METHODS AND CONTROL SYSTEMS FOR CONTROLLING FLUID CONDITIONING SYSTEM INCLUDING PLURAL FLUID CONDITIONING UNITS

FIELD OF THE INVENTION

[0001] The invention relates to fluid conditioning systems, particularly systems that include a plurality of fluid conditioning units. The invention also relates to methods and control systems for controlling the fluid conditioning systems.

BACKGROUND OF THE INVENTION

[0002] To condition air for large commercial and industrial spaces, multiple air conditioning units may be used for a single space. The multiple air conditioning units work together to condition the air, such as cooling the air, within the space, and the multiple air conditioning units are collectively controlled to condition the space.

SUMMARY

[0003] In one aspect, the present disclosure relates to a fluid conditioning system for conditioning a fluid. The fluid conditioning system includes a plurality of fluid conditioning units. Each unit of the plurality of fluid conditioning units is configured to condition a fluid. Each fluid conditioning unit of the plurality of fluid conditioning units includes a unit controller configured to operate the fluid conditioning unit. The unit controllers of the plurality of fluid conditioning units are communicatively coupled to each other. One unit controller of the plurality of the unit controllers functions as a master control module. The master control module provides at least one operational set point to each of the unit controllers.

[0004] In another aspect, the present disclosure relates to a controller for a fluid conditioning unit. The controller comprises a processor and a computer-readable storage medium. The

computer-readable storage medium stores instructions, which, when executed by the processor, cause the controller (i) to operate as a unit controller controlling the fluid conditioning unit based on at least one operational set point and (ii) to operate as a master controller. The controller is selectively operable as the master controller, and, when operating as the master controller, the instructions cause the controller to output the at least one operational set point.

[0005] In a further aspect, the present disclosure relates to a method of conditioning a fluid using a fluid conditioning system. The fluid conditioning system includes a plurality of fluid conditioning units. Each fluid conditioning unit of the plurality of fluid conditioning units includes a unit controller configured to operate the fluid conditioning unit. The method includes determining when a unit controller operating as a master control module for the fluid conditioning system goes offline. The unit controller functioning as the master control module is communicatively coupled to each of the unit controllers to provide at least one operational set point to each of the unit controllers. The method further includes selecting a new unit controller to function as the master control module from the unit controllers of the plurality of fluid conditioning units.

[0006] These and other aspects of the invention will become apparent from the following disclosure.

BRIEF DESCRIPTION OF THE DRAWINGS

[0007] Figure 1 shows a data center with an air conditioning system according to a preferred embodiment of the invention.

[0008] Figure 2 is a schematic diagram showing one of the air conditioning units of the air conditioning system shown in Figure 1 fluidly connected to a server room of the data center.