

Solutions for solar energy

 **BONFIGLIOLI**  
*Power & Control Solutions*





**BONFIGLIOLI  
RIDUTTORI**



**BONFIGLIOLI  
VECTRON**



## We design and manufacture solutions for power transmission and control and for energy generation

Bonfiglioli is a leading company that competes at the highest levels of the global power transmission market.

Bonfiglioli designs, manufactures and distributes a complete range of gearmotors, drive systems and planetary gearboxes and boasts the best integrated offering on the market today. Bonfiglioli has enjoyed impressive growth in recent years.

Efficiency and competitiveness have both been improved by the acquisition of established market-leading companies, the expansion of existing plant and the construction of new factories and, above all, by an ambitious programme of production process automation. The Bonfiglioli name embodies the values of experience and advanced technology, supported by constant dedication to the cause of innovation and research and by the financial resources necessary to sustain a process of continuous evolution.

The Bonfiglioli Group offers the power transmission market three distinct brands:



**BONFIGLIOLI  
RIDUTTORI**



**BONFIGLIOLI  
VECTRON**



**BONFIGLIOLI  
TRASMITAL**

The strength of these brands lies in the high technology content of each product and the careful integration of different technologies to provide an exclusive and synergic solution. Quite uniquely, Bonfiglioli has the core capabilities to develop systems which integrate electronic, hydraulic and mechanical engineering.

These solutions represent choices of excellence for industrial systems and mobile machinery as well as innovative renewable energy applications in the wind turbine, solar panel and bio fuel sectors.

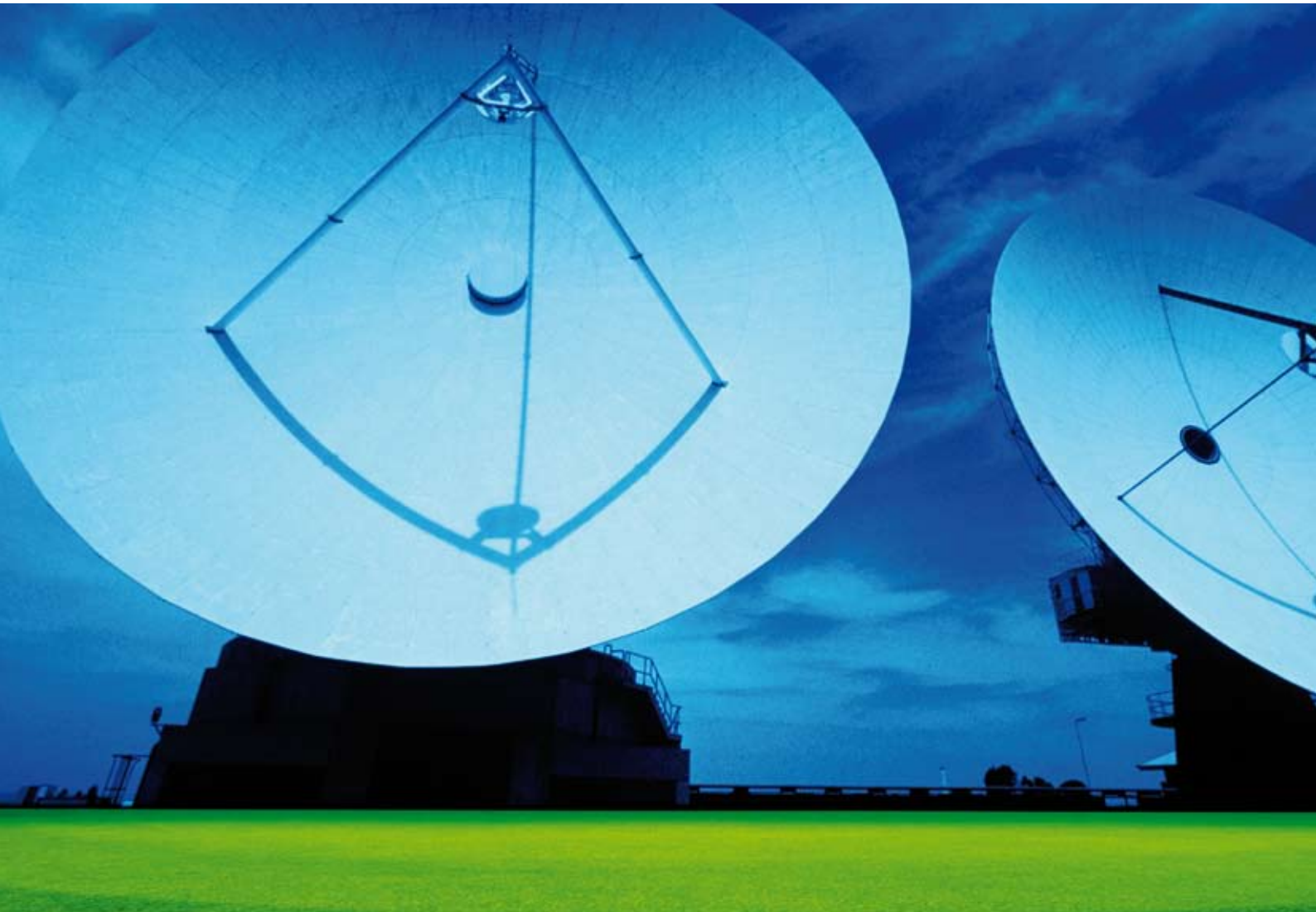
Hi-tech industries and complex applications increasingly call for the ability to provide solutions and not just products. This can only be achieved with the appropriate expertise. And we are convinced that this is our unique selling point which we must foster and invest in our drive to promote innovation.

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## Bonfiglioli Riduttori and Bonfiglioli Vectron develop innovative solutions for industry and renewable energy

Bonfiglioli Riduttori today is one of the top brands in the power transmission industry. The company's success is the result of a business strategy that relies on three fundamental factors: know-how, innovation and quality.

All the brand's gearmotors offer excellent technical characteristics and guarantee the highest performance. Substantial investment and technical expertise have enabled the company to achieve an annual production output of 1600,000 units, using completely automated processes.

Certification of the company's Quality System by DNV and TÜV is proof of the high quality standards achieved. With the acquisition of the Vectron brand, Bonfiglioli is now established as leader of the industrial automation sector. Bonfiglioli Vectron delivers products and services for completely integrated inverter solutions. These solutions complement Bonfiglioli's power transmission and control offering to the industrial sector.

### **Bonfiglioli Riduttori and Bonfiglioli Vectron's offering**

- Helical in-line gearboxes
- Bevel gearmotors
- Worm gears
- Shaft mounted gearmotors
- Heavy duty gearboxes
- Mechanical variators
- Three phase asynchronous motors
- Single phase motors
- Open loop inverters
- Closed loop inverters
- Servo motors and drives
- Solar systems







## Bonfiglioli Riduttori and Bonfiglioli Vectron supply specific products and solutions for photovoltaic energy

Well aware of the need to produce renewable, clean energy alternatives to oil, the Bonfiglioli Group has created a dedicated engineering team to optimise its existing products and develop completely new solutions.

A number of wind turbine gearboxes have already been developed using the know-how acquired by Bonfiglioli Riduttori's experts in the field.

Photovoltaic energy farm developers also use our gearboxes to control panel orientation.

Drawing on its vast experience in inverter design, Bonfiglioli Vectron has now developed the RPS 450, a three-phase photovoltaic inverter capable of converting the direct current generated by photovoltaic panels into alternating current ready for feeding into the grid.

Synergy between the various engineering teams in the Bonfiglioli Group has led to the development of a package optimised for the photovoltaic energy sector, capable of controlling all aspects of energy generation from panel movement to grid supply. Some of the biggest installations in Europe already use the Bonfiglioli Solar Energy solutions.

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## The biggest photovoltaic installations in Europe produce clean energy thanks to Bonfiglioli Vectron

Great Britain, Germany, Spain and Portugal, the nations driving the development of photovoltaic technology for renewable energy production, have all benefited from the assistance of Bonfiglioli's experts in the design and construction of their green energy plant.

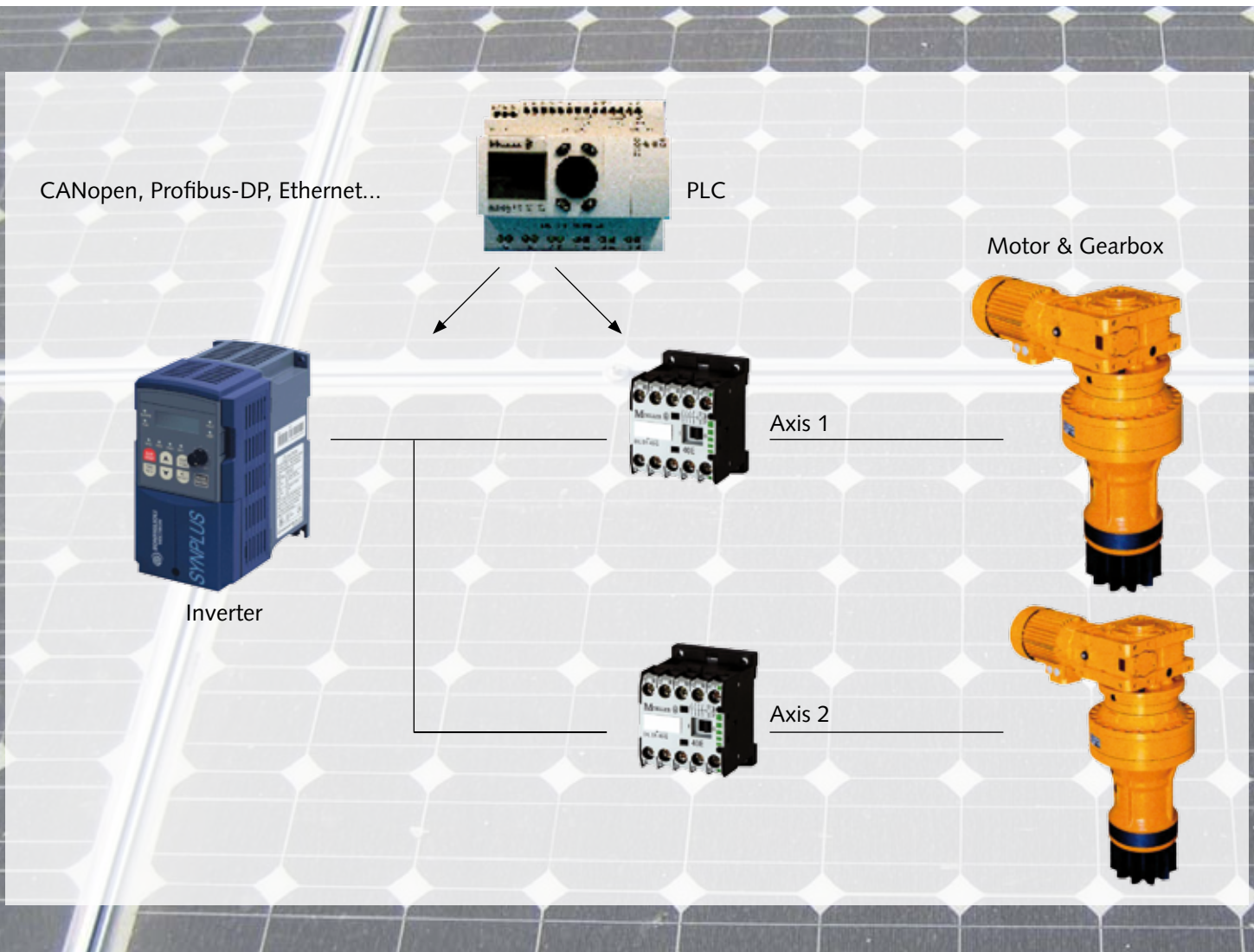
The world's biggest photovoltaic installation is located in Puertollano, in the heart of the Iberian peninsula.

The massive installation, operated by the Renovalia company, covers an area the size of 185 football pitches, or 118 hectares of ground, and has been up and running for a year. Bonfiglioli Riduttori supplied a total of 475 RPS inverters for this plant, to transform the DC power produced by 350,000 photovoltaic panels into 46 MW of clean AC power.





## Solar tracker system





## System monitoring







## RPS 450

### Three-phase photovoltaic inverters

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.

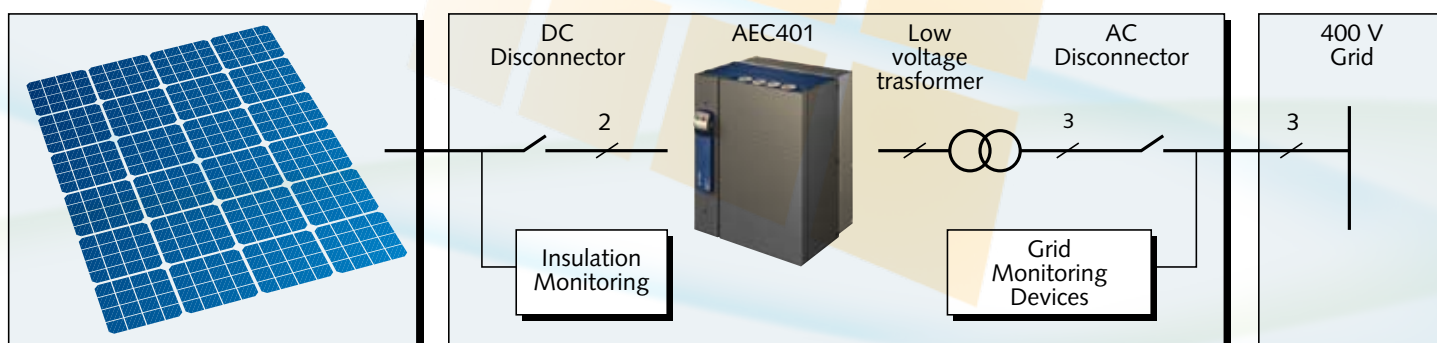
The parameters of the RPS450 solar inverters are set by default at the factory so that they can be operated immediately with any generator configuration.

This allows fast and therefore good-value commissioning.

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#### Compact System Block Diagram





## RPS 450 Compact

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	
Degree of protection <sup>(1)</sup>	-	IP 20				
Environment						
Ambient temperature	°C	-10 ... 40				
Rel. Air humidity	%	15 ... 85, not condensing				
Rate of coolant air required	m³/h		750	1500	300	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 <sup>(2)</sup>	-	CAN, RS485				
Potential-free signaling contacts <sup>(2)</sup>	-	overvoltage protection malfunction, inverter malfunction				

<sup>1)</sup> Higher degree of protection on request - <sup>2)</sup> Other on request



## RPS 450

### Three-phase photovoltaic inverters

#### RPS 450 TL

##### Type

RPS450 <sup>(1)</sup>		<b>-280 TL</b>	<b>-340 TL</b>	<b>-560 TL</b>	<b>-680 TL</b>	<b>-850 TL</b>	<b>-1020 TL</b>	<b>-1190 TL</b>
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##### 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

Control cabinet dimensions (WxHxD)	mm	1800x2100x800	1800x2100x800	3000x2100x800	3200x2100x800	3800x2100x800	4400x2100x800	5000x2100x800
Weight approx.	kg	1150	1300	2100	2450	3000	3550	4100
Degree of protection <sup>(2)</sup>	-	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 <sup>(3)</sup>	-	CAN, RS485						
Potential-free signaling contacts <sup>(3)</sup>	-	overvoltage protection malfunction, inverter malfunction						

<sup>1)</sup> Other power classes available on request - <sup>2)</sup> Higher degree of protection on request - <sup>3)</sup> Other on request

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