Xcom-485i

Isolated RS-485 communication module for Xtender and Vario-systems

User Manual
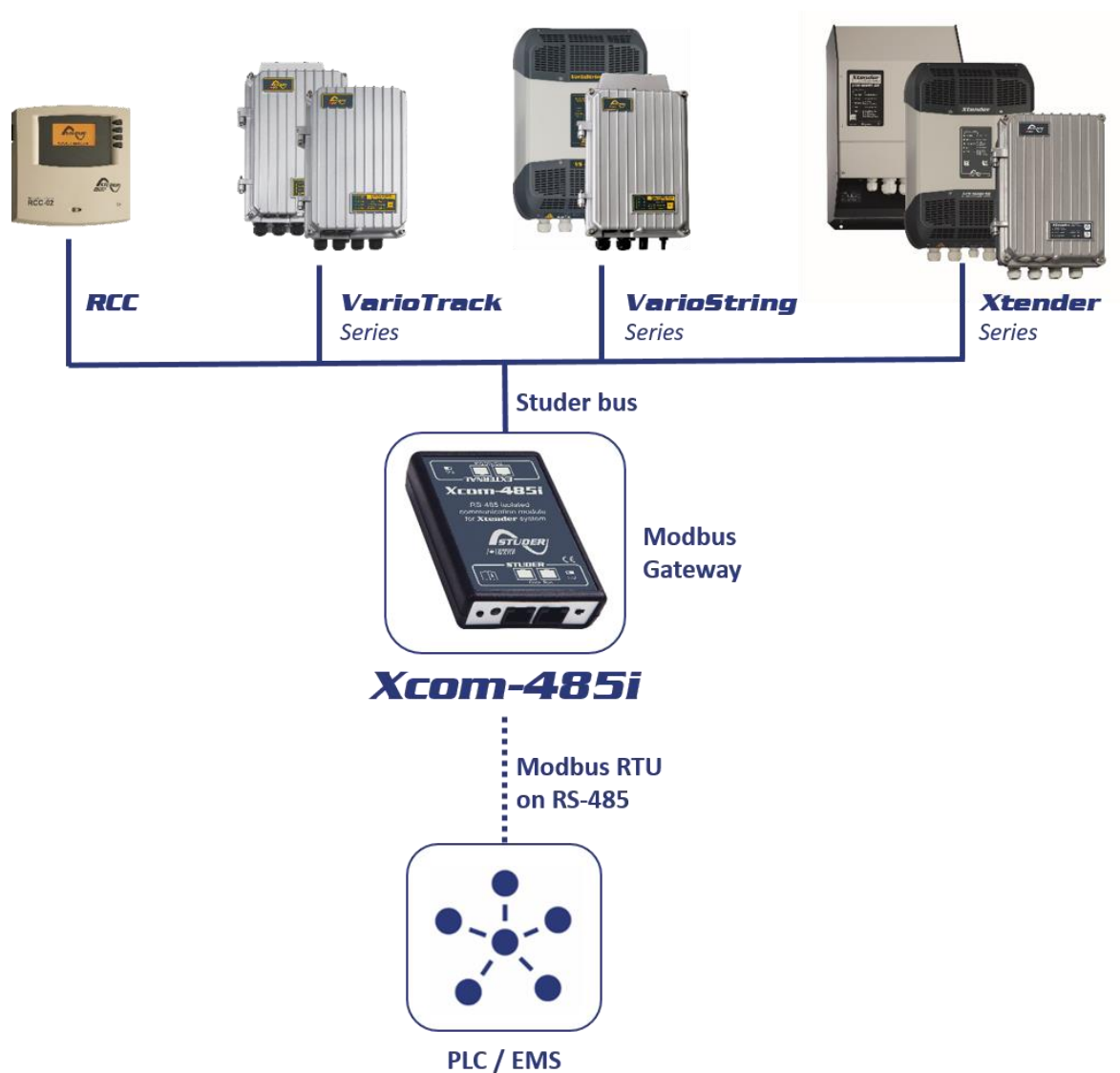
CONTENTS

1   INTRODUCTION

This manual contains a complete description of Xcom-485i communication module. This device is a bridge between the proprietary Studer communication bus on one side and RS-485 (isolated) on the other side. The protocol used on the RS-485 side is Modbus RTU (see our website for more information).

1.1   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.

1.2   CONVENTIONS

1.2.1 Symbols

⚠	This symbol indicates a risk of material damage.
ℹ	This symbol indicates a procedure or function that is important for a safe and correct use of the equipment. Failure to respect these instructions may lead to the cancellation of the guarantee or to a non-compliant installation.

1.3   WARRANTY AND LIABILITY

During production and assembly, each Xcom-485i undergoes several controls and tests. These are carried out in full respect of fixed procedures. Each Xcom-485i 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 with the serial number. The production, assembly and tests of each Xcom-485i 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-485i is 5 years as from the date of delivery ex-works.

1.3.1 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 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 is, 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.

1.5 PRODUCT RECYCLING

The Xcom-485i meets the European RoHS directive 2011/65/EU on hazardous substances and does not contain the following elements: lead, cadmium, mercury, hexavalent chromium, PBB or PBDE.

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

2 EU DECLARATION OF CONFORMITY

The communication module Xcom-485i described in this manual meets the requirements specified in the following EU directives and standards:

Low Voltage Directive (LVD) 2014/35/EU
- EN 62368-1:2014/AC:2015

Electromagnetic Compliance (EMC) Directive 2014/30/EU
- EN 61000-6-1:2007
- EN 61000-6-2:2005/AC:2005
- EN 61000-6-4:2007/A1:2011

2.1 CONTACT INFORMATION

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3 MATERIAL NEEDED FOR THE INSTALLATION

3.1 CONTENTS OF THE XCOM-485I COMMUNICATION SET

The Xcom-485i communication set contains the following material:

One Xcom-485i module

Two 2 meters communication cables, to connect the Xcom-485i to Studer and external devices

Mounting plate

2 DIN rail clips and screws

SD card with manual

3.2 OTHER REQUIRED MATERIAL

In addition to the material delivered with the communication set the use of an Xcom-485i necessitates a cross-headed screwdriver #1 (P1).

Since the Xcom-485i is dedicated to communicate with a third-party system (SCADA, PLC etc.) you will need a specific cable crafted with the proper connector and pinning on each side. See chapter 5.2.

⚠	This device should not be used for any purpose not described in this manual. The device is using RJ45 connectors frequently used and standard for LAN (Local Area Network). The Xcom-485i should never be used or plugged into communication networks other than the ones specified in this manual. This will seriously damage the product.

4   FUNCTIONALITIES OF THE XCOM-485I

The Xcom-485i module offers the possibility to interact with a Studer Xtender/Vario system with a third-party device (SCADA system, PLC, etc.) using Modbus RTU on RS-485. The technical specification of this protocol is available on Studer's web site. This protocol will allow the third-party device to read and write data, get messages and fully control the Xtender/Vario system. For more information, please see www.studer-innotec.com/en/downloads/.

5   INSTALLATION OF THE XCOM-485I

This device was designed for indoor use only and must under no circumstances be exposed to rain, snow or any other humid or dusty environment.

As far as possible, reduce exposure to sudden temperature variation: important heat variation may create undesired and harmful condensation inside the equipment.

Before installing the module, the configuration of the function and the selection of pin out connection must be achieved.

5.1   SELECTION OF FUNCTIONALITY AND PINOUT ARRANGEMENT

To access the DIP switches and jumper array, the module must be opened. First disconnect your Xcom-485i module from all devices (installation, battery, etc.) then open the Xcom-485i with a Phillips screwdriver #1 (2 screws).

On the electronic board inside the device there are two elements to select the chosen configuration:

   (1) Jumper array for RJ-45 (third party side) pinout arrangement.
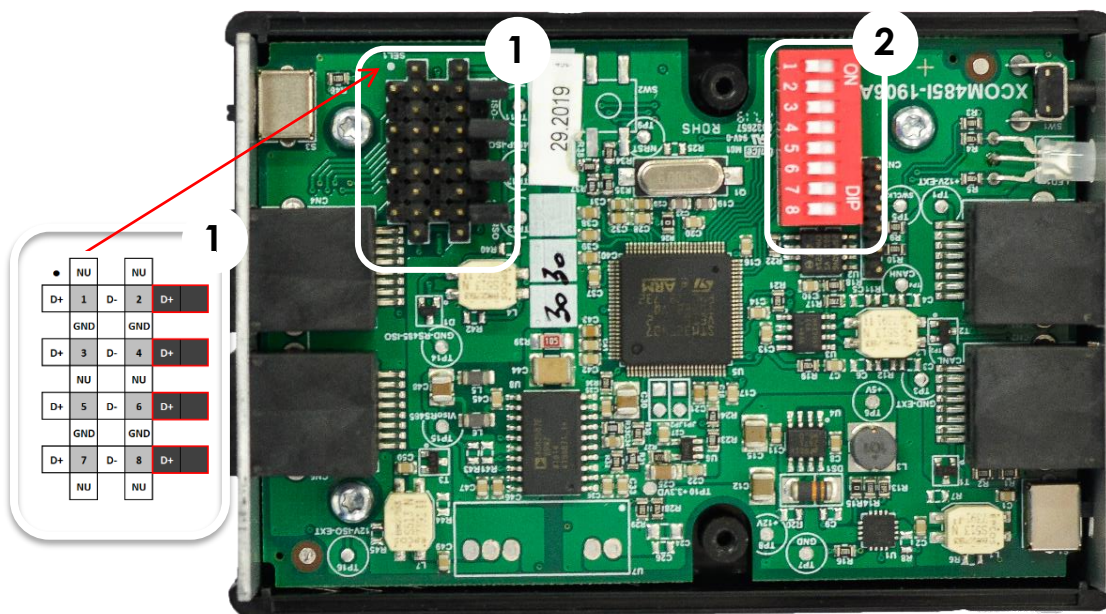   (2) DIP switches to select protocol related configuration (see Modbus RTU Studer protocol).

Figure 1: Electronic board inside the Xcom-485

5.2   CABLE BETWEEN XCOM-485I AND THIRD PARTY DEVICE

Most communication devices provide a specific connector and pin assignment. A specific cable having on one side an RJ-45 connector and on the other side the third-party devices connector is required. This cable is either supplied by the manufacturer or must be crafted by the installer.

The Xcom-485i package provides 2 cables with RJ-45 connectors on both ends. One of the two can be used to craft the proper cable.

Position Number 12345678

8-wire RJ45
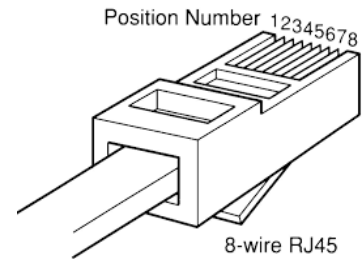
## 5.3   SELECTION OF THE PIN ASSIGNMENT OF THE RS-485 BUS CONNECTION

Any Modbus communication signal can be assigned to any pin of the RJ-45 connector by using the jumper array (1) as shown in Figure 1: Electronic board inside the Xcom-485.

The grey squares in the jumper array show the pin number of RJ-45 connector which can be connected to any signal of the communication interface (GND, D+, D-) using the jumpers. By default, no connexion is done inside the module, so you have to open it and configure it manually.

The EIA/TIA-485 standard uses A/A' and B/B' signal names for data signals. However, this naming is subject to interpretation, as most of the IC manufacturers uses it in a wrong way. In order to avoid this confusion, we use D+ (for Tx+/Rx+) and D- (for Tx-/Rx-) as they are easier to understand.

> ⚠ If the data lines D+ and D- are crossed or wrongly connected, it will not destroy the device but the communication will not work. So in case of communication issue, it can be a good idea to cross D+ and D-.
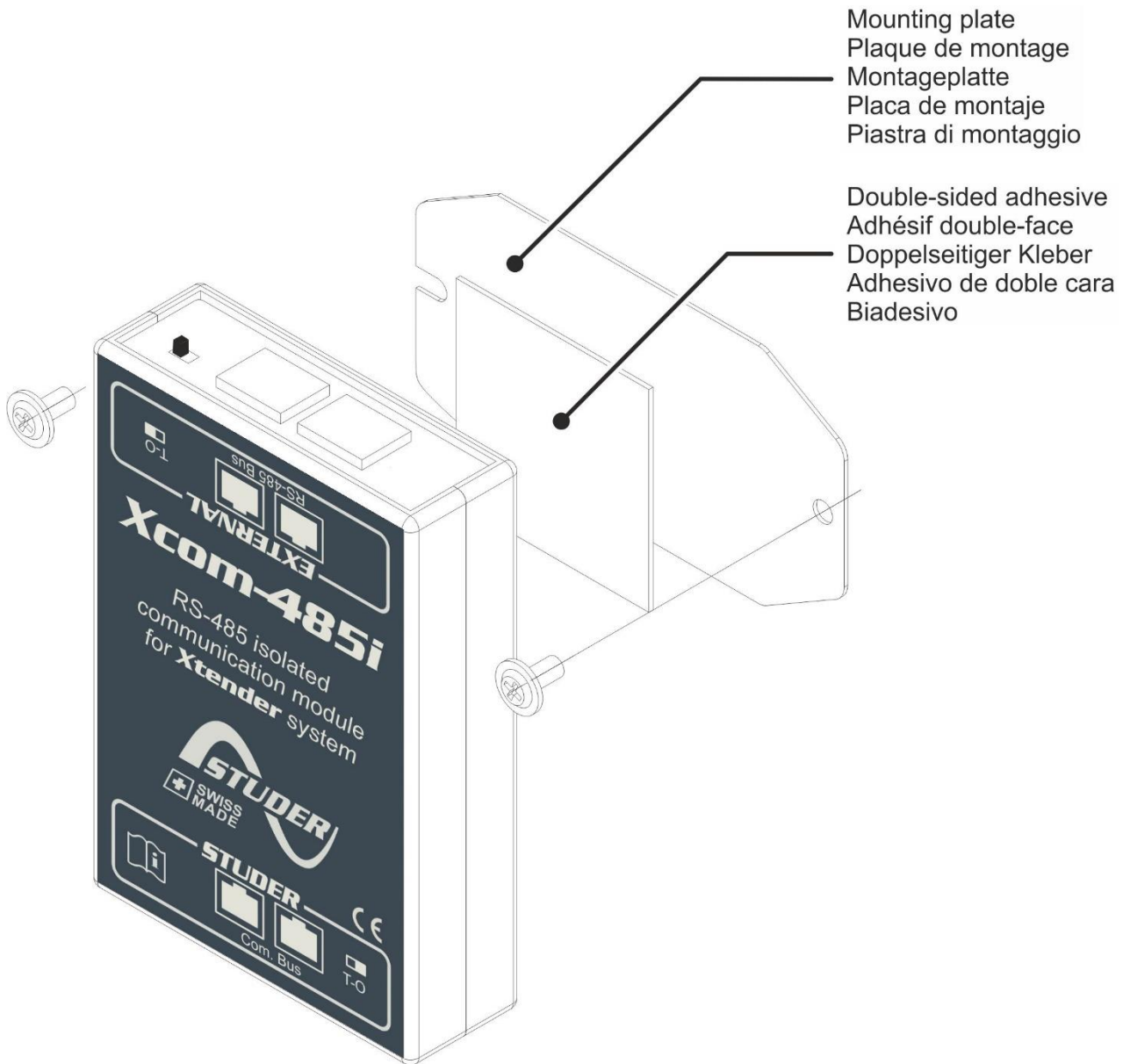
Here is an example of how the jumper array could be configured, depending on your cable.

4 = D-
5 = D+
8 = GND
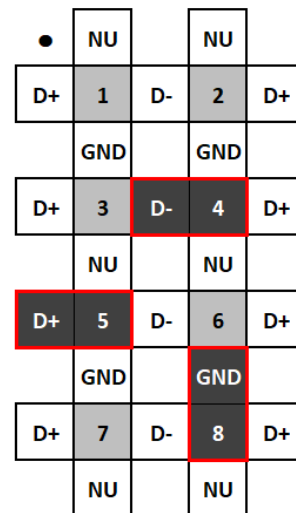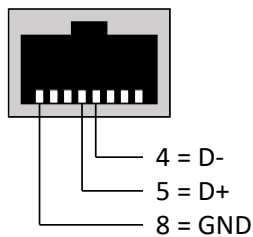
Jumper array

5.4   MOUNTING

The Xcom-485i can be mounted directly on any support by means of the supplied fixing plate, on a smooth surface with double-side adhesive or on DIN rail using the DIN rail clips (part of the Xcom-485i communication set).

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

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

5.5 CONNECTION OF THE COMMUNICATION BUS (STUDER SIDE)

The Studer bus is daisy chained to the other XT/VT/VS Studer components and is powered by the communication plug as soon as the upfront device is powered. The Xcom-485i module should not be installed between 2 devices powered by the battery. Connect the Xcom-485i module with the supplied cable (2m). This cable should not be extended.

⚠	Do not connect the Xcom-485i between devices connected to the battery. Do not connect the module to a device not connected to the battery (RCC or other Xcom).

| ⚠	The termination switch of the communication bus "Com. Bus" remains in position T (terminated) except when both connectors are used. In this case and only in this case, the switch must be placed in the O (open) position. If one of the two connectors is not used, the termination switch will be in position T.
	An incorrect setting of the link ends can lead to an erratic running of the system or impede its updating process.
ⓘ	By default, the termination is set to terminated (position T) on each Studer product.
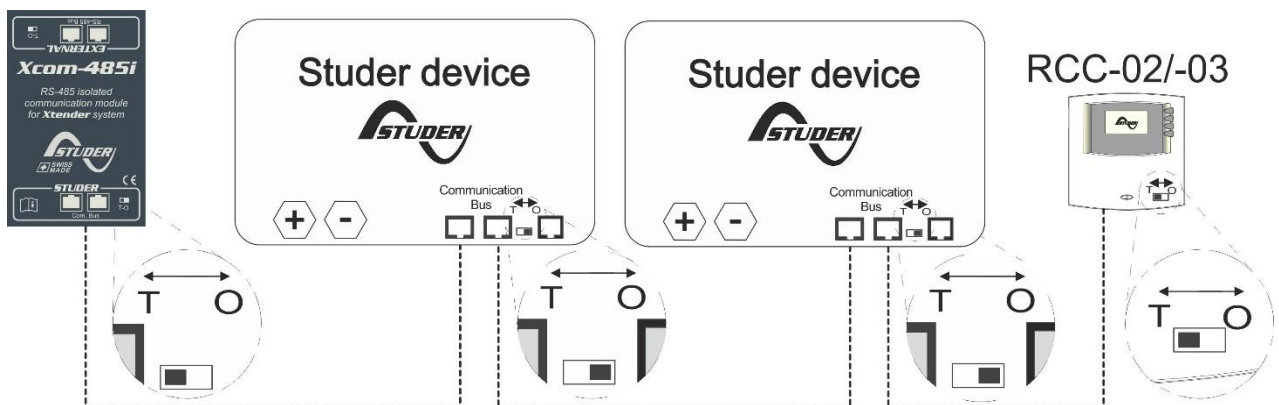
Figure 2: Connection schematic for Xcom-485i

5.6 CONNECTION OF THIRD-PARTY DEVICES

In most cases, a specific cable must be crafted by the installer according to chapter 5.3 . This cable will have on one side the appropriate connector recommended by the third-party device (SCADA, PLC, etc.) and on the other side an RJ-45 connector.

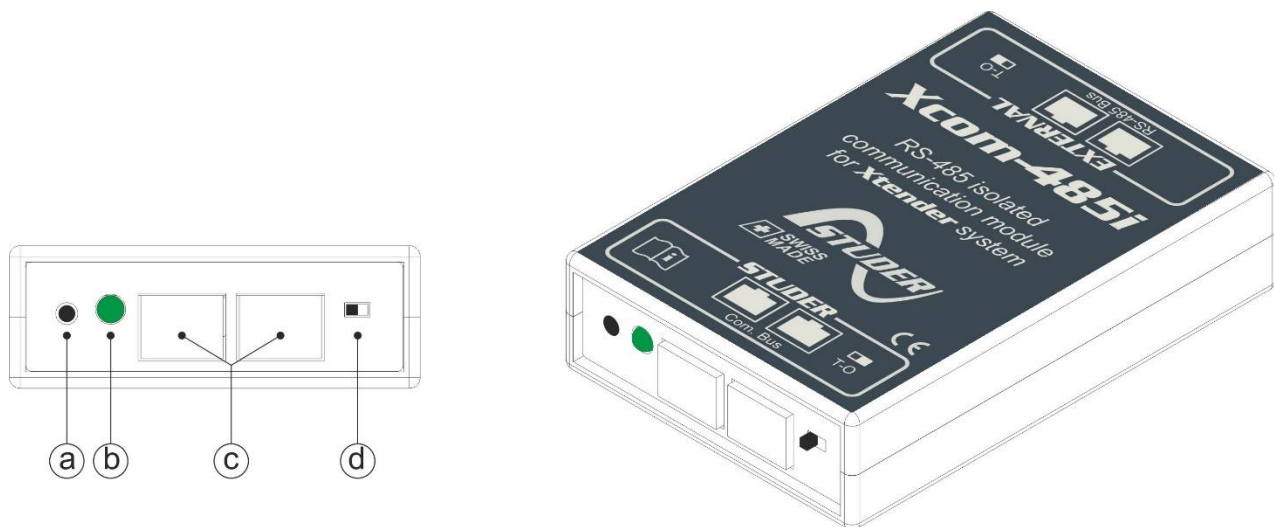## 5.7 ELEMENTS ON THE STUDER SIDE OF THE MODULE

Figure 3: Front and isometric view of the Xcom-485i

Key	Description
(a)	Push button (Not used / reserved for future use)
(b)	Bicoloured signalisation LED (green/red)
	The signalisation LED indicates different functions using colour and frequency of blinking. It is explained in chapter 5.7.1.
(c)	Studer device communication connectors
	These connectors allow the Xcom-485i to be connected with an Xtender system. This is the Studer communication side of the device.
	Do not connect any devices suited for standard Ethernet connection.
(d)	Switch for communication line ending
	This switch activates or deactivates the communication bus termination. The termination is by default activated (terminated). In Figure 3, the termination is activated. Place the switch to the correct side: if there is only one cable connected on port c (com bus) put the switch in T (terminated) position. If there are two cables connected on port c (Xcom-485i connected to two other devices) place the switch in position O (open).

5.7.1 Signalisation LEDs

Bicolour LED	Meaning
Blinks **2x** repeatedly in **GREEN**	The Xcom-485i is running without any error.
Blinks **1x** repeatedly in **ORANGE**	The Xcom-485i is currently starting up.

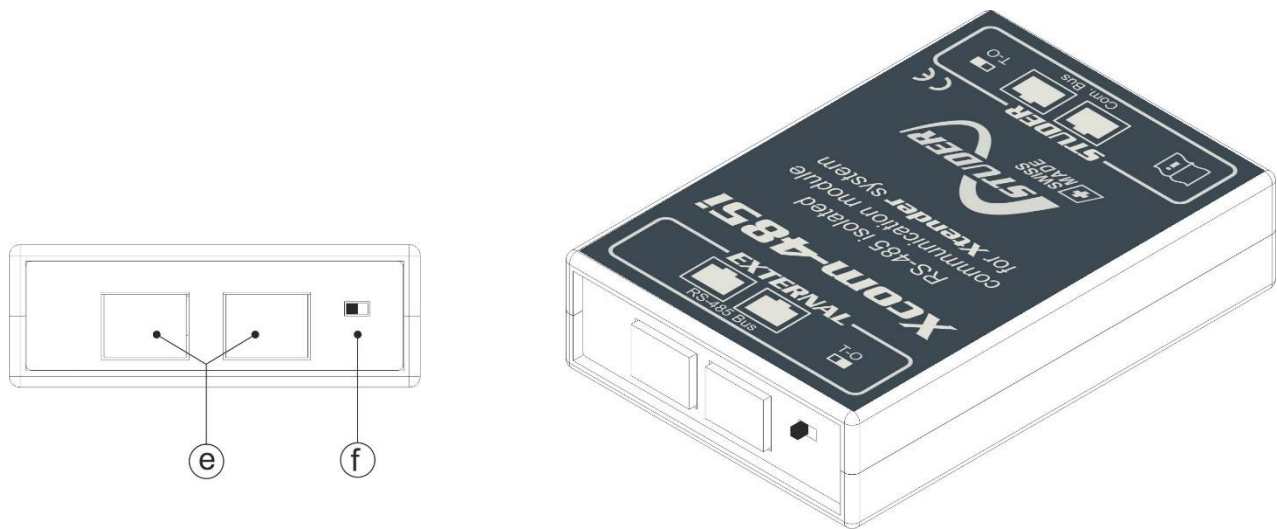## 5.7.2 Elements on the external RS-485 side of the module

Figure 4: Back and isometric view of the Xcom-485i

Key	Description
(e)	RJ-45 connectors for an external network on 2 wires RS-485 These connectors allow the Xcom-485i to be connected to a third party system (SCADA, PLC, etc.) on RS-485. Do not connect any devices suited for standard Ethernet connection.
(f)	Switch for RS-485 termination This switch activates or deactivates the communication bus termination. The termination is by default activated. In Figure 4, the termination is activated (T). Place the switch to the correct side: if there is only one cable connected on port e put the switch in T (terminated) position. If there are two cables connected on port e (Xcom-485i connected to two other devices) place the switch in position O (open).

6 SOFTWARE UPDATES

In case of requirement of software upgrade of the system through the RCC unit, the Xcom-485i is automatically upgraded. The software updates are available in the download area of the website www.studer-innotec.com/en/downloads/.
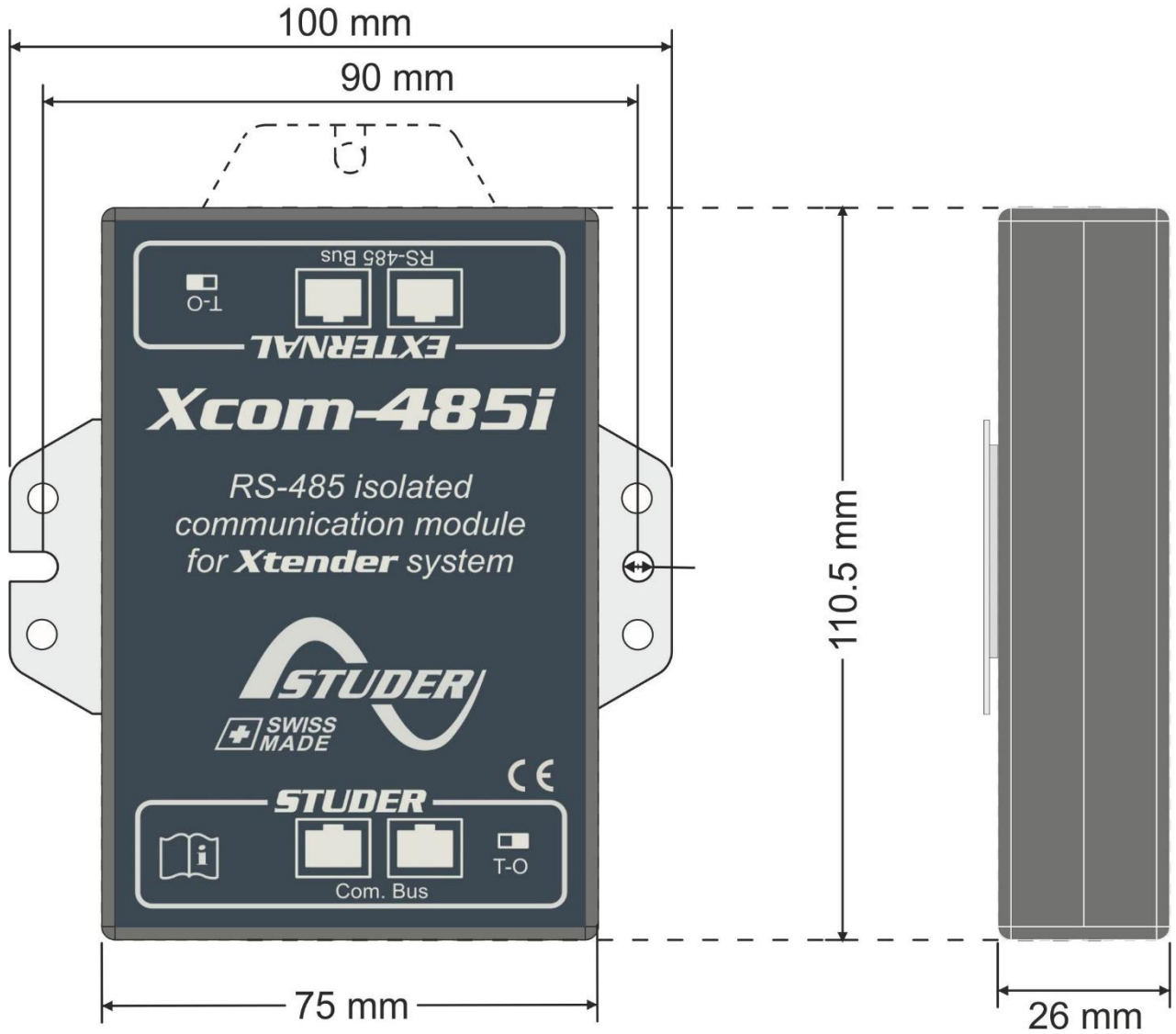
6.1 UPDATING PROCESS

	Turn off all inverter units before making the update. If not manually done, the updating process will automatically stop all Xtender connected to the communication bus.

To carry out an update, insert the micro SD card (containing the latest software version) in the RCC's micro SD card reader. Before starting the updating process, the system automatically checks the compatibility between the devices 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.

	The latest software versions are available on our website www.studer-innotec.com/en/downloads/ under the heading "Softwares and Updates".
	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 of a remote control RCC-02/-03, Xcom-232i/-SMS/-LAN/-GSM must be done directly on the connected device.

7 DIMENSIONS