Photovoltaics

SINVERT PVS 600Series Central Inverters and Components for Photovoltaic Power Plants

Brochure · April 2012

SINVERT

Answers for the environment.

SIEMENS

Sunny prospects for photovoltaic plants

The SINVERT PVS 600Series central inverters from 500 to 2 520 kW: compact, robust, durable

Whether on the roofs of large industrial facilities, in ground-mounted PV systems, or solar power plants – you can now utilize the power of the sun even more efficiently: with the new three-phase SINVERT PVS 600Series photovoltaic inverters.
With these inverters you can achieve a peak efficiency of 98.7% and a European efficiency of 98.4% when converting solar power for feeding into the grid.

The SINVERT PVS inverters operate in inverter stations according to the Siemens master-slave concept that has been proven in use now for more than a decade, and that stands for maximum plant availability, a particularly long service life, and optimized efficiency.

Peak efficiency you can count on!

Inverter stations with SINVERT PVS inverters are system solutions for simple and fast implementation of photovoltaic power plants. Additional system components and accessories required for this purpose are available.

The SINVERT Select dimensioning program helps to find the best possible configuration for a photovoltaic plant.

A modular service concept means that services can be tailored to different needs as required.

The SINVERT PVS inverters are characterized by their ruggedness and longevity, which we back up with a five-year manufacturer's warranty as standard.

Contents

SINVERT PVS 600Series central inverters

Features and advantages at a glance

Transformerless, 3-phase SINVERT PVS inverters are reliable, grid-compatible and cost-effective photovoltaic inverters which are used to convert solar energy into grid-compliant AC voltage for feeding into conventional power grids – thereby achieving peak efficiency levels of up to 98.7%.

The compact SINVERT PVS inverters are ideal for use in **medium and large-scale photovoltaic power plants**.

The SINVERT PVS500, SINVERT PVS585, SINVERT PVS600 and SINVERT PVS630 inverters are grouped together under the name "SINVERT PVS 600Series".

They consist of between 1 and 4 subunits and are available for outputs of between 500 and 2 520 kW in the following power levels:

- – SINVERT PVS500:
  500, 1 000, 1 500, 2 000 kW
- – SINVERT PVS585:
  585, 1 170, 1 755, 2 340 kW
- – SINVERT PVS600:
  600, 1 200, 1 800, 2 400 kW
- – SINVERT PVS630:
  630, 1 260, 1 890, 2 520 kW

The IEC-compliant devices are also available already integrated in an **inverter station** (with two to four subunits), including medium-voltage components. **Besides SINVERT PVS and inverter stations, additional system components and accessories are available for implementing photovoltaic power plants according to IEC standards** ().

The modularity of the series and the free **SINVERT Select dimensioning software** allow flexible planning of photovoltaic plants ().

To obtain early warning of faults and creeping change due to aging and wear, monitoring and control of a PV power plant via a central control room is absolutely essential. Only in this way can the operator initiate repairs and maintenance measures at an early stage and thus avoid costly downtimes. Central monitoring and control is therefore also an essential part of a preventive maintenance system.

Photovoltaic plants in which SINVERT PVS inverters are used can be monitored and controlled with the **WinCC visualization system** installed on a Windows PC. WinCC gives transparency to the status and energy flow of the entire plant, from the photovoltaic array and the inverters right up to the grid connection ().

The free **SINVERT WebMonitor** web application can also be used for monitoring the photovoltaic plant with SINVERT PVS inverters ().

With the **MobileApp** of the SINVERT WebMonitor, it is possible to call up the current and historical data of the selected photovoltaic plant remotely at any time, using a smartphone or tablet computer ().

Your benefits at a glance:

- ■ **Cost-effectiveness**
  - – Good price/performance ratio
  - – Low installation costs
  - – High plant yields thanks to maximum efficiency over very large power ranges
  - – Low operating costs thanks to the robust, durable and low-maintenance design
  - – Reduced operating costs throughout the entire operating period thanks to the master-slave principle with rotating master, in which up to four inverter subunits are interconnected ()

- ■ **Reliability**
  - – Use of fully developed, tried-and-tested industrial standard components
  - – Automatic diagnosis and signaling of faults
  - – Competent, professional support, **worldwide** service
  - – Modular service concept
  - – Compliance with the relevant guidelines

- ■ **Transparency**
  - – Central unit of the photovoltaic plant
  - – Automatic diagnostics on site or by means of remote monitoring
  - – Pixel-graphics display with touch screen on the front of the control cabinet enables simple and intuitive operation and visualization of infeed power data and other information

SINVERT PVS 600Series	Power / kW			
Inverter type	500	1000	1500	2000
PVS500				
PVS585				
PVS600				
PVS630				
PVS1000				
PVS1170				
PVS1200				
PVS1260				
PVS1500				
PVS1755				
PVS1800				
PVS1890				
PVS2000				
PVS2340				
PVS2400				
PVS2520				

Power levels of the SINVERT PVS 600Series central inverters

SINVERT PVS 600Series central inverter (subunit)

Technical data of the SINVERT PVS500 inverter (according to IEC)[1]

Inverter type		PVS500	PVS1000	PVS1500	PVS2000
Input DC					
MPP voltage	V	450 ... 750	450 ... 750	450 ... 750	450 ... 750
Maximum input voltage[2]	V	820	820	820	820
Minimum input voltage	V	450	450	450	450
Rated input power	kW	513	1 026	1 539	2 052
Maximum input current	A	1 103	2 206	3 309	4 412
Number of DC inputs		3	6	9	12
Maximum current per DC input	A	368	368	368	368
Surge arrester		Type 2	Type 2	Type 2	Type 2
Output AC					
Grid connection		50/60 Hz 288 V 3 AC	50/60 Hz 288 V 3 AC	50/60 Hz 288 V 3 AC	50/60 Hz 288 V 3 AC
Rated power	kW	500	1 000	1 500	2 000
Maximum output current	A	1 002	2 004	3 006	4 008
Line voltage	V	244.8 ... 316.8	244.8 ... 316.8	244.8 ... 316.8	244.8 ... 316.8
Power factor, inductive		0.8	0.8	0.8	0.8
Power factor, capacitive		0.8	0.8	0.8	0.8
Efficiency					
European efficiency factor	%	98.1	98.3	98.3	98.3
CEC efficiency factor	%	98.2	98.3	98.3	98.3
Maximum efficiency factor	%	98.4	98.4	98.4	98.4
Further data					
Number of subunits		1	2	3	4
Dimensions (H/W/D) per subunit	mm	2 100 x 2 700 x 730	2 100 x 2 700 x 730	2 100 x 2 700 x 730	2 100 x 2 700 x 730
Weight per subunit	kg	2 085	2 085	2 085	2 085
Ambient temperature - during operation - during storage and transport	°C °C	0 ... +50 -25 ... +70	0 ... +50 -25 ... +70	0 ... +50 -25 ... +70	0 ... +50 -25 ... +70
Relative humidity	%	0 ... 95	0 ... 95	0 ... 95	0 ... 95
Installation altitude - maximum permissible - at rated power	m m	2 000 0 ... 1 000	2 000 0 ... 1 000	2 000 0 ... 1 000	2 000 0 ... 1 000
Data interface		Ethernet	Ethernet	Ethernet	Ethernet
Order number					
Order number (grid frequency 50 Hz)		6AG3111-1AH00-3AB0	6AG3111-1AH10-3AB0	6AG3111-1AH20-3AB0	6AG3111-1AH30-3AB0
Order number (grid frequency 60 Hz)		6AG3111-2AH00-3AB0	6AG3111-2AH10-3AB0	6AG3111-2AH20-3AB0	6AG3111-2AH30-3AB0

[1] Detailed technical information can be found at:
http://support.automation.siemens.com
[2] With the 1 000 V option, expandable to 1 000 V (see page 10 and 24).

Technical data of the SINVERT PVS585 inverter (according to IEC)[1]

Inverter type		PVS585	PVS1170	PVS1755	PVS2340
Input DC					
MPP voltage	V	530 ... 750	530 ... 750	530 ... 750	530 ... 750
Maximum input voltage[2]	V	820	820	820	820
Minimum input voltage	V	530	530	530	530
Rated input power	kW	598	1 196	1 794	2 392
Maximum input current	A	1 104	2 208	3 312	4 416
Number of DC inputs		3	6	9	12
Maximum current per DC input	A	368	368	368	368
Surge arrester		Type 2	Type 2	Type 2	Type 2
Output AC					
Grid connection		50/60 Hz 340 V 3 AC	50/60 Hz 340 V 3 AC	50/60 Hz 340 V 3 AC	50/60 Hz 340 V 3 AC
Rated power	kW	585	1 170	1 755	2 340
Maximum output current	A	995	1 990	2 985	3 980
Line voltage	V	289 ... 374	289 ... 374	289 ... 374	289 ... 374
Power factor, inductive		0.8	0.8	0.8	0.8
Power factor, capacitive		0.8	0.8	0.8	0.8
Efficiency					
European efficiency factor	%	98.2	98.4	98.4	98.4
CEC efficiency factor	%	98.3	98.3	98.4	98.4
Maximum efficiency factor	%	98.6	98.6	98.6	98.6
Further data					
Number of subunits		1	2	3	4
Dimensions (H/W/D) per subunit	mm	2 100 x 2 700 x 730	2 100 x 2 700 x 730	2 100 x 2 700 x 730	2 100 x 2 700 x 730
Weight per subunit	kg	2 085	2 085	2 085	2 085
Ambient temperature - during operation - during storage and transport	°C °C	0 ... +50 -25 ... +70	0 ... +50 -25 ... +70	0 ... +50 -25 ... +70	0 ... +50 -25 ... +70
Relative humidity	%	0 ... 95	0 ... 95	0 ... 95	0 ... 95
Installation altitude - maximum permissible - at rated power	m m	2 000 0 ... 1 000	2 000 0 ... 1 000	2 000 0 ... 1 000	2 000 0 ... 1 000
Data interface		Ethernet	Ethernet	Ethernet	Ethernet
Order number					
Order number (grid frequency 50 Hz)		6AG3111-1AH00-7AB0	6AG3111-1AH10-7AB0	6AG3111-1AH20-7AB0	6AG3111-1AH30-7AB0
Order number (grid frequency 60 Hz)		6AG3111-2AH00-7AB0	6AG3111-2AH10-7AB0	6AG3111-2AH20-7AB0	6AG3111-2AH30-7AB0

[1] Detailed technical information can be found at:
http://support.automation.siemens.com
[2] With the 1 000 V option, expandable to 1 000 V (see page 10 and 24).

Technical data of the SINVERT PVS600 inverter (according to IEC)[1]

Inverter type		PVS600	PVS1200	PVS1800	PVS2400
Input DC					
MPP voltage	V	570 ... 750	570 ... 750	570 ... 750	570 ... 750
Maximum input voltage[2]	V	820	820	820	820
Minimum input voltage	V	570	570	570	570
Rated input power	kW	613	1 226	1 839	2 452
Maximum input current	A	1 104	2 208	3 312	4 416
Number of DC inputs		3	6	9	12
Maximum current per DC input	A	368	368	368	368
Surge arrester		Type 2	Type 2	Type 2	Type 2
Output AC					
Grid connection		50/60 Hz 370 V 3 AC	50/60 Hz 370 V 3 AC	50/60 Hz 370 V 3 AC	50/60 Hz 370 V 3 AC
Rated power	kW	600	1 200	1 800	2 400
Maximum output current	A	936	1 872	2 808	3 744
Line voltage	V	314.5 ... 407	314.5 ... 407	314.5 ... 407	314.5 ... 407
Power factor, inductive		0.8	0.8	0.8	0.8
Power factor, capacitive		0.8	0.8	0.8	0.8
Efficiency					
European efficiency factor	%	98.4	98.6	98.6	98.6
CEC efficiency factor	%	98.5	98.6	98.6	98.6
Maximum efficiency factor	%	98.7	98.7	98.7	98.7
Further data					
Number of subunits		1	2	3	4
Dimensions (H/W/D) per subunit	mm	2 100 x 2 700 x 730	2 100 x 2 700 x 730	2 100 x 2 700 x 730	2 100 x 2 700 x 730
Weight per subunit	kg	2 085	2 085	2 085	2 085
Ambient temperature - during operation - during storage and transport	°C °C	0 ... +50 -25 ... +70	0 ... +50 -25 ... +70	0 ... +50 -25 ... +70	0 ... +50 -25 ... +70
Relative humidity	%	0 ... 95	0 ... 95	0 ... 95	0 ... 95
Installation altitude - maximum permissible - at rated power	m m	2 000 0 ... 1 000	2 000 0 ... 1 000	2 000 0 ... 1 000	2 000 0 ... 1 000
Data interface		Ethernet	Ethernet	Ethernet	Ethernet
Order number					
Order number (grid frequency 50 Hz)		6AG3111-1AH00-0AB0	6AG3111-1AH10-0AB0	6AG3111-1AH20-0AB0	6AG3111-1AH30-0AB0
Order number (grid frequency 60 Hz)		6AG3111-2AH00-0AB0	6AG3111-2AH10-0AB0	6AG3111-2AH20-0AB0	6AG3111-2AH30-0AB0

[1] Detailed technical information can be found at:
http://support.automation.siemens.com
[2] With the 1 000 V option, expandable to 1 000 V (see page 10 and 24).

Technical data of the SINVERT PVS630 inverter (according to IEC)[1]

Inverter type		PVS630	PVS1260	PVS1890	PVS2520
Input DC					
MPP voltage	V	570 ... 750	570 ... 750	570 ... 750	570 ... 750
Maximum input voltage[2]	V	820	820	820	820
Minimum input voltage	V	570	570	570	570
Rated input power	kW	643	1 286	1 929	2 572
Maximum input current	A	1 104	2 208	3 312	4 416
Number of DC inputs		3	6	9	12
Maximum current per DC input	A	368	368	368	368
Surge arrester		Type 2	Type 2	Type 2	Type 2
Output AC					
Grid connection		50/60 Hz 370 V 3 AC	50/60 Hz 370 V 3 AC	50/60 Hz 370 V 3 AC	50/60 Hz 370 V 3 AC
Rated power	kW	630	1 260	1 890	2 520
Maximum output current	A	985	1 970	2 955	3 940
Line voltage	V	314.5 ... 407	314.5 ... 407	314.5 ... 407	314.5 ... 407
Power factor, inductive		0.8	0.8	0.8	0.8
Power factor, capacitive		0.8	0.8	0.8	0.8
Efficiency					
European efficiency factor	%	98.3	98.5	98.5	98.5
CEC efficiency factor	%	98.4	98.5	98.5	98.5
Maximum efficiency factor	%	98.7	98.7	98.7	98.7
Further data					
Number of subunits		1	2	3	4
Dimensions (H/W/D) per subunit	mm	2 100 x 2 700 x 730	2 100 x 2 700 x 730	2 100 x 2 700 x 730	2 100 x 2 700 x 730
Weight per subunit	kg	2 085	2 085	2 085	2 085
Ambient temperature - during operation - during storage and transport	°C °C	0 ... +50 -25 ... +70	0 ... +50 -25 ... +70	0 ... +50 -25 ... +70	0 ... +50 -25 ... +70
Relative humidity	%	0 ... 95	0 ... 95	0 ... 95	0 ... 95
Installation altitude - maximum permissible - at rated power	m m	2 000 0 ... 1 000	2 000 0 ... 1 000	2 000 0 ... 1 000	2 000 0 ... 1 000
Data interface		Ethernet	Ethernet	Ethernet	Ethernet
Order number					
Order number (grid frequency 50 Hz)		6AG3111-1AH00-8AB0	6AG3111-1AH10-8AB0	6AG3111-1AH20-8AB0	6AG3111-1AH30-8AB0
Order number (grid frequency 60 Hz)		6AG3111-2AH00-8AB0	6AG3111-2AH10-8AB0	6AG3111-2AH20-8AB0	6AG3111-2AH30-8AB0

[1] Detailed technical information can be found at:
http://support.automation.siemens.com
[2] With the 1 000 V option, expandable to 1 000 V (see page 10 and 24).

Options for SINVERT PVS 600Series inverters

Basic versions and options

The SINVERT PVS 600Series of inverters can be adapted and expanded by means of options in order to meet the individual needs of the plant.

The following 4 options are available:
– PV array grounding
– 1 000 V option
– Symmetry monitoring
– Cabinet heating

PV array grounding

In most cases, PV systems constitute a DC IT system. In a DC IT system, neither the positive nor negative pole is grounded.

When using certain module types, however, either a positive or negative grounding of the PV generator is required. It is only by this grounding that damage to modules and a steady loss of power can be prevented, i.e. that the maximum yield can be obtained on a continuous basis.

The "PV array grounding positive pole" option allows functional grounding of the positive conductor inside the SINVERT PVS inverter if this is a requirement of the photovoltaic modules used (e.g. large number of thick-film modules).

The "PV array grounding negative pole" option allows functional grounding of the negative conductor inside the SINVERT PVS inverter if this is a requirement of the photovoltaic modules used (e.g. large number of thin-film modules).

PV systems no longer constitute a DC IT system when their modules are grounded. For safety reasons, the PV system must be fenced in and designated as an electrical operating area. Only qualified electricians may be granted access.

Grounding an active conductor (positive pole or negative pole) means that the inverter's insulation measuring function no longer works in the normal way. A hazardous current can start to flow as soon as the first insulation damage occurs. For this reason, in the case of positive pole grounding, the current between the positive pole and ground is measured, and in the case of negative pole grounding, the current between the negative pole and ground. When the current increases to a critical level, the ground connection is automatically separated.

1 000 V option

The 1 000 V option increases the maximum permissible input voltage of the SINVERT PVS inverter from 820 to 1 000 V. Provision of this option ensures that the PV plant will enter operation smoothly even with voltages in excess of 820 V which can occur, for example, on cold days or in arrays containing thin-film modules. The option thus maximizes the potential yield of the installation. The MPP voltage range of the SINVERT PVS inverter is not changed.

Symmetry monitoring

The "symmetry monitoring" option measures the normalized currents at the DC inputs internally and cross-compares the values. If this comparison indicates deviations over time, a message is generated. The message can be used as a guide to localizing faults early in sections of the PV generator (e.g. cell failure).

Cabinet heating

The "cabinet heating" option minimizes the risk of condensation forming on the moisture-sensitive components in the SINVERT PVS photovoltaic inverter at low ambient temperatures. Reliable operation and maximum energy yields to the grid are dependent on compliance with the operating temperature range prescribed for the relevant SINVERT PVS inverter. This function is recommended for locations at which the ambient temperature can drop below 7 °C.

Order numbers for the options

Each of the four options has its own order number which is to be specified in addition to the order number of the basic version ().

SINVERT PVS inverters for industrial roof systems

A SINVERT PVS2000 is used for the Aspropyrgos 2 MW roof system erected in Greece in 2011 for Big Solar

SINVERT PVS inverters for solar power plants

The 31 MW solar power plant at Les Mées in France was constructed in 2010/2011 for Eco Delta and connected to the grid in August 2011. For this project, Siemens acted as a general contractor with an all-in-one concept from a single source, including maintenance, operation and warranty services. SINVERT PVS500 inverters are in use at this PV solar plant with 112 400 solar modules installed over an area of 66 hectares. The SINVERT Select software was used for the plant dimensioning, and the plant is monitored with WinCC software.

SINVERT PVS in power plants

Link between solar power and public AC grid

How solar power is fed into the AC grid

Sunlight is transformed into solar energy in the photovoltaic modules. The direct current obtained is bundled in the field with the aid of SINVERT PVS CombinerBoxes and then fed into a SINVERT PVS inverter (see diagrams on this page).

The alternating current supplied by the inverters is transformed by medium-voltage transformers into the higher voltages of 20 kV, for example, that are needed for feed-in to the grid.

The inverters and the transformers are in a protected location in inverter stations, as is the optional medium-voltage switchgear, which allows energy to be distributed and fed into the medium-voltage grid (see diagram on page 14).

SINVERT PVS CombinerBoxes for bundling partial currents

With the SINVERT PVS CombinerBox, the individual strings of the photovoltaic generator are collected in the field, connected in parallel and the energy conveyed via large cross-section cables to the SINVERT PVS inverter or the inverter station.

Module strings can be "collected" and their energy transported to the SINVERT PVS inverter or inverter station using a single-stage or two-stage connection concept:

With the **single-stage concept**, the energy supplied by the module strings to the inputs of the SINVERT PVS Combiner-Boxes is transported directly to the SINVERT PVS inverter or the inverter station via one output in each case.
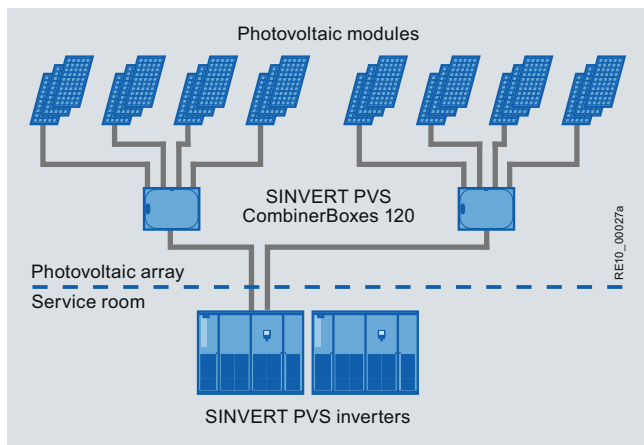
Bundling of the solar direct current using SINVERT PVS CombinerBoxes (single-stage concept)

With the **two-stage concept**, the module strings are initially brought together in the SINVERT PVS CombinerBoxes (first stage). The outputs of these SINVERT PVS CombinerBoxes are then connected to other SINVERT PVS CombinerBoxes (second stage). The outputs of the SINVERT PVS CombinerBoxes of the second stage are then connected to the inputs of the SINVERT PVS inverters or inverter stations. The advantage of this two-stage concept is that power losses are reduced thanks to the increased cable cross-sections.
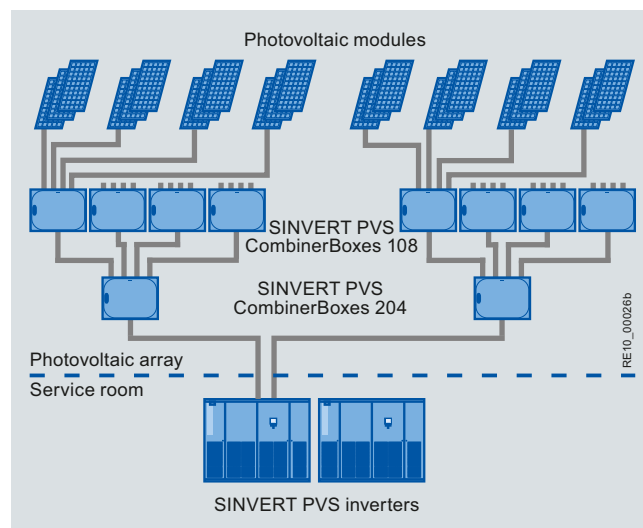
Bundling of the solar direct current using SINVERT PVS CombinerBoxes (two-stage concept)

The SINVERT PVS CombinerBoxes 108, 120, 124 with eight, twenty, and twenty-four inputs are used in the first stage. The CombinerBox 204 with four inputs is used in the second stage.

SINVERT PVS CombinerBoxes 124, 204, 120, 108 (from left to right)

The SINVERT PVS CombinerBoxes are designed for vertical mounting.

The output side of the SINVERT PVS CombinerBoxes can be optionally equipped with or without a switch disconnector. CombinerBoxes with switch disconnectors are capable of disconnecting the connected section of the photovoltaic generator from the SINVERT PVS inverter, e.g. for maintenance work.

SINVERT PVS CombinerBox	108	120	124	204
Number of inputs	8	20	24	4
Maximum protection per input	15 A	20 A		160 A
Voltage	1 000 V			
Switch disconnector	optional			--
Surge arrester	opt.	--		

The SINVERT PVS CombinerBox 108 is optionally available with or without overvoltage protection, which is designed to protect the modules.

The inputs of the SINVERT PVS CombinerBoxes are protected by fuses. The fuses are not included in the scope of supply of the SINVERT PVS CombinerBox and must be ordered separately (see Selection and ordering data on page 25).

The SINVERT PVS CombinerBox has IP54 degree of protection and is rated for voltages up to 1 000 V.

IEC-compliant inverter stations

The inverter stations are system solutions for fast, simple implementation of turnkey photovoltaic stations. They are ideally suited for photovoltaic power plants ("Power Plant" segment) with outputs of 1 000 kW upwards.

They are typically employed in ground-mounted systems. Inverter stations contain two to four SINVERT PVS inverters and, depending on the selected type, also medium-voltage switchgear and medium-voltage transformers. They are designed to convert solar energy reliably and cost-effectively into grid-compatible energy for infeed into conventional power grids.

All individual components of the inverter stations, such as SINVERT PVS inverters and medium-voltage transformers, are technically fully developed, designed for extreme ruggedness electrical and mechanical properties and completely wired and tested.

The inverter stations are available in power levels from 1 000 to 2 520 kW with 2, 3 or 4 inverter subunits comprising the PVS500, PVS585, PVS600 and PVS630 inverters ().
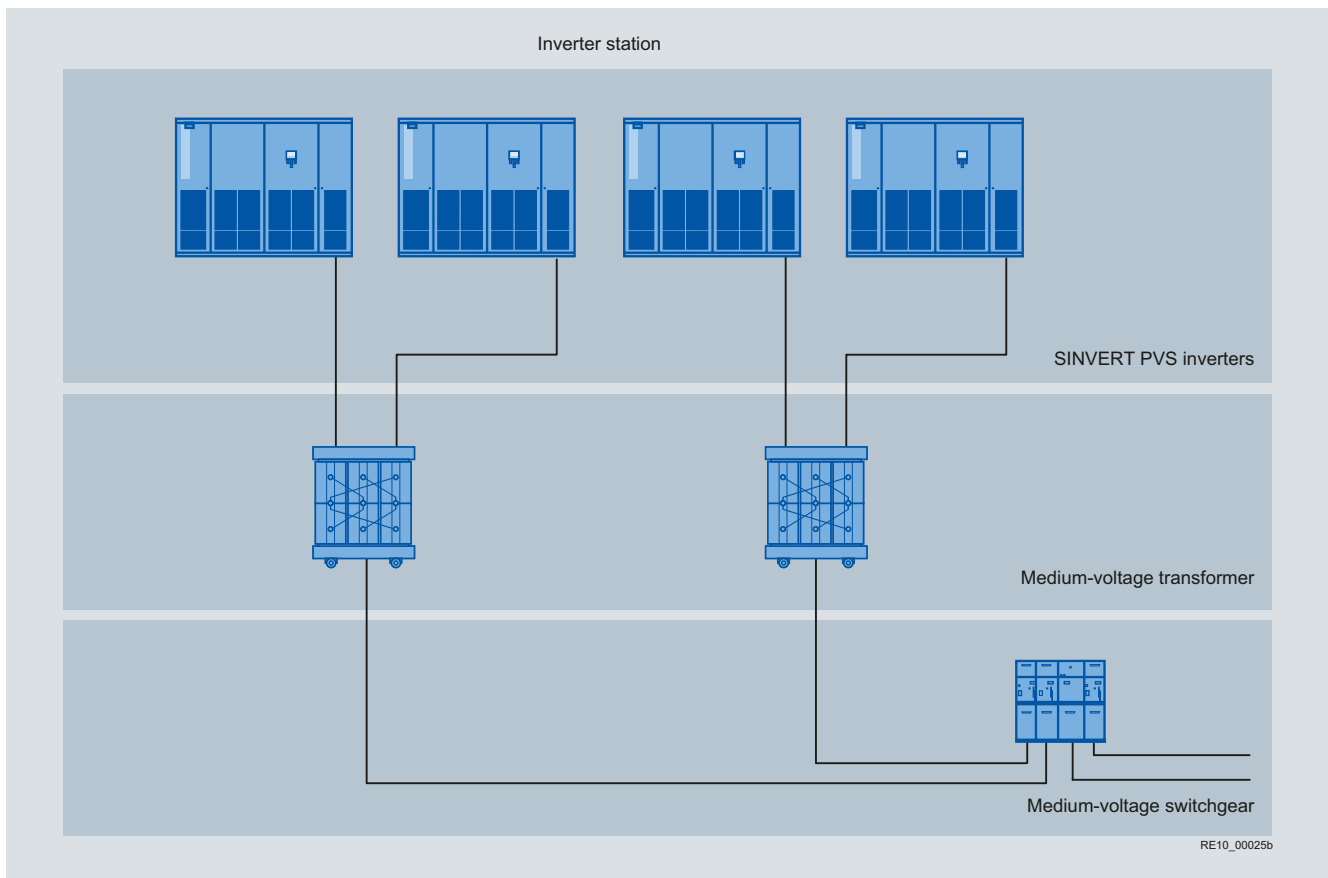
Basic interconnection of components in the inverter station in a configuration containing a SINVERT PVS2000, PVS2340, PVS2400 or PVS2520 inverter (each consisting of four SINVERT PVS500, PVS585, PVS600 or PVS630 subunits)
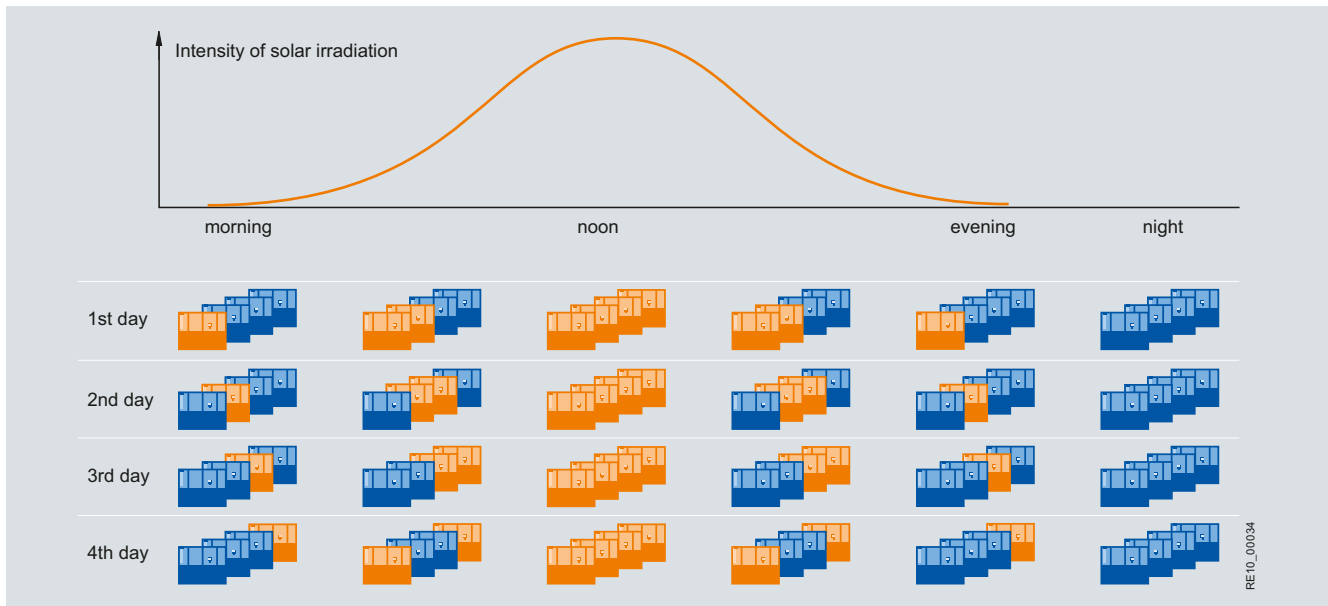
The inverters integrated in the inverter stations operate with a rotating master according to the master-slave principle.
The diagram shows in simplified form that the master moves to the next inverter each day (see left column). In actual fact, the inverter with the fewest operating hours is started as the master on the next day.

Master-slave system with SINVERT PVS

The SINVERT PVS inverters integrated in the inverter stations operate with a "rotating master" according to the master-slave principle. This is a master-slave system comprising between two and four interconnected inverter subunits. It employs an ingenious process to connect or disconnect inverter subunits, depending on the level of solar irradiation (determined according to the sun's path, cloud conditions, etc.). The master is started up first and operates even when irradiation levels are low. As irradiation levels increase, the next inverter subunit is switched in as a slave when a set switching threshold is exceeded. Depending on the configuration, up to three slaves can be switched in. As irradiation levels drop again, the subunits are disconnected in stages. One advantage of the master-slave principle is that the efficiency factor is higher when irradiation levels (which determine the PV generator output) are low than it would be if only a single inverter were used.

In master-slave systems, the "rotating master" function always starts the inverter subunit with the fewest operating hours as the master. In this way, the total operating hours are evenly distributed among all the subunits.

- ■ **Individual components of the inverter stations**
  - – SINVERT PVS inverters according to IEC and their components (for further information see Catalog RE10 "Inverters and Components for Photovoltaic Installations")
  - – AC distribution for voltage supply, control and monitoring of the components.
  - – Medium-voltage transformer
  - – Medium-voltage switchgear

For technical data on the fully configured inverter stations, the AC distribution, the medium-voltage transformer and the medium-voltage switchgear, please contact your local sales partner:
www.siemens.com/sinvert/partner

Medium-voltage transformer

The medium-voltage transformer transforms the low voltage supplied by the SINVERT PVS photovoltaic inverter into a defined medium voltage of 20 kV, for example, for feeding into the grid.

Several medium-voltage transformer brands are available, e.g. the loss-optimized GEAFOL medium-voltage transformer (cast-resin two-tier transformer), which has been specially designed for photovoltaic applications.

Detailed information about GEAFOL medium-voltage transformers can be found in the Catalog TV 1 "GEAFOL cast-resin transformers 100 to 16 000 kVA".

Medium-voltage switchgear

The medium-voltage switchgear is available as an option. It distributes energy and feeds power into the medium-voltage network.

Detailed information about medium-voltage switchgear can be found in the Catalog HA 40.2 "Switchgear Type 8DJH for Secondary Distribution Systems up to 24 kV, Gas-Insulated".

Establishing communication with PVS and system components

Communication via Industrial Ethernet and plant monitoring with WinCC
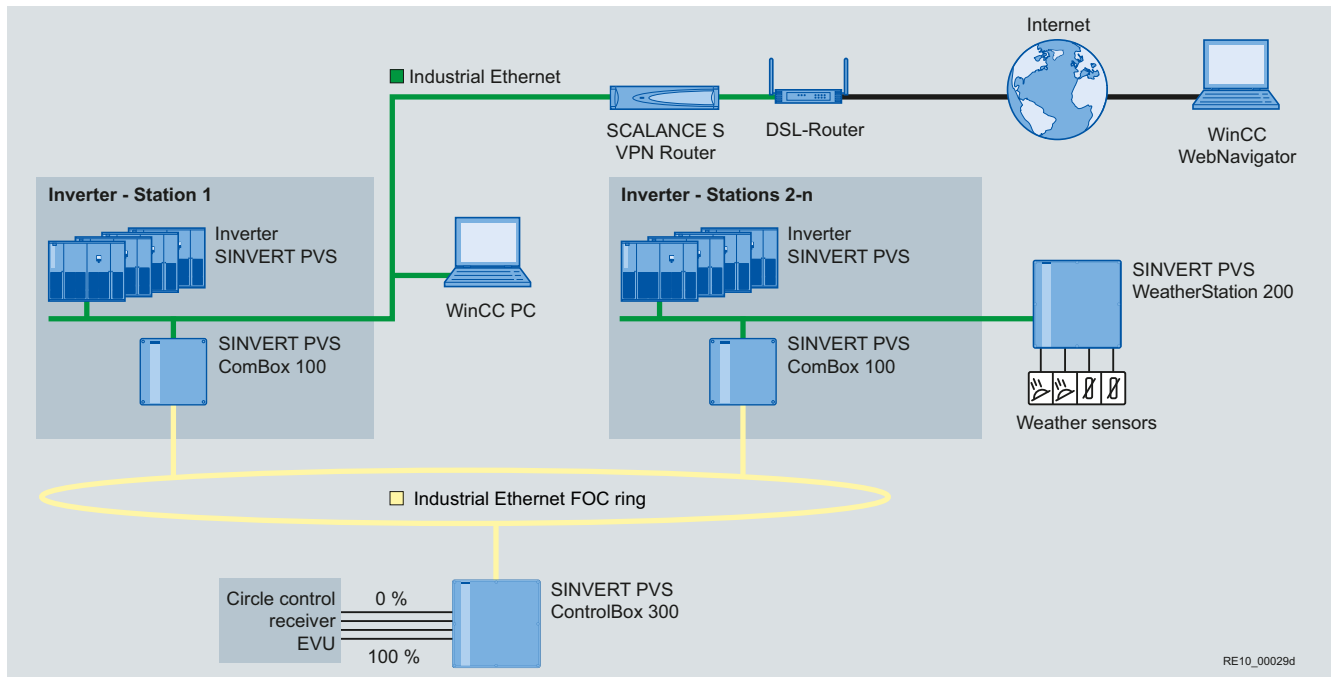
Integration of SINVERT PVS inverters into a photovoltaic plant with communication via an Ethernet network, solar PV plant control by means of the SINVERT PVS ControlBox 300, and monitoring with WinCC

The inverter stations have an Ethernet interface. If the inverter station is linked to an Ethernet network, this interface permits the exchange of data between the inverter station(s) and the WinCC visualization system on a Microsoft Windows PC. The data server on the ControlBox 300 collects the data from all the inverters.

Remote access to the WinCC visualization system is also possible over the Internet if the WinCC WebNavigator software has been installed.

SINVERT PVS ComBox 100

The SINVERT PVS ComBox 100 communications box interconnects the inverter stations (in linear or ring topologies) with copper or fiber-optic LAN cabling and also connects network-capable components in the inverter stations, e.g. SINVERT PVS inverters.

The ComBox 100 has the following connection options:
– 4 x RJ45 ports
– 2 x fiber-optic ports, for cable lengths up to 5 km

SINVERT PVS ControlBox 300

The purpose of the SINVERT PVS ControlBox 300 is to regulate the active and reactive power of a photovoltaic plant containing SINVERT PVS inverters and to ensure compliance with legal requirements (according to the current amendment of the Renewable Energy Act (EEG), in force since January 2009).
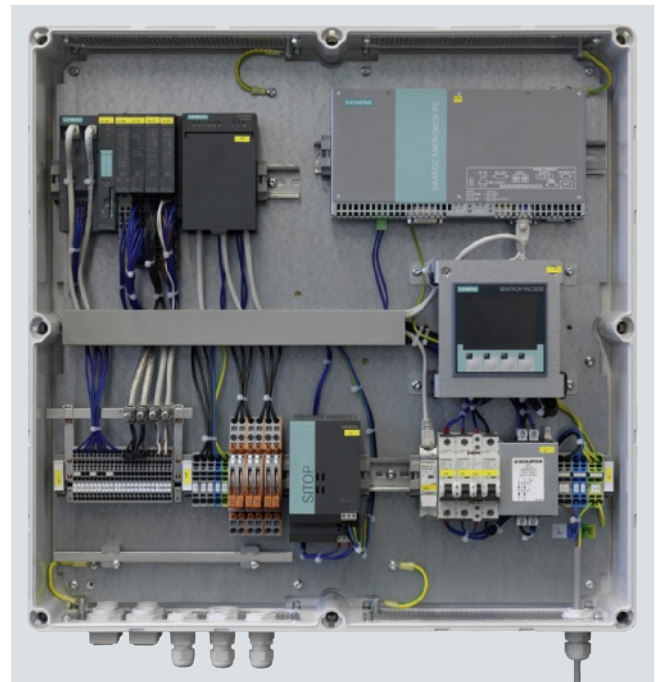
SINVERT PVS ControlBox 300
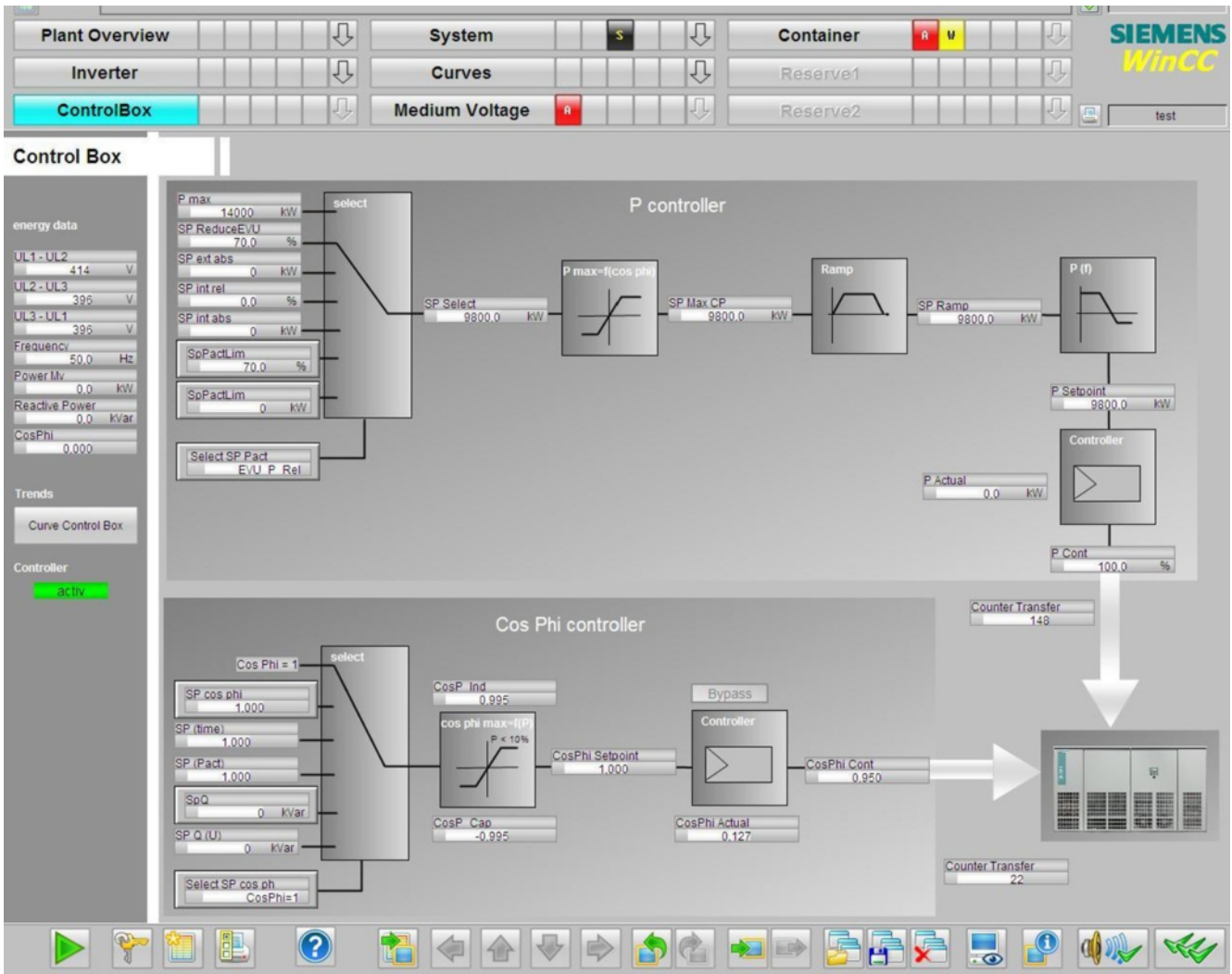
Regulation of the PV plant according to BDEW Guideline and the current amendment of the Renewable Energy Act (EEG) by means of SINVERT PVS ControlBox 300 displayed with WinCC

The "Generating Plants in the Medium-Voltage Grid" BDEW guideline stipulates this requirement for all systems feeding in at the medium-voltage level. Its primary benefit is that it enables grid operators to limit the output of the plant by remote means in accordance with § 6 of the Renewable Energy Act 2009.

The ControlBox 300 offers a wide range of open-loop and closed-loop control functions, e.g.:
– Specification of a fixed active power for all individual SINVERT PVS inverters in the PV plant, e.g. setpoint value = 2 MW (active power fixed value)
– Specification of a fixed reactive power for all individual SINVERT PVS inverters in the PV plant, e.g. setpoint value = 100 kvar inductive (reactive power fixed value)
– Specification of a fixed power factor cos φ for all individual SINVERT PVS inverters in the PV plant, e.g. setpoint value = -0.95
– Regulation of the active power for the individual SINVERT PVS inverters in the PV plant as a function of the active power actually measured at the grid infeed

point, to 0%, 30%, 60%, and 100% of the rated active power of the PV plant. (Active power reduction in accordance with § 6 of the Renewable Energy Act
– Regulation according to Q(U) characteristic
– Regulation according to Q(t) characteristic
– Regulation according to P(f) characteristic
– Ramps for system ramp-up and ramp-down, i.e. continuously approaching the setpoint

The SINVERT PVS ControlBox 300 offers the following connection options:
– SIMATIC components with digital inputs
– SENTRON PAC3200 Power Monitoring Device for measuring actual values at the grid feed-in point
– 4 x RJ45 ports
– 2 x fiber-optic ports, for cable lengths up to 5 km

Communication via Industrial Ethernet and plant monitoring by means of SINVERT WebMonitor
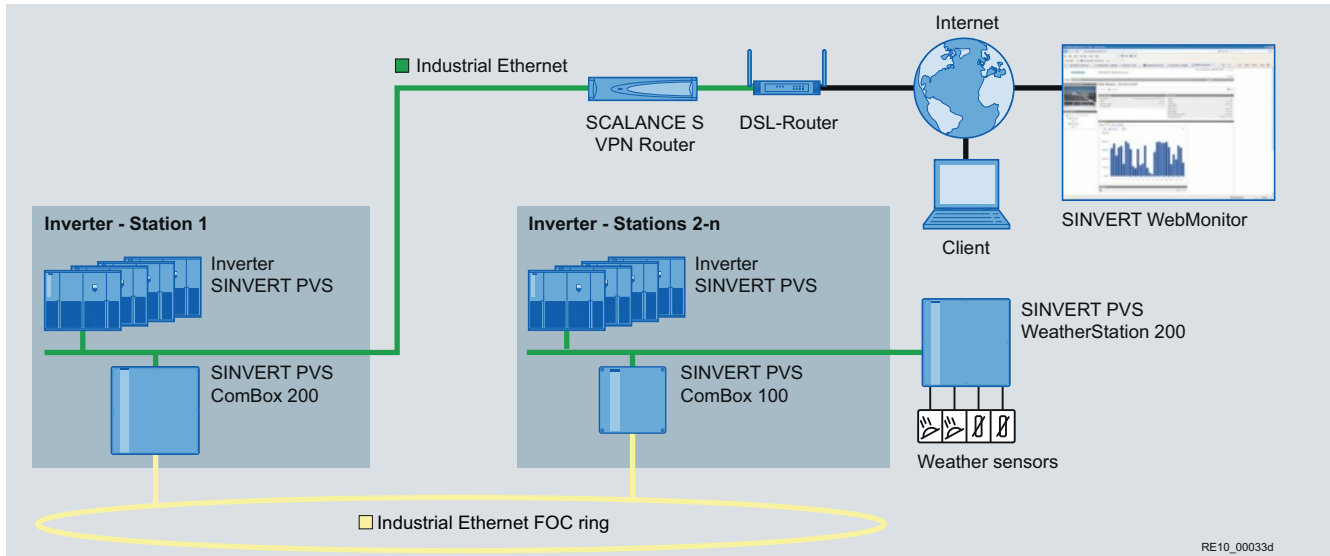

Integration of SINVERT PVS inverters into a photovoltaic plant without solar PV plant control with communication via an Ethernet network and monitoring by means of SINVERT WebMonitor

In the configuration example shown in the diagram without solar PV plant control and with plant monitoring by means of SINVERT WebMonitor, the required industrial PC is provided in the SINVERT PVS ComBox 200, which must be used in one of the inverter stations instead of a ComBox 100.

SINVERT PVS ComBox 200

The SINVERT PVS ComBox 200 has the same scope of functions as the ComBox 100, but also provides the capability of transferring data from the SINVERT PVS inverters and from additional network-capable components to the SINVERT WebMonitor web application for monitoring photovoltaic plants.
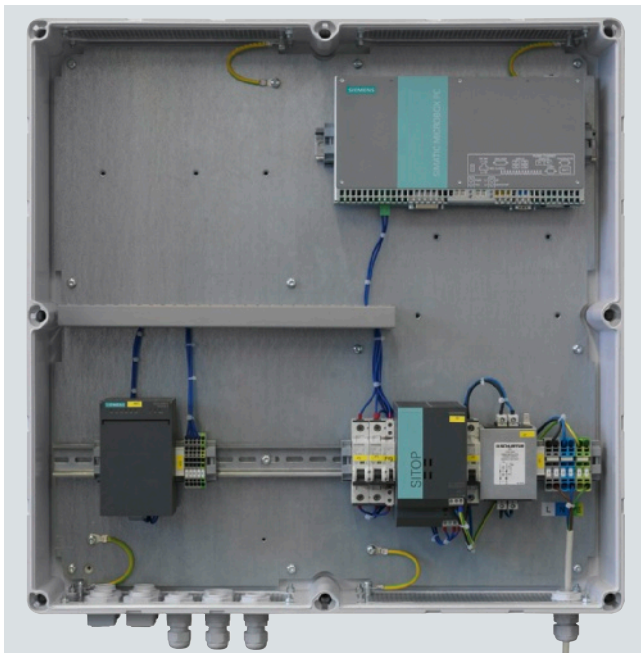
SINVERT PVS ComBox 200

The ComBox 200 contains the following main components:
– 4 x RJ45 ports
– 2 x fiber-optic ports, for cable lengths up to 5 km

Weather station

The **SINVERT PVS WeatherStation 200** acquires data about the weather at the photovoltaic plant site. This weather data is recorded by sensors connected to the station. The following sensors are included in the scope of supply of the WeatherStation 200:
– Insolation
– Module temperature
– Ambient temperature
Additional sensors such as wind speed or rain sensors can be connected.

Using the acquired data, it is possible to perform and transmit extremely precise weather recordings. The target yield of the photovoltaic plant can then be calculated from the recorded weather data. By comparing the actual and target yield, it is possible to make a quick assessment of the plant's operating performance and detect any irregularities very promptly.

The SINVERT PVS WeatherStation 200 offers the following connection options:
– 6 analog inputs for the sensors
– PROFINET communications interface

SINVERT puts sunshine into the grid. Worldwide.

Some examples of solar power plants using SINVERT inverters

Les Mées (France): 31 MW (2010/2011)

Desoto (Florida, USA): 27 MW (2009)

Beneixama (Spain): 20 MW (2007)

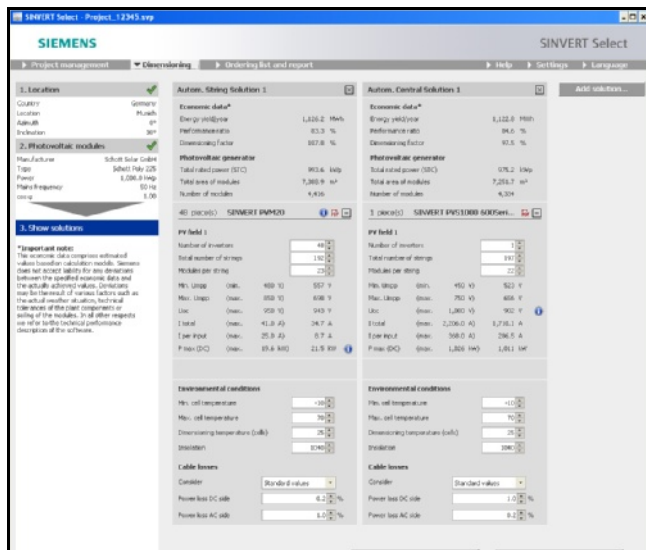Serpa (Portugal): 11 MW (2007)

Shi Lin (China): 10 MW (2010)

Dobre Polé (Czech Republic): 4 MW (2010)

PV plant dimensioning with SINVERT Select

For fast and easy dimensioning

SINVERT Select: Proposed solution for dimensioning a photovoltaic plant, including plant details

SINVERT Select is a free program which facilitates the dimensioning, analysis and optimization of photovoltaic plants with SINVERT inverters and outputs from a few kilowatts up to the megawatt range.

Two different methods can be employed to dimension a photovoltaic plant with SINVERT inverters:

- With the automatic dimensioning method, the SINVERT Select program first uses the information you enter (string/central inverter, location, photovoltaic module, rated power, etc.) to automatically identify the best possible inverter variant. For this variant, it calculates the performance ratio (PR) and the potential energy yield per annum. Individual configurations can be compared, assessed and optimized on the basis of these parameters.

- With the manual dimensioning method, you can input one or two SINVERT inverter types in addition to the information about location, photovoltaic module, and rated power. Optionally, their quantity can also be specified.

After you have registered, you can download the SINVERT Select program free of charge at:
www.siemens.com/sinvert-select

The key features of SINVERT Select are:

- The structure and workflow of the SINVERT Select program means that photovoltaic plants containing SINVERT inverters can be dimensioned quickly and simply in just a few steps.

- The SINVERT Select program can be operated intuitively thanks to the clear structure of the graphical user interface.

- Extensive database for location selection, containing over 400 locations in more than 30 countries

- Database containing all the currently available SINVERT inverters

- Extensive database for module selection, which currently contains over 6 700 different photovoltaic modules available on the market (individual expansion is possible)

- All the necessary data for dimensioning (locations, SINVERT inverters, and PV modules) is constantly updated.

- The online update function of the SINVERT Select program means that the latest version of the program is always installed on your computer.

- Numerous options for specifying the power (specification of area, DC power, and number of modules)

- Selectable calculation modes (automatic/manual dimensioning, number of photovoltaic modules per string, etc.)

- Clear display of results of the possible configurations depending on previously selected parameters

- Project management

- Creation of reports for presentation of calculation results and printout

- SINVERT Select also enables reactive power to be accounted for when configuring inverters in accordance with the Technical Guideline "Generating Plants in the Medium-Voltage Grid" of the German Association of Energy and Water Industries (BDEW).

- Language support: English, German, French, Italian and Spanish

PV plant monitoring

For an instant, up-to-date overview and rapid intervention

PV plant monitoring with WinCC
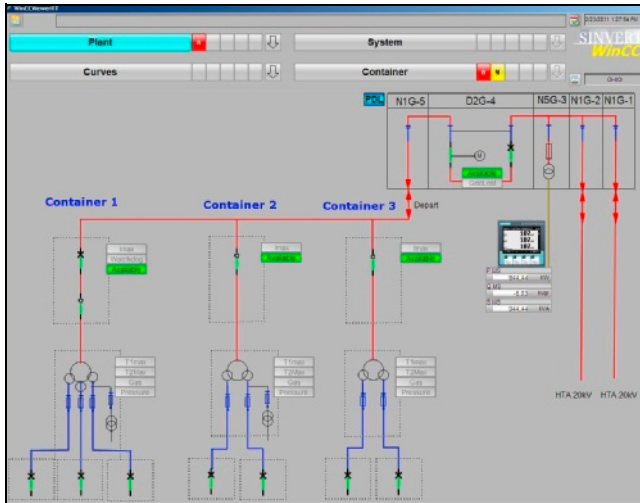
Visualization and operation of photovoltaic plants with WinCC

WinCC (Windows Control Center) is a visualization system which runs on Microsoft Windows. It is used to monitor and control photovoltaic plants in which SINVERT inverters are installed.

WinCC provides all the functions required to visualize and operate PV plants, from the PV generator itself to the inverters and grid connection. It can also acquire data (e.g. energy yields) and store it on a long term basis, acquire, store and visualize alarms and messages, and provide data interfaces to external systems.

WinCC can run on a Microsoft Windows PC that is connected to the Industrial Ethernet network of the PV plant. Remote access to the WinCC visualization system is also possible over the Internet if the WinCC WebNavigator software has been installed (see graphic on page 16).

SINVERT WinCC enables consistently scalable plant configurations – from small PV power plants up to the GW range.

In addition, our visualization system can be configured easily and efficiently. The use of a standardized PV library allows customer-specific adaptations to be carried out. WinCC is configured individually according to customer requirements and specific features of the plant. For more information, please contact your regional sales partner.
www.siemens.com/sinvert/partner

The key features of WinCC are:

- A clearly designed user interface provides an instant overview of all key data of the managed plants, subplants and inverters, e.g. states, energy production, and income

- Graphical representation of the monitored data (see graphic on page 17)

- Graphics with configurable content for quick visual access to customized displays of received and/or calculated data, e.g. sorted according to day, month, year.

- Alarms and messages for quick and simple troubleshooting and for ensuring that remedial measures can be quickly taken to minimize loss of earnings

- Remote monitoring over the Internet with the WinCC/WebNavigator option

- Acquisition, long-term storage and display of current and historical data

- Export of archived data to Excel using the DataMonitor option

- Plant monitoring (e.g. detection and display of faults in the photovoltaic generator through section-by-section measurement of the whole plant)

- Safeguarding of yield and optimum protection by monitoring the insulation value

- Messaging services using email and text messaging with the WinCC/AlarmControlCenter option

- Fault messages can be specifically configured for customized operations management

- Establishment of as many as 128 user groups, each with up to 128 individual users, and assignment of different authorization levels to the users and/or user groups are possible

- Representation of monitored plants on a map

PV plant monitoring with SINVERT WebMonitor
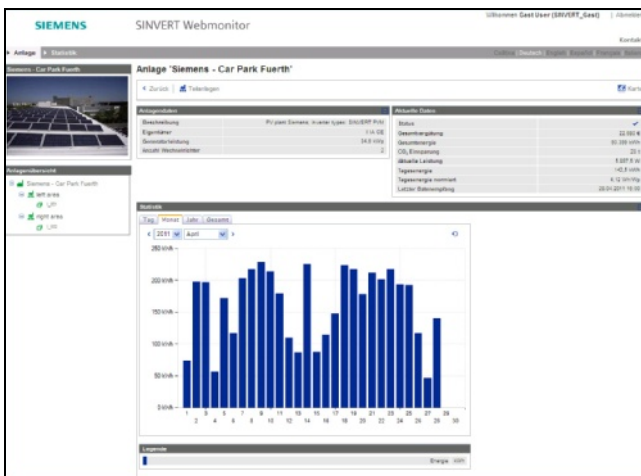
SINVERT WebMonitor for monitoring photovoltaic plants

SINVERT WebMonitor is a Web application for monitoring photovoltaic plants in which SINVERT inverters are used (see graphic on page 18).

It is used for transmitting the states of the photovoltaic plant, for displaying production and income, or optionally for reporting any problems that arise.

SINVERT WebMonitor MobileApp

With the MobileApp of the SINVERT WebMonitor, it is possible to call up the current and historical data of the selected photovoltaic plant remotely at any time using a smartphone or tablet computer.

SINVERT WebMonitor MobileApp
Left: Bar chart indicating daily AC power yield
Right: Bar chart indicating annual energy yield

The key features of SINVERT WebMonitor are:

■ Clear user interface layout provides a quick overview of managed plants, subplants and inverters in a tree structure.

■ Overview page (dashboard) and plant page provide instant, up-to-date information about all key aspects of the plants, subplants and inverters, e.g. states, energy production (daily energy, total energy) and income.

■ Fault lists are provided to speed up and simplify troubleshooting and to ensure that remedial measures can be quickly taken to minimize loss of earnings.

■ Graphics with configurable content provide users with quick visual access to customized displays of received and/or calculated data, sorted according to day, month, year and total.

■ Users can configure monitoring settings (e.g. "daily energy deviation") and activate messaging services (e.g. by e-mail) according to individual require-ments to receive information about plant status, energy production, income and irregularities.

■ User profiles can be defined so that plants and rights can be individually assigned to users.

■ Display of current and historical data

■ Representation of monitored plants on a map

■ Language support: English, German, French, Italian, Spanish, Czech, Greek and Romanian.

If you are using SINVERT PVM und SINVERT PVS inverters in your photovoltaic plant and you want to use SINVERT WebMonitor as a plant monitor, you can register and log in at:
www.siemens.com/sinvert/webmonitor

The SINVERT WebMonitor MobileApp is started by calling the Internet address of the SINVERT WebMonitor from a smartphone or tablet computer. The SINVERT WebMonitor user name is used for the login.

Selection and ordering data

for devices and accessories

SINVERT PVS 600Series inverters

Product type identification	Number of masters/slaves	Active power output (rated value)	Output voltage (rated value)	MPP voltage	Input voltage (max. permissible)	Order No.
		kW	V	V	V	
SINVERT PVS inverters (IEC-compliant)						
Grid frequency 50Hz (rated value)						
PVS500	1M	500	288	450 … 750	820	6AG3111-1AH00-3AB0
PVS585	1M	585	340	530 … 750	820	6AG3111-1AH00-7AB0
PVS600	1M	600	370	570 … 750	820	6AG3111-1AH00-0AB0
PVS630	1M	630	370	570 … 750	820	6AG3111-1AH00-8AB0
PVS1000	1M, 1S	1 000	288	450 … 750	820	6AG3111-1AH10-3AB0
PVS1170	1M, 1S	1 170	340	530 … 750	820	6AG3111-1AH10-7AB0
PVS1200	1M, 1S	1 200	370	570 … 750	820	6AG3111-1AH10-0AB0
PVS1260	1M, 1S	1 260	370	570 … 750	820	6AG3111-1AH10-8AB0
PVS1500	1M, 2S	1 500	288	450 … 750	820	6AG3111-1AH20-3AB0
PVS1755	1M, 2S	1 755	340	530 … 750	820	6AG3111-1AH20-7AB0
PVS1800	1M, 2S	1 800	370	570 … 750	820	6AG3111-1AH20-0AB0
PVS1890	1M, 2S	1 890	370	570 … 750	820	6AG3111-1AH20-8AB0
PVS2000	1M, 3S	2 000	288	450 … 750	820	6AG3111-1AH30-3AB0
PVS2340	1M, 3S	2 340	340	530 … 750	820	6AG3111-1AH30-7AB0
PVS2400	1M, 3S	2 400	370	570 … 750	820	6AG3111-1AH30-0AB0
PVS2520	1M, 3S	2 520	370	570 … 750	820	6AG3111-1AH30-8AB0
Grid frequency 60Hz (rated value)						
PVS500	1M	500	288	450 … 750	820	6AG3111-2AH00-3AB0
PVS585	1M	585	340	530 … 750	820	6AG3111-2AH00-7AB0
PVS600	1M	600	370	570 … 750	820	6AG3111-2AH00-0AB0
PVS630	1M	630	370	570 … 750	820	6AG3111-2AH00-8AB0
PVS1000	1M, 1S	1 000	288	450 … 750	820	6AG3111-2AH10-3AB0
PVS1170	1M, 1S	1 170	340	530 … 750	820	6AG3111-2AH10-7AB0
PVS1200	1M, 1S	1 200	370	570 … 750	820	6AG3111-2AH10-0AB0
PVS1260	1M, 1S	1 260	370	570 … 750	820	6AG3111-2AH10-8AB0
PVS1500	1M, 2S	1 500	288	450 … 750	820	6AG3111-2AH20-3AB0
PVS1755	1M, 2S	1 755	340	530 … 750	820	6AG3111-2AH20-7AB0
PVS1800	1M, 2S	1 800	370	570 … 750	820	6AG3111-2AH20-0AB0
PVS1890	1M, 2S	1 890	370	570 … 750	820	6AG3111-2AH20-8AB0
PVS2000	1M, 3S	2 000	288	450 … 750	820	6AG3111-2AH30-3AB0
PVS2340	1M, 3S	2 340	340	530 … 750	820	6AG3111-2AH30-7AB0
PVS2400	1M, 3S	2 400	370	570 … 750	820	6AG3111-2AH30-0AB0
PVS2520	1M, 3S	2 520	370	570 … 750	820	6AG3111-2AH30-8AB0

Options for SINVERT PVS 600Series inverters

When ordering an inverter, the order numbers of the respective option are added to the order number of the basic version, i.e. if all four possible options are utilized, five order numbers must be specified for ordering the inverter concerned.

For a description of the options

The number of slaves of the respective SINVERT PVS 600Series inverters is to be specified by the 11th digit of the order numbers of the inverters and of the associated options. This simplifies the assignment of the options. The number x of slaves is also specified in the identifications of the options in the suffix MxS (M = Master, S = Slaves)

Product type identification	For inverter	Order No.
Options for SINVERT PVS 600Series inverters		
PV array grounding		
PV array grounding positive pole 600Series M	PVS500, PVS585, PVS600, PVS630	6AG3911-3FA00-0AH0
PV array grounding positive pole 600Series M1S	PVS1000, PVS1170, PVS1200, PVS1260	6AG3911-3FA10-0AH0
PV array grounding positive pole 600Series M2S	PVS1500, PVS1755, PVS1800, PVS1890	6AG3911-3FA20-0AH0
PV array grounding positive pole 600Series M3S	PVS2000, PVS2340, PVS2400, PVS2520	6AG3911-3FA30-0AH0
PV array grounding negative pole 600Series M	PVS500, PVS585, PVS600, PVS630	6AG3911-3FB00-0AH0
PV array grounding negative pole 600Series M1S	PVS1000, PVS1170, PVS1200, PVS1260	6AG3911-3FB10-0AH0
PV array grounding negative pole 600Series M2S	PVS1500, PVS1755, PVS1800, PVS1890	6AG3911-3FB20-0AH0
PV array grounding negative pole 600Series M3S	PVS2000, PVS2340, PVS2400, PVS2520	6AG3911-3FB30-0AH0
1 000 V option		
1000 V option 600Series M	PVS500, PVS585, PVS600, PVS630	6AG3911-3GA00-0AH0
1000 V option 600Series M1S	PVS1000, PVS1170, PVS1200, PVS1260	6AG3911-3GA10-0AH0
1000 V option 600Series M2S	PVS1500, PVS1755, PVS1800, PVS1890	6AG3911-3GA20-0AH0
1000 V option 600Series M3S	PVS2000, PVS2340, PVS2400, PVS2520	6AG3911-3GA30-0AH0
Symmetry monitoring		
Symmetry monitoring 600Series M	PVS500, PVS585, PVS600, PVS630	6AG3911-3EA00-0AH0
Symmetry monitoring 600Series M1S	PVS1000, PVS1170, PVS1200, PVS1260	6AG3911-3EA10-0AH0
Symmetry monitoring 600Series M2S	PVS1500, PVS1755, PVS1800, PVS1890	6AG3911-3EA20-0AH0
Symmetry monitoring 600Series M3S	PVS2000, PVS2340, PVS2400, PVS2520	6AG3911-3EA30-0AH0
Cabinet heating		
Cabinet heating 600Series M	PVS500, PVS585, PVS600, PVS630	6AH3911-3HA00-1AH0
Cabinet heating 600Series M1S	PVS1000, PVS1170, PVS1200, PVS1260	6AH3911-3HA10-1AH0
Cabinet heating 600Series M2S	PVS1500, PVS1755, PVS1800, PVS1890	6AH3911-3HA20-1AH0
Cabinet heating 600Series M3S	PVS2000, PVS2340, PVS2400, PVS2520	6AH3911-3HA30-1AH0

System components, accessories, spare parts for SINVERT PVS 600Series inverters

Product type identification	Number of inputs	Type of fuse protection at input	Input current per input (maximum)	Isolating device at the output	Surge arrester	Order No.
			A			
SINVERT PVS CombinerBoxes						
Array junction box						
CombinerBox 108	8	Fuse holder	10	--	--	6AG3611-3FF21-1AA0
CombinerBox 108	8	Fuse holder	10	--	✓	6AG3611-3FF21-1BA0
CombinerBox 108	8	Fuse holder	10	✓	--	6AG3611-3FF21-1CA0
CombinerBox 108	8	Fuse holder	10	✓	✓	6AG3611-3FF21-1DA0
CombinerBox 120	20	Fuse holder	13	--	--	6AG3611-3FL21-1AA0
CombinerBox 120	20	Fuse holder	13	✓	--	6AG3611-3FL21-1CA0
CombinerBox 124	24	Fuse holder	13	--	--	6AG3611-3FM21-1AA0
CombinerBox 124	24	Fuse holder	13	✓	--	6AG3611-3FM21-1CA0
Generator junction box						
CombinerBox 204	4	Fuse holder	125	--	--	6AG3611-3FD01-1AA0

✓ included
-- not included

Size	Operating class	Operational current (rated value)	Operational voltage (rated value)	Power loss	Order No.
		A	V	W	
Fuses for SINVERT PVS CombinerBox					
LV HRC fuse kit					
Size 1	gPV	80	1 000	23	3NE1 220-4
Size 1	gPV	100	1 000	25	3NE1 221-4
Size 1	gPV	125	1 000	28	3NE1 222-4
Size 1	gPV	160	1 000		3NE1 224-4

Product type identification	Order No.
SINVERT PVS weather station	
WeatherStation 200	6AG3611-3BA00-2AA0
SINVERT PVS ComBox	
ComBox 100	6AG3611-3AB00-1AA0
ComBox 200	6AG3611-3AB00-2AA0
SINVERT PVS ControlBox	
ControlBox 300	6AG3611-3AA00-3AA0
SparesKit for SINVERT PVS	
SINVERT PVS SparesKit 100	6AG3911-3JA00-1AG0
SINVERT PVS SparesKit 200	6AG3911-3JA00-2AG0

Service & Support

## Unique range of complete services for the entire life cycle
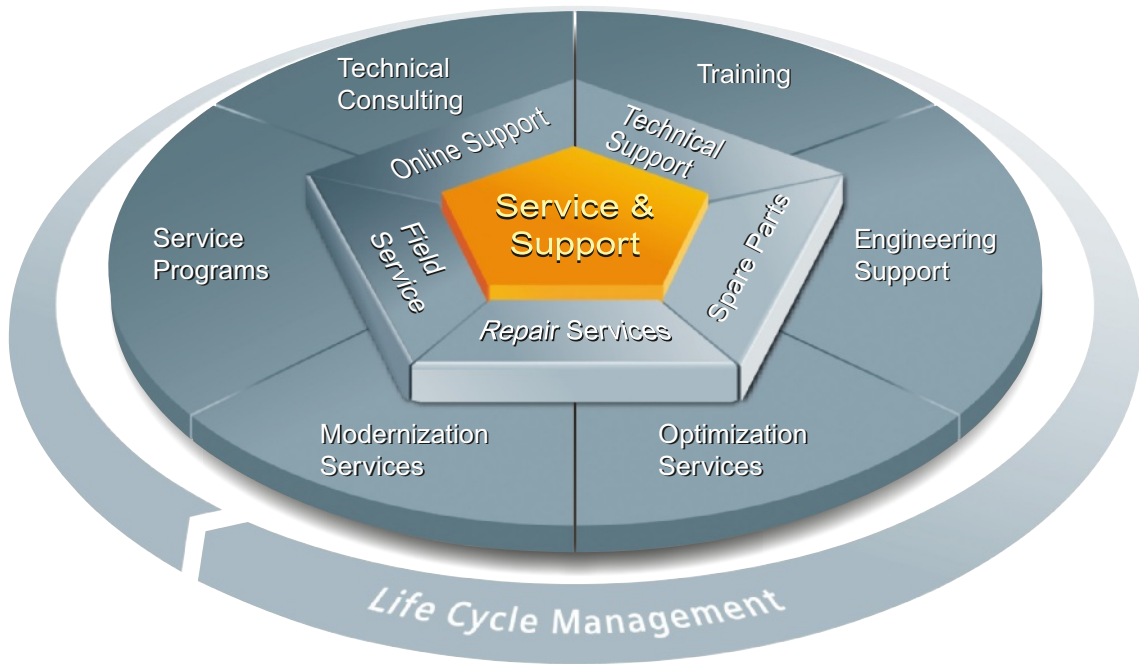
The range of services offered by Siemens Industry Automation and Drive Technologies includes comprehensive Service and Support for a very broad range of users.

To accompany our products and systems, we offer integrated and structured services that provide valuable support in every phase of the lifecycle of your photovoltaic plant – from planning, implementation and commissioning to maintenance and modernization.

Our Service & Support accompanies you in all matters concerning our products and systems for photovoltaic plants. We provide direct on-site support through all phases of the lifecycle of your photovoltaic plants.
An experienced team of specialists with a pool of expertise is at your side to provide active support. Regular training courses and intensive contact with our employees – even across continents – ensure reliable service in a wide variety of areas.

Online Support
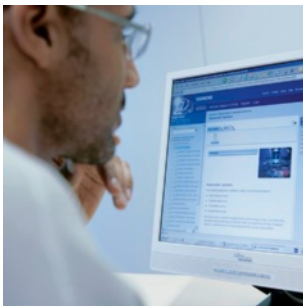
The comprehensive online information platform supports you in all aspects of our Service & Support at any time and from any location in the world. For example, you can find technical product information here.

www.siemens.com/sinvert/support

Technical assistance / hotline
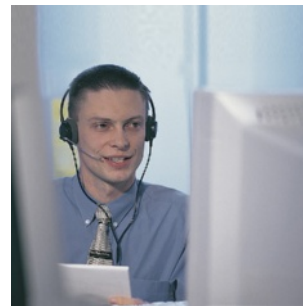
Competent consulting in technical questions covering a wide range of customer-oriented services for all our products and systems.

www.siemens.com/sinvert/technical-assistance

technical-assistance@siemens.com

SINVERT Hotline
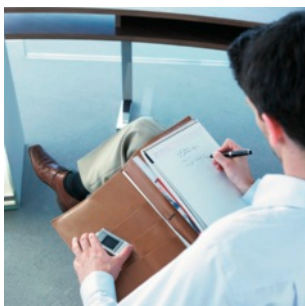(in English and German):
Tel.: +49 (911) 895-5900

Training

Extend your competitive edge – with practical know-how directly from the manufacturer. Familiarize yourself with the technical details and advantages of SINVERT solar inverters so that you can work out the best plant configuration for any situation.

www.siemens.com/sinvert/training

Service programs

Our service programs comprise selected packages of services for photovoltaic plants.

The individual services of a service program can be flexibly adapted and used separately.

- **Spare parts service**
  - Spare parts
  - SparesKits
- **Service calls**
  - Commissioning
  - On-site service
  - Maintenance
- **Service contracts**
  - SparesContract
  - WarrantyExtension
  - MaintenanceContract
  - FullServiceContract

Advantages at a glance:

- Comprehensive service from a single source, fewer interfaces and greater expertise

- Reliability of service due to assured response times and spare part delivery times

- Minimized downtimes

- Optimized service costs due to a tailored scope of services

Tailored program of services for SINVERT PVS

Spare parts service

Security of supply of necessary spares - without contractual obligations

The spare parts service for SINVERT PVS offers you two ways of ordering spares:
– On-demand spare parts delivery
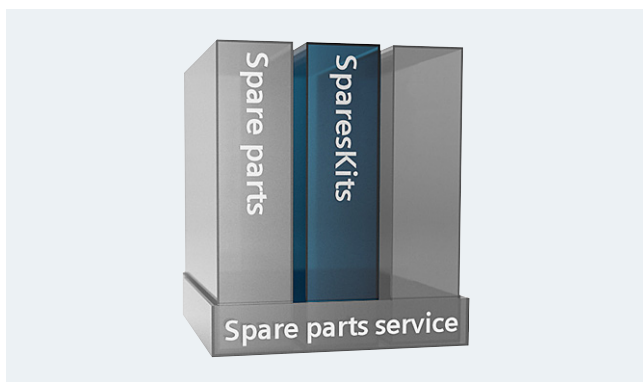– SparesKits

On-demand spare parts delivery
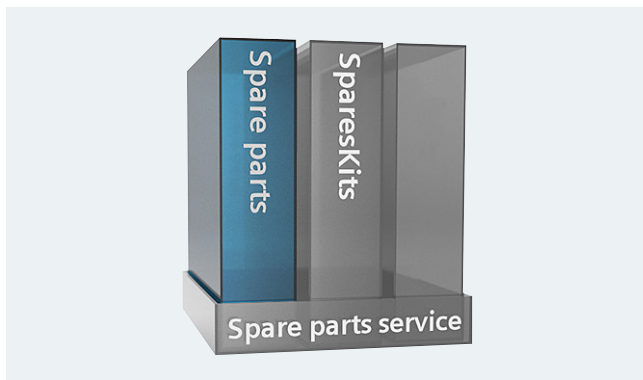
Spare parts service for SINVERT PVS: On-demand spare parts delivery

The relevant spare part can if necessary be ordered directly from your regional contact person. Spare parts can be delivered to anywhere in the world, by express courier if requested.

There is a large selection of individual spare parts available for SINVERT PVS. Further information can be requested from your regional contact person.

SINVERT PVS SparesKits

Spare parts service for SINVERT PVS: SparesKit on-site

Kits stored on site containing spares for the most important components ensure even greater security of supply:
– SINVERT PVS SparesKit 100 recommended for photovoltaic plants containing up to 10 inverter subunits
– SINVERT PVS SparesKit 200 recommended for PV plants containing more than 10 inverter subunits
– Order numbers

Service calls

Service specialists assure plant availability

Three different types of service call are available:
– Commissioning
– On-site service
– Maintenance

Service calls for SINVERT PVS inverters

Commissioning

The following work is carried out during a commissioning callout:
– Checking the correct connection of the inverters
– Setting up the inverters
– Testing and documentation
– Professional contact persons on site

On-site service

If troubleshooting via remote access by the Siemens SINVERT hotline fails to resolve a problem, our specialists can visit your site on request to offer you advice and assistance.

Maintenance

You can ask us to dispatch specialists to your site to carry out preventive maintenance on a date of your choice (in this case, materials will be supplied by our engineer).

Service contracts
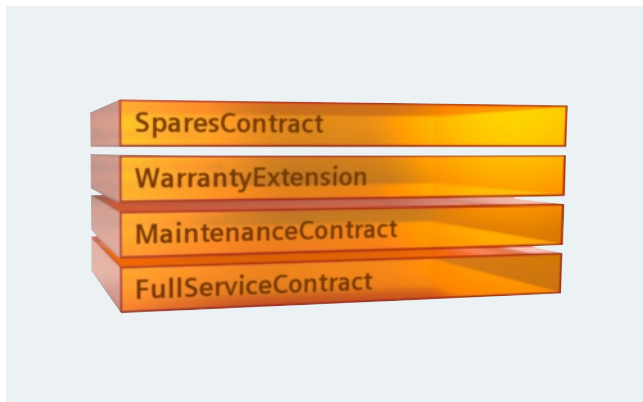
Service contracts for SINVERT PVS inverters

SINVERT PVS service contracts can be concluded within the first 24 months following commissioning of the installation. Depending on the contract type, a contract term of 10, 15 or 20 years can be selected.

New:
24/7 hotline for contract customers

SINVERT PVS service contracts safeguard investments. Customers can choose between a number of contract types to suit their individual requirements.

The sales contact person in the respective region must be contacted for specific orders:
www.siemens.com/sinvert/partner

Contract variants and contents	SparesContract			Warranty Extension	Maintenance Contract	FullService Contract
Benefits level	**100**	**200**	**300**	**100**	**100**	**100**
Spare parts availability over term of contract	✓	✓	✓	✓	✓	✓
Spare parts	--	✓	✓	✓	--	✓
Contractually assured delivery time for spare parts	--	--	3 WD[1]	--	--	--
Routine maintenance: Maintenance parts	--	✓	✓	--	✓	✓
Routine maintenance: Engineer	--	--	--	--	✓	✓
Site service calls: Engineer	--	--	--	✓	--	✓
Contractually assured response time for technical support on site	--	--	3 WD[1]	--	--	--
Contractually assured response time for remote support	--	--	--	--	--	1 WD[1]
Assured repair time	--	--	--	--	--	3 WD[1]
Telephone support 24/7	✓	✓	✓	✓	✓	✓
Reimbursement for loss of earnings	--	--	✓	--	--	✓
Agreed contract periods in years	15, 20	10, 15, 20	10, 15, 20	10, 20	10, 15, 20	10, 15, 20

✓ yes

-- no

[1] WD = working day

SINVERT PVS SparesContract –
Spares stocking as a low-cost alternative
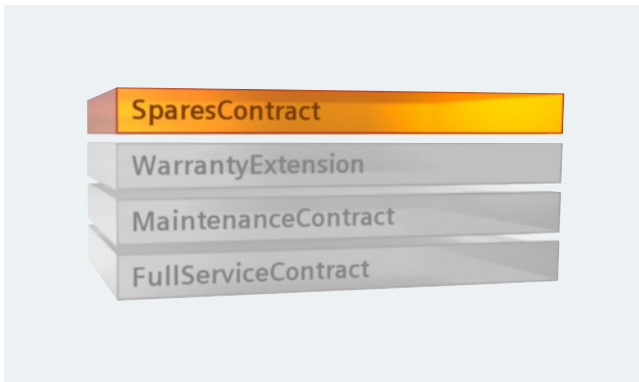
SINVERT PVS SparesContract

For large-scale photovoltaic plants operated by customers who employ their own on-site maintenance personnel, it might make more sense economically to conclude a spares contract which would assure availability of spare parts over the entire contract term.

Three benefits levels

SINVERT PVS Spares Contracts are available with three benefits levels (100, 200 and 300) and with contract terms of 10, 15 or 20 years to suit the individual requirements of the customer (a contract term of 15 or 20 years must be selected in combination with benefits level 100).

- The following applies to all three benefits levels:
  - Assured availability of spare parts over the entire term of the contract
  - A 24-hour hotline has been set up to provide technical support by our Technical Assistance team and to arrange service calls. Troubleshooting support by means of remote access will be offered where necessary.

- Additional services with benefits levels 200 and 300:
  - All spares and routine maintenance parts which are needed on site over the contract term shall be provided free of charge by Siemens.
  - Siemens will supply the required parts free of charge on receipt of notification that routine maintenance is due.

- Additional services with benefits level 300:
  - Contractually assured spare parts delivery time of 3 working days
  - Contractually assured response time of 3 working days for provision of on-site support by a Siemens engineer
 - Reimbursement of loss of earnings in the event that Siemens cannot respond within the assured times.

A basic condition for conclusion of a SINVERT PVS SparesContract is that the customer purchases a spares kit to cover initial spare part requirements. Any spare parts required shall be taken from the spares kit and replacement parts then ordered free of charge from Siemens.

All repair and maintenance work shall be carried out by the customer's own trained service personnel.

In the event that on-site troubleshooting support by a Siemens specialist is required, a service call must be ordered separately.

SINVERT PVS WarrantyExtension –
Extends the period of the standard warranty
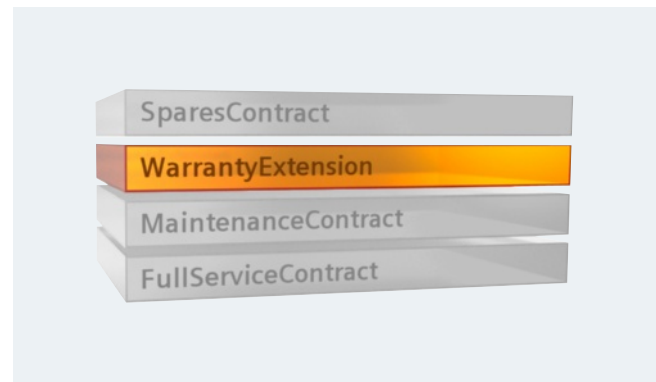
SINVERT PVS WarrantyExtension service contract

The SINVERT PVS WarrantyExtension option can be selected as a quick and simple means of extending the standard 5-year manufacturer warranty for the SINVERT PVS inverters. The customer can choose to extend the warranty to 10 or 20 years depending on individual requirements.

This service contract is intended for customers who wish to call on support from Siemens specialists when servicing is required.

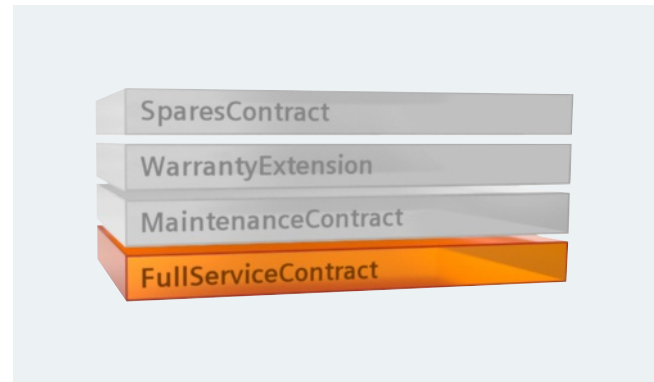### The SINVERT PVS WarrantyExtension offers:

- Spare parts
  - The availability of spare parts is assured over the entire contract term.
  - All spare parts which are needed to repair defects during service calls over the contract term shall be provided free of charge by Siemens.

- Telephone support
  - A 24-hour hotline has been set up to provide technical support by our Technical Assistance team and to arrange service calls.

- Field support
  - After Siemens has received a fault notification, Siemens specialists will rectify the fault via remote access or will dispatch service personnel free of charge to the site in question if this is deemed necessary.

**SINVERT PVS MaintenanceContract –
Routine maintenance by Siemens**
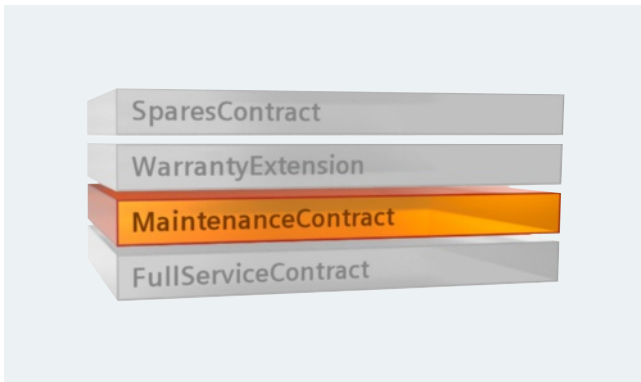
SINVERT PVS MaintenanceContract

The SINVERT PVS MaintenanceContract ensures that routine maintenance is provided by Siemens specialists. This service contract is intended for customers who want to use preventive maintenance by Siemens specialists as a means of ensuring that their plant remains fully functional at all times.

The SINVERT PVS MaintenanceContract can be selected with a contract term of 10, 15 or 20 years depending on the individual requirements of the customer.

The SINVERT PVS MaintenanceContract offers:

- Spare parts
  – The availability of spare parts is assured over the entire contract term.
  – All spare parts required to perform routine mainte-nance at the prescribed routine maintenance inter-vals over the term of the contract will be provided free of charge by Siemens.

- Telephone support
  – A 24-hour hotline has been set up to provide technical support by our Technical Assistance team and to arrange service calls. Troubleshooting support by means of remote access will be offered where necessary.

- Field support
  – Siemens shall bear all the costs of service engineer callouts to site required to carry out the prescribed routine maintenance during the term of the contract.

**SINVERT PVS FullServiceContract –
All-inclusive package for all-round service**

The all-inclusive SINVERT PVS FullServiceContract is intended for customers who rely on the support of Siemens specialists in every case and who wish to enjoy the benefits of all-round service for their plant.

The SINVERT PVS FullServiceContract can be selected with a contract term of 10, 15 or 20 years depending on the individual requirements of the customer.

SINVERT PVS FullServiceContract

The SINVERT PVS FullServiceContract offers:

- Spare parts
  – The availability of spare parts is assured over the entire contract term.
  – All routine maintenance parts required to carry out all the prescribed routine maintenance as well as any spare parts needed to repair defects during service callouts will be supplied free of charge by Siemens over the term of the contract.

- Telephone support
  – A 24-hour hotline has been set up to provide technical support by our Technical Assistance team and to arrange service calls.
  – A response time of one working day for providing troubleshooting support via hotline/remote access is guaranteed.

- On-site service
  – Siemens shall bear all the costs of service engineer callouts to site required to carry out the prescribed routine maintenance or to eliminate faults during the term of the contract.

- The SINVERT PVS FullServiceContract ensures the following in particular:
  – The inverter shall be repaired within three working days of receipt of notification of a fault from the customer
  – Any loss of earnings shall be reimbursed in the event that Siemens cannot respond within the guaranteed times

A basic condition for conclusion of a SINVERT PVS Full Service Contract is that the customer purchases a spares kit to cover initial spare part requirements. Any spare parts required shall be taken from the spares kit and replacement parts then o rdered free of charge from Siemens.

Get more information:

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