Efficient

- Without low-voltage transformers: higher system efficiency due to direct connection to the medium-voltage grid

Turnkey delivery

- Complete with medium-voltage transformer and concrete substation for outdoor installation

Optional

- Grid management
- Reactive power compensation
- Medium-voltage switching stations for a flexible structure of large solar parks
- AC transfer station with measurement
- Medium-voltage transformers for other grid voltages (deviating from 20 kV)

SUNNY CENTRAL 400MV / 500MV / 630MV

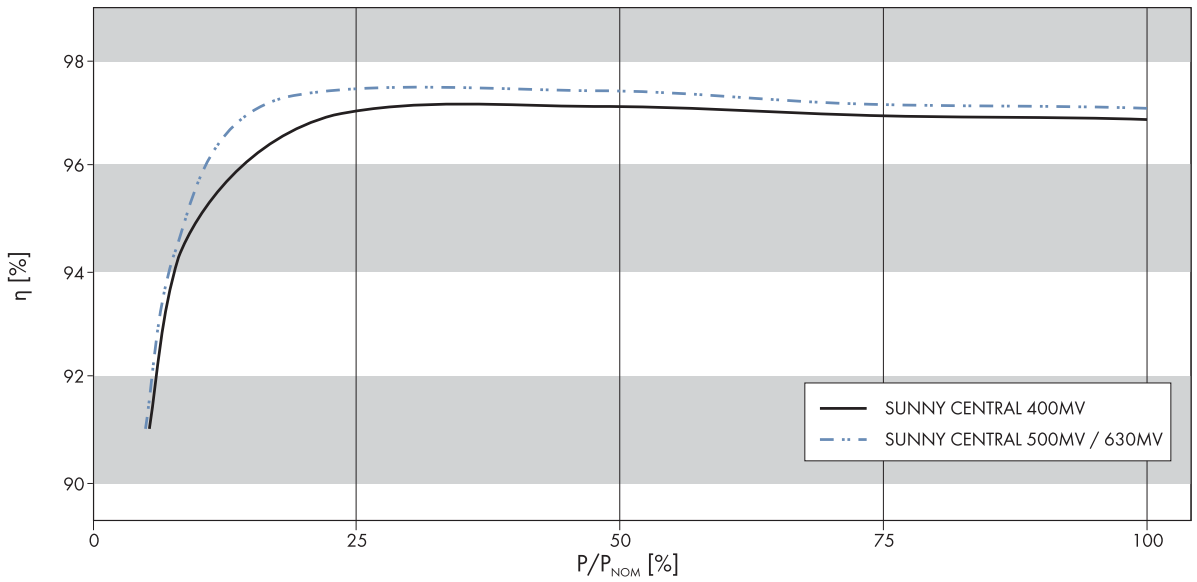
The compact station for medium voltage feed and safe grid management.

This station is quite something. Equipped with an SMA central inverter of the new HE family and with a medium voltage transformer, the Sunny Central MV feeds directly into the medium voltage grid. The advantage: without the low-voltage transformer, the plant operator will generate higher yields at lower inverter costs. For outdoor installation, the Sunny Central MV is delivered as a turnkey station with a concrete substation. The Sunny Central MV also participates actively in grid management and thereby fulfills all requirements of the medium-voltage directive valid from July 2010.

Technical Data
SUNNY CENTRAL 400MV / 500MV / 630MV

	Sunny Central 400MV	Sunny Central 500MV	Sunny Central 630MV
Input data			
Nominal power DC	408 kW	509 kW	642 kW
Max. PV power (recommended), (P_{PV})	450 kWp	560 kWp [1]	705 kWp [1]
DC voltage range, MPPT (U_{DC})	450 V – 820 V [5]	450 V – 820 V [5]	500 V – 820 V [5]
Max. permissible DC voltage ($U_{DC, max}$)	1000 V	1000 V	1000 V
Max. permissible DC current (IDC, max)	1000 A	1200 A	1350 A
Voltage ripple, PV voltage (U_{PP})	< 3 %	< 3 %	< 3 %
Number of fused DC inputs	2 ports for external DC main distributions (SMB) / 8 per potential		
Output data			
Nominal AC output power (P_{AC})	400 kW [6]	500 kW [6]	630 kW [6]
Operating grid voltage ±10 % (U_{AC})	20 kV	20 kV	20 kV
Nominal AC current ($I_{AC, nom}$)	11.6 A	14.4 A	18.2 A
Operating range, grid frequency (f_{AC})	50 Hz – 60 Hz	50 Hz – 60 Hz	50 Hz – 60 Hz
Distortion of grid current (KIAC)	< 3 % at nominal power	< 3 % at nominal power	< 3 % at nominal power
Phase shift (cos φ)	0.95 lagging ... 0.95 leading		
Efficiency [2]			
Max. efficiency PAC, max (η)	97.5 %	97.7 %	97.8 %
Euro ETA (η)	97.1 %	97.3 %	97.4 %
Dimensions and weight			
Width / Height / Depth in mm (W / H / D) with switching system	5300 / 2500 / 3600	5300 / 2500 / 3600	5300 / 2500 / 3600
Width / Height / Depth in mm (W / H / D) without switching system	4800 / 2500 / 3600	4800 / 2500 / 3600	4800 / 2500 / 3600
Weight approx. (m)	30 t	30 t	30 t
Power consumption			
Operating consumption (Pday) [4]	< 2800 W	< 2900 W	< 3000 W
Standby operating consumption (P_{night})	< approx. 100 W + 720 W	< approx. 100 W + 720 W	< approx. 100 W + 860 W
External auxiliary voltage / grid structure	3 x 400 V, 50/60 Hz / TN-S, TN-C or TT grid	3 x 400 V, 50/60 Hz / TN-S, TN-C or TT grid	3 x 400 V, 50/60 Hz / TN-S, TN-C or TT grid
External back-up fuse for auxiliary supply	B 20 A, 3-pole	B 20 A, 3-pole	B 20 A, 3-pole
SCC (Sunny Central Control) interfaces			
Communication (NET Piggy Back, optional)	Analog, ISDN, Ethernet	Analog, ISDN, Ethernet	Analog, ISDN, Ethernet
Analog inputs	1 x Pt 100, 3 x A_{in} [3]	1 x Pt 100, 3 x A_{in} [3]	1 x Pt 100, 3 x A_{in} [3]
Surge voltage protection for analog inputs	optional	optional	optional
Sunny String Monitor interface (COM1)	RS485	RS485	RS485
PC interface (COM3)	RS232	RS232	RS232
Electrically separated relay (ext. signal)	1	1	1

Efficiency curve SUNNY CENTRAL 400MV / 500MV / 630MV

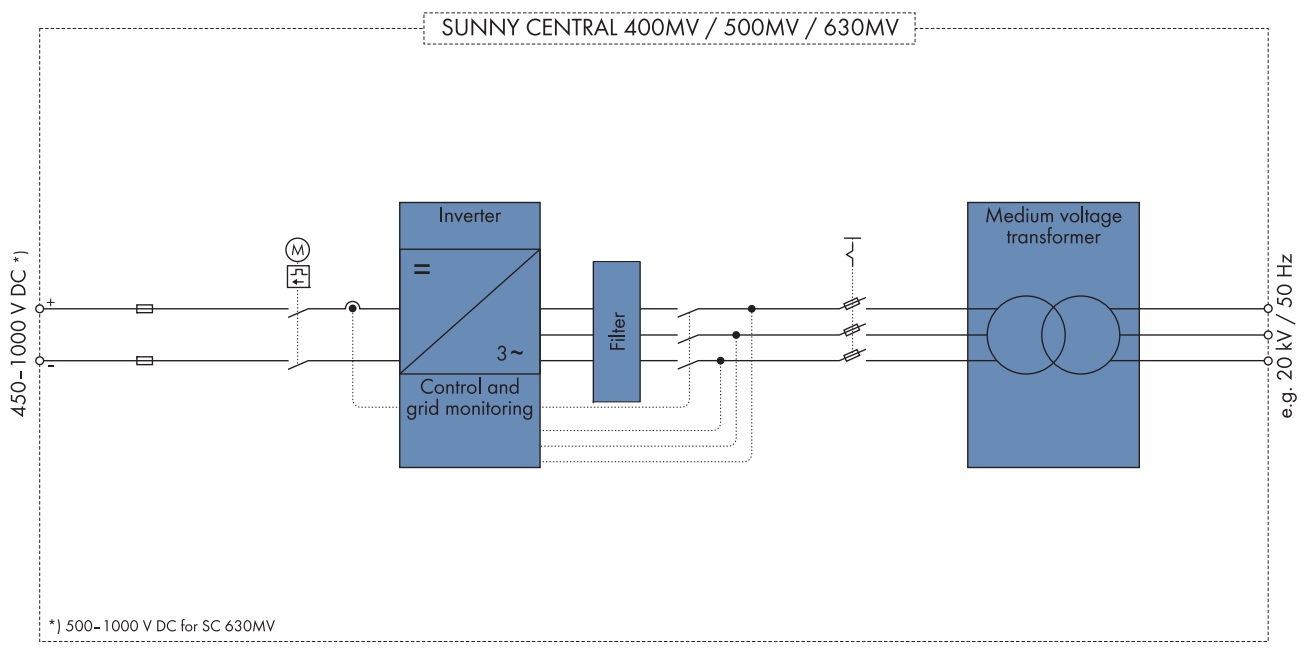


	Sunny Central 400MV	Sunny Central 500MV	Sunny Central 630MV
Features			
Display (SCC)	Yes	Yes	Yes
Ground fault monitoring	Yes	Yes	Yes
Heating	Yes	Yes	Yes
Emergency stop	Yes	Yes	Yes
Power switch AC side	SI load disconnection switch 7)	SI load disconnection switch 7)	SI load disconnection switch 7)
Power switch DC side	Load disconnection switch with motor	Load disconnection switch with motor	Load disconnection switch with motor
Monitored surge voltage protectors AC / DC	Yes 7) / Yes	Yes 7) / Yes	Yes 7) / Yes
Monitored surge voltage protectors for auxiliary supply	Yes	Yes	Yes
Standards			
EMC	EN 61000-6-2, EN 61000-6-4	EN 61000-6-2, EN 61000-6-4	EN 61000-6-2, EN 61000-6-4
Grid monitoring (BDEW: Bundesverband der Energie- und Wasserwirtschaft - Federal Association of Energy and Water Industries)	In accordance with BDEW directive	In accordance with BDEW directive	In accordance with BDEW directive
CE conformity	Yes	Yes	Yes
Protection Rating and Ambient Conditions			
Protection rating as per EN 60529	IP54	IP54	IP54
Protection rating as per EN 60721-3-4, Ambient conditions, fixed location, without special protection against wind and weather	Classification of • chemically active substances: 4C1 • mechanically active substances: 4S2	Classification of • chemically active substances: 4C1 • mechanically active substances: 4S2	Classification of • chemically active substances: 4C1 • mechanically active substances: 4S2
Permissible ambient temperature (T)	–20 °C ... +45 °C	–20 °C ... +45 °C	–20 °C ... +45 °C
Relative humidity, not condensing (U_{AIR})	15 % ... 95 %	15 % ... 95 %	15 % ... 95 %
Max. altitude (above sea level)	1000 m	1000 m	1000 m
Fresh air consumption (V_{AIR})	6200 m³/h	6200 m³/h	6200 m³/h
Type designation	SC 400MV-11	SC 500MV-11	SC 630MV-11

HE: High Efficiency, inverter without electric separation for connection to a medium voltage transformer (taking into account the SMA specifications for the transformer)

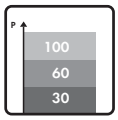
1) Specifications apply to irradiation values below STC
2) Efficiency measured without an internal power supply at U_{DC} = 500 V
3) Terminal for an analog sensor provided by the customer in two-wire and four-wire version
4) Own consumption measured in clock-rate operation with activated AC fans, activated DC fans and stack fans with 100 %
5) $U_{DC, min}$ for $U_{AC, nom}$ ±5 % and cos φ = 1
6) P_{nom} for $U_{AC, nom}$ ±5 % and cos φ = 1
7) The SI-load disconnection switch and the AC overvoltage arrestor are located on the AC side of the inverter.

Please also read: Transport instructions for Sunny Central and the Sunny Central installation guide

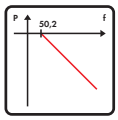


Grid management included

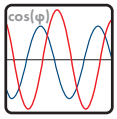
SMA central inverters in the new Sunny Central MV stations fulfill the following specifications of the BDEW medium-voltage directive:



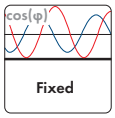
Power limitation in accordance with EEG paragraph 6 / Grid safety management
In order to avoid short-term grid overload, the grid operator presets a nominal active power value which the inverter will implement within 60 seconds. The nominal value is transmitted to the inverters via a ripple control receiver in combination with the SMA Power Reducer Box. Typical limit values are 100, 60, 30, or 0 percent of the nominal power.



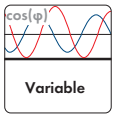
Frequency-dependent control of active power
Starting at a grid frequency of 50.2 Hz, the inverter will automatically reduce the fed-in active power along a preset characteristic curve and thereby contribute to the stabilization of the grid frequency.



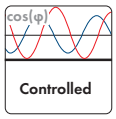
Static grid support through reactive power
In order to keep the grid voltage constant, Sunny Central HE inverters supply leading or lagging reactive power to the grid. For this, there are three options:



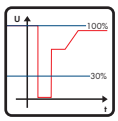
a) Fixed presetting of the reactive power by the grid operator
The grid operator presets a fixed reactive power value or a fixed phase shift between $\cos(\varphi)_{leading} = 0.95$ and $\cos(\varphi)_{lagging} = 0.95$.



b) Dynamic presetting of the reactive power by the grid operator
The grid operator presets a dynamic phase shift - any value between $\cos(\varphi)_{leading} = 0.95$ und $\cos(\varphi)c_{lagging} = 0.95$. It is transmitted either through a communication unit or via a standardized current signal (I=4...20 mA) in accordance with DIN IEC.



c) Control of the reactive power through a characteristic curve
Either the reactive power or the phase shift is controlled by a pre-defined characteristic curve - depending on the fed-in active power or grid voltage.



Monitored dynamic grid support LVRT (Low Voltage Ride Through)
Until now, PV systems have had to disconnect from the grid immediately even during short grid voltage losses. The result is that, if there are grid disturbances, basically all feed-in systems shut down in cascades and further increase the imbalance of the grid. Using the monitored dynamic grid support, the new Sunny Central HE devices can feed in immediately after short-term voltage losses - as long as the nominal voltage exceeds fixed values. (Optional)

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www.SMA.de
Freecall +0800 SUNNYBOY
Freecall +0800 78669269

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