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(54) **GAS WATER HEATER AND PARAMETRIC CODE TRANSFORMATION METHOD AND APPARATUS THEREFOR**

GAS-WASSERERHITZER UND VERFAHREN UND VORRICHTUNG ZUR UMWANDLUNG
PARAMETRISCHER CODES DAFÜR

CHAUFFE-EAU AU GAZ, ET PROCÉDÉ ET APPAREIL DE TRANSFORMATION DE CODE
PARAMÉTRIQUE ASSOCIÉS

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Description**CROSS-REFERENCE TO RELATED APPLICATION**

5 **[0001]** This application is based on and claims priority to Chinese Patent Application Serial No. 201711479483.8, filed on December 29, 2017.

FIELD

10 **[0002]** The present invention relates to the field of gas water heater technology, and more particularly to a parametric code transformation method for a gas water heater, a non-transitory computer readable storage medium, a parametric code transformation apparatus for a gas water heater and a gas water heater.

BACKGROUND

15 **[0003]** In general, a default parametric code of a gas water heater is set with natural gas as gas supply. However, the gas supply in some families may be liquefied gas. Therefore, it needs to transform the parametric code according to the gas supply for the gas water heater.

20 **[0004]** Due to the larger difference of heat values between gas supplies, there are many parametric codes needed to be adjusted, such as a proportional valve maximum secondary pressure code, a maximum wind speed code and a proportional valve minimum secondary pressure code. For ordinary installers, due to the high level of complexity, adjustment errors are prone to occur, and the costs and time to complete such adjustment training are high.

25 **[0005]** In the related art, the parametric codes between gas supplies, in general, are switched automatically by a gas supply dial switch. For the same model of gas water heaters, the parametric code corresponding to the liquefied gas is preset in the gas water heater. When the gas supply for the gas water heater is changed, the parametric code may be directly switched by dialing the gas supply dial switch. For example, for a gas water heater with the natural gas being defaulted as the gas supply, when the gas supply is the natural gas, the maximum secondary pressure code is C1, when the gas supply is the liquefied gas, the maximum secondary pressure code is C9, and the switch between the two parametric codes can be completed by dialing the gas supply dial switch.

30 **[0006]** By the above method, when the gas supply for the gas water heater is changed from the natural gas to the liquefied gas, the parametric codes of the gas water heaters with the same model are the same. However, components, such as proportional valves and fans, of different gas water heaters have some differences to a certain extent, even they have the same model. Therefore, the parametric code transformation by the above method may cause problems, for example, the output of the gas water heater goes beyond the deviation specification, the smoke exceeds a specified range, and the ignition fails, thereby affecting working performance of the gas water heater.

35 **[0007]** CN 102444987 A discloses a dual-air-source gas hot water supply device which comprises a nozzle, a combustor, an electric control fuel control valve, a fan, a main controller and a program chip, wherein the nozzle is communicated with the electric control gas control valve, and the main controller is electrically connected with the fan, the electric control gas control valve and the program chip.

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SUMMARY

45 **[0008]** Embodiments of the present invention aim to solve at least one of technical problems in the related art to some extent. Therefore, the present invention provides a parametric code transformation method for a gas water heater according to claim 1, by which the parametric code is transformed according to a parametric code difference value when the gas supply for the gas water heater is changed, thereby effectively making up errors of the components among gas water heaters and effectively ensuring the working performance of the gas water heater.

[0009] The present invention also provides a non-transitory computer readable storage medium.

[0010] The present invention also provides a parametric code transformation apparatus for a gas water heater.

50 **[0011]** The present invention also provides a gas water heater. Embodiments of a first aspect of the present invention provide a parametric code transformation method for a gas water heater. The gas water heater includes a gas supply dial switch. The method includes: acquiring dial state information of the gas supply dial switch, and determining a gas supply for the gas water heater according to the dial state information, wherein the gas supply for the gas water heater includes natural gas and liquefied gas; transforming a parametric code of the gas water heater into a first parametric code when the gas supply is the natural gas; acquiring a parametric code difference value and transforming the parametric code of the gas water heater into a second parametric code according to the first parametric code and the parametric code difference value when the gas supply is the liquefied gas, wherein the parametric code difference value is acquired by:

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acquiring respectively first optimal parametric codes for a plurality of gas water heaters when supplied with natural gas and second optimal parametric codes for the plurality of the gas water heaters when supplied with liquefied gas; calculating a difference value between the first optimal parametric code and the second optimal parametric code for each of the plurality of the gas water heaters when respectively supplied with natural gas and liquefied gas; and calculating an average value of the difference values and taking the average value as the parametric code difference value.

[0012] With the parametric code transformation method for a gas water heater according to embodiments of the present invention, the dial state information of the gas supply dial switch is acquired first, and the gas supply for the gas water heater is determined according to the dial state information; when the gas supply is the natural gas, the parametric code of the gas water heater is transformed into the first parametric code; when the gas supply is the liquefied gas, the parametric code difference value is acquired, and the parametric code of the gas water heater is transformed into the second parametric code according to the first parametric code and the parametric code difference value. Therefore, the parametric code is transformed according to the parametric code difference value when the gas supply for the gas water heater is changed, and thus the errors of components among gas water heaters can be effectively made up and the working performance of the gas water heater can further be effectively ensured.

[0013] Embodiments of a second aspect of the present invention provide a non-transitory computer readable storage medium having stored therein a computer program that, when executed by a processor, causes the processor to implement a parametric code transformation method for a gas water heater as described in embodiments of the first aspect of the present invention.

[0014] With the non-transitory computer readable storage medium according to embodiments of the present invention, the dial state information of the gas supply dial switch is acquired first, and the gas supply of the gas water heater is determined according to the dial state information; when the gas supply is the natural gas, the parametric code of the gas water heater is transformed into the first parametric code; when the gas supply is the liquefied gas, the parametric code difference value is acquired, and the parametric code of the gas water heater is transformed into the second parametric code according to the first parametric code and the parametric code difference value, thereby effectively making up errors of the components among gas water heaters and effectively ensuring the working performance of the gas water heater.

[0015] Embodiments of a third aspect of the present invention provide a parametric code transformation apparatus for a gas water heater. The gas water heater includes a gas supply dial switch. The apparatus includes: an acquiring module, connected to the gas supply dial switch and configured to acquire dial state information of the gas supply dial switch; a determining module, connected to the acquiring module and configured to determine the gas supply for the gas water heater according to the dial state information, wherein the gas supply for the gas water heater includes natural gas and liquefied gas; a parameter transforming module, connected to the determining module, and configured to transform a parametric code of the gas water heater into a first parameter code when the gas supply is the natural gas, and to acquire a parametric code difference value and transform the parametric code of the gas water heater into a second parametric code according to the first parametric code and the parametric code difference value when the gas supply is the liquefied gas wherein the parameter transforming module is configured to acquire the parametric code difference value by:

acquiring respectively first optimal parametric codes for a plurality of gas water heaters when supplied with natural gas and second optimal parametric codes for the plurality of the gas water heaters when supplied with liquefied gas; calculating a difference value between the first optimal parametric code and the second optimal parametric code for each of the plurality of the gas water heaters when respectively supplied with natural gas and liquefied gas; and calculating an average value of the difference values and taking the average value as the parametric code difference value.

[0016] With the parametric code transformation apparatus for a gas water heater according to embodiments of the present invention, the acquiring module acquires the dial state information of the gas supply dial switch, the determining module determines the gas supply for the gas water heater according to the dial state information, the parameter transformation module transforms the parametric code of the gas water heater into the first parametric code when the gas supply is the natural gas; and acquires the parametric code difference value, and transforms the parametric code of the gas water heater into the second parametric code according to the first parametric code and the parametric code difference value when the gas supply is the liquefied gas. Therefore, the parametric code is transformed by the apparatus according to the parametric code difference value when the gas supply for the gas water heater is changed, and thus the errors of components among gas water heaters can be effectively made up and the working performance of the gas water heater can further be effectively ensured.

[0017] Embodiments of the fourth aspect of the present invention provide a gas water heater, including the parametric

code transformation apparatus for a gas water heater as described in embodiment of the third aspect of the present disclosure.

[0018] The gas water heater as described in embodiments of the present invention transforms the parametric code according to the parametric code difference value when the gas supply for the gas water heater is changed, thereby effectively making up the errors of components and further efficiently ensuring the working performance.

BRIEF DESCRIPTION OF THE DRAWINGS

[0019] The above and/or additional aspects and advantages of the present invention will become apparent and easily understood from the following description made for embodiments with reference to the drawings, in which:

Fig. 1 is a flow chart of a parametric code transformation method for a gas water heater according to the present invention;

Fig. 2 is a flow chart of a parametric code transformation method for a gas water heater according to the present invention; and

Fig. 3 is a block diagram of a parametric code transformation apparatus for a gas water heater according to the present invention.

DETAILED DESCRIPTION

[0020] Reference will be made in detail to embodiments of the present invention, examples of which are illustrated in the accompanying drawings. The same or similar elements and the elements having same or similar functions are denoted by like reference numerals throughout the descriptions. The embodiments described hereinafter with reference to drawings are explanatory, illustrative, and used to generally understand the present invention. The embodiments shall not be construed to limit the present invention which is defined in the appended claims.

[0021] Description will be made hereinafter to a parametric code transformation method for a gas water heater, a non-transitory computer readable storage medium, a parametric code transformation apparatus for a gas water heater and a gas water heater according to embodiments of the present invention with reference to the accompanying drawings.

[0022] Fig. 1 is a flow chart showing a parametric code transformation method for a gas water heater according to the present invention. The gas water heater includes a gas supply dial switch. As shown in Fig. 1, the parametric code transformation method includes the following steps:

At S1, dial state information of the gas supply dial switch is acquired, and a gas supply for the gas water heater is determined according to the dial state information. The gas supply for the gas water heater includes natural gas and liquefied gas.

At S2, a parametric code of the gas water heater is transformed into a first parametric code when the gas supply is the natural gas.

At S3, a parametric code difference value is acquired, and the parametric code of the gas water heater is transformed into a second parametric code according to the first parametric code and the parametric code difference value when the gas supply is the liquefied gas.

[0023] In embodiments of the present invention, the parametric code of the gas water heater is defaulted to be the first parametric code.

[0024] In specific, the gas supply dial switch generally includes a first position and a second position, each of which corresponds to a dial code (1 and 2). There is a silkscreen on the gas supply dial switch, and the user could choose the gas supply for the gas water heater by dialing the silkscreen to a corresponding position. For instance, when the gas supply for the gas water heater is the natural gas, the gas supply dial switch is dialed to the first position, and when the gas supply for the gas water heater is the liquefied gas, the gas supply dial switch is dialed to the second position. The gas supply for the gas water heater is generally the natural gas, and thus the gas supply dial switch of the gas water heater, when leaving the factory, may be dialed to the position corresponding to the natural gas by default.

[0025] After the gas supply for the gas water heater is determined according to dial state information, if the gas supply for the gas water heater is the natural gas, the parametric code of the gas water heater is transformed into a parametric code (i.e., the first parametric code) corresponding to the natural gas; if the gas supply for the gas water supply is the liquefied gas, the parametric code difference value is acquired, and the parametric code of the gas water heater is transformed into the second parametric code according to the first parametric code and parametric code difference value, in which the second parametric code equals to the first parametric code minus the parametric code difference value. Therefore, the method transforms the parametric code according to the first parametric code and the parametric code difference value when the gas supply for the gas water heater is changed to liquefied gas, thereby effectively making

up the errors of components among the gas water heaters and further effectively ensuring the working performance of the gas water heater.

[0026] It should be understood that the first parametric code and the parametric code difference value may be preset in the gas water heater before the gas water heater leaves the factory.

[0027] In embodiments of the present invention, the parametric code may include: a proportional valve maximum secondary pressure code, a maximum wind speed code, a proportional valve minimum secondary pressure code, a minimum wind speed code, a proportional valve ignition secondary pressure code and an ignition wind speed code.

[0028] For example, as shown in Table 1 and taking a gas water heater as an example, the parametric code (the second parametric code) when the gas supply is the liquefied gas is equal to the parametric code (the first parametric code) corresponding to the case when the gas supply is the natural gas minus the parametric code difference value.

Table 1

Parametric Code	Natural Gas	Parametric Code Difference Value	Liquefied Gas
Dial state information			
PH (Proportional Valve Maximum Secondary Pressure)	99	10	89
FH (Maximum Wind Speed)	89	16	73
PL (Proportional Valve Minimum Secondary Pressure)	45	13	32
FL (Minimum Wind Speed)	32	6	2C
DH (Proportional Valve Ignition Secondary Pressure)	35	7	2E
DF (Ignition Wind Speed)	25	5	20

[0029] In embodiments of the present invention, the parameter code is a hexadecimal number, and each parameter code corresponds to a working parameter.

[0030] As shown in Table 1, the parametric code corresponding to the liquefied gas is related to the parametric code corresponding to the natural gas and the parametric code difference value. As shown in Table 1, the PH corresponding to the natural gas defaulted by the gas water heater is 99, then when the gas supply is changed to the liquefied gas, the corresponding PH is equal to 89, i.e., the corresponding $PH=99-10=89$. For the gas water heaters with the same model, due to the difference of the components, the first parametric code for each gas water heater may be slightly different. For example, for a gas water heater with the same model as the gas water heater shown in Table 1, if the default PH corresponding to the natural gas is 98, then when the gas supply is changed to the liquefied gas, the corresponding PH is equal to 88, i.e., the corresponding $PH=98-10=88$.

[0031] As can be seen from the above embodiments, when the gas supply for the gas water heater is changed from the natural gas to the liquefied gas, the parametric code needs to be transformed, and the parametric code difference value needs to be acquired for the transformation of the parametric code. In the following, how to acquire the parametric code difference value will be described with reference to the specific embodiments.

[0032] According to the present invention, as shown in Fig. 2, the parametric code difference value is acquired by the following step.

[0033] At S31, first optimal parametric codes for a plurality of gas water heaters when supplied with natural gas and second optimal parametric codes for the plurality of the gas water heaters when supplied with liquefied gas are acquired respectively. In an embodiment, the phrase "a plurality of" generally refers to 10 or more.

[0034] At S32, a difference value between the first optimal parametric code and the second optimal parametric code for each of the plurality of the gas water heaters when respectively supplied with natural gas and liquefied gas are calculated.

[0035] At S33, an average value of the difference values is calculated and the average value is taken as the parametric code difference value.

[0036] Specifically, before leaving the factory, at least 10 gas water heaters with the same model are tested. For each of the at least 10 gas water heaters, the first optimal parametric code is tested when the gas supply is the natural gas, the second optimal parametric code is tested when the gas supply is the liquefied gas, and the difference value between the first optimal parametric code and the second optimal parametric code is calculated. Then, the average value of the respective difference values of the at least 10 gas water heaters is calculated and taken as the parametric code difference value. For example, an optimal PH (natural gas) of a gas water heater is A3, and an optimal PH (liquefied gas) of the gas water heater is 98, and thus a difference value therebetween is 11. In the similar way, the difference value of the PH values can be obtained for each of other gas water heaters. Then, an average value of all the difference values corresponding to the PH is calculated and taken as the parametric code difference value corresponding to the PH of the gas water heaters. Similarly, the respective parametric code difference values corresponding to other parametric codes, such as FH, PL, FL, DH or DF, may be obtained. Finally, all the parametric code difference values are preset in the gas water heater, such that the parametric code may be transformed when the gas supply for the gas water heater is changed from the natural gas to the liquefied gas, thereby making up the differences of components among gas water heaters.

[0037] In conclusion, with the parametric code transformation method for a gas water heater according to embodiments of the present invention, the dial state information of the gas supply dial switch is acquired first, and the gas supply for the gas water heater is determined according to the dial state information; when the gas supply is the natural gas, the parametric code of the gas water heater is transformed into the first parametric code; when the gas supply is the liquefied gas, the parametric code difference value is acquired, and the parametric code of the gas water heater is transformed into the second parametric code according to the first parametric code and the parametric code difference value. Therefore, the parametric code is transformed according to the parametric code difference value when the gas supply for the gas water heater is changed, and thus the errors of components among gas water heaters can be effectively made up and the working performance of the gas water heater can further be effectively ensured.

[0038] Embodiments of the present invention also provide a non-transitory computer readable storage medium having stored therein a computer program that, when executed by a processor, causes the processor to implement the parametric code transformation method for a gas water heater according to any one of claims 1 to 3.

[0039] With the non-transitory computer readable storage medium according to embodiments of the present invention, the dial state information of the gas supply dial switch is acquired first, and the gas supply for the gas water heater is determined according to the dial state information; when the gas supply is the natural gas, the parametric code of the gas water heater is transformed into the first parametric code; when the gas supply is the liquefied gas, the parametric code difference value is acquired, and the parametric code of the gas water heater is transformed into the second parametric code according to the first parametric code and the parametric code difference value, thereby effectively making up errors of the components among gas water heaters and effectively ensuring the working performance of the gas water heater.

[0040] Fig. 3 is a block diagram of a parametric code transformation apparatus for a gas water heater according to an embodiment of the present invention. As shown in Fig. 3, the gas water heater includes a gas supply dial switch 100, and the parametric code transformation apparatus includes: an acquiring module 10, a determining module 20 and a parameter transforming module 30.

[0041] Among others, the acquiring module 10 is connected to the gas supply dial switch 100, and configured to acquire dial state information of the gas supply dial switch 100. The determining module 20 is connected to the acquiring module 10, and configured to determine a gas supply for the gas water heater according to the dial state information. The gas water heater includes natural gas and liquefied gas. The parameter transforming module 30 is connected to the determining module 20, and configured to transform a parametric code of the gas water heater into a first parametric code when the gas supply is the natural gas; and configured to acquire a parametric code difference value, and transform the parametric code of the gas water heater into a second parametric code according to the first parametric code and the parametric code difference value when the gas supply is liquefied gas.

[0042] In embodiments of the present invention, the parametric code of the gas water heater is defaulted to be the first parametric code.

[0043] In specific, the gas supply dial switch 100 generally includes a first position and a second position, each of which corresponds to a dial code (1 and 2). There is a silkscreen on the gas supply dial switch 100, and the user could choose the gas supply for the gas water heater by dialing the silkscreen to a corresponding position. For instance, when the gas supply for the gas water heater is the natural gas, the gas supply dial switch 100 is dialed to the first position, and when the gas supply for the gas water heater is the liquefied gas, the gas supply dial switch 100 is dialed to the second position. The gas supply for the gas water heater is generally the natural gas, and thus the gas supply dial switch

100 of the gas water heater, when leaving the factory, may be dialed to the position corresponding to the natural gas by default.

[0044] After the gas supply for the gas water heater is determined by the determining module 20 according to the dial state information, if the gas supply for the gas water heater is the natural gas, the parametric code of the gas water heater is transformed by the parameter transforming module 30 into a parametric code (i.e., the first parametric code) corresponding to the natural gas; if the gas supply for the gas water supply is the liquefied gas, the parameter transforming module 30 acquires the parametric code difference value, and transforms the parametric code of the gas water heater into the second parametric code according the first parametric code and parametric code difference value, in which the second parametric code equals to the first parametric code minus the parametric code difference value. Therefore, the apparatus transforms the parametric code according to the first parametric code and the parametric code difference value when the gas supply for the gas water heater is changed to the liquefied gas, thereby effectively making up the errors of components among the gas water heaters and further effectively ensuring the working performance of the gas water heater.

[0045] It should be understood that the first parametric code and the parametric code difference value may be preset in the gas water heater before the gas water heater leaves the factory.

[0046] In embodiments of the present invention, the parametric code may include: a proportional valve maximum secondary pressure code, a maximum wind speed code, a proportional valve minimum secondary pressure code, a minimum wind speed code, a proportional valve ignition secondary pressure code and an ignition wind speed code.

[0047] For example, as shown in Table 1 and taking a gas water heater as an example, the parametric code (the second parametric code) when the gas supply is the liquefied gas is equal to the parametric code (the first parametric code) corresponding to the case when the gas supply is the natural gas minus the parametric code difference value.

Table 1

Parametric Code	Natural Gas	Parametric Code Difference Value	Liquefied Gas
Dial state information			
PH (Proportional Valve Maximum Secondary Pressure)	99	10	89
FH (Maximum Wind Speed)	89	16	73
PL (Proportional Valve Minimum Secondary Pressure)	45	13	32
FL (Minimum Wind Speed)	32	6	2C
DH (Proportional Valve Ignition Secondary Pressure)	35	7	2E
DF (Ignition Wind Speed)	25	5	20

[0048] In embodiments of the present invention, the parameter code is a hexadecimal number, and each parameter code corresponds to a working parameter.

[0049] As shown in Table 1, the parametric code corresponding to the liquefied gas is related to the parametric code corresponding to the natural gas and the parametric code difference value. As shown in Table 1, the PH corresponding to the natural gas defaulted by the gas water heater is 99, then when the gas supply is changed to the liquefied gas, the corresponding PH is equal to 89, i.e., the corresponding PH=99-10=89. For the gas water heaters with the same model, due to the difference of the components, the first parametric code for each gas water heater may be slightly different. For example, for a gas water heater with the same model as the gas water heater shown in Table 1, if the default PH

corresponding to the natural gas is 98, then when the gas supply is changed to the liquefied gas, the corresponding PH is equal to 88, i.e., the corresponding $PH=98-10=88$.

[0050] As can be seen from the above embodiments, when the gas supply for the gas water heater is changed from the natural gas to the liquefied gas, the parametric code needs to be transformed, and the parametric code difference value needs to be acquired for the transformation of the parametric code. In the following, how the parameter conversion module 30 acquires the parametric code difference value will be described with reference to the specific embodiments.

[0051] According to the present invention, as shown in Fig. 2, the parameter conversion module 30 acquires the parametric code difference value by the following step.

[0052] At S31, first optimal parametric codes for a plurality of gas water heaters when supplied with natural gas and second optimal parametric codes for the plurality of the gas water heaters when supplied with liquefied gas are acquired respectively. In an embodiment, the phrase "a plurality of" generally refers to 10 or more.

[0053] At S32, a difference value between the first optimal parametric code and the second optimal parametric code for each of the plurality of the gas water heaters when respectively supplied with natural gas and liquefied gas is calculated.

[0054] At S33, an average value of the difference values is calculated and the average value is taken as the parametric code difference value.

[0055] Specifically, before leaving the factory, at least 10 gas water heaters with the same model are tested. For each of the at least 10 gas water heaters, the first optimal parametric code is tested when the gas supply is the natural gas, the second optimal parametric code is tested when the gas supply is the liquefied gas, and the difference value between the first optimal parametric code and the second optimal parametric code is calculated by the parameter conversion module 30. Then, the average value of the respective difference values of the at least 10 gas water heaters is calculated by the parameter conversion module 30 and taken as the parametric code difference value. For example, an optimal PH (natural gas) of a gas water heater is A3, and an optimal PH (liquefied gas) of the gas water heater is 98, and thus a difference value therebetween is 11. In the similar way, the difference value of the PH values can be obtained for each of other gas water heaters. Then, an average value of all the difference values corresponding to the PH is calculated and taken as the parametric code difference value corresponding to the PH of the gas water heaters. Similarly, the respective parametric code difference values corresponding to other parametric codes, such as FH, PL, FL, DH or DF, may be acquired by the parameter conversion module 30. The parametric code may be transformed by the parameter conversion module 30 according to the first parametric code and the parametric code difference value when the gas supply for the gas water heater is changed from the natural gas to the liquefied gas, thereby making up the differences of components among gas water heaters.

[0056] With the parametric code transformation apparatus for a gas water heater according to embodiments of the present invention, the acquiring module acquires the dial state information of the gas supply dial switch, the determining module determines the gas supply for the gas water heater according to the dial state information, the parameter transformation module transforms the parametric code of the gas water heater into the first parametric code when the gas supply is the natural gas; and acquires the parametric code difference value, and transforms the parametric code of the gas water heater into the second parametric code according to the first parametric code and the parametric code difference value when the gas supply is the liquefied gas. Therefore, the parametric code is transformed by the apparatus according to the parametric code difference value when the gas supply for the gas water heater is changed, and thus the errors of components among gas water heaters can be effectively made up and the working performance of the gas water heater can further be effectively ensured.

[0057] In addition, embodiments of the present invention also provide a gas water heater, including the above parametric code transformation apparatus for a gas water heater according to any one of claims 5 to 7.

[0058] The gas water heater as described in embodiments of the present invention transforms the parametric code according to the parametric code difference value when the gas supply for the gas water heater is changed, thereby effectively making up the errors of components and further efficiently ensuring the working performance.

[0059] In the description of the specification, it is to be understood that terms such as "central," "longitudinal," "lateral," "length," "width," "thickness," "upper," "lower," "front," "rear," "left," "right," "vertical," "horizontal," "top," "bottom," "inner," "outer," "clockwise," "counterclockwise," "axial," "radial," and "circumferential" should be construed to refer to the orientation or position relationships as then described or as shown in the drawings under discussion. These relative terms are only for convenience and simplification of description and do not indicate or imply that the apparatus or elements referred to should have the particular orientation or should be constructed or operated in a particular orientation. Therefore, these relative terms shall not be construed to limit the present disclosure.

[0060] In addition, terms such as "first" and "second" are used herein just for purposes of description and are not intended to indicate or imply relative importance or significance or to imply the number of indicated technical features. Thus, the feature defined with "first" and "second" may expressly or impliedly comprise at least one of this feature. In the description of the present invention, the phrase of "a plurality of" means at least two, such as two or three, unless specified otherwise.

[0061] In the present invention, unless specified or limited otherwise, the terms "mounted," "connected," "coupled,"

"fixed" and the like are used broadly, and may be, for example, fixed connections, detachable connections, or integral connections; may also be mechanical or electrical connections; may also be direct connections or indirect connections via intervening structures; may also be inner communications or interaction of two elements, which can be understood by those skilled in the art according to specific situations.

[0062] In the present invention, unless specified or limited otherwise, a structure in which a first feature is "on" or "below" a second feature may include an embodiment in which the first feature is in direct contact with the second feature, and may also include an embodiment in which the first feature and the second feature are not in direct contact with each other, but are contacted via an additional feature formed therebetween. Furthermore, a first feature "on," "above," or "on top of" a second feature may include an embodiment in which the first feature is right or obliquely "on," "above," or "on top of" the second feature, or just means that the first feature is at a height higher than that of the second feature; while a first feature "below," "under," or "on bottom of" a second feature may include an embodiment in which the first feature is right or obliquely "below," "under," or "on bottom of" the second feature, or just means that the first feature is at a height lower than that of the second feature.

Claims

1. A parametric code transformation method for a gas water heater, wherein the gas water heater comprises a gas supply dial switch (100), and the parametric code transformation method comprises:

acquiring (S1) dial state information of the gas supply dial switch (100), and determining a gas supply for the gas water heater according to the dial state information, wherein the gas supply for the gas water heater comprises natural gas and liquefied gas;

transforming (S2) a parametric code of the gas water heater into a first parametric code, when the gas supply is the natural gas;

characterized in

acquiring (S3) a parametric code difference value and transforming the parametric code of the gas water heater into a second parametric code according to the first parametric code and the parametric code difference value, when the gas supply is the liquefied gas,

and **in that** the parametric code difference value is acquired by:

acquiring (S31) respectively first optimal parametric codes for a plurality of gas water heaters when supplied with natural gas and second optimal parametric codes for the plurality of the gas water heaters when supplied with liquefied gas;

calculating (S32) a difference value between the first optimal parametric code and the second optimal parametric code for each of the plurality of the gas water heaters when respectively supplied with natural gas and liquefied gas; and

calculating (S33) an average value of the difference values and taking the average value as the parametric code difference value.

2. The parametric code transformation method for a gas water heater according to claim 1, wherein the parametric code comprises: a proportional valve maximum secondary pressure code, a maximum wind speed code, a proportional valve minimum secondary pressure code, a minimum wind speed code, a proportional valve ignition secondary pressure code and an ignition wind speed code.

3. The parametric code transformation method for a gas water heater according to any one of claims 1 to 2, wherein a default parametric code of the gas water heater is the first parametric code.

4. A non-transitory computer readable storage medium having stored therein a computer program that, when executed by a processor, causes the processor to implement the parametric code transformation method for a gas water heater according to any one of claims 1 to 3.

5. A parametric code transformation apparatus for a gas water heater, wherein the gas water heater comprises the gas supply dial switch (100), and the parametric code transformation apparatus comprises:

an acquiring module (10), connected to the gas supply dial switch (100), and configured to acquire dial state information of the gas supply dial switch (100);

a determining module (20), connected to the acquiring module (10), and configured to determine a gas supply

of the gas water heater according to the dial state information, wherein the gas supply for the gas water heater comprises natural gas and liquefied gas;

characterized in further comprising

a parameter transforming module (30), connected to the determining module (20), and configured to transform a parametric code of the gas water heater into a first parameter code when the gas supply is natural gas, and to acquire a parametric code difference value and transform the parametric code of the gas water heater into a second parametric code according to the first parametric code and the parametric code difference value when the gas supply is liquefied gas and wherein the parameter transforming module (30) is configured to acquire the parametric code difference value by:

acquiring respectively first optimal parametric codes for a plurality of gas water heaters when supplied with natural gas and second optimal parametric codes for the plurality of the gas water heaters when supplied with liquefied gas;

calculating a difference value between the first optimal parametric code and the second optimal parametric code for each of the plurality of the gas water heaters when respectively supplied with natural gas and liquefied gas; and

calculating an average value of the difference values and taking the average value as the parametric code difference value.

6. The parametric code transformation apparatus for a gas water heater according to claim 5, wherein the parametric code comprises: a proportional valve maximum secondary pressure code, a maximum wind speed code, a proportional valve minimum secondary pressure code, a minimum wind speed code, a proportional valve ignition secondary pressure code and an ignition wind speed code.

7. The parametric code transformation apparatus for a gas water heater according to any one of claims 5 to 6, wherein a default parametric code of the gas water heater is the first parametric code.

8. A gas water heater, comprising a parametric code transformation apparatus for a gas water heater according to any one of claims 5 to 7.

Patentansprüche

1. Parametercode-Umwandlungsverfahren für einen Gas-Wassererhitzer, wobei der Gas-Wassererhitzer einen Gaszufuhr-Wahlschalter (100) umfasst und das Parametercode-Umwandlungsverfahren Folgendes umfasst:

Erfassen (S1) von Wahlzustandsinformationen des Gaszufuhr-Wahlschalters (100) und Bestimmen einer Gaszufuhr für den Gas-Wassererhitzer gemäß den Wahlzustandsinformationen, wobei die Gaszufuhr für den Gas-Wassererhitzer Erdgas und Flüssiggas umfasst;

Umwandeln (S2) eines Parametercodes des Gas-Wassererhitzers in einen ersten Parametercode, wenn die Gaszufuhr das Erdgas ist;

gekennzeichnet durch

Erfassen (S3) eines Parametercode-Differenzwertes und Umwandeln des Parametercodes des Gas-Wassererhitzers in einen zweiten Parametercode gemäß dem ersten Parametercode und dem Parametercode-Differenzwert, wenn die Gaszufuhr das Flüssiggas ist,

und **dadurch**, dass der Parametercode-Differenzwert **durch** Folgendes erfasst wird:

Erfassen (S31) erster optimaler Parametercodes für eine Vielzahl von Gas-Wassererhitzern, wenn diese mit Erdgas versorgt werden, und zweiter optimaler Parametercodes für die Vielzahl der Gas-Wassererhitzer, wenn diese mit Flüssiggas versorgt werden;

Berechnen (S32) eines Differenzwertes zwischen dem ersten optimalen Parametercode und dem zweiten optimalen Parametercode für jeden der Vielzahl der Gas-Wassererhitzer, wenn sie mit Erdgas bzw. Flüssiggas versorgt werden; und

Berechnen (S33) eines Durchschnittswerts der Differenzwerte und Verwendung des Durchschnittswerts als Parametercode-Differenzwert.

2. Parametercode-Umwandlungsverfahren für einen Gas-Wassererhitzer gemäß Anspruch 1, wobei der Parametercode Folgendes umfasst: einen Code für den maximalen Sekundärdruck des Proportionalventils, einen Code für

die maximale Windgeschwindigkeit, einen Code für den minimalen Sekundärdruck des Proportionalventils, einen Code für die minimale Windgeschwindigkeit, einen Code für den Zündungssekundärdruck des Proportionalventils und einen Code für die Zündungswindgeschwindigkeit.

3. Parametercode-Umwandlungsverfahren für einen Gas-Wassererhitzer gemäß einem der Ansprüche 1 bis 2, wobei ein Standard-Parametercode des Gas-Wassererhitzers der erste Parametercode ist.

4. Nicht transitorisches, computerlesbares Speichermedium, in dem ein Computerprogramm gespeichert ist, das, wenn es von einem Prozessor ausgeführt wird, den Prozessor veranlasst, das Parametercode-Umwandlungsverfahren für einen Gas-Wassererhitzer gemäß einem der Ansprüche 1 bis 3 zu implementieren.

5. Parametercode-Umwandlungsvorrichtung für einen Gas-Wassererhitzer, wobei der Gas-Wassererhitzer den Gaszufuhr-Wahlschalter (100) umfasst und die Parametercode-Umwandlungsvorrichtung Folgendes umfasst:

ein Erfassungsmodul (10), das mit dem Gaszufuhr-Wahlschalter (100) verbunden und so konfiguriert ist, dass es Wahlzustandsinformationen des Gaszufuhr-Wahlschalters (100) erfasst;
ein Bestimmungsmodul (20), das mit dem Erfassungsmodul (10) verbunden und so konfiguriert ist, dass es eine Gaszufuhr des Gas-Wassererhitzers gemäß der Wahlzustandsinformationen bestimmt, wobei die Gaszufuhr für den Gas-Wassererhitzer Erdgas und Flüssiggas umfasst;

dadurch gekennzeichnet, dass es ferner Folgendes umfasst
ein Parameterumwandlungsmodul (30), das mit dem Bestimmungsmodul (20) verbunden und so konfiguriert ist, dass es einen Parametercode des Gas-Wassererhitzers in einen ersten Parametercode umwandelt, wenn die Gaszufuhr Erdgas ist, und dass es einen Parametercode-Differenzwert erfasst und den Parametercode des Gas-Wassererhitzers in einen zweiten Parametercode gemäß dem ersten Parametercode und dem Parametercode-Differenzwert umwandelt, wenn die Gaszufuhr Flüssiggas ist, und wobei das Parameterumwandlungsmodul (30) so konfiguriert ist, dass es den Parametercode-Differenzwert durch Folgendes erfasst:

Erfassen erster optimaler Parametercodes für eine Vielzahl von Gas-Wassererhitzern, wenn diese mit Erdgas versorgt werden, bzw. zweiter optimaler Parametercodes für die Vielzahl der Gas-Wassererhitzer, wenn diese mit Flüssiggas versorgt werden;
Berechnen eines Differenzwertes zwischen dem ersten optimalen Parametercode und dem zweiten optimalen Parametercode für jeden der Vielzahl der Gas-Wassererhitzer, wenn diese mit Erdgas bzw. Flüssiggas versorgt werden; und
Berechnen eines Durchschnittswerts der Differenzwerte und Verwendung des Durchschnittswerts als Parametercode-Differenzwert.

6. Parametercode-Umwandlungsvorrichtung für einen Gas-Wassererhitzer gemäß Anspruch 5, wobei der Parametercode Folgendes umfasst: einen Code für den maximalen Sekundärdruck des Proportionalventils, einen Code für die maximale Windgeschwindigkeit, einen Code für den minimalen Sekundärdruck des Proportionalventils, einen Code für die minimale Windgeschwindigkeit, einen Code für den Zündungssekundärdruck des Proportionalventils und einen Code für die Zündungswindgeschwindigkeit.

7. Parametercode-Umwandlungsvorrichtung für einen Gas-Wassererhitzer gemäß einem der Ansprüche 5 bis 6, wobei ein Standard-Parametercode des Gas-Wassererhitzers der erste Parametercode ist.

8. Gas-Wassererhitzer, umfassend eine Parametercode-Umwandlungsvorrichtung für einen Gas-Wassererhitzer gemäß einem der Ansprüche 5 bis 7.

Revendications

1. Méthode de transformation de code paramétrique pour un chauffe-eau à gaz, dans laquelle le chauffe-eau à gaz comprend un commutateur à cadran d'alimentation en gaz (100), et la méthode de transformation de code paramétrique comprend :

acquérir (S1) des informations sur l'état du cadran de l'interrupteur à cadran d'alimentation en gaz (100), et déterminer une alimentation en gaz pour le chauffe-eau à gaz en fonction des informations sur l'état du cadran, l'alimentation en gaz pour le chauffe-eau à gaz comprenant du gaz naturel et du gaz liquéfié ;

transformer (S2) un code paramétrique du chauffe-eau à gaz en un premier code paramétrique, lorsque l'alimentation en gaz est le gaz naturel ;

caractérisé en

l'acquisition (S3) d'une valeur de différence de code paramétrique et la transformation du code paramétrique du chauffe-eau à gaz en un second code paramétrique en fonction du premier code paramétrique et de la valeur de différence de code paramétrique, lorsque l'alimentation en gaz est du gaz liquéfié, et que la valeur de la différence de code paramétrique est acquise par :

acquérir (S31) respectivement les premiers codes paramétriques optimaux pour une pluralité de chauffe-eau à gaz lorsqu'ils sont alimentés en gaz naturel et les seconds codes paramétriques optimaux pour la pluralité de chauffe-eau à gaz lorsqu'ils sont alimentés en gaz liquéfié ;

calculer (S32) une valeur de différence entre le premier code paramétrique optimal et le second code paramétrique optimal pour chacun des chauffe-eau à gaz de la pluralité lorsqu'ils sont alimentés respectivement en gaz naturel et en gaz liquéfié ; et

calculer (S33) une valeur moyenne des valeurs de différence et prendre la valeur moyenne comme valeur de différence du code paramétrique.

2. Méthode de transformation de code paramétrique pour un chauffe-eau à gaz selon la revendication 1, dans laquelle le code paramétrique comprend : un code de pression secondaire maximale de la vanne proportionnelle, un code de vitesse de vent maximale, un code de pression secondaire minimale de la vanne proportionnelle, un code de vitesse de vent minimale, un code de pression secondaire d'allumage de la vanne proportionnelle et un code de vitesse de vent d'allumage.

3. Méthode de transformation de code paramétrique pour un chauffe-eau à gaz selon l'une des revendications 1 à 2, dans laquelle le code paramétrique par défaut du chauffe-eau à gaz est le premier code paramétrique.

4. Support de stockage non transitoire lisible par ordinateur contenant un programme d'ordinateur qui, lorsqu'il est exécuté par un processeur, permet à ce dernier de mettre en oeuvre la méthode de transformation du code paramétrique pour un chauffe-eau à gaz selon l'une des revendications 1 à 3.

5. Appareil de transformation de code paramétrique pour un chauffe-eau à gaz, dans lequel le chauffe-eau à gaz comprend le commutateur à cadran d'alimentation en gaz (100), et l'appareil de transformation de code paramétrique comprend :

un module d'acquisition (10), connecté au commutateur à cadran d'alimentation en gaz (100), et configuré pour acquérir des informations sur l'état du cadran du commutateur à cadran d'alimentation en gaz (100) ;

un module de détermination (20), connecté au module d'acquisition (10), et configuré pour déterminer l'alimentation en gaz du chauffe-eau à gaz en fonction des informations sur l'état du cadran, l'alimentation en gaz du chauffe-eau à gaz comprenant du gaz naturel et du gaz liquéfié ;

caractérisé par le fait qu'il comprend en outre

un module de transformation des paramètres (30), connecté au module de détermination (20), et configuré pour transformer un code paramétrique du chauffe-eau à gaz en un premier code paramétrique lorsque l'alimentation en gaz est du gaz naturel, et pour acquérir une valeur de différence de code paramétrique et transformer le code paramétrique du chauffe-eau à gaz en un second code paramétrique en fonction du premier

code paramétrique et de la valeur de différence de code paramétrique lorsque l'alimentation en gaz est du gaz liquéfié, et dans lequel le module de transformation des paramètres (30) est configuré pour acquérir la valeur de différence de code paramétrique par :

acquérir respectivement des premiers codes paramétriques optimaux pour une pluralité de chauffe-eau à gaz lorsqu'ils sont alimentés en gaz naturel et des seconds codes paramétriques optimaux pour la pluralité de chauffe-eau à gaz lorsqu'ils sont alimentés en gaz liquéfié ;

calculer une valeur de différence entre le premier code paramétrique optimal et le second code paramétrique optimal pour chacun de la pluralité de chauffe-eau à gaz lorsqu'ils sont respectivement alimentés en gaz naturel et en gaz liquéfié ; et

calculer une valeur moyenne des valeurs de différence et prendre la valeur moyenne comme valeur de différence du code paramétrique.

6. Appareil de transformation de code paramétrique pour chauffe-eau à gaz selon la revendication 5, dans lequel le

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code paramétrique comprend : un code de pression secondaire maximale de la vanne proportionnelle, un code de vitesse de vent maximale, un code de pression secondaire minimale de la vanne proportionnelle, un code de vitesse de vent minimale, un code de pression secondaire d'allumage de la vanne proportionnelle et un code de vitesse de vent d'allumage.

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7. Appareil de transformation de code paramétrique pour un chauffe-eau à gaz selon l'une des revendications 5 à 6, dans lequel le code paramétrique par défaut du chauffe-eau à gaz est le premier code paramétrique.
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8. Chauffe-eau à gaz, comprenant un appareil de transformation de code paramétrique pour un chauffe-eau à gaz selon l'une des revendications 5 à 7.

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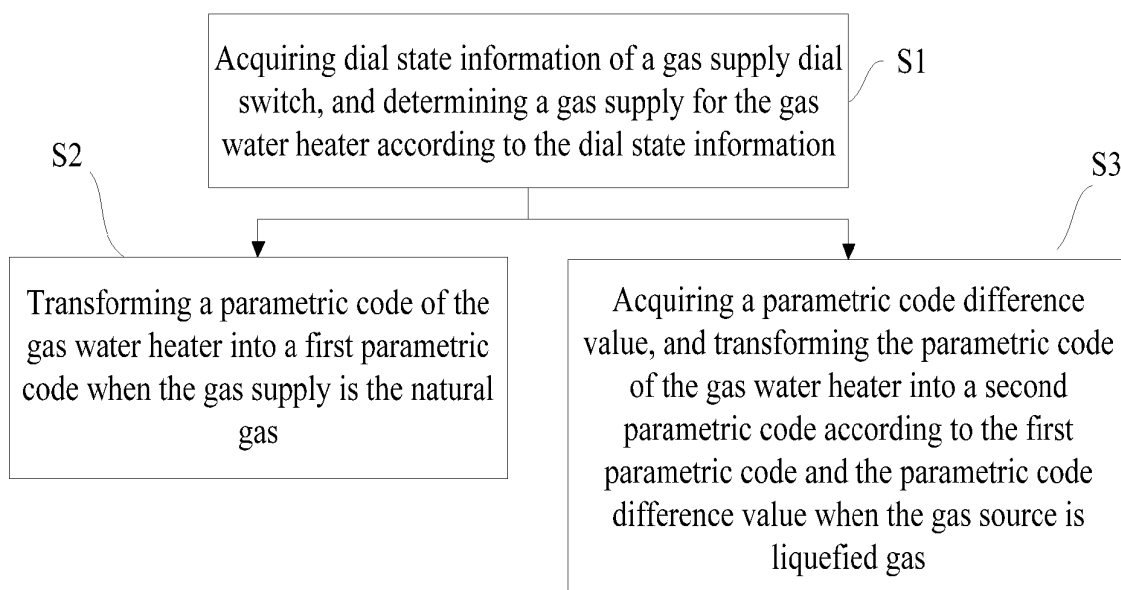


Fig. 1

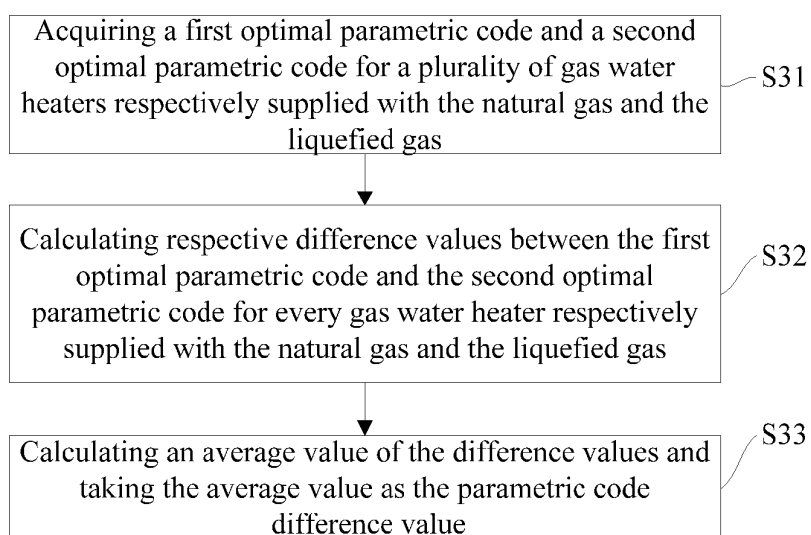


Fig. 2

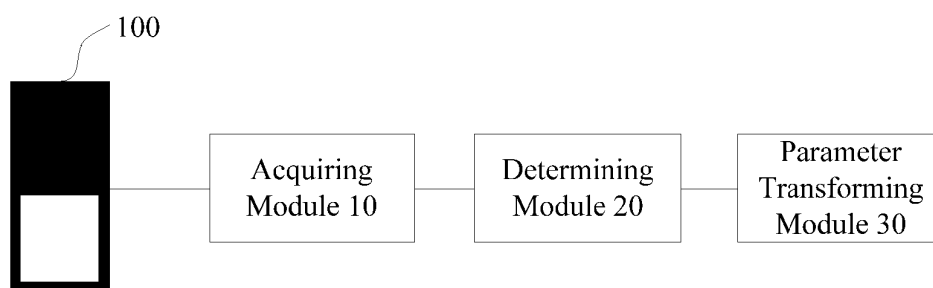


Fig. 3

REFERENCES CITED IN THE DESCRIPTION

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