

# Solar Inverters

## Solar inverter AX-series

### 1 - 5kVA Multifunctional inverter

- PV inverter
- PV / Battery Charger with 3-stage charge
- Battery-backed power supply
- Sine wave inverter with charging function
- 3 phase operation possible
- Parallel operation possible

**NEU / NEW**



### Description:

The AX Series is a multi-function inverter / PV charger with the combined functions of an inverter and MPPT solar and battery charging device.

These inverters are suitable for off-grid stand-alone operation with PV modules, but can also be operated with power from batteries, generators or the public power grid.

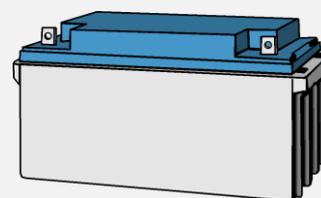
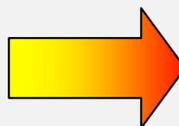
With insufficient power from the PV modules, the device automatically adds on battery power or when the batteries are empty it switches over to the power grid. Three AX-inverter in combination can be configured for three-phase operation.

For higher power requirements up to 4 units (4 or 5 kVA models) with a maximum output of 16 kW (20 kVA) can be optionally connected in parallel.

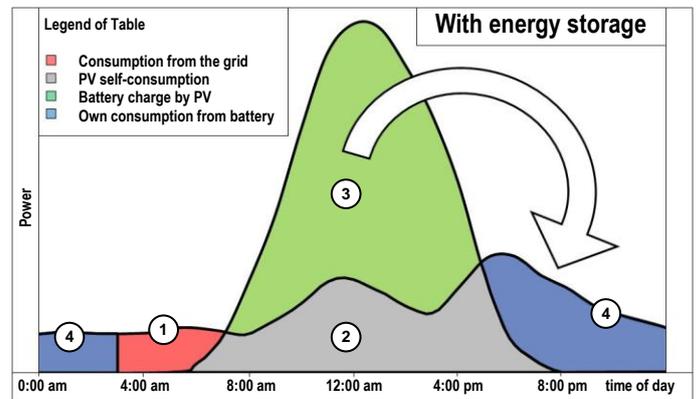
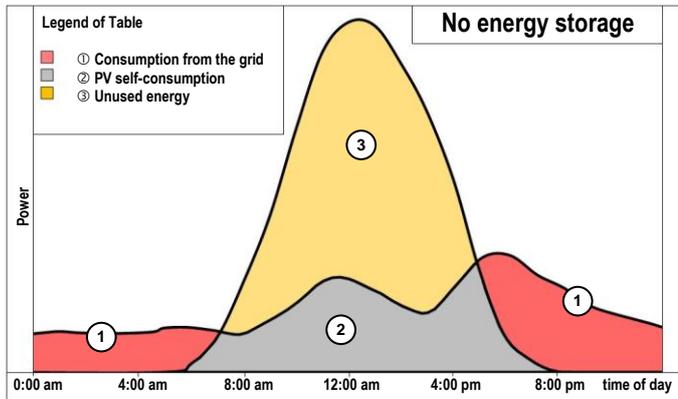
### Features AX-series

- Multiple power sources: solar power, AC power supply, 24 or 48VDC battery
- Parallel operation of several inverters possible
- 3-phase operation possible
- Pure sine wave output
- Built-in MPPT solar charge controller
- Configurable via LCD display or PC software
- Auto restart when mains power returns
- Overload / over temperature / short circuit protection
- Optimized charge process for perfect battery performance ("Smart Charger Design")
- Island operation possible
- 12 months warranty

### Optimized for PV energy storage (improved self-consumption)



During the day any unused surplus electricity is used to charge the batteries and will not be lost. At night or in bad weather consumers are supplied from the batteries. In this way, a smaller amount of electricity must be purchased.



## Optimized own use of solar power

Left: Typical hourly energy production and consumption in a household with photovoltaic system **without energy storage**: At night the photovoltaic system produces no electricity, so the required energy is obtained from the public grid ①. During the day excess energy gets **lost** ③, because the complete amount of electricity produced cannot be consumed ②.

Right: Typical Day course for a household with PV system **and energy storage**: During the day the battery is charged with the excess energy ③. At night, a large part of the necessary energy is obtained from the energy storage device ④. The PV energy yield (② + ④) is now much higher because the purchased energy from the grid is much lower ①. Depending on the configuration of the batteries, the energy loss can decrease to negligible values.

# Specifications

Model		AX 1K24	AX 2K24	AX 3K24	AX 3K48	AX 4K48	AX 5K48
Rated power	VA	1000	2000	3000	3000	4000	5000
	W	800	1600	2400	2400	3200	4000
PV input (DC)	Maximum PV power	600W	600W	600W	900W	3000W	3000W
	MPP voltage range at full load	30 ~ 66VDC	30 ~ 66VDC	30 ~ 66VDC	60 ~ 88VDC	60 ~ 115VDC	60 ~ 115VDC
	Max open circuit voltage	75VDC	75VDC	75VDC	102VDC	145VDC	145VDC
	Maximum PV current	25A	25A	25A	18A	60A	60A
	Maximum efficiency	98%					
AC-input	AC rated voltage	230VAC					
	AC-grid frequency range	50/60Hz automatic					
	Selectable voltage range	170-280VAC (Computer applications)					
		90-280VAC (general home applications)					
Maximum input current	8.09A	18.40A	24.28A	24.28A	36.71A	42.59A	
AC-output	AC rated voltage	230VAC (± 5% @ Batt.-mode)					
	Maximum efficiency	90%	93%	93%	93%	93%	93%
	Changeover time	10 ms (configuration „Computer applications“)					
		20 ms (configuration „general home applications“)					
	Waveform	Sine wave					
Overload capability	110-150% for 10 seconds, >150% for 5 seconds						
Batteries and AC charger	DC rated voltage	24VDC	24VDC	24VDC	48VDC	48VDC	48VDC
	Float voltage	27VDC	27VDC	27VDC	54VDC	54VDC	54VDC
	Overload protection	31VDC	31VDC	31VDC	60VDC	60VDC	60VDC
	Maximum charging current	10 or 20A	20 or 30A	20 or 30A	10 or 15A	20 or 30A	20 or 30A
Parallel operation	no						
3-phase operation	no						

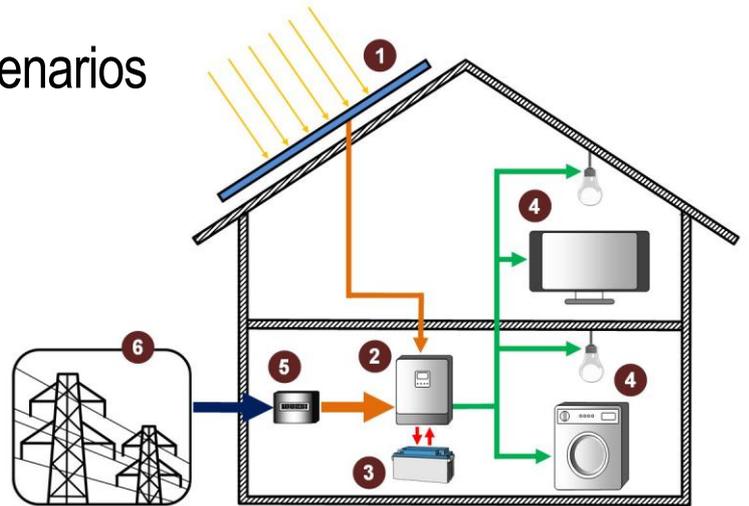
General data							
Size / Weight	Dimensions (H x W x D)	355 x 272 x 128mm				540 x 295 x 140mm	
	Net weight (kg)	7.4	7.6	8.0	8.0	12.5	13.5
	Protection	IP20					
Communication	Interfaces	RS232					
	Slot for expansion cards	no				Communication port for parallel or 3-phase operation	
Ambient conditions	Humidity	5-95% relative humidity (non-condensing)					
	Temperature	Operation 0-40°C, storage 15-60°C					
Regulations / standards	Safety	EN 60950-1					
	EMC	EN 55022 Class A, EN 55024					
	Certifications	CE					

# AX-Series

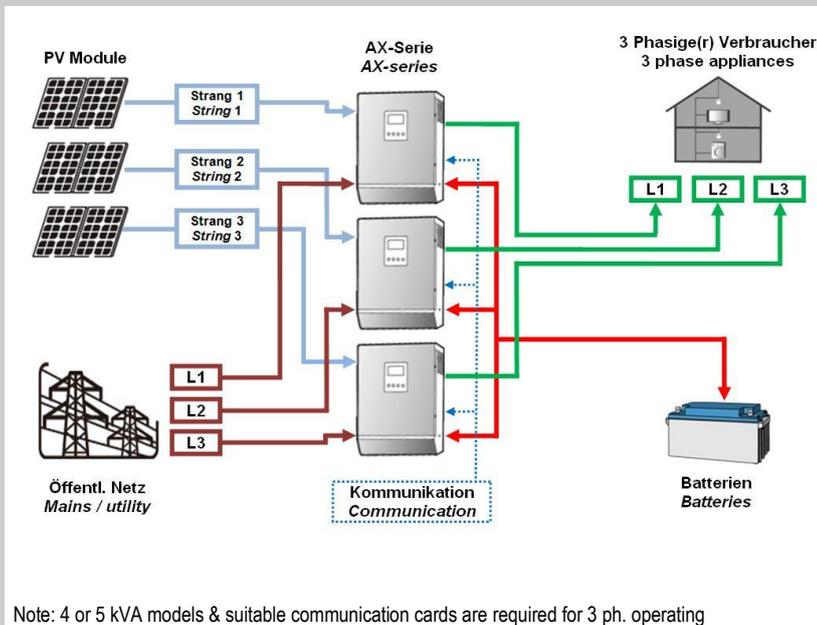
## Basic principle and application scenarios

Scheme on the right: basic principle

- 1 PV plant
- 2 AX inverter
- 3 Energy storage (battery)
- 4 Consumer
- 5 Electric meter
- 6 Public power grid



Following are four application scenarios of the AX-inverter. These represent only sample configurations and can be programmed individually according to the requirements and priorities of the customer.



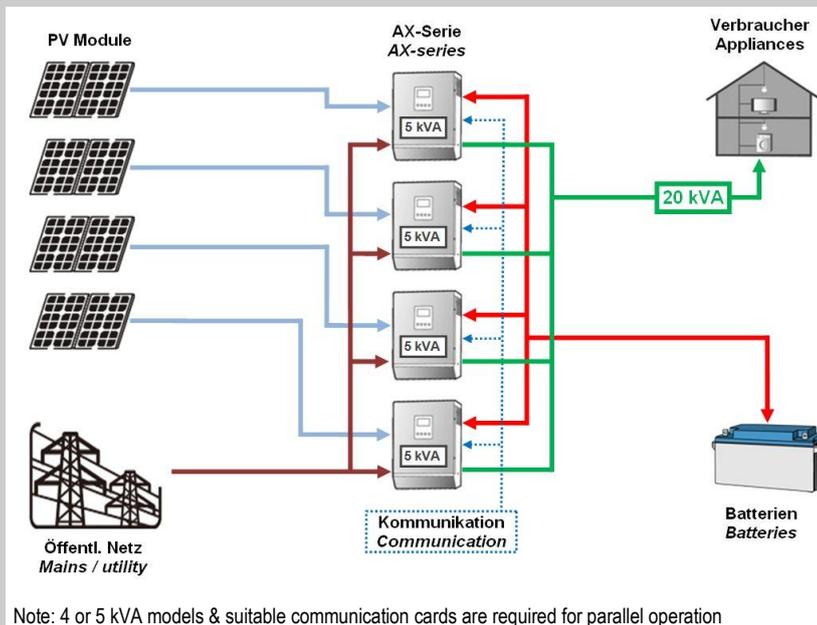
### 3-phase operation (4 & 5kVA models only)

A single AX inverter is required for each phase. Only one battery system is used and shared by all three inverters.

The inverters communicate with each other and generate a three phase current network.

With this configuration, an entire house can be supplied with three phase power easily through PV and energy storage.

At too low PV power, the energy required is first taken from the battery. If this is empty, the missing electricity is provided from the AC source.



### Parallel operation (4 & 5 kVA models only)

In the example on the left a maximum of four 5kVA inverters are connected in parallel and provide a total output of 20kVA.

Each inverter must be connected to a separate PV array. The AC source is shared.

The energy storage device (battery) is charged by all the inverters.

At too low PV power, the energy required is first taken from the battery. If this is empty, the lack of electricity is provided from the AC source.

# AX-Series

## Basic principle and application scenarios

The operating principle of the AX-inverter includes the supply with batteries in case of failure of other energy sources.

Operation is possible with AGM, gel, NiCd, closed lead-acid battery (OpzS, OpzV ...). The batteries are charged via the integrated charger with 3-stage charge.

EFFEKTA® recommends Rolls™ brand batteries of the type 4000 - T12 250 and 5000-12 CS 11P for the system. More details are available on request.



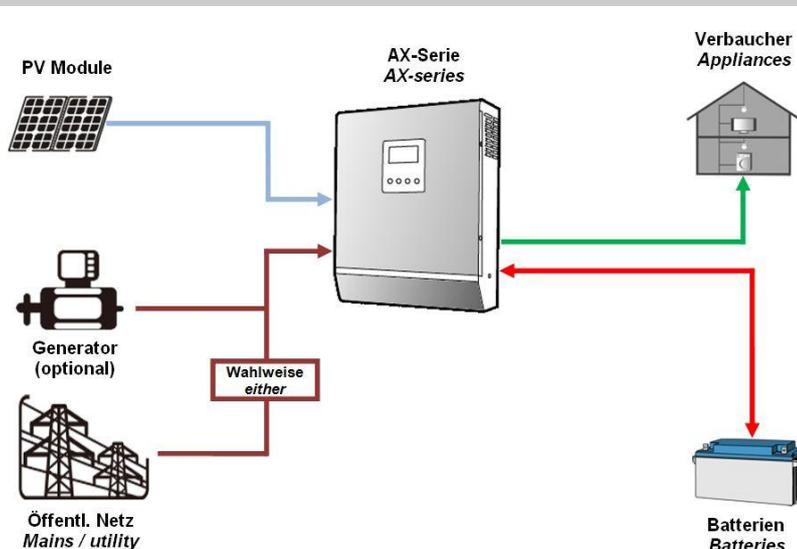
### Rolls 4000 Series / Type T12 250

Vented lead-acid battery  
12V (6 cells), 200Ah (C20)  
391 x 178 x 365mm D x W x H  
55kg max.



### Rolls 5000 Series / Type 12Cs 11P

Vented lead-acid battery  
12V (6 cells), 357Ah (C20)  
559 x 286 x 464mm D x W x H  
123kg max.



According to the needs and depending on the hardware configuration different supply priorities can be set via display or software.

### Solar powered with battery backup

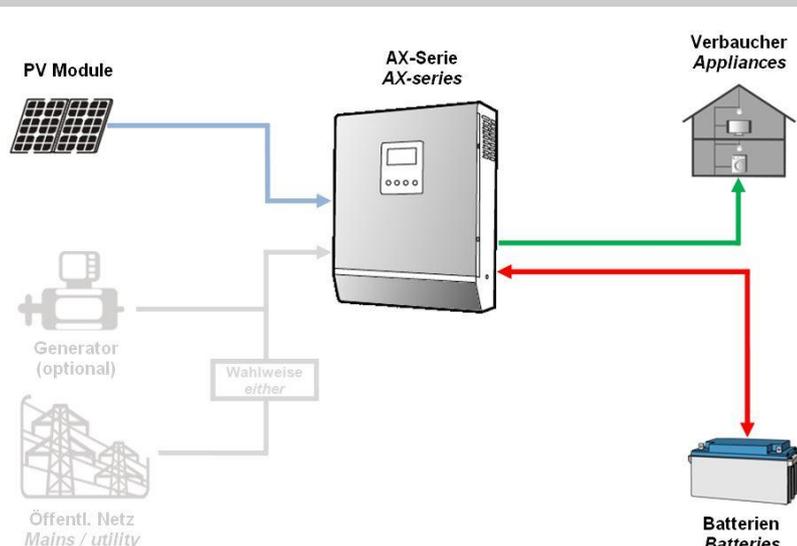
PV modules and AC source (mains or generator) are required.

Consumers primarily are powered from the PV modules.

When there is no or insufficient PV power initially, batteries provide the energy needed. When the batteries are empty the AC source jumps in.

Surplus energy of the PV modules is used to charge the batteries.

Upon failure of PV and AC power supply is powered on on batteries.



### Stand-alone ("Island-") operation with battery backup

The load is supplied by the inverter, which draws the energy from the PV modules. There are no AC sources.

With sufficient PV power, the batteries are charged by PV. The charge is made exclusively with PV.

Upon failure of the PV supply (eg. night mode), consumers can be supplied via the batteries.

Missing PV power of inverter (low solar radiation) can be supplemented through the batteries.