

# **INSTALLATION DEVICE FOR INTEGRAL BUILDING MODULE OF BUILDING AND INSTALLATION METHOD THEREOF**

## **TECHNICAL FIELD**

[0001] The present disclosure relates to the architectural field, and in particular to an installation device for an integral building module of a building and an installation method thereof.

## **BACKGROUND**

[0002] At present, prefabricated building is already very popular in Europe, America and Japan. However, it is still in an initial stage in China as a new building manner. Members of a prefabricated building can be produced in factories in a standardized and industrialized manner, and then transported to a construction site to be installed like building blocks. Thus, house construction is convenient and rapid. However, a bathroom in a prefabricated house is the most complex unit in house construction, which includes water supply and drainage pipes, waterproof works, circuits, sanitary wares, lamps, and the like. In a traditional construction scheme, constructions of parts such as water supply and drainage pipes, waterproof works and circuits are performed in synchronization with integral framework construction, thereby causing problems such as prolonged site construction time.

[0003] Patent Application No. 201510895502.X, with publication No. CN105421826A, entitled “PREFABRICATED INTEGRAL BATHROOM AND CONSTRUCTION METHOD THEREOF” has solved the above problems. The integral bathroom has advantages of light weight, load bearing, heat preservation, thermal insulation, durability, earthquake resistance, excellent fire resistance and sound insulation performances. However, when an integral bathroom is installed in a prefabricated building, a certain limitation may often be brought to its installation due to its installation space, bringing great difficulty to in-place installation.

[0004] At present, the installation of the integral bathroom in the prefabricated building is mainly carried out by lifting with a crane in cooperation with a forklift. However, lifting by the crane requires a large installation space, and the forklift has low installation precision and thus has to perform repeated corrections. Further, a local load bearing capacity of a floor is also a problem to be considered.

## **SUMMARY**

[0005] An objective of the present disclosure is to provide an installation device for an integral building module of a building and an installation method thereof, which can move the integral building module as a whole in complex conditions of small space, obstacles at two sides, and fixed-point installation at a sinking portion of a floor, and can perform accurate locating and integral installation.

[0006] A technical solution of the present disclosure is described below.

[0007] An installation device for an integral building module of a building mainly includes a console, an adjustment device, a connecting device, a lifting device, and an anti-tilt device.

The console is connected to the adjustment device and the lifting device respectively. The connecting device is connected to the lifting device and the adjustment device respectively. One end of the anti-tilt device is connected to the connecting device, and the other end of the anti-tilt device is provided with a counterweight hook, so as to dispose a counterweight according to requirements. A power source and an air source are supplied by external apparatuses.

[0008] The console is provided with various control switches including an electrical apparatus control switch, an oil cylinder control switch, an air source control switch, an adjustment switch, and the like.

[0009] The adjustment device includes a telescopic arm. The telescopic arm can extend or retract according to a size of an integral installation apparatus under the control of the console.

[0010] The connecting device includes three connecting supports and an independent connecting support. The connecting supports are connected to the telescopic arm respectively. The connection device is further provided with a connecting bracing support. An upper end of the connecting device is provided with a top connecting piece capable of performing insertion and fixed connection in cooperation with a bolt fixing hole disposed on the top of the integral building module. A lower end of the connecting device is provided with a bottom hook capable of being fixedly connected to a bottom lifting hole of the integral building module.

[0011] The lifting device mainly includes an oil cylinder, a lifting support, a telescopic guide rod, and a locating pin. A lower part of the lifting device is provided with an air cushion type transport device or a roller transport device. The lifting device is further provided with a self-walking device to facilitate transporting the integral building module for in-place installation. The lifting support is connected to the self-walking device. The telescopic guide rod is provided with a locating pin.

[0012] The self-walking device includes a plurality of universal wheels.

[0013] The air cushion type transport device includes four movable air cushions. The air cushion is provided with a compressed air connecting mouth connected to an external air source.

[0014] The connecting support is configured to be driven by the lifting support and the oil cylinder to perform ascending, locating or descending.

[0015] An installation method of the installation device for an integral building module of a building includes steps of transporting, locating and sinking installation, wherein the method include:

step (A), according to a size and a height of the integral building module, controlling and adjusting a length of the telescopic arm of the adjustment device by the console to match with the integral building module; adjusting a height of the top connecting piece of the connecting support in the connecting device to match with the top connecting piece of the integral building module; and transporting the installation device by the self-walking device to closely contact with the integral building module;

step (B), fixedly connecting the top connecting pieces of the connecting supports to the top connecting pieces of three corners of the integral building module; placing the bottom hooks of the connecting supports into the bottom lifting holes of the integral building module;

then, fixedly connecting the top connecting piece of the independent connecting support to the top connecting piece of the integral building module;

step (C), driving oil cylinders of four lifting devices by the console to ascend synchronously, and driving the four lifting supports, connecting supports, and the integral building module to ascend to 2-4 centimeters from the ground at the same time; installing the locating pins on the telescopic guide rods to locate the lifting supports;

step (D), disposing a corresponding counterweight onto the anti-tilt device to maintain a balanced state relative to the ground until the integral building module completes an ascending action;

step (E), placing the air cushion type transport device below the lifting device; after receiving a compressed air, driving, by the installation device, the integral building module to ascend; at the same time, separating the self-walking device from a floor plane to cause the installation device to leave the ground and to be in an easily movable state;

step (F), transporting the integral building module to a predetermined adjustment position by the air cushion type transport device; then, removing the independent connecting support; at the same time, adjusting the counterweight to maintain the balanced state of the integral building module with respect to the ground;

step (G), transporting the integral building module to a sinking installation position by the air cushion type transport device; then, cutting off supply of the compressed air to the air cushion type transport device to allow the universal wheels of the self-walking device to fall onto the floor plane, the locating being completed at this time;

step (H), removing the locating pins on the telescopic guide rods of the lifting devices; synchronously controlling three oil cylinders to descend; descending the integral building module into the sinking installation position;

step (I), disconnecting three top connecting pieces with the integral building module and releasing the bottom hooks; transporting the installation device away through the universal wheels of the self-walking device to complete accurate an in-place installation of the integral building module.

[0016] The integral building module includes an integral bathroom and an integral kitchen.

## BRIEF DESCRIPTION OF THE DRAWINGS

[0017]

FIG. 1 is a three-dimensional schematic diagram illustrating installation of an integral bathroom according to a first embodiment of the present disclosure.

FIG. 2 is a three-dimensional schematic diagram illustrating a partial structure of a lifting device according to the first embodiment of the present disclosure.

FIG. 3 is a schematic diagram illustrating a partial structure of a lifting device according to the first embodiment of the present disclosure.

FIG. 4 is a schematic diagram illustrating a telescopic structure of an adjustment device according to the first embodiment of the present disclosure.

FIG. 5 is a structural schematic diagram illustrating a side of a connecting support according to the first embodiment of the present disclosure.

FIG. 6 is a structural schematic diagram illustrating another side of a connecting support according to the first embodiment of the present disclosure.

FIG. 7 is a structural schematic diagram illustrating a connecting piece disposed at an upper end of an integral bathroom according to the first embodiment of the present disclosure.

FIG. 8 is a structural top view illustrating a fixed connection of a connecting device and a connecting piece according to the first embodiment of the present disclosure.

FIG. 9 is a structural schematic diagram illustrating a fixed connection of a bottom of an integral bathroom and a connecting device according to the first embodiment of the present disclosure.

FIG. 10 is a structural schematic diagram illustrating a lifting device according to the first embodiment of the present disclosure.

FIG. 11 is a structural top view illustrating a connection of an installation device and an integral bathroom according to the first embodiment of the present disclosure.

FIG. 12a is a schematic diagram illustrating an installation position of an integral bathroom according to the first embodiment of the present disclosure and FIG. 12b is a structural top view illustrating a process of connecting an installation device with an integral bathroom moving to an installation position according to the first embodiment of the present disclosure.

FIG. 13 is a structural top view after an integral bathroom is installed to be in place by an installation device according to the first embodiment of the present disclosure.

FIG. 14 is a horizontal view after an integral bathroom is installed to be in place by an installation device according to the first embodiment of the present disclosure.

FIG. 15 is a horizontal view illustrating an installation device and an integral bathroom moving to an installation position during connection process according to the first embodiment of the present disclosure.

FIG. 16 is a horizontal view illustrating an installation device and an integral bathroom moving to a sinking installation position during connection process according to the first embodiment of the present disclosure.

FIGs. 17-1, 17-2, 17-3 and 17-4 are structural schematic diagrams and three-dimensional diagrams of a roller transport device according to a second embodiment of the present disclosure.

FIGs. 18-1, 18-2 and 18-3 are structural schematic diagrams and three-dimensional diagrams of a top balancing device according to a third embodiment of the present disclosure.

FIG. 19 is a three-dimensional schematic diagram illustrating installation of an integral bathroom according to the second embodiment of the present disclosure.

FIG. 20 is a three-dimensional schematic diagram illustrating installation of an integral bathroom according to the third embodiment of the present disclosure.

[0018] Reference numerals in the drawings are described as follows:

installation device 1; console 2; adjustment device 3; telescopic arm 31;  
connecting device 4; connecting supports 41, 42 and 43; independent connecting support 44;  
connecting bracing support 45; top connecting piece 46; bottom hook 47;  
lifting device 5; oil cylinder 51; lifting support 52; telescopic guide rod 53; locating pin 54;  
air cushion type transport device 55; self-walking device 56;  
anti-tilt device 6; counterweight hook 61; counterweight 62 (not shown);  
integral bathroom 7; integral bathroom bottom lifting hole 71; integral bathroom top connecting piece 72; bolt fixing hole 73 (mate with the connecting piece 46);  
integral bathroom installation position 8; wall 9; floor plane 10;

pipe shaft position 11; installation position floor sinking portion 12;  
roller transport device 13; rotary disk 131; walking wheel 132;  
top balancing device 14; lifting spiral structure 141; top universal wheel 142.

## DETAILED DESCRIPTION OF THE EMBODIMENTS

[0019] The present disclosure will be further described below in combination with accompanying drawings and embodiments.

[0020] The following descriptions related to an installation facility as an integral bathroom 7 are made below:

[0021] Embodiment 1:

[0022] As shown in FIGs. 1-11, an installation device 1 of the present disclosure mainly includes a console 2, an adjustment device 3, a connecting device 4, a lifting device 5, and an anti-tilt device 6. The console 2 is connected to the adjustment device 3 and the lifting device 5 respectively. The connecting device 4 is connected to the lifting device 5 and the adjustment device 3 respectively. One end of the anti-tilt device 6 is connected to the connecting device 4, and the other end of the anti-tilt device 6 is provided with a counterweight hook 61, so as to dispose a counterweight according to requirements. A power source and an air source are supplied by external apparatuses.

[0023] The console 2 is provided with different control switches including an electrical apparatus control switch, an oil cylinder control switch, an air source control switch, an adjustment switch, and the like.

[0024] The adjustment device 3 includes a telescopic arm 31. The telescopic arm 31 can extend or retract according to a size of an integral bathroom 7 under the control of the console 2.

[0025] The connecting device 4 includes connecting supports 41, 42 and 43 and an independent connecting support 44. The connecting supports 41, 42 and 43 are connected to the telescopic arm 31 respectively; the connection device 4 is further provided with a connecting bracing support 45. An upper end of the connecting device 4 is provided with a top connecting piece 46 capable of performing insertion and fixed connection in cooperation with a bolt fixing hole 73 disposed on the top of the integral bathroom 7. A lower end of the connecting device 4 is provided with a bottom hook 47 capable of being fixedly connected to a bottom lifting hole 71 disposed on the integral bathroom 7.

[0026] As shown in FIGs. 2, 3 and 10, the lifting device 5 mainly includes an oil cylinder 51, a lifting support 52, a telescopic guide rod 53 and a locating pin 54. A lower part of the lifting device 5 is provided with an air cushion type transport device 55. The lifting device 5 is further provided with a self-walking device 56, so as to facilitate moving the integral bathroom 7 for an in-place installation. The lifting support 52 is connected to the self-walking device 56. The telescopic guide rod 53 is provided with the locating pin 54.

[0027] The self-walking device 56 includes a plurality of universal wheels.

[0028] The air cushion type transport device 55 includes four movable air cushions. The air cushion is provided with a compressed air connecting mouth connected to an external air source.

[0029] The connecting supports 41, 42, 43 and 44 are driven by the lifting supports 52 and

the oil cylinders 51 to perform ascending, locating or descending.

[0030] As shown in FIGs. 12-16, an installation method of the integral bathroom according to the present disclosure includes the following steps:

step (A), according to a size and a height of the integral bathroom 7, controlling and adjusting, by the console 2, a length of the telescopic arm 31 of the adjustment device 3 to match with the integral bathroom 7; adjusting heights of top connecting pieces 46 of the connecting supports 41, 42, 43 and 44 in the connecting device 4 to match with top connecting pieces 72 of the integral bathroom 7; transporting the installation device 1 by the self-walking device 56 to closely contact with the integral bathroom 7;

step (B), fixedly connecting the top connecting pieces 46 of the connecting supports 41, 42 and 43 to the top connecting pieces 72 of three corners of the integral bathroom 7; placing the bottom hooks 47 of the connecting supports 41, 42 and 43 into the bottom lifting holes 71 of the integral bathroom 7; then, fixedly connecting the top connecting piece 46 of the independent connecting support 44 to the top connecting piece 72 of the integral bathroom 7;

step (C), driving oil cylinders 51 of four lifting devices 5 by the console 2 to ascend synchronously, so as to drive four lifting supports 52, four connecting supports 41, 42, 43 and 44 and the integral bathroom 7 to ascend to 2-4 centimeters from the ground at the same time; installing the locating pins 54 on the telescopic guide rods 53 to locate the lifting supports 52;

step (D), disposing a corresponding counterweight 62 (not shown) onto the hook 61 of the anti-tilt device 6 to maintain a balanced state with respect to the ground until the integral bathroom 7 completes an ascending action;

step (E), placing the air cushion type transport device 55 below the lifting device 5; after receiving compressed air, driving, by the installation device 1, the integral bathroom 7 to ascend; at this time, separating the self-walking device 56 from a floor plane 10 to cause the installation device 1 to leave the ground and to be in an easily movable state;

step (F), transporting the integral bathroom 7 to a predetermined adjusting position by the air cushion type transport device 55; then, removing the independent connecting support 44; at the same time, adjusting the counterweight 62 to maintain the balanced state of the integral bathroom 7 with respect to the ground;

step (G), transporting the integral bathroom 7 to an installation position floor sinking portion 12 by the air cushion type transport device 55; then, cutting off supply of the compressed air to the air cushion type transport device 55 to cause the universal wheels of the self-walking device 56 to fall onto the floor plane 10, locating being completed at this time;

step (H), removing the locating pins 54 on the telescopic guide rods 53 of the lifting devices 5; controlling three oil cylinders 51 to descend synchronously; descending the integral bathroom 7 into the installation position floor sinking portion 12;

step (I), disconnecting three top connecting pieces 46 with the integral bathroom 7 and releasing the bottom hooks 47; transporting the installation device 1 away through the universal wheels of the self-walking device 56 to complete an accurate in-place installation of the integral bathroom.

[0031] Embodiment 2:

[0032] As shown in FIG. 17, a roller transport device 13 of the present disclosure includes a rotary disk 131 and a walking wheel 132.

[0033] As shown in FIG. 19, another installation method of the integral bathroom according to the present disclosure includes the following steps:

step (A), according to the size and the height of the integral bathroom 7, controlling and adjusting, by the console 2, the length of the telescopic arm 31 of the adjustment device 3 to match with the integral bathroom 7; adjusting the heights of the top connecting pieces 46 of the connecting supports 41, 42, 43 and 44 in the connecting device 4 to match with the top connecting pieces 72 of the integral bathroom 7; moving the installation device 1 by the self-walking device 56 to closely contact with the integral bathroom 7;

step (B), fixedly connecting the top connecting pieces 46 of the connecting supports 41, 42 and 43 to the top connecting pieces 72 of three corners of the integral bathroom 7; placing the bottom hooks 47 of the connecting supports 41, 42 and 43 into the bottom lifting holes 71 of the integral bathroom 7; then, fixedly connecting the top connecting piece 46 of the independent connecting support 44 to the top connecting piece 72 of the integral bathroom 7;

step (C), placing the roller transport device 13 below the lifting device 5, wherein a lower part of the roller transport device 13 is provided with the walking wheels 132, and an upper part of the roller transport device 13 is provided with the rotary disk 131 capable of rotating horizontally;

step (D), driving the oil cylinders 51 of four lifting devices 5 by the console 2 to ascend synchronously, so as to drive four lifting supports 52, four connecting supports 41, 42, 43 and 44 and the integral bathroom 7 to ascend to 2-4 centimeters from the ground at the same time; installing the locating pins 54 on the telescopic guide rods 53 to locate the lifting supports 52;

step (E), disposing a corresponding counterweight 62 (not shown) onto the hook 61 of the anti-tilt device 6 to maintain a balanced state with respect to the ground until the integral bathroom 7 completes an ascending action;

step (F), transporting the integral bathroom 7 to the predetermined adjusting position by the roller transport device 13; then, removing the independent connecting support 44; at the same time, adjusting the counterweight 62 to maintain the balanced state of the integral bathroom 7 with respect to the ground;

step (G), moving the integral bathroom 7 to the installation position of a floor sinking portion 12 by the roller transport device 13 to complete locating at this time;

step (H), removing the locating pins 54 on the telescopic guide rods 53 of the lifting device 5; controlling three oil cylinders 51 to descend synchronously; wherein the integral bathroom 7 descends into the installation position floor sinking portion 12;

step (I), disconnecting three top connecting pieces 46 with the integral bathroom 7 and releasing the bottom hooks 47; transporting the installation device 1 away through the universal wheels of the self-walking device 56, so that the accurate in-place installation of the integral bathroom is completed.

[0034] Embodiment 3:

[0035] As shown in FIG. 18, a top balancing device 14 of the present disclosure includes a lifting spiral structure 141 and a top universal wheel 142.

[0036] As shown in FIG. 20, still another installation method of the integral bathroom includes the following steps:

step (A), according to the size and the height of the integral bathroom 7, controlling and adjusting, by the console 2, the length of the telescopic arm 31 of the adjustment device 3 to match with the integral bathroom 7; adjusting the heights of the top connecting pieces 46 of the connecting supports 41, 42, 43 and 44 in the connecting device 4 to match with the top connecting pieces 72 of the integral bathroom 7; moving the installation device 1 by the self-walking device 56 to closely contact with the integral bathroom 7;

step (B), fixedly connecting the top connecting pieces 46 of the connecting supports 41, 42 and 43 to the top connecting pieces 72 of three corners of the integral bathroom 7; placing the bottom hooks 47 of the connecting supports 41, 42 and 43 into the bottom lifting holes 71 of the integral bathroom 7; then, fixedly connecting the top connecting piece 46 of the independent connecting support 44 to the top connecting piece 72 of the integral bathroom 7;

step (C), driving the oil cylinders 51 of four lifting devices 5 by the console 2 to ascend synchronously, so as to drive four lifting supports 52, four connecting supports 41, 42, 43 and 44 and the integral bathroom 7 to ascend to 2-4 centimeters from the ground at the same time; installing the locating pins 54 on the telescopic guide rods 53 to locate the lifting supports 52;

step (D), adjusting the lifting spiral structure 141 of the top balancing device 14 to cause the top universal wheel 142 of the top balancing device to be against a roof, so as to maintain a balanced state with respect to the ground until the integral bathroom 7 completes an ascending action;

step (E), disposing the air cushion type transport device 55 below the lifting device 5; after receiving the compressed air, moving the integral bathroom 7 in an ascending manner by the installation device 1; at this time, separating the self-walking device 56 away from the floor plane 10 to cause the installation device 1 to leave the ground and to be in the easily movable state;

step (F), transporting the integral bathroom 7 to the predetermined adjusting position by the air cushion type transport device 55; then, removing the independent connecting support 44; at the same time, adjusting the top balancing device 14 to cause the top universal wheel 142 of the top balancing device to always maintain in a sliding contact with the roof along with a movement of the integral bathroom 7, thereby maintaining a balanced state of the integral bathroom 7 with respect to the ground;

step (G), moving the integral bathroom 7 to the installation position of the floor sinking portion 12 by the air cushion type transport device 55; then, cutting off the compressed air of the air cushion type transport device 55 to cause the universal wheels of the self-walking device 56 to fall onto the floor plane 10, and to complete locating at this time;

step (H), removing the locating pins 54 from the telescopic guide rods 53 of the lifting device 5; controlling three oil cylinders 51 to descend synchronously; wherein the integral bathroom 7 descends into the installation position floor sinking portion 12;

step (I), adjusting the lifting spiral structure 141 of the top balancing device 14 to release the contact between the top universal wheel 142 of the top balancing device and the roof, disconnecting three top connecting pieces 46 with the integral bathroom 7 and releasing the bottom hooks 47; separating the installation device 1 away through the universal wheels of the self-walking device 56, so that the accurate in-place installation of the integral bathroom is completed.

## INDUSTRIAL APPLICABILITY

[0037] According to the present disclosure, the integral building module, especially the integral bathroom can be accurately installed in place. Interior construction and sanitary ware installation of the integral bathroom are already completed outside the construction site, with only circuit connections, water supply and drainage connections and installation connecting pieces and the like left on the exterior of the bathroom. The integral bathroom is generally installed with its one side against a wall or its two sides against the wall. Further, it is required to perform sinking-type locating installation for the integral bathroom on the foundation of the floor plane. The integral bathroom has a large deadweight and is difficult to move, and sinking locating is further required after the movement to the installation position. In this case, it is very difficult to perform sinking type locating installation in a space with completed floor construction. However, the present disclosure solves the problems of the prior art and can complete the installation of the integral bathroom easily and accurately. Therefore, the present disclosure realizes efficient and accurate installation of large-volume and ton-level prefabricated building in a little space and a complex environment, thereby reducing costs and saving time and labor.

## CLAIMS

1. An installation device for an integral building module of a building, said installation device comprising:

- a console,
- an adjustment device,
- a connecting device,
- a lifting device, and
- an anti-tilt device,

wherein

the console is connected to the adjustment device and the lifting device respectively,

the connecting device is connected to the lifting device and the adjustment device respectively,

one end of the anti-tilt device is connected to the connecting device, and the other end of the anti-tilt device is provided with a counterweight hook to dispose a counterweight according to requirements, and

a power source and an air source are supplied by external apparatuses.

2. The installation device for the integral building module of the building according to claim 1, wherein

the console is provided with control switches including an electrical apparatus control switch, an oil cylinder control switch, an air source control switch, and an adjustment switch.

3. The installation device for the integral building module of the building according to claim 1, wherein

the adjustment device includes a telescopic arm, and

the telescopic arm is configured to extend or retract according to a size of the integral building module under control of the console.

4. The installation device for the integral building module of the building according to claim 1, wherein

the connecting device includes three connecting supports and an independent connecting

support,

the connecting supports are connected to a telescopic arm respectively,

the connection device further includes a connecting bracing support,

an upper end of the connecting device is provided with a top connecting piece capable of performing insertion and fixed connection in cooperation with a bolt fixing hole disposed on the top of the integral building module, and

a lower end of the connecting device is provided with a bottom hook capable of being fixedly connected to a bottom lifting hole of the integral building module.

5. The installation device for the integral building module of the building according to claim 1, wherein

the lifting device includes an oil cylinder, a lifting support, a telescopic guide rod, and a locating pin,

a lower part of the lifting device is provided with an air cushion type transport device or a roller transport device,

the lifting device further includes a self-walking device to facilitate transporting the integral building module for in-place installation,

the lifting support is connected to the self-walking device, and

the telescopic guide rod is provided with a locating pin.

6. The installation device for the integral building module of the building according to claim 5, wherein the self-walking device includes a plurality of universal wheels.

7. The installation device for the integral building module of the building according to claim 5, wherein the air cushion type transport device includes four movable air cushions, and the air cushion is provided with a compressed air connecting mouth connected to the air source of the external apparatus.

8. The installation device for the integral building module of the building according to claim 5, wherein the connecting support is configured to be driven by the lifting support and the oil cylinder to perform ascending, locating or descending.

9. An installation method of the installation device for an integral building module of a building, said method comprises the steps of:

(A) according to a size and a height of the integral building module, controlling and adjusting a length of the telescopic arm of the adjustment device by the console to match with the integral building module; adjusting a height of the top connecting piece of the connecting support in the connecting device to match with the top connecting piece of the integral building module; and transporting the installation device by the self-walking device to closely contact with the integral building module;

(B) fixedly connecting the top connecting pieces of the connecting supports to the top connecting pieces of three corners of the integral building module; placing the bottom hooks of the connecting supports into the bottom lifting holes of the integral building module; then, fixedly connecting the top connecting piece of the independent connecting support to the top connecting piece of the integral building module;

(C) driving oil cylinders of four lifting devices by the console to ascend synchronously, and driving the four lifting supports, connecting supports, and the integral building module to ascend to 2-4 centimeters from the ground at the same time; installing the locating pins on the telescopic guide rods to locate the lifting supports;

(D) disposing a corresponding counterweight onto the anti-tilt device to maintain a balanced state relative to the ground until the integral building module completes an ascending action;

(E) placing the air cushion type transport device below the lifting device; after receiving compressed air, driving, by the installation device, the integral building module to ascend; at the same time, separating the self-walking device from a floor plane to cause the installation device to leave the ground and to be in an easily movable state;

(F) transporting the integral building module to a predetermined adjustment position by the air cushion type transport device; then, removing the independent connecting support; at the same time, adjusting the counterweight to maintain the balanced state of the integral building module with respect to the ground;

(G) transporting the integral building module to a sink installation position of a floor plane by the air cushion type transport device; then, cutting off supply of the compressed air to the air cushion type transport device to cause the universal wheels of the self-walking device to fall onto the floor plane, the locating being completed at this time;

(H) removing locating pins on the telescopic guide rods of the lifting devices; controlling three oil cylinders to descend synchronously; descending the integral building module into the sink installation position of the floor plane; and

(I) disconnecting three top connecting pieces with the integral building module and

releasing the bottom hooks; transporting the installation device away through the universal wheels of the self-walking device to complete an accurate in-place installation of the integral building module.

10. An installation method of the installation device for an integral building module of a building, said method comprises the steps of:

(A) according to a size and a height of an integral bathroom, controlling and adjusting a length of the telescopic arm of an adjustment device by a console to match with the integral bathroom; adjusting heights of top connecting pieces of connecting supports in a connecting device to match with the top connecting pieces of the integral bathroom; moving the installation device by the self-walking device to closely contact with the integral bathroom;

(B) fixedly connecting the top connecting pieces of the connecting supports to the top connecting pieces of three corners of the integral bathroom; placing bottom hooks of the connecting supports into bottom lifting holes of the integral bathroom; then, fixedly connecting the top connecting piece of the independent connecting support to the top connecting piece of the integral bathroom;

(C) placing a roller transport device below a lifting device, wherein a lower part of the roller transport device is provided with the walking wheels and an upper part of the roller transport device is provided with a rotary disk capable of rotating horizontally;

(D) driving the oil cylinders of four lifting devices by the console to ascend synchronously, so as to drive four lifting supports, four connecting supports and the integral bathroom to ascend to 2-4 centimeters from the ground at the same time; installing the locating pins on the telescopic guide rods to locate the lifting supports;

(E) disposing a corresponding counterweight onto the hook of the anti-tilt device to maintain a balanced state with respect to the ground until the integral bathroom completes an ascending action;

(F) transporting the integral bathroom to a predetermined adjusting position by the roller transport device; then, removing the independent connecting support; at the same time, adjusting the counterweight to maintain the balanced state of the integral bathroom with respect to the ground;

(G) moving the integral bathroom to a sink installation position of a floor plane by the roller transport device to complete locating at this time;

(H) removing locating pins on the telescopic guide rods of the lifting device; controlling the three oil cylinders to descend synchronously; wherein the integral bathroom

descends into the sink installation position of the floor plane;

(I) disconnecting three top connecting pieces with the integral bathroom and releasing the bottom hooks; transporting the installation device away through the universal wheels of the self-walking device, so that the accurate in-place installation of the integral bathroom is completed.

11. An installation method of the installation device for an integral building module of a building, said method comprises the steps of:

(A) according to a size and a height of an integral bathroom, controlling and adjusting a length of a telescopic arm of an adjustment device by a console to match with the integral bathroom; adjusting heights of the top connecting pieces of the connecting supports in the connecting device to match with the top connecting pieces of the integral bathroom; moving the installation device by a self-walking device to closely contact with the integral bathroom;

(B) fixedly connecting the top connecting pieces of the connecting supports to the top connecting pieces of three corners of the integral bathroom; placing the bottom hooks of the connecting supports into the bottom lifting holes of the integral bathroom; then, fixedly connecting the top connecting piece of the independent connecting support to the top connecting piece of the integral bathroom;

(C) driving the oil cylinders of four lifting devices by the console to ascend synchronously, so as to drive four lifting supports, four connecting supports, and the integral bathroom to ascend to 2-4 centimeters from the ground at the same time; installing the locating pins on the telescopic guide rods to locate the lifting supports;

(D) adjusting a lifting spiral structure of the top balancing device to cause the top universal wheel of the top balancing device to be against a roof, so as to maintain a balanced state with respect to the ground until the integral bathroom completes an ascending action;

(E) disposing the air cushion type transport device below the lifting device; after receiving the compressed air, moving the integral bathroom in an ascending manner by the installation device; at this time, separating the self-walking device away from the floor plane to cause the installation device to leave the ground and to be in the easily movable state;

(F) transporting the integral bathroom to a predetermined adjusting position by the air cushion type transport device; then, removing the independent connecting support; at the same time, adjusting the top balancing device to cause the top universal wheel of the top balancing device to always maintain in a sliding contact with the roof along with a movement of the integral bathroom, thereby maintaining a balanced state of the integral bathroom with

respect to the ground;

(G) moving the integral bathroom to the sink installation position of the floor plane by the air cushion type transport device; then, cutting off the compressed air of the air cushion type transport device to cause the universal wheels of the self-walking device to fall onto the floor plane, and to complete locating at this time;

(H) removing the locating pins from the telescopic guide rods of the lifting device; controlling three oil cylinders to descend synchronously; wherein the integral bathroom descends into the sink installation position of the floor plane;

(I) adjusting the lifting spiral structure of the top balancing device to release the contact between the top universal wheel of the top balancing device and the roof, disconnecting three top connecting pieces with the integral bathroom and releasing the bottom hooks; separating the installation device away through the universal wheels of the self-walking device, so that the accurate in-place installation of the integral bathroom is completed.

12. The installation device for the integral building module of the building according to claim 1, or the installation method of the installation device for the integral building module of the building according to any one of claims 9-11, wherein the integral building module includes the integral bathroom or an internal kitchen.