CLAIMS

1. A method for controlling an auxiliary power supply system, the method being used for an auxiliary power supply system of a high-speed multiple units, the high-speed multiple units comprising at least one multiple unit, each multiple unit comprising eight carriages, the auxiliary power supply system comprising a plurality of traction auxiliary converters arranged in different carriages of each multiple unit and a plurality of circuit breakers configured to connect the plurality of traction auxiliary converters, the method for controlling the auxiliary power supply system comprising:

acquiring an on/off state of each of the circuit breakers;

dividing the traction auxiliary converters in the multiple unit into a plurality of section groups according to the on/off state of each of the circuit breakers;

controlling one of the traction auxiliary converters in each section group to be started; and

starting simultaneously remaining traction auxiliary converters other than the one started traction auxiliary converter in each section group according to a phase of a voltage outputted by the one started traction auxiliary converter in the section group,

wherein the eight carriages of each multiple unit are numbered from 1 to 8 in order; the auxiliary power supply system comprises four traction auxiliary converters and three circuit breakers, the four traction auxiliary converters are respectively arranged in carriages 2, 4, 5 and 7 of each multiple unit, the three circuit breakers are configured to connect the four traction auxiliary converters and are respectively arranged in carriages 3, 5 and 6 of each multiple unit;

the dividing the traction auxiliary converters in the multiple unit into a plurality of section groups according to the on/off state of each of the circuit breakers comprises:

grouping the traction auxiliary converter in the carriage 2 into one section group, and grouping the traction auxiliary converters in remaining carriages other than the carriage 2 into another section group, if only the circuit breaker in the carriage 3 is turned off;

grouping the traction auxiliary converters in the carriages 2 and 4 into one section group,

and grouping the traction auxiliary converters in remaining carriages other than the carriages 2 and 4 into another section group, if only the circuit breaker in the carriage 5 is turned off;

grouping the traction auxiliary converter in the carriage 7 into one section group, and grouping the traction auxiliary converters in remaining carriages other than the carriage 7 into another section group, if only the circuit breaker in the carriage 6 is turned off;

grouping the traction auxiliary converter in the carriage 2 into a first section group, grouping the traction auxiliary converter in the carriage 4 into a second section group, and grouping the traction auxiliary converters in the carriages 5 and 7 into a third section group, if only the circuit breakers in the carriages 3 and 5 are turned off;

grouping the traction auxiliary converter in the carriage 2 into a first section group, grouping the traction auxiliary converter in the carriage 7 into a second section group, and grouping the traction auxiliary converters in the carriages 4 and 5 into a third section group, if only the circuit breakers in the carriages 3 and 6 are turned off;

grouping the traction auxiliary converter in the carriage 5 into a first section group, grouping the traction auxiliary converter in the carriage 7 into a second section group, and grouping the traction auxiliary converters in the carriages 2 and 4 into a third section group, if only the circuit breakers in the carriages 5 and 6 are turned off; and

grouping each of all the traction auxiliary converters into an independent section group, if all of the circuit breakers in the carriage 3, 5 and 6 are turned off.

2. The method according to claim 1, wherein the starting simultaneously remaining traction auxiliary converters other than the one started traction auxiliary converter in each section group according to a phase of a voltage outputted by the one started traction auxiliary converter in the section group comprises:

after a ready signal is sent by each of the remaining traction auxiliary converters in each section group, controlling each of the remaining traction auxiliary converters to output a voltage having same three phases as the voltage outputted by the one started traction auxiliary converter in the section group.

3. The method according to claim 1, wherein the controlling one of the traction auxiliary converters in each section group to be started comprises:

if a ready signal sent by only one of the traction auxiliary converters in the section group

is received, sending a startup permission signal to the traction auxiliary converter that sends the ready signal, wherein the traction auxiliary converter that sends the ready signal is started after receiving the startup permission signal; and

if ready signals sent by two or more of the traction auxiliary converters in the section group are received, sending a startup permission signal to a traction auxiliary converter having a smallest number among the traction auxiliary converters that send the ready signals, wherein the traction auxiliary converter having a smallest number is started after receiving the startup permission signal.

4. A system for controlling an auxiliary power supply system, the system for controlling an auxiliary power supply system being used for an auxiliary power supply system of a high-speed multiple units, the high-speed multiple units comprising at least one multiple unit, each multiple unit comprising eight carriages, the auxiliary power supply system comprising a plurality of traction auxiliary converters arranged in different carriages of each multiple unit and a plurality of circuit breakers configured to connect the plurality of traction auxiliary converters, the method for controlling the auxiliary power supply system comprising:

a state acquisition module configured to acquire an on/off state of each of the circuit breakers;

a section division module configured to divide the traction auxiliary converters in the multiple unit into a plurality of section groups according to the on/off state of each of the circuit breakers;

a first startup module configured to control one of the traction auxiliary converters in each section group to be started; and

a second startup module configured to start simultaneously remaining traction auxiliary converters other than the one started traction auxiliary converter in each section group according to a phase of a voltage outputted by the one started traction auxiliary converter in the section group,

wherein the eight carriages of each multiple unit are numbered from 1 to 8 in order; the auxiliary power supply system comprises four traction auxiliary converters and three circuit breakers, the four traction auxiliary converters are respectively arranged in carriages 2, 4, 5 and 7 of each multiple unit, the three circuit breakers are configured to connect the four

traction auxiliary converters and are respectively arranged in carriages 3, 5 and 6 of each multiple unit;

the section division module is configured to:

group the traction auxiliary converter in the carriage 2 into one section group, and group the traction auxiliary converters in remaining carriages other than the carriage 2 into another section group, if only the circuit breaker in the carriage 3 is turned off;

group the traction auxiliary converters in the carriages 2 and 4 into one section group, and group the traction auxiliary converters in remaining carriages other than the carriages 2 and 4 into another section group, if only the circuit breaker in the carriage 5 is turned off;

group the traction auxiliary converter in the carriage 7 into one section group, and group the traction auxiliary converters in remaining carriages other than the carriage 7 into another section group, if only the circuit breaker in the carriage 6 is turned off;

group the traction auxiliary converter in the carriage 2 into a first section group, group the traction auxiliary converter in the carriage 4 into a second section group, and group the traction auxiliary converters in the carriages 5 and 7 into a third section group, if only the circuit breakers in the carriages 3 and 5 are turned off;

group the traction auxiliary converter in the carriage 2 into a first section group, group the traction auxiliary converter in the carriage 7 into a second section group, and group the traction auxiliary converters in the carriages 4 and 5 into a third section group, if only the circuit breakers in the carriages 3 and 6 are turned off;

group the traction auxiliary converter in the carriage 5 into a first section group, group the traction auxiliary converter in the carriage 7 into a second section group, and group the traction auxiliary converters in the carriages 2 and 4 into a third section group, if only the circuit breakers in the carriages 5 and 6 are turned off; and

group each of all the traction auxiliary converters into an independent section group, if all of the circuit breakers in the carriage 3, 5 and 6 are turned off.

5. The system according to claim 4, wherein the second startup module is configured to: after a ready signal is sent by each of the remaining traction auxiliary converters in each section group, control each of the remaining traction auxiliary converters to output a voltage having same three phases as the voltage outputted by the one started traction auxiliary

converter in the section group.

6. The system according to claim 4, wherein the first startup module is configured to:

if a ready signal sent by only one of the traction auxiliary converters in the section group is received, send a startup permission signal to the traction auxiliary converter that sends the ready signal, wherein the traction auxiliary converter that sends the ready signal is started after receiving the startup permission signal; and

if ready signals sent by two or more of the traction auxiliary converters in the section group are received, send a startup permission signal to a traction auxiliary converter having a smallest number among the traction auxiliary converters that send the ready signals, wherein the traction auxiliary converter having a smallest number is started after receiving the startup permission signal.

7. A high-speed multiple units comprising:

at least one multiple unit, each multiple unit comprising eight carriages, wherein an auxiliary power supply system comprises a plurality of traction auxiliary converters arranged in different carriages of each multiple unit and a plurality of circuit breakers configured to connect the plurality of traction auxiliary converters; and

the system for controlling an auxiliary power supply system according to any one of claims 4 to 6.