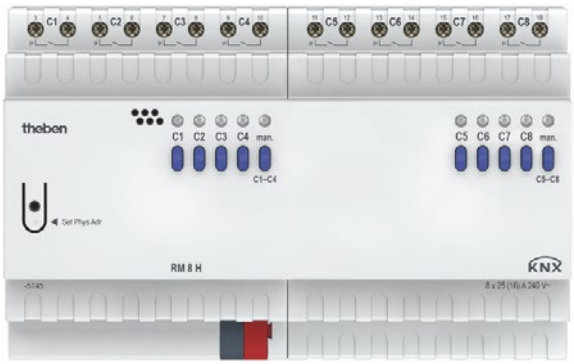
# KNX manual

# High-performance switch actuators

# RM 4 H FIX1

# RM 8 H FIX2


4940212




4940217

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# Contents

# 1 Function description

- 4-fold FIX1 or 8-fold FIX2 switch actuator.
- Up to 25 A switching current.
- Connection cross-section up to a maximum of 6 $mm^2$.
- Energy-saving thanks to bistable relay.
- No power connection required.
- LED switching status indicator for each channel.
- Manual operation on device.
- Adjustable features: e.g. switching, delayed switching, pulse function.
- Links, type of contact (NC contact/NO contact) and participation in central commands such as permanent On, permanent Off, Central switching and save/call up scene.
- Switch functions: e.g. On/Off, pulse, On/Off delay, staircase light with forewarning.
- Logical links: e.g. block, AND, release, OR.
- Activation of the channel function via 1-bit telegram or 8-bit threshold.

# 2 Operation

Each channel can be switched on and off independently of all parameters using the buttons on the device. A status LED displays the current switching status.

All bus telegrams are ignored with manual operation switched on (manual button) and the channels are to be operated exclusively via the buttons.

Once the bus voltage has been connected or after a bus reset, it might take a few seconds until the relays switch.

# 3 Technical data

| | |
|---|---|
| **KNX bus voltage** | 21 – 32 V DC |
| **KNX bus power input** | Typical: 6.5 mA[1], 10 mA[2]<br>Maximum: 12.5 mA[3], 17.5 mA[4] |
| **Number of channels** | 4 or 8 |
| **Type of installation** | DIN-rail |
| **Width** | 4 TE[5] or 8 TE[6] |
| **Connection type** | KNX bus terminal, screw terminals |
| **Max. cable cross-section** | Solid: 6 mm² \| strand with crimp terminal: up to 4 mm² |
| **Standby output** | min. 0.17 W/0.26 W |
| **Type of contact** | µ-contact, floating NO contact, contact gap < 3 mm; NO contact;<br>the switching of any phase is permitted |
| **Switching capacity** | 25 A (at 240 V AC, cos φ = 1)<br>16 A (at 250 V AC, cos φ = 0.6) |
| **Max. inrush current** | 1200 A / 200 µs |
| **Minimum load** | 12 V/100 mA |
| **Switching SELV** | Possible if all channels of a module connect protective low voltage (SELV) |
| **Protection rating** | IP 20 |
| **Protection class** | II subject to designated installation |
| **Operating temperature** | −5 °C ... +45 °C |
| **Incandescent/halogen lamp load** | 4800 W[7] |

[1] RM 4 H
[2] RM 8 H
[3] RM 4 H
[4] RM 8 H
[5] RM 4 H
[6] RM 8 H
[7] With 30,000 switching cycles

| | |
|---|---|
| Fluorescent lamps (LLB) uncompensated/series compensated | 5000 VA[1] |
| Fluorescent lamps (LLB) parallel compensated | 2500 W, 200 µF[2] |
| Fluorescent lamps (EVB) | 1650 W |
| Compact fluorescent lamps (EVG) | 410 W |
| LED lamps < 2 W | 75 W |
| LED lamps > 2 W | 850 W |
| Pollution degree | 2 |
| Rated impulse voltage | 4 kV |
| Shortest switching interval, if all channels are switched at the same time | 3 s |

[1] With 30,000 switching cycles
[2] With 30,000 switching cycles

# 4 The FIX2 RM 8 H application programme

## 4.1 Selection in the product database

| | |
|---|---|
| **Manufacturer** | Theben AG |
| **Product family** | Output |
| **Product type** | RM 4 H, RM 8 H |
| **Programme name** | FIX2 RM 8 H |

| | |
|---|---|
| **Number of communication objects** | 83 |
| **Number of group addresses** | 254 |
| **Number of associations** | 255 |

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

## 4.2 Overview of communication objects

### 4.2.1 Channel-related objects

| No. | Object name | Function | Length | R | W | C | T | DPT |
|---|---|---|---|---|---|---|---|---|
| 0 | *Channel C1* | *Switch object* | 1 bit | R | W | C | - | 1.001 |
| | | *Threshold as a percentage* | 1 byte | R | W | C | - | 5.001 |
| | | *Threshold 0..255* | 1 byte | R | W | C | - | 5.010 |
| | | *Threshold 0..65535* | 2 bytes | R | W | C | - | 7.001 |
| | | *Threshold EIS 5 (DPT 9.xxx)* | 2 bytes | R | W | C | - | 9.xxx |
| 1 | *Channel C1* | *Logic input in OR gate* | 1 bit | R | W | C | - | 1.002 |
| | | *Logic input in AND gate* | 1 bit | R | W | C | - | 1.002 |
| | | *Logic input in XOR gate* | 1 bit | R | W | C | - | 1.002 |
| 2 | *Channel C1* | *Block* | 1 bit | R | W | C | - | 1.001 |
| 3 | *Channel C1* | *Call up/save scenes* | 1 byte | R | W | C | T | 18.001 |
| 4 | *Channel C1* | *Block scenes = 1* | 1 bit | R | W | C | - | 1.001 |
| | | *Enable scenes = 1* | 1 bit | R | W | C | - | 1.003 |
| 5 | *Channel C1* | *Feedback On/Off* | 1 bit | R | - | C | T | 1.001 |
| 6 | *Channel C1* | *Operating hours feedback* | 4 bytes | R | W | C | T | 13.100 |
| | | *Time to next service* | 4 bytes | R | W | C | T | 13.100 |
| 7 | *Channel C1* | *Service required* | 1 bit | R | - | C | T | 1.001 |
| 8 | *Channel C1* | *Reset operating hours* | 1 bit | R | W | C | - | 1.001 |
| | | *Reset service* | 1 bit | R | W | C | - | 1.001 |
| | | *Switching with priority* | 2 bit | R | W | C | - | 2.001 |
| 20 – 159 | *Channel C2 – C8* | | | | | | | |

### 4.2.2 Common objects

| No. | Object name | Function | Length | R | W | C | T | DPT |
|---|---|---|---|---|---|---|---|---|
| 78 | *C1 – C4* | *Manual* | 1 bit | R | W | C | T | 1.001 |
| 79 | *C1 – C4* | *Collective feedback* | 4 bytes | R | - | C | T | 27.001 |
| 158 | *C5 – C8* | *Manual* | 1 bit | R | W | C | T | 1.001 |
| 159 | *C5 – C8* | *Collective feedback* | 4 bytes | R | - | C | T | 27.001 |
| 240 | *Central permanent* | *ON* | 1 bit | R | W | C | T | 1.001 |
| 241 | *Central permanent* | *OFF* | 1 bit | R | W | C | T | 1.001 |
| 242 | *Central switching* | *ON/OFF* | 1 bit | R | W | C | T | 1.001 |
| 243 | *Central scenes* | *Call up/save* | 1 byte | R | W | C | T | 18.001 |
| 250 | *Version of bus coupling unit* | *Send* | 14 bytes | R | - | C | T | 16.001 |
| 251 | *Version C1 – C4* | *Send* | 14 bytes | R | - | C | T | 16.001 |
| 252 | *Version C5 – C8* | *Send* | 14 bytes | R | - | C | T | 16.001 |

## 4.3 Description of communication objects

### 4.3.1 Channel-related objects

*Object 0 Switch object, threshold as a percentage, threshold 0..255, threshold EIS 5 (DPT 9.xxx), threshold 0..65535*
Input object: this object activates the set channel function (see parameter: *Channel function*).

The set channel function can either be activated via 1-bit telegram or by exceeding a threshold (8- or 16-bit telegram).

| **Parameter** | | **Activation of channel function via** |
|---|---|---|
| *Activation of function via* | *Type of threshold object* | |
| Switch object | | 1-bit telegram |
| Exceeding the threshold | *Object type: Per cent (DPT 5.001)* | Exceeding per cent value |
| | *Object type: Counter value 0..255 (DPT 5.010)* | Any value in given numerical range |
| | *Object type: Counter value 0..65535 (DPT 7.001)* | |
| | *Object type: EIS5 e.g. CO2, brightness (DPT 9.xxx)* | 2-byte floating-point number |

*Object 1: Logic input in AND gate, in OR gate, in XOR gate*
Only available if link is activated (Configuration options parameter page).
Forms a logical link together with the input object to activate the channel function.

*Object 2: Block*
Blocks the channel function.
Responses to setting and cancelling the block can be configured if the block function has been activated (***Configuration options*** parameter page).

*Object 3: Call up/save scene*
Only available if the scene function has been activated (***Configuration options*** parameter page).

This object can be used to save and subsequently call up scenes.
Saving stores the channel status.
It does not matter how this status is produced (whether via switch commands, central objects or the buttons on the device).
The saved status is restored 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*

### *Object 4: Block scenes = 1, enable scenes = 1*

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

### *Object 5: On/Off feedback*

Reports the current channel status.
The status can also be inverted depending on configuration.

### *Object 6: Time to next service, operating hours feedback*

Only available if the hour counter function is activated
(***Configuration options*** parameter page).
Reports, depending on selected *Type of hour counter* (***Hour counter and service*** parameter page), either the remaining period to the next service or the current status of the hour counter.

### *Object 7: Service required*

Only available if the hour counter function has been activated (***Configuration options*** parameter page) and *Type of hour counter = Counter for time to next service*.

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

### *Object 8: Switching with priority, reset service, reset operating hours*

The function of the object depends on whether or not the hour counter function has been activated (***Configuration options*** parameter page).

<table>
<tr><th>Activate hour counter</th><th>Function</th><th>Usage</th></tr>
<tr><td rowspan="2">yes</td><td>Reset service[1]</td><td>Reset service interval counter.</td></tr>
<tr><td>Reset operating hours[2]</td><td>Reset hour counter</td></tr>
<tr><td>no</td><td>Switching with priority</td><td>Priority control:
<table>
<tr><th>Status of object Switching with priority</th><th>Channel status</th></tr>
<tr><td>0</td><td rowspan="2">As specified by the input object of the channel</td></tr>
<tr><td>1</td></tr>
<tr><td>2</td><td>OFF</td></tr>
<tr><td>3</td><td>ON</td></tr>
</table></td></tr>
</table>

[1] Depending on configuration
[2] Depending on configuration

### 4.3.2 Common objects

*Objects 78, 158: Manual*
Puts the corresponding channel block (C1 – C4 or C5 – C8) in manual mode or sends the status of the manual operation.

| 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. |

*Objects 79, 159: Collective feedback*
Sends the current switching status of all channels in the format DPT 27.001 (DPT_CombinedInfoOnOff).

*Object 240: Central permanent ON*
Central switch-on function.
Enables simultaneous switching on of all channels with one single telegram.
0 = no function
1 = permanent ON

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

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

*Object 241: Central permanent OFF*
Central switch-off function.
Enables simultaneous switching off of all channels with one single telegram.
0 = no function
1 = permanent OFF

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

ⓘ This object has the second highest priority after Central permanent ON. As long as it is set, the other switch commands will not work on the participating channels.

### *Object 242: Central switching*

Central switch function.

Enables simultaneous switching on or off of all channels with one single telegram.
0 = OFF
1 = ON
Participation in this object can be set individually for each channel
(Configuration options parameter page).
With this object, every participating channel responds exactly as if its input object were receiving a switch command.

### *Object 243: Call up/save central scenes*

Central object for using scenes.
This object can be used to save and subsequently call up "scenes".

See appendix: *Scenes*

### *Object 250: 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 directly via the ETS.

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

| Code | Meaning |
|---|---|
| xx | 00 .. FF = Version of application without dividing point (10 = V1.0, 11 = V1.1, etc.). |
| yy | Hardware version 00..99 |
| zzz | Firmware version 000..999 |

**EXAMPLE:** A10 H01 V001
- ETS application version 1.8
Hardware version $01
- Firmware version $001

### *Object 251: Version C1 – C4*

For diagnostic purposes only.

Sends the software version (firmware) of the channel block C1 – C4 after reset or download. Can also be read out directly via the ETS.

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

| Code | Meaning |
|---|---|
| xx | 19 = Module code RM 4 H / RM 8 H (hexadecimal). |
| yy | Hardware version 00..99 |
| zzz | Firmware version 000..999 |

**EXAMPLE:** M19 H01 V001
- Module $19 = RM 4 H / RM 8 H
- Hardware version V01
- Firmware version V01

### *Object 252: Version C5 – C8*

For diagnostic purposes only.

Sends the software version (firmware) of the channel block C5 – C8 after reset or download. Can also be read out directly via the ETS.

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

| Code | Meaning |
|---|---|
| xx | 19 = Module code RM 4 H / RM 8 H (hexadecimal). |
| yy | Hardware version 00..99 |
| zzz | Firmware version 000..999 |

**EXAMPLE:** M19 H01 V001
- Module $19 = RM 4 H / RM 8 H
- Hardware version V01
- Firmware version V01

## 4.4 Parameter pages overview

| Parameter page | Description |
|---|---|
| *General* | General parameters: Collective feedback and relay switch delay. |
| *Channel C1 Configuration options* | Characteristics of channel and activation of additional functions (scenes, links, etc.). |
| *Contact characteristics* | Type of contact and status after download, bus failure, etc. |
| *Threshold* | Settings for triggering channel function through exceeding threshold. |
| *Block function* | Type of block telegram and response to blocking. |
| *Scenes* | Selection of scene numbers relevant to the channel. |
| *Feedback* | Status of feedback object, etc. |
| *Hour counter and service* | Type of hour counter and, if required, service interval, etc. |
| *Link* | Selection of logical link. |

## 4.5 General parameters

### 4.5.1 General

| Designation | Values | Description |
|---|---|---|
| *Device type* | ***RM 4 H*** | 4-channel device FIX1 |
| | *RM 8 H* | 8-channel device FIX2 |
| *Function of the manual button* | *applies for 24 hours or until reset via object blocked*<br>***applies until reset via object***<br>*applies for 30 minutes or until reset via object*<br>*applies for 1 hour or until reset via object*<br>*applies for 2 hours or until reset via object*<br>*applies for 4 hours or until reset via object*<br>*applies for 8 hours or until reset via object*<br>*applies for 12 hours or until reset via object* | Determines how long the device works manually and how this is ended.<br><br>In manual mode, the channels can only be switched on and off via the buttons on the device.<br>See also: Object_78 |
| *Manual operation of the channels* | ***enabled***<br><br>*blocked* | The channels can be operated via the buttons on the device.<br>No manual operation, the buttons on the device are blocked. |
| *Sending collective feedback* | *no*<br><br>***report as inactive***<br><br>*only at change*<br><br>*cyclically and at change* | No collective feedback, object is unavailable.<br><br>Object value can be requested.<br><br>Sends whenever a channel status changes.<br><br>Sends cyclically and with status changes<br><br>See appendix: Collective feedback |
| *Relay switch delay* | | This parameter sets the minimum delay between switching on 2 relays if several are activated at the same time.<br>The shortest delay is achieved by using the *Central switching* object.<br><br>When switching on via individual telegrams (1 telegram per channel), the bus running times and the sequential processing of commands cause an additional delay.<br><br>This can help avoid high current peaks when devices are switched on simultaneously (e.g. with a number of lighting strips). |

| Designation | Values | Description |
|---|---|---|
| | ***None*** | There is no added delay. |
| | *60 ms*<br>*100 ms*<br>*200 ms* | When a relay switches on, the next one can only switch on after the set delay is completed.<br>The switch-on delay between the first and last relay is calculated according to the following formula:<br>(Number of channels – 1) x delay<br>**Example:**<br>RM 4 H and 60 ms:<br>= (4 channels – 1) * 60 ms = 180 ms<br>→ Channel C4 switches 180 ms after C1. |

### 4.5.2 *Channel C1: Configuration options*

A configurable copying function is not incorporated into the design.
The ETS offers convenient and extensive copying functions via the CTRL key.

| Designation | Values | Description |
|---|---|---|
| *Channel function* | ***Switching On/Off..***<br>*On/off delay..*<br>*Pulse function..*<br>*Staircase light time switch with forewarning function..*<br>Flashing.. | Determines the basic functionality of the channel. |
| *Activation of function via* | ***Switch object***<br><br><br>*Exceeding the threshold* | The channel is operated via a 1-bit object.<br><br>The channel is operated through exceeding a 1 or 2-byte threshold.<br>See below: the "Threshold" parameter page |
| *Adjust block function* | *Yes..*<br><br><br><br>***no*** | The block function can be individually adjusted.<br>The relevant parameter page is shown.<br><br>The block function works with the standard parameters:<br>*- Block with ON telegram*<br>*- When setting the block: Unchanged*<br>*- When cancelling: Update.* |
| *Activate scenes* | *Yes..*<br>***no*** | Should scenes be used? |
| *Participation in central objects* | ***no*** | Central objects are not taken into account. |

| Designation | Values | Description |
|---|---|---|
| | *at Central switching, Permanent On, Permanent OFF*<br>*only in central permanent ON*<br>*only in central permanent OFF*<br>*only in Central switching*<br>*only in Central switching and permanent ON*<br>*only in Central switching and permanent OFF*<br>*only in central permanent On and permanent OFF* | Which central objects are to be taken into account?<br><br>Central objects enable simultaneous switching on and off of several channels with one single object. |
| *Adjust feedback* | *Yes..*<br><br>***no*** | The feedback function can be individually adjusted.<br>The relevant parameter page is shown.<br><br>The *Feedback* function works with the standard parameters:<br>- *not inverted*<br>- *do not transmit cyclically* |
| *Activate hour counter* | *Yes..*<br>***no*** | Is the hour counter/service interval function to be used? |
| *Activate link* | *Yes..*<br>***no*** | Are logical links to be used with the channel object? |

### 4.5.3 *Contact characteristics*

| Designation | Values | Description |
|---|---|---|
| *Type of contact* | ***NO contact*** | Standard:<br>The relay contact is closed when a switch-on command is issued. |
| | *NC contact* | Inverted:<br>The relay contact is opened when a switch-on command is issued. |
| *Status with download and bus failure* | | After download or with bus voltage failure… |
| | *OFF* | ..the relay switches off. |
| | *ON* | ..the relay switches on. |
| | ***unchanged*** | …the relay remains in the same state as before. |
| | | ⓘ If several switching operations were executed immediately before the bus failure, the energy may not be sufficient for an additional switching operation.<br>In this case, the relay remains in its previous state, regardless of the parameter setting. |
| *Status with restoration of the bus supply* | | After return of bus voltage… |
| | *OFF* | ..the relay is switched off. |
| | *ON* | ..the relay switches on. |
| | ***same as before failure*** | …the relay remains in the same state as before. |

### 4.5.4 The "On/off delay" time function

This parameter page appears if *On/Off delay* is chosen as the *Channel function*.

| Designation | Values | Description |
|---|---|---|
| *Switch-on delay* | | |
| *Hours* | ***0**..3* | Input of desired switch-on delay in hours. |
| *Minutes* | ***0**..60* | Input of desired switch-on delay in minutes. |
| *Seconds* | ***0**..255* | Input of desired switch-on delay in seconds. |
| *Switch-off delay* | | |
| *Hours* | ***0**..3* | Input of desired switch-off delay in hours. |
| *Minutes* | ***0**..60* | Input of desired switch-off delay in minutes. |
| *Seconds* | ***0**..255* | Input of desired switch-off delay in seconds. |

### 4.5.5 The "Pulse" time function

This parameter page appears if *Pulse function* is chosen as the *Channel function*.

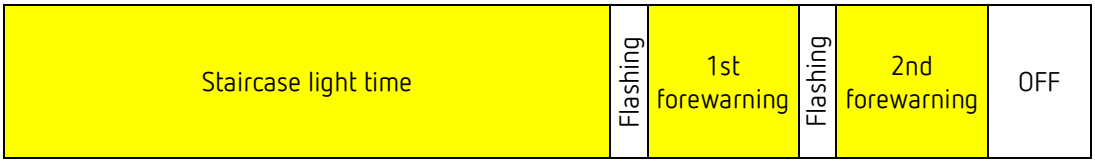
| Designation | Values | Description |
|---|---|---|
| *Hours* | ***0**..3* | Input of desired pulse duration in hours. |
| *Minutes* | ***0**..60* | Input of desired pulse duration in minutes. |
| *Seconds* | ***0**..255* | Input of desired pulse duration in seconds. |
| *Pulse can be retriggered (with 1 on switch object)* | *Yes*<br><br>***no*** | The pulse can be extended as often as desired via a 1-telegram<br><br>The pulse cannot be extended. |
| *Pulse can be reset (with 1 on switch object)* | *Yes*<br><br>***no*** | The pulse can be ended early at anytime via a 0-telegram.<br><br>The pulse cannot be ended early |

### 4.5.6 The "Staircase light with forewarning function" time function

This parameter page appears if *Staircase light with forewarning function* is chosen as the *Channel function*.
The user can press a button again to extend the staircase light time at any time.

| Designation | Values | Description |
|---|---|---|
| *Staircase light time (min. 1 s)* | | |
| *Hours* | ***0**..3* | Input of desired switch-on delay in hours. |
| *Minutes* | ***0**..60* | Input of desired switch-on delay in minutes. |
| *Seconds* | ***0**..255* | Input of desired switch-on delay in seconds. |
| *The maximum sum of pulses* | *1..40*<br>*Default value* = **5** | Determines how often the staircase light time can be extended (restarted) by pressing the button again. |
| *Duration of 1st forewarning in s* | *0*<br><br><br>*1..60*<br>*Default value* = **10** | The light switches off immediately once the staircase light time is completed.<br><br>Once the staircase light time is completed, the light should briefly flash and then stay on for the duration of the forewarning |
| *Duration of 2nd forewarning in s* | *0*<br><br><br>*1..60*<br>*Default value* = **30** | No 2nd forewarning.<br>The light switches off at the end of the 1st forewarning.<br><br>Second forewarning:<br>Once the 1st forewarning is completed, the light should flash briefly and then stay on for the duration of the 2nd forewarning.<br>The light switches off when this time is completed. |

**Example: forewarning function**



### 4.5.7 The "Flashing" time function

This parameter page appears if *Flashing* is chosen as the *Channel function*.

| Designation | Values | Description |
|---|---|---|
| ON phase of flash pulse | | |
| *Hours* | ***0**..3* | Input of desired pulse time in hours. |
| *Minutes* | ***0**..60* | Input of desired pulse time in minutes. |
| *Seconds* | ***0**..255* | Input of desired pulse time in seconds. |
| OFF phase of flash pulse | | |
| *Hours* | ***0**..3* | Input of desired length of break in hours. |
| *Minutes* | ***0**..60* | Input of desired length of break in minutes. |
| *Seconds* | ***0**..255* | Input of desired length of break in seconds. |
| *How often should it flash* | *Until it switches off*<br><br>*1 x*<br>*2 x*<br>***3 x***<br>*4 x*<br>*5 x*<br>*7 x*<br>*10 x*<br>*15 x*<br>*20 x*<br>*30 x*<br>*50 x* | The channel flashes until a switch-off telegram is received.<br><br>The channel flashes as often as set here. |

### 4.5.8 Threshold

This page is shown if the *Activation of the function by exceeding threshold* parameter is set.

| Designation | Values | Description |
|---|---|---|
| *Type of threshold object* | **Object type: Per cent** *(DPT 5.001)*<br>*Counter value 0..255 (DPT 5.010)*<br>*Counter value 0..65535 (DPT 7.001)*<br>*Floating point value DPT9, e.g. temperature, CO2.* | Threshold format |
| *Response on exceeding the threshold* | | Should the channel switch on or off on exceeding the threshold?<br>The set type of contact must be taken into account here. |
| | *As switch object = 0* | NO contact: the relay switches off if threshold is exceeded.<br>NC contact: the relay switches on if threshold is exceeded. |
| | ***As switch object = 1*** | NO contact: the relay switches on if threshold is exceeded.<br>NC contact: the relay switches off if threshold is exceeded. |
| Parameter for *Per cent* threshold object | | |
| *Threshold* | *1..99%*<br>*Default value* = **50%** | Desired threshold.<br>Example of NO contact with response as switch object = 1:<br>Switches on when:<br>Object value > threshold<br>Switches off when:<br>Object value < threshold - hysteresis |
| *Hysteresis (as %)* | *1..99%*<br>*Default value* = **10%** | The hysteresis prevents frequent switching after small fluctuations in readings. |
| Parameter for threshold object *Counter value 0..255* | | |
| *Threshold* | *1..254*<br>*Default value* = **127** | Desired threshold.<br>Example of NO contact with response as switch object = 1:<br>Switches on when:<br>Object value > threshold<br>Switches off when:<br>Object value < threshold - hysteresis |
| *Hysteresis* | *1..254*<br>*Default value* = **5** | The hysteresis prevents frequent switching after small fluctuations in readings. |
| Parameter for threshold object *Counter value 0..65535* | | |

| Designation | Values | Description |
|---|---|---|
| *Threshold* | *1..65534*<br>*Default value* = **1000** | Desired threshold.<br>Example of NO contact with response as switch object = 1:<br>Switches on when:<br>Object value > threshold<br>Switches off when:<br>Object value < threshold - hysteresis |
| *Hysteresis* | *1..65534*<br>*Default value* = **5** | The hysteresis prevents frequent switching after small fluctuations in readings. |
| Parameter for *Floating point value (DPT 9), e.g. temperature, CO2...)* threshold object | | |
| *Threshold* | *-671088.64..*<br>*670760.96*<br>*Default value* = **20** | Desired threshold.<br>Example of NO contact with response as switch object = 1:<br>Switches on when:<br>Object value > threshold<br>Switches off when:<br>Object value < threshold - hysteresis |
| *Hysteresis* | *0.01..*<br>*670760.96*<br>*Default value* = **1** | The hysteresis prevents frequent switching after small fluctuations in readings. |

### 4.5.9 Block function

This page appears when Adjust block function is selected on the ***Configuration options*** parameter page.

| Designation | Values | Description |
|---|---|---|
| *Block telegram* | ***Block with ON telegram*** | 0 = cancel block<br>1 = block |
| | *Block with OFF telegram* | 0 = block<br>1 = cancel block<br><br>Note: The block is always deactivated after reset. |
| *Response when setting the block* | *OFF* | Switch off |
| | *ON* | Switch on |
| | ***unchanged*** | No response |
| *Response when cancelling the block* | *OFF* | Switch off |
| | *ON* | Switch on |
| | *unchanged* | No response |
| | ***update*** | Restore normal operation and switch relay accordingly. |

### 4.5.10 Scenes

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

| Designation | Values | Description |
|---|---|---|
| *Block telegram for scenes* | ***Block with ON telegram*** | 0 = cancel block<br>1 = block |
| | *Block with OFF telegram* | 0 = block<br>1 = cancel block<br>Note: With this setting, the scenes are always blocked immediately after reset or download. |
| *All channel scene statuses* | ***Overwrite on download*** | A download deletes all scene memories in a channel, i.e. all previously taught scenes.<br>When a scene number is called, the channel assumes the configured Status after download (see below).<br>See appendix: Teach in scenes without telegrams |
| | *Unchanged after download* | All previously taught-in scenes are saved.<br>However, the scene numbers to which the channel should react can be changed (see below: Channel reacts to). |
| *Participation in central scene object* | ***No***<br>*yes* | Should the device react to the central scene object? |
| | | |
| *Channel reacts to* | *No scene number*<br>***Scene number 1***<br>*Scene number 63* | First of the 8 possible scene numbers to which the channel is to react. |
| *Status after download* | ***Off***<br>*On* | New switching status to which the selected scene number is to be allocated.<br>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*<br>*Scene number 1*<br>***Scene number 2***<br>...<br>*Scene number 63* | Second of the 8 possible scene numbers |

| Designation | Values | Description |
|---|---|---|
| *Status after download* | ***Off***<br>*On* | See above. |
| *Permit teach-in* | *No*<br>***Yes*** | See above. |
| | | |
| *Channel reacts to* | *No scene number*<br>*Scene number 1*<br>...<br>***Scene number 3***<br>...<br>*Scene number 63* | Third of the 8 possible scene numbers |
| *Status after download* | ***Off***<br>*On* | See above. |
| *Permit teach-in* | *No*<br>***Yes*** | See above. |
| | | |
| *Channel reacts to* | *No scene number*<br>*Scene number 1*<br>...<br>***Scene number 4***<br>...<br>*Scene number 63* | Fourth of the 8 possible scene numbers |
| *Status after download* | ***Off***<br>*On* | See above. |
| *Permit teach-in* | *No*<br>***Yes*** | See above. |
| | | |
| *Channel reacts to* | *No scene number*<br>*Scene number 1*<br>...<br>***Scene number 5***<br>...<br>*Scene number 63* | Fifth of the 8 possible scene numbers |
| *Status after download* | ***Off***<br>*On* | See above. |
| *Permit teach-in* | *No*<br>***Yes*** | See above. |
| | | |
| *Channel reacts to* | *No scene number*<br>*Scene number 1*<br>...<br>***Scene number 6***<br>...<br>*Scene number 63* | Sixth of the 8 possible scene numbers |
| *Status after download* | ***Off***<br>*On* | See above. |
| *Permit teach-in* | *No*<br>***Yes*** | See above. |
| | | |

| Designation | Values | Description |
|---|---|---|
| *Channel reacts to* | *No scene number*<br>*Scene number 1*<br>...<br>***Scene number 7***<br>...<br>*Scene number 63* | Seventh of the 8 possible scene numbers |
| *Status after download* | ***Off***<br>*On* | See above. |
| *Permit teach-in* | *No*<br>***Yes*** | See above. |
| *Channel reacts to* | *No scene number*<br>*Scene number 1*<br>...<br>***Scene number 8***<br>...<br>*Scene number 63* | Last of the 8 possible scene numbers |
| *Status after download* | ***Off***<br>*On* | See above. |
| *Permit teach-in* | *No*<br>***Yes*** | See above. |

### 4.5.11 Feedback

| Designation | Values | Description |
|---|---|---|
| *Reported status* | ***Not inverted*** | Channel switched on: feedback object sends a 1 |
| | *inverted* | Channel switched on: feedback object sends a 0 |
| *Transmit feedback cyclically* | ***No*** *yes* | Send at regular intervals? |
| *Time for cyclical transmission of feedback* | *2 minutes, 3 minutes, 5 minutes, 10 minutes,* **15 minutes**, *20 minutes, 30 minutes, 45 minutes 60 minutes* | At what interval? |

### 4.5.12 Hour counter and service

This page appears when *Activate hour counter* is selected on the ***Configuration options*** parameter page.

| Designation | Values | Description |
|---|---|---|
| *Type of hour counter* | ***Hour counter***<br><br>*Counter for time period before next service* | Forward counter for channel duty cycle.<br><br>Backward counter for channel duty cycle. |
| *Hour counter* | | |
| *Reporting of operating hours when changing (0..100 h, 0 = no report)* | *0..100*<br>*Default value = **10*** | At what interval is the current meter reading to be sent?<br>Example:<br>10 = Send each time the meter reading increases by another 10 hours. |
| *Report operating hours cyclically* | ***No***<br>*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*<br>***60 minutes*** | At what interval? |
| *Counter for time period before next service* | | |
| *Service interval (x10 h)* | *0..2000*<br>*Default value = 100* | Desired timescale between 2 services.<br>Example:<br>10 = 10 x 10 h<br>= 100 hours |
| *Reporting of time to service when changing (0 = no report)* | *0..100*<br>*Default value = 10* | At what interval is the current meter reading to be sent?<br>Example:<br>10 = Send each time the meter reading decreases by another 10 hours. |
| *Report time to service cyclically* | ***no***<br>*Yes* | Send **remaining** time to next service at regular intervals?<br>→ Object *Time to next service*. |
| *Report service cyclically* | ***no***<br>*Yes* | Send **expiry** of time to next service at regular intervals?<br>→ Object *Service required*. |
| *Time for cyclical transmission (if used)* | *2 minutes, 3 minutes, 5 minutes, 10 minutes, 15 minutes, 20 minutes, 30 minutes, 45 minutes*<br>***60 minutes*** | At what interval? |

### 4.5.13 Link

| Designation | Values | Description |
|---|---|---|
| *Activate link* | | Selection of logical link with the channel object |
| | ***AND link*** | The *Logic input in AND gate* object appears. |
| | *OR link (override)* | The *Logic input in OR gate* object appears. |
| | *XOR link* | The *Logic input in XOR gate* object appears. |
| *Block object affects logic object* | ***No*** | The block object only affects the input object.<br>If required, the logic object can activate the channel function despite block (with OR and XOR link). |
| | *yes* | The block object affects the channel object and the logic object.<br>The channel function is completely blocked if the block is active. |

# 5 Typical applications

These typical applications are designed to aid planning and are not to be considered an exhaustive list.
It can be extended and updated as required.

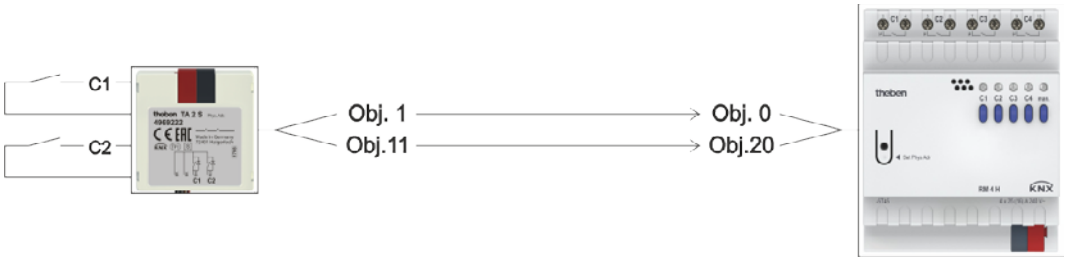
## 5.1 2x switching with push button interface

2 push buttons are connected to a TA 2 S push button interface and they control 2 channels on the RM 4 H.

### 5.1.1 Devices

- RM 4 H (4940212)
- TA 2 S (RM 8 H (4930212))

### 5.1.2 Overview




### 5.1.3 Objects and links

| No. | TA 2 S<br>Object name | No. | RM 4 H<br>Object name | Comment |
|---|---|---|---|---|
| 1 | *Channel I1.1 switching* | 0 | *Channel C1 switch object* | - |
| 11 | *Channel I2.1 switching* | 20 | *Channel C2 switch object* | - |

### 5.1.4 Important parameter settings

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

TA 2 S:

| Parameter page | Parameter | Setting |
|---|---|---|
| ***Channel 1*** | *Activate channel 1* | *Yes* |
| | *Channel 1 function* | *Push button* |
| ***Button object 1*** | *Object type* | *Switching (1 bit)* |
| | *Send after short operation* | *Send telegram* |
| | *Value* | *Change over* |
| | *Send after long operation* | *Do not send* |
| | *Send after double-click* | *Do not send* |
| ***Channel 2*** | *Activate channel 2* | *Yes* |
| | *Channel 2 function* | *Push button* |
| ***Button object 1*** | *Object type* | *Switching (1 bit)* |
| | *Send after short operation* | *Send telegram* |
| | *Value* | *Change over* |
| | *Send after long operation* | *Do not send* |
| | *Send after double-click* | *Do not send* |

RM 4 H:

| Parameter page | Parameter | Setting |
|---|---|---|
| ***Channel C1*** | *Channel function* | *Switch On/Off* |
| | *Activation of function via* | *Switch object* |
| ***Contact characteristics*** | *Type of contact* | *NO contact* |

## 5.2 Temperature-controlled domestic water heating

**Task:**
The domestic water temperature must be maintained at a minimum of 50 °C using a heating element.

The water temperature is measured using a remote sensor (e.g. order no. 9070321).
The sensor is connected to a TA 4 S input and the temperature value is sent to the bus.
Channel C1 receives the domestic water temperature via a threshold object and switches the heating element to relay output.

### 5.2.1 Devices

- RM 4 H (4940212)
- TA 4 S (RM 8 H (4930214))
- 100k feed temperature sensor (9070489)

### 5.2.2 Overview


### 5.2.3 Objects and links

| No. | TA 4 S<br>Object name | No. | RM 4 H<br>Object name | Comment |
|---|---|---|---|---|
| 21 | *Temperature actual value of channel I3* | 0 | *DPT 9 threshold* | The measured temperature is sent to the threshold object. |

### 5.2.4 Important parameter settings

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

TA 4 S:

| Parameter page | Parameter | Setting |
|---|---|---|
| ***Channel 3 Temperature input*** | *Activate channel 3* | *Yes* |
| | *Channel 3 function* | *Temperature input* |
| | *Sensor type* | *Floor sensor (9070321)* |
| | *Transmit temperature in the event of change of* | *2 K* |

RM 4 H, channel C1:

| Parameter page | Parameter | Setting |
|---|---|---|
| ***Configuration options*** | *Channel function* | *Switch On/Off* |
| | *Activation of function via* | *Exceeding the setpoint* |
| ***Contact characteristics*** | *Type of contact* | *NO contact* |
| ***Threshold*** | *Type of threshold object* | *Floating point value DPT9, e.g. temperature, CO2.* |
| | *Threshold* | *50* |
| | *Hysteresis* | *5* |
| | *Response on exceeding the threshold* | *As switch object = 0* |

# 6 Appendix

## 6.1 The scenes

### 6.1.1 Principle

The current status of a channel, or a complete
device can be stored and retrieved later at any time via the scene function.

Each channel can participate simultaneously in up to 8 scenes.
Scene numbers 1 to 64 are permitted.

Permission is required 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 FIX system to be easily and conveniently integrated into any chosen user scene.

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

### 6.1.2 Calling up or saving scenes:

To call up or save a scene, the relevant code is sent to the corresponding scene object.

| Scenario | Call up | | 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 |
| 45 | $2C | 44 | $AC | 172 |
| 46 | $2D | 45 | $AD | 173 |
| 47 | $2E | 46 | $AE | 174 |

| Scenario | Call up | | Save | |
|---|---|---|---|---|
| | Hex. | Dec. | Hex. | Dec. |
| **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)**:**

Call up status of scene 5:
→ Send $04 to the relevant scene object.

Save current status with scene 5:
→ Send $84 to the relevant scene object.

### 6.1.3 Teach-in scenes without telegrams

Instead of defining scenes individually by telegram, this can be done in advance in the ETS. This merely requires setting 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.

## 6.2 Conversion of percentages to hexadecimal and decimal values

| 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.