

## Frequency Shift Power Control

### 1. Overview

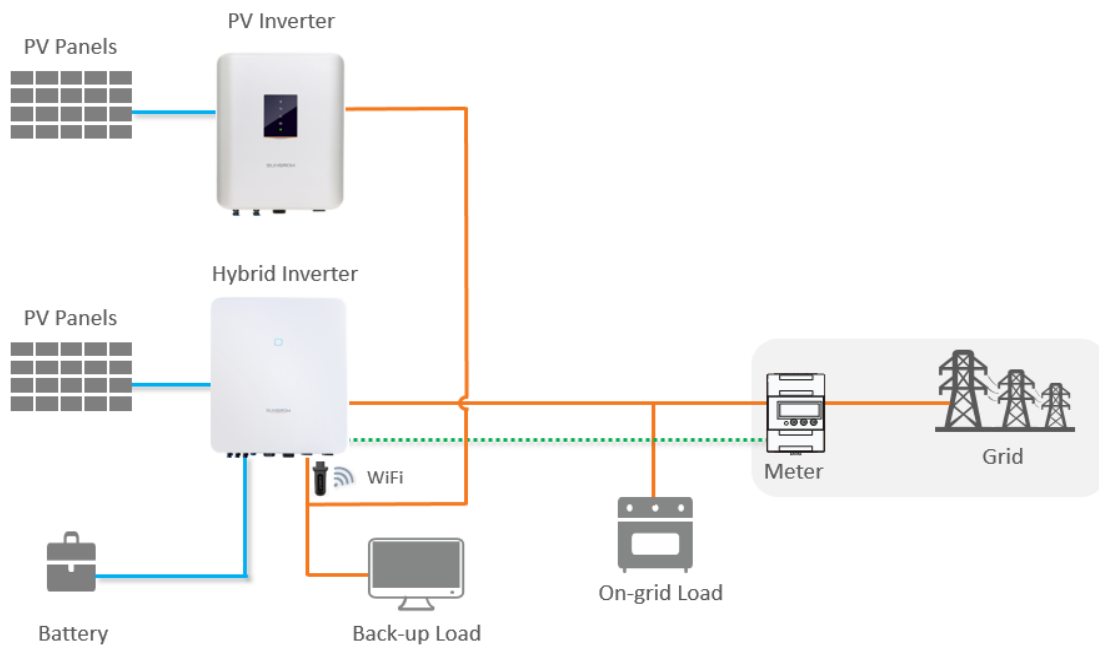
Frequency Shift Power Control (FSPC) can maximize the utilization of PV power in a stand-alone grid or micro grid system. In a stand-alone grid or during grid disconnection, the hybrid inverter of the system will maintain the stand-alone grid's voltage and frequency to allow the PV inverter to continue powering the load or charging the battery, and automatically adjust the frequency to prevent the excess power of the PV inverter from overcharging the battery.

### 2. Sungrow FSPC Solution

The following table lists different types of Sungrow hybrid inverter and the respective software version required support the FSPC function:

NO.	Inverter Type	Software Version
1	SH5K-30	MDSP_SH5K-30_V01_V01_P SDSP_SH5K-30_V01_V01_K LCD_SH5K-30_V01_V01_O or higher
2	SH5.0/6.0/8.0/10RT	Coming soon

The system diagram of Sungrow's FSPC solution is showed in Fig-1, the PV inverter should be connected to the backup port of the hybrid inverter. In stand-alone grid operation, Sungrow hybrid inverter can set up a local grid voltage and frequency at the back-up side, the PV inverter then output PV power at MPPT mode. If the PV power is large than the power required by the back-up load, the excessive power then can be absorded by the hybrid inverter to charge the battery. When the battery is about to be fully charged, hybrid inverter will increase the local grid frequency. As soon as the local grid frequency reaches the derating area. The PV inverter limits its output power accordingly. If the battery SOC falls to a lower preset value, the hybrid inverter will decrease the frequency to allow the PV inverter to output more power.



**Fig-1 System diagram**

FSPC also can be used when grid disconnects in on-grid system. Once grid recovery, hybrid inverter and PV inverter will automatically reconnect to the grid.

If PV inverter in the system is not produced by Sungrow. The following conditions must be met before FSPC function can be applied:

- The PV inverter should be connected to the backup port of Sungrow hybrid inverter;
- The PV inverter should have the same overfrequency derating curve as Sungrow hybrid inverter's. At the same time two inverters should meet local grid requirement ;
- The rated AC output power of three-phase PV inverter should be no more than the maximum backup power of hybrid inverter in the system. For single-phase PV inverter, the rated AC output power should be no more than each phase maximum power of hybrid inverter. (for example, for SH10RT, the allowed rated AC output power of a PV inverter should be no more than 3.3kW).

### 3. FSPC Setting

The FSPC function of Sungrow hybrid inverter is disabled by default. It can be enabled via Sungrow iSolarCloud APP remotely or locally. The following steps mainly introduces the guide of how to enable FSPC in APP's local access mode.

- Access the APP via WLAN, you will be prompted to put in the account and password. Please put TI\_20200613\_Frequency Shift Power Control\_V10\_EN

in “admin” as the account and the password (contact Sungrow).

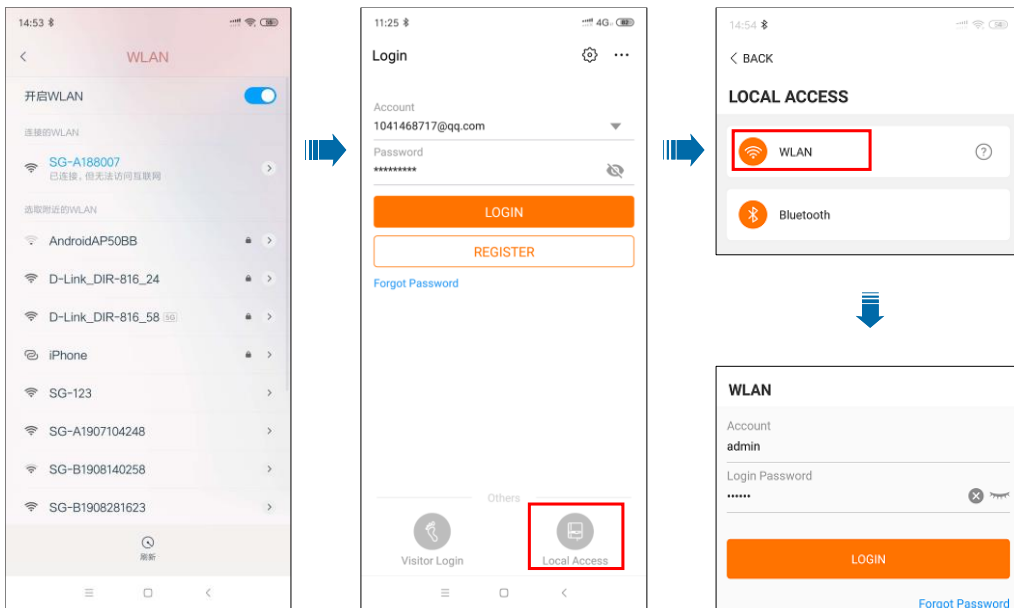


Fig-2 Login

- When login successfully, click "More" > "Settings" > “System Parameters”. Enable “Frequency Shift Power Control”.

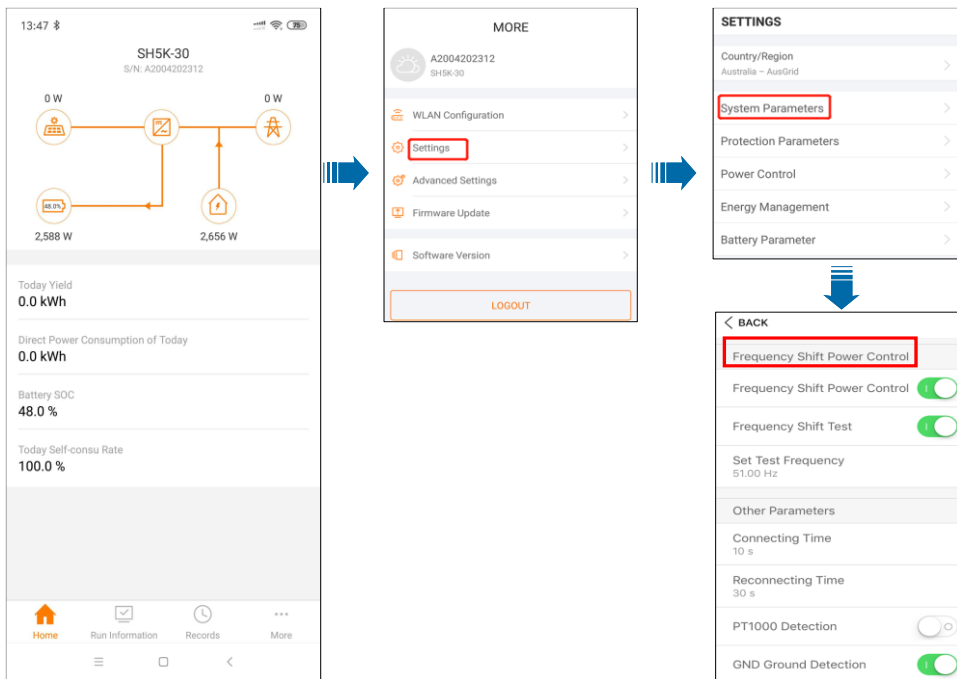


Fig-3 Enable FSPC

For “Frequency Shift Test”, this is designed for customers to test PV inverter if it has the overfrequency derating function, which is not necessary for customer to set. Customers can set any frequency value more than 50Hz for test. For example, input 51Hz in “Set Test Frequency” then check the PV inverter AC output power. If the AC output power of the PV inverter decreases, it means the PV inverter has the overfrequency derating function.