Orion *nCompass* DX i4.3
Installation and Operation 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 Orion nCompass controller, review all of your configuration information to verify that your selections are consistent with your application: input; 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
csr@futuredesigncontrols.com

The Orion nCompass DX i4.3 Installation and Operation Manual is copyrighted by Future Design Controls, Inc., © 2013, all rights reserved (http://www.futuredesigncontrols.com/nCompass.htm).

nCompass i4.3

Appendix
   Component Specifications
   Order Matrix and Replacement Parts
   Software Versions
   Software License
   Software Usage Note
   Warranty
   Returns

nCompass i4.3

FUTUREDESIGN
C O N T R O L S

1   What is nCompass?

The nCompass system combines all of the features of a Dixell Prime CX refrigeration controller or XW60K walk-in controller, video/chart recorder and data logging system 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. All configuration and runtime user access is configurable at the device with no PC software required. OEM's have the ability to configure runtime features (screen availability, menus, language, etc...) to easily customize the system for their requirements. These configurations can be imported/exported to any other nCompass DX device for setup (from scratch) within minutes.

The nCompass DX connects to a single Dixell Prime CX or XW60K control via the optional XJ485-CX external module that plugs into the HOT KEY output of the Dixell control providing compatibility with the XR40CX, XR60CX, XR70CX and XW60K series Dixell controllers.

1.1   Features

nCompass provides a rich set of tools for control interaction and process monitoring. Views include single and dual views, charts, alarm, historical data, alarm log 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.

Data file analysis tools make looking at historical data a simple task. Any control variable saved to the data file can be plotted on the historical data chart 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 can store more than one year of data on its SD memory card. Data logging can be enabled manually or automatically on start-up. Data backup is provided with a USB memory stick for plug and play transfer of files to any PC 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:

- 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 data logging 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   Installation

The following two sections will explain how to install the nCompass control system. nCompass controllers are pre-loaded with all operating software and firmware before leaving the factory, so it is ready to install when you receive it. Refer to Section 2 for mounting information and Section 3 for power, signal and control wiring.

Before beginning installation, read through these sections to gain an understanding of the entire installation. Consider the installation carefully. Plan the power, signal and control wiring before installing nCompass. Also consider the cabinet space, hardware dimensions and environmental conditions. Use good wiring practices to minimize problems that may occur due to electrical interference.

⚠	**WARNING:**	• To avoid potential electric shock and other hazards, all mounting and wiring for nCompass must conform to the National Electric Code (NEC) and other locally applicable codes.
		• Special expertise is required to install, wire, configure and operate the nCompass controller. Personnel without such expertise should not install, wire or operate nCompass.

⚠	**CAUTION:**	• Prevent metal fragments and pieces of wire from dropping inside the housing of any nCompass component. If necessary, place a cover over the components during installation and wiring. Ingress of such fragments and chips may cause a fire hazard, damage or malfunction of the device.
		• Locate nCompass and all related control components away from AC power/motor wiring and sources of direct heat output such as transformers, heaters or large capacity resistors.

2.1   Enclosure Guidelines

nCompass must be installed correctly for reliable operation. The nCompass controller is designed for installation within a suitable enclosure. Do not install nCompass outside of an enclosure. Care must be taken when locating components to ensure that AC power wiring, contactors, starters, relays and other sources of electrical interference are properly located to minimize their impact on the nCompass control system.

Particular note should be taken to the position of variable speed drives and switching power supplies. Their input and load cables should be screened and properly grounded to a central equipment grounding point to prevent radiated emissions from affecting nCompass operation.

2.1.1   Locating the nCompass Touch Screen Interface

It is recommended that the unit be mounted to the front panel of a steel enclosure, through an appropriately sized opening. Proper enclosure depth is required to insure that there is adequate spacing between the rear of the interface and the front of any high voltage devices mounted in the enclosure when the enclosure door is closed. It is required that a minimum separation of 2" be maintained, so plan a depth to accommodate at least 4" (102mm) behind the panel.

Proper clearance must also be maintained above, below and on both sides of the interface to allow for heat dissipation and to facilitate mounting. A minimum of 2" is recommended. Note that additional space may be required below and to the right of the interface (looking from rear of unit) to accommodate the communications wiring depending upon the type of communication cables used.

2.2   Environmental Considerations

Do not subject the nCompass touch screen interface to operating temperatures below 0°C (32°F) or above 50°C (122°F). Minimum and maximum relative humidity levels are limited between 10% and 90% (non-condensing). The nCompass touch screen interface is to be used indoors only. The unit should not be installed where fast temperature variations may occur as this can cause condensation of water vapor on the device.

nCompass should not be exposed to excessive dust, dirt, salt, direct sunlight or shock and vibration. Do not operate the nCompass controller in an area where chemicals or flammable gases are present. Permitted storage temperature extremes for the nCompass control system are limited to -10°C (14°F) and 60°C (140°F).

2.3   Mounting Dimensions

The nCompass i4.3 interface is supplied with four mounting clips. All clips must be installed and properly tightened to insure the IP65 protective rating from the front of the interface. Failure to install all mounting clips may also affect touch screen operation. Be sure to tighten each one evenly so as not to flex the case of the unit.

Mounting Clip Slot (4 total)   *Mounting Clip Installed in Slot*

NOTE: *nCompass will not operate properly without the SD card installed into the SD card slot on the back of the unit. The SD card has all software required, loaded onto the card for 'Auto-Boot' operation. The slot on the back of the interface is 'keyed' so the card can only be installed in one direction. The card is pre-installed for your convenience. If the card is removed, take care when inserting the SD card and do not force it into the slot. The card MUST be installed before powering on the unit.*
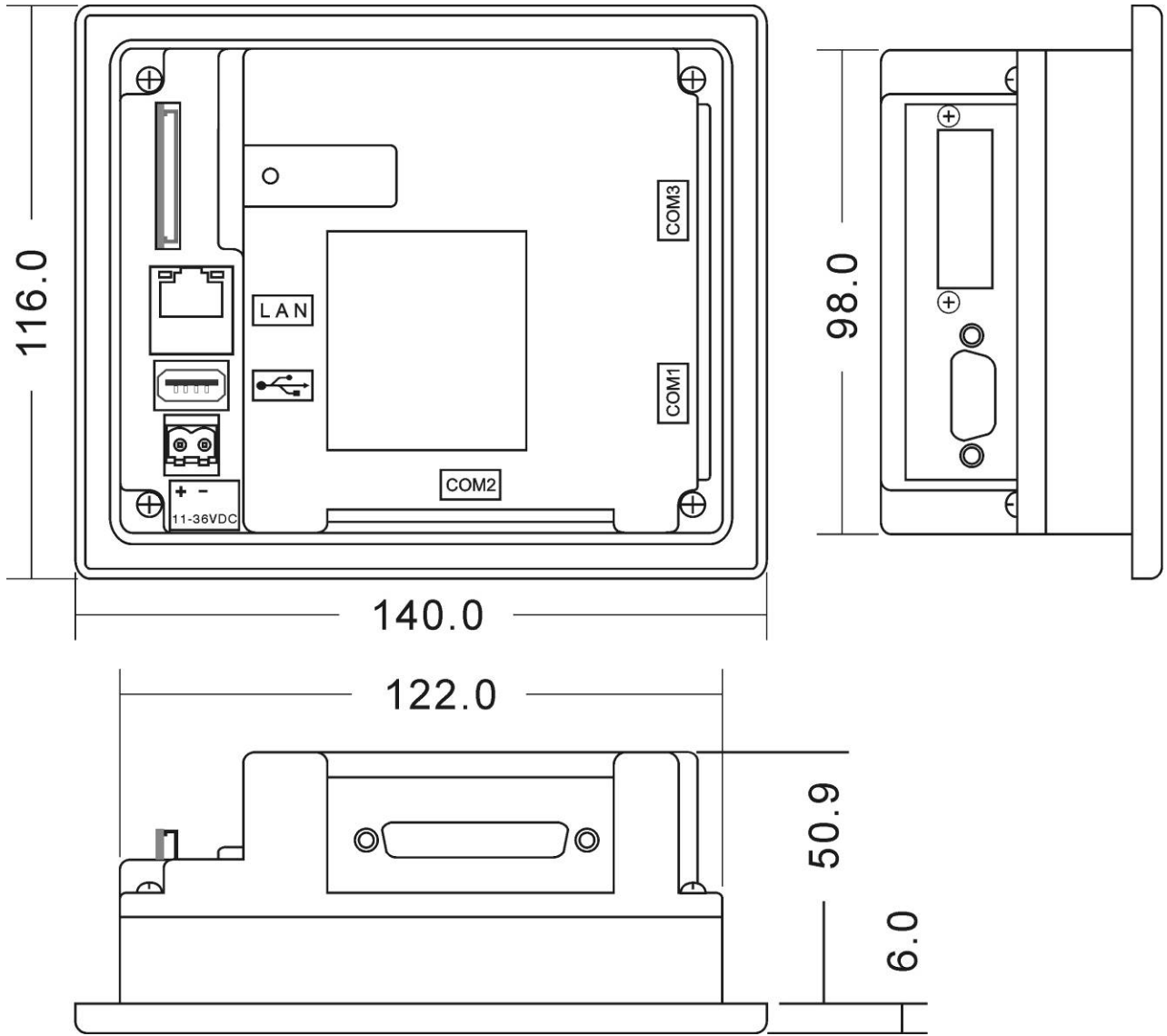
All dimensions are in mm. Tolerance +/- 1 mm.
Panel cutout: 123^{+1} x 99^{+1}

COM1 DB9, Male   COM3 Not Used   LAN, Ethernet (RJ45)   SD slot

COM2 DB25, Female   USB port   Power supply
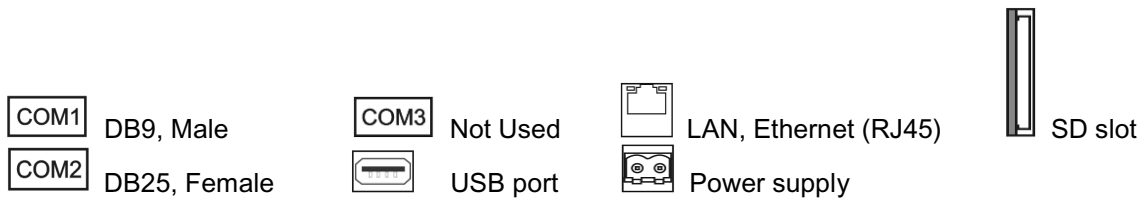
3 Wiring

This section describes the methods and precautions for wiring the nCompass control system. Before beginning, be sure to read "Safety Precautions" in the beginning of this manual.

⚠	**WARNING:**	• Turn off power to nCompass before starting installation, removal, wiring, maintenance and inspection of the nCompass controller. Failure to turn off power may cause electric shock, create a fire hazard or cause damage to nCompass.
		• Emergency stop and interlocking circuits **MUST** be configured outside of the nCompass control system. If such circuits are made through nCompass, failure of the nCompass control system may cause uncontrollable operation, damage to equipment or accidents.

⚠	**CAUTION:**	• This section presents recommended installation practices and procedures. Since no two applications are identical, these recommendations should be considered as guidelines. The system designer should be aware that devices in control systems could fail and thereby create an unsafe condition.
		• Electrical interference in an operator interface can lead to equipment start-up, which could result in property damage and/or physical injury to the equipment operator.
		If the application requires an operator or attendant, you should be aware that this potential safety hazard exists and take appropriate precautions. Consult NEMA ICS 3-304 for more information regarding safety for the installation of solid-state programmable control devices.

3.1 Power Requirements

The nCompass control system touch screen operates on a nominal 24Vdc supply voltage with an allowable range of 11 to 36Vdc. Do not power the nCompass controller and highly inductive DC loads or input circuitry to other equipment, with the same DC power supply used for nCompass.

If nCompass is installed in an area with poor power quality or frequent power interruptions, it is recommended that a time delay-on relay be installed in the power supply wiring to nCompass. This will prevent rapid on-off cycling of nCompass during brown-out or momentary power interruptions. Rapid power cycling to nCompass can cause damage to the electronics and/or loss of data.

3.1.1 Installing the Power-On Delay Relay

Due to the rate at which AC/DC power supplies reach their nominal supply voltage after application of power, the relay contact of the timer should be installed between the output of the power supply and the power input of nCompass. This allows the power supply output voltage to reach its nominal value prior to connecting nCompass to its output terminals.

In order to properly sense the loss of power due to the hold-up times associated with AC/DC power supplies, the time delay relay coil should be wired to the AC power source for the DC power supply of nCompass. This will insure that nCompass is turned off/on at the proper times and prevent malfunction that can be caused by rising or falling voltage at the power supply output during power interruption.

NOTE: *It is recommended that the time delay-on relay be set for a minimum period of 2-5 seconds.*
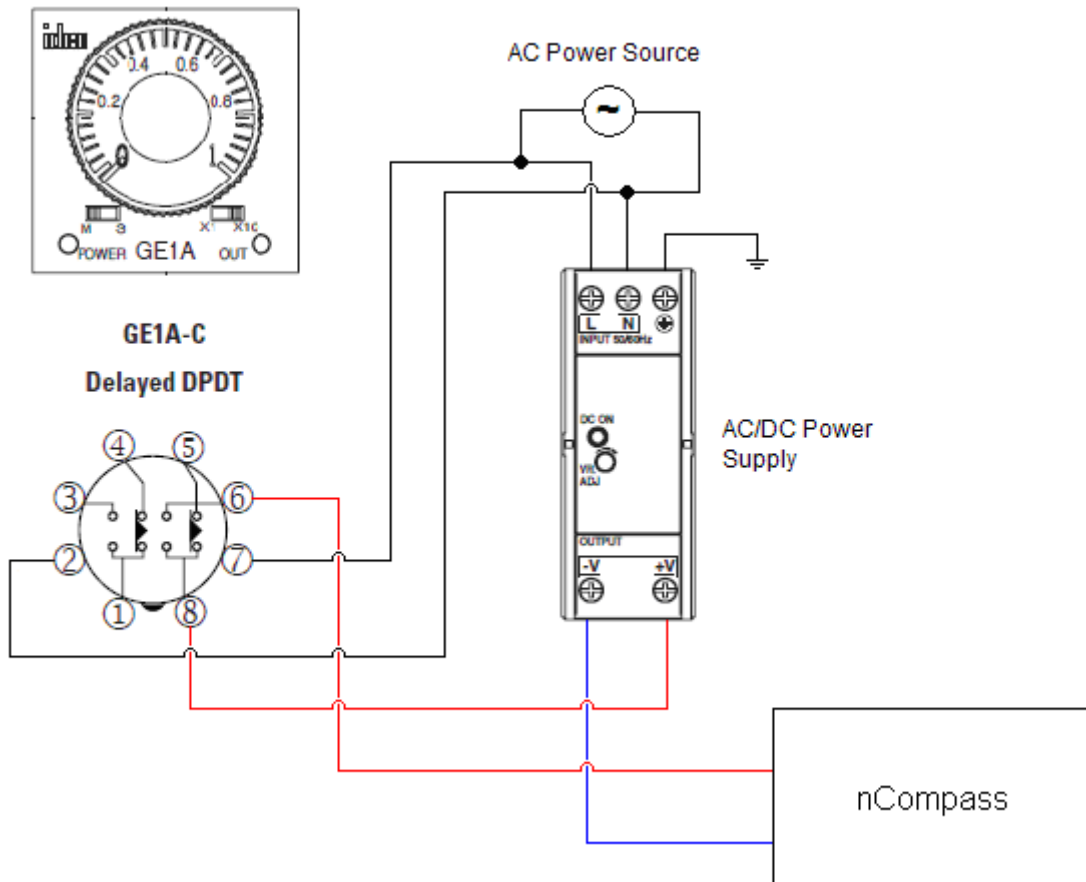
3.2   Connecting to the nCompass Interface

Power wiring lengths should be kept to a minimum, and it is preferable to have the power wiring run using a minimum of 18/2 twisted shielded cable. This keeps the 'hot' and common wires paired to minimize the affects of external noise.

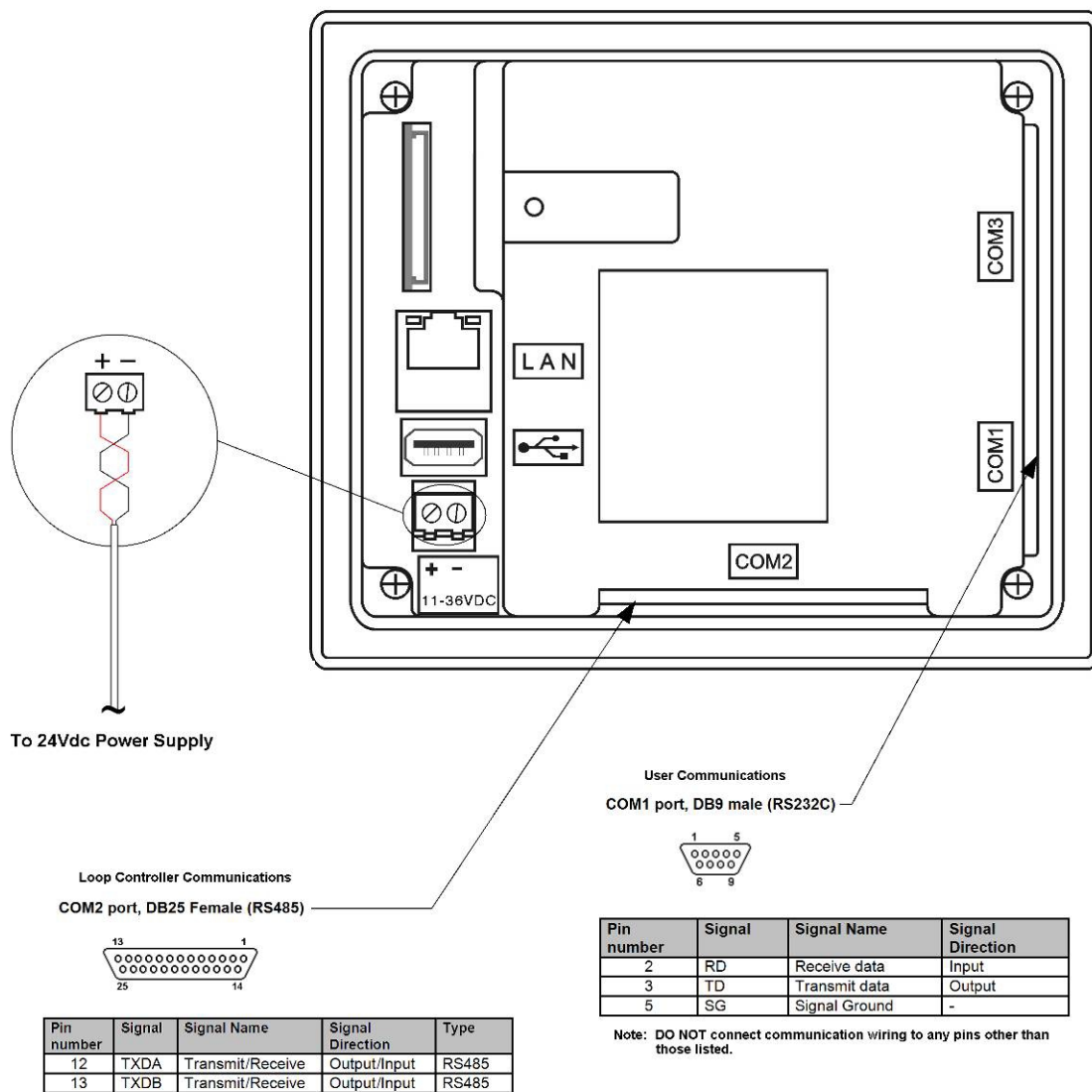To make a connection, strip about ¼" of insulation off the end of the wire, turn the connector screw counterclockwise until the gap is wide open, insert the wire all the way in, and turn the screw clockwise until it's tight. Connect positive DC line to the '**+**' terminal and the negative DC line (common) to the '**-**' terminal. The other end of the cable should be properly terminated at the 24Vdc power source, and the shield connected to the main earth ground.

NOTE: *Upon application of power, if the display does not come on within 2 seconds, remove power. The interface is reverse polarity protected. Check wiring to insure proper connections and try to power up again. An Internal fuse will prevent damage for over voltage conditions; however, it isn't guaranteed. DC voltage sources should provide proper isolation from main AC power and similar hazards.*

To 24Vdc Power Supply

Loop Controller Communications
COM2 port, DB25 Female (RS485)

Pin number	Signal	Signal Name	Signal Direction	Type
12	TXDA	Transmit/Receive	Output/Input	RS485
13	TXDB	Transmit/Receive	Output/Input	RS485

User Communications
COM1 port, DB9 male (RS232C)

Pin number	Signal	Signal Name	Signal Direction
2	RD	Receive data	Input
3	TD	Transmit data	Output
5	SG	Signal Ground	-

Note: DO NOT connect communication wiring to any pins other than those listed.

3.2.1 Dixell Controller Communications

The Dixell XR40, 60 and 70CX controllers or XW60K controller communicates with the nCompass touch screen using the optional XJ485-CX external module on their HOT KEY port. This allows the controller to be connected using one 2-wire link. The nCompass interface communicates with the controller using the default address of 1.

Communications wiring should be run using a minimum of 24 AWG twisted-pair, copper conductors. For short runs (< 50 feet total), non-shielded wiring can be used as long as proper separation from power/control conductors is maintained. For communications wiring where the total length will exceed 50 feet, shielded twisted-pair should be used.

NOTE: *It is important to keep the power/control and sensor/communications wiring separated from one another. Relay and/or high voltage outputs can interfere with the sensor and communication wiring as they cycle on and off, which can cause erroneous sensor readings or communications errors.*

FDC recommends the use of shielded wire for all installations in order to maintain optimum performance and minimize the possibility of communications errors.
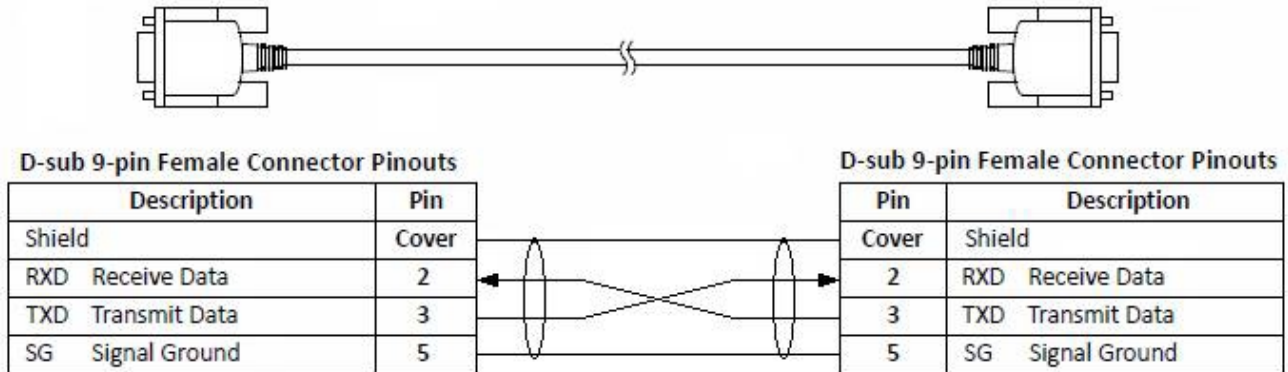
When using shielded twisted-pair, be sure to ground only one end of the cable, preferably at the XJ485-CX module. Allowing any other portion of the cable shield to come in contact with ground, or grounding both ends, will cause ground loop currents to flow in that section of the cable shield which can disrupt communications.
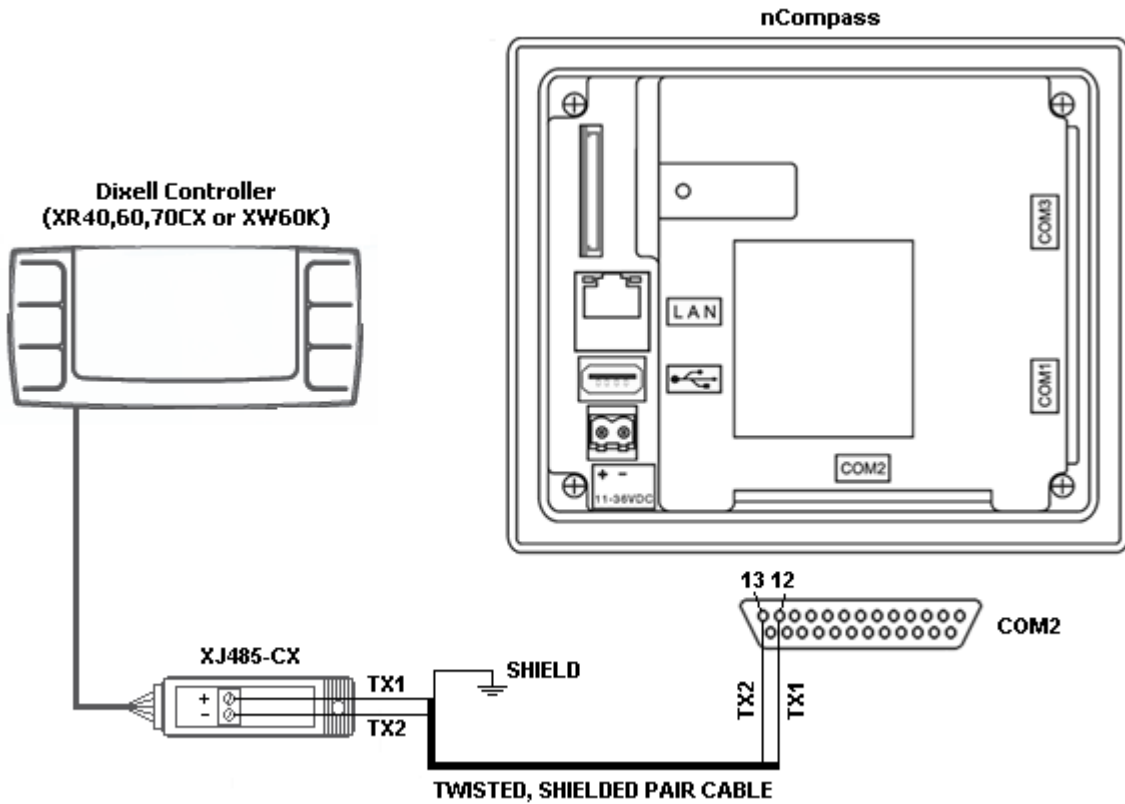
3.2.2 User Serial Communications

The nCompass touch screen provides an RS232C user communications port for connecting nCompass to a PC running software such as FDC's Envision. In order to connect nCompass to a PC, a cable must be made according to the diagram below.

D-sub 9-pin Female Connector Pinouts

Description		Pin
Shield		Cover
RXD	Receive Data	2
TXD	Transmit Data	3
SG	Signal Ground	5

D-sub 9-pin Female Connector Pinouts

Pin	Description	
Cover	Shield	
2	RXD	Receive Data
3	TXD	Transmit Data
5	SG	Signal Ground

NOTE: *DO NOT use a standard null-modem cable to connect nCompass to a PC. Most computers do not provide a standard serial port and a USB to serial converter must be used. Incompatibilities may exist between nCompass and certain USB to serial adapters which will cause nCompass to malfunction when connected using a standard null-modem cable.*

If more than one nCompass controller is to be placed on the communication link with a PC, an RS232/485 converter will be required for each nCompass in order to convert the RS232 communications port to RS485 multi-drop communications for connecting multiple nCompass controllers on the PC communications link.
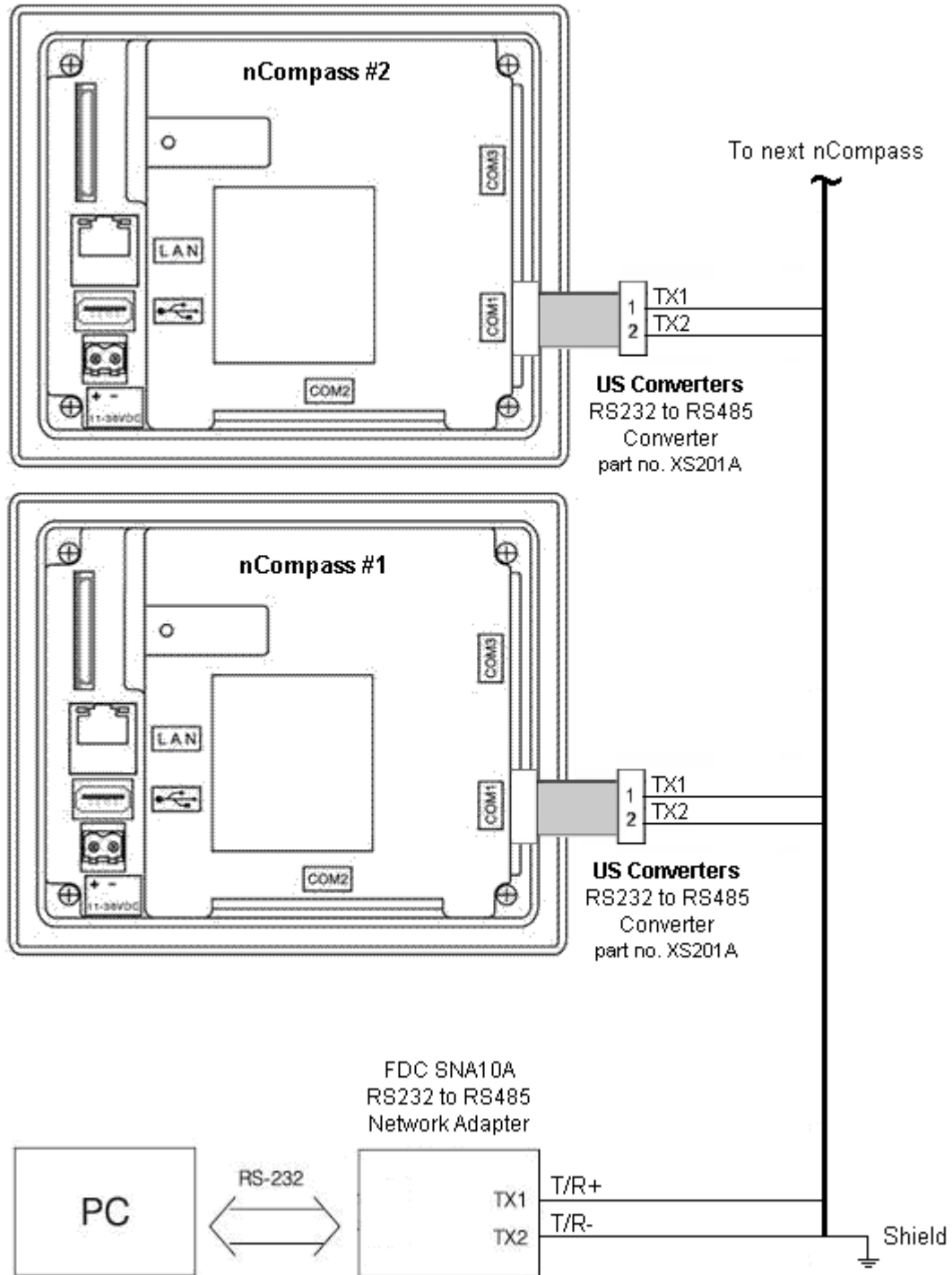
NOTE: The connection requires a single twisted-pair cable that is daisy-chained from one nCompass to the next. When using shielded twisted-pair cable, be sure to ground only one end of the cable, preferably at the RS232 to RS485 network adapter. Allowing any other portion of the cable shield to come in contact with ground, or grounding both ends, will cause ground loop currents to flow in that section of the cable which can cause communication errors.

4 Basic Operation

This section is designed to help guide you through the nCompass touch screen interface and menu structure, so that you can navigate through the various operation, monitor and setup screens and learn how to use them. Subsequent sections of this manual are tailored to the special features and functions of nCompass. Consult those sections of the manual for further information and specifics on how to set up and operate them.

4.1 OEM Configuration Options

The availability of certain menu items, screens and the functionality of nCompass are determined by the configuration of the Dixell controller and nCompass. This manual covers all available options, some of which may not be available on your system.

If there are questions or concerns about the operation and available options on your nCompass controller, contact your OEM for further information. Only your OEM can address equipment related issues.

4.1.1 Dixell Control Buttons

The single view screen of nCompass provides user action buttons similar to those on the front of the Dixell controller. These buttons include control on/off, manual defrost, light on/off, continuous cycle and energy savings. The availability of the buttons is based on the supplied hardware and configuration of the Dixell controller attached to nCompass.


Single View Screen

The manual defrost and continuous cycle buttons are available at all times for all Prime CX models. The light on/off and energy savings buttons will be automatically disabled when the options are not present or configured in the Dixell controller. The control on/off button is provided under the default configuration of nCompass, but can be disabled by the OEM.

The control on/off button allows the user to stop the operation of the Dixell controller without having to remove power from the system. The controller no longer tries to maintain the temperature set point, but will continue to monitor temperature. For information regarding the configuration and use of the functions related to the other user action buttons, refer to the "Installation and Operating Instructions" for the make and model of your Dixell controller.

4.2 Touch Screen Interface

The nCompass display is split into two sections; the icon bar and main display area.

Icon Bar ──────▶

Main Display ──────▶

Single View Screen
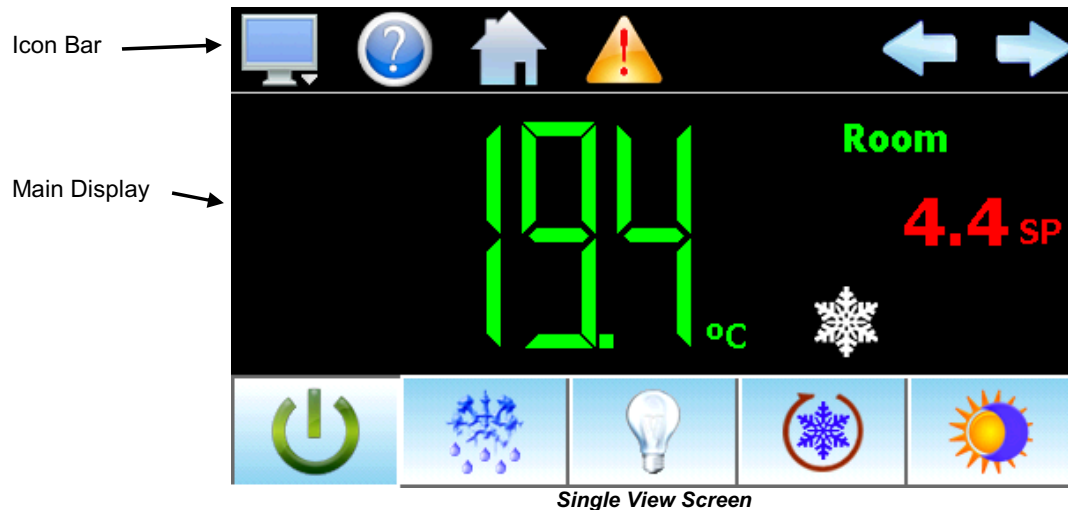
The menu icon will open the main menu for navigating to the different control and monitoring screens. Menu items will dynamically appear providing available options based on the system area the user is in, i.e., security, data logging, setup, etc.

The information (help) icon will display text based help associated with the current screen. Help is available in 25 languages based on the user selection in the offline setup of section of nCompass.

The home icon will return the user to the main view from anywhere in the nCompass application. The main view is set by the OEM in the nCompass configuration and can be the single, dual, chart, alarm or alarm history view.

The alarm icon will appear and flash when a new system alarm occurs. Pressing the alarm icon will take the user directly to the alarm monitor screen in order to view and /or reset the active alarm condition.

The left and right navigation arrows will appear on screens that provide additional information that the user can scroll to such as the single and dual view screens, charts or alarm settings screen.
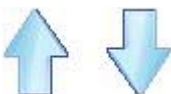
The up and down navigation arrows will appear on screens that provide list views in order to scroll up and down through items of the list. List views also provide "touch sliding" like other modern smart devices.

NOTE: *A single press of the left/right or up/down arrows will scroll list views to the next list item or screens to the next available probe or chart. Pressing and holding the arrow keys will continue the item scrolling until the end of the list is reached or the button is released.*

IMPORTANT: *Do not use any sharp or metal objects on the touch screen as they may damage the surface. Also be sure that hands and fingers are free from oils or chemicals which may mar the surface of the touch screen.*
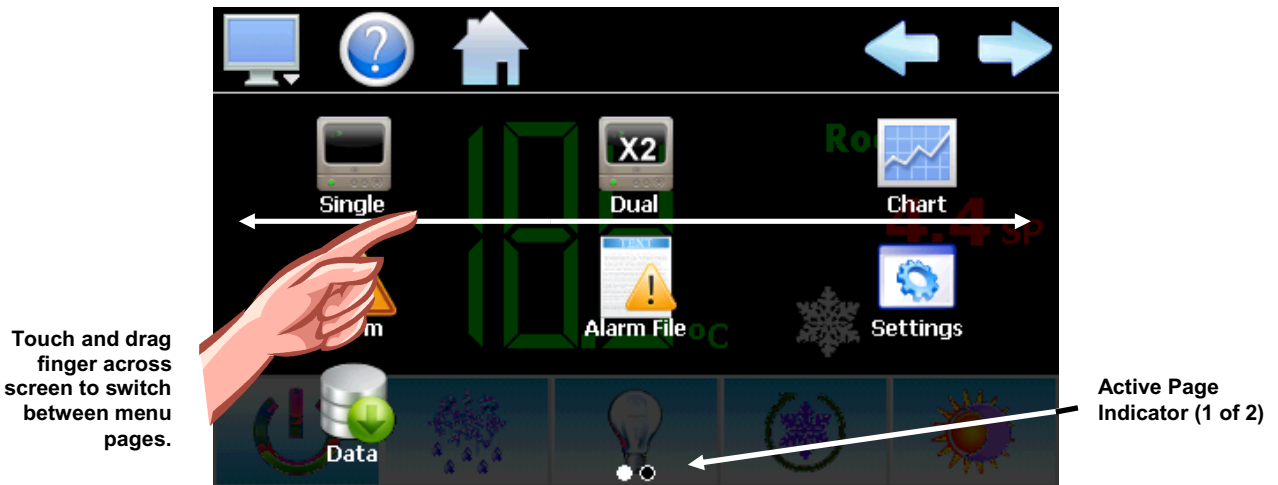
4.3   Menu Navigation

nCompass provides the user with the ability to select text based menu navigation, much like the typical file menu system of a PC, as well as an icon based navigation system like that of a "smart" device. The user can switch back and forth between the two from the Setup menu.
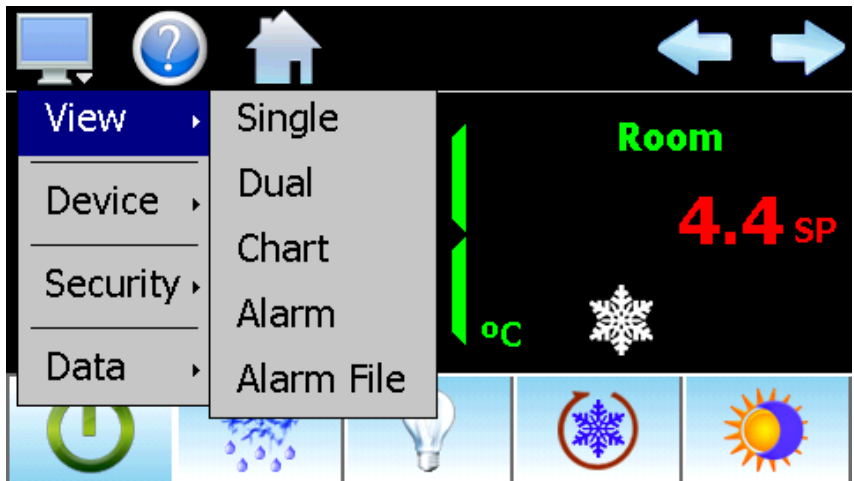
Text Based Navigation

Touch and drag finger across screen to switch between menu pages.

**Active Page Indicator (1 of 2)**

Icon Based/Slide Page Navigation

The available menu items are dependant upon the OEM configuration of nCompass. Not all of the menu items shown may be available on your system. The following information is provided as an overview of the full navigational menus for nCompass.

4.3.1 Home Menu

The home menu is the top level, default menu provided when nCompass first powers on. Pressing the menu (monitor) icon will display the main menu offering the selections shown below.

4.3.1.1   Text Based Home Menu
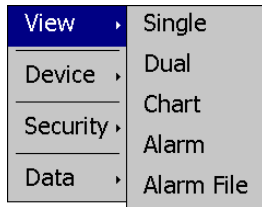
The **View** menu provides navigation to all standard view screens. These include the Single and Dual views, real time Charts, Alarm monitor, and Alarm File screens.
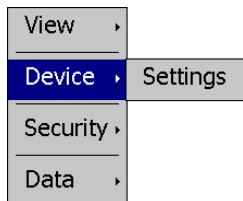
The **Device** menu provides access to the nCompass controller settings. These include, set point entry limits, alarm settings, communication settings, email setup as well as access to offline settings for date/time, etc.
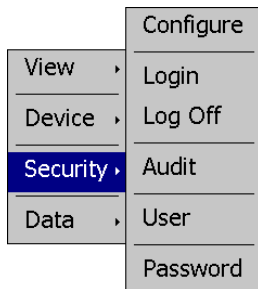
The **Security** menu provides access for user login, security settings and audit trail viewing if the security system is enabled.
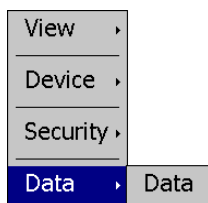
The **Data** menu provides access to data log functions, file utilities, FTP\WAN back-up settings as well as the historical data viewer.

nCompass i4.3

4.3.1.2   Icon/Slide Page Based Home Menu

Slide page 1 provides navigation to all standard view screens. These include the Single and Dual views, trend Charts, Alarm monitor and Alarm File.

It also provides quick access to the nCompass Settings and Data file functions which include file utilities, FTP\WAN back-up settings as well as the historical data viewer.
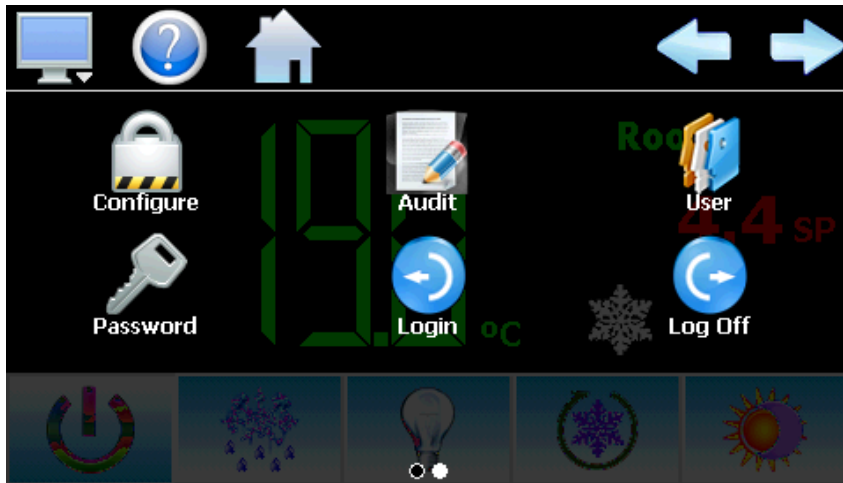
Slide page 2 provides access to security settings, Audit trail viewing, current User information, user Password editing and user Login and Log Off functions.

4.3.2 Device Settings Menu

The device settings menu is provided when the user selects "Settings" from the main "Device" menu. See section 8 on Device Settings for detailed information on these settings and their use.

4.3.2.1 *Text Based System Setup Menu*
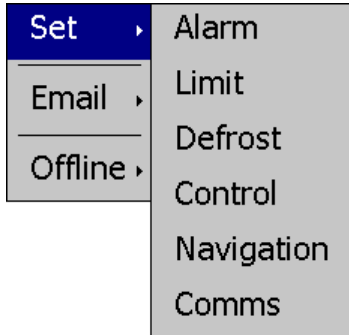
The **Set** menu provides access to settings Alarm set points, set point Limits, Defrost settings, Control settings, Navigation type selection and Communications options.
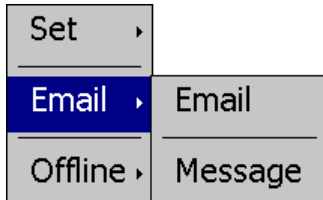
The **Email** menu provides settings for the email server to send SMS text messages and/or emails on alarm and allows the user to compose and send a Message to any user configured in the system.
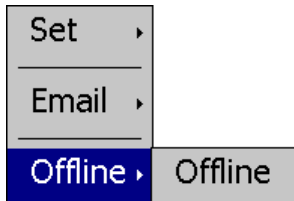
The **Offline** menu provides access to the nCompass offline setup which provides the user with the ability to adjust the date/time, calibrate the touch screen, etc.

4.3.2.2   Icon/Slide Page Based Device Settings Menu
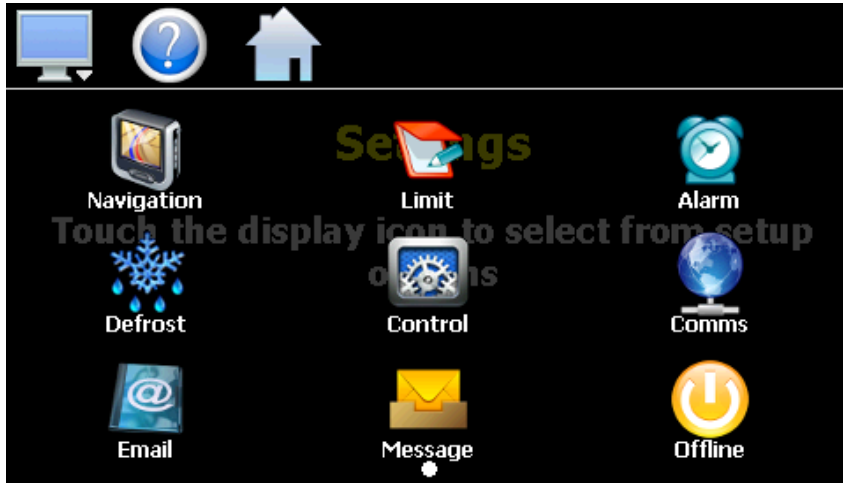
The Setup slide page provides access to the nCompass controller settings. These include options for Navigation type, set point Limits, Alarm settings, Defrost settings, Control settings and Email server settings and Messaging.

It also includes access to the communications settings for the web page, VNC server and Modbus user communications.

4.3.3   Offline Menu

The offline menu is provided when the user selects "Offline" from the device settings "Offline" menu. See section 9 on Offline Settings for information on these settings and their use.

NOTE: *Offline settings can only be accessed when data logging is turned off.*

4.3.3.1   Text Based Offline Setup Menu
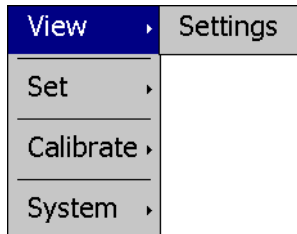
The **View** menu provides navigation back to the nCompass device settings menu.
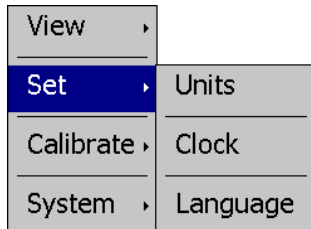
The **Set** menu provides access to the temperature Units selection, NTS Clock, and Language settings.
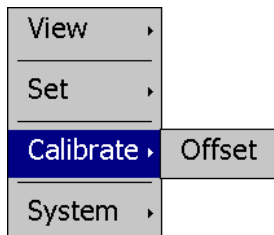
The **Calibrate** menu provides access to the probe Offset calibration for the Dixell controller inputs.
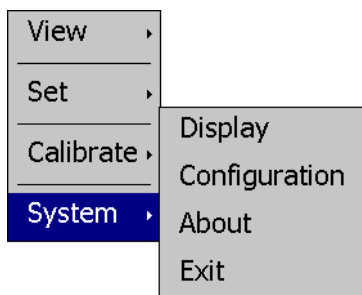
The **System** menu provides access to the nCompass Display settings, import/export Configuration utility, About screen and Exit application screen.

4.3.3.2   *Icon/Slide Page Based Offline Menu*
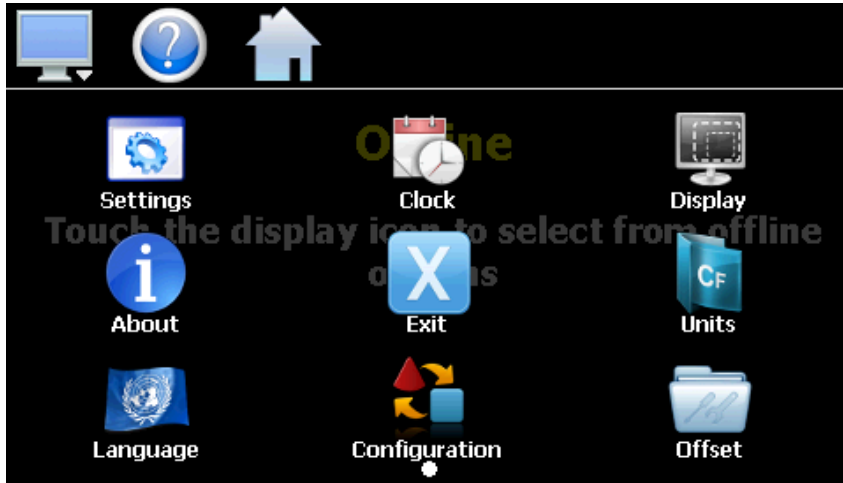
The Offline slide page provides navigation back to the device Settings menu, Clock, Display settings, About nCompass and Exit application screens, temperature Units selection, Language, import/export Configuration utility and input Offset calibration.

4.3.4 Data Menu

The data log menu is provided when the user selects "Data" from the main "Data" menu. See section 7 on Data Logging for information on these settings and their use.

4.3.4.1 *Text Based Data Logging Menu*
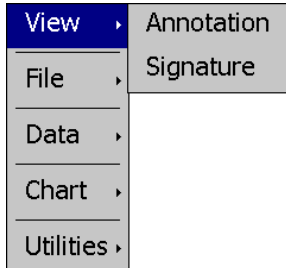
The **View** menu provides access to the data file Annotation and digital Signature screens.
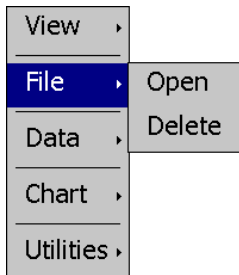
The **File** menu provides functions for opening and deleting historical data log files.
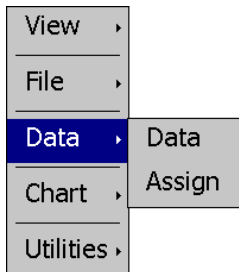
The **Data** menu provides access to the main Data screen for starting and stopping data logging and to the log point Assignment screen where the user can select which items are to be logged to the history file.
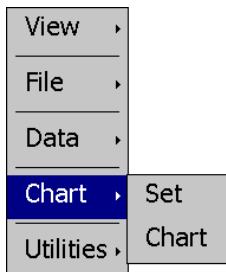
The **Chart** menu provides functions for viewing historical data files in graphical format.
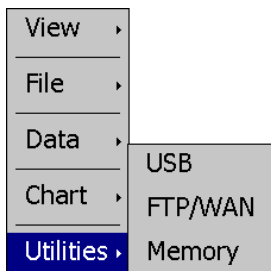
The **Utilities** menu provides access to the nCompass file management utilities including USB file transfer and FTP/WAN back-up.

4.3.4.2   Icon/Slide Page Based Log Menu
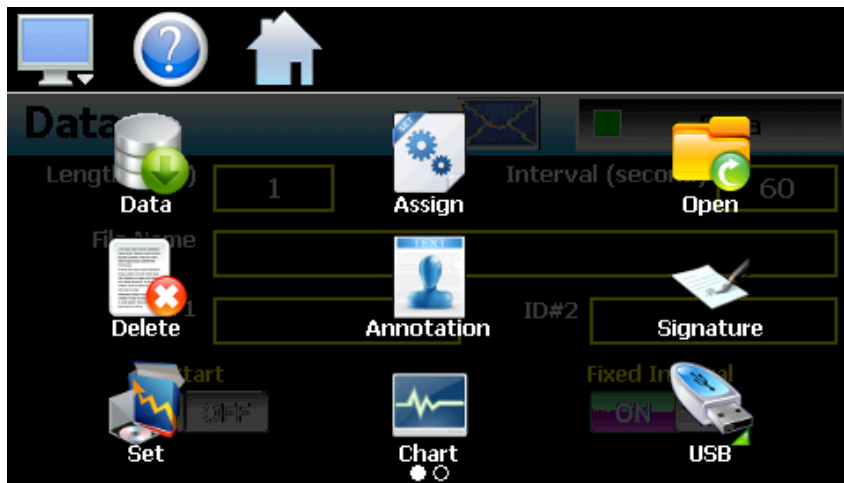
Slide page 1 provides access to the main Data log screen and to the log point Assignment screen where the user can select which items are to be logged.

Historical data file functions are provided for Opening and Deleting historical files and viewing/setting data file Annotations and digital Signatures.

The plot Set and Chart icons provide access to the historical data viewer options.
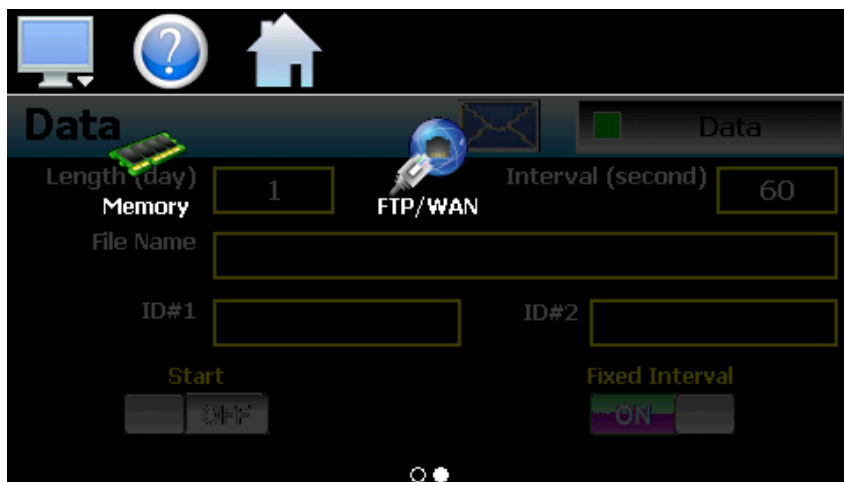
Slide page 2 provides access to the FTP/WAN back-up settings and the memory check utility for viewing available system/storage memory space.

4.4   Control (Regulation Set point)

The Single and Dual view screens provide direct viewing options for the operation and monitoring of the Dixell controller. The screens allow the user to adjust the current set point (SP) and view the process variable (PV) for each probe. The Single view also allows the user to perform various control tasks and view output status for the compressor, fan and auxiliary output.

4.4.1   Single View

The Single view display shows one temperature probe at a time. It is accessed from the home "View" menu.
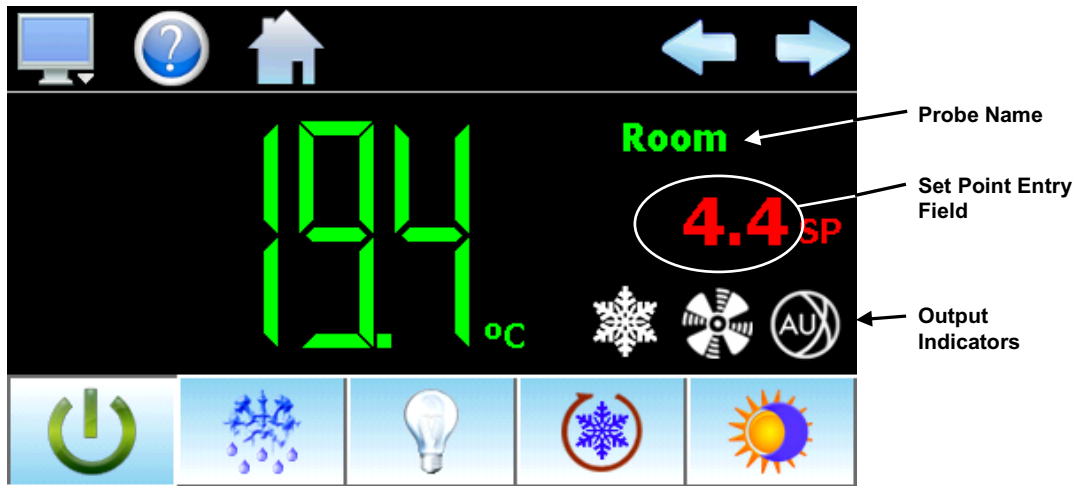
The **left** and **right arrow buttons** allow the user to switch between each available probe configured on nCompass. If only a single probe is configured for indication, the left and right arrow buttons will not be shown.

The **probe name**, shown at the top right of the screen, will update as each probe is shown to inform the user as to which probe is currently being viewed.

The **set point entry field** is the area where the screen can be touched in order to display the numeric keypad so that a new set point can be entered. Once entered, the new set point will be shown in the set point entry field. The field is visible only when the control probe is being viewed.

NOTE: *The set point shown is the regulation set point. If the Dixell controller is configured for energy saving operation and the energy save function is enabled, the set point will be offset by the energy saving set point. If the user has entered a set point of 0.0 for example, and the energy saving set point is 2.0, the indicated set point will be shown as a value of 2.0. When energy saving is then turned off, the set point will revert back to the user set point of 0.0. See Section 7.4 Control Settings for more information.*

The **output indicators** are shown when the respective output of the controller is on. Available indicators include the compressor output (snowflake), the fan output and auxiliary output (available on the XR70CX). Indication and activation of manual defrost, light, continuous cycle and energy saving operation are provided via the control buttons along the bottom of the screen.

Control On/Off- This button is used to turn the temperature regulation function of the Dixell controller on and off. This does not remove physical power from the controller, but turns off all of the outputs. This also disables alarm operation and will prevent the light function from operating (if configured).

Defrost - This button allows manual defrost operation. Once activated, defrost will continue until the defrost termination conditions are met. When defrost is activated either through the digital input or automatically based on the defrost settings, the button will activate to inform the user that defrost is active.

Light - The light control button is provided when the auxiliary output of the Dixell controller is configured as a light control output. Pressing the button will toggle the light output of the Dixell controller on and off.

Continuous Cycle - This button toggles the continuous cycle mode on and off. Once activated, the continuous cycle will continue based on the configuration settings in the Dixell controller. Once the cycle has ended, the button will deactivate. The user can also terminate the continuous cycle at any time by pressing the button again to turn it off.

Energy Savings - The energy save control button is provided when the on/off key enabling in the Dixell controller (parameter onF) is set to "ES" to enable the energy savings key function. Pressing the button will toggle the energy saving mode on and off.

4.4.2   Dual View

The Dual view shows up to two probes on a single screen. It is accessed from the home "View" menu. If nCompass is configured to display only the main probe, only it will be visible on the screen. The screen also allows set point entry for the control probe when shown.
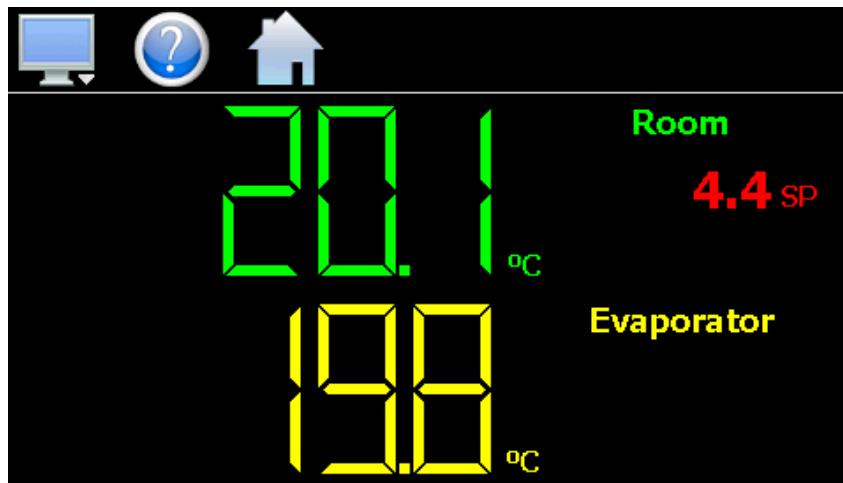
If the Dixell is equipped with three probes and nCompass is configured for indication of all probes, the left and right arrow buttons will be shown to allow the user to scroll through each probe for viewing.

4.5   Process Monitoring

The Single and Dual view screens provide the current process values of nCompass. In order to view the temperatures over time, nCompass provides real-time charts. Four user configurable charts are provided for this purpose.

4.5.1   Charts

The Chart screen is accessed from the home "View" menu. The real-time charts can be configured to display the process variable (PV), set point (SP) and compressor output (%Out) over a selectable period of time. The vertical axis determines the range of displayed data while the horizontal axis determines the history period. The maximum time period that can be shown in a chart is 24 hours.

The rate at which the chart plots a new point is based on the time period to be shown. Each buffer can hold a total of 720 readings for each of the selected channels to plot. The update rate can be calculated by the formula: time period (in minutes) * 60 / 720. Note that for time periods less than 72 minutes, the update rate will be held to a minimum of 6 seconds. Thus, the update rate will vary from a minimum of 6 seconds (for time periods of 72 minutes or less) up to a maximum of 120 seconds for 1440 minutes (24 hours).
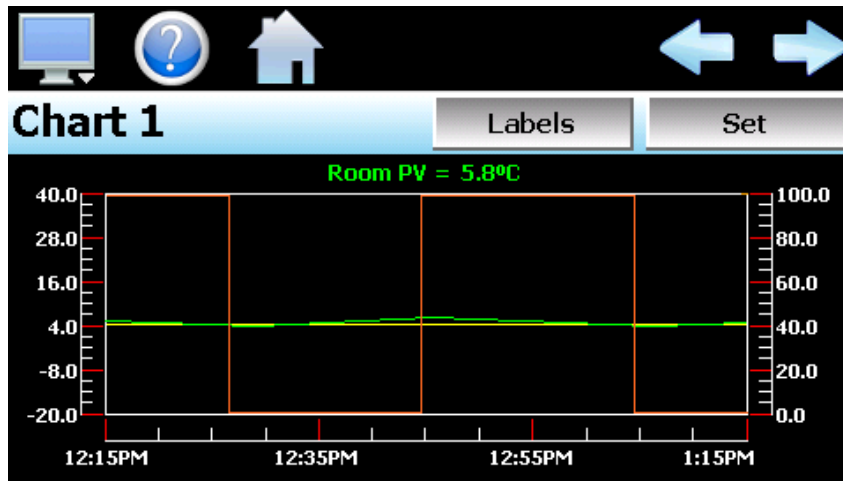
The **Labels** button allows the user to cycle through each of the configured plot channels to determine what each colored plot represents as well as view the current value without having to return to the Single or Dual view screens. Since the compressor output is simply an on/off control, when viewing the %Out, the value will either be 0% for off or 100% for on. The left and right scroll buttons at the upper right of the screen allow the user to switch between each of the charts.

The charts also allow you to "zoom in" on a particular area to have a more detailed look at current data. By using your finger to select an area on the screen, the chart will zoom in on that area. To select a portion of the plot, touch and hold the screen with your finger. Drag your finger across the graph and a box will be drawn around the selected area. Removing your finger from the screen will cause the chart to redraw with only the selected plot area. To return to the normal view, touch the 'X' or 'Y' axis and select zoom out to return to the previous zoom setting or zoom normal to return to the full display.

NOTE: *When a chart is zoomed in, it will not update with new information. The chart must be in normal view mode in order to update at each time interval. The chart will return to normal automatically when selecting a different screen to view.*

4.5.1.1   *Chart Setup*

To configure a chart, press the "Set" button in the upper right corner of the display. The setup screen will be shown. To assign channels to the chart, simply touch the on/off button for the desired items in the list to select them. Select the left or right vertical axis for each item by selecting the item in the list and press the button for the desired "Left" or "Right" axis. The left axis is the default axis selection. If none of the channels are assigned to the right axis, the axis will not be shown on the chart.
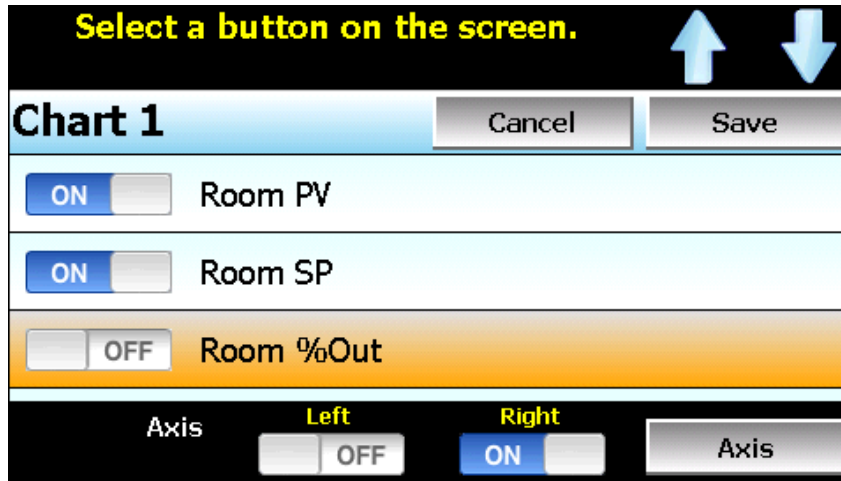
Once the channel selections have been made, press the "Axis" button to adjust the time period and vertical axis ranges of the graph.
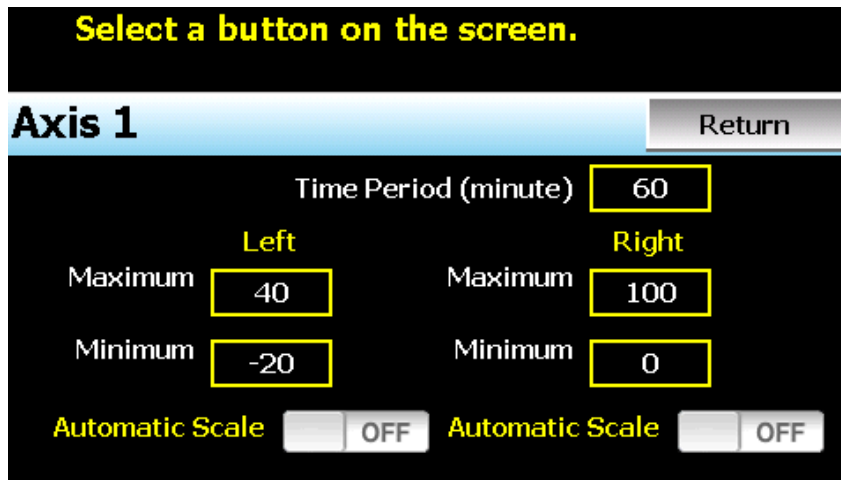
Time Period -   Adjusts the displayed time period for the graph. The allowable range is from 4 to 1440 minutes (24 hours).

Maximum -   The maximum value sets the maximum range of the vertical access with a minimum value of -32,760 and a maximum of 32,760.

Minimum -   The minimum value sets the minimum range of the vertical access with a minimum value of -32,760 and a maximum of 32,760.

Automatic Scale -   When on, the vertical axis will automatically adjust its zero and span as needed to display the selected plot channels.

4.6 System Alarms

When an alarm occurs, the alarm icon will flash in the nCompass icon bar to provide a visual indication of the alarm condition. An audible alarm will also sound if the alarm requires immediate operator attention such as a communications failure or a process alarm set point has been exceeded. For more information on adjusting the audible alarm volume, see Section 9.12.3, Alarm Volume.

4.6.1 Alarm Monitor

The Alarm screen is accessed from the home "View" menu. It can also be displayed by pressing the alarm icon whenever a new alarm occurs. It displays all current and/or previously acknowledged alarms according to time and date of occurrence. Once the alarm is reset, the alarm icon will be hidden; however, the alarm condition may still be present.
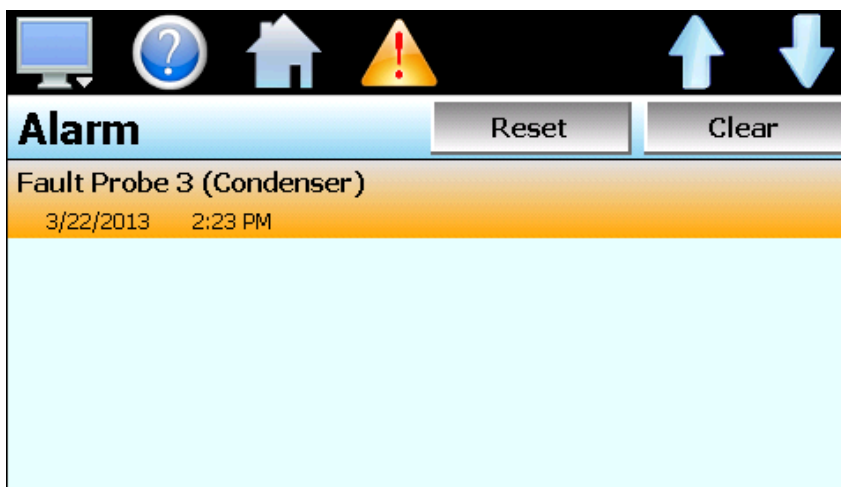
The alarm will be removed from the list when cleared by the operator by pressing the "Clear" button. Only alarms that are not currently active can be cleared from the alarm list.

4.6.2   Alarm File

The Alarm File screen is accessed from the home "View" menu. It displays all alarms for any given day. nCompass can store daily alarm files for a period of a year or longer (time based on storage usage for data history). Each time an alarm occurs on nCompass, the alarm is written to a file. Alarm file names are listed as month_day_year. The "Open" file button will display a dialog box where the user can select any alarm file to view.

NOTE: *If no alarms occurred on a given day, an alarm file will not be created for that day.*
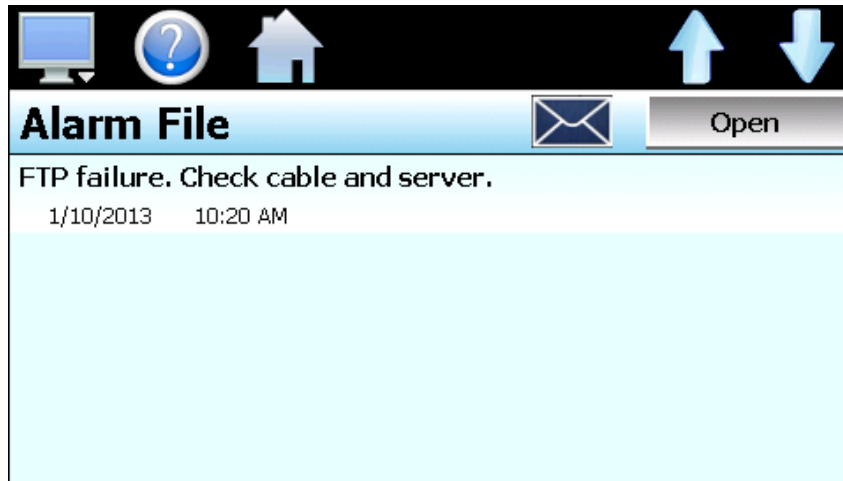
The send email icon [icon] allows the user to send a copy of the currently opened alarm file to any user configured in nCompass. When the email icon is pressed, an "Add Recipients" window will be displayed where the user can select recipients for the file from any of the email addresses configured under the nCompass email settings. For information on how to add email recipients to nCompass, see the section 8.9, Email.

5   Security

The nCompass security model provides an administrator with the tools to add up to 30 users to the system. Each user must have a unique ID, full name and password. Four user levels are provided which include system, user, supervisor and administrator levels. Specific access rights can be assigned to each user level and password aging can be implemented. Verification is provided (if enabled) for any parameters that will change a control parameter, which could upset the process (i.e. loop set point, start/stop automated ramp/soak programs, etc).

Verification requires that the logged in user must log in again before the process value (at the controller) will actually be changed. This feature is provided for extra security. The following example will make re-authentication clearer:

A supervisor logs on the system. The supervisor then steps away from the system to take a phone call but does not log out before leaving. If another user tries to change the control set point on any loop, the system will require another login (by an authorized user for that level) before the control set point is actually changed. This provides an extra level of protection to make the system more "tamper proof".

The 'Security' menu, accessed from the home menu, provides access to the security section of nCompass.

Configure
Login
Log Off
Audit
User
Password
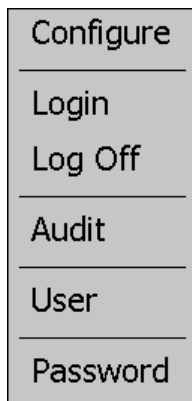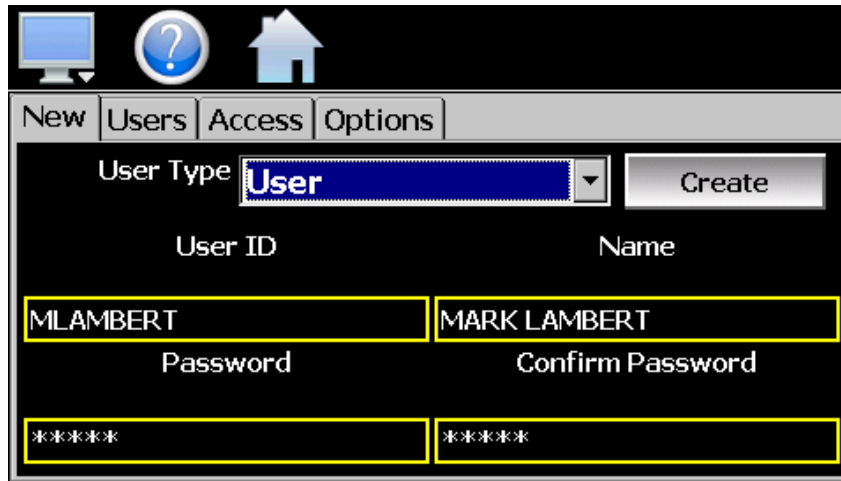
The 'Security' menu provides the following functions:

Configure: Provides access to security setup to add users, set rights and options.
Login: Log on a user if security is enabled.
Log Off   Log off a user if security is enabled.
Audit: Allows the user to view any of the saved audit trail files.
User: Shows the current user logged into the system.
Password: Allows the current user to change their password.
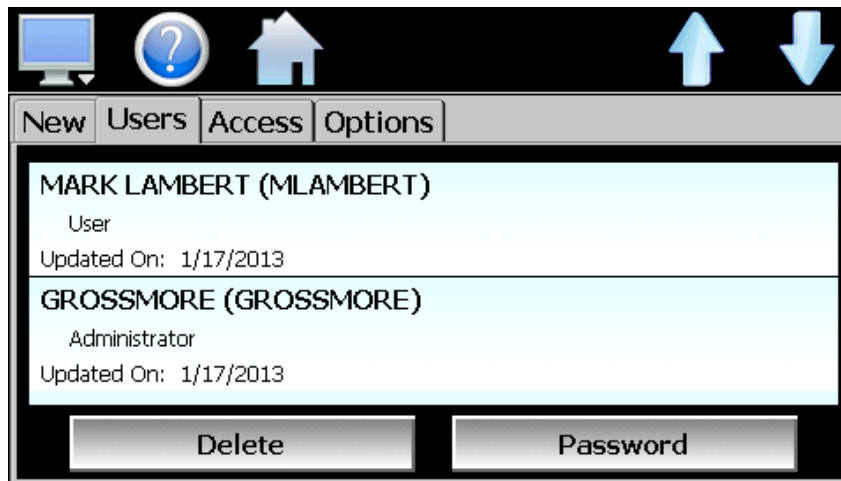
5.1 Adding Users

The "New" user tab provides the ability to add up to 30 users to the system. Select the type of user from the drop down list (System, User, Supervisor or Administrator). Press each field to add the user ID, full name and password (no spaces allowed, 5 character minimum and 16 characters maximum). Press the "Create" button to add the user to the system. If the passwords do not match or the user ID is already used, nCompass will alert the user and not accept the entry.

5.2 Viewing Users

The "Users" tab provides the administrator with the ability to view information on each user entered into the system. Password information is not available. The user can be deleted from this tab and a new password for each user can also be entered from this area.

To delete a user, select the user from the list and press the "Delete" button. Likewise, to change the password for a user, select the user from the list and press the "Password" button.

5.2.1   New Password Entry

To change a password, select the desired user by touching the User ID in the list box and press the 'New Password' button. Enter the new password and confirm the password. Press the 'Accept' button to change the password (no spaces allowed, 4 character minimum and 16 characters maximum).
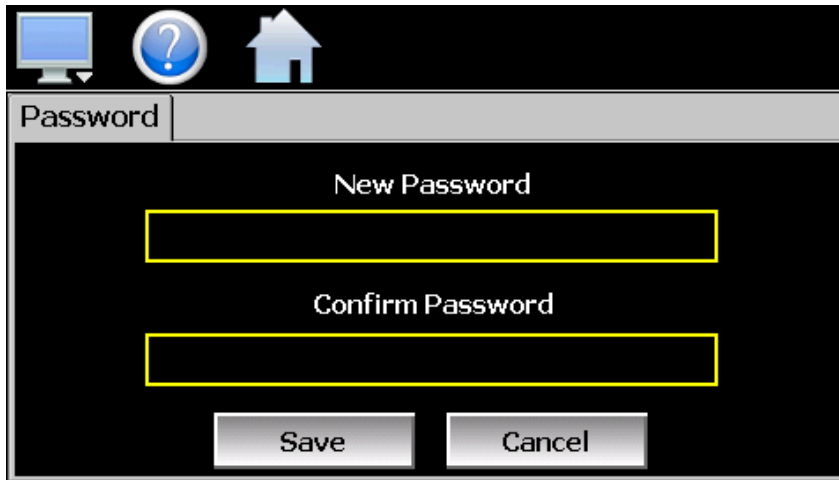
5.3   Setting User Access

The "Access" tab provides the administrator the ability to assign rights to each user level (System, User, Supervisor and Administrator). To enable or disable specific program functions (user rights) for each user level, select the user right from the list and press the corresponding on/off button for the user level you want to change access rights for. If the button is set to on, user access will be enabled for the user group.
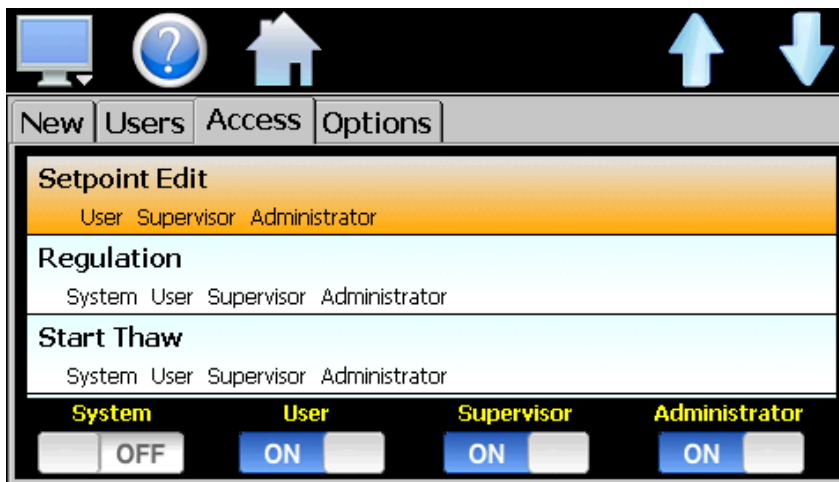
User access for "Security" can not be disabled for the administrator group. This is a safety feature to make sure that any administrator with the proper user ID and password can access security. If the administrator loses his/her ID or password, there is no "back door" to the system and it will have to be reset and reprogrammed in order to return to normal operation.

5.3.1 Security System User Access

The following list shows the available user rights, where to find the menu item(s) applicable to the user right and a description of what it applies to. Note that the OEM configuration allows many menu items to be disabled; in which case the menu for a specific user right may not be shown.

| User Right	Menu Location	Description
Setpoint Edit	View/Single, Dual views	applies to control set point for temperature regulation
Regulation	View/Single	enable or disable on/off control button
Start Thaw	View/Single	enable or disable manual defrost button
Continuous Cycle	View/Single	enable or disable continuous cycle button
Energy Saving	View/Single	enable or disable energy savings button
Reset Alarms	View/Alarm	alarm Reset button
Clear Alarms	View/Alarm; Clear button	prevents alarm list view from being cleared
Chart Settings	View/Chart	configure plot channels, scale & time for charts
Data	Data/Data	applies to all data logging actions & settings
Annotation	Data/View/Annotation	access to add operator messages to active log file
Signature	Data/View/Signature	access to add digital signature to active historical data file
Open	see description	alarm, audit & data files
Delete	see description	data files; note files may be deleted with File Utilities
USB	Data/Utilities/USB	allows USB memory stick to copy/delete data, alarm, program & audit trail files & to import programs
FTP/WAN	Data/Utilities/FTP/WAN	configure FTP client settings
Communications	Device/Settings/Set/Comms	configure web page, Modbus address & VNC settings
Setpoint Limits	Device/Settings/Set/Limit	edit minimum/maximum allowed set point entry
Adjust Alarms	Device/Settings/Set/Alarm	applies to all alarm settings
Defrost	Device/Settings/Set/Defrost	applies to all defrost settings
Control Differential	Device/Settings/Set/Control	edit compressor on/off temperature differential
Energy Save Setpoint	Device/Settings/Set/Control	edit the energy saving temperature rise
Adjust Continuous Cycle	Device/Settings/Set/Control	edit continuous cycle settings
Email Settings	Device/Settings/Email/Email Settings	configure email settings and addresses
Email Message	Device/Settings/Email/Message	access to compose & send email message
Offline	Device/Settings/Offline	access to Off-Line menu system: Units, Clock, Calibrate Touch, Language, Exit Application, Offset, Configuration
Calibrate Touch	Device/Settings/Offline/System/Display	access to the touch screen calibration utility
Backlight	Device/Settings/Offline/System/Display	access to edit backlight settings for brightness and off delay time
Alarm Volume	Device/Settings/Offline/System/Display	allows edit of nCompass alarm beeper volume
Units	Device/Settings//Offline/Set/Units	loop/monitor point temperature units configuration - C\F
Clock	Device/Settings/Offline/Set/Clock	Set Date/Time, Time Zone, DST and NTS connection
NTP	Device/Settings/Offline/Set/Clock	enable & choose National Time Server location
Daylight Savings	Device/Settings/Offline/Set/Clock	enable Daylight Savings Time (DST)
Language	Device/Settings/Offline/Set/Language	Select help language
Security	View/Security/Configure	applies to Security Setup
Configuration	Device/Settings/Offline/System/ Configuration	access to import/export setup files of nCompass
Default Configuration	Device/Settings/Offline/System/ Configuration; Reset Default Configuration button	function to clear nCompass configuration and reset all to default state for reconfiguring
Offset Calibration	Device/Settings/Offline/Calibrate/Offset	access to adjust probe offsets
Exit (run mode)	Device/Settings /Offline/System/Exit; "Exit application. (automatic mode startup)." button	prevents nCompass application from being stopped
Exit to Configurator	Device/Settings /Offline/System/Exit; "Exit Application. (configuration mode startup)." button	prevents nCompass application from being stopped and access to the nCompass configurator application

5.4 Setting Security Options

The security "Options" tab provides the administrator the ability to set the global security options.
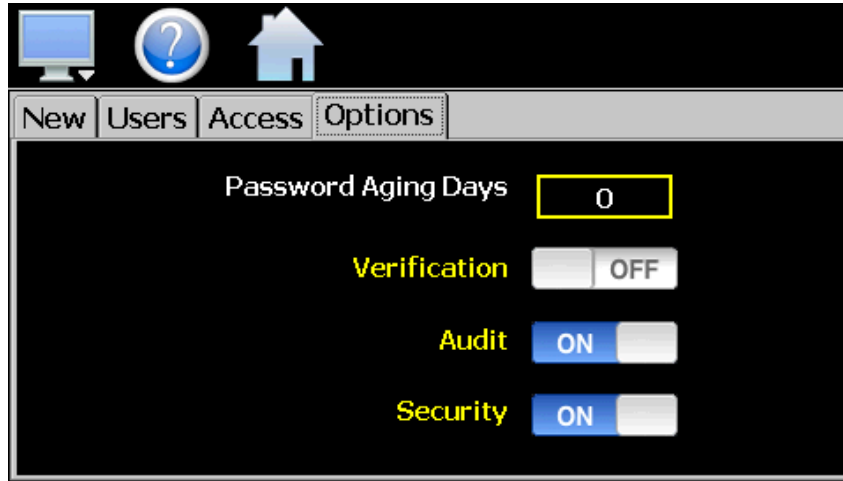
The **Password Aging Days** field is a global for all users. Password aging starts from the day the user is entered into the system. The value can be set from 0 to 365 days. A value of zero disables password aging.

NOTE: *When using password aging and the password expires for a user, the user will be required to change their password before access to the system is permitted. A user can change their password at any time (even if aging is not used) by selecting "Password" from the main security menu.*

When enabled, **Verification** requires that the logged in user must log in again before the process value will actually be changed.

Audit is a global setting that turns the audit trail on or off. When the audit trail is turned on, all user actions are written to a daily log.

Security is the global setting that turns the nCompass security system on or off. The security system must be enabled for the audit trail to be enabled.

5.5   Audit Trail

The audit trail viewer is accessed by selecting "Audit" from the Security menu.   It displays all user actions that affected the system for any given day. nCompass can store daily audit files for a period of a year or longer (time based on storage usage for data history). Each time a user take an action that affect the operation of the system (changing a set point, start/stop data logging, changes an alarm set point, etc.), the action is written to a file. Audit trail file names are listed as month_day_year. The "Open" file button will display a dialog box where the user can select any audit file to view.

NOTE: *If no actions occurred on a given day, an audit file will not be created for that day.*
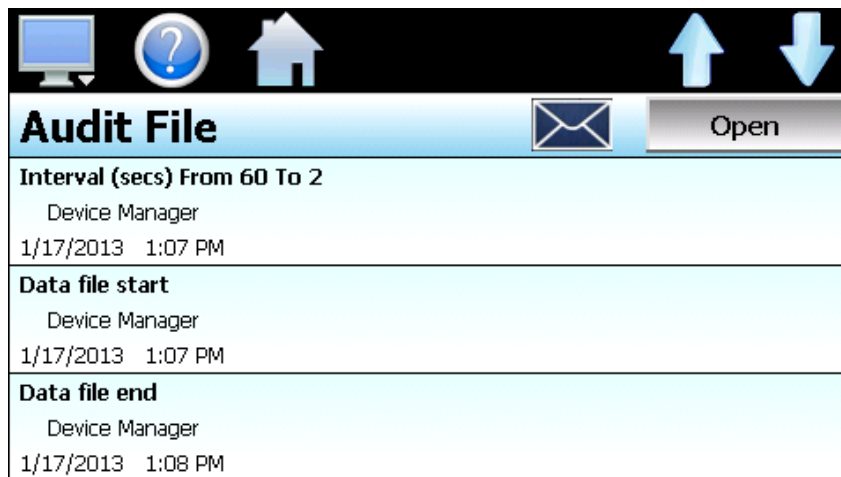
Each action recorded to the file includes the date/time it occurred as well as the user (if logged in) that made the change. If no user is logged in, the user will be listed as "Device Manager", which is the default user account for the nCompass system.

The send email icon ✉ allows the user to send a copy of the currently opened audit trail file to any user configured in nCompass. When the email icon is pressed, an "Add Recipients" window will be displayed where the user can select recipients for the file from any of the email addresses configured under the nCompass email settings. For information on how to add email recipients to nCompass, see the section 8.9, Email.

6 Data Logging

The nCompass data logging features are accessed via the home 'Data" menu item. The system data logging provides the ability to select individual points for logging, view data log files and start/stop logging operations. The logging ability of nCompass provides an easy-to-use, convenient method to obtain electronic data without the need for additional data acquisition equipment.

The Data Log menu provides navigation to the following functions:
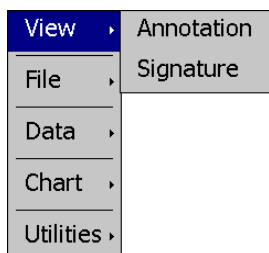
View *menu*
Annotation: Allows the user to insert a notification into the currently running log file or view all annotations associated with the currently loaded historical data file.
Signature: Allows the user to digitally sign a file to prevent data tampering and view all digital signatures associated with the currently loaded historical data file.
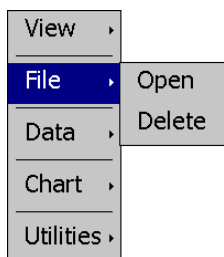
File *menu*
Open: Opens a history file for review.
Delete: Allows the user to delete the currently loaded history file.

> *NOTE:* *The "Delete" log file function does not affect data from a file that is running, only the current data log file loaded for review.*
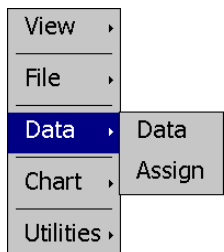
Data *menu*
Data: Displays main data log screen with status of logger.
Assign: Allows the user to select what variables are to be logged.
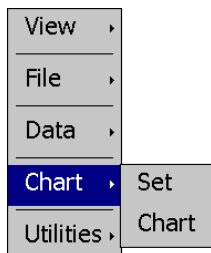
Chart *menu*
Set: Selection of data file points and time period for history review.
Chart: Plots historical data after time and points are selected.
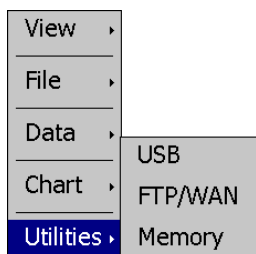
Utilities *menu*
USB: Allows the user to access file utility functions.
FTP/WAN: Provides access to the automatic file back-up settings.
Memory: Displays memory capacity remaining on nCompass.

6.1   Selecting Points for Logging

In order for the data logging function of nCompass to operate, you must first select what variables are to be logged to the data file. To choose which points are to be logged, select "Assign" from the Data menu. This screen allows the user to select any point(s) from the system for data logging.
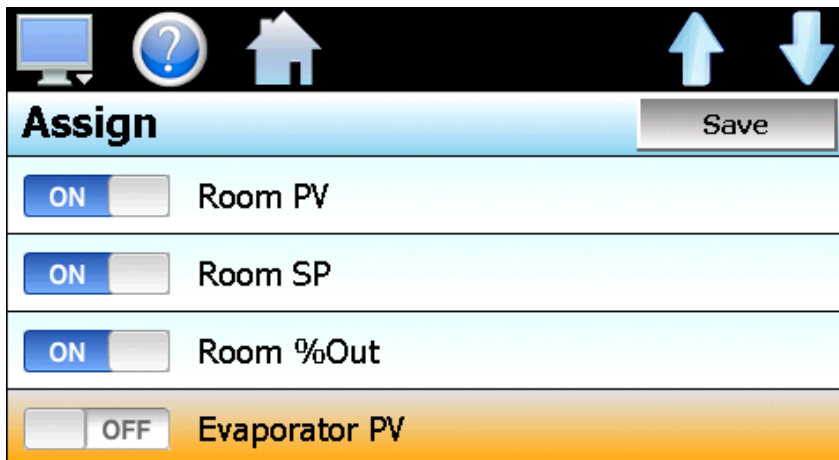
Select the desired items from the list by turning each one on or off. When selections are completed, press the "Save" button to save the point selection to memory. New selections will not take effect until the Save button is pressed.

6.2   Starting/Stopping Data Logging

nCompass logs data to its SD card. Current data for each variable is written to the log at a fixed interval based on the settings entered in the "Length" and "Interval" fields. File names are automatically generated using mm_dd_yyyy_hh_mm_ss format. To enter a new alphanumeric file name, touch the "File Name" field and enter the desired value (up to 16 characters each).   When a file name is specified, the file will be saved as FileName_mm_dd_yyyy_hh_mm_ss.
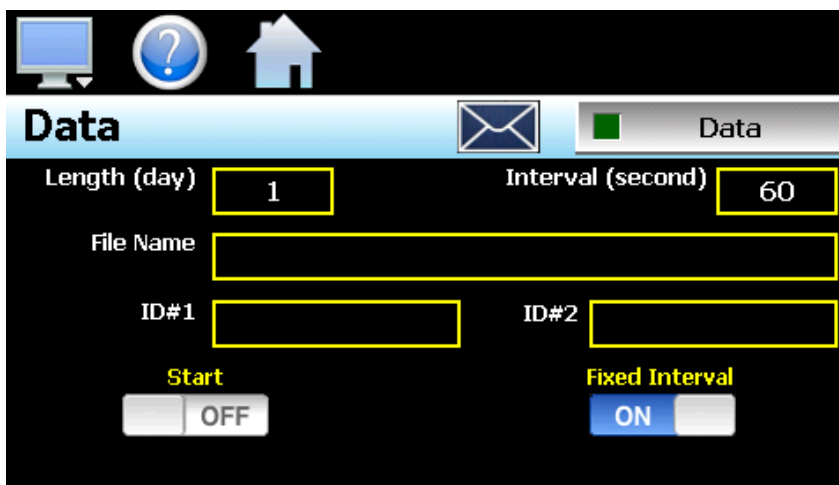
The data logger also provides two entry fields, ID#1 and ID#2, which allow the user to enter in information specific to the file such as a batch and/or lot number to identify product that may be associated with the new data file. These entries will be saved with the data log file for later identification.

The **Length** field sets the length of a data file in number of days. It can be set for 1 to 31 days. Once the selected number of days has elapsed, a new data file will be created and logging will continue in the new file.

The **Interval** field is used to set the rate at which points are written to the log file which equates to the sample rate in seconds. When the "Fixed Interval" option is turned on, the logging interval will be automatically set to record at minute intervals based on the number of days set for the file. If the file is set for 1 day in length, the logging rate will be at 1 minute intervals. If the file is set for 7 days, then the logging rate will be every 7 minutes. This keeps the data file size manageable and able to be viewed by the nCompass data viewer.

The log interval can be manually set to any rate between 6 and 1860 seconds in any combination with the number of days before a new file is started. To do this, turn off the "Fixed Interval" option and enter in the desired logging rate in seconds.

NOTE: *Logging at shorter intervals allows nCompass to capture fast changing processes, but the data files can become extremely large. Files that exceed the capability of the nCompass data viewer (>520KB in size) will have to be extracted from nCompass using a USB memory stick or FTP file transfer in order to be viewed remotely on a PC.*

Files larger than the 520KB limit will not be automatically, digitally signed by nCompass. If the files are to be digitally signed, this must be done manually by extracting the files and using the FDC data viewer program running on a remote PC.

To manually start data logging, press the "Data" button. Any time logging is enabled, the indicator on the Data button will be illuminated. To stop data logging, press the Data button again. Data logging can also be started automatically by turning on the "Start" or "Program" option.

The **Start** option automatically turns data logging on whenever nCompass is first powered on. This action simulates that of a standard chart recorder.

6.2.1   Calculating Log File Size

nCompass saves the log file in a text based format (.csv), so the amount of memory consumed for each reading is dependant upon the number of digits required to accurately display the value. This optimizes memory usage but also makes calculating an exact file size difficult. To obtain a worst case approximation of the resultant file size, use the following formula:

File Size (KB) = 1 + [0.023 + (0.006 * number of log points)] * number of readings

6.3   Reviewing Historical Data

Historical files can be opened and viewed using the historical viewer. In order to view a historical data file, it must first be opened by selecting "Open" from the File menu. Once the file has been opened, nCompass will automatically plot all channels of the historical data file or the user can choose to cancel the plot and select which channels should be plotted as well as adjust the specific time period to plot.

6.3.1   History Plot Setup

The history plot setup allows the user to select any time frame (zoom in/out) from the historical data file as well as select from any of the channels of data to plot. To edit the settings for the historical plot, select "Set" from the Chart menu.
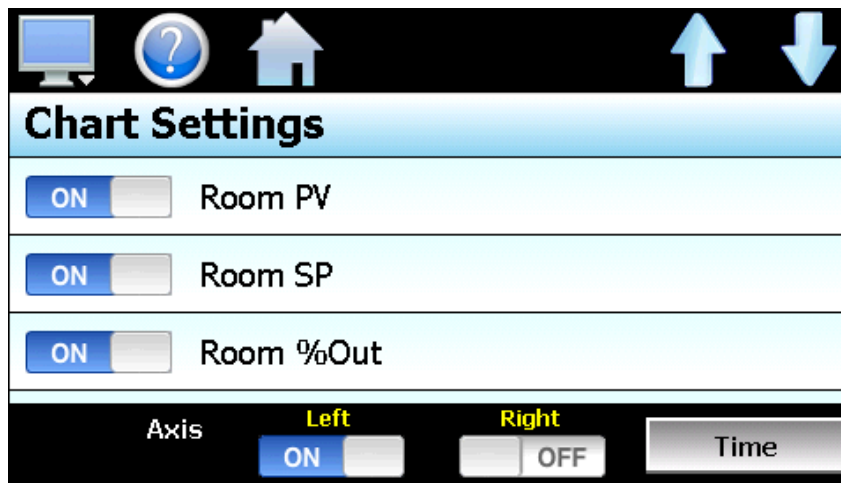
Any point from the data file can be selected along with the vertical axis to be used for each channel to be plotted. Select channels from the list by turning them on or off, and use the "Left" and "Right" axis buttons to assign the selected item to the left or right axis for the plot range. To adjust the period of time to plot from the data file, press the "Time" button.
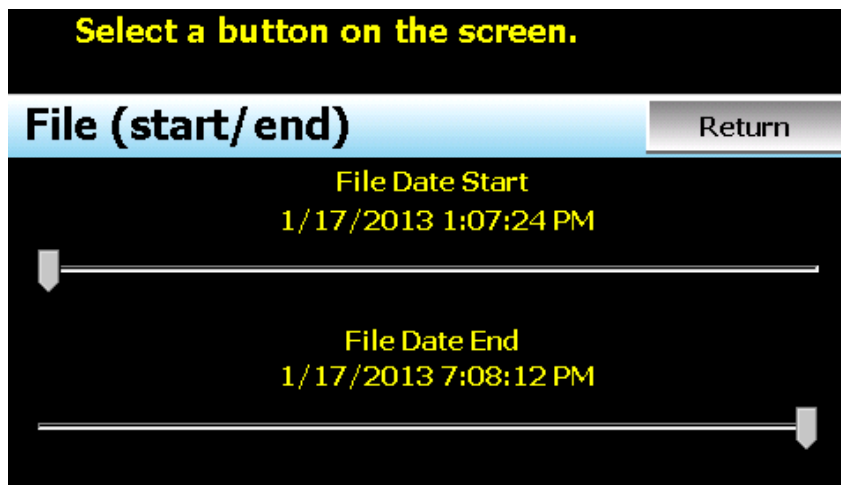
The start and end dates for the currently loaded file will be shown with time in hours, minutes and seconds. The "File Date Start" and "File Date End" sliders are used to select a time span for historical viewing. Once the desired start and end times have been set, press the "Return" button to return to the Chart Settings screen.

6.3.2　Plotting Historical Data

The history Chart plots the data from the currently opened history file according to the selections made under chart setup. If a file has not been opened or data points have not been assigned to a plot, nCompass will alert the user to correct the problem. The 'X' and 'Y' axis scales are set to auto scale based on current values for each plot channel so no user action is required.

The historical graph provides the same zoom feature as the real-time charts so the user can zoom in on a particular area of the historical plot by dragging their finger across the screen to draw a rectangle around the desired plot area.
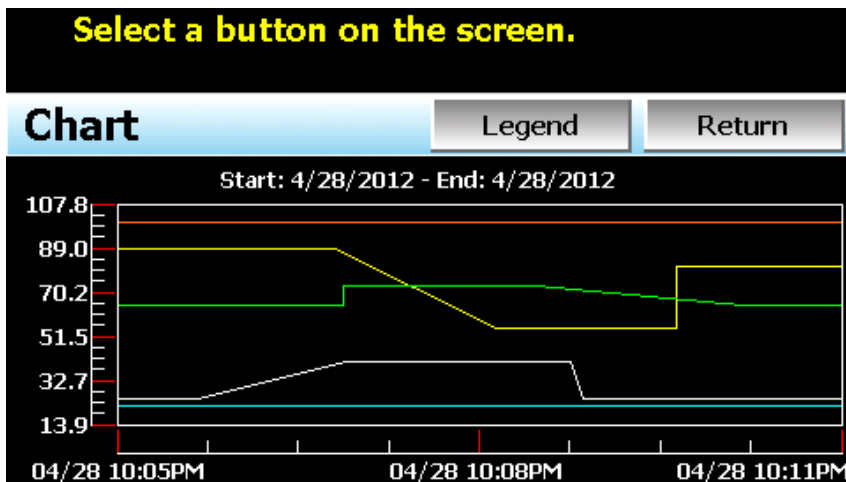
Pressing the "Legend" button will provide the user with channel information by displaying the names of the selected plot channels, which axis they are associated with and the color used to display the plot channel. Pressing the button again will toggle the display back to the historical chart.
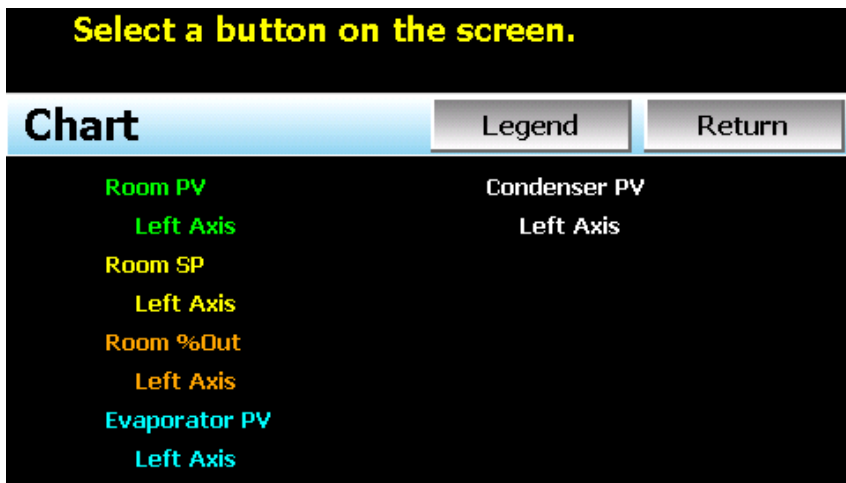
NOTE:　*When pressing the Legend button to toggle between the historical chart and the legend screen, it may take several seconds for the chart to become visible depending on the size of the data file and number of channels selected to plot.*

When finished viewing the historical chart, you must press the "Return" button to exit the historical data viewer and return to the main data log screen.

6.4 USB File Transfer

A quick note about file storage; data and setup files (alarm log and audit trail files) need some maintenance every now and then. After a period of time, storage devices fill up and files require backup or file deletion when no longer needed. The "Data" section of the nCompass interface provides all the functionality required for maintaining the internal SD memory card. The internal SD card should not be removed from the nCompass interface. Any change to SD directory structure (moving or deleting files with a PC) may cause the nCompass interface to stop operating and a new SD card will need to be ordered. Never move or delete the directories unless using the provided nCompass USB file utilities functions.

NOTE: *The data log files, alarm log and audit trail directories are saved to the internal SD card (not the USB memory stick device) plugged into the nCompass interface. Never unplug the SD card when nCompass is powered up or loss of data may result.*

The USB file transfer screen allows the user to copy or erase files from the internal SD card. Complete file directories for all nCompass file types can be copied to the USB memory stick and erased from the internal SD card. The current status for file functions is displayed for the operator during copy/delete operations.

NOTE: *All file transfer functions can be used while data logging is running. If the operator needs to back up or delete files from the system, a large number of files could take considerable time to backup and delete from memory. The file transfer screen will be locked during file transfer so plan the timing appropriately when access to other screen functions is not required. When data logging is running, the current data log file will not be copied or deleted while using the file transfer functions. This protects the current file and makes sure that the data file is complete before being copied and cannot be deleted from memory while it is still in operation.*

To **Copy** files, insert the USB memory stick into the USB port. Select the file type you wish to copy from the "Export Type" drop down menu. Available file selections are Alarm, Audit and Data files. Once the selection is made, press the "Copy" button. All related files will be copied to the USB memory stick with progress status displayed to user.

To **Copy/Delete** files from internal memory, insert the USB memory stick into the USB port. Select the file type you wish to copy and erase from nCompass' internal memory, by selecting it from the "Export Type" drop down menu. Available file selections are Alarm files, Audit trail files and Data files. Once the selection is made, press the "Copy/Delete" button. All related files will be copied to the USB memory stick and then deleted from nCompass with progress status displayed to user.

NOTE: The USB memory stick must be inserted into the USB port for any of the file utility operations to function. It is recommended to only use memory sticks certified by Future Design Controls for use with nCompass. Future Design Controls has tested and validated these memory devices for proper operation and performance.

Due to manufacturing variations in the USB memory sticks, it may take from a few seconds up to 30 seconds for nCompass to recognize the device when it is plugged in. Allow sufficient time for the device to be recognized before attempting any file utility operations or nCompass will indicate a file transfer/memory stick error.

When files are being copied to the USB storage device, a directory for each file type will be created to store the copied files. The directory structure is as follows:

Alarm files directory: Alarm Files_mm_dd_yyyy-hh_mm_ss
Audit files directory: Audit Files_mm_dd_yyyy-hh_mm_ss
Data files directory   Data Files_mm_dd_yyyy-hh_mm_ss

The purpose for using the date and time as part of the directory name, is to make sure the user can track the date and time of the file transfer. If a user transfers a file type more than once in a single day, the files will be grouped logically by time.

When accessing the data files saved to the USB memory stick, the data files will be in ".csv" format. These files can be opened directly with Microsoft Excel or any program that opens a comma separated file format. You can copy or empty the "Data Files"' directory by simply plugging the USB device into a PC's USB port. The device then becomes like any removable disk attached to the computer and can be manipulated once plugged into the PC.

The FDC Data Viewer program is a free Windows accessory program that allows users to view, plot and print data files and is available from Future Design Controls or any manufacturer that markets the nCompass product. It is required when using the digital signature feature of nCompass.
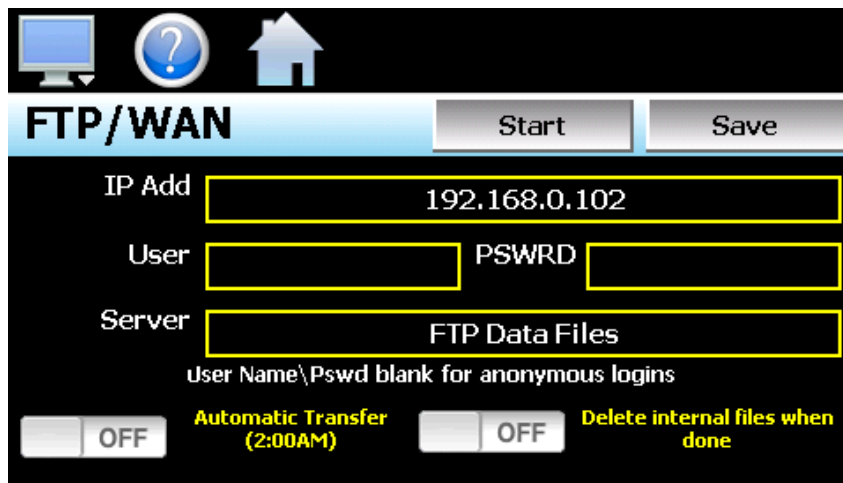
IMPORTANT: Once files are deleted from nCompass storage devices, they are gone and cannot be retrieved. Once again, do not edit, move or delete any other files from the internal SD memory card unless using the nCompass file utilities. nCompass may not operate properly if you do so.

'Windows XP' and 'Excel' are trademarks of the Microsoft Corporation.

6.5 FTP Data Backup

The FTP/WAN screen allows the user to configure automatic back-up of all data files contained in nCompass' memory to a user designated FTP site. When enabled, nCompass will automatically back up all data log files, alarm files and audit trail files at 2:00AM each day. With the optional delete files selection, nCompass will then automatically delete the files from its internal memory after back up. This will maintain nCompass' memory automatically, so that continuous data logging can be performed without filling up the available memory space.

NOTE: Setting up an FTP site on your network may require authorization and/or assistance from your network administrator. Contact your network administrator for proper settings and authorization from your network server (if required) to allow nCompass to connect to the designated FTP site.

The **IP Add** field is used to enter the IP address of the FTP site that nCompass is to send the files to.

The **User** field allows you to enter a user name for FTP site access. When nCompass connects to the FTP site to transfer files, the user name will be used to identify the connection. If a security login is required, the proper user name will have to be entered in this field. If security is not used, this field can be left blank.

The **PSWRD** (password) field is used in conjunction with the user name field and is for entering a password, if required by your FTP site, so that nCompass can access the site. If security is not used, this field can be left blank.

The **Server** field is used to enter the server directory where the files are to be backed up. When the automatic back-up occurs, nCompass will place the historical data files in this directory on the FTP site. nCompass will automatically create an 'Alarms' directory and an 'Audit' directory within the specified server directory for backup of the alarm files and audit trail files.

When the **Automatic Transfer (2:00AM)** option is turned on, nCompass will perform an automatic backup of all historical data files, alarm files and audit trail files contained in its internal memory to the designated FTP site. Note that if data logging is currently active, the active file will not be copied.

When the **Delete internal files when done** option is turned on, nCompass will delete all data log files, alarm files and audit trail files within its memory after completing the backup to the FTP site. Note that if data logging is currently active, the active file will not be deleted.

Once all settings have been made, press the "Save" button to save the settings so that on the next power-up, the entries will be maintained. The "Start" button can be used at any time to perform a manual data backup. If the files already exist on the FTP site, they will be overwritten on each subsequent backup. If the FTP site is down, or nCompass is not connected to the network, a local alarm message on the Alarm screen will indicate a transmission failure.

NOTE: *Typically FTP Server software uses case sensitive alpha-numeric characters for the User name, Password and Server directory. Contact your network administrator for proper settings.*

6.6 Annotation

The Annotation screen allows the user to add a messages to the running data file and view any messages currently associated with a loaded historical data file.
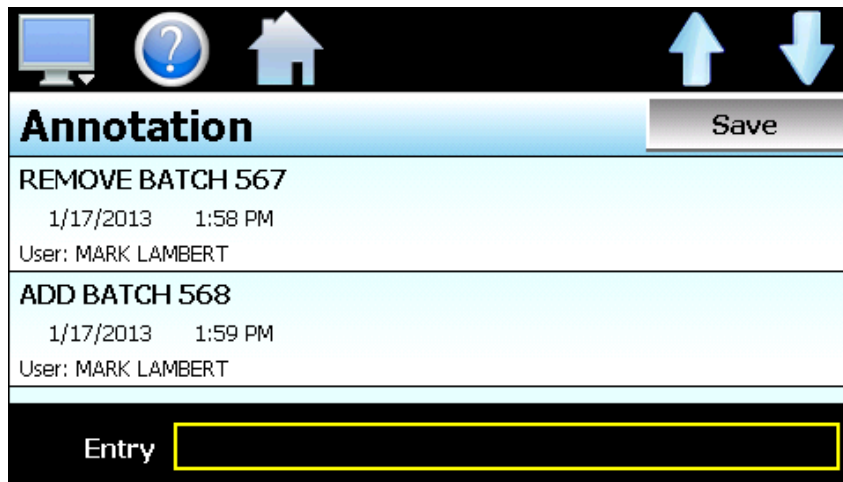
When a historical data file is loaded, the Annotation screen will display any messages that were written to the file. The date, time, user name and description of the data file annotation is shown. Note that the currently running data log file can be opened as a historical data file, and the current annotations for the running file will be shown.

To add an annotation to the running log file, touch the "Entry" field at the bottom of the screen and enter the message (up to 16 characters maximum). Press the "Add" button and the message will be added to the current log file. If the running log file was opened as the historical log file, the annotation will be shown immediately on the screen as it is added. If logging is not currently running, the entry field will be disabled.

6.7   Add\View Digital Signatures

The Signature screen allows the user to add digital signatures to historical data log files and view any digital signatures currently associated with the loaded historical log file.
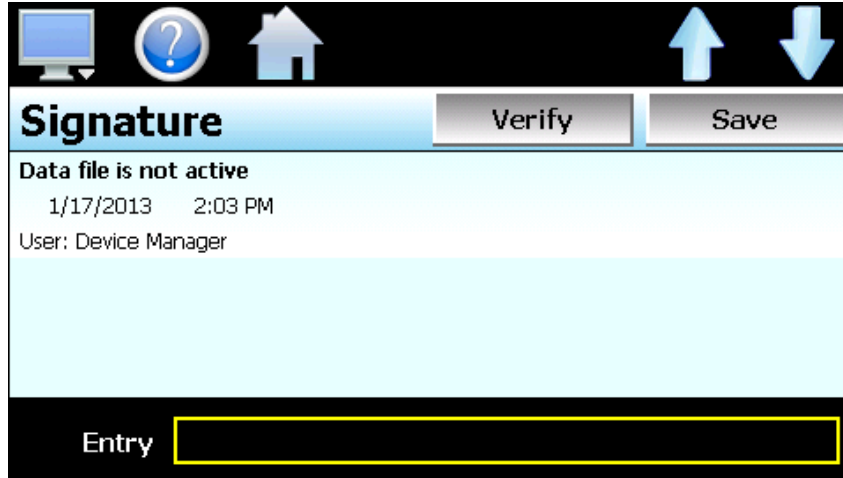
When a historical data file is loaded, the Signature screen will display any signatures currently associated with the file. To verify a digital signature and insure that the data file has not been altered, touch the signature in the list box and press the "Verify" button. nCompass will compare the signature to the log file to see if any alterations to the data have been made. nCompass will then indicate if the signature is valid or not.

If the signature is valid, the historical data file is intact and has not been altered. If the signature is invalid, the data has been altered at some time after the signature was assigned to the file. For data integrity, nCompass automatically signs a data file when logging is stopped; however, this only occurs if the "Auto Interval" is selected on the Log screen. If a different logging interval is used, nCompass will not automatically sign the file, and it must be signed by a user.

To add a digital signature to the historical log file, touch the "Entry" field at the bottom of the screen and enter in the comment line for the signature (up to 16 characters maximum). Press the "Add" button and the signature will be added to the log file. The signature includes the date and time of the signature, the user name and comment line. If a user is not logged into the system, the default user name "Device Manager" will be used as the user.

NOTE: *The Signature screen is not available if security is disabled. The nCompass security module must be enabled in order to digitally sign data log files. See Section 6, Security.*

7   Device Settings

This section covers the use of extended controller features that enhance the functionality of your system. To gain access to the nCompass setup options, select 'System Setup' from the home Setup menu.

The System Setup menu provides navigation to the following functions:

Set ▸	Alarm
Email ▸	Limit
Offline ▸	Defrost
	Control
	Navigation
	Comms
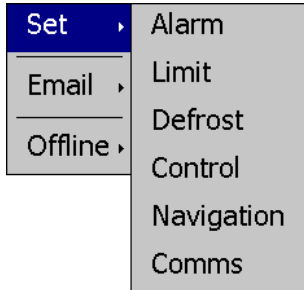
Setup _menu_
Alarm: Provides access to the alarm settings.
Limit: Sets minimum/maximum temperature set points.
Defrost: Provides access to the defrost settings.
Control: Provides access to temperature control settings.
Navigation: Allows the user to choose text based or icon based/slide page navigation menus.
Comms: Allows user to set nCompass communication settings.

Set ▸	
Email ▸	Email
Offline ▸	Message
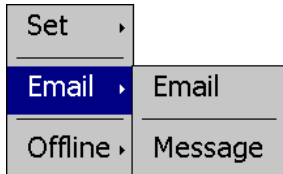
Email _menu_
Email: Provides access to the nCompass email system manager.
Message: Allows the user to send an email message to users entered in the system.

Set ▸	
Email ▸	
Offline ▸	Offline
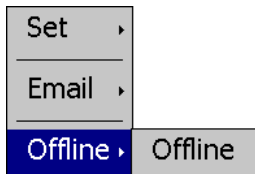
Offline _menu_
Offline: Provides access to offline system settings.

7.1 Alarms

The alarm screen allows the user to edit the alarm set points, alarm delays and the alarm type for the temperature alarm.

NOTE: *The Dixell controller can provide up to 2 alarms. The main temperature alarm is the default (room) alarm and monitors the main temperature probe (probe 1). The "condenser alarm" can be configured to use any of the available probes on the Dixell controller. Depending upon the configuration of the controller, the second alarm may not be available. If there are questions or concerns about the configuration and operation of your nCompass controller, contact your OEM for further information. Only your OEM can address equipment related issues.*
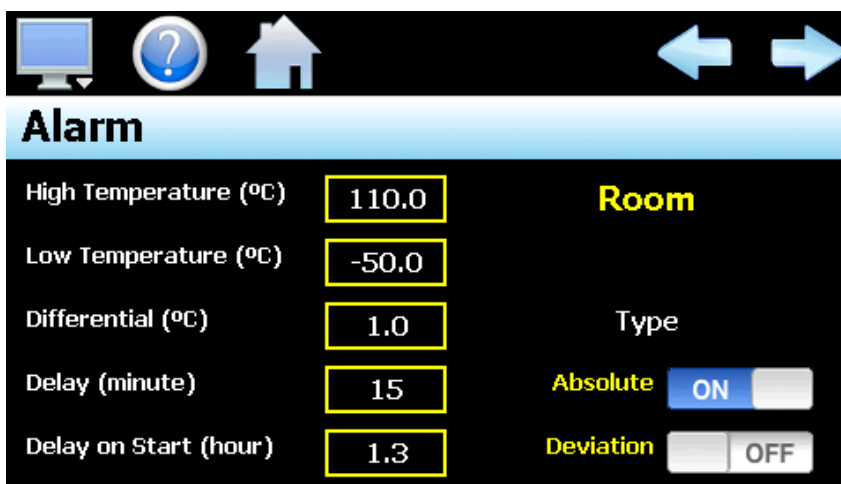
The **left** and **right arrow buttons** allow the user to switch between both of the temperature alarms. If the second alarm (condenser) is not configured, or the probe associated with the alarm is not configured for indication, the left and right arrow buttons will not be shown.

The alarm name shown at the upper right of the screen identifies the alarm based on the name given to the probe that it is associated with. The name will update as the user presses the left or right arrow button to go to the other alarm.

NOTE: If the Dixell controller's "Condenser" alarm is configured to use the main temperature probe, both alarms will be identified with the same name (the OEM configured name for probe 1). However, only the main temperature alarm provides the selection type for Absolute or Deviation. The condenser alarm is an absolute alarm only. Consult the "Installing and Operating Instructions" for your model of Dixell controller for further information.

The alarm **Type** selection is provided for the main temperature alarm only. This allows the user to select how the high and low alarm set points are used to trigger a high or low temperature alarm. When set to absolute, the alarm set points are actual temperature values. When the temperature exceeds the alarm set point, the alarm will be triggered. The deviation selection relates the alarm set points to the temperature control set point. The alarms are then triggered when the temperature exceeds the temperature set point (SP) by the high or low deviation set point. Thus, a high alarm will be triggered when the temperature rises above (SP + high deviation) and a low alarm will be triggered when the temperature falls below (SP – low deviation).

NOTE: If the alarm type is changed, the high and low alarm set points must be re-entered to match the newly selected alarm type in order for the temperature alarm to operate properly.

The **High and Low Temperature (Deviation)** set points define the temperature at which the alarm is triggered. Enter the desired set points by touching the high and low entry fields and enter the desired values using the numeric keypad. When the alarm type is deviation (Dixell room alarm only), the set points for both fields are a positive entry from 1 to 50 degrees. When the alarm type is absolute, the entries can be either positive or negative temperatures.

The alarm **Differential** entry sets the alarm recovery temperature. This value is subtracted from the high alarm set point and added to the low alarm set point to create a dead band around the alarm trigger point. For example, if the differential is set for 1 degree and the high alarm set point is 50, the temperature will have to drop below 49 degrees in order for the alarm to clear. Likewise, if the low alarm set point is -10, the temperature would have to rise above -9 in order for the alarm to clear.

The alarm **Delay** sets the duration of time in which the temperature must exceed the high or low temperature set point before the alarm activates. The entry is made in minutes and can be set between 0 and 255 minutes (maximum of 4 hours, 15 minutes).

The **Delay on Start** sets the length of time from when the system is first powered on to when the alarm is enabled. This can be used to prevent the alarm from triggering when the system is first turned on to allow the system to bring the temperature to within the desired operating range. The entry is made in hours with a range from 0.0 to 24.0 in decimal increments of 10 minutes. For example, an entry of 1-1/2 hours would be made as 1.3 (1 hour, 30 minutes).

7.2   Setpoint Limits

The Setpoint Limits screen allows for the adjustment of the minimum and maximum operating set points allowed to be entered for temperature regulation. These limits can be used to prevent operators from entering a value that exceeds the survivability limits of equipment or product being stored reducing the risk of property damage.

Enter the desired set point limits by touching the "Lower Limit" and "Upper Limit" entry fields and enter the desired values using the numeric keypad.

7.3 Defrost

The Defrost screen allows the user to edit the settings associated with defrost operation.
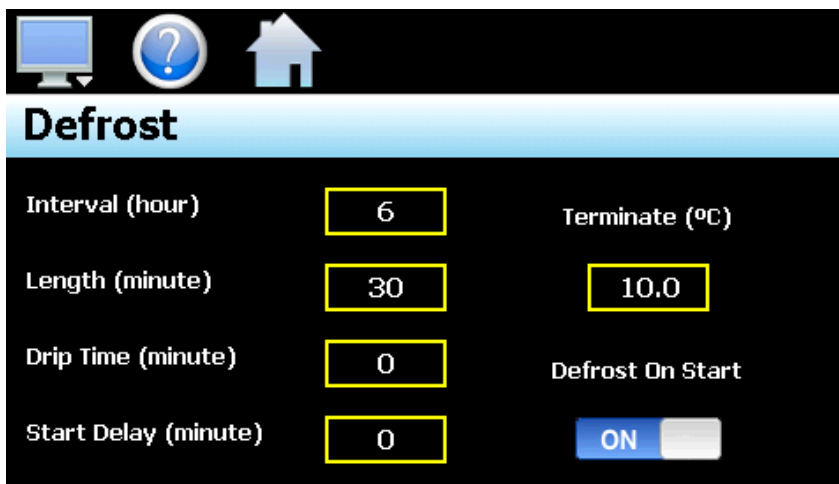
The defrost **Interval** field is used to set the time between each defrost. Time is entered in hours from 1-120.
.
The defrost **Length** field is used to set the maximum duration of the thaw cycle. Time is entered in minutes from 0-255. If '0' is entered for the defrost length, defrost will not operate. The defrost length must be set from 1-255 minutes in order to activate defrost. Setting the field to zero allows the user to disable defrost operation for testing purposes or to prevent it from operating if its use is not required.

The **Drip Time** field is used to enter the delay between the end of defrost and when normal temperature regulation is resumed. This delay is typically used to allow time for water to drain from the evaporator that was formed during defrost. Time is entered in minutes from 0-120.

The **Start Delay** field is used in conjunction with the **Defrost on Start** selection. If defrost on start is set to "on", the first defrost cycle will begin on power up of the system. The start delay time can then be used to delay the first defrost on startup from 0-99 minutes if necessary to avoid overloading the facilities, power grid if multiple units are started at the same time, i.e., due to momentary power outages.

The **Terminate** field is used to set the temperature at which defrost should be terminated regardless of the defrost length setting. This field is only shown if the Dixell controller is configured to use a probe for defrost termination. If no probe is selected, this field will be hidden and defrost will operate on the entered time basis only.
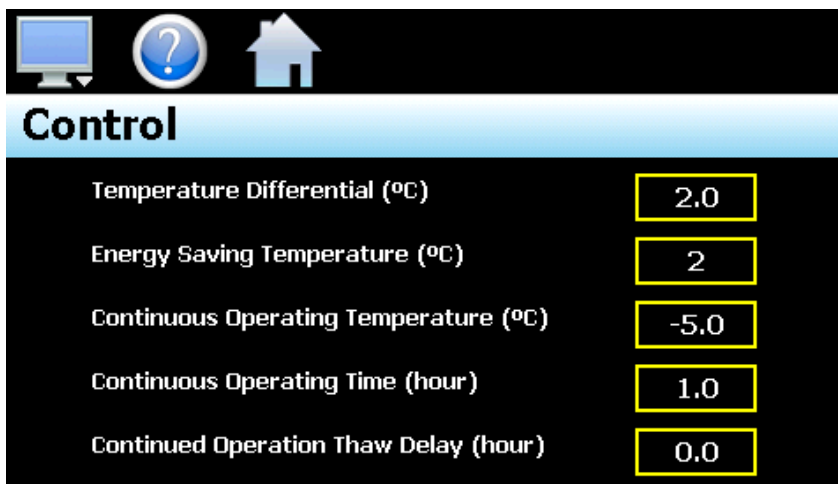
When a probe is configured for use, defrost will be terminated upon the selected probe reaching the terminate temperature. If the temperature is not reached within the allowed length entry for defrost, defrost will terminate. When a probe is selected for use, the defrost length entry is used as a maximum time period for defrost so that normal temperature regulation can resume.

NOTE: If a probe is selected for defrost termination and the measured temperature is above the termination set point, defrost will not activate.

7.4 Control

The Control settings screen allows the user to configure options related to temperature regulation.

The **Temperature Differential** field is used to set the compressor on/off hysteresis. This value is added to the control set point to define the temperature at which the compressor will turn back on. For example, with a differential of 2 degrees and a set point of 0, the compressor will turn off once the temperature reaches 0 and turn back on when the temperature rises to 2 degrees.

The **Energy Saving Temperature** field is provided when the on/off key enabling in the Dixell controller (parameter onF) is set to "ES" to enable the energy savings key function. This field allows the user to enter a set point offset of -30 to 30 for the control set point. When the energy saving function is enabled, this value is added to the control set point.

The **Continuous Operating Temperature** field is used to set the temperature that the Dixell controller is to maintain when the continuous cycle is activated.

The **Continuous Operating Time** field sets maximum length that the continuous cycle remains in operation once activated. The entry is made in hours with a range from 0.0 to 24.0 in decimal increments of 10 minutes. For example, an entry of 1-1/2 hours would be made as 1.3 (1 hour, 30 minutes).

The **Continued Operation Thaw Delay** sets the time from when the continuous cycle is turned off to the point at which defrost is activated. During continuous cycle operation, defrost is prevented from occurring, so upon completion of the continuous cycle (stopped manually or based on the allowed operating time) defrost is automatically activated. This entry allows the user to delay the defrost cycle from 0.0 to 24.0 in decimal increments of 10 minutes. For example, an entry of 1-1/2 hours would be made as 1.3 (1 hour, 30 minutes).

7.5   Navigation
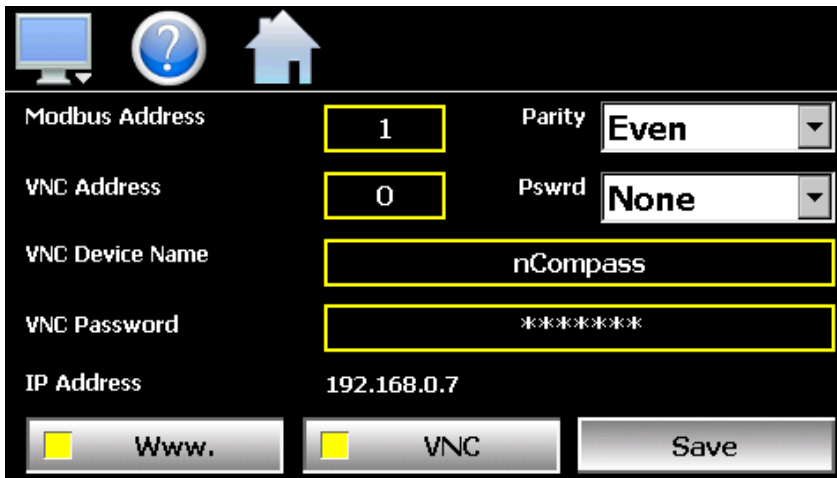
nCompass provides both text based PC style menus and icon based/slide page navigation menus similar to today's "smart" devices. The user can select either type at any time from the Navigation screen.
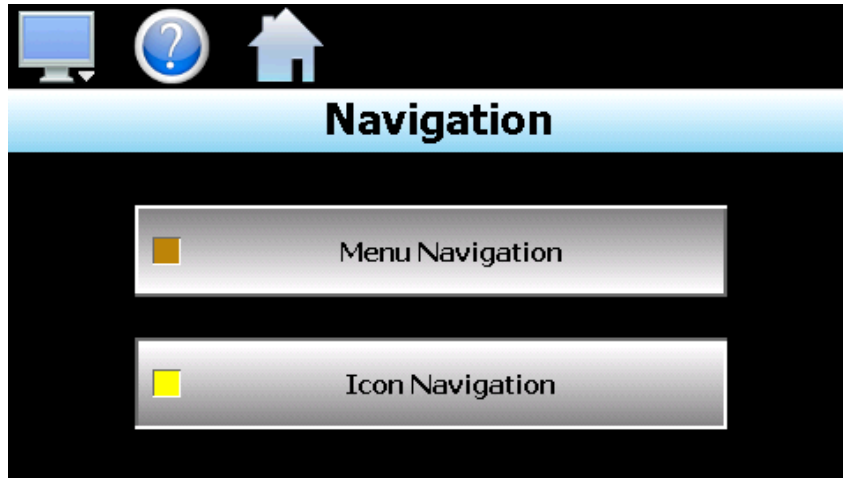
Press the button for the desired menu type to make the selection. The choices are mutually exclusive, so when one selection is made, the other will be de-selected. The button indicator for the active selection will illuminate to show the current selection.

7.6   Communication Settings

The "Comms" screen provides settings for the Modbus serial interface, web server and VNC interfaces. It also provides the nCompass IP address, which is required for using the VNC or web server interfaces.

The **Modbus Address and Parity** settings are used to configure the serial interface for user communications. Valid addresses are 1 to 31. The parity setting is only available for the standard nCompass DX interface and allows the serial port to be set for Even, Odd or no parity (None). If nCompass is configured to provide the pass-through Dixell controller communications interface, the parity selection will not be shown.

The **VNC Address and Password** set access rights to the nCompass VNC server. Valid addresses are from 0 to 255. The VNC password selection defines the connection mode for the server. The selections are "None" and "VncAuth" which requires users to enter the password when connecting to nCompass over the VNC interface.

IMPORTANT: *When multiple nCompass controllers are connected to a single router (DHCP server), it is imperative that each nCompass have a different VNC address. If multiple nCompass controllers have the same VNC address, network errors may result causing the VNC server to shut down or cause nCompass to "lock-up" and become non-responsive requiring the unit to be power cycled in order to return to normal operation.*

The **VNC Device Name** field is used to enter a name (up to 35 characters) that can better identify nCompass to users logged into the VNC interface. The name entered here will be used on the VNC header window on a PC, so that if multiple VNC clients are open to different systems, each one can be identified.

The **VNC Password** field is used to enter the password (up to 20 characters) that a user must enter for the VNC interface to connect to nCompass if the VNC password is enabled.

The **Www.** (web server) pushbutton is used to enable or disable the web server interface.

The **VNC** server pushbutton is used to enable or disable the VNC server interface.

The **IP Address** field is a static field that provides the IP address of nCompass which is required for connecting over the VNC and web server interfaces. For more information on Device IP and other LAN information refer to Section 10, Communications.

NOTE: *Any changes made to the above settings must be saved in order for them to take affect. When changes are completed, press the 'Save' button, and then cycle power to nCompass. The new settings will only take affect when nCompass first boots up.*

7.7 Email

The nCompass email server has the ability to send alarm messages to email and SMS addresses. Up to 30 addresses can be programmed into the system. Each one can be configured to receive emails, SMS text messages or both. When an alarm occurs, nCompass will send an alert to the specified address for each user in the list. The email settings are accessed by selecting "Email" from the setup "Email" menu.

7.7.1 Email Address Entry

Select the "New" tab to add new email addresses to the system. For each entry, enter the recipient's Name, Email Address and/or SMS Number (up to 50 characters each). Turn on the Email Alarm and/or SMS Alarm options to specify which addresses the alarm messages are to be sent to. Press the "Create" button to add the user to the list.

NOTE: *The SMS address is specific to the service provider. Each service provider has their own unique address; however, the phone number is always the "name" for the address entry. Below are common examples for some of the more common cell phone providers. There are internet sites with this information that cover most of the providers, or when in doubt, contact your service provider for the proper address format.*

Cell Phone Provider	Maximum message length	SMS Address to use (where 0123456789 is an example for a 10 digit cell phone number)
Cingular	150 characters	0123456789@mobile.mycingular.com
Cingular (GSM)		0123456789@cingularme.com
Cingular (TDMA)		0123456789@mmode.com
Nextel (now part of Sprint Nextel)	140 characters	0123456789@messaging.nextel.com
Sprint		0123456789@sprintpaging.com
Sprint PCS (now Sprint Nextel)	160 characters	0123456789@messaging.sprintpcs.com
T-Mobile	140 characters	0123456789@tmomail.net
Verizon	160 characters	0123456789@vtext.com
Verizon PCS		0123456789@myvzw.com

7.7.2 Email Addresses

Selecting the "Addresses" tab allows the user to view the list of email addresses entered in nCompass. Each entry will be shown with the notification method and address associated with it (email/SMS). To delete a user, touch the name of the user in the list box and press the "Delete" button. This will permanently remove the user from the list.
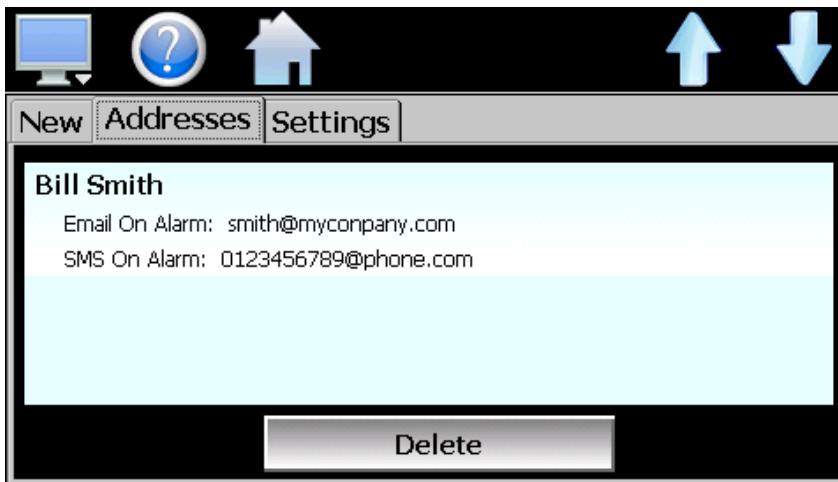
7.7.3 Email Settings

The "Settings" tab provides access to the email server configuration, which is how nCompass is able to connect and send email messages over its Ethernet connection. Each field may have up to 50 characters.
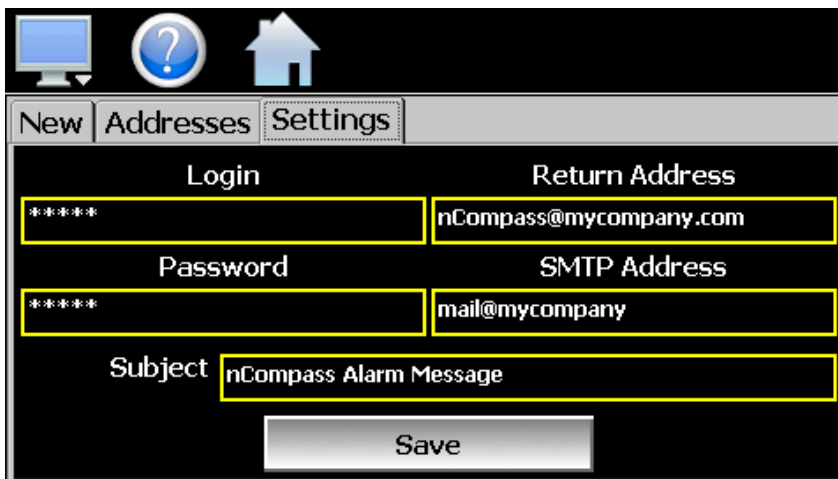
The **Login** field is used to enter the login name required by nCompass to log in to your company's mail server. You can use your login if one is not set up specifically for the nCompass on your network. Contact your network administrator for assistance.

The **Return Address** is the address given for nCompass on your company's mail server. nCompass does not accept email messages; however, this field is required for proper email delivery for security/anti-spam purposes. If using your personal login name, you can also use your personal email address if one is not set up specifically for nCompass on your network. Contact your network administrator for assistance.

The **Password** field is used for entering a password, if required by your network server, to send email. Contact your system administrator for assistance.

This **SMTP Address** field is for entering the address of the email server used for sending emails. This must be a valid mail server for which the above settings allow nCompass access. Contact your system administrator for assistance.

This **Subject** field is used to enter a subject line for emails and/or SMS text messages. It can be used to provide an identifier to the recipients of the alarm message to know which chamber it is coming from.

NOTE: *It is recommended to put some form of entry in this field. It can be left blank; however, many firewalls and spam filters will filter out messages without subject lines. That may prevent recipients from receiving the email. It can also be useful for identifying a particular unit on the factory floor.*

Once all settings have been made, be sure to press the "Save" button to begin using the new values and store them, so that on the next power up, the settings will be retained. The body of the email/SMS text message will contain the description of the alarm condition as it would appear on the alarm screen. If the mail server is down, or nCompass is not connected to the network, the message will not be sent and a local alarm message on the alarm screen will indicate a transmission failure.

7.7.4 Email Message

nCompass provides the user with the ability to send short email messages to users configured in the nCompass email server. To send a message, select "Message" from the device settings, Email menu.

Press the "Compose" button to create a brief message using the keypad (up to 100 characters). When you are finished entering the message, press the "Done" button. The completed message will then be shown in the message window. Press the "Send" button to select the email recipients you wish to receive the message and send the message.

8 Offline

The Offline settings do not include the OEM setup of nCompass. Refer to the documentation provided by your OEM regarding loop control setup. Note that prior to entering offline setup, automated ramp/soak program operation and data logging must be manually stopped.

The offline menu provides navigation to the following functions:
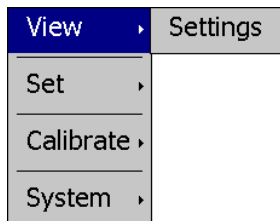
View _menu_
Settings: Navigation back to the device settings menu.
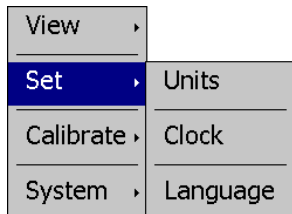
Set _menu_
Units: Setting for temperature units.
Clock: Settings for system date and time
Language: Settings for menu and help language text.
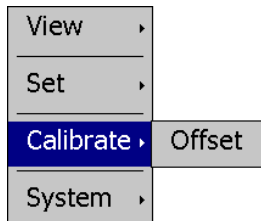
Calibrate _menu_
Offset: Settings for probe offset calibration.
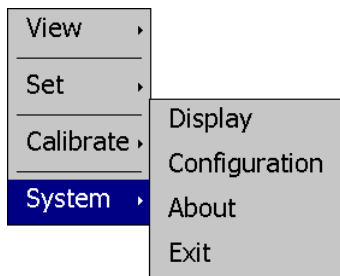
System _menu_
Display: Access to display calibration and backlight settings.
Configuration: Access to nCompass import/export utility.
About: View current firmware/software version numbers.
Exit: Exit nCompass application and access to the
                                nCompass configurator.

8.1 Degrees C/F Units Selection

Temperatures can be displayed in either degrees Centigrade or Fahrenheit. To change the temperature display units, select "Units" from the offline Set menu.
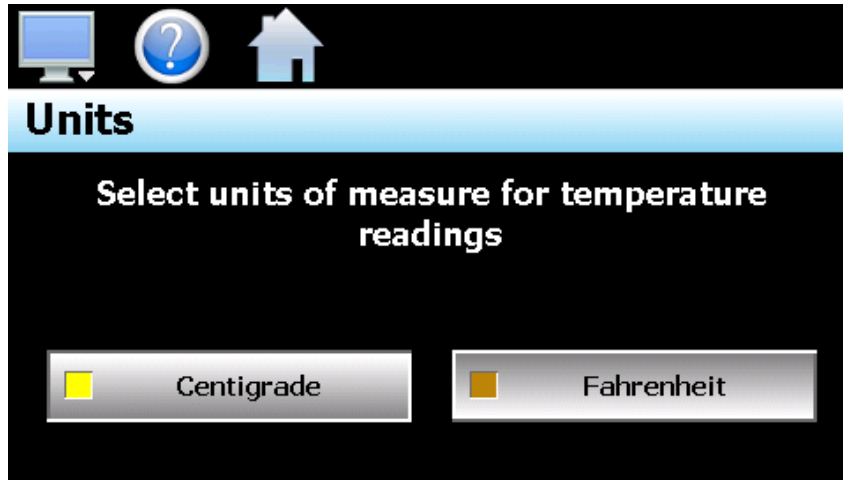
Press the button for the desired temperature units to make the selection. The choices are mutually exclusive so when one selection is made, the other will be de-selected.

IMPORTANT: *When changing temperature units, the control set point, control differential, "room" alarm high and low set points and probe calibration must all be checked and re-entered if necessary.*

For temperature units of degrees Fahrenheit, all temperature fields will be shown with no decimal regardless of the resolution selection in the Dixell controller. The resolution setting of 0 or 1 decimal is for degrees Centigrade only.

8.2   Clock Settings

The system date and time is adjusted from the "Adjust Time" tab under the Set/Clock menu. The current date and time will be displayed in the thumb wheels as shown below.
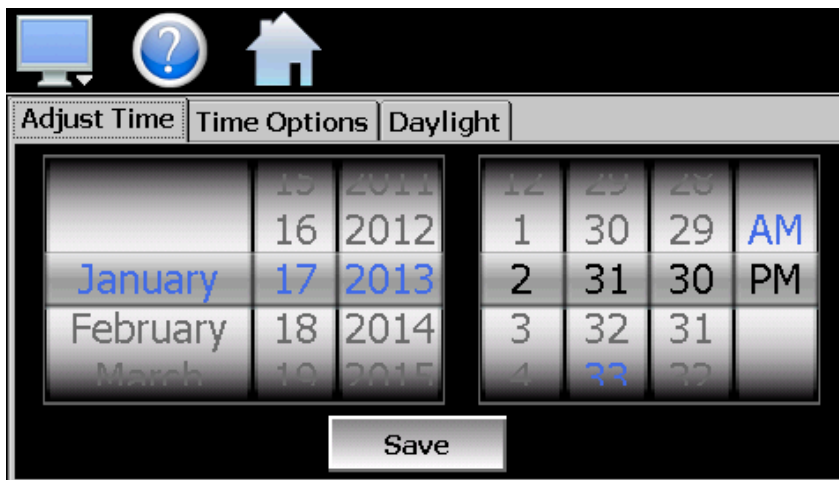
To make adjustments, scroll each time wheel to adjust the month, day, year, hour, minutes, seconds and AM/PM selection. Once all adjustments have been made, press the "Save" button to set the system clock to the date and time entered.

8.2.1   Time Options

Select the "Time Options" tab to configure the time zone and national time server clock settings. If nCompass is connected to the internet, these settings can be used to have nCompass automatically synchronize its time with one of the nationally provided time servers.
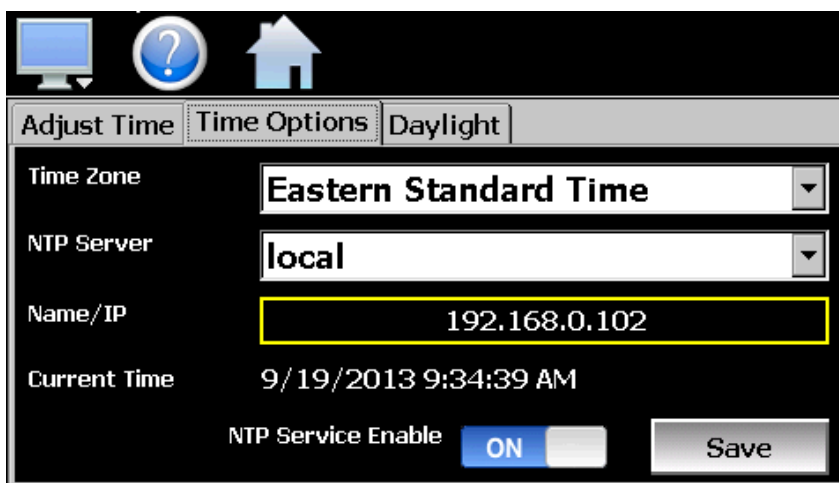
To enable the national time server, select your time zone and which time server you wish to use from the drop down menu selections. Turn on the "NTP Service Enabled" option and press the "Save" button. nCompass will then synchronize its time with the selected national time server at 2:00AM each day.

If nCompass is not connected to the internet, a local alarm message will be shown on the alarm screen; "*NTP Failure. Check cable and server*", to indicate that the time server could not be located.

8.2.1.1   Local Time Server Settings

If an active internet connection is not available, or company policy prohibits internet access, nCompass can be configured to use a local time server instead of one of the national time servers. To configure the use of a local time server, select "local" from the NTP server list. When selected, the "Name/IP" entry field will be shown. The computer name or IP address of the computer running the local timer server on the LAN can then be entered. nCompass will then contact the local computer in order to synchronize time.

NOTE: *The steps required to configure and provide NTP service from a computer on the LAN is outside the scope of this manual. Contact your network administrator for assistance.*

8.2.2   Daylight Savings

Select the "Daylight" tab to configure daylight saving time options. The daylight savings time options allow the user to set the start date and end date for daylight savings time.

If your locale utilizes daylight savings time, set the start and stop dates for daylight savings and turn on the "Daylight Savings Enable" option. Press the "Save" button to store the settings. nCompass will then automatically update its clock for daylight savings time.

NOTE: *If the NTS time server setting is enabled, and the selected time zone uses daylight savings time, daylight savings must be properly configured and enabled or the clock will not show the correct time.*

8.3   Language

The Language screen is used to select the language for all of the online help, menus and most static display fields. Note that the keypad will remain in English, so all user text entry will still be in the English language.

Available language selections include:
- Afrikaans
- Albanian
- Arabic
- Basque
- Belarusian
- Simplified Chinese
- Traditional Chinese
- Czech
- Danish
- Dutch
- English
- Finnish
- French
- German
- Greek
- Hebrew
- Hungarian
- Icelandic
- Italian
- Japanese
- Korean
- Norwegian
- Polish
- Russian
- Spanish
- Swedish
- Turkish

DISCLAIMER: English is the default language for the nCompass control system. All other language selections provided through internet translation of the English language. FDC does not guarantee the accuracy or validity of alternative language selections and shall not be liable for any damages or losses, whether direct, indirect, incidental, special, consequential or any other damages for misinterpretation of other languages. FDC offers a free, PC based application which allows the end user or OEM to create the translation files for the desired language selection. The translation files can then be copied to the nCompass control system in order to provide a more accurate or desired translation for the online help files.

8.4   Offset Calibration

The offset calibration allows the user to apply an offset to each configured probe of the Dixell controller.
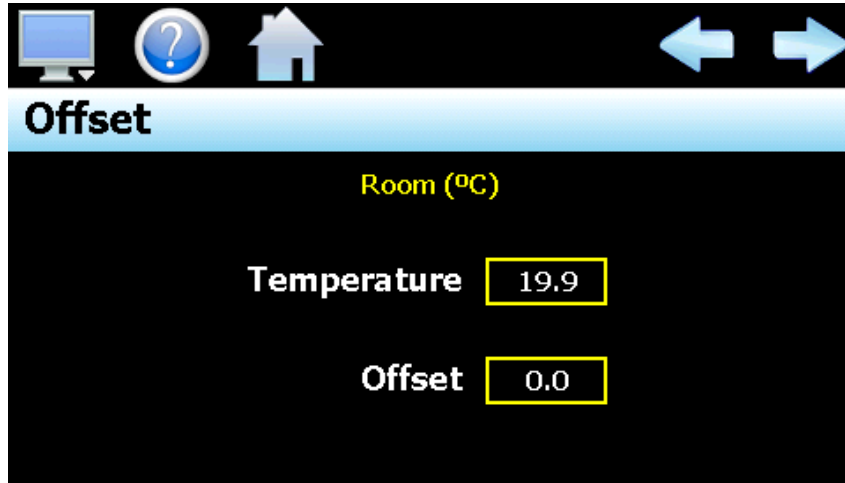
The **left** and **right arrow buttons** allow the user to cycle through each probe. If only the main control probe is installed or the other probes are not configured for indication, the left and right arrow buttons will not be shown. Only probes that are configured for indication on nCompass will be shown.

The temperature field displays the current measured value of the selected probe. To adjust the probe offset, touch the offset field and enter in the desired probe offset via the numeric keypad.

8.5 Display Settings

The Display screen provides access to the touch screen calibration utility, back light settings and alarm volume.
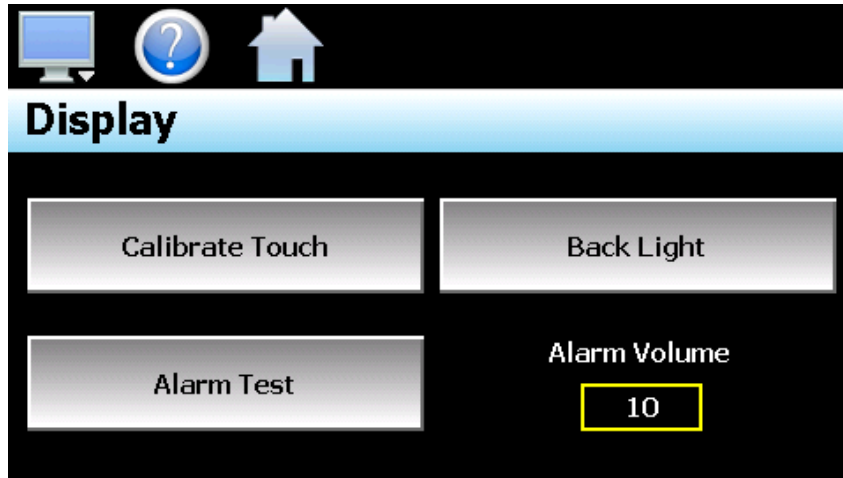
The **Alarm Volume** adjusts how loud the internal alarm buzzer of nCompass will be when activated under an alarm condition. The volume can be set from 0 (off) to 100. To edit the alarm volume, touch the entry field and enter the desired volume level. To test the buzzer, press the "Alarm Test" button.

8.5.1 Calibrate Touch

After extended use and many hours of operation, it may be necessary to recalibrate the touch screen of nCompass. A typical sign that the screen may be out of adjustment, is inaccurate responses when attempting to press buttons, check boxes or adjust fields on the display. The calibration utility is provided in order to readjust the screen when this happens.

To begin the calibration process, press the "Calibrate Touch" button. An alert message will appear stating that the application will be disabled to perform the calibration procedure. Press "Yes" to continue.
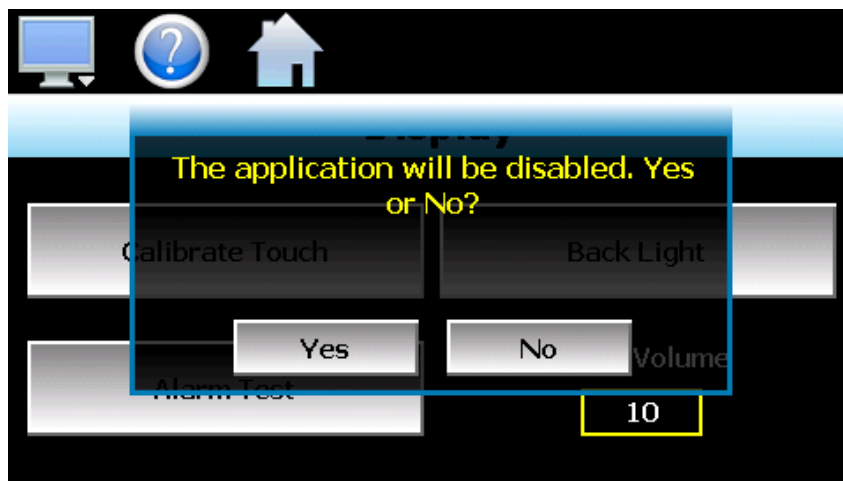
The calibration utility will start and crosshairs will appear on the screen. At each crosshair position, touch the screen at the center of the crosshairs. Repeat this for each position in order to set the calibration. The calibration requires five points, the center and four corners.

NOTE: *It is recommended that you use your finger rather than a stylus when calibrating the screen. The touch response will be more fluid after calibrating it with your finger.*
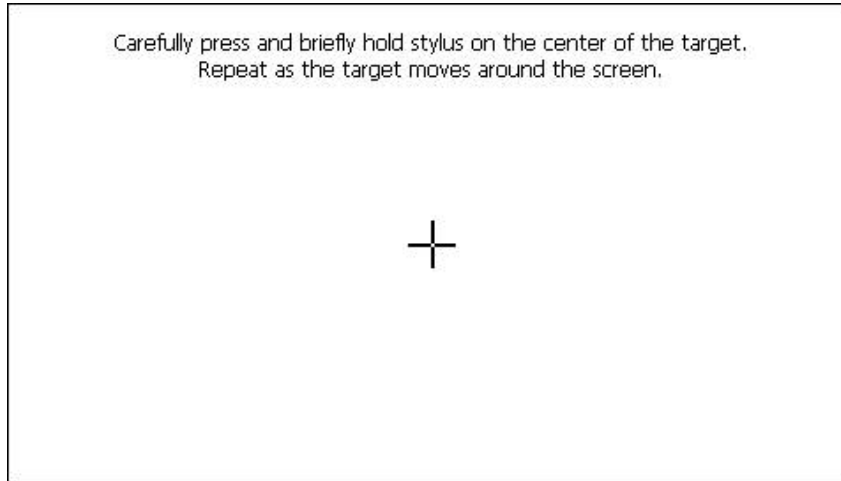
Once complete, the calibration utility will provide a notification message that the new calibration settings have been measured and to touch the screen to register the new calibration data; just touch anywhere on the screen to close the window and return to the nCompass application to resume normal operation.
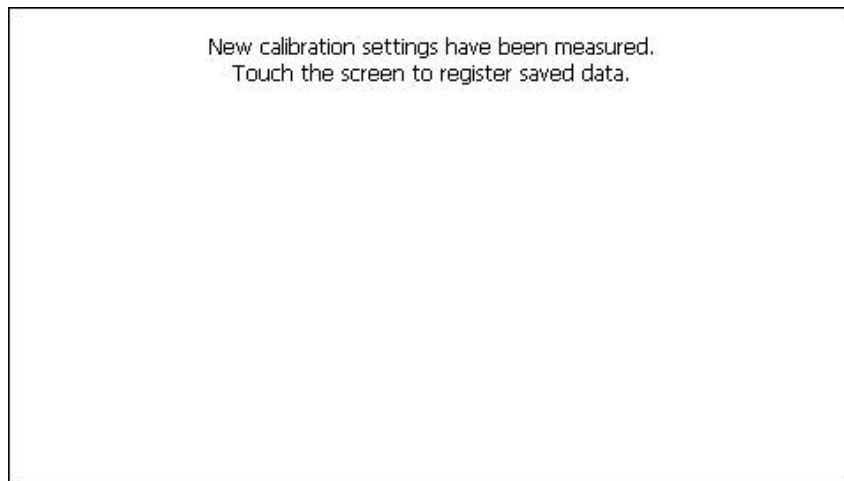
8.5.2   Backlight Settings

The backlight settings allow the user to adjust the screen brightness as well as set a time period for dimming the backlight after a period of inactivity which can extend the life of the display. To adjust the backlight settings press the "Back Light" button. An alert message will appear stating that the application will be disabled to enter the backlight settings, press "Yes" to continue.

Select the "Backlight" tab from on the Display Properties window. Press the "Advanced…" button to access the settings for the backlight.

NOTE: *The checkboxes on the Backlight tab for "Automatically turn off backlight while on battery power" and "Automatically turn off backlight while on external power" have no affect on backlight operation and should be left unchecked.*
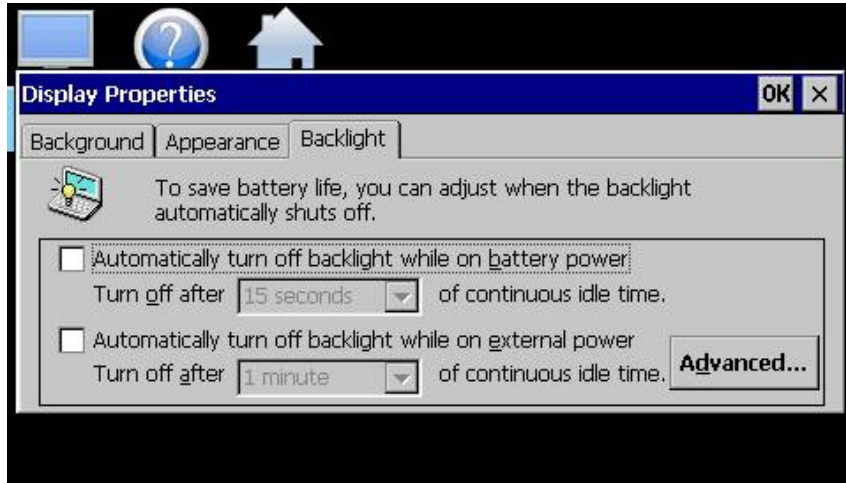
The brightness of the display during operation is set by adjusting the "ON" slider. The default setting is 100. The "OFF" slider is used to adjust the brightness of the display during periods of inactivity. The default setting is 10. Note that a setting of zero (0) does not completely turn off the backlight.
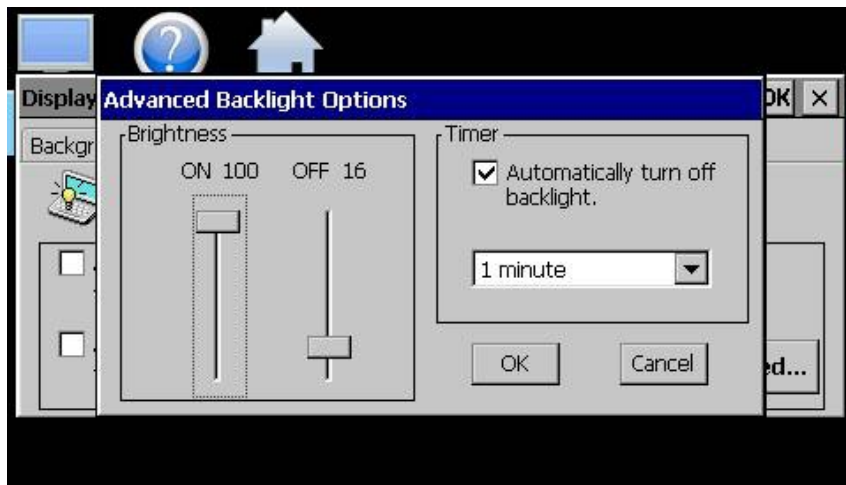
To enable the backlight dimming function, place a check in the "Automatically turn off backlight." checkbox and set the delay time using the drop down selection box. The delay time can be set at fixed intervals from as little as 15 seconds to as long as 30 minutes.

Once all settings are complete, press the "OK" button and then press the "OK" button at the top right of the "Display Properties" window to return to the nCompass application and begin normal operation.

8.6   Configuration

The Configuration utility allows the user to back up the entire configuration of nCompass including the user parameters of the Dixell controller and save it to a file for "safe keeping" in case of system damage due to a lightning strike, etc. The utility also allows nCompass to be configured with a push of a button by selecting from a list of preconfigured setups that could be created and saved on a USB memory device, for loading a configuration to a new nCompass system.
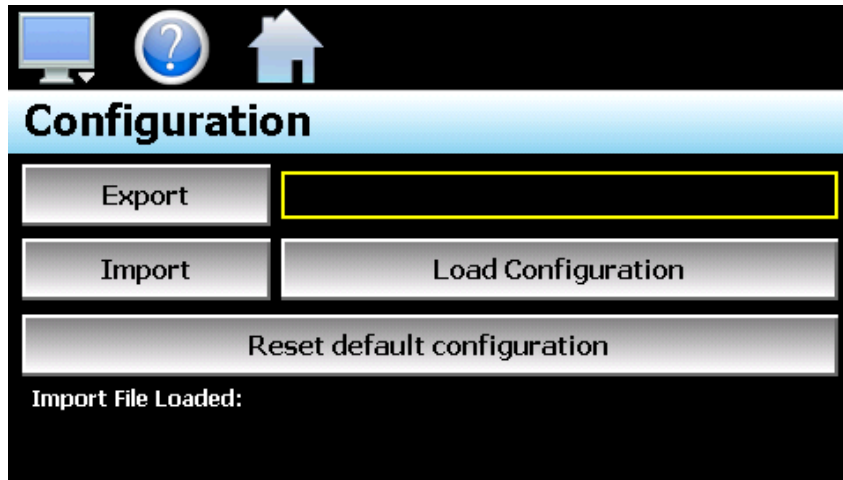
When the **Export** button is pressed, the nCompass configuration data and user parameters of the Dixell controller will be written to the USB memory device. The export file function will use the name entered in the text field to the right of the export button and create a directory on the memory stick with that name, to contain the configuration data.   The filename can be entered with up to 10 characters which permits multiple configurations to be identified and saved for later retrieval.

The export file will be saved with a name format of "cfg_*filename*_mm_dd_yy_hh_mm_ss" to identify the configuration according to the date and time it was created. This prevents multiple configuration files with the same name from overwriting previous files. It also allows the user to identify a backup of nCompass so that it could be reconfigured to a previous date if multiple back-ups are created.

The **Import** button is used to write the configuration data to nCompass and the user parameters of the Dixell controller from the currently loaded file. To load a configuration file, the USB memory device must first be inserted into the USB port. When the **Load Configuration** button is pressed, a list of available configuration files from the memory stick will be shown. Select the desired file from the list and press "Open" to load the file.

Once the file is loaded, the import process can begin. Pressing the "Import" button will begin the process. When the import is complete, you must cycle power to nCompass in order for the new configuration data to be loaded into runtime memory for proper operation.

The **Reset default configuration** button can be used to reset the nCompass configuration back to default values. This does not alter the user parameters of the Dixell controller. This function is provided as a means to start over in the event that the system configuration (security rights, menus, startup functions) has been altered to an unknown state and is not operating properly, and a known good configuration is not available to import. Rather than go through every setting of every feature to try and determine where the configuration error exists, this allows nCompass to be cleared so that it can be reconfigured from a clean slate.

IMPORTANT: *The configuration functions do not affect the VNC server configuration. The enable state, VNC address, device name and password fields must be manually changed as these settings are specific to each device and must be set independently for proper VNC server operation over a network.*

When nCompass exports the user parameters to the configuration file, it also records the model number and firmware version of the controller. When selecting a configuration file to load, if the model number and firmware version recorded in the file do not match the control currently connected to nCompass, the load will fail and the message "Config file is corrupted or damaged" will be shown. Be sure to select files compatible with the current model of control connected to nCompass.

8.7   About nCompass

The "About" nCompass screen provides operating system version numbers for the currently installed firmware and program of both the nCompass HMI and Dixell controller. This information should be recorded prior to any service request so that proper assistance can be provided for your control model.

8.8   Exit Application

The "Exit" Application screen allows the user to quit the nCompass runtime software and return to the CE.Net operating system. This operation is NOT recommended with the exception of users who are in charge of system configuration due to the danger of editing or removing files by accident.
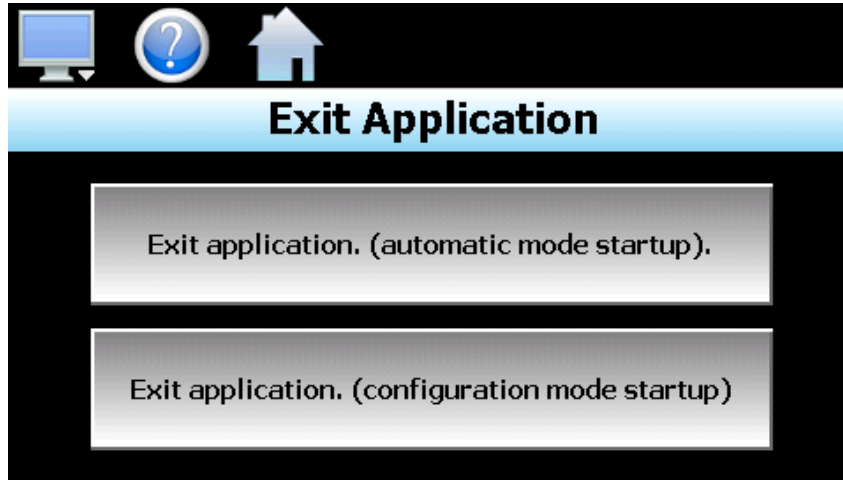
The **automatic mode startup** option will return nCompass to normal operation on the next power up.

The configuration mode startup option will start the nCompass configurator program on the next power up so that the user can access control loop and nCompass runtime settings.

9   Communications

This section provides instructions on how to use the nCompass communication interfaces. As a standard, nCompass is equipped with both an Ethernet interface and an RS232 serial interface for user communications.

9.1   Ethernet Communications

nCompass provides two forms of Ethernet communication interfaces for monitoring and controlling the system across a network. The web server interface provides a monitor only connection, while the VNC server interface allows a user to manipulate and control the nCompass remotely by viewing the nCompass display directly on their PC screen.

NOTE: *In order to use Ethernet communications, nCompass must be properly connected to a network. To connect nCompass to a network, connect the touch screen's Ethernet port to your network using a standard CAT5 cable connection. Note that after connecting the network cable, it may be necessary to cycle power to nCompass in order for it to obtain a valid IP address.*

9.1.1   Guide to Smart Networking Practices

The expansion of Ethernet onto the industrial floor has brought forth a new realm of possibilities from the gathering of information to the inherent control of equipment from anywhere around the world. The flexibility and convenience that this provides makes it a very desirable feature for new equipment. nCompass provides this ability, but there are considerations that must be taken by the end user to protect their equipment and investment.

Just like placing a personal computer on the internet opens it up to outside attack, placing your nCompass on a network poses the same risk. The first thing to remember is this: The most likely cause of problems is not a hacker trying to sabotage your equipment, but more often to be related to the ubiquity of PCs with Ethernet cards, the ease with which your own co-workers can 'hang stuff on the network,' and careless or nonexistent internal security measures. Accidental problems are more common than deliberate ones.

Allowing anyone access to nCompass by placing it on the office LAN, also opens the door for accidental shutdown, damage to equipment, loss of data, lost time, etc. This is possible even by the most well-intentioned co-workers. Thus, there are several steps that should be taken to minimize this risk.

The first is to never mix your office LAN with your control LAN. The control LAN should be a separate network that consists of your nCompass controller(s) and possibly any other equipment that you may have that is related to the operation of the system. It should be separated from your office LAN by a firewall, or at minimum, a bridge or router. A control network and a business network have two entirely different purposes and their interaction should be closely controlled.

It is also unwise to assume that any Ethernet capable devices themselves have any security features at all. The nCompass VNC server only provides minimal single-password based security access. Separating the control LAN from the office LAN using a firewall would increase security and only allow control access that is based on a combination of IP source address, destination address, and port number. This is by no means completely 'hacker-proof,' but it should keep the well-meaning co-workers out.

Another hazard is connecting consumer 'plug and play' devices to your control LAN. A printer for example, might flood the network with traffic in a 'broadcast storm' as it tries to self-configure or advertise its presence to all nodes on the network. Faulty devices, for example defective NIC cards, can transmit large amounts of bad packets (i.e., runts, which are abnormally short Ethernet frames) into your network. Using switches instead of hubs will limit the effect of such problems.

The most commonly overlooked source of problems is cabling. Not all cables are created equal. Electrical noise generated by factory equipment or other electrical equipment in the area, could easily corrupt transmitted data over the network and cause devices to 'lock up' or shut down the VNC server, both of which then require nCompass to be shut down and restarted to clear the problem.

Select the right cable for the environment. Shielded twisted pair (STP) cable is naturally more noise immune and is preferable to unshielded twisted pair or UTP in noisy situations. STP should have at least 40dB CMRR and less than 0.1pF capacitance unbalance per foot. Ground STP cable, making sure the ground is connected only at one end. CAT5 STP patch panels normally provide a grounding strip or bar. Hubs and switches don't provide grounding, use cables.

It's wise to be pessimistic about a cable's ability to reject noise from 230 VAC and 460 VAC power lines and electrically 'noisy' equipment in the area. Capacitance imbalance in cables greater than 70pF per 100m can introduce harmonic distortion, resulting in bit errors. The cost of cable is quite small compared to total equipment cost, so if you're looking to save money, this is not a place to do it. Choose a well designed cable to minimize bit-error rate after installation, and that will give faster throughput with fewer glitches.

9.1.2   Configuring the nCompass Network

In order to connect to the VNC server or web server of nCompass, you will need to know the IP address of nCompass on the network. It is important to note that if using DHCP in your network router, the nCompass address may change on re-power requiring you to access the nCompass controller directly in order to obtain the new IP address. This could result in VNC/web server connection issues if the address regularly changes.

Therefore, it is recommended that the IP address for nCompass be assigned as a fixed (static) address. This insures that the address will not change once it has been set. This can be done in one of two ways. The first is by setting up the control LAN router to assign the same IP address whenever it detects the nCompass device on the network via its own identifier; it's MAC address.

The other option is to configure nCompass to use a fixed IP address and disable the DHCP addressing function of its network interface. When using this method, it is important to make sure that the address being assigned to nCompass is not used by any other device on the network. If another device is using the same address, the VNC and web server interfaces will not function correctly. It is recommended that this method of static IP assignment be used as it removes the IP address lease renewal process that would be performed by the control LAN router if DHCP was used.

The lease renewal process performed by the control LAN router can cause the VNC server in nCompass to shut down due to an issue in the renewal process. It could be caused by something in the router firmware or configuration of the router itself. Due to the numerous brands and models of routers available, and the dynamic nature of their use, attempting to resolve the issue is beyond the scope of this manual. Therefore, the use of static IP addressing removes this from the equation, providing the most robust network solution.

9.1.2.1   *Obtaining the nCompass' MAC Address*

The MAC address can be obtained from the network connections screen. In order to access the screen, you must exit the nCompass application. To do so, proceed to the 'Exit Application' screen under the offline setup menu. Press the 'Exit and start runtime on next power up' button to exit the nCompass runtime application. Follow the on screen prompts to stop the application and exit to the Windows CE desktop.

NOTE: The text, "System Startup Please Wait…" on the desktop is static and does not indicate that any application is going to start at this time. It is used as a "placeholder" prior to the nCompass runtime or configuration application starting during normal power-up sequences so that the user is informed that an action is taking place.

From the desktop, touch the narrow, gray bar at the bottom of the screen to show the taskbar.

Network Icon

Next, 'double-click' on the network connections icon to open the network connection information window. Two tabs will be provided; one for IP Information and the other for IPv6 Information. To obtain the MAC address, press the 'Details...' button on the IP information tab.
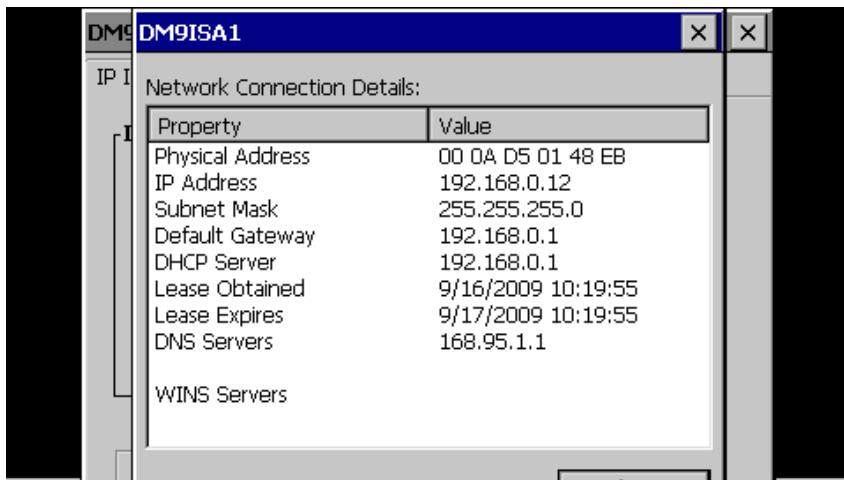
The MAC address is displayed as the first item (Physical Address). Once the address has been recorded, close the network information windows and cycle power to nCompass in order to restart the system and return to normal operation.

9.1.2.2   Setting a Static IP Address

In order to set a static IP address for nCompass on a network, it requires you to exit the nCompass application and enter the 'Network and Dial-up Connections' settings of the CE operating system.

IMPORTANT: *It is recommended that only personnel charged with configuring and maintaining nCompass perform this procedure. Do not alter, change or delete any other files or settings of the system. Doing so may render nCompass inoperable.*

To begin, you must exit the nCompass application. To do so, proceed to the 'Exit Application' screen under the offline setup menu. Press the 'Exit and start runtime on next power up' button to exit the nCompass runtime application. Follow the on screen prompts to stop the application and exit to the Windows CE desktop.

From the desktop, touch the narrow, gray bar at the bottom of the screen to show the taskbar. Before proceeding any further, enable the CE keyboard so that it will be available to enter in the IP address. If you do not enable it now, you will not be able to access the taskbar later once in the Ethernet Drivers screen.
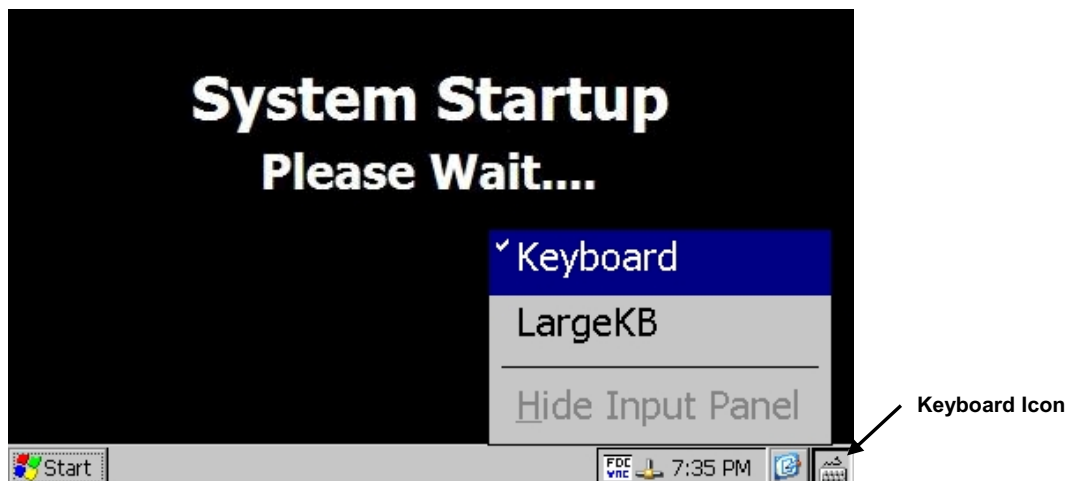
To enable the keyboard, touch the keyboard icon at the lower right of the taskbar and select 'Keyboard' from the menu. This will make the keypad visible. Next, press the Windows Start button and select 'Settings' and then 'Network and Dial-up Connections' to show the connections window.
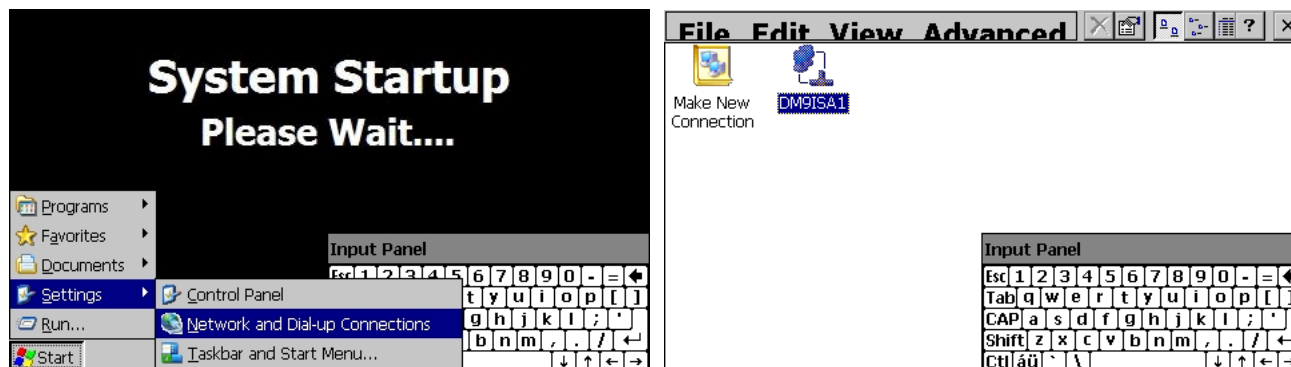
From the 'Connection' window, select the current network connection by 'double-tapping' the connection icon to enter its property window. DO NOT create a new connection. The 'Ethernet Drivers' property window will allow you to set the IP address as well as name primary and secondary DNS and WINS servers from the 'Name Servers' tab if necessary. Select 'Specify an IP address' and enter in the desired IP address, subnet mask and default gateway.

You can move the keyboard around on the screen to position it as necessary to access the different fields. Once complete, close the 'Ethernet Drivers' window by pressing the 'OK' button located at the top right of the window. Next, close the Connection window by pressing the 'X' button at the top right of the window.
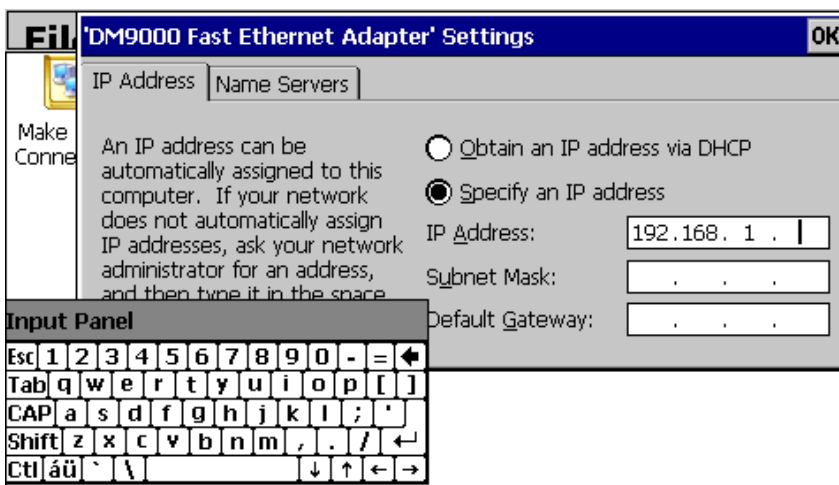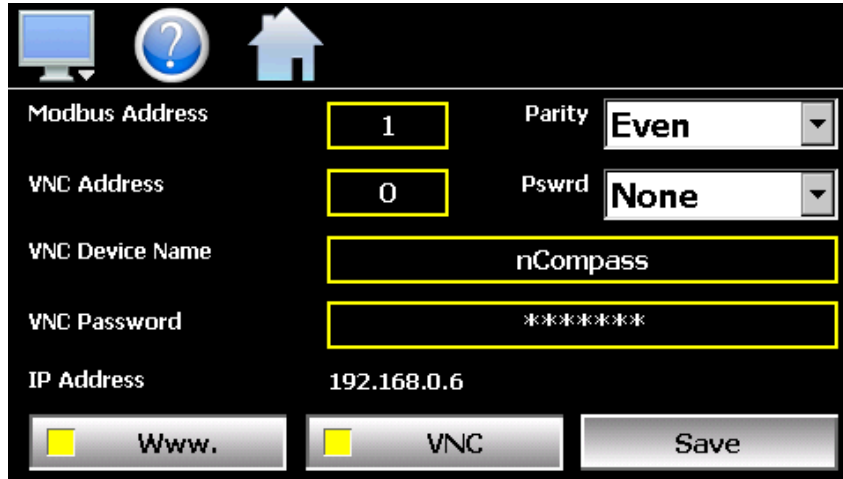
Access the taskbar and hide the keyboard by pressing the keyboard button at the bottom right of the taskbar and select 'Hide Input Panel'. DO NOT cycle power to nCompass at this time. Wait approximately 2 minutes before removing power. This provides time to allow the Windows CE operating system to save the new network settings to the registry so that it uses the settings on the next reboot. If power is cycled too soon, the network settings will revert back to the previous settings on the next power up. Once the 2 minute time period has elapsed since updating the network settings, cycle power to nCompass in order to restart the system and return to normal operation with the new network settings.

NOTE: The text, "System Startup Please Wait…" on the desktop is static and does not indicate that any application is going to start at this time. It is used as a "placeholder" prior to the nCompass runtime or configuration application starting during normal power-up sequences so that the user is informed that an action is taking place.

9.1.3   Using the Web Server

The nCompass web server allows a user to remotely monitor operations anywhere via a PC's standard web browser. When enabled, the web server provides a detailed status page of the current operating conditions. The web server can be enabled and disabled by pressing the 'Web Server' button on the communications screen under the 'Comms' setup menu.

You must use the assigned IP address to access nCompass. The IP address is shown on the communications screen and is also included in the notifications list. Write down the IP address so you will have it later to enter into your web browser.

NOTE: *Contact your network administrator prior to enabling the web server of nCompass. Company policy may prohibit the use of web servers for security reasons. Future Design is not responsible for the use of, nor makes any claims as to the security of the web server interface over your network. The use of the web server is the responsibility of the end user.*

To access and view the nCompass web page, enter the following link in your PC's browser address window: http://"IPaddress"/orion.html   From the example address shown on the screen above, then entry would be: http://192.168.0.6/orion.html. The following example is typical of the nCompass web page appearance. The web page updates automatically every 30 seconds and provides information on probe configured for indication, function status and alarm status.

Untitled Document - Internet Explorer, optimized for Bing and MSN

http://192.168.0.6/orion.html   Google

Favorites   Untitled Document   Page ▾ Safety ▾ Tools ▾

FUTURE DESIGN CONTROLS - nCompass-DX

BRIDGEVIEW, IL - 888-751-5444

TEMPERATURE DATA

Room	PV = 20.5C	SP = 4.4C
Evaporator	PV = 20.5C	-
Condenser	PV = 20.5C	-

CONTROL STATUS

Controller	On
Defrost	Off
Continuous Cycle	Off
Energy Saving	Off
Light	Off
Fan	Off
Compressor	On

SYSTEM ALARMS

Done   Internet   100%

9.1.4 Using the VNC Server

The nCompass VNC server allows a user to remotely monitor and control nCompass by directly viewing and manipulating the touch screen over the network. You must use the assigned IP address and VNC port number to access nCompass. The IP address is shown on the communications screen and is also included in the notifications list. Write down the IP address and port number so you will have it to enter into your VNC viewer.

There are many VNC viewers available for both PC and tablet use. Due to the ever changing market and availability of such applications, it is not possible to test them all for compatibility or provide assistance for their use with nCompass. It is the responsibility of the end user to test the chosen VNC client for compatibility with nCompass prior to putting the unit into service. If the VNC client viewer has compatibility issues with nCompass, it can cause the VNC server to stop responding and/or shut down requiring power to be cycled to nCompass in order to reboot the system and restart the server.

Future Design Controls has tested and recommends the use of RealVNC's viewer. It has been tested for compatibility with nCompass and a free version can be obtained from http://www.realvnc.com/ for PC/MAC use. RealVNC does offer a version for the iPad that can be obtained through the App Store for a small fee. The App Store also offers a free VNC client called Remotix for the iPad. It has also been tested for compatibility with nCompass.

NOTE: *Contact your network administrator prior to enabling the VNC server of nCompass. Company policy may prohibit the use of VNC servers and/or viewers for security reasons. Future Design is not responsible for the use of, nor makes any claims as to the security of the VNC server interface over your network. The use of the VNC server is the responsibility of the end user.*

9.1.4.1 Recommended VNC Viewer Settings (PC/MAC)

This section applies to setup of the recommended RealVNC viewer for PC/MAC. These settings have been tested and evaluated in order to provide the best performance and quickest response to user input when using the VNC viewer with nCompass. After installing the VNC viewer software, it is recommended that the following changes be made to the default viewer settings.

To begin, start the VNC viewer. Click on the 'Options' button in order to open the 'VNC Viewer - Options' window.
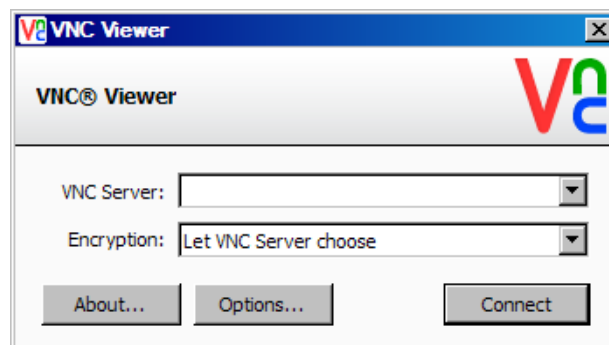
Click on the 'Advanced' button at the bottom left of the window in order to show the advanced setup options. On the 'Display' tab, make sure the scaling is set to 'No scaling' and the checkbox for 'Adapt to network speed (recommended)' is checked.
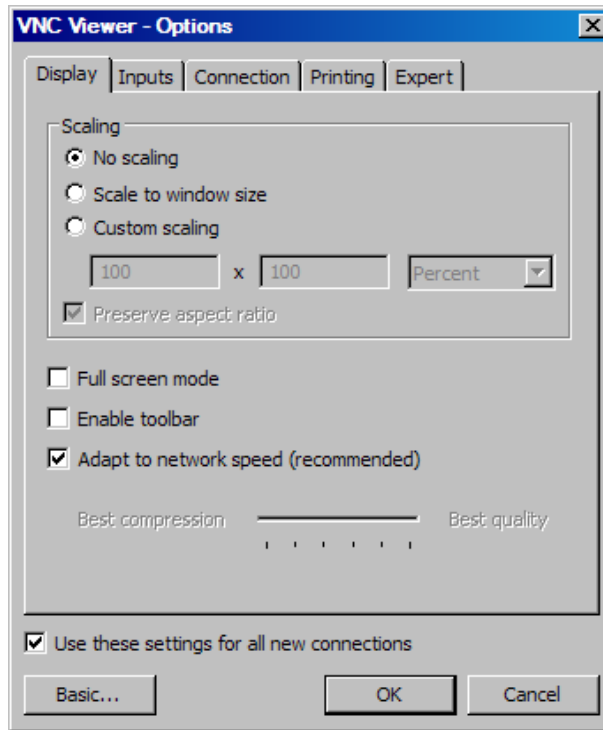
Next, select the 'Inputs' tab and deselect all entries except for 'Enable mouse input' and 'Rate-limit mouse move events'. The 'Inputs:' drop down selection box will automatically change to 'Custom' when the settings are made.
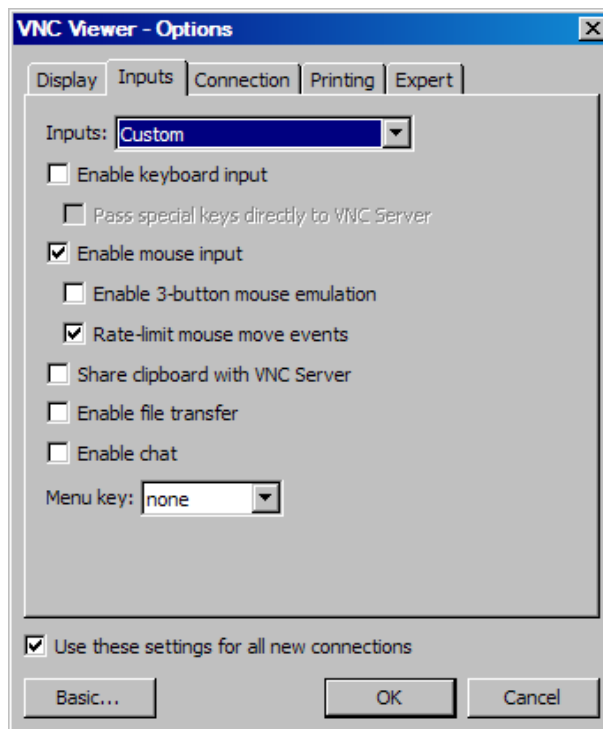
Proceed to the 'Expert' tab. Scroll down the list of settings until you find the 'PreferredEncoding' and 'Protocol3.3' options. Set the preferred encoding to Hextile and the Protocol 3.3 option to true. Verify that the 'Use these settings for all new connections' checkbox at the bottom of the window is checked and click the OK button. This will set the selections to the default start settings for the VNC viewer.
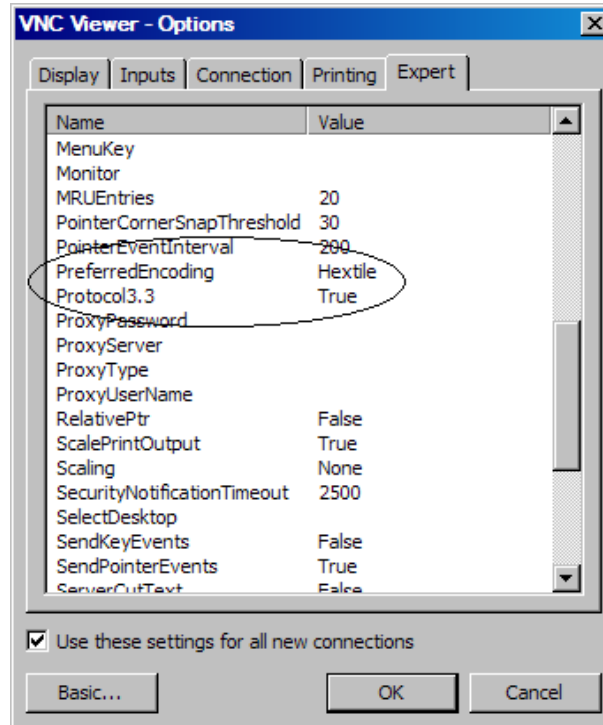
9.1.4.2 Recommended VNC Viewer Settings for Tablets

The VNC clients for tablets have been found to offer limited flexibility for use with nCompass. Most clients have default settings requiring security to be enabled on the server in order to connect. If you have trouble connecting with a VNC viewer through an iPad, iPhone or even an Android based phone, start by enabling the security on the nCompass VNC server and be sure to enter those settings in the client viewer.

Color and encoding options can also affect the connectivity. If the client offers the option, leave color and encoding options to 'automatically detect' or 'server decides'. If the client is still unable to connect, try default encoding of Hextile and set the color option to limited colors such as 256 bit color. Future Design Controls does not write or create VNC clients (3rd party software), so final selection of client and testing is the end user responsibility. The following settings are provided as an example for the Remotix client for the iPad. When adding an nCompass server to the Remotix client, use the following settings. Note that the VNC server in nCompass must have security enabled in order for this client to connect.

```
Connection Type:       VNC
Host/IP:               IP address of nCompass
Port:                  VNC address of nCompass (5900 = 0, 5901 = 1, etc…)
Use SSH Tunnel:        Off
VNC Authentication:    VNC Password
VNC Password:          VNC password of nCompass
VNC Server Type:       AutoDetect
Operating System:      Windows
Preferred Encodings:   Hextile
Color Depth:           16 bits
```

9.1.4.3   Accessing nCompass through a VNC Viewer

The following examples are based on the use of the RealVNC viewer for PC/MAC. Once the default settings have been entered, just enter the IP address and port number for nCompass, and click the 'Connect' button to access nCompass over the network.

Intranet Example: If the IP address assigned is 192.168.3.5 and the configured VNC Address is 1, from the PC's VNC Viewer address field, enter '192.168.3.5:1' to access the device (address 1 relates to port 5901, address 2 to port 5902, etc., which is the port opened by the VNC interface in order to allow communications with nCompass over the network).
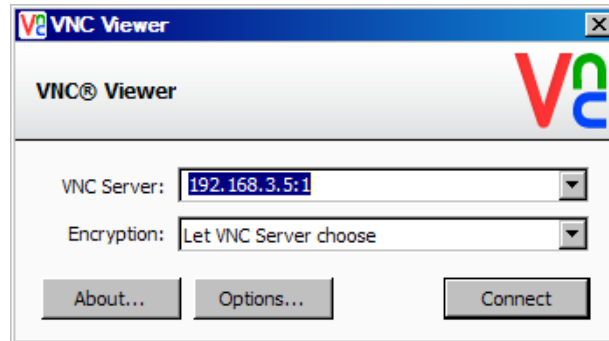
Internet Example: Internet connection typically requires a qualified network System Administrator. Typically a permanent IP address and specific port address are assigned to nCompass; support on this action is beyond the scope of this guide. *Consult your network system administrator for assistance in setting up an Internet connection.*

If the IP address of the LAN is 69.216.64.69 and the configured VNC Address is 1 (port 5901 has been opened and assigned to this specific nCompass controller), from the remote PC (outside of the site Servers LAN), in the VNC Viewer address field enter '69.216.64.69::5901' to access the device (5901 relates to address 1, 5902 to address 2, 5903 to address 3, etc., note the double colon).
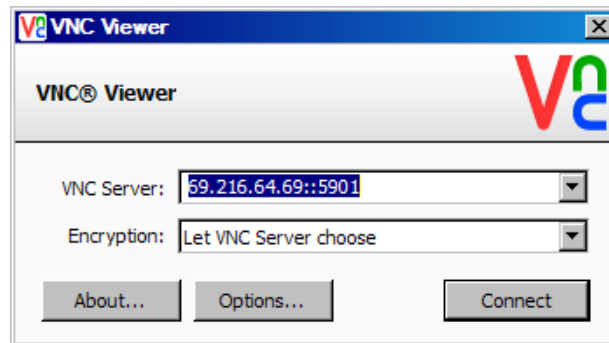
NOTE: The IP address shown on the communications screen of nCompass is the LAN address and would not typically be used for an Internet connection.

Security Example: If the VNC server password is enabled on nCompass, for either example above, upon pressing the 'Connect' button to make the connection, the VNC viewer will prompt for the proper password. The connection will only be established once the valid password is entered.
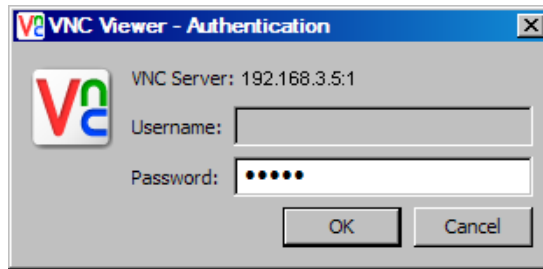
Once the connection is established, the current nCompass display will be shown on your desktop. The image will be a duplicate of what is on the nCompass. As you manipulate the screen, the display of nCompass will also be manipulated so that any local operator will be able to see what is happening and vice versa.
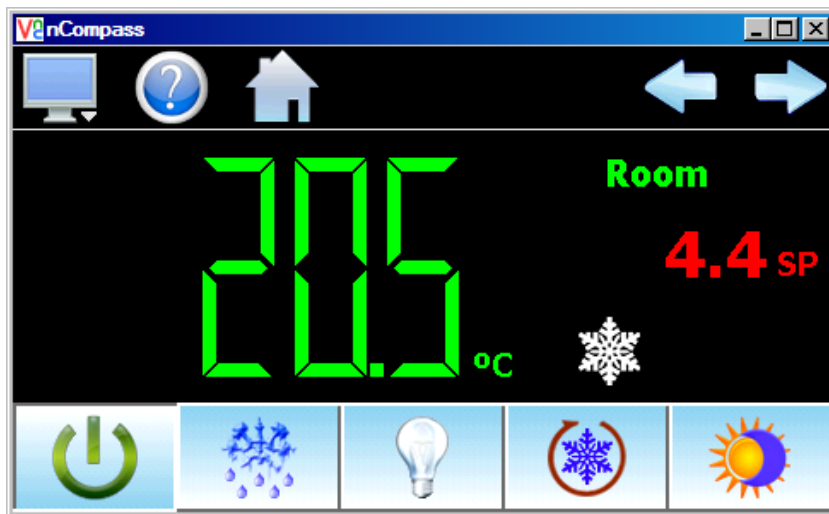
Multiple instances of the VNC viewer can be started on your PC. By running multiple viewers, you can have access to multiple nCompass controllers right from your desktop. The heading of each VNC viewer window will use the 'VNC Device Name' entry for the header. By entering a unique name for each nCompass, you can identify each VNC connection and know which system you are accessing.
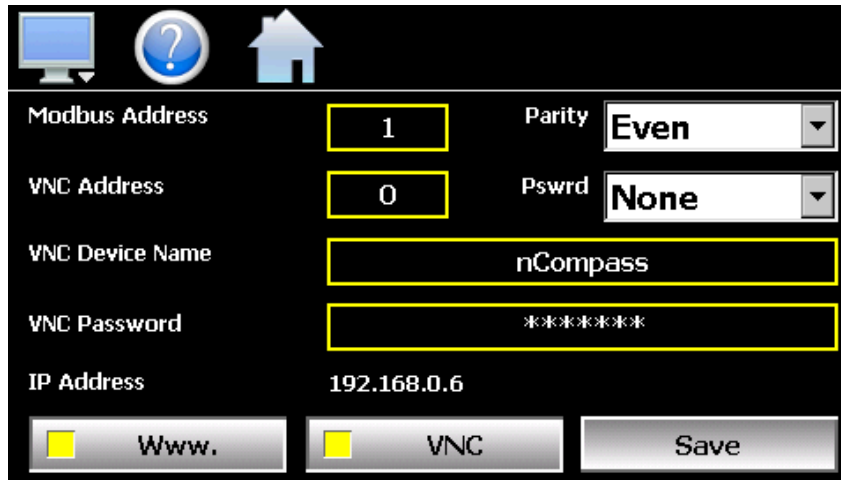
The VNC viewer is meant to be used for short term control access to nCompass. It is not meant for long term monitoring of system operation. If long term monitoring access is desired, use the built-in web server of nCompass or a PC with FDC software to monitor and control nCompass over its serial communications port. The web server interface and PC software is designed for long term monitoring and status updates.

Due to the nature of VNC operation, and for security reasons, the VNC viewer connection should not be left open on your desktop. The viewer connection should be opened in order to perform the necessary control and/or status check of system operation, and then closed once the task is complete. Accidental manipulation of the control or erroneous network activity could cause connection problems over the VNC interface and result in the VNC server shutting down and requiring nCompass to be restarted in order to regain access.

NOTE: *Some viewers may also contain additional features for file transfer and other high level functions. These functions are NOT compatible with nCompass. Any attempt to use them may cause the nCompass VNC server to malfunction and require power to be cycled in order to reboot the system. All viewers should be used ONLY to monitor and manipulate nCompass as if you were standing directly in front of it.*

9.2   Serial Communications Option

The nCompass serial interface uses Modbus RTU protocol. Any device used to communicate with nCompass over the serial interface must use this protocol. The interface can be configured to operate in either standard nCompass DX mode or a pass-through Dixell controller communications mode.

When configured for the standard nCompass DX interface, the communication address and parity can be set on the Web/Modbus/VNC. All other communication settings are fixed. The port settings of the device used to communicate with nCompass must be set to match in order for the communications to take place.

Address: 1-31 (user selectable)
Baud Rate: 9600
Data Bits: 8
Stop Bits: 1
Parity: None, Odd, Even (user selectable)

When configured with the Dixell pass-through interface, only the communications address can be set. The parity setting is hidden and defaulted to "None" in order to be compatible with Dixell software or other devices used to communicate with a Dixell Prime CX controller. The port settings of the device used to communicate with nCompass must be set to match the standard Dixell controller settings as follows:

Address: 1-31 (user selectable)
Baud Rate: 9600
Data Bits: 8
Stop Bits: 1
Parity: None

IMPORTANT: *See the nCompass DX i4.3 User Communications Reference Manual for details on using nCompass communications interface.*

The Modbus address is used to identify nCompass on the serial link. When a multi-drop connection is used, each controller on the link must have a different address so that each one can be identified separately. If two or more nCompass controllers have duplicate addresses, communications with those controllers will fail because they will each try to respond to the same message. For single nCompass connections, the address only needs to match that of the commands being sent from the host device.

10 Alarm Codes and Troubleshooting

This section provides explanations of standard nCompass alarms to help in diagnosing and resolving the alarm conditions. If you are unable to diagnose a problem through the use of this guide, contact your OEM for further assistance.

Some of the troubleshooting procedures may require access to live circuitry. Dangerous accidental contact with line voltage may be possible. Only qualified service personnel should be allowed to perform these procedures.

Alarm Monitor Description	Explanation/Corrective Action
"*tagname*" High Temperature	Indicates that the high alarm condition has been met for the alarm assigned to the probe indicated by "*tagname*". Check alarm set point and system for proper operation.
"*tagname*" Low Temperature	Indicates that the low alarm condition has been met for the alarm assigned to the probe indicated by "*tagname*". Check alarm set point and system for proper operation.
Fault Probe # ("*tagname*")	Indicates a probe failure for the probe # shown. Check the probe and its connection to the Dixell controller. Replace probe/correct wiring as necessary.
Fault EEPROM	Indicates a Dixell controller failure. Consult Dixell service/factory representative for return/repair.
Door Open	Indicates door open to storage room. Close door/check door switch/wiring. *Note: Alarm can occur only when Dixell controller has the digital input configured as a door alarm (parameter i1F = dor).*
Digital Input	Indicates digital input activation. Consult OEM documentation for cause/remedy. *Note: Alarm can occur only when Dixell has the digital input configured as a generic alarm (parameter i1F = EAL).*
Pressure Switch. Power off and on to reset.	Indicates compressor pressure switch exceeded allowed on/off count. Regulation stopped. Cycle power off/on to reset. *Note: Alarm can occur only when Dixell controller has the digital input configured for pressure switch operation (parameter i1F = PAL).*
Digital Input. Outputs off.	Indicates serious input alarm. Outputs off. Consult OEM documentation for cause/remedy. *Note: Alarm can occur only when Dixell controller has the digital input configured as a serious alarm (parameter i1F = bAL).*

Alarm Monitor Description	Explanation/Corrective Action
Communications write error. Check communication cable.	User entry unable to be sent to Dixell controller. Check communication wiring between COM2 of the nCompass touch screen and the Dixell control. Verify that the controller is set to the proper communications address of 1.
Communications read error. Check communication cable.	Unable to read data from the Dixell controller. Check communication wiring between COM2 of the nCompass touch screen and the Dixell control. Verify that the controller is set to the proper communications address of 1.
Email Error! Check cable or server down.	Indicates that nCompass was unable to send an alarm message through the mail server. Verify that nCompass is properly connected to the network and that the email settings and addresses are valid.
FTP! Check cable or server down.	Indicates that the FTP back-up attempt of the data files failed. Verify that nCompass is properly connected to the network and that the FTP settings are valid. *Note: If nCompass is not connected to a network, disable the FTP data back-up to prevent seeing this alarm.*
NTP Failure. Check cable and server.	Indicates that nCompass was unable to synchronize its clock with the selected national time server. Verify that nCompass is properly connected to the network and the selected time server is accessible. *Note: If nCompass is not connected to a network, disable the NTS clock to prevent seeing this alarm.*

11 nCompass Configurator

The nCompass configurator is a separate software program that provides the user with tools to customize the appearance of the nCompass runtime software. It is typically used by an OEM to set up control system options for their equipment. The configurator program will not run at the same time as the main runtime software.

The configurator is accessed by exiting the runtime software via the "Exit application. (configuration mode startup" button is pressed on the offline exit application screen. The next time the unit is re-powered the configurator will run.
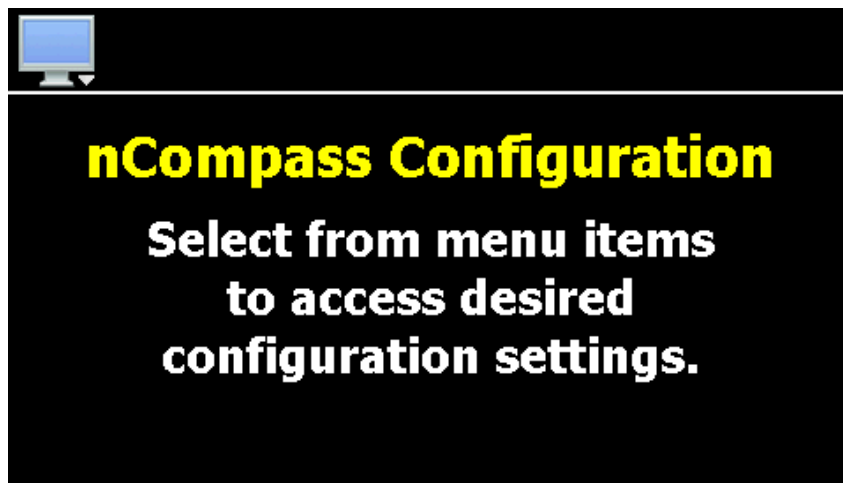
Configurator Startup Screen

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 display name and enable/disable indication for each probe of the Dixell controller.
- Select the type of user communications for Modbus Slave interface.
- 'Splash Screen' name editing for custom OEM or user requirements.
- Enable/disable options for runtime menu and screen availability.
- Set the default screen that is shown when the runtime application first starts.

11.1 Configurator Menu

The configurator menu is accessed by pressing the "Monitor" icon at the top left of the screen.
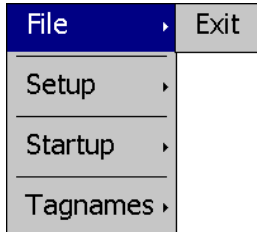
The **File** menu provides the exit function for the configurator. After selecting this menu item and exiting the configurator, the controller runtime software will run after the unit is re-powered.
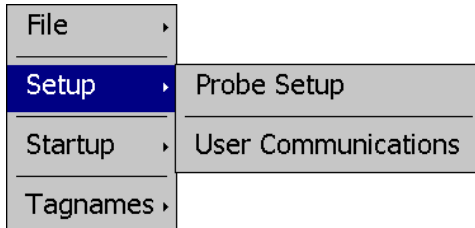
The **Setup** menu provides access to the probe setup and user communications selection.
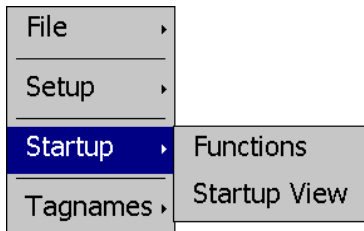
The **Startup** menu provides access to enable and disable nCompass runtime screens/menus and the desired startup view selection.
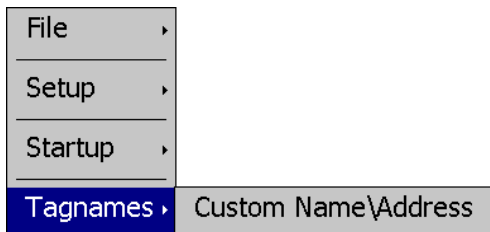
The **Tagnames** menu provides access to edit the splash screen information that is shown when the runtime application starts, and is also shown on the "About" screen.
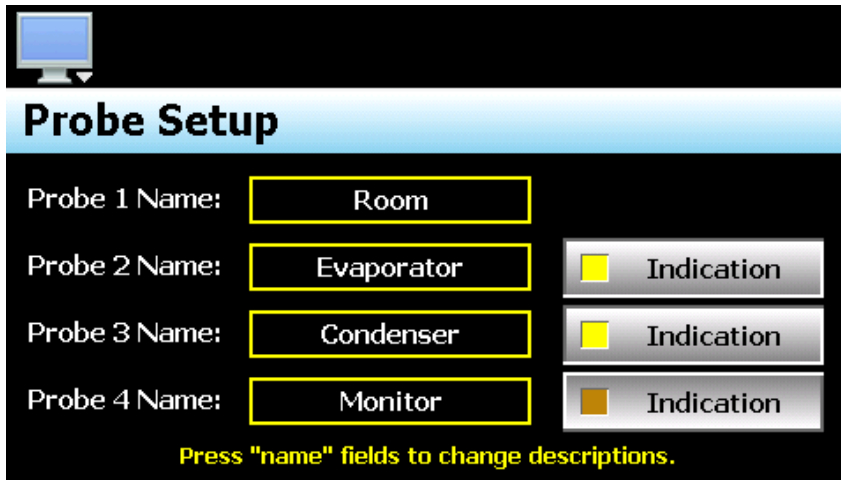
11.2 Configuring nCompass

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 appear as desired when entering the runtime application.*

11.2.1 Probes

The Probe Setup screen is accessed from the configurator Setup menu. It provides fields for entering a display name for each probe as well as buttons for enable/disable indication of optional probes 2, 3 and 4.

The **Probe Name** fields are used to enter a specific name for each probe up to 11 characters in length. This name will be used throughout the nCompass runtime application. Default tag names are Room, Evaporator, Condenser and Monitor.

The **Indication** buttons are used to set whether the corresponding probe should be displayed in the runtime application. When selected for display, the indicator on the button will be on. The button for probe indication can only be turned on if the probe is enabled in the configuration of the Dixell controller attached to nCompass. If the probe is not configured, indication is disabled.

NOTE: *Probe 4 is available on the XW60K model only.*

11.2.2 User Communications

The Modbus slave interface of nCompass can be set to operate in one of two modes. The default setting is to provide the standard DX user interface to simplify communications for users developing their own software while providing access to typical control and alarm parameters.
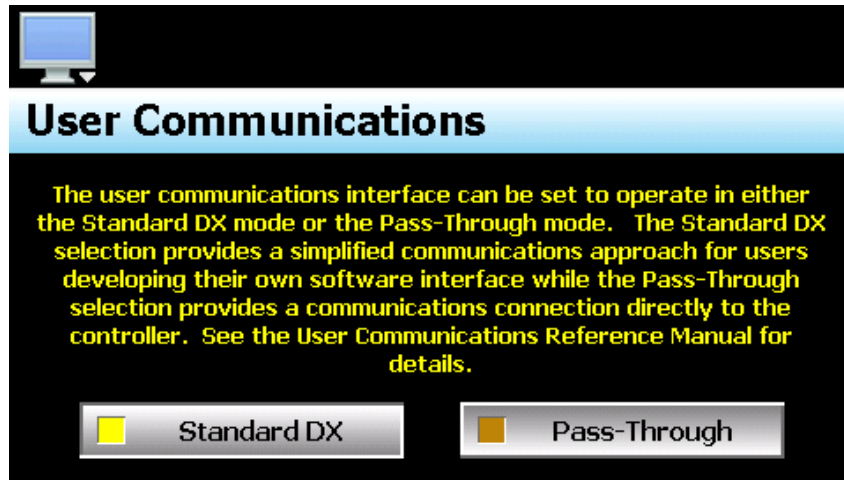
The second selection configures the Modbus slave interface as a pass-through to simulate the communications interface for the Dixell controller. This selection assigns nCompass control values to the corresponding register addresses of the Dixell controller allowing compatibility with existing Dixell software or devices. This provides current users of a Dixell controller the option for adding the nCompass DX interface to their system without sacrificing their current software/communications interface.

IMPORTANT: *The pass-through interface option does not provide access to the EEPROM elements.*

> *See the nCompass DX i4.3 User Communications Reference Manual for details on the use of the Modbus slave interface including communications settings, register addresses and their associated values as well as the functionality of the selected interface type.*

11.2.3 Functions

The nCompass functions are accessed from the configurator 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.
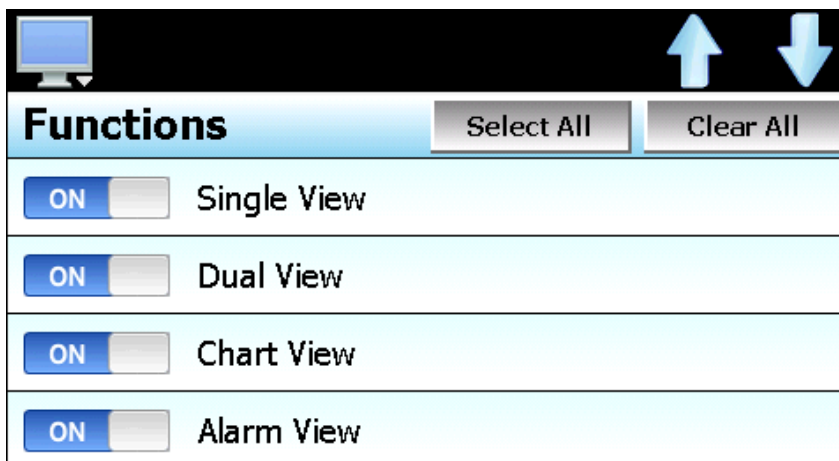
When functions are disabled at the configurator level from the **Functions** list, it will be disabled in the runtime software by removing the menu item or disabling the field so the operator can not select the function or edit any corresponding settings related to the function. The following list shows 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.*

Function	Runtime Menu Location	Description
Single View	View\Single	View temperature, output status, set control set point. **NOTE:** Without access to the single view screen, the user will be unable to start a manual defrost, activate the continuous cycle or energy savings or turn the light on and off.
Dual View	View\Dual	view temperature, set control set point **NOTE:** Without access to at least one view screen, the user will be unable to manually adjust the set point..
Chart View	View\Chart	view and set up real time trends
Alarm View	View\Alarm	view and reset current alarms **NOTE:** Without access to alarm screen, user will be unable to reset and acknowledge alarms.
Alarm Log	View\Alarm Log	view and email alarm history files

Function	Runtime Menu Location	Description
Security Settings	Security	view/set security rights, view audit trails, user log on **NOTE:** If security is enabled, but system security is then disabled through this item, the user will be unable to log on. Default security (system 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.
Data Logging	Data\Data	enable/disable data logging, select points for logging, access to historical viewer, FTP and USB File utilities **NOTE:** If data logging is set to log 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 or, audit 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
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 Settings	Device\Settings\Set\Defrost	access to defrost settings screen **NOTE:** With the defrost settings screen disabled, defrost will still operate and the user can still initiate a manual defrost from the single view screen. Only user adjustment of defrost settings is removed.
Alarm Settings	Device\Settings\Set\Alarm	access alarm settings **NOTE:** Alarms can be configured in the runtime or the Dixell controller directly and then the menu removed by disabling this function. The alarms will operate as configured in the background removing all access by the operator.
Email/SMTP Settings	Device\Settings\Email\Email	access to view/configure email settings
Communication Settings	Device\Settings\Set\Comms	access to web server, Modbus and VNC settings

Function	Runtime Menu Location	Description
		NOTE: Without access, the user will be unable to view the Orion-M IP address if required for VNC or web server access.
Control Settings	Device\Settings\Set \Control	access to temperature control/continuous cycle settings
Temperature Units	Device\Settings\Offline\Set\Units	access to set temperature units
Input Offset Calibration	Device\Settings\Offline\Calibrate\Offset	adjust offsets of probe inputs
Import/Export Setup	Device\Settings\Offline\System\ Configuration	access import/export utility to back up current nCompass control system configuration or restore configuration from back-up file
Setpoint Limits	Device\Settings\Set\Limits	access temperature set point high/low limit entry
Language	Device\Settings\Offline\Set\Language	access to set the nCompass display language for menus and online help
Keyboard Lock	-	Automatically activates the Dixell controller key lock when the runtime is in online to prevent direct, user access of controller settings via the Dixell controller.
On/Off Button	View\Single	enables control on/off button

11.2.4 Startup View

The Startup View screen 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.
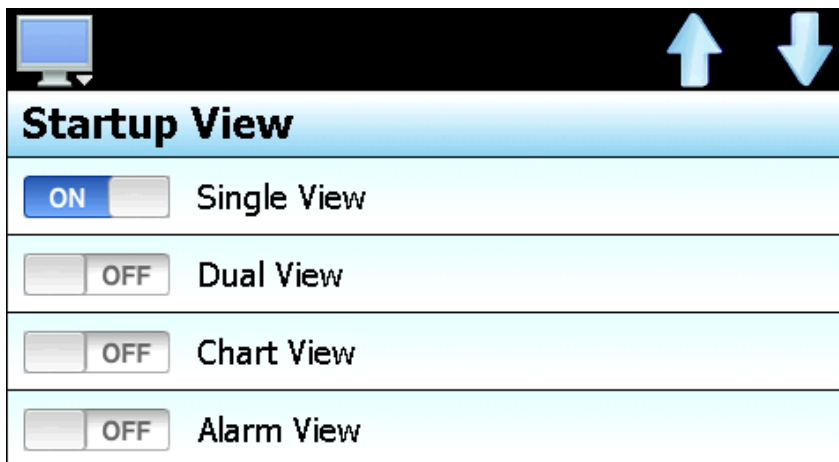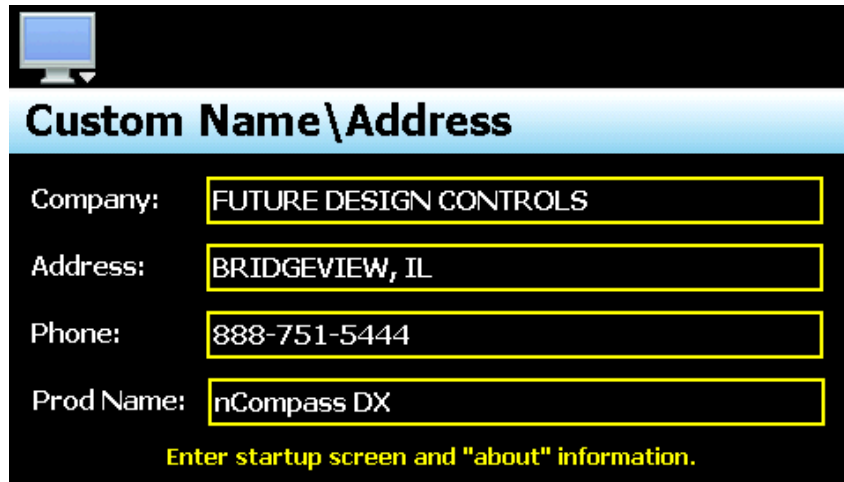
The available selections are Single View, Dual View, Chart View, Alarm View and Alarm Log.

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.*

11.2.5 Custom Name\Address

The 'Custom Name\Address' screen is accessed from the configurator 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. The information is also visible on the "About" screen under the Offline\System menu in the runtime application.

Appendix

FDC-0450 Touch Screen Interface Specifications (page 1 of 3)

Technical Specifications

Description	Details
Size	4.3"
Resolution (W X H in pixels)	480 x 272
Display type	TFT, Wide touch Screen
Colors	65,536
Touch screen Type	Resistive analog
Active display area (W X H mm)	95 X 54
MTBF back light at 25 0C	30,000 hrs
Backlight	LED
Brightness Adjustment	Yes
Screen Saver	Yes
Language Fonts	Yes

Main Hardware

Description	Details
Processor, CPU speed	ARM11, 533Mhz
Flash Memory(ROM)	128 MB
SDRAM(RAM)	128 MB
Operating system	WinCE 6.0
Real Time Clock	Yes
Buzzer	Yes
Sound Output	N/A
SD card slot	Yes

Communication Ports/Interfaces

Description	Details
RS232C, DB9 Male	1
RS232C/ RS422/ RS485, DB25 Female	1
Ethernet 10/100 Mbps, RJ45	Option
USB Host	1

General Specifications

Description	Details
Rated Voltage	24 V DC
Power supply	11-36V DC
Rated Current	0.91A (DC)
Power Consumption (with out sound output)	10 W
Power on LED indicator	Yes
Outer dimensions (W X H X D mm)	140 X 116 X 57
Mounting depth (mm)	51
Panel cut (W X H mm)	123^{+1} X 99^{+1}
Protection	IP65 front, IP20 rear
Front bezel, housing	Plastic, plastic
Stainless Steel front bezel (Option)	N.A
Installation	Panel Mount
Net Weight (Kg)	0.5

FDC-0450 Touch Screen Interface Specifications (page 2 of 3)

Standards, Certificates and Approvals

Description	Details
UL approval	UL 508 and CSA C22.2 No.142
Low Voltage Directive	2006/95/EC
EMC Directive	2004/108/EC
Requirements for Emission	EN 61000-6-4 :2007
Requirements for Interference Immunity	EN 61000-6-2 :2005
Tick mark for Australia	AS/NZS CISPR 11:2004
FCC	FCC Part 15, Subpart B, Class A

Base Standards for EMC & Safety

Description	Details
Electrostatic discharge	IEC 61000-4-2: 2008
Radiated radio-frequency electromagnetic fields	IEC 61000-4-3: 2006 + A1:2007 + A2:2010
Electrical fast transient/burst	IEC 61000-4-4: 2004 + A1: 2010
Surge	IEC 61000-4-5: 2005
Conducted disturbances induced by radio-frequency fields	IEC 61000-4-6: 2008
Power frequency magnetic field	IEC 61000-4-8: 2009
Voltage dips, short interruptions and voltage variations	IEC 61000-4-11: 2004
Emission from Electromagnetic fields	CISPR 11:2009 + A1:2010 Class A
Harmonics Current	IEC61000-3-2:2005 + A1:2008 + A2:2009
Voltage Fluctuation and Flicks	IEC61000-3-3:2008
Requirements for Safety	EN61010-1:2001

Protective class

Description	Details
Standard enclosures	IP 65 (Front), IP20 housing and terminals
Stainless steel front – Option	IP 66K (Front), IP20 housing and terminals

Transport & Storage conditions

Description	Details
Temperature	-20 0C to + 60 0C
Relative Humidity	10% to 90%, no condensation
Altitude	2000 meters maximum
Sinusoidal vibration conforming to IEC 60068-2-6	5 to 10 Hz: 3.5 mm amplitude 10 to 150 Hz: 2g 1oct/min. 40 sweeps
Shock conforming to IEC 60068-2-29	3 shocks per direction 11ms 15g

Best conditions for storage of LCD display modules:
Room ambient temperature 15°C to 35°C and 65% RH or less.
Do not store in surroundings containing organic solvent or corrosive gas.
Store HMI in anti-electrostatic container or bag.

FDC-0450 Touch Screen Interface Specifications (page 3 of 3)

Operating conditions

Description	Details
Temperature	0 0C to + 50 0C
Relative Humidity	10% to 90%, no condensation
Altitude	2000 meters maximum
Pollution	Degree 2
Sinusoidal vibration conforming to IEC 60068-2-6	10 to 58Hz: 0.75mm amplitude 58 to 150Hz: 1g 1oct/min. 1 sweep
Shock conforming to IEC 60068-2-29	3 shocks per direction 11ms 10g

NOTE: *In temperatures below 0°C, the response time of liquid crystal display becomes slower and color of the display will be darker than normal. Do not operate HMI in ambient temperature less than 0°C.*

LCD specifications

Description	Details
Touch operations	1,000,000 times using R 0.8 Polyacetal stylus with force 250g
Vibration test	10-55 Hz, Stroke: 1.5mm, 2 hrs. for each direction of X, Y, Z
Shock test	100 G, 6 ms, +/- X, +/- Y, +/- Z, 3 times for each direction
Package vibration test	0.015G*G/Hz from 5-200 Hz, -6bB /Octave from 200-500 Hz, 2 hrs for each direction of X, Y, Z
Package drop test	10 drops from 60 cm on 1 corner, 3 edges, 6 surfaces

Typical Viewing Angle

Description	Details
Vertical (Up/Down)	50° / 70°
Horizontal (Left/Right)	70° / 70°

DIN Rail Mount Power Supply Specifications

Part Numbers	24V DC output	PS5R-SB24
Output Capacity		15W
Input	Input Voltage (single-phase, 2-wire)	85 to 264 VAC, 100 to 370 VDC
	Input Current (maximum) — 100VAC	0.45A
	Input Current (maximum) — 200VAC	0.3A
	Internal Fuse Rating	2A
	Inrush Current (cold start)	50A maximum (at 200V AC)
	Leakage Current (at no load)	132V AC: 0.38 mA maximum 264V AC: 0.75 mA maximum
	Typical Efficiency — 24V DC	79%
Output	Output Current Ratings — 24V DC	0.65A
	Voltage Adjustment	±10% (V. ADJ control on front)
	Output Holding Time	20ms minimum (at rated input and output)
	Starting Time	200ms maximum
	Rise Time	100ms maximum (at rated input and output)
	Line Regulation	0.4% maximum
	Load Regulation	1.5% maximum
	Temperature Regulation	0.05% degree C maximum
	Ripple Voltage	2% peak to peak maximum (including noise)
	Overcurrent Protection	105% or more, auto reset
	Overvoltage Protection	120% min. SHUTDOWN
	Operation Indicator	LED (green)
	Voltage Low Indication	LED (amber)
Parallel Operation		No
Dielectric Strength		Between Input and Ground: 2000 VAC, 1 minute*
Insulation Resistance		Between Input & Output Terminals: 100 MΩ Min
Operating Temperature		−10 to +65°C (14 to 149°F)
Storage Temperature		-25 to 75°C (-13 to +167°F)
Operating Humidity		20 to 90% relative humidity (no condensation)
Vibration Resistance		Frequency 10 to 55Hz, Amplitude 0.375mm
Shock Resistance		300m/s² (30G) 3 times each in 6 axes
Approvals		EMC: EN61204-3 (EMI: Class B, EMS: Industrial), c-UL (CSA 22.2 No. 14), UL 1604, UL 508, LVD: EN60950, EN50178
		UL1310 Class 2, c-UL (CSA 22.2 No. 213 and 223)
Harmonic Directive		N/A
Weight (approx.)		160g
Terminal Screw		M3.5 slotted-Phillips head screw (screw terminal type)
IP protection		IP20 fingersafe
Dimensions H x W x D (mm)		90 x 22.5 x 95
Dimensions H x W x D (inches)		3.54 x 0.89 x 3.74

* Between input and output: 3000VAC, 1 minute; Between output and ground: 500VAC, 1 minute

Open Frame Power Supply Specifications (page 1 of 2)

Description	Power Supplies		[15W] PS3X-B24
Input	Rated Input Voltage		100 to 240V AC
	Voltage Range (Note 1)		85 to 264V AC/ 120 to 375V DC
	Frequency		47 to 63 Hz
	Input Current		0.5A max.
	Inrush Current (Ta = −25°C, ACV cold start)	at 115V AC	40A max.
		at 230V AC	60A max.
	Leakage Current		0.5mA max.
	Efficiency (Typ.) (230V AC at input/rated output)	5V	77%
		12V	81%
		24V	82%
Output	Rated Voltage/Current		24V, 0.63A
	Adjustable Voltage Range		±10%
	Output Holding Time		13 ms typ. (100V AC) 60 ms minimum (230V AC)
	Start Time		1000 ms max. (230V AC input, rated output)
	Rise Time		50 ms max. (230V AC input, rated output)
	Regulation	Input Fluctuation	0.5% max.
		Overvoltage Fluctuation	5V: ±2% max. 12V, 24V: ±1% max.
		Temperature Fluctuation	0.04% / °C max. (−20 to +50°C)
	Ripple (including noise)	−20 to −10°C	5V: 200mV max. 12V/24V: 200mV max.
		−10 to 0°C	5V: 160mV max. 12V/24V: 200mV max.
		PS3X-B, C: 0 to +50°C PS3X-D, Q, E: 0 to +45°C	5V: 100mV max. 12V/24V: 150mV max.
Supplementary Functions	Overcurrent Protection		105% min. (auto reset) (Note 2)
	Overvoltage Protection		Voltage limitation at 115% min.
	Operation Indicator		green LED
Dielectric Strength	Between input and output terminals		3000V AC, 1 minute
	Between input and ground terminals		2000V AC, 1 minute
	Between output and ground terminals		500V DC, 1 minute
Insulation Resistance			100MΩ minimum, 500V DC megger (between input and output terminals, between input and ground terminals)
Operating Temperature			−20 to +70°C (no freezing, see output derating)
Operating Humidity			20 to 85% RH (no condensation)
Storage Temperature			−40 to +85°C (no freezing)
Storage Humidity			10 to 95% RH (no condensation)
Vibration Resistance			10 to 55 Hz, 20m/s² constant, 2 hours each in 3 axes
Shock Resistance			200m/s², 1 shock each in 3 axes
EMC	EMI		EN55022 Class B
	EMS		EN55024
Safety Standards			IEC/EN60950-1, UL60950-1, CSA C22.2 No. 60950-1
Dimensions (H × W × D) (mm)			50.8H × 28W × 62D
Weight (approx.)			130g
Terminal Screw			M3

Note 1: See "Output Current vs. Input Voltage" characteristics next page. Not subject to safety standards. When using DC input, connect a fuse to the input terminal for DC input protection.
Note 2: Overload for 30 seconds or longer may damage the internal elements.
Note 3: One minute after the output has been turned off, turn on the AC input again.

Open Frame Power Supply Specifications (page 2 of 2)

Operating Temperature vs. Output Current (Derating Curves)
Conditions: Natural air cooling (operating temperature is the temperature around the power supply)

PS3X-B

Dimensions (mm)
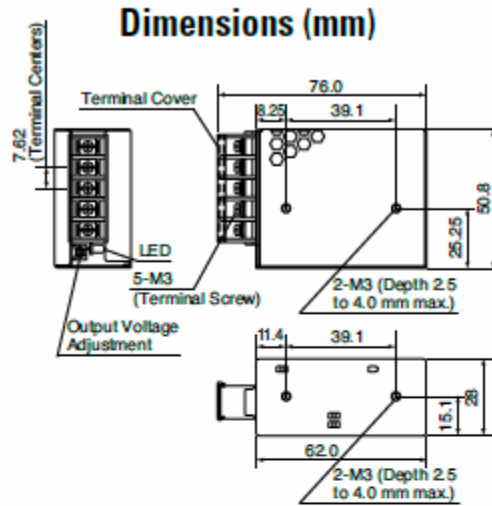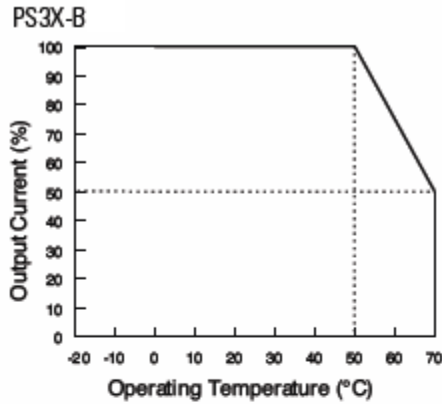
Output Current vs. Input Voltage (TA = 25°C)
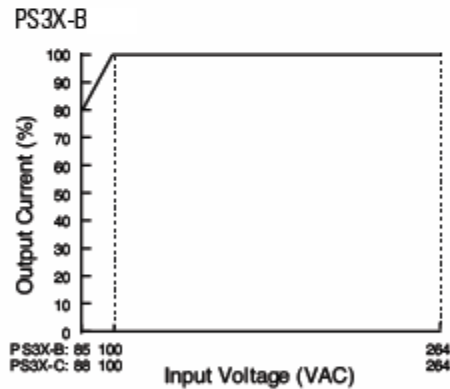
PS3X-B

Overcurrent Protection Characteristics
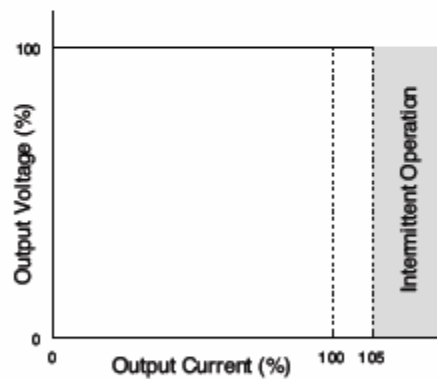
Operating Temperature by Safety Standards

Power Supplies	UL/EN60950-1
	Mounting A, B
PS3X-B24	50°C

Mounting A (standard)   Mounting B

Power-On Delay Relay Specifications (page 1 of 2)

[GE1A-C10MA110]

CE   UL, c-UL Listed File No. E55996   TÜV Rheinland

Specifications

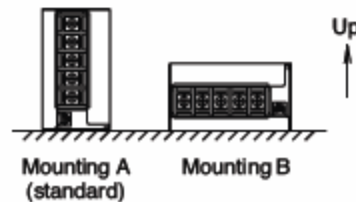|		
Rated Operating Voltage		24V AC/DC 100 to 120V AC 220 to 240V AC
Voltage Tolerance		AC: 85 to 110% DC: 90 to 110%
Contact Rating		240V AC/5A 24V DC/5A
Contact Form		DPDT or SPDT+ instantaneous SPDT
Repeat Error		±0.2% ±10msec maximum
Voltage Error		±0.5% ±10msec maximum
Temperature Error		±3% maximum
Setting Error		±10% maximum
Reset Time		0.1 sec maximum
Insulation Resistance		100MΩ minimum (500V DC megger)
Dielectric Strength		Between power and output terminals: 1,500V AC, 1 minute Between contact circuits: 750V AC, 1 minute
Vibration Resistance		Damage limits: Amplitude 0.75mm, 10 to 55 Hz Operating extremes: Amplitude 0.5mm, 10 to 55 Hz
Shock Resistance		Damage limits: 500m/s² (Approx. 50G)
Power Consumption	**GE1A-B**	24V AC type: 1.6 VA
		24V DC type: 1.0W
		110V AC type: 3.8 VA
		220V AC type: 7.7 VA
	GE1A-C	24V AC type: 2.0 VA
		24V DC type: 0.8W
		110V AC type: 3.5 VA
		220V AC type: 8.0 VA
Electrical Life		100,000 operations minimum (at full rated load)
Mechanical Life		10,000,000 operations minimum
Operating Temperature		−10 to +55°C (without freezing)
Operating Humidity		35 to 85% RH (without freezing)

Power-On Delay Relay Specifications (page 2 of 2)

Item	Terminal Number		Operation
Set Time			
Power	2 - 7 (8p)		
Delayed Contact	5 - 8 (8p)	(NC)	
	6 - 8 (8p)	(NO)	
Indicator	POWER		
	OUT		

8-Pin Screw Terminal (SR2P-06)
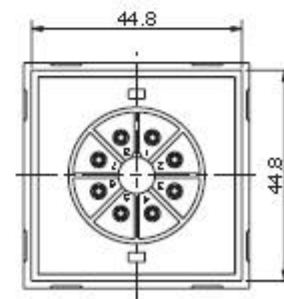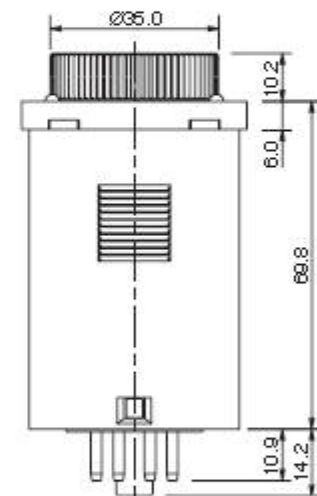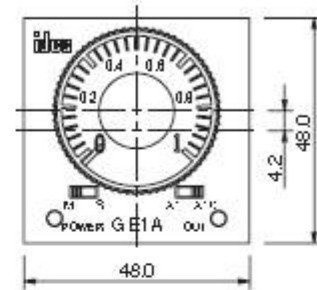
How to Order

---

nCompass DX Sample Part Numbers
(minimum of 2 component part numbers is required; (1) display, (2) firmware

Item #	Product	Sample Part Number	Description
1	Display	FDC-0450-1011-000BN	4.3" display, LC software, 11-36 VDC power input, SD slot, Ethernet, standard enclosure
2	DX Firmware	SD-DX	DX Controller Firmware (inserted into display SD slot)
	Options		
	Power Supply	PS5R-SD24	85-264VAC power input, Output 24VDC 15W (0.6A)
	Cable	CA2011-3D	Cable from display to Dixell Controller (DB25 connector (display), twisted pair leads (Dixell), shielded (10ft)

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)

Item #2: **Control Firmware**

Order Matrix #   [SD] - [LC]

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

Control System Options *(ordered separately as appropriate)*

Cable: Display to Dixell Controller
CA2011-8D: Cable (10ft) from Display to B42 controller.

Note: Consult factory for other lengths & options

Display Power Supply (input 100-240VAC / Output 24VDC)
DIN Rail Mount: PS5R-SB24:   15W power supply (0.6A)
Open Frame: PS3X-B24AFC: 15W power supply (0.6A)

Note: Either of the above will power the FDC-0450 touch screen display

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

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 erroneous operation.

Printed Operators Manual
Part Number
(Orion-nCompass_DX_i4.3_Installation_and_Operation_Manual.pdf)
FDC-Orion nCompass DX i4.3 Installation and Operation Manual

Printed Communication Reference Manual
Part Number   (Orion-nCompass_DX_i4.3_Comm Reference.pdf)
FDC-Orion nCompass DX i4.3 Communication Reference Manual

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

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 probe indication, alarms, , Help language selection and more, all without an external device or PC.
- Control Views: view 1 or 2 probes in single or dual view as well as in a Trend format.
- File Management: View, print, copy/move Alarm, Historical Data (data log files) and operator audit trial files. File transfer via LAN features or USB flash memory.
- 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 PV for all probes, SP and compressor output on/off.
- Log interval: configurable 6 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 or system boot.
- 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. (all file names appended with date-time to file name)
- Operator Comments/Events: Unlimited operator comments/events linked to each file entered manually.
- 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: Power Supply – Optional

Power Capacity Required (Watts) - A base system requires ~10 watts of 24Vdc power for the nCompass user interface. The 15W power supplies offered are sufficient to power display only.

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

RoHS Compliant

SOFTWARE VERSIONS FOR FDC- nCompass Control System

The software version levels for the nCompass Control system can be viewed in the offline system setup, from the System menu; select 'About nCompass'. Both the HMI (Human Machine Interface – color touch screen) and the Dixell Prime CX controller model and firmware versions will be displayed.

When obtaining replacement parts or to get assistance for setup and/or troubleshooting purposes, it is important to have this information available to insure that your request is processed properly and in a timely manner. It is recommended that this information be written down and kept in a readily accessible location along with this manual, so that it is available when required.

CE Net Version: _____   CE Image Version: _____

HMI Version: _____   CE BSP Version: _____

Dixell Model: _____

The CE Image, CE BSP and software versions of the HMI of the nCompass control system are proprietary and only available directly from Future Design.

Using similar or like components obtained from a source other than Future Design will cause unexpected operation and/or malfunction of the nCompass control system. Any attempts to do so will be at the user's own risk and void any and all claims or warranties with Future Design Controls.

In addition, installing Future Design nCompass software on hardware not obtained directly from Future Design is a violation of the software license agreement. See the Future Design Software License agreement on the following page. By installing and/or using the nCompass Control System, you are accepting the terms of the software license.

FUTURE DESIGN SOFTWARE LICENSE - For FDC nCompass Controller

Future Design Controls Windows CE based nCompass display and Control Module (Idec PLC) software (listed as "SOFTWARE" in this document) is protected by copyright laws and international copyright treaties, as well as other intellectual property laws and treaties. The SOFTWARE is licensed at no charge to the end user when all components, including but not limited to the Control Module (Idec PLC components) and CE Color Touch Screen display are purchased from Future Design Controls. All ownership and rights remain with Future Design Controls.

I. LICENSE GRANT. This LICENSE grants you the following rights:

A. You may use Future Design's SOFTWARE with Future Design Controls products or products marketed by Future Design Controls only. Products are considered Future Design Controls products (and products marketed by Future Design Controls) when the sale or shipment originates from our main headquarters in Bridgeview, IL or one of our authorized office locations. Products purchased from Future Design Controls distributors or OEM's with brand labels other than Future Design controls are not considered Future Design Controls products and cannot be used with Future Designs SOFTWARE. Using Future Design's SOFTWARE with any other manufacturer (or distributor) of hardware is a violation of this license and applicable copyright laws. The SOFTWARE is considered in "use" when it is installed into permanent or temporary memory (e.g. CE display unit/PLC, or other storage device)

B. Solely with respect to electronic documents included with the SOFTWARE, you may make a copy (either in hardcopy or electronic form), provided that the software is not resold without the knowledge and acceptance of terms by Future Design Controls.

II. TITLE; COPYRIGHT.

All title and copyrights in and to the SOFTWARE (including but not limited to any images, photographs, animation, video, audio, music, text and "applets" incorporated into the SOFTWARE), the accompanying printed materials, and any copies of the SOFTWARE are owned by Future Design Controls or its suppliers. The SOFTWARE is protected by copyright laws and international treaty provisions. Therefore, you must treat the SOFTWARE like any other copyrighted material, except that you may either (A) make one copy of the SOFTWARE solely for backup or archival purposes or (B) install the SOFTWARE on each system purchased from Future Design Controls (CE display/PLC) provided you keep the original solely for backup or archival purposes. You may not copy the printed materials accompanying the SOFTWARE.

III. ADDITIONAL RIGHTS AND LIMITATIONS.

A. Reverse Engineering, De-compilation, and Disassembly: You may not reverse engineer, decompile, disassemble or modify the SOFTWARE (CE display software and/or Control Module (PLC) code).

B. No Separation of Components. The SOFTWARE is licensed as a single product and the software programs comprising the SOFTWARE may not be separated for use on any hardware not supplied by Future Design Controls.

C. Rental. You may not rent or lease the SOFTWARE.

D. Software Transfer. You may NOT transfer any of your rights under this LICENSE.

E. Termination. Without prejudice to any other rights, Future Design Controls may terminate this LICENSE if you fail to comply with the terms and conditions of this LICENSE. In such event, you must destroy all copies of the SOFTWARE and agree not to modify/distribute the software or download to any hardware not purchased from Future Design Controls.

F. The selection, application and use of Future Design products and/or software is the sole responsibility of the purchaser or end user. No claims will be allowed for any damages or losses, whether direct, indirect, incidental, special or consequential. In addition, Future Design reserves the right to make changes without notification to purchaser or user to materials or processing that do not affect compliance with any applicable specification. Future Design Controls makes no warranties when using Future Design Controls SOFTWARE system.

Software Usage Note:

The selection, application and use of Future Design Control products or software is the sole responsibility of the purchaser or end user. No claims will be allowed for any damages or losses, whether direct, indirect, incidental, special or consequential.

In addition, Future Design reserves the right to make changes without notification to purchaser or user to materials or processing that do not affect compliance with any applicable specification. Future Design makes no warranties when using the nCompass system.

Warranty:

Future Design Controls products described in this book are warranted to be free from functional defects in material and workmanship at the time the products shipped from Future Design Controls facilities and to conform at that time to the specifications set forth in the relevant Future Design Controls manual, sheet or sheets for a period of one year after delivery to the first purchaser.

Future Design Controls FDC-0450 products are warranted to be free from functional defects in materials and workmanship at the time the products shipped from Future Design Controls facilities and to conform at that time to the specifications set forth in the relevant Future Design Controls manual, sheet or sheets for a period of one year after delivery to the first purchaser for use.

There are no expressed or implied Warranties extending beyond the Warranties herein and above set forth. Limitations: Future Design Controls provides no warranty or representations of any sort regarding the fitness of use or application of its products by the purchaser. Users are responsible for the selection, suitability of the products for their application or use of Future Design Controls products.

Future Design Controls shall not be liable for any damages or losses, whether direct, indirect, incidental, special, consequential or any other damages, costs or expenses excepting only the cost or expense of repair or replacement of Future Design Control products as described below.

Future Design Controls sole responsibility under the warranty, at Future Design Controls option, is limited to replacement or repair, free of charge, or refund of purchase price within the warranty period specified. This warranty does not apply to damage resulting from transportation, alteration, misuse or abuse.

Future Design Controls reserves the right to make changes without notification to purchaser to materials or processing that do not affect compliance with any applicable specifications.

Return Material Authorization:

Contact Future Design Controls for Return Material Authorization Number prior to returning any product to our facility:

7524 West 98th Place – Bridgeview, IL 60455 – Phone 888.751.5444 – Fax 888.307.8014

http://www.futuredesigncontrols.com