



**Automations- und
Steuerungstechnik GmbH**

Documentation

KNX-GSM Gateway



**EIB/KNX remote control and
alarming with a mobile phone**

Order number: E001-H031007



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

Softwaredesign und Coding:	Volker Knapp, Peter Bernert, Michael Herbst
Documentation:	Volker Knapp, Peter Bernert, Michael Herbst
Editor:	Steffen Kiene

b+b Automations- und Steuerungstechnik GmbH

**Eichenstraße 38a
D-64743 Beerfelden
Tel.: +49 6068 / 478910**

**Email: support@bb-steuerungstechnik.de
Internet: <http://bb-steuerungstechnik.de>**



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Highlights KNX-GSM Gateway

- Bi-directional EIB/KNX \leftrightarrow GSM communication via short messages (SMS)
- Quadband GSM support for worldwide use
- Only additional SIM card required, no other hardware is needed
- Integrated EIB/KNX – bus coupling unit with two wire EIB/KNX connector
- Integrated real time clock
- Writing values to all 32767 groupaddresses by SMS
- Up to 100 event messages can be set to up to 8 receivers
- A receiver can be: (*: network provider dependent)
 - mobile phone
 - telephone *
 - fax *
 - e-mail address *
- Eight event time ranges are possible, time synchronisation via EIB-DCF
- Access control for protection against unauthorized access to your EIB/KNX – installation:
 - phone number filter
 - password protection for commands via SMS
 - groupaddress filter
- Alarm input
- Automatic log in to the GSM network after power failure
- Alarming on sabotage, bus voltage loss, bus voltage return
- Routine event message every X hour for monitoring the gateway („Alive – SMS“)
- Event message when starting the gateway („BootUp – SMS“)
- Easy configuration using the EIBDoktor software

Fields of application

- Remote control your EIB/KNX – installation via mobile phone over GSM network
- Monitor your EIB/KNX – installation via mobile phone over GSM network

Contents of delivery

- KNX-GSM Gateway
- Dualband GSM antenna (supports GSM frequency bands 900MHz and 1800MHz)
- EIBDoktor software for configuration
- Documentation



Introduction

The KNX-GSM Gateway offers a bi-directional communication between the EIB/KNX and the GSM network via short messages (SMS). This allows you to remote control and monitor your EIB/KNX installation with a mobile phone.

Every authorized user can read from/write to EIB/KNX group addresses via mobile phone, if these addresses are unlocked in the KNX-GSM Gateway. Furthermore the KNX-GSM Gateway provides the opportunity to send short messages to one or more receivers if certain events (e.g. "Temperature > x°C") occur. This can be used to inform the user about interferences.

The KNX-GSM Gateway supports the widespread mobile phone standard GSM. This is why it can be used in almost any place.

Technical data

General

Dimensions (W x H x D) (mm)	156 x 86 x 59
Power supply	230V AC
Current consumption	5VA
Temperature range	0°C – 50°C (in operation)
Degree of protection	IP40 (frontside, after installation)
Casing	DIN-rail mounted, 9TE
GSM standard	Quadband GSM (GSM 900, GSM1800, GSM 850, GSM 1900)
GSM antenna	5dBi antenna, Dualband GSM (GSM 900, GSM 1800), magnetic base, SMA connector (male)

GSM Standards

The KNX-GSM Gateway was developed for operating in four different GSM frequency bands:

- 900MHz (mainly used in Europe)
- 1800MHz (mainly used in Europe)
- 850MHz (mainly used in USA)
- 1900MHz (mainly used in USA)

The KNX-GSM Gateway supports all current GSM standards because it uses GSM Quadband technology.

Important: You have to ensure, that your GSM network provider supports the short message service and that this service is activated for your account!



SIM cards

A SIM card from a GSM network provider is needed for communication in the GSM network. This SIM card identifies the user in the GSM network. The KNX-GSM Gateway supports 1,8V and 3V mini SIM cards.

Important: Bevor changing the SIM card you have to cut the power supply from the KNX-GSM Gateway. This is important to save the SIM card from damage!

GSM antenna

Every GSM antenna with SMA connector (male) can be used with the KNX-GSM Gateway. You only have to ensure that the used antenna supports the frequency band used by your GSM network provider.

Note: The included antenna is a Dualband antenna which supports operation in the frequency bands 900MHz and 1800MHz. If you plan to use the KNX-GSM Gateway in the frequency band 850MHz or 1900MHz you have to provide an extra antenna which supports these frequency bands.



Overview

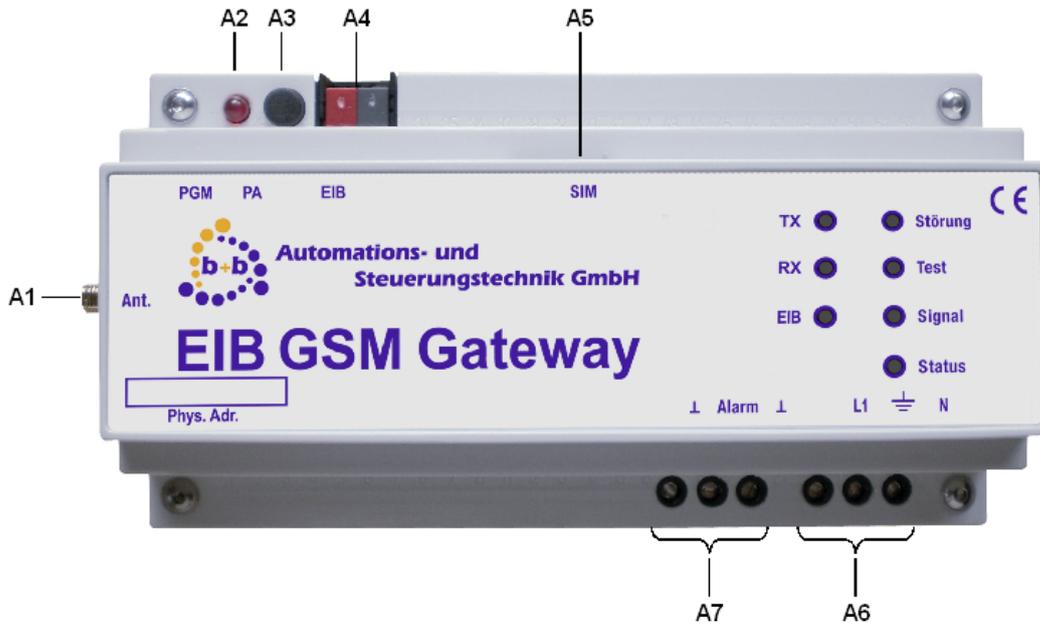


Figure 1: KNX-GSM Gateway overview

- | | | |
|-----------|---|-------------------------------------|
| A1 | Ant . | GSM antenna, SMA connector (female) |
| A2 | PGM | Programming LED |
| A3 | PA | Programming Button |
| A4 | EIB | EIB/KNX connector |
| A5 | SIM | SIM card holder |
| A6 | | Power supply 230V AC |
| |  | : Protective conductor |
| | N : | Neutral conductor |
| | L1 : | Phase conductor |
| A7 | | Alarm input, n.c. |
| | \perp : | Ground |
| | Alarm : | Alarm |



Installation instruction

Mount the KNX-GSM Gateway on DIN rail. After this insert the SIM card in the SIM card holder (**A5**). While inserting the SIM you should see the SIM card's backside (side without contacts). The next step is to connect the Gateway to the EIB/KNX bus system and to the power supply 230V AC. If everything is connected properly you can switch on power supply.

Changing the SIM card: To unlock the SIM card holder you have to push the SIM card into the casing. When releasing the pressure the SIM card holder unlocks and you can take the SIM card from the KNX-GSM Gateway.

Important: It is important to cut the power supply bevor you change the SIM card! This prevents the SIM card from being damaged!

After installing the KNX-GSM Gateway you have to configure it (see „*Configuration with the EIBDoktor Software*“).



Functions

After installing and configuring the KNX-GSM Gateway it is ready for usage.

The KNX-GSM Gateway has seven light emitting diodes (LEDs) on its top to visualize occurred errors to the user. The meaning of these LEDs is described in the following section.

LED description

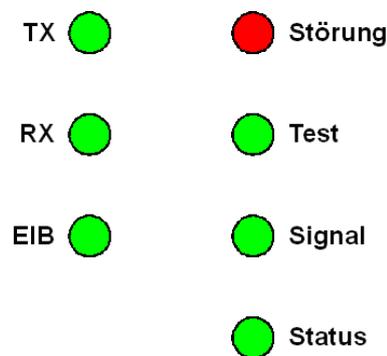


Figure 2: Overview LEDs

LED	Function		
	LED off	LED on	LED blinking
TX			SMS sending
RX			SMS receiving
EIB			Flashing when receiving / sending EIB/KNX telegrams Blinking with 1Hz if no connection to the EIB/KNX system is available
Störung		Error occurred → see below for details	
Test		Sending SMS for test	Measure signal strength
Signal	no GSM signal	GSM signal strength good	Blinking shows poor GSM signal strength
Status			Blinking with 1Hz in normal operation mode

Parameterisation phase

If the KNX-GSM Gateway is in the parameterisation phase the LEDs **Test**, **Signal** and **Status** are **blinking alternately**. Additionally the programming LED (**PGM**) is blinking.



System startup phase

Power up

When switching on the power supply the KNX-GSM Gateway switches **all LEDs on and off**. The LEDs are switched one after another in the following order:

Status → **Signal** → **Test** → **Störung** → **TX** → **RX** → **EIB**

Check Parametrization

After Power up the KNX-GSM Gateway checks its parametrization. If the gateway is not yet configured or the parametrization is incorrect or inconsistent the LEDs **Störung**, **Test**, **Signal** and **Status** are blinking simultaneously. In this case you have to configure the KNX-GSM Gateway before you can use it (see „*Configuration with the EIBDoktor software*“).

Initialization

If the KNX-GSM Gateway is configured correctly the initialization phase starts. First, the gateway checks if a SIM card exists in the SIM cardholder. If there's no SIM card present in the KNX-GSM gateway, the LED **Status** is switched on and the LED **Störung** starts **blinking** (ca. 1Hz). The KNX-GSM gateway will stop in this state and no further initialization steps will be executed.

Important: You have to switch off the power supply before inserting the SIM card in the SIM cardholder! This is important to save the SIM card from damage!.

Next, if a SIM card is inserted in the KNX-GSM Gateway, the configured PIN is checked. If the PIN is rejected by the SIM card, the LED **Störung** starts **blinking** (ca. 1Hz) and the LED **Signal** is **switched on**. In this case the initialization phase is also cancelled and the KNX-GSM Gateway stops in the current state.

Note: Normally SIM cards are locked if you enter an invalid PIN three times. If the KNX-GSM Gateway shows an invalid PIN, you have to correct your parameterisation and upload this parameterisation into the KNX-GSM Gateway. If you boot the KNX-GSM Gateway three times with an incorrect PIN your SIM card will be locked! In this case the SIM card can not be used anymore in the KNX-GSM Gateway. You have to unlock your SIM card with the corresponding PUK (Personal Unblocking Key) in a normal mobile phone.

The LED **RX** will **blink** (ca. 1Hz) if the configured PIN is accepted by the SIM card. After the PIN checking phase the KNX-GSM Gateway will try to log in to the GSM network. The LEDs **Status**, **Signal** and **Test** will show the current state of the log in action. Thereby the three LEDs will be illuminated in the following order:

- **Status** illuminates
- **Signal** illuminates
- **Status** and **Signal** illuminate
- **Test** illuminates



- **Status** and **Test** illuminate
- **Signal** and **Test** illuminate
- **Status**, **Signal** and **Test** illuminate
- **Status**, **Signal** and **Test** are switched off.

At this moment the log in procedure is finished successfully. Next step is checking the GSM signal strength. When the signal strength is evaluated the LED **RX** will also be switched off.

The evaluated GSM signal strength is visualized by the LED **Signal**. If the LED is illuminating this means a good GSM signal strength, if the LED flashes GSM signal is poor.

The GSM signal strength and the LED **Signal** are updated every 60 seconds. When this actions takes place the LED **Test** will flash.

When starting the KNX-GSM Gateway the current time needs to be adjusted. This is performed by the KNX-GSM Gateway by sending a short message to it's own mobile phone number. This action is shown to the user by a blinking LED **Status** and an illuminating LED **Test**.

If the SMS sending fails the LED **Störung** starts blinking and the LEDs **Status** and **Signal** illuminate.

After sending the Test SMS successfully the KNX-GSM Gateway is waiting for the receiving. The LED **Test** is switched off if the SMS is received successfully. After this SMS receive the system startup phase is over and the KNX-GSM Gateway is ready for action.

Test mode

It is also possible to check if the KNX-GSM Gateway is in operation and is logged in the GSM network even if you are on the way. You just have to call the KNX-GSM Gateway's mobile phone number from any telephone. The KNX-GSM Gateway will accept the call and will answer with four different tones. After these tones the gateway hangs up the call automatically.

Alarm input

The KNX-GSM Gateway offers an additional alarm input. This input offers the opportunity to connect a contact of sabotage to the KNX-GSM Gateway. This contact can e.g. be a switch which can monitor the door opening of your control cabinet. To use this alarm input feature the KNX-GSM Gateway must be configured to activate the input. After the parameterisation the monitoring of the contact is activated as soon as the contact is closed the first time.



Configuration with the EIBDoktor software

The KNX-GSM Gateway needs a correct configuration to work properly. This configuration can be generated with the EIBDoktor software, the configuration data transfer can be done directly with the EIBDoktor or with the ETS software.

Start the EIBDoktor software, and select the menu item „Options“ → „KNX-GSM Gateway...“. The following window will appear:

In the upper line you have to enter the serialnumber of the Gateway (can be found on the case of the device), and the wanted physical address of the device. Additional you have to enter a „Parameter group address“, this address will be used to send the gateway configuration to the device.

The button „Transfer to GW“ starts the device configuration. This button is only available if the EIBDoktor software is connected to the EIB with an EIBDoktor-EIBWeiche. If you do not have such a bus coupling device available, you can save the current configuration by the button „Save to file...“. This will also save a „.TEL“ file, which can be loaded and used in the ETS software, to transfer the gateway configuration.

The button „Load from file...“ loads a saved configuration into the configuration window.



In the upper part of the window you have to enter the SIM card details to access the mobile network. Please enter the correct PIN number of the card, and the matching phone number. All phone numbers have to be entered in the international format (+49...) without blanks and special characters!

Up to eight receiver phone numbers can be stored and used in the gateway (E1 – E8). Each message can refer to one or more of this numbers, so you can create different message priorities.

You can specify an external EIB/KNX time address, to synchronize the Real-Time-Clock of the Gateway with an EIB/KNX DCF device.

In the middle area of the window you can see the list with up to 100 defined messages, which will be send by incoming EIB data. Below the list you can optionally activate certain alarming messages..

Sending a SMS by incoming EIB data

Up to 100 different events and messages can be stored in the Gateway. Push the button „Add...“ to define a new message, the following window will appear:

SMS message

Receiver: E1 E2 E3 E4 E5 E6 E7 E8

Group address: 00/0/000

Data type: No EIS type

Text: ...

Append current value to message text

Send SMS when: Receiving a value

Lower limit: ...

Upper limit: ...

Send always (not only once when the limit has been reached)

Time limit: Send SMS independed from current time
 Send SMS only if current time is in the given time range
 Send SMS only if current time is outside the given time range

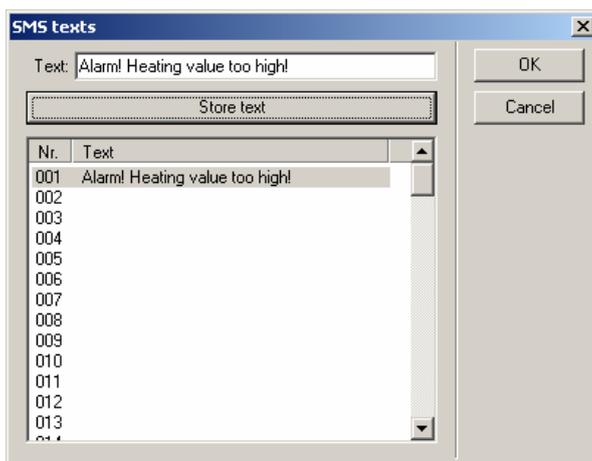
Time range: ...

OK
Cancel

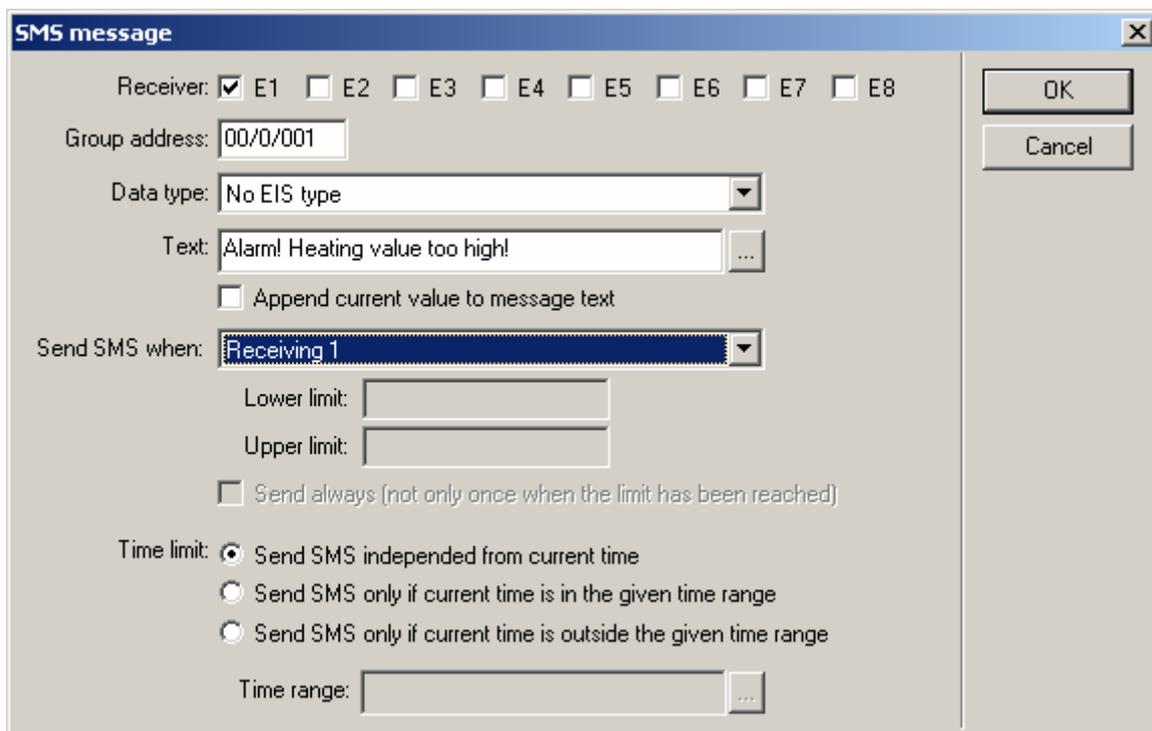


First you select the up to 8 receiver of this message, by selecting the check boxes E1 to E8. In the edit field „Group address“ you have to enter the address you want to react to. Next is the EIB data type, possible are simply switches (1 bit), but also 8, 16 and 32 bit integer values, and floating point numbers (16 and 32 bit formats are supported).

Simply press the „...“ button to define the related message text:



Here you can define up to 100 different texts, by selecting a number in the list, entering the text, and pressing the „Store text“ button. To use this text in a message, select the text in the list and press “OK”:





If you want to get the incoming value inside the SMS, you can activate the option „Append current value to message text“.

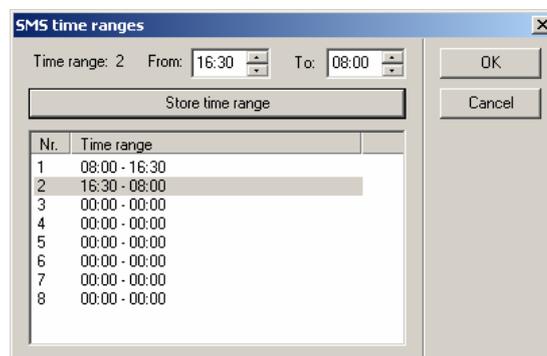
In the middle area you define when the SMS should be send, the following event types are possible:

- Receiving a value
- Receiving 0
- Receiving 1
- Receiving 0 → x
- Receiving x → 0
- Value below lower limit
- Value in range
- Value outside range
- Value above upper limit

The last four events need additional lower/upper limit values. Please take care that the limits are matching the selected EIB data type.

The limit/range events will by default only triggered, if the limit/range condition has been reached the first time. If you for example are using “Value below lower limit”, and the temperature is falling into this range, a SMS will be send. If the temperature doesn't leave this lower area, no new messages will be send. If you want a message on every incoming value, you have to activate the option “Send always”.

You can also lock each message to a time range. If you select „Send SMS independed from current time“, the message will be send always. If you select the “Send only ... in / out time range“, you can additionally create and select a time range fort his message. Up to eight time ranges are possible;:



After you have defined your message, pressing “OK” will add it to the list in the main window:



KNX-GSM Gateway Parameters

GSM gateway: GW serialno.: Phys. address: Param. address:

PIN of SIM card: Phone number of SIM card:

Sync GW time with EIB time EIB time group address:

Receiver phone nr. (max 8): E1: E2: E3:
E4: E5: E6:
E7: E8:

SMS send parameters

Receivers	GA	Datatype	SMS text	A...
1/2	00/0/001	Switch (1 bit)	Alarm Heizungsraum!	
1	00/0/002	IEEE float (32 bit)	Temperaturüberschreitung:	X
1/2	01/2/003	Value (32 bit - sign)	Flußkontrolle	

SMS on sabotage ... E1 E2 E3 E4 E5 E6 E7 E8
 SMS on bus power loss ... E1 E2 E3 E4 E5 E6 E7 E8
 SMS on bus power recovery ... E1 E2 E3 E4 E5 E6 E7 E8
 SMS on start of gateway ... E1 E2 E3 E4 E5 E6 E7 E8
 From every hours ... E1 E2 E3 E4 E5 E6 E7 E8

SMS receive parameters

Accept incoming SMS only from the eight receiver phone numbers
 Password security: read/write on "#[Password].Command" Password:
 Send current process-value on receive of "R[GA]"
 Allow writing values on all GAs: "w[GA],[Type]=[Value]"
 Allow writing only for the following GAs:

Up to 100 EIB messages are possible.

Below the message list you can activate optional messages for special events:

- Message on sabotage
- Message on bus power loss
- Message on bus power recovery
- Message on start of gateway
- From (time) every (n) hours

Each of this message can be connected to one of the 100 message texts (button "..."), and to up to eight receivers (E1 – E8).



In the lower part of the main configuration window you can define the SMS receiving parameters of the Gateway:

The option „Accept incoming SMS only from the eight receiver phone numbers” limits the access to the gateway for the given phone numbers, no other number will be able to control the EIB by sending a SMS.

The option „Password security...” can be used to lock your GSM gateway: only commands with a proper password will be accepted. Example: „#secret,W0/0/1,L=1“ is sending the password „secret“ along with the write command.

The option „Send current value on receive of R[GA]“ will send a SMS with the current GA value to the number which had requested the value. For example: phone A is sending „R0/0/1“ to the gateway. The gateway will answer to this call by sending the text „GA=value“ (if the value or GA is unknown, it will send ? instead) to phone A. Please note: only GAs you have used in the up to 100 messages can be requested. Also the „R...” command will not issue a read telegram on the bus, the Gateway will simply send back the last known value for this address.

Please note: if the password security is activated, you have to send a „#pw,R...” command (including the correct password).

Writing an EIB telegram with a SMS Text is easy: simply send „W[GA],[Type]=[Value]“ to the gateway. For example, if you are sending „W0/0/1,L=1“ by SMS, the value „1“ will be written to group address „0/0/1“ (Type L=switch). The following types are possible:

L	= (Light-)Switch (1 bit)	Values: 0 or 1
D	= Dimming value (8 bit)	Values: 0-100% (scaled to 0..255)
B	= Byte value (8 bit)	Values: 0-255
I	= Integer value (16 bit)	Values: 0-65535
F	= Floating point 16 bit (EIB float)	Values: vvv,nnn (note: , instead of .)
T	= Texts (up to 14 characters)	Values: EIB Text

If you don't want to give complete write control by SMS, you can limit the range of group addresses the gateway can write to. Simply activate „Allow writing only for the following GAs“ and enter a list with up to 100 group addresses in the combo box. „OK“ will add a GA, „Delete“ will remove the selected GA from the list. If you don't want to allow any writing, simply activate this option and leave the GA list empty.



Transferring the configuration

EIBDoktor

The easiest way to transfer the gateway configuration is by using the EIBDoktor software. Just go online to the EIB with a connected EIBDoktor-EIBWeiche coupling device by pressing the green arrow (or selecting the menu item “Logging” → “Start” in the EIBDoktor software).

If you now go to the KNX-GSM Gateway configuration window, the button „Transfer to GW“ is available. By pressing this button the data transfer will start. Please note: if the serial number of the gateway is wrong, or the gateway is not connected to the EIB, an error message box will appear after a short time. If the data transfer has been completed, a success message box will pop up. The Gateway will automatically reboot after the transfer, and is now ready to use with the new configuration.

ETS

If you do not have an EIBDoktor-EIBWeiche available, you can save your current configuration into a file by pressing the „Save to file...“ button. This will create automatically a “.TEL” file as well. This file contains the configuration data as a telegram list, which can be used with the ETS software. You have to start the ETS, change into the group monitor, and open/transfer this TEL file.