MURR ELEKTRONIK

stay connected

Manual
MIRO GSM

- Safety
- Description
- Installation
- Software
- Run Mode
- Configuration
- Remote Access
- Technical Data
- Accessories

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Publisher's Note

User Manual for	MIRO GSM DI6 DO4R 24 VDC	Art. No. 52530
	MIRO GSM ADI6 DO4R 24 VDC	Art. No. 52531
	MIRO GSM DI6 DO4R 230 VAC	Art. No. 52532

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Website:

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In addition, our Customer Service Center (CSC) will be glad to assist you:

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Important Information

Important instructions in this Manual are indicated by the use of colors and are marked accordingly.

DANGER

Immediate danger

Failure to observe this warning will immediately result in death or severe personal injury.

WARNING

Possible danger

Failure to observe this warning may possibly result in death or severe personal injury.

CAUTION

Low risk hazard

Failure to observe this instruction will lead to personal injury of light to medium severity.

Note

Notes indicate important information.

Instructions highlighted in green are recommendations issued by Murrelektronik.

1. Safety

1.1 Intended Purpose

The products that are described in this manual were developed, manufactured, tested, and documented in compliance with the relevant safety standards. In normal cases, these products do not constitute any danger to persons or objects, provided the handling specifications and safety instructions described in this manual are observed. The products comply with the requirements of EMC Directive 2004/108/EG and standards EN 61000-6-2 and EN 61000-6-3.

WARNING

This device is not suitable for monitoring sensitive plants or time-critical processes. GSM network failures or interruptions in power supply may disturb supervision safety and reliability.

- **Do not use the OFF state of the outputs to implement safety-related requirements of the system/machine.**

The products are designed for industrial use. An industrial environment is defined as one in which loads are not connected directly to the public low-voltage power grid. Additional measures must be taken if the products are used in private, business, or trade environments.

Operating the device in accordance with its intended purpose is only assured when it is fully mounted.

The power supply must comply with SELV[1] or PELV[2]. Power sources in accordance with EN 61558-2-6 (transformers) or EN 60950-1 (switched-mode power supply) meet these requirements.

WARNING

This device may not be installed in explosion-hazard zones or in the vicinity of medical equipment.

1.2 Qualified Personnel

Only qualified, trained electricians knowledgeable in the safety standards of automation systems may configure, install, set up, service, and test the devices.

[1] Safety Extra Low Voltage
[2] Protective Extra Low Voltage

The requirements concerning qualified personnel are dependent on the requirements profiles described in ZVEI and VDMA publication

Only electricians who know the contents of this manual may install and maintain the products described here. "Weiterbildung in der Automatisierungstechnik“(Further training in automation systems), published by ZVEI and VDMA in the Maschinenbau-Verlag, P.O.Box 710864 in D-60498 Frankfurt, Germany.

They are therefore persons who are capable of assessing the work executed and any possible dangers arising from this due to their professional training, knowledge, experience, and their knowledge of the relevant standards, or the same level of knowledge from a similar field, or after doing technical training.

Only Murrelektronik technical personnel are allowed to execute work on the hardware and software of our products, provided they are devices not described in this manual.

WARNING
Electrical hook-up, start-up, and operation of this device may only be performed by qualified personnel.

WARNING
Tampering with the hardware or software, or failure to observe the warning instructions may result in severe personal injury or damage to assets.

- **Never tamper with hardware or software.**
  Comply with the warning instructions.

1.3 Safety Instructions

WARNING
Make sure you read the operating instructions.

The safe, troublefree functioning of the product requires proper transportation, storage, mounting, and installation, and careful operation.

Current safety and accident prevention laws valid for the specific application must be observed for the configuration, installation, setup, servicing, and testing of the devices.

Only use cables and accessories that meet the requirements and regulations for safety, electromagnetic compatibility, and, if necessary, the specifications for telecommunications terminal equipment.
Make absolutely sure when you hook up to the 230 VAC power source that the power supply and the power to the inputs stem from the same outer conductor. Do not allow a voltage exceeding 240 VAC to access the device itself.
Only fit or remove the MIRO GSM when it is in deenergized state.
Comply with the regulations and customary standards when you perform the electrical installation of the device. Installation must be performed by a competent person.

Note
The card owner bears the sole responsibility for protection against misuse of the SIM card.

Note
Murrelektronik GmbH assumes no liability for any injury to persons or damage to buildings and/or machines arising from faulty operation or from failure to comply with the instructions. Murrelektronik GmbH assumes no responsibility for use of the MIRO GSM or its operation. In particular, Murrelektronik GmbH guarantees no connection reliability to the mobile network, neither do we guarantee there will be no network failures.

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2. Description

2.1 Short Description of the MIRO GSM

The MIRO GSM from Murrelektronik is a remote-control and messaging system. It has six inputs, which can be configured as analog or digital inputs, and four relay outputs with switchover contacts. All the inputs and outputs can be monitored by SMS (Short Message System) over any mobile radio network*. The service provider decides on the SIM card. The device's own phone book saves up to 50 mobile phone numbers and names of message receivers. Each state change at one of the inputs sends a predefined message by SMS to the assigned receivers. The receivers are processed cyclically one by one, according to the selected sequence. The outputs can be switched ON and OFF by SMS containing predefined messages. In order to obtain an overview of the present state of all inputs and outputs of the installation, the input and output states can be queried by SMS. The relay outputs can be linked to a "timer function" and can be switched time-dependent for a preset period. The password option prevents unauthorized remote access to MIRO GSM by third parties. MIRO GSM sends out a message at regular intervals automatically, for example, the MIRO GSM sends out a message in case of power loss. When power is restored, the MIRO GSM announces its operational state again with a new message. All input and output states can be attached to each message. Programming the MIRO GSM is carried out using the *"MIRO GSM Configuration Software"* that is supplied together with the device. All the settings can be configured very easily and without special knowledge of any programming language.

*** Mobile radio network:** 850 MHz, 900 MHz, 1800 MHz, 1900 MHz (quad band GSM module inside)

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2.2 Application Examples

- Heating control
- Pump control
- Irrigation installations
- Alarm transmission
- Level monitoring
- Temperature monitoring
- Pressure monitoring
- Valve control
- Voltage monitoring
- Fault signals from machines and installations of all types

- and many more

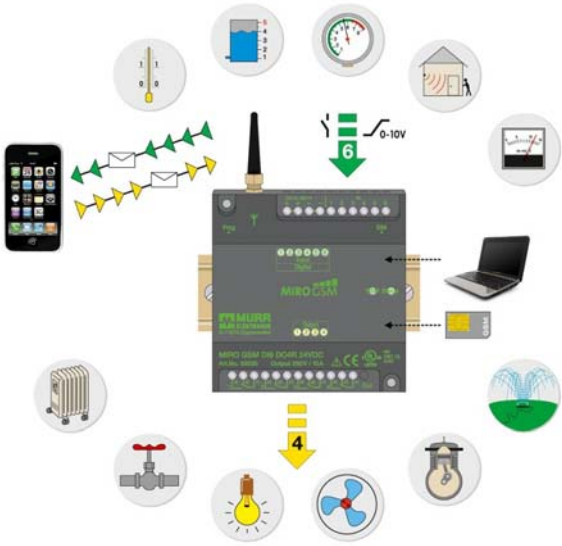

Fig. 1: Application examples

2.3 Short Instructions

Note

Installation requirements: The MIRO GSM must be disconnected from the power source when it is installed.

1. Snap the MIRO GSM on to the mounting rail.
2. Hook up the MIRO GSM as described in the connection diagrams on pages 16 to 16.
3. Open the front cover and insert the SIM card.

Fig. 2: Remove the front cover

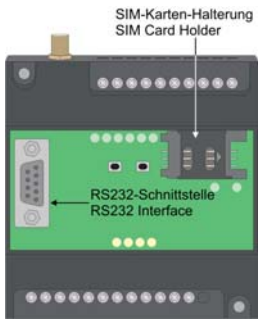

Fig. 3: SIM card, RS232 interface

4. **Caution: Make sure the voltage is correct.**
   The MIRO GSM then starts its initialization routine.
5. **Caution: Do not access the MIRO GSM.**
6. Load the MIRO GSM Configuration Software (Service and Start-up Kit Art. No. 52535, or download from www.murrelektronik.com).
7. Connect the RS232 interface of your PC or notebook to the programming interface of the MIRO GSM.

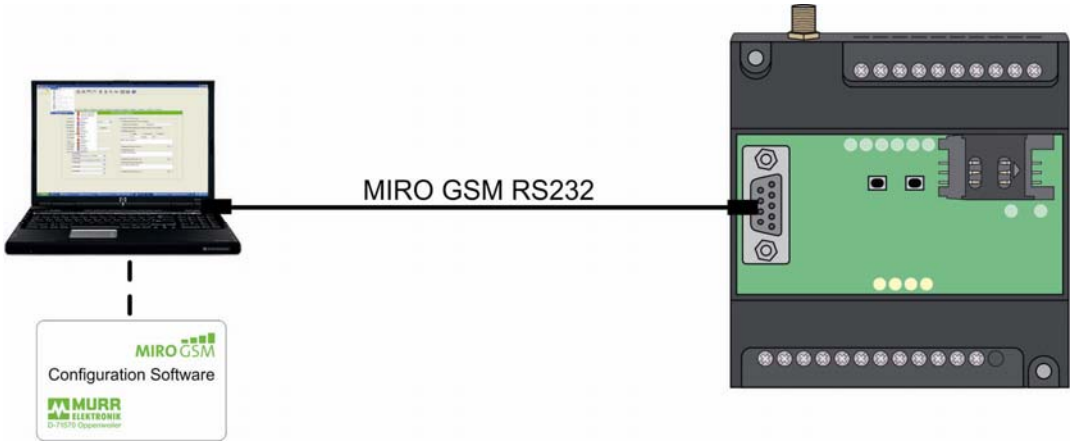

Fig. 4: Connecting a PC or notebook with RS232 interface

Note

If there is RS232 slot, use the one supplied in the Service and Start-up Kit (Art. No. 52535) or a commercially available USB RS232 converter (do not forget to install the driver).

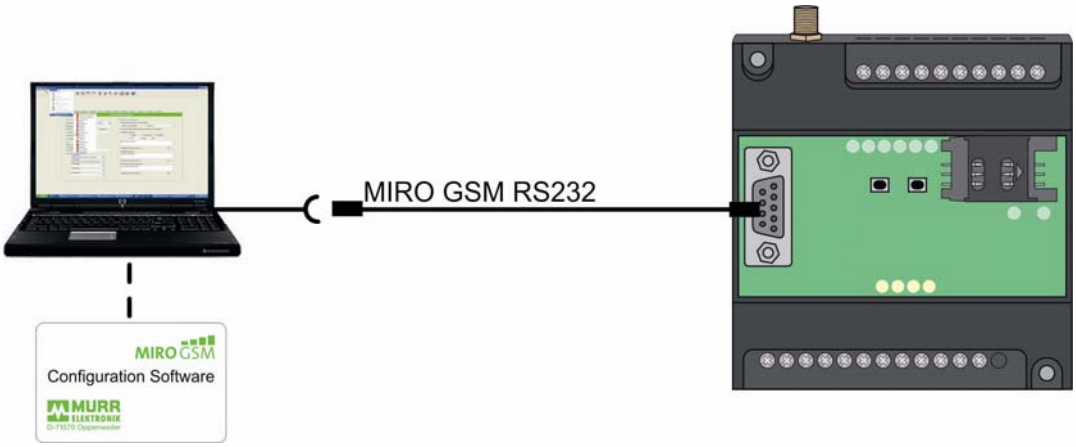

Fig. 5: Connecting a PC or notebook without RS232 interface

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8. Start the MIRO GSM Configuration Software.
9. Create a new configuration or open an existing one. Save your configuration locally on your PC or notebook.
10. Enter the correct PIN code. **This is absolutely necessary for the first installation.**

Once the MIRO GSM is initialized, the state LED and GSM LED flash regularly at the rate of one second (after approx. 100 s).

11. Write the configuration you generated to the MIRO GSM.
12. Select a free COM port (menu option: Configuration => Select Port). The COM port can be found under Windows in the Control Panel under System / Hardware / Connections.
13. Download the file to MIRO GSM.
14. Wait approx. 100 s until the MIRO GSM is ready, i.e. the state and GSM LEDs flash at a rate of 3 seconds.
15. Set the clock (menu option: Configuration => Set Clock).

3. Installation / Scope of Supply

3.1 Selecting the Antenna

When ordering, observe the following points and check them previously using a mobile phone. Check the strength of the transmitted signal from the selected provider before ordering the antenna. The MIRO GSM is supplied without antenna. In the switch cabinet, the MIRO GSM Outdoor Antenna Art.No. 52534 provides much better results than the stub antenna Art. No. 52533.

Note

When selecting the antenna, take the installation location into consideration. The MIRO GSM Stub Antenna Art. No. 52533 is not suitable for integration in a switch cabinet (due to the shielding).

Fig. 6: MIRO GSM Stub Antenna Art. No. 52533

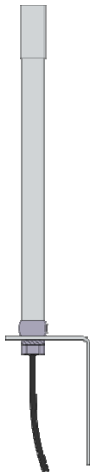

Fig. 7: MIRO GSM Outdoor Antenna Art. No. 52534

3.2 Installation

WARNING

Electrical hook-up, start-up, and operation of this device may only be performed by qualified personnel.

Make sure you read the operating instructions.

Failure to observe the instructions may lead to severe personal injury and/or damage to assets.

CAUTION

Make absolutely sure when you hook up to the 230 VAC power source that the power supply and the power to the inputs stem from the same line conductor. A voltage of > 240 VAC may not be applied to the device.

CAUTION

Only fit or remove the MIRO GSM when it is in deenergized state.

The MIRO GSM is isolation-protected and does not require grounding.
Connect the MIRO GSM according to the schematic diagram below.

3.2.1 Connecting the Inputs

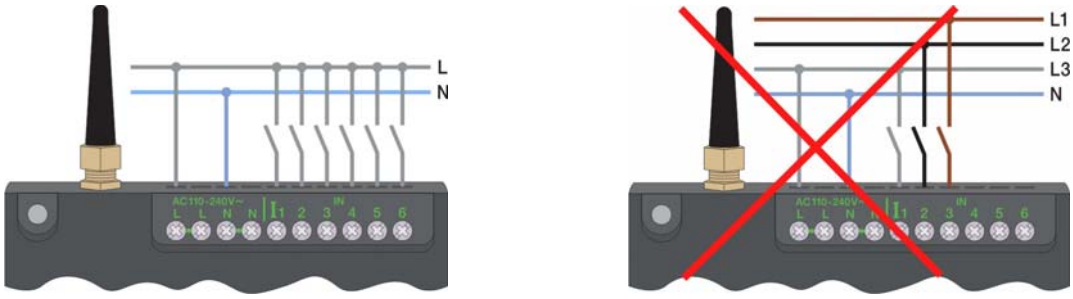

Fig. 8: Connecting the MIRO GSM DI6 DO4R 230 VAC Art. No. 52532 digital inputs

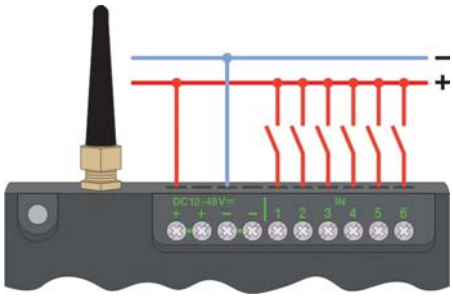

Fig. 9: Connecting the MIRO GSM DI6 DO4R 24 VDC Art. No. 52530 digital inputs

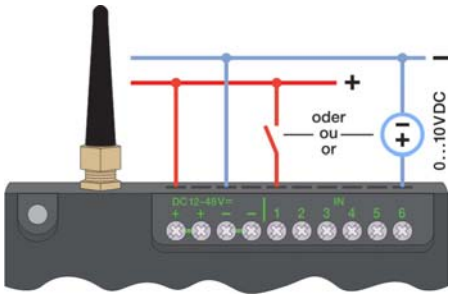

Fig. 10: Connecting the MIRO GSM ADI6 DO4R 24VDC Art. No. 52532 with either analog or digital inputs

3.2.2 Connecting the Outputs

Fig. 11: Connecting the outputs, all variants

3.3 TEST and RESET Buttons

TEST button (the right button when viewed from the front)

If you press the TEST button for more than 5 seconds, a test message is sent.

RESET button (the left button when viewed from the front)

All relay outputs are reset when the button is pressed for longer than 15 s in its home position. This means for the first switchover contact: 12-14 → open / 12-13 → closed. The characteristic of all switchover contacts is identical.

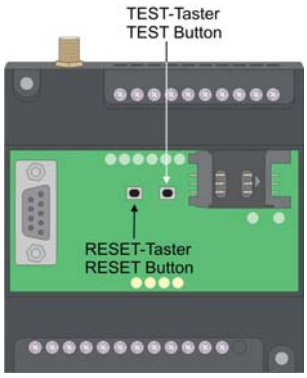

Fig. 12: TEST and RESET buttons

4. Software

4.1 System Requirements

The MIRO GSM Configuration Software runs on the current Microsoft® operating systems. The following minimum system requirements must be met for the software to function properly:

Operating systems	Windows®2000, Windows®XP, Windows®Vista, Windows®7
CPU capacity	Pentium II / 166 MHz, recommended: Pentium III / 800 MHz
RAM	256 MB (Windows®XP)
Hard disk storage capacity requirement	40 MB
Programming interface	RS232 USB (with USB RS232 interface converter)
Screen resolution*	Minimal: 1024 x 768 Pixel
*Please note:	If the screen resolution is too low, the window of the programming software will not be displayed in the normal size. This means some tabs or buttons may be outside the screen window and therefore illegible. **Procedure:** Change the screen resolution by selecting “Start” – “Control panel” – “Display” and then the “Settings” tab. Please set the screen resolution to a minimum of 1024 x 768 pixels.

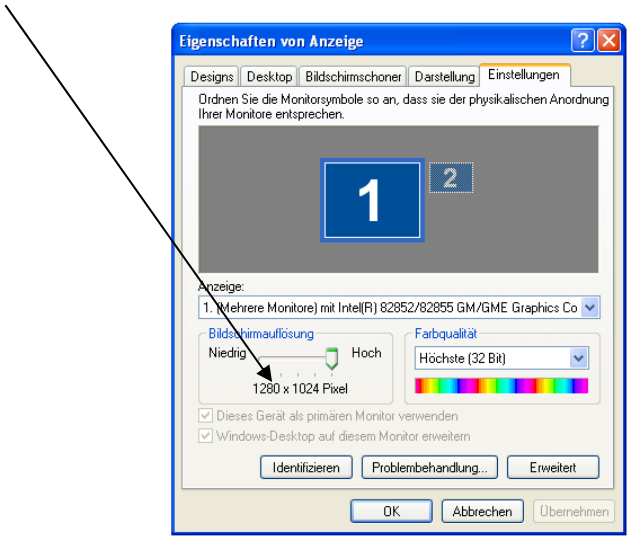

Fig. 13: Setting the screen resolution

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4.2 Software Installation

The installation menu starts automatically when you insert the CD ROM in the CD drive. If this is not the case, then start the CD-ROM by double-clicking on "Start" in Windows® Explorer. Start → right mouse button → Explorer → My Computer → Device with removable drives → setup.exe. If no CD ROM available, the software is available for free download from the Murrelektronik website at www.murrelektronik.com.

PC synchronization programs for mobile phones (eg Nokia Ovi Suite), can occur compatibility problems with the MIRO GSM Configuration software. In this cases, please contact us.

The installation menu is available in different languages. Please choose the required language. The Configuration Software is loaded onto your computer. Please follow the set-up programming instructions during installation.

The MIRO GSM starts up automatically after power is applied. If the signal is strong enough, the device registers itself in the GSM network (dependent on the SIM card settings, dependent on the provider). The two LEDs display the actual device and network states (see Chapter 5).

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5. Run Mode

5.1 LED State Display

The MIRO GSM has two LEDs, the GSM LED, and the state LED. The two LEDs are visible from the outside and are located below the cover. The following states are indicated:

5.1.1 GSM LED

State	***Rate***	***Meaning***
Flashing regularly	1 s	Module is not registered in the GSM network.
Brief flashing	approx. 3 s	Module is registered and ready for data transmission.
Irregular flashing		Data are transmitted (SMS).

Tab. 1: GSM LED displays

5.1.2 State LED

State	***Rate***	***Repetition***	***Meaning***
LED dark			Device is not running.
Intermittent flashing	Irregular		Device is running up.
Brief flashing	approx. 3 s	1x	Device in running, everything OK.
Brief flashing	approx. 3 s	2x	No credit left
Brief flashing	approx. 3 s	3x	Clock not set.
Regular flashing	1 s	1x	Module in initialized state.
Regular flashing	1 s	2x	Configuration error of SIM blocked
Regular flashing	1 s	3x	Communication error

Tab. 2: State LED displays

For further explanations of errors and their rectification, see "5.3 Diagnostics".

5.1.3 Inputs and Outputs

Each input and output state is displayed by individual LEDs.

These LEDs are designated as follows:

Inputs	1, 2, 3, 4, 5, 6	(LED lights up = input switched on)
Outputs	1, 2, 3, 4	(LED lights up = output switched on)

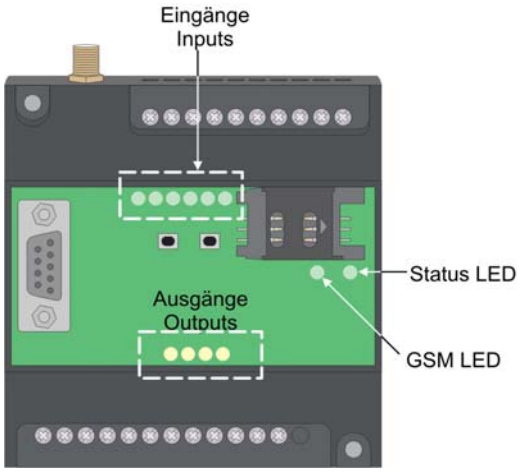

Fig. 14: LEDs on the MIRO GSM

5.2 Power Failure

Short power supply failures (t < 1s) are tolerated and do not change the module state.

Longer power failures (t > 1s) are registered and can trigger a last SMS alarm message (depending on the mode setting) before the device shuts down. The device restarts automatically after the power supply is restored. The registration of the MIRO GSM in the GSM network is restored and the same state of the outputs is initiated as before the power failure (memory function).

Note

The relays have monostable outputs. They are in their home position during power off, e.g. Contact 11-14 → open / Contact 11-12 → closed. After power is restored, the contacts are in the same position as before the power failure.

5.3 Diagnostics

The MIRO GSM in conjunction with the Configuration Software allows the display of the actual signal strength. To achieve this, the MIRO GSM must be connected to a PC / notebook by the programming cable. The diagnostic routine is accessible using menu option "Options – Diagnose". In addition to the signal quality, the diagnostics displays more information, such as version numbers, error codes, and service provider.

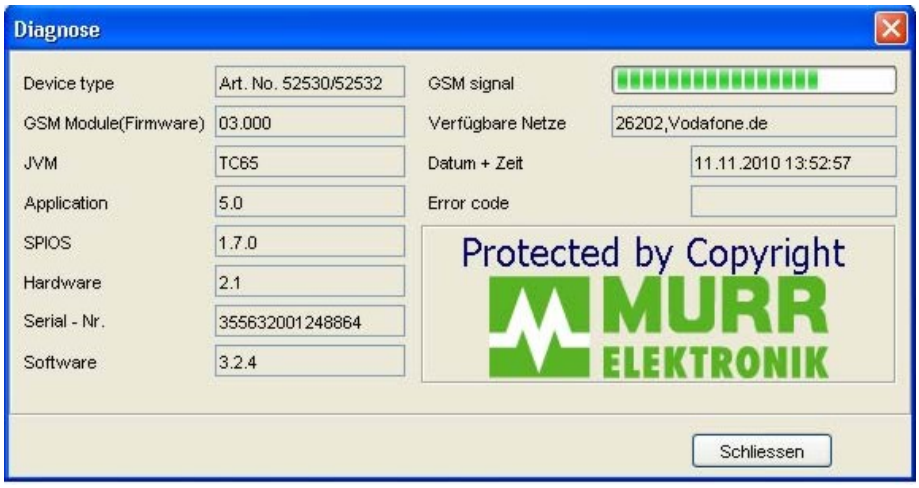

Fig. 15: "Diagnose" window

The table below shows the error codes and their meaning.

Code	Meaning	Cause	Remedial Action
1	No credit	Pre-paid card empty	Load SIM card
2	Time not set	Time not set	Set time manually using menu option "Options – Settings: Date / Time", or send an SMS to the MIRO GSM.
3	No configuration	Device is not configured.	Write configuration.
4	Configuration error	Configuration faulty or incompletely saved.	Repeat file loading.
5	Communication error	An SMS was not sent completely since there was no reception, or the device was not registered in the network.	Check receive signal strength: Check SIM card validity. Procedure: Insert SIM in a mobile phone (cell phone) and send an SMS to a call number.

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Code	Meaning	Cause	Remedial Action
1001	SIM card blocked	PIN code was entered incorrectly 3 times.	Insert the SIM card in a mobile phone → Enter PUK to clear → Replace SIM card in replay.
1002	No SIM card.	SIM card missing or soiled.	Insert SIM card or clean SIM contacts:

Tab. 3: Error codes and their meaning

5.4 State Request

When the PC is connected to MIRO GSM, the current state of the inputs and outputs of the MIRO GSM can be requested. The state can also be requested by remote access (see Chapter 7).

6. Configuration

6.1 General Information

The MIRO GSM is configured and prepared for use by a PC or notebook using the MIRO GSM Configuration Software. Before, the MIRO GSM may be prepared for installation, i.e. the MIRO GSM can be configured (create phone book, enter messages) without connection to the device. Do this by starting the software, creating a new file, or opening an existing file and editing it. Save the resulting file under a new file name. Then send it to the MIRO GSM over the programming cable MIRO GSM RS232. The diagnostic function is not active in offline mode. You can only access the diagnostic function when the MIRO GSM is connected to the PC via the serial RS232 interface.

You can use the MIRO GSM to perform remote maintenance over a GSM link. For this, you require the MIRO GSM Configuration Software. See Chapter "7. Remote Maintenance" which describes the requirements for connection set-up and operation in more detail.

6.2 Managing the Phone Book

The software offers the option to register and manage up to 50 telephone numbers or email addresses. The next section describes how to manage phone book entries.

6.2.1 Phone Numbers

- *Add* Enter a new phone number.
- *Edit* Edit an existing entry.
- *Delete* Delete an existing entry.

Please enter the phone number in international format (i.e. with country code and prefix) with no blanks, e.g.. +497191470 (+49 Germany, +41 Switzerland; +31 the Netherlands, etc.).

6.2.2 Email Address

First, activate the email function in the field "*Activate email"* and enter the provider's service number. Enter the email addresses using the procedure below:

- *Add* Enter a new email address.
- *Edit* Edit an existing entry.
- *Delete* Delete an existing entry.

Please enter email addresses in the format xxx@xxx.xx.

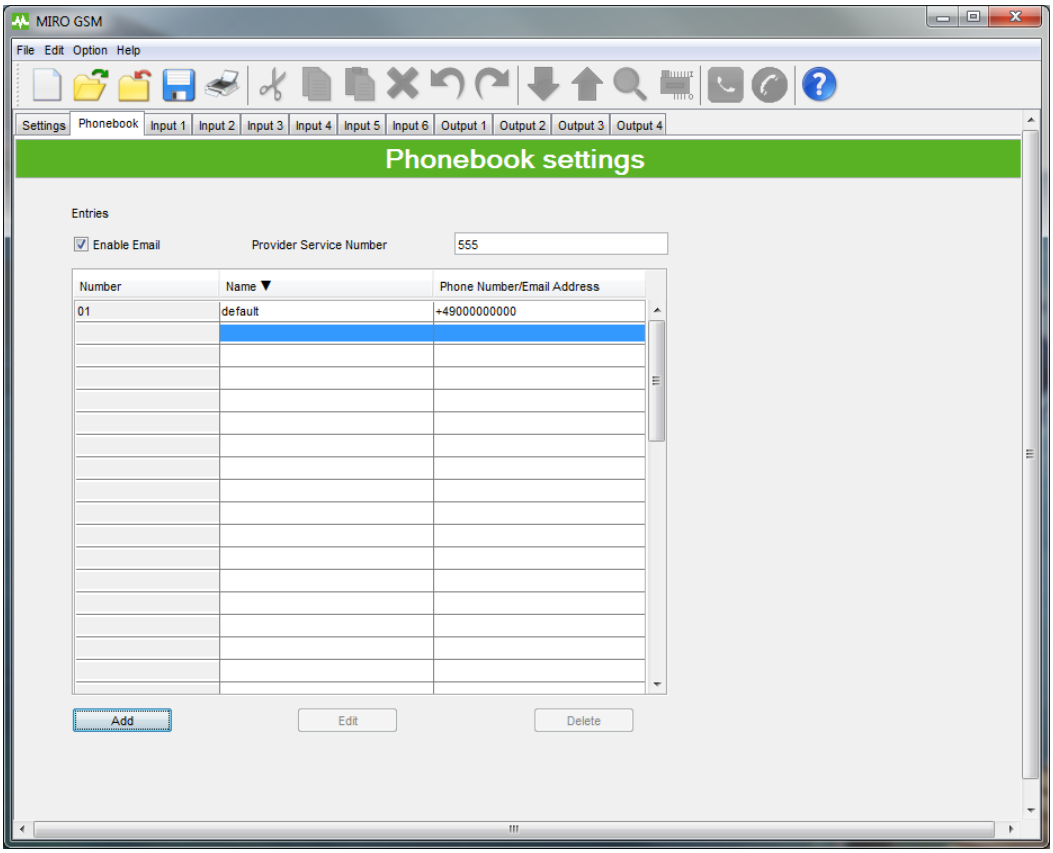


Fig. 16: Phone book entry

Note

Not all special characters can be used for SMS messages. The characters are recognized by the programming software and displayed in an error window. The error characters must then be deleted.

The "*Name*" data field can sort the list alphabetically in ascending or descending order. Sorting has no impact on existing entries.

Overwrite the "*Default*" with a user entry.

6.2.3 Settings

The default settings for SMS transmission contain important general data which help to identify the device or the installation. This is where remote access is enabled (for a description, see Chapter "7. Remote Access"). The SIM card is protected by PIN code just as a regular cell phone. For more information, please refer to the supplement supplied with the SIM card. It describes procedures, such as how you can clear a blocked SIM card after entering an incorrect PIN three times. To do this, remove the SIM card from the MIRO GSM and insert it in a cell phone (mobile phone). Then clear the card according to the specifications of the network operator.

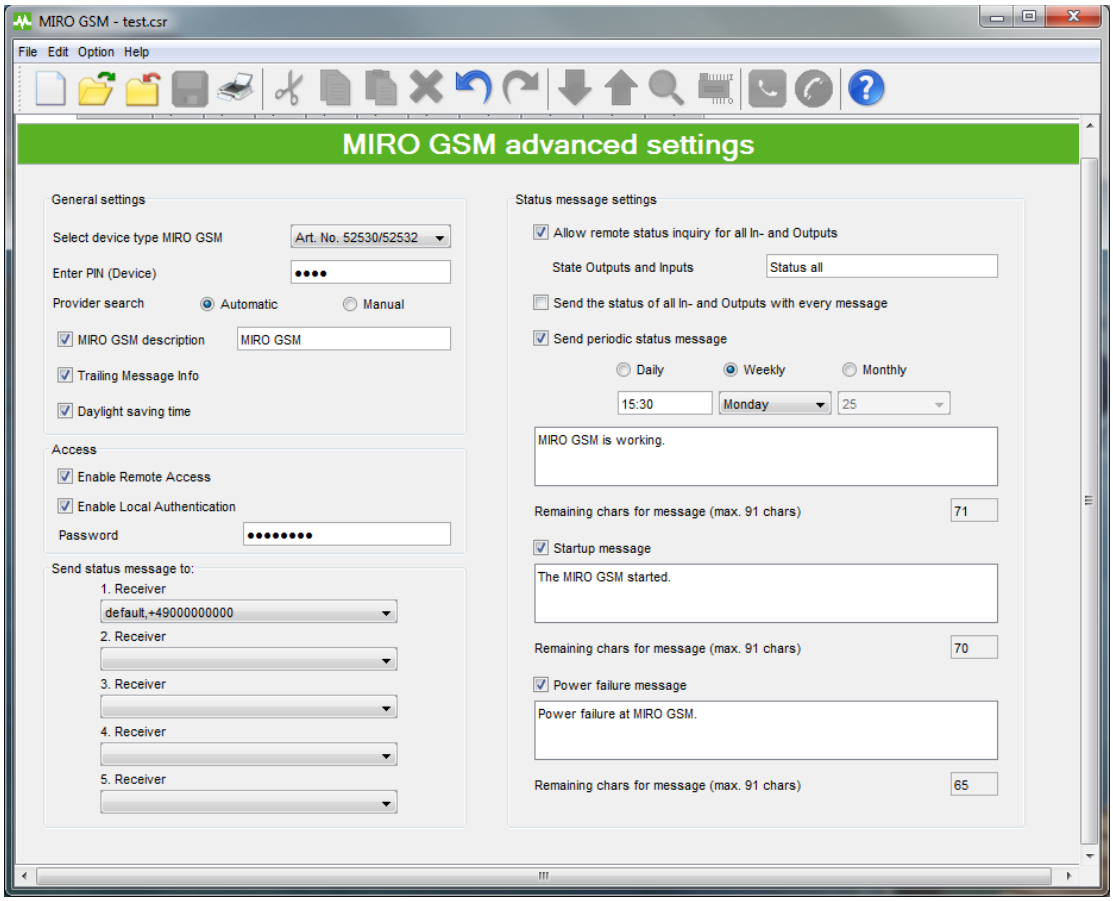


Fig. 17: MIRO GSM settings

6.2.4 Automatic Network Provider Search

The automatic network provider selection depends on the SIM card inserted in the MIRO GSM. The provider data and rights stored on the SIM card are accepted. Basically, the provider is preassigned when the SIM card is purchased. Due to the "Automatic" setting, the device searches automatically for the network provider. This is useful when the card is used in the home network. Other GSM networks can be accessed abroad using the same SIM card, depending on the roaming contracts.

6.2.5 Manual Provider Search

In manual provider searches, the available GSM networks are scanned several times. The results of this search are displayed with a list of networks. Click on "Search" to display the available networks. Then select the required network. The SMS service center number in contained in the SIM card documentation. Normally, this number is already saved on the SIM card. The number is dependent on the GSM provider.

6.2.6 Device Identification

The MIRO GSM can be named in the "*Device Description*“ field. All messages sent from this MIRO GSM are identified by the name entered in the first line. Device identification can be deactivated. Then, messages are sent without this identification .

Note

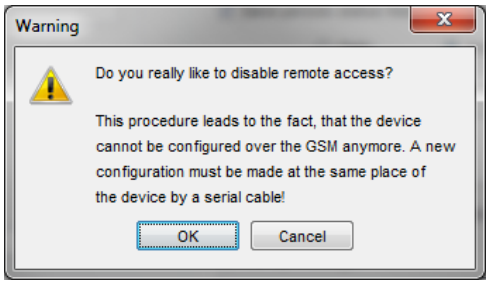
Not all special characters can be used for SMS messages. The characters are recognized by the programming software and displayed in an error window. The error characters must then be deleted.

6.2.7 Activating Remote Access

The remote access function allows the user to edit the configuration of the MIRO GSM remotely, or to send remote requests, or to switch outputs. Changes and edits need not be carried out locally. They can be performed remotely via a GSM link.
A remote access password protects against unauthorized access.

Note
Remote access can only be activated from a PC using the serial cable interface (RS232).

CAUTION
Remote access can be deactivated by remote access. The device can then no longer be accessed or configured over the GSM network. Re-activation must then be executed locally using a serial cable.



Warning "Deactivate Remote Access"

6.2.8 Disabling Local Access

Use *"Disable local access"* to protect access via a serial cable (RS232) by password. This password also applies to remote access.

6.3 State Messages

The receivers of state messages can be chosen from the telephone book. To do this, click the mouse pointer on the expand arrow and select the required entry.

The MIRO GSM can send the following state messages:

- *Remote enquiry of all inputs and outputs*

  The device includes an option to interrogate all input and output states by SMS. A code word is then sent by SMS to the device. The code word can be changed. The default code word is: **?#all**

The reply is sent to the requesting call number (call number identification). The object identification, in this case MIRO GSM, appears at the start of the reply.

```
MIRO GSM I=001001
Q=0101 V1.4.5
SPIOS=1.7.0 HW=2.1
SN=358244014610861
16.09.2009 15:38
```

The states of the inputs and outputs are mapped in the SMS message as follows:

I:001001 → inputs 1 to 6 → 0 = OFF / 1 = ON

O:0101 → outputs 1 to 4 → 0 = OFF / 1 = ON

If inputs on the MIRO GSM are configured as analog inputs, the device sends the analog values together with their unit. The analog-configured inputs are identified by "-". The state message then looks like this, e.g. when inputs 12 and 15 are analog inputs:

```
MIRO GSM I=0-00-0
Q=0000 21.3m3/h,126lt
V1.4.5 SPIOS=1.7.0
HW=2.1
SN=358244014610861
16.09.2009 15:38
```

I: 0-10-1 O:0101 21.2m3/h,126lt

I: 0-10-1 → inputs 1 to 6 → 0 = OFF / 1 = ON / - = analog

O: 0101 → outputs 1 to 4 → 0 = OFF / 1 = ON

- *Attach state of all inputs and outputs to each message*

  This options attaches the state of all inputs and outputs to each message.

- *Periodic message*

  The periodic message is intended for function checking and confirms device functionality. A message is sent periodically. The message can be sent daily (time), weekly (time, weekday), or monthly (time, date). The message text can be edited. The message also contains the current state of the inputs and outputs if they are activated.

- *Message at the start*

  This message is sent to the pre-assigned phone numbers at each start-up (switch on / power restore). The message text can be edited.

- *Message in case of power failure*

  This message is sent to the pre-assigned phone numbers in case the MIRO GSM suffers a power failure. The message text can be edited.

Note

Not all special characters can be used for SMS messages. The characters are recognized by the programming software and displayed in an error window. The error characters must then be deleted.

- *Trailing Message Info*

  The trailing information of each message (date, time, remaining credit) can be activated or deactivated in the field *Trailing Message Info* located in the *Settings* tab.

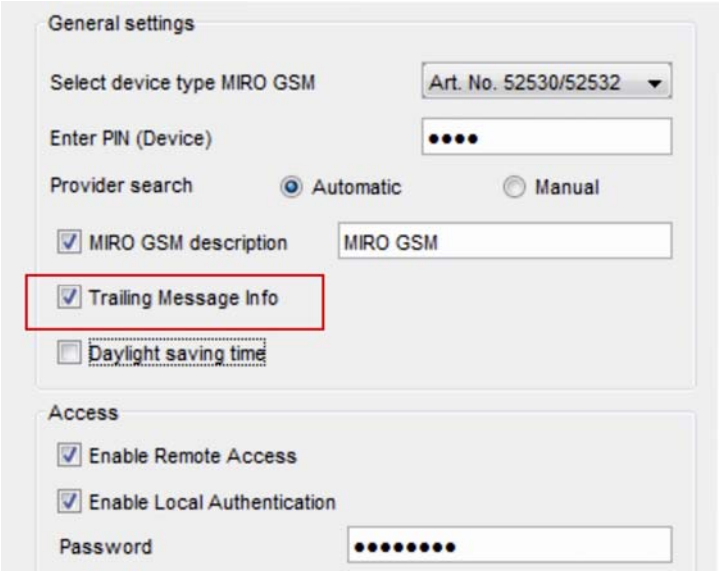


Fig. 18: Trailing Message Info

6.4 Input Configuration

6.4.1 General Information

The MIRO GSM has 6 inputs. These inputs can be activated as **digital** (MIRO GSM DI6 DO4R 24 VDC, Art. No. 52530 und MIRO GSM DI6 DO4R 230 VAC, Art. No. 52532), or **digital / analog** (MIRO GSM ADI6 DO4R 24 VDC, Art. No. 52531).

6.4.2 Digital Inputs (MIRO GSM DI6 DO4R 24 VDC, Art. No. 52530 and MIRO GSM DI6 DO4R 230 VAC, Art. No. 52532)

Each of these inputs can send a freely definable SMS message to a maximum of five pre-assigned phone numbers when the input signal is HIGH or LOW.

Note

Please note that every input must be assigned with at least one phone number selected from the list of receivers. It is irrelevant whether the input is connected or not. If the receiver list is empty, the configuration can not be saved.

Basically, two events can trigger an SMS message: a change from "LOW" to "HIGH", and the inverse, a change from "HIGH" to "LOW". One or both events can be configured to activate a message. A separate message text can be entered for each event.
If the **confirmation function is activated,** and the MIRO GSM receives no receive acknowledgement SMS from the receiver within the preset timeout, the event message is sent to the next receiver. The MIRO GSM runs through the assigned receiver phone number cyclically and then starts again with the first phone number. A maximum of five loops can be defined. As soon as the device receives a confirmation, the process is stopped. If this is not the case, the message is sent to the next receiver on expiry of the preset timeout.
If the **confirmation function is not activated**, all the assigned receivers receive a message without repetition simultaneously.

If the **confirmation code word is not activated,** the phone number identification is carried out as a security check, and it is sufficient to send an empty SMS message to the MIRO GSM.

Note

Not all special characters can be used for SMS messages. The characters are recognized by the programming software and displayed in an error window. The error characters must then be deleted.

6.4.3 Parallel Message Handling

It may occur that the state of several inputs change at the same time or within the actual running message cycle. Every input activates its individual message.
Every change of the input state, which triggers an event message, is processed in order of their appearance (device-internal). Several different messages can therefore be triggered simultaneously. For example, the two events “pump breakdown” and “overtemperature” (two separate inputs) may be signaled at the same time. The two events are processed individually and the two messages are sent one after the other.

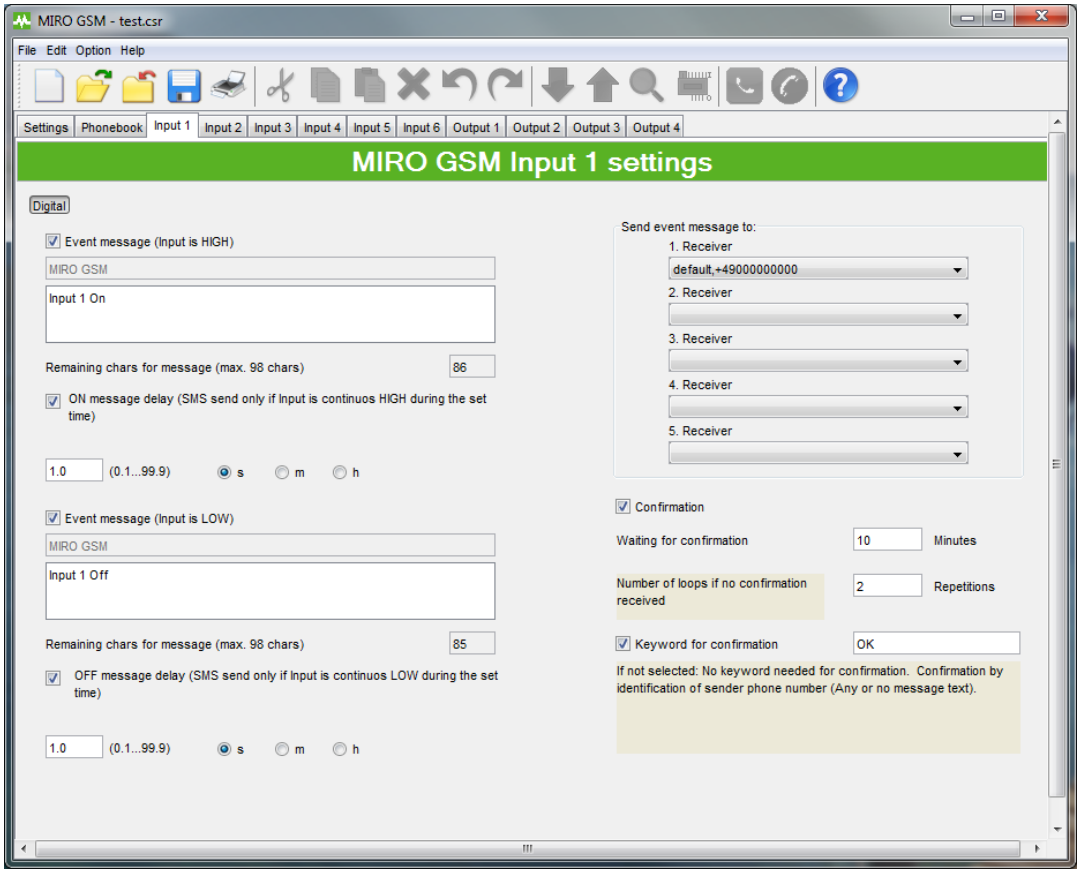


Fig. 19: Configuration of digital inputs

6.4.4 Time-delayed Messages on Signal Reception

If an input signal occurs, the message can be transmitted time-delayed, i.e. the MIRO GSM only sends the predefined message after the preset time elapses and if the signal remains ON constantly during

that time. In other words, the input signal is ignored during the set delay time. This prevents instable input signals, or input impulses that occur repeatedly, to send identical SMS messages several times. Time delays can be set between 0.1 seconds and 99.9 hours.

Note
It is recommended to activate the delay function (prevents the transmission of several SMS messages for the same event).

6.4.5 Time-delayed Messages on Output OFF

If an input changes its state from "HIGH" to "LOW", a delayed message can also be activated. The MIRO GSM sends the predefined message after the preset time elapses and provided the affected input is still "LOW". This prevents instable input signals, or input impulses that occur repeatedly, to send identical SMS messages several times. Time delays can be set between 0.1 seconds and 99.9 hours.

Note
It is recommended to activate the delay function (prevents the transmission of several SMS messages for the same event).

6.4.6 Analog Inputs (MIRO GSM ADI6 DO4R 24 VDC, Art. No. 52531)

The 6 inputs can be individually configured as digital or analog inputs. For this purpose, each input must be defined explicitly as an analog or digital input. The analog inputs are designed for a standardized 0 to 10 VDC analog signal. The resolution here is 12.5 mV across the whole range.

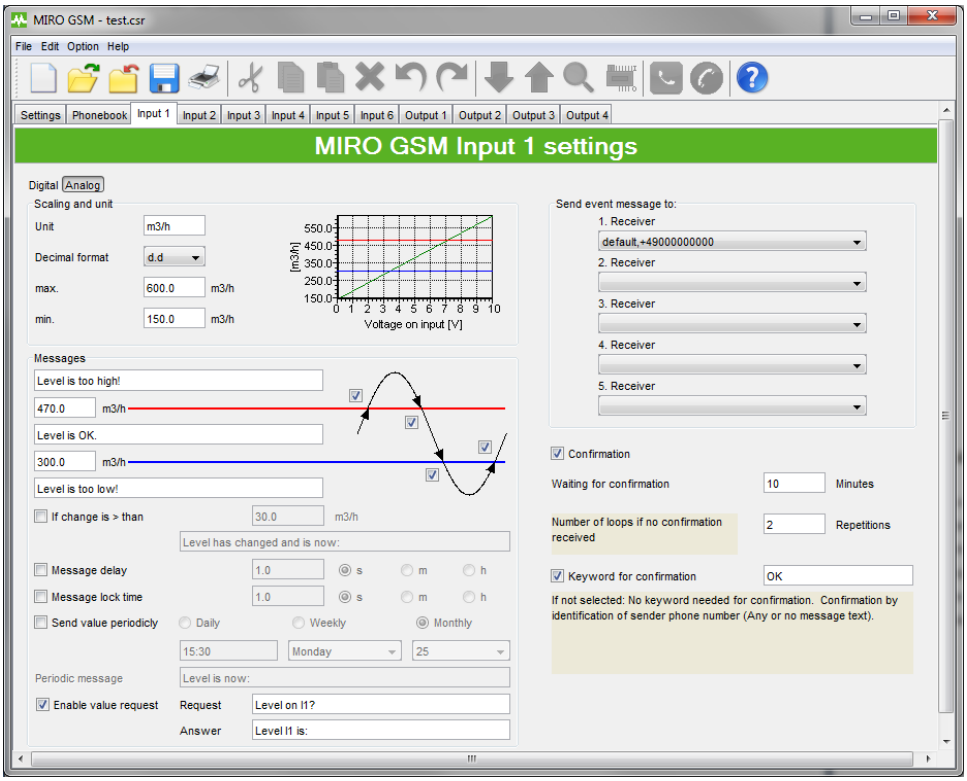


Fig. 20: Configuration of analog inputs

6.4.7 Scaling and Unit

In a first step, the measuring unit and the scale must be defined. Two values (MinValue and MaxValue) are assigned to the two end-values 0 V and 10 V. A linear interpolation is carried out between these two values. The resulting linear function (a straight line between two end values) is displayed in the configuration window and is adapted continuously to the entered values.
The values entered can be displayed in various decimal formats. The following display types are selectable:

d	integer value, e.g. 520
d.d	one digit after the decimal point, e.g. 520.0
d.dd	two digits after the decimal point, e.g. 520.00
d.ddd	three digits after the decimal point, e.g. 520.000

Ten characters are available to label the units. This unit is sent with every value message following the actual value.

Example of a message: **The house temperature is 15.5C**

Note

Not all special characters can be used for SMS messages. The characters are recognized by the programming software and displayed in an error window. The error characters must then be deleted.

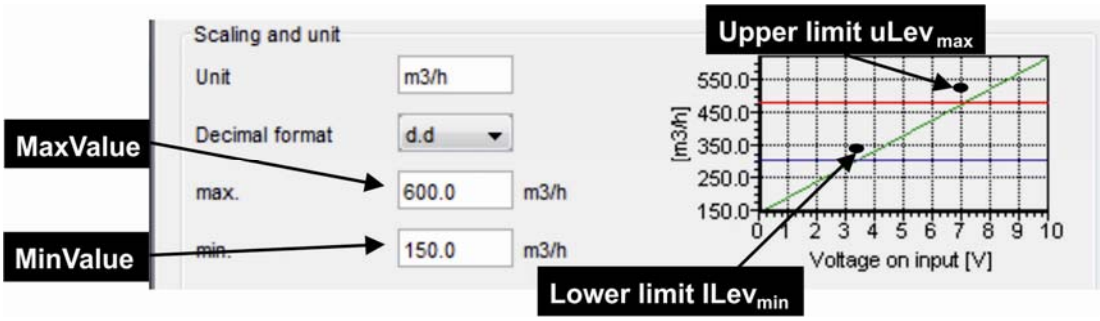


Fig. 21: Excerpt from "Scaling and Unit"

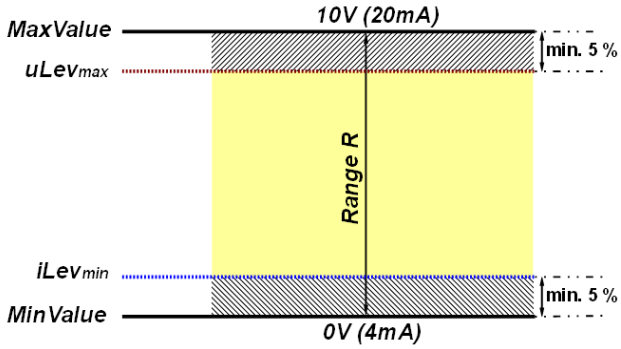


Fig. 22: Range and limits

The value between *MaxValue* and *MinValue* is the range R. This range has an important function in defining the thresholds.

6.4.8 Messages and Limit Definition

The upper and lower limits must be defined to permit the sending of messages. These limiting values depend on the installation which is monitored. However, certain rules must be obeyed so that the limits are easily recognizable in the scale window.

First, the measuring range is calculated. The range is the span between *MaxValue* and *MinValue*. The two values correspond to the end values of the analog signal (0 to 10 V) and must be entered. The calculated amount of the measuring range is positive.

$$|\textbf{Range R}| = |MaxValue - MinValue|$$

The **maximum Upper Level *uLevmax*** is calculated as follows:

Deduct 5% of the range from *MaxValue*. This results in the maximum upper level $uLev_{max}$

$$\boldsymbol{uLev_{max}} = MaxValue - (|R| \times 0.05)$$

➔ Values entered above this value are corrected automatically by the software.

The **minimum Lower Level $lLev_{min}$** is calculated as follows:

An amount of 5% of the range is added to the *MinValue*. This results in the minimum lower level $lLev_{min}$

$$\boldsymbol{lLev_{min}} = MinValue + (|R| \times 0.05)$$

➔ Values entered below this value are corrected automatically by the software.

Example:

MaxValue:	600 m3/h	→ corresponds to 10 V of the analog signal
MinValue:	150 m3/h	→ corresponds to 0 V of the analog signal

$|Range\ R| = |MaxValue - MinValue| = |600\ m3/h - 150\ m3/h| = 450\ m3/h$

$\mathbf{uLev_{max}} = MaxValue - (|R| \times 0.05) = 600\ m3/h - (450\ m3/h \times 0.05)$ **=577.5 m3/h**

≅9.5 V

$\mathbf{lLev_{min}} = MinValue + (|B| \times 0.05) = 150\ m3/h + (450\ m3/h \times 0.05)$ **=172.5 m3/h**

≅0.5 V

The following states may then occur or be monitored:

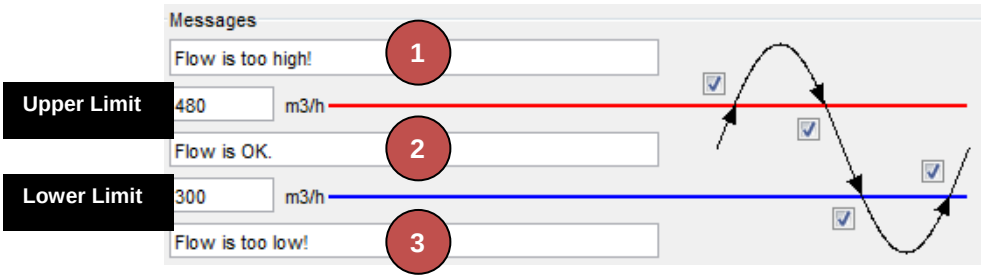


Fig. 23: Excerpt from "Messages"

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- **The present measured value is greater than the upper limit.**

The system is not in its normal state. The upper limit is exceeded. A message is sent (if this is activated by ☑). The message text is freely configurable.

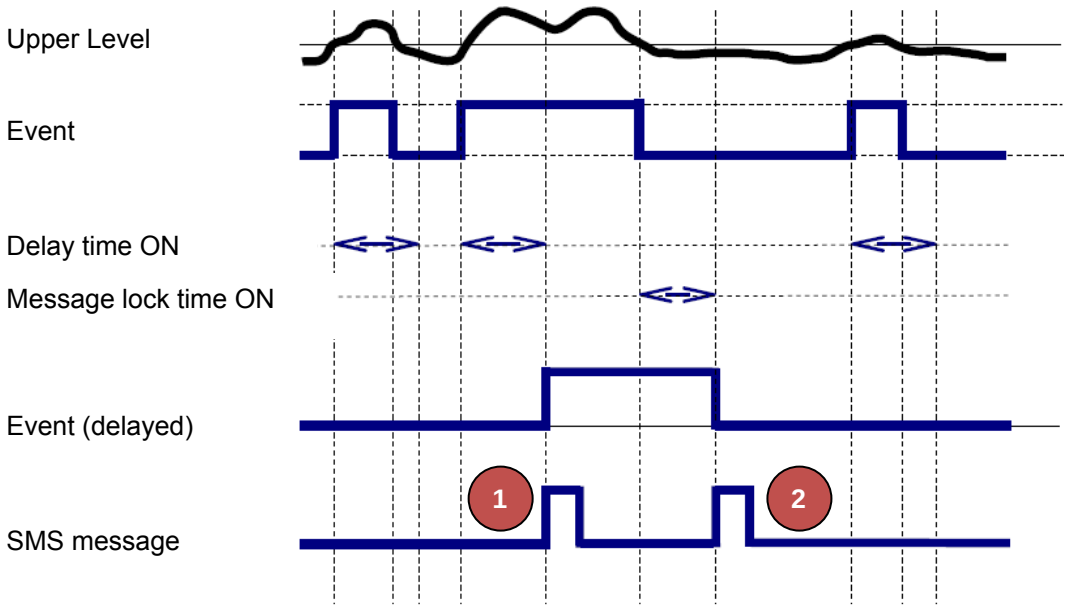

Fig. 24: Analogue value processing: The measured value is above the upper level.

- **The present measured value <u>lies between</u> the Upper and Lower Levels.**

The installation is (again) in normal state. A message is only sent if it is activated by ☑, and if the state is occurs, i.e. the upper limit or lower limit was exceeded. The message text is freely configurable.

- **The present measured value is smaller than the lower limit.**

The monitored installation is not in normal state. The lower limit was exceeded. A message is sent (f this is activated by ☑. The message text is freely configurable.

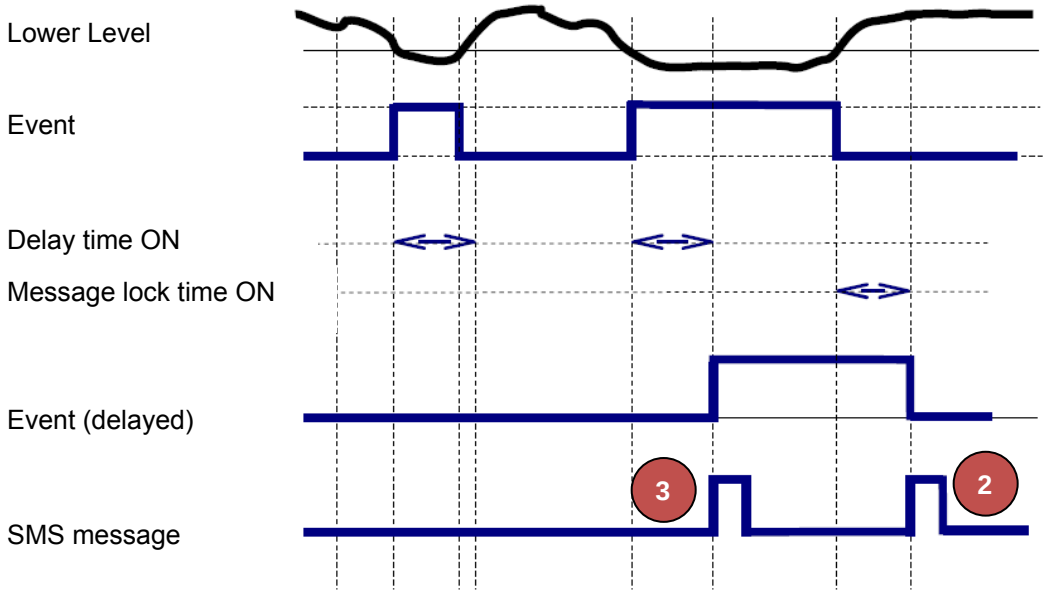

Fig. 25: Analogue value processing: "Value is smaller than the lower level"

- **The <u>change in value</u> (difference) of the present measured value <u>is exceeded</u> compared to the last measured value sent**

The MIRO GSM monitors the analog measured value. A message is sent if the difference is activated by ☑ and the difference exceeds a certain value. The maximum value here is 50% of the range.

Note

Values entered above this value are corrected automatically by the software.

- **Periodic Messages**
  The MIRO GSM can send a present measured value by SMS periodically at intervals of days, weeks, or months. The periodic message is sent to the first receiver. If the receiver fails to acknowledge receipt of the message, the message is sent to the next receiver.
  All message texts can be freely edited. The measured value and the unit are always transmitted after the message text. A blank is inserted automatically between the message text and the value. No blank is inserted between the value and the unit.

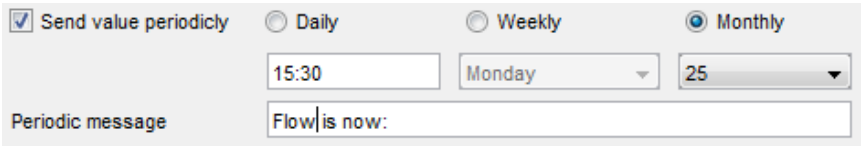

Fig. 26: Example for "Periodical messages"

- **Requesting a Value**
  The present value can be requested by SMS. The message text is freely definable. To start a request, an SMS must first be sent to the MIRO GSM. The message must contain the exact wording of the request text. The request text is freely definable. The reply text can also be defined. The measured value and the unit are always transmitted after the reply text. A blank is inserted automatically between the reply text and the value. No blank is inserted between the value and the unit.

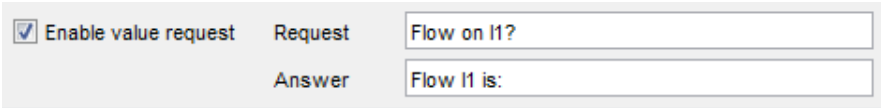

Fig. 27: Example for "Request value"

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- **Confirmation**
  If the confirmation function is activated, but the MIRO GSM fails to receive a receive confirmation from the receiver within the set timeout, the event message is sent to the next receiver. This means that the device works through the assigned receiver phone numbers (maximum five) cyclically and then starts with the first phone number again. A maximum of five loops can be defined. As soon as the device receives a confirmation, the process is stopped. If this is not the case, the message is sent to the next receiver when the preset timeout elapses.

  If the confirmation request is not activated, all the receivers assigned to this action receive a message with no repetition simultaneously.

  If the confirmation password is not activated, the phone number identification is used as a security check, and it is sufficient to send an empty SMS message to the MIRO GSM.

6.4.9 Message Delay

If a state is reached at the input that requires the sending of a message due to the set criteria, the message is sent with a time delay, i.e. the MIRO GSM only responds after the preset time by sending the predefined message, provided the state persists during this time. In other words, the input signal is ignored during the set delay time. This prevents the device from sending identical SMS messages several times due to instable input signals, or input impulses that occur repeatedly. Time delays can be set between 0.1 seconds and 99.9 hours.

Note

It is recommended to activate the delay function (prevents the transmission of several SMS messages for the same event).

6.4.10 Message Block

If an event that requires the sending of a predefined message occurs, the timer starts running. During this time no further messages are sent for this input. This prevents the same events from sending several messages to this input. Block times can be set between 0.1 seconds and 99.9 hours.

Note
It is recommended to activate the block function (prevents the transmission of several SMS messages for the same event).

6.5 Configuring the Outputs

6.5.1 General Information

The MIRO GSM has 4 relay outputs (switchover contacts, 10 A, 250 V). The outputs can be controlled by an SMS, i.e. they can be switched ON or OFF.
Every output can be controlled individually. The message text is freely definable. The device only responds to precise wording, i.e. the message (switch command) must have the precise text wording as entered. Uppercase and lowercase characters are ignored, but the blanks between the words and other characters must be entered correctly. When the number identification function is enabled, the device responds only to the switch commands from phone numbers entered in the phone book. An output can therefore be switched on or off by SMS. The MIRO GSM then confirms execution of the action after it occurs. Message texts can be written to switch the device on or off. An additional message can be defined if an output is already in the required state and so no action can be executed. These messages are always sent to the sender of the switch command.

Default
Click on the button to return all ON/OFF commands automatically to the preset factory defaults.

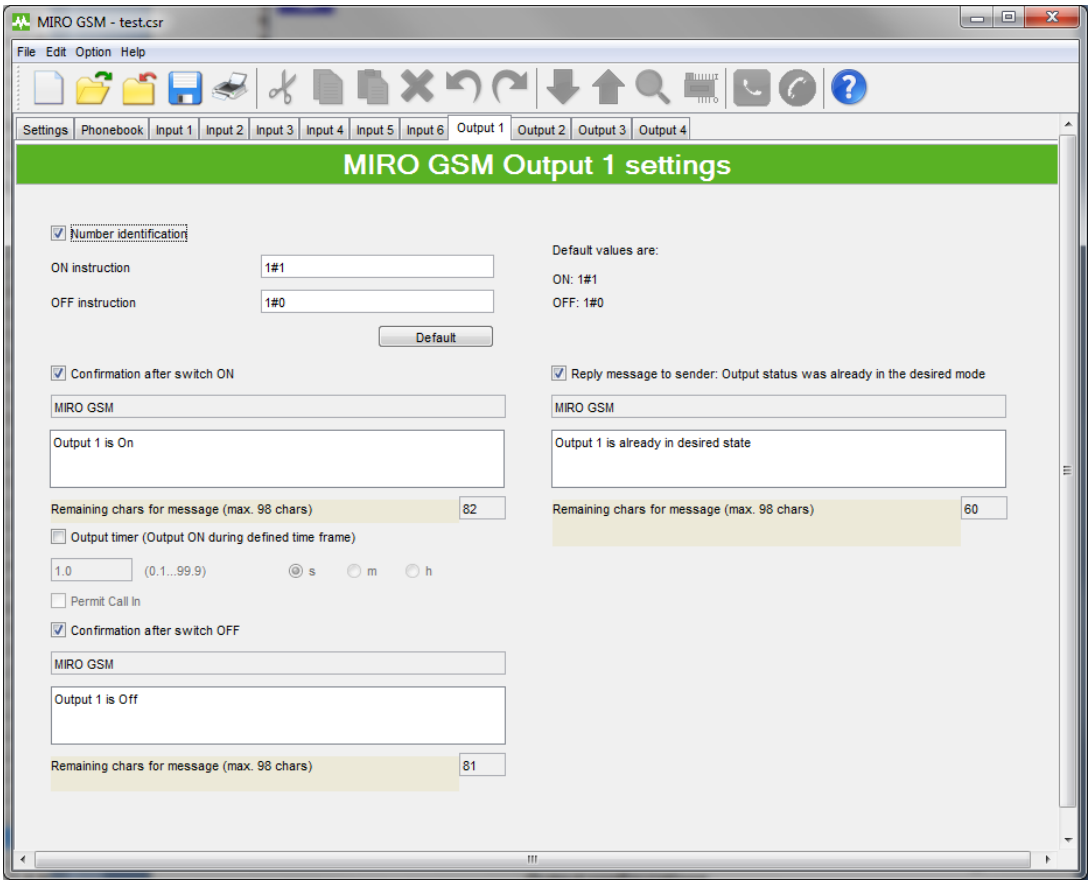


Fig. 28: Configuring the outputs

Note

Not all special characters can be used for SMS messages. The characters are recognized by the programming software and displayed in an error window. The error characters must then be deleted.

6.6 Time Function

Using a time function, an output can be switched off after a certain time without the need for a switch-off command to be sent by SMS. Switching times can be set between 0.1 seconds and 99.9 hours. When the output is switched off after the preset time elapses, a message is sent to confirm this action. If a switch-off command is sent before the preset time elapses, the command is processed. The time function is defaulted to the OFF state and must therefore be enabled.

WARNING

This device is not suitable for monitoring sensitive plants or time-critical processes. GSM network failures or interruptions in power supply may disturb supervision safety and reliability.

6.7 CALL-IN Function

The CALL-IN function switches on each output by caller ID for the time specified in Section 6.6. The device detects the incoming call and switches the outputs on without accepting the call. The outputs are switched off automatically when the preset time elapses. An action can so be executed without any costs occurring.

Note

To enable the "Activate Call-In" field, first enable the time-limited output circuit.

7. Remote Access

7.1.1 General

The remote access feature can make changes to the configuration using the MIRO GSM. In order to do this, set up a link to the MIRO GSM (data call to the MIRO GSM) via the GSM modem using the MIRO GSM Configuration Software. Changes on the MIRO GSM can now be made in the familiar environment of the Configuration Software. The first start-up must be executed as described in the two sections "1.1 Short Description" and "6. Configuring the MIRO GSM". Only then can you activate the remote maintenance function.

You can perform remote maintenance on the MIRO GSM over a GSM link.

Note

The SIM cards used for remote maintenance (in the MIRO GSM and also in the GSM modem) must be capable of running with CSD. CSD is a special data transmission standard and means Circuit Switched Data. Contact your network provider for the necessary details.

7.2 Configuring Remote Access

Remote access is activated using the MIRO GSM Configuration Software. Remote access is activated in the general settings.

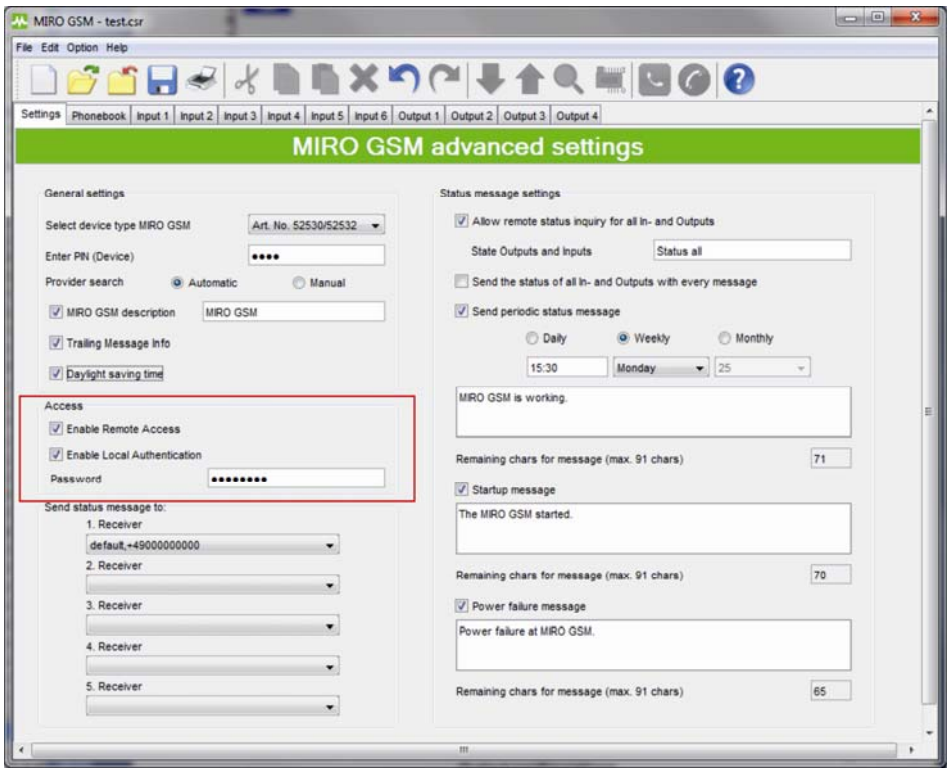


Fig. 29: General settings

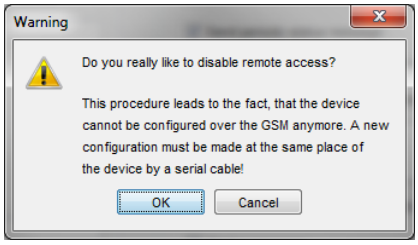
The password protects the remote access function from unauthorized access.

Note

Remote maintenance must first be activated from a PC over a customary commercial serial cable connection (RS232).

CAUTION

Remote access can be deactivated over the remote access. The device can then no longer be accessed or configured over the GSM network. Re-activation must then be executed locally using a serial cable.



Warning "Deactivate Remote Access"

7.3 Connection Set-up

You need a GSM modem and the MIRO GSM with activated remote access to set up a connection. Connect the model to the PC or laptop. The MIRO GSM itself is already fitted with an integrated modem of this type.

Hook up the modem to the PC/laptop. After connection set-up, the PC/laptop can communicate with the modem. Then you can send data over the GSM link to the MIRO GSM or load data on the PC/laptop.

Note

Call fees are levied for the whole time that the call is set up between the modem and the MIRO GSM (for calls to a device in another country, roaming fees may also be charged). For this reason, the call should be interrupted immediately after data transmission.

Note

Before call set-up to the device, we recommend you first complete the configuration on the PC before starting data transmission with the device.

First select the option *Modem configuration* so that the MIRO GSM Configuration Software can set up a connection to the MIRO GSM via GSM. The Configuration Software contains a list of a few modem types. These modems were tested and are supported by the software.

Note

We advise you to use modems we have tested. We can not guarantee the function of other modem types (under certain circumstances, the user may have to configure other AT command sets for the modem in use).

After selecting the modem type you require, enter the PIN for the modem SIM card in the appropriate field. Confirm your inputs by clicking on OK.

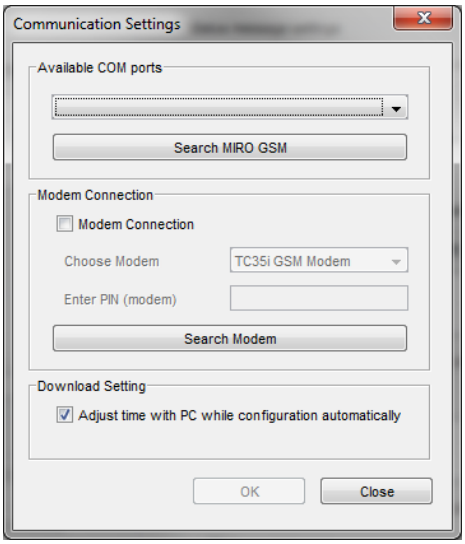


Fig. 30: Connection settings

Then set up the connection to the remote MIRO GSM. Set the remote access to "active" in the menu bar and the menu option *Options*.

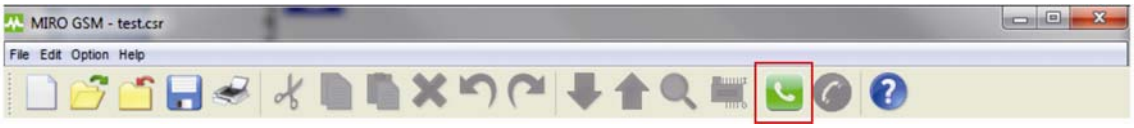


Fig. 31: Remote access is "activated"

When you select remote access, the Configuration Software starts to set up a data link via the GSM modem. To set up a data call, the software requests you to enter the phone number of the MIRO GSM and the password for remote access.

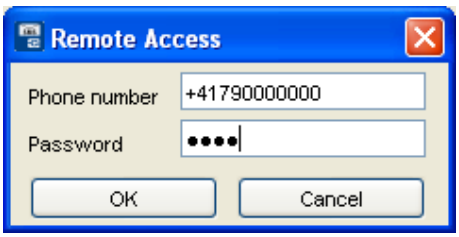


Fig. 32: Phone number for data call

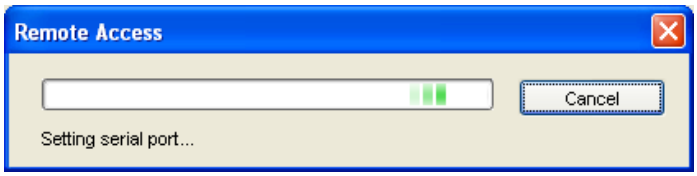


Fig. 33: Progress of "Connection set-up"

If connection set-up fails, repeat your attempt to set up the connection.

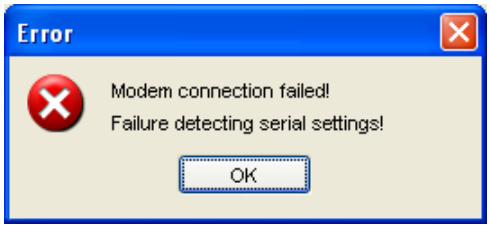


Fig. 34: Error message "Connection failed"

When the connection is set up successfully, you can start to work with the Configuration Software as usual as described in the previous sections. Please note that data transmission over the GSM network may take some time. It may take longer than to load data over a serial cable.

Note

Data transmission via GSM (remote access) takes more time that direct access over the serial cable.

Close the GSM link in the reverse order of operations. Here you may use the menu bar (*Disconnect remote access*) or use the menu option *Options*.

Fig. 35: Disconnect remote access

Fig. 36: Message "Modem connection is terminated"

The connection must also be reset after a timeout of 15 mins. In this case, the connection must be restarted.

7.4 I/O State Request

After setting up a connection between the modem and the MIRO GSM (remote access or via a serial cable link), the device state can be requested for all inputs and outputs, and for the present analog values.

Note

If values or settings are modified over the remote request access, it will take a certain time until they appear in the state display. This may be dependent on the request cycle.

Note

Data transmission via GSM (remote access) takes more time that direct access over the serial cable.

Fig. 37: State request

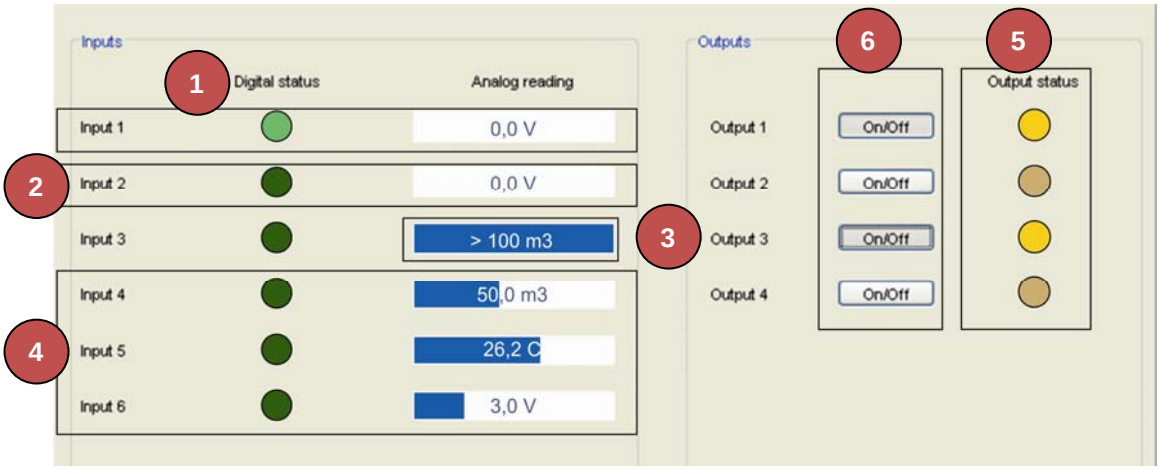


Fig. 38: I/O state request - display

7.4.1 Digital Inputs

1 Digital input **ON** →

2 Digital input **OFF** →

7.4.2 Analog Inputs

The measuring bar displays the measured value and specifies the configured unit.

3 The measuring range of the analog signal is between 0 V and 10 V. If the value present at the input is over 10 V, this is displayed in the state request by >100.0 m3 at the appropriate input. The relevant unit and the entered maximum value are used for the display.

4 If the signal lies within the measuring range, the measuring bars are displayed in proportion to the present measured value, i.e. the minimum value 0 V = 0 m^3 and the maximum value 10 V = 100 m^3, e.g. the present measured value is 5 V (corresponds to 50 m^3) is displayed by half a measuring bar 50.0 m3. Other values are displayed accordingly in proportion to the measuring range.

7.4.3 Outputs

5 The switching state of the outputs is displayed by ON and → **OFF.**.

6 The outputs may be "remote-controlled" by remote access request. Click the mouse on EIN/AUS of the corresponding output to switch the output.

7.5 Selecting the Language

7.5.1 General Information

The MIRO GSM Configuration Software has the capability of changing languages. The program need not be restarted after selecting a language. Select in the menu option "*Options - Change language"* and then select the required language from the list in the menu.

Fig. 39: Select language

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8. Technical Data

8.1 Dimensional Layout

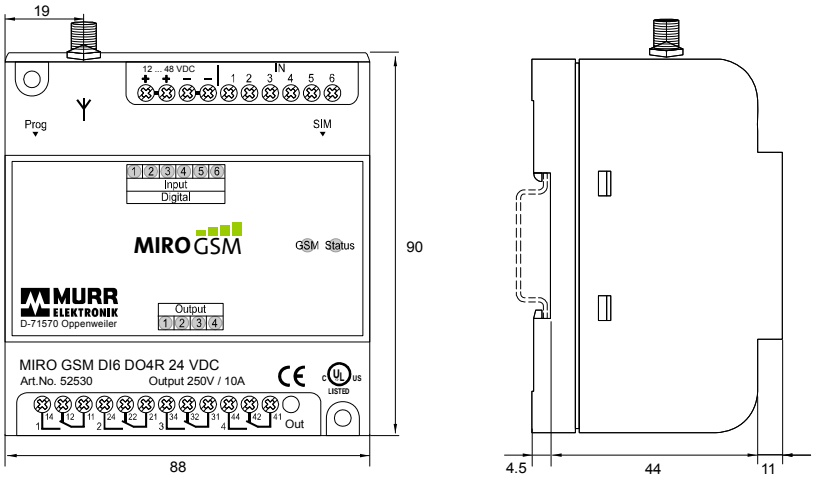

Fig. 40: MIRO GSM - dimensional layout

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8.2 Technical Data

Art. No. 52530
MIRO GSM DI6 DO4R 24 V DC
Art. No. 52531
MIRO GSM ADI6 DO4R 24 V DC
Art. No. 52532
MIRO GSM DI6 DO4R 230 V AC

Gerätebeschreibung / *Device Description*

- Spannungsversorgung 24 V DC bzw. 230 V AC /
  Supply voltage 24 V DC or 230 V AC
- 4 Relaisausgänge (Wechslerkontakte) 250 V/10 A /
  4 relay outputs (switchover contacts) 250 V/10 A
- Individuelle SMS-Meldung für jeden E/A /
  Individual SMS message for each I/O
- Einfach konfigurierbar per Computersoftware /
  Easy to configure with computer software
- Meldung bei Ausfall bzw. Wiederkehr der Speisung /
  Alarm in case of failure or return of supply
- State-Anzeige (LED) für jeden E/A /
  LED state indication for each I/O
- Fernwartung über GSM-Netz /
  Remote maintenance via GSM net
- Anwendung der üblichen SIM-Karten /
  Use of standard SIM cards
- unabhängig von Mobilfunknetzanbietern /
  Independent of mobile network provider
- Call-in-Funktion / *Call-in function*

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Technische Daten / *Technical data*

	52530 *MIRO GSM DI6 DO4R 24 V DC*	**52531** *MIRO GSM ADI6 DO4R 24 V DC*	**52532** *MIRO GSM DI6 DO4R 230 V AC*
Speisung / *Power Supply*			
Nennbetriebsspannung / *nominal operating voltage*	12 … 24 V DC		110 … 240 V AC
Betriebsspannung / *operating voltage*	10 … 60 V DC		85 … 250 V AC
Frequenzbereich / *frequency range*	-		45 … 63 Hz
Stromaufnahme Standby ✶ *current consumption in standby ✶*	approx. 15 mA at 24 V DC approx. 25 mA at 12 V DC		approx. 10 mA at 230 V AC
Leistungsaufnahme / *power consumption*	4.2 W		8 VA / 5 W
Einschaltstromstoss / *inrush current*	< 2.6 A, τ = 0.4 ms		
Digitale Eingänge I1 … I6 / *Digital inputs I1 … I6*			
Ansteuerspannungsbereich AC, DC / *control voltage range AC, DC*	12 … 48 V DC		110 … 240 V AC
Eingangsspannungsbereich / *input voltage range*	0 … 60 V DC		0 … 250 V AC
Ansprechschwelle / *trigger threshold*	9.5 V DC		85 V AC
Hysterese / *hysteresis*	ca. 5 V		ca. 20 V
Stromaufnahme / *current consumption*	1.5 mA / 24 V		4 mA / 230 V
Zulässiger Reststrom / *Permissible leakage current*	20 µA		0.9 mA
Kabelkapazität / *cable capacity*	-		≤ 50 nF
Induktive Parallellastenergie / *inductive parallel load energy*	50 mWs / 1 Hz (2.5 kV)		

✶ Bedingungen: Eingebucht im GSM-Netz, keine Kommunikation aktiv, Eingänge nicht angesteuert, Ausgänge ausgeschaltet / *Conditions: Logged into the GSM net, no communication active, inputs uncontrolled, outputs switched off*

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	52530 *MIRO GSM DI6 DO4R 24 V DC*	**52531** *MIRO GSM ADI6 DO4R 24 V DC*	**52532** *MIRO GSM DI6 DO4R 230 V AC*
Analoge Eingänge I1 … I6 / *Analog inputs I1 … I6*			
Eingangsbereich nominal / *nominal input range*	-	0 … 10 V DC	-
Eingangsbereich effektiv / *actual input range*	-	0 … 12 V DC	-
Maximale Eingangsspannung / *maximum input voltage*	-	60 V DC	-
Auflösung / *resolution*	-	12 Bit, LBS ca. 12.5 mV	-
Eingangsimpedanz / *input impedance*	-	142 kΩ	-
Fehlergrenze, bezogen auf Eingangsbereich / *error limit, related to input range*	-	± 1 %	-
Reaktionszeit maximal / *max. reaction time*	-	1 s	-
Zeitdaten / *Time data*			
Hochlaufzeit Speisung (Ri = 0) / *Set-up time supply (Ri = 0)*	≤ 25 s		
Min. Ansteuerdauer Input (AC, DC) / *min. control time input (AC, DC)*	≥ 200 ms		
Netzausfallsicherheit / *power failure protection*	≥ 15 ms		
Ausgangskreis / *Output circuit*			
Ausgang / *output*	4 relay contact		
Kontaktart / *contact type*	Switchover contacts		
Nennstrom pro Ausgang / *nominal current per output*	10 A		
Summenstrom / *total current*	max. 20 A		
Einschaltstrom / *inrush current*	15 A / 20 ms		
Nennspannung / *nominal voltage*	250 V AC		
Schaltleistung / *switching capacity*	2500 VA AC-1 / …250 W DC-1		
Empfohlene Mindestlast / *recommended minimum load*	10 mA / 12 V		
Kontaktwerkstoff / *contact material*	AgNi 90/10		
Kontaktlebensdauer / *contact life*	150 000 (10 A, 250 V AC-1)		
Mechanische Lebensdauer / *mechanical life*	30×10^6		
Spannungsfestigkeit / *electric strength* Gerät – Kontakt / *device - contact* Kontakt – Kontakt / *contact - contact*	 2.5 kV (RMS, 1 min) 2.5 kV (RMS, 1 min)		

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Sonstiges / *Other*:

	52530 *MIRO GSM DI6 DO4R 24 V DC*	**52531** *MIRO GSM ADI6 DO4R 24 V DC*	**52532** *MIRO GSM DI6 DO4R 230 V AC*
Allgemeine Daten / *General data*			
Abmessungen (H x B x T) / *dimensions (H x W x D)*	80 x 90 x 59.5 mm		
Gehäusewerkstoff / *housing material*	Noryl SE1, Lexan EXL9330		
Anschluss / *connection*	Screw terminal 2.5 mm², 0.5 Nm, Pozidrive/slot-head		
Schutzklasse / *protection class*	IP20		
Befestigung / *attachment*	TS 35 DIN/EN60715, screw fixing M4		
Gewicht / *Weight*	approx. 260 g		
Umgebungsbedingungen / *Ambient conditions*			
Lagertemperatur / *Storage temperature*	-40 … +85 °C		
Betriebstemperatur / *operating temperature*	-25 … +55 °C		
Relative Feuchte / *relative humidity*	10 … 95 %		
Transientenschutz / *transient protection*	Single impulse 2.5 kV / 2.5 Ws		
EMV / *EMC*			
Sicherheit / *safety*	EN 60730-1:2000		
Störfestigkeit / *interference immunity*	EN 61000-6-2:2005		
Störaussendung / *interference emission*	EN 61000-6-3:2007		

Zulassungen / *Approvals*

CE Conformitätserklärung / *CE declaration of conformity*

CE-Bezeichnung in Übereinstimmung mit EMV Richtlinie 2004/108/EC und Niederspannungsrichtlinie 2006/95/EC / *CE-marking in compliance with EMC directive 2004/108/EC and low-voltage directive 2006/95/EC*

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9. Accessories

Art. No. 52533 MIRO GSM Stummelantenne / *Stub antenna*

Art. No. 52534 MIRO GSM Außenantenne mit 5 m Kabel / *Antenna with 5 m cable*

Art. No. 52535 MIRO GSM Service- und Inbetriebnahme-Kit / *Service and Start-up Kit*

Art.-No. 52536 MIRO GSM Handbuch / *Manual*

Overview of Devices and Phone Numbers

Devices

N°	MIRO GSM Device ID	Device type A/D	PIN	Password	Phone Number
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					

Modem

N°	MIRO GSM Device ID	Device type A/D	Pin	Password	Phone Numbers
1					

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