Shine Design

Growatt

1.0

2011-12-5

Version	Date	Notes
1.0.0.2	2011-08-19	New
1.0.0.3	2011-09-14	New City functions; Output PDF documents Etc.
1.0.0.4	2011-10-20	
1.0.0.5	2011-11-25	
1.0	2011-12-5	

Table of Contents

1. Introduction

ShineDesign is PV system design software aimed at help users design PV systems with different power requirements. ShineDesign software is able to automatically match the components of the PV system according to data of selected PV panels, strings and inverters. What's more, it can measure the system matches in percentage via some algorithm, and calculate the year yield power. Moreover, ShineDesign can design and set several PV station project simultaneously.

Target group:
This user manual is for end users, installers and qualified persons.

Notes:
ShineDesign of this version is used to design grid-tied PV systems only.

Disclaimer:
ShineDesign software are based on estimated values and mathematical models, hence the results of station design are just for reference. Growatt accepts no responsibilities to possible errors or changes of this software.

2. Install and Uninstall

2.1 System requirements

ShineDesign is developed by Java technology, hence it's available for several operating systems such as Windows XP/Vista/Win 7/2000/2003 or any other systems suitable to running Java applications.

Notes:
ShineDesign of this version (v1.0) supports both 32bit operating systems and 64bit operating systems.

Notes:
ShineDesign is based on Java, it requires JRE at least version 1.6. Download the JRE from website: http://download.oracle.com/otn-pub/java/jdk/6u27-b07/jre-6u27-windows-i586.exe . During installation, it will remind users to install the JRE first.

2.2 Install the ShineDesign

● Double click the *ShineDesign 1.0*
  The welcome window will open, click *Next* button to continue installation, or *Cancel* button to quit installation.


● Next is the *Read me windows*
  Please make sure the PC has installed with JRE (version 1.6 at least), if not, please download and install the JRE from link shown in *chapter 2.1*.

Click *Next* button to continue, while *Back* button to go back to welcome window, *Cancel* button to cancel installation.


- Select the installation path
  Choose the folder that ShineDesign will be installed.
  Click the *Browse* button to set the installation path of ShineDesign.
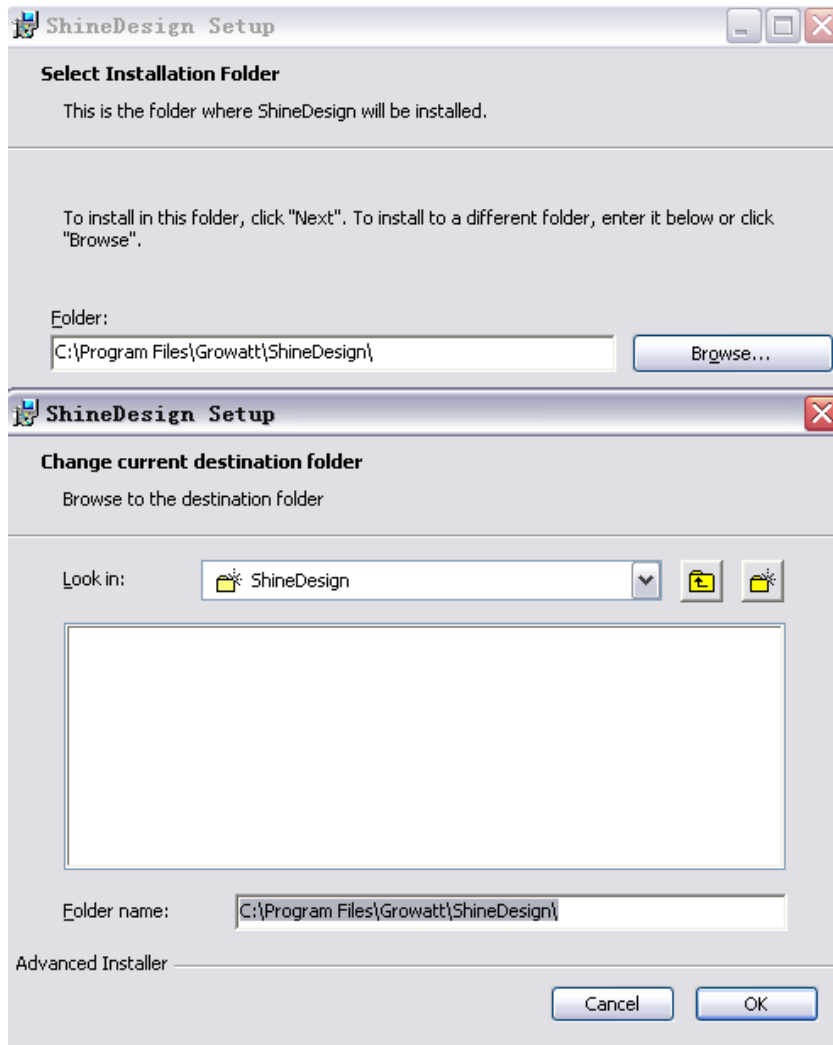
Click *OK* to continue, and cancel to quit.

- Ready to install
  After setting the installation path, the wizard is ready to install ShineDesign. Click *Install* button to begin the installation. If you want to reset the installation path please click *Back* button, or if you want to quit installation please click *Cancel* button.
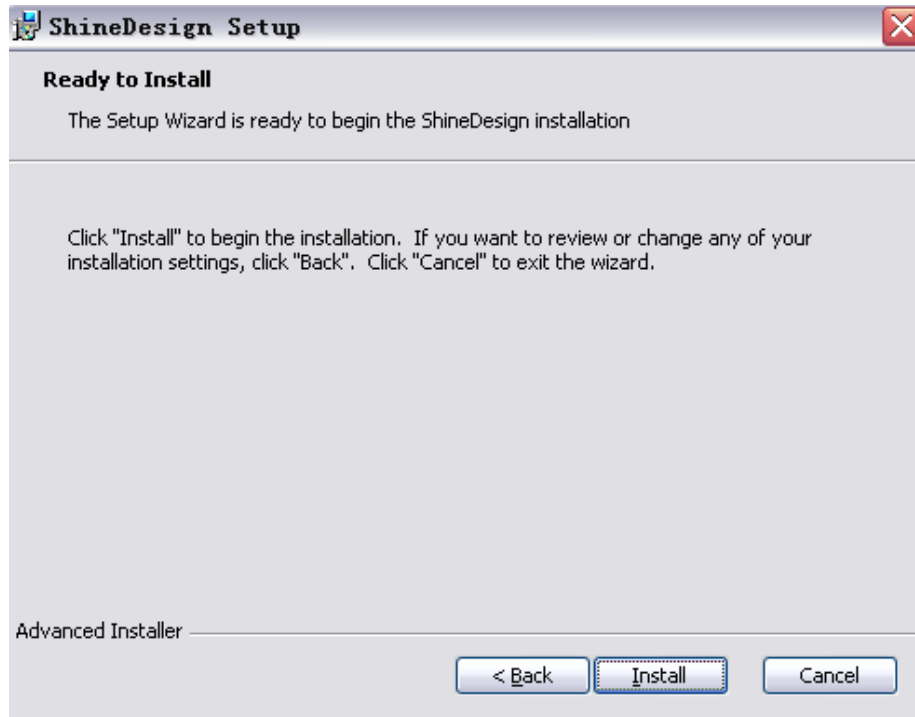
- Installation

During installation, if you want to stop, please click *Cancel* button.
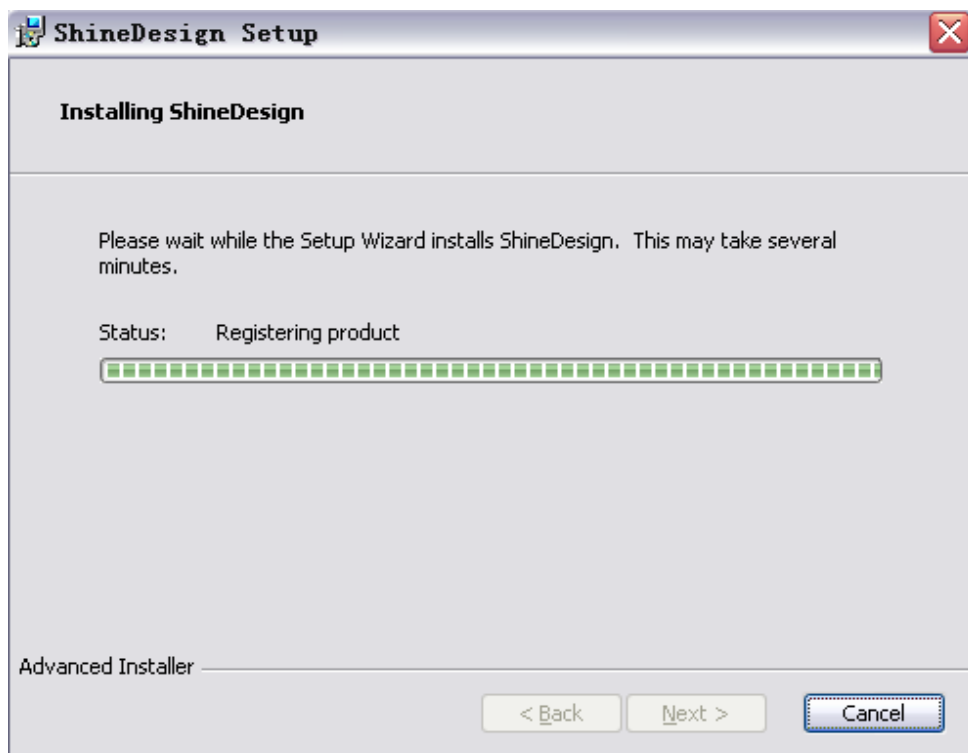
Wait till the complete window appears, and click *Finish* button to finish installation.

2.3 Uninstall the ShineDesign

It's easy to uninstall ShineDesign by using the uninstall program of the operating system. For example, in Windows XP, you can choose the control panel →add/remove program→select and remove.

3 Operation of ShineDesign

Notes: While you open the ShineDesign software, it will remind you to create a new project before any other operations, refer to Chapter 3.2 *Create and Manage Projects*.

3.1 User Interface

3.1.1 Overview
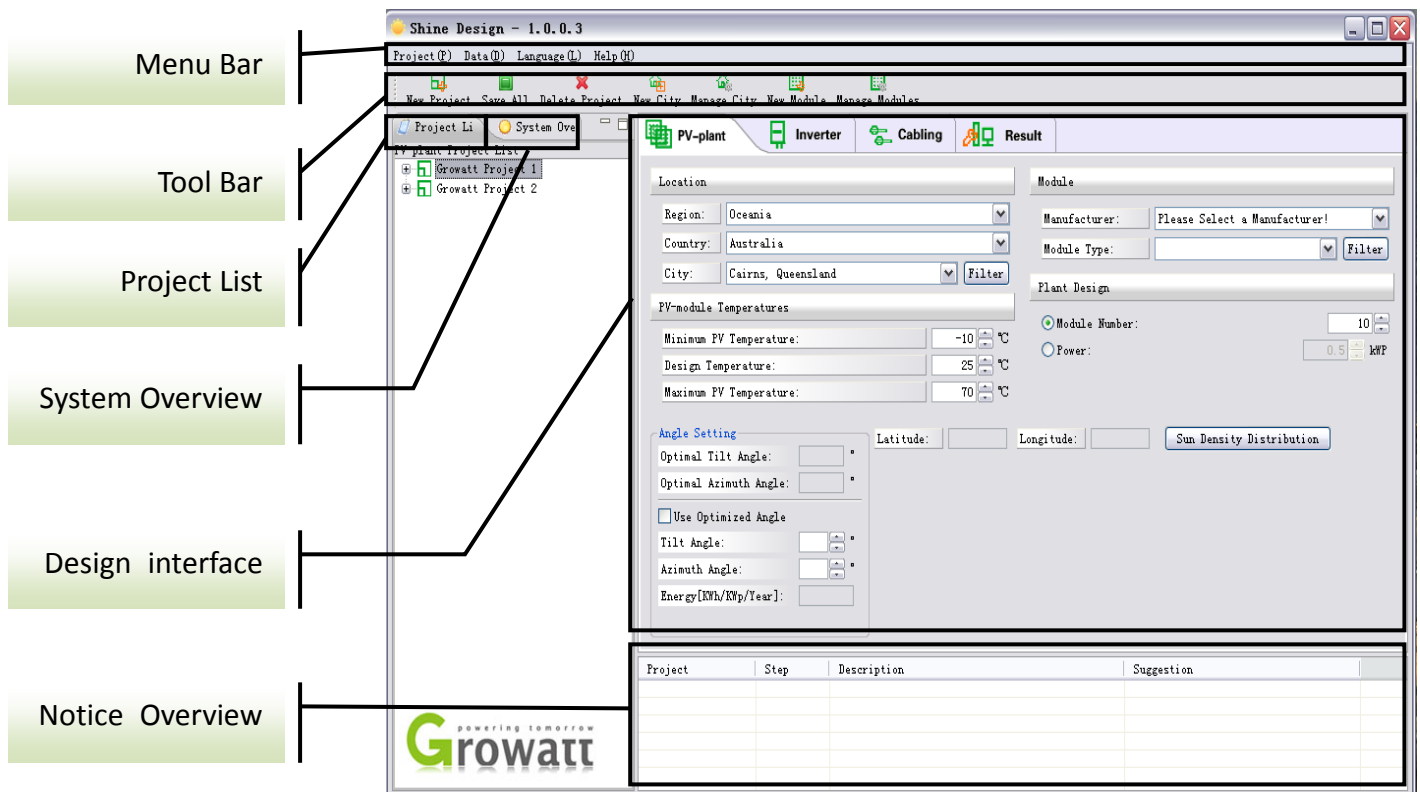
3.1.2 Menu Bar

At the top line of the design interface is the menu bar, which enables some basic operations of ShineDesign. Each menu have a hot key, it's available to link to these menus by pressing *Alt* key plus the relative hot key.

Menus:

Menus	Secondary menus	Description
Project(P)	New Project (N)	Create a new project

|	Save All (S)	Save all the project which is changed
	Delete Project (D)	Delete the selected project
Data(D)	New City (C)	Add New City data
	Manage City (I)	Manage or change the City Data
	New Module (N)	Add new panel's data
	Manage Modules (M)	Manage or change the panels' data
Language(L)	English (E)	Change language to English
	Chinese (C)	Change language to Chinese (simplified)
Help(H)	About ShineDesign (A)	Information about ShineDesign
	Documentations (D)	ShineDesign user manual
	Growatt online (G)	Official website of Growatt

3.1.3 Tool Bar

There are five Icons in Tool bar: *New project*, *Save all*, *Delete Project*, *New City, Manage City, New module* and *Manage Modules*. The functions of the five icons are the same as the menus of the same names in Menu Bar.
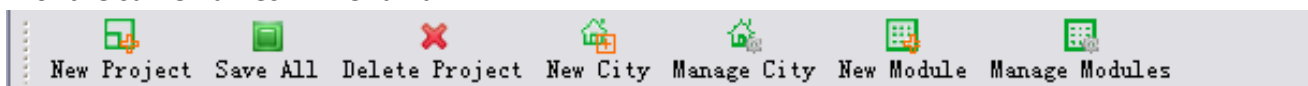
3.1.4 Project List

The project list view at left will show the information of all the projects being operated right now. In popup menu there provides *New Project* and *Delete Project* functions. Moreover, you can do the same operation via click icons in tool bar or menus in menu bar.

The project list view will show information include Project name, PV plant, Inverter, Cabling, Results information of projects. Once click the relative menus in the list, the design interface will show the relative information.
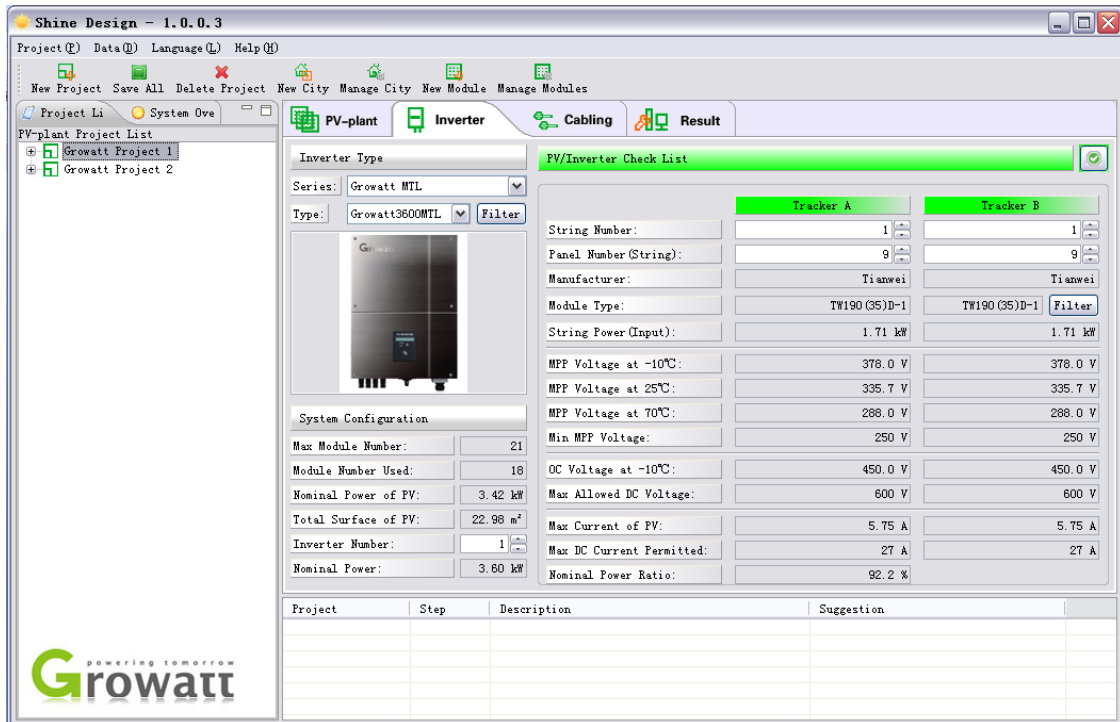
3.1.5 System Overview

This overview will show PV system information about location, modules and inverters.
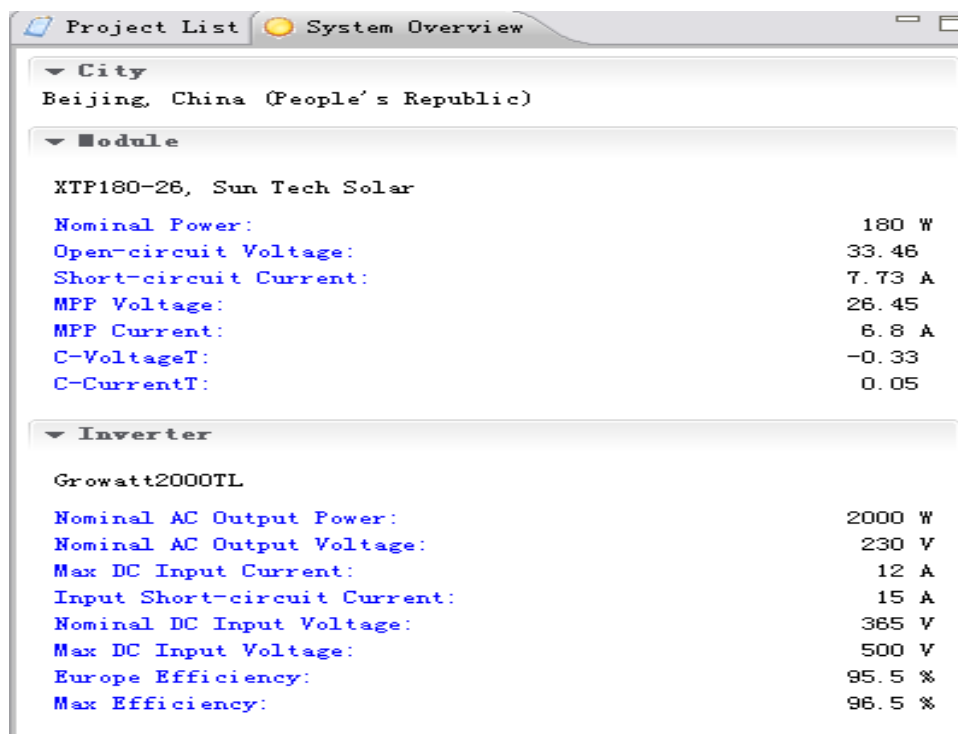
3.1.6 Design Interface

Design interface show detailed information of operation and designing of relative projects. There are four tabs in this interface: *PV plant*, *Inverter*, *Cabling*, *Result*.

● **PV plant**: Set some basic parameters of the PV system such as the location of the system, the panel model, panel number, the operating temperature range and the angles of the PV panel array etc.
   The *Filter* buttons under title *Location* and *Module* are used to filter the locations and modules according to the user's requirements.
   The Sun Density Distribution button enables to show the sunlight density monthly distribution of a whole year.

● **Inverter**: Choose the number and model of the inverters; and test the matches of panel and inverters. The *Filter* button under the *Inverter Type* title makes it available to select inverters via the location (or country), the properties, the key words of inverters' name and the series.
   The PV/Inverter check list view will show the results of the matching of inverters and panels and strings. The color of items under this title will show the information of matches: red means serious error or energy loss, yellow means warnings, while no color or green means the items are OK for matches.

Inverter Type

Series: Growatt

Type: Growatt2000TL [Filter]

System Configuration

Max Module Number:	12
Module Number Used:	11
Nominal Power of PV:	1.98 kW
Total Surface of PV:	14.68 m²
Inverter Number:	1
Nominal Power:	2.00 kW

PV/Inverter Check List

	Tracker A	Tracker B
String Number:	1	0
Panel Number(String):	11	0
Manufacturer:	Sun Tech Solar	
Module Type:	XTP180-26	[Filter]
String Power(Input):	1.98 kW	
MPP Voltage at -10℃:	326.5 V	
MPP Voltage at 25℃:	291.0 V	
MPP Voltage at 70℃:	250.7 V	
Min MPP Voltage:	220 V	
OC Voltage at -10℃:	413.0 V	
Max Allowed DC Voltage:	500 V	
Max Current of PV:	7.91 A	
Max DC Cur...Permitted:	15 A	
Nominal Power Ratio:	94.5 %	

- **Cabling**: Provide advises and supports for the cabling of the systems. ShineDesign will automatically adjust the specifications of cabling of both AC and DC sides. And the color of the titles (DC-Side and AC-Side) also shows information about cabling like the Inverter tab.

DC-Side

Wire Material:	Cu	
Single Cable Length:	18	m
Cable Cross-Section:	2.5	mm²
Cable Resistance:	0.25	Ω
Voltage Drop:	1.96	V
Total Power Loss:	15.48	W
Rate of Energy Loss:	0.66	%

AC-Side

Wire Material:	Cu	
Single Cable Length:	10	m
Cable Cross-Section:	2.5	mm²
Cable Resistance:	0.14	Ω
Voltage Drop:	1.20	V
Total Power Loss:	10.40	W
Rate of Energy Loss:	0.52	%

- **Result**: Show the design result information of the PV project includes PV generator, inverters and system match. The Print button at the right corner enables to print the result into PDF documents. And The Layout button enables to set layout of the output PDF documents.

3.1.7 Notice Overview

Notice Overview interface will show messages of the PV project such as errors and warnings. The interface shows the type of errors or warnings, steps where error occurs, description and suggestions. Double click the error of warning message will help you quickly go to the steps where this error occurs.

| Project	Step	Description	Suggestion
☐ ⊗ Errors			
⊗ 1	⬚ Inverter	(MPP Tracker A) The MPP voltage at the maximu...	Increase the number of modules in t...
☐ ⚠ Warnings			
⚠ 1	⬚ Inverter	(MPP Tracker A) The MPP voltage at the design...	Increase the number of modules in t...
⚠ 1	⬤– Cabling	The power loss of the DC-side cable is high	Adjust the cable configuration para...

3.2 Create and Manage Projects

3.2.1 Start New Projects

- **Create a new project**

  If there is no project, once running ShineDesign, it will remind users to create a new project, shown as figures below.

  Anyway, users can also create new project by click *New Project* menu in menu bar (Menu Bar→Project (P)→New Project(N)) or *New Project* icon in icon bar. Also in the popup menu of *Project List* interface (click the right) there is a new project menu.
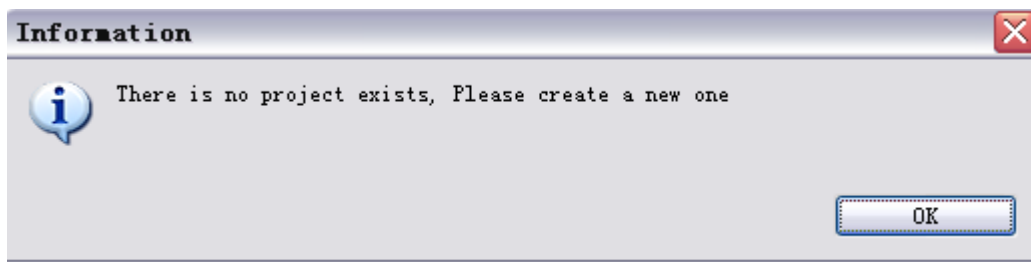
  Click the *OK* button or the cross icon on the right top corner to continue, and go to the interface of naming project. If you create a new project via the *New Project* menu in menu bar or popup menu, or *New Project* icon in icon bar, you will directly go to the interface of naming project.

  Input the name of the new project such as "Growatt Project 1" and click *OK* button to create the project or *Cancel* button to quit.

- **Set basic parameters of PV plant**

  Click the *PV plant* menu in *Project List* interface or the *PV plant* tab in *Design* interface will lead to *PV plant* tab. The default tab displays in *Design* interface of a new project is *PV plant* tab.

  1. Select the location of the project under *Location* title, the filter button will help you filter the location.
  2. Select the type and number or power of the module under *Module* and *Plant Design* titles. The *Filter* button will help you select the module via the module type or manufacture. Notice that because ShineDesign v1.0.0.2 is not complete so the data of

module type is little, however we suggest you to add panel data to ShineDesign if in need. To add panel data please refer to chapter 3.2.3 *New Module and Manage Modules.*

3. Select the angles of the PV array under *Angle Setting* title, we suggest you to tick the *Use Optimized Angle* option to enable ShineDesign to automatically set the angle.

Filter of Location: filter the City by input part of the city names in to the *City Filter* box
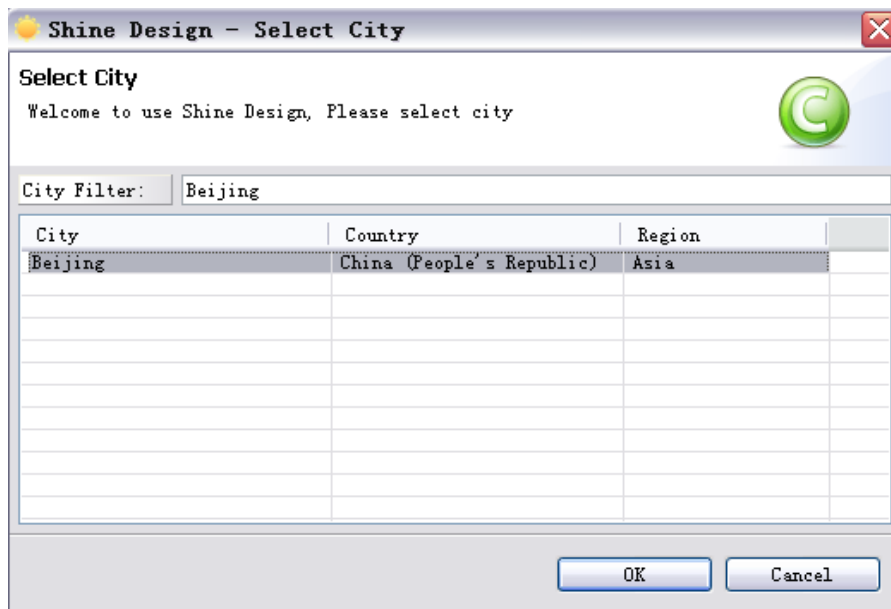
Filter of modules: filter the modules by input part of name of the module type (or model) or manufacture into relative box.
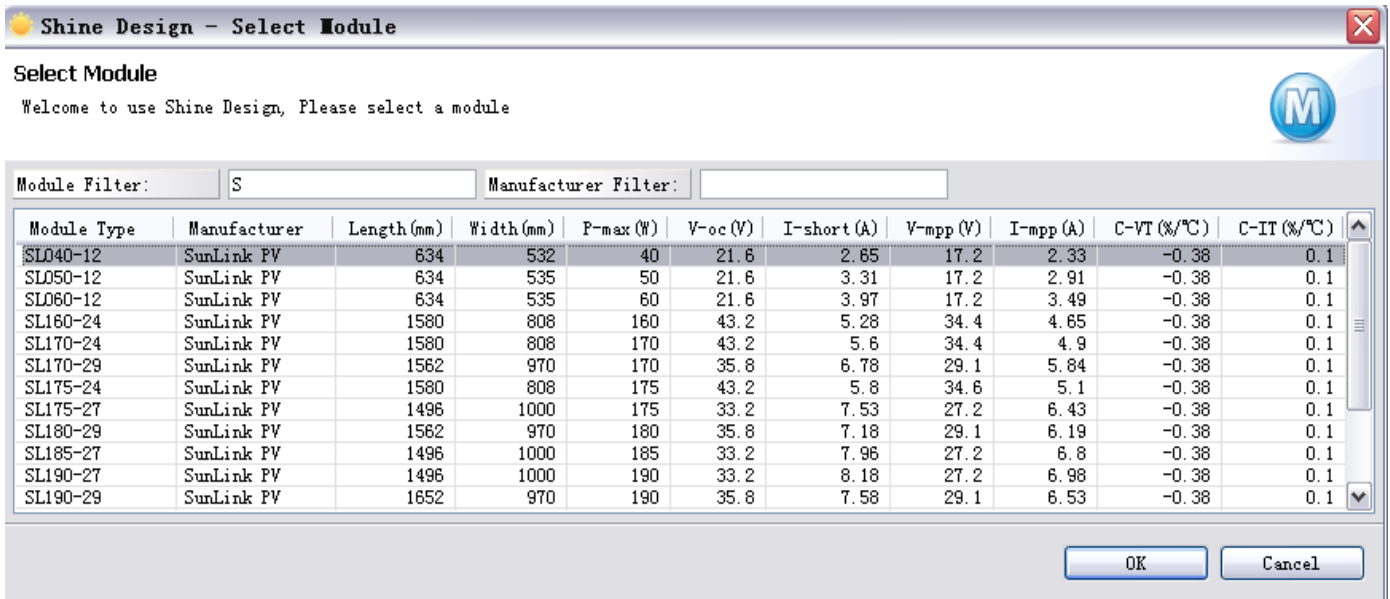
- **Match the inverter and PV modules**

  Click the *Inverter* menu in the *Project List* interface or the *Inverter* tab in *Design* interface will lead to Inverter tab.

  1. Select the Series and Type (Model) of the inverter, the filter will help users filter the inverters as required.
  2. Select the number of inverters.
  3. Select the number of Strings and Panels of each string. The displayed default number of the strings and modules has been automatically adjusted. But you can find any other suitable numbers of the Strings and Panels to make the performance be better.

  Notes: During operation please notice the color of the titles, refer to chapter 3.1.6 *Design Interface →Inverter*.

  Notes: During operation please notice the information showed in Notice Overview, if you are not qualified person, while there are some errors or warnings popup in Notice Overview, please operate or adjust the data according to the suggestions showed in Notice Overview.

Inverter

1

Inverter Type

Series: Growatt

Type: Growatt2000TL | Filter

3

System Configuration

Max Module Number:	12
Module Number Used:	11
Nominal Power of PV:	1.98 kW
Total Surface of PV:	14.68 m²
Inverter Number:	1
Nominal Power:	2.00 kW

2

PV/Inverter Check List

	Tracker A	Tracker B
String Number:	1	0
Panel Number (String):	11	0
Manufacturer:	Sun Tech Solar	
Module Type:	XTP180-26	Filter
String Power (Input):	1.98 kW	
MPP Voltage at -10℃:	326.5 V	
MPP Voltage at 25℃:	291.0 V	
MPP Voltage at 70℃:	250.7 V	
Min MPP Voltage:	220 V	
OC Voltage at -10℃:	413.0 V	
Max Allowed DC Voltage:	500 V	
Max Current of PV:	7.91 A	
Max DC Cur...Permitted:	15 A	
Nominal Power Ratio:	94.5 %	

Filter of Inverters: Filter the inverters via choose the country or properties of the inverters, or input he inverters series of type (model) to relative boxes.

Shine Design – Select Inverter

Select Inverter

Welcome to use Shine Design, Please select a inverter

Country

☐ Germany ☐ Austria ☐ France ☐ Switzerland

☐ English ☐ Italy ☐ Spain ☐ U.S.A.

Properties

☐ With transformer ☐ Transformerless ☐ Multi-String

☐ Indoor ☐ Outdoor

Inverter filter: | Series Filter: All Series

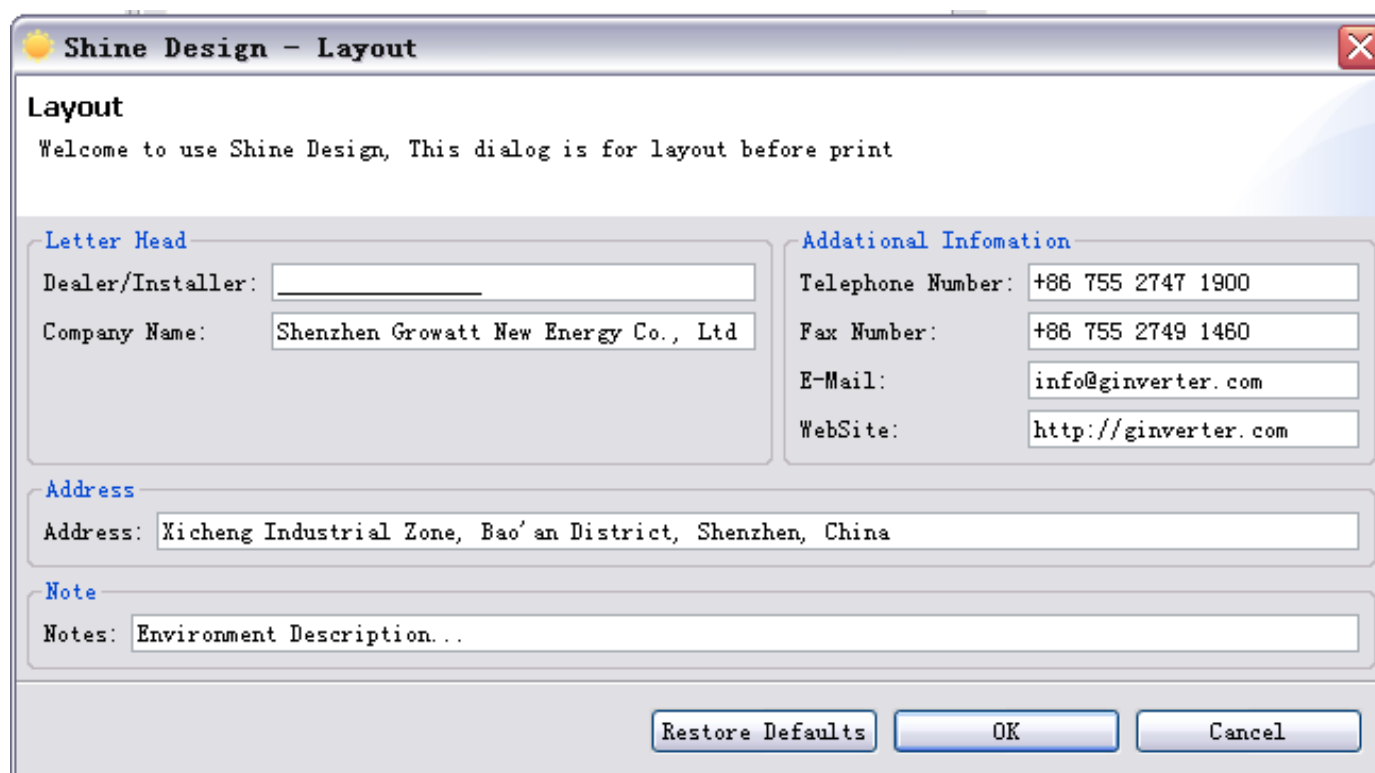| Inverter Type	Series	P-normal (W)	Vac-normal (V)	Idc-mpp (A)	Idc-short (A)	Vdc-normal (V)	Vdc-max (V)	E-europe (%)	E-max (%)
GROWATT10000UE	GROWATTUE	10000	230	15	20	600	800	0.975	0.98
GROWATT12000UE	GROWATTUE	12000	230	17	22	600	800	0.975	0.98
GROWATT18000UE	GROWATTUE	18000	230	23	29	600	800	0.975	0.98
GROWATT20000UE	GROWATTUE	19500	230	25	33	600	800	0.975	0.98
Growatt1500TL	Growatt	1600	230	10	15	365	450	0.955	0.965
Growatt2000TL	Growatt	2000	230	12	15	365	500	0.955	0.965
Growatt3000TL	Growatt	2850	230	15	20	365	500	0.96	0.97
Growatt4400TL	Growatt	4200	230	20	27	365	580	0.974	0.978
Growatt5000TL	Growatt	4600	230	20	27	365	580	0.974	0.978
Growatt3600MTL	Growatt MTL	3600	230	10	27	365	600	0.97	0.976

OK | Cancel

- **Adjust the cabling of DC and AC side**

  Click the *Cabling* menu in the *Project List* interface or *Cabling* tab in *Design* interface will lead to *Cabling* tab.

  Notes: If you are not qualified person, we suggest you not to change the default data of cabling. The default data has already been automatically adjusted by ShineDesign software.

- **Print the result**

After all the operations above, then click the *Result* menu in the *Project List* interface or the *Result* tab in the *Design* interface and turn to the *Result* tab. Click the *Print* button to output the project as PDF documents. Notice that before print the PDF documents users can choose which of information to be displayed on the documents via click the *Layout* button.

3.2.2 Manage Projects

Save projects:
Click the *Save All* menu in menu bar (menu bar→Project (P)→Save all (S)) or *Save All* icon in tool bar will save all the projects operated right now.
However, if users cancel ShineDesign without save the projects, the software will pop up a reminder window to remind users save the projects.

Delete projects:
Click the *Delete* Project menu in menu bar (menu bar→Project (P)→ Delete Project (D)) or *Delete* Project icon in tool bar, or click the *Delete* Project menu in popup menu in *Project List* interface, then the project will be removed.

3.2.3 New Module and Manage Modules

For the panel information is not comprehensive, sometimes users need to add new panel data into database of ShineDesign.

(Growatt logo — powering tomorrow)

- **New Panel**

  To add new panel data into database you can click the *New Module* menu in menu bar (menu bar→Data (D)→New Module (N)) or the *New Module* icon in tool bar.

  Input all the required data and click *OK* button to add the data.

- **Manage Modules**

  Users can manage the data of panels in ShineDesign by clicking the *Manage Modules* menu in menu bar (menu bar→Data (D)→Manage Modules (M)) or the *Manage Modules* icon in tool bar.

  In Manage Modules window, users can add, modify or delete the module data in ShineDesign. The window is shown like below.

Module Type	Manufacturer	Length(mm)	Width(mm)	P-max(W)	V-oc(V)	I-short(A)	V-mpp(V)	I-mpp(A)	C-VT(%/℃)	C-IT(%/℃)
SL040-12	SunLink PV	634	532	40	21.6	2.65	17.2	2.33	-0.38	0.1
SL050-12	SunLink PV	634	535	50	21.6	3.31	17.2	2.91	-0.38	0.1
SL060-12	SunLink PV	634	535	60	21.6	3.97	17.2	3.49	-0.38	0.1
SL160-24	SunLink PV	1580	808	160	43.2	5.28	34.4	4.65	-0.38	0.1
SL170-24	SunLink PV	1580	808	170	43.2	5.6	34.4	4.9	-0.38	0.1
SL170-29	SunLink PV	1562	970	170	35.8	6.78	29.1	5.84	-0.38	0.1
SL175-24	SunLink PV	1580	808	175	43.2	5.8	34.6	5.1	-0.38	0.1
SL175-27	SunLink PV	1496	1000	175	33.2	7.53	27.2	6.43	-0.38	0.1
SL180-29	SunLink PV	1562	970	180	35.8	7.18	29.1	6.19	-0.38	0.1
SL185-27	SunLink PV	1496	1000	185	33.2	7.96	27.2	6.8	-0.38	0.1
SL190-27	SunLink PV	1496	1000	190	33.2	8.18	27.2	6.98	-0.38	0.1
SL190-29	SunLink PV	1652	970	190	35.8	7.58	29.1	6.53	-0.38	0.1
SL5-170	SunLink PV	1580	809	170	43.2	5.62	34.4	4.93	-0.38	0.1
SL5-180	SunLink PV	1580	809	180	43.2	5.95	34.4	5.23	-0.38	0.1
SL75-12	SunLink PV	1196	535	75	21.6	4.96	17.2	4.36	-0.38	0.1
SL80-12	SunLink PV	1196	535	80	21.6	5.29	17.2	4.65	-0.38	0.1

3.2.4 New City and Manage City

For some users' requirements, ShineDesign has functions of New City and Manage City, to add and manage location data.

- **New City**

  To add new city data to the database, users can click the *New City (C)* menu in menu bar (menu bar →Data (D) →New City (C)) or the *New City* icon in Tool Bar.
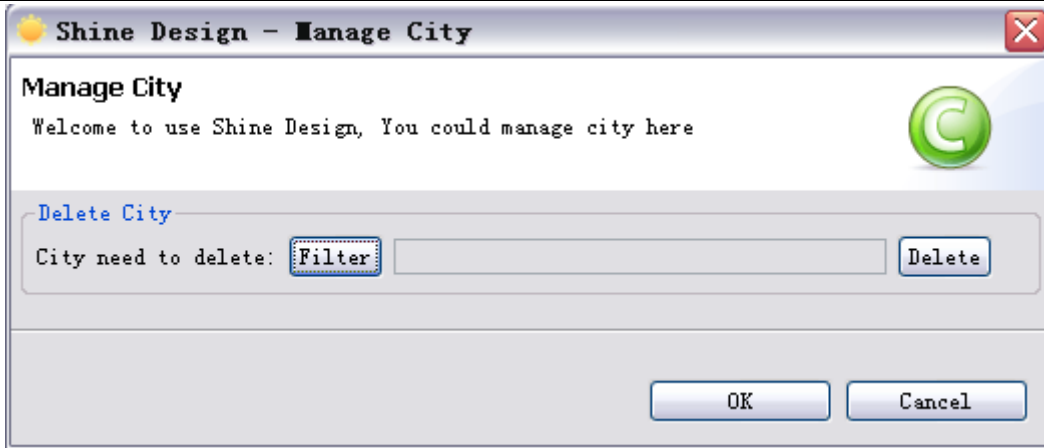
  Input all the data required and click the *OK* button to add new city data:

- **Manage City**

  Users can manage the city data by clicking the Manage City (I) menu in menu bar (menu bar→ Data (D) → Manage City (I)) or the Manage City icon in Tool bar.

  The manage City function of ShineDesign V1.0 just provide delete city data function.
  Be careful of misoperations.

Contact Growatt

Users can contact Growatt New Energy for further information and help.

Growatt New Energy Co., Ltd

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