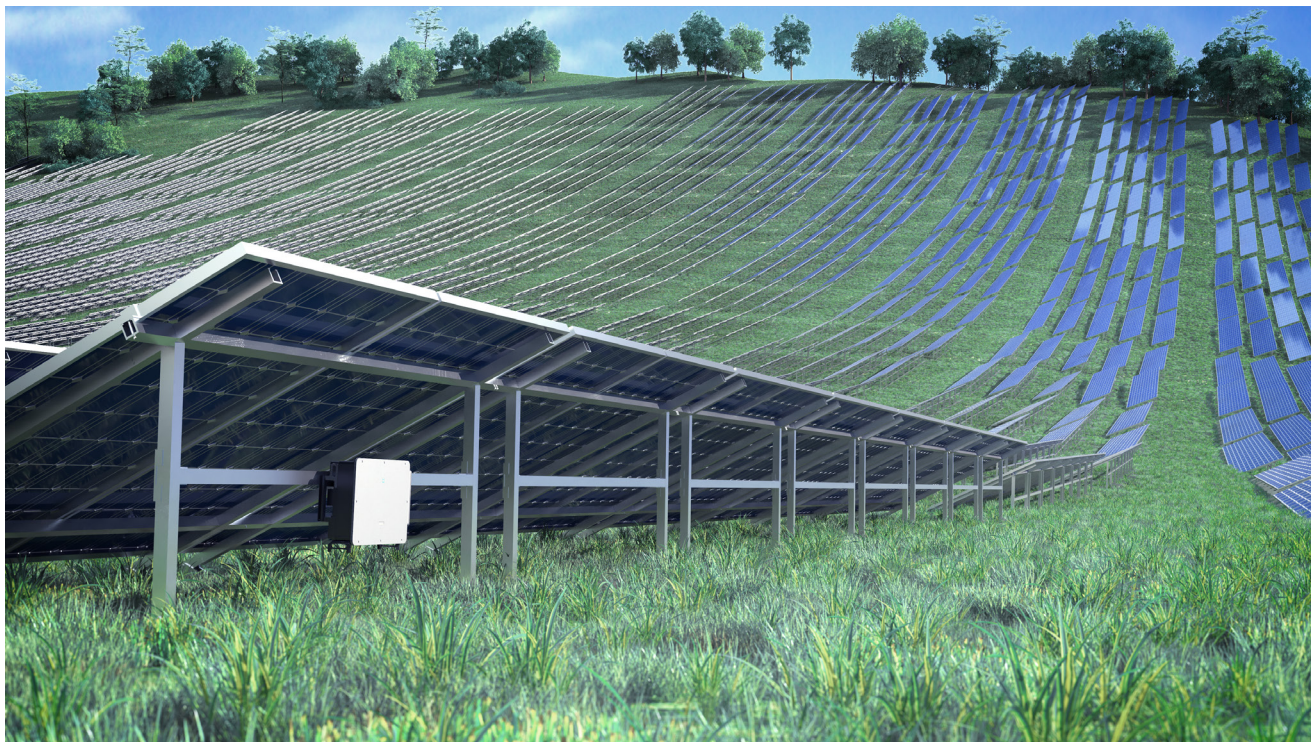




Ultra-Powerful String Inverter SG320HX

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1. Overview

As the solar industry evolves rapidly, there emerge a series of new technical requirements and complicated application scenarios, including high penetration rate, UHV AC/DC transmission, high safety requirements due to increased module current, the pressure of investment costs, as well as the more stringent grid support demand. The new and complicated requirements set a higher threshold for the inverter.

To meet the multi-dimensional, multi-variable requirements, Sungrow launches its new-generation string inverter: SG320HX, which is ultra-powerful with max 352kVA AC output power.



Fig-1: String Inverter SG320HX

2. 2 Strings per MPPT, No Fear of String Short Circuit or Reverse Connection

According to IEC 62548, if two strings connect to one MPPT, there is no need to configure overcurrent protection devices such as circuit breakers or PV fuses. With 2 strings connecting to 1 MPPT input, PV modules and cables will only withstand $1 \times I_{sc}$ when the strings are reversely connected.

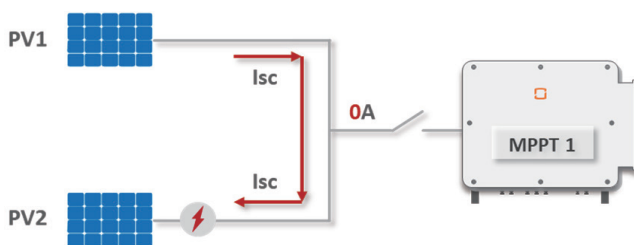


Fig-2: Reverse connection situation

3. 24h real-time AC and DC insulation monitoring, Enhanced System Safety

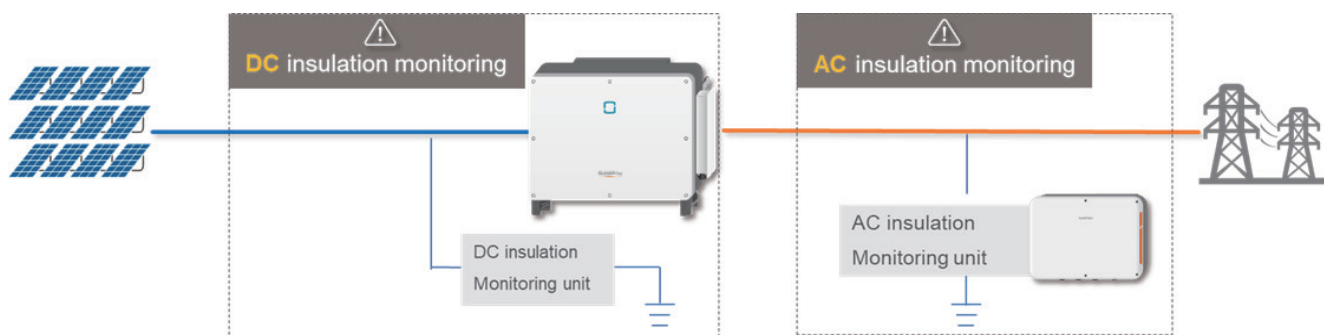


Fig-3: DC and AC insulation monitoring

4. Open Platform with Tracking System, Optimized LCOE

When the inverter and tracking system are integrated on the open platform, the GPS, radiation, wind speed, inverter electrical parameters, tracking bracket angle, tracker wind tunnel experiment

For non-isolated inverters, DC-side or AC-side ground faults can form a loop between the fault point and the electrical grid, which directly causes a fault current. In this situation, the inverter is prohibited to connect to the grid.

Non-isolated inverters, if being connected in series to ungrounded PV modules, need to possess an insulation resistance monitoring function. In addition, before the inverter is connected to the grid, the insulation resistance value must be checked. When the insulation resistance value is lower than the threshold value required by the relevant standards, an alarm shall be promptly issued. Consequently, the inverter should not be connected to the grid.

SG320HX 24h real-time AC and DC insulation monitoring function will analyze the impedance, evaluate the insulation state and upload real-time alarm and impedance value. These functions enable SG320HX to precisely locate faults, thereby facilitating quick repair, and improving O&M efficiency. SG320HX also supports the flexibly-setting insulation resistance threshold to satisfy different application scenario requirements.

data, and other information remain open to one interconnected communication network. The integrated solution with the dual-core cooperative operation of the inverter and the tracking controller can help achieve the maximum power generation, and prolong the lifespan of PV modules and the tracking system. The open platform with tracking

systems brings many other benefits enabled by dynamic sensing, closed-loop control, and AI learning functions.

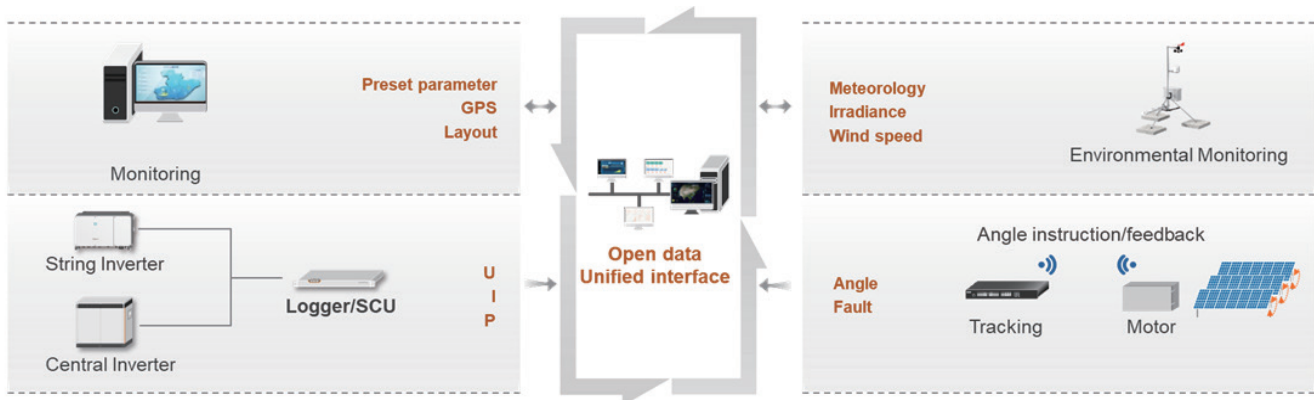


Fig-4: Open platform system diagram

5. IV Scanning and Intelligent Cleaning, Higher Yield

During the operation of the PV plant, factors such as dust on PV modules, damage to PV cells, pollutants, short circuits of inside diodes, and the PID phenomenon may affect system performance and lower power yield.

The smart IV scanning can assess the conditions of PV modules, automatically locate the faulty strings, and instruct O&M engineers to quickly locate and fix faults, thereby significantly improving work efficiency and increasing yield.

Smart IV scanning can also command the cleaning robots to operate according to actual site situations, avoiding unnecessary cleanings. Hence, the cleaning robots see a prolonged life span. With a combination of IV scanning and intelligent cleaning, plant power yield will be increased as a whole.



Fig-6: Intelligent Cleaning

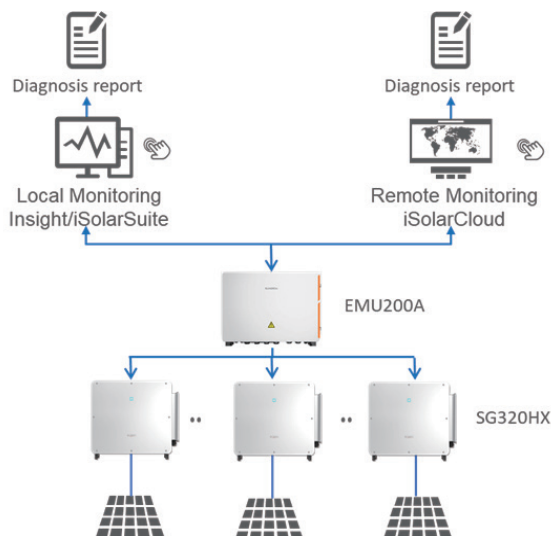


Fig-5: Topology of smart IV scanning

6. Compatibility with 600Wp+ PV Panel and the Tracking system, Stronger Adaptability

Project stakeholders take a lower LCOE seriously and prefer advanced technologies, like the bifacial panel, the large panel of 600Wp+, and the tracker system to maximize solar yield. There are two different technical paths in large PV panels in terms of the short circuit current; one is below 15A and the other is around 18.5A. Sungrow SG320HX is compatible

with both types; 12 MPPTs for 210 PV modules and up to 16MPPTs for 182 PV modules.

Most solar installations in the MENA market are equipped with tracker systems and bifacial modules. Sungrow, as one of the industry leaders worldwide, not only satisfies the local technical requirements but also builds profound partnerships with local players in a bid to increase the overall ROI.

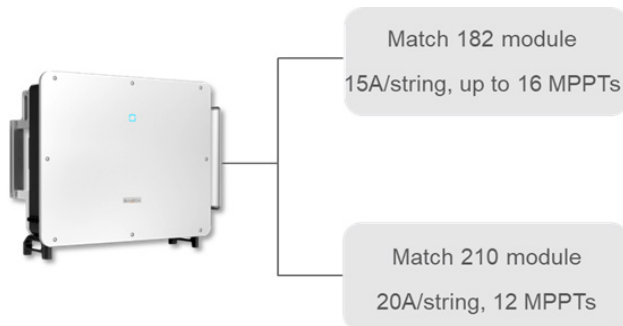


Fig-7: Compatible with 182 and 210 module

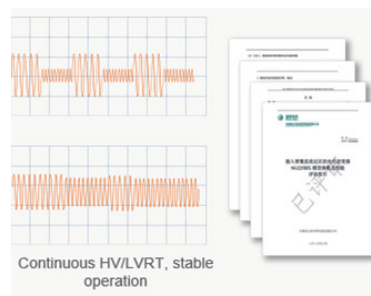
7. Strong Grid supports, Enhanced Reliability

As more and more large-scale renewable energy plants connect to the grid, the grid SCR is ever decreasing. This phenomenon requires the inverter to provide strong grid supports to maintain grid stability. SG320HX can remodel the dynamic impedance and suppress transient overvoltage to stably operate even in the SCR=1.16 weak grid. When the grid fails or gets disturbed, SG320HX can operate continuously with the LV/ HVRT function. To further support the grid, SG320HX enables a reactive power response within 30 ms, which makes it possible to use SG320HX instead of additional SVG. SG320HX can also integrate the Virtual Synchronous Generator function to support the grid by active voltage and frequency adjustment.

Weak grid stable operation



UHV continuous HV/LVRT



Quick response time

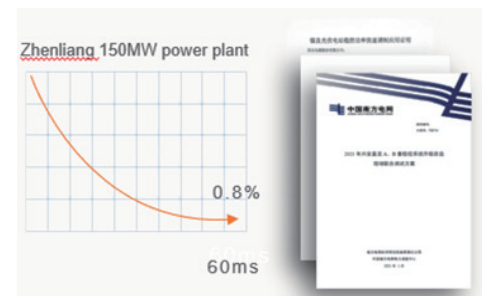


Fig-8: Strong grid supports

8. IP66 Protection & C5 Anti-Corrosion, Better Adaptation to Various Harsh Environments

In recent years, more solar plants are installed in coastal areas or desert areas. Such a harsh environment poses challenges to inverters. With smart forced air-cooling technology, the SG320HX can work stably in scorching heat. On account of the

lower internal temperature than the temperature in the natural cooling method, the lifetime of the SG320HX will be longer. Due to its separated electrical/cooling chamber design, SG320HX provides an ingress protection rating of IP66 for all chambers and anti-corrosion design with C5 protection degree, making it ideal for applications in coastal areas, chemical industrial regions, and other typical harsh conditions.



Fig-9: SG320HX adapting to the harsh environment

9. Max. 8.85MVA block, Cost Efficiency

As a recent study shows that the global market for utility-scale PV installations is shifting to bigger block designs for a lower LCOE. Based on the cost comparison of different capacity blocks, the 7~9MW block enables the lowest cost. Sungrow's SG320HX is flexible for different optimal block sizes from 3MW to 8.85MW. Customers can choose the one block size that fits their needs best from this range, and gain excellent cost-efficiency. Sungrow offers a one-stop solution, integrating SG320HX, MV Station, Communication box, and Local & Remote SCADA. MPLC communication is applied between SG320HX and the data logger to save communication cable material and installation costs.

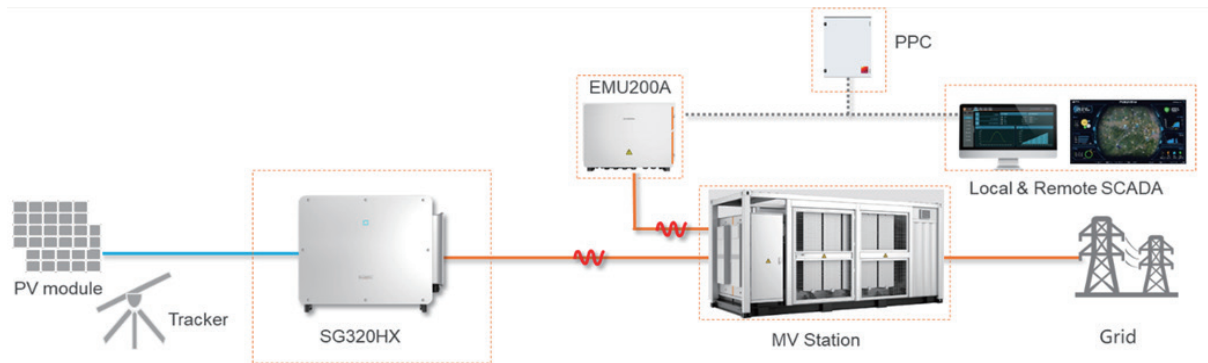


Fig-10: System diagram

10. Summary

Backed by Sungrow's industry-leading R&D, SG320HX is equipped with the latest technologies to withstand new challenges and fit the utility-scale solar plants best. It will bring higher yields and lower

CAPEX. The IP66 protection and C5 anti-corrosion capability make it adapt to harsh environments well. With the application of 24h real-time AC and DC insulation monitoring, faults can be accurately located so that the plant's overall safety and reliability can be guaranteed.



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