C L A I M S

1. A rotating machine system characterized by comprising:

a rotating machine including a plurality of coils configured to be individually conductive in a plurality of phases, respectively;

an operation direction determination means of determining an operation direction of the rotating machine to a driving direction or a braking direction;

a drive coil number determination means of determining a number of coils in each phase based on a drive operation instruction value when the operation direction determined by the operation direction determination means is the driving direction;

a drive coil selection means of selecting the coils of the number of coils determined by the drive coil number determination means from the plurality of coils in each phase;

a drive control means of conducting the coils selected by the drive coil selection means to perform drive control of the rotating machine;

a brake coil number determination means of determining a number of coils in each phase based on a brake operation instruction value when the operation direction determined by the operation direction determination means is the braking direction; and

a brake control means of performing brake control of the rotating machine by allowing electricity to flow the coils of the number of coils in each phase determined by the brake coil number determination means, based on the brake operation instruction value when the operation direction determined by the operation direction determination means is the braking

direction.

2. The rotating machine system of claim 1, characterized in that a drive circuit to control conducting of the coil for performing the drive control by the drive control means, and a brake circuit to control conducting of the coil for performing the brake control by the brake control means are a common circuit.

3. The rotating machine system of claim 1, characterized in that

the drive coil number determination means determines the number of coils in each phase based on a drive torque instruction value included in the drive operation instruction value, and

the drive control means conducts the coils of the number of coils determined by the drive coil number determination means to perform the drive control such that a torque of the rotating machine follows the drive torque instruction value.

4. The rotating machine system of claim 1, characterized by further comprising:

a brake coil selection means of selecting the coils of the number of coils determined by the brake coil number determination means from the plurality of coils in each phase, wherein

the brake control means conducts the coils selected by the brake coil selection means to perform the brake control.

5. The rotating machine system of claim 1, characterized in that

the brake coil number determination means determines the number of coils in each phase based on a brake torque instruction value included in the brake

operation instruction value, and

the brake control means performs the brake control such that a torque of the rotating machine follows the brake torque instruction value.

6. The rotating machine system of claim 1, characterized in that

the rotating machine is an electric motor, and

the brake control means performs regeneration control to make the electric motor regenerate power.

7. The rotating machine system of claim 1, characterized in that

the rotating machine is a generator, and

the drive control means performs generation control to causes the generator to generate electricity.

8. The rotating machine system of claim 6, characterized in that the brake control means generates regeneration power from all of the coils.

9. The rotating machine system of claim 8, characterized by further comprising a rectifier circuit to convert the regeneration power from the electric motor into direct current power.

10. The rotating machine system of claim 6, characterized by further comprising a booster circuit to boost regeneration power that is regenerated by the electric motor.

11. The rotating machine system of claim 6, characterized by further comprising:

a brake coil selection means of selecting the coils of the number of coils determined by the brake coil number determination means from the plurality of coils in each phase, wherein

the brake control means conducts the coils

selected by the brake coil selection means to boost regeneration power that is regenerated by the electric motor.

12. The rotating machine system of claim 11, characterized in that

the brake coil number determination means determines the number of coils in each phase by ΔΣ modulation based on the brake operation instruction value.

13. The rotating machine system of claim 11, characterized in that the brake coil selection means selects the coils of the number of coils in each phase through a noise shaping dynamic element matching method.

14. The rotating machine system of claim 1, characterized by further comprising a fault coil detection means of detecting a failure of each coil of the rotating machine, wherein

the drive coil selection means does not select the failed coil detected by the fault coil detection means.

15. The rotating machine system of claim 1, characterized by further comprising a fault coil detection means of detecting a failure of each coil of the rotating machine, wherein

the drive coil selection means newly selects one or more coils instead of the failed coil detected by the fault coil detection means to compensate the magnetic flux supposed to be generated by the failed coil.

16. The rotating machine system of claim 1, characterized by further comprising a power source provided with each group to conduct the coils therein, where all of the coils of the rotating machine is

divided into a plurality of groups, and each group includes coils of all phases.

17. The rotating machine system of claim 1, characterized by further comprising a power source provided with each group to conduct the coils therein, where the coils are divided into a plurality of groups by each phase of the rotating machine.

18. The rotating machine system of claim 1, characterized by further comprising a drive circuit provided with each group to control the conducting of the coils for the drive control by the drive control means, where all of the coils of the rotating machine is divided into a plurality of groups, and each groups includes coils of all phases.

19. The rotating machine system of claim 1, characterized by further comprising a drive circuit provided with each group to control the conducting of the coils for the drive control by the drive control means, where the coils are divided into a plurality of groups by each phase of the rotating machine.

20. The rotating machine system of claim 1, characterized by further comprising:

a power source to conduct the coils; and

a regeneration power source which is separated from the power source in order to charge regeneration power from the rotating machine.

21. The rotating machine system of claim 1, characterized by further comprising:

a plurality of power sources to conduct the coils; and

a switching means of switching the power sources to select a power source to conduct the coils from the plurality of power sources.

22. A rotating machine control apparatus configured to control a rotating machine with a plurality of coils configured to be individually conductive in a plurality of phases, the apparatus characterized by comprising:

an operation direction determination means of determining an operation direction of the rotating machine to a driving direction or a braking direction;

a drive coil number determination means of determining a number of coils in each phase based on a drive operation instruction value when the operation direction determined by the operation direction determination means is the driving direction;

a drive coil selection means of selecting the coils of the number of coils determined by the drive coil number determination means from the plurality of coils in each phase;

a drive control means of conducting the coils selected by the drive coil selection means to perform drive control of the rotating machine;

a brake coil number determination means of determining a number of coils in each phase based on a brake operation instruction value when the operation direction determined by the operation direction determination means is the braking direction; and

a brake control means of performing brake control of the rotating machine by allowing electricity to flow the coils of the number of coils in each phase determined by the brake coil number determination means, based on the brake operation instruction value when the operation direction determined by the operation direction determination means is the braking direction.

23. A rotating machine control method for controlling a rotating machine with a plurality of coils configured to be individually conductive in a plurality of phases, the method characterized by comprising:

determining an operation direction of the rotating machine to a driving direction or a braking direction;

determining a number of coils in each phase based on a drive operation instruction value when the determined operation direction is the driving direction;

selecting the coils of the determined number of coils from the plurality of coils in each phase;

conducting the selected coils to perform drive control of the rotating machine;

determining a number of coils in each phase based on a brake operation instruction value when the determined operation direction is the braking direction; and

performing brake control of the rotating machine by allowing electricity to flow the coils of the determined number of coils in each phase, based on the brake operation instruction value when the determined operation direction is the braking direction.