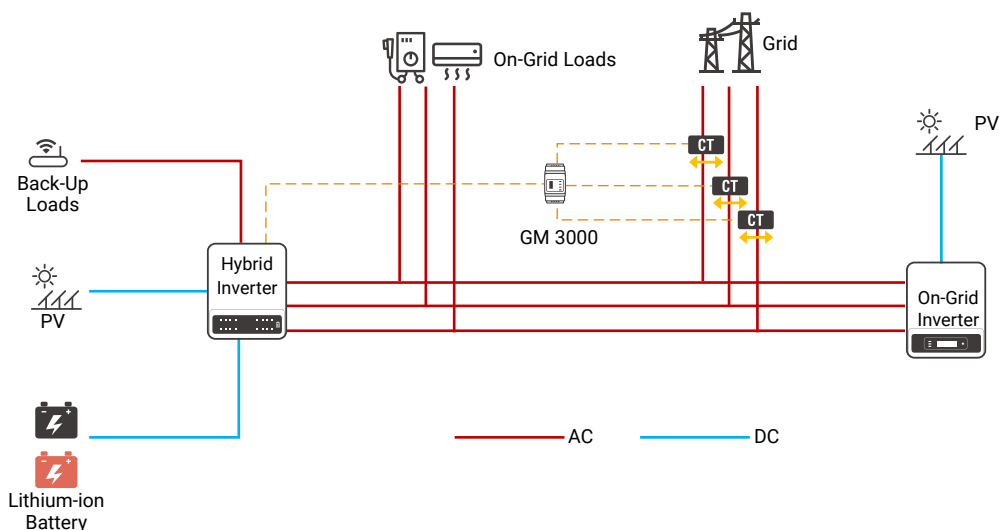


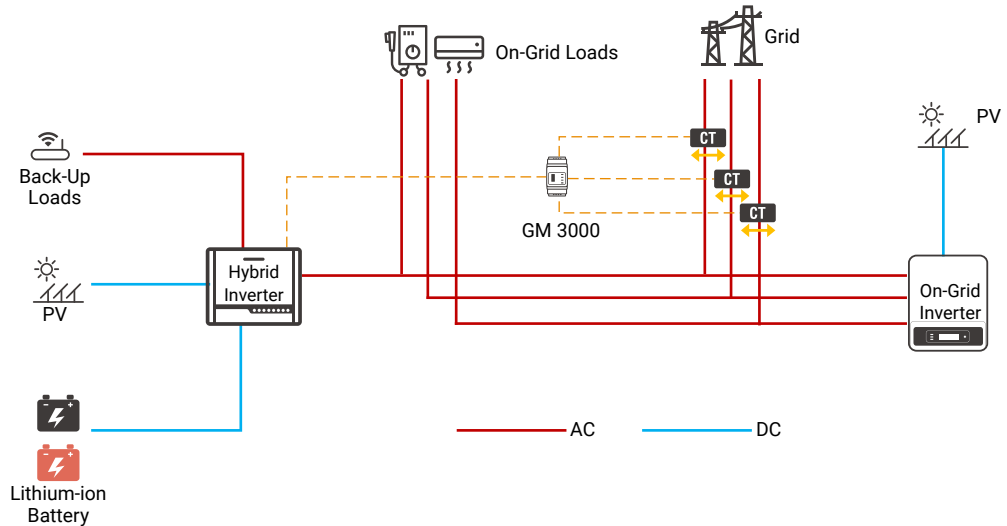


February 19, 2021

**Solution B: Three phase hybrid system retrofit three phase on-grid system**


Hybrid inverter working mode	1. Self-consumption, 2. Back-up, 3. Time of use, 4. Load monitoring (depends), 5. Export power limitation (depends).
Required devices	Solar, Hybrid inverter (ET), Lithium-ion battery, GM 3000
Operation Logic	Solar power of the system will support loads first then charge battery, and the exceed power will be able to export to grid which could be limited. (Will load monitoring and export power limitation of the whole system realize or not depends on on-grid inverter has such functions)
Load monitoring	GM3000 & CTs detect the power of the whole system, however the system lacks the data from on-grid inverter. Two situations has been listed as following: 1) If the power from on-grid inverter is known: Real-time consumption of loads can be calculated as following: $P_{load} = P_{on-grid \text{ inverter output}} + P_{hybrid \text{ inverter output}} - P_{grid \text{ (exporting)}}$ or $P_{load} = P_{on-grid \text{ inverter output}} + P_{hybrid \text{ inverter output}} + P_{grid \text{ (importing)}}$ 1) If the power from on-grid inverter is unknown: Load monitoring cannot be realized.
Export power limitation	Export power limitation depends on whether on-grid system can control output power or not. Two situations has been listed as following: 1) If the power from on-grid inverter is known and controllable: Export power limitation can be realized. 1) If the power from on-grid inverter is not known and controllable: Export power limitation of the whole system cannot be realized. The system can only control the power of itself.

February 19, 2021

**Solution C: Single phase hybrid system retrofit three phase on-grid system**


Hybrid inverter working mode	1. Self-consumption, 2. Back-up, 3. Time of use, 4. Load monitoring (depends), 5. Export power limitation (depends).
Required devices	Solar, Hybrid inverter (EH, ES, EM, ESA, EHB), Lithium-ion battery, GM 3000
Operation Logic	Solar power of the system will support loads first then charge battery, and the exceed power will be able to export to grid which could be limited. (Will load monitoring and export power limitation of the whole system realize or not depends on on-grid inverter has such functions)
Load monitoring	GM3000 & CTs detect the power of the whole system, however the system lacks the data from on-grid inverter. Two situations has been listed as following: 1) If the power from on-grid inverter is known: Real-time consumption of loads can be calculated as following: $P_{load} = P_{on-grid \text{ inverter output}} + P_{hybrid \text{ inverter output}} - P_{grid \text{ (exporting)}}$ or $P_{load} = P_{on-grid \text{ inverter output}} + P_{hybrid \text{ inverter output}} + P_{grid \text{ (importing)}}$ 1) If the power from on-grid inverter is unknown: Load monitoring cannot be realized.
Export power limitation	Export power limitation depends on whether on-grid system can control output power or not. Two situations has been listed as following: 1) If the power from on-grid inverter is known and controllable: Export power limitation can be realized. 1) If the power from on-grid inverter is not known and controllable: Export power limitation of the whole system cannot be realized. The hybrid system can only control the power of itself.

\*1 : See detailed information below.