Claims:

[Claim 1] A variable air volume (VAV) air conditioning system, comprising:

an air conditioner;

a VAV unit, provided for each controlled area;

a first control part, configured to control, for each of the controlled area, an opening degree of a damper of the VAV unit in accordance with a required air volume determined in accordance with a load condition of the controlled area;

a status notification part, configured to transmit, for each of the VAV unit, static pressure excess/insufficiency information based on the opening degree of the damper;

a fan rotation speed determination part, configured to determine a fan rotation speed of the air conditioner based on a total required air volume summing up a value of the required air volume of each of the VAV unit;

a fan rotation speed correction part, configured to correct the fan rotation speed of the air conditioner based on total static pressure excess/insufficiency information integrating the static pressure excess/insufficiency information of each of the VAV unit; a second control part, configured to control a fan of the air conditioner, so as to arrive at the fan rotation speed determined by the fan rotation speed determination part and corrected by the fan rotation speed correction part;

a re-determination part, configured to perform re-determination on the static pressure excess/insufficiency information based on a room temperature or a room CO_2 concentration of the controlled area before the static pressure excess/insufficiency information of each of the VAV unit is integrated; and

a static pressure excess/insufficiency information change part, configured to change the static pressure excess/insufficiency information of each of the VAV unit based on a determination result of the re-determination part before the static pressure excess/insufficiency information of each of the VAV unit is integrated,

wherein in a case where the room temperature of the controlled area corresponding to the VAV unit whose static pressure excess/insufficiency information indicates a static pressure as insufficient falls within an allowable temperature range, the re-determination part determines that the static pressure is to be changed from insufficient to appropriate.

[Claim 2] The VAV air conditioning system as claimed in claim 1, wherein the allowable temperature range comprises: a first allowable temperature range, which is a

range in which a difference between the room temperature and a room temperature setting value of the controlled area is from negative infinity to a positive first predetermined temperature when cooling and a range in which the difference between the room temperature and the room temperature setting value of the controlled area is from a negative first predetermined temperature to infinity when heating; and a second allowable temperature range, which is a range in which the room temperature of the controlled area is from negative infinity to a positive second predetermined temperature when cooling and a range in which the room temperature of the controlled area is from a positive third predetermined temperature to infinity when heating,

in a case where the room temperature of the controlled area corresponding to the VAV unit whose static pressure excess/insufficiency information indicates the static pressure as insufficient falls within at least one of the first allowable temperature range and the second allowable temperature range, the re-determination part determines that the static pressure is to be changed from insufficient to appropriate.

[Claim 3] A VAV air conditioning system, comprising:

an air conditioner;

a VAV unit, provided for each controlled area;

a first control part, configured to control, for each of the controlled area, an opening degree of a damper of the VAV unit in accordance with a required air volume determined in accordance with a load condition of the controlled area;

a status notification part, configured to transmit, for each of the VAV unit, static pressure excess/insufficiency information based on the opening degree of the damper;

a fan rotation speed determination part, configured to determine a fan rotation speed of the air conditioner based on a total required air volume summing up a value of the required air volume of each of the VAV unit;

a fan rotation speed correction part, configured to correct the fan rotation speed of the air conditioner based on total static pressure excess/insufficiency information integrating the static pressure excess/insufficiency information of each of the VAV unit; a second control part, configured to control a fan of the air conditioner, so as to arrive at the fan rotation speed determined by the fan rotation speed determination part and corrected by the fan rotation speed correction part;

a re-determination part, configured to perform re-determination on the static pressure

excess/insufficiency information based on a room temperature or a room CO2 concentration of the controlled area before the static pressure excess/insufficiency information of each of the VAV unit is integrated; and

a static pressure excess/insufficiency information change part, configured to change the static pressure excess/insufficiency information of each of the VAV unit based on a determination result of the re-determination part before the static pressure excess/insufficiency information of each of the VAV unit is integrated,

wherein in a case where a difference between the room CO_2 concentration and a room CO_2 concentration setting value of the controlled area corresponding to the VAV unit whose static pressure excess/insufficiency information indicates a static pressure as insufficient falls within a range from negative infinity to a positive predetermined concentration, the re-determination part determines that the static pressure is to be changed from insufficient to appropriate.

[Claim 4] A VAV air conditioning system, comprising:

an air conditioner;

a VAV unit, provided for each controlled area;

a first control part, configured to control, for each of the controlled area, an opening degree of a damper of the VAV unit in accordance with a required air volume determined in accordance with a load condition of the controlled area;

a status notification part, configured to transmit, for each of the VAV unit, static pressure excess/insufficiency information based on the opening degree of the damper;

a fan rotation speed determination part, configured to determine a fan rotation speed of the air conditioner based on a total required air volume summing up a value of the required air volume of each of the VAV unit;

a fan rotation speed correction part, configured to correct the fan rotation speed of the air conditioner based on total static pressure excess/insufficiency information integrating the static pressure excess/insufficiency information of each of the VAV unit; a second control part, configured to control a fan of the air conditioner, so as to arrive at the fan rotation speed determined by the fan rotation speed determination part and corrected by the fan rotation speed correction part;

a re-determination part, configured to perform re-determination on the static pressure excess/insufficiency information based on a room temperature or a room CO_2

concentration of the controlled area before the static pressure excess/insufficiency information of each of the VAV unit is integrated;

a static pressure excess/insufficiency information change part, configured to change the static pressure excess/insufficiency information of each of the VAV unit based on a determination result of the re-determination part before the static pressure excess/insufficiency information of each of the VAV unit is integrated; and

a room temperature prediction part configured to predict the room temperature of each of the controlled area in a future moment,

wherein in a case where at least one of the room temperature and a room temperature prediction value of the controlled area corresponding to the VAV unit whose static pressure excess/insufficiency information indicates a static pressure as insufficient falls within an allowable temperature range, the re-determination part determines that the static pressure is to be changed from insufficient to appropriate.

[Claim 5] The VAV air conditioning system as claimed in claim 4, wherein the allowable temperature range comprises: a first allowable temperature range, which is a range in which a difference between the room temperature and a room temperature setting value of the controlled area is from negative infinity to a positive first predetermined temperature when cooling and a range in which the difference between the room temperature and the room temperature setting value of the controlled area is from a negative first predetermined temperature to infinity when heating; and a second allowable temperature range, which is a range in which the room temperature of the controlled area is from negative infinity to a positive second predetermined temperature when cooling and a range in which the room temperature of the controlled area is from a positive third predetermined temperature to infinity when heating,

in a case where at least one of the room temperature and the room temperature prediction value of the controlled area corresponding to the VAV unit whose static pressure excess/insufficiency information indicates the static pressure as insufficient falls within at least one of the first allowable temperature range and the second allowable temperature range, the re-determination part determines that the static pressure is to be changed from insufficient to appropriate.

[Claim 6] The VAV air conditioning system as claimed in claim 4 or 5, wherein in a case where the room temperature prediction value of the controlled area corresponding to

the VAV unit whose static pressure excess/insufficiency information indicates the static pressure as appropriate is out of the allowable temperature range, the re-determination part determines that the static pressure is to be changed from appropriate to insufficient.

[Claim 7] A VAV air conditioning system, comprising:

an air conditioner;

a VAV unit, provided for each controlled area;

a first control part, configured to control, for each of the controlled area, an opening degree of a damper of the VAV unit in accordance with a required air volume determined in accordance with a load condition of the controlled area;

a status notification part, configured to transmit, for each of the VAV unit, static pressure excess/insufficiency information based on the opening degree of the damper;

a fan rotation speed determination part, configured to determine a fan rotation speed of the air conditioner based on a total required air volume summing up a value of the required air volume of each of the VAV unit;

a fan rotation speed correction part, configured to correct the fan rotation speed of the air conditioner based on total static pressure excess/insufficiency information integrating the static pressure excess/insufficiency information of each of the VAV unit; a second control part, configured to control a fan of the air conditioner, so as to arrive at the fan rotation speed determined by the fan rotation speed determination part and corrected by the fan rotation speed correction part;

a re-determination part, configured to perform re-determination on the static pressure excess/insufficiency information based on a room temperature or a room CO_2 concentration of the controlled area before the static pressure excess/insufficiency information of each of the VAV unit is integrated;

a static pressure excess/insufficiency information change part, configured to change the static pressure excess/insufficiency information of each of the VAV unit based on a determination result of the re-determination part before the static pressure excess/insufficiency information of each of the VAV unit is integrated; and

a room CO_2 concentration prediction part configured to predict the room CO_2 concentration of each of the controlled area in a future moment,

wherein in a case where a difference between the room CO_2 concentration or a room CO_2 concentration prediction value and a room CO_2 concentration setting value of the

controlled area corresponding to the VAV unit whose static pressure excess/insufficiency information indicates a static pressure as insufficient falls within a range from negative infinity to a positive predetermined concentration, the re-determination part determines that the static pressure is to be changed from insufficient to appropriate.

[Claim 8] The VAV air conditioning system as claimed in claim 7, wherein in a case where a difference between the room CO_2 concentration prediction value and the room CO_2 concentration setting value of the controlled area corresponding to the VAV unit whose static pressure excess/insufficiency information indicates the static pressure as appropriate is out of the range from negative infinity to the positive predetermined concentration, the re-determination part determines that the static pressure is to be changed from appropriate to insufficient.

[Claim 9] An air conditioning control method, comprising:

a first step of controlling, for each controlled area, an opening degree of a damper of a variable air volume (VAV) unit in accordance with a required air volume determined in accordance with a load condition of the controlled area;

a second step of transmitting, for each of the VAV unit, static pressure excess/insufficiency information based on the opening degree of the damper;

a third step of determining a fan rotation speed of an air conditioner supplying air to the VAV unit based on a total required air volume summing up a value of the required air volume of each of the VAV unit;

a fourth step of correcting the fan rotation speed of the air conditioner based on total static pressure excess/insufficiency information integrating the static pressure excess/insufficiency information of each of the VAV unit;

a fifth step of controlling a fan of the air conditioner, so as to arrive at the fan rotation speed determined in the third step and corrected in the fourth step;

a sixth step of performing re-determination on the static pressure excess/insufficiency information based on a room temperature or a room CO_2 concentration of the controlled area before the static pressure excess/insufficiency information of each of the VAV unit is integrated; and

a seventh step of changing the static pressure excess/insufficiency information of each of the VAV unit based on a determination result of the sixth step before the static pressure excess/insufficiency information of each of the VAV unit is integrated,

wherein the sixth step comprises a step of, in a case where the room temperature of the controlled area corresponding to the VAV unit whose static pressure excess/insufficiency information indicates a static pressure as insufficient falls within an allowable temperature range, determining that the static pressure is to be changed from insufficient to appropriate.

[Claim 10] The air conditioning control method as claimed in claim 9, wherein the allowable temperature range comprises: a first allowable temperature range, which is a range in which a difference between the room temperature and a room temperature setting value of the controlled area is from negative infinity to a positive first predetermined temperature when cooling and a range in which the difference between the room temperature and the room temperature setting value of the controlled area is from a negative first predetermined temperature to infinity when heating; and a second allowable temperature range, which is a range in which the room temperature of the controlled area is from negative infinity to a positive second predetermined temperature when cooling and a range in which the room temperature of the controlled area is from a positive third predetermined temperature to infinity when heating,

wherein the sixth step comprises a step of, in a case where the room temperature of the controlled area corresponding to the VAV unit whose static pressure excess/insufficiency information indicates the static pressure as insufficient falls within at least one of the first allowable temperature range and the second allowable temperature range, determining that the static pressure is to be changed from insufficient to appropriate.

[Claim 11] An air conditioning control method, comprising:

a first step of controlling, for each controlled area, an opening degree of a damper of a variable air volume (VAV) unit in accordance with a required air volume determined in accordance with a load condition of the controlled area;

a second step of transmitting, for each of the VAV unit, static pressure excess/insufficiency information based on the opening degree of the damper;

a third step of determining a fan rotation speed of an air conditioner supplying air to the VAV unit based on a total required air volume summing up a value of the required air volume of each of the VAV unit;

a fourth step of correcting the fan rotation speed of the air conditioner based on total

static pressure excess/insufficiency information integrating the static pressure excess/insufficiency information of each of the VAV unit;

a fifth step of controlling a fan of the air conditioner, so as to arrive at the fan rotation speed determined in the third step and corrected in the fourth step;

a sixth step of performing re-determination on the static pressure excess/insufficiency information based on a room temperature or a room CO_2 concentration of the controlled area before the static pressure excess/insufficiency information of each of the VAV unit is integrated; and

a seventh step of changing the static pressure excess/insufficiency information of each of the VAV unit based on a determination result of the sixth step before the static pressure excess/insufficiency information of each of the VAV unit is integrated,

wherein the sixth step comprises a step of, in a case where a difference between the room CO_2 concentration and a room CO_2 concentration setting value of the controlled area corresponding to the VAV unit whose static pressure excess/insufficiency information indicates a static pressure as insufficient falls within a range from negative infinity to a positive predetermined concentration, determining that the static pressure is to be changed from insufficient to appropriate.

[Claim 12] An air conditioning control method, comprising:

a first step of controlling, for each controlled area, an opening degree of a damper of a variable air volume (VAV) unit in accordance with a required air volume determined in accordance with a load condition of the controlled area;

a second step of transmitting, for each of the VAV unit, static pressure excess/insufficiency information based on the opening degree of the damper;

a third step of determining a fan rotation speed of an air conditioner supplying air to the VAV unit based on a total required air volume summing up a value of the required air volume of each of the VAV unit;

a fourth step of correcting the fan rotation speed of the air conditioner based on total static pressure excess/insufficiency information integrating the static pressure excess/insufficiency information of each of the VAV unit;

a fifth step of controlling a fan of the air conditioner, so as to arrive at the fan rotation speed determined in the third step and corrected in the fourth step;

a sixth step of performing re-determination on the static pressure excess/insufficiency

information based on a room temperature or a room CO_2 concentration of the controlled area before the static pressure excess/insufficiency information of each of the VAV unit is integrated;

a seventh step of changing the static pressure excess/insufficiency information of each of the VAV unit based on a determination result of the sixth step before the static pressure excess/insufficiency information of each of the VAV unit is integrated; and

an eighth step of predicting the room temperature of each of the controlled area in a future moment,

wherein the sixth step comprises a step of, in a case where at least one of the room temperature and a room temperature prediction value of the controlled area corresponding to the VAV unit whose static pressure excess/insufficiency information indicates a static pressure as insufficient falls within an allowable temperature range, determining that the static pressure is to be changed from insufficient to appropriate.

[Claim 13] The air conditioning control method as claimed in claim 12, wherein the allowable temperature range comprises: a first allowable temperature range, which is a range in which a difference between the room temperature and a room temperature setting value of the controlled area is from negative infinity to a positive first predetermined temperature when cooling and a range in which the difference between the room temperature and the room temperature setting value of the controlled area is from a negative first predetermined temperature to infinity when heating; and a second allowable temperature range, which is a range in which the room temperature of the controlled area is from negative infinity to a positive second predetermined temperature when cooling and a range in which the room temperature of the controlled area is from a positive third predetermined temperature to infinity when heating,

wherein the sixth step comprises a step of, in a case where at least one of the room temperature and the room temperature prediction value of the controlled area corresponding to the VAV unit whose static pressure excess/insufficiency information indicates the static pressure as insufficient falls within at least one of the first allowable temperature range and the second allowable temperature range, determining that the static pressure is to be changed from insufficient to appropriate.

[Claim 14] The air conditioning control method as claimed in claim 12 or 13, wherein the sixth step comprises a step of, in a case where a room prediction temperature

of the controlled area corresponding to the VAV unit whose static pressure excess/insufficiency information indicates the static pressure as appropriate is out of the allowable temperature range, determining that the static pressure is to be changed from appropriate to insufficient.

[Claim 15] An air conditioning control method, comprising:

a first step of controlling, for each controlled area, an opening degree of a damper of a variable air volume (VAV) unit in accordance with a required air volume determined in accordance with a load condition of the controlled area;

a second step of transmitting, for each of the VAV unit, static pressure excess/insufficiency information based on the opening degree of the damper;

a third step of determining a fan rotation speed of an air conditioner supplying air to the VAV unit based on a total required air volume summing up a value of the required air volume of each of the VAV unit;

a fourth step of correcting the fan rotation speed of the air conditioner based on total static pressure excess/insufficiency information integrating the static pressure excess/insufficiency information of each of the VAV unit;

a fifth step of controlling a fan of the air conditioner, so as to arrive at the fan rotation speed determined in the third step and corrected in the fourth step;

a sixth step of performing re-determination on the static pressure excess/insufficiency information based on a room temperature or a room CO_2 concentration of the controlled area before the static pressure excess/insufficiency information of each of the VAV unit is integrated;

a seventh step of changing the static pressure excess/insufficiency information of each of the VAV unit based on a determination result of the sixth step before the static pressure excess/insufficiency information of each of the VAV unit is integrated; and

an eighth step of predicting the room CO_2 concentration of each of the controlled area in a future moment,

wherein the sixth step comprises a step of, in a case where a difference between the room CO_2 concentration or a room CO_2 concentration prediction value and a room CO_2 concentration setting value of the controlled area corresponding to the VAV unit whose static pressure excess/insufficiency information indicates a static pressure as insufficient falls within a range from negative infinity to a positive predetermined concentration,

determining that the static pressure is to be changed from insufficient to appropriate.

[Claim 16] The air conditioning control method as claimed in claim 15, wherein the sixth step comprises a step of, in a case where a difference between the room CO_2 concentration prediction value and the room CO_2 concentration setting value of the controlled area corresponding to the VAV unit whose static pressure excess/insufficiency information indicates the static pressure as insufficient is out of the range from negative infinity to the positive predetermined concentration, determining that the static pressure is to be changed from appropriate to insufficient.