Troubleshooting OMNI-4000

Where to start troubleshooting

Read the troubleshooting sections and then follow the guidelines and instructions for your situation. If you cannot resolve the problem, contact your dealer or Phason Customer Support.

Collect the following equipment

Loopback connectors (part number PKG-LOOPBACK, available from your dealer or Phason)

Test Bench software (included with OMNI-4000, or available from **www.phason.ca**)

Loopback software (included with OMNI-4000, or available from **www.phason.ca**)

Review the Communication Center

The Communication Center provides an overview of the status of your system.
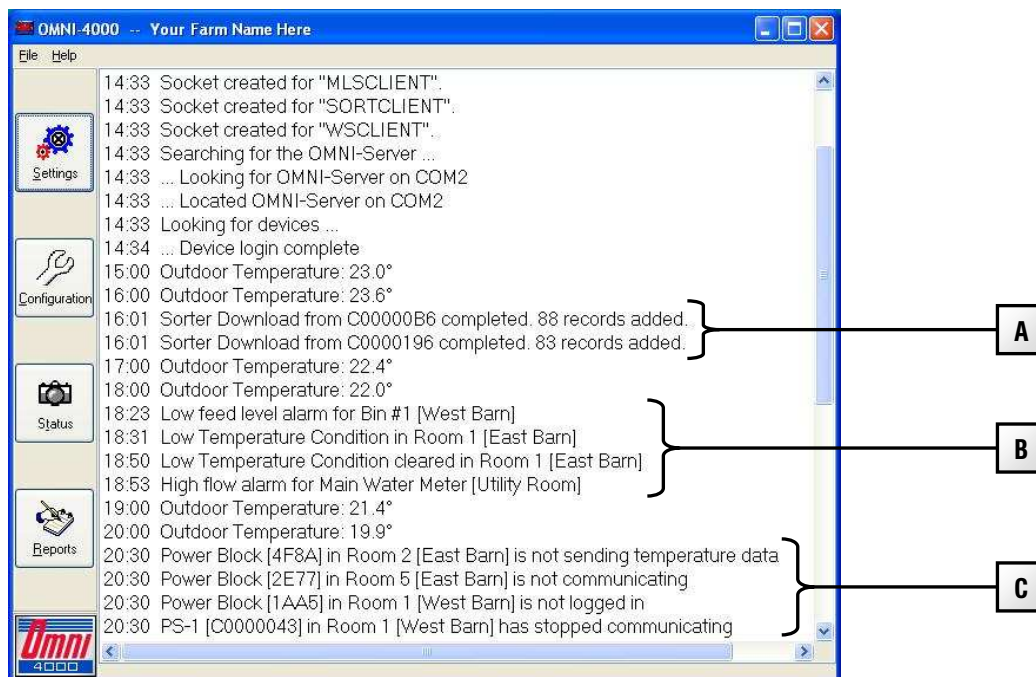
A   Indicates non-alarm information about these devices

B   Indicates fault alarms for these devices

C   Indicates a communication problem with these devices

Review the devices that have alarm conditions

There are two categories of alarms: *fault alarms* and *communication alarms*. For all other problems, read **General troubleshooting** on page 13.

Fault alarms

Fault alarms are alarms caused by out-of-range conditions. For example, high or low temperature, a damaged water pipe causing excess water flow, a jammed hog sorter, an actuator calibration problem, or other similar condition. Determine what is causing the out-of-range condition and fix the problem.

Communication alarms

Communication alarms are alarms that indicate *not logged in*, *not sending temperature data*, or *not communicating*. The remainder of this guide provides details for troubleshooting communications.

If the devices are connected wirelessly, also read **Troubleshooting Wireless Adapters (PWAs)** on page 15.

Important troubleshooting instructions

◆ Always fix communication problems at the OMNI Server before fixing problems at other devices.

◆ Always troubleshoot one OMNI Server channel (COM 1 to 8) at a time. Disconnect all other channel cables you are not currently troubleshooting.

◆ Remove termination resistors from any device that is NOT at the end of the communication cable.

◆ Because communication wires can become corroded or cracked at the green connector, cut and then re-strip the wires at each device you access even if the wires do not look broken.

◆ When checking wiring, make sure the color sequence is the same at each device and has not been mixed up between devices.

◆ When replacing a circuit board, use new replacement boards. Using a circuit board that has been sitting on a shelf without an anti-static bag can cause more problems.

◆ Because electrical interference from AC power cables can cause communication problems, make sure communication cable does not run within 12 inches of AC power cables.

◆ Because poor grounds or different ground planes between buildings can cause communication problems, use a spare wire in the communication cable as a common reference connection (at position E) between each device. For more information, read the **RS485 installation guide**.

Create a site map

Before you start troubleshooting, you need to know the sequence of devices on the communication cable. If you do not have this information, create a "site map" by following the steps below.

1. Create a Site Structure Report.

   a) On the Communication Center, click **Reports**, and log into Omni.

   b) In the Reports Utility window, click **General**, and then **Site Structure Report**.

   c) In the report, find the *Building Groups* section. Each device will have information similar to the example below.

Group Name:	*Barn 1*		
Power Block:	*Finisher-7*		
Address:	*0658*	*Power Block Type:*	*PB-3*
Last Login:	*15-Jul-2010 16:13*	*Communication Channel:*	*4*

2. Enter the information in the site map template at the end of this troubleshooting guide. Determine the sequence of devices by following the cable between devices.

Troubleshooting communication problems

If the alarm message says...

The OMNI Server is not communicating or Cannot find the OMNI Server

OMNI-4000 cannot find the OMNI Server and its trouble light will be on. The problem is between the computer and the OMNI Server and you must fix it before troubleshooting other communication problems.

There are four places between the computer and OMNI Server that hardware can be a problem.

   ◆ Serial port or USB port on computer

   ◆ USB to serial converter (if used)

   ◆ RS-485 converter (RS-485A or RS-485-FD)

   ◆ CAT-5 wiring between RS-485 converter and OMNI Server (or OAM, if applicable)

Troubleshooting steps

1. In OMNI-4000 configuration, select the Options tab and take note of the Serial Port setting.

2. Shut down OMNI-4000.

3. Start Test Bench: click Start>All Programs>OMNI-4000>Diagnostics>Test Bench. If it is not at this location or it looks different from the screenshot below, contact Phason for the latest version. For more information about Test Bench, read **Using Test Bench** on page 8.

> **NOTE** Do not use TBClient; it will not work for this method of troubleshooting.
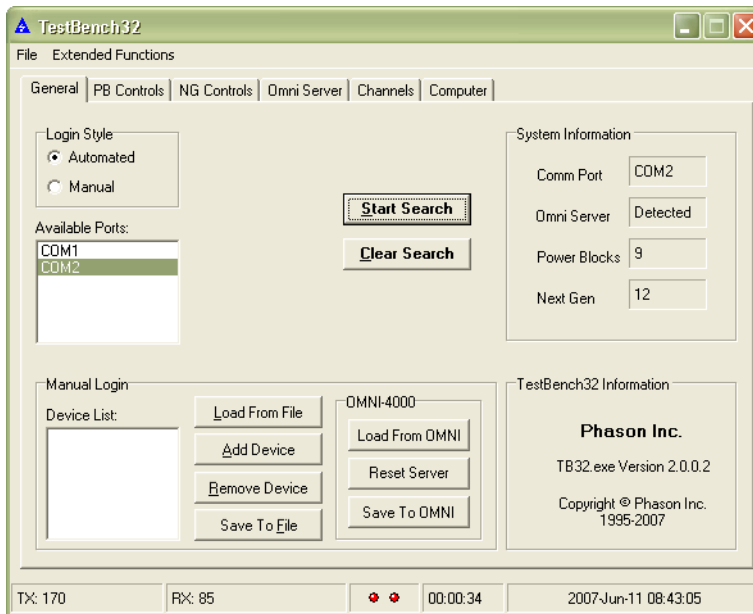
4. Under *Available Ports*, select the serial port you found in OMNI-4000 configuration. Click **Start Search** after each of the following steps as applicable.

> **NOTE** If you are unsure of which serial port to use, start with COM1 and repeat the search on all available ports.

5. Make sure the RS-485 converter is plugged in and the power light is lit.

6. Make sure there is power to the OMNI Server and its AC Power light is lit.

7. Re-strip the communication cable on the RS-485 converter and the OMNI Server, ensuring the wiring color sequence is the same.

8. Move the serial or USB cable to another port on the computer. If using USB, restart Test Bench to find the new USB port.

9. Perform loopback tests on the following devices, in the following order. This will help determine which device is causing the problem. If your setup does not have one of the devices, move to the next device. For more information about loopback tests, read **Using the Loopback utility** on page 11.

a) Serial port

b) USB-to-serial converter

c) RS-485 Converter (RS485A or RS485-FD)

d) CAT-5 cable at the OMNI Server

e) Replace the failed device(s). For a faulty serial port, install an RS485-FD or USB-to-serial converter.

10. If the OMNI Server is communicating but the devices are still not communicating, proceed to the next section.

If the alarm message says...

'Device Name'   ... is not sending temperature data.

                       ... is not communicating.

                       ... has not logged in.

The first two messages indicate that the device logged in previously but lost communication. The third message indicates that the device has not communicated since OMNI-4000 was last started. This last message for a power block will coincide with a temperature of 0°C (32°F) in the Settings Manager. All three messages use the same troubleshooting strategy.

> If the TROUBLE light on the OMNI Server is lit, read **The OMNI Server is not communicating or Cannot find the OMNI Server** on page 3 before continuing.

Important

◆ Always start troubleshooting at the device closest to the OMNI Server.

◆ Disconnect all channel cables you are not currently troubleshooting.

◆ After each of the following steps, test using **Test Bench** until the problem is solved.

Troubleshooting steps

1. Make sure the device has power and the incoming voltage (12 VDC or 120/230 VAC) is correct.

> For Power Blocks, if the incoming voltage is correct, but the *WORKING OK* light is not on solid, go to **General troubleshooting** on page 13.

2. Cut and then re-strip the communication wires at the first device that is *not communicating*, and at the previous one, even if the wires do not look broken.

3. Perform a loopback test at the device that is not communicating to verify continuity to that point.

   ◆ If the test passes, continue to the next step.

   ◆ If the test fails, there is a problem at a previous connection or in the cable between the connections. Locate and fix the problem before proceeding.

4. Reconnect the device and test communications with Test Bench.

5. If the device fails and all devices after it are OK, go to step 8.

6. If the device fails and there are failed devices after it, disconnect the communication connector. The problem might be caused by other failed devices so return to this device later.

7. At the next faulty device, cut and then re-strip the communication wires. Go back to step 3.

8. To fix the device:

   ◆ For *Power Blocks*, determine if the problem is with the microboard or the main board by replacing one at a time, starting with the microboard.

   > **NOTE** If the microboard has a bad connection with the main board, it often does not need to be replaced. Switch off the power, remove the microboard, and then reinsert it.

   ◆ For *PS-1 Scale Heads*, determine if the problem is with the display or power board by replacing one at a time, starting with the display.

   ◆ For *all other devices*, replace the circuit board.

9. Reconnect (one at a time) any devices still disconnected from step 6 and then test communications using **Test Bench**. Repeat step 8 for any failed devices.

Complete communication overhaul for multiple problems

The above troubleshooting steps often identify and fix all communication problems. However, when unexpected symptoms occur and there are multiple problems with a system, it is often best to do a complete communication overhaul as described below.

1. Make sure all devices have power and the incoming voltage (12 VDC, 120 VAC, or 230 VAC) is correct.

    > **NOTE** For Power Blocks, if the incoming voltage is correct, but the *WORKING OK* light is not on solid, go to **General troubleshooting** on page 13.

2. Disconnect the communication connectors at all faulty devices and then cut and re-strip the communication wires at each one. Leave the connectors disconnected. Make sure only the last device has termination resistors installed. For information about the location of the termination resistors, read the installation guide for that specific device.

3. Perform a loopback test at the termination end of the cable to ensure continuity to the computer. If the test fails, repeat the test at the next closest device until you identify the break in the cable.

4. Reconnect the last device (this provides proper termination) and then try to locate it using **Test Bench**.

5. If the device is not communicating:

    ◆ For *Power Blocks*, determine if the problem is with the microboard or the main board by replacing one at a time, starting with the microboard.

    > **NOTE** If the microboard has a bad connection with the main board, it often does not need to be replaced. Switch off the power, remove the microboard, and then reinsert it.

    ◆ For *PS-1 Scale Heads*, determine if the problem is with the display or power board by replacing one at a time, starting with the display.

    ◆ For *all other devices*, replace the circuit board.

6. Reconnect the next device and then try to locate it using **Test Bench**.

    ◆ If the device is *not* communicating, go to step 5.

    ◆ If it is communicating, repeat step 6 for the next device.

Using Test Bench

If your version of Test Bench looks different from the screenshot, download the latest version from **www.phason.ca**.

NOTE: Do not use *TBClient*; it will not work for this method of troubleshooting.
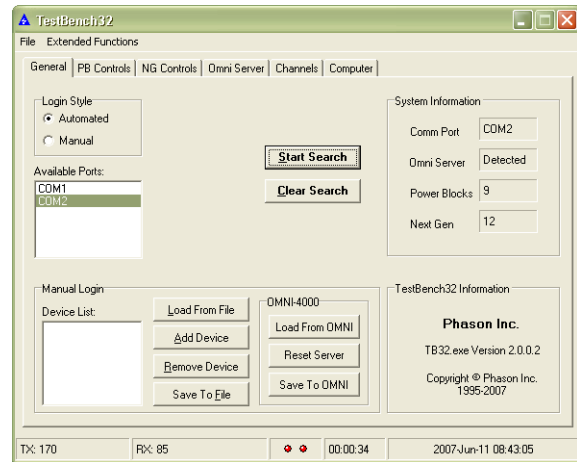
Screen description

General tab

Login style

- ◆ *Automated:* Test Bench searches for all devices.

- ◆ *Manual:* Test Bench searches only for devices on the user-generated device list. This can be useful to isolate a few devices that you are troubleshooting.

- ◆ *Available Ports:* A list of serial ports available on which to search for devices

System Information

- ◆ *Comm Port:* The current serial port being searched

- ◆ *OMNI Server:* Indicates whether or not there is communication to the OMNI Server

- ◆ *Power Blocks:* The number of Power Blocks found

- ◆ *Next Gen:* The number of next-generation devices (non-Power Blocks) found

Manual Login

- ◆ *Load From File:* Load a previously saved device list.

- ◆ *Add Device:* Add a device address to the device list.

- ◆ *Remove Device:* Remove a device address from the device list.

- ◆ *Save To File:* Save the device list to a text file.

OMNI-4000

- ◆ *Load From OMNI:* Load the device list with addresses programmed in OMNI-4000

- ◆ *Save To OMNI:* Save the logged in devices (from automated or manual mode) to OMNI-4000. Does not affect devices already saved in OMNI-4000.

- ◆ *Reset Server:* Remotely resets the OMNI Server in case of communication problems with it. Simulates cycling the power to the OMNI Server.

PB Controls

Address: A unique four-digit code that identifies each Power Block

Type: The type of power block: PB-1 to PB-6

A Type: Phason internal use

Status: Phason internal use

Temperature: The temperature the Power Block probe is measuring

Version: The firmware version of the microboard in the Power Block

Pots: Phason internal use

Analog: Phason internal use

Login Num: The order in which the Power Blocks were found. This DOES NOT correspond to the location on the communication channel.

Channel: The OMNI Server channel (COM1 to COM8) where the device is located

NG Controls ("next generation" controls)

◆ *Address:* A unique eight-digit code that identifies each device

◆ *Name:* The name of device (Supra only)

◆ *Zone 1-4:* The zone temperature reading (Supra only)

◆ *Outdoor:* The outdoor temperature reading (Supra only)

◆ *Type:* Phason internal use

◆ *Sub-Type:* The model of the device (OWM, SUPRA, PS-1 etc)

◆ *Version:* The firmware version of the device

Channel: The communication channel in the OMNI Server (COM1 to COM8) where the device is located. Non-OMNI applications display channel 0.

Supra Info

Get Temp: Retrieves the current temperature readings from the selected Supra

Get Name: Retrieves the name of the selected Supra

Change Name: Allows you to change the name of the Supra

OMNI Server

Get A/D Readings

   ◆ *Pwr Supp:* The regulated 5 volt power supply level on the board

   ◆ *AN1-6:* The analog temperature probe readings, in degrees Celsius

   ◆ *Batt Term:* The 12 volt battery backup level

Get Status

   ◆   *Relays:* The current status of alarm relays on the board; green means it is in alarm state.

Channels

Tests for proper termination of each communication channel. The Line Driver Test number indicates a properly, under, over-terminated, or shorted line.

For an over-terminated channel, remove the extra termination resistors.

For an under-terminated channel, make sure the termination resistors are in place in the last device. If under-termination continues, re-strip the wires at all devices to ensure a solid connection.

Computer

Lists information about the computer you are using.

Searching for devices using Test Bench

1. Close all programs that use a serial port (OMNI-4000, MaxPro II, BinBoss, and so on)

2. Start **Test Bench**. In the *Start* menu, the shortcut is in *All Programs* and in the folder of the Phason software you purchased.

3. Under Login Style, select *Automated*.

4. Under *Available Ports*, select the serial port to which the RS485 and devices are connected.

5. Click **Start Search**.
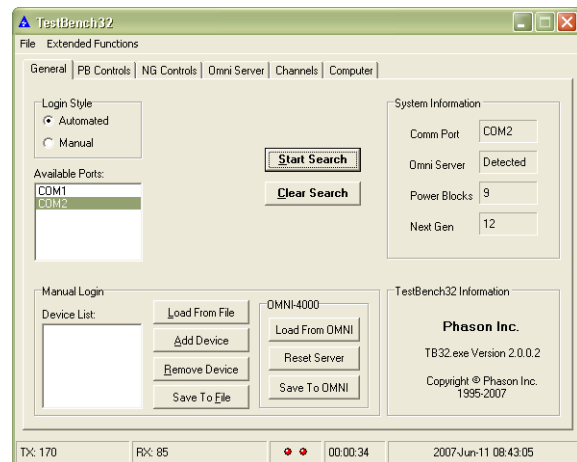
> If do not know which serial port you are using, start a search on each one until device information displays under *System Information*. If no devices appear, perform a loopback test on each serial port to make sure they work.

When the RX/TX indicators stop flashing, the login is complete. The System Information area lists the number of devices logged in. Click **PB Controls** and **NG Controls** for more device-specific information.

Using the Loopback utility

A loopback test verifies the continuity of the communication line. To perform a loopback test, you require a test utility and loopback connectors. The Loopback test utility is included with all Phason software and is available for download at **www.phason.ca**.

During the test, the computer sends out information along the communication cable. The information "bounces back" when it gets to the loopback connector. The computer compares the information it receives back; if it is the same as the information sent out, the test passes indicating both the send (TX) and receive (RX) lines are intact.

> **NOTE** The loopback test does not indicate crossed wires or corroded connections. To determine either of these two conditions, visually inspect the wiring.

Loopback connectors

To perform a loopback test, you need loopback connectors to connect to the cable. A loopback connector package is available from your dealer or Phason and includes connectors for different locations/connector types on the communication cable.

If a loopback connector is not available, you can create a temporary loopback for most situations by inserting wires into the connectors as shown above. However, this type of loopback connector will not work for a serial port or USB-to-serial port loopback test.
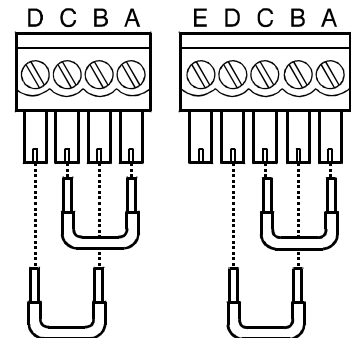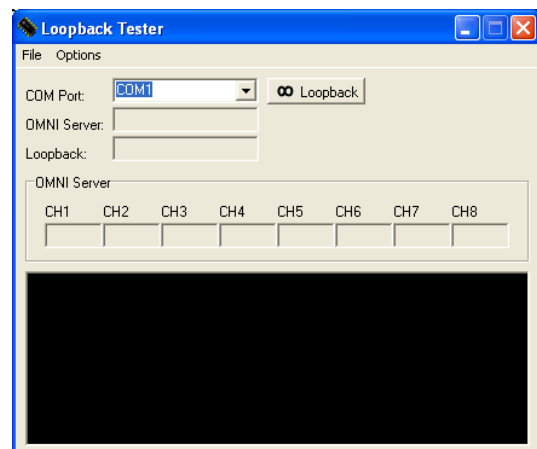

Loopback utility screen description

COM Port: The serial port selected to test

OMNI Server: Shows if an OMNI Server is detected.

Loopback: Shows if a loopback connector was found in a single- channel (single cable) communication system.

OMNI Server CH1-8: Indicates if a loopback connector was found on a specific Server channel.

Performing a loopback test with the Phason Loopback utility

1. Connect the appropriate loopback connector to the test location.

2. On the *Start Menu*, start the Loopback utility. The shortcut is located in *All Programs* and in the folder of the Phason software you purchased.

3. Select the COM port to test and then click **Loopback**.
   The test results will show whether the loopback passed and, if applicable, on which OMNI Server channel. A passed loopback test indicates that there is continuity to the loopback connector.

   When a test passes, remove the loopback connector and then repeat the test. The test should fail, indicating there is *not* a short on the line causing an unintentional loopback situation.

> The loopback test does not indicate crossed wires or corroded connections. To determine either of these two conditions, visually inspect the wiring.

Performing a loopback test with Hyperterminal

1. Connect the appropriate loopback connector to the test location.

2. Start HyperTerminal (on the start menu, click *All Programs*, *Accessories*, *Communications*, and then *HyperTerminal*.
   HyperTerminal's Connection Description window displays. You might see a window display asking if you want to make HyperTerminal your default Telnet program. Click **No** to continue.

3. Beside *Name*, type Loopback and then click **OK**.
   The Connect To window displays.

4. Beside *Connect Using*, select the COM port the system is connected to and then click **OK**.
   The Properties window displays.

5. Beside Bits per second, select *9600* and then click **OK**.
   The main HyperTerminal window displays.

6. Type your name.

   ◆ If the window displays the characters you typed, there is continuity to the loopback connector.

   ◆ If the window *does not* display the characters, *there is a problem* between the computer and the loopback connector. Disconnect the loopback connector and then connect it at the next device closer to the computer.

7. Repeat the step 6 until you find the wiring problem.

> The loopback test does not identify crossed wires or corroded connections. You will need to inspect the cable and connectors to identify these problems.

General troubleshooting

PROBLEM: A Power Block's *WORKING OK* light is not on solid

1. Measure and make sure the incoming voltage (120 VAC or 230 VAC) matches the selection switch on the circuit board.

2. Switch off the power to the Power Block. Remove and then re-insert the microboard into the socket. When finished, restore power to the Power Block.

3. Replace the microboard with a new one.

4. Replace the main board. If the Power Block functions properly, retest the original microboard to see if it functions.

PROBLEM: A Power Block's output (fan, heater, and so on) is not operating

1. Review the communication center and fix any communication problems to the Power Block.

2. Review the settings for the Power Block and make sure they are set to operate the load at the current temperature.

3. Test the Power Block using the Power Block test card to determine if the relay or variable stage works. For more information, read the *Testing Power Blocks* section of the **Power Block installation guide**. If the test passes, replace the microboard because it is likely damaged.

Determining proper actuator feedback

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

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 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 these steps to measure the resistance and determine the correct wiring.

To determine correct wiring

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 two 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 in any order. Polarity is not important.

9. Connect the remaining wire to the feedback terminal.

10. Calibrate the actuator. The following diagram shows the calibration cycle.
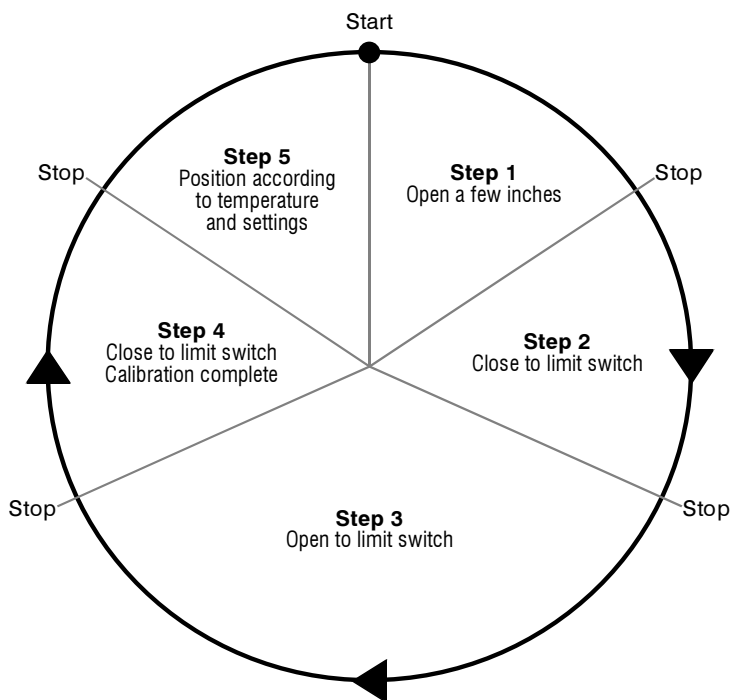
11. If the actuator wiring is correct and it calibrated properly, the actuator will position according to the settings in the control.

Troubleshooting Wireless Adapters (PWAs)

PWA indicator light descriptions

Radio: The light is on when the wireless transmitter (radio) is on.

Joined: The light flashes continuously when the radio is connected to a wireless network.

Transmit: The light flashes when data is sent.

Receive: The light flashes when data is received.

Power: The light is on when the PWA has power.

Signal: This light will flashes when data is sent or received.

When operating properly and connected to a wireless network, the *Power* and *Radio* lights are on and the *Joined* light flashes.

PROBLEM: The *Radio* or *Power* lights are off

1. Make sure the PWA has sufficient power (9 to 14 VDC).

2. If the PWA is still not functioning, replace it because it is damaged.

PROBLEM: The *Joined* light is off

1. Make sure the PWAs are not too far apart or the signal is not being blocked by obstacles like buildings or trees. The typical range through objects is 300 feet (91 meters); line of sight range is 1 mile (1.6 kilometers).

   Test for an out-of-range condition by bringing the remote PWA closer to the coordinator and then testing to see if it joins. If it does join, find a better location for the PWA.

2. Make sure the other PWA has sufficient power (9 to 14 VDC).

PROBLEM: The *Receive* or *Transmit* lights are not flashing when searching with Test Bench

1. Cut and then re-strip the wiring at the PWA and previous device.

2. Perform a loopback test at the PWA to test the cable back to the computer. Fix any cable problems.

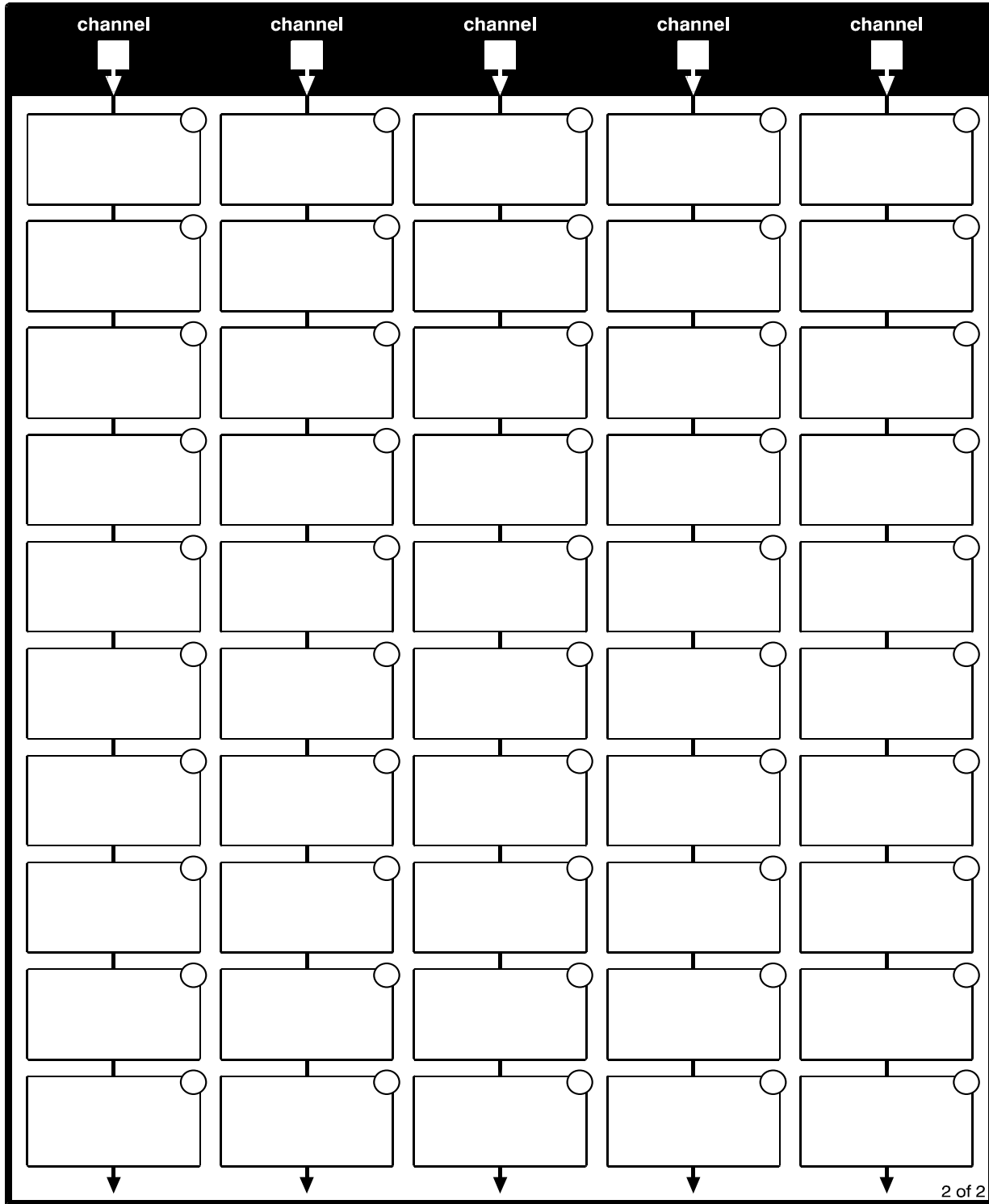# Site map templates

channel 7	channel	channel	channel	channel
Building Device type Device address Group name Position on channel				
Finisher 1 PB-2 OC1A N.Fin1-1 (1)				
Finisher 1 PB-2 O21F N.Fin1-2 (2)				
Finisher 1 PB-1 A21A S.Fin1-1 (3)				
Finisher 1 PB-3 OFFA S.Fin1-2 (4)				
Finisher 1 FLS 12345678 N.FinFeed (5)				
Finisher 1 FLS 87654321 S.FinFeed (6)				
Finisher 1 OWM 56473829 Fin1Water (7)				
Finisher 1 LEM 09871234 Fin1S/W (8)				
Finisher 1 MLS 12387645 N.Lagoon (9) Last one!				

1 of 2

channel   channel   channel   channel   channel

2 of 2

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