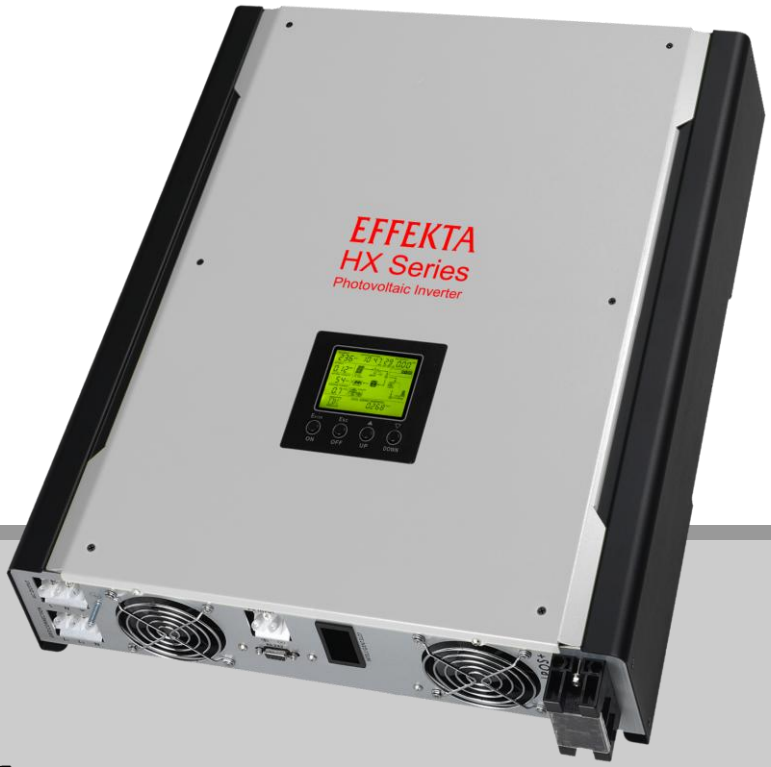
Solar inverter HX-Series

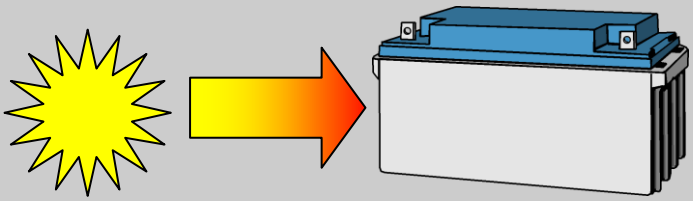
**Multifunctional Photovoltaic inverter
for off-grid stand-alone operation
as well as grid-connected operation
3000W**

Meets VDE-AR-N-4105

NEU / NEW



**Optimized for
PV energy storage**



The EFFEKTA® HX-Series inverter is a multifunctional potovoltaik inverter, which obtains its power from three sources of electricity: photovoltaic modules, rechargeable batteries or an AC power source. Additionally the inverter is suitable for grid connection.

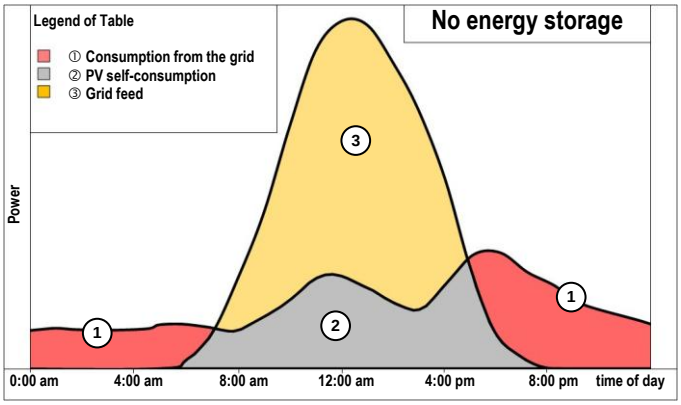
The batteries are charged with PV power minus own consumption. In addition, surplus electricity is fed into the public grid. At night or during bad weather consumers are supplied from the batteries.

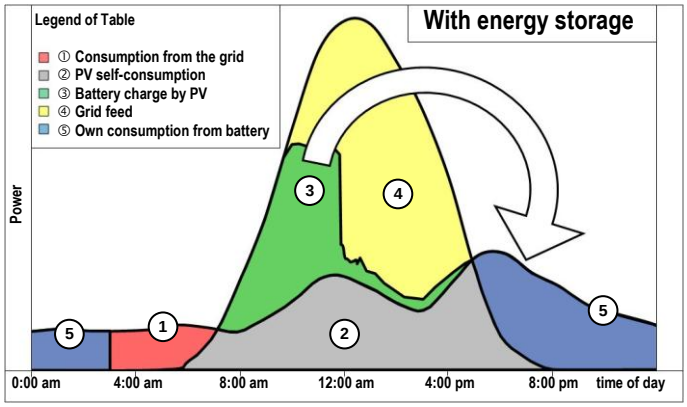
In this way, a smaller amount of electricity must be purchased at the same time you get the benefit from the state-guaranteed feed-in tariff.

All the important data of your PV system can be monitored via the extensive display or via included PC software.

Features HX-Series

- Suitable for mains feed (equivalent to standard VDE-AR-N-4105)
- DSP and microprocessor with redundant controller ensure maximum reliability
- Pure sine wave output
- Multiple power sources: solar power, AC power supply, 48VDC battery
- Built-in MPPT tracker
- Electrical isolation between the inverter and battery guarantee for increased safety
- Smart LCD display with a display memory
- Multiple communication interfaces for remote monitoring (Email / SMS messages can be output)
- Incl. monitoring and configuration software
- RS-232 / USB as standard (optional Modbus, SNMP, GPRS, AS400 dry contacts)
- Adjustable charge current up to 25A
- High efficiency:
  Solar Panel > AC output up to 95.5%
  Battery > AC output up to 92%
- 24 month's warranty





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 network ①. During the day excess energy is fed into the public grid ③, because not the complete amount of electricity produced is itself 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 and a part is fed into the public grid ④. At night, a large part of the necessary energy is obtained from the energy storage device ⑤. The PV energy yield (② + ⑤) is now much higher while the purchased energy from the grid share is much lower ①.

Specifications

Specifications

Model		HX-Series 3kW
Rated Power		3000W
PV-input (DC)	Nominal DC Voltage	360VDC
	Maximum DC Voltage	500VDC
	Start-up Voltage / Initial Feeding Voltage	116VDC / 150VDC
	MPP Voltage Range	250VDC ~ 450VDC
	Maximum Input Current	13A
AC- input (mains supply)	Acceptable Input Voltage Range	184 - 265VAC
	Nominal Frequency	50 / 60Hz
	AC Input Power	5100VA / 5100W
	Maximum AC Input Current	30A
	Inrush current	30A
	Maximum Power Factor	0.9 lead – 0.9 lag
AC output	Nominal Output Voltage	230VAC
	Output Voltage Range	184 ~ 265VAC
	Output Frequency Range	47.5 ~ 51.5Hz or 59.3 ~ 60.5Hz
	Nominal Output Current	13A
	Inrush Current	17A
	Maximum output overcurrent protection	51A
Battery mode output (AC)	Nominal Output Voltage	208/220/230/240VAC
	Output Frequency	50 / 60Hz (auto sensing)
	Output Waveform	sinewave
	Output Power	3000VA / 3000W
	Overload capability	>110% für max. ca. 1 min. / >150% für max. ca. 30 sek >200% sofortige Abschaltung
	Output Current	14.4A / 13.6A / 13A / 12.5A
	Efficiency (DC > AC)	92%
Battery & Charger	Nominal DC Voltage	48VDC
	Maximum Battery Current	82A
	Maximum Charging Current	25A
General data		
Physical	Dimensions (H x W x D in mm)	515 x 438 x 117
	Net Weight (kgs)	15.57
	Protective Class	I
	Ingress Protection Rating	IP 30
Communication	Communication Port	RS232 / USB
	Intelligent Slot	Optional cards: SNMP, Modbus
Environment	Humidity	0 ~ 90% RH (non condensing)
	Operating Temperature	0°C to +40°C
	Altitude	0 ~ 1000m*
Regulations / standards	Safety	EN 62040-1, EN 62109-1, EN 62109-2, VDE-AR-N-4105, VDE 0124-100, VDE 0126-1-1
	EMC	EN 61000-6-2, EN 61000-6-3, EN 61000-3-2, EN 61000-3-3
	Certifications	CE

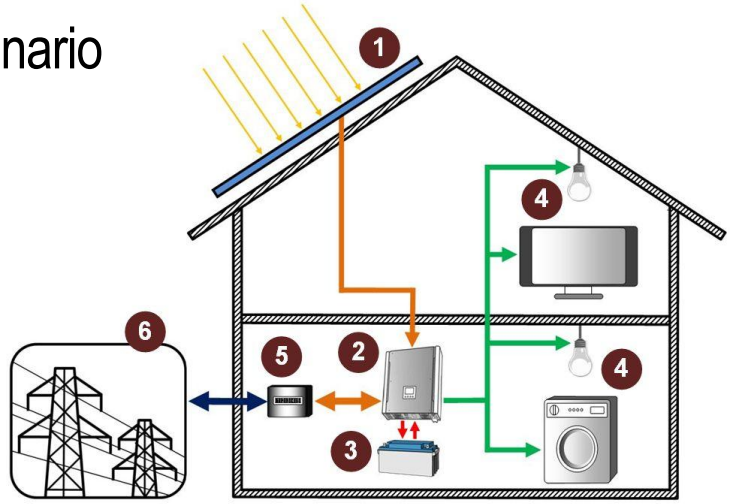
* Power derating 1% every 100 m when altitude is over 1000m

HX-Series

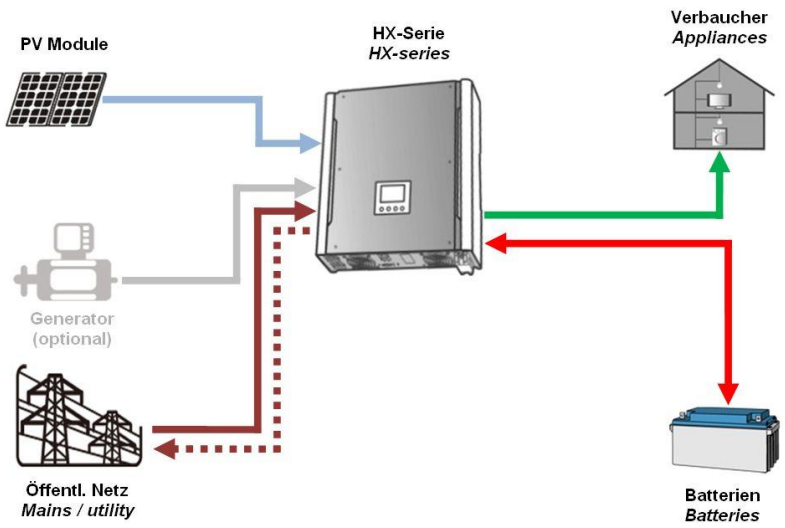
Basic principle and application scenario

Scheme on the right: basic principle

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



Below you can find basic application scenarios of the HX inverter.



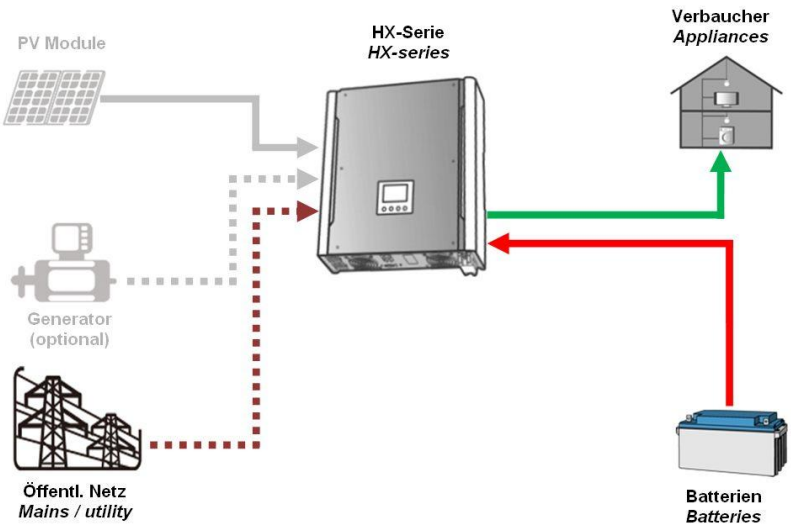
Normal operation (PV operation with power supply and battery charging)

PV modules and AC source (mains) are available.

The load is supplied by the inverter, which draws the energy from the PV modules. The battery is charged via PV.

At too low or failed PV power, the energy required is first taken from the battery. If battery is empty, the AC source substitutes as power supplier.

Surplus PV electricity is fed into the public grid.



Night mode (no PV-operation)

The inverters of the HX-series are optimized for feeding the grid and especially for energy storage.

At night or in bad weather PV modules don't produce electricity. Instead batteries and AC source (mains) are used.

The load is supplied by the battery. If the battery is empty, the AC source jumps in.

Both at normal operation as well as during nighttime operation optionally further AC sources may be used such as generators.

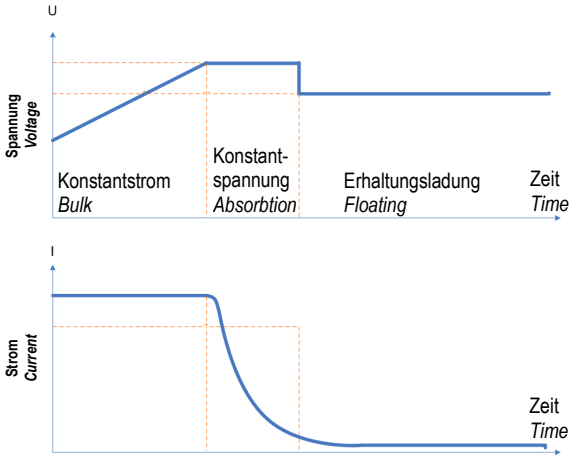
HX-Series

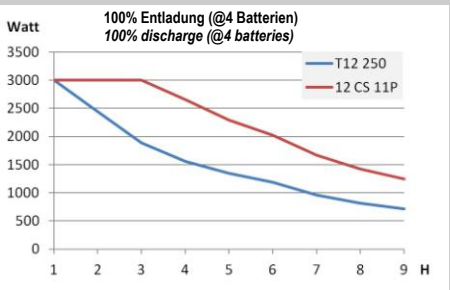
Battery charge and suitable battery type

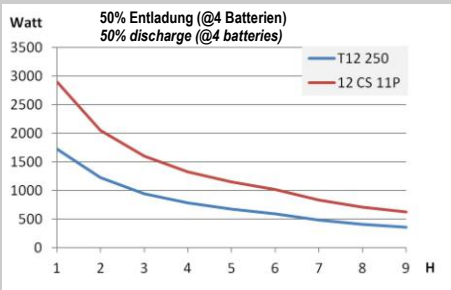
Supplying of the consumer over the batteries is part of the functional principle of the EFFEKTA HX, e.g. if the minimal solar radiation doesn't have enough capacity over the PV-modules.

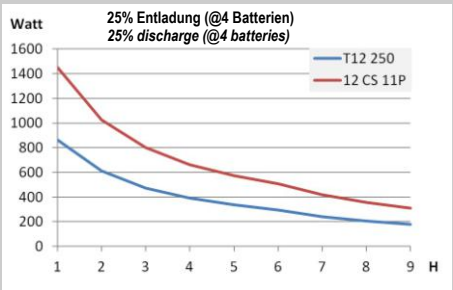
The operation is with AGM, Gel, NiCd, closed lead acid battery (OPzS, OPzV ...) possible. The batteries will be charged over the integrated 3-stepped battery charger in the HX. (schema right).

EFFEKTA® advises the Rolls™ brands batteries of the type 4000 - T12 250 and 5000 - 12 CS 11P for the system. More types can be requested.









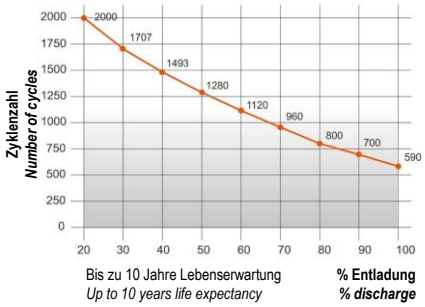
The tables below are showing the possible supplying time in response to the cable-connected consumer load. It's emanated from a system with 4 cable-connected batteries.

Note to the graphic left (100%):
1) it's considered the maximum power extraction of 3000 W for the HX.
2) 100% discharge curtates the batteries life time

Rolls Series 4000 / Typ T12 250

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

- Coated separators
- High capacity at a small desgin
- High life expectancy
- Minimal amount of maintenance
- Increased liquid reservoir



Rolls Series 5000 / Typ 12CS 11P

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

- No stray current corrosion
- Coated separators
- High capacity at a small design
- High life expectancy
- Minimal amount of maintenance
- Increased liquid reservoir