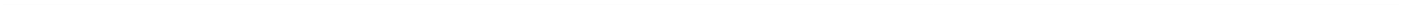


Communication module Xcom-232i

User Manual





Communication module Xcom-232i: User Manual

V1.0.2

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About the software

This document applies to the version of software V1.4.2 or higher of the Xcom-232i. It is possible to check the software with the menu "Information on the system" or update it with the latest version available on "www.studer-innotec.com/support".

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-232i conforms to the European directive 2002/95/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 the collection of electrical waste and observe all applicable obligations according to the place of purchase.

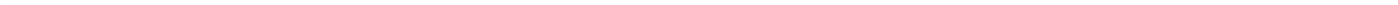


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1. Introduction

1.1. The communication module Xcom-232i

Equipped with a serial port RS-232, the communication module Xcom-232i was designed for the remote communication with any SCADA system¹. This module allows also the data logging (energy consumption of a system, state of the auxiliary relays, input currents and voltages, etc...) on a MicroSD card thanks to the function "Data logger".

1.2. Conventions

Symbols



This symbol is used to indicate the presence of a dangerous voltage that is sufficient to constitute a risk of electric shock.



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

Warranty and liability

During production and assembling, each Xcom-232i gets several controls and tests. They are carried out in full respect of fixed procedures. Each Xcom-232i 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 assembling and the tests of each Xcom-232i are entirely carried out in our factory in Sion (CH). The warranty of this product depends on strictly following the instructions in this manual. The warranty period for the Xcom-232i is 5 years from the date of manufacture.

Exclusion 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 tight during installation or maintenance.
- Damages due to atmospheric overvoltage (lightning).
- Damages due to transport or improper packaging.
- Disappearing of original marking items.

¹Supervisory Control And Data Acquisition

Exclusion of liability

Installation, commissioning, use and maintenance of this device can not be supervised by the company Studer Innotec SA. For this reason, we do not accept any liability for the damages, the costs or the losses generated either by an installation that is not conforming to the prescriptions, by a defectuous operation or by a 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.

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

Generalities

Do read carefully all safety instructions before proceeding to the installation and commissioning of the device. Not respecting these instructions might constitute a lethal physical danger but can also damage the functionalities of the device. Therefore do keep this manual close to the device.



Do, for any installation, follow strictly the local and national norms and regulations in force.

Warnings

- Wherever the installation, the person in charge of installation and commissioning must know perfectly the safety measures and the prescriptions in force in the country. Therefore, the whole maintenance must be carried out by a qualified staff.
- All components connected to this device must be conform to the laws and regulations in force. The persons without a written authorization from Studer Innotec SA are forbidden to do any change, modification or repair whatsoever. Regarding authorized modifications and replacements, only genuine components shall be used.
- This device is meant for a use only indoor and must under no circumstances stand in the rain, the snow or any other humid or dusty environment.
- In case of use in motor vehicles this device must also be protected against vibrations by absorbing components.

2. EC declaration of conformity

The communication module Xcom-232i described in this manual meets the requirements specified in the following EC directives and norms:

- Low voltage directive 2006/95/EC: EN 60950:2005
- EMC directive 2004/108/EC: EN61000-6-1:2005 and EN61000-6-3:2006
- RoHS directive 2002/95/EC



CH - 1950 Sion, November 2011

Studer Innotec SA (R.Studer)

A handwritten signature in black ink, appearing to read "R. Studer".

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3. Dimensions

3.1. Views of different sides with dimensions

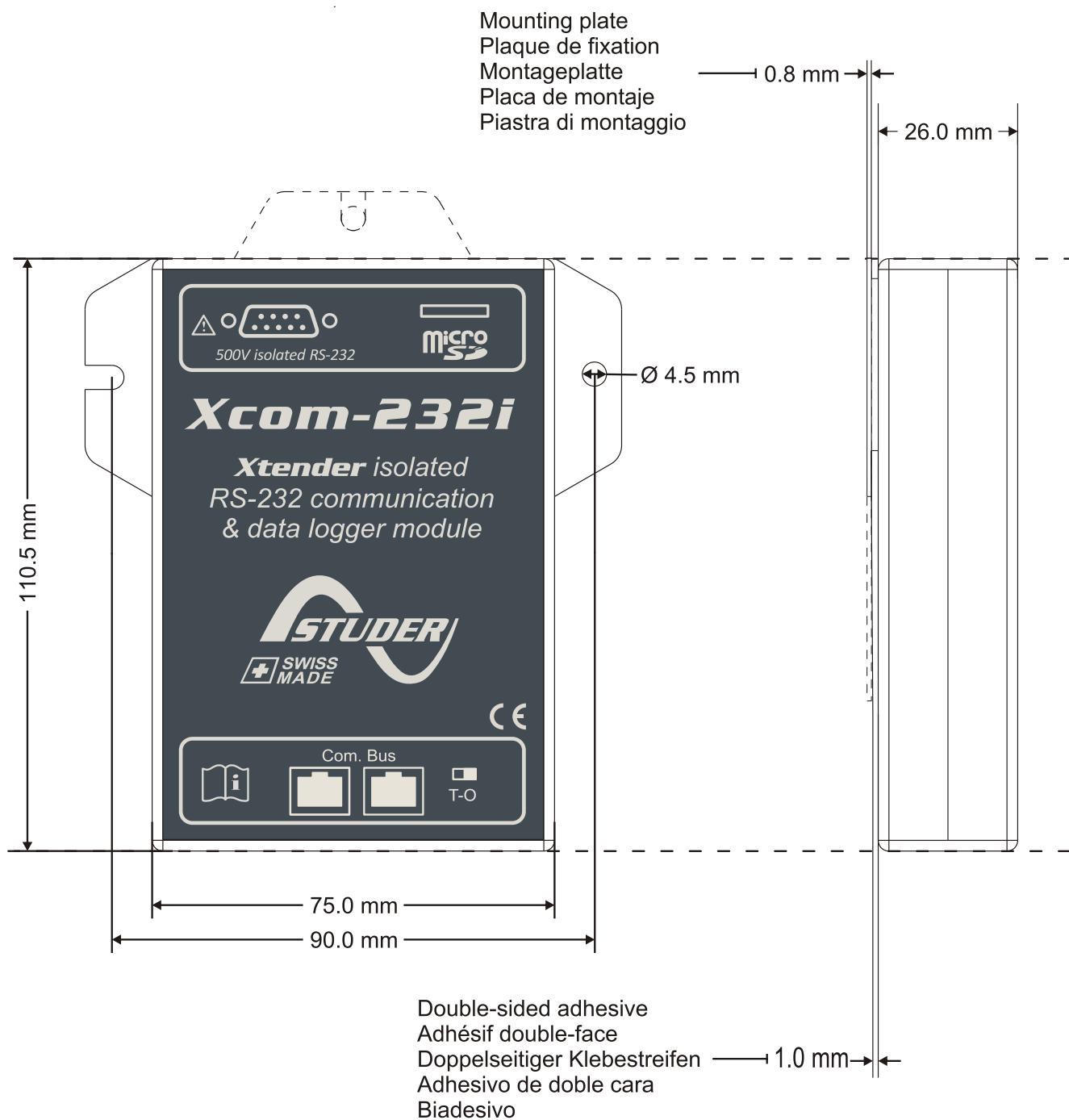


Figure 3.1. Views of different sides with dimensions

3.2. Exploded view

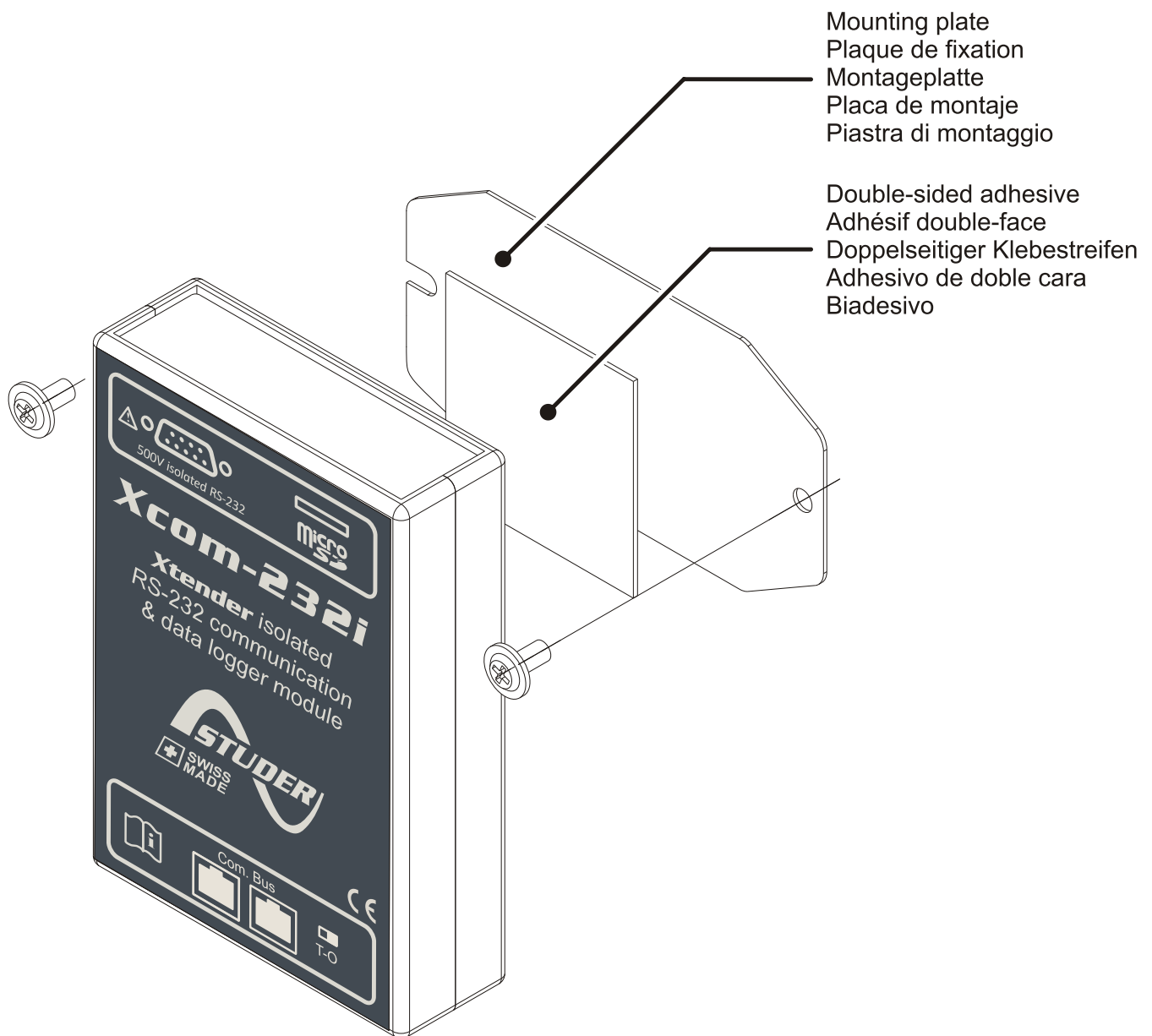


Figure 3.2. Exploded view

4. Installation

Due to the more restrictive limits of the connection RS-232 (compared to the connection on the Xtender communication bus), the Xcom-232i is meant for a mounting as close as possible to the supervision or SCADA control system (PC, programmable logic controller, microcontroller).

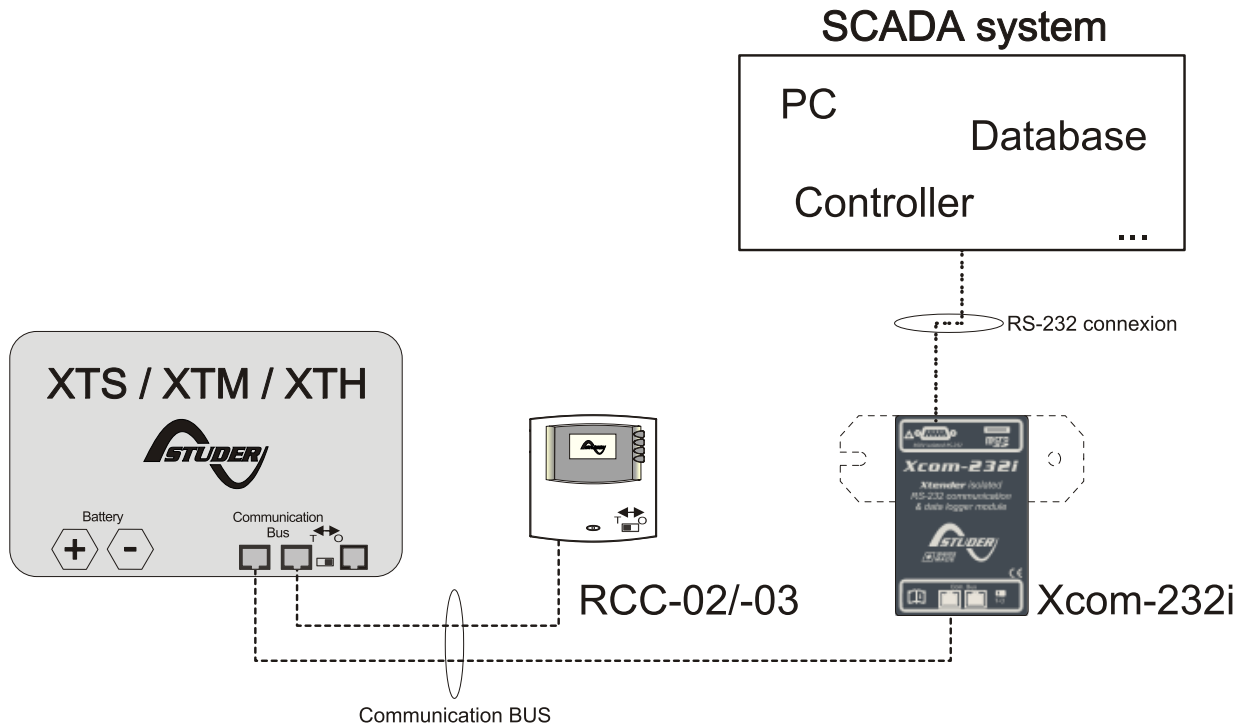


Figure 4.1. Connection schematics of the Xcom-232i (example 1)

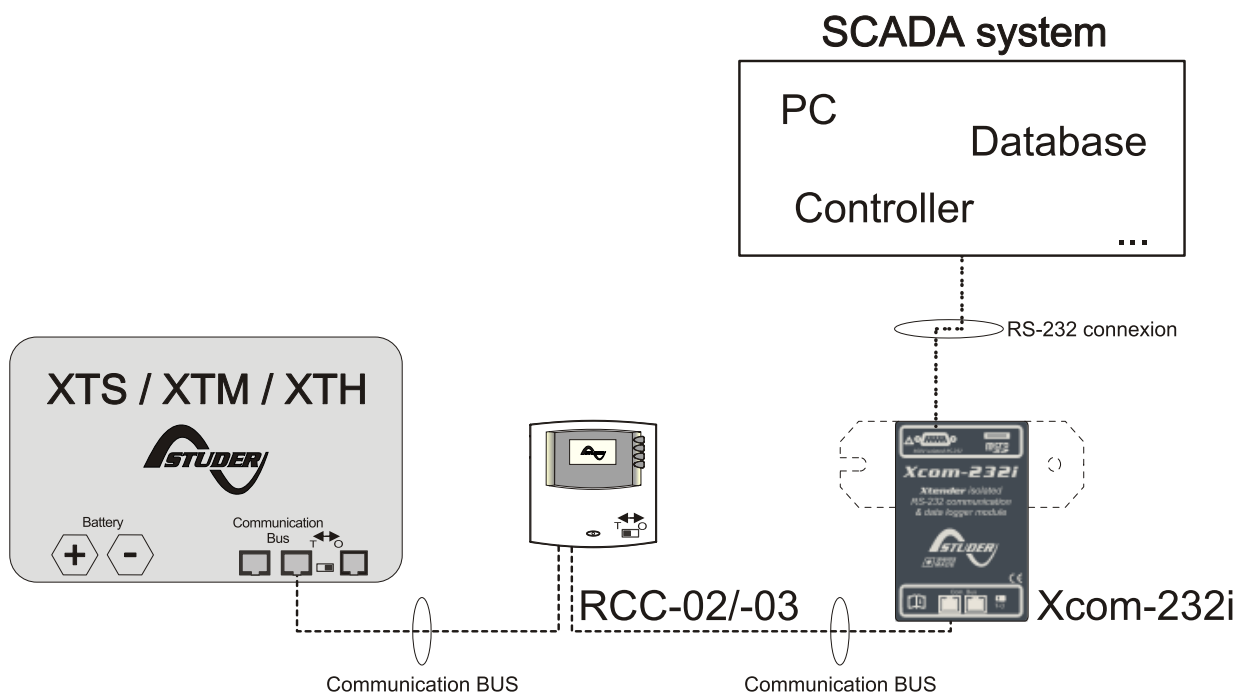


Figure 4.2. Connection schematics of the Xcom-232i (example 2)

4.1. Mounting

The Xcom-232i can be mounted directly on any support by means of the supplied fixing plate or on a bald surface with a double-side adhesive (see Figure 3.2 (p. 11)).

4.2. Connecting the communication bus

The devices of the Xtender range are equipped with a owned communication bus for data exchange, configuration and updating of the system. Connection is being made by linking the devices with the communication cables. One gets then a bus online where a linkend must be activated on the devices on each end, to obtain the configuration of the Figure 4.3 .

Each device is equipped with a switch offering to choose between open "O" or terminated "T". The devices at the end of the line must be set on "T". The others, receiving two communication cables, must be set on "O".



By default, the termination is not activated on each product of Studer Innotec SA.



A wrong setting of the linkends can lead to an erratic running of the installation or impede its updating.

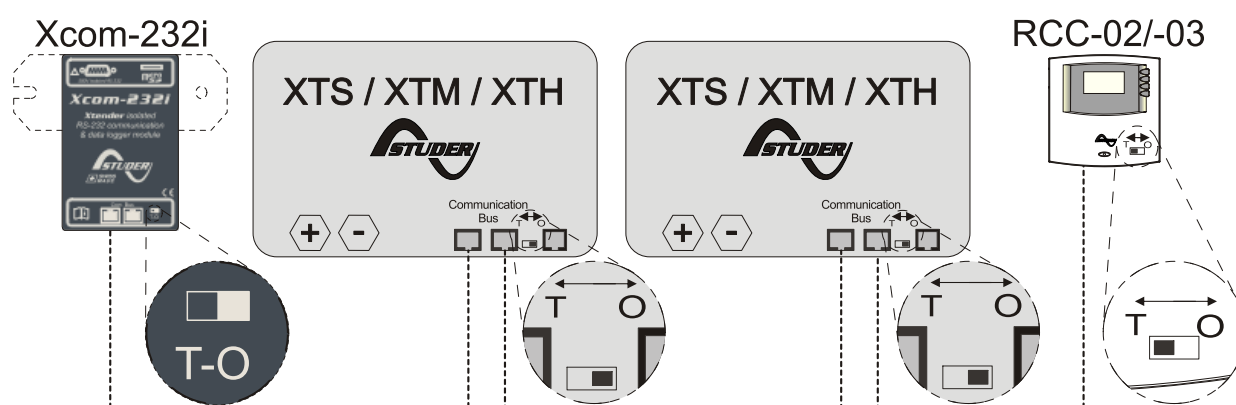


Figure 4.3. The communication bus on line of a system Xtender (example)

5. Description of the communication module Xcom-232i

The communication module Xcom-232i consists on its front and on its back of different parts with various functions. Here below, you will find the description of each part and of its function(s).

5.1. Front

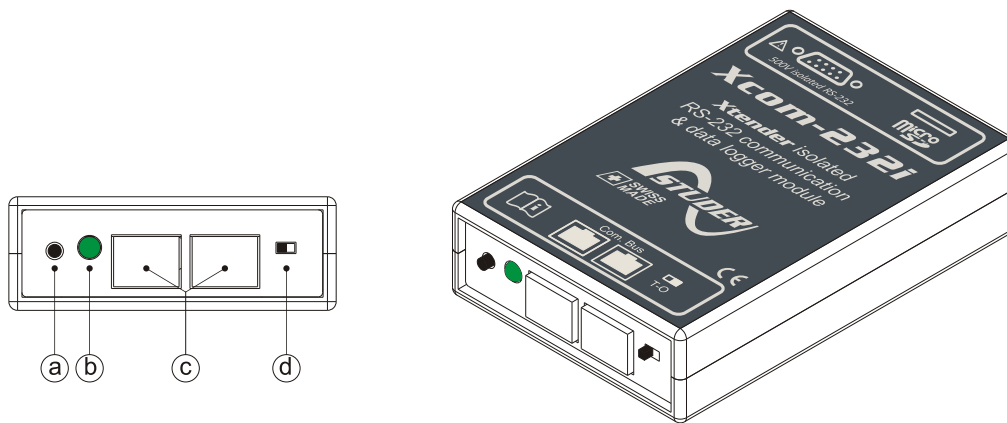


Figure 5.1. Front and isometric view of the Xcom-232i

Key	Description of the part	Description of the function
a	Push button	This button enables the activation/deactivation of the data logging function ¹ . The function is activated or deactivated by pushing the button more than 3 seconds. When the data logging function is activated, the signalisation LED (b) is continuously green.
b	Bicoloured signalisation LED	The signalisation LED has different functions each corresponding to a specific colour and blinking frequency. Here below the detail of each function. Update processing: Once the Xcom-232i is updated (after insertion of a MicroSD card containing the updating), the "red colour" signalisation LED blinks with a cyclical ratio of 50 % (Ton = 50 % Toff = 50 %). i The updating process can take between 3 and 15 minutes. During this period, it is possible that the signalisation LED does not meet exactly the cyclical ratio described above (Ton = 50% Toff = 50 %). The updating will be completed as soon as the the "red colour" signalisation LED stops blinking for at least 20 seconds.

Key	Description of the part	Description of the function
		Error during update or back up of the datalogger : - If the Xcom-232i detects an error, the "red colour" signalisation LED lights continuously (Ton = 100 % Toff = 0 %). MicroSD card full: - If the Xcom-232i detects that MicroSD card is full, the "red colour" signalisation LED blinks with a cyclical ratio of 10 % (Ton = 10 % Toff = 90 %). Data logging: - When the data logging function is activated, the "green colour" signalisation LED lights (Ton = 100% Toff = 0 %). Communication (via RS-232 connection): - When the communication via the RS-232 connection is active, the "green colour" signalisation LED blinks with a cyclical ratio of 20 % (Ton = 20 % Toff = 80 %). If many of the 3 states indicated by the "red colour" LED are coming up simultaneously, they will be displayed in the following priority order:  1) "Update processing"; 2) "Error during updating"; 3) "MicroSD card full". If many of the 2 states indicated by the "green colour" LED are coming up simultaneously, the "Communication" signal is reversed (Ton = 80 % Toff = 20%).
c	Connectors CAN	Connectors for the connection of Xcom-232i to one or several Xtenders.
d	Switch for the CAN termination	This switch allows to activate or not the the communication bus termination ⁱⁱ . The termination is activated by default on each product of Studer Innotec SA.

ⁱSee Chapter 7: "Data logger" (p. 18)

ⁱⁱSee Section 4.2: " Connecting the communication bus " (p. 13)

Table 5.1. Description of the communication module Xcom-232i - Front

5.2. Back

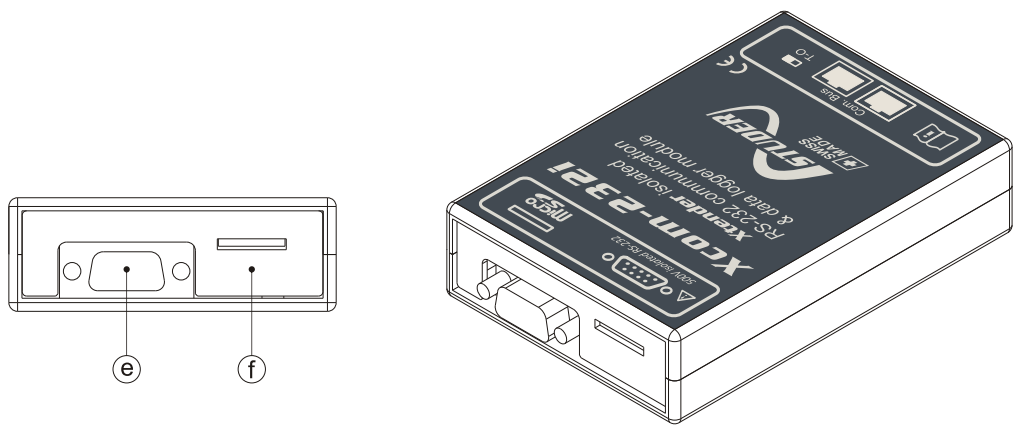


Figure 5.2. Back and isometric view of the Xcom-232i

Key	Description of the part	Description of the function
e	Connector RS-232	A cable RS-232 can be plugged to this connector and be used for the data transmission to systems SCADA ⁱ .
f	MicroSD card reader	Card reader for the insertion of a MicroSD card for the data logging ⁱⁱ or the system updates ⁱⁱⁱ .

ⁱSee Chapter 6: “The communication RS-232” (p. 17)

ⁱⁱSee Chapter 7: “Data logger” (p. 18)

ⁱⁱⁱSee Chapter 8: “Software(s) updating” (p. 19)

Table 5.2. Description of the communication module Xcom-232i - Back

5.3. MicroSD card

The Xcom-232i is equipped with a memory stick reader type MicroSD (Micro Secure Digital). This card, supplied with the Xcom-232i, allows among others:

- The updating of the whole system (Xcom-232i; Xtender; BSP)¹
- The restoring of parameters or settings
- The data logging



The system of card reading is guaranteed for the following types of cards:

- MicroSD and MicroSD HC

But it is incompatible for these types of cards:

- MicroSD XC as well as cards with a capacity higher than 32 GB

¹ The updating of a remote control RCC-02/-03 or of another Xcom-232i must be done directly on the concerned device.

6. The communication RS-232

The Xcom-232i is a module equipped with a serial port RS-232, enables to be informed of the state of a system consisting of one or several Xtenders. It is then possible to read all data that can be displayed on the remote control basic screen and also to modify the configuration parameters via this serial port. An Xtender system can therefore be connected to various SCADA control and supervision devices (PC, programmable logic controller, microcontroller).

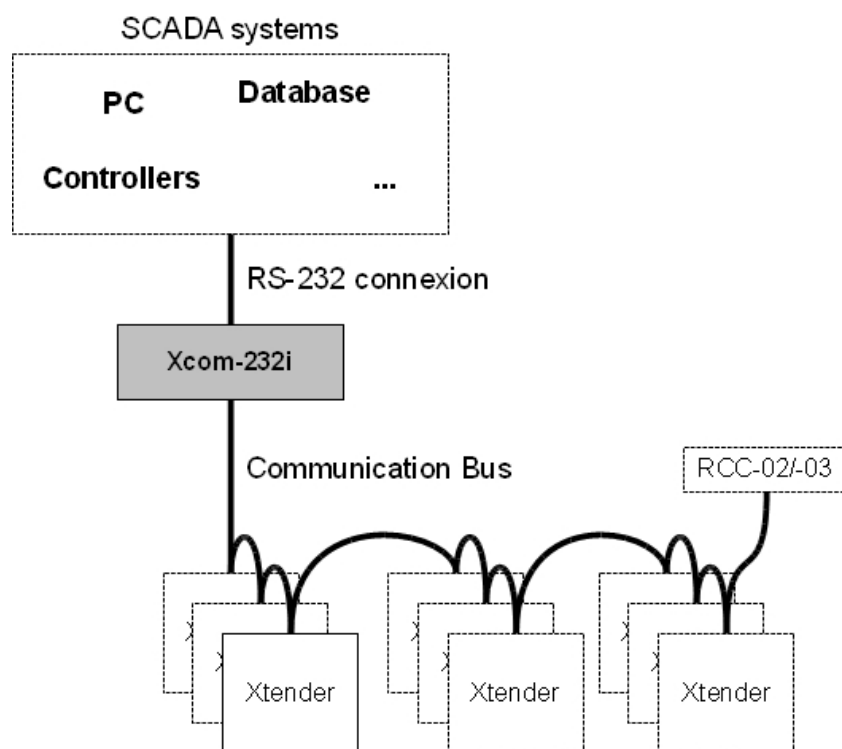


Figure 6.1. Principle schematics of a typical application

From a more technical point of view, the interface RS-232 allows for instance the data transmission with GSM modems, RS-232 bridges to TCP/IP or also with long distance converters RS-422.



The specific protocol, easy, open and fully documented is available on request on www.studer-innotec.com/support (tab Protocol).

7. Data logger

The communication module Xcom-232i offers a function that allows to record 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.



The function data logging of the Xcom-232i is deactivated by default.

7.1. Functioning

If the data logger is activated, a file is created at midnight every day on the SD card inserted in the remote control. 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 softwares. The file name integrates the date of the measure in this form: LGaammjj.csv.



- In case no MicroSD card was inserted, the daily data will be lost.
- The software updating of the Xcom-232i will lead to erase the daily data.

7.2. Analysis and visualization of the data with the Xtender data analysis tool or with the Xtender Matlab® data analysis

Attached to this function, Studer Innotec SA offers free of charge an analysis tool in the form of a file type Microsoft® Excel® 2007 which allows to read specifically the CSV files generated by the Xcom-232i. 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.

A Matlab® script is also available. It enables to do analysis or to work out a possible simulation. These files can be downloaded for free on www.studer-innotec.com/support.

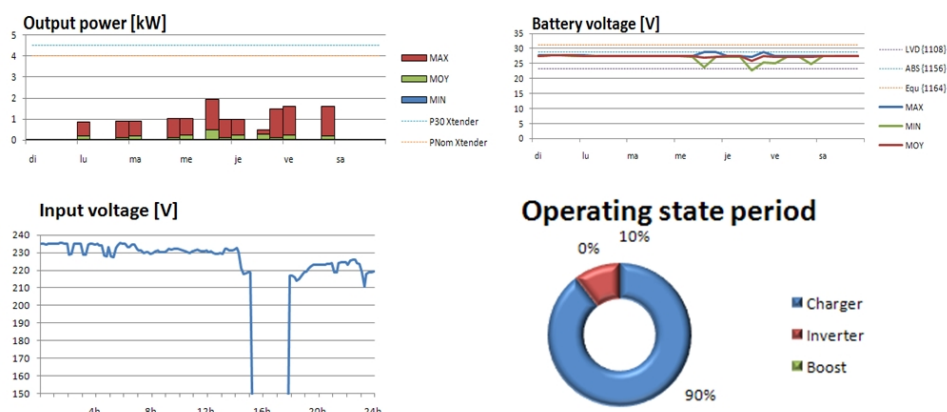


Figure 7.1. Overview of an analysis with the "XTENDER Data Analysis Tool"

8. Software(s) updating

The software of the communication module Xcom-232i as well as the softwares integrated in the inverter-chargers of the series Xtender, the battery monitors (BSP) as well as the communication bridge MPPT (Xcom-MS) can be updated in order to benefit from the new functionalities.

All softwares for updating are available in the technical area of our website www.studer-innotec.com/support.

8.1. Updating process



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



Before inserting the MicroSD card ¹ to carry out an update, it is better to turn off all Xtenders (putting on "off"). If not manually done, the updating process will automatically stop all Xtenders connected to the communication bus.

To carry out an update, insert the MicroSD card (containing the last update software) in the slot of the communication module Xcom-232i. Prior to do the updating, the system checks automatically the compatibility between the device and the software present on the MicroSD card. The MicroSD card must not be removed until the end of the updating process. In case this process is interrupted, insert again the SD card to let the process carry on.



The updating process can take between 3 and 15 minutes. During this period, it might be possible that the signalisation LED does not respect exactly the cyclical ratio described². The updating will be finished once the "red colour" signalisation LED stops blinking for at least 5 seconds continuously.



The updating of a remote control RCC-02/-03 or of another Xcom-232i must be done directly on the concerned device.

¹or SD card for the RCC-02/-03

²see Chapter 5: "Description of the communication module Xcom-232i" (p. 14)



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