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Backlight module including dampening assembly, sensor, and controller and display device including the same

Abstract

A backlight module and a display device. The backlight module includes: a back plate, a light guide plate, a damping assembly and a controller. Two ends of the damping assembly are abutted between an inner side wall of the back plate and an outer side wall of the light guide plate; one end of the damping assembly is provided with a pressure sensor, and the controller is respectively electrically connected with the pressure sensor and the damping assembly, and is configured to control a magnitude of a damping force of the damping assembly according to pressure data detected by the pressure sensor. The technical solutions provided in the present application may improve a reliability of position limitation of the light guide plate.

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Background/Summary

CROSS-REFERENCE TO RELATED APPLICATION

(1) This application claims priority to Chinese patent application No. 202311092555.9, filed on Aug. 29, 2023, and entitled “backlight module and display device”, the entire contents each of which is incorporated herein by reference.

TECHNICAL FIELD

(2) The present application relates to the field of display technologies, and more particularly, to a backlight module and a display device.

BACKGROUND

(3) A backlight module is an important component of a liquid crystal display (Liquid Crystal Display, LCD) device, and the function of the backlight module is to provide uniformly distributed backlight for the display panel, to enable the display panel to be normally displayed. A light bar of the backlight module is usually arranged on an inner side wall of the back plate, and a light guide plate is provided to guide a light scattering direction so as to convert line source into uniform area light source.

(4) In the related art, aiming at fixation of the light guide plate, a rubber block is usually arranged between the light guide plate and the back plate to limit the position of the light guide plate, thereby ensuring that the light guide plate can normally guide light.
(5) However, since the light guide plate is prone to be expanded in high-temperature and high-humidity environment, when the light guide plate is expanded, the rubber block arranged between the back plate and the light guide plate may be extruded by the light guide plate, and the rubber block is enabled to generate a certain amount of compression. Then, arc-shaped bulges are formed on two ends of the rubber block, and the rubber block is caused to deviate upwards and is even fallen off, and thus a reliability of position limitation of the light guide plate is affected.

SUMMARY

(6) In view of above, the present application provides a backlight module and a display device, which are directed at improving the reliability of position limitation of the light guide plate.
(7) In order to achieve the aforesaid objective, in the first aspect, a backlight module is provided in the embodiments of the present application. The backlight module includes: a back plate, a light guide plate, one or a plurality of damping assembly/assemblies and a controller, two ends of the damping assembly are abutted between an inner side wall of the back plate and an outer side wall of the light guide plate;
(8) one end of the damping assembly is provided with a pressure sensor, and the controller is respectively electrically connected with the pressure sensor and the damping assembly, and is configured to control a magnitude of a damping force of the damping assembly according to pressure data detected by the pressure sensor.
(9) In one possible implementation method in the first aspect, the pressure sensor is arranged between the damping assembly and the light guide plate.
(10) In one possible implementation method in the first aspect, the damping assembly includes a piston rod, a cylinder block, and one or a plurality of elastic member(s) and a piston located in the cylinder block;
(11) one end of the piston rod is connected with a first end face of the piston, and the other end of the piston rod extends out of one end of the cylinder block and is connected with the pressure sensor;
(12) the elastic member is connected between the cylinder block and the first end face of the piston;
(13) the controller is electrically connected with the piston, and is configured to control a magnitude of a motion resistance of the piston so as to control the magnitude of the damping force of the damping assembly.
(14) In one possible implementation method in the first aspect, the piston rod is connected to the pressure sensor through a push head, and a cross-sectional area of the push head is greater than a cross-sectional area of the piston rod.
(15) In one possible implementation method in the first aspect, a plurality of through holes are formed in the piston, the plurality of through holes penetrate through the piston and a direction of each of the plurality of through holes is the same as a movement direction of the piston rod;
(16) the controller is specifically configured to control opening and closing of each of the plurality of through holes according to the pressure data.
(17) In one possible implementation method in the first aspect, a damping fluid is enclosed in the cylinder block.
(18) In one possible implementation method in the first aspect, the plurality of elastic members are arranged around the piston rod.
(19) In one possible implementation method in the first aspect, the plurality of damping assemblies are arranged around the light guide plate.
(20) In one possible implementation method in the first aspect, the damping assembly is provided on the light guide plate, and the damping assembly is arranged at least between two ends of two outer side walls of the light guide plate adjacent to a light incident side and the back plate.

(21) In the second aspect, a display device is provided in the embodiments of the present application, the display device includes a display panel and any backlight module in the first aspect.
(22) According to the backlight module and the display device provided in the embodiments of the present application, the damping assembly abuts against the outer side wall of the light guide plate and the inner side wall of the back plate, and the pressure sensor is arranged at one end of the damping assembly, in order to detect the pressure of the light guide plate on the damping assembly. Due to this arrangement, the controller is enabled to control the magnitude of the damping force of the damping assembly according to the pressure data detected by the pressure sensor, and the reliability of position limitation of the light guide plate is improved accordingly.

Description

DESCRIPTION OF THE DRAWINGS
(1) FIG. **1** is a schematic structural diagram of a backlight module according to one embodiment of the present application;
(2) FIG. **2** is a schematic structural diagram of a damping assembly according to one embodiment of the present application;
(3) FIG. **3** is a top view of a piston structure according to one embodiment of the present application; and
(4) FIG. **4** is a schematic block diagram of the backlight module according to one embodiment of the present application.
DETAILED DESCRIPTION OF EMBODIMENTS
(5) The embodiments of the present application are described below with reference to the accompanying drawings. The terms used in the embodiments of the present application are only intended to illustrate the embodiments of the present application, rather than limiting the present application. The following embodiments may be combined with each other, and similar concepts or processes may not be repeatedly described in some embodiments.
(6) FIG. **1** is a schematic structural diagram of a backlight module according to one embodiment of the present application. As shown in FIG. **1**, the backlight module includes a back plate **10** and a light guide plate **20**, where a light bar **30** is arranged on an inner side wall of the back plate **10**, and a light-exiting surface of the light bar **30** is opposite to a side wall of the light guide plate **20**. In this way, light emitted by the light bar **30** is converted from line source to an area light source that can provide uniform backlight for the display panel, after it is conducted and diffused by the light guide plate **20**.
(7) In order to improve the reliability of position limitation of the light guide plate **20**, the backlight module provided in the present application may further include one or more damping assemblies **40**, and each damping assembly **40** may be disposed between an outer side wall of the light guide plate **20** and an inner side wall of the back plate **10**, in order to limit the position of the light guide plate **20**.
(8) In the present application, the present application is illustratively described by taken a plurality of damping assemblies **40** as an example, each damping assembly **40** is arranged on the light guide plate, and the damping assembly **40** is arranged at least between two ends of two outer side walls of the light guide plate **20** adjacent to a light incident side and the back plate. Illustratively, in some embodiments, the plurality of damping assemblies **40** may also be arranged around the light guide plate **20**. In some other embodiments, the backlight module may be provided with a damping assembly **40** between two ends of the outer side wall (i.e., a non-light incident side of the light guide plate **20**) of the light guide plate **20** excluding the light incident side, and the inner side wall of the back plate **10**. Thus, both space occupation of the damping assembly **40** on the light bar **30**

and light shielding of the damping assembly **40** can be reduced, the light incident amount of the light guide plate **20** is increased accordingly, and the dark area is reduced.

(9) Considering that when the damping assembly **40** is arranged on the opposite side (which may also be referred to as an antenna side) of the light incident side of the light guide plate **20**, a problem of lamp collision may occur. As shown in FIG. **1**, the damping assembly **40** may also be arranged on the other two outer side walls of the light guide plate **20** excluding the light incident side and the antenna side of the light guide plate **20**, so as to reduce the probability of occurrence of lamp collision and prolong the service life of the backlight module. The number and the position of the damping assembly/assemblies **40** may be selected according to the actual requirement such as the size of the light guide plate **20**, which is not particularly limited in the present application.

(10) Two ends of the damping assembly **40** may be abutted between the inner side wall of the back plate **10** and the outer side wall of the light guide plate **20**. Due to this arrangement, when the light guide plate **20** is expanded or shrinks, the damping assembly **40** may provide a corresponding damping force to the light guide plate **20** according to a degree of expansion of the light guide plate **20**.

(11) In some embodiments, one end of the damping assembly **40** may be fixed to the inner side wall of the back plate **10** by gluing, bolting, etc., thereby improving the reliability of position limitation of the light guide plate **20** through the damping assembly **40**. In some other embodiments, the two ends of the damping assembly **40** may also be fixed on the inner side walls of the light guide plate **20** and the back plate **10**.

(12) In order to improve the accuracy of the damping force provided by the damping assembly **40**, as shown in FIG. **4**, the backlight module may further include a pressure sensor and a controller **60**.

(13) FIG. **2** is a schematic structural diagram of a damping assembly **40** according to one embodiment of the present application. As shown in FIG. **2**, the pressure sensor **50** may be arranged at one end of the damping assembly **40** and is configured to detect a pressure exerted on the damping assembly **40**. Specifically, the pressure sensor **50** may be fixed at one end of the damping assembly **40** abutting against the light guide plate **20**. In some other embodiments, the pressure sensor **50** may also be fixed to a position of the light guide plate **20** that abuts against the damping assembly **40**.

(14) It may be understood that, in some embodiments, the pressure sensor **50** may also be fixed between the damping assembly **40** and the inner side wall of the back plate **10**. For example, the pressure sensor **50** may be fixed at one end of the damping assembly **40** abutting against the inner side wall of the back plate **10**.

(15) For the convenience of description, the present application is described by taking the pressure sensor **50** arranged at one end of the damping assembly **40** abutting against the light guide plate **20** as an example.

(16) The controller **60** may be electrically connected to the pressure sensor **50** and the damping assembly **40** respectively, and is configured to control the magnitude of the damping force of the damping assembly **40** according to the pressure data detected by the pressure sensor **50**. The controller **60** may obtain the pressure data detected by the pressure sensor **50** in real time so as to adjust the damping force of the damping assembly **40** in real time. Alternatively, the controller **60** may also periodically obtain the pressure data detected by the pressure sensor **50** so as to reduce power consumption.

(17) Referring to FIG. **2**, the damping assembly **40** may include a piston rod **41**, a cylinder block **42**, an elastic member **43** and a piston **44** located in the cylinder block **42**. Where the piston rod **41** is a connecting piece that supports the piston **44** to work, one end of the piston rod **41** is connected to a first end surface of the piston **44**, and the other end of the piston rod **41** extends from one end of the cylinder block **42** and is connected to the pressure sensor **50**. The piston rod **41** may be made of metal, or the like. In some embodiments, the piston rod **41** may also be a hard composite material, thereby improving lightweight and corrosion resistance of the damping assembly **40**.

(18) The piston **44** may divide a chamber of the cylinder block **42** into a first working chamber and a second working chamber. The elastic member **43** may be deformed under the pressure between the light guide plate **20** and the damping assembly **40** and restore to its original shape after the pressure is removed. For example, when the piston **44** moves towards the bottom of the cylinder block **42**, the elastic member **43** is stretched to generate a pulling force applied on the piston **44**. The elastic member **43** may be located in the first working chamber and is connected between the cylinder block **42** and the first end surface of the piston **44**. A plurality of elastic members **43** may be provided, and the plurality of elastic members **43** may be arranged around the piston rod **41** to improve the reliability of the damping assembly **40**. Specifically, the elastic member(s) **43** may be spring(s).

(19) The damping assembly **40** may further include a push head **45**, the piston rod **41** may be connected to the pressure sensor **50** through the push head **45**, and a cross-sectional area of the push head **45** is greater than a cross-sectional area of the piston rod **41**. The reliability of position limitation on the light guide plate **20** through the damping assembly **40** may be improved by increasing a contact area between the damping assembly **40** and the light guide plate **20**. In some embodiments, the pressure sensor **50** may be arranged on an abutting surface of the damping assembly **40** and the light guide plate **20**. In some other embodiments, the pressure sensor **50** may also be arranged to be embedded in the push head **45**, so as to improve the stability of the pressure sensor **50**. Moreover, the pressure sensor **50** is embedded in the push head **45**, such that the pressure applied on the push head **45** may be better detected, and the accuracy of the pressure data is improved accordingly. The push head **45** may be connected to the piston rod **41** by gluing, welding, etc. In some embodiments, the push head **45** and the piston rod **41** may be integrally formed, due to this arrangement, reduction of assembly cost and structural complexity of the damping assembly **40** is facilitated.

(20) The controller **60** may be electrically connected with the piston **44** in the cylinder block **42**, and is configured to control a magnitude of a motion resistance of the piston **44**, thereby controlling a magnitude of a damping force of the damping assembly **40**. The controller **60** may be arranged outside or inside the damping assembly **40**. For example, the controller **60** may be arranged on an inner side wall of the backplate **10** and is electrically connected to the pressure sensor **50** and the piston **44** through a connecting wire (not shown) passing through the piston rod **41**. The controller **60** may be configured as one single controller **60** for controlling magnitudes of damping forces of the plurality of damping assemblies **40**. As an alternative, the controller **60** may be configured as multiple controllers **60** for controlling the magnitudes of the damping forces of the plurality of damping assemblies **40**, respectively. The configured location and the number of the controller **60** are not particularly limited in the present application. The motion resistance of the piston **44** refers to various forces that hinder the movement of the piston **44** in the damping assembly **40**, such as the friction force between the piston **44** and the inner side wall of the cylinder block **42**, the pulling force on the piston **44** when the elastic member **43** is stretched, etc. The numerical value of the motion resistance of the piston **44** may be obtained by using a method such as resistance sensor detection, empirical formula calculation, and the like, which is not particularly limited in the present application.

(21) In a possible implementation method, the controller **60** compares the pressure detected by the pressure sensor **50** with a pressure threshold value, and determines that the light guide plate **20** is expanded when the pressure data is greater than the pressure threshold value. When the light guide plate **20** is expanded, the controller **60** may adjust a fitting degree between the side surface of the piston **44** and the inner wall of the cylinder block **42** according to the pressure of the light guide plate **20** applied on the damping assembly **40**. Thus, the magnitude of the motion resistance of the piston **44** in the cylinder block **42** may be controlled.

(22) In some embodiments, how the controller **60** controls the motion resistance of the piston **44** may be implemented according to the method described below:

(23) The piston may include an elastic insulating layer, a first electrode layer, a second electrode layer, and an electroactive polymer disposed between the first electrode layer and the second electrode layer. The electroactive polymer (Electroactive Polymer, EAP) is a new type of flexible functional material that can expand or shrink by changing the internal structure thereof under the change of external electric field. The elastic insulating layer may be configured to enclose the first electrode layer, the second electrode layer, and the electroactive polymer. An outer surface of the elastic insulating layer is provided with a wear-resistant layer.
(24) For example, the light guide plate **20** is heated to expand and then is cooled to shrink and return to its original shape, when the light guide plate **20** is expanded, pressure will be applied on the push head **45** so as to drive the piston rod **41** to push the piston **44** to move towards the bottom of the cylinder block **42**, thereby compressing air in the second working chamber. In this condition, the elastic member **43** is in a stretched state. When the controller **60** detects that the pressure data is less than the motion resistance of the piston **44**, the electric field between the first electrode layer and the second electrode layer is changed, such that the electroactive polymer shrinks, the gap between the piston **44** and the inner wall of the cylinder block **42** is increased, and the air in the second working chamber may flow into the first working chamber through the gap, thereby reducing the motion resistance of the piston **44**.
(25) When the controller **60** detects that the pressure data detected by the pressure sensor **50** is lower than the pressure threshold value, the controller **60** determines that the light guide plate **20** shrinks. In this condition, the piston **44** moves towards the top of the cylinder block **42** under the action of the pulling force of the elastic member **43**. When the pulling force is less than the motion resistance, the controller **60** causes the electroactive polymer to shrink by changing the electric field according to a comparison result between the pulling force of the elastic member **43** and the motion resistance of the piston **44**, such that the gap between the piston **44** and the inner wall of the cylinder block **42** is increased, and the motion resistance of the piston **44** is reduced. Thus, the elastic member **43** can pull the piston **44** back, and the push head **45** moves accordingly, such that the damping assembly **40** can continuously provide position limitation function for the light guide plate **20**.
(26) The controller **60** controls the electroactive polymer to expand or shrink, so as to control the degree of change of the gap between the piston **44** and the inner wall of the cylinder block **42** according to the actual requirement, which is not particularly limited in the present application.
(27) FIG. **3** is a top view of a piston structure according to one embodiment of the present application. As shown in FIG. **3**, in some other embodiments, the controller **60** may further control the motion resistance of the piston **44** by forming through hole(s) **441** penetrating through the piston **44**, and the direction of the through hole(s) **441** is the same as the movement direction of the piston rod **41**. One through hole **441** may be provided. In order to better control the magnitude of the motion resistance of the piston **44**, a plurality of through holes **441** may be provided. For the convenience of description, the present application is exemplarily described by taking a plurality of through holes **441** as an example. When the light guide plate **20** is expanded, the piston rod **41** pushes the piston **44** to move towards the bottom of the cylinder block **42**, and the air in the second working chamber is compressed. When the controller **60** detects that the pressure data is less than the resistance to the piston **44**, the controller **60** may control opening and closing of each through hole **441** according to the pressure data, which facilitates the air in the second working chamber to flows to the first working chamber, thereby reducing the motion resistance of the piston **44**, and thereby controlling the magnitude of the damping force of the damping assembly **40**.
(28) The controller **60** determines that the light guide plate **20** shrinks when detecting that the pressure data detected by the pressure sensor **50** is lower than the pressure threshold value. In this condition, the piston **44** moves towards the top of the cylinder block **42** under the action of the pulling force of the elastic member **43**. When the pulling force is less than the motion resistance, the controller **60** controls the piston **44** to open a preset number of through holes **441** according to

the comparison result between the pulling force of the elastic member **43** and the motion resistance of the piston **44**, such that air in the first working chamber can flow to the second working chamber through the through holes **441**, the motion resistance of the piston **44** is reduced, such that the elastic member **43** can reset the push head **45**, and the damping assembly **40** can continuously provide the position limitation function for the light guide plate **20**.

(29) When the pressure data is less than the motion resistance of the piston **44**, the controller **60** controls the piston **44** to open one through hole **441** according to the comparison result between the pulling force of the elastic member **43** and the motion resistance of the piston **44**. The controller **60** may also control the quantity of opened through holes and the quantity of closed through holes correspondingly according to a difference value between the pressure data detected when the light guide plate **20** expands or shrinks and the motion resistance of the piston **44**, and according to the proportion of the difference value to the motion resistance of the piston **44**.

(30) In order to improve the reliability of position limitation of the damping assembly **40**, a damping fluid (not shown in the figures) may also be provided in the cylinder block **42**. The damping fluid may be oil, thereby providing a lubrication protection effect required for the piston **44** and the inner wall of the cylinder block **42**, and prolonging the service life of the piston **44** Exemplarily, when the light guide plate **20** is expanded, the piston rod **41** pushes the piston **44** to move towards the bottom of the cylinder block **42**, and the oil in the second working chamber generates resistance to the piston **44** when the piston **44** moves. When the pressure data is less than the resistance to the piston **44**, the controller **60** may control the quantity of the opened through holes **441** according to the pressure data, to enable the oil in the second working chamber to flow from the through holes **441** of the piston **44** to the first working chamber, thereby reducing the motion resistance of the piston **44**.

(31) When the light guide plate **20** shrinks back to its original shape, the pressure of the light guide plate **20** applied on the damping assembly **40** is reduced. When the controller **60** detects that the pressure data is lower than the pressure threshold value, the controller **60** may control the piston **44** to open at least one through hole **441**, in order that the damping assembly **40** can restore the push head **45** to its initial position abutting against the light guide plate **20** under the pulling force generated by the elastic member **43**. Correspondingly, the damping fluid flows back to the second working chamber from the first working chamber through the at least one through hole **441**.

(32) In some embodiments, the controller **60** may further control the piston **44** to close the preset number of through holes **441** after a condition that the pressure data is continuously less than the pressure threshold value lasts for a preset time.

(33) It should be noted that the structure of the damping assembly **40** in the present application is not limited thereto. For example, in an actual product, a sealing member (e.g., an oil seal ring) may also be provided between an opening of the cylinder block **42** and the piston rod **41**, such that the damping liquid can be prevented from flowing out of the gap of the cylinder block **42** from the piston rod **41**, and the service life of the damping assembly **40** is prolonged accordingly.

(34) In some embodiments, a reflective film may be arranged on the abutting surface of the damping assembly **40** and the outer side wall of the light guide plate **20**, and thus a utilization rate of light is improved.

(35) The backlight module provided in the present application includes the back plate, the light guide plate, the damping assembly **40** and the controller **60**, the damping assembly **40** is abutted between the inner side wall of the back plate and the outer side wall of the light guide plate, and one end of the damping assembly **40** is provided with the pressure sensor for detecting the pressure of the light guide plate applied on the damping assembly **40**. Due to this arrangement, the controller **60** may control the damping force of the damping assembly **40** according to the pressure data detected by the pressure sensor, thereby improving the reliability of position limitation of the light guide plate.

(36) Based on the same inventive concept, the present application further provides a display device.

The display device includes a display panel and the backlight module according to any one of the aforesaid embodiments.

(37) It should be understood that, in the description of the specification and the annexed claims of the present application, terms including “including”, “contain”, “have”, and any variations thereof are intended to cover non-exclusive inclusion and imply “including but not limited to”, unless otherwise these terms are specially emphasized in other manner.

(38) In the description of the present application, “/” indicates that there is a “or” relationship between two consecutive associated objects, unless otherwise “/” is specified. For example, A/B may represent A or B. The phrase of “and/or” in the context is used for describing an association relationship of the associated objects, and indicates that three relationships may exist. For example, A and/or B may represent that A exists alone, A and B exist at the same time, and B exists alone. A and B may be singular or plural.

(39) Moreover, in the description of the present application, “plurality of” refers to two or more than two, unless otherwise “plurality of” is particularly specified. “at least one of the following items” or similar expressions refers to any combination of the terms, including any combination of singular term or plural terms.

(40) In addition, in the description of the present application, it needs to be understood that, directions or location relationships indicated by terms such as “longitudinal”, “horizontal”, “up”, “down”, “front”, “rear”, “left”, “right”, “vertical”, “horizontal”, “top”, “bottom”, “inside”, “outside”, “axial direction”, “radial direction”, “circumferential direction” and so on are the directions or location relationships shown in the accompanying figures, which are only intended to describe the present application conveniently and simplify the description of the present application, rather than indicating or implying that an indicated device or component must have specific locations or be constructed and manipulated according to specific locations. Thus, these terms shouldn't be interpreted as limitations to the present application.

(41) In the present application, unless there is additional explicit stipulation and limitation, terms such as “connect”, “connected” and the like should be generalizedly interpreted. For example, “connect” may be interpreted as mechanically connected or electrically connected; “connect” may also be interpreted as directly connected or indirectly connected through intermediary, or be interpreted as internal communication between two components or an interaction relationship between the two components, unless otherwise “connect” is specifically defined. The person of ordinary skill in the art may interpret the specific meanings of the aforesaid terms in the present application according to specific conditions.

(42) In addition, in the description of the present application and the annexed claims, terms such as “first”, “second”, and the like are used to distinguish similar objects and do not need to be used for describing a specific order or sequence order, nor can they are interpreted as indicating or implying relative importance or implying the quantity of the indicated technical features. It should be understood that the data used in this way may be interchanged in appropriate condition, such that the embodiments described herein can be implemented in an order other than those illustrated or described herein. A feature limited by “first” or “second” may explicitly or implicitly include at least one such feature.

(43) In the embodiments of the present application, words such as “illustratively” or “for example” are used to indicate examples, examples or explanations. Any embodiment or design scheme described as “exemplary” or “for example” in the present application should not be interpreted as being more preferable or advantageous than other embodiments or design schemes. Specifically, the use of words such as “exemplarily” or “for example” aims at presenting relevant concepts in a concrete manner.

(44) The descriptions of “referring to one embodiment” and “referring to some embodiments”, and the like as described in the specification of the present application means that a specific feature, structure, or characters which are described with reference to this embodiment are included in one

embodiment or some embodiments of the present application. Thus, phrases of “in one embodiment”, “in some embodiments”, “in some other embodiments”, “in other embodiments”, and the like in this specification are not necessarily referring to the same embodiment, but instead indicate “one or more embodiments instead of all embodiments”, unless otherwise these phrases are specially emphasized in other manner.

(45) Finally, it should be noted that, the various embodiments mentioned above are only intended to explain the technical solutions of the present application, rather than limiting the technical solutions of the present application. Although the present application has been described in detail with reference to these embodiments, a person of ordinary skilled in the art should understand that, the technical solutions disclosed in the embodiments may also be amended, some technical features in the technical solutions may also be equivalently replaced. The amendments or the equivalent replacements don't cause the essence of the corresponding technical solutions to be deviated from the spirit and the scope of the technical solutions in the embodiments of the present application.

Claims

1. A backlight module, comprising: a back plate, a light guide plate, one or a plurality of damping assemblies and a controller, wherein two ends of each damping assembly are abutted between an inner side wall of the back plate and an outer side wall of the light guide plate; wherein one end of the damping assembly is provided with a pressure sensor, and the controller is respectively electrically connected with the pressure sensor and the damping assembly, and is configured to control a magnitude of a damping force of the damping assembly according to pressure data detected by the pressure sensor.

2. The backlight module according to claim 1, wherein the pressure sensor is arranged between the damping assembly and the light guide plate.

3. The backlight module according to claim 1, wherein the damping assembly comprises a piston rod, a cylinder block, and one or a plurality of elastic member(s) and a piston located in the cylinder block; wherein one end of the piston rod is connected with a first end face of the piston, and an other end of the piston rod extends out of one end of the cylinder block and is connected with the pressure sensor; each elastic member is connected between the cylinder block and the first end face of the piston; and the controller is electrically connected with the piston, and is configured to control a magnitude of a motion resistance of the piston so as to control the magnitude of the damping force of the damping assembly.

4. The backlight module according to claim 3, wherein the piston rod is connected to the pressure sensor through a push head, and a cross-sectional area of the push head is greater than a cross-sectional area of the piston rod.

5. The backlight module according to claim 3, wherein a plurality of through holes are formed in the piston, wherein the plurality of through holes penetrate through the piston and a direction of each of the plurality of through holes is identical to a movement direction of the piston rod; the controller is specifically configured to control opening and closing of each of the plurality of through holes according to the pressure data.

6. The backlight module according to claim 3, wherein a damping fluid is enclosed in the cylinder block.

7. The backlight module according to claim 3, wherein the plurality of elastic members are arranged around the piston rod.

8. The backlight module according to claim 1, wherein the plurality of damping assemblies are arranged around the light guide plate.

9. The backlight module according to claim 1, wherein the damping assembly is provided on the light guide plate, the damping assembly is arranged at least between two ends of two outer side walls of the light guide plate adjacent to a light incident side and the back plate.

10. A display device, comprising a display panel and a backlight module, and the backlight module comprising: a back plate, a light guide plate, one or a plurality of damping assemblies and a controller, wherein two ends of each damping assembly are abutted between an inner side wall of the back plate and an outer side wall of the light guide plate; wherein one end of the damping assembly is provided with a pressure sensor, and the controller is respectively electrically connected with the pressure sensor and the damping assembly, and is configured to control a magnitude of a damping force of the damping assembly according to pressure data detected by the pressure sensor.

11. The display device according to claim 10, wherein the pressure sensor is arranged between the damping assembly and the light guide plate.

12. The display device according to claim 10, wherein the damping assembly comprises: a piston rod, a cylinder block, and one or a plurality of elastic member(s) and a piston located in the cylinder block; wherein one end of the piston rod is connected with a first end face of the piston, and an other end of the piston rod extends out of one end of the cylinder block and is connected with the pressure sensor; the elastic member is connected between the cylinder block and the first end face of the piston; and the controller is electrically connected with the piston, and is configured to control a magnitude of a motion resistance of the piston so as to control the magnitude of the damping force of the damping assembly.

13. The display device according to claim 12, wherein the piston rod is connected to the pressure sensor through a push head, and a cross-sectional area of the push head is greater than a cross-sectional area of the piston rod.

14. The display device according to claim 12, wherein a plurality of through holes penetrating through the piston are formed in the piston, and a direction of the through holes is identical to a movement direction of the piston rod; the controller is specifically configured to control opening and closing of each of the plurality of through holes according to the pressure data.

15. The display device according to claim 12, wherein a damping fluid is enclosed in the cylinder block.

16. The display device according to claim 12, wherein the backlight module comprises a plurality of elastic members which are arranged around the piston rod.

17. The display device according to claim 10, wherein the backlight module comprises a plurality of damping assemblies which are arranged around the light guide plate.

18. The display device according to claim 10, wherein the damping assembly is arranged on the light guide plate, and wherein the damping assembly is arranged at least between two ends of two outer side walls of the light guide plate adjacent to a light incident side and the back plate.