CLAIMS

1. A charger applied to a railway vehicle, the charger comprising:

an input filtering circuit;

a power module connected to the input filtering circuit; and

an output circuit connected to the power module, wherein

the input filtering circuit is configured to filter a received input alternating current voltage and transfer the filtered input alternating current voltage to the power module;

the power module comprises a first power unit and a second power unit each configured to rectify and reduce the filtered input alternating current voltage to obtain a direct current voltage;

the output circuit comprises a first output unit and a second output unit each configured to process the direct current voltage to output a plurality of output voltages; and

a transistor in the power unit is a silicon carbide transistor,

wherein the power unit comprises a pre-charge unit comprising a first output branch and a second output branch,

and wherein the pre-charge unit is configured to: receive the filtered input alternating current voltage; output a pre-charge current via the first output branch in a case that an output voltage of the pre-charge unit is less than a preset voltage threshold; and output the pre-charge current via the second output branch in a case that the output voltage of the pre-charge unit is not less than the preset voltage threshold.

2. The charger according to claim 1, wherein the power unit further comprises:

a rectification unit configured to receive the pre-charge current, rectify the pre-charge current, and perform a first filtering process on the pre-charge current, to obtain a to-be-reduced direct current voltage;

a voltage conversion unit configured to reduce the to-be-reduced direct current voltage, to obtain a to-be-filtered direct current voltage; and

a filtering unit configured to perform a second filtering process on the to-be-filtered

direct current voltage to obtain the direct current voltage to be transferred to the output circuit.

3. The charger according to claim 2, wherein

the first output branch in the pre-charge unit comprises: a first switch group comprising three first switches and a first resistor group comprising three first resistors, wherein each of the first switches and one of the first resistors form one of first pre-charge branches,

the second output branch in the pre-charge unit comprises a second switch group comprising three second switches, wherein each of the second switches forms one of second pre-charge branches;

each of the first pre-charge branches is connected in parallel with one of the second pre-charge branches;

the first switch is turned on in the case that the output voltage of the pre-charge unit is less than the preset voltage threshold and is turned off in the case that the output voltage of the pre-charge unit is not less than the preset voltage threshold; and

the second switch is turned on in the case that the output voltage of the pre-charge unit is not less than the preset voltage threshold and is turned off in the case that the output voltage of the pre-charge unit is less than the preset voltage threshold.

4. The charger according to claim 2, wherein the rectification unit comprises:

three rectification branches that are connected in parallel with each other, wherein each of the rectification branches comprises a first diode and a second diode that are connected in series with each other, a cathode of the first diode is connected to an anode of the second diode, the pre-charge current is received at a node connecting the cathode of the first diode and the anode of the second diode, and each of the first diode and the second diode is a silicon carbide Schottky diode; and

a first filtering branch, a second filtering branch and a third filtering branch that are connected in parallel with each of the rectification branches, wherein the first filtering branch comprises a first capacitor and a second resistor that are connected in series with each other, the second filtering branch comprises a second capacitor, and the third filtering branch comprises a third resistor.

5. The charger according to claim 2, wherein the filtering unit comprises:

a first inductor; and

a third capacitor, wherein

one terminal of the first inductor is connected to a first output terminal of the voltage conversion unit, and the other terminal of the first inductor is connected to one terminal of the third capacitor and serves as a first output terminal of the filtering unit; and

the other terminal of the third capacitor that is remote from the first inductor is connected to a second output terminal of the voltage conversion unit and serves as a second output terminal of the filtering unit.

6. The charger according to claim 5, wherein the output unit comprises: a third diode, a first output branch, a second output branch, a third output branch, a fourth output branch and a fifth output branch, wherein

an anode of the third diode is connected to the first output terminal of the filtering unit, and a cathode of the third diode is connected to each of the first output branch, the second output branch, the third output branch and the fourth output branch of the output unit;

the fifth output branch of the output unit comprises a fifth fuse, wherein one terminal of the fifth fuse is connected to the second output terminal of the filtering unit, and one of the output voltages is outputted from the other terminal of the fifth fuse;

the first output branch of the output unit comprises a first fuse and a third switch that are sequentially connected in series with each other and is configured to output one of the output voltages;

the second output branch of the output unit comprises a second fuse and a fourth switch that are sequentially connected in series with each other and is configured to output one of the output voltages;

the third output branch of the output unit comprises a fourth diode and a third fuse that are sequentially connected in series with each other and is configured to output one of the output voltages; and

the fourth output branch of the output unit comprises a fourth fuse.

7. The charger according to claim 2, wherein a power switch transistor in the voltage conversion unit is a silicon carbide metal-oxide-semiconductor field-effect transistor.

8. A railway vehicle comprising the charger according to any one of claims 1 to 7.