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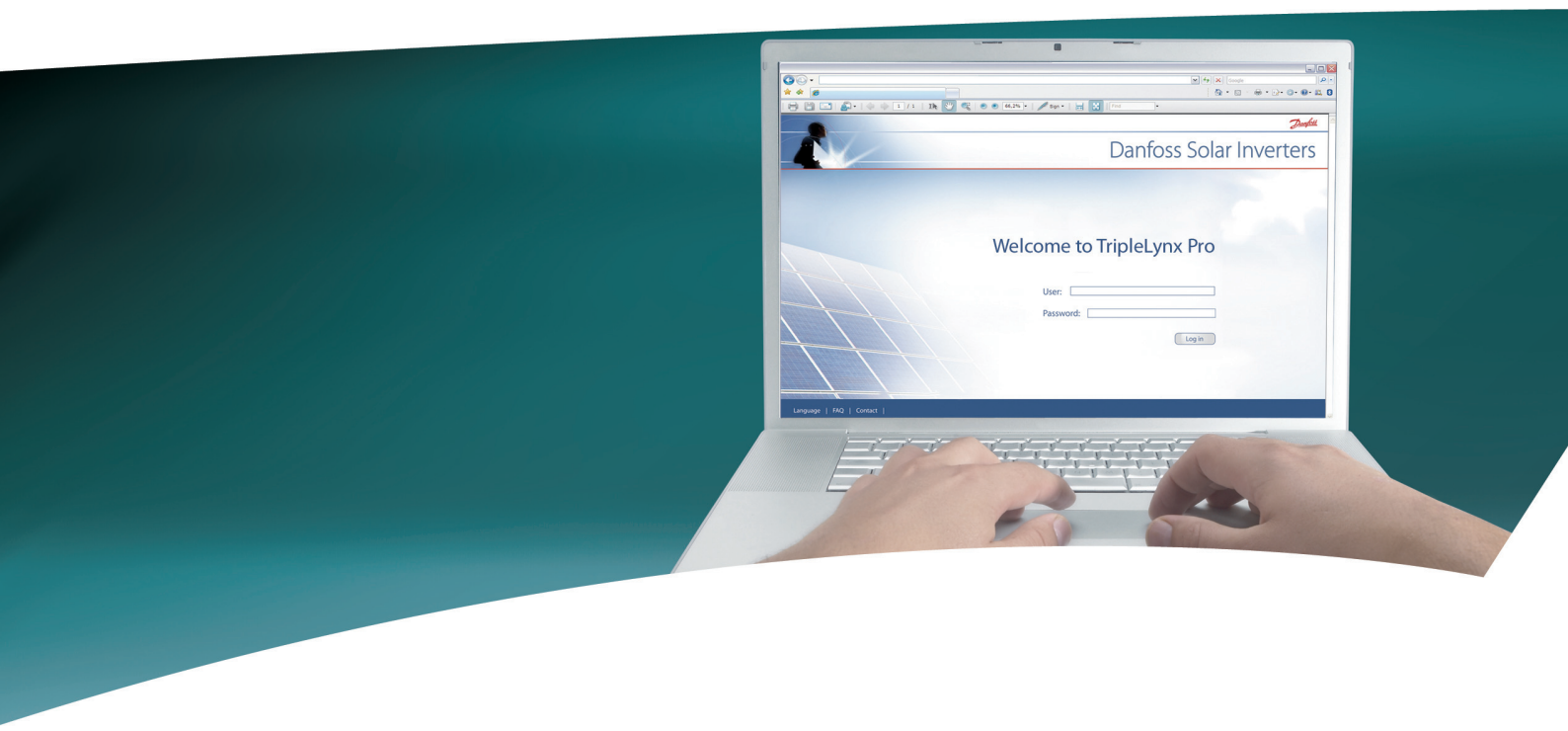

Danfoss TLX Pro Web Server

User Manual

Three-phase – 8, 10, 12.5 and 15 kW

SOLAR INVERTERS

Contents

1. Introduction

1.1. Introduction

These instructions describe the TripleLynx Pro Web Server and explain how to use it.
Refer to the download area at www.danfoss.com/solar for the newest instructions.

The Remote Connection chapter contains information for establishing access via the internet.
The Getting Started chapter explains initial setup and operation of the Web Server.
The remaining chapters explain functions in each menu.
The final chapter, Site Map, provides an overview of all menu items.

1.1.1. Disclaimer

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Do not use data obtained from the inverter for billing purposes. Data collected by the TripleLynx inverter regarding the power generated by the PV plant may deviate from those displayed by the energy meter with up to 3 %.

Values are calculated on the basis of active power unless otherwise indicated.

1

Symbol	Explanatory note
Italics	1) Indicates reference to a section of the present manual. 2) *Italics* are also used to indicate an operation mode, e.g. operation mode *Connecting*.
[ ] used in text	1) Encloses a path of menu navigation. 2) Also used to enclose abbreviations such as [kW].
[x] superscripted in headlines	Indicates security level.
[Plant]	Menu item accessible at plant level.
[Group]	Menu item accessible at group level or above.
[Inverter]	Menu item accessible at inverter level or above.
→	Indicates a step within menu navigation.
✍	Note, useful information.
!	Caution, important safety information.
# ... #	Name of plant, group or inverter in sms or e-mail message, eg. #plant name#.
Site Map	
Symbol	**Explanatory note**
↳	Indicates a submenu.
[x]	Defines current security level, where x is between 0-3.

Table 1.1: Symbols

1.1.2. List of Abbreviations

APN	Access point name (for GPRS)
DW-upload	Data warehouse upload of logged inverter data, also known as web portal upload
DHCP	Dynamic Host Configuration Protocol - dynamic allocation of IP addresses
DNO	Distribution network operator
DNS	Domain Name System
FF	Fill Factor
FTP	File Transfer Protocol
GPRS	General Packet Radio Service
GSM	Global System for Mobile Communication
ISP	Internet Service Provider
LAN	Local Area Network
MAC	Media Access Control, a unique hardware number of the inverter
P	P is the symbol for real power and is measured in Watts (W)
PLA	Power level adjustment
P_{NOM} Power	Nominal conditions
P_{STC} Power	Standard Test Conditions
PR	Performance Ratio
Q	Q is the symbol for reactive power and is measured in reactive volt-amperes (VAr)
RCMU	Residual Current Monitoring Unit
ROCOF	Rate Of Change Of Frequency
RTC	Real Time Clock
S	S is the symbol for apparent power and is measured in volt-amperes (VA)
SIM	Subscriber Identity Module
SMTP	Simple Mail Transfer Protocol
SW	Software
TLX	TripleLynx

1.1.3. System Requirements

The TripleLynx Pro Web Server is operated exclusively from a web browser (Internet Explorer® from version 5 or Firefox® from version 2), with either:

- direct access via PC connection to the Ethernet interface of the communication board (see *Accessing the* TripleLynx), or
- remote access via the internet (see *Remote Connection*).

For all language versions, the Web Server software supports characters compatible with Unicode.

For plant, group and inverter name, only the following characters are supported:

Letters	abcdefghijklmnopqrstuvwxyz
Capital letters	ABCDEFGHIJKLMNOPQRSTUVWXYZ
Numbers	0123456789
Special characters	- _.
Note! No spaces are allowed in inverter name.	

2. Getting Started

2

2.1. Access and Initial Setup

2.1.1. Access via PC Ethernet Interface

> Change the Web Server logon and password of the master inverter immediately for optimal security when connecting to the internet. To change the password go to [Setup → Web Server → Admin].

Setup Sequence:

1. Select which inverter will be set up as master.
2. Open the cover of this inverter. Refer to the TripleLynx Installation Manual for instructions.
3. Connect the inverter RJ45 interface to the PC Ethernet interface using a patch cable (network cable cat5e, crossed or straight through).
4. On the PC, wait until Windows reports limited connectivity (if no DHCP is present). Open the internet browser and ensure pop-ups are enabled.
5. Type http://invertername in the address field:
   - Find the serial number on the product label, located on the side of the housing.
   - 'Invertername' is the final 10 digits of the serial number (1).

Illustration 2.1: Product Label

6. The Web Server logon dialog opens.
7. Type 'admin' in the user and password fields, and click [Log in].
8. At initial logon the inverter runs a setup wizard.

2.1.2. Setup Wizard

Step 1 of 7: Master setting

To set up a master inverter, click on [Set this inverter as master].

- A scan runs to identify inverters in the network.

- A pop-up window shows the inverters successfully identified.

Click [OK] to confirm that the correct number of inverters has been found.

Illustration 2.2: Step 1 of 7: Master Setting

To change this setting later, refer to *Setup, Inverter Details*.

Step 2 of 7: Display language

Select display language. Note that this selection defines the language in the display, not the grid code.

- The default language is English.

Illustration 2.3: Step 2 of 7: Display Language

To change the language setting later, refer to *Setup, Setup Details*.

Step 3 of 7: Time and date

Enter

- time in 24-hour format
- date
- time zone

Accuracy is important, because date and time are used for logging purposes. Adjustment for daylight savings is automatic.

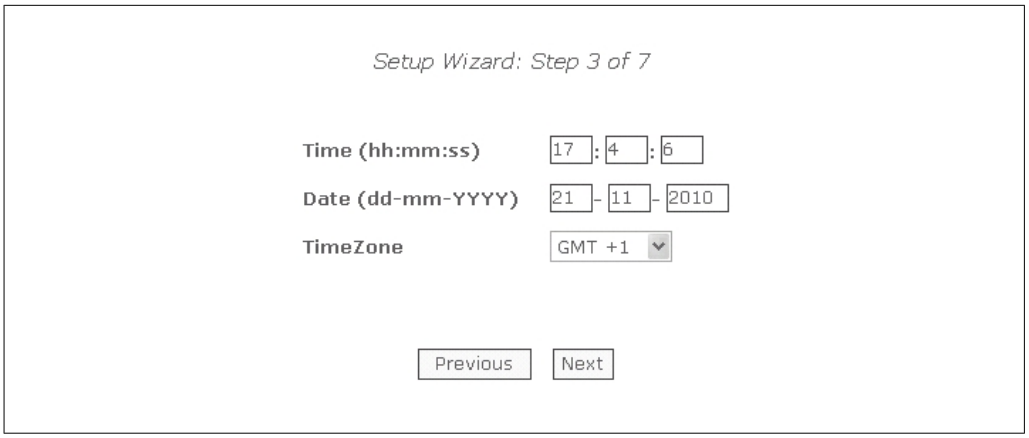

Illustration 2.4: Step 3 of 7: Time and Date

To change these settings later, refer to *Setup, Inverter details, Set Date and Time*.

Step 4 of 7: Installed power

For each PV input, enter

- surface area
- installed power

For more information refer to the TripleLynx Reference Manual.

Incorrect setting can have serious consequences for production efficiency.

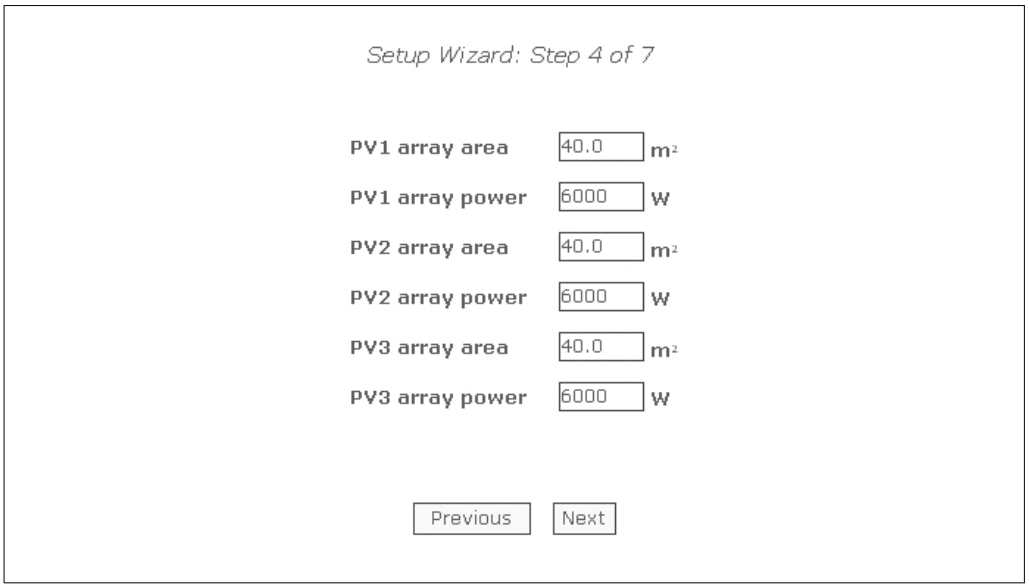

Illustration 2.5: Step 4 of 7: Installed Power

To change the installed power, refer to *Setup, Calibration, PV Array*.

Step 5 of 7: Grid code

Select the grid code to match the location of the installation. To meet medium-voltage grid requirements select a grid code ending in MV.

- The default setting is [undefined].

Select the grid code again, to confirm.

- The setting is activated immediately.

Correct selection is essential to comply with local and national standards.

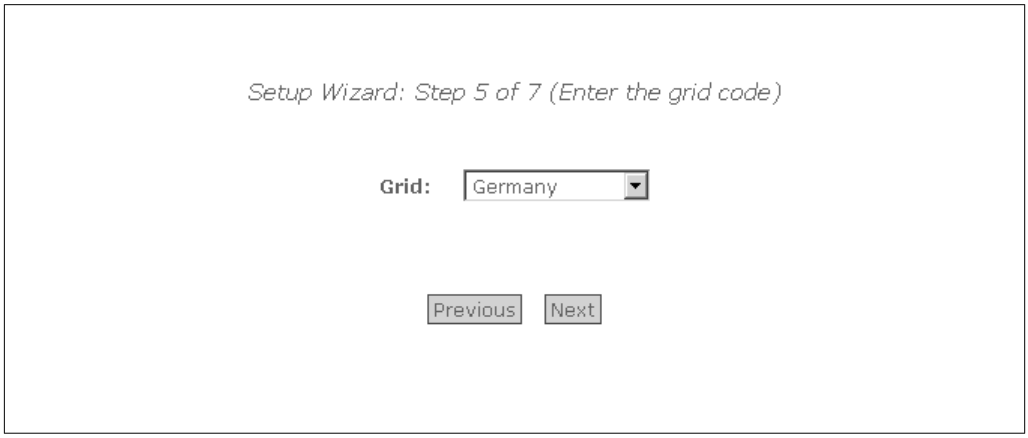

Illustration 2.6: Step 5 of 7: Grid Code

Note:
If the initial and confirmation settings are different,

- grid code selection is cancelled
- the wizard recommences step 5

If initial and confirmation settings match, but are incorrect, contact service.

Step 6 of 7: Replication

To replicate the settings from steps 1 to 6 to other inverters in the same network

- Select inverters
- Click [Replicate]

Note:
When the PV configuration, installed PV power and PV array area of follower inverters in the network differ from that of the master, do not replicate. Set up the follower inverters individually.

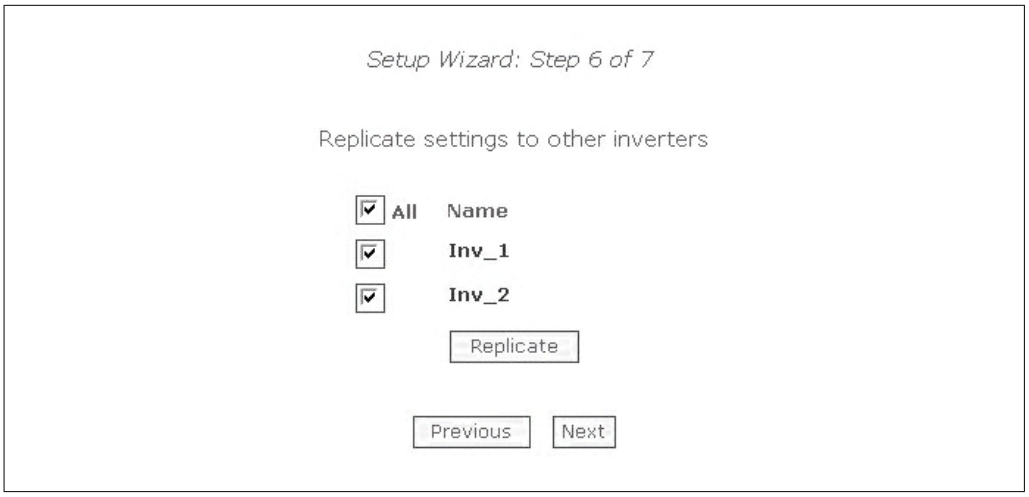

Illustration 2.7: Step 6 of 7: Replication

Step 7 of 7: Inverter startup

The inverter will start automatically when the installation sequence is complete (see the TripleLynx Installation Manual), and solar radiation is sufficient.
The startup sequence, including self-test, takes a few minutes.

Illustration 2.8: Step 7 of 7: Inverter startup

To change the setup later, access the inverter via the integrated web interface or the display, at inverter level.

- To change the name of the inverter, go to [Setup → Inverter details]
- To enable master mode, go to [Setup → Inverter details]

2.2. Operation

2.2.1. Web Server Structure

The Web Server overview is structured as follows.

Illustration 2.9: Overview

1. **Plant name:** Displays the current plant name:
   - Click on the plant name to display the plant view.
   - Change the plant name at [Setup → Plant details].
2. **Group menu:** Displays groups of inverters:
   - Inverters join group 1 by default
   - Click on a group name to display the group view, and a list of inverters in the group.
   - Change the group name via [Setup → Inverter details] in the inverter view.
3. **Group members:** Displays the inverter names in the group currently selected. The default inverter name is based on the serial number (see section *Accessing the* Web Server):
   - Click on an inverter name to display the inverter view.
   - Change the name of the inverter via [Setup → Inverter details] in the inverter view.
4. **Main menu:** This menu corresponds to the inverter display main menu.
5. **Sub menu:** The sub menu corresponds to the main menu item currently selected. All sub menu items belonging to a particular main menu item are displayed here.
6. **Content area:** The Web Server main menu and sub menus are identical to the menus in the inverter display. The sub menu content displayed here corresponds to the sub menu selected: [Overview]. On some pages, a horizontal menu is provided for improved readability.
7. **Footer:** Options on the footer bar:
   - **Language:** Opens a pop-up window. Click on the country flag to change the language of the Web Server to the desired language for the active session.

- **Contact:** Opens a pop-up window which displays Danfoss contact information.
- **Logout:** Opens the log in / log out dialog box.
- **Security level:** Displays the current security level as explained in the section *Security Levels*.

Note:
The content of the main menu changes depending on which view is currently selected: the plant, a group of inverters or an individual inverter. The active view is indicated by text in red.

2.2.2. Plant, Group and Inverter Views

The overview screens for plant view, group view, and inverter view display the same overall status information.

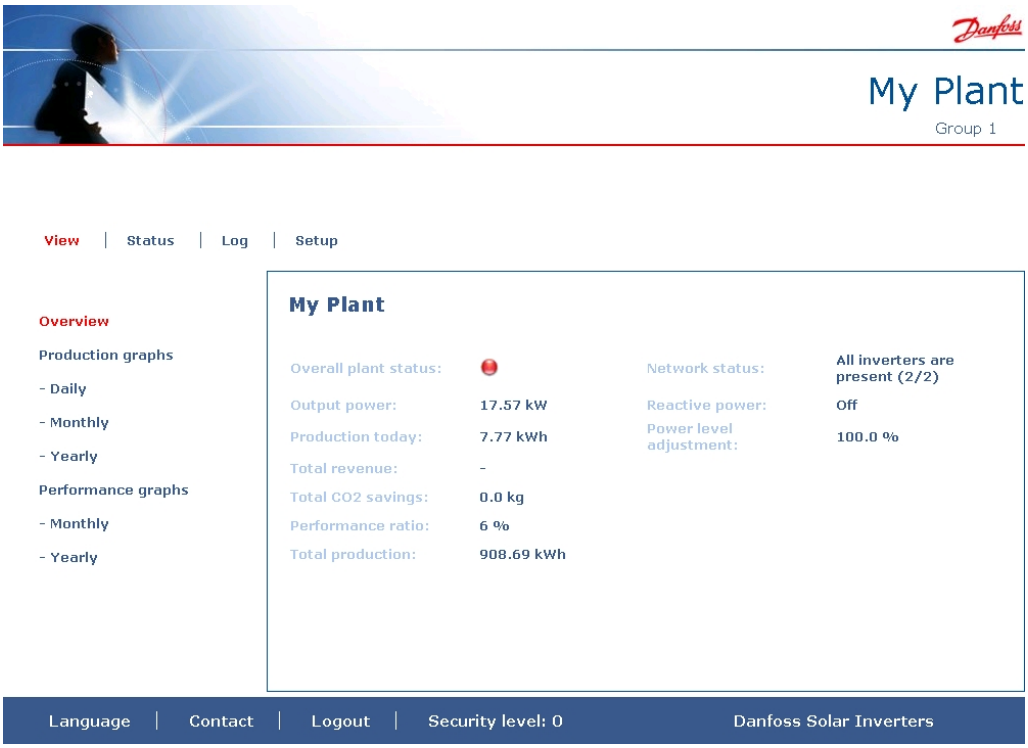

Illustration 2.10: Plant View

Item	Unit	View		Description
		Plant and Group	Inverter	
Overall plant status	-	x		**Red:** Plant PR < 50 %, or: Any inverter in the network - in *fail safe* mode, or - missing from the scan list, no contact with the master **Yellow:** Any inverter in the network - with PR < 70 %, or - in *Connecting* or *Off grid* mode **Green:** Plant PR ≥ 70 %, and - all inverters with PR ≥ 70 %, and - all inverters in *On grid* mode
			x	**Red:** Inverter PR < 50 %, or inverter has an error **Yellow:** Inverter PR between 51 % and 70 %, or inverter in *Connecting* mode **Green:** No errors, and - inverter PR ≥ 70 %, and - inverter in *On grid* mode
Current production	kW	x	x	Real time energy production level
Yield today	kWh	x	x	Cumulative yield for the day
Total revenue	Euro	x	x	Cumulative revenue earned since initial startup
Total CO_2 saving	kg	x	x	Cumulative CO_2 saved since initial startup
Performance ratio	%	x	x	Real time performance ratio
Total yield	kWh	x	x	Cumulative yield since initial startup
Power limit adjustment	%		x	Maximum power limit as % of nominal inverter AC output rating

Note: ✍
To calculate performance ratio PR, an irradiation sensor is required, see [Setup → Calibration].

2.3. Security Levels

Three predefined security levels filter user access to menus and options.

Security levels:

- Level 0: End-user, no password is needed
- Level 1: Installer / service technician
- Level 2: Installer / service technician (extended).

When logged on to the Web Server as Admin, access is at security level 0. Subsequent user accounts created provide access to a predefined subset of menus, according to user profile.
Define user profile at [Plant → Setup → Web Server → Profiles]

Access to levels 1 and 2 requires a service logon, comprising a user ID and a password.

- The service logon provides direct access to a specific security level for the duration of the current day.
- Obtain the service logon from Danfoss.
- Enter the logon via the Web Server logon dialog.
- When the service task is complete, log off at [Setup → Security].
- The Web Server automatically logs off the user after 10 minutes of inactivity.

Security levels are similar on the inverter display and the Web Server.

A security level grants access to all menu items at the same level as well as all menu items of a lower security level.
Throughout the manual, a [0], [1] or [2] inserted after the menu item indicates the minimum security level required for access.

2.4. Changing the Language

The Web Server automatically operates in the same language as the inverter language setting. The default operating language is English.

To change the Web Server operating language temporarily:

- click on Language in the page footer
- select the required language
- at logoff this language setting will return to default

To change the default Web Server operating language, refer to the section *Setup Details*.

2.5. Compatibility in Networks with Other TripleLynx Pro Inverters

The specific functionality related to the TripleLynx Pro inverter only works in networks consisting of TripleLynx Pro inverters. Likewise, the specific functionality related to the TripleLynx Pro+ inverter only works in networks of TripleLynx inverters.

2.6. Managing the Logged Data via the Integrated Web Server

2.6.1. Graphs

The TripleLynx Pro inverter has the ability to generate graphs either based on the entire plant, a particular group of inverters, or based on each individual inverter.

The following types of graphs are available:

- Production graphs on daily, monthly and annual basis.
- Performance graphs on monthly and annual basis.

For an in-depth description of each graph type, refer to the *View* section of this manual.

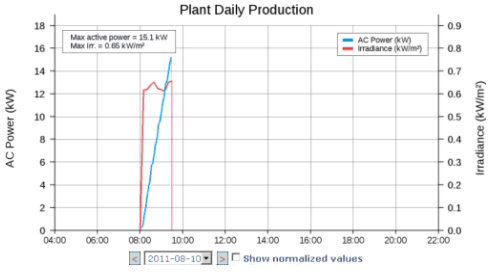

Illustration 2.11: Production Graph

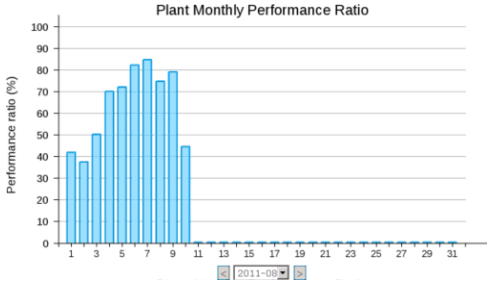

Illustration 2.12: Performance Graph

2.6.2. Export of Logged Data

Data logged by the TripleLynx Pro inverter can be exported or downloaded to a PC.
For further information, refer to *Log*.

2.6.3. Yield Notification and Events

Using the master inverter functionality, the TripleLynx Pro inverter can send notifications by e-mail or sms of:

- production status
- warning in the event of inadequate production level
- inverter events

Requirements for notification by e-mail or sms:

- All inverters are TripleLynx Pro inverters.
- The master is connected to the internet or has a GSM modem installed.
- All settings regarding e-mail [Setup → Communication] and GSM [Setup → Communication → GPRS setup] respectively are configured correctly.

Requirements for sms only:

- a GSM modem is installed in the master inverter, or
- an e-mail to sms account from the ISP (internet service provider) is established.

For further information on notifications, refer to *Setup, Messaging*.

2.6.4. Upload to Web Portal or FTP Server

The master inverter collects the data from all TripleLynx Pro inverters in its network. The data can be uploaded to a web portal or an FTP server when the master inverter:

- is connected to a network with internet access, or
- has a GSM modem installed

For data upload frequency, refer to *Setup, Communication, Data Warehouse* (DW).

3. View

3.1. Overview [0] [Plant, Group, Inverter]

The layout of the overview screen on both plant, group and inverter basis is described in Chapter 2, section *Operation*.

3.2. Graphs[0] [Plant, Group, Inverter]

The TLX Pro+ inverter can generate the following graphs on plant, group or inverter basis:

Production graphs

- Daily
- Monthly
- Yearly

Performance graphs (PR or yield)

- Monthly
- Yearly

The performance graphs display PR only when irradiation is logged.

Note: ✍
The duration of data displayed in the graphs depends on the logging interval, see *Logging*.

For a detailed description of each graph shown on each individual level, see below.

3.2.1. Plant View

Click on the plant name to display the plant view. In plant view the following graphs are generated based on data from the entire plant:

Production graph		
Interval	**Unit**	**Description**
Daily	kW W/m^2	Power output. Irradiation levels (when irradiation sensor is installed). Data are displayed on an hourly basis.
Monthly	kWh	Energy production on a daily basis for the current month to date.
Yearly	kWh	Energy production on a monthly basis for the current year to date.

Performance graph (with irradiation sensor installed)		
Interval	**Unit**	**Description**
Monthly	%	Performance ratio for the current month to date.
Yearly	%	Performance ratio for the current year to date.

Performance graph - yield (with no irradiation sensor installed)		
Interval	**Unit**	**Description**
Monthly	hours	Operating time for month to date.
Yearly	hours	Operating time for the year to date.

3.2.2. Group View

Click on the group name to display the group view. In group view, a list of all inverters in the current group is displayed, detailing:

- overall status (see *Operation*)
- real time production level
- total power output

In group view, the following graphs are generated based on data from the current group:

Production graph		
Interval	**Unit**	**Description**
Daily	kWh	Energy production for the current day.
Monthly	kWh	Energy production on a daily basis for the current month to date.
Yearly	kWh	Energy production on a monthly basis for the current year to date.

Performance graph - PR (with irradiation sensor installed)		
Interval	**Unit**	**Description**
Monthly	%	Performance ratio in [%] for the current month to date.
Yearly	%	Performance ratio in [%] for the current year to date.

Performance graph - yield (with no irradiation sensor installed)		
Interval	**Unit**	**Description**
Monthly	hours	Operating time for month to date.
Yearly	hours	Operating time for the year to date.

3.2.3. Inverter View

Click on the inverter name to display the inverter view. In inverter view, the following graphs are generated based on inverter data:

Production graph		
Interval	**Unit**	**Description**
Daily	W	Active power
	VA	Apparent power
	VAr	Reactive power
	W	PV power
Monthly	kWh	Energy production on a daily basis, month to date.
Yearly	kWh	Energy production on a monthly basis, year to date.

Performance graph - PR (with irradiation sensor installed)		
Interval	**Unit**	**Description**
Monthly	%	Performance ratio in [%] for the current month to date.
Yearly	%	Performance ratio in [%] for the current year to date.

Performance graph - yield (with no irradiation sensor installed)		
Interval	**Unit**	**Description**
Monthly	hours	Operating time for month to date
Yearly	hours	Operating time for the year to date.

4. Status

4.1. Status

All values displayed in the Status are read-only. To change the inverter settings, see the *Setup* section. For a detailed description of the individual settings, refer to the TripleLynx Reference Manual.

As the values are requested live from the inverter, short delays may occur in retrieving data. Fetch the newest inverter data by pressing the 'Reload' button.

4.2. Ambient Conditions[0] [Inverter]

If external sensors are connected to the inverter, their current values are displayed here.

Illustration 4.1: Ambient Conditions

4.3. Photovoltaic[0] [Inverter]

In the photovoltaic status, menu all status information and settings related to the PV side of the inverter are displayed.

4.3.1. PV Present Values [0] [Inverter]

The voltage, current and power detected on each PV input are displayed here.

4.3.2. PV Maximum Values[0] [Inverter]

The maximum values of voltage, current and power recorded on each PV input are displayed here.
The maximum values can be reset via [Inverter view → Setup → Inverter details → Reset max. values].

4.3.3. PV Input Energy[0] [Inverter]

The total daily energy produced by all three PV inputs as a sum and by each PV input individually are shown.

Note: ✍
If two inputs are running in parallel configuration, only one value will be shown.

4.3.4. Isolation Resistance[0] [Inverter]

The isolation resistance between the earth and PV arrays is displayed in Ohm (Ω). The isolation resistance is measured during the inverter self-test at startup.

4.3.5. PV Configuration[1] [Inverter]

The current configuration of each PV input is shown.

4.4. AC Grid[0] [Inverter]

This menu section displays the status of values related to the AC side of the inverter.

4.4.1. Present Values[0] [Inverter]

For each of the three phases, the real time AC grid values are displayed for the current phase:

Item	Description
Voltage[0]	Voltage
10 min. mean[1]	The average voltage sampled over 10 min.
L1-L2[1]	Phase to phase voltage
Current[0]	Current
DC content of current[1]	The DC content of the AC grid current
Frequency[0]	Frequency
Power[0]	The power on the current phase
Apparent power (S)[1]	Apparent power on the phase in question
Reactive power (Q)[1]	The reactive power on the phase in question

4.4.2. Maximum Values[0] [Inverter]

The maximum voltage, current and power values registered on the AC grid phase 1, 2 and 3, are displayed here.
Reset the maximum values at [Inverter view → Setup → Inverter details → Reset max. values].

4.4.3. Residual Current Monitor [0] [Inverter]

The current and max. current value seen by the Residual Current Monitor Unit (RCMU).

Item	Description
Current[0]	Displays the rms value of residual current.
Maximum value[1]	Displays the maximum recorded rms value of residual current.

4.5. Grid Management[0] [Inverter]

Grid management displays the current status of power level adjustment current production and settings for frequency stabilization.

The grid management menu is only displayed if the functionality is enabled in the current grid code.

4.6. Reactive Power[1] [Plant]

The setpoint type and setpoint value of reactive power are displayed here, for TLX Pro+ variants only.

Item	Description
Setpoint type	Displays the setpoint type
Value	Displays the value of the setpoint

4.7. Inverter[0] [Inverter]

The status inverter content page displays the general status of the complete inverter.

4.7.1. General[0] [Inverter]

Note: ✍
When calling Service, note that the information listed on this web page is required in order to obtain assistance.

The general settings of the inverter are displayed here.

Item	Description
Country	Installation country.
Language	Language of inverter display and Web Server software. The session language of the Web Server software can also be changed via the footer.
Name*)	Displays the current name of the inverter.
Group name*)	Displays the name of the group to which the inverter belongs.*)
Operation mode	Displays the current mode of operation of the inverter.
Installation date	The date on which the inverter was installed.*)
Model	Current model and inverter power class.
Serial number	The serial number of the inverter.
Product number	The product number of the inverter.
Software version	The software version of the inverter.
MAC address	The MAC address of the communication board.

**) These names can be changed in inverter view at [Inverter view → Setup → Inverter details].*

4.7.2. DC bus voltage[1] [Inverter]

The current and maximum values of the DC bus voltage are shown here. The DC bus voltages have both a lower and an upper limit.

4.7.3. PCB Temperatures[0] [Inverter]

Internal temperatures of the inverter PCB's:

- current temperature
- maximum temperature [1]

Note: ✍
Some PCB temperatures are only accessible at security level 1 or above.

4.7.4. RPM of Fans[1] [Inverter]

The internal fan speed is displayed in RPM.

4.7.5. Power Module Temperatures[0] [Inverter]

Internal temperature of the inverter power modules:

- current temperature
- maximum temperature [1]

Note:
Some power module temperatures are only accessible at security level 1 or above.

4.7.6. PCB Part and Serial Number[0] [Inverter]

The part and serial number of the control board as well as the power board, the communication board, and the aux board are displayed here.

4.7.7. PCB Software version[0] [Inverter]

The software version of the control board, communication board, the functional safety processor and the display software are shown here.

4.7.8. Operating Time[1] [Inverter]

Total operating time of the power, aux, control and communication boards.

4.8. Software Version[0] [Plant]

Software version of the TripleLynx Pro Web Server.

4.9. Upload Status[0] [Plant]

The modem menu displays the current status of the GSM/GPRS connection and the status of the data warehouse/portal upload.

Item	Description
Upload status	Current upload status.
Signal strength	Signal strength. Should preferably be between 16-31. GSM signal strength.
GSM network name	The network to which the modem is currently connected.
GSM status	Displays the current GSM network status.
Failed uploads	Number of consecutive failed uploads.
Last error	Event ID together with timestamp (time and date) of the last event. Refer to the GSM Manual for a further description of the event ID's.
Last upload	Timestamp of last successful upload.

Table 4.1: Upload Status

For further information, refer to the GSM Manual.

4.10. PV Sweep[0] [Plant, Inverter]

To view the result of the most recent PV sweep performed, go to

- Plant level: [Plant → Status → PV sweep].
- Inverter level: [Inverter → Status → PV sweep].

To export the data, click on 'Export'.

4

Inverter level

Item	Unit	Description
Status		
PV1		PV input 1
Timestamp	hh:mm:ss	Time of most recent PV sweep
U_{MPP}	V	DC voltage at global MPP
I_{MPP}	A	Current at global MPP
P_{MPP}	W	Power production at global MPP
FF		Fill factor = $P_{MPP}/(U_{OC}*I_{SC})$
U_{OC}	V	Open-circuit voltage at global MPP
I_{SC}	A	Short-circuit current at global MPP
Number of MPP		Total of global and local MPP detected
Status		Confirmation of successful PV sweep
PV2		PV input 2
Timestamp	hh:mm:ss	Time of most recent PV sweep
U_{MPP}	V	DC voltage at global MPP
I_{MPP}	A	Current at global MPP
P_{MPP}	W	Power production at global MPP
FF		Fill factor = $P_{MPP}/(U_{OC}*I_{SC})$
U_{OC}	V	Open-circuit voltage at global MPP
I_{SC}	A	Short-circuit current at global MPP
Number of MPP		Total of global and local MPP detected
Status		Confirmation of successful PV sweep
PV3		
Timestamp	hh:mm:ss	Time of most recent PV sweep
U_{MPP}	V	DC voltage at global MPP
I_{MPP}	A	Current at global MPP
P_{MPP}	W	Power production at global MPP
FF		Fill factor = $P_{MPP}/(U_{OC}*I_{SC})$
U_{OC}	V	Open-circuit voltage at global MPP
I_{SC}	A	Short-circuit current at global MPP
Number of MPP		Total of global and local MPP detected
Status		Confirmation of successful PV sweep

Plant level

The plant level view displays the same data as at inverter level, for each inverter in the solar power plant.

For further information about PV sweep functionality, refer to the section *Status, PV Sweep*.

4.11. Plant Status[0] [Plant]

The plant status report details energy production for the overall plant and also individual PV inputs and individual inverters. The report provides the information required to identify failures due to soiling, partial failure of solar cells, and faulty inverter circuits.

This report is also available as an email message. For further information, refer to the section *Setup, Plant status*.

Item	Unit	Description
Plant name		Name of PV plant
Report date		Date of report
Report period		Duration of period covered by report
Plant production	Wh	PV plant production in report period
Plant revenue	Euro	PV plant revenue generated in report period
Equivalent CO_2 emission	kg	PV plant equivalent CO_2 emission reduction in report period
Performance ratio above 70 %		
Individual inverter name	%	Performance ratio for individual inverter
Performance ratio between 50 % and 70 %		
Individual inverter name	%	Performance ratio for individual inverter
Performance ratio below 50%		
Individual inverter name	%	Performance ratio for individual inverter
Inverter production deviates more than 10 %		
Individual inverter name	%	Deviation for individual inverter
PV production deviates more than 10 %		
Inverter name		
PV input 1	%	Deviation for PV input 1(PV string 1)
PV input 2	%	Deviation for PV input 2 (PV string 2)
PV input 3	%	Deviation for PV input 3 (PV string 3)

5. Log

5.1. Logging

This section explains the individual logs of the TripleLynx Pro. All individual logs can be downloaded as .csv file for further processing. Not all logs are visible in both plant and inverter views.

When the internal log of the inverter is full, it will overwrite the oldest data first. To set up a notification when the internal logging capacity of the inverter is 60 % full, refer to the section *Messaging*.

Note: ✍
In Internet Explorer®, Firefox® and/or firewall software, the file download/export of the logged data might be prevented by pop-up blockers. Refer to the program supplier for further information and options.

5.2. General[0] [Plant, Inverter]

Displayed in inverter view:

- Total energy production
- Total operating time
- Time of power down (previous day)
- Time of power up (current day)

Displayed in plant view:

- Total energy production for entire plant

Note: ✍
Time of power down and power up are displayed only when the inverter has been operating.

5.3. Derating[1] [Inverter]

Derating the output power is a means of protecting the inverter against overload and potential failure. The log records total duration of derating. To view the distribution of the various types of derating, level 1 security access is needed. For more information on derating, refer to the TripleLynx Reference Manual.

This menu is visible at inverter and group levels.

Value	Unit	Description
Off-grid counter[0]	Hour	Total duration of disconnection from grid.
Total derate counter[0]	Hour	Total duration of power production limitation.
Grid voltage[1]	Hour	Total duration of derating due to the grid voltage.
Grid current[1]	Hour	Total duration of derating due to the grid current.
Grid power[1]	Hour	Total duration of derating due to the grid power.
PV current[1]	Hour	Total duration of derating due to the PV current.
PV power[1]	Hour	Total duration of derating due to PV power.
Temperature[1]	Hour	Total duration of derating due to the inverter temperature.
Power Level Adjustment[0] 1)	Hour	Total duration of derating due to Power Level Adjustment.
Frequency stabilization[0]	Hour	Total duration of derating due to frequency stabilization.
Reactive power[0]	Hour	Total duration of derating due to reactive power.

1) If enabled by the current grid code.

5.4. Data Log[0] [Inverter]

The TripleLynx Pro inverter logs detailed data for a total of 34 days at 10-minute logging intervals before it starts to overwrite the data.
Logged data:

Data	Unit
Timestamp	dd:mm:yy hh:mm
Irradiance1)	W/m^2
Ambient temperature1)	°C
Module temperature1)	°C
PV voltage, per string	V
PV current, per string	A
PV power, per string	W
PV energy, per string	Wh
Grid voltage, per phase	V
Grid current, per phase	A
Grid power, per phase	W
Apparent power, sum of phases	VA
Grid power total	W
Grid energy, per phase	Wh
Today's energy production measured by S0 counter2)	Wh
DC content of grid current, per phase	mA
Residual grid current	mA
Grid frequency, mean of phases	Hz
DC bus voltages	V
Internal temperatures	°C
Apparent power, per phase	VA
Reactive power, per phase	Var
Inverter operation mode	
Latest inverter event	
PLA present value	%
Reactive power abs(Q)	%
Reactive power cos(φ)	
Reactive power mode	

1) When sensor connected.
2) When counter connected.

5.5. Production Log[0] [Plant, Inverter]

These data are logged at inverter level:

- Daily energy production data during the past week.
- The weekly energy production data for the past 4 weeks.
- The monthly energy production for the past 12 months.
- The yearly energy production for the past 20 years.

If inverter exchange is required, data can be transferred to the new inverter. Refer to the section *Settings Backup* for further information. At plant level, this log displays the sum of energy production for all inverters in the network.

5.6. Irradiation Log[0] [Plant, Inverter]

When the inverter is equipped with an irradiation sensor, these data are logged at inverter level:

- Daily irradiation of the past week
- Weekly irradiation for the past 4 weeks
- Monthly irradiation for the past 12 months
- Annual irradiation for the past 20 years

If inverter exchange is required, data can be transferred to the new inverter. Refer to the section *Settings Backup* for further information.
In plant view, this menu displays the irradiation log of the master inverter.

5.7. Event Log[0] [Inverter]

The event log menu displays the 20 most recent inverter events.

Latest 20 events[1] displays

- event ID
- date and time
- status (on/off)

for each of the most recent 20 events.

See the section *Troubleshooting* in the TripleLynx Reference Manual for more information on specific events.

The complete event log consists of max. 1000 entries, which can be viewed by exporting the event log. This menu is visible in inverter view only.

5.8. Change Log[1] [Inverter]

Displays the most recent 20 entries from the change log of the inverter.
The change log records:

- Changes to functional safety parameters.
- Each logon with service password.

View the content of the change log by exporting the log.

Note: ✍
The change log keeps track of all modifications made to parameters accessed at security level 2. The log includes:

- Parameter changed
- New setting
- Timestamp
- User name of user making the change. View the change log at [Inverter view → Log → Change Log].

5.9. Grid Management Log[0] [Plant, Inverter]

Contains a power reduction telegram received from the master inverter.
The Web Server only displays the latest 20 entries. The complete log can be viewed by exporting the log.

5.10. Reactive Power[0] [Inverter]

This menu item is available for:

- TripleLynx Pro+ variants only
- Grid codes where reactive power is enabled

Displays a log of the sum of generated reactive energy:

- Under-excited
- Over-excited

6. Setup

6.1. Calibration[0] [Plant, Inverter]

Configuration of individual sensors, PV arrays and environmental settings.

6.1.1. Sensors[0] [Plant, Inverter]

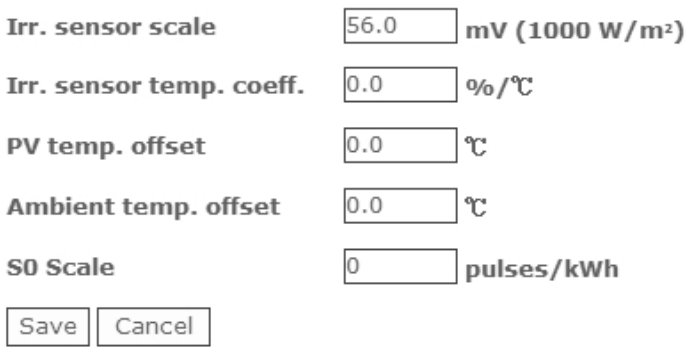

Illustration 6.1: Sensors

Item	Unit	Description
Irradiation sensor scale	mV(1000 w/m^2)	The calibration value of the irradiation sensor. The value is usually written on a label at the back of the sensor. Note that this value must be entered before the inverter will recognise that there is an irradiation sensor connected.
Irradiation sensor temp. coeff.	%	Calibration value for internal temperature correction of the irradiation measurement. Only used for irradiation sensors with integrated temperature compensation.
PV temp. offset	°C	The temperature sensor may be calibrated using an offset ranging from −5.0 to 5.0 °C.
Ambient temp. offset	°C	The temperature sensor may be calibrated using an offset ranging from −5.0 to 5.0 °C.
S0 scale	pulses/kWh	In order to use an energy meter (S0 sensor), the scale of the energy meter must be entered here.

For a description of which sensor to connect to the TripleLynx Pro, refer to the TripleLynx Installation Manual.

6.1.2. PV Array[0] [Inverter]

The PV area and the rated PV power (STC) for the installation are defined here.

Note: ✍
These definitions are required to calculate PV string comparison for the plant status report. Refer to *Messaging*.

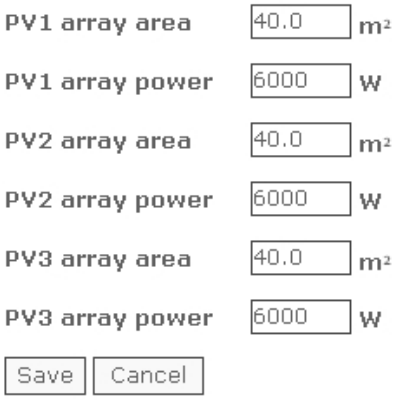

Illustration 6.2: PV Array

Item	Unit	Description
PV1 array area	m^2	Input 1 - total PV array area
PV1 array power	W	Input 1 - total rated output of PV panels
PV2 array area	m^2	Input 2 - total PV array area
PV2 array power	W	Input 2 - total rated output of PV panels
PV3 array area	m^2	Input 3 - total PV array area
PV3 array power	W	Input 3 - total rated output of PV panels

6.1.3. Environment[0] [Plant, Inverter]

Via the environment menu in plant view, the values for total reimbursement and total CO_2 emission can be configured.

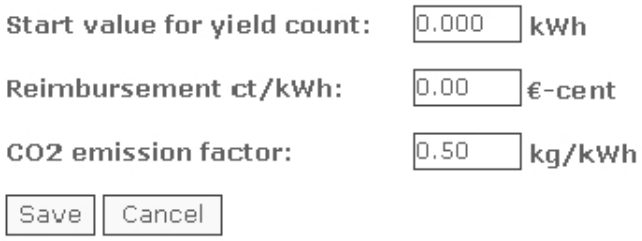

Illustration 6.3: Calculation Values

Item	Unit	Description
Start value for yield count	kWh	Defines the value (an offset) from where the yield count used in the calculation of reimbursement and CO_2 emission begins.
Reimbursement ct/kWh	Euro cent per KWh	Defines a value for the financial yield. **Note:** Defining this value requires considerable knowledge of the individual reimbursement models of the different countries. The default value is 0.00.
CO_2 emissions factor	CO_2/kg	Allows the conversion of yield/kWh. This calculation factor for CO_2 saving depends on the energy source to power generation ratio. Per default it is set to 0.5 $C0_2$/kg. Ask the local electricity provider for an exact value.

6.2. Communication[0][Plant, Inverter]

The communication menu contains the following sub menus; see descriptions below. Some of the menus are only visible in plant view whereas others are only visible in inverter view.

6.2.1. RS485[0] [Inverter]

Illustration 6.4: RS485 Network Address

Change the RS485 network address of the inverter here. Ensure that each inverter in the network has a unique address.

The RS485 addresses must be selected within the following range (network.subnet.address): 2.1.1 to 12.14.254.

Note: ✍
Only in very rare cases will it be necessary to change the RS485 address of the inverter as each inverter is delivered with a unique RS485 address.

6.2.2. IP Setup[0] [Inverter]

The TripleLynx Pro inverter is equipped with two integrated Ethernet interfaces, which connectivity to Ethernet networks.
The inverter automatically configures a unique IP address.
An integrated DNS server enables access to the master inverter via its name or serial number.

For local administration of IP addresses, the inverter also supports DHCP in the automatic configuration.
Alternatively, IP addresses can be administrated manually under [Setup → Communication → IP setup].
View the inverter IP address via the display at [Setup → Communication setup → IP setup].

Note: ✍
For manual configuration, ensure that each inverter has a unique IP address.

Item	Description
Configuration	Options: • Manual • Automatic
The following settings are obtained automatically if automatic configuration is selected, otherwise they have to be entered manually. They are only visible when [Configuration → Manual] is chosen.	
IP address	IP address
Subnet mask	Subnet mask
Standard gateway	IP address of the Internet gateway. This address can be requested from the network administrator.
DNS server	This parameter can be requested from the network administrator.

6.2.3. Communication Channel[0] [Plant]

This menu item is available for TLX Pro and TLX Pro+ only.
Selection of a communication channel is the first step in configuration of email transmission and FTP upload.

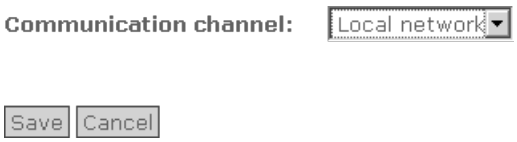

Illustration 6.5: Communication Channel

Item	Description
Communication channel	Select the desired communication channel for FTP upload and email transmission. Select 'GSM' or 'Local network' Default is 'Not present'

Procedure:

- Select 'GSM' to transmit FTP upload and emails via the optional GSM modem.
- Select 'Local network' to transmit FTP upload and emails via Ethernet.

Email and FTP upload configuration

Selection of a communication channel is required to define a route for email transmission and/ or FTP upload.

To fully activate email communication or FTP upload, additional configuration is required. For further information, refer to the sections *GPRS Setup, SMTP Setup* and *Data Warehouse / FTP Upload*.

Note that when the communication channel is set to 'Not present', no FTP upload or email transmission will take place, even when GPRS, SMTP and/or Data Warehouse are configured.

SMS configuration

For SMS communication, no 'communication channel' setting is required. For configuration of SMS communication, refer to the section *Recipient*.

6.2.4. GPRS Setup[0] [Plant]

Configure the GPRS settings of the inverter here. They are required so the GSM modem can connect to the internet to send e-mails or upload data to a web portal or FTP server.

This menu is visible when the master inverter is equipped with a GSM modem and a valid SIM card.

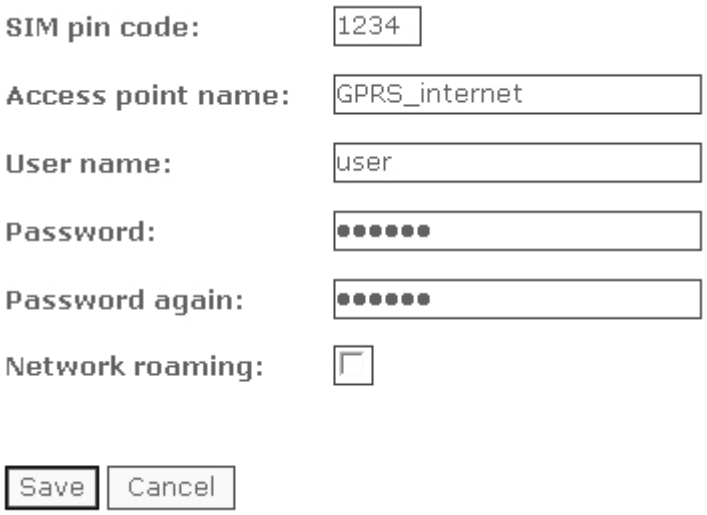

Illustration 6.6: GPRS Setup for GSM networking

Note: ✍
In order for messaging or DW upload (FTP server upload) via GSM to work it is essential that the GPRS setup has been configured correctly.

Item	Description
SIM pin code	Here the SIM PIN code is entered, if applicable. The PIN code can consist of 4-8 characters.
Access point name	Connection information from the GPRS service provider. This information together with a user name and password can be requested by the SIM card supplier and is needed in order for the inverter to be able to dial in to the internet. Max. 24 characters.
User name	User name assigned by the GPRS service provider. Max. 24 characters.
Password	Password assigned by the GPRS service provider. For security reasons, every password character is displayed as an asterisk (*).
Password again	Retype the password
Network roaming	• Checked (Enabled) • Not checked (Disabled) Per default the network roaming check box is not checked. If checked, the GPRS modem is allowed to connect to the internet via a network which is not the home network (a network which does not belong to the network of the telephone company). Roaming is not a free service and the telephone company will most likely impose extra charges.

6.2.5. SMTP Setup[0] [Plant]

In the SMTP setup menu, the mail-server settings for exchanging e-mails are specified. Parameters here include SMTP server, logon, password, sender address, and authentication type.

Note: ✍
A correctly configured SMTP server and internet connection, IP and DNS server, are necessary for receiving e-mail messages from the inverter. To test the SMTP settings go to [Setup → Messaging] on plant view, configure a recipient and press the 'Test Setup' button. Within a few minutes, a test e-mail will be sent from the inverter.

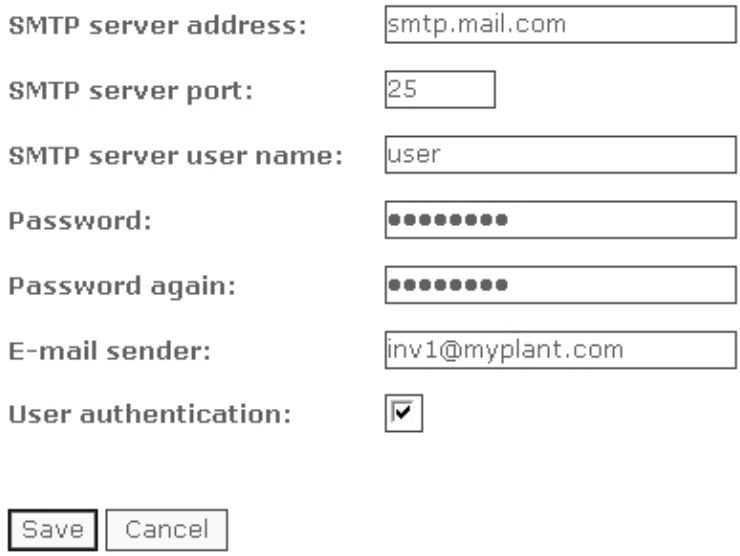

Illustration 6.7: STMP Setup

Item	Description
SMTP server address	Outbox server; this information can be requested from the Internet provider (see below) or LAN administrator.
SMTP server port	Here the server port used for the e-mail transfer can be changed. At delivery it is configured to port 25. Ask the network administrator before changing this value.
User name	Service provider's user name. A maximum of 24 characters can be entered.
Password	Password assigned by the Internet service provider. For security reasons, every password character is displayed as an asterisk (*). A maximum of 24 characters can be entered.
Retype password	Retype the password.
E-mail sender address	Sender's e-mail address used for authenticating the SMTP server. An unknown sender address can cause e-mail delivery to fail.
User Authentication	As authentication type exclusively SMTP authentication is supported! If the authentication check box is checked, remember to enter the account information of the e-mail. This information will be forwarded by the internet provider.

6.2.6. Data Warehouse[0] [Plant] / FTP Server Upload

Illustration 6.8: Data Warehouse

Item	Description
Upload time[0]	Time of day when the upload takes place, only used when upload interval is configured to 'daily'.
Upload interval[0]	Hourly Daily Weekly Monthly Disabled
FTP server address[1]	The FTP server address is user configurable. It can be a name or IP address. A maximum of 24 characters can be entered.
FTP server port[1]	FTP server port is user configurable. Default port is 21
FTP mode[1]	FTP connection mode is user configurable. The following options exists: - Passive - Active Default mode is "Active"
FTP server user name[0]	Both the user name and the password for the FTP session (web portal upload) established by the TripleLynx Pro inverter can be configured by the user. If empty, the serial number of the inverter is used. A maximum of 24 characters can be entered.
Password[0]	The password for the FTP/web portal account. A maximum of 24 characters can be entered.
Start log upload now[0]	Tests the FTP upload immediately. To check status go to [Plant → Status → Upload status]

Note: ✍
A prerequisite for a successful data transfer to the data warehouse is a valid and active portal account. Receive further details directly from the data warehouse/web portal provider.

When registering the inverter at a data warehouse/web portal provider, the serial number of the inverter which sends the data to the portal is often needed. In this case it is the serial number of the master inverter. The serial number of the inverter can be found via [Status → Inverter] or on the name plate on the side of the inverter. Use the last 10 digits.

6.2.7. Remote Access[2] [Inverter]

As per default it is not possible to change the functional safety settings of the inverter via the Web Server. To be able to do so, enable the remote access check mark. Note that this must be done individually for each inverter in the system.

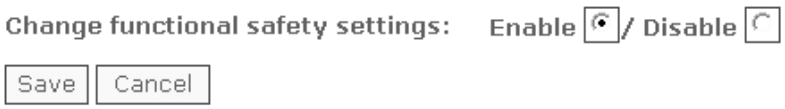

Illustration 6.9: Change Functional Safety Settings

The following functional safety parameters can be set here:

- Rate of change of frequency, maximum amount, and time to trip
- 10-minute mean value of grid voltage, maximum amount, and time to trip

Modifications made to parameters at security level 2 are recorded. See the section *Change Log*.

To change other functional safety settings, refer to the TripleLynx Reference Manual.

6.3. Relay[0] [Inverter]

6.3.1. Relay Functionality - Alarm[0] [Inverter]

Configure the inverter relay for use with an external alarm or self-consumption. The default configuration is alarm enabled, self-consumption disabled.

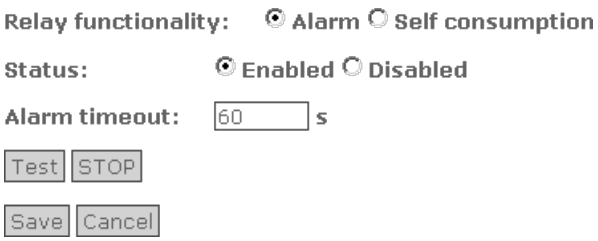

Illustration 6.10: Relay functionality - Alarm

To use this feature, connect an external notification device, e.g. a lamp to the relay output of the TripleLynx Pro inverter. For further instructions on how to connect the device, refer to the TripleLynx Installation Manual.

If the alarm is triggered, it will remain active for the period of time defined under 'Alarm time-out' (the value 0 disables the time-out functionality and the alarm will sound continuously). While the alarm is active it can be stopped at any time by pressing the 'Stop' button. The relay output can be tested by pressing the 'Test' button.

The alarm is activated by the occurrence of a predefined inverter event. Refer to the TripleLynx Reference Manual for a complete list of which events can enable the external alarm output of the TripleLynx Pro inverter.

Note: ✍
The external alarm functionality only works per individual inverter; it cannot be configured on plant basis.

6.3.2. Relay Functionality - Self-consumption[0] [Inverter]

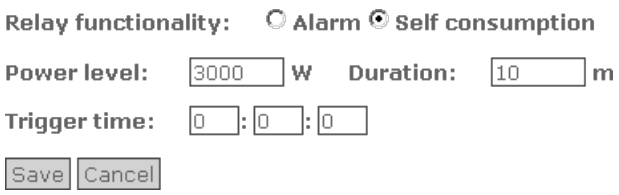

Illustration 6.11: Relay Functionality - Self-consumption

Item	Unit	Description
[0] Power level	W	Minimum output power level at which the relay must activate
[0] Duration	minutes	Time (minutes) the output power must be above the minimum output power level
[0] Trigger time	hh:mm:ss	Time of day the relay must activate

Self-consumption is applicable when a power-consuming unit is connected to the inverter. By default the self-consumption functionality is disabled.
To enable self-consumption, go to [Inverter → Setup → Relay → Relay functionality] and select 'Self-consumption'.

Once enabled, the self-consumption functionality is activated by output power level or a time of day. Set up the conditions for activation as follows:

- Output power level
  - Set 'Power level' to the desired minimum output power level for activation of self-consumption. The default value of 'Power level' is 3000W.
  - Set the 'Duration' period. Self-consumption will activate when output exceeds the minimum power level, for the period defined in 'Duration'. The default value of 'Duration' is 1 minute.
    The 'Duration' function serves to avoid inappropriate activation of self-consumption
- Time of day
  - Set 'Trigger time' to the desired time of self-consumption activation, in the format hh:mm:ss. Self-consumption is automatically de-activated when the sun sets and the inverter disconnects from the grid.

6.4. Inverter Details[0] [Inverter]

6.4.1. General [0] [Inverter]

The specific inverter settings for the TripleLynx Pro variant are defined here:

- Selecting a master
- Changing the name of the inverter or the group to which it belongs

If the particular inverter is a master in its network, view the list of follower inverters by pressing the 'Show list' button.

The inverter is delivered with default names for both inverter and group, see the table below.

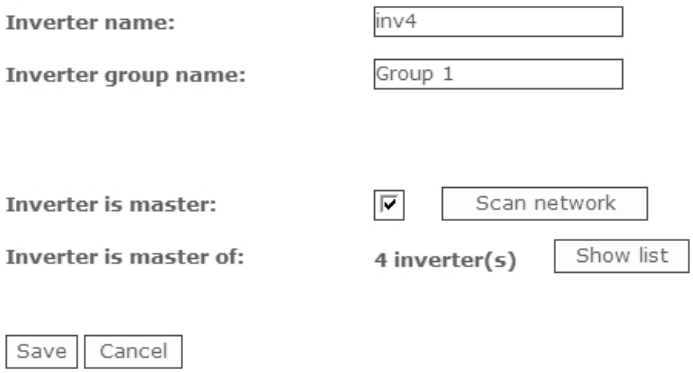

Illustration 6.12: Inverter Details

Item	Description
Inverter name	The name of the inverter. At delivery, this name corresponds to the serial number of the inverter. A maximum of 15 characters can be entered, see the section *Supported Characters* for a complete list of the valid characters.
Inverter group name	In order to group the inverters of the plant into different groups, a group name is needed. A maximum of 15 characters can be used, see the section *Supported Characters* for a complete list of the valid characters. To add more inverters to the same group just enter the same group name for all inverters. Inverters are delivered with the default group name *Group 1*.
Inverter is master	This check box needs to be enabled if this particular inverter is the master inverter in the network. Enabling the master check box and pressing 'Save' generates an automatic network scan and the 'Scan network' button will appear. Per default the master check box is unchecked.
'Scan network'	Press this button to scan for connected inverters. The names of the inverters found will appear in the list. Check manually that all connected inverters have been found. A network scan can be renewed at any time. Newly found inverters will be added to the list, and inverters not present in the network anymore will automatically be deleted from the list. **NOTE!** The 'Scan network' button is only visible if the inverter is set up as the master inverter.
Show list	Pressing the 'Show list' button will open a pop-up window, which displays the names of all the inverters currently connected to the master together with their current status. Via the pop-up window it is possible to perform a quick communication check from the master inverter to the other inverters. This is done by pressing the 'Check communication' button. **NOTE!** The 'Scan network' button is only visible if the inverter is set up as the master inverter.

6.4.2. Date and Time[0] [Plant, Inverter]

This menu is visible in plant and inverter views only.
The date/time settings of the inverter can be changed here.

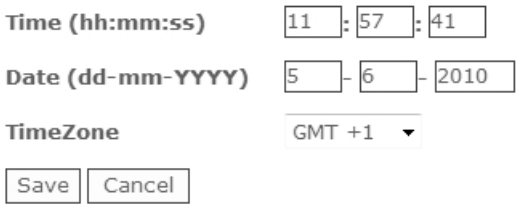

Illustration 6.13: Date and Time

Item	Description
Time	The current time in the following format: hh:mm:ss Be careful when changing the time settings of the inverter as changing the time affects data which are already logged. Setting the time back one hour will result in the existing data logged for the last hour being overwritten.
Date	The current date in the following format: dd-mm-yyyy. Be careful when changing the date of the inverter as a date change affects data which are already logged.
TimeZone	Time zone in which the inverter is located.

Note: ✍
The master inverter automatically ensures

- identical date and time settings, and
- adjustment to summer time throughout the network.

6

6.5. Logging[0] [Inverter]

6.5.1. Logging Interval[0] [Inverter]

Configure the logging interval of the individual inverter at [Inverter → Setup → Logging].
Logging intervals:

- 1 minute
- 10 minutes
- 1 hour

Illustration 6.14: Logging Interval

Note: ✍
Web portals support differing logging intervals. Ask the service provider.

Note: ✍
Changes to the logging interval impact:

- logging of detailed inverter data
- inverter logging capacity

For more information, refer to the section *Logging Capacity*.

6.5.2. Logging Capacity[0][Inverter]

This menu displays the current logging capacity of the data log of the particular inverter.
[Inverter → Setup→ Logging]
The logging capacity of the inverter depends on the current logging interval configuration. With a default logging interval of 10 min., the inverter can log its detailed inverter data for a maximum of 34 days. It will then start to overwrite the old data.

6.5.3. Delete Logs[1] [Inverter]

At security level 1, go to [Inverter → Setup → Logging] to delete the Event, production, irradiation and data log of each individual inverter.

This menu is visible in inverter and group views.

Note: ✍
Deleting a log is an unrecoverable action and data will be lost.

6.6. Grid Management[1] [Plant]

This menu applies to TripleLynx Pro+ variants only.
[Setup → Grid management]

Set up ancillary services such as Power Level Adjustment (PLA) and Reactive Power in this area.

6.6.1. General[1] [Plant]

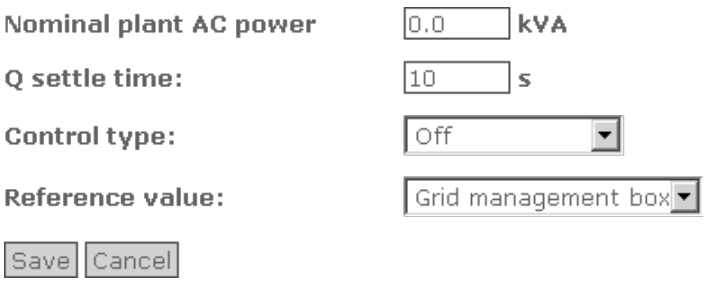

Illustration 6.15: General

Item	Description
Nominal plant AC power	Enter the total nominal AC power for the entire plant. This value is necessary for correct calculation of the absolute reactive power Q.
Q and PF settle time	Enter the system settling time for reactive power regulation. Range: 10 – 60 seconds.
Control type	Specifies whether the control should be Open loop (enabled) or Off (disabled).
Reference value	Select a reference for reactive power • Grid management box • Reactive power Q • Power factor PF • Setpoint curve PF(P) • Setpoint curve Q(U)

Grid management box

- The grid management box receives setpoint values for reactive power and PLA from the DNO. Configure the grid management box inputs under: Relay configuration. For more information refer to the TripleLynx Reference Manual and the Danfoss Grid Management Box Manual.

Reactive power Q

- Enter the fixed setpoint value for the plant reactive power Q as either:

- percentage value of the nominal plant AC power (%)
  Range: 0 – 60 % of the nominal plant AC power, over-excited or under-excited.
- value of Q (kVAr)

Power factor PF
Enter the fixed setpoint value for the plant power factor.
Range: 1 – 0.8 over-excited or under-excited.

Setpoint curve PF(P)
The power factor is defined as a function of the plant output power. Enter the values for the setpoint curve under: *PF(P) Curve*.

Setpoint curve Q(U)
Reactive power is defined as a function of the grid voltage, either as a percentage of the nominal plant power or directly in kVAr. Enter the values for the setpoint curve under: *Q(U) Curve*.

6.6.2. Relay Configuration[1] [Plant]

When grid management box is selected as reference value, configure the discrete inputs K1 – K4.

Each of the 16 combinations of the four discrete inputs corresponds to a specific plant output power level (PLA) and a reactive power output:

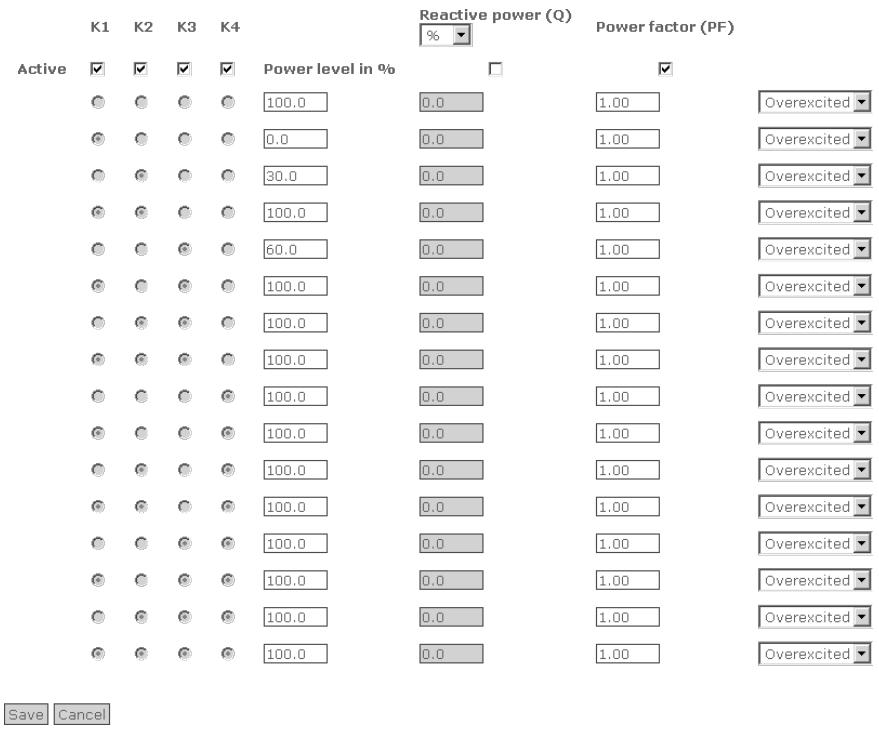

Illustration 6.16: Relay configuration

Item	Description
K1-K4 active	Enable (check) or disable (uncheck) the individual inputs, K1-K4. If the input is disabled, its state is ignored (considered off).
Power level in %	PLA setting. Output power reduction as percentage of the plant nominal AC power.
Reactive power	Reactive power (Q) output in % or kVAr.
Power factor	Output power factor (PF).

6.6.3. Setpoint Curves[1] [Plant]

The TripleLynx Pro+ inverter is capable of generating reactive power on basis of predefined set-point curves, either:

- Reactive power (Q) as a function of the grid voltage
- Power factor (PF) as a function of the plant output power

The setpoint curves are defined by values and displayed as a graphical curve.

Over-excited energy is always displayed above the horizontal axis, and under-excited energy below the axis.
The curve ends are always horizontal, meaning that the inverters will operate with the first set-point (1) below that power or voltage level and with the last setpoint (9) above that power or voltage level.

The reference for the grid voltage is measured on the grid side of the master inverter.
The reference for the plant output power is calculated by the master inverter.

Reactive power generation will follow the specified setpoint curves when sufficient PV power is available.

To define the PF(P) setpoint curve:

- enter up to nine pairs of values
- select under-excited or over-excited for each

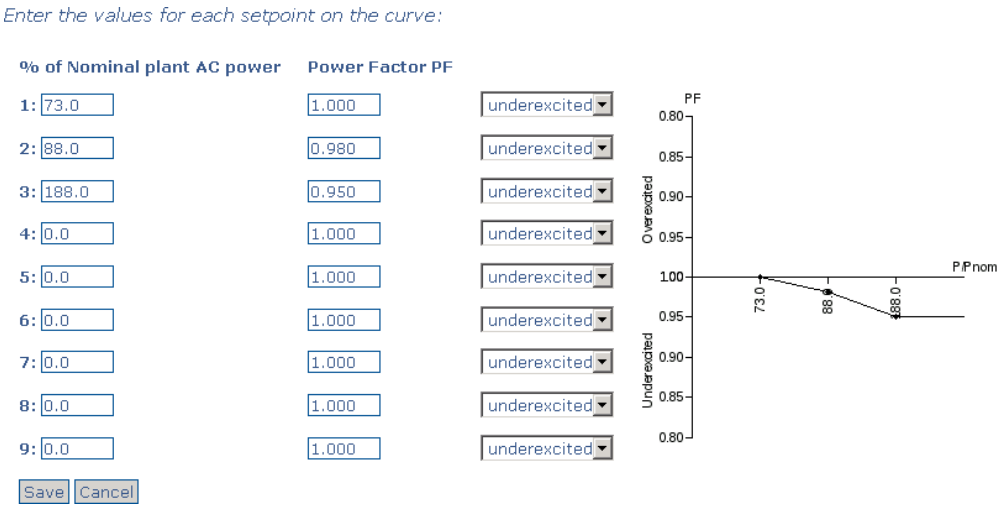

Illustration 6.17: PF(P) Setpoint Curves - Power Factor

To define the Q(U) setpoint curve:

- select an option from the drop-down menu under Reactive power Q

- enter up to nine pairs of values
- select under-excited or over-excited for each

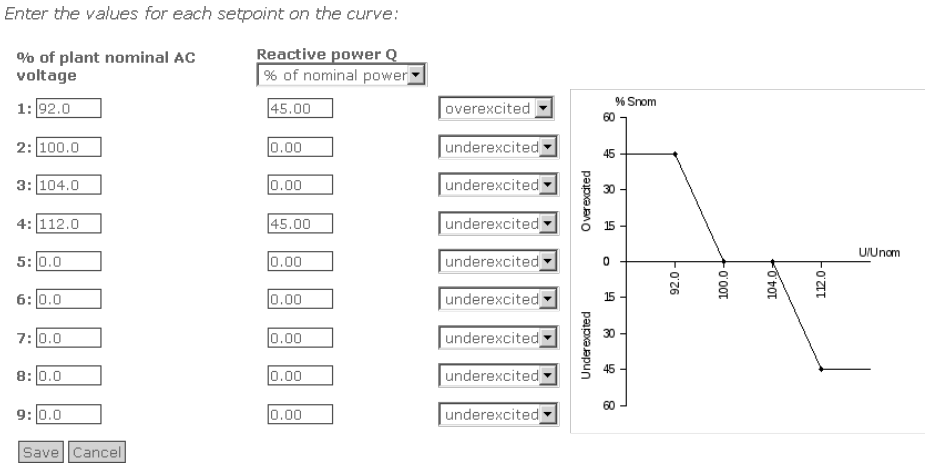

Illustration 6.18: Q(U) Setpoint Curves - Reactive Power

Note: ✍
A pop-up warning appears when an inconsistent pair of values is entered.

6.6.4. Fallback Values[1] [Plant]

When the grid management box is selected as reference value, enter fallback values. Fallback values are automatically activated when communication fails between:

- the master inverter and the grid management box
- the master inverter and a follower inverter

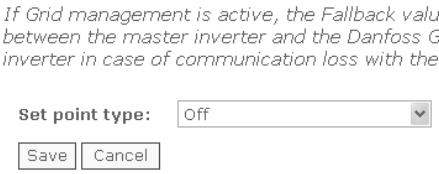

Illustration 6.19: Fallback Values

Item	Description
Setpoint type	**OFF** - The fallback value is disabled. The inverters will continue to run with the most recent configuration. **Constant reactive power Q** - The inverters will fall back to the value of reactive power Q specified in *Value*. **Constant power factor PF** - The inverters will fall back to the value of power factor PF specified in *Value*.
Value	The fallback value for Q or PF.

6.7. Messaging[0] [Plant, Inverter]

Message types:

- Yield
- Event
- DW upload
- Performance ratio (PR)
- Communication error (Com Error)
- Data overwrite
- Plant status

Each message type can be enabled or disabled individually. All message types are disabled as default.

6.7.1. Recipient[0] [Plant]

To use the TripleLynx Pro messaging functionality, define at least one message recipient by name and language. A maximum of 10 recipients can be defined.
By default, each recipient receives all available message types from the inverter.
In the following sections, the specific messages/notifications, which can be sent by the inverter, are described in more detail.

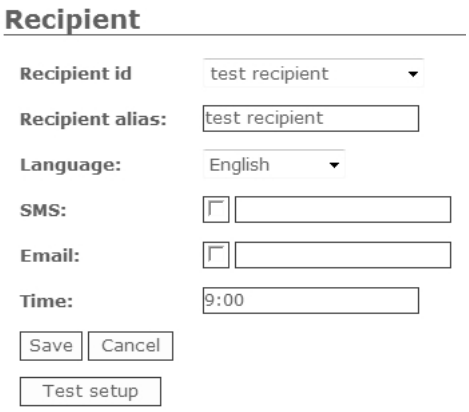

Illustration 6.20: Recipient

Item	Description
Recipient id	A preconfigured alias, the name can be changed.
Recipient alias	An alias to be used as a name/reference for the recipient.
SMS	The mobile number of the recipient, including international country code.
E-mail	The e-mail address of the recipient.
Language	Defines the language in which the recipient wants to receive the message.
Time	Specifies the time of day when the recipient wants to receive the notification. This does not apply to event messages as they are sent according to the threshold specified in [Messaging → Event].
Test setup	Tests the current recipient. If both e-mail and text messages (SMS) have been configured, a test e-mail as well as a text message (SMS) will be sent.

Note: ✍
Before the master inverter can send SMS messages, a GSM modem together with a valid SIM card must have been installed and configured. Refer to the GSM Manual.

Note: ✍
Before the master inverter can send out e-mail, a valid GSM modem and SIM card must have been installed in the inverter, or the master inverter must be connected to the internet. If the master inverter is placed behind a network router, the router must open SMTP port 25.
Remember to configure the e-mail settings in plant view [Setup → Communication → SMTP]. For further details refer to the section *SMTP Setup*.

6.7.2. Yield[0] [Plant]

Check the 'Enable' option to activate yield notification.
Select yield notification interval: Daily, weekly monthly or yearly.

Example: Day yield - #plant name# (27.04.2008) = 325.648 kWh

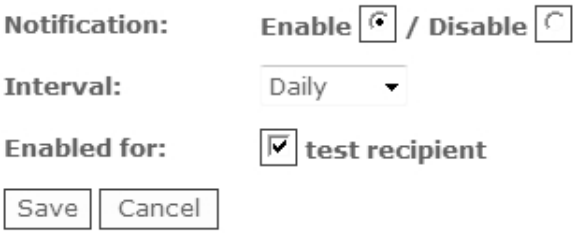

Illustration 6.21: Yield

6.7.3. Event[0] [Plant]

If the inverter fails to supply energy to the grid, it will generate an event. Activate event notification to send out a notification containing a short event text together with an event id, either via e-mail or sms.

Note: ✍
If all inverters in a large plant generate an event at the same time, it is not guaranteed that the user will receive all event notifications from every single inverter.

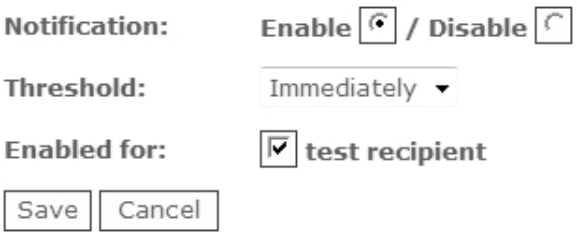

Illustration 6.22: Event

Event threshold:
The event is sent when the threshold is reached. Select a threshold:

- Immediately
- 10 minutes

- 30 minutes
- 1 hour
- 12 hours

Example: Event at #plant name# #group name# #inverter name#: reports event: Grid_1 since 21.01.2009 07:59:35

Note:
Read the inverter event checklist in the TripleLynx User Manual before calling service. A table describing the different events and the corresponding event texts which the inverter can generate can also be found here.

6.7.4. DW Upload[0] [Plant]

For e-mail or sms notification of a data warehouse (FTP upload) failure, select 'Enable'. The notification includes an event code.
For more information about event codes, refer to the *Troubleshooting* section of this manual.

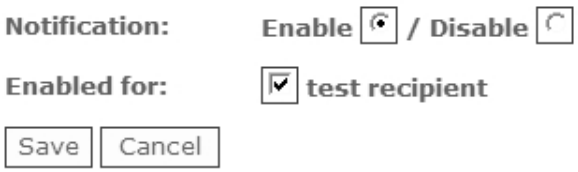

Illustration 6.23: DW Upload

ID			Description	Remedy
	GSM	LAN		
0	✓	✓	No error.	
17	✓	✓	Uploaded file size check did not match. Part of the file was probably lost.	The upload file was corrupted during upload. Upload file again.
18	✓		Modem did not connect to any GSM network.	Check that there is GSM coverage and SIM card is activated.
19	✓		SIM card did not respond to PIN query. SIM card is missing or defect.	Replace SIM card.
26	✓		SIM card requests a code, not PIN code (commonly PUK, because SIM is locked).	The SIM card is blocked. Find the PUK code, insert the SIM into a mobile phone and unblock it.
30	✓		Failed to set PIN code.	The PIN code is wrong. Find the correct PIN code before resetting the inverter. When the inverter is reset, it will set the same PIN code again. After two resets the SIM will block because it received 3 attempts to set wrong PIN.
31	✓		Failed to set GPRS access point name (APN). APN is not valid.	Use only alpha-numeric (a-z, A-Z, 0-9) and dot (.) characters for the APN.
33	✓		Failed to set GPRS user name. User name is not valid.	Avoid spaces in the GPRS user name.
34	✓		Failed to set GPRS password. Password is not valid.	Avoid spaces in the GPRS password.
35	✓		Failed to open GPRS connection.	The APN, user name or password might be wrong, or GPRS is not enabled. Obtain the GPRS configuration from the GSM provider.
36	✓	✓	Failed to open FTP connection.	Check that the Internet is connected. Check that the FTP server address, user name and password are correct.
39	✓	✓	Failed to start file upload.	Check that the server and Internet connections are functioning correctly. Check that the firewall does not block active mode FTP.
40	✓		Failed to read uploaded file back to verify.	An attempt to obtain the file listing from the FTP server failed. Check that the server and Internet connections are functioning correctly.
41	✓		There is no data log to upload.	This is not an error. All logged data has been sent and the inverter has not yet generated new data.
42	✓	✓	The RTC of the master inverter is not set.	Set the inverter time to enable upload.
43	✓	✓	The serial number of the master inverter is not valid.	Check the master inverter serial number.
44	✓		The SIM PIN code is not valid.	A PIN code must be 4-8 characters long and consist only of digits. No other characters are permitted.

Table 6.1: DW Upload Error Codes

6.7.5. Performance Ratio[0] [Plant]

The follower inverters in the network will use the value from the irradiation sensor connected to the master inverter for their performance ratio calculation. When follower inverters are installed in a different environment than the master inverter, individual irradiation sensors can be connected to them to obtain a more accurate calculation of the performance ratio.

Select 'Enable' to receive notification when performance ratio falls below a limit value.
If the irradiation falls below 0.20 W/m^2, notification of performance ratio below limit will not be sent.

Note: ✍
The PV array settings of the inverter must be configured before the performance ratio can be calculated. For further details refer to [Inverter → Setup → Calibration].

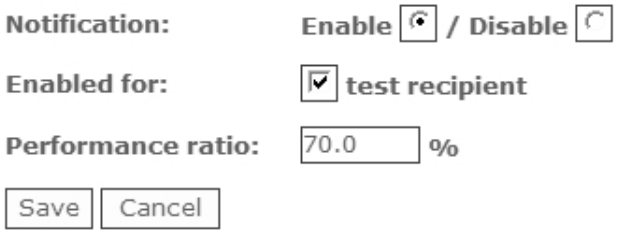

Illustration 6.24: Performance Ratio

6.7.6. Communication Error[0] [Plant]

If the master inverter is unable to communicate with one or more inverters in its network, a message will be sent to the specified recipient.

The notification is sent when communication has failed for 60 minutes or more.

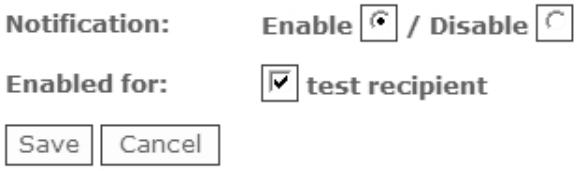

Illustration 6.25: Communication Error

6.7.7. Data Overwrite[0] [Plant]

Check 'Enable' to activate a notification when the datalog content reaches the 60% limit of data capacity without a log upload.

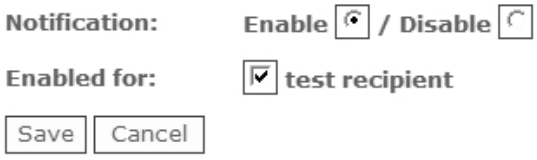

Illustration 6.26: Data Overwrite

6.7.8. Plant Status[0] [Plant]

Check 'Enable' to activate a plant status e-mail on a daily, weekly or monthly basis. The e-mail contains important information about the energy production of each PV input (PV string) and each inverter. This can help discover failures due to soiling, partial failure of solar cells, or a faulty inverter circuit.

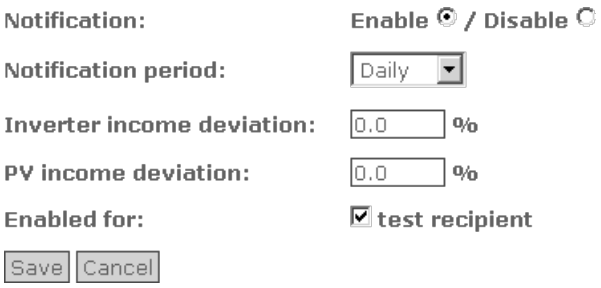

Illustration 6.27: Plant Status Example

In this example, the recipient 'test' receives a daily e-mail, with the following notifications:

- INVERTER PRODUCTION DEVIATES MORE THAN 5 %
  When the energy produced by an inverter within the plant deviates more than 5 % compared to the total average of the plant, the report shows the inverter name.
  Note that the plant must contain more than one inverter, to obtain this notification.
- PV PRODUCTION DEVIATES MORE THAN 3 %
  When a PV string within a specific inverter deviates more than 3 % compared to the average of the inputs on this inverter, the e-mail reports the name of inverter and PV input.
  Note that a minimum of two individual PV inputs must be activated on the inverter, to obtain this notification. For example, two individual inputs are adequate but two inputs in parallel are not.

Plant name:	My plant
Report date:	30.07.2010
Report period:	Yesterday
Plant production:	421422 Wh
Plant revenue:	126.30 Euro
Equivalent CO2 emission:	210.710 kg

PERFORMANCE RATIO ABOVE 70 %

- Inverter_1:	89.1 %
- Inverter_2:	97.8 %
- Inverter_3:	75.3 %
- Inverter_5:	85.2 %
- Inverter_6:	89.0 %
- Inverter_7:	93.9 %

PERFORMANCE RATIO BETWEEN 50 AND 70 %

- Inverter_4:	67.2 %

PERFORMANCE RATIO BELOW 50 %
none

INVERTER PRODUCTION DEVIATES MORE THAN 10 %

- Inverter_4:	−11.2 %
- Inverter_6:	−10.7 %

PV PRODUCTION DEVIATES MORE THAN 10 %

- Inverter_3	
PV input 1:	−13.4 %
PV input 2:	6.3 %
PV input 3:	7.1 %
- Inverter_6	
PV input 1:	12.3 %
PV input 2:	−10.8 %
PV input 3:	−1.5 %

Table 6.2: Example of E-mail Notification

Content of E-mail Notification

Item	Unit	Description
Plant name	-	The name of the plant.
Report date	dd-mm-yyyy	The reporting date.
Report period	-	The reporting period: daily, weekly, monthly.
Plant production	kWh	Energy of the entire plant delivered to the utility grid during the reporting period.
Plant revenue	Euro	The total revenue for the reporting period.
Equivalent CO_2 emission	kg	The total CO_2 saved for the reporting period
Performance ratio	%	A coloured bullet indicates the status of the system. See the section *Plant, Group and Inverter Views* for an explanation of status. **Red:** Plant PR < 50 %, or: Any inverter in the network - in *fail safe* mode, or - missing from the scan list, no contact with the master **Yellow:** Any inverter in the network - with PR < 70 %, or - in *Connecting* or *Off grid* mode **Green:** Plant PR ≥ 70 %, and - all inverters with PR ≥ 70 %, and - all inverters in *On grid* mode An irradiation sensor must be installed before the performance ratio can be calculated.
Inverter income deviation	-	A notification is issued if an inverter has produced insufficient energy compared to the remaining inverters during the reporting period. The message will contain a list of inverters producing insufficient energy. If there are no events, the following text is shown: *All inverters operating OK*.
PV income deviation	-	A notification is issued if one of the PV strings has produced insufficient energy compared to the remaining strings during the reporting period. The message will contain a list of inverters and the corresponding PV string, where the production comparison has issued the notification. If there are no events, the following text is shown: *All strings operating OK*.
Inverter event		List of inverters which have had events. If there are no errors, the following text is shown: *All inverters operating OK*.

Table 6.3: Content of E-mail Notification

6.8. Date and Time[0] [Plant]

See section *Setup, Inverter details, Data and Time*.

6.9. Security[0] [Plant, Inverter]

Enter the security password here.
The password defines the user security level , ranging from 1 to 3.

Changing the security level via the master changes the security level for every inverter in the network.
The current user access level is displayed in the footer of the Web Server, as Security Level xx.

6.10. Setup Details[0] [Plant, Inverter]

6.10.1. Details[0] [Inverter]

Enter the language and grid code of the inverter here.

Illustration 6.28: Setup Details

Item	Description
Language[0]	Changes the display language (inverter display) and the default Web Server language.
Country[2]	Changes the current grid code of the inverter. Note that this is a functional safety setting.

6.10.2. 10 Min. Mean[2] [Inverter]

The 10-minute average of the grid voltage magnitude can be changed here. Note that this is a functional safety setting.

This menu is only visible if remote access has been enabled, see section *Remote Access.* For more information on how to change the functional safety settings of the inverter, refer to the TripleLynx Reference Manual where the procedure for changing the functional safety setting of the inverter is described in detail.

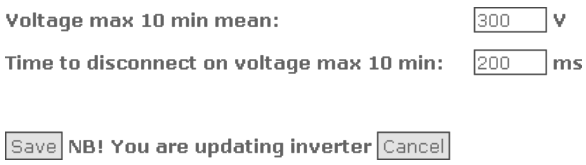

Illustration 6.29: 10 Min. Mean

Item	Description
Voltage max.[2]	Upper 10-minute average voltage limit.
Time to disconnect[2]	Time limit for inverter disconnection from grid.

6.10.3. ROCOF[2] [Inverter]

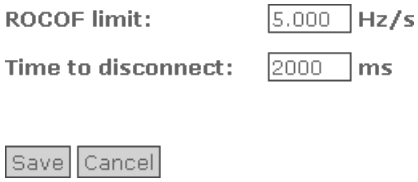

Illustration 6.30: ROCOF

Enter the settings for the Rate of Change of Frequency (ROCOF) here. For more information on ROCOF and functional safety settings, refer to the TripleLynx Reference Manual.
This setting can only be changed if remote access has been enabled, see section *Remote Access*.

Item	Description
ROCOF limit[2]	Trip setting in Hz/s
Time to disconnect[2]	Time limit for inverter disconnection from grid.

6.10.4. PV Configuration[1] [Inverter]

Configure the individual PV inputs here. Select:

- Individual
- Parallel
- Auto detect

By default each PV input is configured to run in auto detect mode, thus minimising PV configuration errors. When selecting individual or parallel configuration, ensure the configuration corresponds to the physical wiring of the inverter.
For further information, refer to the TripleLynx Reference Manual.

This setting is accessible for TripleLynx Pro variants only.

Note: ✍
For PLA settings in TripleLynx Pro+ variants see the section *Grid Management*.

[Setup → Setup details]

For networks of TripleLynx Pro inverters, plant power output level can be controlled via the Danfoss Grid Management Box as follows:

- Configure the grid management box inputs at plant level: [Setup → Setup details]. See the illustration *Power Level Adjustment*.
- The grid management box sends set point values for reactive power and PLA to the master inverter.

For further information refer to the Danfoss Grid Management Box Manual.

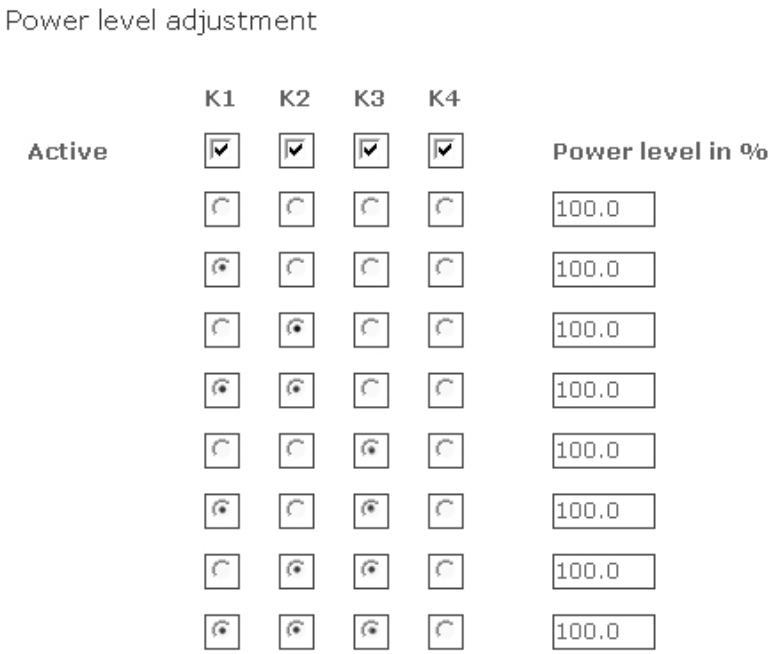

Illustration 6.31: Power Level Adjustment

Item	Description
K1-K4 active	Enable (check) or disable (uncheck) the individual inputs, K1-K4. If the input is disabled its state is ignored (considered off).
Power level in %	PLA setting. Output power reduction as percentage of the plant nominal AC power rating.

6.11. Service[1] [Plant]

6.11.1. Replicate [1] [Plant]

To make the configuration of the TripleLynx Pro inverter easier for installers and service technicians in connection with either commissioning or service, it is possible to distribute/replicate the general settings of the master inverter to the other inverters in the network.

It is not possible to choose to only replicate some of the settings; all the settings specified are replicated.

Specify which inverters to replicate to. These settings can be replicated from the master to any inverter in its network:

- Time and Date
- Setup details
  - Language
  - Country
- Messaging
- Logging interval
- Environmental settings (settings for revenue and CO_2 emission)

Note: ✍
It is only possible to replicate the settings of the master inverter to the other inverters in the network.

6.11.2. Settings Backup[1] [Inverter]

When settings are changed, the inverter backs up its production log, and updates settings stored in the display unit.

Stored data are::

- Timestamp
- Setup details
  - Language
  - Country
  - PV Configuration
- Energy production log
- Irradiation log
- Communication setup
  - RS485 network address
  - IP configuration
  - IP address
- Inverter details
  - Inverter name
  - Group name
  - Inverter type
- Messaging
- Logging interval
- Data warehouse service
- GPRS communication setup
- Sensor calibration values
- Environmental settings (settings for revenue and CO_2 emission)
- PV array settings

Via the Web Server software these settings can be dumped to a file and saved locally on a PC. Afterwards the file can be loaded to another inverter.

Upload and set the backup file before the inverter has commenced energy production. This ensures the settings are used before being superseded.

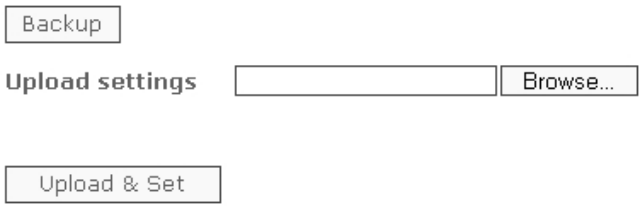

Illustration 6.32: Settings Backup & Restore

Item	Description
Backup	'Dumps' the settings and the content of the production log of the particular inverter to a file where the location and file name are specified by the user.
Browse	Press 'Browse' to select an already saved settings file to be uploaded.
Upload & Set	Pressing this button results in the settings being sent to the inverter in question.

Note: ✍
Note that this is an unrecoverable action. All earlier settings will be lost and cannot be restored afterwards.

6.11.3. Settings Report[1] [Inverter]

This feature enables generation of a report listing the current functional safety parameters. This report has to be signed by the customer, the service technician, and approved by the DNO.

For further instructions on how to change the functional safety settings of the inverter, refer to the TripleLynx Reference Manual where a description of the complete procedure is given.

The service-related menus are described below. Note that some of the menus are visible on plant level or inverter level only.

6.12. Web Server[0] [Plant]

6.12.1. Admin[0] [Plant]

Change the admin password for Web Server access here.

Illustration 6.33: Admin Master Password

For optimal security select a number-letter combination consisting of at least eight characters for the password.
Changing the password here automatically changes the password for each inverter.

Note: ✍
In case the username or password is forgotten, the current username and password can be reset via the display. This is done via [Setup → Reset password] on the display of the inverter. If the password is reset via the display of the master inverter, the password will automatically be reset for every inverter belonging to this master.

6.12.2. Users[0] [Plant]

Via this menu, the administrator can assign access for up to 10 different users. A user can access different groups of inverters or individual inverters. Which inverters or groups the particular user will have access to is configured in the *Profiles* menu. In the section *Supported Characters*, a list of allowed characters can be found.

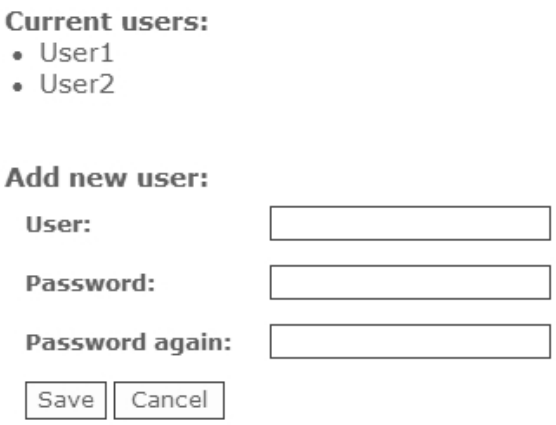

Illustration 6.34: Users

Change the user name and password by clicking on the particular user in the list as shown in the illustration.

6.12.3. Profiles[0] [Plant]

The administrator selects which inverters/groups the user in question will have access to.

Illustration 6.35: Profiles

Each user is referenced via the name configured in the users menu (see above).
All groups belonging to the master inverter are automatically added to the page. Note that a user will only have access to the view menu in plant, group and inverter views.

Note:
User profiles are not stored in the display. Therefore transfer of profiles from one inverter to another is not possible via the display.

6.13. Plant Details[0] [Plant, Inverter]

Enter the name of the plant here. The plant name can consist of a maximum of 25 characters including spaces. See the section *Supported Characters* for a list of allowed character types.

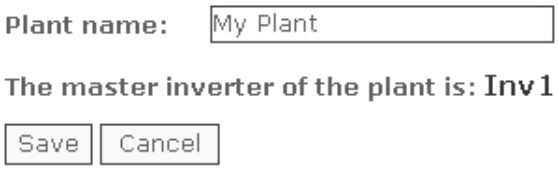

Illustration 6.36: Plant Name

6.14. PV Sweep[0] [Plant, Inverter]

This menu item is available for TLX Pro and TLX Pro+ only.

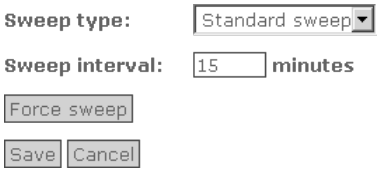

Illustration 6.37: PV Sweep - Inverter View, Setup

Illustration 6.38: PV Sweep – Plant View, Setup

Item	Unit	Description
Sweep type		Select 'Off' or 'Standard sweep' Default is 'Off'
Sweep interval	minutes	Set desired frequency of standard PV sweep Default: 15 minutes
Force sweep		Activate once-off sweep, independent of standard sweep interval

The characteristic power curve of a PV string is non-linear, and in situations where PV panels are partly shadowed, for example by a tree or a chimney, the curve can have more than one local maximum power point (local MPP). Only one of the points is the true global maximum power point (global MPP). Using PV sweep the inverter locates the global MPP, rather than just the local MPP. The inverter then maintains production at the optimum point, the global MPP.

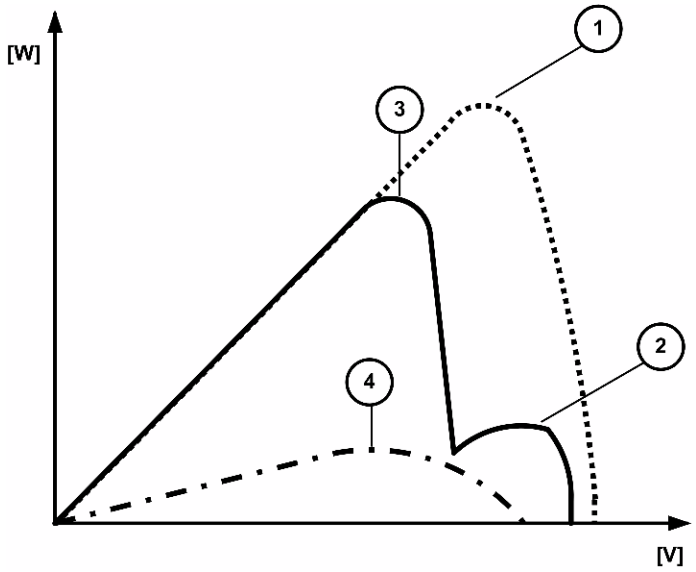

Illustration 6.39: Inverter Output, Power (W) versus Voltage (V)

Legend	
1	Fully irradiated solar panels - Global MPP
2	Partly shaded solar panels - Local MPP
3	Partly shaded solar panels - Global MPP
4	Cloudy conditions - Global MPP

PV sweep functionality comprises two options for scanning of the entire curve:

- Standard sweep – regular sweep at a pre-programmed interval
- Forced sweep – once-off manual sweep

Standard sweep[0] [Plant, Inverter]

Use standard sweep to optimise yield when there are permanent shadows on the PV panel. The characteristic will then be scanned at the defined interval to ensure production remains at the global MPP.

Procedure at plant and inverter level:

1. Under 'Sweep Type', select 'Standard sweep'
2. Under 'Sweep Interval', enter the desired sweep interval in minutes
3. Click on 'Save'

Note:
Select the sweep interval with care. During the sweep, inverter production will be reduced by up to 20 %. Therefore, to ensure maximum overall yield, an appropriate sweep interval is important. The optimum interval will vary for each installation and can be established by experimentation.

Forced sweep[0] [Inverter]

Forced sweep operates independently of the standard sweep functionality and is intended for longer-term evaluation of the PV panels. The recommended procedure is to perform an initial forced sweep after commissioning and save the results in a log file. Comparison of future

sweeps to the initial sweep will indicate the extent of power loss due to degeneration of the solar panels over time.

A forced sweep comprises the following steps:

1. Disconnection of inverter from the grid.
2. Measurement of open-circuit voltage of the PV panels.
3. Reconnection of inverter to the grid.
4. Resumption/completion of PV sweep.
5. Resumption of normal production.

Procedure:

1. Click on 'Force Sweep'.

7. Remote Connection

7.1. Remote Connection

For network management purposes, the following inverter ports are used for communication:

Application	Protocol	Default Port No.
WEB	TCP/UDP	80 (fixed)
FTP	TCP/UDP	21 (changeable), via [Setup→ Communication → Data warehouse] on plant level
SMTP	TCP/UDP	25 (changeable), via [Setup → Communication → SMTP] on plant level
EtherLynx	UDP	48004 (fixed)

Consult the ISP for proper installation of the modem and router.

For support of third -party equipment refer to the network administrator.

Note: ✍
Inverter Ethernet communication is not protected against internet hazards. Therefore implementation of IT safety precautions is required before connecting the inverter to the internet. These precautions include firewall, VPN, etc.

8. Appendix A - Sitemap

8.1. Plant View

[x] Defines current security level, where x is 0, 1 or 2.
[*] Defines whether this page is shown when logged in as user.

Main Menu		Horizontal menu	Page content
[0] [*] View			
↳	**Submenu**		
	[0] [*] Overview		Displays the main page with overall plant status information
	[0] [*] Production graphs	[0] Daily	Displays daily, monthly and yearly production graphs
		[0] Monthly	
		[0] Yearly	
	[0] [*] Performance graphs	[0] Monthly	Displays monthly and yearly performance graphs, if a irradiation sensor is installed on the master inverter
		[0] Yearly	
[0] Status			
↳	**Submenu**		
	[1] Reactive power*		[1] Control type [1] Set point: [1] Value:
	[0] Software version		Displays the software version of the com board of the master inverter
	[0] Upload status		[0] Upload Status: [0] Signal strength: [0] GSM status: [0] GSM network name: [0] Failed uploads: [0] Last error: [0] Last upload:
	[0] PV Sweep		**[0] Inverter name** [0] PV1 [0] Timestamp [0] Sweep status [0] U_{MPP} [0] I_{MPP} [0] P_{MPP} [0] U_{OC} [0] I_{SC} [0] FF Fill factor [0] PV2 [0] Timestamp [0] Sweep status [0] U_{MPP} [0] I_{MPP} [0] P_{MPP} [0] U_{OC} [0] I_{SC} [0] FF Fill factor [0] PV3[1] [0] Timestamp [0] Sweep status [0] U_{MPP} [0] I_{MPP} [0] P_{MPP} [0] U_{OC} [0] I_{SC} [0] FF Fill factor

Table 8.1: Plant View

Main Menu		Horizontal menu	Page content
↳	**Submenu**		
	[0] Plant Status		[0] Plant name [0] Report date [0] Report period [0] Plant production [0] Plant revenue [0] Equivalent CO_2 emission [0] Performance ratio > 70 % [0] Performance ratio 50 %...70 % [0] Performance ratio < 50 % [0] Inverter production deviates more than 10 % [0] PV production deviates more than 10 %
[0] Log			
↳	**Submenu**		
	[0] General		Displays the total production of the entire plant.
	[0] Production log		The total energy log for the entire plant, accumulated data for the past 20 years.
	[0] Irradiation log		The irradiation log, of the master inverter, provided an irradiation sensor is connected.
	[0] Grid management log		Contains an entry for every time the inverter has received a power reduction telegram from an external device. The Web Server only displays the latest 20 events, and the complete log can be viewed by exporting the log.

Table 8.2: Plant View - Continued

Main Menu		Horizontal menu	Page content
[0] Setup			
↳	**Submenu**		
	[0] Calibration	[0] Sensors	[0] Irradiation sensor scale: mV (1000 W/m2) [0] Irradiation sensor temp. coeff.: %/°C [0] PV temp offset: °C [0] Ambient temp offset: °C [0] S0 scale: pulses/kWh
		[0] Environment	Here the values for CO_2 emission and revenue calculation are entered.
↳	**Submenu**		
	[0] Communication	[0] GPRS Setup	[0] SIM pin code: [0] Internet access point [0] User name: [0] Password: [0] Retype password: [0] Network roaming:
		[0] SMTP Setup	[0] STMP Server address: [0] STMP Server port: [0] STMP Server user name: [0] Password: [0] Retype password: [0] Email Sender: [0] User authentication:
		[0] Communication channel	Local network
		[0] Data warehouse	[0] Upload interval: [0] Upload time: [1] FTP server address: [1] FTP server port: [1] FTP mode: [0] FTP user name: [0] Password: [0] Password again:
↳	**Submenu**		
	[1] Grid Management	[1] General	[1] Nominal Plant AC power: [1] Q and PF settle time: [1] Control type: [1] Reference value: [1] Constant reactive power Q (visible for Ref. value set to 'Reactive Power Q') [1] Constant power factor PF (visible for Ref. value set to 'Power Factor PF')
		[1] Relay configuration (this menu is available when General | Reference value = Danfoss Grid Management Box)	[1] K1-K2-K3-K4 [1] Power level % [1] Reactive power Q [1] Power Factor PF
		[1] PF(P) curve (this menu is available when General | Reference value = Set point curve PF(P))	[1] Up to nine data sets (% of Nominal plant AC power and Power Factor PF)
		[1] Q(U) curve (this menu is available when General | Reference value = Set point curve Q(U))	[1] Up to nine data sets (% of plant nominal AC voltage and Reactive Power Q)
		[1] Fallback values	[1] Set point type

Table 8.3: Plant View - Continued

Main Menu		Horizontal menu	Page content
[0] Setup			
↳	**Submenu**		
	[0] Messaging	[0] Recipient	[0] Recipient ID [0] Recipient Alias [0] Language [0] SMS [0] Email [0] Time
		[0] Yield	[0] Notification [0] Interval [0] List of recipients
		[0] Event	[0] Notification [0] Threshold [0] List of recipients
		[0] DW Upload	[0] Notification [0] List of recipients
		[0] Performance ratio	[0] Notification [0] List of recipients [0] Performance ratio
		[0] Communication error	[0] Notification [0] List of recipients
		[0] Data overwrite	[0] Notification [0] List of recipients
		[0] Plant status	[0] Notification [0] Interval [0] Income deviation [0] PV deviation [0] List of recipients
↳	**Submenu**		
	[0] Date and time		Changes the date and time settings for the entire plant.
	[0] Plant details		Here the name of the plant is specified
	[0] Security		Changes the plant access level.
	[0] Setup details[2]	[0] Power level adjustment[2]	Here the current relay configuration is specified.
	[1] Service	[1] Replicate	Replicates the installation settings of the master inverter to the other inverters.
	[0] Web Server	[0] Admin	Changes the admin password.
		[0] Users	Defines new users.
		[0] Profiles	Defines the current user profile (which group of inverters can the particular user see).
	[0] PV Sweep		[0] Sweep type [0] Sweep interval

Table 8.4: Plant View - Continued

1) PV3 is not displayed for inverter rating 10 kW.
2) TripleLynx Pro only.

8.2. Group View

Main Menu		Horizontal menu	Page content
[0] [*] View			
↳	**Submenu**		
	[0] [*] Overview		Displays the main page with overall group status
	[0] [*] Inverters		Here a list of all inverters, belonging to this particular group, together with a colour bullet indicating their current status is shown.
	[0] [*] Production graphs	[0] Daily	Displays daily, monthly and yearly production graphs
		[0] Monthly	
		[0] Yearly	
	[0] [*] Performance graphs	[0] Monthly	Displays monthly and yearly performance graphs, provided an irradiation sensor is installed on the master inverter
		[0] Yearly	

Table 8.5: Group View

8.3. Inverter View

Main Menu		Horizontal menu	Page content
[0] [*] View			
↳	**Submenu**		
	[0] [*] Overview		Displays the main page with overall inverter status information
	[0] [*] Production graphs	[0] Daily	Displays the daily monthly and yearly production graphs, of the specific inverter
		[0] Monthly	
		[0] Yearly	
	[0] [*] Performance graphs	[0] Monthly	Displays monthly and yearly performance graphs, provided an irradiation sensor is installed on the master inverter or on this particular inverter
		[0] Yearly	
[0] Status			
↳	**Submenu**		
	[0] Ambient conditions		[0] Irradiance: w/m^2 [0] PV module temp: °C [0] Ambient temp: °C [0] Irr. sensor temp: °C
	[0] Photovoltaic		**[0] PV Present values** [0] PV input 1 [0] Voltage: V [0] Current: A [0] Power: W [0] PV input 2 [0] Voltage: V [0] Current: A [0] Power: W [0] PV input 3 [0] Voltage: V [0] Current: A [0] Power: W
			[0] PV Maximum values PV input 1 [0] Voltage:V [0] Current: A [0] Power: W PV input 2 [0] Voltage: V [0] Current: A [0] Power W PV input 3 [0] Voltage: V [0] Current: A [0] Power: W
			[0] PV input energy [0] Total: kWh [0] PV1: kWh [0] PV2: kWh [0] PV3: kWh
			[0] Isolation resistance [0] Resistance: MΩ [1] Minimum: MΩ [1] Maximum: MΩ
			[1] PV configuration [1] PV input 1: [1] PV input 2: [1] PV input 3:

Table 8.6: Inverter View

Main Menu		Horizontal menu	Page content
↳	**Submenu**		
	[0] AC grid		**[0] Present values** On Phase 1 (L1): Phase 2 (L2): Phase 3 (L3) [0] Voltage: V [1] 10 min. mean: V [1] L1-L2: V [0] Current: A [1] DC-cont of current: mA [0] Frequency: Hz [0] Power: W [1] Apparent power (S): VA [1] Reactive power (Q): VAr
			[1] Maximum values of AC Phase 1 [0] Voltage: V [0] Current: A [0] Power: W Phase 2 [0] Voltage: V [0] Current: A [0] Power: W Phase 3 [0] Voltage: V [0] Current: A [0] Power: W
			[0] Residual current monitor [0] Current: mA [1] Maximum value: mA

Table 8.7: Inverter View - Continued

Main Menu		Horizontal menu	Page content
↳	**Submenu**		
	[0] Grid management[2]		**[0] Power level adjustment** [0] Power level adjustment: % [0] Current production: W **[0] Frequency stabilization** [0] Maximum power: W [0] Activation frequency: Hz [0] Slope: % [0] Deactivation frequency: Hz
	[0] Reactive power		[0] Setpoint type [0] Value
	[0] Inverter		**[0] General** [0] Country: [0] Language: [0] Inverter name: [0] Inverter group name: [0] Inverter operation mode: [0] Installation date: [0] Inverter model: [0] Inverter serial number: [0] Inverter product number: [0] Inverter SW version: [0] MAC address:
			[1] DC bus voltage [1] Upper: V [1] Maximum upper: V [1] Lower: V [1] Maximum lower: V
			[0] PCB temperatures [0] PCB 1 (Aux): °C [1] PCB 2 (Ctrl): °C [1] PCB 3 (Pow): °C [0] PCB 1 Max (Aux): °C [1] PCB 2 Max (Ctrl): °C [1] PCB 3 Max (Pow): °C
			[1] Internal conditions – RPM of fans [1] Fan 1: RPM [1] Fan 2: RPM [1] Fan 3: RPM [1] Fan 4: RPM
			[0] Power module temperatures [0] Power module 1: °C [1] Power module 2: °C [1] Power module 3: °C [1] Power module 4: °C [1] Power module 1 Max: °C [1] Power module 2 Max: °C [1] Power module 3 Max: °C [1] Power module 4 Max: °C
			[0] PCB Serial numbers Power board serial number [0] POW AUX board serial number [0] AUX Com board serial number Control board serial number [0] CTRL[0] COMM
			[0] PCB product numbers Power board part number [0] POW AUX board part number [0] AUX Control board part number [0] CTRL Com board part number [0] COMM
			[0] PCB software versions Control board [0] CTRL Functional safety processor [0] FSP Display software version [0] DISP Communication board [0] COMM

Table 8.8: Inverter View - Continued

Main Menu		Horizontal menu	Page content
↳			**[1] Operating time** Power board [1] POW: h AUX board: 2341 h [1] AUX: h Control board: 2341 h [1] CTRL: h Communication board [1] COMM: h
↳	**Submenu**		
	[0] PV Sweep		[0] Status [0] PV1 Timestamp [0] PV1 U_{MPP} [0] PV1 I_{MPP} [0] PV1 P_{MPP} [0] PV1 FF [0] PV1 U_{OC} [0] PV1 I_{SC} [0] PV1 FF [0] PV1 Status [0] PV2..... [0] PV3..... (12.5 kW and 15 kW ratings only)

Table 8.9: Inverter View - Continued

Main Menu		Horizontal menu	Page content
[0] Log			
↳	**Submenu**		
	[0] General		[0] Total Production: kWh [0] Total Operating time: h
	[1] Derating		[1] Off grid counter [1] Total de-rate: h [1] Grid voltage: h [1] Grid current: h [1] Grid power: h [1] PV current: h [1] PV power: h [1] Internal temperature: h [1] Power level adjustment: h [1] Frequency stabilization: h [1] Reactive power: h
	[0] Data log		Displays the overall content of the data log, individual log records are viewed when exporting the log.
	[0] Production log		This log displays the accumulated production data for the past 20 years. This log can be exported.
	[0] Irradiation log		Provided an irradiation sensor is installed on the inverter, this log displays the accumulated irradiation data for the past 20 years. This log can be exported.
	[0] Event log		Displays the latest 20 inverter events. The complete event log can be viewed when exporting the log.
	[1] Change log		This log contains an entry for every time any of the functional safety related parameters of the inverters has been changed. The Web Server displays the latest 20 events, the complete change log can be viewed when exporting the log.
	[0] Grid management log[2]		The grid management log contains an entry for every time the inverter has received a power reduction telegram. The Web Server only displays the latest 20 events, the complete log can be viewed when exporting the log.
	[0] Reactive Power		[0] Reactive energy underexcited: kVArh [0] Reactive energy overexcited: kVArh

Table 8.10: Inverter View - Continued

Main Menu		Horizontal menu	Page content
[0] Setup			
↳	**Submenu**		
	[0] Calibration	[0] Sensors	[0] Irradiation sensor scale: mV (1000 W/m^2) [0] Irradiation sensor temp. coeff.: %/°C [0] PV temp offset: 2 °C [0] Ambient temp offset: °C [0] S0 scale: pulses/kWh
		[0] PV Array	[0] PV1 Array area: m^2 [0] PV1 Array power: W [0] PV2 Array area: m^2 [0] PV2 Array power: W [0] PV3 Array area: m^2 [0] PV3 Array power: W
		[0] Environment	Here the values for CO_2 emission and revenue calculation are entered.
	[0] Communication	[0] RS485 Setup	[0] Network: [0] Subnet: [0] Address:
		[0] IP Setup	[0] Configuration Automatic/manual [0] IP address: [0] Subnet mask: [0] Default gateway: [0] DNS Server:
		[0] Remote access	[2] Change functional safety setting:
	[0] Relay	[0] Relay functionality - Alarm	[0] Status [0] Alarm timeout [0] Test alarm [0] Stop alarm
		[0] Relay functionality - Self-consumption	[0] Power level [0] Duration [0] Trigger time
	[0] Inverter details	[0] General	[0] Inverter name: [0] Group name: [0] Master mode: [0] List of follower inverters
		[1] Date and time	[1] Time: [1] Date: [1] Time zone:
		[1] Reset max values	Reset the max values of the inverter
	[0] Logging		[0] Logging interval: [0] Logging capacity: [1] Delete event log [1] Delete Production log [1] Delete Energy log [1] Delete irradiation log
	[0] Messaging	[0] Enable/disable messaging for the individual inverter	
	[0] Security		Change the current security level of the inverter.
	[0] Setup details	[0] Setup details	[0] Language: [2] Country[3]:
		[2] 10 min mean[3]	[2] 10 min. mean voltage: V [2] Time to disconnect: ms
		[2] ROCOF[3]	[2] ROCOF limit: Hz/s [2] Time to disconnect: ms
		[1] PV Configuration	PV Configuration, individual or parallel [1] PV 1 configuration [1] PV 2 configuration [1] PV 3 configuration[1]
		[1] Force inverter power up	Turns on grid supply to the control board.

Table 8.11: Inverter View - Continued

Main Menu		Horizontal menu	Page content
↳	[1] Service	[1] Settings backup	Performs a settings backup or a restore of the backed up settings.
		[1] Settings report	A settings report must be generated when one of the functional safety settings has been changed.
		[1] Reset	[1] Reset communication board [1] Reset control board
	[0] PV Sweep		[0] Sweep type [0] Sweep interval [0] Force sweep

Table 8.12: Inverter View - Continued

1) PV3 is not displayed for inverter type rating 10 kW.
2) When grid code is an _MV country.
3) When "change functional safety settings" is enabled.
4) TripleLynx Pro variants only.
*) Only visible in the TripleLynx Pro+ version.

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