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Kitchen air conditioner and control method thereof

Abstract

A kitchen air conditioner and a control method thereof, where the kitchen is equipped with a range hood, the air conditioner including a housing and a current detection device. An electric control board is disposed in the housing, and the current detection device is disposed outside the housing and electrically connected to the electric control board. The current detection device is used for detecting a current of the range hood and determining whether the range hood works.

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Background/Summary

FOREIGN PRIORITY

(1) This application claims priority to Chinese Patent Application No. 202110209978.9, filed Feb.

24, 2021, and all the benefits accruing therefrom under 35 U.S.C. § 119, the contents of which in its entirety are herein incorporated by reference.

TECHNICAL FIELD OF INVENTION

(2) The present invention relates to the field of air conditioning technology, and in particular to a kitchen air conditioner and a control method thereof.

BACKGROUND OF THE INVENTION

(3) Existing ducted kitchen air conditioners generally use return air in the kitchen. Due to a large amount of oil fume in the kitchen, the evaporator in the kitchen air conditioner is likely to be clogged when the air conditioner runs for a long period of time, resulting in reduction in performance. More seriously, no wind comes out from the conditioner, causing a unit failure. Some kitchen air conditioners adopt a fresh air return design, which can solve the oil fouling problem of the evaporator. However, the air pressure in the kitchen rises due to the indoor air supply, causing that no wind comes out from the conditioner; and moreover, the related design and control is complicated. Currently, there is an integrated control technology of the kitchen air conditioner and a range hood from the same manufacturer. However, general users purchase the range hood and the kitchen air conditioner separately, or general users in the inventory market have installed the range hood and may purchase the kitchen air conditioner in future. The non-integrated range hood and kitchen air conditioner cannot be linked, that is, cannot automatically adjust the return air inlet of the air conditioner according to the status of the range hood, thus having a low degree of intelligence.

SUMMARY OF THE INVENTION

(4) The main objective of the present invention is to provide a kitchen air conditioner and a control method thereof, so as to solve the technical problem that the non-integrated range hood and kitchen air conditioner cannot be linked, that is, cannot automatically adjust the return air inlet of the air conditioner according to the status of the range hood.

(5) To achieve the foregoing objective, the present invention adopts the following technical solution: A kitchen air conditioner is provided, the kitchen being equipped with a range hood, the air conditioner including: a housing, in which an electric control board is disposed; and a current detection device disposed outside the housing and electrically connected to the electric control board, where the current detection device is used for detecting a current of the range hood and determining whether the range hood works, where the electric control board controls a working status of the air conditioner according to whether the range hood works.

(6) Further, a return air inlet is provided on the housing, and includes a first return air inlet and a second return air inlet; the first return air inlet is used for the air that enters the kitchen, and the second return air inlet leads to the outside of the kitchen through an air duct and is used for introducing the outdoor air.

(7) Further, a first air valve is disposed in the first return air inlet and is electrically connected to the electric control board; a second air valve is disposed in the second return air inlet and is electrically connected to the electric control board; a temperature measurement device for measuring the temperature at the second return air inlet is disposed on a sidewall of the second return air inlet, and is electrically connected to the electric control board; and the temperature measurement device is a temperature probe.

(8) Further, the current detection device is an annular current transformer **3** sleeved on a power line of the range hood.

(9) The present invention further provides a control method of a kitchen air conditioner, applied to the above-described kitchen air conditioner, where the control method includes: acquiring, by the electric control board, a current of the power line of the range hood that is induced by the annular current transformer **3** in a set time; determining, by the electric control board according to the current of the power line induced by the annular current transformer **3**, whether the range hood works; and controlling, by the electric control board according to whether the range hood works, a

working status of the air conditioner.
(10) Further, a return air inlet is provided on the housing of the air conditioner, and includes a first return air inlet and a second return air inlet; the first return air inlet is used for the air that enters the kitchen, and the second return air inlet leads to the outside of the kitchen through an air duct and is used for introducing the outdoor air; and before the step of acquiring, by the electric control board, the current of the power line of the range hood that is induced by the annular current transformer **3** in the set time, the method includes: when the air conditioner stands by, controlling, by the electric control board, the first air valve and the second air valve to close.
(11) Further, a first air valve is disposed in the first return air inlet and is electrically connected to the electric control board; a second air valve is disposed in the second return air inlet and is electrically connected to the electric control board; a temperature measurement device for measuring the temperature at the second return air inlet is disposed on a sidewall of the second return air inlet, and is electrically connected to the electric control board; and the temperature measurement device is a temperature probe; the step of determining, by the electric control board according to the current of the power line induced by the annular current transformer **3**, whether the range hood works includes: determining whether the current induced by the annular current transformer **3** in the set time is less than a set value; and if the current is less than the set value, determining that the range hood does not work; the step of controlling, by the electric control board according to whether the range hood works, a working status of the air conditioner includes: if the range hood does not work, controlling, by the electric control board, the first air valve to open, so that the first return air inlet returns air; and controlling a motor of the air conditioner to work and a compressor of the air conditioner to implement refrigeration after a preset time.
(12) Further, the step of determining, by the electric control board according to the current of the power line induced by the annular current transformer **3**, whether the range hood works includes: determining whether the current induced by the annular current transformer **3** in the set time is greater than or equal to a set value; and if the current is greater than or equal to the set value, determining that the range hood works; the step of controlling, by the electric control board according to whether the range hood works, a working status of the air conditioner includes: if the range hood works, controlling, by the electric control board, the second air valve to open, so that the second return air inlet returns air; and controlling the motor of the air conditioner to work.
(13) Further, after the step of controlling, by the electric control board according to whether the range hood works, a working status of the air conditioner, the method includes: acquiring, by the electric control board, the temperature at the second return air inlet measured by the temperature probe; determining whether the temperature at the second return air inlet is less than a set minimum value; and if the temperature at the second return air inlet is less than the set minimum value, controlling, by the electric control board, the compressor to keep in a non-working status.
(14) Further, after the step of controlling, by the electric control board according to whether the range hood works, a working status of the air conditioner, the method includes: acquiring, by the electric control board, the temperature at the second return air inlet measured by the temperature probe; determining whether the temperature at the second return air inlet is between set minimum and maximum values; and if the temperature at the second return air inlet is between the set minimum and maximum values, controlling, by the electric control board after the set time, the compressor of the air conditioner to implement refrigeration.
(15) Further, after the step of controlling, by the electric control board according to whether the range hood works, a working status of the air conditioner, the method includes: acquiring, by the electric control board, the temperature at the second return air inlet measured by the temperature probe; determining whether the temperature at the second return air inlet is greater than a set maximum value; and if the temperature at the second return air inlet is greater than the maximum value, controlling, by the electric control board, the second air valve to close and the first air valve to open, so that the first return air inlet returns air; and after the set time, controlling, by the electric

control board, the compressor of the air conditioner to implement refrigeration.
(16) Beneficial effects: In the present invention, the electric control board determines, according to a current signal of the range hood output by the current detection device, whether the range hood works; and further controls a working status of the air conditioner according to whether the range hood works, thus achieving linkage between the range hood and the air conditioner.

Description

BRIEF DESCRIPTION OF THE DRAWINGS
(1) FIG. **1** is a schematic structural diagram of an air conditioner in an embodiment of the present invention; and
(2) FIG. **2** is a schematic assembled structural diagram of an air conditioner and a range hood in an embodiment of the present invention.
MEANING OF NUMERALS
(3) **100**. Air conditioner; **1**. Housing; **11**. First return air inlet; **12**. First air valve; **13**. Second return air inlet; **14**. Second air valve; **15**. Temperature probe; **2**. Range hood; **21**. Power line; **3**. Annular current transformer
(4) The realization, functional characteristics, and advantages of the objective of the present invention will be further described with reference to the accompanying drawings in combination with the embodiments.
DETAILED DESCRIPTION OF THE INVENTION
(5) It should be understood that the specific embodiments described herein are merely used to explain the present invention, but not intended to limit the present invention.
(6) The technical solution in the embodiments of the present invention is clearly and completely described below with reference to the accompanying drawings in the embodiments of the present invention. Apparently, the described embodiments are some rather than all of the embodiments of the present invention. Based on the described embodiments of the present invention, other embodiments acquired by those of ordinary skill in the art without creative effort all belong to the protection scope of the present invention.
(7) It should be noted that, the terms “one end”, “the other end”, “first”, “second”, and similar expressions used herein are for illustrative purposes only and should not be construed as indicating or implying relative importance.
(8) The technical solutions between the various embodiments in the embodiments of the present invention may be combined with each other, but must be based on the realization by those of ordinary skill in the art. When the combination of the technical solutions has contradictions or cannot be realized, it shall be considered that such combination of the technical solutions does not exist and is not within the protection scope of the present invention.
(9) Referring to FIGS. **1** and **2**, a kitchen air conditioner in an embodiment of the present invention is provided, the kitchen being equipped with a range hood **2**, the air conditioner including: a housing **1**, in which an electric control board is disposed; and a current detection device disposed outside the housing **1** and electrically connected to the electric control board, where the current detection device is used for detecting the current of the range hood **2** and determining whether the range hood works.
(10) The electric control board controls a working status of the air conditioner according to whether the range hood **2** works.
(11) In the foregoing embodiment, the electric control board determines, according to a current signal of the range hood that is output by the current detection device, whether the range hood **2** works; and controls, according to whether the range hood **2** works, the working status of the air conditioner. When determining, according to the current signal, that the range hood **2** works, the

electric control board controls a motor in the air conditioner to work, thus achieving linkage between the range hood **2** and the kitchen air conditioner.

(12) In an embodiment, a return air inlet is provided on the housing, where the return air inlet includes a first return air inlet **11** and a second return air inlet **13**. The first return air inlet **11** is used for the air that enters the kitchen, and the second return air inlet **13** leads to the outside of the kitchen through an air duct and is used for introducing the outdoor air.

(13) In the foregoing embodiment, the return air inlet functions as an air circulation entrance in the kitchen; and the return air inlet of the air conditioner is used for air return, and returns some air into an air conditioning cabinet through the air duct. Under a fixed indoor load, the amount of cold air that needs to be sent into the kitchen is fixed. The second return air inlet **13** leads to the outside of the kitchen through the air duct and is used for introducing the outdoor air, thus reducing the air pressure in the kitchen. After the indoor air is mixed with a small amount of fresh air, cold air is made and is then sent into the kitchen. When the temperature in the kitchen is not too high, the fresh air introduced through the second return air inlet **13** can be directly used for refrigeration, without the need to use a compressor for refrigeration, thus achieving an energy saving effect. The first return air inlet **11** is used for the air that enters the kitchen and realizes circulation of a gas flow in the kitchen.

(14) In an embodiment, a first air valve **12** is disposed in the first return air inlet **11** and is electrically connected to the electric control board; and a second air valve **14** is disposed in the second return air inlet **13** and is electrically connected to the electric control board. A temperature measurement device for measuring the temperature at the second return air inlet **13** is disposed on a sidewall of the second return air inlet **13**, and is electrically connected to the electric control board. The temperature measurement device is a temperature probe **15**.

(15) In the foregoing embodiment, when the first air valve **12** is opened, the first return air inlet **11** returns air; and when the second air valve **14** is opened, the second return air inlet **13** returns air. The first air valve **12** and the second air valve **14** are both electrically connected to the electric control board, and the electric control board controls opening and closing of the first air valve **12** and the second air valve **14** according to a signal output by the temperature measurement device, so that the first return air inlet **11** and the second return air inlet **13** alternately return air.

(16) A temperature probe **15** is disposed on the sidewall of the first return air inlet **11** and is used for measuring the temperature at the first return air inlet **12**.

(17) In the foregoing embodiment, the temperature probe **15** has a small size and thus is easily mounted on the sidewall of the second return air inlet **13**. The second return air inlet **13** leads to the outside of the kitchen through the air duct and is used for introducing the outdoor air. The temperature probe **15** is mounted on the sidewall of the second return air inlet **13** and used for measuring the temperature of the outdoor air that enters from the second return air inlet **13**.

(18) In an embodiment, the current detection device is an annular current transformer **33** sleeved on a power line **21** of the range hood **2**.

(19) In the foregoing embodiment, the annular current transformer **33** can measure the current; is ring-shaped and can be sleeved on the power line **21**; and is used for measuring the current magnitude of the power line **21**. The annular current transformer **33** is electrically connected to the electric control board; and the electric control board determines, according to the current magnitude of the power line **21** measured by the annular current transformer **33**, whether the range hood **2** works.

(20) A control method of a kitchen air conditioner in an embodiment of the present invention is further provided, which is applied to the above-described kitchen air conditioner **100**. The control method includes the following steps: acquiring, by the electric control board, a current of the power line **21** of the range hood **2** that is induced by the annular current transformer **33** in a set time; determining, by the electric control board according to the current of the power line **21** induced by the annular current transformer **33**, whether the range hood **2** works; and controlling, by the electric

control board according to whether the range hood **2** works, a working status of the air conditioner **100**.

(21) In the foregoing embodiment, the current passes through the power line **21** in a power-on status, and changes in magnitude within a range. The electric control board determines, according to the current magnitude, whether the range hood **2** works; and controls, according to the working status of the range hood **2**, a motor and a compressor in the air conditioner **100** to work or not and further controls one of the return air inlets of the air conditioner **100** to return air.

(22) In an embodiment, a return air inlet is provided on the housing, where the return air inlet includes a first return air inlet **11** and a second return air inlet **13**. The first return air inlet **11** is used for the air that enters the kitchen, and the second return air inlet **13** leads to the outside of the kitchen through an air duct and is used for introducing the outdoor air.

(23) Before the step of acquiring, by the electric control board, the current of the power line of the range hood **2** that is induced by the annular current transformer **33** in the set time, the method includes: when the air conditioner **100** stands by, closing the first air valve **12** and the second air valve **14**.

(24) In the foregoing embodiment, when the air conditioner **100** stands by, the return air inlet functions as an air circulation entrance in the kitchen. When the air conditioner does not work, it is not required to circulate the air in the kitchen through the return air inlet.

(25) In the foregoing embodiment, before the air conditioner **100** is turned on, both the first air valve **12** and the second air valve **14** are in a closed state. While the annular current transformer **33** induces the current of the power line **21**, the temperature probe **13** synchronously measures the temperature at the second return air inlet **13**.

(26) In an embodiment, a first air valve **12** is disposed in the first return air inlet **11** and is electrically connected to the electric control board; and a second air valve **14** is disposed in the second return air inlet **13** and is electrically connected to the electric control board. A temperature measurement device for measuring the temperature at the second return air inlet **13** is disposed on a sidewall of the second return air inlet **13**, and is electrically connected to the electric control board. The temperature measurement device is a temperature probe **15**.

(27) The step of determining, by the electric control board according to the current of the power line **21** induced by the annular current transformer **33**, whether the range hood **2** works includes: determining whether the current induced by the annular current transformer **33** in the set time is less than a set value; and if the current is less than the set value, determining that the range hood **2** does not work.

(28) The step of controlling, by the electric control board according to whether the range hood **2** works, a working status of the air conditioner **100** includes: if the range hood **2** does not work, controlling, by the electric control board, the first air valve **12** to open, so that the first return air inlet **11** returns air; and controlling the motor of the air conditioner **100** to work and the compressor of the air conditioner **100** to implement refrigeration after a preset time.

(29) In the foregoing embodiment, the current passes through the power line **21** in a power-on status, and changes in magnitude within a range. When the range hood **2** works, the current value increases. When the range hood **2** changes from not working to working, the current has a change limit value which is a set value. The annular current transformer **33** outputs the current of the power line **21** to the electric control board; and when the current is less than the set value, the electric control board determines that the range hood **2** does not work. When the range hood **2** does not work, the motor works and the first air valve **12** is opened; and the first return air inlet **11** returns air indoors. The motor first works to implement indoor air return and circulates the air in the kitchen, and after a preset time, the compressor works to implement refrigeration in the kitchen.

(30) In an embodiment, the step of determining, by the electric control board according to the current of the power line **21** induced by the annular current transformer **33**, whether the range hood **2** works includes: determining whether the current induced by the annular current transformer **33** in

the set time is greater than or equal to a set value.
(31) The step of controlling, by the electric control board according to whether the range hood **2** works, a working status of the air conditioner **100** includes: if the range hood **2** works, controlling, by the electric control board, the second air valve **14** to open, so that the second return air inlet **13** returns air; and controlling the motor of the air conditioner to work.
(32) In the foregoing embodiment, the annular current transformer **33** outputs the current of the power line **21** to the electric control board; and when the current is greater than the set value, the electric control board determines that the range hood **2** works. When the range hood **2** works, the second return air inlet **13** returns air and the motor works. The second return air inlet **13** introduces outdoor air, and the air in the kitchen is exchanged with the outdoor air, to reduce the air pressure in the kitchen.
(33) After the step of controlling, by the electric control board according to whether the range hood **2** works, a working status of the air conditioner **100**, the method includes: acquiring, by the electric control board, the temperature at the second return air inlet **13** measured by the temperature probe **15**; and if the temperature at the second return air inlet **13** is less than the set minimum value, controlling, by the electric control board, the compressor to keep in a non-working status.
(34) In the foregoing embodiment, the temperature at the second return air inlet **13** being lower than the set minimum value indicates that the outdoor temperature is lower than the set value. The outdoor air flows in the kitchen by the rotation of the motor and is used for refrigeration to reduce the temperature in the kitchen, without the need to start the compressor for refrigeration and temperature reduction.
(35) In an embodiment, after the step of controlling, by the electric control board according to whether the range hood **2** works, a working status of the air conditioner **100**, the method includes: acquiring, by the electric control board, the temperature at the second return air inlet **13** measured by the temperature probe **15**; determining whether the temperature at the second return air inlet **13** is between set minimum and maximum values; and if the temperature at the second return air inlet **13** is between the set minimum and maximum values, controlling, by the electric control board after the set time, the compressor of the air conditioner **100** to implement refrigeration.
(36) In the foregoing embodiment, when the range hood **2** works, the second return air inlet **13** returns air and the motor works. The second return air inlet **13** introduces outdoor air, and the air in the kitchen is exchanged with the outdoor air. The temperature measured by the temperature probe **15** is an initial temperature at the second return air inlet **13**, namely, the temperature of the introduced outdoor air. The air with the temperature ranging from the two set values cannot reduce the temperature in the kitchen. The motor first works to circulate the air in the kitchen and the outdoor air. After 3 min, the electric control board controls the compressor of the air conditioner to implement refrigeration, so as to reduce the temperature in the kitchen.
(37) In an embodiment, after the step of controlling, by the electric control board according to whether the range hood **2** works, a working status of the air conditioner **100**, the method includes: acquiring, by the electric control board, the temperature at the second return air inlet **13** measured by the temperature probe **15**; determining whether the temperature at the second return air inlet **13** is greater than a maximum value; and if the temperature at the second return air inlet **13** is greater than the maximum value, controlling, by the electric control board, the second air valve **14** to close and the first air valve **12** to open, so that the first return air inlet **11** returns air; and after a set time, controlling, by the electric control board, the compressor of the air conditioner to implement refrigeration.
(38) In the foregoing embodiment, the outdoor air introduced through the second return air inlet **13** has a high temperature, which cannot lower the temperature in the kitchen, but on the contrary, may increase the temperature in the kitchen. The second air valve **14** is closed to no longer introduce the outdoor air. Then, the first return air inlet **11** returns air to circulate the air in the kitchen, and the compressor works to implement refrigeration so as to reduce the temperature in the kitchen.

(39) The set value of the current is 0.2 A, the set minimum value of the temperature is 16° C., and the set maximum value of the temperature is 40° C.
(40) In the foregoing embodiment, a low current passes through the power line **21** in a power-on status and increases during passing through the power line **21**. When the current passing through the power line **21** is higher than 0.2 A, it indicates that the range hood **2** works. The set maximum and minimum temperature values indicate the temperature at the second air valve **14**, namely, the temperature of the outdoor air that enters the second air valve **14**; and the inlet air has a temperature lower than 16° C. The air with the temperature below 16° C. enters the kitchen, and the outdoor air flows in the kitchen by the rotation of the motor to implement refrigeration. The outdoor air with the temperature higher than 16° C. and lower than 40° C. cannot enter the kitchen only by the rotation of the motor for temperature reduction. The inlet air entering from the outside with the temperature higher than 40° C. cannot lower the temperature in the kitchen, but on the contrary, may increase the workload of the compressor.
(41) The above merely describes preferred embodiments of the present invention, and does not limit the patent protection scope of the present invention. Any equivalent structures or process transformations made by using the specification and the accompanying drawings of the present invention can be applied directly or indirectly in other related technical fields, and all fall within the patent protection scope of the present invention.

Claims

1. A control method for a kitchen air conditioner in a kitchen equipped with a range hood, the kitchen air conditioner comprising: a housing, in which an electric control board is disposed wherein a return air inlet, is provided on the housing, and comprises a first return air inlet and a second return air inlet; the first return air inlet is used for the air that enters the kitchen, and the second return air inlet leads to the outside of the kitchen through an air duct and is used for introducing the outdoor air; wherein a first air valve is disposed in the first return air inlet and is electrically connected to the electric control board; a second air valve is disposed in the second return air inlet and is electrically connected to the electric control board; a temperature measurement device for measuring the temperature at the second return air inlet is disposed on a sidewall of the second return air inlet, and is electrically connected to the electric control board; and the temperature measurement device is a temperature probe; and the air conditioner comprises a current detection device disposed outside the housing and electrically connected to the electric control board, wherein the current detection device is used for detecting a current of the range hood and determining whether the range hood works, and wherein the current detection device is an annular current transformer sleeved on a power line of the range hood, wherein the control method comprises: when the air conditioner stands by, controlling, by the electric control board, the first air valve and the second air valve to close; acquiring, by the electric control board, a current of the power line of the range hood that is induced by the annular current transformer in a set time; determining, by the electric control board according to the current of the power line induced by the annular current transformer, whether the range hood works by determining whether the current induced by the annular current transformer in the set time is less than a set value and determining that the range hood does not work in response to the current being less than the set value; and controlling, by the electric control board according to whether the range hood works, a working status of the air conditioner, wherein the controlling comprises, controlling, by the electric control board, the first air valve to open in response to the range hood not working, so that the first return air inlet returns air; and controlling a motor of the air conditioner to work and a compressor of the air conditioner to implement refrigeration after a preset time.
2. The control method of a kitchen air conditioner according to claim 1, wherein the step of determining, by the electric control board according to the current of the power line induced by the

annular current transformer, whether the range hood works comprises: determining whether the current induced by the annular current transformer in the set time is greater than or equal to a set value; and determining that the range hood works in response to the determining; the step of controlling, by the electric control board according to whether the range hood works, a working status of the air conditioner comprises: controlling, by the electric control board, the second air valve to open in response to the range hood working, so that the second return air inlet returns air; and controlling the motor of the air conditioner to work.

3. The control method of a kitchen air conditioner according to claim 2, wherein after the step of controlling, by the electric control board according to whether the range hood works, a working status of the air conditioner, the method comprises: acquiring, by the electric control board, the temperature at the second return air inlet measured by the temperature probe; determining whether the temperature at the second return air inlet is less than a set minimum value; and controlling, by the electric control board, a compressor to keep in a non-working status in response to the temperature at the second return air inlet being less than the set minimum value.

4. The control method of a kitchen air conditioner according to claim 2, wherein after the step of controlling, by the electric control board according to whether the range hood works, a working status of the air conditioner, the method comprises: acquiring, by the electric control board, the temperature at the second return air inlet measured by the temperature probe; determining whether the temperature at the second return air inlet is between set minimum and maximum values; and controlling, by the electric control board after a set time, a compressor of the air conditioner to implement refrigeration in response to the temperature at the second return air inlet being between the set minimum and maximum values.

5. The control method of a kitchen air conditioner according to claim 2, wherein after the step of controlling, by the electric control board according to whether the range hood works, a working status of the air conditioner, the method comprises: acquiring, by the electric control board, the temperature at the second return air inlet measured by the temperature probe; determining whether the temperature at the second return air inlet is greater than a set maximum value; and controlling, by the electric control board, the second air valve to close and the first air valve to open in response to the temperature at the second return air inlet being greater than the maximum value, so that the first return air inlet returns air; and after a set time, controlling, by the electric control board, a compressor of the air conditioner to implement refrigeration.

6. A system comprising a kitchen air conditioner and a range hood, the air kitchen conditioner comprising: a housing, in which an electric control board is disposed, wherein a return air inlet is provided on the housing of the air conditioner, and comprises a first return air inlet and a second return air inlet; the first return air inlet is used for the air that enters the kitchen, and the second return air inlet is configured to lead to the outside of the kitchen through an air duct and is for introducing the outdoor air; wherein a first air valve is disposed in the first return air inlet and is electrically connected to the electric control board; a second air valve is disposed in the second return air inlet and is electrically connected to the electric control board; a temperature measurement device for measuring the temperature at the second return air inlet is disposed on a sidewall of the second return air inlet, and is electrically connected to the electric control board; and the temperature measurement device is a temperature probe; and a current detection device disposed outside the housing and electrically connected to the electric control board, wherein the current detection device is for detecting a current of the range hood and determining whether the range hood works, and wherein the current detection device is an annular current transformer sleeved on a power line of the range hood, wherein the electric control board is configured to carry out the method of claim 1 in order to control a working status of the air conditioner according to whether the range hood works.