Technical specification

Multi-protocol communication module Xcom-CAN

Date   :   02.10.15

Version   :   V1.0

MULTI-PROTOCOL COMMUNICATION MODULE XCOM-CAN: TECHNICAL SPECIFICATION

ABOUT THE SOFTWARE

This document applies to software versions V1.5.2 or higher of the Xcom-CAN. It is possible to update the product with the latest software version available on www.studer-innotec.com/support and the use of a Remote control (RCC-02, RCC-03, Xcom-232i, Xcom-SMS)

COMPATIBILITY WITH STUDER PRODUCTS

The Xcom-CAN operates in Xtender systems (with products such as Xtender, VarioTrack, VarioString, BSP, RCC-02/-03, Xcom-232i, Xcom-LAN, Xcom-GSM, Xcom-SMS).

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.

CONTENTS

1 INTRODUCTION

1.1 THE MULTI-PROTOCOL COMMUNICATION MODULE XCOM-CAN

This manual contains a complete description of the functioning of the multi-protocol communication module Xcom-CAN.

The multi-protocol communication module Xcom-CAN makes it possible to access systems with Studer Innotec devices through multiple protocols.

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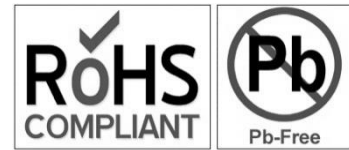
To dispose of this product, please use the service for the collection of electrical waste and observe all obligations in force in the place of purchase.

3   EC DECLARATION OF CONFORMITY

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

- Low voltage directive 2006/95/EC: EN 60950-1:2006
- EMC directive 2004/108/EC: EN 61000-6-1:2007, EN 61000-6-3:2007
- RoHS directive: 2011/65/EU

CH - 1950 Sion, September 2015

Studer Innotec SA (R. Studer)

Studer Innotec SA contact details

Studer Innotec SA
Rue des Casernes 57
CH - 1950 Sion
Switzerland

+41(0) 27 205 60 80
+41(0) 27 205 60 88

info@studer-innotec.com
www.studer-innotec.com

4 MATERIAL NEEDED FOR THE INSTALLATION

4.1 CONTENTS OF THE XCOM-CAN COMMUNICATION SET

The communication set Xcom-CAN contains the following material:

• 1 Xcom-CAN	
• Two 2 meter communication cables, to connect the Xcom-CAN to Studer and external devices	
• Mounting plate	
• SD card with manual	

4.2 ADDITIONAL ITEMS

In addition to the material delivered with the communication set the use of an Xcom-CAN necessitates a Phillips screwdriver #1 (P1).

5 INSTALLATION

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.

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

5.1 MOUNTING

The Xcom-CAN can be mounted directly on any support by means of the supplied fixing plate or on a smooth surface with double-side adhesive (see Figure 11 (p. 35)).

5.2 CONNECTING THE COMMUNICATION BUS

Check the termination on the device to which you will connect the Xcom-CAN. If the system contains several devices do not connect the Xcom-CAN between devices connected to the battery. Connect your module with the supplied cable to a free communication connector in the system.
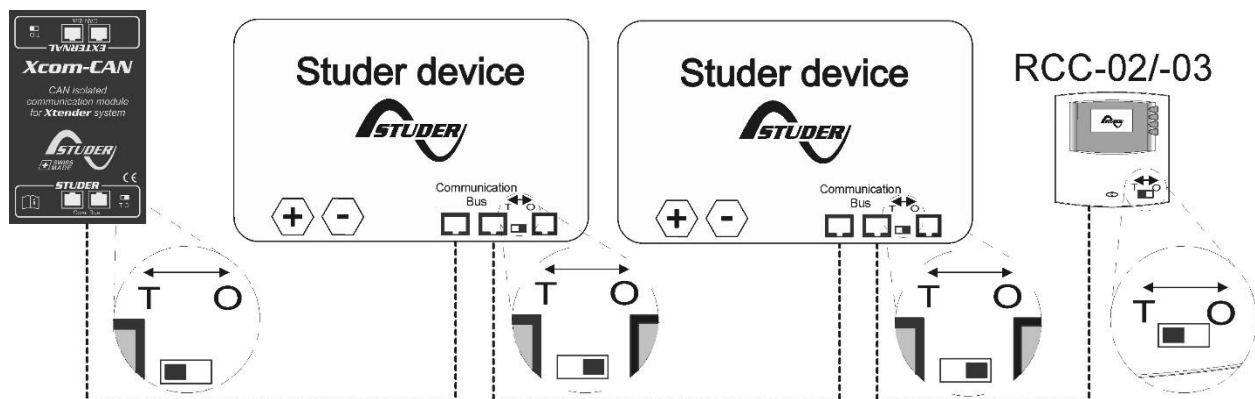

Figure 1: Connection schematics for Xcom-CAN

⚠	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 (with one cable). These devices should be put to T as "Terminated". See Figure 1. 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-CAN is connected and powered by the Studer system. The Xcom-CAN will perform different sequences indicated by the bi-coloured LED (red/green) situated next to the communication cable.

6   BLINKING CODES AND PUSH BUTTON
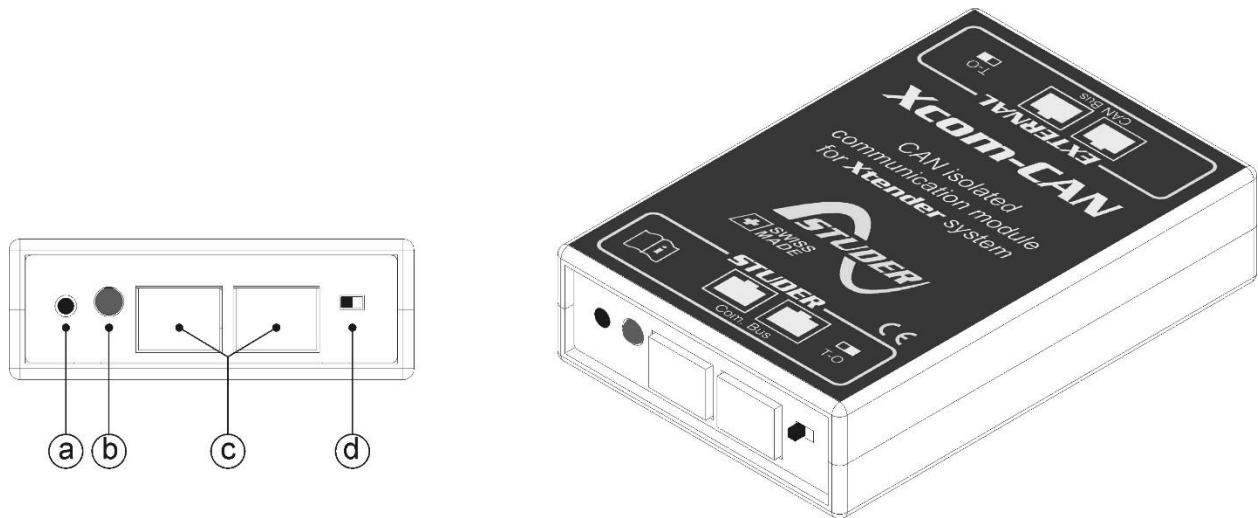
*Figure 2: Front and isometric view of the Xcom-CAN*

| Key	Description
(a)	**Push button**
	This button is reserved for Studer Innotec manufacturing use only. It does not provide any function to the end user.
(b)	**Bicoloured signalisation LED green/red**
	The signalisation LED indicates different functions using colour and frequency of blinking. See in chapters dedicated to the protocols the specific description.
	In normal operation
	The green signalisation LED blinks 2x repeatedly if the Xcom-CAN is in operation.
(c)	**Studer devices communication connectors**
	This connector allows the Xcom-CAN to connect with an Xtender system, and thus fully use its functions.
(d)	**Switch for communication line ending**
	This switch activates or deactivates the communication bus termination. The termination is by default activated (terminated). In Figure 2, 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).
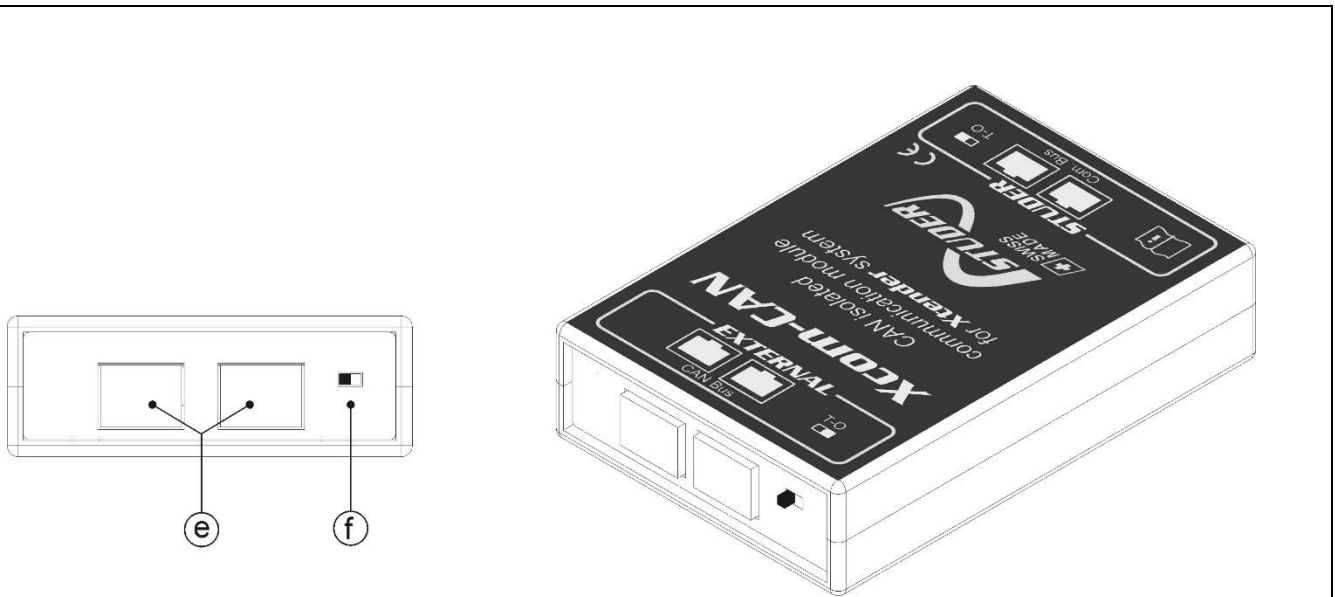
Figure 3: Back and isometric view of the Xcom-CAN

Key	Description
(e)	**CAN connectors for an external network** These connectors allow the Xcom-CAN to connect to an external network. Examples of networks : • An external system (e.g. SCADA), implementing the public protocol • A battery, compatible with the BMS protocol • A battery, compatible with the CANopen protocol • A second Studer Innotec system (Xcom-CAN-36) The cable pinning must be carefully checked before connecting any device at this point.
(f)	**Switch for CAN termination** This switch activates or deactivates the communication bus termination. The termination is by default activated. In Figure 3, the termination is activated (T).

7 HOW TO USE THE COMMUNICATION MODULE

The Xcom-CAN module supports different protocols and functionalities:

- Studer Public protocol: communication with Xtender installations through a specific CAN from any programmable device (e.g. SCADA, Industrial PC, etc.)
- BMS protocol: interface with some specific batteries. For a detailed list, please refer to BMS section (chapter 7.3) to select the correct battery.
- CANopen protocol: interface with some specific batteries using the CANopen profile for batteries (CiA 418) and providing the battery charger profile (CiA 419)
- Isolated Studer protocol: this protocol enables you to connect an RCC-02/-03 through a galvanic isolation to your Xtender system. To use this protocol, you need to use a special version of the Xcom-CAN: "Xcom-CAN-36".

Selecting the functionality is done by a DIP switch and a hardware configuration using jumpers directly on the electronic board of the device. Figure 4 shows the printed circuit board of the Xcom-CAN module with its casing opened.
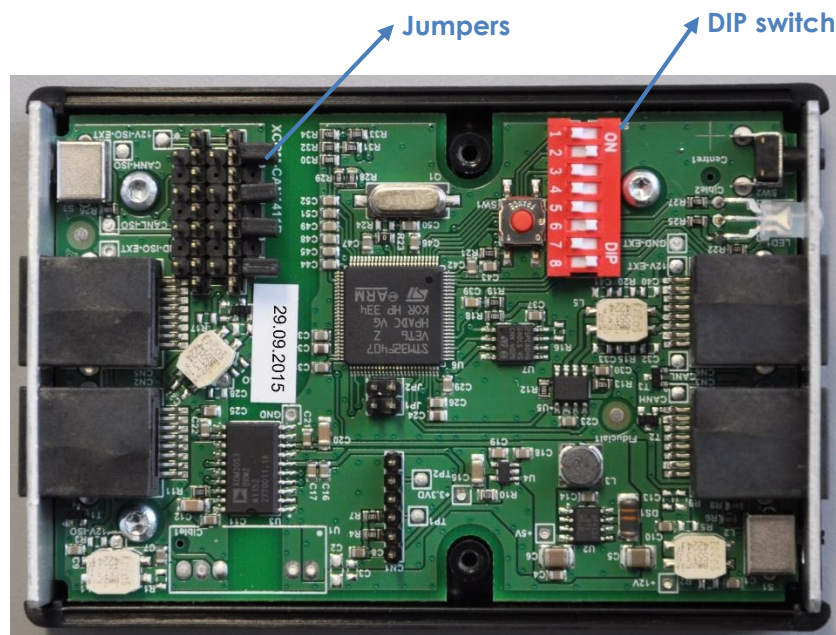

Figure 4: Electronic board inside the Xcom-CAN

The following steps must be performed when selecting a functionality:

1. Disconnect your Xcom-CAN module from all devices (installation, battery, etc.)

2. Open the Xcom-CAN with a Phillips screwdriver #1.

3. Configure the DIP switch according to the functionality you want. Please refer to "DIP switch configuration" for a complete explanation.

4. Configure the jumpers according to your requirement on the External CAN connector. Please refer to "jumper configuration" for a complete description.

5. Close the Xcom-CAN with the two screws

6. Connect the Xcom-CAN to your installation. Be sure that the termination switches on both sides of the Xcom-CAN module are correctly positioned.

The default pinning of the connector is intentionally left undefined, so you need to configure it before the first use. Four jumpers are available on the patch panel (see Figure 5).

The pinning of the connector can be freely configured with the patch panel and the jumpers:

	12V		12V	
CAN H	1	CAN L	2	CAN H
	GND		GND	
CAN H	3	CAN L	4	CAN H
	12V		12V	
CAN H	5	CAN L	6	CAN H
	GND		GND	
CAN H	7	CAN L	8	CAN H
	12V		12V	
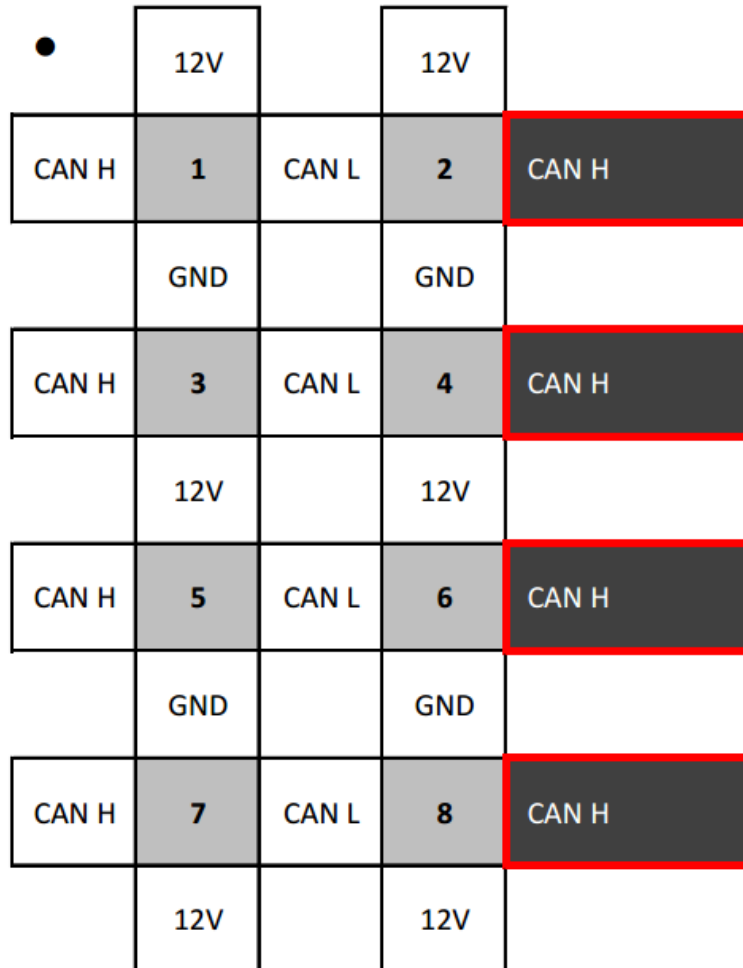
Figure 5: Patch panel with default jumpers

You can connect any pin of the connector (grey cells with pin number) with any signal of the communication line (+12V, GND, CAN-H, CAN-L) with jumpers. The +12V is only available with the special execution Xcom-CAN-36.

7.1 STUDER PUBLIC PROTOCOL

The Studer Public protocol is intended for communication between devices in a Studer system with any other CAN 2.0 compatible system. The entire system can be controlled through this interface. It is possible to change all parameters within the system, to receive all electric measures in real time as well as all messages from all devices in the system.

7.1.1 DIP switch configuration

Figure 6 shows the DIP switch configuration in order to select the Studer Public protocol. The default CAN speed for this protocol is set to 250 kbps. However, you can adjust it depending on your needs. Refer to chapter 7.2.4 for a specific CAN speed configuration.
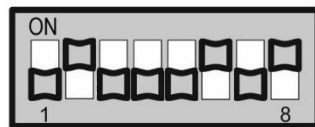

Figure 6: DIP switch configuration for Studer Public protocol

7.1.2 Jumper configuration

There is no specific attribution for the pinning of the public protocol. Place the jumpers according to your own pin connection. Please refer to Figure 5 for a complete description of the possibilities.

7.1.3 CAN frame format

The Xcom-CAN and the DTE exchange frames consist of a header of 29 bits followed by a variable number of data bytes depending on frame type.

CAN Identifier				CAN Data
DST ADDR	**SRC ADDR**	**SERVICE**	**FLAGS**	**Specific to service**
10 bits	10 bits	3 bits	6 bits	

DST ADDR

The destination address, e.g. 101 for the first Xtender, see chapter 7.1.5 for more details.

SRC ADDR

The source address is the address of the client device, the response will return to this address.

SERVICE

The service that the frame is intended for. The value could be:

0x00   :   User info read service
0x01   :   Parameter read service
0x02   :   Parameter write service
0x03   :   Message notification service
0x04 – 0x07 :   Reserved

FLAGS

The **BIT0** flag is the least significant bit (LSB) of the **FLAGS** field. The flags are described hereafter:

BIT0	**:**	Error ➜ indicates if the response is an error notification (see chap. 7.1.11)
BIT1	**:**	Reserved
BIT2	**:**	Reserved
BIT3	**:**	Reserved
BIT4	**:**	Reserved
BIT5	**:**	Reserved

SPECIFIC TO SERVICE

Specific to used service, see description under each service

7.1.4 Endianness

All frames are written in Big Endian.

7.1.5 Addressing the devices

Address	Devices	Remarks
100	Virtual address to access all XTH, XTM and XTS	See section "multicast addresses"
101 to 109	A single XTH, XTM or XTS inverter	Ordered by the index displayed on the RCC
191 to 193	Virtual address to access properties on all inverters on a phase : 191 for L1, 192 for L2 and 193 for L3	A read access return the value of the master of the phase
300	Virtual address to access all VarioTrack	See section "multicast addresses"
301 to 315	VarioTrack	Ordered by the index displayed on the RCC
401	Xcom MS	
601	BSP	
700	Virtual address to access all VarioString	See section "multicast addresses"
701 to 715	VarioString	Ordered by the index displayed on the RCC

7.1.6 Multicast addresses

A write to this kind of address will have the effect to change the property value on all devices of the same kind. Read operations are not supported.

7.1.7 Response delay

The response delay of the Xcom-CAN can be up to 2 seconds. This is a good value for a timeout in the client implementation.

The response delay depends on the busload (number of devices, number of RCC, values displayed on the RCC). The use of the data logger on other RCCs can cause a periodic increase of the response delay every 60 seconds.

7.1.8 User info

These objects give information about the current state of the system. They cannot be modified and their values change during the operation of the system. Previously known as system states.

The fields that are specific to parameter frames are:

INFO ID : The identifier of a user info object (see chapter **Erreur ! Source du renvoi ntrouvable.** for all user info id)
DATA : Value of the user info in 32-bit Floating point format (see IEEE 754)

7.1.8.1   Read info service

The client side sends a request frame with the following structure:

CAN Identifier				CAN Data
DST ADDR	SRC ADDR	SERVICE	FLAGS	INFO ID
10 bits	10 bits	3 bits	6 bits	16 bits
0x000 to 0x3FF	0x000 to 0x3FF	0x0	0x00	0x0000 to 0xFFFF

DST ADDR : 0x00 to 0x3FF

SRC ADDR : 0x00 to 0x3FF

SERVICE : 0x0

FLAGS : 0x00

INFO ID : 0x0000 to 0xFFFF (see chap. **Erreur ! Source du renvoi introuvable.**)

The Xcom-CAN responds with a frame with the following structure:

CAN Identifier				CAN Data	
DST ADDR	SRC ADDR	SERVICE	FLAGS	INFO ID	DATA
10 bits	10 bits	3 bits	6 bits	16 bits	32 bits
0x000 to 0x3FF	0x000 to 0x3FF	0x0	0x00 to 0x01	0x0000 to 0xFFFF	0x00000000 to 0xFFFFFFFF

DST ADDR : 0x00 to 0x3FF

SRC ADDR : 0x00 to 0x3FF

SERVICE : 0x0

FLAGS : 0x0 or 0x01 (if error)

INFO ID : 0x0000 to 0xFFFF (see chap.**Erreur ! Source du renvoi introuvable.**)

DATA : 0x00000000 to 0xFFFFFFFF

7.1.8.2 Available user info

The available user information is the same as the values that can be chosen to be displayed on the RCC. The user information is related with the inverter parameters that can be configured with the RCC. The functionalities of each parameter are described in the RCC manual. You can easily find specific parameters by using the parameter index at the end of the manual.

7.1.9 Parameters

All parameters accessible from the remote control can also be modified with the protocol. The behaviour is the same as if a physical person changes the value with the remote control buttons.

The fields that are specific to parameter frames are:

PARAM ID	:	The identifier for a parameter object
PART	:	The parameter part (value = 0, min = 1, max = 2)
DATA	:	The parameter value in case of a read and value to write in case of a write. The data are always in 32-bit Floating point format (see IEEE 754).

7.1.9.1 Read parameter service

The client side sends a request frame with the following structure:

CAN Identifier				CAN Data	
DST ADDR	**SRC ADDR**	**SERVICE**	**FLAGS**	**PARAM ID**	**PART**
10 bits	10 bits	3 bits	6 bits	16 bits	8 bits
0x000 to 0x3FF	0x000 to 0x3FF	0x1	0x00	0x0000 to 0xFFFF	0x00 to 0x02

DST ADDR	:	0x000 to 0x3FF
SRC ADDR	:	0x000 to 0x3FF
SERVICE	:	0x1
FLAGS	:	0x00
PARAM ID	:	0x0000 to 0xFFFF (see chap.**Erreur ! Source du renvoi introuvable.**)
PART	:	0x00 to 0x02
DATA	:	no data

The Xcom-CAN responds with a frame with the following structure:

CAN Identifier				CAN Data		
DST ADDR	**SRC ADDR**	**SERVICE**	**FLAGS**	**PARAM ID**	**PART**	**DATA**
10 bits	10 bits	3 bits	6 bits	16 bits	8 bits	32 bits
0x000 to 0x3FF	0x000 to 0x3FF	0x1	0x00	0x0000 to 0xFFFF	0x00 to 0x02	0x00000000 to 0xFFFFFFFF

DST ADDR	:	0x00 to 0x3FF
SRC ADDR	:	0x00 to 0x3FF
SERVICE	:	0x1
FLAGS	:	0x0 or 0x01 (if error)
PARAM ID	:	0x0000 to 0xFFFF (see chap. 6)
PART	:	0x00 to 0x02
DATA	:	0x00000000 to 0xFFFFFFFF

7.1.9.2   *Write parameter service*

The client side sends a request frame with the following structure:

CAN Identifier				CAN Data		
DST ADDR	**SRC ADDR**	**SERVICE**	**FLAGS**	**PARAM ID**	**PART**	**DATA**
10 bits	10 bits	3 bits	6 bits	16 bits	8 bits	32 bits
0x000 to 0x3FF	0x000 to 0x3FF	0x2	0x00	0x0000 to 0xFFFF	0x00	0x00000000 to 0xFFFFFFFF

DST ADDR	:	0x00 to 0x3FF
SRC ADDR	:	0x00 to 0x3FF
SERVICE	:	0x2
FLAGS	:	0x0
PARAM ID	:	0x0000 to 0xFFFF (see chap. **Erreur ! Source du renvoi introuvable.**)
PART	:	0x00 (only the value is writable)
DATA	:	0x00000000 to 0xFFFFFFFF

The Xcom-CAN responds with a frame with the following structure:

CAN Identifier				CAN Data		
DST ADDR	**SRC ADDR**	**SERVICE**	**FLAGS**	**PARAM ID**	**PART**	**DATA**
10 bits	10 bits	3 bits	6 bits	16 bits	8 bits	32 bits
0x000 to 0x3FF	0x000 to 0x3FF	0x2	0x00 to 0x01	0x0000 to 0xFFFF	0x00	no data

DST ADDR	:	0x00 to 0x3FF
SRC ADDR	:	0x00 to 0x3FF
SERVICE	:	0x2
FLAGS	:	0x0 or 0x01 (if error)

PARAM ID	:	0x0000 to 0xFFFF (see chap. **Erreur ! Source du renvoi introuvable.**)
PART	:	0x00 (only the value is writable)
DATA	:	no data

7.1.9.3 Available parameters on the Xtender inverter

Changing parameters when the inverters are in operation should be done carefully. The modification of parameters can restart the corresponding algorithm inside the inverter. For example, the change of a delay can restart the timer attached to it.

7.1.9.4 Cyclic write of parameters on the Xtender inverter

The Xtender inverter store the parameter values in a non-volatile flash memory. Because of the endurance of this memory, the number of writes on a single parameter property is only guaranteed for 1000 write operations.

To allow the cyclic write of parameters without count limit, the parameter {1550} "Parameters saved in flash memory" has been introduced in the Xtender software.

This parameter has the value "yes" by default. A write of "no" to this parameter value stop the write in the non-volatile flash memory. This operation is written in the flash memory only the first time, so consecutive writes of the value "no" to {1550} can be repeated without limit.

After parameter {1550} has been set to "no", all other parameters can be written without count limit. Because the values of all other parameters are not stored in flash, the read operation will give the values before {1550} as be changed to "no". Also, after a reset the old values will be taken.

To use the inverter with cyclic write operations you must:

- ensure that all inverters have a firmware version >= 1.5.32
- set the parameter {1550} to "no" on all targeted inverters
- avoid to write cyclically on other devices like BSP, RCC, ...
- ensure that no "reset default/factory settings", "apply configuration file (masterfile)" or modification with the remote control change {1550} to "yes"

It is a good practice to cyclically write "no" to {1550}.

A write of "yes" to the parameter {1550} reactivate the write in flash. It will be written in the flash every time and should not be used more than 1000 times.

7.1.9.5 Cyclic write of parameters on VarioTrack and VarioString

The VarioTrack and VarioString behave in the same way as the Xtender inverter. The parameter {10058} for the VarioTrack and {14069} for the VarioString allow to deactivate the write in non-volatile memory.

7.1.9.6 Hours encoding

The hours encoding is in minutes beginning at 00:00. For example 13:41 is 13*60+41 = 821.

7.1.9.7 Days of the week encoding

The days of the week selection (parameters {1205}, for example) is coded as a bit field in a Float. A day selected as it bit set to 1.

bit	BIT31-7	BIT6	BIT5	BIT4	BIT3	BIT2	BIT1	BIT0
day of the week	undefined	SU	SA	FR	TH	WE	TU	MO

7.1.9.8 Month of the year encoding

The month of the year selection (parameters {1479}, for example) is coded as a bit field in a Float. A month selected as it bit set to 1. January is BIT0 and December BIT11. The BIT31 to 12 are undefined.

7.1.9.9 Date encoding

The Date (parameters {5002}, for example) is coded as a Float. The value is the number of seconds since 1.1.1970 00:00:00.

7.1.9.10 Signal encoding

The Signal (parameters {1468}, for example) is coded as a Float. To send a signal, you must write the value 1 to the parameter value.

7.1.10 Message objects

These objects are messages from system participants.

7.1.10.1 Message notification prototype

The Xcom-CAN notify a new message with a frame with the following structure:

CAN Identifier				CAN Data	
DST ADDR	**SRC ADDR**	**SERVICE**	**FLAGS**	**MESSAGE ID**	**VALUE**
10 bits	10 bits	3 bits	6 bits	16 bits	32 bits
500	0x000 to 0x3FF	0x3	0x00 to 0x01	0x0000 to 0xFFFF	0x00000000 to 0xFFFFFFFF

DST ADDR	:	500 => RCC group address
SRC ADDR	:	0x00 to 0x3FF
SERVICE	:	0x3
FLAGS	:	0x00 or 0x01 (if error)
MESSAGE ID	:	0x0000 to 0xFFFF
VALUE	:	0x00000000 to 0xFFFFFFFF

7.1.10.2 Available messages

A list referencing all available messages and their descriptions is in chapter 12.12.

7.1.11   Error objects

These objects are error code that are returned when a request fails.

7.1.11.1   Error response prototype

The Xcom-CAN notify an error code with a frame with the following structure:

CAN Identifier				CAN Data	
DST ADDR	**SRC ADDR**	**SERVICE**	**FLAGS**	**ID**	**ERROR CODE**
10 bits	10 bits	3 bits	6 bits	16 bits	8 bits
0x000 to 0x3FF	0x000 to 0x3FF	0x3	0x00 to 0x01	0x0000 to 0xFFFF	0x00000000 to 0xFFFFFFFF

DST ADDR	:	0x00 to 0x3FF
SRC ADDR	:	0x00 to 0x3FF
SERVICE	:	0x3
FLAGS	:	0x00 or 0x01 (if error)
ID	:	0x0000 to 0xFFFF
ERROR CODE	:	0x00000000 to 0xFFFFFFFF

7.1.11.2   Error codes

The following error codes can be returned:

Name	Error code	Meaning
INVALID_FRAME	0x0001	Malformed frame
DEVICE_NOT_FOUND	0x0002	Wrong DST_ADDR field
RESPONSE_TIMEOUT	0x0003	No response from the server
INVALID_SERVICE_ARGUMENT	0x0012	Wrong service data
GATEWAY_BUSY	0x0013	Gateway busy
OBJECT_ID_NOT_FOUND	0x0022	No object with this info or param id was found
INVALID_DATA_LENGTH	0x0024	The data field has an invalid number of bytes
PROPERTY_IS_READ_ONLY	0x0025	A writing to this property is not allowed
INVALID_DATA	0x0026	This value is impossible for this property

Name	Error code	Meaning
DATA_TOO_SMALL	0x0027	The value is below the minimum limit
DATA_TOO_BIG	0x0028	The value is above the maximum limit
WRITE_PROPERTY_FAILED	0x0029	Writing is possible, but failed
READ_PROPERTY_FAILED	0x002A	Reading is possible, but failed
ACCESS_DENIED	0x002B	Insufficient user access
MULTICAST_READ_NOT_SUPPORTED	0x002D	Read operation is not supported when used on multicast addresses

7.1.12   Signalisation LED

Red LED	Meaning
Blink 2x repeatedly	The communication with the Studer system is lost

7.1.13   CAN bus speed

The DIP switches in position 6 to 8 enables you to select the CAN speed. The table below shows the different speed possibilities.

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

7.1.14   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. You need to : 1. Check that the module is correctly connected to your Xtender system with the appropriate cable (see chapter 0)

7.2 CANOPEN PROTOCOL

In mode CANopen, the Xcom-CAN acts as a battery charger (CiA 419). It will automatically locate the battery on the CAN network and configure the necessary communication channels between the battery charger (Xcom-CAN) and the battery (BMS of the battery).

In an Xtender system the Xcom-CAN is seen as a BSP and it communicates battery information to the rest of the system.

7.2.1 DIP switch configuration

Figure 7 shows the DIP switch configuration to select the CANopen protocol. The default CAN speed for this protocol is set to 250 kbps. However, you can adjust it depending on your needs. Refer to chapter 7.2.4 for specific CAN speed configurations.
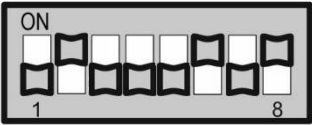
Figure 7: CANopen DIP switch configuration

7.2.2 Jumper configuration

Figure 8 shows the jumper configuration in order to select the CANopen protocol.
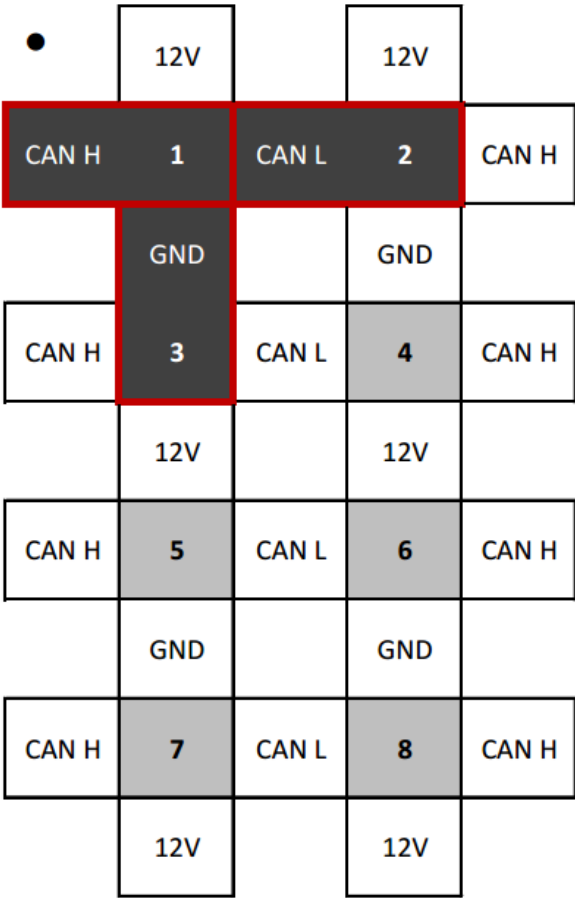
Figure 8: Jumper selection for CANopen protocol

7.2.3 Signalisation LED

Red LED	Meaning
Blink 2x repeatedly	The communication with the battery is lost

7.2.4 CAN bus speed

The DIP switches in position 6 to 8 enables you to select the CAN speed. The table below shows the different speed possibilities.

Position			CAN bus speed	Remarks
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	

7.2.5 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. You need to : 1. Check that the module is correctly connected to your Xtender system with the appropriate cable (see chapter 0)

7.3 BMS PROTOCOL

Selecting the BMS protocol, the Xcom-CAN module enables the Xtender system to work with Lithium-Ion batteries. The supported batteries are listed below:

- BMZ ESS 3.0 ~ESS 7.0 (and compatibles)
- Leclanché TiBox (and compatibles)
- BYD B-Box2.5~B-Box10.0

These batteries send information (limits, expectations, measures) to the Xcom-CAN. The Xcom-CAN interprets this information and automatically configures the Studer devices, such as Xtender, VarioTrack & VarioString, accordingly. The parameters of these devices will be managed directly by the Xcom-CAN module. No special configuration has to be done to handle the battery properly.

All these batteries are compatible with the Xcom-CAN in terms of protocol. In terms of performance, it has to be evaluated case by case, depending on the battery and the installation needs.

When working with the BMS protocol, the Xcom-CAN will automatically change the parameters of your Xtender system (Xtender, VarioTrack & VarioString). Some parameters will be changed frequently depending on the needs of your battery.

To avoid premature aging of the flash memory, the Xcom-CAN deactivates the saving of parameters in flash for Xtender, VarioTrack & VarioString.

As an end user, you have to be warned that all parameters seen on the screen of the RCC will not reflect the real configuration when using an Xcom-CAN in BMS protocol mode. For technology reasons, the RCC shows flash saved parameters, not the ones in RAM that the Xcom-CAN changes.

As the Xcom-CAN changes parameters really fast, depending on what is needed for the battery, it will access the used parameters (in RAM), not the saved parameters (in FLASH). Used parameters are dynamic and are lost in case of power off. On the other hand, saved parameters are permanent and are used for static configuration with the RCC.
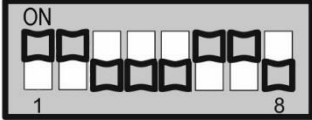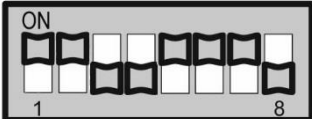
All these batteries have a limited current in charge and discharge. Studer Innotec devices can control the charge current, but not the discharge current as the main purpose of the inverter is to provide current to the load in any case. So, if the discharge current is overpassed, the BMS of the battery will probably disconnect the battery from the system (open the security relays). It is the responsibility of the customer to take this parameter (discharge current limit) into account for dimensioning the battery of his installation.

The status of the battery (voltage, current, SOC) is monitored and it is possible to visualise it on the RCC-02/-03's BSP menu depending on the battery used. Some of the batteries might not provide this information; in that case, you will see in the corresponding field a "n.a.", which means "not available".

The configuration is easily done by hardware (DIP switch and jumpers). No other special tuning is needed for the BMS protocol.

7.3.1 DIP switch configuration

As battery manufacturers have slightly different protocols, the Xcom-CAN is able to adapt to different implementations. The next table shows DIP switch configuration depending on battery manufacturer.

Battery manufacturer	DIP switch configuration
BMZ ESS 3.0 BYD	
Leclanché TiBox	

7.3.2 Jumper configuration

Figure 9 shows the jumper configuration to select the BMS protocol mode.
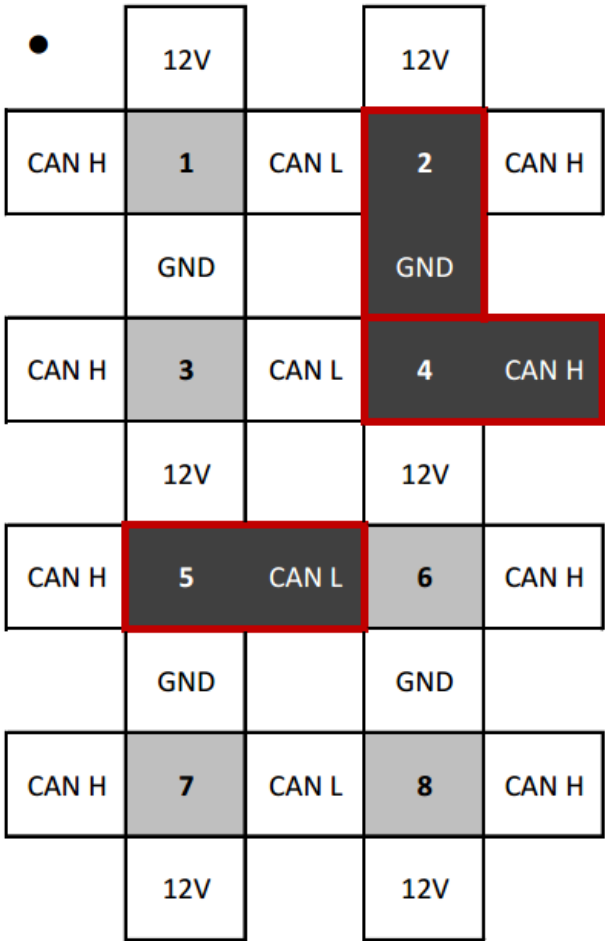
Figure 9: Jumper selection for BMS protocol

7.3.3 Signalisation LED

Red LED	Meaning
Blink 2x repeatedly	The communication with the battery is lost

7.3.4 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. You need to : 2. Check that the module is correctly connected to your Xtender system with the appropriate cable (see chapter 0)

Red LED blinking	The communication with the battery is lost.
	
	You could do the following :
	
	    1. Check that the battery is correctly connected with the Xcom-CAN module.
	
	    2. Check that the CAN communication speed of the Xcom-CAN module is corresponding to the one of the battery (500 Kbits/s normally). You can see that on the screen of the RCC under "System Info" menu, then select the Xcom-CAN by using the up and down arrow.
	
	    3. Check that the jumpers are correctly positioned. Restart the battery system.

7.4   CAN ISOLATED STUDER PROTOCOL

The CAN Isolated Studer protocol is intended for special applications where a galvanic isolation is necessary in between the different system components, such as a remote control for instance. Only Studer Innotec system components can be connected with this protocol.

A standard Xcom-CAN cannot use this protocol, it requires a special version, the "Xcom-CAN-36". This special version has an isolated power supply through the external CAN.

7.4.1 DIP switch configuration

Figure 10 shows the DIP switch configuration for selecting the CAN Isolated Studer protocol. The only supported CAN speed for this protocol is 125 kbps. This is a special execution and it is delivered from factory with this configuration.

Figure 10: CAN Isolated Studer DIP switch configuration

7.4.2 Jumper configuration

Figure 11 shows the jumper configuration to select the CAN Isolated Studer protocol mode.

	12V		12V	
CAN H	1	CAN L	2	CAN H
	GND		GND	
CAN H	3	CAN L	4	CAN H
	12V		12V	
CAN H	5	CAN L	6	CAN H
	GND		GND	
CAN H	7	CAN L	8	CAN H
	12V		12V	
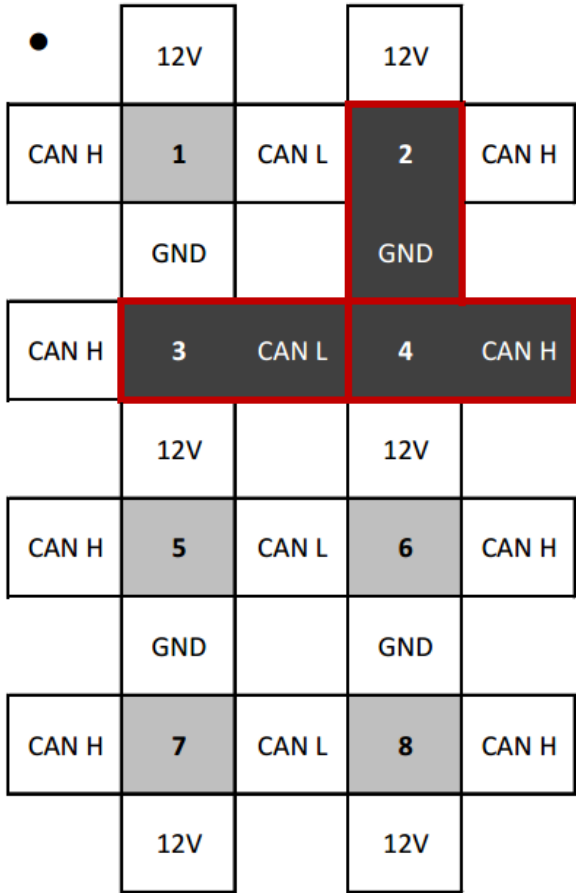
Figure 11: Jumper selection for CAN Isolated Studer protocol

7.5 DIP SWITCH CONFIGURATION

Following are all the details regarding the DIP switch configuration. Normally it is not necessary as all protocols have their own DIP switch schema in order to facilitate the setup of the system.

7.5.1 Protocol

The DIP switches in position 1 to 3 enables you to select a specific protocol. The table below shows the different possibilities.

Position			Protocol	Remarks
1	2	3		
OFF	OFF	OFF	Reserved	
		ON	Reserved	
	ON	OFF	Studer Public	CAN 2.0B (extended format)
		ON	Isolated Studer	
ON	OFF	OFF	CANopen	CiA 418 (battery)
		ON	Reserved	

		OFF	CAN BMS	
	ON	ON	Reserved	

7.5.2 Protocol mode option

The DIP switches in position 4 to 5 enables you to select some specific protocol options. These options are not available for all protocols. The table below shows the different option possibilities.

Protocol	Position		Protocol Option	Remarks
	4	5		
CAN BMS	OFF	OFF	BMZ & BYD	
		ON	Leclanché TiBox	
	ON	OFF	Reserved	
		ON	Reserved	
Others modes	OFF	OFF	Reserved	
		ON	Reserved	
	ON	OFF	Reserved	
		ON	Reserved	

8 SOFTWARE(S) UPDATING

The software of the remote control RCC as well as the Xtender inverter/chargers, VarioTrack/VarioString chargers, the RS-232 communication module (Xcom-232i), the CAN communication module (Xcom-CAN) 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.

8.1 UPDATING PROCESS

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 RCC'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.

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.

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

9   ELECTRICAL SPECIFICATIONS

Table 1: Maximum continuous working voltage for insulation

Parameter	Max	Unit	Remarks
AC Voltage			
Bipolar waveform	424	V_{PEAK}	50 year minimum lifetime
Unipolar Waveform			
Basic insulation	1074	V_{PEAK}	Maximum approved working voltage per IEC60950-1
Reinforced insulation	537	V_{PEAK}	Maximum approved working voltage per IEC60950-1
DC Voltage			
Basic insulation	1074	V_{PEAK}	Maximum approved working voltage per IEC60950-1
Reinforced insulation	537	V_{PEAK}	Maximum approved working voltage per IEC60950-1
ESD (Human Body Model)	3	kV	
Rated Dielectric Insulation Voltage	2500	V_{RMS}	1-minute duration

10 DIMENSIONS

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

0.8 mm

26.0 mm

Ø 4.5 mm

Xcom-CAN

*CAN isolated
communication module
for Xtender system*

EXTERNAL

CAN Bus

T-O

STUDER

SWISS MADE

C E

STUDER

Com. Bus

T-O

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

11 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

12   APPENDICES

12.1 XTENDER PARAMETERS

Level	User ref.	Parameter	Increment
Basic	**1100**	**BASIC SETTINGS**	Menu
Basic	1551	Basic parameters set by means of the potentiomenter in the XTS	1
Basic	1107	Maximum current of AC source (Input limit)	1
Basic	1138	Battery charge current	1
Basic	1126	Smart-Boost allowed	1
Basic	1124	Inverter allowed	1
Basic	1552	Type of detection of the grid loss (AC-In)	Only 1 bit 1:Slow 2:Tolerant 4:Fast
Basic	1187	Standby level	10
Basic	1395	Restore default settings	Signal
Inst.	1287	Restore factory settings	Signal
Expert	**1137**	**BATTERY MANAGEMENT AND CYCLE**	Menu
Expert	1125	Charger allowed	1
Basic	1138	Battery charge current	1
Expert	1139	Temperature compensation	1
QSP	1615	Fast charge/inject regulation	1
Expert	**1568**	**Undervoltage**	Menu
Expert	1108	Battery undervoltage level without load	0.1
Expert	**1531**	**Battery undervoltage dynamic compensation**	Menu
Expert	1191	Battery undervoltage dynamic compensation	1
Expert	1532	Kind of dynamic compensation	Only 1 bit 0:Manual 1:Automatic
QSP	1632	Automatic adaptation of dynamic compensation	1
Expert	1109	Battery undervoltage level at full load	0.1
Expert	1190	Battery undervoltage duration before turn off	1
Expert	1110	Restart voltage after batteries undervoltage	0.1
Expert	1194	Battery adaptive low voltage (B.L.O)	1
Expert	1195	Max voltage for adaptive low voltage	0.1
Expert	1307	Reset voltage for adaptive correction	0.1
Expert	1298	Increment step of the adaptive low voltage	0.01
Expert	1121	Battery overvoltage level	0.1
Expert	1122	Restart voltage level after an battery overvoltage	0.1
Expert	1140	Floating voltage	0.1
Expert	1467	Force phase of floating	Signal
Expert	**1141**	**New cycle menu**	Menu
Expert	1142	Force a new cycle	Signal
Inst.	1608	Use dynamic compensation of battery level (new cycle)	1
Expert	1143	Voltage level 1 to start a new cycle	0.1
Expert	1144	Time period under voltage level 1 to start a new cycle	1
Expert	1145	Voltage level 2 to start a new cycle	0.1
Expert	1146	Time period under voltage level 2 to start a new cycle	2
Expert	1149	New cycle priority on absorption and equalization phases	1
Expert	1147	Cycling restricted	1
Expert	1148	Minimal delay between cycles	1
Expert	**1451**	**Absorption phase**	Menu
Expert	1155	Absorption phase allowed	1
Expert	1156	Absorption voltage	0.1
Expert	1157	Absorption duration	0.25
Expert	1158	End of absorption triggered with current	1

Level	User ref.	Parameter	Increment
Expert	1159	Current limit to quit the absorption phase	1
Expert	1160	Maximal frequency of absorption control	1
Expert	1161	Minimal delay since last absorption	1
Expert	**1452**	**Equalization phase**	Menu
Expert	1163	Equalization allowed	1
Expert	1162	Force equalization	Signal
Expert	1291	Equalization before absorption phase	1
Expert	1290	Equalization current	1
Expert	1164	Equalization voltage	0.1
Expert	1165	Equalization duration	0.25
Expert	1166	Number of cycles before an equalization	1
Expert	1284	Equalization with fixed interval	1
Expert	1285	Weeks between equalizations	1
Expert	1168	End of equalization triggered with current	1
Expert	1169	Current threshold to end equalization phase	1
Expert	**1453**	**Reduced floating phase**	Menu
Expert	1170	Reduced floating allowed	1
Expert	1171	Floating duration before reduced floating	1
Expert	1172	Reduced floating voltage	0.1
Expert	**1454**	**Periodic absorption phase**	Menu
Expert	1173	Periodic absorption allowed	1
Expert	1174	Periodic absorption voltage	0.1
Expert	1175	Reduced floating duration before periodic absorption	1
Expert	1176	Periodic absorption duration	0.25
Expert	**1186**	**INVERTER**	Menu
Basic	1124	Inverter allowed	1
Expert	1286	AC Output voltage	1
Expert	1548	AC voltage increase according to battery voltage	1
Expert	1560	Max AC voltage increase with battery voltage	1
Expert	1112	Inverter frequency	0.1
Expert	1536	Inverter frequency increase when battery full	1
Expert	1549	Inverter frequency increase according to battery voltage	1
Expert	1546	Max frequency increase	0.1
Expert	1534	Speed of voltage or frequency change in function of battery	1
Expert	**1420**	**Standby and turn on**	Menu
Basic	1187	Standby level	10
Expert	1189	Time delay between standby pulses	0.2
Expert	1188	Standby number of pulses	1
Expert	1599	Softstart duration	0.25
Expert	1438	Solsafe presence Energy source at AC-Out side	1
QSP	1572	Modulator ru_soll	1
Expert	**1197**	**AC-IN AND TRANSFER**	Menu
Expert	1128	Transfer relay allowed	1
Expert	1580	Delay before closing transfer relay	0.25
Basic	1126	Smart-Boost allowed	1
Inst.	1607	Limitation of the power Boost	5
Basic	1107	Maximum current of AC source (Input limit)	1
Expert	**1471**	**Max input current modification**	Menu
Expert	1566	Using a secondary value for the maximum current of the AC source	1
Expert	1567	Second maximum current of the AC source (Input limit)	1
Expert	1527	Decrease max input limit current with AC-In voltage	1
Expert	1554	Decrease of the max. current of the source with input voltage activated by command entry	1
Expert	1309	AC input low limit voltage to allow charger function	5

Level	User ref.	Parameter	Increment
Expert	1433	Adaptation range of the input current according to the input voltage	1
Expert	1553	Speed of input limit increase	2
Expert	1295	Charge current decrease coef. at voltage limit to turn back in inverter mode	5
Expert	1436	Overrun AC source current limit without opening the transfer relay (Input limit)	1
Basic	1552	Type of detection of the grid loss (AC-In)	Only 1 bit 1:Slow 2:Tolerant 4:Fast
Expert	1510	Tolerance on detection of AC-input loss (tolerant UPS mode)	2
Expert	1199	Input voltage giving an opening of the transfer relay with delay	5
Expert	1198	Time delay before opening of transfer relay	1
Expert	1200	Input voltage giving an immediate opening of the transfer relay (UPS)	5
Inst.	1432	Absolute max limit for input voltage	5
QSP	1500	Standby of the charger allowed	1
Expert	1505	Delta frequency allowed above the standard input frequency	0.2
Expert	1506	Delta frequency allowed under the standard input frequency	0.2
Expert	1507	Duration with frequency error before opening the transfer	1
Expert	1575	AC-IN current active filtering	1
Inst.	1557	Use an energy quota on AC-input	1
Inst.	1559	AC-in energy quota	0.5
Expert	**1201**	**AUXILIARY CONTACT 1**	Menu
Expert	1202	Operating mode (AUX 1)	Only 1 bit 1:Automatic 2:Reversed automatic 4:Manual ON 8:Manual OFF
Expert	1497	Combination of the events for the auxiliary contact (AUX 1)	Only 1 bit 0:Any (Function OR) 1:All (Function AND)
Expert	**1203**	**Temporal restrictions (AUX 1)**	Menu
Expert	**1204**	**Program 1 (AUX 1)**	Menu
Expert	1205	Day of the week (AUX 1)	Bit field
Expert	1206	Start hour (AUX 1)	1
Expert	1207	End hour (AUX 1)	1
Expert	**1208**	**Program 2 (AUX 1)**	Menu
Expert	1209	Day of the week (AUX 1)	Bit field
Expert	1210	Start hour (AUX 1)	1
Expert	1211	End hour (AUX 1)	1
Expert	**1212**	**Program 3 (AUX 1)**	Menu
Expert	1213	Day of the week (AUX 1)	Bit field
Expert	1214	Start hour (AUX 1)	1
Expert	1215	End hour (AUX 1)	1
Inst.	**1216**	**Program 4 (AUX 1)**	Menu
Inst.	1217	Day of the week (AUX 1)	Bit field
Inst.	1218	Start hour (AUX 1)	1
Inst.	1219	End hour (AUX 1)	1
Inst.	**1220**	**Program 5 (AUX 1)**	Menu
Inst.	1221	Day of the week (AUX 1)	Bit field
Inst.	1222	Start hour (AUX 1)	1
Inst.	1223	End hour (AUX 1)	1
Expert	**1269**	**Contact active with a fixed time schedule (AUX 1)**	Menu
Expert	**1270**	**Program 1 (AUX 1)**	Menu

Level	User ref.	Parameter	Increment
Expert	1271	Day of the week (AUX 1)	Bit field
Expert	1272	Start hour (AUX 1)	1
Expert	1273	End hour (AUX 1)	1
Expert	**1274**	**Program 2 (AUX 1)**	Menu
Expert	1275	Day of the week (AUX 1)	Bit field
Expert	1276	Start hour (AUX 1)	1
Expert	1277	End hour (AUX 1)	1
Expert	**1278**	**Program 3 (AUX 1)**	Menu
Expert	1279	Day of the week (AUX 1)	Bit field
Expert	1280	Start hour (AUX 1)	1
Expert	1281	End hour (AUX 1)	1
Expert	**1455**	**Contact active on event (AUX 1)**	Menu
Expert	1225	Xtender is OFF (AUX 1)	1
Expert	1518	Xtender ON (AUX 1)	1
Expert	1543	Remote entry (AUX 1)	1
Expert	1226	Battery undervoltage alarm (AUX 1)	1
Expert	1227	Battery overvoltage (AUX 1)	1
Expert	1228	Inverter or Smart- Boost overload (AUX 1)	1
Expert	1229	Overtemperature (AUX 1)	1
Expert	1520	No overtemperature (AUX 1)	1
Expert	1231	Active charger (AUX 1)	1
Expert	1232	Active inverter (AUX 1)	1
Expert	1233	Active Smart-Boost (AUX 1)	1
Expert	1234	AC input presence but with fault (AUX 1)	1
Expert	1235	AC input presence (AUX 1)	1
Expert	1236	Transfer relay ON (AUX 1)	1
Expert	1237	AC out presence (AUX 1)	1
Expert	1238	Bulk charge phase (AUX 1)	1
Expert	1239	Absorption phase (AUX 1)	1
Expert	1240	Equalization phase (AUX 1)	1
Expert	1242	Floating (AUX 1)	1
Expert	1243	Reduced floating (AUX 1)	1
Expert	1244	Periodic absorption (AUX 1)	1
Inst.	1601	AC-in energy quota (AUX1)	1
Expert	**1245**	**Contact active according to battery voltage (AUX 1)**	Menu
Expert	1288	Use dynamic compensation of battery level (AUX 1)	1
Expert	1246	Battery voltage 1 activate (AUX 1)	1
Expert	1247	Battery voltage 1 (AUX 1)	0.1
Expert	1248	Delay 1 (AUX 1)	1
Expert	1249	Battery voltage 2 activate (AUX 1)	1
Expert	1250	Battery voltage 2 (AUX 1)	0.1
Expert	1251	Delay 2 (AUX 1)	1
Expert	1252	Battery voltage 3 activate (AUX 1)	1
Expert	1253	Battery voltage 3 (AUX 1)	0.1
Expert	1254	Delay 3 (AUX 1)	1
Expert	1255	Battery voltage to deactivate (AUX 1)	0.1
Expert	1256	Delay to deactivate (AUX 1)	5
Expert	1516	Deactivate if battery in floating phase (AUX 1)	1
Expert	**1257**	**Contact active with inverter power or Smart-Boost (AUX 1)**	Menu
Expert	1258	Inverter power level 1 activate (AUX 1)	1
Expert	1259	Power level 1 (AUX 1)	10
Expert	1260	Time delay 1 (AUX 1)	1
Expert	1261	Inverter power level 2 activate (AUX 1)	1
Expert	1262	Power level 2 (AUX 1)	10
Expert	1263	Time delay 2 (AUX 1)	1

Level	User ref.	Parameter	Increment
Expert	1264	Inverter power level 3 activate (AUX 1)	1
Expert	1265	Power level 3 (AUX 1)	10
Expert	1266	Time delay 3 (AUX 1)	1
Expert	1267	Inverter power level to deactivate (AUX 1)	10
Expert	1268	Time delay to deactivate (AUX 1)	5
Inst.	**1503**	**Contact active according to battery temperature (AUX 1) With BSP or BTS**	Menu
Inst.	1446	Contact activated with the temperature of battery (AUX 1)	1
Inst.	1447	Contact activated over (AUX 1)	1
Inst.	1448	Contact deactivated below (AUX 1)	1
Expert	**1501**	**Contact active according to SOC (AUX 1) Only with BSP**	Menu
Expert	1439	Contact activated with the SOC 1 of battery (AUX 1)	1
Expert	1440	Contact activated below SOC 1 (AUX 1)	5
Expert	1581	Delay 1 (AUX 1)	0.25
Expert	1582	Contact activated with the SOC 2 of battery (AUX 1)	1
Expert	1583	Contact activated below SOC 2 (AUX 1)	5
Expert	1584	Delay 2 (AUX 1)	0.25
Expert	1585	Contact activated with the SOC 3 of battery (AUX 1)	1
Expert	1586	Contact activated below SOC 3 (AUX 1)	5
Expert	1587	Delay 3 (AUX 1)	0.25
Expert	1441	Contact deactivated over SOC (AUX 1)	5
Expert	1588	Delay to deactivate (AUX 1)	0.25
Expert	1589	Deactivate if battery in floating phase (AUX 1)	1
Expert	1512	Security, maximum time of contact (AUX 1)	1
Expert	1514	Maximum time of operation of contact (AUX 1)	10
Expert	1569	Reset all settings (AUX 1)	Signal
Expert	**1310**	**AUXILIARY CONTACT 2**	Menu
Expert	1311	Operating mode (AUX 2)	Only 1 bit 1:Automatic 2:Reversed automatic 4:Manual ON 8:Manual OFF
Expert	1498	Combination of the events for the auxiliary contact (AUX 2)	Only 1 bit 0:Any (Function OR) 1:All (Function AND)
Expert	**1312**	**Temporal restrictions (AUX 2)**	Menu
Expert	**1313**	**Program 1 (AUX 2)**	Menu
Expert	1314	Day of the week (AUX 2)	Bit field
Expert	1315	Start hour (AUX 2)	1
Expert	1316	End hour (AUX 2)	1
Expert	**1317**	**Program 2 (AUX 2)**	Menu
Expert	1318	Day of the week (AUX 2)	Bit field
Expert	1319	Start hour (AUX 2)	1
Expert	1320	End hour (AUX 2)	1
Expert	**1321**	**Program 3 (AUX 2)**	Menu
Expert	1322	Day of the week (AUX 2)	Bit field
Expert	1323	Start hour (AUX 2)	1
Expert	1324	End hour (AUX 2)	1
Inst.	**1325**	**Program 4 (AUX 2)**	Menu
Inst.	1326	Day of the week (AUX 2)	Bit field
Inst.	1327	Start hour (AUX 2)	1
Inst.	1328	End hour (AUX 2)	1
Inst.	**1329**	**Program 5 (AUX 2)**	Menu
Inst.	1330	Day of the week (AUX 2)	Bit field
Inst.	1331	Start hour (AUX 2)	1
Inst.	1332	End hour (AUX 2)	1

STUDER

Level	User ref.	Parameter	Increment
Expert	**1378**	**Contact active with a fixed time schedule (AUX 2)**	Menu
Expert	**1379**	**Program 1 (AUX 2)**	Menu
Expert	1380	Day of the week (AUX 2)	Bit field
Expert	1381	Start hour (AUX 2)	1
Expert	1382	End hour (AUX 2)	1
Expert	**1383**	**Program 2 (AUX 2)**	Menu
Expert	1384	Day of the week (AUX 2)	Bit field
Expert	1385	Start hour (AUX 2)	1
Expert	1386	End hour (AUX 2)	1
Expert	**1387**	**Program 3 (AUX 2)**	Menu
Expert	1388	Day of the week (AUX 2)	Bit field
Expert	1389	Start hour (AUX 2)	1
Expert	1390	End hour (AUX 2)	1
Expert	**1456**	**Contact active on event (AUX 2)**	Menu
Expert	1333	Xtender is OFF (AUX 2)	1
Expert	1519	Xtender ON (AUX 2)	1
Expert	1544	Remote entry (AUX 2)	1
Expert	1334	Battery undervoltage alarm (AUX 2)	1
Expert	1335	Battery overvoltage (AUX 2)	1
Expert	1336	Inverter or Smart-Boost overload (AUX 2)	1
Expert	1337	Overtemperature (AUX 2)	1
Expert	1521	No overtemperature (AUX 2)	1
Expert	1339	Active charger (AUX 2)	1
Expert	1340	Active inverter (AUX 2)	1
Expert	1341	Active Smart-Boost (AUX 2)	1
Expert	1342	AC input presence but with fault (AUX 2)	1
Expert	1343	AC input presence (AUX 2)	1
Expert	1344	Transfer contact ON (AUX 2)	1
Expert	1345	AC out presence (AUX 2)	1
Expert	1346	Bulk charge phase (AUX 2)	1
Expert	1347	Absorption phase (AUX 2)	1
Expert	1348	Equalization phase (AUX 2)	1
Expert	1350	Floating (AUX 2)	1
Expert	1351	Reduced floating (AUX 2)	1
Expert	1352	Periodic absorption (AUX 2)	1
Inst.	1602	AC-in energy quota (AUX2)	1
Expert	**1353**	**Contact active according to battery voltage (AUX 2)**	Menu
Expert	1354	Use dynamic compensation of battery level (AUX 2)	1
Expert	1355	Battery voltage 1 activate (AUX 2)	1
Expert	1356	Battery voltage 1 (AUX 2)	0.1
Expert	1357	Delay 1 (AUX 2)	1
Expert	1358	Battery voltage 2 activate (AUX 2)	1
Expert	1359	Battery voltage 2 (AUX 2)	0.1
Expert	1360	Delay 2 (AUX 2)	1
Expert	1361	Battery voltage 3 activate (AUX 2)	1
Expert	1362	Battery voltage 3 (AUX 2)	0.1
Expert	1363	Delay 3 (AUX 2)	1
Expert	1364	Battery voltage to deactivate (AUX 2)	0.1
Expert	1365	Delay to deactivate (AUX 2)	5
Expert	1517	Deactivate if battery in floating phase (AUX 2)	1
Expert	**1366**	**Contact active with inverter power or Smart-Boost (AUX 2)**	Menu
Expert	1367	Inverter power level 1 activate (AUX 2)	1
Expert	1368	Power level 1 (AUX 2)	10
Expert	1369	Time delay 1 (AUX 2)	1
Expert	1370	Inverter power level 2 activate (AUX 2)	1

Level	User ref.	Parameter	Increment
Expert	1371	Power level 2 (AUX 2)	10
Expert	1372	Time delay 2 (AUX 2)	1
Expert	1373	Inverter power level 3 activate (AUX 2)	1
Expert	1374	Power level 3 (AUX 2)	10
Expert	1375	Time delay 3 (AUX 2)	1
Expert	1376	Inverter power level to deactivate (AUX 2)	10
Expert	1377	Time delay to deactivate (AUX 2)	5
Inst.	**1504**	**Contact active according to battery temperature (AUX 2) With BSP or BTS**	Menu
Inst.	1457	Contact activated with the temperature of battery (AUX 2)	1
Inst.	1458	Contact activated over (AUX 2)	1
Inst.	1459	Contact deactivated below (AUX 2)	1
Expert	**1502**	**Contact active according to SOC (AUX 2) Only with BSP**	Menu
Expert	1442	Contact activated with the SOC 1 of battery (AUX 2)	1
Expert	1443	Contact activated below SOC 1 (AUX 2)	5
Expert	1590	Delay 1 (AUX 2)	0.25
Expert	1591	Contact activated with the SOC 2 of battery (AUX 2)	1
Expert	1592	Contact activated below SOC 2 (AUX 2)	5
Expert	1593	Delay 2 (AUX 2)	0.25
Expert	1594	Contact activated with the SOC 3 of battery (AUX 2)	1
Expert	1595	Contact activated below SOC 3 (AUX 2)	5
Expert	1596	Delay 3 (AUX 2)	0.25
Expert	1444	Contact deactivated over SOC (AUX 2)	5
Expert	1597	Delay to deactivate (AUX 2)	0.25
Expert	1598	Deactivate if battery in floating phase (AUX 2)	1
Expert	1513	Security, maximum time of contact (AUX 2)	1
Expert	1515	Maximum time of operation of contact (AUX 2)	10
Expert	1570	Reset all settings (AUX 2)	Signal
Expert	**1489**	**AUXILIARY CONTACTS 1 AND 2 EXTENDED FUNCTIONS**	Menu
Expert	1491	Generator control active	1
Expert	1493	Number of starting attempts	1
Expert	1492	Starter pulse duration (with AUX2)	1
Expert	1494	Time before a starter pulse	1
Expert	1574	Main contact hold/interrupt time	1
Expert	**1101**	**SYSTEM**	Menu
Expert	**1537**	**Remote entry (Remote ON/OFF)**	Menu
Expert	1545	Remote entry active	Only 1 bit 0:Closed 1:Open
Expert	1538	Prohibits transfert relay	1
Expert	1539	Prohibits inverter	1
Expert	1540	Prohibits charger	1
Expert	1541	Prohibits Smart-Boost	1
Expert	1542	Prohibits grid feeding	1
Expert	1566	Using a secondary value for the maximum current of the AC source	1
Expert	1567	Second maximum current of the AC source (Input limit)	1
Expert	1554	Decrease of the max. current of the source with input voltage activated by command entry	1
Expert	1576	ON/OFF command	1
Expert	1578	Activated by AUX1 state	1
Expert	1579	Prohibits battery priority	1
Inst.	1600	Disable minigrid mode	1
Expert	1296	Batteries priority as energy source	1
Expert	1297	Battery priority voltage	0.1
Expert	1565	Buzzer alarm duration	1

Level	User ref.	Parameter	Increment
Expert	**1129**	**Auto restarts**	Menu
Expert	1130	After battery undervoltage	1
Expert	1304	Number of batteries undervoltage allowed before definitive stop	1
Expert	1404	Time period for batteries undervoltages counting	60
Expert	1305	Number of batteries critical undervoltage allowed before definitive stop	1
Expert	1405	Time period for critical batteries undervoltages counting	5
Expert	1131	After battery overvoltage	1
Expert	1132	After inverter or Smart-Boost overload	1
Expert	1533	Delay to restart after an overload	1
Expert	1134	After overtemperature	1
Expert	1111	Autostart to the battery connection	1
Expert	**1484**	**System earthing (Earth - Neutral)**	Menu
Expert	1485	Prohibited ground relay	1
Expert	1486	Continuous neutral	1
Inst.	1628	Xtender watchdog enabled	1
Inst.	1629	Xtender watchdog delay	10
QSP	1616	Use of functions limited to a number of days	1
QSP	1391	Number of days without functionalitie's restrictions	1
QSP	1617	Transfer relay disabled after timeout	1
QSP	1618	Inverter disabled after timeout	1
QSP	1619	Charger disabled after timeout	1
QSP	1620	Smart-Boost disabled after timeout	1
QSP	1621	Grid feeding disabled after timeout	1
Inst.	1550	Parameters saved in flash memory	1
Inst.	1415	ON of the Xtenders	Signal
Inst.	1399	OFF of the Xtenders	Signal
Expert	1468	Reset of all the inverters	Signal
Expert	**1282**	**MULTI XTENDER SYSTEM**	Menu
Expert	1283	Integral mode	1
Expert	1461	Multi inverters allowed	1
Expert	1462	Multi inverters independents. Need reset {1468}	1
Expert	1555	Battery cycle synchronized by the master	1
Expert	1547	Allow slaves standby in multi-Xtender system	1
Expert	1571	Splitphase: L2 with 180 degrees phaseshift	1
QSP	1558	Separated Batteries	1
Inst.	1437	Minigrid compatible	1
Inst.	1577	Minigrid with shared battery energy	1
Inst.	1556	is central inverter in distributed minigrid	1
Expert	**1522**	**GRID-FEEDING**	Menu
Expert	1127	Grid feeding allowed	1
Expert	1523	Max grid feeding current	0.2
Expert	1524	Battery voltage target for forced grid feeding	0.1
Expert	1525	Forced grid feeding start time	1
Expert	1526	Forced grid feeding stop time	1
Inst.	1610	Use of the defined phase shift curve for injection	1
Inst.	1622	Cos phi at P = 0%	0.01
Inst.	1623	Cos phi at the power defined by param {1613}	0.01
Inst.	1613	Power of the second cos phi point in % of Pnom	5
Inst.	1624	Cos phi at P = 100%	0.01
Inst.	1627	ARN4105 frequency control enabled	1
Inst.	1630	Delta from user frequency to start derating	0.1
Inst.	1631	Delta from user frequency to reach 100% derating	0.1

The cos phi parameter range goes from -0.1 (Capacitive 0.9) to +0.1 (Inductive 0.9) by 0.01 steps.

12.2 XTENDER INFOS

Info. no.	Description	Unit on the RCC	Unit	Related parameter or description
3000	Battery voltage	Vdc	V	
3001	Battery temperature	°C	°C no sensor : return ~32767 °C	Value given by the external battery temperature sensor BTS-01
3002	Temperature compensation of battery voltage	Ctmp	Ctmp	
3003	Dynamic compensation of battery voltage	Cdyn	Cdyn	
3004	Wanted battery charge current	Ausr	A	
3005	Battery charge current	Adc	A	
3006	Battery voltage ripple	Vrip	V	
3007	State of charge	%	%	
3008	Low Voltage Disconect	LVD	V	
3010	Battery cycle phase		0:Invalid value 1:Bulk 2:Absorpt. 3:Equalise 4:Floating 5:R.float. 6:Per.abs. 7:Mixing 8:Forming	See parameter {1137}
3011	Input voltage	Vac	V	See parameter {1197}
3012	Input current	Aac	A	
3013	Input power	kVA	kVA	
3017	Input limit value	ILim	A	
3018	Input limite reached		0:Off 1:On	L*, see parameter {1107}
3019	Boost active		0:Off 1:On	B*, see parameter {1126}
3020	State of transfer relay		0:Opened 1:Closed	
3021	Output voltage	Vac	V	See parameter {1286}
3022	Output current	Aac	A	
3023	Output power	kVA	kVA	
3028	Operating state		0:Invalid value 1:Inverter 2:Charger 3:Boost 4:Injection	Give the current working mode of the inverter. See {1107} for Boost, {1522} for Injection (grid-feeding), charger and inverter mode are oblivious. Only in CSV file, the value 6 indicate that the xtender is off.
3030	State of output relay		0:Opened 1:Closed	
3031	State of auxiliary relay I		0:Opened 1:Closed	See parameter {1201}
3032	State of auxiliary relay II		0:Opened 1:Closed	See parameter {1201}

Info. no.	Description	Unit on the RCC	Unit	Related parameter or description
3045	Nbr. of overloads			
3046	Nbr. overtemperature			
3047	Nbr. batterie overvoltage			
3049	State of the inverter		0:Off 1:On	
3050	Number of battery elements			
3051	Search mode state		0:Off 1:On	See parameter {1187}
3054	Relay aux I mode		0:Invalid value 1:A 2:I 3:M 4:M 5:G	
3055	Relay aux II mode		0:Invalid value 1:A 2:I 3:M 4:M 5:G	
3056	Lockings flag			Bit 0: forbidden inverter Bit 1: forbidden charger Bit 2: forbidden boost Bit 3: forbidden transfert Bit 4: forbidden injection Bit 8: mode integral Bit 9: forbidden multi Bit 10: multi independants Bit 11: standy slave allowed
3074	State of the ground relay		0:Opened 1:Closed	
3075	State of the neutral transfer relay		0:Opened 1:Closed	
3076	Discharge of battery of the previous day	kWh	kWh	
3078	Discharge of battery of the current day	kWh	kWh	
3080	Energy AC-In from of the previous day	kWh	kWh	
3081	Energy AC-In from of the current day	kWh	kWh	
3082	Consumers energy of the previous day	kWh	kWh	
3083	Consumers energy of the current day	kWh	kWh	
3084	Input frequency	Hz	Hz	Replace info 3014
3085	Output frequency	Hz	Hz	Replace info 3024
3086	Remote entry state		0:RM EN 0 1:RM EN 1	
3087	Output active power	W	W	
3088	Input active power	W	W	
3089	Defined phase			1=L1, 2=L2, 4=L3
3090	Battery voltage (minute min)	Vdc	V	1 minute minimum
3091	Battery voltage (minute max)	Vdc	V	1 minute maximum
3092	Battery voltage (minute avg)	Vdc	V	1 minute average
3093	Battery charge current (minute min)	Adc	A	1 minute minimum
3094	Battery charge current (minute max)	Adc	A	1 minute maximum

Info. no.	Description	Unit on the RCC	Unit	Related parameter or description
3095	Battery charge current (minute avg)	Adc	A	1 minute average
3096	Output power min (minute min)	kVA	kVA	1 minute minimum
3097	Output power (minute max)	kVA	kVA	1 minute maximum
3098	Output power (minute avg)	kVA	kVA	1 minute average
3099	Output active power (minute min)	kW	kW	1 minute minimum
3100	Output active power (minute max)	kW	kW	1 minute maximum
3101	Output active power (minute avg)	kW	kW	1 minute average
3102	Dev 1 (minute min)			1 minute minimum
3103	Dev 1 (minute max)			1 minute maximum
3104	Dev 1 (minute avg)			1 minute average
3105	Dev 2 (minute min)			1 minute minimum
3106	Dev 2 (minute max)			1 minute maximum
3107	Dev 2 (minute avg)			1 minute average
3108	Output frequency (minute min)	Hz	Hz	1 minute minimum
3109	Output frequency (minute max)	Hz	Hz	1 minute maximum
3110	Output frequency (minute avg)	Hz	Hz	1 minute average
3111	Input voltage (minute min)	Vac	V	1 minute minimum
3112	Input voltage (minute max)	Vac	V	1 minute maximum
3113	Input voltage (minute avg)	Vac	V	1 minute average
3114	Input current (minute min)	Aac	A	1 minute minimum
3115	Input current (minute max)	Aac	A	1 minute maximum
3116	Input current (minute avg)	Aac	A	1 minute average
3117	Input active power (minute min)	kW	kW	1 minute minimum
3118	Input active power (minute max)	kW	kW	1 minute maximum
3119	Input active power (minute avg)	kW	kW	1 minute average
3120	Input frequency (minute min)	Hz	Hz	1 minute minimum
3121	Input frequency (minute max)	Hz	Hz	1 minute maximum
3122	Input frequency (minute avg)	Hz	Hz	1 minute average
3124	ID type			XTH family = 1, XTM family = 256 et XTS family = 512
3125	ID Power	VA	VA	
3126	ID Uout	Vac	V	
3127	ID batt voltage	Vdc	V	
3128	ID Iout nom	Aac	A	
3129	ID HW			
3130	ID SOFT msb			
3131	ID SOFT lsb			
3132	ID HW PWR			
3133	Parameter number (in code)			
3134	Info user number			
3135	ID SID			
3136	Output active power	kW	kW	
3137	Input active power	kW	kW	
3138	Input power	kVA	kVA	
3139	Output power	kVA	kVA	
3140	System debug 1			
3141	System debug 2			
3142	System state machine			
3154	Input frequency	Hz	Hz	
3155	Desired AC injection current	Aac	A	
3156	ID FID msb			
3157	ID FID lsb			
3158	AC injection current limited (ARN4105)	Aac		

Info. no.	Description	Unit on the RCC	Unit	Related parameter or description
3159	AC injection current, type of limitation (ARN4105)		0:No limit 1:Freeze 2:No freeze	Injection limitation source is : Bit 0: I is not at maximum Bit 1: I is frozen due to frequency
3160	Source de limitation des fct chargeur ou injecteur		0:Ubatt 1:Ubattp 2:Ubattpp 3:Ibatt 4:Pchar 5:Iinj 6:Imax 7:Ilim	limitation source is : Bit 0: U batt Bit 1: U batt peak Bit 2: U batt peak peak Bit 3: I batt Bit 4: P charger Bit 8: I injection Bit 9: I max Bit 10: I input limit
3161	Battery priority active		0:Off 1:On	Target voltage for charge/inject is battery priotrity
3162	Forced grid feeding active		0:Off 1:On	Target voltage for charge/inject is forced injection

STUDER

12.3 RCC PARAMETERS

Level	User ref.	Parameter	Increment
Basic	5000	Language	1
Expert	**5036**	**OTHER LANGUAGES**	Menu
Basic	5038	Choice of the second language	Only 1 bit 1:English 2:French 4:German 8:Spanish 16:Dutch 32:Latinoellinika 64:Italian
Basic	5039	Choice of the third language	Only 1 bit 1:English 2:French 4:German 8:Spanish 16:Dutch 32:Latinoellinika 64:Italian
Basic	5040	Choice of the fourth language	Only 1 bit 1:English 2:French 4:German 8:Spanish 16:Dutch 32:Latinoellinika 64:Italian
Basic	5001	Time	1
Basic	5002	Date	1
V.O.	5012	User level	
Expert	5019	Force remote control to user BASIC level	Signal
Expert	**5057**	**DATALOGGER**	Menu
Expert	5101	Datalogger enabled	Only 1 bit 1:Automatic 2:Yes 4:No
Expert	5059	Save today's datas	Signal
Inst.	5120	Erase the 30 oldest log files from the SD card	Signal
Expert	5123	Editable datalogger Track	1
QSP	5076	Track 1: device	Only 1 bit 1:XT 2:BSP 4:VarioTrack 8:Xcom-MS 16:VarioString
QSP	5077	Track 1: reference	1
QSP	5078	Track 2: device	Only 1 bit 1:XT 2:BSP 4:VarioTrack 8:Xcom-MS 16:VarioString
QSP	5079	Track 2: reference	1

Level	User ref.	Parameter	Increment
QSP	5080	Track 3: device	Only 1 bit 1:XT 2:BSP 4:VarioTrack 8:Xcom-MS 16:VarioString
QSP	5081	Track 3: reference	1
QSP	5082	Track 4: device	Only 1 bit 1:XT 2:BSP 4:VarioTrack 8:Xcom-MS 16:VarioString
QSP	5083	Track 4: reference	1
Basic	**5013**	**SAVE AND RESTORE FILES**	Menu
Basic	5041	Save all files (system backup)	Signal
Basic	5068	Restore all files (system recovery)	Signal
Basic	5070	Apply configuration files (masterfile)	Signal
Expert	5032	Separator of the .csv files	Only 1 bit 1:Automatic 2:; 4:,
Expert	**5069**	**Advanced backup functions**	Menu
Expert	5030	Save messages	Signal
Expert	**5049**	**Save and restore RCC files**	Menu
Expert	5015	Save RCC parameters	Signal
Expert	5016	Load RCC parameters	Signal
Inst.	5097	Create RCC configuration file (masterfile)	Signal
Expert	5098	Load RCC configuration file (masterfile)	Signal
Expert	**5050**	**Save and restore Xtender files**	Menu
Expert	5017	Save Xtender parameters	Signal
Expert	5018	Load Xtender parameters	Signal
Inst.	5033	Create Xtender configuration file (masterfile)	Signal
Expert	5034	Load Xtender configuration file (masterfile)	Signal
Expert	5045	Load Xtender parameters preset	
Expert	**5051**	**Save and restore BSP files**	Menu
Expert	5052	Save BSP parameters	Signal
Expert	5053	Load BSP parameters	Signal
Inst.	5054	Create BSP configuration file (masterfile)	Signal
Expert	5055	Load BSP configuration file (masterfile)	Signal
Expert	**5084**	**Save and restore VarioTrack files**	Menu
Expert	5085	Save VarioTrack parameters	Signal
Expert	5086	Load VarioTrack parameters	Signal
Inst.	5087	Create VarioTrack configuration file (masterfile)	Signal
Expert	5088	Load VarioTrack configuration file (masterfile)	Signal
Expert	**5114**	**Save and restore VarioString files**	Menu
Expert	5115	Save VarioString parameters	Signal
Expert	5116	Load VarioString parameters	Signal
Inst.	5117	Create VarioString configuration file (masterfile)	Signal
Expert	5118	Load VarioString configuration file (masterfile)	Signal
Expert	**5063**	**Save and restore MPPT Tristar files**	Menu
Expert	5064	Save MPPT Tristar parameters	Signal
Expert	5065	Load MPPT Tristar parameters	Signal
Inst.	5066	Create MPPT Tristar configuration file (masterfile)	Signal
Expert	5067	Load MPPT Tristar configuration file (masterfile)	Signal
Inst.	5047	Format the SD card	Signal
Expert	5061	Start update	Signal

Level	User ref.	Parameter	Increment
Inst.	**5042**	**MODIFICATION OF ACCESS LEVELS OF MANY PARAMETERS**	Menu
Inst.	5043	Change all parameters access level to:	Only 1 bit 1:Choose 2:BASIC 4:EXPERT 8:INSTALLER
Inst.	5044	Restore default access level of all parameters	Signal
Basic	**5007**	**BACKLIGHT**	Menu
Basic	5093	Backlight mode	Only 1 bit 1:Delayed 2:OFF 4:ON
Basic	5009	Backlight switch off after	5
Expert	5026	Red backlight flashing on Xtender off and faulty	1
Basic	**5021**	**EXTENDED AND SPECIAL FUNCTIONS**	Menu
Basic	5006	Display contrast	5
Expert	5073	Choice of standard display	Only 1 bit 1:Clock 2:Xtender 4:BSP 8:VarioTrack 16:VarioString
Expert	5010	Come back to standard display after	5
Expert	5011	Visibility of the transitory messages	5
Basic	5027	Acoustic alarm active	1
Expert	5031	Remote control acoustic alarm duration	5
Expert	5056	Switching ON and OFF of system on level "VIEW ONLY"	1
Expert	5071	Reset of all the remotes control	Signal
Expert	5121	Reset all devices of the system	Signal
QSP	**5090**	**Update FID (only 1 device)**	Menu
QSP	5091	Choose device type	Only 1 bit 1:XT 2:BSP 4:VarioTrack 8:Xcom-MS 16:VarioString
QSP	5092	Choose device id (UID)	1
QSP	5062	Update device FID (only 1 device)	Signal
Expert	**5094**	**SCOM**	Menu
Expert	5105	Test of the modem's GPRS signal level	Signal
Inst.	5119	Device identification (LEDs) with the SCOM address	1
Inst.	5095	Enable SCOM watchdog	1
Inst.	5096	SCOM watchdog delay before reset of Xcom-232i	10
QSP	5103	Activation of the watchdog hardware (deactivation restarts the RCC)	1
QSP	5104	Clears the restart flag of RCC	Signal
QSP	5035	Erase messages	Signal

12.4 BSP PARAMETERS

Level	User ref.	Parameter	Increment
Basic	**6000**	**BASIC SETTINGS**	Menu
Basic	6057	Voltage of the system	Only 1 bit 1:Automatic 2:12V 4:24V 8:48V
Basic	6001	Nominal capacity	10
Basic	6002	Nominal discharge duration (C-rating)	1
Basic	6017	Nominal shunt current	10
Basic	6018	Nominal shunt voltage	10
Expert	6003	Reset of battery history	Signal
Basic	6004	Restore default settings	Signal
Inst.	6005	Restore factory settings	Signal
Expert	**6016**	**ADVANCED SETTINGS**	Menu
Expert	6031	Reset of user counters	Signal
Expert	6055	Manufacturer SOC for 0% diplayed	5
Expert	6056	Manufacturer SOC for 100% displayed	5
Expert	6042	Activate the end of charge synchronization	1
Expert	6024	End of charge voltage level	0.1
Expert	6025	End of charge current level	1
Expert	6026	Minimum duration before end of charge	5
Expert	6048	Temperature correction of the end of charge voltage	1
Expert	6044	Activate the state of charge correction by the open circuit voltage	1
Expert	6058	Battery current limitation activated	1
Expert	6059	Max battery charge current	10
Expert	6019	Self-discharge rate	0.1
Expert	6020	Nominal temperature	1
Expert	6021	Temperature coefficient	0.0999756
Expert	6022	Charge efficiency factor	1
Expert	6023	Peukert's exponent	0.0100098
Expert	6049	Use C20 Capacity as reference value	1

12.5 BSP, XCOM-CAN BMS INFOS

Info. no.	Description	Unit on the RCC	Unit	Related parameter or description
7000	Battery voltage	Vdc	V	
7001	Battery current	Adc	Adc	
7002	State of Charge	%	%	
7003	Power	W	W	
7004	Remaining autonomy		minutes	in discharge, number of minutes before 0 % between -60000 and 0, in charge, always NAN
7006	Relative capacity	%	%	deprecated, return 100 % in version >= 1.5.6
7007	Ah charged today	Ah	Ah	
7008	Ah discharged today	Ah	Ah	
7009	Ah charged yesterday	Ah	Ah	
7010	Ah discharged yesterday	Ah	Ah	
7011	Total Ah charged	kAh	kAh	

Info. no.	Description	Unit on the RCC	Unit	Related parameter or description
7012	Total Ah discharged	kAh	kAh	
7013	Total time	days	days	
7017	Custom charge Ah counter	Ah	Ah	
7018	Custom discharge Ah counter	Ah	Ah	
7019	Custom counter duration	h	h	
7029	Battery temperature	°C	°C	
7030	Battery voltage (minute avg)	Vdc	V	
7031	Battery current (minute avg)	Adc	Adc	
7032	State of Charge (minute avg)	%	%	
7033	Battery temperature (minute avg)	°C	°C	
7034	ID type			BSP500 and BSP1200 = 10241d (0x2801)
7035	ID batt voltage	Vdc	V	
7036	ID HW			
7037	ID SOFT msb			
7038	ID SOFT lsb			
7039	Parameter number (in code)			
7040	Info user number			
7041	ID SID			
7047	SOC manufacturer	%	%	
7048	ID FID msb			
7049	ID FID lsb			
7053	Battery Type. With Xcom-CAN			
7054	BMS Version. With Xcom-CAN			
7055	Battery Capacity. With Xcom-CAN	Ah	Ah	
7056	Reserved Manufacturer ID. With Xcom-CAN			
7057	State Of Health. With Xcom-CAN	%		
7058	High resolution State of Charge. With Xcom-CAN	%		
7059	Local daily communication error counter			
7060	Number of parameters (in flash)			

12.6 XCOM-MS PARAMETERS

Level	User ref.	Parameter	Increment
Basic	**8000**	**BASIC SETTINGS**	Menu
Expert	8014	Address of the MPPT selected for the display	1
Basic	8001	Charge cycles synchronization activated	1
Expert	8002	Change the RS-485 identifier	1
Basic	8015	Restore default settings	Signal
Inst.	8016	Restore factory settings	Signal
Basic	**8003**	**BATTERY MANAGEMENT WITHOUT SYNCHRONIZATION**	Menu
Basic	8004	Battery floating level	0.1
Basic	8005	Maximum delay in floating	0.25
Basic	8006	Battery voltage level to start a new cycle	0.1
Basic	8009	Battery absorption voltage	0.1
Basic	8010	Absorption time	0.25
Basic	8011	Battery temperature compensation	1
Basic	8017	Equalization allowed	1
Basic	8018	Equalization voltage	0.1
Basic	8019	Equalization time	0.25
Basic	8020	Equalization interval	1
Basic	8021	Equalization timeout	1

STUDER

12.7 XCOM-MS INFOS

Info. no.	Description	Unit on the RCC	Unit	Related parameter or description
9000	Battery voltage of the selected MPPT	Vdc	V	
9001	Battery current of the selected MPPT	Adc	A	
9002	Array voltage of the selected MPPT	Vdc	V	
9004	Output power of the selected MPPT	W	W	
9006	Daily charge of the selected MPPT	Ah	Ah	
9007	Daily energy of the selected MPPT	kWh	kWh	
9010	Sum of battery currents	A	A	
9011	Sum of of the output powers	kW	kW	
9012	Sum of daily charges	Ah	Ah	
9013	Sum of daily energy	kWh	kWh	
9014	Number of MPPT			
9017	Average battery voltage	Vdc	V	
9018	Sum of of the output powers (minute avg)	kW	kW	
9019	ID type			Xcom-MS = 9217d (0x2401)
9020	ID batt voltage	Vdc	V	
9021	ID HW			
9022	ID SOFT msb			
9023	ID SOFT lsb			
9024	Parameter number (in code)			
9025	Info user number			
9026	ID SID			

12.8 VARIOTRACK PARAMETERS

Level	User ref.	Parameter	Increment
Basic	**10000**	**BASIC SETTINGS**	Menu
Expert	10054	Block manual programming (DIP switch)	1
Basic	10001	Voltage of the system	Only 1 bit 1:Automatic 2:12V 4:24V 8:48V
Basic	10037	Synchronisation battery cycle with Xtender	1
Basic	10005	Floating voltage	0.1
Basic	10009	Absorption voltage	0.1
Basic	10017	Equalization allowed	1
Basic	10021	Equalization voltage	0.1
Basic	10056	Restore default settings	Signal
Inst.	10057	Restore factory settings	Signal
Expert	**10003**	**BATTERY MANAGEMENT AND CYCLE**	Menu
Basic	10037	Synchronisation battery cycle with Xtender	1
Expert	10002	Battery charge current	2
Expert	10334	Battery undervoltage	0.1
Expert	10036	Temperature compensation	1
Expert	**10004**	**Floating phase**	Menu
Basic	10005	Floating voltage	0.1
Expert	10006	Force phase of floating	Signal
Expert	**10007**	**Absorption phase**	Menu
Expert	10008	Absorption phase allowed	1
Basic	10009	Absorption voltage	0.1
Expert	10010	Force absorption phase	Signal
Expert	10011	Absorption duration	5

Level	User ref.	Parameter	Increment
Expert	10012	End of absorption triggered by the current	1
Expert	10013	Current threshold to end absorption phase	2
Expert	**10016**	**Equalization phase**	Menu
Basic	10017	Equalization allowed	1
Expert	10018	Force equalization	Signal
Basic	10021	Equalization voltage	0.1
Expert	10020	Equalization current	2
Expert	10022	Equalization duration	5
Expert	10052	Equalization with fixed interval	1
Expert	10025	Days between equalizations	1
Expert	10026	End of equalization triggered by the current	1
Expert	10027	Current threshold to end equalization phase	1
Expert	10019	Equalization before absorption phase	1
Expert	**10028**	**New cycle**	Menu
Expert	10029	Force a new cycle	Signal
Expert	10030	Voltage level 1 to start a new cycle	0.1
Expert	10031	Time period under voltage level 1 to start a new cycle	1
Expert	10032	Voltage level 2 to start a new cycle	0.1
Expert	10033	Time period under voltage level 2 to start a new cycle	1
Expert	10034	Cycling restricted	1
Expert	10035	Minimal delay between cycles	1
Expert	**10038**	**SYSTEM**	Menu
Expert	10054	Block manual programming (DIP switch)	1
Expert	10060	Check Earthing	Only 1 bit 1:No control 2:Negative Grounding 4:Bat Pos Grounding 8:Floating system
Inst.	10087	Disabling of the display button	1
Expert	**10312**	**Remote entry (Remote ON/OFF)**	Menu
Expert	10313	Remote entry active	Only 1 bit 1:Closed 2:Open 4:Edge
Expert	10314	ON/OFF command	1
Expert	10315	Activated by AUX1 state	1
Expert	10316	Start equalization	1
Expert	10317	Send a message when remote entry changes state	1
QSP	10075	Type of MPP tracking	Only 1 bit 1:P&O 2:OC ratio 4:Upv fixed
QSP	10053	Open circuit ratio -> MPP	1
QSP	10103	PV voltage fixed -> MPP	1
Expert	10200	Reset PV energy meter	Signal
QSP	10201	Reset total produced PV energy meter	Signal
Expert	10043	Reset daily solar production meters	Signal
Expert	10044	Reset daily min-max	Signal
Basic	10056	Restore default settings	Signal
Inst.	10057	Restore factory settings	Signal
Inst.	10058	Parameters saved in flash memory	1
Expert	10039	ON of the VarioTrack	Signal
Expert	10040	OFF of the VarioTrack	Signal
Expert	10051	Reset of all VarioTrack	Signal
Expert	**10088**	**AUXILIARY CONTACT 1**	Menu

Level	User ref.	Parameter	Increment
Expert	10089	Operating mode (AUX 1)	Only 1 bit 1:Automatic 2:Reversed automatic 4:Manual ON 8:Manual OFF
Expert	10090	Combination of the events for the auxiliary contact (AUX 1)	Only 1 bit 0:Any (Function OR) 1:All (Function AND)
Expert	**10092**	**Contact activated in night mode (AUX 1)**	Menu
Expert	10093	Activated in night mode (AUX 1)	1
Expert	10094	Delay of activation after entering night mode (AUX 1)	1
Expert	10095	Activation time for the auxiliary relay in night mode (AUX 1)	1
Expert	**10318**	**Contact active with a fixed time schedule (AUX 1)**	Menu
Expert	10319	Contact activated with fixed time schedule (AUX 1)	1
Expert	10320	Start hour (AUX 1)	1
Expert	10321	End hour (AUX 1)	1
Expert	**10096**	**Contact active on event (AUX 1)**	Menu
Expert	10198	VarioTrack is ON (AUX 1)	1
Expert	10091	VarioTrack is OFF (AUX 1)	1
Expert	10308	Remote entry (AUX 1)	1
Expert	10097	Battery undervoltage (AUX 1)	1
Expert	10334	Battery undervoltage	0.1
Expert	10098	Battery overvoltage (AUX 1)	1
Expert	10099	Earth fault (AUX 1)	1
Expert	10100	PV error (48h without charge) (AUX 1)	1
Expert	10102	Overtemperature (AUX 1)	1
Expert	10104	Bulk charge phase (AUX 1)	1
Expert	10105	Absorption phase (AUX 1)	1
Expert	10106	Equalization phase (AUX 1)	1
Expert	10107	Floating (AUX 1)	1
Expert	10108	Reduced floating (AUX 1)	1
Expert	10109	Periodic absorption (AUX 1)	1
Expert	**10110**	**Contact active according to battery voltage (AUX 1)**	Menu
Expert	10111	Battery voltage 1 activate (AUX 1)	1
Expert	10112	Battery voltage 1 (AUX 1)	0.1
Expert	10113	Delay 1 (AUX 1)	1
Expert	10114	Battery voltage 2 activate (AUX 1)	1
Expert	10115	Battery voltage 2 (AUX 1)	0.1
Expert	10116	Delay 2 (AUX 1)	1
Expert	10117	Battery voltage 3 activate (AUX 1)	1
Expert	10118	Battery voltage 3 (AUX 1)	0.1
Expert	10119	Delay 3 (AUX 1)	1
Expert	10120	Battery voltage to deactivate (AUX 1)	0.1
Expert	10121	Delay to deactivate (AUX 1)	5
Expert	10122	Deactivate if battery in floating phase (AUX 1)	1
Expert	**10123**	**Contact active according to battery temperature (AUX 1) With BSP or BTS**	Menu
Expert	10124	Contact activated with the temperature of battery (AUX 1)	1
Expert	10125	Contact activated over (AUX 1)	1
Expert	10126	Contact deactivated below (AUX 1)	1
Expert	10127	Only activated if the battery is not in bulk phase (AUX 1)	1
Expert	**10128**	**Contact active according to SOC (AUX 1) Only with BSP**	Menu
Expert	10129	Contact activated with the SOC 1 of battery (AUX 1)	1
Expert	10130	Contact activated below SOC 1 (AUX 1)	5
Expert	10131	Delay 1 (AUX 1)	0.25
Expert	10132	Contact activated with the SOC 2 of battery (AUX 1)	1

Level	User ref.	Parameter	Increment
Expert	10133	Contact activated below SOC 2 (AUX 1)	5
Expert	10134	Delay 2 (AUX 1)	0.25
Expert	10135	Contact activated with the SOC 3 of battery (AUX 1)	1
Expert	10136	Contact activated below SOC 3 (AUX 1)	5
Expert	10137	Delay 3 (AUX 1)	0.25
Expert	10138	Contact deactivated over SOC (AUX 1)	5
Expert	10139	Delay to deactivate (AUX 1)	0.25
Expert	10140	Deactivate if battery in floating phase (AUX 1)	1
Expert	10141	Reset all settings (AUX 1)	Signal
Expert	**10142**	**AUXILIARY CONTACT 2**	Menu
Expert	10143	Operating mode (AUX 2)	Only 1 bit 1:Automatic 2:Reversed automatic 4:Manual ON 8:Manual OFF
Expert	10144	Combination of the events for the auxiliary contact (AUX 2)	Only 1 bit 0:Any (Function OR) 1:All (Function AND)
Expert	**10146**	**Contact activated in night mode (AUX 2)**	Menu
Expert	10147	Activated in night mode (AUX 2)	1
Expert	10148	Delay of activation after entering night mode (AUX 2)	1
Expert	10149	Activation time for the auxiliary relay in night mode (AUX 2)	1
Expert	**10322**	**Contact active with a fixed time schedule (AUX 2)**	Menu
Expert	10323	Contact activated with fixed time schedule (AUX 2)	1
Expert	10324	Start hour (AUX 2)	1
Expert	10325	End hour (AUX 2)	1
Expert	**10150**	**Contact active on event (AUX 2)**	Menu
Expert	10199	VarioTrack is ON (AUX 2)	1
Expert	10145	VarioTrack is OFF (AUX 2)	1
Expert	10309	Remote entry (AUX 2)	1
Expert	10151	Battery undervoltage (AUX 2)	1
Expert	10334	Battery undervoltage	0.1
Expert	10152	Battery overvoltage (AUX 2)	1
Expert	10153	Earth fault (AUX 2)	1
Expert	10154	PV error (48h without charge) (AUX 2)	1
Expert	10156	Overtemperature (AUX 2)	1
Expert	10158	Bulk charge phase (AUX 2)	1
Expert	10159	Absorption phase (AUX 2)	1
Expert	10160	Equalization phase (AUX 2)	1
Expert	10161	Floating (AUX 2)	1
Expert	10162	Reduced floating (AUX 2)	1
Expert	10163	Periodic absorption (AUX 2)	1
Expert	**10164**	**Contact active according to battery voltage (AUX 2)**	Menu
Expert	10165	Battery voltage 1 activate (AUX 2)	1
Expert	10166	Battery voltage 1 (AUX 2)	0.1
Expert	10167	Delay 1 (AUX 2)	1
Expert	10168	Battery voltage 2 activate (AUX 2)	1
Expert	10169	Battery voltage 2 (AUX 2)	0.1
Expert	10170	Delay 2 (AUX 2)	1
Expert	10171	Battery voltage 3 activate (AUX 2)	1
Expert	10172	Battery voltage 3 (AUX 2)	0.1
Expert	10173	Delay 3 (AUX 2)	1
Expert	10174	Battery voltage to deactivate (AUX 2)	0.1
Expert	10175	Delay to deactivate (AUX 2)	5
Expert	10176	Deactivate if battery in floating phase (AUX 2)	1

Level	User ref.	Parameter	Increment
Expert	**10177**	**Contact active according to battery temperature (AUX 2) With BSP or BTS**	Menu
Expert	10178	Contact activated with the temperature of battery (AUX 2)	1
Expert	10179	Contact activated over (AUX 2)	1
Expert	10180	Contact deactivated below (AUX 2)	1
Expert	10181	Only activated if the battery is not in bulk phase (AUX 2)	1
Expert	**10182**	**Contact active according to SOC (AUX 2) Only with BSP**	Menu
Expert	10183	Contact activated with the SOC 1 of battery (AUX 2)	1
Expert	10184	Contact activated below SOC 1 (AUX 2)	5
Expert	10185	Delay 1 (AUX 2)	0.25
Expert	10186	Contact activated with the SOC 2 of battery (AUX 2)	1
Expert	10187	Contact activated below SOC 2 (AUX 2)	5
Expert	10188	Delay 2 (AUX 2)	0.25
Expert	10189	Contact activated with the SOC 3 of battery (AUX 2)	1
Expert	10190	Contact activated below SOC 3 (AUX 2)	5
Expert	10191	Delay 3 (AUX 2)	0.25
Expert	10192	Contact deactivated over SOC (AUX 2)	5
Expert	10193	Delay to deactivate (AUX 2)	0.25
Expert	10194	Deactivate if battery in floating phase (AUX 2)	1
Expert	10195	Reset all settings (AUX 2)	Signal
Expert	**10202**	**AUXILIARY CONTACT 3**	Menu
Expert	10203	Operating mode (AUX 3)	Only 1 bit 1:Automatic 2:Reversed automatic 4:Manual ON 8:Manual OFF
Expert	10204	Combination of the events for the auxiliary contact (AUX 3)	Only 1 bit 0:Any (Function OR) 1:All (Function AND)
Expert	**10205**	**Contact activated in night mode (AUX 3)**	Menu
Expert	10206	Activated in night mode (AUX 3)	1
Expert	10207	Delay of activation after entering night mode (AUX 3)	1
Expert	10208	Activation time for the auxiliary relay in night mode (AUX 3)	1
Expert	**10326**	**Contact active with a fixed time schedule (AUX 3)**	Menu
Expert	10327	Contact activated with fixed time schedule (AUX 3)	1
Expert	10328	Start hour (AUX 3)	1
Expert	10329	End hour (AUX 3)	1
Expert	**10209**	**Contact active on event (AUX 3)**	Menu
Expert	10210	VarioTrack is ON (AUX 3)	1
Expert	10211	VarioTrack is OFF (AUX 3)	1
Expert	10310	Remote entry (AUX 3)	1
Expert	10212	Battery undervoltage (AUX 3)	1
Expert	10213	Battery overvoltage (AUX 3)	1
Expert	10214	Earth fault (AUX 3)	1
Expert	10215	PV error (48h without charge) (AUX 3)	1
Expert	10216	Overtemperature (AUX 3)	1
Expert	10217	Bulk charge phase (AUX 3)	1
Expert	10218	Absorption phase (AUX 3)	1
Expert	10219	Equalization phase (AUX 3)	1
Expert	10220	Floating (AUX 3)	1
Expert	10221	Reduced floating (AUX 3)	1
Expert	10222	Periodic absorption (AUX 3)	1
Expert	**10223**	**Contact active according to battery voltage (AUX 3)**	Menu
Expert	10224	Battery voltage 1 activate (AUX 3)	1
Expert	10225	Battery voltage 1 (AUX 3)	0.1
Expert	10226	Delay 1 (AUX 3)	1

Level	User ref.	Parameter	Increment
Expert	10227	Battery voltage 2 activate (AUX 3)	1
Expert	10228	Battery voltage 2 (AUX 3)	0.1
Expert	10229	Delay 2 (AUX 3)	1
Expert	10230	Battery voltage 3 activate (AUX 3)	1
Expert	10231	Battery voltage 3 (AUX 3)	0.1
Expert	10232	Delay 3 (AUX 3)	1
Expert	10233	Battery voltage to deactivate (AUX 3)	0.1
Expert	10234	Delay to deactivate (AUX 3)	5
Expert	10235	Deactivate if battery in floating phase (AUX 3)	1
Expert	**10236**	**Contact active according to battery temperature (AUX 3) With BSP or BTS**	Menu
Expert	10237	Contact activated with the temperature of battery (AUX 3)	1
Expert	10238	Contact activated over (AUX 3)	1
Expert	10239	Contact deactivated below (AUX 3)	1
Expert	10240	Only activated if the battery is not in bulk phase (AUX 3)	1
Expert	**10241**	**Contact active according to SOC (AUX 3) Only with BSP**	Menu
Expert	10242	Contact activated with the SOC 1 of battery (AUX 3)	1
Expert	10243	Contact activated below SOC 1 (AUX 3)	5
Expert	10244	Delay 1 (AUX 3)	0.25
Expert	10245	Contact activated with the SOC 2 of battery (AUX 3)	1
Expert	10246	Contact activated below SOC 2 (AUX 3)	5
Expert	10247	Delay 2 (AUX 3)	0.25
Expert	10248	Contact activated with the SOC 3 of battery (AUX 3)	1
Expert	10249	Contact activated below SOC 3 (AUX 3)	5
Expert	10250	Delay 3 (AUX 3)	0.25
Expert	10251	Contact deactivated over SOC (AUX 3)	5
Expert	10252	Delay to deactivate (AUX 3)	0.25
Expert	10253	Deactivate if battery in floating phase (AUX 3)	1
Expert	10254	Reset all settings (AUX 3)	Signal
Expert	**10255**	**AUXILIARY CONTACT 4**	Menu
Expert	10256	Operating mode (AUX 4)	Only 1 bit 1:Automatic 2:Reversed automatic 4:Manual ON 8:Manual OFF
Expert	10257	Combination of the events for the auxiliary contact (AUX 4)	Only 1 bit 0:Any (Function OR) 1:All (Function AND)
Expert	**10258**	**Contact activated in night mode (AUX 4)**	Menu
Expert	10259	Activated in night mode (AUX 4)	1
Expert	10260	Delay of activation after entering night mode (AUX 4)	1
Expert	10261	Activation time for the auxiliary relay in night mode (AUX 4)	1
Expert	**10330**	**Contact active with a fixed time schedule (AUX 4)**	Menu
Expert	10331	Contact activated with fixed time schedule (AUX 4)	1
Expert	10332	Start hour (AUX 4)	1
Expert	10333	End hour (AUX 4)	1
Expert	**10262**	**Contact active on event (AUX 4)**	Menu
Expert	10263	VarioTrack is ON (AUX 4)	1
Expert	10264	VarioTrack is OFF (AUX 4)	1
Expert	10311	Remote entry (AUX 4)	1
Expert	10265	Battery undervoltage (AUX 4)	1
Expert	10266	Battery overvoltage (AUX 4)	1
Expert	10267	Earth fault (AUX 4)	1
Expert	10268	PV error (48h without charge) (AUX 4)	1
Expert	10269	Overtemperature (AUX 4)	1
Expert	10270	Bulk charge phase (AUX 4)	1

Level	User ref.	Parameter	Increment
Expert	10271	Absorption phase (AUX 4)	1
Expert	10272	Equalization phase (AUX 4)	1
Expert	10273	Floating (AUX 4)	1
Expert	10274	Reduced floating (AUX 4)	1
Expert	10275	Periodic absorption (AUX 4)	1
Expert	**10276**	**Contact active according to battery voltage (AUX 4)**	Menu
Expert	10277	Battery voltage 1 activate (AUX 4)	1
Expert	10278	Battery voltage 1 (AUX 4)	0.1
Expert	10279	Delay 1 (AUX 4)	1
Expert	10280	Battery voltage 2 activate (AUX 4)	1
Expert	10281	Battery voltage 2 (AUX 4)	0.1
Expert	10282	Delay 2 (AUX 4)	1
Expert	10283	Battery voltage 3 activate (AUX 4)	1
Expert	10284	Battery voltage 3 (AUX 4)	0.1
Expert	10285	Delay 3 (AUX 4)	1
Expert	10286	Battery voltage to deactivate (AUX 4)	0.1
Expert	10287	Delay to deactivate (AUX 4)	5
Expert	10288	Deactivate if battery in floating phase (AUX 4)	1
Expert	**10289**	**Contact active according to battery temperature (AUX 4) With BSP or BTS**	Menu
Expert	10290	Contact activated with the temperature of battery (AUX 4)	1
Expert	10291	Contact activated over (AUX 4)	1
Expert	10292	Contact deactivated below (AUX 4)	1
Expert	10293	Only activated if the battery is not in bulk phase (AUX 4)	1
Expert	**10294**	**Contact active according to SOC (AUX 4) Only with BSP**	Menu
Expert	10295	Contact activated with the SOC 1 of battery (AUX 4)	1
Expert	10296	Contact activated below SOC 1 (AUX 4)	5
Expert	10297	Delay 1 (AUX 4)	0.25
Expert	10298	Contact activated with the SOC 2 of battery (AUX 4)	1
Expert	10299	Contact activated below SOC 2 (AUX 4)	5
Expert	10300	Delay 2 (AUX 4)	0.25
Expert	10301	Contact activated with the SOC 3 of battery (AUX 4)	1
Expert	10302	Contact activated below SOC 3 (AUX 4)	5
Expert	10303	Delay 3 (AUX 4)	0.25
Expert	10304	Contact deactivated over SOC (AUX 4)	5
Expert	10305	Delay to deactivate (AUX 4)	0.25
Expert	10306	Deactivate if battery in floating phase (AUX 4)	1
Expert	10307	Reset all settings (AUX 4)	Signal

12.9 VARIOTRACK INFOS

Info. no.	Description	Unit on the RCC	Unit	Related parameter or description
11000	Battery voltage	Vdc	V	
11001	Battery current	Adc	A	
11002	Voltage of the PV generator	Vdc	V	
11004	Power of the PV generator	kW	kW	
11005	Battery temperature	°C	°C	
11006	Production in (Ah) for the current day	Ah	Ah	
11007	Production in (kWh) for the current day	kWh	kWh	
11008	Produced energy resettable counter	kWh	kWh	
11009	Total produced energy	MWh	MWh	
11010	Production in (Ah) for the previous day	Ah	Ah	
11011	Production in (Wh) for the previous day	kWh	kWh	
11012	Number of parameters (in code)			

Info. no.	Description	Unit on the RCC	Unit	Related parameter or description
11013	Number of parameters (in flash)			
11014	Number of infos users			
11015	Model of VarioTrack		0:VT-80 1:VT-65	
11016	Operating mode		0:Night 1:StartUp 2:--- 3:Charger 4:--- 5:Security 6:OFF 7:--- 8:Charge 9:Charge V 10:Charge I 11:Charge T 12:Ch. Ibsp	See the VarioTrack user manual for a description of the modes. Mode 3: is available up to VT code version 1.5.8. Modes 8: to 11: are available from VT code version 1.5.10.
11017	Max PV voltage for the current day	Vdc	V	
11018	Max battery current of the current day	Adc	A	
11019	Max power production for the current day	kW	kW	
11020	Max battery voltage for the current day	Vdc	V	
11021	Min battery voltage for the current day	Vdc	V	
11025	Number of irradiation hours for the current day	h	h	
11026	Number of irradiation hours for the previous day	h	h	
11034	Type of error		0:No Error 1:BatoverV 2:Earth 3:No Batt 4:OverTemp 5:BatOverV 6:PvOverV 7:Others 8:--- 9:--- 10:--- 11:--- 12:HardErr	See the VarioTrack user manual for a description of these errors
11037	Number of days before next equalization	days	days	
11038	Battery cycle phase		0:Bulk 1:Absorpt. 2:Equalize 3:Floating 4:--- 5:--- 6:R.float. 7:Per.abs. 8:--- 9:--- 10:--- 11:---	
11039	Battery voltage (minute avg)	Vdc	V	
11040	Battery current (minute avg)	Adc	A	
11041	PV voltage (minute avg)	Vdc	V	
11043	PV power (minute avg)	kW	kW	
11044	Battery temperature (minute avg)	°C	°C	
11045	Dev 1 (minute avg)			
11046	Dev 2 (minute avg)			

Info. no.	Description	Unit on the RCC	Unit	Related parameter or description
11047	ID type			VT65 and VT80 = 9079d (0x2601)
11048	ID batt voltage	Vdc	V	
11049	ID HW			
11050	ID SOFT msb			
11051	ID SOFT lsb			
11052	ID SID			
11061	State of auxiliary relay 1		0:Opened 1:Closed	
11062	State of auxiliary relay 2		0:Opened 1:Closed	
11063	Relay aux 1 mode		0:--- 1:A 2:I 3:M 4:M 5:G	
11064	Relay aux 2 mode		0:--- 1:A 2:I 3:M 4:M 5:G	
11066	Synchronisation state		0:--- 1:--- 2:--- 3:--- 4:XTslave 5:VTslave 6:--- 7:--- 8:VTmaster 9:Autonom. 10:VSslave 11:VSmaster	
11067	ID FID msb			
11068	ID FID lsb			
11069	State of the VarioTrack		0:Off 1:On	
11076	Local daily communication error counter			
11077	State of auxiliary relay 3		0:Opened 1:Closed	
11078	State of auxiliary relay 4		0:Opened 1:Closed	
11079	Relay aux 3 mode		0:--- 1:A 2:I 3:M 4:M 5:G	
11080	Relay aux 4 mode		0:--- 1:A 2:I 3:M 4:M 5:G	

STUDER

12.10 VARIOSTRING PARAMETERS

Level	User ref.	Parameter	Increment
Basic	**14000**	**BASIC SETTINGS**	Menu
Expert	14174	Block manual programming (DIP switch)	1
Expert	14001	Battery charge current (VS-120)	2
Expert	14217	Battery charge current (VS-70)	1
Basic	14002	Configuration of PV modules (VS-120)	Only 1 bit 1:Automatic 2:Independent 4:Serial 8:Parallel
Basic	14067	Restore default settings	Signal
Inst.	14068	Restore factory settings	Signal
Expert	**14003**	**BATTERY MANAGEMENT AND CYCLE**	Menu
Basic	14036	Synchronisation battery cycle with Xtender	1
Expert	14001	Battery charge current (VS-120)	2
Expert	14217	Battery charge current (VS-70)	1
Expert	14216	Battery undervoltage	0.1
Expert	14035	Temperature compensation	1
Expert	**14004**	**Floating phase**	Menu
Expert	14005	Floating voltage	0.1
Expert	14006	Force phase of floating	Signal
Expert	**14007**	**Absorption phase**	Menu
Expert	14008	Absorption phase allowed	1
Expert	14009	Absorption voltage	0.1
Expert	14010	Force absorption phase	Signal
Expert	14011	Absorption duration	5
Expert	14012	End of absorption triggered by the current	1
Expert	14013	Current threshold to end absorption phase	2
Expert	**14016**	**Equalization phase**	Menu
Expert	14017	Equalization allowed	1
Expert	14018	Force equalization	Signal
Expert	14021	Equalization voltage	0.1
Expert	14020	Equalization current	2
Expert	14022	Equalization duration	5
Expert	14023	Equalization with fixed interval	1
Expert	14024	Days between equalizations	1
Expert	14025	End of equalization triggered by the current	1
Expert	14026	Current threshold to end equalization phase	1
Expert	14019	Equalization before absorption phase	1
Expert	**14027**	**New cycle**	Menu
Expert	14028	Force a new cycle	Signal
Expert	14029	Voltage level 1 to start a new cycle	0.1
Expert	14030	Time period under voltage level 1 to start a new cycle	1
Expert	14031	Voltage level 2 to start a new cycle	0.1
Expert	14032	Time period under voltage level 2 to start a new cycle	1
Expert	14033	Cycling restricted	1
Expert	14034	Minimal delay between cycles	1
Expert	**14037**	**SYSTEM**	Menu
Expert	14174	Block manual programming (DIP switch)	1
Expert	14040	Type of battery grounding	Only 1 bit 1:No control 2:Bat+ grounded 4:Bat- grounded 8:Bat floating
Expert	**14194**	**Configuration for VS-120**	Menu

Level	User ref.	Parameter	Increment
Expert	14041	Type of PV grounding	Only 1 bit 1:No control 2:PV+ grounded 4:PV- grounded 8:PV floating
Expert	14175	Type of PV1 grounding	Only 1 bit 1:No control 2:PV+ grounded 4:PV- grounded 8:PV floating
Expert	14042	Type of PV2 grounding	Only 1 bit 1:No control 2:PV+ grounded 4:PV- grounded 8:PV floating
Expert	**14180**	**Type of MPPT algorithm**	Menu
Expert	14043	Type of MPP tracking algorithm PV	Only 1 bit 1:P&O 2:OC ratio 4:Upv fixed 8:LSF
Expert	14044	PV voltage fixed (for PV in series)	10
Expert	14179	PV voltage fixed (for PV in //)	10
Expert	14045	Ratio of PV open circuit voltage	0.010009766
Expert	14176	Type of MPP tracking algorithm PV1	Only 1 bit 1:P&O 2:OC ratio 4:Upv fixed 8:LSF
Expert	14177	PV1 voltage fixed	10
Expert	14178	Ratio of PV1 open circuit voltage	0.010009766
Expert	14046	Type of MPP tracking algorithm PV2	Only 1 bit 1:P&O 2:OC ratio 4:Upv fixed 8:LSF
Expert	14047	PV2 voltage fixed	10
Expert	14048	Ratio of PV2 open circuit voltage	0.010009766
Inst.	14192	Establishment time (Algo MPPT)	1
Inst.	14193	Averaging time (algo MPPT)	1
Inst.	14190	PV wiring type erased from memory	Signal
Expert	**14195**	**Configuration for VS-70**	Menu
Expert	14196	Type of PV grounding	Only 1 bit 1:No control 2:PV+ grounded 4:PV- grounded 8:PV floating
Expert	**14180**	**Type of MPPT algorithm**	Menu
Expert	14197	Type of MPP tracking algorithm PV	Only 1 bit 1:P&O 2:OC ratio 4:Upv fixed 8:LSF
Expert	14198	PV voltage fixed	10
Expert	14199	Ratio of PV open circuit voltage	0.010009766
Inst.	14192	Establishment time (Algo MPPT)	1
Inst.	14193	Averaging time (algo MPPT)	1
Expert	**14200**	**Remote entry (Remote ON/OFF)**	Menu

Level	User ref.	Parameter	Increment
Expert	14201	Remote entry active	Only 1 bit 1:Closed 2:Open 4:Edge
Expert	14202	ON/OFF command	1
Expert	14203	Activated by AUX1 state	1
Expert	14204	Start equalization	1
Expert	14205	Send a message when remote entry changes state	1
Expert	14182	Reset PV energy meter	Signal
QSP	14183	Reset total produced PV energy meter	Signal
Expert	14051	Reset daily solar production meters	Signal
Expert	14052	Reset daily min-max	Signal
Basic	14067	Restore default settings	Signal
Inst.	14068	Restore factory settings	Signal
Inst.	14069	Parameters saved in flash memory	1
Expert	14038	ON of the VarioString	Signal
Expert	14039	OFF of the VarioString	Signal
Expert	14059	Reset of all VarioString	Signal
Expert	**14070**	**AUXILIARY CONTACT 1**	Menu
Expert	14071	Operating mode (AUX 1)	Only 1 bit 1:Automatic 2:Reversed automatic 4:Manual ON 8:Manual OFF
Expert	14072	Combination of the events for the auxiliary contact (AUX 1)	Only 1 bit 0:Any (Function OR) 1:All (Function AND)
Expert	**14073**	**Contact activated in night mode (AUX 1)**	Menu
Expert	14074	Activated in night mode (AUX 1)	1
Expert	14075	Delay of activation after entering night mode (AUX 1)	1
Expert	14076	Activation time for the auxiliary relay in night mode (AUX 1)	1
Expert	**14206**	**Contact active with a fixed time schedule (AUX 1)**	Menu
Expert	14207	Contact activated with fixed time schedule (AUX 1)	1
Expert	14208	Start hour (AUX 1)	1
Expert	14209	End hour (AUX 1)	1
Expert	**14077**	**Contact active on event (AUX 1)**	Menu
Expert	14188	VarioString is ON (AUX 1)	1
Expert	14078	VarioString is OFF (AUX 1)	1
Expert	14214	Remote entry (AUX 1)	1
Expert	14079	Battery undervoltage (AUX 1)	1
Expert	14216	Battery undervoltage	0.1
Expert	14080	Battery overvoltage (AUX 1)	1
Expert	14081	Earth fault (AUX 1)	1
Expert	14082	PV error (48h without charge) (AUX 1)	1
Expert	14083	Overtemperature (AUX 1)	1
Expert	14084	Bulk charge phase (AUX 1)	1
Expert	14085	Absorption phase (AUX 1)	1
Expert	14086	Equalization phase (AUX 1)	1
Expert	14087	Floating (AUX 1)	1
Expert	14088	Reduced floating (AUX 1)	1
Expert	14089	Periodic absorption (AUX 1)	1
Expert	**14090**	**Contact active according to battery voltage (AUX 1)**	Menu
Expert	14091	Battery voltage 1 activate (AUX 1)	1
Expert	14092	Battery voltage 1 (AUX 1)	0.1
Expert	14093	Delay 1 (AUX 1)	1
Expert	14094	Battery voltage 2 activate (AUX 1)	1

Level	User ref.	Parameter	Increment
Expert	14095	Battery voltage 2 (AUX 1)	0.1
Expert	14096	Delay 2 (AUX 1)	1
Expert	14097	Battery voltage 3 activate (AUX 1)	1
Expert	14098	Battery voltage 3 (AUX 1)	0.1
Expert	14099	Delay 3 (AUX 1)	1
Expert	14100	Battery voltage to deactivate (AUX 1)	0.1
Expert	14101	Delay to deactivate (AUX 1)	5
Expert	14102	Deactivate if battery in floating phase (AUX 1)	1
Expert	**14103**	**Contact active according to battery temperature (AUX 1) With BSP or BTS**	Menu
Expert	14104	Contact activated with the temperature of battery (AUX 1)	1
Expert	14105	Contact activated over (AUX 1)	1
Expert	14106	Contact deactivated below (AUX 1)	1
Expert	14107	Only activated if the battery is not in bulk phase (AUX 1)	1
Expert	**14108**	**Contact active according to SOC (AUX 1) Only with BSP**	Menu
Expert	14109	Contact activated with the SOC 1 of battery (AUX 1)	1
Expert	14110	Contact activated below SOC 1 (AUX 1)	5
Expert	14111	Delay 1 (AUX 1)	0.25
Expert	14112	Contact activated with the SOC 2 of battery (AUX 1)	1
Expert	14113	Contact activated below SOC 2 (AUX 1)	5
Expert	14114	Delay 2 (AUX 1)	0.25
Expert	14115	Contact activated with the SOC 3 of battery (AUX 1)	1
Expert	14116	Contact activated below SOC 3 (AUX 1)	5
Expert	14117	Delay 3 (AUX 1)	0.25
Expert	14118	Contact deactivated over SOC (AUX 1)	5
Expert	14119	Delay to deactivate (AUX 1)	0.25
Expert	14120	Deactivate if battery in floating phase (AUX 1)	1
Expert	14121	Reset all settings (AUX 1)	Signal
Expert	**14122**	**AUXILIARY CONTACT 2**	Menu
Expert	14123	Operating mode (AUX 2)	Only 1 bit 1:Automatic 2:Reversed automatic 4:Manual ON 8:Manual OFF
Expert	14124	Combination of the events for the auxiliary contact (AUX 2)	Only 1 bit 0:Any (Function OR) 1:All (Function AND)
Expert	**14125**	**Contact activated in night mode (AUX 2)**	Menu
Expert	14126	Activated in night mode (AUX 2)	1
Expert	14127	Delay of activation after entering night mode (AUX 2)	1
Expert	14128	Activation time for the auxiliary relay in night mode (AUX 2)	1
Expert	**14210**	**Contact active with a fixed time schedule (AUX 2)**	Menu
Expert	14211	Contact activated with fixed time schedule (AUX 2)	1
Expert	14212	Start hour (AUX 2)	1
Expert	14213	End hour (AUX 2)	1
Expert	**14129**	**Contact active on event (AUX 2)**	Menu
Expert	14189	VarioString is ON (AUX 2)	1
Expert	14130	VarioString is OFF (AUX 2)	1
Expert	14215	Remote entry (AUX 2)	1
Expert	14131	Battery undervoltage (AUX 2)	1
Expert	14216	Battery undervoltage	0.1
Expert	14132	Battery overvoltage (AUX 2)	1
Expert	14133	Earth fault (AUX 2)	1
Expert	14134	PV error (48h without charge) (AUX 2)	1
Expert	14135	Overtemperature (AUX 2)	1
Expert	14136	Bulk charge phase (AUX 2)	1

Level	User ref.	Parameter	Increment
Expert	14137	Absorption phase (AUX 2)	1
Expert	14138	Equalization phase (AUX 2)	1
Expert	14139	Floating (AUX 2)	1
Expert	14140	Reduced floating (AUX 2)	1
Expert	14141	Periodic absorption (AUX 2)	1
Expert	**14142**	**Contact active according to battery voltage (AUX 2)**	Menu
Expert	14143	Battery voltage 1 activate (AUX 2)	1
Expert	14144	Battery voltage 1 (AUX 2)	0.1
Expert	14145	Delay 1 (AUX 2)	1
Expert	14146	Battery voltage 2 activate (AUX 2)	1
Expert	14147	Battery voltage 2 (AUX 2)	0.1
Expert	14148	Delay 2 (AUX 2)	1
Expert	14149	Battery voltage 3 activate (AUX 2)	1
Expert	14150	Battery voltage 3 (AUX 2)	0.1
Expert	14151	Delay 3 (AUX 2)	1
Expert	14152	Battery voltage to deactivate (AUX 2)	0.1
Expert	14153	Delay to deactivate (AUX 2)	5
Expert	14154	Deactivate if battery in floating phase (AUX 2)	1
Expert	**14155**	**Contact active according to battery temperature (AUX 2) With BSP or BTS**	Menu
Expert	14156	Contact activated with the temperature of battery (AUX 2)	1
Expert	14157	Contact activated over (AUX 2)	1
Expert	14158	Contact deactivated below (AUX 2)	1
Expert	14159	Only activated if the battery is not in bulk phase (AUX 2)	1
Expert	**14160**	**Contact active according to SOC (AUX 2) Only with BSP**	Menu
Expert	14161	Contact activated with the SOC 1 of battery (AUX 2)	1
Expert	14162	Contact activated below SOC 1 (AUX 2)	5
Expert	14163	Delay 1 (AUX 2)	0.25
Expert	14164	Contact activated with the SOC 2 of battery (AUX 2)	1
Expert	14165	Contact activated below SOC 2 (AUX 2)	5
Expert	14166	Delay 2 (AUX 2)	0.25
Expert	14167	Contact activated with the SOC 3 of battery (AUX 2)	1
Expert	14168	Contact activated below SOC 3 (AUX 2)	5
Expert	14169	Delay 3 (AUX 2)	0.25
Expert	14170	Contact deactivated over SOC (AUX 2)	5
Expert	14171	Delay to deactivate (AUX 2)	0.25
Expert	14172	Deactivate if battery in floating phase (AUX 2)	1
Expert	14173	Reset all settings (AUX 2)	Signal

12.11 VARIOSTRING INFOS

Info. no.	Description	Unit on the RCC	Unit	Related parameter or description
15000	Battery voltage	Vdc	V	
15001	Battery current	Adc	A	

Info. no.	Description	Unit on the RCC	Unit	Related parameter or description
15002	Battery cycle phase		0:Bulk 1:Absorpt. 2:Equalize 3:Floating 4:--- 5:--- 6:R.float. 7:Per.abs. 8:--- 9:--- 10:--- 11:---	
15003	PV type of wiring		0:Unknown 1:Independ. 2:Series 3:Parallel 4:Error	
15004	PV voltage	Vdc	V	
15005	PV1 voltage	Vdc	V	
15006	PV2 voltage	Vdc	V	
15007	PV current	Adc	A	
15008	PV1 current	Adc	A	
15009	PV2 current	Adc	A	
15010	PV power	kW	kW	
15011	PV1 power	kW	kW	
15012	PV2 power	kW	kW	
15013	PV operating mode		0:Night 1:Security 2:OFF 3:Charge 4:ChargeV 5:Charge I 6:ChargeP 7:ChargeIpv 8:ChargeT 9:--- 10:Ch.Ibsp	
15014	PV1 operating mode		0:Night 1:Security 2:OFF 3:Charge 4:ChargeV 5:Charge I 6:ChargeP 7:ChargeIpv 8:ChargeT 9:--- 10:Ch.Ibsp	

Info. no.	Description	Unit on the RCC	Unit	Related parameter or description
15015	PV2 operating mode		0:Night 1:Security 2:OFF 3:Charge 4:ChargeV 5:Charge I 6:ChargeP 7:ChargeIpv 8:ChargeT 9:--- 10:Ch.Ibsp	
15016	Production PV in (Ah) for the current day	Ah	Ah	
15017	Production PV in (kWh) for the current day	kWh	kWh	
15018	Production PV1 in (kWh) for the current day	kWh	kWh	
15019	Production PV2 in (kWh) for the current day	kWh	kWh	
15020	Produced PV energy resettable counter	kWh	kWh	
15021	Produced PV1 energy resettable counter	kWh	kWh	
15022	Produced PV2 energy resettable counter	kWh	kWh	
15023	Total PV produced energy	MWh	MWh	
15024	Total PV1 produced energy	MWh	MWh	
15025	Total PV2 produced energy	MWh	MWh	
15026	Production PV in (Ah) for the previous day	Ah	Ah	
15027	Production PV in (Wh) for the previous day	kWh	kWh	
15028	Production PV1 in (Wh) for the previous day	kWh	kWh	
15029	Production PV2 in (Wh) for the previous day	kWh	kWh	
15030	Number of irradiation hours for the current day	h	h	
15031	Number of irradiation hours for the previous day	h	h	
15032	Battery temperature	°C	°C	
15033	Max PV voltage for the current day	Vdc	V	
15034	Max PV1 voltage for the current day	Vdc	V	
15035	Max PV2 voltage for the current day	Vdc	V	
15036	Max battery current of the current day	Adc	A	
15037	Max PV power for the current day	kW	kW	
15038	Max PV1 power for the current day	kW	kW	
15039	Max PV2 power for the current day	kW	kW	
15040	Max battery voltage for the current day	Vdc	V	
15041	Min battery voltage for the current day	Vdc	V	
15042	Time in absorption of the current day	h	h	
15043	BAT- and Earth voltage	Vdc	V	
15044	PV- and Earth voltage	Vdc	V	
15045	PV1- and Earth voltage	Vdc	V	
15046	PV2- and Earth voltage	Vdc	V	

Info. no.	Description	Unit on the RCC	Unit	Related parameter or description
15049	Type of error		0:None 1:OverV_B 2:OverV_PV 3:OverV_PV1 4:OverV_PV2 5:OverI_PV 6:OverI_PV1 7:OverI_PV2 8:GroundBat 9:GroundPV 10:GroundPV1 11:GroundPV2 12:OverTemp 13:UnderV_B 14:Cabling 15:Other	
15050	Synchronized with Xtender battery cycle		0:No 1:Yes	
15051	Synchronisation state		0:--- 1:--- 2:--- 3:--- 4:XTslave 5:VTslave 6:--- 7:--- 8:VTmaster 9:Autonom 10:VSslave 11:VSmaster	
15052	Number of days before next equalization	days	days	
15053	Battery set point	Vdc	V	
15054	Battery voltage (minute avg)	Vdc	V	
15055	Battery voltage (minute max)	Vdc	V	
15056	Battery voltage (minute min)	Vdc	V	
15057	Battery current (minute avg)	Adc	A	
15058	PV voltage (minute avg)	Vdc	V	
15059	PV1 voltage (minute avg)	Vdc	V	
15060	PV2 voltage (minute avg)	Vdc	V	
15061	PV power (minute avg)	kW	kW	
15062	PV1 power (minute avg)	kW	kW	
15063	PV2 power (minute avg)	kW	kW	
15064	Battery temperature (minute avg)	°C	°C	
15065	Dev 1 (minute avg)			
15066	Dev 1 (minute max)			
15067	Dev 1 (minute min)			
15068	Dev 2 (minute avg)			
15069	Dev 2 (minute max)			
15070	Dev 2 (minute min)			
15071	Number of parameters (in code)			
15072	Number of parameters (in flash)			
15073	Number of infos users			
15074	ID type			
15075	ID bat voltage	Vdc	V	
15076	ID HW			
15077	ID SOFT msb			
15078	ID SOFT lsb			

Info. no.	Description	Unit on the RCC	Unit	Related parameter or description
15079	ID SID			
15088	State of auxiliary AUX1		0:Opened 1:Closed	
15089	State of auxiliary AUX2		0:Opened 1:Closed	
15090	Relay AUX1 mode		0:--- 1:A 2:I 3:M 4:M	
15091	Relay AUX2 mode		0:--- 1:A 2:I 3:M 4:M	
15102	ID FID msb			
15103	ID FID lsb			
15108	State of the VarioString		0:Off 1:On	
15109	Local daily communication error counter			

12.12 RCC MESSAGES

User ref.	Description
0	Warning (000): Battery low
1	Warning (001): Battery too high
2	Warning (002): Bulk charge too long
3	(003): AC-In synchronization in progress
4	Warning (004): Input frequency AC-In wrong
5	Warning (005): Input frequency AC-In wrong
6	Warning (006): Input voltage AC-In too high
7	Warning (007): Input voltage AC-In too low
8	Halted (008): Inverter overload SC
9	Halted (009): Charger short circuit
10	(010): System start-up in progress
11	Warning (011): AC-In Energy quota
12	(012): Use of battery temperature sensor
13	(013): Use of additional remote control
14	Halted (014): Over temperature EL
15	Halted (015): Inverter overload BL
16	Warning (016): Fan error detected
17	(017): Programing mode
18	Warning (018): Excessive battery voltage ripple
19	Halted (019): Battery undervoltage
20	Halted (020): Battery overvoltage
21	(021): Transfer not authorized, ACout current is higher than {1107}
22	Halted (022): Voltage presence on AC-Out
23	Halted (023): Phase not defined
24	Warning (024): Change the clock battery
25	Halted (025): Unknown Command board. Software upgrade needed
26	Halted (026): Unknown Power board. Software upgrade needed
27	Halted (027): Unknown extension board. Software upgrade needed
28	Halted (028): Voltage incompatibility Power - Command
29	Halted (029): Voltage incompatibility Ext. - Command
30	Halted (030): Power incompatibility Power - Command

User ref.	Description
31	Halted (031): Command board software incompatibility
32	Halted (032): Power board software incompatibility
33	Halted (033): Extension board software incompatibility
34	Halted (034): FID corruption, call factory
35	(035): Memory structure modified
36	Halted (036): Parameter file lacking
37	Warning (037): Message file lack. SW upgrade advised
38	Warning (038): Upgrade of the device software advised
39	Warning (039): Upgrade of the device software advised
40	Warning (040): Upgrade of the device software advised
41	Warning (041): Over temperature TR
42	Halted (042): Unauthorized energy source at the output
43	(043): Start of monthly test
44	(044): End of successfully monthly test
45	Warning (045): Monthly autonomy test failed
46	(046): Start of weekly test
47	(047): End of successfully weekly test
48	Warning (048): Weekly autonomy test failed
49	(049): Transfer opened because ACin max current exceeded {1107}
50	Error (050): Incomplete data transfer
51	(051): The update is finished
52	(052): Your installation is already updated
53	Halted (053): Devices not compatible, software update required
54	(054): Please wait. Data transfer in progress
55	Error (055): No SD card inserted
56	Warning (056): Upgrade of the RCC software advised
57	(057): Operation finished successfully
58	Halted (058): Master synchronization missing
59	Halted (059): Inverter overload HW
60	Warning (060): Time security 1512 AUX1
61	Warning (061): Time security 1513 AUX2
62	Warning (062): Genset, no AC-In coming after AUX command
63	(063): Save parameter XT
64	(064): Save parameter BSP
65	(065): Save parameter MPPT
71	Error (071): Insufficient disk space on SD card
72	Halted (072): COM identification incorrect
73	(073): Datalogger is enabled on this RCC
74	(074): Save parameter Xcom-MS
75	(075): MPPT MS address changed successfully
76	Error (076): Error during change of MPPT MS address
77	Error (077): Wrong MPPT MS DIP switch position
78	(078): SMS or email sent
79	Halted (079): More than 9 XTs in the system
80	Halted (080): No battery (or reverse polarity)
81	Warning (081): Earthing fault
82	Halted (082): PV overvoltage
83	Warning (083): No solar production in the last 48h
84	(084): Equalization performed
85	Error (085): Modem not available
86	Error (086): Incorrect PIN code, unable to initiate the modem
87	Error (087): Insufficient Signal from GSM modem
88	Error (088): No connection to GSM network
89	Error (089): No server access
90	(090): Server connected
91	Error (091): Update software of other RCC or Xcom-232i
92	Error (092): More than 3 RCC or Xcom-232i in the system

User ref.	Description
93	Error (093): More than 1 BSP in the system
94	Error (094): More than 1 Xcom MS in the system
95	Error (095): More than 15 VarioTrack in the system
121	Error (121): Impossible communication with target device
122	Error (122): SD card corrupted
123	Error (123): SD card not formatted
124	Error (124): SD card not compatible
125	Error (125): SD card format not recognized. Should be FAT
126	Error (126): SD card write protected
127	Error (127): SD card, file(s) corrupted
128	Error (128): SD card file or directory could not be found
129	Error (129): SD card has been prematurely removed
130	Error (130): Update directory is empty
131	(131): The VarioTrack is configured for 12V batteries
132	(132): The VarioTrack is configured for 24V batteries
133	(133): The VarioTrack is configured for 48V batteries
134	(134): Reception level of the GSM signal
137	Error (137): VarioTrack master synchronization lost
138	Error (138): XT master synchronization lost
139	(139): Synchronized on VarioTrack master
140	(140): Synchronized on XT master
141	Error (141): More than 1 Xcom SMS in the system
142	Error (142): More than 15 VarioString in the system
143	(143): Save parameter Xcom SMS
144	(144): Save parameter VarioString
145	Error (145): SIM card blocked, PUK code required
146	Error (146): SIM card missing
147	Error (147): Install R532 firmware release prior to install an older release
148	(148): Datalogger function interrupted (SD card removed)
149	Error (149): Parameter setting incomplete
150	Error (150): Cabling error between PV and VarioString
162	Error (162): Communication loss with RCC or Xcom232i
163	Error (163): Communication loss with Xtender
164	Error (164): Communication loss with BSP
165	Error (165): Communication loss with Xcom MS
166	Error (166): Communication loss with VarioTrack
167	Error (167): Communication loss with VarioString
168	(168): Synchronized with VarioString master
169	(169): Synchronization with VarioString master lost
170	Warning (170): No solar production in the last 48h on PV1
171	Warning (171): No solar production in the last 48h on PV2
175	Halted (175): Critical undervoltage
176	(176): Calibration setting lost
177	(177): An Xtender has started up
178	(178): No BSP. Necessary for programming with SOC
179	(179): No BTS or BSP. Necessary for programming with temperature
180	(180): Command entry activated
181	Error (181): Disconnection of BTS
182	(182): BTS/BSP battery temperature measurement used by a device
183	Halted (183): An Xtender has lost communication with the system
184	Error (184): Check phase orientation or circuit breakers state on AC-In
185	Warning (185): AC-In voltage level with delay too low
186	Halted (186): Critical undervoltage (fast)
187	Halted (187): Critical overvoltage (fast)
188	(188): CAN stage startup
189	Error (189): Incompatible configuration file
190	(190): The Xcom-SMS is busy

User ref.	Description
191	(191): Parameter not supported
192	(192): Unknown reference
193	(193): Invalid value
194	(194): Value too low
195	(195): Value too high
196	(196): Writing error
197	(197): Reading error
198	(198): User level insufficient
199	(199): No data for the report
200	Error (200): Memory full
202	Warning (202): External alarm arrives
203	(203): External alarm leaves
204	Halted (204): External stop arrives
205	(205): External stop leaves
206	Halted (206): Board hardware incompatibility
207	(207): AUX1 relay activation
208	(208): AUX1 relay deactivation
209	(209): AUX2 relay activation
210	(210): AUX2 relay deactivation
211	(211): Command entry deactivated
212	Error (212): VarioTrack software incompatibility. Upgrade needed
213	(213): Battery current limitation by the BSP stopped
214	Warning (214): Half periode RMS voltage limit exceeded, transfer opened
215	Warning (215): UPS limit reached, transfer opened
216	Warning (216): Scom watchdog caused the reset of Xcom-232i
217	Warning (217): CAN problem at Xtender declaration
218	Warning (218): CAN problem while writing parameters
222	(222): Front ON/OFF button pressed
223	(223): Main OFF detected
224	(224): Delay before closing transfer relay in progress {1580}

STUDER