Technical Manual

State 09/2023 - Version 1.1

Switch Actuator AZI with active power meter

AZI-0316.03

AZI-0616.03

Further Documents:

Datasheet:
https://www.mdt.de/EN_Downloads_Datasheets.html

Assembly and Operation Instructions:
https://www.mdt.de/EN_Downloads_Instructions.html

Solution Proposals for MDT products:
https://www.mdt.de/en/for-professionals/tips-tricks.html

Comparison list MDT Switch Actuators:
https://www.mdt.de/fileadmin/user_upload/user_upload/download/MDT_Overview_Switch_Actuators.pdf

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Content

2 Overview

2.1 Overview devices

This manual refers to the following devices (order number in bold).

- **AZI-0316.03** Switch Actuator 3 channel, 4SU MDRC, 16/20 A, 230 V AC, with active power meter, 200 µF
- **AZI-0616.03** Switch Actuator 6 channel, 8SU MDRC, 16/20 A, 230 V AC, with active power meter, 200 µF

2.2 Functions

Active power measurement

The active power can be output per channel and as the sum of all channels in watts or kilowatts. Load exceedances and load undercuts can be evaluated and (delayed) execute a switch function or a scene. The extended power measurement offers an additional object per channel, selectable from apparent power (VA/kVA), reactive power (Var/kVar) or the power factor (cos φ). The measured values can be sent cyclically and at an adjustable minimum change.

Current measurement

The current value can be output per channel and as a total current in milliamperes or amperes. Exceeding and undercut of the current value can be monitored per channel and in total and actions can be triggered as a result. The output object of the monitoring can be “Switch” or “Scene”. Actions can be delayed on activation and on withdrawal. Cyclical sending of the monitoring can be activated.

Voltage measurement

The voltage is output per channel as a 4 Byte object. Exceeding and undercut of the voltage can be monitored and actions can be triggered as a result. The output object of the monitoring can be “Switch” or “Scene”. Actions can be delayed on activation and on withdrawal. Cyclical sending of the monitoring can be activated.

Energy and cost meter

The electricity prices for day and night required for cost calculation can be entered either fixed via the ETS or variable via objects. The currently valid electricity price is output per object. The meter readings can be output separately for day and night. The energy meters of the channels can be written to via their object. Intermediate meters with selectable datapoint types (Wh or kWh) can be activated for each channel and for the total meter.

Events

Up to two events can be activated in each meter. An event is triggered as soon as a selected condition is met. The condition can be a reached value of a (main) meter, certain costs of a (main) meter, a time or an interval. The triggered event then performs functions such as sending and/or resetting a counter reading.

Error messages

If a load failure occurs when the contact is closed, or if a fault current occurs when the contact is open, this can be signalled by means of a 1 Bit object.

Switch function

Separate settings for each channel allow, for example, operation as a normally closed or normally open contact, with a switch-on and/or switch-off delay. The status of each channel can be sent cyclically if required. An additional - inverted - status object can be activated.

Threshold function

With the threshold function, for example, the channel can be switched when a temperature or brightness is reached. Various actions can be set for exceeding/undercutting of the threshold value.

Pulse function

Short switching pulses are used, for example, to open or close garage doors. The pulse duration is adjustable and pulses can be repeated once for certain applications.

Extended staircase light function

By pressing the push-button several times, the time in the switch actuator can be added up and the staircase lighting can remain switched on longer as required. Staircase lighting times can be set differently per floor using a 1 Byte object. The prewarning can flash the button LEDs via an object, for example. An actuator channel with staircase lighting function can be used in parallel as a switch channel by means of an additionally activatable switch object.

Extended logic and scene function

The extended logic function links the channel with up to two further logic inputs. AND, OR, XOR and gate functions are available for selection. The logic inputs can be inverted as desired and set to a defined value after bus voltage recovery. This prevents undesired behaviour after a restart. The extended scene function can lock or unlock in addition to switching on or off. Furthermore, saved scenes are retained when the application is reprogrammed.

Operating hours meter

The actuator has an operating hours meter for each channel, which can be reset via a 1 Bit object. Alternatively, a service count down timer can be activated for each channel, which triggers a 1 bit alarm after previously defined operating hours and sends the remaining time as a 4 Byte object.

Central switch function

The central switch function can be activated per channel. This function enables simple programming of central switch functions. If the communication object of the central function is triggered, all channels with activated central function are switched.

Lock function/ priority/ forced guidance

In addition to the usual lock function, the switch actuator also offers priority/forced guidance per channel. Priority/forced guidance can be used to switch a channel permanently ON or OFF. The behaviour in the event of bus voltage failure, bus voltage recovery, locking and unlocking or priority can be set differently. A fallback time can be set for the priority function, after which the channel returns to the normal state.

Status objects

The actuators have a status object for each channel with adjustable sending conditions and cyclical sending. In addition, an inverted status object can be activated. This can be used for visualisations or logics.

Long Frame Support

The AZI switch actuator supports “long frames” (longer telegrams). These contain more user data per telegram, which significantly reduces the programming time.

2.3 Connection diagram

The following figure shows the connection diagram using the 3-channel unit as an example:

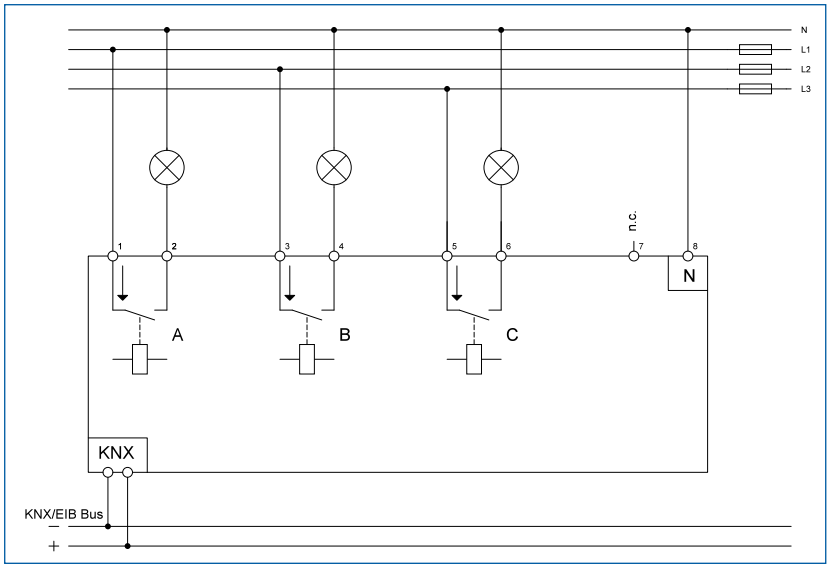

Figure 1: Connection diagram – AZI-0316.03

2.4 Structure & Handling

The following pictures show the structure of the switch actuators:

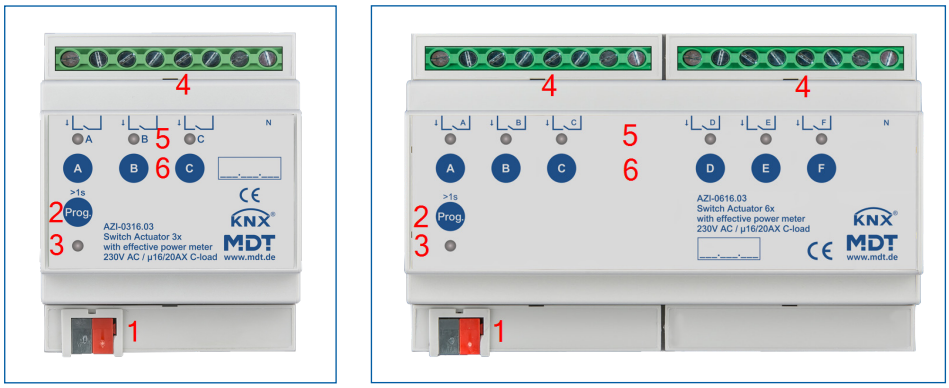

Figure 2: Structure & Handling

1 = Bus connecting terminal
2 = Programming button
3 = Red programming LED
4 = Connection terminals
5 = Green channel indicator LED
6 = Buttons for manual operation

Important note:
The green channel indicator LED on the actuator reflects the status of the status object (“1” = LED On, “0” = LED Off). It does not reflect the state of the relay contact, whether open or closed (important when configured as a “normally closed”).

2.5 Commissioning

1. Wire the device according to the connection diagram.
2. Connect interface to the bus, e.g. MDT USB Interface.
3. Switch on bus voltage.
4. Press the programming button on the device for > 1 s (red programming LED lights up continuously).
5. Set and programme the individual address in the ETS.
   (Programming LED turns off)
6. Configure and programme the settings in the application programme.

3 Communication objects

3.1 Standard settings of the communication objects

The following tables show the default settings for the communication objects:

Standard Settings – Channels								
No.	Name	Object Function	Length	C	R	W	T	U
0	Channel A:	Switch	1 Bit	■		■		
1	Channel A:	Staircase light	1 Bit	■		■		
1	Channel A:	Service required	1 Bit	■	■		■	
1	Channel A:	Switch pulse	1 Bit	■		■		
2	Channel A:	Time until next service	2 Byte	■	■		■	
2	Channel A:	Time until next service	4 Byte	■	■		■	
2	Channel A:	Meter reading: Operating hours	2 Byte	■	■		■	
2	Channel A:	Meter reading: Operating hours	4 Byte	■	■		■	
2	Channel A:	Staircase light with time	1 Byte	■		■		
3	Channel A:	Prewarning	1 Bit	■			■	
3	Channel A:	Reset: Operating hours	1 Bit	■		■		
3	Channel A:	Reset: Service messages	1 Bit	■		■		
4	Channel A:	Lock	1 Bit	■		■		
5	Channel A:	Priority	1 Bit	■		■		
5	Channel A:	Forced guidance	2 Bit	■		■		
6	Channel A:	Scene	1 Byte	■		■		
7	Channel A:	Status	1 Bit	■	■		■	
8	Channel A:	Inverted status	1 Bit	■	■		■	
9	Channel A:	Logic 1	1 Bit	■		■		
10	Channel A:	Logic 2	1 Bit	■		■		
11	Channel A:	Threshold switch	1 Byte	■		■		
11	Channel A:	Threshold switch	2 Byte	■		■		
12	Channel A:	Active Power	2 Byte	■	■		■	
12	Channel A:	Active Power	4 Byte	■	■		■	
13	Channel A:	Current value	2 Byte	■	■		■	

Standard Settings – Channels								
No.	Name	Object Function	Length	C	R	W	T	U
13	Channel A:	Current value	4 Byte	■	■		■	
14	Channel A:	Voltage value	4 Byte	■	■		■	
15	Channel A:	Extended power measurement: Apparent power	2 Byte	■	■		■	
15	Channel A:	Extended power measurement: Apparent power	4 Byte	■	■		■	
15	Channel A:	Extended power measurement: Reactive power	2 Byte	■	■		■	
15	Channel A:	Extended power measurement: Reactive power	4 Byte	■	■		■	
15	Channel A:	Extended power measurement: Power factor cos Phi	4 Byte	■	■		■	
16	Channel A:	Load exceedance	1 Bit	■	■		■	
16	Channel A:	Load exceedance	1 Byte	■	■		■	
17	Channel A:	Load undercut	1 Bit	■	■		■	
17	Channel A:	Load undercut	1 Byte	■	■		■	
18	Channel A:	Current exceedance	1 Bit	■	■		■	
18	Channel A:	Current exceedance	1 Byte	■	■		■	
19	Channel A:	Current undercut	1 Bit	■	■		■	
19	Channel A:	Current undercut	1 Byte	■	■		■	
20	Channel A:	Voltage exceedance	1 Bit	■	■		■	
20	Channel A:	Voltage exceedance	1 Byte	■	■		■	
21	Channel A:	Voltage undercut	1 Bit	■	■		■	
21	Channel A:	Voltage undercut	1 Byte	■	■		■	
22	Channel A:	Intermediate meter: Electrical active energy (24 h)	4 Byte	■	■	■	■	
23	Channel A:	Intermediate meter: Costs in Cent - Output	2 Byte	■	■		■	
23	Channel A:	Intermediate meter: Costs in Cent - Output	4 Byte	■	■		■	
23	Channel A:	Intermediate meter: Costs in Euro - Output	2 Byte	■	■		■	
23	Channel A:	Intermediate meter: Costs in Euro - Output	4 Byte	■	■		■	
24	Channel A:	Intermediate meter: Meter reading “Day”	4 Byte	■	■	■	■	

Standard Settings – Channels								
No.	Name	Object Function	Length	C	R	W	T	U
25	Channel A:	Intermediate meter: Meter reading “Night”	4 Byte	■	■	■	■	
26	Channel A:	Intermediate meter: Reset	1 Bit	■		■		
27	Channel A:	Main meter: Electrical active energy (24 h)	4 Byte	■	■	■	■	
28	Channel A:	Main meter: Costs in Cent - Output	2 Byte	■	■		■	
28	Channel A:	Main meter: Costs in Cent - Output	4 Byte	■	■		■	
28	Channel A:	Main meter: Costs in Euro - Output	2 Byte	■	■		■	
28	Channel A:	Main meter: Costs in Euro - Output	4 Byte	■	■		■	
29	Channel A:	Main meter: Meter reading “Day”	4 Byte	■	■	■	■	
30	Channel A:	Main meter: Meter reading “Night”	4 Byte	■	■	■	■	
31	Channel A:	Main meter: Reset	1 Bit	■		■		
32	Channel A:	Meter: Event A	1 Bit	■			■	
33	Channel A:	Meter: Event B	1 Bit	■			■	
34	Channel A:	Load failure	1 Bit	■	■		■	
34	Channel A:	Residual current	1 Bit	■	■		■	
34	Channel A:	Residual current / Load failure	1 Bit	■	■		■	
+35	**next channel**							

Table 1: Communication objects – Standard settings: Channels

Standard Settings – General objects								
No.	Name	Object Function	Length	C	R	W	T	U
105/210 *	Central function	Switch	1 Bit	■		■		
106/211 *	Central function	Lock manual operation	1 Bit	■		■		
107/212 *	Central function	In operation	1 Bit	■	■		■	
108/213 *	Central function	Day/Night	1 Bit	■		■	■	■
109/214 *	Central function	Time	3 Byte	■		■	■	■
132/237 *	Central function	Voltage error	1 Bit	■	■		■	
111/216 *	Total current	Current value	2 Byte	■	■		■	
111/216 *	Total current	Current value	4 Byte	■	■		■	
115/220 *	Total current	Current exceedance	1 Bit	■	■		■	
115/220 *	Total current	Current exceedance	1 Byte	■	■		■	
116/221 *	Total current	Current undercut	1 Bit	■	■		■	
116/221 *	Total current	Current undercut	1 Byte	■	■		■	
110/215 *	Total: Active power	Total value	2 Byte	■	■		■	
110/215 *	Total: Active power	Total value	4 Byte	■	■		■	
113/218 *	Total: Active power	Load exceedance	1 Bit	■	■		■	
113/218 *	Total: Active power	Load exceedance	1 Byte	■	■		■	
114/219 *	Total: Active power	Load undercut	1 Bit	■	■		■	
114/219 *	Total: Active power	Load undercut	1 Byte	■	■		■	
133/238 *	Total: Active power	External - Input	2 Byte	■		■		
133/238 *	Total: Active power	External - Input	4 Byte	■		■		
117/222 *	Total: Intermediate meter	Active energy (Wh)	4 Byte	■	■		■	
117/222 *	Total: Intermediate meter	Active energy (kWh)	4 Byte	■	■		■	
118/223 *	Total: Intermediate meter	Costs in Cent - Output	2 Byte	■	■		■	
118/223 *	Total: Intermediate meter	Costs in Cent - Output	4 Byte	■	■		■	
118/223 *	Total: Intermediate meter	Costs in Euro - Output	2 Byte	■	■		■	
118/223 *	Total: Intermediate meter	Costs in Euro - Output	4 Byte	■	■		■	
119/224 *	Total: Intermediate meter	Meter reading “Day”	4 Byte	■	■		■	
120/225 *	Total: Intermediate meter	Meter reading “Night”	4 Byte	■	■		■	

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Standard Settings – General objects								
No.	Name	Object Function	Length	C	R	W	T	U
121/226 *	Total: Intermediate meter	Reset	1 Bit	■		■		
122/227 *	Total: Main meter	Active energy (kWh)	4 Byte	■	■		■	
123/228 *	Total: Main meter	Costs in Cent - Output	2 Byte	■	■		■	
123/228 *	Total: Main meter	Costs in Cent - Output	4 Byte	■	■		■	
123/228 *	Total: Main meter	Costs in Euro - Output	2 Byte	■	■		■	
123/228 *	Total: Main meter	Costs in Euro - Output	4 Byte	■	■		■	
124/229 *	Total: Main meter	Meter reading “Day”	4 Byte	■	■		■	
125/230 *	Total: Main meter	Meter reading “Night”	4 Byte	■	■		■	
126/231 *	Total: Main meter	Reset	1 Bit	■		■		
127/232 *	Total: Meter	Event A	1 Bit	■			■	
128/233 *	Total: Meter	Event B	1 Bit	■			■	
129/234 *	Electricity price: “Day”	Electricity rate in Euro - Input	2 Byte	■		■		
129/234 *	Electricity price: “Day”	Electricity rate in Euro - Input	4 Byte	■		■		
129/234 *	Electricity price: “Day”	Electricity rate in Cent - Input	2 Byte	■		■		
129/234 *	Electricity price: “Day”	Electricity rate in Cent - Input	4 Byte	■		■		
130/235 *	Electricity price: “Night”	Electricity rate in Euro - Input	2 Byte	■		■		
130/235 *	Electricity price: “Night”	Electricity rate in Euro - Input	4 Byte	■		■		
130/235 *	Electricity price: “Night”	Electricity rate in Cent - Input	2 Byte	■		■		
130/235 *	Electricity price: “Night”	Electricity rate in Cent - Input	4 Byte	■		■		
131/236 *	Actual electricity price	Electricity rate in Euro - Output	2 Byte	■	■		■	
131/236 *	Actual electricity price	Electricity rate in Euro - Output	4 Byte	■	■		■	
131/236 *	Actual electricity price	Electricity rate in Cent - Output	2 Byte	■	■		■	
131/236 *	Actual electricity price	Electricity rate in Cent - Output	4 Byte	■	■		■	

Table 2: Communication objects – Standard settings: General objects

* Objects for central functions are always at the end of the object list and thus depend on the number of channels. The first number applies to a device with 3 channels, the second number applies to a device with 6 channels.

The table above shows the preset default settings. The priority of the individual communications objects and the flags can be adjusted by the user as required. The flags assign the communication objects their respective tasks in programming, where C stands for communication, R for read, W for write, T for transmit and U for update.

4 ETS Parameter

4.1 General Settings

The following table shows the available settings:

ETS Text	Dynamic range **[Default value]**	Comment
Startup time	2 ... 240 s **[2 s]**	Sets the time between restart and functional start-up of the device.
Send „In operation“ cyclically	**not active** 1 min – 24 h	Activation of a cyclical “In operation” telegram.
Manual operation	■ **active** ■ locked ■ lockable via object	Setting if operation via buttons on the device is possible.
Economy mode, switch off LEDs after	**not active** 30 s – 1 h	Setting whether the LEDs should be switched off after the set time.
Set energy meters to “0” after transmitting the application	■ **not active** ■ only intermediate meter ■ Intermediate and main meter	Setting whether meter readings are deleted when the application is transferred.
All energy meters in the channel are writable via object	■ **not active** ■ active	Setting whether counter readings can be overwritten per object.
Behaviour after bus voltage return		
Object „Day/Night“	■ **no request** ■ request	Setting whether the object should be automatically requested after bus voltage return.
Object „Time“	■ **no request** ■ request	Setting whether the object should be automatically requested after bus voltage return.

Table 3: General settings

Startup time
This time defines when the unit “boots up” after a restart (reset, reprogramming, bus voltage recovery). This can be important if, for example, a bus reset is carried out. If there are many units on a line, all units would start at the same time and load the bus. With a variable time, the units can thus start differently.

„In operation”
“In operation” is used to show on the bus that the unit is “alive”. If activated, an ON telegram is sent cyclically.

Behaviour after bus power return
„Object „Day/Night“ no request/request“ is only displayed with the following setting:
In the menu “Cost calculation” - “Calculate costs via”, the selection must be either “two fixed values (Day/Night)” or “two variable values (Day/Night)”.

The following actions are possible with the “**Manual operation**” setting:

- **active** Manual operation possible
- **locked** Manual operation not possible
- **lockable** via object Manual operation can be locked / unlocked via object

Via “**Economy mode, switch off LEDs after**”, the status LEDs can be deactivated after a certain time.

By means of “**All energy meters in the channel are writable via object**”, existing meter readings of the energy meters can be transmitted - for example when replacing a device..
Important: The meter readings of the cost meters cannot be overwritten!

Note:
- All functions of the current and consumption measurements are available approx. 30 seconds after a functional restart of the actuator (after programming or switching on the bus voltage). This also applies to “**All energy meters in the channel writable via object**” and “**Reset**” of the meter readings..
- When activating the parameter **“Set energy meters to “0” after transmitting the application”**, already recorded meter readings are permanently deleted and cannot be restored!

The following table shows the communication objects:

Number	Name / Object function	Length	Usage
106 / 211 *	Central function – Lock manual operation	1 Bit	Locking/unlocking the manual operation
107 / 212 *	Central function – In operation	1 Bit	Send Cyclic “In operation” telegram
108 / 213 *	Central function – Day/Night	1 Bit	Receiving the value, whether “Day” or “Night”
109 / 214 *	Central function – Time	3 Byte	Receiving the time

Table 4: General settings

* First number applies to unit with 3 channels, second number applies to unit with 6 channels.

4.2 Total: Active power

The active power measurement allows the output of the real active power by simultaneous measurement of current and voltage. The output value is therefore no longer a “theoretical” power at nominal voltage, but the actual power.

Important: Only channels in which the parameter “Add channel to overall evaluation (current, active power, energy meter, voltage error)” has been activated are included.

The following table shows the selection options:

ETS Text	Dynamic range **[Default value]**	Comment
Active power measurement	■ **not active** ■ active	Activation/deactivation of the menu.
Object selection	■ **4 Byte floating value in W (DPT 14.056)** ■ 2 Byte floating value in kW (DPT 9.024)	Selection of the datapoint type for the output object of the total active power.
Send value on change of ...	**not active** 5 % – 75 %	Setting from which percentage change the value is to be sent.
Minimum change	**not active** 50 W – 5000 W	Value by which the value to be sent must change at least. **Only if change in % is active.**
Send cyclically every ...	not active, 1 min – 24 h **[1 h]**	Setting at which intervals the value is to be sent.
Monitoring of load exceedance	■ **not active** ■ active, Output: Switch ■ active, Output: Scene	Activation of the load exceedance and selection of the output object. **A description follows in chapter 4.2.1**
Monitoring of load undercut	■ **not active** ■ active, Output: Switch ■ active, Output: Scene	Activation of the load undercut and selection of the output object. **A description follows in chapter 4.2.2**

Table 5: Settings – Total : Active Power

With the activation of the “**Active power measurement**”, further parameters appear.

The data point type for the output object is defined via the “**Object selection**”.

Furthermore, it can be determined at which change a value is to be sent. In order not to send too frequently in case of smaller measured values, a value can subsequently be defined by which the measured value must change at least.
With the parameter “**Send cyclically every ...**”, a fixed sending interval is defined independent of the measured value.

The parameters for “M**onitoring of load exceedance”** and**“Monitoring of load undercut”** are explained in the following chapters.

It is possible to write a value for the total active power from external. This is done via the object “Active power - External (Input)”. The object is permanently displayed.

Important: The value does not overwrite the current value, but the entered value is added to the current meter reading.

Application example: Several active power meters are installed in the house. The current value of device 1 can now be sent to the object “External (Input)” of device 2. Device 2 then outputs the sum of both devices.

The following table shows the associated communication objects:

Number	Name / Object function	Length	Usage
110 / 215 *	Total: Active power – Total value	2 Byte 4 Byte	Output object for the measured value. DPT depending on the parameter setting.
133 / 238 *	Total: Active power – External - Input	2 Byte 4 Byte	Receive an external value. DPT according to parameter setting.

Table 6: Communication objects – Total : Active Power

* First number applies to unit with 3 channels, second number applies to unit with 6 channels.

4.2.1 Monitoring of load exceedance

After activating the parameter, the following selection options are available:

ETS Text	Dynamic range **[Default value]**	Comment
Value for exceedance	0 ... 27600 W [**100**]	Setting of the threshold for exceeding.
Send value if exceeded	■ not active ■ **value „1“** ■ value „0“	Setting the value to be sent when the switching threshold is exceeded. **Only with „Output: Switch“.**
Send scene if exceeded	not active 1 – 64 **[1]**	Setting of the scene to be sent when the switching threshold is exceeded. **Only with „Output: Scene“.**
Send output cyclically	**not active** 1 min – 24 h	Setting at which intervals the value or scene is to be sent.
Switch off all channels	■ **not active** ■ active	Setting whether all channels should switch off when the threshold is exceeded.
Value for withdrawal	0 ... 27600 W [**100**]	Setting the threshold for the withdrawal of the exceedance.
Send value on withdrawal	■ not active ■ value „1“ ■ **value „0“**	Setting the value to be sent when falling below the withdrawal threshold. **Only with „Output: Switch“.**
Send scene on withdrawal	not active 1 – 64 **[2]**	Setting the scene to be sent when falling below the withdrawal threshold. **Only with „Output: Scene“.**
Type of delay	■ Delay after activation ■ Delay after withdrawal	Setting to which function the delay should apply.
Delay time	00:00:00 ... 08:00:00 hh:mm:ss **[00:00:00]**	Entering a time by which the selected type is to be sent delayed.

Table 7: Settings – Monitoring of load exceedance

When the individual “**Value for exceedance**” is overshot, the output object sends - depending on the setting - either a corresponding 1 Bit value or the desired scene number.

When falling below the individual “**Value for withdrawal**”, the output object sends - depending on the setting - either a corresponding 1 Bit value or the desired scene number.

Important: The value for withdrawal must be smaller than the value for exceedance!

The parameter “**Switch off all channels**” can be used to set whether these should switch off when the threshold is exceeded. After switching off, each individual channel must be reactivated via object.

Via the setting “**Type of delay**” it is possible to activate a switching delay either for the exceedance (delay after activation) or for the withdrawal of the exceedance (delay after withdrawal). The corresponding time is set with the “**Delay time**” setting. With the setting “00:00:00”, switching is always direct.

The following table shows the associated communication objects:

Number	Name / Object function	Length	Usage
113 / 218 *	Total: Active power – Load exceedance	1 Bit 1 Byte	Output object for monitoring the load exceedance. DPT depending on the parameter setting

Table 8: Communication objects – Load exceedance

* First number applies to unit with 3 channels, second number applies to unit with 6 channels.

4.2.2 Monitoring of load undercut

After activating the parameter, the following selection options are available:

ETS Text	Dynamic range **[Default value]**	Comment
Value for undercut	0 ... 27600 W **[5]**	Setting of the threshold for undercutting
Send value if undercut	■ not active ■ **value „1“** ■ value „0“	Setting the value to be sent when the switching threshold is undercut. **Only with „Output: Switch“.**
Send scene if undercut	not active 1 – 64 **[1]**	Setting of the scene to be sent when the switching threshold is undercut. **Only with „Output: Scene“.**
Send output cyclically	**not active** 1 min – 24 h	Setting at which intervals the value or scene is to be sent.
Switch off all channels	■ **not active** ■ active	Setting whether all channels should switch off when the threshold is undercut.
Value for withdrawal	0 ... 27600 W [5]	Setting the threshold for the withdrawal of the undercut
Send value on withdrawal	■ not active ■ value „1“ ■ **value „0“**	Setting of the value to be sent when the withdrawal threshold is exceeded. **Only with „Output: Switch“.**
Send scene on withdrawal	not active 1 – 64 **[2]**	Setting of the scene to be sent when the withdrawal threshold is exceeded. **Only with „Output: Scene“.**
Type of delay	■ Delay after activation ■ Delay after withdrawal	Setting to which function the delay should apply.
Delay time	00:00:00 ... 08:00:00 hh:mm:ss **[00:00:00]**	Entering a time by which the selected type is to be sent delayed.

Table 9: Settings – Monitoring of load undercut

When the value falls below the individual “**Value for undercut**”, the output object sends - depending on the setting - either the corresponding 1 Bit value or the desired scene number.

When the individual “**Value for withdrawal**” is exceeded, the output object sends - depending on the setting - either the corresponding 1 Bit value or the desired scene number.

Important: The value for withdrawal must be greater than the value for undercut!

The parameter “**Switch off all channels**” can be used to set whether they should switch off when falling below the threshold. After switching off, each individual channel must be reactivated via the object.

Via the setting “**Type of delay**” it is possible to activate a switching delay either for the undercut (delay after activation) or for the withdrawal of the undercut (delay after withdrawal). The corresponding time is set with the “**Delay time**” setting. With the setting “00:00:00”, switching is always direct.

The following table shows the associated communication objects:

Number	Name / Object function	Length	Usage
114 / 219 *	Total: Active power – Load undercut	1 Bit 1 Byte	Output object for monitoring of load undercut. DPT depending on the parameter setting

Table 10: Communication objects – Load undercut

* First number applies to unit with 3 channels, second number applies to unit with 6 channels.

4.3 Total: Current

Important: Only channels in which the parameter “Add channel to overall evaluation (current, active power, energy meter, voltage error)” has been activated are included.

The following table shows the available settings:

ETS Text	Dynamic range **[Default value]**	Comment
Total current measurement	■ **not active** ■ active	Activation/deactivation of the menu.
Object selection	■ **2 Byte value in mA (DPT 7.012)** ■ 2 Byte floating value in mA (DPT 9.021) ■ 4 Byte floating value in A (DPT 14.019)	Selection of the datapoint type for the output object of the total active power.
Send value on change of ...	**not active** 5 % – 75 %	Setting from which percentage change the value is to be sent.
Minimum change	**not active** 50 mA – 5 A	Value by which the value to be sent must change at least. **Only if change in % is active.**
Send cyclically every ...	not active, 1 min – 24 h **[1 h]**	Setting at which intervals the value is to be sent.
Monitoring of current exceedance	■ **not active** ■ active, Output: Switch ■ active, Output: Scene	Activation of the current exceedance and selection of the output object. **A description follows in chapter 4.3.1**
Monitoring of current undercut	■ **not active** ■ active, Output: Switch ■ active, Output: Scene	Activation of the current undercut and selection of the output object. **A description follows in chapter 4.3.2**

Table 11: Settings – Total : Current

With the activation of the “**Total current measurement**”, further parameters appear.

The data point type for the output object is defined via the “**Object selection**”.

Furthermore, it can be determined at which change a value is to be sent. In order not to send too frequently in case of smaller measured values, a value can subsequently be defined by which the measured value must change at least.

With the parameter “**Send cyclically every ...**”, a fixed sending interval is defined independent of the measured value.

The parameters for **monitoring of current exceedance** and **monitoring of current undercut** are explained in the following chapters.

The following table shows the associated communication objects:

Number	Name / Object function	Length	Usage
111 / 216 *	Total current – Current value	2 Byte 4 Byte	Output object for the measured value. DPT depending on the parameter setting.

Table 12: Communication objects – Total : Current

* First number applies to unit with 3 channels, second number applies to unit with 6 channels.

4.3.1 Monitoring of current exceedance

After activating the parameter, the following selection options are available:

ETS Text	Dynamic range **[Default value]**	Comment
Value range	■ **100 mA – 1000 mA** ■ 1 A – 48 / 70 A	Preselection and limitation of the exceedance value range.. **Values in "A" depend on the number of channels**.
Value for exceedance	100 ... 1000 mA [**1000**] 1 ... 48 / 70 A [**20**]	Setting of the threshold for exceeding.. **Unit depends on the set value range.**
Send value if exceeded	■ not active ■ **value „1"** ■ value „0"	Setting the value to be sent when the switching threshold is exceeded. **Only with „Output: Switch".**
Send scene if exceeded	not active 1 – 64 **[1]**	Setting of the scene to be sent when the switching threshold is exceeded. **Only with „Output: Scene".**
Send output cyclically	**not active** 1 min – 24 h	Setting at which intervals the value or scene is to be sent.
Switch off all channels	■ **not active** ■ active	Setting whether all channels should switch off when the threshold is exceeded.
Value range for withdrawal	■ **100 mA – 1000 mA** ■ 1 A – 48 / 70 A	Preselection and limitation of the value range for withdrawal of exceedance. **Values in "A" depend on the number of channels**.
Value for withdrawal	100 ... 1000 mA [**100**] 1 ... 48 / 70 A [**10**]	Setting the threshold for the withdrawal of the exceedance. **Unit depends on the set value range.**
Send value on withdrawal	■ not active ■ value „1" ■ **value „0"**	Setting the value to be sent when falling below the withdrawal threshold. **Only with „Output: Switch".**
Send scene on withdrawal	not active 1 – 64 **[2]**	Setting the scene to be sent when falling below the withdrawal threshold. **Only with „Output: Scene".**
Type of delay	■ Delay after activation ■ Delay after withdrawal	Setting to which function the delay should apply.
Delay time	00:00:00 ... 08:00:00 hh:mm:ss **[00:00:00]**	Entering a time by which the selected type is to be sent delayed.

Table 13: Settings – Monitoring of current exceedance

By means of the parameters “**Value range**” and “**Value range for withdrawal**”, the respective setting range of the threshold is adapted to the current value to be expected.

When the individual “**Value for exceedance**” is overshot, the output object sends - depending on the setting - either a corresponding 1 Bit value or the desired scene number.

When falling below the individual “**Value for withdrawal**”, the output object sends - depending on the setting - either a corresponding 1 Bit value or the desired scene number.

Important: The value for withdrawal must be smaller than the value for exceedance!

The parameter “**Switch off all channels**” can be used to set whether these should switch off when the threshold is exceeded. After switching off, each individual channel must be reactivated via object.

Via the setting “**Type of delay**” it is possible to activate a switching delay either for the exceedance (delay after activation) or for the withdrawal of the exceedance (delay after withdrawal). The corresponding time is set with the “**Delay time**” setting. With the setting “00:00:00”, switching is always direct.

The following table shows the associated communication objects:

Number	Name / Object function	Length	Usage
115 / 220 *	Total current – Current exceedance	1 Bit 1 Byte	Output object for monitoring the current exceedance. DPT depending on the parameter setting

Table 14: Communication objects – Current exceedance

* First number applies to unit with 3 channels, second number applies to unit with 6 channels.

4.3.2 Monitoring of current undercut

After activating the parameter, the following selection options are available:

ETS Text	Dynamic range **[Default value]**	Comment
Value range	■ **100 mA – 1000 mA** ■ 1 A – 48 / 70 A	Preselection and limitation of the undercut value range. **Values in "A" depend on the number of channels**.
Value for undercut	100 ... 1000 mA [**100**] 1 ... 48 / 70 A [**10**]	Setting of the threshold for undercutting. **Unit depends on the set value range.**
Send value if undercut	■ not active ■ **value „1"** ■ value „0"	Setting of the value to be sent when falling below the threshold.. **Only with „Output: Switch".**
Send scene if undercut	not active 1 – 64 **[1]**	Setting of the scene to be sent when falling below the threshold. **Only with „Output: Scene".**
Send output cyclically	**not active** 1 min – 24 h	Setting at which intervals the value or scene is to be sent.
Switch off all channels	■ **not active** ■ active	Setting whether all channels should switch off when the threshold is undercut.
Value range for withdrawal	■ **100 mA – 1000 mA** ■ 1 A – 48 / 70 A	Preselection and limitation of the range of values for the withdrawal of the undercut. **Values in "A" depend on the number of channels**.
Value for withdrawal	100 ... 1000 mA [**1000**] 1 ... 48 / 70 A [**20**]	Setting the threshold for the withdrawal of the undercut. **Unit depends on the set value range.**
Send value on withdrawal	■ not active ■ value „1" ■ **value „0"**	Setting of the value to be sent when the withdrawal threshold is exceeded. **Only with „Output: Switch".**
Send scene on withdrawal	not active 1 – 64 **[2]**	Setting of the scene to be sent when the withdrawal threshold is exceeded. **Only with „Output: Scene".**
Type of delay	■ Delay after activation ■ Delay after withdrawal	Setting to which function the delay should apply.
Delay time	00:00:00 ... 08:00:00 hh:mm:ss **[00:00:00]**	Entering a time by which the selected type is to be sent delayed.

Table 15: Settings – Monitoring of current undercut

By means of the parameters “**Value range**” and “**Value range for withdrawal**”, the respective setting range of the threshold is adapted to the current value to be expected.

When the value falls below the individual “**Value for undercut**”, the output object sends - depending on the setting - either the corresponding 1 Bit value or the desired scene number.

When the individual “**Value for withdrawal**” is exceeded, the output object sends - depending on the setting - either the corresponding 1 Bit value or the desired scene number.

Important: The value for withdrawal must be greater than the value for undercut!

The parameter “**Switch off all channels**” can be used to set whether they should switch off when falling below the threshold. After switching off, each individual channel must be reactivated via the object.

Via the setting “**Type of delay**” it is possible to activate a switching delay either for the undercut (delay after activation) or for the withdrawal of the undercut (delay after withdrawal). The corresponding time is set with the “**Delay time**” setting. With the setting “00:00:00”, switching is always direct.

The following table shows the associated communication objects:

Number	Name / Object function	Length	Usage
116 / 221 *	Total current – Current undercut	1 Bit 1 Byte	Output object for monitoring of current undercut. DPT depending on the parameter setting

Table 16: Communication objects – Current undercut

* First number applies to unit with 3 channels, second number applies to unit with 6 channels.

4.4 Total: Energy and cost meter

Important: Only channels in which the parameter “Add channel to overall evaluation (current, active power, energy meter, voltage error)” has been activated are included.

The table shows the possible settings:

ETS Text	Dynamic range **[Default value]**	Comment
Meter	■ **not active** ■ active	Activation/deactivation of the various counters
Main meter (is automatically active after activating “Meter”)		
Object selection (from HW R4.2)	■ **Value in Wh (DPT 13.010)** ■ Value in kWh (DPT 13.013)	Selection of the datapoint type for the main meter.
Send meter reading on change	■ **not active** ■ active	Setting whether the meter reading should be sent when changed.
Send meter reading every ...	10 - 50000 Wh **[10 Wh]** 1 ... 65535 kWh **[10 kWh]**	Setting for which change the meter reading is to be sent. **Selection depends on the selected datapoint type.**
Send meter reading cyclically every ...	not active, 1 min – 24 h **[1 h]**	Setting whether and at what interval the meter reading is to be sent cyclically.
Intermediate meter		
Intermediate meter	■ **not active** ■ active	Activation of the intermediate meter.
Object selection	■ **Value in Wh (DPT 13.010)** ■ Value in kWh (DPT 13.013)	Selection of the datapoint type for the intermediate meter.
Send meter reading on change	■ **not active** ■ active	Setting whether the meter reading should be sent when changed.
Send meter reading every ...	10 – 50000 Wh **[10 Wh]** 1 ... 65535 kWh **[10 kWh]**	Setting for which change the meter reading is to be sent.. **Selection depends on the selected datapoint type.**
Send meter reading cyclically every ...	not active, 1 min – 24 h **[1 h]**	Setting whether and at what interval the meter reading is to be sent cyclically.
Cost meter (Settings are the same for main and intermediate meter)		
Cost meter	■ **not active** ■ active	Activation of the cost meter.
Send meter reading on change	■ **not active** ■ active	Setting whether the meter reading should be sent when changed.

ETS Text	Dynamic range **[Default value]**	Comment
Send meter reading every ...	1 ... 255 € **[100 €]** **[10 €]**	Setting for which change the meter reading is to be sent.
Send meter reading cyclically every ...	not active, 1 min – 24 h **[1 h]**	Setting whether and at what interval the meter reading is to be sent cyclically.
Event A / Event B		
Activate Event A/B with	■ **not active** ■ final value: intermediate meter ■ final value: main meter ■ final value: costs intermediate meter ■ final value: costs main meter ■ time ■ interval	Determination of the action with which an event is to be activated.
Final value	1 ... 4294967295 € **[200]**	Value from which the event is to be activated. **Only with "final value: costs ...".**
Final value	1 ... 4294967295 kWh/Wh **[200]**	Value from which the event is to be activated. **Visible when "final value ..." is selected.** **DPT for main meter is "kWh".** **DPT for intermediate meter depends on the "Object selection" parameter**
Hours	0 ... 23 **[0]**	Specify the time or interval at which the event is to be activated. **If "Time" or "Interval" is selected**
Minutes	0 ... 59 **[0]**	
Day	■ **every day** ■ Monday ■ Tuesday ■ Wednesday ■ Thursday ■ Friday ■ Saturday ■ Sunday ■ every working day ■ every weekend day	Setting on which day(s) the event is to be activated. **Visible when "Time" is selected.**

ETS Text	Dynamic range **[Default value]**	Comment
Object „Event A“ / “Event B” sends	■ **OFF** ■ ON	Value to be sent when the condition for triggering the event is met.
Intermediate meter: Send all values	■ **not active** ■ active	Settings for which additional actions are to be carried out when the condition for activating the event is fulfilled. **The number of possible actions depends on the selection “Activate event X with”.**
Intermediate meter: Send costs	■ **not active** ■ active	
Intermediate meter: Reset	■ **not active** ■ active	
Main meter: Send all values	■ **not active** ■ active	
Main meter: Send costs	■ **not active** ■ active	
Main meter: Reset	■ **not active** ■ active	

Table 17: Settings – Total: Energy and cost meter

Main meter / Intermediate meter
The parameter “**Object selection**” can be used to set the datapoint type of the main and intermediate meters independently (Wh or kWh).

Important: The selection at the main meter requires the units HW R4.2!

The setting “**Send meter reading on change**” can be used to set at which change the meter sends its actual meter reading. If the setting is “not active”, the meter does not send a value, no matter how big the change is.

The setting “**Send meter reading cyclically every ...**” can be used to set the intervals at which the device sends its actual measured value. The cyclical sending function can be activated or deactivated independently of the setting “Send meter reading on change”. Values are also sent if the meter has not recorded a change. If both parameters are deactivated, no value is ever sent.

Cost meter
Here, sending conditions for the meter reading can be set for both the main and intermediate meters. The settings correspond to the settings for the main and intermediate meters.

Event A / Event B
Two different events can be triggered if certain conditions are met. This is done via 1 Bit objects.
In addition to sending the object (Event A or Event B), other actions can be performed. These can be activated individually as required:

final value: intermediate/main meter
Event is activated with a fixed value

final value: costs intermediate/main meter
Event is activated when a certain cost level is reached.

time
Event is executed recurrently at a certain time. In addition to hours and minutes, it is also possible to set whether the event is to be activated on certain days.

Interval
Event is activated recurrently at a defined interval (in hours and minutes).

Important: The starting point and subsequent cyclical transmission repetition is always after reprogramming or when the bus voltage returns!

The following table shows the associated communication objects:

Number	Name / Object function	Length	Usage
117 / 222 *	Total: Intermediate meter – Active energy (Wh/kWh)	4 Byte	Sending the meter reading. DPT depending on setting
118 / 223 *	Total: Intermediate meter – Costs in Cent /Euro - Output	2 Byte 4 Byte	Sending the actual costs. DPT according to setting in “Cost calculation
119 / 224 *	Total: Intermediate meter – Meter reading “Day”	4 Byte	Sending the meter reading
120 / 225 *	Total: Intermediate meter – Meter reading “Night”	4 Byte	Sending the meter reading
121 / 226 *	Total: Intermediate meter – Reset	1 Bit	Resetting the intermediate meter
122 / 227 *	Total: Main meter – Active energy (kWh)	4 Byte	Sending the meter reading
123 / 228 *	Total: Main meter – Costs in Cent /Euro - Output	2 Byte 4 Byte	Sending the actual costs. DPT according to setting in “Cost calculation”
124 / 229 *	Total: Main meter – Meter reading “Day”	4 Byte	Sending the meter reading
125 / 230 *	Total: Main meter – Meter reading “Night”	4 Byte	Sending the meter reading
126 / 231 *	Total: Main meter – Reset	1 Bit	Resetting the main meter
127 / 232 *	Total: Meter – Event A	1 Bit	Sending the value of Event A
128 / 233 *	Total: Meter – Event B	1 Bit	Sending the value of Event B

Table 18: Communication objects – Total: Energy and cost meter

* First number applies to unit with 3 channels, second number applies to unit with 6 channels.

4.5 Cost calculation

The following table shows the available settings:

ETS Text	Dynamic range **[Default value]**	Comment
Calculate costs via	■ **a fixed value (Day)** ■ two fixed values (Day /Night) ■ a variable value (Day) ■ two variable values (Day/Night)	Setting of how the costs for consumption are to be calculated.
Electricity rate „Day“	0,000 ... 10,000 €/KWh **[0,22]**	Setting the tariff for „Day“. **Only for “fixed” values.**
Electricity rate „Night“	0,000 ... 10,000 €/KWh **[0,18]**	Setting the tariff for „Night“. **Only for “two fixed” values.**
DPT for object „Actual electricity price“	■ 4 Byte Floating [Cent] ■ 2 Byte Floating [Cent] ■ 4 Byte Floating [Euro] ■ 2 Byte Floating [Euro]	Specifying the datapoint type. **Only for “fixed” values**
DPT for object „Electricity price Day“ and „ Actual electricity price “	■ 4 Byte Floating [Cent] ■ 2 Byte Floating [Cent] ■ 4 Byte Floating [Euro] ■ 2 Byte Floating [Euro]	Specifying the datapoint type. **Only for „one variable value“.**
DPT for object „Electricity price Day/Night“ and „ Actual electricity price “	■ 4 Byte Floating [Cent] ■ 2 Byte Floating [Cent] ■ 4 Byte Floating [Euro] ■ 2 Byte Floating [Euro]	Specifying the datapoint type. **Only for „two variable values“.**
“Day” <-> “Night” change is controlled via	■ “Day/Night” object (Day = 1, Night = 0) ■ “Day/Night” object (Day = 0, Night = 1) ■ time	Setting for how the changeover between “Day” and “Night” is to be carried out.
Time to switch from „Day“ to „Night“	0 ... 23 h **[0]**	Setting of the respective switching time in hours and minutes, when to switch between “Day” and “Night”.. **Only with selection „time“**
Time to switch from „Day“ to „Night“	0 ... 59 min **[0]**	
Time to switch from „Night“ to „Day“	0 ... 23 h **[0]**	
Time to switch from „Night“ to „Day“	0 ... 59 min **[0]**	

ETS Text	Dynamic range **[Default value]**	Comment
DPT for costs at intermediate and main meter	■ 4 Byte floating [Cent] ■ 2 Byte floating [Cent] ■ 4 Byte floating [Euro] ■ 2 Byte floating [Euro]	Determination of the datapoint type.
Separate “Day/Night” meters	■ **not active** ■ active	Setting whether meters for "Day" or "Night" mode are to be separated.

Table 19: Settings – Cost calculation

When calculating costs via fixed values, the corresponding tariff for “Day” or “Day” and “Night” is set in the ETS. When calculating via variable values, the tariffs are entered via objects. The currently valid tariff is output via the object - “Current electricity price”. The datapoint type for input and output can each be defined via parameters.

When the parameter “Separate “Day/Night” meters” is activated, objects for “Meter reading Day and Night” are displayed for the respective channels as well as for the “Total: Intermediate and Main meters”.

Accordingly, “Day” and “Night” are then counted separately.

The following table shows the corresponding communication objects:

Number	Name / Object function	Length	Usage
108 / 213 *	Central function – Day/Night	1 Bit	Receiving the value, whether "Day" or "Night
109 / 214 *	Central function – Time	3 Byte	Receiving the time
129 / 234 *	Electricity price: “Tag” – Electricity rate in Cent/Euro - Input		Receive the current electricity price. DPT according to parameter setting
130 / 235 *	Electricity price: “Night” – Electricity rate in Cent/Euro - Input		Receive the current electricity price. DPT according to parameter setting
131 / 236 *	Actual electricity price – Electricity rate in Cent/Euro - Output		Sending the current electricity price. DPT according to parameter setting

Table 20: Communication objects – Cost calculation

* First number applies to unit with 3 channels, second number applies to unit with 6 channels.

4.6 Channel selection

The table shows the possible settings for each channel:

ETS Text	Dynamic range **[Default value]**	**Comment**
Channel A – „X“	■ not active ■ **Switch** ■ Staircase light ■ Switch pulse ■ switch synchronously with channel A ■ switch synchronously with channel D	Operating mode of the respective channel. **“Switch synchronously with channel D” only for device with 6 channels**

Table 21: Settings – Channel selection

With the activation of a channel, a submenu appears in which the channel can be configured according to the selection.
The selection options (**Switch, Staircase light, Switch pulse**) are described in the following chapters.

With the selection “**switch synchronously with channel A**”, the respective channel switches simultaneously with channel A. No parameters for the switch function are shown here, as these are set in channel A. This setting is available from channel B.

Important: The setting is always possible for a maximum of 3 channels. It is thus possible to switch channels B and C synchronously with channel A.
Correspondingly, channels E and F can be switched **synchronously with channel D**.
With this function, for example, a three-phase motor or a cooker/oven can be directly connected and controlled without an external contactor.

4.7 Identical settings: Description of channel/objects + Additional text

For each channel, two text fields are available for free labelling:

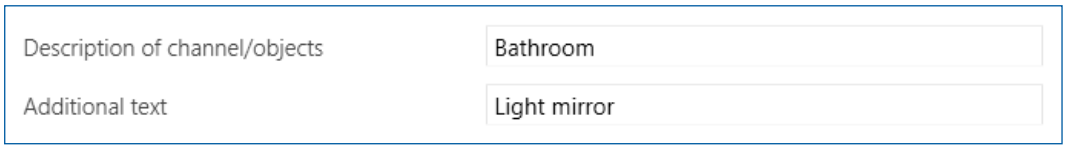

Figure 3: Settings – Text fields per channel

Texts with up to 30 characters can be stored for the “Description of channel/objects” field, texts with up to 80 characters can be stored for the “Additional text” field.

The text entered for “**Description of channels/objects**” appears both in the menu for the channel and in the communication objects of the channels.

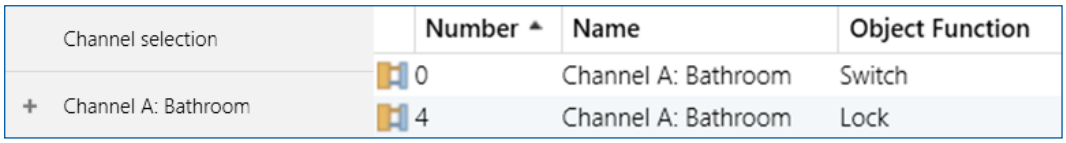

Figure 4: Labelling: Channel and objects

The “**Additional text**” is merely additional information for the programmer. This text is not visible anywhere else.

4.8 Switch

If a channel is selected for the “Switch” function, the corresponding menu appears. The individual settings are described in the following chapters.

Information on “**Description of channel/objects” and “Additional text**”, see 4.7 Identical settings: Description of channel/objects + Additional text

Activation of:

- Logic
- Scenes
- Threshold switch
- Operating hours meter
- Active power measurement
- Current measurement
- Voltage measurement
- Energy and cost meter

creates a new sub-menu in each case. These are also described separately below.

4.8.1 Relay operating mode

The table shows the possible settings:

ETS Text	Dynamic Range **[Default value]**	Comment
Mode	■ **normally open** ■ normally closed	Relay operating mode of the respective channel.

Table 22: Settings – Relay operating mode

The “M**ode”** determines whether a relay is operated as a “normally open” or “normally closed” contact. This means whether the relay is activated with a “1” or with a “0”.

Important note: The green channel indicator LED on the actuator reflects the status of the status object (“1” = LED On, “0” = LED Off). It does not reflect the state of the relay contact, whether open or closed (important when configured as a “normally closed”).

The following diagram shows the behaviour of a relay - in the operating mode as a “normally open” contact or as a “normally closed” contact - in response to a KNX telegram:

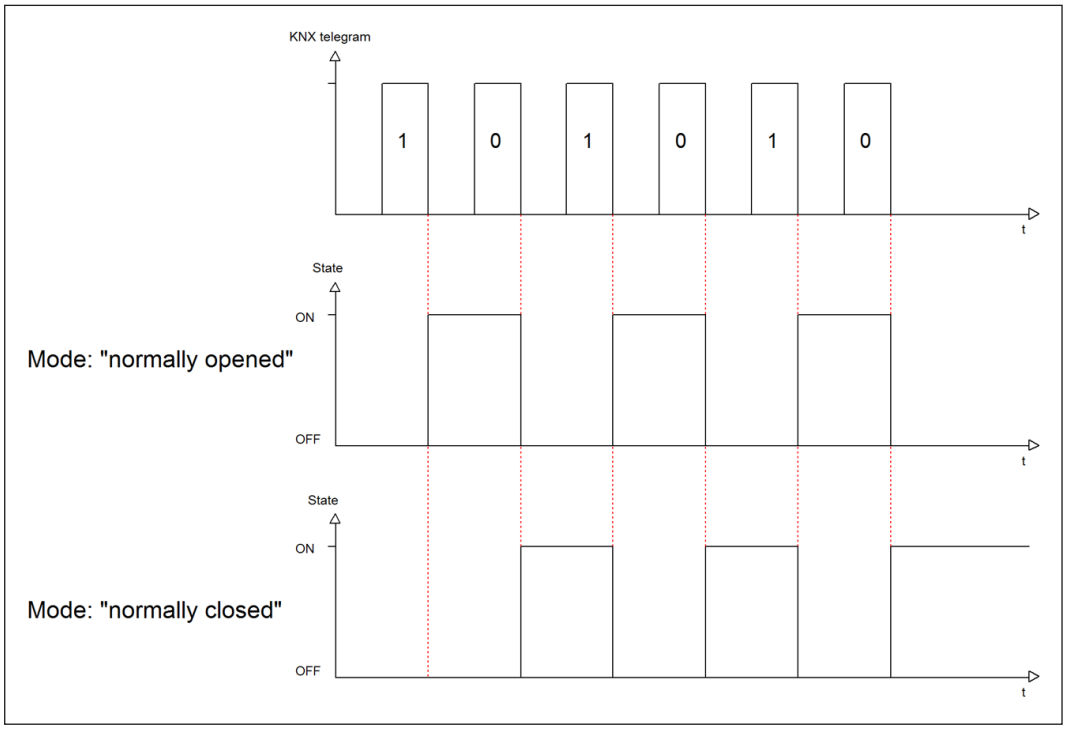

Figure 5: Diagram – Relay operation mode

4.8.2 Switch-on / -off delay

The table shows the possible settings:

ETS Text	Dynamic Range **[Default value]**	Comment
Switch-on/-off delay	0 ... 30000 s **[0 s]**	Setting the time by which the switch-on/ switch-off is to be delayed.

Table 23: Setting – Switch-on/-off delay

The **"Switch-on delay"** causes a delayed switch-on of the switch output. This means that the output only switches at a certain time after the switch-on command has been given.

The **"Switch-off delay"** works according to the same principle as the switch-on delay. It causes a time-delayed switch-off. On-delay and off-delay can be combined.

The following diagram shows the combination of a switch-on and switch-off delay:

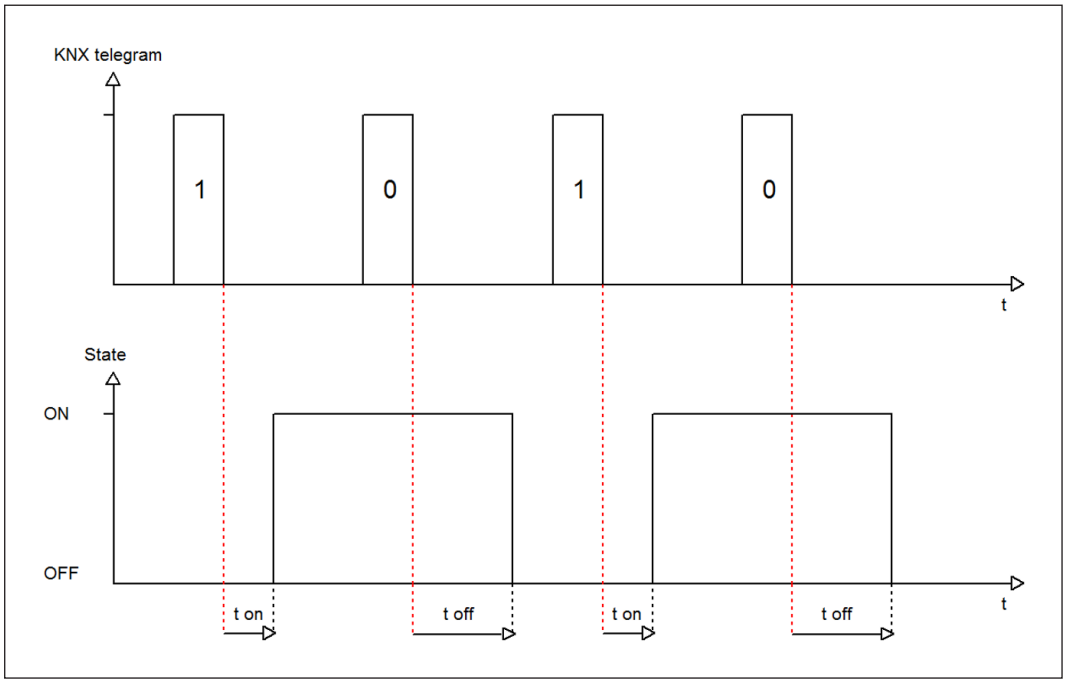

Figure 6: Diagram – Switch-on/-off delay

Important:

- The delays are only effective with a switching command via the communication object (via the object “Switch” of the channel as well as via the central function “Switch”).
- Manual operation via buttons on the device always reacts immediately (without delay).
- If a new command is sent during the expiry time for a delay, the last switching command applies.

  Example:
  Switch-on delay = 5 s
  ON command is sent
  An OFF command is sent after e.g. 3 seconds => OFF command is valid, ON command is no longer valid. Switch channel remains OFF.

4.8.3 Central function

The table shows the possible settings:

ETS Text	Dynamic Range **[Default value]**	Comment
Central function	■ **not active** ■ active	Setting whether the channel should react to the central switch function or not.

Table 24: Setting – Central function

The central switch function can be selected for each individual channel. To do this, the "**Central function**" parameter must be set to "active". This function enables easier programming of central switch functions. If the communication object of the central function is now addressed, all channels with activated "Central function" are switched.

The following table shows the communication objects:

Number	Name / Object function	Length	Usage
105 / 210 *	Central function – Switch	1 Bit	Central switching of the channels

Table 25: Communication objects – Central function

* First number applies to unit with 3 channels, second number applies to unit with 6 channels.

4.8.4 Status functions

The table shows the possible settings:

ETS Text	Dynamic Range **[Default value]**	Comment
Send status	■ not active, passive status object ■ on change ■ on change and lock ■ on input of telegram	Sending condition of the status object.
Send status cyclically (0 = not active)	0 ... 30000 s **[0 s]**	Setting of a time in which the status object is to be sent cyclically.
Additional inverted status	■ **not active** ■ active	Activation of an object for inverted status.

Table 26: Settings – Status functions

With the parameter "**Send status**" the sending condition can be defined:

- **not active, passive status object**
  The status object is not actively sent but can be requested
- **on change**
  The status object is sent each time the output is changed.
- **on change and lock**
  The status object is sent whenever the output is changed - also during locking. Sending the status during locking ensures that a switch button sends the correct value after locking.
- **on input of telegram**
  The status object is sent out with every telegram input - regardless of the output change.

The setting "**Send status cyclically**" can be used to set whether and at what interval the current status is to be sent to the bus. With the setting "0 s", the function is inactive.

With the parameter "**Additional inverted status**", a new object can also be activated with which the current status is sent inverted. This is used, for example, for integration in logic functions or other subsequent functions.

The following table shows the communication objects:

Number	Name / Object function	Length	Usage
7	Channel A – Status	1 Bit	Sends the status of the channel
8	Channel A – Inverted status	1 Bit	Sends the inverted status of the channel

Table 27: Communication objects – Status functions

4.8.5 Add channel to overall evaluation (...)

The table shows the possible settings:

ETS Text	Dynamic Range **[Default value]**	Comment
Add channel to overall evaluation (current, active power, energy meter and voltage error)	■ **not active** ■ active	Setting whether the channel is to be included in the overall evaluation.

Table 28: Setting – Add channel to overall evaluation

With this setting, it can be determined for each channel individually whether the channel is to be included in the calculation of the total current, the total active power, for the energy meter as well as in the evaluation of a voltage error for the actuator.

4.8.6 Behaviour on locking / unlocking

The table shows the possible settings:

ETS Text	Dynamic Range **[Default value]**	Comment
Behaviour on locking	■ OFF ■ ON ■ **no change**	Setting for how the channel should behave when a lock is set.
Behaviour on unlocking	■ OFF ■ ON ■ **no change** ■ previous state, catch up on switching ■ previous state	Setting for how the channel should behave when it is unlocked.

Table 29: Setting – Behaviour on locking / unlocking

If a channel is locked by sending a “1” to the lock object, the channel is locked for further operation until it is unlocked again by sending a “0” to the lock object.

The following actions can be executed when **locking** and **unlocking**:

- **OFF**
  The channel is switched off.
- **ON**
  The channel is switched on.
- **no change**
  The channel retains the current state.

In addition, the following actions can be executed when **unlocking**:

- **previous state, catch up on switching**
  The channel restores the status it had before the lock and catches up on possible switching commands received during the lock. The last command is assumed.
- **previous state**
  The channel is restored to the state it was in before it was locked.

The following table shows the communication object:

Number	Name / Object function	Length	Usage
4	Channel A – Lock	1 Bit	Activates / deactivates a lock

Table 30: Communication object – Lock object

4.8.7 Priority / Forced guidance

The table shows the possible settings:

ETS Text	Dynamic Range **[Default value]**	Comment
Priority / Forced guidance	■ **not active** ■ 2 Bit forced guidance ■ 1 Bit priority ON ■ 1 Bit priority OFF	Activate a priority or a forced guidance.
Fallback time for priority / forced guidance (0 = not active)	0 ... 600 min **[0 min]**	Definition of a fallback time from priority / forced guidance back to the normal state.
Behaviour after deactivation of priority / Behaviour after forced guidance	■ OFF ■ ON ■ **no change** ■ previous state, catch up on switching ■ previous state	Setting of the behaviour after deactivation of the priority / forced guidance.

Table 31: Settings – Priority / Forced guidance

Priority/forced guidance causes prioritised switching of the output. Priority is switched via a 1 Bit object, forced guidance via a 2 Bit object. With the activation of a priority/forced guidance, the actuator channel is "forced" into a fixed position (ON or OFF), which has the highest priority. This means that the channel cannot be operated manually or via an object. This is only possible when the priority/forced guidance is withdrawn or when a set fallback time has expired.

The channel is switched on with the setting "**1 Bit Priority ON**" when activated with a "1" and switched off accordingly with the setting "**1 Bit Priority OFF**". With a "0", the priority is deactivated and the channel is in normal operation.

The object "**Forced guidance**" knows 3 possible states:

- **control = 1, value = 1** **Forced guidance ON** Channel is switched on
- **control = 1, value = 0** **Forced guidance OFF** Channel is switched off
- **control = 0, value = 0** **Forced guidance inactive** Channel is in normal operation

With the **fallback time**, the priority / forced guidance can be automatically deactivated after a certain time and the channel changes back to “normal” operation after the fallback time has elapsed.

The following actions can be performed after deactivating priority / forced guidance:

- **OFF**
  The channel is switched off.
- **ON**
  The channel is switched on.
- **no change**
  The channel retains in current state.
- **previous state, catch up on switching**
  The channel is restored to the state it was in before the “forced state”, retaining the last switching command that was sent during the “forced state”.
- **previous state**
  The channel is restored to the state it was before it was “forced”.

The following table shows the communication objects:

Number	Name / Object function	Length	Usage
5	Channel A – Priority	1 Bit	Activate / deactivate the priority
5	Channel A – Forced guidance	2 Bit	Activate / deactivate the forced guidance

Table 32: Communication objects – Priority / Forced guidance

4.8.8 Behaviour on bus power return / bus power failure

The table shows the possible settings:

ETS Text	Dynamic Range **[Default value]**	Comment
Behaviour on bus power return	■ OFF ■ ON ■ **no change**	Behaviour on the return of the bus power.
Behaviour on bus power failure	■ OFF ■ ON ■ **no change**	Behaviour in response to a bus power failure.

Table 33: Settings – Behaviour on bus power return / bus power failure

The behaviour on bus power return / failure can be used to set which state the channel assumes on the respective event.

4.8.9 Logic

The submenu “Logic” is displayed with activation of the parameter in the corresponding channel. The table shows the possible settings:

ETS Text	Dynamic Range **[Default value]**	Comment
Logic function	■ **with Switch object and one Logic object** ■ with Switch object and two Logic objects	Setting how many logic objects are used as inputs in addition to the switch object.
Logic operation	■ **OR** ■ AND ■ XOR ■ gate open with Logic object = 0 ■ gate open with Logic object = 1	Setting according to which logical operation the logic should work.
Invert inputs	■ **not active** ■ object “Switch” ■ object “Logic 1” ■ object “Logic 2” ■ object “Switch” and object “Logic 1” ■ object “Switch” and object “Logic 2” ■ object “Logic 1” and object “Logic 2” ■ object “Switch”, object “Logic 1” and object “Logic 2”	Setting whether and which inputs work inverted. **All settings with “Logic object 2” only available with “Logic function: with Switch object and two Logic objects”.**
Invert output	■ **not active** ■ active	Setting whether the output object should be inverted.
Set objects to value after bus power return	■ **not active** ■ active	Setting whether objects should be set to fixed values after bus power return.
Value for object “Switch”	■ **not active** ■ value = 0 ■ value = 1	**Only shown if “Set objects to value after bus voltage return” is active.** Setting with which value the objects are to be assigned after bus power return.
Value for object “Logic 1”	■ **not active** ■ value = 0 ■ value = 1	
Value for object “Logic 2”	■ **not active** ■ value = 0 ■ value = 1	

Table 34: Settings – Logic

The switch object is always an input of a logic function. It can also be determined whether one or two external logic objects are added for the function in order to carry out the logic operation. The result of the function is internally linked to the switch output (relay ON or OFF), therefore no output object is available. A logic with only external input objects is not possible here.
The logic functions switch the output ON when the following conditions are fulfilled:

- **AND**
  When all inputs are active “1”.
- **OR**
  If at least one input is active “1”.
- **XOR**
  If only one input is active “1”.
- **gate open with Logic object = “0”**
  The output can only be switched via the object “switch” if the logic objects have the value “0”.
- **gate open with Logic object = “1”**
  The output can only be switched via the object “switch” if the logic objects have the value “1”.

The polarity of the inputs and the output can be individually reversed via the parameters “**Invert inputs / output**”.

The parameter “**Set objects to value after bus voltage return**” enables the logic to be set to a fixed value after bus power return.

The following table shows the communication objects:

Number	Name / Object function	Length	Usage
9	Channel A – Logic 1	1 Bit	Logic object 1, used for integration into a logic function
10	Channel A – Logic 2	1 Bit	Logic object 2, used for integration into a logic function

Table 35: Communication objects – Logic

4.8.10 Scenes

The submenu “Scenes” is displayed with activation of the parameter in the corresponding channel. With a scene, it is possible to carry out several actions in different trades (e.g. light, heating, roller shutter) simultaneously with a button press or an operating command. All this happens with one telegram. With the help of the scene function of the switch actuator, the channels can be integrated into a scene control. To do this, a scene number (1 ... 64) and a behaviour must be assigned to the corresponding memory location (scene A...H).

The table shows the possible settings:

ETS Text	Dynamic Range **[Default value]**	Comment
Learn scene	■ **not active** ■ active ■ keep learned scene (do not maintain parameter settings)	Learning scenes. Activate / deactivate memory function.
Scene A - H	■ **not active** ■ active	Activation of the corresponding scene.
Scene number	not active 1 – 64	Setting of the scene number to which the channel should react.
Scene behaviour	■ **OFF** ■ ON ■ lock ■ unlock	Reaction of the selected channel to the call of this scene.

Table 36: Settings – Scenes

If the parameter “**Learn scene**” is activated, a scene value can be changed and saved after calling up the scene. To do this, the triggering button must also be set to “save => active”. If the button is now pressed for a longer time, the corresponding value is sent to the bus for saving (see table on the next page). The new value is then saved and will be executed the next time the scene is called up.

The parameter “**keep learned scenes**” has the effect that learned scenes are retained even after reprogramming.

The following table shows the communication objects:

Number	Name / Object function	Length	Usage
6	Channel A – Scene	1 Byte	Call of the respective scene

Table 37: Communication object – Scene

Note: A KNX scene is transmitted by a 1 Byte group address. When called up, scene 1 corresponds to the transmitted decimal value “0” or the hex value “00”. While the decimal value “128” or the hex value “80” is transmitted to save scene 1. The following table clarifies the relationship between scene number and transmitted value and helps with diagnosis via the group monitor of the ETS.

Scene No.	Call up		Save	
	Decimal	Hexadecimal	Decimal	Hexadecimal
1	0	0x00	128	0x80
2	1	0x01	129	0x81
3	2	0x02	130	0x82
....	....	....	....	....
64	63	0x3f	191	0xBF

Table 38: Call up and save scenes

4.8.11 Threshold switch

The submenu “Threshold switch” is displayed with activation of the parameter in the corresponding channel. The following table shows the selection options:

ETS Text	Dynamic Range **[Default value]**	Comment
Datapoint type	■ 1 Byte DPT 5.001 Percent (0...100 %) ■ 1 Byte DPT 5.005 Decimal factor (0...255) ■ 2 Byte DPT 7.001 Pulse (0...65535) ■ 2 Byte DPT 9.001 Temperature (°C) ■ 2 Byte DPT 9.004 Brightness (Lux)	Setting of the datapoint type with which the threshold switch is to work.
Behaviour when undercut	■ **not active** ■ OFF ■ ON	Setting which state the channel is to assume when the value falls below the threshold.
Lower threshold	Free value input	Setting of the value below which the channel is to switch. **Value and value range depending on the set datapoint type.**
Behaviour when exceeded	■ **not active** ■ OFF ■ ON	Setting which state the channel is to assume when the value is exceeded.
Upper threshold	Free value input	Setting of the value above which the channel is to switch. **Value and value range depending on the set datapoint type.**

Table 39: Settings – Threshold switch

The threshold switch enables the switching of the channel depending on an analogue value. For example, a channel can be switched on when a certain temperature is fallen below (lower threshold) in order to activate a radiator. If the temperature exceeds a certain value (upper threshold), the channel can be switched off again.

Important: The channel switches when the upper threshold value is exceeded and when the lower threshold value is undercut. Values in between act like a hysteresis, i.e. no change at the output.

Example:

Parameter
Upper threshold = 20 °C
Behaviour when exceeded = OFF
Lower threshold = 15 °C
Behaviour when undercut = ON

Current status: Channel is switched on

Reaction
Actual value 17°C = No reaction (remains ON)
Actual value 20°C = Channel switches OFF
Actual value 17°C = No reaction (remains OFF)
Actual value 14°C = Channel switches ON

The following table shows the communication object:

Number	Name / Object function	Length	Usage
11	Channel A – Threshold switch	1 Byte 2 Byte	Receive the input value. DPT depending on the parameter setting

Table 40: Communication object – Threshold switch

4.8.12 Operating hours meter

The submenu “Operating hours meter” is displayed with activation of the parameter in the corresponding channel. The following table shows the selection options:

ETS Text	Dynamic Range **[Default value]**	Comment
Type of meter	■ **operating hours meter** ■ service count down timer	Setting how the meter is to be used
Datapoint type	■ **4 Byte value in s (DPT 13.100)** ■ 2 Byte value in h (DPT 7.007)	Selection of the datapoint type for the output object.
Type “**operating hours meter**”		
Send operating hours every ... (0 = not active)	0 ... 10000 h **[0 h]**	Setting at which intervals the operating hours are to be sent.
Send operating hours cyclically every ...	**not active** 10 min – 4 h	Setting at which intervals the operating hours are to be sent cyclically.
Type “**service count down timer**”		
Send “Time until next service” every ... (0 = not active)	0 ... 10000 h **[0 h]**	Setting at which intervals the “Time until next service” should be sent.
Send service message at intervals of ...	0 ... 60000 h **[0 h]**	Setting of the value from which to count down.

Table 41: Settings – Operating hours meter

There are 2 operating modes for the meter to choose from:

Operating hours meter
The operating hours meter counts the operating hours when the relay of the channel is closed.

Send operating hours every ...
Set a sending interval in full hours at which the operating hours are to be sent. The value is only sent when a certain meter reading has been reached.

Send operating hours cyclically every ...
Setting a cyclical transmission interval of the operating hours. The transmission cycle is fixed, regardless of whether the counter reading has changed in the meantime.

The following communication objects are available for this operating mode:

Number	Name / Object function	Length	Usage
2	Channel A – Meter reading - Operating hours	2 Byte 4 Byte	Sending the operating hours. DPT depending on parameter setting
3	Channel A – Reset operating hours	1 Bit	Resetting the operating hours meter

Table 42: Communication objects – Operating hours meter

Service count down timer

The “Service count down timer” counts down from the set start value when the relay of the channel is closed. When the set time expires, a service message is sent via the corresponding object.

Send “Time until next service” every ...
Set a sending interval in full hours at which the remaining hours until service are sent.

Send service message at intervals of ...
Set the value from which to count down. When the counter value “0 h” is reached, a service message is output via an object. This value is also valid if the service message was reset via object.

The following communication objects are available for this operating mode:

Number	Name / Object function	Length	Usage
1	Channel A – Service required	1 Bit	Reporting an upcoming service
2	Channel A – Time until next service	2 Byte 4 Byte	Sending the remaining service hours. DPT depending on parameter setting
3	Channel A – Reset: Service message	1 Bit	Resetting the service hours to the parameter value (Send service message at intervals of ...)

Table 43: Communication objects – Service count down timer

4.8.13 Active power measurement

The menu is displayed as soon as the “Active power measurement” parameter has been activated in the channel.

The following table shows the settings:

ETS Text	Dynamic range **[Default value]**	Comment
Object selection	■ **4 Byte floating value in W (DPT 14.056)** ■ 2 Byte floating value in kW (DPT 9.024)	Selection of the datapoint type for the output object of the total active power.
Send value on change of ...	not active, 5 % – 75 % **[10 %]**	Setting from which percentage change the value is to be sent.
Minimum change	**not active** 10 W – 1000 W	Value by which the value to be sent must change at least. **Only if change in % is active.**
Send cyclically every ...	**not active** 1 min – 24 h	Setting at which intervals the value is to be sent.
Monitoring of load exceedance	■ **not active** ■ active, Output: Switch ■ active, Output: Scene	Activation of the load exceedance and selection of the output object. **A detailed description follows in chapter 4.8.13.1**
Monitoring of load undercut	■ **not active** ■ active, Output: Switch ■ active, Output: Scene	Activation of the load undercut and selection of the output object. **A detailed description follows in chapter 4.8.13.2**
Extended power measurement	■ **not active** ■ active	Activation/deactivation of the function. **A detailed description follows in chapter 4.8.13.3**

Table 44: Settings – Active Power measurement

The data point type for the output object is defined via the “**Object selection**”.

Furthermore, it can be determined at which change a value is to be sent. In order not to send too frequently in case of smaller measured values, a value can subsequently be defined by which the measured value must change at least.
With the parameter “**Send cyclically every ...**”, a fixed sending interval is defined independent of the measured value.

The parameters for “M**onitoring of load exceedance”, “Monitoring of load undercut”** and **“Extended power measurement”** are explained in the following chapters.

The following table shows the associated communication objects:

Number	Name / Object function	Length	Usage
12	Channel A – Active power	2 Byte 4 Byte	Output object for the measured value. DPT depending on the parameter setting.

Table 45: Communication objects – Active Power

4.8.13.1 Monitoring of load exceedance

After activating the parameter, the following selection options are available:

ETS Text	Dynamic range **[Default value]**	Comment
Value for exceedance	0 ... 4600 W [**100**]	Setting of the threshold for exceeding.
Send value if exceeded	■ not active ■ **value „1“** ■ value „0“	Setting the value to be sent when the switching threshold is exceeded. **Only with „Output: Switch“.**
Send scene if exceeded	not active 1 – 64 **[1]**	Setting of the scene to be sent when the switching threshold is exceeded. **Only with „Output: Scene“.**
Send output cyclically	**not active** 1 min – 24 h	Setting at which intervals the value or scene is to be sent.
Switch off channel	■ **not active** ■ active	Setting whether the channel should switch off when the threshold is exceeded.
Value for withdrawal	0 ... 4600 W [**100**]	Setting the threshold for the withdrawal of the exceedance.
Send value on withdrawal	■ not active ■ value „1“ ■ **value „0“**	Setting the value to be sent when falling below the withdrawal threshold. **Only with „Output: Switch“.**
Send scene on withdrawal	not active 1 – 64 **[2]**	Setting the scene to be sent when falling below the withdrawal threshold. **Only with „Output: Scene“.**
Type of delay	■ Delay after activation ■ Delay after withdrawal	Setting to which function the delay should apply.
Delay time	00:00:00 ... 08:00:00 hh:mm:ss **[00:00:00]**	Entering a time by which the selected type is to be sent delayed.

Table 46: Settings – Monitoring of load exceedance

When the individual “**Value for exceedance**” is overshot, the output object sends - depending on the setting - either a corresponding 1 Bit value or the desired scene number.

When falling below the individual “**Value for withdrawal**”, the output object sends - depending on the setting - either a corresponding 1 Bit value or the desired scene number.

Important: The value for withdrawal must be smaller than the value for exceedance!

The parameter “**Switch off channel**” can be used to set whether this should switch off when the threshold is exceeded. After switching off, the channel must be reactivated via object.

Via the setting “**Type of delay**” it is possible to activate a switching delay either for the exceedance (delay after activation) or for the withdrawal of the exceedance (delay after withdrawal). The corresponding time is set with the “**Delay time**” setting. With the setting “00:00:00”, switching is always direct.

The following table shows the associated communication objects:

Number	Name / Object function	Length	Usage
16	Channel A – Load exceedance	1 Bit 1 Byte	Output object for monitoring the load exceedance. DPT depending on the parameter setting

Table 47: Communication objects – Load exceedance

4.8.13.2 Monitoring of load undercut

After activating the parameter, the following selection options are available:

ETS Text	Dynamic range **[Default value]**	Comment
Value for undercut	0 ... 4600 W [**5**]	Setting of the threshold for undercutting
Send value if undercut	■ not active ■ **value „1“** ■ value „0“	Setting the value to be sent when the switching threshold is undercut. **Only with „Output: Switch“.**
Send scene if undercut	not active 1 – 64 **[1]**	Setting of the scene to be sent when the switching threshold is undercut. **Only with „Output: Scene“.**
Send output cyclically	**not active** 1 min – 24 h	Setting at which intervals the value or scene is to be sent.
Switch off channel	■ **not active** ■ active	Setting whether the channel should switch off when the threshold is undercut.
Value for withdrawal	0 ... 4600 W [**100**]	Setting the threshold for the withdrawal of the undercut
Send value on withdrawal	■ not active ■ value „1“ ■ **value „0“**	Setting of the value to be sent when the withdrawal threshold is exceeded. **Only with „Output: Switch“.**
Send scene on withdrawal	not active 1 – 64 **[2]**	Setting of the scene to be sent when the withdrawal threshold is exceeded. **Only with „Output: Scene“.**
Type of delay	■ Delay after activation ■ Delay after withdrawal	Setting to which function the delay should apply.
Delay time	00:00:00 ... 08:00:00 hh:mm:ss **[00:00:00]**	Entering a time by which the selected type is to be sent delayed.

Table 48: Settings – Monitoring of load undercut

When the value falls below the individual “**Value for undercut**”, the output object sends - depending on the setting - either the corresponding 1 Bit value or the desired scene number.

When the individual “**Value for withdrawal**” is exceeded, the output object sends - depending on the setting - either the corresponding 1 Bit value or the desired scene number.

Important: The value for withdrawal must be greater than the value for undercut!

The parameter "**Switch off channel**" can be used to set whether this should switch off when falling below the threshold. After switching off, the channel must be reactivated via the object.

Via the setting "**Type of delay**" it is possible to activate a switching delay either for the undercut (delay after activation) or for the withdrawal of the undercut (delay after withdrawal). The corresponding time is set with the "**Delay time**" setting. With the setting "00:00:00", switching is always direct.

The following table shows the associated communication objects:

Number	Name / Object function	Length	Usage
17	Channel A – Load undercut	1 Bit 1 Byte	Output object for monitoring of load undercut. DPT depending on the parameter setting

Table 49: Communication objects – Load undercut

4.8.13.3 Extended power measurement

After activating the parameter in the channel, the following setting options are available:

ETS Text	Dynamic range **[Default value]**	Comment
Object selection	■ Apparent power in VA (DPT 14.056) ■ Apparent power in kVA (DPT 9.024) ■ Reactive power in Var (DPT 14.056) ■ Reactive power in kVar (DPT 9.024) ■ Power factor in cos Phi (DPT 14.057)	Setting of the object type that is to be output additionally.
Send value on change of ...	not active, 5 % – 75 % **[10 %]**	Setting from which percentage change the value is to be sent.
Send cyclically every ...	**not active** 1 min – 24 h	Setting at which intervals the value is to be sent.

Table 50: Settings – Extended power measurement

With "**Object selection**", in addition to the active power, another "power" or the "power factor cos Phi" can be output via an object. It can be selected for the apparent power and the reactive power whether it is a 2 Byte or a 4 Byte object.

The parameters "**Send value on change of ...**" and "**Send cyclically every ...**" can also be used to define send conditions.

The following table shows the associated communication object:

Number	Name / Object function	Length	Usage
15	Channel A – Extended power measurement: Apparent power / Reactive power / Power factor cos Phi	2 Byte 4 Byte	Output object for the measured value. DPT depending on the parameter setting.

Table 51: Communication objects – Extended power measurement

4.8.14 Current measurement

The menu is displayed as soon as the “Current measurement” parameter has been activated in the channel.

The following table shows the settings:

ETS Text	Dynamic range **[Default value]**	Comment
Object selection	■ **2 Byte value in mA (DPT 7.012)** ■ 2 Byte floating value in mA (DPT 9.021) ■ 4 Byte floating value in A (DPT 14.019)	Selection of the datapoint type for the output object of the current measurement.
Send value on change of ...	not active, 5 % – 75 % **[10 %]**	Setting from which percentage change the value is to be sent.
Minimum change	**not active** 10 mA – 1 A	Value by which the value to be sent must change at least. **Only if change in % is active.**
Send cyclically every ...	**not active** 1 min – 24 h	Setting at which intervals the value is to be sent.
Monitoring of current exceedance	■ **not active** ■ active, Output: Switch ■ active, Output: Scene	Activation of the current exceedance and selection of the output object. **A detailed description follows in chapter 4.8.14.1**
Monitoring of current undercut	■ **not active** ■ active, Output: Switch ■ active, Output: Scene	Activation of the current undercut and selection of the output object. **A detailed description follows in chapter 4.8.14.2**
Error message	■ **not active** ■ Load failure with closed contact ■ Residual current with open contact ■ Residual current / Load failure	Selection in which error case a 1 Bit telegram is to be sent.
Threshold	20 mA – 2 A **[20 mA]**	Setting of the threshold value for sending an error message. **Only displayed if “Error message” is active.**

Table 52: Settings – Current measurement

The datapoint type for the output object is defined via the "**Object selection**".

It can also be determined at which change a value is to be sent. In order not to send too often for smaller measured values, a value can be defined subsequently by which the measured value must change at least.

The parameter "**Send cyclically every ...**" is used to set a fixed send interval independent of the measured value.

The parameters for "**Monitoring of current exceedance"** and "M**onitoring of current undercut"** are explained in the following chapters.

Error message

Load failure with closed contact:
If the set threshold is fallen below when the contact is closed, the "Load failure" output object sends a "1". Exceedance again resets the value to "0".

Residual current with open contact:
If the actuator measures a current greater than the set threshold when the contact is open, the "Residual current" output object sends a "1".

Residual current / Load failure:
The output object "Residual current / Load failure" sends a "1" in both error cases.

The following table shows the associated communication objects:

Number	Name / Object function	Length	Usage
13	Channel A – Current value	2 Byte 4 Byte	Output of the currently measured value. DPT depending on the parameter setting.
34	Channel A – Load failure	1 Bit	Output object for the error message in the event of a load failure.
34	Channel A – Residual current	1 Bit	Output object for the error message in the event of a residual current.
34	Channel A – Residual current / Load failure	1 Bit	Output object for the error message in case of residual current and load failure.

Table 53: Communication objects – Current measurement

4.8.14.1 Monitoring of current exceedance

After activating the parameter, the following settings are available:

ETS Text	Dynamic range **[Default value]**	Comment
Value range	■ **10 mA – 1000 mA** ■ 1 A – 20 A	Preselection and limitation of the value range of the exceedance.
Value for exceedance	10 ... 1000 mA [**10**] 1 ... 20 A [**1**]	Setting of the threshold for exceeding. **Unit depends on the set value range.**
Send value if exceeded	■ not active ■ **value „1“** ■ value „0“	Setting the value to be sent when the switching threshold is exceeded. **Only with „Output: Switch“.**
Send scene if exceeded	not active 1 – 64 **[1]**	Setting of the scene to be sent when the switching threshold is exceeded. **Only with „Output: Scene“.**
Send output cyclically	**not active** 1 min – 24 h	Setting at which intervals the value or scene is to be sent.
Switch off channel	■ **not active** ■ active	Setting whether the channel should switch off when the threshold is exceeded.
Value range for withdrawal	■ **10 mA – 1000 mA** ■ 1 A – 20 A	Preselection and limitation of the value range for withdrawal of exceedance.
Value for withdrawal	10 ... 1000 mA [**10**] 1 ... 20 A [**1**]	Setting the threshold for the withdrawal of the exceedance. **Unit depends on the set value range.**
Send value on withdrawal	■ not active ■ value „1“ ■ **value „0“**	Setting the value to be sent when falling below the withdrawal threshold. **Only with „Output: Switch“.**
Send scene on withdrawal	not active 1 – 64 **[2]**	Setting the scene to be sent when falling below the withdrawal threshold. **Only with „Output: Scene“.**
Type of delay	■ Delay after activation ■ Delay after withdrawal	Setting to which function the delay should apply.
Delay time	00:00:00 ... 08:00:00 hh:mm:ss **[00:00:00]**	Entering a time by which the selected type is to be sent delayed.

Table 54: Settings – Monitoring of current exceedance

By means of the parameters “**Value range**” and “**Value range for withdrawal**”, the respective setting range of the threshold is adapted to the current value to be expected.

When the individual “**Value for exceedance**” is overshot, the output object sends - depending on the setting - either a corresponding 1 Bit value or the desired scene number.

When falling below the individual “**Value for withdrawal**”, the output object sends - depending on the setting - either a corresponding 1 Bit value or the desired scene number.

Important: The value for withdrawal must be smaller than the value for exceedance!

The parameter “**Switch off channel**” can be used to set whether this should switch off when the threshold is exceeded. After switching off, the channel must be reactivated via object.

Via the setting “**Type of delay**” it is possible to activate a switching delay either for the exceedance (delay after activation) or for the withdrawal of the exceedance (delay after withdrawal). The corresponding time is set with the “**Delay time**” setting. With the setting “00:00:00”, switching is always direct.

The following table shows the associated communication objects:

Number	Name / Object function	Length	Usage
18	Channel A – Current exceedance	1 Bit 1 Byte	Output object for monitoring the current exceedance. DPT depending on the parameter setting

Table 55: Communication objects – Current exceedance

4.8.14.2 Monitoring of current undercut

After activating the parameter, the following settings are available:

ETS Text	Dynamic range **[Default value]**	Comment
Value range	■ **10 mA – 1000 mA** ■ 1 A – 20 A	Preselection and limitation of the undercut value range.
Value for undercut	10 ... 1000 mA [**10**] 1 ... 20 A [**1**]	Setting of the threshold for undercutting. **Unit depends on the set value range.**
Send value if undercut	■ not active ■ **value „1“** ■ value „0“	Setting of the value to be sent when falling below the threshold.. **Only with „Output: Switch“.**
Send scene if undercut	not active 1 – 64 **[1]**	Setting of the scene to be sent when falling below the threshold. **Only with „Output: Scene“.**
Send output cyclically	**not active** 1 min – 24 h	Setting at which intervals the value or scene is to be sent.
Switch off channel	■ **not active** ■ active	Setting whether the channel should switch off when the threshold is undercut.
Value range for withdrawal	■ **10 mA – 1000 mA** ■ 1 A – 20 A	Preselection and limitation of the range of values for the withdrawal of the undercut.
Value for withdrawal	10 ... 1000 mA [**10**] 1 ... 20 A [**1**]	Setting the threshold for the withdrawal of the undercut. **Unit depends on the set value range.**
Send value on withdrawal	■ not active ■ value „1“ ■ **value „0“**	Setting of the value to be sent when the withdrawal threshold is exceeded. **Only with „Output: Switch“.**
Send scene on withdrawal	not active 1 – 64 **[2]**	Setting of the scene to be sent when the withdrawal threshold is exceeded. **Only with „Output: Scene“.**
Type of delay	■ Delay after activation ■ Delay after withdrawal	Setting to which function the delay should apply.
Delay time	00:00:00 ... 08:00:00 hh:mm:ss **[00:00:00]**	Entering a time by which the selected type is to be sent delayed.

Table 56: Settings – Monitoring of current undercut

By means of the parameters “**Value range**” and “**Value range for withdrawal**”, the respective setting range of the threshold is adapted to the current value to be expected.

When the value falls below the individual “**Value for undercut**”, the output object sends - depending on the setting - either the corresponding 1 Bit value or the desired scene number.

When the individual “**Value for withdrawal**” is exceeded, the output object sends - depending on the setting - either the corresponding 1 Bit value or the desired scene number.

Important: The value for withdrawal must be greater than the value for undercut!

The parameter “**Switch off channel**” can be used to set whether this should switch off when falling below the threshold. After switching off, the channel must be reactivated via the object.

Via the setting “**Type of delay**” it is possible to activate a switching delay either for the undercut (delay after activation) or for the withdrawal of the undercut (delay after withdrawal). The corresponding time is set with the “**Delay time**” setting. With the setting “00:00:00”, switching is always direct.

The following table shows the associated communication objects:

Number	Name / Object function	Length	Usage
19	Channel A – Current undercut	1 Bit 1 Byte	Output object for monitoring of current undercut. DPT depending on the parameter setting

Table 57: Communication objects – Current undercut

4.8.15 Voltage measurement

The menu is displayed as soon as the “Voltage measurement” parameter has been activated in the channel.

The following table shows the settings:

ETS Text	Dynamic range **[Default value]**	Comment
Send value on change of ...	not active, 5 % – 75 % **[10 %]**	Setting from which percentage change the value is to be sent.
Send cyclically every ...	**not active** 1 min – 24 h	Setting at which intervals the value is to be sent.
Monitoring of voltage exceedance	■ **not active** ■ active, Output: Switch ■ active, Output: Scene	Activation of the voltage exceedance and selection of the output object. **A detailed description follows in chapter4.8.15.1**
Monitoring of voltage undercut	■ **not active** ■ active, Output: Switch ■ active, Output: Scene	Activation of the voltage undercut and selection of the output object.. **A detailed description follows in chapter 4.8.15.2**

Table 58: Settings – Voltage measurement

With activation, the actual voltage value at the channel is measured.

The sending conditions for the measured value can be set. On the one hand, it can be defined **at which change a value** is to be sent, on the other hand, a fixed sending interval can be determined with the parameter “**Send cyclically every ...**” independent of the measured value.

The parameters for “**Monitoring of voltage exceedance”** and “M**onitoring of voltage undercut”** are explained in the following chapters.

The following table shows the associated communication objects:

Number	Name / Object function	Length	Usage
14	Channel A – Voltage value	4 Byte	Output of the currently measured value.

Table 59: Communication object – Voltage measurement

4.8.15.1 Monitoring of voltage exceedance

After activating the parameter, the following settings are available:

ETS Text	Dynamic range **[Default value]**	Comment
Value for exceedance	180 ... 300 V **[260 V]**	Setting of the threshold for exceeding.
Send value if exceeded	■ not active ■ **value „1“** ■ value „0“	Setting the value to be sent when the switching threshold is exceeded. **Only with „Output: Switch“.**
Send scene if exceeded	not active 1 – 64 **[1]**	Setting of the scene to be sent when the switching threshold is exceeded. **Only with „Output: Scene“.**
Send output cyclically	**not active** 1 min – 24 h	Setting at which intervals the value or scene is to be sent.
Switch off channel	■ **not active** ■ active	Setting whether the channel should switch off when the threshold is exceeded.
Value for withdrawal	180 ... 300 V **[240 V]**	Setting the threshold for the withdrawal of the exceedance.
Send value on withdrawal	■ not active ■ value „1“ ■ **value „0“**	Setting the value to be sent when falling below the withdrawal threshold. **Only with „Output: Switch“.**
Send scene on withdrawal	not active 1 – 64 **[2]**	Setting the scene to be sent when falling below the withdrawal threshold. **Only with „Output: Scene“.**
Type of delay	■ Delay after activation ■ Delay after withdrawal	Setting to which function the delay should apply.
Delay time	00:00:00 ... 08:00:00 hh:mm:ss **[00:00:00]**	Entering a time by which the selected type is to be sent delayed.

Table 60: Settings – Monitoring of voltage exceedance

When the individual “**Value for exceedance**” is overshot, the output object sends - depending on the setting - either a corresponding 1 Bit value or the desired scene number.

When falling below the individual “**Value for withdrawal**”, the output object sends - depending on the setting - either a corresponding 1 Bit value or the desired scene number.

Important: The value for withdrawal must be smaller than the value for exceedance!

The parameter "**Switch off channel**" can be used to set whether this should switch off when the threshold is exceeded. After switching off, the channel must be reactivated via object.

Via the setting "**Type of delay**" it is possible to activate a switching delay either for the exceedance (delay after activation) or for the withdrawal of the exceedance (delay after withdrawal). The corresponding time is set with the "**Delay time**" setting. With the setting "00:00:00", switching is always direct.

The following table shows the associated communication objects:

Number	Name / Object function	Length	Usage
20	Channel A – Voltage exceedance	1 Bit 1 Byte	Output object for monitoring the voltage exceedance. DPT depending on the parameter setting

Table 61: Communication objects – Voltage exceedance

4.8.15.2 Monitoring of voltage undercut

After activating the parameter, the following settings are available:

ETS Text	Dynamic range **[Default value]**	Comment
Value for undercut	180 ... 300 V **[210 V]**	Setting of the threshold for undercutting
Send value if undercut	■ not active ■ **value „1“** ■ value „0“	Setting of the value to be sent when falling below the threshold.. **Only with „Output: Switch“.**
Send scene if undercut	not active 1 – 64 **[1]**	Setting of the scene to be sent when falling below the threshold. **Only with „Output: Scene“.**
Send output cyclically	**not active** 1 min – 24 h	Setting at which intervals the value or scene is to be sent.
Switch off channel	■ **not active** ■ active	Setting whether the channel should switch off when the threshold is undercut.
Value for withdrawal	180 ... 300 V **[230 V]**	Setting the threshold for the withdrawal of the undercut.
Send value on withdrawal	■ not active ■ value „1“ ■ **value „0“**	Setting of the value to be sent when the withdrawal threshold is exceeded. **Only with „Output: Switch“.**
Send scene on withdrawal	not active 1 – 64 **[2]**	Setting of the scene to be sent when the withdrawal threshold is exceeded. **Only with „Output: Scene“.**
Type of delay	■ Delay after activation ■ Delay after withdrawal	Setting to which function the delay should apply.
Delay time	00:00:00 ... 08:00:00 hh:mm:ss **[00:00:00]**	Entering a time by which the selected type is to be sent delayed.

Table 62: Settings – Monitoring of voltage undercut

When the value falls below the individual “**Value for undercut**”, the output object sends - depending on the setting - either the corresponding 1 Bit value or the desired scene number.

When the individual “**Value for withdrawal**” is exceeded, the output object sends - depending on the setting - either the corresponding 1 Bit value or the desired scene number.

Important: The value for withdrawal must be greater than the value for undercut!

The parameter "**Switch off channel**" can be used to set whether this should switch off when falling below the threshold. After switching off, the channel must be reactivated via the object.

Via the setting "**Type of delay**" it is possible to activate a switching delay either for the undercut (delay after activation) or for the withdrawal of the undercut (delay after withdrawal). The corresponding time is set with the "**Delay time**" setting. With the setting "00:00:00", switching is always direct.

The following table shows the associated communication objects:

Number	Name / Object function	Length	Usage
21	Channel A – Voltage undercut	1 Bit 1 Byte	Output object for monitoring of voltage undercut. DPT depending on the parameter setting

Table 63: Communication objects – Voltage undercut

4.8.16 Energy and cost meter

The menu is displayed as soon as the parameter “Energy and cost meter” has been activated in the channel.

The following table shows the selection options:

ETS Text	Dynamic range **[Default value]**	Comment
Main meter (is automatically active)		
Object selection (from HW R4.2)	■ **Value in Wh (DPT 13.010)** ■ Value in kWh (DPT 13.013)	Selection of the datapoint type for the main meter.
Send meter reading on change	■ **not active** ■ active	Setting whether the meter reading should be sent when changed.
Send meter reading every ...	10 - 50000 Wh **[10 Wh]** 1 ... 65535 kWh **[1 kWh]**	Setting for which change the meter reading is to be sent. **Selection depends on the selected datapoint type.**
Send meter reading cyclically every ...	not active 1 min – 24 h **[5 min]**	Setting whether and at what interval the meter reading is to be sent cyclically.
Intermediate meter		
Intermediate meter	■ **not active** ■ active	Activation of the intermediate meter.
Object selection	■ **Value in Wh (DPT 13.010)** ■ Value in kWh (DPT 13.013)	Selection of the datapoint type for the intermediate meter.
Send meter reading on change	■ **not active** ■ active	Setting whether the meter reading should be sent when changed.
Send meter reading every ...	10 - 50000 Wh **[10 Wh]** 1 ... 65535 kWh **[1 kWh]**	Setting for which change the meter reading is to be sent. **Selection depends on the selected datapoint type.**
Send meter reading cyclically every ...	**not active** 1 min – 24 h	Setting whether and at what interval the meter reading is to be sent cyclically.
Cost meter (Settings are the same for main and intermediate meter)		
Cost meter	■ **not active** ■ active	Activation of the cost meter.
Send meter reading on change	■ **not active** ■ active	Setting whether the meter reading should be sent when changed.

ETS Text	Dynamic range **[Default value]**	Comment
Send meter reading every ...	1 ... 255 € **[100 €]** **[10 €]**	Setting for which change the meter reading is to be sent.
Send meter reading cyclically every ...	not active 1 min – 24 h **[1 h]**	Setting whether and at what interval the meter reading is to be sent cyclically.
Event A / Event B		
Activate Event A/B with	■ **not active** ■ final value: intermediate meter ■ final value: main meter ■ final value: costs intermediate meter ■ final value: costs main meter ■ time ■ interval	Determination of the action with which an event is to be activated.
Final value	1 ... 4294967295 € **[200]**	Value from which the event is to be activated. **Only with “final value: costs ...”.**
Final value	1 ... 4294967295 kWh/Wh **[200]**	Value from which the event is to be activated. **Visible when “final value ...” is selected.** **DPT for main meter is “kWh”.** **DPT for intermediate meter depends on the “Object selection” parameter**
Hours	0 ... 23 **[0]**	Specify the time or interval at which the event is to be activated. **If “Time” or “Interval” is selected**
Minutes	0 ... 59 **[0]**	
Day	■ **every day** ■ Monday ■ Tuesday ■ Wednesday ■ Thursday ■ Friday ■ Saturday ■ Sunday ■ every working day ■ every weekend day	Setting on which day(s) the event is to be activated. **Visible when “Time” is selected.**

ETS Text	Dynamic range **[Default value]**	Comment
Object „Event A“ / “Event B” sends	■ **OFF** ■ ON	Value to be sent when the condition for triggering the event is met.
Intermediate meter: Send all values	■ **not active** ■ active	Settings for which additional actions are to be carried out when the condition for activating the event is fulfilled. **The number of possible actions depends on the selection “Activate event X with”.**
Intermediate meter: Send costs	■ **not active** ■ active	
Intermediate meter: Reset	■ **not active** ■ active	
Main meter: Send all values	■ **not active** ■ active	
Main meter: Send costs	■ **not active** ■ active	
Main meter: Reset	■ **not active** ■ active	

Table 64: Settings – Energy and cost meter

Main meter / Intermediate meter
The parameter “**Object selection**” can be used to set the datapoint type of the main and intermediate meters independently (Wh or kWh).

Important: The selection at the main meter requires the units HW R4.2!

The setting “**Send meter reading on change**” can be used to set at which change the meter sends its actual meter reading. If the setting is “not active”, the meter does not send a value, no matter how big the change is.

The setting “**Send meter reading cyclically every ...**” can be used to set the intervals at which the device sends its actual measured value. The cyclical sending function can be activated or deactivated independently of the setting “Send meter reading on change”. Values are also sent if the meter has not recorded a change. If both parameters are deactivated, no value is ever sent..

Cost meter
Here, sending conditions for the meter reading can be set for both the main and intermediate meters. The settings correspond to the settings for the main and intermediate meters.

Important: If the parameter “Separate Day/Night meters” in the menu “Cost calculation” is active, the objects “Intermediate meter: Electric active energy (24 h)” and “Main meter: Electric active energy (24 h)” are not writable!

Event A / Event B
Two different events can be triggered if certain conditions are met. This is done via 1 Bit objects.
In addition to sending the object (Event A or Event B), other actions can be performed. These can be activated individually as required:

final value: intermediate/main meter
Event is activated with a fixed value

final value: costs intermediate/main meter
Event is activated when a certain cost level is reached.

time
Event is executed recurrently at a certain time. In addition to hours and minutes, it is also possible to set whether the event is to be activated on certain days.

Interval
Event is activated recurrently at a defined interval (in hours and minutes).

Important: The starting point and subsequent cyclical transmission repetition is always after reprogramming or when the bus voltage returns!

The following table shows the associated communication objects:

Number	Name / Object function	Length	Usage
22	Channel A – Intermediate meter: Electrical active energy (24 h)	4 Byte	Sending the meter reading. DPT depending on setting
23	Channel A – Intermediate meter: Costs in Cent /Euro - Output	2 Byte 4 Byte	Sending the actual costs. DPT according to setting in “Cost calculation”
24	Channel A – Intermediate meter: Meter reading “Day”	4 Byte	Sending the meter reading
25	Channel A – Intermediate meter: Meter reading “Night”	4 Byte	Sending the meter reading
26	Channel A – Intermediate meter: Reset	1 Bit	Resetting the intermediate meter
27	Channel A – Main meter: Electrical active energy (24 h)	4 Byte	Sending the meter reading
28	Channel A – Main meter: Costs in Cent /Euro - Output	2 Byte 4 Byte	Sending the actual costs. DPT according to setting in “Cost calculation”
29	Channel A – Main meter: Meter reading “Day”	4 Byte	Sending the meter reading
30	Channel A – Main meter: Meter reading “Night”	4 Byte	Sending the meter reading
31	Channel A – Main meter: Reset	1 Bit	Resetting the main meter
32	Channel A – Meter: Event A	1 Bit	Sending the value of Event A
33	Channel A – Meter: Event B	1 Bit	Sending the value of Event B

Table 65: Communication objects – Energy and cost meter

4.9 Staircase light

Note: When selecting “Staircase light”, the functions “Logic”, “Threshold switch” and “Operating hours meter” are not available!

The staircase light function enables automatic switch-off after a preset time. The staircase light time is freely adjustable. The individual settings are described in the following chapters.

Information on “**Description of channel/objects” and “Additional text**”,
see 4.7 Identical settings: Description of channel/objects + Additional text

Activation of:

- Scenes
- Active power measurement
- Current measurement
- Voltage measurement
- Energy and cost meter

creates a new sub-menu in each case. These are also described separately below.

4.9.1 Relay operating mode

The table shows the possible settings:

ETS Text	Dynamic Range **[Default value]**	Comment
Mode	■ **normally open** ■ normally closed	Relay operating mode of the respective channel.

Table 66: Settings – Relay operating mode

The “M**ode”** determines whether a relay is operated as a “normally open” or “normally closed” contact. This means whether the relay is activated with a “1” or with a “0”.

Important note: The green channel indicator LED on the actuator reflects the status of the status object (“1” = LED On, “0” = LED Off). It does not reflect the state of the relay contact, whether open or closed (important when configured as a “normally closed”).

The following diagram shows the behaviour of a relay - in the operating mode as a “normally open” contact or as a “normally closed” contact - in response to a KNX telegram:

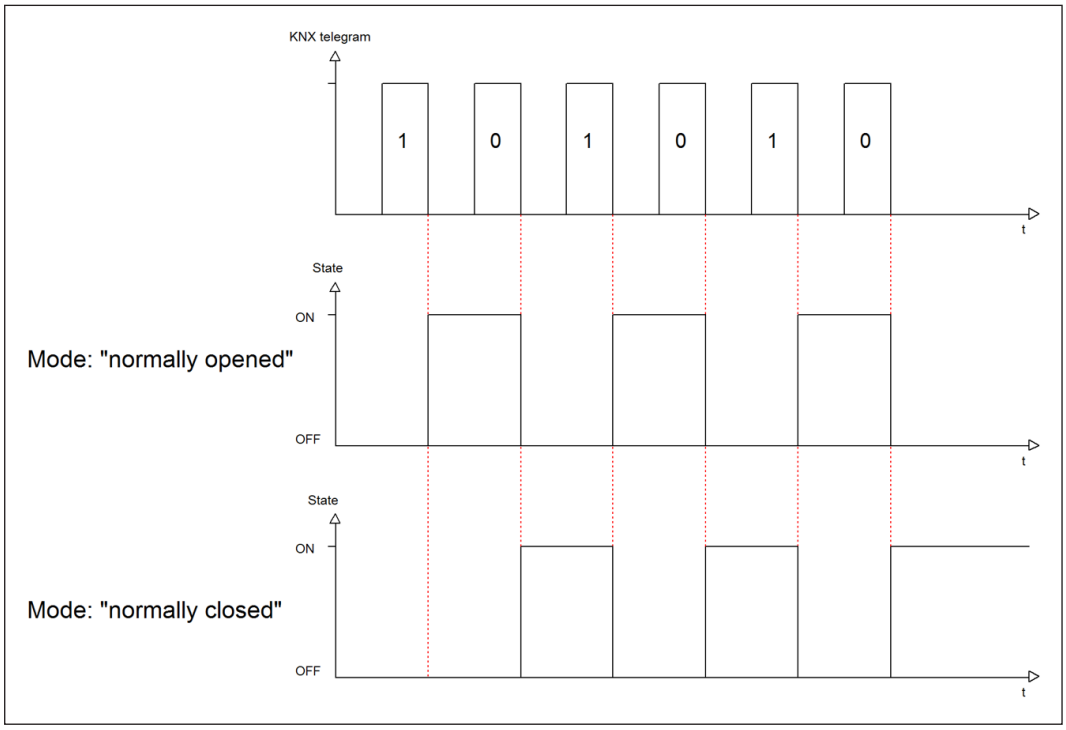

Figure 7: Diagram – Relay operation mode

4.9.2 Additional switch object

By activating the parameter **"Additional switch object"**, an object is displayed which can switch the corresponding channel independently of the staircase light function. Via this switch object, the channel can be switched ON/OFF permanently and does not access the staircase light time.
As soon as the staircase light time is started again, the switching command via the additional object is no longer valid. Priority is therefore always given to the last command sent.

The following table shows the communication object:

Number	Name / Object function	Length	Usage
0	Channel A – Switch	1 Bit	Switch object for permanent ON/OFF

Table 67: Communication object – Additional switch object

4.9.3 Staircase light timer

The table shows the possible settings:

ETS Text	Dynamic range **[Default value]**	Comment
Staircase light timer	1 ... 30000 s **[120 s]**	Setting the duration of the staircase light time.

Table 68: Setting – Staircase light timer

When the staircase light time is activated, the channel switches. After the time has elapsed, it falls back to the previous state.

The following table shows the communication object:

Number	Name / Object function	Length	Usage
1	Channel A – Staircase light	1 Bit	Object triggers the staircase light timer

Table 69: Communication object – Staircase light timer

4.9.4 Prewarning

The table shows the possible settings:

ETS Text	Dynamic Range **[Default value]**	Comment
Prewarning	■ **not active** ■ light On/Off ■ prewarning object ■ light On/Off and prewarning object	Setting of the prewarning function.
Prewarning duration	0 ... 30000 s **[1]**	Setting the prewarning duration. **Only available for functions with „light On/Off“.**
Prewarning time	0 ... 30000 s **[10]**	Setting the prewarning time.

Table 70: Settings – Prewarning

The prewarning function warns about the end of the staircase light timer.
The following options are available:

- **light On/Off**
  After the staircase light timer has elapsed, the light is switched off for the set **prewarning duration** and then switched on again for the set **prewarning time**.
- **prewarning object**
  An additional communication object is displayed for the prewarning. This object sends a “1” after the staircase light timer has elapsed - but the light remains switched on during this time. After the prewarning time has elapsed, the staircase light switches off and the prewarning object sends a “0”. With this setting, the total staircase light timer is extended by the set prewarning time.
- **light On/Off and prewarning object**
  Combination of the above two settings.

The **prewarning duration** indicates the time that the channel is switched off after the staircase lighting timer has elapsed.

The **prewarning time** indicates the time the prewarning object sends a “1” or the light is switched on again after the prewarning duration.

Important: Total duration = staircase light timer + prewarning duration + prewarning time

The following diagram illustrates the time sequence:

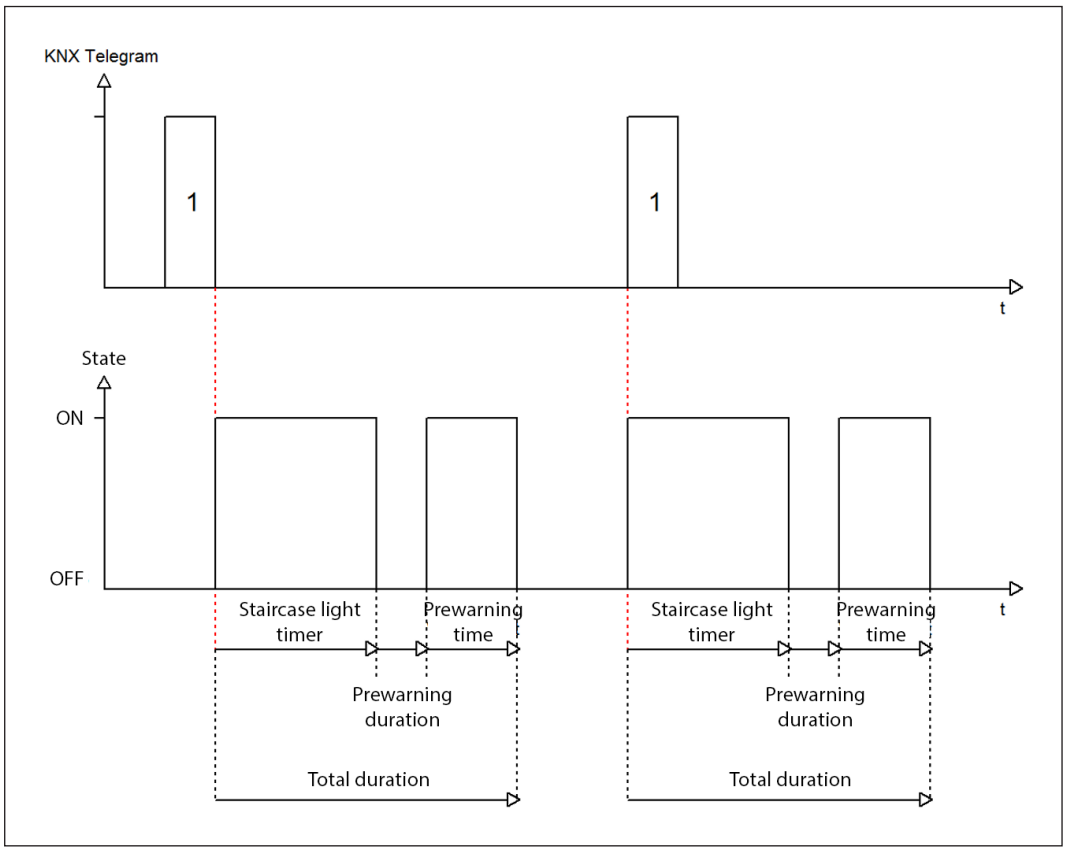

Figure 8: Diagram – Prewarning

The following table shows the communication object:

Number	Name / Object function	Length	Usage
3	Channel A – Prewarning	1 Bit	Sending the prewarning

Table 71: Communication object – Prewarning

4.9.5 Manual switch-off

If this function is active, the channel can be switched off before the set staircase light timer has elapsed with a “0” to the “Staircase light” object.

4.9.6 Extend staircase light time

The table shows the possible settings:

ETS Text	Dynamic Range **[Default value]**	Comment
Extend staircase light time	■ not active ■ **restart time** ■ add time	Setting whether and how the staircase light time can be extended.

Table 72: Settings – Extend staircase light time

The following options are available:

not active
Staircase light time cannot be extended and can only be restarted after the staircase light timer has expired.

restart time
The staircase light timer is restarted by sending a “1” to the “Staircase light” object again.

add time
The staircase light timer is added to the remaining staircase light time by sending a “1” to the object “Staircase light” again.

The following diagram shows the behaviour with the setting “Restart time”:

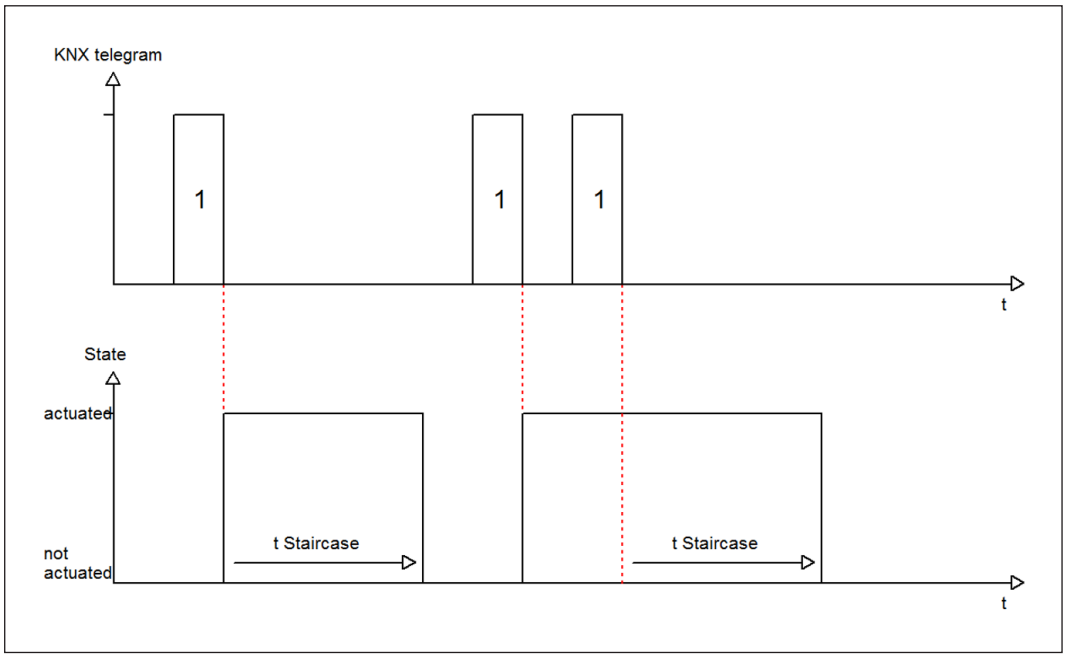

Figure 9: Diagram – Extend staircase light time

4.9.7 Staircase light with variable time

With this function, it is possible to individually set the staircase light timer via a separate communication object. The table shows the possible settings:

ETS Text	Dynamic Range **[Default value]**	Comment
Factor for object „Staircase light with time“	■ **1 s** ■ 10 s ■ 1 min	Setting the time factor

Table 73: Settings – Staircase light with variable time

The variable staircase light timer enables the staircase light to be started with variable time. For this purpose, a value of 0-255 is sent to the 1 Byte input. The resulting staircase light timer is calculated as follows:

Set time factor x sent value = staircase light timer

The staircase light function with variable time can be used in large staircases, for example, to start the staircase light on each floor with an individual time.

The following table shows the communication object:

Number	Name / Object function	Length	Usage
2	Channel A – Staircase light with time	1 Byte	Starting a variable staircase light timer

Table 74: Communication object – Staircase light with variable time

4.9.8 Central function

The table shows the possible settings:

ETS Text	Dynamic Range **[Default value]**	Comment
Central function	■ **not active** ■ active	Setting whether the channel should react to the central switch function.

Table 75: Setting – Central function

This function simplifies the programming of central switch functions. If the communication object of the central function is triggered, all channels with activated central function are switched.

The following table shows the communication objects:

Number	Name / Object function	Length	Usage
105 / 210 *	Central function – Switch	1 Byte	Central switching of the channels

Table 76: Communication objects – Central function

* First number applies to unit with 3 channels, second number applies to unit with 6 channels.

4.9.9 Status functions

The table shows the possible settings:

ETS Text	Dynamic Range **[Default value]**	Comment
Send status	■ not active, passive status object ■ on change ■ on change and lock ■ on input of telegram	Sending condition of the status object.
Send status cyclically (0 = not active)	0 ... 30000 s **[0 s]**	Setting of a time in which the status object is to be sent cyclically.
Additional inverted status	■ **not active** ■ active	Activation of an object for inverted status.

Table 77: Settings – Status functions

With the parameter "**Send status**" the sending condition can be defined:

- **not active, passive status object**
  The status object is not actively sent but can be requested
- **on change**
  The status object is sent each time the output is changed.
- **on change and lock**
  The status object is sent whenever the output is changed - also during locking. Sending the status during locking ensures that a switch button sends the correct value after locking.
- **on input of telegram**
  The status object is sent out with every telegram input - regardless of the output change.

The setting "**Send status cyclically**" can be used to set whether and at what interval the current status is to be sent to the bus. With the setting "0 s", the function is inactive.

With the parameter "**Additional inverted status**", a new object can also be activated with which the current status is sent inverted. This is used, for example, for integration in logic functions or other subsequent functions.

The following table shows the communication objects:

Number	Name / Object function	Length	Usage
7	Channel A – Status	1 Bit	Sends the status of the channel
8	Channel A – Inverted status	1 Bit	Sends the inverted status of the channel

Table 78: Communication objects – Status functions

4.9.10 Add channel to overall evaluation (...)

The table shows the possible settings:

ETS Text	Dynamic Range **[Default value]**	Comment
Add channel to overall evaluation (current, active power, energy meter and voltage error)	■ **not active** ■ active	Setting whether the channel is to be included in the overall evaluation.

Table 79: Setting – Add channel to overall evaluation

With this setting, it can be determined for each channel individually whether the channel is to be included in the calculation of the total current, the total active power, for the energy meter as well as in the evaluation of a voltage error for the actuator.

4.9.11 Behaviour on locking / unlocking

The table shows the possible settings:

ETS Text	Dynamic range **[Default value]**	Comment
Behaviour on locking	■ OFF ■ ON ■ **no change**	Setting for how the channel should behave when a lock is set.
Behaviour on unlocking	■ **OFF** ■ start staircase light timer	Setting for how the channel should behave when it is unlocked.

Table 80: Setting – Behaviour on locking / unlocking

If a channel is locked by sending a “1” to the lock object, the channel is locked for further operation until it is unlocked again by sending a “0” to the lock object.

The following actions can be executed when **locking** and **unlocking**:

- **OFF**
  The channel is switched off.
- **ON (only for locking)**
  The channel is switched on permanently.
- **no change (only for locking)**
  The channel retains the current state.
- **start staircase light timer (only for unlocking)**
  The staircase light time is started.

The following table shows the communication object:

Number	Name / Object function	Length	Usage
4	Channel A – Lock	1 Bit	Activates / deactivates a lock

Table 81: Communication object – Lock object

4.9.12 Priority / Forced guidance

The table shows the possible settings:

ETS Text	Dynamic range **[Default value]**	Comment
Priority / Forced guidance	■ **not active** ■ 2 Bit forced guidance ■ 1 Bit priority ON ■ 1 Bit priority OFF	Activate a priority or a forced guidance.
Fallback time for priority / forced guidance (0 = not active)	0 ... 600 min **[0 min]**	Definition of a fallback time from priority / forced guidance back to the normal state.
Behaviour after deactivation of priority / Behaviour after forced guidance	■ **OFF** ■ start staircase light timer	Setting of the behaviour after deactivation of the priority / forced guidance.

Table 82: Settings – Priority / Forced guidance

Priority/forced guidance causes prioritised switching of the output. Priority is switched via a 1 Bit object, forced guidance via a 2 Bit object. With the activation of a priority/forced guidance, the actuator channel is "forced" into a fixed position (ON or OFF), which has the highest priority. This means that the channel cannot be operated manually or via an object. This is only possible when the priority/forced guidance is withdrawn or when a set fallback time has expired.

The channel is switched on with the setting "**1 Bit Priority ON**" when activated with a "1" and switched off accordingly with the setting "**1 Bit Priority OFF**". With a "0", the priority is deactivated and the channel is in normal operation.

The object "**Forced guidance**" knows 3 possible states:

- **control = 1, value = 1** **Forced guidance ON** Channel is switched on
- **control = 1, value = 0** **Forced guidance OFF** Channel is switched off
- **control = 0, value = 0** **Forced guidance inactive** Channel is in normal operation

With the **fallback time**, the priority / forced guidance can be automatically deactivated after a certain time and the channel changes back to “normal” operation after the fallback time has elapsed.

The following actions can be performed after **deactivating priority / forced guidance**:

- **OFF**
  The channel is switched off.
- **start staircase light timer**
  The staircase light time is started..

The following table shows the communication objects:

Number	Name / Object function	Length	Usage
5	Channel A – Priority	1 Bit	Activate / deactivate the priority
5	Channel A – Forced guidance	2 Bit	Activate / deactivate the forced guidance

Table 83: Communication objects – Priority / Forced guidance

4.9.13 Behaviour on bus power return / bus power failure

The table shows the possible settings:

ETS Text	Dynamic range **[Default value]**	Comment
Behaviour on bus power return	■ OFF ■ start staircase light timer ■ **state before bus power failure**	Behaviour on the return of the bus power.
Behaviour on bus power failure	■ OFF ■ ON ■ **no change**	Behaviour in response to a bus power failure.

Table 84: Settings – Behaviour on bus power return / bus power failure

The behaviour on bus power return / failure can be used to set which state the channel assumes on the respective event.

4.9.14 Scenes

The submenu “Scenes” is displayed with activation of the parameter in the corresponding channel. With a scene, it is possible to carry out several actions in different trades (e.g. light, heating, roller shutter) simultaneously with a button press or an operating command. All this happens with one telegram. With the help of the scene function of the switch actuator, the channels can be integrated into a scene control. To do this, a scene number (1 ... 64) and a behaviour must be assigned to the corresponding memory location (scene A...H).

The table shows the possible settings:

ETS Text	Dynamic Range **[Default value]**	Comment
Learn scene	■ **not active** ■ active ■ keep learned scene (do not maintain parameter settings)	Learning scenes. Activate / deactivate memory function.
Scene A - H	■ **not active** ■ active	Activation of the corresponding scene.
Scene number	not active 1 – 64	Setting of the scene number to which the channel should react.
Scene behaviour	■ **OFF** ■ ON ■ lock ■ unlock	Reaction of the selected channel to the call of this scene.

Table 85: Settings – Scenes

If the parameter “**Learn scene**” is activated, a scene value can be changed and saved after calling up the scene. To do this, the triggering button must also be set to “save => active”. If the button is now pressed for a longer time, the corresponding value is sent to the bus for saving (see table on the next page). The new value is then saved and will be executed the next time the scene is called up.

The parameter “**keep learned scenes**” has the effect that learned scenes are retained even after reprogramming.

The following table shows the communication objects:

Number	Name / Object function	Length	Usage
6	Channel A – Scene	1 Byte	Call of the respective scene

Table 86: Communication object – Scene

Note: A KNX scene is transmitted by a 1 Byte group address. When called up, scene 1 corresponds to the transmitted decimal value “0” or the hex value “00”. While the decimal value “128” or the hex value “80” is transmitted to save scene 1. The following table clarifies the relationship between scene number and transmitted value and helps with diagnosis via the group monitor of the ETS.

Scene No.	Call up		Save	
	Decimal	Hexadecimal	Decimal	Hexadecimal
1	0	0x00	128	0x80
2	1	0x01	129	0x81
3	2	0x02	130	0x82
....	....	....	....	....
64	63	0x3f	191	0xBF

Table 87: Call up and save scenes

4.9.15 Active power measurement

The menu is displayed as soon as the “Active power measurement” parameter has been activated in the channel.

The following table shows the settings:

ETS Text	Dynamic range **[Default value]**	Comment
Object selection	■ **4 Byte floating value in W (DPT 14.056)** ■ 2 Byte floating value in kW (DPT 9.024)	Selection of the datapoint type for the output object of the total active power.
Send value on change of ...	not active, 5 % – 75 % **[10 %]**	Setting from which percentage change the value is to be sent.
Minimum change	**not active** 10 W – 1000 W	Value by which the value to be sent must change at least. **Only if change in % is active.**
Send cyclically every ...	**not active** 1 min – 24 h	Setting at which intervals the value is to be sent.
Monitoring of load exceedance	■ **not active** ■ active, Output: Switch ■ active, Output: Scene	Activation of the load exceedance and selection of the output object. **A detailed description follows in chapter 4.9.15.1**
Monitoring of load undercut	■ **not active** ■ active, Output: Switch ■ active, Output: Scene	Activation of the load undercut and selection of the output object. **A detailed description follows in chapter 4.9.15.2**
Extended power measurement	■ **not active** ■ active	Activation/deactivation of the function. **A detailed description follows in chapter 4.9.15.3**

Table 88: Settings – Active Power measurement

The data point type for the output object is defined via the “**Object selection**”.

Furthermore, it can be determined at which change a value is to be sent. In order not to send too frequently in case of smaller measured values, a value can subsequently be defined by which the measured value must change at least.

With the parameter “**Send cyclically every ...**”, a fixed sending interval is defined independent of the measured value.

The parameters for “M**onitoring of load exceedance”, “Monitoring of load undercut”** and **“Extended power measurement”** are explained in the following chapters.

The following table shows the associated communication object:

Number	Name / Object function	Length	Usage
12	Channel A – Active power	2 Byte 4 Byte	Output object for the measured value. DPT depending on the parameter setting.

Table 89: Communication object – Active Power

4.9.15.1 Monitoring of load exceedance

After activating the parameter, the following selection options are available:

ETS Text	Dynamic range **[Default value]**	Comment
Value for exceedance	0 ... 4600 W [**100**]	Setting of the threshold for exceeding.
Send value if exceeded	■ not active ■ **value „1“** ■ value „0“	Setting the value to be sent when the switching threshold is exceeded. **Only with „Output: Switch“.**
Send scene if exceeded	not active 1 – 64 **[1]**	Setting of the scene to be sent when the switching threshold is exceeded. **Only with „Output: Scene“.**
Send output cyclically	**not active** 1 min – 24 h	Setting at which intervals the value or scene is to be sent.
Switch off channel	■ **not active** ■ active	Setting whether the channel should switch off when the threshold is exceeded.
Value for withdrawal	0 ... 4600 W [**100**]	Setting the threshold for the withdrawal of the exceedance.
Send value on withdrawal	■ not active ■ value „1“ ■ **value „0“**	Setting the value to be sent when falling below the withdrawal threshold. **Only with „Output: Switch“.**
Send scene on withdrawal	not active 1 – 64 **[2]**	Setting the scene to be sent when falling below the withdrawal threshold. **Only with „Output: Scene“.**
Type of delay	■ Delay after activation ■ Delay after withdrawal	Setting to which function the delay should apply.
Delay time	00:00:00 ... 08:00:00 hh:mm:ss **[00:00:00]**	Entering a time by which the selected type is to be sent delayed.

Table 90: Settings – Monitoring of load exceedance

When the individual “**Value for exceedance**” is overshot, the output object sends - depending on the setting - either a corresponding 1 Bit value or the desired scene number.

When falling below the individual “**Value for withdrawal**”, the output object sends - depending on the setting - either a corresponding 1 Bit value or the desired scene number.

Important: The value for withdrawal must be smaller than the value for exceedance!

The parameter "**Switch off channel**" can be used to set whether this should switch off when the threshold is exceeded. After switching off, the channel must be reactivated via object.

Via the setting "**Type of delay**" it is possible to activate a switching delay either for the exceedance (delay after activation) or for the withdrawal of the exceedance (delay after withdrawal). The corresponding time is set with the "**Delay time**" setting. With the setting "00:00:00", switching is always direct.

The following table shows the associated communication objects:

Number	Name / Object function	Length	Usage
16	Channel A – Load exceedance	1 Bit 1 Byte	Output object for monitoring the load exceedance. DPT depending on the parameter setting

Table 91: Communication objects – Load exceedance

4.9.15.2 Monitoring of load undercut

After activating the parameter, the following selection options are available:

ETS Text	Dynamic range **[Default value]**	Comment
Value for undercut	0 ... 4600 W [**5**]	Setting of the threshold for undercutting
Send value if undercut	■ not active ■ **value „1“** ■ value „0“	Setting the value to be sent when the switching threshold is undercut. **Only with „Output: Switch“.**
Send scene if undercut	not active 1 – 64 **[1]**	Setting of the scene to be sent when the switching threshold is undercut. **Only with „Output: Scene“.**
Send output cyclically	**not active** 1 min – 24 h	Setting at which intervals the value or scene is to be sent.
Switch off channel	■ **not active** ■ active	Setting whether the channel should switch off when the threshold is undercut.
Value for withdrawal	0 ... 4600 W [**100**]	Setting the threshold for the withdrawal of the undercut
Send value on withdrawal	■ not active ■ value „1“ ■ **value „0“**	Setting of the value to be sent when the withdrawal threshold is exceeded. **Only with „Output: Switch“.**
Send scene on withdrawal	not active 1 – 64 **[2]**	Setting of the scene to be sent when the withdrawal threshold is exceeded. **Only with „Output: Scene“.**
Type of delay	■ Delay after activation ■ Delay after withdrawal	Setting to which function the delay should apply.
Delay time	00:00:00 ... 08:00:00 hh:mm:ss **[00:00:00]**	Entering a time by which the selected type is to be sent delayed.

Table 92: Settings – Monitoring of load undercut

When the value falls below the individual “**Value for undercut**”, the output object sends - depending on the setting - either the corresponding 1 Bit value or the desired scene number.

When the individual “**Value for withdrawal**” is exceeded, the output object sends - depending on the setting - either the corresponding 1 Bit value or the desired scene number.

Important: The value for withdrawal must be greater than the value for undercut!

The parameter "**Switch off channel**" can be used to set whether this should switch off when falling below the threshold. After switching off, the channel must be reactivated via the object.

Via the setting "**Type of delay**" it is possible to activate a switching delay either for the undercut (delay after activation) or for the withdrawal of the undercut (delay after withdrawal). The corresponding time is set with the "**Delay time**" setting. With the setting "00:00:00", switching is always direct.

The following table shows the associated communication objects:

Number	Name / Object function	Length	Usage
17	Channel A – Load undercut	1 Bit 1 Byte	Output object for monitoring of load undercut. DPT depending on the parameter setting

Table 93: Communication objects – Load undercut

4.9.15.3 Extended power measurement

After activating the parameter in the channel, the following setting options are available:

ETS Text	Dynamic range **[Default value]**	Comment
Object selection	■ Apparent power in VA (DPT 14.056) ■ Apparent power in kVA (DPT 9.024) ■ Reactive power in Var (DPT 14.056) ■ Reactive power in kVar (DPT 9.024) ■ Power factor in cos Phi (DPT 14.057)	Setting of the object type that is to be output additionally.
Send value on change of ...	not active, 5 % – 75 % **[10 %]**	Setting from which percentage change the value is to be sent.
Send cyclically every ...	**not active** 1 min – 24 h	Setting at which intervals the value is to be sent.

Table 94: Settings – Extended power measurement

With “**Object selection**”, in addition to the active power, another “power” or the “power factor cos Phi” can be output via an object. It can be selected for the apparent power and the reactive power whether it is a 2 Byte or a 4 Byte object.

The parameters “**Send value on change of ...**” and “**Send cyclically every ...**” can also be used to define send conditions.

The following table shows the associated communication objects:

Number	Name / Object function	Length	Usage
15	Channel A – Extended power measurement: Apparent power / Reactive power / Power factor cos Phi	2 Byte 4 Byte	Output object for the measured value. DPT depending on the parameter setting.

Table 95: Communication objects – Extended power measurement

4.9.16 Current measurement

The menu is displayed as soon as the “Current measurement” parameter has been activated in the channel.

The following table shows the settings:

ETS Text	Dynamic range **[Default value]**	Comment
Object selection	■ **2 Byte value in mA (DPT 7.012)** ■ 2 Byte floating value in mA (DPT 9.021) ■ 4 Byte floating value in A (DPT 14.019)	Selection of the datapoint type for the output object of the current measurement.
Send value on change of ...	not active, 5 % – 75 % **[10 %]**	Setting from which percentage change the value is to be sent.
Minimum change	**not active** 10 mA – 1 A	Value by which the value to be sent must change at least. **Only if change in % is active.**
Send cyclically every ...	**not active** 1 min – 24 h	Setting at which intervals the value is to be sent.
Monitoring of current exceedance	■ **not active** ■ active, Output: Switch ■ active, Output: Scene	Activation of the current exceedance and selection of the output object. **A detailed description follows in chapter 4.9.16.1**
Monitoring of current undercut	■ **not active** ■ active, Output: Switch ■ active, Output: Scene	Activation of the current undercut and selection of the output object.. **A detailed description follows in chapter 4.9.16.2**
Error message	■ **not active** ■ Load failure with closed contact ■ Residual current with open contact ■ Residual current / Load failure	Selection in which error case a 1 Bit telegram is to be sent.
Threshold	20 mA – 2 A **[20 mA]**	Setting of the threshold value for sending an error message. **Only displayed if “Error message” is active.**

Table 96: Settings – Current measurement

The datapoint type for the output object is defined via the "**Object selection**".

The setting "**Include channel in total current**" can be used to determine whether the channel should be added when calculating the total current for the actuator.

It can also be determined at which change a value is to be sent. In order not to send too often for smaller measured values, a value can be defined subsequently by which the measured value must change at least.

The parameter "**Send cyclically every ...**" is used to set a fixed send interval independent of the measured value.

The parameters for "**Monitoring of current exceedance**", "M**onitoring of current undercut**" and "**Error message**" are explained in the following chapters.

Error message

Load failure with closed contact:
If the set threshold is fallen below when the contact is closed, the "Load failure" output object sends a "1". Exceedance again resets the value to "0".

Residual current with open contact:
If the actuator measures a current greater than the set threshold when the contact is open, the "Residual current" output object sends a "1".

Residual current / Load failure:
The output object "Residual current / Load failure" sends a "1" in both error cases.

The following table shows the associated communication objects:

Number	Name / Object function	Length	Usage
13	Channel A – Current value	2 Byte 4 Byte	Output of the currently measured value. DPT depending on the parameter setting.
34	Channel A – Load failure	1 Bit	Output object for the error message in the event of a load failure.
34	Channel A – Residual current	1 Bit	Output object for the error message in the event of a residual current.
34	Channel A – Residual current / Load failure	1 Bit	Output object for the error message in case of residual current and load failure.

Table 97: Communication objects – Current measurement

4.9.16.1 Monitoring of current exceedance

After activating the parameter, the following settings are available:

ETS Text	Dynamic range **[Default value]**	Comment
Value range	■ **10 mA – 1000 mA** ■ 1 A – 20 A	Preselection and limitation of the value range of the exceedance.
Value for exceedance	10 ... 1000 mA [**10**] 1 ... 20 A [**1**]	Setting of the threshold for exceeding. **Unit depends on the set value range.**
Send value if exceeded	■ not active ■ **value „1“** ■ value „0“	Setting the value to be sent when the switching threshold is exceeded. **Only with „Output: Switch“.**
Send scene if exceeded	not active 1 – 64 **[1]**	Setting of the scene to be sent when the switching threshold is exceeded. **Only with „Output: Scene“.**
Send output cyclically	**not active** 1 min – 24 h	Setting at which intervals the value or scene is to be sent.
Switch off channel	■ **not active** ■ active	Setting whether the channel should switch off when the threshold is exceeded.
Value range for withdrawal	■ **10 mA – 1000 mA** ■ 1 A – 20 A	Preselection and limitation of the value range for withdrawal of exceedance.
Value for withdrawal	10 ... 1000 mA [**10**] 1 ... 20 A [**1**]	Setting the threshold for the withdrawal of the exceedance. **Unit depends on the set value range.**
Send value on withdrawal	■ not active ■ value „1“ ■ **value „0“**	Setting the value to be sent when falling below the withdrawal threshold. **Only with „Output: Switch“.**
Send scene on withdrawal	not active 1 – 64 **[2]**	Setting the scene to be sent when falling below the withdrawal threshold. **Only with „Output: Scene“.**
Type of delay	■ Delay after activation ■ Delay after withdrawal	Setting to which function the delay should apply.
Delay time	00:00:00 ... 08:00:00 hh:mm:ss **[00:00:00]**	Entering a time by which the selected type is to be sent delayed.

Table 98: Settings – Monitoring of current exceedance

By means of the parameters “**Value range**” and “**Value range for withdrawal**”, the respective setting range of the threshold is adapted to the current value to be expected.

When the individual “**Value for exceedance**” is overshot, the output object sends - depending on the setting - either a corresponding 1 Bit value or the desired scene number.

When falling below the individual “**Value for withdrawal**”, the output object sends - depending on the setting - either a corresponding 1 Bit value or the desired scene number.

Important: The value for withdrawal must be smaller than the value for exceedance!

The parameter “**Switch off channel**” can be used to set whether this should switch off when the threshold is exceeded. After switching off, the channel must be reactivated via object.

Via the setting “**Type of delay**” it is possible to activate a switching delay either for the exceedance (delay after activation) or for the withdrawal of the exceedance (delay after withdrawal). The corresponding time is set with the “**Delay time**” setting. With the setting “00:00:00”, switching is always direct.

The following table shows the associated communication objects:

Number	Name / Object function	Length	Usage
18	Channel A – Current exceedance	1 Bit 1 Byte	Output object for monitoring the current exceedance. DPT depending on the parameter setting

Table 99: Communication objects – Current exceedance

4.9.16.2 Monitoring of current undercut

After activating the parameter, the following settings are available:

ETS Text	Dynamic range **[Default value]**	Comment
Value range	■ **10 mA – 1000 mA** ■ 1 A – 20 A	Preselection and limitation of the undercut value range.
Value for undercut	10 ... 1000 mA [**10**] 1 ... 20 A [**1**]	Setting of the threshold for undercutting. **Unit depends on the set value range.**
Send value if undercut	■ not active ■ **value „1“** ■ value „0“	Setting of the value to be sent when falling below the threshold.. **Only with „Output: Switch“.**
Send scene if undercut	not active 1 – 64 **[1]**	Setting of the scene to be sent when falling below the threshold. **Only with „Output: Scene“.**
Send output cyclically	**not active** 1 min – 24 h	Setting at which intervals the value or scene is to be sent.
Switch off channel	■ **not active** ■ active	Setting whether the channel should switch off when the threshold is undercut.
Value range for withdrawal	■ **10 mA – 1000 mA** ■ 1 A – 20 A	Preselection and limitation of the range of values for the withdrawal of the undercut.
Value for withdrawal	10 ... 1000 mA [**10**] 1 ... 20 A [**1**]	Setting the threshold for the withdrawal of the undercut. **Unit depends on the set value range.**
Send value on withdrawal	■ not active ■ value „1“ ■ **value „0“**	Setting of the value to be sent when the withdrawal threshold is exceeded. **Only with „Output: Switch“.**
Send scene on withdrawal	not active 1 – 64 **[2]**	Setting of the scene to be sent when the withdrawal threshold is exceeded. **Only with „Output: Scene“.**
Type of delay	■ Delay after activation ■ Delay after withdrawal	Setting to which function the delay should apply.
Delay time	00:00:00 ... 08:00:00 hh:mm:ss **[00:00:00]**	Entering a time by which the selected type is to be sent delayed.

Table 100: Settings – Monitoring of current undercut

By means of the parameters “**Value range**” and “**Value range for withdrawal**”, the respective setting range of the threshold is adapted to the current value to be expected.

When the value falls below the individual “**Value for undercut**”, the output object sends - depending on the setting - either the corresponding 1 Bit value or the desired scene number.

When the individual “**Value for withdrawal**” is exceeded, the output object sends - depending on the setting - either the corresponding 1 Bit value or the desired scene number.

Important: The value for withdrawal must be greater than the value for undercut!

The parameter “**Switch off channel**” can be used to set whether this should switch off when falling below the threshold. After switching off, the channel must be reactivated via the object.

Via the setting “**Type of delay**” it is possible to activate a switching delay either for the undercut (delay after activation) or for the withdrawal of the undercut (delay after withdrawal). The corresponding time is set with the “**Delay time**” setting. With the setting “00:00:00”, switching is always direct.

The following table shows the associated communication objects:

Number	Name / Object function	Length	Usage
19	Channel A – Current undercut	1 Bit 1 Byte	Output object for monitoring of current undercut. DPT depending on the parameter setting

Table 101: Communication objects – Current undercut

4.9.17 Voltage measurement

The menu is displayed as soon as the “Voltage measurement” parameter has been activated in the channel.

The following table shows the settings:

ETS Text	Dynamic range **[Default value]**	Comment
Send value on change of ...	not active, 5 % – 75 % **[10 %]**	Setting from which percentage change the value is to be sent.
Send cyclically every ...	**not active** 1 min – 24 h	Setting at which intervals the value is to be sent.
Monitoring of voltage exceedance	■ **not active** ■ active, Output: Switch ■ active, Output: Scene	Activation of the voltage exceedance and selection of the output object. **A detailed description follows in chapter 4.9.17.1**
Monitoring of voltage undercut	■ **not active** ■ active, Output: Switch ■ active, Output: Scene	Activation of the voltage undercut and selection of the output object.. **A detailed description follows in chapter 4.9.17.2**

Table 102: Settings – Voltage measurement

With activation, the actual voltage value at the channel is measured.

The sending conditions for the measured value can be set. On the one hand, it can be defined **at which change a value** is to be sent, on the other hand, a fixed sending interval can be determined with the parameter “**Send cyclically every ...**” independent of the measured value.

The parameters for “**Monitoring of voltage exceedance”** and “M**onitoring of voltage undercut”** are explained in the following chapters.

The following table shows the associated communication objects:

Number	Name / Object function	Length	Usage
14	Channel A – Voltage value	4 Byte	Output of the currently measured value.

Table 103: Communication object – Voltage measurement

4.9.17.1 Monitoring of voltage exceedance

After activating the parameter, the following settings are available:

ETS Text	Dynamic range **[Default value]**	Comment
Value for exceedance	180 ... 300 V **[260 V]**	Setting of the threshold for exceeding.
Send value if exceeded	■ not active ■ **value „1“** ■ value „0“	Setting the value to be sent when the switching threshold is exceeded. **Only with „Output: Switch“.**
Send scene if exceeded	not active 1 – 64 **[1]**	Setting of the scene to be sent when the switching threshold is exceeded. **Only with „Output: Scene“.**
Send output cyclically	**not active** 1 min – 24 h	Setting at which intervals the value or scene is to be sent.
Switch off channel	■ **not active** ■ active	Setting whether the channel should switch off when the threshold is exceeded.
Value for withdrawal	180 ... 300 V **[240 V]**	Setting the threshold for the withdrawal of the exceedance.
Send value on withdrawal	■ not active ■ value „1“ ■ **value „0“**	Setting the value to be sent when falling below the withdrawal threshold. **Only with „Output: Switch“.**
Send scene on withdrawal	not active 1 – 64 **[2]**	Setting the scene to be sent when falling below the withdrawal threshold. **Only with „Output: Scene“.**
Type of delay	■ Delay after activation ■ Delay after withdrawal	Setting to which function the delay should apply.
Delay time	00:00:00 ... 08:00:00 hh:mm:ss **[00:00:00]**	Entering a time by which the selected type is to be sent delayed.

Table 104: Settings – Monitoring of voltage exceedance

When the individual “**Value for exceedance**” is overshot, the output object sends - depending on the setting - either a corresponding 1 Bit value or the desired scene number.

When falling below the individual “**Value for withdrawal**”, the output object sends - depending on the setting - either a corresponding 1 Bit value or the desired scene number.

Important: The value for withdrawal must be smaller than the value for exceedance!

The parameter "**Switch off channel**" can be used to set whether this should switch off when the threshold is exceeded. After switching off, the channel must be reactivated via object.

Via the setting "**Type of delay**" it is possible to activate a switching delay either for the exceedance (delay after activation) or for the withdrawal of the exceedance (delay after withdrawal). The corresponding time is set with the "**Delay time**" setting. With the setting "00:00:00", switching is always direct.

The following table shows the associated communication objects:

Number	Name / Object function	Length	Usage
20	Channel A – Voltage exceedance	1 Bit 1 Byte	Output object for monitoring the voltage exceedance. DPT depending on the parameter setting

Table 105: Communication objects – Voltage exceedance

4.9.17.2 Monitoring of voltage undercut

After activating the parameter, the following settings are available:

ETS Text	Dynamic range **[Default value]**	Comment
Value for undercut	180 ... 300 V **[210 V]**	Setting of the threshold for undercutting
Send value if undercut	■ not active ■ **value „1“** ■ value „0“	Setting of the value to be sent when falling below the threshold.. **Only with „Output: Switch“.**
Send scene if undercut	not active 1 – 64 **[1]**	Setting of the scene to be sent when falling below the threshold. **Only with „Output: Scene“.**
Send output cyclically	**not active** 1 min – 24 h	Setting at which intervals the value or scene is to be sent.
Switch off channel	■ **not active** ■ active	Setting whether the channel should switch off when the threshold is undercut.
Value for withdrawal	180 ... 300 V **[230 V]**	Setting the threshold for the withdrawal of the undercut.
Send value on withdrawal	■ not active ■ value „1“ ■ **value „0“**	Setting of the value to be sent when the withdrawal threshold is exceeded. **Only with „Output: Switch“.**
Send scene on withdrawal	not active 1 – 64 **[2]**	Setting of the scene to be sent when the withdrawal threshold is exceeded. **Only with „Output: Scene“.**
Type of delay	■ Delay after activation ■ Delay after withdrawal	Setting to which function the delay should apply.
Delay time	00:00:00 ... 08:00:00 hh:mm:ss **[00:00:00]**	Entering a time by which the selected type is to be sent delayed.

Table 106: Settings – Monitoring of voltage undercut

When the value falls below the individual “**Value for undercut**”, the output object sends - depending on the setting - either the corresponding 1 Bit value or the desired scene number.

When the individual “**Value for withdrawal**” is exceeded, the output object sends - depending on the setting - either the corresponding 1 Bit value or the desired scene number.

Important: The value for withdrawal must be greater than the value for undercut!

The parameter "**Switch off channel**" can be used to set whether this should switch off when falling below the threshold. After switching off, the channel must be reactivated via the object.

Via the setting "**Type of delay**" it is possible to activate a switching delay either for the undercut (delay after activation) or for the withdrawal of the undercut (delay after withdrawal). The corresponding time is set with the "**Delay time**" setting. With the setting "00:00:00", switching is always direct.

The following table shows the associated communication objects:

Number	Name / Object function	Length	Usage
21	Channel A – Voltage undercut	1 Bit 1 Byte	Output object for monitoring of voltage undercut. DPT depending on the parameter setting

Table 107: Communication objects – Voltage undercut

4.9.18 Energy and cost meter

The menu is displayed as soon as the parameter “Energy and cost meter” has been activated in the channel.

The following table shows the selection options:

ETS Text	Dynamic range **[Default value]**	Comment
Main meter (is automatically active)		
Object selection (from HW R4.2)	■ **Value in Wh (DPT 13.010)** ■ Value in kWh (DPT 13.013)	Selection of the datapoint type for the main meter.
Send meter reading on change	■ **not active** ■ active	Setting whether the meter reading should be sent when changed.
Send meter reading every ...	10 - 50000 Wh **[10 Wh]** 1 ... 65535 kWh **[1 kWh]**	Setting for which change the meter reading is to be sent. **Selection depends on the selected datapoint type.**
Send meter reading cyclically every ...	not active 1 min – 24 h **[5 min]**	Setting whether and at what interval the meter reading is to be sent cyclically.
Intermediate meter		
Intermediate meter	■ **not active** ■ active	Activation of the intermediate meter.
Object selection	■ **Value in Wh (DPT 13.010)** ■ Value in kWh (DPT 13.013)	Selection of the datapoint type for the intermediate meter.
Send meter reading on change	■ **not active** ■ active	Setting whether the meter reading should be sent when changed.
Send meter reading every ...	10 - 50000 Wh **[10 Wh]** 1 ... 65535 kWh **[1 kWh]**	Setting for which change the meter reading is to be sent. **Selection depends on the selected datapoint type.**
Send meter reading cyclically every ...	**not active** 1 min – 24 h	Setting whether and at what interval the meter reading is to be sent cyclically.
Cost meter (Settings are the same for main and intermediate meter)		
Cost meter	■ **not active** ■ active	Activation of the cost meter.
Send meter reading on change	■ **not active** ■ active	Setting whether the meter reading should be sent when changed.

ETS Text	Dynamic range **[Default value]**	Comment
Send meter reading every ...	1 ... 255 € **[100 €]** **[10 €]**	Setting for which change the meter reading is to be sent. **Different default values: main and Intermediate meter.**
Send meter reading cyclically every ...	not active 1 min – 24 h **[1 h]**	Setting whether and at what interval the meter reading is to be sent cyclically.
Event A / Event B		
Activate Event A/B with	■ **not active** ■ final value: intermediate meter ■ final value: main meter ■ final value: costs intermediate meter ■ final value: costs main meter ■ time ■ interval	Determination of the action with which an event is to be activated.
Final value	1 ... 4294967295 € **[200]**	Value from which the event is to be activated. **Only with “final value: costs ...”.**
Final value	1 ... 4294967295 kWh/Wh **[200]**	Value from which the event is to be activated. **Visible when “final value ...” is selected.** **DPT for main meter is “kWh”.** **DPT for intermediate meter depends on the “Object selection” parameter**
Hours	0 ... 23 **[0]**	Specify the time or interval at which the event is to be activated. **If “time” or “interval” is selected**
Minutes	0 ... 59 **[0]**	
Day	■ **every day** ■ Monday ■ Tuesday ■ Wednesday ■ Thursday ■ Friday ■ Saturday ■ Sunday ■ every working day ■ every weekend day	Setting on which day(s) the event is to be activated. **Visible when “time” is selected.**

ETS Text	Dynamic range **[Default value]**	Comment
Object „Event A“ / “Event B” sends	■ **OFF** ■ ON	Value to be sent when the condition for triggering the event is met.
Intermediate meter: Send all values	■ **not active** ■ active	Settings for which additional actions are to be carried out when the condition for activating the event is fulfilled. **The number of possible actions depends on the selection “Activate event X with”.**
Intermediate meter: Send costs	■ **not active** ■ active	
Intermediate meter: Reset	■ **not active** ■ active	
Main meter: Send all values	■ **not active** ■ active	
Main meter: Send costs	■ **not active** ■ active	
Main meter: Reset	■ **not active** ■ active	

Table 108: Settings – Energy and cost meter

Main meter / Intermediate meter
The parameter “**Object selection**” can be used to set the datapoint type of the main and intermediate meters independently (Wh or kWh).

Important: The selection at the main meter requires the units HW R4.2!

The setting “**Send meter reading on change**” can be used to set at which change the meter sends its actual meter reading. If the setting is “not active”, the meter does not send a value, no matter how big the change is.

The setting “**Send meter reading cyclically every ...**” can be used to set the intervals at which the device sends its actual measured value. The cyclical sending function can be activated or deactivated independently of the setting “Send meter reading on change”. Values are also sent if the meter has not recorded a change. If both parameters are deactivated, no value is ever sent..

Cost meter
Here, sending conditions for the meter reading can be set for both the main and intermediate meters. The settings correspond to the settings for the main and intermediate meters.

Important: If the parameter “Separate Day/Night meters” in the menu “Cost calculation” is active, the objects “Intermediate meter: Electric active energy (24 h)” and “Main meter: Electric active energy (24 h)” are not writable!

Event A / Event B
Two different events can be triggered if certain conditions are met. This is done via 1 Bit objects.
In addition to sending the object (Event A or Event B), other actions can be performed. These can be activated individually as required:

final value: intermediate/main meter
Event is activated with a fixed value

final value: costs intermediate/main meter
Event is activated when a certain cost level is reached.

time
Event is executed recurrently at a certain time. In addition to hours and minutes, it is also possible to set whether the event is to be activated on certain days.

interval
Event is activated recurrently at a defined interval (in hours and minutes).

Important: The starting point and subsequent cyclical transmission repetition is always after reprogramming or when the bus voltage returns!

The following table shows the associated communication objects:

Number	Name / Object function	Length	Usage
22	Channel A – Intermediate meter: Electrical active energy (24 h)	4 Byte	Sending the meter reading. DPT depending on setting
23	Channel A – Intermediate meter: Costs in Cent /Euro - Output	2 Byte 4 Byte	Sending the actual costs. DPT according to setting in “Cost calculation”
24	Channel A – Intermediate meter: Meter reading “Day”	4 Byte	Sending the meter reading
25	Channel A – Intermediate meter: Meter reading “Night”	4 Byte	Sending the meter reading
26	Channel A – Intermediate meter: Reset	1 Bit	Resetting the intermediate meter
27	Channel A – Main meter: Electrical active energy (24 h)	4 Byte	Sending the meter reading
28	Channel A – Main meter: Costs in Cent / Euro - Output	2 Byte 4 Byte	Sending the actual costs. DPT according to setting in “Cost calculation”
29	Channel A – Main meter: Meter reading “Day”	4 Byte	Sending the meter reading
30	Channel A – Main meter: Meter reading “Night”	4 Byte	Sending the meter reading
31	Channel A – Main meter: Reset	1 Bit	Resetting the main meter
32	Channel A – Meter: Event A	1 Bit	Sending the value of Event A
33	Channel A – Meter: Event B	1 Bit	Sending the value of Event B

Table 109: Communication objects – Energy and cost meter

4.10 Switch pulse

If a channel is selected for the “Switch pulse” function, the corresponding menu appears
The individual settings are described in the following chapters.

Information on “**Description of channel/objects” and “Additional text**”,
see 4.7 Identical settings: Description of channel/objects + Additional text

4.10.1 Relay operating mode

The table shows the possible settings:

ETS Text	Dynamic range **[Default value]**	Comment
Mode	■ **normally open** ■ normally closed	Relay operating mode of the respective channel.

Table 110: Settings – Relay operating mode

The “M**ode”** determines whether a relay is operated as a “normally open” or “normally closed” contact. This means whether the relay is activated with a “1” or with a “0”.

Important note: The green channel indicator LED on the actuator reflects the status of the status object (“1” = LED On, “0” = LED Off). It does not reflect the state of the relay contact, whether open or closed (important when configured as a “normally closed”).

The following diagram shows the behaviour of a relay - in the operating mode as a “normally open” contact or as a “normally closed” contact - in response to a KNX telegram:

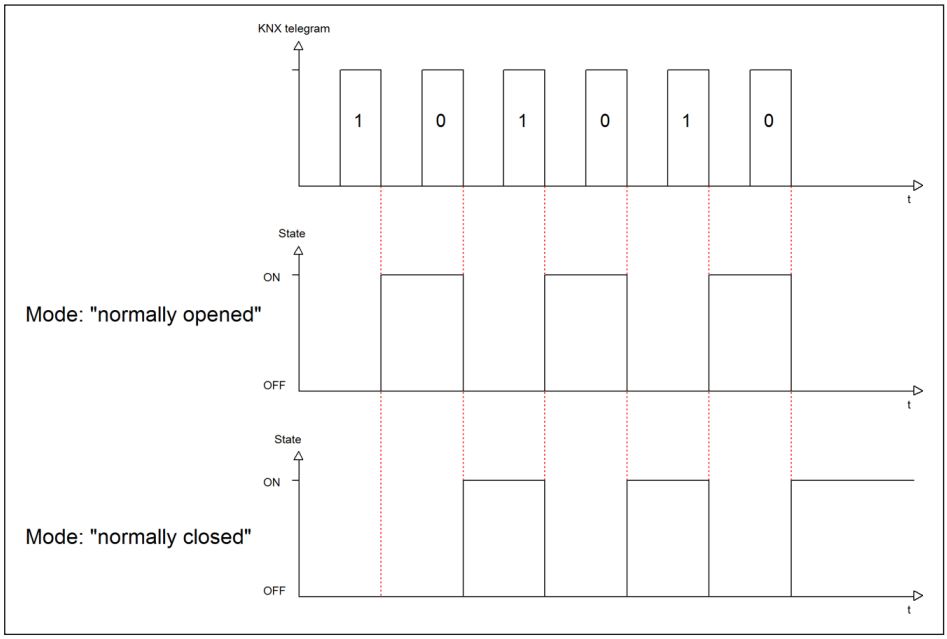

Figure 10: Diagram – Relay operation mode

4.10.2 Switch pulse

The table shows the possible settings:

ETS Text	Dynamic Range **[Default value]**	Comment
Pulse time	300 ms – 30 s **[500 ms]**	Setting the duration of the pulse.
Repeat pulse signal once	■ **not active** ■ active	Setting whether the pulse should be repeated once more.
Time until the next pulse	0,5 s – 30 s **[0,5 s]**	Setting the duration between the first and the second pulse. **Only shown if "Repeat pulse signal once" is active.**

Table 111: Settings – Switch pulse

Can be used e.g. for a bell. By sending a "1" to the object "Switch pulse", the bell is activated for 0.5 s, for example. After a set delay, the bell is activated a second time for the same pulse time. Thus the bell rings twice.

The following table shows the communication object:

Number	Name / Object function	Length	Usage
1	Channel A – Switch pulse	1 Bit	Starting the pulse

Table 112: Communication object – Switch pulse

4.10.3 Behaviour on locking / unlocking

The table shows the possible settings:

ETS Text	Dynamic range **[Default value]**	Comment
Behaviour on locking	■ OFF ■ **no change**	Setting for how the channel should behave when a lock is set.
Behaviour on unlocking	■ **OFF** ■ switch pulse	Setting for how the channel should behave when it is unlocked.

Table 113: Setting – Behaviour on locking / unlocking

If a channel is locked by sending a “1” to the lock object, the channel is locked for further operation until it is unlocked again by sending a “0” to the lock object.

The following actions can be executed when **locking** and **unlocking**:

- **OFF**
  The channel is switched off.
- **no change (only for “locking”)**
  The channel retains the current state.
- **switch pulse (only for “unlocking”)**
  The channel triggers the switch pulse.

The following table shows the communication object:

Number	Name / Object function	Length	Usage
4	Channel A – Lock	1 Bit	Activates / deactivates a lock

Table 114: Communication object – Lock object

5 Index

5.1 List of figures

5.2 List of tables

6 Appendix

6.1 Statutory requirements

The devices described above must not be used in conjunction with devices which directly or indirectly serve human, health, or life-safety purposes. Furthermore, the devices described must not be used if their use may cause danger to people, animals, or property.
Do not leave the packaging material carelessly lying around. Plastic foils/ bags etc. can become a dangerous toy for children.

6.2 Disposal

Do not dispose of the old devices in the household waste. The device contains electrical components that must be disposed of as electronic waste. The housing is made of recyclable plastic.

6.3 Assembly

Danger to life from electric current!

All work on the unit may only be carried out by qualified electricians. The country-specific regulations and the applicable KNX guidelines must be observed.

The devices are approved for operation in the European Union and in the United Kingdom. The products are respectively marked with the CE and UKCA symbols.

Use in the USA and Canada is prohibited!

Before starting work on the device, always disconnect it from the power supply by turning off the circuit breaker or removing the fuse. After installation, all live terminals and connections must be completely covered by the control panel cover to prevent accidental contact. It must be ensured that the control panel cover may not be opened without tools.

6.4 History

V1.0	First version of the technical manual	DB V3.0	06/2023
V1.1	Adaptation of the meter parameters to the new application	DB V3.1	09/2023

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