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BIOMETRIC SENSING DEVICE

Abstract

A biometric sensing device of preventing circuit failure includes a case, a circuit board, a cover, an operation component and an auxiliary component. The case includes a retaining wall and a piercing hole structure. The circuit board is disposed inside the case and includes an electronic switch. The cover is disposed above the case and includes an opening structure. The operation component is movably disposed on the case and protruded through the opening structure. The auxiliary component is connected to the operation component and disposed under the case. The auxiliary component includes a main body and a blocking portion. The main body is divided into a central region and an outer region adjacent to each other, and the operation component passes through the central region. The blocking portion disposed on the outer region and around the operation component, and adapted to clog liquid flowing into the piercing hole structure.

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Background/Summary

BACKGROUND OF THE INVENTION

1. Field of the Invention

[0001] The present invention relates to a biometric sensing device, and more particularly, to a biometric sensing device for circuit failure prevention.

2. Description of the Prior Art

[0002] In the medical institutions, a blood glucose meter may be the shared medical equipment among several patients. For avoiding bacterial cross-infection caused by the shared the medical equipment, the blood glucose meter must comply with the disinfection principles required by health regulations. The conventional blood glucose meter must be disinfected by disinfection wipes specified by the medical equipment manufacturer; however, when the blood glucose meter is cleaned for a certain number of times, the conventional blood glucose meter may have drawbacks of the blood glucose detection error or the function failure, which is resulted from the disinfectant leaking into the blood glucose meter. Therefore, design of a blood glucose meter of preventing the disinfectant from leaking into the internal circuit board is an important issue in the medical equipment industry.

SUMMARY OF THE INVENTION

[0003] The present invention provides a biometric sensing device for circuit failure prevention for solving above drawbacks.

[0004] According to the claimed invention, a biometric sensing device of preventing circuit failure includes a case, a circuit board, a cover and an operation component. The case includes a retaining wall and a piercing hole structure, and the piercing hole structure is surrounded by the retaining wall. The circuit board is disposed inside the case and includes an electronic switch. The cover is disposed above the case and comprising an opening structure. The operation component is movably disposed on the case, and an accommodating chamber is formed between the case, the cover and the operation component. The operation component includes a pressing portion, an actuating portion, a supporting portion and an abutting portion. The pressing portion is protruded through the opening structure. The actuating portion is connected to a bottom of the pressing portion, and adapted to inset into the piercing hole structure for detachably contacting the electronic switch. The supporting portion is connected to a lateral side of the pressing portion, and located between the cover and the case to support the pressing portion. The abutting portion is connected to the pressing portion and located between the actuating portion and the supporting portion. The abutting portion slidably abuts against the retaining wall to prevent liquid in the accommodating chamber from flowing into the piercing hole structure through a first gap formed between the abutting portion and the retaining wall.

[0005] According to the claimed invention, a second gap is formed between the operation component and the cover, and a structural width of the second gap is greater than a structural width of the first gap. The abutting portion includes a first surface and a second surface opposite to each other, the first surface slidably abuts against the retaining wall, the second surface is adapted to push the liquid to drain out of the accommodating chamber through the second gap in accordance with a movement of the pressing portion.

[0006] According to the claimed invention, the case further includes a plate body where on the retaining wall is disposed, and a distance between a top end of the retaining wall and the plate body is greater than a distance between the cover and the plate body. The supporting portion is made of resilient and deformable material, and comprises a first end and a second end opposite to each other, the first end abuts against the plate body, the second case contacts or is separated from the cover in accordance with a movement of the pressing portion. The operation component further includes a positioning portion disposed on the first end and fixed to the case for constraining rotation of the pressing portion.

[0007] According to the claimed invention, the biometric sensing device further includes an

auxiliary component connected to the operation component and disposed under the case, for clogging and diverting the liquid. The auxiliary component includes a main body divided into a central region and an outer region adjacent to each other, the actuating portion is connected to the central region. The auxiliary component further includes a blocking portion disposed on the outer region and around the actuating portion.

[0008] According to the claimed invention, a top end of the blocking portion abuts against a lower surface of the case. The blocking portion is a closed ring structure or a non-closed C-shaped structure. The case further includes an engaging portion disposed on a lower surface of the case and adapted to engage with a top end of the blocking portion. The auxiliary component further includes a guiding portion disposed on the outer region and around the blocking portion. The guiding portion is extended toward a position located above a drain hole formed on the case.

[0009] According to the claimed invention, a biometric sensing device of preventing circuit failure includes a case, a circuit board, a cover, an operation component and an auxiliary component. The case includes a retaining wall and a piercing hole structure, and the piercing hole structure is surrounded by the retaining wall. The circuit board is disposed inside the case and includes an electronic switch. The cover is disposed above the case and includes an opening structure. The operation component is movably disposed on the case and protruded through the opening structure, and the operation component partly passes into the piercing hole structure for detachably contacting the electronic switch. The auxiliary component is connected to the operation component and disposed under the case. The auxiliary component includes a main body and a blocking portion. The main body is divided into a central region and an outer region adjacent to each other, and the operation component passes through the central region. The blocking portion disposed on the outer region and around the operation component, and adapted to clog liquid flowing into the piercing hole structure.

[0010] According to the claimed invention, the retaining wall includes an inner surface adjacent to the operation component, and a first included angle between a tangent line of the inner surface and a planar normal vector of the plate body is smaller than five degrees. The retaining wall further includes an outer surface opposite to the operation component, and a second included angle between a tangent line of the outer surface and the planar normal vector is greater than the first included angle.

[0011] The biometric sensing device of the present invention can be applied to a blood glucose meter or any similar product, and can optionally utilize the operation component or the auxiliary component with the specific design, or simultaneously utilize the operation component and the auxiliary component with the specific design, to prevent the liquid outside the case from flowing into the gap between the cover and the operation component; if the liquid flows into the gap between the cover and the operation component, the liquid can be accumulated inside the accommodating chamber formed between the case, the cover and the operation component, and the second surface of the abutting portion can be used to drain the accumulated liquid out of the accommodating chamber when pressing the operation component; if the accumulated liquid flows from the accommodating chamber into the piercing hole structure, the blocking portion of the auxiliary component can avoid the liquid from flowing towards the circuit board, and the guiding portion of the auxiliary component can guide the liquid flowing across the blocking portion to flow towards the drain hole for being drained out of the case. The biometric sensing device of the present invention can provide liquid blocking and diversion ways and prevent the liquid outside the case from flowing onto the circuit board inside the case to result in the circuit failure.

[0012] These and other objectives of the present invention will no doubt become obvious to those of ordinary skill in the art after reading the following detailed description of the preferred embodiment that is illustrated in the various figures and drawings.

Description

BRIEF DESCRIPTION OF THE DRAWINGS

[0013] FIG. **1** and FIG. **2** are diagrams of a biometric sensing device in different views according to an embodiment of the present invention.

[0014] FIG. **3** is an exploded diagram of the biometric sensing device according to a first embodiment of the present invention.

[0015] FIG. **4** is a sectional view of some part of the biometric sensing device according to the first embodiment of the present invention.

[0016] FIG. **5** is a diagram of an operation component according to the first embodiment of the present invention.

[0017] FIG. **6** is a diagram of an auxiliary component according to the first embodiment of the present invention.

[0018] FIG. **7** is a sectional view of the biometric sensing device in another operation mode according to the first embodiment of the present invention.

[0019] FIG. **8** is a sectional view of some part of the biometric sensing device according to a second embodiment of the present invention.

[0020] FIG. **9** is a sectional view of some part of the biometric sensing device according to a third embodiment of the present invention.

[0021] FIG. **10** is an enlarged diagram of the biometric sensing device according to the third embodiment of the present invention.

DETAILED DESCRIPTION

[0022] Please refer to FIG. **1** to FIG. **4**. FIG. **1** and FIG. **2** are diagrams of a biometric sensing device **10** in different views according to an embodiment of the present invention. FIG. **3** is an exploded diagram of the biometric sensing device **10** according to a first embodiment of the present invention. FIG. **4** is a sectional view of some part of the biometric sensing device **10** according to the first embodiment of the present invention. The biometric sensing device **10** can include a case **12**, a circuit board **14**, a cover **16**, an operation component **18** and an auxiliary component **20**. The case **12** can have an upper housing **121** and a lower housing **122**. The circuit board **14** can be disposed inside the case **12**, such as being located on the lower housing **122**. The cover **16** can be disposed above the upper housing **121**. The operation component **18** can be movably disposed on the upper housing **121**, and be partly protruded from the cover **16**. The auxiliary component **20** can be connected to the operation component **18**, and be disposed under the upper housing **121**.

[0023] The operation component **18** can be used to drain liquid accumulated between the upper housing **121**, the cover **16** and the operation component **18** out of the case **12**. The auxiliary component **20** can prevent the liquid from flowing onto the circuit board **14**, and further can drain the liquid flowing into the case **12** out of the biometric sensing device **10**. The upper housing **121** of the case **12** can include a retaining wall **22** and a piercing hole structure **24**. The piercing hole structure **24** can be surrounded by the retaining wall **22**. The cover **16** can include an opening structure **26**; the cover **16** can be disposed above the upper housing **121** by putting the opening structure **26** around the retaining wall **22** and the piercing hole structure **24**. The operation component **18** can be partly inserted into a gap between the case **12** and the cover **16**, and a part of the operation component **18** can cover the retaining wall **22** and the piercing hole structure **24** to protrude from the opening structure **26**. An accommodating chamber **28** can be formed between the case **12**, the cover **16** and the operation component **18**. The auxiliary component **20** can be disposed under the retaining wall **22** and the piercing hole structure **24**.

[0024] Please refer to FIG. **4** to FIG. **6**. FIG. **5** is a diagram of the operation component **18** according to the first embodiment of the present invention. FIG. **6** is a diagram of the auxiliary component **20** according to the first embodiment of the present invention. The operation

component **18** can include a pressing portion **30**, an actuating portion **32**, a supporting portion **34**, an abutting portion **36** and a positioning portion **38**. The pressing portion **30** can be protruded through the opening structure **26** of the cover **16**, and a symbol can be printed on the pressing portion **30** to be touched and identified by a user. The actuating portion **32** can be connected to a bottom of the pressing portion **30**, and can be inserted into the piercing hole structure **24** of the case **12**, and may contact against an electronic switch **40** of the circuit board **14** via the auxiliary component **20** in a detachable manner or in a connective manner. The supporting portion **34** can be connected to a lateral side of the pressing portion **30**, and can be extended into the gap between the cover **16** and the case **12** for supporting the pressing portion **30**. The abutting portion **36** can be connected to the pressing portion **30** and located between the actuating portion **32** and the supporting portion **34**, and can further abut against the retaining wall **22** of the case **12** in a slidable manner.

[0025] The upper housing **121** of the case **12** can further include a plate body **42**. An outer surface of the plate body **42** opposite to the upper housing **121** can be formed as a concave structure, as the embodiment shown in FIG. **3**; the gap between the plate body **42** and the cover **16** can accommodate the supporting portion **34** of the operation component **18**. In addition, the piercing hole structure **24** can be formed on a central area of the plate body **42**, and the retaining wall **22** can be disposed on the plate body **42** to surround the piercing hole structure **24**. A structural height of the retaining wall **22** can be preferably greater/higher than the opening structure **26** of the cover **16**, which means a distance D**1** between a top end of the retaining wall **22** and the plate body **42** can be greater than a distance D**2** between the cover **16** and the plate body **42**.

[0026] The actuating portion **32** can be disposed on a connecting portion **44** of the auxiliary component **20**, so as to ensure that the auxiliary component **20** can be synchronously moved in the same direction in accordance with pressing motion of the operation component **18**. The supporting portion **34** preferably can be made of resilient and deformable material, and include a first end **46** and a second end **48** opposite to each other. The first end **46** can abut against the plate body **42**; the second end **48** can be connected to the pressing portion **30**, and may abut against or be separated from the cover **16** in accordance with motion of the pressing portion **30**. The positioning portion **38** of the operation component **18** can be disposed on the first end **46** of the supporting portion **34**, and be used to fix onto the upper housing **121** of the case **12** for constraining rotation of the pressing portion **30**. For example, the positioning portion **38** can be fixed onto the upper housing **121** in an adhering manner, in an engaging manner or in a locking manner, and variation of the positioning portion **38** can depend on a design demand.

[0027] The abutting portion **36** can include a first surface **50** and a second surface **52** opposite to each other. The first surface **50** can slidably abut against the retaining wall **22**; generally, the first surface **50** can be a flat surface close to the retaining wall **22**. The second surface **52** can be an inclined surface relative to the first surface **50**, which means a second planar normal vector of the second surface **52** can be interleaved with a first planar normal vector of the first surface **50**, and an included angle between the first planar normal vector and the second planar normal vector may be approximately forty-five degree, with an allowable error of plus or minus fifteen percent. Besides, a first gap G**1** can be formed between the first surface **50** of the abutting portion **36** and the retaining wall **22**, and a second gap G**2** can be formed between the operation component **18** (such as a junction of the pressing portion **30** and the supporting portion **34**) and the cover **16**; a structural width of the second gap G**2** can be greater than a structural width of the first gap G**1**.

[0028] The auxiliary component **20** can include a connecting portion **44**, a main body **54**, a blocking portion **56** and a guiding portion **58**. The main body **54** can be divided into a central region **60** and an outer region **62** adjacent to each other. The connecting portion **44** can be disposed on the central region **60**, and the actuating portion **32** of the operation component **18** can be disposed on the connecting portion **44** to connect with the central region **60** in the detachable manner or in the connective manner. The blocking portion **56** can be disposed on the outer region

62 to surround the connecting portion **44**, and further surround the actuating portion **32** disposed on the connecting portion **44**. The blocking portion **56** can be a protruding structure formed on the main body **54**; a top end of the blocking portion **56** can preferably abut against a lower surface of the upper housing **121** of the case **12**, or be indicated as abutting against a lower surface of the plate body **42**. The upper housing **121** of the case **12** can include an engaging portion **64** disposed on the lower surface of the upper housing **121**; the engaging portion **64** can be engaged with the top end of the blocking portion **56**, or abut against the main body **54** of the auxiliary component **20** and be located adjacent to the blocking portion **56**. The guiding portion **58** can be disposed on the outer region **62** and surround the blocking portion **56**; the guiding portion **58** can be extended to a position above a drain hole **66** formed on the case **12**.

[0029] Please refer to FIG. **4** to FIG. **7**. FIG. **7** is a sectional view of the biometric sensing device **10** in another operation mode according to the first embodiment of the present invention. As shown in FIG. **4**, the operation component **18** is not pressed and located on an initial position; the first gap G**1** may be formed between the operation component **18** and the case **12** due to an assembly demand, and the second gap G**2** may be formed between the operation component **18** and the cover **16** due to the assembly demand. The liquid outside the biometric sensing device **10** may flow into the second gap G**2** and be accumulated inside the accommodating chamber **28**. As shown in FIG. **7**, when the operation component **18** is pressed and moved downwardly, the actuating portion **32** can be accordingly moved to actuate the electronic switch **40** of the circuit board **14** via the auxiliary component **20**; in the meantime, the supporting portion **34** can be forced and resiliently deformed, and the first surface **50** of the abutting portion **36** can slidably abut against the retaining wall **22** to prevent the liquid from flowing into the piercing hole structure **24** through the first gap G**1**, and the second surface **50** of the abutting portion **36** can push the liquid accumulated inside the accommodating chamber **28** towards the second gap G**2** for draining out of the accommodating chamber **28**. When an external force applied to the operation component **18** is removed, a resilient recovering force of the supporting portion **34** can move the operation component **18** back to the initial position.

[0030] Moreover, the biometric sensing device **10** can further utilize the auxiliary component **20** to block and divert the liquid flowing into the piercing hole structure **24**. As mentioned above, the biometric sensing device **10** can utilize specific design of the operation component **18** to drain the liquid out of the accommodating chamber **28**, but the liquid may still flow into the piercing hole structure **24**; for preventing the liquid inside the piercing hole structure **24** from flowing towards the circuit board **14** to result in the circuit failure, the biometric sensing device **10** can dispose the auxiliary component **20** under the piercing hole structure **24** of the case **12**. The blocking portion **56** of the auxiliary component **20** can be a closed ring structure, as shown in FIG. **6**; or the blocking portion **56** can be a non-closed C-shaped structure, which is a modified form of the closed ring structure being partly cut. The blocking portion **56** of the auxiliary component **20** and/or the engaging portion **64** of the case **12** can avoid the liquid inside the piercing hole structure **24** from flowing towards the circuit board **14**. If the liquid still flows across the blocking portion **56**, the auxiliary component **20** can further utilize the guiding portion **58** to guide the liquid to flow towards the drain hole **66** of the case **12**, so as to drain the liquid out of the case **12** without the circuit failure.

[0031] Please refer to FIG. **1**, FIG. **2** and FIG. **8**. FIG. **8** is a sectional view of some part of the biometric sensing device **10**A according to a second embodiment of the present invention. The biometric sensing device **10**A can include the case **12**, the circuit board **14**, the cover **16**, and the operation component **18**A. The case **12** can have the upper housing **121** and the lower housing **122** assembled with each other. The circuit board **14** can be disposed inside the case **12**, such as being located on the lower housing **122**. The cover **16** can be disposed above the upper housing **121**. The operation component **18**A can be movably disposed on the upper housing **121**, and be partly protruded from the cover **16**. The upper housing **121** of the case **12** can include the retaining wall

22 and the piercing hole structure **24**. The piercing hole structure **24** can be surrounded by the retaining wall **22**. The cover **16** can include the opening structure **26**; the cover **16** can be disposed above the upper housing **121** by putting the opening structure **26** around the retaining wall **22** and the piercing hole structure **24**. The operation component **18**A can be partly inserted into the gap between the case **12** and the cover **16**, and some part of the operation component **18**A can cover the retaining wall **22** and the piercing hole structure **24** to protrude from the opening structure **26**. The accommodating chamber **28** can be formed between the case **12**, the cover **16** and the operation component **18**A.

[0032] The operation component **18**A can include the pressing portion **30**, the actuating portion **32**, the supporting portion **34**, the abutting portion **36** and the positioning portion **38**. The pressing portion **30** can be protruded through the opening structure **26** of the cover **16**, and the symbol can be printed on the pressing portion **30** to be touched and identified by the user. The actuating portion **32** can be connected to the bottom of the pressing portion **30**, and can be inserted into the piercing hole structure **24** of the case **12**, and may actuate the electronic switch **40** of the circuit board **14** in the detachable manner or in the connective manner. The supporting portion **34** can be connected to the lateral side of the pressing portion **30**, and can be extended into the gap between the cover **16** and the case **12** for supporting the pressing portion **30**. The abutting portion **36** can be connected to the pressing portion **30** and located between the actuating portion **32** and the supporting portion **34**, and can further abut against the retaining wall **22** of the case **12** in the slidable manner. The upper housing **121** of the case **12** can further include the plate body **42**; the gap between the plate body **42** and the cover **16** can accommodate the supporting portion **34** of the operation component **18**A. In addition, the piercing hole structure **24** can be formed on the central area of the plate body **42**, and the retaining wall **22** can be disposed on the plate body **42** to surround the piercing hole structure **24**. The structural height of the retaining wall **22** can be preferably greater or higher than the opening structure **26** of the cover **16**.

[0033] The actuating portion **32** can be extended into the upper housing **121** for directly contacting the electronic switch **40**; the actuating portion **32** can be synchronously moved in the same direction in accordance with the pressing motion of the operation component **18**A for switching on or off the electronic switch **40**. The supporting portion **34** preferably can be made of resilient and deformable material, and may abut against or be separated from the cover **16** in accordance with the motion of the pressing portion **30**. The positioning portion **38** of the operation component **18**A can be disposed on the free end of the supporting portion **34**, and be used to fix onto the upper housing **121** of the case **12** for constraining the rotation of the pressing portion **30**. The abutting portion **36** can include the first surface **50** and the second surface **52** opposite to each other. The first surface **50** can be the flat surface close to the retaining wall **22** for slidably abutting against the retaining wall **22**, and the second surface **52** can be the inclined surface relative to the first surface **50**. Besides, the first gap G**1** can be formed between the first surface **50** of the abutting portion **36** and the retaining wall **22**, and the second gap G**2** can be formed between the operation component **18**A (such as the junction of the pressing portion **30** and the supporting portion **34**) and the cover **16**; the structural width of the second gap G**2** can be greater than the structural width of the first gap G**1**.

[0034] Due to the second gap G**2** between the operation component **18**A and the cover **16**, the liquid outside the biometric sensing device **10**A may flow into the second gap G**2** and be accumulated inside the accommodating chamber **28**. In the meantime, the user can press the operation component **18**A for downward motion, and the actuating portion **32** can be moved downwardly and accordingly to actuate the electronic switch **40** of the circuit board **14**; the first surface **50** of the abutting portion **36** can slidably abut against the retaining wall **22** to prevent the liquid from flowing into the piercing hole structure **24** through the first gap G**1**, and the second surface **50** of the abutting portion **36** can push the liquid accumulated inside the accommodating chamber **28** towards the second gap G**2** for draining out of the accommodating chamber **28**. In

other possible embodiments, a waterproof gasket or any similar element (which is not shown in the figures) can be optionally disposed between the retaining wall **22** and the abutting portion **36**, and can be used to avoid the liquid accumulated inside the accommodating chamber **28** from flowing into the piercing hole structure **24** through the first gap G**1**.

[0035] Please refer to FIG. **1**, FIG. **2**, FIG. **9** and FIG. **10**. FIG. **9** is a sectional view of some part of the biometric sensing device **10**B according to a third embodiment of the present invention. FIG. **10** is an enlarged diagram of the biometric sensing device **10**B according to the third embodiment of the present invention. The biometric sensing device **10**B can include the case **12**B, the circuit board **14**, the cover **16**, the operation component **18**B and the auxiliary component **20**. The case **12**B can have the upper housing **121** and the lower housing **122** assembled with each other. The circuit board **14** can be disposed inside the case **12**B, such as being located on the lower housing **122**. The cover **16** can be disposed above the upper housing **121**. The operation component **18**B can be movably disposed on the upper housing **121**, and be partly protruded from the cover **16**. The auxiliary component **20** can be connected to the operation component **18**B, and be disposed inside the upper housing **121**. The upper housing **121** of the case **12**B can include the retaining wall **22**B and the piercing hole structure **24**. The piercing hole structure **24** can be surrounded by the retaining wall **22**B. The cover **16** can include the opening structure **26**; the cover **16** can be disposed one the upper housing **121** by corresponding the opening structure **26** to the piercing hole structure **24**. The operation component **18**B can be partly inserted into the piercing hole structure **24** of the case **12**B and/or the opening structure **26** of the cover **16** to connect with the auxiliary component **20**; for example, the operation component **18**B can be monolithically integrated with the auxiliary component **20**, which depends on the design demand. A part of the operation component **18**B can protrude from the piercing hole structure **24** of the case **12**B and/or the opening structure **26** of the cover **16** for being pressed by the user. The auxiliary component **20** can be disposed under the retaining wall **22**B and the piercing hole structure **24**, and may be monolithically integrated with the operation component **18**B, or may further be detachably connected with the operation component **18**B.

[0036] The pressing portion **30** (such as a top surface) of the operation component **18**B can protrude from the piercing hole structure **24** of the case **12**B and/or the opening structure **26** of the cover **16**, and the symbol can be printed on the pressing portion **30** to be touched and identified by the user. The actuating portion **32** (such as a middle section) of the operation component **18**B can be extended from the pressing portion **30** downwardly, and may contact against the electronic switch **40** of the circuit board **14** via the auxiliary component **20** in the detachable manner or in the connective manner. The supporting portion (which is not marked in FIG. **9**) of the operation component **18**B can be connected to the lateral side of the pressing portion **30** or the lateral side of the auxiliary component **20** (such as an element drawn as a dotted line in FIG. **9**), and can be disposed on the cover **16** and/or the case **12**B for supporting the pressing portion **30**. In addition, the piercing hole structure **24** can be formed on the central area of the upper housing **121**, and the retaining wall **22**B can be disposed on a position of the upper housing **121** surrounding the piercing hole structure **24**. The actuating portion **32** can be disposed on the central position area **45** of the auxiliary component **20**, so as to ensure that the auxiliary component **20** can be synchronously moved in the same direction in accordance with the pressing motion of the operation component **18**B. The supporting portion (which is not marked in FIG. **9**) of the operation component **18**B preferably can be made of resilient and deformable material, and may abut against or be separated from the cover **16** and/or the casing **12**B in accordance with motion of the pressing portion **30**. The positioning portion (which is not marked in FIG. **9**) of the operation component **18**B can be disposed on the free end of the supporting portion (which is not marked in FIG. **9**), and be used to fix onto the case **12**B and/or the cover **16** for constraining the rotation of the pressing portion **30**.

[0037] The auxiliary component **20** can include the central position area **45**, the main body **54**, the blocking portion **56** and the guiding portion **58**. The main body **54** can be divided into the central

region **60** and the outer region **62** adjacent to each other. The central position area **45** can correspond to the central region **60**, and the actuating portion **32** of the operation component **18**B can be connected with the central region **60**. As mentioned above, the operation component **18**B and the auxiliary component **20** may be monolithically integrated with each other in a preferable manner. The blocking portion **56** can be disposed on the outer region **62** to surround the central region **60**, and further surround the actuating portion **32** disposed on the central region **60**. The blocking portion **56** can be the protruding structure formed on the main body **54**; the top end of the blocking portion **56** can preferably abut against the lower surface of the upper housing **121** of the case **12**B. The upper housing **121** of the case **12**B or the cover **16** can include the engaging portion **64** disposed on the lower surface of the upper housing **121** or the cover **16**; the engaging portion **64** can be engaged with the top end of the blocking portion **56**, or abut against the main body **54** of the auxiliary component **20** and be located adjacent to the blocking portion **56**. The guiding portion **58** can be disposed on the outer region **62** and surround the blocking portion **56**; the guiding portion **58** can be extended to the position above the drain hole **66** formed on the case **12**.

[0038] As shown in FIG. **10**, it should be mentioned that the retaining wall **22**B can include an inner surface **68** adjacent to the operation component **18**B, and a first included angle θ**1** between a tangent line L**1** of the inner surface **68** and a planar normal vector V of the cover **16** can be smaller than five degrees; besides, the retaining wall **22**B can further include an outer surface **70** opposite to the operation component **18**B, and a second included angle θ**2** between a tangent line L**2** of the outer surface **70** and the planar normal vector V can be greater than the first included angle θ**1**. Therefore, the retaining wall **22**B can block the liquid flowing through the gap between the operation component **18**B and the case **12**B, to reduce the amount of the liquid flowing towards the auxiliary component **20**, and the blocking portion **56** and the guiding portion **58** of the auxiliary component **20** can rapidly and effectively drain the liquid out of the drain hole **66** of the case **12**B.

[0039] In conclusion, the biometric sensing device of the present invention can be applied to a blood glucose meter or any similar product, and can optionally utilize the operation component or the auxiliary component with the specific design, or simultaneously utilize the operation component and the auxiliary component with the specific design, to prevent the liquid outside the case from flowing into the gap between the cover and the operation component; if the liquid flows into the gap between the cover and the operation component, the liquid can be accumulated inside the accommodating chamber formed between the case, the cover and the operation component, and the second surface of the abutting portion can be used to drain the accumulated liquid out of the accommodating chamber when pressing the operation component; if the accumulated liquid flows from the accommodating chamber into the piercing hole structure, the blocking portion of the auxiliary component can avoid the liquid from flowing towards the circuit board, and the guiding portion of the auxiliary component can guide the liquid flowing across the blocking portion to flow towards the drain hole for being drained out of the case. Comparing to the prior art, the biometric sensing device of the present invention can provide liquid blocking and diversion ways and prevent the liquid outside the case from flowing onto the circuit board inside the case to result in the circuit failure.

[0040] Those skilled in the art will readily observe that numerous modifications and alterations of the device and method may be made while retaining the teachings of the invention. Accordingly, the above disclosure should be construed as limited only by the metes and bounds of the appended claims.

Claims

1. A biometric sensing device of preventing circuit failure, comprising: a case comprising a retaining wall and a piercing hole structure, the piercing hole structure being surrounded by the retaining wall; a circuit board disposed inside the case and comprising an electronic switch; a cover

disposed above the case and comprising an opening structure; and an operation component movably disposed on the case, an accommodating chamber being formed between the case, the cover and the operation component, the operation component comprising: a pressing portion protruded through the opening structure; an actuating portion connected to a bottom of the pressing portion, and adapted to inset into the piercing hole structure for detachably contacting the electronic switch; a supporting portion connected to a lateral side of the pressing portion, and located between the cover and the case to support the pressing portion; and an abutting portion connected to the pressing portion and located between the actuating portion and the supporting portion, the abutting portion slidably abutting against the retaining wall to prevent liquid in the accommodating chamber from flowing into the piercing hole structure through a first gap formed between the abutting portion and the retaining wall.

2. The biometric sensing device of claim 1, wherein a second gap is formed between the operation component and the cover, and a structural width of the second gap is greater than a structural width of the first gap.

3. The biometric sensing device of claim 2, wherein the abutting portion comprising a first surface and a second surface opposite to each other, the first surface slidably abuts against the retaining wall, the second surface is adapted to push the liquid to drain out of the accommodating chamber through the second gap in accordance with a movement of the pressing portion.

4. The biometric sensing device of claim 1, wherein the case further comprises a plate body where on the retaining wall is disposed, and a distance between a top end of the retaining wall and the plate body is greater than a distance between the cover and the plate body.

5. The biometric sensing device of claim 4, wherein the supporting portion is made of resilient and deformable material, and comprises a first end and a second end opposite to each other, the first end abuts against the plate body, the second case contacts or is separated from the cover in accordance with a movement of the pressing portion.

6. The biometric sensing device of claim 5, wherein the operation component further comprises a positioning portion disposed on the first end and fixed to the case for constraining rotation of the pressing portion.

7. The biometric sensing device of claim 1, wherein the biometric sensing device further comprises an auxiliary component connected to the operation component and disposed under the case, for clogging and diverting the liquid.

8. The biometric sensing device of claim 7, wherein the auxiliary component comprises a main body divided into a central region and an outer region adjacent to each other, the actuating portion is connected to the central region.

9. The biometric sensing device of claim 8, wherein the auxiliary component further comprises a blocking portion disposed on the outer region and around the actuating portion.

10. The biometric sensing device of claim 9, wherein a top end of the blocking portion abuts against a lower surface of the case.

11. The biometric sensing device of claim 9, wherein the blocking portion is a closed ring structure or a non-closed C-shaped structure.

12. The biometric sensing device of claim 9, wherein the case further comprises an engaging portion disposed on a lower surface of the case and adapted to engage with a top end of the blocking portion.

13. The biometric sensing device of claim 8, wherein the auxiliary component further comprises a guiding portion disposed on the outer region and around the blocking portion.

14. The biometric sensing device of claim 13, wherein the guiding portion is extended toward a position located above a drain hole formed on the case.

15. A biometric sensing device of preventing circuit failure, comprising: a case comprising a retaining wall and a piercing hole structure, the piercing hole structure being surrounded by the retaining wall; a circuit board disposed inside the case and comprising an electronic switch; a cover

disposed above the case and comprising an opening structure; an operation component movably disposed on the case and protruded through the opening structure, the operation component partly passing into the piercing hole structure for detachably contacting the electronic switch; and an auxiliary component connected to the operation component and disposed under the case, the auxiliary component comprising: a main body divided into a central region and an outer region adjacent to each other, the operation component passing through the central region; and a blocking portion disposed on the outer region and around the operation component, and adapted to clog liquid flowing into the piercing hole structure.

16. The biometric sensing device of claim 15, wherein the auxiliary component further comprises a guiding portion disposed on the outer region and around the blocking portion, and adapted to divert the liquid passing through the blocking portion.

17. The biometric sensing device of claim 15, wherein a top end of the blocking portion abuts against a lower surface of the case.

18. The biometric sensing device of claim 15, wherein the blocking portion is a closed ring structure or a non-closed C-shaped structure.

19. The biometric sensing device of claim 15, wherein the case further comprises an engaging portion disposed on a lower surface of the case and adapted to engage with a top end of the blocking portion.

20. The biometric sensing device of claim 16, wherein the guiding portion is extended toward a position located above a drain hole formed on the case.

21. The biometric sensing device of claim 15, wherein the case further comprises a plate body, and the retaining wall is protruded from the plate body.

22. The biometric sensing device of claim 21, wherein the retaining wall comprises an inner surface adjacent to the operation component, and a first included angle between a tangent line of the inner surface and a planar normal vector of the plate body is smaller than five degrees.

23. The biometric sensing device of claim 22, wherein the retaining wall further comprises an outer surface opposite to the operation component, and a second included angle between a tangent line of the outer surface and the planar normal vector is greater than the first included angle.