

SIEMENS

PV Inverter SITOP solar

Visualisation Software SITOP solar log

Instructions for Extending Communication

Siemens AG
Automation and Drives
Systems Engineering
Power Supplies
P.O. Box 2355
90713 Fuerth, Germany

Release 01/2007

Copyright © Siemens AG 2007
Subject to change
without prior notice

www.siemens.com/sitop-solar

Contents

- 1 .Reading the inverter data with the PC
 - 1.1 Preparing the data cable for the indoor inverter (IP21)
 - 1.1.1 Connecting the indoor inverter (IP21) to the PC
 - 1.1.2 Connecting several indoor inverters to each other (IP21)
 - 1.2 Preparing the data cable for the outdoor inverter (IP65)
 - 1.2.1 Connecting the outdoor inverter (IP65) to the PC
 - 1.2.2 Connecting several outdoor inverters to each other (IP65)

2. Modem
 - 2.1 Modem configuration: U.S. Robotics Courier 56k Business Modem V.92 / USR843453B
 - 2.1.1 DIP switches
 - 2.1.2 Connecting the indoor inverter to the modem
 - 2.1.2.1 Method 1
 - 2.1.2.2 Method 2
 - 2.1.3 Connecting the outdoor inverter to the modem
 - 2.2 Modem configuration: U.S. Robotics 56K* V.92 external faxmodem serial / USR025630B
 - 2.2.1 Connecting the indoor inverter to the modem
 - 2.2.2 Connecting the outdoor inverter to the modem
 - 2.3 Modem configuration: Siemens TC 35i terminal
 - 2.3.1 Connecting the indoor inverter to the modem
 - 2.3.2 Connecting the outdoor inverter to the modem

3. Procurement list

Instructions for extending communication

Instructions for configuring the connection for reading the inverter data with a PC and modem.

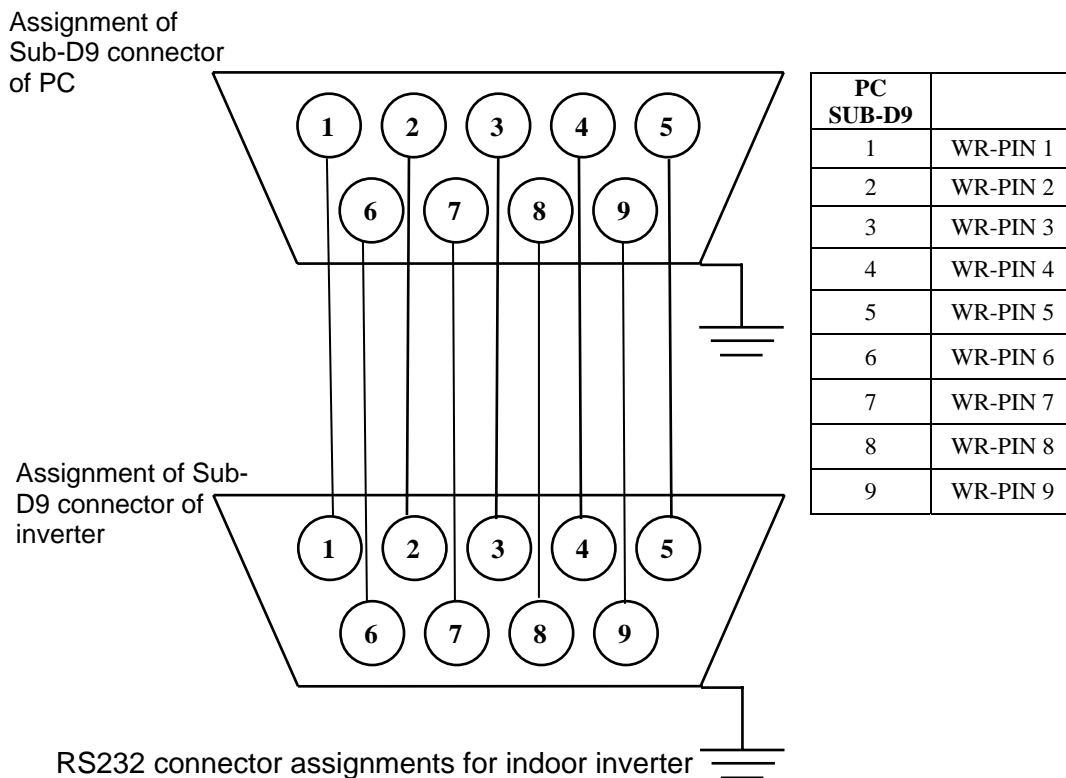
1. Reading the inverter data with the PC

With your PC, you can use the **SITOP solar log** software to obtain information about your photovoltaic system and the inverter. To do so, an inverter is connected to your PC via an RS 232 cable. This data cable must be prepared as described in the following sections.

1.1 Preparing the data cable for the indoor inverter (IP21)

1.1.1 Connecting the indoor inverter (IP21) to the PC

To connect the indoor inverter to a PC, prepare the cable as follows:



Note: A standard 1:1 RS 232 cable can be used, although it must have two sockets because both the PC and inverter connections are designed as plugs. (Cable: e.g. Schuricht, article no.: 672742, DB9 female/female 1.8m)

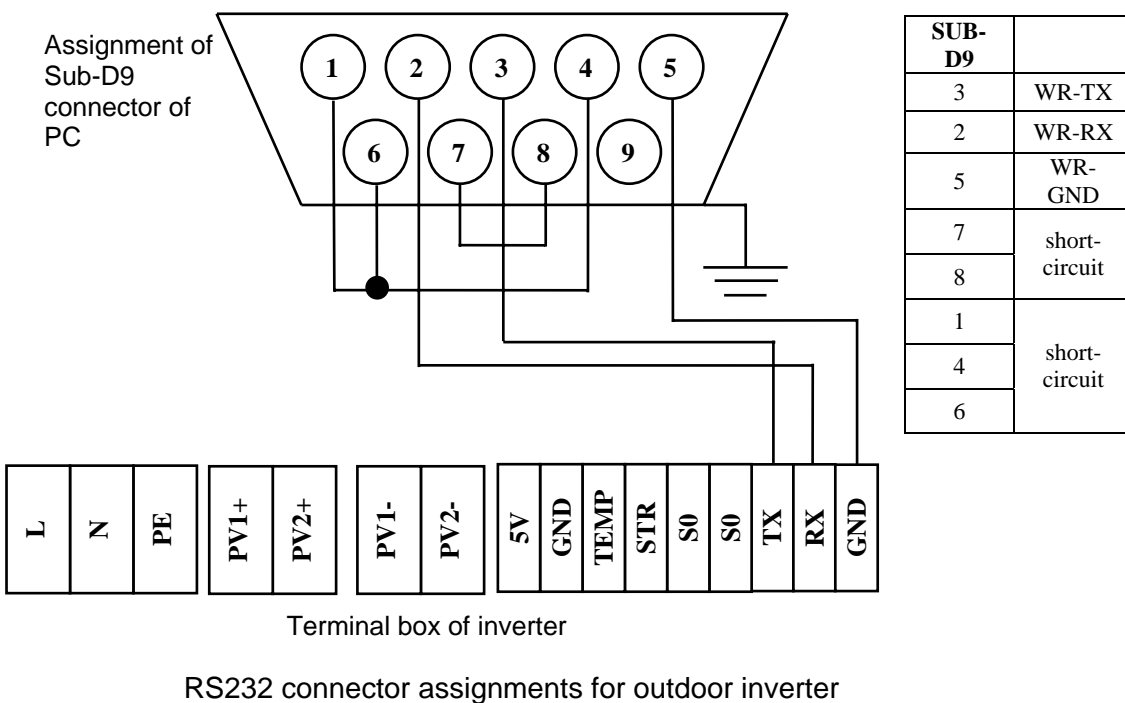
1.1.2 Connecting several indoor inverters (IP21) to each other

If more than one indoor inverter needs to be read, the master devices (devices with display) are connected to each other via a 1:1 RS232 cable (cable: e.g. Schuricht, article no.: 672742, DB9 female/female 1.8m). The PC only needs to be connected to one of the master devices. Each master inverter must be assigned a different hardware address.

1.2 Preparing the data cable for the outdoor inverter (IP65)

1.2.1 Connecting the outdoor inverter (IP65) to the PC

To connect the outdoor inverter to a PC, prepare the RS232 cable as follows:



1.2.2 Connecting several outdoor inverters (IP65) to each other

If more than one outdoor inverter needs to be read, they are connected to each other 1:1 (i.e. the TX is connected to the TX of the other, the RX connected to the RX of the other, and the GND connected to the GND of the other). The PC only needs to be connected to one of the inverters. Each inverter must be assigned a different hardware address.

2. Modem

We recommend the U.S. Robotics Courier 56k Business Modem V.92 / USR843453B, which is available via the U.S. Robotics online shop: <http://www.usroboticsshop.de/>. Tests showed that smooth operation was ensured with this modem.

The U.S. Robotics® 56K* V.92 external faxmodem serial / USR025630B is usually also sufficient, although connection problems can occur with this modem, particularly when it is used in telecommunication systems.

If a GSM modem is required, the Siemens TC35i Terminal can be used, although problems may occur with this too. For distributors from whom you can order the modem, see

http://www.siemens.com/index.jsp?sdc_p=i129089110mo1293430pWMDEc61fsu1436z4&sdc_sid=30260811027&sdc_defnav=true.

For example, you can order all the components you need from Holz Elektronik with the order number TC35i-T-A102-KIT (modem, antenna, RS232 cable, plug-in power supply unit).

The inverter and the modem are connected by means of a crossed RS 232 cable (zero modem cable). For the PIN assignments, see the drawings on the following pages.

The modem only needs to be connected to one inverter. To connect the inverters to each other, use the connection assignments described in the previous section (Reading the inverter data with the PC).

2.1 Modem configuration: U.S. Robotics Courier 56k Business Modem V.92 /USR843453B

2.1.1 DIP switches

Step 1: set the DIP switches on the modem

The default settings of the DIP switches must be changed as follows:

Set DIP switch 1 to "On". The modem then ignores the DTR signal (Data Terminal Ready, PIN 4).

Set DIP switch 5 to "Off". "Automatic response mode" is then activated.

2.1.2 Connecting the indoor inverter to the modem

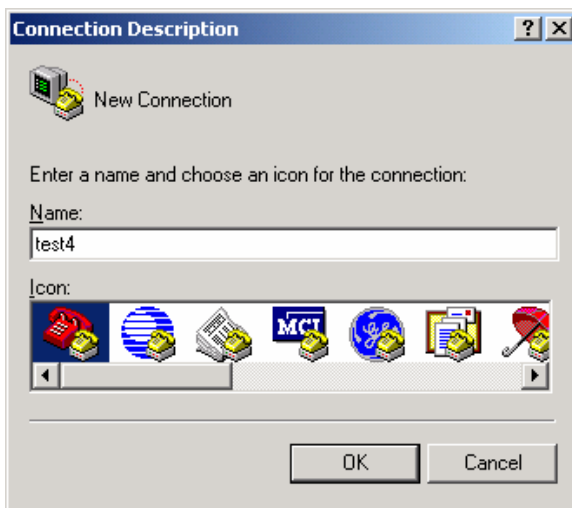
With the indoor inverter, two different methods are available depending on whether you would rather configure a suitable cable yourself or simply buy a standard cable and parameterize the modem by means of AT commands.

2.1.2.1 Method 1

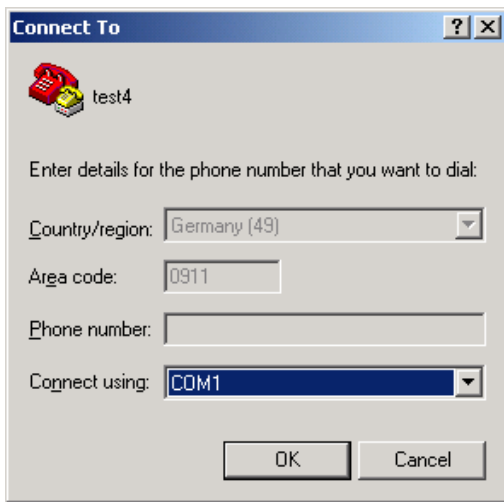
Step 2: Configure the modem by means of AT commands

To configure the modem, you first have to connect the modem to a PC using a 1:1 RS 232 cable. This serial cable is supplied with the modem (25 pin on 9 pin).

You can use the HyperTerminal program, which is supplied with Windows, to configure the modem. To call up HyperTerminal, choose All Programs -> Accessories -> Communications -> HyperTerminal. Once you have launched HyperTerminal, you have to assign a name for the new connection.



You can then choose the connection type. Here, specify the COM port that is used for connecting the PC to the modem.



You now have to make the connection settings. You have to enter the values listed below because the modem uses these settings once a connection has been established with the PC. Only with these settings can the modem communicate with the inverter.

Set the following values:

Bits per second: 9600

Data bits: 8

Parity: None

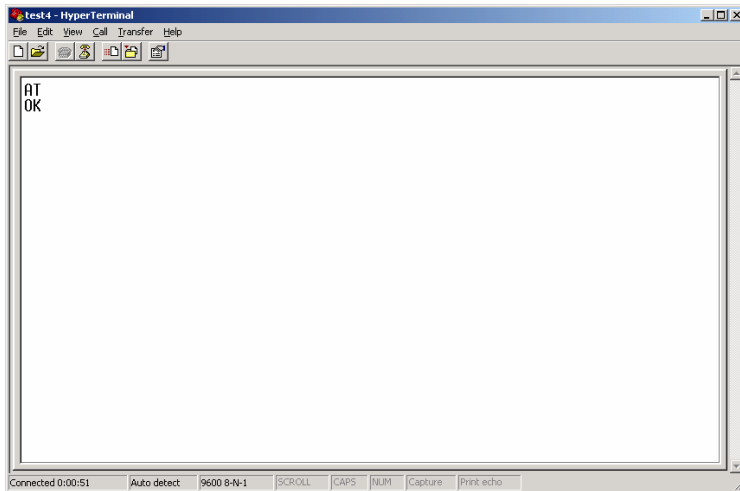
Stop bits: 1

Flow control: None



When you confirm with OK, the empty HyperTerminal program window is displayed. To establish a connection with the modem, choose Call.

You can check whether or not a connection was successfully established with the modem by entering AT. If a connection was successfully established, the modem responds with OK.



You then have to send the following AT commands (\emptyset = zero):

- | | |
|--------------------|---|
| AT&F1 | Reset the modem parameters to the default settings |
| AT&H \emptyset | Deactivate "Send flow control". This prevents the modem buffer from overflowing. |
| AT&R1 | Deactivate "Receive flow control". The modem sends data even if it has not received the RTS signal (PIN 7/9 pin). |
| AT&D \emptyset | Causes the modem to ignore the DTR status (PIN 4/9 pin). |
| ATS \emptyset =1 | Accept calls automatically. The modem is to answer after one ring tone. |
| AT&C \emptyset | Carrier Detect always on (PIN 1/ 9 pin). |
| AT&W | Save the configuration in NV-RAM. |

The modem should respond to all commands with OK. If this is not the case, reset the parameters. The connection to the modem and the HyperTerminal program can then be terminated. You now have to connect the modem to the inverter.

Step 3: Connect the modem to the indoor inverter

You can now connect the modem to an indoor inverter (master).

Option 1:

You now also have to connect a zero modem adapter to the serial RS232 cable (25 pin / 9 pin) supplied with the modem (e.g. Schuricht, catalog 2005, page 1820, article no. 675596, DB9M / DB9 F). The modem can then be connected to the inverter.

To ensure that the distance between the modem and the inverter is sufficient because of the heat generated, we advise you to extend the length of the serial cable by means of a standard 1:1 RS 232 cable (e.g. Schuricht, article no. 676696, DB 9 male/female, 4.5m).

Option 2:

Instead of connecting a zero modem adapter from Schuricht to the serial RS232 (25 pin / 9 pin), you can use a zero modem cable from Conrad. This cable is fitted with sockets at both ends, which means that you need to purchase a standard adapter too (order no. 979970 or 741620).

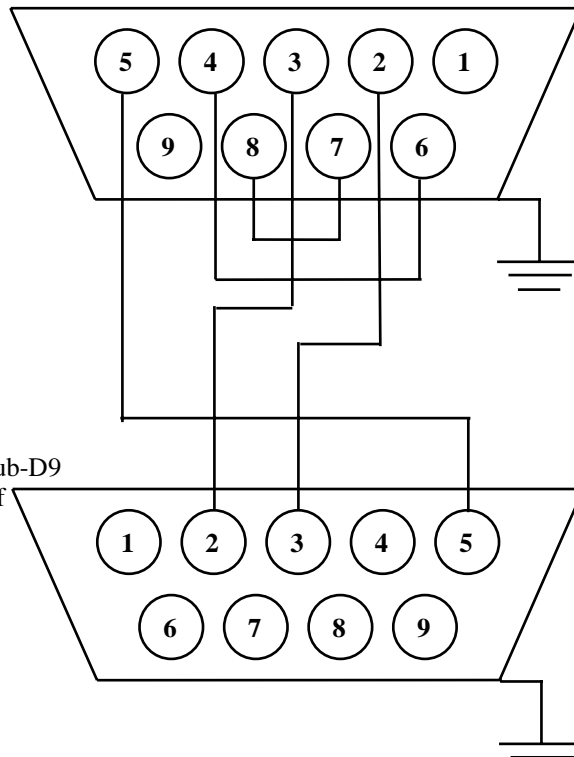
2.1.2.2 Method 2

With this method, you do not have to configure the modem by means of AT commands, although you do require a more complex cable. There is a trick, however, that allows you to use a standard cable (see note). If you have any problems with this method, you will have to parameterize the modem with AT commands as described under method 1.

Step 2: Connect the modem to the indoor inverter

Connect the serial RS232 cable (25 pin / 9 pin) supplied with the modem to the modem. You now have to connect another cable with a 9-pin connector on the modem side and a 9-pin socket on the inverter side to the 9-pin cable output. The connection assignments are as follows:

Assignment of Sub-D9 socket of serial cable (modem)



Modem SUB-D9	
2	WR-PIN 3
3	WR-PIN 2
5	WR-PIN 5
7	short-circuit
8	
4	short-circuit
6	

Assignment of Sub-D9 connector of inverter

RS232 connector assignments for indoor inverter

Note:

The inverter itself is equipped with jumpers (PIN 1, PIN 4, PIN 6, and PIN 8 are jumpered), which enables the inverter data to be read from the PC. This means that you have the option of using a standard zero modem adapter.

This zero modem adapter is available from Schuricht, for example (catalog 2005, page 1820, article no. 675596, DB9M / DB9 F). With this zero modem adapter, you only have to isolate PIN 1. You then attach the zero modem adapter to the serial cable and the Sub-D9 connector of the inverter.

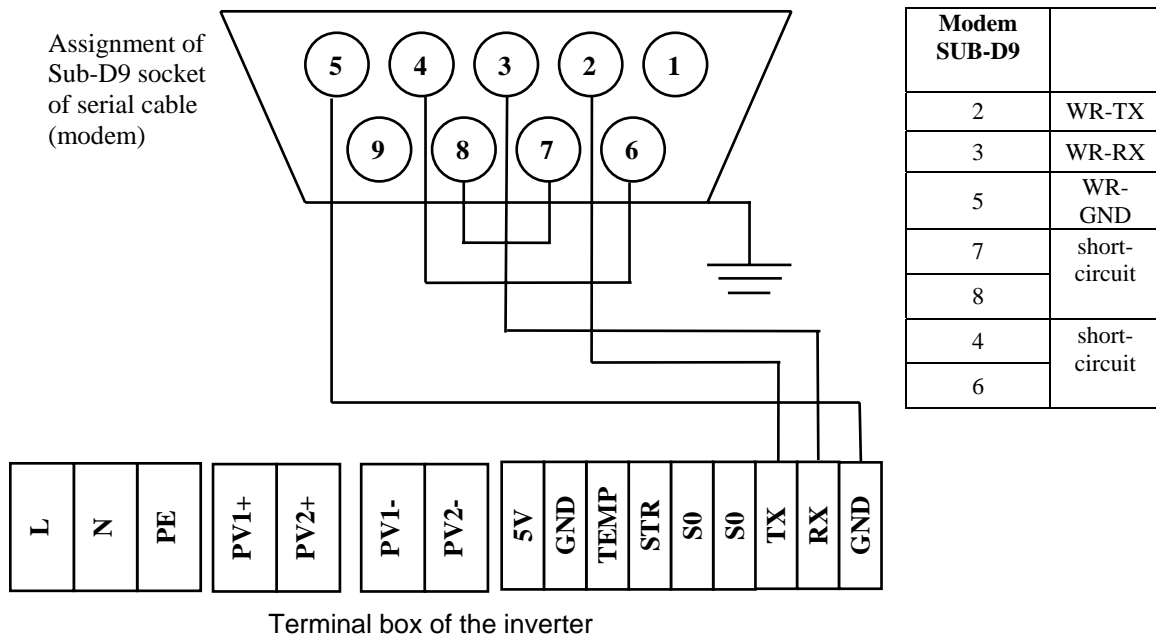
To ensure that the distance between the modem and the inverter is sufficient because of the heat generated, we advise you to extend the length of the serial 1:1 cable supplied with the modem by means of a standard 1:1 RS 232 cable (e.g. Schuricht, article no. 676696, DB 9 male/female, 4.5m).

2.1.3 Connecting the outdoor inverter to the modem

Step 2: Prepare the data cable (outdoor)

Connect the serial RS232 cable (25 pin / 9 pin) supplied with the modem to the modem. You now have to connect another cable to the 9-pin cable output.

This cable must have a 9-pin connector for the modem side and 3 cables for the inverter side. The connection assignments are as follows:



RS232 connector assignments for outdoor inverter

Note:

If communication is not possible between the modem and the inverter even though you are using the correct cable and have set the DIP switches correctly, you may be able to rectify this by reconfiguring the modem with AT commands. For information on configuring the modem with HyperTerminal and AT commands, see procedure 1, step 2 under "Indoor inverter".

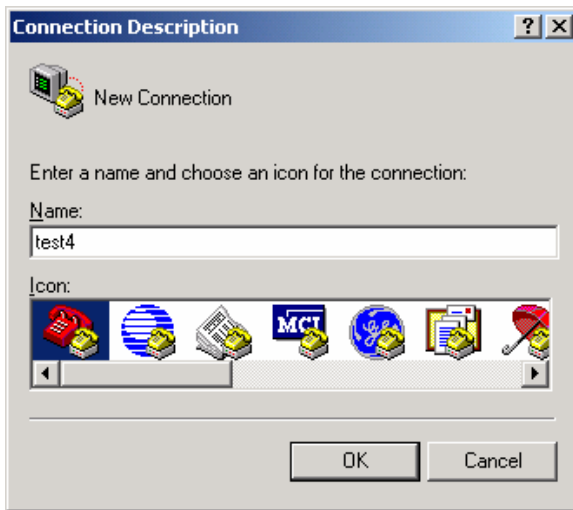
2.2 Modem configuration: U.S. Robotics 56K* V.92 external faxmodem serial / USR025630B

2.2.1 Connecting the indoor inverter to the modem

Step 1: Configure the modem by means of AT commands

To configure the modem, you first have to connect the modem to a PC using a 1:1 RS 232 cable. This serial cable is supplied with the modem (25 pin on 9 pin).

You can use the HyperTerminal program, which is supplied with Windows, to configure the modem. To call up HyperTerminal, choose All Programs -> Accessories -> Communications -> HyperTerminal. Once you have launched HyperTerminal, you have to assign a name for the new connection.



You can then choose the connection type. Here, specify the COM port that is used for connecting the PC to the modem.



You now have to make the connection settings. You have to enter the values listed below because the modem uses these settings once a connection has been established with the PC. Only with these settings can the modem communicate with the inverter.

Set the following values:

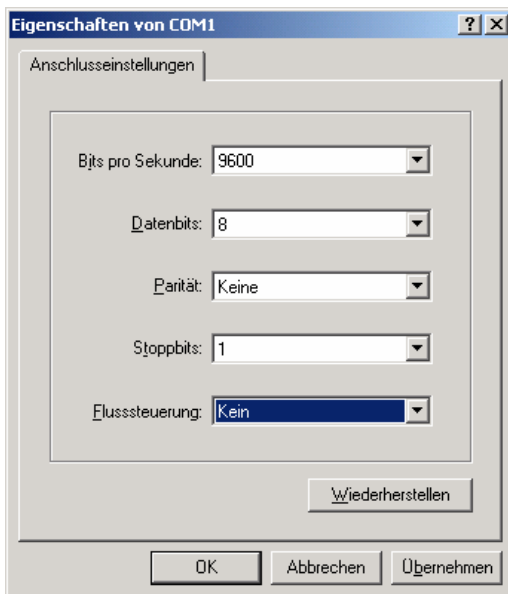
Bits per second: 9600

Data bits: 8

Parity: None

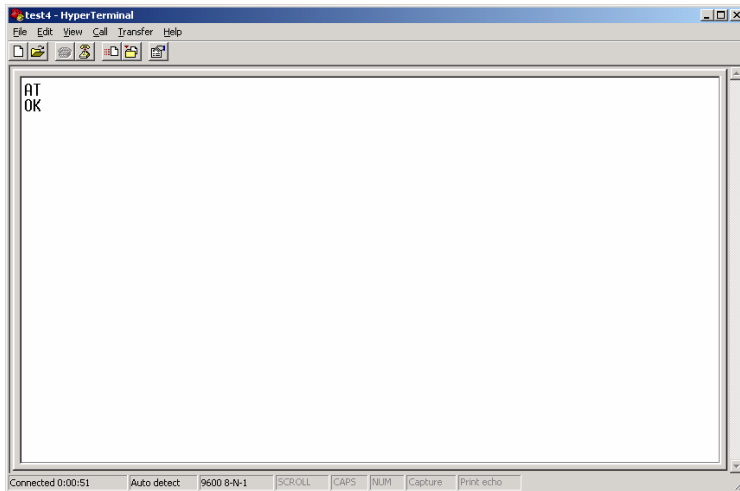
Stop bits: 1

Flow control: None



When you confirm with OK, the empty HyperTerminal program window is displayed. To establish a connection with the modem, choose Call.

You can check whether or not a connection was successfully established with the modem by entering AT. If a connection was successfully established, the modem responds with OK.



You then have to send the following AT commands (Ø = zero):

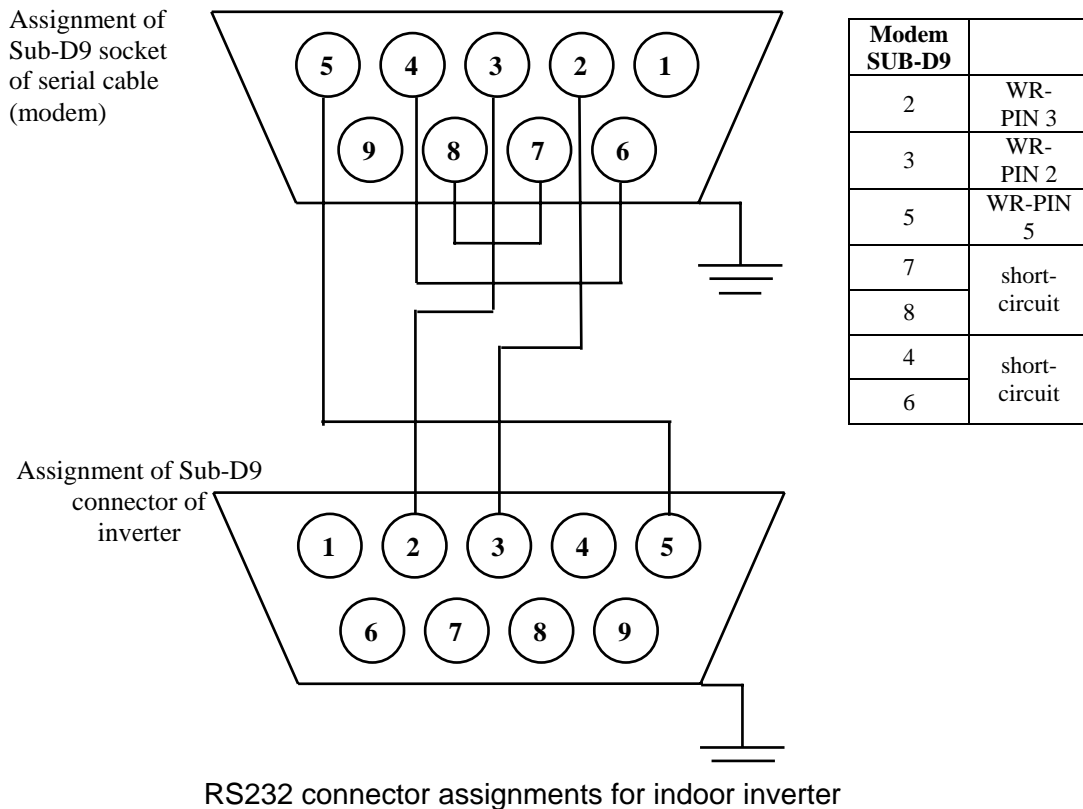
- | | |
|--------|---|
| AT&F1 | Reset the modem parameters to the default settings |
| AT&HØ | Deactivate "Send flow control". This prevents the modem buffer from overflowing. |
| AT&R1 | Deactivate "Receive flow control". The modem sends data even if it has not received the RTS signal (PIN 7/9 pin). |
| AT&DØ | Causes the modem to ignore the DTR status (PIN 4/9 pin). |
| ATSØ=1 | Accept calls automatically. The modem is to answer after one ring tone. |
| AT&CØ | Carrier Detect always on (PIN 1/ 9 pin). |
| ATYØ | Use NV RAM profile 0 during start-up. |
| AT&WØ | Save the configuration in NV-RAM profile 0. |

The modem should respond to all commands with OK. If this is not the case, reset the parameters. The connection to the modem and the HyperTerminal program can then be terminated. You now have to connect the modem to the inverter.

Step 2: Connect the modem to the indoor inverter

Connect the serial RS232 cable (25 pin / 9 pin) supplied with the modem to the modem. You now have to connect another cable with a 9-pin connector on the modem side and a 9-pin socket on the inverter side to the 9-pin cable output.

The connection assignments are as follows:



Note:

The inverter itself is equipped with jumpers (PIN 1, PIN 4, PIN 6, and PIN 8 are jumpered), which enables the inverter data to be read from the PC. This means that you have the option of using a standard zero modem adapter. This zero modem adapter is available from Schuricht, for example (catalog 2005, page 1820, article no. 675596, DB9M / DB9 F). With this zero modem adapter, you only have to isolate PIN 1. You then attach the zero modem adapter to the serial cable and the Sub-D9 connector of the inverter.

To ensure that the distance between the modem and the inverter is sufficient because of the heat generated, we advise you to extend the length of the serial 1:1 cable supplied with the modem by means of a standard 1:1 RS 232 cable (e.g. Schuricht, article no. 676696, DB 9 male/female, 4.5m).

2.2.2 Connecting the outdoor inverter to the modem

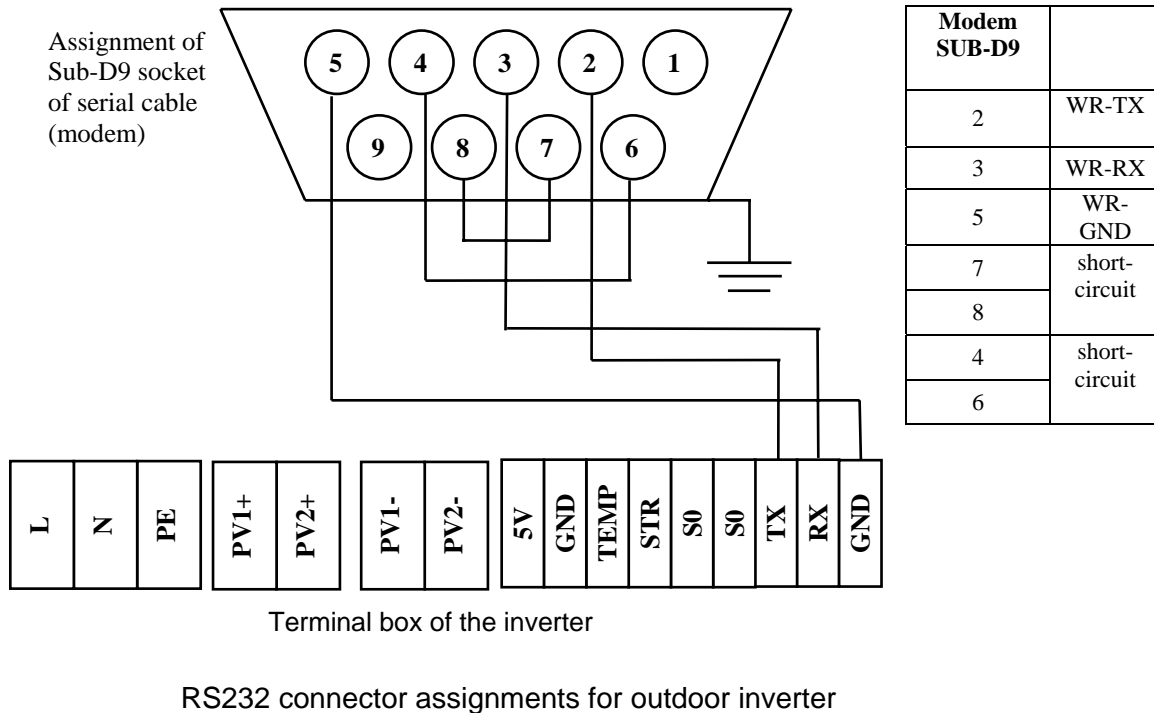
Step 1: Configure the modem by means of AT commands

Configure the modem as described in section 2.2.1, step 1.

Step 2: Prepare the data cable (outdoor)

Connect the serial RS232 cable (25 pin / 9 pin) supplied with the modem to the modem. You now have to connect another cable to the 9-pin cable output.

This cable must have a 9-pin connector for the modem side and 3 cables for the inverter side. The connection assignments are as follows:



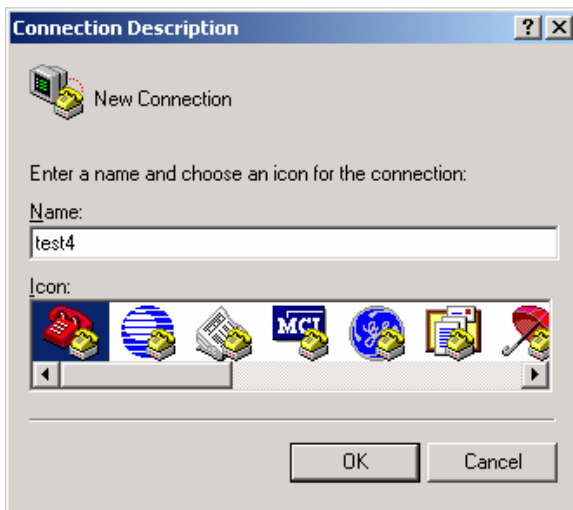
2.3 Modem configuration: Siemens TC 35i terminal

2.3.1 Connecting the indoor inverter to the modem

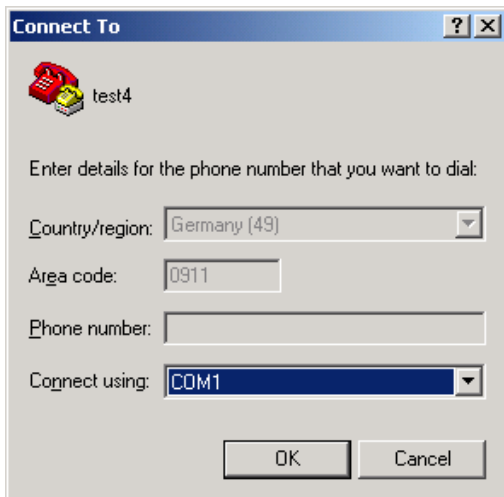
Step 1: Configure the modem by means of AT commands

To configure the modem, you first have to connect the modem to a PC using a 1:1 RS 232 cable. This serial cable is supplied with the modem (when you order the TC35i-T-A102-KIT; alternative serial cable: Schuricht, article no. 676696, DB9 male/female 4.5 m).

You can use the HyperTerminal program, which is supplied with Windows, to configure the modem. To call up HyperTerminal, choose All Programs -> Accessories -> Communications -> HyperTerminal. Once you have launched HyperTerminal, you have to assign a name for the new connection.



You can then choose the connection type. Here, specify the COM port that is used for connecting the PC to the modem.



You now have to make the connection settings. You have to enter the values listed below because the modem uses these settings once a connection has been established with the PC. Only with these settings can the modem communicate with the inverter.

Set the following values:

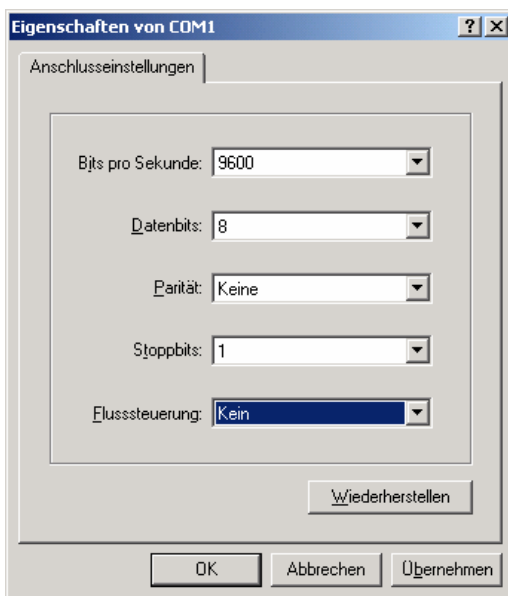
Bits per second: 9600

Data bits: 8

Parity: None

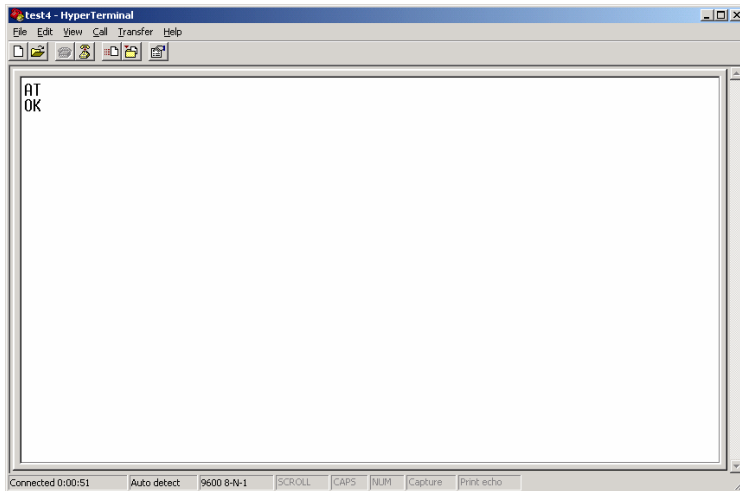
Stop bits: 1

Flow control: None



When you confirm with OK, the empty HyperTerminal program window is displayed. To establish a connection with the modem, choose Call.

You can check whether or not a connection was successfully established with the modem by entering AT. If a connection was successfully established, the modem responds with OK.



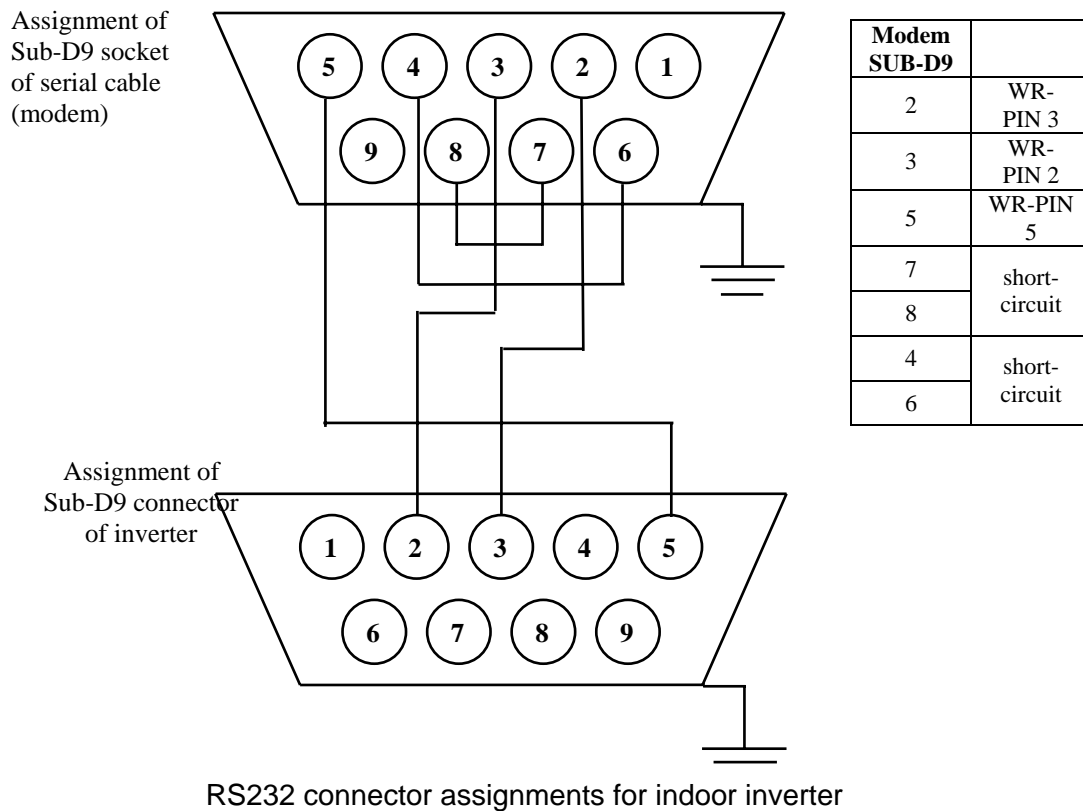
You then have to send the following AT commands (\emptyset = zero):

AT&F	Reset the modem parameters to the default settings
AT+CPIN=xxxx	Set PIN
AT+CLCK="SC", \emptyset ,xxxx	Switch off PIN query
AT+CSNS=4	Data reception
AT\Q \emptyset	Deactivate flow control (PIN 7/9 pin)
AT&D \emptyset	Causes the modem to ignore the DTR status (PIN 4/9 pin).
ATS \emptyset =1	Accept calls automatically. The modem is to answer after one ring tone.
ATS1 \emptyset =1	Modem hangs up immediately if no data is exchanged
AT+IPR=960 \emptyset	Set bits per second to 9600
AT&W	Save the configuration
AT^SMSO	Restart, save data instead of voice command

The modem should respond to all commands with OK. If this is not the case, reset the parameters. The connection to the modem and the HyperTerminal program can then be terminated. You now have to connect the modem to the inverter.

Step 2: Connect the modem to the indoor inverter

You now have to connect an RS232 cable with a 9-pin connector on the modem side and a 9-pin socket on the inverter side to the 9-pin modem output. The connection assignments are as follows:



Note:

The inverter itself is equipped with jumpers (PIN 1, PIN 4, PIN 6, and PIN 8 are jumpered), which enables the inverter data to be read from the PC. This means that you have the option of using a standard zero modem adapter. This zero modem adapter is available from Schuricht, for example (catalog 2005, page 1820, article no. 675596, DB9M / DB9 F). With this zero modem adapter, you

only have to isolate PIN 1. The zero modem adapter is then attached to the SUB-D9 socket of the modem. The connection between the modem and inverter is now established by means of a standard 1:1 RS 232 cable. This cable is supplied with the modem package from Holz Elektronik (see modem recommendation). Alternatively, you can use the cable from Schuricht (Schuricht, article no. 676696, DB 9 male/female, 4.5m).

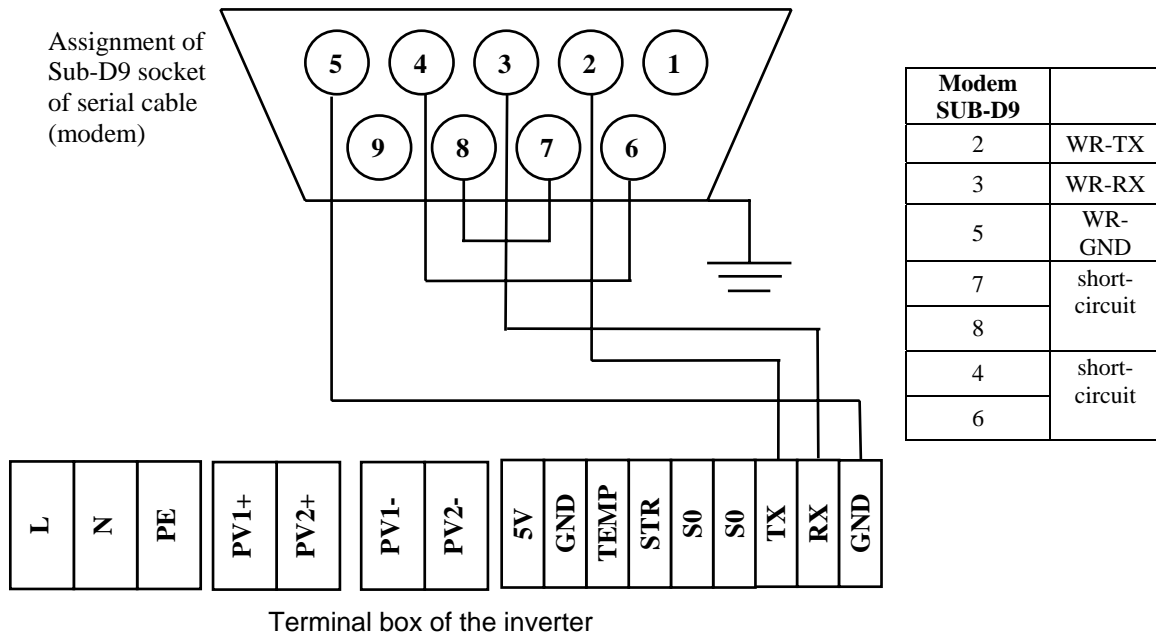
2.3.2 Connecting the outdoor inverter to the modem

Step 1: Configure the modem by means of AT commands

Configure the modem as described in section 2.3.1, step 1.

Step 2: Prepare the data cable (outdoor)

Now connect the inverter and modem with an RS232 cable. This cable must have a 9-pin connector for the modem side and 3 cables for the inverter side. The connection assignments are as follows:



RS232 connector assignments for outdoor inverter

3. Procurement list

Reading the inverter data with the PC

Cable

Indoor inverter: PC with inverter +
inverters connected
to each other

1:1 RS 232 cable
Socket/socket:
Schuricht,
Article no.: 672742,
DB9 female/female 1.8 m

Cable

Outdoor inverter: PC with inverter +

Cable must be prepared
by the customer.
inverters connected to
each other
The cable can be
used for
the indoor inverter.
Schuricht,
Article no.: 672742,
DB9 female/female 1.8 m
or
Schuricht, article no.
676696
DB9 male/female 4.5 m

Reading the inverter data with the modem

Modem: Recommended: U.S. Robotics Courier 56k Business Modem
V.92 /

USR843453B available via the U.S. Robotics online
shop: <http://www.usroboticsshop.de/>.

Alternative: U.S. Robotics® 56K* V.92 external faxmodem serial /
USR025630B. available via the U.S. Robotics online
shop: <http://www.usroboticsshop.de/>.

Alternative: Siemens TC 35i Terminal available from Holz
Elektronik with order number TC35i-T-A102-KIT with
all the required components (modem, antenna, 1:1
RS232 cable, plug-in power supply unit).

Cable

Indoor inverter: Modem connected to PC: Zero modem adapter (e.g. Schuricht, article no. 675596, DB9M / DB9 F)
+
Serial cable
Schuricht, article no. 676696
DB9 male/female 4.5 m

or
Conrad standard adapter
Order no. 741620
+
Conrad zero modem cable
Order no. 979970

or
Customer-prepared
RS232 cable

Inverters connected to each other: 1:1 RS 232 cable
Schuricht,
Article no.: 672742,
DB9 female/female 1.8 m

Cable

Outdoor inverter: PC with inverter + Cable must be prepared by the customer.
inverters connected to each other
The cable can be used for the indoor inverter.
Schuricht,
Article no.: 672742, 1.8m
or
Schuricht, article no. 676696 4.5m