P2G/P2W

Communicator & Data Logger

Device configuration for simple applications

Version 1.9, 31/03/2008

Summary:

1. Introduction

The Communicators & Data Loggers of the type P2G and P2W make part of the Automatic Meter Reading (AMR) system of Iskraemeco. Remote reading of data from the device is performed by means of an integrated GSM modem and SMP (SMS Metering Protocol) communication protocol. The requested data can be transmitted either automatically according to a preset time schedule or on demand.

The collection of data, the management of the database and the creation of reports is performed by the **SEP2W** or **SEP2Lite** program package supplied by Iskraemeco.

This document contains the instructions how to configure the device in the case of a simple application where a scheduled reading of the load profile of one pulse input and of the temperature profile is performed.

2. General on the communicators of type P2G and P2W

The P2G Communicator & Data Logger is available in three different versions according to the number of pulse inputs and according to the type of protection needed for potentially explosive environments. The P2W Communicator & Data Logger is available in one version only.

Type	Pulse inputs	Pulse outputs	Protection
P2G-K17V03I00	4 inputs (2 pulse inputs, 2 »tamper« inputs)	2 outputs	Intrinsic safety with the type of protection »ia« (pulse inputs only).The unit must be installed in the safe area but can be connected to a device in the hazardous area
P2G-K17V03I01	4 pulse inputs	4 outputs	
P2G-K17V03I00-IS	4 inputs (2 pulse inputs, 2 »tamper« inputs)	2 outputs	Intrinsic safety with the type of protection »ia«. The unit can be installed in the hazardous area.
P2W-K17V02	2 pulse inputs	-	-

Table 1. Available P2G and P2W types

In the remaining text of this document the different types of P2G and P2W Communicator & Data Logger will be designated shortly as »communicator«.

3. Typical application
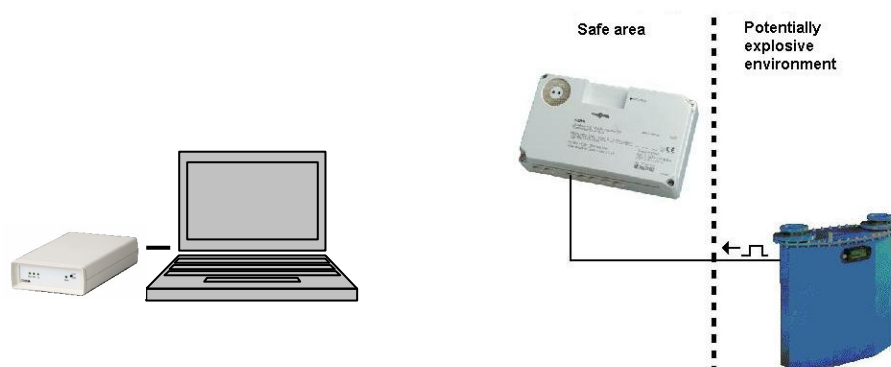
Figure 1. Simple application of the P2G communicator including a data centre with a PC and an external GSM modem.

In the very simple application a gas meter with a pulse output is connected to a pulse input of the communicator. The communicator counts the incoming pulses and stores them in a cumulative register. By periodically (for example every hour) storing this register in special registers the communicator builds a load profile (LP). By means of SMS messages the communicator automatically daily sends the load profile of the previous day according to a time schedule to a remote computer or data centre. The communicator also sends a temperature profile recorded by the built-in temperature sensor.

4. Basic settings of the communicator

4.1. General

The parameters of the communicator can be set with the use of the **MeterView** application supplied by Iskraemeco. The MeterView represents the basic tool for configuring of different Iskraemeco products and is constantly being upgraded. Use MeterView manual to navigate through different MeterView screens.
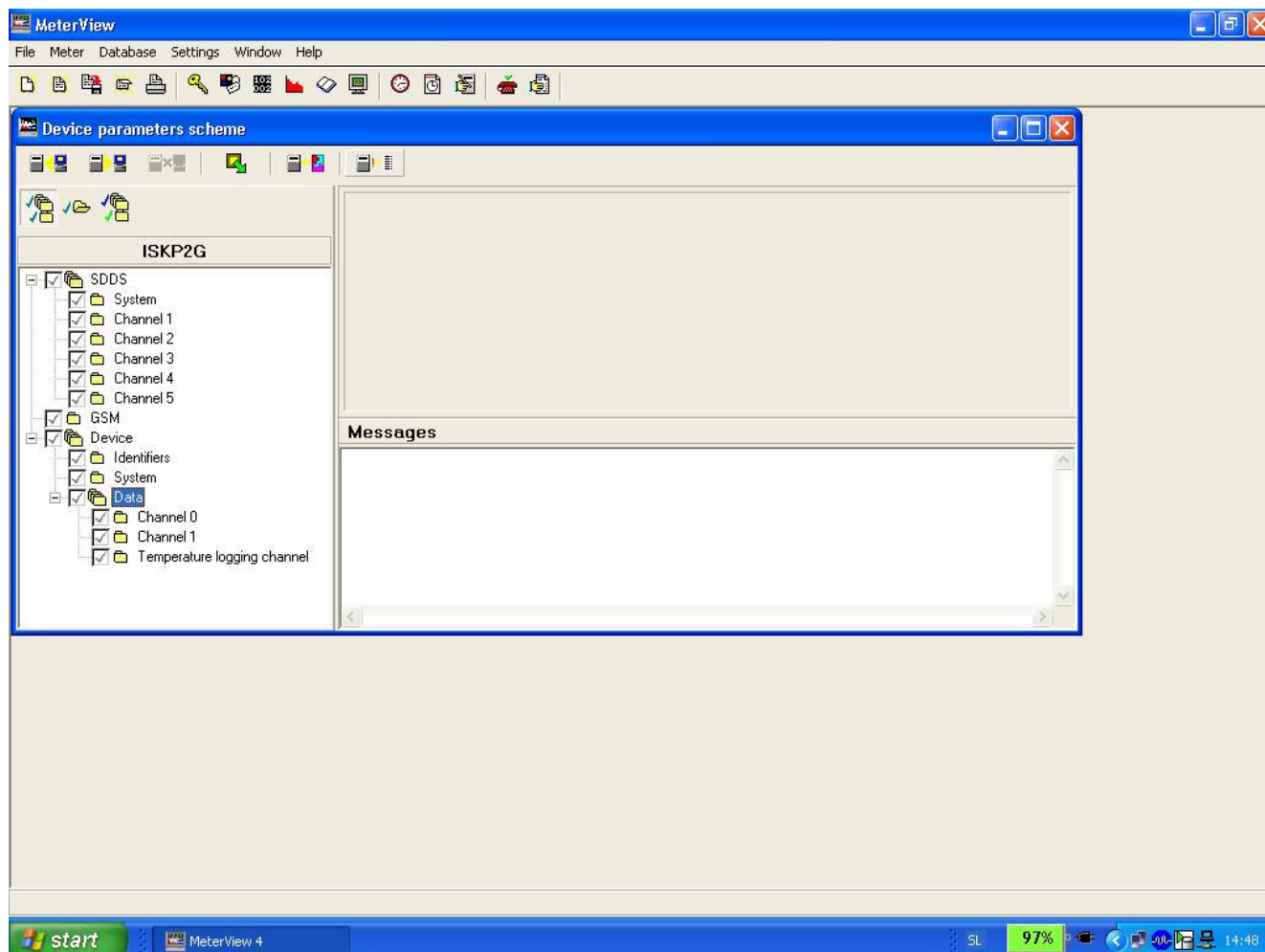
Figure 2. Program tool MeterView for configuring of Iskraemeco products

The communicator can be configured locally through its optical port by using an optical probe. The recommended optical probe type **Sonda 5 USB** and a driver for MS Windows are supplied by Iskraemeco (order code 020.356.308). Prior to entering parameters set the internal clock of the communicator. **First read out the complete set of parameters of the communicator and make changes after that in order not to accidentally overwrite the existing values with blanks.** Equip the communicator with a SIM card of the selected mobile operator.

4.2. Setting the Real Time Clock

The internal Real Time Clock of the communicator can be set by clicking on the **Set time** clock icon in the upper command console of MeterView. Click **OK** to set the P2G with your computer's system time.

4.3. Setting the communicator parameters for a simple application

4.3.1. Example 1: Scheduled reading of a load profile
In the case of a simple application shown on Fig. 1 the following is assumed:

- A gas meter operated by Gas Network and with a pulse output is connected to the pulse input 1 of the P2G communicator with a serial number 37 445 541
- The accumulated value of the number of pulses on the pulse input 1 shall be recorded in one hour intervals
- The ambient temperature shall be recorded in one hour intervals
- The communicator shall send both load profiles for the previous day automatically once a day to a remote data centre with a primary telephone number +38641770834 and with a secondary number +38641892466.
- The data will be collected by SEP2Messaging software and stored in files on a personal computer.

Table 2 shows the minimum required settings of the communicator in order to satisfy the above requirements. In order to set the parameters of the P2G use the Graphical User Interface (GUI) of the MeterView (Figure 2), or in case of problems read and write selected registers directly by selecting **Meter**/**Command**/**Custom…** and entering **R1** for reading or **W1** for writing in the **Command** field.

The registers in Table 2 that are not shaded contain data in the ISKRA-SYS format of the SMP protocol. Read the registers e.g. the register 00.00.01 by entering the register address as below followed by **Connect** and **Send**. Write the registers by using the command **W1** and supplying a value in the **Value** field.

Command	Ident	Value
R1	00*00.00.01	

Command	Ident	Value
W1	00*00.00.01	0B918346812964F7

The shaded registers in Table 2 contain data in the ISKRA-DATA format of the SMP protocol. Read or write the registers following the example below.

Command	Ident	Value
R1	06*00.04.04	

Command	Ident	Value
W1	06*00.04.04	3

Group	Subgroup	Register name	Register	Value	Meaning
SDSS	System	Primary MSISDN	00.00.00	0B918346710738F4	+38641770834
		Secondary MSISDN	00.00.01	0B918346812964F7	+38641892467
		Automatic Channel Ident	00.00.0B	1	Auto Channel Ident ON
	Channel 1	Data format	00.01.04	6	Logged data is in the ISKRA-DATA format
		Data Registers	00.02.00	00.02.01	LP for physical input 1
		Activation Date	00.01.00	00:00	Schedule is running
		Termination Date	00.01.01	03:22	Ends on March 22
		Scheduled Delivery	00.01.02	18:55	Every day at 18:55
		Scheduled Interval	00.01.03	00:01	Once a day
	Channel 5	Data format	00.41.04	6	Logged data is in the ISKRA-DATA format
		Data Registers	00.42.00	04.02.01	LP for temperature
		Activation Date	00.41.00	00:00	Schedule is running
		Termination Date	00.41.01	03:22	Ends on March 22
		Scheduled Delivery	00.41.02	19:00	Every day at 19:00
		Scheduled Interval	00.41.03	00:01	Once a day
GSM		Device MSISDN	01.00.00	098140710797F1	041770791
Device	Identifiers	Device identifier	02.00.00	3337343435353431	Serial number 37445541 of the P2G
		Device operator	02.00.02	Gas Network	Device operator
	System	Time	02.02.00	16:21:30	Actual time is 16:21:30
		Date	02.02.01	07:01:02	January 2, 2007
		Daylight Saving Time Mode	02.02.02	1	DST is ON
	Data Ch 0	Load profile period	00.04.04	3	LP interval is 1 hour
		Load profiling mode	00.04.05	0	Accumulated value
		Load profile interval size	00.04.06	1	Data length is 4 byte

Data Temp	Load profile period	04.04.04	3		LP interval is 1 hour

Table 2. Example settings of the P2G registers for the P2G-K17V03I01 version

Group	Subgroup	Register name	Register	Value	Meaning
SDSS	**System**	Primary MSISDN	00.00.00	0B918346710738F4	+38641770834
		Secondary MSISDN	00.00.01	0B918346812964F7	+38641892467
		Automatic Channel Ident	00.00.0B	1	Auto Channel Ident ON
	Channel 1	Data format	00.01.04	6	Data sent is in the ISKRA-DATA format
		Data Registers	00.02.00	00.02.01	LP for physical input 1
		Activation Date	00.01.00	00:00	Schedule is running
		Termination Date	00.01.01	03:22	Ends on March 22
		Scheduled Delivery	00.01.02	18:55	Every day at 18:55
		Scheduled Interval	00.01.03	00:01	Once a day
	Channel 5	Data format	00.41.04	6	Logged data is in the ISKRA-DATA format
		Data Registers	00.42.00	02.02.01	LP for temperature
		Activation Date	00.41.00	00:00	Schedule is running
		Termination Date	00.41.01	03:22	Ends on March 22
		Scheduled Delivery	00.41.02	19:00	Every day at 19:00
		Scheduled Interval	00.41.03	00:01	Once a day
GSM		Device MSISDN	01.00.00	098140710797F1	041770791
Device	**Identifiers**	Device identifier	02.00.00	3337343435353431	Serial number 37445541 of the P2G
		Device operator	02.00.02	Gas Network	Device operator
	System	Time	02.02.00	16:21:30	Actual time is 16:21:30
		Date	02.02.01	07:01:02	January 2, 2007
		Daylight Saving Time Mode	02.02.02	1	DST is ON
	Data Ch 0	Load profile period	00.04.04	3	LP interval is 1 hour
		Load profiling mode	00.04.05	0	Accumulated value
		Load profile interval size	00.04.06	1	Data length is 4 byte
	Data Temp	Load profile period	02.04.04	3	LP interval is 1 hour

Table 3. Example settings of the P2G registers for the P2G-K17V03I00, P2G-K17V03I00-IS or P2W-K17V02

EXPLANATION:

- The primary and secondary telephone numbers are given as international numbers in the GSM 04.08 format. The communicator sends data always to the primary number but receives remote configuring or read-out commands from both numbers. Automatic channel identification is enabled (data in an SMS message will be preceded by the schedule channel number). Active alarm mode and active error mode should normally be disabled.
- **Channel 1** and **Channel 5** are two separate time schedules for sending SMS messages containing the pulse load profile (Channel 1) and temperature profile (Channel 5). Up to five different independent schedule channels can be set. The numbering of channels in the P2G/W firmware goes from 0 to 4.
- The first schedule (Channel 1) was activated on January 1 and will end on March 22. The register **Activation Date** should contain 01:01, but if the schedule is already active (that is, after January 1) the register is automatically reset to 00:00. The schedule sends once a day at 18:55 an SMS message with the contents of the register 00.02.01. This register contains a daily load profile with a load profile period of one hour (this means 24 values) of the number of pulses accumulated on the physical pulse input no. 1 for yesterday. The register, that tells the schedule what needs to be sent is the register denoted by 00.02.00. **REMARK**: the physical pulse inputs of the device are numbered from 1 to 4 but in the unit's firmware they are numbered from 0 to 3 (for the P2G with 4 pulse inputs). In the case of the P2G with 2 pulse + 2 tamper inputs or the P2W the physical inputs are numbered 0 to 1.
- A parallel schedule (Channel 5) was activated on January 1 and will end on March 22. Again, the register **Activation Date** should contain 01:01, but if the schedule is already active (that is, after January 1) the register is automatically reset to 00:00. The schedule sends once a day at 19:00 an SMS message with the contents of the register 04.02.01. This register contains a daily load profile with a load profile period of one hour (this means 24 values) of the temperature on the logical input no. 4. The register, that tells the schedule what needs to be sent is the register denoted by 00.42.00. **REMARK**: the internal temperature

sensor of the unit is connected to a logical channel of which the number follows the number of the last physical channel and is therefore equal to 4 (for the P2G with 4 pulse inputs). In the case of the P2G with 2 pulse + 2 tamper inputs or the P2W the number of the logical channel is 2.

- The scheduled data are preceded by the number of the schedule channel (**Automatic Channel Identification**)
- The device telephone number is given as a national number in the GSM 04.08 format.
- The digits of the device identifier are transferred as ASCII characters. The serial number 37445541 is therefore stored as 3337343435353431.
- The load profile period for the pulse input is 1 hour (4→24 hours, 3→1 hour, 2→30 minutes, 1→15 minutes, 0→5 minutes), the cumulated value is recorded (0→accumulated, 1→differential) and each value is 4 bytes in length (0→2 bytes, 1→4 bytes). With the temperature load profile only the load profile period can be set.

PLEASE NOTE: The telephone numbers in this document are given as an example. Do not use this numbers for any of your applications!

Many different values contained in the P2G/W registers may be transmitted by means of SMS messages. See Example 2. The complete list of P2G/W registers is outside the scope of this document however a list of SYSTEM and DATA registers is joined in the Appendix.

4.3.2. Example 2: Scheduled reading of a single value
In the case of a simple application shown on Fig. 1 the following is assumed:

- A gas meter operated by Gas Network and with a pulse output is connected to the pulse input 1 of the P2G communicator with a serial number 37 445 541. The gas meter has a serial number 12121212 and is located in a place called Office.
- The actual value of the gas meter's register is 123.45 m^3
- The gas meter has a meter constant of 100 pulses per m^3 of gas
- The communicator shall send the accumulated value (the value of the meter's register) in m^3 automatically once a day at 18:55 to a remote data centre with a primary telephone number +38641770834 and with a secondary number +38641892466.
- The data will be collected by SEP2Messaging software and stored in files on a personal computer.

Group	Subgroup	Register name	Register	Value	Meaning
SDSS	System	Primary MSISDN	00.00.00	0B918346710738F4	+38641770834
		Secondary MSISDN	00.00.01	0B918346812964F7	+38641892467
		Automatic Channel Ident	00.00.0B	1	Auto Channel Ident ON
	Channel 1	Data format	00.01.04	6	Data sent is in the ISKRA-DATA format
		Data Registers	00.02.00	00.01.00	Current accumulated value
		Activation Date	00.01.00	00:00	Schedule is running
		Termination Date	00.01.01	03:22	Ends on March 22
		Scheduled Delivery	00.01.02	18:55	Every day at 18:55
		Scheduled Interval	00.01.03	00:01	Once a day
GSM		Device MSISDN	01.00.00	098140710797F1	041770791
Device	Identifiers	Device identifier	02.00.00	3337343435353431	Serial number 37445541 of the P2G
		Device operator	02.00.02	Gas Network	Device operator
	System	Time	02.02.00	16:21:30	Actual time is 16:21:30
		Date	02.02.01	07:01:02	January 2, 2007
		Daylight Saving Time Mode	02.02.02	1	DST is ON
	Data Ch 0	Meter ID	00.04.00	12121212	Serial no. of gas meter
		Meter information	00.04.01	Office	Location of gas meter
		Raw current accumulator	00.00.00	12345	Raw meter's register
		Current scaled accumulator	00.01.00	123.45	Meter's register in m^3
		Raw data divider	00.04.02	100	100 impulses/m^3

Table 4. Example settings of the P2G registers for all P2G types and P2W

EXPLANATION:

- **Channel 1** is a time schedule for sending SMS messages containing the accumulated value of the meter's register. The Data Registers register contains the value 00.01.00. This is the current scaled accumulated value of the gas meter's register
- The raw current accumulator value need not be set. It will be set automatically once the Current scaled accumulator and the Raw data divider are set.

4.3.3. Example 3: *Scheduled reading of a single value from several P2G/W devices*
In the case of a simple application shown on Fig. 1 the following is assumed:

- A **first** gas meter operated by Gas Network and with a pulse output is connected to the pulse input 1 of the **first** P2G communicator with a serial number 37 445 541.
- A **second** gas meter operated by Gas Network and with a pulse output is connected to the pulse input 1 of the **second** P2G communicator with a serial number 37 445 542.

Set both P2Gs according to Example 2. Of course, the P2Gs will have a different serial number and the Device MSISDN. They will probably also have a different location, actual register value and meter constant.

Set the scheduled delivery of both P2Gs some minutes apart, for example at 18:55 and 18:59 in order to avoid a possible collision of SMS messages.

5. Scheduled data read-out

5.1. Hardware

In order to read the SMS messages sent by the communicator according to a predefined time schedule a personal computer (PC) and an external GSM modem are needed. The modem needs to be equipped with a SIM card of a selected mobile operator.

The recommended external GSM modem type is P2CD-GSM supplied by Iskraemeco (order code 020.501.964.000) that connects to a personal computer via COM port or via an USB port with the use of an USB to Serial Cable converter.

5.2. Required software

For reading of the SMS messages received by the external GSM modem the **SEP2 Messaging** component of the SEP2W package is needed. It runs in Windows XP environment and is composed of SEP2 Messaging Service and SEP2 Messaging Client components. Prior to installation of SEP2 Messaging the **Microsoft .NET Framework 1.1** needs to be installed.

The **SEP2 Messaging Service** is an application running in the background that checks every minute whether there has been an SMS message received by the GSM modem. The application reads the message from the modem and transfers the data in the form of an *.XML file to a selected directory on the hard disk. If a connection to a database exists the data are automatically transferred to this database.

The **SEP2 Messaging Client** is a graphical user interface, which allows defining the directory for the storing of the *.XML files, the connection to the database and other parameters for the correct operation of the SEP2 Messaging Service.

NOTE: In the case that SEP2 Messaging is used to receive scheduled messages from the P2G/W a special adapter file of type SMPAdapter_Registers.xml is needed. This file instructs the SEP2 Messaging how to interpret the data received in an SMS message. Examples how to configure this file in order to read for example a load profile or a single value from the P2G/W are given in separate instructions.

5.3. Database

The SEP2 Messaging program may store the data in a database managed either by Oracle RDBMS (Relational Data Base Management System) or Microsoft SQL Server. For simple applications the **MSDE** (Microsoft SQL Server Desktop Engine) can be used. The MSDE is a reduced version of MS SQL Server 7.0 and allows access to the database to a maximum of five users. The MSDE is a freely available program (for example on Internet).

NOTE: SEP2 Messaging needs a special mapping file of type SMPAdapter_Mappings.xml in order to correctly store the data received in an SMS message into a database readable by the SEP2W application (see 5.4). Examples how to configure this mapping file are given in separate instructions.

5.4. Database management and creation of reports

To create a new database and user on the MSDE a simple graphical tool for the database management is needed (for example **DbaMgr2k** freely available on Internet). The structure of the database, which conforms to the SEP2W specifications, is set with the use of the **SEP2 DbManager** application. Finally, to create reports the **SEP2 Report** application is needed. SEP2 DbManager and SEP2 Report are components of the SEP2W package, which is the leading Iskraemeco software package for Automatic Meter Reading (AMR) systems.

In the case of a system with a small number of P2Gs and P2Ws (up to 50 units) we recommend the use of **SEP2Lite**. This program is a simplified version of the program package SEP2W. It allows creating of a new database on the MSDE, assigning rights to users, managing the database and creating reports.

The instructions for the installation of the SEP2W, SEP2Lite and MSDE can be provided by Iskraemeco.

6. Frequently Asked Questions

6.1. What is the capacity of one SMS message in terms of data it can carry?

The capacity of one SMS message is 140 Bytes. The message header requires 14 Bytes therefore 126 Bytes are available for user data. A day's load profile with a one-hour load profile period (i. e. 24 values) requires 24 x 4 = 96 bytes. The load profile registration always needs to be conceived in such a way, that the load profile of one day can be transmitted in a single SMS message.

6.2. Do the PC and the external modem need to be constantly turned on?

The modem needs to be permanently turned on. Normally it can save up to 24 SMS messages. This means that if one SMS message is sent per day, the computer roughly needs to be turned on every few days for the SEP2 Messaging to process the received messages. We recommend however that the computer is permanently turned on and SEP2 Messaging kept running.

6.3. Do I need one computer to run the SEP2 Messaging and another to run the MSDE database?

No. The SEP2 Messaging, the SQL Server (MSDE) and SEP2W (or SEP2Lite) software can all run on one computer with the GSM modem attached. Of course, you can run the MSDE on a separate server and SEP2 Messaging will direct data to this database over the Ethernet connection. Also, you could run the SEP2W (SEP2Lite) on a third computer and access the database over the Ethernet connection.

6.4. Can I receive SMS messages from the P2G or P2W to my mobile phone?

You could configure the P2G or P2W to send messages to your mobile phone number. The phone would actually receive the message, but it would not be able to decode its contents. Most likely the message »8-bit Data« would appear on the phone's screen.

6.5. Can I send messages to the P2G or P2W using my mobile phone?

In theory yes, but it is not possible to influence the operation of the P2G/W by using a mobile phone. To do so, one would need to know the telephone number of the P2G/W (which is normally kept secret by the P2G/W operator) and one would need to know the exact communication protocol. The P2G/W receives commands only from a trusted source. Equally, it is impossible to replicate the SMP communication protocol with a mobile phone.

6.6. How does the P2G or P2W ensure a reliable delivery of SMS messages?

If within a time period called *Validity Period* (this is usually set to 5 minutes) the P2G or P2W does not receive a positive delivery report from the mobile operator's Short Message Service Centre (SMSC) then the device will implement a special retry mechanism to deliver the SMS message. By default the maximum number of retries is set to 5, however the P2G/W can be set to retry indefinitely until a message is delivered successfully. In the case of five retries, the P2G/W would typically make a first retry after the expired *Validity period*, and then four

more retries after 30 minutes, 1, 4 and 8 hours. Note however that mobile operators will usually discard the non delivered messages in about a day or so.

7. Appendix

7.1. SDDS (SMS Data Delivery Service) register map

Field	Register	Description	Channel	Size	Permission
					SYSTEM
00.00.00	MSISDN1	Primary MS-ISDN address	-	3-12	R/W
00.00.01	MSISDN2	Secondary MS-ISDN address	-	3-12	R/W
00.00.02	L1PASSWD	Level 1 access password	-	1-16	W
00.00.03	L2PASSWD	Level 2 access password	-	1-16	W
00.00.04	L3PASSWD	Level 3 access password	-	1-16	W
00.00.05	L4PASSWD	Reset password	-	1-16	W
00.00.06	MAXRETRY	Maximum delivery retry attempts	-	1	R/W
00.00.07	RTCSYNC	Time synchronisation interval	-	2	R/W
00.00.08	ALARMS	Active alarm mode state	-	1	R/W
00.00.09	ERRORS	Active error mode state	-	1	R/W
00.00.0A	LPDP	Load profile data scaler	-	1	R/W
00.00.0B	AUTOID	Automatic channel identification	-	1	R/W
00.00.0C	WKPSTART	Wakeup schedule activation date	-	2	R/W
00.00.0D	WKPSTOP	Wakeup schedule termination date	-	2	R/W
00.00.0E	WKPTIME	Scheduled wakeup time	-	2	R/W
00.00.0F	WKPWAIT	Active wakeup window duration	-	1	R/W
00.00.10	WKPINT	Scheduled wakeup interval	-	2	R/W
00.00.11	WKPACTIVE	Wakeup window active state	-	1	R
00.00.12	WKPNEXT	Next scheduled wakeup timestamp	-	6	R
00.00.13	LPINTEXT	Load profile extended interval enable	-	1	R/W

Field	Register	Description	Channel	Size	Permission
00.00.14	FRAGMENT	Fragmentation mode	-	1	R/W
00.00.15	RSTWKPWAIT	Active wakeup window duration following a reset	-	1	R/W
					SYSTEM INFO
00.04.00	RETRIES_ALL	Total number of retry attempts	-	2	R
00.04.01	TXOK_ALL	Total number of successful deliveries	-	2	R
00.04.02	TXFAIL_ALL	Total number of failed deliveries	-	2	R
00.04.03	TXDATA	Number of METER-DATA messages sent	-	2	R
00.04.04	TXREPLY	Number of METER-REPLY messages sent	-	2	R
00.04.05	TXTEST	Number of METER-TEST messages sent	-	2	R
00.04.06	TXALARM	Number of METER-ALARM messages sent	-	2	R
00.04.07	TXERROR	Number of METER-ERROR messages sent	-	2	R
00.04.08	RECVD	Total number of messages received	-	2	R
00.04.09	RXCONFIG	Number of METER-CONFIG messages received	-	2	R
00.04.0A	RXRESET	Number of METER-RESET messages received	-	2	R
00.04.0B	RXREQ	Number of METER-REQ messages received	-	2	R
00.04.0C	RXTEST	Number of METER-TEST messages received	-	2	R
00.04.0D	LASTSENT	Timestamp of last message sent	-	6	R
00.04.0E	LASTRCVD	Timestamp of last message received	-	6	R
					CHANNEL
00.01.00	STARTDATE	Activation date	0	2	R/W
00.01.01	STOPDATE	Termination date	0	2	R/W
00.01.02	SENDTIME	Scheduled delivery time	0	2	R/W
00.01.03	INTERVAL	Scheduled delivery interval	0	2	R/W
00.01.04	DATATYPE	Data register format	0	1	R/W
00.01.05	ACTIVE	Schedule active state	0	1	R
00.01.06	NEXT	Next scheduled delivery timestamp	0	6	R
					DATA
00.02.00	DATA0	Data register 0	0	1-8	R/W
00.02.01	DATA1	Data register 1	0	1-8	R/W
00.02.02	DATA2	Data register 2	0	1-8	R/W
...	...	...	...	...	...
00.02.EF	DATA239	Data register 239	0	1-8	R/W
					CHANNEL INFO
00.03.00	RETRIES_CH	Number of retry attempts	0	2	R
00.03.01	TXOK_CH	Number of successful deliveries	0	2	R
00.03.02	TXFAIL_CH	Number of failed deliveries	0	2	R
					CHANNEL
00.11.00	STARTDATE	Activation date	1	2	R/W
00.11.01	STOPDATE	Termination date	1	2	R/W
00.11.02	SENDTIME	Scheduled delivery time	1	2	R/W
00.11.03	INTERVAL	Scheduled delivery interval	1	2	R/W
00.11.04	DATATYPE	Data register format	1	1	R/W
00.11.05	ACTIVE	Schedule active state	1	1	R
00.11.06	NEXT	Next scheduled delivery timestamp	1	6	R
					CHANNEL INFO
00.13.00	RETRIES_CH	Number of retry attempts	1	2	R
00.13.01	TXOK_CH	Number of successful deliveries	1	2	R
00.13.02	TXFAIL_CH	Number of failed deliveries	1	2	R
					DATA
00.12.00	DATA0	Data register 0	1	1-8	R/W
00.12.01	DATA1	Data register 1	1	1-8	R/W
00.12.02	DATA2	Data register 2	1	1-8	R/W
...	...	...	...	...	...
00.12.EF	DATA239	Data register 239	1	1-8	R/W
...	...	....	...	...	...
00.F1.00	STARTDATE	Activation date	15	2	R/W
00.F1.01	STOPDATE	Termination date	15	2	R/W

Field	Register	Description	Channel	Size	Permission
00.F1.02	SENDTIME	Scheduled delivery time	15	2	R/W
00.F1.03	INTERVAL	Scheduled delivery interval	15	2	R/W
00.F1.04	DATATYPE	Data register format	15	1	R/W
00.F1.05	ACTIVE	Schedule active state	15	1	R
00.F1.06	NEXT	Next scheduled delivery timestamp	15	6	R
					CHANNEL
00.F3.00	RETRIES_CH	Number of retry attempts	15	2	R
00.F3.01	TX_OK_CH	Number of successful deliveries	15	2	R
00.F3.02	TX_FAIL_CH	Number of failed deliveries	15	2	R
					DATA
00.F2.00	DATA0	Data register 0	15	1-8	R/W
00.F2.01	DATA1	Data register 1	15	1-8	R/W
00.F2.02	DATA2	Data register 2	15	1-8	R/W
...	...	...	...	...	...
00.F2.EF	DATA239	Data register 239	15	1-8	R/W

7.2. GSM register map

Field	Register	Description	Size	Permission
				SYSTEM
01.00.00	DEVMSISDN	MSISDN of this device	2-12	R/W
				INFO
01.01.00	GSMVER	GSM application firmware version ID	1-16	R
01.01.01	RSSIMIN	Minimum RSSI	1	R
01.01.02	RSSIMAX	Maximum RSSI	1	R
01.01.03	BERMIN	Minimum Bit Error Rate (RXQUAL)	1	R
01.01.04	BERMAX	Maximum Bit Error Rate (RXQUAL)	1	R
01.01.05	CELLID	Cell ID	2	R
01.01.06	LAC	Location Area Code	2	R
01.01.07	NETLOSS	Network outage count	2	R
01.01.08	IMEI	GSM equipment manufacturer ID	15	R
01.01.09	IMSI	Subscriber ID	15	R
01.01.0A	COREVER	GSM OS firmware version ID	1-16	R
01.01.0B	LASTREG	Timestamp of last network registration	6	R
01.01.0C	GSMSTATUS	GSM enabled state	1	R
01.01.0D	NETSTATUS	Network registration state	1	R

7.3. Device register map

Field	Register	Description	Size	Permission
				SYSTEM
02.00.00	DEVICEID	Device ID (serial designation)	1-9	R/W
02.00.01	DEVLOC	Device location identifier	1-16	R/W
02.00.02	DEVOP	Device operator / owner identifier	1-16	R/W
02.00.03	OPNOTE1	Operator / Owner proprietary identifier 1	1-16	R/W
02.00.04	OPNOTE2	Operator / Owner proprietary identifier 2	1-16	R/W
02.00.05	FLAGRATE	FLAG port data rate	1	R/W
				SECURITY
02.01.00	L1PASSWD	Level 1 access password *	1-16	W

Field	Register	Description	Size	Permission
02.01.01	L2PASSWD	Level 2 access password *	1-16	W
02.01.02	L3PASSWD	Level 3 access password *	1-16	W
				CLOCK
02.02.00	TIME	System time	3	R/W
02.02.01	DATE	System date	3	R/W
02.02.02	DST	European Daylight Saving Time mode	1	R/W
02.02.03	UPTIME	System uptime	4	R
				INFO
02.03.00	PWRLOSS	Number of power outages (if appropriate)	2	R
02.03.01	FWVER	Firmware version number	1-9	R
02.03.02	AMBTMP	Ambient temperature	4	R
02.03.03	RSTCNT	Reset count	2	R
02.03.04	BATTLIFE	Battery life remaining (mAh)	2	R
02.03.05	BATTRST	Battery reset count	2	R
02.03.06	STATUS	System operational status	1-16	R
02.03.07	LASTFLAG	Timestamp of last FLAG session	6	R
02.03.08	BADFLAG	FLAG session authentication fail count	2	R
02.03.09	FLAGCNT	FLAG session count	2	R
02.03.0A	LASTCFG	Timestamp of last configuration	6	R
02.03.0B	PRODUCTID	Product designation code	1-16	R
02.03.0C	IOCFG	Hardware input/output configuration	1-16	R

7.4. ISKRA-DATA register map

Field	Register	Description	Size	Permission
				RAW
xx.00.00	RAWACC	Current raw data accumulator	4	R/W
xx.00.01	RAWINIT	Initial raw data accumulator	4	R
				SCALED
xx.01.00	SCAACC	Current scaled data accumulator	4	R/W
xx.01.01	SCAINIT	Initial scaled data reading	4	R
				RAW LP
xx.02.00	RAWLP0	Raw load profile for today	See 4.1.2.5	R
xx.02.01	RAWLP1	Raw load profile for yesterday	See 4.1.2.5	R

Field	Register	Description	Size	Permission
xx.02.02	RAWLP2	Raw load profile for 2 days ago	*See 4.1.2.5*	R
...	...	...	...	...
xx.02.FF	RAWLP255	Raw load profile for 255 days ago	*See 4.1.2.5*	R
				SCALED LP
xx.03.00	SCALP0	Scaled load profile for today	*See 4.1.2.5*	R
xx.03.01	SCALP1	Scaled load profile for yesterday	*See 4.1.2.5*	R
xx.03.02	SCALP2	Scaled load profile for 2 days ago	*See 4.1.2.5*	R
...	...	...	...	...
xx.03.FF	SCALP255	Scaled load profile for 255 days ago	*See 4.1.2.5*	R
				CONFIG
xx.04.00	METERID	Serial number of meter	1-9	R/W
xx.04.01	CHINFO	Channel information	1-16	R/W
xx.04.02	SCALER	Raw data divider	2	R/W
xx.04.03	ROLLOVER	Maximum value of SCAACC	4	R/W
xx.04.04	LPPERIOD	Load profile measurement period	1	R/W
xx.04.05	LPMODE	Load profiling mode	1	R/W
xx.04.06	LPINTEXT	Load profile extended interval enable	1	R/W
xx.04.07	LPCAP	Load profile capacity	1	R
xx.04.08	TAMPER	Tamper enable	1	R/W
xx.04.09	TAMPVAL	Tamper event validation time	1	R/W
xx.04.0A	CHTYPE	Data channel type	1	R/W
xx.04.0B	IPORTNO	Physical input port number	1	R/W
xx.04.0C	OPORTNO	Physical output port number	1	R/W
xx.04.0D	THLMON	Low threshold monitor enable	1	R/W
xx.04.0E	THLTIME	Low threshold monitor time	2	R/W
xx.04.0F	THLPERIOD	Low threshold monitor period	2	R/W
xx.04.10	THLLEVEL	Low threshold monitor count level	4	R/W
xx.04.11	THHMON	High threshold monitor enable	1	R/W
xx.04.12	THHTIME	High threshold monitor time	2	R/W
xx.04.13	THHPERIOD	High threshold monitor period	2	R/W
xx.04.14	THHLEVEL	High threshold monitor count level	4	R/W
xx.04.15	NOTE1	Channel information note 1	1 - 16	R/W
xx.04.16	NOTE2	Channel information note 2	1 - 16	R/W
				INFO
xx.05.00	TAMPSTAT	Tamper status	1	R
xx.05.01	TAMPCNT	Tamper event count	2	R
xx.05.02	TAMPTIME	Timestamp of last tamper	6	R
xx.05.03	IPCONN	Physical input connection presence	1	R
xx.05.04	THLSTAT	Low threshold alarm status	1	R
xx.05.05	THLCNT	Low threshold alarm event count	2	R
xx.05.06	THLLAST	Timestamp of last low threshold alarm	6	R
xx.05.07	THHSTAT	High threshold alarm status	1	R
xx.05.08	THHCNT	High threshold alarm event count	2	R
xx.05.09	THHLAST	Timestamp of last high threshold alarm	6	R

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