

**PVremote Pro  
Central System**

# **Solar Monitoring System**

# **OPERATION MANUAL**

**OMRON**



# Introduction

---

Thank you for purchasing the Omron PVremote Pro system.

This manual contains information that is necessary for operation of the Central System used in the PVremote Pro system. Please read this manual and make sure you understand the functionality and performance of the related equipment before you attempt to operate the system. Keep this manual in a safe place where it will be available for reference.

## Intended Audience

This manual is intended for the following personnel who must also have knowledge of electrical systems (an electrical engineer or the equivalent).

- Personnel involved with managing and/or monitoring a solar energy Plant.
- Personnel involved with managing and/or using PVremote Pro.

# Manual Structure

## Page Structure

The following page structure is used in this manual.

Level 2 heading

Level 3 heading

A step in a procedure  
Indicates a procedure.

Special information  
Icons indicate precautions, additional information, or reference information.

Manual name

Level 1 heading

Level 2 heading

Level 3 heading

Gives the current headings.

Page tab

Gives the number of the main section.

## Special Information

Special information in this manual is classified as follows:



### Precautions for Safe Use

Precautions on what to do and what not to do to ensure safe usage of the product.



### Precautions for Correct Use

Precautions on what to do and what not to do to ensure proper operation and performance.



### Additional Information

Additional information to read as required.

This information is provided to increase understanding or make operation easier.

**Note** References are provided to more detailed or related information.

# Sections in this Manual

---



# Safety Precautions

---

## Definition of Precautionary Information

The following notation is used in this manual to provide precautions required to ensure safe usage of related hardware. The safety precautions that are provided are extremely important to safety. Always read and heed the information provided in all safety precautions. The following notation is used.



### **Precautions for Safe Use**

Indicates precautions on what to do and what not to do to ensure safe usage of the product.



### **Precautions for Correct Use**

Indicates precautions on what to do and what not to do to ensure proper operation and performance.

# Related Manuals

Manual name	Cat. No.	Model numbers	Application	Description
PVremote Pro Central System Operation Manual (this manual)	T06E	---	Central System operation and interface	Describes functionality and operation of the Central System.
PVremote Pro Installation Manual	T05E	---	Installing and configuring a PVremote Pro system	Describes the installation and configuration of the hardware and systems included in a PVremote Pro system.
PVremote Pro Quick Start Guide	T04E	---	Quick start for the PVremote Pro system	Describes important guidelines for commissioning the PVremote Pro system.
CJ2 CPU Units Hardware User's Manual	W472	CJ2M-CPU□□	Hardware specifications for CJ2 CPU Units	Describes the following for CJ2 CPU Units: <ul style="list-style-type: none"> <li>• Overview and features</li> <li>• Basic system configuration</li> <li>• Part nomenclature and functions</li> <li>• Mounting and setting procedure</li> <li>• Remedies for errors</li> <li>• Also refer to the Software User's Manual (W473).</li> </ul>
CJ-series CJ2 CPU Unit Software User's Manual	W473	CJ2M-CPU□□	Software specifications for CJ2 CPU Units	Describes the following for CJ2 CPU Units: <ul style="list-style-type: none"> <li>• CPU Unit operation</li> <li>• Internal memory</li> <li>• Programming</li> <li>• Settings</li> <li>• Functions built into the CPU Unit. Also refer to the Hardware User's Manual (W472)</li> </ul>
CS/CJ-series EtherNet/IP Units Operation Manual	W465	CJ2M-CPU3□	Using the built-in EtherNet/IP port of the CJ2 CPU Unit	Describes the built-in EtherNet/IP port and EtherNet/IP Units. Describes basic settings, tag data links, FINS communications, and other functions.
CS/CJ/NSJ-series Instructions Reference Manual	W474	CJ2M-CPU□□	Information on instructions.	Describes each programming instruction in detail. Also refer to the Software User's Manual (W473) when you create programs.
CX-Programmer Operation Manual	W446	WS02-CX□□-V□	Support Software for Windows computers	Describes operating procedures for the CX-Programmer. Also refer to the Software User's Manual (W473) and CS/CJ/NSJ-series Instructions Reference Manual (W474) when you create programs.
CX-Programmer Operation Manual Functions Blocks/Structured Text	W447		CX-Programmer operating procedure	
CX-Programmer Operation Manual SFC Programming	W469			
Universal Input Units Operation Manual	W466	CJ1W-AD04U(SL)-NL(SL)-NL	Using the Universal Input Unit	Describes the specifications, installation, troubleshooting, and other information on the Universal Input Units.
Grid Connect Photovoltaic Inverter Communication Manual	S103	KP□□L	Using Communication features	Describes the configuration and protocol for the communication features of the PV Inverter.
Grid Connect Photovoltaic Inverter Quick Installation Guideline	S102	KP□□L	Installing the PV Inverter	Describes the installation of the PV Inverter.
Grid Connect Photovoltaic Inverter User's Manual	S101	KP□□L	Using the KP□□L Unit	Describes essential information regarding functions, performance, and usage of the KP□□L.



# Revision History

---

A manual revision code appears as a suffix to the catalog number on the front and back covers of the manual.



Revision code	Date	Revised content
01	January 2012	Original production
02	January 2013	<p>Relevant manuals updated with current revision code.</p> <p>The definition of terms Plant Manager and Plant Viewer are updated.</p> <p>Added details of Base and Advanced Licence types.</p> <p>Added updated Central System images.</p> <p>Added detail of 0 or 1 Plant Viewer per Plant.</p> <p>Added detail for multiple language support.</p> <p>Added PLC Application download details.</p> <p>Added MPPT Warning details.</p>



# Read and Understand this Manual

Please read and understand this manual before using the product. Please consult your OMRON representative if you have any questions or comments.

## Precaution on Terminology

The Omron Monitoring Web Portal may be referred to as the “User Interface” or “Monitoring Web Portal”.

The KP□□L may be referred to as the “Inverter”, “Photovoltaic Inverter” or “PV Inverter”.

The term “user” refers to any person signing in to the Monitoring Web Portal and includes both a Plant Viewer and a Plant Manager.

The term “Remote Monitoring PLC Application” may be referred to as “PLC Application” or “Application”.

When referring to Base and Advanced License types and their respective functionality, Advanced License functionality is exclusive and provides specified functions not available with Base License types.

## Trademarks

- Windows, Windows 98, Windows XP, Windows Vista, and Windows 7 are registered trademarks of Microsoft Corporation in the USA and other countries.
- Internet Explorer is a registered trademark of Microsoft Corporation.
- Google Chrome is a registered trademark of Google Inc.
- Mozilla Firefox is a registered trademark of the Mozilla Corporation.

Other company names and product names in this document are the trademarks or registered trademarks of their respective companies.

## *Warranty and Limitations of Liability*

### **WARRANTY**

OMRON's exclusive warranty is that the products are free from defects in materials and workmanship for a period of one year (or other period if specified) from date of sale by OMRON.

OMRON MAKES NO WARRANTY OR REPRESENTATION, EXPRESS OR IMPLIED, REGARDING NON-INFRINGEMENT, MERCHANTABILITY, OR FITNESS FOR PARTICULAR PURPOSE OF THE PRODUCTS. ANY BUYER OR USER ACKNOWLEDGES THAT THE BUYER OR USER ALONE HAS DETERMINED THAT THE PRODUCTS WILL SUITABLY MEET THE REQUIREMENTS OF THEIR INTENDED USE. OMRON DISCLAIMS ALL OTHER WARRANTIES, EXPRESS OR IMPLIED.

### ***LIMITATIONS OF LIABILITY***

OMRON SHALL NOT BE RESPONSIBLE FOR SPECIAL, INDIRECT, OR CONSEQUENTIAL DAMAGES, LOSS OF PROFITS OR COMMERCIAL LOSS IN ANY WAY CONNECTED WITH THE PRODUCTS, WHETHER SUCH CLAIM IS BASED ON CONTRACT, WARRANTY, NEGLIGENCE, OR STRICT LIABILITY.

In no event shall the responsibility of OMRON for any act exceed the individual price of the product on which liability is asserted.

IN NO EVENT SHALL OMRON BE RESPONSIBLE FOR WARRANTY, REPAIR, OR OTHER CLAIMS REGARDING THE PRODUCTS UNLESS OMRON'S ANALYSIS CONFIRMS THAT THE PRODUCTS WERE PROPERLY HANDLED, STORED, INSTALLED, AND MAINTAINED AND NOT SUBJECT TO CONTAMINATION, ABUSE, MISUSE, OR INAPPROPRIATE MODIFICATION OR REPAIR.

## ***Application Considerations***

### ***SUITABILITY FOR USE***

OMRON shall not be responsible for conformity with any standards, codes, or regulations that apply to the combination of products in the customer's application or use of the products.

At the customer's request, OMRON will provide applicable third party certification documents identifying ratings and limitations of use that apply to the products. This information by itself is not sufficient for a complete determination of the suitability of the products in combination with the end product, machine, system, or other application or use.

The following are some examples of applications for which particular attention must be given. This is not intended to be an exhaustive list of all possible uses of the products, nor is it intended to imply that the uses listed may be suitable for the products:

- Uses involving potential chemical contamination or electrical interference, or conditions or uses not described in this manual.
- Nuclear energy control systems, combustion systems, railroad systems, aviation systems, medical equipment, amusement machines, vehicles, safety equipment, and installations subject to separate industry or government regulations.
- Systems, machines, and equipment that could present a risk to life or property.

Please know and observe all prohibitions of use applicable to the products.

NEVER USE THE PRODUCTS FOR AN APPLICATION INVOLVING SERIOUS RISK TO LIFE OR PROPERTY WITHOUT ENSURING THAT THE SYSTEM AS A WHOLE HAS BEEN DESIGNED TO ADDRESS THE RISKS, AND THAT THE OMRON PRODUCTS ARE PROPERLY RATED AND INSTALLED FOR THE INTENDED USE WITHIN THE OVERALL EQUIPMENT OR SYSTEM.

### ***PROGRAMMABLE PRODUCTS***

OMRON shall not be responsible for the user's programming of a programmable product, or any consequence thereof.

## **Disclaimers**

### ***CHANGE IN SPECIFICATIONS***

Product specifications and accessories may be changed at any time based on improvements and other reasons.

It is our practice to change model numbers when published ratings or features are changed, or when significant construction changes are made. However, some specifications of the products may be changed without any notice. When in doubt, special model numbers may be assigned to fix or establish key specifications for your application on your request. Please consult with your OMRON representative at any time to confirm actual specifications of purchased products.

### ***DIMENSIONS AND WEIGHTS***

Dimensions and weights are nominal and are not to be used for manufacturing purposes, even when tolerances are shown.

### ***PERFORMANCE DATA***

Performance data given in this manual is provided as a guide for the user in determining suitability and does not constitute a warranty. It may represent the result of OMRON's test conditions, and the users must correlate it to actual application requirements. Actual performance is subject to the OMRON Warranty and Limitations of Liability.

### ***ERRORS AND OMISSIONS***

The information in this manual has been carefully checked and is believed to be accurate; however, no responsibility is assumed for clerical, typographical, or proofreading errors, or omissions.



# CONTENTS

---

Introduction .....	1
Manual Structure .....	2
Sections in this Manual .....	3
Safety Precautions .....	4
Related Manuals .....	5
Revision History .....	7
Contents .....	13
Read and Understand this Manual .....	9

## Section 1 Overview

---

<b>1-1 Overview of the Central System .....</b>	<b>1-2</b>
1-1-1 General Terms .....	1-2
1-1-2 Overview .....	1-3
1-1-3 User Interface Functions .....	1-4
1-1-4 Licenses .....	1-6
1-1-5 System Example .....	1-9

## Section 2 Administration

---

<b>2-1 Overview .....</b>	<b>2-2</b>
<b>2-2 User Administration .....</b>	<b>2-3</b>
2-2-1 User Administration Area .....	2-3
2-2-2 New Plant Viewer Form .....	2-4
<b>2-3 Site Administration .....</b>	<b>2-6</b>
2-3-1 Site Administration Area .....	2-6
2-3-2 New Site Form .....	2-7
2-3-3 Plant Administration Area .....	2-8
2-3-4 New Plant Form .....	2-9
2-3-5 PLC Administration Area .....	2-10
2-3-6 New PLC Form .....	2-11
2-3-7 PLC Application Download .....	2-12
2-3-8 Inverter Administration Area .....	2-14
2-3-9 New Inverter Form .....	2-15
<b>2-4 Registration Overview .....</b>	<b>2-16</b>
2-4-1 Registration Procedure .....	2-16

## Section 3 Monitoring

---

<b>3-1 Site and Plant Access (Base and Advanced License) .....</b>	<b>3-2</b>
3-1-1 Graph .....	3-4
3-1-2 Events .....	3-8
3-1-3 Big Display .....	3-10

- 3-2 Site and Plant Access (Advanced License Only) ..... 3-12**
  - 3-2-1 Plant Settings ..... 3-12
  - 3-2-2 Environmental Sensors ..... 3-17
  - 3-2-3 Forecast Information ..... 3-18
- 3-3 Data Processing ..... 3-19**
  - 3-3-1 Periodic Properties for Inverters ..... 3-19
  - 3-3-2 Periodic Properties for the Total Plant ..... 3-20
  - 3-3-3 Properties Data ..... 3-21

# Overview

---

This section provides a general overview and introduction of the functionality of the Central System.

---

<b>1-1</b>	<b>Overview of the Central System</b>	<b>1-2</b>
1-1-1	General Terms	1-2
1-1-2	Overview	1-3
1-1-3	User Interface Functions	1-4
1-1-4	Licenses	1-6
1-1-5	System Example	1-9

# 1-1 Overview of the Central System

---

## 1-1-1 General Terms

### Site

---

Remote installation location to include one or more Plants with the same postal address.

### Plant

---

Installation point at the Site that includes one or more Photovoltaic Inverters and one or more PLCs. Multiple Plants can exist within the same Site.

### Data Link

---

The Data Link is the data connection between the PLC and the Central System. The Data link operates using an Internet Protocol (IP) based communication method.

### Plant Viewer

---

The user assigned to a specific Plant to view and monitor system performance.

### Plant Manager

---

Typically the person responsible for managing the operation of the Site and all Plants within. This person creates and edits all Site and Plant details in the Central System including allocation of Plant Viewers to specific Plants.

### Inverter

---

Device that converts DC power obtained from the solar modules into the AC power that is used in businesses and enables interconnection with the grid.

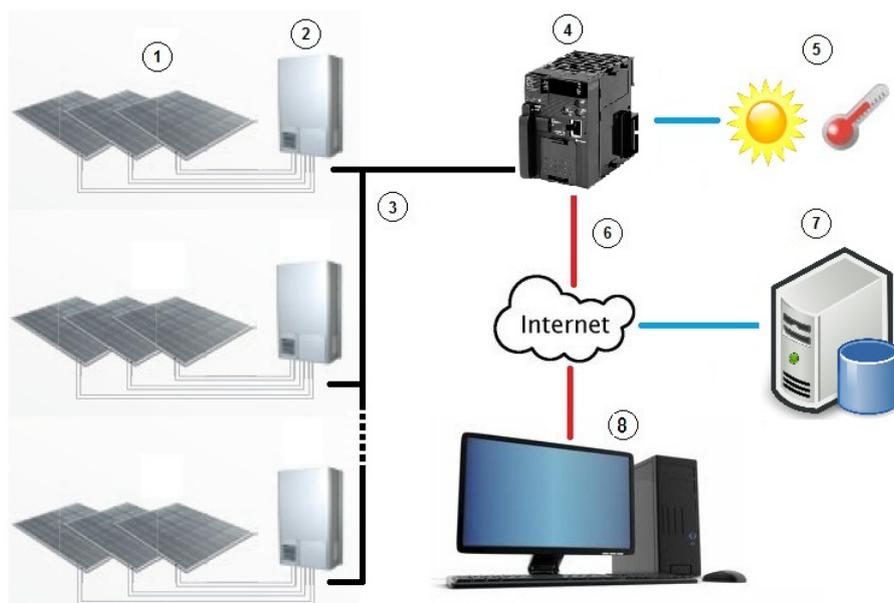
### PLC

---

Programmable Logic Controller that facilitates all communications and functions at the installation location within a Plant. The PLC operates according to an installed Remote Monitoring Application to gather and manage data collected from the connected Inverters.

## 1-1-2 Overview

One of the main components of the PVremote Pro is the Central System. The Central System provides users with the ability to monitor and track the operation of the remote installation with a simple User Interface. The Central System provides several functions that can be accessed using common web browsers from any personal computer with an internet connection. The Central System is shown below as a part of the total PVremote Pro system.



Item	Description
1	Solar Module
2	PV Inverter, KP□□L type
3	RS-485 serial network
4	PLC including Remote Monitoring PLC Application
5	Environmental Data (Temperature sensor, Radiation sensor)
6	Data Link
7	Central System
8	User Interface



### Additional Information

- The system diagram above shows is a typical configuration however many other variations are possible. Contact your local Omron representative for more information.
- The Central System and related databases are managed by Omron.
- The web browser Mozilla Firefox (version 10.0 or higher) is recommended for best performance. Mozilla Firefox (version 3.6 or higher), Google Chrome and Internet Explorer (version 7 or higher) are usable but may differ from examples in this manual and can lead to minor graphical issues.
- PVRemote Pro has been developed for optimal performance however, it is a web-based system therefore user experience and performance may be influenced by data traffic on the internet.

### 1-1-3 User Interface Functions

The Central System provides several functions that enable the user to control and monitor the remote site with a simple interface.

The User Interface consists of a web portal that enables the Plant Manager to administer the system and provide Plant Viewers with access to critical performance information for Plants and Sites at a remote location.

**OMRON** Green Automation | Europe UK IT DE ES    [Register now!](#) [Forgot your password?](#)

Home | Public Plants | Supported Devices | Contact

Welcome to the  
**Omron PVremote Pro!**  
The easy way for monitoring

**Omron PVremote Pro**  
Keep an eye on your investments... from everywhere!

Omron is there to support you when it comes to monitoring your photovoltaic plants. You can monitor the production of your plant in every moment, at a string level, with a single product! You will be notified immediately once an error occurs. Because we know that in that case, maybe more than ever, time is money!

**Solar Plant**  
Power Output

**Omron KP100L**  
Photovoltaic Inverter

**Omron PVremote Pro**

[View supported devices](#) [View Demo application](#)

[Omron Europe](#) [Omron Corporation](#) [Legal notices](#) [Site map](#)

Copyright © Omron Corporation 2013. All rights reserved. **realizing**

## Plant Manager Registration

The Plant Manager registration serves as a starting point for establishing communication between the remote system and the Central system as well as configuration of Plant, Site and user details. See section 2-4-1 *Registration Procedure* for more details regarding the registration process.

## User Administration

Plant Viewers are registered by the Plant Manager in the User Administration area. This area is only accessible by the Plant Manager and not seen by Plant Viewers. See section 2-2 *User Administration* for more details.

## Site Administration

---

The Site Administration area is used by the Plant Manager to establish, configure and review the following.

- Sites
- Plants
- PLCs
- Inverters

This area is only accessible by the Plant Manager and not seen by registered Plant Viewers. See section 2-3 *Site Administration* for more details.

## Plant Administration

---

The Plant Administration area is used by the Plant Manager to establish, configure and review the following.

- Plants
- PLCs
- Inverters
- License registration and expiration
- Plant Viewer assignment

See section 2-3-3 *Plant Administration Area* for more details.

## PLC Administration

---

The Central System maintains communication with all specified PLCs that are configured in this area. PLC configuration parameters and Inverter registration information can be found and edited here by the Plant Manager. See section 2-3-5 *PLC Administration Area* for more details.

## Inverter Administration

---

The Inverter Administration area is used by the Plant Manager to establish, configure and review all Photovoltaic Inverters connected to a specific PLC. See section 2-3-8 *Inverter Administration Area* for more information.

## Plant Monitoring

---

The Central System utilizes a database to store incoming data (see note) from a remote Plant. This data is presented in the *My Plants* area for monitoring by Plant Managers and specified Plant Viewers. This area contains detailed information such as graphs, events, graphic displays and setting adjustments. See section 3, *Monitoring* for more details.

**Note** Data is accessible and stored during valid License periods. See section 1-1-4 *Licenses* for more information.

## 1-1-4 Licenses

Two license types are available for a Plant. Base or Advanced licenses provide different user data access and feature availability.

### ● Base License

The Base License license provides limited functionality to manage the system and to monitor a Plant for a period of one year.

License type	Plant Power
KP-RMP-B-1-A	Up to 20 kWp
KP-RMP-B-1-B	>20kWp up to 50kWp
KP-RMP-B-1-C	>50kWp up to 200kWp
KP-RMP-B-1-D	>200kWp up to 1MWp
KP-RMP-B-1-E	>1MWp up to 3MWp
KP-RMP-B-1-X	>3MWp

### ● Advanced Licence

The Advanced License license provides full functionality to manage the system and to monitor a Plant for a period of one year.

License type	Plant Power
KP-RMP-A-1-A	Up to 20 kWp
KP-RMP-A-1-B	>20kWp up to 50kWp
KP-RMP-A-1-C	>50kWp up to 200kWp
KP-RMP-A-1-D	>200kWp up to 1MWp
KP-RMP-A-1-E	>1MWp up to 3MWp
KP-RMP-A-1-X	>3MWp

## License Functionality

The following table provides details of Central System user data access and feature availability for License types.

Item	No License	Base License	Advanced License
Site Configuration	Available	Available	Available
Plant Configuration			
PLC Configuration			
Inverter Configuration			
Graph of PV Inverter Properties (Data)	Not available*1	Available*2	
Events			
Radiation Sensor Data*3	Not available	Not available	
Ambient Temperature Sensor Data*3			
Forecasts including current energy produced, forecasted energy produced, performance factor, and calculated revenue.	Not available	Not available	Available
Daily Report			
Email Manager			
Email Alerts			
PLC Settings			
Plant Settings			

**Note 1** Page is accessible but no data is displayed.

**2** Events related to sensor data are not available for Base License.

**3** Radiation and ambient temperature sensors are optional hardware.

## Purchase Agreement

In order to use PVremote Pro, the following steps need to be taken.

- 1** Determine what type of different functionalities you may need (Base or Advanced).
- 2** Determine the Plant size you want to monitor (see note).
- 3** Choose the required license type (see note).
- 4** Place your order through Omron or authorized sales channels.
- 5** Once the purchase order is placed, Omron or the Authorized sales channel will send a License Code.
- 6** Input your License Code to the proper web portal and enjoy PVremote Pro.

**Note** Select a Plant size according to the amount of installed PV power, calculated as the sum of each PV module power at standard test conditions, measured in kWp. License type upgrades and downgrades are possible after expiration.



### Additional Information

Contact your local Omron Representative more information regarding upgrading and downgrading Plant size and/or License type.

## License Expiration and Renewal

---

License expiration and renewal policies are detailed below.

- A purchased License is valid for one year from the date of License Code input into the web portal (Central System).
- A License can be renewed up to 90 days prior to current License expiration (early). An early License renewal within the 90 days prior to existing License expiration will not affect the existing License and becomes active immediately after the existing License expires, allowing for an additional year of service with no interruption.
- When a License expires, access to current data\*<sup>1</sup> stops but will still be collected for an additional 90 days (grace period) beyond the expiration date pending proper system communications.
- Access to data\*<sup>1</sup> collected during the 90 day grace period after License expiration will occur if a License is renewed during said period.
- If a License is renewed within the 90 day grace period after License expiration, the renewal date is effective as of the prior License expiration date.
- If a License is not renewed within the 90 day grace period after expiration, data\*<sup>1</sup> collected during said period is not accessible.
- If a License is renewed after the 90 day grace period has elapsed, data\*<sup>1</sup> access is restored only from the date of renewal and this sets the start date of the new License period of one year.

**Note 1** Refer to *License Functionality* on page 7 for detail of data (items) accessible for valid Base and Advanced Licenses.



### Additional Information

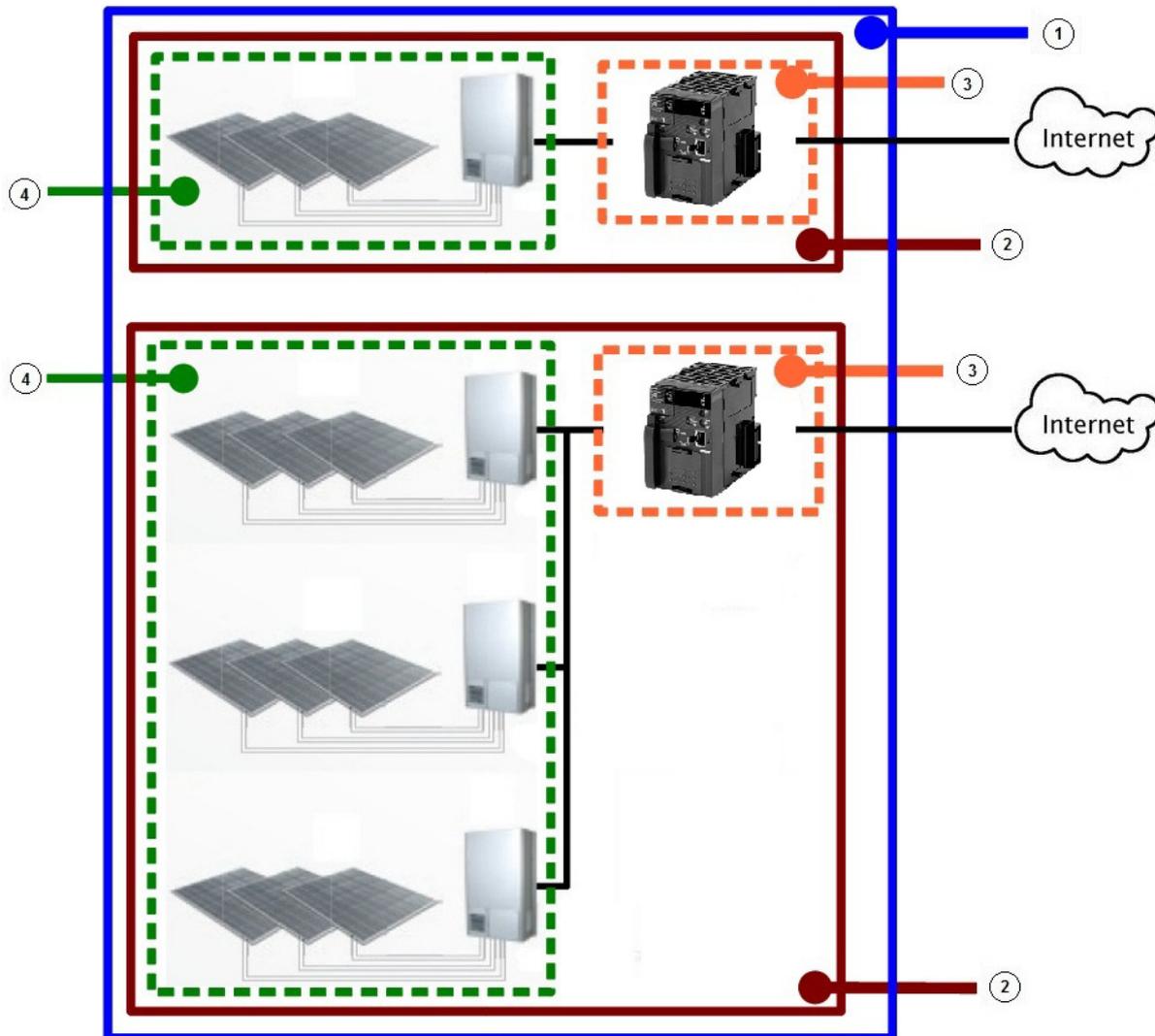
---

Contact your local Omron Representative for further information.

---

### 1-1-5 System Example

The following diagram illustrates how the various registered items interact within a working system.



Item	Description
1 (Site)	Remote installation location to include one or more Plants.
2 (Plant)	Installation point at the Site that includes one or more Photovoltaic Inverters and one or more PLCs.
3 (PLC)	Programmable Logic Controller that facilitates all communications and functions at the installation location within a Plant.
4 (Inverter)	Device that converts DC power obtained from the solar modules into AC power within a plant and in communication with a PLC.

 **Additional Information**

The system diagram above shows is a typical configuration however many other variations are possible. Contact your local Omron representative for more information.



# 2

## Administration

This section provides details on Central System administration and registration utilities.

---

<b>2-1</b>	<b>Overview</b>	<b>2-2</b>
<b>2-2</b>	<b>User Administration</b>	<b>2-3</b>
2-2-1	User Administration Area	2-3
2-2-2	New Plant Viewer Form	2-4
<b>2-3</b>	<b>Site Administration</b>	<b>2-6</b>
2-3-1	Site Administration Area	2-6
2-3-2	New Site Form	2-7
2-3-3	Plant Administration Area	2-8
2-3-4	New Plant Form	2-9
2-3-5	PLC Administration Area	2-10
2-3-6	New PLC Form	2-11
2-3-7	PLC Application Download	2-12
2-3-8	Inverter Administration Area	2-14
2-3-9	New Inverter Form	2-15
<b>2-4</b>	<b>Registration Overview</b>	<b>2-16</b>
2-4-1	Registration Procedure	2-16

## 2-1 Overview

---

The Central System's Monitoring Web Portal allows Plant Managers to configure and administer the remote system before, during and after the installation process. The Monitoring Web Portal accommodates a variety of Sites and Plants in various configurations for the following tasks.

- Creating Plant Viewers with access to specific Plants
- Registering and licensing of a new Remote Installation
- Specifying MAC IDs of PLCs for remote communications
- Registering serial numbers of Photovoltaic Inverters
- Editing the configuration of Plants, Sites, PLCs and Photovoltaic Inverters
- Email for events (Advanced License feature)

### Access Control

---

Plant Managers can manage a Plant Viewer's specific access to individual Plants including password protection.

### Specific Configurations

---

Various configurations of Plants, PLCs and Inverters are supported when a new Site is created to ensure accurate monitoring of the specific solar application.

### Flexibility

---

Plants, PLCs and Inverters can be added or removed at any time to match system changes and improvements.

### Detailed Information

---

Specific details such as location and contact information can be submitted for Plant Viewers, Plant Managers, Sites and Plants for convenient organization and quick access to critical information.



#### **Precautions for Correct Use**

---

To protect the privacy of Plant data, keep License Code and access credentials confidential.

---

## 2-2 User Administration

The User Administration area provides a full overview of all registered users including details of contact and location information. This area is also used by the Plant Manager to create and edit Plant Viewers. User Administration is only accessible when signed in as a Plant Manager.



### Additional Information

The allocation of Plants to Plant Viewers can be found in the Plant Administration area (see section 2-3-3 *Plant Administration Area* for more information).

### 2-2-1 User Administration Area

In the User Administration area Plant Viewers can be created, deleted, edited and reviewed by the Plant Manager. The initial creation of Plant Viewer(s) should be completed during registration (see section 2-4-1 *Registration Procedure*) but can be edited later if necessary. Access the User Administration area by clicking on *User admin* when signed in as a Plant Manager. The following rules apply to a Plant Viewer.

- A maximum of one Plant Viewer may be assigned but is not required.
- A Plant Viewer may be assigned to multiple Plants.

The screenshot shows the OMRON User Administration interface. The top navigation bar includes the OMRON logo, "Green Automation | Europe", and a "signed in as John Smith | Sign out" link. Below the navigation bar, there are several menu items: "Home", "Public Plants", "My Plants", "Register Plant Viewer", "Supported Devices", and "Contact". The "Register Plant Viewer" button is highlighted with a green box and an arrow pointing to the text "Create New User Form".

Below the navigation bar, there is a "User administration" section. On the right side of this section, there is a "Create new user" button, which is highlighted with a green box and an arrow pointing to the text "Create New User Form".

In the center of the page, there is a table of users. The table has columns for "User name", "Role", "Display name", "Email", and "Verified". The "User name" column is highlighted with a green box and an arrow pointing to the text "Access Existing User Information". The "Edit" column is also highlighted with a green box and an arrow pointing to the text "Edit or Delete Existing User".

User name	Role	Display name	Email	Verified	Edit
john01	Plant Manager	John Smith	email@email.com	<input checked="" type="checkbox"/>	
paul	Plant Viewer	Paul Jones	email2@email.com	<input checked="" type="checkbox"/>	
Pedro	Plant Viewer	Pedro Sanchez	email1@email.com	<input checked="" type="checkbox"/>	

At the bottom of the table, it says "Showing 1 to 3 of 3 users". On the right side of the table, there are navigation links: "First", "Previous", "1", "Next", "Last".

## 2-2-2 New Plant Viewer Form

The form below must be completed when registering a new Plant Viewer.

### Create User

Company name	<input type="text"/>
Name	<input type="text"/>
Address	<input type="text"/>
Country	<input type="text" value="select"/>
Email *	<input type="text"/>
Language for e-mails *	<input type="text" value="English"/>
Phone number	<input type="text"/>
Mobile	<input type="text"/>
Fax number	<input type="text"/>
Username *	<input type="text"/>
Password *	<input type="text"/>
Confirm password *	<input type="text"/>
Role *	<input type="text" value="Plant Viewer"/>
<input type="button" value="Cancel"/> <input type="button" value="Create"/>	

Item	Description
Company Name	Specific details associated with the Plant Viewer
Name	
Address	
Country	
Email	Specific detail associated with the Plant Viewer. This email address is used when a specified event triggers an outgoing email by the Central System. See <i>Email Manager</i> on page 15, Section 3 for more information.
Language for e-mails	Plant Viewer's preferred e-mail language
Phone Number	Specific details associated with the Plant Viewer
Mobile	
Fax Number	

Item	Description
Username	The name used when signing in to the Monitoring Web Portal.
Password	Unique password associated with the Plant Viewer used when signing in
Confirm Password	Re-enter and confirm the password for validity
Role	Read only field to indicate the role of the user

## 2-3 Site Administration

The Site Administration area provides a full overview of all registered Sites. This area is used by the Plant Manager to create and delete Sites. Site Administration is only accessible when logged in as a Plant Manager.



### Additional Information

A Site is defined as a remote installation location to include one or more Plants with the same postal address.

### 2-3-1 Site Administration Area

In the Site Administration area, Sites can be created, edited, deleted and reviewed. The initial creation of Site(s) should be completed during registration (see section 2-4-1 *Registration Procedure*) but can be edited as necessary. Access the Site Administration area by clicking on the *Site admin* when signed in as a Plant Manager.

Access Existing Site Information  
Create New Site Form

The screenshot shows the OMRON Green Automation website interface. At the top right, it says "signed in as John Smith | Sign out". Below that, there are two buttons: "User admin" and "Site admin". The "Site admin" button is highlighted with a green rectangular box. Below the navigation bar, there is a "Site Administration" section. In this section, there is a "Create new site" button, which is also highlighted with a green rectangular box. Below the "Create new site" button, there is a table with columns: Name, City, Country, Email for alerts, Plants, and Edit. The table contains two rows: "Site No. 1" and "Site No. 2". The "Site No. 1" row is highlighted with a green rectangular box. The "Edit" column for "Site No. 1" has a green arrow pointing to it with the label "Edit or Delete Existing Site". The "Site No. 2" row is also highlighted with a green rectangular box. Below the table, there is a "Showing 1 to 2 of 2 sites" message. At the bottom right of the table, there are navigation buttons: "First", "Previous", "1", "Next", "Last".

Access Site Administration Area

Edit or Delete Existing Site



### Additional Information

See sections below for more details on Plant, PLC and Inverter allocation.

## 2-3-2 New Site Form

The form below must be completed when registering a new Site.

### Create Site

The screenshot shows a 'Create Site' form with the following fields and values:

- Name:  (required, marked with a red asterisk)
- Plant Manager:
- Address:
- Postal Code:
- City:
- Country:  (required, marked with a red asterisk)
- Email for alerts:
- Latitude:
- Longitude:

Buttons: Cancel, Create

Item	Description
Name	The unique name for the Site
Plant Manager	The signed in Plant Manager will appear here (read only)
Address	Specific details associated with the Site
Postal Code	
City	
Country	
Email for alerts <sup>*1</sup>	
Latitude	Global position of the Site in degrees.
Longitude	

**Note 1** When the initial connection is established between a PLC and the Central System, the Central System will generate email(s) confirming that monitoring for a specified Plant has started. This email is sent to the Plant Manager's Site *Email for alerts* address and also to a Plant Viewer's email address. Additionally, communication events can be monitored to verify a specific PLC's communication status (see section 3-1-2 *Events* for more information).

### 2-3-3 Plant Administration Area

Plant editing and creation can be accessed from within the Site Administration area when signed in as a Plant Manager.

#### Site Administration

Create new site

Show 10 sites Search:

Name	City	Country	Email for alerts	Plants	Edit
Site No. 1	Ciudad del Sol	Spain	email@email.com	2	
Site No. 2	Madrid	Spain	email3@email.com	1	

Showing 1 to 2 of 2 sites First Previous 1 Next Last

The Plant Administration area allows the Plant Manager to manage one or more Plants within an installation Site and also provides a full overview of registered Plants with details of location information as well as system configuration. The initial creation of a Plant should be completed during registration (see section 2-4-1 *Registration Procedure*) but can be edited if necessary.

#### Create New Plant Form

OMRON Green Automation | Europe signed in as John Smith | Sign out  
User admin Site admin

Home Public Plants My Plants Register Plant Viewer Supported Devices Contact

#### Plant Administration

← Back to Site Administration

Create new plant

Show 10 plants Search:

Name	License expiration date	License type	License code	PLCs	Edit
Plant 1 at Site No.1	1/17/2020	KP-RMP-B-1-X	2334-5678-9012-3456	1	
Plant 2 at Site No. 1	1/17/2020	KP-RMP-A-1-X	1334-5678-9012-3456	1	

Showing 1 to 2 of 2 plants First Previous 1 Next Last

Access Existing Plant Information Edit, Access Graph Area, or Delete an Existing Plant



#### Additional Information

See sections below for more details on PLC and Inverter allocation.

## 2-3-4 New Plant Form

The form below must be completed when registering a new Plant.

A Plant is defined as an installation point at the Site that includes one or more Photovoltaic Inverters and one or more PLCs. One or more Plants can exist within the same Site.

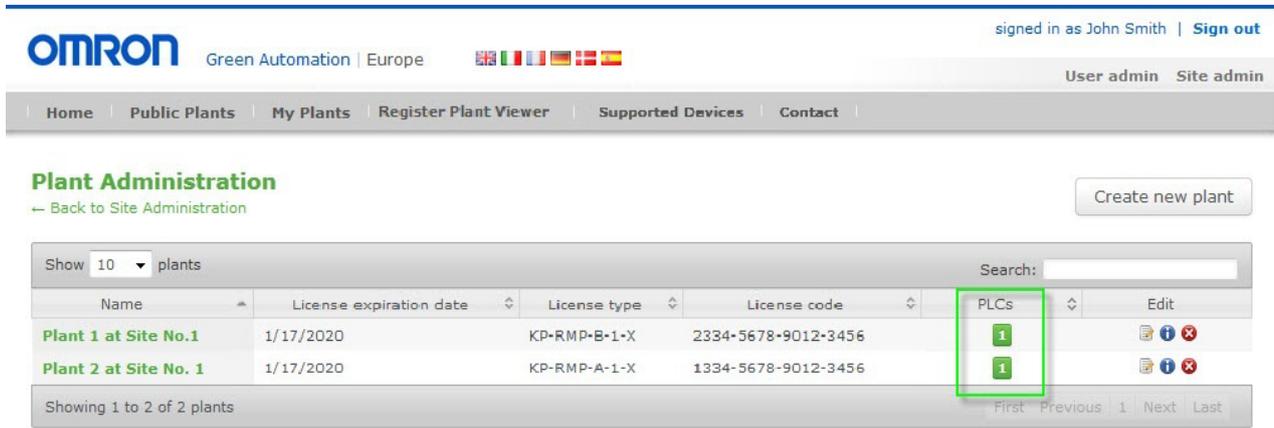
### Create new plant

Item	Description
Name	The unique name of the Plant
Picture	Upload an image file that will be visible in the <i>My Plants</i> area, background of the graph, and the <i>Big Display</i> area. Only jpg or png extensions are accepted.
Feed-in Tariff	Price rate for energy supplied to the grid
Plant Manager	Plant Manager associated to this Plant (read only)
Plant Viewer	Assign a previously registered Plant Viewer to this Plant to allow access. A maximum of one Plant Viewer may be assigned but is not required.
License Type	Currently registered License information. See <i>1-1-4 Licenses</i> (read only)
License Code	
Add Licence* <sup>1</sup>	Enter License code obtained from your local Omron sales representative and click <i>OK</i> . See <i>1-1-4 Licenses</i> .
Is Public	Allows the graph page of this Plant to be visible to anyone with no sign in required. The Plant graph information will be found in the <i>Public Plants</i> area on the main Monitoring Web Portal page when this option is selected.

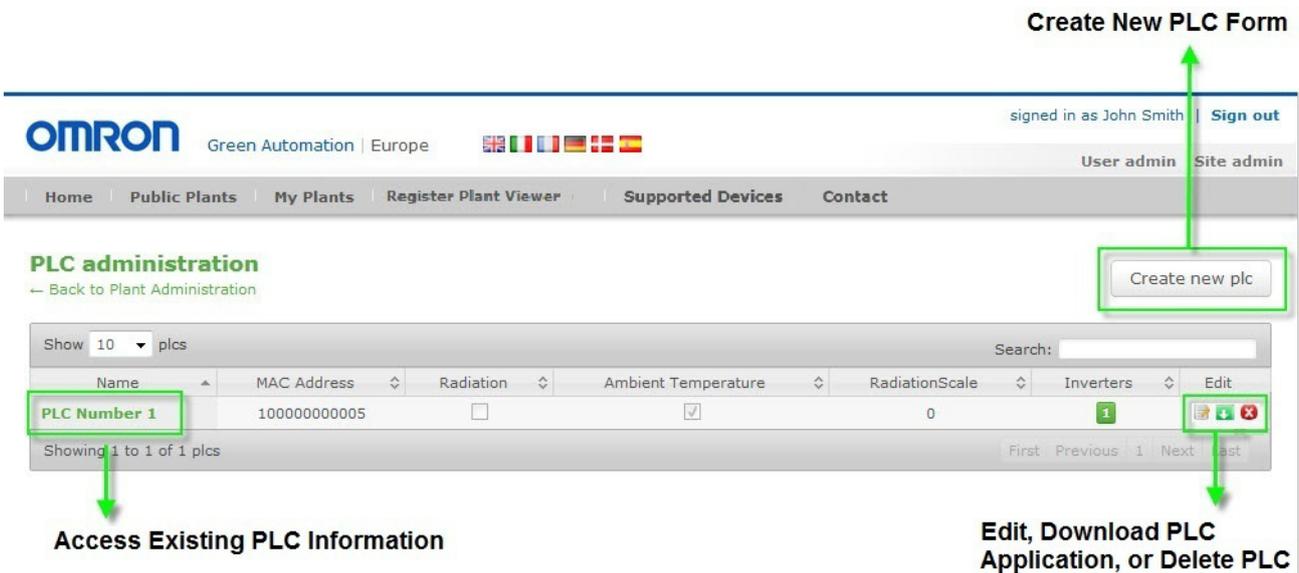
**Note 1** The *Add License* button is hidden when a Plant has a valid License and becomes visible 90 days before current License expiration.

### 2-3-5 PLC Administration Area

PLC editing and creation can be accessed from within the Plant Administration area when signed in as a Plant Manager.



The PLC Administration area allows the Plant Manager to manage one or more PLCs within a Plant and also provides a full overview of registered PLCs. The initial creation of a PLC should be completed during registration (see section 2-4-1 *Registration Procedure*) but can be edited as necessary.



#### Additional Information

See section 2-3-8 *Inverter Administration Area* for more details about Inverter allocation.

## 2-3-6 New PLC Form

The form below must be completed when registering a new PLC.

Item	Description
Name	Name of the PLC for identification purposes
MAC ID Address	The unique MAC ID address of the PLC



### Additional Information

See the *PVremote Pro Installation Manual* (Cat. No. T05E) for more information.



### Precautions for Correct Use

Inconsistent behavior may occur if the MAC ID address of the PLC is incorrect. No ambient temperature or radiation data (if equipped) will be stored and the system will display as offline.

## 2-3-7 PLC Application Download

The PLC Application Download area can be accessed in the PLC administration area with the icon shown below.

The screenshot shows the OMRON PLC administration interface. At the top, it says "signed in as John Smith | Sign out" and "User admin Site admin". The navigation menu includes "Home", "Public Plants", "My Plants", "Register Plant Viewer", "Supported Devices", and "Contact". The main heading is "PLC administration" with a link to "Back to Plant Administration" and a "Create new plc" button. Below this is a table of PLCs with columns: Name, MAC Address, Radiation, Ambient Temperature, RadiationScale, Inverters, and Edit. The table contains one entry: "PLC Number 1" with MAC Address "100000000005", Radiation "0", Ambient Temperature checked, and RadiationScale "0". The "Edit" column for this entry contains a green download icon, which is highlighted by a green box and a green arrow pointing to the text "Access PLC Application Download Area".

Name	MAC Address	Radiation	Ambient Temperature	RadiationScale	Inverters	Edit
PLC Number 1	100000000005	<input type="checkbox"/>	<input checked="" type="checkbox"/>	0	1	

Showing 1 to 1 of 1 plcs

## Download PLC Application Form

The form below must be completed to generate a PLC Application file. This file can be used to automatically configure a PLC without the use of CX-Programmer software (see note). Complete the form to download the file. See the *PVremote Pro Installation Manual* (Cat. No. T05E) for details about the automatic PLC configuration procedure and PLC Application file use.

**Note** CX-Programmer is a PLC programming tool for the creation, testing and maintenance of programs associated with OMRON PLCs. It provides facilities for the support of PLC device and address information and for communications with OMRON PLCs and their supported network types. CX-Programmer operates on IBM compatible personal computers with Pentium or better central processors, including Pentium II. It runs in a Microsoft Windows environment (Microsoft Windows XP with Service Pack 3 or later, Vista, or 7).

## Download PLC Application

Here below you can customize and download the PLC software. You have to unzip the downloaded file into your CF card to install the PLC application. Please read PVremote Pro Installation Manual for detailed information and instructions.

CPU Type

**Network settings**  
Please make sure that:  
1- PLC local IP address is not used by another device within the local network.  
2- The node address switches on the PLC are set accordingly.

PLC Local IP address \*

Subnet Mask \*

Default Gateway \*

**PLC to Central System communication**  
Data Send Period   
minutes

**PLC Analog unit settings**  
You can tell the PLC if a radiation sensor is connected and which radiation scale is used.

Radiation Sensor

Item	Unit	Range	Recommended Setting	Description
CPU Type	--	33, 34, 35	--	Select the PLC CPU type used
PLC Local IP Address	--	--	Application Dependant	IP address of the PLC
Subnet Mask	--	--		Subnet mask of the PLC
Default Gateway	--	--		Gateway of the PLC
PLC to Central System Communication	Minutes	0 to 14	5	Frequency in which a PLC communicates with the Central System
PLC Analog Unit Setting	Watt/M <sup>2</sup>	1200 or 1500	Application Dependant	Select 1200 or 1500 based on the type of radiation sensor/scale used. Select OFF if no radiation sensor is present.

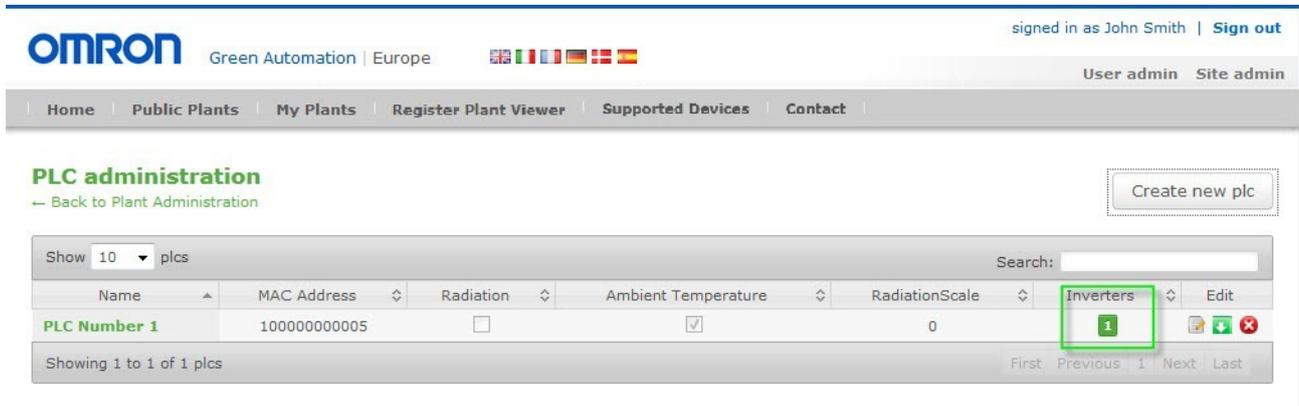


### Precautions for Correct Use

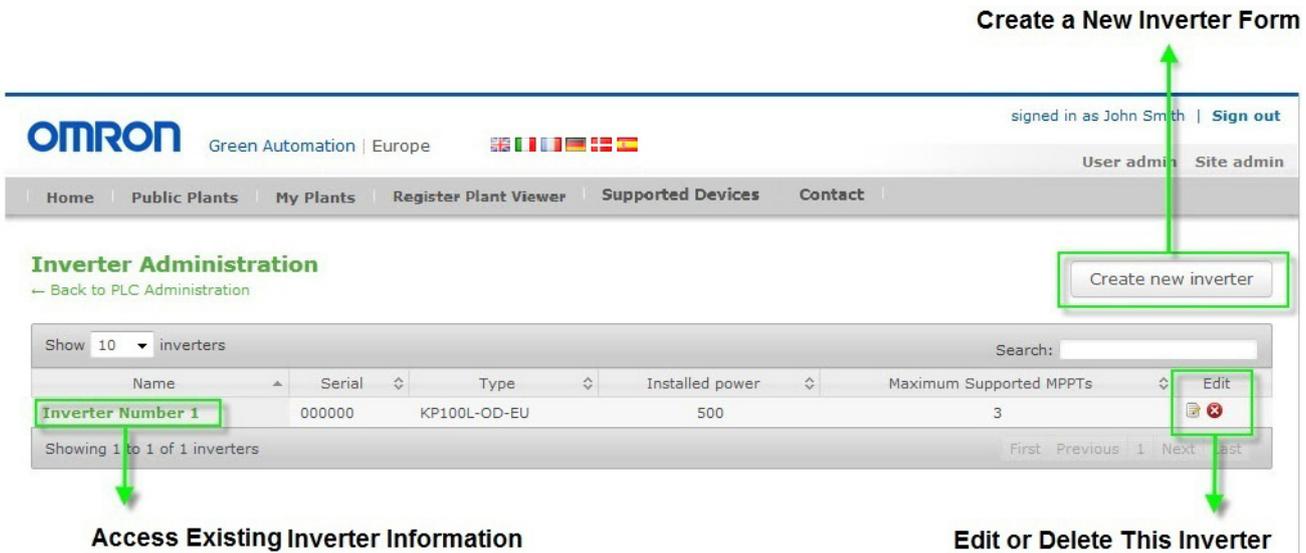
Entering incorrect information may cause invalid or missing monitoring data.

### 2-3-8 Inverter Administration Area

Inverter editing and creation can be accessed from within the PLC Administration area when signed in as a Plant Manager.



The Inverter Administration area allows the Plant Manager to manage one or more Inverters associated and connected to a PLC and also provides a full overview of registered Inverters. The initial creation of an Inverter should be completed during registration (see section 2-4-1 Registration Procedure) but can be edited as necessary.



## 2-3-9 New Inverter Form

The form below must be completed when registering a new Inverter.

**Create Inverter**

Name \*

Serial \*

Inverter Model \* KP100L-OD-EU

Installed power (kWp) \*

MPPTs connected

1

2

3

Item	Description
Name	Name of the Inverter for identification purposes
Serial	Unique serial number of the PV Inverter for registration
Inverter Model	Type of the Inverter
Installed power (kWp)	Sum of the installed Solar Module's peak power producing capacity
MPPTs Connected	Select the individual MPPTs that are connected to one or more PV Inverter strings (MPPT 1, MPPT 2, MPPT 3)



### Precautions for Correct Use

If the Serial number of the PV Inverter is incorrect, data will not be stored or displayed in the Central System.

## 2-4 Registration Overview

Registration is required before operation and access to the PVremote Pro system can begin. The registration process is performed using the Central System User Interface (Monitoring Web Portal). The registration procedure described below allows the Central System to synchronize and communicate with the remote site and its accompanying hardware. License validation must be completed for each Plant to allow data collection and access within the Central System. See section 2-3-4 *New Plant Form* for more information.



### Precautions for Correct Use

If the registration process, including License validation is completed and then the hardware is properly installed, all operational data will be recorded accurately in the Central System. If the hardware is installed before registration is completed, some data may not be recorded.

### 2-4-1 Registration Procedure

Use the following procedure to complete the registration process for a single Plant Manager responsible for configuring a Site, Plant(s), User(s), PLC(s) and Inverter(s).

- 1 Access the Monitoring Web Portal at the following address with a web browser.  
<http://www.pvremotepro.com>



### Precautions for Correct Use

The web browser Mozilla Firefox (version 10.0 or higher) is recommended for best performance. Mozilla Firefox (version 3.6 or higher), Google Chrome and Internet Explorer (version 7 or higher) are usable but may differ from examples in this manual and can lead to minor graphical issues.

- 2 Begin the Plant Manager registration process by clicking the *Register now!* link or using the green box.

The screenshot shows the Omron PVremote Pro website. At the top, there is the Omron logo and navigation links for 'Home', 'Public Plants', 'My Plants', 'Register Plant Viewer', 'Supported Devices', and 'Contact'. A search bar with 'Username' and 'Password' fields and a 'Sign in' button is visible. A green box highlights the 'Register now!' link. Below the navigation, a banner reads 'Welcome to the Omron PVremote Pro! The easy way for monitoring'. The main content area features the heading 'Omron PVremote Pro' and the tagline 'Keep an eye on your investments... from everywhere!'. A paragraph describes the system's capabilities. At the bottom, there is an image of solar panels, an inverter, and a computer monitor displaying a graph. To the right, a green box contains the 'Sign up for a new account' form with fields for 'Username' and 'Email-address', and a 'Sign up' button.

### 3 Register as a new Plant Manager.

#### Register as Plant Manager

Company name \*

Name \*

Address \*

Country  ▼

Email \*

Language for e-mails \*  ▼

Phone number \*

Mobile

Fax number

Username \*

Password \*

Confirm password \*

By ticking this box you confirm to have read, understood  and agreed the applicable terms and conditions of PVremote Pro monitoring service. These terms and conditions and other relevant information regarding the service can be read and downloaded by following this [link](#). If you do not tick the box you are not allowed to proceed and to make use of the PVremote Pro monitoring service. If you do not agree or do not understand any of the conditions, please contact your OMRON sales representative.

Captcha \*

Item	Description
Company Name	Specific details associated with the Plant Manager
Name	
Address	
Country	
Email	Specific detail associated with the Plant Manager. This is not used for emailing of events by the Central System, but as a method to restore a lost password. See section 2-3-2 <i>New Site Form</i> for the appropriate area to enter the Plant Manager's email address for specified events sent from the Central System.

Item	Description
Language for e-mails	Plant Manager's preferred e-mail language.
Phone Number	Specific details associated with the Plant Manager
Mobile	
Fax Number	
Username	The unique name used when signing in to the PVremote Pro. This name is also displayed in the User Administration area (not case sensitive).
Password	Password associated with the Plant Manager used when signing in
Confirm Password	Re-enter and confirm the password for validity
Terms of Service	Review details and check before continuing
Captcha	Enter the characters displayed in the graphic to ensure the form is being completed by a person and not a program or script (not case sensitive).

**4** After the Plant Manager registration is completed, sign in with the new username and password previously entered.

The Plant Manager view of the Monitoring Web Portal will include new links as shown below when signed in.

Item	Description
Public Plants	Plant accessible to the public (see section 2-3-4 <i>New Plant Form</i> )
My Plants	Provides an overview of all Plants and Sites registered to a user (see section 3-1 <i>Site and Plant Access (Base and Advanced License)</i> for details)
Register Plant Viewer	Provides a form to enter new Plant Viewer information (see section 2-2-2 <i>New Plant Viewer Form</i> for details)
Supported Devices	Provides an overview of all PVremote Pro supported devices
User Admin	Provides an overview of all registered Plant Viewers and Plant Managers (see section 2-2-1 <i>User Administration Area</i> for details)
Site Admin	Provides an overview of all registered Sites (see section 2-3-1 <i>Site Administration Area</i> for details)

- 5** Register a new Plant Viewer(s) by clicking **Register User** at the main Monitoring Web Portal page. Complete the form and click **Create**. After Registering new Plant Viewer(s), they will appear in the User Administration area.

### Create User

Company name	<input type="text"/>
Name	<input type="text"/>
Address	<input type="text"/>
Country	<input type="text" value="select"/> ▼
Email *	<input type="text"/>
Language for e-mails *	<input type="text" value="English"/> ▼
Phone number	<input type="text"/>
Mobile	<input type="text"/>
Fax number	<input type="text"/>
Username *	<input type="text"/>
Password *	<input type="text"/>
Confirm password *	<input type="text"/>
Role *	<input type="text" value="Plant Viewer"/>



**Additional Information**

- The Create User page is also accessible from the User Administration page (create new user).
- See section 2-2-2 *New Plant Viewer Form* for more details about the new Plant Viewer form fields.

**6** Create a new Site by entering the *Site admin* area and clicking **Create new site**. Complete the form shown and click **Create**. After creating the Site, it will appear in the Site Administration area.



**Create Site**

Name	*	<input type="text"/>
Plant Manager		<input type="text" value="John Smith"/>
Address		<input type="text"/>
Postal Code		<input type="text"/>
City		<input type="text"/>
Country	*	<input type="text" value="select"/>
Email for alerts		<input type="text"/>
Latitude		<input type="text"/>
Longitude		<input type="text"/>
		<input type="button" value="Cancel"/> <input type="button" value="Create"/>



**Additional Information**

See section 2-3-2 *New Site Form* for more details about the new Site form fields.

- 7** To register a new Plant, click on the *Plants* icon found in the Site Administration area. In the Plant Administration area, click **create new plant**, complete the form and click **Create**. The new plant will appear in the Site Administration area.

Click *Add License* to add a License to the Plant. License addition is completed at this step and allows access and monitoring of data for an installed system after the License verification process is complete.

The screenshot shows the OMRON Green Automation website interface. At the top, it says "signed in as John Smith | Sign o". Below the navigation bar, the "Site Administration" section is visible. A table lists two sites:

Name	City	Country	Email for alerts	Plants	Edit
Site No. 1	Cuidad del Sol	Spain	email@email.com	2	[Edit] [Delete]
Site No. 2	Madrid	Spain	email3@email.com	1	[Edit] [Delete]

The "Plants" column contains green boxes with the numbers 2 and 1, indicating the number of plants registered for each site. The "Plants" column header is highlighted with a green box in the original image.

### Create new plant

The "Create new plant" form contains the following fields and controls:

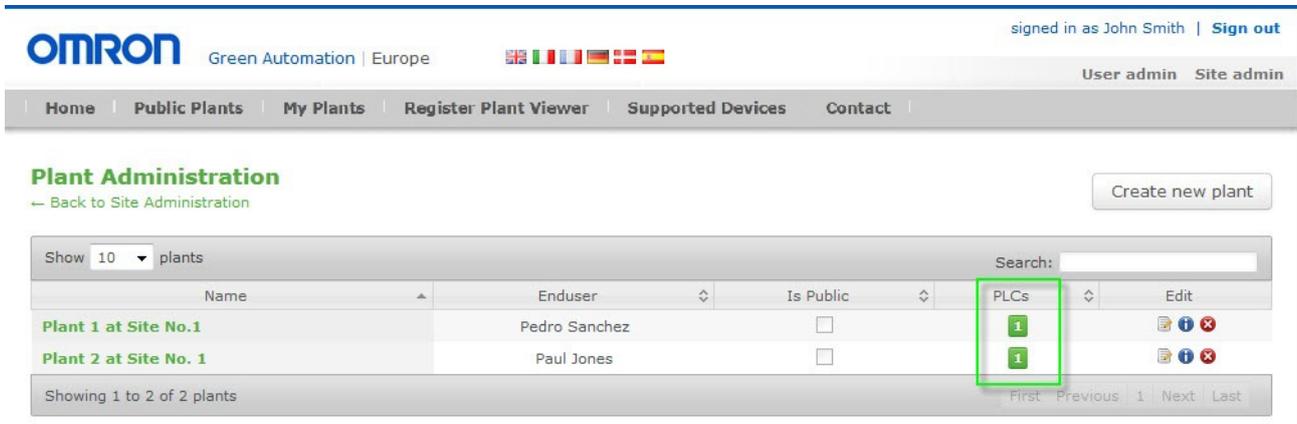
- Name**: Required field (marked with \*).
- Picture**: Field with a "Browse" button.
- Feed-in tariff**: Required field (marked with \*), value 0.00.
- Plant Manager**: Text field with value "John Smith".
- Plant Viewer**: Dropdown menu with value "None".
- License type**: Text field.
- License code**: Text field.
- Add License**: Button.
- Is Public**: Checkbox.
- Cancel** and **Create**: Action buttons at the bottom.



### Additional Information

See section 2-3-4 *New Plant Form* for more details about the new Plant form fields.

- 8 Create a new PLC by clicking on the PLCs icon found in the Plant Administration area. In the PLC administration area, click **Create new plc**, complete the form and click **Create**. The new PLC will appear in the Plant Administration area.



### Create new PLC

Name \*

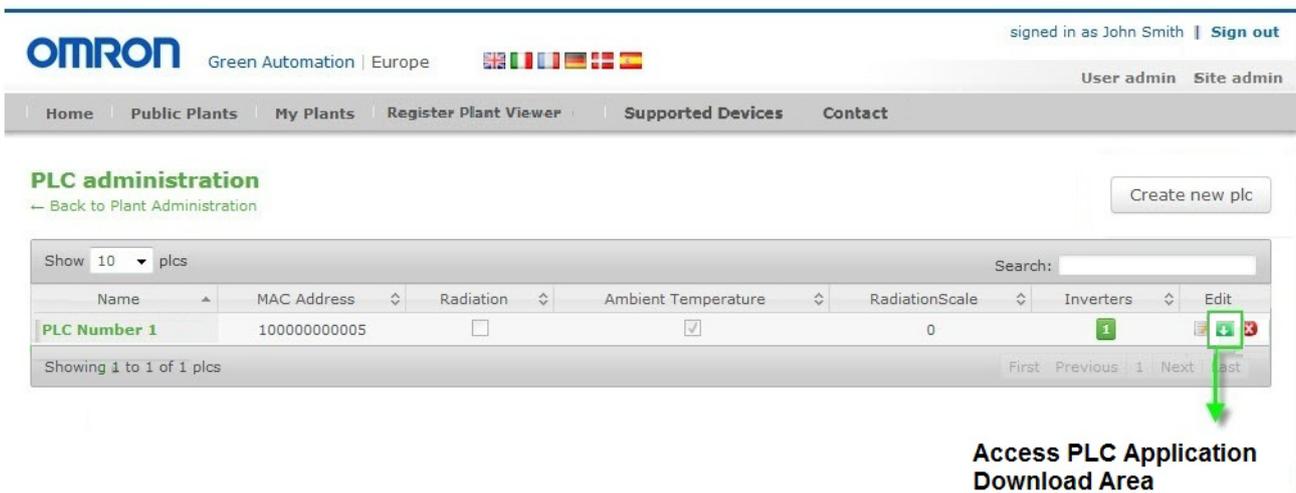
MAC Address \*



### Additional Information

See section 2-3-6 *New PLC Form* for more details about the new PLC form fields.

- 9 Customize and download the PLC Application by clicking the download icon found in the PLC Administration area and completing the form. Save the downloaded PLC Application file for use during the PLC automatic configuration procedure detailed in the *PVremote Pro Installation Manual* (Cat. No T05E).



**Access PLC Application Download Area**

## Download PLC Application

Here below you can customize and download the PLC software. You have to unzip the downloaded file into your CF card to install the PLC application. Please read PVremote Pro Installation Manual for detailed information and instructions.

CPU Type

**Network settings**  
Please make sure that:  
1- PLC local IP address is not used by another device within the local network.  
2- The node address switches on the PLC are set accordingly.

PLC Local IP address \*

Subnet Mask \*

Default Gateway \*

**PLC to Central System communication**  
Data Send Period   
minutes

**PLC Analog unit settings**  
You can tell the PLC if a radiation sensor is connected and which radiation scale is used.

Radiation Sensor

- 10** Create a new inverter associated with the previously created PLC by clicking on the Inverter icon found in the PLC Administration area. Click **create new inverter**, complete the form and click **Create**. The new Inverter will appear in the PLC Administration area.


Green Automation | Europe

signed in as John Smith | [Sign out](#)

User admin
Site admin

Home | Public Plants | My Plants | Register Plant Viewer | Supported Devices | Contact

**PLC administration**

[← Back to Plant Administration](#)

Show  plcs Search:

Name	MAC Address	Radiation	Ambient Temperature	RadiationScale	Inverters	Edit
PLC Number 1	100000000005	<input type="checkbox"/>	<input checked="" type="checkbox"/>	0	<input type="button" value="1"/>	<input type="button" value="Edit"/>

Showing 1 to 1 of 1 plcs First Previous 1 Next Last

Create Inverter

Name \*

Serial \*

Inverter Model \* KP100L-OD-EU

Installed power (kWp) \*

MPPTs connected

1

2

3

Cancel Create



**Additional Information**

---

See section 2-3-9 *New Inverter Form* for more details about the new Inverter form fields.

---

- 11** Repeat various steps to create all necessary items of the remote system. Add appropriate quantities of Sites, Plants, Users, PLCs and Inverters to match the specific application.



**Additional Information**

---

If registration is completed and correct, the Central System will begin communicating to collect and process data with the configured hardware.

---

# 3

## Monitoring

This section provides details on the Plant monitoring area (*My Plants*) of the Central System User Interface.

---

<b>3-1 Site and Plant Access (Base and Advanced License)</b> .....	<b>3-2</b>
3-1-1 Graph .....	3-4
3-1-2 Events .....	3-8
3-1-3 Big Display .....	3-10
<b>3-2 Site and Plant Access (Advanced License Only)</b> .....	<b>3-12</b>
3-2-1 Plant Settings .....	3-12
3-2-2 Environmental Sensors .....	3-17
3-2-3 Forecast Information .....	3-18
<b>3-3 Data Processing</b> .....	<b>3-19</b>
3-3-1 Periodic Properties for Inverters .....	3-19
3-3-2 Periodic Properties for the Total Plant .....	3-20
3-3-3 Properties Data .....	3-21

## 3-1 Site and Plant Access (Base and Advanced License)

The Omron Monitoring Web Portal provides access to overall Site and individual Plant information for the Plant Manager and Plant Viewer from a remote location.

The User Interface gives a quick overview as well as detailed information for Sites and Plants previously registered by the Plant Manager. This information allows a remote user to monitor the current operation of the PVremote Pro system as well as past performance history during specified periods of time.

The Plant Manager has the ability to limit a Plant Viewer's access to specific Plants. As each Plant is created and registered, the Plant Manager may assign a Plant Viewer(s) and access is granted for that specific Plant (see section 2-3-4 *New Plant Form*). When a Plant Viewer signs in, only the Plants previously assigned by the Plant Manager to that Plant Viewer will be visible and other unassigned Plants will not appear in the *My Plants* area. The Plant Manager has access to all registered Plants for a particular Site.



### Precautions for Correct Use

A registered License is required for access to specific information. See 2-4 *Registration Overview* for details.

## My Plants

After signing in, the *My Plants* area allows quick access to Site and Plant operational data. In this area, the Plant Viewer or Plant Manager can easily see general information for their respective Sites and Plants. This area conveniently groups all Plant details within a Site.

When **View Totals** is selected, a quick Site overview is displayed.

The screenshot displays the Omron Monitoring Web Portal interface. The top navigation bar includes 'Home', 'Public Plants', 'My Plants', 'Register Plant Viewer', 'Supported Devices', and 'Contact'. The 'My Plants' section is active, showing a filter for plants with installed power (from 0 kWp to 198.49 kWp). A 'View Totals' button is visible. The 'View Totals' button is annotated with 'Access to Quick Site Overview'. Below the filter, a 'License Status' indicator is shown. The main content area displays two summary cards: 'Site Status' (SITE OK) and 'Plant Status' (PLANT OK). The 'Site Status' card provides a general overview of site metrics, and the 'Plant Status' card provides a general overview of plant metrics. A 'Solar Plant Details' button is located at the bottom right of the plant status card, annotated with 'Access to Graph Area'. The footer includes 'Omron Europe', 'Omron Corporation', 'Legal notices', 'Site map', and 'realizing'.

Item	Description
Installed Power (kilowatts-peak)	Sum of the installed Solar Module's peak power producing capacity
Total Produced Energy (kilowatt-hour)	Cumulative energy production value
Produced Energy Today (kilowatt-hour)	Daily energy production value
Total Euros Earned (Euro)	Cumulative monetary value earned based on specified Feed-in tariff (Euros per kilowatt-hour)
CO2 Saved (kilograms)	Carbon Dioxide saved (see note)
AC Power (kilowatt)	Actual power production

**Note** For every 1.0 MWh of energy produced using traditional generation methods, an average of 0.5 tons of CO2 is emitted into the atmosphere.



### Precautions for Correct Use

- Exchanging a PV Inverter after a period of use may cause a modification to the Total Produced Energy values shown in the *My Plants* area. Always check the PV Inverter parameters when exchanging units.
- Total Produced Energy values displayed in the *My Plants* overview area may differ from Energy values found in the graph area. This may be caused by differences in Inverter installation timing, Inverter communication problems or periods of maintenance.

### ● Filter Plants

If a user has several Plants to manage, the option to filter plants in view by installed power can provide faster access to specific installations. Entering a range of installed power as shown below will filter the visible Plants.

**My Plants**

Show plants with installed power

from  to

### ● License Status

The following icons indicate current License status.

Icon	Status
	Valid Base License type
	Expired Base License type

Icon	Status
	Valid Advanced License type
	Expired Advanced License type
	No License

### ● Plant and Site Status

Each Plant and Site overview provides a fast status message for general operating conditions.

Status Message	Description
PLANT OK	No PLCs offline, failures, grid faults, other faults, communication problems or warnings present in the Plant
SITE OK	No PLCs offline, failures, grid faults, other faults, communication problems or warnings present in (accessible Plants in the case of Plant Viewers) Plants within the Site
OFFLINE	Any PLC within a Plant has lost communications with the Central System
ALERT	Any PV Inverter within a Plant has a grid fault, other fault or failure and is not OFFLINE
WARNING	Any PV Inverter within a Plant has a warning and is not OFFLINE

## 3-1-1 Graph

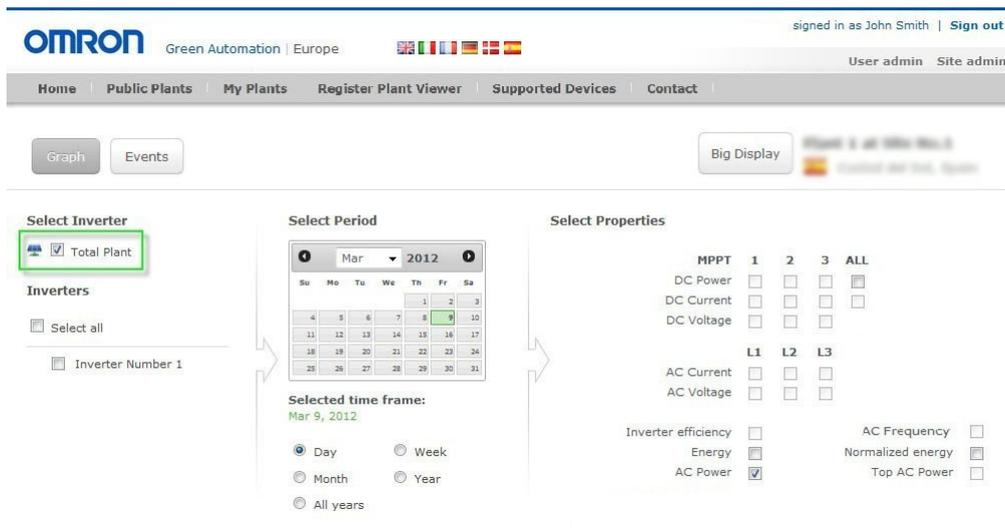
The Graph page is the default view when reviewing the selected plant details. Generally, this view allows the user to review overall Plant and individual inverter data for specified periods (valid License required). Make selections for inverter, period and properties, click **show graph** and a detailed and customized graph will appear to allow easy comparison of several performance metrics.

### Select Properties

When attempting to graph detailed properties of plant and inverter performance for a period of time, several properties can be selected for a comprehensive view.

#### ● Total Plant

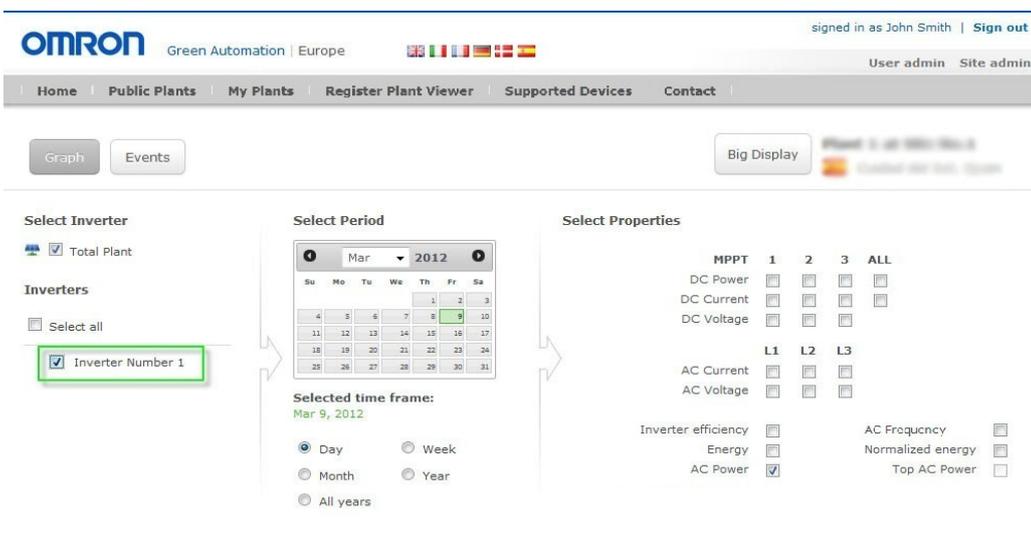
When only the *Total Plant* data is selected, many of the properties become invalid for selection and graphing because these are specific to Inverter operation. Use this selection to view overall performance data of the Plant.



Item	Unit	Description
Energy	Kilowatt-Hour [kWh]	Produced Energy
AC Power	Kilowatt [kW]	AC output power
Normalized Energy	Kilowatt-Hour per Peak Kilowatt [kWh/kWp]	Produced energy/connected solar module power

### ● Inverters

When detailed data is required for individual Inverter performance, select the specific Inverters of interest and then multiple properties can be selected for the graph.



Item	Unit	Description
DC Power	Kilowatt [kW]	DC input power from individual and/or all MPPT's
DC Current	Ampere [A]	DC input Current from individual and/or all MPPT's
DC Voltage	Volt [V]	DC input voltage from individual MPPT's

Item	Unit	Description
AC Current	Ampere [A]	AC output current for each phase (L1, L2, L3)
AC Voltage	Volt [V]	AC output voltage for each phase (L1, L2, L3)
Inverter Efficiency	Percentage [%]	AC output power/DC input power
AC Frequency	Hertz [Hz]	Grid Frequency

## Select Period

The selection for period allows the user to specify a time frame for viewing collected data (properties).

This selection affects the graph presentation and displays data in different time scales and resolutions shown in the table below. See 3-3 *Data Processing* for details.

Item	Description
Day	The time scale is hourly and data resolution is based on the Data Exchange Interval.
Week	The time scale is daily and the data resolution is hourly.
Month	The time scale and data resolution are daily.
Year	The time scale and data resolution are monthly.
All Years	The time scale and data resolution are yearly.

## Download CSV File

After the appropriate Plant/Inverters, Period and Properties are selected, a comma separated variable (CSV) file can be downloaded for evaluation and backup requirements by clicking **Download CSV**.

- Selecting Plant will create a file including all registered PV Inverter's data
- Maximum selectable period is one week
- PV Inverter total operating hours and grid frequency information are provided in addition to the selectable properties for the graph

## Show Graph

After the appropriate Plant/Inverters, Period and Properties are selected, clicking *Show graph* will cause the graph to update with the requested data collected over the specified interval.

**Selected Properties to be Displayed on the Graph**

**Generates the Customized Graph Below**

**Color Coded Properties on the Graph**

**Customized Graph Area Displaying Required Data Over the Specified Period Above**

### Additional Information

- Clicking and dragging over an area on the graph will allow custom zoom areas to be set for better viewing of data.
- The default graph area background is a blank grid, but clicking **picture** will use the picture selected in the Create/Edit Plant area as the background. See section 2-3-4 *New Plant Form* for details.

### 3-1-2 Events

Events include Plant and Inverter occurrences that are logged during operation. Viewing a history of events can improve system performance and diagnose potential problems to improve overall efficiency and performance of the Plant.

This feature allows the user to view time of occurrence, time of recovery, duration and other details for the available properties that occurred during a specific period.



#### Additional Information

When the PLC establishes communications with the Central System, the PLC clock is automatically set to local time and receives periodic adjustments from the Central System to maintain accuracy. There is no need to manually adjust or set the PLC clock.

The screenshot shows the OMRON PV Inverter Properties interface. On the left, there are sections for 'Select Inverter' (with 'Plant' selected) and 'Inverters' (with 'Inv 1' through 'Inv 4' selected). In the center, a 'Select Period' calendar shows 'Mar 9, 2012' selected. On the right, 'PV Inverter Properties' lists various event types with checkboxes, including Failure, Grid fault, Other fault, Communication, Warning, Maintenance, Failure recovery, Grid fault recovery, Other fault recovery, Communication recovery, and Warning recovery. A 'Show events' button is highlighted. Below, a table displays a list of events with columns for Device name, Time stamp, Error Code, and Message. The table shows events for 'Inv 14' and 'Inv 3' on '3/9/2012' with error codes like 'E1-2', 'E1-4', and 'E1-0'. A 'Show 10 events' dropdown is visible above the table.

**Plant Name**

**Event Types to View Below**

**Generate a List of Selected Events**

**Sort Events**

**Selected Occuring Events During the Specified Time Period are Displayed**

Device name	Time stamp	Error Code	Message
Inv 14	3/9/2012 2:28 PM	E1-2	Under voltage (Grid)
Inv 14	3/9/2012 2:28 PM	E1-4	Under frequency (Grid)
Inv 14	3/9/2012 2:28 PM	E1-0	No grid
Inv 14	3/9/2012 2:28 PM	E1-2	Under voltage (Grid)
Inv 14	3/9/2012 2:28 PM	E1-4	Under frequency (Grid)
Inv 14	3/9/2012 2:28 PM	E1-0	No grid
Inv 3	3/9/2012 12:27 PM	E1-2	Under voltage (Grid)
Inv 3	3/9/2012 12:27 PM	E1-4	Under frequency (Grid)
Inv 3	3/9/2012 12:27 PM	E1-0	No grid
Inv 3	3/9/2012 12:26 PM	E1-2	Under voltage (Grid)

### PV Inverter Properties

- **Failure**  
Hardware breakdown of the PV Inverter
- **Grid Fault**  
Error of the grid such as abnormal voltage or frequency

### ● Other Fault

Other errors on the DC side of the PV Inverter or PV system errors

### ● Communication

Communication interruption for PV Inverter to PLC

Communication interruption for PLC to Central System

### ● Warning

A minor event in which the PV Inverter has detected a condition of concern

### ● Maintenance

All events occurring during maintenance mode. See Maintenance Mode details below.



#### Additional Information

- See the *GridConnect Photovoltaic Inverter User's Manual* (Cat. No. S101) for a comprehensive list of failures, faults and warnings.
- Default properties are automatically chosen as shown above when the *Events* page is viewed.
- In the list of selectable Inverters, there can be a red icon and error code present for an Inverter with a problem. The highest priority error code will be listed but other errors may also be present for that Inverter. Examine the error list for more detail. Contact your local Omron representative for more details of error code priority levels.

## Maintenance Mode

The Plant Manager has the ability to turn Maintenance mode ON or OFF. This setting has an impact on the events occurring during a scheduled maintenance interval. Errors occurring while maintenance mode is ON will appear as gray in color to distinguish them from normal errors when not in maintenance mode. The text field is used to make a note that will appear in the event list, e.g. "Inverter 2 scheduled maintenance". An entry will appear in the event list when entering and exiting maintenance mode to indicate when maintenance mode is started and stopped.

### ● Example

A plant has 3 inverters named Inverter 1, Inverter 2 and Inverter 3.

Maintenance needs to be performed on Inverter 2 which will cause many forced errors to appear in the event list for that Inverter because communications and other functions are interrupted.

Turning on maintenance mode during this service interval will distinguish those forced errors for a clear indication that they were caused by an intentional service period. Other naturally occurring errors will still be recorded for Inverters 1 and 2, but their gray color will indicate they occurred during the scheduled maintenance mode as well.

### 3-1-3 Big Display

This selection provides a user with a simplified, graphical view of the general Plant performance for easy review, promotion or advertisement purposes. The image used as the background can be uploaded in the Plant Registration page (see 2-3-4 *New Plant Form*).



The information displayed in the gray box refers to the total Plant production data and include:

#### ● Installed Power

The sum of the connected solar modules as is specified by the Plant Manager in the Inverter Administration area.

#### ● Total Produced Energy

The total energy the Plant produced from the beginning of operation, calculated as the sum of the total energy from each registered PV Inverter.

#### ● Produced Energy Today

The current daily energy produced\*1

#### ● CO2 Saved

For every 1.0 MWh of energy produced using traditional generation methods, an average of 0.5 tons of CO2 is emitted into the atmosphere.

**Note 1** The current daily energy produced value is updated based on the data interval setting for PLC to Central System communications.



### Precautions for Correct Use

---

- Exchanging a PV Inverter after a period of use may cause a modification to the Total Produced Energy values shown in the Big Display. Always manually record the PV Inverter total energy production parameter value when exchanging units.
  - Total Produced Energy values displayed in the Big Display area may differ from Energy values found in the graph area. This may be caused by differences in Inverter installation timing versus Central System communications, Inverter communication problems or periods of maintenance.
  - The Total Produced Energy may vary from the actual energy read by the grid meter.
- 



### Additional Information

---

Using the browser zoom function can improve Big Display visibility on various systems. Use keystrokes “CTRL +” and “CTRL -” to adjust the zoom level or press F11 for fullscreen.

---

## 3-2 Site and Plant Access (Advanced License Only)

All Base License features described in section 3-1 *Site and Plant Access (Base and Advanced License)* apply to Advanced License types. The following additional features are applicable to Advanced License types only.

The screenshot displays the OMRON Green Automation software interface. At the top, there is a navigation menu with options like Home, Public Plants, My Plants, Register Plant Viewer, Supported Devices, and Contact. A 'Settings' button is highlighted with a green box and an arrow pointing to the text 'Plant Settings'. Below this, the interface is divided into several sections: 'Select Inverter' with a list of inverters (Inv 1 to Inv 6), 'Select Period' with a calendar for January 2012, and 'Select Properties' with various checkboxes for MPPT, DC Power, DC Current, DC Voltage, AC Current, AC Voltage, Inverter efficiency, Energy, AC Power, AC Frequency, Normalised energy, and Top AC Power. A section titled 'Environmental Sensors' is highlighted with a green box and an arrow pointing to the text 'Environmental Sensors', containing checkboxes for 'Ambient Temperature P/LC' and 'Radiation P/LC'. Below the settings, there is a 'Graph background' section with a 'Show graph' button. The graph area shows a line chart with multiple data series representing power and radiation over time. At the bottom, a 'Forecasts' section provides summary statistics: 'Current energy produced: 155.8 kWh', 'Forecasted energy produced: 144.2 kWh', 'Performance factor: 101.8%', and 'Calculated revenue: € 20.18'. An arrow points from this section to the text 'Forecast Information'.

### 3-2-1 Plant Settings

The Plant Manager has access to settings available for the PLC, Plant and Email. Clicking **Settings** in the Plant Details area will allow the following adjustments.

The screenshot shows a dialog box titled 'My First Plant settings'. At the top, there are three buttons: 'PLC Settings', 'Plant Settings', and 'Email Manager'. Below the buttons, the 'PLC1 settings' section is visible, containing two dropdown menus: 'Radiation Sensor' set to 'Off' and 'Temperature Sensor' set to 'Off'. A 'Save settings' button is located at the bottom of the dialog box.

## ● PLC Settings

For the first PLC configured in a Plant, additional hardware configuration settings can be selected to match the actual application. A radiation sensor and/or temperature sensor can be added to provide additional environmental feedback data for the remote location. When these settings are turned on and saved, they will appear as selectable properties in the Graph area.

If an optional Radiation Sensor is selected, thresholds can be configured to trigger *MPPT Warning* events, emails and report details. The *MPPT Warning* condition occurs when the system is equipped with an optional Radiation Sensor, selected in the above area and detects a low DC voltage (MPPT voltage) while radiation is high and no other errors or alarms are pending. If an MPPT(s) is not in use, it should be deselected in the Inverter edit/create area to prevent erroneous *MPPT Warning* conditions (see section 2-3-9 *New Inverter Form*).

PLC Settings   Plant Settings   Email Manager

### My First Plant settings

**PLC1 settings**

Radiation Sensor   Off

Temperature Sensor   Off

Save settings

Below the thresholds to trigger the "MPPT production warning" can be configured. Please make sure a radiation sensor is connected to the PLC at the installation and the radiation sensor is not set to OFF in this page in the box above.

**Thresholds**

MPPT Threshold (V)   100

Radiation Threshold (W/m2)   100

Save



### Additional Information

Radiation calibration details should be correctly set in the PLC to match the connected sensor. See the *PVremote Pro Installation Manual* (Cat. No. T05E) for more information.

## ● Plant Settings

Plant Settings allow the Plant Manager to enter the expected monthly energy production of their plant after calculating the forecasts. Predicted energy is fundamental data to calculate the Performance Factor of the plant. The user can observe the continually updated Performance Factor on the graph page in the forecast area below the graph. See section 3-2-3 *Forecast Information* for more information.

PLC Settings
Plant Settings
Email Manager

### Performance Forecasts

Enter the expected monthly energy production of your plant after calculating the forecasts with a separate estimation software. Predicted energy is fundamental data to calculate the Performance Factor of your plant. You can observe the continually updated Performance Factor on the graph page.

Month	kWh
January	<input type="text" value="4782.0"/>
February	<input type="text" value="7693.0"/>
March	<input type="text" value="14622.0"/>
April	<input type="text" value="20436.0"/>
May	<input type="text" value="25609.0"/>
June	<input type="text" value="28304.0"/>
July	<input type="text" value="31334.0"/>
August	<input type="text" value="25062.0"/>
September	<input type="text" value="17186.0"/>
October	<input type="text" value="10590.0"/>
November	<input type="text" value="5491.0"/>
December	<input type="text" value="4134.0"/>

● **Email Manager**

The Central System is capable of sending emails to specified users when specific Events occur. In the Email Manager area, the Plant Manager can select which events should trigger an email to the Plant Viewer(s) for that plant. A daily report is also a selectable item for an email to an Plant Viewer(s). See *Daily Report* below for more info.

Code	Message	Type	Occurrence		Recovery	
			Plant Manager	Plant Viewer	Select all Plant Manager	Plant Viewer
E1-0	No grid	Grid fault	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
E1-1	Over voltage (Grid)	Grid fault	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	20 Griderror threshold	
E1-2	Under voltage (Grid)	Grid fault	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		
E1-3	Over frequency (Grid)	Grid fault	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		
E1-4	Under frequency (Grid)	Grid fault	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		
E1-5	Islanding passive	Grid fault	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		
E1-6	Islanding active	Grid fault	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		
E1-7	Over voltage instantly (Grid)	Grid fault	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		
E1-8	Under voltage instantly (Grid)	Grid fault	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		
E2-1	Over voltage (DC)	Other fault	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
E2-3	Ground I fault	Other fault	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
E2-4	Insulation resistance fault	Other fault	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
E3-1	Over current (DC)	Failure	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
E3-2	Over current (AC)	Failure	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

**Additional Information**

Certain events can occur with a high frequency due to the nature of the fault (i.e. rapid power cycling at the beginning of solar energy production). To prevent redundant emails for these types of events, Griderror Threshold can be adjusted for Codes E1-1 through E1-8. The Griderror Threshold value represents the number of errors to accumulate before an email is sent to the user. The Central System tracks the number of errors occurring for each inverter and resets the accumulated number of griderrors at 30 minute intervals. The moment that the Griderror threshold setting is exceeded, an email will be sent to the user.

● **Daily Report**

The Daily Report service can be selected by the Plant Manager in the Email Manager. Choosing this option will enable daily email generation at the end of each day (at approximately GMT+1/UMT+1) to the chosen user(s). The subject of the email will include the date, "Daily Report" for identification and the name of the Plant. The body of the email will include a table indicating *Date*, *Plant Status* and *Energy Today* as well as any occurring alarm/events that have been selected in the Email Manager. This selectivity can omit alarm details from a Plant Viewer's report, for example. Plant status however is not affected and will always reflect the overall status of the system.

The following Plant Status conditions can be reported.

- PLANT OK: No Failures, Grid Faults, Other Faults or Warnings present

Date	Plant status	Energy Today[kWh]
18.03.2012	PLANT OK	202,015

- ALERT: Failure, Grid Fault or Other Fault is present at the Plant

Date	Plant status	Energy Today[kWh]
18.03.2012	ALERT	202,015

#### INVERTER STATUS:

Inverter name	Code	Message	Type
lv 1	E1-1	Over voltage (Grid)	FAULT
lv 1	E2-1	Over voltage (DC)	FAULT
lv 1	A2-5	Abnormality of fan	WARNING
lv 2	A2-6	DC/DC overvoltage	WARNING

- WARNING: A Warning is present at the Plant

Date	Plant status	Energy Today[kWh]
18.03.2012	WARNING	202,015

#### INVERTER STATUS:

Inverter name	Code	Message	Type
lv 1	A2-5	Abnormality of fan	WARNING
lv 2	A2-6	DC/DC overvoltage	WARNING

## 3-2-2 Environmental Sensors

Optional radiation and temperature environmental data are viewable on the graph by selecting the appropriate property.

These options only appear when the Plant Manager has made the appropriate configuration settings (see section 3-2-1 *Plant Settings*).

Item	Unit	Description
Ambient Temperature [Name]	Celsius degree [°C]	Temperature measured from the back of a module in the Plant
Radiation Sensor [Name]	Watt per square meter [W/m <sup>2</sup> ]	Power from the sun received by the Inverter if the orientation is the same as the solar modules.



### Additional Information

- Ambient Temperature and Radiation Sensor selections are considered Environmental Sensors and they are directly input to the PLC from external devices. See the *PVremote Pro Installation Manual* (Cat. No. T05E) for more information.
- Ambient Temperature and Radiation data are only available for the first registered PLC in the system. Data for Temperature and Radiation sensors that are connected to other PLCs are not viewable.

### 3-2-3 Forecast Information

The Forecast information below the graph provides information to track energy production in comparison to known, expected values. Enter the expected monthly energy production of the plant in the *Plant Settings* tab in the *Plant Details* area (see 3-2-1 *Plant Settings* for more information).

- **Current Energy Produced**

The current Energy produced for the selected period

- **Forecasted Energy Produced**

The forecast energy for the selected period (see note)

- **Performance Factor**

The Current Energy Produced / Forecasted Energy Produced (%) for the selected period (see note)

- **Calculated Revenue**

The Revenue produced based on the current setting<sup>\*1</sup> of Feed-in Tariff for the selected period<sup>\*2</sup>

**Note 1** Calculated Revenue does not account for past variations of Feed-in Tariff and uses the current setting found in the Plant Administration area.

**2** For periods selected other than *Day*, the values used for forecast calculations do not include the following. This ensures accurate values for Performance Factor.

- Days in the future where actual production data has not yet been collected
- Days in the past where actual production data was not collected due to conditions such as lack of communication, maintenance and startup



#### **Precautions for Correct Use**

---

Total Produced Energy and Total Euros earned values displayed in the *My Plants* overview area may differ from Calculated Revenue values found in the graph area. This may be caused by differences in Inverter installation timing, Inverter communication problems or periods of maintenance.

---

## 3-3 Data Processing

When data from a Plant or Site is presented in the User Interface, several calculations and formulas are applied to the raw data collected from the PV Inverter(s) and PLC(s) to provide a clear information. This section explains these calculations in detail to help the user accurately interpret Plant and Site production data.

### Data Exchange Interval and Averaging

The data exchange interval is the frequency at which the PLC communicates with the Central System. This rate is adjustable during configuration and installation of the PVremote Pro system and has a direct impact on data calculations. Although the PLC collects information from the PV Inverters at user configurable intervals, this data is averaged based on the PLC to Central System interval setting (cumulative values such as Energy are not averaged). See the *PVremote Pro Installation Manual* (Cat. No. T05E) and section 2-3-7 *PLC Application Download* for more information about interval adjustment settings.

### 3-3-1 Periodic Properties for Inverters

Individual Inverters can be selected to view specific data for each unit. Some properties are recorded directly from PV Inverter memory and others are manipulated with formulas before displaying. See the table in section 3-3-3 *Properties Data* for details.

- **Day Period Properties**

Daily period properties are directly recorded in the Central System based on the Data Exchange Interval.

- **Week Period Properties**

Properties selected for a specific week period are calculated from recorded inverter data.

- **Month Period Properties**

Properties selected for a specific month period are calculated from recorded inverter data.

- **Year Period Properties**

Properties selected for a specific year period are calculated from recorded inverter data.

- **All Years Period Properties**

The *All Years* property calculates the total energy produced from the beginning of recorded inverter data to present day.

### 3-3-2 Periodic Properties for the Total Plant

The Total Plant selection allows the user to view properties based on the sum of all inverters in the entire Plant. All properties viewed under the Total Plant selection will display the sum total of all connected Inverters during requested periods.

- **Day Period Properties**

Daily period properties are evaluated at 15 minute intervals to ensure data recording of all PLCs communicating with the Central System. The values are summed for all inverters and displayed accordingly.

- **Week, Month, Year and All Year Period Properties**

Weekly, monthly, yearly and *All Year* period properties are calculated in the same method as periodic properties for individual Inverters, but all Inverter values are summed for a total of the entire Plant.

### 3-3-3 Properties Data

Several properties of Inverter and Plant performance can be evaluated in the Plant Details area of the User Interface. Some data is presented directly from the internal memory areas of the PV Inverter while other data is processed before presentation. The table below provides more detail about this data.

Property	KP□□L Internal Address (CompoWay/F)	Details	
DC Power (MPPT 1)	Type Code C8, 0102	Taken directly from internal PV memory areas based on PLC to PV Inverter communication interval setting. Manipulated only when a period greater than <i>Day</i> is selected.	
DC Power (MPPT 2)	Type Code C8, 0202		
DC Power (MPPT 3)	Type Code C8, 0302		
DC Power (ALL)	Type Code C8, 0102, 0202, 0302	The sum of all connected MPPT DC Power.	
DC Current (MPPT 1)	Type Code C8, 0101	Taken directly from internal PV memory areas based on PLC to PV Inverter communication interval setting. Manipulated only when a period greater than <i>Day</i> is selected.	
DC Current (MPPT 2)	Type Code C8, 0201		
DC Current (MPPT 3)	Type Code C8, 0301		
DC Current (ALL)	Type Code C8, 0101, 0201, 0301	The sum of all connected MPPT DC Current	
DC Voltage (MPPT 1)	Type Code C8, 0100	Taken directly from internal PV memory areas based on PLC to PV Inverter communication interval setting. Manipulated only when a period greater than <i>Day</i> is selected.	
DC Voltage (MPPT 2)	Type Code C8, 0200		
DC Voltage (MPPT 3)	Type Code C8, 0300		
AC Current L1	Type Code C8, 000B		
AC Current L2	Type Code C8, 000C		
AC Current L3	Type Code C8, 000D		
AC Frequency	Type Code C8, 0007		
AC Voltage L1	Type Code C8, 0008		
AC Voltage L2	Type Code C8, 0009		
AC Voltage L3	Type Code C8, 000A		
AC Power	Type Code C8, 000F		
Temperature (optional)	Read from PLC		Recorded directly to the PLC from connected sensors.
Radiation (optional)	Read from PLC		
Inverter Efficiency	Type Code C8, 000F, 0102, 0202, 0302	Calculated with the following equation: Inverter Efficiency = AC Power for the requested period / DC Power (ALL) for the requested period <ul style="list-style-type: none"> <li>Limited to a maximum of 98%.</li> <li>If DC Power (ALL) is 0, then Inverter Efficiency is represented as 0%.</li> </ul>	

Property	KP□□L Internal Address (CompoWay/F)	Details
Energy	Type Code C3, 0000	<p>Calculated with the following equation:  <math>\text{Energy} = \text{Energy at moment of request}^{*1} - \text{Energy at beginning of a production day}</math></p> <ul style="list-style-type: none"> <li>Each inverter's daily energy production is recorded for every day of operation. This value is used for calculating all other energy period requests.</li> </ul>
Normalized Energy	Type Code C3, 0000	<p>Calculated with the following equation:  <math>\text{Normalized Energy} = \text{Energy} / \text{Installed PV Power}</math></p> <ul style="list-style-type: none"> <li>See section 2-3-9 <i>New Inverter Form</i> for details on Installed PV Power value.</li> </ul>
Top AC Power	Type Code C8, 000F	<p>Calculated with the following equation:  <math>\text{Top AC Power} = \text{Maximum AC Power for a requested period}</math></p> <p>Each inverter's maximum daily AC Power is recorded for every day of operation. This value is used for calculating all Top AC Power period requests.</p>

**Note 1** The moment of request may have latency due to the data exchange interval setting. This represents the most currently obtained value.



#### Additional Information

- Inverter efficiency is always limited to a maximum of 98% regardless of period selection.
- If DC Power (ALL) is 0, efficiency will be represented as 0%.
- Total operating hours for each Inverter is included in the CSV download only and not represented in the graph. This data is taken directly from each Inverter's internal address of Type Code C3, 0002.
- For more information on PV Inverter internal memory, see the *Grid Connect Photovoltaic Inverter Communication Manual* (Cat. No. S103).
- In some cases, PV Inverter data that has a value near zero can become negative due to Inverter system resolution. The Central System will change these negative values to zero to preserve data validity.
- For property data taken from internal PV memory areas, this is the value at the moment of data transmission between the PLC and PV Inverter. These values are momentary and as a consequence, fluctuations between sample periods will not be recorded. This applies to momentary values and not cumulative values such as Energy.

## Selectable Period

The table below indicates the selectable period available for each property.

Property	Selectable for Inverter Specific Period				Selectable for Total Plant Period					
	Day	Week	Month/Year	All Years	Day	Week	Month/Year	All Years		
DC Power (ALL)	YES	YES	NO	NO	YES	YES	NO	NO		
DC Power (MPPT 1)					NO	NO				
DC Power (MPPT 2)										
DC Power (MPPT 3)										
DC Current (ALL)										
DC Current (MPPT 1)										
DC Current (MPPT 2)										
DC Current (MPPT 3)										
DC Voltage (MPPT 1)										
DC Voltage (MPPT 2)										
DC Voltage (MPPT 3)										
AC Current L1										
AC Current L2										
AC Current L3										
AC Frequency										
AC Voltage L1										
AC Voltage L2										
AC Voltage L3										
AC Power									YES	YES
Temperature (optional)										
Radiation (optional)										
Inverter Efficiency				NO	NO					
Energy			YES	YES	YES	YES				
Normalized Energy				NO			NO			
Top AC Power	NO				NO					





# Index



# Index

---

<b>A</b>		<b>F</b>	
AC Current .....	3-6	Failure (PV Inverter Event) .....	3-8
AC Frequency .....	3-6	Feed-in Tariff .....	2-9
AC Power .....	3-3, 3-5	Filter Plants .....	3-3
AC Voltage .....	3-6	Forecasted Energy Produced .....	3-18
Access Control .....	2-2	<b>G</b>	
Add Licence .....	2-9	Grid Fault (PV Inverter Event) .....	3-8
Advanced Licence .....	1-6	Griderror Threshold .....	3-15
Alert .....	3-4, 3-16	<b>I</b>	
All Year Period Properties (Plant) .....	3-20	Installed Power .....	2-15, 3-3, 3-10
All Years (Graph Period) .....	3-6	Inverter .....	1-2, 1-9
All Years Period Properties (Inverter) .....	3-19	Inverter Administration .....	1-5
Ambient Temperature .....	3-17	Inverter Efficiency .....	3-6
<b>B</b>		Is Public .....	2-9
Base License .....	1-6	<b>L</b>	
Big Display Visibility .....	3-11	Latitude .....	2-7
<b>C</b>		License Expiration and Renewal .....	1-8
Calculated Revenue .....	3-18	License Functionality .....	1-7
Captcha .....	2-18	License Renewal Date .....	1-8
Central System .....	1-3	License Status .....	3-3
CO2 Saved .....	3-3, 3-10	Longitude .....	2-7
Communication Event .....	3-9	<b>M</b>	
CSV File .....	3-6	MAC ID Address .....	2-11
Current Energy Produced .....	3-18	Maintenance Event .....	3-9
Custom Zoom Areas (Graph) .....	3-7	Maintenance Mode .....	3-9
CX-Programmer Software .....	2-12	Maintenance Mode Example .....	3-10
<b>D</b>		Monitoring Web Portal .....	2-2
Daily Report .....	3-15	Month (Graph Period) .....	3-6
Data Exchange Interval .....	3-19	Month Period Properties (Inverter) .....	3-19
Data Link .....	1-2, 1-3	Month Period Properties (Plant) .....	3-20
Day (Graph Period) .....	3-6	MPPT Warning .....	3-13
Day Period Properties (Inverter) .....	3-19	MPPTs Connected .....	2-15
Day Period Properties (Plant) .....	3-20	My Plants .....	2-19, 3-2
DC Current .....	3-5	<b>N</b>	
DC Power .....	3-5	Normalized Energy .....	3-5
DC Voltage .....	3-5	<b>O</b>	
<b>E</b>		Offline .....	3-4
Email Manager .....	3-15	Other Fault (PV Inverter Event) .....	3-9
Energy .....	3-5	<b>P</b>	
Environmental Data .....	1-3	<b>Q</b>	
Events .....	3-8	<b>R</b>	
Expired Advanced License .....	3-4	<b>S</b>	
Expired Base License .....	3-3	<b>T</b>	

**P**

Performance Factor .....	3-18
Picture .....	2-9
Plant .....	1-2, 1-9
Plant Administration .....	1-5
Plant and Site Status .....	3-4
Plant Manager .....	1-2
Plant Monitoring .....	1-5
Plant OK .....	3-4, 3-16
Plant Settings .....	3-14
Plant Size .....	1-7
Plant Viewer .....	1-2
PLC .....	1-2, 1-3, 1-9
PLC Administration .....	1-5
PLC Analog Unit Setting .....	2-13
PLC Application File .....	2-12
PLC Clock .....	3-8
PLC Name .....	2-11
PLC Settings .....	3-13
PLC to Central System Communication .....	2-13
Produced Energy Today .....	3-3, 3-10
Public Plants .....	2-19
Purchase Agreement .....	1-7
PV Inverter Properties .....	3-8
PV Inverter, KP□□L type .....	1-3

**R**

Radiation Sensor .....	3-17
Register Now Link .....	2-16
Register Plant Viewer .....	2-19
Registration .....	1-4, 2-16
Role .....	2-5
RS-485 Serial Network .....	1-3

**S**

Select Properties .....	3-4
Selectable Period .....	3-23
Serial (Inverter) .....	2-15
Settings Button .....	3-12
Show Graph .....	3-7
Site .....	1-2, 1-9, 2-6
Site Admin .....	2-19
Site Administration .....	1-5
Site OK .....	3-4
Solar Module .....	1-3
Sort Events .....	3-8
Supported Devices .....	2-19

**T**

Total Euros Earned .....	3-3
Total Plant .....	3-4
Total Produced Energy .....	3-3, 3-10

**U**

User Admin .....	2-19
User Administration .....	1-4
User Interface .....	1-3

**V**

Valid Advanced License .....	3-4
Valid Base License .....	3-3
View Totals .....	3-2

**W**

Warning .....	3-4, 3-16
Warning Event .....	3-9
Week (Graph Period) .....	3-6
Week Period Properties (Inverter) .....	3-19
Week Period Properties (Plant) .....	3-20

**Y**

Year (Graph Period) .....	3-6
Year Period Properties (Inverter) .....	3-19





# OMRON

**Authorized Distributor:**