GoodWe Remote Shutdown Solution

(SA-E-20210520-002)
VER 01, UPDATED ON Dec 8, 2021

THE NEED FOR REMOTE SHUTDOWN

As string inverter market is expanding, more and more solar systems are installed on rooftops or located adjacent to buildings. Due to the complexity of installation circumstances, there are high risks of unrecoverable damage caused to property as well as humans supposing fire hazards happened on installation site where first responders would need to shut down the system remotely before they respond. Once the shutdown button is pressed, inverter disconnects from utility grid and stops output as well as input from PV arrays. In this way, damage caused by such hazards can be alleviated and safety of the whole solar system and stability of utility grid can be secured.

GOODWE REMOTE SHUTDOWN SOLUTION

In general, a solar system is composed of PV array, inverter, combiner box and monitoring platform. As a key unit in the system, inverter undertakes the task of both generation and protection. The remote shutdown function that comes with inverter can be realized by a shutdown function circuit integrated in the inverter and a switch installed in the control room. As shown on the figure 1. Schematic of Inverter, the remote shutdown function is added on the basis of original functions of the grid-tied inverter.

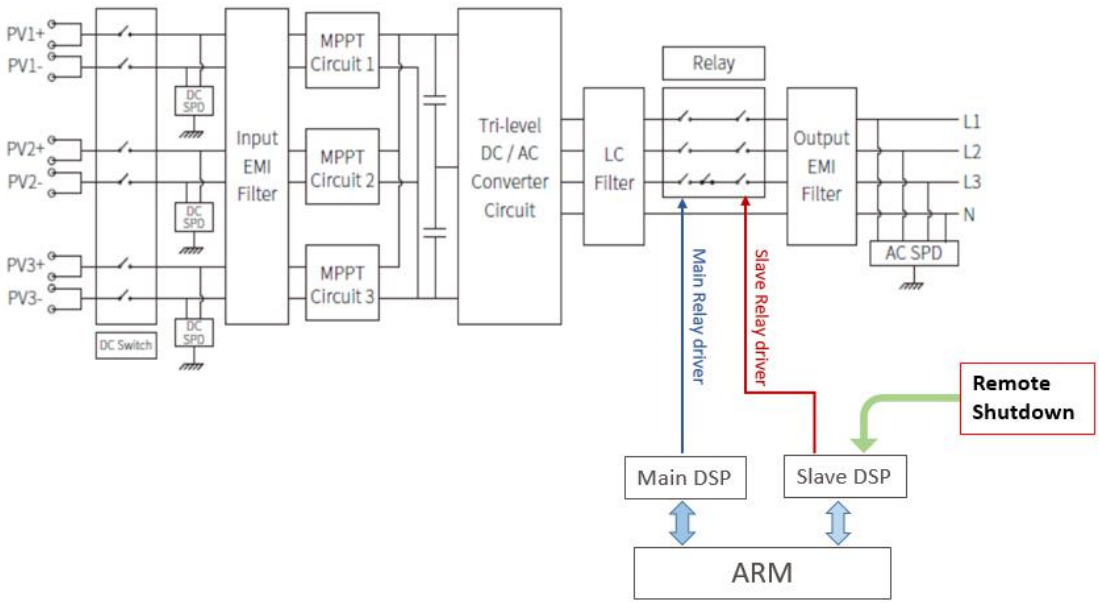

Figure 1 Schematic of Inverter

To realize the remote shutdown function of inverter, it requires combined action of on-off switch, long-distance communication and control mechanism via signals.

a. Switch control. The on-off switch can be deployed in a remote place such as a control room in the first floor of the building where the operator can turn on or off the switch at a safe distance to shut down or restart the inverter if some hazards happen on the site. Common emergency switch can be used to enable switch control.

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b. Remote communication. Communication cables such as RS485 are used here to transmit signals of remote shutdown generated by emergency switch. To realize remote shutdown of multiple inverters by one emergency switch, the communication cables between inverter should be connected hand in hand and communication cables connected to the communication board inside the inverter should be connected as well. When operator turns on the emergency switch, signals of remote shutdown shall be sent to multiple inverters in the circle simultaneously and the inverters should disconnect from grid and stop output.

c. Signal control. Signals for remote shutdown are interpreted by a special circuit and then transmitted to the control unit where commands will be generated to ask inverter disconnect from grid and stop output. As there is no AC output, IGBT module and DC boost module stop working and the DC input power is nearly zero.

The shutdown control of this remote shutdown function is realizable at a millisecond level (simultaneously shutdown multiple inverters within 200ms). With this function integrated, we can protect our inverter from hazards, secure the stability of grid and remotely control the output of inverter.

Remote shutdown is only for Europe installations, in compliance with European safety requirements. And Remote shutdown device is not provided by manufacturer.

CONNECTION to inverters such as SMT SERIES

For single inverter, emergency switch and control unit inside the inverter should be connected through communication cable; for multiple inverters, emergency switch and inverters should be connected hand in hand as shown in figure 2 through communication cables. The last inverter in the link should be connected to the emergency switch. As shown in figure 3, a 2-pin connector is added on the communication board for the wiring.

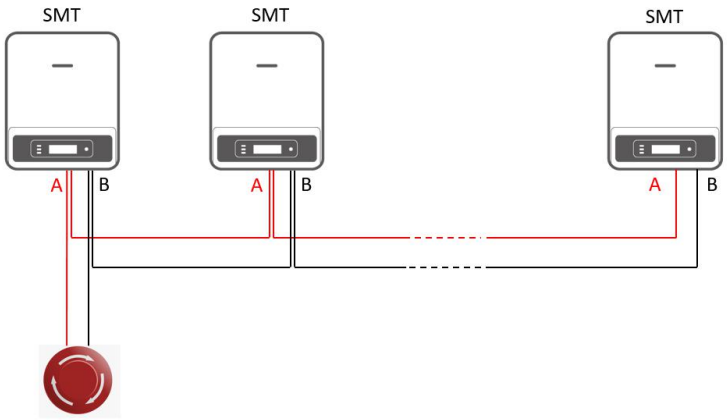

Figure 2 External Wiring of Multiple Inverters

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Remote shutdown should be connected to the COM port with 2-Pin as illustrated below.

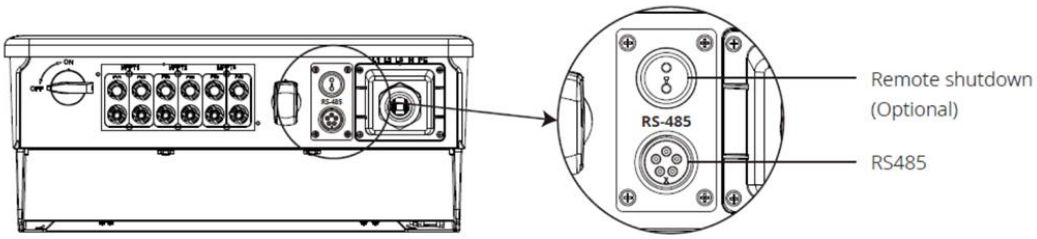

Figure 3 COM Port of Remote Shutdown for SMT

The cables should be connected in order as shown in the figure 4.

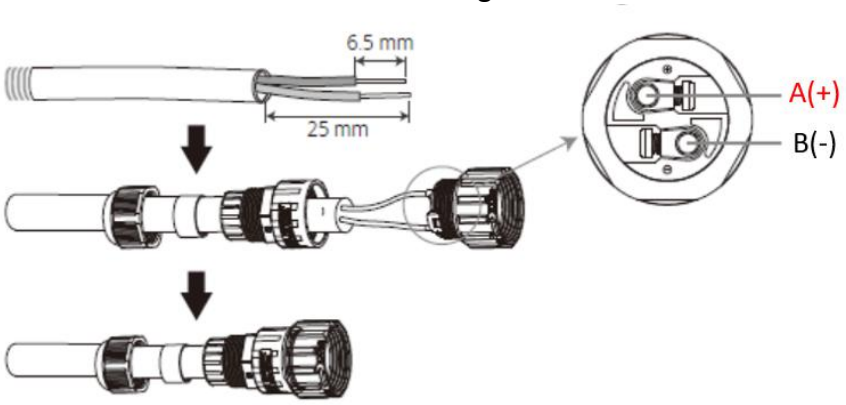

Figure 4 Interface for Communication Cables Used in Remote Shutdown for SMT

As shown in above figure, the communication cables should be connected to the 2-Pin port and to the emergency switch. Terminal A and B should be connected as shown in figure 4.For multiple inverters, the communication cables between 2 inverters must also be connected in order of A to A and B to B.

CONCLUSION

With remote shutdown function integrated in the inverter, it is safe and efficient to shut down the inverter or inverters in a distant spot by a switch for the sake of stability of grid and security of inverter. At the same time, we can also remotely control the output of inverter to realize operation mode switch.

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