JP 2003-348885 ABSTRACT

The working state of a permanent magnet synchronous motor during starting may be learnt without a sensor such as a Hall IC, and then the working state of a driven pair driven by the permanent magnet synchronous motor is learnt. Detect an induced voltage generated in a brushless DC motor (step S2), and detect the working states of brushless DC motors 30A and 30B based on the detected induced voltage (steps S3 and S5).

CLAIMS

1. A method for controlling a permanent magnet synchronous motor, for performing vector control on the permanent magnet synchronous motor in a sine wave driving mode, comprising:

an induced voltage detecting process, for detecting an induced voltage generated in the permanent magnet synchronous motor; and

a working state detecting process, for detecting the working state of the permanent magnet synchronous motor based on the detected induced voltage.

2. The method for controlling the permanent magnet synchronous motor according to claim 1, comprising:

a start processing process, used for performing start processing to start the permanent magnet synchronous motor under the condition that the permanent magnet synchronous motor is stopped or is being stopped in the working state detecting process.

3. The method for controlling the permanent magnet synchronous motor according to claim 2, characterized in that

the working state detecting process comprises a revolution detecting process, for detecting revolutions of the permanent magnet synchronous motor,

the condition that the permanent magnet synchronous motor is stopped or is being stopped is a condition that the detected revolutions are less than the stipulated revolutions.

4. The method for controlling the permanent magnet synchronous motor according to claim 1, characterized in that

the working state detecting process comprises the revolution detecting process, for detecting the revolutions of the permanent magnet synchronous motor, comprising:

a stop processing process, enabling the permanent magnet synchronous motor to stop revolving under the condition that the detected revolutions are more than the stipulated

revolutions; and

a start processing process, used for starting the permanent magnet synchronous motor which has stopped revolving in the stop processing process.

5. The method for controlling the permanent magnet synchronous motor according to claim 2 or 4, characterized in that

the start processing process comprises an initial position transfer process, for transferring a rotor to a stipulated angle range of a higher acquiring probability of a positive torque enabling the rotor to rotate in a positive revolving direction; and

an initial drive control process, used for performing drive control under the condition that the position of the rotor is within the stipulated angle range to drive the rotor towards the positive revolving direction.

6. A device for controlling a permanent magnet synchronous motor, used for performing vector control on the permanent magnet synchronous motor in a sine wave driving mode, comprising:

an induced voltage detecting part, used for detecting an induced voltage generated in the permanent magnet synchronous motor; and

a working state detecting part, used for detecting the working state of the permanent magnet synchronous motor based on the detected induced voltage.

7. The device for controlling the permanent magnet synchronous motor according to claim 6, characterized in that

the working state detecting part comprises a start processing part, used for performing start processing to start the permanent magnet synchronous motor under the condition that the permanent magnet synchronous motor is stopped or is being stopped as detected by the working state detecting part.

8. The device for controlling the permanent magnet synchronous motor according to claim 7, characterized in that

the working state detecting part comprises a revolution detecting part for detecting

revolutions of the permanent magnet synchronous motor,

the condition that the permanent magnet synchronous motor is stopped or is being stopped is a condition that the detected revolutions are less than the stipulated revolutions.

9. The device for controlling the permanent magnet synchronous motor according to claim 6, characterized in that

the working state detecting part comprises the revolution detecting part, for detecting the revolutions of the permanent magnet synchronous motor;

the controlling device comprises a stop processing part, enabling the permanent magnet synchronous motor to stop revolving under the condition that the detected revolutions are more than the stipulated revolutions; and

a start processing part, used for starting the permanent magnet synchronous motor which has stopped revolving through the stop processing part.

10. The device for controlling the permanent magnet synchronous motor according to claim 7 or 9, characterized in that

the start processing part comprises an initial position transfer part, for transferring a rotor to a stipulated angle range of a higher acquiring probability of a positive torque enabling the rotor to rotate in a positive revolving direction; and

an initial drive control part, used for performing drive control under the condition that the position of the rotor is within the stipulated angle range to drive the rotor towards the positive revolving direction.

11. An air conditioning device comprises an indoor unit and an outdoor unit, characterized by also comprising:

a permanent magnet synchronous motor, used for driving a fan arranged in at least one of the indoor unit and the outdoor unit;

an induced voltage detecting part, used for detecting an induced voltage generated in the permanent magnet synchronous motor; and

a working state detecting part, used for detecting the working state of the fan based on the

detected induced voltage.

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