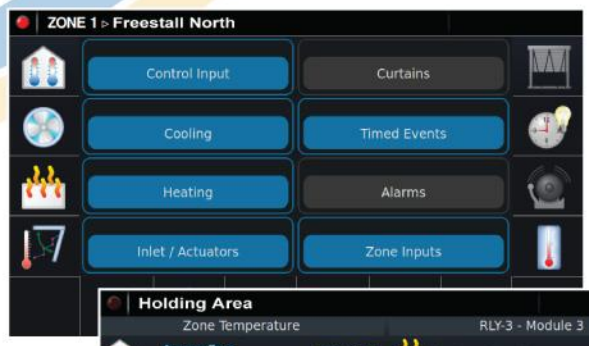
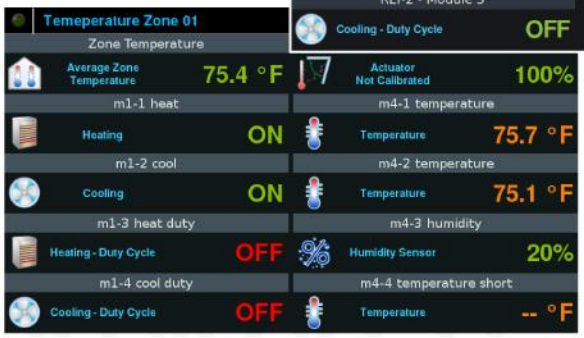
Auto FleX





User manual and installation guide

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Chapter 1: Introducing AutoFlex

Introducing AutoFlex

AutoFlex works with the Select Automation software of the OMNI Select application to control equipment according to your programmed settings.

AutoFlex is modular, meaning it gives you the flexibility to add what you need for your building configuration.

Standard AutoFlex configuration features

- Three **RM-4 Relay Modules** for a total of 12 general-purpose relays
- Two **ACT-1 Actuator Modules** for a total of two inlet actuators
- Two **IN-4 Input Modules** for a total of eight sensor connections
- One **VDC-4 Variable DC Module** for a total of four 0 to 10 volt DC signal outputs
- Space for six additional modules
- Color LCD display, 7 inch
- Alarm relay (for external alarm system)
- Large (22 x 15 x 7 inches) polycarbonate enclosure (corrosion resistant, water resistant, and fire retardant)
- Temperature probe; 30 feet, extendable to 500 feet
- Limited warranty (two years)

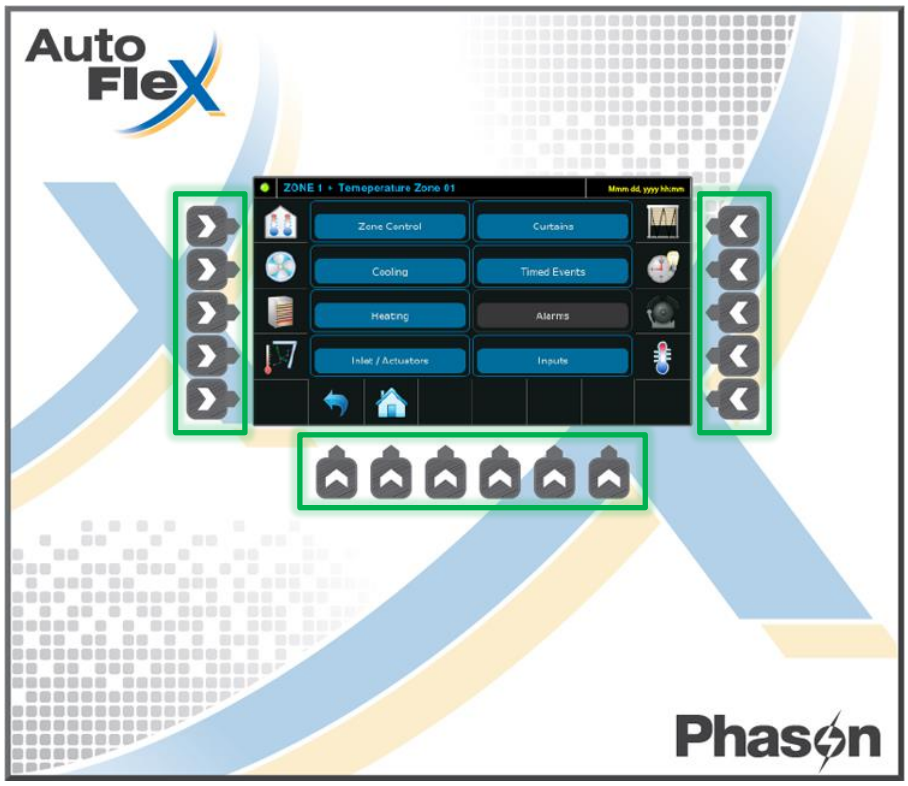
Electrical ratings

Control power	85 to 264 VAC, 50/60 Hz
Actuator Modules	15 A at 120/230 VAC, general-purpose (resistive) 1/2 HP at 120 VAC, 1 HP at 230 VAC
Relay Modules	15 A at 120/230 VAC, general-purpose (resistive) 1/2 HP at 120 VAC, 1 HP at 230 VAC
Variable DC Module	0 to 10 VDC, 2K Ω load
Alarm relay	0.4 A at 125 VAC; 2 A at 30 VDC, resistive load 0.2 A at 125 VAC; 1 A at 30 VDC, inductive load

Becoming familiar with AutoFlex

AutoFlex works with the Select Automation software of the OMNI Select application to control equipment according to your programmed settings. Configuration and programming must be done in the **Select Automation** software. After you have programmed AutoFlex, it can operate on its own, independent of OMNI Select.

AutoFlex front panel layout



The buttons on the sides and bottom of the display are how you access the control.

If a button points to an **enabled** icon, you can press the button to select that function/feature. An enabled icon is colored; an icon that is grayed out is not enabled.

Common icons

 Zones

 Global inputs

 Alarms

 Manual override

 Configuration

 Status viewer

 Locate stage/relay

 Go to main menu

 Go back one screen

 Refresh/reload

 Scroll up/increase

 Actuators

 Cooling elements/elay

 Curtains

 Heat elements/variable heating

 Heat relay

 Timed events

 Variable cooling

 Scroll to the top

 Scroll down/decrease

 Scroll to the bottom

 Zone inputs/temperature probes

 Static pressure zone/sensors

 Data only zone/sensors

 Humidity zone/ sensors

 Temperature zone/temperatures

 Rain sensor

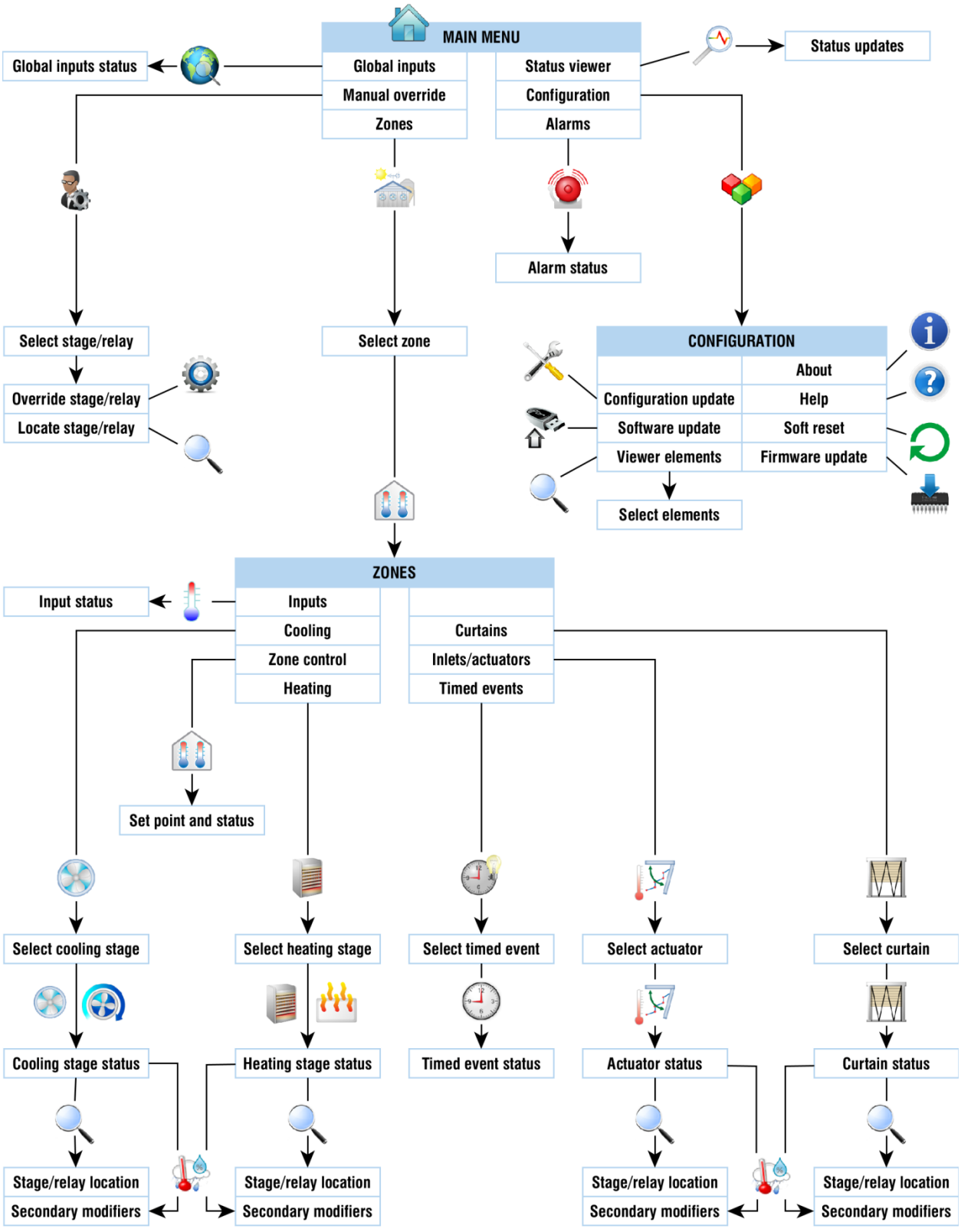
 Secondary modifiers

 Select all

 Select none

 Select single item

Menu and screen layout



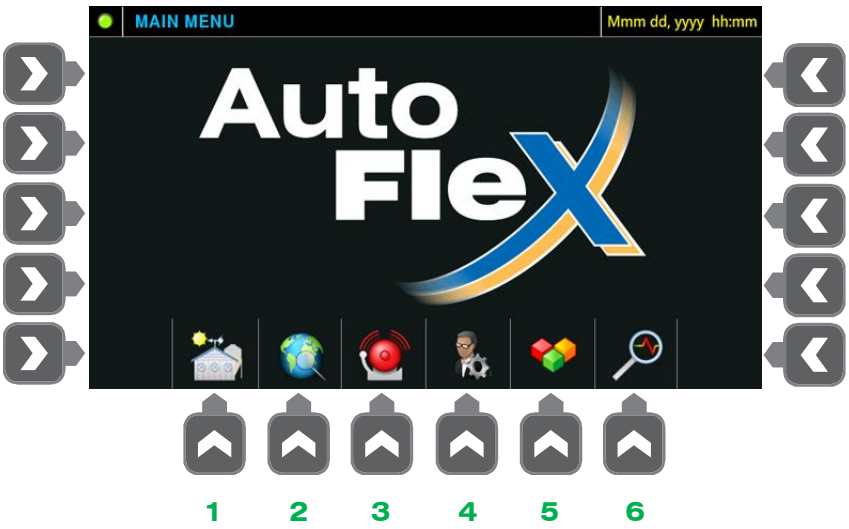
Moving through the screens

The following are some examples of menus and screens you will see. The examples and explanations here will give you a good overview of how to move about the AutoFlex screens. There is a **description of the icons** on page 7. There is a chart of the **menus and screens** on page 8.

MAIN MENU

When you start (power on) the AutoFlex, it goes through a system check and then displays the MAIN MENU. Pressing the button beside or below an icon takes you to that menu or screen.

To get back to the MAIN MENU from other screens, press the button below the home icon.

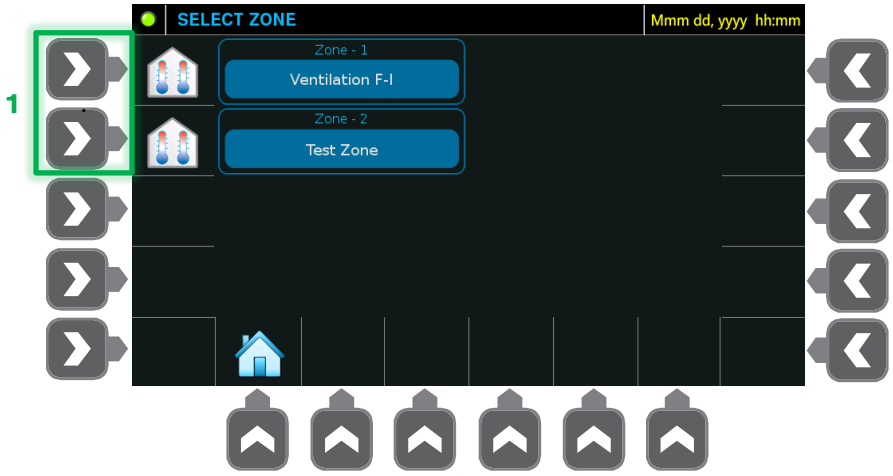


1. To go to ZONES, press the building button.
2. To go to GLOBAL ELEMENTS, press the globe button.
3. To go to ALARMS, press the alarm button.
4. To go to MANUAL OVERRIDE, press the man button.
5. To go to CONFIGURATION, press the cubes button.
6. To go to the STATUS VIEWER, press the magnifying glass button.

ZONES

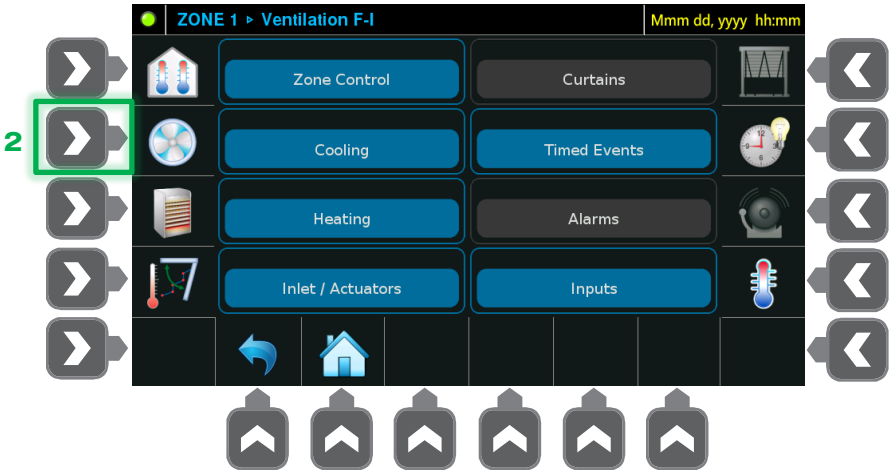
The ZONE screens are where you view the settings and status of all your zones. You can configure up to 16 zones. To get to the ZONES screens, press the building button in the MAIN MENU.

1. Press the button for the zone you want to view.

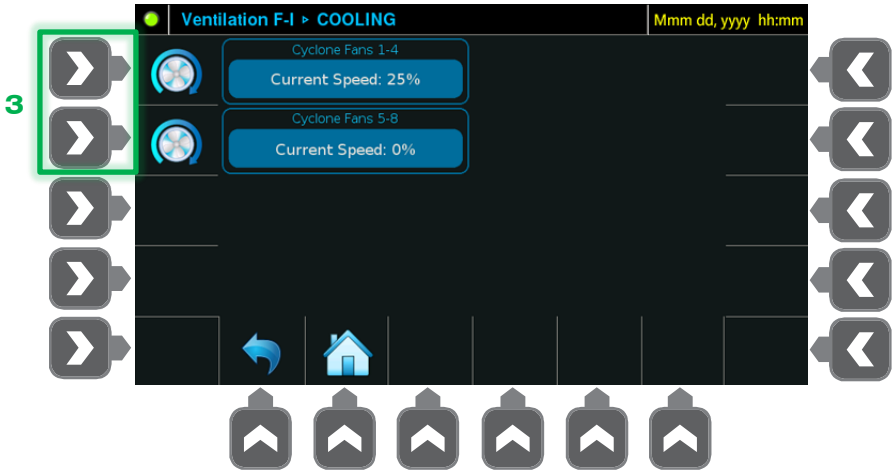


Items that are colored are available or configured; items that are grayed out are not. In the example below, there are no curtains or alarms.

2. Press the button for one of the icons to view the available elements of that type. For example, press the fan button to view a list of cooling relays and variable stages.



3. Press the button for any of the elements to view the EQUIPMENT STATUS screen for that element.

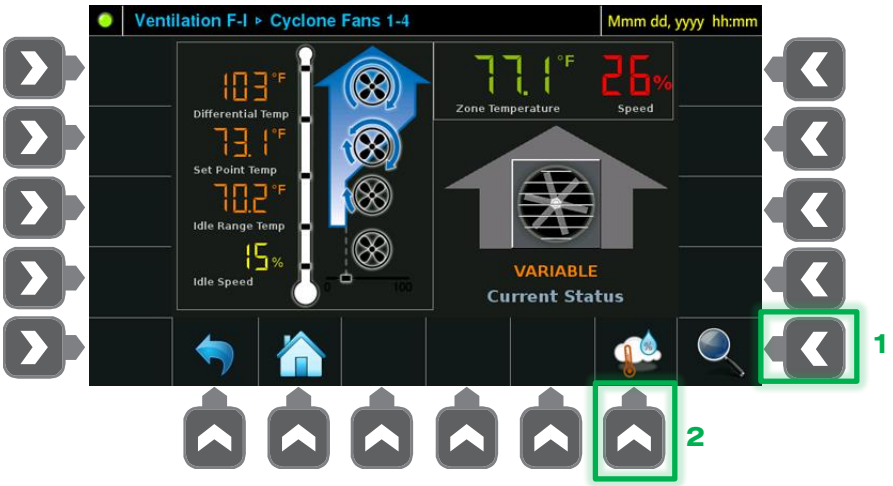


EQUIPMENT STATUS

EQUIPMENT STATUS screens display the settings and current status for the equipment. The screens are different for each type of equipment (variable stage, relay, actuator, and so on). You get to the EQUIPMENT STATUS screens from ZONES.

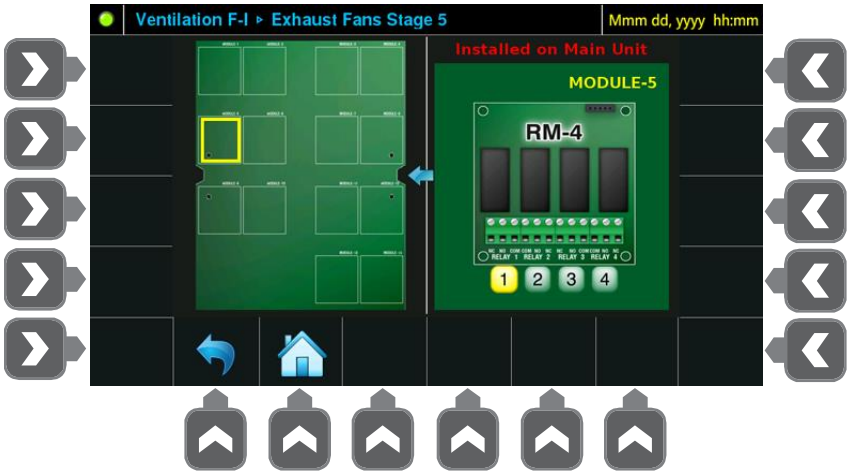
For heating and cooling stages, inlet actuators, and curtains, you can view information about secondary modifiers and show the location of that stage or relay inside the AutoFlex.

1. To show the location of the stage or relay inside the AutoFlex, press the magnifying glass button.
2. To view the secondary modifiers, press the cloud button.



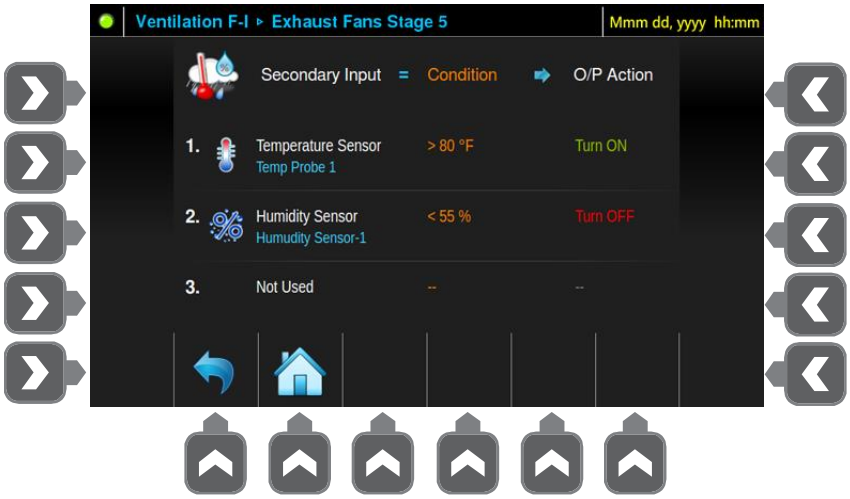
Location

The location screen shows the relay or stage the equipment is connected to and the location of the module on the mounting board. In the example below, the exhaust fan is connected to the first relay on an RM-4 module located at the MODULE-5 position.

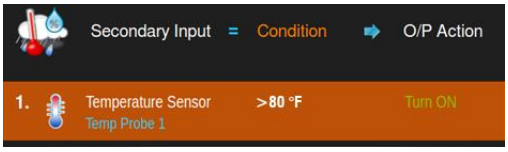


Secondary modifiers

The secondary modifier screen shows any modifiers you have set up for the equipment you previously selected. In the example below, the exhaust fan has two secondary modifiers: one for temperature, and one for humidity.



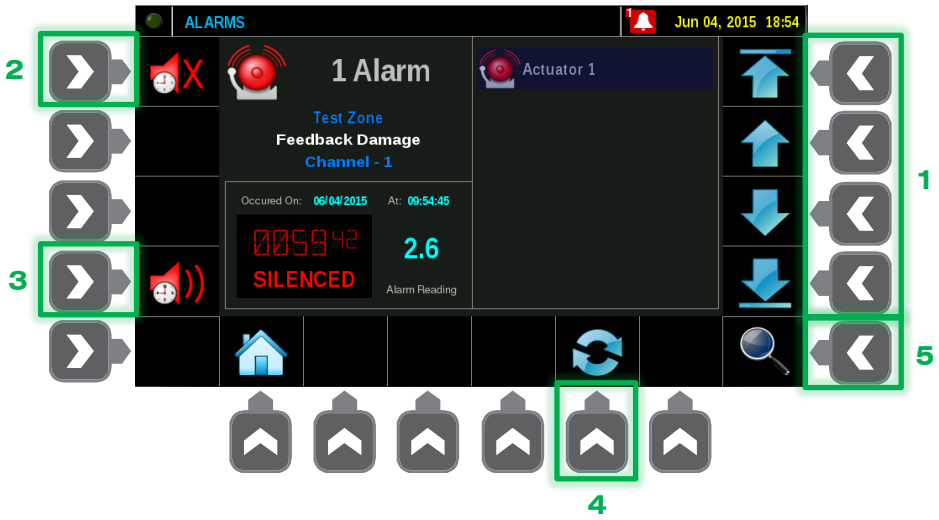
If a condition is met and the modifier is active, it will be highlighted.



ALARMS

The ALARMS screen displays a list of alarms that have not been acknowledged (in the Select Automation software).

1. The arrow buttons let you scroll through the list of alarms. As you scroll through the list, information about each alarm displays.
2. To silence (mute) all alarms for up to 6:00 hours, press the mute button.
3. To remove alarm silencing all alarms, press the button beside the alarm sound icon.
4. To refresh the alarm list, press the button below the refresh button.
5. To show the location of the relay or module that has the alarm, press the magnifying glass button. This function is not available for zone alarms.



MANUAL OVERRIDE

MANUAL OVERRIDE allows you to override the automatic settings of your connected equipment. To get to the MANUAL OVERRIDE screen, press the man/gear button in the MAIN MENU.

1. The arrow buttons let you scroll through the list of variable stages and relays.
2. When the element (variable stage, relay, and so on) you want to override is highlighted, press the man/gear button.

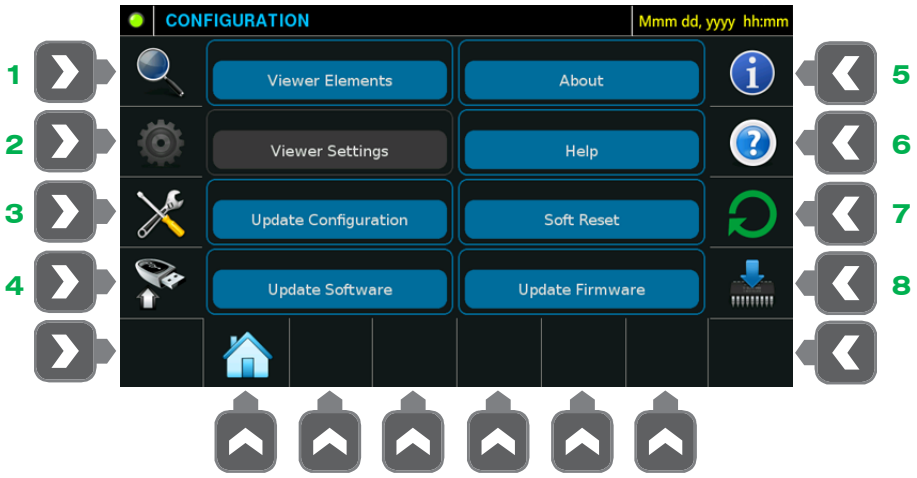
3. To adjust the status, press the arrow buttons **on the left**.
   - Relays: ON or OFF
   - Variable stages and actuators: 0 to 100%
   - Curtains: OPEN, CLOSE, or IDLE
4. To put the element in manual mode, press the man/check button.
5. To take the element out of manual mode and return to automatic mode, press the gear button.

An element stays in manual mode until you put it back into automatic mode or restart the AutoFlex.

CONFIGURATION

The CONFIGURATION MENU is where you configure the viewer, update the software and firmware, and restart the display. To get to the CONFIGURATION MENU screen, press the cubes button in the MAIN MENU.

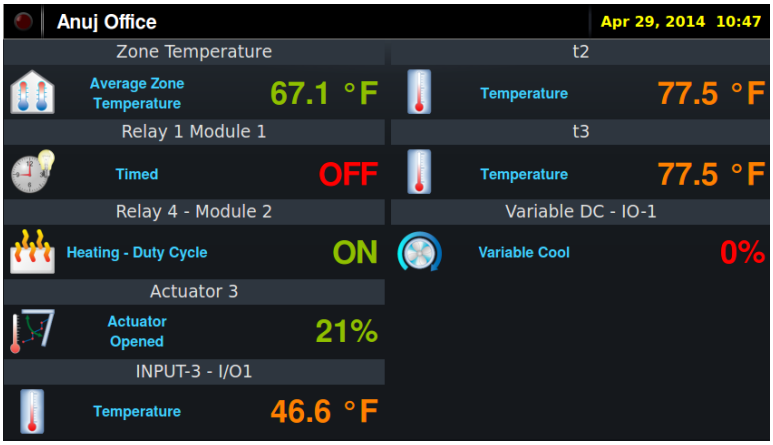
1. Press the magnifying glass button to go to the viewer configuration screen.
2. This item is not used.
3. Press the wrench button to manually refresh all configuration and settings.
4. Press the USB stick button to start the software update process.
5. Press the information button to display the name, address, and versions.
6. Press the help button to display help information.
7. Press the refresh button to restart the display.
8. Press the microchip button to start the firmware update process.



STATUS VIEWER

The STATUS VIEWER scrolls through information and can display the status of all elements in all zones. You can choose which items to display by selecting them in the CONFIGURATION MENU.

The STATUS VIEWER automatically displays when AutoFlex has been left at the MAIN MENU and idle for one minute. To go directly to the STATUS VIEWER, press the magnifying glass button in the MAIN MENU.



Chapter 2: Installing the AutoFlex control

What you need to know before installing

- ◇ If you do not install external surge suppression devices, you risk damage to the electronics inside the control, which may cause the control to fail.
- ◇ Because it is not possible to completely protect this product internally from the effects of power surges and other transients, we highly recommend that you install external surge suppression devices. For specific recommendations, see your electrical contractor.
- ◇ If you do not take these precautions, you acknowledge your willingness to accept the risk of loss or injury.

Understanding power surges and surge suppression

Power surges can be caused by external influences (outside the barn – for example, lightning or utility distribution problems) or they can be caused internally (inside the barn – for example, starting and stopping inductive loads such as motors).

One of the most common causes of power surges is lightning. When lightning strikes the ground, it produces an enormously powerful electromagnetic field. This field affects nearby power lines, which transmit a surge to any device connected to it, such as lights, computers, or environmental controls like the control. Lightning does not have to actually strike a power line to transmit a surge.

Surge suppression devices offer some protection from power surges. Because it is not possible to internally protect this product completely from the effects of power surges and other transients, Phason highly recommends that you install external surge suppression devices. For specific recommendations, see your electrical contractor. If you do not take these precautions, you acknowledge your willingness to accept the risk of loss or injury.

Reducing electrical noise using filters

Electrical noise is caused by high voltage transients created when inductive loads, such as power contactors, are switched on or off. The strength of the transients can be over 1000 volts and can vary with the type of equipment and wiring, as well as several other factors.

Symptoms of electrical noise include erratic control operation, cycling inlets, communication problems, and more. However, the effects of electrical noise are not always visible. Over time, electrical noise can cause electronic circuits, relay contacts, and power contactors to deteriorate.

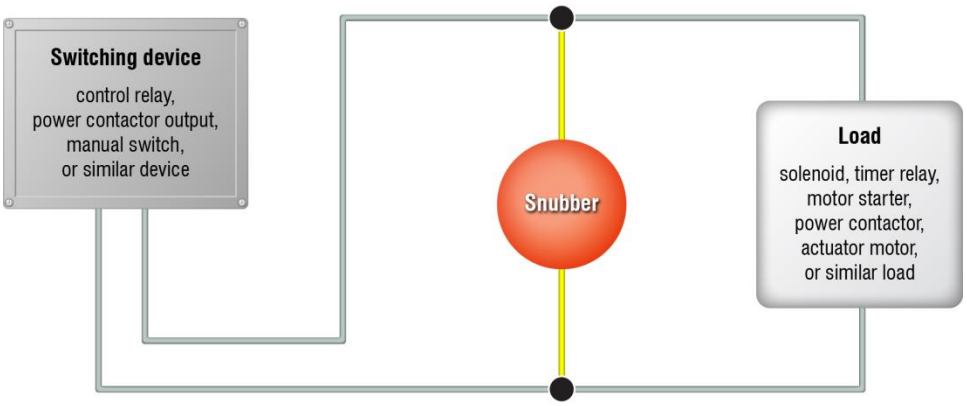
Phason highly recommends installing filters on all inductive loads.

Installing filters helps extend the life of equipment

Filters help prevent electrical noise problems by absorbing the transient energy. Even if you do not have *visible* symptoms of electrical noise, filters help keep controls operating reliably and can extend the life of the controls and equipment connected to them.

Phason's snubber filters (part number 127-0) are for use with solenoids, timer relays, DC motors, furnaces, and other equipment connected to the control's relays. You can also use the filters with loads connected to power contactors.

Install a filter in parallel with the load, as shown in the following example.



TIP

- ◇ Do not use Snubber filters with variable stages.
- ◇ Some power contactors include snubber filters. For more information, read **Using power contactors to increase the capacity of relays** below.
- ◇ For more information about snubber filters or other Phason accessories, see your dealer or visit **www.phason.ca**.

Using power contactors to increase the capacity of relays

Phason's 240-volt power contactors are heavy-duty relays that allow you to increase the load handling capability of control relays. Power contactors are ideal for secondary ventilation fans and electric heaters.

Phason's power contactor relays have the following electrical ratings.

- ◆ **Coil** 10.2 mA at 240 VAC
- ◆ **Contact** 25 A at 240 VAC; resistive
  2 HP at 240 VAC, 1 HP at 120 VAC; motor, power factor 0.4
  1300 W at 120 VAC; tungsten

For more information about power contactors, visit **www.phason.ca**.

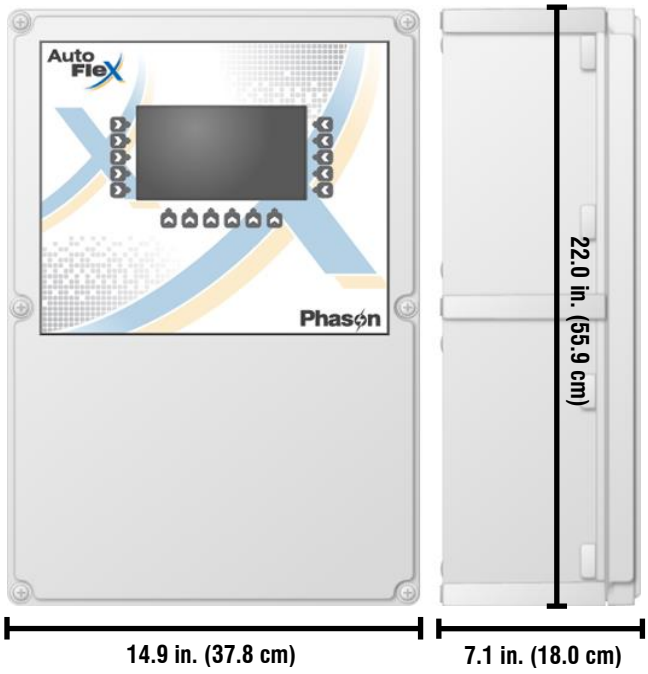
Electrical ratings

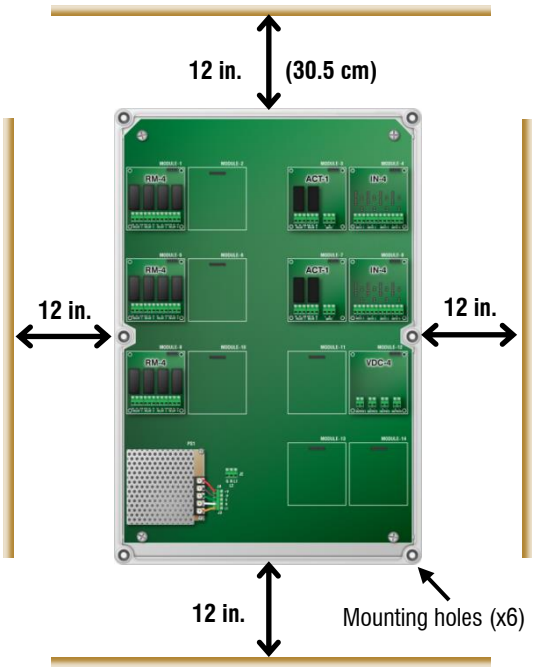
◆ Control power	85 to 264 VAC, 50/60 Hz
◆ Actuator Modules	15 A at 120/230 VAC, general-purpose (resistive) 1/2 HP at 120 VAC, 1 HP at 230 VAC
◆ Relay Modules	15 A at 120/230 VAC, general-purpose (resistive) 1/2 HP at 120 VAC, 1 HP at 230 VAC
◆ Variable DC Module	0 to 10 VDC, 2K Ω load
◆ Alarm relay	0.4 A at 125 VAC; 2 A at 30 VDC, resistive load 0.2 A at 125 VAC; 1 A at 30 VDC, inductive load

NOTE

You can connect more than one piece of equipment to a variable stage or relay as long as they are the same type (for example, two fans) and the total current draw does not exceed the relay's limit.

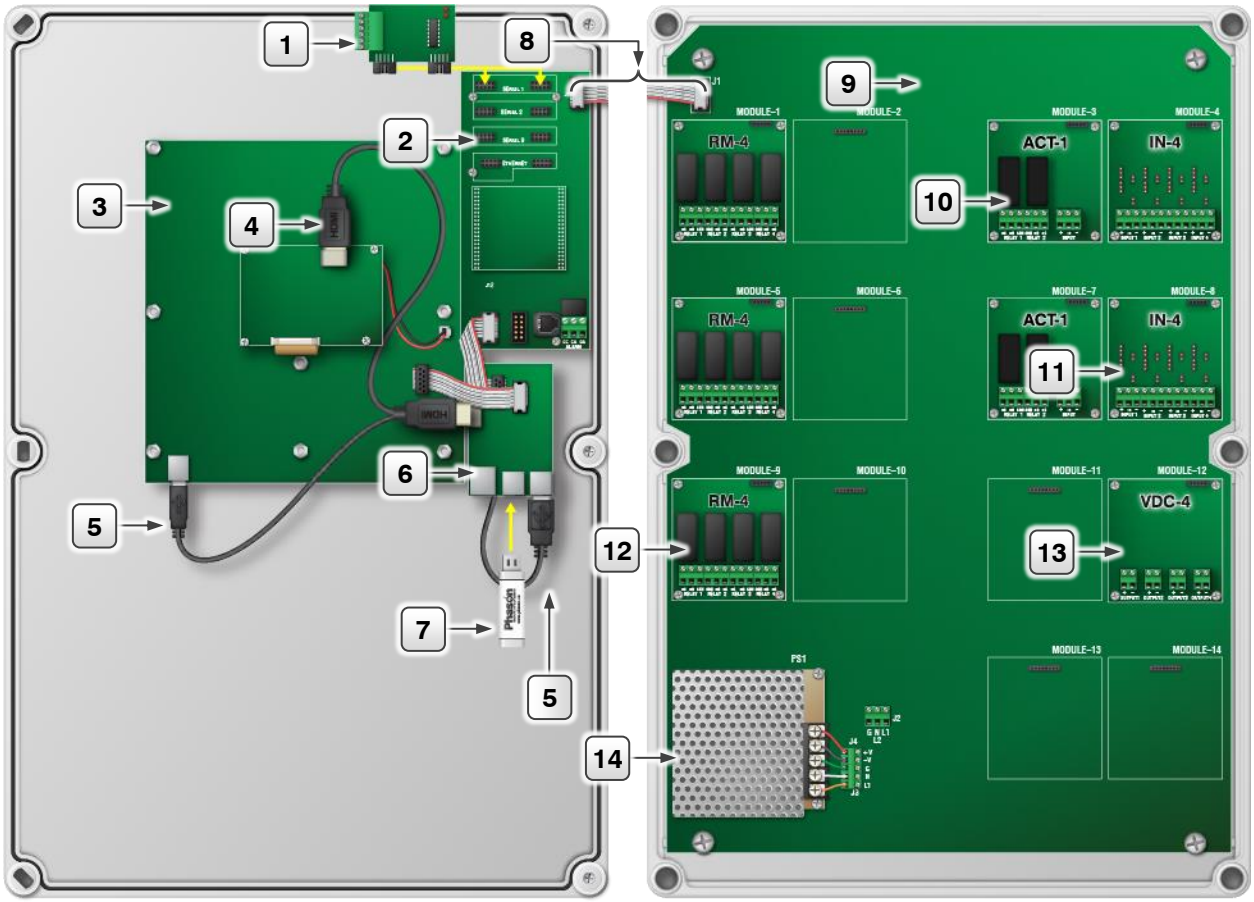
Enclosure dimensions and mounting guidelines





- ◆ Mount the control on a sheltered, vertical surface.
- ◆ Mount the control with the electrical knockouts facing down.
- ◆ Mount the control away from sources of moisture and heat.

AutoFlex layout



1	**RS485 module:** connect the communication wiring to the RS485 module, and then connect the module to the communication board. See page 27.
2	**Communication board:** make sure the ribbon cable is connected from the communication board to the mounting board. If you have an external alarm system, connect it here. See page 27.
3	**Display board:** make sure all cables are properly connected.
4	**HDMI cable (video):** make sure the cable is properly connected from the controller board to the display board.
5	**USB cable (front panel buttons):** make sure the cable is properly connected from the controller board to the display board.
6	**Controller board and power supply:** make sure the power supply (top board) is properly connected to the controller (bottom board), and all cables are properly connected.
7	**USB drive:** (appearance may vary) make sure the USB drive is properly connected to a USB port.
8	**Ribbon cable**: make sure the ribbon cable is connected from the communication board to the mounting board.
9	**Mounting board:** make sure all module boards, incoming power, and the ribbon cable from the communication board are properly connected.
10	**Actuator Module:** connect curtain machines, actuators, and actuator feedback wiring. See page 21.
11	**Input Module:** connect temperature probes, humidity sensors, and other types of inputs. See page 23.

12	**Relay Module:** connect any equipment that is either ON or OFF. Examples include lights and single speed fans. See page 24.
13	**Variable DC Module:** connect any equipment requiring a 0 to 10 VDC signal input. Examples include variable frequency drives and slave units. See page 26.
14	**Power supply:** connect 120/230 VAC, 50/60 Hz power. See page 30.

Connecting equipment to Actuator Modules

The standard configuration comes with two Actuator Modules (**model ACT-1**). Each module has one OPEN and one CLOSE relay, and a connection for potentiometer feedback. You can connect an actuator or a curtain machine to an Actuator Module.

Actuators

Actuator control is for equipment that is not OFF or ON, but instead varies by a percentage. For example, inlets can be open between 0 and 100 percent. Actuators use a feedback potentiometer to indicate their position to the control.

Typically, linear actuators are connected directly to the inlets, or by cables and pulleys. Inlets are generally located in the ceiling or walls. Inlet systems are usually spring loaded to aid in closing the inlet, or counter weighted to aid in opening the inlets.

Feedback potentiometers

Each actuator you connect must have a feedback potentiometer. The feedback potentiometer, which you connect to INPUT terminal on the Actuator Module, lets the control know how far the actuator's arm is extended.

Most linear actuators are available with potentiometer feedback and internal adjustable limit switches. A 10,000 ohm, 10-turn feedback potentiometer is preferred, but the internal feedback potentiometer can range between 1000 and 20,000 ohms. Potentiometers outside of this range will affect the precision to which the control can control the actuator.

A system operates more precisely when using the largest amount of stroke that is feasible with the actuator. The stroke is the distance the actuator arm extends or retracts.

Curtain machines

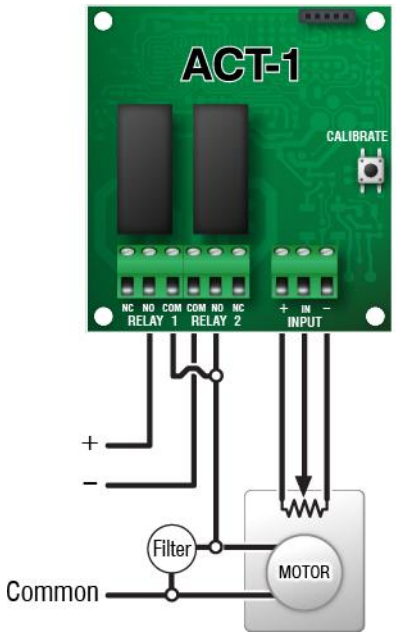
Curtains are usually controlled by equipment called curtain machines (sometimes referred to as winches). Curtains are opened and closed to let in more air or less air, the idea being more air cools the building. Curtain machines use a timer and do not have a feedback potentiometer.

The ratings of the actuator or curtain machine must not exceed the relay ratings of the Actuator Module. For more information, read **Electrical ratings** on page 19.

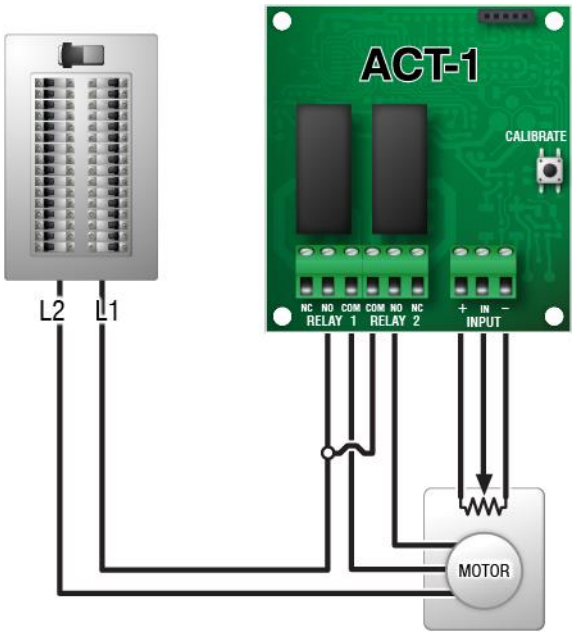
To connect actuators

1. Connect actuators to the control as shown below. Refer to your actuator's installation guide for information about its power supply requirements.
2. Calibrate the actuator. You can calibrate by pressing the CALIBRATE button, or using the display. For more information the calibration process, and instructions for calibrating using the display, read **Calibrating actuators** on page 35.

DC powered actuators



AC powered actuators

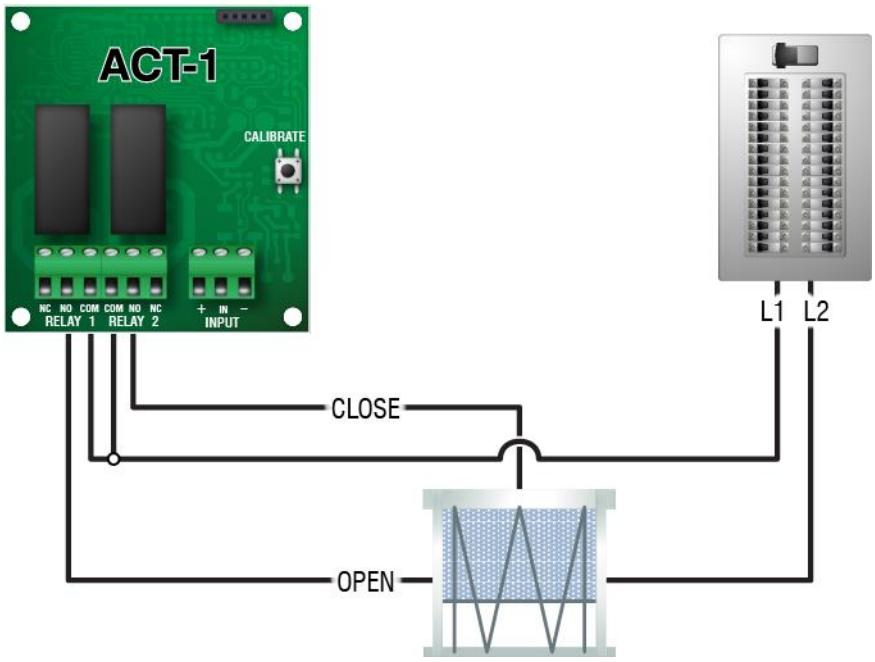


NOTE

- ◇ If you are unsure of the potentiometer wiring for your actuator, read **Determining correct actuator feedback wiring** on page 36.
- ◇ When routing the actuator feedback wires, do not run them in or along the same conduit as AC-power lines.
- ◇ If you are measuring AC power with a digital multimeter (DMM) and a limit switch opens the circuit, the DMM measures voltage after the relay switch even if the relay is open.

To connect curtain machines

Connect curtain machines to the control as shown below.



Connecting sensors to Input Modules

The standard configuration comes with two Input Modules (**model IN-4**). Each Input Module has connections for four analog sensors of the following types.

Phason sensors

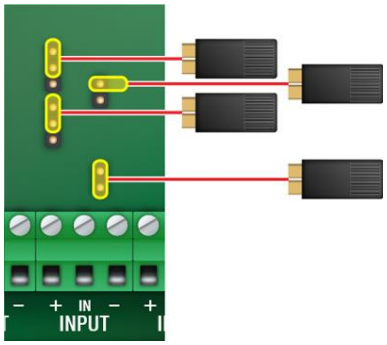
- 3K temperature probe
- Relative Humidity Sensor (models RHS and RHS-P)
- Static Pressure Sensor (model SPS-2)
- Rain Sensor (model PRS)

Guidelines for connecting all sensors

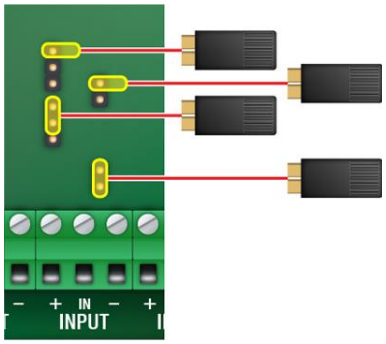
- Do not run the probe cable in the same conduit as AC power cables
- Do not run the sensor cable beside AC power cables or near electrical equipment.
- When crossing other cables or power lines, cross them at a 90-degree angle.

Shunt positions for Phason sensors

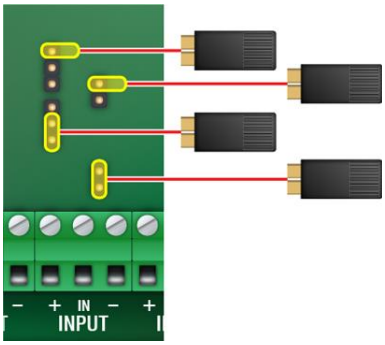
3K temperature probe and Phason Rain Sensor



Relative Humidity Sensor

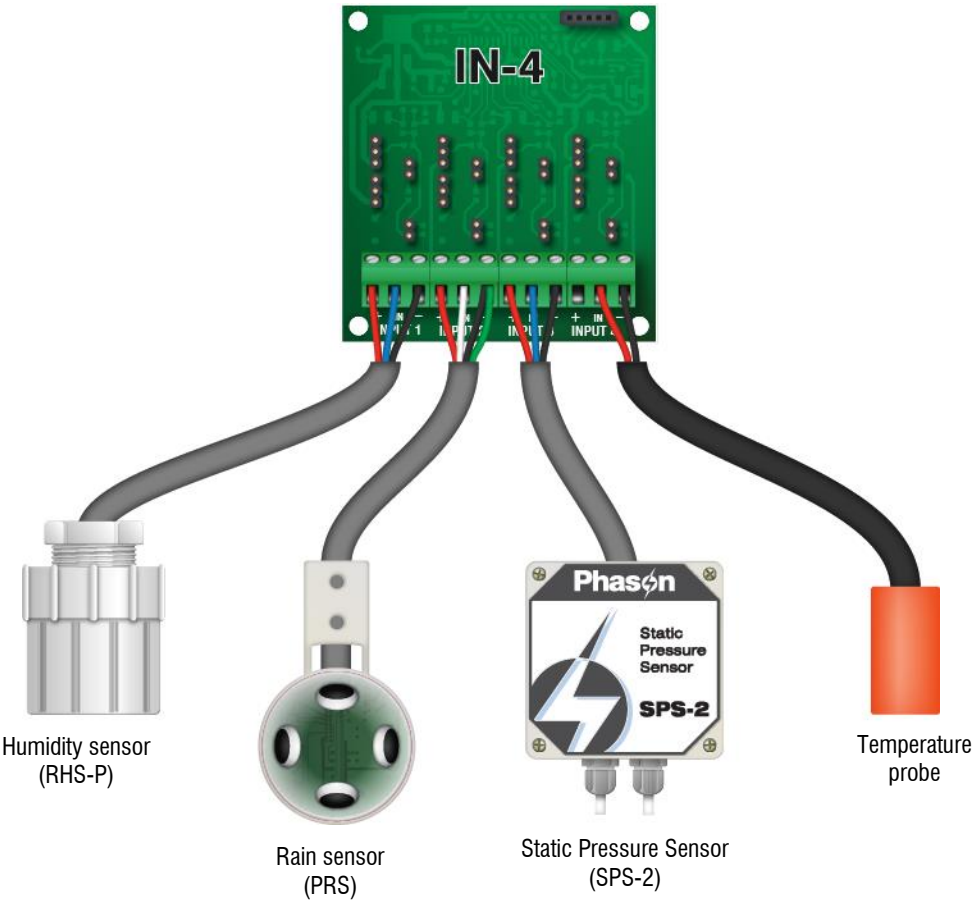


Static Pressure Sensor



Wiring for Phason sensors

After placing the shunts in the proper positions, connect sensors as shown below. For additional information, read the installation guide for the specific sensor.



Connecting equipment to Relay Modules

The standard AutoFlex configuration comes with three Relay Modules (**model RM-4**). Each module has four general-purpose relays for connecting equipment that is either on or off. Examples include heaters, furnaces, single-speed fans, and lights. You can also use a relay as a disconnect switch for a 0 to 10 VDC device.

For curtain machines, read **Connecting equipment to Actuator Modules** on page 21.

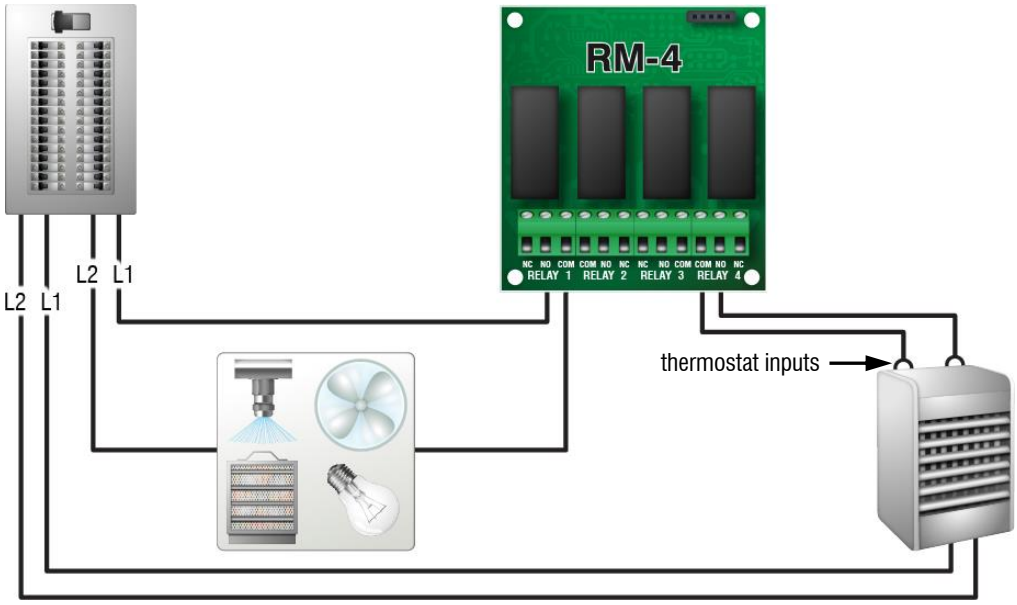
- ◇ The ratings of the equipment you connect must not exceed the ratings of the Relay Module. For more information, read **Electrical ratings** on page 19.
- ◇ Gas furnaces using hot-surface ignition or glow plugs can draw more current than indicated on their nameplate and require power contactors. For more information, contact your furnace dealer.

Connecting single-stage heating or cooling elements

Heating or cooling elements include equipment such as electric heaters, furnaces, single-speed fans, and sprinklers.

To connect single-stage heating or cooling elements

Connect single-speed heating or cooling elements to the control as shown below.



Connecting equipment to Variable DC Modules

The standard AutoFlex comes with one Variable DC Module (model VDC-4). Each module has four 0 to 10 V outputs for controlling variable frequency drives or FanDRIVEs.

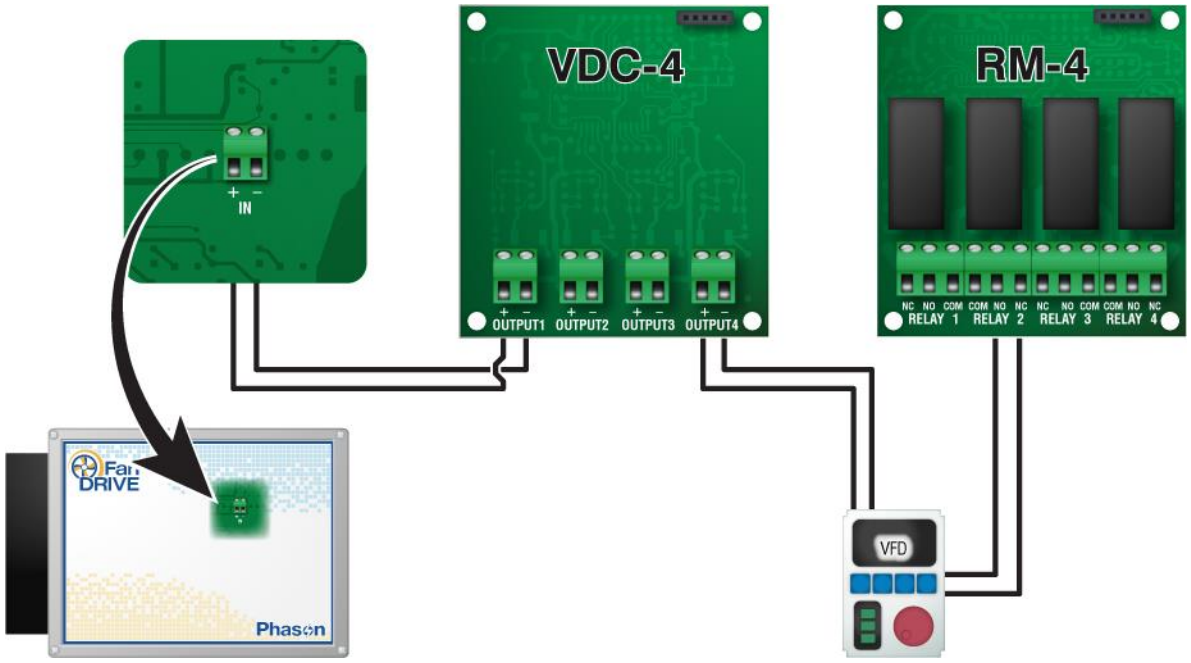
The ratings of the equipment you connect must not exceed the ratings of the Variable DC Module. For more information, read **Electrical ratings** on page 19.

FanDRIVEs

FanDRIVEs are a cost-effective way to increase the capacity of your fan control system. Installation is simple and there is no additional configuration required; FanDRIVEs follow the programming of the AutoFlex.

There are two FanDRIVE models available. Model FD-2-7 has two 7 FLA stages, model FD-1-14 has one 14 FLA stage. For more information about FanDRIVEs, visit **www.phason.ca**.

To connect variable frequency drives or FanDRIVEs



NOTE The disconnect relay for the variable frequency drive is a relay on an RM-4 module. Configure the relay to follow the variable DC output. For more information, refer to the **Select Automation user manual**.

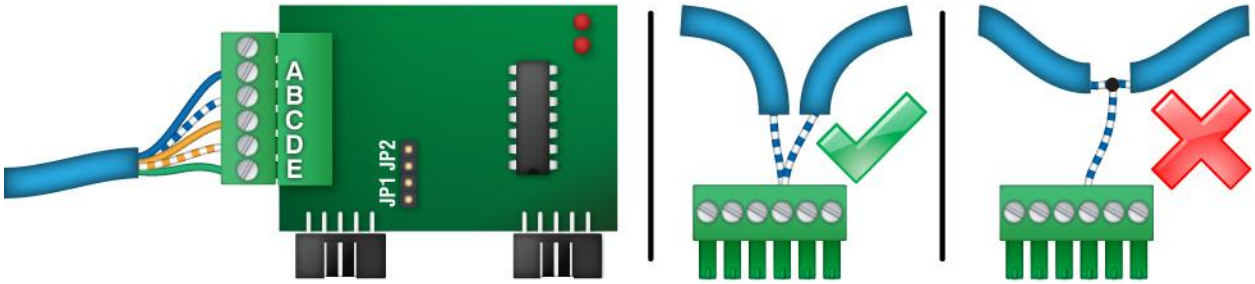
Connecting the communication wiring

There are two options for communication: wired communication using the included RS485 Module, or wireless communication using the optional iWire Flex.

Wired communication using the RS485 Module

Controls communicate with the computer through the RS485-FD Converter. The RS485-FD connects to all AutoFlex controls and other OMNI Select devices using CAT5 communication cable.

The following diagram is an overview of connecting the wiring, and continuing it from one device to the next. You can find complete instructions for connecting the communication wiring in the **RS485-FD Converter installation guide**, and the **OMNI Select user manual**.



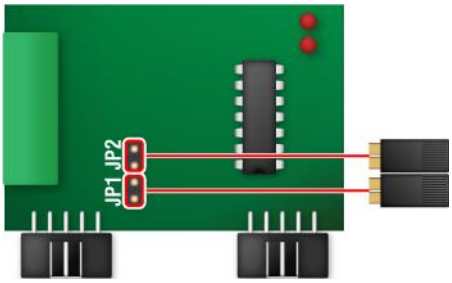
Connect the communication wires to the **ABCDE** positions on the communication connector, **in the order shown. The order must be the same at each device.** When continuing from one device to the next, connect the two wires to each position in the connector; **do not use branches or T-connections**.

A blue
B blue/white
C orange
D orange/white
E green

Termination jumpers

The last device on the communication channel must have the termination shunts installed. All other devices on the communication channel must have the shunts removed. When connecting the communication wiring, make sure to place the jumpers in the proper positions.

Remove the termination shunts from all devices on the communication channel, **except the last one**.



Make sure the shunts are in place for the last device on the communication channel.

Wireless communication using iWire

iWire Radios provide wireless RS485 communication with other iWire Radios and connected devices. A version of iWire Radios called iWire Flex (**model IWIRE-FLEX**) installs inside the Phason Communication Hub (PCH) or any Phason Flex-compatible device, such as AutoFlex.

iWire is for users who want to avoid running communication cable between buildings, or to remote, hard-to-get-to devices or locations. Typical applications include using iWire in place of expensive trenching of underground CAT5 cable.

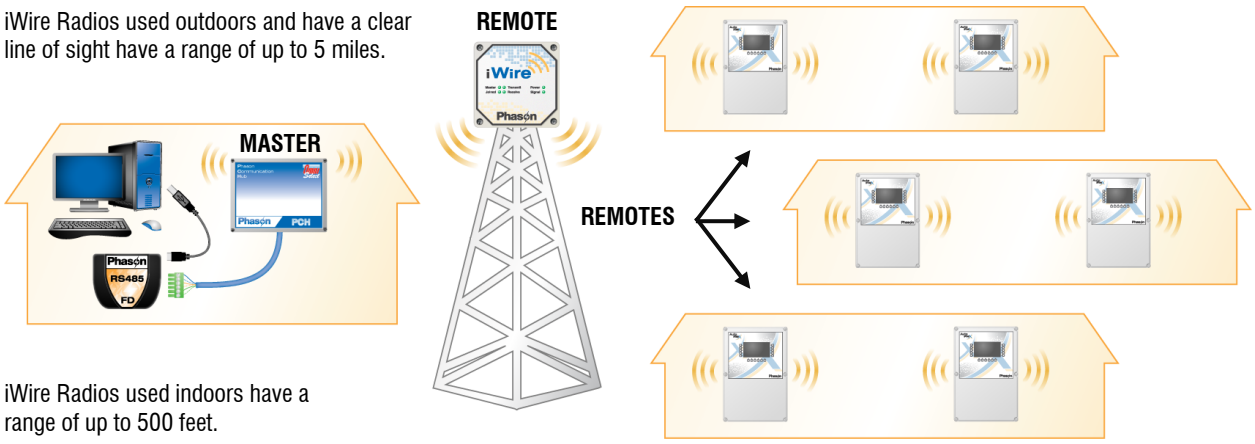
iWire Radios have an outdoor, line-of-sight range of up to 5 miles, and an indoor range of up to 500 feet. Range can vary depending on obstacles, building structure, or interference from other electrical devices.

How iWire works

An iWire network consists of two or more iWire Radios or iWire Flex Radios. One Radio on the network is a **Master Radio**; all others are **Remote Radios**.

The Master Radio connects to the communication channel after the RS485 Converter. The Master Radio communicates with all Remote Radios on the network. The Remote Radios send information from the OMNI Select devices to the Master.

The example below shows an iWire Flex mounted in the Phason Communication Hub (PCH) as the Master Radio. All other iWires are Remote Radios. A standard iWire Radio is mounted on a tower to enhance communication between the office and the outer buildings. An iWire Flex is mounted in each AutoFlex control in the buildings.



For complete iWire instructions, refer to the iWire or **iWire Flex installation guide**.

Connecting an alarm system

You can connect an alarm system such as a siren or alarm panel to the control's alarm terminal. Read your system's installation guide for installation instructions and information about the type of system: **normally open** or **normally closed**. Below are the descriptions for the alarm terminal.

- **CC:** common connection
- **CA:** normally open; closes during alarm conditions
- **OA:** normally closed; opens during alarm conditions

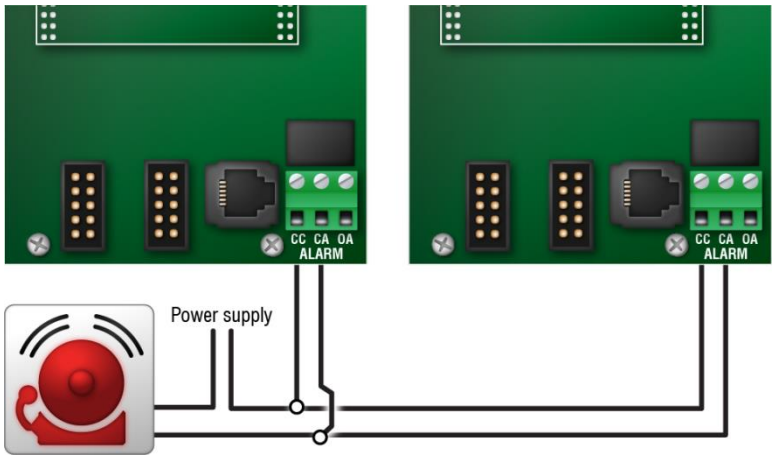
For the alarm system to trigger during an alarm condition, you must enable the alarms. For more information, read the **Programming alarms** section in the **Select Automation user manual**.

> The ratings of the alarm system you connect must not exceed the ratings of the alarm relay.

To connect a normally open alarm system

If you are connecting the alarm system to multiple AutoFlex controls and your system uses a **normally open** connection (closes on alarm), connect the system as shown in the normally open diagram.

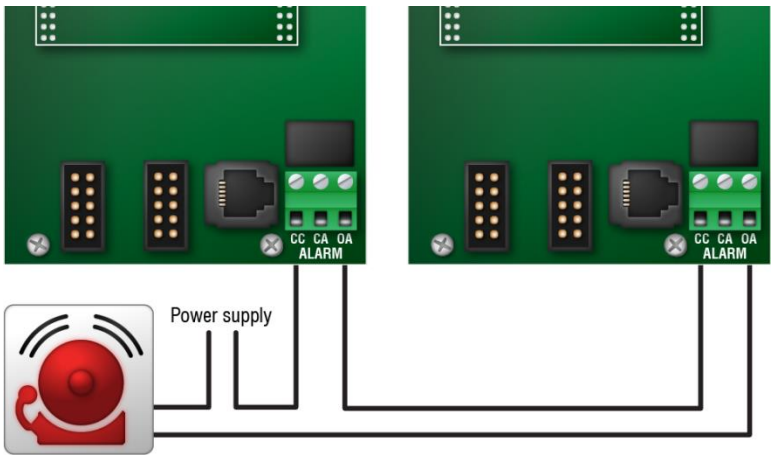
Join all the **CC** connections together and all the **CA** connections together. The AutoFlex alarm relays must be in parallel with each other so any AutoFlex can trigger the alarm system when an alarm condition occurs.



To connect a normally closed alarm system

If you are connecting the alarm system to multiple AutoFlex controls and your system uses a **normally closed** connection (opens on alarm), connect the system as shown in the normally closed diagram.

Join the alarm relays in a continuous loop. The AutoFlex alarm relays must be in series with each other so any AutoFlex can trigger the alarm system when an alarm condition occurs.

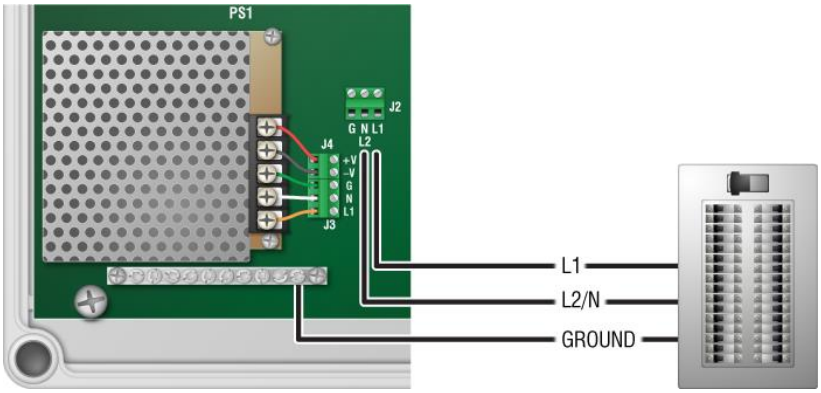


Connecting the power source

- ◇ Before connecting the incoming power, switch OFF the power at the source.
- ◇ Do not switch ON the power until you have finished all wiring and verified all equipment is properly connected and free of obstructions.

To connect the incoming power source

You can connect the control to 85 to 264 VAC, 50 or 60 Hz power. Connect the incoming power source as shown below.



Finishing the installation

After installing and connecting equipment to the AutoFlex control, you are ready to finish the installation. Before you start configuring the control, you need to verify the connections and close the control. After you have finished connecting all equipment and wiring:

1. Make sure all the wires are properly connected to the correct terminals.
2. Make sure all cables are properly connected. For more information, see the diagram on page 20.
3. Close the cover.
4. Switch on the power to the control.
   When you switch on the power to the control, AutoFlex goes through its startup process. If the control display does not come on, go back to step 1.

Appendixes

Appendix A: Troubleshooting

The following table lists some problems, possible causes, and possible solutions. If you are having a problem with your AutoFlex, see if the problem is described in the table, and then follow the instructions for correcting the problem.

If the problem is not listed here, it could be a problem with the configuration and/or settings. For troubleshooting information about configuration and settings, read the *Troubleshooting* section in the **Select Automation user manual**.

- For additional wired and wireless troubleshooting information, read **Service Bulletin 54: Troubleshooting OMNI Select**. You can download the service bulletin from **www.phason.ca/tech.htm**.
- Some solutions in the Troubleshooting table refer to repair kits. For more information about kits, read **Appendix C: Additional modules and repair kits** on page 37.

Problem(s)	Possible cause(s)	Possible solution(s)
	Modules	
Status LED (near the microchip) flashes *more often* than once every two seconds 	A module is updating.	Wait for the update to complete. It takes approximately 1 1/2 minutes per module. If it does not return to the normal flash rate of once every 2 seconds, replace the module with a kit.
Status LED does not turn on	Module, mounting board, or power supply is damaged	If the problem is limited to a specific module, then replace that module. If the problem affects all modules, check the power supply.
Relay does not switch load on	Incorrect wiring	Correct the wiring. For more information, read the installation section for the specific type of equipment and module.
	Manual override	The control is in manual override. For more information, read **Manual override** on page 13.
	No power to the load	Switch on the power or reset the breaker.
	Faulty equipment	Replace the equipment.
	Blown relay	Solve the problem that caused the relay to blow and then replace the module with a kit.

Problem(s)	Possible cause(s)	Possible solution(s)
A curtain opens when it should close, or closes when it should open.	The wiring is incorrect; the close and open wires are reversed.	Correct the wiring. For more information, read **Connecting equipment to Actuator Modules** on page 21.
	Wired communications	
The lights (referred to as RX and TX) on the RS485 Module are not flashing. NOTE: The lights will flash only when OMNI Select is actively searching for a device. For example, when you click Check for All Devices in ToolKit.	The wiring is bad or disconnected.	Cut, strip, and then connect the wires according to the instructions on page 27. Do a loopback test to confirm proper connection. For more information, see the section in the **OMNI Select user manual**.
	The RS485 Module is damaged.	Replace the RS485 Module with kit RS485-FLEX.
Communication board LED L1 does not flash once per second and/or LED L2 is not off.	An update is in progress	Wait for the update to complete. It takes approximately 1 1/2 minutes per module. If it does not return to the normal flash rate of once every 2 seconds, replace the module with a kit.
	The communication board is damaged.	Replace with kit KCOMM-3S.
	iWire wireless communications	
The Power LED is off or the Joined LED does not flash.	There is insufficient or no power.	Make sure the iWire has 9 to 14 VDC.
	The unit is damaged.	Replace the unit.
The Signal LED is off or very dim.	The channel switch positions do not match.	Make sure the channel switches are in the same positions on the MASTER and REMOTE radios.
	The radio is out of range.	Make sure the iWire radios are close enough to each other and that the signal is not blocked by obstacles. Indoor range is 500 feet (152 m); outdoor, line-of-sight range is 5 miles (8 km). Test for an out-of-range condition by bringing the iWire radios closer to each other until the Signal LED comes on. If you cannot position the iWire radios so the Signal LED turns on, add another REMOTE iWire between them to provide a bridge for the signal.
The Transmit LED flashes, but the Receive LED does not when searching for devices with ToolKit.	The iWire is accepting the data from the computer, but not getting a response from the OMNI devices.	Make sure the OMNI device connected to the REMOTE iWire has sufficient power. Cut and re-strip the communication wiring at the REMOTE iWire and at the OMNI devices connected to it.

Problem(s)	Possible cause(s)	Possible solution(s)
The Transmit and Receive LEDs do not flash when searching for devices with ToolKit.		In OMNI Select, make sure the correct iWire address is assigned to the device you are searching for. Cut and re-strip the communication wiring at the MASTER iWire, RS485-FD, and any devices in between.
	General	
There is no display, no LEDs light up.	There is no power to the AutoFlex.	Switch on the power or reset the breaker.
	The input power is incorrect.	Measure the incoming AC voltage. The voltage must be 85 to 264 VAC, 50/60 Hz.
	The power supply is damaged.	If input voltage is correct, replace power supply with the correct kit.
There is no display, but power to the rest of the control.	The HDMI cable is loose or disconnected.	Reconnect the cable. For more information, see **AutoFlex layout** on page 20.
	The ribbon cables are disconnected.	Connect all ribbon cables. For more information, see **AutoFlex layout** on page 20.
	The controller board is damaged.	Replace the controller board with kit KDISPLAY-CTRL.
Nothing happens when buttons are pressed.	The USB cable is loose or disconnected.	Reconnect the cable. For more information, see **AutoFlex layout** on page 20.
	The ribbon cables are disconnected.	Connect all ribbon cables. For more information, see **AutoFlex layout** on page 20.
	The controller board is damaged.	Replace the controller board with kit KDISPLAY-CTRL.
Controller board LED L1 (green) is not on and/or bottom board LED PWR (red) is not on.	The ribbon cables are disconnected.	Connect all ribbon cables. For more information, see **AutoFlex layout** on page 20.
	There is no power to the board.	Confirm the input power to the Autoflex is connected.
	The controller board is damaged.	Replace the controller board with kit KAFX-CONTROLLER.
Power supply components are blown out. There are burned marks on boards and components. Motors and fans slow down or stop.	There is/was a power surge, brownout, or power outage.	Avoid the problem in future by providing proper voltage and protection for the control. Replace any damaged circuit boards with a kit.
Alarm relay not operating alarm system	The wiring is incorrect	Correct the wiring. For more information, read **Connecting an alarm system** on page 29.

Appendix B: Calibrating and troubleshooting actuators

Calibrating actuators

After configuring the actuator relays, you need to calibrate the actuators. Calibrating the actuator lets the control know the position of the actuator when it is fully extended and fully retracted. The control uses the limits to define the range of motion it uses to position the inlets. These limits tell the control how much to adjust when you want the actuators, for example, only 25% extended.

Because cables can stretch and equipment can come out of alignment (similar to tires on your car), we recommend resetting the limit switches and calibrating your actuators at least once each year.

During calibration, the actuator opens, pauses, and then closes. If the actuator is operating properly, the inlet should open completely and then close completely. After closing completely, the actuators should position according to the temperature and default settings.

- Before calibrating actuators, make sure the limit switches are set and the cable and counter weights can move freely.
- If the calibration procedure stops after closing the first time, or fails to position properly, the feedback signal is not connected properly. Verify that the potentiometer wiring is correct. For more information, read **Determining correct actuator feedback wiring** on page 36.

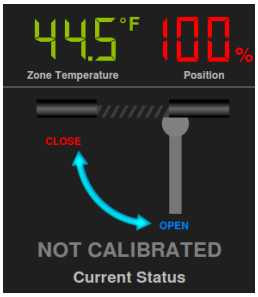
To calibrate actuators

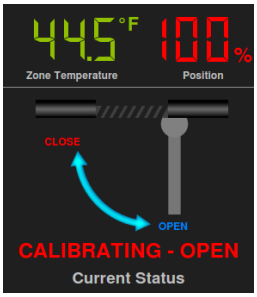
1. From the MAIN MENU, press the button for zones. 
2. Press the button for the zone you want.  

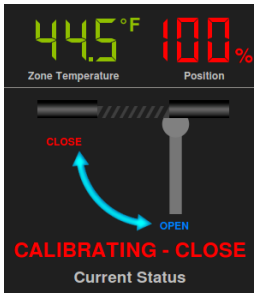
3. Press the button for actuators. 
4. Press the button for the actuator you want to calibrate.  

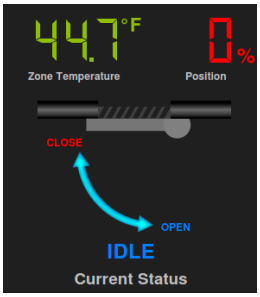
5. Press the button for calibration. 

   AutoFlex calibrates the actuator. During the calibration process, the status changes from NOT CALIBRATED to CALIBRATING – OPEN, CALIBRATING – CLOSE, and then IDLE.









Determining correct actuator feedback wiring

After installing a new actuator or potentiometer, or due to age-related potentiometer wear, the actuator might not move correctly. Common symptoms include:

- The actuator oscillating back and forth
- The actuator not traveling the full stroke during calibration

The feedback potentiometer wiring must be properly connected to the control. Determining the correct wiring can be difficult on some actuators or potentiometers.

Potentiometers have three wires: positive (+), negative (–), and feedback (FB). If the feedback wire is not connected to the FB terminal on the control, the actuator will not function properly.

Because the wires are often different colors and are not always labeled the same as above, measuring the resistance between the wires is the best way to determine which wire is the feedback wire. Follow the steps below to measure the resistance and determine the correct wiring.

Before checking the potentiometer wires, verify that the power wires are properly connected.

1. Manually move the actuator away from the end of its stroke by at least a quarter of its total stroke.
2. Disconnect all three potentiometer wires from the control.
3. Number the wires 1, 2, and 3, in any order.
4. Set your ohmmeter to measure the potentiometer's maximum resistance, normally 20,000 Ω.
5. Measure and record the resistance between wires 1 and 2. _____ Ω
6. Measure and record the resistance between wires 1 and 3. _____ Ω
7. Measure and record the resistance between wires 2 and 3. _____ Ω
8. The pair of wires with the highest measured value are the positive and negative wires. Connect the wires to the positive and negative actuator terminals on the control. At this time, do not be concerned with which wire you connect to which terminal.
9. Connect the remaining wire to the feedback terminal.
10. Test the actuator using manual mode to see if the control moves it properly. If the actuator moves in the opposite direction than it is supposed to, switch the positive and negative wires on the control.

Appendix C: Additional modules and repair kits

Repair kits are available for most circuit boards. Refer to **AutoFlex layout** on page 20 for the locations of the following items. If you need more information about repair kits, contact your dealer, or visit **www.phason.ca**.

Additional modules

ACT-1

Actuator Module

◇ One open and one close relay
◇ Potentiometer feedback input

IN-4

Input Module

◇ Connections for four sensors

RM-4

Relay Module

◇ Four general-purpose relays

VDC-4

Variable DC Module

◇ Four 0 to 10 V DC signal outputs

Replacement parts and repair kits

HDMI-1FT

HDMI cable, 1 foot

◇ For AutoFlex and AutoFlex Mini
◇ Connects the display controller to the display.

USB-1.5FT

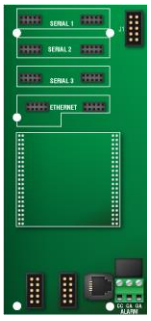
USB cable, 1.5 feet

◇ For AutoFlex and AutoFlex Mini
◇ Connects the display controller to the display.

KCOMM-3S

Communication board

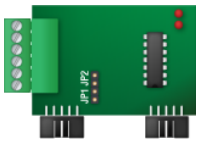
◇ For AutoFlex and AutoFlex Mini
◇ Alarm relay



RS485-FLEX

RS485 Module

◇ For AutoFlex and AutoFlex Mini



IWIRE-FLEX

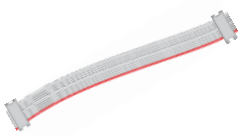
iWire Flex Radio

◇ For AutoFlex, AutoFlex Mini, and Phason Communication Hub

KAFX-RIBBON

Ribbon cable, 10 inches

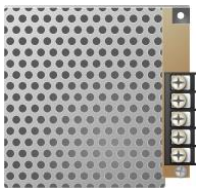
◇ For AutoFlex only
◇ Connects the communication board to the mounting board.

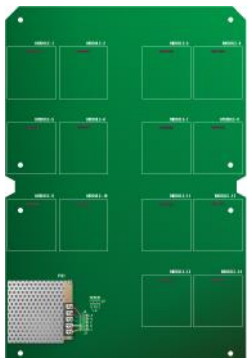
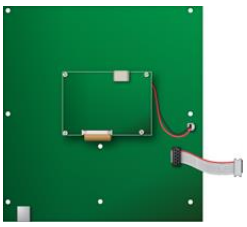
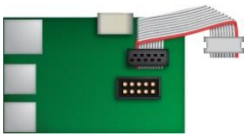
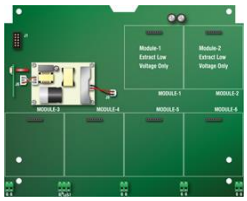
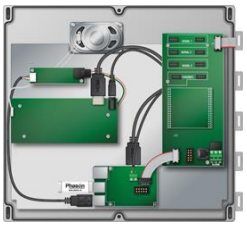
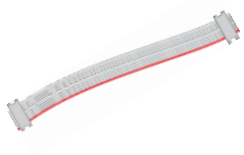
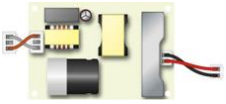


KAFX-POWER

Power supply, 35 W

◇ For AutoFlex only



Replacement parts and repair kits			
KAFX-MOUNTING *AutoFlex mounting board* ◇ For AutoFlex only ◇ Includes 35 W power supply		**KAFX-DISPLAY-7** *AutoFlex display kit* ◇ For AutoFlex only ◇ Includes 7-inch LCD and display board	
		KDISPLAY-CTRL *Display controller* ◇ For AutoFlex and AutoFlex Mini ◇ Includes controller and controller power supply	
KAFXM-MOUNTING *AutoFlex Mini mounting board* ◇ For AutoFlex Mini only ◇ Includes 25 W power supply		**KAFXM-DISPLAY** *AutoFlex Mini display kit* ◇ For AutoFlex Mini only ◇ Includes 10-inch LCD, cover, display controller, and communication board	
KAFXM-RIBBON *Ribbon cable, 5 inches* ◇ For AutoFlex Mini only ◇ Connects the communication board to the mounting board.		**KAFXM-POWER** *Power supply, 25 W* ◇ For AutoFlex Mini only	

Appendix D: Updating AutoFlex

These instructions are for an AutoFlex that has software version 1.00 or higher. To check the software version on the AutoFlex main screen, go to **Configuration**, and then **About**.

There are two updates.

- The **software** is what you see and interact with on the display.
- The **firmware** is what the internal modules, such as a Relay Module, use to operate.

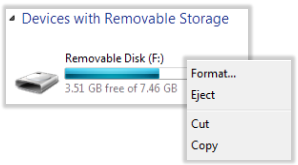
Four steps to the update process

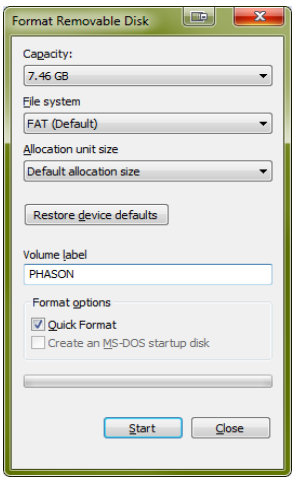
1. Prepare the USB flash drive.
2. Download the software and firmware update files from **www.autoflexcontrols.com\updates.php**.
3. Unzip the update files and then copy them to the USB drive.
4. Update the AutoFlex.

Prepare the USB flash drive

> NOTE This section is not necessary if the USB drive has been previously used in the Autoflex.

You will need a USB flash drive. The capacity (8 GB, for example) does not matter.





1. Plug the USB drive into a USB port on your computer.
2. Click **Start** > **Computer**
3. Under *Removable Storage*, find the USB stick that you plugged in. **Make sure it is the drive you want because the next step is to format it, which will erase ALL information on the drive.**
4. Right-click on the icon for the USB drive and then click **Format**. The *Format Removable Disk* window displays.
5. Click **Restore device defaults**.
6. Below *Volume label*, type `PHASON` in capital letters with no spaces.
7. Make sure Quick Format is selected (has a checkmark).
8. Click **Start** and then wait for the drive to be formatted. When complete and successful, the USB drive should display as **PHASON (X:)**, where **X** is the drive letter. After the drive has been successfully formatted, it is ready to use for AutoFlex updates.

Copy the update files to the USB drive

1. Download the latest software and firmware files from **www.autoflexcontrols.com\updates.php** and then unzip them to your computer. The files are:

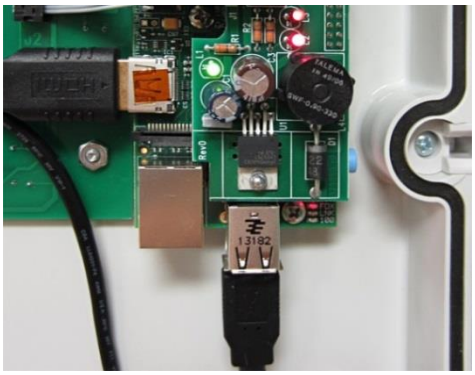
```
AutoFlex
control.sys
01.hex
02.hex
03.hex
04.hex
05.hex
pbx20os.hex
pbx20os.sum
```

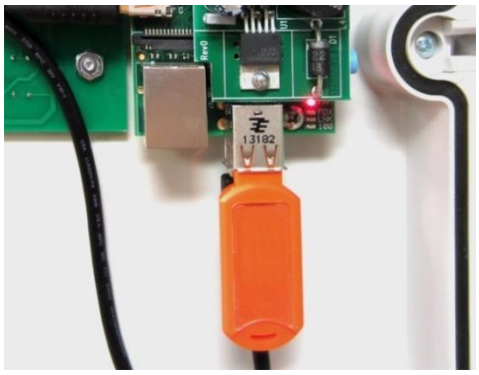
2. Delete any files that are on the PHASON USB drive.
3. Copy the new files to the PHASON USB drive.

> NOTE The files must be in the root of the drive; do not put them in a folder.

Update the software

1. Make sure the PHASON USB drive has the latest update files on it.
2. On the AutoFlex main screen, press **Configuration** (), and then **Update Software**.
3. When prompted, plug the PHASON USB drive into the USB connector on the controller board, as shown in the following pictures.

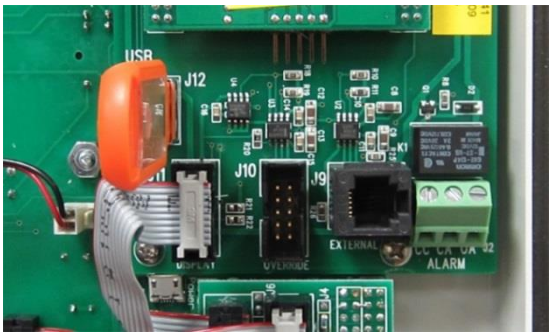




4. If prompted to update the firmware, follow the instructions on the screen.

Update the firmware

1. Make sure the PHASON USB drive has the latest update files on it.
5. Plug the USB drive into the USB port on the communication board, as shown below.



2. On the AutoFlex main screen, press **Configuration** (), and then **Update Firmware**.
3. Follow the instructions on the screen until the following processes have completed.
   - On the communication board, the green LEDs **L1** and **L2** will flash randomly as it updates. LEDs on the module boards will flash two times per second.
   - Each module will update in order. As each module updates, the green LED will flash on that module. Each module takes about 1 1/2 minutes to update. If you have 8 modules, the process should take about 12 minutes.
   - When all modules have updated, LED **L1** on the communication board will flash once per second and **L2** will be off. All modules will slowly flash their LED once every two seconds.
4. If prompted to update the software, follow the instructions on the screen.

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Limited warranty

This warranty applies only to the Phason AutoFlex Modular Control System (AUTOFLEX). If you need warranty service, return the product and original proof of purchase to your dealer.

Phason Inc. (Phason) warrants the AUTOFLEX subject to the following terms and conditions.

This warranty is valid only to the original purchaser of the product, for two years from the manufacturing date. The manufacturing date is stated in the first eight digits of the serial number in the form year-month-day.

Phason hereby warrants that should the AUTOFLEX fail because of improper workmanship, Phason will repair the unit, effecting all necessary parts replacements without charge for either parts or labor.

Conditions

- Installation must be done according to our enclosed installation instructions.
- The product must not have been previously altered, modified, or repaired by anyone other than Phason.
- The product must not have been involved in an accident, misused, abused, or operated or installed contrary to the instructions in our user and/or installation manuals. Phason's opinion about these items is final.
- The person requesting warranty service must be the original purchaser of the unit, and provide proof of purchase upon request.
- All transportation charges for products submitted for warranty must be paid by the purchaser.

Except to the extent prohibited by applicable law, no other warranties, whether expressed or implied, including warranties of merchantability and fitness for a particular purpose, shall apply to the control. Any implied warranties are excluded.

Phason is not liable for consequential damages caused by the AUTOFLEX.

Phason does not assume or authorize any representatives, or other people, to assume any obligations or liabilities, other than those specifically stated in this warranty.

Phason reserves the right to improve or alter the AUTOFLEX without notice.

Service and technical support

Phason will be happy to answer all technical questions that will help you use your AutoFlex. Before contacting Phason, check the following:

- Read this guide for information about the feature with which you are having trouble.
- If you are having a problem using your AutoFlex, look in **Appendix A: Troubleshooting** on page 32, and then follow the directions for correcting the problem.
- If you still have a problem with your AutoFlex, collect the following information:
  - The serial number
  - Any messages displayed by your AutoFlex
  - A description of the problem
  - A description of what you were doing before the problem occurred

- ◇ Phason controls are designed and manufactured to provide reliable performance, but they are not guaranteed to be 100 percent free of defects. Even reliable products can experience occasional failures and the user should recognize this possibility.
- ◇ If Phason products are used in a life-support ventilation system where failure could result in loss or injury, the user should provide adequate back up ventilation, supplementary natural ventilation, or an independent failure-alarm system. The user's lack of such precautions acknowledges their willingness to accept the risk of such loss or injury.

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