

Micro Inverters for Photovoltaic Systems



AEconversion GmbH & Co.KG

- Adaptive Energy Conversion
 - Focus: development, production and distribution of
 - Micro Inverters for PV systems
 - Customer specific inverters for industrial applications
 - Founded 2012, out of the Solar Division of APtronic AG
 - Management: Walter Knittel, co-founder and former CEO of APtronic AG
 - Locations:
 - Germany: Bielefeld (R&D, Europe Sales Office), Salzkotten (production)
 - USA: Salt Point, NY, Sales Office
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Company profile



R & D

- Micro Inverters
 - Communication solutions for PV systems
 - Customized power conversion solutions for renewable energies and industrial applications
 - Design Made in Germany: Electrical engineering with large experience in both solar and power supply industries
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Company profile



Production / Logistic

- Worldwide purchase of components from long-term supplier network
 - Assembly in Germany
 - QC and parameterizing in Germany
 - 100% QC before shipment
 - Worldwide shipment
 - Manufactured power 2013: 3 MW
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Company profile



Quality, performance and stress tests

- Performance and reliability (MTBF) of AEconversion Micro Inverters are tested in both field and laboratory



Product



- Micro Inverter for photovoltaic systems



AEconversion Micro Inverters



Product Range

4 power versions

- INV250-45: 250W | 45V
- INV350-60: 350W | 60V
- INV350-90: 350W | 90V
- INV500-90: 500W | 90V
- Available in 50 Hz and 60 Hz



Product Range



		INV250-45	INV350-60	INV350-90	INV500-90
Input	<i>Maximum PV power</i>	250W	350W	350W	500W
	<i>Maximum DC voltage</i>	45V	60V	90V	90V
	<i>Min./Max. start voltage</i>	18V / 45V	18V / 60V	36V / 90V	40V / 90V
	<i>MPPT range</i>	20V ... 40V	20V ... 50V	40V ... 80V	40V ... 80V
	<i>Maximum DC current</i>	11A	11A	9A	11A
Output	<i>Maximum AC Power</i>	240W	330W	330W	480W
	<i>Nominal Current</i>	1.0A	1.4A	1.4A	2.1A
	<i>Power factor</i>	> 0.99	> 0.99	> 0.99	> 0.99
Efficiency	<i>Peak inverter efficiency</i>	93.5%	93.5%	95.0%	95.0%
	<i>CEC efficiency</i>	92.6%	92.3%	94.0%	93.2%
	<i>Nominal MPP efficiency</i>	99.8%	99.8%	99.8%	99.8%
50Hz-Version	<i>Nominal AC voltage</i>	230V	230V	230V	230V
	<i>Nominal AC voltage range</i>	184V ... 264V	184V ... 264V	184V ... 264V	184V ... 264V
	<i>Frequency</i>	50Hz			
	<i>Frequency range</i>	47.5Hz ... 51.5Hz			
	<i>Productsafety* EMC</i>	IEC 62103:2003, IEC 62109-1:2010, IEC 55011B, EN 50178:1997 EN 61000-6-2, EN 61000-6-3			
60Hz-Version	<i>Nominal AC voltage</i>	208V or 240V	208V or 240V	208V or 240V	208V or 240V
	<i>Nominal AC voltage range</i>	184V ... 264V	184V ... 264V	184V ... 264V	184V ... 264V
	<i>Frequency</i>	60Hz			
	<i>Frequency range</i>	59.5Hz ... 60.3Hz			
	<i>Productsafety EMC</i>	UL 1741:2010, IEEE 1547:2003, CSA C22.2 FCC Part 15 Class B			
Mechanical Data	<i>Weight</i>	2.5kg			
	<i>Operating Temperature</i>	-25°C ... +70°C			
	<i>Cooling</i>	Natural convection			
	<i>Night time power consumption</i>	30mW			
	<i>Max. altitude a.s.l.</i>	2000m			
	<i>Safety class</i>	Class I			
Housing	<i>Dimensions</i>	314mm x 267mm x 66.5mm (BxHxT)			
	<i>Protection Degree</i>	IP65 (50Hz-Version) NEMA 4 (60Hz-Version)			
	<i>Enclosure material</i>	Aluminum			
Features	<i>MSD / (anti-islanding)</i>	integrated (corresponds VDE-AR-N 4105)			
	<i>Communication Versions</i>	Powerline / RS-485 / No Com			

AEconversion Micro Inverters



Product Range

3 communication versions

- NoCom
- Powerline
- RS 485



Communication accessories

- Gateway
- Datalogger



AEconversion Micro Inverters



Product Range Country versions and certifications

Part Number Key:

11 - 05 - 500YYY - XX

YYY

XX

50 Hz

Power / Communication Version

291- 250W 45V 50Hz NoCom
292- 250W 45V 50Hz RS485
293- 250W 45V 50Hz PLC

190- 350W 60V 50Hz NoCom
246- 350W 60V 50Hz RS485
247- 350W 60V 50Hz PLC

295- 350W 80V 50Hz RS485
299- 350W 80V 50Hz PLC

302- 500W 80V 50Hz RS485
303- 500W 80V 50Hz PLC

60 Hz

Power / Communication Version

296- 250W 45V 60Hz NoCom
297- 250W 45V 60Hz RS485
298- 250W 45V 60Hz PLC

277- 350W 60V 60Hz NoCom
278- 350W 60V 60Hz RS485
279- 350W 60V 60Hz PLC

300- 350W 80V 60Hz RS485
301- 350W 80V 60Hz PLC

304- 500W 80V 60Hz RS485
305- 500W 80V 60Hz PLC

50 Hz

Country-Version

-01	DE	Germany	X
-02	AT	Austria	X
-03	BE	Belgium	X
-04	DK	Denmark	X
-05	ES	Spain	
-06	FR	France	X
-07	UK	United Kingdom G83/1	X
-08	GR	Greece (Mainland)	X
-09	IT	Italy	
-10	NL	Netherlands	X
-11	PT	Portugal	X
-12	TR	Turkey	X
-13	LT	Lithuania	
-14	LV	Latvia	
-15	BG	Bulgaria	
-18	CH	Switzerland	X
-19	PL	Poland	X
-20	CZ	Czech Republic	X
-21	SK	Slovakia	X
-40	IL	Israel	
-41	AU	Australia	
-42	TN	Tunisia	
-43	BB	Barbados	
-44	CL	Chile	
-45	ZA	South Africa	

60 Hz

Country- / Voltage-Version

-80	NA	USA/Canada 208 V	X
-81	NA	USA/Canada 240 V	X
-82	NA	Mexico - 240 V	

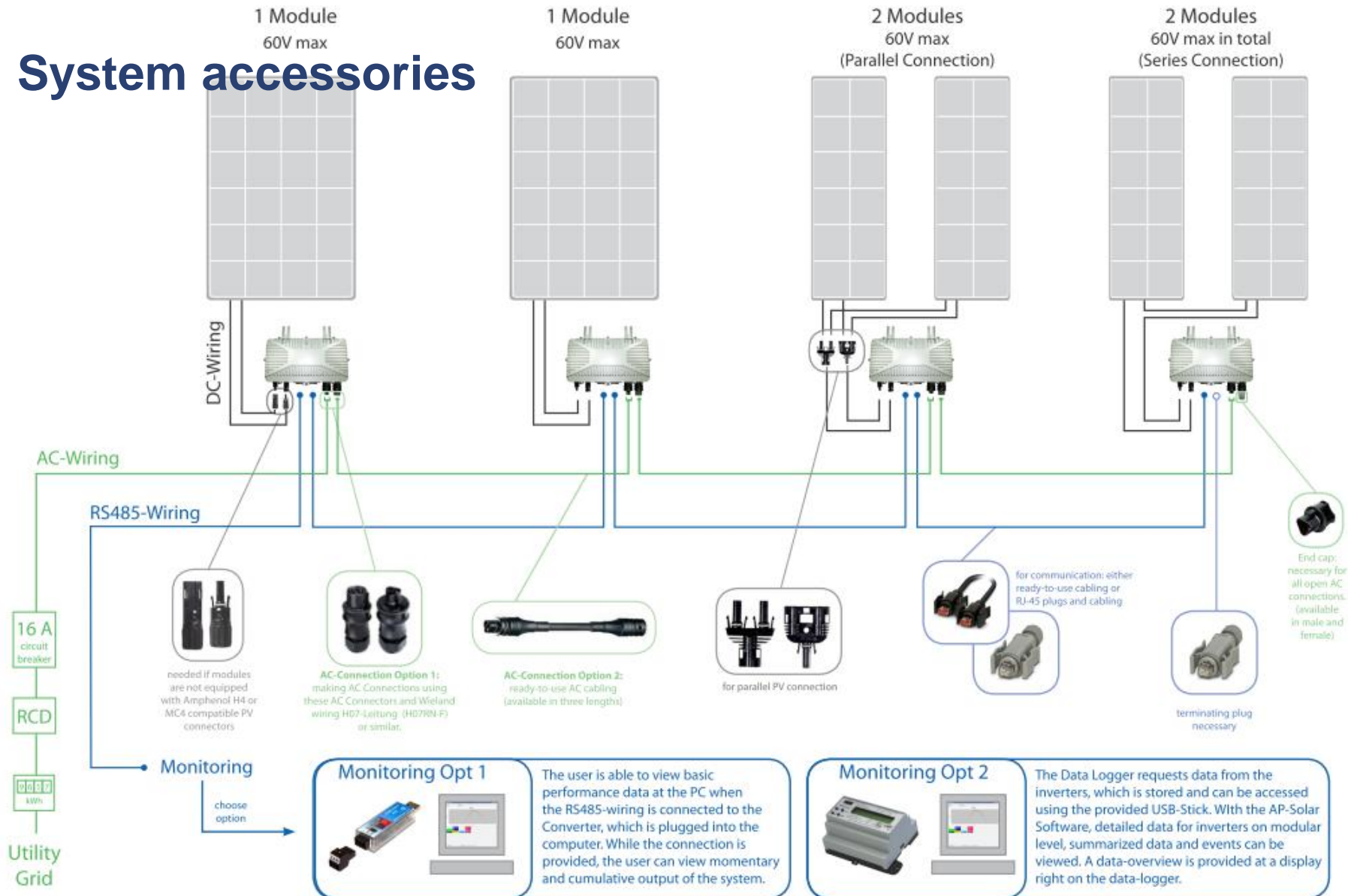
All prices net, excluding tax
Delivery ex stock Holsen, plus freight

X = certification

AEconversion Micro Inverters



System accessories



Unique selling propositions

- Large compatibility with current PV module types and brands due to wide DC Input Voltage range
 - Topology: isolated current fed inverter, i.e. a two-stage topology
 - Same shell for all different power versions
 - Standard connector system
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Unique selling propositions

- Integrated MSD, compliant with
 - VDE-126
 - VDE-AR-N-4105
 - VDE-62109
 - No additional external MSD box needed
 - Cost efficient for small pv systems
 - Real Plug In system, no wasted time for parameterizing required during installation
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Technical data

- Wide MPPT range:
 - - AEconversion: MPPT-range: 20V - 50V
 - - Comparison to competition devices:
 - Enphase MPPT-Range: 22V - 36V
 - Enecsys MPPT-Range: 29V - 42V

Micro Inverters



Function

- AEconversion Micro-Inverters convert the generated energy into grid-compliant alternating current.
- The Micro Inverter is directly connected to one or two modules.



Advantages

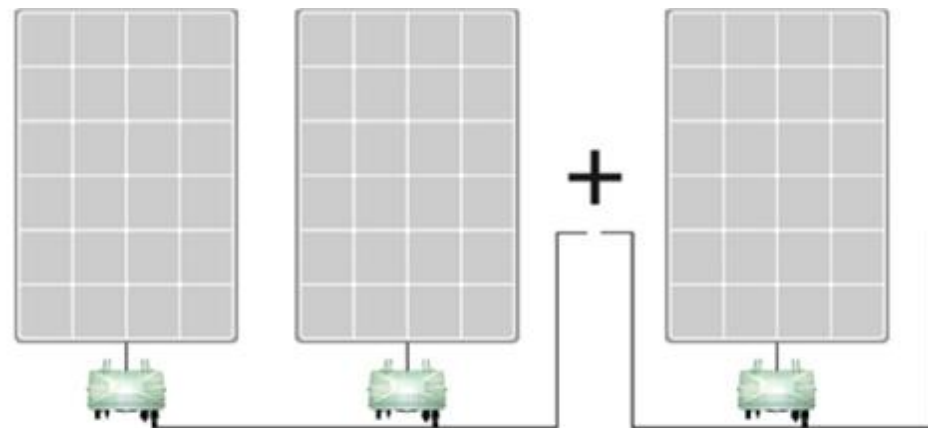
Panel-based MPP-Tracking

- The Maximum Power Point Tracking (MPPT) is performed on a single PV panel, so the inverter is able to harvest the highest possible output from each PV panel
 - The performance of PV generators working with Micro Inverters is approx. 5% higher compared to string inverters
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Advantages

Expanding existing PV generators

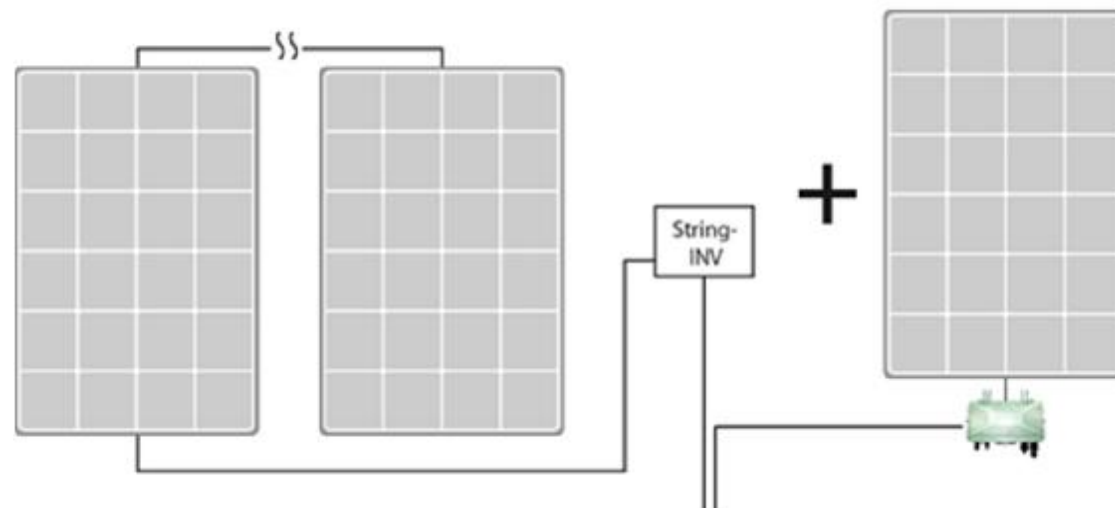
- PV systems based on Micro Inverters can be arranged according to the building's architecture and expanded with more panels when needed



Advantages

Expanding existing PV generators

- Where String Inverters are limited in their flexibility, Micro Inverters can not only be added to an existing system of Micro-Inverters, but also to a string-based system.



Micro Inverters



Advantages

Shading

- Roof vents, chimneys, power lines, trees, neighboring buildings...
- Through the individual connection of Micro Inverters, the total energy harvest can be increased by 5-25% depending on shading impact.



Advantages

Module mismatching / different orientations

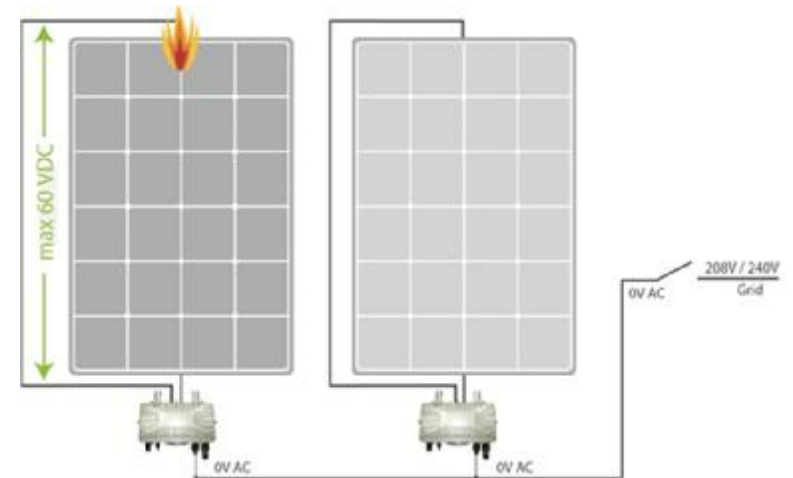
- Different panel tolerances or orientations in a PV system lead to different performance levels of the single panels, which greatly affect the total system output.
- Micro Inverters help maximizing the total output of the generator.



Advantages

Risk of Fire

- String Inverter systems are at high fire risk from arc faults due to high DC-voltages of about 600V.
- High risks to fire fighters while disconnecting AC power
- Micro Inverters work with short DC wiring at lower DC voltage and current



Advantages

Mini PV systems for residential self consumption

- 1-2 panels, Micro Inverter, mounting system
- Covers the power supply of heating or cooling systems, fridge, devices in stand-by modus, etc...
- Easy Installation
- Connection to residential mains
- Direct power consumption



Micro Inverters



Examples

