

## KNX-GW-MBUS

### KNX Gateway M-Bus

### Product Group 1

Application : KNX bus coupling for counters with M-Bus interface

The M-bus gateway is a Master for M-Bus systems according to the DIN 13757-2/3. The Master can supply and service up to 3 M-Bus devices. There are 32 M-Bus data points available, which can be assigned freely to the different devices.


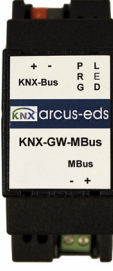

In the SK08 variant, the internal M-Bus IDs is not important significance.

Product Data Base: **MBUS\_v4.vd5**

KNX Readable Data: A maximum of 32 Data points ( free dividable )

For each M-Bus device

- Device date
- Secondary Address

KNX-GW-MBUS	Article	Article Description	Article-No.
KNX		Document: 4400_ex_KNX-GW-MBUS.pdf	
	KNX-GW-MBUS SK01	M-Bus Gateway for up to 3 M-Bus devices with KNX terminal block.  SK01 plastic housing: 72 x 64 x 40 mm  IP54/65	60400001
	KNX-GW-MBUS REG	M-Bus Gateway for up to 3 M-Bus devices with KNX terminal block.  DIN Rail mounted housing 2 units width ( 35 mm )  IP20	60400002
	KNX-GW-MBUS SK08	M-Bus Gateway for up to 3 M-Bus devices. Each M-Bus device with its own Screw-Type Terminal for M-Bus ID independent device identification. With KNX terminal block.  SK08 plastic housing: 115 x 65 x 55 mm  IP54/65	60400008

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## 1 Application Description

The M-Bus Gateway is set up using the ETS ( KNX Tool Software ) with the associated application program.  
The device is delivered unprogrammed.  
All functions are parameterized and programmed by ETS.

### Functions

- 32 Data points for
  - Consumption values - Measured values
  - Date
  - Time
- 3 Data points for secondary address of the connected devices
- 3 Data points for date information of the connected devices
- 3 Data points for triggering special functions
- 1 Data point for status information
- 1 Data point to set the MBUS ID of the connected devices ( *SK01 und REG* )

## 2 KNX Parameter

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## 2.1 Global Settings

Device: 1.1.1 MBUS

Global Settings	KNX Sending Cycle	None
Mbus-ID 1	Send NKE Telegram	No
Mbus-ID 2	Baudrate	2400
Mbus-ID 3	Mbus-Devices	3 ID's
Mbus Datapoint 1		
Mbus Datapoint 2		
Mbus Datapoint 3		
Mbus Datapoint 4		
Mbus Datapoint 5		
⋮		
Mbus Datapoint 31		
Mbus Datapoint 32		

## Global Settings - KNX-GW-MBUS xxx

Parameter	Setting	Description
KNX Sending Cycle	None 1 min .. 12 h	The measured values are sent a measurement change independently in the cycle time.
NKE	No Yes	If set to "Yes", SND-NKE command before each M-Bus read cycle is sent.
Baudrate	300 2400 9600	The baud rate with which communicates via the M-Bus must match the setting of the M-Bus slaves. 2400 baud is the default value.
<b>Only at SK01 and REG</b>		
Mbus-Devices	Single Device 3 ID's	This setting determines whether only one M-Bus device is operated or up to three devices. With just one device simplifies the parameterization, since the identification runs via the broadcast address 254.  The ID can be programmed via an object. For details, see <b>4. Function Description</b> .

## 2.2 MBus ID X

Device: 1.1.1 MBUS

Global Settings

- MBus-ID 1**
- MBus-ID 2
- MBus-ID 3
- MBus Datapoint 1
- MBus Datapoint 2
- MBus Datapoint 3
- MBus Datapoint 4
- MBus Datapoint 5
- ⋮
- MBus Datapoint 31
- MBus Datapoint 32

MBus-ID 1

Read Cycle

Device Date Identifier

Special Function Identifier

## MBus ID X - KNX-GW-MBUS xxx

Parameter	Setting	Description
MBus-ID X	0 .. 250	<p>Each M-Bus device is accessed by a unique ID. This must match the ID stored in the device. The preset value is stated in general on the device. If only one device, eliminating the ID setting.</p> <p>The ID can be programmed via an object.</p> <p>The SK01 and REG variant eliminates these parameters, if setting</p> <p><b>Global Settings</b> <b>Parameter "MBus-Devices = Single Device"</b></p> <p>When using the SK08 variation of these parameters is eliminated.</p> <p>For details, see <b>4. Function Description</b>.</p>
Read Cycle	10 sec .. 12 h	<p>Many M-Bus devices allow only a limited number of readings per day or a minimum readout cycle.</p> <p>This applies preferably for battery holder devices, but should be requested in each case from the meter manufacturer.</p> <p>The read cycle is adjusted accordingly.</p> <p><b>Attention:</b> If the M-Bus read cycle is equal to the KNX sending cycle, it may happen that after two cycles of setting the values, a change in the value can be seen on the KNX bus.</p>
Device Date Identifier	8 Character	Data Information Field [DIF(E)] and Value Information Field [VIF(E)] of the device date of the M-Bus device can be specified as hexadecimal values.
Special Function Identifier	32 Character	Some M-Bus devices support special functions such as reset a utility meter. The string can be specified as a string of hexadecimal values here.

## 2.3 MBus Datapoint X

Device: 1.1.1 MBUS

- Global Settings
- MBus-ID 1
- MBus-ID 2
- MBus-ID 3
- MBus Datapoint 1**
- MBus Datapoint 2
- MBus Datapoint 3
- MBus Datapoint 4
- MBus Datapoint 5
- MBus Datapoint 6
- MBus Datapoint 7
- ⋮
- MBus Datapoint 31
- MBus Datapoint 32

Send on change	Yes
Send cyclical	No
ID Select	ID1
MBus DPT Identifier	0c13
KNX DPT Type	4 Byte Float
Adjustment Value	1
Comment	Wärmeenergie in kWh

## MBus Datapoint X - KNX-GW-MBUS xxx

Parameter	Setting	Description
Send on change	No Yes	If " <b>Yes</b> ", the M-Bus data point is sent when the value changes.
Send cyclical	No Yes	If " <b>Yes</b> ", the M-Bus data point value of a value change is independent as under <b>Global Settings</b> <b>Parameter "KNX Sending Cycle"</b> is sent.
ID Select	None ID1 - ID3	Assignment of the data point to a M-Bus device
MBus DPT Identifier	String, up to 8 hex-character	Data Information Field [DIF(E)] and Value Information Field [VIF(E)] of the data point can be specified as hexadecimal values ( see manufacturers datasheet ).  The HEX characters must be specified in succession without spaces or other characters. see <b>4. Function Description</b>
KNX DPT Type	6 Byte Metering Value 4 Byte Float 4-Byte unsigned Integer Date Time	
Adjustment Value	Powers of ten of 10 <sup>-6</sup> ... 10 <sup>6</sup>	With adjustment value, the value representation can be customized in the ETS (decimal point).
Comment	up to 64 ASCII-character	The comment uses as an overview in the parameterization.

### 3 KNX Objects

#### Objects - KNX-GW-MBUS xxx

No.	Label	Data Point Type	Function
0 : ..31	Output, Value x	DPT 4 Byte	MBus Value
0 : ..31	Output, Date x	DPT 3 Byte	MBus Date
0 : ..31	Output, Time x	DPT 3 Byte	MBus Time
32 34 36	Output, Secondary Address Device x	DPT 16.000 14 Byte	Secondary Address
33 35 37	Output, Date Device x	DPT 10.001 3 Byte	Device Date
38	IO, ID programming	DPT 5.* 1 Byte	ID programming
39	Output, Status	DPT 5.* 1 Byte	Status
40 41 42	Input, Special Function ID x	DPT 1.010 1 Bit	Send Special Function

#### Object Description - KNX-GW-MBUS xxx

Object	Description
Output, Value x	The value of a data point
Output, Date x	Date ( for example, be used as a date stamp )
Output, Time x	Time ( for example, be used as a time stamp )
Output, Secondary Address Device x	The serial numbers of M-Bus devices.
Output, Date Device x	The internal Date of M-Bus devices.
IO, ID programming	Using this object, the connected device must have an ID assigned.
Output, Status	Status value = 0 : M-Bus ok, <b>not any</b> device is connected or detected. Status value = 1 : M-Bus ok, <b>one</b> device is connected or detected. Status value = 2 : M-Bus ok, <b>two</b> devices are connected or detected. Status value = 3 : M-Bus ok, <b>three</b> devices are connected or detected. Bit 3 (decimal 8) corresponds to a short circuit (fault) in the M-Bus line.
Input, Special Function ID x	When writing a 1 to this object, the special function is executed. Please note the information about the meter manufacturer!

## 4 Function Description

The M-Bus was developed for configuration and reading of data from meters and consumption counting devices. The M-Bus is a bus with a single master that powers and reads out multiple slave devices. Each slave is addressable with an individual ID that is between 1 and 250. Theoretically up to 250 slave devices could be operated in one M-Bus segment, but the practical number is determined by the ability of the master to power the devices. The topology is not critical and no termination is required. Maximum bus length is 4km in theory depending on the baudrate, in practical situations not more than 10m should be aspired for good noise immunity.

The **SK01 / REG** variants from Gateway can power up to 3 devices and communicate with them. If only one device is present, this can be addressed independent of its individual ID with the broadcast ID ( 254 ). This simplifies the configuration of such a minimal system.

When used the SK08 variant all connected devices are addressed via a broadcast ID.  
An importance of IDs eliminates.

Some M-Bus devices can be powered through the M-Bus, others draw current from the internal battery at readout of the data. So some M-Bus devices only allow a certain number of readings over an amount of time to disburden the internal batteries. The readout cycles must be choosen accordingly.

Readout of the devices data is initiated by the master by sending a REQ\_UD2 ( Request User Data ) telegram. The connected devices check if they are addressed by comparing their ID and return a RSP\_UD ( Respond User Data ) telegram. The RSP\_UD telegram contains up to 252 byte of user data. The user data consists of several data packages each of them beginning with some identification bytes, the DIF ( Data Information Field ) and the VIF ( Value Information Field ). DIF and VIF can have several byte, of practical relevance are 1 or 2 byte per field. With 4 byte nearly all data packages can be identified. If a value field represents a reference value there is usually a date field associated with this value. The information that can be expected in the DIF and VIF are different with every manufacturer and every device class. Generally the desired informations can be achieved from the manufacturers. The values for the DIF and VIF must be identified and written into the appropriate fields as strings of hexadecimal characters.

### Examples

Water meter		
Volume information	DIF 04 VIF 13	Data to write into the parameter field: 0413
Reference value	DIF 04 VIF 80 13	Data to write into the parameter field: 048013
Electrical Meter		
Total consumption	DIF 04 VIF 03	Data to write into the parameter field: 0403
Actual consumption	DIF 02 VIF 2B	Data to write into the parameter field: 022B

These are examples only, the correct data sequences can be obtained from the manufacturer of the counters/meters. Some meters provide extra functionality as resettable counters or minimum/maximum values that can be reset with special data sequences. These sequences can be defined in the ETS and can be triggered by writing a "1" on an Object.

Set the ID of a connected device:

- 1) Select under "Global Settings", parameter "MBus-Devices" = "Single Device"
- 2) The Object "IO, ID programming" is active
- 3) Connecting the device and send desired ID (1 .. 250) on the object "IO, ID programming"

The status value bits:

Status value = 0 : M-Bus ok, **not any** device is connected or detected.  
 Status value = 1 : M-Bus ok, **one** device is connected or detected.  
 Status value = 2 : M-Bus ok, **two** devices are connected or detected.  
 Status value = 3 : M-Bus ok, **three** devices are connected or detected.  
 Status value = 8 : The M-Bus is shorted or overloaded.

## 5 Product Page

The **KNX-GW-MBUS xxx** is a device that can integrate all kind of consumption measuring devices that are equipped with an M-Bus interface into the KNX-bus.

Up to 3 M-Bus devices can be supplied and up to 32 data point values can be collected and sent to the KNX-Bus. Each of these Datapoints can have a date associated in case of reference values.

The device has an integrated bus coupling unit and needs no auxiliary power.

The **KNX-GW-MBUS SK01** is delivered in a housing of an impact resistant glass pallet reinforced plastic with gasket and achieves the protection class IP54/65.

The **KNX-GW-MBUS REG** is delivered in a housing of fire retardant plastic meant for DIN rail mounting and achieves the protection class IP20.

The **KNX-GW-MBUS SK08** is delivered in a high-strength, extremely robust stable impact ABS plastic housing. Cover and base have a revolving groove and tongue system with neoprene gasket and achieves the protection class IP54/65.

The KNX-GW-MBUS is set up using the ETS ( KNX Tool Software ) and the applicable application program.

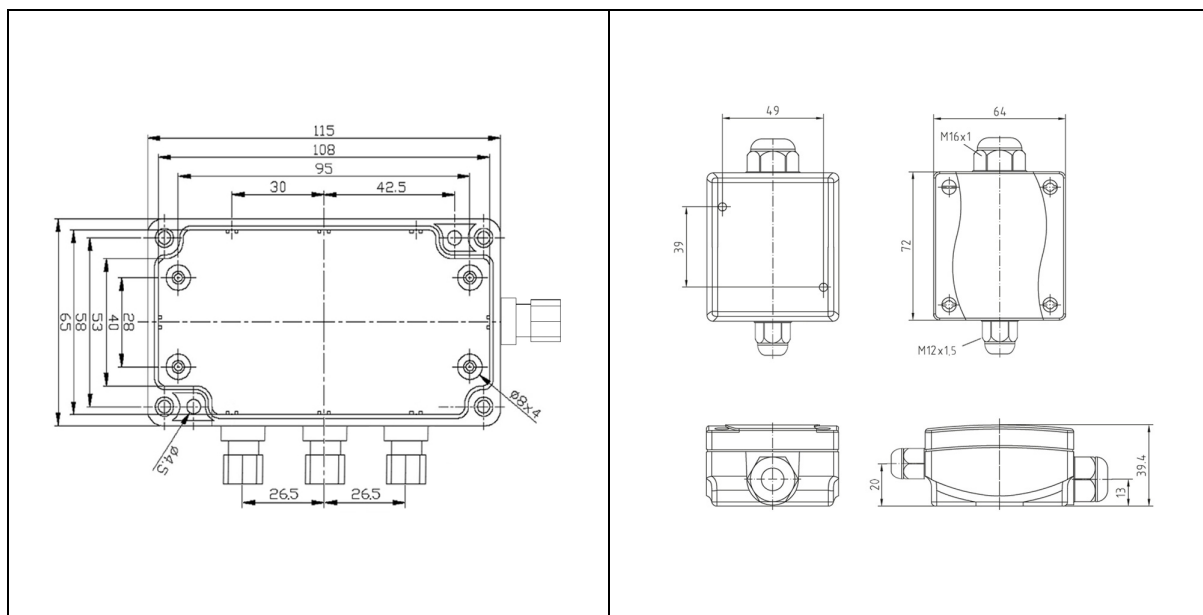
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KNX-GW-MBUS xxx  
SK01 und SK08 IP54/65  
REG IP20

## Applications

- Integration of Meters and Consumption counters into the KNX-bus
- Acquisition and communication of consumption data in KNX environments
- Retrofitting of existing M-Bus installations





## 6 Technical Data

### Technical Data - KNX-GW-MBUS xxx

Maximum number of M-bus devices	3
Maximum number of M-bus data values	32
M-bus Reading cycle time	10s bis 12h
M-bus short circuit immunity	unlimited
Supply voltage	KNX Busvoltage 21 .. 32VDC
Power consumption	max ca. 550 mW ( at 24VDC )
Auxiliary power	not necessary
Bus coupler	integrated
Environment temperature	Storage: -20 .. +85 °C Operation: -20 .. +55 °C
ETS data file	<b>MBUS_v4.vd5</b>
Connections	KNX-2-pin Terminal ( red / black ) M-bus 2-pin terminal with screws
Protection class SK01	IP54/65
Mounting style	On wall mounting with two screws
Housing	Glass filled Plastics, grey
Housing dimension	72 x 64 x 40 mm
Article number	60400001
Protection class REG	IP20
Mounting style	DIN rail mounting
Housing	Plastics housing DIN rail / 2 Units ( 35 mm )
Article number	60400002
Protection class SK08	IP54/65
Mounting style	On wall mounting with two screws
Housing	ABS plastics, grey
Housing dimension	115 x 65 x 55 mm
Article number	60400008

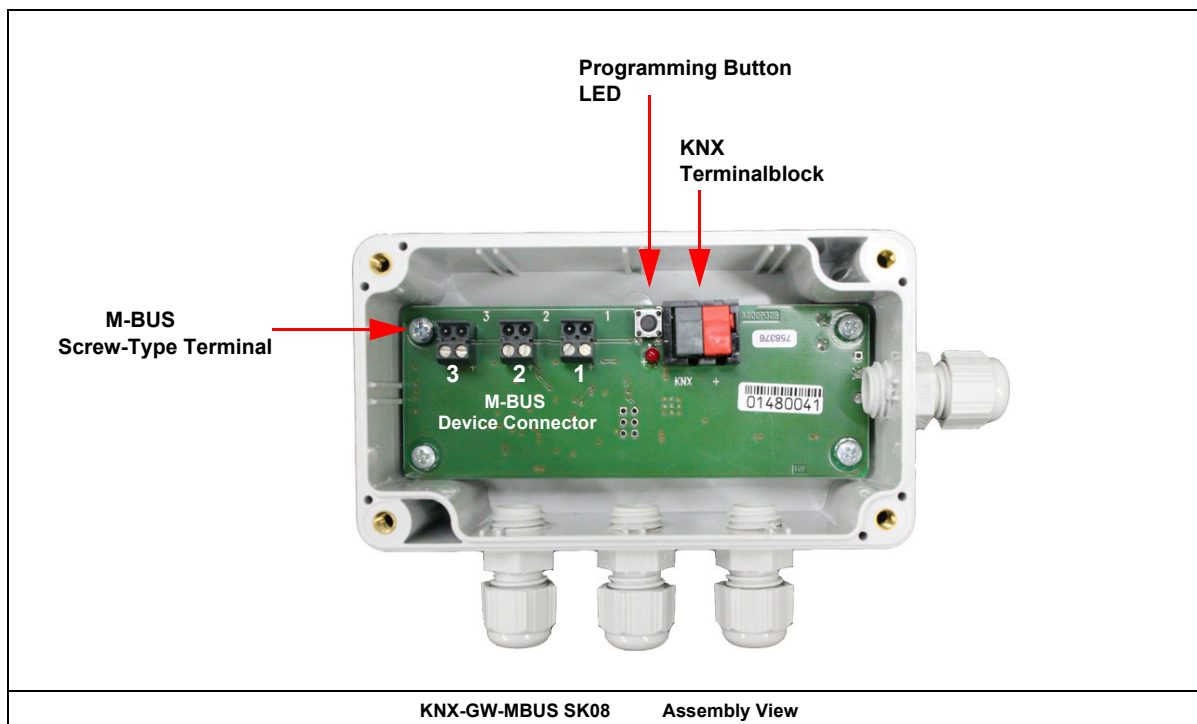
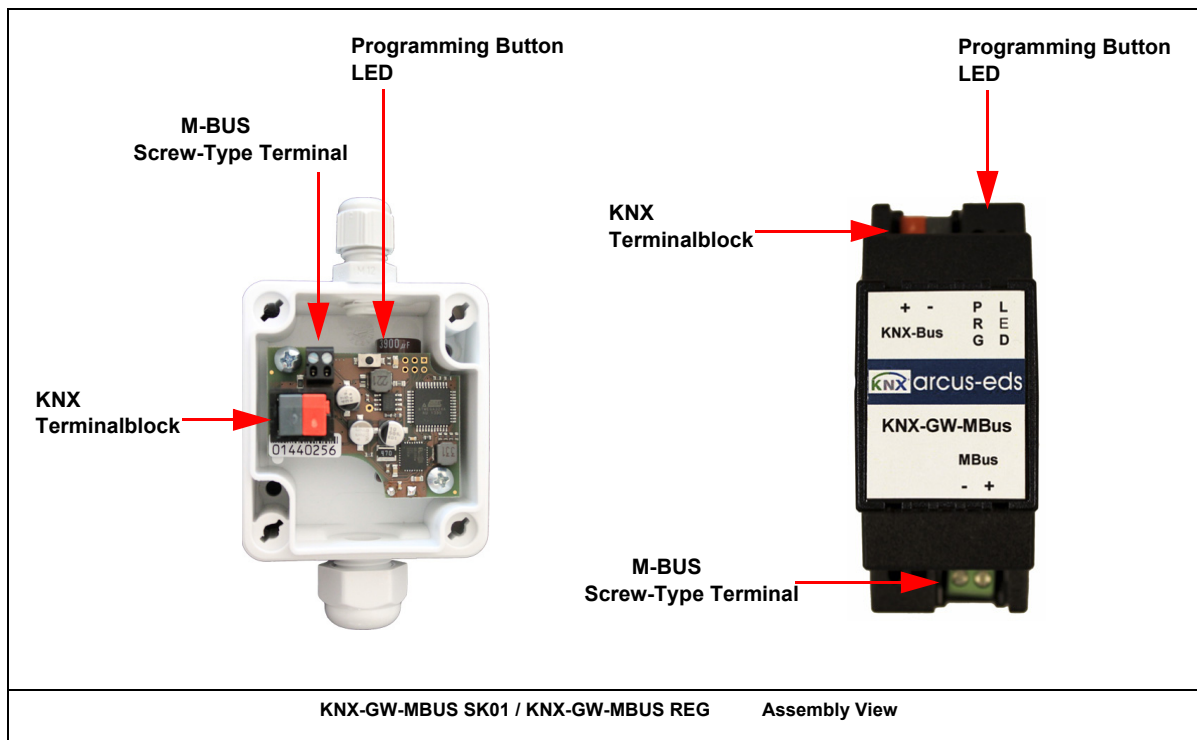
## 7 Startup

The KNX-GW-MBUS is set up using the ETS ( KNX Tool Software ) and the applicable application program.

The gateway is delivered unprogrammed.

All functions are programmed and parameterized with ETS.

Please read the ETS instructions.



## 8 Assembly

The **KNX-GW-MBUS SK01** device is intended for mounting in indoor/outdoor and damp room environment. It achieves the protection class IP54/65. Mounting is done on wall through 2 screw holes.

The cover of the device can be removed by turning the screws on the top. Feed the KNX-bus cable through the fitting into the device after mounting the gateway on the wall or ceiling. For this you must remove the connector block from the cable, after insertion the connector block can be attached again. After successful programming the cover should be mounted again. Be careful not to damage the electronics with tools and cable heads.

The **KNX-GW-MBUS REG** device is intended for DIN rail mounting in dry indoor environment. Mounting is done by clipping the device on the DIN rail. Protection class IP20 is achieved.

The **KNX-GW-MBUS SK08** device is intended for mounting in indoor/outdoor and damp room environment. It achieves the protection class IP54/65. Mounting is done on wall through 2 screw holes.

### In Case of Bus Voltage Recurrence

The values of M-Bus devices are available again after a new reading. The ETS parameter settings are retained.

### Discharge Program and Reset Sensor

In order to delete the programming ( projecting ) and to reset the module back to delivery status, it must be switched to zero potential ( disconnect the KNX bus coupler ). Press and hold the programming button while reconnecting the KNX-bus coupler and wait until the programming LED lights up ( approx. 5-10 seconds ). Now you can release the programming button. The module is ready for renewed projecting. If you release the programming button too early, repeat the aforementioned procedure.

## Imprint

Editor: Arcus-EDS GmbH, Rigaer Str. 88, 10247 Berlin

Responsible for the contents: Hjalmar Hevers, Reinhard Pegelow

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