

ATTACHMENT H

Manufacturer Specifications

ENGINEERED SIMPLICITY

99.9%
UPTIME

7%
LOWER LCOE

31%
LOWER LIFETIME O&M

Array DuraTrack®

The most durable, reliable tracking system under the sun. While our single-bolt module clamp and forgiving tolerances streamline installation, and our flexibly linked architecture maximizes power density, it's our innovative use of fewer components and a failure-free wind management system that makes Array Technologies the best choice for solar trackers. **Better. Stronger. Smarter.**



Zero Scheduled Maintenance

Maintenance-free motors and gears, fewer moving parts, and industrial-grade components, means no scheduled maintenance required for our customers. While our competitors average two unscheduled maintenance events per day, we average only one per year.



Failure-free wind management

Nobody can control the weather, but DuraTrack self-manages wind events to power through even the harshest storms.



High Power Density

Higher density means more power and more profit. DuraTrack offers the unique ability to maximize the power density of each site, boasting up to 120 modules per row and higher density than our closest competition.



Fewer Components. Greater Reliability.

Array was founded on a philosophy of engineered simplicity. Minimizing potential failure points. With fewer components than competitors, DuraTrack consistently delivers higher reliability and superior uptime.

COST VERSUS VALUE

Value is more than the cost of a tracking system. It's about building with forgiving tolerance and fewer parts so construction crews can work efficiently. It means protecting your investment with a failure-free wind management system. It also includes increasing power density. But most of all, value is measured in operational uptime, or reliability.

THE GLOBAL LEADER IN RELIABILITY

Maintenance-free motors and gears, fewer moving parts, and industrial-grade components, means no scheduled maintenance required for our customers. While our competitors average two unscheduled maintenance events per day, we average only one per year.

ARRAY TECHNOLOGIES, INC.

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30+ GW YEARS OF OPERATION

NEARLY **200x**
FEWER ELECTRICAL COMPONENTS PER
100MWAC THAN DECENTRALIZED TRACKERS

STRUCTURAL & MECHANICAL FEATURES/SPECIFICATIONS

Tracker Type	Horizontal single axis (1 module in portrait)
Ground Cover Ratio (GCR)	Site configurable. Typical: 28-45%
Linked Rows per Drive Motor	Up to 32
Drive Type	Rotating gear drive connected by drivelines (no driveline or bearing lubrication required)
Array Height	Torque Tube Elevation: 54" standard, adjustable (48" min height above grade)
Tracking Range of Motion	+/- 52°
Terrain Flexibility (N-S)	Up to 8.5° standard (up to 15° optional)
Terrain Flexibility (E-W)	Up to 25° combined angle
Wind Protection	Autonomous passive mechanical system No sensors or grid power required to activate
Max Wind Speed	140mph (225 km/h) per ASCE 7-10 (3-second gust), higher wind speeds possible depending on project conditions
Operating Temp Range	Standard: -4°F to 140°F (-20°C to 60°C) Optional: -40°F to 104°F (-40°C to 40°C)
Materials	Pre-galv steel, HDG steel and aluminum structural members, as required.
Codes and Standards	Certified to UL 3703 and IEC 62817

MODULE COMPATIBILITY

c-Si Modules per Row (1500V DC)	Typical: 84-112 Maximum: 120
First Solar Modules per Row (1500V DC)	Series 6 Plus: 84-108 Series 7: 96-114
Modules Supported	Most commercially available, including framed or frameless crystalline, thin film, bifacial, and back rails
Module Attachment	Single fastener, high-speed mounting clamps with integrated grounding. Traditional rails for crystalline in landscape, custom racking for thin film and frameless crystalline and bifacial per manufacturer specs.

CONTROL SYSTEM DETAILS

Baseline Solar Tracking Method	SANDIA's Ephemeris Model
Control Electronics	SmarTrack™ Controller Site Data Controller 6X Motor Controllers
Communications	MODBUS TCP
Backtracking	Yes (Optional terrain adaptive backtracking with SmarTrack)
Diffuse Light Response	Optional with SmarTrack
Night-time Stow	Yes (configurable)
Tracking Accuracy	+/- 2°
Motor Type	2HP, 3 Phase, 480V AC

INSTALLATION, OPERATION, AND MAINTENANCE

Annual Power Consumption (kWh per 1 MW)	Approximately 310 kWh per MW
PE Stamped Structural Calculations & Drawings	Yes
On-site Training and System Commissioning	Yes
Connection	100% bolted connections. No drilling, cutting or welding on-site or in-field fabrication
Scheduled Maintenance	None required
Module Cleaning Compatibility	Robotic, Tractor, Manual
Warranty	10 years structural; 5 years drive and controls components



156HC M10 TPC SL Bifacial Module

156 Half-Cut Monocrystalline 605W – 625W

22.4%

Utilizes the latest M10 size super high efficiency TOPCon N-type cells. Half cut design further reduces cell to module (CTM) losses.

Stability & Looks

Enhanced frame design to withstand higher wind, snow, and other mechanical stresses. Framed Glass-Backsheet aesthetic is ideal for high visibility installation.

High Energy Yield

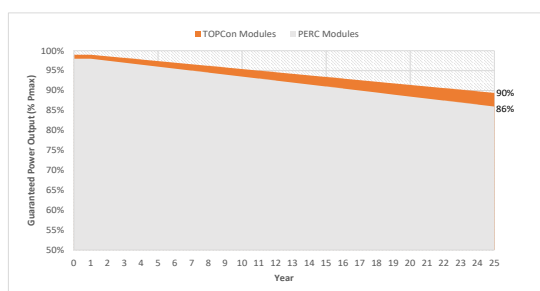
Highest Efficiency, Excellent Bifaciality & Low temperature coefficient of N-type TOPCon Solar Cells enable High Energy yield

High Reliability

TOPCon cells, based on N-type silicon result in low LID, reducing annual degradation and guaranteeing more power throughout the lifetime.

No Compromise Guarantee

15 Year Product Warranty
25 Year Linear Performance Guarantee



Highly efficient N-type Solar Cells based on TOPCon technology

Low LCOE enabled by High Power Output & Low BOS Cost

1% First year degradation & 0.4% Annual Power degradation

World-class Quality

- Heliene's fully automated manufacturing facilities with state-of-the-art robotics and computer aided inspection systems ensure the highest level of product quality and consistency
- All manufacturing locations are compliant with international quality standards and are ISO 9001 certified
- Heliene modules have received Top Performer rankings in several categories from PV Evolution Labs (PV EL) independent quality evaluations

Bankable Reputation

- Established in 2010, Heliene is recognized as highly bankable Tier 1 manufacturer of solar modules and has been approved for use by the U.S. Department of Defense, U.S. Army Corps of Engineers and from numerous top tier utility scale project debt providers
- By investing heavily in research and development, Heliene has been able to stay on the cutting edge of advances in module technology and manufacturing efficiency

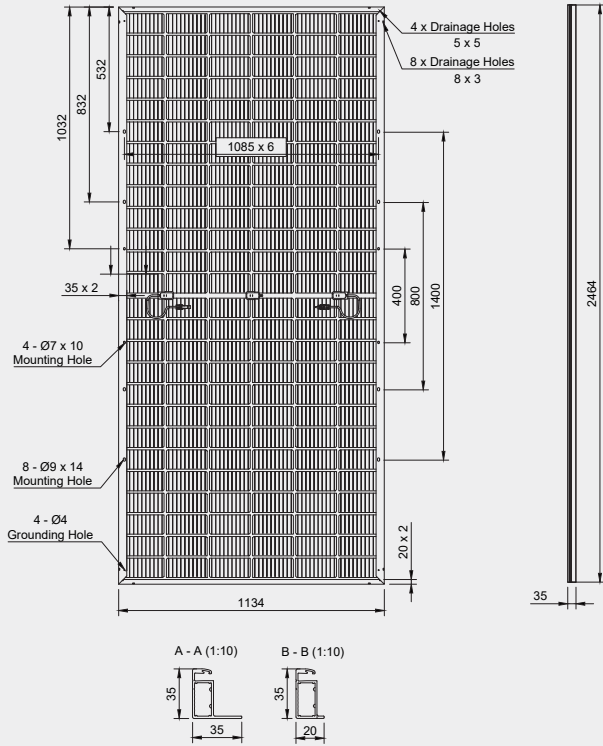
Local Sales, Service, and Support

- With sales offices across the U.S. and Canada, Heliene prides itself on unsurpassed customer support for our clients. Heliene has become the brand of choice for many of the leading residential installers, developers and Independent Power Producers due to our innovative technology, product customization capability and just in time last-mile logistics support
- Local sales and customer support means answered phone calls and immediate answers to your technical and logistics questions. We understand your project schedules often change with little warning and endeavor to work with you to solve your project management challenges





Dimensions for 156HC M10 TPC SL Bifacial Series Modules



Electrical Data (STC)

Table with 6 columns: Parameter, Unit, and five values. Parameters include Peak Rated Power*, Maximum Power Voltage, Maximum Power Current, Open Circuit Voltage*, Short Circuit Current**, Module Efficiency, Maximum Series Fuse Rating, and Power Sorting Range.

Bifaciality Factor***

80 ± 5%

STC - Standard Test Conditions: Irradiation 1000 W/m² - Air mass AM 1.5 - Cell temperature 25 °C,

*P_{mpp} Production Tolerance ± 3%, V_{oc} Production Tolerance ± 3%, I_{sc} Production Tolerance ± 4%,

***Bifaciality Factor= P_{mpp, rear}/P_{mpp, front} where P_{mpp, rear} and P_{mpp, front} are tested at STC

Electrical Data (NMOT)

Table with 6 columns: Parameter, Unit, and five values. Parameters include Maximum Power, Maximum Power Voltage, Maximum Power Current, Open Circuit Voltage, and Short Circuit Current.

NMOT - Nominal Module Operating Temperature:

Irradiance at 800W/m², Ambient Temperature 20°C, Wind speed 1m/s

Mechanical Data

Table with 2 columns: Component and Description. Components include Solar Cells, Module Construction, Backsheet, Dimensions, Weight, Frame, Glass, Junction Box, Output Cables, and Connectors.

Certifications

UL Certification UL61215, UL61730 pending

Temperature Ratings

Table with 2 columns: Parameter and Value. Parameters include Nominal Module Operating Temperature, Temperature Coefficient of P_{max}, Temperature Coefficient of V_{oc}, and Temperature Coefficient of I_{sc}.

Maximum Ratings

Table with 2 columns: Rating and Value. Ratings include Operational Temperature, Max System Voltage, Mech. Load Test (Front), Mech. Load Test (Back), and Fire Type.

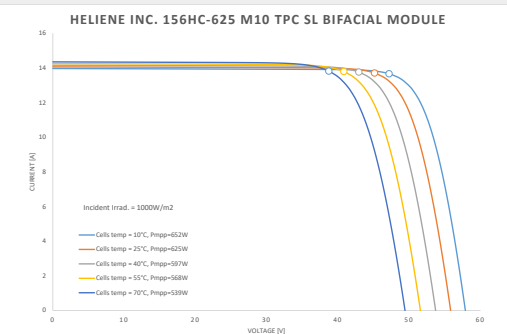
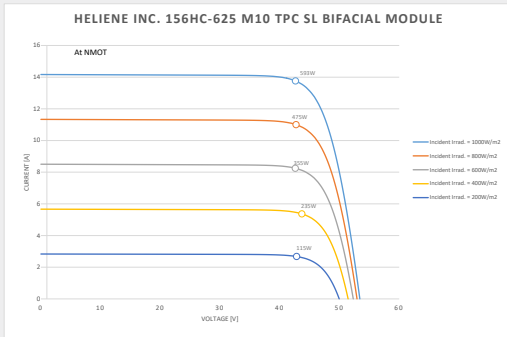
Warranty

- 15 Year Product Warranty
25 Year Linear Power Guarantee

Packaging Configuration

Table with 2 columns: Configuration and Quantity. Configurations include Modules per Pallet 40' Container, Modules per 40' Container, Modules per Pallet 53' Trailer, and Modules per 53' Trailer.

I-V Curves for 156HC M10 TPC SL Bifacial Series Modules



SUNNY CENTRAL

2660 UP-US / 2800 UP-US / 2930 UP-US / 3060 UP-US



Efficient

- Up to 4 inverters can be transported in one standard shipping container
- Overdimensioning up to 150% is possible
- Full power at ambient temperatures of up to 35°C

Robust

- Intelligent air cooling system OptiCool for efficient cooling
- Suitable for outdoor use in all climatic ambient conditions worldwide

Flexible

- Conforms to all known grid requirements worldwide
- Q on demand
- Available as a single device or turnkey solution, including Medium Voltage Power Station

Easy to Use

- Improved DC connection area
- Connection area for customer equipment
- Integrated voltage support for internal and external loads

SUNNY CENTRAL

2660 UP-US / 2800 UP-US / 2930 UP-US / 3060 UP-US

The new Sunny Central: more power per cubic meter

With an output of up to 3060 kVA and system voltages of 1500 V DC, the SMA central inverter allows for more efficient system design and a reduction in specific costs for PV power plants. A separate voltage supply and additional space are available for the installation of customer equipment. True 1500 V technology and the intelligent cooling system OptiCool ensure smooth operation even in extreme ambient temperature as well as a long service life of 25 years.

SUNNY CENTRAL 2660 UP-US / 2800 UP-US

Technical data*	SC 2660 UP-US	SC 2800 UP-US
Input (DC)		
MPP voltage range V_{DC} (at 35 °C / at 50 °C)	880 to 1325 V / 1100 V	921 to 1325 V / 1100 V
Min. input voltage $V_{DC, min}$ / Start voltage $V_{DC, Start}$	849 V / 1030 V	891 V / 1071 V
Max. input voltage $V_{DC, max}$	1500 V	
Max. input current $I_{DC, max}$ / with DC coupling	3200 A / 4800 A	
Max. short-circuit current $I_{DC, sc}$	6400 A	
Number of DC inputs	24 double pole fused (32 single pole fused)	
Number of DC inputs with optional DC coupling of battery	18 double pole fused (36 single pole fused) for PV, 6 double pole fused for batteries	
Max. number of DC cables per DC input (for each polarity)	2 x 800 kcmil, 2 x 400 mm ²	
Integrated zone monitoring	○	
Available PV fuse sizes (per input)	200 A, 250 A, 315 A, 350 A, 400 A, 450 A, 500 A	
Available DC-DC converter fuse size (per input)	750 A	
Output (AC)		
Nominal AC power at $\cos \phi = 1$ (at 35 °C / at 50 °C)	2667 kVA / 2400 kVA	2800 kVA / 2520 kVA
Nominal AC power at $\cos \phi = 0.8$ (at 35 °C / at 50 °C)	2134 kW / 1920 kW	2240 kW / 2016 kW
Nominal AC current $I_{AC, nom}$ (at 35 °C / at 50 °C)	2566 A / 2309 A	
Max. total harmonic distortion	< 3% at nominal power	
Nominal AC voltage / nominal AC voltage range ^{1) 8)}	600 V / 480 V to 720 V	630 V / 504 V to 756 V
AC power frequency / range	50 Hz / 47 Hz to 53 Hz 60 Hz / 57 Hz to 63 Hz	
Min. short-circuit ratio at the AC terminals ⁹⁾	> 2	
Power factor at rated power / displacement power factor adjustable ^{8) 10)}	1 / 0.8 overexcited to 0.8 underexcited	
Efficiency		
Max. efficiency ²⁾ / European efficiency ²⁾ / CEC efficiency ³⁾	98.7%* / 98.6%* / 98.5%*	98.7%* / 98.6%* / 98.5%*
Protective Devices		
Input-side disconnection point	DC load break switch	
Output-side disconnection point	AC circuit breaker	
DC overvoltage protection	Surge arrester, type I	
AC overvoltage protection (optional)	Surge arrester, class I	
Lightning protection (according to IEC 62305-1)	Lightning Protection Level III	
Ground-fault monitoring / remote ground-fault monitoring	○ / ○	
Insulation monitoring	○	
Degree of protection	NEMA 3R	
General Data		
Dimensions (W / H / D)	2815 / 2318 / 1588 mm (110.8 / 91.3 / 62.5 inch)	
Weight	< 3400 kg / < 7500 lb	
Self-consumption (max. ⁴⁾ / partial load ⁵⁾ / average ⁶⁾	< 8100 W / < 1800 W / < 2000 W	
Self-consumption (standby)	< 370 W	
Internal auxiliary power supply	○ Integrated 8.4 kVA transformer	
Operating temperature range ⁸⁾	-25 °C to 60 °C / -13 °F to 140 °F	
Noise emission ⁷⁾	67.0 dB(A)*	
Temperature range (standby)	-40 °C to 60 °C / -40 °F to 140 °F	
Temperature range (storage)	-40 °C to 70 °C / -40 °F to 158 °F	
Max. permissible value for relative humidity (condensing / non-condensing)	95% to 100% (2 month/year) / 0% to 95%	
Maximum operating altitude above MSL ⁸⁾ 1000 m / 2000 m	● / ○ (earlier temperature-dependent derating)	
Fresh air consumption	6500 m ³ /h	
Features		
DC connection	Terminal lug on each input (without fuse)	
AC connection	With busbar system (three busbars, one per line conductor)	
Communication	Ethernet, Modbus Master, Modbus Slave	
Communication with SMA string monitor (transmission medium)	Modbus TCP / Ethernet (FO MM, Cat-5)	
Enclosure / roof color	RAL 9016 / RAL 7004	
Supply transformer for external loads	○ (2.5 kVA)	
Standards and directives complied with	UL 62109-1, UL 1741 (Chapter 31, CDR 61), UL 1741-SA, UL 1998, IEEE 1547, MIL-STD-810G	
EMC standards	FCC Part 15 Class A	
Quality standards and directives complied with	VDI/VDE 2862 page 2, DIN EN ISO 9001	
● Standard features ○ Optional * preliminary		

1) At nominal AC voltage, nominal AC power decreases in the same proportion

2) Efficiency measured without internal power supply

3) Efficiency measured with internal power supply

4) Self-consumption at rated operation

5) Self-consumption at < 75% P_n at 25 °C

6) Self-consumption averaged out from 5% to 100% P_n at 25 °C

7) Sound pressure level at a distance of 10 m

8) Values apply only to inverters. Permissible values for SMA MV solutions from SMA can be found in the corresponding data sheets.

9) A short-circuit ratio of < 2 requires a special approval from SMA

10) Depending on the DC voltage

SUNNY CENTRAL 2930 UP-US / 3060 UP-US

Technical data*	SC 2930 UP-US	SC 3060 UP-US
Input (DC)		
MPP voltage range V_{DC} (at 35 °C / at 50 °C)	962 to 1325 V / 1100 V	1003 to 1325 V / 1100 V
Min. input voltage $V_{DC, min}$ / Start voltage $V_{DC, Start}$	934 V / 1112 V	976 V / 1153 V
Max. input voltage $V_{DC, max}$	1500 V	
Max. input current $I_{DC, max}$ / with DC coupling	3200 A / 4800 A	
Max. short-circuit current $I_{DC, sc}$	6400 A	
Number of DC inputs	24 double pole fused (32 single pole fused)	
Number of DC inputs with optional DC coupling of battery	18 double pole fused (36 single pole fused) for PV, 6 double pole fused for batteries	
Max. number of DC cables per DC input (for each polarity)	2 x 800 kcmil, 2 x 400 mm ²	
Integrated zone monitoring	○	
Available PV fuse sizes (per input)	200 A, 250 A, 315 A, 350 A, 400 A, 450 A, 500 A	
Available DC-DC converter fuse size (per input)	750 A	
Output (AC)		
Nominal AC power at $\cos \phi = 1$ (at 35 °C / at 50 °C)	2933 kVA / 2640 kVA	3067 kVA / 2760 kVA
Nominal AC power at $\cos \phi = 0.8$ (at 35 °C / at 50 °C)	2346 kW / 2112 kW	2454 kW / 2208 kW
Nominal AC current $I_{AC, nom}$ (at 35 °C / at 50 °C)	2566 A / 2309 A	
Max. total harmonic distortion	< 3% at nominal power	
Nominal AC voltage / nominal AC voltage range ^{1) 8)}	660 V / 528 V to 759 V	690 V / 552 V to 759 V
AC power frequency / range	50 Hz / 47 Hz to 53 Hz 60 Hz / 57 Hz to 63 Hz	
Min. short-circuit ratio at the AC terminals ⁹⁾	> 2	
Power factor at rated power / displacement power factor adjustable ^{8) 10)}	1 / 0.8 overexcited to 0.8 underexcited	
Efficiency		
Max. efficiency ²⁾ / European efficiency ²⁾ / CEC efficiency ³⁾	98.7%* / 98.6%* / 98.5%*	98.7%* / 98.6%* / 98.5%*
Protective Devices		
Input-side disconnection point	DC load break switch	
Output-side disconnection point	AC circuit breaker	
DC overvoltage protection	Surge arrester, type I	
AC overvoltage protection (optional)	Surge arrester, class I	
Lightning protection (according to IEC 62305-1)	Lightning Protection Level III	
Ground-fault monitoring / remote ground-fault monitoring	○ / ○	
Insulation monitoring	○	
Degree of protection	NEMA 3R	
General Data		
Dimensions (W / H / D)	2815 / 2318 / 1588 mm (110.8 / 91.3 / 62.5 inch)	
Weight	< 3400 kg / < 7500 lb	
Self-consumption (max. ⁴⁾ / partial load ⁵⁾ / average ⁶⁾	< 8100 W / < 1800 W / < 2000 W	
Self-consumption (standby)	< 370 W	
Internal auxiliary power supply	○ Integrated 8.4 kVA transformer	
Operating temperature range ⁸⁾	-25 °C to 60 °C / -13 °F to 140 °F	
Noise emission ⁷⁾	67.0 dB(A)*	
Temperature range (standby)	-40 °C to 60 °C / -40 °F to 140 °F	
Temperature range (storage)	-40 °C to 70 °C / -40 °F to 158 °F	
Max. permissible value for relative humidity (condensing / non-condensing)	95% to 100% (2 month/year) / 0% to 95%	
Maximum operating altitude above MSL ⁸⁾ 1000 m / 2000 m	● / ○ (earlier temperature-dependent derating)	
Fresh air consumption	6500 m ³ /h	
Features		
DC connection	Terminal lug on each input (without fuse)	
AC connection	With busbar system (three busbars, one per line conductor)	
Communication	Ethernet, Modbus Master, Modbus Slave	
Communication with SMA string monitor (transmission medium)	Modbus TCP / Ethernet (FO MM, Cat-5)	
Enclosure / roof color	RAL 9016 / RAL 7004	
Supply transformer for external loads	○ (2.5 kVA)	
Standards and directives complied with	UL 62109-1, UL 1741 (Chapter 31, CDR 6I), UL 1741-SA, UL 1998 IEEE 1547, MIL-STD-810G	
EMC standards	FCC Part 15 Class A	
Quality standards and directives complied with	VDI/VDE 2862 page 2, DIN EN ISO 9001	
● Standard features ○ Optional * preliminary		

1) At nominal AC voltage, nominal AC power decreases in the same proportion

2) Efficiency measured without internal power supply

3) Efficiency measured with internal power supply

4) Self-consumption at rated operation

5) Self-consumption at < 75% P_n at 25 °C

6) Self-consumption averaged out from 5% to 100% P_n at 25 °C

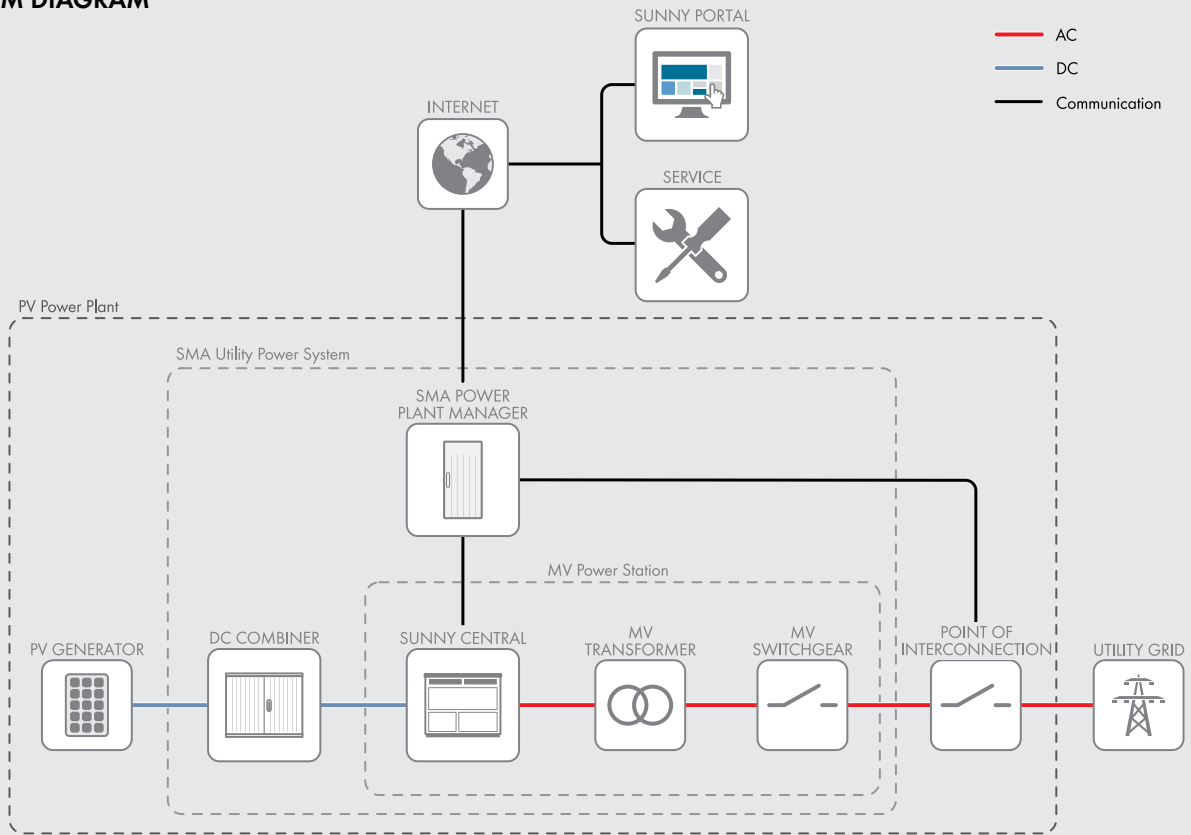
7) Sound pressure level at a distance of 10 m

8) Values apply only to inverters. Permissible values for SMA MV solutions from SMA can be found in the corresponding data sheets.

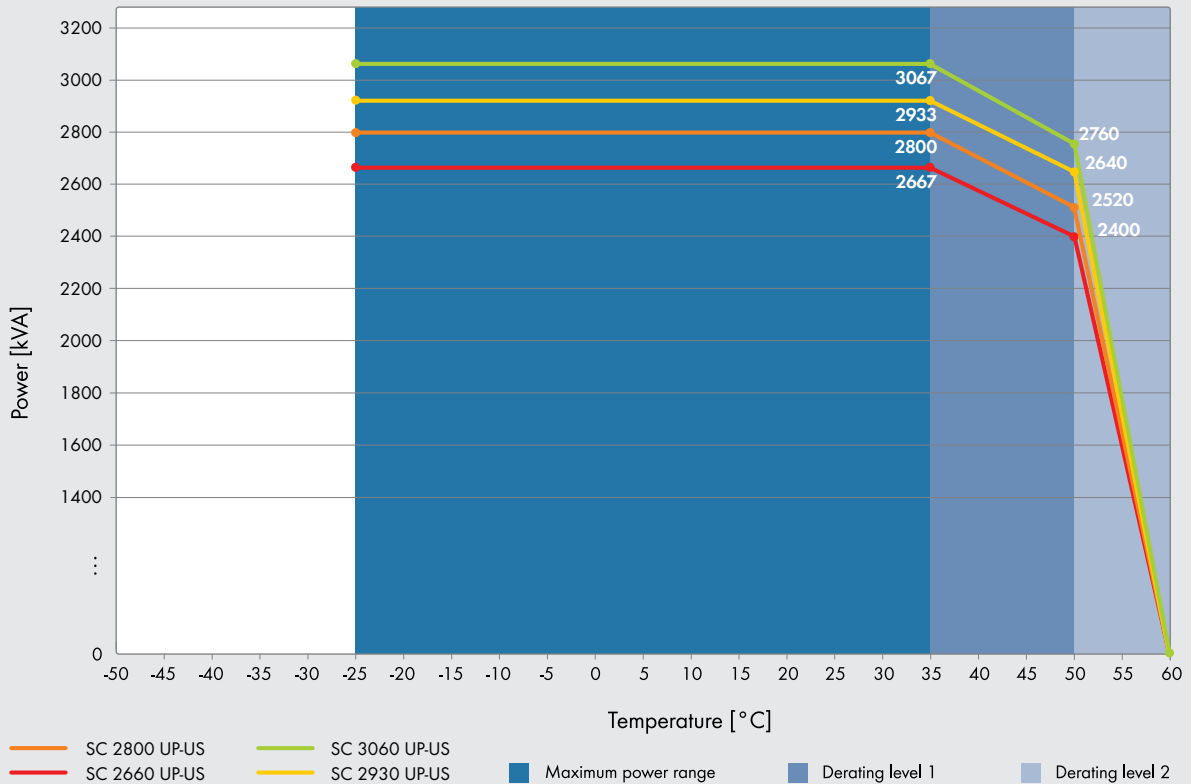
9) A short-circuit ratio of < 2 requires a special approval from SMA

10) Depending on the DC voltage

SYSTEM DIAGRAM



TEMPERATURE BEHAVIOR (at 1000 m)



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