VACON®

DRIVEN BY DRIVES

VACON® 8000 SOLAR INVERTER

A DRIVING FORCE IN SOLAR ENERGY

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.

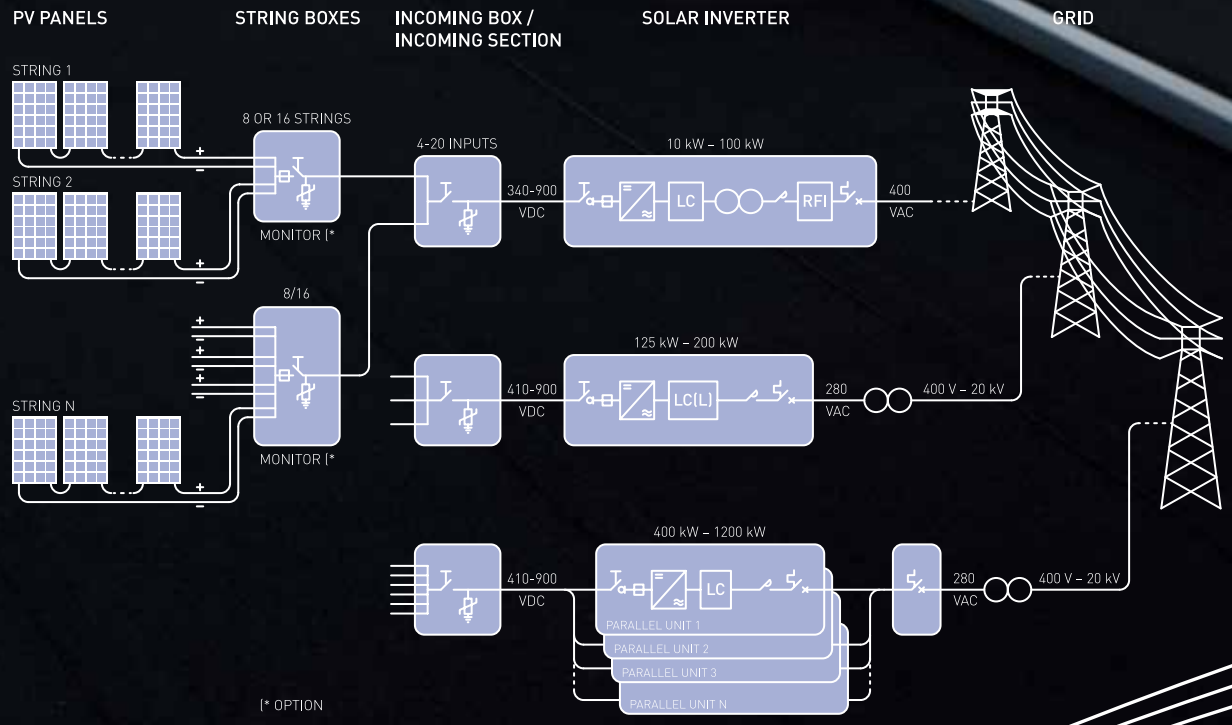
RELIABLE PERFORMANCE

To date, over 7000 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 cornerstones of our company strategy.

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 extensive partner network in nearly 90 locations.

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



VACON SOLAR OFFERING

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.

APPROVALS

Country	Low voltage	Medium voltage
Germany	VDE 0126-1-1, VDE-AR-N 4105*	BDEW 2008
France	EN 50438	Arrêté du 23 avril 2008
Italy	"Guida per le connessioni alla rete elettrica di Enel distribuzione" CEI 11-20, CEI 11-21*	CEI 0-16
Spain	R.D. 1663/2000	P.O. 12.2; P.O. 12.3
Czech	EN 50438	
UK	EN 50438	
Belgium	EN 50438	
Australia	AS 4777.2; AS 4777.3	
Anti-Islanding	IEC-62116	

* Certification in progress, please check status from your local sales office

VACON® 8000 SOLAR 10-100 kW

VACON 8000 SOLAR 10-100 kW series is a compact cabinet-assembled product line with integrated isolation transformers for maximum worldwide grid compatibility. The little brother of the product family is ideally suited for smaller and decentralized installations. It is well suited for such purposes as rooftop installations.

The smaller power range of the VACON 8000 SOLAR 10-100 kW series does not make it any less handy than the larger products in the series. It is extremely fast to install and commission. It offers the same high quality, efficiency and reliability that you would expect from any Vacon product.

FEATURES

- Nine power ratings for optimum fit with PV-installation
- Wide DC-input range: 340-900 VDC
- Common 400 VAC grid connection
- Safety built in: AC- and DC-protections, Ground fault monitoring, Overload and overtemperature protection, IP21 steel cabinet
- Options available for DC-positive or –negative pole grounding, different communication set-ups and BOS equipment

BENEFITS

- High efficiency and reliability
- Fast installation and plug n' play commissioning
- Thin film compatibility
- Allows flexible string configurations (due to wide MPP range)
- Connectivity to Vacon remote monitoring system
- Wide range of grid certifications

TECHNICAL DATA

Inverter type	Nominal output power **kW**	Nominal output current IAC **A**	Max no. of output connections	Recomm. max PV power **kW**	Max nominal input current **A**	Max allowed PV current Isc[b] **A**	Max no. of DC connections (1 MPPT)	Max. efficiency **%**	Euro efficiency **%**	Power cons. at night **W**	Inverter dimensions WxHxD **mm**	Inverter weight **kg**	Air flow requirement **m³/h**
NXV00104A2L	10	14,4	1	12	29	50	2	94,9	93,1	0	600X1481X600	220	300
NXV00154A2L	15	21,6	1	18	44	50	2	94,9	93,6	0	600X1481X600	220	300
NXV00204A2L	20	28,8	1	24	59	99	2	95,3	92,2	0	600X1481X600	300	425
NXV00254A2L	25	36,1	1	30	74	99	2	95,3	93,0	0	600X1481X600	300	425
NXV00304A2L	30	43,3	1	36	88	99	2	95,4	93,9	0	600X1481X600	300	425
NXV00404A2L	40	57,7	2	48	118	198	4	95,8	94,8	0	800X1881X600	550	700
NXV00504A2L	50	72,1	2	60	147	198	4	96,2	95,2	0	800X1881X600	550	700
NXV00804A2L	80	115	2	96	235	353	4	96,4	95,6	0	800X2281X600	850	800
NXV01004A2L	100	144	2	120	294	353	4	96,5	95,8	0	800X2281X600	850	800

INPUT

MPP voltage range	340 - 800 VDC
Max input voltage	900 VDC
Max open circuit voltage	850 VDC

OUTPUT

Nominal output voltage	400 V, 3 phase
Output frequency	50 / 60
Power factor	Adjustable 0,8-1 leading/lagging
AC overvoltage protection	Yes
AC current harmonics at rated power	<3%

AUX POWER

Aux Power Supply	internal 1ph, 230VAC, 50/60Hz

AMBIENT

Temperature range	-10 C° to 40 C°
Temperature derating	1,5% / 1C° up to 50 C°
Relative humidity	95%, no condensation allowed
Installation altitude	2000m [g]
Environment category	Indoor, conditioned
Pollution degree	PD2
Overvoltage category	AC (Mains) = OVCIII DC (Panel) = OVCII

SAFETY / PROTECTION

IP class	IP21
Ground fault monitoring	Yes
Overload behaviour	Power limiting
Over temperature behaviour	Power limiting
Forced stop	Yes
Circuit breaker AC side	Yes
Circuit breaker DC side	Yes

CONTROL INTERFACE

Communication	RS485 (Modbus RTU) Ethernet (Modbus TCP) GPRS
Signalling	3 Potential free contacts to indicate faults and alarms (programmable)

CERTIFICATES

EMC	EN 61000-6-2, EN 61000-6-4
Safety	EN-62109-1
Grid Codes 10-100kW	VDE 0126-1-1, VDE-AR-N 4105*, EN 50438 CEI 11-20, CEi 11-21*, R.D. 1633/2000 AS 4777.2, AS 4777.3 IEC-62116
Grid Codes 50-100kW	BDEW 2008 Arrëté du 23 avril 2008 Allegato 17. Terna Regolazione P.O. 12.2, P.O. 12.3

[b] Maximum input current withstand of the inverter cabinet.
[c] See manual for recommended cross sections of cables
[d] Efficiency measured at 340VDC
[g] Up to 3000m with derating of 1% per 100m. Hence 2600m would mean a derating of 6% of nominal output power. Note! EN-62109 certification is done only for European conditions up to 2000m

* Certification in progress, please check status from your local sales office

VACON® 8000 SOLAR 125-1200 kW

VACON 8000 SOLAR 125-1200 kW series is a rugged cabinet assembled product line. The parallel inverter concept enables both cost and power efficient installations up to Megawatt range. This is your optimum choice for large centralized installations that cover a considerable area of land.

You can expect best-in-industry efficiency combined with the kind of ease and reliability that you would hope for in a product that is installed in remote areas. The VACON 8000 SOLAR 125-1200 kW series has been designed to be easy and fast to install and start up. For added convenience and ease, the design has also taken service needs into consideration, but thanks to its extreme reliability, that is a feature that you may never grow to appreciate.

FEATURES

- Multimaster-topology (>=400 kW)
- Wide DC-input range: 410-900 VDC
- Separate input (DC), inverter and output (AC) sections for safety and redundancy (>=400 kW)
- Safety built in: AC- and DC-protections, Ground fault monitoring, Overload and overtemperature protection, IP21 steel cabinet
- Options available for DC-positive or –negative pole grounding, different communication set-ups and BOS equipment
- Common DC- and AC-bus bars for safety and for minimizing BOS costs

BENEFITS

- Top of the industry efficiency
- Fast and easy commissioning and start up
- Additional reliability and redundancy
- Multimaster-topology increases life time and ensures top production yield
- Service friendly design
- Hot reconnect
- Thin film compatibility
- Available in MV Station
- Single configuration interface
- Connectivity to Vacon remote monitoring system
- Wide range of grid certifications
- Easy commissioning and start-up

Inverter type	Nominal output power kW	Nominal output current IAC A	Max no. of output connections	Recomm. max PV power kW	Max nominal input current A	Max allowed PV current Isc[b] A	Max no. of DC connections (1 MPPT)	Max. efficiency %	Euro efficiency %	Power cons. at night W	Inverter dimensions WxHxD mm	Inverter weight kg	Air flow requirement m³/h
NXV01252A2T	125	256	2	150	305	353	4	96,8	95,2	0	800X2281X600	450	800
NXV02002A2T	200	412	4	240	488	613	4	98,6	97,6	0	800X2281X600	645	1000
NXV04002A2T	400	825	12[a]	480	976	1226	20	98,6	98,0	60	2800X2281X600	1675	2000
NXV06002A2T	600	1237	12[a]	720	1463	1839	20	98,6	98,2	60	3600X2281X600	2285	3000
NXV08002A2T	800	1650	12[a]	960	1951	2452	32	98,6	98,2	60	4600X2281X600	3160	4000
NXV10002A2T	1000	2062	12[a]	1200	2439	3065	32	98,6	98,2	60	5400X2281X600	3770	5000
NXV12002A2T	1200	2474	12[a]	1440	2926	3678	32	98,6	98,2	60	6200X2281X600	4380	6000

INPUT

MPP voltage range	410 - 800 VDC
Max input voltage	900 VDC
Max open circuit voltage	850 VDC

OUTPUT

Nominal output voltage	280 V, 3 phase
Output frequency	50 / 60
Power factor	Adjustable 0,8-1 leading/lagging
AC overvoltage protection	Yes
AC current harmonics at rated power	<3%
Step-up transformer requirement [h]	Neutral not connected and short circuit voltage (Z%): >= 6%

AUX POWER

Aux Power Supply [f]	1ph, 230VAC, 50/60Hz, 25A
Auxiliary power fuse	25A

AMBIENT

Temperature range	-10 C° to 40 C°
Temperature derating	1,5% / 1C° up to 50 C°
Relative humidity	95%, no condensation allowed
Installation altitude	2000m [g]
Environment category	Indoor, conditioned
Pollution degree	PD2
Overvoltage category	AC (Mains) = OVCIII DC (Panel) = OVCII

SAFETY / PROTECTION

IP class	IP21
Ground fault monitoring	Yes
Overload behaviour	Power limiting
Over temperature behaviour	Power limiting
Forced stop	Yes
Circuit breaker AC side	Yes [e]
Circuit breaker DC side	Yes

CONTROL INTERFACE

Communication	RS485 (Modbus RTU) Ethernet (Modbus TCP) GPRS
Signalling	3 Potential free contacts to indicate faults and alarms (programmable)

CERTIFICATES

EMC	EN 61000-6-2, EN 61000-6-4
Safety	EN-62109-1
Grid Codes 125-200kW	VDE 0126-1-1, EN 50438, CEI 11-20, R.D. 1633/2000, AS 4777.2, AS 4777.3, IEC-62116
Grid Codes 125-1200kW	BDEW 2008, Arrëté du 23 avril 2008, Allegato 17. Terna Regolazione P.O. 12.2, P.O. 12.3

[a] If AC Cubicle is left out, then 4 per inverter
[b] Maximum input current withstand of the inverter cabinet
[c] See manual for recommended cross sections of cables
[d] Efficiency measured at 410 VDC with external power supply for auxiliary components
[e] >=400kW Units includes outgoing AC cubicle with circuit breaker. This can optionally be left out and will decrease the width and weight 600mm & 250kg for 400-600kW units and 600mm & 365kg for 800-1200kW respectively. Note! If AC cubicle is left out, then AC breaker functionality has to be taken care of during stop sleep state or inverter's LC filter capacitors will stay permanently connected to the grid.
[f] Auxiliary power supply required for inverters >=400kW. Note! UPS recommended
[g] Up to 3000m with derating of 1% per 100m. Hence 2600m would mean a derating of 6% of nominal output power. Note! EN-62109 certification is done only for European conditions up to 2000m
[h] Not included in delivery

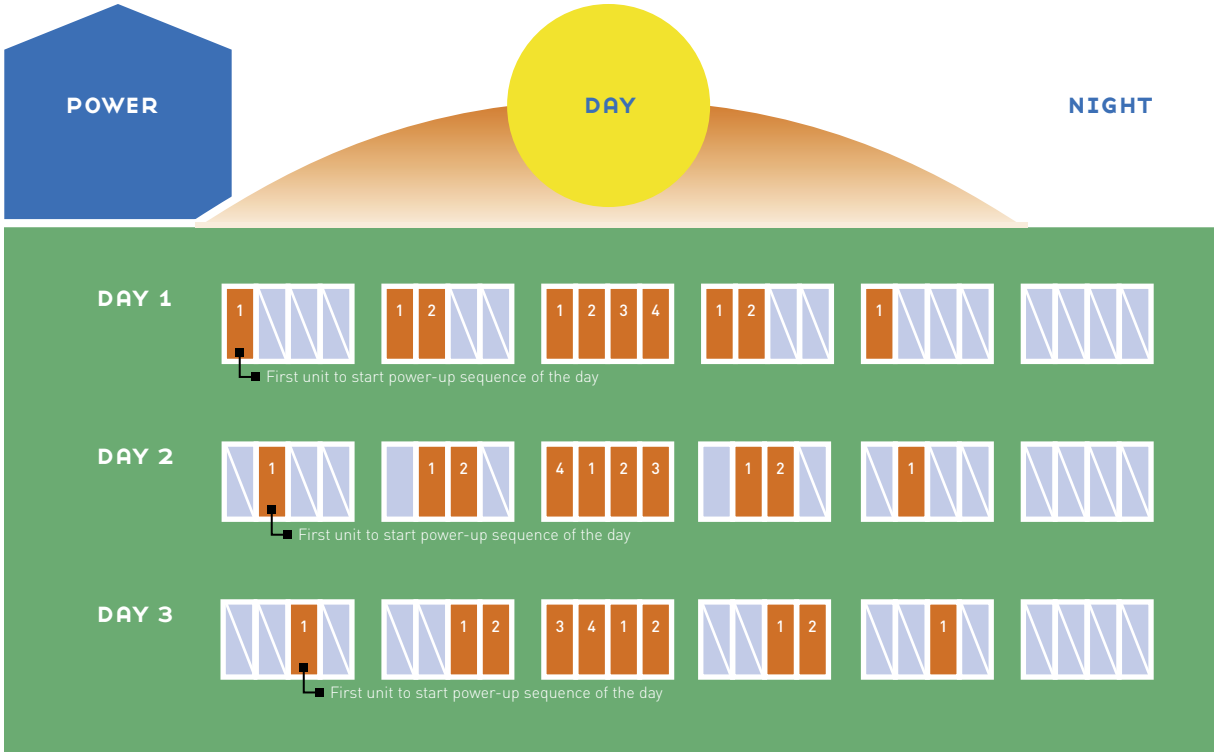
VACON® 8000 SOLAR WITH MULTIMASTER: KEEPS YOUR SUN SHINING EVEN DURING SERVICE

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 runtime, thereby ex- tending 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/№ of active inverter units.

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.

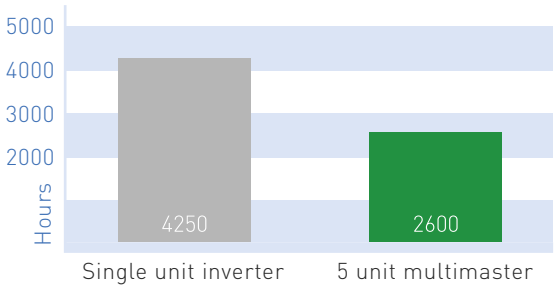
BETTER AVAILABILITY THROUGH REDUNDANCY

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.

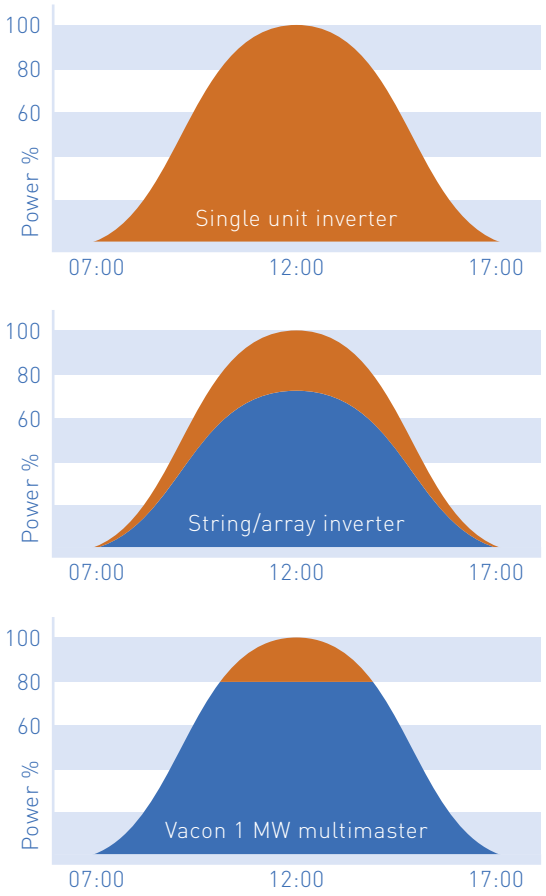
SIMPLE TRANSFORMER DESIGN

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.

OPERATIONAL HOURS



ENERGY LOSS COMPARISON



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

VACON® 8000 SOLAR MV STATION

VACON 8000 SOLAR MV Station ensures that, when converting sun energy into electrical power, environmental factors don't stop you from getting the best results possible. VACON 8000 SOLAR Inverters require shelter from the elements in order to perform. By choosing VACON 8000 SOLAR MV Station, you receive everything you need to convert solar energy into electricity, all in one convenient turnkey package.

PROTECTION FROM THE ELEMENTS

In order to set up a solar farm that is to have a major impact on the grid, it has to have two things – sunlight and space. This often means that solar farms are positioned in places where there is a lack of buildings to store the inverters. That's where VACON 8000 SOLAR MV Station can help. Designed to act as a comprehensive turnkey solution, it utilizes the functionality and electrical performance of VACON Multimaster technology to offer maximum efficiency at all times.

WE WILL TAKE CARE OF EVERYTHING

VACON 8000 SOLAR MV Station is designed with the customer in mind. As well as offering environmental protection to your VACON 8000 SOLAR inverters, you'll also reap rewards from how easy it is to use. Instead of having to commission a complex infrastructure to house your solar farm, just contact Vacon and we'll do the rest. VACON 8000 SOLAR MV Station comes with power ranging from 400 kW to 1200 kW that can be tailored around your needs. We can even build the enclosure to your requirements – where you want it to blend subtly into the surrounding environment or painted bright pink, we'll deliver it just how you want.

VACON 8000 SOLAR	Maximum PV power kW	Max. PV current ISC A	Max no. of DC inputs (1 MPPT)	Nominal power kW	Max. efficiency %	%	Inverter dimensions WxHxD mm	Inverter weight kg
400MV	480	1226	20	400	98.6	98,0	6700X3100X2800	30000
600MV	720	1839	20	600	98.6	98.2	6700X3100X2800	30000
800MV	960	2452	32	800	98.6	98,2	7800X3100X2800	36000
1000MV	1200	3065	32	1000	98.6	98,2	7800X3100X2800	36000
1200MV	1440	3678	32	1200	98.6	98,2	7800X3100X2800	36000

INPUT

MPPT voltage range	410-800 VDC
Max. input voltage	900 VDC

OUTPUT

Nominal voltage	20 kV (other voltages at request)
Output frequency	50 / 60 Hz
Power factor	Adjustable 0,8-1 inductive/ capacitive
AC current harmonics	<3%

AMBIENT

IP class	IP54
Temperature range	-10 to 40 °C
Temperature derating	1,5% / 1 °C up to 50 °C
Relative humidity	15% to 95%, condensation not allowed
Maximum installation altitude	2000 m

AUXILIARY POWER

External auxiliary power supply	1 ph, 230 VAC, 50 / 60 Hz, 10 A
Auxiliary power fuse	25 A

SAFETY / PROTECTION

Ground fault monitoring	Yes
Overload behavior	Power limiting
Over temperature behavior	Power limiting
Circuit breaker AC side	Yes
Circuit breaker DC side	Yes

MEDIUM VOLTAGE

Medium voltage transformer	Dry type
Transformer over temperature protection	Yes
Transformer over load protection	Switchgear with fuses
Medium voltage output connection	Ring connection, two switchgears

OPTIONS

Internal auxiliary power supply	Optional
Medium voltage output connection	Star connection
Monitoring system	Monitoring through web portal, SMS messages, e-mail messages

For certifications, see page 7

FEATURES

- Power range of 400 kW to 1200 kW
- Multimaster functionality and electrical performance
- Provides additional environmental protection for VACON 8000 SOLAR Inverter IP21 enclosures

BENEFITS

- Turnkey delivery in an optimized structure
- Short delivery and installation
- Easy to monitor and maintain
- Suitable for EPC customers

VACON® 8000 SOLAR INVERTER MODULES

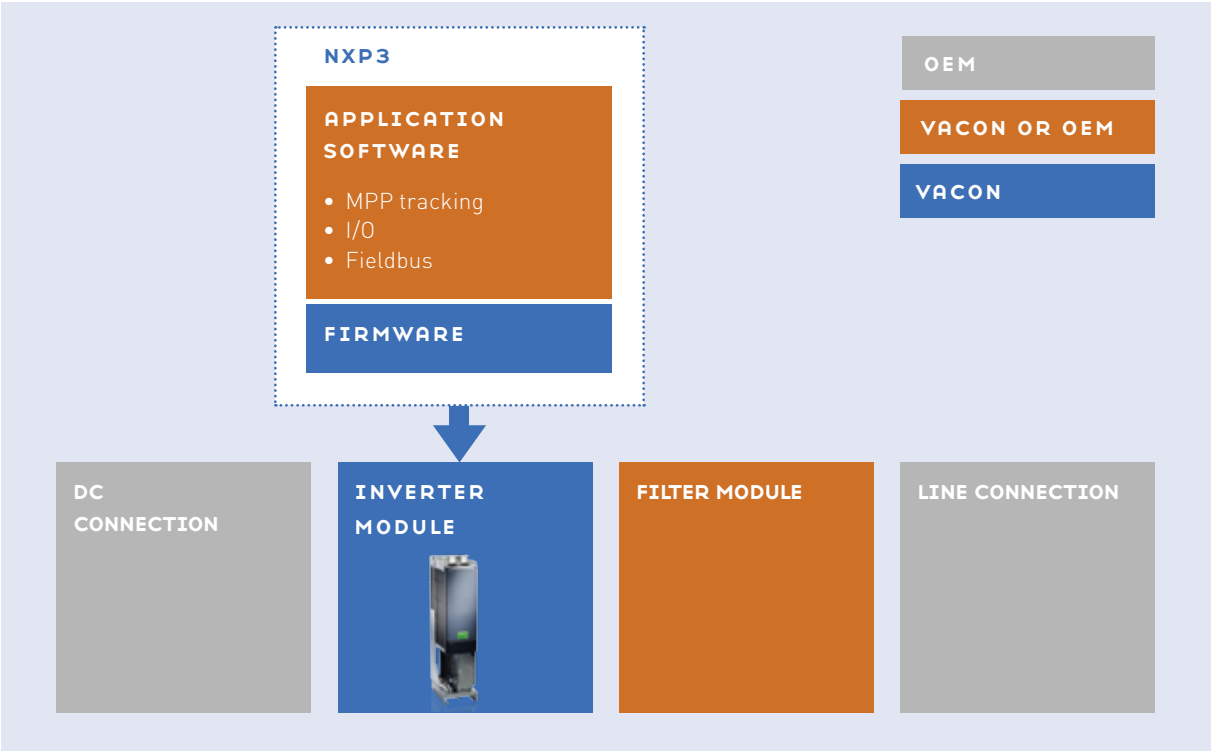
In addition to full solar inverter solutions, Vacon also offers a range of key individual solar components to our customers. All our components come with the same benefits as they do in comprehensive Vacon solar solutions i.e. excellent reliability, efficiency, and full grid code support.

SUNSHINE INTO POWER

Inverting solar energy has one major obstacle in its way – to successfully harness power from a PV source into the grid, it is essential that the voltage and frequency is constantly controlled. The amount of energy a photovoltaic system produces is dependent on variables such as cloud cover, the angle of the sun and ambient temperature. We take this into account by decoupling the voltage and current harvested from the Sun to those fed into the grid. This means the PV array can remain at its optimum operating point at any given time and, with the help of state-of-the-art power electronics, voltage and frequency being fed into the grid can be controlled according to grid requirements.

SOLAR INVERTER MODULE

Solar inverter modules utilize close-looped control to feed energy into the grid. Combining these two components with a filter module produces a comprehensive, readily connectable Vacon solar inverter system, with the option of expansion according to the customer's needs. Connectivity to communication networks such as Modbus and Profibus allows the user to constantly monitor and maintain the system to ensure they get the most out of their Vacon Solar module solution. In addition, there as an IEC61131-3 compatible software tool available for the customer's specific application requirements.



Topology example of a PV inverter system for photovoltaic systems based on Vacon modules for solar inverters. Customers have an option to build their own application software and select the filter, although Vacon can offer both for maximum performance and optimization. Engineering support for solution tailoring is also available.

Module	Device frame	Power kW	Max. current DC A	Current AC A	Min. voltage DC V	Voltage AC V
SXA0145	FI10	145	354	299	410	280
SXA0186	FI10	186	454	324	410	280
SXA0200	FI10	200	488	412	410	280

HIGH-PERFORMANCE CONTROL

Vacon has a high-performance control platform that is perfect for solar applications. The micro controller provides exceptional processing and calculating power, while low harmonic control is available in open- and closed-loop control modes. The Vacon control features built-in PLC functionality without the need for any additional hardware and all customer- specific functionality can be integrated to cut costs and improve performance. The same control is used in all Vacon solar modules, allowing the maximum utilization of control features over a wide power and voltage range.

VOLTAGE MEASUREMENT

To ensure that voltage is under control, it has to measured constantly. By sensing the amplitude, phase position and phase angle of the grid voltage, the inverter synchronizes to transmit as much energy as is required at any given time. Vacon has designed a board which enables superior performance during demanding grid conditions like in low voltage ride-through situations.

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.

STRING BOX FOR 8 STRINGS

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

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 400 – 1200 kW units.

TYPE CODE KEYS

VACON® 8000 SOLAR 10-200 kW

VACON NXV - 0010 - 4 - A - 2 - L - A1A2D7B5XX

NXV	**Product range** **VACON NXV** = Solar power inverter
0010	**Nominal power** **e.g. 0010** = 10 kW, 0100 = 100 kW
4	**4** = Galvanic isolation transformer, output 3 x 400 VAC **2** = No galvanic isolation transformer, output 3 x 280 VAC
A	**Control keypad and display on the cabinet** **A** = Alpha-numeric (default) **B** = No local keypad **F** = Dummy keypad **G** = Graphical keypad
2	**Enclosure class** **2** = IP21
L	**EMC emission level** **L** = Fulfils standard EN 61800-3, 2nd environment, restricted distribution **T** = Fulfils standard EN 61800-3 for IT networks
A1 A2 D7 B5 XX	**Options, monitoring** **00** = not used **C2** = Modbus RTU **CI** = Modbus TCP

VACON® 8000 SOLAR 400-1200 kW

VACON NXV - 1000 - 2 - A - 2 - T - A1A2D7D2CI

NXV	**Product range** **VACON NXV** = Solar power inverter
1000	**Nominal power** **e.g. 0400** = 400 kW, 1200 = 1200 kW
2	**2** = No galvanic isolation transformer, output 3 x 280 VAC
A	**Control keypad and display on the cabinet** **A** = Alpha-numeric (default) **B** = No local keypad **F** = Dummy keypad **G** = Graphical keypad
2	**Enclosure class** **2** = IP21
T	**EMC emission level** **T** = Fulfils standard EN 61800-3 for IT networks
A1 A2 D7 D2 CI	

VACON® SOLAR SERVICES

Vacon has a comprehensive service network in nearly 90 locations worldwide. Offered services are available either directly from Vacon service centers or through authorized Vacon service partners. All service centers and partners are trained to service all Vacon products and can be relied upon to give expert technical support. This service network enables us to guarantee timely and proficient service to all our customers throughout the lifecycle of their Vacon products and/or solutions. Vacon offers three different levels of service policy. All three are available to all solar industry customers.

1

STANDARD WARRANTY POLICY (5 years)

- The Vacon Standard Warranty Policy is granted free of charge to all VACON® 8000 SOLAR Inverters, offering users protection against unexpected failures for 5 years
- In order to maintain warranty beyond 24 months maintenance is required in accordance with the maintenance schedule

2

EXTENDED SERVICE POLICY

(Comprehensive warranty up to 20 years)

- Vacon offers its Extended Service Policy to all solar customers. The Extended Service Policy is always a service package tailored according to the customer's requirements and offers a full 20 years warranty coverage with 5 year terms
- The Extended Service Policy is a contractual document between the customer and Vacon. For more information contact your nearest Vacon sales office
- The Extended Service Policy is rendered with Proactive Maintenance and Extended Warranty Services:

Proactive Maintenance

- Active replacement of parts before the estimated end of their lifecycle
- Maintenance schedule defines the inspections, checks and replacements required
- Risk of unexpected failures is substantially reduced
- Environmental Assessment verifies the operational conditions

Extended Warranty Service

- Service provider covers the risk of unexpected failures and ensures the usability of the inverter
- In case of unexpected failures, costs of parts and labor incurred during replacement are covered

3

GENERAL SERVICE POLICY

- Customers that have not opted for an Extended Service Policy are still able to receive services for commissioning, maintenance and repair and spare parts
- For the Standard Warranty to remain valid, the following services must be ordered and carried out in accordance to the maintenance schedule

- Vacon Solar Commissioning
- Proactive Maintenance
- Repair and Spare Part Services

* Vacon also offers additional services to meet rule, regulation or law changes that require modifications, changes etc. to the solar inverters.

REFERENCES

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:

HIMIESA TEXTILE YARN
ALICANTE, SPAIN

Located on the sunny Mediterranean area of Alicante (Spain), Himiesa is one of those companies that has managed to combine tradition and innovation in the manufacturing of textile yarns. This has helped them become one of the leading companies on the market.

With a clear concern for the environment and an aim for reducing both CO2 emissions and energy costs, the company opted decisively for photovoltaic solar energy to achieve these goals. From the beginning they had strong conviction that they should trust the essential part of power generation to a solvent and consolidated company such as Vacon.

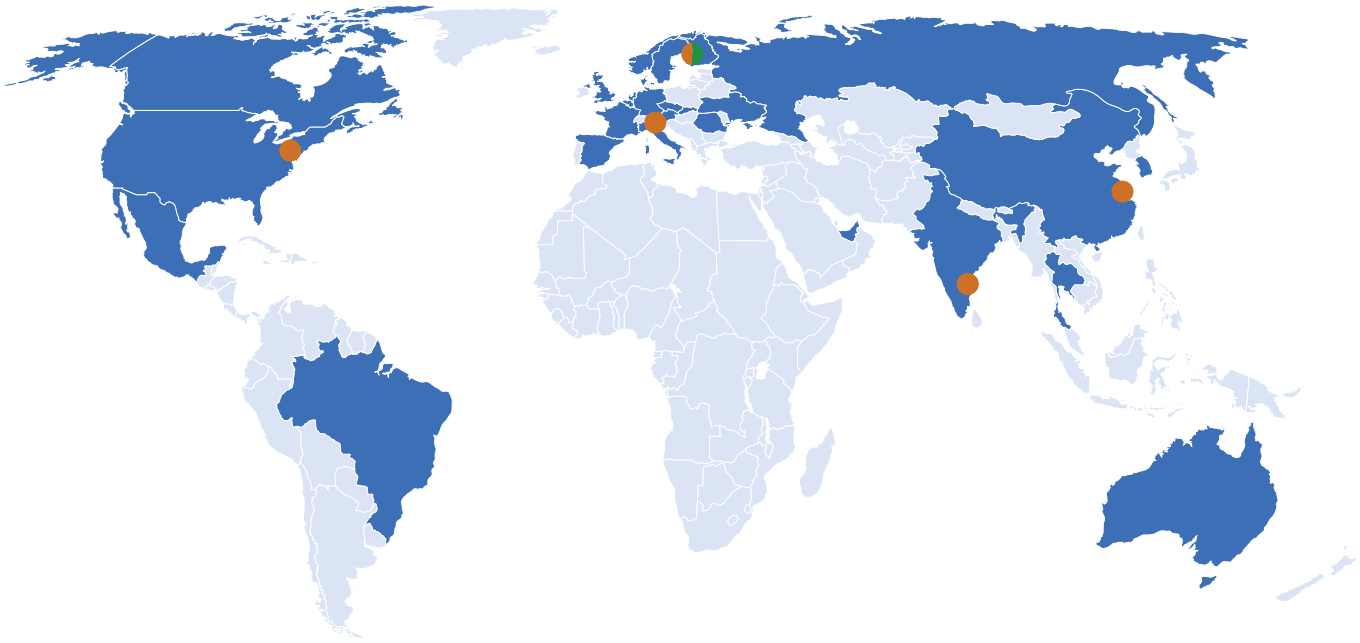
Entrusting the execution of the project to Electroaldesa, an important system integrator in Spain, Vacon was present in all the stages of the project, adapting to the customer's changes and needs. Vacon's wide portfolio of product and features as well as their staff's passionate attitude played a key role during the project along with Vacon's continuous support for the pre and post-sales. The choice was clear: Vacon was outlined as the preferential supplier from the beginning by the managing team of the Himiesa.

On a sunny Mediterranean day, 1.200 kW from thin film solar modules installed on the roof, feed 2 twin NXV0600 units of the VACON 8000 SOLAR Inverter, spilling all the available solar power into the electrical network. The Multimaster configuration assures maximum efficiency in any solar condition.

VACON AT YOUR SERVICE

Vacon is driven by a passion to develop, manufacture and sell the best AC drives and inverters in the world - and to provide customers with efficient product life-cycle services. Our AC drives offer optimum process control and energy efficiency for electric motors. Vacon inverters play a key role when energy is produced from renewable sources. Vacon has production and R&D facilities in Europe, Asia and North America, and sales and service operations in nearly 90 countries. In 2011, Vacon's revenues amounted to EUR 380.9 million, and the company employed globally approximately 1,500 people. The shares of Vacon Plc (VAC1V) are quoted on the main list of the Helsinki stock exchange (NASDAQ OMX Helsinki).

VACON – TRULY GLOBAL



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