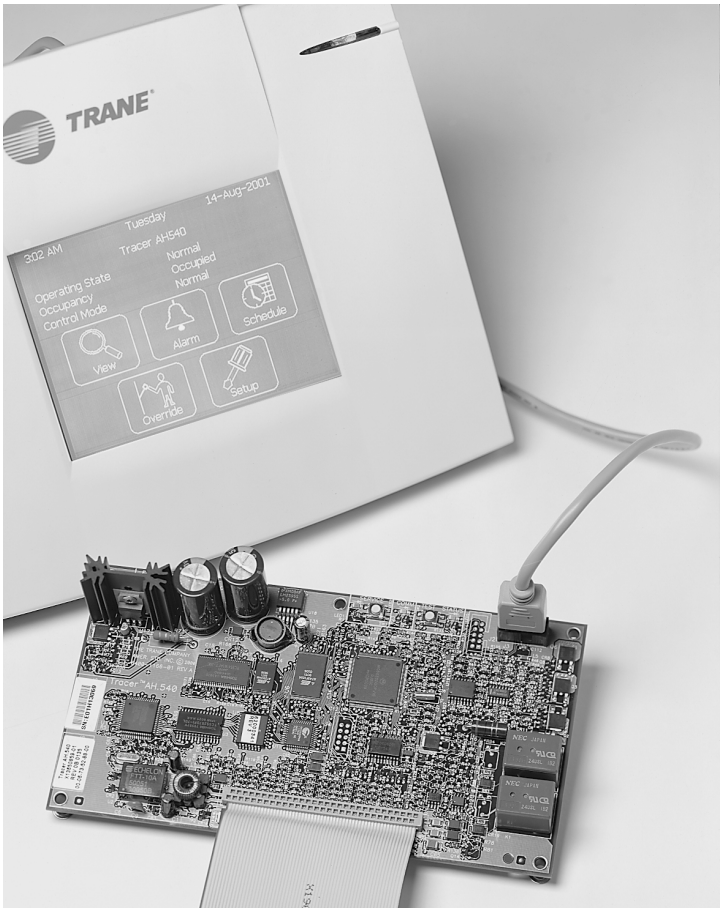
Addendum

Installation
Owner
Diagnostics

Tracer™ AH540
Tracer™ AH541
Operator Display



CNT-SVX10A-EN

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Tracer AH540 and Tracer AH541 Operator Display Installation and Operation

Note: Printed in the U.S.A.

Introduction

This document is an addendum to the Tracer™ AH540 and AH541 Installation Owner Diagnostics manual, and includes information about the touch-screen operator display. The ¼" VGA touch screen display is used as an interface to the Tracer AH540 Configurable Air Handling Unit Controller.

This same operator display hardware is used on other Trane controllers; however, this document only details its use with the Tracer AH540 or AH541 controller. For simplicity, the controller will hereafter be referred to as AH540.

For detailed information about the operation of the controller, such as valid parameters and sequence of operation, refer to the Installation Owner Diagnostics manual (CNT-SVX05A-EN) for the Tracer AH540 controller.

Installation

The Tracer AH540 Operator Display may be connected to a Tracer AH540 controller in two ways: as a stand-alone interface or as a portable display.

As a stand-alone operator display, the touch-screen display can be mounted up to 10 ft (3 m) from the Tracer AH540 controller. It can be used to execute most operations for the controller.

As a portable operator display, the touch-screen display can be carried to the controller and plugged directly into the controller board. In this case, the display can be used for configuration of HVAC equipment, but cannot be used to set up schedules.

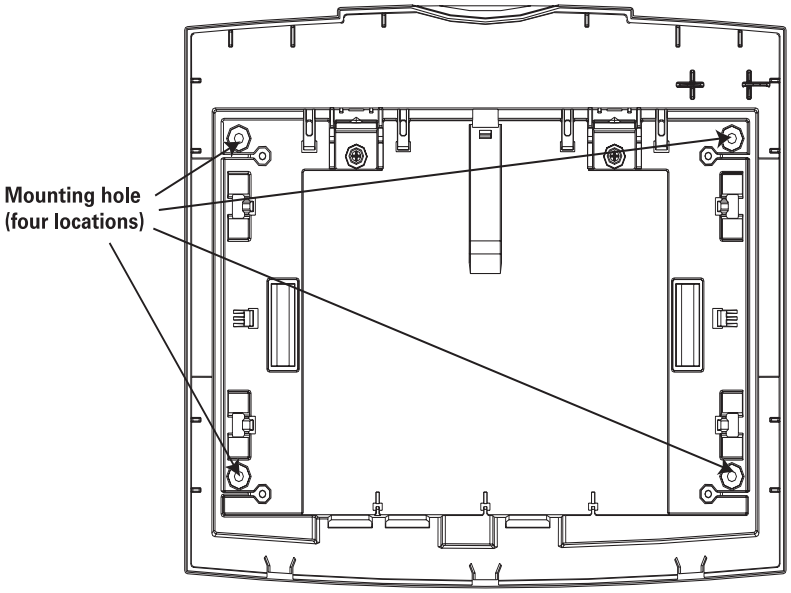
Installing the stand-alone operator display

The stand-alone operator display can be mounted up to 10 ft (3 m) from the Tracer AH540 controller.

To install the stand-alone operator display:

1. Unsnap the gray plastic backing from the operator display.
2. Carefully disconnect the operator display cable from connector P2.
3. Use the plastic backing as a template to mark the position of the four mounting holes on the mounting surface (see Figure 1).

Figure 1 — Operator display mounting holes

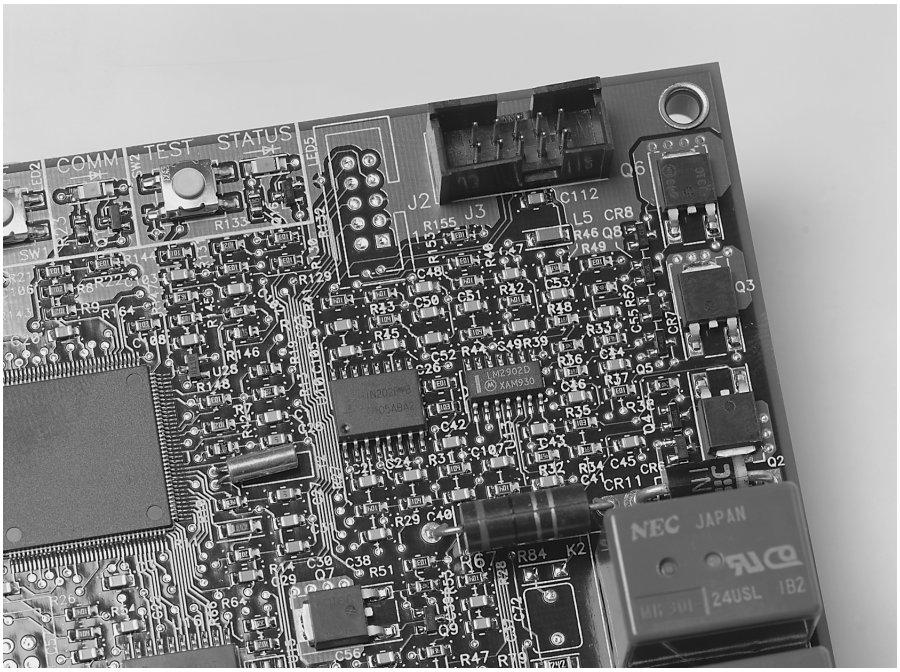


Installation

4. Set the plastic backing aside and drill holes for #8 screws or #8 wall anchors.
5. Secure the plastic backing to the wall with #8 (4 mm) mounting screws (not included).
6. Connect the operator display cable to the operator display, and then snap the operator display to the plastic backing. The operator display cable is keyed to the P2 connector. If you have difficulty connecting it, ensure that the key is lined up with the slot.
7. Run the operator display cable to the Tracer AH540, affixing it to the wall with wiring staples or wire mold.
8. Feed the cable into the controller enclosure.
9. Attach the operator display cable to the J3 connector on the circuit board as shown in Figure 2.

The operator display receives power from the Tracer AH540 and turns on automatically when it is connected to the controller.

Figure 2 — Operator display connector J3 on the Tracer AH540



Installation

CAUTION!

AVOID EQUIPMENT DAMAGE

To clean the touch screen, use a cloth dampened with commercial liquid glass cleaner. Spraying water or cleaners directly on the screen may result in equipment damage.

Connecting the portable operator display

The portable operator display is designed for temporary connection of HVAC equipment. You cannot use the portable operator display to set up schedules, because the time clock resides with the operator display, not with the Tracer AH540 controller.

To install the portable operator display:

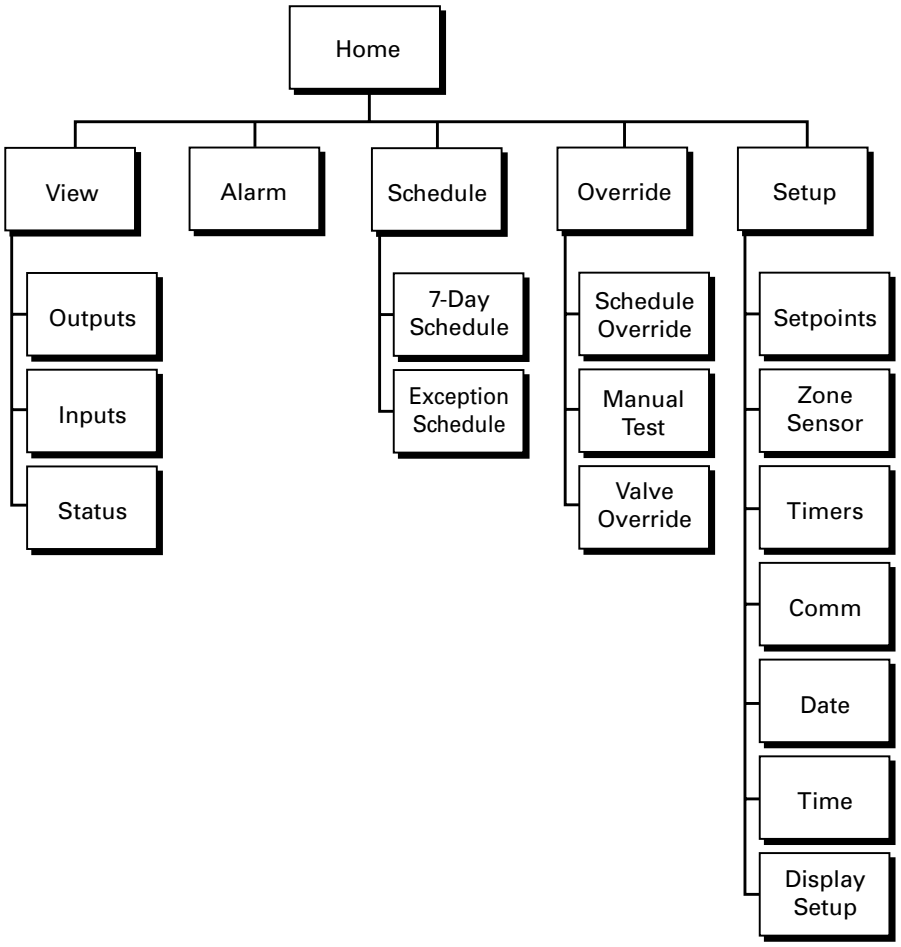
1. Remove the factory-installed AH540 control box cover or open the Tracer AH541 enclosure door.
2. Attach the operator display cable to the J3 connector on the circuit board as shown in the previous Figure 2.

The operator display receives power from the Tracer AH540 and turns on automatically when it is connected to the controller.

Overview of operator display screens

Figure 3 shows an overview of the display screens and how to navigate between them. Each of these screens is explained in this manual. Some of these screens require a security password to adjust values; refer to the Security section.

Figure 3 — Hierarchy of display screens



Navigating the screens

The following touch buttons are commonly found on the display screens.

Home
Touch the Home button to return to the Home menu.

Back
Touch the Back button to return to the previous screen.

Down
Touch the Down button to show the next segment in a list.

Bottom
Touch the Bottom button to show the last segment in a list.

Up
Touch the Up button to show the previous segment in a list.

Top
Touch the Top button to show the start of a list.

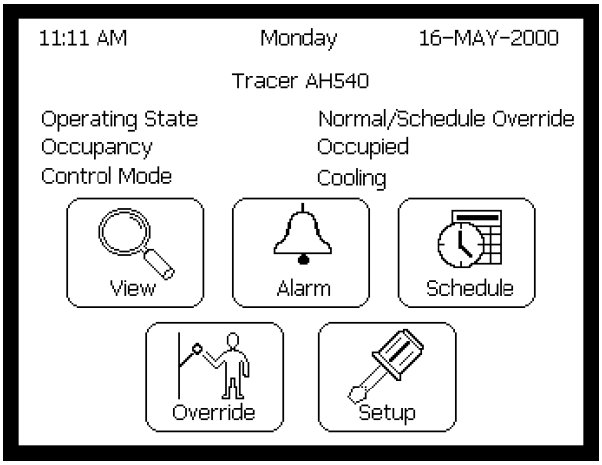
Home screen

The Home screen is the starting point for navigating through the screens of the operator display (see Figure 4). This screen contains several areas: time and date, location, operating parameters, and touch buttons.

The backlight on the operator display will turn off and the display will revert to the Home Screen after 30 minutes of inactivity. If the display is dark, touch the screen. The Home Screen will reappear.

Note: The portable operator display does not have a time clock and therefore cannot be used to set up schedules. The schedule button does not appear on the Home screen when a portable operator display is connected to the controller. The stand-alone operator display should be used to set up schedules.

Figure 4 — Home screen



Time and date

The current time, day, and date are displayed at the top of the Home screen.

Location

The name of the controller location is displayed below the time and date. This is the location identifier specified in the sales order information. If no location name is specified, “Tracer AH540” is used as the location. Use the Rover™ service tool to change the name of the controller location.

Operating parameters

The Home screen lists the Operating State, Occupancy Mode, and Control Mode of the connected AH540 controller.

Touch buttons

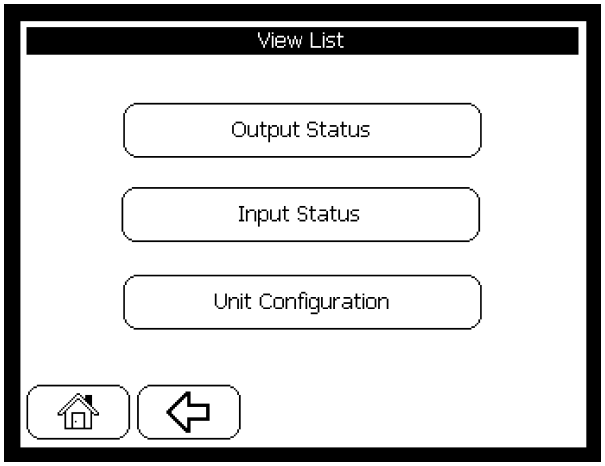
Five touch buttons are located at the bottom of the Home screen. Touch the View, Alarm, Schedule, Override, or Setup button to access the desired set of screens. Each of these buttons is described in the following text. The Schedule button does not appear on the Home screen when a portable operator display is connected to the controller; refer to the Schedule section.

View

The View screens enable you to quickly look at the status of outputs, inputs, and unit configuration. Parameters cannot be modified from the View screens.

From the Home screen, touch the **View** touch button to access the View List (see Figure 5).

Figure 5 — View List



Touch any of the buttons on the View List to access parameters, or touch the Home button to return to the Home screen. Use the Up, Down, Top, and Bottom buttons to navigate within a list of parameters. The following Table 1 describes the parameters that can be accessed via the View List.

Table 1 – Parameters that can be viewed from the View List

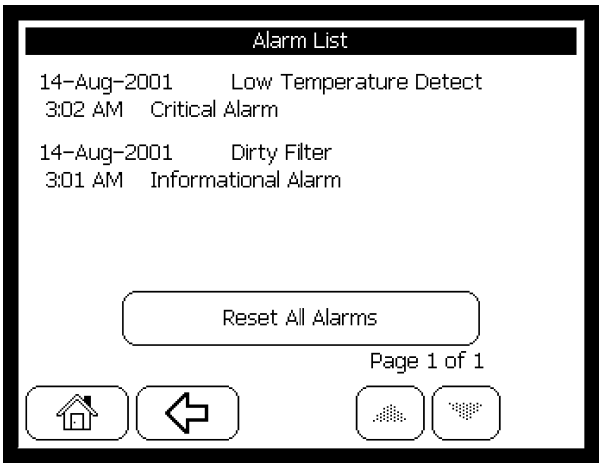
Push Button	Parameter	Value
Output Status	Supply Fan	On/Off
	Supply Fan Speed	%
	Cooling Output	%
	Heating Output	%
	Face & Bypass Damper	%
	Outdoor Air Damper	%
	Exhaust Fan	On/Off
	Economizing	Enabled/Disabled
Input Status	Occupancy	Occupied/Unoccupied
	Mode	Heating or Cooling Mode
	Space Temperature	°C/°F
	Effective Setpoint	°C/°F
	Discharge Air Temperature	°C/°F
	Discharge Air Setpoint	°C/°F
	Duct Static Pressure	Pa/in
	Duct Static Setpoint	Pa/in
	Outdoor Air Temperature	°C/°F
	Mixed Air Temperature	°C/°F
	Mixed Air Limit Setpoint	°C/°F
	Fan Run Hours	Number of Hours
Unit Configuration	Location	Location Label
	Control	Space Temperature Control / Discharge Air Control
	Unit Type	Constant Volume
		Variable Air Volume
		Cooling Only
		Outdoor Air Damper

For details on any of the inputs, outputs, or unit configuration, refer to the AH540 Installation Owner Diagnostics manual.

Alarm

The Alarm screen shows all AH540 diagnostics that are currently active (in alarm), and allows you to reset any latching alarms. Normally the operator display front panel light is on as solid green. If an alarm is present, the front panel light will blink red to notify the user. From the Home screen, touch the **Alarm** button to access the Alarm List (see Figure 6).

Figure 6 — Alarm List



If an alarm is present, a button will be available to **Reset All Alarms**. If a Maintenance Required diagnostic is present, a button will be available to **Reset Maintenance Alarm**. Touch the appropriate button to reset all alarms, or touch the Home button to return to the Home screen. After an alarm is reset from the AH540 controller, it is no longer shown on the Alarm List.

Refer to the Tracer AH540 manual for a list of possible diagnostics.

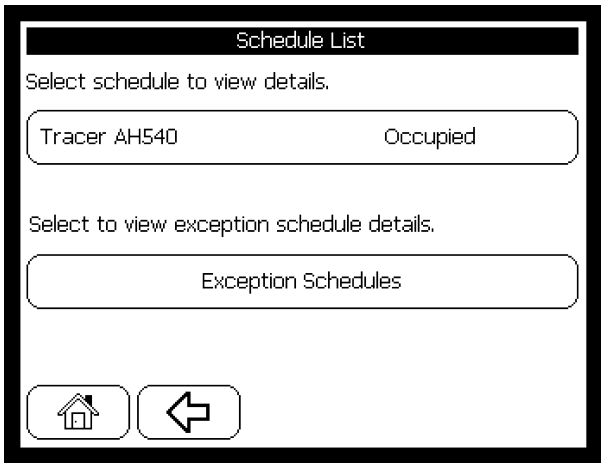
Schedule

The Schedule screens allow you to program an individual 7-day schedule plus an exception schedule for the connected controller.

Note: The portable operator display does not have a time clock and therefore cannot be used to set up schedules. The schedule button does not appear on the Home screen when a portable operator display is connected to the controller. The stand-alone operator display should be used to set up schedules.

From the Home screen, touch the **Schedule** button to access the Schedule List (see Figure 7). The Schedule List contains touch buttons for the regular schedule and the exception schedule.

Figure 7 — Schedule List

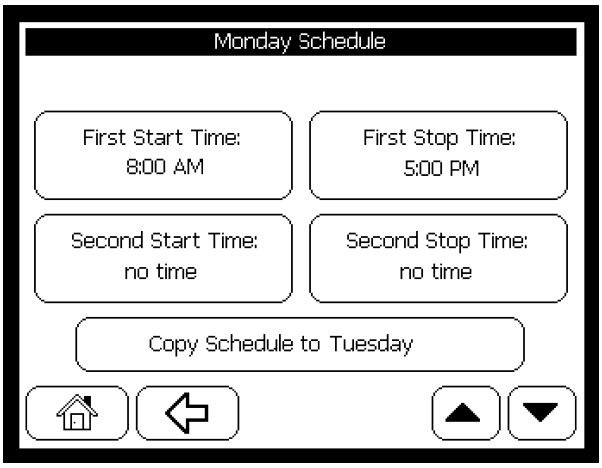


Schedule

7-Day schedule

The Schedule List displays the 7-day schedule name and its status (occupied, unoccupied, occupied standby, or occupied bypass). Touch this Schedule button to access the current day of the regular schedule (see Figure 8).

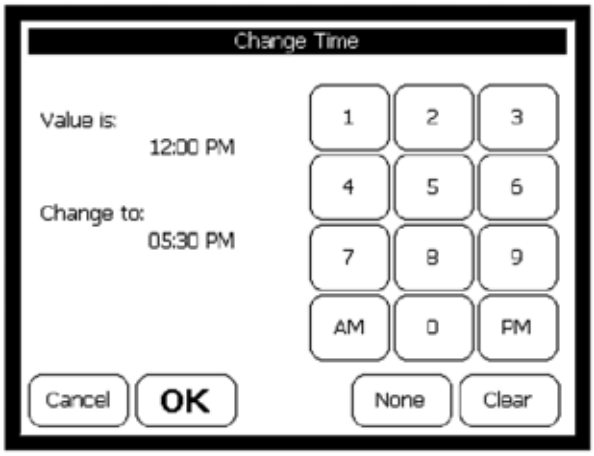
Figure 8 — Program screen for a regular schedule day



Press the appropriate touch button to adjust a **Start Time** or **Stop Time**, or to copy the schedule to the next day. Use the Up and Down arrows to scroll through the days of the week.

On the Time screen (see Figure 9), touch the number buttons to enter the new time. Press the **None** button to remove the time from the schedule; for example, to remove an unused Second Start Time. Then touch the OK button to continue.

Figure 9 — Time screen used to adjust start and stop times



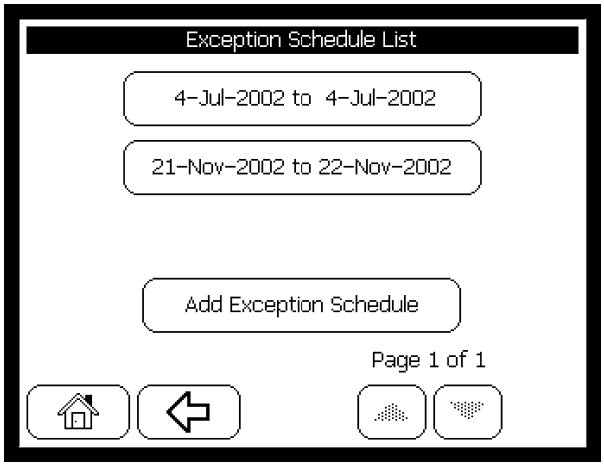
Any change to the schedule prompts a confirmation screen that enables you to accept or reject changes before continuing.

Schedule

Exception schedule

The AH540 controller allows up to 20 exception-day schedules. The exception schedule list is sorted chronologically by start date. From the Schedule List screen, touch the **Exception Schedule** button to list and change the active exception schedule(s) for the connected controller (see Figure 10).

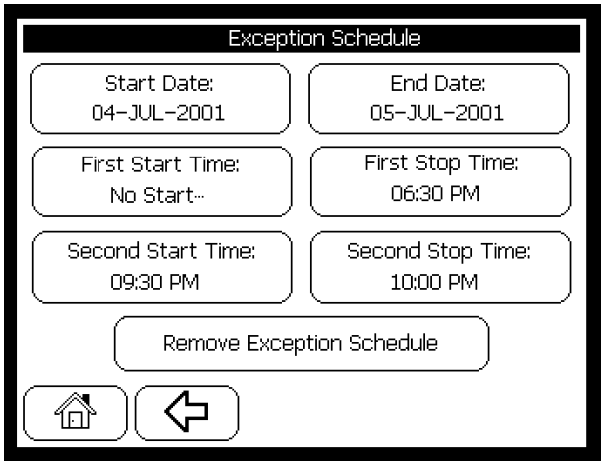
Figure 10 — Exception Schedule List



Changing an exception schedule

Touch the appropriate button to display an exception schedule (see Figure 11).

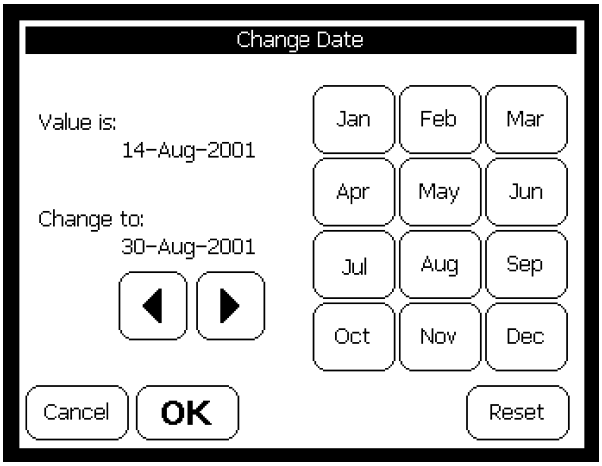
Figure 11 — Exception Schedule screen



From the Exception Schedule screen, you can change the start and end date (see Figure 11), as well as start and stop times. Touch a Date or Time button, and then enter the new value. Touch OK to continue. Any changes to these values prompts a confirmation screen that enables you to accept or reject changes before continuing.

Schedule

Figure 12 — Changing the month for an exception schedule



Touch the **Remove Exception Schedule** button to delete this exception schedule from the controller (see previous Figure 11).

Adding an exception schedule
From the Exception Schedule List screen, touch the **Add Exception Schedule** button. The Exception Schedule screen is displayed (see previous Figure 11), which contains default values. To change the start and end date, as well as start and stop times, touch the desired button. On the subsequent Change screen, enter the new value, and then touch OK to continue. Any change to these values prompts a confirmation screen that enables you to accept or reject changes before continuing.

How schedules work

A schedule start time is the beginning of an occupied period of time, and a stop time is the start of an unoccupied period of time. The controller remains unoccupied until the time reaches a start time event. Then the controller will remain occupied until the time reaches a stop time event. If the controller powers up between events, the controller searches back in time to the first start or stop event to determine its initial occupancy.

If an exception schedule exists for the current date, the controller operates according to the specified exception schedule. If no exception schedule is specified for the current date, the controller operates according to the 7-day schedule.

Schedule

Operator display schedule effect on the controller
The occupancy mode can be controlled in several ways:

- By communicated request (usually provided by the building automation system or peer device)
- By pressing the timed override On button (or Cancel button) on the zone sensor
- Occupancy binary input
- Operator display 7-day schedule or exception day schedule
- Default operation of the controller (occupied mode)

The AH540 controller can receive an occupancy schedule command from a communicated schedule input or from the local operator display. A communicated occupancy schedule has priority over the local schedule. If a communicated occupancy schedule input is not present, the controller uses the local operator display schedule input.

A communicated occupancy sensor input or local occupancy binary input (IN 9) can place the controller into occupied standby mode.

The Occupancy Override feature from the operator display has the highest priority and is the same as an occupancy manual command request. Use the occupancy override feature to locally override the occupancy mode of the controller. The schedule override remains in effect until it is manually removed. Table 2 lists the effect of different occupancy commands on the controller.

Schedule

Table 2 – Effect of occupancy commands on the controller

Occupancy—manual command or operator display schedule override	Occupancy—schedule or operator display schedule	Occupancy—sensor (Note 2)	Effective occupancy of the controller
Occupied	Any state	Occupied (Note 3)	Occupied
		Unoccupied	Occupied
Unoccupied	Any state	Any state	Unoccupied (Note 4)
Occupied bypass (Note 1)	Occupied	Any state	Occupied
	Unoccupied	Any state	Occupied bypass
	Occupied standby	Any state	Occupied bypass (Note 1)
	Invalid or not present	Occupied (Note 3)	Occupied
		Unoccupied	Occupied bypass (Note 1)
		Invalid or not present	Occupied
			Unoccupied (Note 4)
			Occupied
Occupied standby	Any state	Any state	Occupied standby (Note 4)
Invalid or not present	Occupied	Occupied (Note 3)	Occupied
		Unoccupied	Occupied standby (Note 4)
	Unoccupied	Any state	Unoccupied (Note 4)
	Occupied standby	Any state	Occupied standby (Note 4)
	Invalid or not present	Occupied (Note 3)	Occupied
		Unoccupied	Unoccupied
			Occupied
			Unoccupied (Note 4)
			Occupied

Note 1: Occupied bypass is initiated by a communicated request, schedule override from the operator display, or by pressing the local zone sensor On button. The effective occupancy is occupied bypass.

Note 2: The occupancy sensor can be either a local binary input (IN 9) or a communicated input. If a valid value for the network input is present, it has precedence over the local input.

Note 3: If the occupancy sensor communicated input is invalid or not present, and no local input exists, the controller's mode is occupied.

Note 4: If the occupied bypass timer is not equal to zero, the effective occupancy is occupied bypass.

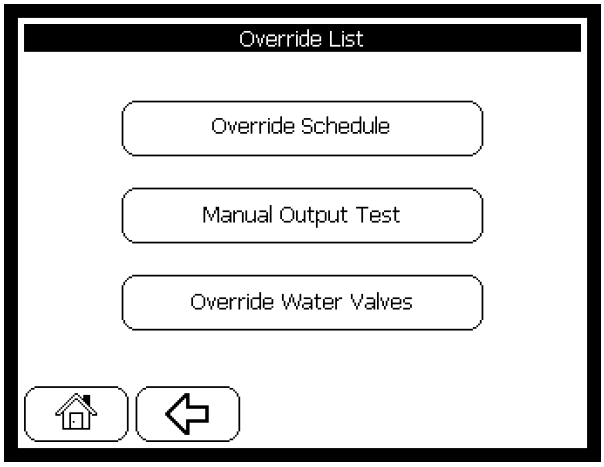
Override

The Override screens allow you to:

- Override the effective occupancy mode of the controller
- Invoke the Manual Output Test
- Override the heating and cooling valves open or closed

From the Home screen, touch the **Override** button to access the Override List (see Figure 13).

Figure 13 — Override List showing override functions



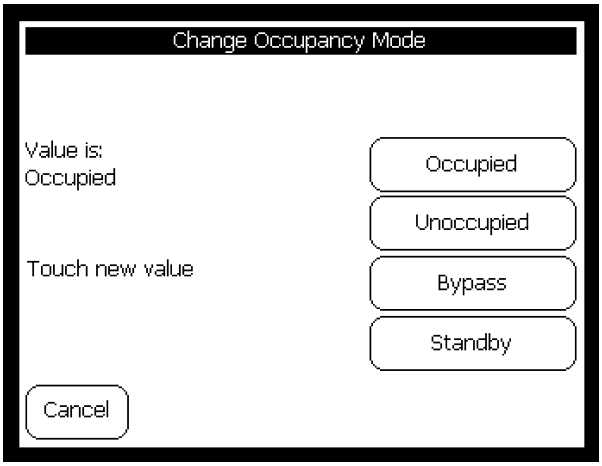
Override Schedule

This function allows you to override the AH540 occupancy control mode (occupied, occupied bypass, occupied standby, or unoccupied). The occupancy override remains in effect until the override is released.

From the Override List screen, touch the **Override Schedule** button. The Change Occupancy Mode screen is displayed (see Figure 14). This screen lists the current control mode and provides touch buttons for other control mode options.

Override

Figure 14 — Change Occupancy Mode screen used for control mode override



Touch the button for the new occupancy mode. Any change to the occupancy mode prompts a confirmation screen that enables you to accept or reject the change before continuing.

Releasing an override

To release an existing override, touch the **Override Schedule** button from the main override list screen. Then touch the **Release Override** button, which is added to the Change Occupancy Mode screen. A confirmation screen asks you to accept or reject the change before continuing.

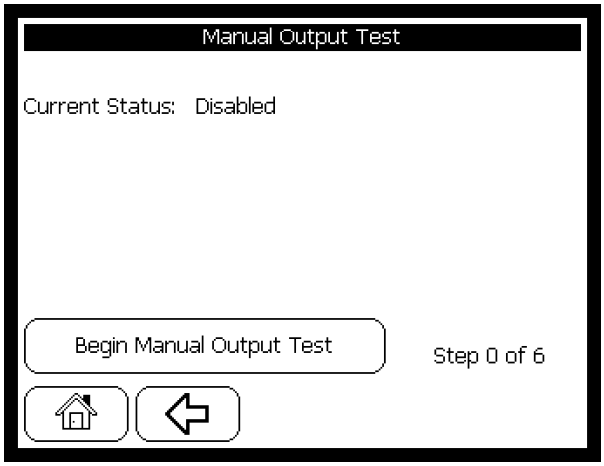
Manual Output Test

This function allows you to enter the controller into Manual Output Test.

From the Override List screen (see previous Figure 13), touch the **Manual Output Test** button. The first Manual Output Test screen is displayed (see Figure 15), which lists the controller's current test status (enabled or disabled).

Override

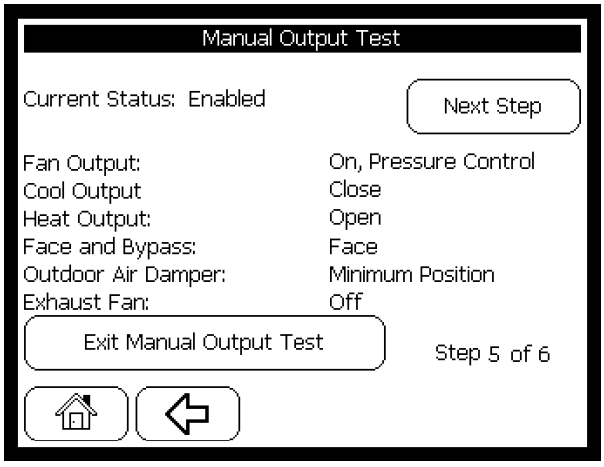
Figure 15 — Screen used to enable Manual Output Test



Touch the **Begin Manual Output Test** button to commence the test. A confirmation screen asks you to confirm this step.

The controller then enters the Manual Output Test sequence. Each of the six steps in the test sequence is detailed in a subsequent screen. All six screens are similar. Figure 16 shows an example of a Manual Output Test screen when the test is enabled.

Figure 16 — Example of a Manual Output Test screen



Touch the **Next Step** button to advance the test sequence to the next step. At the end of the test sequence, the controller exits Manual Output Test and is reset.

Touch the **Exit Manual Output Test** button at any time if you want to stop the test sequence and reset the controller.

Override

If any of the following alarms is active, the controller automatically exits Manual Output Test:

- Duct Static Pressure High Limit
- Low Supply Fan Air Flow
- Low Temp Detect
- Unit Shutdown

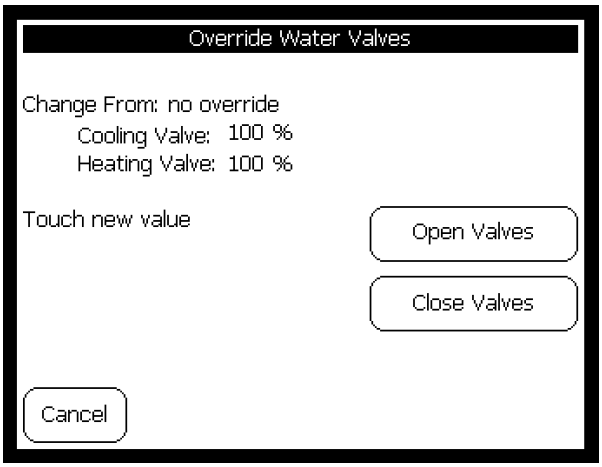
For details about Manual Output Test, refer to the AH540 Installation Owner Diagnostics manual.

Override Water Valves

This function allows you to override the heating and cooling valves to fully open or fully close them. This option is useful for water balancing. This option does not override steam heating valves.

From the Override List screen (see previous Figure 13), touch the **Override Water Valves** button. The Override Water Valves screen is displayed (see Figure 17), which lists the current value of the cooling and heating valve outputs.

Figure 17 — Override Water Valves screen



Touch the **Open Valves** or **Close Valves** button to open or close the valves. Any change to the valves prompts a confirmation screen that enables you to accept or reject the change before continuing.

The override time limit is 10 hours. During this time, the override can be released by touching the **Release Override** button, which appears on the Override Water Valves screen when an override is active.

For details about overriding water valves, refer to the AH540 Installation Owner Diagnostics manual.

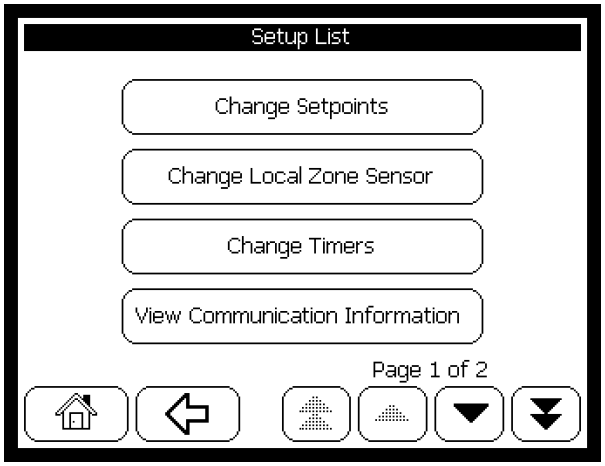
Setup

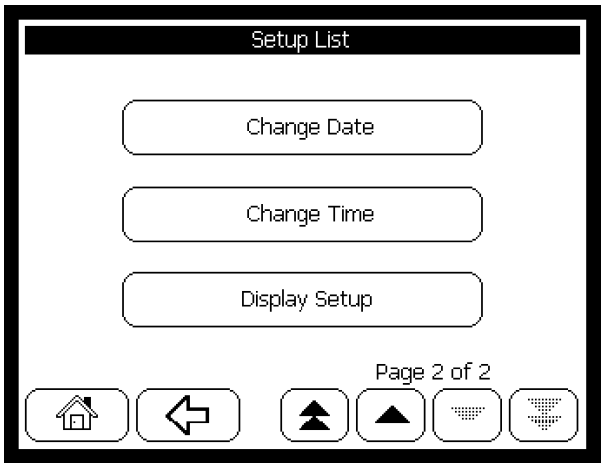
The Setup screens are used for two purposes:

- **AH540 configuration** such as setpoints and timers
- **Operator display configuration** such as date and time, screen brightness, and language

From the Home screen, touch the **Setup** button to access the Setup List (see Figure 18). Use the Up, Down, Home, and End buttons to move between pages of the list.

Figure 18 — Setup List pages





Setup

Setup parameters

The first six items on the Setup List are used to configure data in the AH540 controller. Table 3 summarizes the parameters that can be changed using these touch buttons.

Table 3 – Setup items used to configure the controller

Push Button	Parameter	Value
Change Setpoints	Discharge Air Cool Setpoint	°C/°F
	Discharge Air Heat Setpoint	°C/°F
	Duct Static Pressure Setpoint	Pa/in wc
	Outside Air Damper Min Position	%
	Exhaust Fan Start Setpoint	%
	Exh Fan Stop Differential	°C/°F
	Occupied Cooling Setpoint	°C/°F
	Occupied Heating Setpoint	°C/°F
	Standby Cooling Setpoint	°C/°F
	Standby Heating Setpoint	°C/°F
	Unoccupied Cooling Setpoint	°C/°F
	Unoccupied Heating Setpoint	
Change Local Zone Sensor	Space Sensor Calibration	°C/°F
	Local Setpoint Calibration	°C/°F
	Local Fan Switch	Enabled/Disabled
	Thumbwheel Setpoint	Enabled/Disabled
Change Timers	Occupied Bypass Time	Number of Minutes
	Maintenance Time	Number of Hours
View Communication Information	State, Product ID, Neuron® ID, DSN A, DSN B, Version, Profile	Activate Service Pin (see Note 1)
Change Date	Current date	DD-MMM-YYYY
Change Time	Current time	HH:MM AM/PM (12-hour clock format)

Note 1: The Communication Information screen contains a touch button to Activate Service Pin. Touching this button is the equivalent of pressing the Service button on the AH540 controller board. When the Activate Service Pin button is touched, the controller responds with the message Wink Received. Refer to the AH540 manual for more information about the Service function.

When you touch any of these buttons, a screen is displayed that lists the current value(s). To change a value, touch the button for the parameter, and then use the subsequent Change Value screen to enter a new value. Any change prompts a confirmation screen that enables you to accept or reject the change before continuing.

Operator display configuration

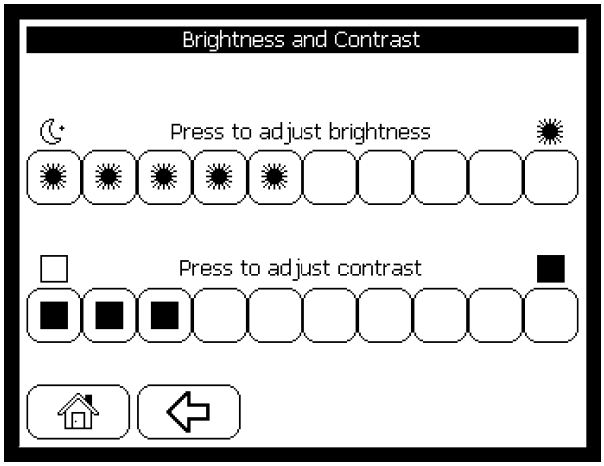
The last item on the Setup List, Display Setup, is used to configure the touch-screen operator display. Touch the **Display Setup** button to access the following items.

Adjust Brightness and Contrast

This item is used to adjust the brightness and contrast of the touch screen (see Figure 19). Touch a location along the spectrum for brightness (dim to bright) or contrast (light to dark). Then touch the Back arrow to return to the previous screen.

Setup

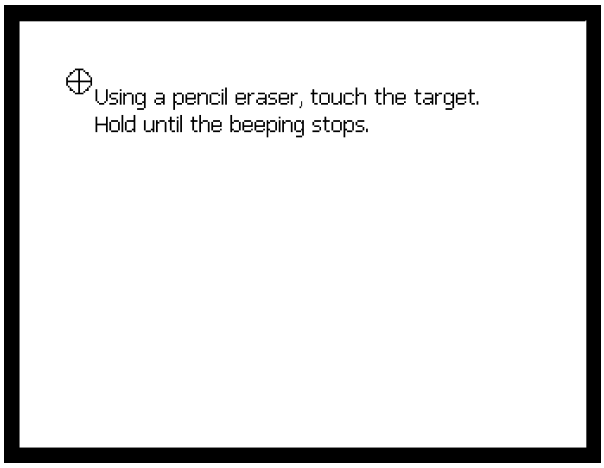
Figure 19 — Brightness and Contrast adjustment screen



Calibrate Touch Screen
This screen contains a target used to calibrate the screen (see Figure 20). Hold a pencil eraser on the target until the beeping stops. A second, similar screen is displayed with the target in another location. Again hold the pencil eraser on the target until the beeping stops. The display automatically returns to the previous screen.

If the same operator display is used in markedly different temperatures, recalibrate the screen to ensure optimum performance.

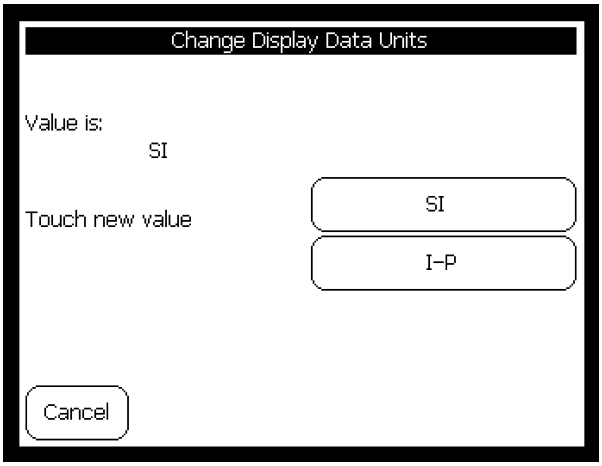
Figure 20 — Calibrate Touch Screen



Change Display Data Units
This screen lists the current units used to display parameters: I-P (Inch-Pound) or SI (Standard International). (See Figure 21). To change the units, touch the button for the new value. A confirmation screen enables you to accept or reject the change before continuing.

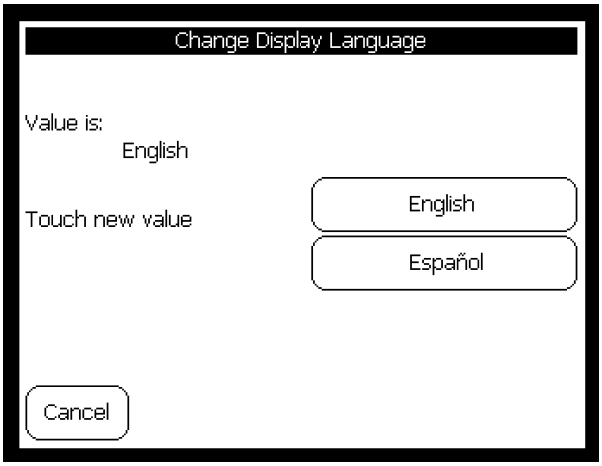
Setup

Figure 21 — Change Display Data Units screen



Change Display Language
This screen lists the language currently used to display text: English or Spanish (see Figure 22). To change the language, touch the button for your display language preference. A confirmation screen enables you to accept or reject the change before continuing.

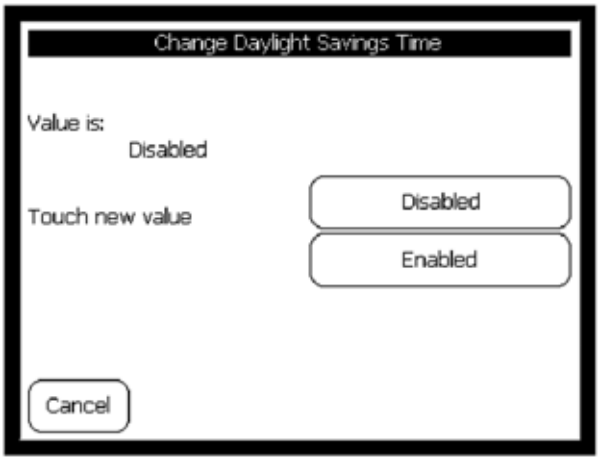
Figure 22 — Change Display Language screen



Setup

Daylight Saving Time
This screen allows you to enable or disable the use of daylight saving time (see Figure 23). When enabled, the AH540 controller automatically changes the operator display time clock at 2:00 a.m. on the first Sunday of April and the last Sunday of October. The current value is listed. To change the value, touch the appropriate button. A confirmation screen enables you to accept or reject the change before continuing.

Figure 23 — Daylight Saving Time screen

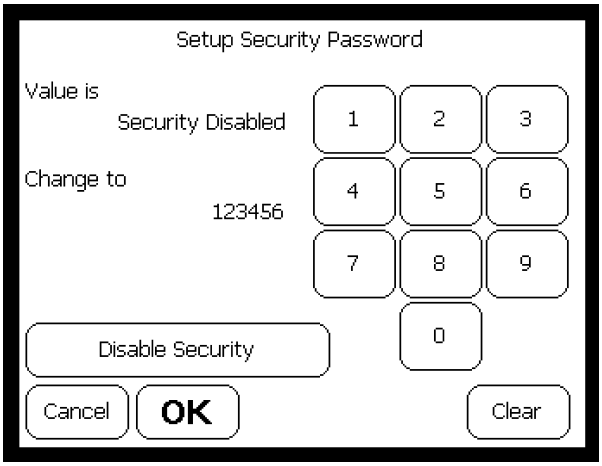


Setup Security Password
This screen allows you to configure a security password and enable or disable its use (see Figure 24). The current value (enable or disable) is listed. To configure or change the password, use the number keys to enter 4–8 numbers, then touch the OK button. This changes the password and enables security. To disable the use of the password, touch the **Disable Security** button. Any change to this screen prompts a confirmation screen that enables you to accept or reject the change before continuing.

The password is stored in the AH540 controller, not the operator display.

Setup

Figure 24 — Setup Security Password screen



Security

Security for the operator display is enabled by creating a valid password, which is stored in the controller. Security is disabled by disabling the password. For information about creating a password or enabling and disabling security, refer to Setup Security Password in the Setup section.

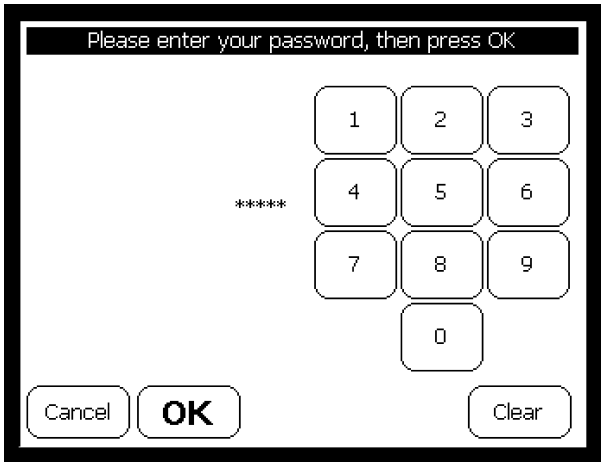
When security is disabled, any user can perform all tasks from the operator display without being required to enter a password and log on to the operator display. When security is enabled, the user is required to enter a password and log on to the operator display to change any of the following:

- Schedule override
- Manual output test
- Valve override
- Change setpoints
- Change local zone sensor
- Change timers
- Setup security password

Logon

The Logon screen (see Figure 25) is displayed if security is enabled and the user attempts to change a value protected by security. To logon, use the number keys to enter the password, then touch the OK button.

Figure 25 — Logon screen



Logoff

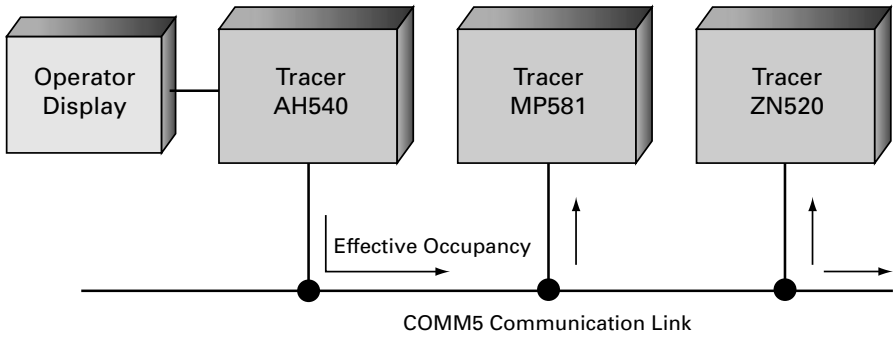
A user is automatically logged off after the operator display is idle for 30 minutes, or if the operator display is unplugged from the controller.

Applications

Scheduling more than one controller

More than one controller can be scheduled using a single operator display. Figure 26 describes an example.

Figure 26 — Scheduling more than one controller using one operator display



In this example, the stand-alone operator display with time clock is connected to the Tracer AH540 controller. First, set up the regular and exception day schedule for the AH540 controller. Then use the Trane Rover service tool to bind the effective occupancy of the AH540 controller to other controllers (connected to the COMM5 link) that should follow the same occupancy schedule. See the Rover service tool for information regarding binding of COMM5 network variables.

Stand-alone occupied standby mode

When an operator display is used to locally schedule the Tracer AH540 controller to occupied and unoccupied, a local sensor can be used to place the controller into occupied standby mode. Occupied standby can be used in a conference room, for example, in which the space will either be occupied or on “standby,“ but usually not totally unoccupied.

A local occupancy sensor can be wired to the occupancy binary input (IN 9) of the controller or to a communicated occupancy sensor input via COMM5. When the Tracer AH540 schedule is occupied and the occupancy sensor input is unoccupied, the occupancy mode of the controller is occupied standby. Refer to the previous Table 2.

When both wired and communicated occupancy sensors are present, the controller uses the communicated value input.

Occupied standby only applies to space temperature control operation.

Literature Order Number	CNT-SVX10A-EN
File Number	SV-ES-CNT000-SVX-10A-1201-EN
Supersedes	New
Stocking Location	La Crosse

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