# Claims

1. A UPS system based on aqueous sodium ion batteries, characterized in that the UPS system comprises an energy storage module, a UPS host, and a control device, wherein:

the energy storage module comprises two battery packs, each battery pack uses an aqueous sodium ion battery energy storage module, the two battery packs are battery pack B1 and battery pack B2, respectively;

the control device comprises a microcontroller, two choppers, and four switches, wherein the two choppers and the four switches communicate with the microcontroller respectively; the two choppers are chopper D1 and chopper D2, and the four switches are switch K1, switch K2, switch K3, and switch K4, respectively;

the UPS host comprises a rectifier and an inverter connected to the rectifier, the rectifier is connected to a power grid, and the inverter is connected to a load;

the battery pack B1 is respectively connected to the chopper D1 and the switch K2, and the chopper D1 is connected to the switch K1;

the battery pack B2 is respectively connected to the chopper D2 and the switch K4, and the chopper D2 is connected to the switch K3;

connection ends of the rectifier and the inverter are respectively connected to the switch K1, the switch K2, the switch K3, and the switch K4;

the microcontroller monitors a voltage status of the power grid and controls a working status of the two choppers and the four switches based on the voltage status of the power grid,

a minimum voltage of each chopper is less than a minimum discharge voltage of the respectively connected aqueous sodium ion battery energy storage module, and a maximum voltage of each chopper is greater than a

maximum charging voltage of the respectively connected aqueous sodium ion battery energy storage module.

2. The UPS system based on aqueous sodium ion batteries as claimed in claim 1, characterized in that each aqueous sodium ion battery energy storage module comprises multiple aqueous sodium ion battery units connected in series or parallel, each aqueous sodium ion battery unit has a rated capacity of 30-200Ah, a cycle life greater than 3500 times, a rated voltage of 1.5-2.0V, a charge discharge rate of 0.1-2C, and an applicable temperature range of -10-50 ℃.

3. The UPS system based on aqueous sodium ion batteries as claimed in claim 1, characterized in that, when the power grid provides a power supply, the microcontroller opens the switch K1 and the switch K3, closes the switch K2 and the switch K4, and the battery packs B1 and B2 are in a charging standby state, and the load is powered by the power grid.

4. The UPS system based on aqueous sodium ion batteries as claimed in claim 2, characterized in that when the power grid loses power, when the microcontroller detects that a voltage of the power grid is 0V, the battery pack B1 and the battery pack B2 switch to a discharge state, and the entire UPS system is in a power grid loss working state, and a voltage of each aqueous sodium ion battery energy storage module decreases due to discharge, the battery pack B1 and the battery pack B2 are sequentially switched through the control device to supply power to the load, specifically:

firstly, when the microcontroller disconnects the switch K2, the battery pack B1 exits an operating state, and the battery pack B2 remains in the operating state, directly supplying power to the load through the inverter to maintain a continued operation of the UPS system; then the microcontroller closes the switch K1, the chopper D1 enters a working state, the battery pack B1 is put into operation, the battery pack B1 supplies power to the load through the chopper D1 and the inverter, and an output voltage

of the battery pack B1 is set as a current bus voltage;

then, the microcontroller disconnects the switch K4, the battery pack B2 exits the operating state, and the battery pack B1 remains in the operating state, supplying power to the load through the chopper D1 and the inverter to maintain the continued operation of the UPS system; then the microcontroller closes the switch K3, the chopper D2 enters the working state, and the battery pack B2 is put into operation, the battery pack B2 supplies power to the load through the chopper D2 and the inverter, and an output voltage of the battery pack B2 is set as the current bus voltage;

at this point, the switch K1 and the switch K3 are in a closed state, the switch K2 and the switch K4 are in an open state, and the battery pack B1 and the battery pack B2 respectively supply power to the load through corresponding choppers and the inverter.

5. The UPS system based on aqueous sodium ion batteries according to claim 4, characterized in that when the power grid is restored and the microcontroller monitors that the voltage of the power grid returns to providing the power supply, the battery packs B1 and B2 sequentially switch to a charging standby state, specifically:

firstly, the microcontroller sequentially stops the chopper D2, disconnects the switch K3, and closes the switch K4, and the battery pack B2 switches to the charging standby state;

then the microcontroller sequentially stops the chopper D1, disconnects the switch K1, and closes the switch K2, and the battery pack B1 switches to a charging state, completing the switching of the two battery packs to the charging standby state, and the load is powered by the power grid.