

AGILITY CONTROLLER USER GUIDE

INTRODUCTION

The Agility Controller is a powerful yet easy to use controller family based on the proven Logix Axiom platform. Since it is Web-Based, virtually any smartphone, tablet, PC or laptop can be used to monitor and configure the Agility Controller. The controller is highly field-configurable using simple screens and requires no expensive custom programming. And help and documentation is built-in and always available.

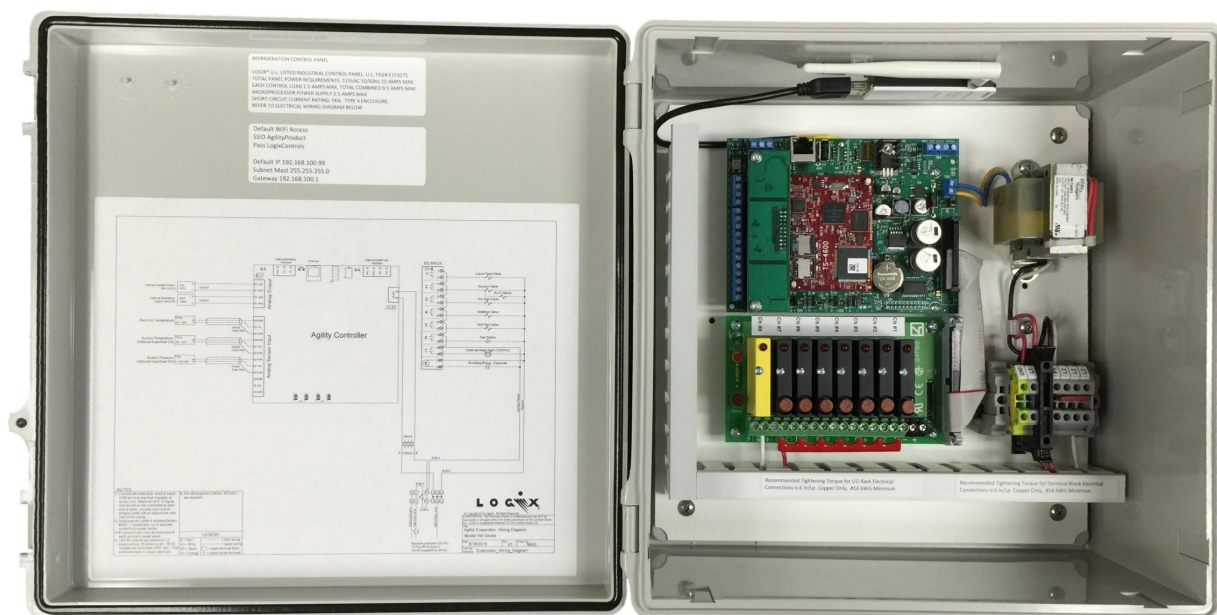


FIGURE 1- TYPICAL AGILITY CONTROLLER PANEL

KEY FEATURES

1. Universal Web-Based Operator Interface
 - a. Graphical Web-Browser access from any smartphone, tablet, laptop or PC.
 - b. Built-in online help system and documentation
2. Agility Controller Platform
 - a. Up to 4 Analog Sensor Inputs for measuring Temperature, Pressure, Humidity etc.
 - b. Up to 2 fully-isolated Analog Outputs to drive VFDs and valve positioners.
 - c. Up to 8 (optionally 16) isolated line voltage digital input or outputs
 - d. 10/100 Isolated Ethernet Port
 - e. Flexible WiFi access allows operation as either an access point or as a client connection to an existing WiFi network.
 - f. Open-Standard Modbus through both Ethernet and an Isolated Serial Port allows easy 3rd-party integration into most any control system.
 - g. USB slot for field program updates and for saving/restoring settings
 - h. LEDs provide direct indication of Agility Controller status.
 - i. Powerful Open-Source ARM Linux Operating System

- j. “Watchdog” timer insures reliable operation and resets the Agility controller in the unlikely event of a malfunction.
- 3. Rugged Type-4X Enclosure withstands indoor, outdoor and washdown environments.
- 4. Evaporator Application
 - a. Field Configurable for a wide variety of applications
 - i. Low Temp, High Temp, Dock Heat/Cool, User-Defined
 - ii. Up to 5 valves outputs with support for newer valve technology (CK6D, ICLX etc.)
 - iii. 1 fan output
 - iv. 1 alarm output for annunciators or alerting systems
 - v. 1 input configurable as Run/Stop or Emergency Stop (ex. Ammonia Sensor shutdown).
 - b. Fan can be a single speed or Variable Speed with the 4-20mA Analog Output option.
 - c. Precise platinum temperature sensor for accurate, reliable operation.
 - d. Flexible temperature control, high and low alarm setpoints
 - e. Flexible defrost sequencing: Pump Out, Pre Defrost, Soft Gas, Defrost, Stabilize, and Coil Cool
 - f. Defrost initiation on cooling runtime and/or time of day+day of week.
 - g. IntelliFrost compatible for true demand defrost initiation.
 - h. History log of alarms and warnings
 - i. Optional Superheat and Modulating DX valve control
- 5. Condenser Application
 - a. Field Configurable for a wide variety of applications
 - i. Up to 6 fans or pumps in any combination.
 - ii. 1 alarm output for annunciators or alerting systems
 - iii. 1 fan fault alarm input.
 - b. Fans can be a single speed or Variable Speed with the 4-20mA Analog Output option.
 - c. Powerful stager maintains accurate pressure control.
 - d. Alternate cold weather operating sequence
 - e. Floating Pressure Setpoint based on ambient temperature and relative humidity conditions maximizes energy conservation.
 - f. History log of alarms and warnings
- 6. EPCS Application
 - a. Designed to comply with IIAR-2 requirements
 - b. Supports up to two zones of pressure relief control
 - c. Support for 250# or 300# rated vessels

AGILITY CONTROLLER INSTALLATION

SAFETY NOTIFICATION



Important Safety Considerations

It is very important for the user to consider the adverse effects of power, wiring, component, sensor, or software failures in designing any type of control or monitoring system. This Agility Controller is not designed for applications in which a malfunction of the Agility Controller could result in a hazardous and or dangerous condition. In no circumstance may this Agility Controller be used to limit any piece of equipment to a safe mode of operation. This is especially important where economic loss or human life is involved. It is important that the user employ satisfactory overall system design. It is agreed

between the buyer and Logix that this is the buyer's responsibility. It is the responsibility of the installer to ensure that the installation is in compliance with all national and local codes. Installation should only be attempted by a licensed electrician familiar with codes, standards, and proper safety procedures for line-voltage installations.



Caution

Read this Entire Document Prior to Installation and Operation of this Unit.



Warning

Risk of Electrical Shock. Severe injury or death can result from electric shock during contact with line voltage wiring and equipment. Disconnect and lock-out all power sources during installation and service.

MOUNTING LOCATION CONSIDERATIONS

1. Overall Dimensions - 13.4"W x 13.0"H x 7.1"D
2. Environmental
 - a. Temperature
 - i. Operating Temperature -22°F - +122°F (-30°C - +50°C)
 - ii. Protect from direct sunlight which can cause the enclosure to exceed its operating temperature limit.
 - b. Humidity
 - i. Maintain operating and storage relative humidity between 10% and 95%, non-condensing.
 - c. Mechanical Considerations
 - i. The UL-Rated Type 4X enclosure allows mounting in indoor or outdoor locations.
 - ii. Mount in a low vibration location.
 - iii. Mount in a location providing protection from damage.
 - iv. Mount in a location providing easy access for servicing.
 - v. Mount in proximity to controlled or monitored equipment to reduce installation costs.
3. Networking Considerations
 - a. WiFi signal range is diminished by walls, metal objects, etc.
 - b. Ethernet (CAT5e) network cabling is limited to 328 feet. Longer distances require additional equipment (not provided) such as a repeater or fiber-optic link.
 - c. Modbus RTU twisted pair cabling is limited to 4000 feet total.

POWER REQUIREMENTS

1. The Agility Controller requires 100VAC – 125VAC, 50/60Hz power and consumes up to a total of 10 Amps (including controller and controlled devices). The controller itself requires 0.5 Amps leaving 9.5 Amps available for controlled devices.
2. Do not “tap in” to the Agility Controller to power other equipment or otherwise alter the intended function of the Agility Controller.

SECURITY CONSIDERATIONS


1. Network Security Considerations - Agility is not designed to be connected directly to the public Internet. Rather it should reside behind a firewall on a private network. Remote access, if any, should be implemented through a secure VPN connection.
2. The Agility Controller's WiFi network name and password are field configurable. At a minimum, the WiFi Access Point password should be changed.

3. Agility Password Protection - the Agility Controller features a built-in password mechanism to prevent unauthorized changes to the controller's settings. The Agility Controller supports up to ten unique user names and passwords. Although setting up passwords is not required, it is strongly recommended.




WIRING AND INSTALLATION

1. Consult the application-specific Wiring Diagram supplied with your Agility Controller for specific wiring details.
2. Water and debris can and will find its way through conduit connections. **Do Not Drill/Puncture the Top of the Enclosure or the Warranty Shall Be Void.**
3. Controller 120VAC Power Wiring – a dedicated 15 Amp branch circuit is required.
4. Sensor Analog Inputs – shielded wire is required. A good choice is Belden 9501 or equal. Connect the shield at the Agility Controller end of the cable only. Refer to the Wiring Diagram for more details.
5. Variable Analog Outputs (Optional) – shielded wire is required. A good choice is Belden 9501 or equal.
6. Digital Inputs and Outputs – keep all line voltage wiring away from low voltage (sensor, network etc.) wiring. 120VAC outputs are maximum 1.5 amps running, 30 amps inrush. All I/O modules are solid state (NOT dry contacts). Total combined load is 9.5 amps maximum.
7. Wired Ethernet (Optional) – use standard CAT5 or better cable with high quality end terminations. Avoid kinks and tight bends which can degrade network performance. Limit individual network cable length to 100 meters or 328 feet.
8. Modbus RTU (Optional) – high quality shield twisted-pair cable is required. A good choice is Belden 9841 or equal. Limit total network cabling length to 4000 feet.


QUICK START OVERVIEW

1. Install the Agility Controller following the provided installation instructions and wiring diagrams. At a minimum, wire the 120VAC power supply connections.
2. Power on the Agility Controller.
3. Access the Agility Controller's web pages using one of the following methods. Note that once a smartphone, tablet laptop or PC is connected to the Agility Controller, the controller's network and WiFi configuration can (and should) be altered.
 - a. Method 1: **WiFi Access** (preferred method)
 - b. Once the Agility Controller has been powered-up for more than 30 seconds, connect a smartphone, tablet or laptop to the Agility-xxxx WiFi hotspot (xxxx varies by Agility application). The default password is LogixControls.
 - c. Access agility.com using the smartphone, tablet or laptop's web browser.
 - d. Method 2: **Ethernet Access** (alternate method)
 - e. Using CAT5 cabling, connect both the Agility Controller and a PC or laptop into a suitable network switch (not provided).
 - f. The Agility Controller's default IP address is 192.168.100.99 and its net mask is 255.255.255.0. Configure the laptop or PC with a compatible (but different) IP address.
 - g. Once the Agility Controller has been powered-up for 30 seconds or longer, access 192.168.100.99 with the PC or laptop's web browser.
4. The Main Status web page displays an animated graphical indication of equipment operation in real-time.
5. Accessing menus and changing settings.
 - a. The application menu is accessed by selecting the menu  symbol displayed in the upper left corner.
 - b. The menu tree expands where the > symbol is shown and contracts where the V symbol is shown.
 - c. Navigate to the desired page.
 - d. On settings pages, select either **Save Settings** or **Cancel** to discard any changes.

6. Safety Status and Acknowledgement

- a. A green checkmark icon  is displayed when no alarm or warning conditions exist.
- b. A red flashing beacon icon  is displayed when any unacknowledged alarm or warning condition exists. Select the icon to display and acknowledge the alarm or warning.
- c. A dormant orange beacon icon  is displayed when an acknowledged but still active alarm or warning condition exists.

7. Accessing Online Documentation and Help

- a. Wiring Diagram and Troubleshooting Guides are available through the *Configuration & Diagnostics>Agility Documentation* sub-menu.
- b. When accessing Agility setpoint pages, specific help is available by selecting the  help icon in the upper left corner.

NETWORK CONFIGURATION

The Agility Controller features both wired Ethernet and Wireless WiFi access to its graphical user interface. Both the Ethernet and WiFi networks can be configured for each site's specific network requirements. Since the Agility Controller has its own Web Server it utilizes a fixed "Static" IP address.

WiFi NETWORK CONFIGURATION

The WiFi network can be configured to operate in three (3) distinct modes:

1. **Local Access Point** - The WiFi acts similar to a Hot Spot allowing direct access to the Agility Controller's graphical web interface. This is the easiest method to configure and is the default configuration.
2. **Connect to Existing** - The WiFi is a client and connects to an existing WiFi network. This will require additional IT support to determine the Agility Controller's IP address obtained from the existing WiFi Access Point.
3. **Disable WiFi Access** - The WiFi interface is disabled.

WiFi NETWORK SETTINGS PAGE

1. **WiFi Network Type** - Enter the desired WiFi network type: Local Access Point (create a Local WiFi network), Connect to Existing (join an existing WiFi network) or Disable WiFi Access.
2. **Access Point Channel** - Enter the WiFi Access Point channel. This is only utilized for Local Access Point WiFi networks. Typical values are 1, 6 and 11. Other values may result in poor performance and/or a malfunctioning network.
3. **WiFi Network Name (SSID)** - Enter the name of the WiFi network.
 - a. For **Local Access Point** WiFi networks this should be a name unique to other WiFi networks. For example this could be "Agility-F4" for Freezer 4's Agility Controller.
 - b. For **Connect to Existing** WiFi networks, enter the name of the existing WiFi network.
4. **WiFi Network Password** - Enter the password for the WiFi network.
 - a. For **Local Access Point** WiFi networks this is the password required to connect to the WiFi network. The password must be between 8 and 63 characters in length and can contain any combination of letters and numbers (no spaces).
 - b. For **Connect to Existing** WiFi networks, enter the password of the existing network.

The Agility Controller's WiFi network can be enabled or disabled by installing or removing the W-ON jumper located on the Agility Controller board. To enable the WiFi network, place the jumper over both pins and allow 30 seconds for the WiFi network to appear. To disable the WiFi network, place the jumper over a single pin.

ETHERNET NETWORK CONFIGURATION

Before attempting to alter the Ethernet settings you should have a firm understanding of how networks function and how each setting affects the network. It is beyond the scope of the document to provide the required documentation or training for this complicated topic. If you are unfamiliar with network configuration, have a network professional or IT department configure this device. **Warning:** Improper network settings can affect an entire network, possibly rendering it inoperable. This behavior applies to any device attached to an Ethernet network, not just an Agility Controller.

ETHERNET NETWORK SETTINGS PAGE

1. The Default button forces the network configuration back to the factory-configured settings.
2. The Agility Controller's MAC Address is shown at the bottom of the page. This is sometimes needed by IT personnel.
3. Ethernet Settings
 - a. **Eth0 IP Address** - Enter the unique IP address for this device. For example, 10.0.100.200. The default IP address is 192.168.100.99.
 - b. **Eth0 Subnet Mask** - Enter the Subnet Mask for this device. For example, 255.0.0.0. The default Subnet Mask is 255.255.255.0.
 - c. **Eth0 Broadcast Mask** (optional) - Enter the Broadcast Mask for this device. If unknown or not required, enter 0.0.0.0
 - d. **Eth0 Gateway** - Enter the Gateway address for this device. For example, 10.0.100.1. The default Gateway address is 192.168.100.1.

MODBUS SUPPORT

Modbus is a de facto standard of communications commonly available in industrial control products. The Agility Controller functions as a Modbus slave simultaneously on both the Ethernet and the isolated Com 1 RS-485 serial port.

Modbus/TCP is available on the Ethernet port on the standard port 502.

Modbus RTU is available on Com 1 isolated RS-485 serial port.

- a. The serial port is configured as 9600 BPS, 8N1.
- b. The ID is determined by the DIP switch settings.

The Modbus Register Map is available in the Agility Controller's Documentation sub-menu.

SPECIFICATIONS

1. Environmental
 - a. Operating Temperature -30°C - +50°C (-22°F - +122°F)
 - b. Operating Humidity 10% – 95% Non-Condensing
 - c. Dimensions 13.4"W x 13.0"H x 7.1"D
2. Power 100VAC – 125VAC, 50/60Hz 10 Amps max.
 - a. Agility processor – 0.5 Amps max.
 - b. Individual digital outputs – 1.5 Amps max.
 - c. Combined total digital Input/Outputs - 9.5 Amps maximum.
3. WiFi Network
 - a. Secure WPA2 Encryption
 - b. WiFi Mode:
 - i. Local Access Point (Hotspot) allowing access to the Agility Controller only.
 - ii. Client (Connect to existing WiFi network). Access is dependent on the existing network's configuration.

c. Type/Speed

- i. Up to 150Mbps data rate.
- ii. IEEE 802.11n,g,b is compatible with a wide range of WiFi devices.

4. Ethernet Network

- a. 10/100 BaseT
- b. TCP/IP Protocol

Agility Configuration Setpoints

Set Time and Date

Set System Time and Date

Date (mmddyyyy)

Time of Day (hh:mm)

Daylight Saving Time

Auto Adjust for Daylight Saving Time

Daylight Saving Time Begins on the Sunday of

Daylight Saving Time Ends on the Sunday of

Date (mmddyyyy)

Enter the desired date in the mmddyyyy format. For example, December 9th, 2016 would be entered as **12092016**.

Time of Day (hh:mm)

Enter the desired time of day using the 24 hour hh:mm format. Note the : is required.

Daylight Saving Time

Enter **Yes** if Daylight Saving Time is currently in effect in your area. Enter **No** if Daylight Saving Time is not in effect in your area or if your area does not have Daylight Saving Time.

Auto Adjust for Daylight Saving Time

Enter **Yes** to allow automatic adjustments for Daylight Saving Time. Enter **No** if you wish to manually adjust the time and/or date.

Daylight Saving Time Beginning Date

Daylight Saving Time Ending Date

Starting in March of 2007, daylight time in the United States began on the second Sunday in March and end on the first Sunday in November. The **Daylight Saving Time Beginning and Ending Date** settings allow modification of the date at which Daylight Saving Time begins and ends. **These settings should be adjusted cautiously.**

Network Configuration

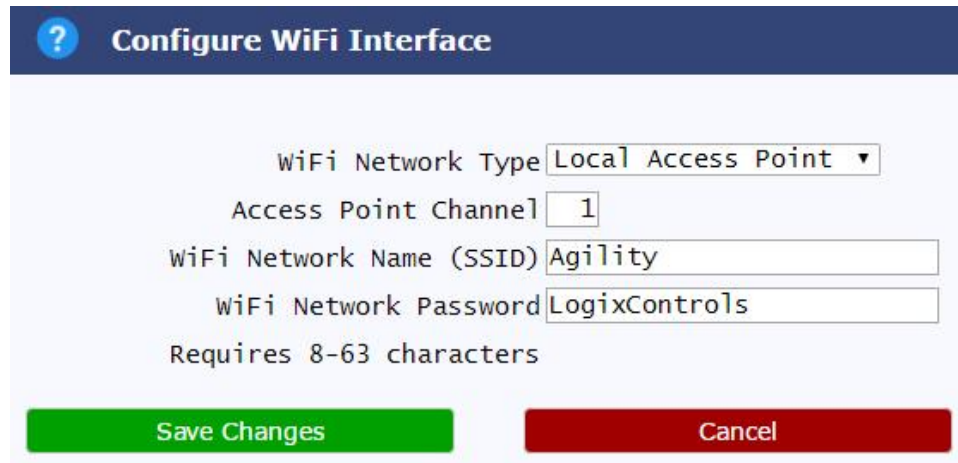
Network Configuration Overview

The Agility Controller features both wired Ethernet and Wireless WiFi access to its graphical user interface. Both the Ethernet and WiFi networks can be configured for each site's specific network requirements. Since the Agility Controller has its own Web Server it utilizes a fixed "Static" IP address.

Configure WiFi Interface

The Agility Controller's wireless WiFi network configuration is setup on this page. The WiFi network can be configured to operate in three (3) distinct modes:

1. **Local Access Point** - The WiFi acts similar to a Hot Spot allowing direct access to the Agility Controller's graphical web interface. This is the easiest method to configure and is the default configuration.
2. **Connect to Existing** - The WiFi is a client and connects to an existing WiFi network. This will require additional IT support to determine the Agility Controller's IP address obtained from the existing WiFi Access Point.
3. **Disable WiFi Access** - The WiFi interface is disabled.



The screenshot shows a web form titled "Configure WiFi Interface" with a blue header bar containing a question mark icon. The form has a light blue background and contains the following fields and buttons:

- WiFi Network Type**: A dropdown menu with "Local Access Point" selected.
- Access Point Channel**: A text input field containing the number "1".
- WiFi Network Name (SSID)**: A text input field containing "Agility".
- WiFi Network Password**: A text input field containing "LogixControls".
- Below the password field, it says "Requires 8-63 characters".
- At the bottom, there are two buttons: a green "Save Changes" button and a red "Cancel" button.

WiFi Network Type

Enter the desired WiFi network type: **Local Access Point** (create a Local WiFi network), **Connect to Existing** (join existing WiFi network) or **Disable WiFi Access**.

Access Point Channel

Enter the WiFi Access Point channel. This is only utilized for **Local Access Point** WiFi networks. Typical values are 1, 6 and 11. Other values will result in poor performance and/or a malfunctioning network.

WiFi Network Name (SSID)

Enter the name of the WiFi network.

For **Local Access Point** WiFi networks this should be a name unique to other WiFi networks. For example this could be "Agility-F4" for Freezer 4's Agility Controller.

For **Connect to Existing** WiFi networks, enter the name of the existing WiFi network.

WiFi Network Password

Enter the password for the WiFi network.

For **Local Access Point** WiFi networks this is the password required to connect to the WiFi network. The password must be between 8 and 63 characters in length and can contain any combination of letters and numbers (no spaces).

For **Connect to Existing** WiFi networks, enter the password of the existing network.

Configure Ethernet Network IP Address

The Agility Controller's Ethernet network is configured on this page. Before attempting to alter these settings you should have a *firm* understanding of how networks function and how each setting affects the network. It is beyond the scope of the document to provide the required documentation or training for this complicated topic. If you are unfamiliar with network configuration, have your IT department configure this device.

? Configure Agility Network IP Address		
Parameter	New Value	Default Value
Eth0 IP Address	<input type="text" value="10.168.1.241"/>	192.168.200.202
Eth0 Subnet Mask	<input type="text" value="255.255.0.0"/>	255.255.255.0
Eth0 Broadcast Mask	<input type="text" value="10.168.255.255"/>	192.168.200.255
Eth0 Gateway	<input type="text" value="10.168.1.1"/>	192.168.200.1
<div><input type="button" value="Cancel"/> <input type="button" value="Save Changes"/> <input type="button" value=" << Set Defaults"/></div>		

Eth0 MAC Address 00:d0:69:47:e6:e3

The **Default** button forces the network configuration back to the factory-configured settings.

The Agility Controller's MAC Address is shown at the bottom of the page. This is sometimes needed by IT personnel.

Eth0 IP Address

Enter the unique IP address for this device. For example, 10.0.100.200

Eth0 Subnet Mask

Enter the Subnet Mask for this device. For example, 255.0.0.0

Eth0 Broadcast Mask (optional)

Enter the Broadcast Mask for this device. If unknown or not required, enter 0.0.0.0

Eth0 Gateway

Enter the Gateway address for this device. For example, 10.0.100.1

Agility Password Setpoints

Password Security Overview


The Agility Controller features a built-in password mechanism to prevent unauthorized changes to the controller. The controller supports up to ten unique user names and passwords. While setting up passwords is not required, it is strongly recommended. Password protection is enabled when at least one user is set up. This requires a user to be signed in with the appropriate level password to change setpoints or acknowledge safeties.

Setpoint Page Password Security

Each setpoint page is pre-configured with a unique minimum password access level required to modify the settings. When a setpoint page or menu selection is accessed, Agility will prompt the user to sign in, if not already. If a valid user name and password is not entered, the page's settings will still be displayed, allowing observation but not modification.

Setup Passwords

To access the Setup Passwords page, from the **Secure Access** menu, select **Setup Passwords** and provide a top level password when prompted.

 **Setup Passwords**

User ID	Password	Access Level
Jim C	Magic1	9
Quatro	4444	4
Mike G	Highball	8
Night Watch	NiteOwl	1
		0
		0
		0
		0
		0
		0

Save Changes

Cancel

The **User ID** field contains the user's public name and/or ID. The **Password** field contains the user's secret password required to access the system. The **Access Level** field contains the user's system access level with **1** as the most restrictive through **8** as the least restrictive. Passwords can be any combination of letters, numbers and/or punctuation with a maximum of **15** and minimum of **4** characters in length. Similarly, the **User ID** can be any combination of letters, numbers and/or punctuation up to a maximum of **12** characters in length.

Signing In and Out

From the **Secure Access** menu, select **Sign In** or **Sign Out**. A user will be automatically signed out after there has been no activity in the Agility page for longer than 10 minutes.

Agility Condenser Configuration Setpoints

Condenser Mode & Lead List

?

Condenser Lead List & Modes

Stage	Op	Run	Cold
Name	Mode	Order	Order
Pump P1	Auto ▾	1	2
VFD F1	Auto ▾	2	3
VFD F3	Auto ▾	3	1
None	Auto ▾	0	0
None	Auto ▾	0	0
None	Auto ▾	0	0

Use Cold Order if Air Temp is Below 30.0 °F
and Pressure is Below 165 PSIG

Save ChangesCancel

Stage Name

The stage name is the condenser stage's abbreviated identification (ID)

Operation (Op) Mode

Stager verifies a stage's availability to run by checking its **Op Mode**. Equipment not in **Auto** mode is not available for sequencing, even if it is in the active Lead List. If it is known that a stage will be unavailable for automatic control (i.e. servicing) select **Down** as an indication that there is a physical reason not start the fan or pump.

Run Order

During normal (non-cold) operation, the staging sequence is determined by these settings. Enter a 1 for the first condenser stage, a 2 for the second stage, etc. To disable a condenser stage, enter 0.

Cold Order

During Cold weather operation, the staging sequence is determined by these settings. Enter a 1 for the first condenser stage, a 2 for the second stage, etc. To disable a condenser stage, enter 0. See below for settings related to cold operation.

Low Outside Air Temperature Pump Disabling

The Lead List will automatically switch to the **Cold Order** lead list when the outside air temperature falls below an adjustable low temperature setpoint and the condensing pressure remains below a high setting. The original **Run Order** will be restored when the temperature rises above the low temperature setpoint.

Use Cold Order if Air Temp is Below

Enter the outside air temperature below which the Condenser Stager will switch to the alternate **Cold Order** Lead List.

and Pressure is Below

Enter the maximum allowed condenser pressure to allow **Cold Order** operation. If the condenser pressure exceeds this setting the normal **Run Order** lead list will be used.

Condenser Control Setpoints

?

Condenser Control Setpoints

Staging Control Mode Automatic ▼

High Pressure Alarm180PSIG

Increase Fast Stage Offset15.0PSIG

Increase Stage Offset5.0PSIG

Control Pressure Setpoint120PSIG

Decrease Stage Offset5.0PSIG

Decrease Fast Stage Offset15.0PSIG

Low Pressure Alarm90.0PSIG

Fast Delay Time12Secs

Normal Delay Time30Secs

Normal Delay Time45Secs

Fast Delay Time12Secs

Maximum #Stages to Run3

Minimum #Stages to Run0

Floating Pressure Control?☒

Wetbulb Offset (Approach)12.0°F

Max Floating Pres Setpoint155PSIG

Min Floating Pres Setpoint100PSIG

Save ChangesCancel

Staging Strategy

Instead of traditional cut-in/cut-out pressures, the Logix Condenser Stager employs a time delay system to stage equipment on and off to maintain a condenser pressure setpoint. This approach provides the proper capacity control regardless of load while minimizing unnecessary starting and stopping of equipment

Staging Mode

The operating mode for the Condenser Stager can be selected from the drop-down list. Set the **Staging Mode** to **Automatic** to allow normal sequencing control. **STOP** and **EmergSTOP** disables control, immediately stopping any running equipment. **HOLD**, **Increase** and **Decrease** all override **Automatic** operation: review the **Stager Override** section (below) for further explanation. The Staging Mode can also be changed to **Automatic** or **STOP** by selecting either the **Start Condenser Stager** or **Stop Condenser Stager** from the Condenser Stager Menu.

Control Setpoint

The Condenser Stager will sequence equipment as needed to maintain the **Control Setpoint** pressure.

High and Low Pressure Alarm Setpoints

If pressure exceeds the **High Pressure Alarm Setpoint** or falls below the **Low Pressure Alarm Setpoint** an alarm will be produced. These alarms are only active when the **Staging Mode** is **Automatic**.

Increase/Decrease Stage Offset

The **Control Setpoint** plus the **Increase Stage Offset** and the **Control Setpoint** minus the **Decrease Stage Offset** define a *Stage Deadband*. The number of condenser stages running will not change while pressure is within the *Stage Deadband*.

If the **Increase or Decrease Stage Offset** is set too high (wide deadband), the Stager may not hold the Condenser Pressure close to the setpoint, resulting in inefficient operation. If the **Increase or Decrease Stage Offset** is set too low (narrow deadband), condenser stages may be cycled on/off excessively or display erratic behavior.

For example, at a **Control Setpoint** of 120 PSIG, an **Increase Stage Offset** of 5 PSIG, and a **Decrease Stage Offset** of 10 PSIG, the Condenser Stager will operate as follows:

- Above 125 PSIG the Stager will start additional stages
- Below 110 PSIG the Stager will stop stages
- Between 110 PSIG and 125 PSIG no changes in control will occur (deadband).

Increase/Decrease Fast Offset

The **Control Setpoint** plus the **Increase Fast Offset** and the **Control Setpoint** minus the **Decrease Fast Offset** define a *Fast Stage Bandwidth*. When determining when to start or stop a condenser stage, the Condenser Stager applies the **Normal Stage Delay Time** if suction pressure remains within the *Fast Stage Bandwidth* but outside of the **Normal Control Deadband**. If pressure exceeds *Fast Stage Bandwidth* the **Fast Stage Delay Time** is applied. This allows a faster response time when pressures are well off setpoint. A larger Bandwidth equates to less responsive staging.

Normal Delay Time

If pressure lies outside the **Normal Control Deadband** but within the **Fast Stage Bandwidth** the Condenser Stager will start or stop a stage when the **Normal Stage Delay Time** expires. The **Normal Stage Delay Time** resets and begins counting down whenever a stage is started or stopped. Separate Increase and Decrease setpoints allow independent tuning of above and below setpoint conditions.

Fast Delay Time

If pressure exceeds **Fast Stage Bandwidth** the Condenser Stager will start or stop a stage after the **Fast Stage Delay Time** expires. The **Fast Stage Delay Time** resets and begins counting down whenever a stage is started or stopped. Separate Increase and Decrease setpoints allow independent tuning of above and below setpoint conditions.

Maximum # Stages To Run

Regardless of suction pressure, the number of sequenced machines will never increase above the **Maximum # Stages To Run** setpoint.

Minimum # Stages To Run

Regardless of suction pressure, the number of sequenced machines will never drop below the **Minimum # Stages To Run** setpoint, provided the **Staging Mode** is set to **Automatic** and the machinery is available in the Lead List/Equipment Mode settings.

Floating Condenser Pressure Control

Floating Pressure Control?

Select **Yes** to enable Floating Condenser Pressure Control, ignoring the **Control Setpoint**. The effective pressure setpoint is continually adjusted to match the corresponding wet-bulb temperature.

WetBulb Offset (Approach)

The **WetBulb Offset (Approach)** is added to the actual wet-bulb temperature when floating pressure setpoint is calculated. This corresponds to the physical reality that any condenser has an inherent temperature differential drop across the coil because it is not perfectly efficient. Without this Offset all condensing stages would always run: no amount of condenser capacity could ever reduce pressure down to the corresponding wet-bulb temperature. Note that after cleaning a condenser the Offset can be reduced by several degrees. 12 degrees is a typical Offset for an efficient condenser.


Maximum Floating Pres Setpoint

The floating pressure setpoint will not be allowed to rise above the **Maximum Floating Pressure Setpoint**.

Minimum Floating Pres Setpoint

The floating pressure setpoint will not be allowed to fall below the **Minimum Floating Pressure Setpoint**. This can be used to ensure adequate liquid pressure for other refrigeration equipment.

PID Control Overview

 **Condenser Fan VFD Setpoints**

Condenser VFD Maximum Speed%	<input type="text" value="100"/>	%
Condenser VFD Minimum Speed%	<input type="text" value="25.0"/>	%
Capacity Control Deadband	<input type="text" value="4.0"/>	PSIG
Capacity Control Bandwidth	<input type="text" value="20.0"/>	PSIG
Capacity Control Update Rate	<input type="text" value="4"/>	Secs
Proportional Sensitivity	<input type="text" value="50.0"/>	%
Integral (Reset) Sensitivity	<input type="text" value="10.0"/>	%

The term PID stands for **P**roportional, **I**ntegral and **D**erivative. These three terms describe the basic elements of a PID controller. Each of these elements performs a different task and has a different effect on the functioning of a system. Note that for fan speed control, the derivative term adds no real benefit and is omitted from this fan control strategy.

The PID control routine calculates optimal control **Fan Speed** based on a control **Setpoint** and **Condenser Pressure Input**. The PID control routine must be "tuned" for the particular process loop. Without such tuning, the control **Output** will be erratic, unstable or sluggish. To be able to tune a PID loop, each of the terms of the PID equation must be understood.

PID Control Setpoints

Condenser VFD Minimum Speed %

The VFD fan speed will not be allowed to drop below the **Minimum Speed %** setpoint.

Condenser VFD Maximum Speed %

The VFD fan speed will not be allowed exceed the **Maximum Speed %** setpoint.

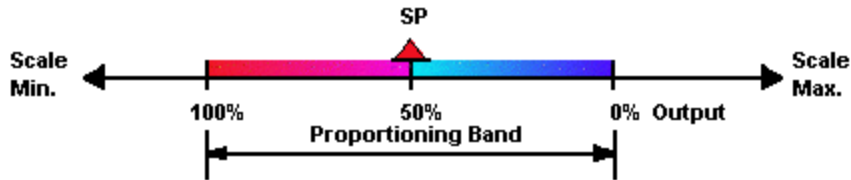
Capacity Control Deadband

No change in control **Fan Speed** will occur when the **Condenser Pressure Input** is within the **Capacity Control Deadband**. As with all Logix control mechanisms, a **Deadband** setpoint represents the total range above and below a setpoint within which no control changes are made. This should be set significantly smaller (tighter) than the **Condenser Control Stager Deadband**.

Capacity Control Bandwidth

The overall sensitivity of the PID control routine is set by the **Capacity Control Bandwidth**. In general, a wider Bandwidth provides less sensitive control. Like the Deadband, the Bandwidth encompasses the total range above *and* below setpoint. The adjustments made by the Proportional, Integral and Derivative routines are all relative to **Setpoint Error** (actual **Condenser Pressure Input** as compared to the **Capacity Control Setpoint**) and Bandwidth. For example, if setpoint error lies halfway between the **Capacity Control Setpoint** and the extreme of the **Capacity Control Bandwidth** then the Proportional, Integral and Derivative routines will make adjustments at half their respective maximums. A larger Bandwidth provides less responsive

staging.



Capacity Control Update Rate

Each portion of the **PID** routine will be recalculated at this update rate. **Fan Speed** will not change in the period between adjustments. It is important that the **Capacity Control Update Rate** is not significantly shorter than the mechanical cause-and-effect delay inherent in the system. Too short of an Update Rate may result in overshooting and control instability as the control routine cannot *adapt* from its previous adjustment.

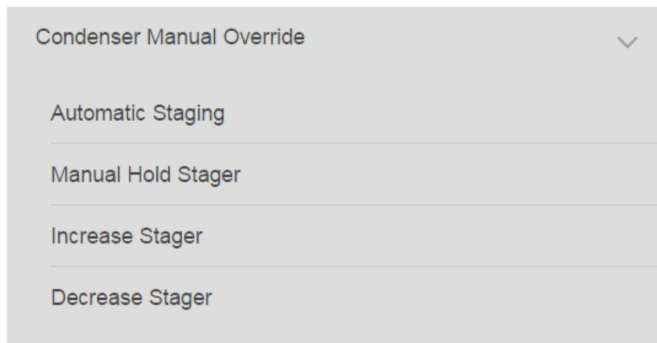
Proportional Sensitivity

Fan Speed is proportionally adjusted to the control **Setpoint Error**. The **Proportional Sensitivity** setpoint defines what percentage of this error is applied to the proportional routine. Higher settings provide a larger response in to **Process Input** variation. Too high a setting will cause instability.

Integral (Reset) Sensitivity

A portion of the **Setpoint Error** is successively added back into the next calculation. The **Integral (Reset) Sensitivity** setpoint defines this portion. If **Condenser Pressure Input** remains off **Setpoint** the Integral error correction grows, having the cumulative effect re-adjusting (resetting) control **Output** to account for the new load condition. Typical settings for **Integral (Reset) Sensitivity** are between 2% and 25%.

Condenser Manual Override



The **Condenser Manual Override** menu provides a means to immediately alter the number of stages in operation. During normal Automatic operation a stager will increase and decrease the number of operating stages based on a suction pressure setpoint. When **Manual Staging** is in effect a stager shall increase and decrease the number of operating stages through menu selection only.

Automatic Staging

Activate the stager and begin automatic staging. If the stager was previously active, this clears any stager delay timers allowing rapid equipment staging. Selecting **Start Condenser Stager** from the Condenser Stager menu has the same effect.

Manual Hold Stager

Indefinitely places the stager in Manual Staging mode. Automatic staging control is discontinued - equipment already operating will continue to do so. **Automatic Staging** must be selected to discontinue Manual Staging.


Increase Stager

Immediately increases the number of stages operating by starting one additional stage. This does not place the stager in Manual Staging mode.

Decrease Stager

Immediately decreases the number of stages operating by stopping one stage. This does not place the stager in Manual Staging mode.

Condenser Configuration

 **Condenser Configuration**

Caution: Read All Documentation before Changing these Settings.

Warning: Changing these Settings May Restart the Condenser.

Condenser Group Name

Stage 1 Type	<input type="text" value="Pump"/>	ID	<input type="text" value="P1"/>
Stage 2 Type	<input type="text" value="Variable Speed Fan"/>	ID	<input type="text" value="F1"/>
Stage 3 Type	<input type="text" value="Variable Speed Fan"/>	ID	<input type="text" value="F3"/>
Stage 4 Type	<input type="text" value="Not Used"/>	ID	<input type="text"/>
Stage 5 Type	<input type="text" value="Not Used"/>	ID	<input type="text"/>
Stage 6 Type	<input type="text" value="Not Used"/>	ID	<input type="text"/>

Refrigerant Type

Condenser Group Name

Enter a short name for this Condenser.

Stage 1-6 Type

For each condenser stage of control, select its type from the drop-down list.

- **Pump** - water pump
- **Single Speed Fan** - simple single-speed fan
- **Variable Speed Fan** - variable speed (VFD) fan
- **Not used** - stage is not used

Stage 1-6 ID

Enter a unique ID for each condenser stage.

Refrigerant Type

Enter the refrigerant type for this Condenser.

Agility Controller Troubleshooting Guide



Warning:

Risk of Electrical Shock. Severe injury or death can result from electric shock during contact with line voltage wiring and equipment. Disconnect and lock-out all power sources during installation and service.



Caution:

Before any work is performed either inside an Agility panel or to any devices interfaced to an Agility panel, all sources of hazardous voltage, both into and out of the panel must be disconnected. The circuit protectors and/or circuit breakers installed in the Agility panel may not disconnect all sources of power. As Logix cannot verify the actual installation and any modifications of the control panel, Logix recommends that, at a minimum, all circuits both inside the panel and interfaced to the panel be thoroughly verified as disconnected and safe with a high quality electrical meter, which is tested to be functional before and after the verification procedures, before any work is performed on the panel or interfaced devices. Even if all known circuits are disconnected, it is still possible a circuit may become inadvertently energized from another source.

All work must be performed by personnel who are fully qualified to work on industrial control panels.

Troubleshooting Guide

This Troubleshooting Guide is divided into the following sections:

1. Status LEDs
2. Agility LED Error Codes
3. Power and Circuit Protection
4. Analog Sensors
5. Analog Sensor Calibration
6. Analog Outputs
7. Digital Outputs
8. Networking
9. Restoring Default Settings

Refer to the Agility Panel Layout Drawing to assist in locating components.

Status LEDs

The Agility Controller has multiple LEDs indicating its operational status.

Both the red and the green LEDs, labeled Status, indicate the general condition of the controller. The behavior of these LEDs differs during initial power-on and normal operation.

During power-on, both LEDs should immediately illuminate. Within a few seconds the red LED should turn off. This indicates the processor is operational. If an abnormal condition exists during the self-test phase, the red LED will issue a unique blink code to indicate the source of the error. Refer to the next section for details. No LEDs will illuminate if there are power supply issues (ex. a blown fuse).

Several seconds later during a normal power-on cycle, the green LED should begin flashing in a consistent one second on then one second off blinking pattern. This indicates the "heartbeat" of normal Agility Controller operation.

Each of the two serial communication ports has a pair of LEDs indicating transmission and reception of serial data. The TX LED indicates the Agility Controller has sent a message. The RX LED indicates the Agility Controller has received a message.

The Ethernet jack has a green LED which indicates a basic connection to the network. It does not indicate that the network settings are correctly set.

Agility Power On Self Test (POST) Codes

During power-up, the Agility microcontroller performs a Power On Self Test (**POST**). Any abnormal conditions are reported by the Red Status LED: A long blink (a one second On period followed by a one second Off) followed by a number of short blinks. The number of short blinks indicates the POST error code. For example, one long blink followed by four (4) short blinks would indicate POST code four (4) which indicates "EEPROM Memory Failure". Multiple errors are flashed sequentially, one after another with a long blink between each code.

Agility POST Code List (may vary by application; refer to online error code list)

- 1 Unrecoverable Error
- 2 Program Recovery Mode
- 3 NBus Failure
- 4 EEPROM Memory Failure
- 5 Digital I/O Driver Fault
- 6 Analog Output Module Error
- 7 COM-1 Failure
- 8 COM-2 Failure
- 9 Device Initialization Chain Failure
- 10 Task Initialization Chain Failure
- 11 Invalid Library Function
- 12 Factory Defaults Error
- 13 WebServer Fault

Power and Circuit Protection

The Agility Controller requires a dedicated 120VAC power circuit. The Agility Controller contains a 10 amp fuse to protect both itself and any controlled devices. Each digital output is also individually fused with a 4 amp fuse. Each digital output is rated for a maximum of 1.5 amps for a combined total of 9.5 amps.

Additionally the analog sensor +24V and Com 2 +24V are protected with a self-resetting polymer fuses rated at 1/10th amp. When a polymer fuse is exposed to over-current conditions, power must be removed before the fuse will reset.

Analog Sensor Troubleshooting

The safety message "Sensor Under-Range" indicates at least one sensor is sending an excessively low signal (under the normal operating range) to the Agility panel. Typically causes of a low signal are a broken wire or damaged sensor.

The safety message "Sensor Over-Range" indicates at least one sensor is sending an excessively high signal (over the normal operating range) to the Agility panel. Typically causes of a over-range signal are a shorted wire or damaged sensor. A faulty sensor will display a series of question marks instead of a normal sensor reading. View I/O Status to ascertain which sensor is faulting. Moisture penetration into a sensor's enclosure is the most common source of sensor failure. Refer to the sensor installation wiring diagrams for installation information.

Problem	Test	Possible Solution	Comments
"Sensor Under-Range" safety message.	Measure +24VDC supply at the sensor. The voltage should be near +24VDC.	<ol style="list-style-type: none">1. The +24VDC Power wire is shorted to the Common (shield) wire. An Automatically Resettable fuse protect the sensor's +24VDC power. The cause of the short must be removed before +24VDC power will be restored. In some cases, the Agility controller must be powered-down for approximately 5 seconds.2. Break in supply wire to sensor.3. The sensor supply is wired incorrectly. The sensor should be supplied by +24VDC power from the "Pwr" terminal. Review the wiring diagram and correct any wiring errors.4. The Agility +24VDC supply is faulty. Replace the Agility controller assembly.	Refer to the Sensor Diagnostics Diagram
"Sensor Under-Range" safety message (continued).	Measure the signal wire from the sensor. It should be between +0.5VDC and +3VDC (approximately).	<ol style="list-style-type: none">1. Sensor is bad if voltage is not between +0.5VDC and +3VDC, often from water damage. Replace Sensor if signs of corrosion are present.2. Signal wire is broken or disconnected if voltage is near zero.	Refer to the Sensor Diagnostics Diagram

"Sensor Over-Range" safety message.	Measure the signal wire from the sensor. It should be between +0.5VDC and +3VDC (approximately).	<ol style="list-style-type: none"> 1. Sensor's probe is disconnected from sensor transmitter if voltage is above +3VDC. 2. A wiring short is shorting the +24VDC Power wire to sensor's Signal wire. 3. The sensor supply is wired incorrectly. The sensor should be supplied +24VDC power from the Agility "Pwr" terminal. 	Refer to the Sensor Diagnostics Diagram
Sensor reading fluctuates.	Verify cable is shielded and grounded at Agility panel end only.	<ol style="list-style-type: none"> 1. Use shielded twisted-pair cable such as Belden #9501 and connect the shield at the Agility Common (COM) terminal only. 2. Sensor is faulty or wet and needs replacing. 3. Sensor cannot support an extremely long probe wire lead length. 	Refer to the Sensor Diagnostics Diagram
Sensor reading is too high or too low.	Compare reading against a known, accurate sensor.	<ol style="list-style-type: none"> 1. Use the Calibration routine for normal (up to 5%) sensor deviation. 2. Sensor is being affected by external sources (unusual air flow, lights, moisture). If moisture is observed inside sensor enclosure dry completely and retest. Drill a weep hole at the lowest point to limit moisture related problems. 3. Sensor is damaged or faulty and needs replacing. 	

Analog Sensor Calibration

The Sensor Calibration routine permits small adjustments to fine-tune sensor readings. Most sensors deployed with the Agility Control System are accurate to within 1% - calibrating beyond 1% would indicate a malfunctioning sensor, faulty wiring or an inaccurate calibration device (very common) or calibration methodology (also very common). Sensor calibration is limited to within 5% of the sensor's pre-programmed range.

A Sensor should only be calibrated against a device known to be accurate under identical conditions.

To obtain reliable results, it is very important to use a high precision reference device (i.e. a lab thermometer or pressure gauge), preferably one traceable to a NIST reference standard. Note that thermocouple-based digital thermometers are designed for a wide range of temperature measurement and therefore make a poor choice as a calibration instrument.

When calibrating a temperature sensor, the probe and calibrating device should be as close as possible to one another, preferably in direct contact. A surprising large amount of heat is given off by the human body, so make sure to keep well away from the temperature sensor during calibration. Also, be sure to calibrate

a sensor at the exact same location. For example do not attempt to calibrate a ceiling mounted temperature sensor by measuring air temperature near the floor. The calibration may be off by ten (10) degrees or more.

Sensor Calibration Procedure

To calibrate a sensor:

1. From the **Configuration and Diagnostics** menu, select **Calibrate Sensors**.
2. Select the desired sensor to display its calibration settings.
3. Type in the new, accurate reading in the **Enter Correct Value** setpoint and then select **Save Changes**.

The **Span** and **Offset** adjustments are automatically recalculated and permanently saved to the Agility unit. **Span** describes the pre-programmed range in proportion to the electrical signal (typically 4-20ma). **Offset** defines the "starting point" by comparing the minimum range value with the electrical signal. Because both factors are dynamically adjusted, calibration is most effective when the sensor is close to either extreme of its sensing range, i.e. calibrate a 0 - 300 PSIG pressure sensor when the pressure is at or near 0 PSIG then again at or near 300 PSIG.

Analog Output Troubleshooting

The Agility Controller's two analog outputs generate an active 4-20mA signal to control variable speed or position devices including modulating valves and variable speed motors. Since the Agility Controller *actively* generates the control signal, **no other source of power should be connected to the current loop**. Additionally, each 4-20mA current loop is optically isolated to eliminate troublesome ground loop conditions.

The surest method to determine if the analog output is functional is to entirely remove the field wiring from the pair of analog output terminals and, using a high quality digital DC milliamp meter, directly measure the signal. A reading between 4mA and 20mA indicates a functional analog output.

Digital Output Troubleshooting

Digital Outputs are solid state relays driven by an isolated low voltage signal from the Agility microcontroller. Some sections also apply to a faulty Input module.

Problem	Test	Possible Solution	Comments
Digital Output fails to energize .	Verify that the microcontroller is trying to energize the output by viewing View I/O Status.	Enable (or disable) the control mechanism that energizes the output.	Some outputs, such as suction pilot valves or compressor unloaders may be energized when the control routine is off ("Reverse Logic").

Digital Output fails to energize (continued).	Verify Red LED is illuminated for the Digital Output.	<ol style="list-style-type: none"> 1. I/O Module is faulty. 2. I/O Rack cable is loose or faulty. 3. Agility Controller board is faulty 4. Agility Controller power is off. 	This also applies to Inputs.
Digital Output fails to energize (continued).	Verify 120VAC is present on digital output line side.	<ol style="list-style-type: none"> 1. The fuse in Agility panel is disconnected or blown. 2. Power is disabled at external main breaker. 3. 4 Amp fuse is blown - determine cause first then replace fuse. 4. The load device is a loose neutral connection. 	Also applies to Inputs.
Digital Output fails to de-energize .	Verify LED is not illuminated for the Digital Output.	<ol style="list-style-type: none"> 1. Enable (or disable) the control mechanism that is keeping the output energized. 	Some outputs, such as suction pilot valves or compressor unloaders may be energized when the control routine is off.
Digital Output fails to de-energize (continued).	Measure output voltage with a load connected.	<ol style="list-style-type: none"> 1. Connected load is very small (less than 25mA) and leakage current is causing the output to stay at or near 120VAC. 2. Connect a larger load and re-measure output voltage. 	Refer to the Digital Input Output Schematic.

Network Troubleshooting

WiFi Troubleshooting

Review the Agility WiFi configuration section of the installation guide. Verify the W-ON jumper is installed across both pins. If it is missing or only on a single pin, the WiFi network will be disabled. Verify your device (smartphone, tablet, laptop etc.) is not in “Airplane Mode”.

For Local Access Point (hot spot) configurations, verify the Agility’s network SSID (name) is shown on your device’s WiFi connection screen. If it is not shown, the Agility’s WiFi network may be off (W-ON jumper removed) or may be misconfigured as **Connect to Existing** or **Disable WiFi Access**.

Verify the correct password is entered on your device. Try forgetting the WiFi network on your device and reconnecting to the Agility WiFi network.

Try resetting the Agility network configuration (see Restoring Default Settings below) and carefully reconfiguring it.

Ethernet Troubleshooting

Verify the green link LED on the Ethernet jack is illuminated. If the LED is dark there is likely cabling issue (broken and disconnected) or equipment issue (network switch or router malfunctioning or powered off).

If the green link LED on the Ethernet jack is illuminated and you can't connect to the device, the Agility network settings are likely misconfigured. A misconfigured Ethernet device (not just Agility but any networkable device) can conflict with other devices and/or cause an entire network to malfunction. Before attempting to alter the Ethernet settings you should have a firm understanding of how networks function and how each setting affects the network. It is beyond the scope of the document to provide the required documentation or training for this complicated topic. If you are unfamiliar with network configuration, have a network professional or IT department configure this device.

Verify if another device is misconfigured and is corrupting the Ethernet network. For example, a newly-installed web-camera was improperly configured with the same IP address as the Agility Controller, resulting in an address conflict. The symptoms include intermittent and/or no connectivity.

Try resetting the Agility network configuration (see Restoring Default Settings below) and carefully reconfiguring it.

Restoring Default Settings

To restore default settings to the Agility Controller, install the OPT jumper over both pins and set DIP switches 8 On, switch 7 Off. DIP switches 1-6 determine type of operation as follows:

- 1) Set switches 1-6 On to set Factory Default Setting. This will reset all setpoints and the WiFi configuration back to factory defaults. This will not reset the Ethernet IP address and netmask (see below).
- 2) Set switch 1 Off, switches 2-6 On to clear all analog sensor calibrations.
- 3) Set switches 1 and 3 Off, switches 2, 4-6 On to set default WiFi (SSID name and password) and Ethernet (IP Address, Netmask and Gateway) network settings.

Once the DIP switches are set, reset the Agility Controller and wait a minimum 15 seconds before setting DIP switches back off. Default Settings have now been restored.

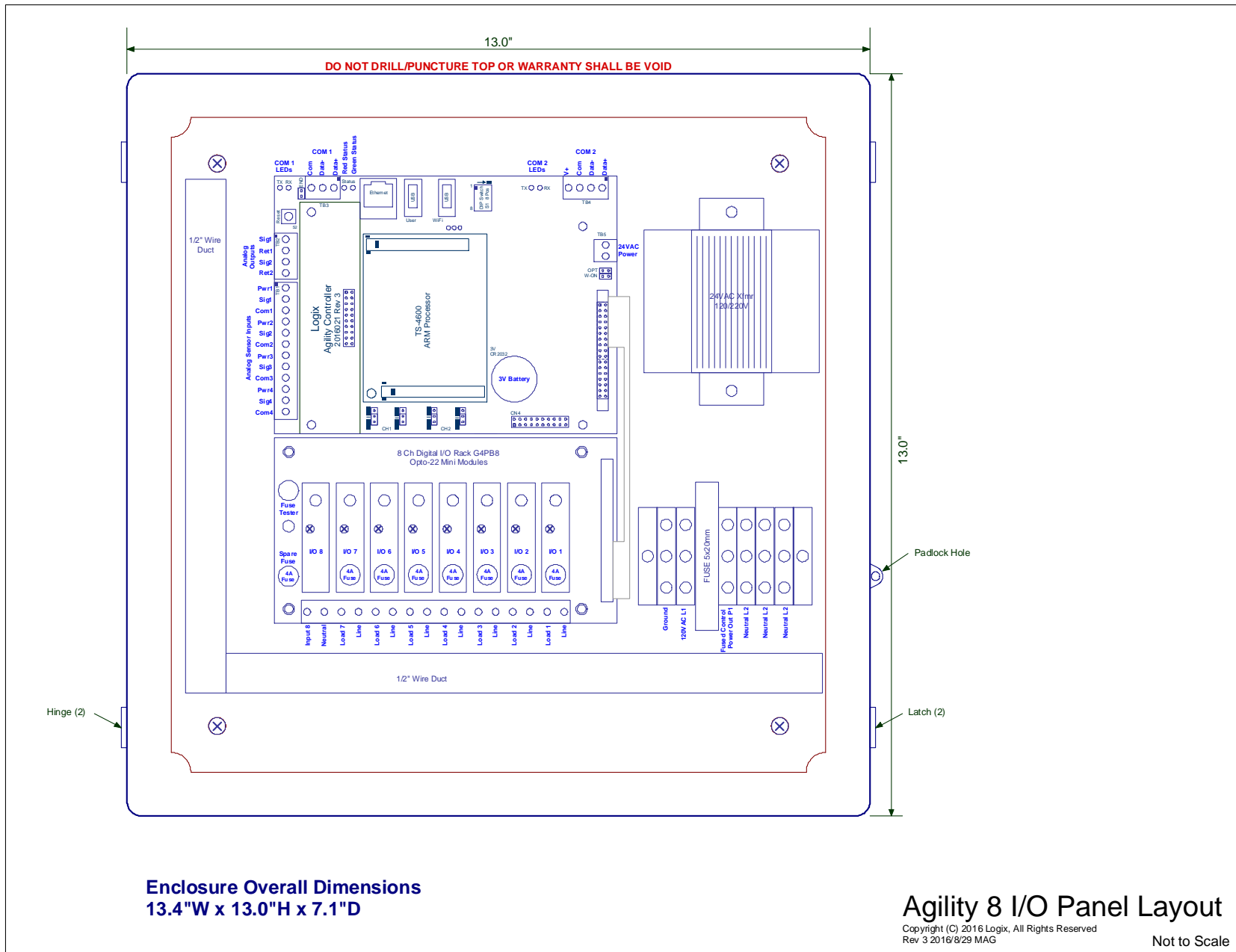
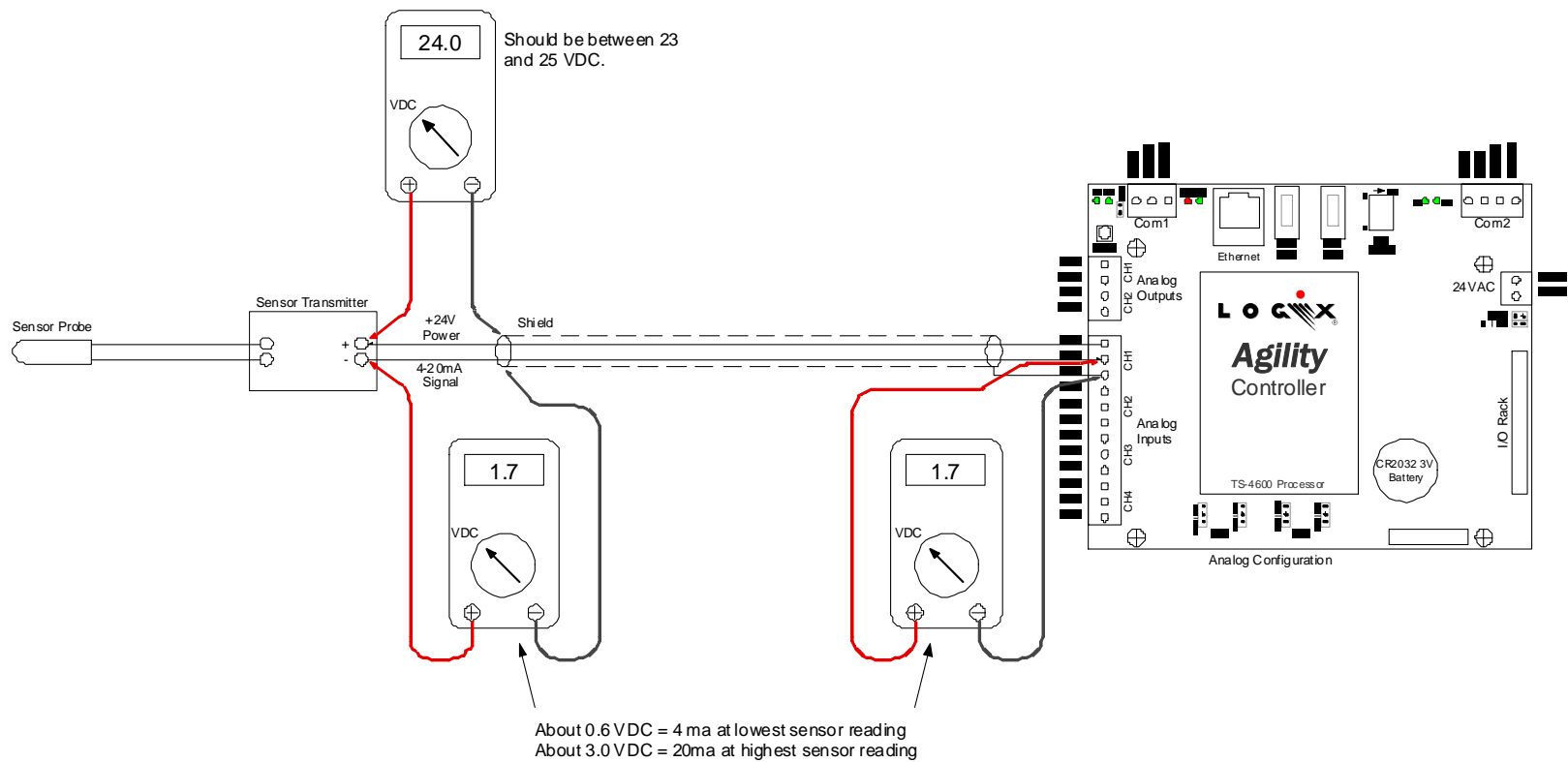


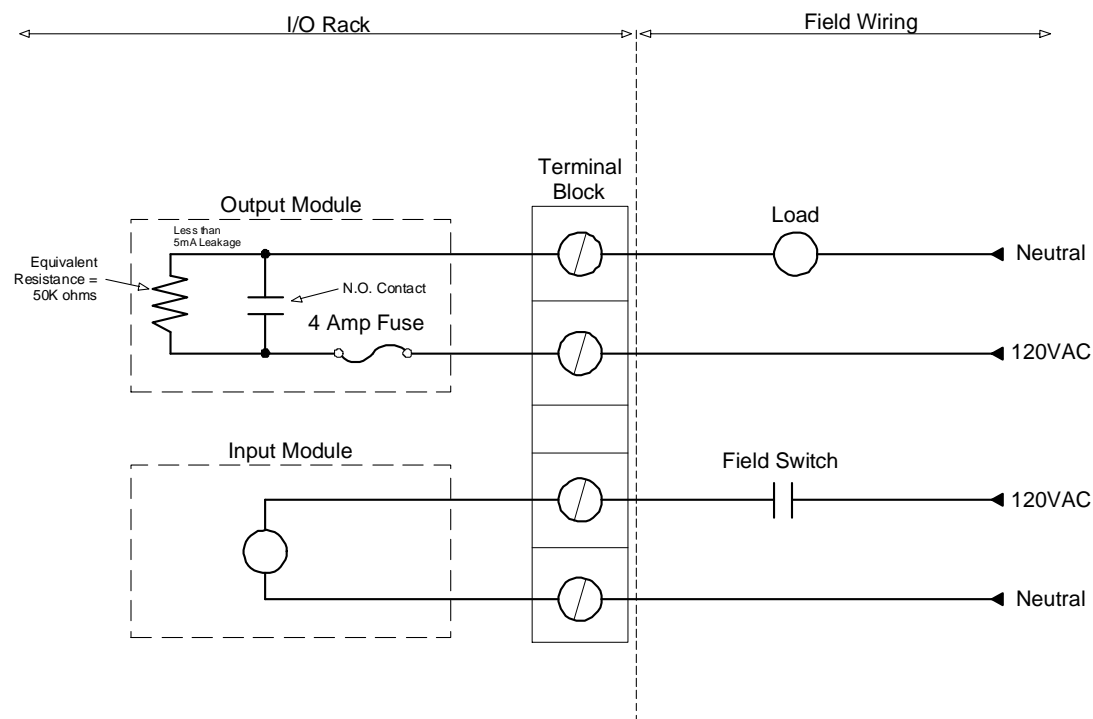
Figure 1- Agility Panel Layout



Agility Sensor Diagnostics

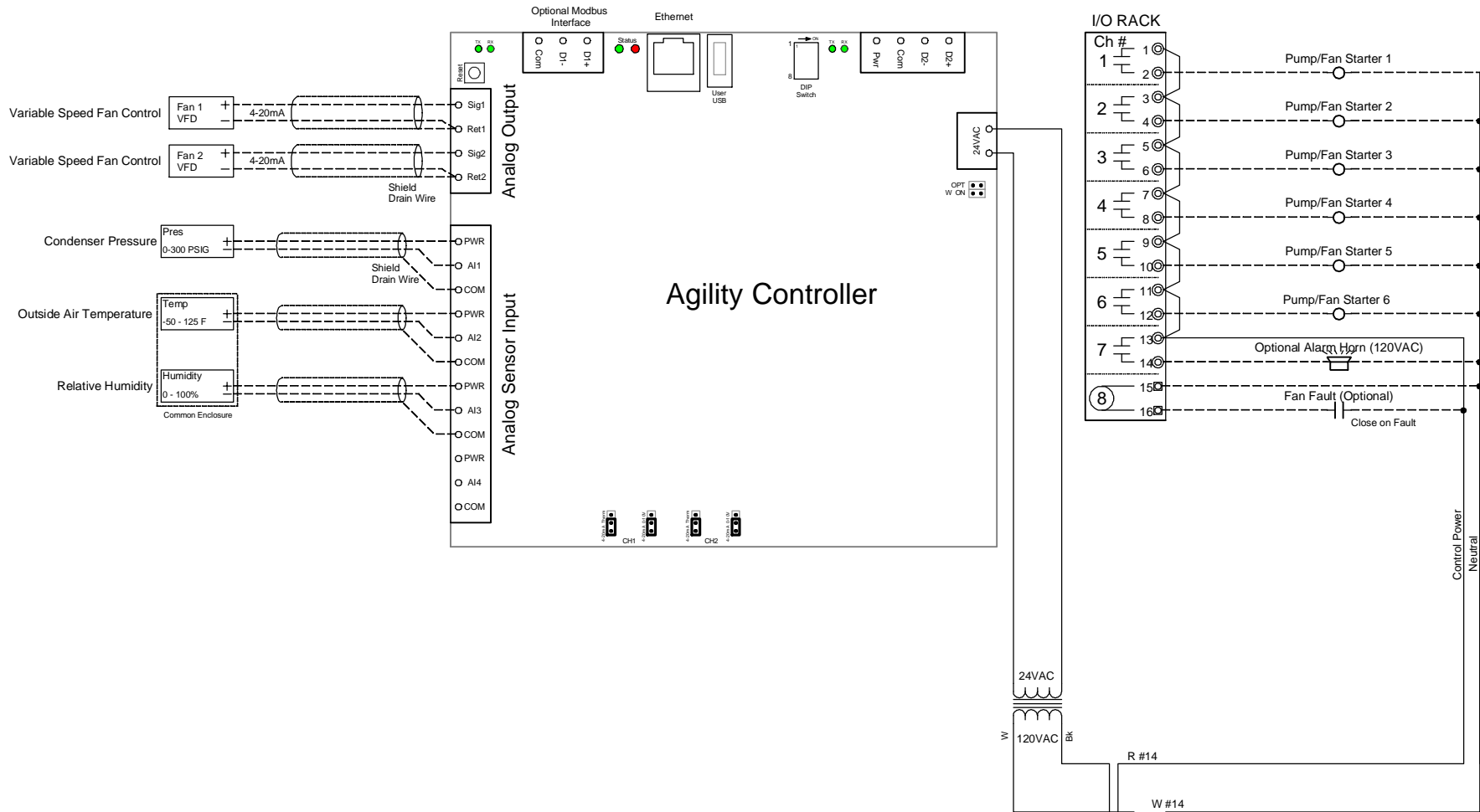
Rev 1.0 2016-07-08 MAG
File: SensorDiagnostics

Figure 2- Agility Sensor Diagnostics Diagram



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Title Agility Digital Input Output Schematic		
Date	Rev	Drawn by
07/11/2016	01	MAG
Drawing Filename AgilityDignOutSchem.axd		

Figure 3- Agility Digital Input/Output Schematic



NOTES:

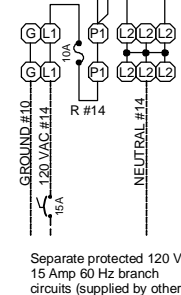
- 1) Connect all shield drain wires to panel COM terminal and float (insulate) at sensor end. Maximum of 4" of signal wire should be left unshielded at each end of cable. Insulate each end of stripped cable with an appropriate size heat shrink tubing.
- 2) Analog sensor cable is shielded Belden #9501, 1 twisted pair run in separate conduit from power wiring.
- 3) #10 ground wire must be connected to earth ground in power panel.
- 4) 120VAC outputs are maximum 1.5 amps running, 30 amps inrush. All I/O modules are solid state (NOT dry). Total combined load is 9.5 amps maximum.

- 5) Not all equipment (pumps, fans, VFD etc.) are required.

LEGEND

R = Red
W = White
BK = Black
Or = Orange

----- = field wiring
----- = panel wiring
○ = panel terminal block
○ = panel screw terminal



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Agility Condenser Wiring Diagram Model 200 Series

Date 12/08/16 Rev 01 Drawn by MAG
Drawing Filename Agility_Condenser_Wiring_Diagram