

have been completed when they have been partly completed can be saved.

[0011]

It may be a computer of a business operator that provides the building to a user of the building.

This configuration allows the business operator to provide the building to build the interior sensor network.

[0012]

A section for displaying a Save button for saving a list of the devices, the sensors, and the installation locations of the devices and the sensors, on condition that connections to all of the devices and the sensors to be targets of the network have succeeded, and a section for storing an electronic file in which the list is stored under a file name containing identification information identifying the building in a connected device list storage section when the Save button is clicked may further be included.

This configuration allows information on the installation locations of the devices and the sensors registered in the list stored in the electronic file to be used for a so-called home energy management system (HEMS) that controls electric devices used in the building.

[0013]

The sensor for measuring the amount of energy ~~measurement~~ may be a sensor selected from a group including an electric energy meter attached to a circuit provided on a distribution board of the building, a pulse sensor for

measuring the amount of water ~~or gas~~ used, a pulse sensor for measuring the amount of gas used, and a generated power amount sensor for measuring the amount of power generated by a power generation apparatus.

This configuration allows for the building of an interior sensor network covering various sensors provided in a building.

[0014]

A section for determining whether a connection ID entered for permission of connection to the router agrees with a predetermined ID for connection to a network commonly used by the building device when release of the connection with the router is instructed, and when it agrees, stopping the release of the connection with the router may further be included.

This configuration prevents the connection ID used for connecting to the router from being automatically deleted at the release of the connection with the router even when it agrees with the predetermined ID for connecting to a network commonly used in a workplace or the like.

[0015]

The server may include a protocol switching section capable of controlling the devices and the sensors by switching between communication protocols used when a control signal is transmitted to the devices and the sensors, according to communication protocols used by the devices and the sensors at transmission destinations, when the devices and the sensors include devices that

11a for measuring the amount of electricity in the circuits, power measurement taps 11b for measuring the amount of power consumption of electrical devices, a data logger 11g for temporarily storing data on the amount of consumed and generated power measured by the branch sensors 11a, the power measurement taps 11b, a generated power amount sensor 11c, a generated power amount sensor 11d, a gas pulse sensor 11e, and a water pulse sensor 11f and transmitting it to the home server 10, a display 12 on which a resident views information on the amount of use of consumed power and the like and controls electrical devices and others in the home 2, the router 13 interconnecting the home network 21 and an external network such as the Internet, various electrical devices such as air conditioners and lighting, a distribution board 30, a photovoltaic power generation apparatus 41, a fuel cell 42, a storage battery 43 for storing electric power generated by the photovoltaic power generation apparatus 41 and the fuel cell 42, the gas pulse sensor 11e, and the water pulse sensor 11f are connected.

[0021]

The home server 10 is a device for managing information in the home network 21, and has a device management function of managing addresses of devices such as the display 12, the distribution board 30, the photovoltaic power generation apparatus 41, and electrical devices~~23~~ connected to the home network 21, and communicating with these devices, acquiring information such as the status of the devices, and controlling the

status of the devices. The home server 10 is implemented in the form of being incorporated in a server computer, a personal computer, a set-top box, or another existing device, or the like. The hardware configuration of the home server 10 is similar to that of the terminal 51, and will not be described.

[0022]

By the way, in the home 2 equipped with a HEMS, it is generally recommended to use electrical devices adopting a common communication protocol (synonymous with a communication scheme and a communication standard). For example, it is desired that devices adopt a common communication protocol proposed by the ECHONET Consortium. On the other hand, protocols proposed by the ECHONET Consortium include ECHONET (registered trademark) and ECHONETLite (recorded trademark) that is a succeeding standard of the ECHONET, and both the protocols sometimes coexist in electrical devices in the home 2. Further, some electrical devices purchased by the user may include devices ~~outside~~using a communication protocol other than ECHONET and ECHONETLite.

[0023]

In the home network 21, among the plurality of electrical devices and sensors used in the home 2, there are devices that communicate on communication protocols different from each other. Therefore, in a storage section of the home server 10, a communication bundle for the home server 10 to communicate with the other end of

communication in the home 2 is stored for each communication protocol. That is, the same number of communication bundles as the number of types of communication protocols adopted by the electrical devices and the sensors in the home 2 are stored in the storage section. To explain specifically, in the storage section, a bundle for communication using a first communication protocol (e.g. ECHONET), a bundle for communication using a second communication protocol (e.g. ECHONETLite), and a bundle for communication on a third communication protocol (e.g. a communication protocol other than ECHONET and ECHONETLite) are stored.

[0024]

In the home network 21, among the communication bundles stored in the storage section, a communication bundle read and executed changes according to the other end of communication. This allows the home server 10 to switch between the communication protocols adopted when communicating with the electrical devices and the sensors, according to the communication protocols adopted by the electrical devices and the sensors at the other end of communication. A switch between communication protocols is synonymous with a rewrite of a telegraphic message (command) transmitted on a certain communication protocol in conformity with a different communication protocol for transmission to a communication device using the different communication protocol. Electrical devices at the other end of communication with which the home server 10 switches

between communication protocols for communication include

control signals are transmitted from the home server 10 to the electrical devices and the sensors, and response signals are transmitted from the electrical devices and the sensors to the home server 10.

The display 12 is a display installed in a place such as in a kitchen, a living room, or a lavatory in the home 2, and having a function of transmission and reception to and from the home server 10 and a touch panel. A display device 69 of the home server 10 may be used as the display 12.

[0031]

Electrical devices ~~23~~ are a general term for devices used in a home, and include every electrical device in a home such as household electrical devices such as a refrigerator and a microwave oven, a game machine, audio and video equipment, as well as sensors and lighting.

When each of the electrical devices according to this embodiment is connected to the home server 10 to be able to communicate with it, it is automatically recognized at the home server 10. To explain specifically, among the electrical devices according to this embodiment, household electrical devices such as air conditioners and lighting are devices adopting the ECHONET standard proposed by the ECHONET Consortium, or devices adopting a standard in compliance with the ECHONET standard. When such an electrical device is connected to the home server 10 to be able to communicate with it by the ECHONET standard, it is automatically recognized at the home server 10, and further

power consumption.

The photovoltaic power generation apparatus 41 is formed by a known photovoltaic power generation apparatus, to which a known generated power amount sensor 11c for detecting the amount of electric power generated by the photovoltaic power generation apparatus 41 is connected.

The fuel cell 42 is formed by a known fuel cell, to which a known generated power amount sensor 11d for detecting the amount of electric power generated by the fuel cell 42 is connected.

The gas pulse sensor 11e and the water pulse sensor 11f are known pulse sensors that detect the amount of gas used and the amount of water used in a home, respectively.

[0034]

The branch sensors 11a, ~~and~~ the power measurement taps 11b ~~and the generated power amount sensor 11c~~ output data showing the amount of power consumption, the gas pulse sensor 11e, data showing the amount of gas consumption, the water pulse sensor 11f, data showing the amount of water consumption, as measurement results. These pieces of data are temporarily stored in the data logger 11g, and are transmitted from the data logger 11g to the home server 10 at predetermined time intervals such as at one minute intervals.

[0035]

The terminal 51 is a computer used by a person in charge of the home builder to perform operation checks and the like on the home server 10, the other electrical

When it is not clicked (step ~~S44~~S45: No), in step ~~S44~~S45, it is determined whether the Complete button 201 has been clicked. That is, step ~~S44~~S45 is repeated until the Complete button 201 is clicked.

When the Complete button 201 has been clicked (step ~~S44~~S45: Yes), in step S46, the connection and operation check completion flag of the sensors is set to 1 on a record to which the IP address of the router 13 is attached in the connection and operation check result table stored in the HDD 64 of the terminal 51, to set the sensor check status to completion. The data on the Branch Sensor List screen 190 and the Other Sensor List screen 200 as the results of the connection and operation checks is stored in a file, which is saved under a file name containing the identification number unique to the home 2 and the symbol indicating sensors, in the check result folder in the HDD 64 of the terminal 51.

[0057]

Next, in step S47, with the IP address of the router 13 as a key, the connection and operation check result table is referred to, and it is determined whether the connection and operation check completion flags have been set to "Completed" (1) on all of the sensors, the air conditioners, and the storage battery 43.

When they have not (step S47: No), the processing proceeds from C in Fig. 11 through C in Fig. 7 to step S26, in which with the IP address of the router 13 as a key, the connection and operation check result table in the HDD 64

18 listing the detected storage battery 43 is displayed. In step S66, among display items in the storage battery list 251 on the Storage Battery List screen 250, items other than installation locations and names are automatically displayed.

The installation locations and the names are entered manually by the person in charge. Although these items are entered manually in this embodiment, they may be automatically entered from the data on the working drawing of the home 2. For example, the device IDs of the devices and the sensors are registered in advance in the data on the working drawing, the data on the working drawing is searched with the device IDs of the devices and the sensors automatically acquired as a key, and data on the installation locations and the names is acquired to be automatically entered in these fields.

[0068]

Next, in step S67, it is determined whether a problem has occurred during the operation checks and the installation location registration. When no problem has occurred during the operation checks and the installation location registration (step S67: No), it is considered that the operation check on the storage battery 43 has all been completed. In step S72, a Complete button ~~233~~253 is activated.

When a problem has occurred during the operation checks and the installation location registration (step S67: Yes), the processing proceeds from I in Fig. 16

through I in Fig 17 to step S68, in which an error screen

processing is terminated.

When the Stop button 157 has not been clicked (step S76: No), in step S78, it is determined whether the Complete button 158 has been clicked. When it has not been clicked (step S78: No), the processing proceeds from H in Fig. 16 through H in Fig. 7 to step S28, in which it is determined whether the sensor button 151 has been clicked.

When the Complete button 158 has been clicked (step S78: Yes), the processing proceeds from G in Fig. 16 through G in Fig. 12 to step S52, in which the operation check result screen 210 is displayed.

[0073]

In any timing after the Wireless Connection button 101 on the TOP screen 100 is clicked, after the processing for connection to the router 13 and the Device Connection Check button 102 is clicked, or during the processing of checking connections to the sensors, the air conditioners, and the storage battery 43 is performed, the Wireless Connection Release button 103 on the TOP screen 100 can be clicked to release connection through the Connection Release Confirmation Screen 104.

When the Wireless Connection Release button 103 is clicked, the terminal 51 displays the Connection Release Confirmation Screen 104 displaying a radio-frequency ID in connection.

It is determined whether a Cancel button 106 has been clicked. When the Cancel button 106 has been clicked, the Connection Release Confirmation Screen 104 is closed.

11a branch sensor
11b power measurement tap
11c, 11d generated power amount sensor
11e gas pulse sensor
11f water pulse sensor
11g data logger
12 display
13 router
21 home network
~~23 electrical device~~
30 distribution board
31 main circuit
32 branch circuit
41 photovoltaic power generation apparatus
42 fuel cell
43 storage battery
51 terminal computer

2. The interior sensor network building device according to claim 1 being a computer of a business operator that provides the building to a user of the building.

3. The interior sensor network building device according to claim 1 or 2, further comprising:

a section for displaying a Save button for saving a list of the devices, the sensors, and the installation locations of the devices and the sensors, on condition that connection to all of the devices and the sensors to be targets of the network has succeeded; and

a section for storing an electronic file in which the list is stored under a file name containing identification information identifying the building, in a connected device list storage section when the Save button is clicked.

4. The interior sensor network building device according to any one of claims 1 to 3, wherein the sensor for measuring the amount of energy measurement is a sensor selected from a group including an electric energy meter attached to a circuit provided on a distribution board of the building, a pulse sensor for measuring the amount of water ~~or gas~~ used, a pulse sensor for measuring the amount of gas used, and a generated power amount sensor for measuring the amount of power generated by a power generation apparatus.

5. The interior sensor network building device according

have been completed when they have been partly completed can be saved.

[0011]

It may be a computer of a business operator that provides the building to a user of the building.

This configuration allows the business operator to provide the building to build the interior sensor network.

[0012]

A section for displaying a Save button for saving a list of the devices, the sensors, and the installation locations of the devices and the sensors, on condition that connections to all of the devices and the sensors to be targets of the network have succeeded, and a section for storing an electronic file in which the list is stored under a file name containing identification information identifying the building in a connected device list storage section when the Save button is clicked may further be included.

This configuration allows information on the installation locations of the devices and the sensors registered in the list stored in the electronic file to be used for a so-called home energy management system (HEMS) that controls electric devices used in the building.

[0013]

The sensor for measuring the amount of energy may be a sensor selected from a group including an electric energy meter attached to a circuit provided on a distribution board of the building, a pulse sensor for

measuring the amount of water used, a pulse sensor for measuring the amount of gas used, and a generated power amount sensor for measuring the amount of power generated by a power generation apparatus.

This configuration allows for the building of an interior sensor network covering various sensors provided in a building.

[0014]

A section for determining whether a connection ID entered for permission of connection to the router agrees with a predetermined ID for connection to a network commonly used by the building device when release of the connection with the router is instructed, and when it agrees, stopping the release of the connection with the router may further be included.

This configuration prevents the connection ID used for connecting to the router from being automatically deleted at the release of the connection with the router even when it agrees with the predetermined ID for connecting to a network commonly used in a workplace or the like.

[0015]

The server may include a protocol switching section capable of controlling the devices and the sensors by switching between communication protocols used when a control signal is transmitted to the devices and the sensors, according to communication protocols used by the devices and the sensors at transmission destinations, when the devices and the sensors include devices that

11a for measuring the amount of electricity in the circuits, power measurement taps 11b for measuring the amount of power consumption of electrical devices, a data logger 11g for temporarily storing data on the amount of consumed and generated power measured by the branch sensors 11a, the power measurement taps 11b, a generated power amount sensor 11c, a generated power amount sensor 11d, a gas pulse sensor 11e, and a water pulse sensor 11f and transmitting it to the home server 10, a display 12 on which a resident views information on the amount of use of consumed power and the like and controls electrical devices and others in the home 2, the router 13 interconnecting the home network 21 and an external network such as the Internet, various electrical devices such as air conditioners and lighting, a distribution board 30, a photovoltaic power generation apparatus 41, a fuel cell 42, a storage battery 43 for storing electric power generated by the photovoltaic power generation apparatus 41 and the fuel cell 42, the gas pulse sensor 11e, and the water pulse sensor 11f are connected.

[0021]

The home server 10 is a device for managing information in the home network 21, and has a device management function of managing addresses of devices such as the display 12, the distribution board 30, the photovoltaic power generation apparatus 41, and electrical devices connected to the home network 21, and communicating with these devices, acquiring information such as the status of the devices, and controlling the

status of the devices. The home server 10 is implemented in the form of being incorporated in a server computer, a personal computer, a set-top box, or another existing device, or the like. The hardware configuration of the home server 10 is similar to that of the terminal 51, and will not be described.

[0022]

By the way, in the home 2 equipped with a HEMS, it is generally recommended to use electrical devices adopting a common communication protocol (synonymous with a communication scheme and a communication standard). For example, it is desired that devices adopt a common communication protocol proposed by the ECHONET Consortium. On the other hand, protocols proposed by the ECHONET Consortium include ECHONET (registered trademark) and ECHONETLite (recorded trademark) that is a succeeding standard of the ECHONET, and both the protocols sometimes coexist in electrical devices in the home 2. Further, some electrical devices purchased by the user may include devices using a communication protocol other than ECHONET and ECHONETLite.

[0023]

In the home network 21, among the plurality of electrical devices and sensors used in the home 2, there are devices that communicate on communication protocols different from each other. Therefore, in a storage section of the home server 10, a communication bundle for the home server 10 to communicate with the other end of

communication in the home 2 is stored for each communication protocol. That is, the same number of communication bundles as the number of types of communication protocols adopted by the electrical devices and the sensors in the home 2 are stored in the storage section. To explain specifically, in the storage section, a bundle for communication using a first communication protocol (e.g. ECHONET), a bundle for communication using a second communication protocol (e.g. ECHONETLite), and a bundle for communication on a third communication protocol (e.g. a communication protocol other than ECHONET and ECHONETLite) are stored.

[0024]

In the home network 21, among the communication bundles stored in the storage section, a communication bundle read and executed changes according to the other end of communication. This allows the home server 10 to switch between the communication protocols adopted when communicating with the electrical devices and the sensors, according to the communication protocols adopted by the electrical devices and the sensors at the other end of communication. A switch between communication protocols is synonymous with a rewrite of a telegraphic message (command) transmitted on a certain communication protocol in conformity with a different communication protocol for transmission to a communication device using the different communication protocol. Electrical devices at the other end of communication with which the home server 10 switches between communication protocols for communication include

control signals are transmitted from the home server 10 to the electrical devices and the sensors, and response signals are transmitted from the electrical devices and the sensors to the home server 10.

The display 12 is a display installed in a place such as in a kitchen, a living room, or a lavatory in the home 2, and having a function of transmission and reception to and from the home server 10 and a touch panel. A display device 69 of the home server 10 may be used as the display 12.

[0031]

Electrical devices are a general term for devices used in a home, and include every electrical device in a home such as household electrical devices such as a refrigerator and a microwave oven, a game machine, audio and video equipment, as well as sensors and lighting.

When each of the electrical devices according to this embodiment is connected to the home server 10 to be able to communicate with it, it is automatically recognized at the home server 10. To explain specifically, among the electrical devices according to this embodiment, household electrical devices such as air conditioners and lighting are devices adopting the ECHONET standard proposed by the ECHONET Consortium, or devices adopting a standard in compliance with the ECHONET standard. When such an electrical device is connected to the home server 10 to be able to communicate with it by the ECHONET standard, it is automatically recognized at the home server 10, and further

power consumption.

The photovoltaic power generation apparatus 41 is formed by a known photovoltaic power generation apparatus, to which a known generated power amount sensor 11c for detecting the amount of electric power generated by the photovoltaic power generation apparatus 41 is connected.

The fuel cell 42 is formed by a known fuel cell, to which a known generated power amount sensor 11d for detecting the amount of electric power generated by the fuel cell 42 is connected.

The gas pulse sensor 11e and the water pulse sensor 11f are known pulse sensors that detect the amount of gas used and the amount of water used in a home, respectively.

[0034]

The branch sensors 11a and the power measurement taps 11b output data showing the amount of power consumption, the gas pulse sensor 11e, data showing the amount of gas consumption, the water pulse sensor 11f, data showing the amount of water consumption, as measurement results. These pieces of data are temporarily stored in the data logger 11g, and are transmitted from the data logger 11g to the home server 10 at predetermined time intervals such as at one minute intervals.

[0035]

The terminal 51 is a computer used by a person in charge of the home builder to perform operation checks and the like on the home server 10, the other electrical

When it is not clicked (step S45: No), in step S45, it is determined whether the Complete button 201 has been clicked. That is, step S45 is repeated until the Complete button 201 is clicked.

When the Complete button 201 has been clicked (step S45: Yes), in step S46, the connection and operation check completion flag of the sensors is set to 1 on a record to which the IP address of the router 13 is attached in the connection and operation check result table stored in the HDD 64 of the terminal 51, to set the sensor check status to completion. The data on the Branch Sensor List screen 190 and the Other Sensor List screen 200 as the results of the connection and operation checks is stored in a file, which is saved under a file name containing the identification number unique to the home 2 and the symbol indicating sensors, in the check result folder in the HDD 64 of the terminal 51.

[0057]

Next, in step S47, with the IP address of the router 13 as a key, the connection and operation check result table is referred to, and it is determined whether the connection and operation check completion flags have been set to "Completed" (1) on all of the sensors, the air conditioners, and the storage battery 43.

When they have not (step S47: No), the processing proceeds from C in Fig. 11 through C in Fig. 7 to step S26, in which with the IP address of the router 13 as a key, the connection and operation check result table in the HDD 64

18 listing the detected storage battery 43 is displayed. In step S66, among display items in the storage battery list 251 on the Storage Battery List screen 250, items other than installation locations and names are automatically displayed.

The installation locations and the names are entered manually by the person in charge. Although these items are entered manually in this embodiment, they may be automatically entered from the data on the working drawing of the home 2. For example, the device IDs of the devices and the sensors are registered in advance in the data on the working drawing, the data on the working drawing is searched with the device IDs of the devices and the sensors automatically acquired as a key, and data on the installation locations and the names is acquired to be automatically entered in these fields.

[0068]

Next, in step S67, it is determined whether a problem has occurred during the operation checks and the installation location registration. When no problem has occurred during the operation checks and the installation location registration (step S67: No), it is considered that the operation check on the storage battery 43 has all been completed. In step S72, a Complete button 253 is activated.

When a problem has occurred during the operation checks and the installation location registration (step S67: Yes), the processing proceeds from I in Fig. 16 through I in Fig 17 to step S68, in which an error screen

processing is terminated.

When the Stop button 157 has not been clicked (step S76: No), in step S78, it is determined whether the Complete button 158 has been clicked. When it has not been clicked (step S78: No), the processing proceeds from H in Fig. 16 through H in Fig. 7 to step S28, in which it is determined whether the sensor button 151 has been clicked.

When the Complete button 158 has been clicked (step S78: Yes), the processing proceeds from G in Fig. 16 through G in Fig. 12 to step S52, in which the operation check result screen 210 is displayed.

[0073]

In any timing after the Wireless Connection button 101 on the TOP screen 100 is clicked, after the processing for connection to the router 13 and the Device Connection Check button 102 is clicked, or during the processing of checking connections to the sensors, the air conditioners, and the storage battery 43 is performed, the Wireless Connection Release button 103 on the TOP screen 100 can be clicked to release connection through the Connection Release Confirmation Screen 104.

When the Wireless Connection Release button 103 is clicked, the terminal 51 displays the Connection Release Confirmation Screen 104 displaying a radio-frequency ID in connection.

It is determined whether a Cancel button 106 has been clicked. When the Cancel button 106 has been clicked, the Connection Release Confirmation Screen 104 is closed.

- 11a branch sensor
- 11b power measurement tap
- 11c, 11d generated power amount sensor
- 11e gas pulse sensor
- 11f water pulse sensor
- 11g data logger
- 12 display
- 13 router
- 21 home network
 - 30 distribution board
- 31 main circuit
- 32 branch circuit
- 41 photovoltaic power generation apparatus
- 42 fuel cell
- 43 storage battery
- 51 terminal computer

2. The interior sensor network building device according to claim 1 being a computer of a business operator that provides the building to a user of the building.

3. The interior sensor network building device according to claim 1 or 2, further comprising:

a section for displaying a Save button for saving a list of the devices, the sensors, and the installation locations of the devices and the sensors, on condition that connection to all of the devices and the sensors to be targets of the network has succeeded; and

a section for storing an electronic file in which the list is stored under a file name containing identification information identifying the building, in a connected device list storage section when the Save button is clicked.

4. The interior sensor network building device according to any one of claims 1 to 3, wherein the sensor for measuring the amount of energy measurement is a sensor selected from a group including an electric energy meter attached to a circuit provided on a distribution board of the building, a pulse sensor for measuring the amount of water used, a pulse sensor for measuring the amount of gas used, and a generated power amount sensor for measuring the amount of power generated by a power generation apparatus.

5. The interior sensor network building device according