FUTUREDESIGN
CONTROLS

nCompass CM i4.3
Multi-loop Controller
Configuration Manual

Safety Information in this Manual

Notes, cautions and warnings appear throughout this book to draw your attention to important operational and safety information.

A "**NOTE**" marks a short message to alert you to an important detail.

A "**CAUTION**" safety alert appears with information that is important for protecting your equipment and performance.

A "**WARNING**" safety alert appears with information that is important for protecting you, others and equipment from damage. Pay very close attention to all warnings that apply to your application.

This symbol (an exclamation point in a triangle) precedes a general CAUTION or WARNING statement.

This symbol (a lightning bolt in a lightning bolt in a triangle) precedes an electric shock hazard CAUTION or WARNING safety statement.

Technical Assistance

If you encounter a problem with your nCompass controller, review all of your configuration information to verify that your selections are consistent with your application: inputs; outputs; alarms; limits; etc. If the problem persists after checking the above, you can get technical assistance by dialing +1 (866) 342-5332 or by faxing your request to +1 (866) 332-8014, Monday thru Friday, 8:00 a.m. to 5:00 p.m. Eastern Standard Time. You can also email your request to support@futuredesigncontrols.com.

An applications engineer will discuss your application with you.

Please have the following information available:

• Complete Model #'s and/or Serial #'s for Component(s) in Question
• Complete Software Version #'s
• All Configuration Information
• All User Manuals

Warranty and return information is on the back cover of this manual.

Your Comments

Your comments or suggestions on this manual are welcome. Please send them to:
Future Design Controls, P.O. Box 1196, Bridgeview, Illinois, 60455
Telephone: +1 (888) 751-5444; fax: +1 (888) 307-8014
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nCompass i4.3

Appendix

   Order Matrix
   Software License
   Software Usage Note
   Warranty
   Returns

1   What is nCompass?

The nCompass system combines all of the features of typical loop controllers, video/chart recorders and datalogging systems into a single/intuitive device. Email, SMS (text messaging), FTP (file transfer protocol for automated data backup) and remote view/control (Web server/VNC server) are standard with nCompass and can be accessed via LAN/WAN using a PC, tablet or smart phone device.

Future Designs "nCompass" provides a 4.3"color touch screen interface with standard "Smart Device" user interface features for up to ten loop OEM control applications. All loop configuration and runtime user access is configurable at the device with no PC software required. OEM's have the ability to configure runtime features (screens available, menus, etc...) to easily customize the system for their requirements. These configurations can be imported/exported to any nCompass device for setup (from scratch) within minutes.

In addition to a maximum of ten loops of control, nCompass can also provide up to an additional 15 inputs for process monitoring for a total of 25 process inputs. The system is provided with eight 24Vdc digital inputs, two 24Vdc outputs and 6 relay outputs standard. nCompass can be expanded to a total of 16 digital inputs and 32 digital outputs. nCompass also provides the capability of accepting analog inputs for remote set point control and analog outputs capable of retransmitting system variables (PV, SP or %Out) to other devices such as a chart recorder. The 0-10Vdc or 4-20mA user selectable signals are provided through the addition of optional analog expander cards.

Individual process controllers, one for each loop in the system, provide reliable, consistent and accurate control by distributing the process control requirements of the system among multiple processors. Each loop controller provides full auto tune functionality with high resolution, universal process inputs. When coupled with the built in ramping programmer of nCompass, it allows for automatic, timed control of all processes and outputs of the system.

1.1   Features

The nCompass digital inputs can be configured as alarm inputs with adjustable delay timers, as control inputs for controlling automatic program operation or for direct control of the system's digital outputs.

The nCompass digital outputs can be used as direct outputs for controlling external equipment related to the application through software switches, called events, or be programmed to act as system alarm or status outputs. All outputs have adjustable delay times for on, off and cycle times.

nCompass can be operated in single set point or automatic program control mode. Program entry is made easy through the use of copy, paste and delete menu selections. Programs can be copied to the external 'USB' memory stick and then imported to another nCompass controller which eliminates the need to enter duplicate ramp/soak programs into multiple systems. When running in automatic program mode, the operator can place the system into hold and change any control parameter without modifying the original program. This gives the operator maximum flexibility over the controlled process.

Data file analysis tools (auto-trend) make looking at historical data a simple task. Any control variable saved to the nCompass SD memory can be plotted on the historical data trend, for any time frame within the data file's total time range.

The built in Ethernet functionality includes a 'Web Server' to provides access to all nCompass data (view only), a VNC interface for remote control and monitoring and an NTS clock, all available via a local Intranet connection (wired or wireless), or the World Wide Web using standard software like Microsoft's Internet Explorer.

nCompass provides a rich set of tools for control interaction and data analysis. Views include system overviews, trends, alarms, automatic programs as well as historical data, alarm history and audit trail views. The menu driven interface eliminates screen 'clutter' by providing an easy to use 'Smart Device' interface for interaction between the user and nCompass.

nCompass can store more than one year of data on its SD memory card. Data logging can be enabled manually or automatically during automatic program operation. Data backup is provided with the 'USB I-Stick' for plug and play transfer of files to any PC running Microsoft Windows XP operating systems and via the FTP back-up utility.

nCompass protects system access with 4 level security (user rights based), audit trails that document all user activity and ensures data integrity by digitally signing all data files and audit trails to meet regulatory requirements.

The nCompass controller includes the following features:

- Single/Dual loop controller models.
- Touch screen, "Smart Device" user interface (UI).
- Email, SMS, FTP, VNC and Web functionality standard.
- Remote View/Control using PC, Tablet or Smartphone.
- Detailed maintenance, alarm monitoring and alarm history.
- User configurable datalogging and historical data viewer.
- 4 level security with digitally signed audit trails and data files.
- National time server connectivity with daylight savings.
- Multi-lingual user interface supports over 25 languages.
- 30,000 hour LED display

2 Configurator Overview

The nCompass configurator is a program that allows the OEM or user to set up control system options for the nCompass runtime application. The configurator program will not run at the same time as the main runtime software, therefore, no control functions are active while the OEM or operator is editing the configuration of nCompass through the configurator program.

The configurator program is a powerful tool that allows full customization of nCompass. Text editing for all inputs, outputs and event names can be customized via the configurator. All control loop functionality can also be edited via the configurator.

The nCompass configurator program will run the first time power is applied to the controller. The configurator can also be run when the runtime software is exited and the "Exit and run configurator on next power-up" option is selected. The next time the unit is re-powered the configurator will run.

NOTE: *Each time the nCompass configurator software is exited; the controller runtime software will run after the unit is re-powered.*

The nCompass configurator provides the following functionality:

- Set the number of control loops that nCompass will use.
- Provides control loop configuration settings for decimal point, set point range, control function, etc.
- Set the number of analog inputs and outputs accessible on the system.
- Set the number of digital inputs and outputs accessible on the system.
- Set the number of system events accessible on the system with configurable digital output selection.
- Set the number of alarms accessible on the system.
- Set the number of monitor points and input type that nCompass will use.
- 'Splash Screen' name editing for custom OEM or user requirements.
- Enable/disable options for runtime menu and screen availability.
- Text editing for all system event, digital input and digital output names.


To assist in setup and documentation of nCompass, see the "nCompass CM Configuration and Worksheet" Excel file provided on the Future Design Controls website. This document provides setup and configuration forms and templates for all of the nCompass CM configuration parameters (http://www.futuredesigncontrols.com/nCompass.htm).

2.1 Configurator Menu

The configurator menu is accessed by pressing the 'Monitor' icon at the top left of the screen.

The **File** menu provides the exit function for the configurator. After selecting this menu item and exiting the configurator, the controller runtime software will run after the unit is re-powered.
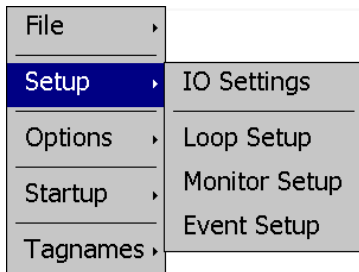
The **Setup** menu provides access to the primary controller setup options. These options include the number of loops and monitors used, the number of digital and analog inputs and outputs available, the number of alarms and events available as well as loop, monitor and event configuration.
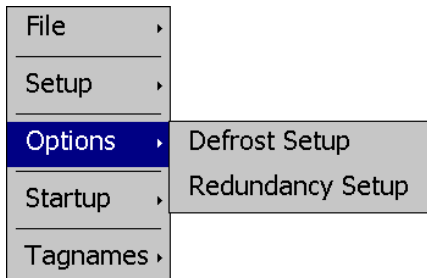
The **Options** menu provides access to additional controller options including the setup of defrost and redundancy operation.

The **Startup** menu provides access to enable and disable nCompass runtime screens/menus and the select the desired startup view.
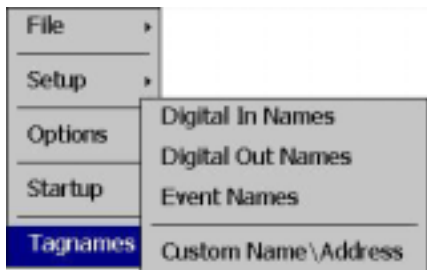
The **Tagnames** menu provides access to the text editing functions of the configurator which allow the event and digital input and output names to be changed to match their use in the system. The menu also provides access to edit the splash screen information that is shown when the system starts.

3   Configuring nCompass

Different setup screens are provided in the configurator for the various functions and settings of nCompass. It is important to note; however, that the loop controllers must be set up independently of the configurator, via the loop controller itself. Since nCompass is capable of interfacing to more than one type of controller, refer to the operating manual for the model loop control being used for information on how to access the various input and output settings in order to properly set up the controller to match the application.

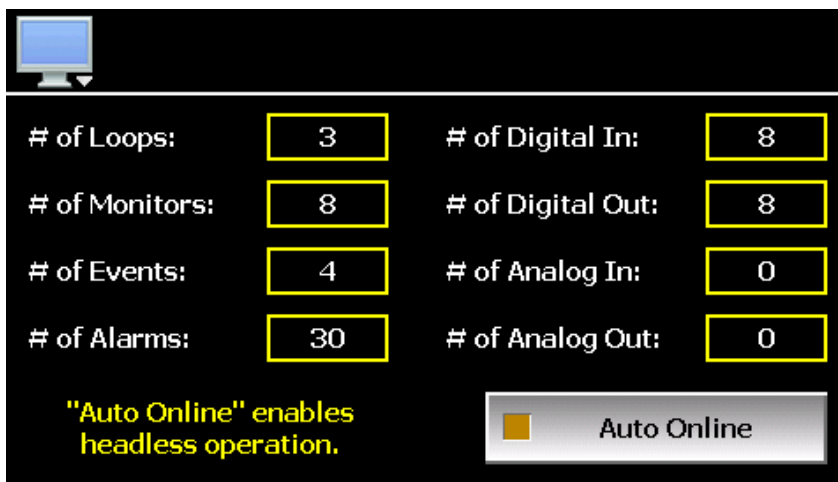**IMPORTANT:**   *Once all configuration settings are made, you must select 'Exit' from the File menu to exit the configurator prior to cycling power to nCompass. All configuration files are written upon exiting the configurator. Do not cycle power prior to exiting the configurator or settings will be lost and nCompass will not operate properly when the runtime application is restarted.*

3.1   IO Settings

The 'IO Settings' screen is accessed from the Setup menu. It is the primary configuration screen for nCompass providing entries for setting the number of control loops and monitor points, number of analog and digital inputs and outputs, number of process alarms as well as the number of system events available in the system. It also provides the ability to set the auto-online feature for systems that do not use a local operator interface (HMI).

3.1.1   Setting the Number of Control Loops

The **# of Loops** field sets the number of loop controls that will be attached to nCompass. The maximum number of control loops available is ten. If no control loops are used in the application, the number of control loops can be set to zero. Once the number of loop controls is set, the loop configuration for each controller must be performed so that the proper units, decimal point and set point ranges are used for each control loop.

See Section 3.2, Loop Setup for information on configuring each control loop. When the nCompass runtime application is started, nCompass will automatically configure all loop view displays, trends and available log point selections based on the settings for each control loop.

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3.1.2 Setting the Number of Monitor Points

The **# of Monitors** field sets the number of monitor points that will be shown in the nCompass runtime application. Up to 15 monitor points can be configured. Note that the thermocouple and analog input monitor modules provide up to 8 inputs each, while the RTD type provides up to 6 inputs. If the CM version used supports using the second input of the loop controls as monitor points, they may also be assigned as a monitor point.

Once the number of monitor points is set, the monitor configuration of nCompass must be set so that the proper input assignment, units, decimal point and input ranges are used for each point. See Section 3.3, Monitor Setup for information on configuring each monitor point.

3.1.3 Setting the Number of System Events

The **# of Events** field sets the number of system events that will be provided in the nCompass runtime application under the 'Overview' screen. The system events are 'soft' switches which can be assigned to the different digital outputs configured in the system. When the event is turned on, any digital outputs assigned to the event will be activated. This allows equipment to be turned on and off directly through nCompass which also allows for the automatic and timed starting and stopping of equipment with the use of automatic programs.

The maximum number of system events available is 32, one for each digital output available. Outputs can be assigned to events specifically by the OEM in the configurator or outputs can be assigned to events in the runtime application under the Offline\Setup\IO menu. However, in the runtime application, if a digital output is assigned as a system event on the digital output screen, it will be assigned to the corresponding system event only. For example, digital output 4 will be assigned to system event 4; digital output 14 to system event 14, etc. The outputs cannot be assigned to specific events; this can only be done in the configurator.

NOTE: *See Section 3.8, System Events Configuration for information on how to assign digital outputs to different system events.*

3.1.4 Setting the Number of Loop/Monitor Alarms

The **# of Alarms** field sets the number of loop/monitor alarms that will be accessible under the nCompass runtime application 'Setup' menu. The alarms provide various alarming and output control functions for indicating out-of-tolerance conditions for the various loop and monitors configured in the system. nCompass provides up to 30 loop/monitor alarms.

If the maximum number of alarms is set to zero, the 'Alarms' menu selection under the 'Setup' menu in the runtime application will not be accessible. This provides the OEM with a means of protecting the alarm settings from accidental changes that may occur if the end user accesses them. It also provides a means for offering the end user alarms that they can set up for their own use, while hiding alarms specifically configured for proper system operation that the user is not to have access to.

3.1.4.1 *Protected Loop/Monitor Alarms Example*

Two alarms are to be provided for the end user while 10 alarms are required for use specifically by the OEM so they are not to be altered. In order to set up the OEM alarms, the '# of Alarms' field must first be set to 12. This allows all 12 alarms to be accessed from the Setup menu in the runtime application. The OEM can then set up alarms 3 - 12 while leaving 1 and 2 available for the end user. Once the system has been configured and tested, prior to shipment, the OEM can then access the configurator once more and change the '# of Alarms' field to a value of two.

Since the field is now set to two, only the first two alarms will be accessible from the Setup menu, i.e., alarms 1 and 2, the alarms for the end user. Alarms 3 - 12, the OEM alarms, are now hidden and cannot be accessed by the end user. The alarm configurations are then protected and the alarms will operate in the background as set by the OEM.

NOTE: *See the nCompass i4.3 Multi-Loop Controller Manual, Section 8.4 Alarm Settings, for information on configuring the alarms for operation.*

3.1.5   Setting the Number of Digital Inputs

The **# of Digital In** field sets the number of digital inputs that will be accessible in the nCompass runtime application's 'Offline\Setup\IO' menu. The digital inputs provide various control functions such as alarming, remote program start/stop, digital output control, etc. The base nCompass system provides 8 digital inputs on the CPU, and can be expanded up to a maximum of 16 digital inputs with the addition of an optional digital input card.

If the maximum number of digital inputs is set to zero, the 'Digital Inputs' selection under the 'Offline\Setup\IO' menu in the runtime application will be hidden, regardless of the number of digital inputs physically attached to the system. This provides the OEM with a means of protecting the inputs from accidental changes that may occur if the end user accesses them. It also provides a means for offering the end user digital inputs that they can set up for their own use, while hiding inputs specifically configured for proper system operation that the user is not to have access to.

3.1.5.1   Protected Digital Input Example

Four digital inputs are to be provided to the end user while 12 inputs are set up at the factory and are used specifically by the OEM so they are not to be altered. In order to get a total of 16 inputs, the optional 8 point digital input card is attached to the system.

In order to set up the OEM digital inputs, the '# of DigIn' field must first be set to 16. This allows all 16 inputs to be accessed from the Offline\Setup\IO menu in the runtime application. The OEM can then set up digital inputs 5 - 16 while leaving 1 - 4 available for the end user. Once the system has been configured and tested, prior to shipment, the OEM can then access the configurator once more and change the '# of Digital In' field to a value of four.

Since the field is now set to four, only the first four digital inputs will be accessible from the Offline\Setup\IO menu, i.e., inputs 1 - 4, the digital inputs for the end user. Digital inputs 5 - 16, the OEM inputs, are now hidden and can not be accessed by the end user. The digital input configuration is then protected and the digital inputs will operate in the background as set by the OEM.

NOTE: *See the nCompass i4.3 Multi-Loop Controller Manual, Section 9.7 Digital Inputs, for information on configuring the digital inputs for operation.*

3.1.6   Setting the Number of Digital Outputs

The **# of Digital Out** field sets the number of digital outputs that will be accessible in the nCompass runtime application's 'Offline\Setup\IO' menu. The digital outputs provide various control functions such as system events, audible alarm, remote fault contact, automatic program status indication, etc. The base nCompass system provides 8 digital outputs on the CPU (2 TTL and 6 relay), and can be expanded up to a maximum of 32 digital outputs with the addition of an optional digital output cards.

If the maximum number of digital outputs is set to zero, the 'Digital Outputs' selection under the 'Offline\Setup\IO' menu in the runtime application will be hidden, regardless of the number of digital outputs physically attached to the system. This provides the OEM with a means of protecting the outputs from accidental changes that may occur if the end user accesses them. It also provides a means for offering the end user digital outputs that they can set up for their own use, while hiding outputs specifically configured for proper system operation that the user is not to have access to.

3.1.6.1 Protected Digital Output Example

Eight digital outputs are to be provided to the end user while 8 outputs are set up at the factory and are used specifically by the OEM so they are not to be altered. In order to get a total of 16 outputs, the optional 8 point digital output card is attached to the system.

In order to set up the OEM digital outputs, the '# of DigOut' field must first be set to 16. This allows all 16 outputs to be accessed from the Offline\Setup\IO menu in the runtime application. The OEM can then set up digital outputs 9 - 16 while leaving 1 - 8 available for the end user. Once the system has been configured and tested, prior to shipment, the OEM can then access the configurator once more and change the '# of DigOut' field to a value of eight.

Since the field is now set to eight, only the first eight digital outputs will be accessible from the Offline\Setup\IO menu, i.e., outputs 1 - 8, the digital outputs for the end user. Digital outputs 9 - 16, the OEM outputs, are now hidden and cannot be accessed by the end user. The digital output configuration is then protected and the digital outputs will operate in the background as set by the OEM.

NOTE: *See the nCompass i4.3 Multi-Loop Controller Manual, Section 9.8 Digital Outputs, for information on configuring the digital outputs for operation.*

3.1.7 Setting the Number of Analog Inputs

The **# of Analog In** field sets the number of analog inputs that will be accessible in the nCompass runtime application's 'Offline\Setup\IO' menu. The analog inputs provide a means for generating a remote set point for any of the configured control loops from a 2-10Vdc or 4-20mA source. The maximum number of analog inputs available is 14, based on the number of optional analog I/O cards attached to the nCompass CPU (two inputs per analog I/O card).

If the maximum number of analog inputs is set to zero, the 'Analog Inputs' selection under the 'Offline\Setup\IO' menu in the runtime application will be hidden, regardless of the number of analog inputs physically attached to the system. This provides the OEM with a means of protecting the inputs from accidental changes that may occur if the end user accesses them. It also provides a means for offering the end user analog inputs that they can set up for their own use, while hiding inputs specifically configured for proper system operation that the user is not to have access to.

3.1.7.1 Protected Analog Input Example

One analog I/O card is attached to the system in order to provide a total of two analog inputs. One input is to be provided to the end user. The other input is set up at the factory and is used specifically by the OEM so it is not to be altered.

In order to set up the OEM analog input, the '# of AnaIn' field must first be set to two. This allows both inputs to be accessed from the Offline\Setup\IO menu in the runtime application. The OEM can then set up analog input 2 while leaving input 1 available for the end user. Once the system has been configured and tested, prior to shipment, the OEM can then access the configurator once more and change the '# of Analog In' field to a value of one.

Since the field is now set to one, only the first analog input will be accessible from the Offline\Setup\IO menu for the end user. Analog input 2, the OEM input, is now hidden and cannot be accessed by the end user. The analog input configuration is then protected and the analog inputs will operate in the background as set by the OEM.

NOTE: *See the nCompass i4.3 Multi-Loop Controller Manual, Section 9.5 Analog Inputs, for information on configuring the analog inputs for operation.*

3.1.8   Setting the Number of Analog Outputs

The **# of Analog Out** field sets the number of analog outputs that will be accessible in the nCompass runtime application's 'Offline\Setup\IO' menu. The analog outputs provide the ability to transmit loop input, set point or percentage of output values to a remote device such as a chart recorder via a 0-10Vdc or 4-20mA signal. The maximum number of analog outputs available is 7, based on the number of optional analog I/O cards attached to the nCompass CPU (one output per analog I/O card).

If the maximum number of analog outputs is set to zero, the 'Analog Outputs' selection under the 'Offline\Setup\IO' menu in the runtime application will be hidden, regardless of the number of analog outputs physically attached to the system. This provides the OEM with a means of protecting the outputs from accidental changes that may occur if the end user accesses them. It also provides a means for offering the end user analog outputs that they can set up for their own use, while hiding outputs specifically configured for proper system operation that the user is not to have access to.

3.1.8.1   *Protected Analog Output Example*

Two analog I/O cards are attached to the system in order to provide a total of two analog outputs. One output is to be provided to the end user while the other output is set up at the factory and is used specifically by the OEM so it is not to be altered.

In order to set up the OEM analog output, the '# of AnaOut' field must first be set to two. This allows both outputs to be accessed from the Offline\Setup\IO menu in the runtime application. The OEM can then set up analog output 2 while leaving 1 available for the end user. Once the system has been configured and tested, prior to shipment, the OEM can then access the configurator once more and change the '# of Analog Out' field to a value of one.

Since the field is now set to one, only the first analog output will be accessible from the Offline\Setup\IO menu, i.e., output 1, the analog output for the end user. Analog output 2, the OEM output, is now hidden and can not be accessed by the end user. The analog output configuration is then protected and the analog output will operate in the background as set by the OEM.

NOTE: *See the nCompass Multi-Loop Controller Manual, Section 9.6 Analog Outputs, for information on configuring the analog outputs for operation.*

3.1.9   Auto-Online Enable/Disable

The default setting for the auto-online function is 'disabled'. This prevents the nCompass control module from operating until the HMI initializes and begins the nCompass runtime application. This insures that the system will not run until the runtime application is active, so that the operator has a means for viewing and controlling system operations. Once the HMI starts the nCompass application, it instructs the control module to begin operation.

By enabling the auto-online function, the nCompass control module will begin operation upon application of power, as it no longer requires the run instruction from the nCompass application. It is intended for use on equipment that does not use a local nCompass display, or that contains multiple nCompass systems linked together and operated from a single computer and software interface such as Future Design Control's EnVision software package.

IMPORTANT: *It is highly recommended that 'Auto Online' be disabled whenever the nCompass display is used on the system. This prevents system operation until the nCompass application is initialized and ready for operator input to control the system.*

When using the auto online function, insure that the automatic start of the nCompass control module upon application of power will not cause a hazardous condition. Operator control/monitoring of the system will not be available until a software connection is made via nCompass's optional, user communications port, or the nCompass's local display is attached and the runtime application has initialized.

Emergency stop, safety and interlocking circuits MUST be configured outside of nCompass. If such circuits are made through the use of nCompass, failure of nCompass may cause uncontrollable operation, damage to equipment or accidents. The selection, application and use of Future Design Control products and software is the sole responsibility of the OEM or end user. Future Design Control will not be held responsible for any damages or losses, whether direct, indirect, incidental, special or consequential, resulting from the use of Future Design Control products or software.

3.2   Loop Setup

In order for nCompass to properly interface with each of the loop controls attached to the system, nCompass must be given the proper configuration settings for each loop. These settings are accessed from the 'Loop Setup' screen under the Setup menu.

IMPORTANT: *The loop input number corresponds to the communications address that must be manually set in the loop control for nCompass to access it properly. If the communications address is not set properly in the loop control, nCompass will not be able to communicate with it, or may communicate with the wrong loop control and assign the incorrect set points and control parameters to it.*

See the corresponding FDC nCompass CM Controller Configuration Guide for the model of loop control you are using with nCompass. Each loop control must be configured separately according to the manual guidelines prior to use with nCompass.
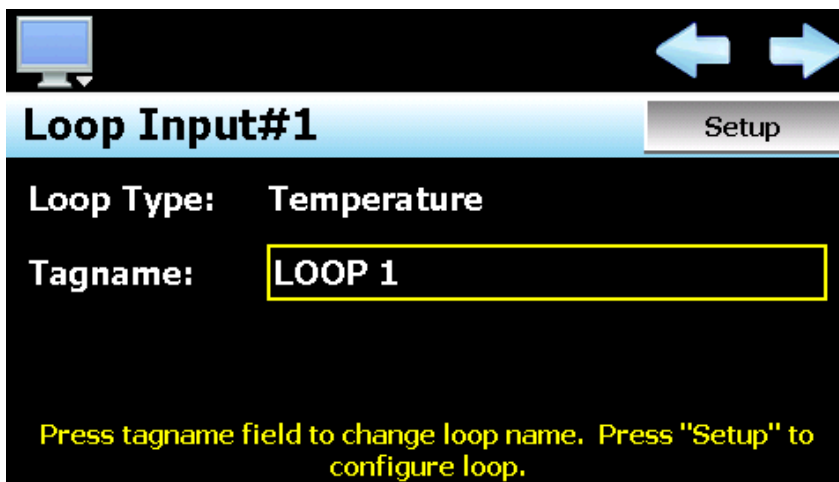
The left and right scroll (arrow) buttons allow the user access each loop in the system, by pressing left or right to go to the previous or next loop.

The **Loop Type** is a display only field that allows the user to view the current input type setting of the loop. In order to change the input type and access other settings for the loop input, press the 'Setup' button. This provides access to the loop setup screen.

The **Tagname** field is used to enter a specific name for the loop, up to 11 characters in length. This name will be used throughout the nCompass runtime application and can be used to provide a more detailed description as to the function of the loop in the application. Default tagnames are Loop 1, Loop 2, Loop 3 and so on up to Loop 10.

3.2.1   Loop Settings

The 'Loop Settings' screen is accessed by pressing the Setup button on the Loop Setup screen. The Loop Settings screen provides all settings related to the loop input configuration for nCompass. When all settings have been made, press the 'Done' button to return to the Loop Setup screen.

NOTE: The settings entered on the Loop Settings screen must correspond to the settings entered into the corresponding loop controller for proper operation of nCompass.
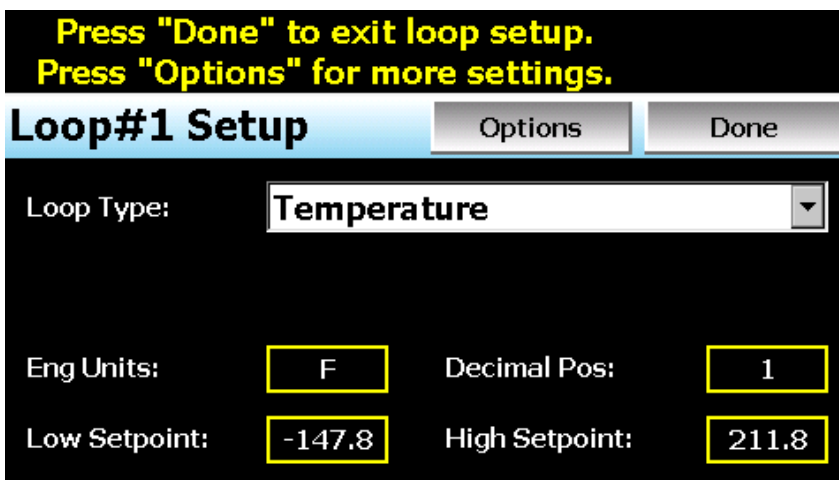
The **Loop Type** selection is used to set the input type of the loop. There are two selections available for the type of loop that can be used with nCompass:

Temperature: This loop type should be used when the loop controller is configured with a temperature input such as a thermocouple or RTD. nCompass will automatically switch the temperature units of the controller between degrees C and degrees F as selected in the nCompass runtime application on the Offline\Setup\Units screen.

Process: This loop type should be used when the loop controller is configured with a linear input type (voltage or current). With this input type, the loop units can be changed in order to display the proper engineering units for the value being controlled.

> **NOTE:** *If the linear input to the controller is from a temperature transmitter, the loop units will not change based on the temperature units selection in nCompass on the Offline\Setup\Units screen. The units will remain as set in the loop control and the engineering units will remain at the value set in the configurator. Only temperature loop types allow for degrees C/F selection.*

The **Eng Units** field is used to enter the engineering units for the loop up to three characters maximum. This value is shown on the single and dual view loop screens in the nCompass runtime application. When the loop type selection is temperature, nCompass will change the units between 'C' and 'F' based on the units selection on the Offline\Setup\Units screen. If the loop type is wetbulb or process, the engineering units entered here will remain as entered regardless of the temperature unit configuration.

The **Decimal Pos** field is used to select the decimal point resolution for the loop input. All set point and process value readings in nCompass will be displayed using the selected resolution. Temperature loop types have a maximum resolution of 1 decimal point. Process loop types can be displayed with a resolution of up to 3 decimal points.

The **Low Setpoint** and **High Setpoint** fields are used to set the minimum and maximum allowable set points for the control loop. These settings allow the OEM to enter an absolute minimum and maximum range for the operation of the control loop regardless of the end user's desired range. The 'Setpoint Limits' screen in the runtime application (see Section 8.2 Setpoint Limits in the nCompass i4.3 Multi-Loop Controller Manual) will be limited to the loop input low and high set point limits as set in the configurator. The end user will be able to decrease the set point range if given access in the runtime application, but not increase the range beyond these limits.

> **NOTE:** *If the low and/or high set point limit fields exceed the range of the loop control input, a communications error will result when the nCompass runtime application is started. This error will not be able to be cleared and the loop will not operate properly until these low and high set point limit fields are set to a value within the input range of the controller.*

3.2.2   Loop Options

nCompass provides additional control options for each control loop. These options are accessed by pressing the 'Options' button on the Loop Settings screen.

3.2.2.1   Loop Permissives

By default, nCompass is the master control for the system. All loop set points, auto/manual and auto tune functions are controlled by nCompass. If a user tries to modify any of these settings through the front panel of the loop control, their selections will be overridden by nCompass. If there is a desire to allow a user to adjust these settings from the front panel of the loop control as well as the nCompass interface, the loop permissions can be set to allow the user to adjust each of the individual settings at the loop control.

 NOTE: *The security suite of nCompass runtime application provides audit trail capabilities in which all user changes to the system are tracked and logged. This includes user set point, auto/manual and auto tune changes to each individual loop control attached to the system.   If loop permission is granted for one or all of these settings, the user will be able to make adjustments at the loop controller.*

These changes can not be tracked or controlled by the nCompass security settings as they were made at the loop control, not the nCompass interface. If the application requires the user to have proper security rights to make any control system changes, the loop permissions should not be enabled unless other means are used to prevent adjustments at the loop controller without proper security access to the loop controller.

The **SP** permissive is used to allow the user to change the set point at the loop controller. However, if the loop is currently under automatic program operation through nCompass, any set point change made at the loop control by an operator will be overridden by the program generated set point in nCompass. The program would have to be placed in hold or stopped to allow local set point changes.

NOTE: *If the loop has the cascade option enabled, the set point for the loop is generated by calculations performed in nCompass, thus, even with the set point change permission enabled, any set point entered by an operator at the control will be overridden by nCompass unless the "set point communications disable" digital input function of nCompass is activated to disable set point communications from nCompass.*

The **A/M** permissive is used to allow the user to switch the control loop between auto and manual mode at the at the loop controller.

The **A-T** permissive is used to allow the user to initiate an auto tune of the control loop at the loop controller. Note that not all controllers allow set point changes once auto tune has been initiated. The FDC 9300 for example, will terminate auto tune if the set point is changed. If the loop is under automatic program control or has the cascade option enabled in which the set point for the loop is constantly changing based on other control loop conditions, auto tune will not be able to initiate at the controller even with this permission enabled.

NOTE: *Loops that are programmed with the cascade option should have auto tune initiated through nCompass. When initiated from nCompass, the set point will be held at its current value, regardless of the source loop condition, in order to allow the auto tune to be performed and complete properly.*

3.2.2.2   Cascade Control Mode Settings

Cascade loop operation is a control strategy in which one control loop provides the set point for another loop. If cascade operation is enabled for a loop, its set point will be calculated by nCompass based on the output of the selected source loop. nCompass will then apply the set point automatically and override any other set point entered for the loop.

There are two modes of operation for the cascade control feature, deviation and process. These modes define how the loop set point is calculated using the low and high set points.

Deviation: This mode uses the low and high set points to generate a set point that is defined relative to the source loop set point. The upper and lower range of the cascade loop set point is calculated by adding the high and low set point values as offsets from the source loop's set point. As the set point of the source loop changes, the window defined by the high and low set points automatically changes with it.

Example: *If the source loop set point is 50, the cascade Low SP is -10 and the High SP is 20, the cascade loop set point will be in the range of 40 (-10 + 50) to 70 (50 + 20). The actual value is then calculated by using the percentage of output of the source loop and creating a linear set point range from 40 to 70.*

Thus, if the source loop output range is 0 to 100%, at 0% output, the cascade loop set point will be 40, at 50% output the cascade set point will be 55 and at 100% output the cascade loop set point will be 70.

Process: This mode uses the low and high set points as the upper and lower range of the cascade loop set point. The output of the source loop is then used to calculate the cascade loop's set point by generating a linear value between the low and high set points.

Example: *If the cascade Low SP is 10 and the High SP is 150, the cascade loop set point will be in the range of 10 to 150. The actual value is then calculated by using the percentage of output of the source loop and creating a linear set point range from 10 to 150.*

Thus, if the source loop output range is 0 to 100%, at 0% output, the cascade loop set point will be 10, at 50% output the cascade set point will be 80 and at 100% output the cascade loop set point will be 150.

The deviation mode has the benefit of limiting the maximum and minimum temperature that the cascade loop can achieve relative to the source loop set point. This allows the system to be fine tuned to the minimum amount of overshoot required to obtain the desired control response.

The process mode has the benefit of maximum change rates by allowing the cascade loop to go to absolute limits. This allows the process to achieve set point temperature as quickly as possible, but does so at the cost of stability. If the process has a considerable amount of lag, the cascade loop control may oscillate uncontrollably once the source loop reaches set point because of the large overshoot that can be created.

The **Source Loop** is often referred to as the 'outer loop' for cascade control. The source loop selection tells nCompass which control loop to use in calculating the set point for the cascade loop. nCompass will monitor the output percentage of the source loop and generate a set point using the **Low Setpoint** and **High Setpoint** entries as the upper and lower ranges for calculating the set point.

3.3 Monitor Setup

In order for nCompass to properly display values from the optional monitor input modules and/or input 2 of the loop controllers, nCompass must be given the proper configuration settings for each monitor input used. These settings are accessed from the 'Monitor Setup' screen under the Setup menu.

NOTE: It is not necessary to wire or use all inputs of the monitor input modules (or second input of control loops) if they are not required for the application. Unused inputs will be ignored by nCompass. nCompass will only utilize the inputs individually configured as monitor points.
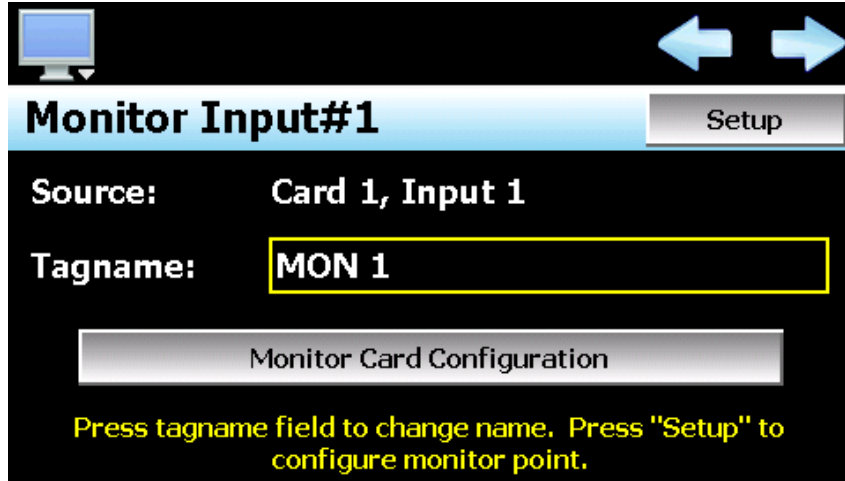
The left and right scroll (arrow) buttons allow the user access each monitor point in the system, by pressing left or right to go to the previous or next monitor point.

The **Source** is a display only field that allows the user to view the current input source for the monitor point. In order to change the input source and access other settings for the monitor point, press the 'Setup' button. This will provide access to the 'Monitor Point Settings' screen.

The **Tagname** field is used to enter a specific name for the monitor point, up to 11 characters in length. This name will be used throughout the nCompass runtime application and can be used to provide a more detailed description as to the value the input indicates in the application. Default tagnames are MON 1, MON 2, etc.

3.3.1 Monitor Point Settings

The Monitor Point Settings screen provides a drop down menu selection that allow the user to set the **Input Source** for the input (monitor card 1 or card 2) and which input to use from the selected card. In addition, certain CM software versions such as the FD30, also allow the second input of the loop controls to be configured as monitor points. These versions will allow the selection of 'Loop Input 2' from the input source drop-down menu.

Once the input source selection is made, the **Input Number** selection will provide the corresponding input selections for the source selected. These will be inputs 1-6 for RTD cards, inputs 1-8 for analog and thermocouple cards or the individual loop names for all loops configured in the system. If the selected monitor card is not used, or loop input 2 is selected but is not available on the current CM version, the selection will be cleared and the user will be alerted to make another selection.

NOTE: It is possible to assign the same monitor card input or loop to more than one monitor point.

The **Eng Units** field is used to enter the engineering units for the input up to three characters maximum. This value is shown on the single and dual view loop screens in the nCompass runtime application. When the monitor input module is an RTD or Thermocouple type, nCompass will change the units between 'C' and 'F' based on the units selection on the Offline\Setup\Units screen. If the monitor input module is an analog input type, the engineering units entered here will remain as entered regardless of the temperature units selection.

The **Decimal Pos** field is used to select the decimal point resolution for the monitor point. All readings in nCompass will be displayed using the selected resolution. Temperature input types have a maximum resolution of 1 decimal point. The analog input types can be displayed with a resolution of up to 3 decimal points.

The **Low Scale** and **High Scale** fields are shown for analog input types only. They are used to set the display range for the input in order to scale the 0(2)-10Vdc or 0(4)-20mA signal. The display value is then a linear representation of the input signal from the low to high scale value.

Once all of the settings have been made for the monitor point, press the 'Done' button to return to the Monitor Setup screen.

3.3.1.1 Important Settings for Using Loop Input 2 as Monitor Points

Decimal Point   When using the second input of control loops for monitor points, it is important to note that the controller itself, provides range, calibration and input bias settings for the input. In order for nCompass to properly read and display the value, the decimal point setting for the monitor input must match that of the loop control for input 2. If the decimal point settings do not match between nCompass and the loop controller, nCompass will not properly read or display the value of the second input for the monitor point.

Engineering Units When degrees C or degrees F is selected from the Degrees C/F screen in the nCompass runtime application, engineering units for temperature of 'C' or 'F' are automatically updated for all loop and monitor points. If input 2 of the loop controller is a temperature reading in degrees F for example (from a temperature transmitter), and degrees C is selected on nCompass, the monitor point reading will be a value in degrees F, but the units shown will be in degrees C.

To prevent the units from being changed, the Degrees C/F settings screen in the runtime application can be hidden to prevent changes (see Section 3.6 nCompass Functions) or even password protected in the runtime application. The engineering units could also be entered as 'dgC' or 'dgF' for example. nCompass will then ignore them for a degrees C or degrees F units change.

It is important to insure that the engineering units match the loop control for input 2 to avoid operator confusion and prevent the misinterpretation of the value.

Input Offsets   When using the second input of control loops for monitor points, it is important to note that the controller itself, provides range, calibration and input bias settings for the input. nCompass does provide an input offset capability which can be used to correct errors in readings from the analog, RTD or thermocouple monitor modules in order to correct for lead resistance or sensor tolerance.

The 'Input Offset' screen in the nCompass runtime application also allows an offset to be applied to the monitor points when input 2 of the loop controls are used. However, the input offset of nCompass only corrects the value shown on nCompass and does not offset the reading in the loop control.
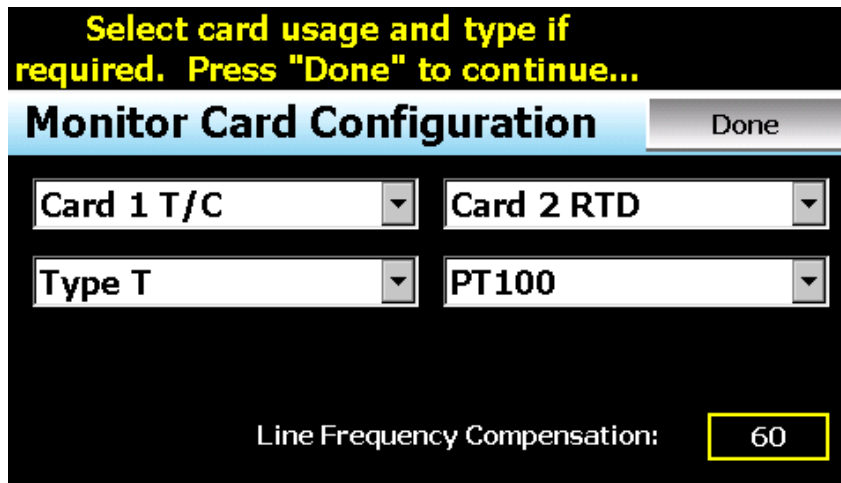
If the loop control is visible to the operator, it is recommended that the 'Input Offset' screen be hidden (see Section 3.6 nCompass Functions) or even password protected in the runtime application to prevent an offset from being applied to the monitor point in nCompass. Rather, use the input bias setting of the loop control so that both the reading on the loop control and nCompass will match to avoid operator confusion.

3.3.2   Monitor Card Configuration

In order for nCompass to properly interface with the optional monitor input modules, nCompass must be given the proper configuration settings for the type of monitor input modules used. These settings are accessed by pressing the 'Monitor Card Configuration' button on the Monitor Setup screen.

IMPORTANT: *The monitor input modules must be assigned the proper communications address or nCompass will not be able to communicate with them. In addition, if an address of a monitor module is improperly assigned to an address that corresponds to one of the loop controllers or the other monitor module, it will cause a failure in the communications to the loop controller or monitor module of the same address.*

The first monitor input module (card 1) must be assigned to address 16. If the second monitor module is used (card 2), it must be assigned an address of 17. This is done via the DIP switches located on the front of the monitor module. See Section 3.5, Connecting to the nCompass Process Monitor Module, of the nCompass Multi-Loop Controller Manual for more information on the proper DIP switch settings pertaining to the type of monitor card used.

Select card usage and type if required. Press "Done" to continue...

Monitor Card Configuration   Done

Card 1 T/C ▼   Card 2 RTD ▼

Type T ▼   PT100 ▼

Line Frequency Compensation: 60

The card type drop down menu is used to select the type of monitor module connected to nCompass. Available selections are Not Used, Analog, RTD and Thermocouple.

The input type drop down menu is shown only for RTD and Thermocouple type monitor input modules. This field is used to select from one of the available sensor types that are supported by the input module. The analog input modules have fixed voltage or current input ranges. The available RTD and Thermocouple input ranges are provided in the following tables.

RTD Selections	
Sensor Type	*Input range*
PT100	-200 to 850°C $\pm$ 0.3°C
Ni120	-80 to 320°C $\pm$ 0.3°C
PT1000	-200 to 850°C $\pm$ 0.3°C
Ni1000-DIN	-200 to 850°C $\pm$ 0.3°C
Ni1000-Landys&Gyr	-200 to 850°C $\pm$ 0.3°C
10-400ohms	10 to 400
10-4000ohms	10 to 4000

Thermocouple Selections	
Sensor Type	*Input Range*
Type J	-150 to 760°C $\pm$ 0.2°C
Type K	-200 to 1370°C $\pm$ 0.3°C
Type E	-0 to 600°C $\pm$ 0.1°C
Type T	-200 to 400°C $\pm$ 0.3°C
Type N	0 to 1300°C $\pm$ 0.3°C
Type B	400 to 18200°C $\pm$ 0.5°C
Type S	-50 to 1767°C $\pm$ 0.6°C
Type R	-50 to 1767°C $\pm$ 0.7°C
0 – 50mV	0 to 50 $\pm$ 0.1%
Type C	0 to 2315.5°C $\pm$ 0.7°C
Type D	0 to 2315.5°C $\pm$ 0.7°C
Type G	0 to 2315.5°C $\pm$ 0.9°C
-100 – 100mV	-100 to 100 $\pm$ 0.1%

The **Line Frequency Compensation** field is shown if one or both monitor input cards are configured for use. It is used to set the filtering circuit in the monitor input modules. The field has an adjustable range from 50 to 60 corresponding to typical 50Hz and 60Hz power sources.

3.4 Event Setup

The 'Event Setup' screen allows the OEM to assign specific digital outputs to each system event. Outputs can be assigned to one or more events as required based on the application.
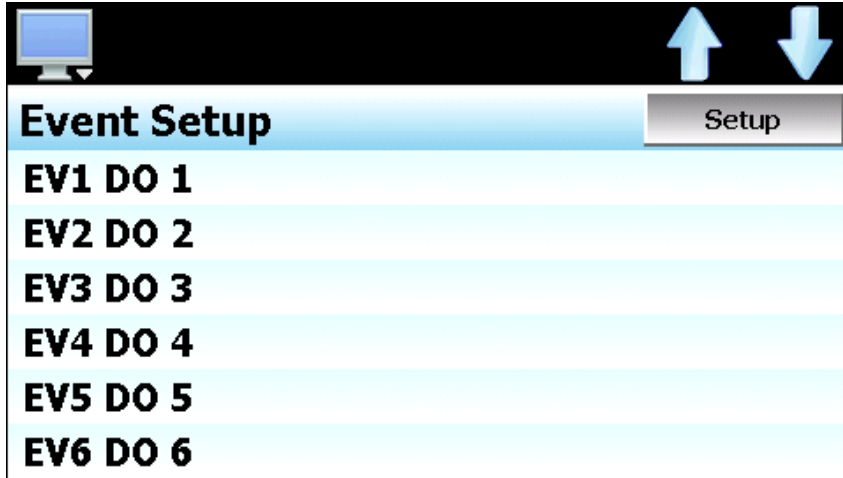
To assign outputs to an event, touch the desired event in the list box to select it and press the 'Setup' button. The 'System Event Output Configuration' screen will then be shown.
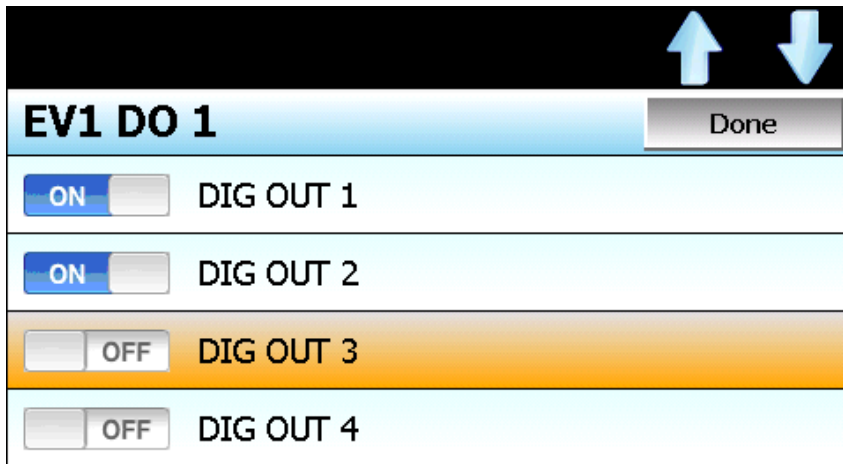
Select each output that is to be assigned to the event from the list and press the 'Done' button to assign the outputs to the event and return to the Event Setup screen.

NOTE: *Each digital output can be assigned to more than one event. This allows different events to control the same output or combination of outputs in order to perform various tasks as required by the application.*

3.5   Defrost Setup

The 'Defrost Setup' screen is accessed from the 'Options' menu and allows the OEM to configure the type of defrost mode to use (if any) and what outputs are to be associated with defrost operation. While the nCompass defrost function is primarily intended for refrigeration system use, it can also be used as a general timer function to perform repetitiv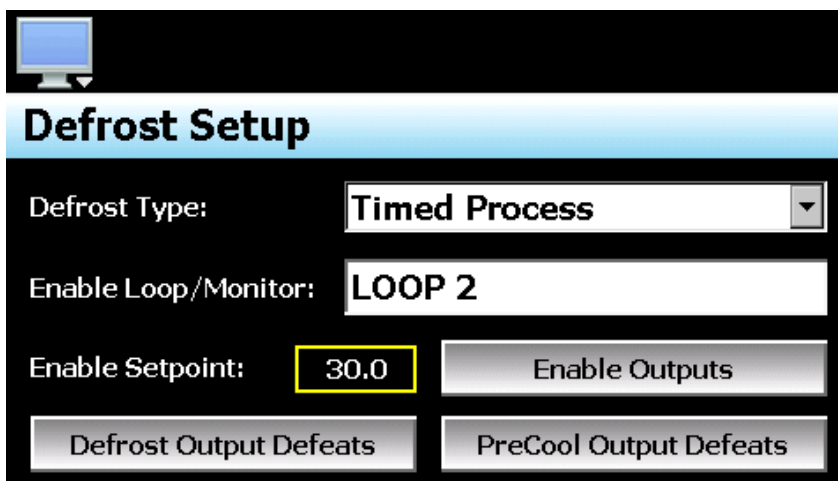e actions based on an interval time or in conjunction with a specific loop value. It does not have to be used in conjunction with a refrigeration system.

Defrost Setup

Defrost Type:	Timed Process
Enable Loop/Monitor:	LOOP 2
Enable Setpoint:	30.0 Enable Outputs
Defrost Output Defeats	PreCool Output Defeats

The **Defrost Type** selection is used to choose the defrost mode. Available selections are Disabled, Timed Defrost and Timed Process. When Timed Defrost is selected, defrost occurs on regular intervals based on the interval time entered on the defrost screen in the nCompass runtime application. When Timed Process is selected, defrost also occurs on regular intervals based on the interval time entered on the defrost screen in the nCompass runtime application; however, the selected enable loop/monitor must also be below the enable setpoint.

The interval timer will begin counting down to the next defrost as long as the selected enable loop/monitor remains below the enable setpoint. If at any time the selected loop/monitor rises above the setpoint, the defrost interval timer will be reset. This provides a means for enabling defrost only when the control loop or monitor point associated with the function is below a certain temperature in which defrost may be required on regular intervals.

The **Enable Loop/Monitor** selection is shown only when defrost is set to timed process. This field is used to select any of the available loop or monitor points configured in the system to be used as the enable point for defrost.

When a loop is selected as the enable source:
The set point of the selected loop is used as the source value and is compared to the defrost enable set point. When the loop set point is equal to or less than the defrost enable set point, the defrost logic will be activated. This insures that defrost will operate as required, since temperatures can rise if the cooling coil begins to ice over and cooling capacity is lost. If the air temperature was used, the coil could ice over causing air temperature to rise, preventing defrost from activating when it is required.

When a monitor point is selected as the enable source:
The process value of the selected monitor point is used as the source value and is compared to the defrost enable set point. When the monitor point is equal to or less than the defrost enable set point, the defrost logic will be activated. This offers the ability to provide a type of "adaptive" defrost by placing the sensor on the cooling coil or cold plate and monitoring surface temperature. It could then be used to activate defrost only when the surface temperature is operating at or below freezing in which ice can accumulate.

The **Enable Setpoint** field is shown only when defrost is set to timed process. It is used to enter the setpoint for the selected enable loop/monitor below which the defrost interval timer will be started.

3.5.1   Setting the Defrost Enable Outputs

In order for defrost to operate, timed or timed process, an output must be selected as an enable for the defrost logic. When the output is on, the defrost interval timer will begin operation. Note that if timed process is selected, the enable loop/monitor point must also be below the enable setpoint. As long as the output remains on, defrost will continue operation.

The output(s) is used as the switch to activate defrost. This allows defrost to be turned on and off in conjunction with the system it is associated with. If at any time the enable output(s) is off, defrost operation will be terminated. There must be at least one output selected in order for defrost to operate regardless of the selected type. To select which output(s) is to be used, press the 'Enable Outputs' button.
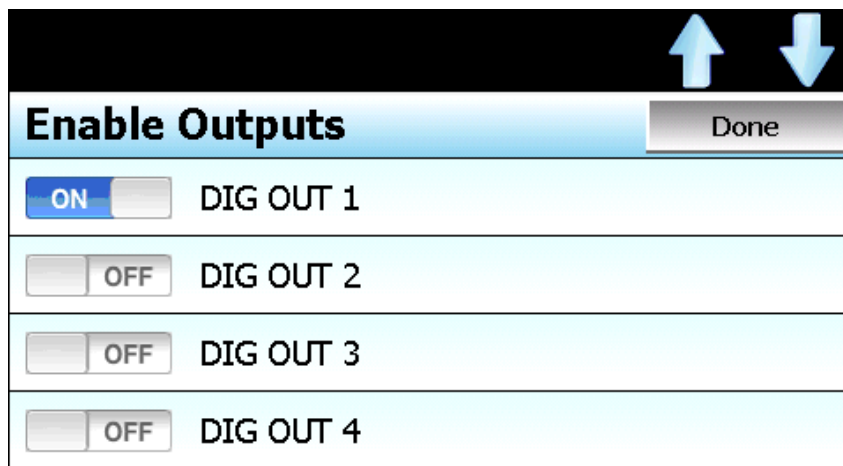
For example, if digital output 1 is used as the control output for the refrigeration system when a system event is turned on, then select digital output 1 from the list. This will enable the defrost logic whenever the refrigeration system is on. Additional outputs can be selected if necessary. Once all selections have been made, press the 'Done' button to accept the output selections and return to the Defrost Setup screen.

NOTE: *Control outputs for defrost and precool (that activate when defrost or precool are active) are configured under Digital Output Setup in the nCompass runtime application.*

3.5.2   Setting Defrost/PreCool Output Defeats

The defrost and precool output defeat selections allow the OEM to select which outputs should be disabled during defrost and precool. This allows specific equipment to be disabled during defrost operation such as a fan or cooling valve for example.

The 'Defrost Output Defeats' button allows the OEM to select which outputs should be disabled during defrost. The 'PreCool Output Defeats' button allows the OEM to select which outputs should be defeated during precool. Precool, otherwise known as fan delay, occurs immediately after the defrost duration has completed. In typical refrigeration applications, this allows the OEM to defeat cooling systems and fans during defrost, but then allow the cooling systems to operate during the precool period while keeping the fan off. This allows the cooling coil temperature to be lowered prior to turning the system fans back on and minimize temperature rise in the conditioned space.

Defrost Output Defeats	Done
OFF	DIG OUT 1
ON	DIG OUT 2
OFF	DIG OUT 3
OFF	DIG OUT 4

Precool Output Defeats	Done
OFF	DIG OUT 1
ON	DIG OUT 2
OFF	DIG OUT 3
OFF	DIG OUT 4

For example, if digital output 2 is used as the control output for the system fans when a system event is turned on, then select digital output 2 from the list. This will turn off the fans during defrost and precool whenever the defrost cycle is active. Additional outputs can be selected if necessary. Once all selections have been made, press the 'Done' button to accept the defeat selections and return to the Defrost Setup screen.

3.6 Redundancy Setup

The 'Redundancy Setup' screen is accessed from the 'Options' menu and allows the OEM to configure the type of redundancy mode to use (if any) and what alarm and outputs are to be associated with redundancy operation. Redundancy provides the OEM with a means for configuring nCompass to control two separate systems, usually identical, where one is a primary system and the other is a back-up system in case of primary system failure. The redundancy settings provide selections for the type of back-up system operation as well as selections for alarm inputs and redundancy enable settings.

NOTE: *See the nCompass i4.3 User's Manual for a more detailed explanation of redundancy operation.*
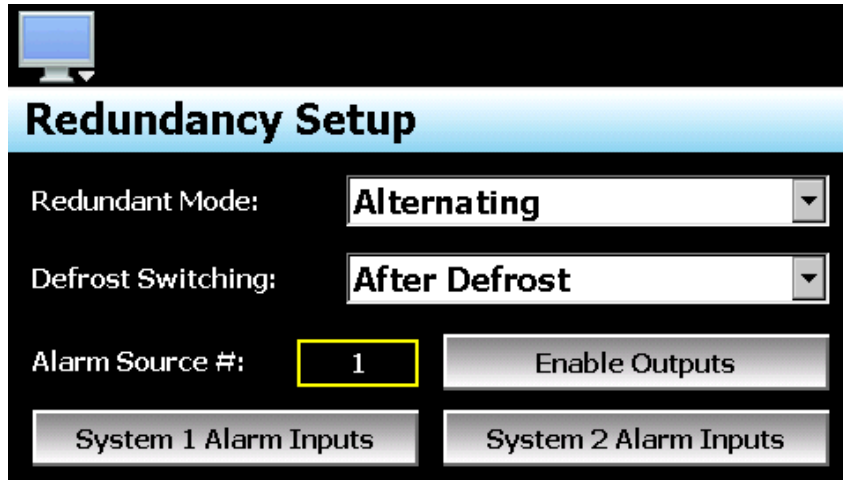
The **Redundant Mode** selection is used to choose how redundancy operates. Available selections are Disabled, Concurrent and Alternating. The concurrent and alternating redundancy modes select the back-up system mode of operation. When concurrent is selected, both system 1 and system 2 will operate at the same time when the selected alarm source in is alarm. When alternating is selected, nCompass will switch to the back-up system on alarm.

The **Defrost Switching** action is used to select how the redundant systems will switch if defrost is also enabled. Available selections are Before Defrost and After Defrost. When before defrost is selected, the systems will alternate based on the defrost interval setting without actually running a defrost cycle. When after defrost is selected, the currently running system will perform a defrost cycle prior to switching to the other system.

NOTE: *If defrost is disabled in the nCompass configuration and redundancy is enabled, you must select 'After Defrost' in order to activate equal run time switching. Alternating time settings will not be activated in the nCompass runtime application unless 'after defrost' is selected.*

If equal run time switching is not required or desired, setting the defrost switching action to 'before defrost' will prevent equal run time operation and the systems will only switch upon failure or when the primary system is manually changed by the user in the nCompass runtime application.

The **Alarm Source #** field is used to enter the system alarm number that is to be used to activate the redundancy back-up system. This allows the OEM to select any of the 30 process alarms available in nCompass (each alarm is configurable in the nCompass runtime application). This allows any loop or monitor point to activate the back-up system on a high, low, high/low, deviation or rate of change condition.

3.6.1 Setting the System A/B Alarm Inputs

The system 1 and system 2 alarm input selections allow the OEM to select which inputs should be used (if any) for the system 1 and system 2 failure inputs. When the digital input is activated, the respective system would be disabled and the other system would remain operating indefinitely until the alarm condition was corrected on the other system.

Alarm inputs do not have to be configured; however, when configured, the selected input(s) must be configured as an alarm input under the Digital Input Setup of the nCompass runtime application. To select alarm inputs for system 1 and/or system 2, press the 'System 1 Alarm Inputs' or 'System 2 Alarm Inputs' button.
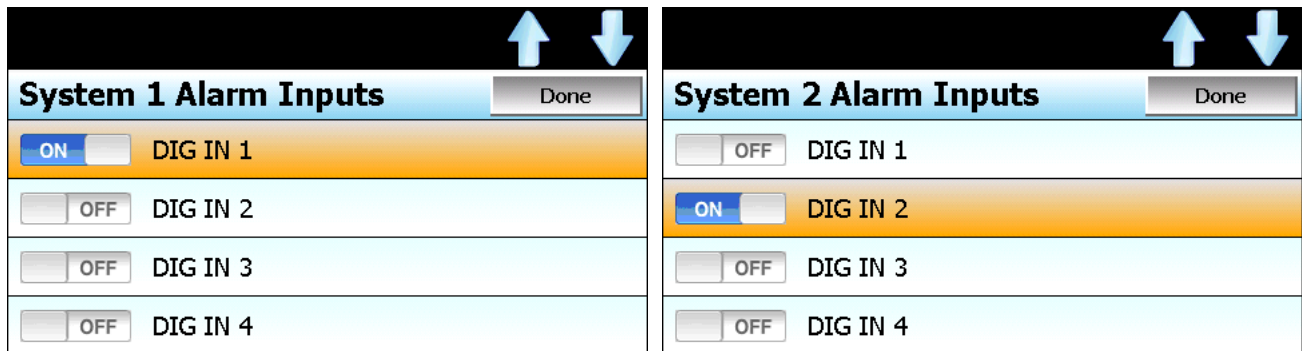
For example, if digital input 1 will be used for the system 1 failure input, then select digital input 1 from the list. If digital input 2 will be used for the system 2 failure input, select it as the alarm input for system 2. Additional inputs can be selected if necessary. Once all selections have been made, press the 'Done' button to accept the input selections and return to the Redundancy Setup screen.

3.6.2 Setting the Redundancy Enable Outputs

In order for redundancy to operate, concurrent or alternating, an output must be selected as an enable for the redundancy logic. When the output is on, the redundancy logic is activated and any digital outputs configured in the nCompass runtime application under Digital Output Setup as 'Redundant System 1' or 'Redundant System 2' will activate based on the redundancy mode of operation.

This allows the system 1 and 2 outputs to be turned on and off in conjunction with a common system that they are associated with. There must be at least one output selected in order for redundancy to operate regardless of the selected type. To select which output(s) is to be used, press the 'Enable Outputs' button.
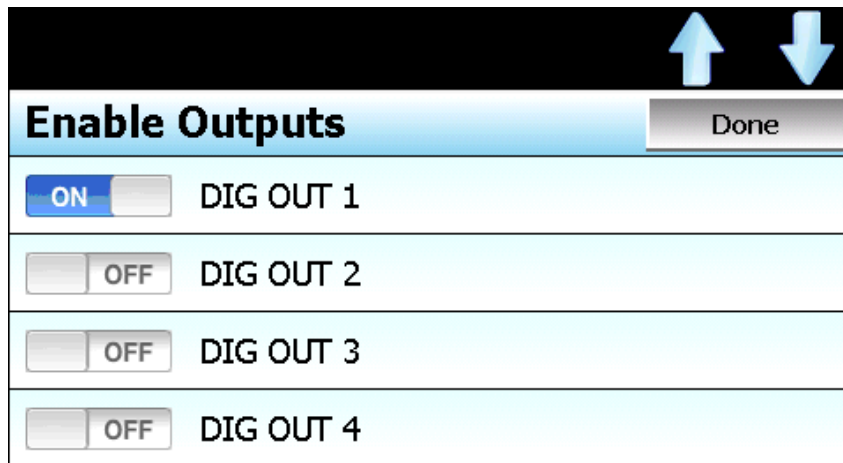
For example, if digital output 1 is used as a control output to turn on a circulating fans that are common to both system 1 and system 2 when a system event is turned on, then select digital output 1 from the list. This will enable the redundancy logic whenever the circulating fans are on. Additional outputs can be selected if necessary. Once all selections have been made, press the 'Done' button to accept the output selections and return to the Redundancy Setup screen.

3.7   Functions

The nCompass functions are accessed from the 'Startup' menu and allow the OEM to select which screens/menu items will be enabled (shown) in the nCompass runtime application. These functions can be used to customize the system to meet specific requirements.
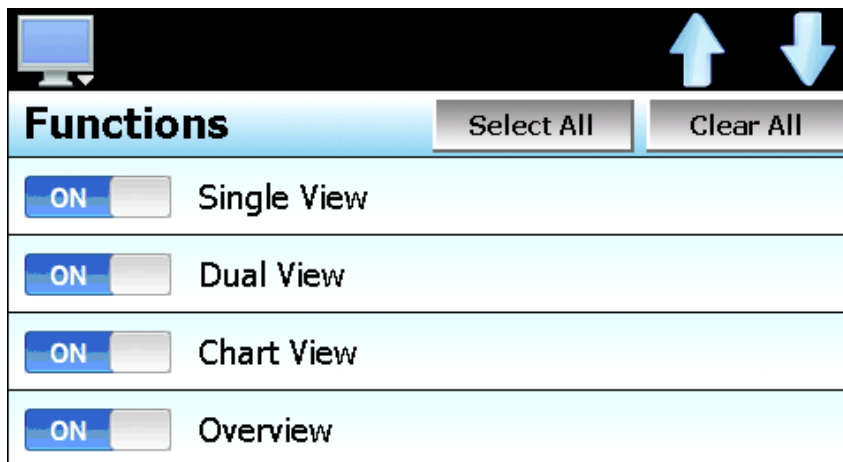
When functions are disabled at the configurator level from the **Functions** list, it will be disabled in the runtime software by removing the menu item so the operator can not select the function or edit any corresponding settings related to the function. The following list shows the available nCompass functions, where to find the menu item(s) applicable to the function and a description of what it applies to.

IMPORTANT: *Disabling nCompass functions that are not required for the application results in a system that is clean and easy to use for the operator; however, be careful when disabling certain items.*

Without access to them, there will be no way of determining if the system is operating as required, i.e., wait for conditions programmed in an automatic program already loaded, but no way of accessing them because the Wait For access has been revoked. The program may then enter a wait for condition that the operator did not know about and think the system is malfunctioning.

| nCompass Function	Runtime Menu Location	Description
Single View	View\Single	View loop PV, %Out, set loop auto tune, manual output mode and loop set point **NOTE:** Without access to the single loop view screen, the user will be unable to initiate auto tune or set loop in manual mode and adjust its output.
Dual View	View\Dual	view loop PV, %Out, set loop set point **NOTE:** Without access to at least one loop view screen, the user will be unable to manually adjust loop set points.
Chart View	View\Chart	view and set up real time trends for loops and monitors
Overview	View\Overview	view loop PV, %Out, set loop set point, view monitor points and view and enable or disable manual events **NOTE:** Without overview screen access, user will be unable to manually turn events on/off which could prevent them from operating equipment if events are used.
Alarm View	View\Alarm Notifications	view and reset current alarms current alarm status **NOTE:** With the function disabled, the user will only be able to access the alarm screen to reset an alarm when the alarm occurs by pressing the flashing alarm icon. If the alarm is latching and does not reset, the user will be unable to return to the screen to try and clear the alarm unless another alarm occurs to again display the flashing alarm icon.
Alarm Log	View\Alarm File	view and email alarm history files
Digital IO View	View\Digital	view current digital input and output status
Security Settings	Security Notifications	view/set security rights, view audit trails, user log on view security and audit status **NOTE:** If security is enabled, but system security is then disabled through this item, the user will be unable to log on. Default security (operator level) access will be used. This allows audit trails to be active while hiding all user security features. With security menu disabled, audit trail files are accessible via Log/USB File Utilities or temporarily re-enable security menu to gain access to the audit files.

nCompass Function	Runtime Menu Location	Description
Automatic Program Control/Recovery	Program Device\Settings\Recovery Notifications	view, create, edit and run automatic ramp/soak programs set power recovery mode view program status **NOTE:** When disabled, all program items and menus will be removed from the runtime application. The user will be unable to access or start programs via the interface.
Automatic Program G-Soak	Program\Entry Program\View\Soak	ability to view/edit soak events for steps of an automatic program ability to view/edit soak limits for an automatic program **NOTE:** If a program is loaded that has G-Soak events programmed, the operator will be unable to view or change the event status and soak limits.
Automatic Program Jump Entry	Program\Entry	ability to view/program jump steps in an automatic program **NOTE:** If a program is loaded that has jump steps programmed, the operator will be unable to view or change the jump step settings.
Automatic Program Wait For	Program\Entry	ability to view/program wait for conditions in an automatic program **NOTE:** If a program is loaded that has wait for conditions programmed, the operator will be unable to view or change them.
Automatic Program AutoStart	Program\View\AutoStart	ability to view/program auto start settings for an automatic program **NOTE:** If a program is loaded that has auto start programmed, the operator will be unable to view or change the auto start settings.
Data Logging	Data\Data Notifications	enable/disable data logging, select points for logging, access to historical viewer, FTP and USB File utilities view data log status, length and interval **NOTE:** If data logging is set to log on program operation or when nCompass starts and this menu is then disabled, data logging will be disabled. This menu item must remain visible in order for the built in data logging of nCompass to function. The USB File utilities will not be accessible to copy or delete data, alarm, audit or program files. Alarm, audit and data files may be transferred via FTP if unit is so configured.
Data Log Viewer	Data\Chart	access to view historical data log files
Annotations	Data\View\Annotation	access to add and view operator annotations to data files
Digital Signatures	Data\View\Signature	access to view and add digital signature to data log file

nCompass Function	Runtime Menu Location	Description
File Utilities	Data\Utilities\USB	access to copy/delete alarm, audit, program and data log files **Note:** Alarm, audit and data files may be transferred via FTP if unit is so configured.
FTP/WAN Settings	Data\Utilities\FTP/WAN	access to view/configure FTP file transfer settings **NOTE:** Once the FTP is configured for Auto Backup in the runtime application, this menu item can be disabled and hidden from the operator so that OEM configuration is preserved and can not be accessed or altered. The Auto Backup to the FTP Server would occur as configured.
Defrost	Device\Settings\View\Defrost	view defrost status, activate demand defrost and set interval and duration times
Redundancy	Device\Settings\View\Redundancy	view redundancy status and set primary system, operating mode and cycle times
Alarm Settings	Device\Settings\Set\Alarm	access loop/monitor alarm settings **NOTE:** Alarms can be configured in the runtime and then the menu removed by disabling this function. The alarms will operate as configured in the background removing all access by the operator.
Setpoint Limits	Device\Settings\Set\Limit	access loop set point high low limit entry
Email/SMTP Settings	Device\Settings\Email\Email	access to view/configure email settings
Communication Settings	Device\Settings\Comms\Comms Notifications	access to web server, Modbus and VNC settings view web server and VNC status
Barcode Setup	Device\Settings\Comms\Barcode	access to view/edit barcode setup **NOTE:** Once Barcode Setup is configured in the runtime application, this menu item can be disabled and hidden from the operator so that OEM configuration is preserved and can not be accessed or altered
Edit Event Names	Device\Settings\Set\Event	access to view/edit system event names **NOTE:** Event names can be assigned in the runtime and then this item disabled to prevent changes to event names.
Service	Device\Settings\Offline\View\Service Device\Settings\Offline\View\Options	view, set and clear maintenance counters **NOTE:** If maintenance service alerts are enabled and this function is then disabled, the operator will be unable to clear service alerts from the alarm monitor since access to clear service counters is not available.
Temperature Units	Device\Settings\Offline\Set\Units	access to set temperature units
Monitor Input Offset	Device\Settings\Offline\Calibrate\Offset	adjust offsets of monitor inputs
Import/Export Setup	Device\Settings\Offline\System\Configuration	access import/export utility to back up current nCompass configuration or restore configuration from back-up file

nCompass Function	Runtime Menu Location	Description
Language	Device\Settings\Offline\Set\Language	access to set the nCompass display language selections for menus and online help
Analog Input Setup	Device\Settings\Offline\Hardware\ Analog Input	access analog input settings **NOTE:** Once analog inputs are set in the runtime application, this menu item can be disabled and hidden from the operator so that OEM configuration is preserved and can not be accessed or altered.
Analog Output Setup	Device\Settings\Offline\Hardware\ Analog Output	access analog output settings **NOTE:** Once analog outputs are set in the runtime application, this menu item can be disabled and hidden from the operator so that OEM configuration is preserved and can not be accessed or altered.
Digital Input Setup	Device\Settings\Offline\Hardware\ Digital Input	access digital input settings **NOTE:** Once digital inputs are set in the runtime application, this menu item can be disabled and hidden from the operator so that OEM configuration is preserved and can not be accessed or altered.
Digital Output Setup	Device\Settings\Offline\Hardware\ Digital Output	access digital output settings **NOTE:** Once digital outputs are set in the runtime application, this menu item can be disabled and hidden from the operator so that OEM configuration is preserved and can not be accessed or altered.
Offline DI Monitor	Device\Settings\Offline\Hardware\Monitor	access to view digital input status
Offline DO Force	Device\Settings\Offline\Hardware\Force	access to view digital output status as well as force digital outputs on/off in offline mode
Tuning	Device\Settings\View\Tuning	access loop manual tuning parameter entry
Delta	Program\Entry\Wait	ability to view/program delta control operation in an automatic program **NOTE:** If a program is loaded that has delta control programmed, the operator will be unable to view or change the settings.

3.8 Startup View

The "Startup View" screen is accessed from the "Startup" menu and allows the OEM to define which of the main view screens the runtime application will show when it first starts and when the "Home" icon is pressed.
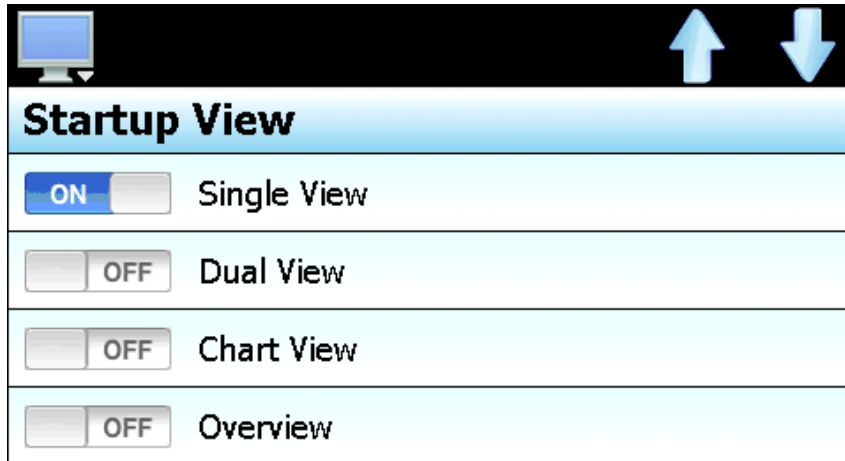
The available selections are Single loop View, Dual loop View, Chart View, Overview, Alarm View and Alarm Log.

NOTE: *If the selected screen to view on startup is disabled in the nCompass functions list, the screen will only be available when the "Home" icon is pressed.*

3.9 Digital IO/Event Tagnames

To gain access to the 'names' screens, there must be at least one digital input, digital output or event enabled in the system on the IO Settings screen or the corresponding names screen will not be accessible.

3.9.1 Digital Input Names

The 'Digital In Names' screen is accessed from the 'Tagnames" menu and allows the OEM to edit the names of the digital inputs. These names will be displayed in the runtime application under the Digital IO Monitor screens and used as the alarm description on the Alarm Monitor screen if the input is configured as an alarm input. To change the name of a digital input, select the input from the list and press the 'Edit' button to and enter the desired text up to 9 characters.

Digital Input Names	Edit
DIG IN 1	
DIG IN 2	
DIG IN 3	
DIG IN 4	
DIG IN 5	
DIG IN 6	
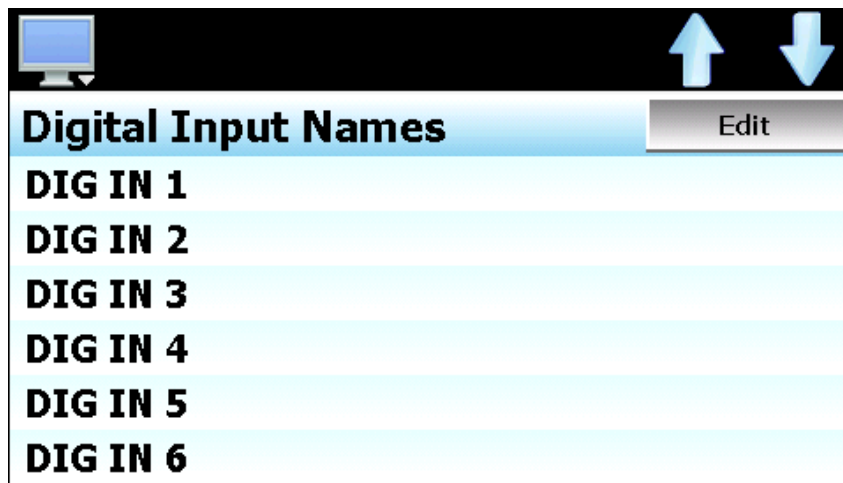
3.9.2 Digital Output Names

The 'Digital Out Names' screen is accessed from the 'Tagnames" menu and allows the OEM to edit the names of the digital outputs. These names will be displayed in the runtime application under the Digital IO Monitor screens. This allows each output to be identified by the function it performs for the end user. To change the name of a digital output, select the output from the list and press the 'Edit' button to and enter the desired text up to 9 characters.

Digital Output Names	Edit
DIG OUT 1	
DIG OUT 2	
DIG OUT 3	
DIG OUT 4	
DIG OUT 5	
DIG OUT 6	
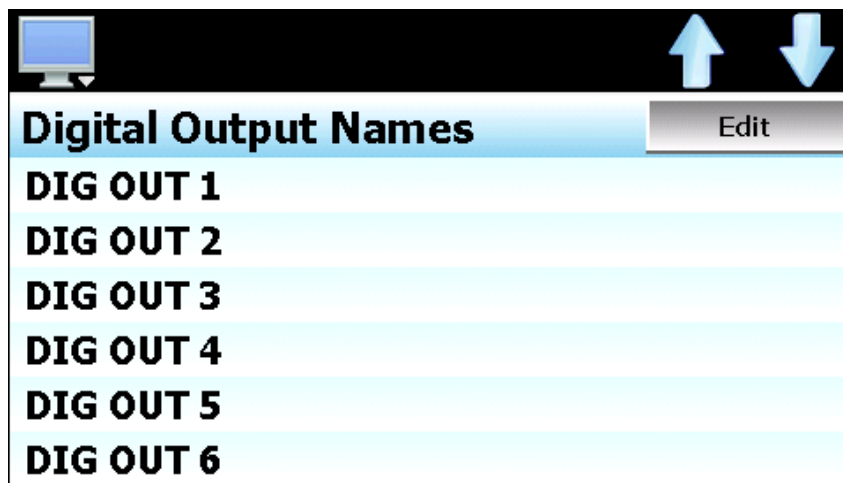
### 3.9.3 System Event Names

The 'Event Names' screen accessed from the 'Tagnames" menu and allows the OEM to edit the system event names. These names will be displayed in the runtime application under the Event Control and program entry step Events screens. This allows each event to be identified by the function it performs for the end user. To change the name of an event, select the event from the list and press the 'Edit' button to and enter the desired text up to 9 characters.
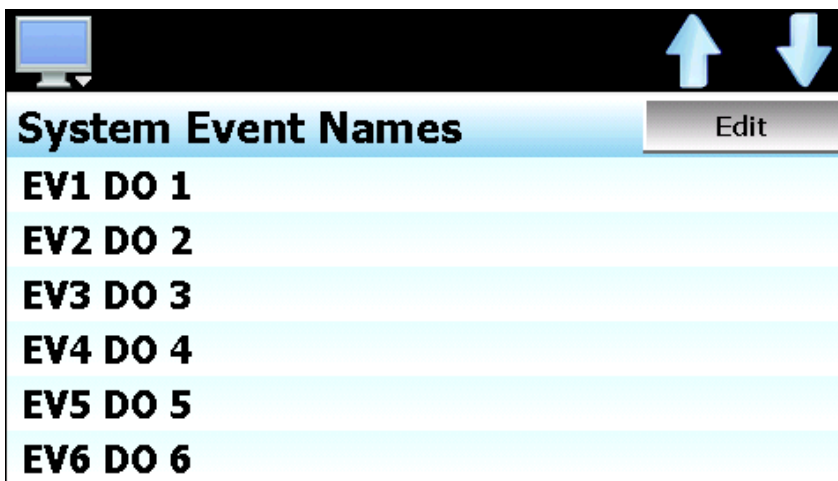
3.10 Custom Name\Address

The 'Custom Name\Address' screen is accessed from the 'Tagnames' menu and allows the OEM to configure the main splash screen when the nCompass runtime application starts. This is used so the OEM name and contact information is shown each time the nCompass controller is powered up. It also allows the OEM to change the name of the controller to adapt it to a specific product or market.
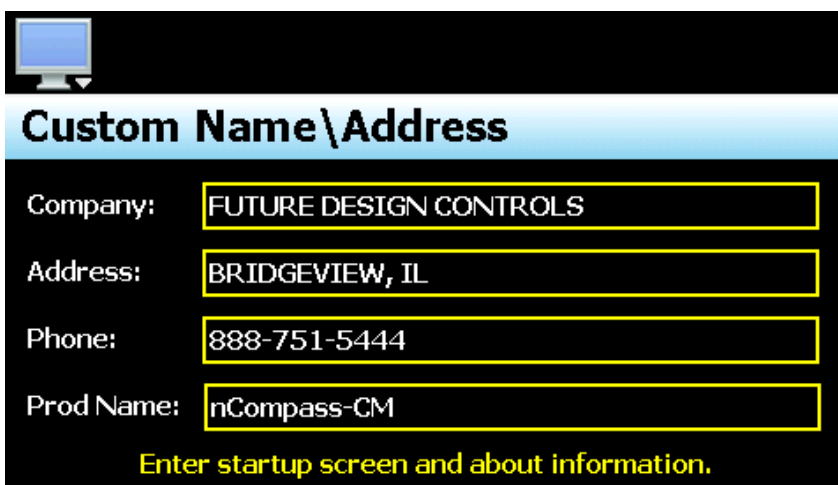
To edit the company, address, phone number or controller (product) name, press the field and enter the desired text. Each field can be entered with a maximum of 24 characters that will be displayed on the splash screen when nCompass starts.

Appendix

How to Order

nCompass CM is ordered as three components, the 4.3" color touch screen, firmware and the Control Module (CM) with its assorted options. The loop controls must be ordered separately.

nCompass CM Sample Part Numbers
(minimum of 3 component part numbers is required; (1) Display, (2) Firmware and (3) Control Module.)

Item #	Product	Sample Part Number	Description
1	Display	FDC-0450-1011-000BN	4.3" display, CM software, 11-36 VDC power input, SD slot, Ethernet, standard enclosure
2	CM Firmware	SD-CM	CM Control Module Firmware (inserted into display SD slot)
3	Control Module	CM-0000-010	Base CM, no optional serial communications, DI, DO, AI or AO and (1) 8-chanel monitor card (T/C)
	Options		
	Power Supply	PS5R-SD24	85-264VAC power input, Output 24VDC 60W (2.5A)
	Cable	CA2011-8A	Cable from Display to Control Module (DB9 connector (display), mini DIN on CM, (8ft)
	Loop Controls	9300-413001	FDC 9300 1/16 DIN control, input #1 universal (T/C, RTD, mA &Vdc) Input #2 linear (mA & Vdc may be used as monitor input) Output #1 mA PID, RS485 communications

Item #1 — Model FDC - 0450 4.3" Color Touch Screen

FDC - 0450 - | 1 | 0 | 1 | 1 | 0 | 0 | 0 | B | N |

Order Matrix # | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |

(1) Power Input
  1: 11 to 36 VDC

(2) Sound Output
  0: None

(3) SD Card Slot
  1: Yes

(4) Ethernet
  1: Yes

(5) Network
  0: None

(6) Software
  0: None

(7) Enclosure
  0: Standard

(8) Overlay Color
  B: Black Overlay

(9) Special Code
  N: Neutral Overlay (no name/logo)

Control System Options *(ordered separately as appropriate)*

Control Loops: Order appropriate loop controls separately.

Cable: Control Module to Display
CA2011-8A: Cable from FC5A CPU to display (8ft)
  Note: consult factory for other lengths and options

System Power Supply (input 100-240VAC / Output 24VDC)
PS5R-SD24 60W power supply
  Note: DIN Rail mount 24VDC 60 watt power supply (2.5-amps) to power the FDC-0450, control module CPU, optional IO and FDC-IO monitor input modules.

System Reset Timer
GE1A-C10MA110 / SR2P-06: Reset Timer and socket (DIN Rail)
  Note: Timer is recommended for proper system restart due to momentary power interruptions (<500ms) which can cause false alarms and/or erroneous operation.

Printed Operator Manual
Part Number   (nCompass_CM_i4.3_User_Manual.pdf)
FDC nCompass CM i4.3 User Manual

Printed Configuration Manual
Part Number   (Compass_CM_i4.3_Config_Manual.pdf)
FDC nCompass CM i4.3 Configuration Manual

USB Memory Stick
UDF115-2GB (2GB High Capacity USB Memory Stick (3VDC))

USB Cables & Accessories
IStick-Panel   USB Panel Mount Adapter
IStick-4X-CVR   USB Panel Mount Adapter-Nema4x

DIN Rail Mounting Adapter for 1/16 DIN Loop Controls
DRA-16   1/16 Din Rail Mounting Adapter

nCompass i4.3   FUTUREDESIGN CONTROLS

Item #2	Loop Control Firmware
Order Matrix #	SD - CM

(Fixed characters SD-CM: SD card with CM (Control Module) Display Configuration and SD plugged into display)

Item #3	nCompass Control Module *(loop controls ordered separately)*
	CM - ☐ ☐ ☐ ☐ ☐ ☐ ☐ (note 3)
Order Matrix #	1 2 3 4 5 6 7

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1. Control Module (CM) Application Software (loop control type)

0: FD10:   CM software for FDC 100 Series
2: FD30:   CM software for FDC 300 Series   (note 1)
9: Special

2. Optional Serial Communications (Note 2) (DIN Rail Mount – plug into

0: None
1: FC5A-SIF4   (RS485 Modbus RTU port (slave))* (port 3)
2: FC5A-SIF2   (RS232 port for Barcode Reader) ** (port 4)

Note: If Item 2 is specified, Item 1 is included and must be installed for proper operation of the barcode reader.

*RS485 Modbus RTU port allows R/W access by FDC EnVision & 3rd party software.
**Bar Code Reader input is compatible for serial based barcode readers.

3. Optional Digital Inputs (Note 2) (DIN Rail Mount – plug into CM)

0: None
1: FC4A-N08B1:   (8-digital input card (24Vdc))
2: FC4A-N08A11: (8-digital input card (120Vac))

Note: The above optional digital inputs (DI) are in addition to the eight 24Vdc digital inputs that are standard on the CM; system maximum of 16 digital inputs.

4. Optional Digital Outputs (Note 2) (DIN Rail Mount – plug into CM)

0: None
1: FC4A-T08S1   (8-digital output– TTL 24Vdc (source))*
2: FC4A-R081   (8-digital output - Relay (240Vac 2-amps))
3: FC4A-T16S3   (16-digital output– TTL 24Vdc (source))*
4: FC4A-R161   (16-digital output - Relay (240Vac 2-amps))

Combination DO modules (maximum of 24 optional DO)
A:	Item 1 / qty 2	**G:**	Items 1 & 3
B:	Item 1 / qty 3	**H:**	Items 1 & 4
C:	Item 2 / qty 2	**J:**	Items 2 & 3
D:	Item 2 / qty 3	**K:**	Items 2 & 4
E:	Item 1 qty 2 & Item 2 qty 1		
F:	Item 1 qty 1 & Item 2 qty 2		

*The terminal blocks for all of the above are inclusive except for the FC4A-T16S3, 24Vdc output card, whose terminal block is a separate component, part number FC4A-PMPC20P. This terminal block is included as a separate component when specifying this output card.

Note: The above optional digital outputs (DO) are in addition to the 8 DO that are standard on the CPU (6 relay & 2 TTL 24Vdc); maximum of 32 DO.

Note 1: Maximum of 2 monitor input cards monitoring a maximum of 15 monitor card inputs. With specific CM software, the loop control's input #2 may be configured as a monitor point. System maximum of 15 monitor points made up of loop control input #2, inputs of monitor cards or combination of both.

Note 2: CM will support up to 7 expansion modules (the monitor point input module is not a CM expansion module).

5. Optional Analog I/O (Note 2) (DIN Rail Mount – plug into CM)

0:	None		
1:	1 A-IO card	FC4A-L03A1	(4-20mA or 0-10Vdc IO)
2:	2 A-IO cards	FC4A-L03A1	(4-20mA or 0-10Vdc IO)
3:	3 A-IO cards	FC4A-L03A1	(4-20mA or 0-10Vdc IO)
4:	4 A-IO cards	FC4A-L03A1	(4-20mA or 0-10Vdc IO)
5:	5 A-IO cards	FC4A-L03A1	(4-20mA or 0-10Vdc IO)
6:	6 A-IO cards	FC4A-L03A1	(4-20mA or 0-10Vdc IO)
7:	7 A-IO cards	FC4A-L03A1	(4-20mA or 0-10Vdc IO)

Note: Each I/O card has qty 2 Remote Setpoint input and quantity 1 Retransmission output configurable for PV,SP or %Out

6. Optional Monitor Inputs (Note 1) (serial connection to CM)

0: None
1: IO-8TCS: (8-thermocouple input module - isolated)
2: IO-6RTD: (6-RTD input module)
3: IO-8AIIS: (8- input module 0-20 / 4-20mA - isolated)
4: IO-8AIVS: (8-analog input 0-10 / 2-10Vdc—isolated)

Combination Monitor Input Modules (maximum of 2 & 15 points)
A:	Item 1 / qty 2	**F:**	Items 1 & 3
B:	Item 2 / qty 2	**G:**	Items 1 & 4
C:	Item 3 / qty 2	**H:**	Items 2 & 3
D:	Item 4 / qty 2	**I:**	Items 2 & 4
E:	Items 1 & 2	**J:**	Items 3 & 4

7. Special

0: None

Note 3: CM-XXXXXXX includes the additional standard components:

Part #: FC4A-HPC3 (Note A)
   Comms Card (RS485 comms to loop controls and monitor cards)

Part #: FC5A-D16RA1
   Control Module with 8 Digital Inputs (DI) and 8 Digital Outputs (DO)

Part #: FC4A-PT1   (Note B)
   Real Time Clock module

Part #: FC4A-PM64   (Note B)
   Memory Module

     Note A: FC4A-HPC3 must be plugged into the FC5A-D16RA1 control module during installation as described in the manual.

     Note B: The FC4A-PT1 and FC4A-PM64 modules are assembled and contained within the FC5A-D16R1 Control Module.

All other CM (Control Module) options are packaged separately and like the FC4A-HPC3 must be plugged into the FC5A-D16RA1 bus as described in the manuals. The exception is the Monitor Card(s) which are not part of the FC5A-D16RA1 bus and have separate power supply and RS485 communication wiring. The Monitor Card serial RS485 is wired to the FC4A-HPC32 board along with any loop controls.

NOTES: SCADA (Supervisory Control & Data Acquisition)

FDC-nCompass Series Graphic User Interface (GUI) touch screen provides a full SCADA feature set providing ease of use with either an icon menu system with finger navigation or traditional Menu bar, data acquisition, alarm manager, operator audit trail, multi-level security with user rights, LAN connections and more.

The GUI provides ease of configuration, use & support.
- System Configuration for loop, monitor point, alarm, digital input & outputs assignment / logic, Help language selection and more, all without an external device or PC.
- Loop Views: view Loop and/or Monitor Points in single or dual View; and also in Trend format
- Ramp/Soak Programs: Virtually unlimited number of programs with each program having up to 99 steps with up to 32 events.
- File Management: View, print, copy/move Program, Alarm, Historical Data (data log files) and operator audit trial files. File transfer via LAN features or USB flash memory.
- Support: View loop & digital IO status, force loop & digital outputs and more.
- LAN: Remote Access & touch screen operation (VNC), email/SMS on alarm, email historical, alarm & audit trail files on-demand, Web Page (view only) and FTP of alarm, audit and historical data files automatically or on-demand.

Data Acquisition:
- Data log up to 10 control loops (PV, SP & % out) and up to 15 optional Monitor Point PVs (up to 25 PV inputs in all).
- Log interval: configurable 2 seconds to 31 minutes with configurable number of days to auto start & name next file (1 to 31 days).
- File Start/Stop: Configurable; operator on-demand, on system boot, automatic program start/end or digital inputs
- File Interval: Once started a data log file is configurable to auto end and start new file with the same name as previous file with an appended time/date name. Configurable time interval is from 1 to 31 days.
- File name: Operator entered file name, batch & lot number or if running an automatic program, file name same as program name. (all file names appended with date-time to file name)
- Operator Comments/Events: Unlimited operator comments/events linked to each file entered manually or via Bar Code Scanner.
- Digital Signatures: full support for user based digital signatures for each data file (data encryption).
- Historical Data File: View & print the data directly from the display (auto scale on X & Y axis with each channel selectable for right or left axis values), from a PC after data is copied/moved via LAN (FTP or email) or USB Flash Memory card provided.

NOTES: Monitor Inputs – Optional
(DIN Rail Mount w/serial connection to CM)

Monitor Inputs:
The FDC-IO modules are DIN rail mount 8-channel isolated thermocouple, RTD (6-channel) or 8-channel linear mA or Vdc input modules. Each monitor point is configurable for Alarm setpoints and segment advance "wait for" logic (SP logic & loop Delta function).

2 Monitor input cards may be specified. nCompass system configuration allows up to 15 monitor points.

Information on the FDC-IO modules may be found at the following Link: http://www.futuredesigncontrols.com/FDC-IO_Modules.html

NOTES: Power Supply – Standard (DIN Rail Mount)

Power Capacity Required (Watts) - A base system without options requires ~30 watts of 24Vdc power. The 60W power supply offered is sufficient to power all of the components and up to two optional monitor input modules.

Note: The power supply should be used to power nCompass components only and not OEM or other end user components or devices.

NOTES: Configurable Control Logic

Ramp/Soak Programs (Global program configurable as Time or Ramp Rate based): The FDC-nCompass provides for a virtually unlimited number of automatic programs each with up to 99 steps and up to 32 configurable events per step. Step Advance, Hold, Stop, and other "Wait For" logic per step is standard. The "Wait For" step advance logic includes digital inputs, loop / monitor points achieving a "wait for SP".

Configurable Loop Control:
Each of the control loops may be configured via the operator interface as single loop controls or as components in a Cascade control loop.

Alarm Configuration:
System Alarms
System Alarms include loss of communication with loop & monitor points, configurable call back, audible and more; may be mapped to one of the standard or optional digital outputs

DIN Control Loop Alarms (a maximum of 30 alarms for loop & monitor)
The loop controls (up to 10) may have up to 30 alarms configured per loop. The alarms may be configured as latching or not, inhibit logic and to defeat any digital output. Alarms may be mapped to one or more of the standard or optional digital outputs (maximum of 32 digital outputs).

Alarm types include:
- Process, Deviation, Percent Output low, high or both

Monitor Input (a maximum of 30 alarms for Loop & monitor)
Each channel may be configured with Process or Rate of Change (ROC), latching or not, inhibit and/or to defeat any digital output. Alarms may be mapped to one or more of the standard or optional digital outputs (max of 32 digital outputs)

Digital IO Configuration
Digital Outputs (DO): CPU includes 8-digital output (6-relay & 2-TTL) with optional 8 or 16-output cards (24VDC or relay); max of 32 DO.
Digital Outputs are configurable as:
- Loop, monitor point or digital input alarms
- Event outputs used in ramp/soak programs
- Event output for automatic program status: run, hold & step change
- Event outputs as a result of Digital Inputs
- Configurable cycle times to pulse an output or no cycle - on 100%
- Configurable time delay to automatically turn DO off
- Configure DO with counter & alarm message

Digital Inputs (DI): CPU includes 8-digital inputs with optional 8- digital input card for maximum of 16 digital inputs.
Digital Inputs are configurable as:
- Configurable time delay (timers)
- System Run
- Alarm Input
- Data Acquisition start and stop
- Automatic Program functions; start, stop, hold, previous/next step
- Defeat Logic; disable specific or groups of DO
- Disable Communication to loop control SP
   - SP communication disabled: SP values may be changed at loop controls while still monitor & data log all values.

NOTES: Analog I/O – Optional (DIN Rail Mount to CM)

Analog I/O (Input/Output):
Control Module
- Remote Setpoint: Cards accept two 4-20mA or 2-10Vdc inputs to be transmitted as SP values via the serial link to specific DIN controllers.
- Retransmission: Cards have one 4-20mA or 0-10VDC signals configurable as PV, Setpoint or % Out values from specific DIN controls. Maximum number of cards is 7: 14 remote set point inputs and 7 retransmitted PV, Setpoint or %Output values.

Loop Controls
- The loop control model used may offer Retransmission capability although it, along any other outputs, are not accessible from the nCompass control system.

nCompass *i4.3*   **FUTUREDESIGN** C O N T R O L S

NOTES: System Configuration

nCompass has an embedded configuration program and normal runtime allowing full customization & configuration directly from the GUI. Simple Import/Export function allows complete configurations to quickly & easily imported to other nCompass-CM control systems.

Configuration Program allows:
- Number of Loop Controls, Monitor Points, Digital Inputs, Digital Outputs, Events and Analog I/O with naming assignment for all types.
- Program Setup: Time or Ramp Rate based program operation.
- Main startup view and menu/options (used/not used) configuration.

NOTES: Loop Controls (Serial connection to CM)

Control Module (CM) Software for Loop Controls:
Up to 10 loops of control and up to 15 monitor points (8-T/C, 6-RTD or 8-mA or VDC inputs). Supports DIN style loop controls or board only control modules (B42). Loop controllers/control boards ordered separately.
.
The FD30 CM software allows connection to Future Design Controls 300 Series DIN controllers. Series is available in 1/32, 1/16, 1/8 and 1/4 DIN sizes with DIN rail mounting available for both the 1/32 and 1/16 DIN sizes. Information on these Series controllers may be found at the following links:
http://www.futuredesigncontrols.com/300.HTM

The FD42 CM software allows connection to Future Design Controls P Series DIN controllers and the B42 board level controller. Information on these Series controllers may be found at the following links:
http://www.futuredesigncontrols.com/P_Series.HTM
http://www.futuredesigncontrols.com/B42.HTM

NOTES: Serial Communications (Serial connection to CM)

RS485 Modbus RTU (slave) and RS232 (barcode input) modules

RS485 Modbus RTU input module:
The RS485 module allows 3rd party software / hardware R/W access to specific registers within the Control Module. Contact Future Design Controls technical support for the register/address listing for specific software versions.

RS232 Serial input for barcode readers:
The RS232 serial input option allows the nCompass to receive up to 16 characters from a standard compatible serial Barcode reader. Data from the bar code reader will insert operator events into the historical data file; there is no limit to the number of events that may be entered manually or with a bar code scanner.

Note: If Serial Communication is used the RS485 module must be included; i.e. if bar code reader is used both the RS485 and the RS232 (used for bar code reader) modules must be specified.

NOTES: Language Configuration

nCompass provides a one-button language configuration for the following languages.
- Afrikaans
- Albanian
- Arabic
- Basque
- Belarusian
- Chinese – Simplified
- Chinese – Traditional
- Czech
- Danish
- Dutch
- English
- Finnish
- French
- German
- Greek
- Hebrew
- Hungarian
- Icelandic
- Italian
- Japanese
- Korean
- Norwegian
- Polish
- Portuguese
- Russian
- Spanish
- Swedish
- Turkish

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