



MES-DO-16R KNX / MESBUS powered 16 channel multifunction actuator MES-DO-8R KNX / MESBUS powered 8 channel multifunction actuator



User Manual

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1. Introduction

1.1. Features

MES-DO-16R is a 16 channel multifunction actuator and MES-DO-8R is an 8 channel multifunction actuator. Both actuators operate on the KNX /MESBUS bus with the following individual and common features:

1.1.1. MES-D0-16R -> 16 Channel multifunction actuator

- 16 Individual outputs
- 8 Shutter channels
- 4 Ceiling fan channels

1.1.2. MES-D0-8R -> 8 Channel multifunction actuator

- 8 Individual outputs
- 4 Shutter channels
- 2 Ceiling fan channels

1.1.3. Common features

- Power relay outputs for directly operating the loads.
- Powered and addressed using the KNX or MESBUS bus.
- Provided with push buttons and LED indicators for individual outputs.
- Ability to run 10 scenes per output.
- Programmed via ETS software.
- Enhanced flexibility of application through 48 discrete logical functions.
- Saving of total data on failure of bus.
- Individual relay outputs, that allow load to be powered from different phases.
- Programming button with LED indicator.
- Mounting on a 35 mm DIN rail.
- CE marked.

1.2. Application

MES-DO-16R/MES-DO-8R can operate various switching electrical loads for the home, office and hotel automation.

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These loads typically include:

- Lighting
- Shutter/Curtains
- Fans
- Air-conditioners
- Appliances

1.3. Appearance and features

1.3.1. MES-DO-16R

MES-DO-16R is housed in an ABS plastic enclosure of 143 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.

1.3.2. MES-DO-8R

MES-DO-8R 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.

1.3.3. Features

No.	Part	Function
1.	R1/S1 to R8/S4	Connector for R1/S1 to R8/S4
2.	R9/S5 to R14/S7	Connector for R9/S5 to R14/S7 [applicable only for MES-DO-16R]
3.	R15/S8 to R16/S8	Connector for R15/S8 to R16/S8 [applicable only for MES-DO-16R]
4.	Programming button	Push button for initializing the programming mode.
5.	Programming LED	Red LED illuminates when the device is in the programing mode.
6.	Output test button	Push button for toggling the output.
7.	Output LED	Green LED illuminates to reflect the output status.
8.	Power LED	Red LED illuminates when power is supplied to the device.

Table 1.1: Parts description, refer to the figures below



Table 1.1: Parts description	, refer to the figures below
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No.	Part	Function
9.	KNX / MESBUS connectors	Connectors for KNX / MESBUS bus.
10.	Retention clip	Secures the device to the DIN rail.



Figure 1-1: MES-DO-16R

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Figure 1-2: MES-DO-8R

1.4. Installation



Note

Install the MES-DO-16R/MES-DO-8R in an suitable electrical panel that protects the device from dust, dripping liquids, condensation, and vermin.







Figure 1-3: Installing on the DIN rail

- 1. Engage the slot at the rear of the device into the upper edge of the DIN rail **1**. <u>See</u> <u>*"Installing on the DIN rail" on page 9.*</u>
- 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. <u>See</u> <u>"Securing the device on the DIN rail" on page 10.</u>
- 4. To remove the device from the DIN rail **1**, reverse the above steps.





Figure 1-4: Securing the device on the DIN rail

1.5. Connections

For connection diagrams of various applications, go to the following sections:

- "Operating Switching Loads" on page 13.
- "Operating Shutter Loads" on page 15
- "Operating Ceiling Fans" on page 19

1.5.1. About connections

- MES-DO-16R/MES-DO-8R uses the standard KNX connector for connecting to the KNX / MESBUS bus.
- MES-DO-16R/MES-DO-8R is powered through the KNX / MESBUS bus. The device does not need a separate power supply. Ensure adequate wire thickness for connecting the load.
- Connect loads through short-circuit or overload protection device suitable for the load current.



ACaution

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



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



The device outputs may be connected to high external potential even if the device is off. Isolate the load supply from source, before commencing work on connections.

ACaution

Only trained and qualified personnel should do the electrical wiring.

1.5.2. 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-DO-16R/MES-DO-8R will not operate with a reversed bus connection,
- 3. Connect the supply [Line] wires to each relay common contact [C terminal].
- 4. Connect the load wire to each relay output contact **[D terminal]** and wire to the other end of load to the return **[Neutral]** supply.





1.6. Start-up and power-loss

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Note

Start-up and power-loss behavior is applicable to both the 16 channel and 8 channel actuators.

1.6.1. During start-up

- The red PWR LED illuminates when KNX / MESBUS supply is available.
- The green LEDs for individual outputs illuminate as per the status prior to the bus failure.

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Note

Default and **Custom** options are available for deciding the relay behavior during startup for switching, shutter and the fan application.

1.6.2. During power-loss

- The PWR LED switches off.
- The green LEDs for individual outputs switch off, if they were illuminated when the KNX / MESBUS was available.
- The relay output retain their state, even during a power-loss for switching and fan application.
- The relay switches off during power loss when configured for shutter application.
- See paragraph 5.1.3.1. "Start Up and Shutdown Action" on page 25 for setting the relay's behavior during power loss and power restoration for switching application.



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2. Operating Switching Loads

This section explains the wiring and usage of MES-DO-16R with switching loads.

- In this application, the MES-DO-16R drives any on/off single phase load such as lamps (LED, fluorescent, and similar), air-conditioners, appliances etc.
- For driving 3 phase applications, wire individual phases to separate channels inputs and connect the load to individual channel outputs.

2.1. Connection diagram



Figure 2-1: Typical connection diagram of MES-DO-16R driving switching loads

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2.2. Manual operation

- 1. Connect the MES-DO-16R as shown in the <u>Figure 2-1: "Typical connection diagram of</u> <u>MES-DO-16R driving switching loads" on page 13</u>.
- 2. To manually switch the load on/off, press the push button of that channel to toggle the output.



Note

Similar connection diagram and operation is applicable for MES-DO-8R.



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3. Operating Shutter Loads

In this application, the MES-DO-16R drives single-phase curtain motor load used in shutter or curtain automation.

3.1. Connection diagram



Figure 3-1: Typical connection diagram of MES-DO-16R driving curtain motor

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Note

For **Shutter** application, you must select adjacent channel for connecting the shutter/ curtain motor. i.e. The curtain motor can be wired for output 1 and output 2 but not output 1 and output 3.

This logic reflects in the terminal decal (upper terminal decal shown below) of the MES- DO-16R device, which marks the adjacent pairs of outputs for the same curtain motor. i.e. Output R1 and Output R2 are marked to operate S1 curtain motor.

~i i	1 1	1 1		1 1		1 1	I I
R1/S1∔	R2/S1 t	R3/S2↓	R4/S2†	R5/S3∔	R6/S3†	R7/S4 ↓	R8/S4 †

- 1. Connect the MES-DO-16R as show in the <u>Figure 3-1: "Typical connection diagram of</u> <u>MES-DO-16R driving curtain motor" on page 15</u>.
- 2. Wire the forward and reverse connections of curtain motor to separate channel outputs while feeding the input of these channels from the same phase supply.

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Note

Note

When the device is configured for shutter, left channel is for moving the curtain downwards and right channel is for moving the curtain upwards.

3.2. Manual operation

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A **long-press** refers to holding down the button for more than 2 seconds and then releasing. A **short-press** refers to a momentary operation of the button before releasing.

- 1. To manually operate the curtain motor in any direction, i.e. for opening or closing, long-press the push button of the respective channel on the MES-DO-16R. The channel will automatically switch off after the rise and fall time as configured in the ETS software.
- 2. To stop the shutter at any desired position, short-press the push button of the respective channel. This will keep the shutter at a certain position.



3. When the shutter is moving down, the left LED will switch on during the set fall time, similarly, when the shutter is moving up, the right LED will switch on during the set rise time. When the shutter has ended its movement, both the LEDs will switch off.



Note

Similar connection diagram and operation is applicable for MES-DO-8R.

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4. Operating Ceiling Fans

In this application, we use the MES-DO-16R to drive ceiling fan through an external EX-CFC-1 one channel ceiling fan controller. MES-DO-16R can control 4 individual ceiling fans with a separate EX-CFC-1 for each fan.

4.1. Connection diagram



Note

Ensure that the connections between designated 4 channels are in sequence with the EX-CFC-1's I1 to I4 inputs. Wrong sequence of connections will result in the fan's speed changing in an unpredictable way.



Figure 4-1: Typical connection diagram of MES-DO-16R for operating ceiling fan using EX-CFC-1

- 1. Connect 230 VAC supply to four channel inputs of the MES-DO-16R.
- 2. Connect the outputs of the four channels to the I1, I2, I3 and I4 inputs of the EX-CFC-1.

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3. Wire the neutral connection for the ceiling fan directly to EX-CFC-1 and the fan motor.

4.2. Manual operation

The EX-CFC-1 is a expansion one channel ceiling fan controller that is designed for use with the MES-DO-16R actuator.

The EX-CFC-1 unit has 4 numbers of 230 VAC inputs and a fan load (single phase) + neutral output for the ceiling fan. The EX-CFC-1 changes the fan speed in 5 steps, from zero (off) to 5th speed.

4.2.1. Changing fan speeds

- 1. To manually change the fan speeds from zero to full speeds, short-press the button associated with the 1st of the 4 channels.
- 2. Short-press the button every time you wish to change the speed.
- 3. The LEDs associated with four channels illuminate in a sequence to indicate the present fan speed. See <u>"Channel output LEDs" on page 20.</u>
- 4. Short-pressing the button when the fan is already running at full speed will switch the fan off i.e. zero speed. Short-pressing the button when the fan is at zero speed will increase the speed to the first level and so on.

Fan speed	Short-press channel 1 button		Channel output LEDs										
			1 O	2 O	3 O	4 O	5 O	6 0	7 0	8 O		PRG O	PWR ●
Fan speed 0 = Fan off	Starting	Į	۲	۲	۲	۲	۲	۲	۲	۲	MES-DO- 16R	•	ý.
	condition	ſ	۲	۲	۲	۲	۲	۲	۲	۲	MESBUS	•	杰 ՝ ``
			0 9	0 10	0 11	0 12	0 13	0 14	0 15	0 16		O	ntican
		Γ	1	2 O	3 O	4 O	5 O	6 O	7 0	8 O		PRG O	PWR
Fan speed 1	Once	ļ	۲	۲	۲	۲	۲	۲	۲	۲	MES-DO- 16R	•	j.
		ſ	۲	۲	۲	۲	۲	۲	۲	۲	MESBUS	•	<u>ጥ ገ</u>
			0 9	0 10	0 11	0 12	0 13	0 14	0 15	0 16		O	ntican

Table 4.1: Channel output LEDs





Table 4.1: Channel output LEDs

Fan speed	Short-press channel 1 button	Channel output LEDs										
Ean speed 2	Twico		1 ○	2 •	3 ○ ●	4 ○	5 ○	6 0 ()	7 ○	8 0 ()	MES-DO- 16R	PRG PWR • •
ran speeu 2	TWILE	() 0 9) 0 10) 0 11) 0 12) 0 13) 0 14) 0 15) 0 16	MESBUS	· . Owijican
Fan speed 3	Thrice		1 ○	2 ○	3 • •	4 ○ ●	5 ○	6 ○ ●	7 ○ ●	8 0	MES-DO- 16R	PRG PWR O O · ·
		() 0 9) 0 10) 0 11) 0 12) 0 13) 0 14) 0 15) 0 16	MESBUS	Owjican
Fan speed 4	Four times		1 ○	2 ○	3 ○ ●	4 • •	5 ○	6 0 ()	7 ○ ●	8 ○ ●	MES-DO- 16R	PRG PWR • • •
Fan speed 4		() 0 9) 0 10) 0 11) 0 12) 0 13) 0 14) 0 15) 0 16	MESBUS	· . Owijican
Fan speed 5	Five times. On the 6th	(1 •	2 •	3 • •	4 • •	5 ○	6 ○	7 0 ()	8 ○	MES-DO- 16R	PRG PWR O • •
ran speed o	short-press, the fan speed will be zero.	() 0 9) 0 10	© ○ 11) 0 12) 0 13) 0 14	© ○ 15) 0 16	MESBUS	• • • Owtican

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Note

Similar connection diagram and operation is applicable for MES-DO-8R.



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5. MES-DO-16R/MES-DO-8R Outputs

5.1. Configuring the Outputs

In this section we configure the MES-DO-16R/MES-DO-8R device.

The device can be configured for switching application, shutter/curtain application, and ceiling fan application using EX-CFC-1.

5.1.1. Defining the Blocks

- The 16 relays outputs of MES-DO-16R device are defined in 4 blocks.
- The 8 relays outputs of MES-DO-8R device are defined in 2 blocks.

Block number	Channel number	Output number		
	Channel 1	Output 1		
Block 1		Output 2		
DIOCK	Channel 2	Output 3		
		Output 4		
	Channel 3	Output 5		
Block 2		Output 6		
DIOCK Z	Channel 4	Output 7		
		Output 8		
	Channel 5	Output 9		
Block 3		Output 10		
DIUCK 3	Channel 6	Output 11		
		Output 12		
	Channel 7	Output 13		
Block /		Output 14		
	Channel 8	Output 15		
		Output 16		

Table 5.1: : Defining the blocks

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5.1.2. Enable the Outputs

General	Outputs	Ulsaure O Enable
- Outputs	Logic Functions	O Disable C Enable
Output 1 Output 2		

Figure 5-1: Enable the outputs

- 1. In the ETS, navigate to the **Parameters** tab and under the General page select **Enable** for **Outputs**.
- 2. Click the Outputs sub-tab.
 - > The **Outputs** page shows.

5.1.2.1. Expand the Outputs page for Switch and Shutter

General	BLOCK 1	Disabled
Outputs	BLOCK 2	Disabled Switch/Shutter
	BLOCK 3	Fan
	BLOCK 4	Disabled

Figure 5-2: Expand the Output menu

- Click on one of the Blocks 1 through Block 4 text to show the drop-down menu with an options of Disabled, Switch/Shutter and Fan. See <u>"Expand the Output menu" on</u> <u>page 24.</u>
- 4. Select the Switch/Shutter option.
 - > The menu under Channel 1 further expands to Disabled, Switch, or Shutter.





Figure 5-3: Expand the Channel menu for Switch or Shutter

General	Output 1	Switch	+
Outputs	Behaviour at Locking	Off	Ŧ
Output 1	Behaviour at Unlocking	Off	*
Output 2	Shutdown Action	Off	•
	Start Up	O Default Custom	
	Status after Bus Voltage Recovery	O Disable C Enable	
	Timer	O Disable C Enable	
	Scene	O Disable C Enable	

Expand the output for switch application

5.1.3. Configuration for Switch Application



Note

This section explains setting that are applicable to the Switch application.

5.1.3.1. Start Up and Shutdown Action

This section sets the behavior of the relay outputs at start up (bus power up) and shutdown (bus power down). This **Start Up** and **Shutdown** behavior options are meant only for the **Switch** application.

1. Select the **Shutdown Action** drop-down menu to show the **Off, On** and **No Change** options. See <u>"Expand the Outputs page for Switch and Shutter" on page 24</u>.

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 Selecting the Off option at Shutdown will force relays to the switched-off position, while On option will force the relays to the on-position and No Change option will retain the relay's previously set state after device switches off. See <u>"Options for</u> <u>Shutdown action" on page 26</u>.

General	Output 1	Switch	•
Outputs	Behaviour at Locking	01	•
Output 1	Behavi	Off	•
Output 2	Shutdown Action	Off	-
Output 2	Start Up	Off	~
	Status after Bus Voltage Recovery	On No Change	
	Timer	O Disable O Enable	
	Scene	O Disable C Enable	

Figure 5-4: Options for Shutdown action

- 3. Start Up menu offers the Default and Custom options.
- 4. In the **Default** option, relay will retain the last state after device is powered up and relay will switch off after downloading the ETS program.
- 5. In **Custom** option, the relay state can be changed to **On**, **Off**, or the last state after device is powered up and after downloading the ETS program.

General	Output 1	Switch	•
Outputs	Behaviour at Locking	Off	•
+ Output 1	Behaviour at Unlocking	Off	•
Output 2	Shutdown Action	Off	•
oupurz	Stort Up	🔵 Default 🔘 Custom	
	Start Up Action	Off	•
	Status after Bus Voltage Recovery	Off	Л
	Delay	Last	
	Timer	Disable O Enable	_
	Scene	Disable O Enable	

Figure 5-5: Options for Start Up action



5.1.3.2. Status after Bus Voltage Recovery Action

General	Output 1	Switch	•
- Outputs	Behaviour at Locking	Off	•
	Behaviour at Unlocking	Off	•
Output 1	Shutdown Action	Off	•
Output 2	Start Up	Default O Custom	
	Soft Up Action	Off	•
	Status after Bus Voltage Recovery	Disable Enable	
	Delay	0	÷ s
	Timer	🔵 Disable 🔘 Enable	0 50
	Scene	O Disable O Enable	

Figure 5-6: Options for Status after Bus Voltage Recovery action

This section sets the time for sending the status of relay output after power failure (bus power down) followed by power restoration (bus voltage recovery).

Enabling the Status after Bus Voltage Recovery menu reveals the Delay text box.

This delay sets the time duration in seconds after which the status will be sent on the bus.

- 1. Select Enable for the **Status after Bus Voltage Recovery** menu. See <u>"Options for</u> <u>Status after Bus Voltage Recovery action" on page 27</u>.
 - > The Delay text box shows.
- In the Delay text box, directly type the time in seconds (between 0 to 50 seconds) or click on the ▲/▼ symbols to increment /decrement the time.

5.1.3.3. Lock and Unlock for Switch output

This section sets the behavior of relay outputs when the MES-DO-8R device is locked or unlocked.

- In Lock state, the output will not change on receiving any command from On/Off, Scene or Push button.
- After locking, the relay state will change as defined in "Behaviour at Locking" parameter.
- After Unlocking, the relay state will change as defined in "Behaviour at Unlocking" parameter.

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General	Output 1	SWITCH	-
Outputs	Behaviour at Locking	Off	
+ Output 1	Behaviour at Unlocking Shutdown Action	Off On Last	1
Output 2	Start Up	Default 🔘 Custom	
	Start Up Action	Off	•
	Status after Bus Voltage Recovery	O Disable O Enable	
	Delay	0	🌲 S
	Timer	O Disable O Enable	
	Scene	O Disable O Enable	

Figure 5-7: Options for Behaviour at Locking

- If the Lock is enabled and followed by a download of the ETS, the relays switch off and the Lock is disabled.
- If the output is in the Lock state, and KNX power fails, then the shutdown action occurs.
- After bus recovery, the output will remain in the Lock state. Also, startup action and Status after Bus Voltage Recovery will not occur.
- When the output is locked or unlocked, then status is sent on the bus once.

5.1.3.4. Scene configuration for Switch application





Each channel has different **Group Object** for the **Scene** application. The **Scene Number** can vary from 1 to 64 (0 = disabled) and **Output State** can be either **On** or **Off**.

- 1. Select Enable for the Scene menu. See <u>"Enable the Scenes" on page 28</u>.
 - > The Scene sub-menu shows under the Output number.
- 2. Click the **Scene** sub-menu text to show the expanded scene menu options. See <u>"Expand the Scene menu" on page 29</u>.
- 3. Set the Scene Number between 1 to 64 and Output State to either On or Off.

General	Scene Number (0 = disabled)	0	* *
Outputs	Output State	Off On	0
Output 1	Scene Number (0 = disabled)	0	÷
Scenes	Output State	Off On	
Output 2	Scene Number (0 = disabled)	0	А т
	Output State	Off On	
	Scene Number (0 = disabled)	0	* *
	Output State	Off On	

Figure 5-9: Expand the Scene menu

5.1.3.5. Group Objects for Switch

- Selecting Switch option for Channel 1 enables Output 1 and Output 2. See <u>"Group Objects for switch output 1 and output 2" on page 30</u>.
- Similarly, selecting Switch option for Channel 2 enables Output 3 and Output 4 and so on.
- You can set 16 individual group objects for the 16 channels.

Table 5.2: Group Objects for Switch

Group object	Description of Group Objects	Definition
Output On/Off	0 = Off, 1 = On	Output switches On or Off.
Output On/Off Status	0 = Off, 1 = On	Feedback about the On/Off

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	Number *	Name	Object Function	Descr	Group A	Lengt	c	R	w	Т	U	Data Type	Priority
‡	1	Output 1 On/Off	0 = Off, 1 = On			1 bit	С	-	W	Т	-	switch	Low
;	2	Output 2 On/Off	0 = Off, 1 = On			1 bit	С	-	W	Т	-	switch	Low
₽	21	Output 1 On/Off Status	0 = Off, 1 = On			1 bit	С	R	-	Т	-	switch	Low
;	22	Output 2 On/Off Status	0 = Off, 1 = On			1 bit	C	R	-	Т	-	switch	Low
₽	324	Output 1 Timer	0 = Stop, 1 = Start			1 bit	C	-	W	-	-	start/stop	Low
₽	325	Output 2 Timer	0 = Stop, 1 = Start			1 bit	С	-	W	-	-	start/stop	Low
	356	Output 1 Scene	Scene (Run 1 - 64)			1 byte	С	-	W	-	-	scene number	Low
;	357	Output 2 Scene	Scene (Run 1 - 64)			1 byte	С	-	W	-	-	scene number	Low
₹	384	Output 1 Lock	0 = Unlock, 1 =			1 bit	С	-	W	Т	-	enable	Low
;	385	Output 2 Lock	0 = Unlock, 1 =			1 bit	С	-	W	Т	-	enable	Low

Figure 5-10: Group Objects for switch output 1 and output 2

5.1.4. Timer and Pulse function

In this section we explain the timer and pulse functions of the MES-DO-8R device.

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Note

The timer and pulse function is applicable only for the MES-DO-8R. This function is available only with the Switch application.

5.1.4.1. Timer function

The Timer function switches on or switches off the output after a preset time on receiving a 1 or 0 through the "TIMER" group object.

The timer contains the following parameters:

- Timer: This timer function will work according to the parameters set in ON Delay, OFF Delay and ON Duration.
- ON Delay: This parameter sets the delay after which the ON action would activate. The delay triggers after receiving a 1 from a timer group object. The settable range of time is 0 to 3600 seconds or 0 to 1440 minutes.
- **OFF Delay:** This parameter sets the delay after which the OFF action would activate. The delay triggers after receiving a 0 from a timer group object. The settable range of time is 0 to 3600 seconds or 0 to 1440 minutes.
- ON Duration: This parameter defines the time duration for which relay will remain ON. If set to 0, the relay will remain ON indefinitely. The settable range of time is 0 to 3600 seconds or 0 to 1440 minutes.



Note

ON Delay, **OFF Delay** and **ON Duration** are available only when timer is activated through timer group object.



Note

See <u>"Enable the Timer function" on page 32</u>, <u>"Set the Timer function" on page 33</u> and <u>"Group</u> <u>Objects for Timer functions" on page 33</u> for configuring the timer function.

Table 5.3: Timer logic

Output state	Received value	Action
	0	No Action
Off	1	Output switches ON after the "ON Delay" After the "ON Duration" it switches back off.
On	0	Output switches OFF after the "OFF Delay"
	1	Output switches OFF after the "ON Duration"

Note

► A running "ON Delay" will restart every time a new 1 is received through timer group object.

► A running "OFF Delay" will restart every time a new 0 is received through timer group object.

► A running "On Duration" will restart every time a new 1 is received through the timer group object.

► The Timer action is cancelled when 1 or 0 is received through "ON/OFF" group object.

Note

<u>"Timing diagram" on page 32</u> shows the timer operation with an ON delay of 5 seconds, OFF delay of 5 seconds and ON Duration of 10 seconds.

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Figure 5-12: Enable the Timer function

General	ON Delay	0	* *
- Outputs		Second Minute	
- Output 1	OFF Delay	0	* *
Timer		Second O Minute	
Scene	On Duration (0 = Forever)	0	* *
Output 2		Second Minute	

Figure 5-13: Set the Timer function

After enabling the Timer function, view the Group Objects tab for the relevant group objects.

Number	Name	Object Function	Descr	Group A	Lengt	с	R	w	т	U	Data Type	Priority
■ ‡1	Output 1 On/Off	0 = Off, 1 = On			1 bit	С	-	W	Т	-	switch	Low
■2 1	Output 1 On/Off Status	0 = Off, 1 = On			1 bit	С	R	-	Т	-	switch	Low
324	Output 1 Timer	0 = Stop, 1 = Start			1 bit	С	-	W	-	-	start/stop	Low
1 2 356	Output 1 Scene	Scene (Run 1 - 64)			1 byte	С	-	W	-	-	scene number	Low
■₽ 384	Output 1 Lock	0 = Unlock, 1 =			1 bit	С	-	W	Т	-	enable	Low

Figure 5-14: Group Objects for Timer functions

5.1.4.2. Pulse function

The Pulse function performs a continuous timed on and off sequence of the switch output when trigger is received through "**PULSE**" group object.

The Pulse function contains the following parameters:

- Pulse time: This parameter sets the length of each pulse after receiving the trigger through the "PULSE" group object.
- Repeat Pulse Signal: This setting enables or disables Repetitions and Time for next pulse parameters.
- Repetitions: This parameter sets the number of required pulses. If set to 0, the pulses will go on forever.
- Time for next Pulse: This parameter sets the duration between consecutive pulses.
- Behaviour at Locking: After locking, the relay state will be either off or there will be no change in the relay state as defined in "Behaviour at Locking parameter". In Lock State, the output will not change on receiving any command from pulse group object.

Behaviour at Unlocking: After Unlocking, the relay state will be either off or there will be no change in the relay state as defined in "Behaviour at Unlocking parameter."

General	Output 1	Pulse Function		•
- Outputs	Pulse time	300	*	ms
Output 1	Repeat Pulse Signal	🔵 Disable 🥥 Enable		
Output 2	Repetitions (0 = Forever)	0		* *
	Time for next Pulse	500	÷	ms
Logic Functions	Behaviour at Locking	Off Off No Change		
	Behaviour at Unlocking	Off No Change		

Figure 5-15: Enable the Pulse function

After enabling the Pulse function, view the Group Objects tab for the relevant group objects.

Number	Name	Object Function	Descr	Group A	Lengt	С	R	W	т	U	Data Type	Priority
■‡ 21	Output 1 On/Off Status	0 = Off, 1 = On			1 bit	С	R	-	Т	-	switch	Low
■≵ 340	Output 1 Pulse	0 = Stop, 1 = Start			1 bit	С	-	W	-	-	start/stop	Low
■≵ 384	Output 1 Lock	0 = Unlock, 1 =			1 bit	С	-	W	Т	-	enable	Low

Figure 5-16: Group Objects for Pulse functions

5.1.5. Configuration for Shutter application

General	Shutter Rise/Fall Time	1	S
- Outputs	Shutter Additional Time	0	S
Shutter Channel 1	Reversion Pause Time	2	X 100ms
	Status Sending Period	0	* S
	Behaviour at Locking	Current Position	•
	Behaviour at Unlocking	Current Position	•
	Reverse Function	O Disable C Enable	
	Start Up	O Default Custom	
	Status after Bus Voltage Recovery	O Disable C Enable	
	Scene	O Disable Enable	

Figure 5-17: Expand the output for shutter application

Note

This section explains setting that are applicable to the Shutter application.

5.1.5.1. Parameter description for shutter application

See <u>"Expand the output for shutter application" on page 34</u>.

Set the following parameters for the shutter channel:

- Shutter Rise/Fall Time (0 to 255 seconds) sets time required for shutter to move from 0% to 100% or vice-versa.
- Shutter Rise/Fall Additional Time (0 to 100 seconds) sets the additional time that is needed to completely open (move up) or close (move down) the shutter. If the Down command is received after the shutter reaches 100%, the shutter motor will energize once again for the set additional time. An identical process would occur for the Up operation.
- **Reversion Pause Time** (200 milliseconds to 5 seconds) sets the pause time between opposite direction command. For example, if the Up command was active and the Down command is sent, this pause will ensure that the curtain motor will come to rest before reversing its motion.
- Status Sending Period (0 to 100 seconds) sets the time after which the curtain's current status is sent on the bus while the shutter/curtain is moving. If set to 0, the status will not be sent when the curtain/shutter is moving. The status will be sent when the shutter/curtain reaches 0% or 100%.
- Behaviour at Locking defines the state after activating the lock function. The available options are Current Position, Up, Down and Specific Position.
- Behaviour at Unlocking defines the state after activating the unlock function. The available options are Current Position, Up, Down and Specific Position.
- Reverse Function enables or disables the Reverse Function group object. Refer "Group Objects for Shutter" on page 37 for more details.
- Start Up option decides whether to perform **Default** or **Custom** action. In Default configuration, the actuator will be fully raised (at 0%) after ETS download and shutter position is retained after bus voltage recovery. In the Default configuration, the status is not sent on the bus. In the Custom configuration, the shutter will move as per Initial Position option. Also, in the Custom configuration, the status is sent on bus.
- Initial Position defines the position of the shutter after bus voltage recovery. The available options are Current Position, Up, Down, Specific Position. On selecting **Up**, shutter will move upwards and on selecting **Down**, shutter will move downwards after bus voltage recovery.

On selecting Specific Position, the shutter will move to a specific position as

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configured in ETS.

On selecting **Current Position**, the shutter will move to the last state after bus voltage recovery.

- Status after Bus Voltage Recovery sets the time (0 to 50 seconds) for sending the status after power failure (bus power down) followed by power restoration (bus voltage recovery).
- Delay sets the time (0 to 50 seconds) after which the shutter status is sent on the bus.
- **Scene** option enables the scene group object for that particular channel.

5.1.5.2. Lock and Unlock for Shutter output

This section sets the behavior of relay outputs when the MES-DO-8R device is locked or unlocked.

- In Lock state, the shutter position will not change on receiving any command like move, stop, direct position, scene or push button.
- After locking, the shutter position will change as defined in "Behaviour at Locking" parameter.
- After unlocking, the shutter position will change as defined in "Behaviour at Unlocking" parameter.
- If the Lock is enabled and followed by an ETS download, then the relays will switch off, the shutter position will be at 0% (Up) and channel will be unlocked.

General	Shutter Rise/Fall Time	1	* S
- Outputs	Shutter Additional Time	0	* S
	Reversion Pause Time	2	🗘 X 100ms
- Snutter Channe	Status Sending Period	0	s
Scenes	Behaviour at Locking	Current Position	<u>_</u>
	Behaviour at Unlocking	Current Position	1
	Reverse Function	Up Down	-
	Start Up	Specific Position	
	Initial Position	Current Position	•
	Status after Bus Voltage Recovery	Oisable O Enable	
	Delay	0	* * S
	Scene	Oisable O Enable	

Figure 5-18: Options for Behaviour at Locking

- If the channel is in the Lock state, and KNX power fails, then after bus recovery, the channel will remain in the Lock state. Also, startup action and status after bus voltage recovery will not occur.
- When the channel is locked or unlocked, then shutter position is sent once on the bus.
- If Lock/Unlock command is received while the shutter is moving, the shutter will stop if "Behaviour at Lock/Unlock" is set to Current Position.

5.1.5.3. Group objects for shutter

	Number *	Name	Object Function Descr Group	A Lengt	łC	R	w	т	U	Data Type	Priority
₽	241	Shutter 1 Move	0 = Up, 1 = Down	1 bit	С	-	W	Т	-	up/down	Low
■₹	242	Shutter 1 Stop	0 / 1 = Stop	1 bit	С	-	W	Т	-	trigger	Low
∎₹	243	Shutter 1 Direct Position	0 to 100 %	1 byte	С	-	W	Т	-	percentage (0100%)	Low
‡	244	Shutter 1 Position Status	0 to 100 %	1 byte	С	R	-	Т	-	percentage (0100%)	Low
∎₹	400	Shutter 1 Lock	0 = Unlock, 1 =	1 bit	С	-	W	Т	-	enable	Low

Figure 5-19: Group objects for shutter

Table 5.4: Group Objects for Shutter

Group Object	Description of Group Objects	Definition
Shutter Move	0=Up, 1=Down	Shutter moves up/open or down/close.
Shutter Stop	0/1 = Stop	Shutter stops.
Shutter Direct Position	0 to 100 %	Shutter will move to that specified position given in % in the duration as per rise/fall time.
Shutter Position Status	0 to 100 %	The real-time position feedback of the shutter while it is moving.
Reverse Function	0=Down, 1=Up	Shutter moves up or down.
Shutter Scene	1 to 64	Shutter scene number.

5.1.5.4. Scene Configuration for the shutter application

You can configure 10 scenes for each channel. Each channel has different group object for scene application. The scene number will vary from 1 to 64 (0 = disabled) and shutter position will vary from 0 to 100%.

1. Select **Shutter** in the **Channel** drop down menu.

General	Shutter Rise/Fall Time	1	* S
- Outputs	Shutter Additional Time	0	¢ S
	Reversion Pause Time	2	2 X 100ms
	Status Sending Period	0	÷ S
Scelles	Behaviour at Locking	Current Position	•
	Behaviour at Unlocking	Current Position	•
	Reverse Function	O Disable O Enable	
	Start Up	Oefault Custor	
	Status after Bus Velt go necovery	O Disable Enable	
	Scene	🔵 Disable 🔘 Enable	

Figure 5-20: Enable Shutter Scene

General	Scene Number (0 = disabled)	64	
Outputs	Shutter Position	0	* *
Shutter Channel 1	Scene Number (0 = disabled)	32	≜ ▼
Scenes	Shutter Position	0	* %
	Scene Number (0 = disabled)	0	▲ ▼
	Shutter Position	0	÷ %
	Scene Number (0 = disabled)	0	▲ ▼
	Shutter Position	0	* %
	Scene Number (0 = disabled)	0	▲ ▼
	Shutter Position	0	* %
	Scene Number (0 = disabled)	0	▲ ▼
	Shutter Position	0	÷ %
	Scene Number (0 = disabled)	0	▲ ۳
	Shutter Position	0	* *
	Scene Number (0 = disabled)	0	▲ ▼
	Shutter Position	0	<u>م</u>

Figure 5-21: Expand the Shutter Scenes sub-tab

- 2. Click **Enable** for the **Shutter Scene** Enable/Disable. See <u>"Enable Shutter Scene" on</u> <u>page 38.</u>
 - In the Scenes sub-tab, set Scene Number field between 0 and 64, where 0 (zero) is disabled and 1 to 64 are the scene numbers. Set value of Shutter Position between 0% to 100%. See <u>"Expand the Shutter Scenes sub-tab" on page 38</u>.
 - > The **Group Objects** tab now has an additional **Shutter Scenes** group object. See <u>"Group Objects with Shutter Scene Enabled" on page 39.</u>

	Number 4	Name	Object Function	Descr	Group A	Lengt	ł C	R	w	Т	U	Data Type	Priority
■‡ 2	241	Shutter 1 Move	0 = Up, 1 = Down			1 bit	С	-	W	Т	-	up/down	Low
■# 2	242	Shutter 1 Stop	0 / 1 = Stop			1 bit	С	-	W	Т	-	trigger	Low
■‡ 2	243	Shutter 1 Direct Position	0 to 100 %			1 byte	С	-	W	Т	-	percentage (0100%)	Low
;	244	Shutter 1 Position Status	0 to 100 %			1 byte	С	R	-	Т	-	percentage (0100%)	Low
;	249	Shutter 1 Reverse Function	0 = Down, 1 = Up			1 bit	С	-	W	Т	-	up/down	Low
;	372	Shutter 1 Scene	Scene (Run 1 - 64)			1 byte	С	-	W	-	-	scene number	Low
■₹ 4	400	Shutter 1 Lock	0 = Unlock, 1 =			1 bit	С	-	W	Т	-	enable	Low

Figure 5-22: Group Objects with Shutter Scene Enabled

5.1.6. Configuration for fan application

Note

This section explains setting that are applicable to the Fan application.

General	PLOCK 1	Ean	
Centeral	BLOCK	rdii	
Outputs	BLOCK 2	Disabled	
Outputs		Switch/Shutter	_
	BLOCK 3	Fan	
	BLOCK 4	Disabled	

Figure 5-23: Expand the Channel menu for Fan

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General	Status for Push Button	0100 %	•
- Outputs	Status for On/Off	0100 %	•
+ Fan Channel 1	Status for Inc/Dec	0100 %	•
	Status for Scenes	0100 %	•
	Cyclic Speed	O Disable O Enable	
	Type of Cyclic Speed	0,1,2,3,4,5,4,3,2,1,0 0,1,2,3,4,5,0,1,2,3,4	
	Status for Cyclic Speed	0100 %	•
	Behaviour at Locking	Last Speed	•
	Behaviour at Unlocking	Last Speed	•
	Start Up	O Default O Custom	
	Speed Value	Last Speed	•
	Status after Bus Voltage Recovery	O Disable O Enable	
	Delay	0	
	Scene	Oisable O Enable	

Figure 5-24: Expand the output for fan application

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Note

Selecting the **Fan** option reserves the 4 consecutive outputs for setting the various fan speeds. Thus, selecting Block 1 for fan application will reserve output 1 through output 4 for the 1st fan.

- 1. Set **Output > Enable**.
- 2. Select Fan in the BLOCK (block number) drop-down.

5.1.6.1. Parameter description for fan application

Table 5.5:	Parameter	description	for fan	application

Parameter	Options	Description
	0 to 5	Speed status will be 0 to 5
Status for Push Button (Decides the status type when operated using push buttons)	0 to 100%	Speed status will be 0 to 100%
	Both	Speed status will be 0 to 5 & 0 to 100%
0 to 5		Speed status will be 0 to 5
when On/Off group object is used for	0 to 100%	Speed status will be 0 to 100%
	Both	Speed status will be 0 to 5 & 0 to 100%
Status for Inc/Dec (Decides the status type	0 to 5	Speed status will be 0 to 5
when Inc/Dec group object is used for increasing or decreasing the fan speed	0 to 100%	Speed status will be 0 to 100%
value)	Both	Speed status will be 0 to 5 & 0 to 100%
	0 to 5	Speed status will be 0 to 5
Status for Scenes (Decides the status type when scenes are used)	0 to 100%	Speed status will be 0 to 100%
	Both	Speed status will be 0 to 5 & 0 to 100%
Cyclic Speed - Enables the cyclic speed	Enable	Enables the cyclic speed feature.
feature	Disable	Disables the cyclic speed feature.

Parameter	Options	Description
Types of Cyclic Speed - Allows selection	0,1,2,3,4,5,4,3,2,1,0	Speed increases from 0 to 5 and then decreases from 5 to 0.
of any one type of cyclic speed.	0.1,2,3,4,5,0,1,2,3,4	Speed value increases from 0 to 5. After the 5th speed, repeat the 0 to 5 cycle.
	0 to 5	Speed status will be 0 to 5
Status for Cyclic Speed (Decides the status type when cyclic speed group object is used	0 to 100%	Speed status will be 0 to 100%
for changing the fan speed value)	Both	Speed status will be 0 to 5 & 0 to 100%
Startup Decides performing of Default or	Default	Selecting this option sets the fan speed value to 0 and prevents sending of status on the bus after downloading the ETS. After the bus voltage recovery, the fan speed value will also recover.
Custom action during device start up.	Custom	Selecting this option sets the fan speed value as per configuration and sends the status on the bus after downloading the ETS. After bus voltage recovery, the fan speed value will change as per configuration in the ETS.
Speed Value (Fan speed value after bus	0 to 5	Speed value is in between 0 to 5
power up)	Last	Fan speed value is not changed after bus power up
Status after Bus Voltage Recovery	Enable	Enables the delay time, which is the time duration after which status will be sent on the bus.
	Disable	Disables the delay time.
Delay	0 to 50	Time duration in seconds after which the status will be sent on the bus.

Table 5.5: Parameter description for fan application (Continued)

Table 5.5: Parameter description	n for fan application	(Continued)
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Parameter	Options	Description
Scene	Enable	Shows Status for Scene and Scene Group Object.
	Disable	Hides Status for Scene and Scene Group Object.

5.1.6.2. Lock and Unlock for Fan output

This section sets the behavior of relay outputs when the MES-DO-8R device is locked or unlocked.

- In Lock state, the fan speed value will not change on receiving of any commands like On/Off, Speed Value, Inc/Dec, Cyclic Speed, Scene or Push Button.
- After locking, the fan speed value will change as defined in "Behaviour at Locking" parameter.

General	Status for Push Button	0100 %
- Outputs	Status for On/Off	0100 %
the Con Channel 1	Status for Inc/Dec	0100 %
T Fan Channel I	Status Scenes	0100 %
	Cyclic Speed	O Disable O Enable
	Type of Cyclic Speed	0,1,2,3,4,5,0,1,2,3,4
	Status for Cyclic Speed	0100 %
	Behaviour at Locking	Last Speed
	Behaviour at Unlocking	Last Speed
	Start Up	Speed 0 Speed 1
	Speed Value	Speed 2
	Status after Bus Voltage Recovery	Speed 5 Speed 4
	Delay	Speed 5
	Scene	Disable O Enable

Figure 5-25: Options for Behaviour at Locking

After unlocking, the fan speed value will change as defined in "**Behaviour at Unlocking**" parameter.

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- If Lock is enabled, followed by an ETS download, then the relays will switch off, fan speed value will be 0 and channel will be unlocked.
- If the channel is in the Lock state, and KNX power fails, then after the bus recovery, the channel will remain in the Lock state. Also, the Start Up action and Status after Bus Voltage Recovery will not occur.
- When the channel is locked or unlocked, then fan speed value is sent once on the bus.

5.1.6.3. Group Objects for fan

Group Object	Description of Group Objects	Definition
Fan On/Off	0 = Off, 1 = On	Switches fan on or off
Fan On/Off Status (0 to 5)	0 = Off, 1 = On	Feedback of fan on/off
Fan Speed Value, %	0, 20%, 40%, 60%, 80%, 100%	Sets the fan speed value through percentage
Fan Speed Value, (0 to 5)	0, 1, 2, 3, 4, 5	Set the fan speed value through 0 to 5
Fan Speed Value Status, %	0, 20%, 40%, 60%, 80%, 100%	Sends the fan speed status in %
Fan Speed Value Status, (0 to 5)	0, 1, 2, 3, 4, 5	Sends the fan speed status in 0 to 5
Fan Inc/Dec	1 = Speed increases 0 = Speed decreases	Fan speed increases when 1 is received and decreases when 0 is received.
Fan Cyclic Speed	0 or 1	Speed sequence can be 0>1>2>3>4>5>4>3>2>1>0 or 0>1>2>3>4>5>0>1>2>3>4>5 (irrespective of the received 0 or 1).

Table 5.6: Group Objects for Fan

3. Click the **Group Object** tab to view Fan related group objects. See <u>"Group objects for</u> <u>the fan" on page 45.</u>

	Number 4	Name	Object Function	Descr	Group A	Lengt	ł C	R	W	т	U	Data Type	Priority
∎7 8		Output 8 On/Off	0 = Off, 1 = On			1 bit	С	-	W	Т	-	switch	Low
∎₽ 2	7	Output 7 On/Off Status	0 = Off, 1 = On			1 bit	С	R	-	Т	-	switch	Low
∎₽ 2	8	Output 8 On/Off Status	0 = Off, 1 = On			1 bit	С	R	-	Т	-	switch	Low
■2 24	41	Shutter 1 Move	0 = Up, 1 = Down			1 bit	C	-	W	Т	-	up/down	Low
∎‡ 24	42	Shutter 1 Stop	0 / 1 = Stop			1 bit	С	-	W	Т	-	trigger	Low
∎‡ 24	43	Shutter 1 Direct Position	0 to 100 %			1 byte	С	-	W	Т	-	percentage (0100%)	Low
∎7 24	44	Shutter 1 Position Status	0 to 100 %			1 byte	С	R	-	Т	-	percentage (0100%)	Low
∎7 24	45	Shutter 2 Move	0 = Up, 1 = Down			1 bit	С	-	W	Т	-	up/down	Low
∎‡ 24	46	Shutter 2 Stop	0 / 1 = Stop			1 bit	С	-	W	Т	-	trigger	Low
∎‡ 24	47	Shutter 2 Direct Position	0 to 100%			1 byte	С	-	W	Т	-	percentage (0100%)	Low
∎7 24	48	Shutter 2 Position Status	0 to 100 %			1 byte	С	R	-	Т	-	percentage (0100%)	Low
∎‡ 24	49	Shutter 1 Reverse Function	0 = Down, 1 = Up			1 bit	С	-	W	Т	-	up/down	Low
∎₽ 2	51	Shutter 3 Move	0 = Up, 1 = Down			1 bit	С	-	W	Т	-	up/down	Low
∎₽ 2	52	Shutter 3 Stop	0 / 1 = Stop			1 bit	С	-	W	Т	-	trigger	Low
∎₽ 2	53	Shutter 3 Direct Position	0 to 100 %			1 byte	С	-	W	Т	-	percentage (0100%)	Low
∎₽ 2	54	Shutter 3 Position Status	0 to 100 %			1 byte	С	R	-	Т	-	percentage (0100%)	Low
∎₽ 2	59	Shutter 3 Reverse Function	0 = Down, 1 = Up			1 bit	С	-	W	Т	-	up/down	Low
■7 3	31	Output 8 Timer	0 = Stop, 1 = Start			1 bit	С	-	W	-	-	start/stop	Low
■7 34	46	Output 7 Pulse	0 = Stop, 1 = Start			1 bit	С	-	W	-	-	start/stop	Low
■7 3	63	Output 8 Scene	Scene (Run 1 - 64)			1 byte	С	-	W	-	-	scene number	Low
■7 3	72	Shutter 1 Scene	Scene (Run 1 - 64)			1 byte	С	-	W	-	-	scene number	Low
■‡ 3	74	Shutter 3 Scene	Scene (Run 1 - 64)			1 byte	С	-	W	-	-	scene number	Low
■7 39	91	Output 8 Lock	0 = Unlock, 1 =			1 bit	С	-	W	Т	-	enable	Low
∎7 4	00	Shutter 1 Lock	0 = Unlock, 1 =			1 bit	С	-	W	Т	-	enable	Low
∎7 4	01	Shutter 2 Lock	0 = Unlock, 1 =			1 bit	С	-	W	Т	-	enable	Low
∎7 4	02	Shutter 3 Lock	0 = Unlock, 1 =			1 bit	С	-	W	Т	-	enable	Low

Figure 5-26: Group objects for the fan

Note

1) On/Off Status as well as Speed Value Status are observed for all group objects like Increment/Decrement, Cyclic Speed etc.

2) Following group objects have dependency on each other: Increment/Decrement, On/Off and Fan Speed Value.

3) The speed set by the Cyclic Speed or push button is independent of the speed set by all other group objects like On/Off, Increment/Decrement, Scenes or Speed after Bus Voltage Recovery.

4) Group objects of Speed Value (percent) and Speed Value (0 to 5) cannot be used at the same time. Changing the Speed Value (percent) will change the Speed Status (percent) but the Speed Value (0 to 5) will not update.

5.1.6.4. Scene Configuration for fan application

You can configure 10 scenes for each channel. Each channel has different **Group Object** for **Scene** application. **Scene** number varies from 1 to 64 (0 = disabled) and **Fan Speed** value varies from 0 to 5.

General	Status for Push Button	0100 %	•
- Cutputs	Status for On/Off	0100.%	•
Fan Channel 1	Ste us for Inc/Dec	0100 %	
Scoper	Status for Scenes	0100.%	•
+ Ean Channel 2	Cyclic Speed	O Disable 🔘 Enable	
	Type of Cyclic Speed	0,1,2,3,4,5,4,3,2,1,0 0,1,2,3,4,5,0,1,2,3,4	
	Status for Cyclic Speed	0100 %	•
	Behaviour at Locking	Last Speed	•
	Behaviour at Unlocking	Last Speed	•
	Start Up	Default 🔘 Custom	
	Speed Value	Last Speed	•
	Status after Bus Voltage Recovery	Disable 🔍 Enable	
	Delay	0	‡ s
	Scene	Disable Enable	

Figure 5-27: Enable Fan Scene

General	Scene Number (0 = disabled)	64	÷
- Outputs	Fan Speed Value	5	÷. V
- Fan Channel 1	Scene Number (0 = disabled)	32	÷
Scenes	Fan Speed Value	0	\$
	Scene Number (0 = disabled)	0	<u>م</u>
	Fan Speed Value	0	÷
	Scene Number (0 = disabled)	0	\$
	Fan Speed Value	0	÷
	Scene Number (0 = disabled)	0	A
	Fan Speed Value	0	÷
	Scene Number (0 = disabled)	0	۸. T
	Fan Speed Value	0	ţ

Figure 5-28: Expand the Fan Scenes sub-tab

- 1. Select the Enable option under the Fan Scenes menu. See <u>"Enable Fan Scene" on</u> <u>page 46</u>.
 - > The Scenes options show.
 - > The Group Objects tab now has an additional Fan Scenes group object. See <u>"Group</u> Objects with Fan Scene Enabled" on page 48.
 - In the Scene sub-tab, set Scene Number field between 0 and 64, where 0 (zero) is disabled and 1 to 64 are the scene numbers. Set value of Fan Speed Value between 0 and 5. See <u>"Expand the Fan Scenes sub-tab" on page 47</u>. Each Channel can use 10 scenes.

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	Number	Name	Object Function	Descr G	Group A	Lengt	łC	R	w	т	U	Data Type	Priority
‡	291	Fan 1 On/Off	0 = Off, 1 = On			1 bit	С	-	W	т	-	switch	Low
.	292	Fan 1 On/Off Status	0 = Off, 1 = On			1 bit	С	R	-	Т	-	switch	Low
;	293	Fan 1 Speed Value (Perce	0, 20%, 40%, 60			1 byte	С	-	W	Т	-	percentage (0100%)	Low
;	294	Fan 1 Speed Value Status	0, 20%, 40%, 60			1 byte	С	R	-	Т	-	percentage (0100%)	Low
;	295	Fan 1 Inc/Dec	0 = Dec, 1 = Inc			1 bit	С	-	W	Т	-	step	Low
;	296	Fan 2 On/Off	0 = Off, 1 = On			1 bit	С	-	W	Т	-	switch	Low
;	297	Fan 2 On/Off Status	0 = Off, 1 = On			1 bit	С	R	-	Т	-	switch	Low
;	298	Fan 2 Speed Value (Perce	0, 20%, 40%, 60			1 byte	С	-	W	Т	-	percentage (0100%)	Low
;	299	Fan 2 Speed Value Status	0, 20%, 40%, 60			1 byte	С	R	-	Т	-	percentage (0100%)	Low
4	300	Fan 2 Inc/Dec	0 = Dec, 1 = Inc			1 bit	С	-	W	Т	-	step	Low
ŧ.	311	Fan 1 Cyclic Speed	0 / 1 = Cyclic sp			1 bit	С	-	W	Т	-	trigger	Low
4	312	Fan 2 Cyclic Speed	0 / 1 = Cyclic sp			1 bit	С	-	W	Т	-	trigger	Low
4	316	Fan 1 Speed Value (0 to 5)	0 to 5 speed			1 byte	С	-	W	Т	-	fan stage (0255)	Low
;	317	Fan 1 Speed Value Status	0 to 5 speed			1 byte	С	R	-	Т	-	fan stage (0255)	Low
₹	318	Fan 2 Speed Value (0 to 5)	0 to 5 speed			1 byte	С	-	W	Т	-	fan stage (0255)	Low
7	319	Fan 2 Speed Value Status	0 to 5 speed			1 byte	С	R	-	Т	-	fan stage (0255)	Low
₹	380	Fan 1 Scene	Scene (Run 1 - 64)			1 byte	С	-	W	-	-	scene number	Low
;	381	Fan 2 Scene	Scene (Run 1 - 64)			1 byte	С	-	W	-	-	scene number	Low
∎ ‡	408	Fan 1 Lock	0 = Unlock, 1 =			1 bit	С	-	W	Т	-	enable	Low
∎ ‡	409	Fan 2 Lock	0 = Unlock, 1 =			1 bit	С	-	W	Т	-	enable	Low

Figure 5-29: Group Objects with Fan Scene Enabled

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6. Logic Functions

6.1. Introduction to Logic Functions

In this section we explore the inbuilt logic functions of the MES-DO-16R/MES-DO-8R device.

This functionality allow implementation of Boolean logic, comparison, and simple arithmetic without needing an external device or wiring. You can use a combination of logical functions to build the required interlocks and states.

6.1.1. List of Logical Function

For the truth table of logic gates See paragraph 7. "Annexure 1 - Logic Gates" on page 55.

Logical function	Number of inputs	Available functions
AND	2	6
OR	2	6
EXOR	2	6
NOT	1	10
ID (Identity)	1	5
Comparison Functions	2	5
Addition Functions	2	5
Subtraction Functions	2	5

6.1.2. Enable the Logic Functions

Figure 6-1: Enable Logic Functions

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- 1. Under the **Parameters** tab, navigate to the **General** tab and enable **Logic Functions**.
 - > > The Logic Function menu shows. See "Expanded Logic Function menu" on page 50.

Figure 6-2: Expanded Logic Function menu

6.1.3. Group Objects for Logic Gates

1. Open the Logic Function page. See "Expanded Logic Function menu" on page 50.

General	Number of AND Gates	1	÷
- cogic Functions	Number of OR Gates	0	* *
Addition 1	Number of XOR Gates	0	* *
Addition	Number of NOT Gates	0	* *
	Number of ID Gates	0	÷
	Number of Comparison Functions	0	* *
	Number of Addition Functions	1	*
	Number of Subtraction Functions	0	÷

Figure 6-3: Adding Logic Functions

- Enter the number of required logic gates (AND, OR, XOR, NOT, and ID), either by clicking the ▲ ▼ buttons or by entering the number. Refer to the list of Logic Functions and their available quantity under the paragraph <u>"List of Logical Function" on page 49</u>.
- 3. Increasing the number of logical gates enables the appropriate group objects under the **Group Objects** tab.

	Number 4	Name	Object Function	Description	Group Addres	Length	с	R	w	Т	U	Data Type	Priority
₽	51	AND Operand 1	1 - Bit Data Entry (0/1)			1 bit	С	-	W	Т	-	switch	Low
;	52	AND Operand 2	1 - Bit Data Entry (0/1)			1 bit	С	-	W	Т	-	switch	Low
₽	53	AND Result 1	1 - Bit Data Result (0/1)			1 bit	С	R	-	Т	-	switch	Low

Figure 6-4: Group Objects for the Boolean Logic Functions

6.1.4. Group Objects for Comparison, Addition, or Subtraction

- Enter the number of required comparison, addition, subtraction functions either by clicking the ▲ ▼ buttons or by entering the number. Refer to the list of Logic Functions and their available quantity at <u>"List of Logical Function" on page 49</u>.
- 2. View the Group Objects for the selected Comparison or Addition, or Subtraction function under the **Group Objects** tab.
- 3. View the sub-tab(s) for the Comparison or Addition, or Subtraction function under the **Parameters** tab.

Figure 6-5: Group Objects for Comparison, Addition, or Subtraction

6.1.4.1. Sub-tab for Comparison

- 1. Click on the Comparison [number] sub-menu under the Parameters tab.
- For comparing the operand 1 with a constant value, enable Compare with Constant Value option. For comparing with a group object, disable the Compare with Constant Value.
- 3. As per the configuration of this window, a Comparison result shows a 0, 1, dimming value (0 to 100%), shutter position value (0 to 100%) or fan speed value (0, 20, 40, 60, 80, 100 %).

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 Enable Compare with Constant Value [0 to 255], Dimming Value [0 to 100%], Shutter Position Value [0 to 100%], and Fan Speed Value [0, 20%, 40%, 60%, 80%, and 100%] to open an additional text box for entry of a number or value.

General	Compare with Constant Value	Disable Disable	+
Dutputs	Constant Value	0	\$
ogic Functions	RESULT		
Comparison 1	Bit 0 (False)	🔵 Disable 🔘 Enable	1
	Bit 1 (True)	O Disable O Enable	1
	Send Dimming Value 2	Disable Disable	+
	Dimning Value	0	* %
	Send Shutter Position Value *	O Disable O Enable	
	Shutter Position Value	0	\$ %
	Send Fan Speed Value ?	Disable Disable	-

Figure 6-6: Sub-tab for Comparison with entry of values

6.1.4.2. Sub-tab for Addition and Subtraction

- 1. Click on the **Addition [number]** or **Subtraction [number]** sub-menu under the **Parameters** tab.
- 2. Select **Disable** for the **Add or Subtract with Constant Value** option to continue with **Addition** or **Subtraction** of two values using **Group Objects**.
- Enable Add with Constant Value option to add the operand 1 with constant value. See <u>"Sub-tab for Addition with Add with Constant Value enabled" on page 53.</u>
 - > An additional **Constant Value** text box shows.
 - > The Group Objects in the Group Objects tab show only one operand and the result.

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General	Add with Constant Value	0	nable
- Outputs	Constant Jalue	0	1
+ Output 1 Output 2			
Logic Function Addition 1			

Figure 6-7: Sub-tab for Addition with Add with Constant Value enabled

- 4. Enter a value between 0 to 255 in the Constant Value text box.
 - > This constant value will add to the value of the Operand 1.

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The **Subtraction** function is similar to the **Addition** function.

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7. Annexure 1 - Logic Gates

7.1. Logic gates

MES-DO-16R/MES-DO-8R offers the following Boolean logic gates:

- ID
- NOT
- AND
- OR
- XOR

Other logic gates are created by cascading default logic gates:

- NAND = AND + NOT
- NOR = OR + NOT
- XNOR = XOR + NOT

7.2. Truth table

Note

This is a generic truth table for the logic gates. Not all logic gates are directly available in the MES-DO-16R/MES-DO-8R actuator. However, they can be created by cascading several logical gates.

For single input gates [ID and NOT], A is the operand and Q is the output or result. For double input gates [AND, NAND, OR, NOR, EXOR, and EXNOR], A is operand 1, B is operand 2, while Q is the output or result.

Туре	Symbol	Boolean Algebra	Truth table			
			INPUT	OUTPUT		
ID			A	Q		
U		A	0	0		
			1	1		

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			INPUT	OUT	PUT
NOT		Ā	А	0)
NOT		A	0	1	
			1	()
			INP	UT	OUTPUT
			А	В	Q
		1.D	0	0	0
		A · D	0	1	0
			1	0	0
			1	1	1
			INP	UT	OUTPUT
			А	B	Q
ΝΔΝΟ		$\overline{A \cdot B}$	0	0	1
		AD	0	1	1
			1	0	1
			1	1	0
			INP	ŪT	OUTPUT
			A	В	Q
OR		$A \perp B$	0	0	0
ÖK		A+D	0	1	1
			1	0	1
			1	1	1
	A B D Q	$\overline{A+B}$	INP	UT	OUTPUT
			A	В	Q
NOR			0	0	1
non			0	1	0
			1	0	0
			1	1	0
			INP	UT	OUTPUT
			A	В	Q
EXOR		AΦR	0	0	0
		$\Pi \cup D$	0	1	1
			1	0	1
			1	1	0
			INP	UT	OUTPUT
			A	В	Q
EXNOR		$\overline{A \oplus B}$	0	0	1
		$A \oplus B$	0	1	0
			1	0	0
			1	1	1

8. Annexure 2 - Communication Objects

8.1. Table of communication objects

Table 8.1: Communication objects

Number	Size	I/O	Flags	Data type (DPT)	Description	Function
1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16	1 Bit	I	C-WT	1.001 switch	OUTPUT 1 - 16	0 = Off, 1 = On
21, 22, 23, 24, 25, 26, 27, 28, 29, 30,31, 32, 33, 34, 35, 36	1 Bit	0	CR-T	1.001 switch	OUTPUT STATUS 1 - 16	0 = Off, 1 = On
51,52, 54, 55,57,58,61,62, 64. 65,67, 68	1 Bit	I	C-WT	1.001 switch	AND operand	0 = Off, 1 = On
53,56,59,63,66,69	1 Bit	0	CR-T	1.001 switch	AND result	0 = Off, 1 = On
71,72,74,75,77, 78,81,82,84,85,87, 88	1 Bit	I	C-WT	1.001 switch	OR operand	0 = Off, 1 = On
73,76, 79,83,86, 89	1 Bit	0	CR-T	1.001 switch	OR result	0 = Off, 1 = On
91,92,94, 95, 97,98,101,102,104,105, 107,108	1 Bit	I	C-WT	1.001 switch	XOR operand	0 = Off, 1 = On
93,96,99,103,106,109	1 Bit	0	CR-T	1.001 switch	XOR result	0 = Off, 1 = On
111,113,115,117,119,121,123,125, 127,129	1 Bit	I	C-WT	1.001 switch	NOT operand 1-10	0 = Off, 1 = On
112,114,116,118,120,122,124,126, 128,130	1 Bit	0	CR-T	1.001 switch	NOT result 1-10	0 = Off, 1 = On
131, 133, 135, 137, 139	1 Bit	I	C-WT	1.001 switch	ID operand 1 - 5	0 = Off, 1 = On

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Table 8.1: (Continued)Communication objects

Number	Size	I/O	Flags	Data type (DPT)	Description	Function
132,134,136,138,140	1 Bit	0	CR-T	1.001 switch	ID result 1 - 5	0 = Off, 1 = On
141, 151, 161, 171, 181	1 Byte	I	C-WT	5.010 counter pulses (0255)	COMPARE VALUE 1	0-255
142, 152, 162, 172, 182	1 Byte	I	C-WT	5.010 counter pulses (0255)	COMPARE VALUE 2	0-255
143, 153, 163, 173, 183	1 Bit	0	CR-T	1.001 switch	RESULT: BIT 0	0 = Off
144, 154, 164, 174, 184	1 Bit	0	CR-T	1.001 switch	RESULT: BIT 1	1 = On
145, 155, 165, 175, 185	1 Byte	0	CR-T	5.001 percentage (0100%)	RESULT: DIM	0-100%
146, 156, 166, 176, 186	1 Byte	0	CR-T	5.001 percentage (0100%)	RESULT: SHUTTER	0-100%
147, 157, 167, 177, 187	1 Byte	0	CR-T	5.001 percentage (0100%)	RESULT: FANSPEED	0%, 20%, 40%, 60%, 80%, 100%
201,202, 204,205,207,208,211,212, 214,215	1 Byte	I	C-WT	5.010 counter pulses (0255)	ADD Operand	0-255
203,206, 209,213,216	1 Byte	0	CR-T	5.010 counter pulses (0255)	ADD Result	0-255
221,222, 224,225,227,228,231,232, 234,235	1 Byte	I	C-WT	5.010 counter pulses (0255)	SUB Operand	0-255
223,226,229,233,236	1 Byte	0	CR-T	5.010 counter pulses (0255)	SUB Result	0-255
241, 245, 251, 255, 261, 265, 271, 275	1 Bit	I	C-WT	1.008 move	MOVE	0 = Up, 1 = Down
242, 246, 252, 256, 262, 266, 272, 276	1 Bit	I	C-WT	1.017 trigger	STOP	0/1 = Stop
243, 247, 253, 257, 263, 267, 273, 277	1 Byte	1	C-WT	5.001 percentage	DIRECT POSITION	0 to 100 %
244, 248, 254, 258, 264, 268, 274, 278	1 Byte	0	CR-T	5.001 percentage	POSITION STATUS	0 to 100 %

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Table 8.1: (Continued)Communication objects

Number	Size	I/O	Flags	Data type (DPT)	Description	Function
249, 250, 259, 260, 269, 270, 279, 280	1 Bit	I	C-WT	1.008 move	REVERSE FUNCTION	0 = Down, 1 = Up
291, 296, 301, 306	1 Bit	I	C-WT	1.001 switch	FAN ON/OFF	0 = Off, 1 = On
292, 297, 302, 307	1 Bit	0	CR-T	1.001 switch	FAN ON/OFF STATUS	0 = Off, 1 = On
293, 298, 303, 308	1 Byte	I	C-WT	5.001 percentage	SPEED VALUE (PERCENTAGE)	0 to 100 %
294, 299, 304, 309	1 Byte	0	CR-T	5.001 percentage	SPEED STATUS (PERCENTAGE)	0 to 100 %
295, 300, 305, 310	1 Bit	I	C-WT	1.007 step	INC/DEC	0 = Dec, 1 = Inc
311, 312, 313, 314	1 Bit	I	C-WT	1.017 trigger	CYCLIC SPEED	Speed sequence can be 0,1, 2, 3, 4, 5, 4, 3, 2, 1, 0 or 0, 1, 2, 3, 4, 5, 0, 1, 2, 3, 4, 5
316, 318, 320, 322	1 Byte	I	C-WT	5.100 fan stage	SPEED VALUE (0 to 5)	0 to 5 Speed value
317, 319, 321, 323	1 Byte	I	CR-T	5.100 fan stage	SPEED STATUS (0 to 5)	0 to 5 Speed status
324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339	1 Byte	I	C-W-	1.010 start/stop	TIMER	0 = Stop, 1 = Start
340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351,352, 353, 354, 355	1 Byte	I	C-W-	1.010 start/stop	PULSE	0 = Stop, 1 = Start
356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371	1 Byte	I	C-WT	17.001 scene number	SWITCH SCENES	1 to 64
372, 373, 374, 375, 376, 377, 378, 379	1 Byte	I	C-WT	17.001 scene number	SHUTTER SCENES	1 to 64
380, 381, 382, 383	1 Byte	I	C-WT	17.001 scene number	FAN SCENES	1 to 64
384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399	1 Bit	1	C-WT	1.003 enable	SWITCH LOCK	0 = Disable, 1 = Enable

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Table 8.1: (Continued)Communication objects

Number	Size	I/O	Flags	Data type (DPT)	Description	Function
400, 401, 402, 403, 404, 405, 406, 407	1 Bit	I	C-WT	1.003 enable	SHUTTER LOCK	0 = Disable, 1 = Enable
408, 409, 410, 411	1 Bit	I	C-WT	1.003 enable	FAN LOCK	0 = Disable, 1 = Enable

MES-DO-16R/MES-DO-8R

KNX / MESBUS powered 16/8 channel multifunction actuator

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