



VACON 8000 SOLAR INVERTER
A DRIVING FORCE IN SOLAR ENERGY

VACON
DRIVEN BY DRIVES

VACON – A DRIVING FORCE IN RENEWABLE ENERGY

Vacon was founded in Vaasa, Finland in 1993. It has a long history of producing high-quality inverters, power converters and AC drives for demanding renewable energy and industrial applications and operating environments. We have a solid foundation to lean on and we thrive on actively driving the industry forward.

A RELIABLE PERFORMANCE

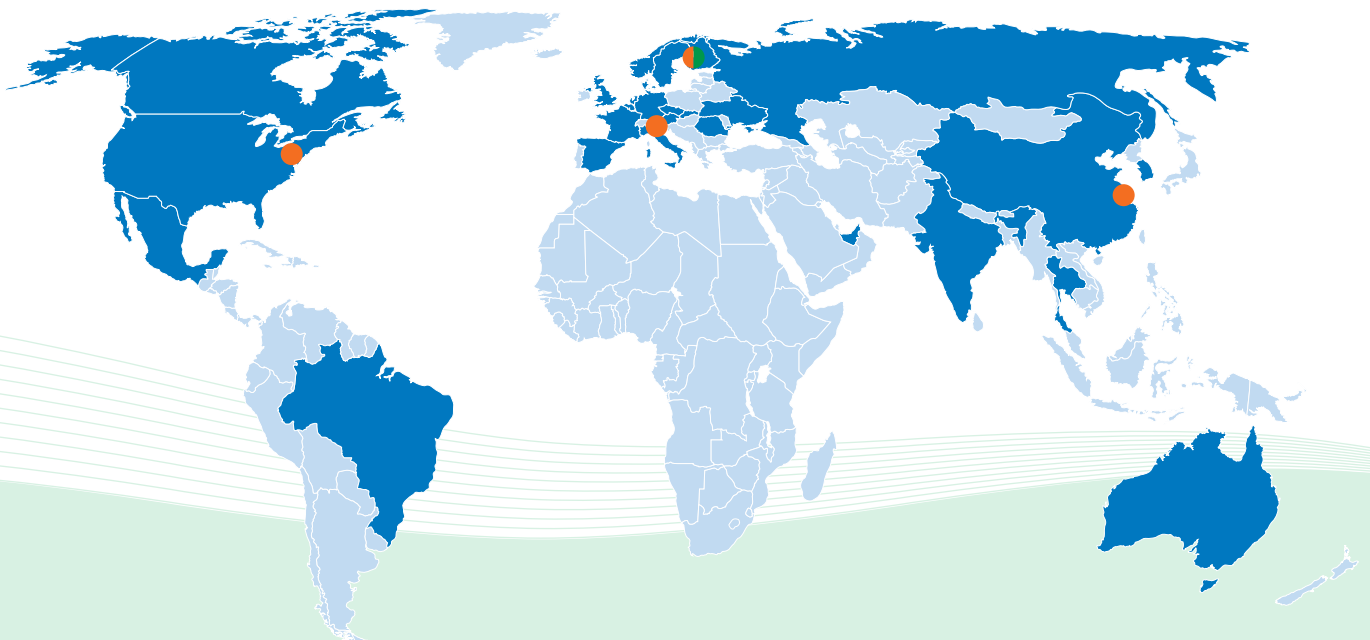
To date, over 5000 MW of renewable peak power capacity has been enabled by Vacon inverters. To put these numbers into perspective, a typical nuclear power plant can produce up to 1000 MW of capacity. And with an R&D team dedicated solely to the development of new solar energy applications, we continue to strengthen the position of renewable energy as one of the corner-stones of our company strategy.

A STRONG GLOBAL PRESENCE

Vacon is an established and international company with production on three different continents. A large and continuous flow of parts improves the availability of our products and solutions. We have a global service network: Vacon has offices in 27 countries and with our extensive partner network we have 83 service locations in 50 countries.

In accordance with our long history of producing reliable solutions, all the Vacon 8000 SOLAR products are extensively tested before delivery.

VACON – TRULY GLOBAL



● Production and R&D ● Vacon PLC ■ Vacon own sales offices

MANUFACTURING
and R&D on 3 continents

VACON SALES
and services in 27 countries

SERVICE CENTERS
in 50 countries (including partners)

VACON SOLAR OFFERING – PRODUCTS, SERVICES AND SOLUTION SUPPORT



HARNESSING THE SUN

Vacon's offering for the solar energy industry is not just limited to our inverter products. Based on our long experience in serving our customers in the renewable energy field, as well as other demanding industries, we can offer you the whole package from products to maintenance services and support for planning and commissioning.

Solar inverters, such as the Vacon 8000 SOLAR, are a vital part of the configuration between solar panels and the general grid. The function of an inverter is simply to convert the captured photovoltaic power into AC, and feed it into the grid.

The Vacon 8000 SOLAR covers all the needs of the commercial, industrial and utility sectors. Our products have been designed with ease in mind. They are easy to install, use and maintain. The modular set-up and additional tools give you an enjoyable user experience with numerous benefits.

We take care of all your solar inverter needs. Our wide power range of solar inverters is supported by a variety of string connection boxes as well as medium voltage outdoor stations. We also understand how essential it is to be able to provide first-class commissioning- and maintenance services at any location where you decide to install your solar power plant.



Vacon solution support will provide you with the needed documentation for your outdoor medium voltage station.

VACON SOLAR SERVICES

PREDICTABLE AND RELIABLE POWER GENERATION

Vacon has a well-established global service network which ensures that your inverters keep generating power to the grid. The services, which are designed to meet the requirements of the entire life cycle of the plant and the inverters, are available whenever needed. Services are also available upon request to customers with no service agreement.

The availability and performance of services can be further ensured with a service agreement that offers an extended coverage of the standard product warranty, scheduled maintenance with guaranteed parts availability and condition based monitoring. With the service agreement Vacon is responsible for providing the necessary and appropriate services in accordance with the requirements set by the site conditions and usage of the inverters.

Vacon can help you to optimize your power generation through the analysis of inverter capacity and energy production. By securing inverter availability and performance with the service agreement, you can minimize risks and uncertainty.



HEADING FOR TIME LINE

LIFE CYCLE PHASE	Start payback	Optimize payback	Secure production
VACON EXPERTISE	Proper commissioning: On-time as planned start	Ambient monitoring Operating hour monitor Energy monitor Capacity analysis	Scheduled maintenance Condition based maintenance Ambient monitoring Capacity update analysis
TIME	Start	1 year	2 years 5 years

VACON SERVICES

- Maintenance
 - Site visits to ensure the wellbeing of the inverter
- Spare parts
 - Availability of spare parts for inverters
- Exchange units
 - With an exchange unit a single inverter module can be replaced quickly and the system can be recovered fast
- Troubleshooting and repair
 - In cases of malfunction the inverter will be analysed and fixed and put back into operation

VACON SERVICE AGREEMENT

- 5 to 20 years from delivery
- Availability and performance of the services (listed left)
- Capacity analysis
 - Ensuring inverter capacity is properly utilized
- Inverter availability
 - Guaranteed inverter capacity availability

VACON 8000 SOLAR INVERTER



10 years

15 years

20 years

EASY INSTALLATION AND COMMISSIONING

- Saves time and resources
- Flexible physical layout due to modular inverter concept
- Intuitive graphical touch screen interface
- Factory set up requires very little, if any further adjustment on site

EFFICIENT OPERATIONS

- Unique Solar Multimaster concept secures maximum inverter efficiency
- Superior active front end (AFE) technology enables the very low harmonic content of the output power
- 10 – 100 kW units with isolation transformer: limits EMC related disturbances and prohibits DC current to grid
- Robust voltage transient protection to minimize downtime

MAINTENANCE WITHOUT DOWNTIME

- Modular concept allows maintenance and replacement of a single unit while the inverter is still generating power for the network
- Remote monitoring software allows status checks. Enables fast response and reduces traveling costs
- Modular set up within individual units allows easy and fast access to single components

VACON 8000 SOLAR WITH MULTIMASTER: KEEPS YOUR SUN SHINING EVEN DURING SERVICE

EASE AND RELIABILITY THROUGH MODULARITY

The Solar Multimaster is a unique concept that improves efficiency, reliability and functionality in all large-scale applications. The concept allows a series of one to twelve separate inverter units to be connected together in sequence. This means that only the optimal needed number of inverter modules is powered up for minimal power loss. By rotating the inverters in use we can ensure reduced and equal run-time, thereby extending the entire set-ups overall lifetime.

The entire set-up is centrally controlled via the touch screen on the control unit. This modular approach creates numerous advantages compared to conventional single inverter set-ups. In addition to allowing for optimisation according to sunlight, the modularity allows for repairs and maintenance to be carried out without complete shutdowns. The charging fuse disconnectors allow single units to be safely connected and disconnected while the set-up is up and running.

BY ROTATING INVERTER UNITS IN USE WE ENSURE EQUAL USAGE AND EXTEND THEIR LIFETIME



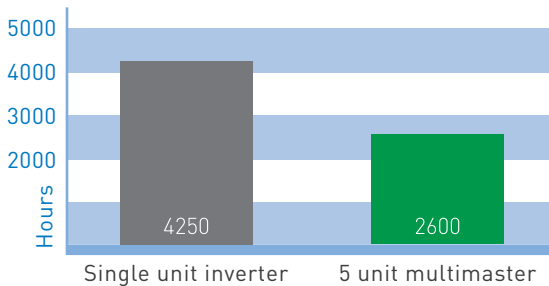
X Power/No of active inverter units.

SOLAR MULTIMASTER BENEFITS

40% LOWER WEAR AND TEAR OF EACH INVERTER MODULE

The 1 MW Vacon 8000 SOLAR Multimaster consists of 5 parallel inverter modules that are started up only when the available power from solar panels require it. In practice, during mornings, evenings and cloudy days only some of the units are active. This reduces the running hours of each module by 40% on a typical installation site. Reduced running hours will result in a longer lifetime and a lower failure rate.

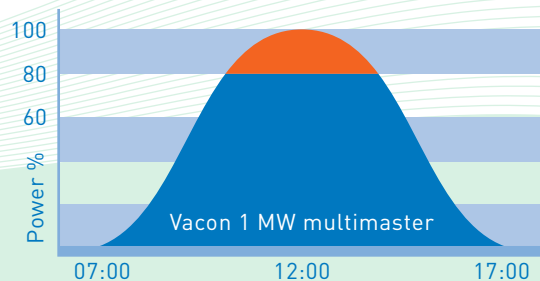
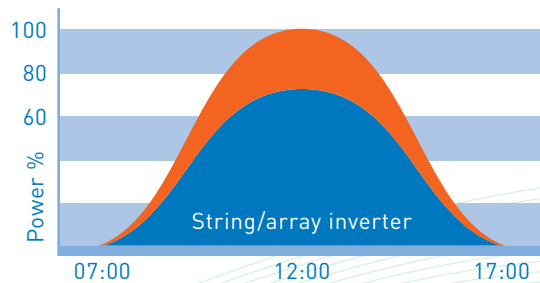
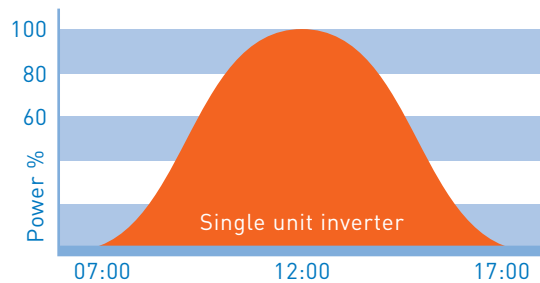
OPERATIONAL HOURS



BETTER AVAILABILITY THROUGH REDUNDANCY

If one inverter module in the 1 MW Vacon 8000 SOLAR is not operating due to maintenance work or unit failure, the loss of production is only 4%. Typically only 4% of the accumulated energy per year is generated with peak capacity provided by the 5th module. This means that with the Vacon 8000 SOLAR you will reach 99% availability even if one of the modules is down for 3 months. The modules are installed in individual cabinet sections. In case of a failure in one of the cabinets, the other modules are protected and the failure is isolated into only one section. The amount of spare parts needed to guarantee fast service is also smaller and less expensive due to the lower power per module.

ENERGY LOSS COMPARISON



Energy loss percentage resulting from a single module being switched off (time span 7-17 hrs)

SIMPLE TRANSFORMER DESIGN

Vacon has patented a switching algorithm that minimizes the circulating currents between inverters and the transformer. This allows you to use a transformer with single secondary winding when connected to the Vacon 8000 SOLAR with Multimaster.

TECHNICAL DATA

Inverter type	Nominal output power kW	Nominal output current A	Max. PV power kW	Max. input current IDC A [*]	No of DC inputs (1 MPPT)	Max. efficiency %	Euro efficiency %	Power cons. at night W	Inverter dimensions WxHxD mm	Inverter weight kg	Air flow requirement m³/h	Outgoing AC cabinet mm/kg (optional)
NXV0010	10	14	12	29	1	94	93	5	600x1400x600	220	300	N/A
NXV0015	15	22	18	44	1	94	93	5	600x1400x600	250	300	N/A
NXV0020	20	29	24	59	1	94	93	5	600x1400x600	300	425	N/A
NXV0025	25	36	30	74	1	94	93	5	600x1400x600	325	425	N/A
NXV0030	30	43	36	88	1	94	93	5	600x1400x600	350	425	N/A
NXV0040	40	58	48	118	4	95	94	30	800x1821x600	550	700	N/A
NXV0050	50	72	60	147	4	96	96	30	800x1821x600	600	700	N/A
NXV0080	80	115	96	235	4	96	96	30	800x1821x600	850	800	N/A
NXV0100	100	144	120	294	4	96	96	30	800x1821x600	950	800	N/A
NXV0125	125	258	150	305	4	97	96	30	800x2281x600	450	800	N/A
NXV0200	200	412	240	488	4	98	97	30	800x2281x600	645	1000	N/A
NXV0400	400	825	480	976	10	98	98	30	2200x2281x600	1425	2000	600/215
NXV0600	600	1240	720	1460	10	98	98	30	3000x2281x600	2035	3000	600/215
NXV0800	800	1650	960	1950	18	98	98	30	4000x2281x600	2795	4000	600/320
NXV1000	1000	2060	1200	2440	18	98	98	30	4800x2281x600	3405	5000	600/320

Input

MPP voltage range 10 - 100 kW	340 - 800 VDC
MPP voltage range 125 - 1000 kW	410 - 800 VDC
Min. input voltage	900 VDC
Min. input voltage	350 VDC
Max. open circuit voltage	850 VDC

Output

Nominal output voltage 10 - 100 kW	400 V, 3 phase
Nominal output voltage 125 - 1000 kW	280 V, 3 phase
Output frequency	50 / 60
Power factor	Adjustable 0,1-1 leading/lagging
AC overvoltage protection	Yes
AC current harmonics	<2.5%

Aux power

Aux power supply (if from outside)	1 ph, 230 VAC, 50/60 Hz, 10 A
Auxiliary power fuse	25 A

Ambient

Temperature range 10 - 100 kW	-10 to 40 °C
Temperature derating 10 - 100 kW	1% / 1 °C up to 50 °C
Temperature range 125 - 1000 kW	-10 to 40 °C
Temperature derating 125 - 1000 kW	1% / 1 °C up to 60 °C
Relative humidity	95%, no condensation allowed
Max. installation altitude	2000 m

Safety / protection

IP class 10 - 100 kW	IP21
IP class 125 - 1000 kW	IP21
Ground fault monitoring	Yes
Overload behaviour	Power limiting
Over temperature behaviour	Power limiting
Forced stop	Yes
Circuit breaker AC side	Optional
Circuit breaker DC side	Yes

Control interface

Communication	RS-485, Ethernet, GPRS
Analog inputs	2
Analog outputs	1
Digital inputs	6
Relay outputs	2 x RO, 1 x DO

Certificates

EMC	EN 61000-6-2, EN 61000-6-4
Safety	EN 62109-1

[* Max. continuous input current at lowest DC voltage.

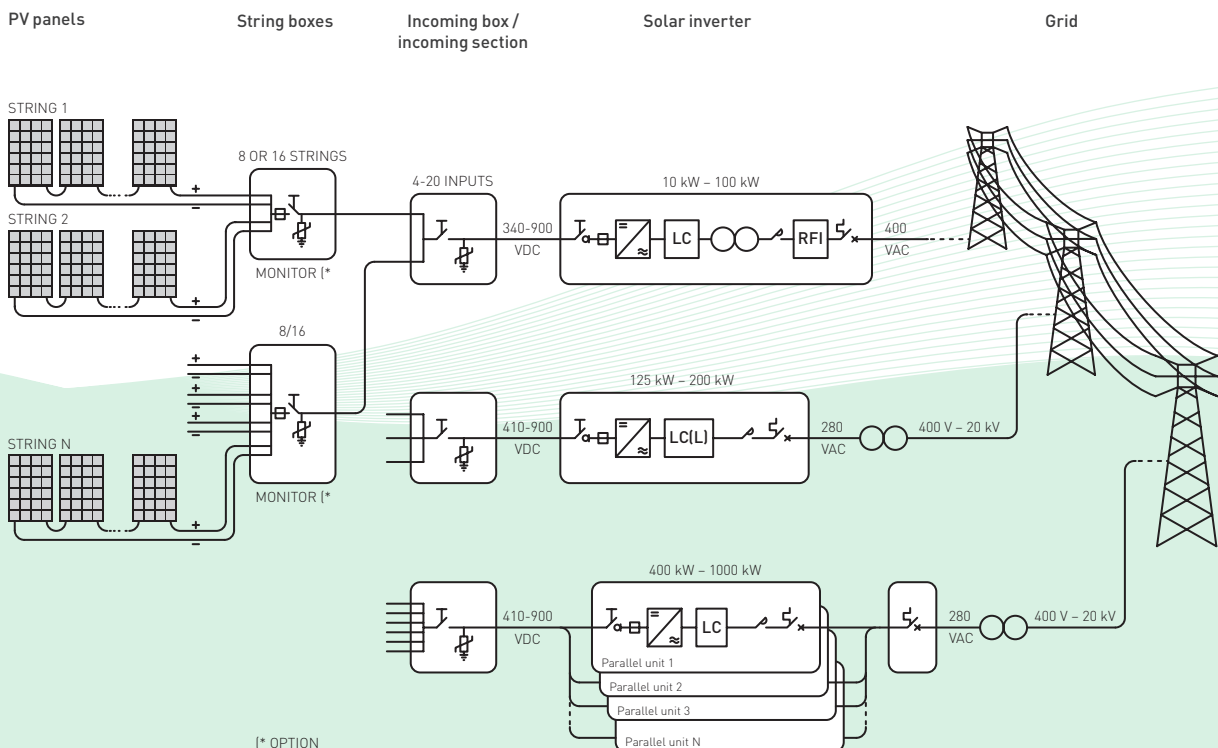
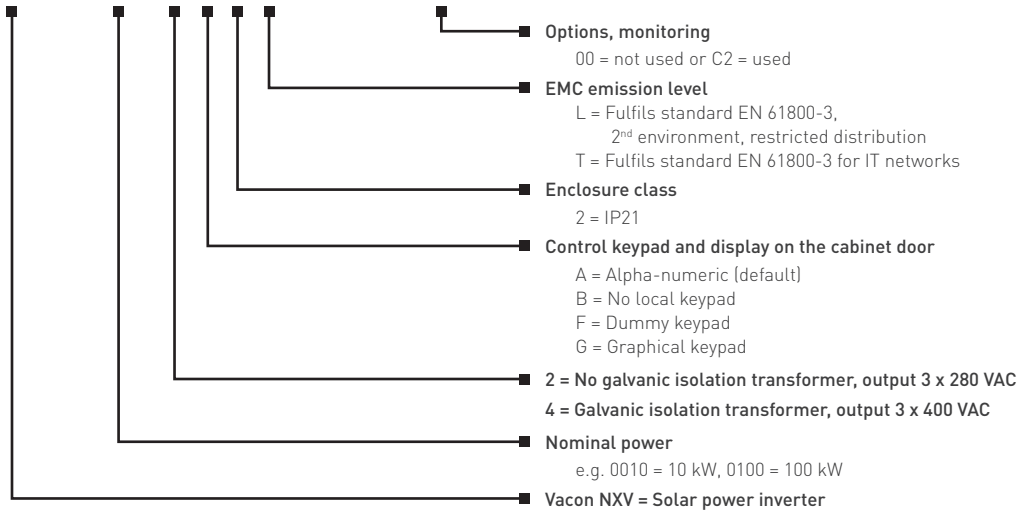
STRING BOX FOR 8 STRINGS

Type code	Strings	Max. voltage	Fuse/string	MC3 connector	Remote monitoring	IP
STG 08	8	1000 V	10 A	-	-	54
STG 08+ASM	8	1000 V	10 A	-	Yes	54
STG 08+IMC	8	1000 V	10 A	Yes	-	54

MONITORING BOX

Type code	Nº of inverter nodes	Nº string box nodes / inverter	Max. Nº modbus nodes	IP
STG 00	99	99	230	54

VACON NXV-0010-4-A-2-L-A1A2D700XX



TOOLS MAKE PLANNING AND USE EASIER

REMOTE MONITORING FOR VACON 8000 SOLAR

The remote monitoring function allows you to follow the system status and power generation of your inverters online. This function is especially important for inverters in remote sites. Remote monitoring functions can create considerable savings over time by reducing travel related costs for regular check-ups and maintenance.

The remote monitoring of the Vacon 8000 SOLAR Inverters produces a data archive (daily, monthly and yearly). When combined with Vacon's remote monitoring stringboxes, it is possible to monitor individual string intensity for diagnostic purposes. This way bad strings can be found and serviced in order to achieve the highest possible energy production. The system delivers an immediate SMS alarm message to minimize downtime, and provides a report on all the latest events.



PLC TOUCH SCREEN PANEL

The PLC touch screen panel on the control unit provides a simple and clear user interface for the entire system. By using the panel, you can monitor the status of the entire system. You can see the actual power generated in graphical form and choose to view daily, weekly or even

monthly figures. Regardless of the number of units in your system, you can use one single touch screen to adjust or control set-up. The touch screen is available as standard in 600 – 1000 kW units.

Vacon's installed base of solar applications now totals more than 200 MW in Europe alone. Deliveries have been made to: Australia, Belgium, China, The Czech Republic, Finland, India, Italy and Spain. There have been many successful solar energy cases completed for customers around the world.



"A LONG TERM CUSTOMER TRUSTED VACON'S RENEWABLE ENERGY PRODUCTS AND PERSONNEL, AND RECEIVED A HIGH-QUALITY SOLAR INVERTER SOLUTION FOR THEIR FACILITIES."

Marco Beltrami
Deputy Managing Director
Vacon SpA, Italy

CASE: HEALTH CITY FITNESS CENTER, MERKSEM, BELGIUM

This case, in Merksem, Belgium is an exemplary success story for Vacon. Health City is a fitness center group with facilities in Belgium, The Netherlands and Germany. The Merksem center's environmental concerns and interest in renewable energy resulted in an on-site solar installation of 60 kW in total, consisting of 2 times 30 kW.

The original installed PV inverters, when put online, were found to cause disturbances in the wireless heart monitoring systems, used in cardiac training and safe intensive workouts. The customers complained that the equipment didn't work as intended and the inverters had to be switched off during such fitness sessions. The situation could not be allowed to continue.

The system integrator contacted Vacon wanting to know whether the Vacon 8000 SOLAR inverter could be the solution. Based on Vacon's experience with drives in sensitive environments, Vacon was confident that it could offer a solution for this particular case.

Initially one Vacon 8000 SOLAR 30 kW unit was shipped to Merksem in order to test it for this particular case. The wireless heart monitoring devices worked perfectly, even when the Vacon inverter was enabled. The results were very satisfying. The system integrator found a solution for the special needs of a sensitive environment and the Health City Fitness Center in Merksem is now able to get a return on their investment, without the risk of any disturbance in their wireless heart monitoring systems.

A second Vacon 8000 SOLAR 30 kW unit is about to replace the other inverter that still gets switched off every time the heart monitoring system is used.



CASE: VETRERIA DI BORGONOVO, ITALY

The Vetreria di Borgonovo glassware factory, established in the 1950s, is located near the town of Piacenza in northern Italy. Vacon provided all the needed inverters, which have been connected to solar panels mounted onto the factory's roof. The Vacon 8000 SOLAR is a vital part of the configuration between the solar panels and the grid: it converts photovoltaic DC power into AC power, and feeds it into the grid. Vacon's Multimaster software has made it possible to connect one to eight inverter modules, based on the amount of sunshine, thus ensuring that the glassware factory's solar power plant operates with the best possible efficiency.