

DESCRIPTION

ILLUMINATION CONTROL DEVICE, AND ILLUMINATION SYSTEM

Technical Field

[0001] The present invention relates to a illumination control device and a illumination system, and in particular relates to a technology of controlling a illumination device through wireless communication.

Background Art

[0002] In conventional wireless illumination systems, a technology of controlling one illumination device by using an illumination control device corresponding to the illumination device through wireless communication has widely been employed (see Patent Literature 1, for example). Specifically, the illumination control device has a transmission unit, an input unit, and a first control unit, and the first control unit, on the basis of a command to be input from the input unit, generates a control signal including at least any one of a light-on signal, a light-off signal, and a dimming signal and also transmits the control signal to the illumination device through the transmission unit. The illumination device has a reception unit, a light emitting unit such as an LED (Light Emitting Diode), and a second control unit, and, when the reception unit receives

the control signal to be transmitted from the transmission unit of the illumination control device, the second control unit performs an illumination control (such as light-on, light-off, dimming) according to the control signal received by the reception unit, to the light emitting unit.

Citation List

Patent Literature

[0003] Patent Literature 1 : Japanese Patent Laid-Open Publication No. 2010-238572

Summary of Invention

Technical Problem

[0004] A large space such as an office needs a plurality of illumination devices. In a case in which the plurality of illumination devices are individually controlled through wireless communication, in the conventional wireless illumination systems, one illumination control device is required for each of the illumination devices. Therefore, when the number of illumination devices increases, it becomes substantially impossible to control all the illumination devices individually.

[0005] For example, it is possible to perform the same illumination control to all the illumination devices installed in the space such as an office by one illumination control device.

However, in such an illumination control, the illuminance of the illumination devices may not be appropriate and electricity may be consumed wastefully, depending on a position in which the illumination devices are arranged or a time period of the illumination.

[0006] In view of the foregoing, an object of the present invention is to provide an illumination control device and an illumination system that are capable of individually controlling a plurality of illumination devices and also collectively managing the control of the illumination devices.

Solution to Problem

[0007] An illumination control device according to the present invention is a device that controls a plurality of illumination devices through wireless communication and has a transmission unit, a control unit, a display unit, an input unit, and a storage unit. The transmission unit transmits a control signal including at least any one of a light-on signal, a light-off signal, and a dimming signal. Here, the plurality of illumination devices to be controlled each have first identification information that can identify each of the plurality of illumination devices.

[0008] Then, the control unit executes controls (i) to (v). In the control (i), the control unit causes the display unit to display a symbol image to be corresponded to at least one

of the illumination devices. In the control (ii), the control unit obtains the first identification information and also causes the display unit to display the obtained first identification information. In the control (iii), the control unit, when the first identification information displayed on the display unit is dragged by an operation from the input unit to a position in which the first identification information is superimposed on the symbol image causes the storage unit to store the dragged first identification information with the dragged first identification information being associated with the symbol image on which the first identification information is superimposed, and thereby causes the illumination device possessing the first identification information and the symbol image to be corresponded to each other. In the control (iv), the control unit causes the storage unit to store illumination control information with the illumination control information being associated with the symbol image, the illumination control information being related to the control of the illumination device corresponded to the symbol image in the control (iii). In the control (v), the control unit generates the control signal on the basis of the first identification information and the illumination control information that are associated with the symbol image and also transmits the generated control signal through the transmission unit to the illumination device corresponded to the symbol image.

[0009] An illumination system according to the present invention includes a plurality of illumination devices and the above described illumination control device that controls the illumination devices through wireless communication.

Advantageous Effects of Invention

[0010] An illumination control device and an illumination system according to the present invention can individually control a plurality of illumination devices and also collectively manage the control of the illumination devices.

[0011] While new features of the present invention are described in scope of claims attached hereto, preferred embodiments of the present invention relate to both configuration and content, the above and other objects and features of the present invention will be further understood by the following detailed description of the preferred embodiments with reference to the attached drawings.

Brief Description of Drawings

[0012] Fig. 1 is a block diagram conceptually illustrating a configuration of an LED illumination system according to a preferred embodiment of the present invention.

Fig. 2 is a block diagram conceptually illustrating a configuration of an illumination control device.

Fig. 3 is a block diagram conceptually illustrating a

configuration included in each of LED illumination devices.

Fig. 4 is a flow chart showing a control that a first control unit of the illumination control device executes and an operation that a user performs.

Fig. 5 is a plan view of a PC monitor on which a lighting layout image is displayed.

Fig. 6 is a plan view of the PC monitor, used for description of an operation of creating an area image.

Fig. 7 is a plan view of the PC monitor displaying a created area image.

Fig. 8 is a plan view of the PC monitor, used for description of a drag operation executed when area images are listed.

Fig. 9 is a plan view of the PC monitor displaying a screen for performing an arrangement operation of arranging a symbol image.

Fig. 10 is a plan view of the PC monitor, used for description of the arrangement operation of arranging the symbol image.

Fig. 11 is a plan view of the PC monitor, used for description of the arrangement operation of arranging the symbol image.

Fig. 12 is a plan view of the PC monitor displaying an arranged symbol image.

Fig. 13 is a plan view of the illumination control device,

used for description of a drag operation executed when the LED illumination device (first identification information) and the area image are associated with each other.

Fig. 14 is a plan view of the illumination control device, used for description of a drag operation executed when the LED illumination device (first identification information) and the symbol image are associated with each other.

Fig. 15 is a block diagram conceptually illustrating a configuration of an illumination control device included in an LED illumination system according to a first modification example.

Fig. 16 is a perspective view conceptually illustrating a gateway included in an LED illumination system according to a second modification example.

Fig. 17 is a flow chart showing a control that a first control unit of an illumination control device executes and an operation that a user performs according to the second modification example of the LED illumination system.

Fig. 18 is a plan view of the illumination control device of which a touch panel displays second identification information.

Fig. 19 is a block diagram conceptually illustrating a configuration of a demand control system including the LED illumination system.

Fig. 20 is a block diagram conceptually illustrating a

configuration of a demand control system according to a first modification example.

Fig. 21 is a block diagram conceptually illustrating a configuration of a demand control system according to a second modification example.

Fig. 22 is a block diagram conceptually illustrating a configuration of a demand control system according to a third modification example.

Description of Preferred Embodiments

[0013] First, preferred embodiments of the present invention are listed and described as follows. An illumination control device according to preferred embodiments of the present invention is a device that controls a plurality of illumination devices through wireless communication and has a transmission unit, a control unit, a display unit, an input unit, and a storage unit. The transmission unit transmits a control signal including at least any one of a light-on signal, a light-off signal, and a dimming signal. Here, the plurality of illumination devices to be controlled each have first identification information that can identify each of the plurality of illumination devices.

[0014] Then, the control unit executes controls (i) to (v). In the control (i), the control unit causes the display unit to display a symbol image to be corresponded to at least one

of the illumination devices. In the control (ii), the control unit obtains the first identification information and also causes the display unit to display the obtained first identification information. In the control (iii), the control unit, when the first identification information displayed on the display unit is dragged by an operation from the input unit to a position in which the first identification information is superimposed on the symbol image, causes the storage unit to store the dragged first identification information with the dragged first identification information being associated with the symbol image on which the first identification information is superimposed, and thereby causes the illumination device possessing the first identification information and the symbol image to be corresponded to each other. In the control (iv), the control unit causes the storage unit to store illumination control information with the illumination control information being associated with the symbol image, the illumination control information being related to the control of the illumination device corresponded to the symbol image in the control (iii). In the control (v), the control unit generates the control signal on the basis of the first identification information and the illumination control information that are associated with the symbol image and also transmits the generated control signal through the transmission unit to the illumination device corresponded to the symbol image.

[0015] According to the above described illumination control device, by a simple operation from the input unit by a user, at least one piece of first identification information is associated with the illumination control information through the symbol image. Accordingly, it is possible to control a plurality of illumination devices in modes of a desired association with the illumination control information. Here, the modes of a desired association include a mode in which illumination control information is associated with each of the illumination devices, a mode in which illumination control information is associated with a group of illumination devices, and a mode obtained by combining the modes. In this manner, according to the above described illumination control device, the plurality of illumination devices can be individually controlled and the control of the illumination devices can also be collectively managed with one illumination control device alone. In addition, in the illumination control device, it is easy to change in settings related to illumination control such as change of the symbol image (change of an area in which the same illumination control is desired, for example). Furthermore, since the plurality of illumination devices are controlled through wireless communication, a circuit (wiring) constructed in a wired system becomes unnecessary.

[0016] Preferably, on a lighting layout image that indicates the positions of the plurality of illumination devices,

the symbol image may be an image that symbolizes that the symbol image corresponds to at least one of the illumination devices arranged at a position in which the illumination device is superimposed on the symbol image, and, before the control (i), the control unit may further execute a control (vi) of causing the display unit to display the lighting layout image. Then, in the control (i), the control unit may preferably cause the display unit to display the symbol image with the symbol image being superimposed on the lighting layout image.

[0017] Preferably, in the control (ii), the control unit may cause the display unit to display a first switch that generates the light-on signal for lighting the illumination device possessing the obtained first identification information with the first switch being corresponded to the obtained first identification information.

[0018] According to such a configuration, a user, by an operation of the first switch from the input unit, lights the illumination device and can confirm an actual position of the illumination device corresponding to the operated first switch. Accordingly, the user can drag, on the basis of the confirmed actual position, first identification information displayed corresponding to the operated first switch to a symbol image to be associated with the first identification information. When such a drag operation of the user is executed, the control unit executes the control (iii). Therefore, the first

identification information is correctly associated with the symbol image.

[0019] In the above described illumination control device, the symbol image may be an area image that represents an area of the illumination devices to which the same illumination control is executed. In such a case, in the control (iii), the control unit may cause the storage unit to store the first identification information of all the illumination devices in the area represented by the area image with the first identification information being associated with the area image. In addition, in the control (v), the control unit may transmit the control signal through the transmission unit to all the illumination devices in the area represented by the area image.

[0020] According to such a configuration, by a simple operation from the input unit by a user, the settings for performing the same illumination control to all the illumination devices in a desired area are executed.

[0021] In a preferred specific configuration of the above described illumination control device, the illumination control device may further have a reception unit that receives information signal including the first identification information, the information signal being a signal to be transmitted from the illumination devices during wireless communication. Then, in the control (ii), the control unit may obtain the first identification information included in the

information signal by causing the reception unit to receive the information signal and may cause the display unit to display the obtained first identification information.

[0022] In another preferred specific configuration of the above described illumination control device, the illumination control device may further have a read-in unit that reads in a QR code (registered trademark), each of the illumination devices may include the QR code (registered trademark) corresponding to the first identification information, and the storage unit may store a table representing a correspondence between the first identification information and the QR code (registered trademark). Then, in the control (ii), the control unit, on the basis of the table, may obtain the first identification information corresponding to the QR code (registered trademark) read in by the read-in unit and may cause the display unit to display the obtained first identification information.

[0023] According to such a configuration, even in a case in which an illumination system including the illumination control device having the configuration and a plurality of illumination devices is employed in each of stores adjacent to each other, for example, the display unit of the illumination control device displays only the first identification information included in the illumination devices configuring the same illumination system together with the illumination

control device. Therefore, according to the above described specific configuration, it is possible to prevent the occurrence of such a problem that a system administrator and a user obtain the first identification information from an illumination system different from the system administrator's own illumination system and then associates the first identification information with the symbol image by mistake.

[0024] An illumination system according to preferred embodiments of the present invention includes a plurality of illumination devices and the illumination control device that controls the plurality of illumination devices through wireless communication.

[0025] In a preferred specific configuration of the above described illumination system, the illumination system may further include a plurality of communication relay instruments that perform wireless communication with the illumination devices and the illumination control device and also that are wire-connected to one another. Then, the illumination control device may perform communication with the illumination devices through at least one of the communication relay instruments. In such a configuration, each of the communication relay instruments may have second identification information that can identify each of the plurality of communication relay instruments and the control unit of the illumination control device may preferably further execute a control (vii) before

the control (ii). Specifically, in the control (vii), the control unit may obtain the second identification information of the communication relay instrument that exists in a range in which it is possible to perform wireless communication with the illumination control device and may also cause the display unit to display the obtained second identification information. Then, in the control (ii), the control unit, through the communication relay instrument corresponding to a piece of the second identification information selected by the operation from the input unit among pieces of the second identification information displayed on the display unit, may obtain the first identification information included in the illumination device capable of performing direct wireless communication with the corresponding communication relay instrument and may also cause the display unit to display the obtained first identification information.

[0026] According to such a configuration, only the first identification information of the illumination device that exists in the range in which it is possible to perform direct wireless communication with the selected communication relay instrument is displayed in the display unit. Therefore, it becomes easy to associate the first identification information with the symbol image by the drag operation.

[0027] In a more preferred configuration, each of the communication relay instruments may have a light emitting unit

that emits light to the outside. Then, in the control (vii), the control unit may cause the display unit to display a second switch that generates the light-on signal for lighting the light emitting unit of the communication relay instrument possessing the obtained second identification information with the second switch being corresponded to the obtained second identification information.

[0028] According to such a configuration, a user, by an operation of the second switch from the input unit, may light the light emitting unit of the communication relay instrument and can confirm an actual position of the communication relay instrument. Accordingly, the user, by repeatedly executing selection of the communication relay instrument and association of the first identification information with the symbol image while changing the selected communication relay instrument, can easily perform the association of the first identification information with the symbol image for all the installed illumination devices.

[0029] In a more preferred configuration of the illumination system, the illumination system may further include an illuminance sensor installed in a space in which the plurality of illumination devices are arranged, and a human detection sensor installed integrally with or separately from the illuminance sensor. Then, in the control (v), the control unit may generate the control signal, on the basis of a detection

signal that is output from the illuminance sensor and the human detection sensor, in addition to the first identification information and the illumination control information that are associated with the symbol image.

[0030] Subsequently, preferred embodiments of the present invention will be described in detail.

[1] Configuration of LED Illumination System

Fig. 1 is a block diagram conceptually illustrating a configuration of an LED illumination system according to a preferred embodiment of the present invention. As shown in Fig. 1, the LED illumination system includes a plurality of LED illumination devices 2, an illumination control device 1 that controls the LED illumination devices 2 through wireless communication, a wired network 3, and a sensor 4.

[0031] The network 3 has a plurality of gateways GW that are wire-connected to one another through a hub (HUB). Each of the gateways GW, through wireless communication, transmits and receives information with the LED illumination devices 2 and the illumination control device 1. Then, the illumination control device 1, through at least one of the gateways GW in the network 3, performs communication with the LED illumination devices 2. The gateway GW has a communication relay instrument that performs conversion of a communication protocol and a control instrument that performs illumination control of the LED illumination devices 2 according to a control signal that

is output from the illumination control device 1.

[0032] According to the LED illumination system of the present preferred embodiment, the wireless communication between the illumination control device 1 and the plurality of LED illumination devices 2 are relayed through the network 3 (gateways GW). Accordingly, even in a case in which the plurality of LED illumination devices 2 are installed in a large space such as an office, the wireless communication between illumination control device 1 and the LED illumination devices 2 can be reliably performed.

[0033] Furthermore, in the LED illumination system of the present preferred embodiment, the plurality of gateways GW are wire-connected to one another. Accordingly, even in a case in which the plurality of LED illumination devices 2 are installed over a plurality of rooms or a plurality of floors, the gateways GW are installed in each of the rooms or on each of the floors, so that the illumination control of all the LED illumination devices 2 can be collectively managed with one illumination control device 1.

[0034] The sensor 4 is formed integrally by an illuminance sensor and a human detection sensor and installed in the space in which the plurality of LED illumination devices 2 are installed. The sensor 4 transmits and receives information with the gateways GW through wireless communication. Then, the illumination control device 1, through the network 3, obtains

a detection signal that has been output from the sensor 4. It is to be noted that, in the space in which the LED illumination devices 2 are arranged, the illuminance sensor and the human detection sensor may be installed separately.

[0035] Fig. 2 is a block diagram conceptually illustrating a configuration of the illumination control device 1. As shown in Fig. 2, the illumination control device 1 has a first transmission unit 11, a first reception unit 12, a first control unit 13, a display unit 14, an input unit 15, and a storage unit 16. In the present preferred embodiment, the display unit 14 and the input unit 15 integrally form a touch panel 18.

[0036] The first transmission unit 11 transmits a signal that has been generated by the first control unit 13 to the LED illumination devices 2 and the sensor 4 through the network 3. The signal generated by the first control unit 13 includes a control signal having at least any one of a light-on signal, a light-off signal, and a dimming signal. The first reception unit 12 receives signals that have been output from the LED illumination devices 2 and the sensor 4 through the network 3. The control the first control unit 13 executes will be described later in detail.

[0037] Fig. 3 is a block diagram conceptually illustrating a configuration included in each of the LED illumination devices 2. As shown in Fig. 3, the LED illumination device 2 has a second transmission unit 21, a second reception unit 22, a second

control unit 23, and an LED 24. In addition, the LED illumination device 2 has first identification information I_{LED} that enables identification from the other LED illumination devices 2.

[0038] The second transmission unit 21 transmits a signal that has been generated by the second control unit 23 to the illumination control device 1 through the network 3. The signal generated by the second control unit 23 includes an information signal possessing the first identification information I_{LED} . In the present preferred embodiment, the second transmission unit 21 and the second reception unit 22 integrally form a wireless module and the first identification information I_{LED} is used for distinguishing the wireless module from wireless modules installed in the other LED illumination devices 2. The transmission of a signal from the second transmission unit 21, for example, is executed according to a command from the illumination control device 1.

[0039] The second reception unit 22 receives the control signal that has been output from the illumination control device 1 or a control signal to be output from the control instrument of the gateway GW according to the control signal, through the network 3. The second control unit 23, on the basis of the control signal received in the second reception unit 22, performs the illumination control (light-on, light-off, dimming, and the like) of the LED 24.

[0040] [2] Control of LED Illumination System

Fig. 4 is a flow chart showing a control that the first control unit 13 of the illumination control device 1 executes and an operation that a user performs. First, in step S20, a user performs advance preparation by using a personal computer (hereinafter will be referred to as a "PC"). Fig. 5 to Fig. 12 are plan views of a PC monitor 6 displaying a screen relating to this advance preparation.

[0041] In step S20, the user first reads a lighting layout image P that indicates the positions of the plurality of LED illumination devices 2 into the hard disk of the PC and displays the read lighting layout image P on the PC monitor 6 (see Fig. 5). In Fig. 5, the positions of the plurality of LED illumination devices 2 are indicated by a plurality of circles. It is to be noted that the lighting layout image P may include an image related to interior decoration or facilities. In addition, the lighting layout image P may be an image created by the perspective drawing method. Furthermore, the user may read arrangement information related to the arrangement of the plurality of LED illumination devices 2 in the hard disk of the PC, the arrangement information being necessary to generate the lighting layout image P. In such a case, the user causes the PC to read in the arrangement information from the hard disk and also to generate the lighting layout image P on the basis of the arrangement information.

[0042] In the screen on which the lighting layout image

P is displayed, the user, on the lighting layout image P that has been displayed on the PC monitor 6, creates or arranges a symbol image by an operation of a mouse or the like (step S20). Here, the symbol image is an image that is associated with at least one piece of the first identification information I_{LED} to be corresponded to the LED illumination devices 2 possessing the piece of first identification information I_{LED} . In the present preferred embodiment, the symbol image can make the user recognize that the symbol image, by being displayed while being superimposed on the lighting layout image P on the PC monitor 6 or in the illumination control device 1, corresponds to at least one of the LED illumination devices 2 arranged at a position in which the symbol image and the LED illumination device are superimposed on each other on the lighting layout image P. In other words, on the lighting layout image P, the symbol image is an image that symbolizes that the symbol image corresponds to at least one of the LED illumination devices 2 arranged at the position in which the symbol image and the LED illumination device are superimposed on each other. The symbol image may be created, without displaying the lighting layout image P, as a sort of a box image with which at least one piece of the first identification information I_{LED} is to be associated.

[0043] The symbol image includes an image that represents, on the lighting layout image P, an area in which the LED illumination devices 2 to which the same illumination control

is executed are arranged and that is to be corresponded to the plurality of LED illumination devices 2 in the area (see Fig. 7). Hereinafter, the image is referred to as an "area image". Furthermore, the symbol image includes an image to be corresponded to only one LED illumination device 2 (see Fig. 12). Hereinafter, unless otherwise noted, a term "symbol image" is used to indicate the image.

[0044] As shown in Fig. 5, on the screen on which the lighting layout image P is displayed, in addition to the lighting layout image P, buttons B1 to B7 and EG1 to EG10 are displayed. The button B1 is a button that causes the PC monitor 6 to display an arrangement operation screen (see Fig. 9) for the user to perform an arrangement operation of the symbol image. The button B2 is a button that causes the PC monitor 6 to display a creation operation screen (see Fig. 5) for the user to perform the creation operation of the area image. The button B6 is a button that causes the PC monitor 6 to display again a screen prior to moving to a screen being displayed on the PC monitor 6. The button B7 is a button that makes the arrangement operation of the symbol image and the creation operation of the area image finish.

[0045] In the creation operation screen (see Fig. 5), the buttons B3 to B5 are buttons that are selected when the user creates the area image. Here, the button B3 is selected when a rectangular area image is created (see Fig. 6). Specifically,

the user, after having selected the button B3 by the operation of the mouse or the like, specifies two positions different from each other in the screen displayed on the PC monitor 6. Thus, a rectangular area image having a straight line that links the two positions as a diagonal line is created. The button B4 is selected, with respect to area images having various shapes that are not limited to a rectangle, when a straight line portion of the outer edge of the area images is created. Specifically, the user, by the operation of the mouse or the like, after having selected the button B4, specifies a plurality of positions in the screen displayed on the PC monitor 6. Thus, a line image of which the plurality of positions are connected to each other in a specified order is created. The button B5 is selected when a circular arc curved line portion of the outer edge of the area images is created. Specifically, the user, by the operation of the mouse or the like, after having selected the button B5, specifies one position in the screen displayed on the PC monitor 6. Subsequently, after specifying another position, the user slides the position around the previously specified position. Thus, a circular arc curved line image having the previously specified position as a center is created.

[0046] The user, by performing the above described creation operation in the creation operation screen, can create an area image on the lighting layout image P. Fig. 7 shows a case in which four area images P_{AREA} (1) to P_{AREA} (4) are created

on the lighting layout image P and any one of the four area images P_{AREA} (1) to P_{AREA} (4) corresponds to each of all the LED illumination devices 2 shown in the lighting layout image P. The area image may correspond to only some of the LED illumination devices 2 to be controlled by the illumination control device 1 among the LED illumination devices 2 shown in the lighting layout image P. Alternatively, the area image may correspond to some of the LED illumination devices 2 to be controlled by the illumination control device 1, and the symbol image by an arrangement operation to be described later, may correspond to the other LED illumination devices 2.

[0047] The creation operation of the area image is not limited to the above described operation. For example, figures having various shapes may be displayed on the PC monitor 6, and the user, by the operation of the mouse or the like, may select some figures among the plurality of figures displayed on the PC monitor 6 and may also create one area image by combining the selected figures. In addition, the creation operation of the area image may be performed not only in the PC but also in the illumination control device 1.

[0048] In the screen shown in Fig. 5, in a case in which the button B1 is selected by the operation of the mouse or the like by the user, a screen for performing the arrangement operation of the symbol image is displayed (see Fig. 9). At this time, on the PC monitor 6, the buttons B11 to B14 are displayed

in place of the buttons B3 to B5. Thus, as shown in Fig. 9, on the PC monitor 6, the lighting layout image P and the buttons B1, B2, B11 to B14, B6, and B7 are displayed.

[0049] On the arrangement operation screen (see Fig. 9), the buttons B11 to B13 are buttons to be selected when the user arranges the symbol image. In addition, the button B14 is a button to be selected when the user deletes the arranged symbol image.

[0050] The button B11 is selected when only one symbol image is arranged. Specifically, the user, by the operation of the mouse or the like, after having selected the B11, specifies one position in the screen displayed on the PC monitor 6. When the specification of the position is finished, on the PC monitor 6, a selection screen for selecting the type of the symbol image is displayed (see Fig. 10). Then, the user, by the operation of the mouse or the like, selects the type of the symbol image on the selection screen. Thus, at the specified position, the symbol image of the selected type is arranged.

[0051] The button B12 is selected when a plurality of symbol images of the same type are arranged on a line. Specifically, the user, by the operation of the mouse or the like, after having selected the button B12, specifies two positions in the screen displayed on the PC monitor 6. When the specification of the two positions is finished, on the PC monitor 6, the selection screen for selecting the type of the symbol image is displayed

(see Fig. 10). Then, the user, by the operation of the mouse or the like, selects the type of the symbol image on the selection screen. When the selection of the type of the symbol image is finished, on the PC monitor 6, an input screen for inputting the number of positions of the symbol image is displayed (see Fig. 11). Then, the user, by the operation of the mouse, a keyboard, or the like, inputs a numerical value on the input screen. Thus, on a straight line that links the specified two positions, the symbol images of the input number are arranged at equal intervals.

[0052] The button B13 is selected when the plurality of symbol images of the same type are arranged in a matrix form. Specifically, when the button B13 is selected by the operation of the mouse or the like by the user, on the PC monitor 6, the buttons B3 to B5 are displayed in place of the buttons B11 to B14 (see Fig. 10). Then, the user, by the operation of the mouse or the like, after having selected the B3, as shown in Fig. 10, specifies two positions different from each other in the screen displayed on the PC monitor 6. Thus, a rectangular region R having a straight line that links the two positions as a diagonal line is specified. When the specification of the two positions is finished, on the PC monitor 6, the selection screen for selecting the type of the symbol image is displayed (see Fig. 10). Then, the user, by the operation of the mouse or the like, selects the type of the symbol image on the selection screen.

When the selection of the type of the symbol image is finished, on the PC monitor 6, the input screen for inputting the number of positions (the number of rows and the number of columns) of the symbol image is displayed (see Fig. 11). Then, the user, by the operation of the mouse, the keyboard, or the like, inputs a numerical value on the input screen. Thus, on the specified rectangular region, the symbol images of the input number are arranged in a matrix form (see Fig. 12).

[0053] The user, by performing the above described arrangement operation in the arrangement operation screen, can arrange a symbol image on the lighting layout image P. Fig. 12 shows a case in which nine symbol images P_{SMBL} of the same type are arranged on the lighting layout image P. By repeatedly executing such an arrangement operation, the symbol images can be corresponded to all the LED illumination devices 2 shown in the lighting layout image P. The symbol images may correspond to only some of the LED illumination devices 2 to be controlled by the illumination control device 1 among the LED illumination devices 2 shown in the lighting layout image P. Alternatively, the symbol images may correspond to some of the LED illumination devices 2 to be controlled by the illumination control device 1, and the area image by the above described creation operation, may correspond to the other LED illumination devices 2. Furthermore, the symbol image may be arranged in an area represented by the area image. In addition, the arrangement

operation of the symbol image may be performed not only in the PC but also in the illumination control device 1.

[0054] In step S20, in a case in which the area images P_{AREA} (1) to P_{AREA} (4) are created by the user, the created area images P_{AREA} (1) to P_{AREA} (4) are stored in the hard disk of the PC. At this time, the area images P_{AREA} (1) to P_{AREA} (4) may be listed by being stored in the hard disk while each of the images being associated with any of the buttons EG1 to EG10 in one-to-one correspondence. The association of the area images P_{AREA} (1) to P_{AREA} (4) with the buttons EG1 to EG10, for example, in the screen in which the area images and the buttons are displayed on the PC monitor 6, is performed by the drag operation of the mouse or the like by the user (see Fig. 8).

[0055] In addition, in step S20, in a case in which the symbol image P_{SMBL} is arranged by the user, the arranged symbol image P_{SMBL} is stored in the hard disk of the PC.

[0056] When the advance preparation is finished, in step S21, the user transfers the lighting layout image P , the area images P_{AREA} (1) to P_{AREA} (4), and the symbol image P_{SMBL} that are stored in the hard disk of the PC, through the network 3, for example, to the illumination control device 1.

[0057] Thus, in step S11, the first control unit 13 of the illumination control device 1 reads in the lighting layout image P , the area images P_{AREA} (1) to P_{AREA} (4), and the symbol image P_{SMBL} through the first reception unit 12 and also causes the

storage unit 16 to store these images.

[0058] Subsequently, in step S12, the first control unit 13 reads the lighting layout image P from the storage unit 16 and also causes the touch panel 18 to display the read lighting layout image P. In addition, the first control unit 13 reads at least either of the area images P_{AREA} (1) to P_{AREA} (4) and the symbol image P_{SMBL} from the storage unit 16 and also causes the touch panel 18 to display the read image with the read image being superimposed on the lighting layout image P. Fig. 13 is a plan view of the illumination control device 1 in which only the area images P_{AREA} (1) to P_{AREA} (4) among the area images and the symbol image are displayed on the touch panel 18. In addition, Fig. 14 is a plan view of the illumination control device 1 in which all of the area images P_{AREA} (1) to P_{AREA} (4) and the symbol image P_{SMBL} are displayed on the touch panel 18. It is to be noted that, in step S12, the first control unit 13, without having the lighting layout image P to be displayed, may cause at least either of the area images P_{AREA} (1) to P_{AREA} (4) and the symbol image P_{SMBL} to be displayed on the touch panel 18. Moreover, in a case in which the symbol image is a sort of a box with which at least one piece of first identification information I_{LED} is to be associated, only the symbol image may be displayed on the touch panel 18.

[0059] Subsequently, in step S13, the first control unit 13, by causing the first reception unit 12 to receive information

signals each including the first identification information I_{LED} , obtains the first identification information I_{LED} from each of the plurality of LED illumination devices 2 through the network 3. Then, the first control unit 13 causes the touch panel 18 to display pieces of the obtained first identification information I_{LED} (see Fig. 13 and Fig. 14). At this time, the first control unit 13, with respect to each piece of the obtained first identification information I_{LED} , generates the first switch $S1$ that can generate a light-on signal for lighting the LED illumination devices 2 possessing the first identification information I_{LED} . Then, the first control unit 13 causes the generated first switch $S1$ to be displayed on the touch panel 18 with the first switch $S1$ being corresponded to the first identification information I_{LED} . In the present preferred embodiment, the first switch $S1$ is displayed while being superimposed on the first identification information I_{LED} . The first switch $S1$ may selectively generate a light-on signal and a light-off signal. In addition, the first switch $S1$ may be stored in the storage unit 16, and the first control unit 13 may read the first switch $S1$ corresponding to each piece of the obtained first identification information I_{LED} from the storage unit 16 and may also cause the touch panel 18 to display the read first switch $S1$.

[0060] Subsequently, the user associates the LED illumination devices 2 with the area images P_{AREA} (1) to P_{AREA} (4)

or the symbol image P_{SMBL} that are shown on the touch panel 18 (step S22). Specifically, in the screen on which the first identification information I_{LED} and the first switch S1 are displayed, the user, by operating the first switch S1 on the touch panel 18, lights the LED illumination device 2. In this manner, the user confirms an actual position of the LED illumination device 2 corresponding to the operated first switch S1. Thereafter, the user, on the basis of the confirmed actual position, drags the first identification information I_{LED} displayed while superimposed on the operated first switch S1 to a position in which the first identification information is to be superimposed on the area images P_{AREA} (1) to P_{AREA} (4) or the symbol image P_{SMBL} that are displayed at the corresponding position on the lighting layout image P.

[0061] When the above described drag operation of the user is executed, in step S14, the first control unit 13 causes the storage unit 16 to store the dragged first identification information I_{LED} with the dragged first identification information I_{LED} being associated with the area image or the symbol image on which the first identification information I_{LED} is superimposed. As shown in Fig. 13, in a case in which the first identification information I_{LED} is to be associated with the area image P_{AREA} (1), by the drag operation of the user and the control of the first control unit 13 in step S14, the first identification information I_{LED} of all the LED illumination

devices 2 in an area represented by the area image P_{AREA} (1) is stored in association with the area image P_{AREA} (1) in the storage unit 16.

[0062] It is to be noted that, as shown in Fig. 14, in a case in which the symbol image P_{SMBL} is arranged in the area represented by the area image P_{AREA} (1), when the first identification information I_{LED} is dragged to a position in which the first identification information I_{LED} is superimposed on the symbol image P_{SMBL} , the first control unit 13 may cause the storage unit 16 to store the dragged first identification information I_{LED} with the dragged first identification information I_{LED} being associated with only the symbol image P_{SMBL} or with any of the area image P_{AREA} (1) and the symbol image P_{SMBL} .

[0063] According to such a drag operation of the user based on the confirmation of the position of the LED illumination devices 2 (step S22) and the control of the first control unit 13 (step S14), the first identification information I_{LED} is correctly associated with the area images P_{AREA} (1) to P_{AREA} (4) or the symbol image P_{SMBL} .

[0064] Subsequently, in step S15, the first control unit 13 causes the storage unit 16 to store illumination control information with the illumination control information being associated with the area image, the illumination control information being related to the control of the plurality of LED illumination devices 2 corresponding to the area image. In

addition, the first control unit 13 causes the storage unit 16 to store illumination control information with the illumination control information being associated with the symbol image, the illumination control information being related to the control of one LED illumination device 2 corresponding to the symbol image. The illumination control information is input by an operation of the touch panel 18 by the user (step S23). Moreover, the illumination control information includes information such as illuminance or a time schedule.

[0065] According to the control of the first control unit 13 of steps S11 to S15 and the operation of the user of steps S21 to S23, by a simple operation of the touch panel 18, settings for performing the same illumination control to all the LED illumination devices 2 in a desired area and settings for individually performing the illumination control to the LED illumination devices 2 are executed.

[0066] After the settings are finished, in step S16, the first control unit 13, on the basis of the first identification information I_{LED} and the illumination control information that are associated with the area image, generates a control signal. Then, the first control unit 13 transmits, through the first transmission unit 11, the generated control signal to all the LED illumination devices 2 in the area represented by the area image. Thus, in the desired area, the same illumination control is executed to all the LED illumination devices 2.

[0067] In addition, the first control unit 13, on the basis of the first identification information I_{LED} and the illumination control information that are associated with the symbol image, generates a control signal. Then, the first control unit 13 transmits, through the first transmission unit 11, the generated control signal to the LED illumination device 2 corresponding to the symbol image. Thus, the illumination control is individually executed to the LED illumination devices 2.

[0068] It is to be noted that, in step S16, the first control unit 13, on the basis of a detection signal to be output from the sensor 4 as well in addition to the first identification information I_{LED} and the illumination control information, may generate a control signal.

[0069] According to the illumination control device 1 of the present preferred embodiment, by a user's simple operation of the touch panel 18, at least one piece of the first identification information I_{LED} is associated with the illumination control information through the area images P_{AREA} (1) to P_{AREA} (4) or the symbol image P_{SMBL} . Accordingly, the plurality of LED illumination devices 2 can be controlled in modes of a desired association with the illumination control information. Here, the modes of the desired association include a mode in which illumination control information is associated with each of the illumination devices 2, a mode in which illumination control information is associated with a group of

illumination devices 2, and a mode combining these modes. In this manner, according to the above described illumination control device 1 of the present preferred embodiment, the plurality of LED illumination devices 2 can be individually controlled and the control of the LED illumination devices 2 can also be collectively managed with one illumination control device 1 alone. In addition, in the illumination control device 1 of the present preferred embodiment, it is easy to change settings related to illumination control such as change of the area image or symbol image. Furthermore, since the plurality of LED illumination devices 2 are controlled through wireless communication, a circuit (wiring) constructed in a wired system becomes unnecessary.

[0070] It is to be noted that, by utilizing that the LED illumination devices 2 can be collectively managed by the illumination control device 1, for example, used time for each of the LED illumination devices 2 may be collectively managed by the illumination control device 1. As an example, the illumination control device 1 may collectively manage a timer installed in each of the LED illumination devices 2. The timer is ordinarily arranged to a wireless module.

[0071] In a case of the illumination device such as a fluorescent lamp, a user can recognize the life of the illumination device when the illumination device is unable to be lighted. However, the LED illumination devices 2 can be used

semi permanently and the performance will deteriorate over time. Therefore, for the user, it is difficult to recognize the life (the state of insufficient illuminance).

[0072] As a solution to such a problem, by utilizing that the LED illumination devices 2 can be collectively managed by the illumination control device 1, in a case in which the LED illumination devices 2 reach the life (the state of insufficient illuminance), the life may be displayed, for example, on the touch panel 18 of the illumination control device 1. Thus, the user can recognize the life of the LED illumination devices 2.

[0073] [3] Modification Example Related to LED Illumination System

A description will be made of two modification examples (first modification example and second modification example) related to an LED illumination system.

[3-1] First Modification Example

In a first modification example of the LED illumination system, in addition to the configuration of the above described preferred embodiments, each of the LED illumination devices 2 includes a QR code (registered trademark) corresponding to the first identification information I_{LED} and the storage unit 16 stores a table representing a correspondence between the first identification information I_{LED} and the QR code (registered trademark). In addition, as shown in Fig. 15, the illumination control device 1 further has a read-in unit 17 that is a QR cord

(registered trademark) reader that reads in a QR cord (registered trademark).

[0074] In such an LED illumination system, in the above described step S13, the first control unit 13, on the basis of the table, obtains the first identification information I_{LED} corresponding to the QR cord (registered trademark) by the read-in unit 17. Then, the first control unit 13 causes the touch panel 18 to display the obtained first identification information I_{LED} . The read-in of the QR cord (registered trademark) read by the read-in unit 17, for example, in a step of installing the LED illumination devices, is executed by the user before the installation.

[0075] According to the first modification example of the LED illumination system, even in the case in which the LED illumination systems are employed in a plurality of stores adjacent to each other, for example, the touch panel 18 of each of the illumination control device 1 displays only the first identification information I_{LED} included in the LED illumination devices 2 configuring the same LED illumination system together with the illumination control device 1. Therefore, according to the first modification example of the LED illumination system, it is possible to prevent the occurrence of such a problem that a system administrator and a user obtain the first identification information I_{LED} from an LED illumination system different from the system administrator's own LED illumination system and then

associates the first identification information I_{LED} with the area image or the symbol image by mistake.

[0076] [3-2] Second Modification Example

In a second modification example of the LED illumination system, in addition to the configuration of the above described preferred embodiments, the gateways GW have second identification information I_{GW} that enables identification of each of the gateways GW. In addition, as shown in Fig. 16, each of the gateways GW is provided with a light emitting unit 5 that emits light to the outside. As the light emitting unit 5, for example, an LED is used.

[0077] Fig. 17 is a flow chart showing a control that the first control unit 13 of the illumination control device 1 executes and an operation that a user performs according to the second modification example of the LED illumination system. In addition, Fig. 18 is a plan view of the illumination control device 1 of which the touch panel 18 displays the second identification information I_{GW} . As shown in Fig. 17, the first control unit 13, in addition to the control shown in Fig. 4, executes the control of step S17 before the control of step S13. In step S17, the first control unit 13 obtains the second identification information I_{GW} of the gateway GW that exists in a range in which it is possible to perform wireless communication with the illumination control device 1. Then, the first control unit 13 causes the touch panel 18 to display the obtained second

identification information I_{GW} (see Fig. 18). As an example, the second identification information I_{GW} is displayed on the touch panel 18 in ascending order of distance between the corresponding gateway GW and the illumination control device 1.

[0078] At this time, the first control unit 13, with respect to each piece of the obtained second identification information I_{GW} , generates a second switch S2 that generates a light-on signal for lighting the light emitting device 5 of the gateway GW possessing the second identification information I_{GW} . Then, the first control unit 13 causes the touch panel 18 to display the generated second switch S2 with the second switch S2 being corresponded to the second identification information I_{GW} . In the present preferred embodiment, the second switch S2 is displayed while being superimposed on the second identification information I_{GW} . The second switch S2 may selectively generate a light-on signal and a light-off signal. Moreover, the second switch S2 may be stored in the storage unit 16, and the first control unit 13 may read the second switch S2 corresponding to each piece of the obtained second identification information I_{GW} from the storage unit 16 and may also cause the touch panel 18 to display the read second switch S2.

[0079] Subsequently, the user selects a gateway GW (step S24). Specifically, in the screen on which the second identification information I_{GW} and the second switch S2 are

displayed, the user, by operating the second switch S2 on the touch panel 18, lights the light emitting unit 5 of the gateway GW. In this manner, the user confirms an actual position of the gateway GW corresponding to the operated second switch S2. Then, the user selects one gateway GW among the gateways GW that exist in the range in which it is possible to perform wireless communication with the illumination control device 1.

[0080] When the gateway GW is selected, in step S13, the first control unit 13, through the selected gateway GW, obtains the first identification information I_{LED} included in the LED illumination devices 2 capable of performing direct wireless communication with this gateway GW. Then, the first control unit 13 causes the touch panel 18 to display the obtained first identification information I_{LED} . Hereinafter, a control similar to the control of the above described preferred embodiments is executed.

[0081] According to the second modification example of the LED illumination system, only the first identification information I_{LED} of the LED illumination devices 2 that exist in the range in which it is possible to perform direct wireless communication with the selected gateway GW is displayed on the touch panel 18. Therefore, it becomes easy to associate the first identification information I_{LED} with the area image or the symbol image by the drag operation.

[0082] In addition, the user, by the operation of the second

switch S2, may light the gateway GW and can confirm the actual position of the gateway GW. Accordingly, the user, by repeatedly executing selection of the gateway GW (step S24) and association of the first identification information I_{LED} with the area image or the symbol image (step S22) while changing the selected gateway GW, can easily perform the association of the first identification information I_{LED} with the area image or the symbol image for all the installed LED illumination devices 2.

[0083] [4] Demand Control to LED Illumination System

Subsequently, a demand control will be explained. The demand control is to monitor the total amount of electric power to be used in an office, a store, or the like and to control the amount of electric power to be consumed (hereinafter will be referred to as an "amount of power consumption") in a load (an illumination device, an air conditioner, or the like) so that the total amount of electric power does not exceed a predetermined threshold value. Then, in the present preferred embodiment, the demand control system to achieve the demand control is constructed. In this demand control system, the total amount of electric power to be used is monitored and the amount of power consumption of the load included in the LED illumination system, the air-conditioning system, or the like is controlled so that the total amount of electric power does not exceed a predetermined threshold value. Hereinafter, a

description will be mainly made of a case in which the demand control is executed to the LED illumination system.

[0084] [4-1] Demand Control System

Fig. 19 is a block diagram conceptually illustrating a configuration of the demand control system including the LED illumination system. As shown in Fig. 19, the demand control system includes a power measurement instrument 71 connected to a power line 70, a demand control device 72, and a contact converter 73. Although not illustrated in Fig. 19, the power line 70 is connected to the LED illumination devices 2, the sensor 4 or the like included in the LED illumination system. The power line 70 may be connected to other loads such as an air conditioner included in an air-conditioning system.

[0085] The power measurement instrument 71 measures the total amount of electric power to be used. The power measurement instrument 71 is connected to the demand control device 72, and the demand control device 72, on the basis of a measurement result (the total amount of electric power) by the power measurement instrument 71, determines whether or not the demand control should be executed. Specifically, the demand control device 72 determines whether or not the measured total amount of electric power has exceeded the predetermined threshold value that has been set previously. In the case in which the total amount of electric power is determined to exceed the predetermined threshold value, the demand control device 72 outputs a demand

control signal to execute the demand control. In the present preferred embodiment, the demand control signal is a contact signal that is output by using an actual contact point such as a relay contact point, or a non-contact signal that is output by using a transistor or the like. On the other hand, in a case in which the total amount of electric power is determined not to exceed the predetermined threshold value, the demand control device 72 stands ready without outputting the demand control signal.

[0086] The demand control device 72 is connected through the contact converter 73 to the network 3 configuring the LED illumination system. Fig. 19, in particular, shows a form in which the demand control device 72 is connected to a hub (HUB). The demand control signal that has been output from the demand control device 72 is input into the contact converter 73. The contact converter 73 converts the input demand control signal into a digital signal. This digital signal is transmitted to the gateways GW in the network 3 through the hub (HUB). Alternatively, the digital signal is transmitted to the LED illumination devices 2 through the network 3.

[0087] Information related to the illumination control to execute with respect to the LEDs 24 of the LED illumination devices 2 when the control instrument or the second control unit 23 receives the digital signal is previously set to the control instrument included in each of the gateways GW or the second

control unit 23 included in each of the LED illumination devices 2. Specifically, as the information related to the illumination control at this time, information in order to reduce the amount of power consumption in the LED illumination devices 2 is employed. An example of the illumination control includes a control of uniformly reducing illuminance of all LED illumination devices 2 to predetermined illuminance that has been set beforehand. Another example of the illumination control includes a control of reducing the illuminance of the LED illumination devices 2, for each region, to predetermined illuminance that has been set beforehand.

[0088] According to the above described demand control system, it is possible to restrain excessive consumption of electric power by executing the demand control to the LED illumination system. Here, the important point is that the LED illumination system of the present preferred embodiment can individually control the plurality of LED illumination devices 2 and also collectively manages the control of the plurality of LED illumination devices 2 and that the demand control is executed to such a LED illumination system. In other words, it is possible to individually set the control (illumination control) of the LED illumination devices 2 executed at a time of the demand control under the collective management of the illumination control device 1, the PC, or the like, so that the demand control signal to be transmitted to the LED illumination

system at the time of the demand control does not have to include the information related to the illumination control and thus a contact signal or a non-contact signal can be used as the demand control signal. Therefore, the construction of the demand control system is easy.

[0089] [4-2] Modification Example Related to Demand Control System

Fig. 20 is a block diagram conceptually illustrating a configuration of the demand control system according to the first modification example of the demand control system. As shown in Fig. 20, any one of the plurality of gateways GW configuring the network 3 may be integrally configured together with the contact converter 73. Thus, the construction of the demand control system may be simplified.

[0090] Fig. 21 is a block diagram conceptually illustrating a configuration of the demand control system according to the second modification example of the demand control system. As shown in Fig. 21, in a demand control system, a PWM (Pulse Width Modulation) converter 74 may be installed in place of the contact converter 73. In such a case, the demand control is executed as follows.

[0091] The demand control device 72, when determining to execute the demand control based on the measurement result (total amount of electric power) of the power measurement instrument 71, outputs a PWM signal as the demand control signal to execute

the demand control. The demand control signal that has been output from the demand control device 72 is input into the PWM converter 74. The PWM converter 74 converts the input demand control signal into a digital signal. This digital signal is transmitted to the gateways GW in the network 3 through the hub (HUB). Alternatively, the digital signal is transmitted to the LED illumination devices 2 through the network 3. Then, the second control unit 23 of the LED illumination devices 2, on the basis of the digital signal (control signal) to be output from the PWM converter 74 or the control signal to be output from the control instrument of the gateway GW according to the digital signal, performs the illumination control (light-on, light-off, dimming, and the like) of the LED 24. In such a case, the information related to the illumination control at the time of the demand control is to be set on the demand control device 72 side. The demand control system may employ not only a configuration in which either one of the contact converter 73 and the PWM converter 74 is installed but also a configuration in which both converters are installed.

[0092] Fig. 22 is a block diagram conceptually illustrating a configuration of a demand control system according to a third modification example of the demand control system. As shown in Fig. 22, any one of the plurality of gateways GW configuring the network 3 may be integrally configured together with the PWM converter 74. Thus, the construction of

the demand control system may be simplified.

[0093] It is to be noted that, each configuration of the present invention is not limited to the above described preferred embodiments but may be variously modified in the technical features described in the scope of the claims. For example, each configuration of the above described LED illumination system can be applied to an illumination system provided with various illumination devices that are not limited to the LED illumination device.

[0094] While the present invention has been described in terms of preferred embodiments at present, such disclosure should not be interpreted restrictively. Various alterations and modifications of the present invention will no doubt become apparent to a person of ordinary skill in the art of the present invention according to the foregoing disclosure. Therefore, the present invention should be understood to include all possible embodiments and modification to the shown preferred embodiments which can be embodied without departing from the spirit and scope of the present invention as set forth in the appended claims.

Reference Signs List

[0095]

1 illumination control device

11 first transmission unit

12	first reception unit
13	first control unit
14	display unit
15	input unit
16	storage unit
17	read-in unit
18	touch panel
2	LED illumination device
21	second transmission unit
22	second reception unit
23	second control unit
24	LED
3	network
4	sensor
5	light emitting unit
6	PC monitor
70	power line
71	power measurement instrument
72	demand control device
73	contact converter
74	PWM converter
GW	gateway
I_{LED}	first identification information
I_{GW}	second identification information
P	lighting layout image

P_{AREA} (1) to P_{AREA} (4) area image

P_{SMBL} symbol image

B1 to B7, B11 to B14 button

EG1 to EG10 button

R region

S1 first switch

S2 second switch

CLAIMS

1. An illumination control device that controls through wireless communication a plurality of illumination devices each possessing first identification information that can identify each of the plurality of illumination devices, the illumination control device comprising:

- a transmission unit that transmits a control signal including at least any one of a light-on signal, a light-off signal, and a dimming signal;

- a control unit;

- a display unit;

- an input unit; and

- a storage unit,

wherein the control unit executes:

- a control (i) of causing the display unit to display a symbol image to be corresponded to at least one of the illumination devices;

- a control (ii) of obtaining the first identification information and also causing the display unit to display the obtained first identification information;

- a control (iii) of, when the first identification information displayed on the display unit is dragged by an operation from the input unit to a position in which the first identification information is superimposed on the symbol image,

causing the storage unit to store the dragged first identification information with the dragged first identification information being associated with the symbol image on which the first identification information is superimposed, and thereby causing the illumination device having the first identification information and the symbol image to be corresponded to each other;

a control (iv) of causing the storage unit to store the illumination control information being associated with the symbol image, the illumination control information being related to the control of the illumination device corresponded to the symbol image in the control (iii); and

a control (v) of generating the control signal on the basis of the first identification information and the illumination control information that are associated with the symbol image and also transmitting the generated control signal through the transmission unit to the illumination device corresponded to the symbol image.

2. The illumination control device according to claim 1, wherein:

the symbol image is an image that symbolizes that the symbol image corresponds to at least one of the illumination devices arranged at a position in which the illumination device is superimposed on the symbol image, on a lighting layout image that indicates positions of the plurality of illumination

devices;

the control unit, before the control (i), further executes a control (vi) of causing the display unit to display the lighting layout image; and

the control unit, in the control (i), causes the display unit to display the symbol image with the symbol image being superimposed on the lighting layout image.

3. The illumination control device according to claim 1 or 2, wherein the control unit, in the control (ii), causes the display unit to display a first switch that generates the light-on signal for lighting the illumination device having the obtained first identification information with the first switch being corresponded to the obtained first identification information.

4. The illumination control device according to any one of claims 1 to 3, wherein:

the symbol image is an area image that represents an area where the illumination devices in which a same illumination control is executed are arranged;

the control unit, in the control (iii), causes the storage unit to store the first identification information of all the illumination devices in the area represented by the area image with the first identification information being associated with the area image; and

the control unit, in the control (v), transmits the control signal through the transmission unit to all the illumination devices in the area represented by the area image.

5. The illumination control device according to any one of claims 1 to 4, further comprising a reception unit that receives information signal including the first identification information, the information signal being a signal to be transmitted from the illumination devices during wireless communication, wherein the control unit, in the control (ii), obtains the first identification information included in the information signal by causing the reception unit to receive the information signal and causes the display unit to display the obtained first identification information.

6. The illumination control device according to any one of claims 1 to 4, further comprising a read-in unit that reads in a QR code (registered trademark), wherein:

each of the illumination devices includes the QR code (registered trademark) corresponding to the first identification information;

the storage unit stores a table representing a correspondence between the first identification information and the QR code (registered trademark); and

the control unit, in the control (ii), on a basis of the

table, obtains the first identification information corresponding to the QR code (registered trademark) read in by the read-in unit and causes the display unit to display the obtained first identification information.

7. An illumination system comprising:

the plurality of illumination devices; and

the illumination control device according to any one of claims 1 to 6, the illumination control device controlling the plurality of illumination devices through wireless communication.

8. The illumination system according to claim 7, further comprising a plurality of communication relay instruments that perform wireless communication with the illumination devices and the illumination control device and also that are wire-connected to one another, each of the plurality of communication relay instruments including second identification information that can identify each of the plurality of communication relay instruments, the illumination control device performing communication with the illumination devices through at least one of the communication relay instruments, wherein:

the control unit, in the illumination control device, further executes a control (vii) of obtaining the second

identification information of the communication relay instrument that exists in a range in which it is possible to perform wireless communication with the illumination control device and also causing the display unit to display the obtained second identification information; and

the control unit, in the control (ii), through the communication relay instrument corresponding to a piece of the second identification information selected by the operation from the input unit among pieces of the second identification information displayed on the display unit, obtains the first identification information included in the illumination device capable of performing direct wireless communication with the corresponding communication relay instrument and also causes the display unit to display the obtained first identification information.

9. The illumination system according to claim 8, wherein:

each of the communication relay instruments includes a light emitting unit that emits light outside; and

the control unit, in the control (vii), causes the display unit to display a second switch that generates the light-on signal for lighting the light emitting unit of the communication relay instrument having the obtained second identification information with the second switch being corresponded to the obtained second identification information.

10. The illumination system according to any one of claims 7 to 9, further comprising:

an illuminance sensor installed in a space in which the plurality of illumination devices are arranged; and

a human detection sensor installed integrally with or separately from the illuminance sensor, wherein the control unit, in the control (v), generates the control signal, on a basis of a detection signal that is output from the illuminance sensor and the human detection sensor, in addition to the first identification information and the illumination control information that are associated with the symbol image.

ILLUMINATION CONTROL DEVICE, AND ILLUMINATION SYSTEM

ABSTRACT OF THE DISCLOSURE

An illumination control device and an illumination system that are capable of individually controlling a plurality of illumination devices and also collectively managing the control of the illumination devices are provided.

In the illumination control device, a control unit causes a display unit to display a symbol image to be corresponded to at least one of the illumination devices. Subsequently, the control unit obtains first identification information included in the illumination devices and also causes the display unit to display the obtained first identification information. Then, the control unit causes the storage unit to store the first identification information being associated with the symbol image, and thereby causes the illumination devices and the symbol image to be associated with each other. Then, the control unit causes the storage unit to store illumination control information related to the control of the illumination devices corresponded to the symbol image with the illumination control information being associated with the symbol image. Thereafter, the control unit generates a control signal on the basis of the first identification information and the illumination control information that are associated with the symbol image, and also transmits the generated control signal to the illumination device corresponded to the symbol image.