



**GSM/GPRS
TRANSMISSION
MODULE
SM8 TYPE**



USER'S MANUAL



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1. APPLICATION

The SM8 GSM/GPRS transmission module is a device destined for GSM/GPRS radio communication with a device equipped with RS-232 serial interface.

The SM8 module finds applications, among other things, in power engineering and automatics – for monitoring data from manufacturing processes and in many other applications requiring wireless data transmission.

Data transmission in one of the three accessible GSM bands (900/1800/1900 MHz) is carried out in the GPRS packet technique. Parameters changes, necessary for the correct module operation, are performed by means of the annexed SM8Config.exe configuration program.

The communication connection between the computer software (e.g. Lumel Control) and the SM8 module is realized using the TCP/IP protocol. In order to obtain a correct connection, the SIM card is used in the module, with the option of public and static IP address.

However, the access to Internet network is assigned for the computer.

The exemplary application of the SM8 module is shown on the fig.1.

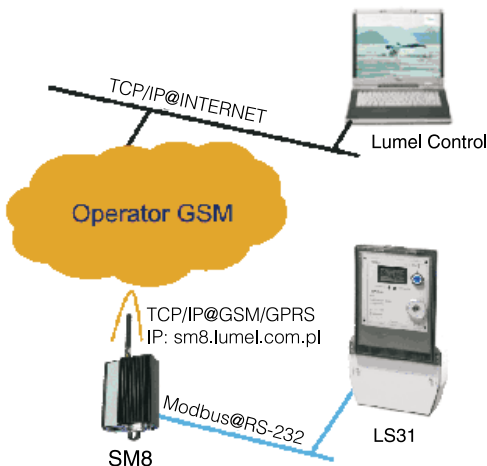


Fig. 1 Exemplary remote readout of the LS31 watt-hour meter using the SM8 module

2. SET OF SM8 MODULE

The set of the SM8 transmission module is composed of:

- SM8 transmission module 1 szt.
- GSM antenna, straight line with SMA connector 1 szt.
- connection cable RS-232 1 szt.
- supply cable..... 1 szt.
- user's manual 1 szt.
- guarantee card 1 szt.
- mini CD with software..... 1 szt.

When unpacking the module, please check whether the type and version code on the data plate correspond to the order.

3. INSTALLATION

Symbols located in this service manual mean:



WARNING!

Warning of potential, hazardous situations.

Especially important, one must acquaint with this before connecting the module. The non-observance of notices marked by these symbols can occasion severe injuries of the personnel and the damage of the module.



CAUTION!

Designates a general useful note. If you observe it, handling of the module is made easier. One must take note of this, when the module is working inconsistently to the expectations.

Possible consequences if disregarded !

In the security scope the module the requirements of the EEC Low-Voltage Directive (EN 61010 -1)

Remarks concerning the operator safety:

1. General

- The SM8 module is destined to be installed in measuring systems, on a 35 mm mounting rail
- Non-authorized removal of the required housing, inappropriate use, incorrect installation or operation creates the risk of injury to personnel or damage to equipment. For more detailed information please study the user's manual.

- All operations concerning transport, installation, and commissioning as well as maintenance must be carried out by qualified, skilled personnel and national regulations for the prevention of accidents must be observed.
- According to this basic safety information, qualified, skilled personnel are persons who are familiar with the installation, assembly, commissioning, and operation of the product and who have qualifications necessary for their occupation.

2. Transport, storage

Please observe the notes on transport, storage and appropriate handling.
Observe the climatic conditions given in technical data.

3. Installation

- The module must be installed according to the regulation and instructions given in this user's manual.
- Ensure proper handling and avoid mechanical stress.
- Do not bend any components and do not change any insulation distances.
- Do not touch any electronic components and contacts.
- Modules may contain electrostatically sensitive components, which can easily be damaged by inappropriate handling.
- **Do not damage or destroy any electrical components since this might endanger your health!**

4. Electrical connection

- Before switching the module on, one must check the correctness of connection to the network.
- In case of the protection terminal connection with a separate lead, one must remember to connect it before the connection of the module to the mains.
- When working on live modules, the applicable national regulations for the prevention of accidents must be observed.
- The electrical installation must be carried out according to the appropriate regulations (cable cross-sections, fuses, PE connection). Additional information can be obtained from the user's manual.
- The documentation contains information about installation in compliance with EMC (shielding, grounding, filters and cables). These notes must be observed for all CE-marked products.
- The manufacturer of the measuring system or installed devices is responsible for the compliance with the required limit values demanded by the EMC legislation.

5. Operation

- Measuring systems including SM8 modules must be equipped with protection devices according to the corresponding standard and regulations for prevention of accidents.
- After the instrument has been disconnected from the supply voltage, live components and power connections must not be touched immediately because capacitors can be charged.
- The housing must be closed during operation.

6. Maintenance and servicing.

Please observe the manufacturer's documentation.

Read all product-specific safety and application notes in this user's manual.

- Before taking the module out, one must turn the supply off.
- The removal of the module housing during the guarantee period may cause its cancellation.

3.1. Module mounting

The module is fixed on two assembly jigs acc. to the fig. 2.

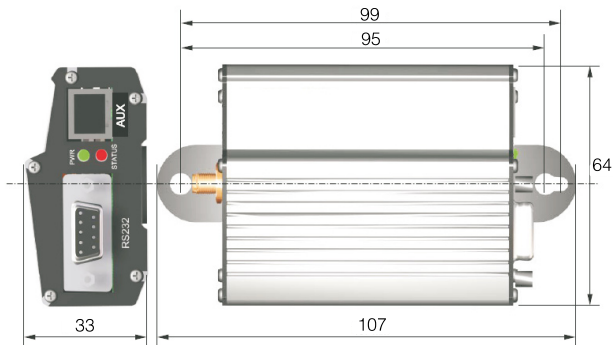


Fig. 2 Overall dimensions and module fixing way

3.2. Electrical connections of SM8

Supply and external signals must be connected acc. to the fig. 3 and table 1 and 2, which the assignment of particular lead-outs is described in.

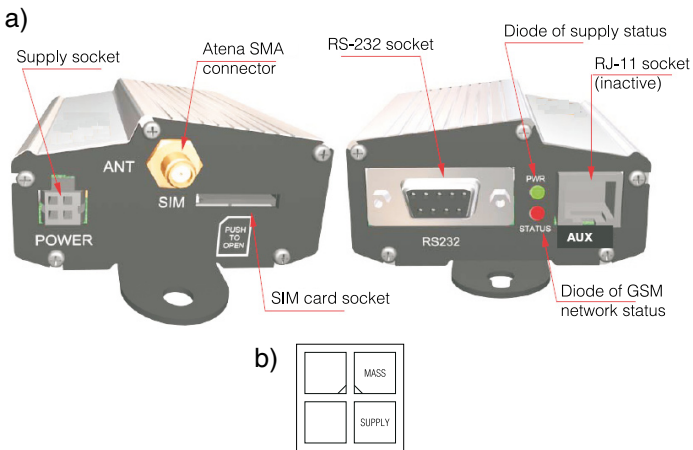


Fig.3 SM8 lead-out description.

a) list of all module connectors, b) module supply socket

Description of RS-232

lead-outs Table 1

Pin	Description
1	DCD
2	RxD
3	TxD
4	DTR
5	GND
6	DSR
7	RTS
8	CTS
9	RI

Description of SM8 supply lead-outs

Table 2

Marking	Description
MASS	Line - supply
	Line + supply (+ 12...24 V d.c.)

The added two-colour supply cable with a Molex plug to the set, facilitates the module preparation to work. The cable wire marked with red colour serves to connect with the pole „+“ of the supply source. However, the black cable wire is connected to the „-“ supply pole.

3.3. Connection way with devices



The connection way of the RS-232 interface is presented on the fig. 4. On must take note of the necessity to short DSR (6) and RTS (7) pins in the DB9 plug.

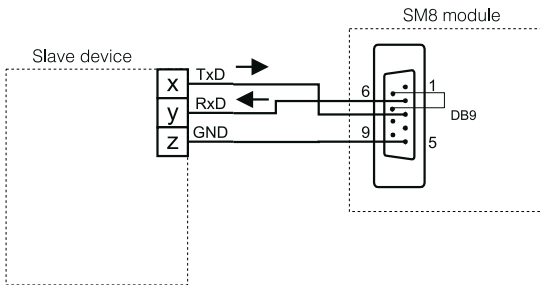


Fig. 4 Connection way of RS-232 interface

3.4. Requirements for lead-out connection



Occurring practically, different interference sources interact on the module in a continuous way or impulse way from the supply network side (interaction of other devices).

The level of these noises should be reduced to a lower value than the module threshold fastness, first of all, through the appropriate installation of the module in the object.

In order to obtain a full module fastness against electromagnetic interference in the environment with unknown interference level, it is recommended to observe following principles:



- not supply the module from the network, near devices generating high impulse interference,
- apply network filters for the module group servicing the same object,
- apply the general principle, that wires (group of wires) leading different signals should be led in the maximal distance between them (not less than 50 cm), and the crossing of such group of wires must be made at 90° angle.

4. PRINCIPLE OF OPERATION

The SM8 GSM/GPRS transmission module is a device destined for the transmission of data through radio GSM from/to built-in RS-232 serial port.

The GSM/GPRS packet transmission in the module is realized in the shape of TCP/IP packets. The contents of the data field of each received packet is transmitted by the serial port module. The field of transmitted data can hold maximally 512 bytes.

The reception of data from the serial port is subjected to the buffering process. It consists on the detection of reception buffer filling or the detection of the temporary lack of new data (timeout). If at least, one of above conditions takes place, then the forming and transmission of the TCP/IP packet in GPRS technique follows.

The size of the reception buffer can count maximally 256 bytes. The optimal value of the timeout parameter is the value of the maximal response time of the device connected to the SM8 module by means of RS-232.

One can obtain the TCP/IP connection between the computer software and the SM8 module by means of the Internet network and the operator's GSM. Since the SM8 module works as the server of the serial port, its IP address must be constant and accessible for the software on the PC, applying the connection with the SM8 module. For this reason, apart the necessary SIM card of the selected operator of the GSM network, one must take care to activate the option of the constant and public IP address in the frame of the public ANP. The obtained SM8 public address in this way, will be accessible through the PC computer through the Internet network.

The built-in server of the serial port in the SM8 module services on the configurable TCP port, one TCP/IP connection with the user in the given time. There is the possibility to lock TCP/IP connections from users, which public addresses are different from the defined address by the SM8's user (option of the trusted IP address). The locking is disconnected when the trusted IP address presents the "0.0.0.0." value. The module is configured by the manufacturer to work on the serial port with 9600 bit/s rate in the 8N1 mode.

But all parameters can be changed depending on requirements.

The configuration is carried out by means of the SM8Config.exe configuration program. The configuration program uses one of the serial port and exchanges data with the SM8 module using its own communication protocol. One can use for the configuration, the RS-232 port and the connecting wire from the set. One must remember, that the module configuration program is working with following serial port settings:

- | | |
|------------------------|------------------|
| - baud rate | 115200 bit/s |
| - transmission mode | 8N1 |
| - transmission control | device (RTS/CTS) |

The SM8 module switches into the configuration mode only when the logic state of the DTR line in the RS-232 port equals one, during the module supply turning on.

The current state of the module operation is signaled by a lighting red diode STATUS.

If the diode starts to light and goes out every 3 sec, that means the configuration state or the module logging to the GSM/GPRS network.

4.1 First start of the SM8 module

At the first start, the SM8 module requires the setting of indispensable information: PIN code and APN name for the used SIM card, the port number for the listening of TCP/IP connections. Besides, it is necessary to set parameters of the serial port: baud rate, transmission mode and parameters for data buffering in the port.

The "SM8Config.exe" program added to the set, allows the user to configure SM8 module settings in a simple way.

4.1.1 Installation of the configuration program on a PC

The installation consists in the copy of the „SM8Config.exe" from the added CD to the set, to the assigned catalogue by the user on the computer hard disc.

4.1.2 Configuration procedure of the SM8 module

In order to configure the SM8 module, one must connect it to the computer RS-232 serial port by means of the cable added to the set.

After starting the "SM8Config.exe" program (fig. 5) in the "Port COM" field, one must choose the COM port number, which SMB is connected to. Next choose 'Configuration' type and after pressing the "Connect" button, the configuration program establishes the connection with the port, and in the message window, the message " Connected to the port COM" appears. In case of access lack to the chosen COM port, information about the lack of connection with the port will be displayed in the message window. Next, turn the module supply on. Then, the program tries to establish the connection with the SM8 module. After the correct connection liaison, the configuration program displays information about the current module configuration. The module configuration change consists on making choice in appropriate fields in the program window.

Following options are available:

- GSM/GPRS option,
 - setting for the SIM card (PIN. APN),
 - option of the serial port server (TCP port, silence limit, address of the trusted user)
- Serial port option,
 - mode and serial baud rate,
 - data buffering parameters.

- Diagnostic,
 - option to display time-consuming messages of the module in the tracing mode of its work,
 - check the signal force from the connected antenna to the module
- Firmware,
 - updating of the built-in software in the module
 - selection of the path to the catalogue with firmware files.

The „Restore manufacturer’s settings” button allows to set manufacturer’s settings in the module.

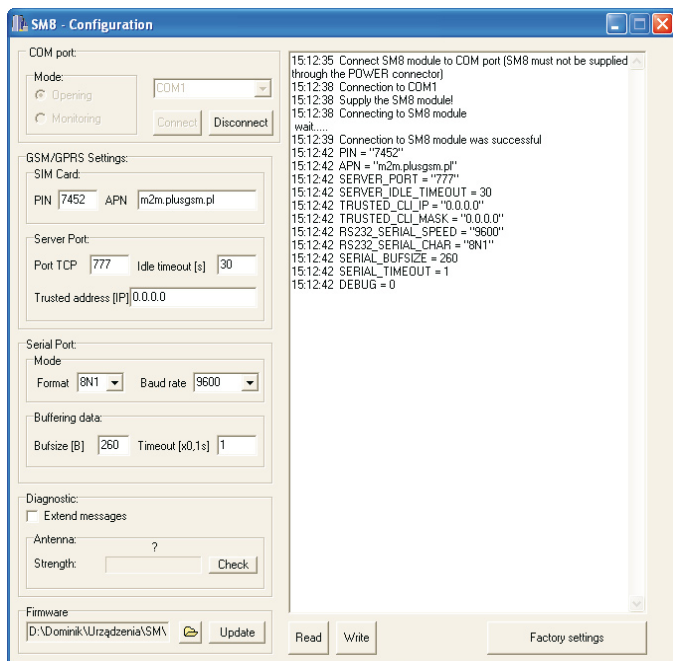


Fig 5. SM8Config program configuration mode.

Introduced changes in settings are transmitted to the SM8 module after pressing the "Store" button of the SM8Config.exe program. In case of a correct or wrong operation of setting changes, an appropriate message will be displayed in the window.

After carrying out changes, one must disconnect the transmission choosing the "Disconnect" button. The transmission disconnection and release of the COM port through SM8Config.exe follows. Set module configuration parameters will begin to be in force in the moment of transmission disconnection.

SM8Config.exe also enables the display of messages received from the SM8 module during the logging process to the GSM/GPRS network (fig. 6). For this aim, one must open the COM port, which the SM8 is connected to, in the "Tracing" mode. Information about the work beginning in the module diagnostic mode appears in

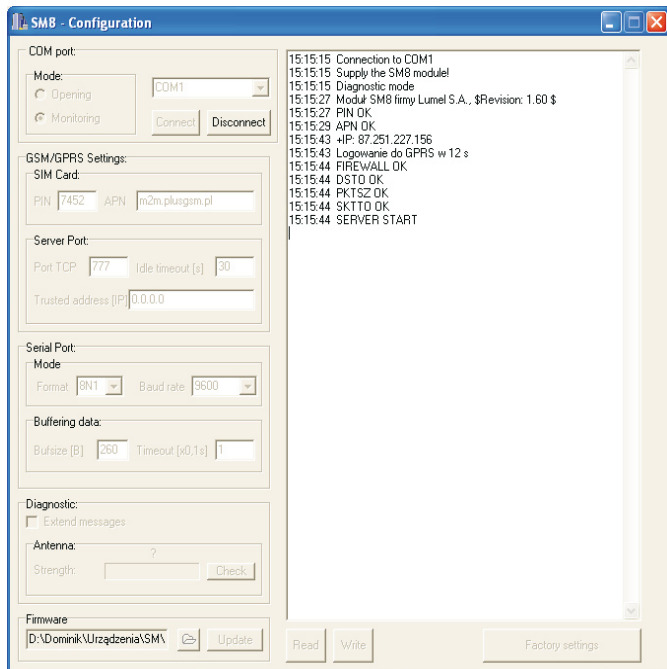


Fig 6. SM8Config in the tracing mode of the module work

the message window. Next, one must start the SM8 module again. After several seconds, information about the current working state of the SM8 module should appear in the message window of the program. Among others, essential information about the public address (in format +IP:XXX.XXX.XXX.XXX)

assigned for the SIM card by the GSM operator, should appear.

This address is just applied for setup together TCP/IP connections between the SM8 module and the software on the PC computer.

4.2 Configuration example of Lumel Control to cooperate with SM8 module

The Lumel Control software can communicate in a wireless way with slave devices through The TCP/IP protocol and GSM/GPRS packet transmission.

To establish communication with the SM8 module one must add the IPsocket module from the Serial group. Next, one must configure it, giving the public SM8 address in the RemoteAddress field and its listening port, in the RemotePort field.

The exemplary way to fill required fields is presented on Fig. 7

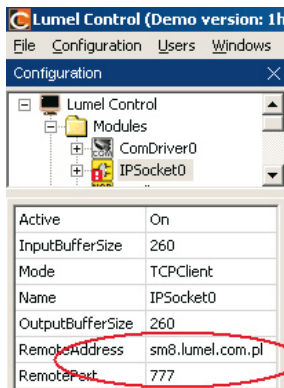


Fig 7. Configuration way of Lumel Control.

4.3. Example of SM8 configuration for SMS message transmission from the „SMS Alarm” module of the LUMEL HEAT program.

To configure the modem for SMS message transmission, one must carry out following operations:

Connect the SM8 module with the COM serial port of the PC computer.

1. Start the Hyper Terminal and connect to the disabled SM8 module with following parameters: mode: 8N1, baud rate: 1555200 bit/s, flow control: lack.
2. Switch the SM8 module supply on and after waiting ca 5 sec, write on the terminal, the command: AT/ (each command write must be confirmed by the “ENTER” key).
3. After receiving the message: OK, the modem is ready for the programming operation.
4. If there is no possibility to write commands, one must switch on and off the SM8 module Again, and try again to realize the command write: AT.
5. If this operation also does not allow to write the command, it is necessary to make the connection between DSR (6) and DTR (4) in the DB9 plug connected to the SM8 module. This operation will force in the modem, the transition into the configuration mode through the AT command. Return to the point 1.
6. After the connection with the modem, one must carry out following commands:
 - **AT#ESCRIP=""** // lock the input in the mode of making the script.
 - **AT+CPIN?** // question about the PIN number state
 - If the modem answer: **+CPIN: SIM PIN** // lack of PIN number
 - **AT+CPIN=PIN** // write the PIN number // (PIN – defines the pin number of SIM card)
 - **AT+CPIN?** // question about the PIN number PIN
 - If the modem answer: **+CPIN: READY** // PIN number is written
 - **AT+CMGF?** // check of the SMS transmission mode
 - If the modem answer: **+CMGF: 0** // lack of text mode selection
 - **AT+CMGF=1** // writing of the text mode of. SMS transmission
 - **AT+CMGF?** // check of the SMS transmission mode
 - If the modem answer: **+CMGF: 1** // text mode is chosen
 - **AT+CLCK="SC",2** // check of the PIN control mode
 - If the modem answer: **+CLCK: 1** // the PIN control is on
 - **AT+CLCK="SC",0,"PIN"** // switching of the number PIN control off // (PIN – defines the pin number of the SIM card)
 - **AT+CLCK="SC",2** // check of the PIN control mode
 - If the modem answer: **+CLCK: 0** // the PIN control is off
 - **AT&P0** // selection of the default setting group
 - **AT&W0** // write to the default setting group.

In case of receiving the „ERROR” message, one must write again the correct „AT” command.

After performing above operations, the SM8 module is ready to work with the LUMEL HEAT program, as a device transmitting SMS messages.

5. TECHNICAL DATA

RS-232 serial interface:

- data format	8N1, 8N2, 8E1, 8O1, 7E1, 7O1
- baud rate	1200, 2400, 4800, 9600, 14400, 19200, 28800, 38400, 57600, 115200 bit/s

GSM radio interface:

- band	900/1800/1900 MHz
- input power	2 W (900 MHz); 1 W (1800/1900 MHz)
- GPRS baud rate	≤ 56000 bit/s
- antenna output	50 Ω SMA

Time to obtain the operating readiness since the moment of supply connection

> 20s

Power absorbed by the module

≤ 14.4 VA

Rated operating conditions:

- supply voltage	12... 24 V d.c
- current when supplying 12 V d.c.:	
- peak, during the transmission	≤ 1.2 A
- mean, during the transmission	110 mA
- when resting	8 mA
- ambient temperature	-20...23...70°C
- relative air humidity	< 95% inadmissible condensation
- working position	any

Storage and transport conditions:

- ambient temperature	-30... 85°C
- relative air humidity	< 95% inadmissible condensation

Ensured protection degree:

- by the frontal housing side	IP 30
- by the terminal side	IP 20

Dimensions

107 x 64 x 33 mm

Weight	0.20 kg
Housing	to be mounted on a plane area
Fulfilled safety standards	EN 60 950-1



6. ORDER CODES

Table 2

GSM/GPRS Transmission module SM8-	XX	X
Version:		
acc. to the catalogue	00	
custom made*	XX	
Acceptance tests:		
without a quality inspection certificate	8	
with a quality inspection certificate	7	
acc. to user's agreement*	X	

* after agreeing by the manufacturer

Coding example:

SM8-007 code means:

00 – SM8 module acc. to the catalogue

7 – with a quality inspection certificate

7. MAINTENANCE AND GUARANTEE

The SM8 transmission module does not require any periodical maintenance.

In case of some incorrect operations:

1. After the dispatch date and within the period stated in the guarantee card

One should return the instrument to the Manufacturer's Quality Inspection Dept. If the module has been used in compliance with the instructions, the Manufacturer guarantees to repair it free of charge.

The disassembling of the housing causes the cancellation of the granted guarantee.

2. After the guaranty period:

One should send the instrument to repair it in an authorised service workshop. Spare parts are available for the period of five years from the date of purchase.

Our policy is one of continuous improvement and we reserve the right to make changes in design and specifications of any products as engineering advances or necessity requires and revise the above specifications without notice.

SALES PROGRAM

- DIGITAL and BARGRAPH PANEL METERS
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- ANALOG and DIGITAL CLAMP-ON METERS
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