

applications, it may be desirable to limit the costs associated with such controllers by eliminating certain features of each programmable controller. For example, programmable controllers without a display are often utilized in such situations. This improves efficiency, especially when simple and low costs programmable controllers are being utilized, because including a display is often expensive relative to the overall costs of a programmable controller. However, this traditionally results in inefficiencies associated with the inability to access and/or program the controllers in the field. Indeed, in most traditional systems, a computer is required to access such systems in order to provide updates and so forth. It is now recognized that it may be desirable to eliminate this requirement along with the associated inefficiencies and expenses.

BRIEF DESCRIPTION

[0004] According to one embodiment of the present invention, an automation controller system is provided. The automation controller system includes an integral memory module configured to store process control functions for control of automation devices of a process controlled by the automation controller, wherein the process utilizes a plurality of operational components for regulating process variables through automated process control. The automation controller system also includes a central processing unit configured to ~~communicate-monitor~~, via an input/output module, with data from the automation devices of a the process controlled by the automation controller, and a detachable display and memory module. Additionally, the automation controller system includes a retention feature configured to toollessly couple with a the detachable display and memory module. Further, the automation controller system includes a controller connector configured to communicatively couple with a display connector of the detachable display and memory module such that the automation controller and the detachable display and memory module are communicatively coupled, wherein the central processing unit is configured to transmit data for presentation on a display of the detachable display and memory module and configured to receive data from a memory and/or a data entry feature of the detachable display and memory module when the detachable display and memory module is communicatively coupled to the automation controller, wherein the memory of the detachable display and memory module is configured to store at least one process control function and the central processing unit is configured to incorporate the at least one process control function into

the process control functions stored in the integral memory module, wherein the central processing unit is configured to control, via the input/output module, the automation devices based on the process control functions stored in the integral memory module, wherein the process control functions are provided to the central processing unit in response to the data monitored by the central processing unit, and wherein processing functions of the display and memory module are directly provided by the central processing unit of the automation controller.

[0005] According to one embodiment of the present invention, an automation controller system is provided. The system includes a detachable display and memory module comprising a first connector and coupling features, with a module housing of the detachable display and memory module, a display disposed within the module housing, a memory

disposed within the module housing, ~~a first connector, and coupling features.~~ The system also includes an automation controller; an integral memory module of the automation controller, wherein the integral memory module is configured to store process control functions for control of automation devices of a process controlled by the automation controller, wherein the process utilizes a plurality of operational components for regulating process variables through automated process control; ~~The automation controller includes a central processing unit of the automation controller, wherein the central processing unit is configured to communicate via an input/output module with automation devices of a process controlled by the automation controller.~~ Additionally, ~~the automation controller includes a retention feature of the automation controller, wherein the retention feature is configured to toollessly couple with the coupling features of the detachable display and memory module.~~ Further, ~~the automation controller includes a second connector of the automation controller, wherein the second connector is configured to communicatively couple with the first connector of the detachable display and memory module such that the automation controller and the detachable display and memory module are communicatively coupled, wherein the central processing unit is configured to transmit data for presentation on the display of the detachable display and memory module and configured to receive data from the memory of the detachable display and memory module when the detachable display and memory module is communicatively coupled to the automation controller, wherein the memory of the detachable display and memory module is configured to store at least one process control function, and the central processing unit is configured to incorporate the at least one process control function into the process control functions stored in the integral memory module, wherein the central processing unit is configured to control, via the input/output module, the automation devices based on the process control functions stored in the integral memory module, wherein the process control functions are provided to the central processing unit in response to the data monitored by the central processing unit, and wherein processing functions of the display and memory module are directly provided by the central processing unit of the automation controller.~~

[0006] According to one embodiment of the present invention, a detachable display and memory module is provided. The detachable display and memory module includes a module housing, a display disposed within the module housing, and a memory disposed within the module housing and configured to store at least one process control function and and exclusively utilize a central processing unit of an automation controller to provide the at least one process control function to an integral memory of the automation controller, wherein the integral memory is configured to store process control functions for control of automation devices of a process controlled by the automation controller, wherein the process utilizes a plurality of operational components for regulating process variables through automated process control~~for processing functions~~. Additionally, the detachable display and memory module includes a display connector configured to communicatively couple with a controller connector of the automation controller upon attachment of the detachable display and memory module with the automation controller. Further, the detachable display and memory module includes coupling features configured to toollessly couple with aspects of a retention feature of the automation controller.

DRAWINGS

[0007] These and other features, aspects, and advantages of the present invention will become better understood when the following detailed description is read with reference to the accompanying drawings in which like characters represent like parts throughout the drawings, wherein:

CLAIMS

1. An automation controller system, comprising:

an integral memory module configured to store process control functions for control of automation devices of a process controlled by the automation controller, wherein the process utilizes a plurality of operational components for regulating process variables through automated process control;

a central processing unit configured to ~~communicate~~ monitor, via an input/output module, with data from the automation devices of a the process controlled by the automation controller;

a detachable display and memory module;

a retention feature configured to toollessly couple with a the detachable display and memory module; and

a controller connector configured to communicatively couple with a display connector of the detachable display and memory module such that the automation controller and the detachable display and memory module are communicatively coupled,

wherein the central processing unit is configured to transmit data for presentation on a display of the detachable display and memory module and configured to receive data from a memory and/or a data entry feature of the detachable display and memory module when the detachable display and memory module is communicatively coupled to the automation controller;

wherein the memory of the detachable display and memory module is configured to store at least one process control function and the central processing unit is configured to incorporate the at least one process control function into the process control functions stored in the integral memory module;

wherein the central processing unit is configured to control, via the input/output module, the automation devices based on the process control functions stored in the integral memory module, wherein the process control functions are provided to the central processing unit in response to the data monitored by the central processing unit; and

wherein processing functions of the display and memory module are directly provided by the central processing unit of the automation controller.

2. The automation controller system of claim 1, comprising the input/output module.
3. The automation controller system of claim 2, wherein the input/output module comprises an input/output board that is integral with the central processing unit.
4. The automation controller system of any one of claims 1 to 3, wherein the retention feature comprises a receptacle configured to receive coupling features of the detachable display and memory module.
5. The automation controller system of any one of claims 1 to 3, wherein the retention feature comprises a protrusion configured to couple with a receptacle of the detachable display and memory module.

6. The automation controller system of any one of claims 1 to 3, wherein the retention feature comprises a receptacle with angled protrusions extending from each of at least two walls of the receptacle.

7. The automation controller system of claim 6, wherein each of the angled protrusions is configured to slidably engage with a respective flexible coupling feature of the detachable display and memory module such that the flexible coupling features flex to pass over the respective angled protrusions and then flex back to engage an edge of each angled protrusion to resist movement of the detachable display and memory module away from engagement with the automation controller.

8. The automation controller system of any one of claims 1 to 7, wherein the controller connector comprises a female pin connector or a male pin connector.

9. The automation controller system of any one of claims 1 to 7, wherein the controller connector comprises various connection components.

10. The automation controller system of claim 1, wherein the controller connector comprises a first connection component configured to transmit data between a display and the automation controller, a second connection component configured to transmit data between a data entry feature and the automation controller, and a third connection component configured to transmit data between an external memory and the automation controller.

11. An automation controller system, comprising:
a detachable display and memory module, comprising: a first connector and coupling features;
a module housing of the detachable display and memory module;
a display disposed within the module housing;
a memory disposed within the module housing;
a first connector; and
coupling features; and
an automation controller, comprising;

an integral memory module of the automation controller, wherein the integral memory module is configured to store process control functions for control of automation devices of a process controlled by the automation controller, wherein the process utilizes a plurality of operational components for regulating process variables through automated process control;

a central processing unit of the automation controller, wherein the central processing unit is configured to ~~communicate~~ monitor, via an input/output module, with data from the automation devices of a the process controlled by the automation controller;

a retention feature of the automation controller, wherein the retention feature is configured to toollessly couple with the coupling features of the detachable display and memory module; and

a second connector of the automation controller, wherein the second connector is configured to communicatively couple with the first connector of the detachable display and memory module such that the automation controller and the detachable display and memory module are communicatively coupled,

wherein the central processing unit is configured to transmit data for presentation on the display of the detachable display and memory module and configured to receive data from the memory of the detachable display and memory module when the detachable display and memory module is communicatively coupled to the automation controller,

wherein the memory of the detachable display and memory module is configured to store at least one process control function, and the central processing unit is configured to incorporate the at least one process control function into the process control functions stored in the integral memory module.

wherein the central processing unit is configured to control, via the input/output module, the automation devices based on the process control functions stored in the integral memory module, wherein the process control functions are provided to the central processing unit in response to the data monitored by the central processing unit, and

wherein processing functions of the display and memory module are directly provided by the central processing unit of the automation controller.

12. The system of claim 11, wherein the detachable display and memory module comprises a data entry feature.

13. The system of claim 12, wherein the data entry feature comprises a touch screen component of the display or a data entry pad.

14. The system of claim 11, wherein the memory module is configured to receive data from an external computer.

15. The system of any one of claims 11 to 14, wherein the retention feature comprises a receptacle or a protrusion.

16. A detachable display and memory module, comprising:
a module housing;

a display disposed within the module housing;

a memory disposed within the module housing and configured to store at least one process control function and exclusively utilize a central processing unit of an automation controller to provide the at least one process control function to an integral memory of the automation controller, wherein the integral memory is configured to store process control functions for control of automation devices of a process controlled by the automation controller, wherein the process utilizes a plurality of operational components for regulating process variables through automated process control~~for processing functions~~;

a display connector configured to communicatively couple with a controller connector of the automation controller upon attachment of the detachable display and memory module with the automation controller; and

coupling features configured to toollessly couple with aspects of a retention feature of the automation controller.

17. The detachable display and memory module of claim 16, comprising a data entry feature.

18. The detachable display and memory module of claim 17, wherein the data entry feature comprises a touch screen.

19. The detachable display and memory module of claim 16, wherein the memory is configured to communicate with the automation controller via a dedicated component of the display connector.

20. The detachable display and memory module of any one of claims 16 to 19, wherein the coupling features comprise elongated flexible extensions from the housing configured to bend upon engagement with the aspects of the retention feature and flex back to abut edges of the aspects of the retention feature to hold the detachable display in place relative to the automation controller.