

CMGSM-SMS User's Manual

1. Introduction



The CMGSM-SMS is a device designed as an add-in to FATEK PLCs. It makes possible to send and receive SMS of GSM network from or to FATEK PLC.

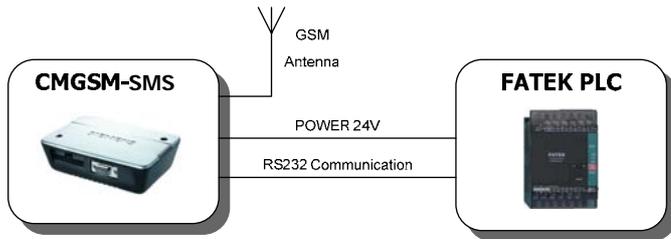
Main features

- SMS send by writing into registers in the PLC.
- Received SMS are stored in registers of the PLC.
- Data connection in GSM network (CSD) for urgent PLC monitoring or configuration.
- Power 24V DC from PLC can be used for this device.
- Configuration data are stored in registers of the PLC.

2. Content of the delivery

- 1 pc of CMGSM-SMS
- 1 pc of cable for power supply from PLC GSM-35-PKAB1
- 1 pc of antenna GSM-ANT12
- 1 pc of GPIO connector with start jumper GSM-65-PK2-START
- 1 pc of printed documentation
- 1 pc of RS232 cable HW-11.01.9018 (null modem cable)

3. Typical application, Installation



3.1 Configuration

Configuration in PLC is necessary. Read chapter [Configuration](#) for more.

3.2 Hardware

- Add to PLC board CB2x or module CM2x to get 9-pin RS232.
- Connect "RS232" cable between CMGSM and CB2x or CM2x on PLC.
- Connect GSM antenna.
- Insert SIM card
- Connect power cable "POWER 24V" between modem and PLC. Red wire connect to "+24V Out" and black wire to GND

3.3 Startup

Device status is indicated with a blue LED on CMGSM-SMS. Valid statuses are following:

Term	Description
permanently off	No power.
600 ms on / 600 ms off	Device is not logged into GSM network. This state occurs after start of device for aprox. 30 seconds. If it remains check: SIM card (is inserted?, is valid?) Antenna (is connected?) Configuration (is SIM PIN correct?)
75 ms on / 3 s off	Device is logged into GSM network and is idle. (It means that no GPRS nor CSD connection is active.)
75 ms on / 75 ms off / 75 ms on / 3 s off	GPRS active, no data
500 ms on / 50 ms off	GPRS active, data transfer in progress
permanently on	CSD (data connection) in progress

Expressed line is common operating state.

4. Function of the device

4.1 SMS – Primary function

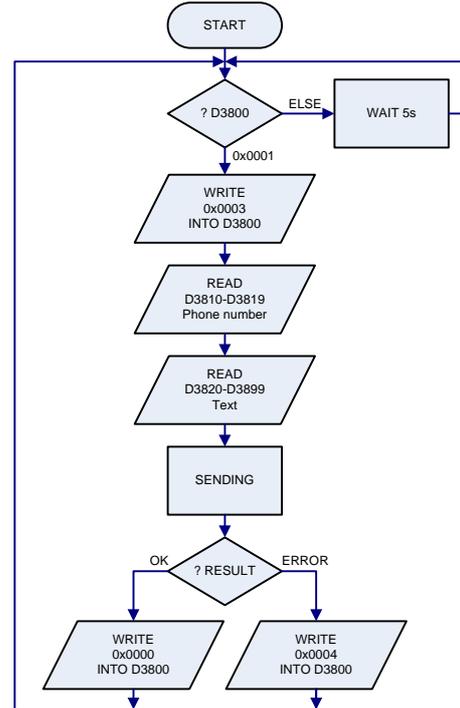
Primary function of this device is to send and receive SMS messages.

4.1.1 Sending a SMS

CMGSM-SMS periodically tests the first register of the *Send Record*, standard base is D3800. The *Send Record* is an area in PLC registers which must be filled by program in PLC in order to send a SMS message. For structure of the record see the following table.

Registers	Caption	Description
D3800	SendFlag	0x0000 – Idle
		0x0001 – Command to send (written by program in PLC)
		0x0002 – SMS is sending (written by CMGSM-SMS)
		0x0000 – SMS sent successfully (written by CMGSM-SMS)
		0x0004 – Failed while sending SMS (written by CMGSM-SMS)
D3810-D3819	SendDestAddress	Phone number where to send the message. Length 20 characters.
D3820-D3899	SendUserData	Text of the message. Length 160 characters.

How does the CMGSM-SMS send a message:



Every register of *Phone number* or *Text* contains two characters. String of characters ends with special character 0x00. Examples:

- String with one character – "A": D3820 = 0x0041
- String "TEXT": D3820 = 0x4554, D3821 = 0x5458, D3822 = 0x0000
- String "HELLO": D3820 = 0x4548, D3821 = 0x4C4C, D3822 = 0x004F

If the length of a phone number is exactly 20 characters (or 160 characters of text) then the character 0x00 at the end is omitted!

If a power failure occurs while sending a message then the message is lost. Base of *Send Record* (D3800) may be changed to another D or R register via configuration key REGSEND. Only register *SendFlag* (D3800) is changed during sending a message.

Example of sending a message "WE ARE THE CHAMPIONS!" to phone "909909": (Check register D3800 – SendFlag for value 0x0000 before sending the message!)

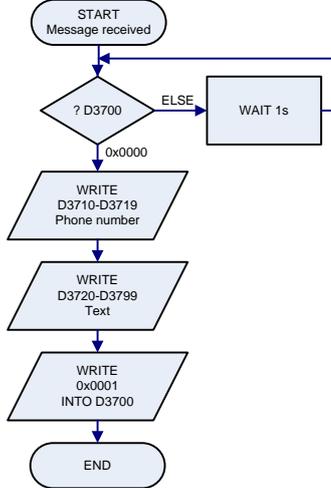
Register	Value	Description
D3810	0x3039	SendDestAddress, characters "9" and "0"
D3811	0x3939	SendDestAddress, characters "9" and "9"
D3812	0x3930	SendDestAddress, characters "0" and "9"
D3813	0x0000	End of string
D3820	0x4557	SendUserData, characters "W" and "E"
D3821	0x4120	SendUserData, characters " " (space) and "A"
D3822	0x4552	SendUserData, characters "R" and "E"
D3823	0x5420	SendUserData, characters " " (space) and "T"
D3824	0x4548	SendUserData, characters "H" and "E"
D3825	0x4320	SendUserData, characters " " (space) and "C"
D3826	0x4148	SendUserData, characters "H" and "A"
D3827	0x504D	SendUserData, characters "M" and "P"
D3828	0x4F49	SendUserData, characters "I" and "O"
D3829	0x534E	SendUserData, characters "N" and "S"
D382A	0x0021	SendUserData, characters "!" and end of string
D3800	0x0001	SendFlag: send command

4.1.2 Receiving a SMS

Incoming SMS messages are saved into registers of PLC in *Recv Record*, standard base D3700. Structure of the record is in following table.

Registers	Caption	Description
D3700	RecvFlag	0x0000 – Idle (written by PLC program) 0x0001 – Message received (written by CMGSM-SMS)
D3710-D3719	RecvOrigAddress	Phone number of the message sender (originator). Length 20 characters.
D3720-D3799	RecvUserData	Text of the message. Length 160 characters.

How CMGSM-SMS stores a received message:



Every register of *Phone number* or *Text* contains two characters. String of characters ends with special character 0x00. Examples:

- String with one character – "A": D3720 = 0x0041
- String "TEXT": D3720 = 0x4554, D3721 = 0x5458, D3722 = 0x0000
- String "HELLO": D3720 = 0x4548, D3721 = 0x4C4C, D3722 = 0x004F

If length of phone number is exactly 20 characters (or 160 characters of text) the character 0x00 at the end is omitted!

CMGSM-SMS contains a queue of up to 32 SMS messages. After the queue is full all other SMS messages are discarded. If a power failure occurs all received messages in the queue are lost. Base of *Recv Record* (D3700) may be changed to another D or R register via configuration key REGRECV. No other registers are changed than the necessary ones.

Example of receiving of message "TEST MESSAGE." from phone "+420123456789":

Register	Value	Description
D3700	0x0001	RecvFlag: new message
D3710	0x342B	RecvOrigAddress, characters "+" and "4"
D3711	0x3032	RecvOrigAddress, characters "2" and "0"
D3712	0x3231	RecvOrigAddress, characters "1" and "2"
D3713	0x3433	RecvOrigAddress, characters "3" and "4"
D3714	0x3635	RecvOrigAddress, characters "5" and "6"
D3715	0x3837	RecvOrigAddress, characters "7" and "8"
D3716	0x0039	RecvOrigAddress, characters "9" and end of string
D3720	0x4554	RecvUserData, characters "T" and "E"
D3721	0x5453	RecvUserData, characters "S" and "T"
D3722	0x4D20	RecvUserData, characters " " (space) and "M"
D3723	0x5345	RecvUserData, characters "E" and "S"
D3724	0x4153	RecvUserData, characters "S" and "A"
D3725	0x4547	RecvUserData, characters "G" and "E"
D3726	0x002E	RecvUserData, characters "." and end of string

Supplementary functions are following.

4.2 Data Connection (data call, CSD)

Data connection to CMGSM-SMS can be established at any time. Data connection is not limited by time and remains active until remote side hangs up. After the data connection ends, the primary function (to send and receive SMS) is restored. There is no security mechanism against unauthorized data connection to PLC. So it is highly recommended to set security in PLC (password).

4.3 Service SMS Commands

Received SMS message with string '#' at the beginning are considered to be *service SMS commands*. These messages are not forwarded to PLC, but they are processed in CMGSM-SMS. Device will check for a valid access code (ACODE parameter in configuration) and if the access code is valid, the message is searched for keywords. Only one keyword in every SMS is executed. Example of this SMS

```
#!998877 DATA
```

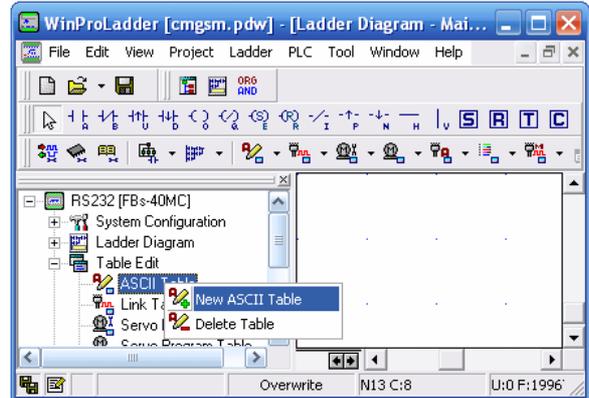
Table of all keywords:

CMGSM-SMS

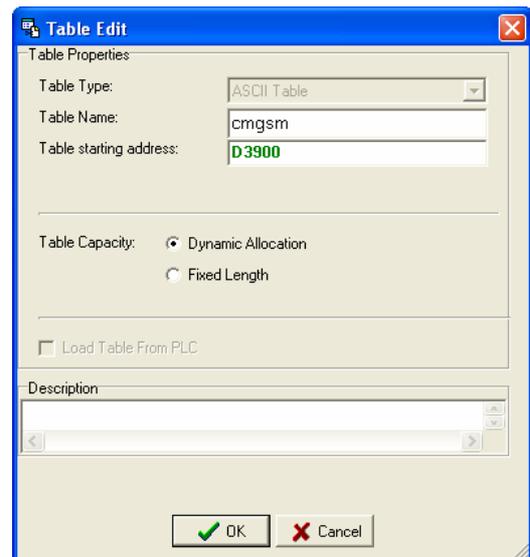
Keyword	Description
RESET	Device will respond with confirmation SMS and within 1 minute will restart itself. PLC is not affected. This command is used after change of configuration in PLC register to accept the changes by CMGSM.
STATE	Device will respond with SMS describing its current status: Operator and signal quality CSD connection: from phone number State of the connection to PLC Fatek Version of CMGSM-SMS

5. Configuration

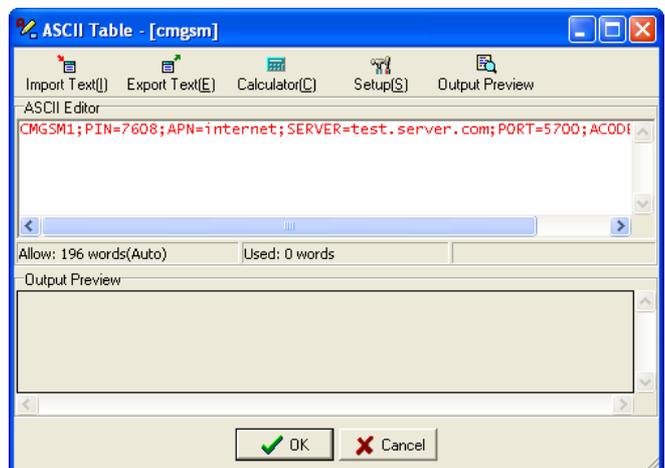
Configuration for CMGSM-SMS is located inside PLC Fatek. Range of internal PLC registers D3900 – D3999 is used. Configuration itself is a string of characters. This string is created via WinProLad (software from PLC FATEK manufacturer), see following images. This range of registers can not be used for any other purposes!



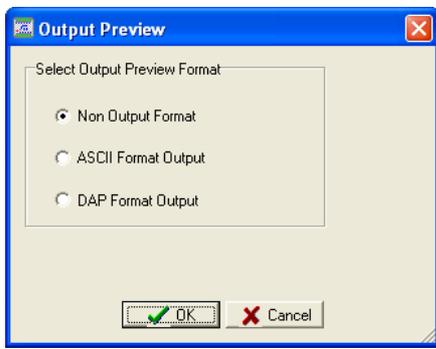
Step 1 – Right click on Table edit - ASCII Table and select "New ASCII Table"



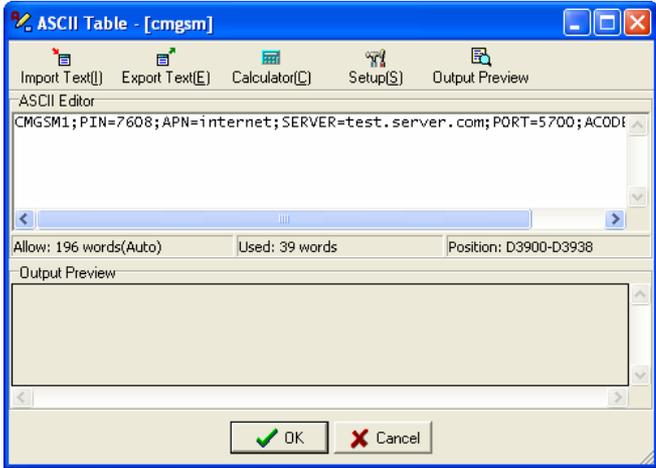
Step 2 – Enter Table Name „cmgsm“ and Table starting address „D3900“. Then click "OK".



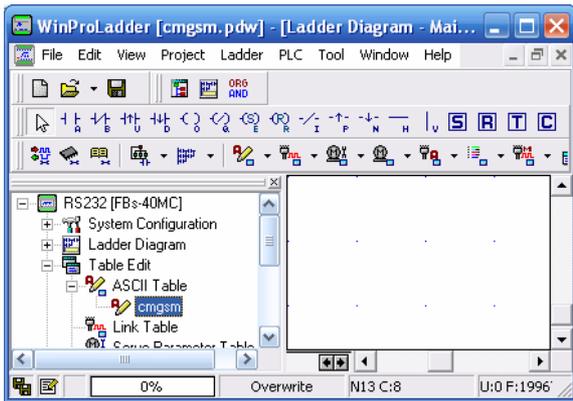
Step 3 – Enter configuration string "CMGSM2;PIN=7608;ACODE=998877;#" into field "ASCII Editor" and click on button "Output Preview". !!! Warning: Change PIN according your real SIM card !!!



Step 4 – Select “Non Output Format” and click “OK”.



Step 5 – Configuration string is now black. Click “OK”.



Step 6 – Result

Configuration is read after power up and only once. CMGSM-SMS will try to log in GSM network without PIN if no configuration in PLC is found. (In this case SIM card without PIN authorization is requested.)

Configuration string is very simple. For example:

```
CMGSM2;PIN=7608;ACODE=998877;#
```

For easy understanding this string says:

- CMGSM2 – It is a configuration for CMGSM, version 2.
- PIN=7608 – PIN code of the SIM card in order to register into GSM network.
- ACODE=998877 – Access code for *Service SMS Commands* is 998877

General format of these messages is following:

```
CMGSM2;KEY1=VALUE1;KEY2=VALUE2;...;#
```

Part 'CMGSM2' at the beginning of the string is mandatory. It is a stamp of validity. Acceptable keys are shown in table below. Unknown keys are ignored, no spaces are allowed inside keys or values. Order of pairs is not important. Keys are not case sensitive, values are case sensitive. Maximum length of configuration string is 200 characters. At the end of each part MUST be character ';' (semicolon), after last pair MUST be characters ';' (semicolon) and '#' (hash)

Key	Description	Default
PIN	PIN code for SIM card. It may be omitted if the SIM card does not need a PIN code. But it is mandatory if the SIM card needs the PIN code.	<empty>
ACODE	Access code for SMS control. You can send SMS message in order to control CMGSM-SMS. These SMS must begin with this ACODE. They will be ignored otherwise. Optional.	1234
REGSEND	First register of the <i>Send Record</i> . It is area, where PLC writes messages to send. See 4.1.1 Sending a	D3800

	SMS. Only D or R registers can be used.	
REGRECV	First register of the <i>Recv Record</i> . It is an area, where CMGSM-SMS writes received messages. See 4.1.2 Receive a SMS. Only D or R registers can be used.	D3700

5.1 Examples of Configuration Strings

5.1.1 SIM without PIN

Configuration string:

```
CMGSM2;ACODE=998877;#
```

Translated for human this string says:

- CMGSM2 – It is configuration for CMGSM, version 1.
- ACODE=998877 – Access code for *Service SMS Commands* is 998877

5.1.2 Use registers D1000-D1100 for sending SMS

Configuration string:

```
CMGSM2;PIN=7608;REGSEND=D1000#
```

Translated for human this string says:

- CMGSM2 – It is configuration for CMGSM, version 1.
- PIN=7608 – User PIN code of '7608 for SIM card in order to register into network.
- REGSEND=D1000 – Begin of the *Send Record*.
- [default Access code for SMS control is 1234]

6. Usage scenarios

6.1 Send SMS With L⇒H Transition on X1

*** To Do Sklenicka

6.2 Response To Simple SMS

*** To Do Sklenicka

7. Technical specifications

7.1 General

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Dimensions	Width	w		130		mm
	Height (without antenna)	h		90		mm
	Depth	d		38		mm
Temperature	Operational	t _a	-30		+65	°C
Antenna			SMA female			
Communication interface			standard RS232			

7.2 Characteristic of the power supply

Parameter	Description	Conditions	Min	Typ	Max	Unit
V _{POWER}	Operating Voltage	for one minute	8 ¹⁾	12	30	V
I _{POWER}	Average supply current (average time 3 min.)	Power Down mode	@8V	0.45		µA
			@12V	0.50		
			@30V	0.80		
	SLEEP mode	@8V	40		mA	
		@12V	29			
		@30V	18			
	IDLE mode	@8V	50		mA	
		@12V	36			
		@30V	21			
	TALK mode	@8V	277		mA	
		@12V	184			
		@30V	82			
Data GPRS 1Tx / 4Rx	Data GPRS 1Tx / 4Rx	@8V	260		mA	
		@12V	173			
		@30V	77			
Data GPRS 2Tx / 3Rx (Power reduction = 3dB)	Data GPRS 2Tx / 3Rx (Power reduction = 3dB)	@8V	378		mA	
		@12V	248			
		@30V	108			
Data GPRS 4Tx / 1Rx (Power reduction = 6dB)	Data GPRS 4Tx / 1Rx (Power reduction = 6dB)	@8V	500		mA	
		@12V	330			
		@30V	140			
I _{POWER, P²⁾}	Peak supply current during transmission slot (577µs * No. of Tx every 4.6ms)	Power control level for Pout max	@8V	1500		mA
		@12V	910			
		@30V	340			
t _{PLUS, Fall}	Allowed power fall time without terminal reset or power down	After this time the Terminal will be reset or switched off			1	ms
	Allowed power fall time without RTC reset	Backup Battery not connected, After this time the RTC will be reset			6	

8. FAQ

- **CSD (data) connection can not be established** – 1) check power supply, 2) check blue indication LED on device, 3) are CSD connections available on your SIM card? Ask provider, 4) check GSM signal quality on your mobile phone near the device. At least 50% signal is recommended.

- **No reply to Service SMS Commands** – 1) check power supply, 2) check blue indication LED on device, 3) check configuration (is access code correct?), 4) try to send SMS from your mobile with SIM card in the device.
- **No communication with PLC** – 1) check power supply for PLC, 2) check COM port settings in WinProlad. It MUST be 9600 7E1, address 01h.
- **Credit** – Device do not check for credit remains nor makes periodic calls to keep SIM card active.

9. Warranty

General warranty period is 12 months after purchase, when eventual malfunction device will be repaired free of charge in SEA company while shipping to SEA is paid by customer and SEA pays for shipping back to customer. For SW there is 24 months warranty under following conditions:

Both CPU and PC software is sold "as is". The software was created by the best software engineers in SEA and was carefully tested both in SEA and also by SEA customers using GSM applications products made in SEA. In spite of making all possible to get error free software it can happen, that the software in CPU or PC programming SW or their mutual interaction has some error under some specific conditions. If such error is found and the description of the problem including configuration file is sent by E-mail to SEA Ltd., the error is removed free of charge and SEA will send new SW by E-mail to customer.

SEA Ltd. has **NO RESPONSIBILITY** for any damage, lost, costs and any other problems direct or inducted, caused by such SW error, by eventual device malfunction from any reason or by undelivered SMS from the device.

(Version 1.03; 2007-03-02 vor)