

SOLiViA CS



Operation and installation manual
SOLiViA CS EU G3



The manual is subject to change.
Please check our website at www.solar-inverter.com
for the most up-to-date manual version.

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1 Scope of supply

- 1 x SOLIVIA CS EU G3 (central inverter cabinet) Delta P/N EOE98030256
- 1 - 6 x SOLIVIA 11 EU G3 R (solar inverter racks 11 kW) Delta P/N EOE47030001
- Cabinet key

1.1 Optional accessories

- Cabinet base 200 mm height
- Blank panels
- Monitoring system (according to customer order: Web'log Pro with analog modem; ISDN modem; GPRS modem or DSL/Ethernet)

2 General information

Congratulations on the purchase of this high-quality SOLIVIA CS EU G3 central inverter and thank you for your confidence in Delta.

These instructions will help you to familiarise yourself with this product.

Please follow the safety instructions at all times. Handling your product carefully will ensure that it will give you good quality and reliable service for a long time. This is essential for excellent results.

3 Safety

3.1 Standards, guidelines and regulations

The central inverter complies with all the currently required standards and regulations, such as the following:

- 2004/108/EG:
Council directive on the harmonisation of laws of the member states relating to electromagnetic compatibility.
- 2006/95/EG:
Council directive on the harmonisation of laws of member states relating to electrical equipment designed for use within certain voltage limits.
- Electromagnetic compatibility (EMC):
EN 55022: 2006 (Class B) (Limits and methods of measurement of radio interference characteristics of information technology equipment)
- General safety standards:
EN 60950-1 (Safety of Information Technology Equipment)
EN 50178 (Electronic equipment for use in power installations)
Draft IEC 62109-1 (Safety of power converters for use in photovoltaic power systems)
Draft IEC 62109-2 (Safety of power converters for use in photovoltaic power systems)
IEC 62103 (Electronic equipment for use in power installations)
- Standards for electric immunity:
EN61000-6-2 (Immunity for industrial environments)
- Standards for electric emissions:
EN61000-6-3 (Emission standard for residential, commercial and light-industrial environments)
- Standards for harmonic current emissions / flicker:
EN 61000-3-12 (Limits - limits for harmonic current emissions)
EN 61000-3-11 (Limits - limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply grids, for equipment with rated current ≤ 75 A per phase and not subject to conditional connection)

3.2 Standards, guidelines and regulations which must also be followed

- Guidelines for connecting generating plants to medium voltage networks and operating them in parallel, including supplementary instructions (published by: BDEW, VDN and FNN)
- Technical requirements for connection to low voltage networks (TAB 2007, published by: BDEW, VDN and FNN)
- Relevant regulations of the trade unions

Rules of the technology:

The installation must comply with the client's conditions, the local regulations and the technical rules and standards. In particular:

- Electrical connection
- VDE 0100 Construction of power installations with low voltages up to 1000 Volts
- VDE 0105 Part 100 Operation of electrical systems
- VDE 0185 General information on the construction of lightning protection systems
- VDE 0190 Main equipotential bonding of electrical systems
- VDE 0298 Part 4 Use of cables and insulated lines for power installations
- DIN 18382 Electrical cable and line system in buildings

Accident prevention regulations:

The inverters must be installed by a certified electrician who is also licensed by the supply network operator. The certified electrician is responsible for making sure the system complies with the current standards and regulations.

3.3 Warnings

Here, you will find explanations for the symbols used in these operating instructions:



DANGER!

Signifies a danger which is an immediate threat. If not prevented, this will result in death or serious injury.



WARNING!

Signifies a situation which may be dangerous. If not prevented, this may result in death or serious injury.



CAUTION!

Signifies a situation which may be dangerous. If not prevented, this may result in light injury.



Warning of electrical voltage!

The safety instructions in this operation manual, which, if not followed, may put persons at risk and are marked by the symbol for electrical voltages when there is a warning for such.



Measures for prevention:

Do not touch live parts.

Immediately report damaged cables to the maintenance staff.



Measures for prevention:

Read the operating instructions carefully and thoroughly and follow all the points!



Measures for prevention:

In order to avoid damage to property or personal injury, only qualified, trained electricians may work on the equipment. The qualified electrician must familiarise himself/herself with the operating instructions.

3.4 General safety instructions



- When electrical equipment is in operation, certain parts carry dangerous voltages. Even if DC and AC switches have been turned off, dangerous voltages are still present.
- Once the equipment (cabinet and racks) has been disconnected from the grid power and the PV modules, dangerous voltages will remain inside the equipment for at least 10 minutes!
- Not handling the equipment properly can lead to physical injury and damage to property!
- Isolate the equipment from the grid and from the PV modules before working on it.
- At high power, the cabinet surface and the surface of the inverter racks may become hot.
- The equipment must be provided with sufficient cooling.
- Please read the operating instructions carefully and thoroughly and follow all points!
- Never open the central inverter while they are in operation.
- Check and make sure that the equipment is not live according to the applicable guidelines before carrying out electrical work.
- The operating instructions must always be kept where the central inverter is in use.
- All work on the equipment must only be carried out by certified electricians.
- Any safety claims will be voided if the equipment is used incorrectly.
- The SOLIVIA CS central inverter has a high leakage current (< 20 mA). Before connecting the equipment to the supply, it must be earthed at the PE connection provided.

3.5 Personal protection

Personnel are protected by electrically isolating the PV module from the grid. In order to provide maximum protection to personnel, a higher level of insulation is provided between the grid, PV modules and interfaces which can be touched (display, RS485 interface and fan connection).

The relevant standards concerning electromagnetic compatibility (EMC) and safety have been met.

The central inverter can only operate in parallel with the grid. An automatic isolation device which has been approved by a certification authority ensures safe disconnection when the grid supply to the equipment is isolated or interrupted and prevents stand-alone operation.

4 Description of the SOLIVIA CS central inverter

4.1 Mode of operation

The SOLIVIA CS is a high-quality central inverter which is used to supply photovoltaically converted solar energy from PV modules to low-voltage networks.

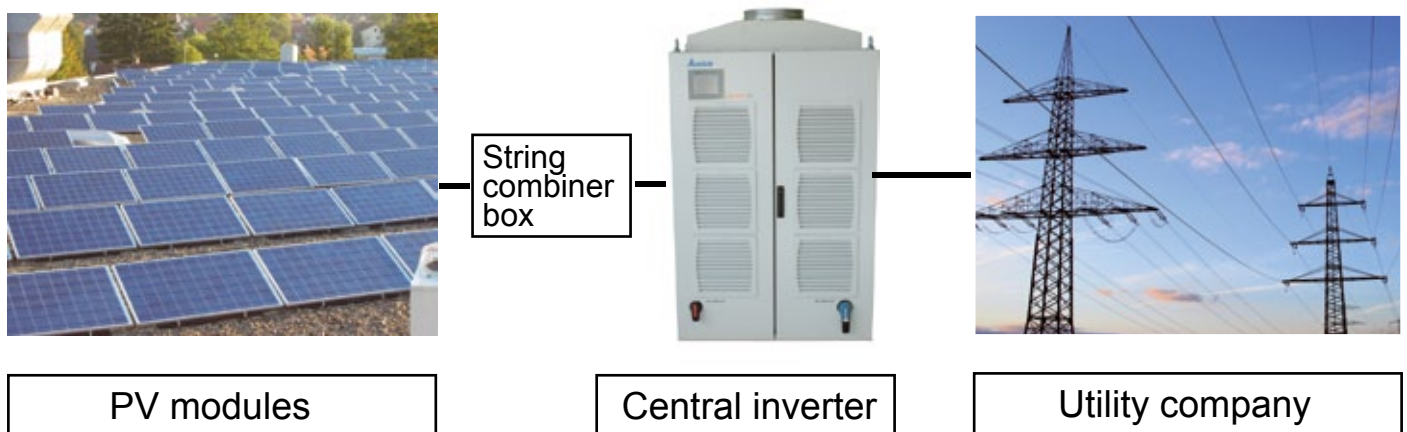
The central inverter converts the direct current generated in PV cells into alternating current. This enables you to feed the solar electricity which you have generated into the public electricity grid of the utility company.

The efficient MPP tracking system ensures that the PV plant operates at maximum efficiency, even on dull days when the sky is cloudy.

With the MPPT concept, PV modules connected in series (strings) or strings at the same voltage connected in parallel are always connected to the central inverter so that the amount of wiring in the photovoltaic plant is substantially reduced. The photovoltaic plant can also be optimised to the input voltage range of the central inverter by the interconnection in the strings.

The modular design of the central inverter takes into account the market requirements for flexible inverter solutions with higher output ranges. At the heart of the inverter system are up to six inverter racks which deliver 11 kW nominal output power in each case.

The cabinet is connected to the PV modules via a string combiner box.



4.1.1 MPP-Tracking

MPP is the abbreviation for Maximum Power Point.

The point of maximum power for a PV cell slowly changes throughout the day. The morning - noon - evening characteristic resembles a half sine-wave. Short-term changes also occur due to weather conditions etc. MPP Tracking is the ability of an inverter to adjust itself repeatedly to the constantly changing MPP of the PV module. It is possible to draw the maximum energy from the PV modules if the solar inverter constantly readjusts itself to the MPP.

MPP is achieved through the software. The central inverter easily changes its operating point again and again and compares the new output with that of the previous operating point. The software then decides whether the new operating point is better than the old one. This procedure is also known as the „Hill Climber“ method. However, it must also be taken into consideration that there may be more than one maximum output power. This happens if one string is shaded when strings are connected in series or parallel. Strategies are then needed to find the genuine MPP, so as not to remain at one local maximum.

4.1.2 Controller / control function

Inverter racks

The inverter racks are based on a 3-phase solar inverter. Each phase in the inverter rack has a master controller and 3 slave controllers. These slave controllers send all the data, measurements and status to the master controller which then passes this information to the system controller.

Backplane controller

All inverter racks are connected to the backplane controller. It is the interface between the inverter racks and the system controller.

The backplane controller is used to connect the system controller, SOLIVIA 11 EU G3 R inverter racks and other cabinet components:

- It sends information concerning which inverter rack is connected in the SOLIVIA CS central inverter.
- It takes over control of the roof fans.

System controller

The system controller is the interface to the user. It collects all the data from the inverter racks and the backplane as well as some signals from the backplane controller via the RS485 interface.

4.1.3 Monitoring system

For analyzing, monitoring and power control, each installation of a CS system requires the installation of a monitoring system (refer to § 6.3.7 to get more details about location and installation of the monitoring system).

To monitor the power generation, the SOLIVIA CS inverter is using a data logger with one of the following modems / communication protocols: Web'log Pro with analog modem; ISDN modem; GPRS modem or DSL/Ethernet.

The data logger stores all the operating values available.

- It acts as the interface for external temperature and insolation sensors.
- It acts as the interface for the external string monitoring and overvoltage protection (typically installed in the string combiner box).
- It acts as the interface for the power control option necessary to reduce the AC output power.

4.1.4 Lifecycle management of the inverter racks

- System solutions from 44 kW to 66 kW can be set up quickly and cheaply.
- Maximum reliability is ensured due to N+1 redundancy of SOLIVIA 11 EU G3 R inverter racks connected in parallel. If an inverter rack fails, the system continues to operate, power continues to be fed into the grid and there is no interruption to earnings.
- Increased service life due to intelligent disconnection of inverter racks when solar insolation decreases and the use of a rolling master module principle (an algorithm decides which inverter racks is to take over control of the entire system by the produced energy of each of the inverter racks – this considerably increases the service life of the inverter racks of the system).
- Easy to service since the SOLIVIA 11 EU G3 R inverter racks are quickly and easily replaced. Each inverter rack is connected to the system via just one plug connector at the back. The system enables the AC side to be de-energised selectively via automatic circuit breakers.

4.2 System layout

4.2.1 Block circuit diagram

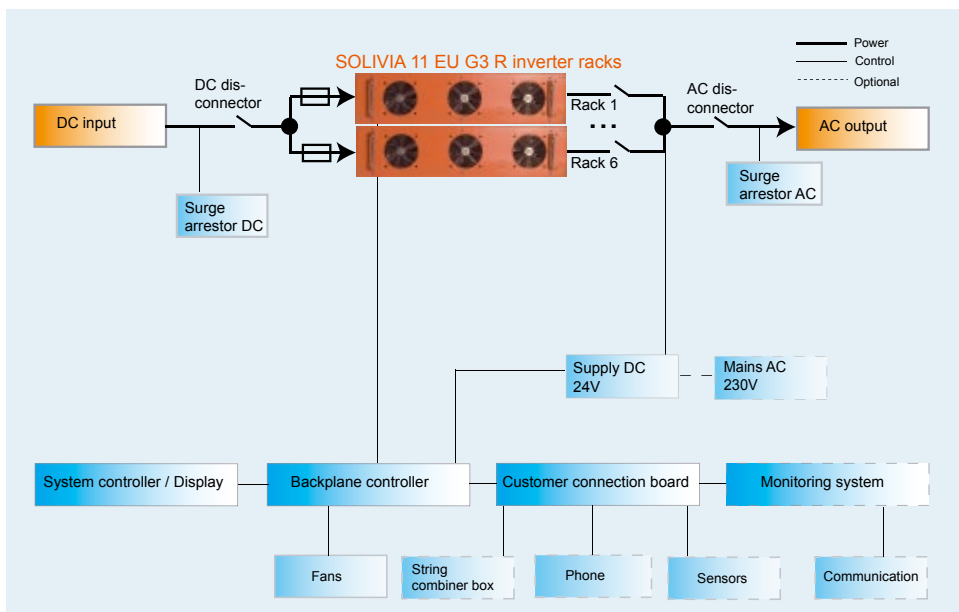
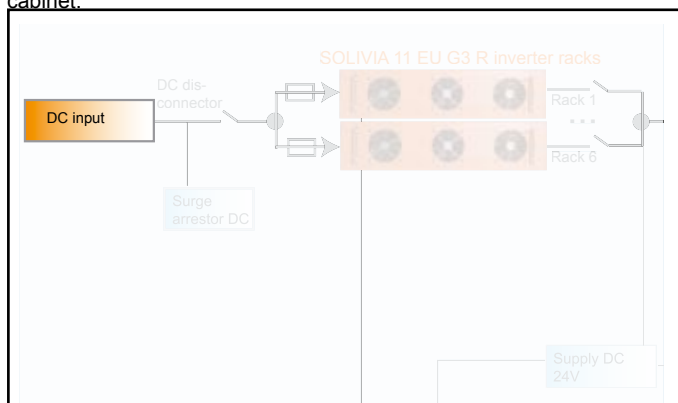


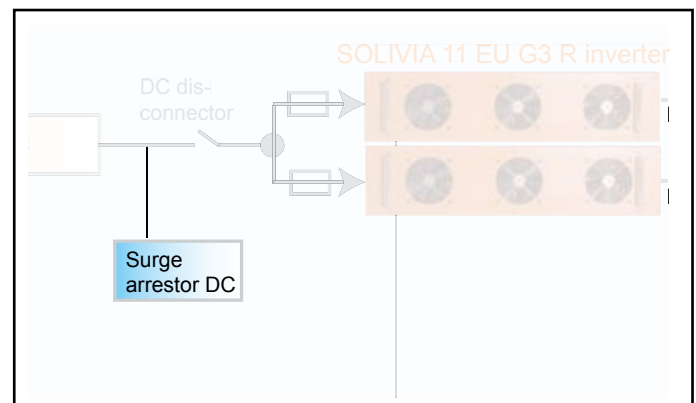
Figure: Block circuit diagram

4.2.2 Description of the block circuit diagram

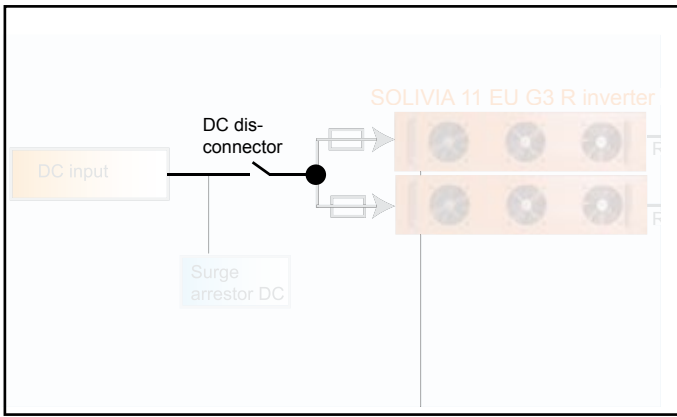
The basic function of the solar inverter is implemented by up to 6, redundant operating SOLIVIA 11 EU G3 R inverter racks connected in parallel. Each SOLIVIA 11 EU G3 R inverter rack operates as a complete solar inverter on its own. However, it can and must not be operated outside the cabinet.



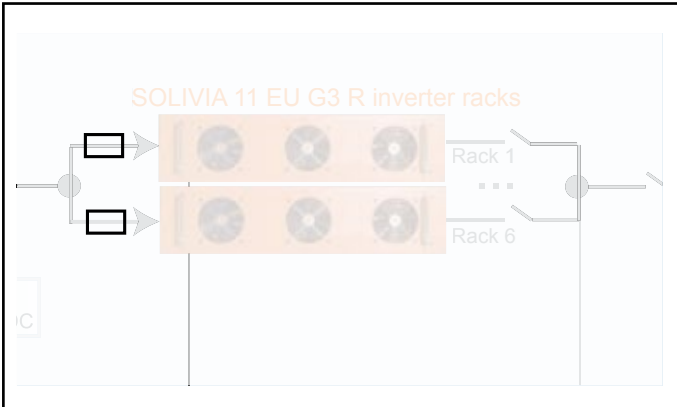
The DC input is the connection point for DC input voltage which is provided by the PV plant via generator connection boxes for the cabinet.



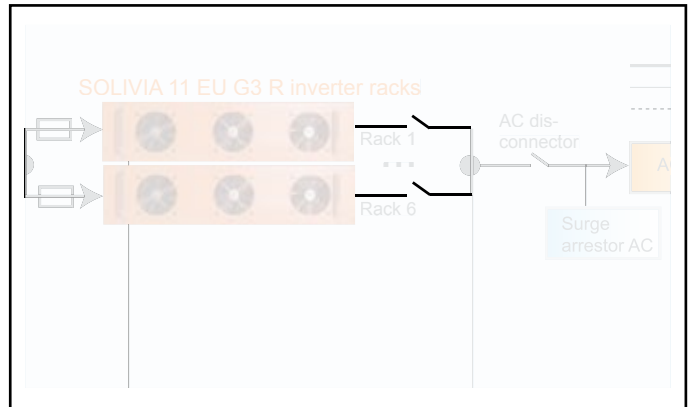
Surge arrester on the DC side (arrester type II) for the DC input.



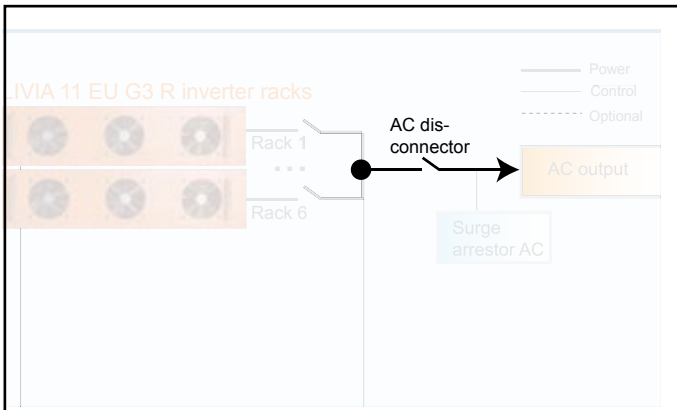
A DC disconnector is arranged downstream of the input terminals. This is an all-pole isolating switch which opens the input path simultaneously on DC plus and DC minus side.



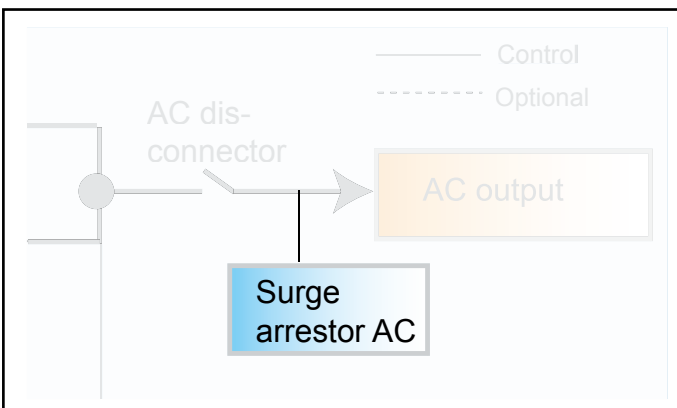
Each SOLIVIA 11 EU G3 R inverter rack has a backup fuse on the input side, in the DC+ path in each case.



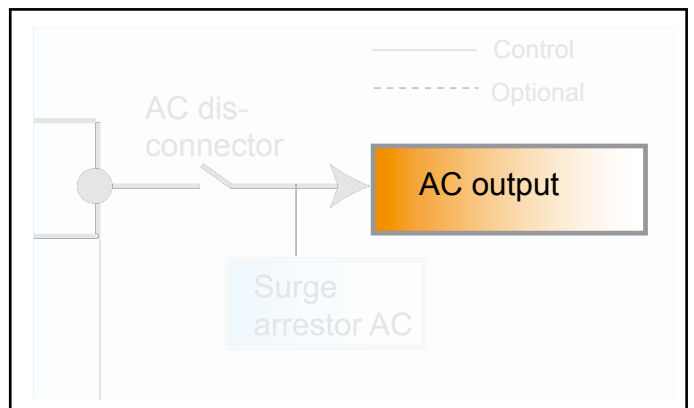
Each SOLIVIA 11 EU G3 R inverter rack is provided with an AC line-protection breaker on the output which enables the inverter rack to be isolated for servicing or replacement purposes.



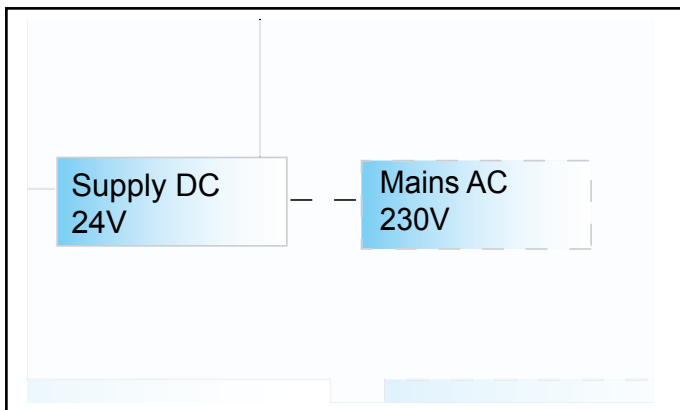
The entire AC string (an assembly of all six SOLIVIA 11 EU G3 R inverter racks) is provided with an AC line breaker. With this AC power switch, the entire cabinet can be isolated from the grid.



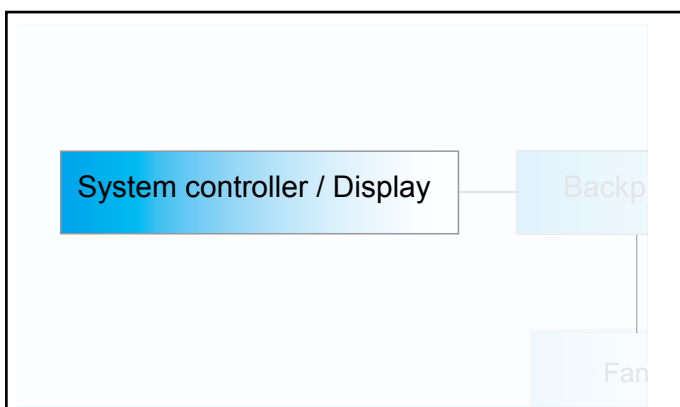
Surge arrester on the AC side (arrester type II) for the AC output.



The AC output is the connection point for AC output voltage which is fed into the grid.

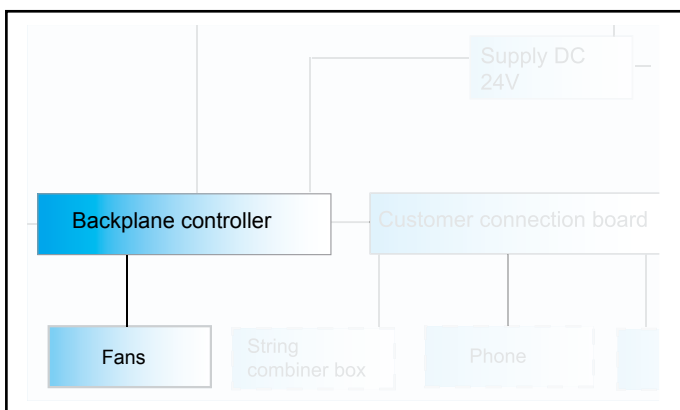


The external supply is provided by an AC/DC DIN rail power supplies which converts the input voltage, potentially-isolated, from 230 V AC to the 24 V DC used to supply the various components on the controller side.

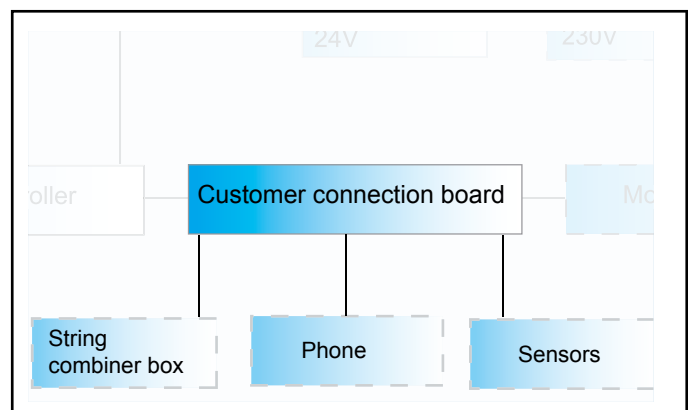


The brain of the cabinet is the system controller which takes on the following tasks:

- **Configuration:**
Start-up procedures, MPPT controller, temperature monitoring, data acquisition
- **Extended current monitoring:**
Prevents non-uniform power output (different power outputs for each AC phase).
Activates / deactivates the SOLiViA 11 EU G3 R inverter racks, depending on solar insolation.
Lifecycle management of the inverter rack by switching on/off the SOLiViA 11 EU G3 R inverter racks which are not necessary.
Diagnosis for CS system and for each SOLiViA 11 EU G3 R inverter rack.
Error handling.

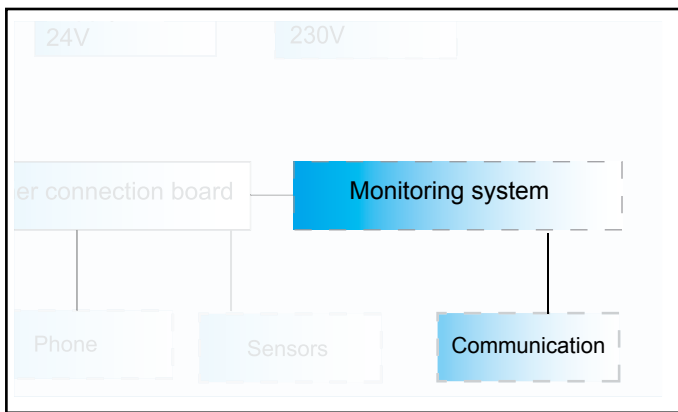


The backplane controller is used to connect the system controller, SOLiViA 11 EU G3 R inverter racks and other cabinet components:
The backplane controller supplies the three roof fans with 24 V DC supply voltage from the AC/DC DIN rail power supplies. It sends information concerning which inverter rack is assembled in the CS central inverter. It takes over the temperature control of the roof fans.



The customer connection board is used for the following external interfaces (refer to § 6.3.6):

- String combiner box with RS485 bus, external overvoltage protection, 24 V DC auxiliary voltage
- Analog phone
- Temperature and insolation sensors
- Monitoring system
- RS485 daisy chain to other SOLiViA cabinets

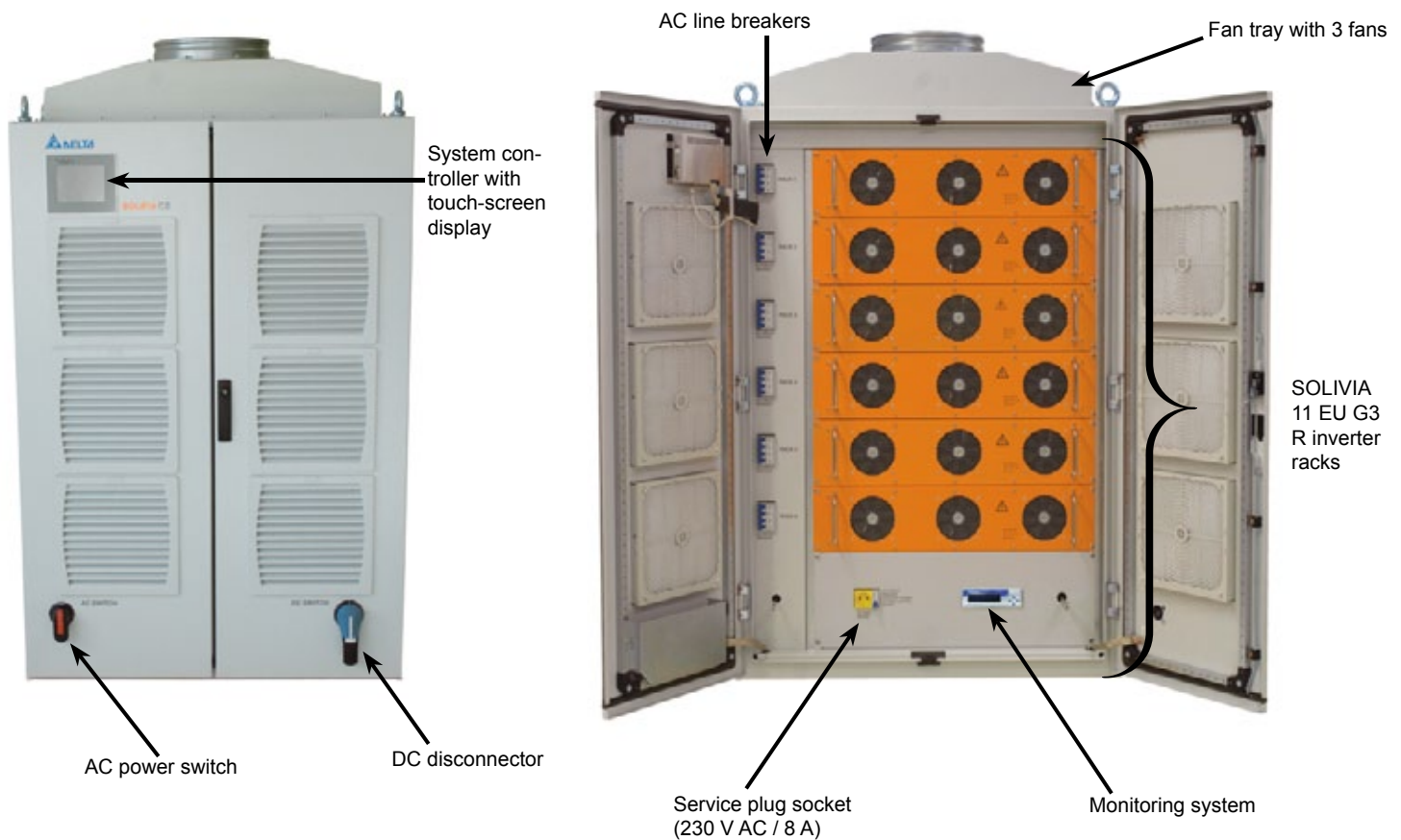


To monitor the power generation, the SOLIVIA CS inverter is using a data logger with one of the following modems / communication protocols: Web'log Pro with analog modem; ISDN modem; GPRS modem or DSL/Ethernet (refer to § 6.3.7 to get more details about location and installation of the monitoring system).

The data logger stores all the operating values available:

- External temperature and insolation and string monitoring data.
- Interface for the power control option necessary to reduce the AC output power.
- Status and error situation, actual data, statistics data.
- Communication interface through different modem types.

4.3 Equipment overview



4.4 Control concept

4.4.1 System controller with touch-screen display

The user-friendly menu navigation is via the touch-screen display on the front door.

All operating conditions and error messages of the SOLIVIA CS central inverter or PV plant are shown on the illuminated display.

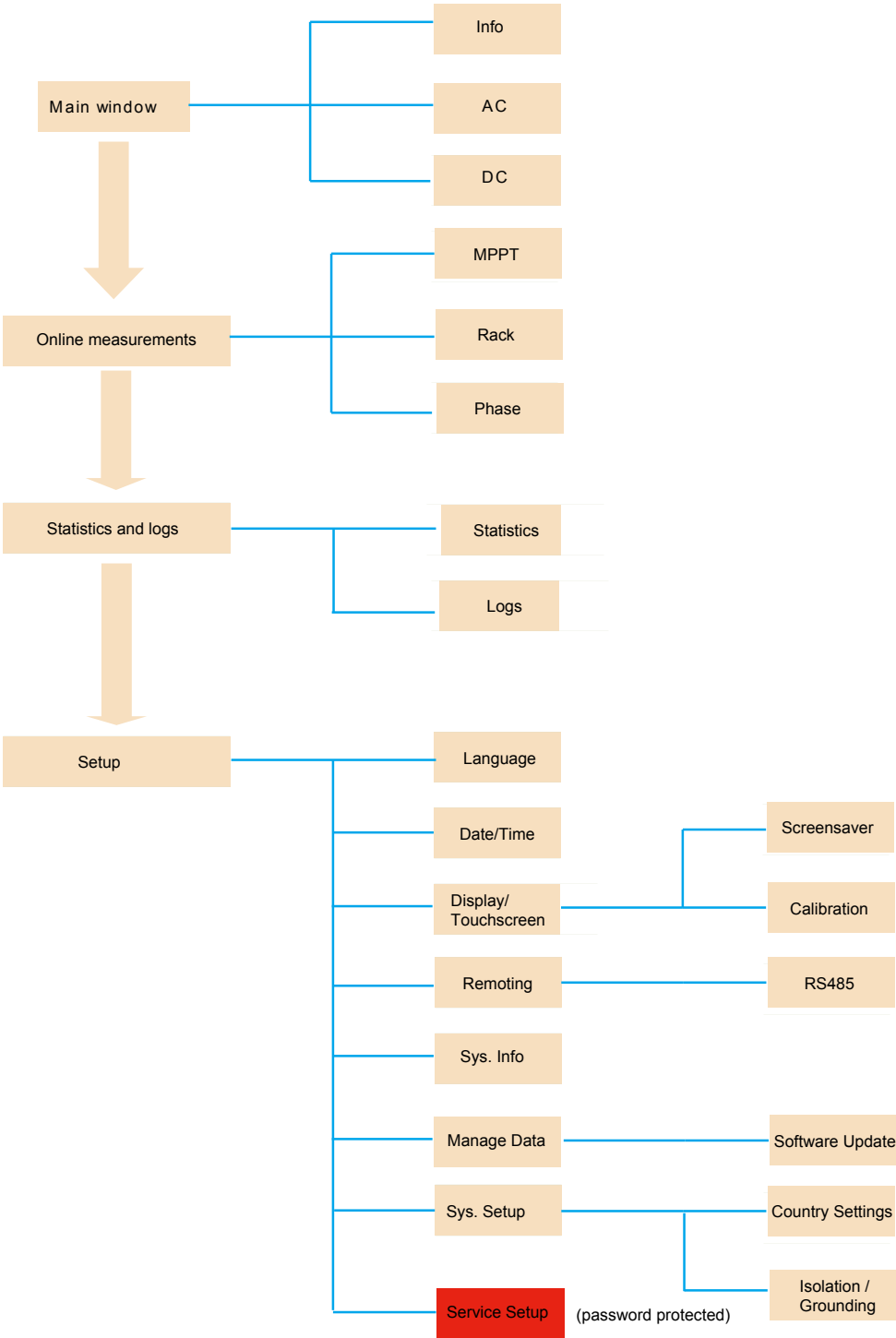
The touch-screen display shows various types of information.

Please note that the values shown on the display are not calibrated measurements, but can deviate by a few percentage points from the actual value!



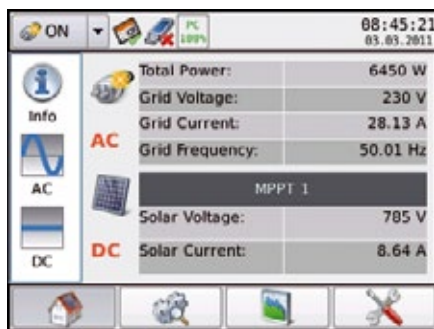
4.4.2 Main menu

The main menu contains different menu options which are then subdivided into submenus. The menu structure is as follows:



4.4.3 Menu: Common to every window

Some common characteristics of every window as follows:



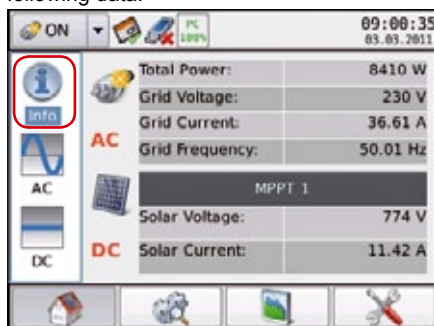
At the top of the screen we have a status bar providing: the current date and time, an indicator of unread errors/warnings, the status of power control, the status of the compact flash and of the memory stick, an On/Off button to connect/disconnect the inverter from the grid.

At the bottom we have a button-bar providing the possibility to switch between the four main menus: Main window, online measurements, statistics and logs and finally setup.

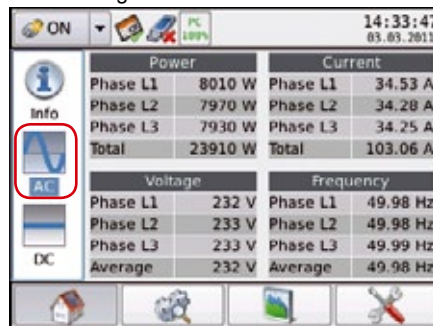
4.4.4 Menu: Main window

The most important measurements appear under the menu option „Main window“ which is divided into 3 submenus.

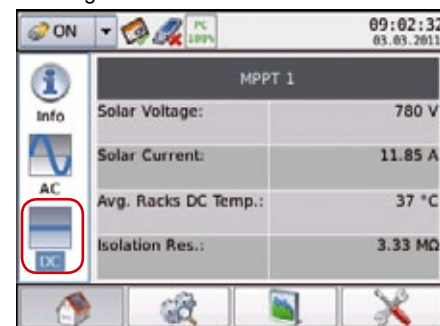
In the submenu „Info“ you can call up the following data:



From the submenu „AC“, you can call up the following data:



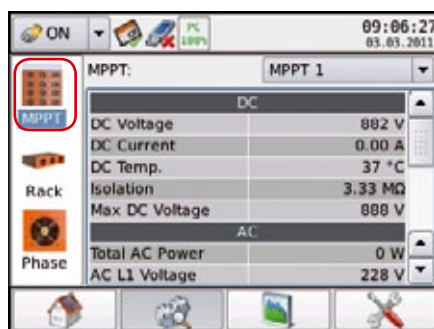
In the submenu „DC“, you can call up the following data:



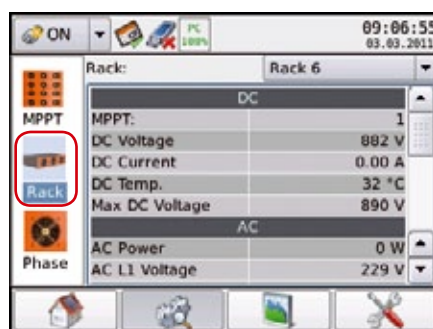
4.4.5 Menu: Online measurements

You can call up more detailed information from the menu option „Online measurements“, which is divided into 3 submenus.

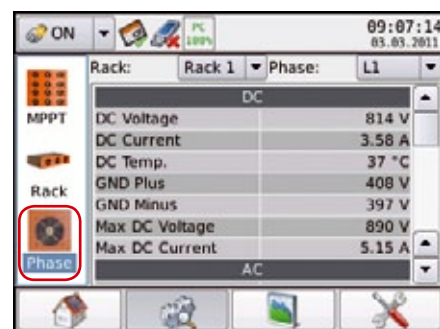
In the submenu „MPPT“, you can call up the following data:



In the submenu „Rack“, you can call up the following data for the SOLIVIA 11 EU G3 R inverter racks:

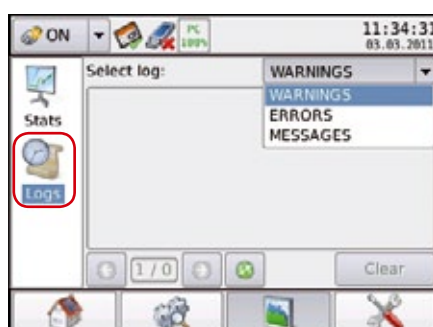
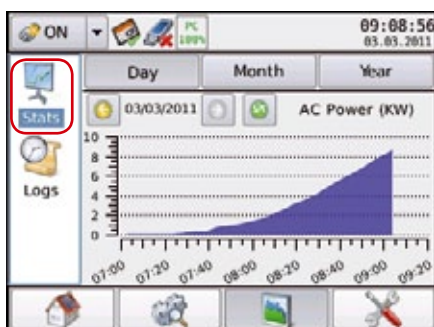


In the submenu „Phase“, you can call up the following data:



4.4.6 Menu: Statistics and logs

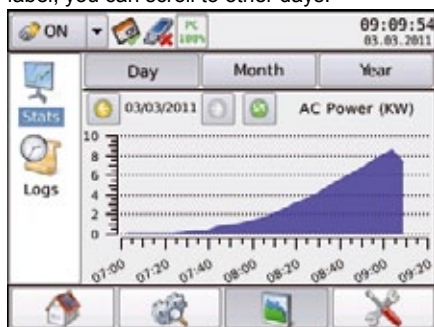
Further information can be called up from the menu option „Statistics and logs“.



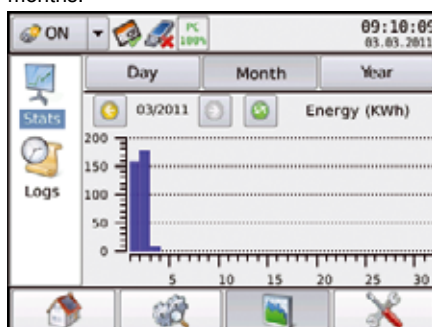
Statistics are only done of the output power and of the delivered energy.

In the submenu „Statistics“, the following data can be called up:

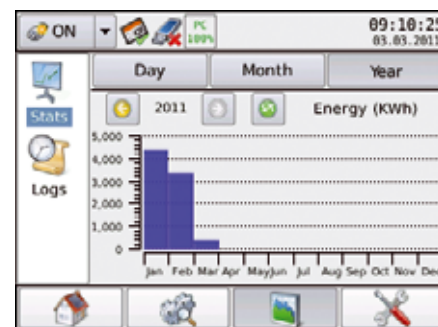
By pressing the tab „Day“, you can call up statistics data of the day. By using the two yellow arrows or by pressing on the date label, you can scroll to other days.



By pressing the tab „Month“, you can call up statistics data of the month. By using the two yellow arrows, you can scroll to other months.



By pressing the tab „Year“, you can call up statistics data of the year. By using the two yellow arrows, you can scroll to other years.



4.4.7 Menu: Setup

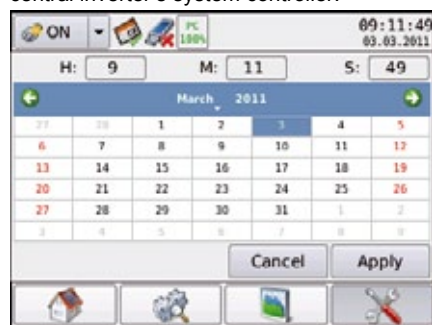
You can carry out fundamental settings from the menu option „Setup“, which is divided into 8 submenus.



In the submenu „Language“, you can set the language of the user interface (German, English, Italian):

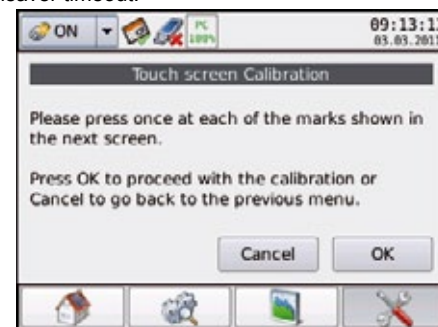
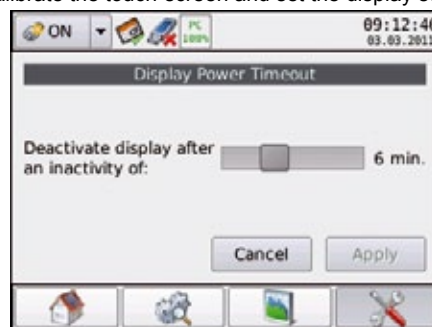


In the submenu „Date/Time“, you can set the date and time of the internal clock of the central inverter's system controller:

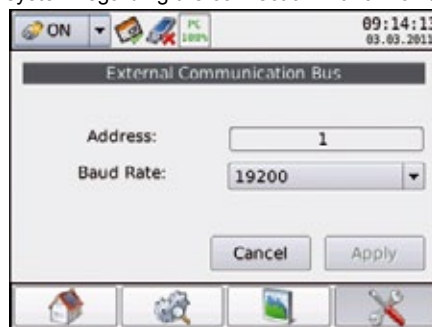
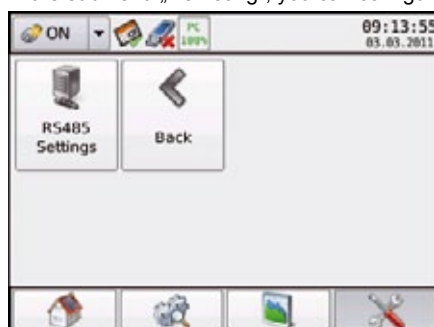


Please note:
Changing the date/time can affect the statistics. We recommend to always set the current date/time.

In the submenu „Display/Touchscreen“, you can calibrate the touch-screen and set the display screensaver timeout:



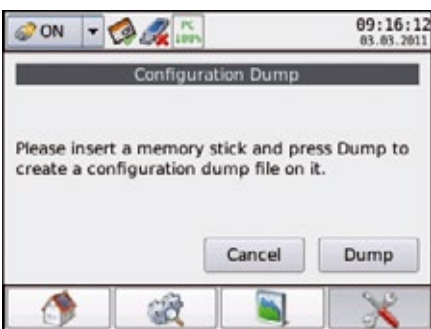
In the submenu „Remoting“, you can configure the system regarding the connection with a monitoring device:



In the submenu „Sys Info“, you can find some generic info like SW/HW version of the system controller, SW/HW version of the backplane controller, etc.:



By using the function "Configuration Dump" the configuration information of the cabinet can be stored in a file on an USB memory stick that is connected to the system controller. The information in this file can be used by Delta support personnel to have precise information about the installation.



If you need to connect the positive or negative pole of the PV system to meet requirements set out by the module manufacturer, please refer to § 6.3.3.2 DC Plus / Minus grounding.

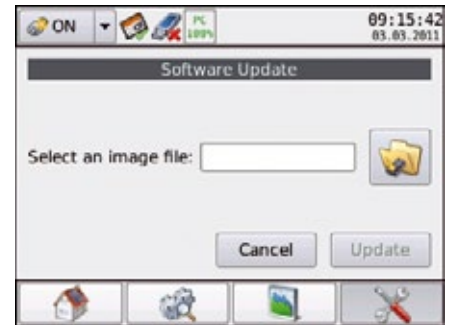
Alternatively, it is possible to turn off the isolation- and grounding monitoring:

- ISO / GND OFF.

From the submenu „Service Setup“, you can adjust the parameter of the inverter racks. These settings must only be carried out by qualified personnel and are therefore password-protected.



The submenu „Manage Data“ allow the user to save data from the system controller to an USB memory stick for example, or to load data from an USB memory stick to the system controller (e.g for firmware update).



In the submenu „Sys Setup“, you can configure the system regarding its country settings and its isolation/grounding settings. Available countries are Germany, Italy (continent/island), Spain (continent/island), France, Greece (continent/island), Czech Republic, Belgium.



The CS central inverter has an isolation and grounding monitoring on the DC side.

The insulation monitoring has two modes:

- ISO ERROR (the CS inverter is disconnected from the grid in the event of an isolation fault)
 - ISO WARNING (the CS inverter indicates the fault but is not disconnected from the grid).
- Deltas CS inverters are factory-set to ISO WARNING mode on delivery.

The grounding monitoring has two modes:

- PV+ GROUNDED (grounding monitoring of the positive pole of the PV generator)
 - PV- GROUNDED (grounding monitoring of the negative pole of the PV generator)
- In these modes the CS inverter remains in feed-in operation and will not be disconnected from the grid in case of a fault. The error message will be logged in the WARNINGS section of the "Logs" menu.

4.4.8 LED messages and display diagnostics

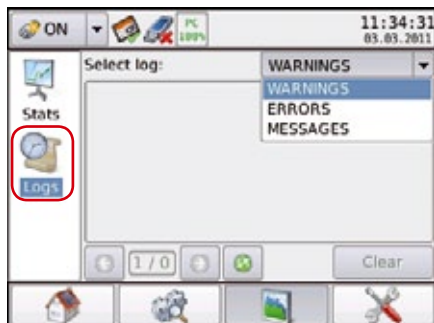
Three light emitting diodes (LEDs) which indicate the operating state of the central inverter are integrated in the touch-screen display in the front door and on each individual inverter rack.

4.4.8.1 LED messages on the system controller

- LEDs dark: The system controller is either off (AC is missing) or is not correctly working
- All 3 LEDs on: Initialization of the system controller.
- LED green on: Normal status of the SC
- Yellow LED on: There are some unread errors or warnings in the log (the LED turn off as soon as the user looks in the logs).
- Red LED on: There is a serious error that prevents the inverter from delivering energy to the grid.

4.4.8.2 Error codes in the menu „Logs“

Please select the menu „Statistics and logs“ and activate „Logs“ button on the left hand side. Then, select „Errors“ in the pull down menu on the right hand side to make the following screen appear.



The following tables show the possible error codes including error message, error description and elimination.

Possible cabinet errors:

ERROR MESSAGE	ERROR DESCRIPTION	SOLUTION
BPC Communication error	There is no communication with the backplane controller.	Please inform your service technician.
Power supply 20A error	The extra power supply for the cabinet's fans signals an error: The backplane controller would not able to turn on the fans of the cabinet (limited output power).	Power Supply T2 is defective. It needs to be exchanged.
External DC OVP error	The external overvoltage protection failed.	Please inform your service technician.
Cabinet Temperature error	The internal temperature sensor has a problem and has to be substituted.	Check air exhaust system and operation of the 3 fans. If the fault persists, please inform your service technician.
Fan x blocked	The fan x (1, 2 or 3) of the cabinet is blocked.	Check air exhaust system and operation of the 3 fans. • Exchange defect fans • If the fault persists, please inform your service technician.

Possible MPPT errors:

ERROR MESSAGE	ERROR DESCRIPTION	SOLUTION
Isolation error on MPPT 1	This error happens only if the system is configured as "ISO ERROR" in the Isolation/grounding settings. It says that the isolation resistance is under the isolation limit. For the other configurations it is only a warning.	Please check the isolation resistance on the DC side of the PV modules. Solar inverter is still feeding.

Possible rack errors:

ERROR MESSAGE	ERROR DESCRIPTION	SOLUTION
AC NTC Over Temperature	Internal AC side over temperature.	If the fault persists after the device has been reset (by turning off the DC main switch), please inform your service technician.
AC High Frequency	AC high frequency error.	Please check phase-measurement system controller. If the fault persists, please inform your service technician.
AC Low Frequency	AC low frequency error.	Please check corresponding AC breaker of the rack. Please check phase-measurement system controller. If the fault persists, please inform your service technician.
AC Critical Overvoltage	AC critical overvoltage error.	Please check phase-measurement system controller. If the fault persists, please inform your service technician.
AC Overvoltage	AC overvoltage error.	Please check phase-measurement system controller. If the fault persists, please inform your service technician.
AC Undervoltage	AC undervoltage error.	Please check corresponding AC breaker of the rack. Please check phase-measurement system controller. If the fault persists, please inform your service technician.
Input under voltage	PV voltage is < 450 V.	Solar voltage too low. • Check PV voltage and MPPT configuration. • Check phase-measurement system controller. • If the fault persists, please inform your service technician.

ERROR MESSAGE	ERROR DESCRIPTION	SOLUTION
Input Voltage start-up	PV voltage is < 400 V.	Solar voltage too low. • Check PV voltage and MPPT configuration. • Check phase-measurement system controller. • If the fault persists, please inform your service technician.
Input Overvoltage	PV voltage is > 900 V.	Solar voltage too high. • Check PV voltage and MPPT configuration. • Check phase-measurement system controller. • If the fault persists, please inform your service technician.
RACK not responding	All the 3 phases of a rack are not responding.	If the fault persists after the device has been reset (by turning off the DC main switch), please inform your service technician.
Phase not responding	One or two phases of a module rack are not responding.	If the fault persists after the device has been reset (by turning off the DC main switch), please inform your service technician.

This is only a reduced list of possible error messages. If needed contact your service technician.

4.4.8.3 On the inverter racks

- LED (A), green: „Operation“ shows the operating state.
- LED (B), red: „Earth Fault“ shows an insulation resistance fault or a PV earth fault (GND) on the DC side.
- LED (C), yellow: „Failure“ indicates internal or external faults and whether the grid feed-in is interrupted.

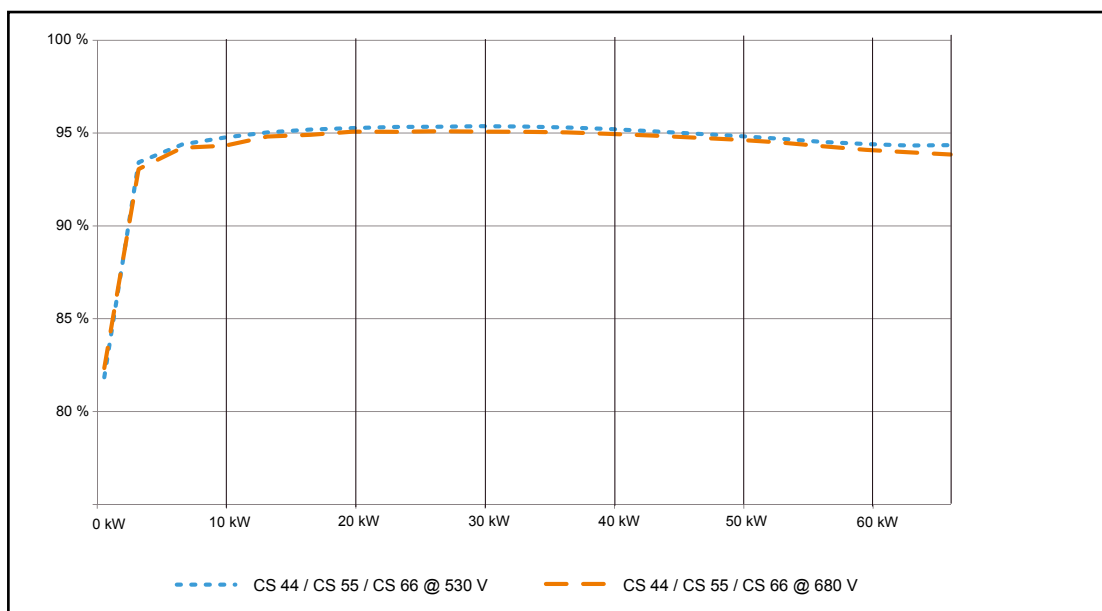
DC INPUT VOLTAGE	RELATED ACTION	LED COLOR	REMARKS TO OPERATION OF SOLIVIA 11 EU G3 R
≤ 400 V	Under voltage	No LED	SOLIVIA 11 EU G3 R rack inverter is turned off.
≥ 400 V	Stand-by mode	Green: Flashing, Yellow: On	Auxiliary power supply is running, but no transfer of power to grid yet. Communication to system controller is enabled.
≥ 450 V \pm 3%	Power turn-on, MPP lower limit	Green: Flashing / On Yellow: Off	Power transfer to AC grid starting at ≥ 450 V. Lower limit of MPP range.
430 V \pm 3%	Power turn-off	Green: Flashing	If PV voltage decreases from 450 V downwards, power can be transferred to AC grid down to 430 V DC.
800 V	MPP upper limit	---	MPP tracker is able to work up to this limit.
900 V	Absolute maximum PV voltage	---	Usually the voltage of 900 V is specified under no load and for lowest temperature.
> 900 V	Over voltage	---	Not allowed input voltage range.

4.4.9 System settings for more than one cabinet per system



Each CS system is working as slave on the communication bus. Please take care that each central inverter should have a unique address [1 ... 254] on the bus (avoid any conflict with I-checker addresses, etc.).

4.5 Efficiency



5 Transport and installation

5.1 Transport and storage

The SOLIVIA CS central inverter may only be transported and set up by persons who are authorised by the operator to do so. Please observe the following important safety instructions:

- Transportation must be done with empty cabinet (without any racks inside)
- Make sure that the transport is vibration free.
- Make sure that the equipment is not exposed to large fluctuations in temperature or particularly high humidities during storage and transport.
- When using a crane or forklift, put the equipment down carefully and avoid impact effects.
- Weight can easily be reduced by removing all side and rear panels as well as the cabinet doors.



WARNING!

Incorrect transport conditions may result in damage to property and personal injury!



WARNING!

Not taking into consideration the centre of gravity may result in damage to property and personal injury!

During transport, take into account the centre of gravity of the SOLIVIA CS central inverter when empty (without inverter racks). Not taking into consideration the centre of gravity of the central inverter may result in tipping over and causing damage to property and personal injury.

When storing the central inverter the following conditions should be taken into consideration:

- The internal areas should be protected.
- The rooms should be ventilated.
- The humidity should not exceed 95 % (non-condensing).

5.2 Site of installation and minimum requirements

- The equipment must be set up on a floor which is not combustible, non-slip and level.
- The load carrying capacity of the floor must be appropriate for the weight of the equipment in relation to its surface area.
- The central inverter must only be installed indoors.
- The cooling air and air of the environment must be free of corrosive substances and combustible and explosive gases.
- The air exchange required is 2000 m³/h.
- The ambient temperature must be between -10 °C and +50 °C (refer to § 12 Technical data).
- Keep ventilation grills unobstructed; check air filters regularly and clean them if necessary (refer to § 9 Maintenance).
- The supply and exhaust air flows for the cabinet must not become restricted.
- The specified installation position must be maintained (vertical).
- Doors must not be obstructed and must be easy to open at all times.

5.3 Installing the cabinet base (optional)

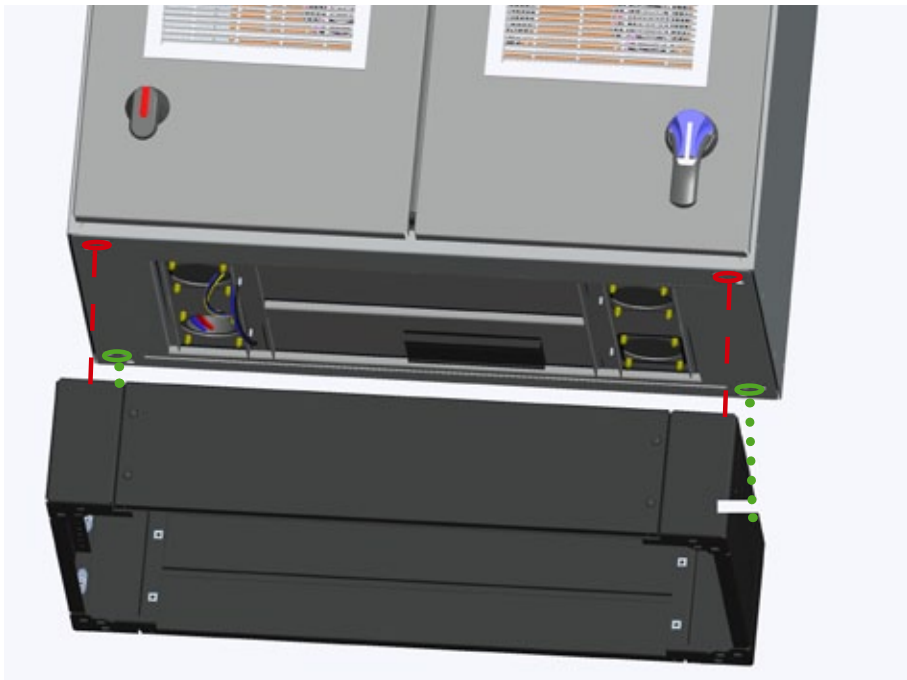
The SOLIVIA CS central inverter is normally dispatched without a cabinet base.

If cable routing from below is not possible, it will be necessary to use a cabinet base (3461304600).

The base is supplied packed in individual parts in a cardboard box. The box also contains assembly instructions (refer to § 14 Appendix). It is also possible to fasten the base to the cabinet with four hex-head screws DIN 933 M8x16; M8x20 and M8x25. Mounting points see picture.

Use anchor bolts FAZ 10/30C to fix the cabinet base to the floor.





5.4 Setting up the central inverter



WARNING!

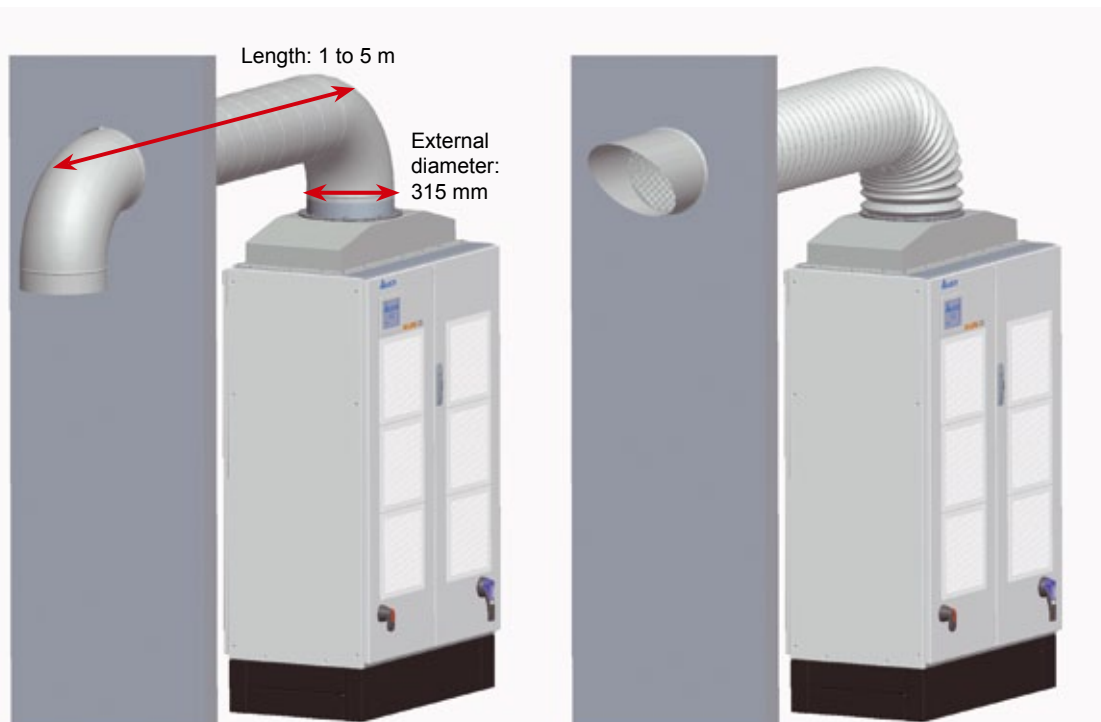
WARNING!

If the central inverter tips over, this may result in damage to property and personal injury!

The client should fasten the floor plate of the central inverter to the floor using screws and dowels. This is the only way to make sure that the cabinet is stable and not able to tip over.

5.5 Installing the exhaust air duct

- The central inverter cabinet is cooled by air circulation using 3 temperature controlled axial DC fans located under the fan tray on the cabinet.
- Room air at ambient temperature is used for cooling.
- The room air is supplied through perforated front doors in the central inverter cabinet.
- Exhaust air escapes upwards via the three fans at the top.
- The exhaust air duct must be provided by the customer.
- Nominal diameter: 315 mm
- Maximum duct length: 5 m.
- Maximum hose length: 5 m.
- Fix the exhaust air duct to the fan tray using sheet-metal screws for folded tubes or a hose clamp for flex tubes and then seal it.
- Exhaust openings must be fitted with grilles so that the exhaust air will not be blocked in any circumstances (by animals, etc.) (refer to § 14 Appendix).
- Recommendation for assembly: Connect the ducts with self-tapping screws and seal the seams with cold shrink tape or cold welding tape.



6 Electrical installation

6.1 Requirements

Heed the following points before putting the CS central inverter into operation:

- Take into account the local conditions
- Adjust settings according to national regulations
- Adjust settings according to the technical requirements for electrical connections

6.2 Safety instructions



WARNING!

WARNING!

Operating the equipment at the wrong grid voltage will result in damage to property!

Make sure that the grid voltage setting is correct since exceeding the specified limits will result in substantial damage to property!

- The grid voltage must be within the specified limits (refer to § 12 Technical data). You can check this by measuring the grid voltage at the feed-in point.
- Also note that the grid overvoltage and grid impedance are interdependent. Here, the maximum permissible grid overvoltage determines the necessary grid impedance value.



CAUTION!

CAUTION!

Using the wrong backup fuse will result in damage to property!

Comply with both the rating and the type of backup fuse, since the wrong backup fuse can cause substantial damage to the equipment!

- Only use an NH fuse with trip characteristic gG.
- Fuse ratings: 125 A
- We recommend a backup fuse of at least 16 A for the auxiliary voltage supply.



Warning about electrical voltage!

Special expertise is required for working on electrical systems.

This work may therefore be only performed by certified electricians.

Follow the procedure described in these operating instructions and the safety instructions for the electrical installation. Not following the procedures can result in the central inverter being destroyed and lead to electrical accidents resulting in serious damage to health.

Work on electrical systems must not start until the safety rules have been correctly applied:

- Isolate
 - Examine the connection diagrams and familiarise yourself with the layout of the switchgear.
 - Only deal with the devices which relate to safety after consulting with the person in charge of them.
 - Create isolation paths which are visible.
 - Wait for the necessary discharge time for any capacitors to discharge.
- Secure any switches from being switched on again.
 - Lock switches mechanically (e.g. by using locks).
 - Pull out any fuse links.
- Establish that the equipment is not live.
 - Only use voltage testers which are suitable for the voltage.
 - Test the voltage tester to make sure it is working.
 - Establish that the work place is not live.
- Earth and short circuits
 - The earth connection and short circuit device are necessary on plants with voltage ratings above 1 kV.
 - The earth and short circuit device must be appropriate for the potential short circuit current which is expected.
- Always connect the device to the earth first.
- Cover or enclose neighbouring parts which are live.
- Live parts must be protected from accidental contact by sufficiently solid and reliably attached covers.

6.3 Connection

6.3.1 Overview of the connection cross sections



CAUTION!

CAUTION!

§ 6.3.1 to § 6.3.4

The cable cross section ranges and torques indicated in § 6.3.1 are applicable exclusively to copper wires.

We hereby inform our customers that, on existing photovoltaic systems with the modular central inverter SOLIVIA CS / CM EU G3, compliance of torques in accordance with § 6.3.1 must be checked and ensured. When using other conducting materials, please take the modified cable cross sections, stop collars and torques into account (see the current standards for correct and appropriate treatment and handling).

For more details, please consult the technical application notice on our homepage www.solar-inverter.com

CONNECTION TYPE	CABLE CROSS SECTIONAL AREA (COPPER WIRE)	TORQUE
DC cable from the string combiner box (DC)	95 ... 150 mm ²	28 ... 30 Nm
AC cable (400 V AC / 3 NPE) *	50 ... 95 mm ²	15 ... 20 Nm
Auxiliary voltage supply (230 V AC)	2.5 mm ²	0.6 ... 0.8 Nm

* Cabinet must be connected to a 3-phase Wye (star) configuration grid.

6.3.2 Work which must be carried out before electrical connection

Carry out the following points for connecting the SOLIVIA CS central inverter. Please note the SOLIVIA CS cabinets arrive without the monitoring system being installed.

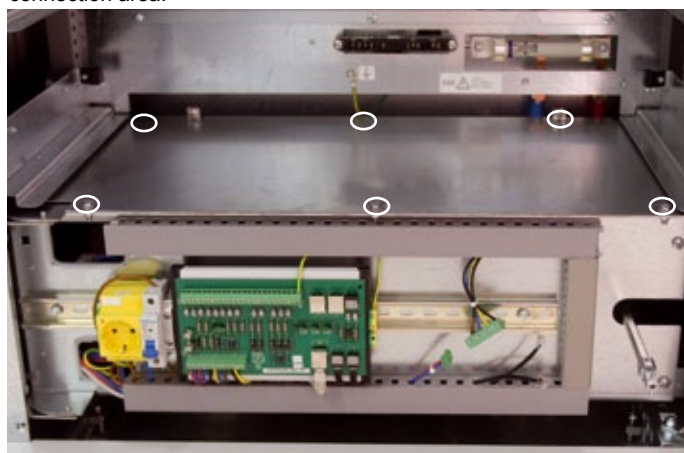
1. Condition on arrival:

Connection area before removing the front panel. Undo the four screws at the corners of the panel to remove it. This will expose the connection area.



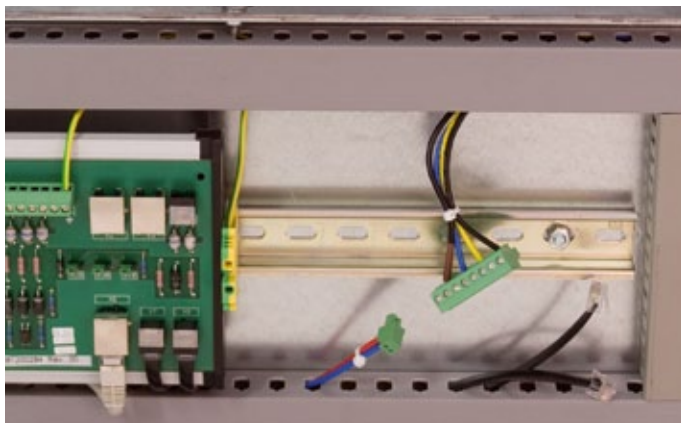
2. Front connection area:

Connection area after removing the front panel and before removing the intermediate panel. Undo the six screws at the corners and in the middle of the intermediate panel to remove it. This will expose the rear connection area.

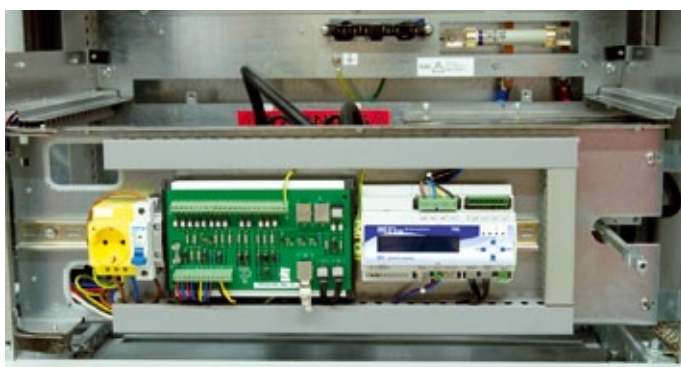


3. Location and installation of monitoring system:

The installation location of the monitoring system is shown on the following pictures. Please take the data logger from the separate package and hook it to the DIN rail. Then, please connect the four cables using the preassembled cable wires.



4. Connection area after removing the intermediate panel.



5. Swivel frame of the front connection area:

Now unscrew the two screws on the right and move the swivel frame forward 90°.



6.3.3 Connecting the DC cables from the string combiner box

Before starting work on the string combiner box, please read the warning label attached to the DC terminal block carefully and follow all points listed on it for your own safety.

⚠ WARNING ⚠

Before connecting DC wiring
please read
**SOLIVIA CM MANUAL SECTION 6.3 and
APPLICATION NOTES**
very carefully and
follow strictly the instructions!

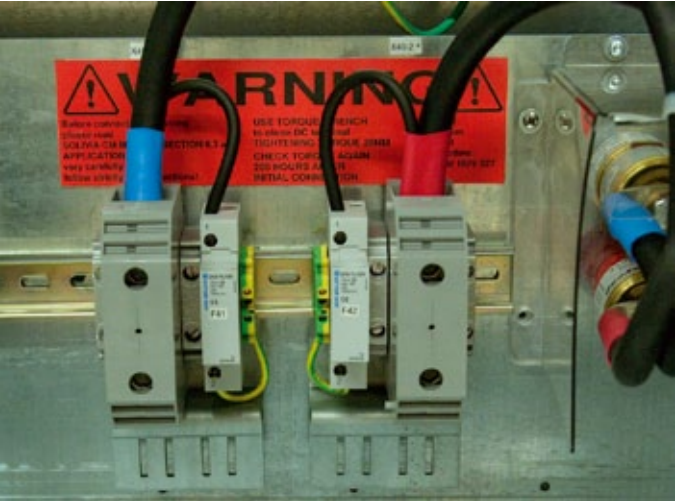
USE TORQUE WRENCH
to close DC terminal
TIGHTENING TORQUE 28NM
CHECK TORQUE AGAIN
200 HOURS AFTER
INITIAL CONNECTION

Before first
switching on
please call
service hotline:
+49 (0) 180 1676 527

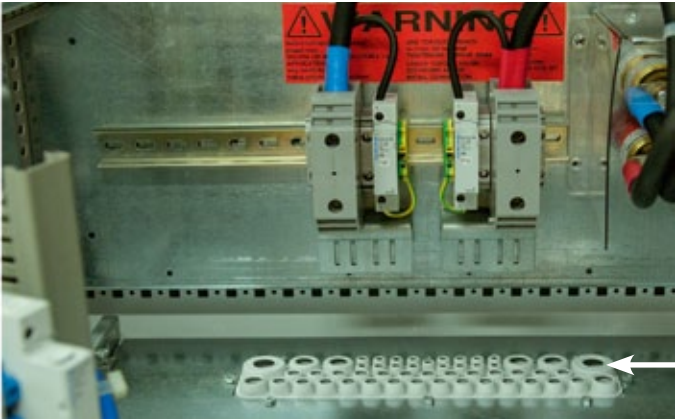
1. Before starting the wiring of the DC cables, please read § 6.3 in this Operating Instruction and the related application notes carefully and follow all instructions contained therein.
2. Use a torque spanner to tighten the DC terminals.
3. Torque: 28 Nm.
4. Recheck the torque 200 hours after first switchin on.
5. Before the first switching on, please call our Service Hotline at +49 (0) 180 1676 527.



Once you have read the warning notes carefully, you can remove the label and start connecting the DC cables from the string combiner box.

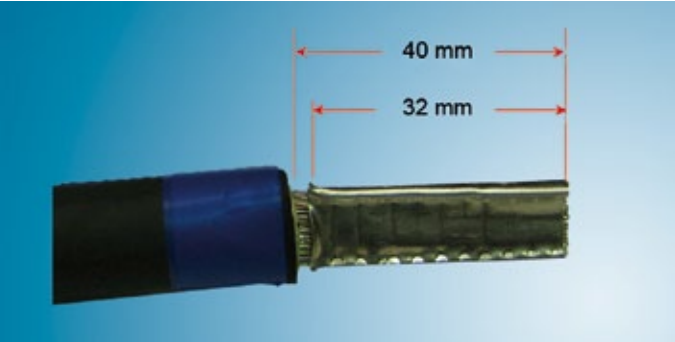


Insert the DC cable through the cable gland plate fixed to the floor of the cabinet (see figure below).



Cable gland plate

Remove the insulation from the ends of the cable up to a length of 40 mm. After this, crimp on core-end sleeves 32 mm long:



6.3.3.1 DC input connection

Connect the main DC cable from the generator connection box to the DC INPUT of the central inverter by using the terminals X40-1 and X40-2 specified on the circuit diagram (refer to § 11 Circuit diagrams).

CONNECTION	TERMINAL
Plus line	X40-2 +
Minus line	X40-1 -



6.3.3.2 DC Plus / Minus grounding

Some manufacturers of thin-film and back-contact PV modules require the PV generator to be grounded at the positive or negative pole. This is intended to compensate the effects of ageing and degradation caused by ionic migration and charging.

Attention: Using the DC Plus / Minus grounding to earth, an initially ungrounded PV generator will disable its insulation. In other words, an important protection function is taken away from the PV installation. The DC Plus / Minus grounding can be used to implement either positive or negative generator grounding.

Positive grounding is recommended for PV module with back-contact solar cells, for example.

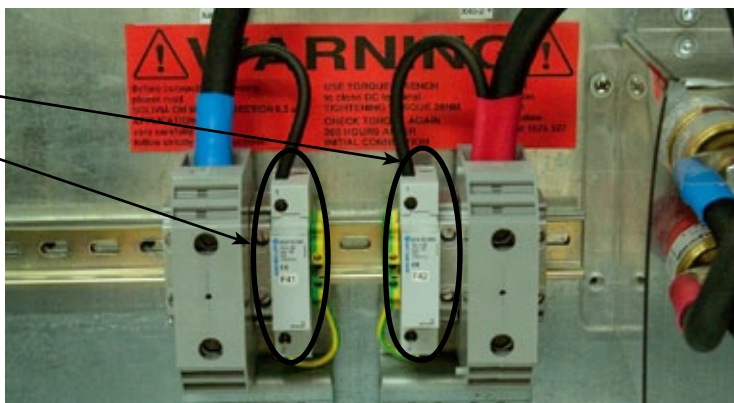
Negative grounding is recommended for thin-film modules (CdTe, CIS, aSi), for example.

Please ask the manufacturer of the PV modules if and with which polarity the module type you are using needs to be grounded.

If applicable to your PV module installation please insert fuse links into following fuse holders:

- Minus (-) grounded: F41
- Plus (+) grounded: F42

For disabling the DC grounding, please remove fuse links.



6.3.4 Connecting to the grid



CAUTION!

CAUTION!

Damage to property may be caused by the high leakage current!

The SOLIVIA CS central inverter has a high leakage current (< 20 mA). Before connecting the equipment to the supply, it must be earthed at the PE connection provided.

Connection to the public grid is carried out via the AC output terminals. The cross section of the connection must be provided according to table 6.3.1. Comply with the additional regulations of your local electricity supplier where necessary.

For the connection, first remove the left support rails of the SOLIVIA 11 EU G3 R inverter racks on position no. 5 and 6. The AC connection area is now visible.



Now feed the AC cable into the cabinet upwards from underneath through the inlet grommet at the rear left of the cabinet. To allow a better insertion of the AC cable through the grommet we recommend to remove the insulation from the cable ends.



inlet grommet

Clamp the AC cable on the terminal block X30 according to the correct phases. Ensure the AC cable against slipping out of the inlet grommet with a hose clamp (strain relief).

6.3.5 Connection to the auxiliary power supply

There are two options for supplying the internal auxiliary power supply circuits of the central inverter:

Option 1: Supply from the AC grid.



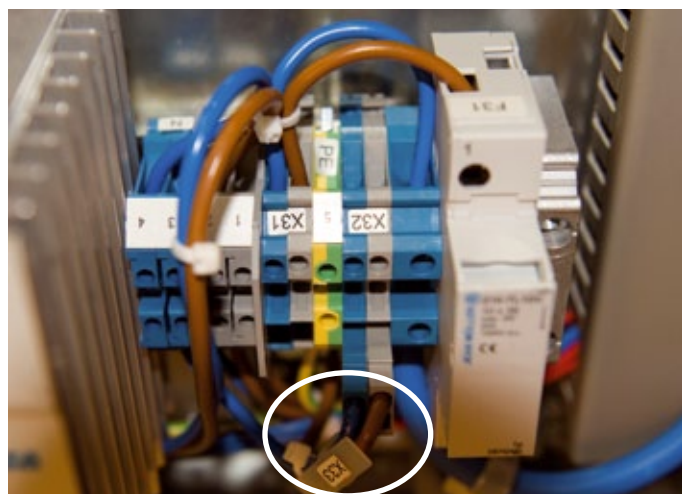
Option 2: Supply from an additional external AC grid (UPS: Uninterruptable Power Supply).



WARNING!

WARNING!

When choosing option 2 and turning off the main AC power switch, hazardous grid voltage will remain present inside the cabinet circuitry.



It is only necessary to connect an external auxiliary voltage (230 V AC) for option 2. Connect this to terminal X32 according to the correct phase. We recommend a backup fuse rated at 20 A at most for the auxiliary voltage supply. Pull off the internal supply plug X33 from terminal X31 and plug it onto terminal X32 according to the correct phase. This modification will change the auxiliary power supply being fed from the AC grid to being fed from the additional external AC grid (UPS: Uninterruptable Power Supply).

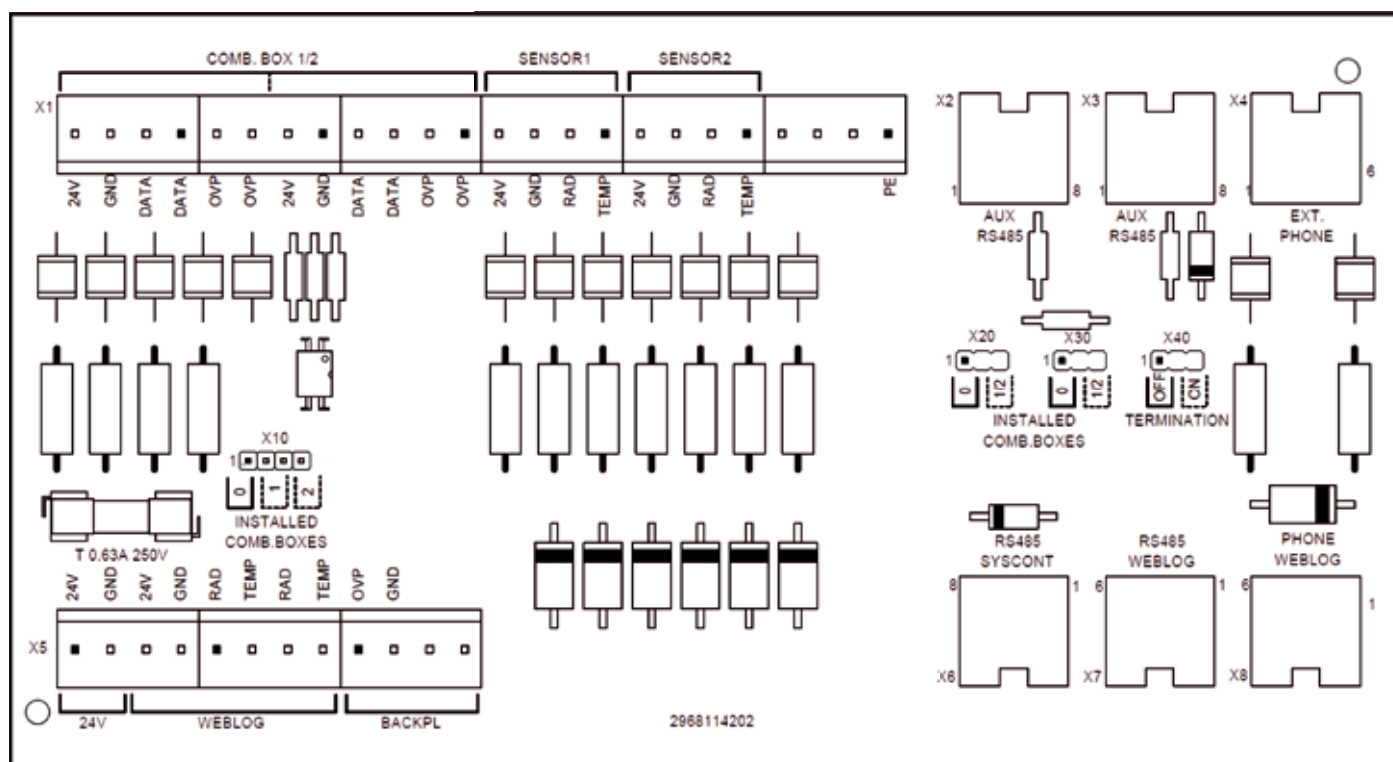
Note:

Before making any changes please switch off the AC line protection breaker F16!

For operation of the auxiliary power supply and for both options, the AC line protection breaker F16 has to be switched on!

6.3.6 Customer connection board

The SOLIVIA CS cabinet is equipped with a centralized customer connection board. This will be used for the connection of all external devices: Temperature and insolation sensors, RS485 communication interfaces, etc.



6.3.6.1 Connecting the temperature and insolation sensors (optional)

Connect the optional insolation or temperature sensors according to the circuit diagram (refer to § 11 Circuit diagram).

CONNECTION	MEASUREMENT RANGE	TERMINAL	DESCRIPTION
Supply (24 V)		X1.13	24 V
Supply (return)		X1.14	GND
Insolation measurement	0 - 10 V corresp. 0 - 1200 W/m ²	X1.15	RAD
Temperature measurement	0 - 9.2 V corresp. -20 - +80°C	X1.16	TEMP

6.3.6.2 Current sensors in string combiner box

The SOLIVIA CS has the possibility to connect current sensors located inside the string combiner box to the data logger. It does allow the monitoring of current signals for different PV strings.

CONNECTION	FUNCTION	TERMINAL	DESCRIPTION
Supply (24 V)	Supply voltage (for current sensors only)	X1.1	24 V
Supply (return)	Reference potential	X1.2	GND
a = Data Plus (output)	RS485 data line	X1.3	DATA
b = Data Minus (output)	RS485 data line	X1.4	DATA
a = Data Plus (input)	RS485 data line	X1.9	DATA
b = Data Minus (input)	RS485 data line	X1.10	DATA

Note: Connect external RS485 bus to both input and output terminals to build a daisy chain. Also set jumpers X20 and X30 to position „1/2“.

6.3.6.3 Overvoltage protection in string combiner box

Connect feedback signal of overvoltage arrestor.

The SOLIVIA CS has the possibility to connect the overvoltage protection feedback signals inside the string combiner box to the data logger.

CONNECTION	FUNCTION	TERMINAL	DESCRIPTION
String combiner box	Normally closed contact of one string combiner boxes (refer to § 11 Circuit diagrams).	X1.5/6	OVP

Note: If feedback signal is connected, also set jumper X10 to position „1“.

6.3.6.4 Data connection ports

CONNECTION	TERMINAL	CONNECTOR
Analog phone input	X4	RJ11/RJ12 (6P2C)
Analog phone output	X8	RJ11/RJ12 (6P2C)
RS485 Daisy chain	X2/X3 *	RJ45 (8P8C)
System controller	X6	RJ45 (8P8C)
Monitoring system	X7	RJ11/RJ12 (6P6C)

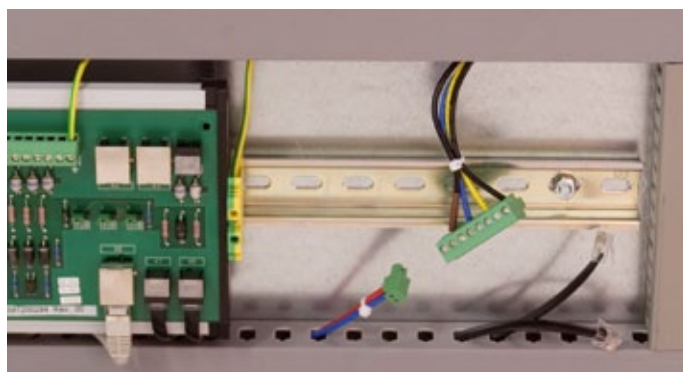
* Use patch cable to connect further SOLIVIA CS central inverters.

6.3.6.5 RS485 termination

If connecting multiple inverters or external current sensors, set jumper X40 to position „On“ only at last cabinet.

6.3.7 Location and installation of monitoring system

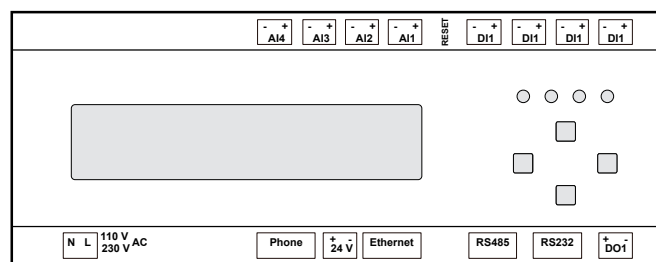
The installation location of the monitoring system is shown on the following pictures. Please take the data logger from the separate package and hook it to the DIN rail. Then, please connect the three cables using the preassembled cable wires.



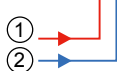
Note:

A separate connection for the 230 V AC supply to the Web'loggers power supply is not required. Parallel supply with AC and DC is not permitted. (For further information, please refer to the User Manual from Meteocontrol for WEB'log Pro (www.meteocontrol.de)).

24 V voltage input / 24 V voltage output



- (1) 24 V DC (red)
(2) GND (blue)



6.3.8 Connection to analog, ISDN, GPRS, DSL/Ethernet

The equipment is fitted with an internal telephone modem (analog or ISDN modem) or connection to GPRS modem or DSL/Ethernet network (according to customer order). The cable connection for the communication is not included in the scope of supply.

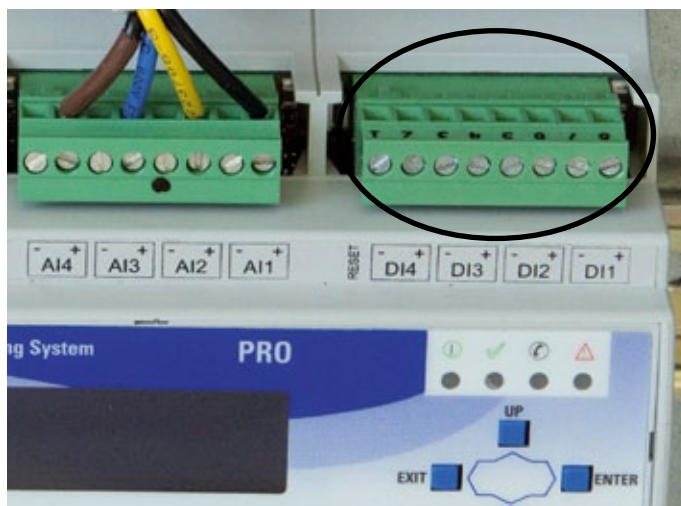
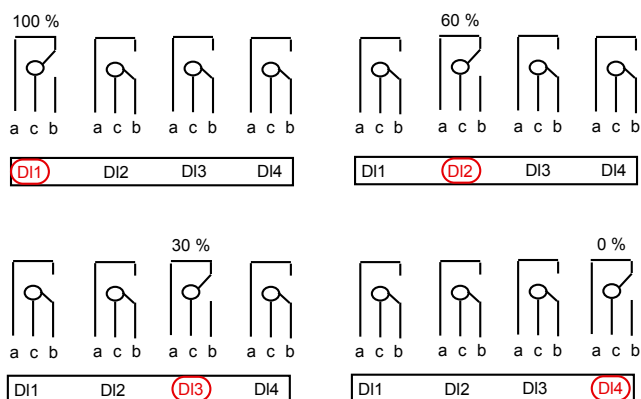
CONNECTION	TERMINAL	CABLE TYPE
Analog*	Phone port of data logger	2-wire telephone cable (La, Lb)
ISDN	Phone port of data logger	4-wire ISDN telephone cable
DSL	Ethernet port of data logger	Cat5 cable
Ethernet	Ethernet port of data logger	Cat5 crossed cable

* If used, then must be connected to customer connection board (X8).



6.3.9 Load management by electric utility

Connect digital load management signals to following inputs allowing active power control by the utility with levels of 100 % / 60 % / 30 % / 0 % of the output power.



6.3.10 Overvoltage protection

The central inverter is provided with surge arrestors on the DC and AC side according to the following table.

PROTECTION AREA	OVERVOLTAGE PROTECTION
DC side	IEC 61643-1 Class II, 2 x 500 V DC
AC side	IEC 61643-1 Class II, 275 V AC

Additional overvoltage or lightning protection must be provided according to the local conditions and regulations.

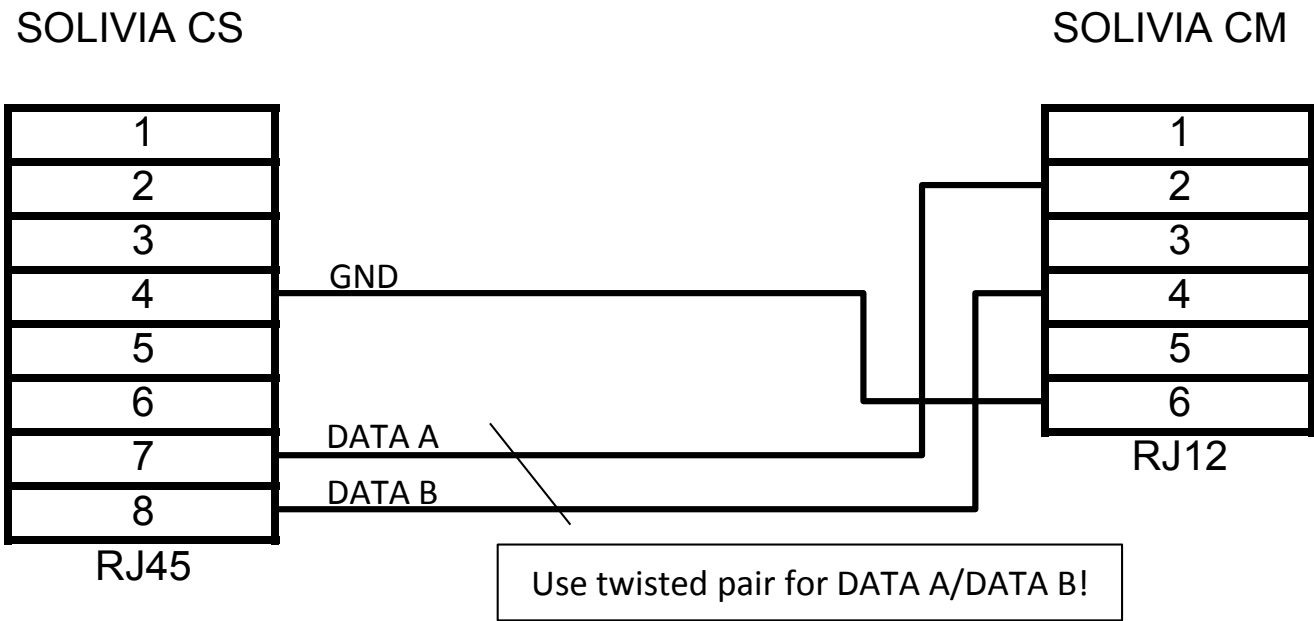
6.3.11 Connection of more than one cabinet per system

Only one datalogger will be needed per system which will be installed in cabinet # 1.
Please take care that each central inverter should have a unique address [1 ... 254] on the bus (avoid any conflict with l'checker addresses, etc.).
Further cabinets (cabinet # 2, 3 etc.) should be connected via RS485 bus as follows:

CABINET (SOLIVIA CS)	TERMINAL (RS485 BUS BOARD)	CABINET (SOLIVIA CS)	TERMINAL(RS485 BUS BOARD)
# 1	X2	# 2	X3
# 2	X2	# 3	X3
# 3	X2	# 4 ...	X3

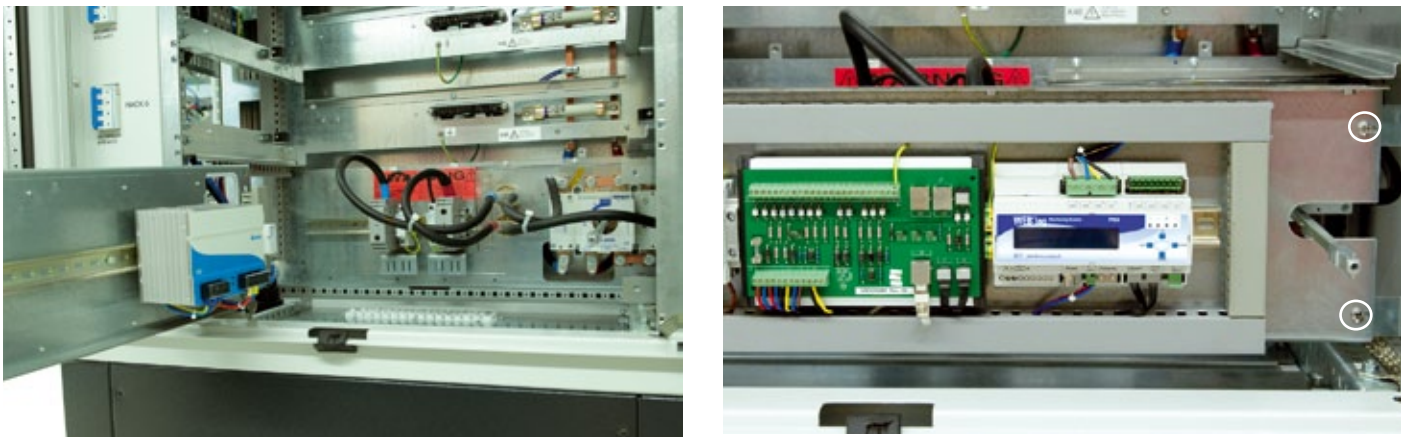
Note:
Needed cable for interconnection: RJ45 patch cable, straight through wired, 8P8C

CABINET (SOLIVIA CS)	TERMINAL (RS485 BUS BOARD)	CABINET (SOLIVIA CM)	TERMINAL(RS485 BUS BOARD)
# 1	X2	# 2	X3



6.3.12 Work which must be carried out after electrical connection

After the central inverter has been connected, carry out the following points:
1. Swivel frame of the front connection area:
Move the swivel frame back 90° into its initial position and fix it in position with the two screws on the right.



2. Front connection area and final condition before inserting the inverter racks:

Reattach the intermediate panel on the front connection area and the front panel to the front connection area using the M6x12 crosshead pan-head screws.



6.3.13 Inserting the SOLIVIA 11 EU G3 R inverter racks

- Because of the weight of the SOLIVIA 11 EU G3 R inverter racks (30 kg each), they should be lifted by at least 2 people.
- Always insert the inverter racks in the cabinet upwards from below. Since all inverter racks are identical, each position is equivalent (refer to § 4.2.1 Block circuit diagram).
- Push the inverter racks into their slots smoothly and horizontally up to the end stop.
- Then screw them firmly in position using the lock washers and crosshead screws provided.



7 Start-up and configuration



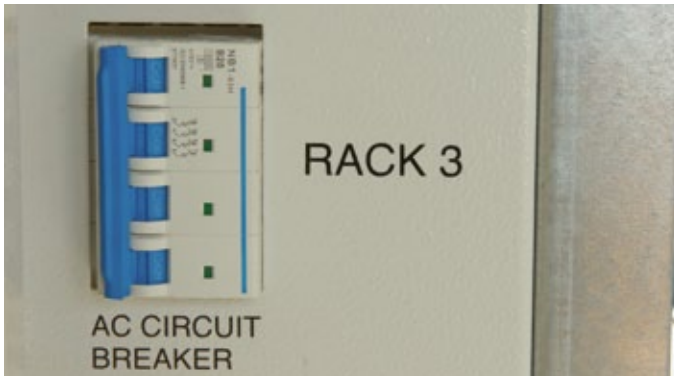
CAUTION!

Water condensation may cause damage to property!

Before starting the SOLIVIA CS central inverter, make sure that it is absolutely dry. We recommend waiting at least two hours after setting up the equipment at the site of operation before starting it up.

7.1 Switching on the AC line-protection breaker for the inverter racks

Before closing the doors, switch on line-protection breakers for the inverter racks 1-6.



7.2 Switching on the AC line-protection breaker for the auxiliary power supply

Before closing the doors, switch on the line-protection breaker F16 for the auxiliary power supply.



7.3 Closing the doors

Close the doors using the cabinet key provided.

7.4 Switching on the grid voltage and the PV generator



Switch on the grid voltage via the AC power switch in the left door.



Switch on the PV generator via the DC disconnecter in the right door.

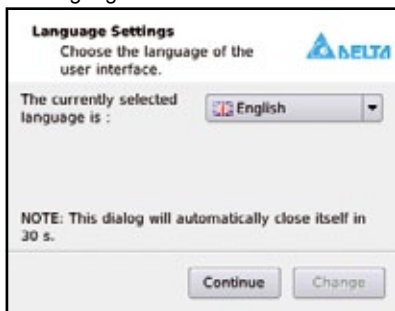
For the purpose of maintenance and service it is also possible to open the cabinet doors during operation. The AC and DC switches have hidden locks which can be pushed down by using a small screw driver (refer to pictures below). This will disable the locking of the AC and DC switches and allow the opening of the two cabinet doors.



7.5 Initial start-up

When starting up the SOLIVIA CS central inverter for the first time, you will first see a message on the touch-screen display on the door requesting you to configure some parameters. Proceed as follows:

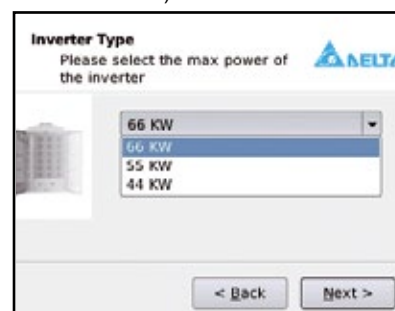
1. At the first start-up of the system controller you will be asked to choose the language of the user interface:



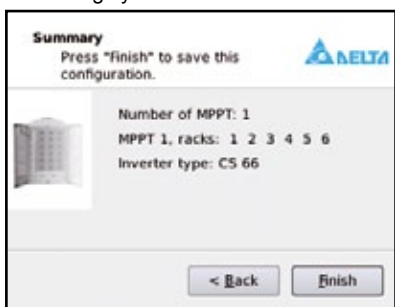
2. Now you are requested to enter data to configure the SOLIVIA CS and the SOLIVIA 11 EU G3 R inverter racks:



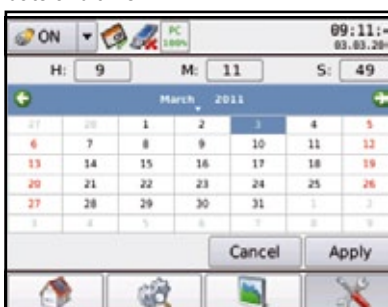
3. Now, the maximum possible power of the CS needs to be selected (44 kW, 55 kW or 66 kW):



4. Then you are requested to confirm the settings you have entered:



5. Next, you are requested to set the date and time:



6. Finally you must select the country settings:



In case of a central anti-islanding monitoring device is installed on request of the utility, the internal anti-islanding of the CS can become disabled by activating the external grid monitor function.

Now the system controller will turn into operation and release the start-up for the internal inverter racks (1-6) - one after the other. This procedures will take up to 10 minutes.

8 Monitoring system

Each installation of a CS system requires the installation of one monitoring system.

Delta is offering different types of data loggers:

- Meteocontrol: Web'log Pro with analog modem; ISDN modem; GPRS modem or DSL/Ethernet (www.meteocontrol.de)
- Solare Datensysteme for Solar-Log (www.solar-log.com).

For further information, please refer to the User Manual of your selected data logger.

9 Maintenance

The CS inverter system must be maintained at regular intervals.

Maintenance includes:

- Inspection of wearing parts, and replacement thereof if necessary
- Functionality test of components
- Inspection of contact joints
- Cleaning of cabinet interior, if necessary

The maintenance interval depends on the location and the ambient conditions. A device installed in an environment with very dusty ambient air requires more frequent maintenance than indicated in the following table.

MAINTENANCE WORK ONCE EVERY MONTH

Read out long-term data and error memory.

MAINTENANCE WORK ONCE EVERY YEAR

The filters in the doors should be cleaned or replaced if necessary

Check the air circulation (contamination of air grills, foreign matter).

Check the exhaust duct for leaks.

Check the inside of the cabinet for heavy dust deposits, dirt, moisture, and water penetration from outside.
If there are thick dust deposits, clean the equipment with a vacuum cleaner.

Check that all cable connections are tight (torque) and free of corrosion. Visually inspect the cable (discolorations, scorches or mechanical defects). Replace damaged cables immediately.

Check the adhesive warning labels and replace them if necessary.

Check all fans for functionality and operating noise.

Functionality test of all protective equipment present by means of manual activation

- Line circuit breaker
- Power switch
- Motor overload switch.

Visually inspect all fuses and disconnectors, and lubricate the contacts if necessary.

Check overvoltage protectors.

Check the 230 V und 24 V control and auxiliary voltages.

Check the covers and function of the locks.

Check the overvoltage protectors for deterioration and replace them if necessary.



10 Spare parts list

NO.	DESCRIPTION	DESCRIPTION CIRCUIT DIAGRAM	DELTA ORDER NO.	RATINGS
1	SOLIVIA 11 EU G3 R (inverter rack 11 kW)	Rack 1...6	EOE47030001	
2	Input terminals	X40-1...2	307343300T	
3	AC/DC power supply	T1	EOE13010007	24 V / 20 A
4	Monitoring system (analog)	A3	5040007100	
5	Monitoring system (ISDN)		5040007200	
6	Monitoring system (GPRS)		5040007300	
7	Monitoring system (DSL/Ethernet)		5040007400	
8	DC disconnect	S1	3000741800	4 x 250 A / 1000 V
9	AC disconnect	S2	3000741700	160 A
10	Line-protection breaker SOLIVIA 11 EU G3 R AC side	Q1...6	0830265337	25 A / 240/415 V AC B 4P
11			0830569232	25 A 400 V AC B 4P
12	AC line protection breaker	F16	0830265237	10 A 240/415 V AC B 1P
13			0830569332	10 A 230/400 V AC B 1P
14	Plug Tyco Multibeam XL	X41...46	3671294400	
15	Roof fan	M1...3	3620200211	24 V
16	PWB assembly backplane	A1	5581200340	
17	System controller	A2	5040003500	
18	Backup fuse 230 V AC	F31	0805041602	16 A / 250 V
19	Cabinet key front doors		3460040300	
20	Filter fan Outlet filter PFA 60000		3791218800	
21	Filter mats for PFA 60000		3243185500	
22	Cabinet base		3461304600	
23	Blank panels RAL2011 orange		3303048400	



DC backup fuse for inverter rack (F1 ... F6).
 Replace only with fuse link of same diameter:
 1) OEZ (Order-No. 0890291048)
 2) SIBA (Order-No. 0891040642)
 3) FERRAZ (Order-No. 0891040637)

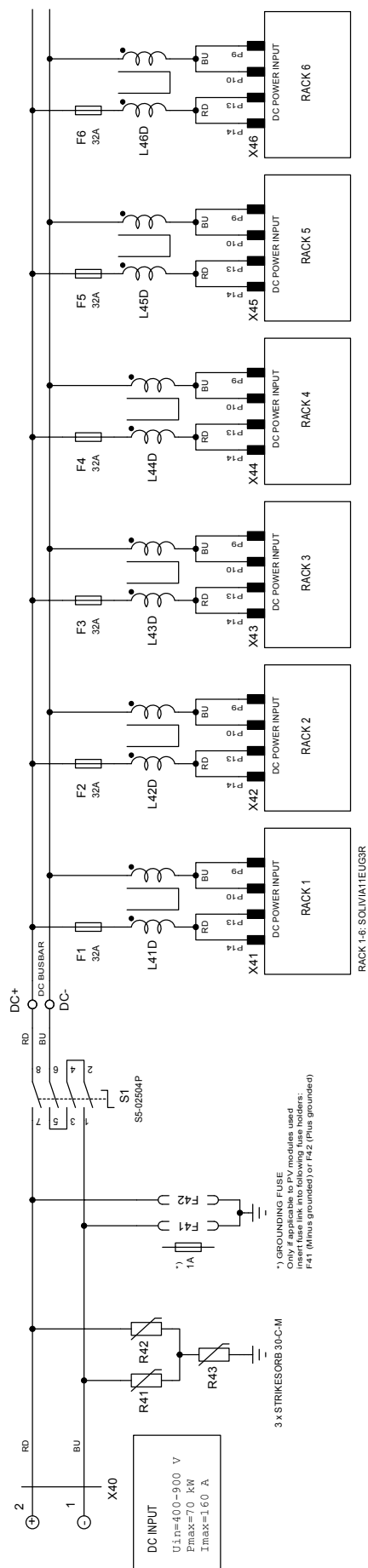


Figure 11-1: Circuit diagram, DC side

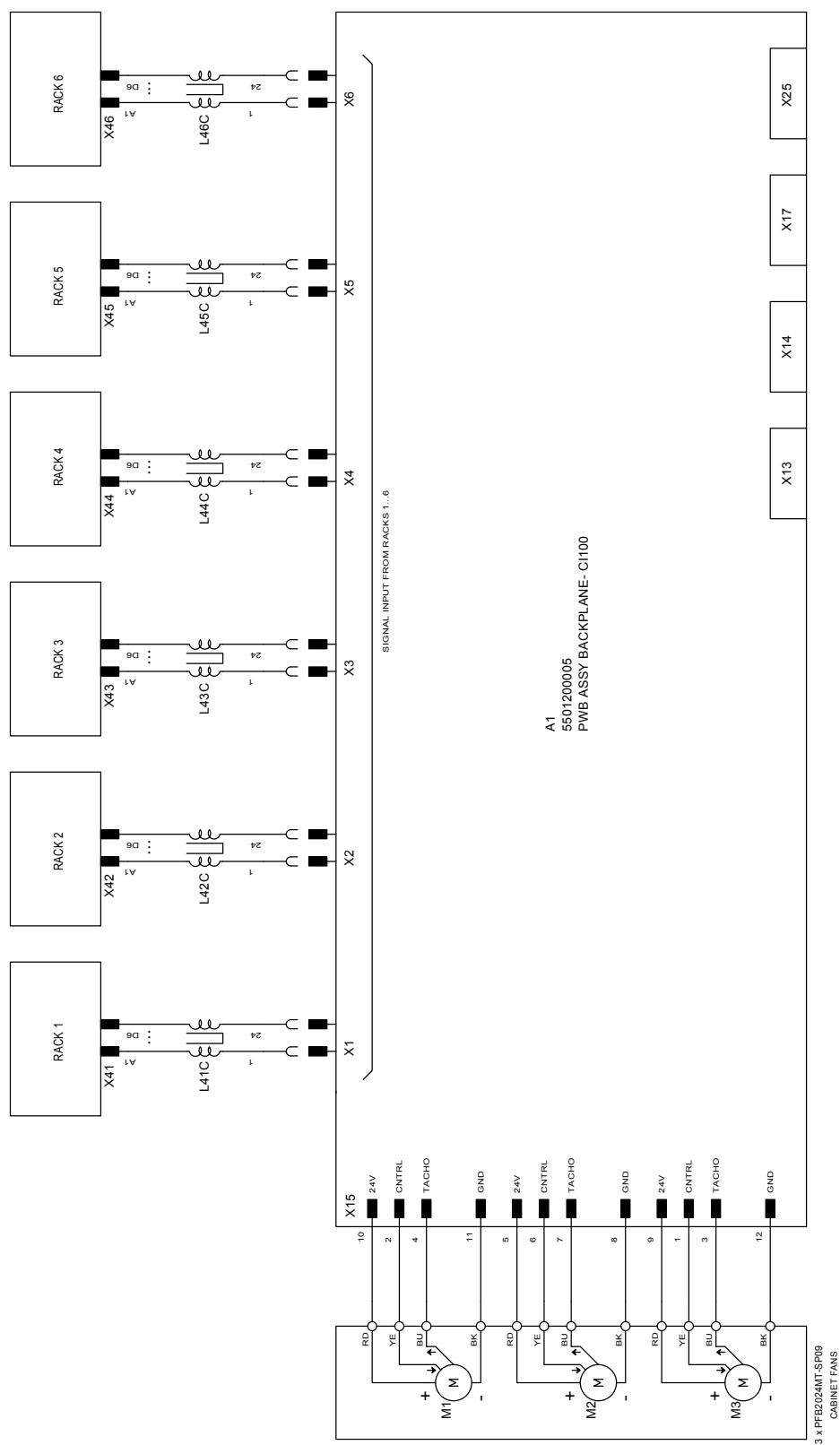


Figure 11-3: Circuit diagram, backplane controller

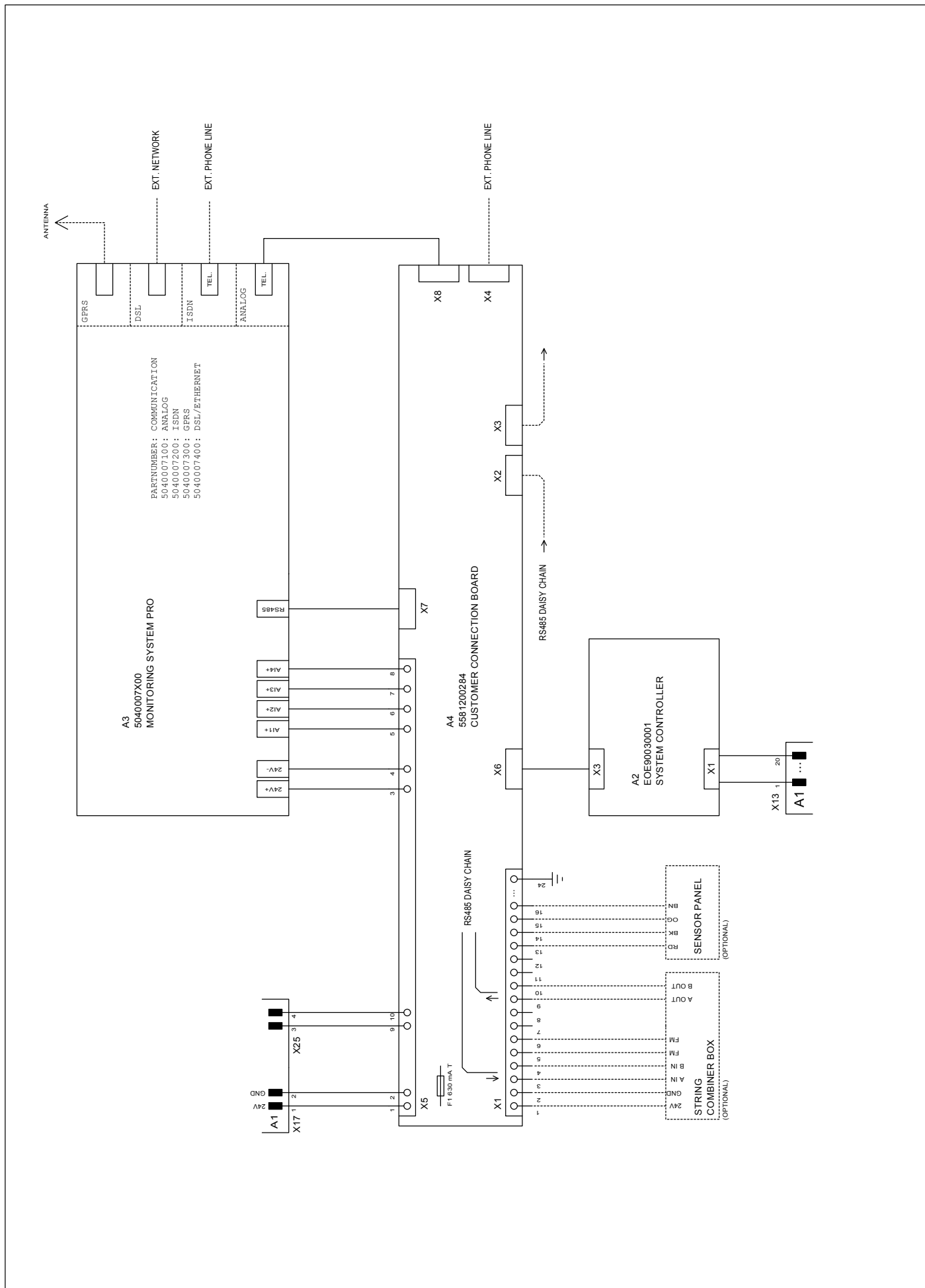


Figure 11-4: Circuit diagram, monitoring system

12 Technical data

INPUT (DC)	CS 44	CS 55	CS 66
Max. recommended PV power	54 kW	67 kW	80 kW
Nominal power	47 kW	59 kW	70 kW
Voltage range	400 ... 900 V		
MPP range	450 ... 800 V		
Full power MPP range	450 ... 800 V		
Max. current	105 A	135 A	160 A
Max. short-circuit current	160 A		
Max. power recovery of DC	1 A		
Power feed-in from	80 W	100 W	120 W
Power transfer starting	> 110 W	> 130 W	> 150 W
No. of MPP tracker	1		

STANDARDS / DIRECTIVES	CS 44	CS 55	CS 66
Protection type	IP54		
Protection Class	1		
Configurable trip parameters	Yes		
Insulation monitor	Yes		
Overload behaviour	Current limitation; power limitation		
Safety	EN60950-1; EN50178; IEC62103; IEC62109-1 / -2		
Anti-islanding protection ³⁾	DIN VDE0126-1-1; RD1663; EN50438; ENEL G.L. 12/2008		
EMC	EN61000-6-2; EN61000-6-4; EN61000-3-11; EN61000-3-12		

GENERAL DESCRIPTION	CS 44	CS 55	CS66
Model name	SOLIVIA CS 44 EU G3	SOLIVIA CS 55 EU G3	SOLIVIA CS 66 EU G3
Part number Delta	EOE98030256		
Max. efficiency	95.6 %		
EU efficiency	94.7 %		
Operating temperature range	-10 ... +50 °C		
Storage temperature range	-25 ... +60 °C		
Humidity	0 ... 95 % (non-condensing)		

OUTPUT (AC)	CS 44	CS 55	CS 66
Nominal power	44.4 kW (4 x 11 kW)	55.5 kW (5 x 11 kW)	66.6 kW (6 x 11 kW)
Max. power ¹⁾	44.4 kW (4 x 11 kW)	55.5 kW (5 x 11 kW)	66.6 kW (6 x 11 kW)
Nominal voltage ²⁾	3 NPE 400 V / 230 V		
Voltage range ²⁾	320 ... 460 V		
Nominal current (per phase)	65 A	81 A	97 A
Max. current	80 A	100 A	120 A
Backup fuse	max. 125 A gG		
Max. current when switching on	0 A		
Nominal frequency	50 Hz		
Frequency range ²⁾	47.5 ... 52.5 Hz		
Stand-by power	25 W		
Leakage current	< 20 mA		
Voltage recording tolerance	< 1 % (after calibration)		
Frequency recording tolerance	< 0.2 %		
DC detection on AC tolerance	< 10 %		
Tripping times tolerance	< 1 %		

MECHANICAL DESIGN	CS 44	CS 55	CS 66
Size (H x W x D)	1700 x 1000 x 600 mm (without cabinet base)		
Size (H x W x D)	1900 x 1000 x 600 mm (with cabinet base)		
Diagonal height (without cabinet base)	1770 mm		
Diagonal height (with cabinet base)	1960 mm		
Weight (with inverter racks)	350.0 kg	380.0 kg	410.0 kg
Weight (without inverter racks)	232.0 kg		
Weight (net) ⁴⁾	157.0 kg		
Cooling	Fan cooling, 2000 m³/h		
AC connector	Terminal connection		
DC connector	Terminal connection		
DC disconnect	Integrated		
AC disconnect	Integrated		
Display	5.7" touch-screen		

- 1) The maximum AC power value indicates the power an inverter might be able to deliver. However, such a maximum AC power may not necessarily be achieved.
- 2) AC voltage and frequency range will be programmed according to the individual country requirements.
- 3) Country-specific regulations:
 - Germany: DIN V VDE 0126-1-1 / Feb. 2006
 - Spain: RD 1663 / 2000 + RD 661/2007
 - Italy: ENEL G.L. 12/2008
 - Greece: DIN V VDE 0126-1-1 / Feb. 2006 with amendments
 - France: DIN V VDE 0126-1-1 / Feb. 2006 with amendments
 - Czech Republic: DIN V VDE 0126-1-1 / Feb. 2006 with amendments
- 4) Weight without inverter racks, doors, back and rear side panels



EC Declaration of Conformity

Hersteller: Delta Energy Systems (Germany) GmbH
 Adresse: Tschelstr. 21, D - 79331 Teningen, Germany

Produktbeschreibung: Solar Inverter for Grid operation

Modell: SOLVIA11EUG3R ⁽¹⁾ SOLVACSEUG3 ⁽²⁾
 SOLVACMEUG3 ⁽³⁾

The product described above in the form as delivered is in conformity with the provisions of the following European Directives:

2004/108/EG Council Directive on the approximation of the laws of the Member States relating to electromagnetic compatibility

Immunity	EN 61000-6-2 : 2005
Emission	EN 61000-6-3 : 2007
Harmonics / Flicker	EN 61000-3-2 : 2006 ⁽¹⁾
	EN 61000-3-3 : 1995 + A1 : 2001 + A2 : 2005 ⁽¹⁾
	EN 61000-3-12 : 2005 + EN 61000-3-11 : 2000 ⁽²⁾

2006/95/EC Council Directive on the approximation of the laws of the Member States related to electrical equipment designed for use within certain voltage limits

Safety	EN 60950-1 : 2006
	Draft IEC 62109-1 : 2003
	Draft IEC 62109-2 : 2005
	IEC 62103 : 2003
	EN 50178 : 1997

The product described above does also comply with the VDEW/BDEW Publication:
 "Richtlinie für Anschluss und Parallelbetrieb von Eigenenergieanlagen am Niederspannungsnetz", 4. Rev.

Teningen, 07. Feb. 2011

Klaus Gremmelspacher	Martin Freyberg
R&D Head of LOB Solar Inverter	Product Management Head of LOB Solar Inverter
Name, Funktion	Signature

This declaration certifies the conformity to the specified directives but contains no assurance of properties. The safety documentation accompanying the product shall be considered in detail.

Deutsch SOLVACSEUG EC_Docid 6 2011207.doc



EG-Konformitätserklärung

Hersteller: Delta Energy Systems (Germany) GmbH
 Adresse: Tschelstr. 21, D - 79331 Teningen, Germany

Produkt: Zentralinverter für den Netzbetrieb

Modell: SOLVIA11EUG3R ⁽¹⁾ SOLVACSEUG3 ⁽²⁾
 SOLVACMEUG3 ⁽³⁾

Das oben beschriebene Produkt ist im gelieferten Zustand konform mit folgenden Richtlinien:

2004/108/EG Richtlinie des Rates zur Angleichung der Rechtsvorschriften der Mitgliedstaaten über die elektromagnetische Verträglichkeit

Störfestigkeit	EN 61000-6-2 : 2005
EMV	EN 61000-6-3 : 2007
Oberschwingungsströme / Flicker	EN 61000-3-2 : 2006 ⁽¹⁾
	EN 61000-3-3 : 1995 + A1 : 2001 + A2 : 2005 ⁽¹⁾
	EN 61000-3-12 : 2005 + EN 61000-3-11 : 2000 ⁽²⁾

2006/95/EC Richtlinie des Rates zur Angleichung der Rechtsvorschriften der Mitgliedstaaten betreffend elektrische Betriebsmittel zur Verwendung innerhalb bestimmter Spannungsgrenzen

Sicherheit	EN 60950-1 : 2006
	Draft IEC 62109-1 : 2003
	Draft IEC 62109-2 : 2005
	IEC 62103 : 2003
	EN 50178 : 1997

Das oben beschriebene Produkt entspricht zudem der VDEW/BDEW-Publikation
 "Richtlinie für Anschluss und Parallelbetrieb von Eigenenergieanlagen am Niederspannungsnetz", 4. Aufl.

Teningen, 07. Feb. 2011

Klaus Gremmelspacher	Martin Freyberg
R&D Head of LOB Solar Inverter	Product Management Head of LOB Solar Inverter
Name, Funktion	Signature

Mit dieser Konformitätserklärung wird die Konformität des Produktes mit den angegebenen Richtlinien bescheinigt, jedoch werden keine Produkteigenschaften zugesichert. Die dem Produkt beiliegende Sicherheitsdokumentation ist sorgfältig zu lesen.

Deutsch SOLVACSEUG EC_Docid 6 2011207.doc



Dichiarazione di conformità CE

Produttore: Delta Energy Systems (Germany) GmbH
 Indirizzo: Tschelstr. 21, D - 79331 Teningen, Germany

Descrizione del prodotto: Inverter solare per il funzionamento in rete

Modello: SOLVIA11EUG3R ⁽¹⁾ SOLVACSEUG3 ⁽²⁾
 SOLVACMEUG3 ⁽³⁾

Il prodotto sopra indicato, così come fornito, è conforme alle seguenti direttive europee:

2004/108/EG Direttiva del Consiglio in materia di ravvicinamento delle legislazioni degli Stati membri relative alla compatibilità elettromagnetica

Immunità elettromagnetica	EN 61000-6-2 : 2005
compatibilità elettromagnetica (EMC)	EN 61000-6-3 : 2007
Armoniche / Flicker	EN 61000-3-2 : 2006 ⁽¹⁾
	EN 61000-3-3 : 1995 + A1 : 2001 + A2 : 2005 ⁽¹⁾
	EN 61000-3-12 : 2005 + EN 61000-3-11 : 2000 ⁽²⁾

2006/95/EC Direttiva del Consiglio in materia di ravvicinamento delle legislazioni degli Stati membri relative al materiale elettrico destinato ad essere utilizzato entro taluni limiti di tensione

Sicurezza	EN 60950-1 : 2006
	Draft IEC 62109-1 : 2003
	Draft IEC 62109-2 : 2005
	IEC 62103 : 2003
	EN 50178 : 1997

Il prodotto sopra indicato, così come fornito, è inoltre conforme a quanto stabilito nella pubblicazione VDEW/BDEW
 "Direttiva sul collegamento e l'utilizzo degli impianti di produzione dell'energia in parallelo alla rete di bassa tensione",
 4. edizione.

Teningen, 7 febbraio del 2011

Klaus Gremmelspacher	Martin Freyberg
R&D Head of LOB Solar Inverter	Product Management Head of LOB Solar Inverter
Nome, funzione	Firma

La presente dichiarazione certifica la conformità del prodotto alle norme specificate, ma non offre alcuna garanzia in merito alle sue caratteristiche. Si raccomanda di leggere attentamente la documentazione sulla sicurezza in dotazione al prodotto.

Deutsch SOLVACSEUG EC_Docid 6 2011207.doc



Déclaration de conformité CE

Fabricant: Delta Energy Systems (Germany) GmbH
 Adresse: Tschelstr. 21, D - 79331 Teningen, Germany

Description du produit: Onduleur solaire couplé au réseau

Modèle: SOLVIA11EUG3R ⁽¹⁾ SOLVACSEUG3 ⁽²⁾
 SOLVACMEUG3 ⁽³⁾

Le produit mentionné ci-dessus, tel qu'il est livré, est conforme aux dispositions des Directives Européennes suivantes:

2004/108/EG Directive du Conseil concernant le rapprochement des législations des États membres relatives à la compatibilité électromagnétique

Immunité CEM	EN 61000-6-2 : 2005
Harmoniques / Flicker	EN 61000-6-3 : 2007
	EN 61000-3-2 : 2006 ⁽¹⁾
	EN 61000-3-3 : 1995 + A1 : 2001 + A2 : 2005 ⁽¹⁾
	EN 61000-3-12 : 2005 + EN 61000-3-11 : 2000 ⁽²⁾

2006/95/EG Directive du Conseil concernant le rapprochement des législations des États membres relatives au matériel électrique destiné à être employé dans certaines limites de tension

Sécurité	EN 60950-1 : 2006
	Draft IEC 62109-1 : 2003
	Draft IEC 62109-2 : 2005
	IEC 62103 : 2003
	EN 50178 : 1997

Le produit mentionné ci-dessus, tel qu'il est livré, est également conforme à la publication du VDEW/BDEW
 «Directive pour la connexion et le fonctionnement en parallèle des générateurs autonomes couplés au réseau basse tension», édition 4.

Teningen, le 07 février 2011

Klaus Gremmelspacher	Martin Freyberg
R&D Head of LOB Solar Inverter	Product Management Head of LOB Solar Inverter
Nome, fonction	Signature

Cette déclaration certifie la conformité aux directives spécifiées mais ne contient aucune assurance de propriété. La documentation de sécurité jointe au produit doit être étudiée en détail.

Deutsch SOLVACSEUG EC_Docid 6 2011207.doc



Declaración de Conformidad CE

Fabricante: Delta Energy Systems (Germany) GmbH
Dirección: Tschelstr. 21, D - 79331 Teningen, Germany

Descripción del producto: Inversor solar para conexión a Red eléctrica

Modelo: SOLVIA11EUG3R ⁽¹⁾ SOLVACSEUG3 ⁽²⁾
SOLVACMEUG3 ⁽³⁾

El producto descrito, en la forma en la que se suministra, cumple con las disposiciones de las siguientes Directivas Europeas:

2004/108/EG Directiva del Consejo relativa a la aproximación de las legislaciones de los Estados Miembros sobre la compatibilidad electromagnética

Immunidad EN 61000-6-2 : 2005
CEM EN 61000-6-3 : 2007
Armónicos / Oscilaciones EN 61000-3-2 : 2006 ⁽¹⁾
EN 61000-3-3 : 1995 + A1 : 2001 + A2 : 2005 ⁽²⁾
EN 61000-3-12 : 2005 + EN 61000-3-11 : 2000 ⁽³⁾

2006/95/EC Directiva del Consejo relativa a la aproximación de las legislaciones de los Estados Miembros sobre el material eléctrico destinado a utilizarse con determinados límites de tensión

Seguridad EN 60950-1 : 2006
Draft IEC 62109-1 : 2003
Draft IEC 62109-2 : 2005
IEC 62103 : 2003
EN 50178 : 1997

El producto descrito también cumple con la publicación VDEW/SEW:
"Richtlinie für Anschluss und Parallelbetrieb von Eigenzeugungsanlagen am Niederspannungsnetz", 4. edición.
(Directiva para la conexión y la operación en paralelo de instalaciones generadoras de energía en la red de bajo voltaje)

Teningen, 7 de febrero 2011

Klaus Gremmelspacher
Klaus Gremmelspacher
R&D Head of LOB Solar Inverter

Nombre, función

Martin Freyberg
Martin Freyberg
Product Management Head of LOB Solar Inverter

Nombre, función

Firma

Esta declaración certifica la conformidad con las directivas especificadas pero no contiene ningún aseguramiento de características.
Se deberá observar detalladamente la documentación de seguridad que acompaña al producto.

de:china

SOLVACSEUG3_Ded es 2011207.doc



ES – Prohlášení o shodě

Výrobce: Delta Energy Systems (Germany) GmbH
Adresa: Tschelstr. 21, D - 79331 Teningen, Německo

Výrobek: Centrální inverter pro napájení ze sítě

Model: SOLVIA11EUG3R ⁽¹⁾ SOLVACSEUG3 ⁽²⁾
SOLVACMEUG3 ⁽³⁾

Výše uvedený výrobek je v dodaném stavu shodný s následujícími směrnici:

2004/108/ES Směrnice Rady k úpravě právních předpisů členských států o elektromagnetické kompatibilitě

Odpornost proti rušení EN 61000-6-2 : 2005
Elektromagnetická kompatibilita EN 61000-6-3 : 2007 ⁽¹⁾
Horní limitové proudy kolísání napětí EN 61000-3-2 : 2006 ⁽²⁾
EN 61000-3-3 : 1995 + A1 : 2001 + A2 : 2005 ⁽³⁾
EN 61000-3-12 : 2005 + EN 61000-3-11 : 2000 ⁽⁴⁾

2006/95/ES Směrnice Rady k úpravě právních předpisů členských států ve vztahu k elektrickým provozním prostředkům k použití v rámci určitých hranic napětí

Bezpečnost EN 60950-1 : 2006
Draft IEC 62109-1 : 2003
Draft IEC 62109-2 : 2005
IEC 62103 : 2003
EN 50178 : 1997

Výše uvedený výrobek odpovídá kromě toho také publikaci VDEW/SEW „Směrnice k připojení a paralelnímu provozu vlastních generujících zařízení na síť nízkého napětí“, 4. číslo.

Teningen, 7. únor 2011

Klaus Gremmelspacher
Klaus Gremmelspacher
R&D Head of LOB Solar Inverter

jméno, funkce

Martin Freyberg
Martin Freyberg
Product Management Head of LOB Solar Inverter

jméno, funkce

podpis

Tímto prohlášením o shodě je potvrzena shoda výrobku s uvedenými směrnicemi, nejsou však zahrnuty žádné vlastnosti výrobku. Předtím si důkladně přečtěte bezpečnostní dokumentaci, která je přiložena k výrobku.

de:china

SOLVACSEUG3_Ded es 2011207.doc



ES – Prohlášení o zhode

Výrobce: Delta Energy Systems (Germany) GmbH
Adresa: Tschelstr. 21, D - 79331 Teningen, Německo

Výrobek: Centrální inverter pro napájení ze sítě

Model: SOLVIA11EUG3R ⁽¹⁾ SOLVACSEUG3 ⁽²⁾
SOLVACMEUG3 ⁽³⁾

Hore opísaný výrobek je v dodanom stave zhodný s nasledujúcimi smernicami:

2004/108/ES Smernica Rady na úpravu právnych predpisov členských štátov o elektromagnetickej zlučiteľnosti

Odpornosť proti rušeniu EN 61000-6-2 : 2005
Elektromagnetická zlučiteľnosť EN 61000-6-3 : 2007 ⁽¹⁾
Horné limitové prúdy kolísanie napätia EN 61000-3-2 : 2006 ⁽²⁾
EN 61000-3-3 : 1995 + A1 : 2001 + A2 : 2005 ⁽³⁾
EN 61000-3-12 : 2005 + EN 61000-3-11 : 2000 ⁽⁴⁾

2006/95/ES Smernica Rady na úpravu právnych predpisov členských štátov vo vzťahu k elektrickým prevádzkovým prostriedkom na používanie v rámci určitých hraníc napätia

Bezpečnosť EN 60950-1 : 2006
Draft IEC 62109-1 : 2003
Draft IEC 62109-2 : 2005
IEC 62103 : 2003
EN 50178 : 1997

Hore opísaný výrobek zodpovedá popri tom aj publikácii VDEW/SEW „Smernica pre pripojenie a paralelnú prevádzku vlastných generovacích zariadení na sieť nízkého napätia“, 4. vydanie.

Teningen, 7. február 2011

Klaus Gremmelspacher
Klaus Gremmelspacher
R&D Head of LOB Solar Inverter

meno, funkcia

podpis

Martin Freyberg
Martin Freyberg
Product Management Head of LOB Solar Inverter

meno, funkcia

podpis

Tímto prohlášením o zhode sa potvrdzuje zhoda výrobku s uvedenými směrnicami, ale nezahrnuje sa žádné vlastnosti výrobku. Důkladně si přečtěte bezpečnostní dokumentaci, která je přiložena k výrobku.

de:china

SOLVACSEUG3_Ded es 2011207.doc



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Certificate of compliance

Applicant: Delta Energy Systems (Germany) GmbH
Tscheulinstr. 21
79331 Teningen
Germany

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

Model: SOLIVACSEUG3

Use in accordance with regulations:

Automatic disconnection device with three-phase mains surveillance in accordance with DIN V VDE V 0126-1-1:2006-02 for photovoltaic systems with a three-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 (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 (VDEW) and Association of network operator (VDN).

The safety concept of an aforementioned representative product corresponds at the time of issue of this certificate to the valid safety specifications for the specified use in accordance with regulations.

Report number: 08TH0195-VDE0126
Certificate number: U11-002
Date of issue: 2011-01-01 **Valid until:** 2014-01-01

Achim Hänchen



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Unbedenklichkeitsbescheinigung

Antragsteller: Delta Energy Systems (Germany) GmbH
Tscheulinstr. 21
79331 Teningen
Deutschland

Erzeugnis: Selbsttätige Schaltstelle zwischen einer netzparallelen Eigenenerzeugungsanlage und dem öffentlichen Niederspannungsnetz

Modell: SOLIVACSEUG3

Bestimmungsgemäße Verwendung:

Selbsttätige Schaltstelle mit dreiphasiger Netzüberwachung gemäß DIN V VDE V 0126-1-1:2006-02 für Photovoltaikanlagen mit einer dreiphasigen Parallelspeisung über Wechselrichter in das Netz der öffentlichen Versorgung. Die selbsttätige Schaltstelle ist integraler Bestandteil des oben angeführten Wechselrichters mit Trennfunktion. Diese dient als Ersatz für eine jederzeit dem Verteilungsnetzbetreiber (VNB) zugängliche Schaltstelle mit Trennfunktion.

Prüfgrundlagen:

DIN V VDE V 0126-1-1 (VDE V 0126-1-1):2006-02 und „Eigenenerzeugungsanlagen am Niederspannungsnetz, 4. Ausgabe 2001, Richtlinie für Anschluss und Parallelbetrieb von Eigenenerzeugungsanlagen am Niederspannungsnetz“ mit VDN Ergänzungen, Stand 2005 vom Verband der Elektrizitätswirtschaft (VDEW) und vom Verband der Netzbetreiber (VDN).

Ein repräsentatives Testmuster der oben genannten Erzeugnisse entspricht den zum Zeitpunkt der Ausstellung dieser Bescheinigung geltenden sicherheitstechnischen Anforderungen der aufgeführten Prüfgrundlagen für die bestimmungsgemäße Verwendung.

Bericht Nummer: 08TH0195-VDE0126
Zertifikat Nummer: U11-001
Datum: 2011-01-01 **Gültig bis:** 2014-01-01

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Dichiarazione di conformità

NOME ORGANISMO CERTIFICATORE: Bureau Veritas Consumer Product Services GmbH
ACCREDITAMENTO n° ZLS IIE/G3933-1/8/09
Rif. DIN EN 45011
Data validità: 30-Giugno-2013

OGGETTO: GUIDA PER LE CONNESSIONI ALLA RETE ELETTRICA DI ENEL
DISTRIBUZIONE, Ed. 1, dicembre 2008
REGOLE TECNICHE DI CONNESSIONE DI CLIENTI PRODUTTORI ALLE RETI ENEL IN BASSA TENSIONE

TIPOLOGIA APPARATO A CUI SI RIFERISCE LA DICHIARAZIONE:			
DISPOSITIVO DI INTERFACCIA	PROTEZIONE DI INTERFACCIA	DISPOSITIVO DI CONVERSIONE STATICA	DISPOSITIVO DI GENERAZIONE ROTANTE
		X	

COSTRUTTORE: Delta Energy Systems (Germany) GmbH
Tscheulinstr. 21
79331 Teningen
Germania

MODELLO:	SOLIVACSEUG3-11	SOLIVACSEUG3-22	SOLIVACSEUG3-33
POTENZA NOMINALE:	11kW	22kW	33kW
MODELLO:	SOLIVACSEUG3-44	SOLIVACSEUG3-55	SOLIVACSEUG3
POTENZA NOMINALE:	44kW	55kW	66kW

VERSIONE FIRMWARE: IT SysControl V0.2.0

NUMERO DI FASI: trifase

RIFERIMENTO: Il dispositivo non è equipaggiato con trasformatore di isolamento a bassa frequenza.
Il dispositivo necessita di essere abbinato ad un trasformatore di isolamento esterno.

RIFERIMENTI DEI LABORATORI CHE HANNO ESEGUITO LE PROVE:

Bureau Veritas Consumer Product Services GmbH
ACCREDITAMENTO n° ZLS IIE/G3933-1/7/09
Rif. DIN EN ISO/IEC 17025
Data validità: 30-Giugno-2013

Esaminati i Fascicoli Prove n°08TH0195-SOLIVACSEUG3-DK5940, emessi dal laboratorio Bureau Veritas Consumer Product Services GmbH

Si dichiara che il prodotto indicato è conforme alle prescrizioni ENEL

Numero di certificato: U11-010
Data di emissione: 2011-01-01

Achim Hänchen
FIRMA RESPONSABILE



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Certificat de conformité

Demandeur: Delta Energy Systems (Germany) GmbH
Tscheulinstr. 21
79331 Teningen
Allemagne

Produit: Dispositif de déconnexion automatique entre un générateur et le réseau public à basse tension

Modèle: SOLIVACSEUG3

À utiliser conformément aux réglementations:

Dispositif de coupure automatique avec une surveillance du réseau triphasé, conformément à DIN V VDE V 0126-1-1:2006-02 (déviation. Limite de fréquence supérieure 5Hz), pour des systèmes photovoltaïques avec un couplage parallèle triphasé, via un convertisseur dans l'alimentation électrique publique. Le dispositif de coupure automatique fait partie intégrante de ce convertisseur. Il remplace l'appareil de déconnexion avec une fonction isolante, auquel le fournisseur du réseau de distribution peut accéder à tout moment.

Réglementations et normes appliquées:

DIN V VDE V 0126-1-1:2006-02 et «générateur au réseau électrique basse tension public, quatrième édition 2001, le guide de connexion et d'utilisation parallèle des générateurs dans le réseau électrique basse tension» avec les additions de VDN (2005), provenant de l'Association allemande du service public de l'énergie «VDEW» et l'Association d'opérateur d'un réseau «VDN».

Un échantillon représentatif des produits mentionnés ci-dessous correspond avec exigences de sécurité technique en vigueur à la date d'émission de ce certificat pour l'usage spécifié et conformément avec réglementation.

Numéro de rapport: 08TH0195-VDE0126_FR
Numéro de certificat: U11-003
Délivré le: 2011-01-01 **Valide jusqu'au :** 2014-01-01

Achim Hänchen



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Solicitante: Delta Energy Systems (Germany) GmbH
Tscheulinstr. 21
79331 Teningen
Alemania

Producto: Inversor fotovoltaico
Modelo: SOLIVACSEUG3

Certificado de conformidad

Que los inversores de conexión a la red citados en este documento cumplen con la normativa española sobre conexión de instalaciones fotovoltaicas a la red de baja tensión.

El inversor dispone de separación galvánica entre la red de distribución y la instalación fotovoltaica.

El tiempo de reconexión de los inversores es de al menos 3 minutos conforme a la norma IEC 61727:2001 una vez que los parámetros de la red vuelven a estar dentro de los márgenes permitidos. Las funciones de protección para la interconexión de máxima y mínima frecuencia conforme al Real Decreto 661/2007 (51 y 48Hz, respectivamente) y de máxima y mínima tensión (1,1 y 0,85 U_n, respectivamente) están integradas en el equipo inversor, existiendo imposibilidad de modificar los valores de ajuste de las protecciones por el usuario mediante software. Los equipos disponen de protección frente a funcionamiento en isla.

Bases de certificación:

RD 1663/2000, RD 661/2007

El concepto de seguridad de un producto representativo ya mencionado, corresponde en el momento de la emisión de este certificado de especificaciones válidas de seguridad para el empleo especificado conforme a reglamentaciones.

Número de informe: 08TH0195-RD1663

Número de certificado: U11-009

Fecha: 2011-01-01 Valedero hasta: 2014-01-01

Achim Hänchen



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Potvrzení o nezávadnosti

Žadatel: Delta Energy Systems (Germany) GmbH
Tscheulinstr. 21
79331 Teningen
Německo

Výrobek: Samostatná spínací stanice mezi síťové paralelním vlastním výrobním zařízením a veřejnou sítí nízkého napětí.

Model: SOLIVACSEUG3

Používání podle určení:

Samostatná spínací stanice s třífázovou kontrolou sítě dle DIN V VDE V 0126-1-1:2006-02 (s ČR odchylkami podle EN 50438:2007, Annex A*) pro fotovoltaická zařízení s třífázovým paralelním napájením pomocí měničů do sítě veřejného napájení. Samostatná spínací stanice je integrovaná součástí výše uvedených měničů s oddělovacím transformátorem. Tato slouží jako náhrada za spínací stanici s dělicí funkcí, která je kdykoli přístupná provozovateli rozvodné sítě (VNB).

± 0,5% V < 115%
49,5 Hz < 50,5 Hz

Zkušební podklady:

DIN V VDE V 0126-1-1 (VDE V 0126-1-1):2006-02, EN 50438:2007 a „Vlastní výrobní zařízení u sítě nízkého napětí, 4. vydání 2001, směrnice pro připojení a paralelní provoz vlastních výrobních zařízení u sítě nízkého napětí“ s doplňky VDN, stav 2005, od elektrárenského svazu (VDEW) a od svazu provozovatelů sítě (VDN).

Reprezentativní zkušební vzorek výše jmenovaného výrobku odpovídá bezpečnostně technickým požadavkům platným v okamžiku vydání tohoto certifikátu, uvedených zkušebními podklady pro používání podle určení.

Číslo zprávy: 08TH0195-VDE0126_GZ

Číslo certifikátu: U11-006

Datum: 2011-01-01 Platnost do: 2014-01-01

Achim Hänchen



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Certifikát o zhode

Žiadateľ: Delta Energy Systems (Germany) GmbH
Tscheulinstr. 21
79331 Teningen
Nemecko

Produkt: Zariadenie na automatické odpojenie medzi generátorom a verejnou elektrickou sieťou s nízkym napätím

Model: SOLIVACSEUG3

Použitie v súlade s predpismi:

Zariadenie na automatické odpojenie s dohľadom nad trojfázovým napájaním v súlade s normou DIN V VDE V 0126-1-1:2006-02 pre fotónapätové systémy s trojfázovým paralelným spojením prostredníctvom prevodníka v rámci napájania z verejnej elektrickej siete. Zariadenie na automatické odpojenie je neoddeliteľnou súčasťou uvedeného prevodníka.

Použitie pravidiel a štandardy:

Norma DIN V VDE V 0126-1-1 (VDE V 0126-1-1):2006-02 a predpis „Generator at the public low-voltage grid, 4th edition 2001, guideline for connection and parallel operation of generators in the public low-voltage grid“ (Generátor vo verejnej elektrickej sieti s nízkym napätím, 4. vydanie, 2001, predpis na pripojenie a paralelnú prevádzku generátorov vo verejnej elektrickej sieti s nízkym napätím) s dodatkami asociácie VDN (2005) od nemeckej asociácie pre elektrinu (VDEW) asociácie sieťových operátorov (VDN).

Koncepcia bezpečnosti uvedeného reprezentatívneho produktu zodpovedá v čase vystavenia tohto certifikátu platným bezpečnostným požiadavkám na určený spôsob použitia v súlade s predpismi.

Číslo správy: 08TH0195-VDE0126

Číslo certifikátu: U11-004

Dátum vystavenia: 2011-01-01 Platnosť do: 2014-01-01

Achim Hänchen



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Πιστοποιητικό ελλείψεως κωλυμάτων

Εντολοδότης: Delta Energy Systems (Germany) GmbH
Tscheulinstr. 21
79331 Teningen
Γερμανία

Παραγόμενο προϊόν: Ανεξάρτητη διεπαφή μεταξύ μιας δικτυακά παράλληλης αυτοτροφοδοτούμενης εγκατάστασης και του δημόσιου δικτύου χαμηλής τάσης

Μοντέλο: SOLIVACSEUG3

Προβλεπόμενη χρήση:

Ανεξάρτητη διεπαφή με τριφασική επιτήρηση δικτύου σύμφωνα με το DIN V VDE V 0126-1-1:2006-02* για φωτοβολταϊκές εγκαταστάσεις με τριφασική παράλληλη τροφοδοσία μέσω αναστροφέα στο δίκτυο της δημόσιας παροχής. Η ανεξάρτητη διεπαφή είναι απαραίτητο εξάρτημα για τον προαναφερθέντα αναστροφέα. Λειτουργεί εφεδρικά για την περίπτωση διεπαφής ανοίγξης στην εταιρεία διανομής δικτύου (εταιρεία ηλεκτρισμού) με λειτουργία απόζευξης.

*with a dc-voltage < 0,5% of U_{nom}
49,5 Hz < 50,5 Hz (Continental)
47,5 Hz < 51,5 Hz (Island)
Disconnection time < 500ms
Reconnection time > 180s

Βασικά στοιχεία ελέγχου:

DIN V VDE V 0126-1-1:2006-02 και „Οδηγία για σύνδεση και παράλληλη λειτουργία από αυτοτροφοδοτούμενη εγκατάσταση σε δίκτυο χαμηλής τάσης“ της „Ένωσης ηλεκτρολογικών έργων Γερμανίας“ VDEW“.

Η έννοια της ασφάλειας ενός προαναφερθέντος αντιπροσωπευτικού προϊόντος αντιστοιχεί στις προδιαγραφές που ισχύουν τη στιγμή έκδοσης αυτού του πιστοποιητικού έγκυρων προδιαγραφών ασφαλείας για τη συγκεκριμένη χρήση σύμφωνα με τους κανονισμούς.

Αριθμός αναφοράς: 08TH0195-VDE0126_GR

Αριθμός πιστοποίησης: U11-005

Ημερομηνία: 2011-01-01 Ισχύει μέχρι: 2014-01-01

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Verklaring van geen bezwaar

Aanvrager: Delta Energy Systems (Germany) GmbH
Tscheulinstr. 21
79331 Teningen
Duitsland

Product: Automatisch schakelstation tussen een netparallelle zelfopwekinstallatie en het openbare laagspanningsnet

Model: SOLIVACSEUG3

Reglementair voorgeschreven gebruik:

Automatisch schakelstation met driefasige netwerkbewaking conform DIN V VDE V 0126-1-1:2006-02 (afwijkende grenswaarden voor België op basis van EN 50438:2007, Annex A*) voor fotovoltaïsche installaties met een driefasige parallelvoeding door middel van gelijkstroom-wisselstroomomvormer in het net van de openbare voorziening. Het automatische schakelstation vormt een integraal bestanddeel van hoger vermelde gelijkstroom-wisselstroomomvormer met scheidingstransformator. Deze dient als vervangsmiddel voor een te allen tijde voor de distributienetexploitant ("VNB") toegankelijk schakelstation met scheidingfunctie.

* 85% < V < 106%
49,7 Hz < f < 50,3 Hz

Controlebasis:

DIN V VDE V 0126-1-1 (VDE V 0126-1-1:2006-02, EN 50438:2007 en „Zelfopwekinstallaties aan het laagspanningsnet, 4^{de} uitgave 2001, richtlijn voor aansluiting en parallelle verwerking van zelfopwekinstallaties aan het laagspanningsnet" met VDN supplementen, stand 2005 van de „Verband der Elektrizitätswirtschaft" (VDEW) en van de „Verband der Netzbetreiber" (VDN).

Een representatief testpatroon van het hoger vermelde product voldoet aan de op het moment van de uitreiking van dit attest geldende veiligheidstechnische eisen van de vermelde controlegrondbeginselen voor een reglementair voorgeschreven gebruik.

Rapportnummer: 08TH0195-VDE0126_BE
Certificaatnummer: U11-008
Datum: 2011-01-01 **Geldig tot:** 2014-01-01

Achim Hänchen



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Certificat de conformité

Demandeur: Delta Energy Systems (Germany) GmbH
Tscheulinstr. 21
79331 Teningen
Allemagne

Produit: Dispositif de déconnexion automatique entre un générateur et le réseau public à basse tension

Modèle: SOLIVACSEUG3

À utiliser conformément aux réglementations:

Dispositif de coupure automatique avec une surveillance du réseau triphasé, conformément à DIN V VDE V 0126-1-1:2006-02 (dérogation Belgique conforme EN 50438:2007, appendice A*), pour des systèmes photovoltaïques avec un couplage parallèle triphasé, via un convertisseur dans l'alimentation électrique publique. Le dispositif de coupure automatique fait partie intégrante de ce convertisseur. Il remplace le appareil de déconnexion avec une fonction isolante, auquel le fournisseur du réseau de distribution peut accéder à tout moment.

* 85% < V < 106%
49,7 Hz < f < 50,3 Hz

Réglementations et normes appliquées:

DIN V VDE V 0126-1-1:2006-02 et «générateur au réseau électrique basse tension public, quatrième édition 2001, le guide de connexion et d'utilisation parallèle des générateurs dans le réseau électrique basse tension» avec les additions de VDN (2005), provenant de l'Association allemande du service public de l'énergie «VDEW» et l'Association d'opérateur d'un réseau «VDN».

Un échantillon représentatif des produits mentionnés ci-dessus correspond à la date de la délivrance de ce certificat en vigueur des exigences de sécurité technique et pour l'utilisation conformément à sa destination.

Numéro de rapport: 08TH0195-VDE0126_BE
Numéro de certificat: U11-007
Délivré le: 2011-01-01 **Valable jusqu'à le:** 2014-01-01

Achim Hänchen

Nr.	Menge	Artikel-Nr.	Benennung 1	Abmessung
1	4	11E50-210-01	Socketleiste Standard	200 hoch
6	8	1584	DIN 966	M6 x 35
9	8	1583	EMKA Sperrschraube	M6 x 16
10	8	132	Poly-Stopfen R 1,4 - 12	Ø 11
11	4	80	Kalfmutter	M8
12	16	82	Kalfmutter	M6
13	8	1576	Klemmstück	3 x 15 x 53

2 panels at rear, 100mm high, fitting base width

2 connecting panels on each side with hole grid, 100mm high, fitting base depth

panel at front, 200mm high fitting base width

Position of mounting bores

DETAIL A
SCALE 1:2

For feeding cables through to adjoining cabinets, the lower panel can be screwed on crosswise.

Name	Date	A4 Maßstab: 1:5
Bearb. SRX	30.06.2003	Installation instruction Cabinet base Height 200mm
Gepr. SRX	30.06.2003	
Norm		

LOHMEIER SCHALTSTRUK- SYSTEME		Zeichnungs- Montageanleitungsnummer:	Blatt
		00MA-1000	1
Dortel: 84C-00029		Ersatz für:	1 Bl.

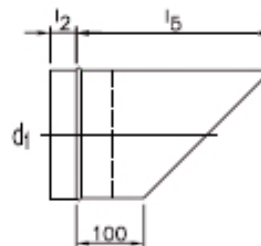


Auslassstutzen, schräg mit Schutzgitter

Inclined exhaust coupling with protection grid

Manchons d'échappement oblique, avec grille de protection

Artikel ALSEL



d ₁	l ₅	Oberfläche m ²		kg
		mit Steckst.	ohne Steckst.	
71	171	0,046	0,033	0,2
80	180	0,053	0,038	0,2
90	190	0,061	0,044	0,3
100	200	0,069	0,051	0,3
112	212	0,080	0,059	0,4
125	225	0,091	0,068	0,4
140	240	0,105	0,079	0,5
150	250	0,115	0,087	0,6
160	260	0,125	0,095	0,6
180	280	0,147	0,113	0,7
200	300	0,170	0,132	0,8
224	324	0,198	0,156	1,0
250	350	0,247	0,184	1,2
280	380	0,290	0,220	1,4
300	400	0,321	0,246	1,6
315	415	0,344	0,265	1,9
355	455	0,410	0,321	2,3
400	500	0,515	0,389	2,9
450	550	0,614	0,473	3,4
500	600	0,723	0,566	4,0
560	660	0,861	0,685	4,9
600	700	0,960	0,772	5,5
630	730	1,038	0,841	8,0
710	810	1,303	1,036	10,0
800	900	1,582	1,281	12,2
900	1000	1,922	1,583	16,8
1000	1100	2,292	1,915	20,1
1120	1220	2,848	2,356	25,0
1250	1350	3,435	2,885	30,3
1400	1500	4,220	3,561	45,7
1600	1700	5,326	4,572	57,9
1800	1900	6,557	5,709	84,5

Vogelschutzgitter bis d₁ = 500 eingeschweißt

ab d₁ = 560 eingeschraubt mit Flansch

freier Querschnitt ca. 80%

14.3 Guarantee and exchange conditions

Please refer to our website www.solar-inverter.com for our guarantee and exchange conditions.

14.4 5-Year guarantee certificate

5-YEAR GUARANTEE CERTIFICATE

Congratulations on the purchase of the high efficient solar inverter from Delta!

This is a 5-year standard guarantee certificate, which is automatically activated and valid from date of purchase by the end customer. We would kindly ask you to keep this certificate with your invoice.


The standard warranty term is 24 months, starting from the date on which the inverter is purchased by the end customer. Delta Energy Systems (Germany) GmbH usually grants customers, who purchase an inverter of the SOLIVIA series an extended guarantee period of 60 months from the date of purchase of the inverter by the end customer. This period is however limited to 66 months maximum from the date of manufacture (according to the date code of the equipment).

When requesting a replacement inverter, copies of the purchase invoice and guarantee certificate must be enclosed. The name plate on the defective solar inverter must be readable and must not have sustained any permanent damage. In the event of any failure to meet this requirement, Delta reserves the right to refuse requests.

Before requesting a replacement inverter, please contact our solar support team or arrange for your installer to do this on your behalf:

Support Hotline: +49 (0) 180 16 SOLAR (76527) or
Fax: +49 (0) 7641 455-208 or via
E-mail: support@solar-inverter.com
Mondays to Fridays from 8 am to 5 pm (apart from official Bank Holidays)

We require the following details from the name plate of the defective solar inverter:

Inverter type	SOLIVACSEUG3	SOLIVACSEUG3	
Part number	EOE98030256	EOE98030256	
Revision	___	Rev: XX	
Date code	___	Date code: YYWW	
Serial number	___	S/N: LLLMMMXYYWWZZZZZ	
Error messages shown on the solar inverter's display			
General details about the layout of the installation			

Detailed information about Delta's Guarantee and Exchange Conditions can be seen on our website www.solar-inverter.com.

Delta Energy Systems (Germany) GmbH
Plant Teningen
Dept. Solar Support Team
Tscheulinstrasse 21
79331 Teningen
GERMANY



Delta Energy Systems (Germany) GmbH

Tscheulinstrasse 21

79331 Teningen

GERMANY

Support Email: support@solar-inverter.com

Support Hotline: +49 180 16 SOLAR (76527)

Mondays to Fridays from 8 am to 5 pm (CET - apart from official Bank Holidays)
(3,9 ct/min)

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24 February 2012

