STATIC TRANSFER SWITCH

STS207 LV & HV
STS203 LV & HV

USER MANUAL

Notes to this manual

ATTENTION! Read this manual carefully before installing and commissioning the specified module. This manual is a part of the delivered module. Familiarity with the contents of this manual is required for installing and operating the specified module.

The function description in this manual corresponds to the stage of technology at the date of publishing. Technical changes and changes in form and content can be made at any time by the manufacturer without notice. There are no obligations to update the manual continually. The rules for prevention of accidents for the specific country and the general safety rules in
accordance with IEC 364 must be observed.

The module is manufactured in accordance with applicable DIN and VDE standards such as VDE 0106 (part 100) and VDE 0100 (part 410). The CE marking on the module confirms compliance with EU standards 2006-95-EG (low voltage) and 2004-108-EG (electromagnetic compatibility) if the installation and operation instructions are followed.

Supplier:

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Changes and errors excepted.

Revision history

Revision: 1.0

Date: 2011-10-06

Revision	Description of change	Writer	Date
1.0	First edition, based on “UM_STS207_WEB_E_R2.0”, STS203 (115 VAC/60 Hz version) included.	RTH	2011-10-06

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1. Safety instructions & notes to electronic waste disposal

Warning!

Because several components of operating electrical modules are charged by dangerous voltage, the improper handling of electrical modules may cause accidents involving electrocution, injury, or material damages.

- Operation and maintenance of electrical devices must be performed by qualified skilled personnel such as electricians in accordance with EN 50110-1 or IEC 60950.
- Install the device only in areas with limited access to unskilled personnel.
- Before starting work, the device must be disconnected from mains. Make sure that the device is earthed.
- Do not touch connector pins as they can be charged with dangerous voltage up to 30 seconds after disconnection.
- Only spare parts approved by the manufacturer must be used.

The correct disposal of electronic waste is the responsibility to recycle discarded electronic equipment and is necessary to achieve the chosen level to protect human health and the environment.

In the case of waste disposal of your discarded equipment we recommend to contact a professional waste management company.

2. General Information

The static transfer switch STS207 is designed for nominal switching capacity of 7 kVA (STS203 ⇨ 3.5 kVA) and is used for nearly interruption free switching (<4 ms) between two AC sources (usually inverter and substitute-mains supply). Operation in combination with inverters of series INV222/INV211 is intended. Consequently AC consumer loads can be driven nearly without interruption if one of the two power sources fails.
The STS207/STS203 (in the following simply named "STS") is a hot plug-in module with rear side connectors and is designed to be mounted in an assembly set sub rack (see section 3.1 "Optional equipment").
The operation and indication elements as well as an Ethernet and CAN-Bus connector are user-friendly integrated in the front plate of the unit.

2.1 Example of use

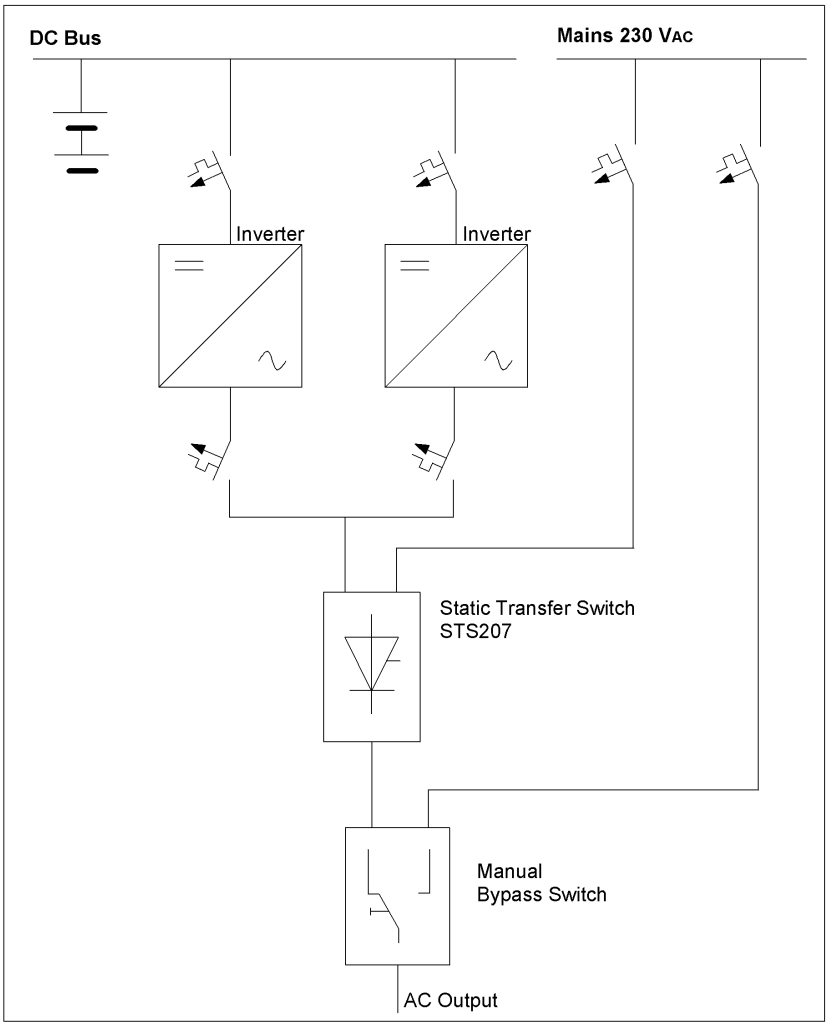


Figure 1. Block diagram "Example of use"

2.2 Operating modes

The static transfer switch STS is designed for the operating modes “inverter priority” and “mains priority” alternatively. The consumer load is fed by priority source as long as that source works faultlessly.

REMARK: The unit's default setting is "Inverter priority".

The priority source is programmable using "service menu 2".

2.2.1 "Inverter priority" (default setting)

At operating mode “inverter priority” the load is fed by inverters. But if the inverter(s) fail or overload occurs, the STS switches to “Load on Mains”.

2.2.2 "Mains priority"

At the operating mode “mains priority” the load is fed by AC mains. The STS switches to “Load on Inverter” if mains fails provided that the load matches the output power of the inverters.

3. Type Range/ Main Data

Type Designation	Article Code	Input Voltage Range Source 1 + 2	Nominal Input Frequency	Redundant DC Circuitry Supply
STS207-230/230HV	601-070-715.00	100 to 250 VAC **Default: 230 VAC**	50 Hz/60 Hz (adjustable) **Default: 50 Hz**	91.8 to 275 VDC (HV version)
STS207-230/230LV	601-070-515.00	100 to 250 VAC **Default: 230 VAC**	50 Hz/60 Hz (adjustable) **Default: 50 Hz**	38 to 75 VDC (LV version)
STS203-115/115HV	601-035-705.00	100 to 250 VAC **Default: 115 VAC**	50 Hz/60 Hz (adjustable) **Default: 60 Hz**	91.8 to 275 VDC (HV version)
STS203-115/115LV	601-035-505.00	100 to 250 VAC **Default: 115 VAC**	50 Hz/60 Hz (adjustable) **Default: 60 Hz**	38 to 75 VDC (LV version)

For more specific data, see section 8 “Technical specifications” please.

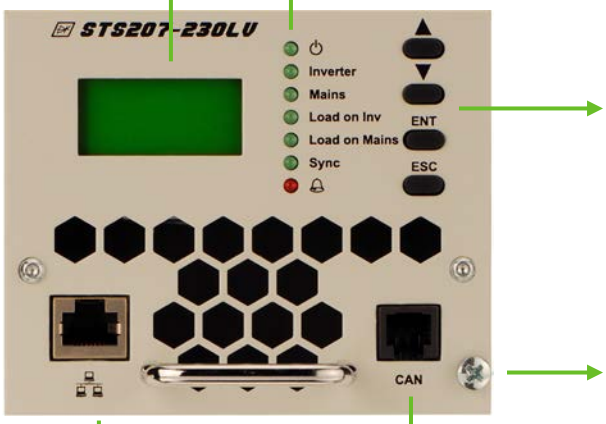
3.1 Optional equipment for STS assembly:

- AC Rack ACR INV222-6.75 LV (assembly set 19" sub rack 2U for max. three inverters INV2xx-48 or INV2xx-60 and for one static transfer switch STS LV including a wired backplane): Material code= 502-222-315.LV

- AC Rack ACR INV222-6.75 HV (assembly set 19" sub rack 2U for max. three inverters INV2xx-110 or INV2xx-220 and for one static transfer switch STS HV including a wired backplane): Material code= 502-222-315.HV

Figure 2. AC Rack ACR INV222-6.75 fully equipped with three inverters INV222 and one static transfer switch STS207

3.2 Front view: operating elements, indicators



The STS is equipped with:

One LC-Display (4 x 16 characters)

Seven LED indicators: STANDBY, INVERTER, MAINS, LOAD ON INVERTER, LOAD ON MAINS, SYNC, ALARM (Collective failure)

Four adjustment keys: Up, Down, ENT, ESC

One captive screw is used for each module to secure it to the sub rack (component of the module).

CAN connector (RJ11)

Ethernet connector 10/100MB (RJ45)

Figure 3. Front view

For more information about the operating elements, LED indicators, LC-Display, and front connectors, read the following sections please.

3.3 Electrical connections

The STS is equipped with:

- 1 rear side connector for: AC input 1 (inverter), AC input 2 (mains), AC output and signalling
- 1 front side connector RJ11 (additional CAN-Bus connector)
- 1 front side connector RJ45 (Ethernet 10/100MB)

3.3.1 Pin assignment of the rear side connector:

Pin	Designation
2b	AC-Input 1 (Inverter)/Phase L1
5b	STS-Output / Phase L1
8b	AC-Input 2 (Mains)/Phase L1
11b	Common Neutral Conductor
16a	CAN_L Signal (low)
17a	CAN_V+ DC-Supply +8 to +15V
18a	-
19a	Synchronization / SYNC - STAT 2
20a	-
16b	CAN_V- DC-Supply GND
17b	CAN_H Signal (high)
18b	Synchronization / SYNC - STAT 1
19b	Synchronization / SYNC - SIG 2
20b	-
16c	Alarm relay output, NO
17c	Alarm relay output, COM
18c	Synchronization / SYNC - GND
19c	Synchronization / SYNC - SIG 1
20c	-
28b	+Vi (DC-Power Supply*)
31b	-Vi (DC-Power Supply*)

* STS HV: Vi = 91.8 to 275 V_{DC}
STS LV: Vi = 38 to 75 V_{DC}

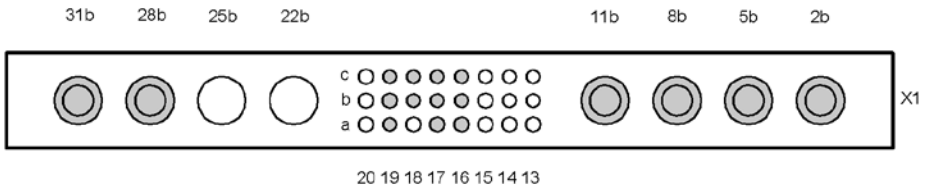


Figure 4. Rear side connector (shown from the rear side of the module)

3.3.2 Pin assignment of the front side CAN-Bus connector (RJ11):

Pin	Signals CAN	Designation
1	CAN_V+	DC-Supply +8 to +15V
2	CAN_V+	DC-Supply +8 to +15V
3	CAN_H	Signal (high)
4	CAN_L	Signal (low)
5	CAN_V-	DC-Supply Ground
6	CAN_V-	DC-Supply Ground

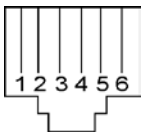


Figure 5. CAN-Bus connector

(socket outlet RJ11, 6-pole)

3.3.3 Pin assignment of the front side Ethernet connector (RJ45):

Pin	Name	Designation
1	TX+	Tranceive Data +
2	TX-	Tranceive Data -
3	RX+	Receive Data +
4	n/c	Not used
5	n/c	Not used
6	RX-	Receive Data -
7	n/c	Not used
8	n/c	Not used

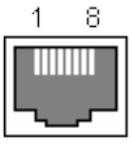


Figure 6. Ethernet connector

(socket outlet RJ45, 8-pole)

3.4 Cooling/Air flow direction

The unit is cooled by an internal fan. The airflow is from front to rear side. The fan is monitored and speed controlled dependent on module temperature. To provide sufficient air flow a minimum space (see item “A” in figure 7) of 50 mm is required between the unit and the rear cabinet wall as well as an unobstructed supply of air to the front of the module.

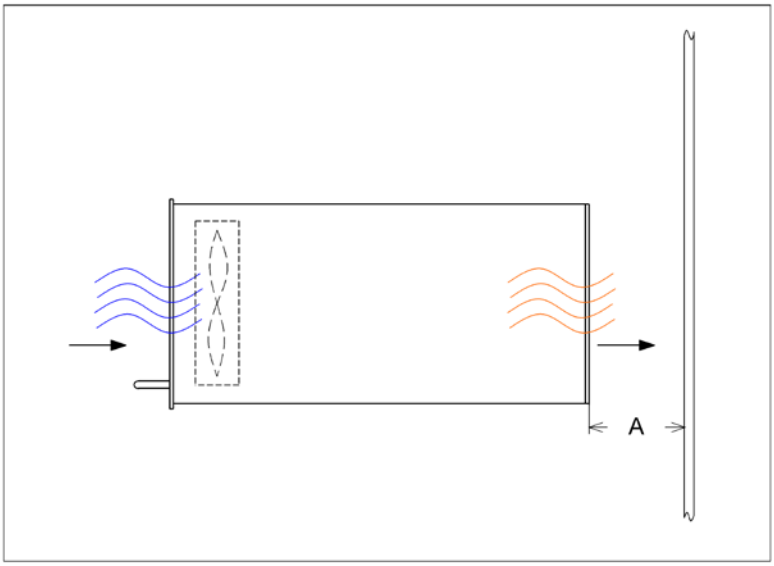


Figure 7. Module air flow

3.5 Communication interfaces

3.5.1 CAN-Bus

The STS is equipped with a serial data interface in accordance with the Controller Area Network (CAN) specification. The CAN-Bus connection is integrated in the rear side connector and an additional one is located at the front panel. The communication of the STS with the connected inverters and a possibly implemented UPC DC controller unit takes place via CAN-Bus.

The following information is available via CAN:

- Status information of the STS:
    - Availability of the connected inverters
    - Availability of substitute mains
    - Load on mains/inverter
    - Synchronization
    - Vbatt </>
    - Vout </>
    - Iout >
- Output current of the STS
- Battery voltage connected to the STS
- Inverter and mains voltage
- Inverter and mains frequency
- STS module temperature

3.5.2 Ethernet (Net Connection)

Furthermore the STS is equipped with an Ethernet interface (10/100MB) at the front side of the module for remote control via HTTP (WEB server), SNMP, SMTP und SNTP.
The STS can directly be configured via PC. Furthermore, extensive remote control can be realized.

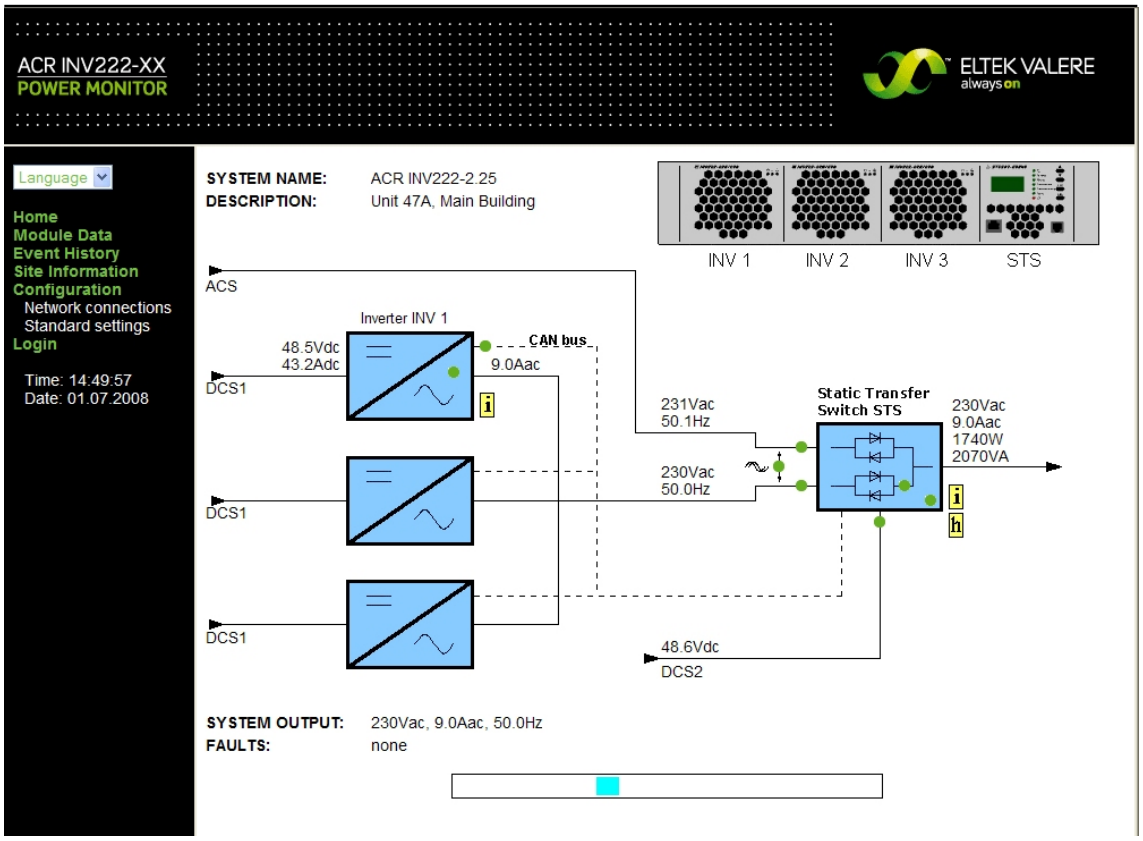


Figure 8. Sample screenshot "Net Connection"

REMARK: A manual for the Net Connection is separately available.

4. Handling

4.1 Storage

The STS must be stored in a dry, dust free environment with a storage temperature according to specific data (see section 8).

4.2 Before commissioning

REMARK:	The LV device is delivered with factory set defaults according to a 48 V battery system (24 cells, lead acid battery) the HV device is delivered with factory set defaults according to a 108 V battery system (54 cells, lead acid battery). The default value of the AC voltage is factory set to 230 V/50 Hz (STS207) or 115 V/60 Hz (STS203) dependent on the type (see section 3 "Type range" and section 8 "Technical specifications" as well). If other battery systems with different cell numbers should be used or the STS should be connected to another AC voltage, the STS must be reconfigured before.	

The factory preset defaults and threshold values and their adjustment ranges/steps as well are listed in the **Service Menus** (see section 9 „Appendix" please).
If necessary, reconfiguration of the STS can be carried out using adjustment keys or via WEB connection at PC alternatively.
Operation using adjustment keys and menu navigation as well is described at the following sections.
For operation via WEB connection please see the specific user manual „WEB connection".

4.3 Commissioning

REMARK:	Before commissioning the module, make sure that the battery voltage for redundant circuitry supply of the STS and voltage values of both AC input sources corresponds to the specification as specified on the type plate. Make sure that the STS is correctly configured according to the used battery system and connected AC voltages (value/frequency) as well (see section 4.2 above "Before commissioning" please).	

1. Carefully unpack the unit
2. Put the unit into the provided slot to the right of the sub rack.
3. Carefully slide in the unit until the module connector touched the backplane connector.
4. Increase the force until the unit fits in completely. Avoid using too much force. If the unit does not fit in, begin again at step 2.
5. Secure the module using the captive screw provided with the module.

Switch-ON/Switch-OFF: The STS is switched ON/OFF by external input fuses

CAUTION:	After the module is switched OFF the internal capacitors are still fully charged. Do not touch connector pins as they can still be charged with dangerous voltage after disconnection.	

4.4 Operation

The operation of the unit takes place with keys located on the front side of the unit.
All main functional parameters and measured values are displayed on the front side LCD panel (text indicator) as well as with LED indicators. The different functions are described in the following sections.

4.4.1 LED Indications

Functions of front panel LED indicators

LED		Colour	Main function	Auxiliary function
●	⏻	green	Unit is ready for operation	---
●	**Inverter**	green	Voltage and frequency of source Inverter within permissible limit	Flashing if inverter overload is detected
●	**Mains**	green	Voltage and frequency of source Mains within permissible limit	Flashing if "Load on mains" is enabled (see menu 2)
●	**Load on Inv.**	green	Load feeding by source Inverter	---
●	**Load on Mains**	green	Load feeding by source Mains	---
●	**Sync.**	green	Inverters are synchronized to mains phase and frequency	---
●	🔔	red	Collective Failure (the allocation of the individual trouble codes is programmable)	---

4.4.2 Adjustment keys

Adjustment takes place using four keys at the front of the module:

Keys	Function
□ ▲	➢ during menu item selection: change to previous item (parameter) ➢ during adjustment mode: increase value
□ ▼	➢ during menu item selection: change to next item (parameter) ➢ during adjustment mode: decrease value
ENT	➢ enter menu (long pressed) ➢ enter submenu ➢ save parameter and leave submenu
ESC	➢ leave the menu without changing ➢ enter error list

4.4.3 LC-Display: Indication of measured values and alarm messages

In its initial state, the display shows the measured voltage value of the input sources (AC output voltage of inverter, mains voltage) and the STS output current.

By pushing the keys ▲ and ▼ you are able to change between different display topics.

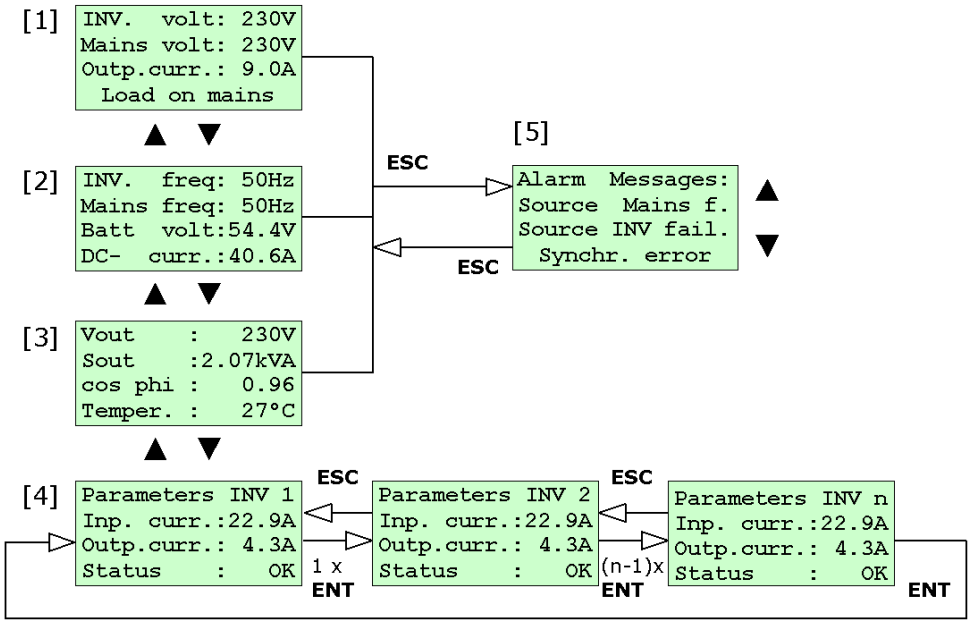


Figure 9. LC-Display: Indication of measured values

The display [1] shows the initial state (basic display). The plain text of the basic display becomes visible after successful start-up procedure. As shown in figure 9., you are able to select the displays [1], [2], [3] and [4] by pressing the keys ▲ or ▼:

- If no inverter is registered, display [4] is not available.
- If exactly one inverter is registered, display [4] is visible without inverter number.
- If more than one inverter is registered, it is possible to call the parameters (input current, output current and status) of all connected inverters in succession by pressing “ENT”. The inverter number is shown in the first line of the display. Press “ESC” to go one step back.

The display automatically reverts to display [1] if no key is pressed for a period of more than 30 seconds.
Display [5] “Alarm messages” indicates the current alarm status. It can be selected from display [1], [2] and [3] by pressing “ESC”.
By pressing the keys ▲ or ▼ you are able to scroll through the list of alarm messages if more than three entries are present there. The display “Alarm messages” can be quit by pressing “ESC” again.
Basically (factory setting) all individual failures according to “List of the selectable individual alarm messages“, (see section 5.1) are enabled and therefore they are visible on the display in case of failure. The alarm messages which shall **not** be visible on the display in case of failure have to be disabled in the customer menu (see the diagram “customer menu”).

5. Parameter adjustment/menu structure

The LV device is delivered with factory set defaults according to a 48 V battery system (24 cells, lead acid battery). The HV device is delivered with factory set defaults according to a 108 V battery system (54 cells, lead acid battery). The default value of the AC voltage is factory set to 230 V/50 Hz (STS207) or 115 V/60 Hz (STS203) dependent on the type (see section 3 "Type range" and section 8 "Technical specifications" as well).
If other battery systems with different cell numbers should be used or the STS should be connected to another AC voltage, the STS must be reconfigured before.
In this case reconfiguration takes place using service menu 1 and 2 (see section 9 „Appendix") or the network menu (see the specific user manual "WEB connection") as well.

ATTENTION: Configuration should be carried out only by qualified and skilled service personnel.

In the following sections the adjustable parameters in the **customer menu** (accessible to each customer) are described. Those are general adjustments such as indicated display language, time delay values, content of collective failure signal etc.
IMPORTANT: In any case the number of connected inverters and number of redundant inverters as well must be configured.

5.1 Adjustable parameters (customer menu)

The following parameters can be adjusted according to the table below:

Customer menu	Functions	Range	Default value
INV-count	Number of connected inverters	0- 16	0
INV-redundancy	Number of redundant inverters	0-15	0
Time/date	Set new time and date	---	---
Configuration CF	Selection (set active/inactive) of single alarm messages for the collective failure (CF) signalization (LED and relay)	All alarm messages*	All enabled
Delay LED CF	LED time delay of the collective failure signal	1- 60 sec	30
Delay Relay CF	Time delay of the collective failure relay output	1- 60 sec	30
LCD-contrast	Contrast adjustment of the display	0- 100	100
LCD backlight	Background illumination	Not used	On
Language	Selection of the language	english, german, polish, swedish, italian	english

***** The following table shows a list of the selectable individual alarm messages:

Alarm messages	Meaning
Source Mains f.	Mains voltage or frequency not Ok
Source INV fail	INV voltage or frequency not Ok
Synchr. error	Mains and INV voltage are not synchronous
Inverter fail.	INV failure
INV redundancy	INV failure
INV count crit.	INV failure
STS overtemp	STS over temperature
STS overload	STS output current to high
INV overload	Actual output current exceeds the combined INV power
INV red. overl.	Actual output current exceeds the combined and **not redundant** INV power
DC-voltage low	Battery voltage low
DC-voltage high	Battery voltage high
fan error	Internal fan error
Uout error	Output voltage < 95% Vin (Mains/INV)
Ubatt< warning	Battery voltage < warning level
Ubatt> warning	Battery voltage > warning level

5.2 Structure of the customer menu

In the customer menu adjustments according to the table “Adjustable Parameters” (see section 5.1) can be done. The customer menu is accessible from the basic display by pressing “ENT” for approx. three seconds and second pressing “ENT” (shortly).

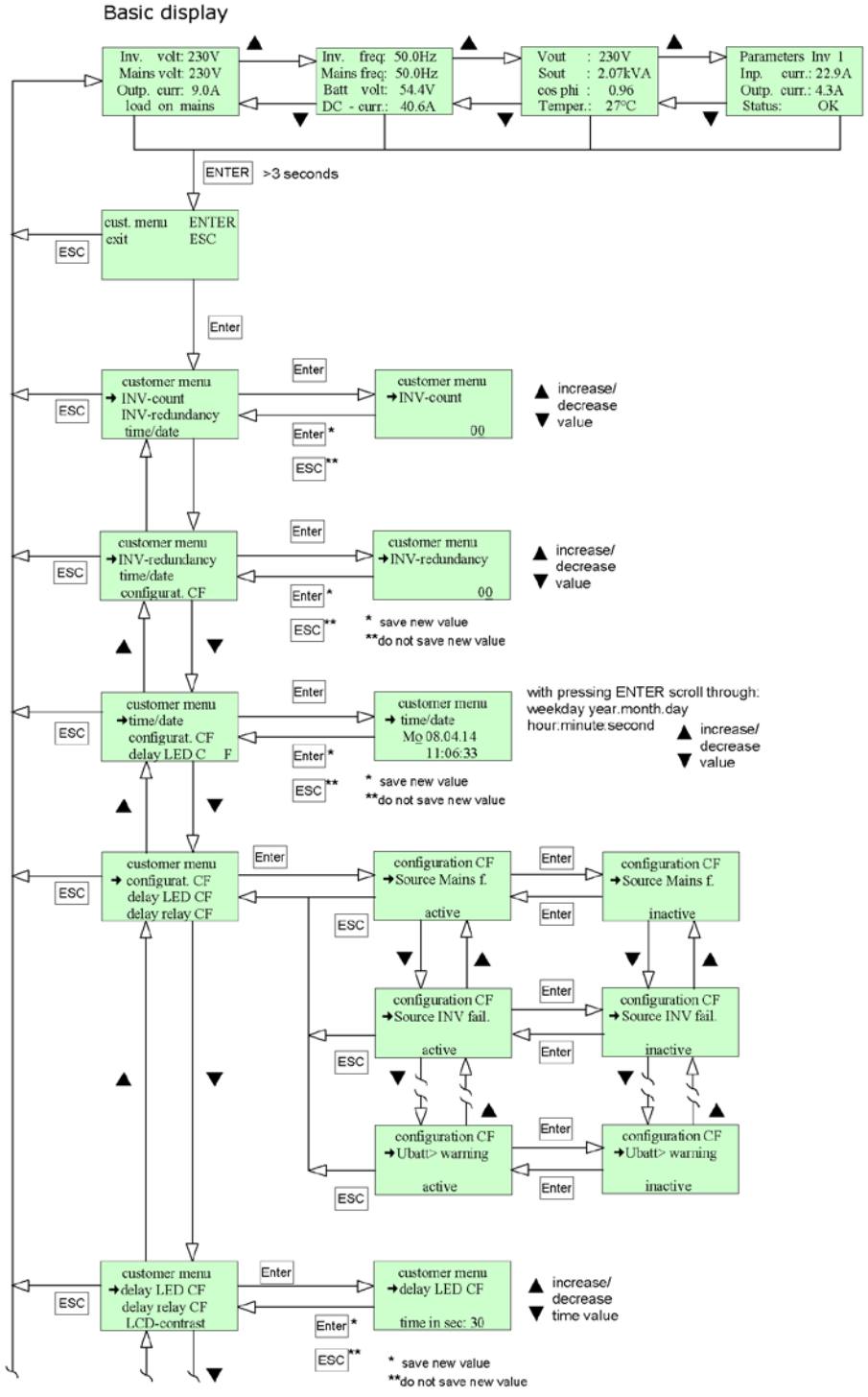


Figure 10. Structure of the customer menu

For a list of all selectable individual alarm messages for the collective failure (CF) signalization, see section 5.1

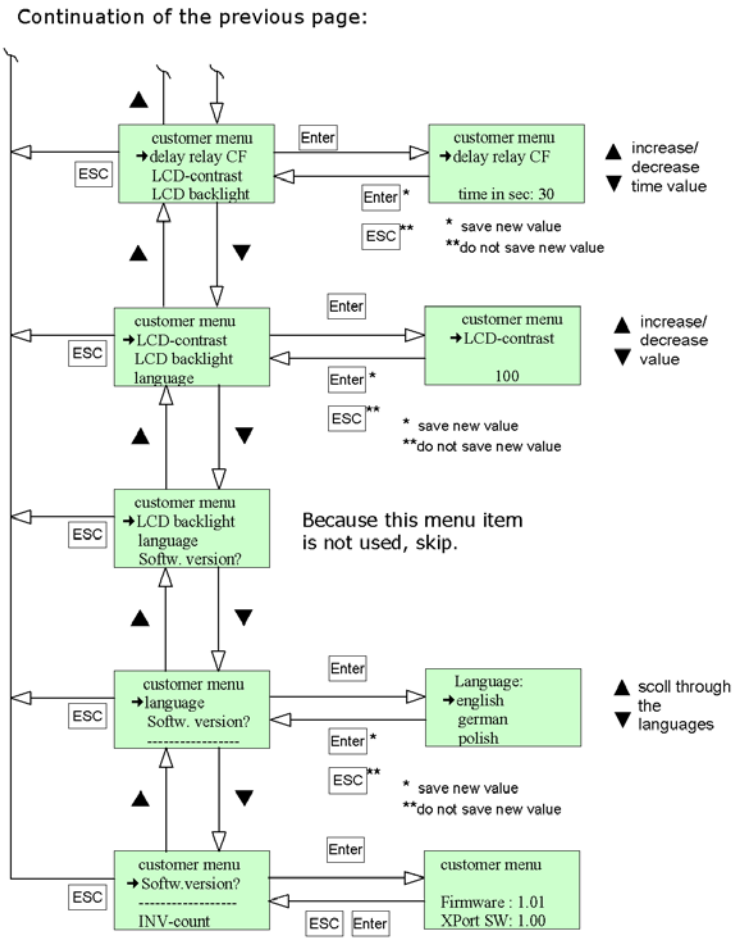


Figure 11. Continuation of the customer menu

The final display shows the currently used firmware version.

6. Maintenance

In general the module is maintenance-free. Exclusively the fan is a component consisting of moving parts. Although it may be expected that the operating life of the fan is more than five years it is recommended to exchange the fan every five years.

By way of precaution a yearly inspection with following checks is recommended:

- Mechanical/visual inspection
- Removal of dust and dirt, especially on radiator surfaces
- Check for internal dust or humidity

Attention!
Dust combined with moisture or water may influence or destroy the internal electronic circuits.
Dust inside the unit can be blown out with dry compressed air. Avoid using too high air pressure.

The interval between the checks depends on ambient conditions of the installed module.

7. Trouble shooting

If a failure occurs in the system, the LED “Alarm” (bell symbol) is illuminated according to the adjustments in the customer menu, item “Configuration CF” (see section 5.2 “Structure of the customer menu”). The failures are shown in clear text mode on the display “Alarm Messages”.

The display “Alarm Messages” can be entered from the basic display by pressing “ESC”.
With pressing the keys ▲ or ▼ you can scroll through the list of alarm messages if more than three entries are present there. The display “Alarm Messages” can be quit by pressing “ESC” again.

Basic display

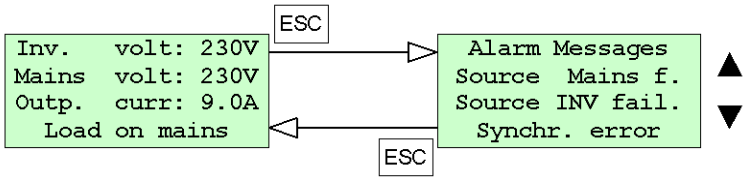


Figure 12. Display “Alarm Messages”

In the table on the following page all possible alarm messages are listed and described.

List of possible alarm messages:

Alarm messages	Meaning/possible reason	Corrective action
Source Mains f.	Mains voltage or frequency not Ok	Check mains voltage
Source INV fail	INV voltage or frequency not Ok	Check INV voltage
Synchr. error	Mains and INV voltage are not synchronous	No mains voltage or frequency of mains voltage is not stable.
Inverter fail.	INV failure	CAN communication with one or more INVs failed or INV failure detected via CAN
INV redundancy	INV failure	The last redundant INV is not Ok! e.g. INV count=3, INV red. count=2 → error active when two inverters are not OK!
INV count crit.	INV failure	The first not redundant INV is not Ok! e.g. INV count=3, INV red. count=2 → error active when three inverters are not OK!
STS overtemp	STS over temperature	Check the air flow Check admissible ambient temperature
STS overload	STS output current to high	Reduce load current
INV overload	Actual output current exceeds the combined INV power#	Reduce load current or increase INV power by additional inverter
INV red. overl.	Actual output current exceeds the combined and **not redundant** INV power##	Reduce load current or increase INV power by additional inverter
DC-voltage low	Battery voltage low	Check DC voltage system (CAN-Off command is send to the inverters)
DC-voltage high	Battery voltage high	Check DC voltage system (CAN-Off command is send to the inverters)
fan error	Internal fan error	Check air flow, change fan
Uout error	Output voltage < 95% Vin (Mains/INV)	Check output voltage
Ubatt< warning	Battery voltage < warning level	Check DC voltage system
Ubatt> warning	Battery voltage > warning level	Check DC voltage system

#Examples:
Case 1): The STS is running on Mains with a present load of 3.0 kVA. There are two INVs installed in the system, each one with a nominal output power of 2.25 kVA but one of the INVs has switched off by over temperature.
>> Even though the STS is measuring the INV voltage and declares "Source INV" as OK, it will not switch back to INV because the present output current exceeds the power of one INV!
Case 2): The STS is running on "Source INV" while one INV turns off, the STS will activate the "INV overload" error but will switch to "Source mains" not till then "Source INV" is also broken-down!

##Example: The INV rack is running with three INVs (each 2.25 kVA). One of them is configured as redundant. If the STS output power **exceeds** 4.5 kVA the error “INV red. overl.” will occur. The system output power is too high for the two **not redundant** INVs!

8. Technical specifications

8.1 Specific data (depending on the type)

Type designation	STS207-230/230LV	STS207-230/230HV	STS203-115/115LV	STS203-115/115HV
Article code	601-070-515.00	601-070-715.00	601-035-505.00	601-035-705.00
Factory set AC input voltage value (source 1 & 2)	230 V	230 V	115 V	115 V
Factory set frequency	50 Hz	50 Hz	60 Hz	60 Hz
Redundant DC circuitry supply	38 to 75 V	91.8 to 275 V	38 to 75 V	91.8 to 275 V
Nominal switching capacity	7 kVA	7 kVA	3.5 kVA	3.5 kVA

8.2 General technical data

AC input:	
Input voltage range of source 1 & 2	100 to 250 VAC ±20 % (factory set default see 8.1 „Specific data" please). REMARK: Redundant AC input voltage has to be ≥90 V.
Input frequency	50 Hz/60 Hz, programmable (factory set default see 8.1 „Specific data" please)
Synchronization range	±2 Hz
Efficiency	≥ 99 %
Mains input fuse	32 A semiconductor protection
External mains fuse	recommended: 32 A gL or MCB characteristic B
Output:	
Nominal output voltage	According to AC input voltage, switch over threshold ±5 to ±20 % programmable
Nominal output current	30.4 A_{AC}
Overload capability	1000 % for 10 ms (fuse tripping of 32 A is guaranteed)
Output frequency	acc. to the input frequency
Transfer time	≤4 ms
Other specifications:	
Monitoring functions	voltage/frequency of sources Mains and INV; synchronization mains- inverter; over temperature; CAN communication lost; synchronization bus interrupted
LED signalling	Operation (green), source Mains OK (green), source INV OK (green), load on inverter (green), load on mains (green), synchronization (green), collective failure (red)
Configuration	with front side operation keys UP/DOWN/ENTER/ESC and LCD (4 x 16 characters) or via Ethernet (internal WEB server)
Fault signalization	text message on LCD, in addition 1 programmable isolated collective failure (alarm) relay output; Email or SNMP (Trap) notification
Rated contact load of the alarm relay	Max. switching power 62.5 VA; 30 W Max. switching voltage 125 V_{AC}; 60 V_{DC}

Communications interface	CAN-Bus, proprietary protocol; redundant synchronization bus; Ethernet 10/100 MB Half/Full (WEB server, SNMP, SMTP, SNTP)
Ambient temperature	operation: -20 °C to +55 °C; storage: -40 °C to + 85 °C
Cooling	fan cooling (temperature regulated; monitored)
Max. installation altitude	≤1500 m
Audible noise	≤45 dBA
Type of construction	1/4 x19", 2 U
Surfaces	powder coating RAL 7035 (front panel only) with black imprint; constructive parts: anodized metal
Dimensions (W/H/D)	106.4/88.4/335 mm plus 25.5 mm handle length
Minimum installation depth	400 mm plus 25.5 mm handle length (in combination with an assembly set 19" sub rack)
Weight	approx. 2.2 kg
Connectors	Rear: AC inputs/output, DC input and signalization (DIN 41612-M-connector); Front: Ethernet (RJ45), CAN (RJ11)
Applicable standards:	
Mechanical construction	acc. to VDE 0160 edition 5.88 chapter 7.2.2
Protection class	IP20
Climatic conditions	acc. to IEC 721-3-3 class 3K3/3Z1/3B1/3C2/3S2/3M2
RFI suppression / immunity	CE- label; ((EN50081-1; EN55011/55022 class "B"; EN50082-2; EN61000-4 part 2/3/4/5)
Compliance to safety standards	acc. to EN60950-1; VDO0100 T410; VDO0110; EN60146

8.3 Dimensional drawings

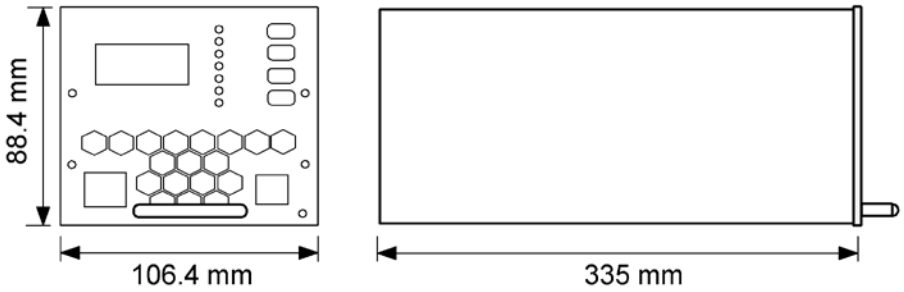


Figure 13. Module dimensions

9 Appendix

9.1 Service menu 1

9.1.1 Adjustable parameters in service menu 1

Menu items (parameters)	Function	Adjustment range	Adjustment steps	Default values
INV-nom. power	Key in the nominal output power of one inverter	1.1 to 5.0 kVA	0.05 kVA	1.1 kVA or 2.25 kVA dependent on the type
Mains voltage	Key in mains voltage value	100 to 250 VAC	1.0 V	230 V or 115 V dependent on the type
Mains frequency	Set mains frequency	50 or 60 Hz		50 Hz or 60 Hz dependent on the type
Frequency range	Key in the tolerance range for synchronization	±0.1 Hz to ±2.0 Hz	0.1 Hz	±0.5 Hz
STS current	Key in the nominal STS current	1- 250 A	1.0 A	30 A
Batt. cellcount[1)]	Key in the number of battery cells	10 to 200	1	LV: 24 cells HV: 54 cells
CAN-Status M/S[2)]	Key in CAN-Status “Master” or “Slave”	0= Master, 1 to 31= Slave	1	0
configur. rel.2	Selection of STS states (active/not active) which lead to relay 2 signalling	**The STS207 (STS203) has no second relay, therefore it is not configurable!**		
function relay 2	Key in the function logic of relay 2			
Delay relay 2	Key in the time delay value of relay 2			
Default-values?	Reset the STS to default values?[3)]	yes/no		no

[1)] Cell count at 2.0 V per cell (Pb).
[2)] This menu item is inoperable
[3)] With the exception of calibrated values.

9.1.2 Selection of "service menu 1"

☞ Service Menu 1 is code protected[1].

To attain Service Menu 1 please follow the steps according to the flow-chart (see figure 15):

1. Based on the basic display **[1]** press and hold ENTER (for approx. three seconds) until the display shows "cust. menu" **[2]**.
2. Press the down button ▼ and keep pressing until you get "servicecode: xxx[1]" **[3]**.
3. Tip ENTER. You are then in service menu 1 **[4]**. Pressing the buttons ▲ or ▼ you are able to leaf through the menu. The arrow (➜) shows the menu item which is selectable by pressing ENTER. The example in the flow-chart (see figure 1) shows the selected menu item "INV-nom. power" **[5]**.
4. Change the values pressing ▲ or ▼.
5. Tip ENTER to save the new values; if you tip ESC, the new values are not saved.
6. Tip ESC to return to the basic display.

For details concerning the adjustable parameters, see the table on previous page "Adjustable Parameters, Service menu 1".

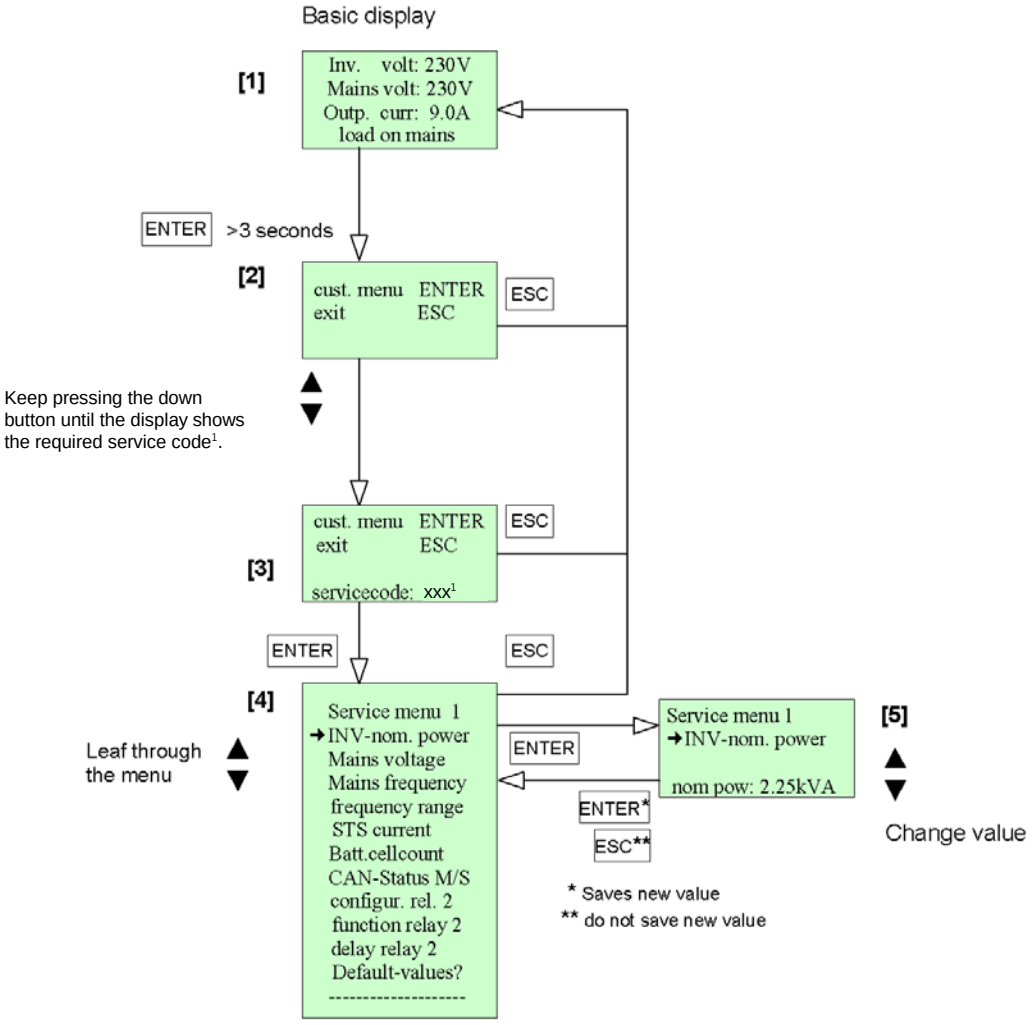


Figure 14. Flow-chart of Service Menu 1

[1]Ask your system supplier if the code is required.

9.2. Service menu 2

9.2.1 Adjustable parameters in service menu 2

Menu items (parameters)	Function	Adjustable range	Adjustment steps	Default values
Operating mode	Key in the priority source	"Inverter-" or "mains priority"		Inverter priority
Source INV>	Upper tolerance range of source inverter voltage	+5 to +20%	1 %	+15%
Source INV<	Lower tolerance range of source inverter voltage	-5 to -20%	1 %	-15%
delay so. INV	Key in the time delay of source INV	0.5 to 4.0 ms	0.5 ms	2.0 ms
Source mains>	Upper tolerance range of source mains voltage	+5 to +20%	1 %	+20%
Source mains<	Lower tolerance range of source mains voltage	-5 to -20%	1 %	-20%
delay so. mains	Key in the time delay of source mains	0.5 to 4.0 ms	0.5 ms	4.0 ms
Vimax	Key in the over voltage switch-off value	1.00-3.00 V/cell	0.01 V	2.50 V/cell*
Vimin 1[1)]	Key in the under voltage switch-off value	0.70-2.50 V/cell	0.01 V	1.70 V/cell*
Vimin 2[1)]	Key in the under voltage switch-on again value	0.60-2.50 V/cell	0.01 V	1.90 V/cell*
Vbatt>	Key in the over voltage warning value	1.10 - 3.00 V/cell	0.01 V	2.35 V/cell*
Vbatt<	Key in the under voltage warning value	0.70 – 2.20 V/cell	0.01 V	1.90 V/cell*
Load on mains[2)]	Key in: Switch load stationary on mains?	Yes/no		no

*Number of cells is set in service menu 1.

[1)] Please note: Vimin 1 < Vimin 2 (hysteresis)!

[2)] Only suitable for service. Not stored in EEPROM!

9.2.2 Selection of "service menu 2"

☞ Service Menu 2 is code protected[1].

To attain Service Menu 2 please follow the steps according to the flow-chart (see figure 16):

1. Based on the basic display **[1]** press and hold ENTER (for approx. three seconds) until the display shows "cust. menu" **[2]**.
2. Press the down button ▼ and keep pressing until you get "servicecode: xxx[1]" **[3]**.
3. Tip ENTER. You are then in service menu 2 **[4]**. Pressing the buttons ▲ or ▼ you are able to leaf through the menu. The arrow (➜) shows the menu item which is selectable by pressing ENTER. The example in the flow chart (see figure 2) shows the selected menu item "operating mode" **[5]**.
4. Change the values pressing ▲ or ▼.
5. Tip ENTER to save the new values; if you tip ESC, the new values are not saved.
6. Tip ESC to return to the basic display.

For details concerning the adjustable parameters please see the table on previous page "Adjustable Parameters, Service Menu 2".

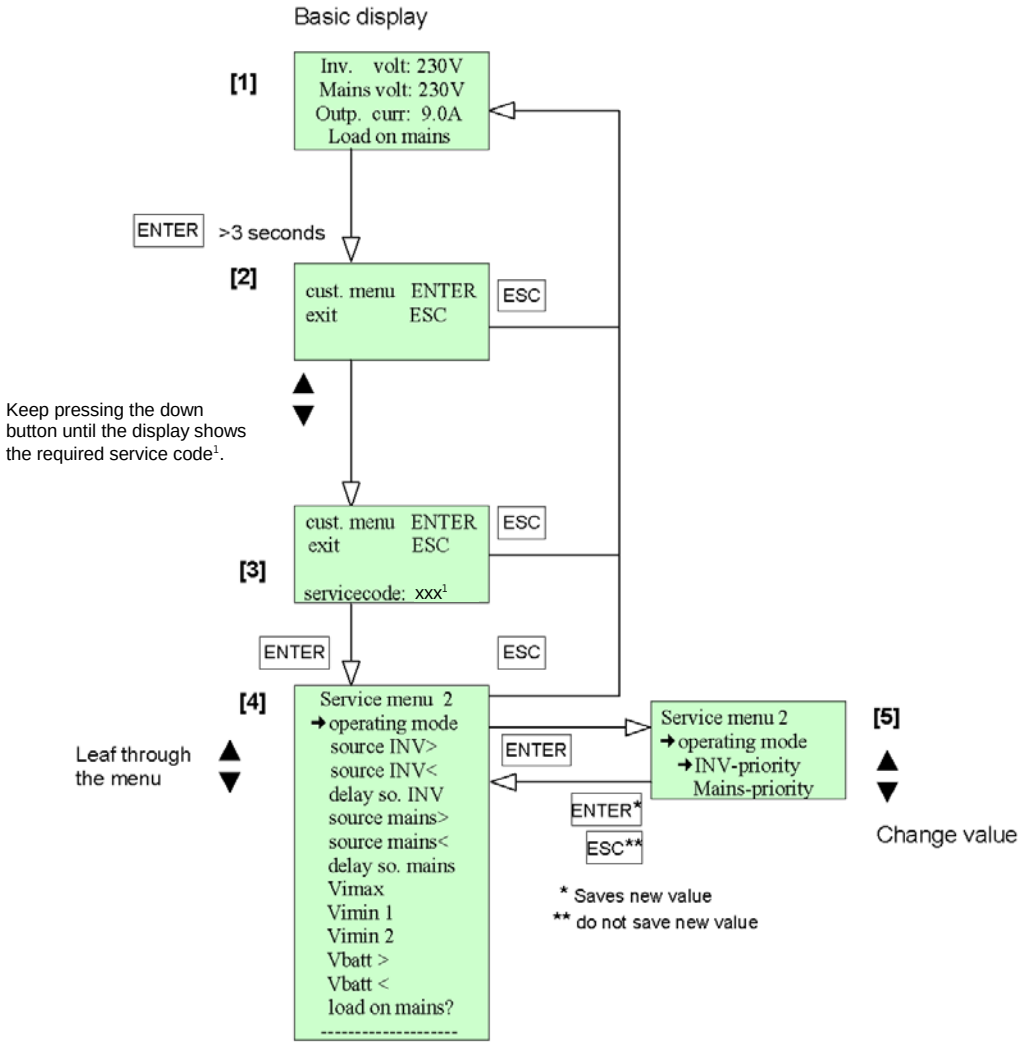


Figure 15. Flow-chart of Service Menu 2

[1]Ask your system supplier if the code is required.

10. Your notes

Your notes

Your notes

Supplier:

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