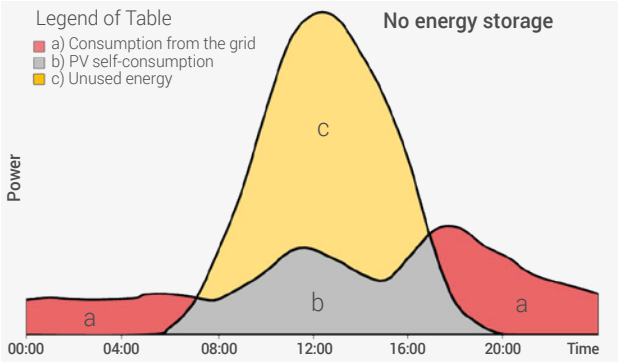
Multifunction inverter
AX series

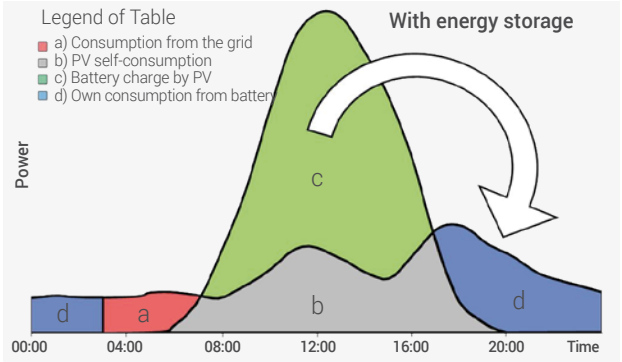
The AX Series is a multi-function inverter / PV charger with the combined functions of an inverter and MPPT solar and battery charging device. These inverters are suitable for off-grid stand-alone operation with PV modules, but can also be operated with power from batteries, generators or the public 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 6 units (4 or 5kVA models) with a maximum output of 24kW (30kVA) can be optionally connected in parallel.

Optimized own use of solar power



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 (a). During the day excess energy gets lost (c), because the complete amount of electricity produced cannot be consumed (b).



Typical Day course for a household with PV system and energy storage:

During the day the battery is charged with the excess energy (c). At night, a large part of the necessary energy is obtained from the energy storage device (d). The PV energy yield (b) + (d) is now much higher because the purchased energy from the grid is much lower (a) Depending on the configuration of the batteries, the energy loss can decrease to negligible values.

Characteristics

- 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
- Island operation possible
- Optimized charge process for perfect battery performance (“Smart Charger Design”)
- 12 months warranty
- Solar power, AC Mains power supply, 24 o. 48 VDC battery (PWM auch 12 VDC)

MPPT suitability

- Superior in temperate regions (Ø 25° C)
- To prefer for services exceeding 500W
- Preferable with load fluctuations
- Suitable for higher yields
- Ideal for the optimal operating point to choose on the current-voltage curve

PWM suitability

- Suitable for constant power / charge conditions
- Suitable for smaller PV systems
- More cost-effective variant
- Suitable for uniform, hot climate conditions

AX-M series

- MPPT Solar Controller
- 800, 1600, 2400, 3200, 4000W rated power
- 24 / 48 V DC

AX-P series

- MPPT Solar Controller
- With increased PV power (see specifications)
- 1600, 2400W rated power
- 24 / 48 V DC

AX-K series

- PWM Solar Controller
- 800, 1600, 2400, 3200, 4000W rated power
- 12, 24, 48 V DC

EFFEKTA®

Specifications (M & P series)

AX		M 1 kVA 24 V	M 2 kVA 24 V	M 3 kVA 24 V 3 kVA 48 V	P 2 kVA 24 V 3 kVA 24 V 2 kVA 48 V 3 kVA 48 V	M 4 kVA 48 V	M 5 kVA 48 V
Operating temperature		0 °C bis 50 °C					
Storage temperature		-15 °C bis 60 °C					
Humidity		< 95 % (non-condensing)					
Size (HxWxD) [mm]		355 x 272 x 128			479 x 295 x 140	540 x 295 x 140	
Weight [Kg]		7,4	7,6	8,0	11,5	12,5	13,5
Protection		IP 20					
Regulations / standards	Safety	EN 60950-1					
	EMC	EN 55022, class A, EN 55024					
	Certifications	CE					
Battery bank alarm contact-load capacity (DRYCONTACT)		2 A / 250 VAC					

AX		M 1 kVA 24 V M 2 kVA 24 V M 3 kVA 24 V M 1 kVA 48 V M 3 kVA 48 V	P 2 kVA 24 V P 3 kVA 24 V P 2 kVA 48 V P 3 kVA 48 V	M 4 kVA 48 V M 5 kVA 48 V
AC input	AC input waveform	Sine wave (Mains and generator)		
	AC input voltage	230 VAC		
	AC input voltage range	90-280 VAC configuration „general home applications“		
		170-280 VAC configuration „Computer applications“ (UPS)		
	Max. AC-input voltage	300 VAC		
	AC input frequency	50 / 60 Hz (automatic)		
	AC input frequency range	40 – 65 Hz		
	Efficiency normal mode	> 95 % (at rated load and battery bank fully loaded)		
	Transfer time	typical 20ms configuration „general home applications“		
		typical 10ms configuration „Computer applications“ (UPS)		

AX		M 1 kVA 24 V M 2 kVA 24 V M 3 kVA 24 V P 2 kVA 24 V P 3 kVA 24 V	M 3 kVA 48V P 2 kVA 48V P 3 kVA 48V	M 4 kVA 48 V M 5 kVA 48 V
Output	Output voltage	230 VAC ± 5 %		
	Output frequency	50 Hz or 60 Hz, adjustable		
	Effective power	1 kVA / 0,8 kW 2 kVA / 1,6 kW 3 kVA / 2,4 kW	2 kVA / 1,6 kW 3 kVA / 2,4 kW	4 kVA / 3,2 kW 5 kVA / 4,0 k
	Max. Efficiency (Inverter)	90 %		
	Overload protection (behavior)	5 s @ >150% load, 10 s @ 110-150% load		
	Max. load	2x nominal load for 5s		
	Short circuit protection Output	Circuit breaker in the main power supply		
		Electronic fuse in the inverter operation		
Internal consumption	Sleep operation (STANDBY):	2 W		
	Energy saving mode	< 10 W		< 15 W
	Normal mode (no load):	< 25 W		< 50W
Battery Bank & charger	Nominal voltage	24 VDC	48 VDC	
	Cold start voltage	23,0 VDC	46,0 VDC	
	Voltage accuracy	±0,3 %		
	Charging algorithm	3 stage (I U o U)		

AX	M 1 kVA 24 V M 2 kVA 24 V M 3 kVA 24 V	M 3 kVA 48 V	P 2 kVA 24 V P 3 kVA 24 V	P 2 kVA 48 V P 3 kVA 48 V M 4 kVA 48 V M 5 kVA 48 V
Charging power	600 W	900 W	1500 W	P: 3000 W, M: 4000 W
Efficiency	98%			
Nominal System voltage U_N	24 VDC	48 VDC	24 VDC	48 VDC
Effective operating range MPPT U_{OP}	30 - 66 VDC	60 – 88 VDC	30 – 115 VDC	60 – 115 VDC
Max. input voltage U_{OCV}	75 VDC	102 VDC	145 VDC	
Min. battery bank voltage for PV-mode	17 VDC	34 VDC	17 VDC	34 VDC
PV- input accuracy	± 2V			

AX	M 1 kVA 24 V	M 2 kVA 24 V M 3 kVA 24 V P 2 kVA 24 V P 3 kVA 24 V	M 3 kVA 48 V P 2 kVA 48 V P 3 kVA 48 V	M 4 kVA 48 V M 5 kVA 48 V
Charging current 230VAC	10/20 A	20/30 A	10/15 A	2/10/20/30/40/50/60 A

Specifications (K series PWM)

AX		K 1000-12	K 2000-24	K 3000-24	K 4000-48	K 5000-48
Power	Nominal power	1000VA / 800W	2000VA / 1600W	3000VA / 2400W	4000VA / 3200W	5000VA / 4000W
AC input	AC input voltage	230 VAC				
	AC input voltage range	90-280VAC configuration „general home applications“ 170-280VAC configuration „Computer applications“ (UPS)				
	AC input frequency	50Hz or 60Hz, adjustable				
Output	Output voltage	230 VAC ± 5 %				
	Max. power	2000 VA	4000 VA	6000 VA	8000 VA	10000 VA
	Max. efficiency	90 %				
	Output frequency	50Hz or 60Hz, adjustable				
	Transfer time	20 ms configuration „general home applications“ 10 ms configuration „Computer applications“ (UPS)				
	Wave form	Sine wave				
Battery	Battery voltage	12 VDC	24 VDC		48 VDC	
	Battery float voltage	13,5 VDC	27 VDC		54 VDC	
	Overload protection	15 VDC	30 VDC		60 VDC	
	Max. charging current	10 A or 20 A	20 A or 30 A		2 / 10 / 20 / 30 / 40 / 50 / 60 A	
Solar charger	Charging current	50 A				
	Effective operating range U_{OP}	15-18 VDC	30-36 VDC		60-72 VDC	
	Max. input voltage U_{OCV}	30 VDC	60 VDC		105 VDC	
	Standby power consumption	1 W	2 W		2 W	
General data	Size (HxWxD) [mm]	316 x 240 x 95	355 x 272 x 100		468 x 295 x 120	
	Weight (in kg)	5,0	6,4	6,9	9,8	9,8
	Humidity	5% bis 95% (non-condensing)				
	Operating temperature	0°C - 55°C				
	Storage temperature	-15°C - 60°C				
	Protection	IP 20				
Regulations / standards	Safety	EN 60950-1				
	EMC	EN 55022, class A, EN 55024				
	Certifications	CE				