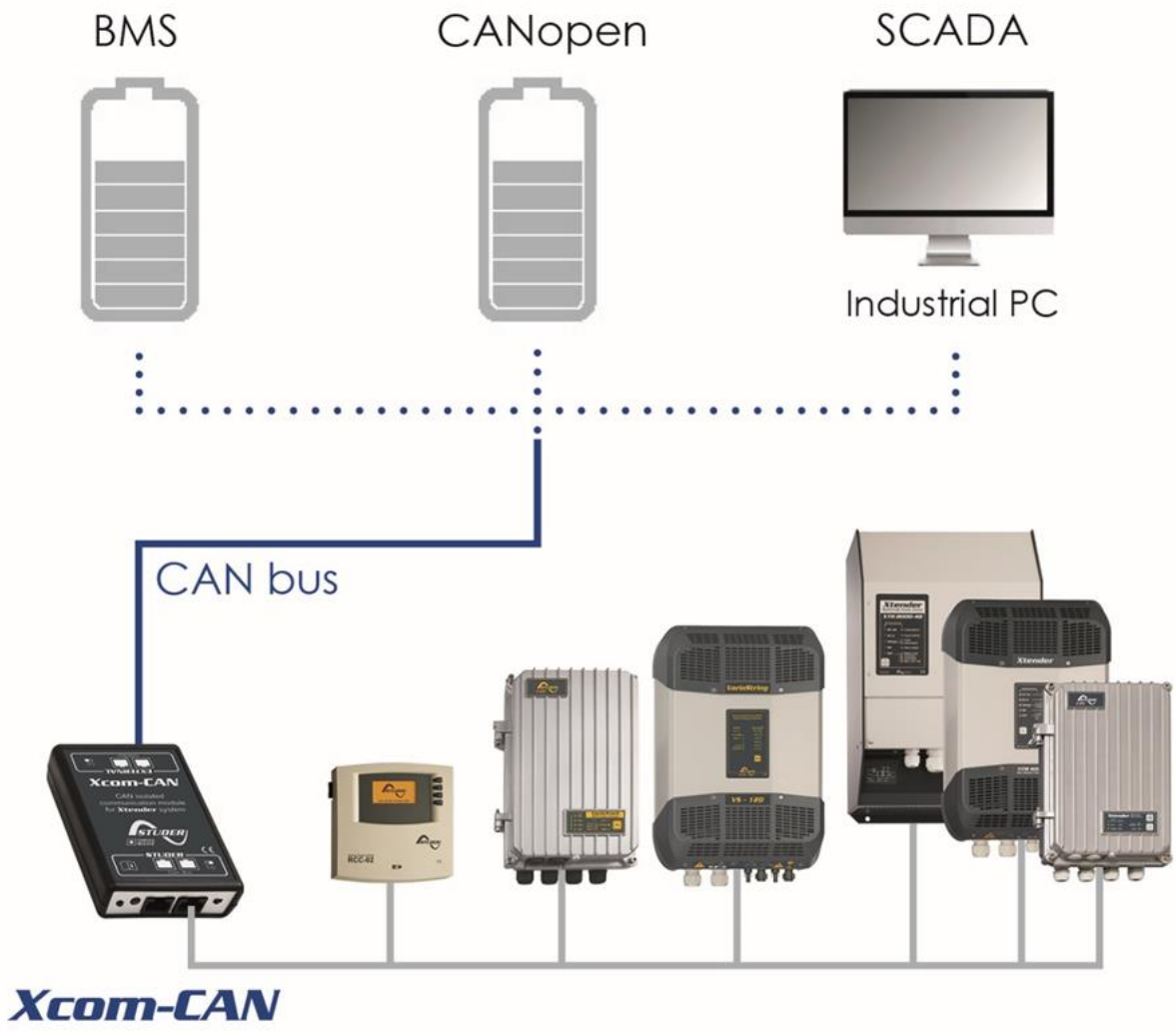
# Xcom-CAN

# Multi-protocol communication set for Xtender and Vario-systems

## User Manual




Studer Innotec SA 2017 – V2.0
409R

# CONTENTS

# 1 INTRODUCTION

## 1.1 XCOM-CAN MULTI-PROTOCOL COMMUNICATION FOR XTENDER AND VARIO-SYSTEMS

This manual contains a complete description of the functionalities of the multi-protocol communication module Xcom-CAN.
The Xcom-CAN Module is a bridge between the proprietary Studer communication bus on one side and various CAN protocol on the other side, in order to access/control Studer Innotec devices or apply specific behaviour on the Studer system, notably with Lithium or specific batteries.
This document applies to software versions V1.6.16 or higher of the Xcom-CAN. It is possible to update the product with the latest software version available on www.studer-innotec.com/en/downloads/ and the use of a Remote control (RCC-02, RCC-03, Xcom-232i, and Xcom-SMS).
The Xcom-CAN operates in Xtender systems (with products such as Xtender, VarioTrack, VarioString, BSP, RCC-02/-03, Xcom-232i, Xcom-LAN, Xcom-GSM, and Xcom-SMS).

## 1.2 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.

## 1.3 CONVENTIONS

### 1.3.1 Symbols

| | |
|---|---|
|  | This symbol indicates a risk of material damage. |
|  | 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. |

## 1.4 WARRANTY AND LIABILITY

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

### 1.4.1 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.

### 1.4.2 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.

### 1.4.3 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.

## 1.5 SAFETY PRECAUTIONS

### 1.5.1 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. |

### 1.5.2 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.

## 1.6 PRODUCT RECYCLING

The Xcom-CAN 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 multi-protocol communication module Xcom-CAN 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

**Electromagnetic Compliance (EMC) Directive 2014/30/EU**
- EN 61000-6-2:2005
- 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-CAN MULTI-PROTOCOL COMMUNICATION SET

The multi-protocol communication set Xcom-CAN contains the following material:

| | |
|---|---|
| One Xcom-CAN module |  |
| Two 2 meters communication cables, to connect the Xcom-CAN 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-CAN necessitates a Phillips screwdriver #1 (P1).
Since the Xcom-CAN is dedicated to communicate with a third party system (Battery, SCADA, PLC etc.) you will need a specific cable crafted with the proper connector and pinning on each side. See chapter 5.1.4.

| | |
|---|---|
| ⚠ | 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-CAN 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-CAN

There are several functionalities (applications) listed below that can be achieved with the Xcom-CAN module. These functionalities (applications) can be selected by the proper setting of the DIP switches located inside the module. See chap. 5.1.

## 4.1 CONNECTION OF AN XTENDER-VARIO SYSTEM TO LITHIUM BATTERIES

An optimal management of Lithium batteries requires communication between the battery and the whole system, like inverters, chargers, display, SCADA and so on. Most Lithium batteries use a CAN bus (as physical layer) but must have specific protocols implemented to communicate. The Xcom-CAN has several protocols implemented for battery management.
These protocols are compatible with specific batteries, as listed in chap. 5.1.1.

## 4.2 ACCESS/CONTROL OF STUDER DEVICES FROM A THIRD PARTY SYSTEM (PLC, SCADA)

The Xcom-CAN can be used to interface a Studer Xtender/Vario system with a third party device via a CAN communication bus (SCADA system, PLC, etc.) with the Studer Public protocol. The technical specification of this protocol is available on Studer's web site, www.studer-innotec.com, and will allow the third party device to read and write data, get alarm or messages and fully control the Xtender/Vario system.

# 5 INSTALLATION OF THE XCOM-CAN

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 jumpers array, the module must be opened. First disconnect your Xcom-CAN module from all devices (installation, battery, etc.) then open the Xcom-CAN 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 the protocol/battery model (switch 1 to 5) and the bus speed (switch 6 to 8) whenever the protocol requires it.

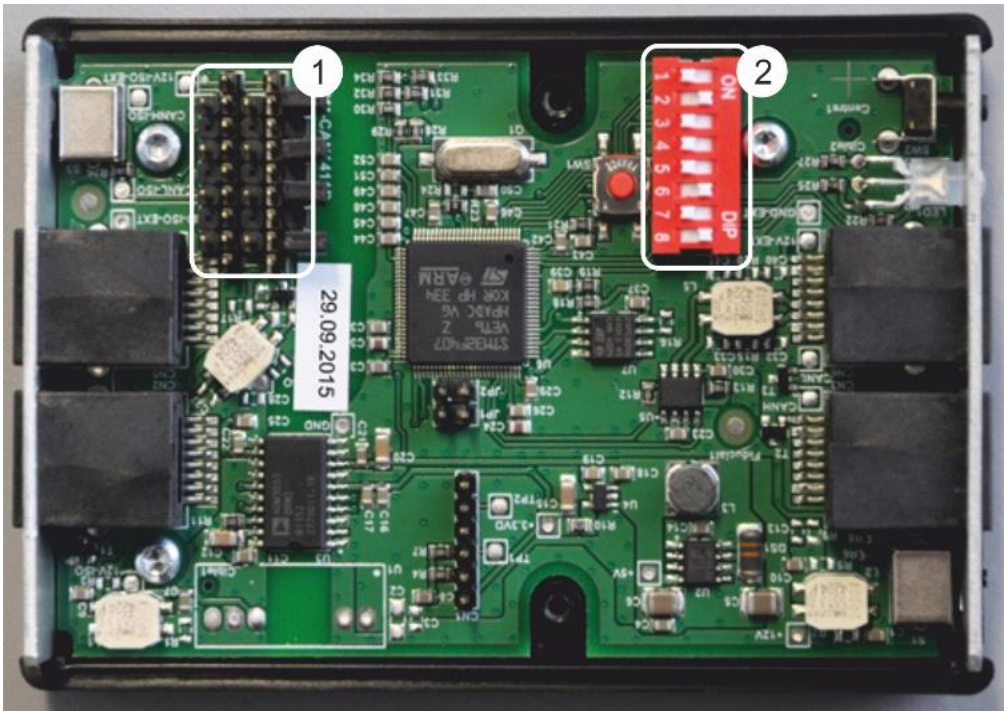


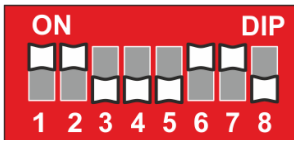
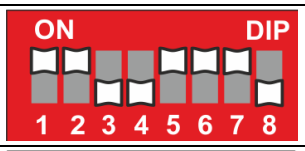
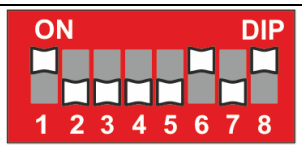
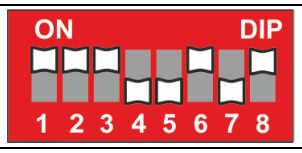

*Figure 1: Electronic board inside the Xcom-CAN*

### 5.1.1 DIP switch configuration for lithium batteries

Note: The list of compatibility is subject to change. Please contact Studer Innotec to get the updated list.

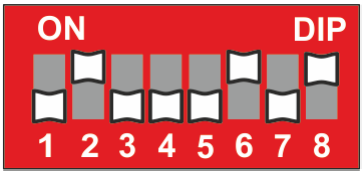
| | |
|---|---|
| ℹ | All the listed batteries are compatible with the Xcom-CAN in terms of protocol. Studer Innotec is not responsible for performance and compliance to system size and requirements. |
| ℹ | When working with Lithium batteries, the Xcom-CAN will automatically change the Xtender system parameters related to the battery management (Xtender, VarioTrack & VarioString). |

***Note: This table is for "Activity Control" mode. For "Activity Inspect" mode, switch 4 must be in "ON" position. For more information about activity modes, please refer to chapter 6.***

| Battery Brand and model | DIP switch settings "Activity Control" mode | Comments |
|---|---|---|
| • *BMZ ESS 3.0 – ESS 7.0*<br>• *BYD B-Box2.5 – B-Box10.0*<br>• *Leclanché Appollion Cube* |  | 48V battery only!<br>CAN bus speed not accessible |
| • *Leclanché TiBox* |  | 48V battery only!<br>CAN bus speed not accessible |
| • *Super-B 12V 160 Ah (SB12V160E-ZC)* |  | CAN bus speed: 250 kbs selectable<br>See chap. 5.1.3 |
| • *IPS (Integrated Power Solution) liCube modular LiFePO4-System* |  | CAN bus speed: 250 kbs selectable<br>See chap. 5.1.3 |

### 5.1.2 DIP switch configuration for third party PLC or SCADA system

To access third party devices to interact with Xtender/Vario system, you have to select the "Studer Public protocol", set the DIP switches according to the figure aside.
The default CAN speed for this protocol is set to 250 kbps. However, you can adjust it depending on your needs. See chapter 5.1.3.



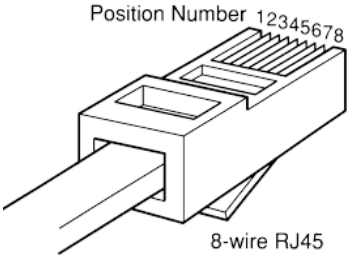
### 5.1.3 CAN bus speed

The Studer public protocol and some batteries allow different CAN bus speed. This choice must be done in accordance with the third party device speed.
Select the communication speed with the DIP switches in position 6 to 8 according to the aside table.
The default setting is 250kbps.

| Position | | | CAN bus speed |
|---|---|---|---|
| 6 | 7 | 8 | |
| OFF | OFF | OFF | 10 kbps |
| | | ON | 20 kbps |
| | ON | OFF | 50 kbps |
| | | ON | 100 kbps |
| ON | OFF | OFF | 125 kbps |
| | | ON | 250 kbps |
| | ON | OFF | 500 kbps |
| | | ON | 1 Mbps |

### 5.1.4 Cable between Xcom-CAN and third party device or battery

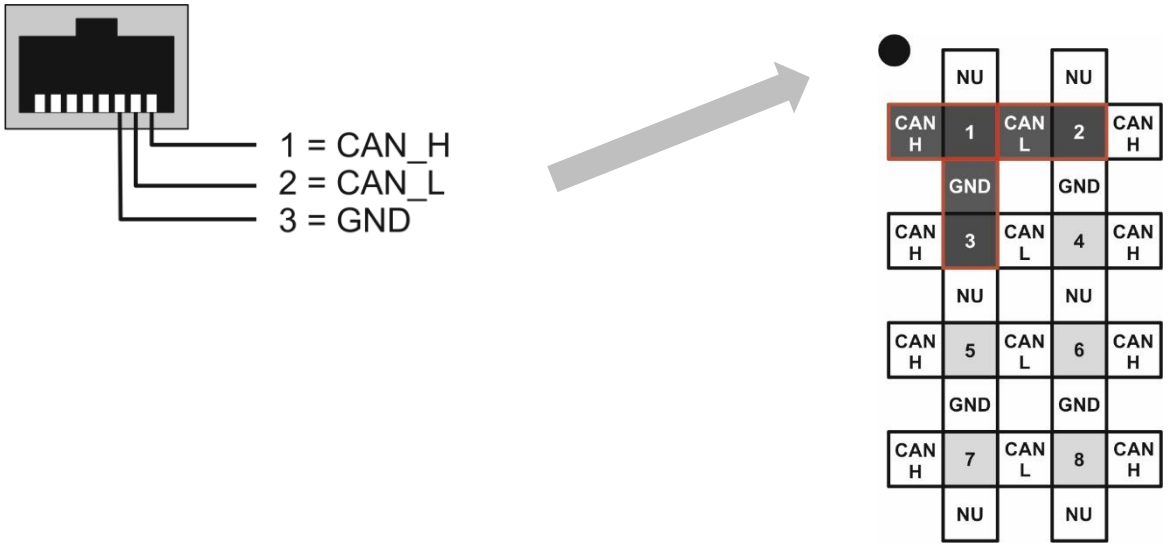
Most communication devices provide a specific connector and pin assignment. A specific cable having on one side an RJ-45 connector and on the other side the third party devices connector is required. This cable is either supplied by the manufacturer or must be crafted by the installer.
The Xcom-CAN package provides 2 cables with RJ-45 connectors on both ends. One of the two can be used to craft the proper cable.




### 5.1.5 Selection of the PIN assignment of the CAN bus connection

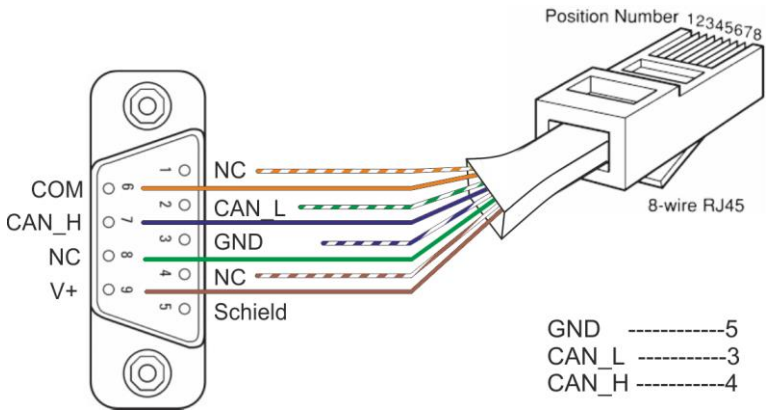
Any communication signal can be assigned to any pin of the RJ-45 connector by using the jumper array (1) in Figure 1.
The grey cells in the figure aside show the pin number of RJ-45 connector which can be connected to any signal of the communication line (GND, CAN-H, CAN-L) using the jumpers. By default, no connexion is done inside the module, so you have to open it and configure it manually.

Here as an example, the pin assignment according to CIA-303-1:

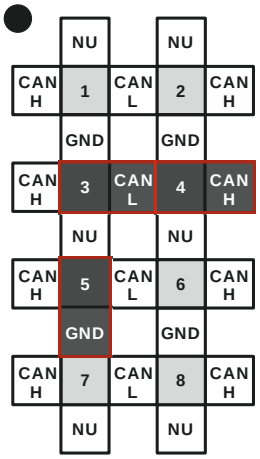



Jumper array

### *5.1.5.1 Example of cable and jumper selection*

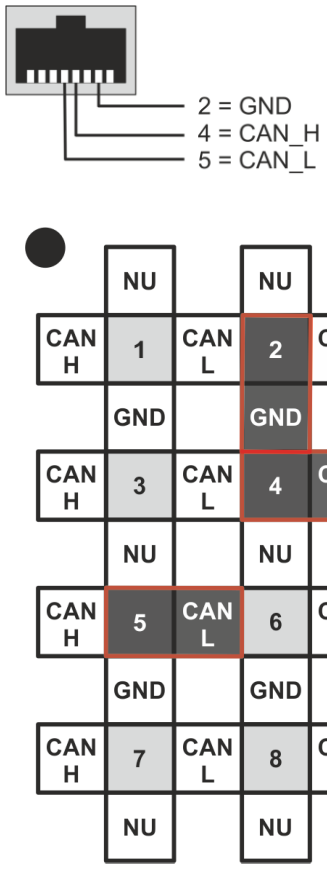
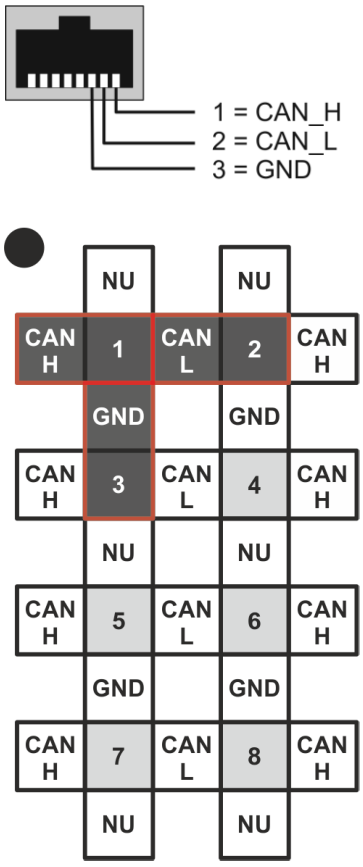
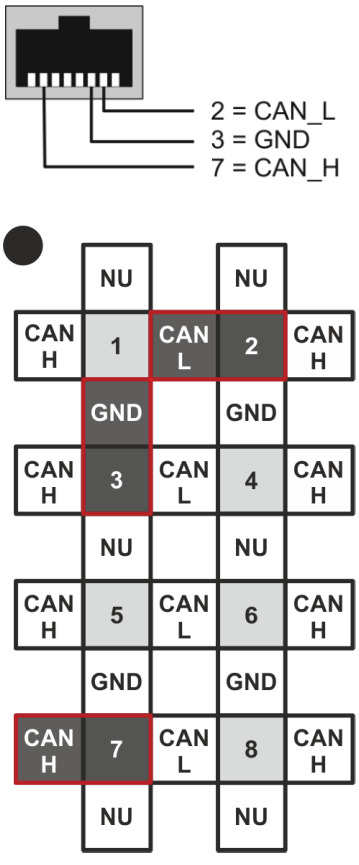



Third party connector RJ-45



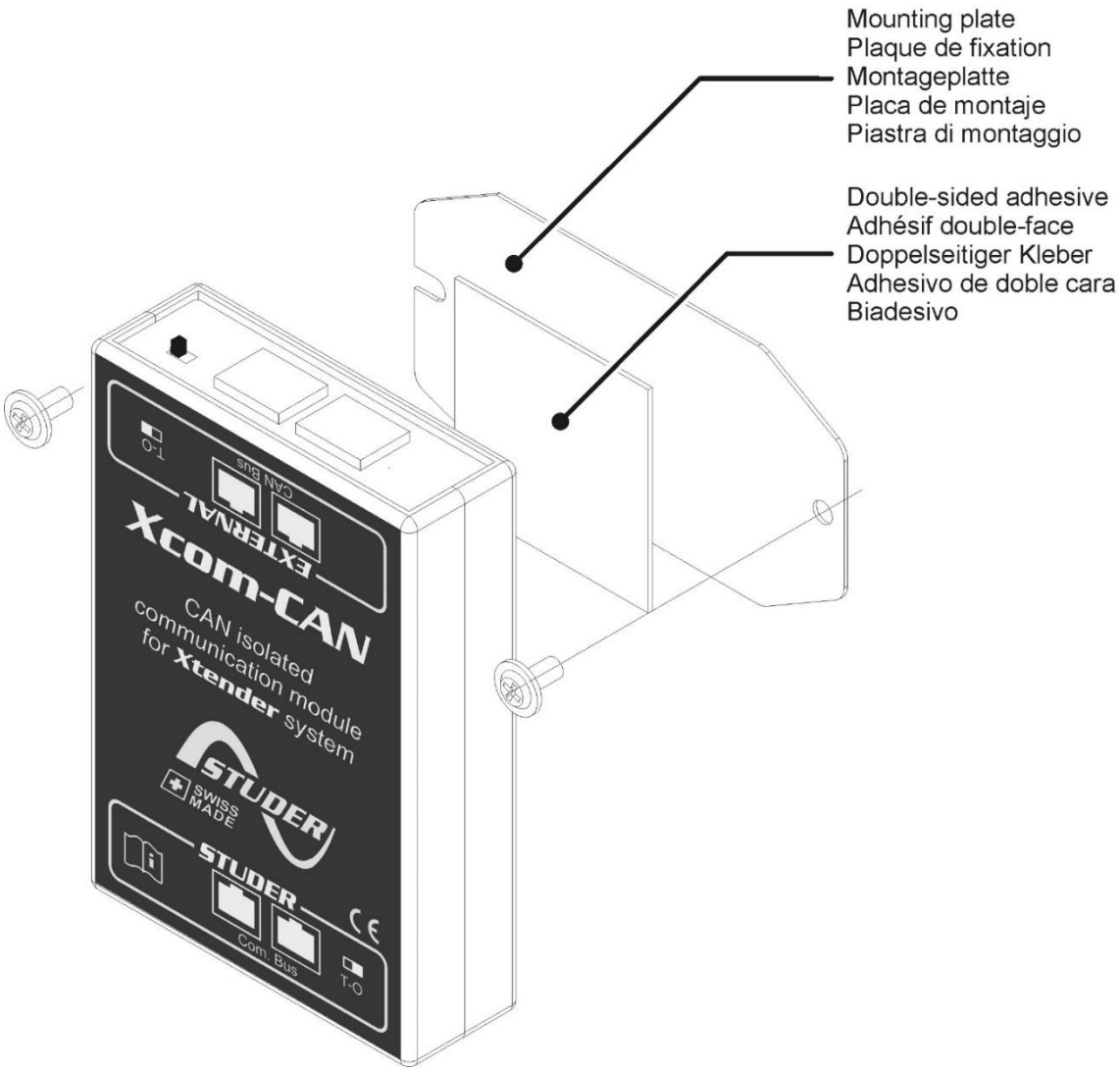

Jumper array

### *5.1.5.2 Jumper configuration according to listed batteries*

| • ***BMZ ESS 3.0 – ESS 7.0***<br>• ***BYD B-Box2.5 – B-Box10.0***<br>• ***Leclanché Appollion Cube***<br>• ***Leclanché TiBox*** | • ***Super-B 12V 160Ah (SB12V160E-ZC)*** | • ***IPS (Integrated Power Solution) liCube modular LiFePO4-System*** |
|---|---|---|
|  |  |  |

## 5.2 MOUNTING

The Xcom-CAN 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-CAN communication set).



## 5.3 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-CAN module should not be installed between 2 devices powered by the battery. Connect the Xcom-CAN module with the supplied cable (2m). This cable should not be extended.

| | |
|---|---|
| ⚠ | Do not connect the Xcom-CAN 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.<br>An incorrect setting of the link ends can lead to an erratic running of the system or impede its updating process. |
| ℹ | By default, the termination is set to terminated (position T) on each Studer product. |

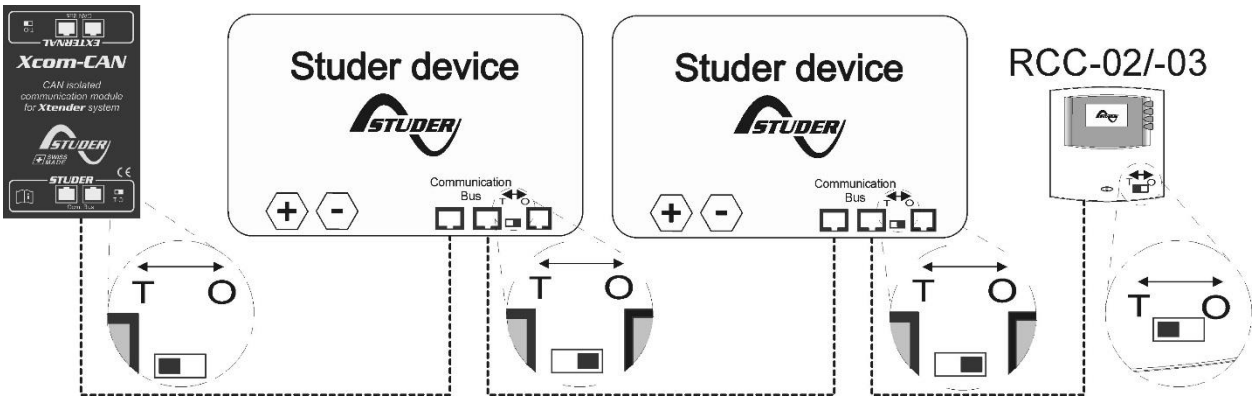



*Figure 2: Connection schematic for Xcom-CAN*

## 5.4 CONNECTION OF THIRD PARTY DEVICES

In most cases, a specific cable must be crafted by the installer according to chapter. 5.1.5 . This cable will have on the Battery BMS side the appropriate connector supplied or recommended by the third party device manufacturer (Battery, SCADA, PLC etc.) and on the Xcom-CAN side an RJ-45 connector.

## 5.5 ELEMENTS ON THE STUDER SIDE OF THE MODULE


*Figure 3: Front and isometric view of the Xcom-CAN*

| Key | Description |
|---|---|
| (a) | Push button (Not used / reserved for future use) |
| (b) | Bicoloured signalisation LED (green/red)<br>The signalisation LED indicates different functions using colour and frequency of blinking. It is explained in chapter 5.5.1. |
| (c) | Studer device communication connectors<br>These connectors allow the Xcom-CAN to be connected with an Xtender system. This is the Studer communication side of the device.<br>Do not connect your battery on it, neither any devices suited for standard Ethernet connection. |
| (d) | Switch for communication line ending<br>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-CAN connected to two other devices) place the switch in position O (open). |

### 5.5.1 Signalisation LEDs

| Bicolour LED | Meaning |
|---|---|
| Blinks **2x** repeatedly in **GREEN** | The Xcom-CAN is running without any error. |
| Blinks **1x** repeatedly in **ORANGE** | The Xcom-CAN is currently starting up. |
| Blinks **2x** repeatedly in **RED** | The Xcom-CAN is in error. See chap. 7. |

## 5.6 ELEMENTS ON THE EXTERNAL CAN BUS SIDE OF THE MODULE

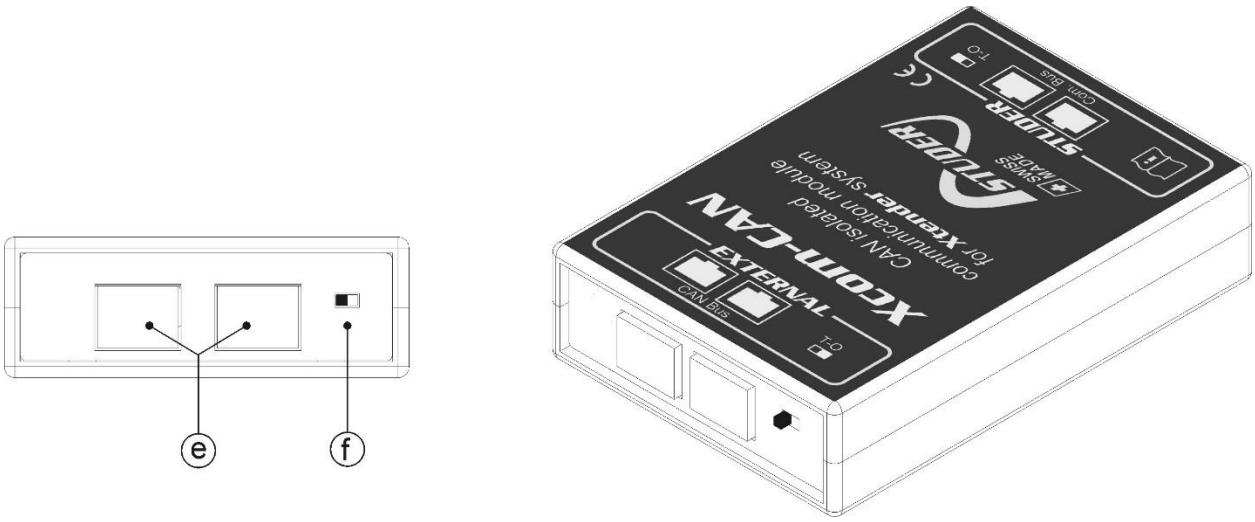



*Figure 4: Back and isometric view of the Xcom-CAN*

| Key | Description |
|---|---|
| (e) | CAN connectors for an external network<br><br>These connectors allow the Xcom-CAN to be connected to a third party system like battery BMS or a SCADA/PLC system.<br>To communicate with the third party system, a specific cable with a specific connector must be crafted according to chapter 5.1.5.<br>The cable pinning must be carefully checked before connecting any device at this point.<br><br>Do not connect any devices suited for standard Ethernet connection. |
| (f) | Switch for CAN termination<br><br>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-CAN connected to two other devices) place the switch in position O (open). |

# 6 USING XCOM-CAN WITH LITHIUM BATTERIES

| | |
|---|---|
| ⚠ | The use of lithium batteries requires special care. It is the responsibility of the installer to handle the battery correctly and to conform to the safety requirements of the battery manufacturer. Studer Innotec will not be responsible for any damage done to the battery and/or to the installation in case of wrong/bad handling of the lithium battery. |

| | |
|---|---|
| ⚠ | The use of an Xcom-CAN with lithium batteries is incompatible with the use of a BSP. Therefore it is not possible to have an Xcom-CAN working in BMS mode together with a BSP on the same Studer CAN bus. |

| | |
|---|---|
| ⚠ | The Xcom-CAN module supports lithium batteries with BMS communicating on the CAN bus. See chapter 5.1.1 for a complete list of compatible brands. The Xcom-CAN should not be used with lithium batteries that are not on this list. |

The Xcom-CAN module enables the use of lithium batteries with your Xtender/Vario installation. Lithium batteries are more complicated to handle compared to simple lead acid batteries. Lithium batteries usually embed a BMS (Battery Monitoring System) which is responsible of cell monitoring and battery safety. The BMS knows the status of each cell, and it computes maximum charging/discharging currents and maximum/minimum target voltages. These values, that change dynamically, are known as set points/limits and must be respected when the installation is working. When using the Xcom-CAN module with compatible lithium batteries, the installer, depending on the application, can choose between two operating modes:

- "Activity Control" operating mode
- "Activity Inspect" operating mode

## 6.1 "ACTIVITY CONTROL" OPERATING MODE

In this operating mode (which is the most commonly used), the Xcom-CAN module enables automatic use of compatible batteries within an Xtender/Vario system. Thanks to the communication protocol between the battery's BMS and the Xcom-CAN, the system is plug and play. The user no longer have to care about the battery's configuration. For this reason, the battery configuration menus for the Xtender, VarioTrack and VarioString are removed from the RCC when using Xcom-CAN with a compatible battery in "Activity Control" operating mode.

At start-up, the Xcom-CAN automatically configures the system based on information received from the battery's BMS. Once the installation is running, the Xcom-CAN takes into account the set points/limits sent by the battery's BMS and manages the connected Xtenders, VarioTracks and VarioStrings accordingly.

For safety reasons, the battery's BMS can send warnings/alarms via the communication protocol. The Xcom-CAN module reacts to these as soon as possible and tries to solve the problem by automatically stopping the charge and/or discharge of the battery, depending on the nature of the warning/alarm. A typical example would be an overvoltage warning/alarm. The Xcom-CAN will react by stopping the charge of the battery.

The reaction of Xcom-CAN on warnings/alarms is normally fast enough to avoid the battery's BMS to disconnect the battery from the installation by opening its relays. However, this situation might occur in exceptional situations (e.g. battery internal damage). In any case, the safety of the battery is guaranteed by the battery's BMS, not by the Xcom-CAN module.

In "Activity Control" operating mode, a third party controller (e.g. SCADA, PLC) might be used (typically as a supervision functionality) but is not mandatory. Several applications are fully plug and play and do not need an additional controller (refer to chapter 6.8 for a list of plug and play applications).

## 6.2 "ACTIVITY INSPECT" OPERATING MODE

In this operating mode, the Xcom-CAN module acts as an interface between the battery's BMS and a third party system (e.g. SCADA, PLC). The Xcom-CAN module decodes the communication protocol and makes the information available. The third party controller will access this information by reading the different Xcom-CAN User Information (see chapter 6.6.3 for a complete list). This can be done by using an additional Xcom-232i module with the SCOM protocol or by using a second Xcom-CAN module configured in "Studer public protocol" mode (see chapter 4.2).
The third party controller will need to control all Studer Innotec devices on the installation and ensure that set points/limits sent by the battery's BMS are respected. The third party controller will be responsible for the safety of the complete installation. The Xcom-CAN will not perform any action on the installation.

## 6.3 SELECTING OPERATING MODE

Selecting operating mode is done by DIP switch 4 regardless of the battery model. The table in paragraph 5.1.1 shows the DIP switch configuration for the compatible battery in "Activity Control" mode. For "Activity Inspect" mode, it is the same, except that the switch 4 must be to "ON". To summarise:

- ***"Activity Control" operating mode : DIP switch 4 must be in position "OFF"***
- ***"Activity Inspect" operating mode : DIP switch 4 must be in position "ON"***

## 6.4 BATTERY POWER UP

Follow the battery manufacturer start-up procedure. Some batteries have a preload system unable to pre-charge all the devices connected to the battery. In this case, disconnect all devices connected to the battery. Repeat the start-up procedure and after a few seconds, reconnect the devices. You can achieve this by using additional breakers on the battery cables.

## 6.5 SYSTEM POWER UP

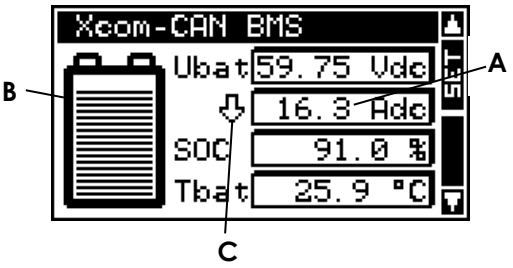
Once the Xcom-CAN is connected and powered by the Studer system it will perform different sequences indicated by the bi-coloured LED (b) according to chapter 5.5.1.

## 6.6 BATTERY MONITORING ON THE RCC

If an RCC is present in the system, several information are available in a specific screen dedicated to the battery.

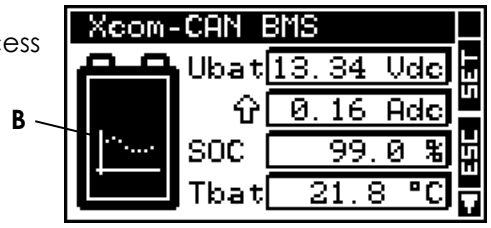
### 6.6.1 Displayed values

In area (A), the Xcom-CAN displays four values. The information to be displayed can be selected with the key "SET" and arrow up/down to select the field, and then "SET" again + arrow up/down to select the info among the one listed in chap. 6.6.3. When the current is displayed, the direction of the current is given in (C): an arrow upwards means the charge, an arrow downwards means the discharge. The battery symbol (B) gives a quick overview of the battery's state of charge (SOC).

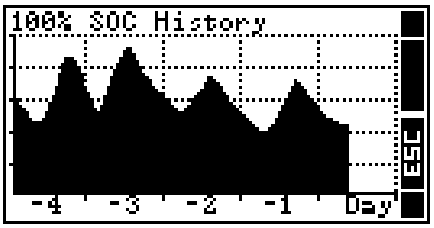


## 6.6.2 SOC history

When the battery symbol field (B) is selected you can access the last 5 days SOC history, with the "SET" key.




On the horizontal axis are indicated today and the last 4 days. Each horizontal pixel represents one hour. The vertical axis gives the state of charge of the battery. The graduations indicate 20, 40, 60, 80 and 100 % and one pixel represents 2 %.




## 6.6.3 Battery information

The table below shows the available information to display. All information can be read by a third party controller using the SCOM protocol or the Xcom-CAN Studer Public protocol.

| Info. no. | Name | Unit | Description |
|---|---|---|---|
| 7000 | Ubat | Vdc | Battery voltage |
| 7001 | Ibat | Adc | Battery current |
| 7002 | SOC | % | State of Charge |
| 7003 | Pbat | W | Power |
| 7007 | 0d< | Ah | Ah charged today |
| 7008 | 0d> | Ah | Ah discharged today |
| 7029 | Tbat | °C | Battery temperature |
| 7053 | bTyp | | Battery Type |
| 7054 | BMSv | | BMS Version |
| 7055 | bCap | Ah | Battery Capacity |
| 7056 | bmid | | Reserved Manufacturer ID |
| 7057 | SOH | % | State Of Health |
| 7058 | hSOC | % | High resolution State of Charge |
| 7061 | UChL | Vdc | Charge voltage limit |
| 7062 | UDiL | Vdc | Discharge voltage limit |
| 7063 | IChL | Adc | Charge current limit |
| 7064 | IDiL | Adc | Discharge current limit |
| 7065 | IChR | Adc | Recommended charge current |
| 7066 | IDiR | Adc | Recommended discharge current |

Note: If the battery is not providing a specific information or value the displayed value is "NA".

## 6.7 SETTING OF THE PARAMETERS

The table below shows the available parameters. All these parameters can be written by a third party controller using the SCOM protocol or the Xcom-CAN Studer Public protocol.

| Level | User ref. | Parameter | Factory value | User value |
|---|---|---|---|---|
| Basic | 6004 | Restore default settings | - | |
| Inst. | 6005 | Restore factory settings | - | |
| Expert | 6062 | SOC for backup | 5% | |
| Expert | 6063 | SOC for grid feeding | 90% | |
| Expert | 6064 | Use battery current limits instead of recommended values | No | |

### 6.7.1 Restore default settings {6004}

Use this parameter to restore the initial settings of the Xcom-CAN.

| | |
|---|---|
| ⚠ | If your installer has made some settings at "installer" level while commissioning your installation, this function restores his settings and not the factory ones. |

### 6.7.2 Restore factory settings {6005}

With this function, you will restore the factory settings. For each parameter, not only the factory value is restored but also the limits and the user level. This function is only accessible with the level "installer".

### 6.7.3 SOC for backup {6062}

You can find this parameter in the "Advanced settings menu" of Xcom-CAN.
This parameter defines a SOC value that will be maintained by the Xtender/Vario system. This SOC level is your energy reserve in case of blackout (grid failure or grid disconnection).
Energy to maintain this level of SOC is taken in priority from the VarioTrack and/or VarioString. If there is not enough energy available from DC-coupled devices, energy is taken from the grid through the AC-In of the Xtender. Once this set level of SOC is reached, no more energy from AC-In will be used.

### 6.7.4 SOC for grid feeding {6063}

You can find this parameter in the "Advanced settings menu" of Xcom-CAN.
This parameter defines a SOC value from which the system starts to feed the grid, in case grid feeding is enabled. If energy is available from DC-coupled devices when the SOC reaches this parameter value, the system will feed the exra amount of energy from the VarioTrack/VarioSting to the grid.

### 6.7.5 Understanding SOC parameters {6062} and {6063}

Parameters {6062} and {6063} enable you to configure the behaviour of your installation depending on SOC.

| | |
|---|---|
| ⚠ | The two parameters are dependent on each other. It is not possible to set SOC for backup {6062} at a higher value than SOC for grid feeding {6063}. In the same way, SOC for grid feeding {6063} cannot be set at a lower value than SOC for backup {6062}. |

The following two figures shows a typical application using Xtender with VarioTrack and/or VarioString and how the system works depending on SOC.

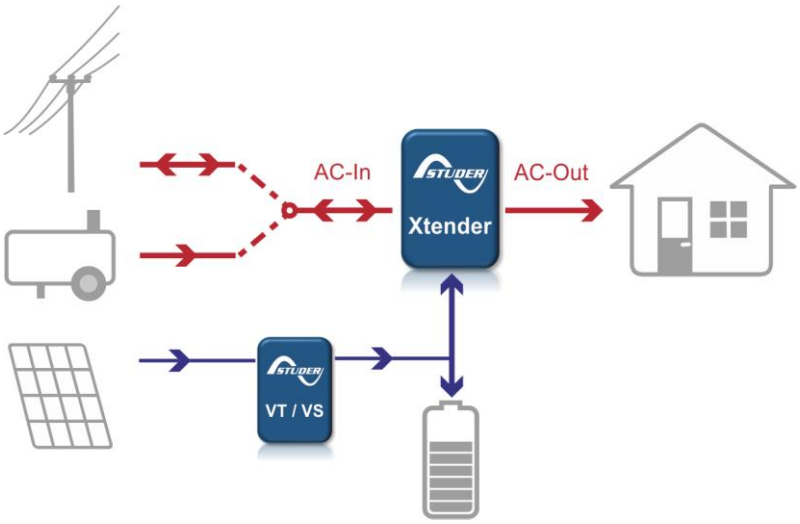



*Figure 5: Typical installation toppology, VT/VS are optional*

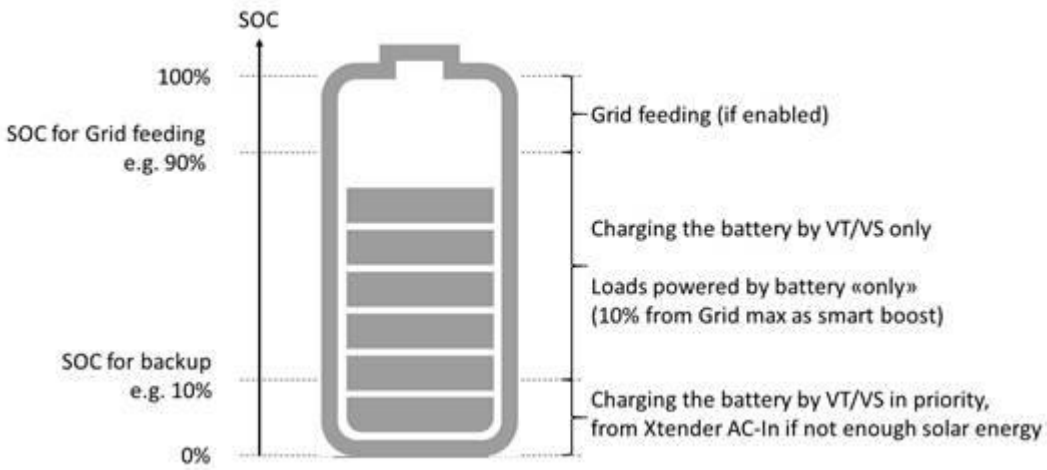



*Figure 6: How a system works depending on SOC*

Summary :

From SOC 0% to SOC = SOC for backup {6062} :
Energy to charge the battery is taken from VarioTrack and/or VarioString in priority and from AC-In of the Xtender if not enough solar energy.

From SOC = SOC for backup {6062} to SOC = SOC for grid feeding {6063} :
Energy to charge the battery is taken from VarioTrack and/or VarioString only. The battery priority is automatically on (parameter {1296} on the Xtender is activated by Xcom-CAN internally) so the load use mainly battery energy.

From SOC = SOC for grid feeding {6063} to SOC = 100% :
Energy is taken from VarioTrack and/or VarioString to feed the grid if grid feeding is enabled.

### 6.7.6 Use battery current limits instead of recommended values {6064}

You can find this parameter in the "Advanced settings menu" of Xcom-CAN.
Some battery models (e.g. IPS liCube modular LiFePO4-System) send both "reccomended values" and "limit values" on the communication interface for the charging and discharging currents. This parameter enables you to choose the values you prefer.. "Recommended values" ensure long life time of the battery system by charging the battery at a lower C-rate. It is selected by setting this parameter {6064} to "No". "Limit values" enable you to use your battery system at the maximum possible performance (higher C-rate). It is selected by setting this parameter {6064} to "Yes".

## 6.8 TYPICAL APPLICATIONS IN "ACTIVITY CONTROL" OPERATING MODE

The most typical applications in "Activity Control" operating mode are presented here. These applications are typical and variations can be made, depending on the special needs of the installation.

There is a limitation of the number of Xtenders that you can use in "Activity Control" mode. For technical reasons and stability issues, it is not allowed to have more than one Xtender per phase. Three-phase systems are supported, but only with one Xtender per phase.

### 6.8.1 Backup/mobile application with or without VarioTrack/VarioString

In a backup/mobile application, the user would like to have the battery fully charged in order to have maximum energy in case of blackout (backup solution) or grid disconnexion (mobile application). For such an installation, set the parameters as explained below :

1. Xcom-CAN settings :
   - SOC for grid feeding {6063} => 100%
   - SOC for backup {6062} => 100%
2. Xtender settings :
   - Grid feeding allowed {1127} => no
   - Charger allowed {1125} => yes
   - Inverter allowed {1124} => yes
   - Smart-boost allowed {1126} => yes
   - Maximum current of AC source (input limit) {1107} => set to the value corresponding to the fuse of your installation.

### 6.8.2 DC-coupled self consumption application with VarioTrack/VarioString

In a DC-coupled self-consumption application, the user would like to set a minimum SOC level for backup in case of blackout. Above this SOC level, the battery has to be charged by DC-coupled devices (VarioTrack and/or VarioString). When the SOC is really high , grid feeding can start if allowerd. An example of settings is explained below :

1. Xcom-CAN settings :
   - SOC for grid feeding {6063} => 90%
   - SOC for backup {6062} => 10%
2. Xtender settings :
   - Grid feeding allowed {1127} => yes
   - Charger allowed {1125} => yes
   - Inverter allowed {1124} => yes
   - Smart-boost allowed {1126} => yes
   - Maximum current of AC source (input limit) {1107} => set to the value corresponding to the fuse of your installation.

### 6.8.3 Xtender/Vario system settings

The Xcom-CAN will automatically initialize the DC voltage/current parameter of your system. All other parameters, non-related to battery management and/or specific to the installation, must be set as described in the user manual of the various XT-VT-VS appliances in the system. For example: the input limit of the Xtender {1107}, the AC output voltage {1286} or the behaviour of the auxiliary relays.

# 7 TROUBLESHOOTING

There are different problems that may cause the Xcom-CAN to malfunction. This list presents known irregularities and the procedures to follow to address them.

| Symptom | Description |
|---|---|
| All LEDs are off | Your Xcom-CAN is not powered correctly.<br>Check that the module is correctly connected to your Xtender system with the appropriate cable. See chapter 5.3. |
| Red LED blinking | An emergency stop occurred or the communication with the battery or third party device is lost. The RCC screen will help you find the source of the problem.<br>In case of an emergency stop:<br>1. Restart the battery system if it has stopped (switched off) or changed to limited power source (preload mode). See also chap. 6.4.<br>2. Check whether the battery is correctly connected with the Xcom-CAN module.<br>3. Check that the CAN communication speed of the Xcom-CAN module is corresponding to the one of the battery. The communication speed is indicated on the RCC under the menu "System info". Use the arrows to find and select the Xcom-CAN.<br>4. Check that the jumpers are correctly positioned. See chap. 5.1.5.<br>5. When the LED is blinking normally again (Blink 2x green), turn on the Studer devices that were turned off by the emergency stop, one by one. |

# 8 SOFTWARE UPDATES

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

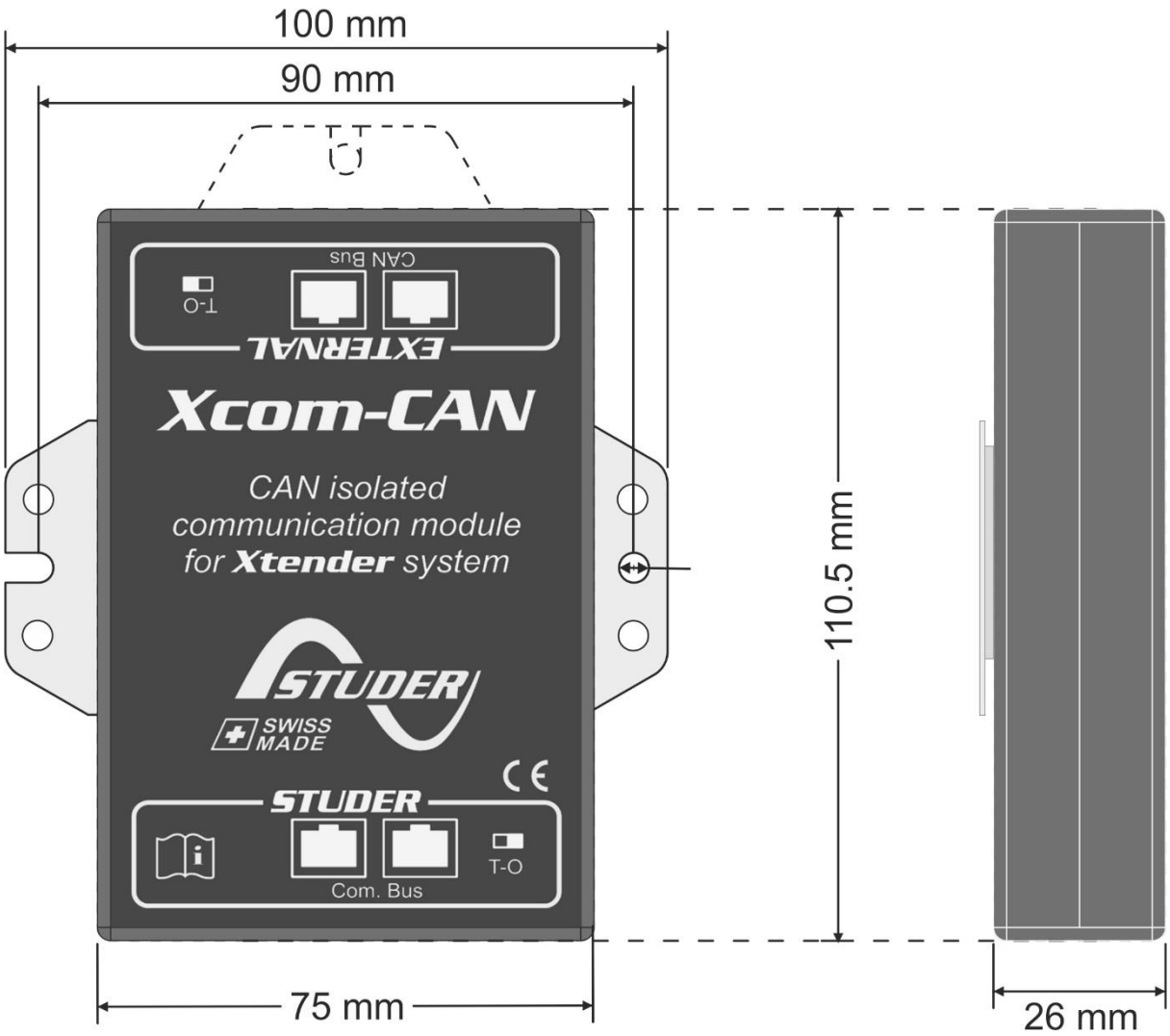
## 8.1 UPDATING PROCESS

| | |
|---|---|
|  | 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. |

# 9 DIMENSIONS



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