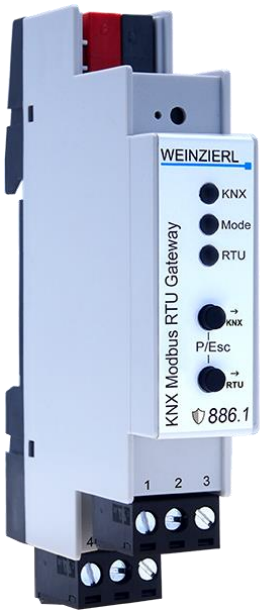
For Modbus RS-485, bus powered

KNX Modbus RTU Gateway 886.1 *secure*

Operation and installation manual



(Art. # 5498)

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Content

1 Application

The KNX Modbus RTU Gateway 886.1 *secure* is a compact Gateway between KNX TP and Modbus RTU with 250 freely configurable datapoints.

The device enables easy integration of Modbus devices that support the RTU protocol via RS-485 and can act as a Modbus master or slave. As Master the device can address up to 25 slave devices.

The assignment between KNX objects and Modbus registers can be configured via parameters in the ETS without an additional tool.

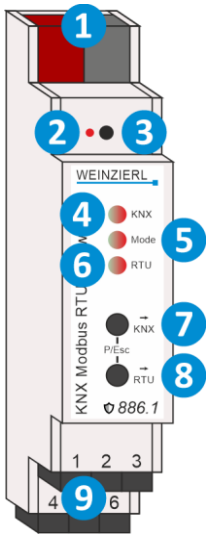
Two buttons and three LEDs allow local operation and visualization of the device status.

The gateway provides a galvanic isolation between KNX bus and Modbus.

Power is supplied via the KNX bus. The device supports KNX Security.

2 Installation and connection

The KNX Modbus RTU Gateway 886.1 *secure* is designed for installation on a DIN rail (35 mm) with a width of 1 unit (18 mm). An installation friendly design with pluggable screw terminals helps to reduce the cost of commissioning. It features the following controls and displays:



1. KNX bus connector
2. Programming LED
3. Button for programming mode
4. LED KNX (multicolor)
5. LED Mode (multicolor)
6. LED RTU (multicolor)
7. Button KNX
8. Button RTU
9. Pluggable screw terminals

The device has galvanic isolation between Modbus and KNX.

If the bus voltage is missing, the device is without function.

2.1 KNX programming mode

The KNX programming mode is activated/deactivated either by pressing the recessed KNX programming button 3 or by simultaneously pressing the buttons (P/Esc) 7 and 8.

When the programming mode is active, the programming LED 2 and the LED Mode 5 light up red.

The operation/visualization of the programming mode on the front can be activated/deactivated in the ETS® on page general settings.

2.2 Manual operation and status display

The LED KNX 4 lights up green when KNX bus voltage is present. When this LED flickers, telegram traffic is taking place on the KNX bus.

Errors in communication (e.g. telegram repetitions or telegram fragments) are indicated by a brief color change to red.

Summary of the states of the LED KNX 4:

LED Status	Meaning
LED lights green	KNX bus voltage present.
LED flickers green	Telegram traffic on the KNX bus.
LED briefly red	Error in the communication on the KNX bus.

The LED RTU 6 lights up green when KNX bus voltage is present When this LED flickers, telegram traffic is taking place on the Modbus.

Errors in the Modbus communication *(gateway is Modbus master)* are indicated by a brief color change to red. These errors are:

- In the Modbus settings, the **Time till next cycle** set too short.
  Not all channels can be run through in the specified time.
- The Modbus gateway receives an exception response.
  But not the exception “Acknowledge” (code 0x05).
- The Modbus gateway does not receive a response.

Furthermore, LED RTU 6 lights up red if a static error has been configured in the ETS database. This is the case if “1 based” is parameterized in the Modbus settings and additionally address 0 is parameterized in at least one channel.

Summary of the states of the LED RTU 6:

LED Status	Meaning
LED lights green	KNX bus voltage present.
LED lights red	Incorrect configuration of the register addresses in the ETS database (static error).
LED flickers green	Telegram traffic on the Modbus.
LED briefly red	Error in the Modbus communication.

The LED Mode 5 lights up or flashes when KNX bus voltage is present.

The synchronization of the KNX objects is triggered by pressing the button KNX 7 for a long time. This is indicated by the LED Mode 5 lighting up in orange.

Pressing the button RTU 7 for a long time triggers the synchronization of the Modbus registers. This is indicated by the LED Mode 5 lighting up in orange.

Summary of the states of the LED Mode 5:

LED Status	Meaning
LED lights green	The unit operates in normal operating mode.
LED lights red	The programming mode is active.
LED lights orange	The programming mode is not active. Synchronization is active.
LED flashes red	The programming mode is not active. Synchronization is not active. The device is not loaded correctly, e.g. after aborting a download.
LED flashes green	The device is currently loaded by the ETS.

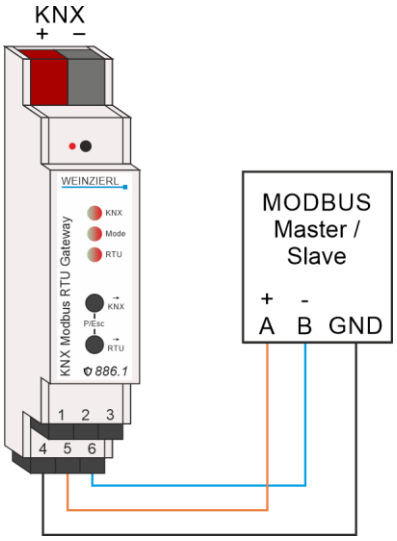
3 Reset to factory default settings

It is possible to reset the device to its factory default settings.

- Disconnect the KNX bus connector 1 from the device.
- Press the KNX programming button 3 and keep it pressed down.
- Reconnect the KNX bus connector 1 to the device.
- Keep the KNX programming button 3 pressed for at least another 6 seconds.
- A short flashing of all LEDs (2 4 5 6) visualizes the successful reset of the device to factory default settings.

In the factory default settings, the device has the physical address 15.15.255 and no group addresses are connected. Also, KNX Data Security is disabled and the initial key (FDSK) must be used for secure commissioning.

4 Wiring scheme



4.1 Pluggable screw terminals

The upper terminal is used to connect the terminating resistor, the lower terminal to connect the Modbus (or vice versa). The terminals are identical:

⊥	A	B
⊥	A	B

4.2 Pin assignment

Connection	Icon	Description
1	⊥	Ground connection for Modbus (connected to connection 4)
2	A	Data line A (+) for Modbus (connected to connection 5)
3	B	Data line B (-) for Modbus (connected to connection 6)
4	⊥	Ground connection for Modbus (connected to connection 1)
5	A	Data line A (+) for Modbus (connected to connection 2)
6	B	Data line B (-) for Modbus (connected to connection 3)
KNX	+	Positive connection for KNX bus
KNX	-	Ground connection for KNX bus

The transmission line must be terminated at the last participant of the Modbus transmission line with a 120 Ohm / 0.25 W resistor. This resistor must be inserted directly between the two signal lines before the input of the last device. No terminating resistor is installed in the device itself. It can be inserted on the upper or lower screw terminal

Only shielded and twisted cables should be used for Modbus.

5 KNX Security

The KNX standard was extended by KNX Security to protect KNX installations from unauthorized access. KNX Security reliably prevents the monitoring of communication as well as the manipulation of the system.

The specification for KNX Security distinguishes between KNX IP Security and KNX Data Security. KNX IP Security protects the communication over IP while on KNX TP the communication remains unencrypted. Thus, KNX IP Security can also be used in existing KNX systems and with non-secure KNX TP devices.

KNX Data Security describes the encryption on telegram level. This means that the telegrams on the twisted pair bus or via RF (radio frequency) are also encrypted.

Encrypted telegrams are longer than the previously used unencrypted ones. For secure programming via the bus, it is therefore necessary that the interface used (e.g. USB) and any intermediate line couplers support the so called KNX Long Frames.

KNX TP – Communication encrypted (KNX Data Security)
Modbus RTU – Communication unencrypted

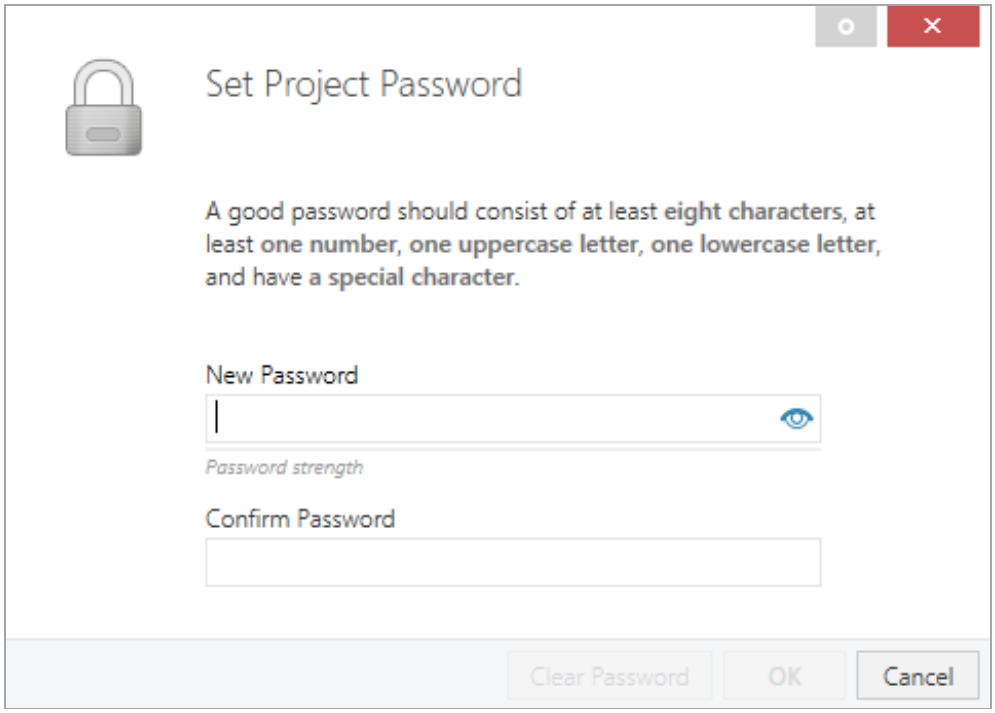
6 ETS database

The ETS 5 database (for ETS 5.7 or newer) can be downloaded from the product website of the KNX Modbus RTU Gateway 886.1 *secure* (www.weinzierl.de) or from the ETS online catalogue.

The KNX Modbus RTU Gateway 886.1 *secure* supports KNX Data Security to protect the device against unauthorized access from the KNX bus. If the device is programmed via the KNX bus, this is done with encrypted telegrams.

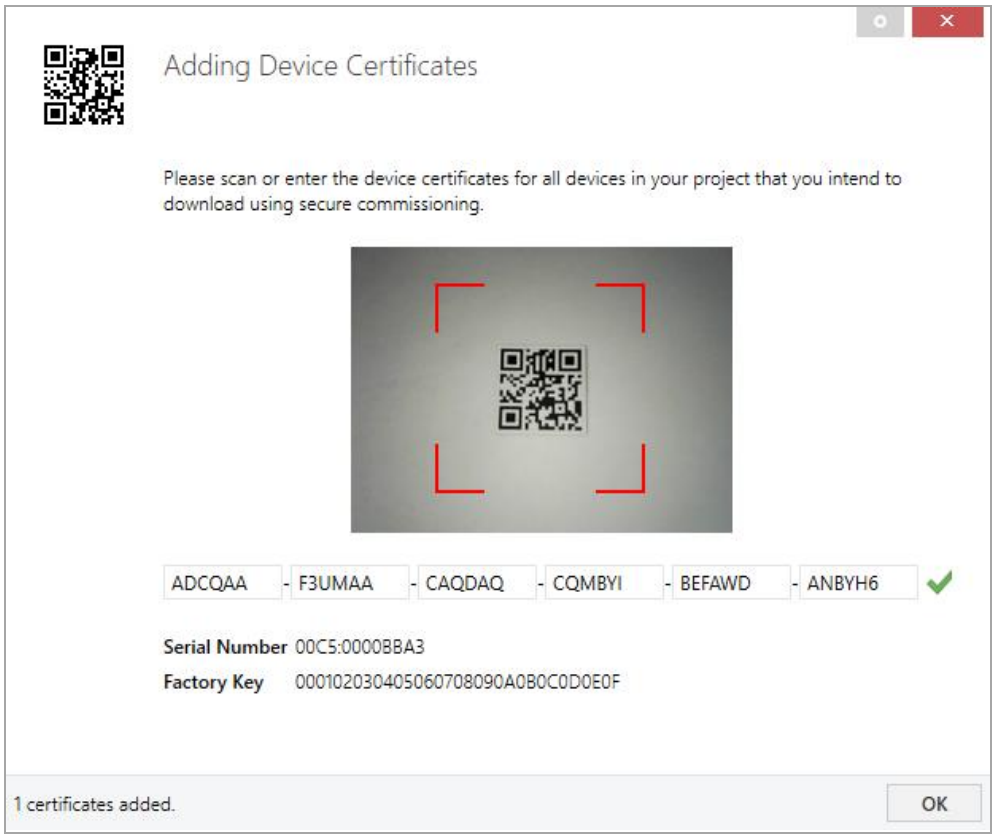
6.1 Secure commissioning

If the first product is inserted into a project with KNX Security, the ETS prompts you to enter a project password.



This password protects the ETS project from unauthorized access. This password is not a key that is used for KNX communication. The entry of the password can be bypassed with "Cancel", but this is not recommended for security reasons.

ETS requires a device certificate for each device with KNX Security that is created in the ETS. This certificate contains the serial number of the device as well as an initial key (FDSK = Factory Default Setup Key).



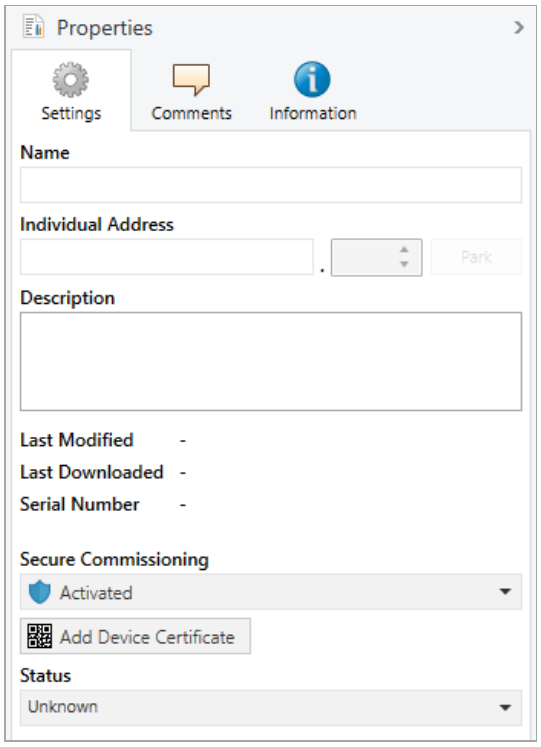
The certificate is printed as text on the device. It can also be scanned from the printed QR code via a webcam.

The list of all device certificates can be managed in the ETS panel Reports – Project Security.

This initial key is required to safely put a device into operation from the start. Even if the ETS download is recorded by a third party, the third party has no access to the secured devices afterwards. During the first secure download, the initial key is replaced by the ETS with a new key that is generated individually for each device. This prevents persons or devices who may know the initial key from accessing the device. The initial key is reactivated after a reset to factory default settings.

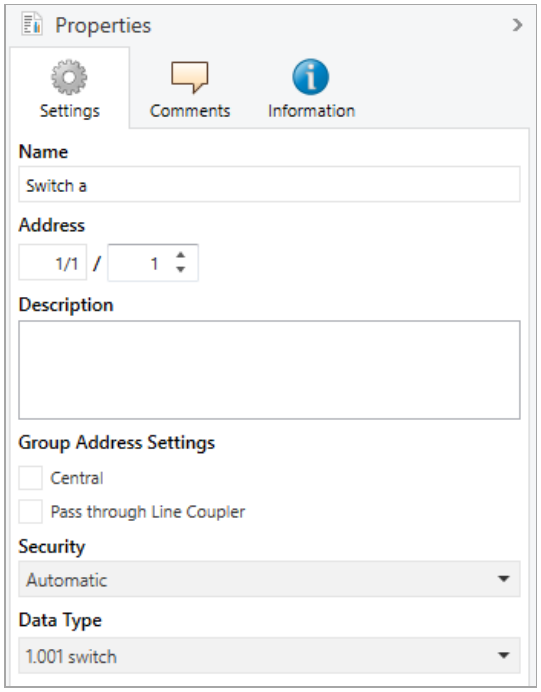
The serial number in the certificate enables the ETS to assign the correct key to a device during a download.

In the ETS project in the properties of the device, secure commissioning can be activated and the device certificate can be added:



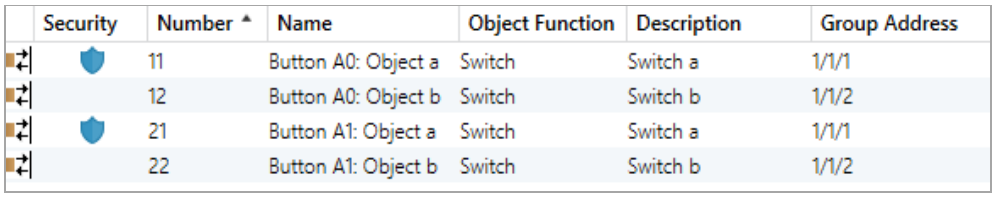
6.2 Secure group communication

Each object of the device can communicate either encrypted or unencrypted. The encryption is set under "Security" in the properties of the used group address:



The setting "Automatic" activates encryption if both objects to be connected can communicate encrypted. Otherwise encrypted communication between the objects is not possible.

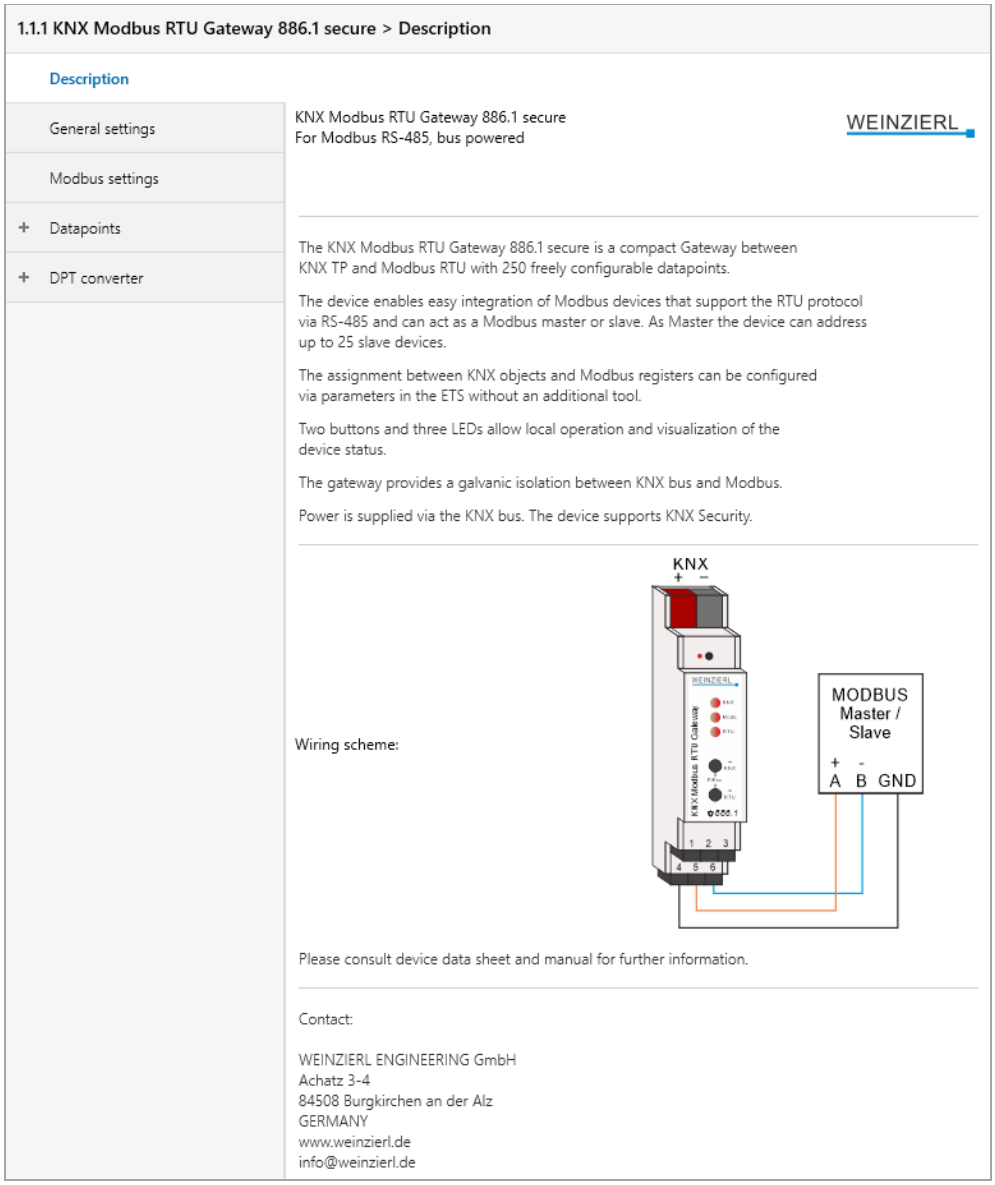
In the overview of communication objects in the ETS project, secured objects can be recognized by a shield symbol:



Security	Number	Name	Object Function	Description	Group Address
🛡	11	Button A0: Object a	Switch	Switch a	1/1/1
	12	Button A0: Object b	Switch	Switch b	1/1/2
🛡	21	Button A1: Object a	Switch	Switch a	1/1/1
	22	Button A1: Object b	Switch	Switch b	1/1/2

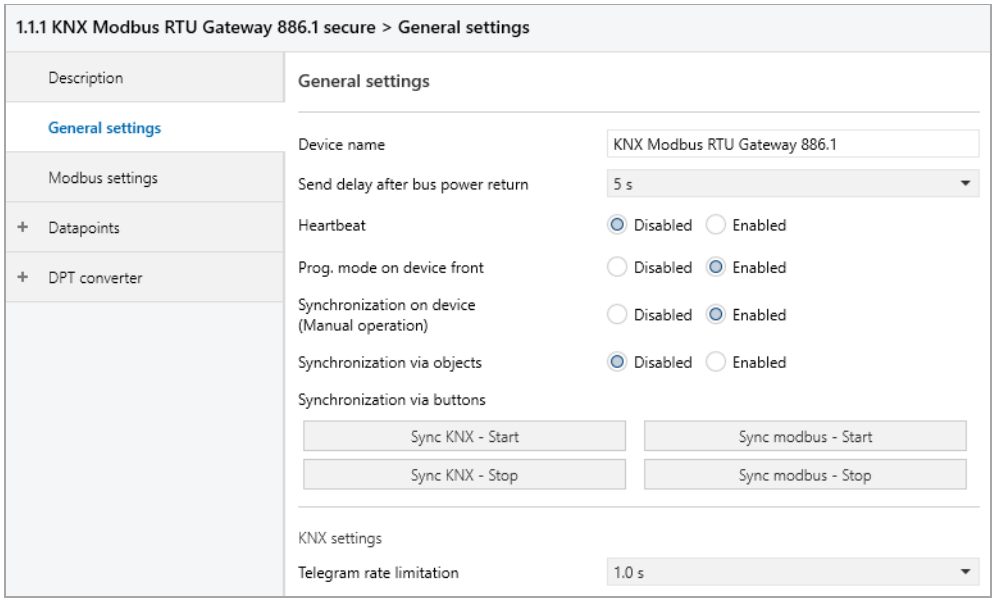
A separate key is automatically generated by the ETS for each secured group address. These keys can also be checked in the ETS panel Reports – Project Security. To enable all devices to communicate with a secure group address, the keys must be known to all. Therefore a download must be made into all devices that use this group address when a key is created or changed. A key is changed by the ETS e.g. when the encryption of a group address is switched off and on again.

6.3 Description



This page shows the device description and the corresponding connection diagram.

6.4 General settings



Device name *(30 characters)*

Any arbitrary name can be assigned to the KNX Modbus RTU Gateway 886.1 *secure*. The device name should be meaningful, e.g. “Living room ground floor”. This helps the clarity of the ETS project.

Send delay after bus power return

The send delay of telegrams after the return of the bus voltage can be set via this parameter. In this case, telegrams from the device are sent to the KNX bus in a delayed manner by the set time. This reduces the bus load when the bus voltage returns. Other functions such as receiving telegrams are not affected by this parameter.

Heartbeat

Cyclic sending of values to the KNX bus, to indicate that the device is operational. For the cycle time values between 1 min and 24 h are selectable.

Group object	Type KNX	Size	Direction
GO 477 Heartbeat – Trigger	1.001	1 bit	To KNX

Prog. mode on device front

In addition to the normal programming button 3 the device allows activating the programming mode on the device front without opening the switchboard cover. The programming mode can be activated and deactivated via pressing simultaneously both buttons 7 and 8.

This feature can be enabled and disabled via the parameter Prog. mode on device front. The recessed programming button 3 (next to the programming LED 2) is always enabled and is not affected by this parameter.

Synchronization on device (Manual operation)

This parameter is used to configure manual operation on the device. Manual operation can be activated or deactivated.

Manual operation enables synchronization of all channels in the direction to KNX (button KNX 7) and in the direction to Modbus (button RTU 8).

Direction KNX:
All datapoints of the channels configured as “Modbus to KNX” send their current value on the KNX bus.

Direction Modbus:
If the gateway is operating as Modbus master, all registers of the channels configured “KNX to modbus” are written to Modbus again.

Synchronization can be cancelled by pressing the keys 7 and 8 simultaneously.

Synchronization via object

Objects for synchronization in direction KNX and direction Modbus can be displayed here. Synchronization can be started or stopped via the respective object.

Direction KNX:
All data points of the channels that are configured “Modbus to KNX” send their current value to the KNX bus.

Direction Modbus:
If the gateway is operated as a Modbus master, all registers of the channels that are configured “KNX to Modbus” are written to Modbus again.

Group object	Type KNX	Size	Direction
GO 478 Sync KNX – Start/Stop	1.010	1 bit	From KNX
GO 479 Sync Modbus – Start/Stop	1.010	1 bit	From KNX

Synchronization via buttons

Sync KNX – Start:
This button can be used to start the synchronization in direction KNX. All datapoints of the channels configured as “Modbus to KNX” send their current value on the KNX bus.

Sync KNX – Stop:
This button can be used to stop the synchronization in direction KNX.

Sync modbus – Start:
This button can be used to start the synchronization in direction modbus. If the gateway is operating as Modbus master, all registers of the channels configured “KNX to Modbus” are written to Modbus again.

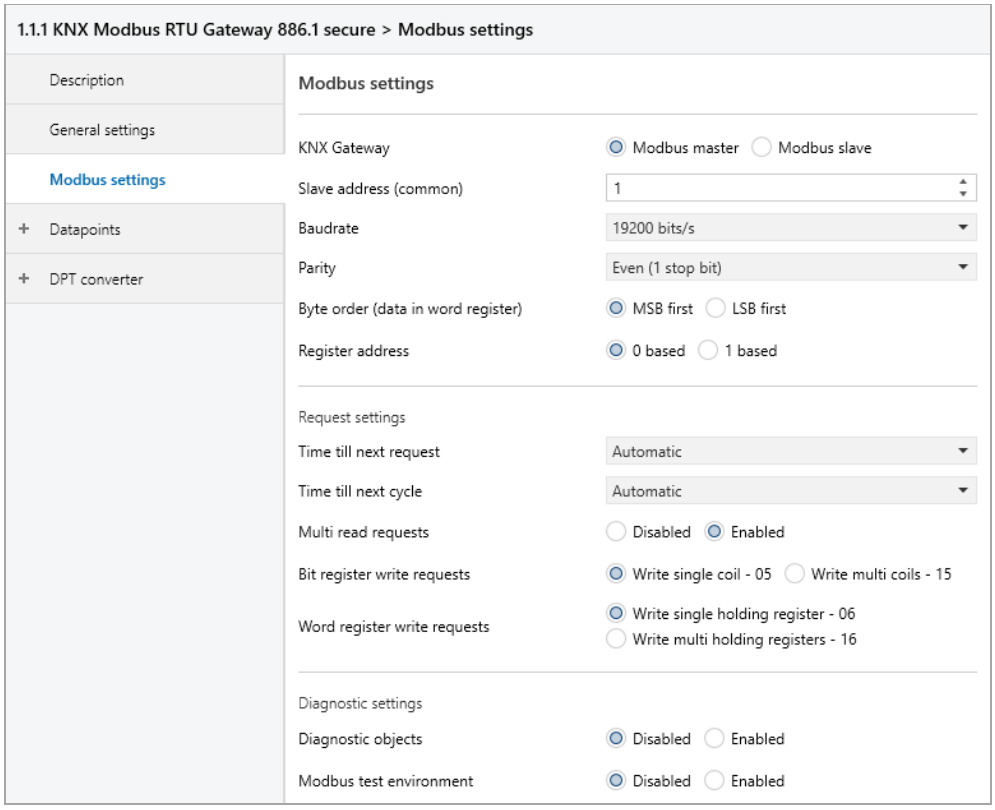
Sync modbus – Stop:
This button can be used to stop the synchronization in direction modbus.

Telegram rate limitation

With this parameter the telegram rate limitation can be activated and the time between telegrams can be configured. Times between 0.1 s and 1.0 s can be selected.

The telegram rate limitation only occurs when the bus load is increased.

6.5 Modbus settings



KNX Gateway

This parameter defines the role of the KNX gateway within the client/server architecture of the Modbus environment. Available are:

- Modbus master
- Modbus slave

Slave address (common)

Here the general slave address (0 ... 247) is set and used according to KNX Gateway configuration.

Modbus master:
The slave address of the Modbus communication partner is entered here. If several Slave devices are to be addressed, a specific slave address can be assigned per parameter page (e.g. datapoints 1-10).

Modbus slave:
The slave address of the KNX gateway is entered here.

Baudrate

Configures the baudrate of the Modbus communication. The following are available:

- 1200 bits/s
- 2400 bits/s
- 4800 bits/s
- 9600 bits/s
- 19200 bits/s
- 38400 bits/s
- 56000 bits/s
- 57600 bits/s
- 115200 bits/s

Parity

Here the Modbus frame is parameterized with regard to parity and stop bit. The following options are available:

- Even (1 stop bit)
- Odd (1 stop bit)
- None (2 stop bits)
- None (1 stop bit)

Byte order (data in word register)

Defines the order in which 2 byte values are transmitted:

- MSB first *(high byte is sent first)*
- LSB first *(low byte is sent first)*

Register address

Here it is set on which address basis the register address is defined:

- 0 based
- 1 based

Time till next request *(only in Master mode)*

This parameter defines the minimum time for the next request. Used to slow down the master.

Time till next cycle *(only in Master Mode)*

This parameter defines the time after which a new request cycle has to begin. If the time is too short, the cycle will not be completed. This is indicated by the red flashing of the LED RTU 6.

Multi read requests *(only in Master Mode)*

When this parameter is activated, Modbus registers which lie one after the other in the channels are combined in a multi-read request.

The slave address and the function code must be identical. The register address must be continuous, but repetitions may occur. A maximum of 16 channels can be combined.

Example:

Type Slave address: Common
Channel 1 – MB to KNX – Read holding register – Address 0
Channel 2 – MB to KNX – Read holding register – Address 1
Channel 3 – MB to KNX – Read holding register – Address 2
Channel 4 – MB to KNX – Read holding register – Address 2
Channel 5 – MB to KNX – Read holding register – Address 3
Channel 6 – MB to KNX – Read holding register – Address 4
Channel 7 – MB to KNX – Read holding register – Address 4

The result is a read-multi-holding-register request for addresses 0 – 4.

Bit register write requests *(only in master mode)*

Here the function code for writing bit registers is set.

- Write single coil – 05
- Write multi coils – 15

Some modbus devices on the market support only one of these function codes. This is usually the function code for multi write access. This can be set here.

Word register write requests *(only in master mode)*

Here the function code for writing word registers is set.

- Write single holding register – 06
- Write multi holding registers – 16

Some modbus devices on the market support only one of these function codes. This is usually the function code for multi write access. This can be set here.

Diagnostic objects

Activated, objects for diagnostic are displayed and provide information about the communication with the respective slave device.

Modbus master:
If no response is received from the slave device, “No communication – On” is sent to the KNX bus via the diagnostic object.

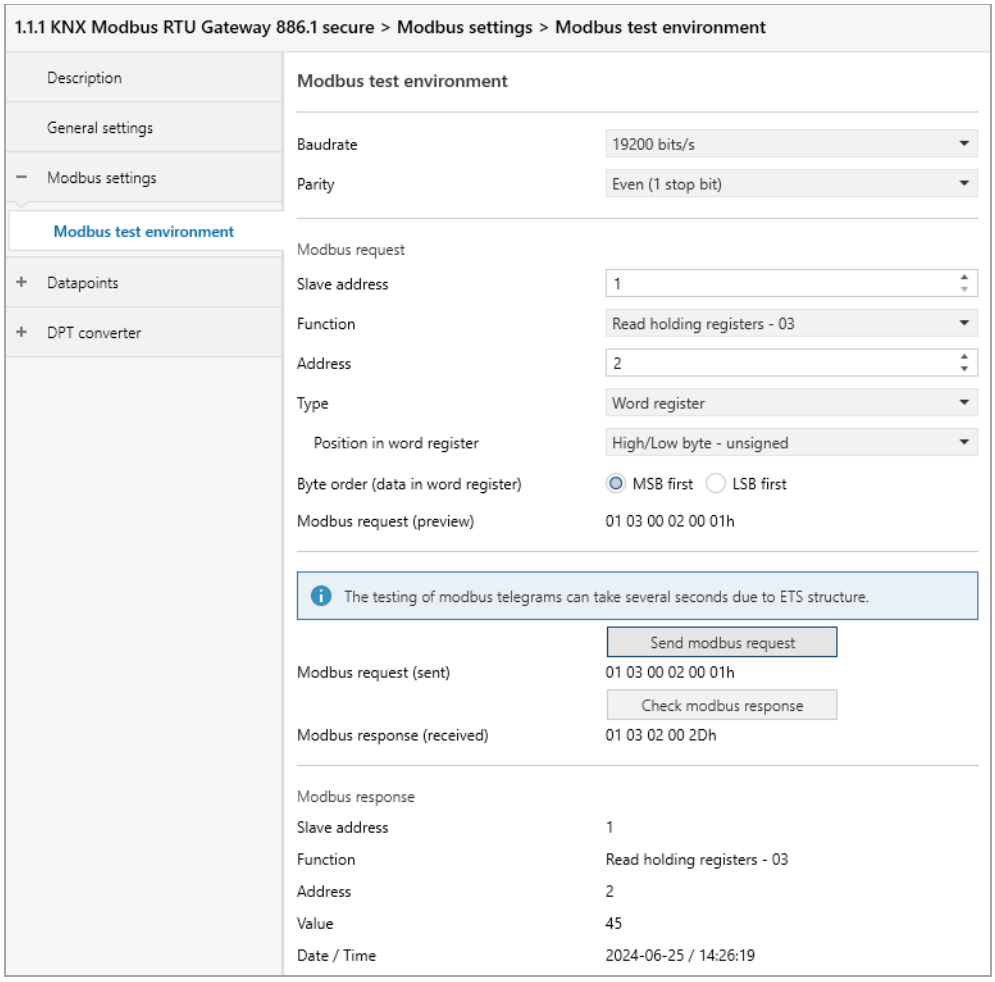
Modbus slave:
If no request is received from the master within the time interval, “No communication – On” is sent to the KNX bus via the diagnostic object.

Group object	Type KNX	Size	Direction
GO 476 Diagnostic: Slave (common) – No communication	1.001	1 bit	To KNX

Modbus test environment

This parameter can be used to activate the modbus test environment. The Modbus communication can then be tested in advance here.

6.6 Modbus test environment



In the Modbus test environment, Modbus telegrams can be created and sent for test purposes. The range of functions corresponds to the settings that can also be used for the individual data points. The names of the parameters are identical.

All settings only apply in the test environment and are not loaded into the device.

Baudrate

Configures the baud rate of the Modbus communication. The following are available:

- 1200 bits/s
- 2400 bits/s
- 4800 bits/s
- 9600 bits/s
- 19200 bits/s
- 38400 bits/s
- 56000 bits/s
- 57600 bits/s
- 115200 bits/s

Parity

The Modbus frame is parameterized here with regard to parity and stop bit. The following options are available:

- Even (1 stop bit)
- Odd (1 stop bit)
- Keine (2 stop bits)
- Keine (1 stop bit)

Slave address

The slave address (1 ... 247) of the Modbus request is set here.

Function

The Modbus function code of the Modbus request is parameterized here. The following options are available:

- Read coils – 01
- Read discrete inputs – 02
- Read holding registers – 03
- Read input registers – 04
- Write single coil – 05
- Write multi coils – 15
- Write single holding register – 06
- Write multi holding registers – 16

Depending on this parameter, various functions are possible here, which are described in more detail in the following sections.

Address

The address of the Modbus register is parameterized here. An address range of 0 … 65535 is available.

Byte order (data in word register)

Defines the order of the two bytes per word register:

- MSB first *(high byte is sent first)*
- LSB first *(low byte is sent first)*

Modbus request (preview)

The Modbus telegram created is displayed here.

Send Modbus request
Check Modbus response

The button “Send modbus request” sends the configured request and automatically waits for the response. If no response is received within 1 second, the button “Check modbus response” can be used to manually check for a response again. However, this is not necessary in most cases.

Modbus request (sent)

The Modbus telegram sent is displayed here.

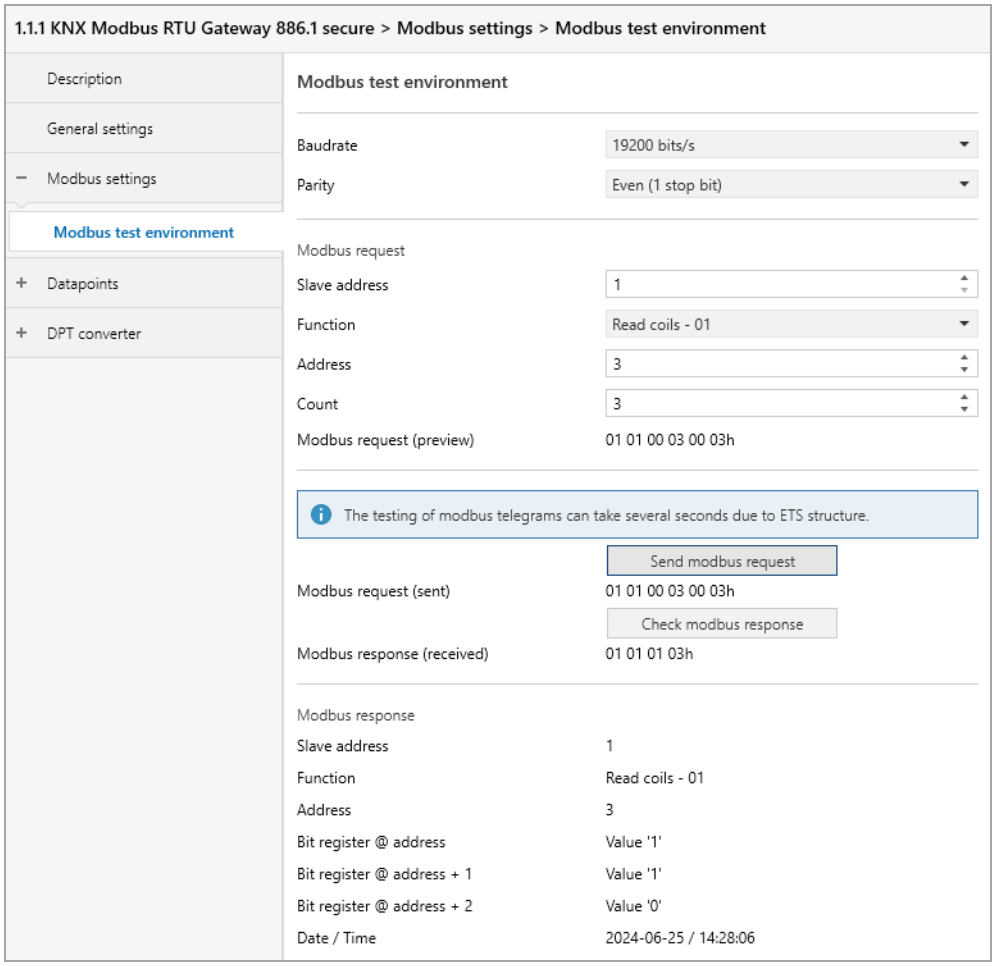
Modbus response (received)

The received Modbus telegram is displayed here.

Modbus response

In the section “Modbus response”, the data of the modbus response is listed and interpreted according to the settings in the section “Modbus request”

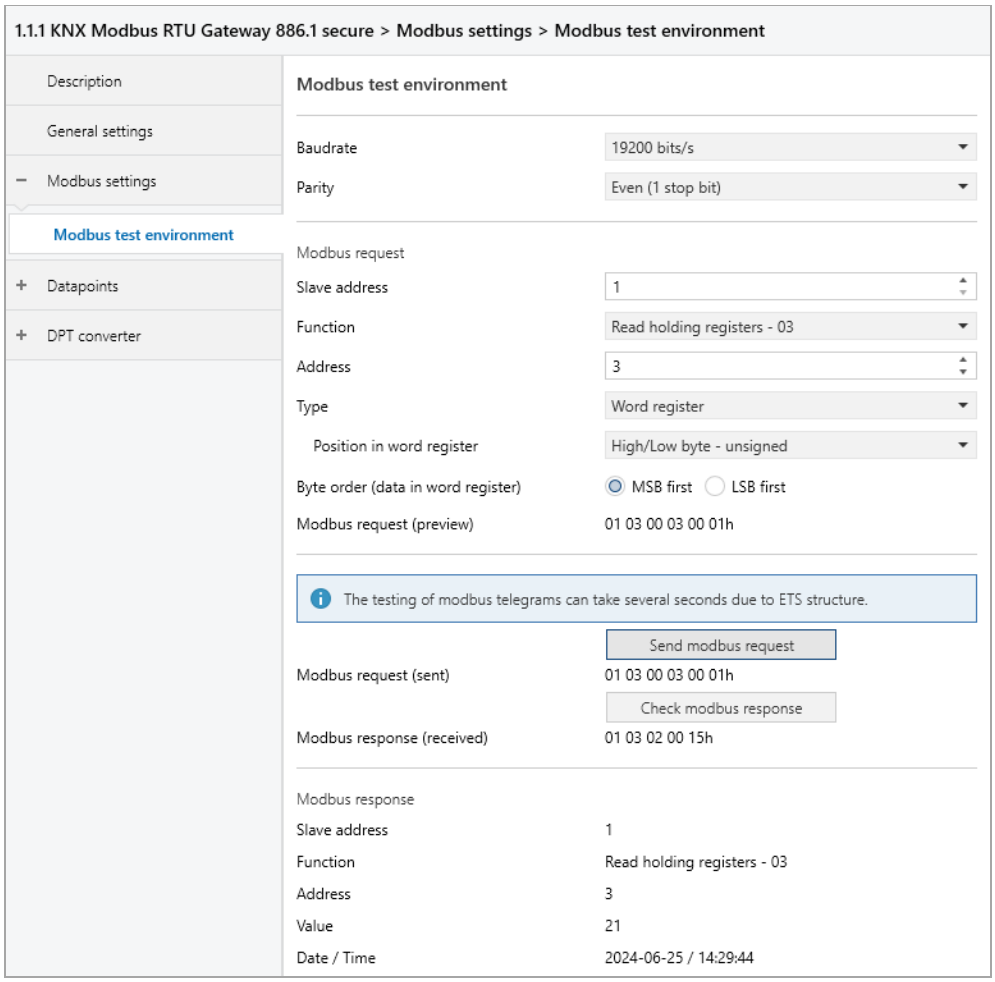
6.6.1 Function – Read coils – 01
Function – Read discrete inputs – 02



Count

The number of bit registers to be read (1 … 16) is set here.

6.6.2 Function – Read holding registers – 03
Function – Read input registers – 04



Type

The following types can be configured:

- Word register
  1 word register (Modbus) is read
- Double word register
  2 word registers (Modbus) are read
- Four word register
  4 word registers (Modbus) are read

Position in word register *(only for word register)*

This parameter defines the area of the word register that is read. The following areas are available:

- Low byte – unsigned
- High byte – unsigned
- High/Low byte – unsigned
- Low byte – 2th complement
- High byte – 2th complement
- High/Low byte – 2th complement

Word order *(only for double/four word register)*

This parameter defines the word order in which the value is set in the word registers (Modbus). The following options are available:

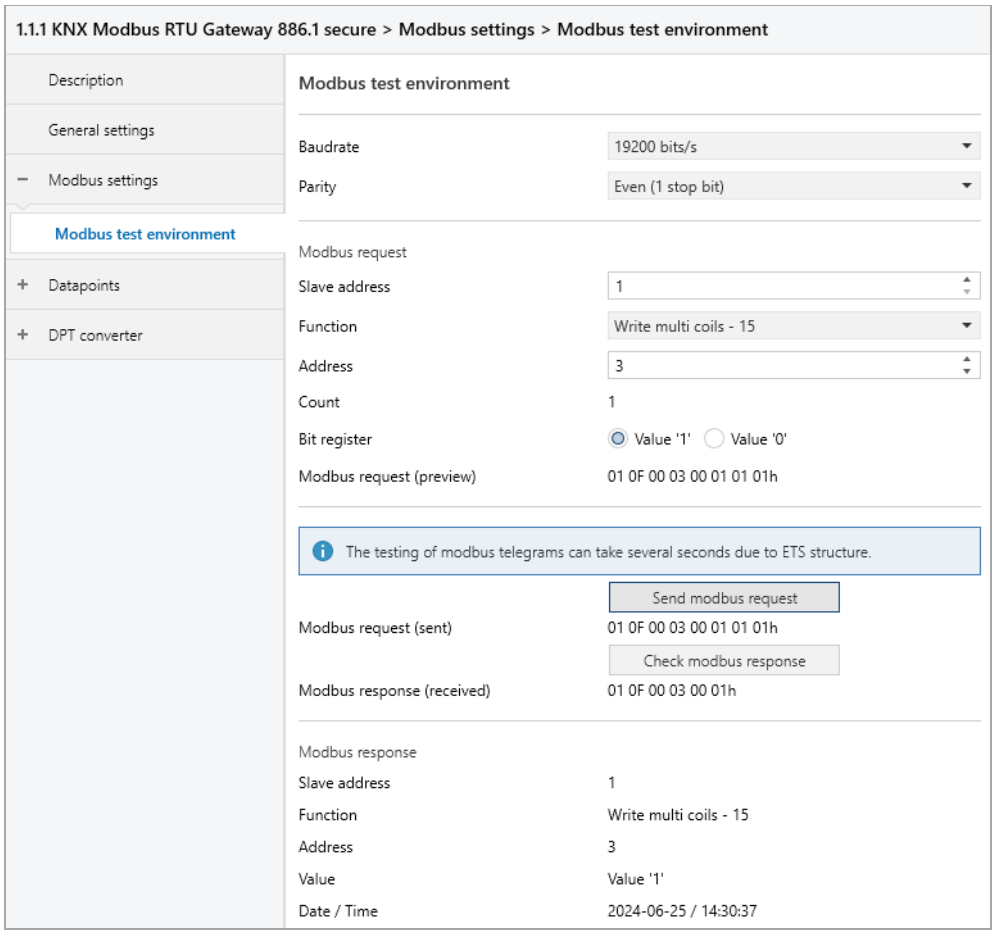
- Hi word @ address / Lo word @ address + 1 *(for double word register)*
- Lo word @ address / Hi word @ address + 1 *(for double word register)*
- Hi word @ address / Lo word @ address + 3 *(for four word register)*
- Lo word @ address / Hi word @ address + 3 *(for four word register)*

Type register value *(only for double/four word register)*

This defines how the register value is interpreted. The following options are available:

- Modbus holds integer value – unsigned
- Modbus holds integer value – 2th complement
- Modbus holds float value – IEEE *(only for four word register)*

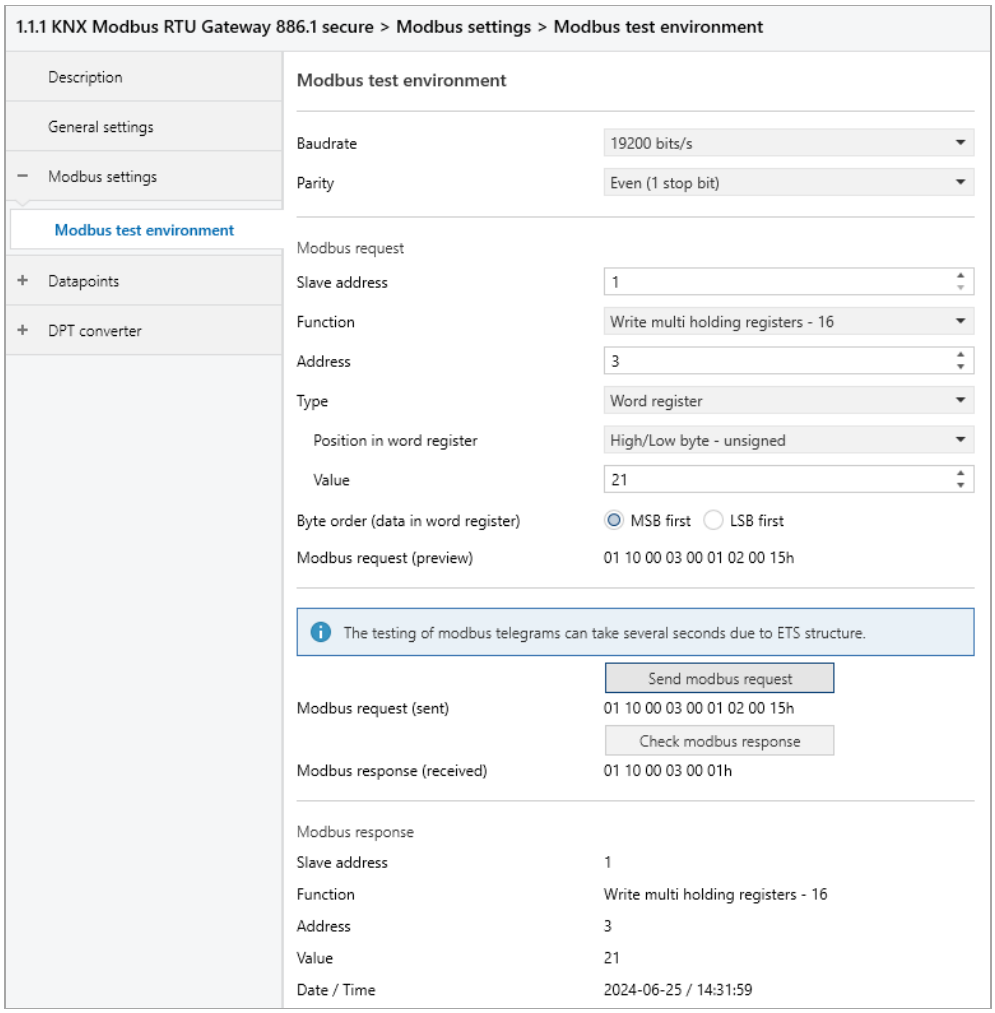
6.6.3 Function – Write single coil – 05
Function – Write multi coils – 15



Count

Only one bit register can be written per request.

6.6.4 Function – Write single holding register – 06
Function – Write multi holding registers – 16



Type

The following types can be configured:

- Word register
  1 word register (Modbus) is written
- Double word register *(only for write multi holding registers – 16)*
  2 word registers (Modbus) are written
- Four word register *(only for write multi holding registers – 16)*
  4 word registers (Modbus) are written

Position in word register *(only for word register)*

This parameter defines the area of the word register that is written. The following areas are available:

- Low byte – unsigned
- High byte – unsigned
- High/Low byte – unsigned
- Low byte – 2th complement
- High byte – 2th complement
- High/Low byte – 2th complement

Word order *(only for double/four word register)*

This parameter defines the word order in which the value is set in the word registers (Modbus). The following options are available:

- Hi word @ address / Lo word @ address + 1 *(for double word register)*
- Lo word @ address / Hi word @ address + 1 *(for double word register)*
- Hi word @ address / Lo word @ address + 3 *(for four word register)*
- Lo word @ address / Hi word @ address + 3 *(for four word register)*

Type register value *(only for double/four word register)*

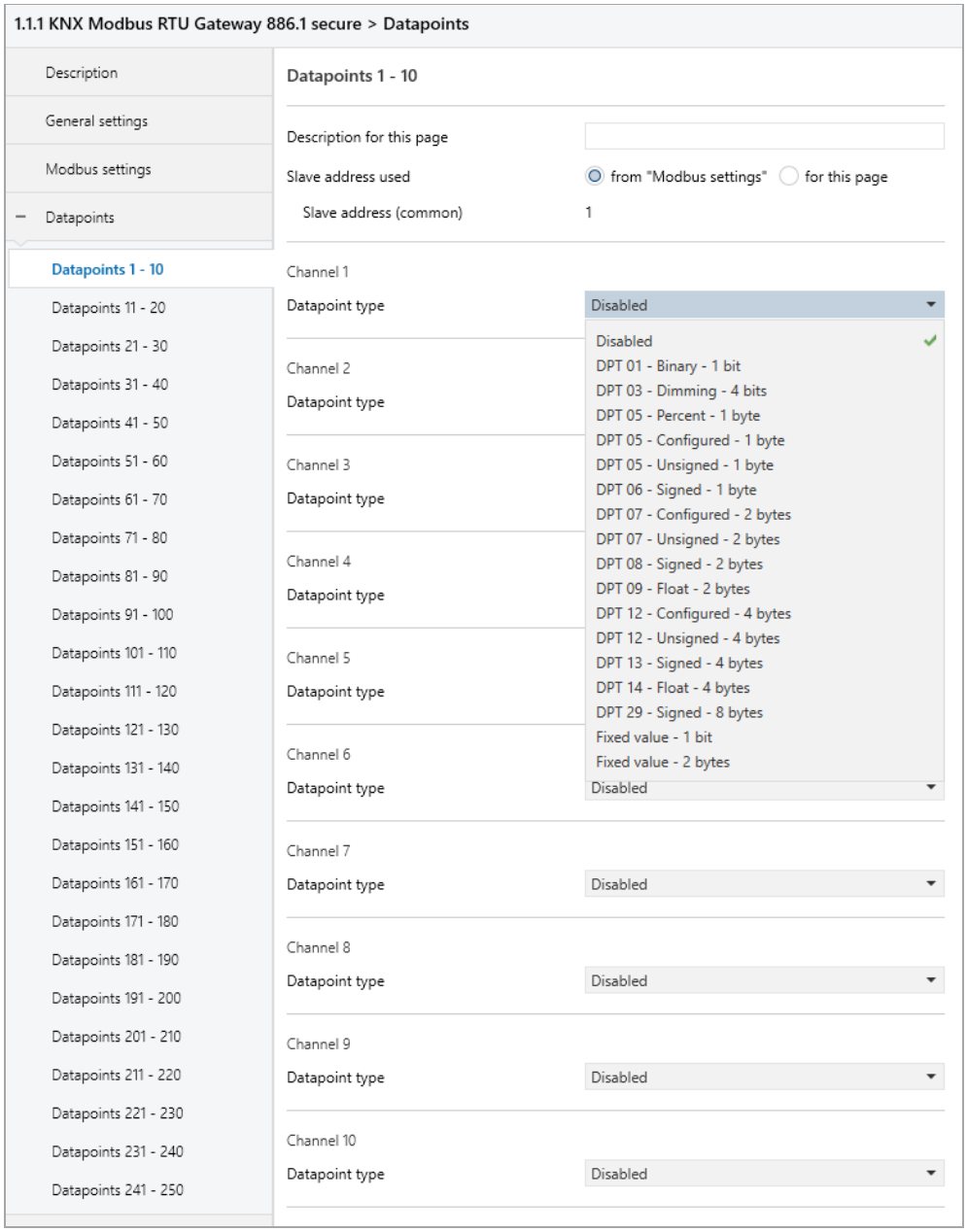
This defines how the register value is interpreted. The following options are available:

- Modbus holds integer value – unsigned
- Modbus holds integer value – 2th complement
- Modbus holds float value – IEEE *(only for four word register)*

Value

The register value to be written.

6.7 Datapoints N – M



10 channels are combined per page.

Description for this page *(30 characters)*

Any name can be assigned to the parameter page. This facilitates the work in the ETS project. If no name is assigned, the channel page is designated e.g. with “Datapoints 1 – 10”.

Slave address used *(only in master mode)*

This parameter determines whether the general slave address, which is configured in “Modbus settings”, or an individual slave address is to be used for the configured channels on this page.

Slave address *(only in master mode)*

Here the individual slave address (0 ... 247) of the channels of this page is set.

Slave description *(only in master mode)*

If the diagnostic is activated, the diagnostic object of this page can be named here.

Group object	Type KNX	Size	Direction
GO 451 Diagnostic: Slave (page 1) – No communication	1.001	1 bit	To KNX

Datapoint type

This parameter activates and defines the KNX interface and the function of this channel. The following options are available:

- Disabled
- DPT 01 – Binary – 1 bit

Group object	Type KNX	Size	Direction
GO 1 Channel 1: ... – Switch – 1 bit	1.001	1 bit	…

- DPT 03 – Dimming – 4 bits

Group object	Type KNX	Size	Direction
GO 1 Channel 1: ... – Dimming – 4 bits	3.007	4 bits	…

- DPT 05 – Percent – 1 byte

Group object	Type KNX	Size	Direction
GO 1 Channel 1: ... – Percent – 1 byte	5.001	1 byte	…

- DPT 05 – Configured – 1 byte

Group object	Type KNX	Size	Direction
GO 1 Channel 1: ... – Configured – 1 byte	5.010	1 byte	…

- DPT 05 – Unsigned – 1 byte

Group object	Type KNX	Size	Direction
GO 1 Channel 1: ... – Unsigned – 1 byte	5.010	1 byte	…

- DPT 06 – Signed – 1 byte

Group object	Type KNX	Size	Direction
GO 1 Channel 1: ... – Signed – 1 byte	6.010	1 byte	…

- DPT 07 – Configured – 2 bytes

Group object	Type KNX	Size	Direction
GO 1 Channel 1: ... – Configured – 2 bytes	7.001	2 bytes	…

- DPT 07 – Unsigned – 2 bytes

Group object	Type KNX	Size	Direction
GO 1 Channel 1: ... – Unsigned – 2 bytes	7.001	2 bytes	…

- DPT 08 – Signed – 2 bytes

Group object	Type KNX	Size	Direction
GO 1 Channel 1: ... – Signed – 2 bytes	8.001	2 bytes	…

- DPT 09 – Float – 2 bytes

Group object	Type KNX	Size	Direction
GO 1 Channel 1: ... – Float – 2 bytes	9.001	2 bytes	…

- DPT 12 – Configured – 4 bytes

Group object	Type KNX	Size	Direction
GO 1 Channel 1: ... – Configured – 4 bytes	12.001	4 bytes	…

- DPT 12 – Unsigned – 4 bytes

Group object	Type KNX	Size	Direction
GO 1 Channel 1: ... – Unsigned – 4 bytes	12.001	4 bytes	…

- DPT 13 – Signed – 4 bytes

Group object	Type KNX	Size	Direction
GO 1 Channel 1: ... – Signed – 4 bytes	13.001	4 bytes	…

- DPT 14 – Float – 4 bytes

Group object	Type KNX	Size	Direction
GO 1 Channel 1: ... – Float – 4 bytes	14.000	4 bytes	…

- DPT 29 – Signed – 8 bytes

Group object	Type KNX	Size	Direction
GO 1 Channel 1: ... – Signed – 8 bytes	29.010	8 bytes	…

- Fixed value – 1 bit
- Fixed value – 2 bytes

Description *(30 characters)*

Any name can be assigned to the channel. However, this should be unique and meaningful, this facilitates later work with the associated group objects, since the assigned name is displayed there as a designation. If no name is assigned, the group objects are designated with “Channel N: ...”.

Direction *(only for channels with DPT)*

The KNX specific communication direction is set here:

- KNX to modbus *(group object is input)*

Group object	Type KNX	Size	Direction
GO 1 Channel 1: Input – ...	Dependent on DPT		From KNX

- Modbus to KNX *(group object is output)*

Group object	Type KNX	Size	Direction
GO 1 Channel 1: Output – ...	Dependent on DPT		To KNX

Send condition *(only for channels with DPT)*

If the group object is defined as an output, it is parameterised here when the object sends the value to the KNX bus. The following are available for selection:

- Read only
  Object sends only on read requests
- On change
  Object sends on value change
- Cyclically
  Object sends after cycle time
- On change and cyclically
  Object sends after cycle time and on value change

Cycle time *(only for channels with DPT)*

The time of the cyclic **Send condition**.

Type

This parameter defines the function of the channel and the size of the modbus register used.

Depending on the parameter **Datapoint type N,** various channel functions are possible here, which are described in more detail in the following chapters.

For “Value in word register” it should be noted that if the channel is misconfigured, it will not work.

Bit count *and* ***Offset from right*** *must not be greater than 16 together.*
The value must fit into ***Bit count****, e.g.* ***Bit count*** *= 1 → “Value” = 0 or 1.*

Function

Here the modbus function code for this channel is parameterized.

Depending on **KNX Gateway** (Modbus master/slave), the **Direction** and the **Type**, different function codes can be configured.

Word register:

Modbus master | KNX to modbus
Set via **Word register write requests**.
- Write single holding register – 06
- Write multi holding registers – 16

Modbus master | Modbus to KNX
- Read holding registers – 03
- Read input registers – 04

Modbus slave | KNX to modbus
- Read holding registers – 03
- Read input registers – 04

Modbus slave | Modbus to KNX
- Write single/multi holding registers – 06, 16

Bit register:

Modbus master | KNX to modbus
Set via **Bit register write requests**.
- Write single coil – 05
- Write multi coils – 15

Modbus master | Modbus to KNX
- Read coils – 01
- Read discrete inputs – 02

Modbus slave | KNX to modbus
- Read coils – 01
- Read discrete inputs – 02

Modbus slave | Modbus to KNX
- Write single/multi coils – 05, 15

Address

The address of the modbus register is parameterized here. An address range of 0 ... 65535 is available.

If the address 0 is parameterized for “1 based”, this is a static error, which deactivates the channel function and is indicated by the LED RTU 6 lighting up red.

Polling interval *(only in master mode with Modbus to KNX)*

The cyclic intervals at which read requests are to be made for the respective register are defined here. The following options are available:

- Every cycle
- Every second cycle
- Every fourth cycle
- Every sixth cycle
- Every eighth cycle

Write interval *(only in master mode for channels without DPT)*

Here it is defined when the fixed value is written to Modbus. The following options are available:

- Once on startup
- On startup and cyclically
  A cycle time of 1 min to 24 h can be parameterized.

Actual register value

This button can be used to check the current modbus register value. The configuration must be loaded into the device to do this.

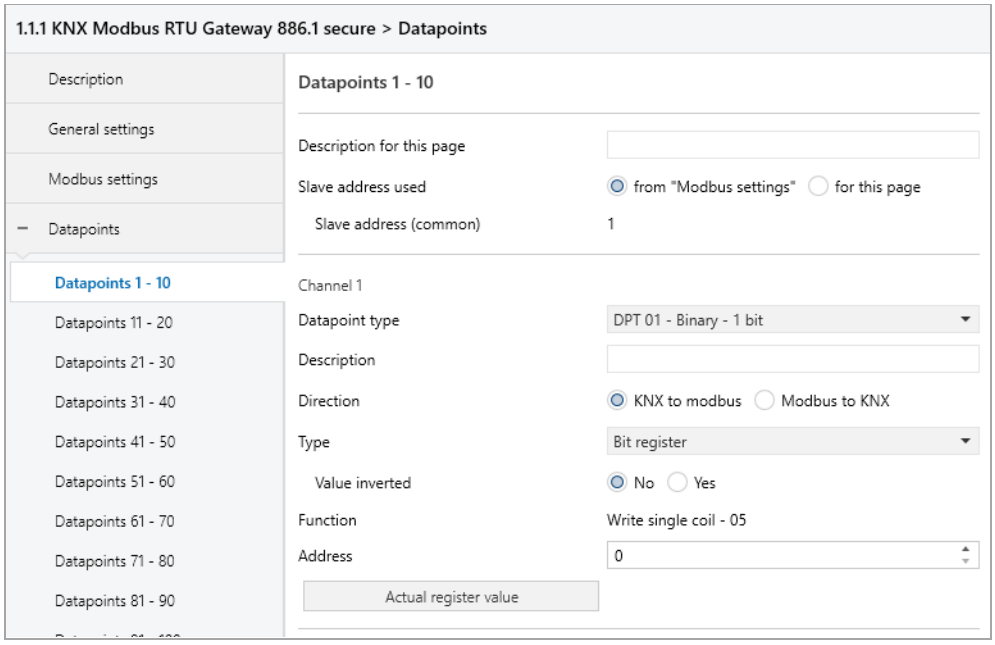
6.8 Channel function “DPT 01 – Binary – 1 bit”

Type

The following types can be configured:

- Bit register
  1 bit (KNX) sets bit register (modbus)
- Bit in word register
  1 bit (KNX) sets 1 bit in word register (modbus)
- Value in word register
  1 bit (KNX) is mapped to value in word register (modbus)

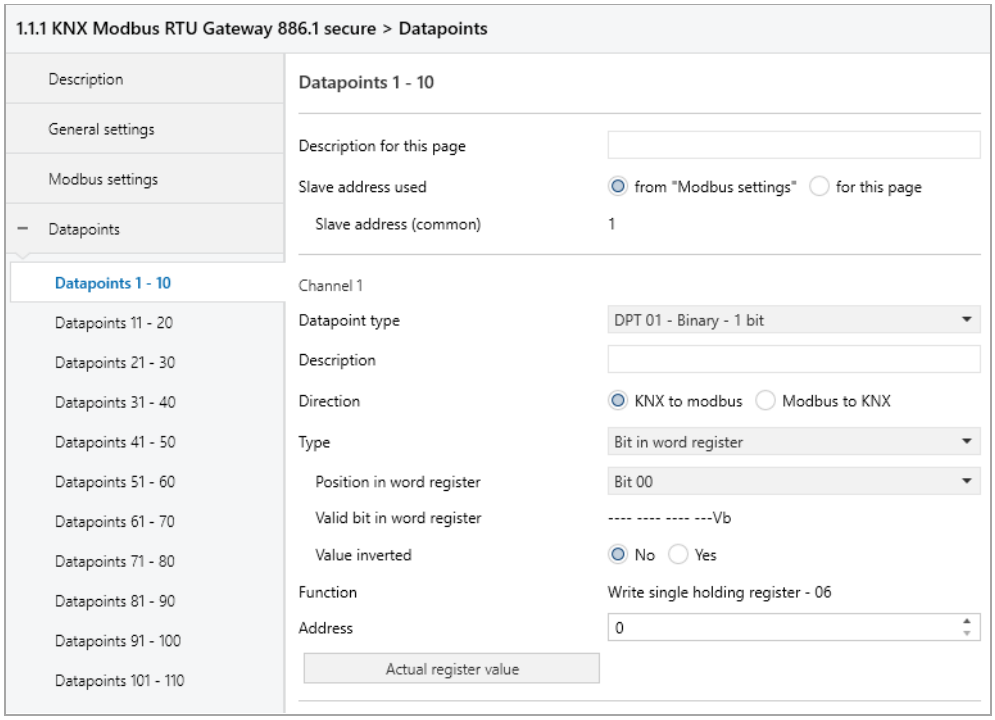
6.8.1 Type – Bit register



Value inverted

If set, the inverted value of the group object corresponds to the value of the bit register.

6.8.2 Type – Bit in word register



Position in word register

Defines the bit in the word register.

Valid bit in word register

Indicates which bit has been defined in the word register.

Value inverted

If set, the inverted value of the group object corresponds to the value of the bit in the word register.

6.8.3 Type – Value in word register

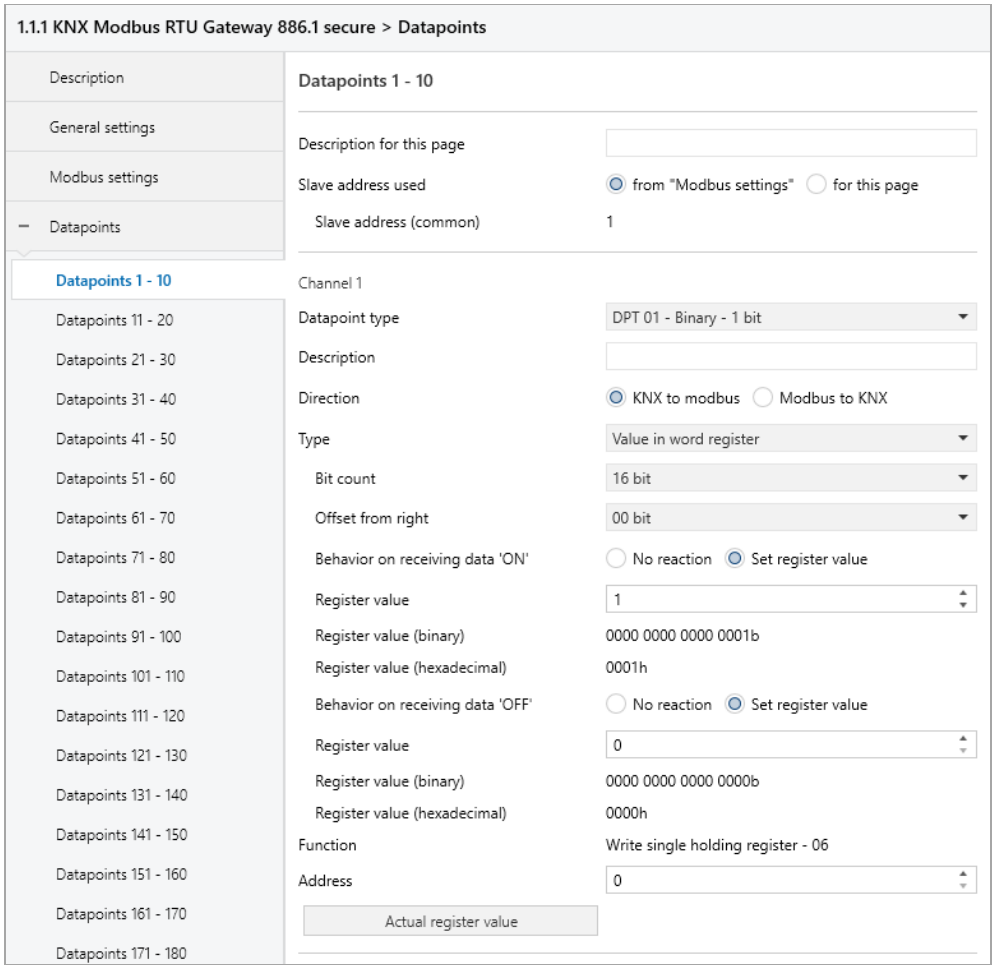
Bit count

This parameter defines the size of the value in the word register (in bits).

Offset from right

This parameter defines the position of the value in the word register (offset from right in bits).

6.8.3.1 Direction – KNX to modbus



Behavior on receiving data ‘ON’

Here you can parameterize whether a value is to be set in the register when an ‘ON’ telegram is received.

Register value *(for ‘ON’ telegram)*

The value that is set in the register when an ‘ON’ telegram is received.

Register value (binary) *(for ‘ON’ telegram)*

Binary representation of the valid bits in the register as well as the parameterized value. Dependent on **Bit count**, **Offset from right** and **Register value**.

Register value (hexadecimal) *(for 'ON' telegram)*

Hexadecimal representation of the valid bits in the register as well as the parameterized value. Dependent on **Bit count**, **Offset from right** and **Register value**.

Behavior on receiving data 'OFF'

Here you can parameterize whether a value is to be set in the register when an 'OFF' telegram is received.

Register value *(for 'OFF' telegram)*

The value that is set in the register when an 'OFF' telegram is received.

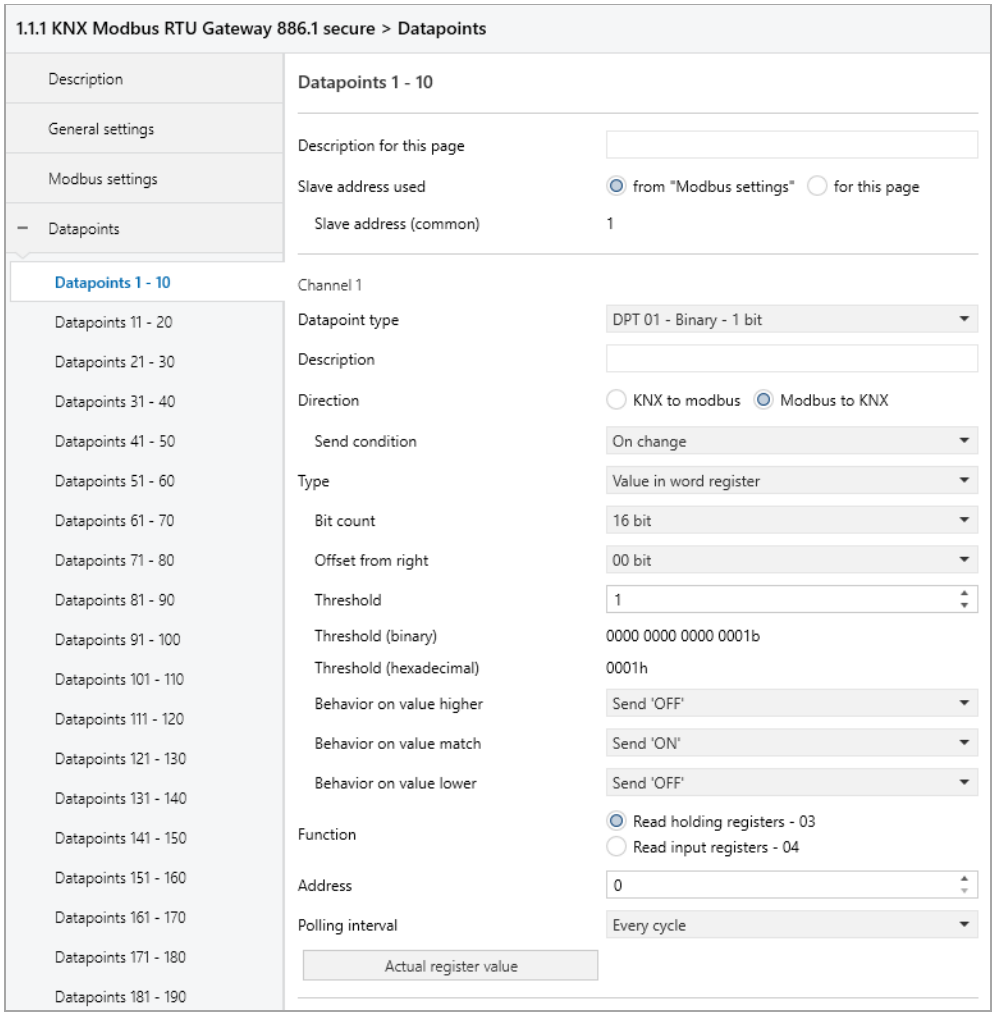
Register value (binary) *(for 'OFF' telegram)*

Binary representation of the valid bits in the register as well as the parameterized value. Dependent on **Bit count**, **Offset from right** and **Register value**.

Register value (hexadecimal) *(for 'OFF' telegram)*

Hexadecimal representation of the valid bits in the register as well as the parameterized value. Dependent on **Bit count**, **Offset from right** and **Register value**.

6.8.3.2 Direction – Modbus to KNX



Threshold

This parameter defines the value for which the word register is checked.

Threshold (binary)

Binary representation of the valid bits in the register as well as the parameterized value. Dependent on **Bit count**, **Offset from right** and **Threshold**.

Threshold (hexadecimal)

Hexadecimal representation of the valid bits in the register as well as the parameterized value. Dependent on **Bit count**, **Offset from right** and **Threshold**.

Behavior on value higher

This parameter defines the behavior of the group object in the event that the register value is greater than the parameterized value. The following options are available:

- No reaction
- Send ‘ON’
- Send ‘OFF’

Behavior on value match

This parameter defines the behavior of the group object in case the register value corresponds to the parameterized value. The following options are available:

- No reaction
- Send ‘ON’
- Send ‘OFF’

Behavior on value lower

This parameter defines the behavior of the group object in case the register value is smaller than the parameterized value. The following options are available:

- No reaction
- Send ‘ON’
- Send ‘OFF’

6.9 Channel function “DPT 03 – Dimming – 4 bits”

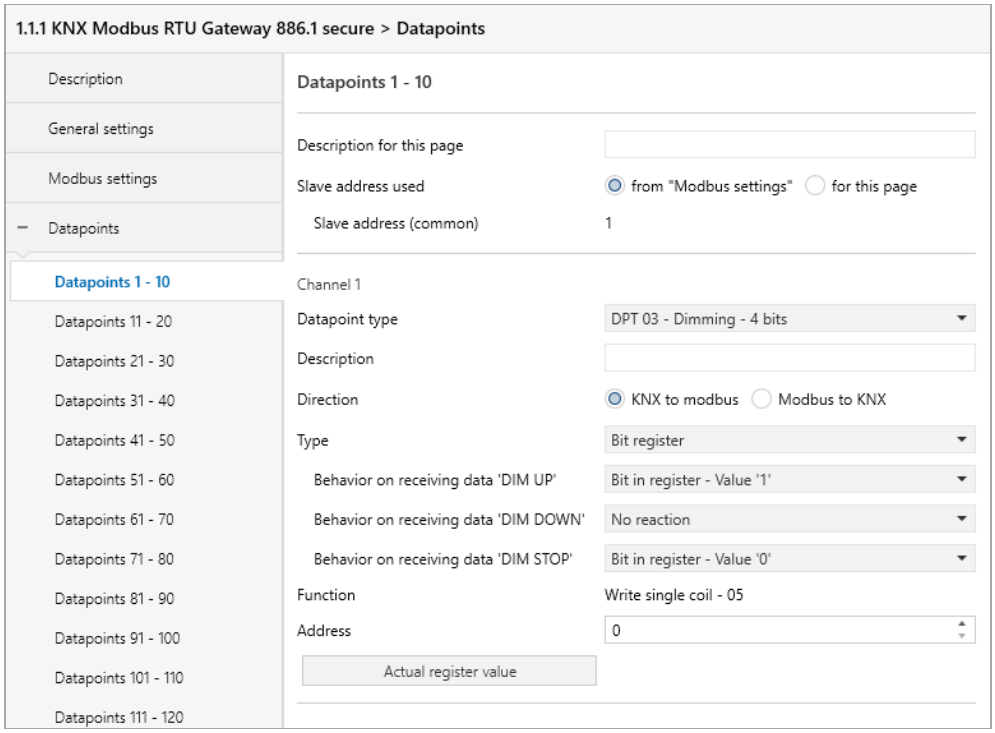
Type

The following types can be configured:

- Bit register
  4 bit dimming command (KNX) sets bit register (modbus)
- Bit in word register
  4 bit dimming command (KNX) sets 1 bit in word register (modbus)
- Value in word register
  4 bit dimming command (KNX) is mapped to value in word register (modbus)

6.9.1 Type – Bit register

6.9.1.1 Direction – KNX to modbus



Behavior on receiving data ‘DIMM UP’

This parameter defines the behavior of the bit register in the event that a ‘DIMM UP’ telegram was received at the group object. The following options are available:

- No reaction
- Bit in register – Value ‘1’
- Bit in register – Value ‘0’

Behavior on receiving data ‘DIMM DOWN’

This parameter defines the behavior of the bit register in the event that a ‘DIMM DOWN’ telegram was received at the group object. The following options are available:

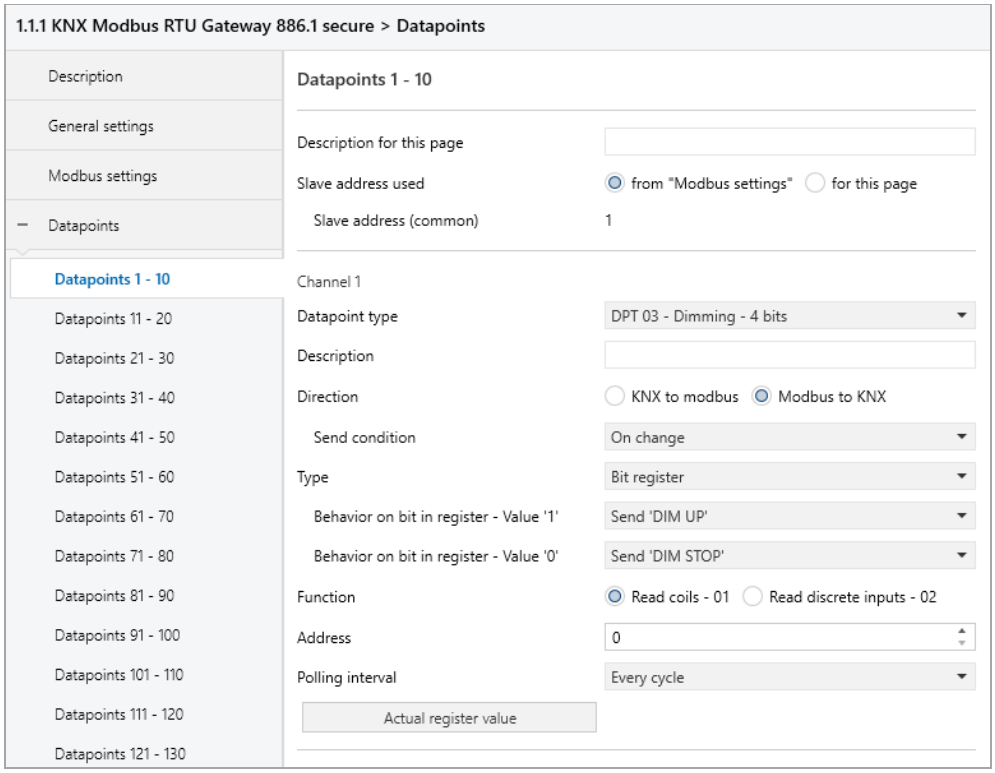
- No reaction
- Bit in register – Value ‘1’
- Bit in register – Value ‘0’

Behavior on receiving data ‘DIMM STOP’

This parameter defines the behavior of the bit register in the event that a ‘DIMM STOP’ telegram has been received at the group object. The following options are available:

- No reaction
- Bit in register – Value ‘1’
- Bit in register – Value ‘0’

6.9.1.2 Direction – Modbus to KNX



Behavior on bit in register – Value ‘1’

This parameter defines the behavior of the group object in case the register value corresponds to the parameterized value. The following options are available:

- No reaction
- Send ‘DIMM UP’
- Send ‘DIMM DOWN’
- Send ‘DIMM STOP’

Behavior on bit in register – Value ‘0’

This parameter defines the behavior of the group object in case the register value corresponds to the parameterized value. The following options are available:

- No reaction
- Send ‘DIMM UP’
- Send ‘DIMM DOWN’
- Send ‘DIMM STOP’

6.9.2 Type – Bit in word register

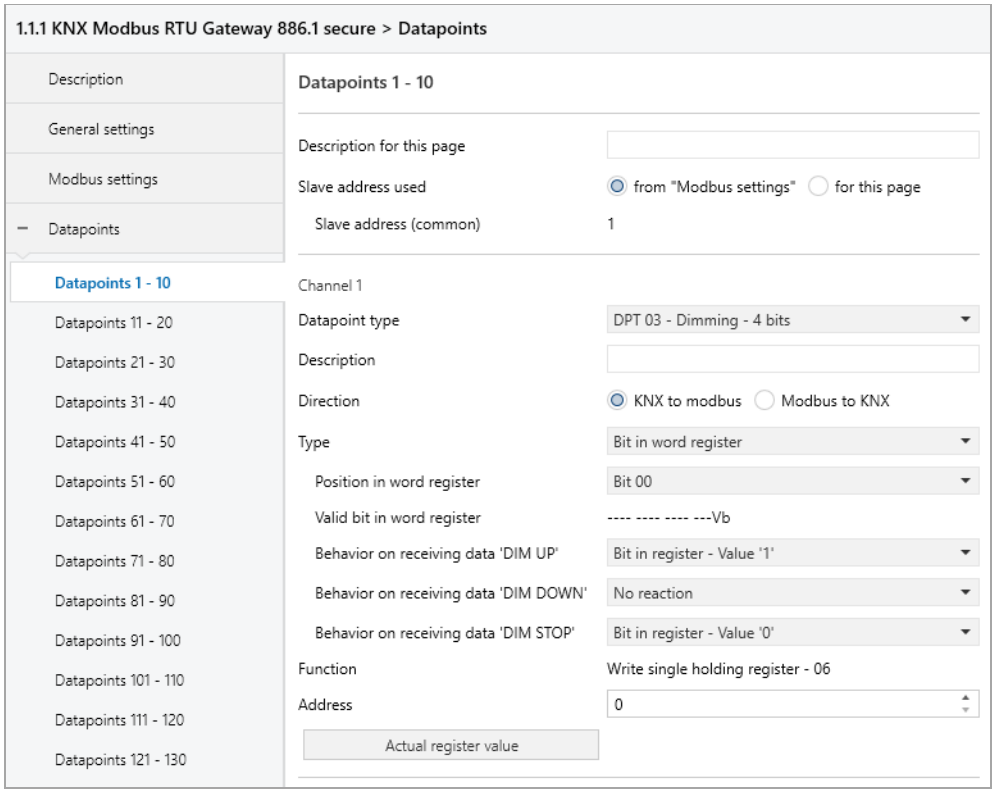
Position in word register

Defines the bit in the word register.

Valid bit in word register

Indicates which bit has been defined in the word register.

6.9.2.1 Direction – KNX to modbus



Behavior on receiving data ‘DIMM UP’

This parameter defines the behavior of the bit register in the event that a ‘DIMM UP’ telegram was received at the group object. The following options are available:

- No reaction
- Bit in register – Value ‘1’
- Bit in register – Value ‘0’

Behavior on receiving data ‘DIMM DOWN’

This parameter defines the behavior of the bit register in the event that a ‘DIMM DOWN’ telegram was received at the group object. The following options are available:

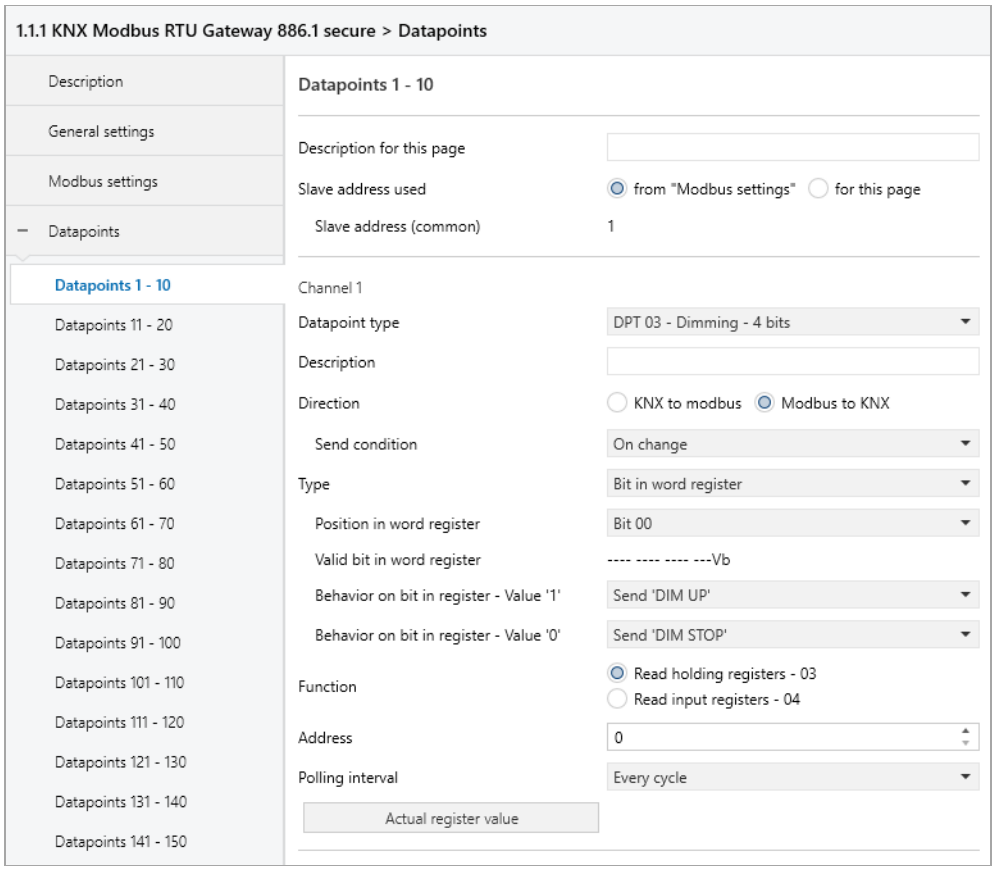
- No reaction
- Bit in register – Value ‘1’
- Bit in register – Value ‘0’

Behavior on receiving data ‘DIMM STOP’

This parameter defines the behavior of the bit register in the event that a ‘DIMM STOP’ telegram has been received at the group object. The following options are available:

- No reaction
- Bit in register – Value ‘1’
- Bit in register – Value ‘0’

6.9.2.2 Direction – Modbus to KNX



Behavior on bit in register – Value ‘1’

This parameter defines the behavior of the group object in case the register value corresponds to the parameterized value. The following options are available:

- No reaction
- Send ‘DIMM UP’
- Send ‘DIMM DOWN’
- Send ‘DIMM STOP’

Behavior on bit in register – Value ‘0’

This parameter defines the behavior of the group object in case the register value corresponds to the parameterized value. The following options are available:

- No reaction
- Send ‘DIMM UP’
- Send ‘DIMM DOWN’
- Send ‘DIMM STOP’

6.9.3 Type – Value in word register

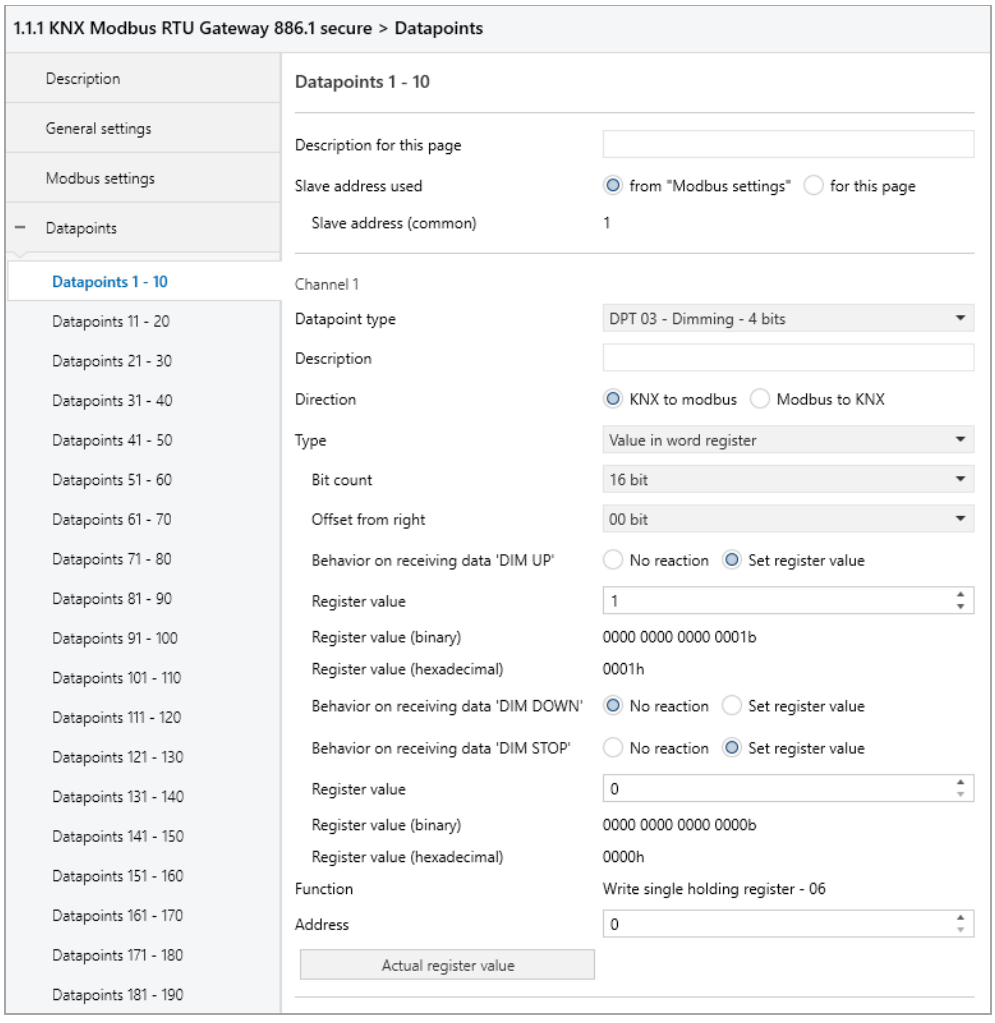
Bit count

This parameter defines the size of the value in the word register (in bits).

Offset from right

This parameter defines the position of the value in the word register (offset from right in bits).

6.9.3.1 Direction – KNX to modbus



Behavior on receiving data ‘DIMM UP’

Here you can parameterize whether a value is to be set in the register when a ‘DIMM UP’ telegram is received.

Register value *(for ‘DIMM UP’ telegram)*

The value that is set in the register when a ‘DIMM UP’ telegram is received.

Register value (binary) *(for ‘DIMM UP’ telegram)*

Binary representation of the valid bits in the register as well as the parameterized value. Dependent on **Bit count**, **Offset from right** and **Register value**.

Register value (hexadecimal) *(for ‘DIMM UP’ telegram)*

Hexadecimal representation of the valid bits in the register as well as the parameterized value. Dependent on **Bit count**, **Offset from right** and **Register value**.

Behavior on receiving data ‘DIMM DOWN’

Here you can parameterize whether a value is to be set in the register when a ‘DIMM DOWN’ telegram is received.

Register value *(for ‘DIMM DOWN’ telegram)*

The value that is set in the register when a ‘DIMM DOWN’ telegram is received.

Register value (binary) *(for ‘DIMM DOWN’ telegram)*

Binary representation of the valid bits in the register as well as the parameterized value. Dependent on **Bit count**, **Offset from right** and **Register value**.

Register value (hexadecimal) *(for ‘DIMM DOWN’ telegram)*

Hexadecimal representation of the valid bits in the register as well as the parameterized value. Dependent on **Bit count**, **Offset from right** and **Register value**.

Behavior on receiving data ‘DIMM STOP’

Here you can parameterize whether a value is to be set in the register when a ‘DIMM STOP’ telegram is received.

Register value *(for ‘DIMM STOP’ telegram)*

The value that is set in the register when a ‘DIMM STOP’ telegram is received.

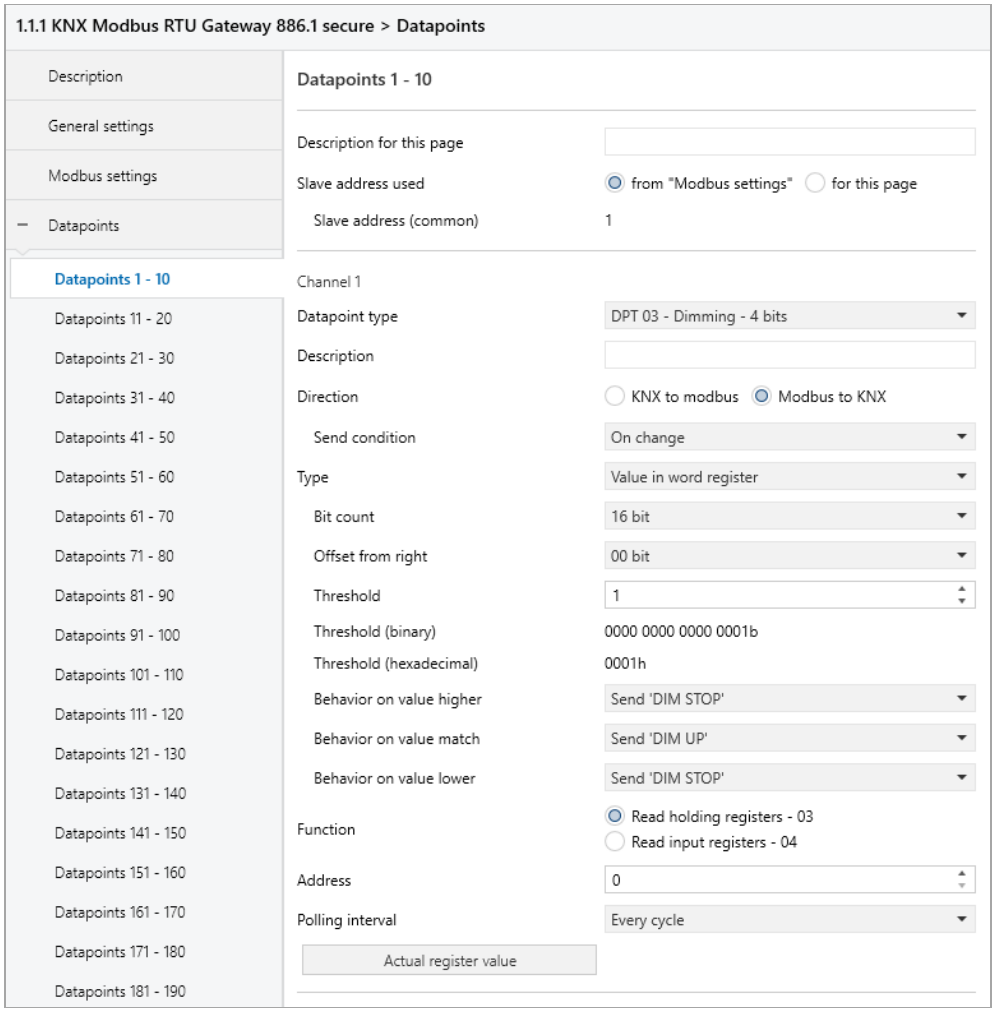
Register value (binary) *(for ‘DIMM STOP’ telegram)*

Binary representation of the valid bits in the register as well as the parameterized value. Dependent on **Bit count**, **Offset from right** and **Register value**.

Register value (hexadecimal) *(for ‘DIMM STOP’ telegram)*

Hexadecimal representation of the valid bits in the register as well as the parameterized value. Dependent on **Bit count**, **Offset from right** and **Register value**.

6.9.3.2 Direction – Modbus to KNX



Threshold

This parameter defines the value for which the word register is checked.

Threshold (binary)

Binary representation of the valid bits in the register as well as the parameterized value. Dependent on **Bit count**, **Offset from right** and **Threshold**.

Threshold (hexadecimal)

Hexadecimal representation of the valid bits in the register as well as the parameterized value. Dependent on **Bit count**, **Offset from right** and **Threshold**.

Behavior on value higher

This parameter defines the behavior of the group object in case the register value is greater than the parameterized value. The following options are available:

- No reaction
- Send ‘DIMM UP’
- Send ‘DIMM DOWN’
- Send ‘DIMM STOP’

Behavior on value match

This parameter defines the behavior of the group object in case the register value corresponds to the parameterized value. The following options are available:

- No reaction
- Send ‘DIMM UP’
- Send ‘DIMM DOWN’
- Send ‘DIMM STOP’

Behavior on value lower

This parameter defines the behavior of the group object in case the register value is smaller than the parameterized value. The following options are available:

- No reaction
- Send ‘DIMM UP’
- Send ‘DIMM DOWN’
- Send ‘DIMM STOP’

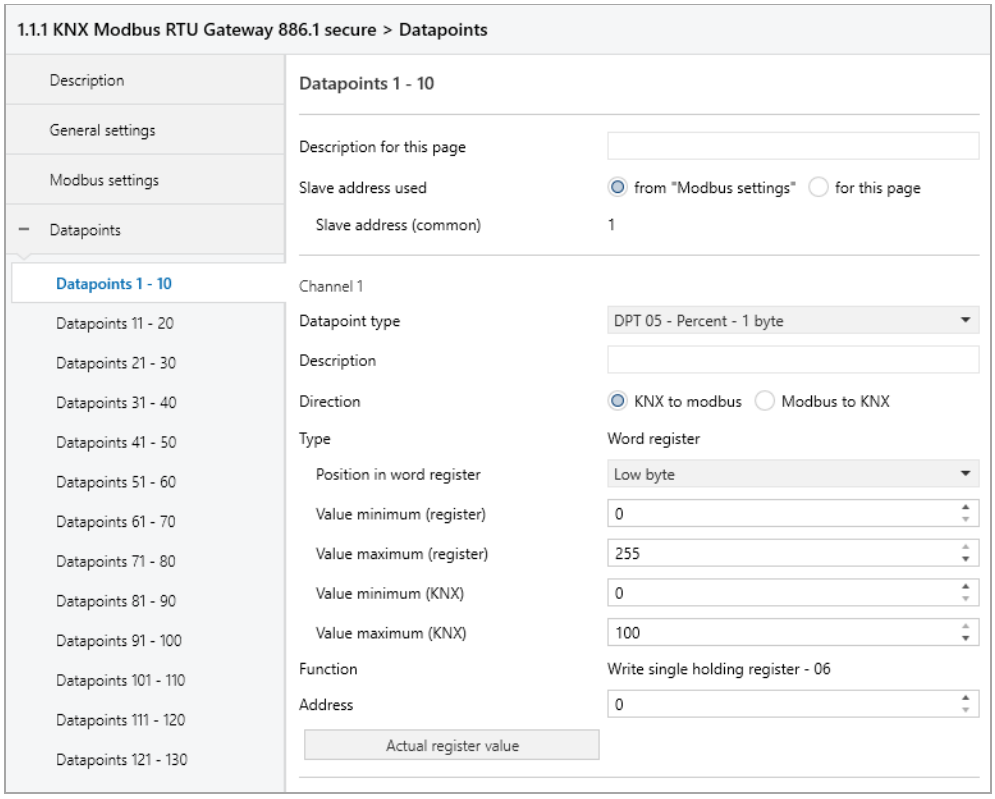
6.10 Channel function “DPT 05 – Percent – 1 byte”

Type

The following type is configured:

- Word register
  1 byte percent value (KNX) is mapped to value in word register (modbus)

6.10.1 Type – Word register



Position in word register

This parameter defines the range of the word register which is mapped. The following ranges are available:

- Low byte
- High byte
- High/Low byte

Value minimum (register)

Register value, which corresponds to **Value minimum (KNX)**.

Value maximum (register)

Register value, which corresponds to **Value maximum (KNX)**.

Value minimum (KNX)

KNX value, which corresponds to the **Value minimum (register)**.

Value maximum (KNX)

KNX value, which corresponds to the **Value maximum (register)**.

The conversion is always transferred to the entire register range.
***Value minimum/maximum (register)** does not define any limits.*

6.11 Channel function “DPT 05 – Configured – 1 byte”

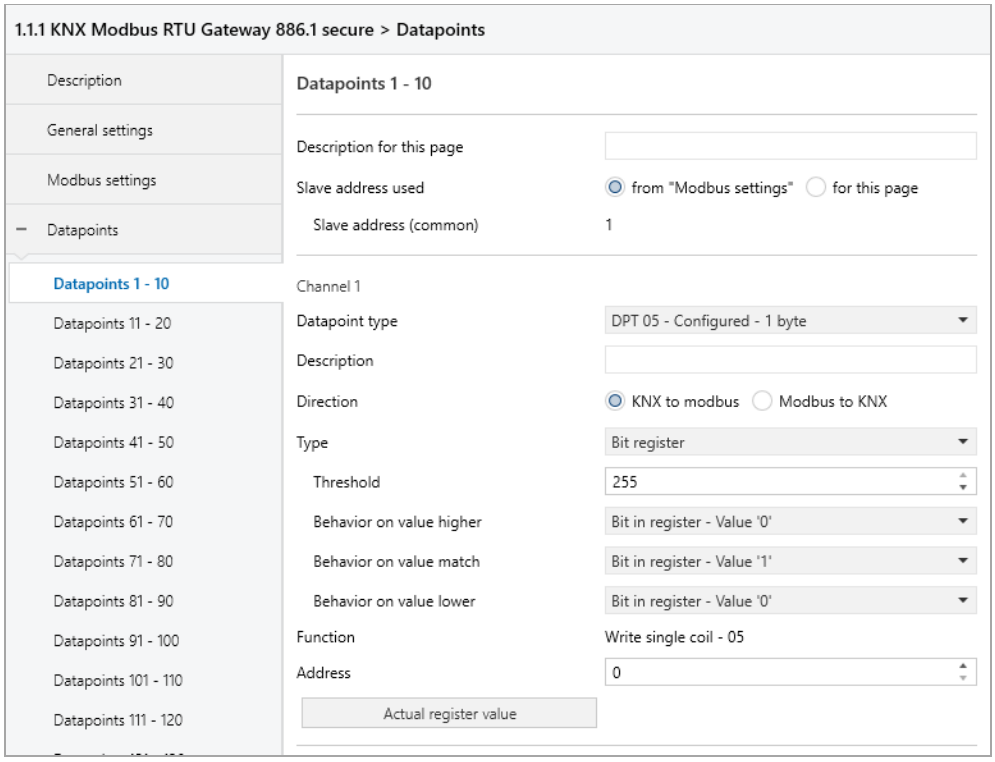
Type

The following types can be configured:

- Bit register
  1 byte unsigned value (KNX) sets bit register (modbus)
- Bit in word register
  1 byte unsigned value (KNX) sets 1 bit in word register (modbus)
- Value in word register
  1 byte unsigned value (KNX) is mapped to value in word register (modbus)

6.11.1 Type – Bit register

6.11.1.1 Direction – KNX to modbus



Threshold

This parameter defines the value for which the group object (KNX) is checked.

Behavior on value higher

This parameter defines the behavior of the bit register in the event that the value received (KNX) is greater than the parameterised value. The following options are available:

- No reaction
- Bit in register – Value ‘1’
- Bit in register – Value ‘0’

Behavior on value match

This parameter defines the behavior of the bit register in the event that the value received (KNX) corresponds to the parameterised value. The following options are available:

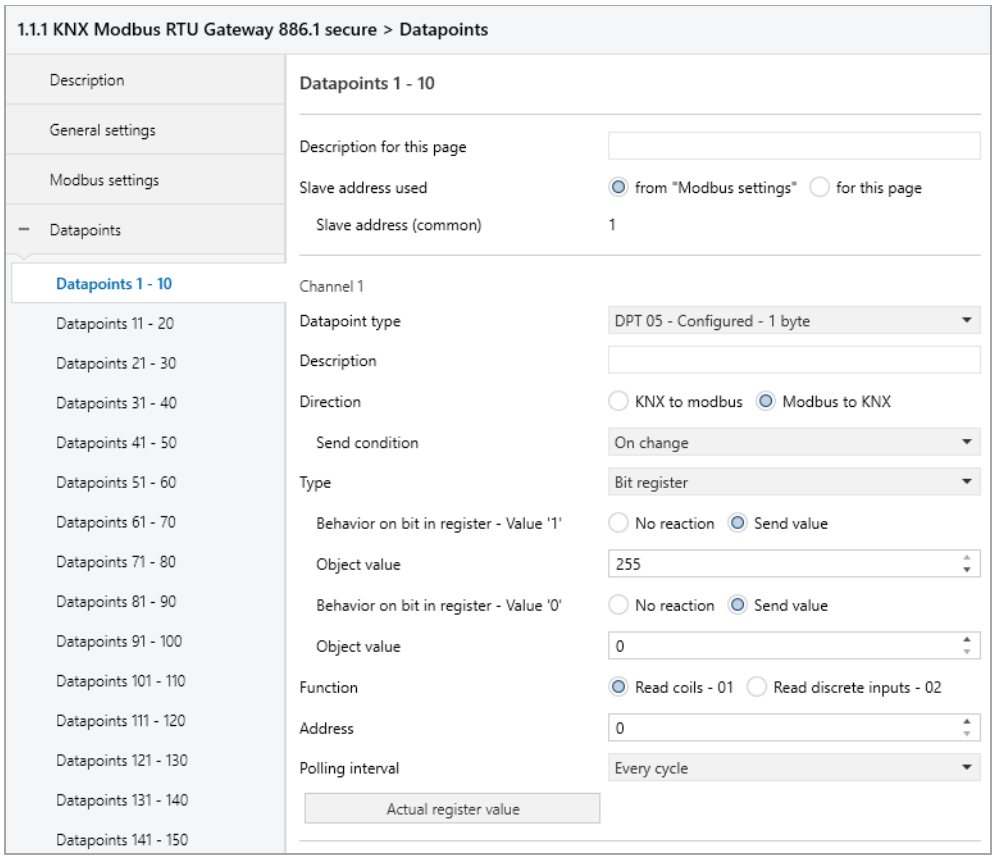
- No reaction
- Bit in register – Value ‘1’
- Bit in register – Value ‘0’

Behavior on value lower

This parameter defines the behavior of the bit register in the event that the value received (KNX) is less than the parameterised value. The following options are available:

- No reaction
- Bit in register – Value ‘1’
- Bit in register – Value ‘0’

6.11.1.2 Direction – Modbus to KNX



Behavior on bit in register – Value ‘1’

Here the behavior of the group object can be defined, in case the register is set. The following options are available:

- No reaction
- Send value

Object value

The value that is sent when the register is set on KNX.

Behavior on bit in register – Value ‘0’

Here the behavior of the group object can be defined in case the register is not set. The following options are available:

- No reaction
- Send value

Object value

The value that is sent on KNX when the register is not set.

6.11.2 Type – Bit in word register

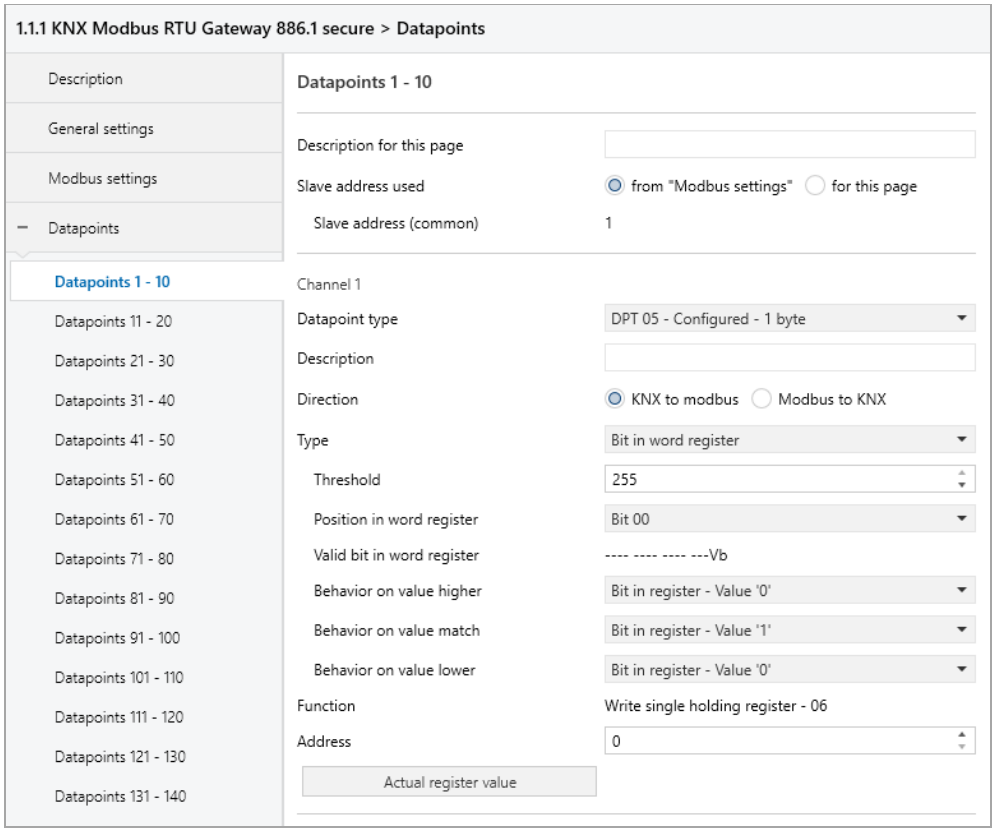
Position in word register

Defines the bit in the word register.

Valid bit in word register

Indicates which bit has been defined in the word register.

6.11.2.1 Direction – KNX to modbus



Threshold

This parameter defines the value for which the group object (KNX) is checked.

Behavior on value higher

This parameter defines the behavior of the bit in the word register in the event that the value received (KNX) is greater than the parameterised value. The following possibilities are available:

- No reaction
- Bit in register – Value ‘1’
- Bit in register – Value ‘0’

Behavior on value match

This parameter defines the behavior of the bit in the word register in the event that the value received (KNX) corresponds to the parameterised value. The following options are available:

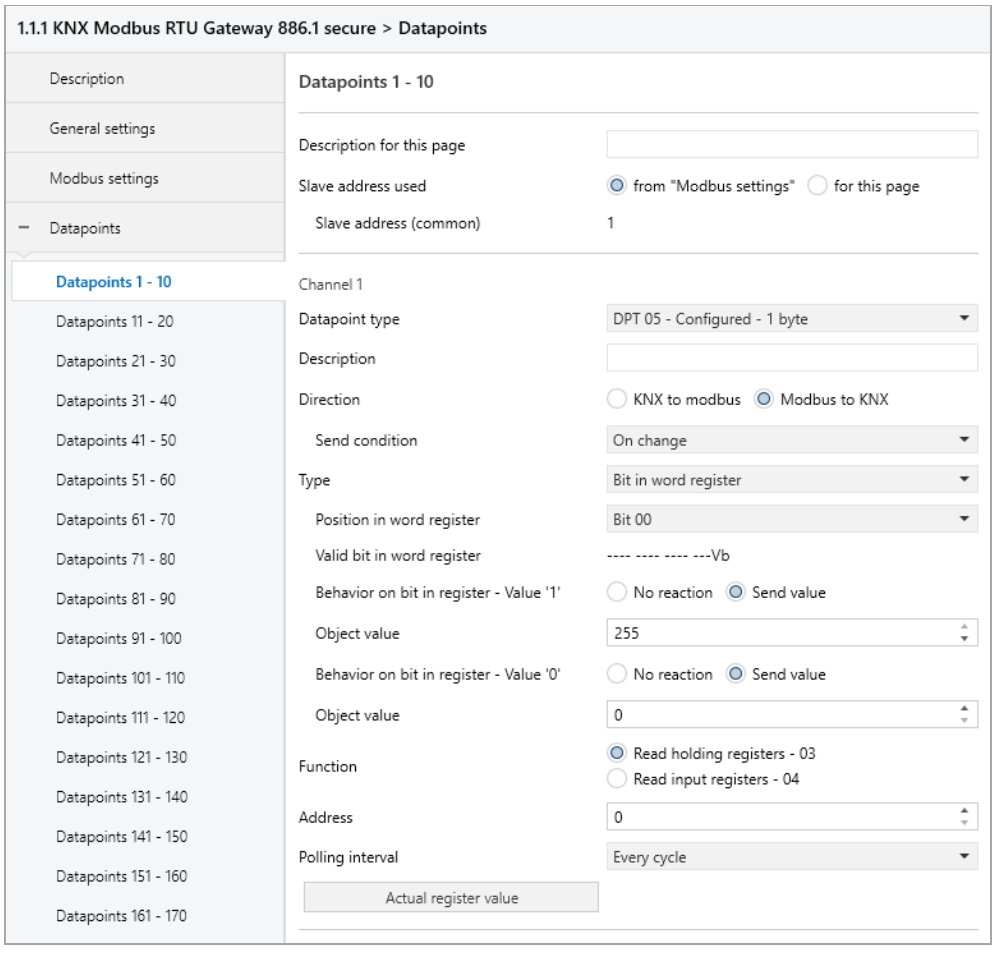
- No reaction
- Bit in register – Value ‘1’
- Bit in register – Value ‘0’

Behavior on value lower

This parameter defines the behavior of the bit in the word register in the event that the value received (KNX) is less than the parameterised value. The following possibilities are available:

- No reaction
- Bit in register – Value ‘1’
- Bit in register – Value ‘0’

6.11.2.2 Direction – Modbus to KNX



Behavior on bit in register – Value ‘1’

Here the behavior of the group object can be defined, in case the bit in the word register is set. The following options are available:

- No reaction
- Send value

Object value

The value that is sent on KNX when the bit in the word register is set.

Behavior on bit in register – Value ‘0’

Here the behavior of the group object can be defined in the event that the bit in the word register is not set. The following options are available:

- No reaction
- Send value

Object value

The value that is sent on KNX when the bit in the word register is not set.

6.11.3 Type – Value in word register

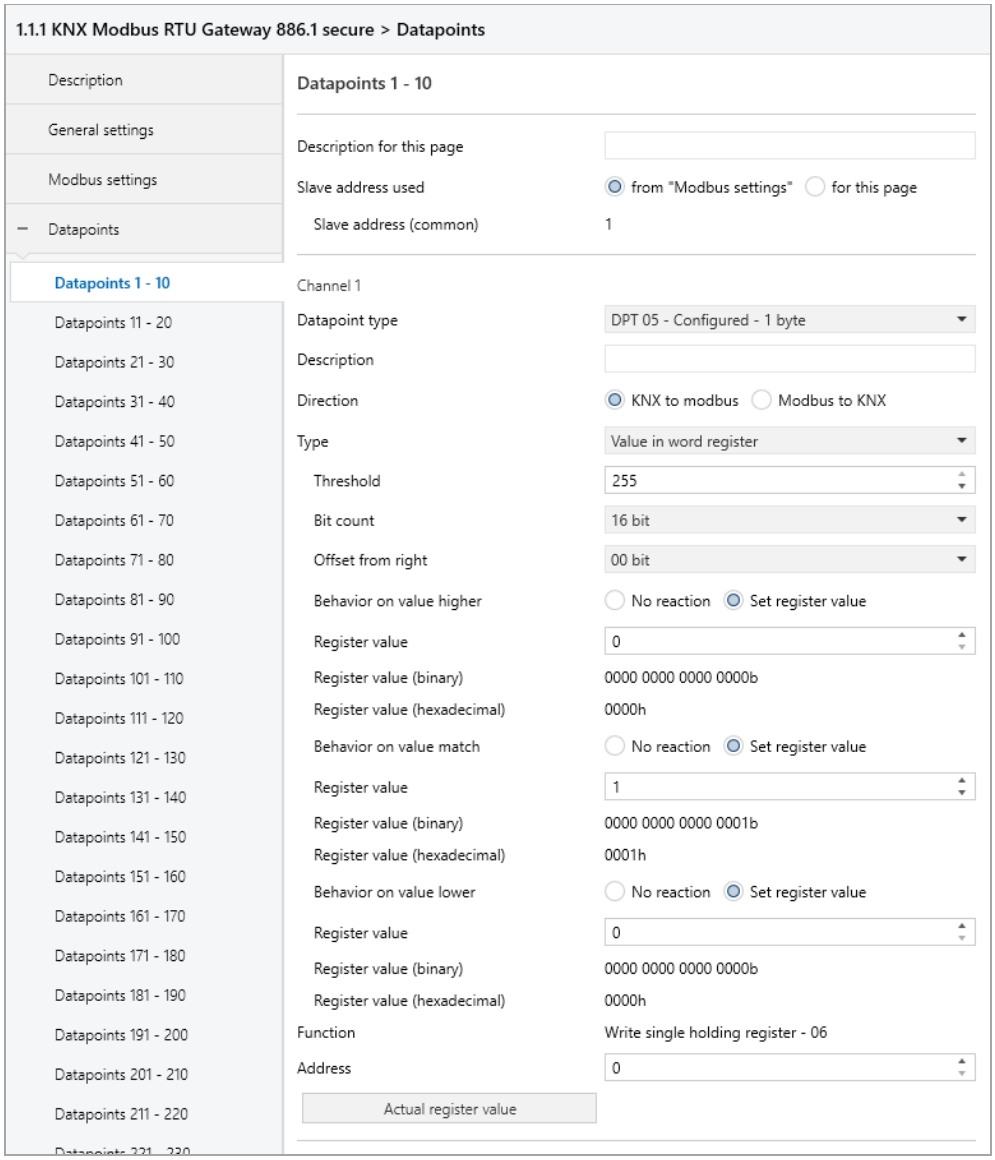
Bit count

This parameter defines the size of the value in the word register (in bits).

Offset from right

This parameter defines the position of the value in the word register (offset from right in bits).

6.11.3.1 Direction – KNX to modbus



Threshold

This parameter defines the value for which the group object (KNX) is checked.

Behavior on value higher

This parameter defines the behavior of the word register in the event that the value received (KNX) is greater than the parameterised value. The following options are available:

- No reaction
- Set register value

Register value *(for value higher)*

The value which is set in the word register.

Register value (binary) *(for value higher)*

Binary representation of the valid bits in the register as well as the parameterized value. Dependent on **Bit count**, **Offset from right** and **Register value**.

Register value (hexadecimal) *(for value higher)*

Hexadecimal representation of the valid bits in the register as well as the parameterized value. Dependent on **Bit count**, **Offset from right** and **Register value**.

Behavior on value match

This parameter defines the behavior of the word register in the event that the value received (KNX) corresponds to the parameterised value. The following options are available:

- No reaction
- Set register value

Register value *(for value match)*

The value which is set in the word register.

Register value (binary) *(for value match)*

Binary representation of the valid bits in the register as well as the parameterized value. Dependent on **Bit count**, **Offset from right** and **Register value**.

Register value (hexadecimal) *(for value match)*

Hexadecimal representation of the valid bits in the register as well as the parameterized value. Dependent on **Bit count**, **Offset from right** and **Register value**.

Behavior on value lower

This parameter defines the behavior of the word register in the event that the value received (KNX) is less than the parameterised value. The following options are available:

- No reaction
- Set register value

Register value *(for value lower)*

The value which is set in the word register.

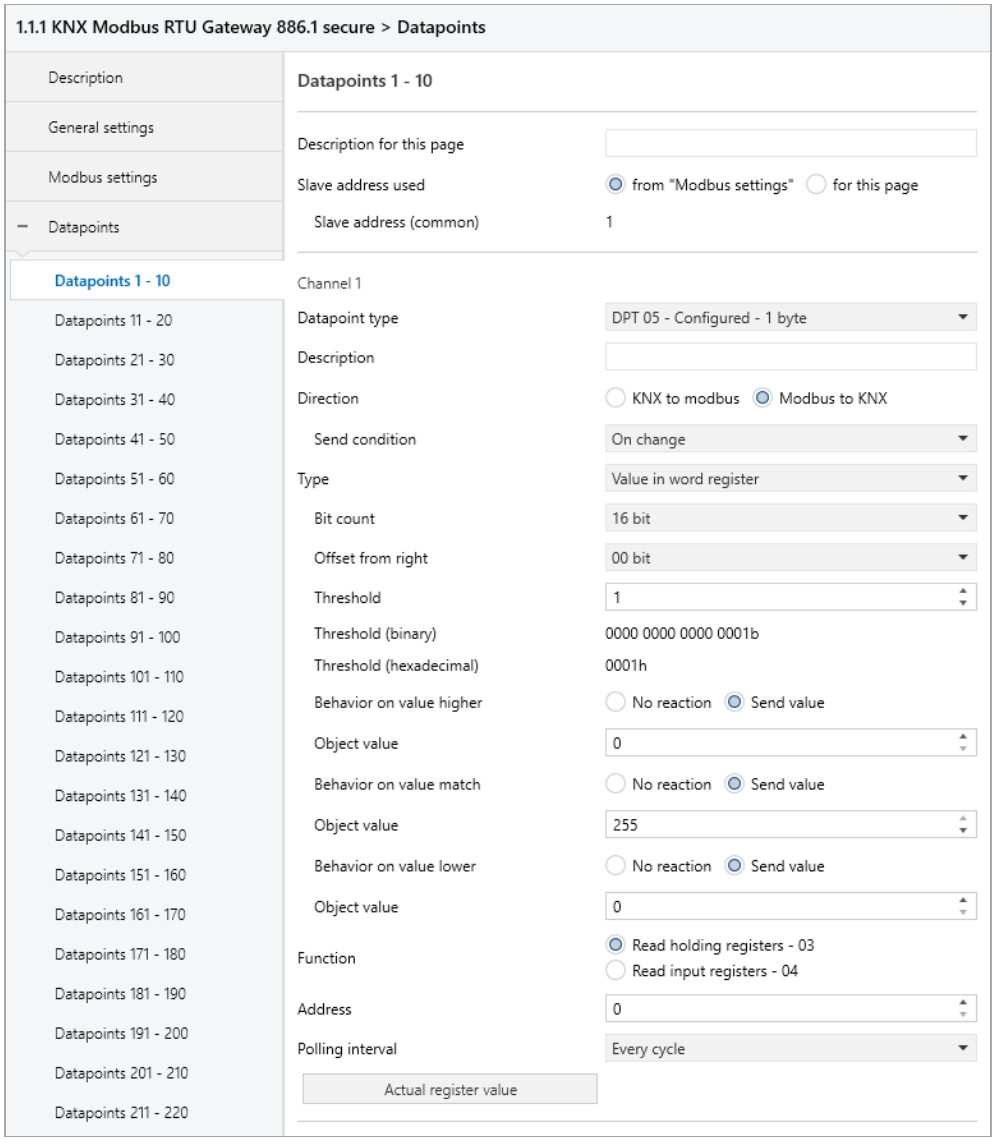
Register value (binary) *(for value lower)*

Binary representation of the valid bits in the register as well as the parameterized value. Dependent on **Bit count**, **Offset from right** and **Register value**.

Register value (hexadecimal) *(for value lower)*

Hexadecimal representation of the valid bits in the register as well as the parameterized value. Dependent on **Bit count**, **Offset from right** and **Register value**.

6.11.3.2 Direction – Modbus to KNX



Threshold

This parameter defines the value for which the word register is checked.

Threshold (binary)

Binary representation of the valid bits in the register as well as the parameterized value.
Dependent on **Bit count**, **Offset from right** and **Threshold**.

Threshold (hexadecimal)

Hexadecimal representation of the valid bits in the register as well as the parameterized value.
Dependent on **Bit count**, **Offset from right** and **Threshold**.

Behavior on value higher

This parameter defines the behavior of the group object (KNX) in the event that the register value is greater than the parameterised value. The following options are available:

- No reaction
- Send value

Object value *(for value higher)*

The value that is sent via the group object (KNX).

Behavior on value match

This parameter defines the behavior of the group object (KNX) in the event that the register value corresponds to the parameterised value. The following options are available:

- No reaction
- Send value

Object value *(for value match)*

The value that is sent via the group object (KNX).

Behavior on value lower

This parameter defines the behavior of the group object (KNX) in the event that the register value is less than the parameterised value. The following options are available:

- No reaction
- Send value

Object value *(for value lower)*

The value that is sent via the group object (KNX).

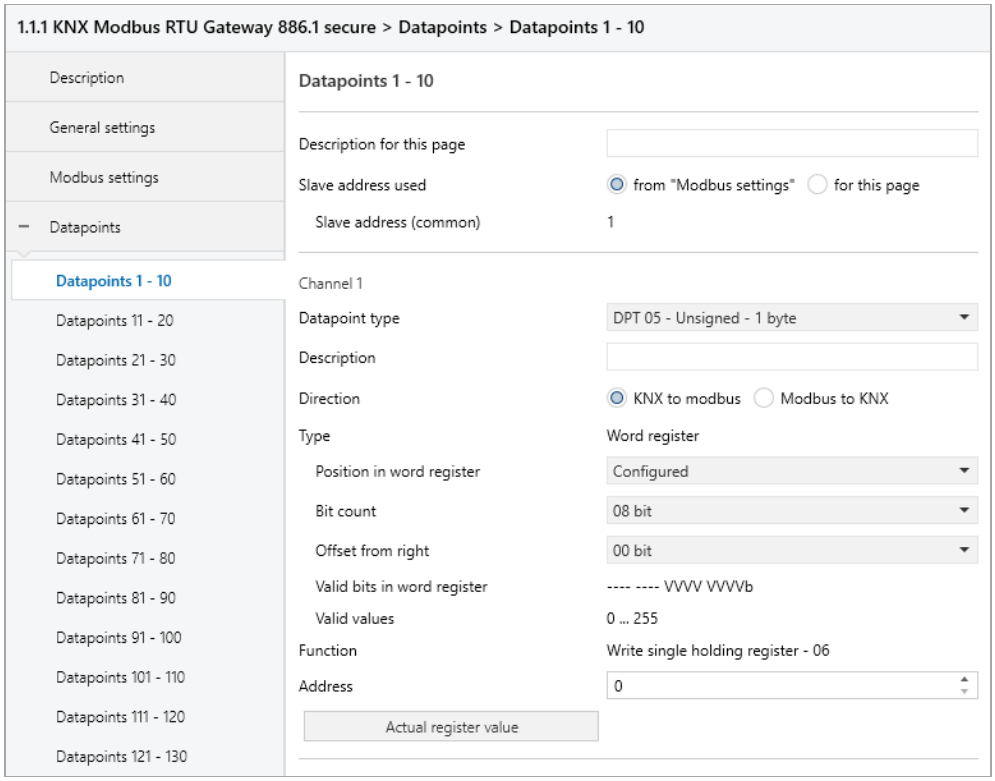
6.12 Channel function “DPT 05 – Unsigned – 1 byte”

Type

The following type is configured:

- Word register
  1 byte unsigned value (KNX) is written/read to/from area in word register (modbus)

6.12.1 Type – Word register



Position in word register

This parameter defines the range of the word register which is written/read. The following areas are available:

- Low byte
- High byte
- Configured

Bit count *(only for configured)*

This parameter defines the size of the area in the word register (in bits).

Offset from right *(only for configured)*

This parameter defines the position of the range in the word register (offset from right in bits).

Valid bits in word register *(only for configured)*

Indicates which bits have been defined in the word register.
Depending on **Bit count** and **Offset from right**.

Valid values *(only for configured)*

Indicates which values fit into the defined bits.
Depending on **Bit count** and **Offset from right**.

Bit count *and* ***Offset from right*** *must not be greater than 16 together.*
The value must fit into ***Bit count****, e.g.* ***Bit count*** *= 1 → "Value" = 0 or 1.*

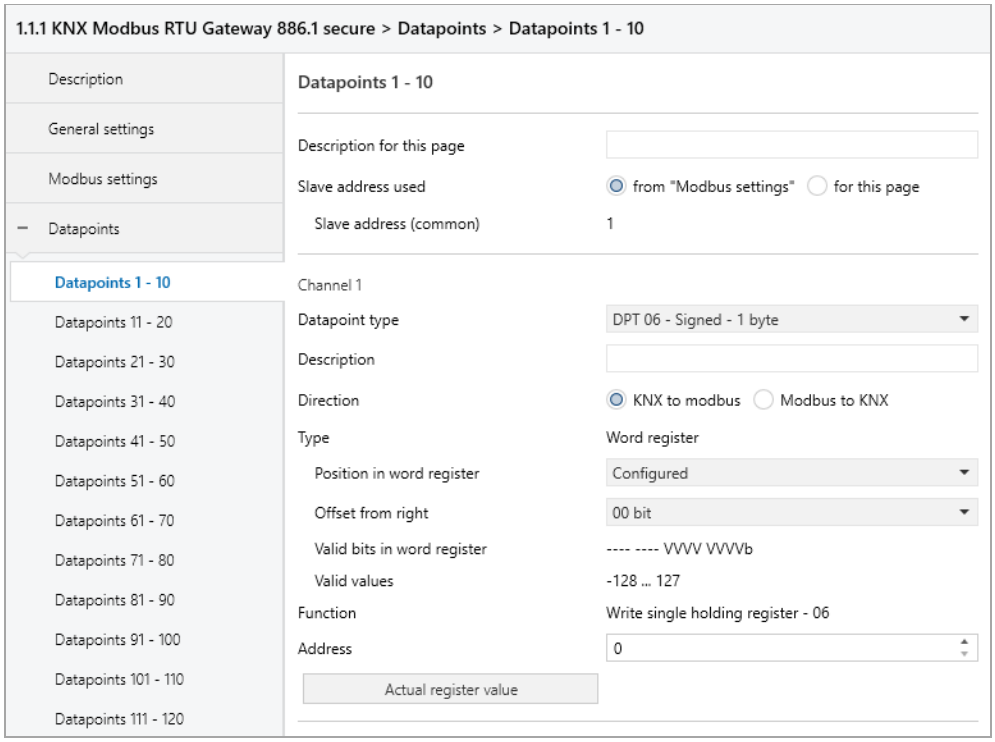
6.13 Channel function “DPT 06 – Signed – 1 byte”

Type

The following type is configured:

- Word register
  1 byte signed value (KNX) is written/read to/from area in word register (modbus)

6.13.1 Type – Word register



Position in word register

This parameter defines the range of the word register which is written/read. The following areas are available:

- Low byte
- High byte
- Configured

Offset from right *(only for configured)*

This parameter defines the position of the range in the word register (offset from right in bits).

Valid bits in word register *(only for configured)*

Indicates which bits have been defined in the word register.
Dependent on **Offset from right**.

Valid values *(only for configured)*

Indicates which values fit into the defined bits.

6.14 Channel function “DPT 07 – Configured – 2 bytes”

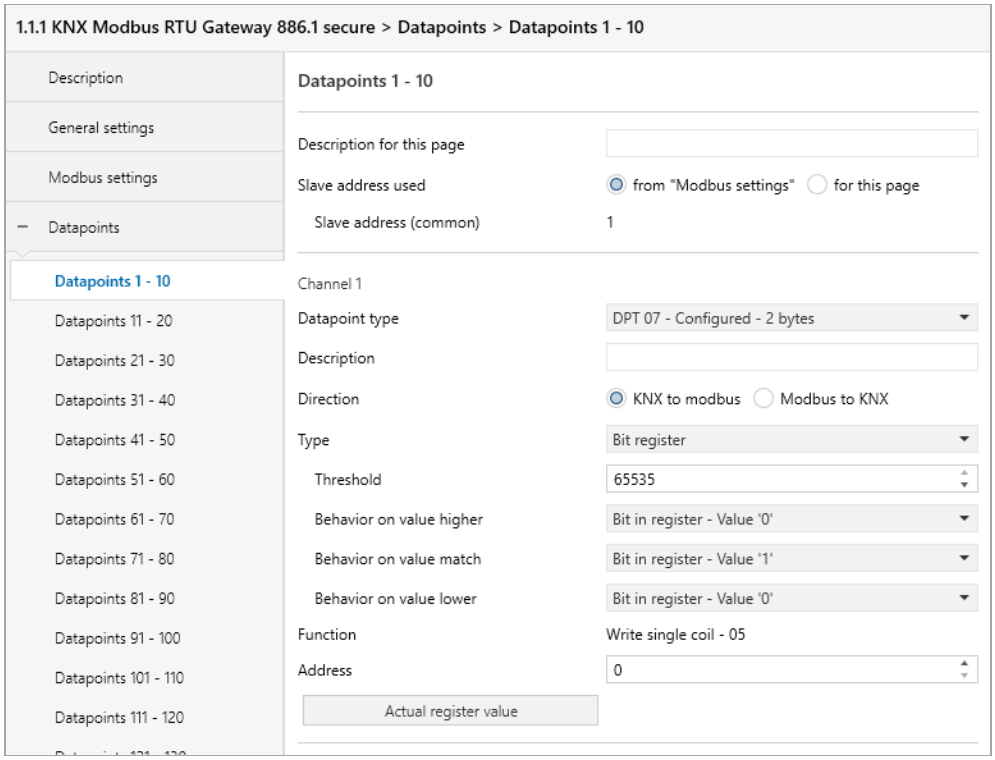
Type

The following types can be configured:

- Bit register
  2 byte unsigned value (KNX) sets bit register (modbus)
- Bit in word register
  2 byte unsigned value (KNX) sets 1 bit in word register (modbus)
- Value in word register
  2 byte unsigned value (KNX) is mapped to value in word register (modbus)

6.14.1 Type – Bit register

6.14.1.1 Direction – KNX to modbus



Threshold

This parameter defines the value for which the group object (KNX) is checked.

Behavior on value higher

This parameter defines the behavior of the bit register in the event that the value received (KNX) is greater than the parameterised value. The following options are available:

- No reaction
- Bit in register – Value ‘1’
- Bit in register – Value ‘0’

Behavior on value match

This parameter defines the behavior of the bit register in the event that the value received (KNX) corresponds to the parameterised value. The following options are available:

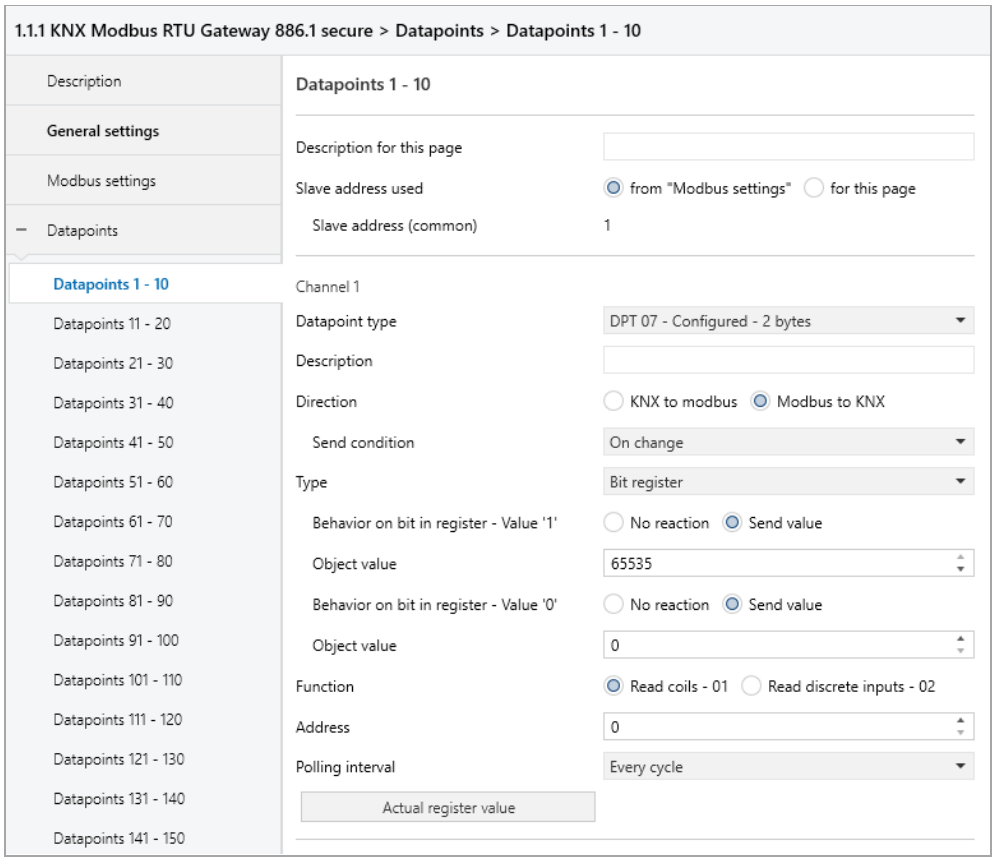
- No reaction
- Bit in register – Value ‘1’
- Bit in register – Value ‘0’

Behavior on value lower

This parameter defines the behavior of the bit register in the event that the value received (KNX) is less than the parameterised value. The following options are available:

- No reaction
- Bit in register – Value ‘1’
- Bit in register – Value ‘0’

6.14.1.2 Direction – Modbus to KNX



Behavior on bit in register – Value ‘1’

Here the behavior of the group object can be defined, in case the register is set. The following options are available:

- No reaction
- Send value

Object value

The value that is sent when the register is set on KNX.

Behavior on bit in register – Value ‘0’

Here the behavior of the group object can be defined in case the register is not set. The following options are available:

- No reaction
- Send value

Object value

The value that is sent on KNX when the register is not set.

6.14.2 Type – Bit in word register

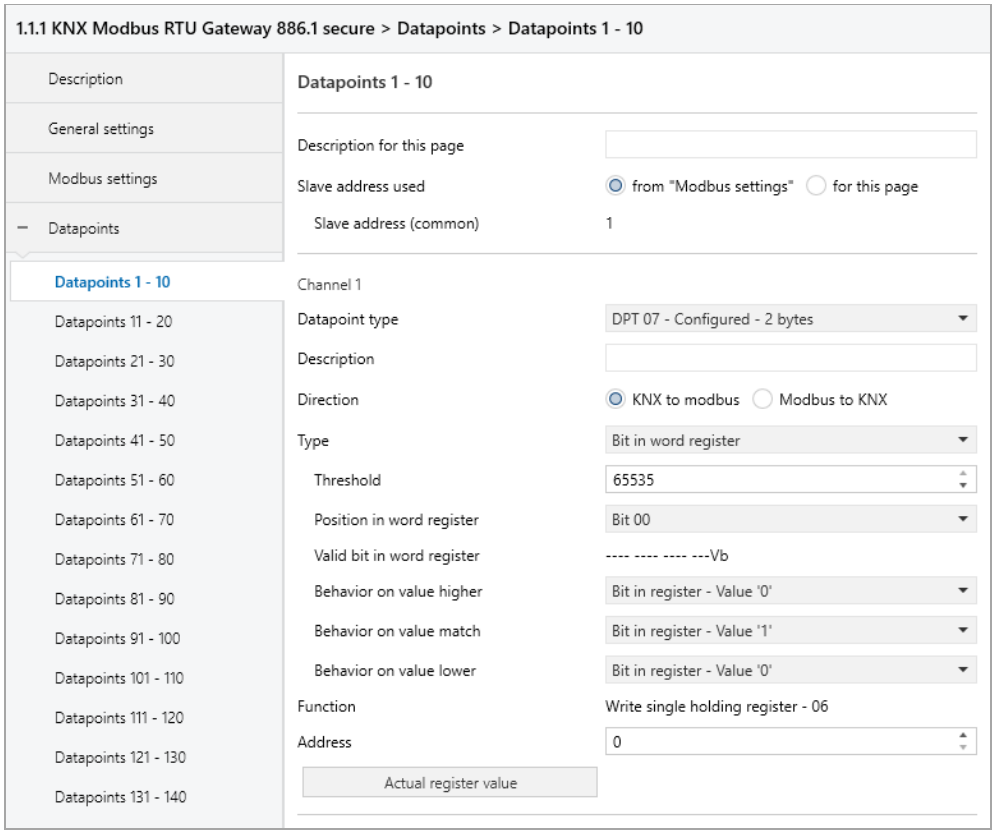
Position in word register

Defines the bit in the word register.

Valid bit in word register

Indicates which bit has been defined in the word register.

6.14.2.1 Direction – KNX to modbus



Threshold

This parameter defines the value for which the group object (KNX) is checked.

Behavior on value higher

This parameter defines the behavior of the bit in the word register in the event that the value received (KNX) is greater than the parameterised value. The following possibilities are available:

- No reaction
- Bit in register – Value ‘1’
- Bit in register – Value ‘0’

Behavior on value match

This parameter defines the behavior of the bit in the word register in the event that the value received (KNX) corresponds to the parameterised value. The following options are available:

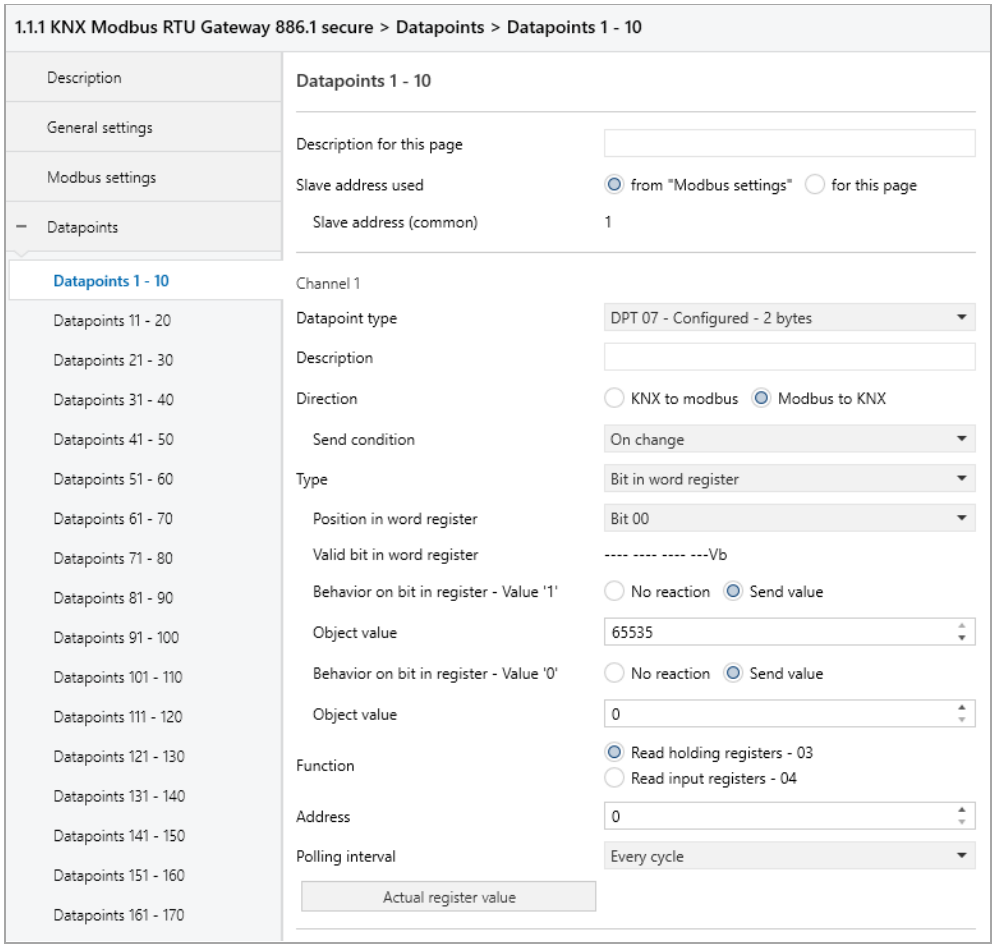
- No reaction
- Bit in register – Value ‘1’
- Bit in register – Value ‘0’

Behavior on value lower

This parameter defines the behavior of the bit in the word register in the event that the value received (KNX) is less than the parameterised value. The following possibilities are available:

- No reaction
- Bit in register – Value ‘1’
- Bit in register – Value ‘0’

6.14.2.2 Direction – Modbus to KNX



Behavior on bit in register – Value ‘1’

Here the behavior of the group object can be defined, in case the bit in the word register is set. The following options are available:

- No reaction
- Send value

Object value

The value that is sent on KNX when the bit in the word register is set.

Behavior on bit in register – Value ‘0’

Here the behavior of the group object can be defined in the event that the bit in the word register is not set. The following options are available:

- No reaction
- Send value

Object value

The value that is sent on KNX when the bit in the word register is not set.

6.14.3 Type – Value in word register

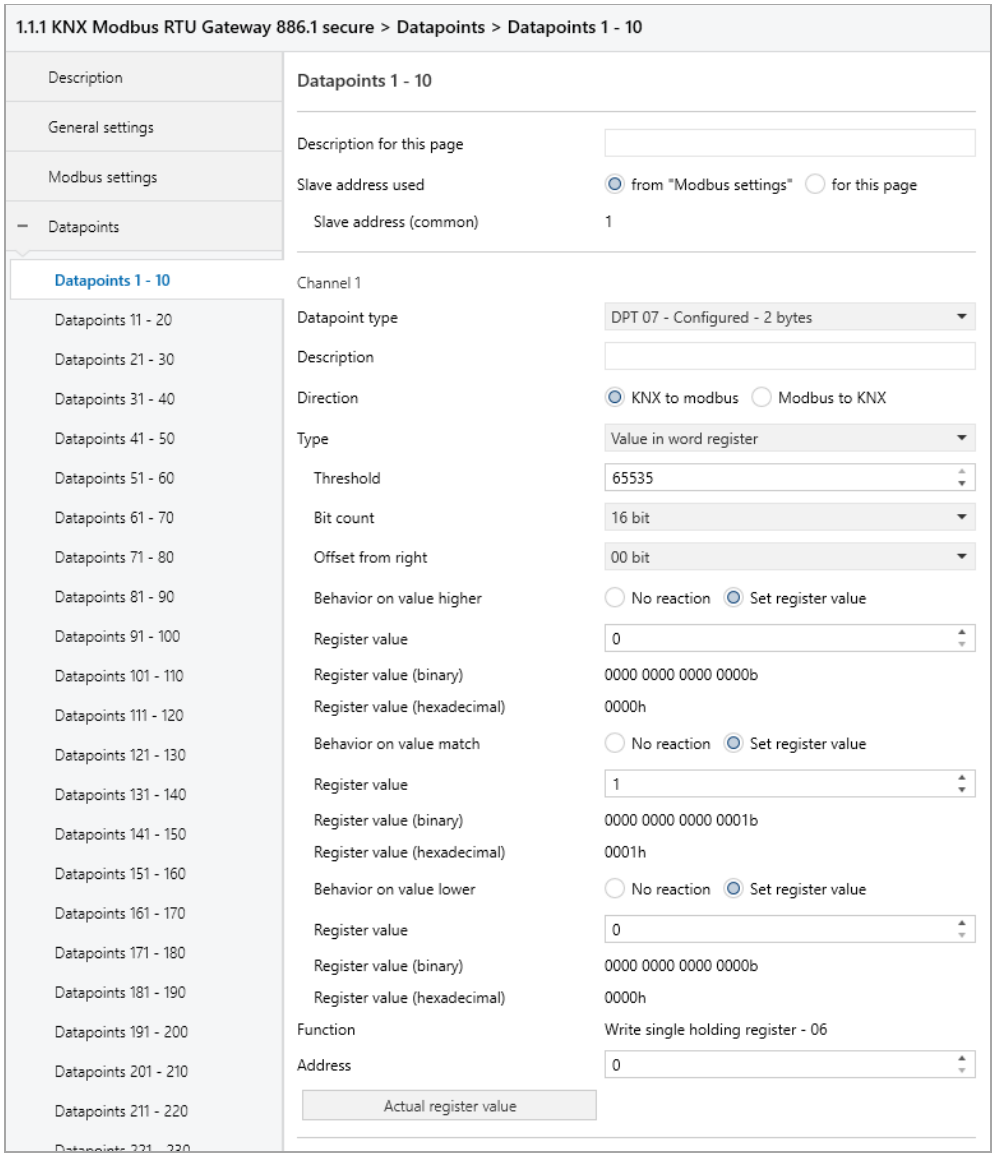
Bit count

This parameter defines the size of the value in the word register (in bits).

Offset from right

This parameter defines the position of the value in the word register (offset from right in bits).

6.14.3.1 Direction – KNX to modbus



Threshold

This parameter defines the value for which the group object (KNX) is checked.

Behavior on value higher

This parameter defines the behavior of the word register in the event that the value received (KNX) is greater than the parameterised value. The following options are available:

- No reaction
- Set register value

Register value *(for value higher)*

The value which is set in the word register.

Register value (binary) *(for value higher)*

Binary representation of the valid bits in the register as well as the parameterized value. Dependent on **Bit count**, **Offset from right** and **Register value**.

Register value (hexadecimal) *(for value higher)*

Hexadecimal representation of the valid bits in the register as well as the parameterized value. Dependent on **Bit count**, **Offset from right** and **Register value**.

Behavior on value match

This parameter defines the behavior of the word register in the event that the value received (KNX) corresponds to the parameterised value. The following options are available:

- No reaction
- Set register value

Register value *(for value match)*

The value which is set in the word register.

Register value (binary) *(for value match)*

Binary representation of the valid bits in the register as well as the parameterized value. Dependent on **Bit count**, **Offset from right** and **Register value**.

Register value (hexadecimal) *(for value match)*

Hexadecimal representation of the valid bits in the register as well as the parameterized value. Dependent on **Bit count**, **Offset from right** and **Register value**.

Behavior on value lower

This parameter defines the behavior of the word register in the event that the value received (KNX) is less than the parameterised value. The following options are available:

- No reaction
- Set register value

Register value *(for value lower)*

The value which is set in the word register.

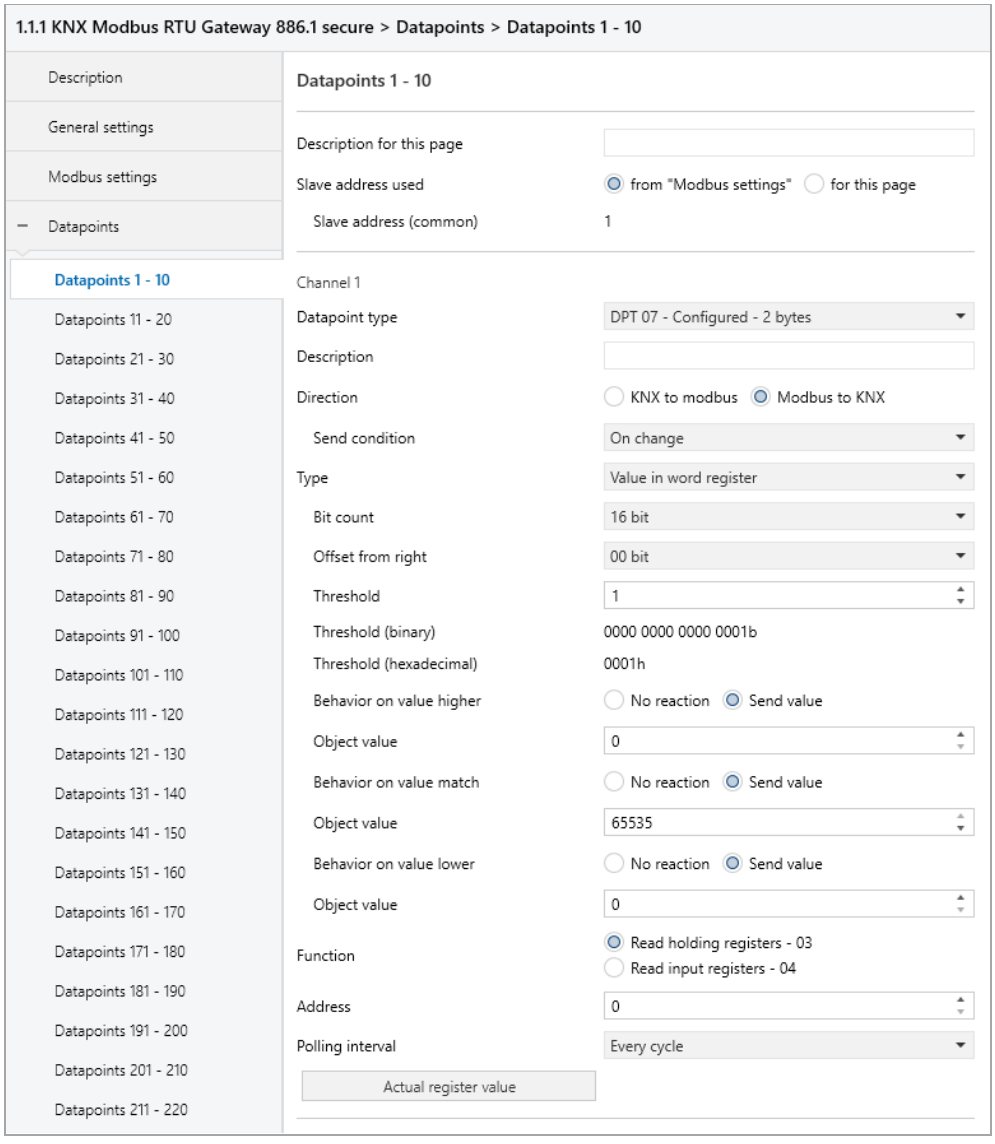
Register value (binary) *(for value lower)*

Binary representation of the valid bits in the register as well as the parameterized value. Dependent on **Bit count**, **Offset from right** and **Register value**.

Register value (hexadecimal) *(for value lower)*

Hexadecimal representation of the valid bits in the register as well as the parameterized value. Dependent on **Bit count**, **Offset from right** and **Register value**.

6.14.3.2 Direction – Modbus to KNX



Threshold

This parameter defines the value for which the word register is checked.

Threshold (binary)

Binary representation of the valid bits in the register as well as the parameterized value. Dependent on **Bit count**, **Offset from right** and **Threshold**.

Threshold (hexadecimal)

Hexadecimal representation of the valid bits in the register as well as the parameterized value. Dependent on **Bit count**, **Offset from right** and **Threshold**.

Behavior on value higher

This parameter defines the behavior of the group object (KNX) in the event that the register value is greater than the parameterised value. The following options are available:

- No reaction
- Send value

Object value *(for value higher)*

The value that is sent via the group object (KNX).

Behavior on value match

This parameter defines the behavior of the group object (KNX) in the event that the register value corresponds to the parameterised value. The following options are available:

- No reaction
- Send value

Object value *(for value match)*

The value that is sent via the group object (KNX).

Behavior on value lower

This parameter defines the behavior of the group object (KNX) in the event that the register value is less than the parameterised value. The following options are available:

- No reaction
- Send value

Object value *(for value lower)*

The value that is sent via the group object (KNX).

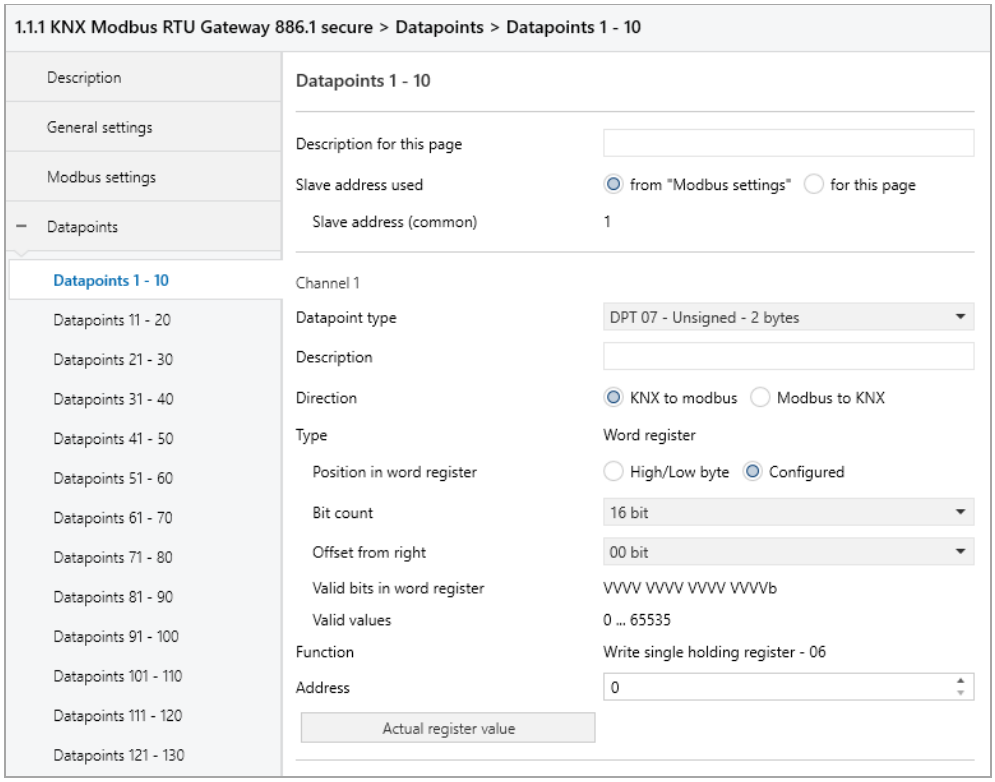
6.15 Channel function “DPT 07 – Unsigned – 2 bytes”

Type

The following type is configured:

- Word register
  2 byte unsigned value (KNX) is written/read to/from area in word register (modbus)

6.15.1 Type – Word register



Position in word register

This parameter defines the range of the word register which is written/read. The following areas are available:

- High/Low byte
- Configured

Bit count *(only for configured)*

This parameter defines the size of the area in the word register (in bits).

Offset from right *(only for configured)*

This parameter defines the position of the range in the word register (offset from right in bits).

Valid bits in word register *(only for configured)*

Indicates which bits have been defined in the word register.
Depending on **Bit count** and **Offset from right**.

Valid values *(only for configured)*

Indicates which values fit into the defined bits.
Depending on **Bit count** and **Offset from right**.

Bit count *and* ***Offset from right*** *must not be greater than 16 together.*
The value must fit into ***Bit count****, e.g.* ***Bit count*** *= 1 → "Value" = 0 or 1.*

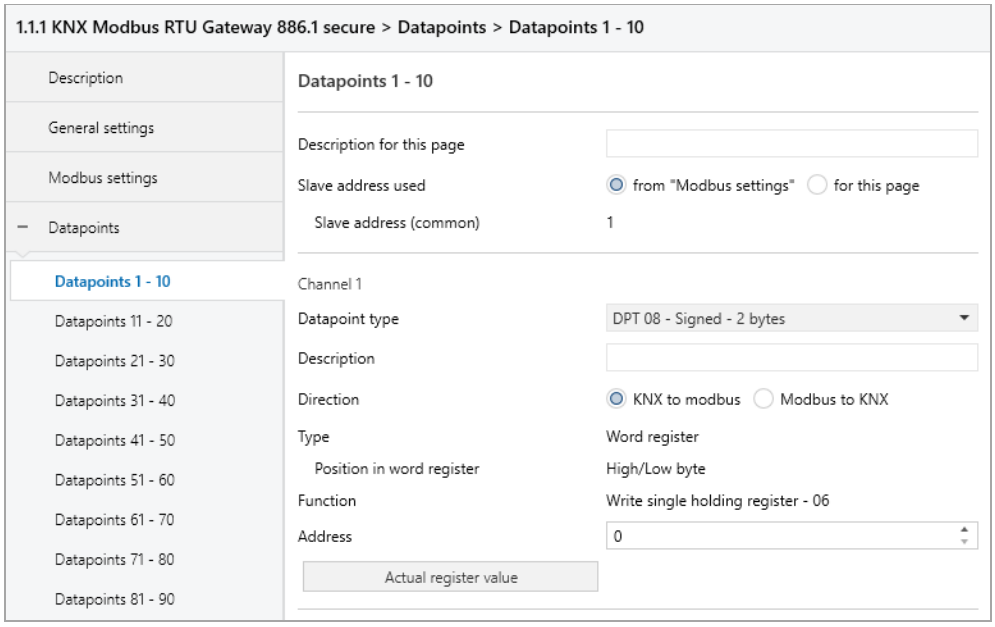
6.16 Channel function “DPT 08 – Signed – 2 bytes”

Type

The following type is configured:

- Word register
  2 byte signed value (KNX) is written/read to/from area in word register (modbus)

6.16.1 Type – Word register



Position in word register

This parameter defines the range of the word register which is written/read. The following range is configured:

- High/Low byte

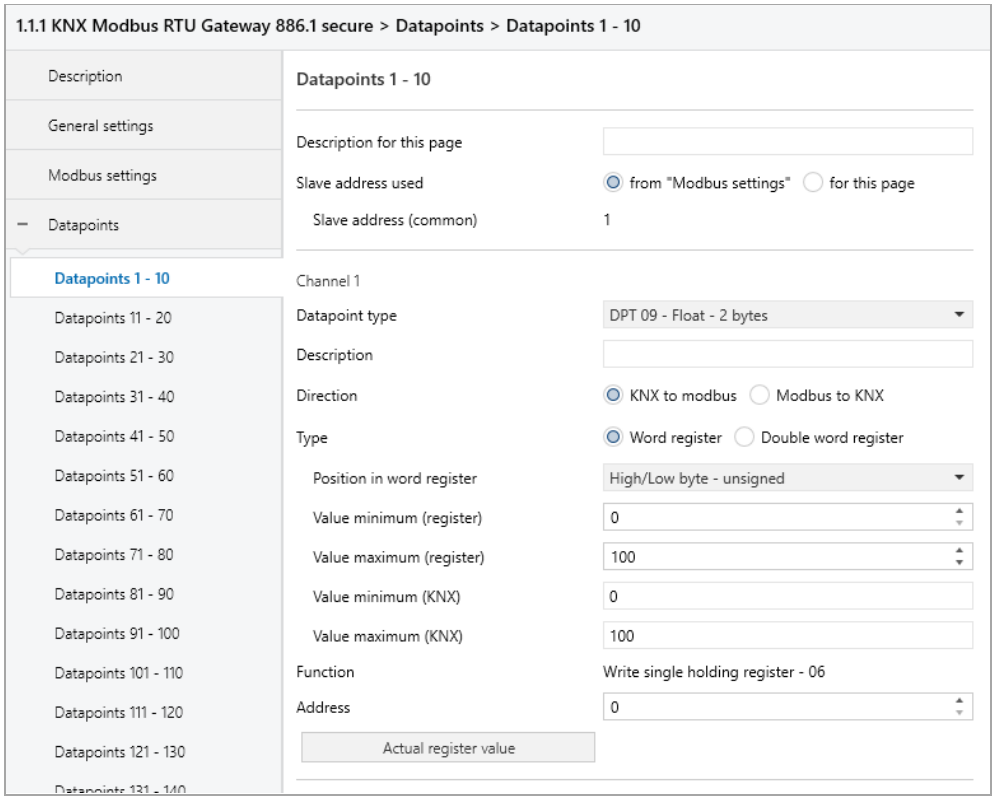
6.17 Channel function “DPT 09 – Float – 2 bytes”

Type

The following type is configured:

- Word register
  2 byte float value (KNX) is mapped to area in word register (modbus)
- Double word register
  2 byte float value (KNX) is mapped to two word registers (modbus)

6.17.1 Type – Word register



Position in word register

This parameter defines the range of the word register which is mapped. The following ranges are available:

- Low byte – unsigned
- High byte – unsigned
- High/Low byte – unsigned
- Low byte – 2th complement
- High byte – 2th complement
- High/Low byte – 2th complement

Value minimum (register)

Register value, which corresponds to **Value minimum (KNX).**

Value maximum (register)

Register value, which corresponds to **Value maximum (KNX).**

Value minimum (KNX)

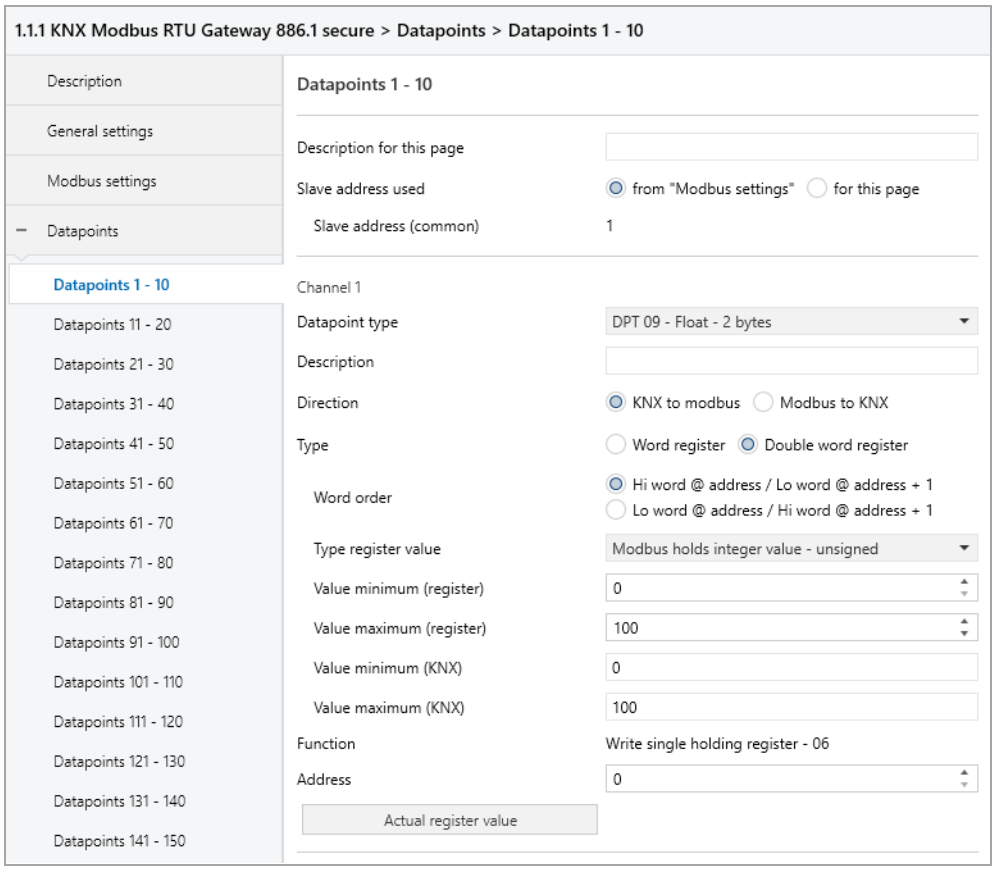
KNX value, which corresponds to **Value minimum (register).**

Value maximum (KNX)

KNX value, which corresponds to **Value maximum (register).**

The conversion is always transferred to the entire register range.
***Value minimum/maximum (register)** does not define any limits.*

6.17.2 Type – Double word register



Word order

This parameter defines the byte order in which the value of the group object (KNX) is distributed to the two word registers (modbus). The following options are available:

- Hi word @ address / Lo word @ address + 1
- Lo word @ address / Hi word @ address + 1

Type register value

Here you define how the float value is to be mapped to modbus. The following options are available:

- Modbus holds integer value – unsigned
- Modbus holds integer value – 2th complement
- Modbus holds float value – IEEE

Value minimum (register) *(only for integer value)*

Register value, which corresponds to **Value minimum (KNX).**

Value maximum (register) *(only for integer value)*

Register value, which corresponds to **Value maximum (KNX).**

Value minimum (KNX) *(only for integer value)*

KNX value, which corresponds to **Value minimum (register).**

Value maximum (KNX) *(only for integer value)*

KNX value, which corresponds to **Value maximum (register).**

The conversion is always transferred to the entire register range.
***Value minimum/maximum (register)** does not define any limits.*

Scaling factor *(only for float value)*

A scaling factor can be specified here, which is applied when converting from KNX to modbus and from modbus to KNX.

Function *(as "Modbus master", for "KNX to modbus" and "Double word register")*

By means of **Word register write requests** the transmission type of the double word register can be configured. The following options are available:

- Write single holding register – 06
  One word register in one request
- Write multi holding registers – 16
  Both word registers in one request

As "Modbus master", for "Modbus to KNX" and "Double word register", multi read requests should be enabled to read both word registers in one request.

Address *(for "Double word register")*

Double word registers use the register address specified here plus this register address + 1.

6.18 Channel function “DPT 12 – Configured – 4 bytes”

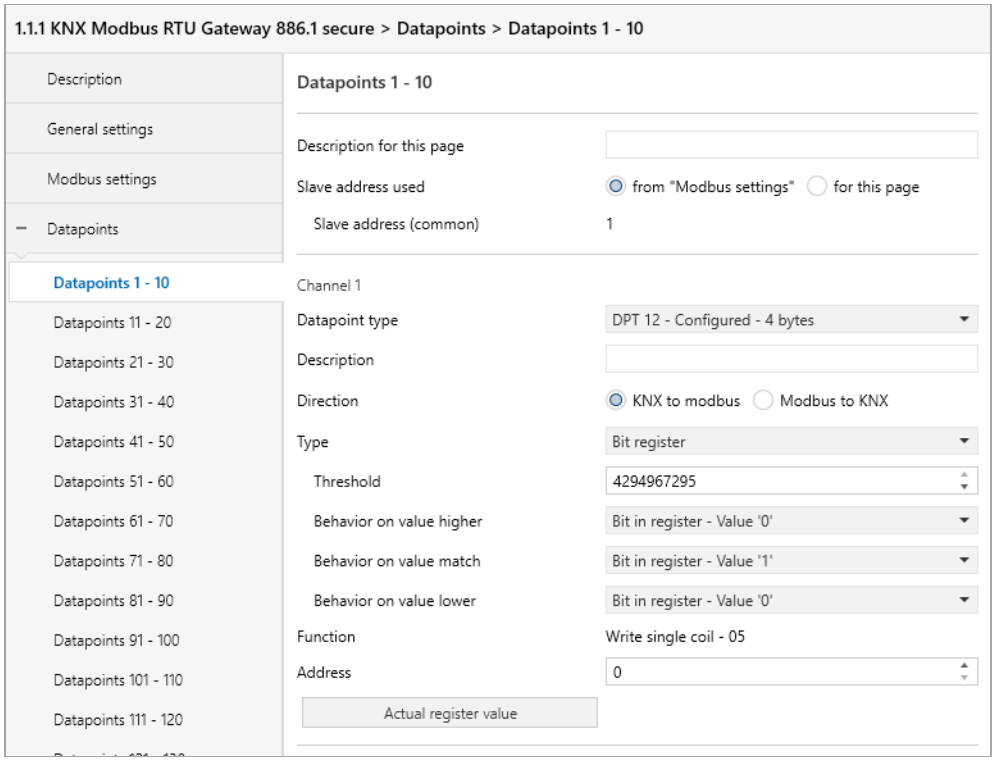
Type

The following types can be configured:

- Bit register
  4 byte unsigned value (KNX) sets bit register (modbus)
- Bit in word register
  4 byte unsigned value (KNX) sets 1 bit in word register (modbus)
- Value in word register
  4 byte unsigned value (KNX) is mapped to value in word register (modbus)

6.18.1 Type – Bit register

6.18.1.1 Direction – KNX to modbus



Threshold

This parameter defines the value for which the group object (KNX) is checked.

Behavior on value higher

This parameter defines the behavior of the bit register in the event that the value received (KNX) is greater than the parameterised value. The following options are available:

- No reaction
- Bit in register – Value ‘1’
- Bit in register – Value ‘0’

Behavior on value match

This parameter defines the behavior of the bit register in the event that the value received (KNX) corresponds to the parameterised value. The following options are available:

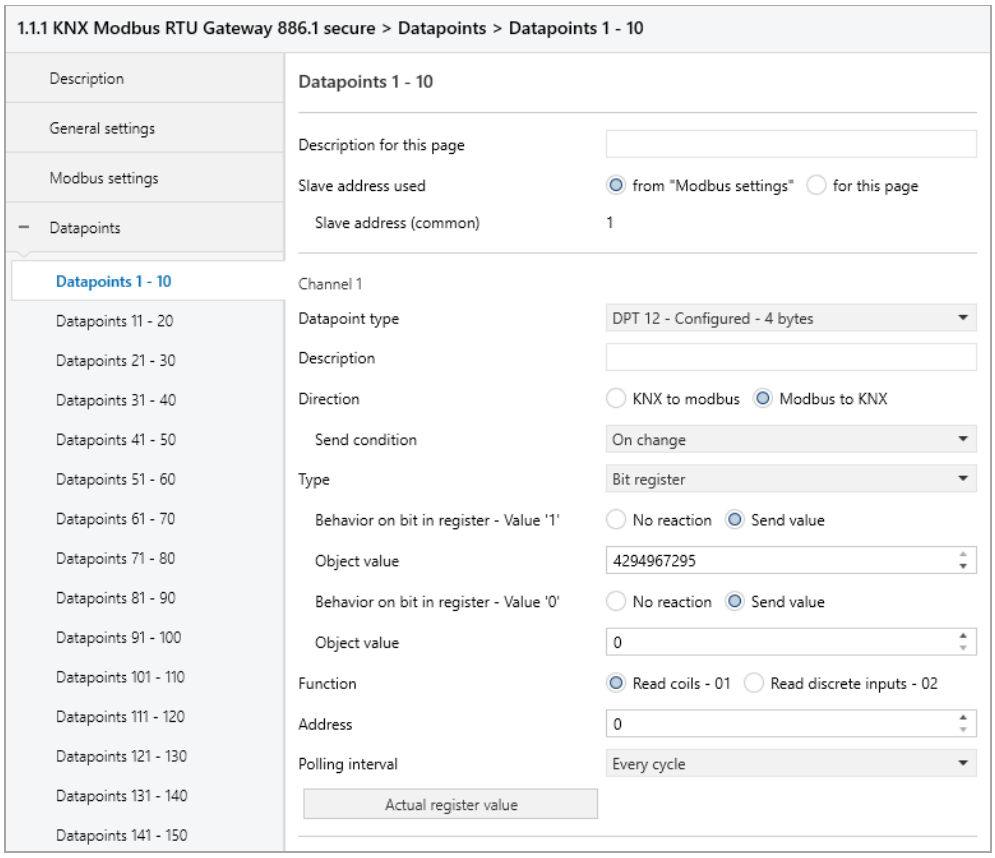
- No reaction
- Bit in register – Value ‘1’
- Bit in register – Value ‘0’

Behavior on value lower

This parameter defines the behavior of the bit register in the event that the value received (KNX) is less than the parameterised value. The following options are available:

- No reaction
- Bit in register – Value ‘1’
- Bit in register – Value ‘0’

6.18.1.2 Direction – Modbus to KNX



Behavior on bit in register – Value ‘1’

Here the behavior of the group object can be defined, in case the register is set. The following options are available:

- No reaction
- Send value

Object value

The value that is sent when the register is set on KNX.

Behavior on bit in register – Value ‘0’

Here the behavior of the group object can be defined in case the register is not set. The following options are available:

- No reaction
- Send value

Object value

The value that is sent on KNX when the register is not set.

6.18.2 Type – Bit in word register

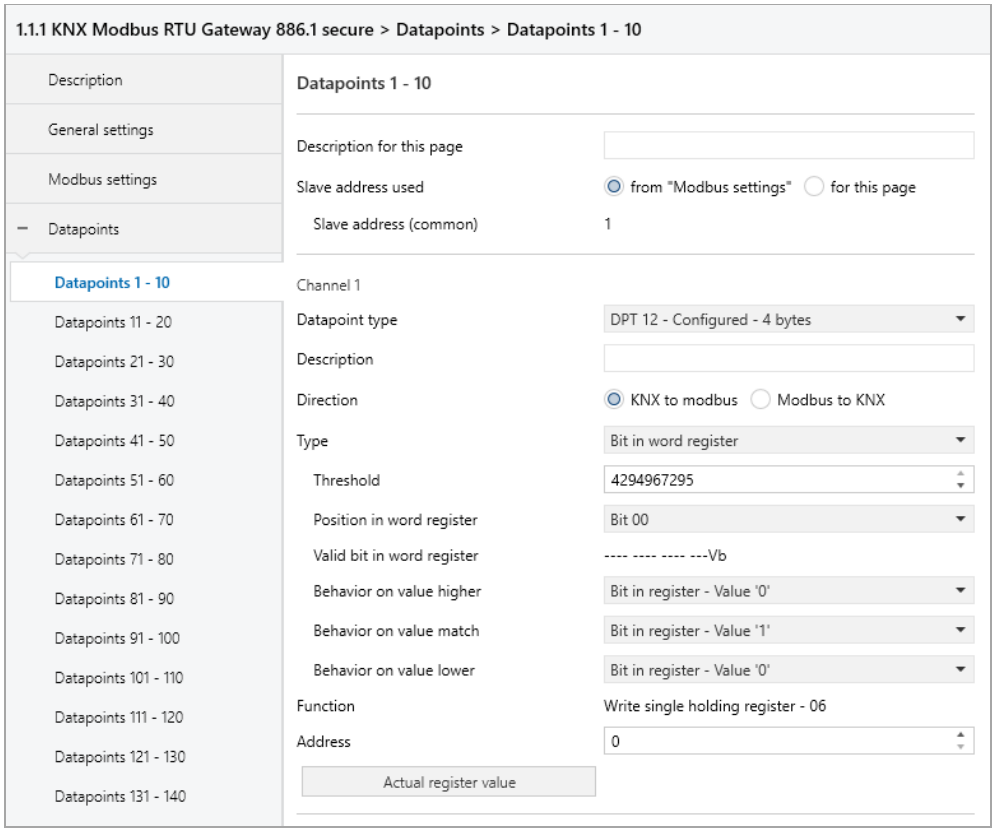
Position in word register

Defines the bit in the word register.

Valid bit in word register

Indicates which bit has been defined in the word register.

6.18.2.1 Direction – KNX to modbus



Threshold

This parameter defines the value for which the group object (KNX) is checked.

Behavior on value higher

This parameter defines the behavior of the bit in the word register in the event that the value received (KNX) is greater than the parameterised value. The following possibilities are available:

- No reaction
- Bit in register – Value ‘1’
- Bit in register – Value ‘0’

Behavior on value match

This parameter defines the behavior of the bit in the word register in the event that the value received (KNX) corresponds to the parameterised value. The following options are available:

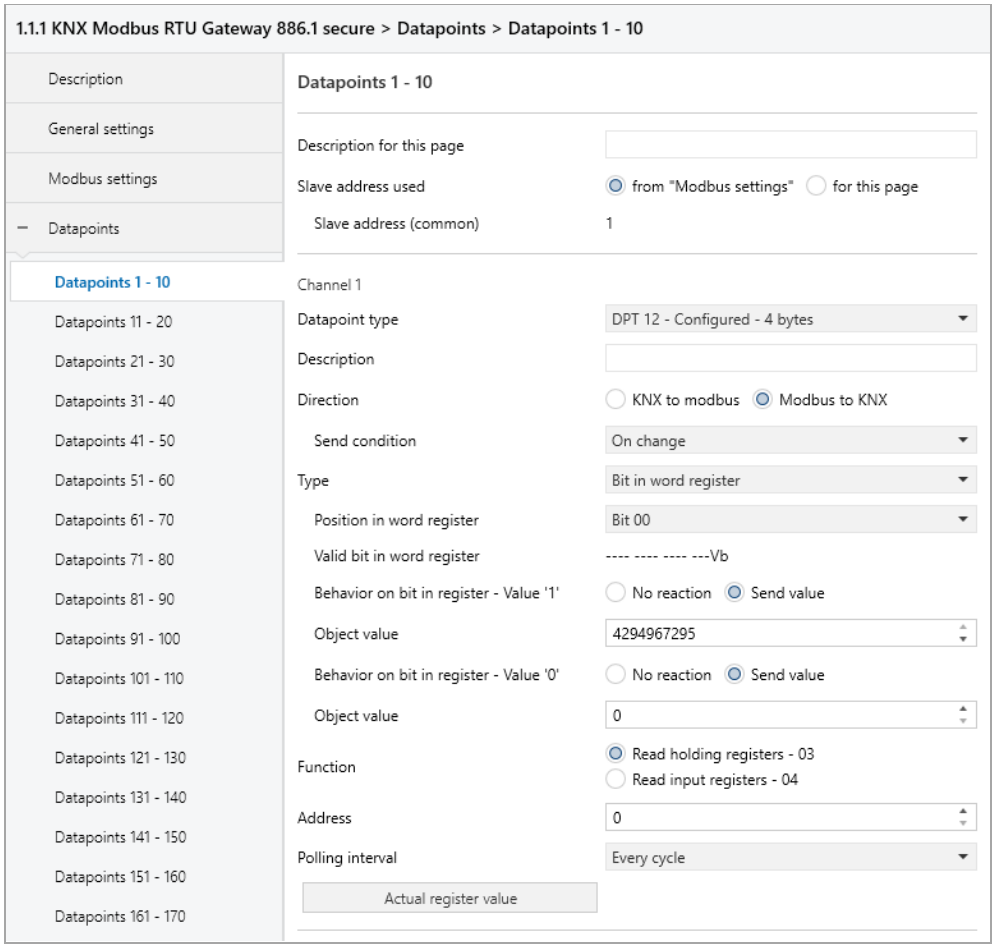
- No reaction
- Bit in register – Value ‘1’
- Bit in register – Value ‘0’

Behavior on value lower

This parameter defines the behavior of the bit in the word register in the event that the value received (KNX) is less than the parameterised value. The following possibilities are available:

- No reaction
- Bit in register – Value ‘1’
- Bit in register – Value ‘0’

6.18.2.2 Direction – Modbus to KNX



Behavior on bit in register – Value ‘1’

Here the behavior of the group object can be defined, in case the bit in the word register is set. The following options are available:

- No reaction
- Send value

Object value

The value that is sent on KNX when the bit in the word register is set.

Behavior on bit in register – Value ‘0’

Here the behavior of the group object can be defined in the event that the bit in the word register is not set. The following options are available:

- No reaction
- Send value

Object value

The value that is sent on KNX when the bit in the word register is not set.

6.18.3 Type – Value in word register

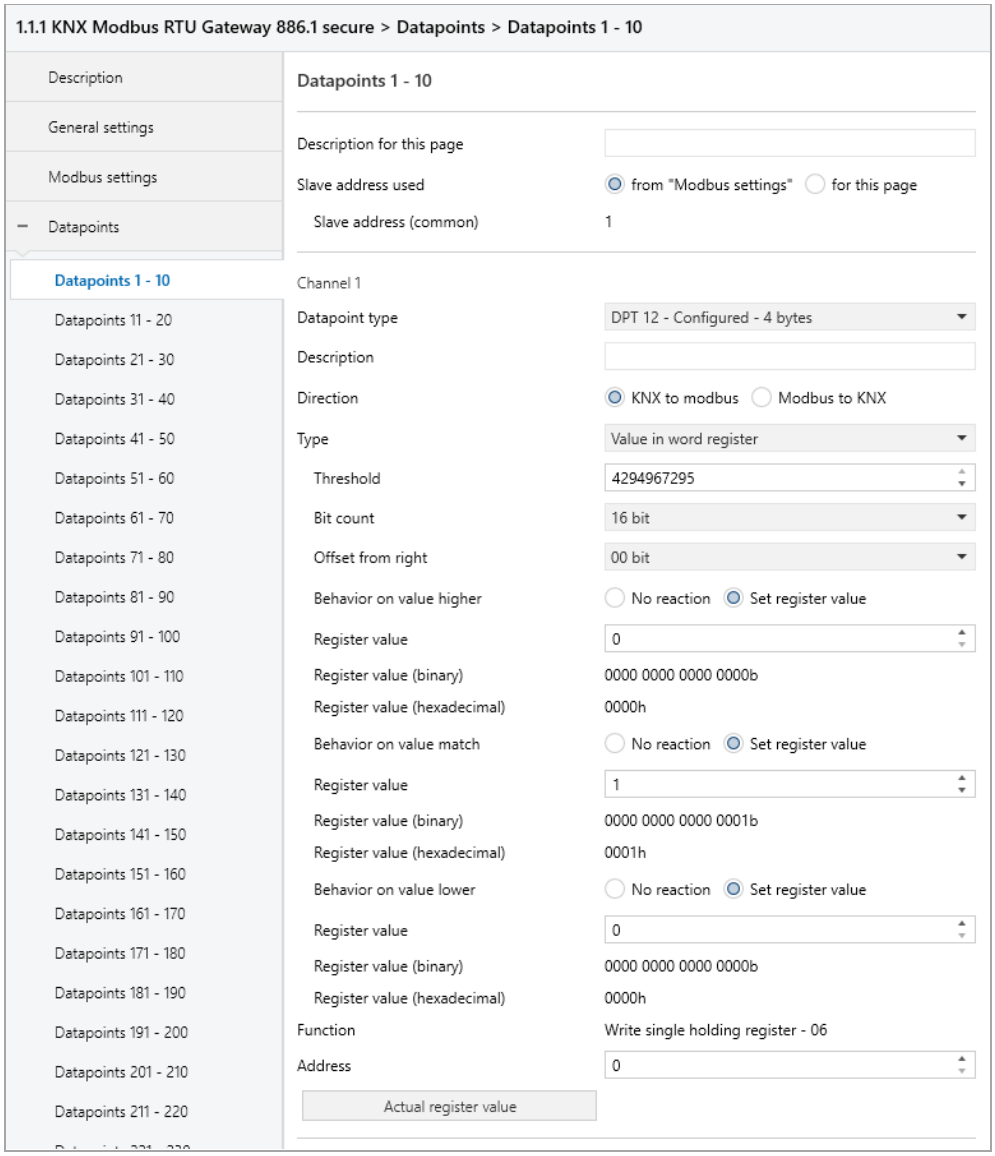
Bit count

This parameter defines the size of the value in the word register (in bits).

Offset from right

This parameter defines the position of the value in the word register (offset from right in bits).

6.18.3.1 Direction – KNX to modbus



Threshold

This parameter defines the value for which the group object (KNX) is checked.

Behavior on value higher

This parameter defines the behavior of the word register in the event that the value received (KNX) is greater than the parameterised value. The following options are available:

- No reaction
- Set register value

Register value *(for value higher)*

The value which is set in the word register.

Register value (binary) *(for value higher)*

Binary representation of the valid bits in the register as well as the parameterized value. Dependent on **Bit count**, **Offset from right** and **Register value**.

Register value (hexadecimal) *(for value higher)*

Hexadecimal representation of the valid bits in the register as well as the parameterized value. Dependent on **Bit count**, **Offset from right** and **Register value**.

Behavior on value match

This parameter defines the behavior of the word register in the event that the value received (KNX) corresponds to the parameterised value. The following options are available:

- No reaction
- Set register value

Register value *(for value match)*

The value which is set in the word register.

Register value (binary) *(for value match)*

Binary representation of the valid bits in the register as well as the parameterized value. Dependent on **Bit count**, **Offset from right** and **Register value**.

Register value (hexadecimal) *(for value match)*

Hexadecimal representation of the valid bits in the register as well as the parameterized value. Dependent on **Bit count**, **Offset from right** and **Register value**.

Behavior on value lower

This parameter defines the behavior of the word register in the event that the value received (KNX) is less than the parameterised value. The following options are available:

- No reaction
- Set register value

Register value *(for value lower)*

The value which is set in the word register.

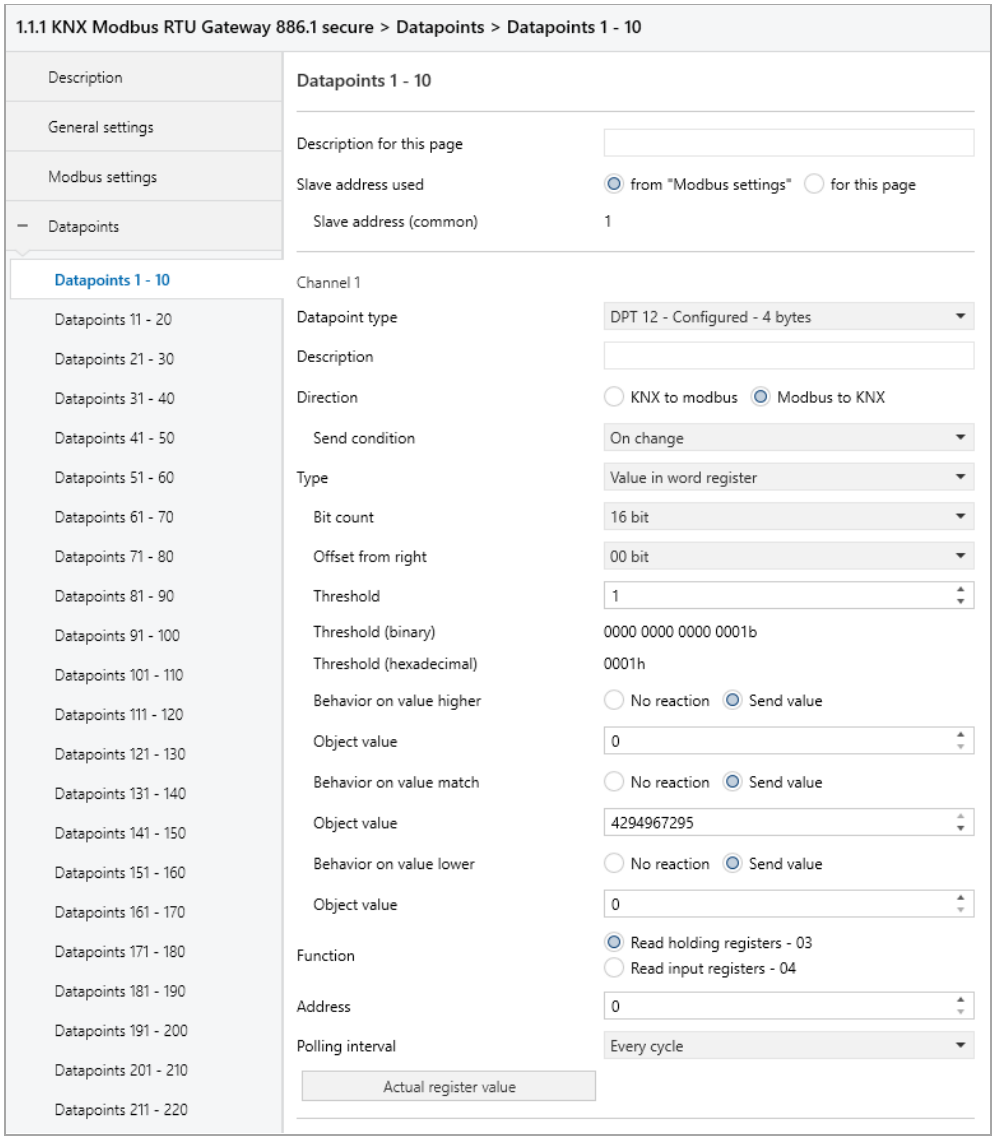
Register value (binary) *(for value lower)*

Binary representation of the valid bits in the register as well as the parameterized value. Dependent on **Bit count**, **Offset from right** and **Register value**.

Register value (hexadecimal) *(for value lower)*

Hexadecimal representation of the valid bits in the register as well as the parameterized value. Dependent on **Bit count**, **Offset from right** and **Register value**.

6.18.3.2 Direction – Modbus to KNX



Threshold

This parameter defines the value for which the word register is checked.

Threshold (binary)

Binary representation of the valid bits in the register as well as the parameterized value. Dependent on **Bit count**, **Offset from right** and **Threshold**.

Threshold (hexadecimal)

Hexadecimal representation of the valid bits in the register as well as the parameterized value. Dependent on **Bit count**, **Offset from right** and **Threshold**.

Behavior on value higher

This parameter defines the behavior of the group object (KNX) in the event that the register value is greater than the parameterised value. The following options are available:

- No reaction
- Send value

Object value *(for value higher)*

The value that is sent via the group object (KNX).

Behavior on value match

This parameter defines the behavior of the group object (KNX) in the event that the register value corresponds to the parameterised value. The following options are available:

- No reaction
- Send value

Object value *(for value match)*

The value that is sent via the group object (KNX).

Behavior on value lower

This parameter defines the behavior of the group object (KNX) in the event that the register value is less than the parameterised value. The following options are available:

- No reaction
- Send value

Object value *(for value lower)*

The value that is sent via the group object (KNX).

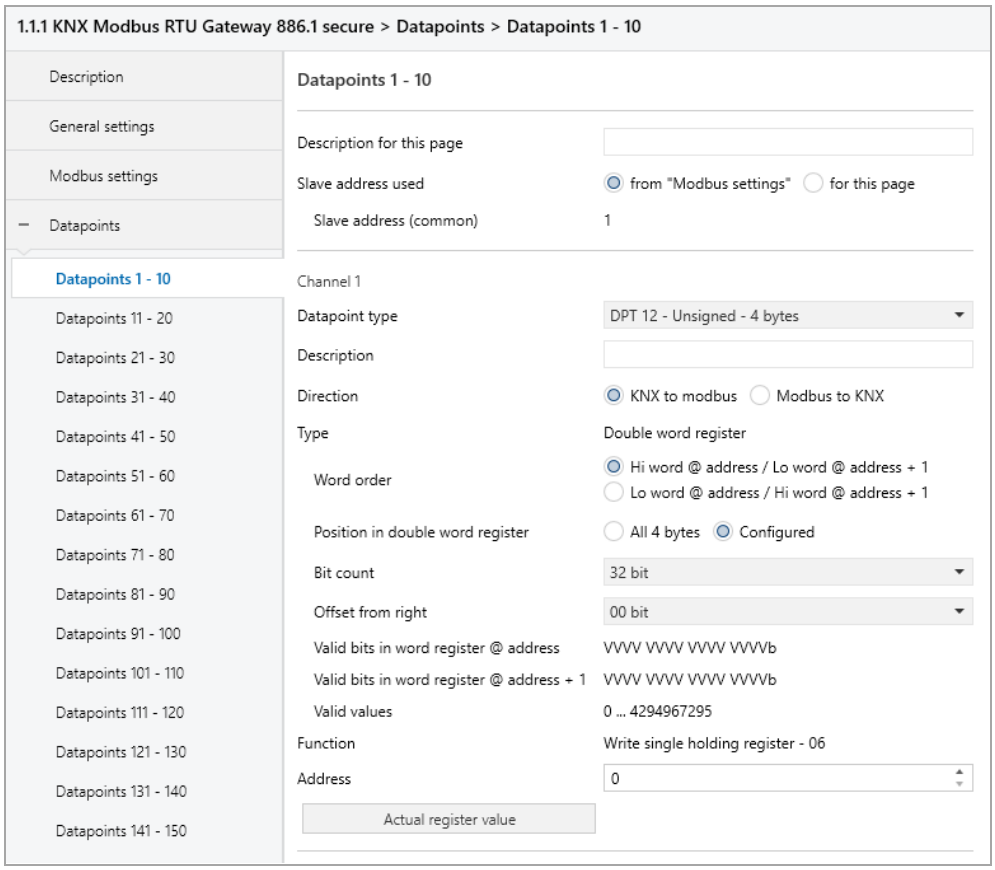
6.19 Channel function “DPT 12 – Unsigned – 4 bytes”

Type

The following type is configured:

- Double word register
  4 byte unsigned value (KNX) is written/read to/from area in double word register (modbus)

6.19.1 Type – Double word register



Word order

This parameter defines the byte order in which the value of the group object (KNX) is distributed to the two word registers (modbus). The following options are available:

- Hi word @ address / Lo word @ address + 1
- Lo word @ address / Hi word @ address + 1

Position in double word register

This parameter defines the range of the double word register which is written/read. The following areas are available:

- All 4 bytes
- Configured

Bit count *(only for configured)*

This parameter defines the size of the area in the Double word register (in bits).

Offset from right *(only for configured)*

This parameter defines the position of the range in the Double word register (offset from right in bits).

Valid bits in word register @ address *(only for configured)*

Indicates which bits have been defined in the word register (address).
Depending on **Word order**, **Bit count** and **Offset from right**.

Valid bits in word register @ address + 1 *(only for configured)*

Indicates which bits have been defined in the word register (address + 1).
Depending on **Word order**, **Bit count** and **Offset from right**.

Valid values *(only for configured)*

Indicates which values fit into the defined bits.
Depending on **Bit count** and **Offset from right**.

***Bit count** and **Offset from right** must not be greater than 32 together.*
*The value must fit into **Bit count**, e.g. **Bit count** = 1 → "Value" = 0 or 1.*

Function *(as "Modbus master", for "KNX to modbus" and "Double word register")*

By means of **Word register write requests** the transmission type of the Double word register can be configured. The following options are available:

- Write single holding register – 06
  One word register in one request
- Write multi holding registers – 16
  Both word registers in one request

As "Modbus master", for "Modbus to KNX" and "Double word register", multi read requests should be enabled to read both word registers in one request.

Address *(for "Double word register")*

Double word registers use the register address specified here plus this register address + 1.

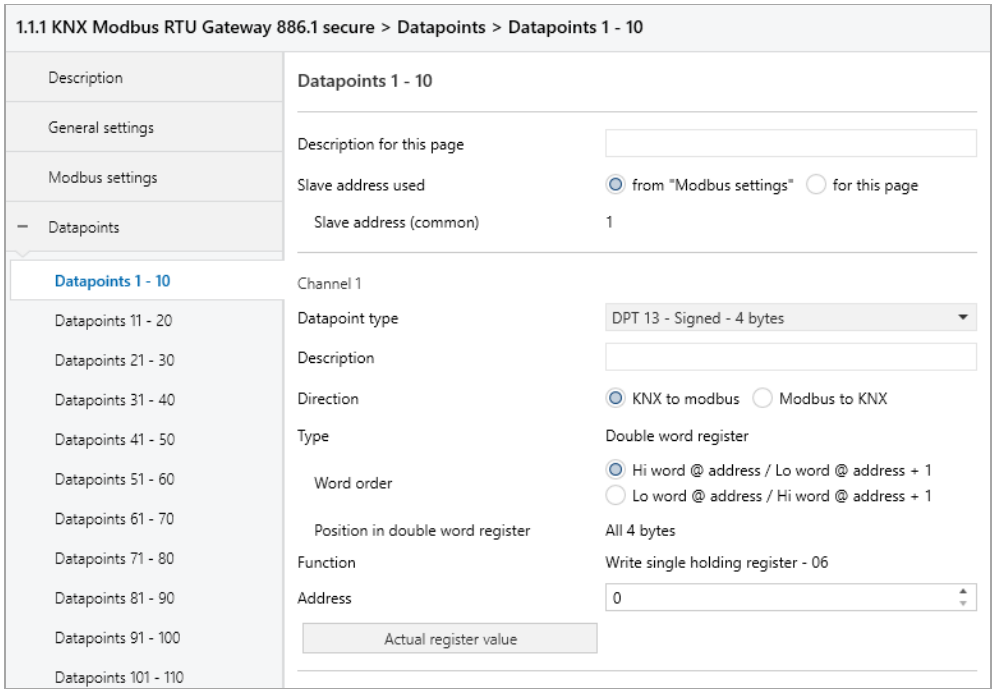
6.20 Channel function "DPT 13 – Signed – 4 bytes"

Type

The following type is configured:

- Double word register
  4 byte signed value (KNX) is written/read to/from area in double word register (modbus)

6.20.1 Type – Double word register



Word order

This parameter defines the byte order in which the value of the group object (KNX) is distributed to the two word registers (modbus). The following options are available:

- Hi word @ address / Lo word @ address + 1
- Lo word @ address / Hi word @ address + 1

Position in double word register

This parameter defines the range of the double word register which is written/read. The following range is configured:

- All 4 bytes

Function *(as "Modbus master", for "KNX to modbus" and "Double word register")*

By means of **Word register write requests** the transmission type of the double word register can be configured. The following options are available:

- Write single holding register – 06
  One word register in one request
- Write multi holding registers – 16
  Both word registers in one request

As "Modbus master", for "Modbus to KNX" and "Double word register", multi read requests should be enabled to read both word registers in one request.

Address *(for "Double word register")*

Double word registers use the register address specified here plus this register address + 1.

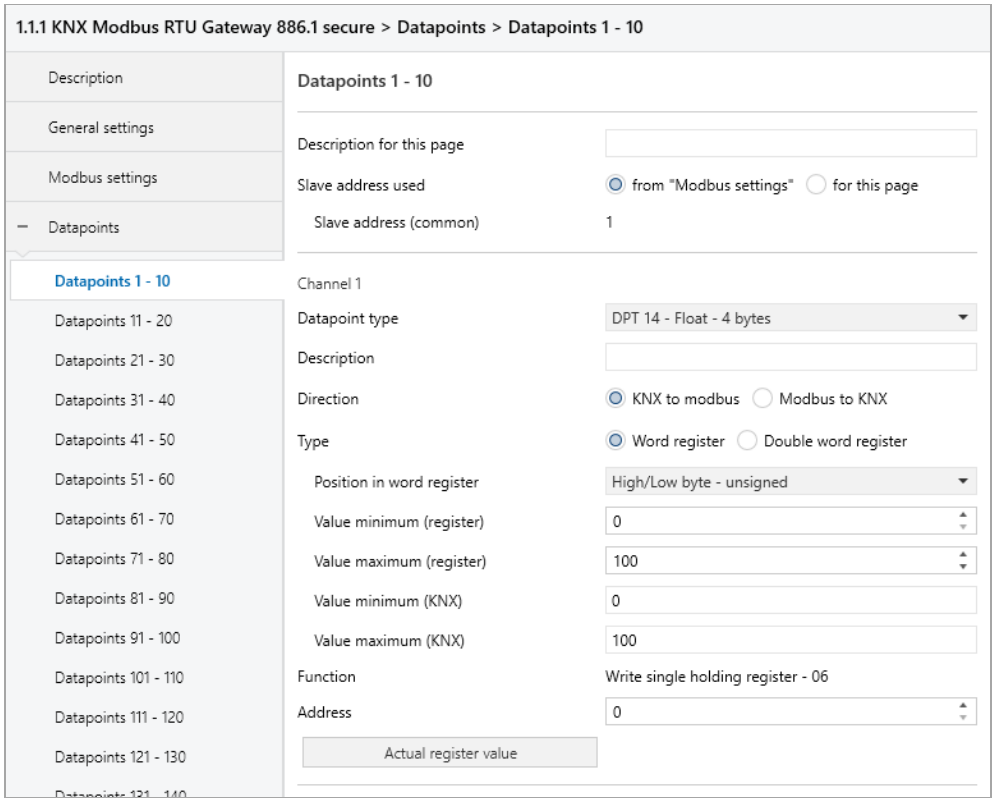
6.21 Channel function “DPT 14 – Float – 4 bytes”

Type

The following types can be configured:

- Word register
  4 byte float value (KNX) is mapped to area in word register (modbus)
- Double word register
  4 byte float value (KNX) is mapped to two word registers (modbus)

6.21.1 Type – Word register



Position in word register

This parameter defines the range of the word register which is mapped. The following ranges are available:

- Low byte – unsigned
- High byte – unsigned
- High/Low byte – unsigned
- Low byte – 2th complement
- High byte – 2th complement
- High/Low byte – 2th complement

Value minimum (register)

Register value, which corresponds to **Value minimum (KNX).**

Value maximum (register)

Register value, which corresponds to **Value maximum (KNX).**

Value minimum (KNX)

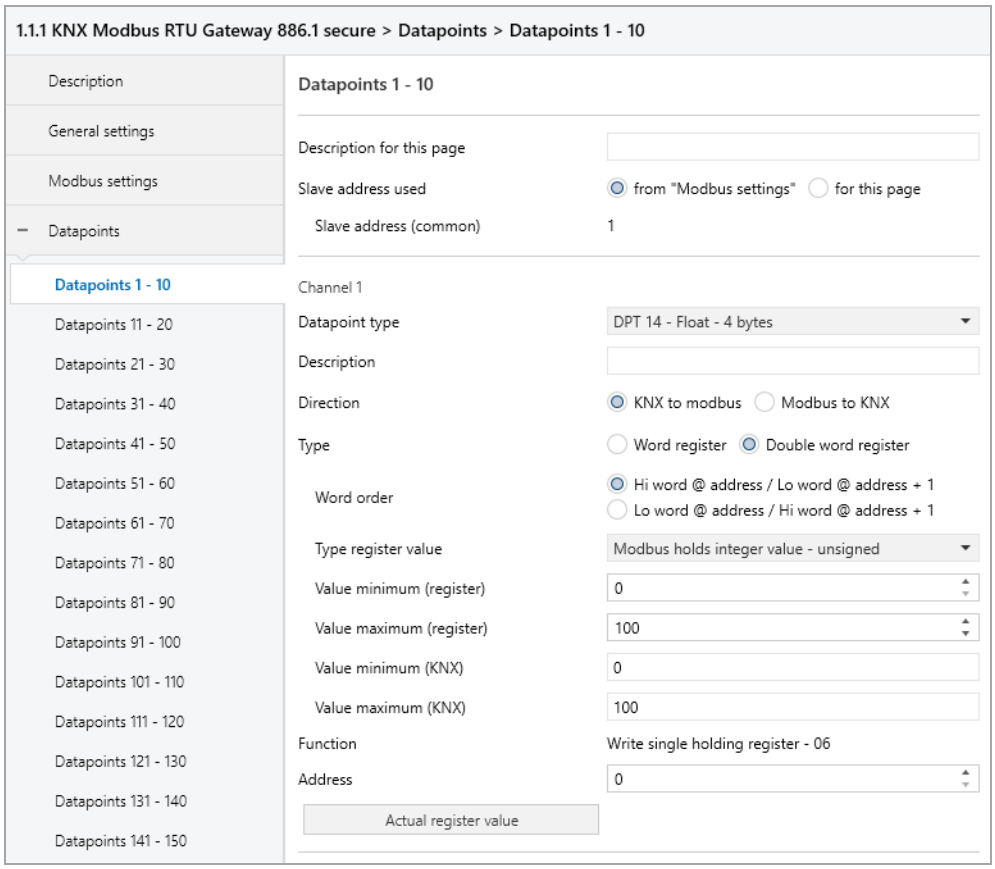
KNX value, which corresponds to **Value minimum (register).**

Value maximum (KNX)

KNX value, which corresponds to **Value maximum (register).**

The conversion is always transferred to the entire register range.
***Value minimum/maximum (register)** does not define any limits.*

6.21.2 Type – Double word register



Word order

This parameter defines the byte order in which the value of the group object (KNX) is distributed to the two word registers (modbus). The following options are available:

- Hi word @ address / Lo word @ address + 1
- Lo word @ address / Hi word @ address + 1

Type register value

Here you define how the float value is to be mapped to modbus. The following options are available:

- Modbus holds integer value – unsigned
- Modbus holds integer value – 2th complement
- Modbus holds float value – IEEE

Value minimum (register) *(only for integer value)*

Register value, which corresponds to **Value minimum (KNX).**

Value maximum (register) *(only for integer value)*

Register value, which corresponds to **Value maximum (KNX).**

Value minimum (KNX) *(only for integer value)*

KNX value, which corresponds to **Value minimum (register).**

Value maximum (KNX) *(only for integer value)*

KNX value, which corresponds to **Value maximum (register).**

The conversion is always transferred to the entire register range.
***Value minimum/maximum (register)** does not define any limits.*

Scaling factor *(only for float value)*

A scaling factor can be specified here, which is applied when converting from KNX to modbus and from modbus to KNX.

Function *(as "Modbus master", for "KNX to modbus" and "Double word register")*

By means of **Word register write requests** the transmission type of the double word register can be configured. The following options are available:

- Write single holding register – 06
  One word register in one request
- Write multi holding registers – 16
  Both word registers in one request

As "Modbus master", for "Modbus to KNX" and "Double word register", multi read requests should be enabled to read both word registers in one request.

Address *(for "Double word register")*

Double word registers use the register address specified here plus this register address + 1.

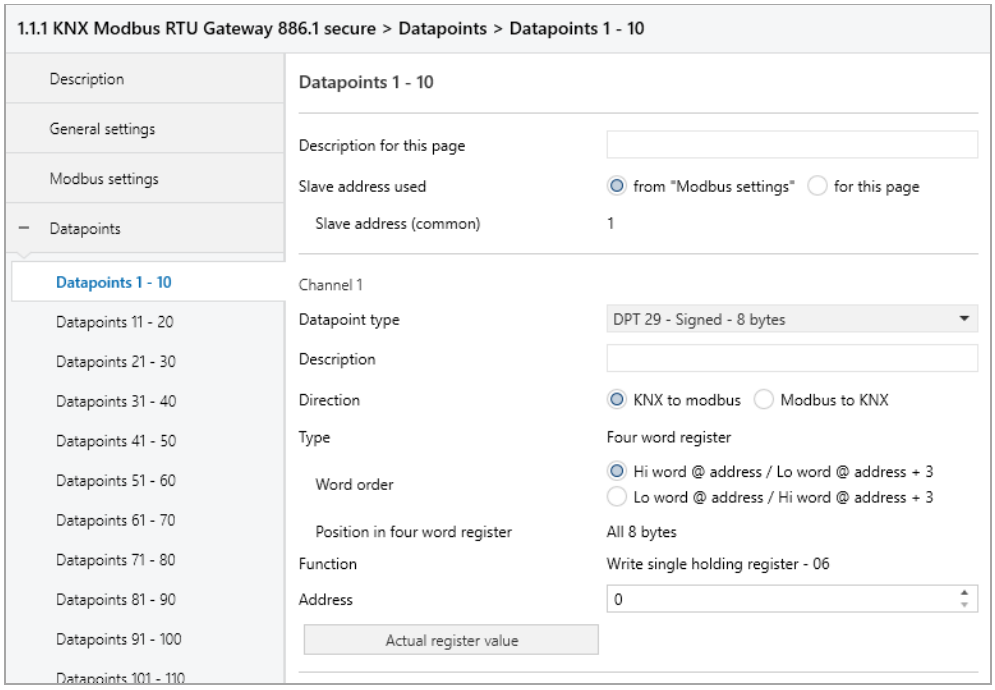
6.22 Channel function “DPT 29 – Signed – 8 bytes”

Type

The following type is configured:

- Four word register
  8 byte signed value (KNX) is written/read to/from area in four word register (modbus)

6.22.1 Type – Four word register



Word order

This parameter defines the byte order in which the value of the group object (KNX) is distributed to the four word registers (modbus). The following options are available for selection:

- Hi word @ address / Lo word @ address + 3
- Lo word @ address / Hi word @ address + 3

Position in four word register

This parameter defines the range of the four word register which is written/read. The following range is configured:

- All 8 bytes

Function *(as "Modbus master", for "KNX to modbus" and "Four word register")*

By means of **Word register write requests** the transmission type of the four word register can be configured. The following options are available:

- Write single holding register – 06
  One word register in one request
- Write multi holding registers – 16
  Four word registers in one request

As "Modbus master", for "Modbus to KNX" and "Four word register", multi read requests should be enabled to read all four word registers in one request.

Address *(for "Four word register")*

Four word registers use the register address specified here, register address + 1, register address + 2 and register address + 3.

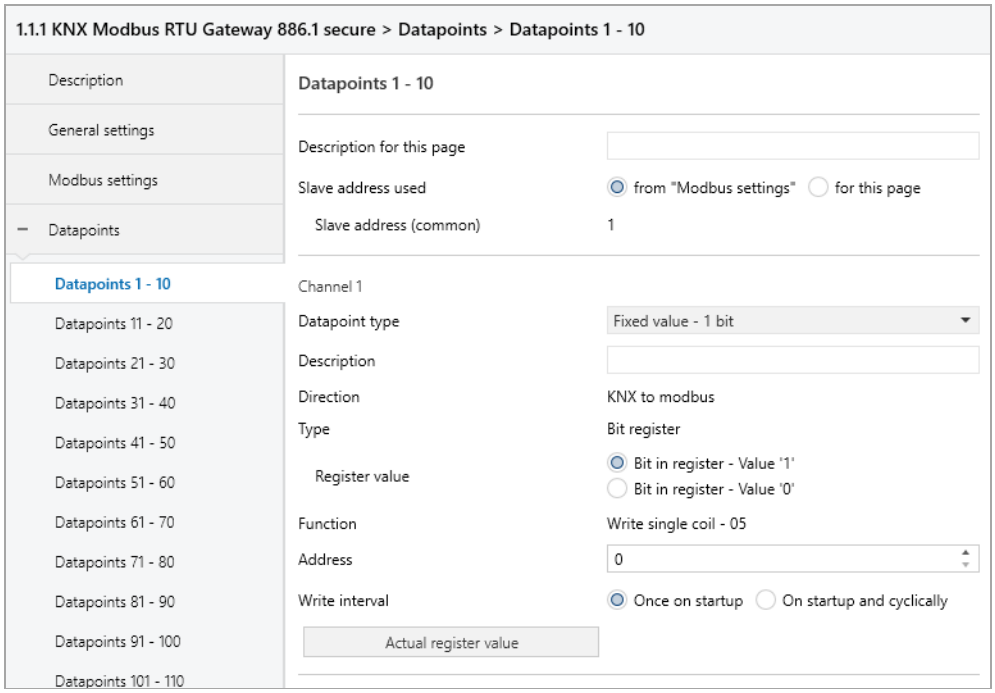
6.23 Channel function "Fixed value – 1 bit"

Type

The following type is configured:

- Bit register
  1 bit (parameter) sets bit register (modbus)

6.23.1 Type – Bit register



Register value

The value which is set in the register. The following are available for selection:

- Bit in register – Value ‘1’
- Bit in register – Value ‘0’

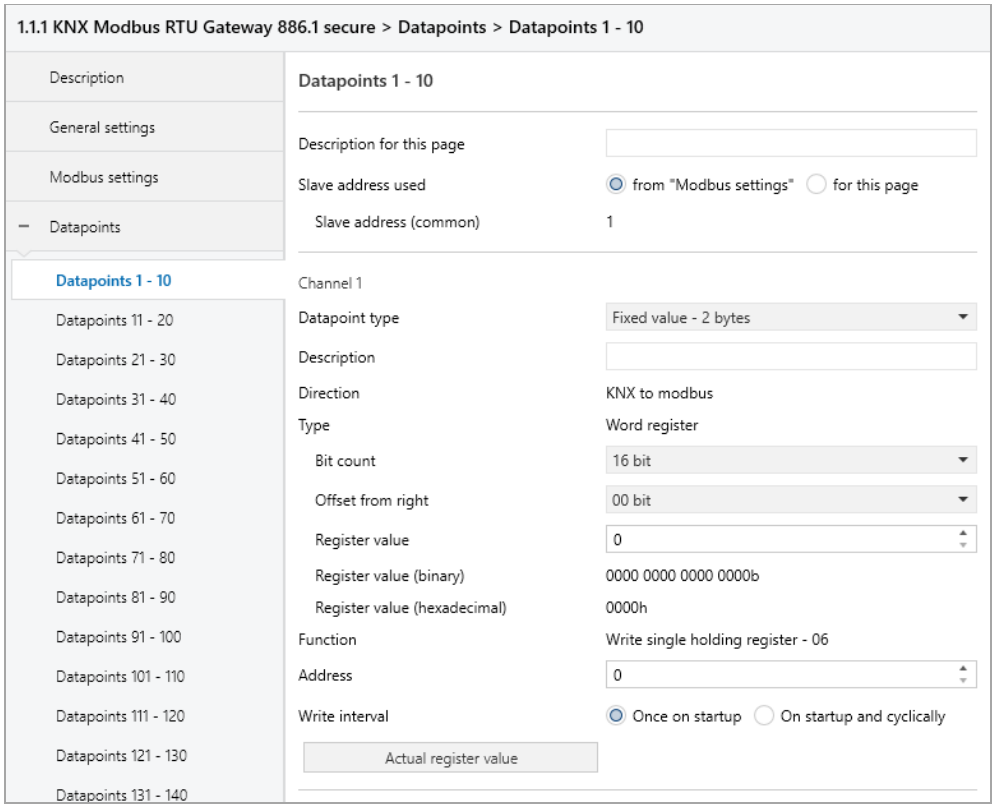
6.24 Channel function “Fixed value – 2 bytes”

Type

The following type is configured:

- Word register
  Value (parameter) sets word register (modbus)

6.24.1 Type – Word register



Bit count

This parameter defines the size of the value in the word register (in bits).

Offset from right

This parameter defines the position of the value in the word register (offset from right in bits).

Register value

The value which is set in the register.

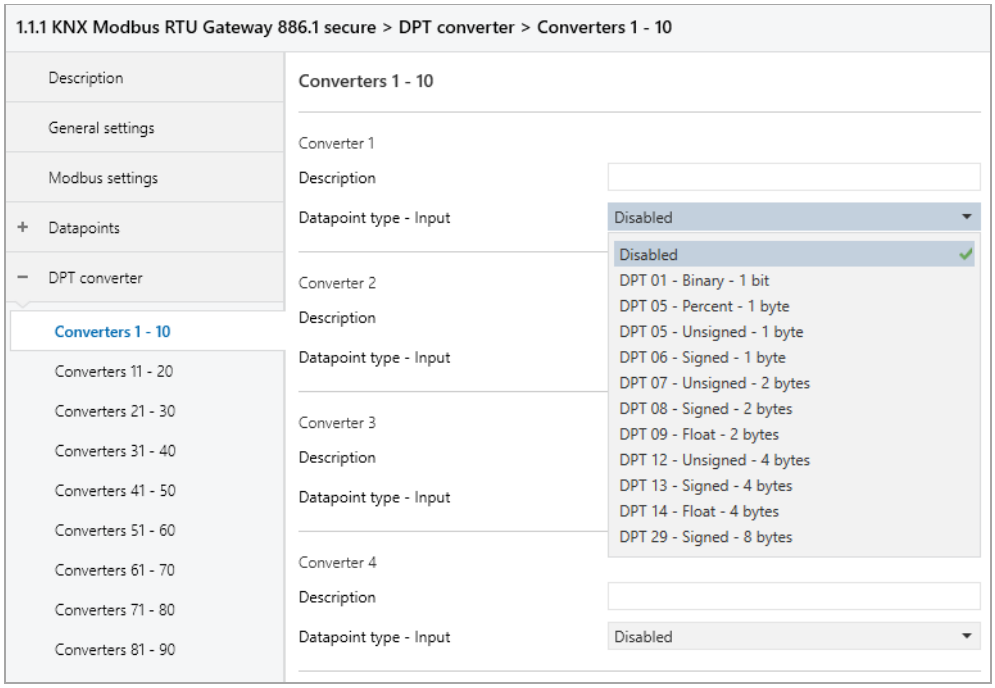
Register value (binary)

Binary representation of the valid bits in the register as well as the parameterized value. Dependent on **Bit count**, **Offset from right** and **Register value**.

Register value (hexadecimal)

Hexadecimal representation of the valid bits in the register as well as the parameterized value. Dependent on **Bit count**, **Offset from right** and **Register value**.

6.25 Converter N – M



10 converters are combined per page.

Description *(30 characters)*

Any name can be assigned to the converter. However, this should be unique and meaningful, this makes it easier to work with the associated group objects later, as the assigned name is displayed there as a designation. If no name is assigned, the group objects are designated with “Converter N: ... ”.

Datapoint type – Input

This parameter activates and defines the input object and the function of this converter. The following options are available:

- Disabled
- DPT 01 – Binary – 1 bit

Group object	Type KNX	Size	Direction
GO 251 Converter 1: Input – Binary – 1 bit	1.001	1 bit	From KNX

- DPT 05 – Percent – 1 byte

Group object	Type KNX	Size	Direction
GO 251 Converter 1: Input – Percent – 1 byte	5.001	1 byte	From KNX

- DPT 05 – Unsigned – 1 byte

Group object	Type KNX	Size	Direction
GO 251 Converter 1: Input – Unsigned – 1 byte	5.010	1 byte	From KNX

- DPT 06 – Signed – 1 byte

Group object	Type KNX	Size	Direction
GO 251 Converter 1: Input – Signed – 1 byte	6.010	1 byte	From KNX

- DPT 07 – Unsigned – 2 bytes

Group object	Type KNX	Size	Direction
GO 251 Converter 1: Input – Unsigned – 2 bytes	7.001	2 bytes	From KNX

- DPT 08 – Signed – 2 bytes

Group object	Type KNX	Size	Direction
GO 251 Converter 1: Input – Signed – 2 bytes	8.001	2 bytes	From KNX

- DPT 09 – Float – 2 bytes

Group object	Type KNX	Size	Direction
GO 251 Converter 1: Input – Float – 2 bytes	9.001	2 bytes	From KNX

- DPT 12 – Unsigned – 4 bytes

Group object	Type KNX	Size	Direction
GO 251 Converter 1: Input – Unsigned – 4 bytes	12.001	4 bytes	From KNX

- DPT 13 – Signed – 4 bytes

Group object	Type KNX	Size	Direction
GO 251 Converter 1: Input – Signed – 4 bytes	13.001	4 bytes	From KNX

- DPT 14 – Float – 4 bytes

Group object	Type KNX	Size	Direction
GO 251 Converter 1: Input – Float – 4 bytes	14.000	4 bytes	From KNX

- DPT 29 – Signed – 8 bytes

Group object	Type KNX	Size	Direction
GO 251 Converter 1: Input – Signed – 8 bytes	29.010	8 bytes	From KNX

Datapoint type – **Output**

This parameter defines the output object of this converter. The selection depends on the selected input object. The following options are available:

- DPT 01 – Binary – 1 bit
  Not for **Datapoint type** – **Input** “DPT 29 – Signed – 8 bytes”.

Group object	Type KNX	Size	Direction
GO 252 Converter 1: Output – Binary – 1 bit	1.001	1 bit	To KNX

- DPT 05 – Percent – 1 byte
  For **Datapoint type** – **Input** “DPT 1 – Binary – 1 bit”
  For **Datapoint type** – **Input** “DPT 5 – Percent – 1 byte”.

Group object	Type KNX	Size	Direction
GO 252 Converter 1: Output – Percent – 1 byte	5.001	1 byte	To KNX

- DPT 05 – Unsigned – 1 byte
  Not for **Datapoint type** – **Input** “DPT 5 – Percent – 1 byte”.

Group object	Type KNX	Size	Direction
GO 252 Converter 1: Output – Unsigned – 1 byte	5.010	1 byte	To KNX

- DPT 06 – Signed – 1 byte
  Not for **Datapoint type** – **Input** “DPT 5 – Percent – 1 byte”.

Group object	Type KNX	Size	Direction
GO 252 Converter 1: Output – Signed – 1 byte	6.010	1 byte	To KNX

- DPT 07 – Unsigned – 2 bytes
  Not for **Datapoint type** – **Input** “DPT 5 – Percent – 1 byte”.

Group object	Type KNX	Size	Direction
GO 252 Converter 1: Output – Unsigned – 2 bytes	7.001	2 bytes	To KNX

- DPT 08 – Signed – 2 bytes
  Not for **Datapoint type** – **Input** “DPT 5 – Percent – 1 byte”.

Group object	Type KNX	Size	Direction
GO 252 Converter 1: Output – Signed – 2 bytes	8.001	2 bytes	To KNX

- DPT 09 – Float – 2 bytes
  Not for **Datapoint type** – **Input** “DPT 5 – Percent – 1 byte”.

Group object	Type KNX	Size	Direction
GO 252 Converter 1: Output – Float – 2 bytes	9.001	2 bytes	To KNX

- DPT 12 – Unsigned – 4 bytes
  Not for **Datapoint type** – **Input** “DPT 5 – Percent – 1 byte”.

Group object	Type KNX	Size	Direction
GO 252 Converter 1: Output – Unsigned – 4 bytes	12.001	4 bytes	To KNX

- DPT 13 – Signed – 4 bytes
  Not for **Datapoint type** – **Input** “DPT 5 – Percent – 1 byte”.

Group object	Type KNX	Size	Direction
GO 252 Converter 1: Output – Signed – 4 bytes	13.001	4 bytes	To KNX

- DPT 14 – Float – 4 bytes
  Not for **Datapoint type** – **Input** “DPT 5 – Percent – 1 byte”.

Group object	Type KNX	Size	Direction
GO 252 Converter 1: Output – Float – 4 bytes	14.000	4 bytes	To KNX

- DPT 18 – Scene – 1 Byte
  For **Datapoint type** – **Input** “DPT 1 – Binary – 1Bit”.

Group object	Type KNX	Size	Direction
GO 252 Converter 1: Output – Scene – 1 byte	18.001	1 byte	To KNX

- DPT 29 – Signed – 8 bytes
  Not for **Datapoint type** – **Input** “DPT 1 – Binary – 1 bit ”
  Not for **Datapoint type** – **Input** “DPT 5 – Percent – 1 byte”.

Group object	Type KNX	Size	Direction
GO 252 Converter 1: Output – Signed – 8 bytes	29.010	8 bytes	To KNX

Send cyclically

If this parameter is activated, the output is sent cyclically.

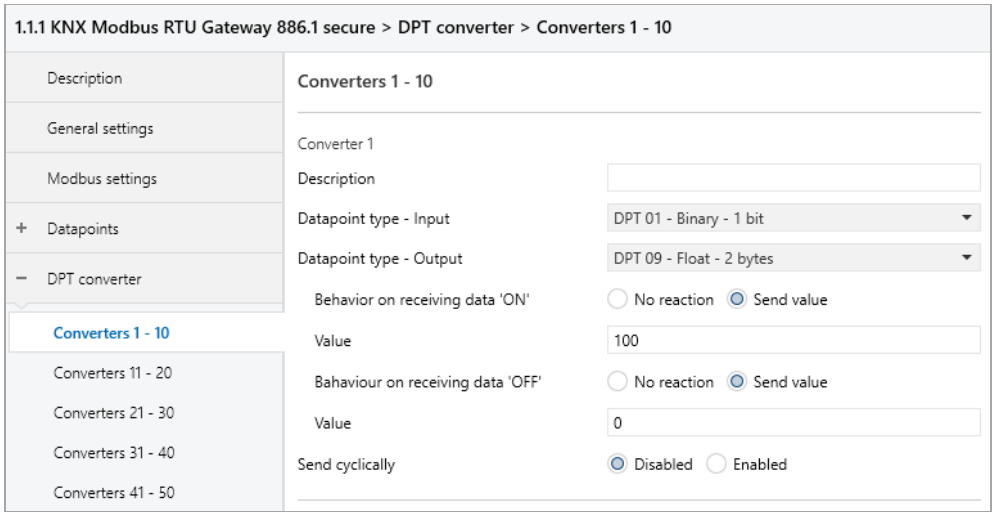
Cycle time *(only for send cyclically)*

The time for **Send cyclically**.

6.26 Converter function “Binary”

Condition:

Datapoint type – Input = *“DPT 01 – Binary – 1 bit”.*



Behavior on receiving data ‘ON’ *(only for output not “DPT 01 – Binary – 1 bit”)*

The behavior on receiving an ‘ON’ telegram is parameterised here.
The following options are available:

- No reaction
- Send value

Value / Scene *(only for output not “DPT 01 – Binary – 1 bit”)*

Here you parameterise which value / scene is sent on receipt of an ‘ON’ telegram at the output.

Behavior on receiving data ‘OFF’ *(only with output not “DPT 01 – Binary – 1 bit”)*

The behavior on receiving an ‘OFF’ telegram is parameterised here.
The following options are available:

- No reaction
- Send value

Value / Scene *(only for output not “DPT 01 – Binary – 1 bit”)*

Here you parameterise which value / scene is sent on receipt of an ‘OFF’ telegram at the output.

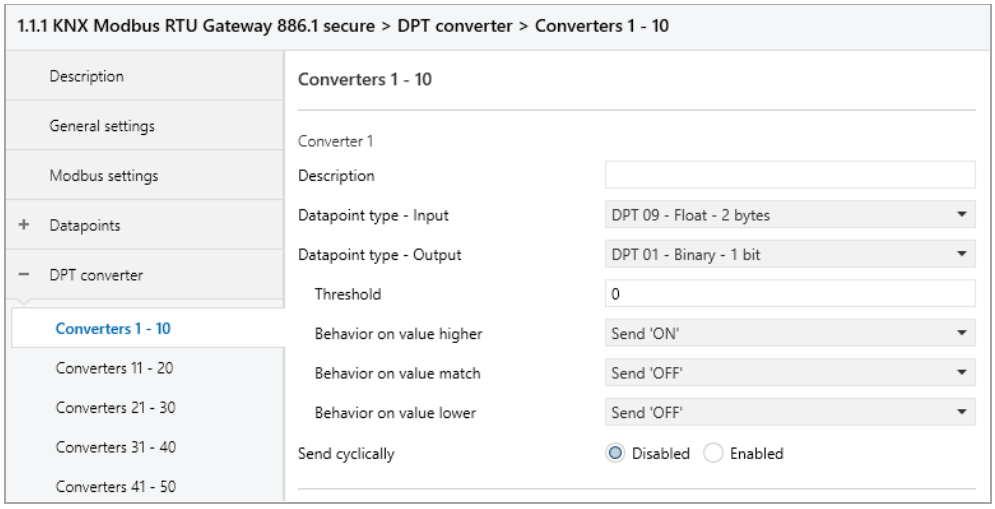
Value inverted *(only for output “DPT 01 – Binary – 1 bit”)*

This parameter defines whether the input value is to be sent inverted at the output.

6.27 Converter function “Threshold”

Condition:

Datapoint type – ***Input !=*** *“DPT 01 – Binary – 1 bit”.*
Datapoint type – ***Input !=*** *“DPT 29 – Signed – 8 bytes”.*
Datapoint type – ***Output =*** *“DPT 01 – Binary – 1 bit”.*



Threshold

This parameter defines the value for which the input object is checked.

Behavior on value higher

This parameter defines the behavior at the output object in the event that the object value at the input is greater than the parameterised value. The following options are available:

- No reaction
- Send ‘ON’
- Send ‘OFF’

Behavior on value match

This parameter defines the behavior at the output object in the event that the object value at the input is equal to the parameterised value. The following options are available:

- No reaction
- Send ‘ON’
- Send ‘OFF’

Behavior on value lower

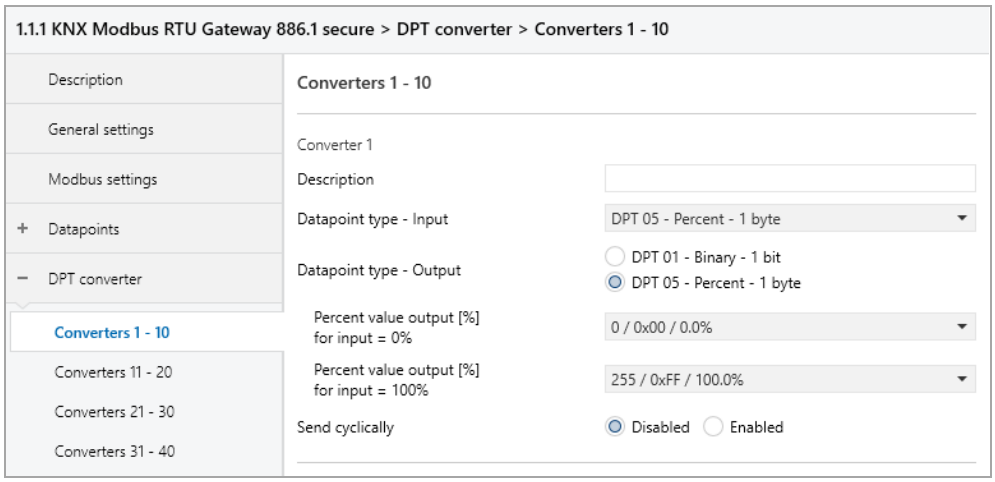
This parameter defines the behavior at the output object in the event that the object value at the input is less than the parameterised value. The following options are available:

- No reaction
- Send ‘ON’
- Send ‘OFF’

6.28 Converter function “Percent”

Condition:

***Datapoint type* – *Input* =** *“DPT 05 – Percent – 1 byte”.*
***Datapoint type* – *Output* =** *“DPT 05 – Percent – 1 byte”.*



Percent value output [%]
for input = 0%

Percent value for output object, which corresponds to 0 % at the input object.

Percent value output [%]
for input = 100%

Percent value for output object, which corresponds to 100 % at the input object.

Example:

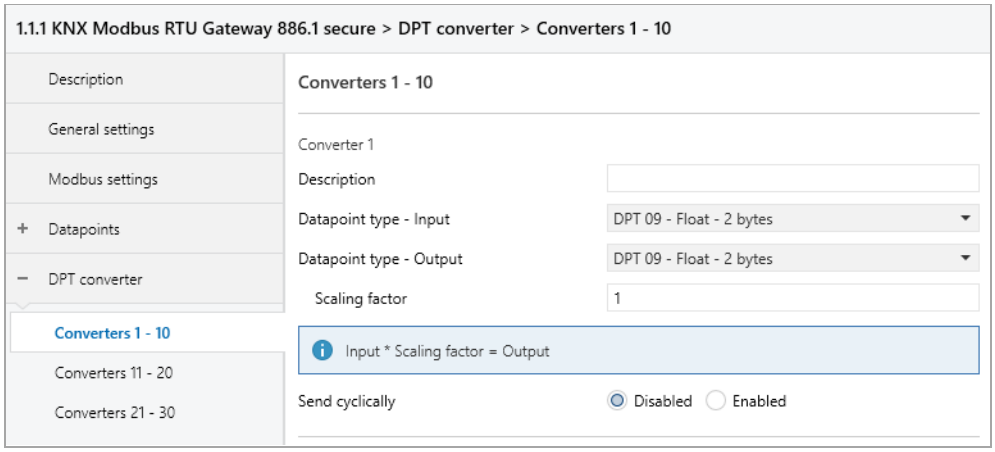
Percent value output [%] for input = 0% = “51 / 0x33 / 20.0%”.
Percent value output [%] for input = 100% = “204 / 0xCC / 80.0%”.

The value range of the input (0 % ... 100 %) is mapped to
the value range of the output (20 % ... 80 %).

6.29 Converter function “Scaling”

Condition:

Datapoint type – ***Input !=*** *“DPT 01 – Binary – 1 bit”.*
Datapoint type – ***Input !=*** *“DPT 05 – Percent – 1 byte”.*
Datapoint type – ***Output ! =*** *“DPT 01 – Binary – 1 bit”*



Scaling factor

A scaling factor can be specified here, which is applied when converting from input to output.

6.30 General information

6.30.1 Scaling

With the respective minimum/maximum values the scaling factor can be defined.

Example:

Value minimum (register) = 0
Value maximum (register) = 100
Value minimum (KNX) = 0
Value maximum (KNX) = 10

This gives a scaling * 10 of the KNX value:
Value KNX = 10.5 Value → Register = 105

The conversion is always transferred to the entire register range.
***Value minimum/maximum (register)** does not define any limits.*

6.30.2 2th complement

The 2th complement is used with modbus registers for the representation of negative numbers. Thus, for example, a range of -32768...32767 can be represented on a word register.

6.30.3 Modbus communication

If the KNX gateway (master mode) does not receive a response from the slave within 1 second, the request is repeated twice. If these are not successful, all channels of this parameter page are skipped.

If the slave needs more than 1 second to process the data, it can send an acknowledge telegram, which restarts the time interval at the master.

6.30.4 Modbus specification

In Modbus there are various types of register address specification.

Variant 1:

Register type	Access	Size	Address range
Coil	RW	1 bit	00001 – 09999
Discrete inputs	R	1 bit	10001 – 19999
Input register	R	2 bytes	30001 – 39999
Holding register	RW	2 bytes	40001 – 49999

The address range additionally defines the register type.
The address range is 1 based.

Example – Coil:

00005 is the fifth coil.

Register address = 1 based
Function = Read coils – 01
Function = Write single coil – 05
Function = Write multi coils – 15
Address = 5

Example – Discrete input:

10001 is the first discrete input.

Register address = 1 based
Function = Read discrete inputs – 02
Address = 1

Example – Input register:

30002 is the second input register.

Register address = 1 based
Function = Read input register – 04
Address = 2

Example – Holding register:

40004 is the fourth holding register.

Register address = 1 based
Function = Read holding register – 03
Function = Write single holding register – 06
Function = Write multi holding register – 16
Address = 4

Variant 2:

Register type	Access	Size	Address range
Coil	RW	1 bit	0x0001 – 0x9999
Discrete inputs	R	1 bit	1x0001 – 1x9999
Input register	R	2 bytes	3x0001 – 3x9999
Holding register	RW	2 bytes	4x0001 – 4x9999

The address range additionally defines the register type.
The address range is 1 based.

Example – Coil:

0x0005 is the fifth coil.

Register address = 1 based
Function = Read coils – 01
Function = Write single coil – 05
Function = Write multi coils – 15
Address = 5

Example – Discrete input:

1x0001 is the first discrete input.

Register address = 1 based
Function = Read discrete inputs – 02
Address = 1

Example – Input register:

3x0002 is the second input register.

Register address = 1 based
Function = Read input register – 04
Address = 2

Example – Holding register:

4x0004 is the fourth holding register.

Register address = 1 based
Function = Read holding register – 03
Function = Write single holding register – 06
Function = Write multi holding register – 16
Address = 4

Variant 3:

Register type	Access	Size	Address range
Coil	RW	1 bit	0 – 65535
Discrete inputs	R	1 bit	0 – 65535
Input register	R	2 bytes	0 – 65535
Holding register	RW	2 bytes	0 – 65535

The address range defines the address that is actually sent.
The address range is 0 based.

Example – Coil:

5 is the sixth coil.

Register address = 0 based
Function = Read coils – 01
Function = Write single coil – 05
Function = Write multi coils – 15
Address = 5

Example – Discrete input:

0 is the first discrete input.

Register address = 0 based
Function = Read discrete inputs – 02
Address = 0

Example – Input register:

2 is the third input register.

Register address = 0 based
Function = Read input register – 04
Address = 2

Example – Holding register:

4 is the fifth holding register.

Register address = 0 based
Function = Read holding register – 03
Function = Write single holding register – 06
Function = Write multi holding register – 16
Address = 4

Variant 4:

Register type	Access	Size	Address range
Coil	RW	1 bit	1 – 65535
Discrete inputs	R	1 bit	1 – 65535
Input register	R	2 bytes	1 – 65535
Holding register	RW	2 bytes	1 – 65535

The address range is 1 based.

Example – Coil:

5 is the fifth coil.

Register address = 1 based
Function = Read coils – 01
Function = Write single coil – 05
Function = Write multi coils – 15
Address = 5

Example – Discrete input:

1 is the first discrete input.

Register address = 1 based
Function = Read discrete inputs – 02
Address = 1

Example – Input register:

2 is the second input register.

Register address = 1 based
Function = Read input register – 04
Address = 2

Example – Holding register:

4 is the fourth holding register.

Register address = 1 based
Function = Read holding register – 03
Function = Write single holding register – 06
Function = Write multi holding register – 16
Address = 4

WARNING

- The device must be mounted and commissioned by an authorized electrician.
- The prevailing safety rules must be heeded.
- The device must not be opened.
- For planning and construction of electric installations, the relevant guidelines, regulations and standards of the respective country are to be considered.

Product database for ETS 5/6
www.weinzierl.de/en/products/886.1/ets6

Data sheet
www.weinzierl.de/en/products/886.1/datasheet

CE Declaration
www.weinzierl.de/en/products/886.1/ce-declaration

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