

Installation and user guide

Inverter

13000 TL, 16000 TL, 19000 TL, 22000 TL, 22001 TL



As at 10/2013, Material no. 749 442-AC

PLATINUM®
Next Energy Solution.

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1 Introduction

1.1 PLATINUM® TL

The inverters in the PLATINUM® TL series are three-phase feed-in inverters for different power ranges; see “Technical data” on page 54.

They are equipped with 3 independently operating MPP trackers with 3 terminal areas for the DC voltage.

With the aid of the PLATINUM® network (EIA485), up to 50 PLATINUM® inverters can be connected to form a system.

The inverters in the PLATINUM TL® series are available in the following versions:

- As a wall-mounted device
- As a free-standing device in a PowerBlock carrier
- As a free-standing device for outdoor use in a PowerBlock carrier with a cover

Options

The following options are available to enhance an inverter or inverter system:

- Remote monitoring or readouts with the PLATINUM® WebMaster
- Evaluation of plant data with the PLATINUM® PV monitor
- Remote-controlled AC power reduction via an external monitoring device

1.2 About this guide

This installation and user guide describes the installation and operation of the following PLATINUM® inverter types: 13000 TL, 16000 TL, 19000 TL, 22000 TL, 22001 TL.


Additional documents

The following additional documents are available in the download area of our website www.platinum-nes.com:

- Detailed installation and user guide
- Information on fault current protection devices
- Detailed list of events for detecting/eliminating errors
- Overview of country and grid codes
- Declaration of conformity and certificates
- Manufacturer's warranty

1.3 Symbols used

1.3.1 Structure of warnings




WARNING WORD


Type, source and consequence of the hazard!

► Measures to avoid the hazard.

1.3.2 Hazard levels in warnings

Symbol	Warning word	Probability of occurrence	Consequences of non-observance
	DANGER	Imminent danger	Death, serious injury
	WARNING	Potential danger	Death, serious injury
	CAUTION	Potential danger	Minor injury
–	CAUTION	Potential danger	Damage to property

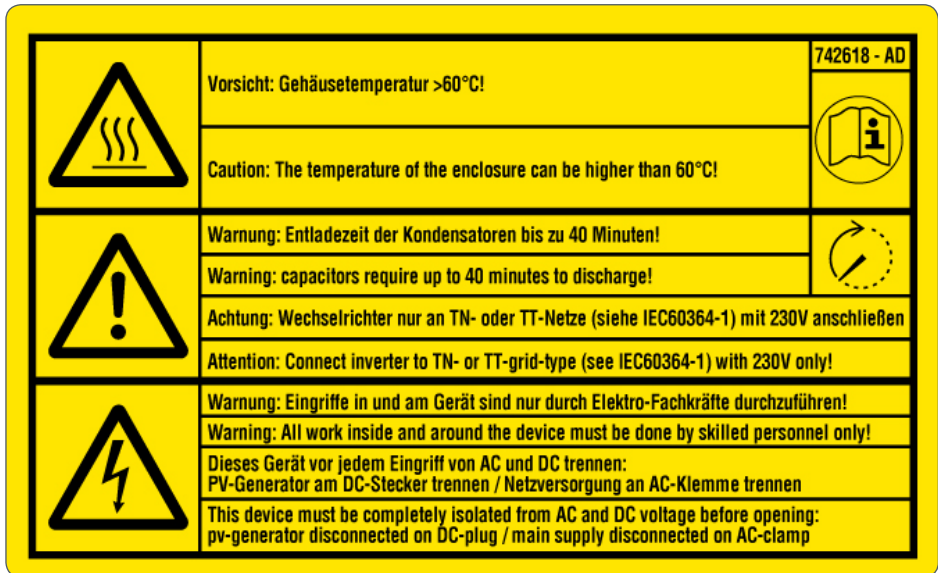
1.3.3 Notes



Notes give tips on how to work easily and safely or contain further information.

1.4 Symbols on product and packaging

The following sticker is attached to the inverter:



2 Safety

2.1 Intended usage

- These inverters are to be used solely for the purpose of feeding converted solar energy into the public grid.
- All other usage does not comply with the regulations.

2.2 Improper usage

- The inverters are not to be used in off-grid PV plants.
- The inverters are not to be used in vehicles.
- The inverters are not to be used in areas at risk of explosion (flour dust, sawdust, etc.).
- The inverters are not to be exposed to direct sunlight.
- The inverters are not to be used in areas in which the ammonia content of the air exceeds 20 ppm.
- All warranty claims will be rendered null and void in the event of failure to comply with the warranty terms or the information provided in this operating and installation manual.

2.3 Personnel requirements

The inverter may only be installed and put into operation in accordance with this installation and user guide by trained specialist personnel, for example:

- Service partners authorised by PLATINUM GmbH
- Authorised specialist personnel with knowledge of the applicable guidelines and standards

2.4 General safety instructions

- The inverters are to be used in their original state without independent modifications and in a technically perfect condition.
- Steps must be taken to ensure that the following are adhered to when assembling and connecting the inverter and the PV system:
 - Guidelines and regulations valid in the respective country
 - Provisions of the trade associations, TÜV, VDE (Association for Electrical, Electronic & Information Technologies)
 - Technical connection conditions of the energy supplier responsible
 - National and international regulations and provisions
- Ensure that all protection devices are working correctly.
- Observe the operating conditions - refer to "Technical data" on page 54.

3 Installation

3.1 Scope of delivery

The scope of delivery varies depending on the particular version supplied.

Wall-mounted device	Free-standing device	Free-standing device for outdoor installation
<ul style="list-style-type: none"> ▪ Inverter with protector ▪ Wall bracket ▪ Brief guide 	<ul style="list-style-type: none"> ▪ Inverter pre-mounted in PowerBlock carrier TL Large ▪ Protector ▪ Brief guide 	<ul style="list-style-type: none"> ▪ Inverter with protector, pre-mounted in PowerBlock carrier TL Large, with protective flap and protective grating ▪ Brief guide

3.2 Transport



CAUTION

The inverter is heavy!

- ▶ Transport the packaged inverter only on the transport pallet and always use a forklift truck.
- ▶ Do not tip/tilt the inverter.
- ▶ Once the inverter has been unpacked, transport it only with suitable lifting gear (e.g. crane).

Transport with lifting gear



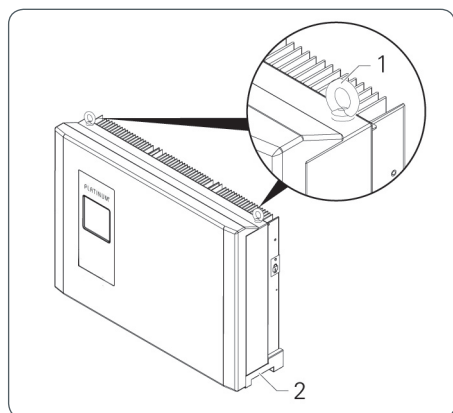
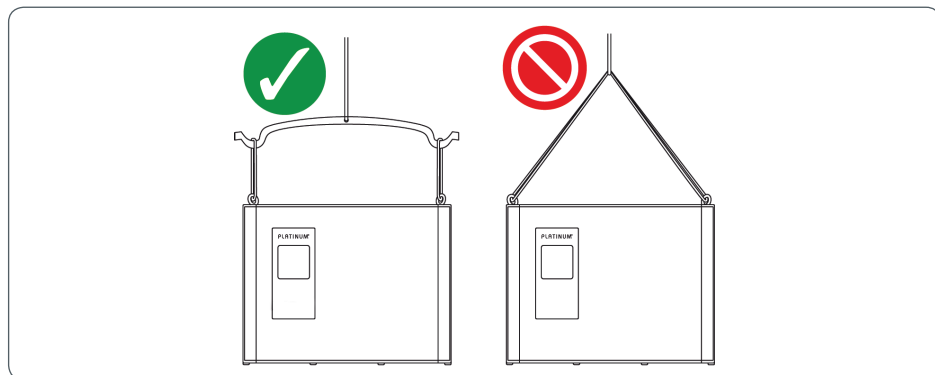
CAUTION

Falling loads!

- ▶ Only use appropriate lifting gear that is approved for the weight of the inverter.
- ▶ Only use load-bearing ropes/straps with a minimum length of 2 m or a cross beam.
- ▶ Make sure that the thread in the inverter is only subjected to loads in longitudinal direction.
- ▶ Only use DIN 580 M10 ring bolts.



The DIN 580 M10 ring bolts are not included in the scope of delivery.



1. Screw the ring bolts (1) into the threaded holes.
2. Attach the lifting gear to the ring bolts.

In order to position the inverter more accurately, you can also grab it by the recessed grips (2).

3.3 Unpacking



CAUTION

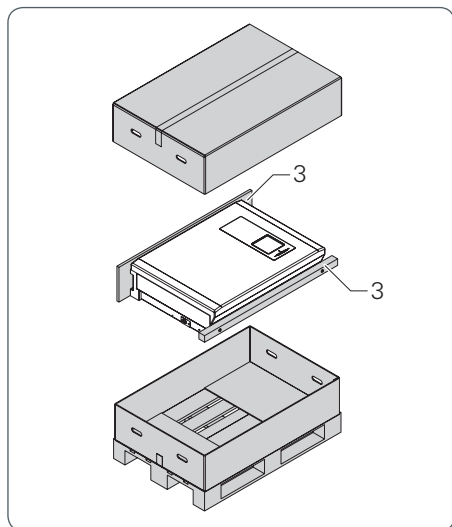
The inverter is heavy!

- ▶ Get another person to help you unpack it.
- ▶ Wear safety shoes when unpacking.
- ▶ Ensure that the inverter is positioned securely.



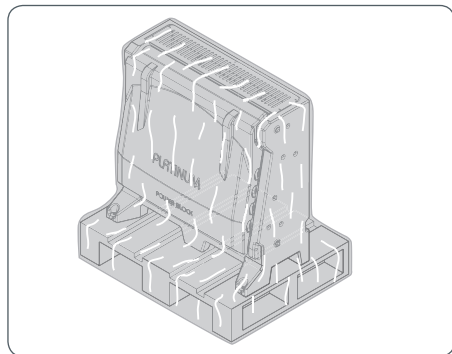
The supplied brief guide can be found under the protector or under the protective flap in a pocket on the housing, see 16.

3.3.1 Unpacking a wall-mounted device



1. Set down the transport pallet with the inverter on level ground near to the installation site.
2. Take off the upper part of the packaging.
3. Lift out the inverter from the bottom part of the packaging. When doing this, you can carry the inverter by the protective pieces of wood (3).
4. Unscrew the protective pieces of wood from the inverter.
5. Transport the inverter with the lifting gear to the installation site.

3.3.2 Unpacking a free-standing device



1. Set down the transport pallet with the inverter on level ground near to the installation site.
2. Take off the protective foil.
3. Use the lifting gear to take the inverter off the pallet and transport it to the installation site.

3.4 Assembly

3.4.1 Safety instructions



WARNING

Injury may result if the inverter falls!

- ▶ Use fixing materials suited to the assembly wall and the weight of the inverter.
- ▶ Get a second person to help with assembly and disassembly.
- ▶ Lift the inverter only with the lifting gear.
- ▶ Wear safety shoes during assembly and disassembly.
- ▶ Ensure that the inverter is positioned securely.



CAUTION

Material damage due to excessive build-up of dust!

The protection class IP65 does not apply to the communication interface.

- ▶ Avoid excessive build-up of dust.
- ▶ Avoid build-up of dust with electrically conductive dust particles.



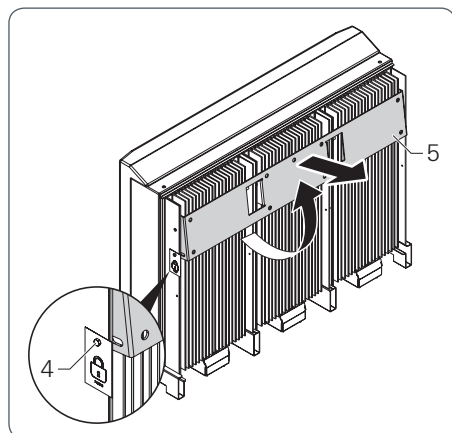
In order to comply with the requirements of standard IEC-62109, a possibility must be provided for tool-free isolation of the solar generator. If the design does not feature an integrated DC disconnect then an external isolation device is mandatory; this must be easily accessible.



PLATINUM GmbH recommends that the inverter should not be installed in living quarters.

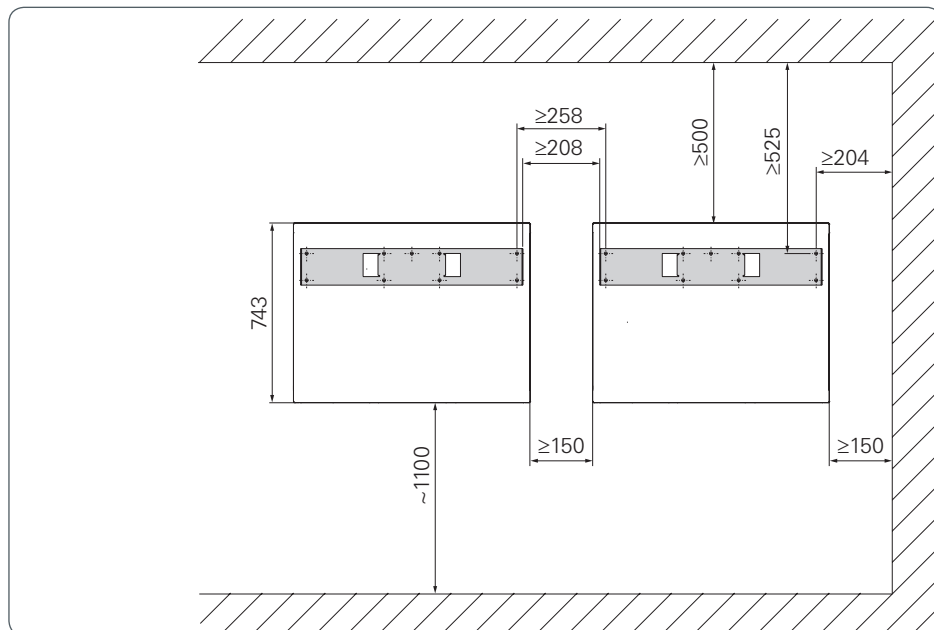
3.4.2 Wall-mounted installation

Disassemble the wall bracket from the inverter.



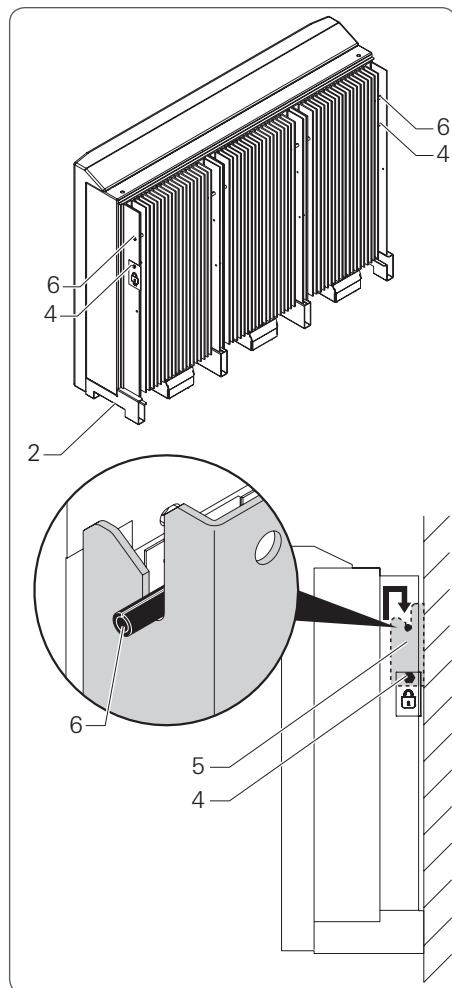
1. Loosen, but do not remove, the safety screws on the sides (4).
2. Grab the wall bracket (5) at the bottom and lift it up off the inverter.

Mounting the inverter



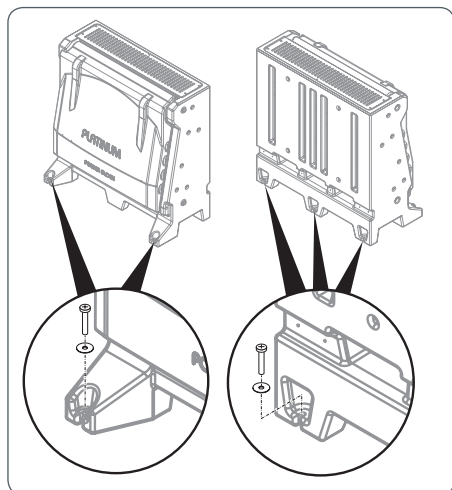
Dimensions in mm

1. Choose a suitable location for mounting. In the process, observe the following:
 - Dimensions and distances
 - The display should be at eye level (approx. 1.60 m from the ground).
 - The inverter must be easily accessible without additional tools or equipment.
2. Fix the wall bracket to the assembly wall with suitable fixing materials.



3. Lift the inverter with the lifting gear. In the process, additionally grab the inverter by the recessed grips (2) to position it accurately.
4. Working from underneath, hook the hanger of the inverter (6) at the top in the slotted piece of the wall bracket (5).
5. Ensure that the inverter is fitted correctly on the wall bracket.
6. Secure the inverter by tightening the safety screws on the side (4).

3.4.3 Installation of a free-standing unit



1. Place the inverter in the required position using the lifting gear.
2. Screw the inverter to the foot of the PowerBlock to secure it against tipping over or being moved.

The screws are not included in the scope of delivery.

Shank diameter for the ground anchoring screws: 12 mm

Head diameter: approx. 30 mm



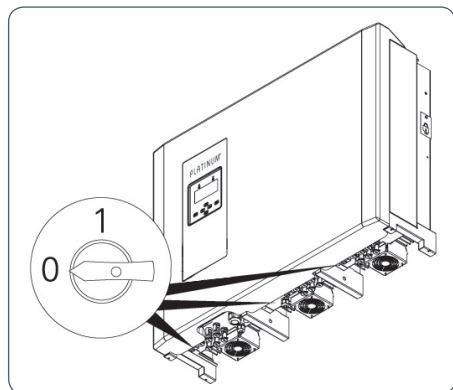
Cables can be routed through the PowerBlock carrier TL Large as follows:

- From the front
- From underneath
- From the rear

3.5 Connection

3.5.1 Preparatory work

Isolation from the solar generator



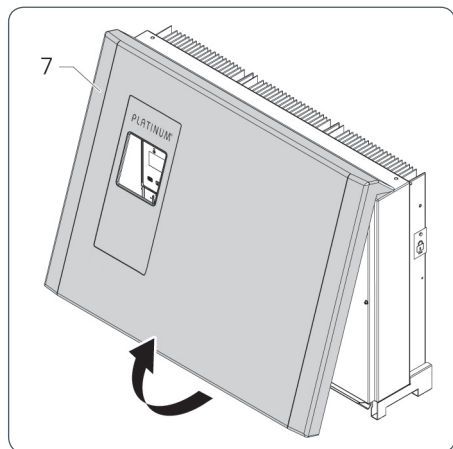
On devices with a DC disconnect

- Move the switch knob of all 3 DC disconnects on the underside of the device to the "0" position. When doing this, make sure the disconnects are not turned too far.

On devices with no DC disconnect

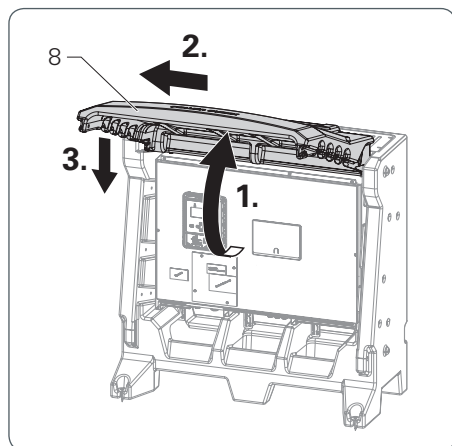
- Disconnect the DC voltage side with the external disconnect device from all solar generators.

Dismantling the protector (wall-mounted device, free-standing device in the Power-Block carrier)



- Grab the protector (7) with both hands by its underside and pull it off the inverter.

Locking the protective flap (free-standing device for outdoor installation)



1. Open the protective flap (8) as far as it will go.
2. Slide the protective flap to the left.
3. Lower the protective flap until it engages.

3.5.2 Connect the AC voltage



DANGER

Risk of death due to high AC voltage!

- ▶ Switch off the mains voltage supply (AC side) before connecting the inverter (safety device).
- ▶ Make sure that the central isolation device can be accessed freely.
- ▶ Only connect the inverter to TN or TT networks (see IEC 60364-1) with 230 V.
- ▶ Observe the maximum fuse protection permitted on the AC voltage side; see "Technical data" on page 54.
- ▶ Make the AC voltage connection with a miniature circuit breaker. PLATINUM GmbH recommends a type C miniature circuit breaker.
- ▶ If an external residual current protection device is required, PLATINUM GmbH recommends using a residual current protection device (RCD) of type A.

CAUTION

Destruction of the inverter!

- ▶ Never mix up the phases with PE or N.
- ▶ If multiple inverters are connected, distribute the inverters across the three phases in such a way that the differences between the AC power levels on the different phases do not exceed the maximum permitted unbalanced load of the utility company.

Prepare the connection cable for the AC voltage



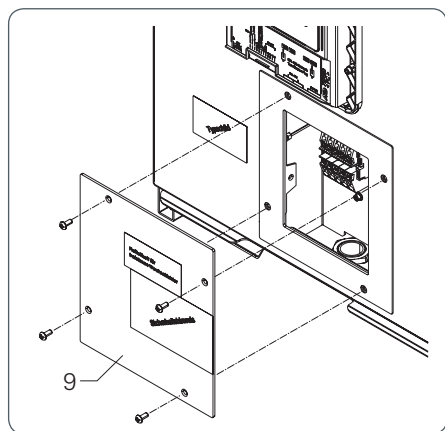
The AC voltage connection must be executed in accordance with VDE 100 part 430.

Dimensioning the wire cross section is the responsibility of the electrician and depends on the cable length and installation situation.

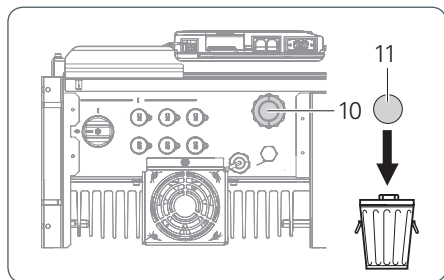
- Min. cross-section **2.5** mm²
- Max. cross-section **10** mm² (rigid conductor) or **6** mm² (multi-wire flexible conductor)

1. Protect the AC voltage connection lines with appropriate fuses; see "Technical data" on page 54.
2. Strip 18 mm of insulation from the AC voltage connection lines and add wire-end sleeves.

Connect

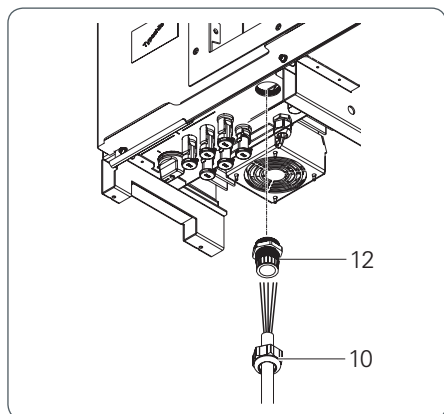


1. Take off the cover (9) from the AC voltage connection by undoing 4 screws.



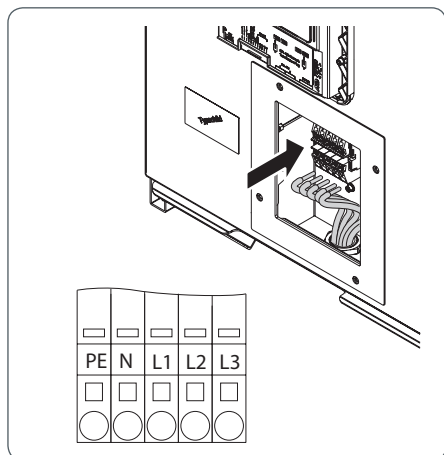
2. Unfasten the AC screw connection (10) with seal from the underside of the inverter.

The cable entry is sealed with a thin protective layer (11) against external influences. This protective layer needs to be removed.



3. Guide the prepared AC voltage connection line through the AC screw connection (10) and seal (12).
4. Feed the AC voltage connection line into the housing from below.
5. Tighten the AC screw connection.

Protection class IP65 is no longer ensured without the seal (12).



6. Connect the AC voltage connection cable to the inverter:
 - Open the terminal with a flat-bladed screwdriver.
 - Insert the conductor.
 - Remove the screwdriver.

Terminal		Assignment
L1	Black	Phase 1
L2	Black	Phase 2
L3	Black	Phase 3
N	Blue	Neutral conductor
PE	Yellow	Protective conductor

3.5.3 Connect DC voltage



DANGER

Risk of death due to high DC voltage! A voltage is present at the PV modules when it is bright.

- ▶ Before connecting the inverter, check whether voltage is applied to the generator's DC voltage connection.
- ▶ Before connecting the inverter, check whether the polarity of the DC voltage is correct.
- ▶ If voltage is applied, wear insulating protective clothing and face protection.
- ▶ Ensure that the cable plug has engaged completely with the socket.
- ▶ Detach the DC voltage cable only if the inverter is not in operation.
- ▶ Make sure that the DC disconnect a central isolation device can be accessed freely.
- ▶ Do not earth the poles of the PV modules. The inverter does not have a transformer.



WARNING

Risk of electric shock and material damage!

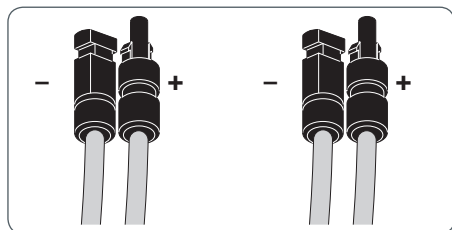
- ▶ Use only the original DC voltage Multi-Contact MC4 cable plug.
- ▶ Only connect PV modules that meet the requirements of IEC 61730 class A.
- ▶ Ensure that the max. DC voltage permitted is not exceeded.
- ▶ Ensure that the max. direct current permitted per string is not exceeded.



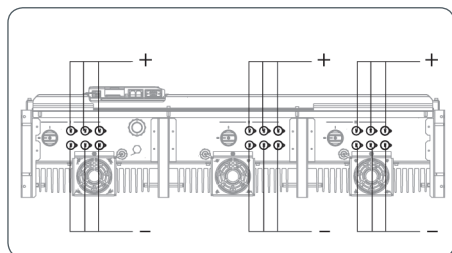
If more than one string is connected, make sure that the quantity and type of solar modules and the voltage of strings to be connected in parallel are the same.



The PLATINUM® TL inverters are equipped with 3 independently operating MPP trackers with 3 terminal areas for the DC voltage. The DC power levels may vary between connection areas, but should be distributed as evenly as possible.



1. Fit original Multi-Contact MC4 connectors to each string of the DC voltage cable. Make sure that the polarity is correct here.

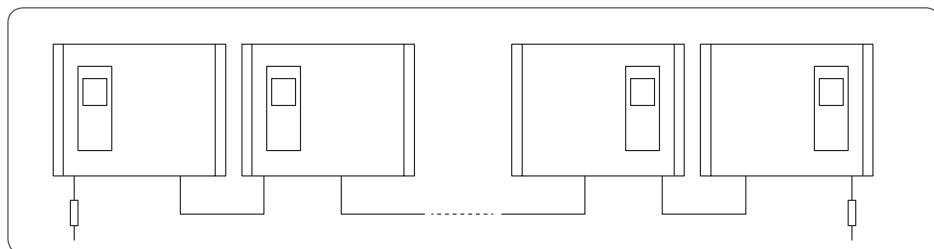


2. Take off the protective caps from the required DC voltage connections.
3. Insert the prepared DC voltage connectors into the DC voltage connections. In the process, make sure that the connectors lock in place correctly.



Fit protective caps to plug connectors that are not used.

3.5.4 Connection to the PLATINUM[®] network (EIA 485)

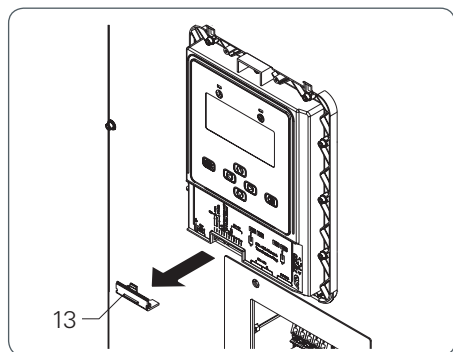


Up to 50 PLATINUM[®] inverters can be connected with monitoring devices to form a network with an overall length of up to 1,000 m.

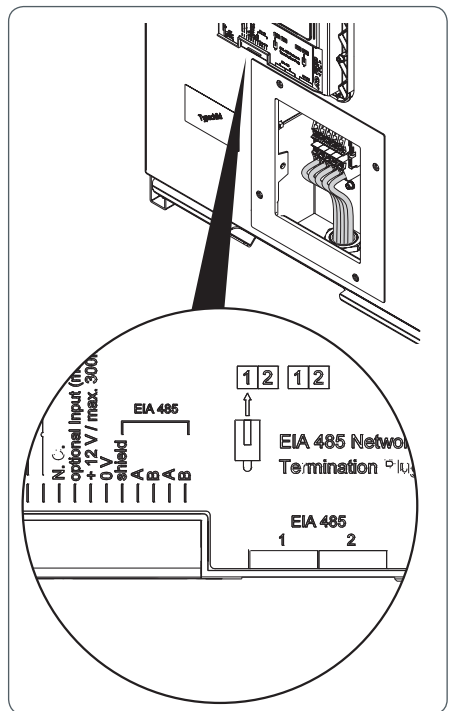
Network cable

- CAT 5 shielded twisted pair cable with pre-assembled RJ45 plugs (pin 3 = B and pin 6 = A)
- or –
- Twisted pair of wires of a CAT 5 cable

Connect



1. Take off the cover (13) from the terminal strip.



2. Connect the network cables in the inverter.

CAT 5 cable with RJ45 plug

- Incoming cable: Socket 1 (EIA485)
- Outgoing cable: Socket 2 (EIA485)

CAT 5 cable with 2 twisted wires

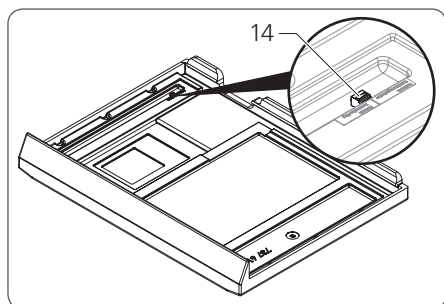
- Incoming cables:
Left-hand terminals A, B
- Outgoing cables:
Right-hand terminals A, B
- Shielding: Terminal 8

→ Ensure that signal lines A and B are not connected incorrectly.

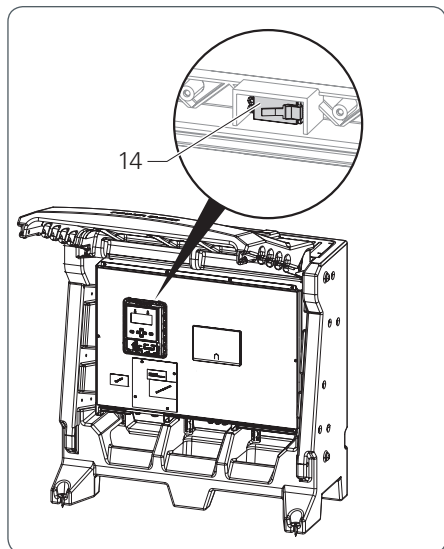
Termination

An integrated terminating resistor can be activated at both open ends of the network (at the first and last inverters).

Terminating ensures that the network functions correctly.

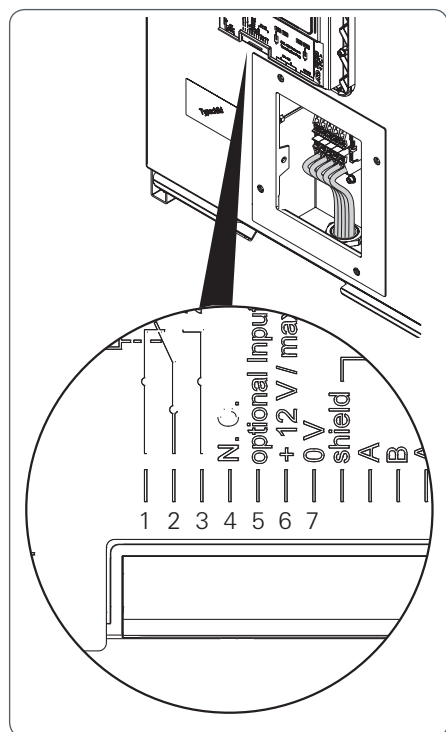


1. Detach the terminating connector (14) from the protector or from the display.
2. Connect the terminating connector to socket 1 of the first and last inverter.



3.5.5 Further connections on the terminal strip

On the terminal strip, there are further terminals for connection of a potential-free alarm contact, an external consumer and an input.



- (1) Alarm contact (NC contact)
- (2) Alarm contact (centre contact)
- (3) Alarm contact (NO contact)
- (4) Not used
- (5) Input, 12 V max. (optional)
- (6) Supply voltage for external consumer, 12 V, 300 mW max
- (7) Supply voltage for external consumer, 0 V

Alarm contact

In the event of a fault the contact closes and activates the alarm system (visual or acoustic) if required.

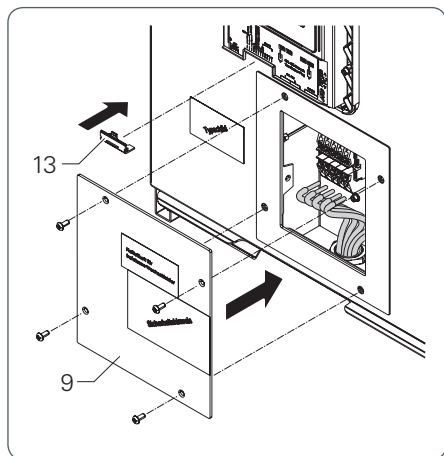
→ For the supply voltage, only use a safety extra-low voltage (SELV) with a maximum voltage of 24 V.



The alarm contact can be configured in the menu SETTINGS → ALARM FUNCTION; see 39.

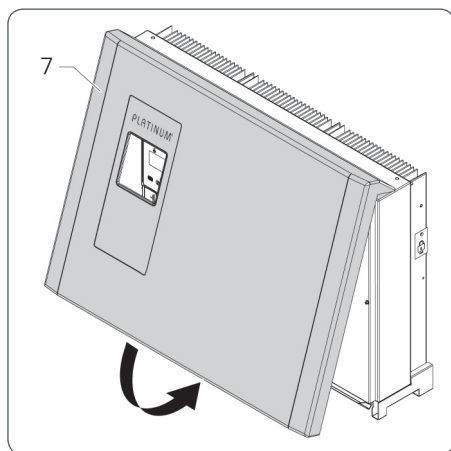
3.5.6 Final tasks

Covers of the internal connections



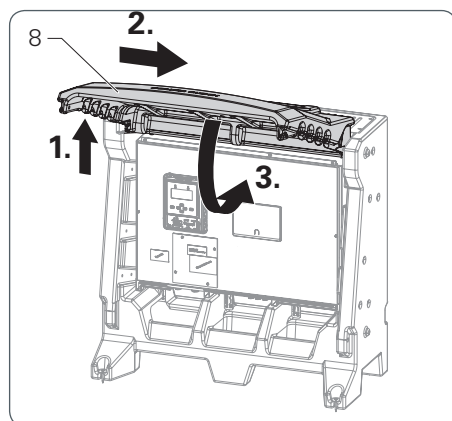
1. Refit the cover of the AC voltage connection (9) using the 4 screws.
2. Refit the cover on the terminal strip (13).

Mounting the protector

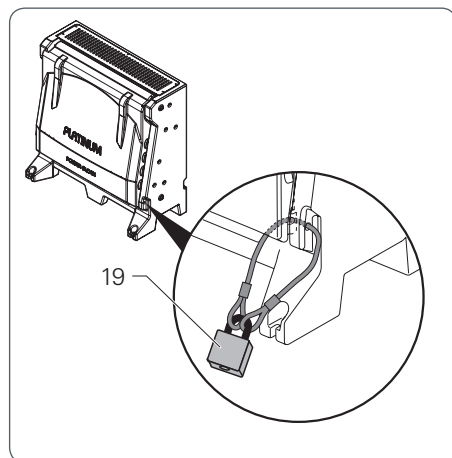


1. Place the upper part of the protector (7) on the upper holder and gently press it onto the housing.
2. Slide the lower part of the protector into the lower holder.

Close the protective flap (on a free-standing device for outdoor installation)



1. Raise the locked protective flap (8) as far as it will go.
2. Slide the protective flap to the right.
3. Closing the protective flap

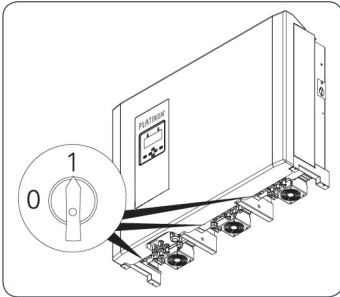


The protective flap can be locked to protect against unauthorised access.

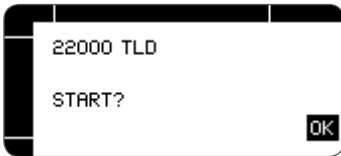
1. Pull a steel rope or similar (max. diameter: 13 mm) through the holes provided at the bottom of the protective flap and in the PowerBlock.
2. Secure the steel rope with a padlock.

4 Placing into operation

4.1 Switch on



1. Switch on mains voltage supply (safety device).
2. Switch on the DC voltage via the 3 DC disconnects on the underside of the device or via the external isolation device.



The inverter type appears on the display along with the prompt START?.

4.2 Initial operation



- To transfer all settings correctly, initial operation must be conducted in full once.
- When installing several inverters that are linked with each other via the PLATINUM[®] network (EIA485), initial operation can be performed on any inverter (master programming). For this to be possible, all inverters in the network must be switched on.
- The inverter automatically transfers the setting values to the other inverters via the PLATINUM[®] network (EIA485).
- Every inverter is allocated a number automatically during initial operation. This number can be changed and freely assigned in a further step.
- The inverters on which no data is entered display different screen content depending on the menu. If data cannot be entered, the inverter displays the start screen.
- During initial operation, all inverters connected to the PLATINUM[®] network are blocked.

4.3 Initial operation menu

4.3.1 Overview

The initial operation menu distinguishes between the initial operation of a device in a new PLATINUM[®] network to be configured and modifications to an existing PLATINUM[®] network (inverter replacement, reconfiguration).

Initial operation	Exchange inverter/reconfiguration
Start	Start
Language	Language
Network scan	Network scan
Change device number	Exchange inverter Reassign numbers
Country code *	Country code *
Date	Date
Time	Time



* The country code can only be changed for a period of 4 hours after initial operation and feed-in starts. This menu will not be displayed later.

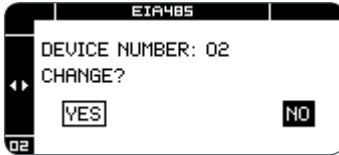
4.3.2 Description of the initial operation menu



Changing the date and time can cause saved data to be overwritten or lead to gaps in data logging.

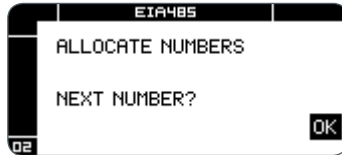
During initial operation, the date and time must be entered completely once.

Initial operation menu

Start	Confirm prompt with OK .
Language	Use the ▼/▲ buttons to select the required language and confirm with OK .
Network scan	<p>The inverter scans the connected PLATINUM® network and then displays the number of participants and inverters in the network.</p> <ul style="list-style-type: none"> ▪ If the number of participants and inverters is correct, confirm with OK. ▪ If the number of participants and inverters displayed is not correct: <ul style="list-style-type: none"> – Check the wiring. – Use the ◀/▶ buttons to choose REPEAT and confirm with OK. <p>The inverter will only detect network participants that are correctly connected via the PLATINUM® network.</p>
Change device number/ reassign numbers	<p>During initial operation, the inverter numbers are assigned automatically in the network.</p>  <ul style="list-style-type: none"> ▪ If the numbers set automatically are to be retained, confirm with NO and continue to the next menu option. The automatic numbers for all inverters in the network are transferred.

Change device number/ reassign numbers

- If different numbering is required, use the ◀/▶ buttons to choose **YES** and choose **OK** to open the menu for changing the device number. The following screen appears on all inverters in the network.

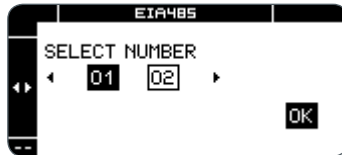


- On the desired first inverter, confirm **NEXT NUMBER?** with **OK**. The number 1 will be assigned to the inverter.
- Confirm **NEXT NUMBER?** with **OK** for every inverter in the network in the order desired. The next number in each case will be assigned to the inverter.

Exchange inverter

This menu option appears only if a new inverter is detected in an existing network. In this case, the numbers of the inverters replaced can be used.

This must be configured on every inverter replaced.



- If the number displayed (of the inverter replaced) is to be used, confirm with **YES** and continue to the next menu.
- If different numbering is required, use the ◀/▶ buttons to choose **YES** and choose **OK** to open the menu for changing the device number.

Country code

Use the ▼/▲ buttons to select the required country and confirm with **OK**.

Further settings may be required depending on the country. These settings depend on the utility company.

The country code is automatically applied to all network participants.



The country code can only be changed for a period of 4 hours after initial operation and feed-in starts. This menu will not be displayed later.

Date	<p>Enter the current date.</p> <ul style="list-style-type: none"> ▪ Use the ▼/▲ buttons to adjust the digits. ▪ Use the ◀/▶ buttons to move to the next digit. ▪ Choose OK to confirm the date entered.
Time	<p>Enter the current time.</p> <ul style="list-style-type: none"> ▪ Use the ▼/▲ buttons to adjust the digits. ▪ Use the ◀/▶ buttons to move to the next digit. ▪ Choose OK to confirm the time entered. <p>The date and time are automatically applied to all network participants.</p>



The date and time must be confirmed with **OK**, otherwise initial operation cannot be completed.

After the date and time have been entered the TIME SETTINGS screen is displayed, see “Menu Settings” on page 38.



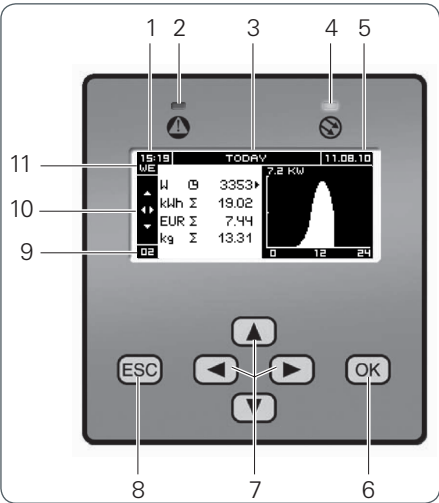
Depending on the requirements of the utility company, the following additional settings need to be made in the service menu, see “Service menu” on page 41:

- Phase balancer*
- Grid support
- Power reduction*

* These menus can only be changed for a period of 4 hours after initial configuration. These menus will not be displayed later.

5 Operation

5.1 Display



- (1) Time in 24-hour format
- (2) Alarm LED (red)
- (3) Title of the current screen
- (4) Operation LED (green)
- (5) Date
- (6) OK button
- (7) Navigation buttons
- (8) ESC button
- (9) Inverter number
- (10) Scroll arrows (vertical and horizontal)
- (11) Week day



The scroll arrows show which navigation buttons can be used to navigate on the current screen.

Meaning of the LEDs

Alarm LED (2) (red)

- | | |
|-------------|--------------------|
| LED off | ▪ Normal operation |
| LED flashes | ▪ Error |

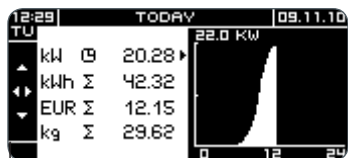
Operation LED (4) (green)

- | | |
|-------------|--------------------------------|
| LED lit up | ▪ Feed-in mode |
| LED flashes | ▪ Preparation for feed-in |
| LED off | ▪ Inverter not in feed-in mode |

Both LEDs flash at same time

The inverter is running a network scan or making parameter settings.

5.2 Operation display

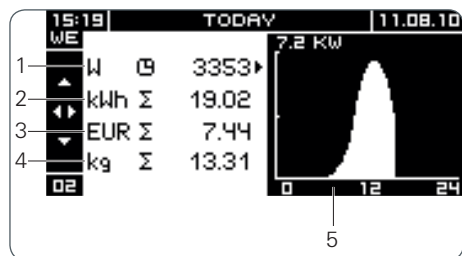


During normal operation, the operating mode is displayed. The power data is shown in a table and graph. In this way, the operation display provides an overview of the feed-in process and the yield of the PV system.

5.2.1 Navigating in the TODAY operation display

- ▼/▲ buttons Change between TODAY and ACTUAL operation displays
- ◀/▶ buttons Change between time periods in the operation display TODAY or from ACTUAL 1 through to ACTUAL 4

5.2.2 TODAY operation display



- (1) Current power
- (2) Total energy fed in today
- (3) Total feed-in rebate generated today
- (4) Total CO₂ saving today
- (5) Feed-in progress today



The values displayed by the inverter may differ from those displayed on calibrated electricity meters.

Display of other time periods

The inverter stores the power data for the total operating time. The following periods can be displayed:

- Today
- Current week
- Current month
- Current year
- Since initial operation
- Yesterday
- Previous week
- Previous month
- Previous year

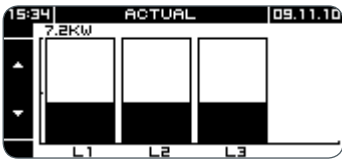
Differing display in other time periods

- The current power value (W ☺) is only displayed for the time period TODAY and if energy is currently being fed in. In all other periods, and when energy is not being fed in, the maximum value (W ↑) is displayed.
- Feed-in rebate >999,000 is displayed exponentially.
 - Example: EUR 1,234,567 is displayed as 1.234E6 (=1.234 x 10⁶)
- The progress of the power feed-in is only displayed for the periods TODAY and YESTERDAY. In all other periods, the energy fed in is displayed for each time interval.
 - Each day is represented by one bar in the weekly display (Mon. – Sun.).
 - Each day is represented by one bar in the monthly display (1st – 31st).
 - Each month is represented by one bar in the yearly display (Jan. – Dec.).

5.2.3 ACTUAL operation display

The ACTUAL operation display is divided between 4 screens.

Screen 1: Distribution across the inverter modules



The current power from each inverter module is displayed as a bar graph.
L1: left-hand inverter unit
L2: middle inverter unit
L3: right-hand inverter unit

Screens 2 – 4: Phase 1 – phase 3 for the DC side

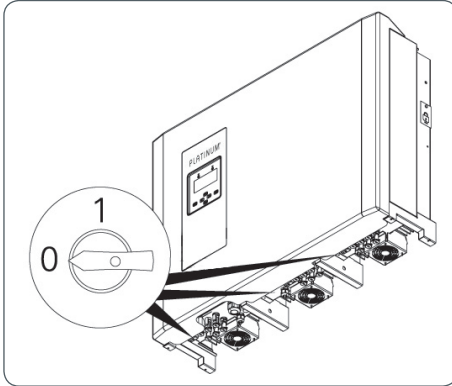
	DC	AC
VOLTAGE	450V	230V
CURRENT	6.1A	11.6A
POWER	2756W	2687W

This display shows the actual (current) values for the voltage, current and power on the DC side and on the AC side for each inverter module.

5.3 Isolation from the generator field

On devices with a DC disconnect

The DC disconnects on the underside of the device allow the solar generators to be switched on and off.



Position 0: Solar generator switched off

Position 1: Solar generator switched on



- PLATINUM GmbH recommends activating the DC disconnect once a year to prevent the contacts from fusing together.
- PLATINUM GmbH recommends switching off the mains voltage (AC) before switching off the DC disconnect to minimise wear to the contacts.

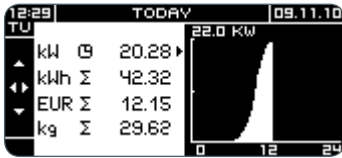
On devices with no DC disconnect

→ Disconnect the DC side from the solar generator using the external isolation device.

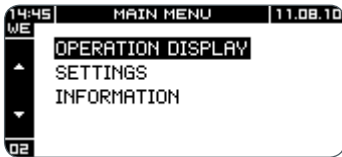
6 Menu

6.1 Operate and navigate in the menu

6.1.1 Call up menu



1. Press **ESC** on the operation display.



The main menu is displayed.

OPERATION DISPLAY is selected.

2. Use the ▼/▲ buttons to select the required menu, e.g. SETTINGS.
3. Open the menu selected by choosing **OK**.
The associated submenus are displayed.

6.1.2 Menu operation



The scroll arrows available in the current menu are shown in the black bar on the left.

Button	Meaning
▼/▲	<ul style="list-style-type: none">▪ Select from a list▪ If entering information: increase/decrease value
◀/▶	<ul style="list-style-type: none">▪ Switch between alternatives, e.g. YES/NO, BACK/SELECT▪ To the next/previous/higher-level parameter▪ If entering information: to the next/previous digit
ESC	<ul style="list-style-type: none">▪ Return to the higher-level menu without making any changes
OK	<ul style="list-style-type: none">▪ Adopt setting and return to the higher-level menu▪ Open selected submenu

6.2 Menu tree

Operation display	See “Display” on page 32	
Settings	Time settings	Date / time
		Date format DD-MM-YYYY, MM-DD-YYYY, YYYY-MM-DD
		Daylight saving Manually, automatically
	Language	Deutsch, English, Italiano, Español, Nederlands, Français
	Alarm volume	0 to 3
	Alarm function	Off, Interval, Continuous, Test
	LCD	Contrast 0 to 63
		Brightness 0 to 9
	Rebate	
	System	
	Plant size	
	Meter 2	
Information	Operating data	
	System data	
	Inverter type	
	Inverter version	



The menu options are described in tables below.

6.3 SETTINGS menu

Time settings

Date / time	<ul style="list-style-type: none">▪ Enter date and time in the format shown.▪ If changing to daylight savings time manually, the following prompt appears: DAYLIGHT SAVING YES/NO.<ul style="list-style-type: none">– YES One hour is added to the time set.– NO The time already set is used.▪ Before the new values are selected, a security prompt is shown.	
Date format	<ul style="list-style-type: none">▪ Select date format. Possible date formats: DD-MM-YYYY, MM-DD-YYYY, YYYY-MM-DD	
Daylight saving	MANUALLY	Manually switch between daylight saving/winter time. When the date and time are next entered, the DAYLIGHT SAVING YES/NO prompt appears.
	AUTOMATICALLY	Automatically switch to daylight saving/winter time according to the selected country.



- Changing the date and time can cause saved data to be overwritten or lead to gaps in data logging.
- The inverter transfers the time settings to all network participants automatically.

Language

Deutsch	<ul style="list-style-type: none">▪ Select the language required. The inverter transfers the language set to all network participants automatically.
English	
Italiano	
Español	
Nederlands	
Français	

Volume

0 to 3	<ul style="list-style-type: none">▪ Set the alarm volume for the built-in buzzer on this inverter. Possible values: 0 to 3 Factory setting: 0 (alarm off)
--------	--

Alarm function

Off	The alarm contact (NO contact) remains constantly open in the event of a safety-related or blocking fault.
Interval	The alarm contact (NO contact) opens and closes periodically in the event of a safety-related or blocking fault.
Duration	The alarm contact (NO contact) is constantly closed if a safety-related or blocking fault occurs until the fault has been rectified.
Test	Briefly closes the alarm contact for testing purposes if the menu item is selected.

LCD

Contrast	<ul style="list-style-type: none"> Set the display contrast. Possible values: 0 to 63
Brightness	<ul style="list-style-type: none"> Set the display brightness. Possible values: 0 to 9

Feed-in rebate

Currency	<ul style="list-style-type: none"> Enter currency of the country, max. three characters.
Value / kWh	<ul style="list-style-type: none"> Enter rebate per fed-in kWh in the format shown.

System

Name	<ul style="list-style-type: none"> Assign the system (network with several inverters) a name (max. 18 characters).
Description	<ul style="list-style-type: none"> Specify the system further by means of a description (max. 18 characters).

Plant size

Power system	<ul style="list-style-type: none"> Enter power installed in the entire network. A security prompt appears: "Plant size ..."
--------------	--

Meter 2

	Meter 2 counts the energy fed in since the last reset.
Back	<ul style="list-style-type: none"> Do not reset meter 2.
Reset	<ul style="list-style-type: none"> Reset meter 2.

6.4 INFORMATION menu

The INFORMATION menu offers the following information screens:

16:44	ENERGY METER	11.08.10
WE		
▲	GENERAL	METER 2
	09.02.2005	11.08.2010
▼	45.862 MWh	13.12 kWh
	20500 h	3 h
02		

- (1) Total energy since initial operation date and number of operating hours
- (2) Energy since the last reset and number of operating hours

15:46	SYSTEM	11.08.10
WE		
3 ▲	NAME	PV-SYSTEM
4 ▼	NO. OF PARTICIPANTS	05
	NO. OF INVERTERS	04
02		

- (3) Name and description (if available) of the system
- (4) Number of participants and inverters in the PLATINUM® network

15:54	INFORMATION	20.10.11
TH		
5 ▲	TYPE	22000 TLD
6		ENS3-DE AK01
7 ▼	S/N	1007.111018001
8		VDE-AR-N 4105
		*

- (5) Type information
- (6) ENS version *
- (7) Serial number
- (8) Configured standard

10:40	INFORMATION	25.02.11
FR		
9 ▲	FIRMWARE	V 1.1.0.0
10 ▼	EIA485	V 5.1
02		

- (9) Firmware version
- (10) PLATINUM® network version

* ENS = Device for monitoring the network with allocated control elements



When making contact with the PLATINUM® service department, have the serial number and event code to hand.

6.5 Service menu

6.5.1 Call up service menu

1. Call up the main menu with the **ESC** button.
2. Select the **SETTINGS** menu with the **▲/▼** buttons and confirm with **OK**.
3. Press and hold the **◀** and **▶** buttons together for around three seconds.
The service menu is displayed with the menu item **EVENTS LIST** selected.
4. Select the required menu using the **▲/▼** buttons.

6.5.2 Overview of the service menu

Event list	See section 8.2
Parameters	See section 6.5.3
Initial op. date	Show initial operation date
Energy meter	Show energy fed in since initial operation
Reconfiguration	See section 4.3
MPP mode	See section 6.5.4
Grid support	See section 6.5.5
Phase balancer*	See section 6.5.6
Power reduction *	See section 6.5.7



* These menus can only be changed for a period of 4 hours after initial configuration.

6.5.3 PARAMETERS service menu

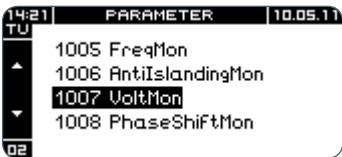
In some supply areas, the values for supply voltage and frequency sometimes or always differ from the factory settings. PLATINUM® inverters can be adapted to these values. For more information, contact the PLATINUM® service.

The PARAMETERS service menu shows the parameters set, the country code and the valid guidelines. The parameters are structured in several levels, with the specific value displayed on the lowest level.

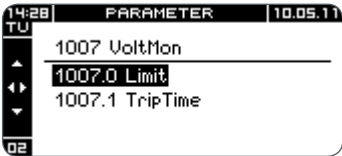


Parameters can only be modified by certified persons with the PLATINUM® service tool.

Example: Parameter 1007 VoltMon (voltage monitoring)

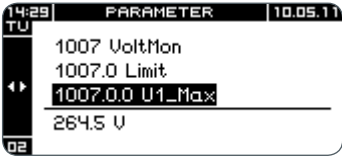


Parameter 1007



Parameter 1007

- with submenus 1007.0 and 1007.1



Parameter 1007,

- with submenus 1007.0 and 1007.0.0
- with the current value for 1007.0.0

6.5.4 MPP MODE service menu

MPP mode

Default	▪ Default MPP mode for free module surface
Shadow mode	▪ For systems with shadowing (e.g. through trees), the MPP area is frequently subject to complete scans.



- Shaded systems should also be run initially in the MPP mode NORMAL.
- In the MPP SHADOW mode, the ideal yield may not be achieved because only a low level is fed in during the MPP search.

6.5.5 GRID SUPPORT service menu

Grid support

Remote	In this setting, grid support is set by a remote device (e.g. PLATINUM® WebMaster).
Cosine Phi	Enter cosine phi. <ul style="list-style-type: none"> ▪ Cosine Phi 0.707 ... 1 ▪ Type Capacitive (over-excited), inductive (under-excited) ▪ Phi Associated angle
Reactive power	Enter the reactive power. <ul style="list-style-type: none"> ▪ % P_Nom 0 ... 50 ▪ Type Capacitive (over-excited), inductive (under-excited) ▪ Reactive power Associated reactive power
Cosine Phi(P)	In this setting, cosine phi is configured according to the specifications saved in the PLATINUM® inverter.
Q(U)	Voltage-dependent reactive power Centre voltage <ul style="list-style-type: none"> ▪ Typically 102.0%
Q(U) hysteresis	Q(U) closed-loop control according to the curve saved in the inverter. The curve can be parametrised via the PLATINUM® service tool.

6.5.6 PHASE BALANCER service menu

The unbalanced load is the difference between the instantaneous AC power levels on the three network phases. Energy providers and utility companies specify the maximum permissible unbalanced load for the installation of inverters in different phases of the supply network.

The phase balancer function ensures that the maximum permissible unbalanced load is not exceeded in the following scenarios:

- Failure of an inverter module
- Load-dependent variations in AC power levels



This menu can only be changed for a period of 4 hours after initial configuration.

Phase Balancer

Off	The phase balancer is switched off. The unbalanced load is not limited.	
Power Control	Configuring the phase balancer.	
	▪ Max. power	Enter max. permissible unbalanced load in W. Possible settings: 0 W to max. power
	▪ Reaction time	Enter the reaction time in seconds. Possible settings: 0 to 3600 seconds Factory setting: 300 seconds
	▪ Power control	Checking and confirmation of the previously chosen settings. The inverter transmits the data to the other two inverters connected to the phase balancer cable. The red and green LEDs flash while the data is being saved.
Error Off	In the event of failure of an inverter, the other two inverters connected via the phase balancer are also isolated from the network.	
Error Reduce	In the event of failure of an inverter, the other two inverters connected via the phase balancer limit the AC power level to the set unbalanced load.	



If the feed-in power of an inverter is reduced due to unbalanced load, no status message is output on the inverter.

6.5.7 POWER REDUCTION service menu



This menu can only be changed for a period of 4 hours after initial configuration.

Power reduction

Maximum power	Enter the maximum power for this inverter according to the specifications of the utility company.
---------------	---

7 Maintenance and cleaning



DANGER

Risk of death due to electric shock!

- ▶ Only allow inverters to be opened by the PLATINUM® service department or by service partners authorised by PLATINUM GmbH.



DANGER

Risk of death due to high DC and AC voltages!

- ▶ Wear insulating protective clothing and face protection.
- ▶ Maintenance and cleaning is to be performed only by trained specialist personnel.

The trained specialist personnel must be granted permission by the energy provider responsible.

Before every maintenance or cleaning task:

- ▶ Switch off mains voltage supply (safety device).
- ▶ Set the switch knobs of all DC disconnects to "0".
- ▶ Wait at least 40 minutes until the capacitors are discharged.
- ▶ Make sure that no voltage is applied to the DC cables.

7.1 Maintenance



The inverter is maintenance-free.

7.2 Cleaning

CAUTION

Destruction of the inverter!

- The inverters must not be cleaned with a steam cleaner.

CAUTION

Damage to the fan due to high rotational speeds!

- Use extreme caution to clean the inverter with compressed air.

To ensure cooling, clean the ventilation slots regularly with the following:

- Vacuum cleaner
- Soft brush
- Pressured air

In a dusty environment:

- Regularly check the fan and cooling element and clean as required.

8 Errors and troubleshooting

8.1 Error display

Three different types of error are displayed on the inverter:

- Serious errors
- Blocking errors
- Non-blocking errors



As long as an error is displayed, the event list can be called up by pressing the ► button – see 41.

8.1.1 Serious errors

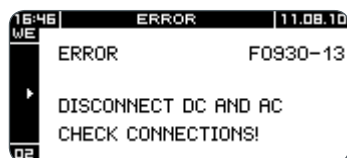


WARNING

Destruction of the inverter due to serious error!

- Switch off AC voltage.
- Switch off DC voltage: Set DC disconnect to 0.
- Inform the PLATINUM[®] service department. Have the error code and serial number to hand.

Example of a serious error



When a serious error is displayed:

1. Follow the instructions on the inverter.
2. To exit the error display, press the ► button.
The event list is displayed.
3. Exit the event list by pressing the **ESC** button.

8.1.2 Blocking errors

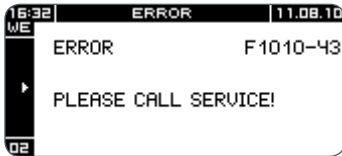


DANGER

Risk of death due to electric shock!

- ▶ Blocking errors are only to be rectified by service partners authorised by PLATINUM GmbH.

Example of a blocking error



- The inverter is permanently switched off.
- The inverter raises a visual alarm (red LED flashes).
- The inverter raises an acoustic alarm.

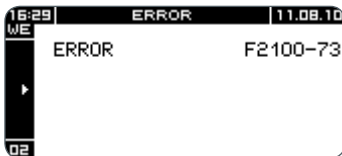
When a blocking error is displayed:

1. Follow the instructions on the inverter.
2. To stop the acoustic alarm, press any button.
3. To exit the error display, press the ► button.
The event list is displayed.
4. Exit the event list by pressing the **ESC** button.
The initial operation screen is displayed. The red LED continues to flash as long as the error remains.

8.1.3 Non-blocking errors and warnings

Non-blocking errors occur temporarily (e.g. overvoltage on the grid). The inverter switches off automatically and remains switched off until the cause of the error no longer exists. Once the error has been rectified, the inverter automatically reverts to normal operation.

Example of a non-blocking error



The red LED flashes at the same time as long as the error exists.

Stop alarm

1. To exit the error display, press the ► button.
The event list is displayed.
2. Exit the event list by pressing the **ESC** button.

8.2 Event list

The “Event List” in the service menu (see “Service menu” on page 41) displays the last 100 events detected.

Structure of the event list

14:33	EVENT LIST				11.08.10
WE					
▲	001	11.08.10	14:29	F1300-43	(1) Sequential numbers
	002	11.08.10	14:29	W4090-A3	(2) Date
▶	003	11.08.10	14:29	F2010-73	(3) Time
	004	11.08.10	14:29	E4020-D3	(4) Event code
▼	005	11.08.10	14:29	E4010-D1	
02					
	1	2	3	4	



- The complete event list can be downloaded from our website www.platinum-nes.com.
- When making contact with the PLATINUM® service department, have the serial number and event code to hand.
- To exit the event list, press the **ESC** button.

No.	Meaning	Measure
Serious errors		
900	AC voltage too high	<ul style="list-style-type: none">▪ Isolate inverter from network▪ Check AC voltage connection
910	DC voltage too high	<ul style="list-style-type: none">▪ Isolate inverter from network▪ Isolate inverter from DC voltage connection▪ Check inverter for damage▪ Check the module connections
920	Reverse polarity at DC voltage connection	<ul style="list-style-type: none">▪ Set DC disconnect to 0▪ Check DC voltage connection
930	Isolation error between PV+ and earth / PV– and earth	<ul style="list-style-type: none">▪ Check isolation of PV modules▪ Check isolation of PV cables▪ AC installation (check N and PE)

No.	Meaning	Measure
940	Serious system error	<ul style="list-style-type: none"> ▪ Disconnect the AC voltage and the DC generator from the inverter and then reconnect them ▪ Inform service ▪ Inform service of error code if required
950	Serious system error	<ul style="list-style-type: none"> ▪ Disconnect the AC voltage and the DC generator from the inverter and then reconnect them ▪ Inform service ▪ Inform service of error code if required
Blocking errors		
1000 ... 1990	Blocking system error	<ul style="list-style-type: none"> ▪ Isolate inverter from network ▪ Put inverter back into operation <p>If measures prove unsuccessful:</p> <ul style="list-style-type: none"> ▪ Inform service
1300	L and N connections mixed up	<ul style="list-style-type: none"> ▪ Check L and N at the AC voltage connection
Non-blocking errors		
2010	AC voltage limit exceeded or undershot on feed-in phase	<ul style="list-style-type: none"> ▪ Have the AC voltage of the feed-in phases checked
2020 ... 2040	Limit for phase-to-phase voltages exceeded or undershot	<ul style="list-style-type: none"> ▪ Ensure that all safety devices are switched on ▪ Ensure that all three phases are connected
2080	Network fault on feed-in phase (voltage peak)	<p>If this occurs frequently:</p> <ul style="list-style-type: none"> ▪ Arrange for all contacts and safety devices to be checked, from the service connection to the inverter ▪ Arrange for the network quality to be checked

No.	Meaning	Measure
2090	Network quality threshold exceeded	<p>If the network voltage is permanently too high at the feed-in point:</p> <ul style="list-style-type: none"> ▪ Check for voltage drop on the network supply line ▪ Inform the utility company ▪ Check the value for the network quality threshold
2100	Mains frequency limit exceeded or undershot	<p>If the inverter is supplied with emergency power from a different mains frequency:</p> <ul style="list-style-type: none"> ▪ No measures required
2120 ... 2130	Diagnosis support in service situation	<ul style="list-style-type: none"> ▪ Inform service of error code if required
2140 ... 2180	Excessively high fault current during switch-on	<p>If this occurs frequently:</p> <ul style="list-style-type: none"> ▪ Check the insulation resistance on the DC side
2200 ... 2250	Measured temperature too high	<ul style="list-style-type: none"> ▪ Check ventilation openings ▪ Clean the cooling fins
2260	Max. network current exceeded	<ul style="list-style-type: none"> ▪ Check the AC voltage side for short circuit
2300 ... 2330	Temperature sensor defective	<ul style="list-style-type: none"> ▪ Inform service
2340 ... 2610	Diagnosis support in service situation	<ul style="list-style-type: none"> ▪ Inform service of error code if required
2620	Power supply overloaded on the interface card	<ul style="list-style-type: none"> ▪ Isolate the connections on the interface card ▪ Check the connections on the interface card for short circuit <p>If measures prove unsuccessful:</p> <ul style="list-style-type: none"> ▪ Inform service ▪ Inform service of error code if required
2630 ... 2990	Diagnosis support in service situation	<ul style="list-style-type: none"> ▪ Inform service of error code if required

No.	Meaning	Measure
2710 ... 2730	Max. AC current exceeded	<ul style="list-style-type: none"> ▪ Check the AC voltage side for short circuit
2740	Min. AC voltage not attained	
2750	Manual stop	<ul style="list-style-type: none"> ▪ Check the position of the emergency off switch ▪ Inform service ▪ Inform service of error code if required
Warnings		
3000 ... 3990	Diagnosis support in service situation The inverter stores the warning in the event list	<ul style="list-style-type: none"> ▪ Inform service of error code if required
Information		
4000 ... 4990	Diagnosis support in service situation The inverter stores the warning in the event list	<ul style="list-style-type: none"> ▪ Inform service of error code if required
Causes		
5000 ... 5990	Diagnosis support in service situation The inverter stores the warning in the event list	<ul style="list-style-type: none"> ▪ Inform service of error code if required

9 Technical data

Input variables	13000 TL
Max. PV power	14,700 Wp
Max. DC power ($\cos \varphi = 1$)	12,900 Wp
MPPT voltage range	351 – 710 V
Max. input voltage	880 V
Max. MPPT input current	3 x 13.0 A
Number of string inputs	3
Number of MPP trackers	3
Short circuit current	3 x 18 A
Output variables	13000 TL
Nominal power ($\cos \varphi = 1$)	12,360 W
Nominal current	17.9 A
Max. apparent power	12,360 VA
Max. AC current	17.9 A
Fuse protection on the AC side	3 x 25 A
Min. start power	21 W
Mains output voltage	3AC 230 V / 400 V + N (+/- 20%)
Mains frequency	50 Hz (+/- 5%)
Feed-in/monitoring phases	3 / 3
Max. network impedance permitted (Z_{\max})	424 mΩ
Standby consumption	<6 W
Short-circuit strength	Yes
Power factor ($\cos \varphi$)	0.7 ind. ... 0.7 cap.
Max. short circuit current (max. duration 5 ms)	<100 A
Max. switch-on current	<20 A
Efficiency	13000 TL
Max. efficiency	97.7%
Euro efficiency	97.4%
Type name	13000 TLxD

16000 TL	19000 TL	22000 TL	22001 TL
18,000 Wp	21,300 Wp	24,000 Wp	23,000 Wp
15,900 Wp	18,900 Wp	21,600 W	20,800 W
349 – 710 V	350 – 710 V	351 – 710 V	351 – 710 V
880 V			
3 x 16.0 A	3 x 18.5 A	3 x 21.0 A	3 x 20.2 A
3	6	6	6
3			
3 x 22 A	3 x 26 A	3 x 29 A	3 x 28 A
16000 TL	19000 TL	22000 TL	22001 TL
15,000 W	18,000 W	20,700 W	20,000 W
21.7 A	26.1 A	30.0 A	29.0 A
15,000 VA	18,000 VA	20,700 VA	20,000 VA
21.7 A	26.1 A	30.0 A	29.0 A
3 x 32 A			
21 W	24 W	24 W	24 W
230 V (+/- 20%) single-phase			
50 Hz (+/- 5%)			
3 / 3			
349 mΩ	290 mΩ	253 mΩ	261 mΩ
<6 W			
Yes			
0.7 ind. ... 0.7 cap.			
<100 A			
<20 A			
16000 TL	19000 TL	22000 TL	22001 TL
97.7%	98.0%	98.0%	98.0%
97.4%	97.5%	97.5%	97.5%
16000 TLxD	19000 TLxD	22000 TLxD	22001 TLxD

Interfaces	... TL
DC isolation device	Optional switch integrated in device for isolation from generator field
DC input	DC connector, Multi-Contact MC4
AC output	Spring terminal
PLATINUM [®] network	EIA 485, 2 x RJ45 Western Modular, screw terminals
Service interface	EIA 232, D-sub 9-pin socket
Potential-free contact	1 changeover contact, max. 24 V AC / 2 A, screw terminals
Ambient conditions	... TL
Operating temperature range	–20 °C to +60 °C
Storage temperature	–20 °C to +80 °C
Rel. humidity	Max. 95%
Protection class (with the exclusion of the digital interface)	IP65 in accordance with DIN EN 60529
Level of contamination	II, external and internal use possible

Inverter data	... TL
Weight	
▪ 13000 TL	81 kg
▪ 16000 TL	84 kg
▪ 19000 TL, 22000 TL, 22001 TL	87 kg
Dimensions (H x W x D)	743 x 972 x 262 mm
Protection class / overvoltage protection	I / III
Overvoltage category	DC side: II; AC side: III
Reverse voltage protection (DC)	Yes
Ground fault monitoring	DC side: Isolation check AC side: AFI
Optical display	Full graphic LCD, 170 x 76 pixels
Integrated datalogger	Storage capacity sufficient for operating time of 30 years
Switching concept	Transformerless, DIVE [®] , RAC-MPP [®] technology
Cooling concept	
▪ 13000 TL	Convection cooling
▪ 16000 TL, 19000 TL, 22000 TL, 22001 TL	Fan



The technical data is valid for a maximum height of 2,000 m above sea level.

10 Taking out of operation



DANGER

Risk of death due to high DC and AC voltages!

- ▶ Wear insulating protective clothing and face protection.
- ▶ Inverters are only to be uninstalled by trained specialist personnel.
The trained specialist personnel must be granted permission by the energy provider responsible.
- ▶ Switch off mains voltage supply (safety device).
- ▶ Set the switch knob of the DC disconnect to 0.
- ▶ Wait at least 40 minutes until the capacitors are discharged.
- ▶ Make sure that no voltage is applied to the DC cables.



WARNING

Injury may result if the inverter falls!

- ▶ Get a second person to help with assembly and disassembly.
- ▶ Wear safety shoes during assembly and disassembly.
- ▶ Ensure that the inverter is positioned securely.



The procedure for taking inverters out of operation is the reverse of that for installation and assembly.

11 Disposal



- Packaging and replaced parts are to be disposed of in accordance with the regulations of the country in which the inverter was installed.
- Do not dispose of PLATINUM[®] inverters with normal household waste.



- PLATINUM[®] inverters can be fully returned to PLATINUM GmbH at the end of their service life.
- PLATINUM[®] inverters can be disposed of via municipal waste management for electrical devices.

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