

WATER PURIFIER SYSTEM WITH ACCURATE IDENTIFICATION OF SERVICE LIFE OF FILTER ELEMENT AND FILTER ELEMENT THEREOF

Technical field

The application belongs to the technical field of water purifiers, in particular to a water purifier system with accurate identification of service life of a filter element and a filter element thereof.

Background

Water purifier is a kind of water treatment equipment that deeply filters and purifies the water quality according to the requirements of water use. The water purifier can effectively filter out rust, gravel and colloid in water, and adsorb chemicals such as residual chlorine, odor, abnormal colors and pesticides in water, as well as impurities such as bacteria, germs, toxins and heavy metals in water.

The core of the water purifier lies in its filter element. As a consumable, the filter element needs to be replaced in time after reaching its service life. Especially for the water purification equipment used for home use, the current water purifier equipment is usually equipped with an independent system for monitoring the service life of the filter element, that is, when replacing the filter element, users are required to purchase the filter element with a service life adapted to the water purifier equipment. The common practice is that after replacing the filter element, the system detects the service time of the filter element from zero. For example, China invention patent (No.CN201921935444.9) discloses a life reminding system for the filter element of the water purifier and the water purifier. A flow acquisition device is arranged at the water outlet of the water purifier, which can measure the purified water output of the water purifier in real time during the operation of the water purifier, and then compare and analyze the purified water output with the preset purified water output. When the purified water output is greater than the preset purified water output, it indicates that the filter element of the water purifier has reached its service life and the raw water cannot be purified normally. In this case, the information that the filter element has reached its service life would be pushed to the user, so that the user can replace the filter element in time.

The above-mentioned water purifier equipment determines the service life of the filter

element by computing the purified water volume, so as to remind users to replace the filter element in time. However, there is a problem in the process of using this water purifier equipment to replace the filter element: the market is flooded with a large number of fake and shoddy products. There are even cases where only the surface of the water purifier is cleaned and then put back into the market. As a result, after replacing the filter element, not only could the user's water purifier not achieve water purification effect, but also it may deepen the pollution of water quality due to the dirt accumulated in the inferior filter element. Therefore, there is a need for a water purifier system that can accurately identify the real service life of the filter element and its supporting filter element.

Summary

The purpose of the present application is to provide a filter element that accurately records the service life, so as to solve the problems mentioned in the above background technology.

In order to achieve the above purpose, the technical solution adopted by the application are as follows. A filter element with accurate records of service life is provided, including a filter element and a data recording chip arranged on the filter element, wherein the data recording chip records a filtered water volume and service days of the filter element, and after connecting with a water purifier main body, the data recording chip continues to record the filtered water volume and service days of the filter element in a cumulative manner based on an existing data.

Preferably, the data recording chip is an encrypted data recording chip, and an identification number for identifying genuine products is also recorded on the data recording chip; when the water purifier main body recognizes that the identification number on the filter element does not match, the water purifier main body refuses to supply water to the filter element.

Preferably, the data recording chip is detachably connected with the filter element.

Preferably, a chip clamping shell is sleeved outside the data recording chip, a fixed clamping shell is fixed on the filter element, and the chip clamping shell and the fixed clamping shell are detachably connected.

Preferably, the data recording chip is connected with a data transmission line 1, and another end of the data transmission line 1 is connected with a connection plug.

Preferably, a water purifier system is provided, used for identifying filter element with accurate records of service life, including a water purifier main body and a main PCB control board arranged on the water purifier main body; after the filter element is connected with the water purifier main body, the main PCB control board is able to compute data of service time and a filtered water volume of the filter element and feed the data back to the data recording chip, and the main PCB control board and the data recording chip are electrically connected.

Preferably, a flow meter is connected to a water purification outlet of the filter element, the main PCB control board is provided with a data statistics unit for calculating the filtered water volume, and the data statistics unit is electrically connected with the flow meter; the main PCB control board computes the filtered water volume on the data statistics unit and transmits it to the data recording chip at a fixed frequency, and the data recording chip accumulates the data of the filtered water volume transmitted by the main PCB control board on the basis of an existing data.

Preferably, an electromagnetic valve is fixed in the water purifier main body, and the electromagnetic valve is connected to a water purification inlet of the filter element, used for determining whether to supply water to the water purifier; the electromagnetic valve is connected to the main PCB control board and is shut off when the filter element identification number does not match, so as to refuse to supply water to the water purifier.

Preferably, a timing unit is arranged on the main PCB control board, and the timing unit determines a single water supply volume by recording a flow time of water running through the electromagnetic valve every time, and transmits the water supply volume to the data recording chip through the main PCB control board.

Preferably, the main PCB control board is provided with a wireless network module for accessing Internet to realize interactive communication with end-user app and manufacturer's backstage terminal, so as to display and record usage data of the filter element.

Preferably, health state of the filter element includes a normal use state, a health warning state and a scrapped state, and conditions of the health state of the filter element are determined by writing in the main PCB control board.

Preferably, the water purifier main body is provided with an indicator light and an alarm speaker, used for prompting when the filter element is not genuine and when the health state of the filter element is the normal use state, health warning state and scrapped state.

Preferably, the main PCB control board is connected with a data transmission line 2, and another end of the data transmission line 2 is connected with a connection socket, and the connection socket is used cooperatively with the connection plug on the data recording chip.

The application has the following beneficial effects. 1. When the water purifier equipment is replaced with a new filter element, it is necessary to connect the main PCB control board on the water purifier main body with the data recording chip on the filter element through electrical signals (including data transmission lines, wireless sensing units, etc.). After being electrified, the main PCB control board identifies the identification number, filtered water volume and service days of the data recording chip on the filter element. When the filter element is monitored to be non-genuine, water supply is refused to make the filter element unusable; when the filter element is monitored to be genuine, the filtered water volume and the service days on the data recording chip are read, and the service time and filtered water volume obtained in the use process are recorded on the data recording chip on the filter element in a cumulative manner, thereby ensuring the certainty of the service life of the data recording chip.

2. With the design of detachable connection between the data recording chip and the filter element, when the data recording chip is damaged, it merely needs to replace the chip without scrapping the filter element at the same time. Meanwhile, the wireless network module is adopted on the main PCB control board, which can record the service life of the current filter element, so as to facilitate the manufacturers to write data on the new data recording chip.

3. With the wireless network module, the health state of the filter element can be updated in real time by interactive communication between the user-end app and Internet, which is convenient for the user to prepare (purchase) the filter element in advance.

Brief description of drawings

Fig. 1 is a signal transmission flow diagram provided by Embodiment 1 of the present application;

Fig. 2 is a signal transmission flow diagram provided by Embodiment 2 of the present application;

Fig. 3 is a schematic diagram of the connection relationship between modules provided by Embodiment 1 of the present application;

Fig. 4 is a schematic diagram of the connection relationship between modules provided by Embodiment 2 of the present application.

Detailed description of disclosed embodiments

The preferred embodiments of this application will be described in detail with the attached drawings, so that the advantages and features of this application would be more easily understood by those skilled in the art, and the protection scope of this application would be defined more clearly.

Embodiment 1

A filter element with accurate records of service life is provided, including a filter element and a data recording chip arranged on the filter element, and the data recording chip records filtered water volume and service days of the filter element, and after connecting with a water purifier main body, the data recording chip continues to record the filtered water volume and service days of the filter element in a cumulative manner based on an existing data. And, the data recording chip is an encrypted data recording chip, and an identification number for identifying genuine products is also recorded on the data recording chip; when the water purifier main body recognizes that the identification number on the filter element does not match, the water purifier main body refuses to supply water to the filter element.

A chip clamping shell is sleeved outside the data recording chip, a fixed clamping shell is fixed on the filter element, and the chip clamping shell and the fixed clamping shell are detachably connected. With this design, when the data recording chip is damaged, it merely needs to replace the chip without scrapping the filter element at the same time; meanwhile, the data recording chip is connected with a data transmission line 1, and another end of the data transmission line 1 is connected with a connection plug. The data transmission line 1 may be used to connect with the water purifier and transmit data.

Referring to Figs. 1 and 3, a water purifier system with accurate identification of service

life of a filter element is provided, including a water purifier main body, a filter element, a main PCB control board arranged on the water purifier main body and a data recording chip fixed on the filter element; after the filter element is connected with the water purifier main body, the main PCB control board is used to compute data of service time and filtered water volume of the filter element and feed the data back to the data recording chip; the main PCB control board is connected with a data transmission line 2, and another end of the data transmission line 2 is connected with a connection socket, and the connection socket is used cooperatively with the connection plug on the data recording chip. Apparently, in other embodiments, data transmission and signal circulation between the data recording chip and the main PCB control board may also be realized by means of wireless transmission module, in which an electromagnetic valve is installed at the water inlet of the filter element, and whether to supply water to the water purifier is determined by the main PCB control board controlling the electromagnetic valve.

Referring to Fig. 3, a flow meter is connected to a water purification outlet of the filter element, a data statistics unit for calculating the filtered water volume is arranged in the flow meter, and the data statistics unit is connected with the main PCB control board to make the circuit connected. Meanwhile, the main PCB control board is connected with the data recording chip and transmits data to the data recording chip at a fixed frequency, and the data recording chip accumulates the data transmitted by the main PCB control board on the basis of the existing data. The frequency is between 5-15 seconds/time. The main reason for adopting this short frequency is that if the recording frequency is long, the data would be lost and the authenticity of the data would be affected due to the factors such as the circuit voltage and the service time of the water purifier. If it continues for a long time, the service life of the filter itself will show great deviation.

At the same time, the water purifier main body is provided with an indicator light and an alarm speaker. The indicator light may be LED, OLED and other components that can realize the function of different display forms. Data is written on the main PCB control board to distinguish the service life of the filter element into a normal use state, a health warning state and a scrapped state. The indicator light and alarm speaker are connected to the main PCB control board and make corresponding prompts when the filter element is mismatched and when the health state of the filter element is in normal use state, health warning state and scrapped state.

Specifically, the main PCB control board is provided with a wireless network module for accessing Internet to realize interactive communication with end-user app and manufacturer's backstage terminal. The data identified by the main PCB control board (i.e., whether the current filter element is genuine or not and the health state of the filter element) are displayed on the user-end app through the wireless network module, so that the user can know the authenticity of the filter element; and if the filter element is genuine and starts to be used, the user can be informed to prepare (purchase) a filter element in advance by displaying the current use status of the filter element. At the same time, because the wireless network module arranged on the main PCB control board realizes interactive communication with the manufacturer's backstage terminal after accessing Internet. In this way, if the data recording chip on the filter element is damaged, the manufacturer's backstage terminal records the usage data before the data recording chip on the current filter element is damaged, so as to facilitate manufacturers to write data on new data recording chips.

Embodiment 2

Referring to Fig. 2 and Fig. 4, a timing unit may be arranged on the main PCB control board, and the timing unit determines a single water supply volume by recording a flow time of water running through the electromagnetic valve every time, meanwhile, the single water supply volume is transmitted to the data recording chip through the main PCB control board to be accumulated and recorded.

The time unit records the circulation time of water passing through the solenoid valve once, and then determines the single water supply amount, which is transmitted to the data recording chip through the main PCB control board and recorded cumulatively. In this embodiment, the flow meter and the data statistics unit are replaced by the cooperation of the timing unit and the electromagnetic valve, and the accumulated water flow is directly recorded on the data recording chip. It should be noted that the timing unit works at all times, which also plays a role in determining the service time of the filter element.

Working process and principle.

When using this product, users are required to buy genuine filter elements that are matched with the water purifier main body. (i. e., the filter element with data recording chip with encryption mentioned in the present application), when replacing the filter element, the filter element is connected between the electromagnetic valve and the flow meter (or directly

connected to the water purifier mentioned in Embodiment 2), and the data access end on the main PCB control board and the data transmission end on the data recording chip are connected together through the data transmission line. After the water purifier body is powered on, the main PCB control board will identify the identification number, filtered water volume and service days of the products on the data recording chip, and if the identification number of the products does not match, the electromagnetic valve would be shut off to stop the filtering function of the filter element, and make response prompts through LED indicator light and alarm speaker, such as red lights and long horn alarms. If the identification number of the product is correct, no alarm will be given, and the electromagnetic valve is turned on. At the same time, the water purifier main body realizes interactive communication with the user-end app through the wireless network module on the main PCB unit, so that the user can know the state of the filter element in real time. For the present product, by fixing a data recording chip on the genuine filter element, the main PCB control board on the water purifier body identifies the identification number recorded in the data recording chip on the filter element. Under the condition that the product models are matched, the service days and filtered water volume recorded in the data recording chip can be identified, and the current state of the service life of the filter element can be updated, thus ensuring the authenticity of the service status of the filter element. Under the condition that the feedback of product usage is true, users don't have to worry about the situation that the service life of the filter element is inaccurate and it is used beyond the time limit or inferior products are mixed into it.

The above are merely the preferred embodiments of this application, and are not intended to limit the protection scope of the application. Any equivalent structural transformation made by using the description and attached drawings of this application, or directly or indirectly used in other related technical fields, is equally included in the patent protection scope of this application.

Claims:

1. A filter element with accurate records of service life, comprising a filter element and a data recording chip arranged on the filter element, wherein the data recording chip records filtered water volume and service days of the filter element, and after connecting with a water purifier main body, the data recording chip continues to record a filtered water volume and service days of the filter element in a cumulative manner based on an existing data.
2. The filter element with accurate records of service life of claim 1, wherein the data recording chip is an encrypted data recording chip, and an identification number for identifying genuine products is also recorded on the data recording chip; when the water purifier main body recognizes that the identification number on the filter element does not match, the water purifier main body refuses to supply water to the filter element.
3. The filter element with accurate records of service life of claims 1 or 2, wherein the data recording chip is detachably connected with the filter element.
4. The filter element with accurate records of service life of claim 3, wherein a chip clamping shell is sleeved outside the data recording chip, a fixed clamping shell is fixed on the filter element, and the chip clamping shell and the fixed clamping shell are detachably connected.
5. The filter element with accurate records of service life of claim 1, wherein the data recording chip is connected with a data transmission line 1, and another end of the data transmission line 1 is connected with a connection plug.
6. A water purifier system, comprising a filter element with accurate records of service life of any one of claims 1 to 5, characterized by further comprising a water purifier main body and a main PCB control board arranged on the water purifier main body; after the filter element is connected with the water purifier main body, the main PCB control board is able to compute data of service time and a filtered water volume of the filter element and feed the data back to the data recording chip, and the main PCB control board and the data recording chip are electrically connected.
7. The water purifier system of claim 6, wherein a flow meter is connected to a water purification outlet of the filter element, the main PCB control board is provided with a data statistics unit for calculating the filtered water volume, and the data statistics unit is electrically

connected with the flow meter; the main PCB control board computes the filtered water volume on the data statistics unit and transmits it to the data recording chip at a fixed frequency, and the data recording chip accumulates the data of the filtered water volume transmitted by the main PCB control board on the basis of an existing data.

8. The water purifier system of claim 6, wherein an electromagnetic valve is fixed in the water purifier main body, and the electromagnetic valve is connected to a water purification inlet of the filter element, used for determining whether to supply water to the water purifier; the electromagnetic valve is connected to the main PCB control board and is shut off when the filter element identification number does not match, so as to refuse to supply water to the water purifier.

9. The water purifier system of claim 8, wherein a timing unit is arranged on the main PCB control board, and the timing unit determines a single water supply volume by recording a flow time of water running through the electromagnetic valve every time, and transmits the water supply volume to the data recording chip through the main PCB control board.

10. The water purifier system of claims 7 or 9, wherein the main PCB control board is provided with a wireless network module for accessing Internet to realize interactive communication with end-user app and manufacturer's backstage terminal, so as to display and record usage data of the filter element.

11. The water purifier system of claim 8, wherein health state of the filter element comprises a normal use state, a health warning state and a scrapped state, and conditions of the health state of the filter element are determined by writing in the main PCB control board.

12. The water purifier system of claim 9, wherein the water purifier main body is provided with an indicator light and an alarm speaker, used for prompting when the filter element is not genuine and when the health state of the filter element is the normal use state, health warning state and scrapped state.

13. The water purifier system of claim 6, wherein the main PCB control board is connected with a data transmission line 2, and another end of the data transmission line 2 is connected with a connection socket, and the connection socket is used cooperatively with the connection plug on the data recording chip.