ACCON-MPI-Modem GSM
User Manual

from HW 1 & FW 3.10

The best solutions for PLC

1 PREFACE

This manual is for project developers, users and assemblers who utilize the ACCON-MPI-Modem GSM. It shows the user the handling of the ACCON-MPI-Modem GSM and explains signaling functions. All necessary data for assembling should be provided to the assembler. © 1995 - 2009

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Note:

We have checked the content of this manual for conformity with the hardware and software described. Nevertheless, because deviations cannot be ruled out, we cannot accept any liability for complete conformity. The data in this manual have been checked regularly and any necessary corrections will be included in subsequent editions. We always welcome suggestions for improvement.

Last update 2009-03-09. All technical changes reserved.

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2 TECHNICAL DESCRIPTION

The ACCON-MPI-Modem GSM enables the remote maintenance of a S7 controller via the GSM network. The connection is done via GSM or locally via RS232. The ACCON-MPI-Modem GSM is a compact device. It contains an ACCON-MPI/TS-Adapter and a GSM modem. The ACCON-MPI-Modem GSM uses the same communication protocol as the TS Adapter. Thus the device can be used with all software which supports this adapter. There is also an additional bushing to connect a further station e. g. a control panel, to the bus plug of the ACCON-MPI-Modem GSM. To use the ACCON-MPI-Modem GSM with STEP 7 via a modem connection, you need the TeleService option package from Siemens.

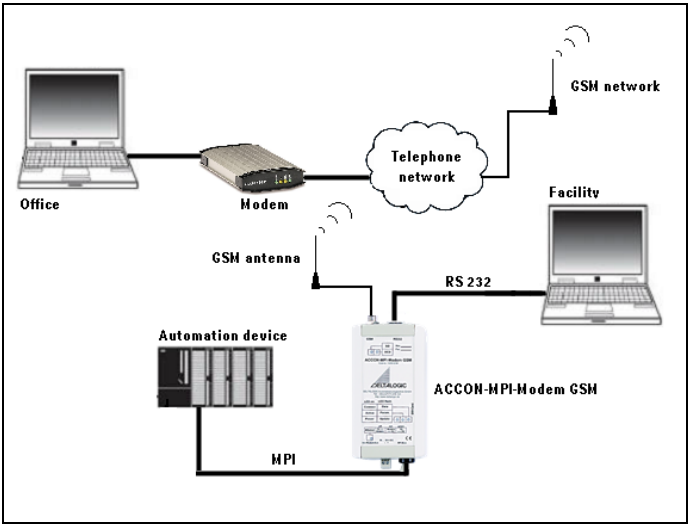

Figure 1: Build-up

The functions »PG_DIAL« and »AS_DIAL« are not implemented.

The ACCON-MPI-Modem GSM does not work with a S7-200 controller!

FM35x modules cannot be parametrized with the ACCON-MPI-Modem GSM!

Features:

- Compact design
- Quick commissioning
- Modem and TS Adapter combined in one single device
- Can be used as local programming adapter
- Assembly on a top hat rail

3 SCOPE OF DELIVERY

- ACCON-MPI-Modem GSM
- PC-Anschlusskabel
- Hutschienenhalterung
- CD mit Software ACCONfigurator zur Parametrierung des integrierten Modems
- Handbuch

Suitable accessories can be found on www.deltalogic.de.

4 DEVICE DESCRIPTION

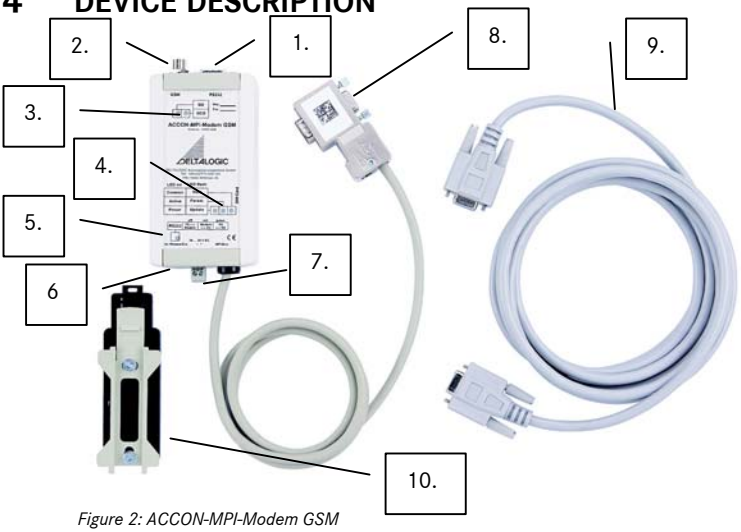

Figure 2: ACCON-MPI-Modem GSM

1) RS232 interface for the communication with the PC
2) FME plug to connect GSM antennas
3) Modem LEDs
4) Status LEDs
5) RS232 LED
6) Switch to change between the different operating modes (microswitch)
7) Power supply bushing for 24 VDC. Please keep the polarity in mind
8) Bus plug with PG bushing, switchable terminator and a 1,2 m connection line
9) PC connection cable
10) Top hat rail holder

LED display

The six LEDs on the front side of the device inform about the operating state of the ACCON-MPI-Modem GSM. So sources of error can be detected very quickly.

When the ACCON-MPI-Modem GSM is connected to the PLC a connection with the MPI bus will be established if the initialization of the internal modem was successful. Then the Active LED lights. If not the initialization of the modem or the log in on the MPI bus does not work. The device can only accept incoming connections when the Active LED lights.

The LEDs can change to one of three possible states: ON, OFF, BLINKING

Status LED	Power/Update LED	Active/Param. LED	Connect/Data LED
Adapter has no voltage feed.	OFF		
Adapter has a 24 VDC voltage feed and is working	ON		
Firmware update being executed	BLINKING	ON	
Adapter is logged on at the MPI bus	ON	ON	
Adapter is receiving parametrization	ON	BLINKING	
Adapter is connected to the PLC	ON	ON	ON
Adapter is transmitting data	ON	ON	BLINKING

Table 1: Status LEDs

Modem LED	DCD LED	SQ LED
Carrier signal has been detected and GSM connection established	ON	
Radio network has been detected and the ACCON-MPI-Modem GSM is ready to receive	ON	BLINKING YELLOW
Signal quality after logging in on the GSM network. The faster the blinking frequency the better the reception	ON	GREEN

Table 2: DCD LED und SQ LED

	RS-232 LED
The ACCON-MPI-Modem GSM works directly with the internal modem and can be connected to a telephone connection for remote maintenance. The RS232 interface does not have any function.	OFF
The internal modem is shut down and the RS232 interface can be used for the communication with the PLC (for parametrization or PC-Adapter).	GREEN
The internal modem can be used directly from a PC via the RS232 interface.	RED

Table 3: RS-232 LED

5 REQUIREMENTS FOR OPERATING

Hardware requirements

If possible put the ACCON-MPI-Modem GSM directly on the MPI interface of the SIMATIC S7-300 or S7-400 controller. You always have to use the 24 VDC external power supply for the ACCON-MPI-Modem GSM.

Please keep in mind that the ACCON-MPI-Modem GSM cannot be used with PROFIBUS!

When using the device abroad, it is recommended to get information about the local radio networks and its frequencies. Contact the network operators in the respective country. Please remember to use a suitable antenna for the used frequency band.

Software requirements

To use the ACCON-MPI-Modem GSM as programming adapter you need SIMATIC STEP 7 from version 5.1. And for an access via a modem connection you need the TeleService options package from Siemens.

Minimum clearance

The following minimum clearance has to be kept that

- you can assemble and disassemble the ACCON-MPI-Modem GSM without disassembling other parts of the facility.
- there is sufficient space to connect all interfaces and connections to standard accessories.
- there is enough room for cable routings.

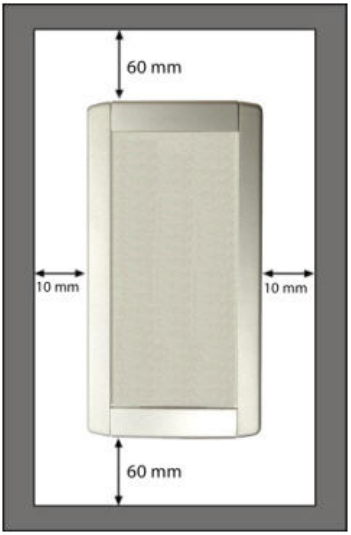

Figure 2: Minimum clearance

Module assembly

A top hat rail holder is supplied.

6 COMMISSIONING

Connecting the antenna

On the front side of the ACCON-MPI-Modem GSM there is an antenna connection (FME plug). The antenna (FME bushing) is screwed in there and installed at a place with the best radio network quality.

Example: Assembly of the magnetic base antenna

Figure 3: Connecting the antenna

Inserting the SIM card

To access a GSM network you need a SIM card from a provider. Please see that the SIM card has a special call number for incoming data calls (CSD connections). Without this data call number you cannot use the SIM card with the ACCON-MPI-Modem GSM.

Before inserting or changing the SIM card you have to interrupt the device's supply voltage!

Figure 1: Release button and SIM card holder

The holder for the SIM card is located sideways. By pushing the countersunk yellow button (e.g. with a biro) the card slot will be ejected that the SIM card can be inserted or removed.
The SIM card must be inserted with the contacts upside into the card holder. After that push the card holder with contacts on the left into the card reader until it snaps in.

Figure 4: Inserted SIM card and ready-to-operate system

You can use 1,8 V as well as 3 V SIM cards.

Only insert and change the SIM card when the device is off!

Data transfer

For the SIM card the GSM provider has to activate a separate call number (incoming data calls CSD). A SIM card can be unlocked for incoming voice and data services at the same time. Then the SIM card has its own call number for each connection type. Normally, the following contracts are possible:

Function	Prepaid card	Contract for voice transmission	Contract for data transmission
Data connection outgoing	✓	✓	✓
Data connection incoming	-	-	✓
SMS	✓	✓	✓
Voice connection	✓	✓	-

Table 1: Services for the SIM card

Different call numbers for incoming calls are assigned to the different services. The GSM network does not redirect e.g. a data call to the call number for voice connections. Please attend to dial the correct call number.

You can establish a data connection between the following:

	analog	ISDN	GSM
analog	Yes	No	Yes
ISDN	No	Yes	No
GSM	Yes	No	Yes

Table 2: Connection types

Connecting to the automation system

Connect the 9-pin SUB-D plug to the MPI interface of your S7 controller.

When the ACCON-MPI-Modem GSM is connected to the PLC at the plant a connection to the MPI bus will be established if the initialization of the internal modem was successful.

If the Power LED does not light, either the modem did not answer to the initialization with »OK« or the ACCON-MPI-Modem GSM was not able to log in on the MPI bus (perhaps wrong MPI address). At this time remote maintenance is not possible.

Connection to the PC

The ACCON-MPI-Modem GSM will be connected to the PC's RS232 interface via the supplied null modem cable. So the ACCON-MPI-Modem GSM can be parametrized or used for the communication as a PC Adapter. You can change between the different modes via the microswitch.

Internal: Modem operating in a telephone network (microswitch position: »Int.«)

When the micro switch is in the »Int.« position, the ACCON-MPI-Modem GSM works directly with the integrated modem. The RS232 LED is off and the RS232 interface has no function. The access on the connected PLC via TeleService is active.

External: RS232 direct operating at a PG/PC (microswitch position: »Ext.«)

When the micro switch is in the »Ext.« position, the ACCON-MPI-modem GSM works with a locally connected PC Adapter or TS Adapter. The RS232 LED is green.

Modem: Modem operating (microswitch position: »Modem.«)

When the microswitch is in the »Mdm.« position, the ACCON-MPI-Modem GSM works as an external GSM modem. The RS2323 LED is red.

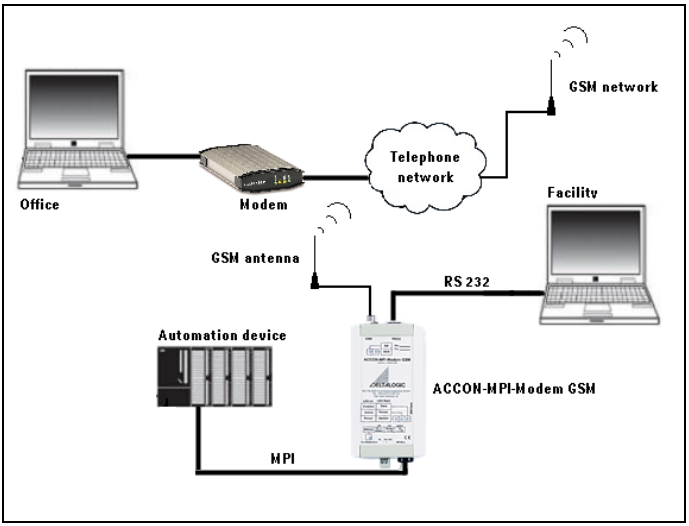

Figure 5: Build-up

Installation of the local modem

If you have already installed a modem under Windows, you can mostly use it for the remote maintenance. In this case you can skip this step and use the already installed modem. Plug&Play modems will be detected automatically after they have been connected to the PC. But you need the driver supplied with the modem. None Plug&Play modems can be installed manually via **Control Panel > Phone and Modem Options > Modems**. The supplied driver is needed here, too. Alternatively, you can use one of the standard drivers supplied with Windows (e.g. Standard 28800 bps Modem). You can choose the installed Modem in the programming software's settings. You choose the installed modem in the programming software during connection establishment.

Example: Setting the local modem

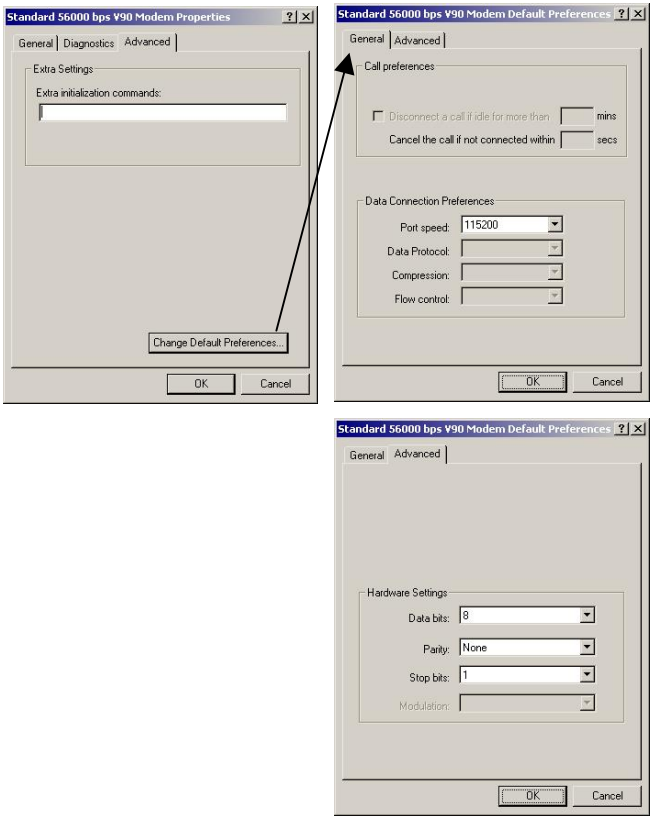

Figure 6: Setting the local modem

For analog connections to the GSM network you have to set the transmission service V.32.

7 INSTALLATION OF THE ACCON-MPI-MODEM GSM AT THE PLANT

Assemble the ACCON-MPI-Modem GSM in the control cabinet remembering the minimum clearance.

Energize 24 VDC to the power supply bushing and assemble the antenna. Please keep the polarity in mind. If the device is fed with voltage only the Power and RS232 LED should light green. If the RS232 LED is of or lights red then change the microswitch to »Ext.«.

Connect the ACCON-MPI-Modem GSM to the RS232 interface of your PC or PG via the supplied null modem cable.

Parametrization with TeleService

The settings of the ACCON-MPI-Modem GSM are defined by the software with which the communication to the automation device is done.

In addition to the programming software STEP 7 you need TeleService from Siemens (from version 3.0) to administrate the connections (phone book) and establish a dual-up connection to the controller.

Adjust the connection in the dialog **Set PG/PC Interface** as follows:

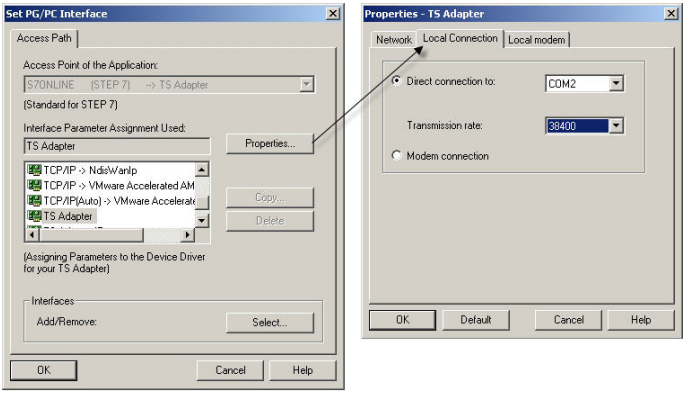

Figure 7: Set PG/PC Interface

Choose the PC's COM port to which the ACCON-MPI-Modem GSM is connected to.

Via the menu **Options > Assign TS Adapter I/II parameters** in the TeleService software, you can define the following settings for the internal adapter and the internal analog modem.

Transmission rate from internal adapter to the modem:

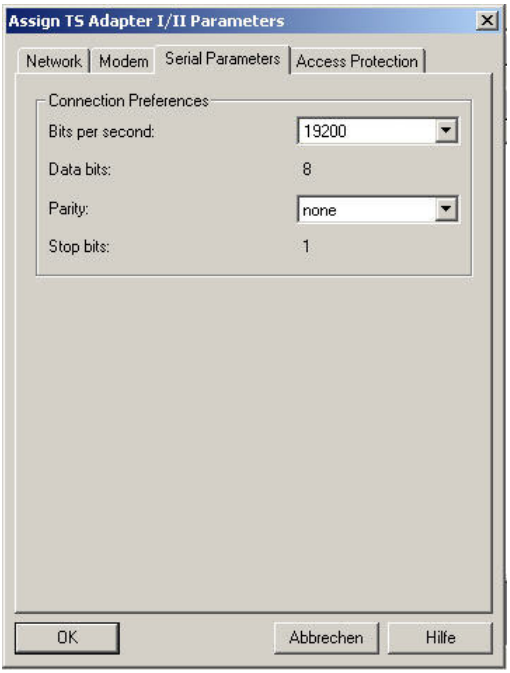

Figure 8: Serial parameters

Modem settings / Initialization string

To log in on the GSM network the personal identification number (PIN) is needed. It is stored in the initialization string (Init string) of the ACCON-MPI-Modem GSM. The Init string is set with the TeleService software or ACCONfigurator.

Setting the PIN with TeleService

Go to the tab »Modem«.

You have to add »AT+CPIN="PIN"« in the Init string.

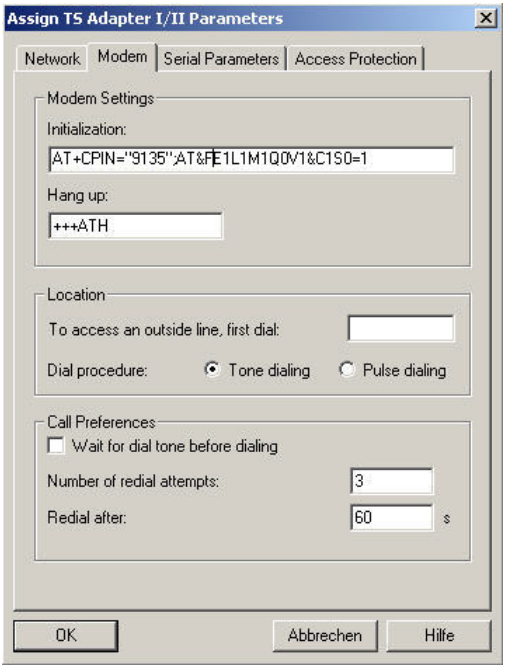

Figure 9: Setting initialization string

*The PIN 9135 is just an example. Please enter **your** 4-digit PIN!*

The complete initialization string could look like the following:

AT+CPIN="9135";AT&FE1L1M1Q0V1&C1S0=1

It consists of two command sequences which are separated by a semicolon. The first one is only sent when activating the ACCON-MPI-Modem GSM, the second after a connection loss. Only change the settings when you are sure that the AT control sequence is correct!

The second part contains the basic settings which normally need not to be changed.

AT	Initiate modem commands
&F	Load modem factory defaults
E1	Echo of commands ON

L1	Sound volume level 1
M1	Speaker ON
Q0	Modem response ON
V1	Response in plain text
&C1	DCD signal shows available carrier
S0=1	Automatic call acceptance. The number 1 stands for rings until call acceptance e.g. S0=3 the modem accepts the call after 3 rings.

When changing the SIM card, please remember that an already existing PIN has to be changed or deleted. Otherwise the SIM card will be locked after three tries with the wrong PIN.

Password protection and call-back

Go to the tab »Access Protection«.

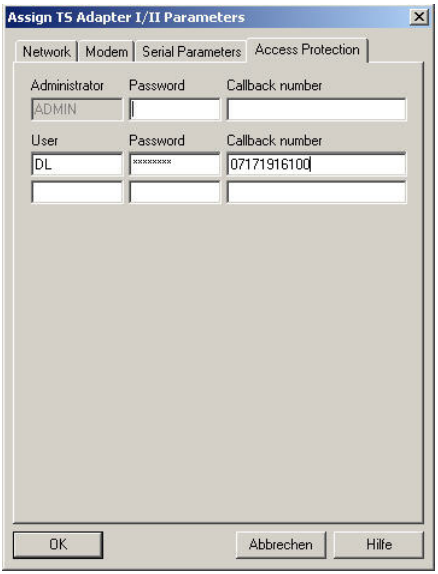

Figure 10: Access Protection

There you can create three different users including call-back number and password. The user »ADMIN« is the only one who has the right to change all settings in the adapter including the settings of the other users. The other two users can only change their own password and call-

back number. If a call-back number is set, the ACCON-MPI-Modem GSM always uses this number to call back if the respective user logs in.

If you enter a wrong call-back number for the user »ADMIN« the ACCON-MPI-Modem GSM cannot be parametrized via a remote connection any more. In this case you can only change the call-back number directly at the device (microswitch position »Ext.«)!

To store the settings in the adapter click on »OK« and answer the eventually appearing warning:

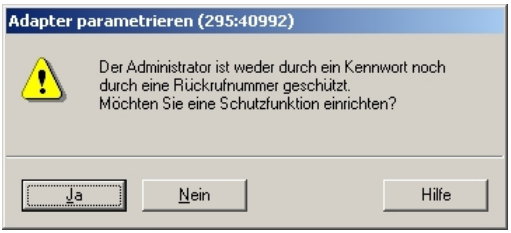

Figure 11: Parametrizing adapter, set access protection

»The administrator is neither protected by a password nor by a call-back number. Do you want to set a protection function?«

By clicking on »No« all settings will be stored in the adapter despite the warning. By clicking on »Yes« you get back to the settings.

Now the ACCON-MPI-Modem GSM is parametrized. Change the microswitch to »Int.« and wait until the Active LED lights. If not the settings of the ACCON-MPI-Modem GSM are incorrect (normally wrong bus settings or init string) and remote maintenance is not possible.

*The parametrization can be done locally via the TeleService software (**microswitch position »Ext.«**) as well as via a telephone connection (**microswitch position »Int.«**).*

The ACCON-MPI-Modem GSM is ready to operate when the Power LED as well as the Active LED is on.

8 PARAMETRIZATION WITH ACCONFIGURATOR

With ACCONfigurator it is possible to parametrize the ACCON-MPI-Modem GSM on any Pc without using an additional software e.g. TeleService. The program can be found on the DELTALOGIC Automatisierungstechnik-CD and on www.deltalogic.de.

Before starting with the parametrization of the ACCON-MPI-Modem GSM you have to choose the proper device via Adapter/Product > ...select. And you have to put the micro switch from »int.« to »ext.«. Connect the ACCON-MPI-Mode GSM to a PG or a PC with the supplied null modem cable.

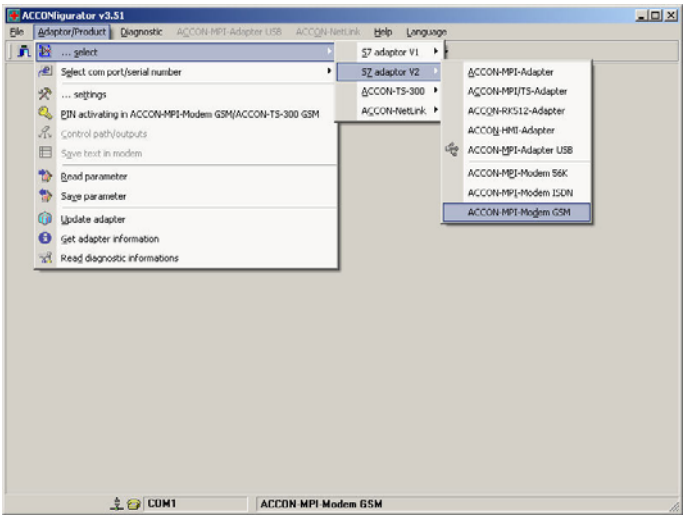

Figure 12: Select ACCON-MPI-Modem GSM

Set the COM port via **Adapter/Product > Select com port/serial number** to which the ACCON-MPI-Modem GSM is connected to.

Read out the settings from the ACCON-MPI-Modem GSM via **Adapter/Product > Read parameter** and enter the changes. Store the new settings via the button »Save/End«.

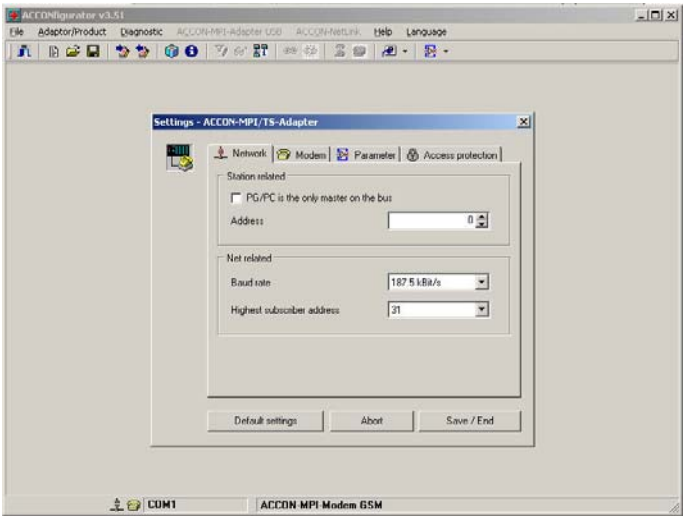

Figure 13: Settings TS Adapter, network

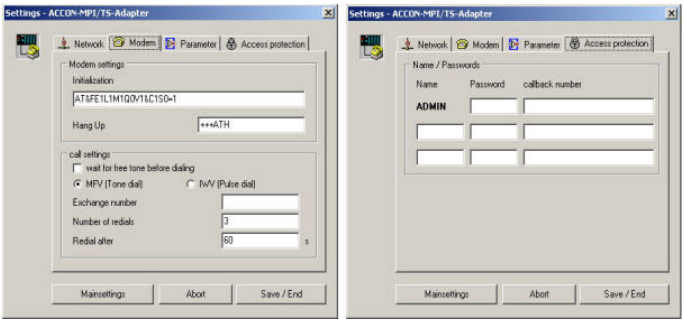

Figure 14: Settings TS Adapter, modem and access protection

Testing SIM card and signal strength

Select the ACCON-MPI-Modem GSM via **Adapter/Product > ...select.** Change the microswitch to »Modem« and connect the ACCON-MPI-Modem GSM to the PC via the supplied null modem cable.

Set the COM port via **Adapter/Product > Select com port/serial number** to which the ACCON-MPI-Modem GSM is connected to.

Call **Adapter/Product > PIN activating in ACCON-MPI-Modem GSM/ACCON-TS-300 GSM.** The following window appears:

Figure 15: PIN for modem

Enter your actual PIN and click on »set the PIN«. After a successful log in on the radio network, the actual signal strength is shown as a bar.

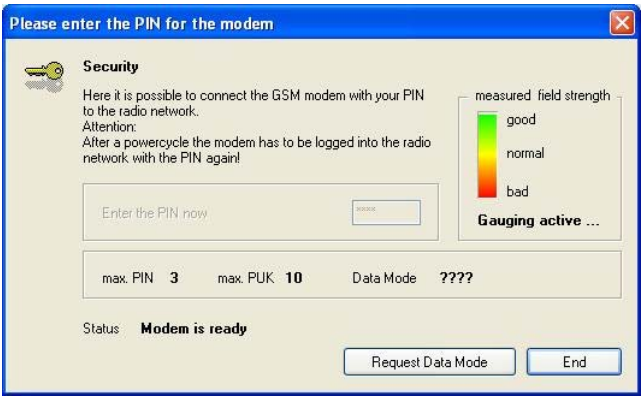

Figure 16: Signal strength

9 TECHNICAL DATA

Supported PLCs	S7-300, S7-400
Weight in kg	Ca. 0,24
Dimensions (W x H x D) in mm	135 x 67 x 30
Operating voltage	24 VDC ±25 %
External power supply possible	Yes
Power consumption	Max. 150 mA
MPI interface	RS485, pot. separated
Transmission rate	19,2 KBit/s or 187,5 KBit/s
Connection line	1,2 m
Connection	9-pin SUB-D plug with PG bushing
Modem connection	FME antenna plug, GSC-F-male
Card type	1,8 V- or 3 V-SIM card for data transfer
Only for modem operating	9-pin SUB-D plug V.24/V.28
GSM frequency bands	GSM 850, EGSM 900, DCS 1800, PCS 1900
Transmission capacity	Class 4 (2 W) for GSM 850 / EGSM 900 Class 1 (1 W) for DCS 1800 / PCS 1900
GSM/DCS certification GCF-CC	V.3.16.0 and GT.01
PCS certification	NAPRD.03 (V.2.10.1)
Communication interface	RS232, serial asynchronous
Transmission rate	9.6 KBit/s to 115 KBit/s

Connection	9-pin SUB-D plug V.24/V.28
Protection type	IP 20
Temperature operating conditions Temp. Storage/transport Relative humidity operating Relative humidity storage	 0 °C to +60 °C -20 °C to +60 °C 5 % to 85 % at 30 °C (no bedewing) 5 % to 93 % at 40 °C (no bedewing)
Quality control	According to ISO 9001:2000
Maintenance	Maintenance-free (no battery)

Table 3: Technical data

Pin assignment

Pin	SUB-D plug PC	SUB-D plug MPI
1	DCD	n. c.
2	Rx	M24 VDC
3	Tx	DATA.B
4	DTR	RTS AS
5	GND	0V (M5 VDC)
6	DSR	n. c.
7	RTS	+24 VDC
8	CTS	DATA.A
9	RI	RTS PG

Table 4: Pin assignment

Connection cable

Null modem cable for the connection to the PC (supplied in delivery)