

FLUID TEMPERATURE MEASURING DEVICE OF LAUNDRY PROCESSING APPARATUS AND LAUNDRY PROCESSING APPARATUS

5 TECHNICAL FIELD

[0001] The present disclosure relates to the technical field of laundry processing apparatuses, in particular to a fluid temperature measuring device of a laundry processing apparatus and a laundry processing apparatus.

10 BACKGROUND

[0002] Basically all laundry processing apparatuses available on the market contain a temperature sensor which may be arranged inside or outside a container to be detected. In the case of being installed inside the container to be detected, the temperature sensor will deteriorate in measuring accuracy if attached with impurities such as thread debris on its surface. For example, in a machine equipped with a drying module, it is particular easy for thread debris to accumulate on the surface of the temperature sensor. In the case of being installed outside the container to be detected, the temperature sensor is susceptible to external temperatures, which may lead to inaccuracy in the detected temperature values. In the prior art, the sensor is arranged inside a mounting housing which prevents the sensor from coming into direct contact with laundry water, and the container to be detected is provided with an opening in which the mounting housing is located. This approach, though preventing laundry water from coming into direct contact with the sensor, it deteriorates the impermeability of the container to be detected due to the opening thereon.

25 SUMMARY

[0003] An object of the present disclosure is to provide a fluid temperature measuring device of a laundry processing apparatus which is stable and reliable in measuring, and a laundry processing apparatus.

[0004] To achieve the object, the present disclosure provides a fluid temperature measuring device of a laundry processing apparatus, comprising:

[0005] a temperature sensor;

[0006] a housing that defines a passageway for fluid circulation; and

[0007] a sensor mount that defines a cavity for accommodating the temperature sensor on an outer side of the housing,

35 [0008] wherein the temperature sensor is arranged in the cavity and operates by sensing a

temperature of the housing.

[0009] Further, the sensor mount comprises a cover, and a mount body fixed on an outer wall of the housing, wherein the cover in combination with the mount body defines the cavity.

[0010] Further, the cover presses directly or indirectly the temperature sensor.

5 [0011] Further, the cover is a thermal insulation member made of a thermal insulation material, or the sensor mount further comprises a thermal insulation member, and the cover presses the temperature sensor by means of the thermal insulation member.

[0012] Further, the cover and the mount body are fixedly connected by means of a screw and/or a hook.

10 [0013] Further, the mount body and the housing are integrally formed.

[0014] Further, a pressing rib is provided on one side of the cover pressed toward the temperature sensor.

[0015] Further, the sensor mount is provided with a wiring hole that allows a lead wire of the temperature sensor to pass through the sensor mount.

15 [0016] Further, the temperature sensor touches the outer wall of the housing, or a heat conducting medium is provided between the temperature sensor and the outer wall of the housing.

[0017] The present disclosure further provides a laundry processing apparatus, which comprises the fluid temperature measuring device in any one of the technical solutions
20 described above.

[0018] As the result of the technical solutions described above, the present disclosure is advantageous in the following aspects.

[0019] The temperature sensor arranged outside the housing reduces the effect of thread debris that otherwise block the temperature sensor, so that the temperature sensor detects more
25 stable and reliable. Besides, since the temperature sensor is arranged in the cavity, the temperature sensor is not be affected by external temperatures and thus the accuracy of the temperature sensor is improved. Also, the temperature sensor accommodated in the sensor mount arranged on an outer side of the housing enables the temperature sensor to operate by sensing the temperature of the housing. This ensures not only the impermeability of the
30 housing with preventing it from leaking gas due to the absence of the opening on the housing, but also the accuracy of the temperature values detected by the temperature sensor.

BRIEF DESCRIPTION OF THE DRAWINGS

[0020] The present disclosure will be further explained below with reference to the drawings.

35 FIG. 1 is a structural schematic diagram of a fluid temperature measuring device according

to a first embodiment of the present disclosure.

FIG. 2 is a structural schematic diagram of the fluid temperature measuring device according to the first embodiment of the present disclosure in a state of assembly.

FIG. 3 is a structural schematic diagram of a cover in the fluid temperature measuring device according to the first embodiment of the present disclosure.

FIG. 4 is a structural schematic diagram of a groove in a fluid temperature measuring device according to a fifth embodiment of the present disclosure.

FIG. 5 is a structural schematic diagram of a mounting groove in a fluid temperature measuring device according to a sixth embodiment of the present disclosure.

FIG. 6 is a schematic diagram of the assembly of a fluid temperature measuring device according to the present disclosure and a water bucket.

[0021] The components in the drawings are named as follows:

100 temperature sensor, 200 housing, 210 mounting groove, 220 groove, 300 sensor mount, 310 mount body, 311 wiring hole, 312 positioning hole, 320 cavity, 330 cover, 331 pressing rib, 332 screw, 333 positioning rib, 340 thermal insulation member, 400 water bucket.

DETAILED DESCRIPTION

[0022] The present disclosure will be further described below by way of specific embodiments with reference to the drawings. It should be appreciated that hereinafter words indicating an orientation or positional relationship, such as “up”, “down”, “left”, “right”, “longitudinal”, “transversal”, “inner”, “outer”, “vertical”, “horizontal”, “top”, and “bottom” are based only on the orientation or positional relationship shown in the drawings; they merely serve the purpose of facilitating and simplifying the description of the present disclosure, and do not indicate or imply that an indicated device/component must be specifically orientated, or must be configured and operated in a specific orientation. Thus, they should not be interpreted as a limitation on the present disclosure.

[0023] First Embodiment

[0024] As shown in FIGs. 1-3, the present disclosure provides a fluid temperature measuring device of a laundry processing apparatus, which comprises a temperature sensor 100, a housing 200, and a sensor mount 300. The housing 200 defines a passageway for fluid circulation. The sensor mount 300 is arranged on an outer side of the housing 200 and defines a cavity 320. The temperature sensor 100 is arranged in the cavity 320 and operates by sensing the temperature of the housing 200. The temperature sensor 100 arranged outside the housing 200 may reduce the effect of thread debris that otherwise block the temperature sensor. The temperature sensor arranged inside the cavity may avoid the effect of external temperature on the temperature

sensor, thereby improving the detection accuracy thereof. Moreover, the temperature sensor as a thermosensitive element such as a thermistor or a thermosensitive diode is accommodated in the sensor mount provided on the outer side of the housing 200. The temperature sensor 100 operates by sensing the temperature of the housing 200. This ensures not only the impermeability of the housing with preventing it from leaking gas due to the absence of the opening on the housing, but also the accuracy of the temperature values detected by the temperature sensor.

[0025] In this embodiment, the sensor mount 300 comprises a cover 330 and a mount body 310 fixed on an outer wall of the housing 200. The mount body 310 and the housing 200 are integrally formed to ensure the impermeability of the housing. The cover 330 covers the mount body 310 to define the cavity 320, in which the temperature sensor is arranged. This enables the temperature sensor less likely to be impaired and less susceptible to external temperature which otherwise causing the detected temperature values inaccuracy. Specifically, the mount body 310 is provided with a positioning hole 312, and the cover 330 is provided with a positioning rib 333 that matches with the positioning hole 312. The positioning rib 333 is matched with the positioning hole so as to enable the position of the cover 330 fixed with respect to the mount body 310. The cover 330 is provided with a threaded hole, and the mount body 310 is provided with a hole aligned with the threaded hole. A screw 332 completely fixes the cover 330 by passing through the two holes.

[0026] Alternatively, the cover and the mount body may be fixedly connected by a hook alone. Both sides of the mount body are provided with a hook, and the corresponding positions of the cover are provided with a hook hole that matches with the hook. The hooks are matched with the hook holes so as to enable the position of the cover fixed with respect to the mount body.

[0027] Alternatively, the cover and the mount body may be fixedly connected by a screw alone. Both ends of the cover are provided with a threaded hole, and the corresponding positions of the mount body are provided with a hole aligned with the threaded hole. The screws completely fix the cover by passing through the two holes.

[0028] The sensor mount 300 further comprises a thermal insulation member 340, which effectively reduces the effect of external temperature on the temperature sensor 100 and enables the temperature sensor to detect temperature more accurately. The cover 330 presses the temperature sensor 100 via the thermal insulation member 340 and ensures that the temperature sensor 100 is in close contact with the bottom surface of the mount body 310 without displacement. Preferably, the thermal insulation member is made of thermal insulation cotton, which not only effects heat insulation, but also does not damage the temperature sensor.

[0029] The temperature sensor 100 touches the outer wall of the housing 200 and thus the accuracy of the temperature sensor is ensured. Specifically, one side of the cover 330 that is pressed toward the temperature sensor 100 is provided with a pressing rib 331, which ensures that the temperature sensor 100 comes into close contact with the outer wall of the housing 200.

5 Preferably, the pressing rib 331 is an elastic rib, and the deformability thereof ensures the temperature sensor not suffering damage due to significant force.

[0030] Alternatively, the pressing rib 331 touches the thermal insulation member. As shown in FIG. 2, the thermal insulation cotton is in close contact with the pressing rib 331 and presses the temperature sensor 100, which ensures the cover 330 fixing the temperature sensor via the pressing rib and the thermal insulating cotton without damaging the temperature sensor.

10 [0031] The sensor mount 300 is provided with a wiring hole 311 through which the lead wire of the temperature sensor 100 passes, so that the temperature sensor may be installed more conveniently. Specifically, the wiring hole is a slot provided on the mount body 310. After the temperature sensor 100 is installed and fixed, the slot may be sealed to isolate the temperature sensor from the outside air.

15 [0032] Second Embodiment

[0033] In this embodiment, the cover directly presses the temperature sensor. Specifically, one side of the cover that is pressed toward the temperature sensor is provided with a pressing rib. The cover and the pressing rib are integrally formed by injection molding. The cover plate directly presses the temperature sensor via the pressing rib, which ensures the temperature sensor close contact with the outer wall of the housing and thus ensures the accuracy of temperature sensor.

20 [0034] In the first embodiment, the thermal insulation cotton is located between the pressing rib and the temperature sensor. In this embodiment, the length of the pressing rib may be increased, or the depth of the mount body may be reduced, to ensure the pressing rib directly pressing the temperature sensor.

[0035] Third Embodiment

[0036] In this embodiment, the cover is made of thermal insulation material.

30 [0037] The cover made of thermal insulation material functions as a thermal insulation member and directly presses the temperature sensor. Such an arrangement is advantageous in that the cover plays not only a pressing role but also a thermal insulation role, making it unnecessary to provide the fluid temperature measuring device with two members and thus simplifying the structure thereof.

[0038] Alternatively, the cover plate made of thermal insulation material may also press the temperature sensor via a thermal insulation member. The cover plate and the thermal insulation

member play a double-insulation function by cooperating with each other, which further improves the reliability of the temperature sensor in the fluid temperature measuring device.

[0039] Fourth Embodiment

[0040] In this embodiment, the mount body and the housing are provided separately.

5 **[0041]** The housing is provided with a threaded hole on its outer wall, and the mount body is provided with a hole aligned with the threaded hole; the screw fixes the mount body on the housing by passing through the two holes successively. Since the threaded hole does not penetrate the outer wall of the housing, the impermeability of the housing is not affected.

10 **[0042]** Alternatively, the mount body may also be adhered on the outer wall of the housing by super glue.

[0043] Alternatively, a hook is provided on the mount body, and a hook hole matching with the hook is provided on the outer wall of the housing; the mount body is fixed on the outer wall of the housing due to the matching between the hook and the hook hole. Since the hook hole does not penetrate the outer wall of the housing, the impermeability of the housing is not
15 affected.

[0044] Alternatively, a hook is provided on the outer wall of the housing, and a hook hole matching with the hook is provided on the mount body. The mount body is fixed on the outer wall of the housing due to the matching between the hook and the hook hole.

[0045] Fifth Embodiment

20 **[0046]** In this embodiment, a mounting groove is provided on the outer wall of the housing, and the mount body is formed by the mounting groove.

[0047] As shown in FIG. 4, the outer wall of the housing 200 is provided with a mounting groove 210. The mounting groove 210 is formed by removing a part of the housing 200 from the outer surface of the housing 200 toward its inside. The mounting groove 210 has a depth L that is less than the thickness M of the housing 200. The provision of the mounting groove 210
25 does not affect the impermeability of the housing 200. The mount body formed by the mounting groove reduces the thickness of the part of the outer wall of the housing which the temperature sensor touches so as to improve the accuracy of the temperature sensor.

[0048] Sixth Embodiment

30 **[0049]** In this embodiment, a groove is provided on the outer wall of the housing, and the mount body is formed by the groove.

[0050] As shown in FIG. 5, the outer wall of the housing 200 is provided with a groove 220. The groove 220 is formed by the outer wall of the housing 200 recessed from the outside toward the inside such that a part of the housing corresponding to the groove protrudes into the
35 passageway. Thus, the thickness of the housing at the groove is equal to the thickness of the

remaining part of the housing, which ensures the impermeability of the housing. The mount body formed by a groove makes the fluid temperature measuring device more structurally compact since the dimension of the sensor mount protruding from the housing is decreased.

[0051] Seventh Embodiment

5 **[0052]** In this embodiment, a heat conducting medium is provided between the temperature sensor and the outer wall of the housing.

[0053] The heat conducting medium provided between the temperature sensor and the outer wall of the housing is made of a metal or heat conducting silicone that performs better thermal conduction. The heat transfer by the heat conducting medium enables the temperature sensor to
10 indirectly access the temperature of the outer wall of the housing. Also, the heat conducting medium ensures effective contact between the temperature sensor and the outer wall of the housing, thereby avoiding a gap therebetween and thus a reduction in the heat transfer effect. Consequently, the accuracy of temperature sensor is ensured.

[0054] The present disclosure also provides a laundry processing apparatus, which comprises
15 the fluid temperature measuring device in any one of the embodiments described above. The laundry processing apparatus detects temperatures stably and reliably because the temperature sensor in the fluid temperature measuring device is not readily affected by thread residues. Meanwhile, the laundry processing apparatus has its temperature controlled reliably because the temperature sensor does not affect the impermeability of the housing.

20 **[0055]** Specifically, as shown in FIG. 6, the laundry processing apparatus is a drum washing machine that comprises a water bucket 400. The housing 200 may be a drying duct installed on the water bucket 400. The air circulating inside the water bucket 400 absorbs the moisture in the laundry inside the water bucket, enters the housing 200, and is condensed by a condenser inside the housing 200. The heat absorbed by the water evaporation during the condensation
25 affects the temperature inside the housing. The fluid temperature measuring device determines whether the laundry is dried by detecting the temperature change inside the housing. Since the fluid temperature measuring device of the present disclosure detects the temperature stably and reliably, the drying control of the drum washing machine is more reliable and thus the drying effect is ensured.

30 **[0056]** It is understandable that the laundry processing apparatus may also be any other laundry processing apparatus such as a dryer that needs temperature measuring.

[0057] In addition to the preferred embodiments described above, the present disclosure can implemented by means of other embodiments. One skilled in the art would be able to make various changes and modifications based on the present disclosure within the spirit of the
35 disclosure, which fall in the scope of the disclosure defined by the claims.

CLAIMS

1. A fluid temperature measuring device of a laundry processing apparatus, comprising:
a temperature sensor;

a housing that defines a passageway for fluid circulation; and

5 a sensor mount that defines a cavity for accommodating the temperature sensor on an outer side of the housing,

wherein the temperature sensor is arranged in the cavity and operates by sensing a temperature of the housing.

2. The fluid temperature measuring device according to claim 1, wherein the sensor mount
10 comprises a cover, and a mount body fixed on an outer wall of the housing, wherein the cover in combination with the mount body defines the cavity.

3. The fluid temperature measuring device according to claim 2, wherein the cover presses directly or indirectly the temperature sensor.

4. The fluid temperature measuring device according to claim 3, wherein the cover is a
15 thermal insulation member made of a thermal insulation material, or the sensor mount further comprises a thermal insulation member, and the cover presses the temperature sensor by means of the thermal insulation member.

5. The fluid temperature measuring device according to claim 3, wherein the cover and the mount body are fixedly connected by means of a screw and/or a hook.

20 6. The fluid temperature measuring device according to claim 3, wherein the mount body and the housing are integrally formed.

7. The fluid temperature measuring device according to claim 2, wherein a pressing rib is provided on one side of the cover pressed toward the temperature sensor.

8. The fluid temperature measuring device according to any one of claims 1 to 7, wherein
25 the sensor mount is provided with a wiring hole that allows a lead wire of the temperature sensor to pass through the sensor mount.

9. The fluid temperature measuring device according to any one of claims 1 to 7, wherein the temperature sensor touches the outer wall of the housing, or a heat conducting medium is provided between the temperature sensor and the outer wall of the housing.

30 10. A laundry processing apparatus, comprising the fluid temperature measuring device according to any one of claims 1 to 9.