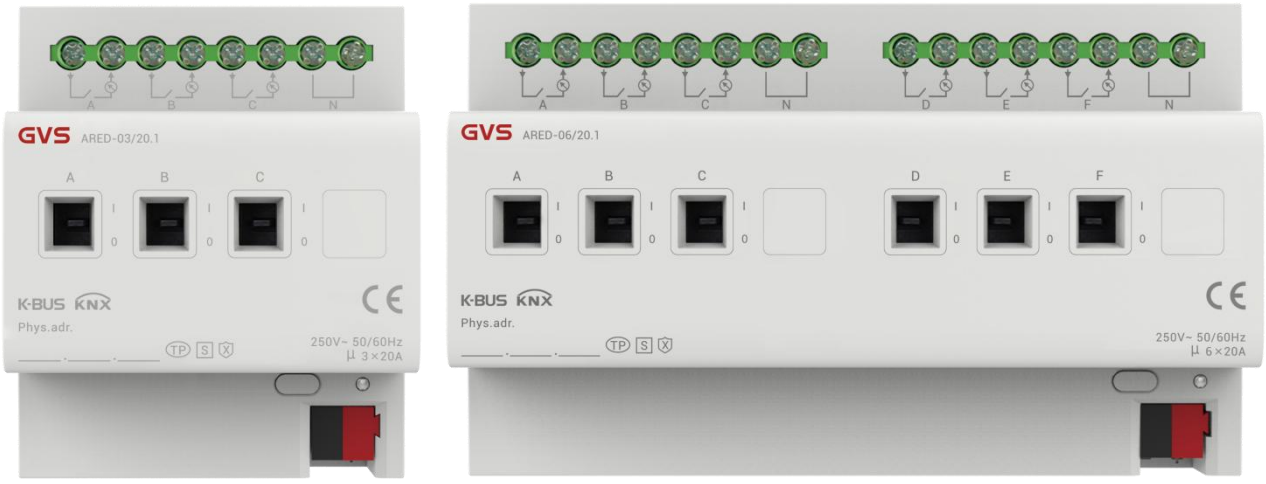
User Manual

K-BUS Switch Actuator with Energy detection, 3/6-Fold,20A_V1.1

ARED-03/20.1

ARED-06/20.1



KNX/EIB Home and Building Control System

Attentions

1. **Please keep devices away from strong magnetic field, high temperature, wet environment;**

2. **Please do not fall the device to the ground or make them get hard impact;**

3. **Please do not use wet cloth or volatile reagent to wipe the device;**

4. **Please do not disassemble the devices.**

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Chapter 1 Summary

Switch Actuator with Energy detection(hereinafter referred to as switch actuator) is mainly applied in building control system, connected to the BUS via KNX terminals and installed together with other devices on the bus to become a system. These switch actuators can be used to control the switch loads and precisely monitor multiple electrical parameters, such as:

- ✧ Lighting
- ✧ Signal devices

It is able to switch from 3 or 6 independent electrical AC loads by the switch actuators with maximum output of 20A per output and manual switch, as well as visible switching status.

This manual provides you the detailed technical information about the Switch Actuator with Secure, not only the installation and programming details, but also the usage explanation in actual application.

Switch Actuator with Secure is modular installation devices in proM design, which are easy to install in the distribution boards on 35mm mounting rails according to EN60715. The devices connect to KNX system via bus connection terminal, and no additional power supply voltage is required. It is able to use the Engineering Tool Software ETS (Version ETS5.7 or above) with knxprod file to allocate the physical address and set the parameters.

The functions of the switching actuator are summarized as follows:

- **Manual operation available**
- **Time function: on/off delay**
- **Scene control / presets via 8bit/1bit commands**
- **Logic operation: AND, OR, XOR, gate function**
- **Status response**
- **Forced operation and safety function**
- **Reaction to threshold functions**
- **Selection of preferred state after bus voltage failure and recovery**
- **Inversion of the outputs**
- **Staircase lighting functions with warning and adaptable staircase lighting time.**
- **Detecting function: Current, Voltage, Power factor, Active power, Apparent power, Electrical energy, Frequency**
- **Total measurement: Current, Active power, Electrical energy**
- **Support the KNX Data Secure**

Chapter 2 Technical Data

Power Supply	Bus voltage	21~30V DC, via the KNX bus
	Bus current	3-Fold: <14.5mA/24V, <12mA/30V 6-Fold: <24.5mA/24V, <20mA/30V
	Bus consumption	3-Fold: <360mW; 6-Fold: <600mW
	Charging current	3-Fold: <27.5mA; 6-Fold: <45.5mA
Output	Number of contacts	3/6
	U_n rated voltage	250V AC (50/60 HZ)
	I_n rated current	20A
	Current detection range	10mA-20A
	Min. detection load	2.2W
	Current detection accuracy	±2% and ±10mA
	Voltage detection range	95-265V AC (50/60Hz)
	Voltage detection accuracy	±1%
Output switch current	Comply with resistive load (EN 60669-1)	20A
	Comply with fluorescent lamp load (EN 60669-2-1)	16AX
Operation and display	Red LED and push button	For assigning the physical address
	Green LED flashing	For display the application layer running normally
	Green LED on	Relay power is charging or delay when startup
Connections	KNX	Bus connection terminal (black/red)
	Load circuits	Screw terminals
	Cable cross-section	0.2—6.0mm^2
Temperature	Operation	–5 °C ... + 45 °C
	Storage	–25 °C ... + 55 °C
	Transport	–25 °C ... + 70 °C
Ambient	Humidity	<93%, except dewing

Product	Load type	Rated power	Life cycles
ARSA-xx/20.S xx=04/08/12	Incandescent lamp	5000W	>30000
	Halogen lamp	4000W	>5000
	Standard/Electronic ballast	4000W	>6000
	Fluorescent lamp（uncompensated）	4000W	>5000
	Fluorescent lamp（parallel compensated）	2800W	>5000
	Motor	2200W	>30000
	LED (Inrush current470A/210us)	800W	>50000

Note: The above load is only for single lamps. In the case of several lamps in parallel, the load will be reduced, although the power is unchanged, but the instantaneous impact of current will increase, and easy to make the relay contacts melted. In normal use, the maximum output current is preferably less than 20A for resistive load, and inductive load and capacitive load will be lower.

Application program	Max. number of communication objects	Max. number of group addresses	Max. number of associations	Secure group addresses
Switch Actuator with Energy detection,3-Fold,20A/00DE 1.0	117	400	400	400
Switch Actuator with Energy detection,6-Fold,20A/00DF 1.0	219	400	400	400

Chapter 3 Dimension and Connection Diagram

3.1.Dimension

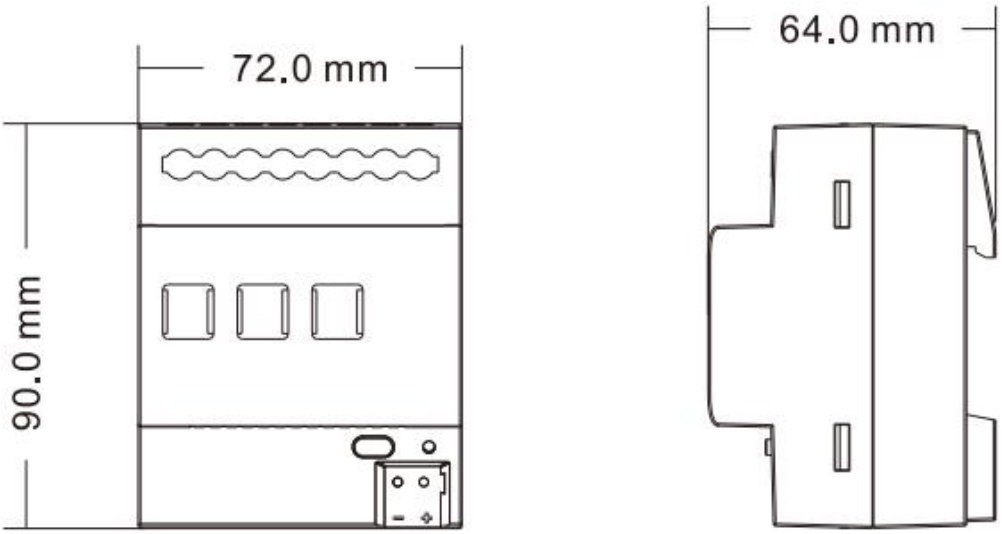


Fig. 3.1(1)ARED-03/20.1

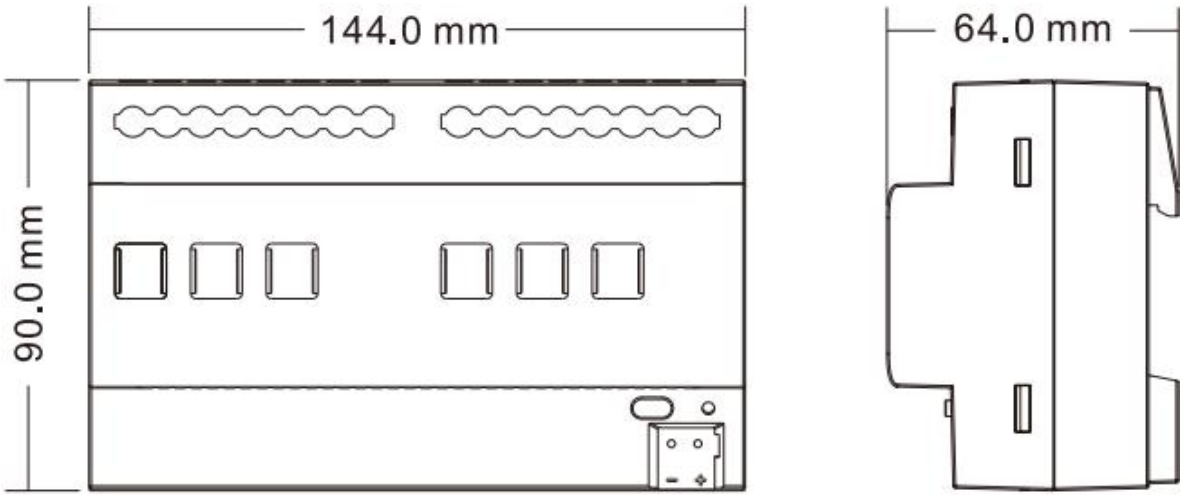


Fig. 3.1(2)ARED-06/20.1

Model	Dimension	Weight
ARED-03/20.1	72 x 90 x 64mm	0.3kg
ARED-06/20.1	144 x 90 x64mm	0.5kg

3.2.Connection Diagram

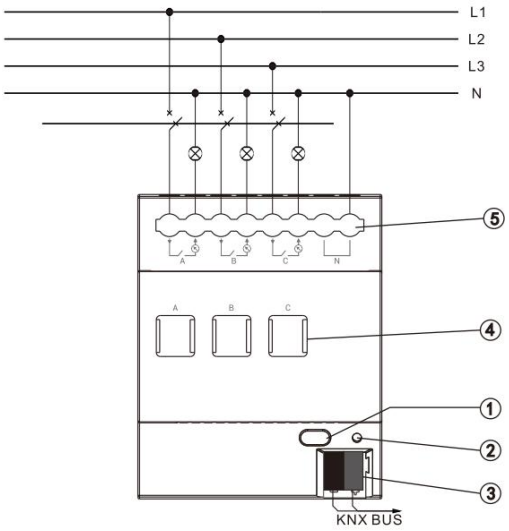


Fig. 3.2(1)ARED-03/20.1

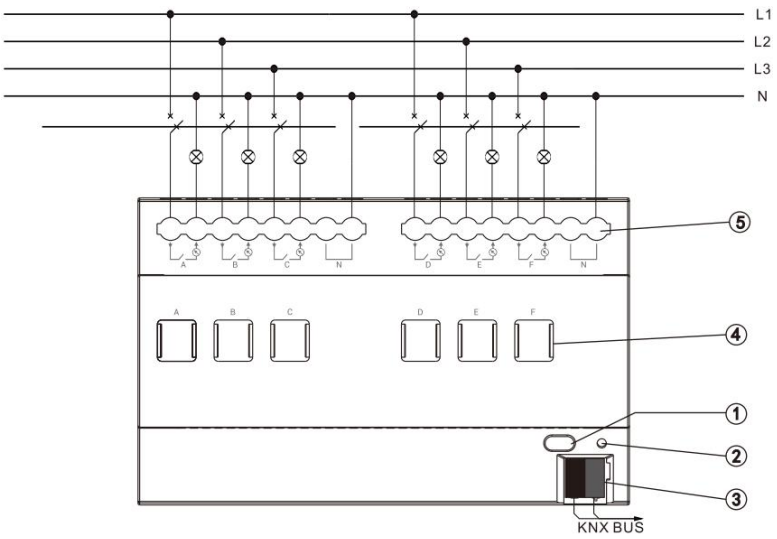


Fig. 3.2(2)ARED-06/20.1

① Programming button

② Red LED for entering the physical address, Green LED flashing for application layer running normally

③ KNX bus connection terminal

④ Manual operation switch control

⑤ Output, load terminal **(Please connect the neutral and live wires in the direction indicated by the arrows on the device. If the connection is reversed, it will lead to inaccurate readings of electrical energy, voltage, power factor, etc.)**

Reset the device to the factory configuration: press the programming button and hold for 4 seconds then release, repeat the operation for 4 times, and the interval between each operation is less than 3 seconds

Chapter 4 Parameters Setting Description in the ETS

4.1.KNX Secure

Switch Actuator with current detection is a KNX device that complies with the KNX secure standard. That is, you can run the device in safe way.

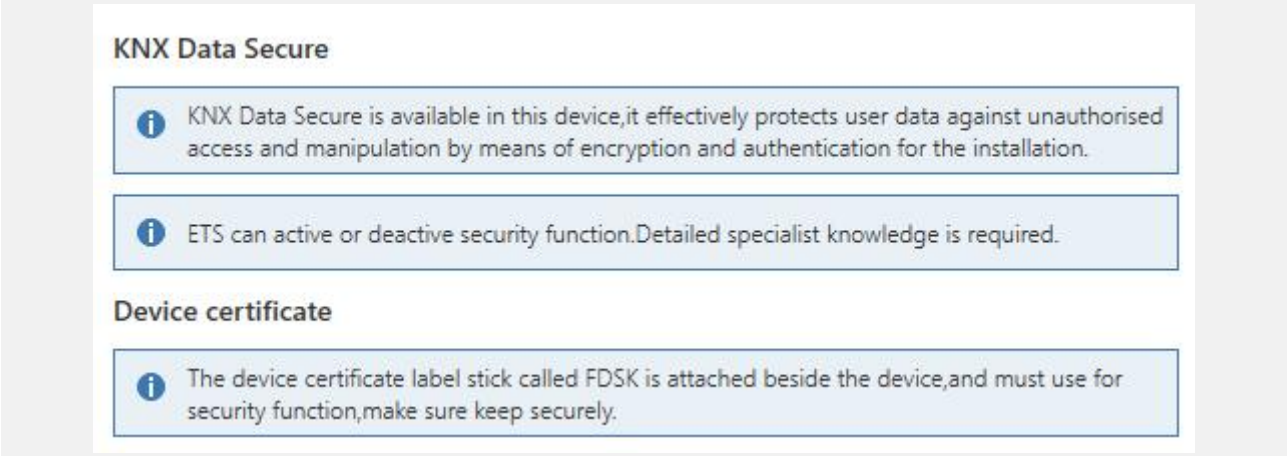


Fig.4.1 (1) "KNX Secure" parameter window

The device with KNX secure will be displayed notes on ETS, as shown as Fig.4.1(1).

If secure commissioning is actived in ETS project, the following information must be considered during device debugging:

❖ It is essential to assign a project password as soon as a KNX Secure device is imported into a project. This will protect the project against unauthorized access.

The password must be kept in a safe place – access to the project is not possible without it (not even the KNX Association or device manufacturer will be able to access it)!

Without the project password, the commissioning key will not be able to be imported.

❖ A commissioning key is required when commissioning a KNX Secure device (first download). This key (FDSK = Factory Default Setup Key) is included on a sticker on the side of the device, and it must be imported into the ETS prior to the first download:

✧ On the first download of the device, a window pops up in the ETS to prompt the user to enter the key, as shown in Fig.4.1 (2) below.

The certificate can also be read from the device using a QR scanner (recommended).

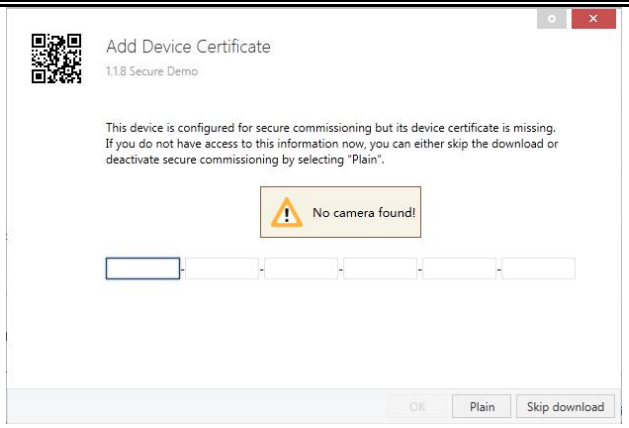


Fig.4.1(2) Add Device Certificate window

✧ Alternatively, the certificates of all Secure devices can be entered in the ETS beforehand.

This is done on the "Security" tab on the project overview page, as shown in Fig.4.1(3) below.

The certificates can be also added to the selected device in the project, as shown in Fig.4.1(4).

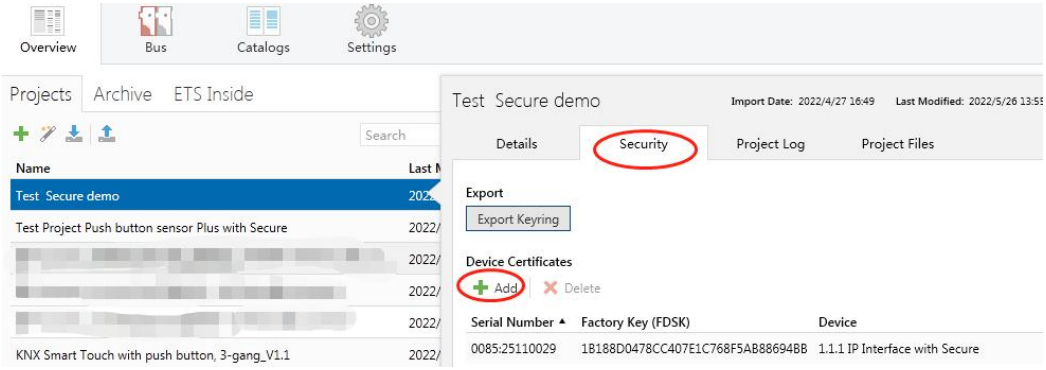


Fig.4.1(3) Add Device Certificate

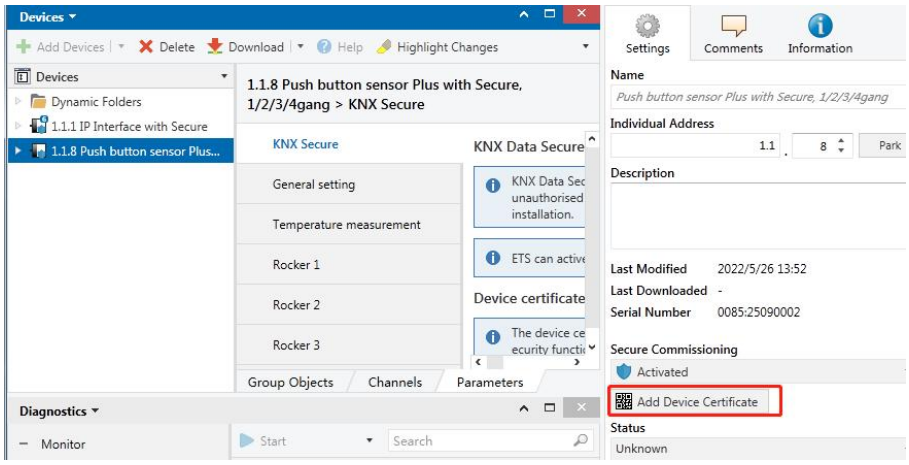


Fig.4.1(4) Add Device Certificate

✧ There is a FDSK sticker on the device, which is used for viewing FDSK number.

Without the FDSK, it will no longer be possible to operate the device in KNX Secure mode after a reset.

The FDSK is required only for initial commissioning. After entering the initial FDSK, the ETS will

assign a new key, as shown in Fig.4.1(5) below.

The FDSK will be required again only if the device was reset to its factory settings (e.g. If the device is to be used in a different ETS project).

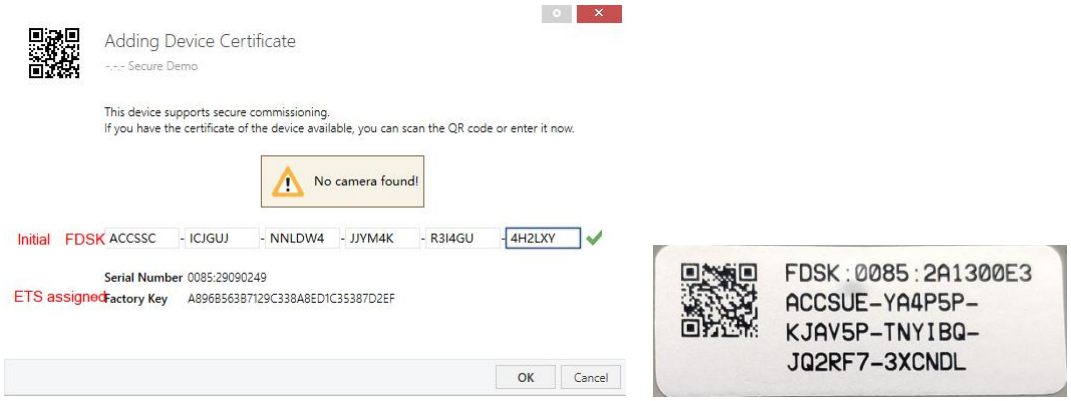


Fig.4.1(5)

Example:

If this application in the project needs to be tried with another device, it is no longer the original device. When the application is downloaded to a new device, the following prompt will appear on the left of Fig.4.1(6), click yes, the Add Device Certificate window will appear, then enter the initial FDSK of the new device, and you need to reset the device to the factory settings (it is not required if the device is still factory default; If it has been used, it will be required to reset, otherwise the following error message will appear on the right of Fig.4.1(6)), and then the device can be successfully downloaded again.

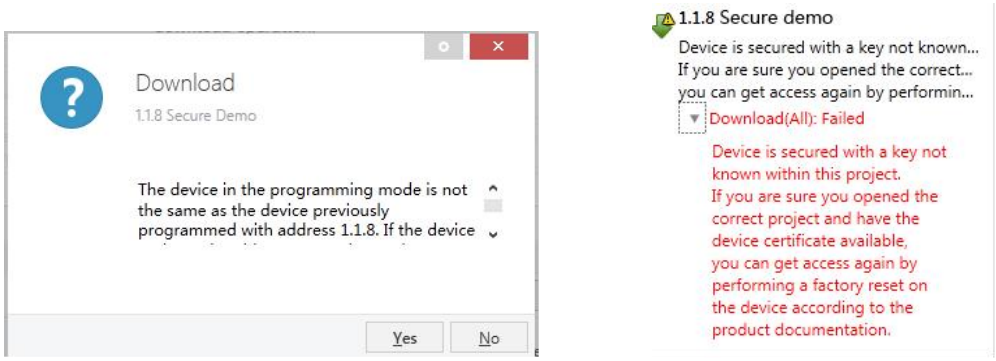


Fig.4.1(6) Example

Whether the device is replaced in the same project, or the device is replaced in a different project, the processing is similar: **Reset the device to the factory settings, then reassign the FDSK.**

After the device is downloaded successfully, the label Add Device Certificate turns gray, indicating that the key for this device has been assigned successfully, as shown in Fig.4.1(7) below.

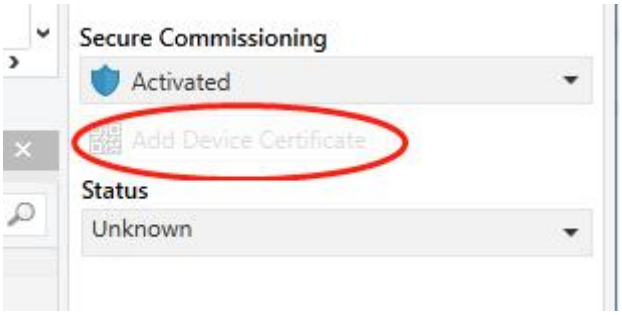


Fig.4.1(7)

ETS generates and manages keys:

Keys and passwords can be exported as needed to the use of security keys outside of the associated ETS projects. As shown in Fig.4.1(8) below, the file extension is .knxkeys.

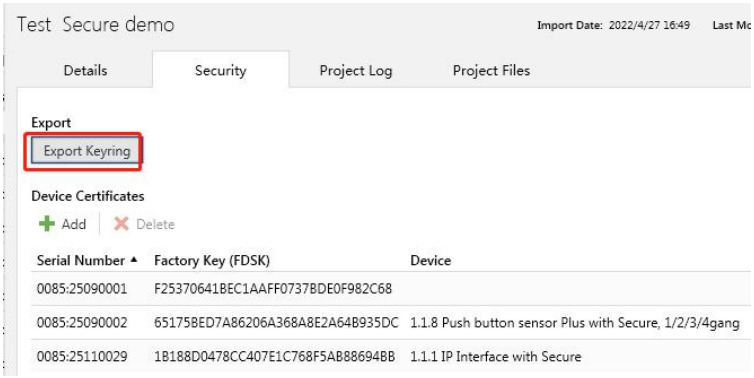
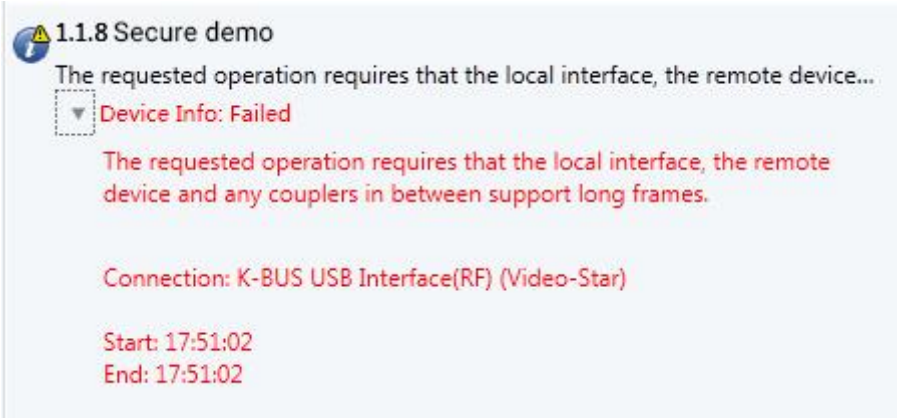


Fig.4.1(8)

Note: Any USB interface used for programming a KNX Secure device must support "long frames". Otherwise ETS will report a download failure information, as shown below.



4.2.Overview

Every output only used as switch actuator:

It is used for normal switching, for instance lighting control, which uses the object “Switch” to control the output directly. Lots of extension functions such as timing, logical, safety functions are available to use. Application description can be found in below text.

4.3.Parameter window “General”

The parameter window “General” will be shown in Fig. 4.3, here set product type and general parameters, general parameters apply to every output.

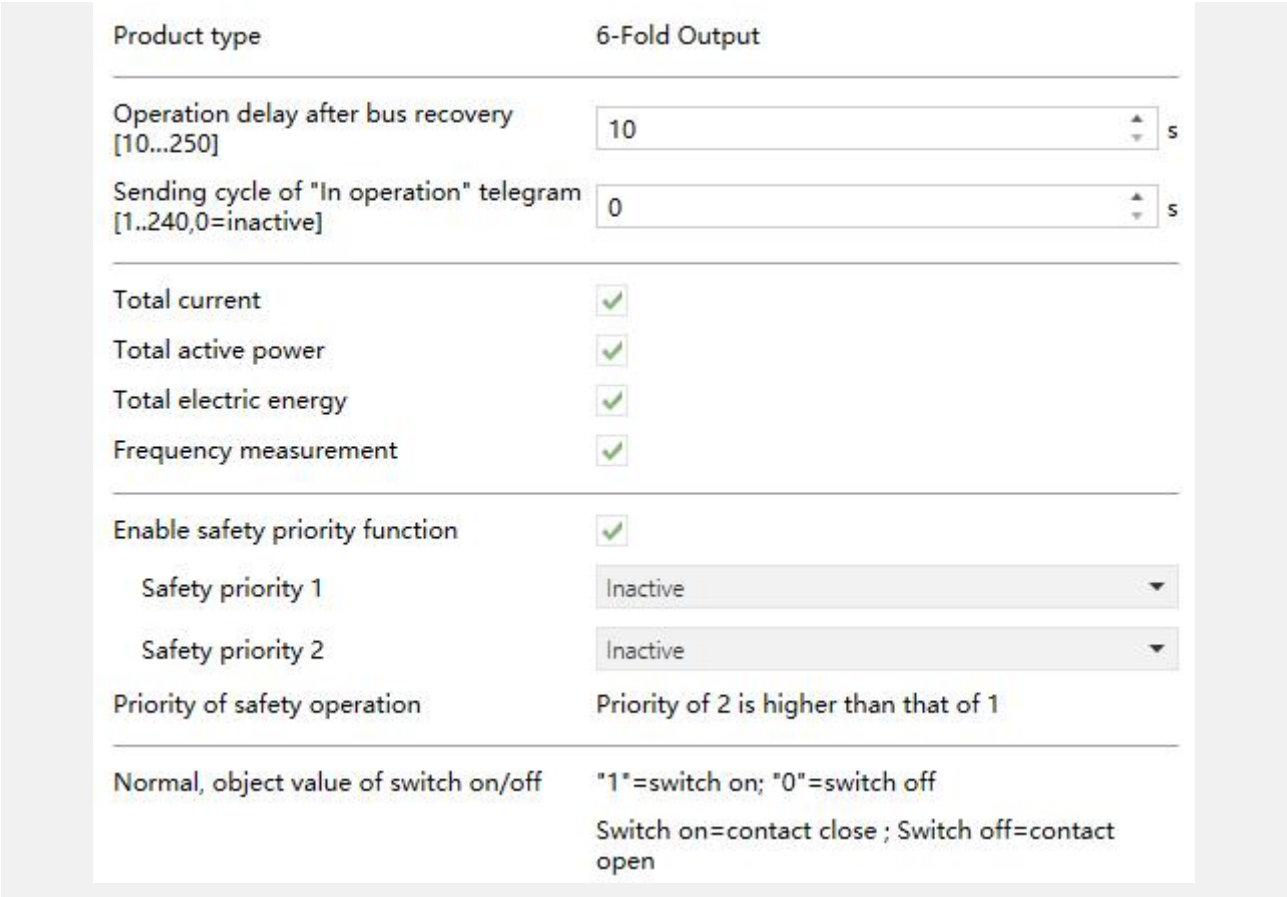


Fig. 4.3 Parameter window “General”

Parameter “Product type”

The parameter sets the product type of the Switch Actuator with Energy detection, and selects the option according to the type of product actually used.

Options:

3-Fold Output (apply to ARED-03/20.1)

6-Fold Output (apply to ARED-06/20.1)

Parameter "Operation delay after bus recovery [10..250]"

The parameter determines the delay time to react after the bus voltage recovery (the delay time after electrified) to avoid the malfunction of the bus and 220V AC caused by the simultaneously working of various relays, excluding the initialization time (approx. 2 seconds) of the device.

Options: **10...250 s**

If there are other devices (e.g. monitor) require to read the communication target value of the relay during the delay time after power on, then this requirement will be recorded, and then reacted after the delay time is finished.

If the delay time is long enough, all contacts of the relay can work simultaneously.

NOTE: And considering that it will generate damage to the power system and bus if a lot of devices operate simultaneously after bus recovery , so it is suggested to set the different delay time to each device.

Parameter "Sending cycle of "in operation" telegram [1..240,0=inactive]"

The parameter determines the time interval to send the telegram which shows the actuator is working normally or not via the bus. With the setting “0”, the actuator doesn’t send the telegram; if the setting is not “0”, a telegram with the value “1” will be sent cyclically according to the setting to the bus.

Options: **0…240 s, 0=cyclical send inactive**

It is suggested to select the maximum time interval according to the application to keep the bus load as low as possible.

NOTE: It is starting to count the time after power up, instead of the operation delay after recovery of bus voltage.

Parameter"Total current"

The parameter is used to set the enable status of the function “Total current”.

Parameter"Total active power"

The parameter is used to set the enable status of the function “Total active power”.

Parameter"Total electric energy"

The parameter is used to set the enable status of the function “Total electric energy”.

Parameter"Frequency measurement"

The parameter is used to set the enable status of the function “Frequency measurement”.

Parameter "Enable Safety priority function"

The parameter is used to set the enable status of the function “Safety priority”.

When the "Enable safety priority function" parameter is enabled, the following parameters are available:

Parameter ”Safety priority x” (x = 1,2)

There are 2 “safety priorities” for selecting. It is available to define the trigger condition to each “Safe priority”, and also enable the correspondent communication object “Safety Priority x” (x=1, 2).

These objects are important to the entire relay when under the working mode “Switch Actuator”, but each output can react differently depending on the received telegrams, whose reactions can be defined in the parameter window “X: Safety”. Options:

Inactive

Reset safety by Object value “0”

Reset safety by Object value “1”

Inactive: Do not initiate any “Safety Priority”;

Reset safety by Object value "0": If the communication object “Safety Priority x” receives “0”, the safety operation is canceled. If the opposite telegram is received, the safety operation is activated and the corresponding reactions will be executed;

Reset safety by Object value "1": If the communication object “Safety Priority x” receives “1”, the safety operation is canceled. If the opposite telegram is received, the safety operation is activated and the corresponding reactions will be executed.

Parameter ”Monitoring period of safety priority x [1...240, 0 = inactive]” (x = 1,2)

The parameter is used to set the monitoring period of safety priority x. Options: **0... 240 s**

When the monitoring period is not 0, if a Reset telegram is received from the object "Safety Priority x" (x = 1,2) during the monitoring period, the safety operation is canceled and the monitoring timing is reset; if the opposite telegram is received, the safety operation is activated, the corresponding reactions

is executed and the monitoring timing is reset. If no telegram is received during the monitoring period, the safety operation is activated and the corresponding reactions is executed.

When the monitoring period is 0, if a Reset telegram is received from the object "Safety Priority x" (x = 1,2), the safety operation is canceled; if the opposite telegram is received, the safety operation is activated and the corresponding reactions is executed.

"Safety priority" function should be monitored longer than twice the sensor's data-sending cycle to avoid an immediate alarm when individual signals occasionally fail.

Parameter "Priority of safety operation"

This parameter for describing that priority of 2 is higher than that of 1.

Parameter "Normal, object value of switch on/off"

This parameter for describing that the object value of Switch on/off.

"1"=switch on; "0"=switch off

Switch on=contact close ; Switch off=contact open

NOTE: "Switch on" mentioned below means the contact of the switch actuator is closed (output is on); "switch off" means the contact of the switch actuator is open (output is off).

4.4.Parameter window "Total current"

The parameter window “Total current” will be shown in Fig. 4.4.1, which applies to every output. The detected current of each channel can be added to the total current, the parameter window is the total current output configuration. Specific function parameters are described below.

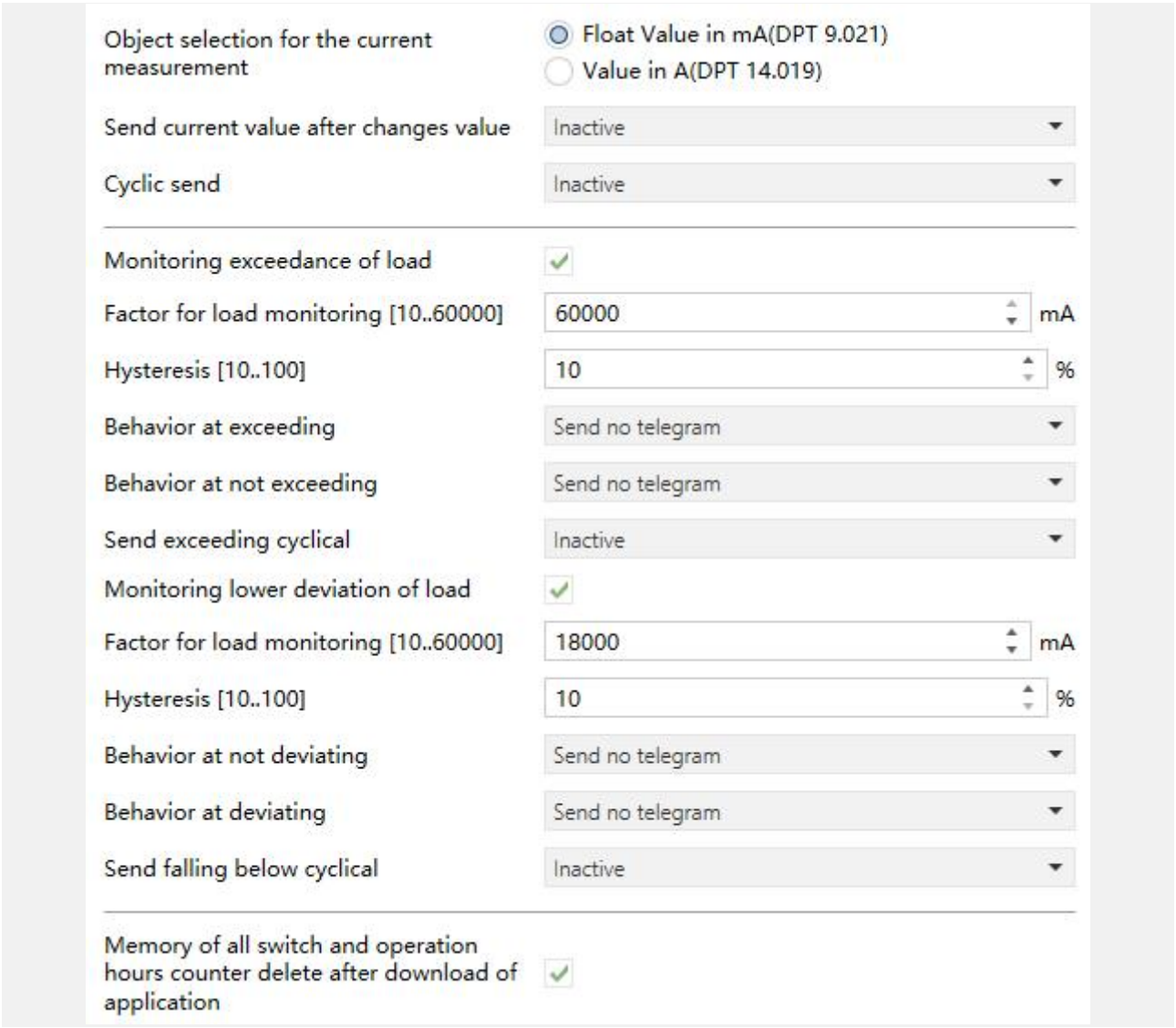


Fig. 4.4.1 Parameter window “Total current”

Parameter “Object selection for the current measurement ”

The parameter is the selection of the sending object for the total current measurement. Options:

Float Value in mA(DPT 9.021)

Value in A(DPT 14.019)

“Float Value in mA” means output current in mA, floating-point data;

"Value in A" means output current in A.

Parameter "Send current value after changes value"

Activation and adjustment of the sending of the current value at determined changes. Options:

Not active

1%

2%

...

70%

When the parameter chooses "10%", current is 1A. The current object value will be send when current larger than 1.1A(1A + 1A * 10%) or less than 于 0.9A(1A - 1A * 10%).

Parameter "Cyclic send"

Activation and adjustment of the sending of the current value at determined times. Options:

Inactive

10 Min

...

90 Min

120 Min

"Inactive": do not send current value.

"10 Min" send current object value every 10 minute, the same as other options.

Parameter "Monitoring exceedance of load"

Parameter "Monitoring lower deviation of load"

These two parameters are used to enable monitoring exceedance or lower deviation of load.

When the monitoring parameters are enabled, the following parameters are visible:

Parameter "Factor for load monitoring [10..60000]"

Parameter "Factor for load monitoring [10..120000]"

These two parameters setting the alarming current value for the monitoring of load exceedance or lower deviation.

When 3-Fold Output is selected, Options: **10...60000 mA**

When 6-Fold Output is selected, Options: **10...120000 mA**

The exceedance value must be larger than the lower deviation value, if not, it can not be configured on ETS.

Parameter "Hysteresis [10...100] "

This parameter adjusts of the hysteresis for avoiding to fast switching. Options: **10...100 %**

The hysteresis value is used to avoid to fast switching. E.g.:

For the alarm of exceedance, "Factor for load monitoring" is set to 1A, "Hysteresis" is set to 10%, then when current is larger than 1A, an alarm value will be send to the bus, when current is less than 0.9A (1A * (1 - 10%)) a not alarm value also will be send to the bus.

For the alarm of lower deviation, "Factor for load monitoring" is set to 0.5A, "Hysteresis" is set to 10%, then when current is less than 0.5A, an alarm value will be send to the bus, when current is larger than 0.55A (0.5A * (1 + 10%)) a not alarm value also will be send to the bus.

Parameter "Behavior at(not) exceeding"

Parameter "Behavior at(not) deviating"

Adjustment of the behavior, when the measured value is out / lower of the threshold value (or not).

Options:

Send no telegram

Send ON telegram

Send OFF telegram

"Send no telegram" do not send value; "Send ON telegram" send "1" telegram; "Send OFF telegram" send"0"telegram.

Parameter "Send exceeding cyclical"

Parameter "Send falling below cyclical"

Activation and adjustment of the time step for a cyclic sending. Options:

Inactive

10 Min

20 Min

...

120 Min

"Inactive" do not send value Cyclically, "10Min" send object value every 10 minutes, the same as other options. And value can be also sent after change.

Parameter "Memory of switch and operation hours counter delete after download of application"

Setting whether to delete switching times and power-on time of each channel.

This parameter is disabled: when database downloading, do not delete switching times and power-on time, and continue to accumulate after the download;

This parameter is enabled: when database downloading, delete all switching times and power-on time, and will be recounted from 0 after the download.

4.5.Parameter window ”Total active power”

The parameter window “Total active power” will be shown in Fig. 4.5.1, which applies to every output. The detected active power of each channel can be added to the total active power, the parameter window is the total active power output configuration. Specific function parameters are described below.

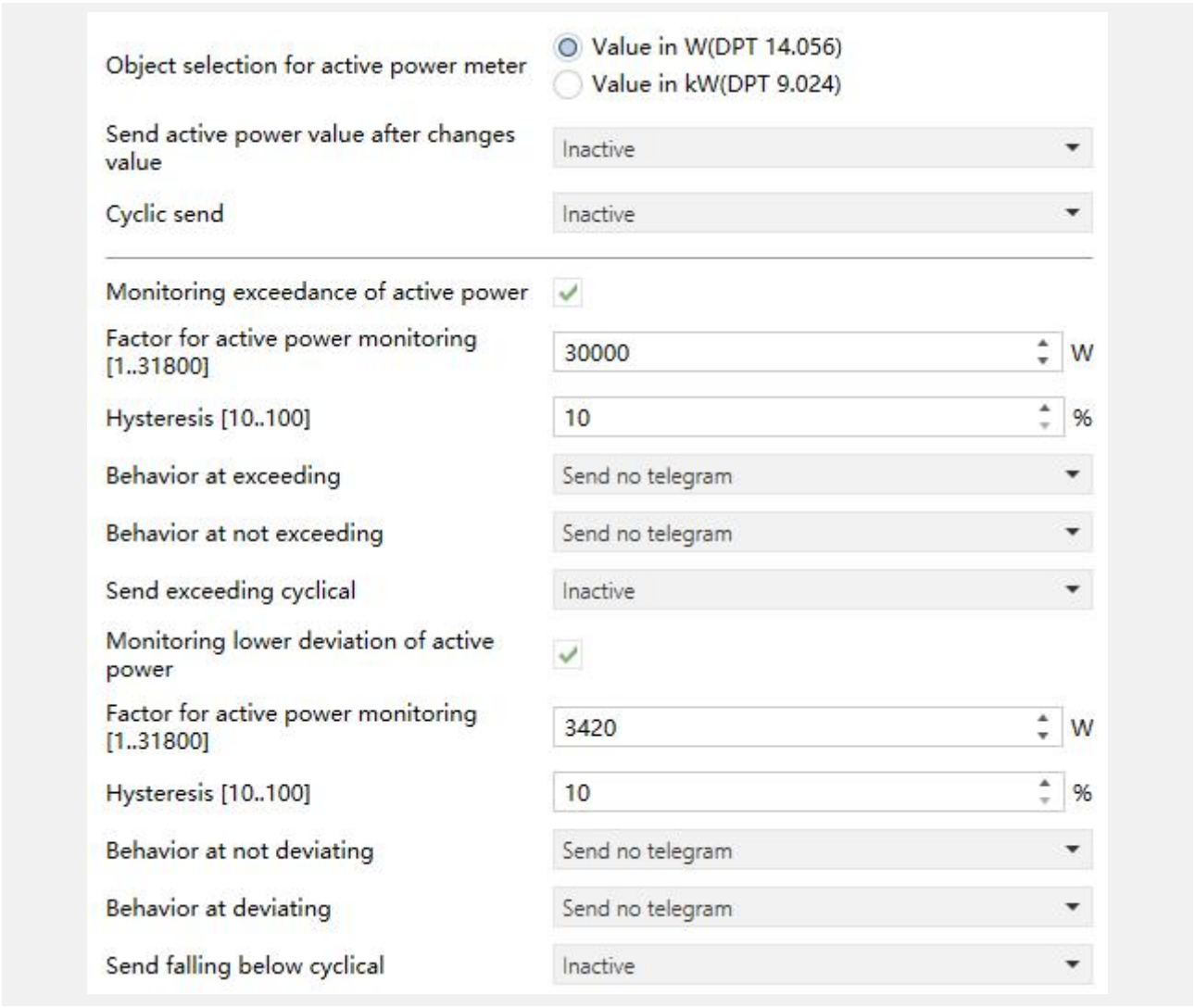


Fig. 4.5.1 Parameter window “Total active power”

Parameter “Object selection for active power meter”

The parameter is the selection of the sending object for the total active power meter. Options:

Value in W(DPT 14.056)

Value in kW(DPT 9.024)

Parameter "Send active power value after changes value "

Activation and adjustment of the sending of the active power value at determined changes.

Options:

Not active

1%

2%

...

70%

When the parameter chooses "10%", active power is 100W. The active power object value will be send when active power larger than 110W(100W + 100W * 10%) or less than 90W(100W - 100W * 10%).

Parameter "Cyclic send "

Activation and adjustment of the sending of the active power value at determined times. Options:

Inactive

10 Min

...

90 Min

120 Min

"Inactive": do not send active power value.

"10 Min" send active power object value every 10 minute, the same as other options.

Parameter "Monitoring exceedance of active power"

Parameter "Monitoring lower deviation of active power"

These two parameters are used to enable monitoring exceedance or lower deviation of active power.

When the monitoring parameters are enabled, the following parameters are visible:

Parameter "Threshold for active power monitoring [1..15900] "

Parameter "Threshold for active power monitoring [1..31800] "

These two parameters setting the alarming value for the monitoring of active power exceedance or lower deviation.

When 3-Fold Output is selected, Options: **1...15900 W**

When 6-Fold Output is selected, Options: **1...31800 W**

The exceedance value must be larger than the lower deviation value, if not, it can not be configured on ETS.

Parameter "Hysteresis [10...100] "

This parameter adjusts of the hysteresis for avoiding to fast switching. Options: **10...100 %**

The hysteresis value is used to avoid to fast switching. E.g.:

For the alarm of exceedance, "Threshold for active power monitoring" is set to 100W, "Hysteresis" is set to 10%, then when active power is larger than 100W, an alarm value will be send to the bus, when active power is less than 90W (100W * (1 - 10%)) a not alarm value also will be send to the bus.

For the alarm of lower deviation, "Threshold for active power monitoring" is set to 50W, "Hysteresis" is set to 10%, then when active power is less than 50W, an alarm value will be send to the bus, when active power is larger than 55W (50W * (1 + 10%)) a not alarm value also will be send to the bus.

Parameter "Behavior at(not) exceeding "

Parameter "Behavior at(not) deviating "

Adjustment of the behavior, when the measured value is out / lower of the threshold value (or not).

Options:

Send no telegram

Send ON telegram

Send OFF telegram

"Send no telegram" do not send value; "Send ON telegram" send "1" telegram; "Send OFF telegram" send"0"telegram.

Parameter ”Send exceeding cyclical”

Parameter ”Send falling below cyclical”

Activation and adjustment of the time step for a cyclic sending. Options:

Inactive

10 Min

20 Min

....

120 Min

“Inactive” do not send value Cyclically, ”10Min” send object value every 10 minutes, the same as other options. And value can be also sent after change.

4.6.Parameter window ”Total electric energy”

The parameter window “Total electric energy” will be shown in Fig. 4.6.1, which applies to every output. The detected electric energy of each channel can be added to the total electric energy, the parameter window is the total electric energy output configuration. Specific function parameters are described below.

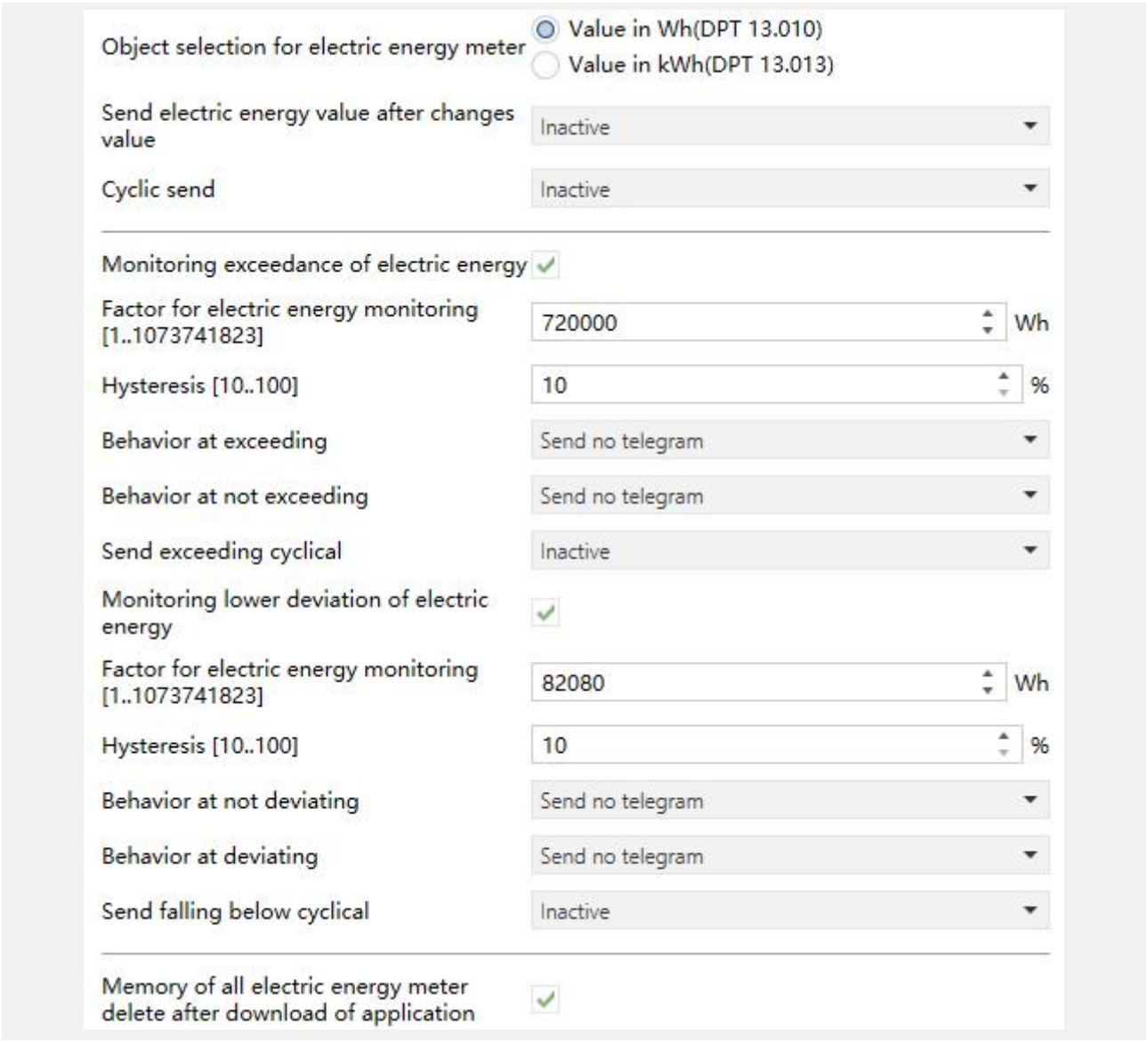


Fig. 4.6.1 Parameter window “Total electric energy”

Parameter "Object selection for electric energy meter"

The parameter is the selection of the sending object for the total electric energy meter. Options:

Value in Wh(DPT 13.010)

Value in kWh(DPT 13.013))

Parameter "Send electric energy value after changes value "

Activation and adjustment of the sending of the electric energy value at determined changes.

Options:

Not active

1%

2%

...

70%

When the parameter chooses "10%", electric energy is 100Wh. The electric energy object value will be send when electric energy larger than 110Wh(100Wh + 100Wh * 10%) or less than 于 90Wh(100Wh - 100Wh * 10%).

Parameter "Cyclic send "

Activation and adjustment of the sending of the electric energy value at determined times. Options:

Inactive

10 Min

...

90 Min

120 Min

"Inactive": do not send electric energy value.

"10 Min" send electric energy object value every 10 minute, the same as other options.

Parameter "Monitoring exceedance of electric energy "

Parameter "Monitoring lower deviation of electric energy "

These two parameters are used to enable monitoring exceedance or lower deviation of electric energy.

When the monitoring parameters are enabled, the following parameters are visible:

Parameter "Threshold for electric energy monitoring [1..1073741823] "

This parameter setting the alarming value for the monitoring of electric energy exceedance or lower deviation. Options: **1...1073741823 Wh**

The exceedance value must be larger than the lower deviation value, if not, it can not be configured on ETS.

Parameter "Hysteresis [10...100] "

This parameter adjusts of the hysteresis for avoiding to fast switching. Options: **10...100 %**

The hysteresis value is used to avoid to fast switching. E.g.:

For the alarm of exceedance, "Threshold for electric energy monitoring" is set to 1000Wh, "Hysteresis" is set to 10%, then when electric energy is larger than 1000Wh, an alarm value will be send to the bus, when electric energy is less than 900Wh (1000Wh * (1 - 10%)) a not alarm value also will be send to the bus.

For the alarm of lower deviation, "Threshold for electric energy monitoring" is set to 500Wh, "Hysteresis" is set to 10%, then when electric energy is less than 500Wh, an alarm value will be send to the bus, when electric energy is larger than 550Wh (500Wh * (1 + 10%)) a not alarm value also will be send to the bus.

Parameter "Behavior at(not) exceeding "

Parameter "Behavior at(not) deviating "

Adjustment of the behavior, when the measured value is out / lower of the threshold value (or not).

Options:

Send no telegram

Send ON telegram

Send OFF telegram

"Send no telegram" do not send value; "Send ON telegram" send "1" telegram; "Send OFF telegram" send"0"telegram.

Parameter "Send exceeding cyclical "

Parameter "Send falling below cyclical "

Activation and adjustment of the time step for a cyclic sending. Options:

Inactive

10 Min

20 Min

....

120 Min

"Inactive" do not send value Cyclically, "10Min" send object value every 10 minutes, the same as other options. And value can be also sent after change.

Parameter "Memory of all electric energy meter delete after download of application "

Setting whether to delete electric energy of each channel.

This parameter is disabled: when database downloading, do not delete electric energy, and continue to accumulate and sent to the bus after the download;

This parameter is enabled: when database downloading, delete all electric energy, and will be recounted from 0 and only send the currently detected total electric energy after the download.

4.7.Parameter window ”Frequency measurement”

The parameter window “Frequency measurement” will be shown in Fig. 4.7.1, the parameter window is the frequency output configuration. Specific function parameters are described below.

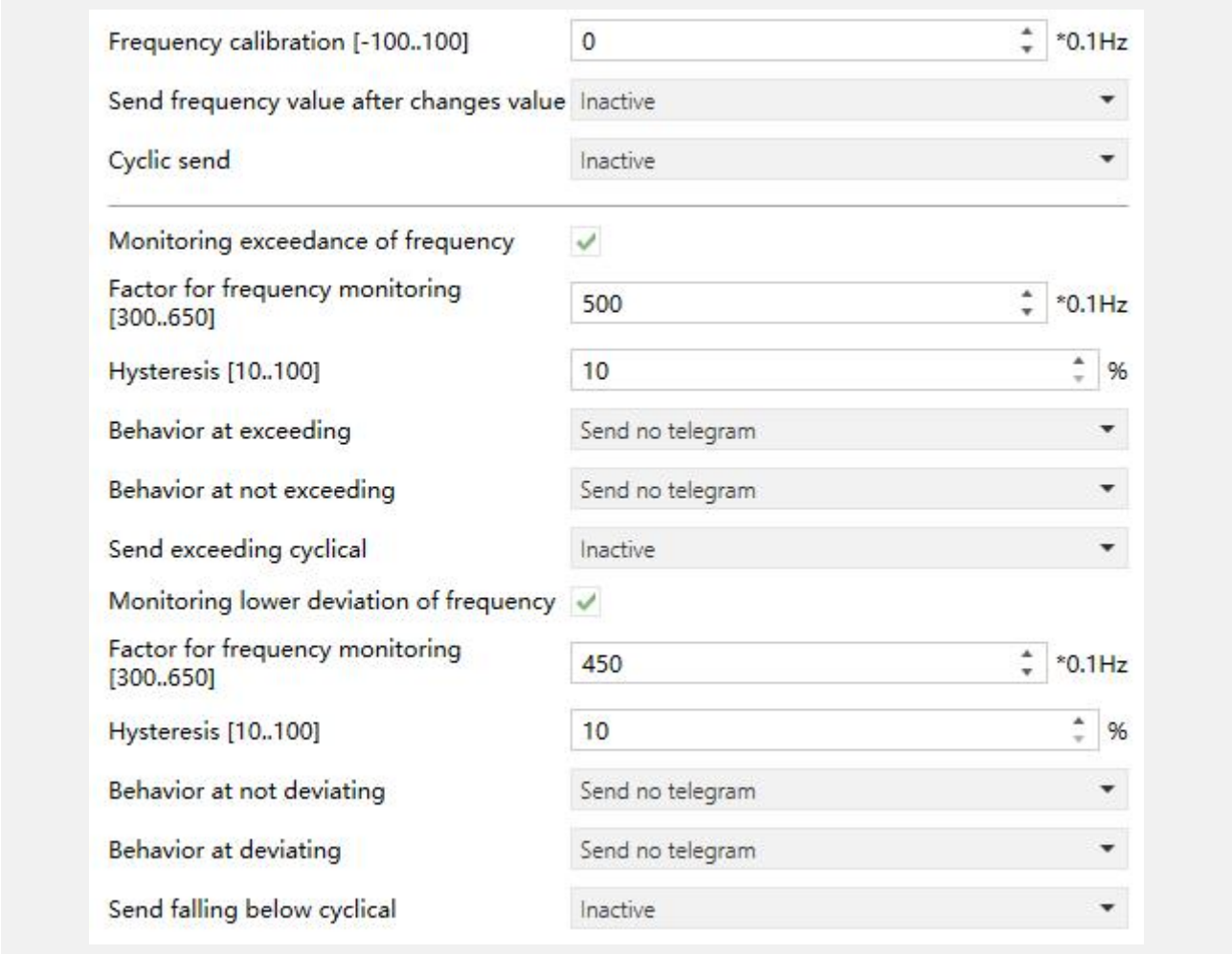


Fig. 4.7.1 Parameter window “Frequency measurement”

Parameter ”Frequency calibration [-100..100] ”

The parameter is used to correct the deviation that occurs in frequency detection.

Options: **-100..100 *0.1Hz**

Parameter ”Send frequency value after changes value ”

Activation and adjustment of the sending of the frequency value at determined changes.

Options:

Not active

1%

2%

...

70%

When the parameter chooses ”10%”, frequency is 10Hz. The frequency object value will be send when frequency larger than 11Hz(10Hz + 10Hz * 10%) or less than 9Hz(10Hz - 10Hz * 10%).

Parameter "Cyclic send "

Activation and adjustment of the sending of the frequency value at determined times.

Inactive

10 Min

...

90 Min

120 Min

“Inactive” do not send frequency value cyclically. ”10 Min” send frequency object value every 10 minute, the same as other options.

Parameter "Monitoring exceedance of frequency "

Parameter "Monitoring lower deviation of frequency "

These two parameters are used to enable monitoring exceedance/lower deviation of frequency.

When the monitoring parameters are enabled, the following parameters are visible:

Parameter “Threshold for frequency monitoring [300..650] ”

This parameter adjusts the alarming value for the monitoring of frequency exceedance or lower deviation. Options: **300..650 *0.1Hz**

The exceedance value must be larger than the lower deviation value, if not, it can not be configured on ETS.

Parameter ”Hysteresis [10...100] ”

This parameter adjusts of the hysteresis for avoiding to fast switching. Options: **10...100 %**

The hysteresis value is used to avoid to fast switching. E.g.:

For the alarm of exceedance, “Threshold for frequency monitoring” is set to 50Hz, “Hysteresis” is set to 10%, then when frequency is larger than 50Hz, an alarm value will be send to the bus, when frequency is less than 45Hz (50Hz * (1 - 10%)) a not alarm value also will be send to the bus.

For the alarm of lower deviation, “Threshold for frequency monitoring” is set to 40Hz, “Hysteresis” is set to 10%, then when frequency is less than 40Hz, an alarm value will be send to the bus, when frequency is larger than 44Hz (40Hz * (1 + 10%)) a not alarm value also will be send to the bus.

Parameter “Behavior at(not) exceeding ”

Parameter “Behavior at(not) deviating ”

Adjustment of the behavior, when the measured value is out / lower of the threshold value (or not).

Options:

Send no telegram

Send ON telegram

Send OFF telegram

“Send no telegram” do not send value; “Send ON telegram” send “1” telegram; “Send OFF telegram” send“0”telegram.

Parameter ”Send exceeding cyclical ”

Parameter ”Send falling below cyclical ”

Activation and adjustment of the time step for a cyclic sending. Options:

Inactive

10 Min

20 Min

....

120 Min

“Inactive” do not send value Cyclically, ”10Min” send object value every 10 minutes, the same as other options. And value can be also sent after change.

4.8.Parameter window “Channel X”-Switch actuator

The parameter window “Channel X” is shown in Fig. 4.8(1) It works for all the outputs. “Channel X” or “X” mentioned below means any output of the switch actuator, which has the same parameter setup interface and communication objects.

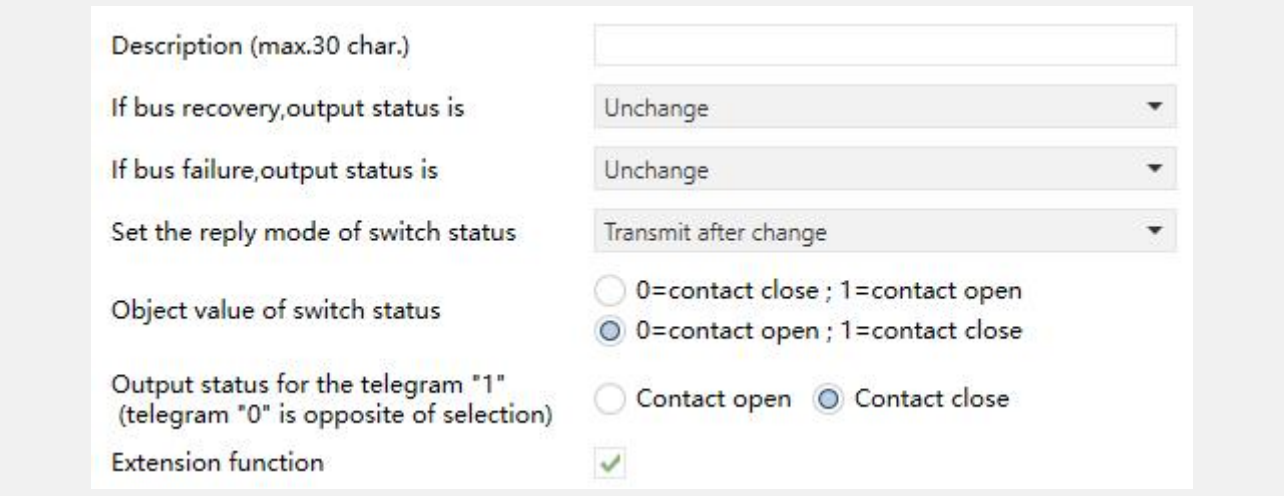


Fig. 4.8(1) Parameter window “Channel: X”

Parameter "Description (max. 30char.) "

This parameter is used to set the custom description of channel, up to input 30 characters.

Parameter "If bus recovery，output status is"

The output can adopt a defined status on bus voltage recovery via this parameter. Options:

Unchange

Contact open

Contact close

As before bus failure

When selecting “Unchange”, the contact of the relay will remain the current status;

When selecting “Contact open”, contact of the channel will be opened when the bus power on;

When selecting “Contact close”, contact of the channel will be closed when the bus power on;

When selecting “As before bus failure”, contact position after voltage recovery is the same as that before power on.

NOTE: After finished application programming, all output channels will remain the same status.

Parameter "If bus failure，output status is"

The output can adopt a defined status after the bus voltage failure via this parameter. Options:

Unchange

Contact open

Contact close

When selecting “Unchange”, status of contact will remain the same as the last status before power off;

When selecting “Contact open”, contact of the channel will be opened when the bus power off;

When selecting “Contact close”, contact of the channel will be closed when the bus power off.

Parameter "Set the reply mode of switch status"

This parameter defines the status of the current switch status when the telegram is sent. Options:

No reply

Respond after read only

Transmit after change

If selecting “No reply”, delay will not send any telegram;

If selecting “Respond after read only”, the status telegram will not be sent out until receiving the status telegrams from other devices;

If selecting “Transmit after change”, it will send the status automatically when there is any changes on the output.

The value (“0” or “1”) of the communication object “Switch status” and “Switch ” defines the current status of the relay, which can be set in the parameter “Set the reply mode of switch status ” (when selecting ““Respond after read only” or “Transmit after change”).

Parameter "Object value of switch status"

This parameter will be visible when selecting “Respond after read only” or “Transmit after change” in “Set the reply mode of switch status”.

Options:

0=contact close ; 1=contact open

0=contact open ; 1=contact close

It means the contact of the relay will be closed when the value of the communication object “Reply the switch status” and “Send the switch status” is 0 when setting “0=contact close; 1=contact open”, while it is open when the value is “1”. It means the opposite with setting “0=contact open; 1=contact close”.

Parameter "Output status for the telegram "1"(telegram "0" is opposite of selection)"

This parameter sets the position of the channel contact when the Switch object telegram"1" is received. The switch operation is triggered by the communication object "switch".. When enabling “Input 0” in the logic function, it will use the communication object “Switch,” to modify the value of “Input 0”, rather than triggering the switch operation. Options:

Contact open

Contact close

The contact position will be off with “**Contact open**”, and on with “**Contact close**”.

If the switch object message "0" is received, it is the opposite of what is selected by this parameter option.

NOTE: The parameter only works after receiving object “Switch”, and defines the direction of the contact after receiving it.

Parameter "Extension function"

This parameter defines whether enable the extension functions of the switch actuator. The parameter window “X: Function” will be seen with “active”, and able to set the special functions individually in Fig. 4.8(2). Enable or disable the special function in “X: Function”, seen in Fig. 4.8(3).

Fig. 4.8(2) Starting parameter window “X: Function”

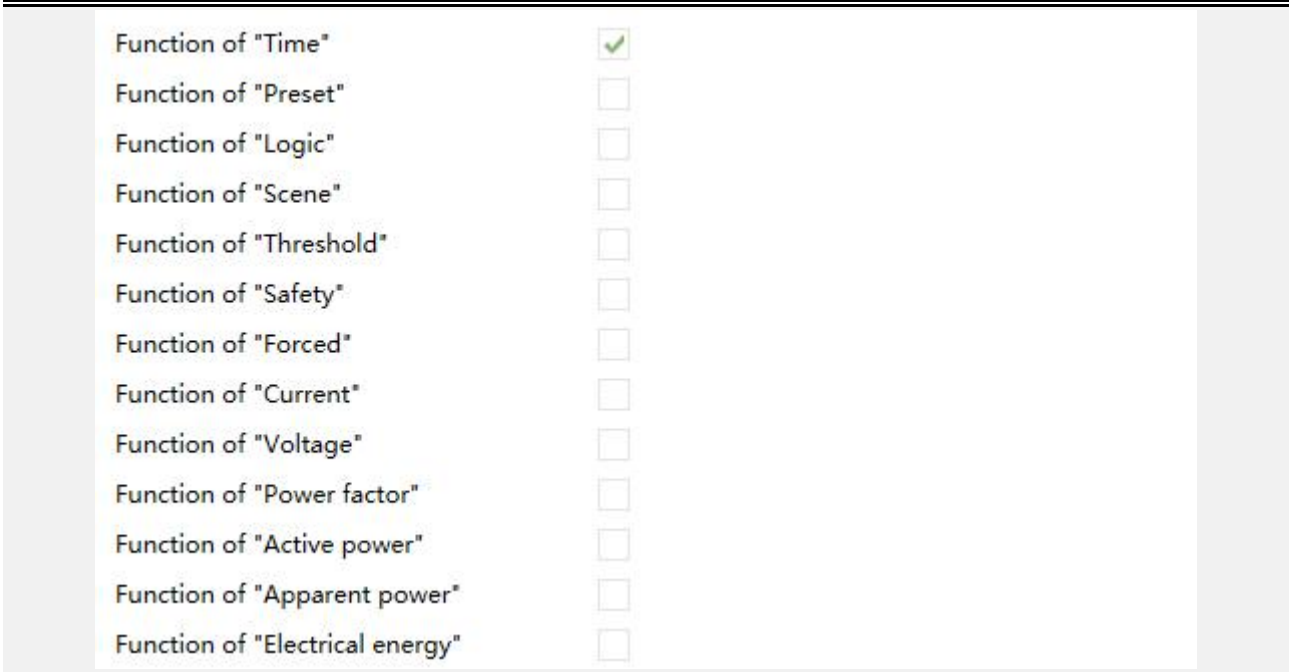


Fig. 4.8(3) Starting parameter window “X: Function”

4.8.1.Parameter window “X: Time”

This parameter window will become visible when the parameter “Function of ‘time’ for switch” is enabled in the parameter window “X:Function”. See Fig. 4.8.1.,which is used to enable/disable the time function via bus.

Fig. 4.8.1 Parameter window “X: Time”

Parameter “The mode of time function”

The parameter defines the type of the timing function setup. Options:

Delay switch

Flashing switch

Staircase lighting

4.8.1.1.Selection “Delay switch”

The parameter window of the time function in Fig. 4.8.1.1 will be shown when selecting “Delay switch”.

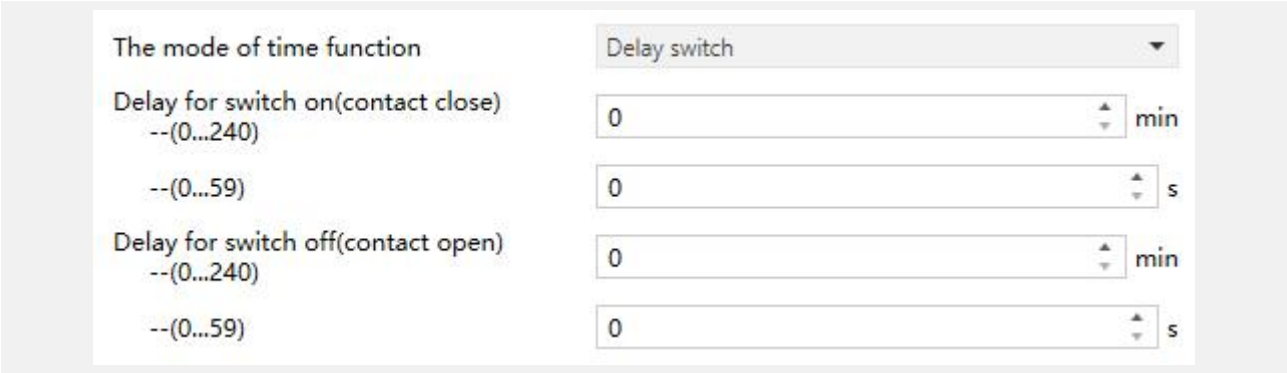


Fig. 4.8.1.1 Parameter window “X: Time”-Delay switch

Parameter "Delay for switching on(contact close): --(0...240) / -- (0...59)"

This parameter defines the delay time of the switch on (contact close). Options:

0…240 min

0...59 s

Setting the delay time to switch off when object receive the control telegram.

Parameter "Delay for switching off(contact open): --(0...240) / -- (0...59)"

This parameter defines the delay time of the switch off. (contact open). Options:

0…240 min

0...59 s

During the delay period, if the same packet command is received, the time is reset.

4.8.1.2.Selection “Flashing switch”

The parameter window in Fig. 4.8.1.2 will be shown up when selecting “Flashing switch” in “The mode of time function”.

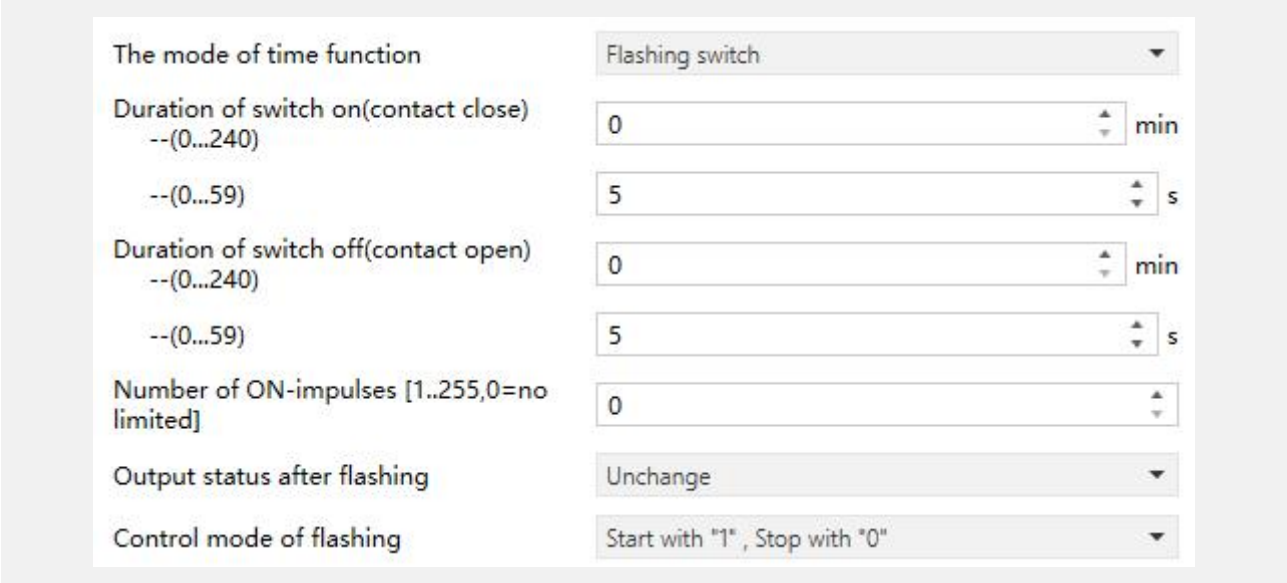


Fig. 4.8.1.2 Parameter window “X: Time”-Flashing switch

When the flashing function is activated, when the corresponding message is received, the system will start the flashing output. The blink switch interval can be set in the parameters "Duration of switch on(contact close)" and "Duration of switch off(contact open)". It will restart the flashing when receiving the relevant telegram by the object “Switch out with flashing”, and define the contact position after flashing.

Parameter "Duration of switch on(contact close): --(0...240) / -- (0...59)"

This parameter defines the duration time to switch on(contact close) the output when flashing.

Options:

0…240 min

0...59 s

Parameter "Duration of switch off(contact open): --(0...240) / -- (0...59)"

This parameter defines the duration time to switch off (contact open) the output when flashing.

Options:

0…240 min

0...59 s

NOTE:

1. it will not be executed unless the time is lower than the relay threshold switch frequency. Since there will be not sufficient energy to do it because of the frequent relay switching, and it may cause time delay. The same situation will happen after the bus voltage recovery.

2. The minutes and seconds cannot be set to 0 at the same time, if not meet the condition, they can not be configured in ETS.

Parameter "Number of ON-impulses [1...255, 0=no limited]"

This parameter setting the flashing times. A flashing includes an on and an off Options: **0...255**

NOTE: 0 means no limited!

Parameter "Output status after flashing"

This parameter points out the relay contact position after flashing. Options:

Unchange

Contact open

Contact close

Parameter "Control mode of flashing"

The parameter states the mode of the flashing output. Options:

Start with"1",stop with "0"

Start with "0",stop with "1"

Start with "1/0", can not be stopped

It will start flashing with “1” received by the object “Switch out with flashing” when selecting “Star with ‘1’, stop with ‘0’”; it will stop flashing with “0”.

It will start flashing with “0” received by the object “Switch out with flashing” when selecting “Star with ‘0’, stop with ‘1’”; it will stop flashing with “1”.

It will start flashing with either “1” or “0” received by the object “Switch out with flashing” when selecting “Star with ‘1/0’，cannot be stopped”; Under this circumstance it cannot terminate the flashing by sending the telegram until the preset ending time, unless it is blocked by other operation or wait for execution finish.

4.8.1.3.Selection “Staircase lighting”

The parameter window of the staircase lighting function in Fig. 4.8.1.3 will be visible when selecting “Staircase lighting” in the parameter “The mode of time function”.

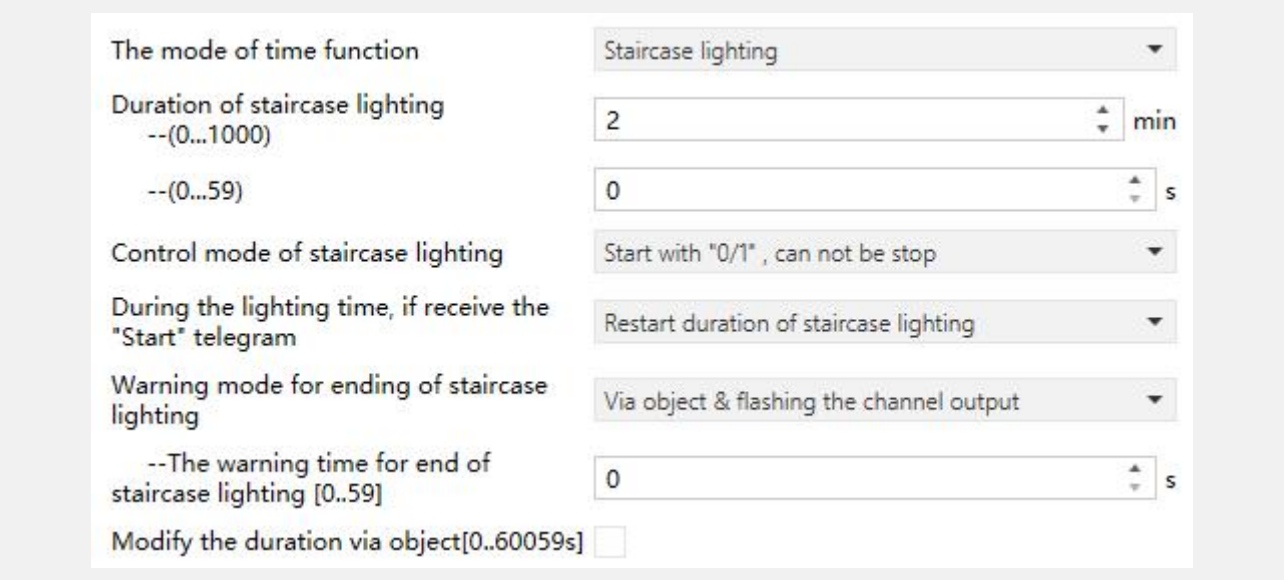


Fig. 4.8.1.3 Parameter window “X: Time”-Staircase lighting

The staircase lighting function is switched on via the object “Output of staircase lighting”. And also it is available to program the value of “Output of staircase lighting”. The staircase lighting time starts when it is switched on and will be switched off immediately after the set time when there is no prewarning setting.

Parameter "Duration of staircase lighting-(0...1000) / --(0...59)"

This parameter describes the duration time when switching on the staircase light function: minutes/seconds.Options:

0…1000 min

0...59 s

NOTE: The minutes and seconds cannot be set to 0 at the same time, if not meet the condition, they can not be configured in ETS.

Parameter "Control mode of Staircase lighting"

This parameter defines the mode of the staircase lighting function. Options:

Start with "1", OFF with "0"

Start with "1", no action with "0"

Start with "0/1", cannot be stopped

When selecting "Start with "1", OFF with "0"", it will switch on the staircase lights with the value "1" received by the object "Output of staircase lighting"; it will switch off on by the value "0".

When selecting "Start with "1", no action with "0"", it will switch on the staircase lights with the value "1" received by the object "Output of staircase lighting" and no reaction with "0".

When selecting "Start with "0/1", cannot be stopped", it will switch on the staircase lights either with "0" or "1" received by the object "Output of staircase lighting" but cannot end it by the object until the duration time finished or changed by other operation.

Parameter "During the lighting time, if receive the 'start' telegram"

Options:

Restart duration of staircase lighting

Extend duration time

Ignored the "start" telegram

If selecting "Restart duration of staircase lighting", if the object "Output of staircase lighting" again receive the telegram of starting staircase lighting during the duration time, then the staircase lighting will restart and the duration time will be restart.

If selecting "Extend duration time", if the object “Output of staircase lighting” again receive the telegram of starting staircase lighting during the duration time, then the duration of the staircase lighting will be extended based on the current timing. For example, the duration of the staircase light is set to 60 seconds, and the current time is 20 seconds, then after receiving a start telegram, the lighting time of the staircase light will become 40+60=100seconds, and the staircase lighting will automatically turn off after 100 seconds. If multiple start telegrams are received continuously, the duration time will continue to accumulate before the maximum time limit is reached.

If selecting “Ignore the ‘start’ telegram”, then it will ignore the receiving start telegram of the object “Output of staircase lighting” during the duration time.

Parameter "Warning mode for ending of staircase lighting"

The parameter points out the alarm type when terminating the staircase lights, which will start the prewarning notice before switching off. This prewarning time is included in the starting duration of the staircase. There will be no alarm if selecting “Nothing”, as well as the lights is off before the prewarning time. Options:

Nothing

Via object

Flashing the channel output with OFF/ON

Via object & flashing the channel output

2 types of prewarning are provided:

--Via the communication object: set the value of the object “Warning of staircase” as “1” when starting alarming and then send it to the bus;

--Via the output flashing: control the output flashing (a short switch), and the duration is 1 second.

These 2 types can be used independently or together. It will be the type of “by the communication object” when it is “via object”, or the type of “by the lights flashing” with “flashing the channel output with OFF/ON”; as well as mixed type with “via object & flashing the channel output”.

Parameter "The warning time for end of staircase lighting [0..59]"

The parameter is visible after selecting a prewarning type, and the duration of the prewarning: second. Options: **0…59 s**

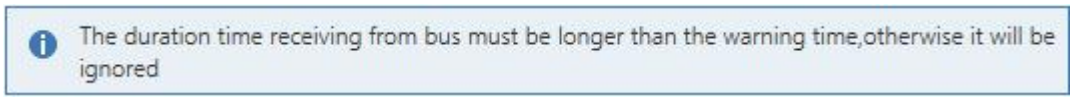
Note: the warning time must be less than the duration time, or it cannot set on the ETS.

Note: the warning time is contained in the startup time of staircase lighting. If switch off before the warning time, there is no prewarning.

Parameter "Modify the duration via object[0..60059s]"

It will activate the object "Duration of staircase" with 2 bytes when it is enabled to modify the staircase lighting time, however it cannot modify the time if disabled.

Store the modified value when bus failure, recovery to the value set by parameter after download.



NOTE: If the values of telegram for modification the duration is "0", the staircase lighting will be disabled.

4.8.2.Parameter window "X: Preset"

This parameter window as shown in Fig. 4.8.2 when the parameter "Function of 'preset' for switch" is enabled in the parameter window "X: Function".

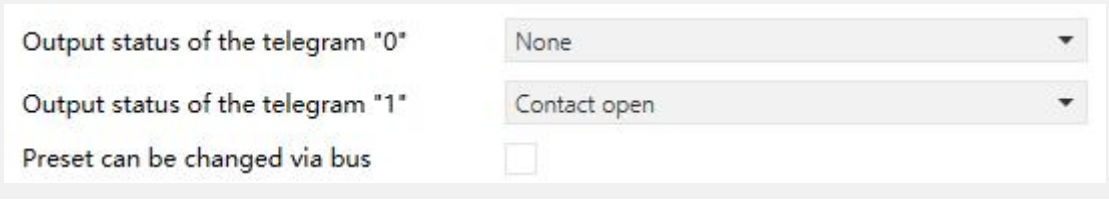


Fig. 4.8.2 Parameter window "X: Preset"

It is able to not only recall the preset value, but also save the new value of the current switch status by the bus.

There are 2 objects to recall and save the preset value, and 2 optional preset values (telegram "0" and telegram "1"). It means "telegram "0"" with "0", and "telegram "1"" with "1".

Parameter "Output status of the telegram "0""

This parameter defines the relay status when recalling the preset value "telegram "0" " (that is when the object "Recall preset" receives the telegram "0") by setting the communication object "Recall preset". Options:

None

Contact close

Contact open

Parameter "Output status of the telegram "1""

This parameter defines the relay status when recalling the preset value “telegram “1” ” (that is when the object “Recall preset” receives the telegram “1”) by setting the communication object “Recall preset”. Options:

Contact open

Contact close

Last position of contact

Same as the telegram "0"

When the action triggered by telegram "1" selects “last position of contact”, it will be recovered to the last switch status every time recalling telegram "1".

When the action triggered by telegram "1" selects ““Same as the telegram "0"””, it will carry out the set parameters of the action triggered by telegram "0" every time recalling telegram "1".

Parameter "Preset can be changed via bus"

It is used to set whether changing the preset value by the bus. It is allowable to change the value and enable the object “Store preset” at the same time when enabled, which can save the current status as the new preset value.

The current value is saved as new telegram "0" when receiving the telegram “0”; as new telegram "1" when “1”.

The current status will be saved in the new preset value if selecting “None” in “Output status of the telegram "0"” and “Last position of contact” or “Same as the telegram "0"” in “output status of the telegram “1” (object value=1)”.

Note: It will save the new preset value after bus voltage recovery.

4.8.3.Parameter window “X: Logic”

It will show up Fig. 4.8.3 when “Function of ‘logic’ for switch” is enabled in Fig. 4.8(3).

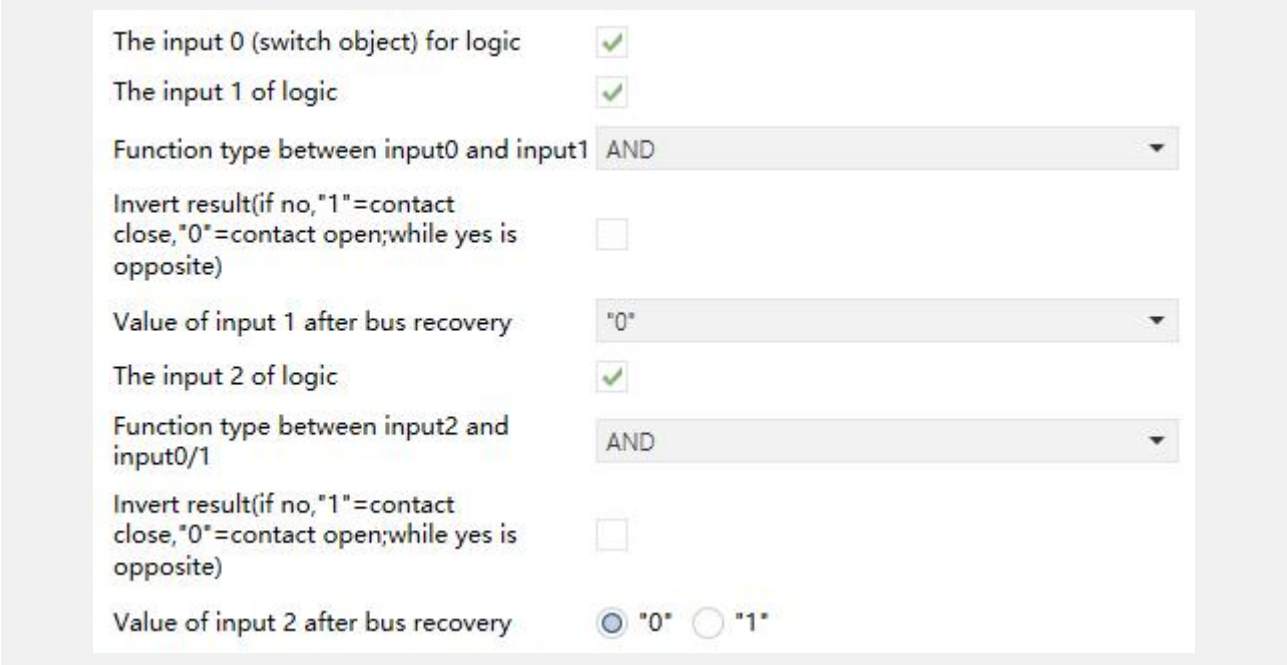


Fig. 4.8.3 Parameter window “X: Logic”

There are 2 logic communication objects to decide the status of individual output, which are related to the “Switch”.

It will re-operate when receiving a new object value as the final output status (close the contact with “1”, open it with “0”).

The value of the communication object “Input 1 of logic” is logically operated with “Switch,X” firstly,and then the result is logically operated with the value of “Input 2 of logic”.This operation will ignore the object which are disable,and continue to the next step with the enabled objects.

Parameter "The input 0 (switch object) for logic is"

This parameter is used to enable the function of logic operation of “Input 0”, whose values are wrote by the object “Switch”.

Parameter "The input x of Logical" (x = 1, 2)

This parameter describes the status of the logic operation of the object “Input 1 of logic” or “Input 2 of logic”.

Parameter "Function type between input 0 and input 1

Parameter "Function type between input 0 and input input 2 and input 0/1"

These two parameters introduce the logical relationship of the logic operation, providing 3 standard logical operations (AND, OR, XOR) and a GATE function.

Explanation for GATE function: Gate function is equivalent to a door, if the door is open, then the previous logic result will can be output, if it is closed, there will be no influence to output. For example, the logic input 2 sets to Gate function and logic value 1, then the logic result of input 0 and input 1 can be output, if logic value of the input 2 is 0, the output will keep. Options:

AND

OR

XOR

GATE

Below result of logic operation is possible:

Logic function	Object values					Description
	Input0(Switch)	Input1	Result of Input 0/1	Input2	Output	
AND	0 0 1 1	0 1 0 1	0 0 0 1	0 1 0 1	0 0 0 1	The result is 1 if both input values are 1.
OR	0 0 1 1	0 1 0 1	0 1 1 1	0 1 0 1	0 1 1 1	The result is 1 if one of both input values is 1
XOR	0 0 1 1	0 1 0 1	0 1 1 0	0 1 0 1	0 0 1 1	The result is 1 if both input values have a different value.
GATE	0 0 1 1	Closed Open Closed Open	0 1	Closed Open Closed Open	0 1	The input 0 of value is only allowed through if the GATE (input 1 and input 2) is open. Otherwise the input0 of value is ignored.

Note:

1. The value of the communication object "Input 1" is logically operated with “Switch” firstly, and then the result will logically operated with the value of “Input 2”, and the final operation result as the final output (close the contact with “1”, open it with “0”).

2. If an input is not enabled, the input is ignored.

3. If logical result needs to be negated, the first negated, then the next step.

4, The signal can be passed if the GATE is open, otherwise it is ignored. For example, the input 0 of value is ignored when the GATE of input 1 is closed, and the output is directly determined by the input 2.

Parameter "Invert result(if no,"1"=contact close,"0"=contact open;while yes is opposite)"

This parameter defines whether negate the logical operation results. Negate it when it is enabled, Otherwise don't take to invert.

Parameter "Value of input 1 after bus recovery"

This parameter defines the default value of the object “Input 1 of logic” after bus voltage recovery. Options:

“0”

“1”

Value before power off

The value will be the one before power off after bus voltage recovery when selecting “value before power off”. After application programming, the object value is 0.

Parameter "Value of input 2 after bus recovery"

This parameter defines the default value of the object “Input 2 of logic” after bus voltage recovery. Options:

“0”

“1”

4.8.4.Parameter window “X: Scene”

The parameter window shown in Fig. 4.8.4 will burst out when “Function of ‘scene’ for switch” is enabled in Fig. 4.8.(3).

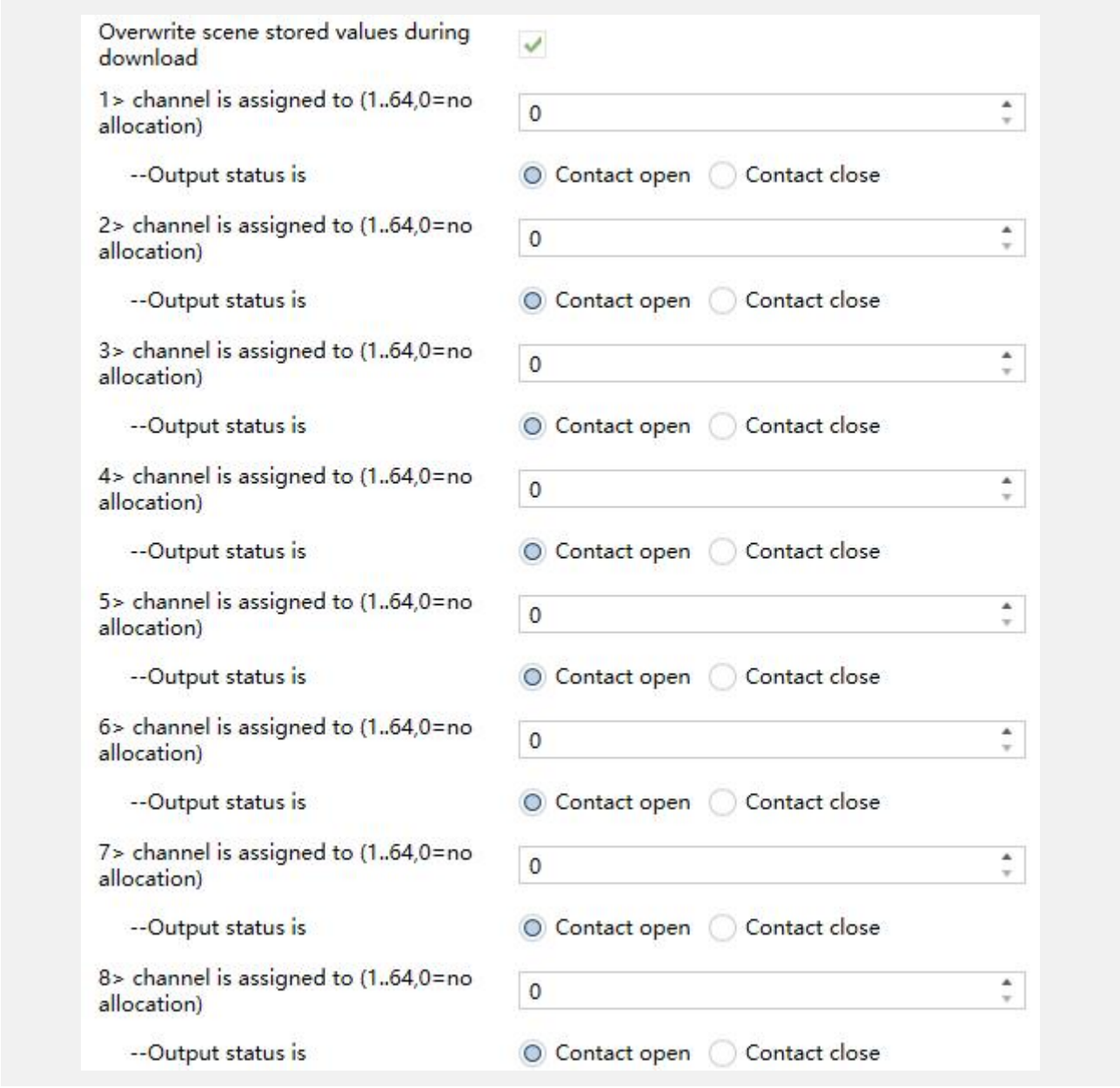


Fig. 4.8.4 Parameter window “X: Scene”

Parameter “Overwrite scene stored values during download”

This parameter sets whether to override the scene save value during application download.

If it is disabled, the stored values before the download can be not overwritten by the parameterized scene value. When the scene is called, the scene saved before the download is still enabled until it is replaced by the new storage scene.

If it is enabled, the stored values will be overwritten by the parameterized scene value during the download. When the scene is called, the scene will be set according to the parameters until it is replaced by the new storage scene.

Parameter "x>channel is assigned to (1...64 scene NO., 0=no allocation)"(x=1~8)

It is able to allocate 64 different scene numbers to every output. There are 5 various scenes can be set per output. Options: **1...64, 0=no allocation**

Note: the valid scene numbers in the parameter setting options are 1-64. The actual corresponding telegram is 0..63. If a scene is stored via a learning telegram, the new scene will be active immediately and still be valid even if power failure.

Parameter "--Output status is:"

This parameter defines the switch output status when recalling the scene. Options:

Contact open
Contact close

4.8.5.Parameter window “X: Threshold”

The window in Fig. 4.8.5 will be shown up when the parameter “Function of ‘threshold’ for switch” is enabled in Fig. 4.8(3).

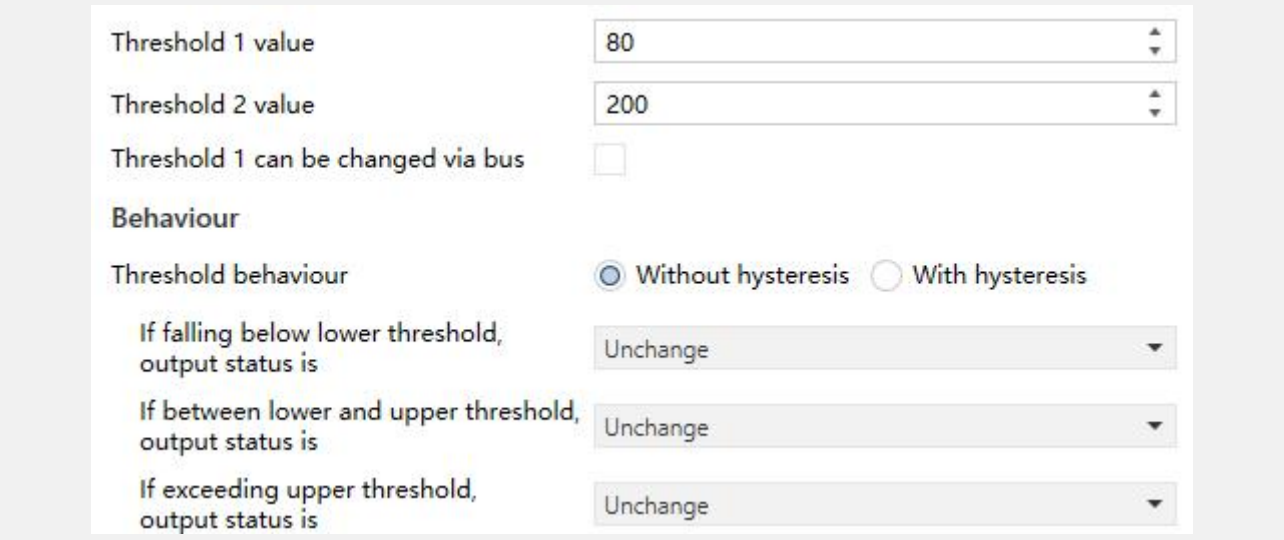


Fig. 4.8.5 Parameter window “X: Threshold”

The object “Threshold input” of 1Byte is enabled when activating the threshold function.

It will trigger the switch to make one operation if the value of the object “Threshold input” is lower or more than the default threshold.

There are 2 individual thresholds are ready to use always and the “Threshold 1 value” is set by the bus.

Parameter “Threshold 1 value”

Parameter “Threshold 2 value”

These two parameters define the value of threshold 1 and threshold 2. Options: **0...255**

It must to meet the condition Threshold 1<Threshold 2, if not, you can not configure in ETS:

Parameter “Threshold 1 can be changed via bus”

This parameter defines whether change the threshold value by bus or not.

It is able to start the object “Change Threshold value 1” when enabled, and change the threshold 1

value by the bus; on the other hand, it cannot change the value when disabled.

However it is not allowable to change the "Threshold 2 value" by the bus.

Parameter "Threshold behaviour"

The parameter defines the hysteresis status of "threshold 1 value" and "threshold 2 value". Option:

Without hysteresis

With hysteresis

The hysteresis can avoid the unnecessary behaviour caused by the input value if its value is between two threshold values.

Parameter "If falling below lower threshold output status is"

Parameter "If between lower and upper output status is"

Parameter "If exceeding upper threshold output status is"

These parameters are used to define the relay action in the object "Threshold input". Options:

Unchange

Contact open

Contact close

When it is "With hysteresis", the parameter "If lower < object value < upper, contact position" is not visible and now the object is no action.

4.8.6.Parameter window “X: Safety”

The window shown in Fig.4.8.6 will be seen when the parameter “Function of ‘safety’ for switch” is enabled in Fig. 4.8(3).

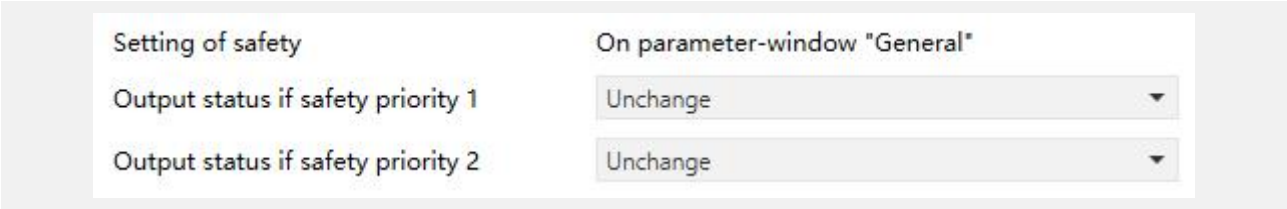


Fig. 4.8.6 Parameter window “X: Safety

Enable two “Safety Priority” (x=1, 2) in the parameter window “General”, which define the relay’s contact position for every output individually.

There are 2 safety priorities for every output and also the “Safety Priority 2” is prior to “Safety Priority 1”. It means when these 2 priorities are triggered at the same time, the contact position will follow the setup of “Safety Priority 2”.

Parameter "Output status if safety priority x" (x=1, 2)

It defines the contact position after triggering “Safety Priority x” (x=1, 2). Options:

Unchange

Contact open

Contact close

Unchange: the contact position is unchanged.

Contact open: the contact position is opened.

Contact close: the contact position is closed.

4.8.7.Parameter window “X: Forced”

The window of the function “forced” in Fig. 4.8.7 will be visible when the parameter “Function of ‘forced’ for switch” is enabled in Fig. 4.8(3).

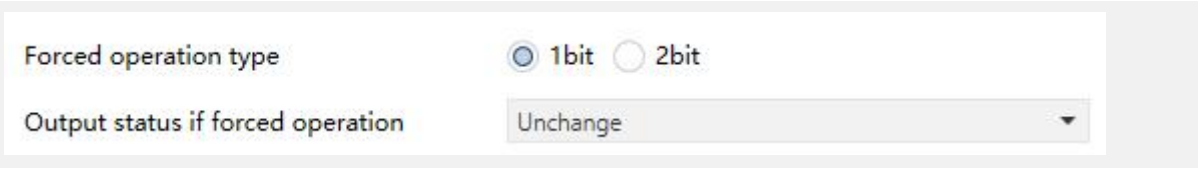


Fig. 4.8.7 Parameter window “X: Forced”

“Forced operation” will be used in some special situation such as emergency, and are activated by the object “Forced output” with the highest priority in the system, which means only “Forced operation” are valid in this case.

Parameter "Forced operation type"

This parameter defines the data type of the force operation. Options:

1bit

2bit

If selecting "2bit" when the object “Forced output” receives a telegram value, the action as follow:

Value of the object "Forced output, X"	Action
00b（0），01b（1）	Cancel force operation, other operation can be performed
10b（2）	Force switch off (OFF)
11b（3）	Force switch on（ON）

When cancel the forced operation, the position of relay contact is unchanged. However, if time function(Delay/Flashing/Staircase) is running before forced operation, then time order will still continue during forced operation, if cancel the forced operation, time counting has not finished, it will continuously operate time function.

Parameter “Output status if forced operation”

This parameter is visible if the option “1bit” is set via the above parameter, which defines the contact position of the “forced operation”. Options:

Unchange

Contact open

Contact close

Unchange: the contact position is unchanged.

Contact open: the contact position is opened.

Contact close: the contact position is closed.

Forced operations have the highest priority, and all other operations are ignored during forced operations. Controlling telegrams received during forced operation is ignored.

4.8.8.Parameter window “X: Current”

The window of the function “current” in Fig. 4.8.8 will be visible when the parameter “Function of ‘current’” is enabled in Fig. 4.8(3).

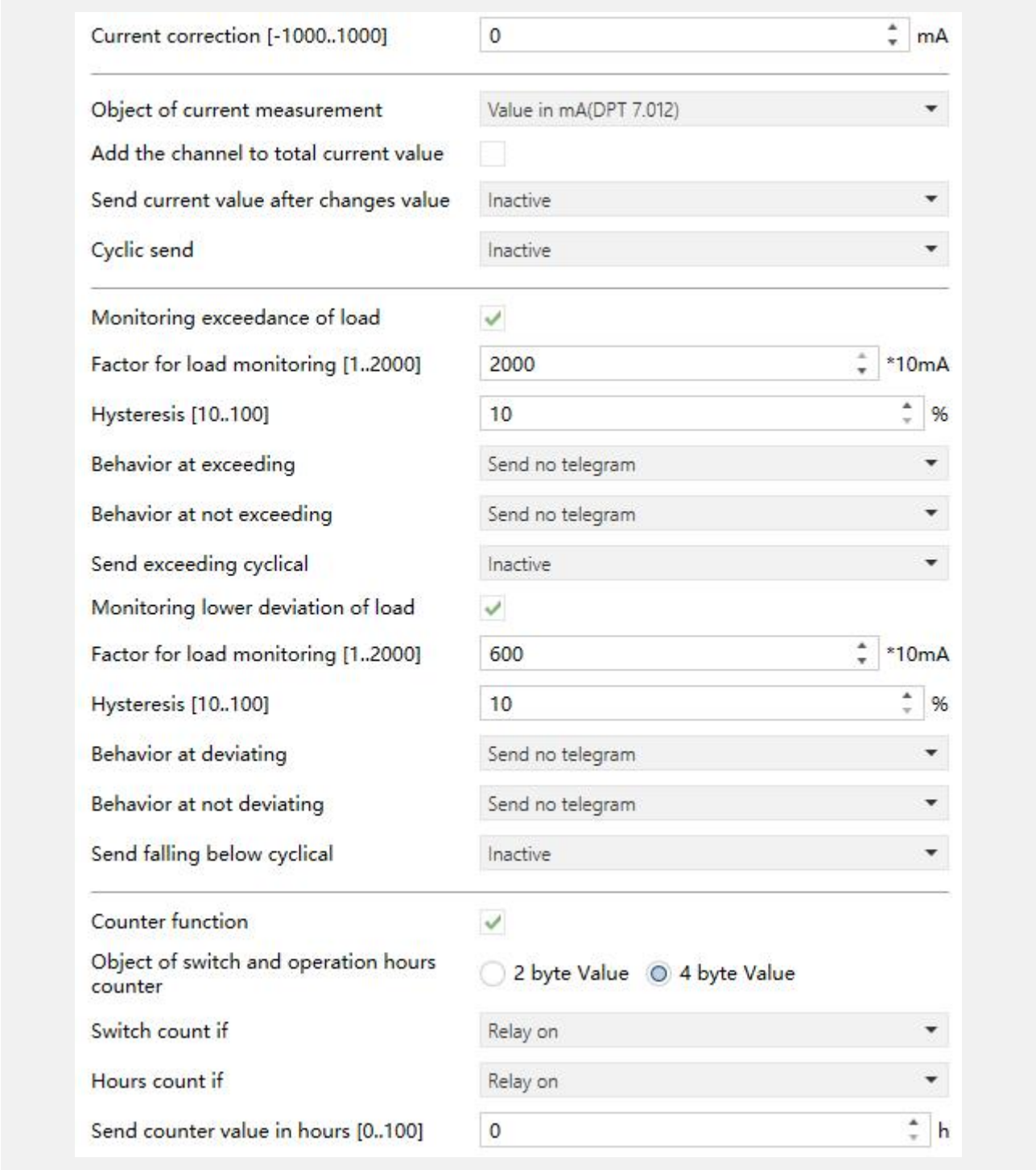


Fig. 4.8.8 Parameter window “X：Current”

Parameter "Current correction [-1000..1000]"

The parameter is used to correct the deviation that occurs in current detection.

Options: **-1000..1000mA**

Parameter "Object of current measurement"

The parameter is the selection of the sending object for each current measurement. Options:

Value in mA(DPT 7.012)

Float Value in mA(DPT 9.021)

Value in A(DPT 14.019)

"Value in mA" means output current in mA, integer data;

"Float Value in mA" means output current in mA, floating-point data;

"Value in A" means output current in A.

Parameter "Add the channel to total current value"

Adjust whether the channel shall be addicted to the total current measurement.

Parameter "Send current value after changes value"

Activation and adjustment of the sending of the current value at determined changes. Options:

No active

1%

2%

...

70%

When the parameter chooses"10%", current is 1A. The current object value will be send when current larger than 1.1A(1A + 1A * 10%) or less than 0.9A(1A - 1A * 10%).

Parameter "Cyclic send"

Activation and adjustment of the sending of the current value at determined times.

Options:

Inactive

10 Min

20 Min

...

120 Min

“Inactive” do not send current value cyclically. ”10 Min” send current object value every 10 minute, the same as other options.

Parameter ”Monitoring exceedance of load”

Parameter ”Monitoring lower deviation of load”

These two parameters are used to enable monitoring exceedance/lower deviation of load.

When the monitoring parameters are enabled, the following parameters are visible:

Parameter “Factor for load monitoring[1...2000]”

This parameter adjusts the alarming current value for the monitoring of load exceedance or lower deviation. Options: **1...2000 *10mA**

The exceedance value must be larger than the lower deviation value, if not, it can not be configured on ETS.

Parameter “Hysteresis[10...100]”

This parameter adjusts of the hysteresis for avoiding to fast switching. Options: **10...100 %**

The hysteresis value is used to avoid to fast switching. E.g.:

For the alarm of exceedance, “Factor for load monitoring” is set to 1A, “Hysteresis” is set to 10%, then when current is larger than 1A, an alarm value will be send to the bus, when current is less than 0.9A (1A * (1 - 10%)) a not alarm value also will be send to the bus.

For the alarm of lower deviation, “Factor for load monitoring” is set to 0.5A, “Hysteresis” is set to 10%, then when current is less than 0.5A, an alarm value will be send to the bus, when current is larger than 0.55A (0.5A * (1 + 10%)) a not alarm value also will be send to the bus.

Parameter “Behavior at(not) exceeding”

Parameter “Behavior at(not) deviating”

Adjustment of the behavior, when the measured value is out / lower of the threshold value (or not).

Options:

Send no telegram

Send ON telegram

Send OFF telegram

“Send no telegram” do not send value; “Send ON telegram” send “1” telegram; “Send OFF telegram” send “0” telegram.

Parameter “Send exceeding cyclical”

Parameter ”Send falling below cyclical”

Activation and adjustment of the time step for a cyclic sending. Options:

Inactive

10 Min

20 Min

...

120 Min

“Inactive” do not send value cyclically, ”10Min” send object value every 10 minutes, the same as other options.

Parameter "counter function"

This parameter is used to enable counter function.

When the "Counter function" parameter is enabled, the following parameters are visible:

Parameter “Object of switch and operation hours counter”

This parameter is used to select data type of counter. Options:

2 byte Value

4 byte Value

2 byte value: indicates that the count value is 2 bytes;

4 byte value: indicates that the count value is 4 bytes.

Parameter "Switch count if"

Set the counting condition for switch count. Options:

Relay on

Current > 20mA

Current > 50mA

Current > 100mA

Current > 200mA

Current > 500mA

Current > 1 A

Current > 2 A

Current > 5 A

"Relay on" means when the contact close, count for once; "Current > 20mA" means when detecting current larger than 20mA, count for once, the same as other options.

Parameter "Hours count if"

Set the counting condition for operation hours count. Options:

Relay on

Current > 20mA

Current > 50mA

Current > 100mA

Current > 200mA

Current > 500mA

Current > 1 A

Current > 2 A

Current > 5 A

"Relay on" means when the contact close, start calculation time; "Current > 20mA" means when detecting current larger than 20mA, start calculation time, the same as other options.

Parameter "Send counter value in hours[0...100]"

The parameter sets the period for sending the switch count and the operation hours count. And send the count value per hours. Options: **0..100 h**

"0" means do not send the period for sending the switch count and the operation hours count. "1-100" means 1 hours to 100 hours cyclically send the value.

When the parameter "Object of switch and operation hours counter" is set "2 byte", the operation hours unit is in hour (h), if set "4 byte", the unit is in second (s).

4.8.9.Parameter window “X: Voltage”

The window of the function “voltage” in Fig. 4.8.9 will be visible when the parameter “Function of ‘voltage’” is enabled in Fig. 4.8(3).

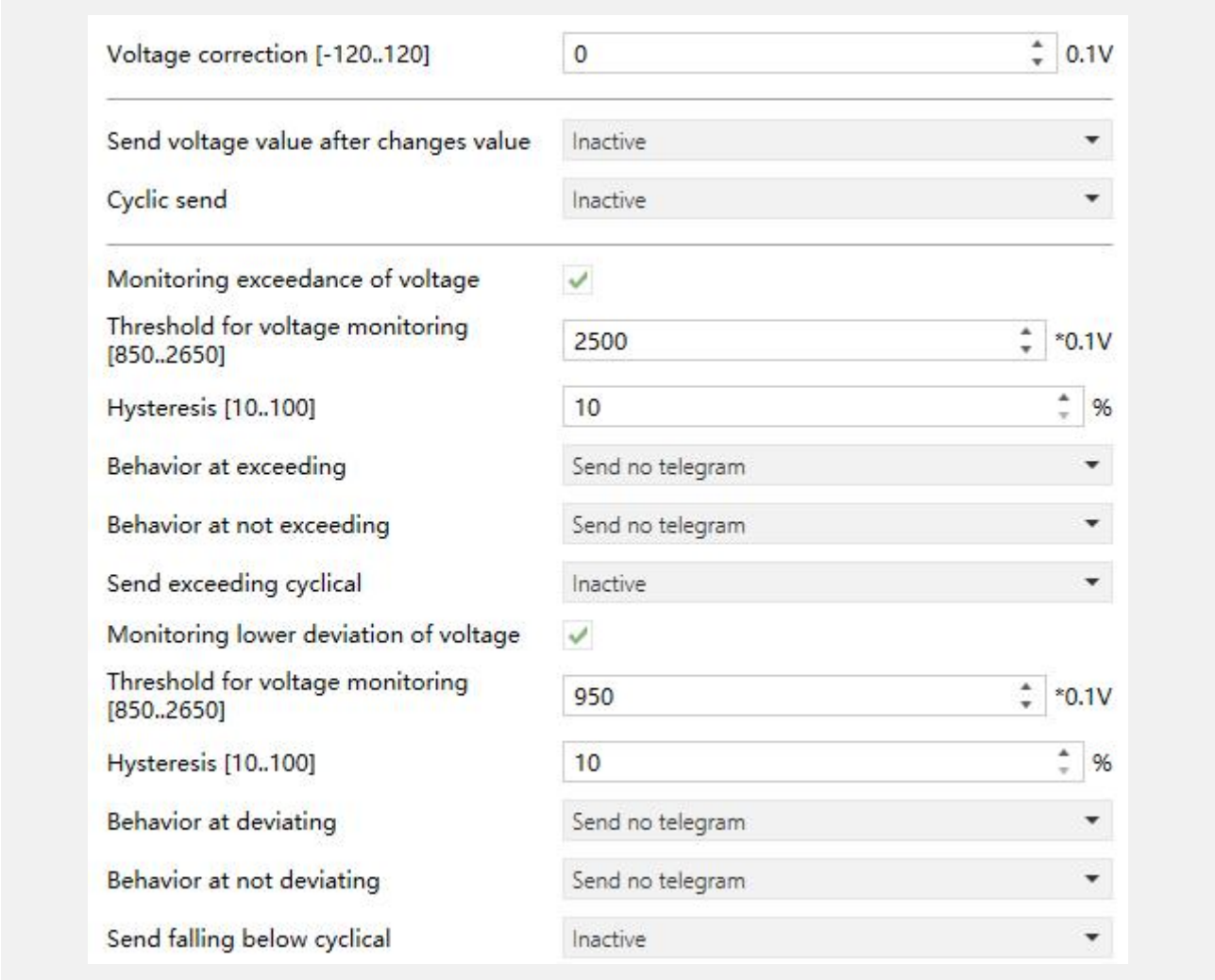


Fig. 4.8.9 Parameter window “X：Voltage”

Parameter “Voltage correction [-120..120]”

The parameter is used to correct the deviation that occurs in voltage detection.

Options: **-120..120 *0.1V**

Parameter “Send voltage value after changes value”

Activation and adjustment of the sending of the voltage value at determined changes. Options:

Not active

1%

2%

...

70%

When the parameter chooses"10%", voltage is 1V. The voltage object value will be send when voltage larger than 1.1V(1V + 1V * 10%) or less than 0.9V(1V - 1V * 10%).

Parameter "Cyclic send"

Activation and adjustment of the sending of the voltage value at determined times.

Options:

Inactive

10 Min

20 Min

...

120 Min

"Inactive" do not send voltage value cyclically. "10 Min" send voltage object value every 10 minute, the same as other options.

Parameter "Monitoring exceedance of voltage"

Parameter "Monitoring lower deviation of voltage"

These two parameters are used to enable monitoring exceedance/lower deviation of voltage.

When the monitoring parameters are enabled, the following parameters are visible:

Parameter "Threshold for voltage monitoring [850..2650] "

This parameter adjusts the alarming value for the monitoring of voltage exceedance or lower deviation. Options: **850..2650 *0.1V**

The exceedance value must be larger than the lower deviation value, if not, it can not be configured on ETS.

Parameter "Hysteresis [10...100]"

This parameter adjusts of the hysteresis for avoiding to fast switching. Options: **10...100 %**

The hysteresis value is used to avoid to fast switching. E.g.:

For the alarm of exceedance, “Threshold for voltage monitoring” is set to 10V, “Hysteresis” is set to 10%, then when voltage is larger than 10V, an alarm value will be send to the bus, when voltage is less than 9V (10V * (1 - 10%)) a not alarm value also will be send to the bus.

For the alarm of lower deviation, “Threshold for voltage monitoring” is set to 5V, “Hysteresis” is set to 10%, then when voltage is less than 5V, an alarm value will be send to the bus, when voltage is larger than 5.5V (5V * (1 + 10%)) a not alarm value also will be send to the bus.

Parameter “Behavior at(not) exceeding ”

Parameter “Behavior at(not) deviating ”

Adjustment of the behavior, when the measured value is out / lower of the threshold value (or not).

Options:

Send no telegram

Send ON telegram

Send OFF telegram

“Send no telegram” do not send value; “Send ON telegram” send “1” telegram; “Send OFF telegram” send “0” telegram.

Parameter “Send exceeding cyclical”

Parameter ”Send falling below cyclical ”

Activation and adjustment of the time step for a cyclic sending. Options:

Inactive

10 Min

20 Min

...

120 Min

“Inactive” do not send value cyclically, ”10Min” send object value every 10 minutes, the same as other options.

4.8.10.Parameter window “X: Power factor”

The window of the function “power factor” in Fig. 4.8.10 will be visible when the parameter “Function of ‘power factor’” is enabled in Fig. 4.8(3).

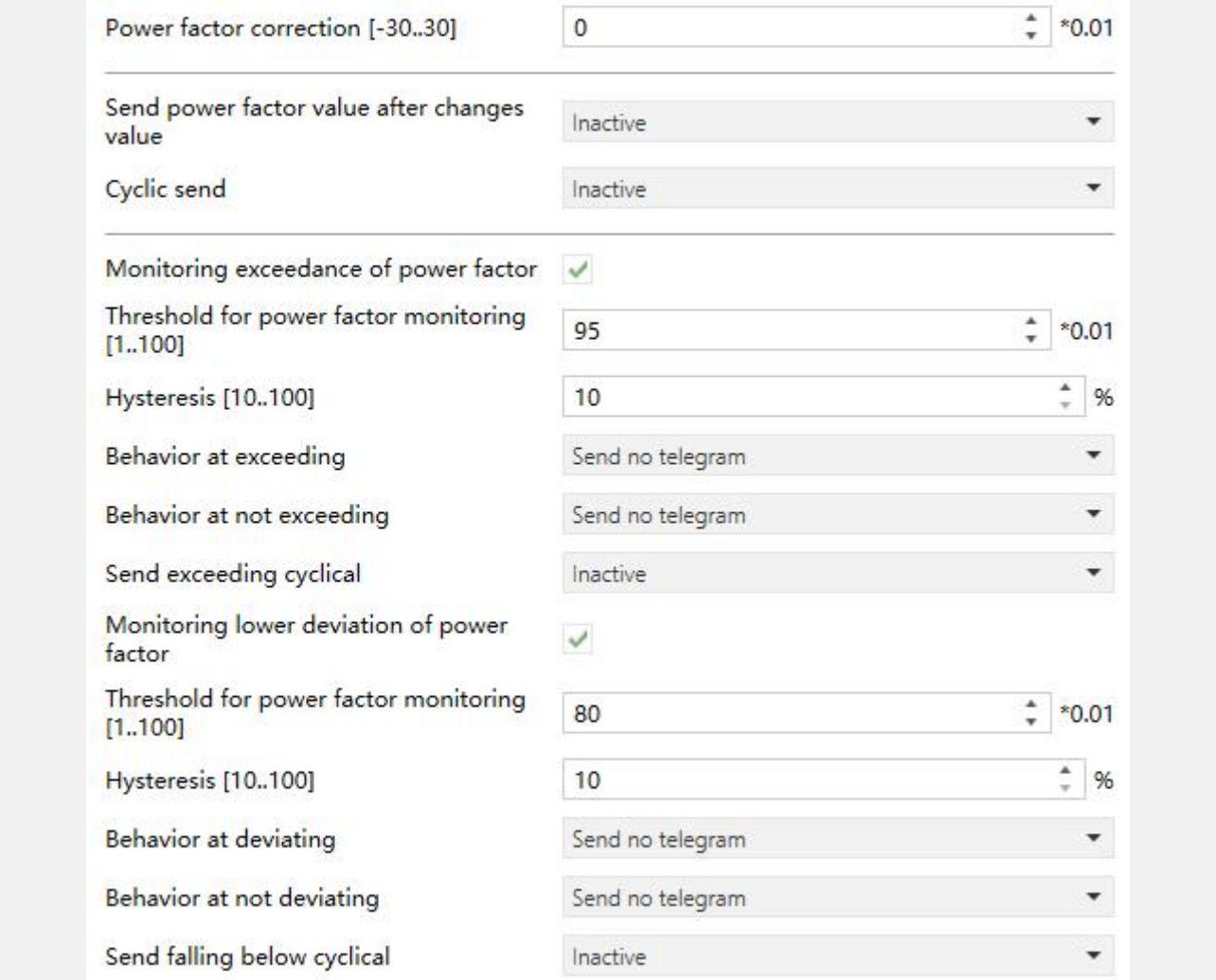


Fig. 4.8.10 Parameter window “X：Power factor”

Parameter "Power factor correction [-30..30]"

The parameter is used to correct the deviation that occurs in power factor detection.

Options: **-30..30 *0.01**

Parameter "Send power factor value after changes value"

Activation and adjustment of the sending of the power factor value at determined changes.

Options:

Not active

1%

2%

...

70%

When the parameter chooses"10%", power factor is 0.1. The power factor object value will be send when power factor larger than 0.11(0.1 + 0.1 * 10%) or less than 0.09(0.1 - 0.1 * 10%).

Parameter "Cyclic send"

Activation and adjustment of the sending of the power factor value at determined times.

Options:

Inactive

10 Min

20 Min

...

120 Min

"Inactive" do not send power factor value cyclically. "10 Min" send power factor object value every 10 minute, the same as other options.

Parameter "Monitoring exceedance of power factor"

Parameter "Monitoring lower deviation of power factor"

These two parameters are used to enable monitoring exceedance/lower deviation of power factor.

When the monitoring parameters are enabled, the following parameters are visible:

Parameter "Threshold for power factor monitoring [1..100] "

This parameter adjusts the alarming value for the monitoring of power factor exceedance or lower deviation. Options: **1..100 *0.01**

The exceedance value must be larger than the lower deviation value, if not, it can not be configured on ETS.

Parameter "Hysteresis [10...100]"

This parameter adjusts of the hysteresis for avoiding to fast switching. Options: **10...100 %**

The hysteresis value is used to avoid to fast switching. E.g.:

For the alarm of exceedance, “Threshold for power factor monitoring” is set to 0.5, “Hysteresis” is set to 10%, then when power factor is larger than 0.5, an alarm value will be send to the bus, when power factor is less than 0.45 (0.5 * (1 - 10%)) a not alarm value also will be send to the bus.

For the alarm of lower deviation, “Threshold for power factor monitoring” is set to 0.2, “Hysteresis” is set to 10%, then when power factor is less than 0.2, an alarm value will be send to the bus, when power factor is larger than 0.22 (0.2 * (1 + 10%)) a not alarm value also will be send to the bus.

Parameter “Behavior at(not) exceeding ”

Parameter “Behavior at(not) deviating ”

Adjustment of the behavior, when the measured value is out / lower of the threshold value (or not).

Options:

Send no telegram

Send ON telegram

Send OFF telegram

“Send no telegram” do not send value; “Send ON telegram” send “1” telegram; “Send OFF telegram” send “0” telegram.

Parameter “Send exceeding cyclical”

Parameter ”Send falling below cyclical ”

Activation and adjustment of the time step for a cyclic sending. Options:

Inactive

10 Min

20 Min

...

120 Min

“Inactive” do not send value cyclically, ”10Min” send object value every 10 minutes, the same as other options.

4.8.11.Parameter window “X: Active power”

The window of the function “active power” in Fig. 4.8.11 will be visible when the parameter “Function of ‘active power’” is enabled in Fig. 4.8(3).

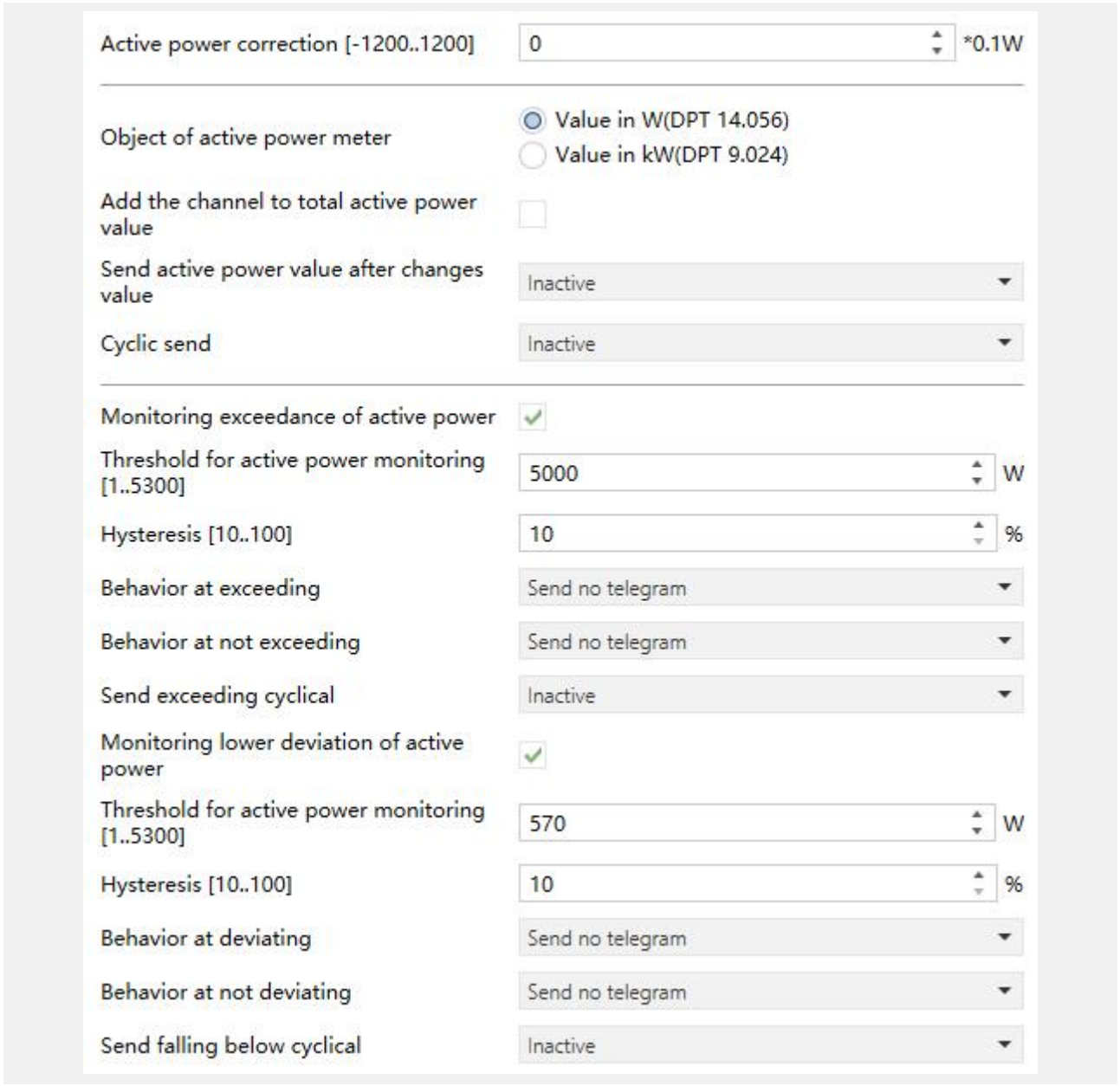


Fig. 4.8.11 Parameter window “X：Active power”

Parameter "Active power correction [-1200..1200]"

The parameter is used to correct the deviation that occurs in active power detection.

Options: **-1200..1200 *0.1W**

Parameter "Object of active power meter"

The parameter is the selection of the sending object for each active power meter. Options:

Value in W(DPT 14.056)

Value in kW(DPT 9.024)

Parameter "Add the channel to total active power value"

Adjust whether the channel shall be addicted to the total active power meter.

Parameter "Send active power value after changes value"

Activation and adjustment of the sending of the active power value at determined changes.

Options:

Not active

1%

2%

...

70%

When the parameter chooses “10%”, active power is 100W. The active power object value will be send when active power larger than 110W(100W + 100W * 10%) or less than 90W(100W - 100W * 10%).

Parameter "Cyclic send"

Activation and adjustment of the sending of the active power value at determined times. Options:

Inactive

10 Min

...

90 Min

120 Min

“Inactive”: do not send active power value.

”10 Min” send active power object value every 10 minute, the same as other options.

Parameter "Monitoring exceedance of active power"

Parameter "Monitoring lower deviation of active power"

These two parameters are used to enable monitoring exceedance or lower deviation of active power.

When the monitoring parameters are enabled, the following parameters are visible:

Parameter "Threshold for active power monitoring [1..5300] "

This parameter setting the alarming value for the monitoring of active power exceedance or lower deviation. Options: **1..5300 W**

The exceedance value must be larger than the lower deviation value, if not, it can not be configured on ETS.

Parameter "Hysteresis [10...100]"

This parameter adjusts of the hysteresis for avoiding to fast switching. Options: **10...100 %**

The hysteresis value is used to avoid to fast switching. E.g.:

For the alarm of exceedance, "Threshold for active power monitoring" is set to 100W, "Hysteresis" is set to 10%, then when active power is larger than 100W, an alarm value will be send to the bus, when active power is less than 90W (100W * (1 - 10%)) a not alarm value also will be send to the bus.

For the alarm of lower deviation, "Threshold for active power monitoring" is set to 50W, "Hysteresis" is set to 10%, then when active power is less than 50W, an alarm value will be send to the bus, when active power is larger than 55W (50W * (1 + 10%)) a not alarm value also will be send to the bus.

Parameter "Behavior at(not) exceeding "

Parameter "Behavior at(not) deviating "

Adjustment of the behavior, when the measured value is out / lower of the threshold value (or not).

Options:

Send no telegram

Send ON telegram

Send OFF telegram

"Send no telegram" do not send value; "Send ON telegram" send "1" telegram; "Send OFF telegram" send"0"telegram.

Parameter “Send exceeding cyclical”

Parameter ”Send falling below cyclical ”

Activation and adjustment of the time step for a cyclic sending. Options:

Inactive

10 Min

20 Min

...

120 Min

“Inactive” do not send value Cyclically, ”10Min” send object value every 10 minutes, the same as other options. And value can be also sent after change.

4.8.12.Parameter window “X: Apparent power”

The window of the function “apparent power” in Fig. 4.8.12 will be visible when the parameter “Function of ‘apparent power’” is enabled in Fig. 4.8(3).

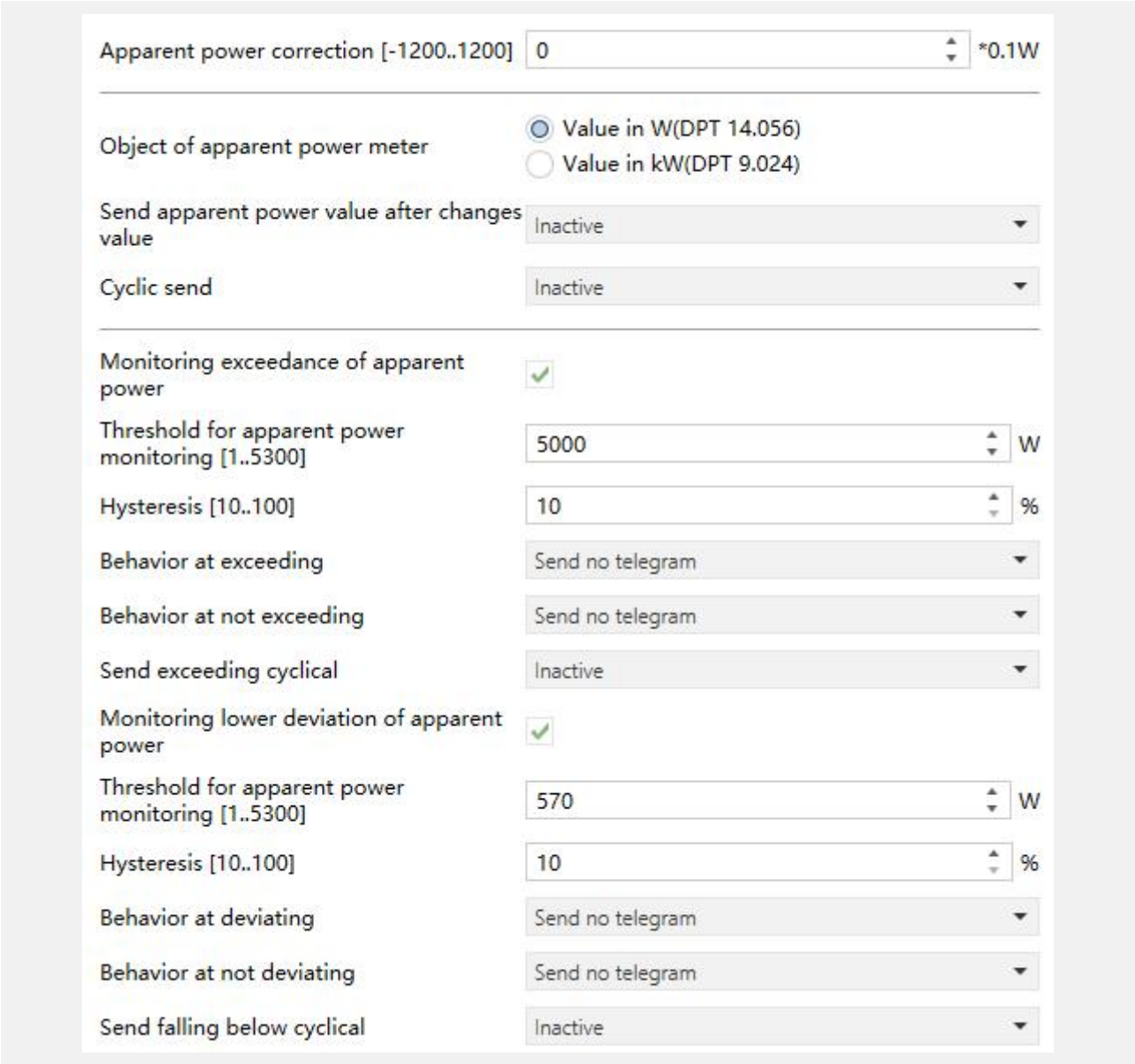


Fig. 4.8.12 Parameter window “X：Apparent power”

Parameter "Apparent power correction [-1200..1200]"

The parameter is used to correct the deviation that occurs in apparent power detection.

Options: **-1200..1200 *0.1W**

Parameter "Object of apparent power meter"

The parameter is the selection of the sending object for each apparent power meter.

Options:

Value in W(DPT 14.056)

Value in kW(DPT 9.024)

Parameter "Send apparent power value after changes value"

Activation and adjustment of the sending of the apparent power value at determined changes.

Options:

Not active

1%

2%

...

70%

When the parameter chooses "10%", apparent power is 100W. The apparent power object value will be send when apparent power larger than 110W(100W + 100W * 10%) or less than 90W(100W - 100W * 10%).

Parameter "Cyclic send"

Activation and adjustment of the sending of the apparent power value at determined times.

Options:

Inactive

10 Min

20 Min

...

120 Min

"Inactive": do not send apparent power value.

"10 Min" send apparent power object value every 10 minute, the same as other options.

Parameter "Monitoring exceedance of apparent power"

Parameter "Monitoring lower deviation of apparent power"

These two parameters are used to enable monitoring exceedance or lower deviation of apparent

power.

When the monitoring parameters are enabled, the following parameters are visible:

Parameter "Threshold for apparent power monitoring [1..5300] "

This parameter setting the alarming value for the monitoring of apparent power exceedance or lower deviation. Options: **1..5300 W**

The exceedance value must be larger than the lower deviation value, if not, it can not be configured on ETS.

Parameter "Hysteresis [10...100]"

This parameter adjusts of the hysteresis for avoiding to fast switching. Options: **10...100 %**

The hysteresis value is used to avoid to fast switching. E.g.:

For the alarm of exceedance, "Threshold for apparent power monitoring" is set to 100W, "Hysteresis" is set to 10%, then when apparent power is larger than 100W, an alarm value will be send to the bus, when apparent power is less than 90W (100W * (1 - 10%)) a not alarm value also will be send to the bus.

For the alarm of lower deviation, "Threshold for apparent power monitoring" is set to 50W, "Hysteresis" is set to 10%, then when apparent power is less than 50W, an alarm value will be send to the bus, when apparent power is larger than 55W (50W * (1 + 10%)) a not alarm value also will be send to the bus.

Parameter "Behavior at(not) exceeding "

Parameter "Behavior at(not) deviating "

Adjustment of the behavior, when the measured value is out / lower of the threshold value (or not).

Options:

Send no telegram

Send ON telegram

Send OFF telegram

"Send no telegram" do not send value; "Send ON telegram" send "1" telegram; "Send OFF telegram" send"0"telegram.

Parameter “Send exceeding cyclical”

Parameter ”Send falling below cyclical ”

Activation and adjustment of the time step for a cyclic sending. Options:

Inactive

10 Min

20 Min

...

120 Min

“Inactive” do not send value Cyclically, ”10Min” send object value every 10 minutes, the same as other options. And value can be also sent after change.

4.8.13.Parameter window “X: Electrical energy”

The window of the function “electrical energy” in Fig. 4.8.13 will be visible when the parameter “Function of ‘electrical energy’” is enabled in Fig. 4.8(3).

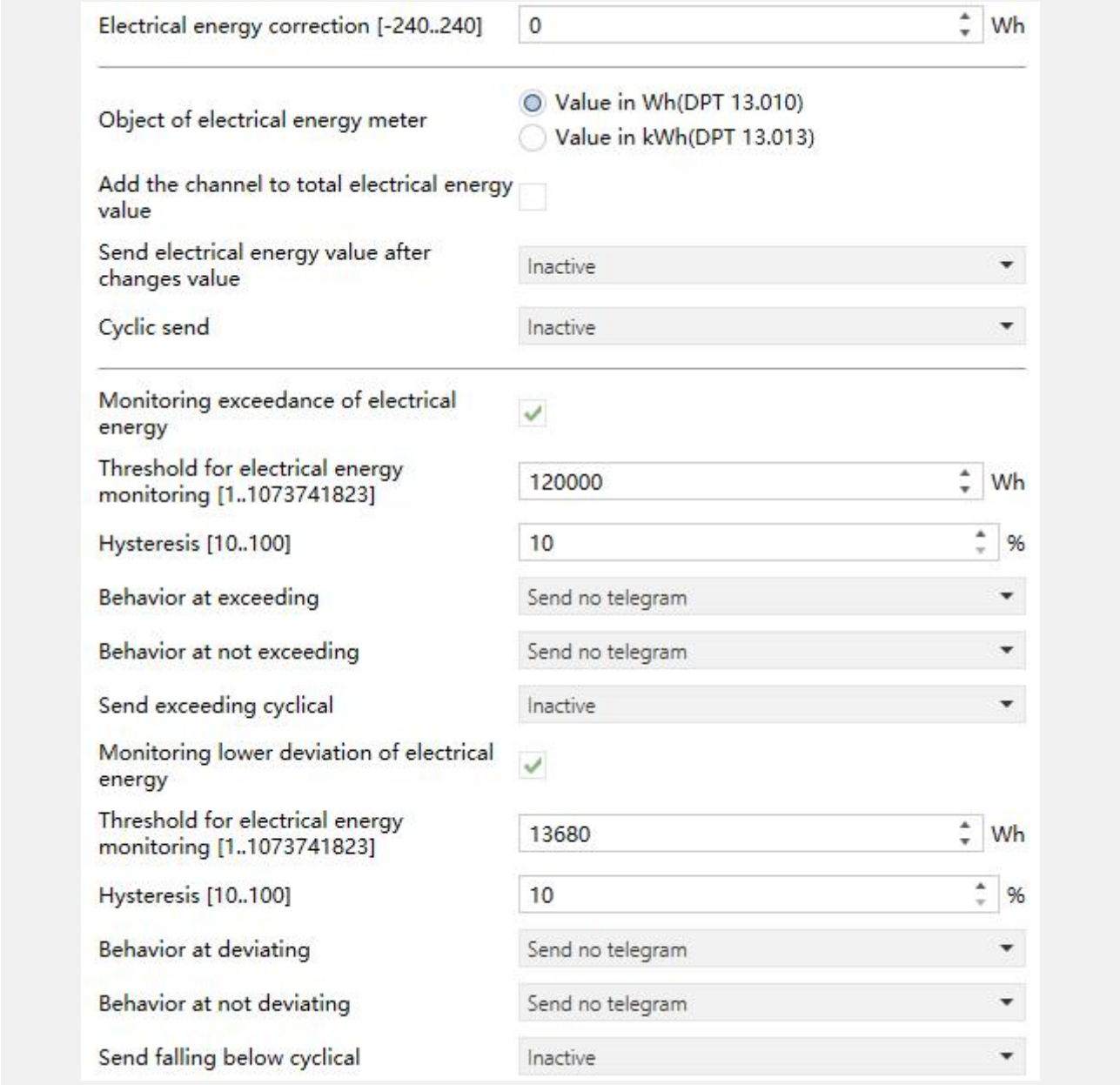


Fig. 4.8.13 Parameter window “X：Electrical energy”

Parameter “Electrical energy correction [-240..240]”

The parameter is used to correct the deviation that occurs in electrical energy detection.

Options: **-240..240 Wh**

Parameter "Object of electrical energy meter"

The parameter is the selection of the sending object for each electrical energy meter. Options:

Value in Wh(DPT 13.010)

Value in kWh(DPT 13.013))

Parameter "Add the channel to total electrical energy value"

Adjust whether the channel shall be addicted to the total electrical energy meter.

Parameter "Send electrical energy value after changes value"

Activation and adjustment of the sending of the electrical energy value at determined changes.

Options:

Not active

1%

2%

...

70%

When the parameter chooses “10%”, electric energy is 100Wh. The electric energy object value will be send when electric energy larger than 110Wh(100Wh + 100Wh * 10%) or less than 于 90Wh(100Wh - 100Wh * 10%).

Parameter "Cyclic send"

Activation and adjustment of the sending of the electric energy value at determined times. Options:

Inactive

10 Min

20 Min

...

120 Min

“Inactive”: do not send electric energy value.

”10 Min” send electric energy object value every 10 minute, the same as other options.

Parameter "Monitoring exceedance of electrical energy"

Parameter "Monitoring lower deviation of electrical energy"

These two parameters are used to enable monitoring exceedance or lower deviation of electric energy.

When the monitoring parameters are enabled, the following parameters are visible:

Parameter "Threshold for electrical energy monitoring [1..1073741823] "

This parameter setting the alarming value for the monitoring of electric energy exceedance or lower deviation. Options: **1...1073741823 Wh**

The exceedance value must be larger than the lower deviation value, if not, it can not be configured on ETS.

Parameter "Hysteresis [10...100]"

This parameter adjusts of the hysteresis for avoiding to fast switching. Options: **10...100 %**

The hysteresis value is used to avoid to fast switching. E.g.:

For the alarm of exceedance, "Threshold for electric energy monitoring" is set to 1000Wh, "Hysteresis" is set to 10%, then when electric energy is larger than 1000Wh, an alarm value will be send to the bus, when electric energy is less than 900Wh (1000Wh * (1 - 10%)) a not alarm value also will be send to the bus.

For the alarm of lower deviation, "Threshold for electric energy monitoring" is set to 500Wh, "Hysteresis" is set to 10%, then when electric energy is less than 500Wh, an alarm value will be send to the bus, when electric energy is larger than 550Wh (500Wh * (1 + 10%)) a not alarm value also will be send to the bus.

Parameter "Behavior at(not) exceeding "

Parameter "Behavior at(not) deviating "

Adjustment of the behavior, when the measured value is out / lower of the threshold value (or not).

Options:

Send no telegram

Send ON telegram

Send OFF telegram

"Send no telegram" do not send value; "Send ON telegram" send "1" telegram; "Send OFF telegram" send"0"telegram.

Parameter "Send exceeding cyclical"

Parameter "Send falling below cyclical "

Activation and adjustment of the time step for a cyclic sending. Options:

Inactive

10 Min

20 Min

....

120 Min

"Inactive" do not send value Cyclically, "10Min" send object value every 10 minutes, the same as other options. And value can be also sent after change.

Chapter 5 Description of communication object

The communication object is a media that the bus talks to the other devices, that means only communication object can have the right to communicate to the bus.

Note: "C" in the property bar of the table below represents the communication function of the communication object.

"W" represents the value of the communication object can be rewritten by the bus.

"R" represents the value of the communication object can be read through the bus.

"T" stands for communication object with transmission function.

"U" means that the value of the communication object can be updated.

5.1.Communication object "General"

There are 3 objects in "General", which plays important role in the regular Switch actuator and Heating actuator. See in Fig. 5.1 and functions are shown in Table 5.1.

Num	Name	Object Function	Description	Group Address	Length	C	R	W	T	U	I	Data Type	Priority
1	General	In operation			1 bit	C	R	-	T	-	-	switch	Low
2	General	Safety priority 1			1 bit	C	-	W	-	U	-	enable	Low
3	General	Safety priority 2			1 bit	C	-	W	-	U	-	enable	Low

Fig. 5.1 Communication object "General"

No.	Function	Object name	Data type	Flags	DPT
1	**In operation**	**General**	**1bit**	**C,R,T**	**1.001 switch**
This object is always enabled, used to send telegram "1" to the bus periodically to proof the device is under normal working condition.					
2	**Safety Priority 1**	**General**	**1bit**	**C,W,U**	**1.003 enable**
It is able to receive the 1bit telegram from the other devices (such as sensors and controllers and so on) and modify the running condition of the other devices by this object. The other devices will be judged as malfunction if this object doesn't receive the relevant telegram for a certain time (which will be defined in the window "All General"), and then it will trigger the set action of "Safety Priority 1" in "X: Safety". The priority of "Safety Priority 1" is lower only to "Forced operation" and "Safety Priority 2".					
3	**Safety Priority 2**	**General**	**1bit**	**C,W,U**	**1.003 enable**
This object has the same function as "Safety Priority 1", but its priority level is secondary only to "Force".					

Table 5.1 Communication object table "All General"

5.2.Communication object “Switch actuator”

5.2.1.General communication object

Num	Name	Object Function	Description	Group Address	Length	C	R	W	T	U	Data Type	Priority
16	Output A-...	Switch			1 bit	C	-	W	-	-	switch	Low
17	Output A-...	Switch status			1 bit	C	R	-	T	-	switch	Low

Fig. 5.2.1 General communication object per output

No.	Function	Object name	Data byte	Flags	DPT
16	**Switch**	**Output A-{{...}}**	**1bit**	**C,W**	**1.001 switch**
This object is used to trigger the switch operation. It will start the switch operation with ”1”, and end with “0”. When enabling “input 0” in the logic function, the object “Switch, X” is used to modify the logic value of “input 0”, rather than trigger the switch operation. The name in parentheses changes with the parameter “Description (max.30 char.)”. If description is empty, display “Output A-...” by default. The same below.					
17	**Switch status**	**Output A-{{...}}**	**1bit**	**C,R,T**	**1.001 switch**
This object will be enabled when selecting “Transmit after change/Respond after read only” in the parameter “Set the reply mode of switch status”, which will indicate the contact status (details will be defined by parameter “Object value of switch status” in “Channel X”).					

Table 5.2.1 General communication table per output

5.2.2.Time function object

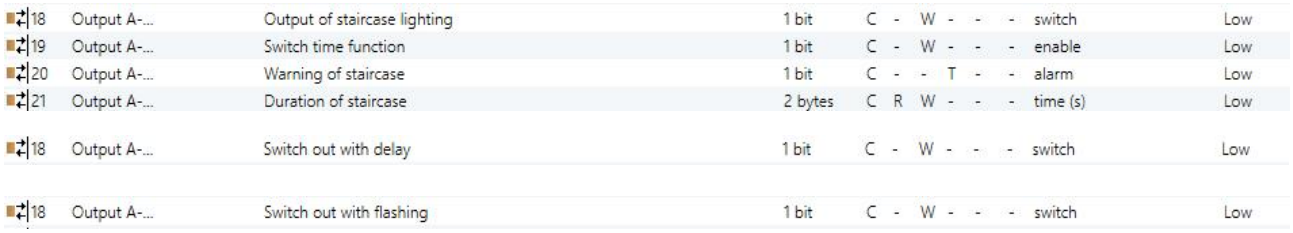


Fig. 5.2.2 timing communication object for every output

No.	Function	Object name	Data type	Flags	DPT
18	**Output of staircase lighting**	**Output A-{{...}}**	**1bit**	**C,W**	**1.001 switch**
It is used to switch on the staircase lighting by this object, which will be enabled when selecting “Staircase lighting” in the parameter “The mode of time function”.					
18	**Switch out with delay**	**Output A-{{...}}**	**1bit**	**C,W**	**1.001 switch**
It is used to switch on the time delay by this object, which will be enabled when selecting “Delay switch” in the parameter “The mode of time function”.					
18	**Switch out with flashing**	**Output A-{{...}}**	**1bit**	**C,W**	**1.001 switch**
It is used to switch on the flash output by this object, which will be enabled when selecting “Flashing switch” in the parameter “The mode of time function”.					
19	**Switch time function**	**Output A-{{...}}**	**1bit**	**C,W**	**1.003 enable**
This object will be started when enabling the time function which can be enabled by this object. It will enable the timing function when receiving the value “1”; time function will disable it when receiving “0”. After the time function is disabled,the current delay time counter will be cleared,and the delaying operation will be ignored,apply to delay switch/flash switch/staircase lighting. Enable is a default setting for the time function after bus voltage recovery.					
20	**Warning of staircase**	**Output A-{{...}}**	**1bit**	**C,T**	**1.005 alarm**
It will be enable while selecting warning by this object in the parameter “Warning mode for ending of staircase”. It will send “1” to the bus when the alarm is starting.					
21	**Duration of staircase**	**Output A-{{...}}**	**2byte**	**C,W,R**	**7.005 time (s)**
This object will be enabled when selecting “enable” in the parameter “Modify the duration via object (0...60059 seconds)” to modify the duration of the staircase lighting.					

Table 5.2.2 Timing function communication table

5.2.3.Preset function object

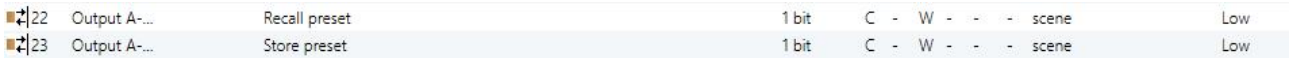


Fig. 5.2.3 Preset function communication object for every output

No.	Function	Object name	Data type	Flags	DPT
22	**Recall preset**	**Output A-{{...}}**	**1bit**	**C,W**	**1.022 scene**
This object is used to call the preset value;telegram “0” with “0” and telegram “1” with “1”					
23	**Store preset**	**Output A-{{...}}**	**1bit**	**C,W**	**1.022 scene**
It can be used to save the current switch status as the new preset value; save the new telegram “0” with “0” and telegram “1” with “1”.					

Table 5.2.3 Preset communication objects

5.2.4.Logic function object

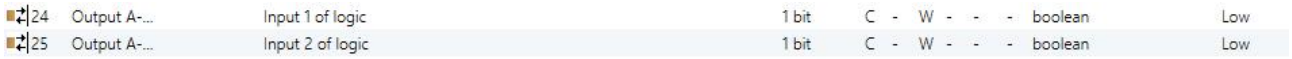


Fig. 5.2.4 Logic function communication object for every output

No.	Function	Object name	Data type	Flags	DPT
24	**Input 1 of logic**	**Output A-{{...}}**	**1bit**	**C,W**	**1.002 boolean**
This object will be enabled when selecting “Enable” in the parameter “The input 1 of logic is”.					
25	**Input 2 of logic**	**Output A-{{...}}**	**1bit**	**C,W**	**1.002 boolean**
This object will be enabled when selecting “Enable” in the parameter “The input 2 of logic is”.					

Table 5.2.4 Logic function communication objects

5.2.5.Scene function object

Fig. 5.2.5 Scene function communication object

No.	Function	Object name	Data type	Flags	DPT
26	**Scene**	**Output A-{{...}}**	**1Byte**	**C,W**	**18.001 scene control**

It is able to recall or save the scene when sending an 8-bit command by this object, which will be enabled when enabling the scene function. The definition of the 8-bit command will be described below:

Assuming an 8-bit command (binary coding) as: FXNNNNNN

F: recall the scene with “0”; save the scene with “1”;

X: 0

NNNNNN: scene number (1-64).

1-64 in the parameter setup corresponds to the scene number 0-63 received by the communication object “Scene handle”. For example, scene 1 in the parameter setup has the same output result as scene 0 in the communication object “Scene handle”.

Table 5.2.5 Scene function communication object

5.2.6.Threshold function object

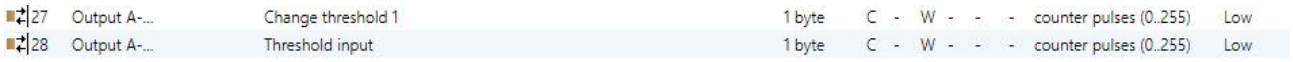


Fig. 5.2.6 Threshold function communication object

No.	Function	Object name	Data type	Flags	DPT
27	**Change threshold 1**	**Output A-{{...}}**	**1Byte**	**C,W**	**5.010 counter pulses**
This object is used to change the value of the threshold 1.					
28	**Threshold input**	**Output A-{{...}}**	**1Byte**	**C,W**	**5.010 counter pulses**
This object is used to receive the threshold sent by other devices.					

Table 5.2.6 Threshold function communication object

5.2.7.Forced function object

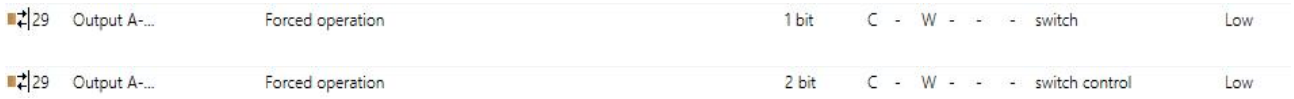


Fig. 5.2.7 Forced function communication objects

No.	Function	Object name	Data type	Flags	DPT
29	**Forced operation**	**Output A-{{...}}**	**1bit**	**C,W**	**1.003 enable**
This object will be started after enabling the 1bit forced function. Enable the forced function with “1”, and the other behaviors will be ignored except the forced function; enable the forced function with “0”.					
29	**Forced operation**	**Output A-{{...}}**	**2bit**	**C,W**	**2.001 switch control**
This object will be started after enabling the 2bit forced function. The contact is forcibly closed when the message value "3" is received; The contact is forcibly disconnected when the message value "2" is received; the enforcement mode is canceled when the message value "1" or "0" is received.					

Table 5.2.7 Forced function communication objects

5.3.Communication object “Total current”

Num	Name	Object Function	Description	Group Address	Length	C	R	W	T	U	I	Data Type	Priority
4	Total current	Value of total current(mA)			2 bytes	C	R	-	T	-	-	current (mA)	Low
5	Total current	Exceedance of total load			1 bit	C	R	-	T	-	-	switch	Low
6	Total current	Lower deviation of total load			1 bit	C	R	-	T	-	-	switch	Low

Fig. 5.4 Communication object “Total current”

No.	Function	Object name	Data type	Flags	DPT
4	**Value of total current**	**Total current**	**2byte** **4byte**	**C,R,T**	**9.021 current (mA) float** **14.019 electric current (A)**
This communication object is used to send the total current value, the data types can be set in the parameter "Object selection for the current measurement".					
5	**Exceedance of total load**	**Total current**	**1bit**	**C,R,T**	**1.001 switch**
This communication object is used to report the total current larger than the set threshold or not, the status value can be set in the parameter "Behavior at (not) exceeding".					
6	**Lower deviation of load**	**Total current**	**1bit**	**C,R,T**	**1.001 switch**
This communication object is used to report the total current lower than the set threshold or not, the status value can be set in the parameter "Behavior at (not) deviating".					

Table 5.4 Communication object “Total current”

5.4.Communication object “Total active power”

Num	Name	Object Function	Description	Group Address	Length	C	R	W	T	U	I	Data Type	Priority
7	Total active power	Value of total active power(W)			4 bytes	C	R	-	T	-	-	power (W)	Low
8	Total active power	Exceedance of total active power			1 bit	C	R	-	T	-	-	switch	Low
9	Total active power	Lower deviation of total active power			1 bit	C	R	-	T	-	-	switch	Low

Fig. 5.4 Communication object “Total active power”

No.	Function	Object name	Data type	Flags	DPT
7	**Value of total active power(KW)** **Value of total active power(W)**	**Total active power**	**2byte** **4byte**	**C,R,T**	**9.024 power (KW)** **14.056 power (W)**
This communication object is used to send the total active power value, the data types can be set in the parameter "Object selection for active power meter".					
8	**Exceedance of total active power**	**Total active power**	**1bit**	**C,R,T**	**1.001 switch**
This communication object is used to report the total active power larger than the set threshold or not, the status value can be set in the parameter "Behavior at (not) exceeding".					
9	**Lower deviation of total active power**	**Total active power**	**1bit**	**C,R,T**	**1.001 switch**
This communication object is used to report the total active power lower than the set threshold or not, the status value can be set in the parameter "Behavior at (not) deviating".					

Table 5.4 Communication object “Total active power”

5.5.Communication object “Total electric energy”

Num	Name	Object Function	Description	Group Address	Length	C	R	W	T	U	Data Type	Priority
10	Total electric energy	Value of total electric energy(Wh)			4 bytes	C	R	W	T	-	active energy (Wh)	Low
11	Total electric energy	Exceedance of total electric energy			1 bit	C	R	-	T	-	switch	Low
12	Total electric energy	Lower deviation of total electric energy			1 bit	C	R	-	T	-	switch	Low

Fig. 5.5 Communication object “Total electric energy”

No.	Function	Object name	Data type	Flags	DPT
10	**Value of total electric energy(Wh)** **Value of total electric energy(KWh)**	**Total electric energy**	**4byte**	**C,R,W,T**	**13.010 active energy (Wh)** **13.013 active energy (KWh)**
This communication object is used to send the total electric energy value, and can also modify the value via the bus, the data types can be set in the parameter "Object selection for electric energy meter".					
11	**Exceedance of total electric energy**	**Total electric energy**	**1bit**	**C,R,T**	**1.001 switch**
This communication object is used to report the total electric energy larger than the set threshold or not, the status value can be set in the parameter "Behavior at (not) exceeding".					
12	**Lower deviation of total electric energy**	**Total electric energy**	**1bit**	**C,R,T**	**1.001 switch**
This communication object is used to report the total electric energy lower than the set threshold or not, the status value can be set in the parameter "Behavior at (not) deviating".					

Table 5.5 Communication object “Total electric energy”

5.6.Communication object “Frequency measurement”

Num	Name	Object Function	Description	Group Address	Length	C	R	W	T	U	I	Data Type	Priority
13	Frequency measurement	Value of frequency			4 bytes	C	R	-	T	-	-	frequency (Hz)	Low
14	Frequency measurement	Exceedance of frequency			1 bit	C	R	-	T	-	-	switch	Low
15	Frequency measurement	Lower deviation of frequency			1 bit	C	R	-	T	-	-	switch	Low

Fig. 5.6 Communication object “Frequency measurement”

No.	Function	Object name	Data type	Flags	DPT
13	**Value of frequency**	**Frequency measurement**	**4byte**	**C,R,T**	**14.033 frequency**
This communication object is used to send the frequency value.					
14	**Exceedance of frequency**	**Frequency measurement**	**1bit**	**C,R,T**	**1.001 switch**
This communication object is used to report the frequency larger than the set threshold or not, the status value can be set in the parameter "Behavior at (not) exceeding".					
15	**Lower deviation of frequency**	**Frequency measurement**	**1bit**	**C,R,T**	**1.001 switch**
This communication object is used to report the frequency lower than the set threshold or not, the status value can be set in the parameter "Behavior at (not) deviating".					

Table 5.6 Communication object “Frequency measurement”

5.7.Communication object “X: Current”

30	Output A-...	Current value(mA)	2 bytes	C	R	-	T	-	-	current (mA)	Low
31	Output A-...	Exceedance of load	1 bit	C	R	-	T	-	-	switch	Low
32	Output A-...	Lower deviation of load	1 bit	C	R	-	T	-	-	switch	Low
33	Output A-...	Switch counter	4 bytes	C	R	W	T	-	-	counter pulses (unsigned)	Low
34	Output A-...	Operation hours	4 bytes	C	R	W	T	-	-	time lag (s)	Low

Fig. 5.7 Communication object “X: Current”

No.	Function	Object name	Data type	Flags	DPT
30	**Current value(mA)** **Current value(A)**	**Output A-{{...}}**	**2byte** **2byte** **4byte**	**C,R,T**	**7.012 current (mA)** **9.021 current (mA) float** **14.019 electric current (A)**
This communication object is used to send the current value of each channel, the data types can be set in the parameter "Object of current measurement".					
31	**Exceedance of load**	**Output A-{{...}}**	**1bit**	**C,R,T**	**1.001 switch**
This communication object is used to report each channel current larger than the set threshold or not, the status value can be set in the parameter “Behavior at (not) exceeding”.					
32	**Lower deviation of load**	**Output A-{{...}}**	**1bit**	**C,R,T**	**1.001 switch**
This communication object is used to report each channel current lower than the set threshold or not, the status value can be set in the parameter "Behavior at (not) deviating".					
33	**Switch counter**	**Output A-{{...}}**	**2byte** **4byte**	**C,W,R,T**	**7.001 pulses** **12.001 counter pulses**
This communication object is used to report the numbers of switching, and can also modify the counter via the bus. It displays when the parameter "Counter function" is enable, the data type of report value can be set in the parameter "Object of switch and hours counter" .					
34	**Operation hours**	**Output A-{{...}}**	**2byte** **4byte**	**C,W,R,T**	**7.007 time (h)** **13.100 time lag (s)**
This communication object is used to report load working time, and can also modify the time via the bus. It displays when the parameter "Counter function" is enable, the data type of report value can be set in the parameter "Object of switch and operation hours counter".					

5.8.Communication object “X:Voltage”

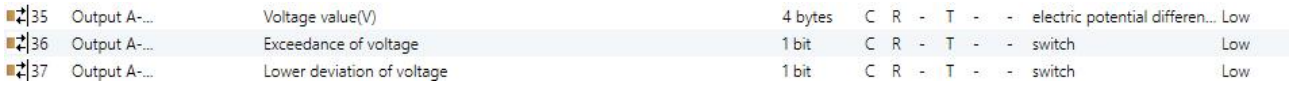


Fig. 5.8 Communication object “X:Voltage”

No.	Function	Object name	Data type	Flags	DPT
35	**Voltage value(V)**	**Output A-{{...}}**	**4byte**	**C,R,T**	**14.028 electric potential difference (V)**
This communication object is used to send the voltage value of each channel.					
36	**Exceedance of voltage**	**Output A-{{...}}**	**1bit**	**C,R,T**	**1.001 switch**
This communication object is used to report each channel voltage larger than the set threshold or not, the status value can be set in the parameter “Behavior at (not) exceeding”.					
37	**Lower deviation of voltage**	**Output A-{{...}}**	**1bit**	**C,R,T**	**1.001 switch**
This communication object is used to report each channel voltage lower than the set threshold or not, the status value can be set in the parameter "Behavior at (not) deviating".					

Table 5.8 Communication object “X:Voltage”

5.9.Communication object “X:Power factor”

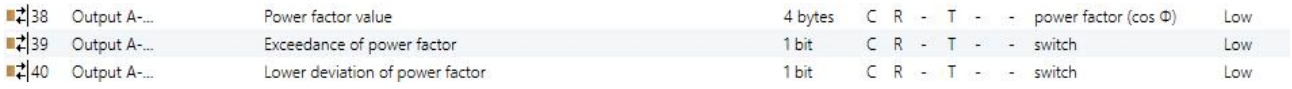


Fig. 5.9 Communication object “X:Power factor”

No.	Function	Object name	Data type	Flags	DPT
38	**Power factor value**	**Output A-{{...}}**	**4byte**	**C,R,T**	**14.057 power factor**
This communication object is used to send the power factor value of each channel.					
39	**Exceedance of power factor**	**Output A-{{...}}**	**1bit**	**C,R,T**	**1.001 switch**
This communication object is used to report each channel power factor larger than the set threshold or not, the status value can be set in the parameter “Behavior at (not) exceeding”.					
40	**Lower deviation of power factor**	**Output A-{{...}}**	**1bit**	**C,R,T**	**1.001 switch**
This communication object is used to report each channel power factor lower than the set threshold or not, the status value can be set in the parameter "Behavior at (not) deviating".					

Table 5.9 Communication object “X:Power factor”

5.10.Communication object “X:Active power”

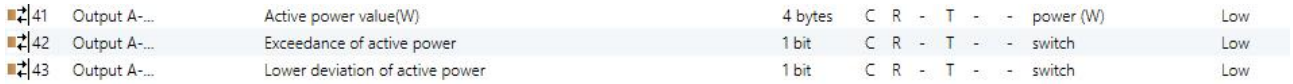


Fig. 5.10 Communication object “X:Active power”

No.	Function	Object name	Data type	Flags	DPT
41	**Active power value(KW)** **Active power value(W)**	**Output A-{{...}}**	**2byte** **4byte**	**C,R,T**	**9.024 power (KW)** **14.056 power (W)**
This communication object is used to send the active power value of each channel, the data types can be set in the parameter "Object of active power meter".					
42	**Exceedance of active power**	**Output A-{{...}}**	**1bit**	**C,R,T**	**1.001 switch**
This communication object is used to report each channel active power larger than the set threshold or not, the status value can be set in the parameter “Behavior at (not) exceeding”.					
43	**Lower deviation of active power**	**Output A-{{...}}**	**1bit**	**C,R,T**	**1.001 switch**
This communication object is used to report each channel active power lower than the set threshold or not, the status value can be set in the parameter "Behavior at (not) deviating".					

Table 5.10 Communication object “X:Active power”

5.11.Communication object “X:Apparent power”

Fig. 5.11 Communication object “X:Apparent power”

No.	Function	Object name	Data type	Flags	DPT
44	**Apparent power value(KW)** **Apparent power value(W)**	**Output A-{{...}}**	**2byte** **4byte**	**C,R,T**	**9.024 power (KW)** **14.056 power (W)**
This communication object is used to send the apparent power value of each channel, the data types can be set in the parameter "Object of apparent power meter".					
45	**Exceedance of apparent power**	**Output A-{{...}}**	**1bit**	**C,R,T**	**1.001 switch**
This communication object is used to report each channel apparent power larger than the set threshold or not, the status value can be set in the parameter “Behavior at (not) exceeding”.					
46	**Lower deviation of apparent power**	**Output A-{{...}}**	**1bit**	**C,R,T**	**1.001 switch**
This communication object is used to report each channel apparent power lower than the set threshold or not, the status value can be set in the parameter "Behavior at (not) deviating".					

Table 5.11 Communication object “X:Apparent power”

5.12.Communication object “X:Electrical energy”

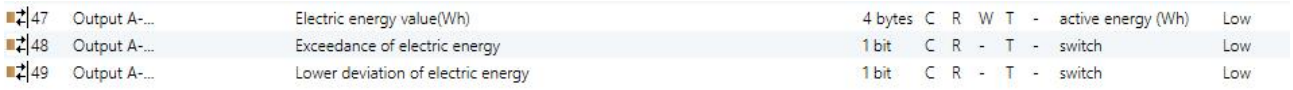


Fig. 5.12 Communication object “X:Electrical energy”

No.	Function	Object name	Data type	Flags	DPT
47	**Electric energy(Wh)** **Electric energy(kWh)**	**Output A-{{...}}**	**4byte**	**C,R,W,T**	**13.010 active energy (Wh)** **13.013 active energy (KWh)**
This communication object is used to send the electric energy value of each channel, and can also modify the value via the bus, the data types can be set in the parameter "Object of electrical energy meter".					
48	**Exceedance of electric energy**	**Output A-{{...}}**	**1bit**	**C,R,T**	**1.001 switch**
This communication object is used to report each channel electrical energy larger than the set threshold or not, the status value can be set in the parameter “Behavior at (not) exceeding”.					
49	**Lower deviation of electric energy**	**Output A-{{...}}**	**1bit**	**C,R,T**	**1.001 switch**
This communication object is used to report each channel electrical energy lower than the set threshold or not, the status value can be set in the parameter "Behavior at (not) deviating".					

Table 5.12 Communication object “X:Electrical energy”

Chapter 6 Priority level description

There are 4 priority levels for the whole system:

Forced > Safety Priority 2 > Safety Priority 1 >common switch / Time/ preset / logic / scene / threshold (from highest priority to lowest)

Only the higher priority behavior can interrupt the lower priority behavior.

General switch:

Forced operation

Safety priority 2

Safety priority 1

Switch

Channel special function switch: output of time/preset/logic/scene/threshold and other functions.

NOTE:

After the higher priority is canceled, the device will check whether the lower priority is enabled, if enabled, the corresponding configuration will be preformed.

The device works in the switch actuator mode. If the Flash / Staircase / Delay time function is running before entering the high priority, then their time will continue to count during the high priority operation. Then after exit at the high priority, if the timing is still not over, the time function will continue to execute. And during high priority, the control telegrams of channel switches and special switches function from the bus are ignored.