Dimmer actuators of the MIX2 secure series DMG 2 T, Extension module DME 2 T, Booster DMB 1 T

DMG 2 T	4930270
DME 2 T	4930275
DMB 1 T	4930279

Contents

1 Functional characteristics

- Double universal dimming actuator MIX2
- MIX2 basic module
- For upgrading to maximum of 6 channels
- Dimming range 0-100%
- For dimming incandescent lamps, low voltage and high voltage halogen lamps, dimmable LED retrofit lamps
- Also suitable for dimming dimmable energy-saving lamps via different dimming curves
- Also suitable for controlling fans
- Up to 2 MIX or MIX2 upgrade modules can be connected to a basic module
- Device and KNX bus module can be swapped independently of each other
- Removable KNX bus module enables devices to be changed without reprogramming
- Manual set-up and use of switch actuators is also possible without KNX bus module
- LED switching status indicator for each channel
- Manual operation on device (even without bus connection)
- Dimming output: 400 W/VA per channel or 1 x 800 W/VA in parallel operation
- Use of the 1-channel DMB 1 T KNX dimming booster can increase dimming output by 300 W/VA.
- Output of up to 2000 W /VA possible via max. 4 boosters in parallel operation (C1//C2).*
- Automatic load detection (can be deactivated)
- For R, L and C-load


This manual can only be used for devices with MIX2 secure BCU.

* Dimming outputs > 1000W for professional use only

2 MIX2 secure

ⓘ Each MIX2 basic module can be used with both a standard and a secure BCU.

ⓘ The extension units (MIX and MIX2) are always compatible.

2.1 BCU and application programmes

ⓘ For the MIX2 secure BCU, the application programme MIX2 secure V2.x is required.

	Standard	Secure
BCU		 *FDSK on the back*
MIX2 basic module with BCU		
Application programme	**MIX2 V1.x**	**MIX2 secure V2.x**

3 MIX and MIX2 devices

The MIX2 series consists of the basic modules RMG 8 S, RMG 8 T, RMG 4 I, RMG 4 U, DMG 2 T, JMG 4 T, JMG 4 T 24V, HMG 6 T, BMG 6 T + extensions RME 8 S, RME 8 T, RME 4 I, RME 4 U, DME 2 T, JME 4 T, JME 4 T 24V, HMG 6 T, BME 6 T (2021).

Any MiX and MIX2 extension modules can be connected to a MIX2 basic module.

Table 1

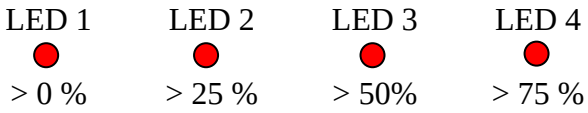
Appliance type	Order No.	Designation	Can be used with basic module...	
			in the MIX series	in the MIX2 series
MIX2 basic modules	493…	RMG 8 S, RMG 8 T, RMG 4 I, RMG 4 U, DMG 2 T, JMG 4 T, JMG 4 T 24V, HMG 6 T, BMG 6 T	-	-
MIX2 upgrades	493…	RME 8 S, RME 8 T, RME 4 I, RME 4 U, DME 2 T, JME 4 T, JME 4 T 24V, HME 6 T, BME 6 T	no	Yes
MIX basic modules	491…	BMG 6, DMG 2 S, HMG 4, JMG 4 S, RMG 4 S, RMG 4 C-Last, SMG 2 S	-	-
MIX upgrades	491…	BME 6, DME 2 S, HME 4, JME 4 S, RME 4 S, RME 4 C-load, SME 2 S	yes	Yes*

* Adjusted parameter display and object numbering.

3.1 Operation

Every dimmer actuator has a manual button.
When manual mode is activated the dimmer can only be operated with the buttons.
Bus telegrams will not be implemented.

4 buttons and 4 LEDs are available for each channel.
The LEDs shown the current state as a bar display:



The device dims down to 0% in the event of excess temperature or a short circuit in the load.

The buttons call up the following dimming values:

Table 2:

Button 1	Button 2	Button 3	Button 4
25 % or OFF	50 %	75 %	100 %

In standard operation:
Pressing a button establishes the desired dimming value.
A status established via the channel button can be overwritten via the bus at any time.

In manual operation with the manual button or *Manual* object:
If the "manual" function is selected, the associated LED lights up.
Any time-based functions that are running (e.g. soft switching) will be terminated.
The dimming status will be frozen and can only be changed via the channel buttons.
Bus telegrams will not be implemented.

The "Manual" state will be reset during a mains power failure.
After cancelling manual operation already received bus events will not be obtained later.

4 Technical data

Operating voltage KNX

4.1 Important information

1. The voltage supply (at the fuse box) must be switched off without fail when replacing lamps.
2. The EIB voltage must be switched off when **plugging together or separating modules**.
3. Connecting dimmers **in series or in parallel** is not permitted:
   ONLY the Booster module is connected in parallel (up to 2 items per channel possible).
4. If C2 boosts the channel C1 (special parallel operation) a total of up to 4 booster modules can be connected and an output of up to 2000 W can be dimmed.
5. Do not install **adjustable transformers** ahead of the dimmer.
6. Ripple control pulses from electric power plants may cause temporary flickering of the lighting.

5 General information about KNX Secure

ETS Version 5.7 and higher support secure communication in KNX systems. A distinction is made between secure communication via the IP medium using KNX IP Secure and secure communication via the TP and RF media using KNX Data Secure. The following information refers to KNX Data Secure.

In the ETS catalogue, KNX products supporting "KNX Secure" are clearly identified:

As soon as a "KNX-Secure" device is included in the project, the ETS requests a project password. If no password is entered, the device is included with Secure Mode deactivated. However, the password can also be entered or changed later in the project overview.

5.1 Start-up with "KNX Data Secure"

For secure communication, the FDSK (Factory Device Setup Key) is required. If a KNX product supporting "KNX Data Secure" is included in a line, the ETS requires the input of the FDSK. This device-specific key is printed on the device label and can either be entered by keyboard or read by using a code scanner or notebook camera.

Example of FDSK on device label:

After entering the FDSK, the ETS generates a device-specific tool key. The ETS sends the tool key to the device to be configured via the bus. The transmission is encrypted and authenticated with the original and previously entered FDSK key. Neither the tool key nor the FDSK key are sent in plain text via the bus.
After the previous action, the device only accepts the tool key for further communication with the ETS.
The FDSK key is no longer used for further communication, unless the device is reset to the factory setting: In this case, all set safety-related data will be deleted.
The ETS generates as many runtime keys as needed for the group communication you want to protect. The ETS sends the runtime keys to the device to be configured via the bus. Transmission takes place by encrypting and authenticating them via the tool key. The runtime keys are never sent in plain text via the bus.

The FDSK is saved in the project and can be viewed in the project overview. All keys for this project can also be exported (backup).

During project planning, it can be defined subsequently which functions / objects are to communicate securely. All objects with encrypted communication are identified by the "Secure" icon in the ETS:

5.2 Start-up without "KNX Data Secure"

Alternatively, the device can also be put into operation without KNX Data Secure. In this case, the device is unsecured and behaves like any other KNX device without KNX Data Secure function.
To start up the device without KNX Data Secure, select the device in the 'Topology' or 'Devices' section and set the 'Secure start up' option in the 'Properties' area of the 'Settings' tab to 'Disabled'.

6 The application program "MIX2 secure"

6.1 Selection in the product database

Manufacturer	Theben AG
Product family	Dimmers
Product type	DMG 2 T
Program name	MIX2 secure

The ETS database can be found on our website: www.theben.de/downloads

Table 3

Number of communication objects:	254
Number of group addresses:	254
Number of associations:	255

6.2 Communication objects

The objects are divided into channel-related and common objects

6.2.1 Channel-related objects

Table 4

No.	Object name	Function	Length DPT
1	*DMG 2 T channel C1*	*Switching ON/OFF*	1 bit 1.001
2	*DMG 2 T channel C1*	*Brighter/darker*	4 bit 3.007
3	*DMG 2 T channel C1*	*Dimming value*	1 byte 5.001
4	*DMG 2 T channel C1*	*Soft switching*	1 bit 1.001
5	*DMG 2 T channel C1*	*Lock*	1 bit 1.001
6	*DMG 2 T channel C1*	*Call up/save scenes*	1 byte 17.001
7	*DMG 2 T channel C1*	*Lock scenes = 1*	1 bit 1.001
		Enable scenes = 1	1 bit 1.001
8	*DMG 2 T channel C1*	*Force = 1*	1 bit 1.001
		Force = 0	1 bit 1.001
		Dimming value with forced op	1 byte 5.001
		Forced operation	2 bit 2.001
9	*DMG 2 T channel C1*	*Dimming value limit*	1 byte 5.001
10	*DMG 2 T channel C1*	*Feedback On/Off*	1 bit 1.001
11	*DMG 2 T channel C1*	*Feedback in %*	1 byte 5.001
12	*DMG 2 T channel C1*	*Time to next service*	2 byte 7.001
		Operating hours feedback	2 byte 7.001
13	*DMG 2 T channel C1*	*Service required*	1 bit 1.001
14	*DMG 2 T channel C1*	*Reset service*	1 bit 1.001
		Reset operating hours	1 bit 1.001
15	*DMG 2 T channel C1*	*General error message*	1 bit 1.001

No.	Object name	Function	Length DPT
16	*DMG 2 T channel C1*	*Short circuit message*	1 bit 1.001
17	*DMG 2 T channel C1*	*Excess temperature message*	1 bit 1.001
18	*DMG 2 T channel C1*	*Mains power failure*	1 bit 1.001
19	*DMG 2 T channel C1*	*Load type message (R, C/L)*	1 bit 1.001
31	*DMG 2 T channel C2*	*Switching ON/OFF*	1 bit 1.001
32	*DMG 2 T channel C2*	*Brighter/darker*	4 bit 3.007
33	*DMG 2 T channel C2*	*Dimming value*	1 byte 5.001
34	*DMG 2 T channel C2*	*Soft switching*	1 bit 1.001
35	*DMG 2 T channel C2*	*Lock*	1 bit 1.001
36	*DMG 2 T channel C2*	*Call up/save scenes*	1 byte 17.001
37	*DMG 2 T channel C2*	*Enable scenes = 1*	1 bit 1.001
		Lock scenes = 1	1 bit 1.001
38	*DMG 2 T channel C2*	*Force = 0*	1 bit 1.001
		Force = 1	1 bit 1.001
		Dimming value with forced op	1 byte 5.001
		Forced operation	2 bit 2.001
39	*DMG 2 T channel C2*	*Dimming value limit*	1 byte 5.001
40	*DMG 2 T channel C2*	*Feedback On/Off*	1 bit 1.001
41	*DMG 2 T channel C2*	*Feedback in %*	1 byte 5.001
42	*DMG 2 T channel C2*	*Time to next service*	2 byte 7.001
	DMG 2 T channel C2	*Operating hours feedback*	2 byte 7.001
43	*DMG 2 T channel C2*	*Service required*	1 bit 1.001
44	*DMG 2 T channel C2*	*Reset service*	1 bit 1.001
	DMG 2 T channel C2	*Reset operating hours*	1 bit 1.001
45	*DMG 2 T channel C2*	*General error message*	1 bit 1.001
46	*DMG 2 T channel C2*	*Short circuit message*	1 bit 1.001

No.	Object name	Function	Length DPT
47	*DMG 2 T channel C2*	*Excess temperature message*	1 bit 1.001
48	*DMG 2 T channel C2*	*Mains power failure*	1 bit 1.001
49	*DMG 2 T channel C2*	*Load type message (R, C/L)*	1 bit 1.001

6.2.2 Common objects

These objects are partly used by the basic device and the two upgrade devices.

Table 5:

No.	Object name	Function	Type DPT
79	*DMG 2 T*		
159	*EM1 DME 2 T*		
239	*EM2 DME 2 T*		
241	*Central continuous ON*	*For RMG 8S, DME 2 S, SME 2 S, DMG 2 T, DME 2 T*	1 bit 1.001
242	*Central continuous OFF*	*For RMG 8S, DME 2S, SME 2S, DMG 2 T, DME 2 T*	1 bit 1.001
243	*Central switching*	*For RMG8S, DME 2S, SME 2S, DMG 2 T, DME 2 T*	1 bit 1.001
244	*Call up/save central scenes*	*RMG8S, DME2S, JME4S, SME2S, DMG 2 T, DME 2 T*	1 Byte 18.001
245	*Central safety 1*	*For JME 4 S*	1 bit 1.001
246	*Central safety 2*	*For JME 4 S*	1 bit 1.001
247	*Central safety 3*	*For JME 4 S*	1 bit 1.001
248	*Central up/down*	*For JME 4 S*	1 bit 1.008
249	*Not used*		
250	*Not used*		
251	*Version of bus coupling unit*	*transmit*	14 byte 16.001
252	*Version of basic device*	*transmit*	14 byte 16.001
253	*Version of first upgrade device*	*transmit*	14 byte 16.001
254	*Version of second upgrade device*	*transmit*	14 byte 16.001

6.2.4 Description of objects

- **Objects 1, 31, 81, 111, 161, 191 "Switching ON/OFF"**

A 1 on this object dims up to 100%,
and 0 dims to 0%

- **Objects 2, 32, 82, 112, 162, 192 "brighter/darker"**

This object is actuated with 4-bit telegrams (DPT 3.007 Control Dimming).
This function can be used to dim the light up or down in
in increments.
In the standard application, telegrams are sent with 64 increments.
IMPORTANT: The response to 4-bit telegrams depends on the
“Switching On/Off with a 4-bit telegram” parameter.
See appendix: 4-bit telegrams (brighter/darker)

- **Objects 3, 33, 83, 113, 163, 193 "Dimming value"**

This object can be used to select the desired dimmer setting directly.
Format: 1 byte percentage value EIS 2 dimming, value.
0 = 0%
255 = 100%

- **Objects 4, 34, 84, 114, 164, 194"Soft switching"**

A “1” on this object starts a soft switching cycle, i.e.:
The brightness is gradually increased, starting from the minimum brightness.
The dimming value remains constant for the programmed time and is then gradually reduced after this time has elapsed.
Once the programmed minimum brightness has been reached the dimming value is reset to 0%.
The cycle can be extended or prematurely terminated via telegrams.

This sequence can also be controlled using a **time switch** if the "*Time between soft ON and soft OFF*" parameter is set to "*Until soft OFF telegram*".
The dimming cycle is then started with a “1” and finished with a “0”.

See appendix: Use of the soft switch function

- **Object 5, 35, 85, 115, 165, 195 "Lock"**

Responses to setting and cancelling the lock can be configured if the lock function has been activated. (parameter page *Channel C1/C2 function selection*).
The lock only applies when the object is received, i.e. with *Lock with OFF telegram* the channel is not locked after bus restoration.
If the parameter *Behaviour when setting the lock = no reaction*, a running soft-switch process will not be interrupted.

- **Objects 6, 36, 86, 116, 166, 196 "Call up/save scenes"**

Only available if the scene function has been activated (*Function selection* parameter page).

This object can be used to save and subsequently call up scenes.
Saving stores the dimming value of the channel.
It does not matter how this dimming value is produced (whether via switching commands, central objects or the buttons on the device).
The saved dimming value is re-established when it is called up.

All scene numbers from 1 to 64 are supported.
Each channel can participate in up to 8 scenes.

See appendix: Scenes

- **Objects 7, 37, 87, 117, 167, 197 "Lock scenes = 1, Enable scenes = 1"**

Locks the scene function with a 1 or a 0 depending on the configuration.
As long as it is locked, scenes cannot be saved or called up.

- **Objects 8, 38, 88, 118, 168, 198 "Forced operation = 1" / "Forced operation = 0" / "Dimming value during forced operation"**

The function of the forced operation object can be configured as a 1-bit, 2-bit or 1-byte object.

Table 6

Format of forced object	Forced operation		Response with forced operation	
	Trigger with	End with	Start	End
1 bit	1 or 0 (configurable)	0 or 1 (configurable)	configurable in the application program	
2 bit	Forced operation on = 3 Forced off = 2	Deactivate forced operation = 0 or 1	configurable in the application program.	The last dimming value before forced operation is restored
1 byte	1-100 %	0	The triggering telegram also acts simultaneously as a forced operation dimming value	The last dimming value before forced operation is restored

- **Objects 9, 39, 89, 119, 169, 199 "Dimming value limit"**

The value received will be configured as the maximum configurable dimming value.
Its range of applicability is defined on the Dimming value restrictions parameter page.

- **Object 10, 40, 90, 120, 170, 200 "Feedback On/Off"**

Sends the current dimming status:
1 = current dimming value is between 1% and 100%
0 = current dimming value is 0%

- **Object 11, 41, 91, 121, 171, 201 "Feedback in %"**

Sends the new dimming value after a change as soon as a dimming procedure is completed, i.e. once the new set point value has been reached.
Format: 1 Byte, 0 ... 255 i.e. 0 ... 100%

- **Objects 12, 42, 92, 122, 172, 202"Operating hours feedback", "Time to next service"**

Only available if the operating hours counter function
has been activated (*Function selection* parameter page).
Reports, depending on selected *Type of operating hours counter* (*Operating hours counter and service* parameter page), either the remaining period to the next set service or the current status of the operating hours counter.

- **Objects 13, 43, 93, 123, 173, 203 "Service required"**

Only available if the operating hours counter function has been activated
(*Function selection* parameter page) and *Type of operating hours counter = Counter for time to next service*.

Reports if the next service is due.
0 = not due
1 = service is due.

- **Objects 14, 44, 94, 124, 174, 204 "Reset operating hours", "Reset service"**

Only available if the operating hours counter function
has been activated (*Function selection* parameter page).

- **Object 15, 45, 95, 125, 175, 205 "General error message"**

Used as a malfunction signal:
0 = No error
1 = an error has been detected

This message can, for example, be displayed on a screen.

- **Object 16, 46, 96, 126, 176, 206 "Short circuit message"**

0 = OK
1 = Short circuit at dimmer output:
Check connected lines and load.

When there is a short circuit, all 4 status LEDs on the device flash.

- **Object 17, 47, 97, 127, 177, 207 "Excess temperature message"**

0 = OK
1= the dimmer is overloaded:

- connected power is too high,
- ambient temperature is too high,
- booster defective
- incorrect installation position, i.e. device cannot dissipate the heat,

If there is excess temperature, the status LEDs 2, 3, and 4 flash.

- **Object 18, 48, 98, 128, 178, 208 "Mains power failure"**

0 = OK
1 = No mains voltage available:
Loss of power or defective hardware

To be able to recognise the mains power failure on the load side, the dimmer must be supplied with power via the mains connection on the basic device.

- **Object 19, 49, 99, 129, 179, 209 "Load type message (R/C, L)"**

Currently selected load type feedback.
0 = Phase control (L load connected), conventional transformers.
1 = Reverse phase control (R, C load connected), electronic transformers or incandescent lamps.

- **Objects 79, 159, 239 "***Manual***"**

Only available for devices in the MIX2 series (order number 493…)
Puts the relevant module in manual mode or sends the status of the manual operation.

Table 7

Telegram	Meaning	Explanation
0	Auto	All channels can be operated via the bus as well as via the buttons.
1	Manual	The channels can only be operated via the buttons on the device. Bus telegrams will not work. Any time-based functions that are running (e.g. soft switching) will be terminated.

The duration of the manual mode, i.e. the *function of the manual operation* is set on the *General* parameter page.

After cancelling manual operation already received bus events will not be obtained later.
The "Manual" state will be reset during a mains power failure.

- **Object 241 "***Central permanent ON***"**

Central switch-on function.
Enables simultaneous switch-on of all channels (basic and extension modules) with a single telegram.
0 = No function
1 = Permanent ON

Participation in this object can be set individually for each channel
(see parameter page DMG 2 T channel C1/C2: Function selection).

IMPORTANT:
This object takes top priority.
As long as it is set, the other switching commands will not work on the participating channels.

Works on the following devices:
RMG 8 S/RME 8 S, RMG 4 I / RME 4 I, RMG 8 T / RME 8 T, RME 4 S / C-Last, DMG 2 T, DME 2 S/T, SME 2 S.

- **Object 242 "***Central permanent OFF***"**

Central switch-off function.
Enables simultaneous switch-off of all channels (basic and extension modules) with a single telegram.
0 = No function
1 = Permanent OFF

Participation in this object can be set individually for each channel
(see parameter page).

IMPORTANT: This object has the second highest priority after *Central permanent ON*. As long as it is set, the other switching commands will not work on the participating channels.
Works on the following devices:
RMG 8 S/RME 8 S, RMG 4 I / RME 4 I, RMG 8 T / RME 8 T, RME 4 S / C-Last, DMG 2 T, DME 2 S/T, SME 2 S.

- **Object 243 "***Central switching***"**

Central switching function.

Enables simultaneous switch-on or off of all channels (basic and extension modules) with a single telegram.
0 = OFF
1 = ON
Participation in this object can be set individually for each channel
(see parameter page DMG 2 T channel C1/C2: Function selection).
With this object, every participating channel responds exactly as if its first object (i.e. obj. 1, 31, etc.) were receiving a switching command.

Works on the following devices:
RMG 8 S/RME 8 S, RMG 4 I / RME 4 I, RMG 8 T / RME 8 T, RME 4 S / C-Last, DMG 2 T, DME 2 S/T, SME 2 S.

- **Object 244 "***Call up/save central scenes***"**

This object can be used to save and subsequently call up "scenes".
The save process stores the current status of the dimming channel (or the switch state with other actuators), regardless of how the status was brought about (e.g. via dimming values, switching commands, central objects or the manual switches).
The saved status is thus restored when called up.
Each channel can participate in a maximum of 8 scenes.

Works on the following devices:
RMG 4 I / RME 4 I, RMG 8 S / RME 8 S, RMG 8 T / RME 8 T, DMG 2 T / DME 2 T, JMG 4 T / JME 4 T, RME 4 S / C-Last, DME 2 S, SME 2 S, JME 4 S.

See appendix: The scenes

- **Objects 245, 246, 247**

Not used.

- **Object 248 "***Central Up/Down***"**

Not used.

- **Object 249**

Not used.

- **Object 250**

Not used.

- **Object 251** "*Version of bus coupling unit*"

For diagnostic purposes only.
Sends the bus coupling unit software version after reset or download.
Can also be read out via the ETS.

Format: **A**xx **H**yy **V**zzz

Code	Meaning
xx	00 .. FF = Version of application without dividing point (14 = V1.4, 15 = V1.5 etc.).
yy	Hardware version 00..99
zzz	Firmware version 000..999

EXAMPLE: A15 H03 V014
- ETS Application Version 1.5
- Hardware version $03
- Firmware version $14

- **Object 252** "*Version of basic module*"

For diagnostic purposes only.
Only for basic modules in the MIX2 series (order number 493…).

Sends the software version (firmware) of the basic module after reset or download.
Can also be read out via the ETS.

The version is issued as an ASCII character string.
Format: **M**xx **H**yy **V**zzz

Code	Meaning
xx	01 .. FF = Module code (hexadecimal).
yy	Hardware version 00..99
zzz	Firmware version 000..999

EXAMPLE: M11 **H**25 **V**025
- Module $11 = RMG 8 S
- Hardware version V25
- Firmware version V25

Possible module codes

Module	Code
Module or mains voltage are unavailable.	$00
RMG 8 S	$11
RMG 4 I	$12
DMG 2 T	$13
JMG 4 T/JMG 4 T 24V	$14
HMG 6 T	$15
RMG 8 T	$17
RMG 4 U	$18
BMG 6 T	$92

EXAMPLE: M15 **H**25 **V**025
- Module $15 = HMG 6 T
- Hardware version V25
- Firmware version V25

- **Object 253** "*Version of first extension module*"

Telegram format: See above, object 252

Possible module codes

Module	Code
Module or mains voltage are unavailable.	$00
RME 8 S	$11
RME 4 I	$12
DME 2 T	$13
JME 4 T/JME 4 T 24V	$14
HME 6 T	$15
RME 8 T	$17
RME 4 U	$18
BME 6 T	$92

Object 254 "*Version of second extension module*"

See above, object 253

6.3 Parameters

6.3.1 Parameter pages

Every device has 2 identical channels.
A copy function in the 2nd channel makes programming easier.

Table 8

Function	description
General	Selection of module and central parameters.
BASIC DEVICE: DMG 2 T	(Empty page)
DMG 2 T Channel C1 Function selection	Characteristics of channel and activation of additional functions (soft switching, forced operation, scenes, etc.).
Dimming response	Load selection, dimming times, dimming switch-on value, etc.
Dimming value limits	Scope of the limit.
Soft switching	Brightness/dimming value and time settings for soft switching.
Locking function	Type of lock telegram and response to locking.
Forced operation	Behaviour in forced operation mode.
Scenes	Selection of scene numbers relevant to the channel.
Feedback	Format of the feedback objects and cyclical transmission time.
Operating hours counter and service	Type of operating hours counter and, if required, service interval etc.
Loss of power and restoration	Behaviour during failure and restoration of bus and mains power.
Diagnostic messages	Activate transmission of the diagnostic and error messages.

6.3.2 General

Table 9

Designation	Values	Description
Type of basic module	***Select device...*** *RMG 8 S..* *RMG 8 T..* *RMG 4 I..* *DMG 2 T..* *JMG 4 T/JMG 4 T 24V..* *HMG 6 T..*	Selection of available basic module (MIX2 series only)
Channel C2 boosts channel C1	***no*** *yes*	Only DMG 2 T: C2 is operated automatically with the same settings as C1. Only forced operation, scenes, operating hours counter and diagnostic messages remain individually configurable for C2. Channel C2 is wired in parallel with C1 and serves only as an output amplifier. In this mode up to 4 booster modules can be connected in parallel and a dimming output of up to 2000 W achieved
Type of first extension module	***not available/inactive*** *RME 8 S..* *RME 8 T..* *RME 4 I..* *DME 2 T..* *JME 4 T/JME 4 T 24V..* *HME 6 T..* *RME 4 S / RME 4 C-Last..* *DME 2 / SME 2..* *BME 6..* *JME 4 S..* *HME 4..*	Selection of first extension module, if available. (MIX or MIX2 series)
Channel C2 boosts channel C1	***no*** *yes*	Only DME 2 T: C2 is operated automatically with the same settings as C1. Only forced operation, scenes, operating hours counter and diagnostic messages remain individually configurable for C2. Channel C2 is wired in parallel with C1 and serves only as an output amplifier. In this mode up to 4 booster modules can be connected in parallel and a dimming output of up to 2000 W achieved
Type of second extension module	***not available/inactive***	Selection of second extension

Designation	Values	Description
	RME 8 S.. *RME 8 T..* *RME 4 I..* *DME 2 T..* *JME 4 T/JME 4 T 24V..* *HME 6 T..* *RME 4 S / RME 4 C-Last..* *DME 2 / SME 2..* *BME 6..* *JME 4 S..* *HME 4..*	module, if available. (MIX or MIX2 series)
Channel C2 boosts channel C1	***no*** *yes*	Only DME 2 T: C2 is operated automatically with the same settings as C1. Only forced operation, scenes, operating hours counter and diagnostic messages remain individually configurable for C2. Channel C2 is wired in parallel with C1 and serves only as an output amplifier. In this mode up to 4 booster modules can be connected in parallel and a dimming output of up to 2000 W achieved
Time for cyclical sending of feedback object *(MIX series, order no. 491...)*	*2 minutes, 3 minutes,* *5 minutes, 10 minutes,* ***15 minutes,** 20 minutes* *30 minutes, 45 minutes* *60 minutes*	This parameter is used exclusively for MIX Series extension modules (DME 2 S, SME 2, JME 4 S, BME 6, RME 4 S / C-Last, and HME 4).
Function of manual button *(MIX2 series, order no. 493...)*	*applies for 24 hours or until reset via object* *disabled* ***applies until reset via object*** *applies for 30 minutes or until reset via object* *applies for 1 hour or until reset via object* *applies for 2 hours or until reset via object* *applies for 4 hours or until reset via object* *applies for 8 hours or until reset via object* *applies for 12 hours or until reset via object*	Determines how long the device works manually and how this is ended. In manual mode, the channels can only be switched on and off via the push buttons on the device. See also: Object 79 This parameter is used exclusively for MIX2 series devices.
Manual operation of channels *(MIX2 series, order no. 493...)*	***enabled*** *disabled*	The channels can be operated via the buttons on the device. No manual operation, the buttons on the device are locked.

6.3.3 DMG 2 T Channel C1/C2: Function selection

Table 10

Designation	Values	description
Adjust dimming value limits	***no***	The standard values apply: *Implement limit when executing the object* = no *Limit applies for:* *- Soft switching,* *- absolute dimming,* *- relative dimming,* *- switch command* = no
	yes..	The page *Dimming value restrictions* will be shown and all parameters can be adjusted individually.
Adjust soft switching	***no***	The standard values apply: *- Time for Soft ON = 1 min* *- Dimming value after Soft On = 100%* *- Time between Soft On and Soft Off = 5 min* *- Time for Soft OFF = 1 min*
	yes..	The page *Soft switching* will be shown and all parameters can be adjusted individually.
Adjust lock function	***no***	The standard values apply: *- Lock with ON telegram* *- Behaviour when setting the lock* *= 10 %* *- Behaviour when cancelling the lock = update*
	yes..	The page *Lock function* will be shown and all parameters can be adjusted individually.
Activate forced operation function	***no*** *yes..*	No forced operation function. The page *Forced operation* will be shown.
Activate scenes	***no*** *yes..*	Do not use scenes. The *Scenes* will be shown
Participation in central objects	***no***	Central objects are not taken into account.
	Yes: in all central objects *only in central continuous ON* *only in central continuous OFF* *only in central switching* *only in central switching and continuous ON*	Which central objects are to be taken into account? Central objects enable the simultaneous switching on and off of several channels with one

Designation	Values	description
	only in central switching and continuous OFF *only in central permanent On and permanent OFF*	single object.
Adjust feedback	***no***	The standard values apply: - Format of 1-bit feedback = not inverted - Send 1-bit feedback cyclically = no - Send 8-Bit feedback: = only after ending dimming process - Send 8-bit feedback cyclically = no - Time for cyclical transmission of feedback = 60 min
	yes..	The page *Feedback* will be shown and all parameters can be adjusted individually.
Activate operating hours counter	***no***	No operating hours counter.
	yes..	The page *operating hours counter* will be shown.
Activate diagnostic messages	***no***	No diagnostic messages
	yes..	The page *Diagnostic messages* will be shown.

6.3.4 Dimming response

Table 11

Designation	Values	description
Load selection	***automatic***	The dimmer detects what type of load is connected and automatically selects the appropriate dimming strategy (phase control or reverse phase control).
	RC load (incandescent lamps, electronic transformers)	Phase control for resistive and capacitive loads (LED lamps, incandescent lamps, halogen high-voltage lamps etc.). For electronic transformers/power units designated for use with RC-mode dimmers (phase control/ trailing edge phase ctrl.). **Notice:** When selecting RC mode load recognition will always be performed in the interests of safety. This should prevent the dimmer being damaged (e.g. wound transformer) when an L-load is connected. The RC mode is actually only used when no L-load is recognised.
	L load (wound transformers)	Phase control (leading edge phase ctrl.) for inductive loads, e.g. wound transformers. **Not** suitable for electronic transformers, can lead to a dimmer overload.
	dimmable energy-saving lamps with RC response	Generally recommended for ESL, especially for high loads (advantage: less heat generated in the dimmer).
Load selection (continuation)	*dimmable energy-saving lamps with L response*	With ESL, only use if a disruptive flickering is noted when dimming up or down. See appendix: Dimming energy-saving lamps (ESL)
	Fan (soft switching deactivated)	Special mode for fans, with configurable start-up time (see below).

Designation	Values	description
	LEDs (RC, 0-90 %, from 09/2013) *reserve 2* … *reserve 32*	Only for LED lights that cannot be dimmed down when = 100% **Do not use.**
Start-up time	*2-60 s*	Only with *Load selection = fan*. Time for which the fan must be driven with full voltage, until it has reached a specific speed.
Minimum dimming value	*1 %, 5 %, **10 %**, 15 %, 20 %, 25 %, 30 % 35 %, 40 %, 45 %, 50 %*	Minimum dimming value for all dimming processes (except 0%). Any values (switch-on dimming value, response to bus failure, etc.) which are below this threshold are increased to the minimum dimming value.
Dimming time 1 from 0% to 100%	*1 s, 2 s, **4 s** 6 s, 8 s, 12 s, 15 s, 24 s, 30 s, 60 s*	This parameter defines the maximum dimming speed from 0 to 100% For greater flexibility 3 different values can be specified. (see below).
Dimming time 2 from 0% to 100%	*1 s, 2 s, 4 s 6 s, **8 s**, 12 s, 15 s, 24 s, 30 s, 60 s*	
Dimming time 3 from 0% to 100%	*1 s, 2 s, 4 s 6 s, 8 s, **12 s**, 15 s, 24 s, 30 s, 60 s*	
Behaviour when receiving a switch command (1-bit)	*immediate on* ***soft on with dimming time 1*** *soft on with dimming time 2* *soft on with dimming time 3*	The change from 0% to 100% or 100% to 0% takes place within max. 1 s. The change from 0% to 100% or 100% to 0% takes place within the preset dimming time.
Behaviour when receiving a dimming command (4-bit)	*immediate on* ***soft on with dimming time 1*** *soft on with dimming time 2* *soft on with dimming time 3*	The change from 0% to 100% or 100% to 0% takes place within max. 1 s (in very quick increments), but can be interrupted by a stop command (release button). The change from 0% to 100% or 100% to 0% takes place within the preset dimming time in correspondingly lower increments.
Behaviour when receiving an absolute value (8-bit)	*immediate on*	The received dimming value is adopted immediately (max. delay 1 s).

Designation	Values	description
	soft on with dimming time 1 *soft on with dimming time 2* *soft on with dimming time 3*	The change from the new dimming value takes place within the preset dimming time proportionately to the change in value. Example with dimming time 1 = 12 s: Change from: - 0 to 100% or 100 to 0% in 12 s (= 100 % of 12s) - 25 to 50% or 50 to 25% in 3 s (= 25% of 12s) etc.
Switch-on value	***Value before previous switch-off*** *minimum value* *100 %* *10 %, 20 %, 30 %* *40 %, 50 %, 60 %* *70 %, 80 %, 90 %*	The last dimming value before switching off is saved and restored The configured minimum brightness is applied. The dimmer adopts the selected value after it is switched on. Here again the configured minimum dimmer value needs to be taken into account.
Switching on with a 4-bit dim telegram		Defines the response if the channel is switched off and a 4-bit telegram (brighter) is received. See in the Appendix: *Parameter: "Switching on/off with a 4-bit telegram"*.
	no	The channel remains switched off
	yes	The channel switches on and dims up with the set dimming time.
Switching off with a 4-bit dimming telegram		Defines the response if the channel is switched on and a 4-bit telegram (darker) is received. See in the Appendix: *Parameter: "Switching on/off with a 4-bit telegram"*.
	no	Channel is dimmed down to the minimum dimming value and remains switched on.
	yes	The channel switches off after reaching the set minimum dimming value.

6.3.5 Dimming value limits

The dimming value can be temporarily restricted via the Object 8 *Brightness restriction*. This is used, for example, to ensure that basic lighting is not exceeded at night, while during the evening the full range of lighting can be used.

The function is implemented as follows:
If the object value = 0, the dimming value is not restricted.
If the object value is greater than 0, then this value indicates the limits for the dimming value.
If the object value is smaller than the configured minimum dimming value, then the brightness is restricted to this minimum dimming value.
If the restriction is removed, the dimming value continues to remain restricted until a new dimming command is received.
During the restriction, the Soft On and Soft Off times are adjusted in such a way that the speed of the brightness change remains the same as when there are no restrictions.

Table 12

Designation	Values	description
Perform limit in describing object	***no***	Limit not applied till next dimming process.
	yes	Dimming value limit as soon as a value is received on the dimming value limit object (Obj. 9, 39..).
Limit applies to switching command (1-bit)	***no***	No limit during switch commands.
	yes	Limit is effective.
Limit applies to relative dimming (4-bit)	***no***	No restriction during brighter/darker comments.
	yes	Limit is effective.
Limit applies to absolute dimming (8-bit)	***no***	No limit for percentage value telegrams.
	yes	Limit is effective.
Limit applies to soft switching	***no***	No limit for soft switching
	yes	Limit is effective.

6.3.6 Soft switching

Table 13

Designation	Values	description
Time for Soft ON	*0 s, 1 s , 2 s, 4 s* *6 s, , 8 s, 12 s, 15 s* *24 s, 30 s, 45 s, **1 min*** *2 min, 3 min, 4 min, 5 min* *6 min, 7 min, 8 min, 9 min* *10 min, 12 min, 15 min, 20 min* *30 min, 40 min, 50 min, 60 min*	Duration of the dimming-up phase (t1) for Soft switching (see appendix). 0 sec. = switch on immediately. **IMPORTANT**: See appendix for further details: Retriggering and premature switch-off
Dimming value after Soft ON	*10 %, 20 %, 30 %* *40 %, 50 %, 60 %,* *70 %, 80 %, 90 %, **100 %***	Final value at the end of the Soft on phase (val) Remarks: Here again the configured minimum dimmer value needs to be taken into account.
Time between Soft ON and Soft OFF	*Until Soft Off telegram* *1 s, 2 s, 3 s, 4 s* *5 s, 6 s, 7 s, 8 s, 9 s* *10 s, 15 s, 20 s, 30 s* *40 s, 50 s, 1 min, 2 min* *3 min, 4 min, **5 min**, 6 min* *7 min, 8 min, 9 min, 10 min* *12 min, 15 min, 20 min, 30 min* *40 min, 50 min, 60 min*	No time restriction; Soft Off phase is initiated by a telegram. Delay (t2) to the start of the Soft Off phase
Time for Soft OFF	*0 s, 1 s , 2 s, 4 s* *6 s, , 8 s, 12 s, 15 s* *24 s, 30 s, 45 s, **1 min*** *2 min, 3 min, 4 min, 5 min* *6 min, 7 min, 8 min, 9 min* *10 min, 12 min, 15 min, 20 min* *30 min, 40 min, 50 min, 60 min*	Duration of the Soft Off phase (t3) 0 sec. = switch off immediately **IMPORTANT**: See appendix for further details: Retriggering and premature switch-off

6.3.7 Locking function

Table 14

Designation	Values	description
Lock telegram	***lock with ON telegram***	0 = Enable 1 = lock
	lock with OFF telegram	0 = lock 1 = Enable **Note:** The lock is always deactivated after reset.
Behaviour when setting the lock	*No change*	No response.
	100 %	Dim to the set value
	0 %, ***10 %***, *20 %, 30 %* *40 %, 50 %, 60 %,* *70 %, 80 %, 90 %*	
Behaviour when cancelling the lock	*No change*	No response.
	Update	If a telegram was received during the lock: apply state. Otherwise: restore state before the lock.
	100 %, 0 %,10 %, 20 %, 30 % *40 %, 50 %, 60 %,* *70 %, 80 %, 90 %*	Dim to the set value

6.3.8 Forced operation

Table 15

Designation	Values	description
Format of forced object	***1 bit*** *2 bit* *1 byte (%)*	Forced operation triggered by: Switch telegram. Priority telegram. Dimming value.
1 bit		
Activate forced function with	***1*** *0*	Recommended. After reset/download forced operation is already activated and must be cancelled if necessary.
Behaviour at start of forced operation	***No change*** *Minimum dimming value* *100 %* *OFF* *10 %, 20 %, 30 %* *40 %, 50 %, 60 %* *70 %, 80 %, 90 %*	Response to the receipt of a forced operation telegram. Here again the configured minimum dimmer value needs to be taken into account.
Behaviour at end of forced operation	*update** ***Value before forced operation*** *Minimum dimming value* *100 %* *OFF* *10 %, 20 %, 30 %* *40 %, 50 %, 60 %* *70 %, 80 %, 90 %*	Response to cancellation of forced operation. Here again the configured minimum dimmer value needs to be taken into account.
2 bit		
Response with forced operation ON	***No change*** *Minimum dimming value* *100 %* *OFF* *10 %, 20 %, 30 %* *40 %, 50 %, 60 %* *70 %, 80 %, 90 %*	Response to the receipt of a forced operation telegram. Here again the configured minimum dimmer value needs to be taken into account.
Response with forced operation OFF	*OFF*	Switch off.
Behaviour at end of forced operation	*update** ***Value before forced operation*** *Minimum dimming value* *100 %* *OFF* *10 %, 20 %, 30 %* *40 %, 50 %, 60 %* *70 %, 80 %, 90 %*	Response to cancellation of forced operation Here again the configured minimum dimmer value needs to be taken into account.
1 byte (%)		

Designation	Values	description
Behaviour at end of forced operation	*update**	Response to cancellation of forced operation Here again the configured minimum dimming value needs to be taken into account.
	Value before forced operation	
	Minimum dimming value	
	100 %	
	OFF	
	10 %, 20 %, 30 % *40 %, 50 %, 60 %* *70 %, 80 %, 90 %*	

** 4-bit telegrams received during forced mode will not be processed. Any soft ON/OFF process will be stopped.*

6.3.9 Scenes

This page appears when the *Scenes* are activated on the *Function selection* parameter page.
Each channel can participate in up to 8 scenes.

Table 16

Designation	Values	description
Lock telegram for scenes	***lock with ON telegram***	0 = Enable 1 = lock
	lock with OFF telegram	0 = lock 1 = Enable **Note:** The lock is always deactivated after reset.
All channel scene statuses	***Overwrite on download***	A download deletes all scene memories in a channel, i.e. all previously taught scenes. When a scene number is called, the channel assumes the configured *Status after download* (see below). See appendix: Enter scenes without telegrams (MIX2 ONLY).
	Unchanged after download	All previously taught-in scenes are saved. However, the scene numbers the channel can react to can be changed (see below: *Channel reacts to*).
Participation in central scene object	***No*** *yes*	Should the device react to the central scene object?
Channel reacts to	*No scene number* ***Scene number 1*** *Scene number 63*	First of the 8 possible scene numbers the channel is to react to.
Allocated dimming value	*Off* ***10 %***, *20 %, 30 %* *40 %, 50 %, 60 %,* *70 %, 80 %, 90 %, 100 %*	New dimming value to be assigned to the selected scene number. Only possible if the scene statuses are to be overwritten after download.
Permit teach-in	***No***	Scenes can only be called up.
	Yes	The user can both call up and teach-in or amend scenes.
Channel reacts to	*No scene number* *Scene number1* ***Scene number 2***	Second of the 8 possible scene numbers

Designation	Values	description
	… *Scene number 63*	
Allocated dimming value	*Off* *10 %, **20 %**, 30 %* *40 %, 50 %, 60 %,* *70 %, 80 %, 90 %, 100 %*	See above.
Permit teach-in	*No* ***Yes***	See above.
Channel reacts to	*No scene number* *Scene number1* … ***Scene number 3*** … *Scene number 63*	Third of the 8 possible scene numbers
Allocated dimming value	*Off* *10 %, 20 %, **30 %*** *40 %, 50 %, 60 %,* *70 %, 80 %, 90 %, 100 %*	See above.
Permit teach-in	*No* ***Yes***	See above.
Channel reacts to	*No scene number* *Scene number1* … ***Scene number 4*** … *Scene number 63*	Fourth of the 8 possible scene numbers
Allocated dimming value	*Off* *10 %, 20 %, 30 %* ***40 %**, 50 %, 60 %,* *70 %, 80 %, 90 %, 100 %*	See above.
Permit teach-in	*No* ***Yes***	See above.
Channel reacts to	*No scene number* *Scene number1* … ***Scene number 5*** … *Scene number 63*	Fifth of the 8 possible scene numbers
Allocated dimming value	*Off* *10 %, 20 %, 30 %* *40 %, **50 %**, 60 %,* *70 %, 80 %, 90 %, 100 %*	See above.
Permit teach-in	*No* ***Yes***	See above.
Channel reacts to	*No scene number* *Scene number1* … ***Scene number 6*** … *Scene number 63*	Sixth of the 8 possible scene numbers

Designation	Values	description
Allocated dimming value	*Off* *10 %, 20 %, 30 %* *40 %, 50 %,* ***60 %****,* *70 %, 80 %, 90 %, 100 %*	See above.
Permit teach-in	*No* ***Yes***	See above.
Channel reacts to	*No scene number* *Scene number1* … ***Scene number 7*** … *Scene number 63*	Seventh of the 8 possible scene numbers
Allocated dimming value	*Off* *10 %, 20 %, 30 %* *40 %, 50 %, 60 %,* ***70 %****, 80 %, 90 %, 100 %*	See above.
Permit teach-in	*No* ***Yes***	See above.
Channel reacts to	*No scene number* *Scene number1* … ***Scene number 8*** … *Scene number 63*	Last of the 8 possible scene numbers
Allocated dimming value	*Off* *10 %, 20 %, 30 %* *40 %, 50 %, 60 %,* *70 %,* ***80 %****, 90 %, 100 %*	See above.
Permit teach-in	*No* ***Yes***	See above.

6.3.10 Feedback

Each channel has 2 feedback objects (e.g. Obj. 10 + 11, 40 + 41, etc.)

Table 17

Designation	Values	description
Format of 1-bit feedback	***Not inverted***	Standard setting: 1-100 % = 1 0 % = 0
	inverted	1-100 % = 0 0 % = 1
Send 1-bit feedback cyclically	***no***	Send at regular intervals?
	yes	
Send 8-bit feedback	***only after ending dimming process***	Only send current dimmer value when the new dimmer value has been reached.
	every 10 % *every 20 %* *every 30 %*	Send even during the dimming process
Send 8-bit feedback cyclically	***no***	Send at regular intervals?
	yes	
Time for cyclical transmission of feedback (if available)	*2 min, 3 min , 5 min* *10 min, 15 min, 20 min* *30 min, 45 min,* ***60 min***	At what interval? This setting applies for both feedback objects (1 and 8-bit)

6.3.11 Operating hours counter and service

This page appears when *Activate operating hours counter* is selected on the *Function selection* parameter page.

Table 18

Designation	Values	description
Type of operating hours counter	***Operating hours counter*** *counter for time period before next service*	Forward counter for channel power-on time. Backward counter for channel power-on time.
Operating hours counter		
Reporting of changes to operating hours (0..100 h, 0 = no report)	*0..100* *Default value =* ***10***	At what interval is the current counter status to be sent? Example: 10 = Send each time the counter status increases by another 10 hours.
Report operating hours cyclically	***No*** *yes*	Send at regular intervals?
Time for cyclical transmission	*2 minutes, 3 minutes, 5 minutes, 10 minutes, 15 minutes, 20 minutes, 30 minutes, 45 minutes* ***60 minutes***	At what interval?
counter for time period before next service		
Service interval (0..2000, x10 h)	*0..2000* Default value = ***100***	Desired timescale between two services. Example: 10 = 10 x 10 h = 100 hours
Reporting of changes to time to service (0..100 h, 0 = no report)	*0..100* Default value = ***10***	At what interval is the current counter status to be sent? Example: 10 = Send each time the counter status decreases by another 10 hours.
Report time to service cyclically	***no*** *Yes*	Send **remaining** time to next service at regular intervals? Object *Time to next service.*
Report service cyclically	***no*** *Yes*	Send **expiry** of time to next service at regular intervals? Object *Service required.*
Tine for cyclical transmission (time to service and service	*2 minutes, 3 minutes, 5 minutes, 10 minutes, 15 minutes, 20 minutes, 30 minutes, 45 minutes* ***60 minutes***	At what interval?

6.3.12 Loss of power and restoration

Table 19

Designation	Values	description
Dimming value during download and bus failure	***Same as before failure***	Restore status before download or maintain status before bus failure.
	100 %, 0 %, *10 %, 20 %, 30 %* *40 %, 50 %, 60 %* *70 %, 80 %, 90 %*	Apply set value here. Here again the configured minimum dimmer value needs to be taken into account.
Dimming value during restoration of the mains supply or bus supply	***Same as before failure***	Restore status before failure
	100 %, 0 %, *10 %, 20 %, 30 %* *40 %, 50 %, 60 %* *70 %, 80 %, 90 %*	Apply set value here. Here again the configured minimum dimmer value needs to be taken into account.

6.3.13 Diagnostic messages

The diagnostic messages are used during troubleshooting when there are faults.

Table 20

Designation	Values	description
Send general error cyclically	***no*** *Yes*	Which messages should be sent cyclically?
Send short circuit cyclically	***no*** *Yes*	
Send excess temperature cyclically	***no*** *Yes*	
Send mains failure cyclically	***no*** *Yes*	
Send load type cyclically	***no*** *Yes*	
Cycle time for all diagnostic messages (if used)	*2 minutes, 3 minutes,* *5 minutes, 10 minutes,* *15 minutes, 20 minutes,* *30 minutes, 45 minutes* ***60 minutes***	At what interval?

7 Typical applications

7.1 Bedroom lighting

The light should not be blinding when switching on at night, otherwise it should light up immediately at 100%.
All dimming values should, however, be configurable via the dimming function:

- At night the switch-on value should not exceed the 40% limit
- Dimming up to 100% should be possible however (e.g. when reading)
- No restrictions during the day
- Dimming via 2 buttons

7.1.1 Devices:

- DMG 2 T (4930270)
- TA 2 S (4969222)
- TR 648 top2 (6489210)
- 2 conventional buttons (NO contact)

7.1.2 Overview

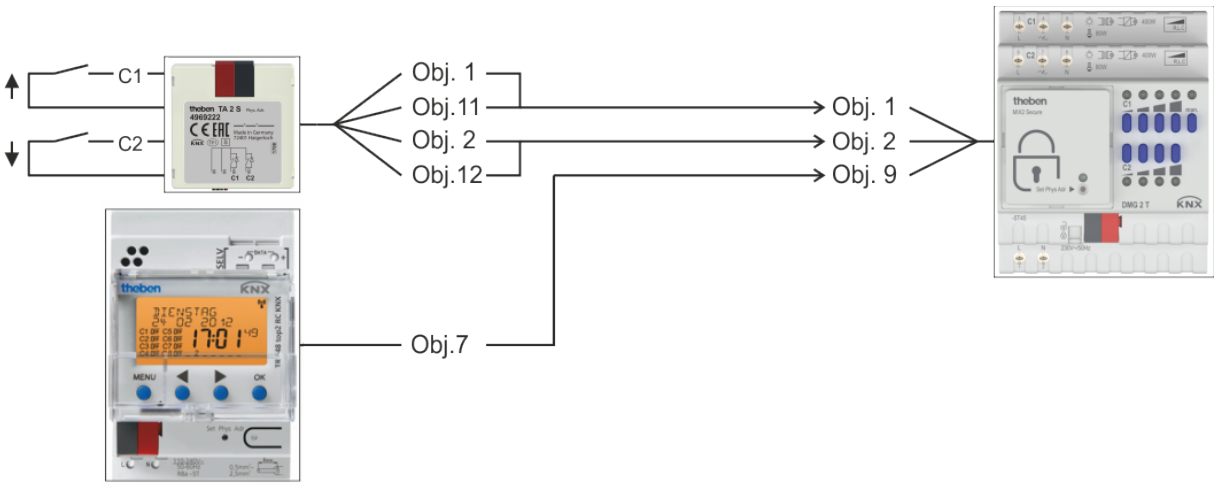


Figure 1

7.1.3 Objects and links

Table 21:

No.	TA2 S Object name	No.	DMG 2 T Object name	Comment
1	*Channel 1 / Switch on/off**	1	*Switching On/Off*	Switch on light via button 1 (brief button press)
2	*Channel 1 / brighter***	2	*Brighter / darker*	Button 1 (brighter)
11	*Channel 2 / Switch on/off**	1	*Switching On/Off*	Switch off light via button 2 (brief button press)
12	*Channel 1 / darker***	2	*Brighter / darker*	Button 2 (darker)

* A common group address for both objects
** A common group address for both objects

Table 22:

No.	TR 648 top2 Object name	No.	DMG 2 T Object name	Comment
7	*C1.1 switching channel per cent*	9	*Dimming value limit*	0.4 -100 % = limit 0 = No limit.

7.1.4 Important parameter settings

Standard or customer-defined parameter settings apply for unlisted parameters.

Table 23: DMG 2 T

Parameter page	to select parameter	Setting
DMG 2 T channel C1: Function selection	*Adjust dimming value limits*	*yes*
Dimming response	*Switch-on value*	*100 %*
Dimming value limits	*Perform limit in describing object*	*yes*
	Limit applies to switching command	*yes*
	Limit applies to relative dimming	*no*
	Limit applies to absolute dimming	*no*
	Limit applies to soft switching	*yes*

Table 24: TA 2 S

Parameter page	to select parameter	Setting
Channel 1		
Configuration options	*Channel function 1*	*Dimming*
Dimming	*Reaction to long / short*	*Brighter / On*
Channel 2		
Configuration options	*Channel function 2*	*Dimming*
Dimming	*Reaction to long / short*	*Darker / Off*

Table 25: TR 648 top2

Parameter page	to select parameter	Setting
General	*Activate time switch channel C1*	*yes*
Switching channel C1	*Telegram type C1.1*	*percentage value*
	With clock ON	*send following telegram once*
	Telegram (%)	*40*
	With clock OFF	*send following telegram once*
	Telegram (%)	*0*

8 APPENDIX

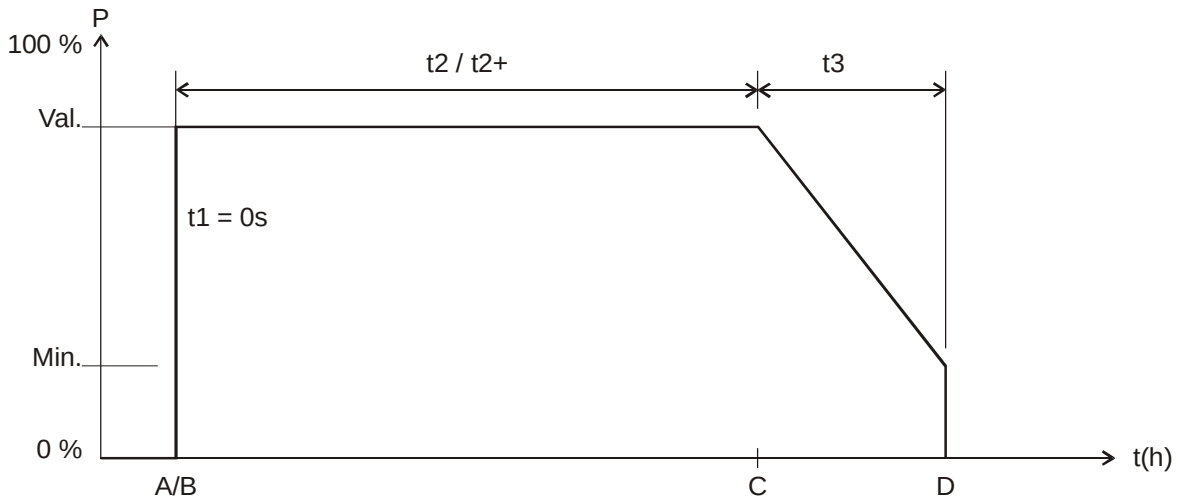
8.1 Use of soft switching function

8.1.1 General

The Soft switch function is a cycle consisting of switch-on, dimming up,
Maintain target brightness, dimming down and switch-off.

8.1.2 Soft ON for staircase lighting

The following function is recommended for staircase lighting:
When the light switch is operated: Full brightness.
After required length of time: Lighting is slowly dimmed down and then switched off.



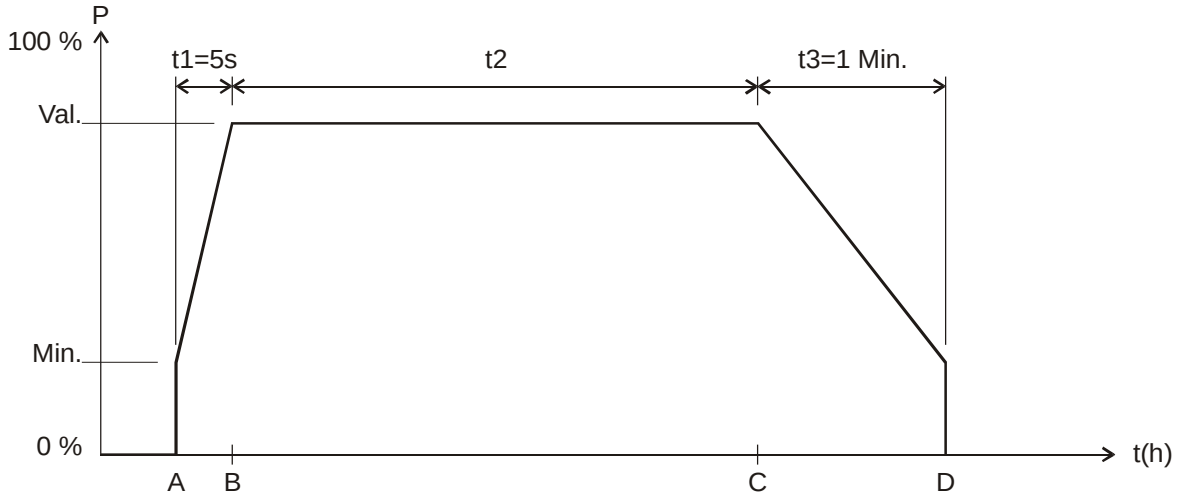
A	Switch sends *Soft On* telegram.
t1	The *Soft On* time is equal to 0, i.e. the "Dim up slowly" function is deactivated
B	The brightness is immediately adjusted to the configured value after *Soft On*
t2	Configured time between *Soft on* and *Soft Off** elapses
t2+	It is possible for t2 to be extended with another *Soft On* telegram
C	t2 or t2+ has elapsed, or a *Soft Off* telegram was received: Start of the *Soft Off* phase
t3	The brightness is gradually reduced within the configured time for *Soft Off*
D	t3 has elapsed, the configured *minimum brightness* has been reached and the system dims to 0%

* *Soft Off* via configured time or via *Soft Off* telegram.

The light can be turned off with a Soft Off telegram or
retriggered with a Soft On telegram.

8.1.3 Entrance lighting

A motion detector activates the dimmer via the soft switching object.
The lighting is dimmed up within 5 seconds if a movement is detected.
This delay gives the eyes enough time to adjust to the light without being dazzled
The lighting is gradually dimmed down within a minute and then switched off after the configured time has elapsed or a Soft Off telegram is received via the button or via the motion detector (cyclic).



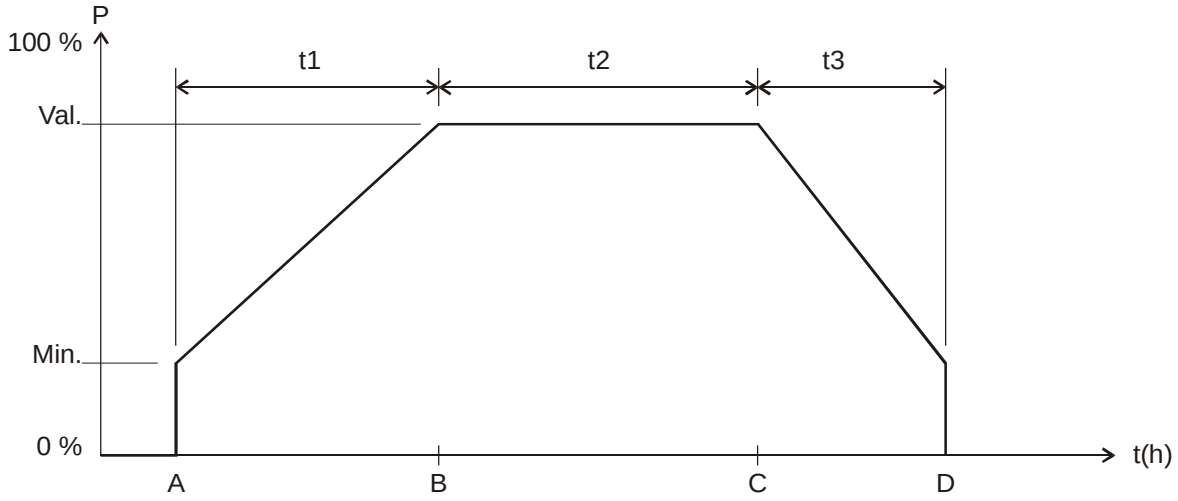
Sequence:

A	*Soft On* is sent by the motion detector: The brightness is immediately adjusted to the configured *Minimum dimming value*
t1	The brightness is gradually increased within the configured time for *Soft On* (5 s)
B	Configured value after *Soft On* is reached
t2	Time between *Soft On (1) and Soft Off*
C	*Soft Off* telegram was received or configured time has elapsed: Start of the *Soft Off* phase
t3	The brightness is gradually reduced within the configured time for *Soft Off*
D	t3 has elapsed, the configured *Minimum dimming value* has been reached and the system dims to 0%

8.1.4 Simulation of a daily routine

Using a time switch, it is possible to simulate an entire daily routine with sunrise and sunset. To do this, the parameter "Time between Soft ON and Soft OFF" needs to be set to "Until Soft Off telegram" (See object 4, soft switching).

The timer switch sends object 4 a Soft On telegram (=1) in the morning and a Soft Off telegram (=0) in the evening.



Key:

Min.	Configurable *Minimum dimming value*
Val.	Target dimming value, i.e. configured *Dimming value after Soft On*
t(h)	Time

Sequence:

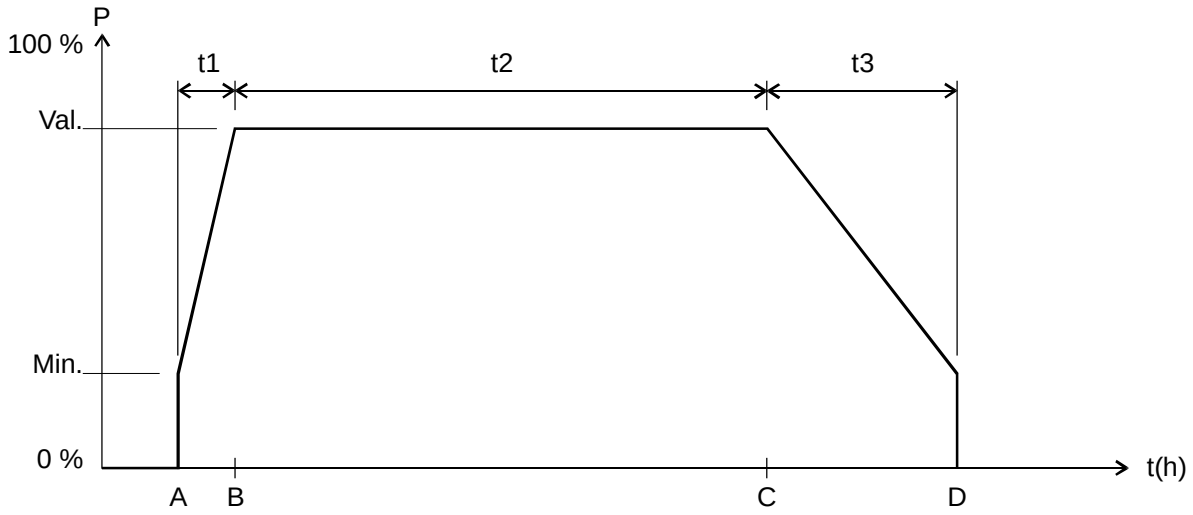
A	*Soft ON* will be sent by the timer: The brightness is immediately adjusted to the configured *Minimum dimming value*
t1	The brightness is gradually increased within the configured time for *Soft On*
B	Configured value after *Soft On* is reached
t2	Time programmed in the time switch between *Soft On* (1) and *Soft Off* telegram (0)
C	*Soft Off* telegram has been received: start of the *Soft Off* phase
t3	The brightness is gradually reduced within the configured time for *Soft Off*
D	t3 has elapsed, the configured *minimum brightness* has been reached and the system dims to 0%

8.1.5 Retriggering and premature switch-off

It is also possible to influence the soft switching process while it is still active. Depending on which phase is currently being executed, the following responses can be triggered by Soft ON and Soft OFF telegrams.

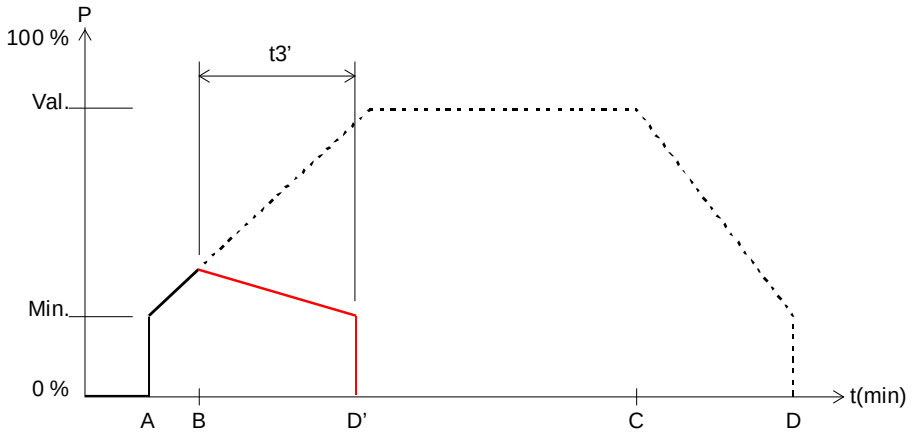
Table 26

Telegram	Response
Soft ON during t1	none
Soft ON during t2	t2 is restarted
Soft ON during t3	A new Soft On process is started. See below.
Soft OFF during t1	The Soft ON process is stopped and the Soft OFF phase started immediately. See below.
Soft OFF during t2	The Soft Off phase starts immediately.
Soft OFF during t3	none

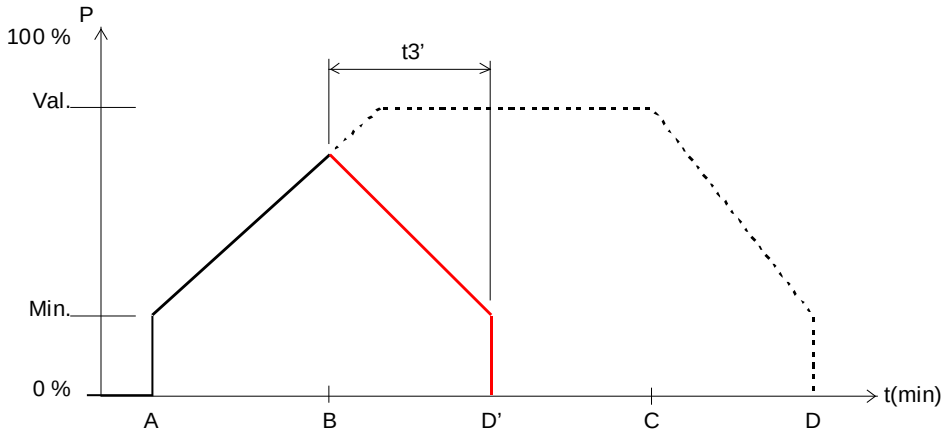


8.1.6 Soft Off telegram during a Soft On process

The duration of the Soft Off phase (t3') is always equivalent to the configured time, independent of the current dimming value.



Example 1: Soft Off at the start of the Soft On phase.



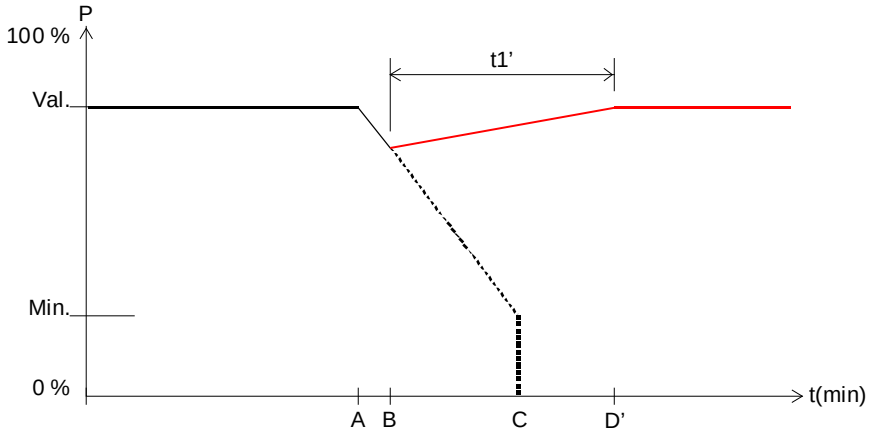
Example 2: Soft Off at the end of the Soft On phase.

Sequence:

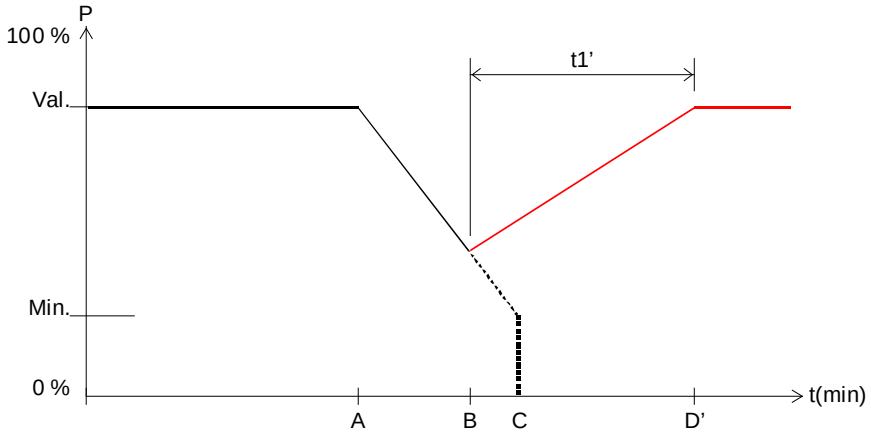
A	A Soft On process is started.
B	A Soft Off telegram is received: The Soft On phase is interrupted and a Soft Off phase starts.
t3'	Duration of the Soft Off phase = configured Soft Off time
D'	End of the Soft Off phase

8.1.7 Soft On telegram during a Soft Off process

The duration of the Soft On phase (t1') is always equivalent to the configured time regardless of the current dimming value.



Example 3: Soft On at the start of the Soft Off phase.



Example 4: Soft On at the end of the Soft Off phase.

Sequence:

A	A Soft Off process is started.
B	A Soft Off telegram is received: The Soft Off phase is interrupted and a Soft On phase starts.
t1'	Duration of the Soft On phase = configured Soft On time
D'	End of the Soft On phase

8.2 Application of the forced operation function

Example: Lighting with brightness control during the daytime and minimum lighting during the night.

The brightness controller continuously measures the brightness of the room and actuates the dimmer as required to keep the brightness constant.
A dimming value of 20% is parameterized for forced mode.

In the evening at the close of work, the time switch activates forced mode, as a result of which the brightness is dimmed down to 20%.
During the night, the lighting is switched on for a certain period of time by the night-watchmen via the central continuous ON function.
In the morning at the start of work, the time switch cancels the forced mode again and the dimmer is actuated via the brightness control.

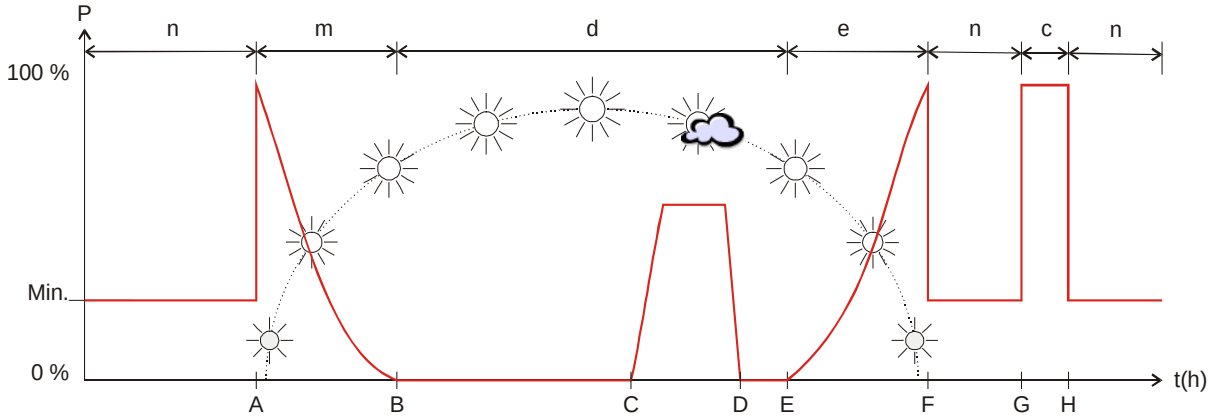


Table 27

A	Forced mode is cancelled by the timer. As the daylight is not yet bright enough the brightness control actuates the dimmer.
B	The daylight is now bright enough to illuminate the room and the dimmer is switched off.
C	Heavy cloud cover, the dimmer compensates for the lack of bright daylight.
D	Clear sunshine, the dimmer is turned back down.
S	Late afternoon, the dimmer gradually replaces the receding daylight.
F	Forced mode is activated by the timer. The dimmer reduces the light to 20%.
G	Central continuous ON = 1
H	Central continuous ON = 0
n	During the night time, the parameterized value for forced mode applies.
c	Night round of security guards: the lighting is switched on via central continuous ON.
m	Morning: Daylight increases and the brightness control slowly reduces the dimming value.
e	Evening: Daylight decreases and the brightness control slowly increases the dimming value.
d	During the daytime, the dimmer is actuated by the brightness control according to the brightness of the sunlight.

8.3 Dimming energy-saving lamps (ESL)

8.3.1 General

Standard energy-saving lamps are not dimmable unless specifically denoted as dimmable.
There are also manufacturer- and type-related differences. In particular, there are variations in switch-on brightness and performance with cold lamps.

Although the ESL mode of the Theben dimmer takes account of the characteristic features of dimmable energy-saving lamps, attention should be paid to the following points.

- ESL can be connected in parallel but it is recommended to only use the same type of lighting on each channel.
- The maximum output per channel is 400 W (Trailing edge/RC-Mode), 80 W (Leading edge (L-Mode). In parallel operation both channels maximum 800 W (Trailing edge/RC-Mode), 140 W (Leading edge (L-Mode).
- The minimum output per channel is 5 W
- When dimming down rapidly (e.g. Jumping configured, dimming value from 100% to 20%) there may be brief flickering even with "warm" lights.
- Brightness values that are too low (below 20%, even partially below 35%) can lead to flickering. Flickering can have a negative effect on the lifespan of the lamp similar to being switched on and off.
- When used with automatic switches (motion/presence detectors) the minimum switch-on time of an ESL must not be < 5 minutes indoors or <10 minutes outdoors. This prevents frequent switching on and off and extends the service life of the light.

To avoid dimmable ESLs flickering or not coming on at all, it is always switched on with a high dimming value and then reduced to the desired brightness within a minute.
This has a compensating effect, as cold ESLs normally exhibit reduced brightness:
It can take up to 5 mins to reach full brightness, depending on manufacturer, type and ambient temperature.

To be able to dim dimmable ESL without problems the Theben dimmer
DMG 2 T offers two special modes for dimmable energy saving lamps with RC or L-response.
These modes also take account of the varying characteristic curve in comparison with the incandescent lamp, i.e. the relationship of the set percentage value to the emitted brightness in relation to maximum brightness.

Important:
Certain LED lights can no longer be dimmed, if they are controlled with a dimming value of > 90%.
In the case of DMG 2 T / DMG 2 E devices manufactured after 09.2013 these lights can also be dimmed. For these, the load selection *LEDs (RC, 0-90 %, from 09/2013)* is used.

8.3.2 Selection of RC or L-response:

Alongside the recommendations of the ESL manufacturer, the following applies:

- **RC-mode:** Generally recommended for ESL, especially for high loads (advantage: less heat generated in the dimmer).
- **L-mode:.**
  With ESL, only use if a disruptive flickering is noted when dimming up or down.

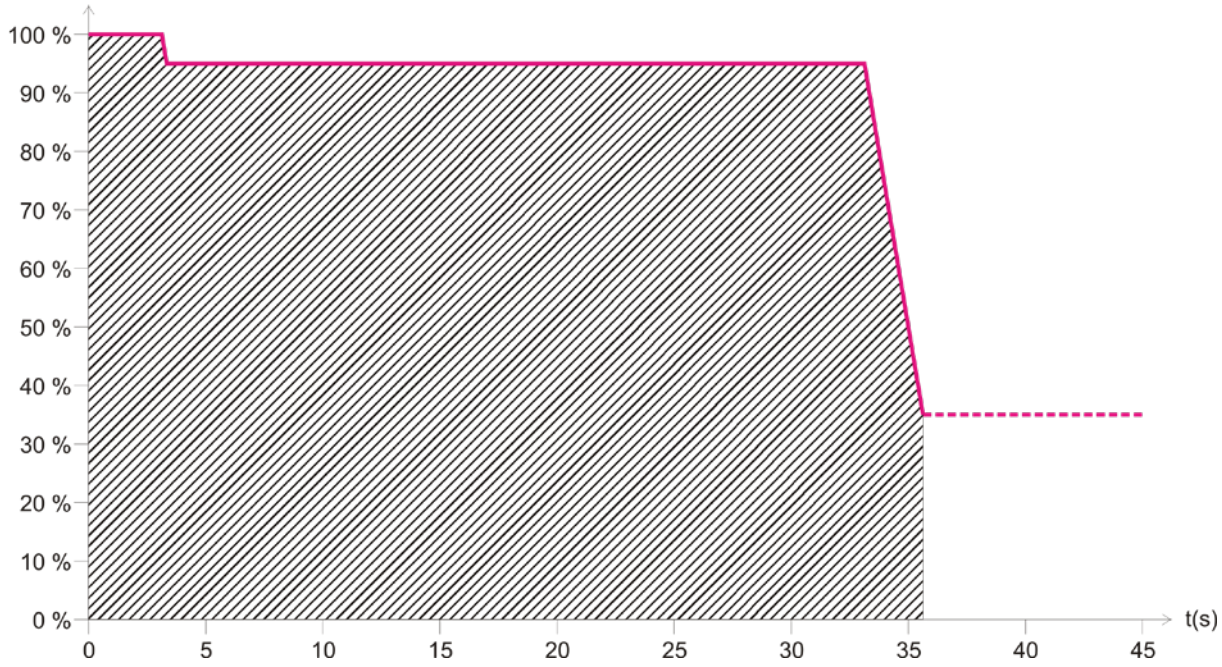
8.3.3 Dimmable energy-saving lamps with RC response (reverse phase control)

This setting allows dimmable energy-saving lamps with RC response to be dimmed.

The energy-saving lamp always starts with 100% output and then, if applicable, automatically dims down to 95% after 3 seconds. After another 30 s the ESL is warm enough and can be dimmed down to the minimum brightness.

- Minimum configurable minimum brightness = 1%. With energy-saving lamps, depending on type, a minimum brightness of 20%...35% is sensible (below that the lamps flicker or go out completely).
- If the ESL is switched off in the warm state for less than 30 s, after being switched on again the heating phase will be shorter.
  In this case the duration of the warm-up phase corresponds to the previous switch-off time.
- This configuration is optimal, for example, for MEGAMAN lamps.

This produces the following relation between the time elapsed since switch-on and the minimum possible dimming value:



No values are permitted in the hatched area independent of the requested dimming value.

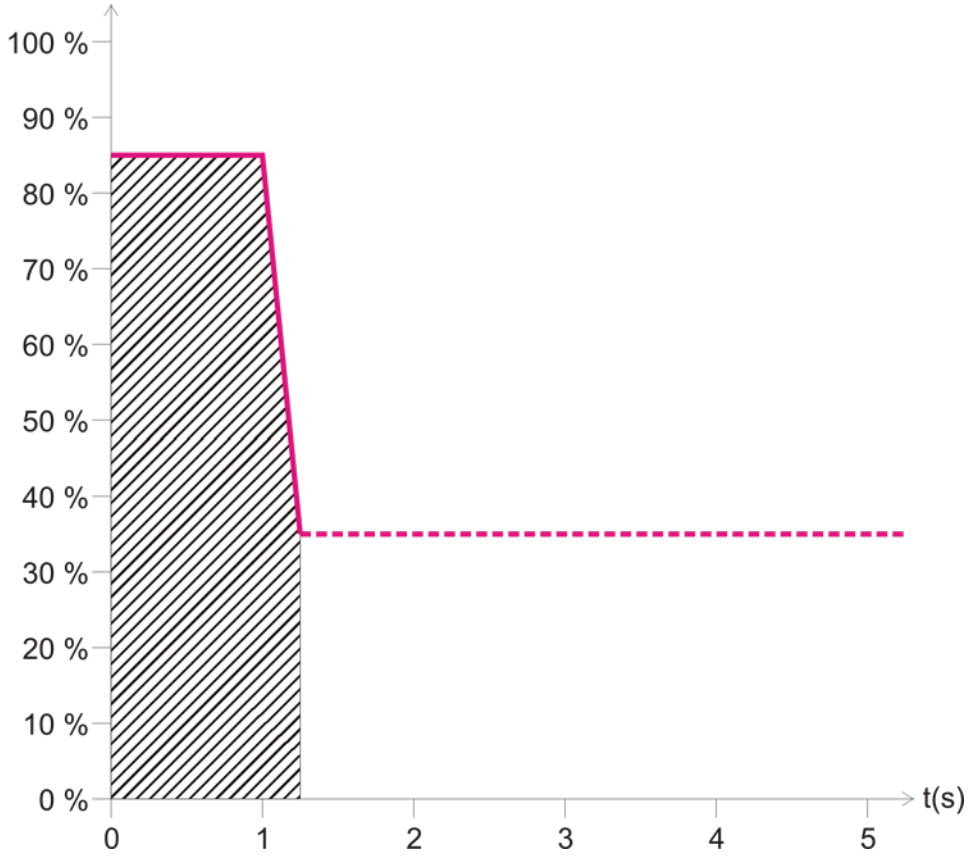
Notice:
As connecting an L-load in RC mode could lead to functional problems with the dimmer load recognition will always be performed in the interests of safety.
The RC mode will only actually be used when no L-load is recognised.

8.3.4 Dimmable energy-saving lamps with L-response (phase control)

This setting allows dimmable energy-saving lamps with L response to be dimmed. No load recognition is performed; dimming is carried out with phase control instead.

- The energy-saving lamp always starts with at least 85% output and then, if applicable, automatically dims down to the minimum brightness after 1 second.
- Minimum configurable minimum brightness = 1%. With energy-saving lamps, depending on type, a minimum brightness of 20%...35% is sensible (below that the lamps flicker or go out completely).
- This configuration is optimal, for example, for OSRAM lamps.

This produces the following relation between the time elapsed since switch-on and the minimum possible dimming value:



No values are permitted in the hatched area independent of the requested dimming value.

Notes:

- Many types of lamp can cause an overload in L-mode, which automatically leads to the dimming down of the load.
- Because of impermissible radio interference some ESL may not be operated in L-mode.

In both cases automatic load recognition must be selected (i.e. RC mode).

8.4 Dim LED lamps

8.4.1 General

The dimmer may only operate LED lamps for 230V mains operation (so-called retrofit lamps), which are exclusively identified as dimmable.

In dimming response, there are also manufacturer- and type-related differences. For that reason we recommend only operating lights of the same type in parallel on one channel.

- The maximum output per channel is 400 W (Trailing edge/RC-Mode), 60 W (Leading edge (L-Mode). In parallel operation both channels maximum 800 W (Trailing edge/RC-Mode), 120 W (Leading edge (L-Mode).
- The minimum output per channel is 5 W.

It may be necessary to adjust the "minimum dimming value" for each parameter.

8.4.2 Selection of RC or L-response:

Alongside the recommendations of the LED manufacturer, the following applies:
LEDs are typically operated in RC mode in order to reduce the activation currents of the lamps, which can lead to disruptions in the power network.
RC mode is therefore especially to be recommended at high outputs.
Another advantage: less heat is generated in the dimmer.

L-mode:
Only use LED if a disruptive flickering is noted when dimming up or down.

Notice:
Many types of lamp can cause an overload in L-mode, which automatically leads to the dimming down of the load.
Then in both cases automatic load recognition must be selected (i.e. RC mode).

8.5 4-bit telegrams (brighter/darker)

8.5.1 Telegram format 4-bit EIS 2 relative dimming:

Table 28

Bit 3	Bit 2	Bit 1	Bit 0
Direction	Dimming range divided into increments		
	Code		Increments
Dim up: dim down: 1	000		**Stop**
0	001		1
	010		2
	011		4
	100		8
	101		16
	110		32
	111		64*

*typical application

Examples: 1111 = to make 64 levels brighter
0111 = decrease brightness by 64 levels
1101 = make 16 levels brighter

8.5.2 Parameter: "Switching on/off with a 4-bit telegram"

In general, the setting "Yes" is required.
The setting "No" is available for use with special customer requests, e.g. in conference rooms.
The situation is described below.
A whole group of dimmer channels is operated from a button (4-bit).
A certain lighting situation has been adjusted by a scene or through other means – e.g. channel 1 OFF, channel 2 40%, channel 3 50%. The requirement is to now dim up and increase the brightness of the entire scene, but the channels which are switched off should remain off.
The parameters "Switching on/off with a 4-bit telegram" block the usual switch on/off function of the 4-bit telegram.

Table 29

Parameter "Switch-on with 4-bit telegram"	4-bit Telegram	Dimmer output status	Response
yes	brighter	Switched on (1%...100%)	Channel is dimmed up.
		Off	Channel is switched on and dimmed up
no	brighter/darker	Off	Dimmer remains switched off
		Switched on (1%...100%)	Channel is normally dimmed.

Table 30

Parameter "Switching off with a 4-bit telegram"	4-bit Telegram	Dimmer output status	Response
yes	darker	Switched on (1%...100%)	Channel is dimmed down and switched off after reaching the set minimum dimming value.
no	brighter/darker	Switched on (1%...100%)	Channel is dimmed normally and remains switched on.

8.6 The scenes

8.6.1 Principle

The current status of a channel, or a complete MIX system
can be stored and retrieved as required at a later point via the scene function.

That applies to switching, blinds and dimming channels.
Each channel can participate simultaneously in up to 8 scenes.

This requires permission to access scenes for the relevant channel via parameter.
See Activate scenes parameter and Scenes parameter page.

The current status is allocated to the appropriate scene number when a scene is saved.
The previously saved status is restored when a scene number is called up.

This allows a MIX system to be easily associated with each chosen user scene.

Table 31: Permitted scene numbers

Series	Appliance	Supported scene numbers
MIX (order no. 4910xxx)	DME 2 S	1 .. 8
	JME 4 S	
MIX2 (order no. 4930xxx)	RMG / RME 8 S	1 .. 64
	RMG / RME 4 I	
	DMG 2 T / DME 2 T	

The scenes are permanently stored and remain intact even after the application has been downloaded again.
See parameter All channel scene statuses on the parameter page Scenes.

8.6.2 Select and save settings:

To call up or store a scene the relevant code is sent to the scene object (obj. 244).

Table 32

scene	Select		Save	
	Hex.	Dec.	Hex.	Dec.
1	$00	0	$80	128
2	$01	1	$81	129
3	$02	2	$82	130
4	$03	3	$83	131
5	$04	4	$84	132
6	$05	5	$85	133
7	$06	6	$86	134
8	$07	7	$87	135
9	$08	8	$88	136
10	$09	9	$89	137
11	$0A	10	$8A	138
12	$0B	11	$8B	139
13	$0C	12	$8C	140
14	$0D	13	$8D	141
15	$0E	14	$8E	142
16	$0F	15	$8F	143
17	$10	16	$90	144
18	$11	17	$91	145
19	$12	18	$92	146
20	$13	19	$93	147
21	$14	20	$94	148
22	$15	21	$95	149
23	$16	22	$96	150
24	$17	23	$97	151
25	$18	24	$98	152
26	$19	25	$99	153
27	$1A	26	$9A	154
28	$1B	27	$9B	155
29	$1C	28	$9C	156
30	$1D	29	$9D	157
31	$1E	30	$9E	158
32	$1F	31	$9F	159
33	$20	32	$A0	160
34	$21	33	$A1	161
35	$22	34	$A2	162
36	$23	35	$A3	163
37	$24	36	$A4	164
38	$25	37	$A5	165
39	$26	38	$A6	166
40	$27	39	$A7	167
41	$28	40	$A8	168
42	$29	41	$A9	169
43	$2A	42	$AA	170
44	$2B	43	$AB	171

scene	Select		Save	
	Hex.	Dec.	Hex.	Dec.
45	$2C	44	$AC	172
46	$2D	45	$AD	173
47	$2E	46	$AE	174
48	$2F	47	$AF	175
49	$30	48	$B0	176
50	$31	49	$B1	177
51	$32	50	$B2	178
52	$33	51	$B3	179
53	$34	52	$B4	180
54	$35	53	$B5	181
55	$36	54	$B6	182
56	$37	55	$B7	183
57	$38	56	$B8	184
58	$39	57	$B9	185
59	$3A	58	$BA	186
60	$3B	59	$BB	187
61	$3C	60	$BC	188
62	$3D	61	$BD	189
63	$3E	62	$BE	190
64	$3F	63	$BF	191

Examples (central or channel-related)**:**

Select status of scene 5:

Save current status with scene 5:

8.6.3 Enter scenes without telegrams (MIX2 ONLY)

Instead of defining scenes individually by telegram, this can be done in advance in the ETS.
This merely requires the setting of the *All channel scene statuses* parameter (*Scenes*) parameter page to *overwrite at download*.

Accordingly, the required status can be selected for each of the 8 possible scene numbers in a channel (= *Status after download* parameter).
The scenes are programmed into the device after the download has been completed.

Later changes via teach-in telegrams are possible if required and they can be permitted or blocked via a parameter.

8.7 Store light scenes in one button

Scenes are normally stored in the DMG 2 T.
Object 5 (call up/save scenes) is used for this purpose.

However, if the light scenes are to be stored **externally**, for example with a scene-capable switch, the following steps should be taken:
The DMG 2 T has one dimming object (dimming value) and one feedback object (feedback in %) per channel.
2 group addresses are used here; hereafter referred to as “Gr.adr.1” and “Gr.adr.2”.

8.7.1 Assignment of group addresses and setting for the object flag

	Object	Connect with	set to sending	Flags*			
				K	L	W	T
PUSH BUTTON	Brightness value telegrams	Gr.adr.1	yes		-		
		Gr.adr.2	no				
DIMMER	Dimming value	Gr.adr.1	x		-		x
	Feedback in %	Gr.adr.1	no			-	x
		Gr.adr.2	yes				

* Object flag: Communication, read, write, transfer, update.
x = user-defined

Feedback to the dimmer should **not** be configured for *cyclical sending*.

8.7.2 Functional description

Save scenes:
The touch sensor sends a read request to Gr.adr.1 which is only answered by the "Feedback in %" object and with Gr.adr.2.
Gr.adr.2 is not processed by the object "dimming value".
In contrast, the touch sensor receives the value and saves it for the appropriate scene.

Calling a scene:
The touch sensor sends the value saved for the scene to the % object with the sending address Gr.adr.1.
The value of the object “dimming value” is further processed to set the output brightness.
Once the dimmer has set the requested value, it sends feedback to the object “Feedback in %” depending on the configuration.

8.8 Conversion of percentages to hexadecimal and decimal values

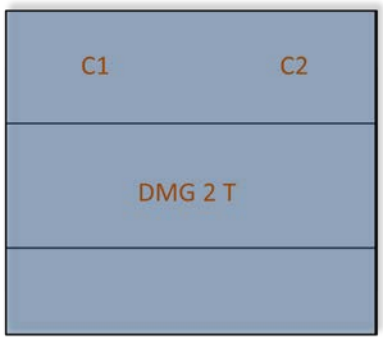
Table 33

percentage value	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
Hexadecimal	00	1A	33	4D	66	80	99	B3	CC	E6	FF
Decimal	00	26	51	77	102	128	153	179	204	230	255

All values from 00 to FF hex. (0 to 255 dec.) are valid.

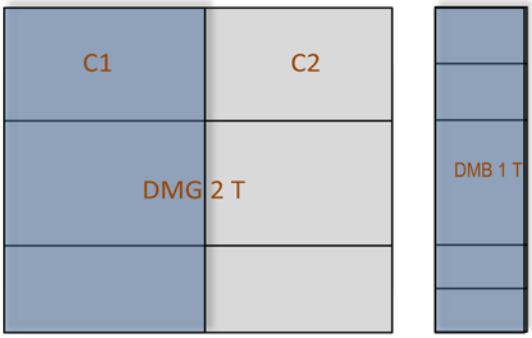
8.9 Maximum incandescent lamp load in parallel operation and in combination with the dimming booster DMB.1 T

Parallel operation C1 + C2



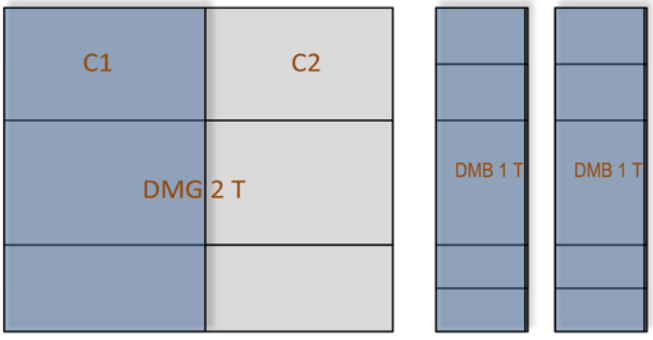
800 W

C1 + DMB



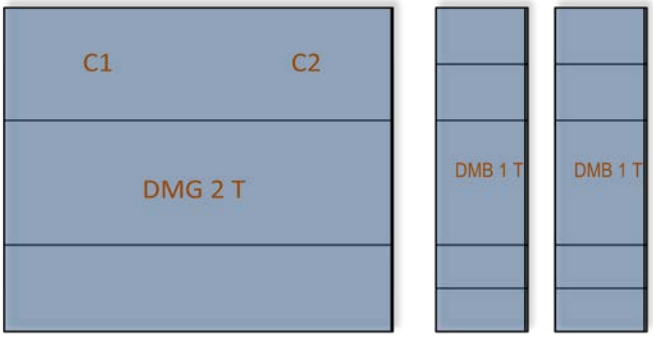
700 W

C1 + DMB + DMB



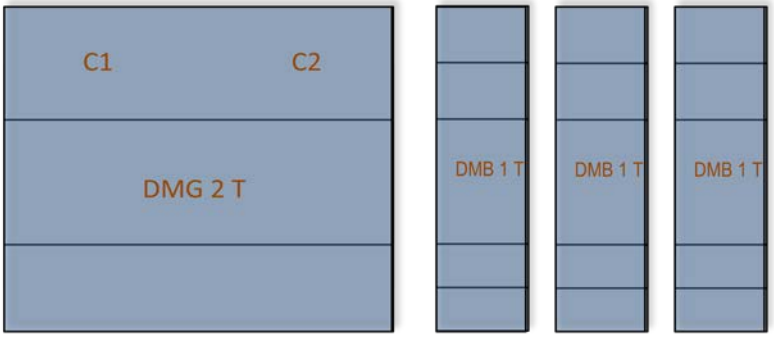
1000 W

Parallel operation C1 + C2 + DMB + DMB



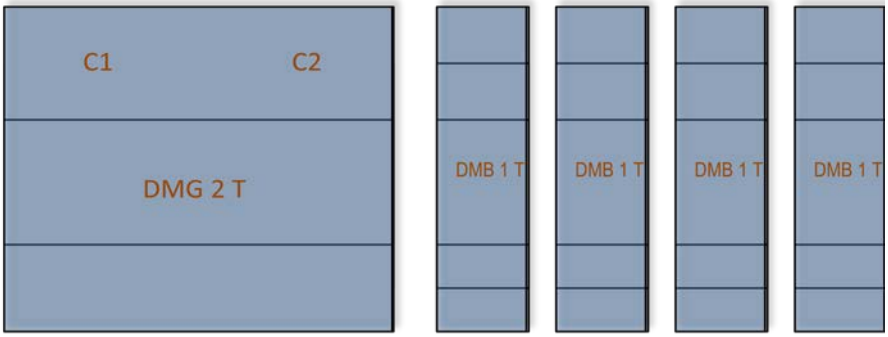
1400 W*

Parallel operation C1 + C2 + DMB + DMB + DMB



1700 W*

Parallel operation C1 + C2 + DMB + DMB + DMB + DMB



2000 W*

* Dimming outputs > 1000W for professional use only

8.10 Function diagram