Documentation

KNX M-Bus Gateway

Monitoring and visualization of M-Bus meters with the EIB/KNX

Order number: E001-H009002

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This handbook describes also functions, which are options.
Only qualified persons are allowed to install our units.

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Highlights KNX M-Bus Gateway

• Integrated EIB/KNX – bus coupling unit with two wire EIB/KNX connector
• Easy parametrisation with the b+b Terminal software over a USB connection
• Up to 25 M-Bus meters can be connected to one KNX M-Bus Gateway
  (up to 25 M-Bus unit loads / 1 unit load = 1.5mA)
• Each KNX M-Bus Gateway can transfer up to 200 M-Bus metered values
• Readout of current consumption values, meter readings, flow and return temperatures, ...
• Cyclic M-Bus meter readouts are possible
• Supports primary and secondary M-Bus addressing
• Integrated M-Bus diagnosis functions
• Rail mounted device (6TE = 105mm) with integrated 85V – 260V wide range power supply

Fields of application

• Simple integration of M-Bus meters in the EIB/KNX bussystem
• Readout of current consumption values
• Readout of meter readings
• Readout of flow and return temperatures
• Diagnosis functions for M-Bus meters

Contents of delivery

• KNX M-Bus Gateway
• USB cable
• b+b Terminal software for parametrisation
• Documentation

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Introduction

The KNX M-Bus Gateway allows the communication between the EIB/KNX bussystem and M-Bus meters. In this communication the KNX M-Bus Gateway acts as the M-Bus master, which means it controls the communication.

The M-Bus meters can be readout cyclic in defined time intervals or by read requests from the EIB/KNX bussystem. Different data formats can be parametrised for each M-Bus metered value, e.g. a temperature value can be transferred to the EIB/KNX bussystem as a 16Bit KNX floating point value, a consumption value can be transferred as a 32Bit binary value, etc..

The KNX M-Bus Gateway also offers several diagnosis functions for M-Bus meters, such as automated search and identification of the M-Bus meters connected to the KNX M-Bus Gateway. The M-Bus meter's response data is presented in detail in clear text, so that the time-consuming procurement of M-Bus telegram description is dispensed with. The diagnosis functions can be used through simple ASCII commands.

Parametrisation and diagnosis is performed through the integrated USB interface in connection with our b+b Terminal software.

The hardware of the KNX M-Bus Gateway consists of a 6TE (= 105mm) DIN rail mounting enclosure with integrated 85V – 260V power unit and connectors for M-Bus and EIB/KNX. The device is maintenance-free without fan or any other wear parts.
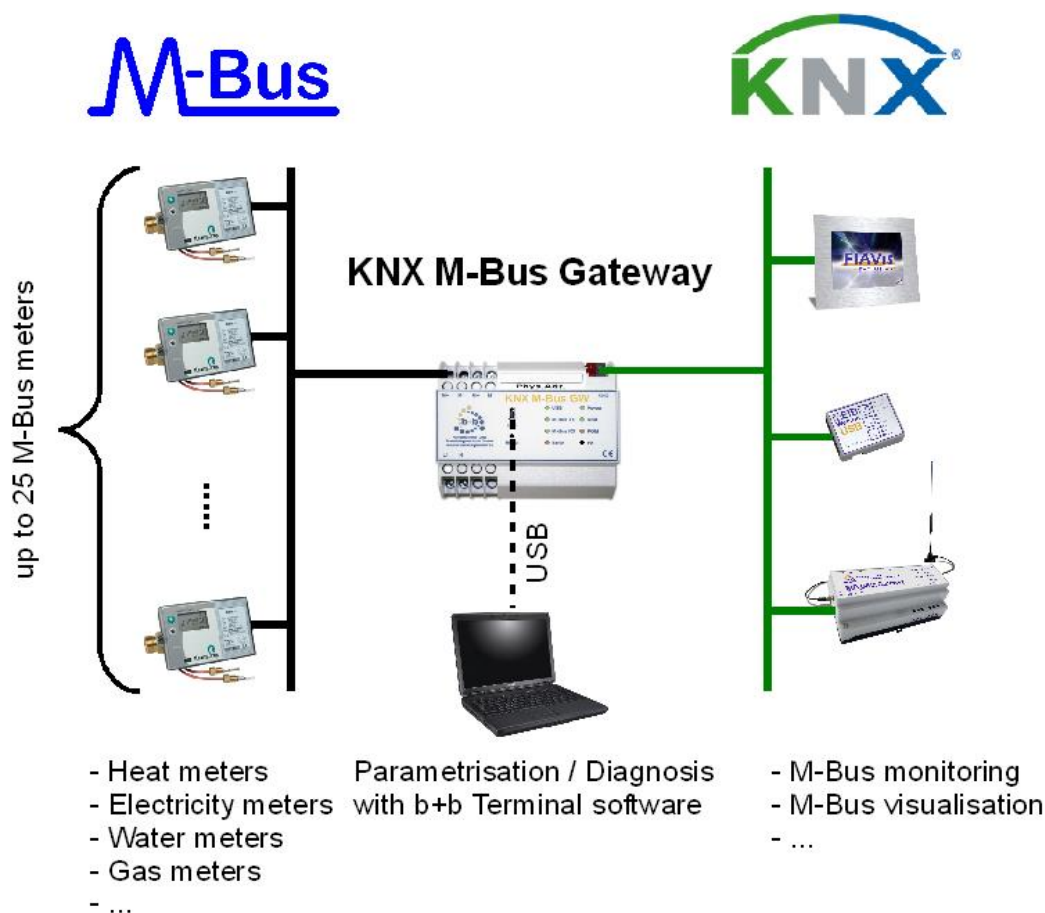

Figure 1: Fields of application KNX M-Bus Gateway

Technical data

|	
External dimensions (W x H x D)	105mm x 90mm x 59mm
Casing	DIN rail mounted, plastic, 6TE, lightgrey (RAL 7035)
Weight	0,3 kg
Power supply	85V – 260V AC, 50Hz – 60Hz, over screw terminals (max. 2 x 2,5mm² solid wire / max. 2 x 1,5mm² flexible wire)
Power consumption	30mA
Temperature range	0°C … +50°C (in operation)
	0°C … +70°C (storage)
Degree of protection	IP20
Interfaces	1.) M-Bus connection over screw terminals: (max. 2 x 2,5 mm² solid wire / max. 2 x 1,5 mm² flexible wire) M-Bus meter requirements: - M-Bus transmission protocol in compliance with EN 1434-3 - Primary or secondary addressing possible - Transfer rate 2400 Baud Up to 25 M-Bus meters can be connected to one KNX M-Bus Gatway. (Up to 25 M-Bus unit loads / 1 unit load = 1.5mA) Up to 200 metered values can be transfer by one KNX M-Bus Gateway. 2.) USB as service interface (for parametrisation / diagnosis) over Mini USB Buchse Typ B Virtual COM port Baudrate 57600 3.) EIB/KNX connection via standard EIB/KNX connector

Table 1: Technical data

Connection overview
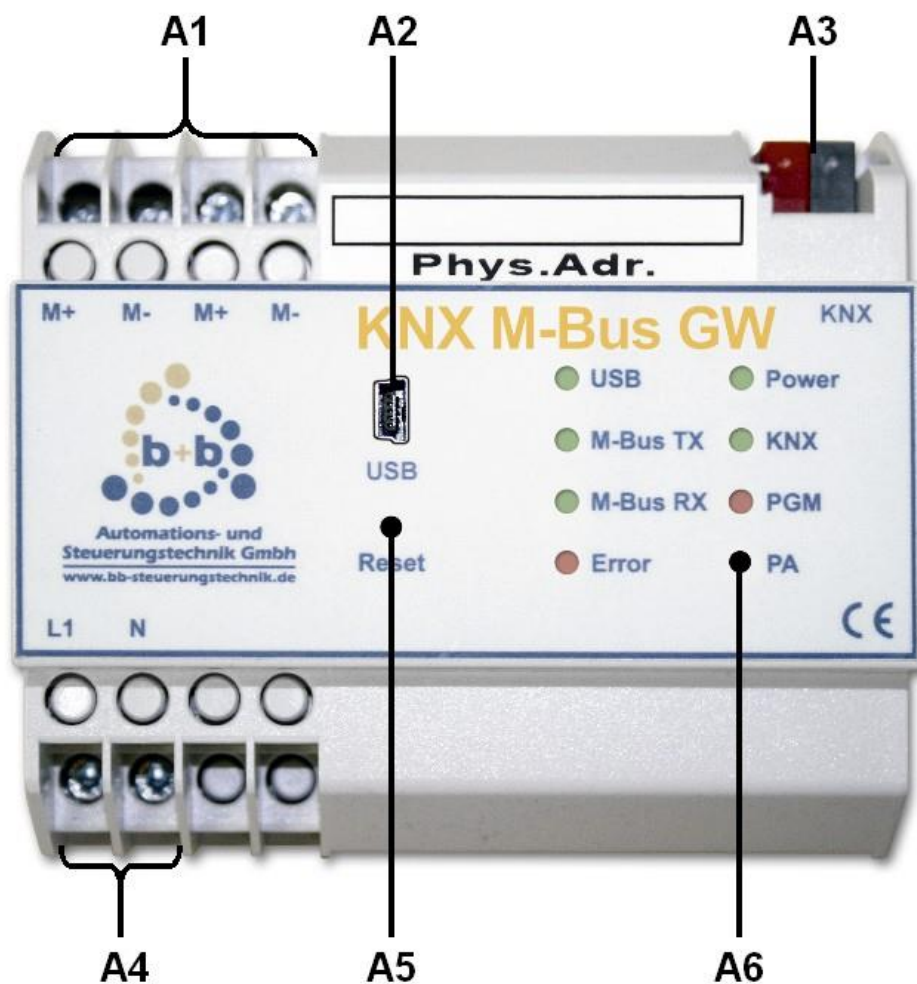
Figure 2: Connection overview KNX M-Bus Gateway

A1	M+ / M-	M-Bus connector
A2	USB	USB connector (Mini USB Typ B)
A3	KNX	EIB/KNX connector
A4	L1 / N	Power supply 85V – 260V AC L1: Phase conductor N: Neutral conductor
A5	RESET	Reset button
A6	PA	Programming button

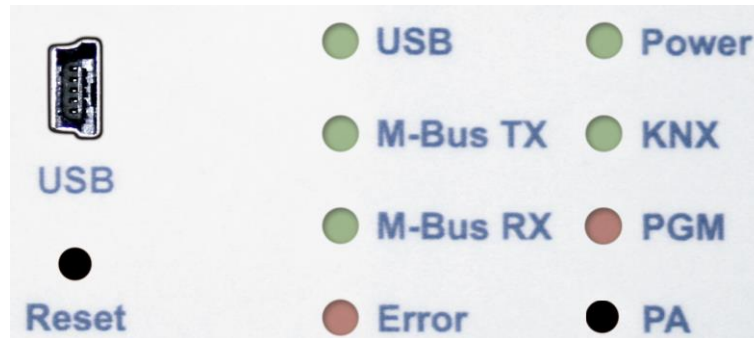Table 2: Connection overview KNX M-Bus Gateway

Display and control elements

Figure 3: Detail view display and control elements

Button	Function
Reset	**Keypress long** (>= 3 seconds): The KNX M-Bus Gateway reboots. **Note:** A reboot is mandatory if you add or remove M-Bus meters to your M-Bus installation!
PA	**Keypress short** (< 3 seconds): The KNX M-Bus Gateway switches to programming mode for EIB/KNX physical address setup. The programming mode is visualised with an illuminated LED **PGM**. You can leave the programming mode by short pressing the **PA** Button again.

LED	Function
USB	**LED flashing:** A data transmission between the PC and the KNX M-Bus Gateway over the USB interface is in progress.
M-Bus TX	**LED flashing:** The KNX M-Bus Gateway sends a M-Bus telegram.
M-Bus RX	**LED flashing:** The KNX M-Bus Gateway receives a M-Bus telegram.
Error	**LED flashing** (frequency: ~ 1Hz): The KNX M-Bus Gateway has detected an EIB/KNX busvoltage breakdown. The EIB/KNX bus voltage is checked cyclic every 30 seconds. **LED blinking** (frequency: ~ 5Hz): The KNX M-Bus Gateway has detected a short circuit on the M-Bus. In this case the LED **M-Bus RX** is also illuminated. **Note:** A reboot of the KNX M-Bus Gateway is mandatory!
Power	**LED illuminated:** Power supply OK
KNX	**LED flashing:** The KNX M-Bus Gateway sends or receives an EIB/KNX telegram.
PGM	**LED illuminated**: The KNX M-Bus Gateway is currently in programming mode, waiting for an EIB/KNX physical address. **LED flashing** (frequency ~1Hz): The KNX M-Bus Gateway is running in normal operating mode.

Table 3: Display and control elements

Installation instruction

- Mount the KNX M-Bus Gateway on a standard DIN rail.
- Connect the KNX M-Bus Gateway to the EIB/KNX bussystem. Connect your M-Bus installation (max. 25 M-Bus meters!) to the KNX M-Bus Gateway.
- Connect the power supply (85V – 260V AC) to your KNX M-Bus Gateway.
- If everything is connected properly you can switch on the power supply.

After installing the KNX M-Bus Gateway you have to configure it **(see section „Parametrisation with the b+b Terminal software").**

Parametrisation with the b+b Terminal software

Before using the KNX M-Bus Gateway you first have to setup the M-Bus meters available in your M-Bus installation. The parametrisation of the gateway is handled with a dialog in the b+b Terminal software and can be transferred to the KNX M-Bus Gateway over the USB interface.

Note: The parametrisation dialog is available in the b+b Terminal software since version 1.29. If you have already installed our b+b Terminal software on your PC please ensure that you have at least version 1.29 (see menu item „*?\Info about b+bTerminal…*") installed. You can find the current version of our b+b Terminal software on the provided EIB Tools CD or on our homepage under „*Support \ Updates and Downloads*".

Before you can parametrise the KNX M-Bus Gateway you first have to install the driver for the USB interface. The driver can be found on the provided EIB Tools CD in the directory „*…\Support\USB KNX M-Bus GW*". For installing the driver please proceed with the following steps:

USB driver installation

There's a setup package available which automatically selects and installs the correct driver which is required by your system. To start this setup doubleclick the file **CDM20802_Setup.exe.** A command prompt window opens for a short period of time and automatically closes. After installing the USB driver you can connect the KNX M-Bus Gateway with your PC. The KNX M-Bus Gateway is recognized and the needed drivers are loaded automatically.

Manual USB driver installation

If you have problems with installing the automatic setup program, you can also install the USB drivers manually. There's a ZIP archive named **CDM20802 WHQL Certified.zip** in the directory „*…\Support\USB KNX M-Bus GW*" on the EIB Tools CD. Copy this file to your harddisk and extract the content into any directory. Proceed with the following steps for manual driver installation:

Ensure that the KNX M-Bus Gateway is connected to the power supply (LED **Power** illuminated) and connect it to your PC with the provided USB cable. You should see the following pop up message in your taskbar:

Figure 4: "Found New Hardware" pop up

After this pop up message the „*Found New Hardware Wizard*" should appear. Select the option „*No, not this time*" and push the „*Next >*" button.

Figure 5: "Found New Hardware Wizard" step 1

In the second step of the Hardware Wizard select the option „*Install from a list or specific location (Advanced)*" and click again on the „*Next >*" button.
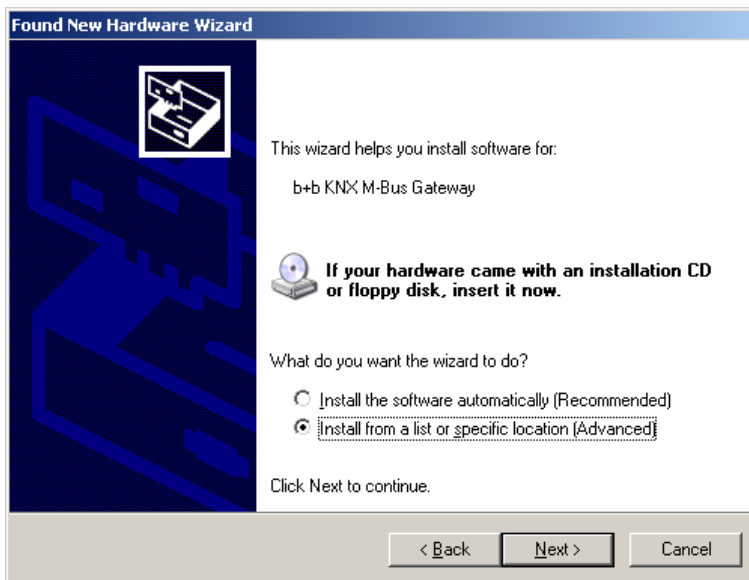

Figure 6: "Found New Hardware Wizard" step 2

In the last step of the Hardware Wizard select the directory on your harddisk in which you have extracted the ZIP archive before and push the button „*Next >*".
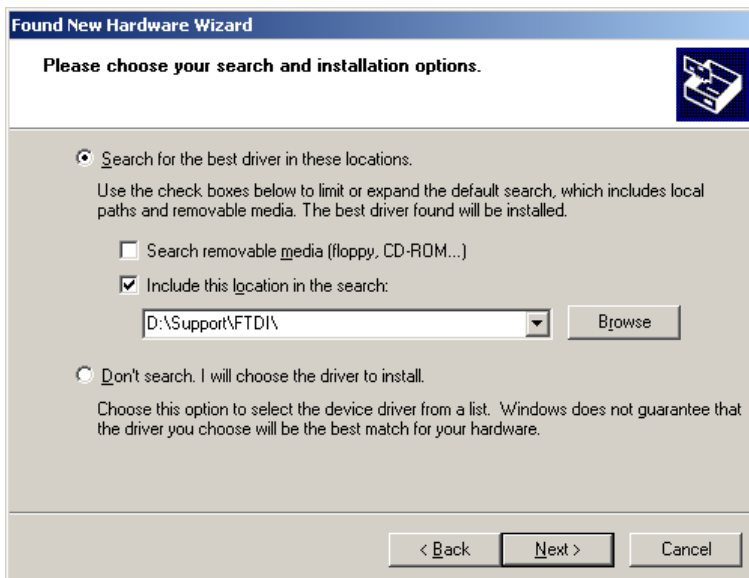
Figure 7: "Found New Hardware Wizard" step 3

The Hardware Wizard signals the successful driver installation in the last dialog. Finish the „*Found New Hardware Wizard*" by pushing the „*Finish*" button.

Figure 8: "Found New Hardware Wizard" successful

After installing the driver for the „*USB Serial Converter*", the Found New Hardware Wizard will ask for a driver for the „*USB Serial Port*". Please repeat the steps of the installation process above to install this driver. The Hardware Wizard again signals the successful driver installation in the last dialog:

Figure 9: "Found New Hardware Wizard" successful

Finish the Found New Hardware Wizard by pushing the „*Finish*" button.

Establish a connection with the KNX M-Bus Gateway

Note: The b+b Terminal software beginning from version 1.30a gives you the opportunity to automatically recognize the virtual COM port of the connected KNX M-Bus Gateway. Open the menuitem „*Settings* → *Communication port / generic settings*". Choose „*Serial*" as connection type and „*b+b KNX M-Bus GW*" in the combobox „*Com port*". Close the window with the „*OK*" button. In all versions < 1.30a you manually need to setup the virtual COM port of your connected KNX M-Bus GW. Please proceed as follows:

To establish a connection with your KNX M-Bus Gateway you have to know the virtual COM port number under which the KNX M-Bus Gateway was installed. To find out this COM port number you have to open the „*Device Manger*" by a right click on the „*My Computer*" symbol on your desktop and choose the menu entry „*Manage*". The „*Computer Management*" window is opened. Select the „*Device Manager*" entry in the left tree view and click on the „*Ports (COM & LPT)*" entry.

You can recognize (and also change) the virtual COM port of your KNX M-Bus Gateway behind the entry „*USB Serial Port*".
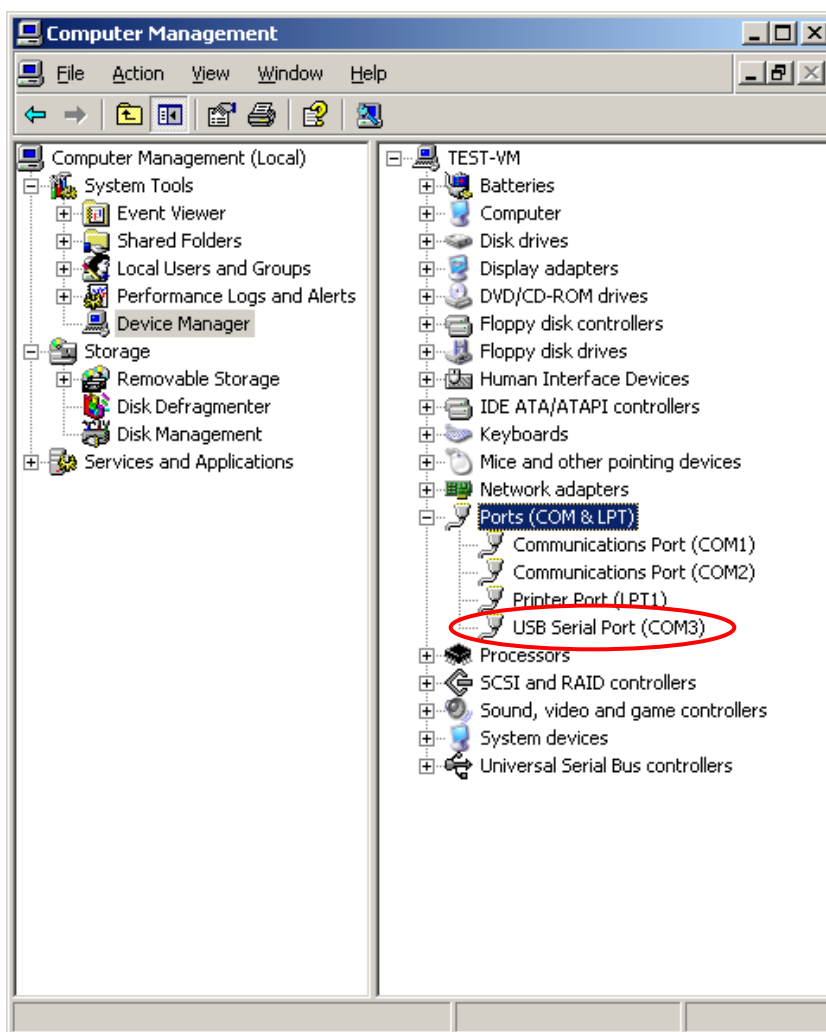

Figure 10: Device Manager

With this information you can now start the b+b Terminal software. Choose the menu entry „*Settings* → *Communication port / generic settings*". The window „*Port settings...*" appears. In this dialog you can select the virtual COM port of your KNX M-Bus Gateway and the following settings:
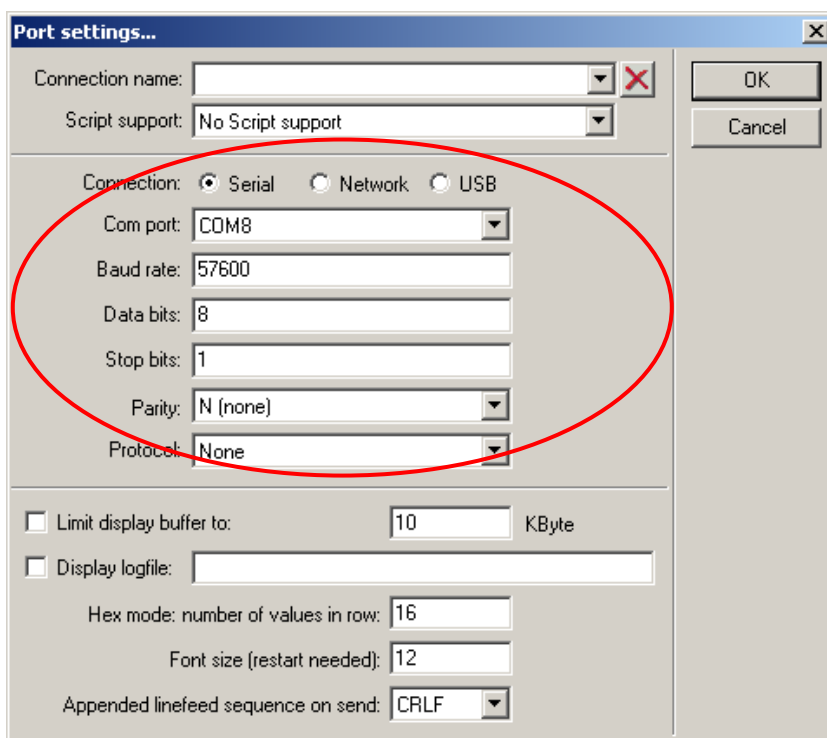

Figure 11: b+b Terminal menu item „*Settings* → *Communication port / generic settings*"

After you've setup the connection, close the window by clicking on the „*OK*" button. To start the communication with your KNX M-Bus Gateway you have to click on the green arrow button in the toolbar. To test the connection you can send a „*?v*" command to your gateway. The KNX M-Bus Gateway should respond with the following text (firmware version and serial number may differ):

```
KNX M-Bus Gateway   V1.00 (compiled Aug 27 2010)   SN: 04207001
```

KNX M-Bus Gateway parametrisation

Note: The data of your installed M-Bus meters which you need to configure the KNX M-Bus Gateway, like e.g. M-Bus address or available M-Bus metered values, can be retrieved from your M-Bus meter's operating manual. Furthermore the KNX M-Bus Gateway also supports diagnosis functions which can be used to determine the needed data from your M-Bus meters. These diagnosis functions are described in the section „*Diagnosis functions*".

To configure your KNX M-Bus Gateways select the menu item „*Settings* → *b+b KNX M-Bus Gateway ...*" in the b+b Terminal software. The following parametrisation dialog appears:
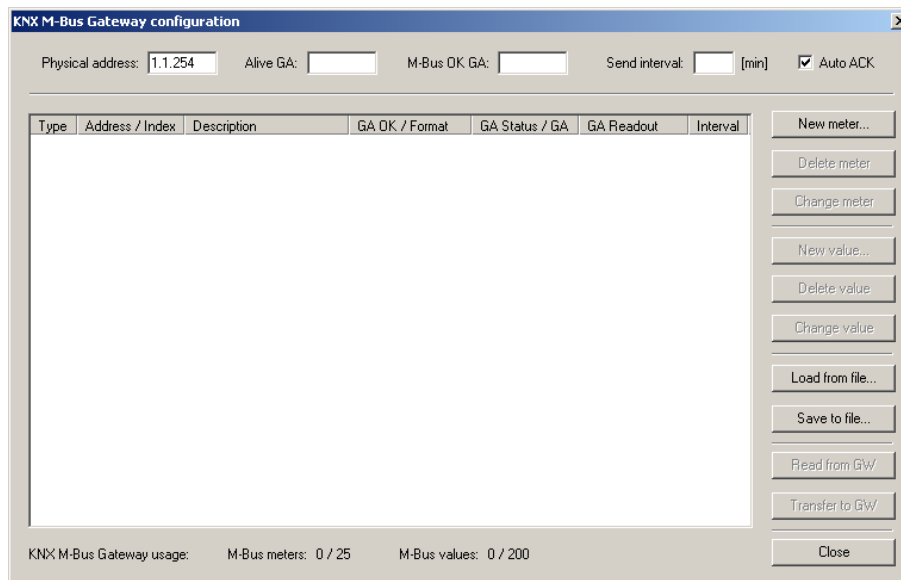
Figure 12: KNX M-Bus Gateway parametrisation dialog

In the top section of the dialog you can setup the gateway specific settings. Enter the desired EIB/KNX physical address for your KNX M-Bus Gateway in the field „*Physical address*".

In the field „*Alive GA*" you have the opportunity to setup an EIB/KNX group address. On this group address a „1" is written cyclic (see description of the field „*Send Interval*") if the KNX M-Bus Gateway is alive.

In the field „*M-Bus OK GA*" you have the opportunity to setup an EIB/KNX group address. On this group address a „1" is written cyclic (see description of the field „*Send Interval*") if no M-Bus failure is present. If the M-Bus Gateway detects a short circuit on the M-Bus it cyclic writes a „0" on the corresponding group address.

The time interval in minutes in which the two EIB/KNX group addresses above are written cyclic can be specified in the field „*Send Interval*".

Activating the checkbox „*Auto ACK*" activates the Auto ACK mode in the KNX M-Bus Gateway. In the Auto ACK mode the KNX M-Bus Gateway automatically acknowledges all EIB/KNX group address telegrams, which can reduce the bus load on your EIB/KNX bussystem.

After setting up the Gateway specific data you can now start to configure your available M-Bus meters and the corresponding M-Bus metered values.

To setup a new M-Bus meter click on the button „*New meter...*". The following window occures:

Figure 13: Add a new M-Bus meter

In this dialog you have to enter the M-Bus meter specific settings. In the field „*Description*" you can enter a description (max. 30 characters) for easily identifying your M-Bus meter. The M-Bus address needs to be entered in the field „*M-Bus address*". The M-Bus meters are secondary addressed by default. If you want to use a primary M-Bus address for your M-Bus meter you have to activate the checkbox „*Primary address*".

In the field „*Meter OK GA*" you have the opportunity to setup an EIB/KNX group address. If the M-Bus meter does not respond to requests from the KNX M-Bus Gateway, a „0" (M-Bus meter failure) is written cyclic (see description of the field „*Poll interval*") on this group address. If the communication with the M-Bus meter can be reconstructed a „1" (M-Bus meter OK) is written once to the parametrised group address.

In the field „*Meter status GA*" you have the opportunity to setup an EIB/KNX group address. On this group address the status of the M-Bus meter is written cyclic (see description of the field „*Poll interval*") as a 8 bit value (0-255).

In the field „*Readout count GA*" you have the opportunity to setup an EIB/KNX group address. On this group address the M-Bus meter's number of readouts is written cyclic (see description of the field „*Poll interval*") as a 8 bit value (0-255).

In the field „*Poll interval*" you can enter a time interval (in minutes) at which the M-Bus meter is readout cyclic. If you don't want to readout the M-Bus meter cyclic, set the value to „0" in this field. The M-Bus meter can then be readout by read requests on the EIB/KNX group address which is parametrised in the field „*Meter OK GA*".

By clicking on the button „*Advanced...*" the dialog is extended with some additional fields for special settings.

Figure 14: M-Bus meter dialog with advanced settings

Note: Please use the follwing settings only if you can not readout your M-Bus meter with the default settings!

In the field „*M-Bus pause*" you can setup a time period in seconds. Before reading out the M-Bus meter the KNX M-Bus Gateway ensures that for the given time period no telegrams are transmitted on the M-Bus.

In the field „*Extended timeout*" you can setup a time period in seconds. With this setting you can expand the time the KNX M-Bus Gateway waits for a response from the M-Bus meter before a timeout occurs.

If you activate the checkbox „*Meter needs additional SND_NKE*", the KNX M-Bus Gateway sends a second SND_NKE command to the M-Bus meter before starting to readout the device.

Figure 15: M-Bus meter settings

After you have setup your M-Bus meter, you have to apply your settings by clicking on the „*OK*" button. You'll return to the main parametrisation dialog.
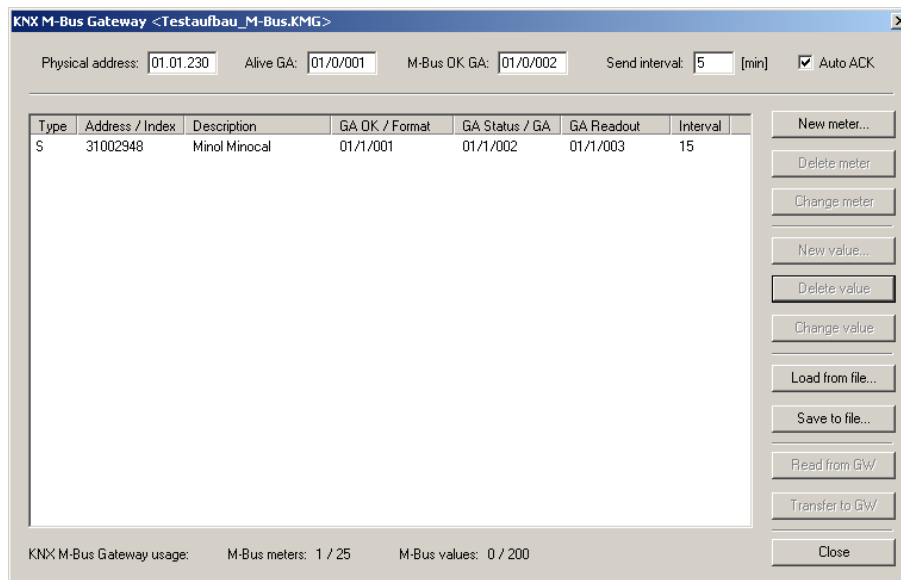
Figure 16: Overview M-Bus meters

To parametrise your M-Bus metered values for the M-Bus meter you've just setup, select the M-Bus meter in the listview and click on the button „*New value...*". The following window occures:
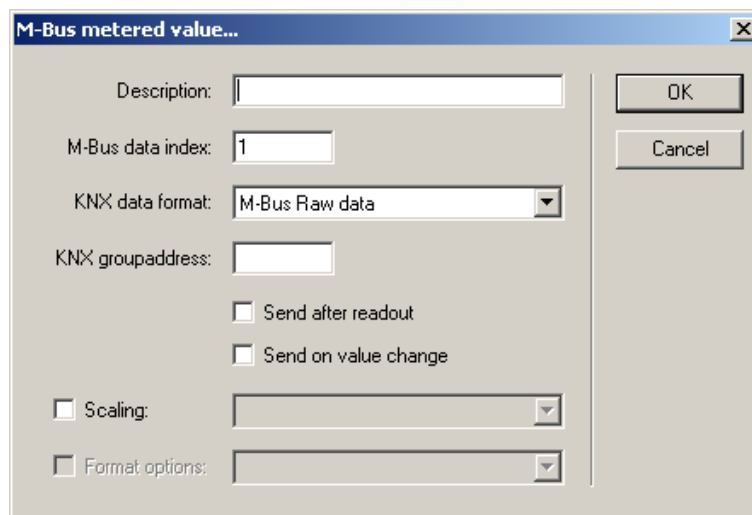
Abbildung 17: Add a new M-Bus metered value

In this dialog you have to setup the M-Bus metered value you want to read out. In the field „*Description*" you can enter a description for your M-Bus metered value (max. 30 characters). The index of the M-Bus metered value you want to readout needs to be entered in the field „*M-Bus data index*".

Note: The available M-Bus metered values of a M-Bus meter can be retrieved from your M-Bus meter's operating manual. The KNX M-Bus Gateway also supports diagnosis functions which can be used to determine the required data. These diagnosis functions are described in the section „*Diagnosis functions*".

In the field „*KNX data format*" you can choose the format in which your M-Bus metered value is converted and transferd to the EIB/KNX bussystem. The following dataformats are available:

M-Bus raw data	The data of the specified data index is transferred to the EIB/KNX without any conversion.
16 Bit binary value	The data of the specified data index is transferred to the EIB/KNX as a 2Byte binary value.
32 Bit binary value	The data of the specified data index is transferred to the EIB/KNX as a 4Byte binary value.
32 Bit IEEE float	The data of the specified data index is transferred to the EIB/KNX as a 4Byte IEEE floating point number. This format is often used with temperature values.
16 Bit KNX float	The data of the specified data index is transferred to the EIB/KNX as a 2Byte EIB/KNX floating point number. This format is often used with temperature values.
14 Byte text	The data of the specified data index is transferred to the EIB/KNX as an ASCII text. This format is useful if you want your M-Bus metered value to be transferred to a text display.

Table 4: Overview available data formats

In the field „*KNX group address*" you have to enter the EIB/KNX group address to which your M-Bus metered value should be transferred.

If you activate the checkbox „*Send after readout*" the M-Bus metered value is transferred to the EIB/KNX after each M-Bus meter readout.
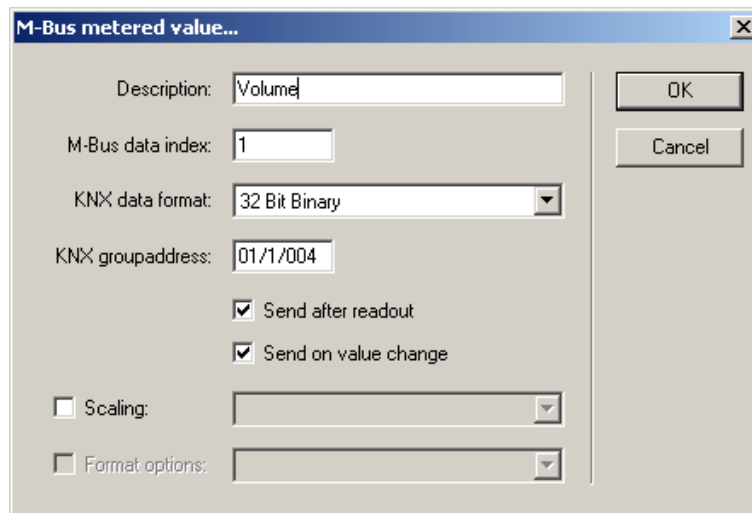
If you activate the checkbox „*Send on value change*" the M-Bus metered value is transferred to the EIB/KNX only if it changed in comparison to the last readout.

If you don't activate any of these two checkboxes the M-Bus metered value is only transferred to the EIB/KNX if there's an EIB/KNX read request on the parametrised group address.

You have the opportunity to additionally scale the M-Bus metered value before transferring it to the EIB/KNX. For scaling, activate the checkbox „*Scaling*" and choose the desired scaling factor in the corresponding combobox.

The checkbox „*Format options*" is only enabled if you choose „*14 Byte text*" as your data format. If you activate the „*Format options*" checkbox you have the opportunity to center or right align the text.

After you have setup all settings for your M-Bus meterd value you can apply your changes by clicking on the „*OK*" Button.
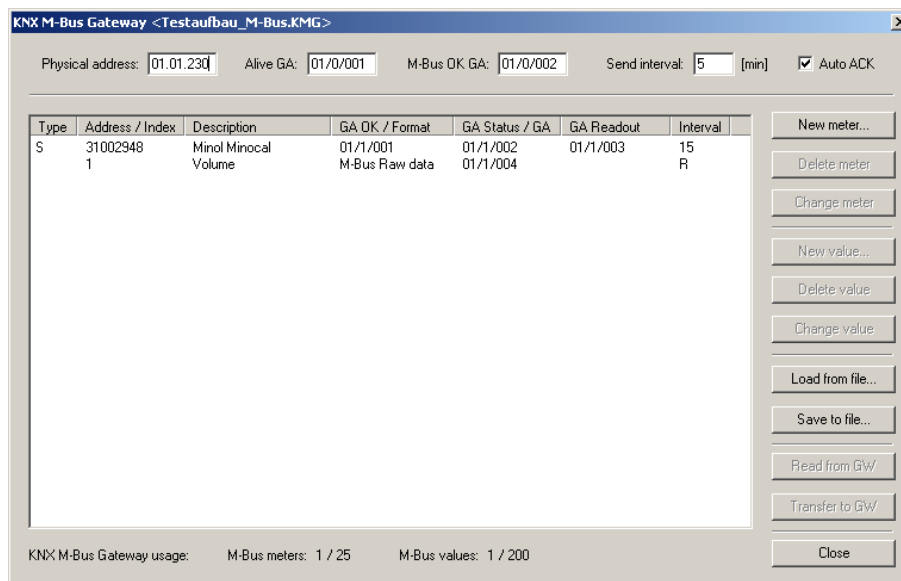
Figure 18: Add new M-Bus metered value

You'll return to the main parametrisation dialog.

Figure 19: Overview M-Bus meters and M-Bus metered values

Repeat the described steps above until you have setup all your M-Bus meters (max. 25 M-Bus meters) and alll your M-Bus metered values (max. 200 M-Bus metered values).

With the button „*Save to file...*" you can save your parametrisation in a „*.KMG*" file. If you want to change your parametrisation you can use the „*Load from file...*" button to reload your parametrisation.

After you have finished your parametrisation you can transfer the parametrisation to the KNX M-Bus Gateway by clicking the button „*Transfer to GW*".

Note: If you want to transfer the parametriazation to your KNX M-Bus Gateway it is necessary to establish a connection to the gateway before opening the parametrisation dialog. You can establish the connection with the „*Start*" button (green arrow in the toolbar). If there's no connection existing to the

KNX M-Bus Gateway the button „*Transfer to GW*" and „*Read from GW*" are deactivated and a parametrisation transfer is impossible.

Important: If you transfer a new parametrisation to your KNX M-Bus Gateway an existing parametrisation in the device is overwritten! With the button „*Read from GW*" you can read out the parametrisation of your KNX M-Bus Gateway at any time and save it.
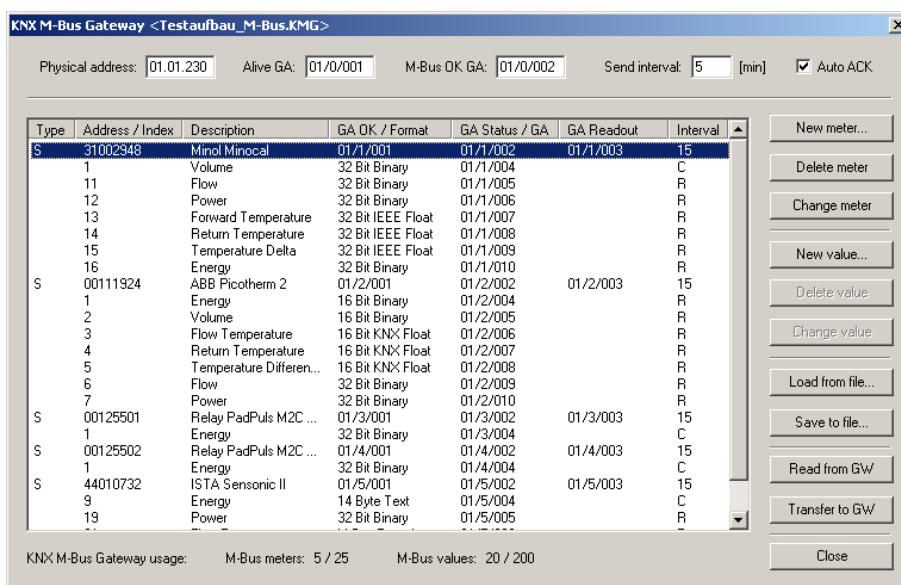

Figure 20: Parametrisation dialog b+b KNX M-Bus Gateway (Online)

Functional description

After the KNX M-Bus Gateway was installed and parametrised it is ready for operation.

The KNX M-Bus Gateway has seven light emitting diodes (LEDs) on its top to visualise occurred er-rors to the user. The meaning of these LEDs was described in the section „*Display and control elements*". In the following section the behaviour of the KNX M-Bus Gateway in different situations is described:

Parametrisation phase

If the KNX M-Bus Gateway is running in parametrisation mode the LEDs **Error, KNX** and **PGM** are blinking altogether (Frequency ~ 1Hz).

System startup

After switching on the power supply the KNX M-Bus Gateway needs to calibrate on the connected M-Bus meters (duration: ~ 30 seconds). This calibration process is visualised by a blinking **M-Bus RX** LED (frequency: ~ 5Hz). If a short circuit on the M-Bus is detected in the calibration phase, the LED **Error** starts to blink (frequency: ~ 5Hz). If the calibration process succedded the KNX M-Bus Gateway checks it's parametrisation.

Important: After adding or removing a M-Bus meter to your M-Bus installation the KNX M-Bus Gateway needs a recalibration to ensure a correct M-Bus meter readout! You can force a recalibration process by pressing the button „**Reset**" more than 3 seconds. The KNX M-Bus Gateway restarts and automatically calibrates on the connected M-Bus meters.

Parametrisation check

After the system startup the KNX M-Bus Gateway checks it's parametrisation. If the Gateway has no parametrisation or an corrupted parametrisation the LEDs **Error, KNX** and **PGM** are blinking in common. In this case the KNX M-Bus Gateway needs to be parametrised for operation (see section „*Parametrisation with the b+b Terminal software*").

After the parametrisation check succedded the KNX M-Bus Gateway sends the text „*KNX M-Bus Gate-way started*" via the USB interface.

The KNX M-Bus Gateway is now runninig in normal operating mode, which is signaled by a cyclic flash-ing (frequency: ~ 1Hz) of the LED **PGM**.

Diagnosis functions

The KNX M-Bus Gateway offers an easy ASCII command interface for doing diagnosis on the M-Bus system. The user can connect to the KNX M-Bus Gateway with a terminal program and search or readout the connected M-Bus meters.

The communication between PC and KNX M-Bus Gateway is textbased. The "carriage return" character (0x0D hexadecimal) signals the end of an ASCII command and is abbreviated with **<CR>** in the following text. ASCII commands from the PC are case insensitive.

ASCII commands overview

Table 5 gives an overview of all ASCII command which are supported by the KNX M-Bus Gateway.

Note: You can also view a short overview of all ASCII commands if you send the command „**?**" or „**?H**" to the KNX M-Bus Gateway.

?, ?H	Show ASCII command overview
?V	Show information about serial number and firmware version ot the KNX M-Bus Gateway
?P	Show physical address of the KNX M-Bus Gateway
?G	Overview KNX M-Bus Gateway settings
DISPDEVS	Show all parametrised M-Bus meters and M-Bus metered values
DISPDEV=<DEV>	Show parametrisation of M-Bus meter <DEV> (<DEV> = 1 ... 25)
DISPDEVCHL=<DEV>	Show channel parametrisation of M-Bus meter <DEV> (<DEV> = 1 ... 25)
DISPALLCH	Show all channel parametrisations of all M-Bus meters
DISPCH=<CH>	Show parametrisation of channel <CH> (<CH> = 1 ... 200)
DISPCHL=<CH>	Show parametrisation of channel <CH> and all linked channels with the same parent M-Bus meter (<CH> = 1 ... 200)
DISPALLGAE	Show a list of all used EIB/KNX group addresses
DISPGA=<GA>	Show settings of EIB/KNX group address <GA> (z.B. <GA> = 0/0/1)
DISP1STGAE	Show index of first EIB/KNX group address entry
ERASE!	Erase KNX M-Bus Gateway parametrisation
OA{+|-}	KNX Auto Acknowledge mode: **OA+:** enabled **OA-:** disabled

OL	Language of dialog texts: German
OLE	Language of dialog texts: English
PA:<PA>	Set physical address <PA> (e.g. <PA> = 1.1.10)
READPRIM=<ADR>	Readout M-Bus meter with primary address <ADR> (e.g. <ADR> = 1)
READSEC=<ADR>	Readout M-Bus meter with secondary address <ADR> (e.g. <ADR> = 12345678)
RESET	Restart KNX M-Bus Gateway
SEARCHPRIM	Search for primary addressable M-Bus meters
SEARCHPRIMD	Search for primary addressable M-Bus meters (extended information)
SEARCHSEC	Search for secondary addressable M-Bus meters
SEARCHSECD	Search for secondary addressable M-Bus meters (extended information)
STOP	Stop M-Bus meter search

Table 5: Overview ASCII commands

Searching connected M-Bus meters

To get an overview of all M-Bus meters (maximal 25!) which are connected to the KNX M-Bus Gateway and are primary addressable you can send the ASCII command **SEARCHPRIM** or **SEARCHPRIMD** (if you are also interested in an overview of all available M-Bus metered values for each M-Bus meter) to the KNX M-Bus Gateway. You'll receive a response from the gateway in the following format:

```
searchprim
 Searching slaves PRIMARY addressed, please wait...
 Searching primary address range:   0 -    9
 Slave found at Primary Address:     1
 Response BAD! More than one slave addressed.
 Slave found at Primary Address:     3
 Response OK ----------------------------
 Searching primary address range:  10 -   19
 Searching primary address range:  20 -   29
 Searching primary address range:  30 -   39
 Searching primary address range:  40 -   49
 Searching primary address range:  50 -   59
 Searching primary address range:  60 -   69
 Searching primary address range:  70 -   79
 Searching primary address range:  80 -   89
 Searching primary address range:  90 -   99
 Searching primary address range: 100 -  109
 Searching primary address range: 110 -  119
 Searching primary address range: 120 -  129
```

```
Searching primary address range: 130 - 139
Searching primary address range: 140 - 149
Searching primary address range: 150 - 159
Searching primary address range: 160 - 169
Searching primary address range: 170 - 179
Searching primary address range: 180 - 189
Searching primary address range: 190 - 199
Searching primary address range: 200 - 209
Searching primary address range: 210 - 219
Searching primary address range: 220 - 229
Searching primary address range: 230 - 239
Searching primary address range: 240 - 249
Slave search finished
```

Listing 1: ASCII command **SEARCHPRIM** response

In the sample response above you can see that two or more M-Bus meters are connected to the KNX M-Bus Gateway which have the sample primary address (here: 1). These M-Bus meters can not be addressed with their primary address because of the address collision. If you want to use these M-Bus meters in your parametrisation it is mandatory to use their secondary address.

The sample response also shows that there's another M-Bus meter with a primary address of 3. This M-Bus meter can be primary addressed without any problem.

The M-Bus meter search (primary addressed and secondary addressed) can be canceled by sending the **STOP** command.

To get an overview of all M-Bus meters (maximal 25!) which are connected to the KNX M-Bus Gateway and are secondary addressable you can send the ASCII command **SEARCHSEC** or **SEARCHSECD** (if you are also interested in an overview of all available M-Bus metered values for each M-Bus meter) to the KNX M-Bus Gateway. You'll receive a response from the gateway in the following format:

```
Searchsec
 Searching slaves SECONDARY addressed, please wait...
 Searching secondary address range: 0xxxxxxx
 Slave found at Secondary Address: 00111924
 Response OK ----------------------------
 Slave found at Secondary Address: 00125501
 Response OK ----------------------------
 Slave found at Secondary Address: 00125502
 Response OK ----------------------------
 Slave found at Secondary Address: 05400811
 Response OK ----------------------------
 Searching secondary address range: 1xxxxxxx
 Searching secondary address range: 2xxxxxxx
 Searching secondary address range: 3xxxxxxx
 Slave found at Secondary Address: 31002948
 Response OK ----------------------------
 Searching secondary address range: 4xxxxxxx
 Slave found at Secondary Address: 44010732
 Response OK ----------------------------
 Searching secondary address range: 5xxxxxxx
 Searching secondary address range: 6xxxxxxx
 Searching secondary address range: 7xxxxxxx
```

```
Searching secondary address range: 8xxxxxxx
Searching secondary address range: 9xxxxxxx
Slave search finished
```

<div align="center">Listing 2: ASCII command SEARCHSEC response</div>

In the sample response above you can recognize that there are five M-Bus meters connected to the KNX M-Bus Gateway which are secondary addressable.

Readout detailed information from M-Bus meters

To get detailed information about a specific M-Bus meter in your M-Bus installation the commands **READPRIM=** and **READSEC=** are available. With these two commands you can directly readout a primary addressable M-Bus meter (**READPRIM=**) or a secondary addressable M-Bus meter (**READSEC=)** to get an overview of all available M-Bus metered values. In the following sample a secondary addressable M-Bus meter with the address „00111924" should be readout. The KNX M-Bus Gateway sends the following response:

```
readsec=00111924
 Response OK ----------------------------------
 M-Bus Response: Data length=58
 C=0x08 A=1 CI=0x72
 INTEL order, Variable Data response
 Ident. Nr.:    00111924
 Manufacturer:  [ABB]
 Version:       0x08
 Medium:        [Heat]
 Access Nr.:    0xD2
 Status:        0x00
 Signature:     0x00 0x00

  DIDX: [  1] ----------------------------
  DIF:  0x04  Datatype: 32 Bit Integer
     :  Storage: 0 Function: Instantaneous value
  VIF:  0x07  Unit: Energy [10e4 Wh]

  Data Value:  195883 [10e4 Wh]

  DIDX: [  2] ----------------------------
  DIF:  0x04  Datatype: 32 Bit Integer
     :  Storage: 0 Function: Instantaneous value
  VIF:  0x14  Unit: Volume [10e-2 m3]

  Data Value:  6557346 [10e-2 m3]

  DIDX: [  3] ----------------------------
  DIF:  0x02  Datatype: 16 Bit Integer
     :  Storage: 0 Function: Instantaneous value
  VIF:  0x5B  Unit: Flow Temperature [°C]

  Data Value:  51 [°C]
```

```
   DIDX: [  4] -----------------------------
   DIF:  0x02  Datatype: 16 Bit Integer
     :  Storage: 0 Function: Instantaneous value
   VIF:  0x5F  Unit: Return Temperature [°C]

   Data Value:  25 [°C]


   DIDX: [  5] -----------------------------
   DIF:  0x02  Datatype: 16 Bit Integer
     :  Storage: 0 Function: Instantaneous value
   VIF:  0x62  Unit: Temperature Difference [10e-1 K]

   Data Value:  258 [10e-1 K]


   DIDX: [  6] -----------------------------
   DIF:  0x04  Datatype: 32 Bit Integer
     :  Storage: 0 Function: Instantaneous value
   VIF:  0x3C  Unit: Volume Flow [10e-2 m3/h]

   Data Value:  0 [10e-2 m3/h]


   DIDX: [  7] -----------------------------
   DIF:  0x04  Datatype: 32 Bit Integer
     :  Storage: 0 Function: Instantaneous value
   VIF:  0x2D  Unit: Power [10e2 W]

   Data Value:  0 [10e2 W]


   DIDX: [  8] -----------------------------
   DIF:  0x04  Datatype: 32 Bit Integer
     :  Storage: 0 Function: Instantaneous value
   VIF:  0x6D  Unit: Time Point [time & date]

   Data Value:  26.06.02 19:33

   Manuf. Data: 0x00 Bytes
 End of record, more records would follow
```

Listing 3: ASCII command **READSEC=00111924** response

The available M-Bus metered values of the M-Bus meter are described in M-Bus data indexes (**DIDX**). You can get the description, the dimension and the scaling of the M-Bus metered value.

In the sample above you can recognize that the Flow Temperatur is transferred at M-Bus data index 3 and the Return Temperatur at M-Bus data index 4, both in the dimension „°C". The Temperature Difference of these two values is available at M-Bus data index 5 in the dimension „10^{-1} °K".

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