SUNSYS

B12 - B15 - B20 - B30

Installations- und bedienungsanleitung (DE)
Manuel d'installation et d'utilisation (FR)
Installation and operating manual (GB)
Manuale di installazione e uso (IT)

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INDEX

ENGLISH

1. GENERAL INFORMATION

This user manual specifies installation and maintenance procedures, technical data and safety instructions for SOCOMEC solar inverters. For further information visit the Socomec website: www.socomec.com.

⚠️ Any work carried out on the equipment must be performed by skilled, qualified technicians.

1.1.   SAFETY SYMBOLS AND INSTRUCTIONS

WARNING!
Failure to observe safety standards could result in fatal accidents or serious injury, and damage equipment or the environment.

WARNING!
Device with several power supply sources.
In the event of system maintenance, carry out the following steps beforehand:
- Open the AC switch.
- Open the DC switch.
- Make sure the system cannot be restarted.
- Make sure the electricity supply has been disconnected.

WARNING! RISK OF ELECTRIC SHOCK!
The equipment includes capacitors that store energy. After disconnecting all power sources wait for the capacitors to discharge.

5 min

WARNING! RISK OF BURNS!
During operation the temperature of the casing may exceed 70 °C. Do not touch the surfaces!

Keep this manual safe for future reference.

Before carrying out any operations on the inverter read the Installation and Operating Manual carefully.

Do not dispose of the inverter with normal household waste.
At the end of its working life, the inverter must be disposed of in accordance with local regulations for the disposal of electronic components applicable to the installation site at the moment of disposal.

The following precautions must be taken in order to avoid risks of overheating, fire. electric shock, mechanical shock, and collateral damage (persons and/or property):

• Do not cover or obstruct the air outlet vents.

• Do not install the inverter inside a cabinet in an enclosed, non-ventilated area.

• When installing the inverter comply the recommended clearances (see chapter 4.2).

• Only use accessories recommended or sold by the manufacturer.

• Ensure the wiring is in good condition and not undersized.

• Do not operate the inverter with damaged or substandard wiring.

• Do not operate the inverter if it has suffered a violent mechanical shock of any kind (fall, impact, etc.)

• Before cleaning or performing maintenance work on the inverter or connected appliances, disconnect the power sources. After disconnecting wait for the internal capacitors to discharge completely (5 minutes approx).

• Inverter earth connection. See Chapter 5.

2. UNPACKING

2.1. REMOVAL OF PACKAGING

Materials can be disturbed during transport. Check the packaging is not damaged.

After removing the packaging ensure that:

• the data plate details on the right hand side of the inverter correspond to those of the model purchased;

• all accessories are included in the package.
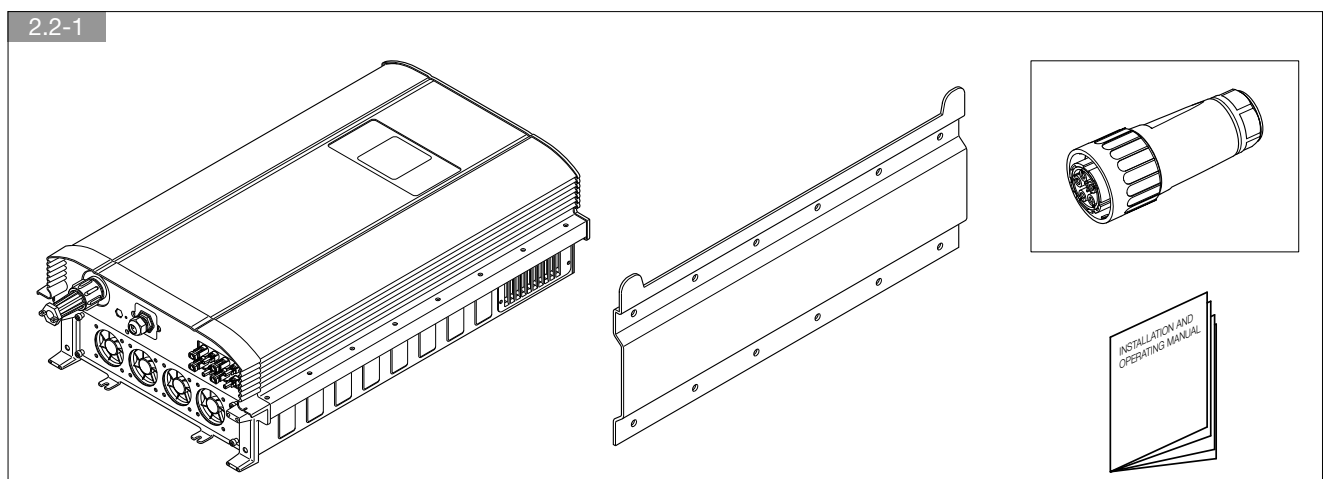
⚠ **WARNING!**
If the inverter is found to be damaged externally or internally, or any of the accessories are damaged or missing, contact SOCOMEC.

2.1-1

⚠ **WARNING!**
The inverter must be lifted by two persons.

2.2. CONTENTS

2.2-1
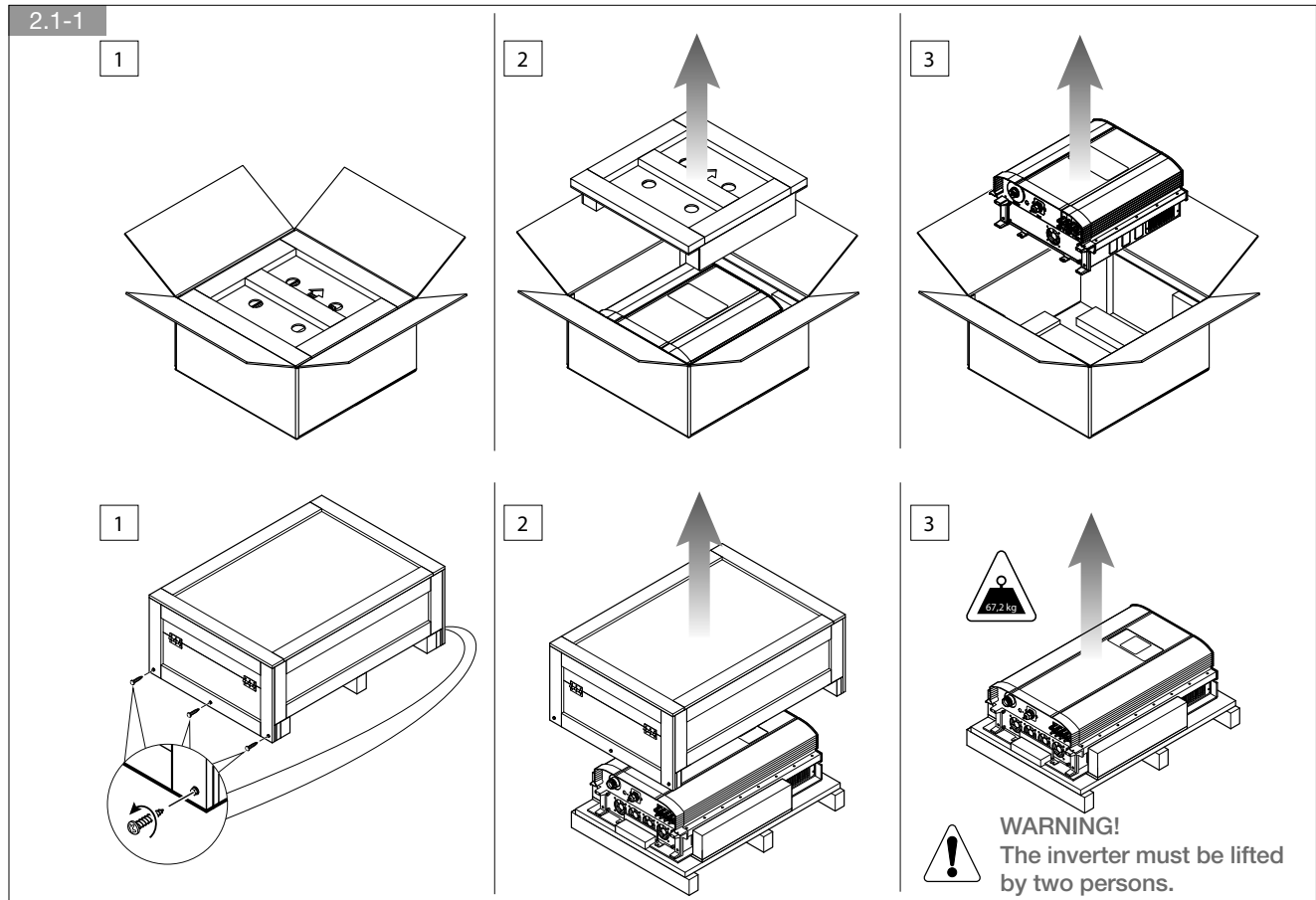
2.3. IDENTIFICATION DATA PLATE

2.3-1

socomec Innovative Power Solutions — Via Sila 1/3 - Zona Industriale Scovizze 36033 Isola Vicentina (VI) Italy

MODEL	: SUN-PR36KTL65RP
DC INPUT	: 200 ÷ 1000V$_{DC}$ - I$_{MAX}$ = 2 x 34 A$_{DC}$
PV MAX	: V$_{OC}$ = 1000V - I$_{SC}$ = 2 x 37 A
AC OUTPUT	: 400V$_{AC}$ 3PH - 50Hz - I$_{MAX}$ = 46 A$_{RMS}$
NOMINAL POWER	: 30kVA - cosφ: 0,8 ÷ 1
OVERVOLTAGE CATEGORY	: 3
IP CLASSIFICATION	: IP65
PROTECTIVE CLASS	: 1 Assembled in China

S/N   C E

30 kW model

socomec Innovative Power Solutions — Via Sila 1/3 - Zona Industriale Scovizze 36033 Isola Vicentina (VI) Italy

MODEL	: SUN-PR24KTL65RP
DC INPUT	: 200 ÷ 1000V$_{DC}$ - I$_{MAX}$ = 2 x 30 A$_{DC}$
PV MAX	: V$_{OC}$ = 1000V - I$_{SC}$ = 2 x 33 A
AC OUTPUT	: 400V$_{AC}$ 3PH - 50Hz - I$_{MAX}$ = 32 A$_{RMS}$
NOMINAL POWER	: 20kVA - cosφ: 0,8 ÷ 1
OVERVOLTAGE CATEGORY	: 3
IP CLASSIFICATION	: IP65
PROTECTIVE CLASS	: 1 Assembled in China

S/N   C E

20 kW model

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MODEL	: SUN-PR18KTL65RP
DC INPUT	: 200 ÷ 1000V$_{DC}$ - I$_{MAX}$ = 2 x 23 A$_{DC}$
PV MAX	: V$_{OC}$ = 1000V - I$_{SC}$ = 2 x 25 A
AC OUTPUT	: 400V$_{AC}$ 3PH - 50Hz - I$_{MAX}$ = 25 A$_{RMS}$
NOMINAL POWER	: 15kVA - cosφ: 0,8 ÷ 1
OVERVOLTAGE CATEGORY	: 3
IP CLASSIFICATION	: IP65
PROTECTIVE CLASS	: 1 Assembled in China

S/N   C E

15 kW model

socomec Innovative Power Solutions — Via Sila 1/3 - Zona Industriale Scovizze 36033 Isola Vicentina (VI) Italy

MODEL	: SUN-PR14KTL65RP
DC INPUT	: 200÷1000V$_{DC}$-I$_{MAX\_MPPT}$=20A$_{DC}$-I$_{MAX\_TOT}$=30A$_{DC}$
PV MAX	: V$_{OC}$ = 1000V - I$_{SC}$ = 2 x 22 A
AC OUTPUT	: 400V$_{AC}$ 3PH - 50Hz - I$_{MAX}$ = 19.2 A$_{RMS}$
NOMINAL POWER	: 12kVA - cosφ: 0,8 ÷ 1
OVERVOLTAGE CATEGORY	: 3
IP CLASSIFICATION	: IP65
PROTECTIVE CLASS	: 1 Assembled in China

S/N   C E

12 kW model

2.3-2

Model —

Technical data —

Serial number —

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MODEL	: SUN-PR24KTL65RP
DC INPUT	: 200 ÷ 1000V$_{DC}$ - I$_{MAX}$ = 2 x 30 A$_{DC}$
PV MAX	: V$_{OC}$ = 1000V - I$_{SC}$ = 2 x 33 A
AC OUTPUT	: 400V$_{AC}$ 3PH - 50Hz - I$_{MAX}$ = 32 A$_{RMS}$
NOMINAL POWER	: 20kVA - cosö: 0,8 ÷ 1
OVERVOLTAGE CATEGORY	: 3
IP CLASSIFICATION	: IP65
PROTECTIVE CLASS	: 1 Assembled in China

S/N   C E

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3. DESCRIPTION

3.1. DIMENSIONS

3.1-1

View from above

12kW
713.5
625

288,1
336,2
208,5

15-20-30kW
1047,5
952

288,1
336,2
208,5

Front view

Side view

Rear view

12kW

15-20kW

30kW

AC OUTPUT   RS 485   + DC1 -   + DC2 -

AC OUTPUT   RS 485   + DC1 -   + DC2 -

AC OUTPUT   RS 485   + DC1 -   + DC2 -

View from below

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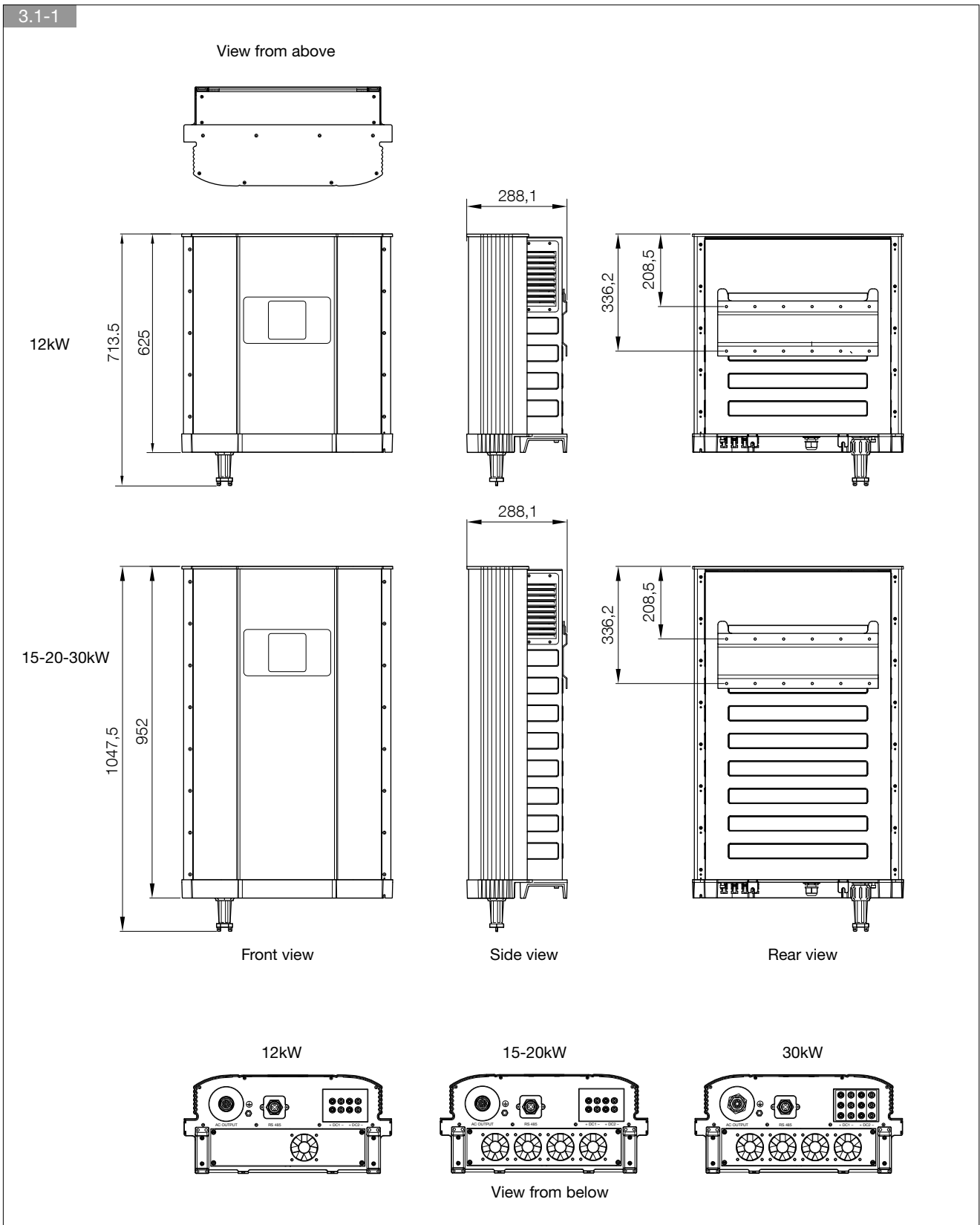
3.2. GENERAL DESCRIPTION OF COMPONENTS

3.2-1

Output connection

Communication port

Input connection

Earth connection

Fans

Label showing data and standards

LCD display and control panel

Air outlet vent

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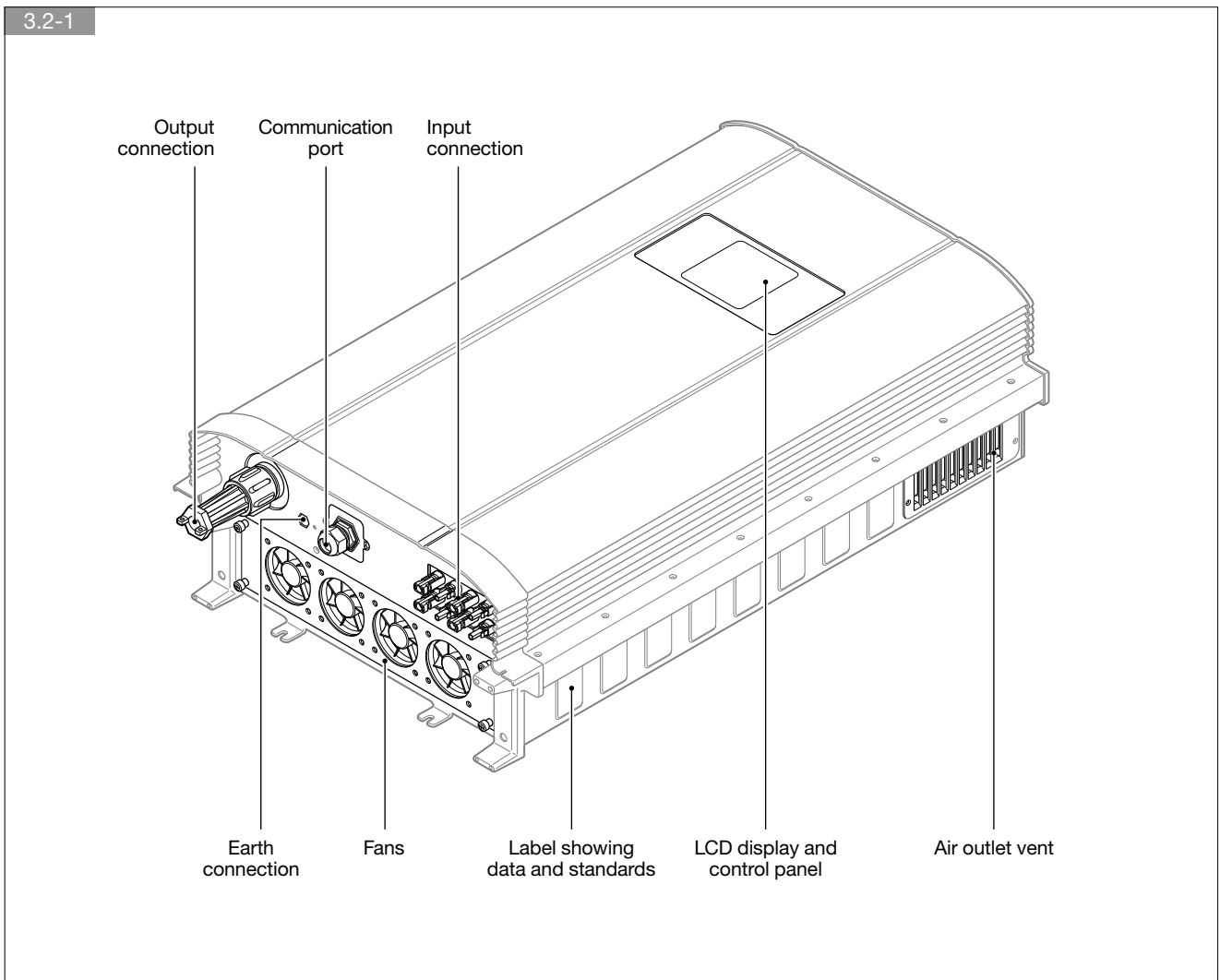
4. INSTALLATION

4.1. WARNINGS

The inverter is designed for mounting on masonry walls. If the walls are made using different materials, the installer must use suitable mounting supports.

Install the inverter in an equipment room where only skilled technicians have access.

The room must be:

• of a suitable size;

• clean;

• free from inflammable items;

• not exposed directly to sunlight;

• maintained at a temperature between -20 °C and 40 °C.

4.2. CONDITIONS FOR INSTALLATION

4.2-1
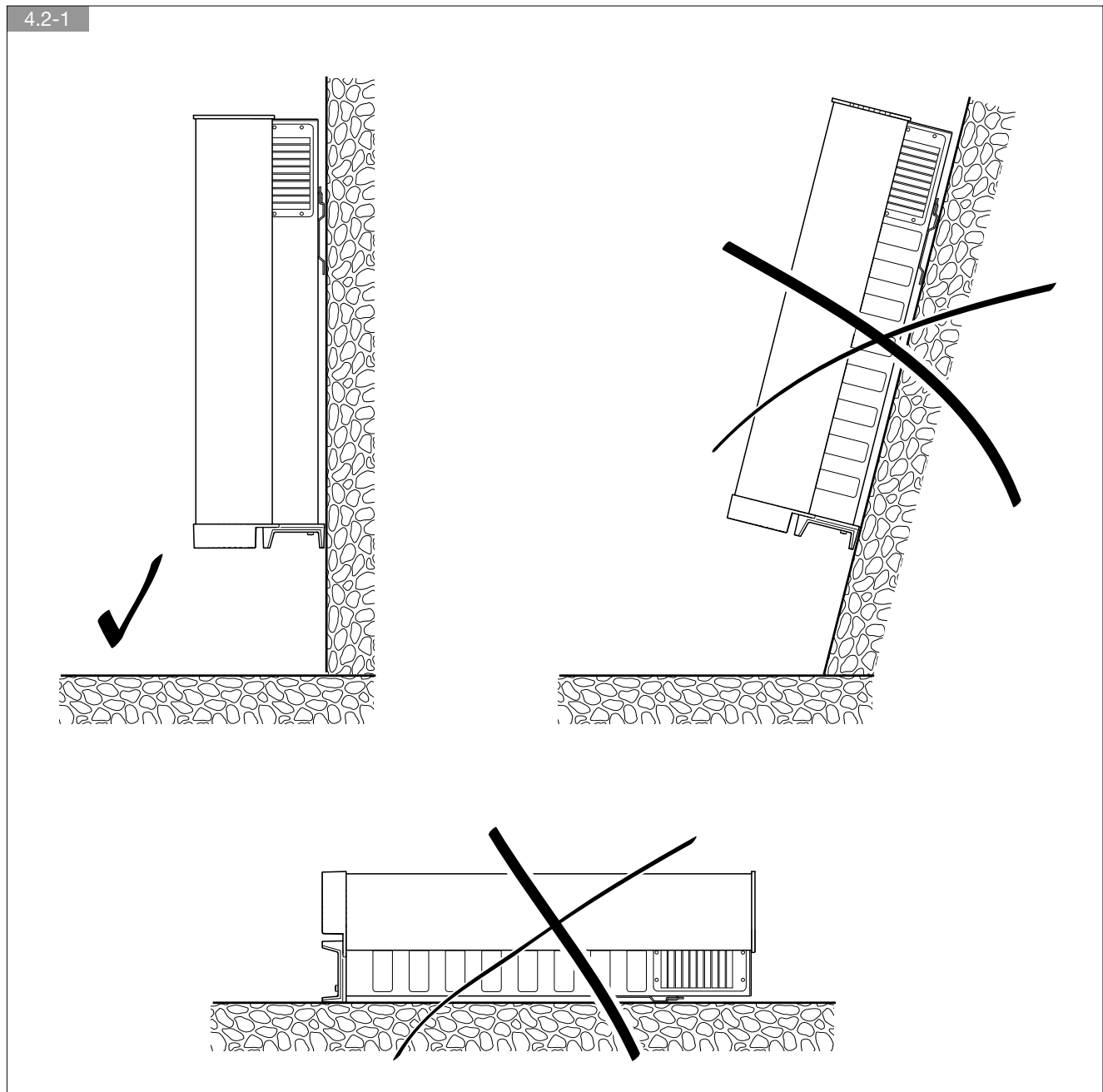
4.2-2   Suitable installation clearances
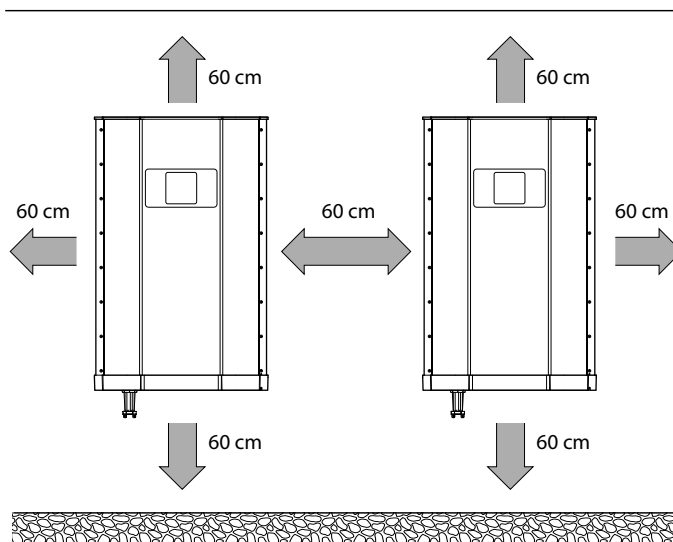
4.3.   WALL FIXING

4.3-1

Parete

3

6 viti M6

30

97,8

129°

30

14

192,8

82 x 6 = 492

82

127,7

6 viti M6

Unità di misura: mm

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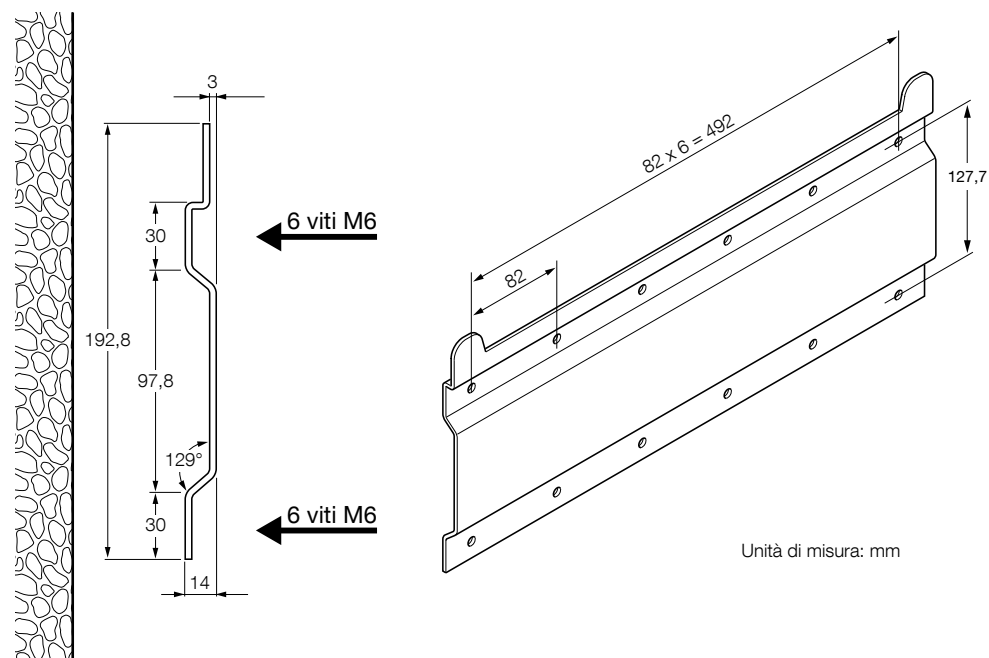
5. CONNECTIONS

WARNING!
carry out the following steps beforehand:
- Open the AC switch.
- Open the DC switch.
- Make sure the system cannot be restarted.
- Make sure the electricity supply has been disconnected.
Before connecting the power supply connect the earth cable (PE).
Before connecting any cables to the inverter, check that the polarity, voltage and sequence of the phases are correct.
Check that the input and output cables of the photovoltaic system are clearly identified.

5.1. DESCRIPTION

5.1-1

Three-phase AC output, with connections L1, L2, L3, N, PE

External communication interface

PV module inputs 1~4
DC1 = 2 strings in parallel
DC2 = 2 strings in parallel

B12
B15
B20

AC OUTPUT   RS 485   + DC1 −   + DC2 −

External earth connection (PE)

Inverter cooling fans

Three-phase AC output, with connections L1, L2, L3, N, PE

External communication interface

PV module inputs 1~6
DC1 = 3 strings in parallel
DC2 = 3 strings in parallel

B30

AC OUTPUT   RS 485   + DC1 −   + DC2 −

External earth connection (PE)

Inverter cooling fans

| 5.1-2 | Connection of the PV system without earth terminal |

Photovoltaic panels

DC distribution panel

DC1 DC2

Parallel or Separate
DC connections

AC connections

1 — L1
2 — L2
3 — L3
4 — N
⏚ — PE

External
communication interface
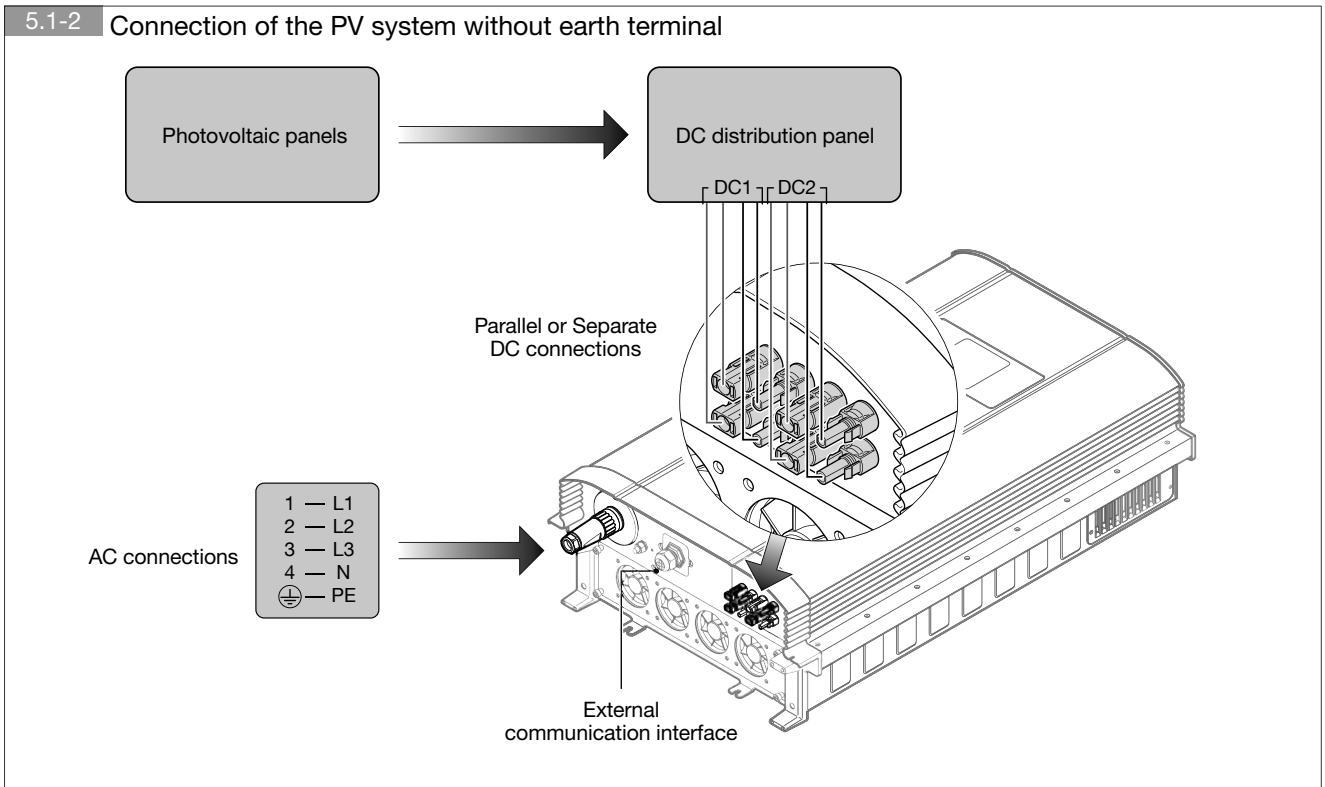
Note

The inverter can be configured either with parallel inputs (1 MPPT) or with two separate inputs (2 MPPT).

| 5.1-3 | Connecting of the PV system to positive or negative earth |

Photovoltaic panels

DC distribution panel
(GND+ or GND-)

z
o
z

Must be
connected in parallel

A transformer must be
installed

Isolating transformer

Load
3 Ph
400 Vac

Inverter
3 Ph +N
400 Vac
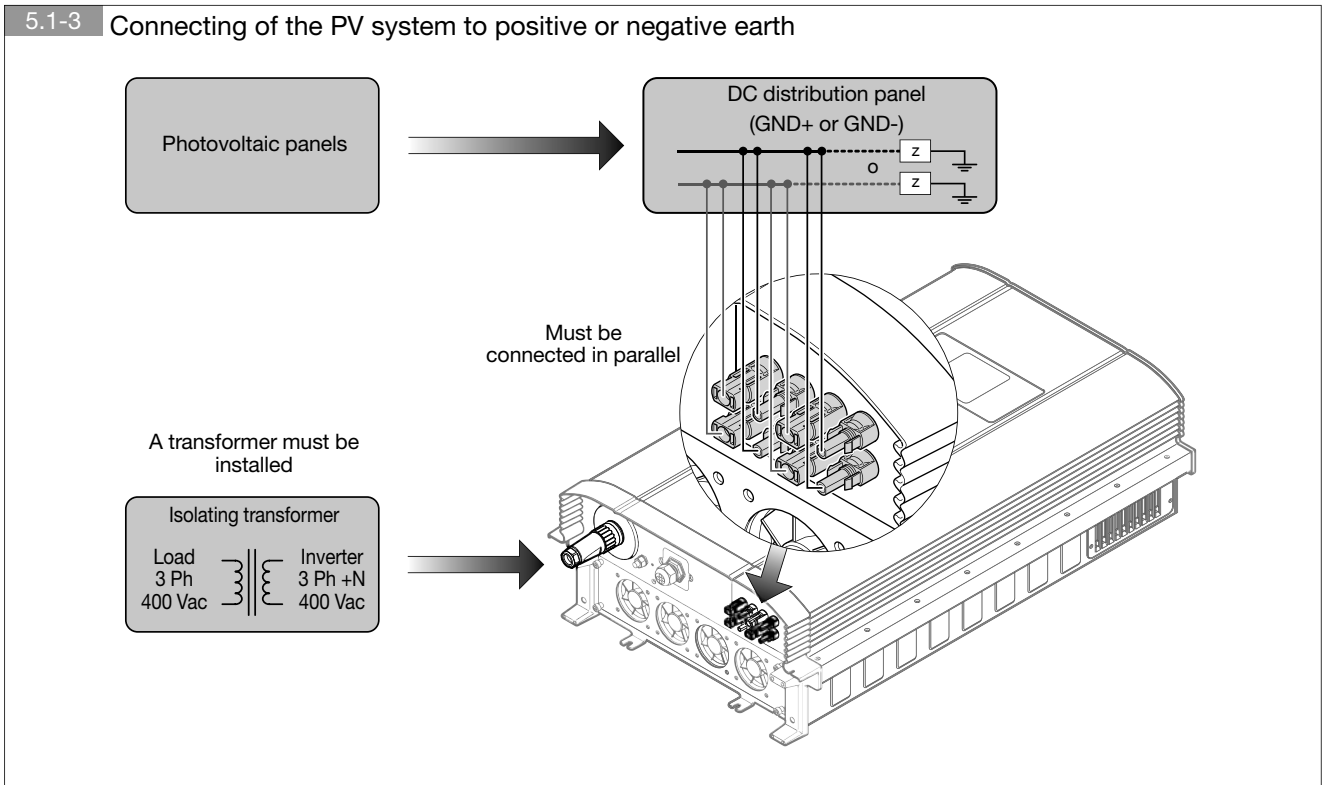
Note

With DC input connected to earth (one pole connected to earth) isolating transformer is required.

All strings of the photovoltaic field must be connected in parallel (1 MPPT).

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5.2. AC CONNECTION

• Before wiring the AC side ensure the three-phase AC mains supply is disconnected.

• Check that the connection cable used matches the specifications in the table.

Sizing of AC cables					
Model	Rated current	Cross-section	Fastening	Circuit breaker	Residual current protection
SUNSYS-B12	17.5 A	6 mm^2	≥ 0.7 Nm	MCCB rated 25 A 3P+N curve C	0.3 A type A or AC
SUNSYS-B15	22 A	6 mm^2	≥ 0.7 Nm	MCCB rated 32 A 3P+N curve C	0.3 A type A or AC
SUNSYS-B20	29 A	6 mm^2	≥ 0.7 Nm	MCCB rated 40 A 3P+N curve C	0.3 A type A or AC
SUNSYS-B30	43 A	16 mm^2	≥ 0.9 Nm	MCCB rated 63 A 3P+N curve C	0.3 A type A or AC

The AC connection is made with a three-phase plug (L1, L2, L3, N, PE - see drawing).

SUNSYS B12-B15-B20

SUNSYS B30

ENGLISH
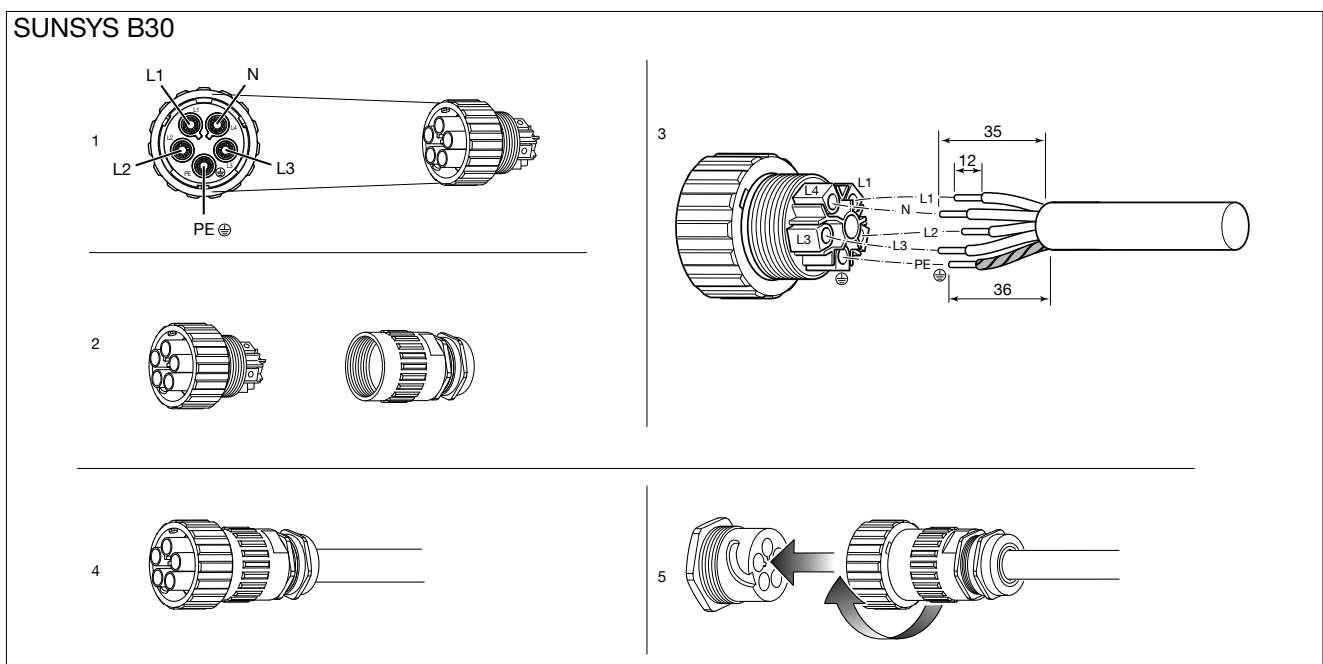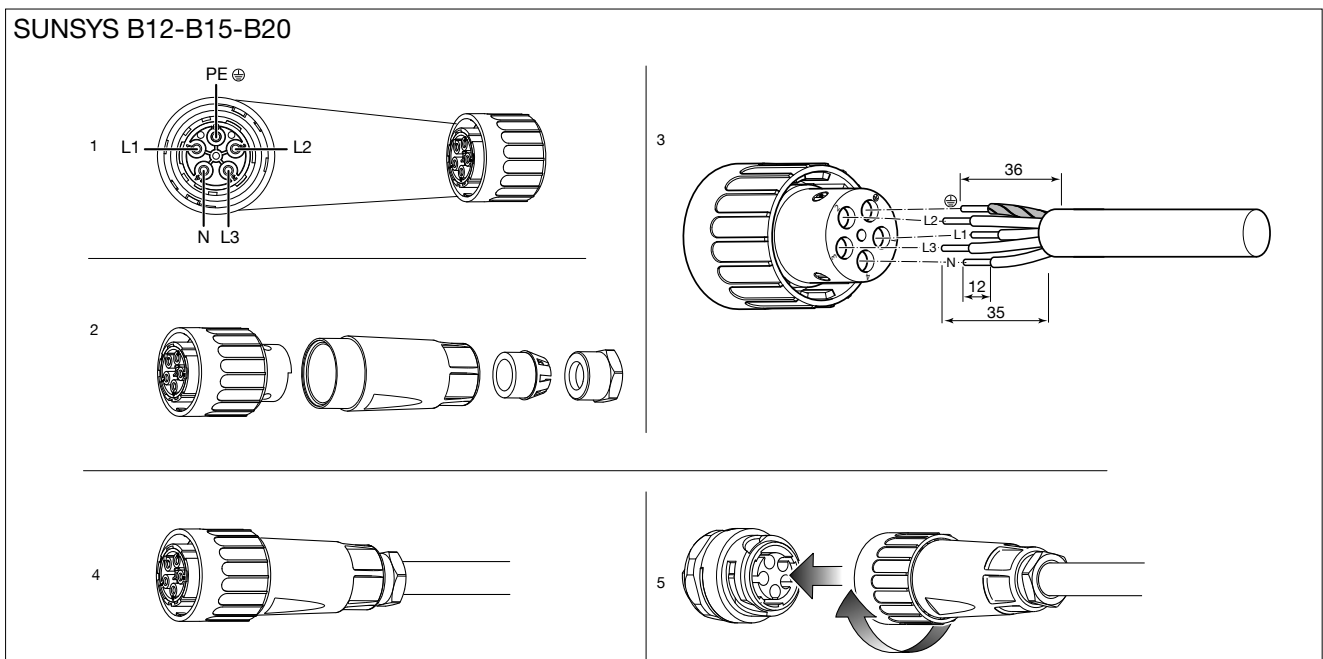
5.3. DC CONNECTION

• Before wiring the DC side ensure the DC power supply is disconnected.

• Check that the connection cable used matches the specifications in the table.

Sizing of DC cables		
Model	Rated current	Cross-section
SUNSYS-B12	2 x 20 ADC	6 mm^2
SUNSYS-B15	2 x 23 ADC	6 mm^2
SUNSYS-B20	2 x 30 ADC	6 mm^2
SUNSYS-B30	2 x 34 ADC	6 mm^2

DC connections are divided into positive and negative poles.

5.3-1
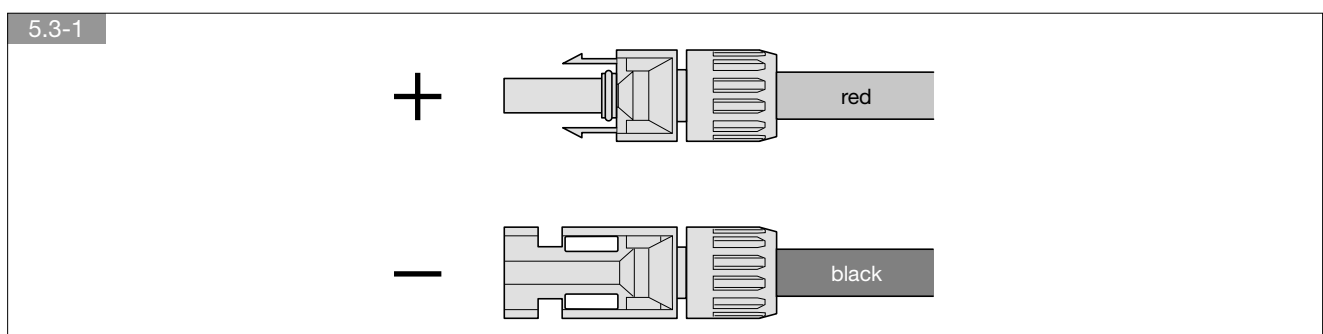
5.4. COMMUNICATION MODULE CONNECTIONS

5.4-1 Communication module

Dry contact (10 A/250 V)

EPO - Emergency Power Off

RS485

Terminal resistor

RS485

PIN Layout	
PIN	FUNCTION
4	DATA -
5	DATE +
7	GND
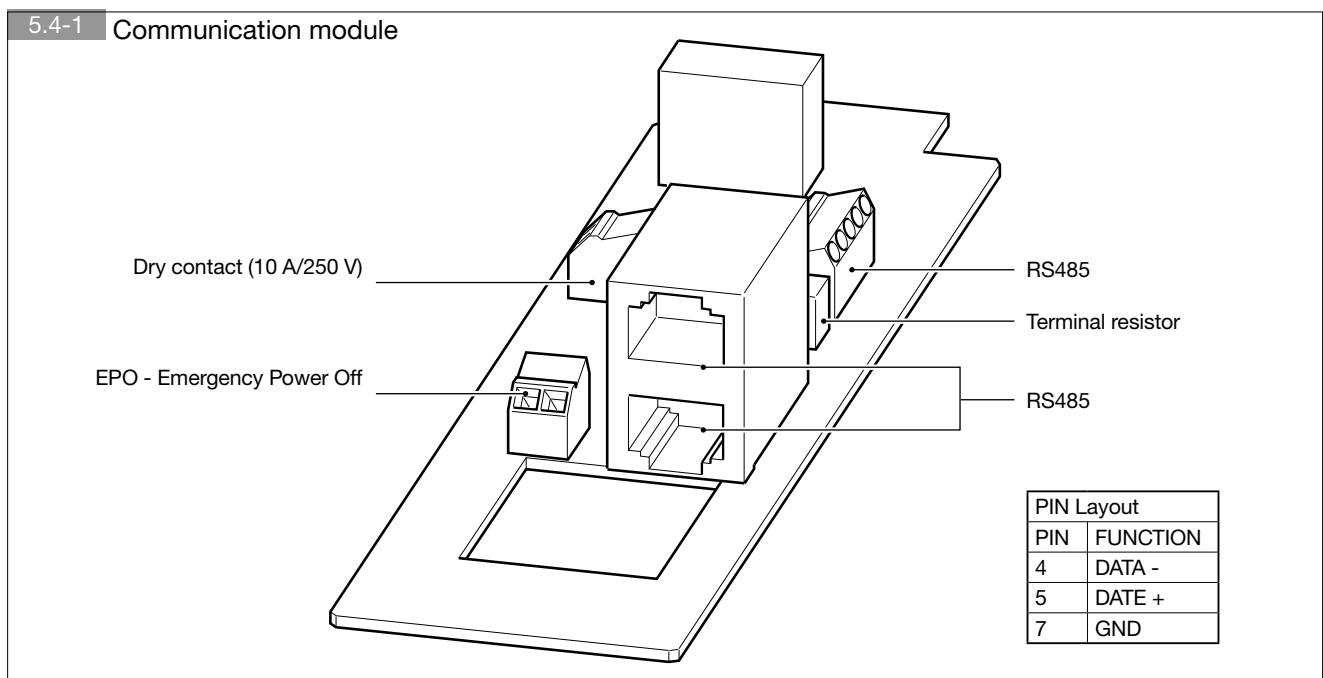
5.4.1. EPO

Connector CNS3 performs an emergency power-off function (EPO).

When the external breaker is short-circuited the inverter shuts down immediately.

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5.4.2. Dry contact

The voltage-free contact is available on connector CNS2 (Dry Contact). With the inverter connected to the grid, the contact is closed.

5.4.3. RS-485 serial port

The communication terminal block allows connection to one or more inverter units.

Installation:

• set the dip-switch SWS1 of the first and last machine in the series to the ON position;

• this same dip switch must be set to the OFF position on all other machines.

⚠ **WARNING!**
If the terminal resistor is installed in the converter do not set the inverter one.

5.4.3-1

Data Format
Baud Rate: 9600
Data bits: 8
Stop bit: 1
Parity: N/A

PIN Layout	
PIN	FUNCTION
4	DATA -
5	DATA +
7	GND

RS485/USB
or
RS485/RS232

5.4.3-2 Connection

RS485

Pin	1	2	3	4	5
Function	DATA -	DATA +	⏚	GND	

Terminal resistor

Resistor	Pin	
	1	2
ON	ON	OFF
OFF	OFF	OFF

ENGLISH

6. COMMISSIONING

6.1.   PHOTOVOLTAIC MODULE SETUP

• The maximum no-load DC voltage of the photovoltaic field must be no higher than 1000 V.

• The voltage range of the MPPTs must be between 350 V and 850 V according to the models.

	B12	B15	B20	B30
The maximum connection power going to the inverter must be no greater than	14 kWp	18 kWp	24 kWp	36 kWp
The breaker device must have a maximum rated voltage of > 1000 Vdc and maximum short-circuit current	>22 A	>24 A	>32 A	>36 A

6.2.   AC GRID VOLTAGE REQUIREMENTS

⚠ **Nominal voltage and current. See Chapter 5.**

• An AC[1] automatic circuit breaker must be installed and allocated to each of the solar inverters, independently of the system (see heading 5.2).

Grid voltage values			
L1-L2	**400 Vac**	L1-N	**230 Vac**
L1-L3	**400 Vac**	L2-N	**230 Vac**
L2-L3	**400 Vac**	L3-N	**230 Vac**

The inverter is fitted with a unit which monitors and detects fault currents; this is sensitive to all types of ground fault current.

We recommend the application of an external type A or AC 30 mA differential protection device with low sensitivity (S).

(1) Or similar protection on the basis of current regulations

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6.3.   FIRST START-UP

⚠ Check that the AC, DC and communication connections are made and secured correctly.

1. Power up the inverter
2. Set the country (confirm twice).
   Note: low voltage (LV) and medium voltage (MV) systems are mutually distinct.

In France only	
FRANCE LV	UPS settings comply with VDE0126-1-1 requirements
FR LV VFR013	UPS settings comply with VDE0126-1-1/A1 VFR2013 requirements
FR LV VFR014	UPS settings comply withVDE0126-1-1/A1 VFR2014 requirements

3. Set the language (confirm once)

6.3-1   Country selection menu

Select Country   12. Lug 2012 14:37

Netherlands
Bèlgium
France
Spain
Italy LV
Italy MV

(SET) → (EXIT) ←

Confirm Country   12. Lug 2012 14:37

Are you sure xxxxxx Country?

No   Yes

(SET) →

6.3-2   Language selection menu

Select Language   12. Lug 2012 14:37

English
Deutsch
Français
Italiano
Español
Nederlands

(SET) →
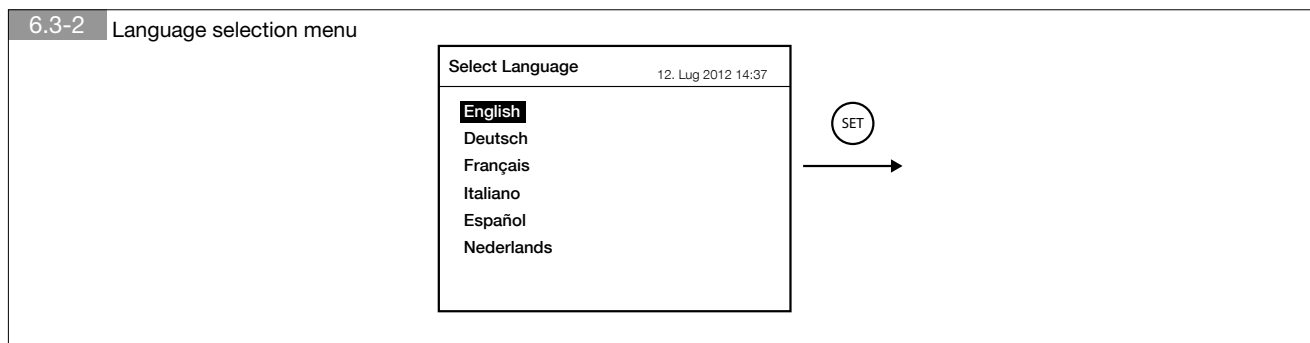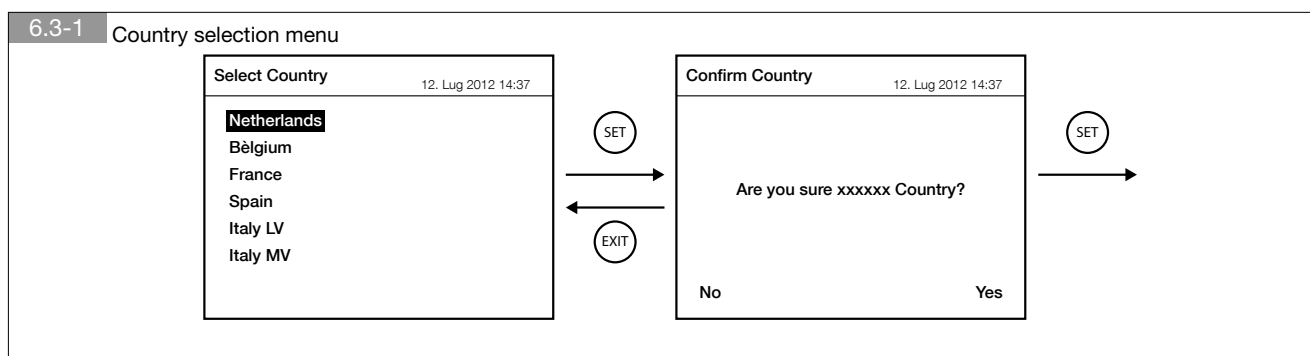
⚠ **WARNING!**
If the country setting is wrong SOCOMEC must be contacted for assistance.

If the level of sunlight is sufficient the inverter will come into operation.

After the first kWh produced the installation date is updated automatically.

During subsequent start-ups the device will show the main page of the menu.

6.3-3   Main menu

Menu   12. July 2012 14:37

E-Today	Daily energy produced
Power Meter	Electrical measurements
Energy Log	Energy data log
Event Log	Event log
Operation Data	Operating data
Inverter Information	About the inverter
Settings	Machine settings
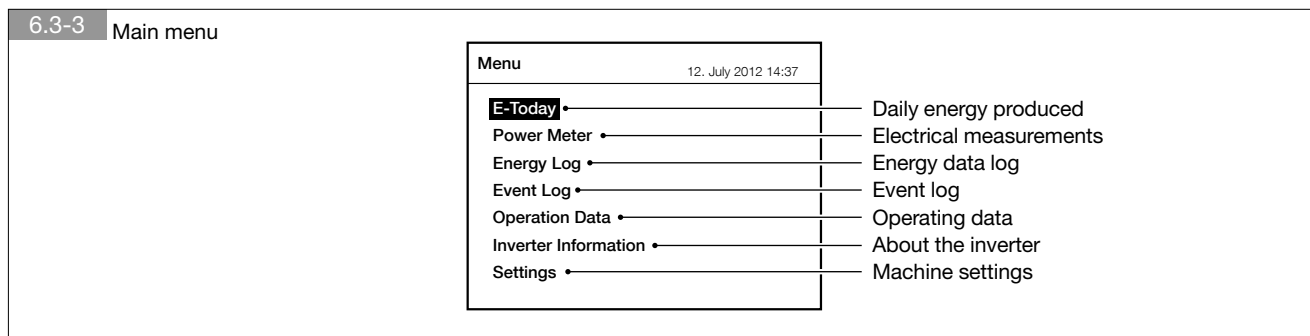
⚠ Description of menus and settings. See Chapter 8.

ENGLISH

7. CONTROL PANEL

⚠ **WARNING! RISK OF ACCIDENT OR SERIOUS INJURY!**
Do not touch the terminal of the photovoltaic module when exposed to sunlight

7.1-1
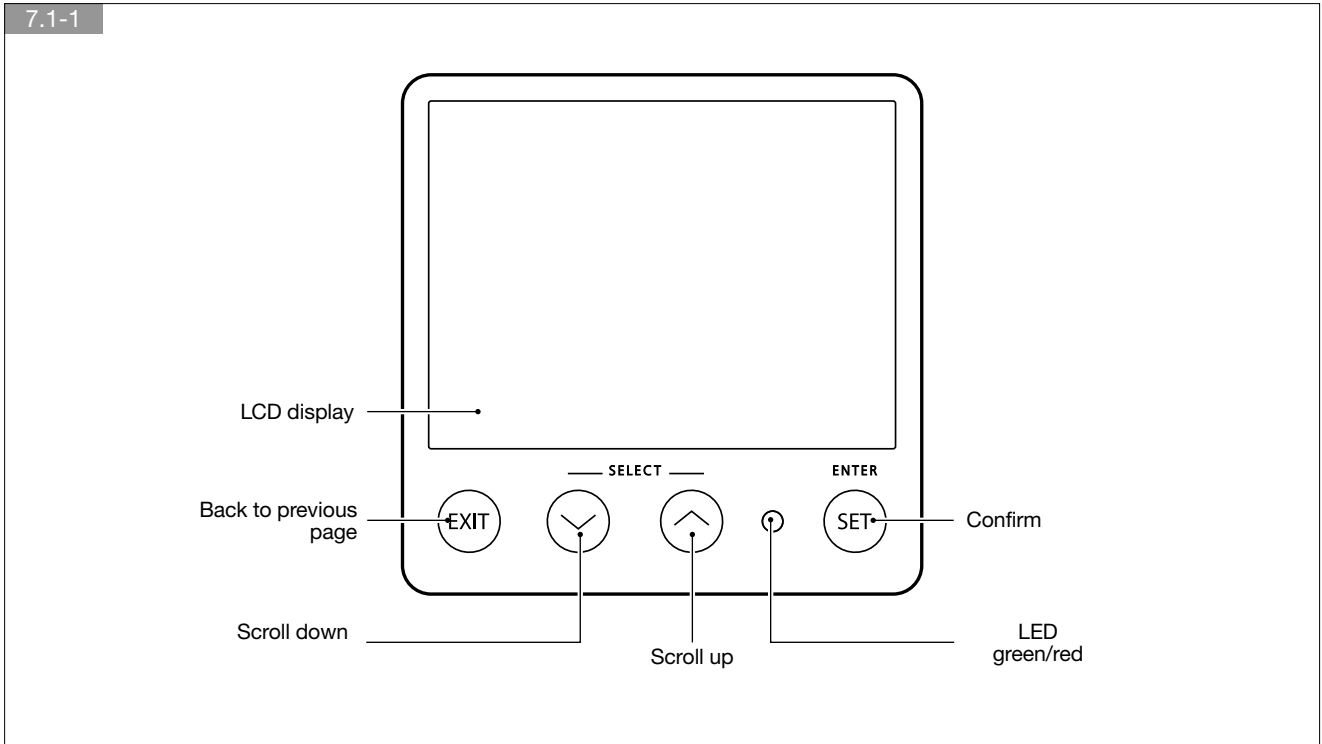
LED indicator		
Condition	Green LED	Red LED
Countdown	FLASHING	OFF
On grid	LIT	OFF
Error or fault	OFF	LIT
Standby or night-time (no DC supply)	OFF	OFF
One DC input only (during countdown)[1]	OFF	FLASHING
One DC input only (inverter delivering)	LIT	FLASHING
Fan fault[2]	LIT	FLASHING
FW update	FLASHING	FLASHING

(1) Solar Low alert (inverter not connected to grid)
(2) HW Fan alert

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8. MENU

8.1. DESCRIPTION

8.1-1 Daily energy

Energy produced — E-Today: 47kWh — 12. July 2012 14:37

Daily hours of operation — Runtime: 8.2 Hrs — Power: 12103 W — Instantaneous power output

Inverter status — On Grid

Power curve —

AC output

8.1-2 Measurements

Input DC2 — Power Meter — 12. July 2012 14:37

	Input 1	Input 2	Output	
P	1002	825	1754	W
V	600	620	230	V
I	1.7	1.3	7.6	A

Input DC1 — Input 1, AC output — Output
Power — P
Voltagc — V
Current — I

Today Energy: 47 kWh
Today Runtime: 8.2 Hours
Today Earning: 24 €
Today CO_2 Saved: 87.42 kg

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8.1-3 Annual, monthly and daily energy generation log

Energy Log-Total	12. July 2012 14:37
Life Energy:	29200 kWh
Life Runtime:	3651 Hours
Total Earning:	14600 €
Total CO2 Saved:	54312 kg

Cronologia

Energy Log-Year — 12. July 2012 14:37
2010
E-Year: 17033 kWh   Year Earning: 8516 €
Peak Month: 2354 kWh   Year CO2 Saved: 31681 kg
Exit   2009   Month

Energy Log-Month — 12. July 2012 14:37
2010.06
E-Month: 1447 kWh   Month Earning: 1240 €
Peak Day: 92 kWh   Month CO2 Saved: 2690 kg
Exit   2010.05   Day

Energy Log-Day — 12. July 2012 14:37
2010.06.21
E-Day: 80 kWh   Day Earning: 40 €
Peak Hours: 14 kWh   Day CO2 Saved: 149 kg
Exit   2010.06.20   Year

Energy Log-Year — 12. July 2012 14:37
2009
E-Year: 29200 kWh   Year Earning: 14600 €
Peak Month: 2490 kWh   Year CO2 Saved: 54312 kg
Esci   2008   2010   Mese

Energy Log-Month — 12. July 2012 14:37
2010.05
E-Month: 2480 kWh   Month Earning: 1240 €
Peak Day: 95 kWh   Month CO2 Saved: 4612 kg
Exit   2010.04   2010.06   Day

Energy Log-Day — 12. July 2012 14:37
2010.06.20
E-Day: 80 kWh   Day Earning: 40 €
Peak Hour: 14.1 kWh   Day CO2 Saved: 149 kg
Exit   2010.06.19   2010.06.21   Year

This page displays the last thirty events (error or fault) recorded by the system. The first event displayed is the most recent. The statistics of the selected event can be displayed by pressing SET.

8.1-4 Event log

Event Log	12. July 2012 14:37
1. 15/02/2010 17:02	AC Freq High
2. 02/12/2009 09:13	No Grid
3. 23/11/2009 15:28	HW Fan
4. 03/10/2009 06:02	Insulation
5. 27/05/2009 05:52	Insulation
6. 18/02/2009 16:46	HW DC Injection

Summary

Event Summary — 12. July 2012 14:37

Event	Count
HW DC Injection	1
Temperature	0
HW NTC1 Fail	0
HW NTC2 Fail	0
HW NTC3 Fail	0
HW NTC4 Fail	0

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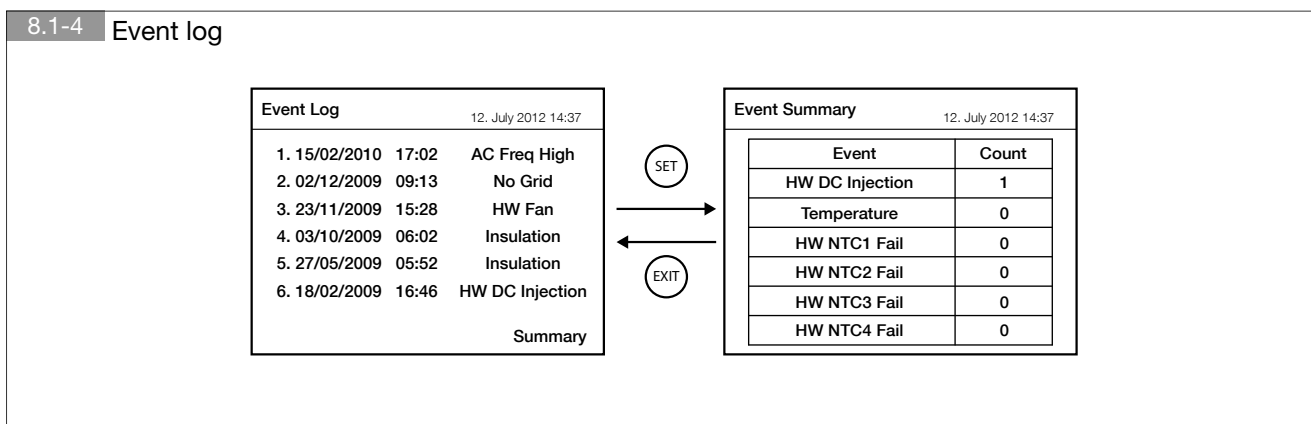
| 8.1-5 | Operating data (maximum values measured) |

Operating Data - 1/4		12. July 2012 14:37
Input 1		**Maximum**
Voltage	(Vdc)	811
Current	(A)	25.2
Power	(W)	11200
Input 2		
Voltage	(Vdc)	785
Current	(A)	26.3
Power	(W)	10301

Operating Data - 2/4			12. July 2012 14:37
			Maximum
	Voltage	(Vdc)	247
L1	Current	(A)	30.5
	Power	(W)	6810
	Voltage	(Vdc)	244
L2	Current	(A)	30.3
	Power	(W)	6756
	Voltage	(Vdc)	245
L3	Current	(A)	30.1
	Power	(W)	6745

Operating Data - 4/4		12. July 2012 14:37	
Temperature		**Max.**	**Min.**
Inside	(°C)	59.3	15.7
Heatsink-1	(°C)	75.5	15.3
Heatsink-2	(°C)	74.2	15.2
Heatsink-3	(°C)	73.6	15.2

Operating Data - 3/4		12. July 2012 14:37
Output		**Maximum**
Voltage	(Vdc)	247
Current	(A)	30.5
Power	(W)	20311
Frequency	(Hz)	5010

⚠ To reset the data on this menu press ▽ △ SET simultaneously and hold for approximately 10 seconds.

| 8.1-6 | Inverter information |

Inverter Information	12. July 2012 14:37
Serial Number	WE08450003
DSP-Version	1.80
Red.-Version	1.17
Comm.-Version	91.23
Installation Date	19.Apr.2012
Inverter ID	001
Country	Italy LV

ENGLISH

8.2. SETTINGS

8.2-1

> **Settings**
> 12. July 2012 14:37
>
> **Personal Settings**
> **Coefficients Settings**
> **Install Settings**
> **Active/Reactive Power Control**
> **FRT**

8.2-2   Personal settings

> **Personal Settings**
> 12. July 2012 14:37
>
> | Language | [| English |] |
> | Date | 12/07/2012 | | |
> | | (DD/MM/YYYY) | | |
> | Time | 13:50 | | |
> | Screen Saver | [| 5 min |] |
> | Brightness | [| 3 |] |
> | Contrast | [| 2 |] |

5–60 minutes automatic shut-down — Screen Saver

1-5 — Brightness / Contrast

8.2-3   Coefficient settings

> **Coefficient Settings**
> 12. July 2012 14:37
>
> | Earning Value w/kWh | [| 0.50 |] |
> | CO2 Saved. Kg/kWh | [| 1.86 |] |
> | Currency | [| € |] |

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8.2.1. Installation settings

⚠ **WARNING! DAMAGE CAN BE CAUSED TO THE MACHINE AND SYSTEM!**
The following settings are enabled and managed by the grid operator, installer or specialist technician. Wrong settings are liable to damage the photovoltaic system.

To access the Installation Settings menu enter the password 5555 (the password cannot be changed).

- **Inverter ID**
 Address of each inverter.
- **Insulation**
  This function measures the impedance between grid and earth. In the event of a fault, prevents connection to the grid. The following insulation measurement methods can be adopted depending on the type of photovoltaic system: positive to earth, negative to earth, DC1 only, DC2 only, not active.
- **RCMU**
  This function monitors current leakage to earth. If the set limit is exceeded the inverter shuts down.
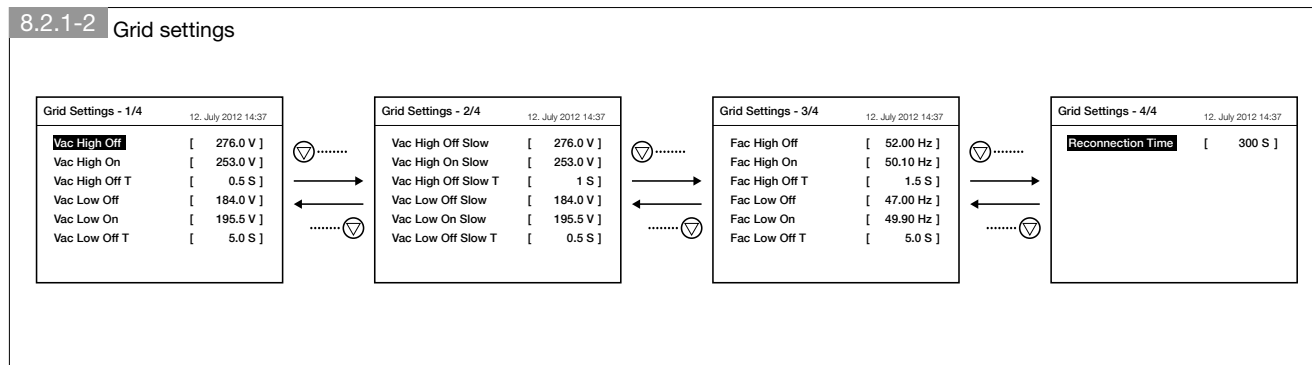
8.2.1-1 Installation settings - User mode
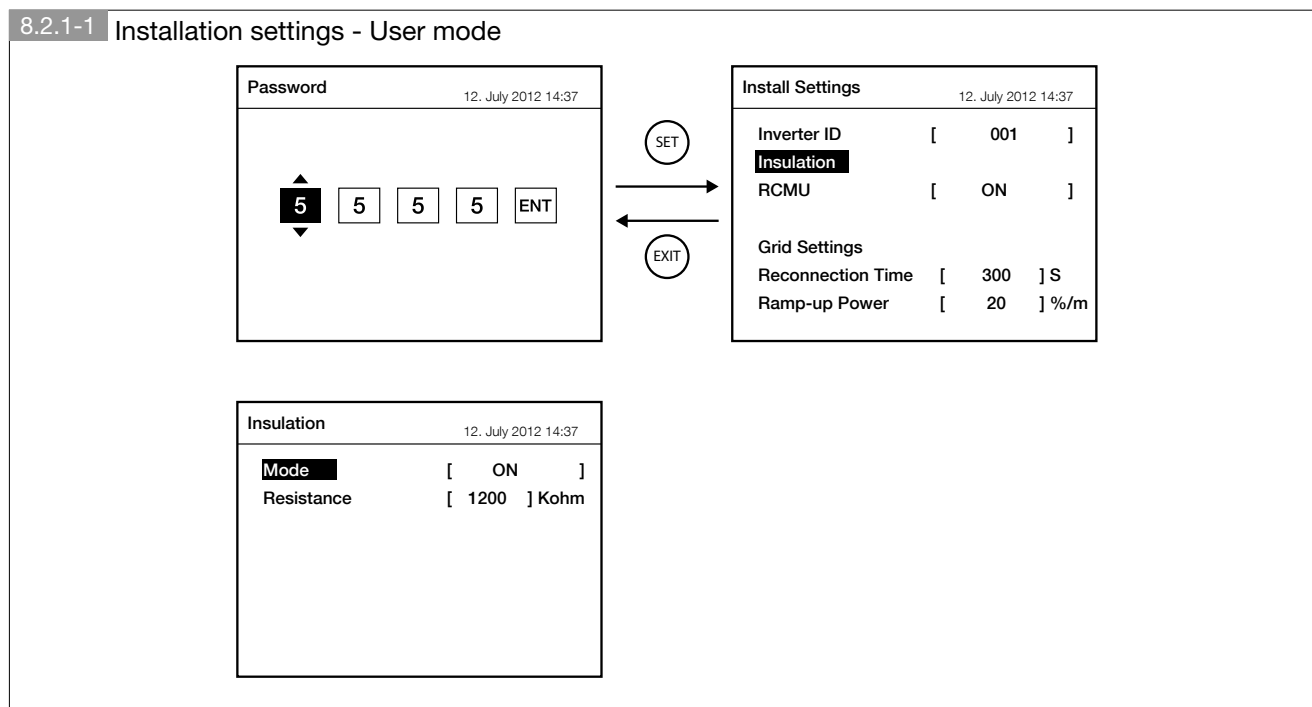
- **Grid setting**
  The operating voltage and frequency thresholds of the inverter are displayed.

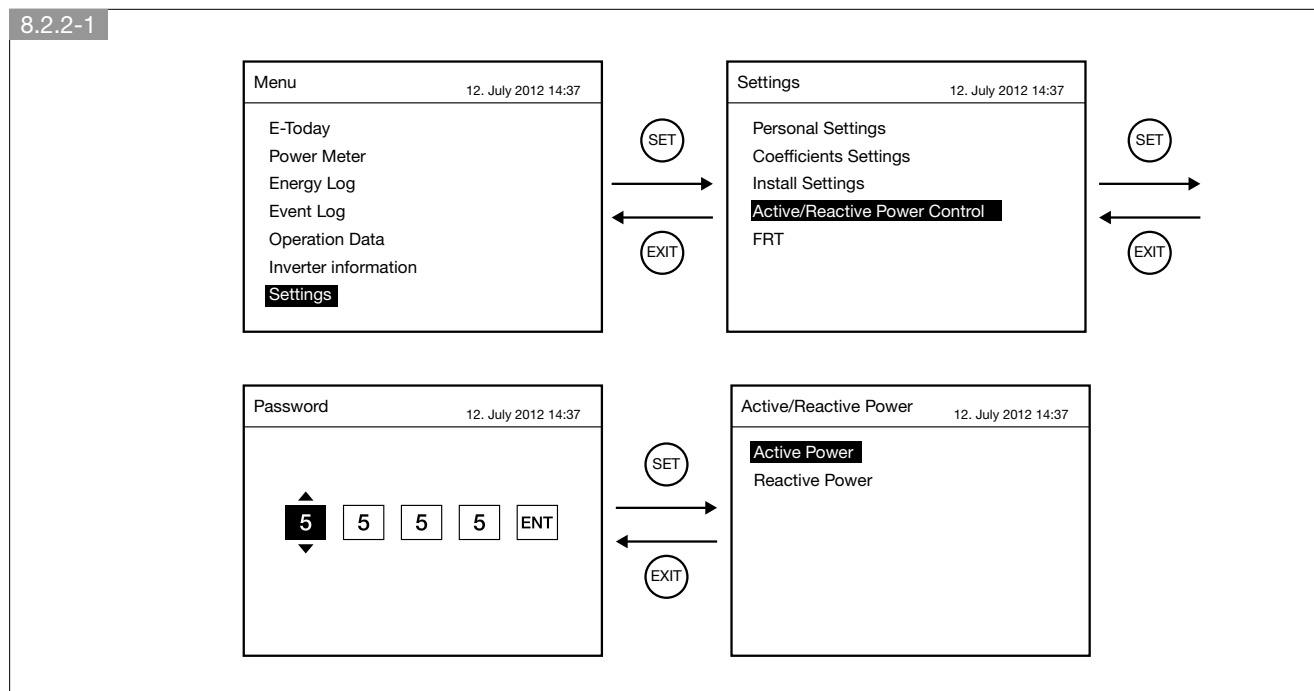**8.2.1-2** Grid settings

- **Reconnection time**
  This function varies the waiting time for the inverter to restart (factory setting 300 s).
- **Ramp up Power**
  Percentage of rated power put onto the grid during start-up (factory setting 20%).

8.2.2. Active/Reactive Power

8.2.2-1

Menu	12. July 2012 14:37
E-Today	
Power Meter	
Energy Log	
Event Log	
Operation Data	
Inverter information	
Settings	

SET → EXIT

Settings	12. July 2012 14:37
Personal Settings	
Coefficients Settings	
Install Settings	
Active/Reactive Power Control	
FRT	

SET → EXIT

Password	12. July 2012 14:37

▲
5 5 5 5 ENT
▼

SET → EXIT

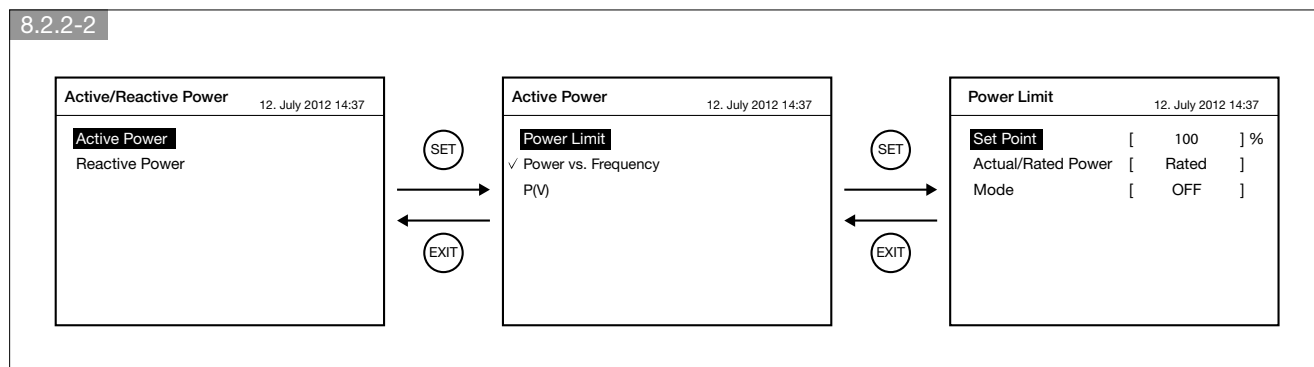| Active/Reactive Power	12. July 2012 14:37
Active Power	
Reactive Power	

• **Active Power Control**

If activated, the Power Limit function will reduce the power output.
This depends on:
- the configured Set Point percentage;
- sunlight conditions.

8.2.2-2

Active/Reactive Power	12. July 2012 14:37
Active Power	
Reactive Power	

SET → EXIT

Active Power	12. July 2012 14:37
Power Limit	
✓ Power vs. Frequency	
P(V)	

SET → EXIT

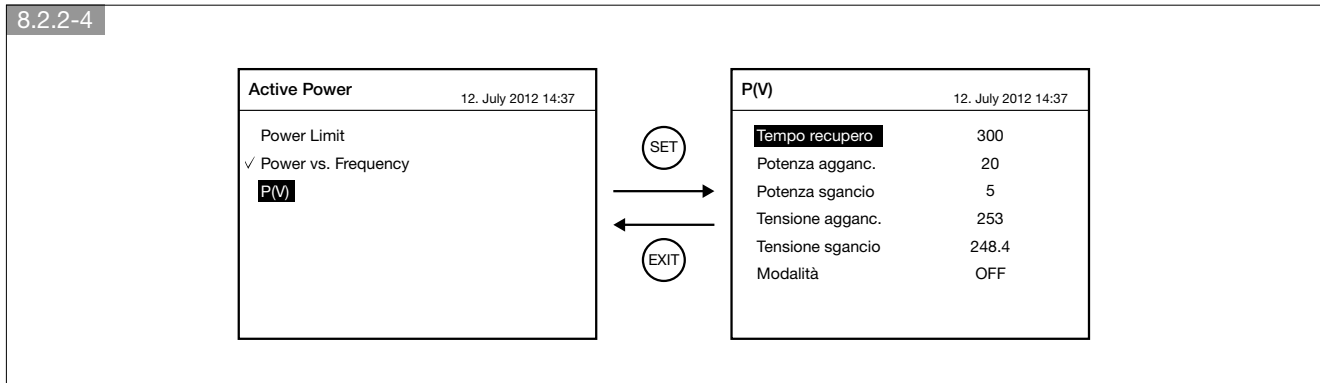| Power Limit	12. July 2012 14:37
Set Point	[100] %
Actual/Rated Power	[Rated]
Mode	[OFF]

• **Frequency-determined Active Power Control**

This function limits the active power output level automatically (in the event of frequency transients higher than the set value).

8.2.2-3

Active Power	12. July 2012 14:37
Power Limit	
✓ **Power vs. Frequency**	
P(V)	

SET → EXIT

Power vs. Frequency	12. July 2012 14:37
Actual/Rated Power	[Actual]
Start Frequency	[50.30] Hz
Stop Frequency	[-----] Hz
Recovery Frequency	[-----] Hz
Statism	[2.4] %
Recovery Time	[300] s
Mode	[ON]

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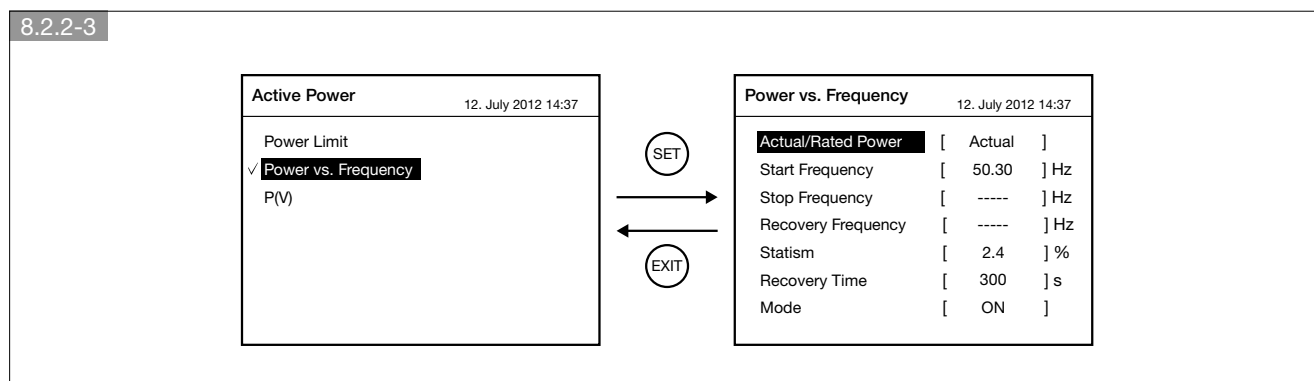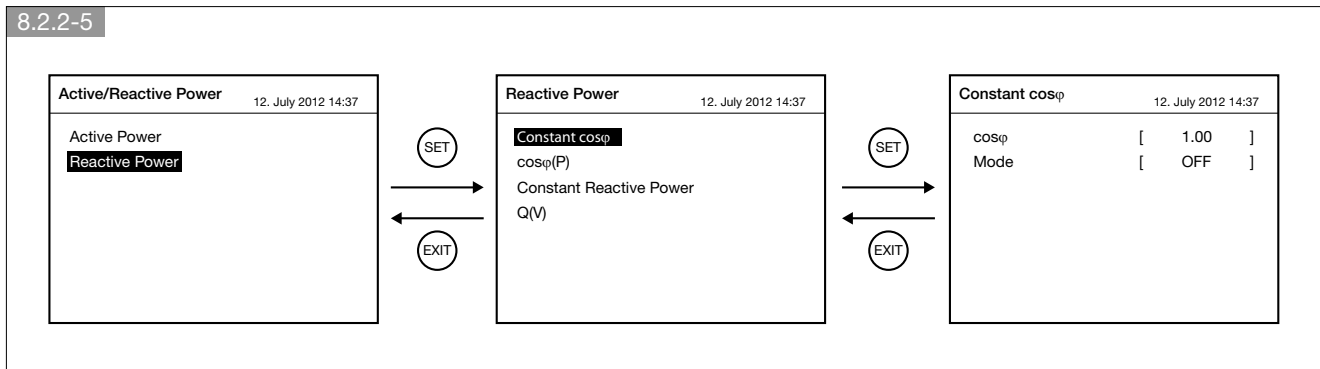
• **Power control as a function of (V)**

This function automatically checks the voltage at the output terminals of the inverter.
This makes it possible to reduce the power delivered to the grid, avoiding the disconnection of the inverter due to overvoltage.
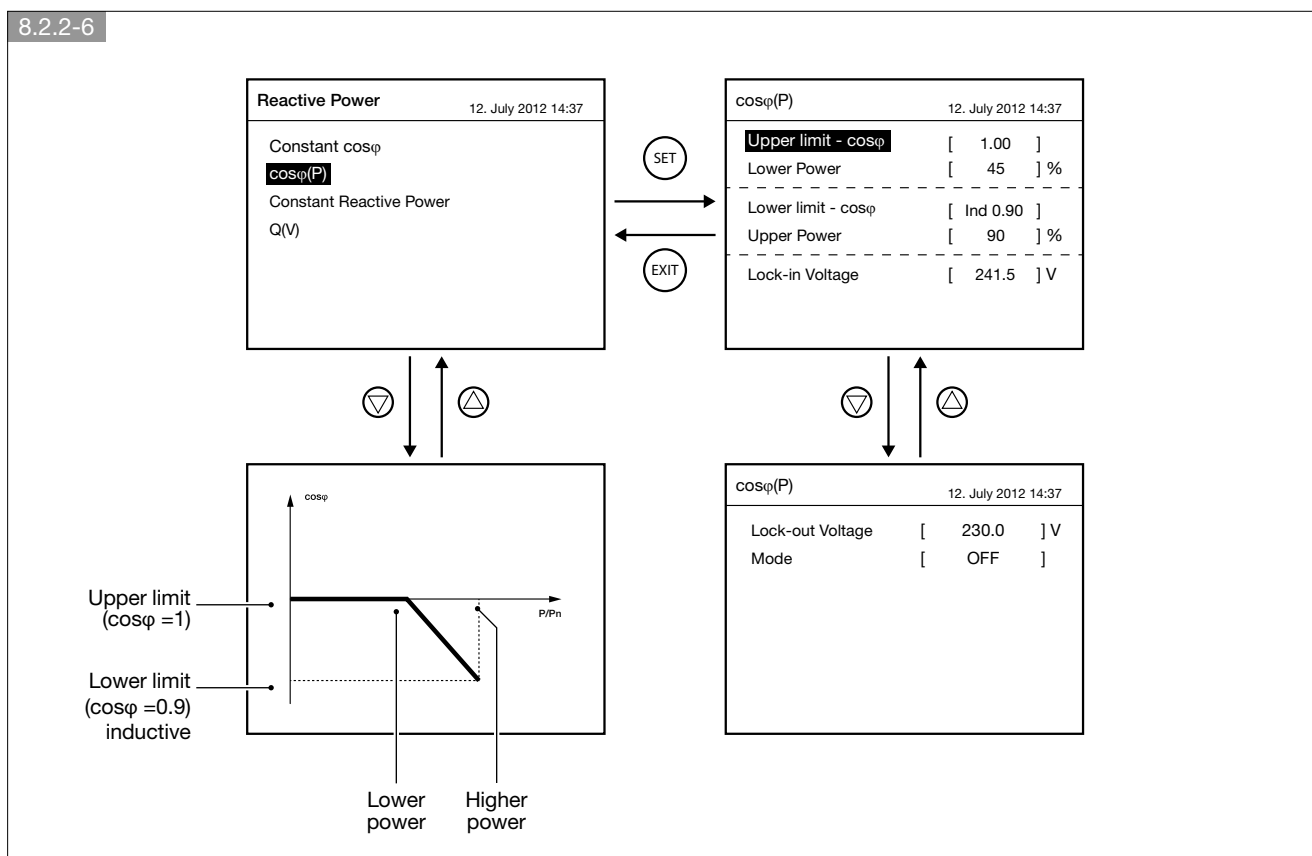
8.2.2-4

Active Power	12. July 2012 14:37
Power Limit	
✓ Power vs. Frequency	
P(V)	

SET
EXIT

P(V)	12. July 2012 14:37
Tempo recupero	300
Potenza agganc.	20
Potenza sgancio	5
Tensione agganc.	253
Tensione sgancio	248.4
Modalità	OFF

• **Operation at constant cosφ**

This function selects a fixed cosφ setting between 0.8 inductive and 0.8 capacitive.

8.2.2-5

Active/Reactive Power	12. July 2012 14:37
Active Power	
Reactive Power	

SET
EXIT

Reactive Power	12. July 2012 14:37
Constant cosφ	
cosφ(P)	
Constant Reactive Power	
Q(V)	

SET
EXIT

Constant cosφ	12. July 2012 14:37
cosφ	[1.00]
Mode	[OFF]

ENGLISH
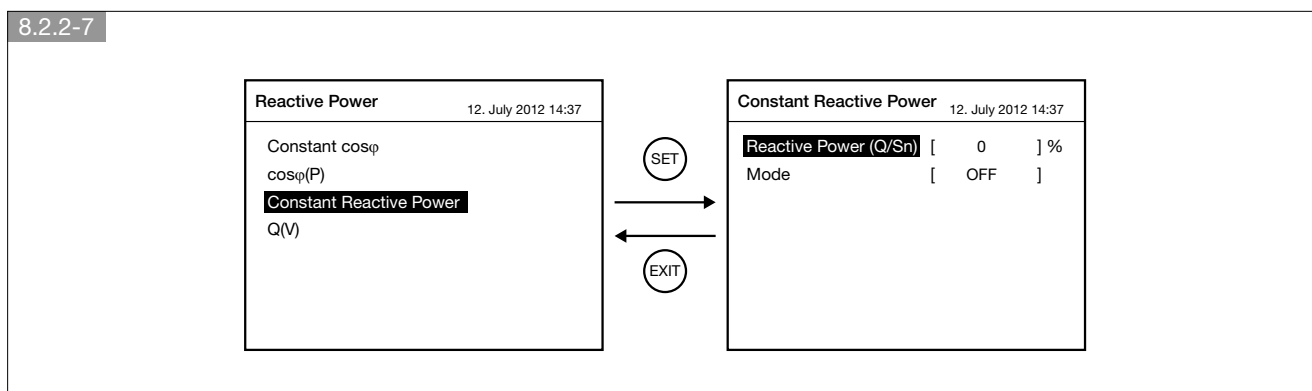
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• **Power-regulated Cosφ monitoring**

If activated, this function generates a cosφ variable as a function of power (instantaneous power factor regulated automatically by the inverter).

8.2.2-6

Reactive Power	12. July 2012 14:37
Constant cosφ	
cosφ(P)	
Constant Reactive Power	
Q(V)	

SET

EXIT

cosφ(P)	12. July 2012 14:37	
Upper limit - cosφ	[1.00]	
Lower Power	[45] %	
Lower limit - cosφ	[Ind 0.90]	
Upper Power	[90] %	
Lock-in Voltage	[241.5] V	

cosφ(P)	12. July 2012 14:37	
Lock-out Voltage	[230.0] V	
Mode	[OFF]	

Upper limit (cosφ =1)

Lower limit (cosφ =0.9) inductive

cosφ
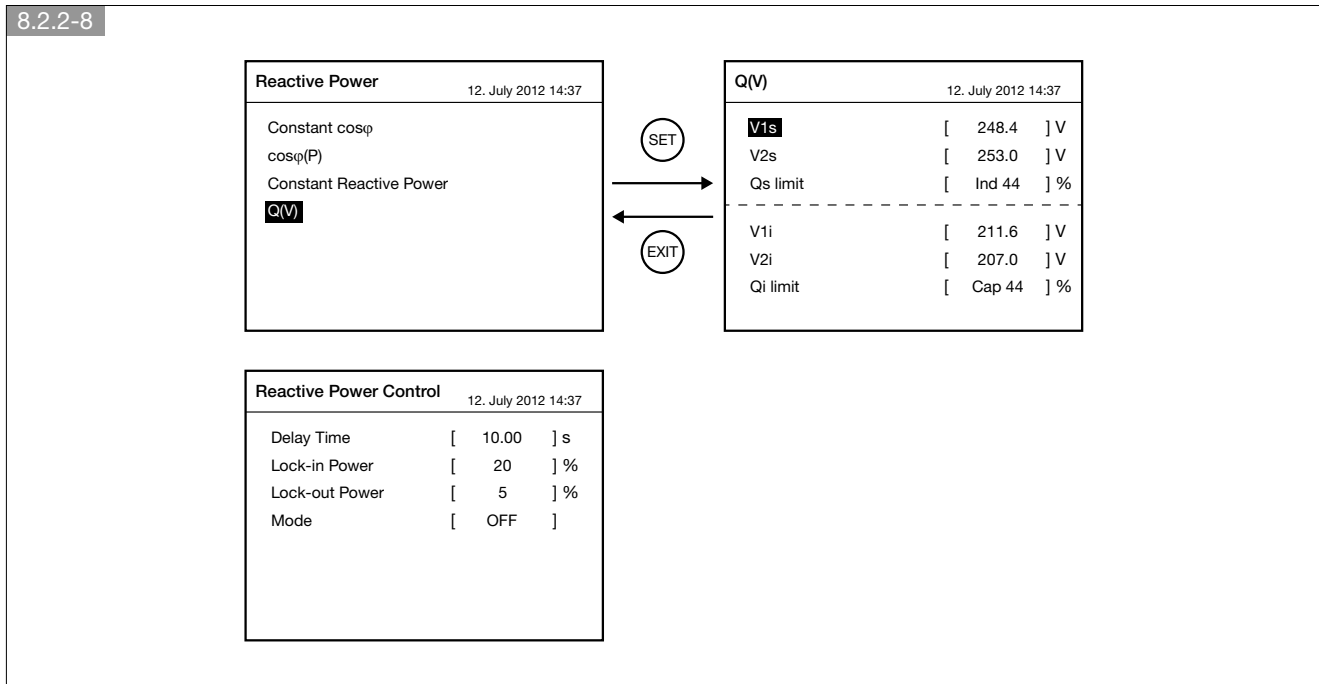
P/Pn

Lower power

Higher power

• **Operation at constant reactive power**

This function selects either a leading or lagging reactive power percentage up to 48.43% of the rated power.
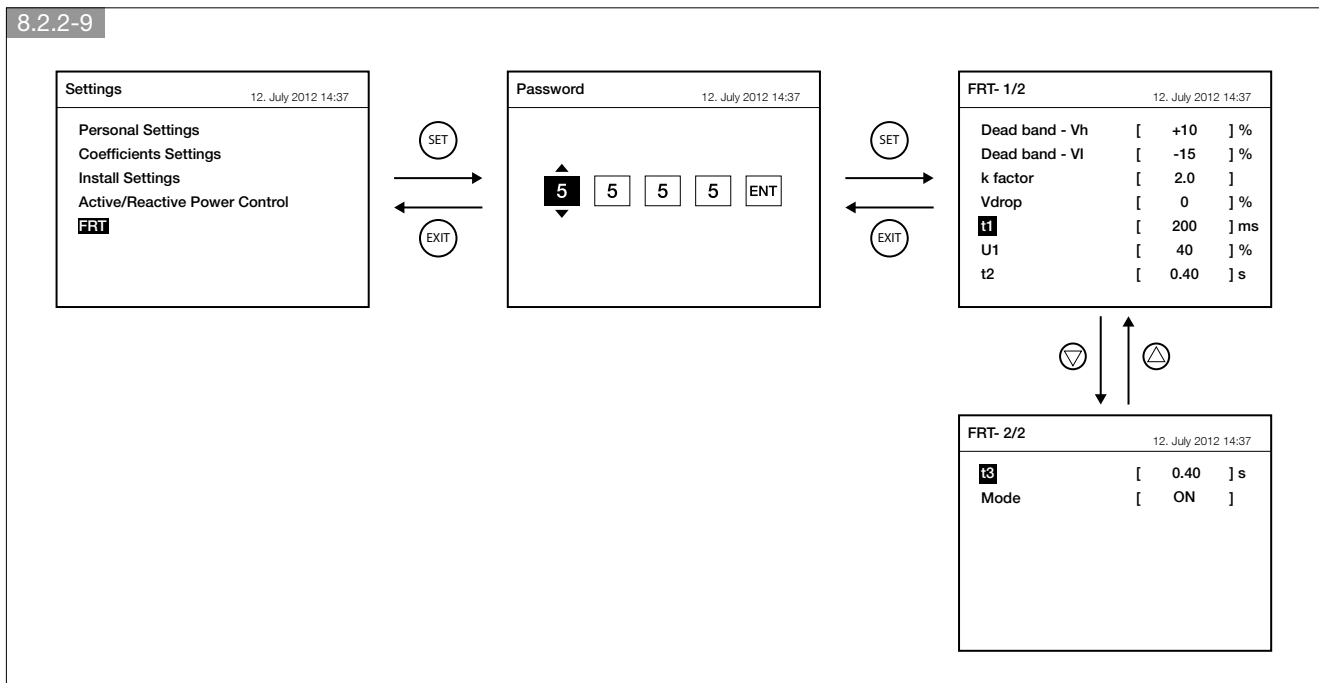
8.2.2-7

Reactive Power	12. July 2012 14:37
Constant cosφ	
cosφ(P)	
Constant Reactive Power	
Q(V)	

SET

EXIT

Constant Reactive Power	12. July 2012 14:37	
Reactive Power (Q/Sn)	[0] %	
Mode	[OFF]	

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• **Operation at voltage-regulated reactive power (Q)**
This function generates reactive power determined by the voltage registered at the output terminals.

8.2.2-8

Reactive Power	12. July 2012 14:37
Constant cosφ	
cosφ(P)	
Constant Reactive Power	
Q(V)	

SET →
← EXIT

Q(V)	12. July 2012 14:37	
V1s	[248.4	] V
V2s	[253.0	] V
Qs limit	[Ind 44	] %
V1i	[211.6	] V
V2i	[207.0	] V
Qi limit	[Cap 44	] %

Reactive Power Control	12. July 2012 14:37	
Delay Time	[10.00	] s
Lock-in Power	[20	] %
Lock-out Power	[5	] %
Mode	[OFF	]

• **FRT (Low Voltage Fault Ride Through)**
This function ensures that the inverter will not shut down during dips in grid voltage.

8.2.2-9

Settings	12. July 2012 14:37
Personal Settings	
Coefficients Settings	
Install Settings	
Active/Reactive Power Control	
FRT	

SET →
← EXIT

Password	12. July 2012 14:37
▲ 5 5 5 5 ENT ▼	

SET →
← EXIT

FRT- 1/2	12. July 2012 14:37	
Dead band - Vh	[+10	] %
Dead band - Vl	[-15	] %
k factor	[2.0	]
Vdrop	[0	] %
t1	[200	] ms
U1	[40	] %
t2	[0.40	] s

FRT- 2/2	12. July 2012 14:37	
t3	[0.40	] s
Mode	[ON	]

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9. MEASUREMENTS AND MESSAGES

9.1. MEASUREMENTS

Description of measurement messages	
Measurement	**Description**
Energy today	Total energy generated during the day
Op time	Total PV inverter operating time during the day
Power	Actual power generated
Input 1 P	Power at DC input 1
Input 1 V	Voltage at DC input 1
Input 1 I	Current at DC input 1
Input 2 P	Power at DC input 2
Input 2 V	Voltage at DC input 2
Input 2 I	Current at DC input 2
P output	Power at AC output
V output	Voltage at AC output (star voltage)
I output	Current at AC output (average current of 3 phases)
Energy today	Total energy generated today
Op time today	Total operating time today
Earnings today	Total amount earned today
CO2 saved today	Total reduction in CO2 emissions today
Tot Energy Prod.	Total energy generated since the system went into operation
Total op time	Total operating time since the system went into operation
Total earnings	Total earnings since the system went into operation
Total CO2 saved	Total reduction in CO2 emissions since the system went into operation
Energy/year	Total energy produced in one year
Earnings/year	Total earnings in one year
Monthly peak	Peak production per month
CO2/year	Total reduction in CO2 emissions over one year
Energy/month	Total energy produced in one month
Earnings/month	Total earnings in one month
Daily peak	Peak production per day
CO2/month	Total reduction in CO2 emissions over one month
Energy/day	Total energy produced in one day
Earnings today	Total earnings in one day
Peak today	Peak production per hour
CO2 saved today	Total reduction in CO2 emissions on one day
Max voltage input 1	Maximum voltage registering at input 1
Max current input 1	Maximum current registering at input 1
Max power input 1	Maximum power registering at input 1
Max voltage input 2	Maximum voltage registering at input 2
Max current input 2	Maximum current registering at input 2
Max power input 2	Maximum power registering at input 2
Max voltage L1	Maximum output voltage on L1
Max current L1	Maximum output current on L1
Max power L1	Maximum output power on L1
Max voltage L2	Maximum output voltage on L2
Max current L2	Maximum output current on L2

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Measurement	Description
Max power L2	Maximum output power on L2
Max voltage L3	Maximum output voltage on L3
Max current L3	Maximum output current on L3
Max power L3	Maximum output power on L3
Max output voltage	Maximum output voltage
Max output current	Maximum output current
Max output power	Maximum output power
Temperature	
Max internal	Maximum internal temperature of the inverter
Min internal	Minimum internal temperature of the inverter
Max heatsink 1	Maximum temperature at heatsink 1
Min heatsink 1	Minimum temperature at heatsink 1
Max heatsink 2	Maximum temperature at heatsink 2
Min heatsink 2	Minimum temperature at heatsink 2
Max heatsink 3	Maximum temperature at heatsink 3
Min heatsink 3	Minimum temperature at heatsink 3

9.2. ERROR MESSAGES

Description of error messages		
Message	**Description**	**Solutions**
AC Freq High	1) Grid frequency higher than nominal 2) Country configuration incorrect 3) Measuring circuit failure	1) Check the grid frequency value 2) Check the country setting 3) Contact the technician
AC Freq Low	1) Grid frequency lower than nominal 2) Country configuration incorrect 3) Measuring circuit failure	1) Check the grid frequency value 2) Check the country setting 3) Contact the product technician
Grid Quality	1) Excessive distortion caused by loads connected to grid or near inverter 2) Measuring circuit failure	1) Check for the existence of non-linear loads connected to the grid 2) Contact the technician
HW Connected Fail	1) AC plug wrongly connected 2) Measuring circuit failure	1) Check the wiring as described in the manual 2) Contact the technician
No Grid	1) No AC power 2) AC switch contacts open 3) Plug not connected 4) Internal fuses blown	1) Check the grid voltage value 2) Close the AC breaker contacts 3) Check the connection and wiring 4) Contact the product technician
AC Volt Low	1) AC voltage lower than nominal 2) Country configuration or grid setting incorrect 3) AC plug wrongly connected 4) Internal fuses blown	1) Check the grid voltage value 2) Check the country/voltage limits setting 3) Check wiring in the manual 4) Contact the technician
AC Volt High	1) AC voltage higher than nominal 2) Country configuration or grid setting incorrect 3) AC plug wrongly connected 4) Internal fuses blown	1) Check the grid voltage value 2) Check the country/voltage limits setting 3) Check wiring in the manual 4) Contact the technician
Solar1 High	1) Input voltage 1 higher than 1000 V 2) Measuring circuit failure	1) Reduce the no. of panels to obtain an open circuit voltage VOC < 1000 V 2) Contact the technician
Solar2 High	1) Input voltage 2 higher than 1000 V 2) Measuring circuit failure	1) Reduce the no. of panels to obtain an open circuit voltage VOC < 1000 V 2) Contact the technician

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9.3. WARNING MESSAGES

Description of error messages		
Message	**Description**	**Solutions**
Solar1 Low	1) Input voltage 1 below limits	1) Check the DC voltage value
	2) Measuring circuit failure	2) Contact the product technician
Solar2 Low	1) Input voltage 2 below limits	1) Check the DC voltage value
	2) Measuring circuit failure	2) Contact the technician
HW FAN	1) One or more fans jammed	1) Remove the object obstructing the fan
	2) One or more fans faulty	2) Remove the faulty fan
	3) One or more fans disconnected	3) Check the fan connections
	4) Measuring circuit failure	4) Contact the chnician

9.4. FAULT MESSAGES

Description of error messages		
Message	**Description**	**Solutions**
HW DC Injection	1) Abnormal grid voltage	1) Check for the existence of non-linear loads connected to the grid
	2) Measuring circuit failure	2) Contact the technician
Temperature	1) Ambient temperature > 60 °C or < -30 °C	1) Check the installation environment and ventilation
	2) Measuring circuit failure	2) Contact the technician
HW NTC1 Fail	1) Ambient temperature > 90 °C or < -30 °C	1) Check the installation environment
	2) Measuring circuit failure NTC1	2) Contact the technician
HW NTC2 Fail	1) Ambient temperature > 90 °C or < -30 °C	1) Check the installation environment
	2) Measuring circuit failure NTC2	2) Contact the technician
HW NTC3 Fail	1) Ambient temperature > 90 °C or < -30 °C	1) Check the installation environment
	2) Measuring circuit failure NTC3	2) Contact the technician
HW NTC4 Fail	1) Ambient temperature > 90 °C or < -30 °C	1) Check the installation environment
	2) Measuring circuit failure NTC4	2) Contact the technician
HW DSP ADC1	1) Insufficient input power	1) Check that DC voltage > 150 V
	2) Measuring circuit failure	2) Contact the technician
HW DSP ADC2	1) Insufficient input power	1) Check that DC voltage > 150 V
	2) Measuring circuit failure	2) Contact the technician
HW DSP ADC3	1) Insufficient input power	1) Check that DC voltage > 150 V
	2) Measuring circuit failure	2) Contact the technician
HW RED ADC1	1) Insufficient input power - Input 1	1) Input power too low
	2) Measuring circuit failure	2) Contact the technician
HW RED ADC2	1) Insufficient input power - Input 2	1) Input power too low
	2) Measuring circuit failure	2) Contact the technician
HW Efficiency	1) Calibration incorrect	1) Check the current measurements between inverter and system
	2) Measuring circuit failure	2) Contact the technician
HW COMM2	1) Problems with internal communication between RED and CPU	1) Switch off the inverter and switch on again
		2) Contact the technician
HW COMM1	1) Problems with internal communication between DSP and COMM	1) Switch off the inverter and switch on again
		2) Contact the technician

Message	Description	Solutions
GROUND CURRENT	1) Problems with PV field insulation 2) High stray capacitance of PV field 3) High level of current leakage to earth	1) Check PV field insulation 2) Check that the stray capacitance of each input to earth is < 2.5 µF. 3) Check system wiring
INSULATION	1) Problems with PV field insulation 2) High stray capacitance of PV field	1) Check PV field insulation 2) Check that the stray capacitance of each input to earth is < 2.5 µF.
HW Connect Fail	1) No internal power supply to the machine 2) Internal control circuits not working	1) Contact the technician
RCMU Fail	1) Internal control circuits not working	1) Contact the technician
Relay Test Short	1) Output relays with contacts closed 2) Internal control circuits not working	1) Contact the technician 2) Contact the technician
Relay Test Open	1) Output relays faulty 2) Internal control circuits not working 3) Grid voltage measurements abnormal	1) Contact the technician 2) Contact the technician 3) Compare machine and grid measurement values
Bus Unbalance	1) Problems with wiring of strings 2) String short-circuiting to earth 3) Internal control circuits not working	1) Check the parallel string setup connected to the inverter 2) Check the system 3) Contact the technician
HW Bus OVR	1) Problems with wiring of strings 2) String short-circuiting to earth 3) Internal control circuits not working	1) Check the parallel string setup connected to the inverter 2) Check the system 3) Contact the technician
AC Current High	1) AC grid overvoltage 2) Internal control circuits not working	1) Switch off/switch on again 2) Contact the technician
HW CT A Fail	1) Internal control circuits not working	1) Contact the technician
HW CT B Fail	1) Internal control circuits not working	1) Contact the technician
HW CT C Fail	1) Internal control circuits not working	1) Contact the technician
HW AC OCR	1) High levels of power system harmonics 2) Internal control circuits not working	1) Check for the existence of non-linear loads connected to the grid 2) Contact the technician
HW ZC Fail	1) Internal control circuits not working	1) Contact the technician
DC Current High	1) Internal control circuits not working	1) Contact the technician

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10. MAINTENANCE

⚠️ **WARNING!**
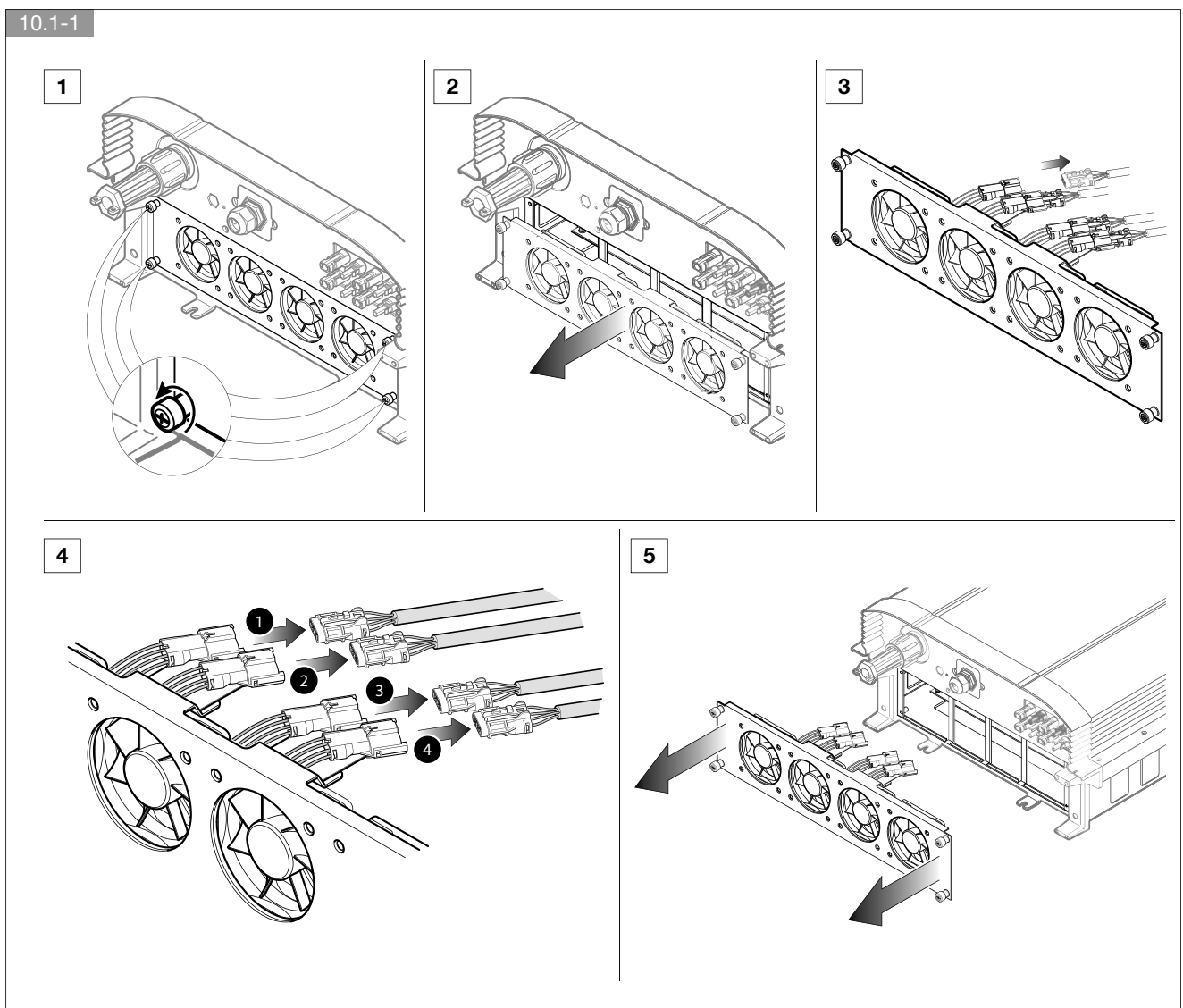carry out the following steps beforehand:
- Open the AC switch.
- Open the DC switch.
- Make sure the system cannot be restarted.
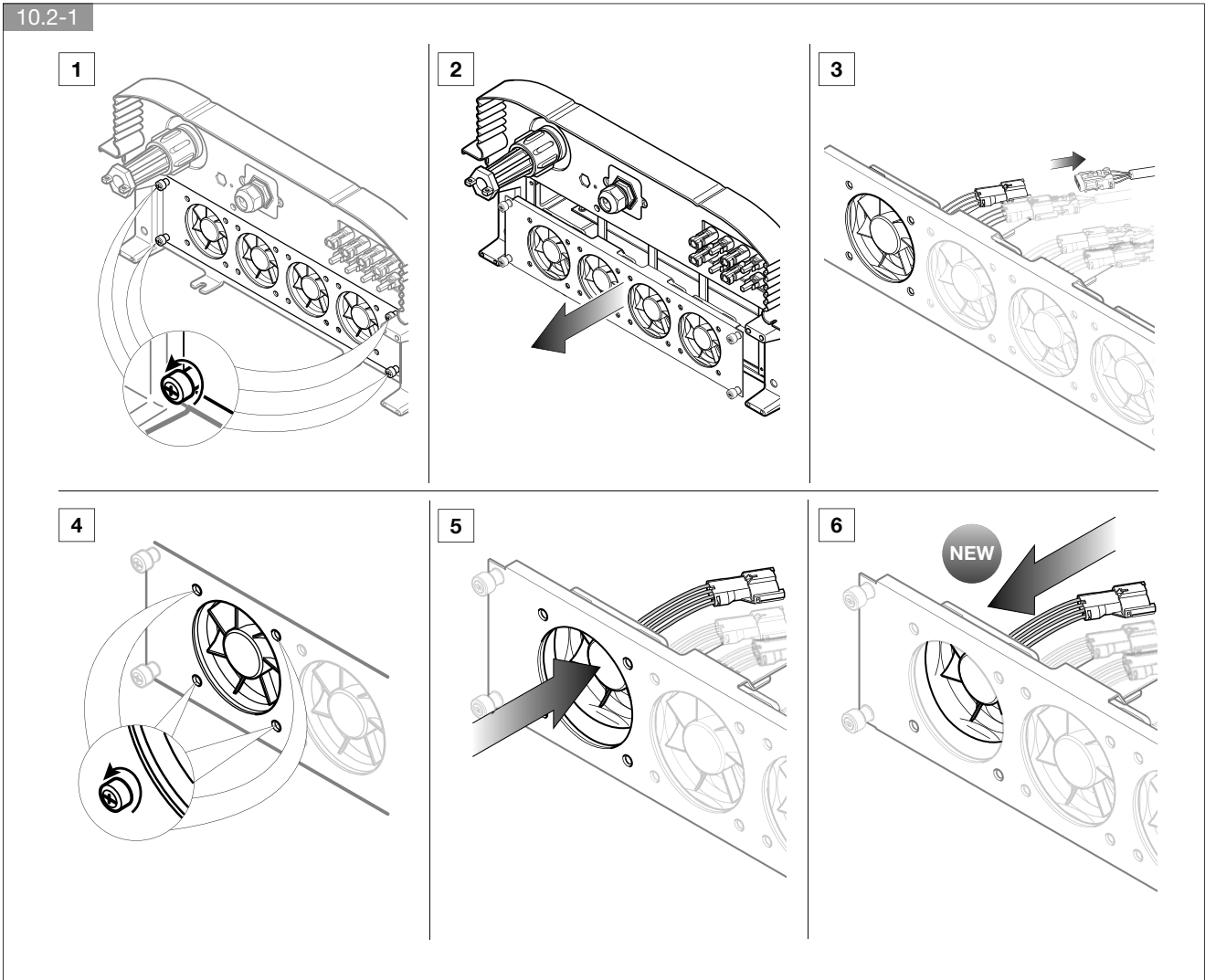- Make sure the electricity supply has been disconnected.

The solar inverter should be inspected at six-monthly intervals to ensure continued trouble-free operation.
To ensure the appliance is properly ventilated check the fans are operating correctly and the protective air vent grilles are clean.

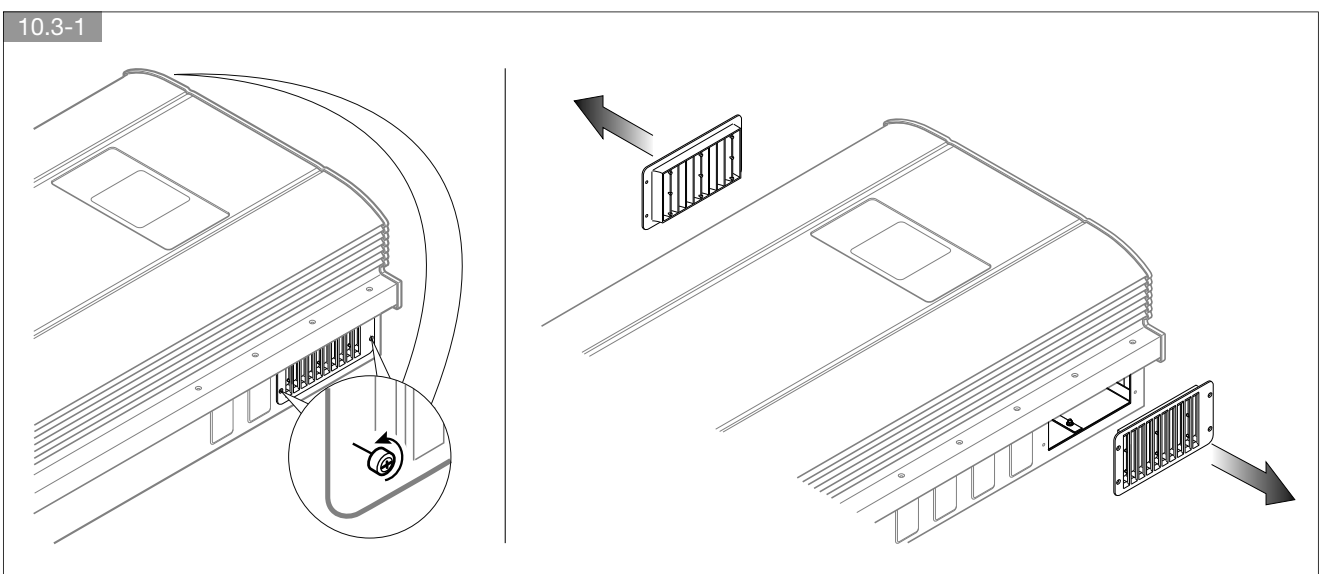## 10.1. REMOVAL OF FAN MOUNTING PLATE

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10.2. FAN REPLACEMENT

10.2-1

| 1 | 2 | 3 |

| 4 | 5 | 6 |

NEW

10.3. REMOVAL OF AIR OUTLET VENT GRILLES

10.3-1

11. REMOVAL OF INVERTER

WARNING!
carry out the following steps beforehand:
- Open the AC switch.
- Open the DC switch.
- Make sure the system cannot be restarted.
- Make sure the electricity supply has been disconnected.

If it is necessary to remove the inverter proceed as follows:

1. Open the AC breaker contacts to disconnect the electricity.

2. Isolate the power feed from the photovoltaic field

3. Use a suitable meter to verify the absence of AC and DC voltages.

4. Remove the AC connections

5. Remove the DC connections to isolate the PV field.

6. Remove the RS485 communication module with the computer connection.

Once these steps have been completed remove the inverter.

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12. TECHNICAL SPECIFICATIONS

Model	SUNSYS B12	SUNSYS B15	SUNSYS B20	SUNSYS B30
Enclosure	Powder coated aluminum			
Operating temperature	-20 to 60 °C - At maximum power: up to 40 °C			
Relative humidity	5 to 90% non-condensing			
Protection level	IP65 (electronic components) - IP54 (other parts)			
Galvanic insulation	NO			
Safety class	Class I metal casing with protective earth connection			
Overvoltage category	III			
Weight	41 kg	67.2 kg	67.2 kg	72.2 kg
Dimensions	625 × 612 × 277 mm	960 × 612 × 278 mm		
Connectors	Weather resistant connectors			
DC input (solar side)				
Maximum input power	14 kWp	18 kWp	24 kWp	36 kWp
Rated voltage	630 VDC			
Operating voltage	200 to1000 VDC			
Start-up voltage	> 250 V			
Start-up power	> 40 W			
Absolute maximum voltage	1000 VDC			
MPP voltage range at rated power	420 to 850 Vdc	350 to 800 Vdc	350 to 800 Vdc	480 to 800 Vdc
Number of inputs	4 (2 MPPT)			6 (2 MPPT)
MPPT	Parallel inputs: 1 MPPT Separate inputs: 2 MPPT			
Separate inputs: 2 MPPT	< 20 A	< 23 A	< 30 A	<34
Rated current	2 x 20 A max 30 A	2 x 23 A	2 x 30 A	2 x 34 A
Isc PV	2 x 22 A	2 x 25 A	2 x 33 A	2 x 37 A
Max. inverter backfeed current to the array	0	0	0	0
AC output (grid side)				
Rated power at 400 V ±10%	12 kVA	15 kVA	20 kVA	30 kVA
Rated power at Cosφ=0.9	10.8 kW	13.5 kW	18 kW	27 kW
Maximum power	12.6 kVA	15.75 kVA	21 kVA	30 kVA
Voltage	400 ±20%			
Maximum output fault current (4ms)	298 A	298 A	298 A	298 A
Output Current (inrush) (a.c. A, peak)	28.2 A	28.2 A	28.2 A	28.2 A
Rated current	17.5 A	22 A	29 A	43 A
Max current	19.2 A	25 A	32 A	46 A
Maximum output overcurrent protection	19.2 A	25 A	32 A	46 A
Frequency	47 to 52 Hz			
Total Harmonic Distortion	< 3% at rated power			
Power factor	> 0.99 at rated power, Cosφ = 0.8 inductive and capacitive			
DC current injection	Disconnect: 0.5% In in 1 s, 1 A in 200 ms			
Night time power	< 2 W			
Maximum efficiency	> 98.3%	> 98.2%		
European efficiency	> 97.7%	> 97.5%		
AC connector	3 Phases + Neutral + PE			
Recommended protection	Thermal-magnetic with I = 1.25 x Inom			

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Model	SUNSYS B12	SUNSYS B15	SUNSYS B20	SUNSYS B30
System information / communication				
User interface	LCD graphic display, 5" (320 x 240 pixels)			
	Data logger with 10 year capacity and real time clock			
	30 events			
External communication	2 x RS-485 connection			
Standards and Directives				
CE compliance	Yes			
Emissions	IEC 61000-6-2, IEC 61000-6-3			
Harmonics	EN 61000-3-12			
Fluctuations and flicker	EN 61000-3-11			
Grid interface	VDE-AN-N-4105; VDE 0126-1-1/A1; CEI 021; CEI 016			
	-		IEC 61727	
Immunity	ESD	IEC 61000-4-2		
	RS	IEC 61000-4-3		
	EFT	IEC 61000-4-4		
	SURGE	IEC 61000-4-5		
	CS	IEC 61000-4-6		
	PFMF	IEC 61000-4-8		
	VOLTAGE DIP	IEC 61000-4-11		
Electrical safety	IEC 62109-1; IEC 62109-2; IEC 60950-1; EN 60950-1			

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