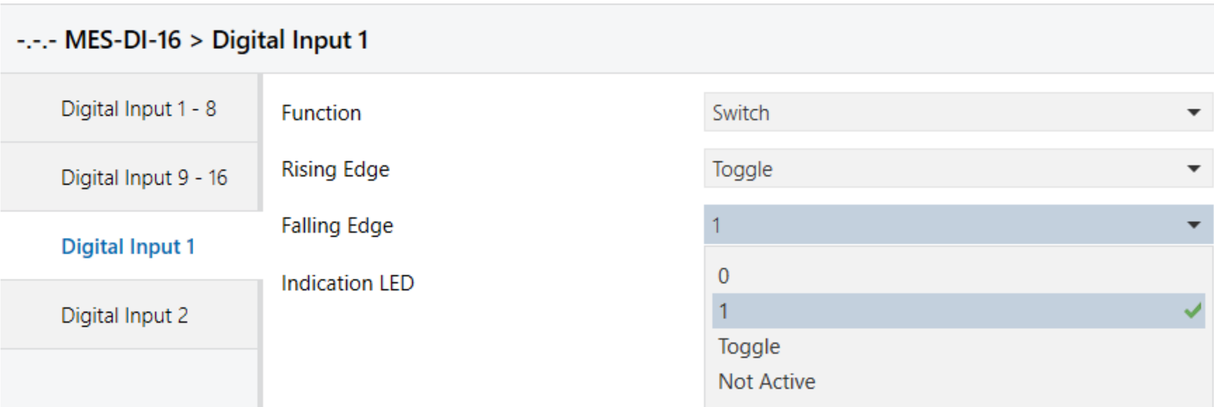

Figure 2-5: Configure switch for falling edge

Table 2.2: Functionalities of Switch

	Value Selection	Function performed
Rising Edge	0	Send Value 0 (OFF) on the KNX bus
	1	Send Value 1 (ON) on the KNX bus
	Toggle	Send Value 0/1 (Toggle) on the KNX bus
	Not Active	No action
Falling Edge	0	Send Value 0 (OFF) on the KNX bus
	1	Send Value 1 (ON) on the KNX bus
	Toggle	Send Value 0/1 (Toggle) on the KNX bus
	Not Active	No action

2.4. Configure for Dimmer

- For the Dimmer functionality, either a short press or long press triggers the action.
- Short press performs the On/Off action.
- Long press performs the dimming action.

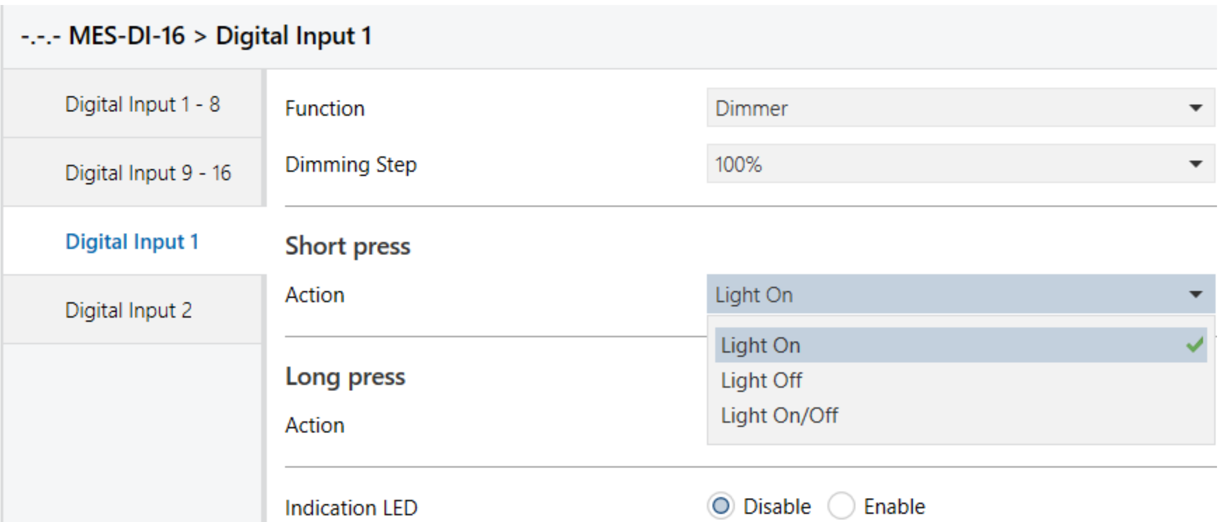

Figure 2-6: Configure dimmer for short press

- Every long press sends a 4-bit command to increase/decrease the light level by a dimming step. Configure this level through the parameter 'Dimming step.'
- The dimming function has a start-stop action. Pressing the button continuously sends the 'brighter or darker' command, until the button is released. After

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releasing the button, the controller sends a stop telegram, which stops the dimming process.

- The dimming status object gives the feedback of the current light level.

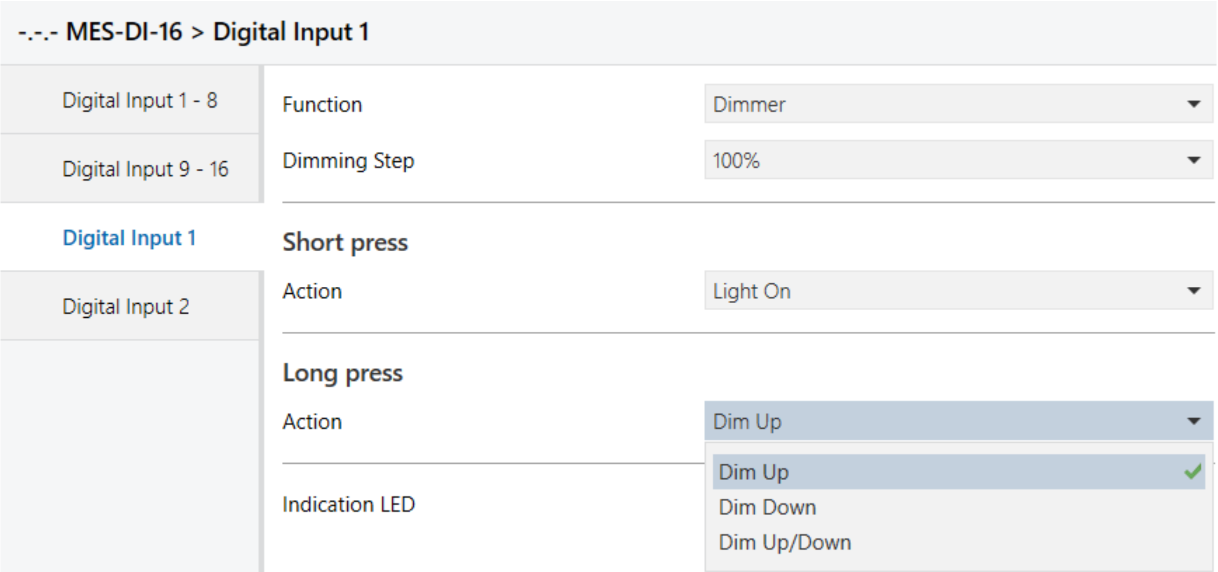

Figure 2-7: Configure dimmer for long press

Table 2.3: Functionalities of Dimmer

	Value Selection	Function Performed
Short Press	Light ON	Value 1 (ON) will be sent on KNX bus
	Light OFF	Value 0 (OFF) will be sent on KNX bus
	Light ON/OFF	Value 1/0 (Toggle) will be sent on KNX bus
Long Press	Dim Down	Darker command will be sent on KNX bus
	Dim Up	Brighter command will be sent on KNX bus
	Dim Up/ Dim Down	Brighter/Darker command will be sent on KNX bus

2.5. Configure for Shutter

- For the shutter functionality, the short press and long press defines the action.
- The long press functionality moves the shutter up/down.
- The short press stops the up/down movement of the shutter before reaching the end position.

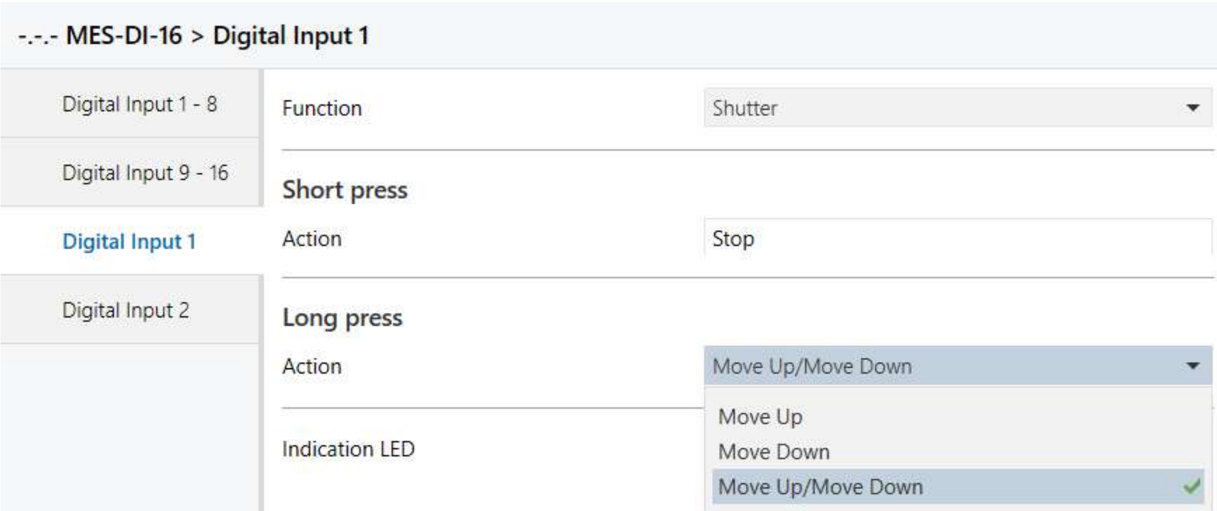

Figure 2-8: Configuration of shutter for short press and long press

Table 2.4: Operation of the shutter

	Value Selection	Functions Performed
Short Press	Stop	Send Value 0 to stop the shutter
Long Press	Move Up	Send Value 0 to move the shutter
	Move Down	Send Value 1 to move the shutter
	Move Up / Move Down	Send Value 0/1 to move the shutter

2.6. LED indication

- Each input has an Indication LED. Thus the 16 inputs have 16 LED indicators. These LED illuminate when the input is active.
- The indication LED works only if linked to the corresponding object from the actuator or the respective input.
- The indication LEDs are available for Push Button, Switch, Dimmer and Shutter.

Figure 2-9: Enable or Disable Indication LED

2.7. Configure Scenes

- The scene function allows running of various scenes.
- The scene numbers can be from 1 to 64.

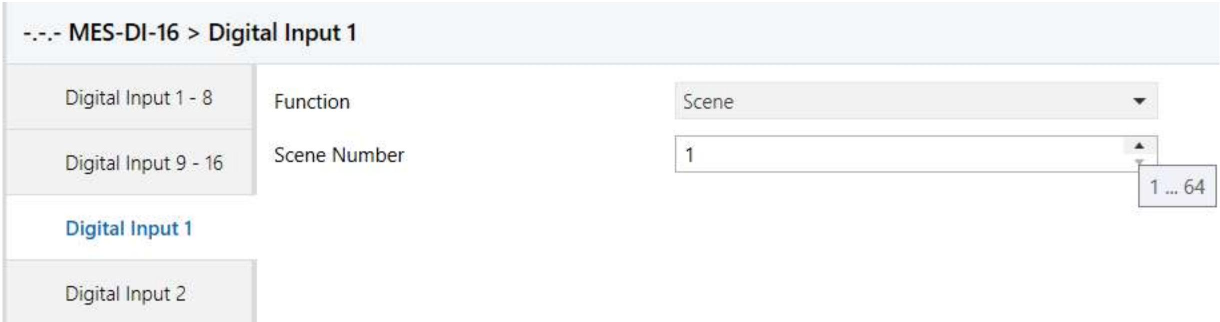

Figure 2-10: Configuration of a scene

2.8. Configure 1-Byte constant (percentage)

- The 1-Byte constant (percentage) sends percentage values (0-100%) on the KNX bus.
- The function has a single group object DI[x] Constant value (percentage).
- The value parameter is used to enter the percent value.

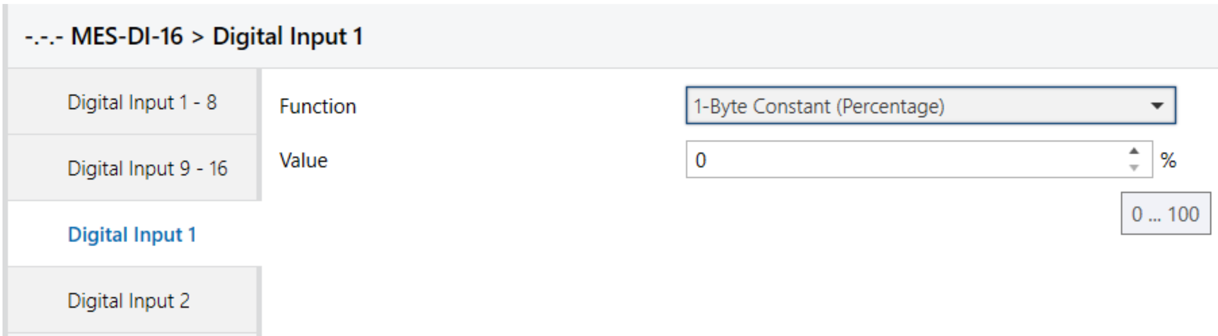

Figure 2-11: Operation of 1-Byte constant (percentage)

2.9. 1-Byte Constant (Unsigned):

- The 1-Byte constant (unsigned) sends the unsigned values (0-255) on the KNX bus.
- The function has a single group object DI[x] Constant value (integer).
- The value parameter is used to enter the unsigned value.

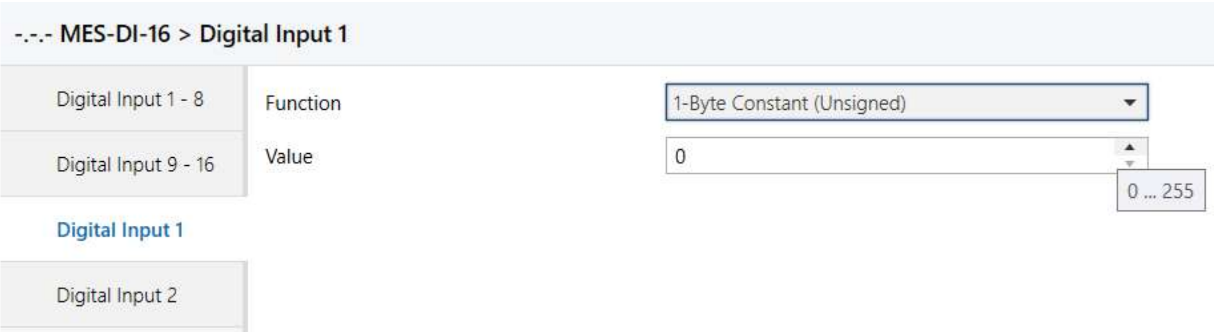

Figure 2-12: Operation of 1-Byte constant (unsigned)

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3. Annexure - Communication Objects

3.1. Table of communication objects

Table 3.1: Communication objects

Number	Size	I/O	Flags	Data type (DPT)	Functional Range	Name
1, 11,21,31, 41, 51, 61, 71, 81, 91, 101, 111, 121, 131, 141, 151	1 Bit	I	C -W T -	DPT_Switch	0/1	DI[x] Short Press Off
	1 Bit	I	C -W T -	DPT_Switch	0/1	DI[x] Short Press On
	1 Bit	I	C -W T -	DPT_Switch	0/1	DI[x] Short Press On/Off
	1 Bit	I/O	C R WT -	DPT_Switch	0/1	DI[x] Switch Edge
	1 Bit	I	C -W T -	DPT_Switch	0/1	DI[x] Light On
	1 Bit	I	C -WT-	DPT_Switch	0/1	DI[x] Light Off
	1 Bit	I	C -W T -	DPT_Switch	0/1	DI[x] Light On/Off
	1 Bit		C - -T-	DPT_Trigger	0/1	DI[x] Shutter Stop

Table 3.1: (Continued)Communication objects

Number	Size	I/O	Flags	Data type (DPT)	Functional Range	Name
5,15, 25,35, 45, 55, 65, 75, 85, 95, 105, 115, 125, 135, 145, 155	1 Byte		C - -T-	DPT_scene_number	(1-64)	DI[x] Scene
6, 16, 26, 36, 46, 56, 66, 76, 86, 96, 106, 116, 126, 136, 146, 156	1 Byte		C - -T-	DPT_percentage	0-100%	DI[x] Constant Value (percentage)
6, 16, 26, 36, 46, 56, 66, 76, 86, 96, 106, 116, 126, 136, 146, 156	1 Byte		C - -T-	DPT_counter_pulses	0-255	DI[x] Constant Value (integer)
8, 18, 28, 38, 48, 58, 68, 78, 88, 98, 108, 118, 128, 138, 148, 158	1 Bit	I	C -W T -	DPT_Switch	0/1	DI[x] Long Press Off
	1 Bit	I	C -W T -	DPT_Switch	0/1	DI[x] Long Press On
	1 Bit	I	C -W T -	DPT_Switch	0/1	DI[x] Long Press On/Off

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Table 3.1: (Continued)Communication objects

Number	Size	I/O	Flags	Data type (DPT)	Functional Range	Name
2, 12, 22, 32, 42, 52, 62, 72, 82, 92, 102, 112, 122, 132, 142, 152	4 bit		C - -T-	DPT_dimming_control	0x0 (Stop) 0x1 (Dec. by 100%) 0x7 (Dec. by 1%) 0x8 (Stop) 0x9 (Inc. by 100%) … 0xF (Inc. by 1%)	DI[x] Long Press Darker
	4 bit		C - - T -	DPT_dimming_control	0x0 (Stop) 0x1 (Dec. by 100%) … 0x7 (Dec. by 1%) 0x8 (Stop) 0x9 (Inc. by 100%) … 0xF (Inc. by 1%)	DI[x] Long Press Brighter/Darker
	4 bit		C - - T -	DPT_dimming_control	0x0 (Stop) 0x1 (Dec. by 100%) … 0x7 (Dec. by 1%) 0x8 (Stop) 0x9 (Inc. by 100%) … 0xF (Inc. by 1%)	Long Press Brighter/Darker
9, 19, 29, 39, 49, 59, 69, 79, 89, 99, 109, 119, 129, 139, 149, 159	1 Byte	I	C - W- -	DPT_percentage	0-100%	DI[x] Dimming status
	1 Byte	I	C - W- -	DPT_percentage	0-100%	DI[x] Shutter status

Table 3.1: (Continued)Communication objects

Number	Size	I/O	Flags	Data type (DPT)	Functional Range	Name
1, 11,21,31, 41, 51, 61, 71, 81, 91, 101, 111, 121, 131, 141, 151	1 Bit		C - -T-	DPT_up/down	0	DI[x] Move Up
	1 Bit		C - -T-	DPT_up/down	1	DI[x] Move Down
	1 Bit		C - -T-	DPT_up/down	0/1	DI[x] Move Up/Down
7, 17, 27, 37, 47, 57, 67, 77, 87, 97, 107, 117, 127, 137, 147, 157	1 Bit	I	C -W T -	DPT_Switch	0/1	DI[x] Indication LED

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MES-DI-16

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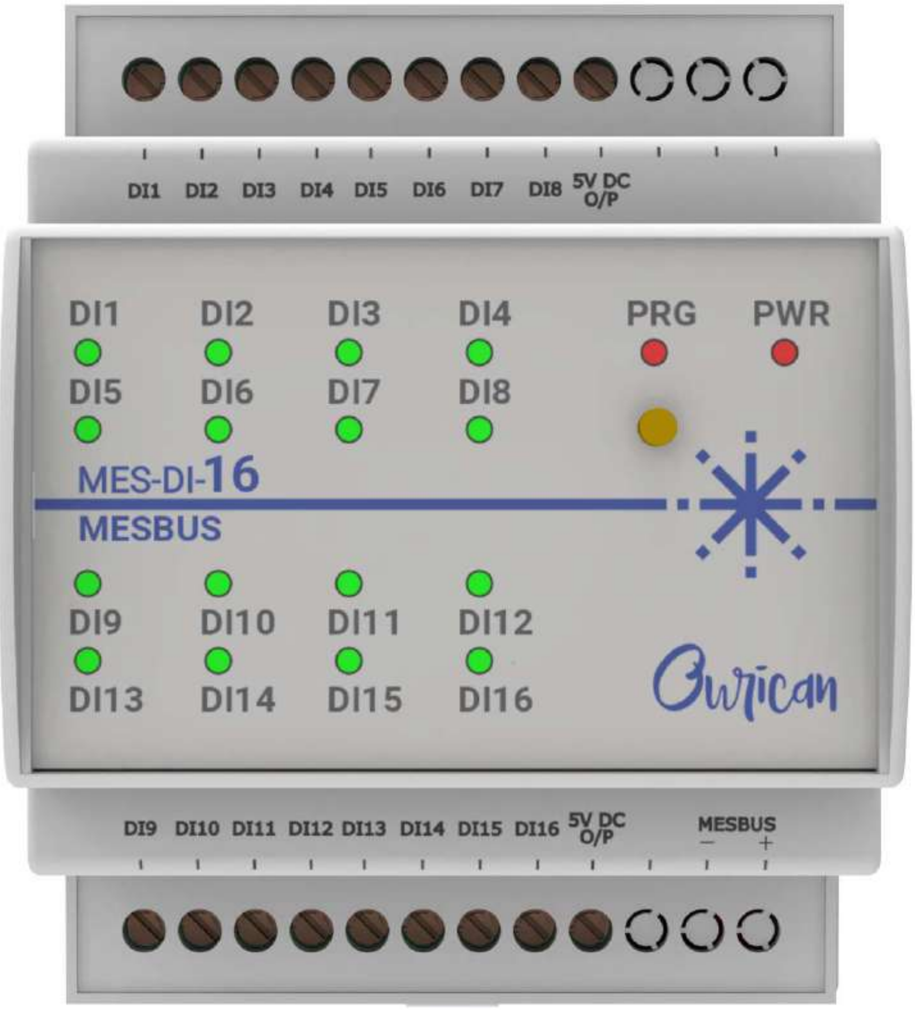

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