

METHOD FOR CONTROLLING STOP POSITION OF ELEVATOR CAGE

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to a method for controlling a stop position of an elevator cage, and in particular to an improved method for controlling a stop position of an elevator cage capable of more correctly controlling a stop position of an elevator cage using a certain value obtained by converting a light received from a light emitting device into a digital value when a position detection plate is inserted between light emitting devices and light receiving devices of a sensor.

2. Description of the Conventional Art

Referring to Fig. 1, the conventional method of controlling a stop position of an elevator cage includes a cage 1 ascending/descending along an ascending/descending path of the elevator, a position detection plate 2 attached to a side wall of each floor of the ascending/descending path, a sensor 3 disposed at a predetermined portion of the cage 1 for detecting the position detection plate 2, and a tail cord 7 for transmitting a voltage outputted from the sensor 3 to an input/output port 6 of a main board disposed in a machinery installation chamber 4.

The operation of a conventional method for controlling a stop position of an elevator cage will now be explained.

To begin with, when the cage 1 is positioned at a predetermined door zone, and when a position detection plate 2 is disposed between a primary coil 3' and a secondary coil 3" as shown in Fig. 2. When the position detection plate 2 is disposed therebetween,

the position detection plate 2 works as a magnetic metal of a transformer, and the alternating current supplied to the primary coil 3' is inducted to the secondary coil 3" and supplied to the input/output port 6 of the main board 6 through the tail cord 7.

Therefore, since the voltage inducted to the secondary coil 3" of the sensor 3 is in proportion to the length of the position detection plate 2, when the voltage level supplied to the input/output port 6 of the main board 5 reaches a maximum level, the central processing unit (not shown) judges that the cage 1 is positioned at a normal position, stops the cage 1, and opens the door of the elevator.

However, the conventional method for controlling a stop position of an elevator cage has disadvantages in that when the voltage inducted to the secondary coil of the sensor is transmitted to the input/output port of the main board through the tail cord, a voltage descending phenomenon takes place due to the characteristics of the material of the tail cord or the voltage variations from neighboring buildings. In addition, a more accuracy cage stop position cannot be achieved because of the variations of the alternating current supplied to the primary coil.

Moreover, controlling a stop position of a cage takes time because of controlling the stop position of the cage by converting the voltage outputted from the input/output port into a digital value.

SUMMARY OF THE INVENTION

Accordingly, it is an object of the present invention to provide a method for controlling a stop position of an elevator cage, which overcome the problems encountered in a conventional method for controlling a stop position of an elevator cage.

It is another object of the present invention to provide an improved method for

controlling a stop position of an elevator cage capable of more correctly controlling a stop position of an elevator using a certain value obtained by converting a light received from a light emitting device into a digital value when a position detection plate is disposed between light emitting devices and light receiving devices of a sensor.

To achieve the above objects, there is provided a method for controlling a stop position of an elevator cage, which includes the steps of a first step which judges whether or not the elevator cage is positioned at a door zone when a position detection plate is inserted between a plurality of light emitting devices and a plurality of light receiving devices in accordance with an ascending/descending operation of the elevator cage, and generates a predetermined number of lights by turning on/off the light emitting devices of a sensor; a second step which converts the predetermined number of lights of the first step passed through the position detection plate inserted between the light emitting devices and the light receiving devices of the sensor; and a third step which compares the digital data value of the second step with a previously set reference value and controls a stop position of an elevator cage in accordance with a result of the comparison.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a plan view of a construction of a conventional elevator.

Fig. 2 is a view of a sensor and a position detection plate when a cage of an elevator is positioned at a door zone of Fig. 1.

Fig. 3A is a perspective view of a construction of a sensor adopted in the present invention.

Fig. 3B is a plan view of a construction of a sensor adopted in the present invention.

Fig. 3C is a front view of a construction of a sensor adopted in the present invention.

Fig. 4 is a view of a position detection plate adopted in the present invention.

Fig. 5 is a flow chart of a method for controlling a stop position of an elevator cage according to the present invention.

DETAILED DESCRIPTION OF THE INVENTION

Referring to Fig. 5, a method for controlling a stop position control of an elevator cage according to the present invention includes the steps of a first step having a sub-step S1 which judges whether or not the cage is positioned at a predetermined door zone when a position detection plate is inserted between the light emitting devices and the light receiving devices of the sensor and a sub-step S2 which causes a plurality number of the light emitting devices to be turned on, a second step which receives the lights of the first step and converts the lights into a digital data, and a third step which receives the digital data of the second step, compares the data with a previously set reference value, and controls a stop position of the cage in accordance with the comparison result thereof.

The third step includes a first sub-step, a second sub-step, and a third sub-step.

In more detail, the first sub-step receives the digital data converted thereby -S3- and compares whether or not a first digital data value outputted from the upper sensor of the light receiving devices is greater than a reference value "1." The second sub-step judges that the cage is positioned at a predetermined position higher than a normal position when the first digital data value is greater than "1" and descend the cage downward -S6- and feeds back to the first sub-step, and when the first digital data value is the same as or smaller than "1," compares a second digital value is greater than "1"

outputted from a lower sensor of the light receiving device -S7-. The third sub-step judges that the cage is positioned at a predetermined position lower than a normal position when the second digital data value is greater than "1," and ascends the cage upward -S8- and feeds back to the first sub-step and the second sub-step, and when the second digital data value is the same as or smaller than "1," compares whether or not the first digital data value is the same as "1" -S9-. The fourth sub-step executes the first sub-step through the third sub-step repeatedly when the first digital data value is not the same as "1" and compares the second digital data value with "1" when the first digital data value is the same as "1" -S10-. The fifth sub-step feeds back to the first sub-step through the fourth sub-step when the second digital data value is the same as "1," and judges that the cage is positioned at a normal position when the second digital data value is the same as "1," and stops the cage -S11-, and opens the door -S13- by turning on/off the light emitting device.

The operation of the cage stop position control method for an elevator according to the present invention will now be explained.

To begin with, when the position detection plate 2 is inserted between the light emitting devices and the light receiving devices, denoted as a distance "L," of the sensor 3 of Fig. 3A, the central processor unit (not shown) provided on the main board 5 judges that the cage is positioned at the door zone -S1- in accordance with an encoding value of a motor (not shown) corresponding to the height of each floor.

Here, the encoding values varies due to the elongation of the rope and causes errors in the central processing unit during the sub-step S1.

Therefore, so as to compensate the errors, the present invention is directed to turning on/off the light emitting devices 9.

As the light emitting devices 9 are turned on/off, 8 (eight) upper sensors 11 and

8 (eight) lower sensors 120 generate a plurality of lights from the light emitting device 9 as shown in Figs. 3A and 3C.

Therefore, the lights emitted from the upper sensors 11 and the lower sensors 12 of the light emitting device 9 are transmitted to the upper sensors 13 and the lower sensors 14 of the light receiving devices 10 through the holes formed on the upper and lower portions of the position detection plate 1.

The upper sensors 13 and the lower sensors 14 of the light receiving device 10 converts the lights transmitted thereto into a digital data -S3-, and the digital data are in parallel transmitted to the input/output port 6 of the main board 5 through the tail cord 7 so as to minimize the time delay of the data transmission -S4-.

Thereafter, the central processing unit compares whether or not the digital data value outputted from the upper sensor 13 of the light receiving device 10 as shown in Fig. 3A is greater than a reference value "1" -S5-.

As a result, when the first digital data value is greater than "1," the central processing unit judges that the cage 1 is positioned at a predetermined position upper than a normal position, descend the cage 1 downward, and feeds back to the sub-step S5.

Meanwhile, as a result of the comparison, when the first digital data value is the same as or smaller than "1," the central processing unit compares whether or not the second digital data is greater than a reference value "1" outputted from the lower sensor 14 in the light receiving device -S7-.

As a result of the comparison, when the second digital data value is greater than "1," the central processing unit judges that the cage is positioned at a predetermined position lower than a normal position, ascends the cage 1 upward, and feeds back to the sub-steps S5 through S8.

Meanwhile, as a result of the comparison, when the second digital data value is

the same as or smaller than "1," the central processing unit compares whether or not the first digital data value is the same as "1" -S9-.

As a result of the comparison, when the first digital data value is not the same as "1," the central processing unit executes the sub-steps S4 through S9, and when the first digital data value is the same as "1," the central processing unit compares whether or not the second digital data value is the same as "1."

As a result of the comparison, when the second digital data value is not the same as "1," the sub-steps S5 through S10 are executed in order. When the second digital data value is the same as "1," the central processing unit judges that the cage 1 is positioned at a normal position, stops the cage 1 -S11-, turns on/off the light emitting devices 9 -S12-, and opens the door of the elevator -S13-.

As described above, the method for controlling a stop position of an elevator cage according to the present invention is directed to turning on/off the light emitting devices when a position detection plate having a plurality of holes formed therein is inserted between the light emitting devices and the light receiving devices and converting the light transmitted through the holes formed on the position detection plate, thus more correctly controlling the cage stop position for an elevator using the digital value.



What is claimed is:

1. A method for controlling a stop position of an elevator cage, including the steps of:

a first step which judges whether or not said elevator cage is positioned at a door zone when a position detection plate is inserted between a plurality of light emitting devices and a plurality of light receiving devices in accordance with an ascending/descending operation of the elevator cage, and generates a predetermined number of lights by turning on/off said light emitting devices of a sensor;

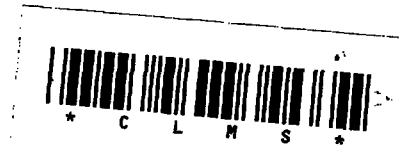
a second step which converts said predetermined number of lights of said first step passed through said position detection plate inserted between the light emitting devices and the light receiving devices of the sensor; and

a third step which compares the digital data value of said second step with a previously set reference value and controls a stop position of an elevator cage in accordance with a result of said comparison.

2. The method of claim 1, wherein said predetermined number of lights of the first step are transmitted from upper sensors and lower sensors, respectively.

3. The method of claim 1, wherein said digital data is obtained so that the predetermined number of the lights are transmitted to the upper sensors and the lower sensors of the light receiving device, passed through the holes which are formed to have a different row and a different number thereof in each row.

4. The method of claim 1, wherein said third step includes the sub-steps of:



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a first sub-step which receives the digital data and compares whether or not a first digital data value outputted from the upper sensors is greater than a reference value;

a second sub-step which judges that the cage is positioned at a predetermined position upper than a normal position when said first digital data value is greater than said reference value, descends the cage, and repeatedly executes said first bus-step, and when the first digital data value is the same as or smaller than the reference value and compares whether or not a second digital data value outputted from the lower sensor is greater than the reference value;

a third sub-step which judges that the cage is positioned at a predetermined position lower than a normal position when said digital data value is greater than said reference value, ascends the cage, and repeatedly executes the first and second sub-steps, and when the second digital data value is the same as or smaller than the reference value, compares whether or not the first digital data value is greater than the reference value;

a fourth sub-step which repeatedly executes the first and third sub-steps when the first digital data value is not the same as the reference value, and when the first digital data value is the same as the reference value, compares whether or not the second digital data value is greater than the reference value; and

a fifth sub-step which repeatedly executes the first through fourth sub-steps when the second digital data value is not the same as the reference value, and when the second digital data value is the same as the reference value, judges that the cage is positioned at the normal position and stops the cage.

5. The method of claim 1, wherein said digital data outputted by the third step is obtained by the second step in parallel form.