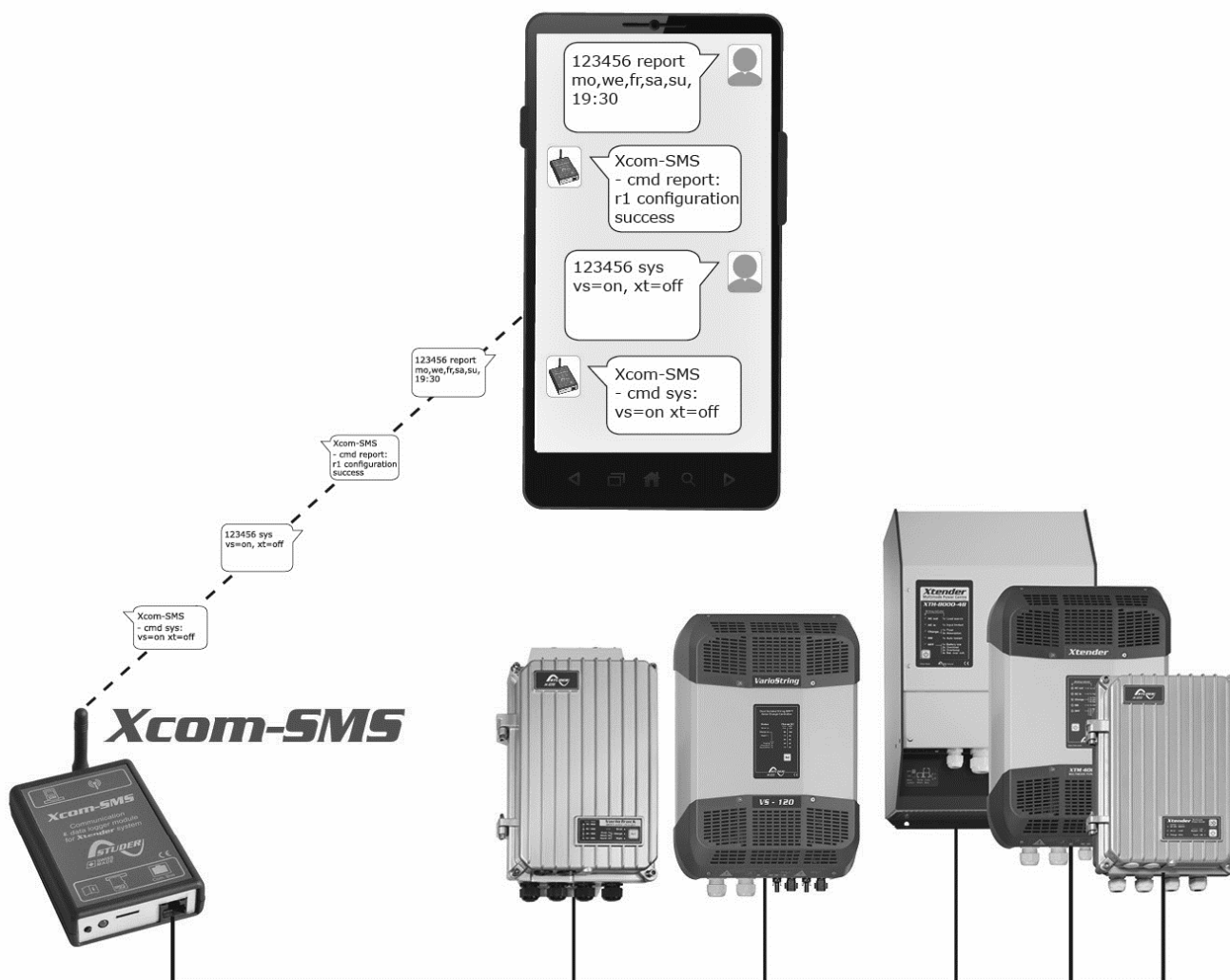# Communication module Xcom-SMS

User manual

COMMUNICATION MODULE XCOM-SMS: USER MANUAL

ABOUT THE SOFTWARE

This document applies to software versions V1.4.0 or higher of the Xcom-SMS. It is possible to update the product with the latest software version available on "www.studer-innotec.com/support".

COMPATIBILITY WITH STUDER PRODUCTS

The Xcom-SMS operates in Xtender systems (with products such as Xtender, VarioTrack, VarioString, BSP, RCC-02/--03); however, it is incompatible with the following products: Xcom-232i, Xcom-LAN, Xcom-GSM.

LEGAL NOTICE

The use of Studer Innotec SA devices is the responsibility of the customer in all cases. Studer Innotec SA reserves the right to make any modification to the product without prior notice.

PRODUCT RECYCLING

The Xcom-SMS conforms to the European directive 2011/65/EC on hazardous substances and does not contain the following elements: lead, cadmium, mercury, hexavalent chrome, PBB or PBDE.

To dispose of this product, please use the service for collection of electrical waste and observe all applicable obligations according to the place of purchase.

TABLE OF CONTENTS

1 INTRODUCTION

1.1 THE COMMUNICATION MODULE XCOM-SMS

This user manual contains a complete description of the functioning of the communication module Xcom-SMS.

The communication module Xcom-SMS makes it possible to access systems with Studer Innotec devices through SMS (Short Message Service) sent from a mobile phone, a web site, etc. It provides the user with a tool that gives easy access to the system in order to know its current state and to control it remotely reducing the necessity to physically go to the site.

1.2 CONVENTIONS

1.2.1 Symbols

⚠	This symbol is used to indicate a risk of material damage.

🛈	This symbol is used to indicate information that is important or which serves to optimize your system.

1.3 WARRANTY AND LIABILITY

During production and assembly, each Xcom-SMS undergoes several controls and tests. These are carried out in full respect of fixed procedures. Each Xcom-SMS is given a serial number allowing a perfect follow-up of the controls, in conformity with the specific data of every device. For this reason, it is very important to never remove the descriptive sticker bearing the serial number. The production, the assembly and tests of each Xcom-SMS are entirely carried out in our factory in Sion (CH). The warranty of this product depends on the strict following of the instructions in this manual. The warranty period for the Xcom-SMS is 5 years as from its production date.

1.3.1 Disclaimer of warranty

No warranty will be applied for damages caused by handling, operation or actions that are not described in this manual. Damages arisen from the following events are not covered by the warranty:

- Overvoltage on the device.
- Liquid in the device or oxidation due to condensation.
- Failures due to a fall or to a mechanical shock.
- Modifications made without the explicit authorization of Studer Innotec SA.
- Nuts or screws partially or insufficiently tightened during installation or maintenance.
- Damages due to atmospheric overvoltage (lightning).
- Damages due to transport or improper packaging.
- Disappearance of original marking items.

1.3.2 Disclaimer of liability

Installation, commissioning, use and maintenance of this device cannot be supervised by the company Studer Innotec SA. For this reason, we do not accept any liability for damages, costs or losses generated either by an installation that is not conforming to the prescriptions, by a defective operation or by poor maintenance. The use of this device is under the responsibility of the end-user. This device is neither designed nor guaranteed for the supply of life support applications or any other critical application with potential risks for human beings or for the environment. We shall assume no liability for patent infringement or other third party rights involved in the use of this device.

1.3.3 Compatibility

Studer Innotec SA guarantees the compatibility of the software updates with the hardware for one year, starting from the date of purchase. The updates are no longer guaranteed beyond this date and a hardware upgrade may be required. Please contact your reseller for any additional information on compatibility.

1.4 SAFETY PRECAUTIONS

1.4.1 Generalities

Carefully read all safety instructions before proceeding with the installation and commissioning of the device. Failure to follow these instructions might constitute a lethal physical danger but can also damage the functionalities of the device. Therefore this manual should always be kept close to the device.

⚠	For any installation, the local and national norms and regulations in force must be strictly followed.

1.4.2 Warnings

- Wherever the system, the person in charge of installation and commissioning must know the safety measures and the prescriptions in force in the country. Therefore, the whole maintenance must be carried out by qualified personnel.
- All components connected to this device must be conforming to the laws and regulations in force. Persons without a written authorization from Studer Innotec SA are forbidden to do any changes, modifications or repairs whatsoever. Regarding authorized modifications and replacements, only genuine components shall be used.
- This device is meant for indoor use only and must under no circumstances be exposed to rain, snow or any other humid or dusty environment.
- If used in motor vehicles, this device must also be protected against vibrations by shock absorbing components.

2   EC DECLARATION OF CONFORMITY

The communication module Xcom-SMS described in this manual meets the requirements specified in the following EC directives and norms:

- Low voltage directive 2006/95/CE: EN 60950:2005
- EMC directive 2004/108/CE: EN61000-6-1:2005
- RoHS directive: 2011/65/UE

CH - 1950 Sion, January 2015

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3 MATERIAL NEEDED FOR THE INSTALLATION

3.1 CONTENTS OF THE XCOM-SMS COMMUNICATION SET

The communication set Xcom-SMS contains the following material:

- 1 Quick guide

- 1 Xcom-SMS with antenna

- 1 communication cable, 2m

- 1 micro SD card with adapter (contains product documentation in pdf-format as well as the Xcom-SMS configuration software.)

- Mounting plate

3.2 ADDITIONAL ITEMS

In addition to the material delivered with the communication set the use of an Xcom-SMS necessitates a micro SIM card as well as a mobile phone that can send and receive SMS messages. During installation there is also need for a computer and a slot headed screwdriver.

4 INSTALLATION

There are two phases in installing an Xcom-SMS:

1. Configuration of the Xcom-SMS, using the Xcom Configurator software supplied on the micro SD card
2. Wiring of the module

4.1 CONFIGURATION OF THE XCOM-SMS

Your Xcom-SMS module needs to know the PIN code of your micro SIM card in order to send SMS messages, just as a mobile phone. You also have to enter the phone number linked with this micro SIM card. During this phase you may also enter a test mobile phone number to which test SMS messages, operating reports of your system and alarms will be sent.

To store these data in the Xcom-SMS you will have to use the micro SD card supplied with the device.

1. Insert the micro SD card (using the adapter) and run the Xcom Configurator available on the micro SD card.

    The following window will open:
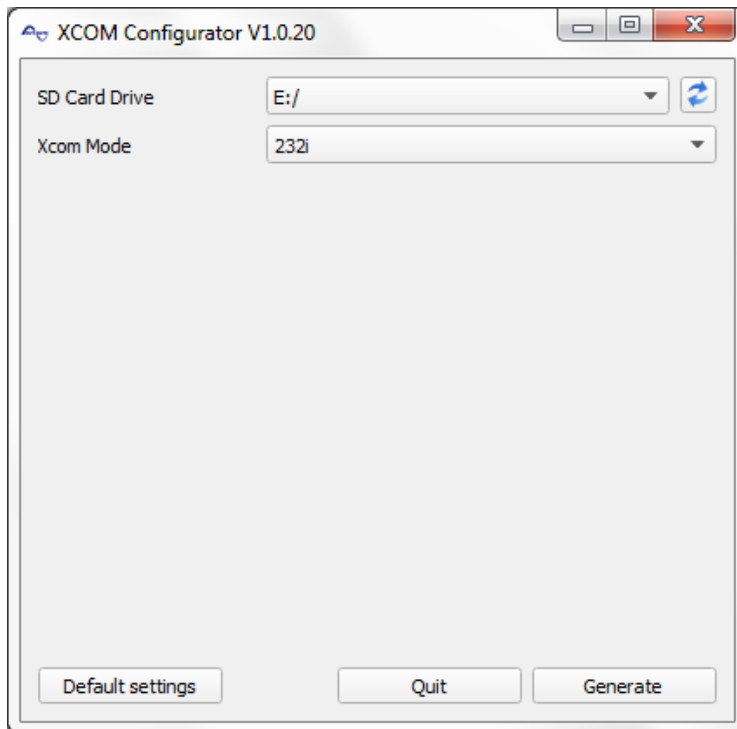
2. In the field "SD Card Drive", choose the drive of your SD card from the drop-down menu (in the example: F:/XCOM CONFIG). The configuration files for your Xcom-SMS will be generated on this drive.
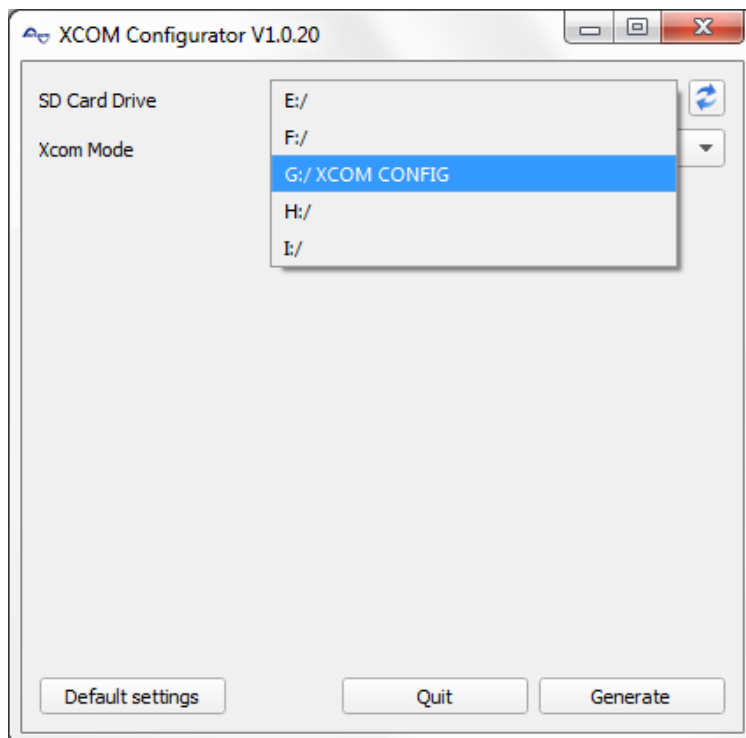
3. In the field "Xcom Mode", choose "SMS"
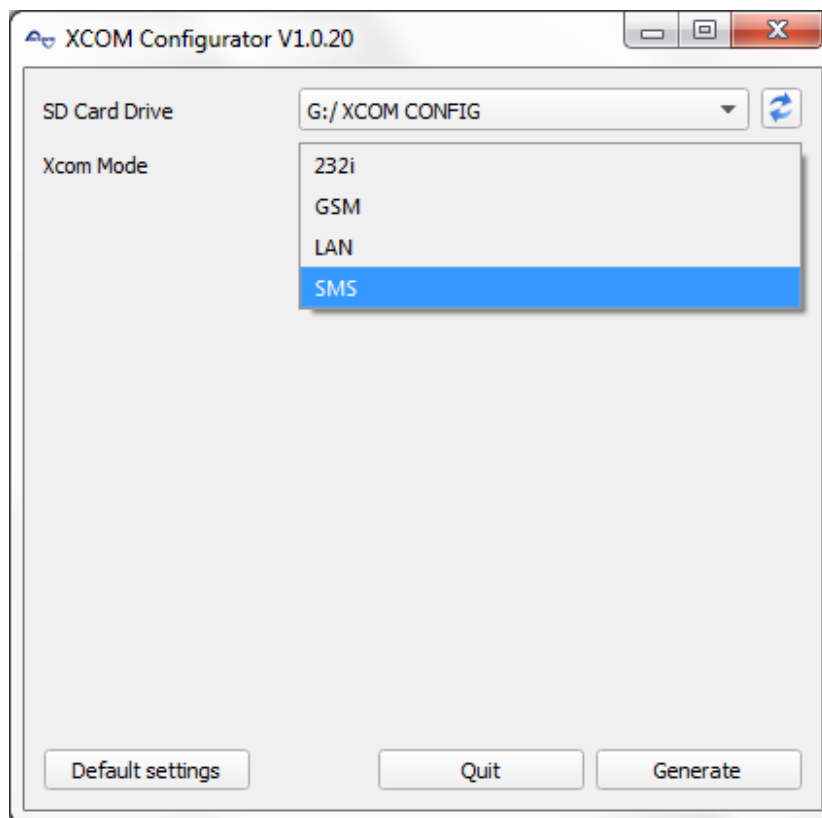
4. On the following screen, complete each field according to the information below:

1. PIN Code:
    Here you should enter the PIN code supplied with your micro SD card. It's a code of 4 to 6 digits. This code is mandatory except if it has been removed, using a phone, or if the SIM card comes without a PIN code.

2. SIM Card Phone Number:
    Here you should enter the phone number assigned to your micro SIM card. We recommend to enter the international phone number format indicating the country code from where the system will be operating. In the example above the country code is +41, which is the country code for Switzerland.

3. Owner Phone Number:
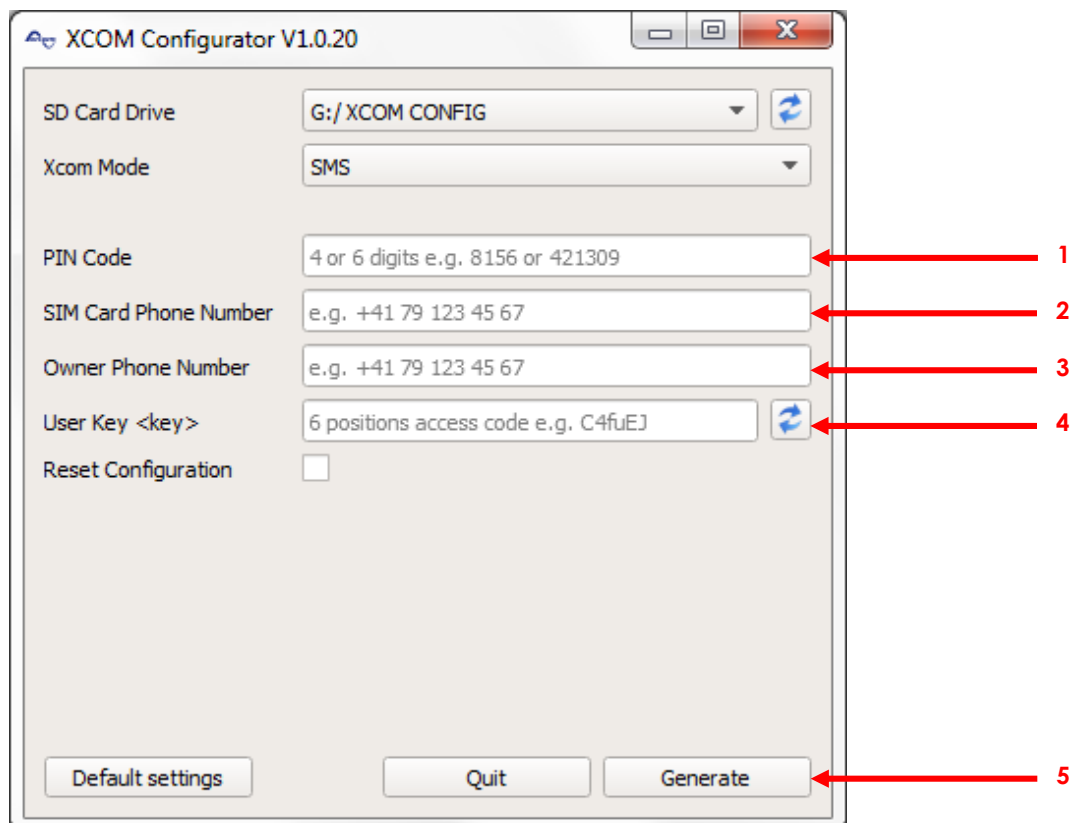   Here you should enter the phone number to which messages and reports from your system will be sent as well as the automatic message that confirms that the configuration has been successful. It is recommended to use an international format with the country code of the country where the system will be operating.

4. User Key:
    Here you should enter the access code that you would like to use when accessing the system in the future. This code (<key>) will be necessary when sending messages to your system. Find out more about its signification and format, in chapter 6.2. This code is mandatory and you will need it in order to generate the configuration files. **Remember to write down this code, without it it's impossible to communicate with your Xcom-SMS.**

5. When all requested fields are filled out, press "Generate" to create the configuration files.

5. A window will automatically confirm the successful file generation. Click on OK, the configuration of your SD card is completed.
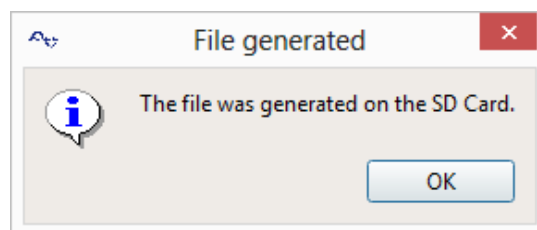
You may now remove the SD card from your computer and insert it into the Xcom-SMS.

4.2 WIRING AND AUTOMATIC POWER-UP

Wiring the system is easy but requires meticulous attention in order to facilitate the smooth functioning of the system. Once connected to your system the power-up will be automatic.

> ⚠ The SD card delivered with the Xcom-SMS contains a software update for all the devices of the system (Xtender/VarioTrack/VarioString/…). When the Xcom-SMS is connected, it will verify the software version of each device connected to the communication bus. If the software version on the SD card is more recent than the existing version on the devices, they will be updated which will cause a restart (with interruption of operation) in the corresponding devices.

1. Insert the micro SIM card. It is a push-push connector (push to insert and push to eject). Insert the micro SIM card until you hear a "click" from the spring.

2. Insert the micro SD card that contains the configuration files of your Xcom-SMS (see chapter 4.1). It is a push-push connector (push to insert and push to eject). Insert the micro SD card until you hear a "click" from the spring.

3. Adjust the antenna (rotate the antenna and manually tighten it).

4. Check the termination on the device to which you will connect the Xcom-SMS. If the system contains several devices it is necessary to connect the Xcom-SMS to one of the ends of the system. Connect your module with the supplied cable to a free communication connector in the system.
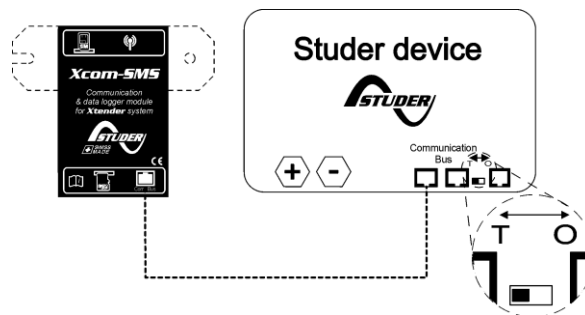
Figure 4.1: Connection schematics for Xcom-SMS
(example 1: system with one other device)

⚠	With one other device in the system the termination on the other device should be put to T as in "Terminated". See figure 4.1. An incorrect setting of the terminations can lead to an erratic running of the system or impede its updating.
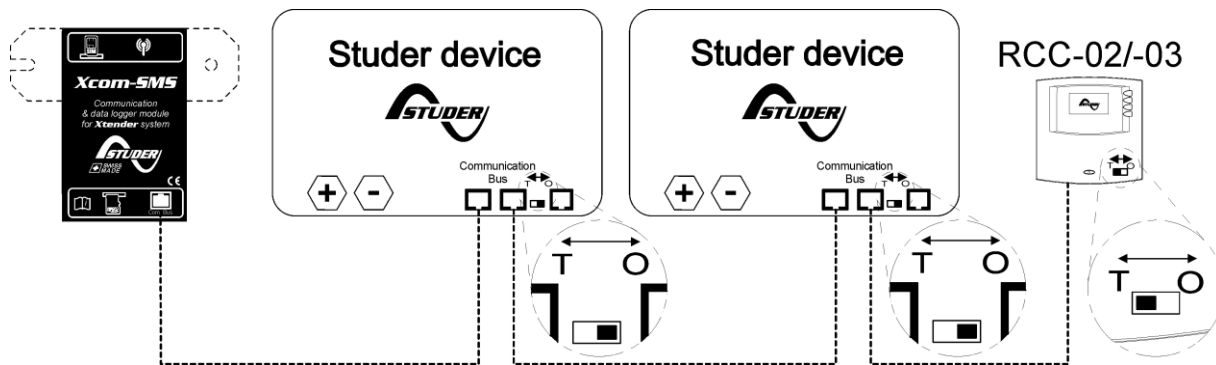
Figure 4.2: Connection schematics for Xcom-SMS
(example 2: system with several devices)

⚠	With more than two devices in the system all Studer devices should be put to O as "Open" apart from the devices at the ends of the communication chain. These devices should be put to T as "Terminated". The Xcom-SMS does not have a termination since it has only one communication cable port. See figure 4.2 An incorrect setting of the link ends can lead to an erratic running of the system or impede its updating.
ℹ	By default, the termination is terminated (position T) on each of Studer Innotec SA's products.

The start-up is automatic once the Xcom-SMS is connected and powered by your system. The Xcom-SMS will perform different sequences indicated by the bi-coloured LED (red/green) situated next to the communication cable. These sequences are summarized below:

1. Start-up of the Xcom-SMS. The bi-coloured LED will blink orange (green and red at the same time) 2x repeatedly.

2. If your system requires an update the communication module will perform it automatically depending on the contents of the SD card. It can be the update of one configuration file or a complete system update. It can be quick or long, depending on its contents and can take from a few seconds to several minutes (update of the entire system). When an update starts the bi-coloured LED lights up for 1.5 seconds in orange, then keeps blinking in red.

3. Once the update is completed the module will access the micro SIM card and the configuration files on your SD card. This sequence is indicated by the LED blinking in orange 2x repeatedly.

4a. If everything functions well and the GSM connection has been established with your mobile phone operator the module will start blinking in green 2x repeatedly. It will send a confirmation SMS of the start-up to the phone number entered in the Xcom Configurator in the field "Owner Phone Number". If you would like to send another test-SMS manually, briefly push the button of the Xcom-SMS.

4b. If the system has not been able to complete properly the start-up, it will blink red 2x repeatedly. No SMS will be sent. If you have a remote control (RCC-02/-03) an error message will be displayed indicating the problem (if the error has been identified). For instance, if there is no micro SIM card inserted into the Xcom-SMS, the RCC will display:

Error (146):
SIM card missing

5 BLINKING CODES AND PUSH BUTTON
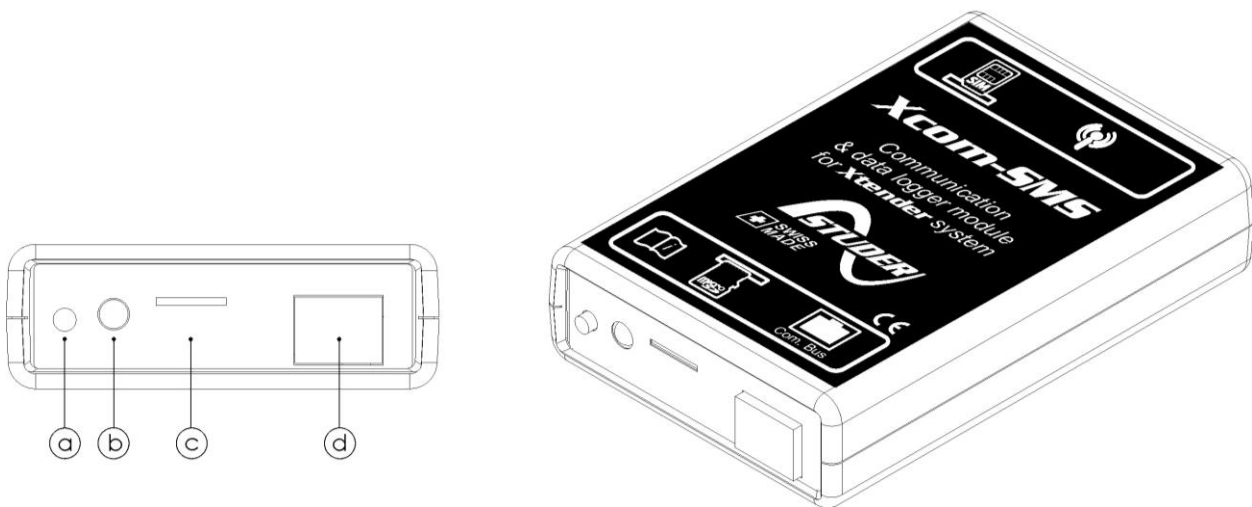
Figure 5.1: Front and isometric view of the Xcom-SMS

Key	Description
(a)	**Push button**
	This button enables 3 functions.
	1. Pressing the button for less than 0.8 s: Sends a test-SMS to the phone number set in the Xcom-configuration. The signalisation LED (b) does not indicate this function and behaves normally.
	2. Pressing the button for 0.8 s to 3 s: No function. However the signalisation LED (b) is turned off. If you let go of the button now nothing will happen and the Xcom-SMS will continue to function normally.
	3. Pressing the button for 3 s to 6 s: Saves all files on the SD card. You should let go of the button when the signalisation LED (b) is green.
	4. Pressing the button for 6 s to 9 s: Deletes the Xcom-SMS configuration (no more events or reports will be sent). You should let go of the button when the signalisation LED (b) is red. This action will not change the access code.
	Pressing the button for more than 9 seconds does nothing. After 9 s the signalisation LED (b) behaves normally and you can let go of the button without any changes in behaviour. For example, if you wish to save all files on the SD card but you accidentally hold the button more than 6 s, you can keep holding the button more than 9 s, then let go without changing any functions.
(b)	**Bicoloured signalisation LED green/red (cable side)**
	The signalisation LED indicates different functions using colour and frequency of blinking. Hereafter each function is described in detail.
	Push button (absolute priority)
	Pressing the push button will have a direct impact on the blinking of the LED. The push button has an absolute priority on the functioning of the LED over other indications described hereafter. These are listed by priority, from the highest to the lowest priority.

SD card inserted (high priority)

When a SD card is inserted the red and green signalisation LEDs blinks simultaneously (orange) during 1.5 seconds and indicates that the card is read/inserted correctly.

Update of the Xcom-SMS

During update of the Xcom-SMS (as soon as a micro SD card containing an update has been inserted) the signalisation LED blinks red.

ⓘ	The updating process may take between 3 and 15 minutes. During this period it is possible that the signalisation LED will stop for an instant. The updating process is finalised as soon as the red signalisation LED stops blinking for at least 20 seconds. Never interrupt an updating process.

Error detected during the update process or during data logging

If the Xcom-SMS detects an error, the red signalisation LED is continuously lit.

Micro SD card is full

If the Xcom-SMS detects that the micro SD card is full, the red signalisation LED will flash.

Fatal errors of the Xcom-SMS

These errors will prevent the communication between the system and your phone. The red signalisation LED will blink 2x repeatedly if the Xcom-SMS is facing one of the following errors:

- The micro SD card is not configured
- The SIM card is not inserted
- The PIN code of the SIM card is wrong
- The SIM card is locked. Use a mobile phone and the PUK code to unlock the SIM card.
- Impossible to connect to the phone network.

In either case you will have to solve the problem (see chapter "Troubleshooting") and then disconnect and reconnect the Xcom-SMS to its Xtender system (disconnect and then reconnect the cable).

Occasional errors of the Xcom-SMS

The red signalisation LED blinks 2x once. These occasional errors are not serious and will not prevent the use of the Xcom-SMS. For instance, the Xcom-SMS has not been able to send an SMS.

Start-up of the Xcom-SMS

The signalisation LED blinks 2x repeatedly in orange (green and red LED lit simultaneously) during the start-up of the system. During this period the Xcom-SMS is not yet in operation.

In operation (low priority)

The green signalisation LED blinks 2x repeatedly if the Xcom-SMS is in operation and none of the above states are present.

(c)	**Micro SD card reader**
	The card reader allows for the insertion of a micro SD card to log data (chap. 11 – p. 42) or for system updates (chap. 12 – p. 43).
(d)	**CAN connectors**
	This connector allows to connect the Xcom-SMS with an Xtender system in order to fully use its functions.
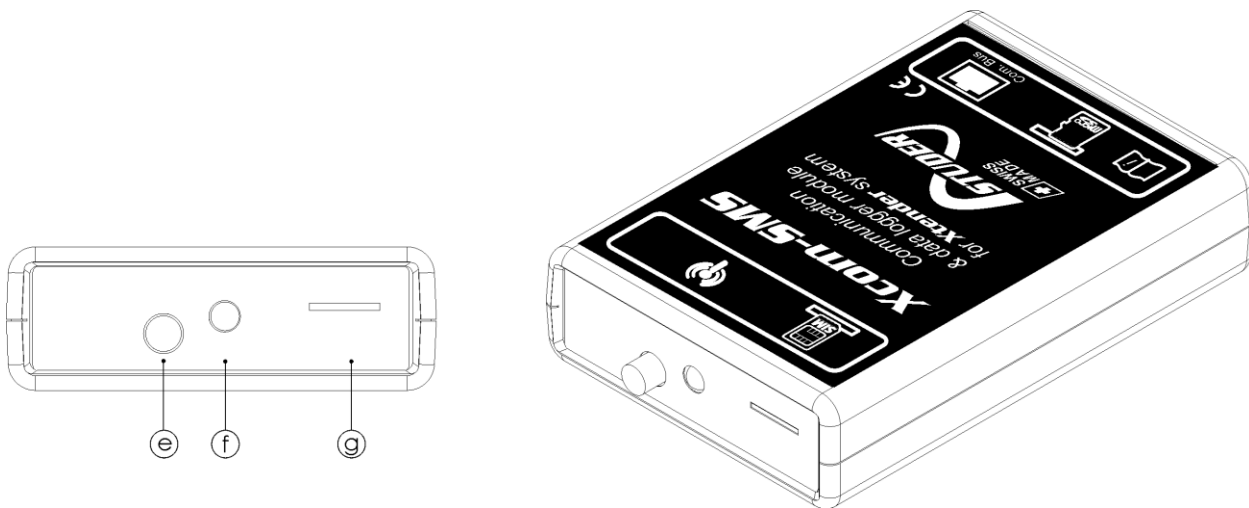
Figure 5.2: Back and isometric view of the Xcom-SMS

Key	Description
(e)	**GSM antenna connector**
	This connector allows to connect the antenna to the module. The antenna should be carefully tightened manually.
(f)	**Green signalisation LED for GSM communication**
	This LED indicates the state of communication with the telephone network. The blinking codes are as follows:
	1. LED off - the modem is not in operation

	2. Fast flashes
	   - searching for the network
	   - not yet registered at the network
	   - about to lose the network (feeble signal)

	3. Slow blinking - registered to the network, complete service
	4. LED continuously lit - ongoing call
(g)	**Micro SIM card connector**
	This is the connector to insert the micro SIM card that you will have to buy from your telephone operator.

6 HOW TO USE THE COMMUNICATION MODULE

6.1 OVERVIEW

A large number of the system's functions are accessible using the Xcom-SMS. However, it is not possible to access all functionalities of the system remotely or though SMS.

The Xcom-SMS module includes the following functionalities:

- Operating reports by SMS
- Events sent by SMS
- Start / Stop a device
- Control the auxiliary relays
- Access to the parameters (Read / Write)
- Reading the user information
- Changing the access code
- Subscribe / Unsubscribe to reports and system alarms
- Changing the language
- Help

6.2 SECURE ACCESS

The Xcom-SMS module protects your system with an access code in order to avoid that a third party takes control over a system by knowing its phone number. This access code, indicated <key> in this document, is a unique code of 6 characters. These characters can be composed of numbers ('0' to '9'), upper case or lower case letters ('a' to 'z' et 'A' to 'Z'). The access code is case sensitive.

As it is not possible to identify the sender of an SMS command, the access code has to be used in the beginning of each SMS. The access code must be followed by a space in order to be acknowledged.

By default the access code is set to: **123456**

It is highly recommended to change the access code to guarantee the security of your system (see the command "newkey").

⚠	Attention, in case of loss of the code the configuration has to be repeated from scratch using the Xcom Configurator available on the micro SD card.
	Your installer may also reset the access code if necessary.

If an SMS is sent using an incorrect access code <key>, the system will send an error message in return if it's possible to identify the sender. The error message has this format:

Xcom-SMS Error: wrong key

⚠	The number of consecutive error messages has been limited to 5. Thereafter the Xcom-SMS is blocked during 24h before taking in consideration any new SMS.
	This function prevent the system from being hacked by the scanning method which would create important SMS costs (in reply) by the Xcom-SMS.

6.3 ACKNOWLEDGEMENT OF RECEIPT

Each message received by the Xcom-SMS will generate a return message that acknowledges whether the SMS has been processed. It is possible to deactivate the return message function with the command "smsrsp", see chapter 0.

If an SMS is sent with incorrect formatting or in a format unknown to the Xcom-SMS, the system will return an error message by SMS if it is possible to identify the sender. The error message has this format:

Xcom-SMS Error : wrong sms format

6.4 SMS FORMAT

SMS messages sent to the Xcom-SMS must have the following format:

- The SMS should always start with the system access code <key>. The access code is followed by one or several commands.
- The following characters are authorized in the SMS commands:
    - Lower case letters 'a' to 'z'
    - Upper case letters 'A' to 'Z'
    - Numbers '0' à '9'
    - Special characters; namely:
        - '.'
        - ','
        - '?'
        - '='

When the Xcom-SMS receives an SMS it starts by verifying the access code <key>. If the access code is correct the commands contained in the SMS will be controlled and then executed.

7 SMS COMMANDS

The commands will enable you to communicate with your remote system. The commands are described on the following pages. At the end of the description of each command an example of the SMS command is given.

All commands are in English. The commands are short and meaningful.

🛈	For some commands the number of arguments is limited to 10. To make a command with more than 10 parameters you will have to send an additional SMS.
🛈	It is not possible to use the same command twice in the same SMS.

7.1 CHANGING THE ACCESS CODE OF THE XCOM-SMS

It is recommended that the user change the access code to the communication module Xcom-SMS. Use the following command to change the access code <key>.

Format :   **newkey <key>**

<key>   Mandatory
               User access code of 6 characters (case sensitive)
               Accepted characters: 0-9, a-z, A-Z

Example of the command "newkey":

Command	Functioning of the Xcom-SMS
newkey 1a2B3c	The access code of the Xcom-SMS is now 1a2B3c. The code by default 123456 is no longer valid. All SMS sent to the Xcom-SMS should hereafter start with the new access code 1a2B3c.

Example of SMS using the command "newkey".

123456 newkey 1a2B3c

Xcom-SMS
- cmd newkey: success
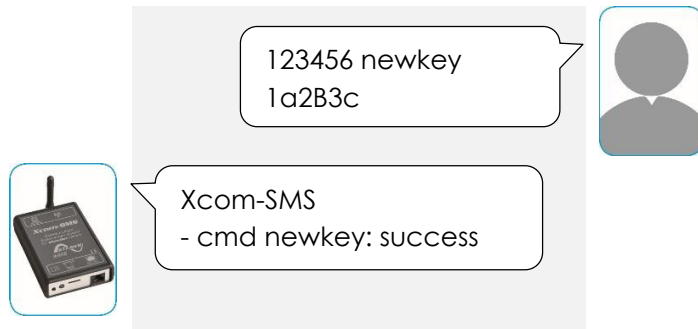
Example of SMS with an error in the command "newkey" (the code must contain 6 characters).

123456 newkey 1a2B3cw346hd

Xcom-SMS
- cmd newkey: wrong format
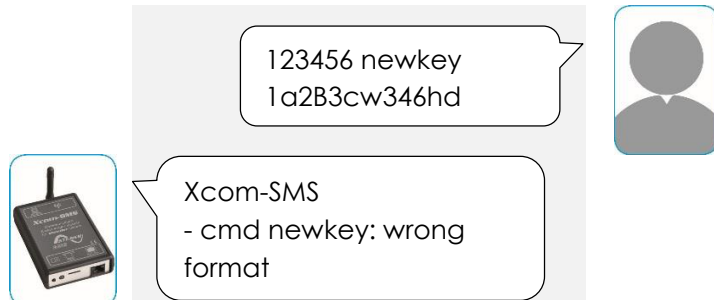
Example of SMS with error in the access code.

123455 newkey 1a2B3c

Xcom-SMS Error: wrong key
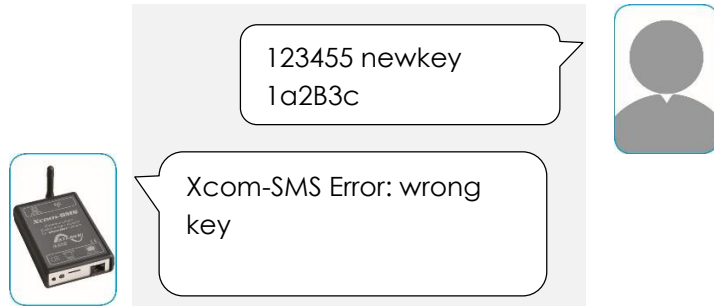
7.2 CHANGING THE LANGUAGE

It is possible to change the language in order for the parameters, the user information and the messages to be sent in the user's preferred language.

Use the following command to change language.

Format :   **lang <l>**

<l>   Mandatory
             Chose language among the following options:
             fr: French
             de: German
             es: Spanish
             en: English

Examples of the "lang" command:

Command	Functioning of the Xcom-SMS
lang fr	The selected language is French
lang de	The selected language is German
lang es	The selected language is Spanish
lang en	The selected language is English

Example of SMS to change the language (German selected).

123456 lang de

Xcom-SMS
-cmd lang:
language=german
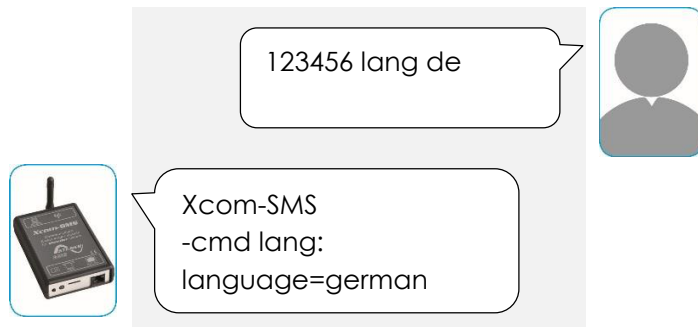
Example of SMS to change the language to a non-supported language.

123456 lang cn

Xcom-SMS
- cmd lang: wrong format
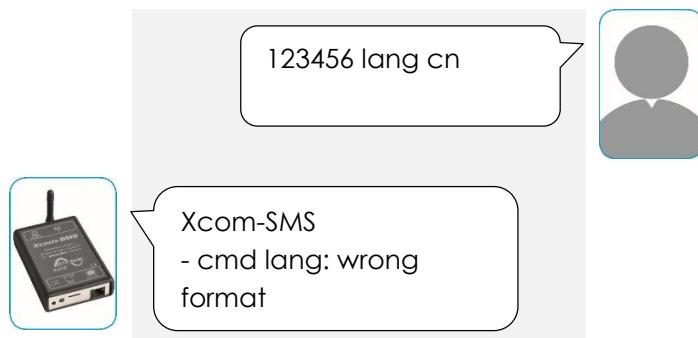
7.3 ACTIVATION/DEACTIVATION OF SMS REPLIES

By default, the Xcom-SMS returns an acknowledgement of receipt in the form of a specific message to the received command. In order to save money, it is possible to deactivate the replies by SMS.

Use the following command to activate or to deactivate the replies by SMS.

Format : **smsrsp <state>**

<state>   Mandatory
                Activated or deactivated state according to the following format:
                on :   activated
                off :   deactivated

Examples of the "smsrsp" command:

Command	Functioning of the Xcom-SMS
smsrsp on	For each received SMS the Xcom-SMS will send a confirming SMS in reply.
smsrsp off	The Xcom-SMS doesn't send any confirmation SMS.

Example of SMS to deactivate the replies by SMS.

123456 smsrsp off

Xcom-SMS
- cmd smsrsp: sms responses deactivated from now on

Example of SMS to activate the replies by SMS.

123456 smsrsp on
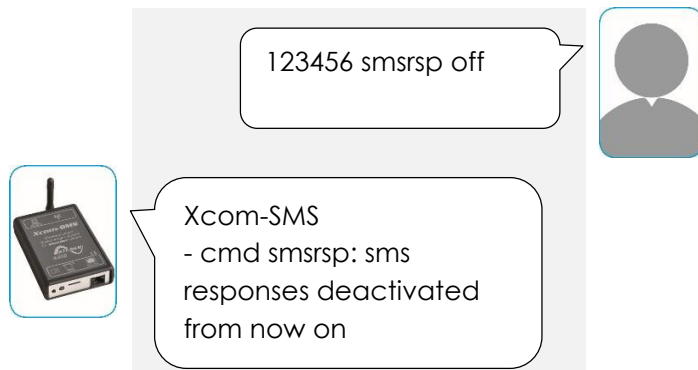
Xcom-SMS
- cmd smsrsp: sms responses activated from now on
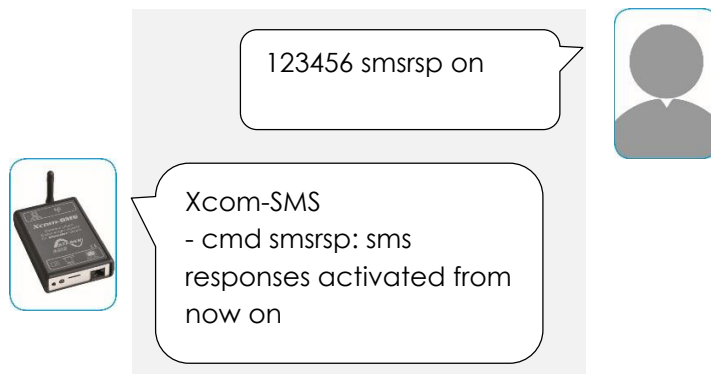
7.4 REMOVE THE XCOM-SMS SUBSCRIPTIONS

It is possible to delete the Xcom-SMS's mailing list of events and reports. The following command makes it possible to use this function. The configuration of reports and events will be returned to as in the factory settings as described below.

- Removal of all subscribers to the reports:
  No reports will be sent automatically

- Deletion of all event subscribers:
  No event SMS will be sent automatically
- Reset of the configuration of events:
  o notifications and warnings deactivated
  o errors and halts activated

All the other parameters of your Xcom-SMS will not be affected by this command.

Format: **reset**

Example of SMS using the command "reset".

123456 reset

Xcom-SMS
- cmd reset: success
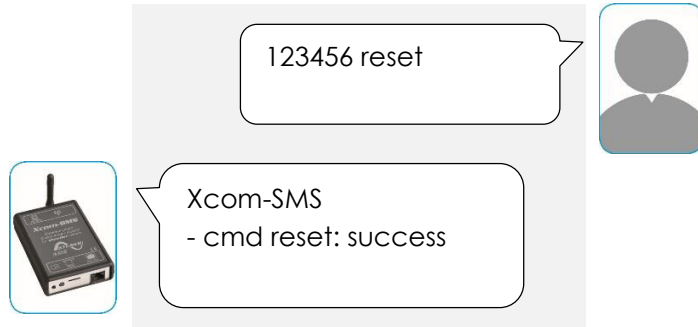
This function can also be made through the Xcom Configurator. It is sufficient to tick the box "Reset configuration" during the creation of the configuration file. When you tick this box you will no longer be able to modify the other parameters.
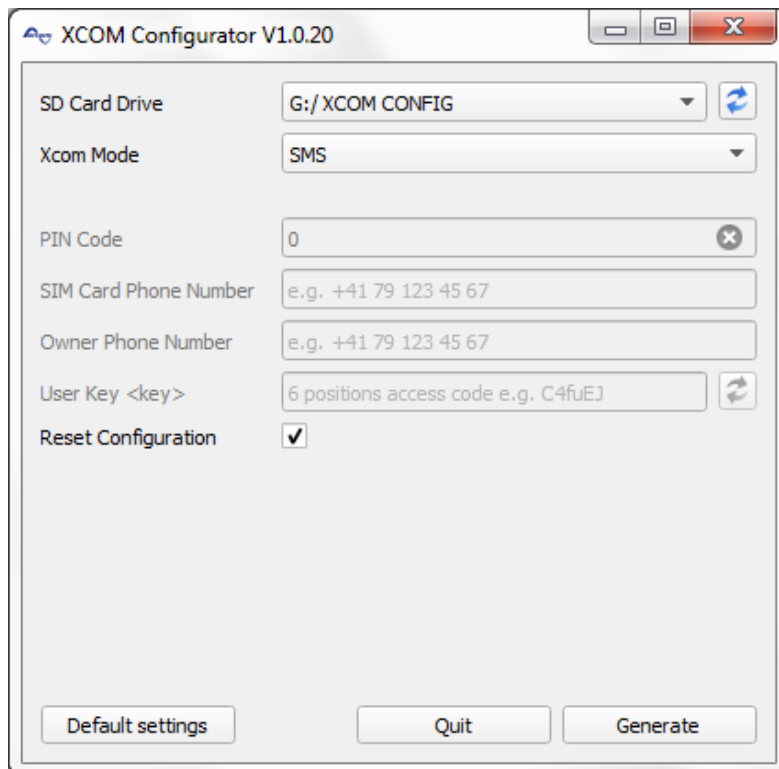
7.5 OPERATING REPORT BY SMS

The Xcom-SMS module has the possibility to generate and send operating reports from the system. This way you could know the state of your batteries, the input and output power of your system as well as the state of the auxiliary relays.

There are two types of reports: one condensed "short" report and one detailed "long" report. It is not possible to configure the contents of the two types of report.

Several users (up to 8) may subscribe to each of these reports. The sending of each report may even be defined with a specific SMS. All subscribers will receive their rapport at the same time, the same day.

By SMS it is possible to:
- Subscribe/ unsubscribe to the "short" or the "long" report service
- Define which days of the week as well as the time each report will be sent.
- Ask to receive one of the two reports immediately without being part of the mailing list.
- Ask to receive the mailing list to both types of reports

7.5.1 Contents of the report

Both reports contain more or less the same information. However, the "short" report presents the information in a brief way whereas the "long" report presents the same information in a much more detailed way (with details of each device within the system).

The following information will be found in the reports:
- State of the system (on/off)
- State of the battery (SOC, temperature, etc.)
- The input and output power of your system
- The energy input and output of your system
- The PV voltage of your system
- State of the auxiliary relays of the Xtenders

ⓘ	Sending a "long" report (indicated as r2 in the commands as from now) demands several SMS from the telephone network's point of view. As a matter of fact the message can contain up to 1600 characters for a large system (>20 devices). The cost for sending such a message may reach the cost of 10 SMS. For a mid-size system (<10 devices) the report may require 3 to 5 SMS.

7.5.2 Subscribe/Unsubscribe to reports

This command makes it possible to subscribe or unsubscribe to one of the two reports. The user that subscribes to this service will automatically receive the selected operating report in accordance with the sending configuration. A user that unsubscribes to this service will no longer receive the operating report.

Format: **report (<n>) <state> <tel>**

(<n>)   Optional
             Report identifier based on this format:
             r1 :   rapport 1 ("short")
             r2 :   rapport 2 ("long")
             If not specified the report 1 ("short") is used by default

<state>   Mandatory
                 Activate or deactivate state based on this format:
                 on :   subscribe
                 off :   unsubscribe

<tel>   Mandatory
                 A phone number with country code (max. 15 digits)
                 Ex. Country code for Switzerland preceded by +:   +41791234567
                 Ex. Country code 00 for Switzerland: 0041791234567

Example of commands to subscribe/ unsubscribe to reports:

Command	Functioning of the Xcom-SMS
report on +41791234567	The operating report by default (r1 => "short") will automatically be sent to phone number +41791234567
report r1 on +41791234567	The operating report by default (r1 => "short") will automatically be sent to phone number +41791234567
report r2 on +41791234567	The operating report by default (r2 => "long") will automatically be sent to phone number +41791234567
report off +41791234567	The operating report by default (r1 => "short") will no longer be automatically sent to phone number +41791234567
report r1 off +41791234567	The operating report by default (r1 => "short") will no longer be automatically sent to phone number +41791234567
report r2 off +41791234567	The operating report by default (r2 => "long") will no longer be automatically sent to phone number +41791234567

Example of SMS to subscribe to the report by default (r1 => "short")

123456 report on +41791234567

Xcom-SMS
- cmd report: r1 subscribe +41791234567

Example of SMS to unsubscribe to the report by default (r1 => "short")

123456 report off +41791234567

Xcom-SMS
- cmd report: r1 unsubscribe
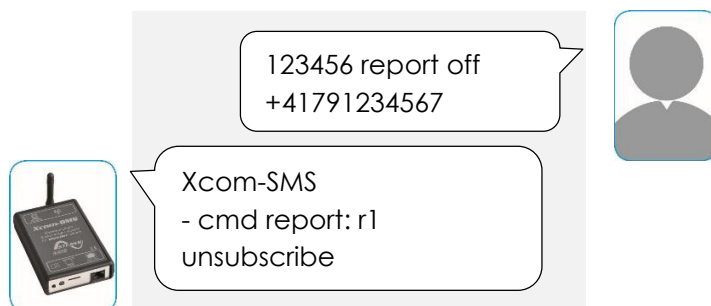
Example of SMS to subscribe to
the rapport r2 ("long")

123456 report r2 on
+41791234567

Xcom-SMS
- cmd report: r2 subscribe
+41791234567
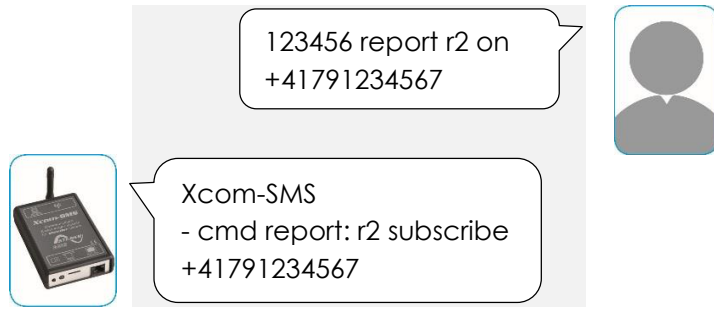
Example of SMS to unsubscribe
to rapport r2 ("long")

123456 report r2 off
+41791234567

Xcom-SMS
- cmd report: r2
unsubscribe
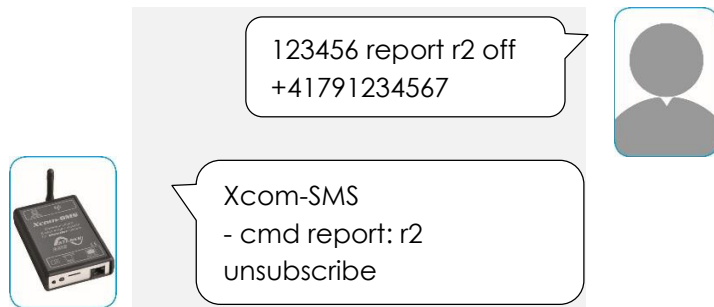
7.5.3 Configuration of sending the operating report

The contents of the operating reports are fixed. However, the time and days on which these reports are sent can be configured using the following command.

Format: **report (<n>) <day>(,<day>)(,<time>)**

(<n>)   Optional
            Report identifier, based on this format:
            r1:   report 1 ("short")
            r2:   report 2 ("long")
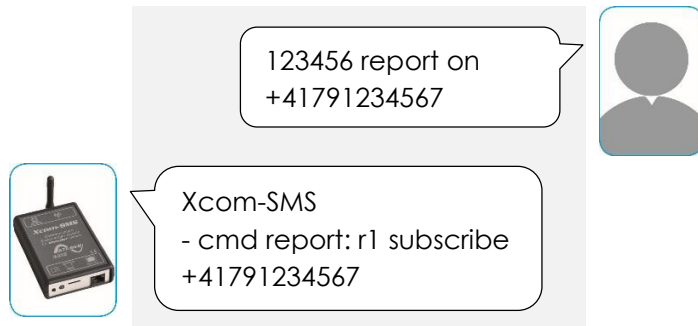   If not specified, report 1 ("short") is used by default

<day>   At least 1
            Weekdays, based on this format:
            mo: Monday
            tu: Tuesday
            we: Wednesday
            th: Thursday
            fr: Friday
            sa: Saturday
            su: Sunday

<time>   Optional
            A specific hour during the day based on this format: hh:mm
            If not specified, 12:00 is used as default value <time>

Example of command for configuration of sending the operating report:

Command	Functioning of the Xcom-SMS
report mo,we,fr,sa,su	A report is sent every Monday, Wednesday, Friday, Saturday and Sunday at 12:00 (default value) to all subscribers
report mo,we,fr,sa,su,10:30	A report is sent every Monday, Wednesday, Friday, Saturday and Sunday at 10:30 to all subscribers

Example of SMS to configure
the time and day of sending
the report

123456 report
mo,we,fr,sa,su,19:30

Xcom-SMS
- cmd report: r1
configuration success

7.5.4 Receive a list of subscribers to the report

This command makes it possible to receive a list of all subscribers to a report. This way it is possible to know who receive which report. This command is very convenient when the administrator of a system does not know which users are subscribed to which report.

Format: **report (<n>) on ?**

(<n>)   Optional
               Report identifier based on this format:
               r1:   report 1 ("short")
               r2:   report 2 ("long")
               If not specified the report 1 ("short") is used by default

Example of command to receive a list of subscribers to the report:

Command	Functioning of the Xcom-SMS
report on ?	Sends the subscribers list to the report by default (short)
report r1 on ?	Sends the subscribers list to the short report
report r2 on ?	Sends the subscribers list to the long report

Example of SMS to receive the
list of subscribers to the long
report

123456 report r2 on ?

Xcom-SMS
- cmd report: r2
subscribers =
+41791234567
+41781122338

7.5.5 Receive a report instantly

This command sends the required operating report instantly to the user. The module only sends the report to the sender of the SMS.

Format: **report (<n>) ?**

(<n>)   Optional
               Report identifier based on this format:
               r1:   report 1 ("short")
               r2:   report 2 ("long")
               If not specified the report 1 ("court") is used by default

Example of commands to receive a report instantly:

Command	Functioning of the Xcom-SMS
report ?	Sends the report by default (short) instantly to the sender of the SMS
report r1 ?	Sends the short report instantly to the sender of the SMS
report r2 ?	Sends the long report instantly to the sender of the SMS

Example of SMS to receive a report instantly.

123456 report?

Report
System:
 ON
Battery:
 44%,25C
Power max kW:
 in=...
 out=...
...

Example of SMS to receive the long report instantly.

123456 report r2 ?

Report
System state:
 XT L1=ON
 VT=ON
 ...
Battery (min,max):
 Cycle=Bulk
 U=12.0V(11.9,12.1)
 ...
Power max kW:
 XT In L1=...
 XT Out L1=...
Energy kWh:
 XT In L1=...
 XT Out L1=...
 ...

7.6 EVENT BASED SMS

The components of your system indicate when various events occur by sending messages. With the Xcom-SMS it is possible to select specific events to be informed about via SMS. You could for instance be notified when the battery is discharged.

The messages are classified in categories. You can chose to receive messages by category or target a certain type of message.

There are four different types of messages:
* **Notification:** general information on the functioning of the system
* **Alarm:** an event that may cause the system to malfunction or to shut down if not resolved soon
* **Error:** a function of the system has been deactivated
* **Halted:** The system had to be stopped as a major event is preventing its operation.

You will find the complete list of events as well as their category in the "RCC-02/-03 Quick guide" available as .pdf on your SD card.

By default the Xcom-SMS sends all messages from the categories error and halted.

Several users (up to 8) can subscribe to the event service. They will all receive the same messages at the same time.

By SMS, it is possible to:

* Subscribe/unsubscribe to events.
* Configure the sending of SMS by category.
* Configure the sending of SMS for one or many specific events.
* Receive the list of subscribers to events
* Receive the list of events for which sending is authorised.

7.6.1 Subscribe/Unsubscribe to events

This command makes it possible to subscribe or unsubscribe to events. The user that subscribes to this service will automatically receive an SMS for each event that happens at the system.

Format: **event <state> <tel>**

<state>   Mandatory
                 Active or deactivated
                 on: subscribe
                 off: unsubscribe

<tel>   Mandatory
                 A phone number with country code (max. 15 digits)
                 Ex. Country code for Switzerland preceded by +:   +41791234567
                 Ex. Country code 00 for Switzerland: 0041791234567

Example of command subscribe/unsubscribe to events:

Command	Functioning of the Xcom-SMS
event on +41791234567	The events that occur on the system will be sent automatically by SMS to phone number: +41791234567
event off +41791234567	The events that occur on the system will no longer be automatically sent by SMS to phone number: +41791234567

Example of SMS to subscribe to events.

123456 event on
+41791234567

Xcom-SMS
- cmd event: subscribe
+41791234567

Example of SMS to unsubscribe to events.

123456 event off
+41791234567

Xcom-SMS
- cmd event: unsubscribe
+41791234567

7.6.2 Sending events by category

This command makes it possible to configure the sending of events occurred at the system by category (see chapter 7.6).

Format: **event <category>=<state>(,<category>=<state>)**

<category>   At least 1
Event categories:
ntf: notification
wrn: warning
err: error
hlt: halted

<state>   At least 1
Indicate whether to receive events of this category or not, 2 possible values:
on: activated category
off: deactivated category

Example of "event" commands for configuration by category:

Command	Functioning of the Xcom-SMS
event ntf=on,wrn=on,err=on,hlt=on	For every event that occurred on the system an SMS will be sent to the subscribers.
event ntf=off,wrn=off,err=off,hlt=off	No SMS will be sent to the subscribers no matter what events occur at the system.
event ntf=off,wrn=off,err=on,hlt=on	Events within the categories "error" or "halted" that occurred on the system will be sent by SMS to the subscribers.
event ntf=on	Sends an SMS when an event in the category "notification" occurs. It does not change the configuration of events in other categories.

Example of SMS to configure the sending of SMS for events by category.

> 123456 event
> ntf=off,wrn=off,err=on,hlt=on

> Xcom-SMS
> - cmd event: configuration
> by category ntf=off
> wrn=off err=on hlt=on

7.6.3 Sending events by number

Regardless of the event categories you have chosen to subscribe to it is possible to add or remove specific events by number. You may choose to remove events that are not interesting to you within a category, for instance within the error category even though you have chosen to receive messages from this category.

Format: **event <num>=<state>(,<num>=<state>)**

<num>   At least 1
                Number of events affected by <state>
                The quantity of event numbers are limited to 10.

<state>   At least 1
                Indicates the state of an event, 2 possible values:
                on: event active
                off: event deactivated

Example of command "event" for configuration by number:

Command	Functioning of the Xcom-SMS
event 9=off,10=on,100=on,13=off	If error numbers 9 or 13 occur on the system, no SMS will be sent. An SMS will be sent if error 10 or 100 occur on the system.

Example of SMS to configure the sending of SMS based on events numbers.

> 123456 event
> 9=off,10=on,100=on,13=off

> Xcom-SMS
> - cmd event: configuration
> by num 9=off 10=on
> 100=on 13=off

7.6.4 Receive the list of event subscribers

This command makes it possible to receive the list of event subscribers. It is thus possible to know who receives which kind of event messages. This command is useful for the administrator of a system to keep track of which users receive event information.

Format: **event on ?**

Example of a "report" command to receive a list of event subscribers:

Command	Functioning of the Xcom-SMS
event on ?	Sends a list of subscriptions to the event service

Example of SMS to receive a list
of event subscribers.

123456 event on ?

Xcom-SMS
- cmd event:
subscribers =
+41791234567
+41781122338

7.6.5 Receive the state of transmission of events

There are more than 200 events that may occur on your Studer system. It is possible to request the state of transmission of events using the following command.

Format: **event ?**

The reply to this command is a long SMS with a list of "0" and "1". Each position represents an event. The events are listed in groups of ten events. If a position is set to "1", this indicate that if the corresponding event occurs on the system an SMS will be sent.

Example of SMS to receive the
state of transmission of events.

123456 event ?

Xcom-SMS
- cmd event: get
0 to 9:
0000000011
10 to 19:
0000111001
20 to 29:
1011011111"
30 to 39:
1111101000
40 to 49:
0110000000
...

> Sending the state of transmission of events requires several SMS from a phone operator's point of view. As a matter of fact this message will require approximately 500 characters. The cost for sending such a message is equivalent of 3 to 4 SMS, independently of the size of the system.

7.7 STATE ON / OFF OF A DEVICE

It is possible to change the state ON/OFF of the devices of your Xtender system by SMS. You may also receive their state.

7.7.1 Turn ON / OFF a device

This command makes it possible to turn on or turn off a device remotely by SMS depending of its type. All devices of the same type will receive the same command and have the same state once the command is executed.

Format: **sys <device>=<state>(,<device>=<state>)**

<device>   At least 1
            Device to be turned on or turned off based on the following format:
            xt: Xtender
            vt: VarioTrack
            vs: VarioString
            all: all of the above listed devices
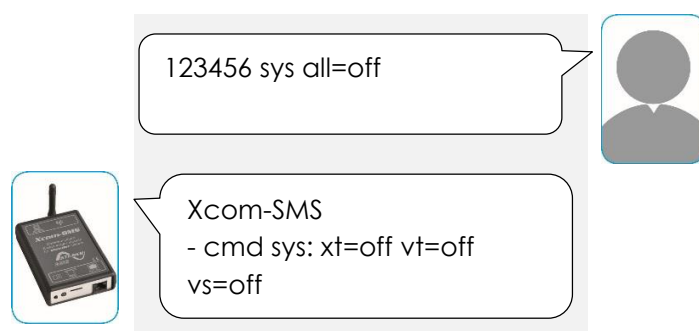
<state>   At least 1
            off: turn off
            on: turn on

Examples of "sys" commands:

Command	Functioning of the Xcom-SMS
sys xt=on	Turns on all Xtenders in the system
sys vt=off	Turns off all VarioTracks in the system
sys vs=on, xt=off	Turns on all VarioStrings and turns off all Xtender in the system
sys all=on	Turns on all Xtenders, all VarioTracks and all VarioStrings in the system
sys all=off	Turns off all Xtenders, all VarioTracks and all VarioStrings in the system

Example of SMS to turn on devices in the system.

123456 sys xt=on

Xcom-SMS
- cmd sys: xt=on
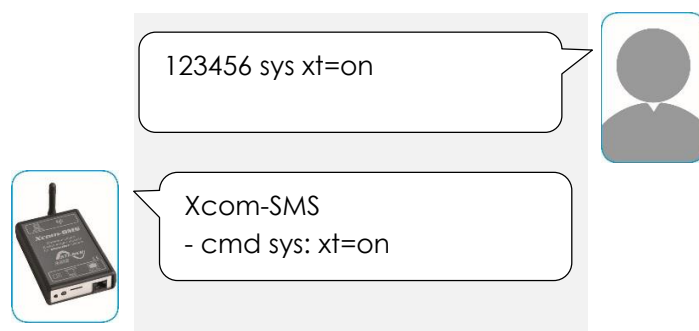
Example of SMS to turn off devices in the system.

123456 sys all=off

Xcom-SMS
- cmd sys: xt=off vt=off vs=off

7.7.2 Receive the state ON / OFF for a device

This command will send you the state ON / OFF for each type of device in your system. The returned state indicates the state of the master of a specific product group.

Format: **sys ?**

Examples of "sys" commands:

Command	Functioning of the Xcom-SMS
sys ?	Returns the state of the master of each product type in the system

Example of SMS to receive the state ON / OFF of the different product types in your system.

123456 sys ?

Xcom-SMS
- cmd sys: xt=on vt=off
vs=on
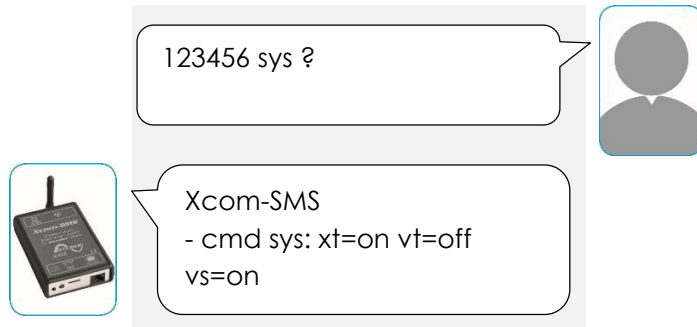
7.8 COMMANDS OF THE XTENDER'S AUXILIARY RELAYS BY SMS

The auxiliary relays of your Xtenders are normally set by specific programing of the parameters. With the following command you may control the relays without using parameters, which makes it easier to use.

By using this command you may remotely control the start-up of additional loads such as a heating system, an air conditioner or any other device that can be cabled using the auxiliary relays.

⚠	Turning on and off loads from a distance should always be made knowingly and with the assurance that there is no inherent risk.
⚠	In a system with several appliances of the same kind, all relays with the same index (AUX 1, AUX 2) are controlled at the same time.

Format: **relay <num>=<state>**

<num>   Mandatory
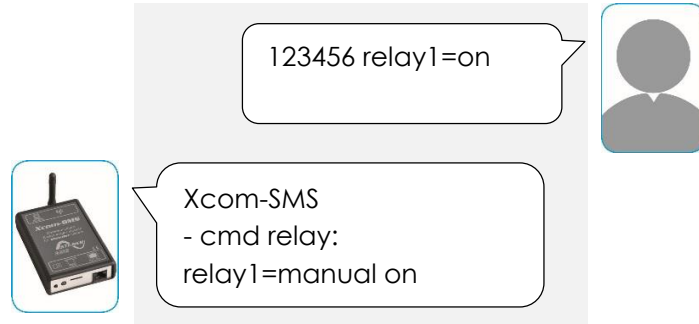   Index of the relay to control, 2 possible values:
                1:      auxiliary relay 1
                2:      auxiliary relay 2

<state>   Mandatory
                State of the relay, 4 possible values:
                off: deactivated
                on: activated
                auto: automatic
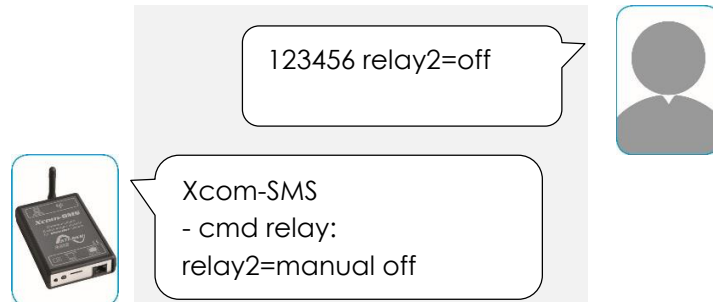   inv: automatic reversed

Examples of "relay" commands:

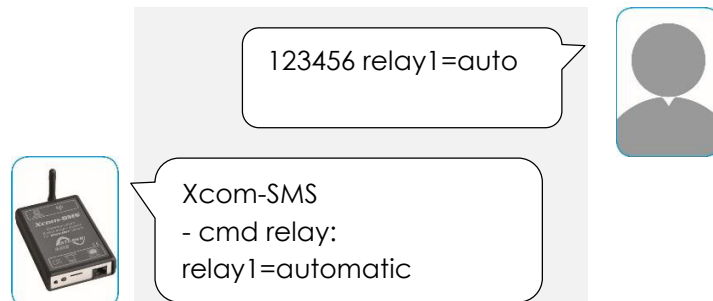| Command	Functioning of the Xcom-SMS
relay 1=on	Activates the auxiliary relay 1
relay 2=off	Deactivates the auxiliary relay 2
relay 1=auto	Auxiliary relay in automatic mode
relay 2=inv	Auxiliary relay in automatic reversed mode

Example of SMS to activate the auxiliary relay 1.

123456 relay1=on

Xcom-SMS
- cmd relay:
relay1=manual on

Example of SMS to deactivate the auxiliary relay 2.
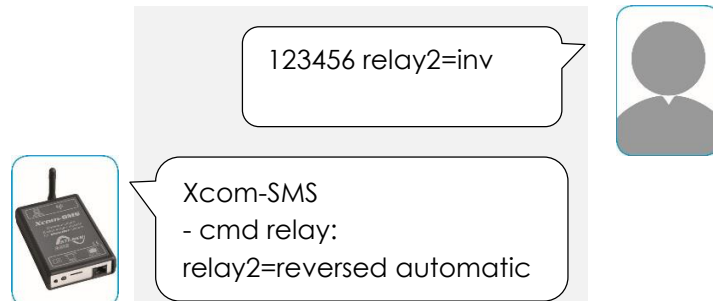
123456 relay2=off

Xcom-SMS
- cmd relay:
relay2=manual off

Example of SMS to configure the auxiliary relay 1 in automatic mode.

123456 relay1=auto

Xcom-SMS
- cmd relay:
relay1=automatic

Example of SMS to configure the auxiliary relay 2 in reversed automatic mode.

123456 relay2=inv

Xcom-SMS
- cmd relay:
relay2=reversed automatic

7.9   ACCESS TO THE SYSTEM'S PARAMETERS BY SMS

It is possible to access the parameters of your system by SMS. There are two available commands: one to write one or several parameters and one to read one or several parameters. These are two separate commands. It is not possible to write and read parameters with the same SMS.

For both commands the maximal number of parameters is 10.

7.9.1 Writing parameters

Your system function with a number of parameters of which most are adjustable. This command makes it possible to change (write) one or several of the system's parameters.

If you try to change a parameter which is not accessible with the Xcom-SMS, you will receive an error message from the communication module Xcom-SMS (for example the parameter 5012).

In a system with several devices, changing a parameter is valid for all devices. A complete list of parameters is available in the RCC-02/-03 Quick guide (pdf-file on the supplied SD card).

i	In cases where the activation of a parameter will enable the execution of a function on a device, the format is somewhat unusual. In the manuals, these parameters don't have a possible value. (For example Xtender parameter 1142: force a new cycle). In order to activate the parameter's function you have to write "1" for this specific parameter.

Format: **param <num>=<value>(,<num>=<value>)**

<num>   Parameter number (see the RCC-02/-03 Quick guide in .pdf available on the micro SD card)

<value>   Assigning a value to a parameter, respecting its specific format.

The number of parameters <num>=<value> is limited to 10.

Example of "param" commands:

Command	Functioning of the Xcom-SMS
param 1138=50	Limits the Xtender's battery charge current to 50 Adc.
param 1552=rapid, 1126=no	Sets the kind of network loss detection (AC-In) to "rapid" and prohibits Smart-boost on the Xtenders.
param 1142=1	Force a new battery cycle on the Xtenders.

Example of SMS changing three parameters successfully.

123456 param 1138=50, 1552=rapid, 1126=no

Xcom-SMS P1138:ok, P1552:ok, P1126:ok

Example of SMS changing three parameters with error and the corresponding reply.

123456 param 1138=50, 1552=rapide, 1126=n

Xcom-SMS P1138:ok, P1552:ok, P1126:Error (193): Invalid value

7.9.2 Reading parameters

This command makes it possible to receive (read) one or several parameter values of your system.

Format: **param ? <num>(,<num>)**

<num>   At least 1, maxi 10
                    Parameter number (see the RCC-02/-03 Quick guide in .pdf available on the micro
                    SD card)
The maximum number of parameters <num> is limited to 10.
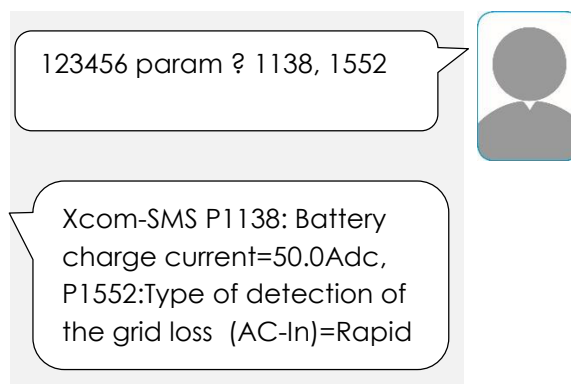
Example of "param" commands:

Command	Functioning of the Xcom-SMS
param ? 1138	Indicates the Xtender's battery charge current limit
param ? 1552, 1126	Indicates the kind of network loss detection (AC-In) and the state of the Smart-Boost.

Example of SMS reading two parameters successfully.

123456 param ? 1138, 1552

Xcom-SMS P1138: Battery charge current=50.0Adc, P1552:Type of detection of the grid loss (AC-In)=Rapid

7.10 ACCESS TO THE SYSTEM'S USER INFORMATION BY SMS

Your system constantly uses electrical quantities and diverse information for its operation which is called "user information". With the Xcom-SMS you can access those at any time, for instance to find out the current state of charge of your battery.

7.10.1   Reading user information

This command makes it possible to read one or several user information from the system.

Format: **info ? <num>(,<num>)**

<num>   At least 1, maximum 10
   Information number to read (see the RCC-02/-03 Quick guide in .pdf available on
                    the micro SD card)

Maximum number of <num> is limited to 10.

Example of "info" commands:

Command	Functioning of the Xcom-SMS
info ? 3028	Reads the Xtender's operating mode
info ? 3000, 3005	Reads the Xtender's battery voltage and battery current.

Example of SMS reading one user information successfully.

> 123456 info ? 3028

> Xcom-SMS
> I3028:Mode=Charger
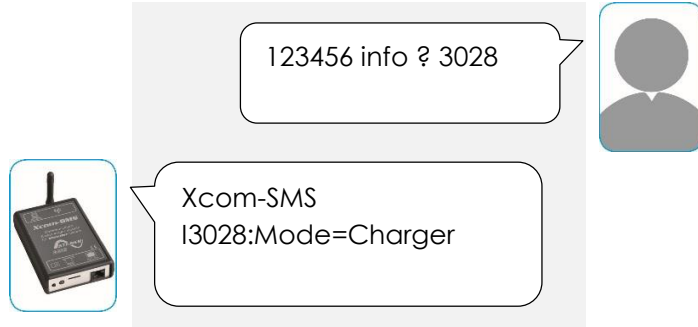
Example of SMS reading two user information successfully.

> 123456 info ? 3000, 3005

> Xcom-SMS
> I3000:Ubat=14.2Vdc,
> I3005:Ibat (m)=10.3Adc
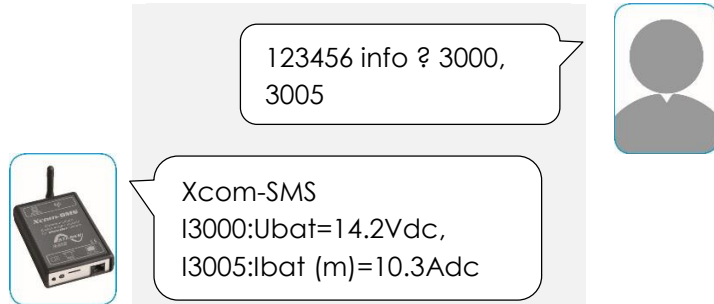
7.11 ASK FOR HELP

It is possible to ask for help from the Xcom-SMS module. This help is given in form of a list of commands supported by the module.

Format: **help**

Example of SMS to read 1 user information successfully.

Command	Functioning of the Xcom-SMS
123456 help	
	Xcom-SMS - cmd help : available commands are help, etc.

Example of SMS to read one user information successfully.

> 123456 help

> Xcom-SMS
> - cmd help : available commands are help, reset, newkey, initkey, sys, lang, smsrsp, report, relay, event, param, info
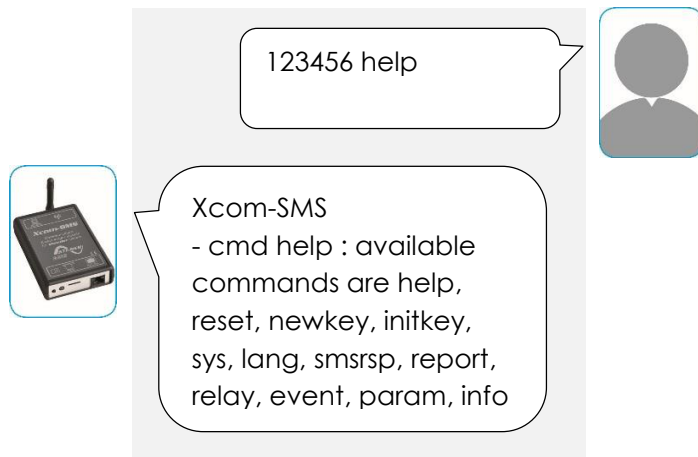
8   CHANGING SIM CARD

If for any reason you need to change the SIM card, please follow the procedure below:

1. Disconnect the Xcom-SMS module from the Xtender system

2. Remove the micro SD card from the module and insert it into the computer

3. Re-run the Xcom Configurator, making sure that the PIN code is that of your new SIM card (see chapter 4.1)

4. Remove the micro SD card from your computer and insert it into your Xcom-SMS module

5. Remove the previous SIM card from your Xcom-SMS and insert the new SIM card

6. Re-connect the Xcom-SMS to the Xtender system

7. Wait until the end of start-up (LED (b) blinks in green 2x repeatedly)

9   TROUBLE-SHOOTING

There are different problems that may cause your Xcom-SMS to malfunction. This list gives you known irregularities and the procedures to follow to address them.

Symptom	Description
All LEDs are off	Your Xcom-SMS is not powered correctly. You need to : 1. Check that the module is correctly connected to your Xtender system with the appropriate cable (see chapter 3)
The module suddenly ceases to send SMS messages	If the module was functioning correctly and suddenly doesn't send any SMS messages, you need to: 1. Check the credit on your SIM card (either by internet or by help of a mobile phone in which you insert the SIM card of your Xcom-SMS) 2. Check the state of the phone network

If your Xcom-SMS module encounters a problem that it can identify, the signalisation LED (b) will start to blink red 2x repeatedly. It is an error that makes the communication by SMS impossible. If you have a remote control of type RCC-02/-03, you can see the error message explaining the origin of the problem. The following table summarize these error messages as well as how to address the problems.

User ref.	Description
-	The micro SD card has not been correctly configured If the micro SD card is not inserted or if it doesn't contain a correct configuration the Xcom-SMS will suspend the starting procedure and wait for a correct configuration. You need to: : 1. Disconnect the module from the Xtender system 2. Remove the micro SD card from the module and insert into a computer

	3. Re-run the Xcom Configurator, making sure that the PIN code is that of your new SIM card (see chapter 4.1).
	4. Remove the micro SD card from your computer and insert it into your Xcom-SMS module
	5. Re-connect the Xcom-SMS to the Xtender system
	6. Wait until the end of start-up (LED (b) blinks in green 2x repeatedly)
146	**No SIM card**
	There is no SIM card inserted into the Xcom-SMS and the module has no access to the GSM network.
	You need to :
	1. Insert a micro SD card into the Xcom-SMS
86	**Incorrect PIN code**
	The PIN code that you entered in the Xcom Configurator while configuring the micro SD card does not match the PIN code of the SIM card.
	You need to :
	1. Disconnect the module from the Xtender system
	2. Remove the micro SD card from the module and insert into a computer
	3. Re-run the Xcom Configurator, making sure that the PIN code is that of your new SIM card (see chapter 4.1)
	4. Remove the micro SD card from your computer and insert it into your Xcom-SMS module
	5. Re-connect the Xcom-SMS to the Xtender system
	6. Wait until the end of start-up (LED (b) blinks in green 2x repeatedly)
145	**Blocked SIM card**
	Your SIM card is blocked due to too many attempts to access it with the wrong PIN code.
	You need to :
	1. Disconnect the module from the Xtender system
	2. Remove the micro SIM card from your Xcom-SMS, insert it into a mobile phone and unblock it with the PUK code
	3. Check the configuration of your micro SD card (see incorrect PIN code of the SIM card here above) in order to make sure that it is the correct PIN code that was used in the Xcom Configurator
	4. Insert the SIM card (and the SD card) into the Xcom-SMS module
	5. Re-connect the Xcom-SMS to the Xtender system
	6. Wait until the end of start-up (LED (b) blinks in green 2x repeatedly)
88	**Impossible to connect to the GSM network**
	Your Xcom-SMS module can't connect to the GSM network. In this case it will tempt to connect indefinitely.

	You need to :
	1. Check the fixing of the antenna. It should be tightened manually.
	2. Check the network coverage with a mobile phone
	3. Change location of the Xcom-SMS until it can connect to the GSM network
	When the module is connected, the signalisation LED (b) blinks green 2x repeatedly.

10   ERROR MESSAGES IN RELATION WITH THE XCOM-SMS

If a command sent by the user is incorrect the Xcom-SMS will send an error message in return. Below you will find a list of error messages specific to the Xcom-SMS.

User ref.	Description
190	The Xcom-SMS is busy
191	Parameter not supported
192	Unknown reference
193	Invalid value
194	Value too low
195	Value too high
196	Writing error
197	Reading error
198	User level insufficient
199	No data for the report
200	Memory full

11 DATALOGGER

The communication module Xcom-SMS offers a function that allows recording many electrical values of your system over a long time.

With this function you can for instance follow the energy consumption and the battery voltage, or see the power cuts, the state of the auxiliary relays, the input currents and voltages, the output powers etc…

This enables you to work out statistics, to check the system operation or its sizing, to verify the loads behaviour, to anticipate or to detect failures.

11.1 FUNCTIONING

If the data logger is activated, a file is created at midnight every day on the SD card inserted in the Xcom-SMS. This file contains the data of the Xtender system components as well as the recordings of the system electrical values, minute after minute. The file is registered in CSV format that can be read by many types of software. The file name integrates the date of the measure in this form: LGyymmdd.csv. In case no SD card was inserted, the daily data will be lost.

Updating the software of the Xcom-SMS will result in the loss of the current day's data.

11.2 ANALYSIS AND VISUALIZATION OF THE DATA WITH THE XTENDER DATA ANALYSIS TOOL

Attached to this function, Studer Innotec offers free of charge an analysis tool in the form of a file type Microsoft® Excel® 2007 which allows reading specifically the CSV files generated by the remote control. This tool shapes and gathers the data of each Xtender and then displays them graphically. In this way the data become readable and understandable at a glance.

These files can be downloaded for free on www.studer-innotec.com/support.
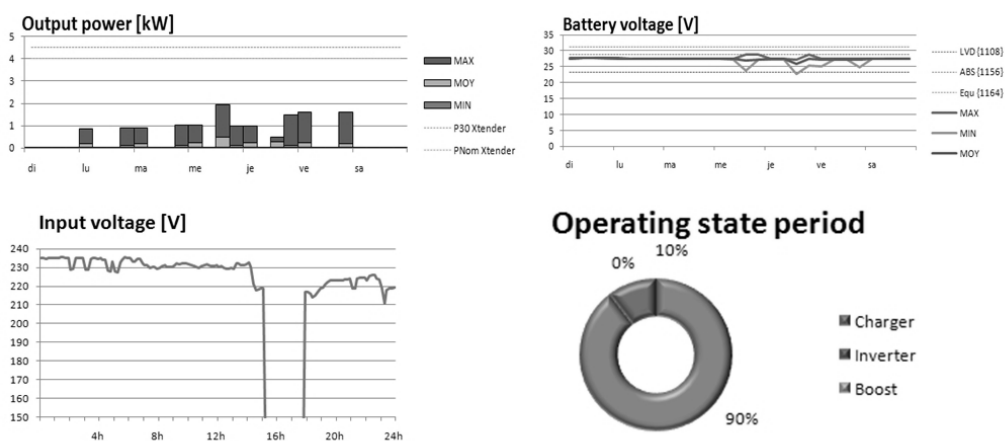
12   SOFTWARE(S) UPDATING

The software of the remote control RCC as well as the Xtender inverter/chargers, the communication module RS-232 (Xcom-232i), the Xcom-SMS and the battery monitor (BSP) can be updated in order that they integrate all new functionalities.

All software updates are available in the technical area of our website www.studer-innotec.com/support.

12.1 UPDATING PROCESS

ℹ	For more information about the updating process, please refer to the document "Updating procedure" available on: www.studer-innotec.com/support.

⚠	Remember to turn off all Xtenders (putting them on "off") before inserting the micro SD card to carry out an update. If not manually performed, the updating process will automatically stop all Xtenders connected to the communication bus.

To carry out an update, insert the micro SD card (containing the latest software version) in the Xcom-SMS module's micro SD card reader. Before starting the updating process, the system automatically checks the compatibility between the device and the software present on the micro SD card. The micro SD card must not be removed until the end of the updating process. If for some reason the updating process is interrupted, reinsert the SD card to let the process finish.
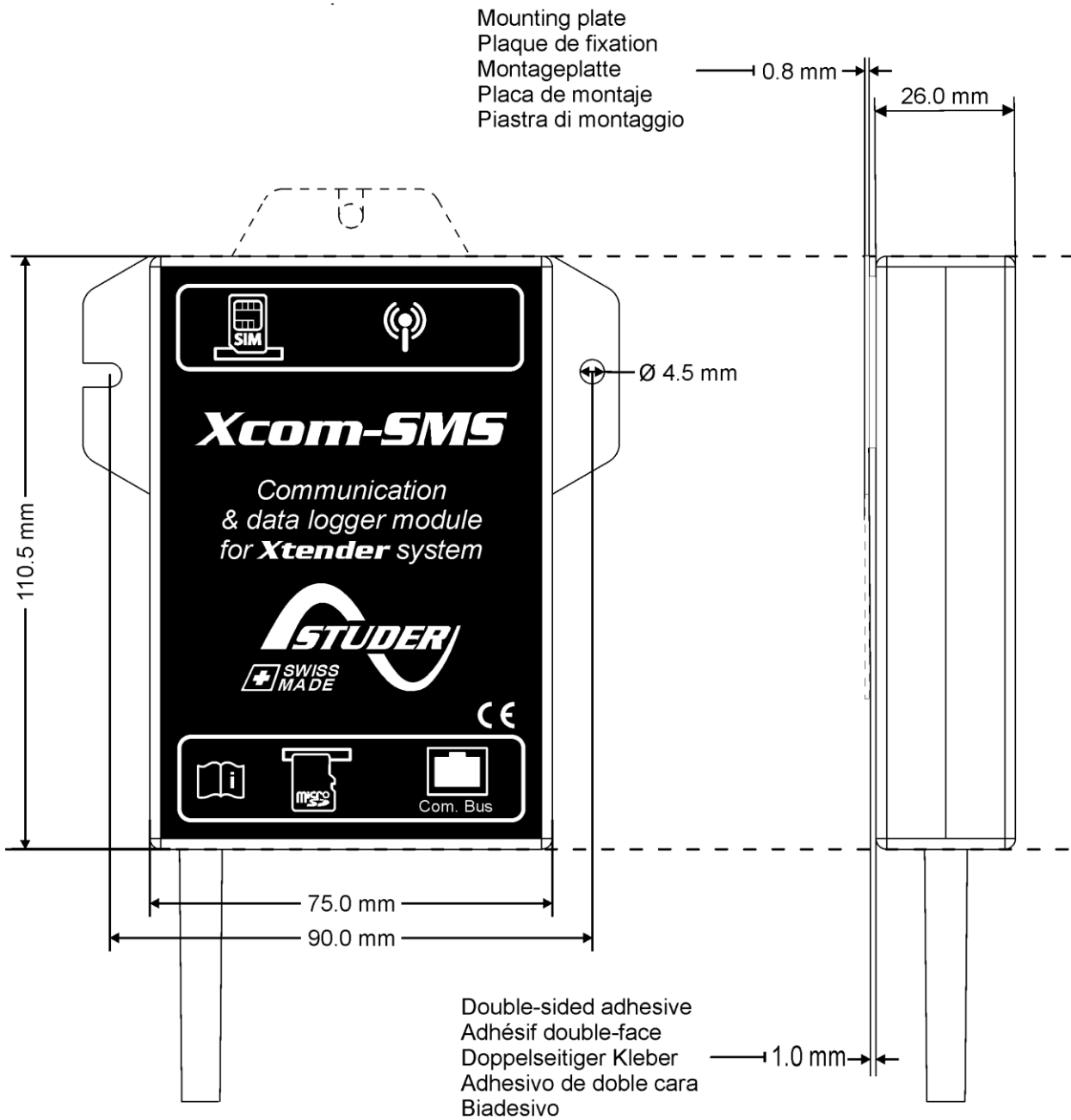
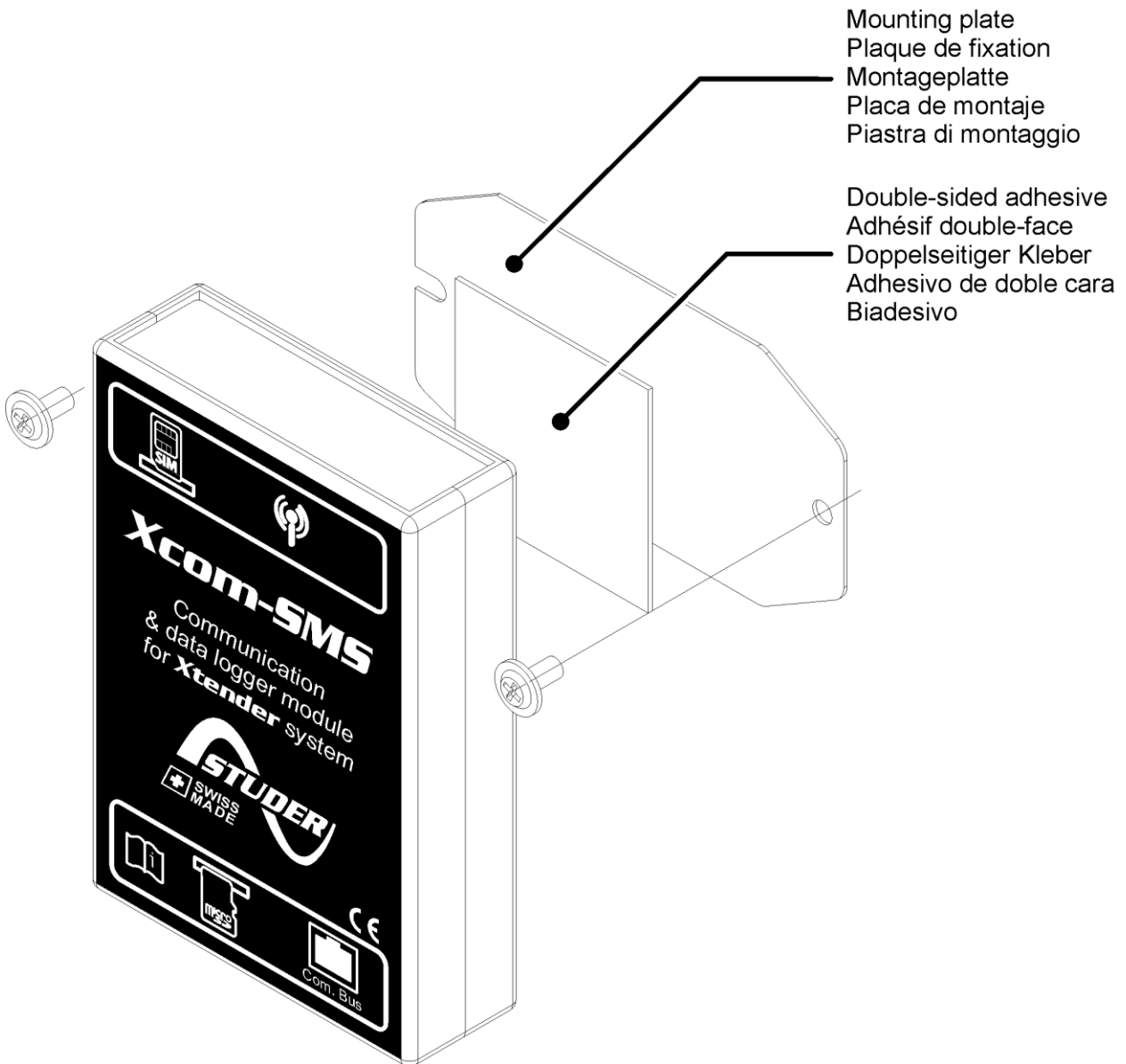|	
ℹ	The updating process can take between 3 and 15 minutes. During this period, it is possible that the signalisation LED does not respect exactly the cyclical ratio described. The updating is finished once the signalisation LED stops blinking red for at least 20 seconds.

ℹ	The updating of a remote control RCC-02/-03, Xcom-232i/-SMS/-LAN/-GSM must be done directly on the connected device.

13   DIMENSIONS

Mounting plate
Plaque de fixation
Montageplatte
Placa de montaje
Piastra di montaggio

0.8 mm

26.0 mm

Ø 4.5 mm

Xcom-SMS

*Communication
& data logger module
for **Xtender** system*

STUDER

SWISS MADE

CE

Com. Bus

110.5 mm

75.0 mm

90.0 mm

Double-sided adhesive
Adhésif double-face
Doppelseitiger Kleber
Adhesivo de doble cara
Biadesivo

1.0 mm

14 MOUNTING

Mounting plate
Plaque de fixation
Montageplatte
Placa de montaje
Piastra di montaggio

Double-sided adhesive
Adhésif double-face
Doppelseitiger Kleber
Adhesivo de doble cara
Biadesivo

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