PHOTOVOLTAIC SOLUTIONS

BONFIGLIOLI VECTRON

Three-phase grid- connected photovoltaic inverter

RPS 450

GB

BONFIGLIOLI

Foreword

Bonfiglioli: Specific Solutions for Power Conversion

Product diversification, process automation, and quality have enabled Bonfiglioli to play a leading role in the industry. Bonfiglioli's policy focuses on integrated solutions, competence and innovative technology as key factors, indispensable to ensure customer satisfaction, while production is aimed at achieving the highest standards.
Bonfiglioli product portfolio aims at meeting the toughest and most sophisticated requirement for Industrial Process and Automation Solution and for Mobile Equipment Solutions.

Industrial equipment applications

BONFIGLIOLI RIDUTTORI

Representing Helical, Bevel and Worm Gearmotors and Gear Units

BONFIGLIOLI VECTRON

Representing AC drives

Mobile equipment applications

BONFIGLIOLI TRASMITAL

Representing Planetary Gearmotors and Gear Units

Product description

The RPS450 solar inverters represent the optimal solution for feeding the solar energy converted from solar modules into the electrical supply grid. A high MPPT adaption efficiency as well as the use of high-quality and low-loss components ensures the highest efficiency.
The use of sophisticated and robust standard components, which have already been used thousands of times in electrical propulsion technology, and are proven under the harshest environmental conditions all over the world, guarantees a long life-cycle and high reliability. The high availability, paired with the excellent efficiency leads to maximum outputs.
A modular system configuration with a few easily accessible individual parts allows the most effective and shortest amount of service and maintenance work.
The RPS450 solar inverter can be operated with every type of solar module, even with thin-layer modules which require grounding on the system. The wide input voltage range allows high flexibility in the planning of the solar generator.
The parameters of the RPS450 solar inverters are set by default at the factory so that they can be operated immediately with any generator configuration. This allows fast and therefore good-value commissioning.

RPS 450

AEC mains unit

The heart of the RPS

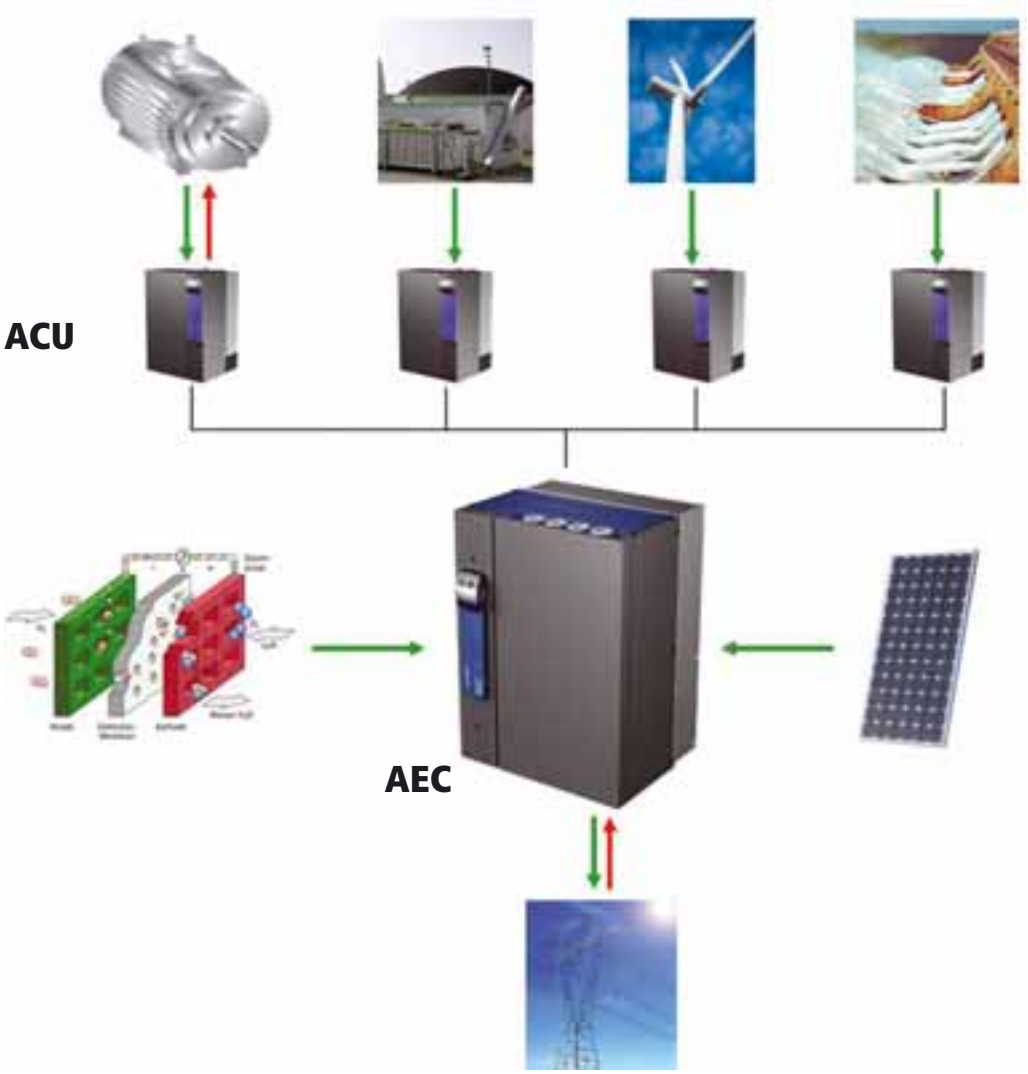
Alongside the diverse range of applications in electrical propulsion technology, the AEC mains unit is particularly suitable for constructing systems for the continual and norm-conform feeding of electrical energy into the supply grid. A special feature is the high rating of the sinus form of the fed mains current.

The energy sources of this system can be both conventional and in particular renewable energy sources, such as fuels cells, photovoltaic systems and wind and water power.

The AEC mains unit is particularly suitable for the low-loss feeding of electrical energy from DC voltage energy sources, whereby in addition to renewable energy sources, buffer batteries can also be used to construct an emergency power supply.

In connection with the ACT/ACU class frequency inverter, the energy produced by electrical machines can also be fed into the supply grid with a high level of efficiency.

Application example



Key features overview

- Power range 9.7 kVA to 318 kVA
- Sine current in generator and motor operation
- Adjustable phase shift between current and voltage (Cos Phi)
- Low harmonic distortion
- High efficiency
- High torque gain of the frequency inverter connected to the DC-link
- Various software functions

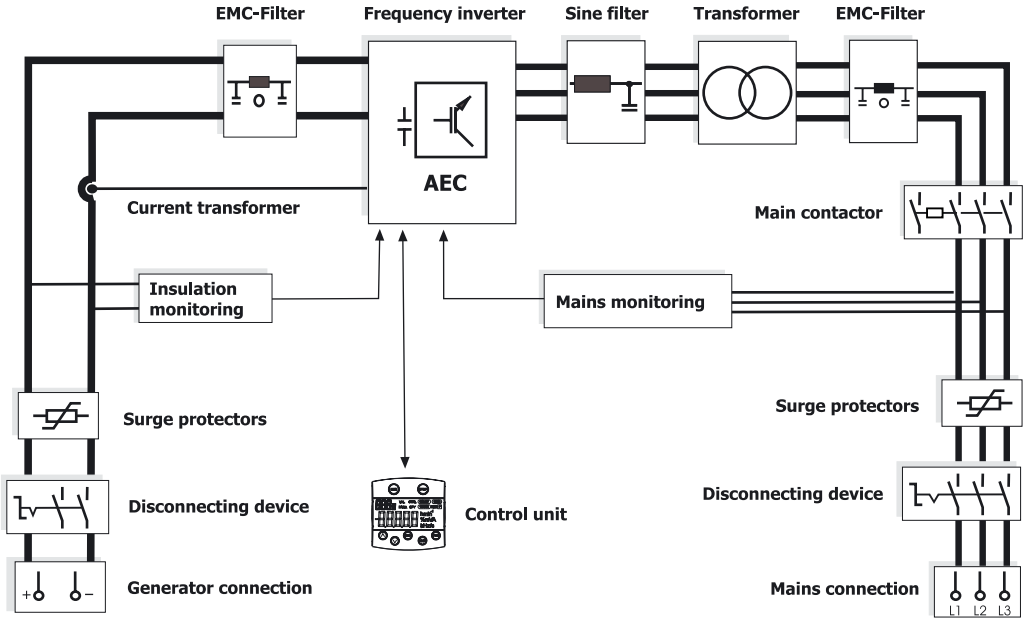
RPS 450 Compact

Photovoltaic inverter with transformer 30kWp - 170kWp generator connected power

Description

For power ranges up to 170kWp, Bonfiglioli offers the RPS450 solar inverter with an internal transformer for feeding into the low-voltage network.
Due to the use of high-quality materials and special production processes, component losses are minimised and a higher degree of efficiency can be reached. Galvanic isolation, which is compulsory in many countries, between the power supply and the generator in order to prevent the feeding of constant components is guaranteed by the internal isolating transformers.
The compact units of the RPS450 range can be interconnected as often as desired on the power supply side, which makes it possible to implement large systems and permits a flexible adjustment on the solar generator.
Solar inverters can be operated in the master-slave network without additional components, the communication interfaces and software functions for it are present in each inverter. The operation of the inverter module in the master-slave network permits a high power output even in the part-load operational range, whereby the operating mode "alternating master module" provides an additional increase in the system life-span. The compact design and limited construction height allows the device to be transported through any standard door. The devices are characterised by an especially simple and fast commissioning process, whereby the power connections merely have to be wired and the solar inverter has to be started in order to start up the device.

Construction



Key features overview

- High efficiency up to 96.7%
- No-load voltage up to 900 V (up to 1000V optionally)
- MPPT-range 425 V - 875 V
- Low distortion factor
- Cos Phi adjustable
- Free assignment of functions to digital and analog inputs and outputs
- Adjustable operating behavior
- Integrated isolating transformer
- Insulation monitoring
- Monitoring of mains with adjustable operating range
- Surge protectors on mains and generator side
- Interference suppression filter on mains and generator side
- Externally switchable AC main switch and DC switch at the 120kWp- und 170kWp-unit
- Communication interfaces
  - RS485 and CAN (standard)
  - Profibus DP, Ethernet (option)
- Control unit KP500
- Ease of operation
- Quick commissioning
- Easy to maintain due to readily accessible components
- Operation with grounded generators

Technical data

Type					
RPS450		**-030**	**-060**	**-120**	**-170**
Input					
Recommended maximum connected generator power	kWp	30	60	120	170
MPPT range	V	425 ... 875			
Max. input voltage	V	900			
Max. input current	A	70	140	250	350
Output AC-side					
Mains voltage	V	400			
Mains frequency	Hz	50			
Rated power	kW	27	54	108	150
Rated current (400 V mains)	A	39	78	156	217
Power factor	-	adjustable, >0.99 at rated power			
Harmonic distortion	%	< 3			
Transformer					
Isolation level	-	according to EN 60726:2003			
Further norms	-	according to EN 61558-2-4			
Efficiency					
Maximum efficiency	%	95.2	95.7	96.7	96.7
European efficiency	%	94.4	94.9	95.9	95.9
Consumption during night hours	W	20.0			
Mechanics					
Control cabinet dimensions (WxHxD)	mm	600x1300x500	800x1700x600	1200x1700x800	1200x1700x800
Weight approx.	kg	285	650	950	1100
Degree of protection [1]	-	IP 20			
Environment					
Ambient temperature	°C	-10 ... 40			
Rel. Air humidity	%	15 ... 85, not condensing			
Rate of coolant air required	m^3/h	750	1500	3000	4500
Protection and monitoring					
Insulation monitoring	-	50kΩ fixed tripping value			
Grid monitoring	-	Adjustable voltage and frequency range			
Overvoltage protection	-	EN Typ 2, IEC Class II on mains and generator side			
Interfaces					
Communication interface [2]	-	CAN, RS485			
Potential-free signaling contacts [2]	-	Overvoltage protection malfunction, inverter malfunction			

1) Higher degree of protection on request
2) Pther on request

Standards and directives

Mains connection terms
- VDE 0126-1-1
- ENEL DK 5940
- Real Decreto 661/2007
- Real Decreto 1663/2000

Electromagnetic compatibility
- DIN EN 61000-6-2; VDE 0839-6-2 (2006)
- DIN EN 61000-6-4; VDE 0839-6-4 (2007)
- DIN EN 61000-3-11; VDE 0838-11 (2001-04)
- DIN EN 61000-3-12; VDE 0838-12 (2005-09)

Safety, function, ambient conditions
- DIN EN 50178; VDE 0160
- DIN EN 60529; VDE 0470-1
- DIN EN 60721-3-3
- EN 60950-1
- CE
- Internal isolating transformer according to EN61558-2-4

Certifications for further country-specific standards projected.

RPS 450

RPS 450 TL

Photovoltaic inverter without transformer
280kWp - 1190kWp generator connected power

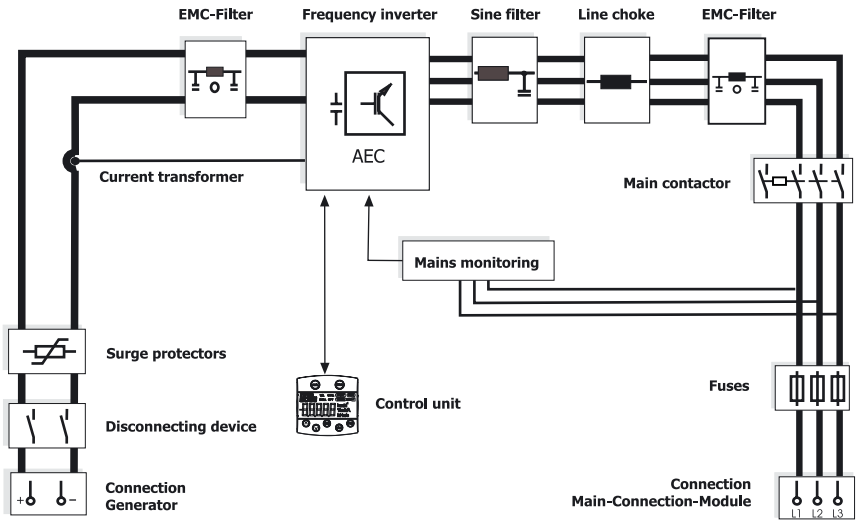
Description

In the power range from 280kWp to 1190kWp, Bonfiglioli offers solar inverters of the RPS450-TL range without internal transformers. This is the most cost and yield optimal solution for photovoltaic systems of moderate to large output. The modular construction allows a perfect adjustment of the inverter to the respective solar generator and increases the availability of the system. The right size of inverter can be selected from the pre-defined and cost-optimised combinations. Alternatively, overall systems of up to 1.19 MWp can be flexibly constructed from individual inverter modules, with nominal outputs of 140kWp and 170kWp. The RPS450TL solar inverters are designed for IT networks and can be attached directly to the low-voltage connections of the medium-voltage transformers. Network connection modules serve as an interface between the inverter modules and the transformer, and are available for different power outputs. Additional low-voltage distribution boards are therefore not necessary.

Each inverter module possesses its own MPP tracker, which reduces yield losses caused by the mismatching of the solar generator.

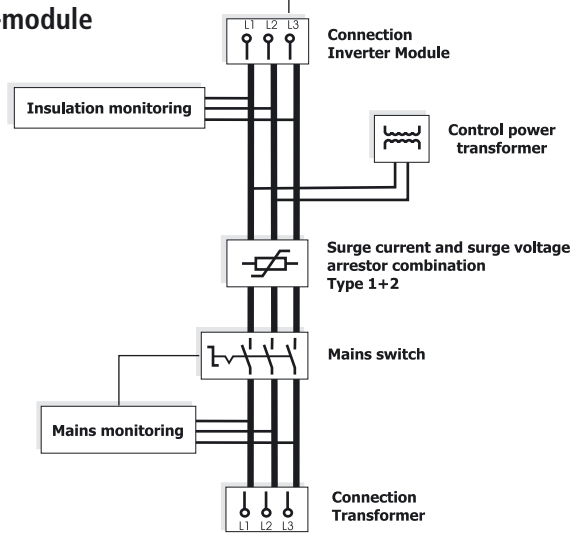
Construction

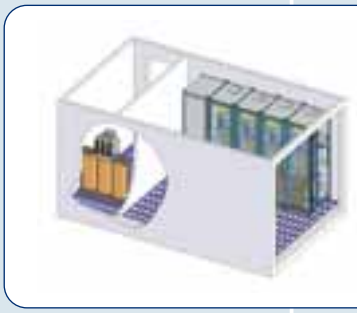
Block diagram inverter module



Modular concept

Block diagram mains-connection-module





Example of an Inverter station

Technical data

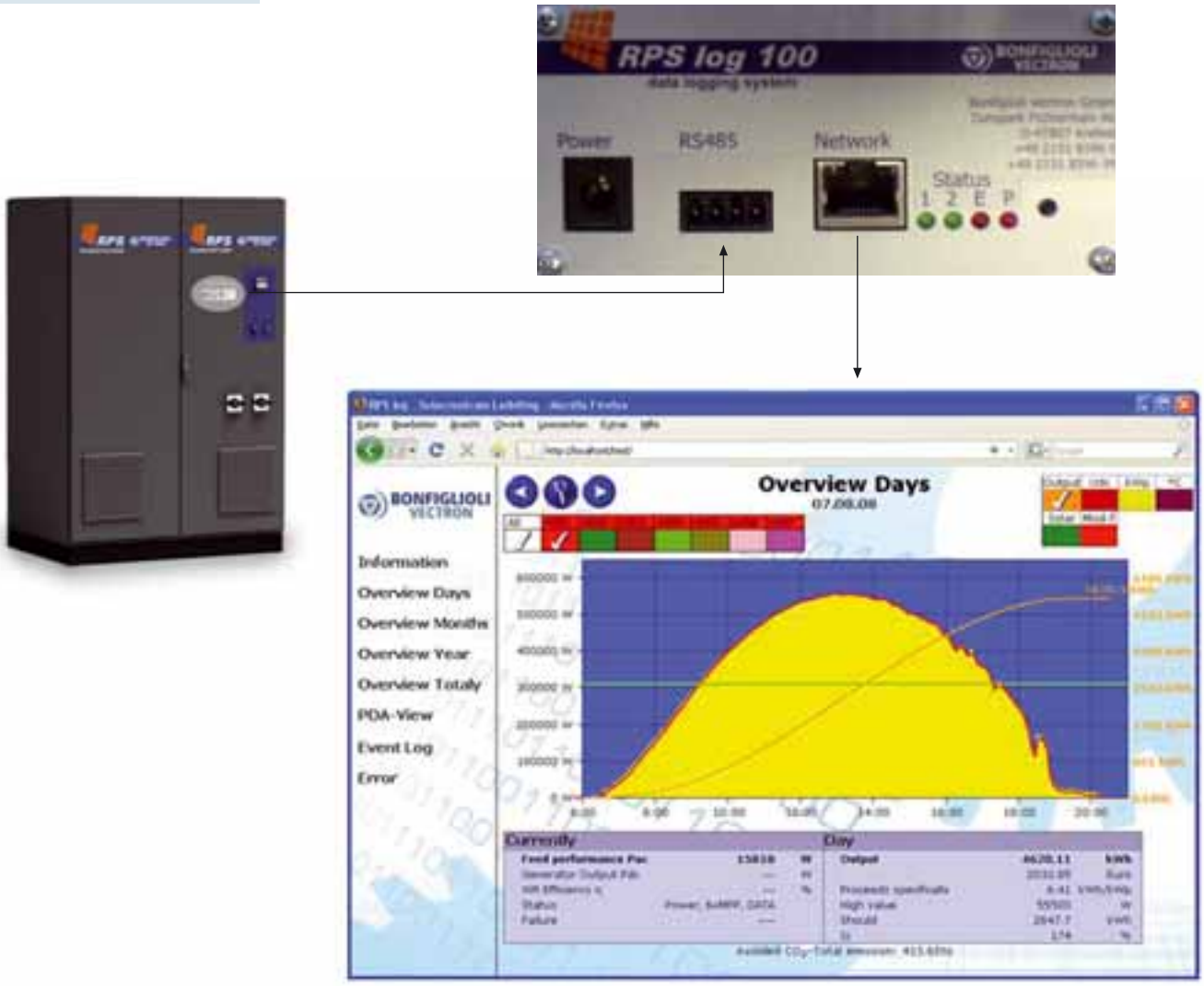
Type								
RPS450 [1]		**-280 TL**	**-340 TL**	**-560 TL**	**-680 TL**	**-850 TL**	**-1020 TL**	**-1190 TL**
Input								
Recommended maximum connected generator power	kWp	280	340	560	680	850	1020	1190
MPPT range (270V mains)	V	425 ... 875						
Max. input voltage	V	900						
Max. input current	A	600	700	1200	1400	1750	2100	2450
Output								
Mains voltage	V	270 - 330 / IT system						
Mains frequency	Hz	50						
Rated power	kW	250	300	500	600	750	900	1050
Rated current (270V mains)	A	540	640	1080	1280	1600	1920	2240
Power factor	-	adjustable, >0.99 at rated power						
Harmonic distortion	%	< 3						
Efficiency								
Maximum efficiency	%	98.3						
European efficiency	%	98.0						
Consumption during night hours	W	40		80		100	120	140
Mechanics								
Dimensions (WxHxD)	mm	1800x2100x 800	1800x2100x 800	3000x2100x 800	3200x2100x 800	3800x2100x 800	4400x2100x 800	5000x2100x 800
Weight approx.	kg	1150	1300	2100	2450	3000	3550	4100
Degree of protection [2]	-	IP 20						
Environment								
Ambient temperature	°C	-10 ... 40						
Rel. Air humidity	%	15 ... 85, not condensing						
Rate of coolant air required	m^3/h	3000		6000		7500	9000	10500
Protective and monitoring equipment								
Insulation monitoring	-	30kΩ fixed tripping value						
Grid monitoring	-	Adjustable voltage and frequency range						
Overvoltage protection	-	EN Type 1 + 2, IEC Class I + II on mains side and EN Type 2, IEC Class II on generator side						
Interfaces								
Communication interface [3]	-	CAN, RS485						
Potential-free signaling contacts [3]	-	Overvoltage protection malfunction, inverter malfunction						

1) Other power classes available on request
2) Higher degree of protection on request
3) Other on request

Key features overview

- Flexible configuration of the inverter system by interconnection of 140kWp and 170kWp inverter modules and a corresponding mains-connection-module
- Multiple-string operation
- High efficiency, up to 98.3%
- No-load voltage up to 900 V (up to 1000V optionally)
- MPPT-range 425V - 875V
- Low distortion factor
- Cos Phi adjustable
- Free assignment of functions to digital and analog inputs and outputs
- Insulation monitoring
- Monitoring of mains with adjustable operating range
- Lightning current protector and surge protector on mains side (EN type I+II)
- Surge protector on generator side (EN type II)
- Interference suppression filter on mains and generator side
- Low weight
- Communication interfaces
  - RS485 and CAN (standard)
  - Profibus DP, Ethernet (option)
- Control unit KP500
- Ease of operation
- Quick commissioning
- Easy to maintain and readily accessible components
- Operation with grounded generators possible
- Complies with all relevant standards and directives as listed for the compact system

Inverter monitoring



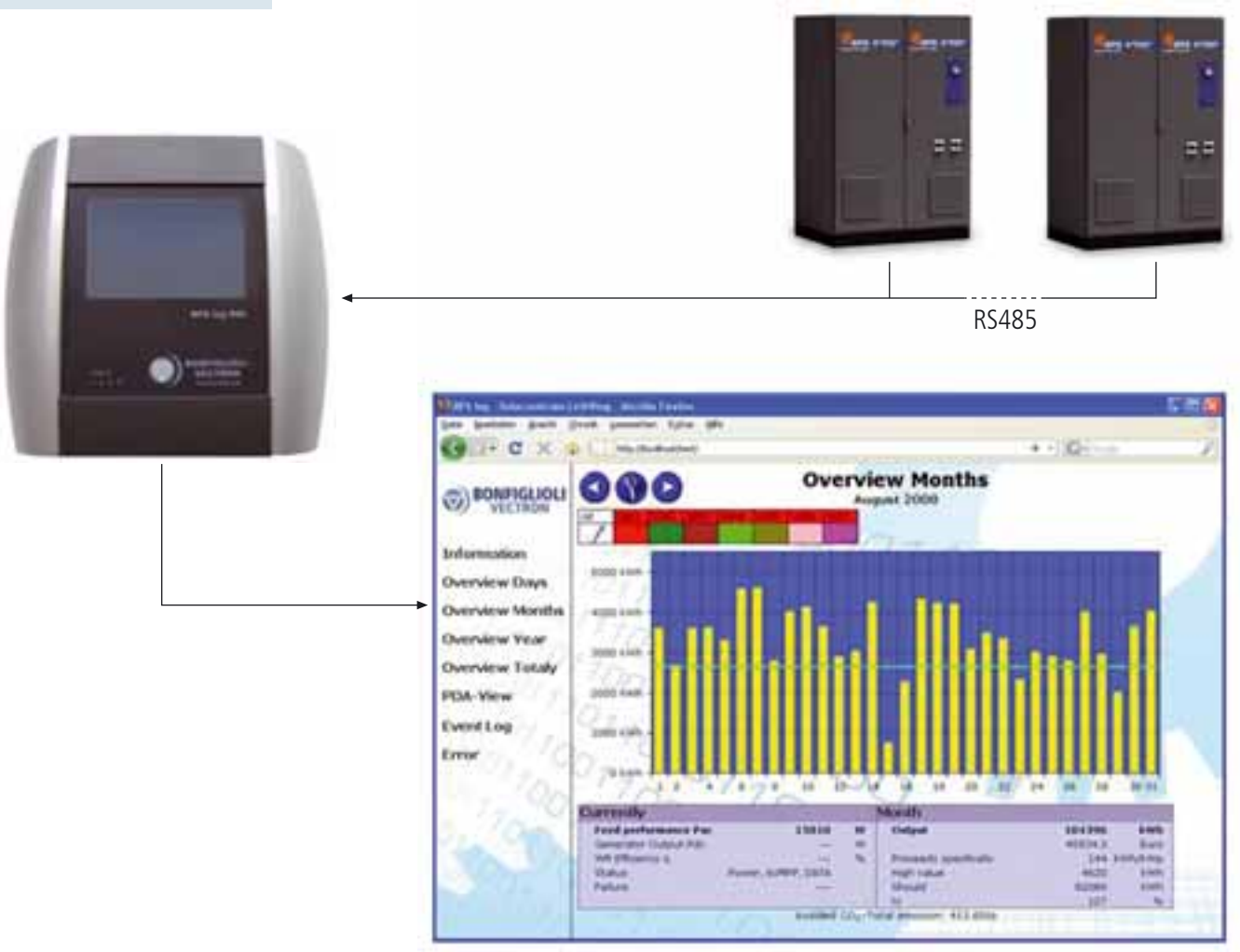
Description

The RPSlog100 data logger can be used to save measuring data and monitor individual RPS450 solar inverters. Measured data, production figures and events are cyclically saved.
The collected data is edited on the internal web server and can then be displayed in clear charts on a web browser. Consequently no additional software is necessary to read the data logger.
Alternatively the periodic transfer of the collected data via the Ethernet interface is also possible to a local network or the internet in order to create evaluations.
Defects which occur are displayed on the website and can be reported immediately via SMS or E-mail.

Key features overview

- Monitoring for single inverters
- 1 MB memory
- Real time clock
- TCP/IP-interface (10/100MBit)
- Integrated web server
- Configuration via browser interface
- Alert notification by Email / SMS / Homepage
- Remote access via internet
- Data export to a web server via FTP-transfer
- Data visualisation on a home page

System monitoring

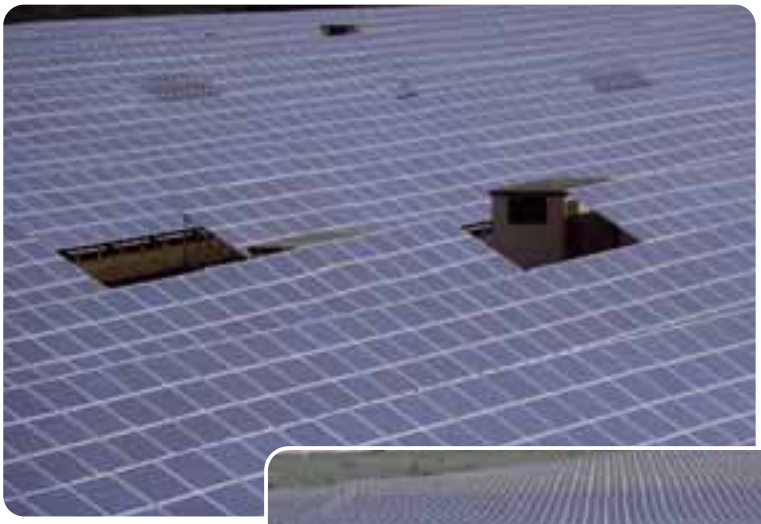


Description

Alongside the range of functions contained in RPSlog100, the RPSlog800 offers a large number of additional features and is therefore best suited to monitor large systems with up to 20 inverters. The configuration can be carried out easily via a browser interface or touchscreen, on which all the charts and diagnosis options are also available. The diverse connection options allow a more precise diagnosis of the system. In this way, for example, environmental data such as irradiation, temperature and wind speed can be collected or an electricity meter can be connected. Customer-specific warning and defect messages can be issued via a relay contact.

Key features overview

- Monitoring of multi-inverter installations
- Up to 20 inverters connectible
- Stringmonitoring function (up to 350 measuring channels)
- 1 GB memory
- Real time clock
- Graphics touch screen display
- TCP/IP-Interface (10/100MBit)
- Potential-free signalling contacts
- USB-Connector for data transfer to/from USB-Stick
- S0 In-/Output for energy meter
- Configuration via browser interface possible
- Multi-language (DE, EN, NL, IT, FR)
- Alert notification by Email / SMS / Homepage
- Remote access via internet
- Data export to a web server via FTP-transfer
- Data visualisation on a home page
- Wide range of accessories



Product overview photovoltaic inverter

30kWp

60kWp

120kWp

170kWp

RPS450 Compact

280kWp

340kWp

560kWp

680kWp

850kWp

1020kWp

1190kWp

RPS450 TL

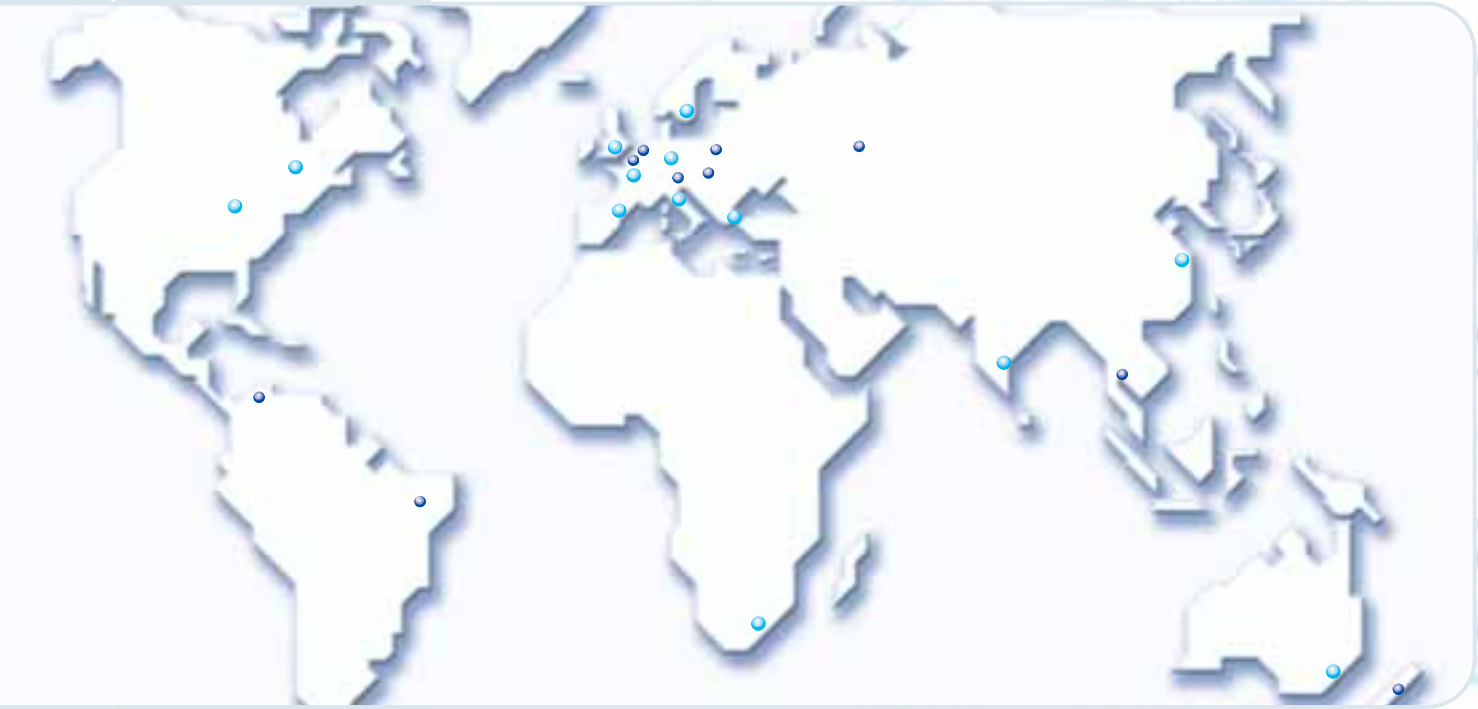
Maintenance and warranty

- 5 years warranty
- Warranty extension up to 20 years
- Maintenance and technical assistance by world wide Drive Service Centers
- Training courses by worldwide Drive Service Centers

Further products

Bonfiglioli is a Partner Worldwide for Power Transmission and Motion Control

The ever-growing export share has led Bonfiglioli into the most far away Countries. With expansion plans entailing a further growth of the sales network Bonfiglioli aims at improving both the competitiveness of its products and the effectiveness of the Customer service.
In every market place Bonfiglioli is committed to improve the Customer satisfaction by offering state-of-the-art technology and shorter deliveries. Nowadays branch companies and BEST Partners bearing the Bonfiglioli name are operating in seventeen Countries outside Italy, with sales and service in the other countries managed by appointed dealers.
The domestic network is made up of 30 sales office and representatives and 100 dealers operating with their own warehouse and supporting Customers locally. Throughout the World Bonfiglioli's reputed know-how and Service guarantee effective and timely assistance.



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