CLAIMS

1. A power conversion apparatus comprising a configurable input interface, a power conversion circuit, and a configurable output interface, wherein:

the configurable input interface is arranged to configure a first electrical connection of an input power supply and the power conversion circuit, and is electrically connected with the input power supply and the power conversion circuit;

the configurable output interface is arranged to configure a second electrical connection of a load and the power conversion circuit, and is electrically connected with the load and the power conversion circuit; and

the power conversion circuit is arranged to perform corresponding power conversion according to parameters of the input power supply and parameters of the load,

wherein the power conversion circuit comprises input ends IN1, IN2, IN3, and IN4, output ends OUT1, OUT2, OUT3, and OUT4, switching groups S1, S2, S3, S4, S5, S6, S7, and S8, inductors L1 and L2, and a capacitor C, wherein:

the input end IN1 is electrically connected with the output end OUT1;

the input end IN4 is electrically connected with the output end OUT4;

the switching groups S1 and S2 that are connected in series in a same direction, the switching groups S3 and S4 that are connected in series in a same direction, the capacitor C, the switching groups

S5 and S6 that are connected in series in a same direction, and the switching groups S7 and S8 that are connected in series in a same direction are connected in parallel between the input ends IN1 and IN4;

the inductor L1 is connected in series between the input end IN2 and a series connection node of the switching groups S1 and S2;

the inductor L2 is connected in series between the output end OUT2 and a series connection node of the switching groups S5 and S6;

the input end IN3 is electrically connected with a serial connection node of the switching groups S3 and S4;

the output end OUT3 is electrically connected with a serial connection node of the switching groups S7 and S8; and

each of the switching groups includes a triode and a diode that are connected in anti-parallel.

2. The apparatus according to claim 1, wherein power conversion performed by the power conversion circuit comprises at least two of the following:

DC/DC step-up conversion, DC/DC step-down conversion, AC/DC conversion, DC/AC conversion, AC/AC conversion, or DC/DC step-up conversion first and then DC/AC conversion.

3. The apparatus according to claim 1, wherein the configurable input interface comprises single-pole double-throw switches K1 and

K2, wherein:

an immovable end K1-1 of the single-pole double-throw switch K1 and an immovable end K2-1 of the single-pole double-throw switch K2 are respectively arranged to be electrically connected with the input power supply;

movable ends K1-2 and K1-3 of the single-pole double-throw switch K1, and movable ends K2-2 and K2-3 of the single-pole double-throw switch K2 are respectively arranged to be electrically connected with four input ends of the power conversion circuit; and

the movable ends K1-2, K1-3, K2-2 and K2-3 are electrically connected with the input ends IN1, IN2, IN3 and IN4 of the power conversion circuit, respectively.

4. The apparatus according to claim 1, wherein the configurable output interface comprises single-pole double-throw switches K3 and K4, wherein:

an immovable end K3-1 of the single-pole double-throw switch K3 and an immovable end K4-1 of the single-pole double-throw switch K4 are respectively arranged to be electrically connected with the load;

movable ends K3-2 and K3-3 of the single-pole double-throw switch K3, and movable ends K4-2 and K4-3 of the single-pole double-throw switch K4 are respectively arranged to be electrically connected with four output ends of the power conversion circuit; and

the movable ends K3-2, K3-3, K4-2 and K4-3 are electrically connected with the output ends OUT1, OUT2, OUT3 and OUT4 of the power conversion circuit, respectively.

5. The apparatus according to claim 1, wherein the power conversion circuit further comprises: a PWM control unit, arranged to control on/off of the triodes in the switching groups according to rules corresponding to the parameters of the input power supply and the parameters of the load.

6. A power conversion method, performed by the power conversion apparatus according to any of claims 1 to 5, comprising:

configuring single-pole double-throw switches K1, K2, K3, and K4, according to parameters of an input power supply and parameters of a load; and

controlling on/off of triodes in switching groups according to rules corresponding to the parameters of the input power supply and the parameters of the load.

7. The method according to claim 6, wherein under the condition that the input power supply is a DC power supply, the load is a DC load, and voltage required by the load is higher than that of the input power supply, the method comprises:

configuring an immovable end K1-1 of the single-pole double-throw switch K1 to be connected with a movable end K1-3, an immovable end K2-1 of the single-pole double-throw switch K2

to be connected with a movable end K2-3, an immovable end K3-1 of the single-pole double-throw switch K3 to be connected with a movable end K3-2, and an immovable end K4-1 of the single-pole double-throw switch K4 to be connected with a movable end K4-3; and

controlling locking of the triodes in the switching groups S1, S3, S4, S5, S6, S7 and S8, and controlling on/off of the triodes in the switching group S2 according to a preset frequency.

8. The method according to claim 6, wherein under the condition that the input power supply is a DC power supply, the load is a DC load, and voltage required by the load is lower than that of the input power supply, the method comprises:

configuring an immovable end K1-1 of the single-pole double-throw switch K1 to be connected with a movable end K1-2, an immovable end K2-1 of the single-pole double-throw switch K2 to be connected with a movable end K2-3, an immovable end K3-1 of the single-pole double-throw switch K3 to be connected with a movable end K3-3, and an immovable end K4-1 of the single-pole double-throw switch K4 to be connected with a movable end K4-3; and

controlling locking of the triodes in the switching groups S1, S2, S3, S4, S6, S7 and S8, and controlling on/off of the triodes in the switching group S5 according to a preset frequency.

9. The method according to claim 6, wherein under the condition

that the input power supply is an AC power supply and the load is a DC load, the method comprises:

configuring an immovable end K1-1 of the single-pole double-throw switch K1 to be connected with a movable end K1-3, an immovable end K2-1 of the single-pole double-throw switch K2 to be connected with a movable end K2-2, an immovable end K3-1 of the single-pole double-throw switch K3 to be connected with a movable end K3-2, and an immovable end K4-1 of the single-pole double-throw switch K4 to be connected with a movable end K4-3; and

controlling locking of the triodes in the switching groups S5, S6, S7 and S8, and controlling on/off of the triodes in the switching groups S1, S2, S3 and S4 according to a preset frequency.

10. The method according to claim 6, wherein under the condition that the input power supply is a DC power supply and the load is an AC load, the method comprises:

configuring an immovable end K1-1 of the single-pole double-throw switch K1 to be connected with a movable end K1-2, an immovable end K2-1 of the single-pole double-throw switch K2 to be connected with a movable end K2-3, an immovable end K3-1 of the single-pole double-throw switch K3 to be connected with a movable end K3-3, and an immovable end K4-1 of the single-pole double-throw switch K4 to be connected with a movable end K4-2; and

controlling locking of the triodes in the switching groups S1,

S2, S3 and S4, and controlling on/off of the triodes in the switching groups S5, S6, S7 and S8 according to a preset frequency.

11. The method according to claim 6, wherein under the condition that the input power supply is an AC power supply and the load is an AC load, the method comprises:

configuring an immovable end K1-1 of the single-pole double-throw switch K1 to be connected with a movable end K1-3, an immovable end K2-1 of the single-pole double-throw switch K2 to be connected with a movable end K2-2, an immovable end K3-1 of the single-pole double-throw switch K3 to be connected with a movable end K3-3, and an immovable end K4-1 of the single-pole double-throw switch K4 to be connected with a movable end K4-2; and

controlling on/off of the triodes of the switching groups S1, S2, S3, S4, S5, S6, S7 and S8 according to a preset frequency.

12. The method according to claim 6, wherein under the condition that the input power supply is a DC power supply, the load is an AC load, and voltage required by the load is step-up, the method comprises:

configuring an immovable end K1-1 of the single-pole double-throw switch K1 to be connected with a movable end K1-3, an immovable end K2-1 of the single-pole double-throw switch K2 to be connected with a movable end K2-3, an immovable end K3-1 of the single-pole double-throw switch K3 to be connected with a

movable end K3-3, and an immovable end K4-1 of the single-pole double-throw switch K4 to be connected with a movable end K4-2; and

controlling locking of the triodes in the switching groups S1, S3 and S4, and controlling on/off of the triodes in the switching group S2, S5, S6, S7 and S8 according to a preset frequency.

13. The method according to any of claims 6 to 12, further comprising:

performing current sampling and voltage sampling of the configurable input interface and the configurable output interface; and

determining the parameters of the input power supply and the parameters of the load according to the current sampling and the voltage sampling.

14. A power conversion device comprising: at least one processor, at least one memory, and computer program instructions stored in the memory, which when executed by the processor, implement the power conversion method according to any of claims 6 to 13.

15. A computer-readable storage medium having stored thereon computer program instructions, which when executed by a processor, implement the power conversion method according to any of claims 6 to 13.