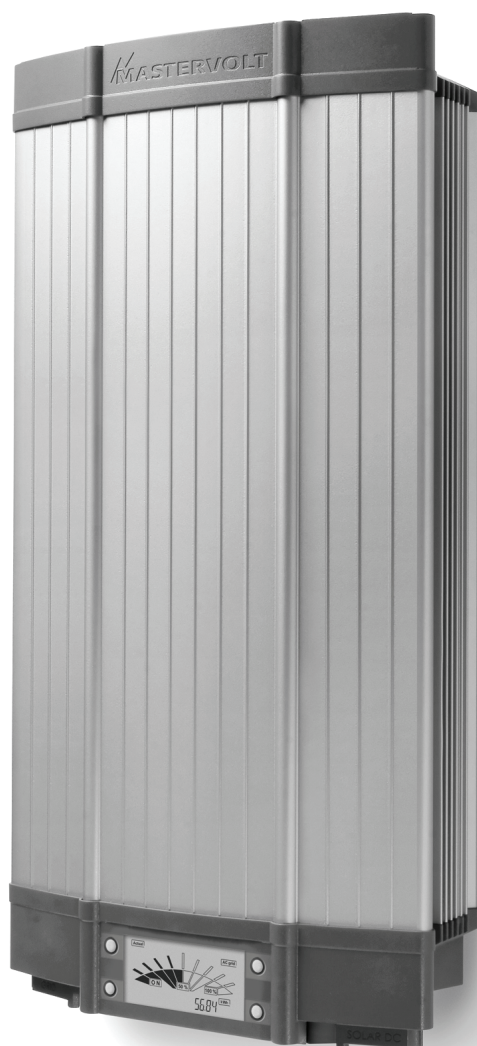




USER'S AND INSTALLATION MANUAL / GEBRUIKERS- EN INSTALLATIEHANDLEIDING
BEDIENUNGS- UND INSTALLATIONSANLEITUNG / MANUEL UTILISATEURS ET D'INSTALLATION
MANUAL DEL USUARIO Y DE INSTALACIÓN / MANUALE DI USO E MANUTENZIONE

Sunmaster XS6500

Grid connected solar inverter



MASTERVOLT
Snijdersbergweg 93,
1105 AN Amsterdam
The Netherlands
Tel.: +31-20-3422100
Fax.: +31-20-6971006
www.mastervolt.com



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OVERVIEW

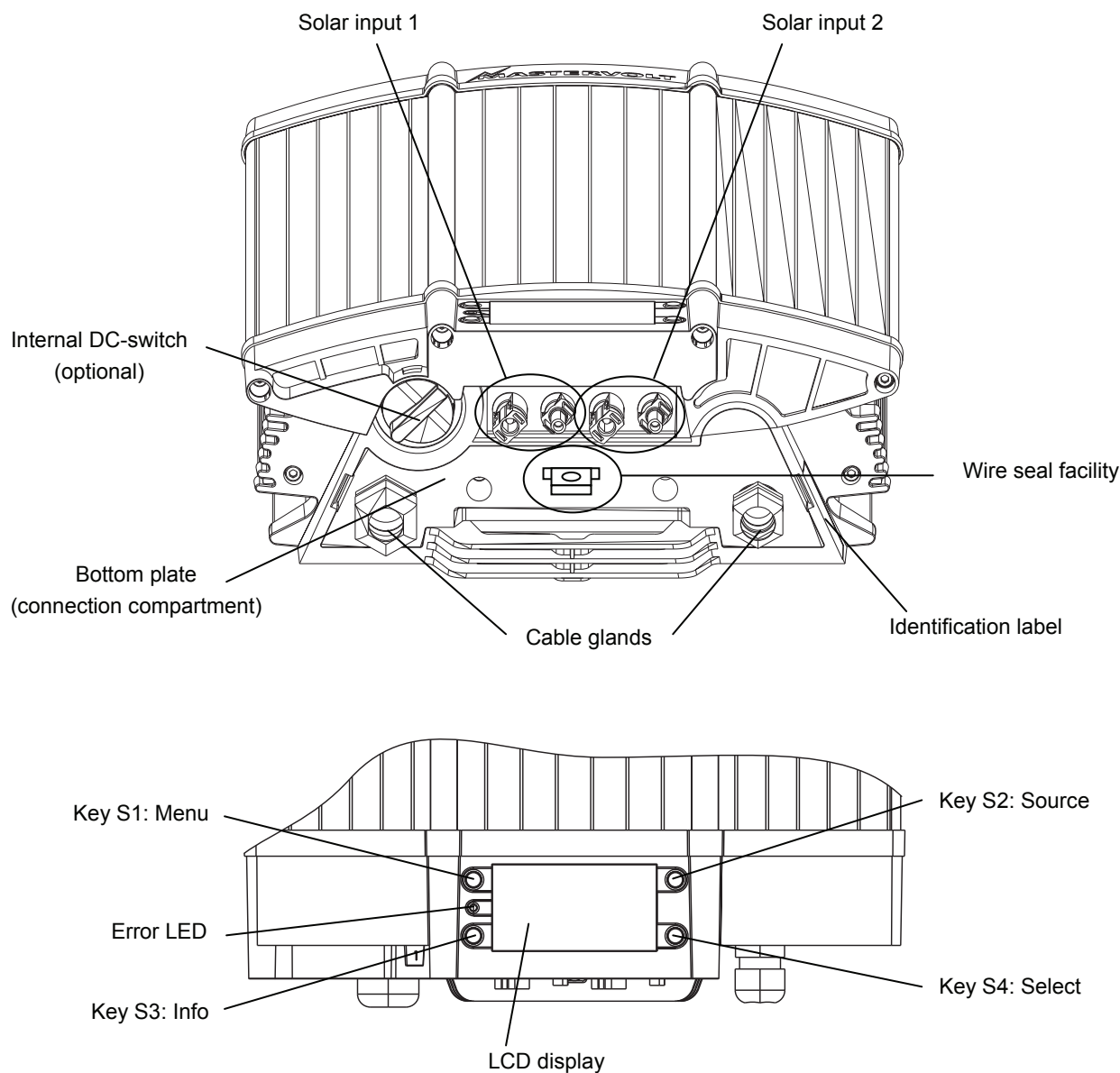


Figure 1: overview of the Mastervolt Sunmaster XS6500.

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1 GENERAL INFORMATION

1.1 PRODUCT DESCRIPTION

Congratulations for choosing the Mastervolt Sunmaster XS6500, further referred to as "Sunmaster". The Sunmaster is a grid connected solar inverter, used for the feed back into the utility grid of power generated by photovoltaic modules.

Depending on the application and in order to meet the local applicable regulations, the Sunmaster can be ordered in several models. See chapter 3.2 for an overview of the available models.

The Sunmaster is not suitable for stand-alone use (i.e. use without public grid).

1.2 USE OF THIS MANUAL

This manual serves as a guideline for the safe and effective installation of the Sunmaster:

- For the electrician this manual gives directions for the installation, operation and commissioning.
- For the end-user this manual gives directions for the operation, maintenance and possible correction of minor malfunctions of the Sunmaster.
- Every person who works with the apparatus should be familiar with the contents of this manual, and must carefully follow the instructions contained herein.
- Store the manual in a user accessible place.

This English manual has 28 pages.

1.3 VALIDITY OF THIS MANUAL

All the specifications, provisions and instructions contained in this manual apply solely to the Mastervolt-delivered standard versions of the Sunmaster (Refer to chapter 3.2).

1.4 GUARANTEE SPECIFICATIONS

Mastervolt assures the product guarantee of the Sunmaster during five years after your purchase, on the condition that all instructions and warnings given in this manual are taken into account during installation and operation.

Among other things, this means that installation is carried out by a qualified electrician, that installation and

maintenance are executed according to the stated instructions and correct working sequence and that no changes or repairs may have been performed on the Sunmaster other than by Mastervolt.

The warranty is limited to the costs of repair and/or replacement of the product by Mastervolt only. Costs for installation labour or shipping of the defective parts are not covered by this warranty.

For making an appeal on warranty you can directly contact your supplier, stating your complaint, application, date of purchase and part number / serial number.

1.5 LIABILITY

Mastervolt accepts no liability for:

- consequential damage due to use of the Sunmaster;
- possible errors in the manuals and the results thereof.

1.6 CHANGES TO THE SUNMASTER

Changes on the Sunmaster may be carried out only after the written permission of Mastervolt .

1.7 IDENTIFICATION LABEL

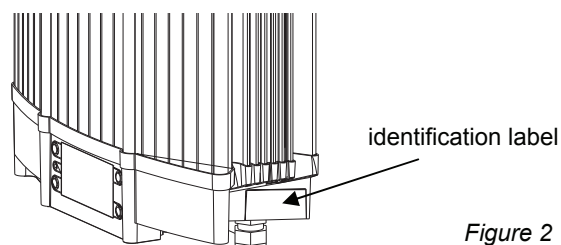


Figure 2

See figure 2 for location. Important technical information required for service, maintenance & secondary delivery of parts can be derived from the identification label.



CAUTION!

Never remove the identification label.

2 SAFETY GUIDELINES AND WARNINGS

2.1 WARNINGS AND SYMBOLS

Safety instructions and warnings are marked in this manual by the following pictograms:



A procedure, circumstance, etc which deserves extra attention.



CAUTION!

Special information, commands and prohibitions in order to prevent damage.



WARNING

A WARNING refers to possible injury to the user or installer or significant material damage to the Sunmaster if the installer / user does not (carefully) follow the stated procedures.

2.2 USE FOR INTENDED PURPOSE

The Sunmaster is constructed as per the applicable safety-technical guidelines. Use the Sunmaster only in installations that meet the following qualifications:

- in permanent installations;
- connected to a separate, grounded AC group, to which no other electrical equipment is connected;
- the electrical installation must meet the applicable regulations and standards, must be carried out correctly and must be in a good condition.
- according to the technical specifications as stated in chapter 7.1.



WARNING

Never use the Sunmaster in situations where there is danger of gas or dust explosion or potentially flammable products!

Use of the Sunmaster other than as mentioned under § 2.2 is not considered to be consistent with the intended purpose. Mastervolt is not liable for any damage resulting from the above.

2.3 ORGANISATIONAL MEASURES

The installer / user must always:

- have access to this manual;
- be familiar with the contents of this manual. This applies particularly to Chapter 2, Safety Guidelines & Warning.

2.4 INSTALLATION, MAINTENANCE AND REPAIR

As lethal voltages exist, allow installation, maintenance and repair of the Sunmaster and changes in your electrical system to be carried out by qualified electricians only.

Connections and safety features must be executed according to the locally applicable regulations.

In case of decommissioning and/or demounting follow the instructions as stated in chapter 4.4.

If such are required, use only original spare parts.

2.5 WARNING OF SPECIAL DANGERS

- Not only AC-grid voltage, but DC voltages up to 600V may exist in the Sunmaster as well
- The voltages present at the grid and solar side of the Sunmaster are not safe to touch and cannot be switched off at the solar side. Depending on local applicable regulations the use of an internal or external DC switch may be obligatory.
- Do not work on the Sunmaster and/or the electrical installation if it is still connected to the solar panels and/or AC-grid.
- Only allow changes in your electrical system to be carried out by qualified electricians.

3 BEFORE YOU START

3.1 UNPACKING

In addition to the Sunmaster the delivery includes:

- A mounting bracket to mount the Sunmaster to a wall
- This user's and installation manual.

After unpacking, check the contents for possible damage. Do not use the product if it is damaged. If in doubt, contact your supplier.

3.2 COUNTRY SELECTION

The Sunmaster is equipped with an anti-islanding device that ensures the switch off in case of grid failure. European countries maintain different regulations with regard to anti-islanding devices and grid connection of distributed generation in general. The common islanding device is the QNS, which switches off the inverter if the grid voltage or frequency is out of range. In some countries like Germany the ENS device (VDE-V-0126-1-1 compliant) is compulsory.

Because of these different regulations the Sunmaster XS6500 must be configured at first installation. See section 4.3.2.

Furthermore the Sunmaster can be supplied with or without internal DC switch which is used to disconnect the photovoltaic modules from the inverter, as required in buildings by the international standard IEC60364-7-712.

Check from the part number on the type number plate whether the Sunmaster is appropriate to be used for the intended application (refer to table 1).

Part number	Description	DC switch
131006500	XS6500 OD ENS	No
131016500	XS6500 OD ENS SW	Yes

Table 1



WARNING

Never use the Sunmaster for a non-intended application!

3.3 INSTALLATION ENVIRONMENT

The Sunmaster can be mounted in the AC distribution cabinet or in the vicinity of the solar panels. Obey the following stipulations during installation:

- The Sunmaster is designed for both indoor and outdoor use, according to safety class IP44. Among others this means that the Sunmaster should not be exposed to direct weather conditions such as rain or snow. Therefore the Sunmaster should at least be installed under a canopy roof for protection against rain.
- Do not install the Sunmaster in dusty environments.
- Ambient temperature: -20 ... 50°C; (power derating above 45°C).
- No objects must be located within a distance of 10 cm around the Sunmaster (figure 3).
- Make sure that the hot air that is generated during operation will be discharged by forced ventilation when installing the Sunmaster in a closed section.
- Keep at least 50 cm in between the inverters when several Sunmasters are installed next to each other (figure 5). If this is not possible, adequate measures must be taken to avoid one inverter heating up the other (figure 4).
- If the Sunmaster is installed in the immediate vicinity of living areas, take into account that the Sunmaster can produce a slight noise level when operating (refer to section 7.1).
- Mount the Sunmaster vertically on a solid wall.
- Readability of the display is optimal when looking at the display from an equal or lower position.

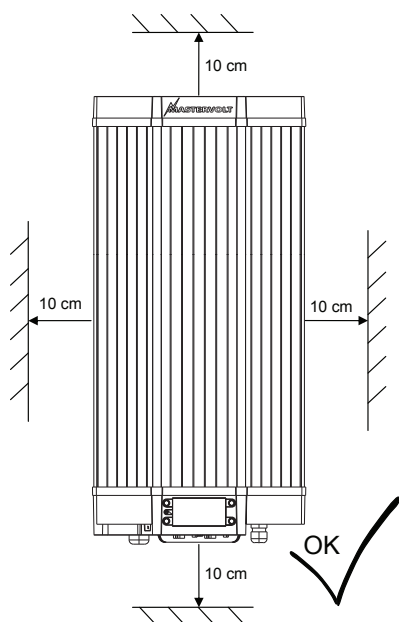


Figure 3

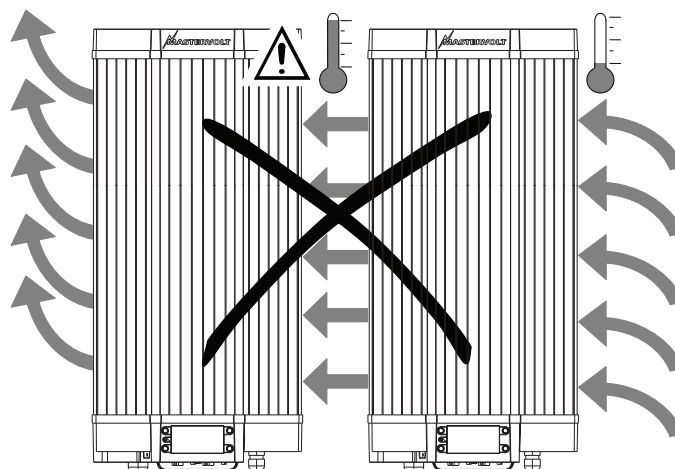


Figure 5

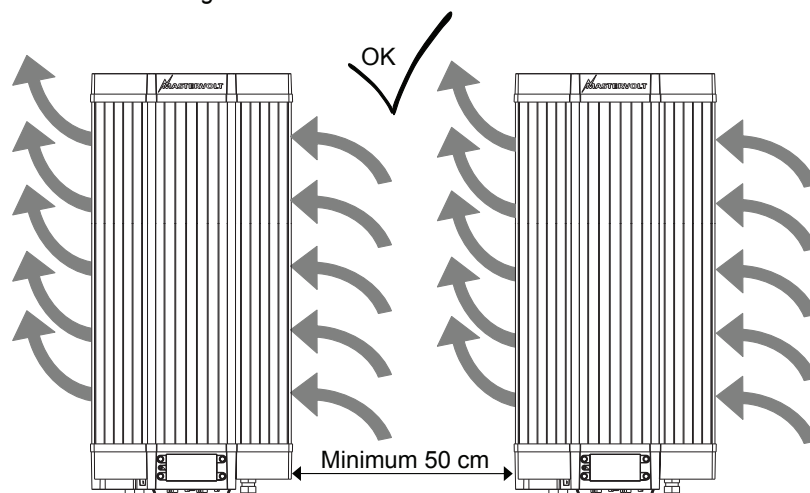
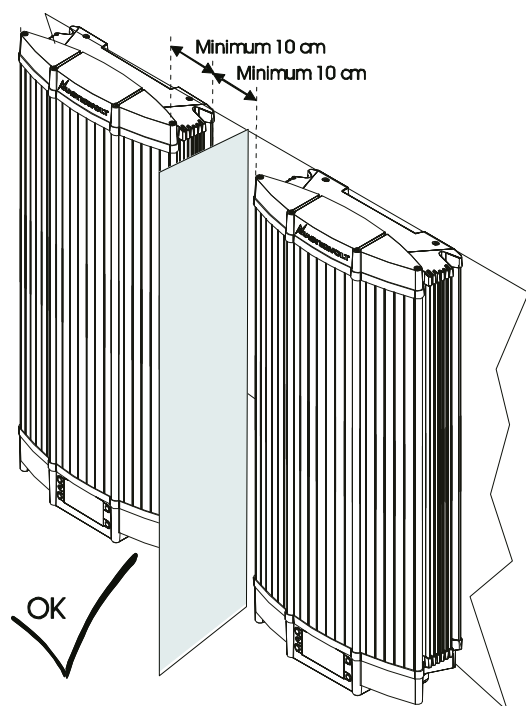


Figure 4



3.4 AC WIRING

The Sunmaster may only be used in a permanent installation, connected to a separate AC distribution group, to which no other electrical equipment is connected.

The cabling between the junction box or electric cable duct and the Sunmaster must be double insulated. Use an appropriate AC-wire diameter, so that the single wire resistance between the Sunmaster and the AC distribution will not exceed 0.25 Ohm. Directive: up to 25 meters length, choose a wire diameter of 3 x 4mm². Choose a larger wire size for lengths above 25 meter.

3.5 GROUNDING

The Sunmaster must be provided with an equipment-grounding conductor to the AC-output ground terminal. Grounding and all other wiring must comply with local codes and ordinances.

Grounding of the solar array is not necessary thanks to the galvanic isolation between the DC-input and the AC output of the Sunmaster.

3.6 SPECIFICATIONS OF THE SOLAR SYSTEM

The solar system should meet the following specifications:

- Maximum open circuit string voltage at lowest possible temperature of the PV modules:

Model	
Sunmaster XS6500	600Vdc max

- Double isolated PV-wiring
- All cables of the string should have double insulation and must be fitted with pre-assembled MultiContact connectors (Ø4mm)
- The maximum power connected to each Solar-input may not exceed 3500Wp
- If two or more strings are connected to the same Solar-input, both string lengths must be equal.
- The total input power must be distributed equally over both Solar-inputs as much as possible. Therefore at least one string must be connected to Solar-input 1 and one string to Solar-input 2.



CAUTION!

Do not install the Sunmaster if the solar-system does not comply with the above mentioned stipulations

3.7 DC SWITCH

Depending on local applicable regulations the use of a DC switch between the PV modules and the inverter may be mandatory

For example international standard IEC60364-7-712 prescribes a DC switch in solar electric installations in buildings. For this reason Mastervolt offers several models of the Sunmaster with integrated DC-switch. See chapter

3.2 to check if your Sunmaster is equipped with such a DC-switch.

If your Sunmaster is not equipped with a DC-switch, an external DC-Switch can be applied. Single and double output types are available rated 600 Volts and 25A. See chapter 8 for ordering information.

3.8 PV MODULES AND STRINGS

The solar or DC side of the system consists of several photovoltaic (solar) modules, further mentioned as "PV modules". The PV-modules are connected in series to form a so called "string". These strings consist of a plus (+) and a minus (–) connection which can be connected directly to the Sunmaster.

The string voltage should be equal to the open circuit voltage (Voc) per PV module (refer to the specifications of the PV-module), multiplied by the number of PV-modules in each string. Depending on the solar irradiation, this value should be equal to 70-95% of the calculated string voltage.

The Sunmaster consists of two separate inverters, indicated as "SOLAR 1" and "SOLAR 2". Refer to figure 6. These separate inverters both have their own Solar inputs, indicated in the apparatus as "Solar 1 connection" and "Solar 2 connection".

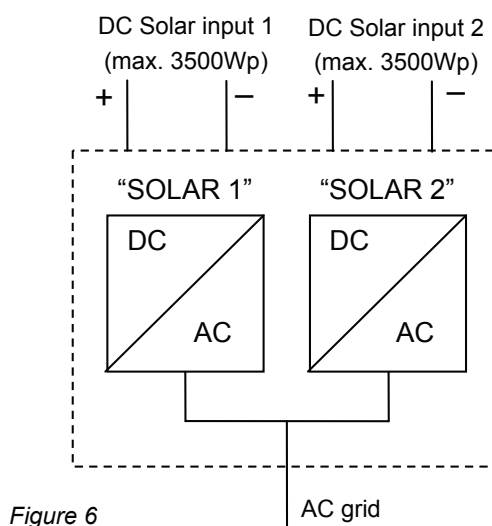


Figure 6

3.8.1 Connection of one string only (option)

By way of exception (only if the total supplied power / current of one of the Solar-inputs will exceed 3500Wp/15A), Solar-inputs 1 and 2 can be paralleled, to connect a total maximum of 7000Wp/30A. In this case use of an external connection box is obligatory. See figure 7.

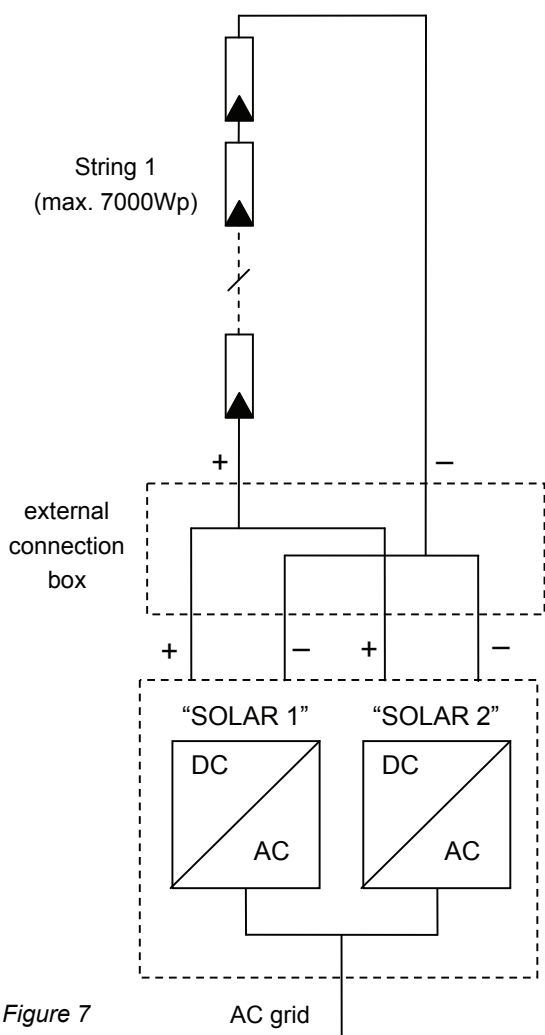


Figure 7

3.8.2 Connection of two strings (standard)

Two strings can be connected to the Sunmaster directly. Note that the maximum power connected to each Solar-input may not exceed 3500Wp and that the total input power must be distributed equally over both Solar-inputs as much as possible. See figure 8.

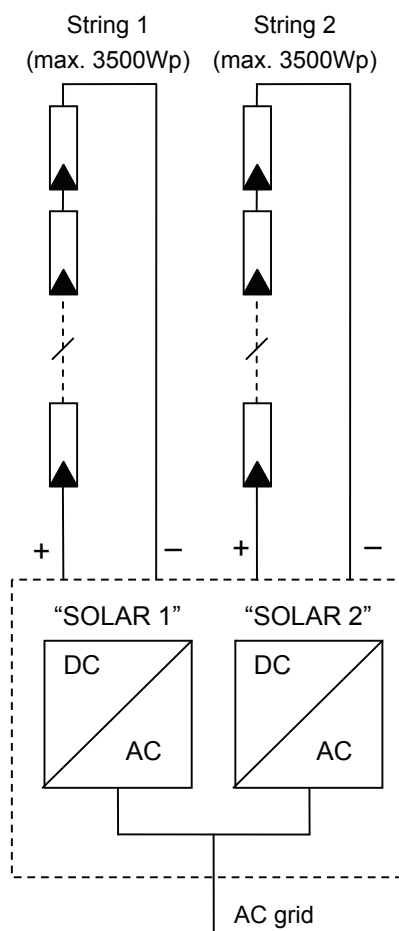


Figure 8

3.8.3 Connection of more than two strings (option)

If more than one string is connected to the same Solar-input, Multicontact Y-adapters must be used to combine the strings (see ordering information chapter 8). The strings connected to the same Solar-input should exist of an equal number of identical PV-modules. Note that the maximum power connected to each Solar-input may not exceed 3500Wp and that the total input power must be distributed equally over both Solar-inputs as much as possible. See figure 9.

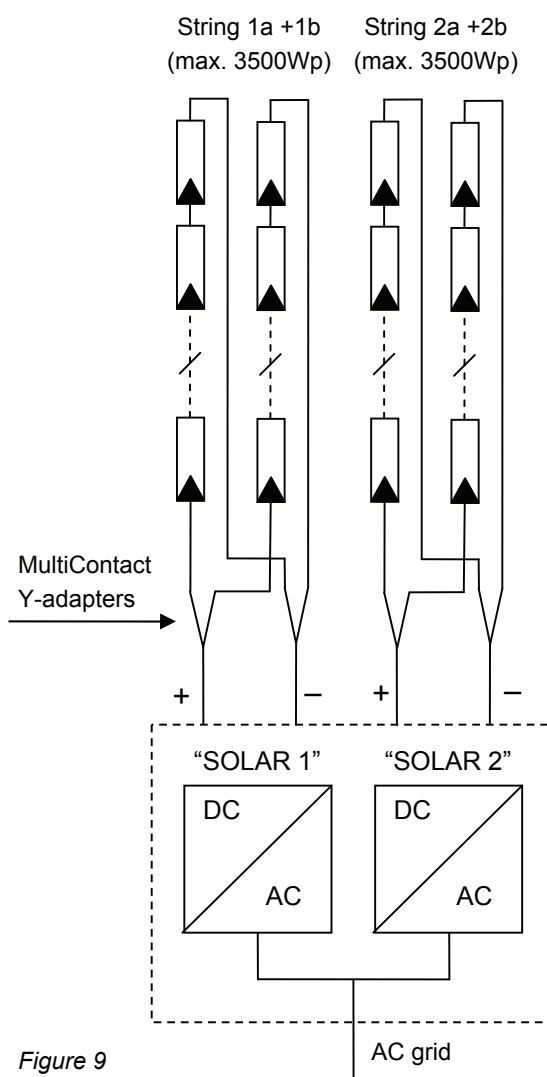


Figure 9

3.9 GENERAL SAFETY AND INSTALLATION PRECAUTIONS



WARNING

Be sure that all wiring is disconnected from any power source during the entire installation.



CAUTION!

- Short circuiting or reversing polarity may lead to damage to the Sunmaster, the cabling and/or the terminal connections.
- Follow all steps of the installation instructions in order of succession as described.
- If such is applied, the DC switch must stay in the OFF-position during the entire installation.

3.10 THINGS YOU NEED FOR INSTALLATION

Make sure you have all the parts you need to install the Sunmaster:

- The Sunmaster + mounting bracket (included).
- Four screws (with plugs) to mount the Sunmaster. Maximum diameter: 5 mm. Use mounting materials which are suitable to carry the weight of the Sunmaster
- Phillips screwdriver nr. 2 to open the connection compartment of the Sunmaster.
- Flat blade screw driver.
- Masterbus communication cables.
- RS485 communication cables.

4 INSTALLATION

4.1 INSTALLATION STEP BY STEP



CAUTION!

Read chapters 2 and 3 prior to installation.

1

Mark the position of the four mounting spots by using the mounting bracket.

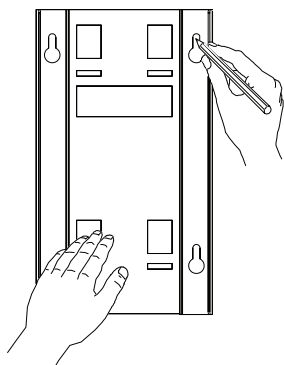


Figure 10

2

Fix the mounting bracket to the wall.

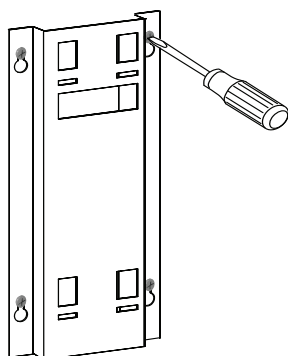


Figure 11

3

Place the Sunmaster over the mounting bracket and then move it downwards until it is locked by the mounting bracket.

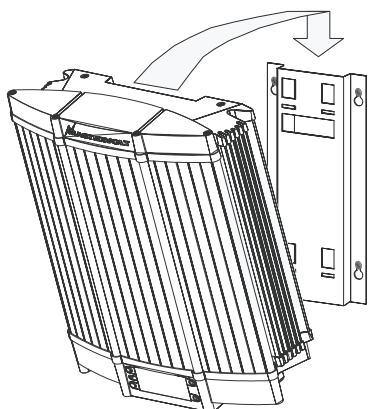


Figure 12

4

Loosen the two hexagonal screws (a) at the bottom side of the cabinet.

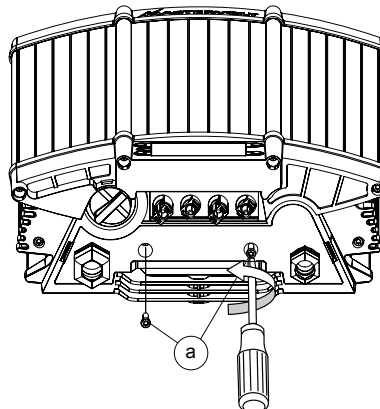


Figure 13

5

Insert a flat blade screw driver in the indicated slots (b). Then remove the bottom plate of the Sunmaster.

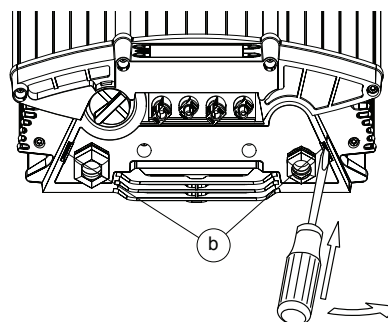


Figure 14

6

Feed the AC wiring through the left hand cable gland of the bottom plate and connect the wiring to the screw terminals.

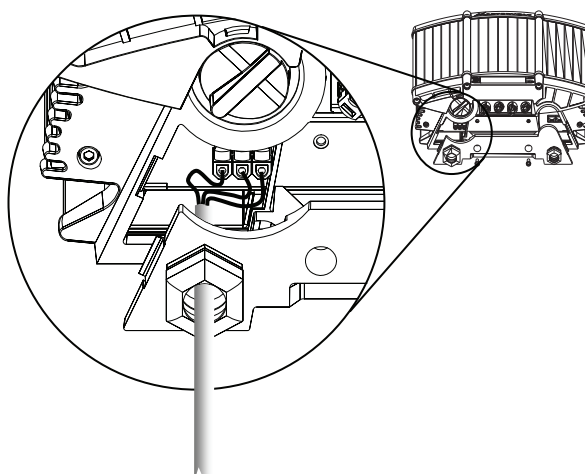


Figure 15

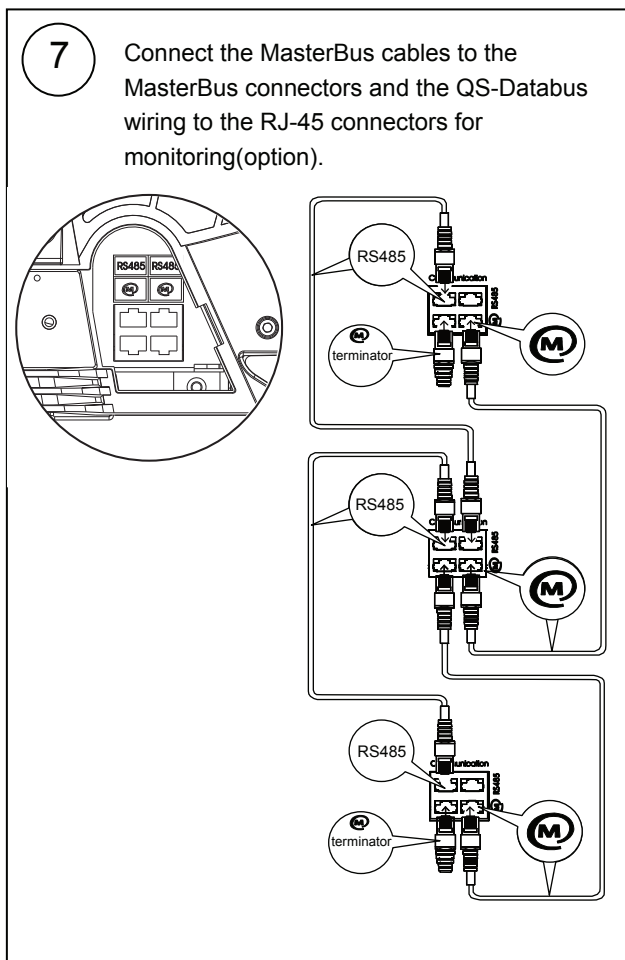


Figure 16

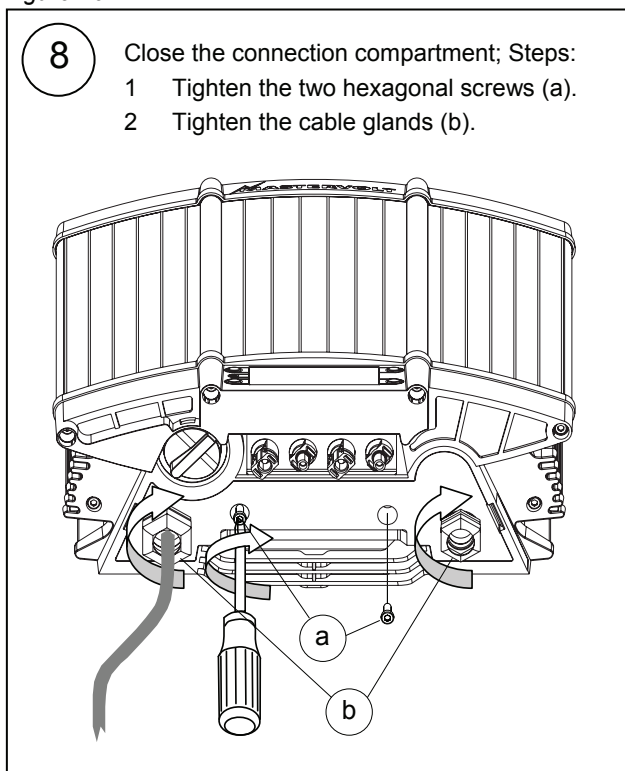


Figure 17

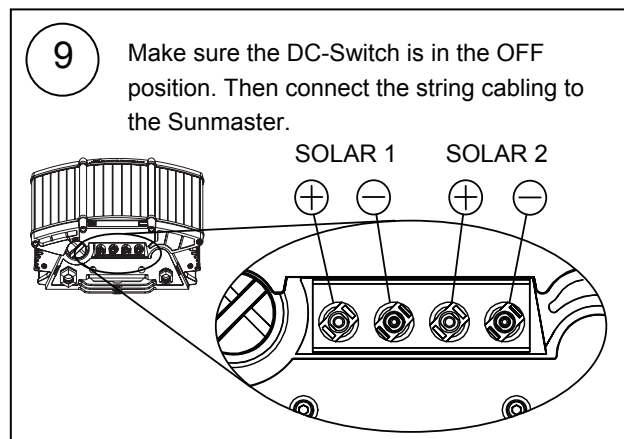


Figure 18

4.2 USE IN ITALY



In Italy ENEL may require sealing parts of the AC wiring.

All Sunmasters are equipped with a wire seal facility. Figure 2 shows where this is located. A detailed view is shown in figure 19.

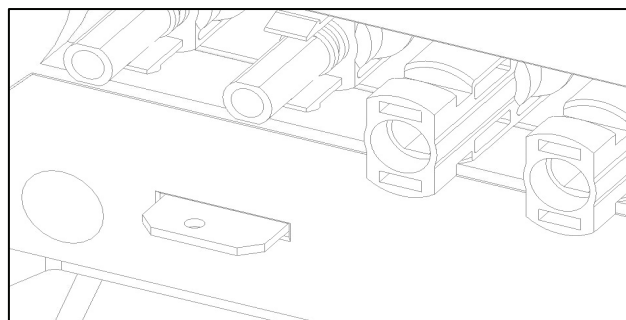


Figure 19: Detailed view of wire seal facility

4.3 COMMISSIONING AFTER INSTALLATION



To check the correct operation of the Sunmaster, commissioning should be carried out during daytime only

4.3.1 Switching on

Follow the steps described below to switch on the Sunmaster:

- 1 Check whether the DC-switch of the solar array is still in the OFF position (or "O"-position).
- 2 Switch on the AC grid.
- 3 Move the DC-switch of the solar array to the ON position (or "I"-position).

If connection has been made correctly and solar irradiation is sufficient, the Sunmaster will switch on automatically. This may take a few seconds.

- 4 At first commissioning the country code must be selected. See section 4.3.2.

4.3.2 Country code selection

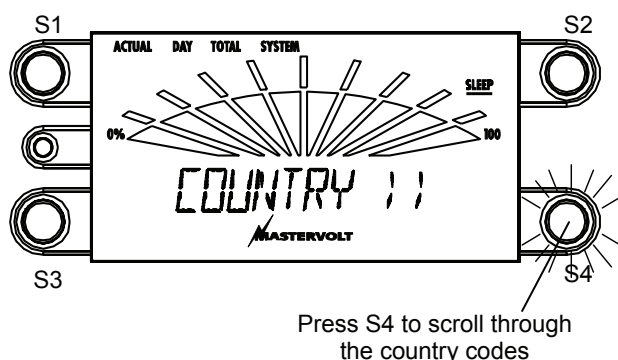
Follow the steps below to configure the Sunmaster in accordance with the local regulations for grid connection (example: Italy).



CAUTION!

NEVER connect the Sunmaster XS6500 to a utility grid other than selected.

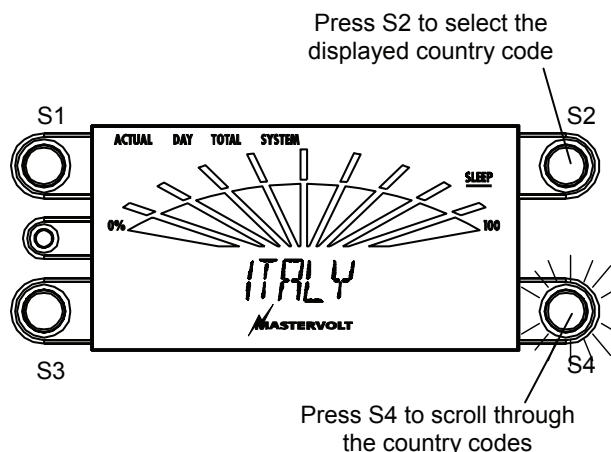
- 1 After commissioning the following message is displayed.



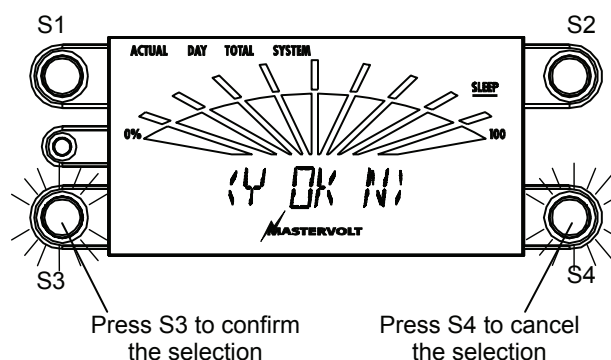
- 2 Select the applicable country code from the table below.

Country code	Norm	Use Allowed in
GERMANY 1P, limited to 4.600 W	ENS	Germany, Austria, Belgium
GERMANY 3P	ENS	Germany, Austria, Belgium
SPAIN	QNS	Spain
ITALY	ENS	Italy
UK	QNS	United Kingdom
FRANCE	QNS	France
AUSTRALIA	QNS	Australia
GREECE	QNS	Greece
HOLLAND	QNS	Netherlands, rest of Europe
USA 240V	QNS	USA (Split Phase 240V)
USA 208V	QNS	USA (ThreePhase 208V)
KOREA	QNS	South Korea
TAIWAN	QNS	Taiwan

- 3 Press S4 to scroll through the country codes.
- 4 If the correct country code is shown, press S2 to select



- 5 Confirm your selection by pressing S3 (or cancel by pressing S4).



If a wrong country code was entered, you can start the procedure over again by pressing S2 and S4 simultaneously during 3 seconds.

- 6 Now the Sunmaster switches on. See chapter 5 for operation instructions.

4.4 DE-COMMISSIONING

If it is necessary to put the Sunmaster out of operation, follow the instructions in order of succession as described below:



CAUTION!

Follow below mentioned instructions in order of succession as described.

- 1 Cut off the grid voltage by switching off AC distribution switch in the meter cupboard.
- 2 If such is applied, move the DC switch to the OFF-position.
- 3 Disconnect the MultiContact connectors from the Sunmaster.
- 4 Remove the bottom plate of the Sunmaster and disconnect the AC wiring.

Now the Sunmaster can be demounted in a safe way.

5 OPERATION

5.1 GENERAL

After installation and commissioning the Sunmaster will switch on automatically if solar irradiation is sufficient. The Sunmaster operates automatically: there is no need for user action. If the irradiation of the PV-modules is insufficient, for instance at night, the Sunmaster switches off automatically. When switched off, the display does not show any information.

The Sunmaster has no ON/OFF switch; In the event of decommissioning, refer to section 4.4.



CAUTION!

Never disconnect the MultiContact plugs during operation of the Sunmaster.

Not complying with this instruction may cause a spark or an electric arc. Should an arc develop, both plug and socket of the Sunmaster must be replaced.

5.2 FORCED COOLING

For an optimum internal temperature control the Sunmaster is provided with a cooling fan. The cooling fan starts running slowly at inverter start up. As internal temperature rises, the cooling fan will increase its speed. This is a normal effect which has a positive contribution to the efficiency and lifetime of the Sunmaster.

5.3 LCD-DISPLAY

The Sunmaster is standard provided with an integrated LCD-display at the front side of the cabinet (figure 23).

This display makes it possible to monitor the performance of your PV-system. It shows the following information:

- Daily energy revenues over the past 30 days
- Actual Solar power, voltage and current.
- Actual AC power, voltage, current and frequency.
- Actual inverter temperature, total energy revenue, total working hours.
- Inverter status and diagnostics.

The LCD screen is operated by means of four keys: S1, S2, S3 and S4. See figure 23.

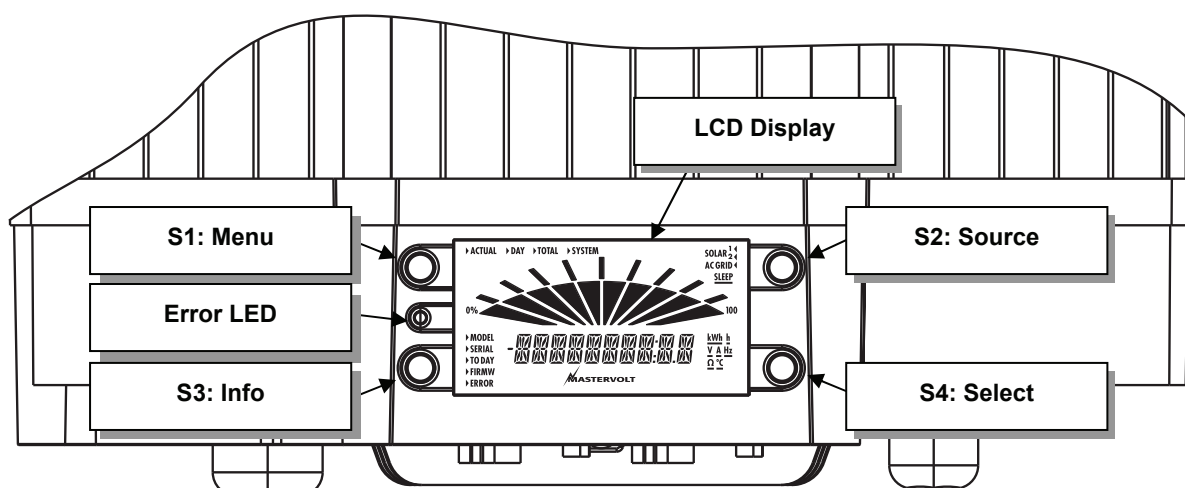


Figure 23: operation of the LCD-display

See figure 24. This screen is shown after start-up. Also if no key was touched for 60 seconds, the display returns to this screen. It shows:

- Actual solar power by means of a 0-100% bar
- Energy generated today.

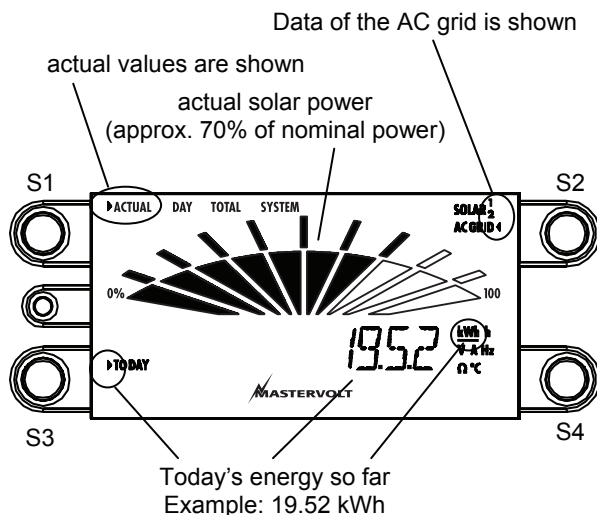


Figure 24: initial screen (displayed values may differ)

By pressing **S1: Menu** you can toggle between:

► ACTUAL	Read out of measurements at this moment; see chapter 5.3.1
► DAY	Showing the historical data of today and 1...30 days ago; see chapter 5.3.2
► TOTAL	This shows the total energy revenue at the two Solar inputs and the AC-output; see chapter 5.3.3.
► SYSTEM	Used to display system information about the Sunmaster; see chapter 5.3.4.

5.3.1 Actual readings

When [►ACTUAL] is highlighted at the LCD-display, actual readings of the Sunmaster are shown (figure25).

By pressing **S2: Source** you can toggle between:

SOLAR 1 ◀	Data measured at DC-input "SOLAR1"
SOLAR 2 ◀	Data measured at DC-input "SOLAR2"
AC GRID ◀	Data measured at the AC-output of the Sunmaster

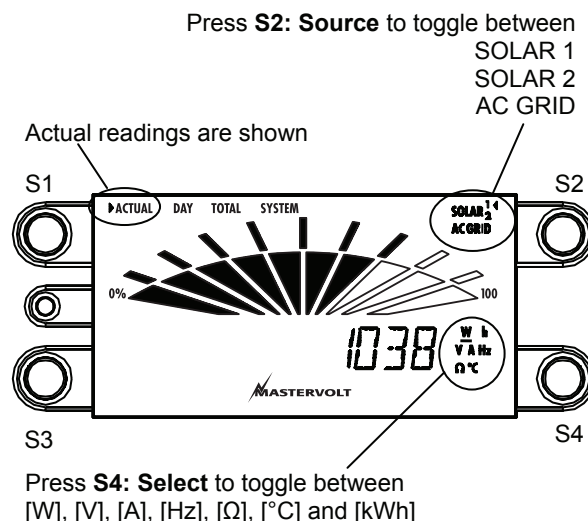


Figure 25: Actual readings

Press **S4: Select** to navigate through the actual data. The table below explains the meaning of the displayed data:

	Selected source = AC GRID	Selected source = SOLAR1 or SOLAR2
W	Power supplied to the AC grid	Solar power supplied to the Sunmaster by the PV-strings
V	AC grid voltage	DC Voltage from the PV-string
A	AC current supplied to the AC grid	DC current from the PV-string
Hz	AC grid frequency	n/a
Ω	AC grid impedance*	n/a
°C	Internal temperature of the inverter	Internal temperature of the inverter
kWh	Energy generated today	n/a

* ENS-models only (see chapter 3.2), else 0.00 is shown.

5.3.2 Historical data

When [►DAY] is highlighted at the left upper corner of the LCD-display, the daily performance of your Sunmaster during the last 30 days is shown. See figure 26.

Press **S4: Select** to switch between [kWh] and [h]:

kWh	Here the total energy yield of the selected day is shown.
h	This value indicates the operating hours of the selected day

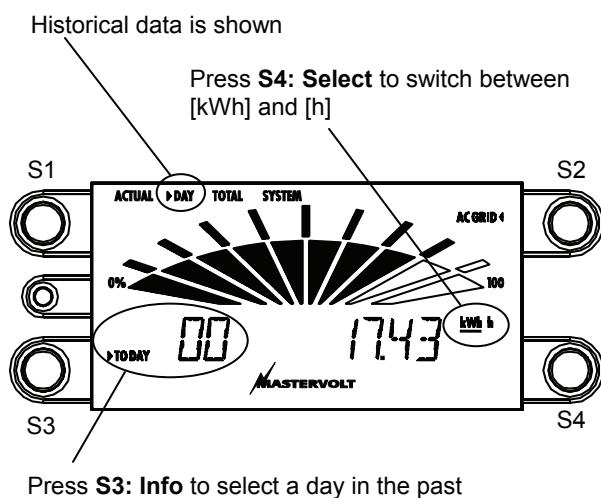


Figure 26: Historical data

Operation of **S3: Info**:

Press shortly	One day back in the past.
Press and hold	Scrolling days forward.

Examples:

► TODAY	00	Shows today's data
► DAY	-01	Shows yesterday's data
► DAY	-07	Shows data from one week ago

5.3.3 Total energy revenues

When [►TOTAL] is highlighted at the upper side of the LCD-display, the total performance since commissioning of the Sunmaster is displayed. See figure 27.

By pressing **S2: Source** you can toggle between:

SOLAR 1 ◀	Total performance of DC-input "SOLAR1" is displayed
SOLAR 2 ◀	Total performance of DC-input "SOLAR2" is displayed
AC GRID ◀	Total performance at the AC-output of the Sunmaster is displayed

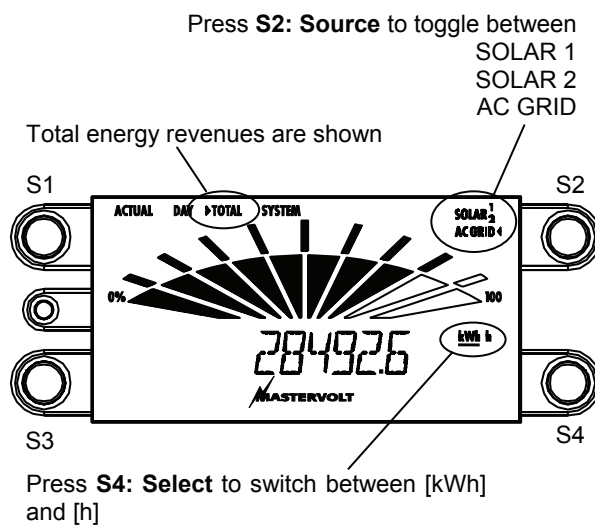


Figure 27: Total energy revenue

Press **S4: Select** to switch between [kWh] and [h]:

kWh	Here the total energy yield of the selected source is displayed.
h	This value represents the total operating hours of the selected input.

5.3.4 System information

When [►SYSTEM] is highlighted at the upper side of the LCD-display, several system information of the Sunmaster can be displayed. See figure 28.

If you *press and hold for 3 seconds S2: Source* you can toggle the Sleep mode on / off:

SLEEP Sleep mode is on: the back light of the display will go off when no key was touched for 60 seconds.

SLEEP Sleep mode is off: the back light of the display will stay illuminated.

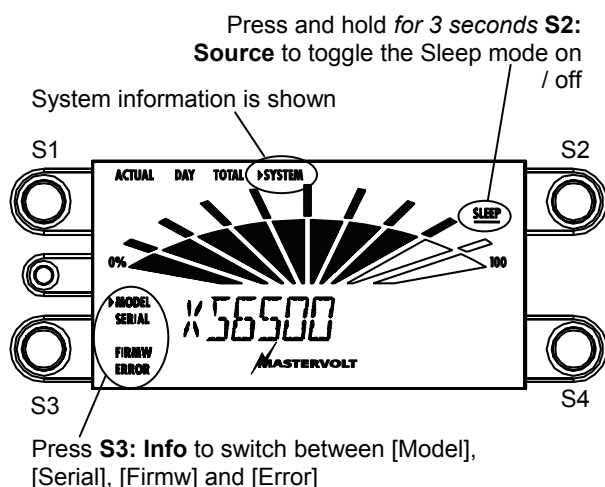


Figure 28: System information

Press **S3: Info** to switch between [Model], [Serial], [Firmw] and [Error]:

► MODEL	Shows the model of the Sunmaster i.e. "XS6500".
► SERIAL	Serial number is displayed. Example: RN07A003.
► FIRMW	Display switches between the firmware of the inverter ("XS") and the display ("DS").
► ERROR	In case of a system failure, the cause of the failure is displayed. See chapter 5.3.5.

5.3.5 Failures



As long as the ERROR LED isn't illuminated, no failure is detected: the Sunmaster is operating normally!



If the irradiation of the PV-modules is insufficient, for instance at night, the Sunmaster switches off automatically and the display does not show any information. This is a normal situation!

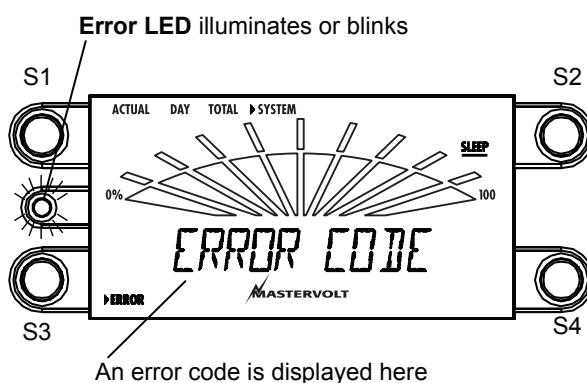


Figure 29: representation of a failure

The operation of the Sunmaster is controlled and checked by a microprocessor. If an error occurs, it is detected by the apparatus itself: the red ERROR LED illuminates or blinks. The cause of error is displayed by means of an error code. See figure 29. Refer to chapter 6 for explanation of the error codes.

5.4 MAINTENANCE

No specific maintenance to the Sunmaster is required. Examine your electrical installation on a regular base, at least once a year. Defects such as loose connections, burnt wiring etc. must be corrected immediately.

If necessary, use a soft clean cloth to clean cabinet of the Sunmaster. Never use any liquids, acids and/or scourers.

6 TROUBLE SHOOTING

Consult an installer, if you cannot solve the problem by means of the table below.

Error LED	Error Code	Meaning	What to do?
Off	NONE	No error	Nothing; the inverter is working normally
Off		Insufficient irradiation	Nothing. Irradiation of the PV modules is insufficient (for instance during night time)
Off		No power from the PV modules	Consult an installer if the display does not show any information during daytime. The wiring between the PV modules and the Sunmaster might be defective.
Off	WAIT 0:00	Start-up	Nothing. After the Sunmaster was (re)connected to the AC grid, it checks the quality of the AC grid before it starts operating normally. This may take up to 5 minutes.
Off	SOL1 LOW	Voltage of one of the Solar inputs is low	Nothing; normal condition during sunrise and sunset.
Off	SOL2 LOW		Consult an installer if the problem remains while irradiation of the PV modules is sufficient.
Off	COUNTRY (or any name of a country)	(Text is blinking) Country code has not been selected yet	Select the correct country code. See section 4.3.2.
On	TEMP HI	Internal temperature of the inverter is high	Maybe the air flow of the Sunmaster is obstructed. See chapter 3.3 for installation guidelines. If the problem remains, consult an installer
On	SOL1 HIGH	Voltage of one of the Solar inputs is high.	Contact your supplier.
On	SOL2 HIGH		
On	NO GRID	No connection to the AC-grid	Check the connection to the AC-grid. Check the fuse in the meter cupboard.
On	ENS OFF	ENS fault	Error created by a grid safety device. The grid quality is outside normal limits. Check the grid connection (for instance too thin or too long AC wiring). Consult an installer
On	G83 OFF	G83 fault	
On	VAC LOW	AC voltage low	Voltage of the AC grid is too low. Consult an installer.
On	VAC HIGH	AC voltage high	Voltage of the AC grid is too high. Consult an installer.
On	FAC LOW	AC frequency low	Frequency of the AC grid is too low. Consult an installer.
On	FAC HIGH	AC frequency high	Frequency of the AC grid is too high. Consult an installer.
On	INSULATION	Insulation failure	Leak current between PV modules and grounding. Consult an installer.
Fast blinking	NTC FAIL	Defective device in the Sunmaster	Write down the exact error text. Consult an installer for replacement of the Sunmaster.
Fast blinking	EF I2C FAIL		
Fast blinking	ENS FAIL		
Fast blinking	CB I2C FAIL		
Fast blinking	HW VAC FAC		
Fast blinking	HW RELAY		
Fast blinking	HW ERROR 1-9		

7 SPECIFICATIONS

7.1 TECHNICAL SPECIFICATIONS

GENERAL SPECIFICATIONS	
Article number	See chapter 3.2
Typical string length	6-12 modules (72 cells), 7-17 modules (54 cells) or 12-25 modules (36 cells)
Operating temperature	-20°C to 50°C (fully protected against over temperature)
Storage temperature	-20°C to 70°C
Relative humidity	max. 95%; PCB has anti-moisture coating
Protection degree	IP44
Safety class	class I
Galvanic isolation	class II
MTBF	165.000 hours
Dimensions	725 x 356 x 145 mm [28.5 x 14.0 x 5.71 inch], see chapter 7.2.
Weight	15 kg [33 lbs]
SOLAR INPUT (DC)	
Sunmaster XS6500	
Nominal power	5325W DC
Maximum power	5600W DC
PV power range	4000-7000Wp
MPP tracker	2 MPP trackers (dynamic)
MPP voltage range	180-480V DC
Maximum voltage	600V DC
Rated current	2 x 15A or 1 x 30A
Start-up power	10W
String connections	2
DC connections	MC2 (4 mm type)
GRID OUTPUT (AC)	
Sunmaster XS6500	
Nominal power at 45°C ambient*	5000W AC (or 4600W AC for Germany*)
Maximum power*	5250W AC (or 4600W AC for Germany*)
Voltage*	230V AC (184-265V)
Nominal current	22A
Fuse	6.3x32 mm. 250V/30A T (ceramic)
Frequency*	50 Hz (48 – 52 Hz) or 60 Hz (57 – 63 Hz)
Power factor	0.99
Stand-by power	< 0.5W
EU efficiency	94.5%
Maximum efficiency	95.5%
AC connections	PG-13.5 gland and screw terminals 2.5 - 4 mm ²

* Depending on country settings, see section 4.3.2

SAFETY DEVICES

General	galvanic separation between DC and AC side, by means of a class II transformer
Island protection*	Mastervolt Digital ENS - VDE 0126 -1-1 compliant
Reclosure time*	10-300 sec
Temperature protection	power derating above 75°C internal temperature, switch off at 90°C
DC side	earth fault (switch off); over-voltage (switch off); polarity (short circuit); overcurrent (limiting by voltage shift-up); DC transients; (varistor and buffer capacitor); overload (temperature controlled power derating)
AC side	current limiting; over- and under-voltage (switch off); over- and under-frequency (switch off); short circuit (ceramic fuse); transients/surge (varistors)

MONITORING

Indicator	Backlit display with indication of power and diagnostic messages
External communication	2 galvanic isolated RS485 QS databus connections
External communication	2 galvanic isolated MasterBus connections
Monitoring (optional)	QS Data Control Basic (PC Software). Free download from www.mastervolt.com
Monitoring (optional)	QS PC-Link (connect the QS-databus to the PC)
Monitoring (optional)	Data Control Premium II: datalogger for up to 6 inverters with local, remote or internet monitoring.
Monitoring (optional)	Data Control Professional: PV system control over the Internet, for up to 20 inverters.

REGULATIONS & DIRECTIVES

EMC Directive	EMC 89/336/EEG
Emmission	EN 55022 Class B
Harmonics	EN 61000-3-2,
Dips, variations, flicker	EN 61000-4-11 and -3-3
Immunity	EN 55024
	EN 61000-4-2 and -3
	EN 61000-4-4, -4-5 and -4-6
LV directive	2006/95/EC
Electrical safety	EN 60950-1
National grid interface req.	VDE 0126-1-1 / DK5940 / RD1663-2000 / K SC 8536 / G83-1 compliant

* Depending on country settings, see section 4.3.2

7.2 OUTLINE DRAWINGS

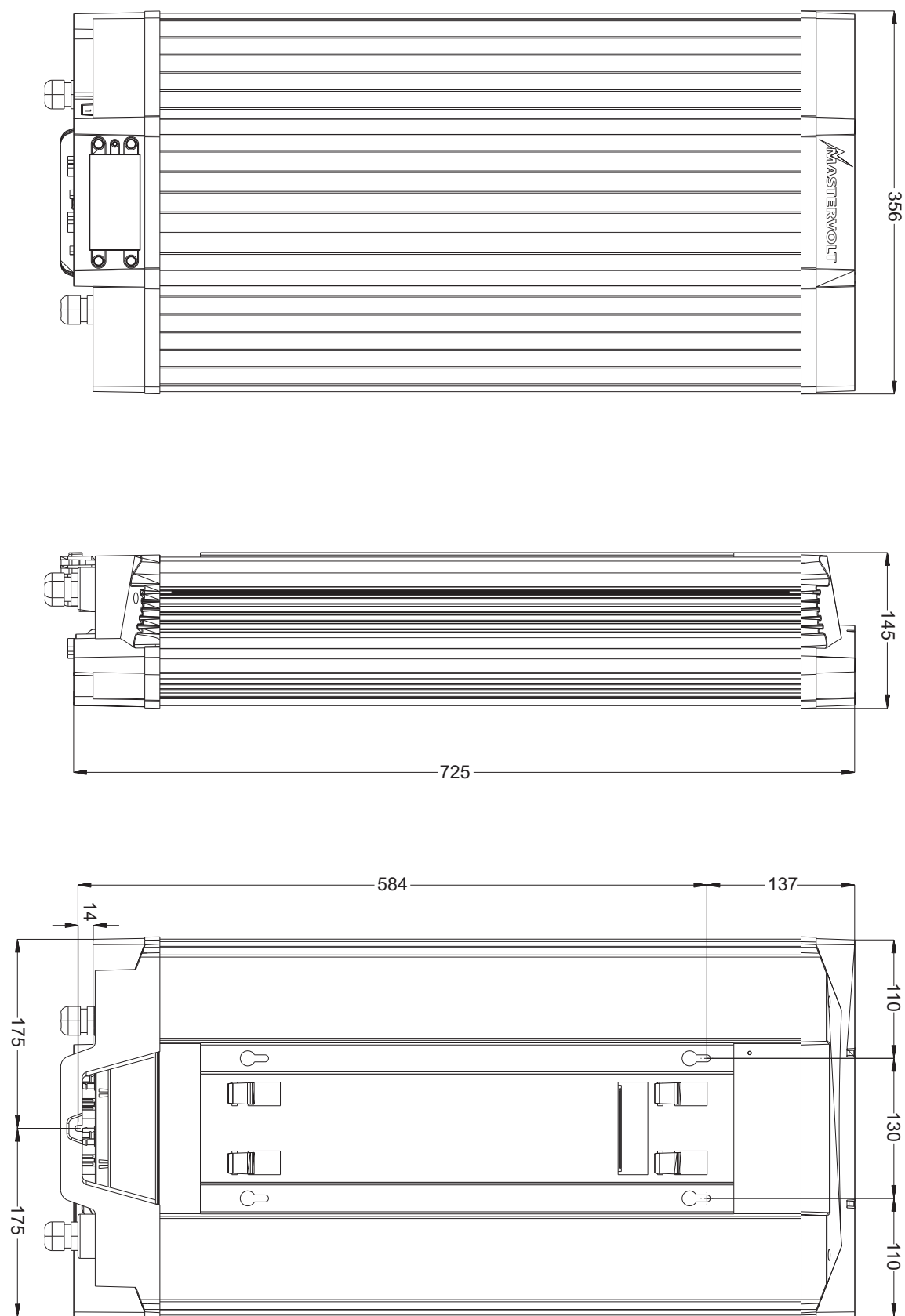


Figure 30: Outline drawings of the Sunmaster XS6500

8 ORDERING INFORMATION

Part number	Description
130362900	Set of two Multicontact Y-adapters PV-AZS4 (positive) and PV-AZB4 (negative)
130360700	Adapter cable (from MC1 to MC2 positive)
130360800	Adapter cable (from MC1 to MC2 negative)
130394000	QS Data Control 'Basic' – Free software package to monitor your photovoltaic (PV) system using your PC or notebook. Use of QS PC Link is compulsory.
130391010	QS PC Link, RS485/232 converter
130391020	QS PC Link Industrial, RS485/RS232 converter for the connection of more than 10 Sunmasters or for cable lengths of more than 100 meters.
130391040	QS PC-Link Industrial, RS485/USB converter for the connection of more than 10 Sunmasters or for cable lengths of more than 100 meters.
130394100	QS Data Control 'Premium' – Datalogger to monitor up to 20 Sunmaster QS inverters Storage of up to three years of historical data. Monitored data includes date and time, energy revenues, maximum power, inverter status and service codes. Includes alarm contact.
130396000	QS Data Control 'Premium' II local – Datalogger to monitor up to 6 Sunmaster inverters locally
130396100	QS Data Control 'Premium' II remote – Datalogger to monitor up to 6 Sunmaster inverters over the Internet
130396200	QS Data Control 'Pro' Analogue – Datalogger to monitor up to 20 Sunmaster inverters locally or over the Internet
130396210	QS Data Control 'Pro' ISDN – Datalogger to monitor up to 20 Sunmaster inverters locally or over the Internet
130396220	QS Data Control 'Pro' GSM – Datalogger to monitor up to 20 Sunmaster inverters locally or over the Internet
130396230	QS Data Control 'Pro' Ethernet – Datalogger to monitor up to 20 Sunmaster inverters locally or over the Internet
130010905	Modular communication cable, cross wired, 8 pole, 1 meter / 3 ft
130010906	Modular communication cable, cross wired, 8 pole, 5 meter / 16 ft
130010910	Modular communication cable, cross wired, 8 pole, 10 meter / 33 ft
130010915	Modular communication cable, cross wired, 8 pole, 15 meter / 49 ft
120107000	Complete set to assemble modular communication cables. Delivery includes: 100 meter modular cable, 100 pcs. modular jacks and crimping tool

Mastervolt can offer a wide range of products for both grid connected and independent autonomous electrical installations, See our website www.mastervolt.com for an extensive overview of all our products

9 ITALY SELF TEST

GENERAL

The Italy Self Test is meant to check the upper and lower limits of the AC voltage and AC frequency at which the inverter will disconnect from the grid.

To enter the Italy self test, select the "System/ Model" menu in the display. See figure 31.

If the model is ITALY, press the lower two buttons for 3 seconds. The screen should stay in the "Model" mode. You will enter the Italy test menu.

The text ITALY TEST will be blinking, press the lower right button to confirm.

First the Uac High Off limit is shown.

During the self test, four tests are done in this sequence:

- UH (high off limit AC voltage);
- UL (low off limit AC voltage);
- FH (high off limit AC frequency);
- FL (low off limit AC frequency).

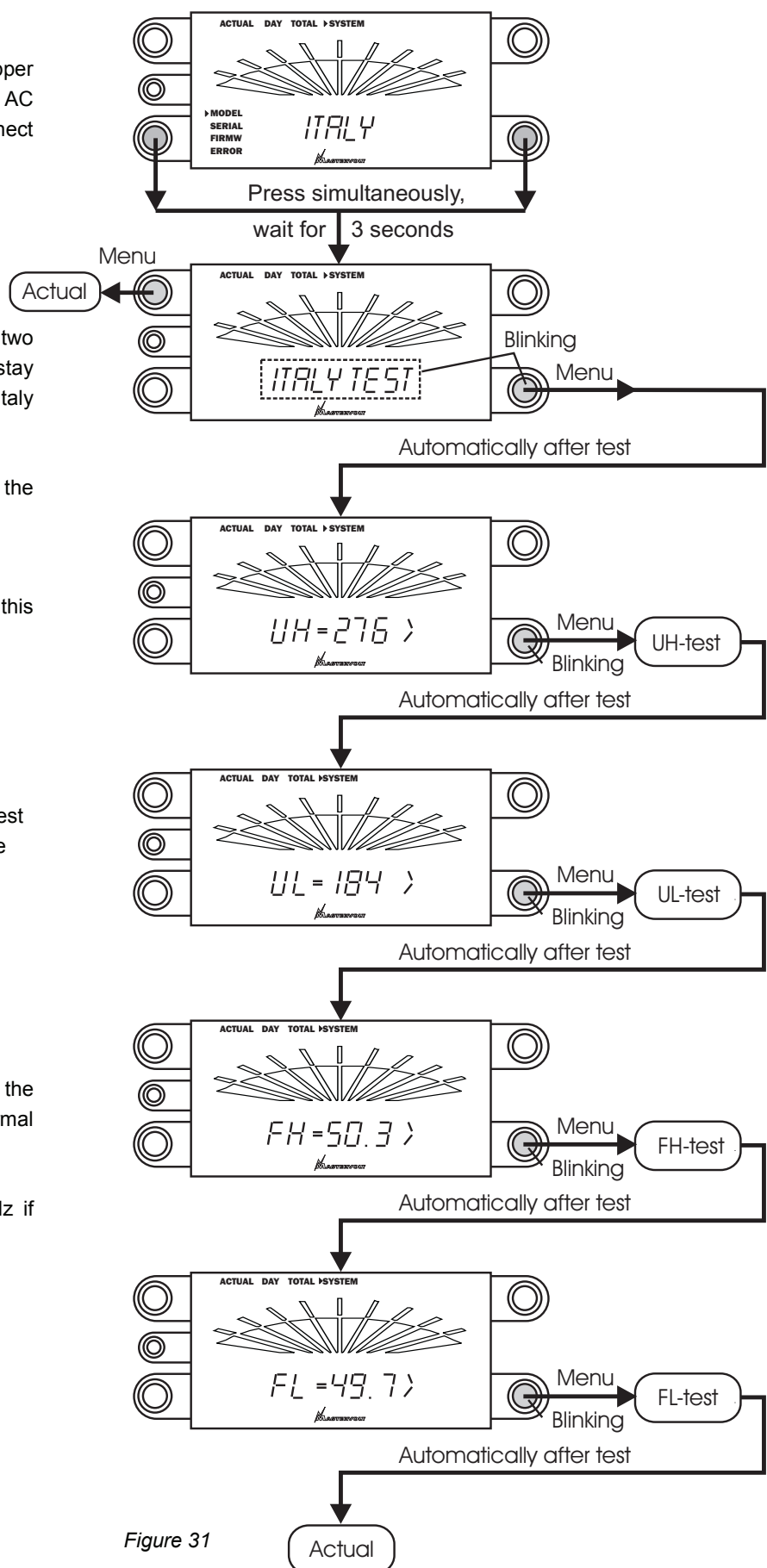
After each test the user has to confirm the test result before the inverter starts the reclosure count down and reconnects to the grid.

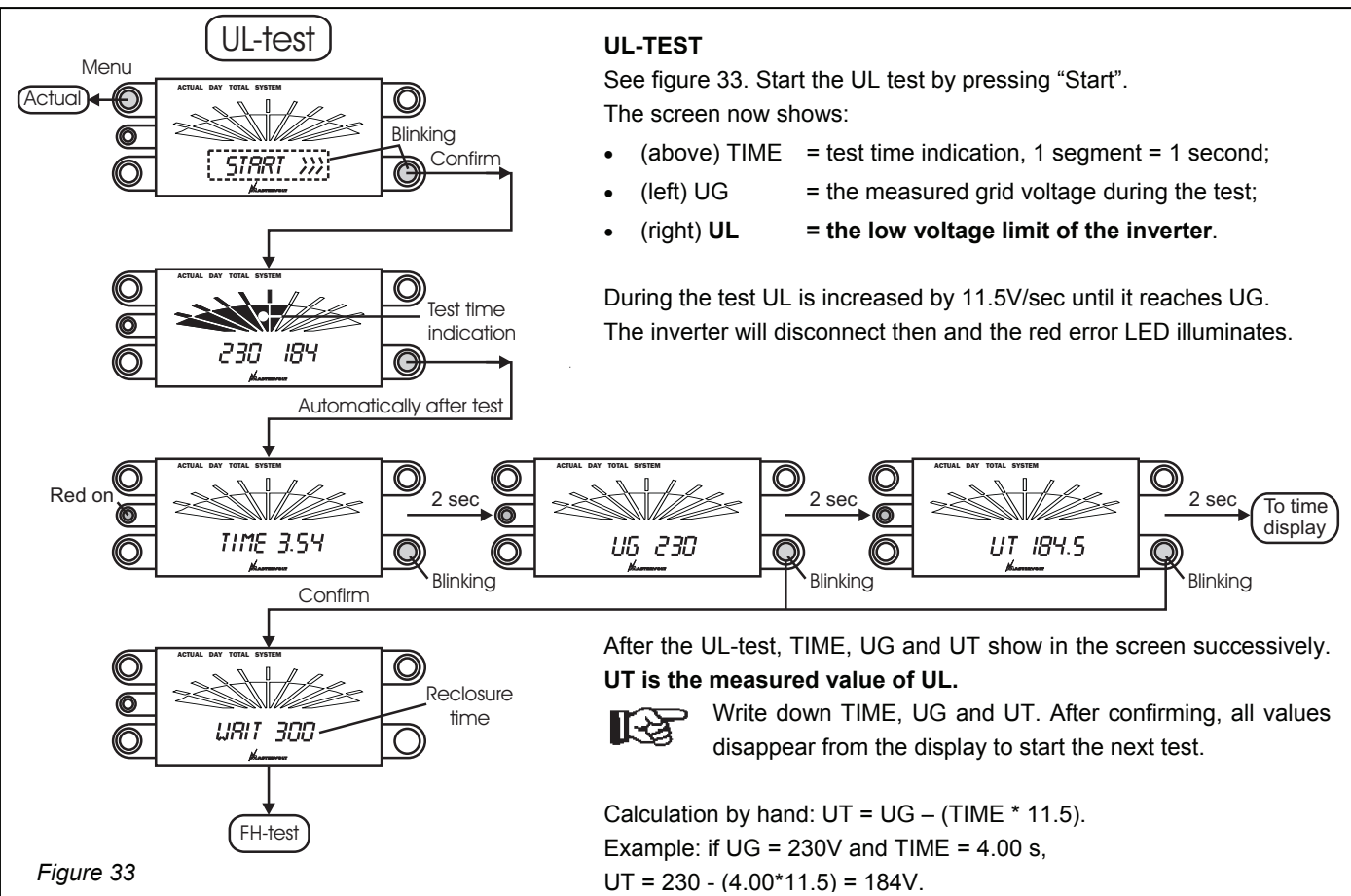
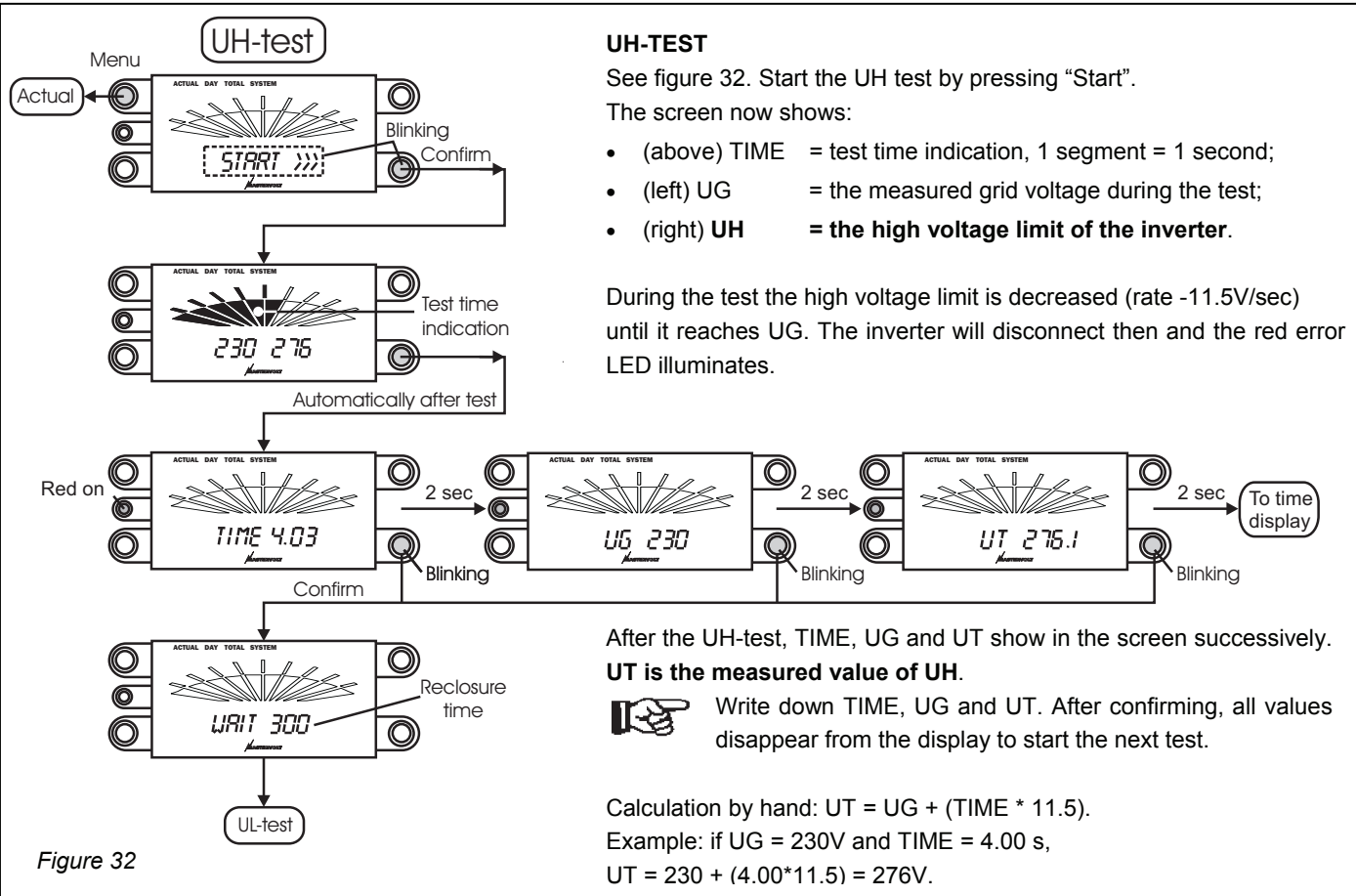


The standard reclosure time of 300 sec has been reduced to 10 sec to shorten the testing time. This is not an error.

After the last test and after reconnecting to the grid the inverter will continue in normal operation.

The test accuracy is better than 1V/ 0.1Hz if grid voltage and frequency are stable.





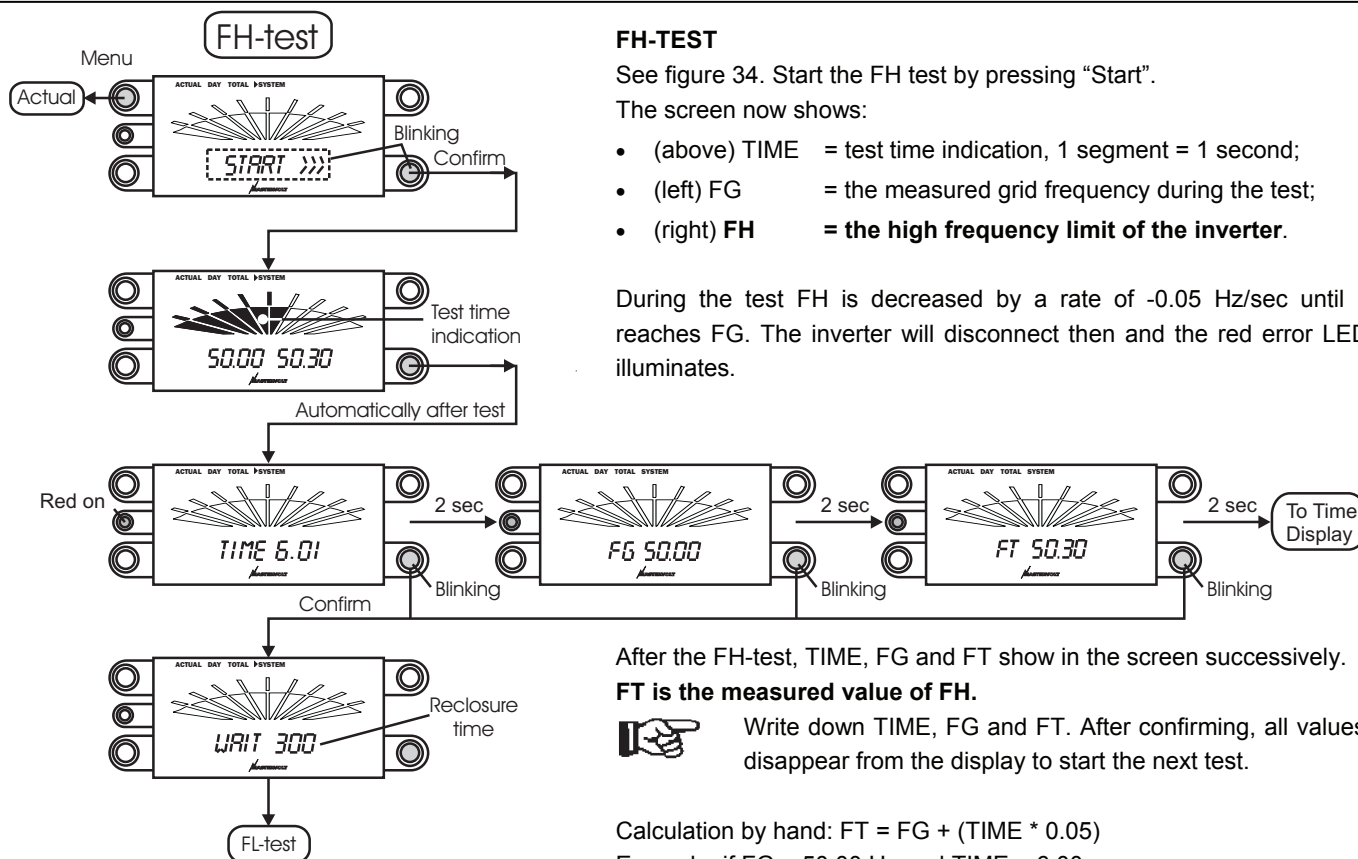


Figure 34

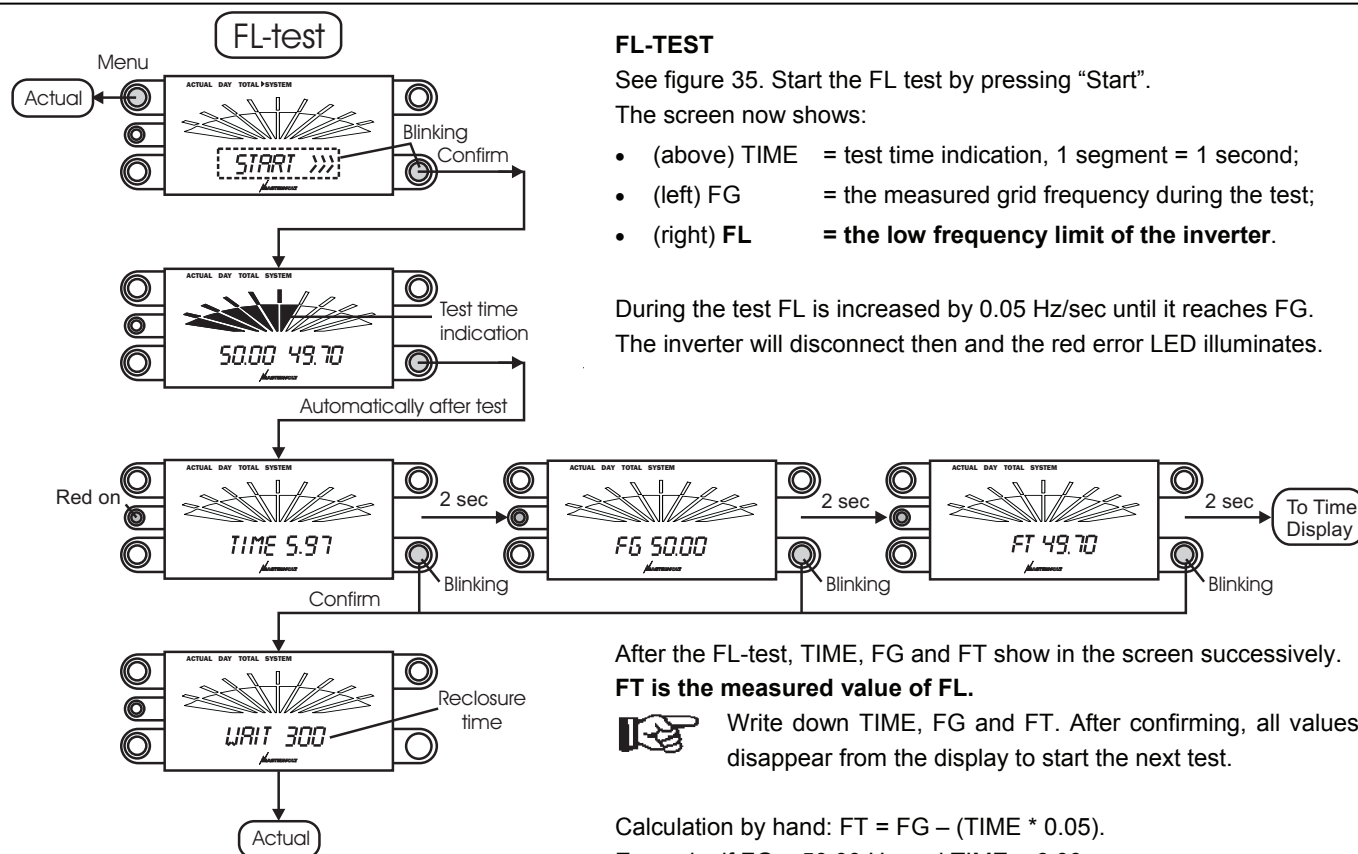



Figure 35

10 CERTIFICATES

10.1 CERTIFICATE OF VDE-0126 CONFORMITY

	Innova Product Service GmbH, A Bureau Veritas Company Gewerbestr. 28 87600 Kaufbeuren Germany + 49 (0) 8341 96660-0 Info@innova-ps.de
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Certificate of compliance

Applicant: **Mastervolt International B.V.**
 Snijdersbergweg 93
 1105 AN Amsterdam
 The Netherlands

Product: **Automatic disconnection device between a**
 generator and the public low-voltage grid

Model: **XS6500, XS4500**

Use in accordance with regulations:

Automatic disconnection device with single-phase mains surveillance in accordance with DIN V VDE V 0126-1-1:2006-02 for photovoltaic systems with a single-phase parallel coupling via an inverter in the public mains supply. The automatic disconnection device is an integral part of the aforementioned inverter. This serves as a replacement for the disconnection device with insulating function which the distribution network provider can access at any time.

Applied rules and standards:

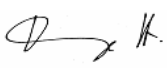
DIN V VDE V 0126-1-1:2006-02 and „Generator at the public low-voltage grid, 4th edition 2001, guideline for connection and parallel operation of generators in the public low-voltage grid” with VDN additions (2005) from the German Electricity Association (VDW) and Association of network operator (VDN).

The safety concept of the aforementioned product, tested in the week 21/2007, corresponds to the time of issue of this certificate of valid safety specifications for the specified use in accordance with regulations.

The conformance certificate will be invalidated no later than 20th of July 2010.

Report number: **07KFS057**
Certificate number: **U07-080**
Issued: **20th of July 2007**

This certificate is valid for 3 years from the date of issue.


Horst Haug

10.2 EC DECLARATION OF CONFORMITY

Manufacturer Mastervolt
Address Snijdersbergweg 93
1105 AN Amsterdam
The Netherlands



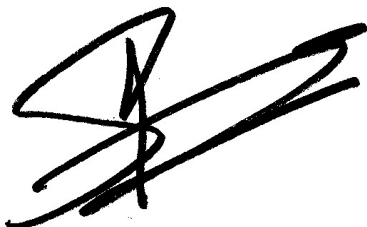
Herewith declares that:

Product: Sunmaster XS6500

is CE-marked and complies with the following standards:

EMC Directive	EMC 89/336/EEG
Emmision	EN 55022 Class B
Harmonics	EN 61000-3-2,
Dips, variations, flicker	EN 61000-4-11 and -3-3
Immunity	EN 55024
	EN 61000-4-2 and -3
	EN 61000-4-4, -4-5 and -4-6
LV directive	2006/95/EC
Electrical safety	EN 60950-1

Amsterdam,



P.F. Kenninck,
General Manager MASTERVOLT



Snijdersbergweg 93, 1105 AN Amsterdam, The Netherlands

Tel : + 31-20-3422100

Fax : + 31-20-6971006

Email : info@mastervolt.com