DESCRIPTION

WASHING MACHINE

TECHNICAL FIELD

[0001]

The present disclosure relates to a washing machine.

BACKGROUND ART

[0002]

Conventionally, a washing machine that detects the temperature of the winding of the stator with a thermistor has been proposed.

[0003]

This washing machine includes a water tub, a rotary tub rotatably arranged inside the water tub, a motor that rotationally drives the rotary tub, and a control circuit that controls the motor and the like. The motor includes a rotor having a ring-shaped permanent magnet and a stator having a three-phase winding. A thermistor that serves as a temperature detection means is arranged in proximity to the winding of the stator. The control circuit detects the temperature of the winding of the stator with the voltage of the thermistor (see, for example, Patent Literature (PTL) 1).

Citation List

Patent Literature

[0004]

[PTL 1] Japanese Unexamined Patent Application Publication No. H11-239688

SUMMARY

[0005]

However, components such as thermistors are expensive, leading to a high manufacturing cost.

[0006]

The present disclosure provides a washing machine that improves the safety of the motor with an inexpensive configuration.

[0007]

A washing machine according to the present disclosure includes a rotary tub, a motor configured to drive the rotary tub to rotate, an inverter circuit configured to convert direct current to alternating current to drive the motor, and a current detector configured to detect current flowing through the motor. The washing machine further includes: a low-pass filter unit configured to perform low-pass filtering on the current detected by the current detector, and output the low-pass filtered value as a processed current value; an overload detector configured to detect an overload state of the motor; and a controller configured to transmit a motor drive command to the inverter circuit to control the motor through the inverter circuit. The overload detector determines an overload state of the motor based on the processed current value output from the low-pass filter unit, and the controller controls rotational drive of the motor based on a determination result of the overload detector.

[0007a]

In one aspect, the present disclosure refers to a washing machine, comprising a rotary tub, a motor configured to drive the rotary tub to rotate, an inverter circuit configured to convert direct current to alternating current to drive the motor, a current detector configured to detect current flowing through the motor, a low-pass filter unit configured to perform low-pass filtering on the current detected by the current detector, and output a low-pass filtered value as

a processed current value, an overload detector configured to detect an overload state of the motor, and a controller configured to transmit a motor drive command to the inverter circuit to control the motor through the inverter circuit, wherein the overload detector determines the motor is in an overload state when a predetermined time elapses in a state where the processed current value output from the low-pass filter unit is greater than or equal to a first value, and cancels the overload state when the processed current value is a second value that is less than the first value, and the controller controls rotational drive of the motor based on a determination result of the overload detector.

[0008]

The washing machine according to the present disclosure improves the safety of the motor with an inexpensive configuration.

BRIEF DESCRIPTION OF THE DRAWINGS

[0009]

[FIG. 1]

CLAIMS

1. A washing machine, comprising:

a rotary tub;

a motor configured to drive the rotary tub to rotate;

an inverter circuit configured to convert direct current to alternating current to drive the motor;

a current detector configured to detect current flowing through the motor;

a low-pass filter unit configured to perform low-pass filtering on the current detected by the current detector, and output a low-pass filtered value as a processed current value;

an overload detector configured to detect an overload state of the motor; and

a controller configured to transmit a motor drive command to the inverter circuit to control the motor through the inverter circuit,

wherein the overload detector determines the motor is in an overload state when a predetermined time elapses in a state where the processed current value output from the low-pass filter unit is greater than or equal to a first value, and cancels the overload state when the processed current value is a second value that is less than the first value, and

the controller controls rotational drive of the motor based on a determination result of the overload detector.

2. The washing machine according to claim 1,

wherein during agitating period of washing operation while rotating the rotary tub to the left or right alternatively,

the controller controls the motor such that one cycle includes a ON time and a OFF time, and rotating direction to the left or right is switched in each cycle, and

the time constant of the low-pass filter is set to a time that is approximately equivalent to the ON time of the motor.

3. The washing machine according to any one of claims 1 and 2,

wherein the controller reduces a rotation speed of the motor when the motor is in the overload state in a spinning operation.