



Three-phase grid-connected photovoltaic inverter

RPS 450



BONFIGLIOLI

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



Representing Helical, Bevel and Worm Gearmotors and Gear Units



Representing AC drives

Mobile equipment applications



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.



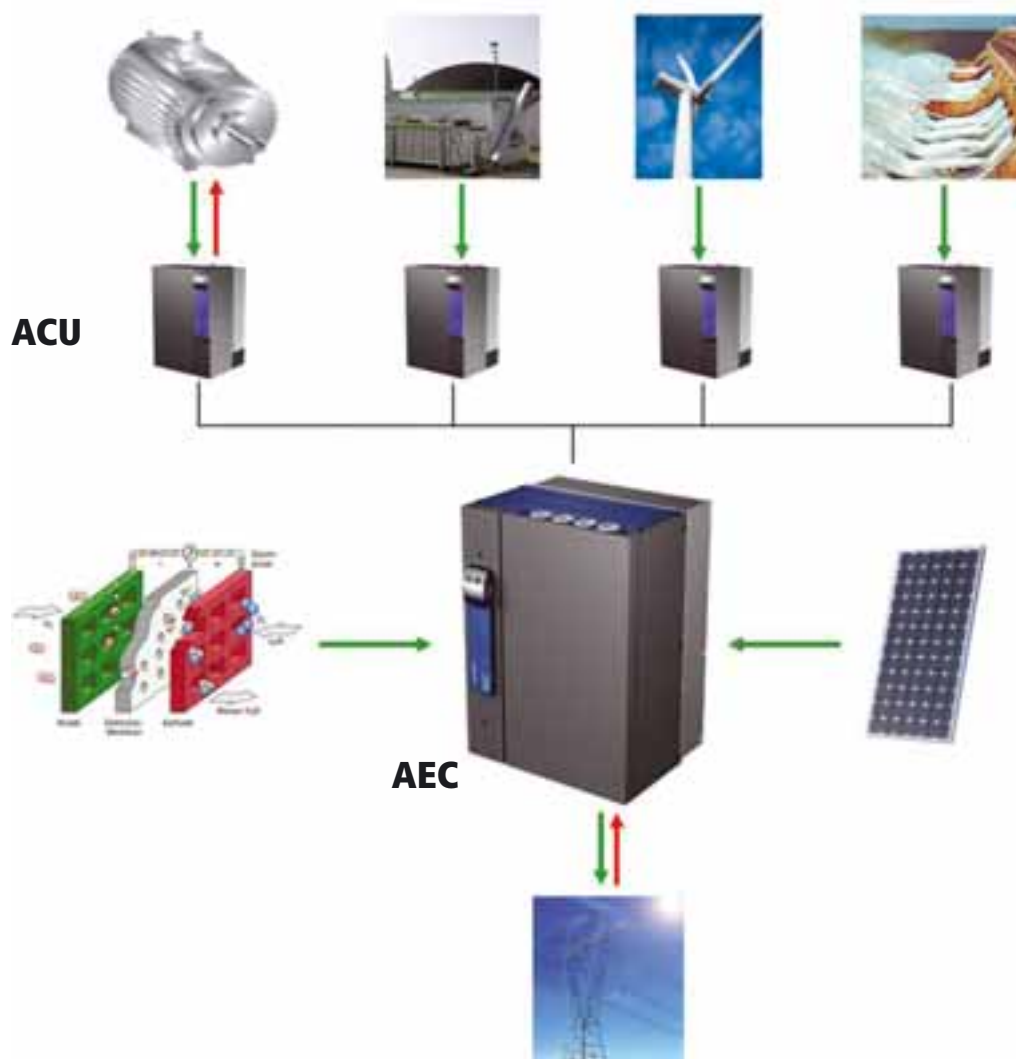
The heart of the RPS

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

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



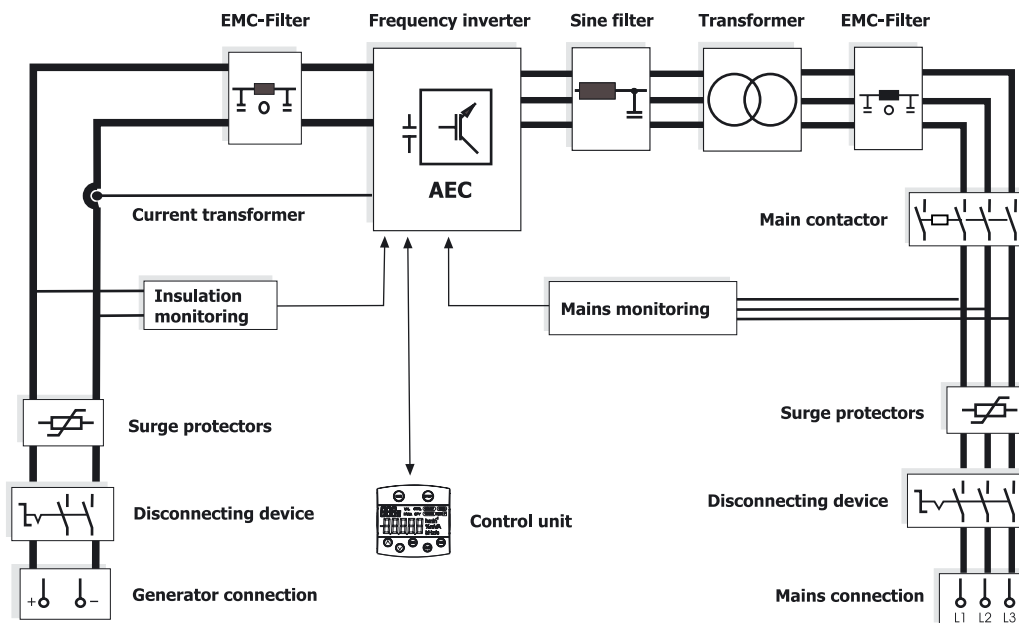
Description

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	m³/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.

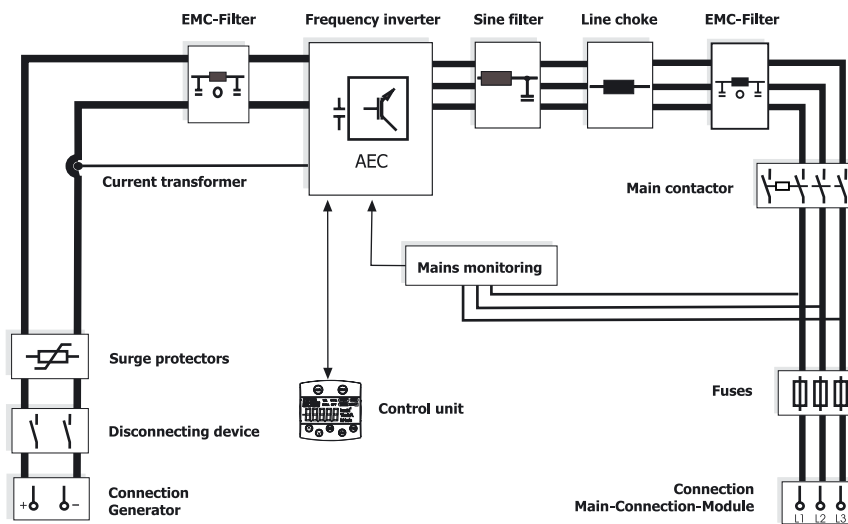
***Photovoltaic inverter without transformer
280kWp - 1190kWp generator connected power***



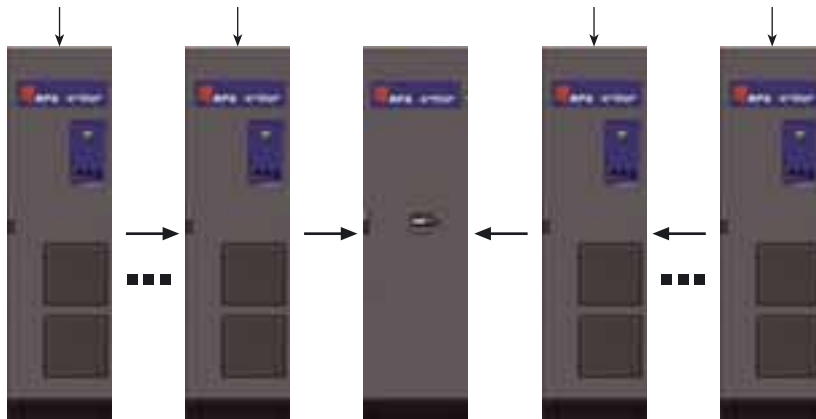
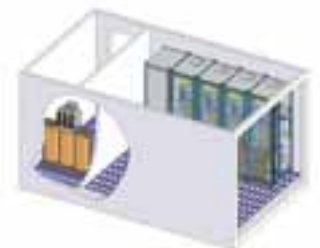
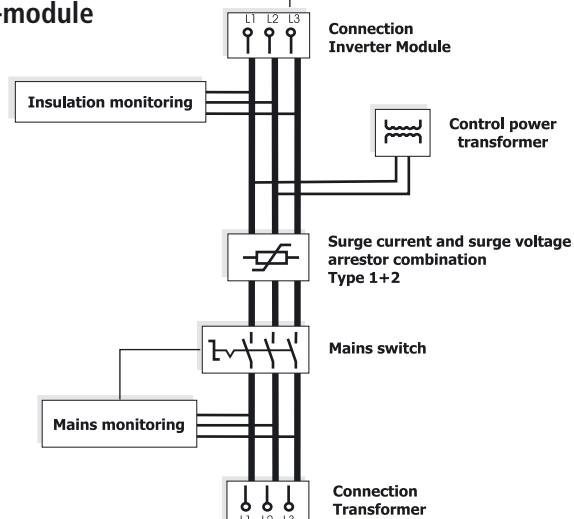
Description

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	1800x2100x800	1800x2100x800	3000x2100x800	3200x2100x800	3800x2100x800	4400x2100x800	5000x2100x800
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	m³/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						

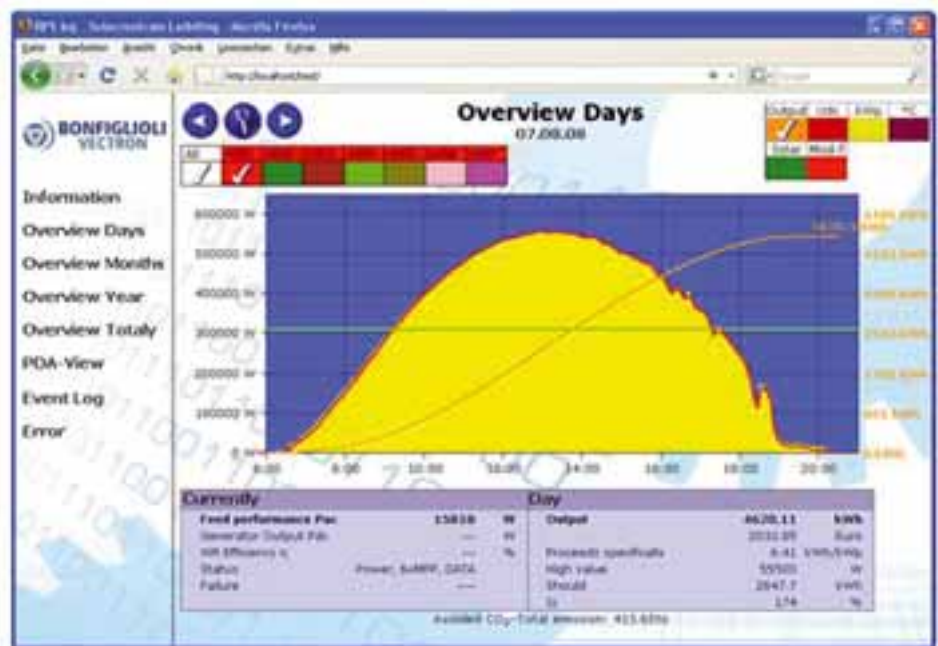
¹⁾ Other power classes available on request

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

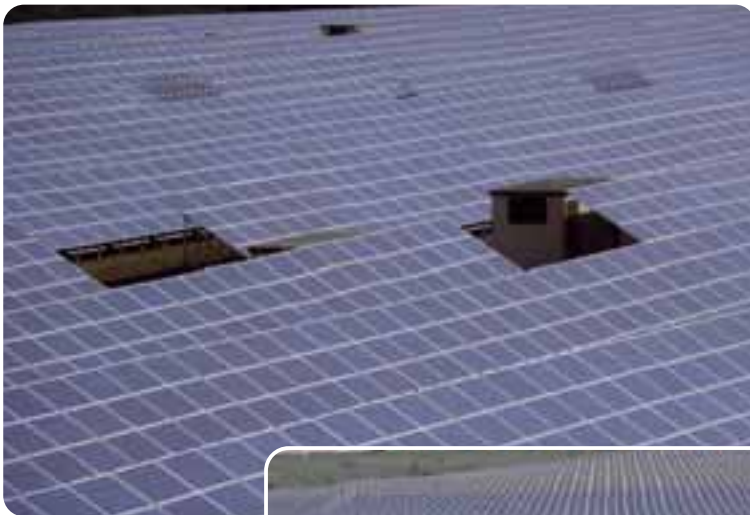
RS485

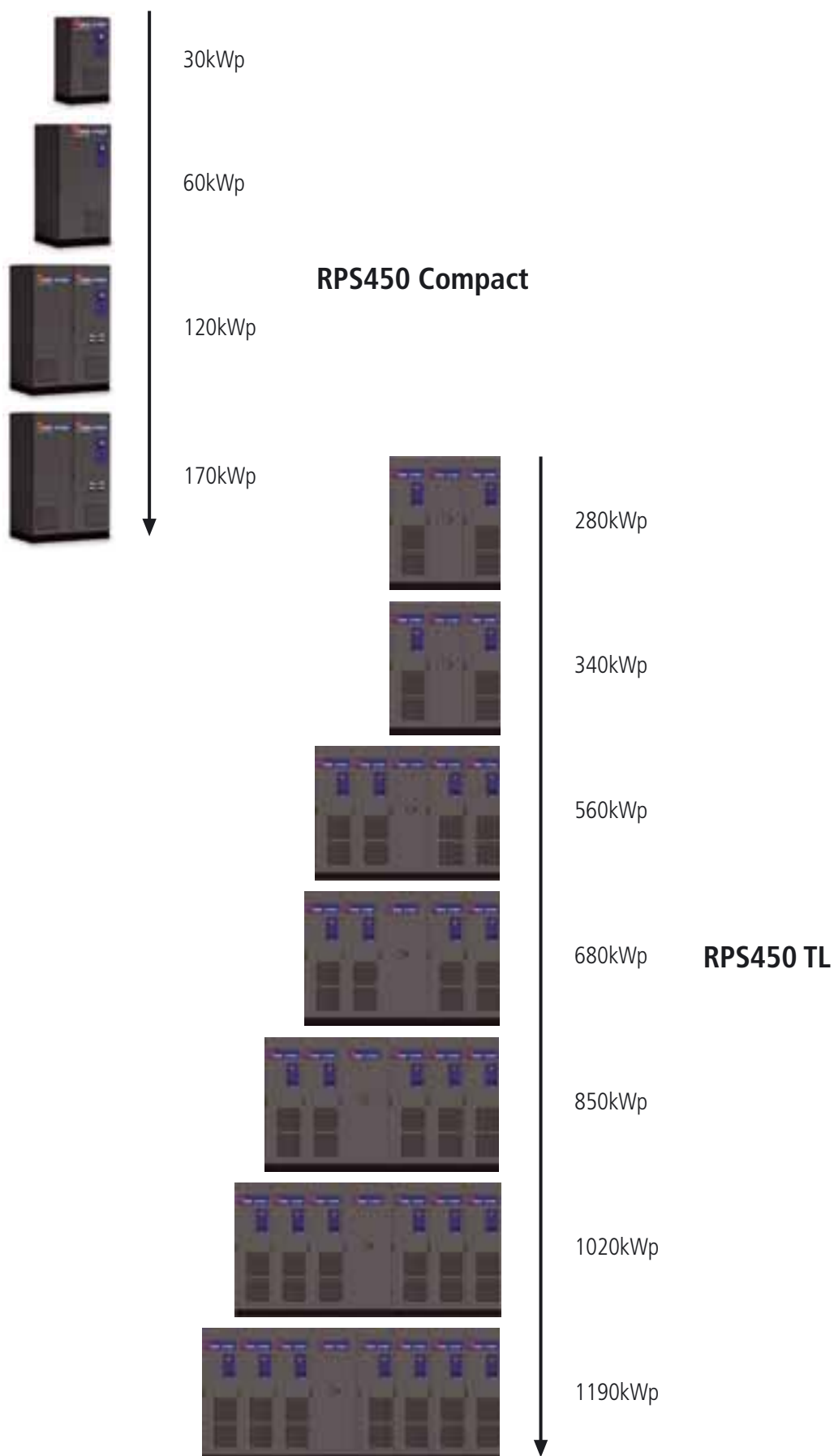
*Description*

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
- 50 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





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.



Bonfiglioli Worldwide & BEST Partners

Worldwide

AUSTRALIA

BONFIGLIOLI TRANSMISSION (Aust) Pty Ltd.
2, Cox Place Glendenning NSW 2761 (Australia)
Locked Bag 1000 Plumpton NSW 2761
Tel. (+61) 2 8811 8000 - Fax (+61) 2 9675 6605
www.bonfiglioli.com.au - sales@bonfiglioli.com.au

AUSTRIA **BEST**

MOLL MOTOR GmbH
Industriestrasse 8 - 2000 Stockerau
Tel. (+43) 2266 63421+DW - Fax (+43) 6342 180
www.mollmotor.at - office@mollmotor.at

BELGIUM **BEST**

ESCO TRANSMISSION N.V./S.A.
Culliganlaan 3 - 1831 Machelem Diegem
Tel. (+32) 2 7176460 - Fax (+32) 2 7176461
www.esco-transmissions.be - info@esco-transmissions.be

BRASIL

BONFIGLIOLI REDUTORES DO BRASIL INDUSTRIA E COMERCIO LTDA
Av. Padre Anchieta 365 - 09891-420 - Sao Bernardo do Campo
Sao Paulo (Brasil) - Tel. (+55) 11 4337 1806 - Fax (+55) 11 4337 5083
www.bonfiglioliodobrasil.com.br - bonfiglioli@bonfiglioliodobrasil.com.br

CANADA

BONFIGLIOLI CANADA INC.
2-7941 Janie Street - Concord, Ontario L4K 4L6
Tel. (+1) 905 7384466 - Fax (+1) 905 7389833
www.bonfigliolicanada.com - sales@bonfigliolicanada.com

CHILE **BEST**

IMATESA S.A.
Santa Rosa 5699 - San Miguel - Santiago
Tel. (+56) 2 5264702 - Fax (+56) 2 5265878
www.imatesa.cl - imatesa@imatesa.cl

CHINA

BONFIGLIOLI DRIVES (SHANGHAI) CO. LTD.
19D, No. 360 Pudong Road (S)
New Shanghai International Tower - 200120 Shanghai (P.R. China)
Tel. (+86) 21 69225500 - Fax (+86) 21 69225511
www.bonfiglioli.cn - bds@bonfiglioli.com.cn

FRANCE

BONFIGLIOLI TRANSMISSIONS S.A.
14 Rue Eugène Pottier BP 19
Zone Industrielle de Moimont II - 95670 Marly la Ville
Tel. (+33) 1 34474510 - Fax (+33) 1 34688800
www.bonfiglioli.fr - btf@bonfiglioli.fr

GERMANY

BONFIGLIOLI DEUTSCHLAND GmbH
Sperberweg 12 - 41468 Neuss
Tel. (+49) 02131 2988-0 - Fax (+49) 02131 2988-100
www.bonfiglioli.de - info@bonfiglioli.de

GREAT BRITAIN

BONFIGLIOLI UK Ltd
Industrial Equipment - Unit 3 Colemeadow Road
North Moons Moat - Redditch, Worcestershire B98 9PB
Tel. (+44) 1527 65022 - Fax (+44) 1527 61995
www.bonfiglioli.com - uksales@bonfiglioli-uk.com

Mobile Equipment
5 Grosvenor Grange, Woolston, Warrington - Cheshire WA1 4SF
Tel. (+44) 1925 852667 - Fax (+44) 1925 852668
www.bonfiglioli-uk.com - salesmobile@bonfiglioli-uk.com

GREECE **BEST**

B.E.S.T. HELLAS S.A.
O.T. 48A T.O. 230 - C.P. 570 22, Industrial Area - Thessaloniki
Tel. (+30) 2310 796456 - Fax (+30) 2310 795903
www.bonfiglioli.gr - info@bonfiglioli.gr

HOLLAND **BEST**

ELSTO AANDRIJFTECHNIEK
Loosterweg, 7 - 2215 TL Voorhout
Tel. (+31) 252 219 123 - Fax (+31) 252 231 660
www.elsto.nl - info@elsto.nl

HUNGARY **BEST**

AGISYS AGITATORS & TRANSMISSIONS Ltd
2045 Törökbalint, Tó u.2. (Hungary)
Tel. (+36) 23 50 11 50 - Fax (+36) 23 50 11 59
www.agisys.hu - info@agisys.hu

INDIA

BONFIGLIOLI TRANSMISSIONS PVT Ltd.
PLOT AC7-AC11 Sidco Industrial Estate - Thirumudivakkam - Chennai 600 044
Tel. +91(0) 44 24781035 / 24781036 / 24781037
Fax +91(0) 44 24780091 / 24781904
www.bonfiglioli.co.in - bonfig@vsnl.com

INDONESIA **BEST**

PT. ANEKAMAKMUR TEKNIK NUSAJAYA
Pertokoan Glodok Makmur No. 32 - Jakarta Barat
Tel. (+62) 21 624 8828 - Fax (+62) 21 624 2405
www.anekamakmur.com - sales@anekamakmur.com

ITALY

BONFIGLIOLI ITALIA S.p.A.
Via Sandro Pertini lotto 7b - 20080 Carpiano (Milano)
Tel. (+39) 02 985081 - Fax (+39) 02 985085817
www.bonfiglioli.it - customerservice.italia@bonfiglioli.it

NEW ZEALAND **BEST**

SAECO BEARINGS TRANSMISSION
36 Hastie Avenue, Mangere Po Box 22256, Otahuhu - Auckland
Tel. (+64) 9 634 7540 - Fax (+64) 9 634 7552
mark@saeco.co.nz

POLAND **BEST**

POLPACK Sp. z o.o. - Ul. Chrobrego 135/137 - 87100 Torun
Tel. (+48) 56 6559235 - 6559236 - Fax (+48) 56 6559238
www.polpack.com.pl - polpack@polpack.com.pl

PORTUGAL **BEST**

BT BONFITEC Equipamentos Industriais, Lda.
Largo do Colegio de Ermesinde, 70 - Formiga 4445-382 Ermesinde
Tel. (+351) 229759634/5/6 - Fax (+351) 229752211
www.bonfitec.pt - bonfitec@bonfitec.pt

RUSSIA **BEST**

FAM
57, Maly prospekt, V.O. - 199048, St. Petersburg
Tel. (+7) 812 3319333 - Fax (+7) 812 3271454
www.fam-drive.ru - info@fam-drive.ru

SPAIN

TECNOTRANS BONFIGLIOLI S.A.
Pol. Ind. Zona Franca sector C, calle F, n°6 08040 Barcelona
Tel. (+34) 93 4478400 - Fax (+34) 93 3360402
www.tecnotrans.com - tecnotrans@tecnotrans.com

SOUTH AFRICA

BONFIGLIOLI POWER TRANSMISSION Pty Ltd.
55 Galaxy Avenue, Linbro Business Park - Sandton
Tel. (+27) 11 608 2030 OR - Fax (+27) 11 608 2631
www.bonfiglioli.co.za - bonfigsales@bonfiglioli.co.za

SOUTH KOREA **BEST**

YOUN HO INDUSTRIAL
Room B1, World Plaza Bldg.
1262 Guro-Dong, Gurd-Gu, Seoul
Tel. (+82) 2 626 43201 - Fax (+82) 2 263 23202
www.younho.com - younho@younho.com

SWEDEN

BONFIGLIOLI SKANDINAVIEN AB
Koppargatan 8 - 234 35 Lomma (Sweden)
Tel. (+46) 40418230 - Fax (+46) 40414508
www.bonfiglioli.se - info@bonfiglioli.se

THAILAND **BEST**

K.P.T MACHINERY (1993) CO.LTD.
259/83 Soi Phiboovnes, Sukhumvit 71 Rd. Phrakhanong-nur,
Wattana, Bangkok 10110
Tel. (+66) 2 3913030/7111998
Fax (+66) 2 7112852/3811308/3814905
www.kpt-group.com - sales@kpt-group.com

TURKEY

BONFIGLIOLI TURKIYE
Atatürk Organize Sanayi Bölgesi, 10015 Sk. No: 17, Çiğli - Izmir
Tel. +90 (0) 232 328 22 77 (pbx) - Fax +90 (0) 232 328 04 14
www.bonfiglioli.com.tr - info@bonfiglioli.com.tr

USA

BONFIGLIOLI USA, INC.
3541 Hargrave Drive Hebron, Kentucky 41048
Tel. (+1) 859 334 3333 - Fax (+1) 859 334 8888
www.bonfiglioliusa.com
industrialsales@bonfiglioliusa.com - mobilesales@bonfiglioliusa.com

VENEZUELA **BEST**

MAICA SOLUCIONES TECNICAS C.A.
Calle 3B - Edif. Comindu - Planta Baja
Local B - La Urbina - Caracas 1070
Tel. (+58) 212 2413570 / 2425268 / 2418263
Fax (+58) 212 2424552 - Tlx 24780 Maica V - maica1@cantv.net

HEADQUARTERS

BONFIGLIOLI RIDUTTORI S.p.A.
Via Giovanni XXIII, 7/A
40012 Lippo di Calderara di Reno
Bologna (ITALY)
Tel. (+39) 051 6473111
Fax (+39) 051 6473126
www.bonfiglioli.com
bonfiglioli@bonfiglioli.com

SPARE PARTS BONFIGLIOLI

B.R.T.
Via Castagnini, 2-4
Z.I. Bargellino - 40012
Calderara di Reno - Bologna (ITALY)
Tel. (+39) 051 727844
Fax (+39) 051 727066
www.brtbonfiglioliricambi.it
brt@bonfiglioli.com

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