



APC-2 AUTOMATIC EVACUATION PROCESS CONTROLLER USER MANUAL

Purpose of the document

The purpose of this document is to explain how to operate the APC-2 Evacuation Process Controller referred to in this document as the APC-2 or unit. The APC-2 is designed especially for production line use. The system's low maintenance design, combined with fast and efficient evacuation, make the APC-2 the most cost-effective product available from a company with more than 70 years of experience in building affordable evacuation processing equipment.

The Airserco APC-2 is an industrially hardened, compact, easy-to-use solution for automating vacuum and decay tests. It allows parameters such as evacuation time, minimum/maximum vacuum set points (in microns), and decay time to match test requirements of the appliance being tested. If desired, parts can be serialized, data can be saved to a database (local SQLite or SQL Server), and results can be printed. The APC-2 includes an active Pirani sensor / transducer (APC-2-01), as well as a 120v solenoid valve (required for operation). The APC-2 operates on 115 volt, 60hz single-phase power.

The APC-2 software provides multiple modes of operation with varying degrees of simplicity. Any unit can be run as a standalone system or as part of an enterprise level system.

The APC-2 software runs on the Windows Embedded Standard 7 operating system. The design allows APC-2 software updates while still protecting the file system from corruption in the case of power loss.

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1. ICONS USED IN THE MANUAL

Throughout this document, the icons below are used to underline points or important notions

	Important information
	Good to know - Tricks
	Risk in front of a parameter setting or of a specific action
	Action to be avoided
	Mandatory action
	Sensitive or difficult procedure. To take into account necessarily



2. SYSTEM MODES

The APC-2 system is able to operate in 3 modes – BASIC, LOCAL, and ENTERPRISE. Printing is available for all modes.

2.1 BASIC

In BASIC mode, multiple product configurations are not available. All testing is done with DEFAULT settings. Before each cycle, desired parameters are set. At the end of a test cycle, no results are saved. With this mode, no network connection is required while little to no data maintenance is required. This mode provides a simple PASS/FAIL result.

2.2 LOCAL

In LOCAL mode, pre-configured parameters can be used and if desired, results can be saved to the local database. Most station setup can be performed right on the station using the touchscreen (although station setup requires a mouse and keyboard). To retrieve saved values (test results, fault history, etc.), the local database must be copied to a thumb drive using a USB keyboard and mouse.

2.3 ENTERPRISE

In ENTERPRISE mode, all LOCAL mode capabilities remain, but all values are stored in tables on an SQL Server system. Local configuration is still possible, but the station can also be locked out to prevent local modifications to settings. The Airserco AirExecutive application can be used to configure the SQL database (your Microsoft SQL Server Management Studio can be used if preferred). This is the most secure and robust mode of operation.

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3. SYSTEM TESTING OPTIONS

The APC-2 provides procedures and tests that can be configured by product to provide customized progressive testing. If multiple procedures or tests are configured, all procedures/tests must complete successfully before the product is passed. The failure of any procedure/test results in the product test failing.



Procedures do not test for pass/fail conditions. If only one procedure is specified, the completion of that procedure will result in a pass result. If a procedure **and** a test are specified, the test will determine the pass/fail result.

3.1 MINIMUM PUMPDOWN TIME PROCEDURE

The Minimum Pumpdown Time is an optional procedure that simply opens the vacuum valve for a pre-defined period of time. The procedure is unconditional and cannot be shorted with the Manual Test button.

3.2 TIME BELOW SETPOINT PROCEDURE

The Time Below Setpoint procedure waits for the micron value to drop below the setpoint and once it reaches that level, continues evacuating for the time period specified. This procedure opens the vacuum valve, waits for the micron level to drop below the Start Timer at Micron value, and holds the vacuum valve open for the amount of time specified by the Time Duration Below Setpoint value.



The APC-2 unit evacuates for the amount of time specified unconditionally after reaching the setpoint.

3.3 LOW MICRON SETPOINT PROCEDURE

The Low Micron Setpoint procedure opens the vacuum valve and waits for the micron level to drop below the Low Micron Setpoint value.

3.4 DECAY TEST

The Decay Test disables the vacuum valve and ensures the micron level remains lower than the High Micron Setpoint for the amount of time specified by the Decay Test Time value.

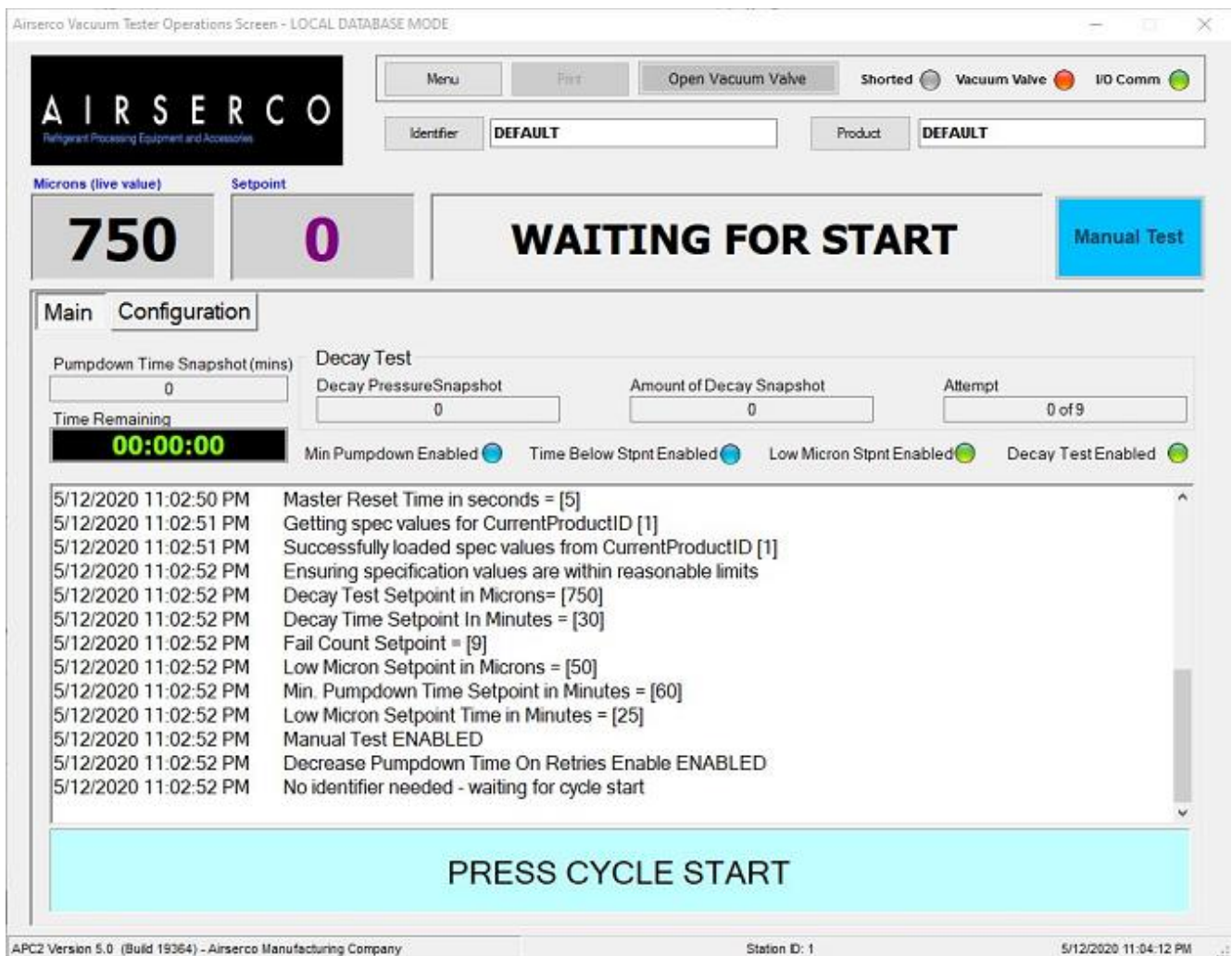


If the Decay Test is enabled, the Low Micron Setpoint procedure must also be enabled.

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4. THE APC-2 SOFTWARE MAIN SCREEN

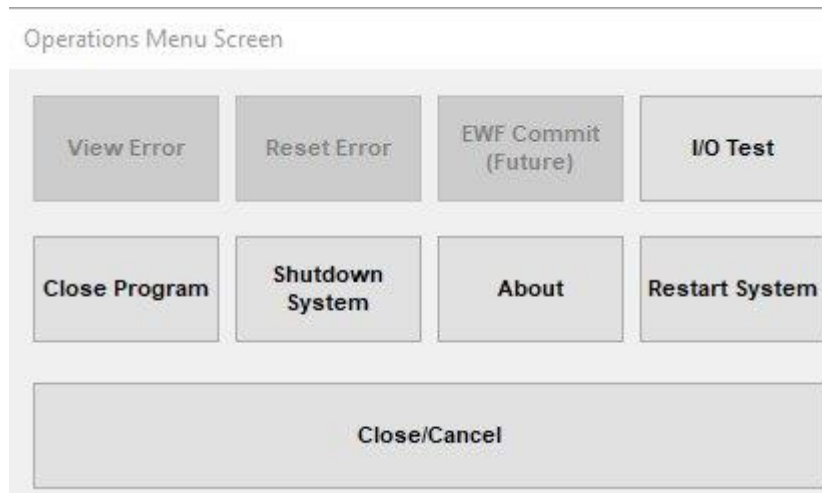
When the APC-2 system starts, the user will be presented with the main screen. From here, the APC-2 system can be completely configured to the user's requirements. Most settings can be made on the touchscreen without the need of a mouse and/or keyboard.



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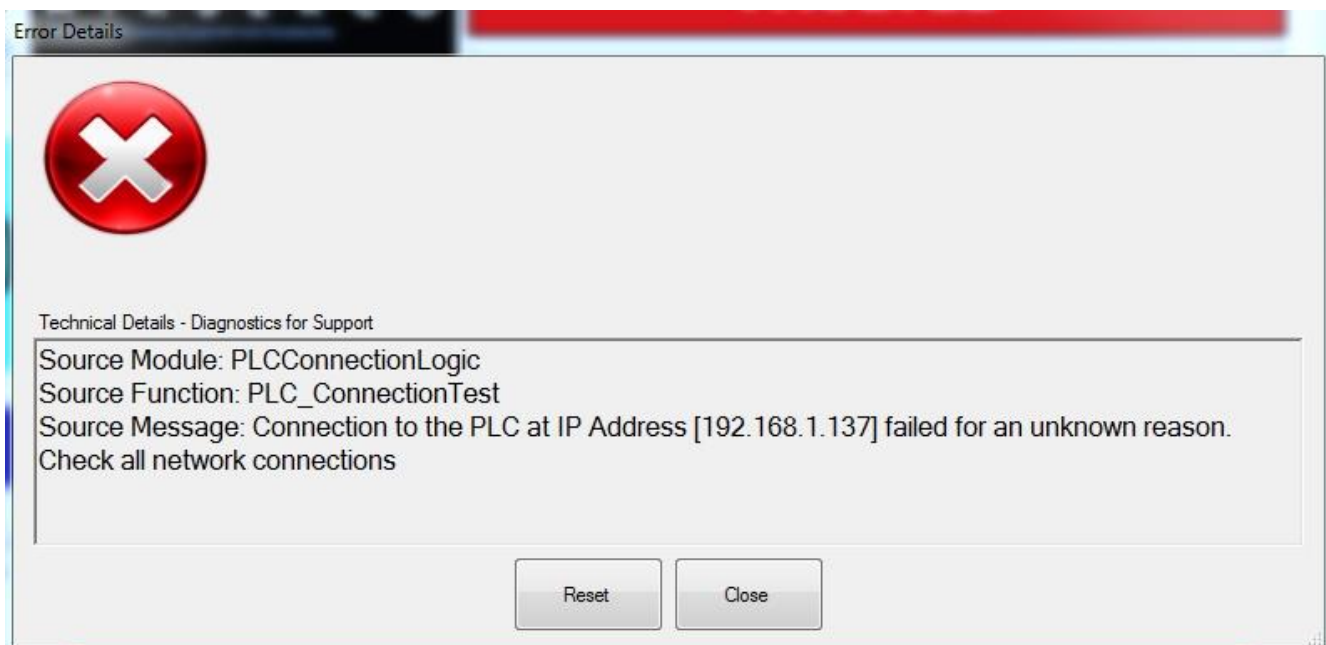
4.1 MENU BUTTON

Pressing the Menu button displays a series of buttons that are used to perform less common tasks such as viewing/resetting faults and shutting the system down.



4.1.1 VIEW ERROR

In the event of a fault condition, the details of the error can be found by pressing the View Error button. This screen provides diagnostic information helpful to technical personnel. The Reset button can be used to reset the fault condition. The Close Button can be pressed to close the error details window.

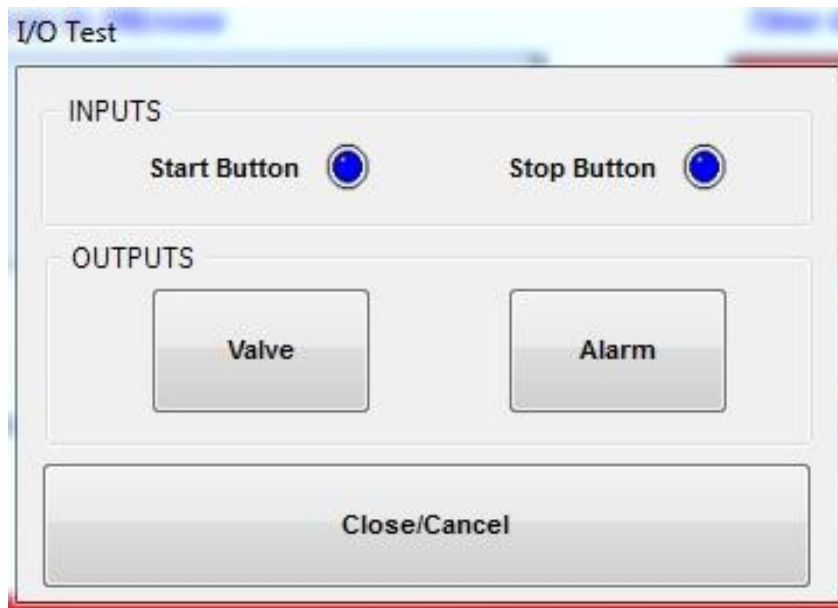


4.1.2 RESET ERROR

The Reset button simply resets any fault conditions.

4.1.3 I/O TEST

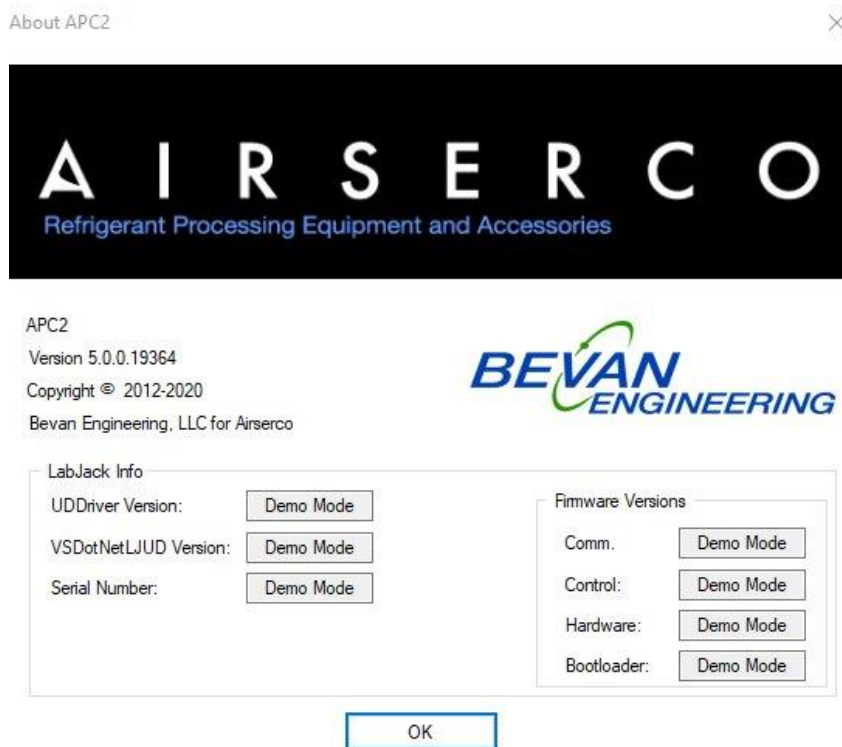
Pressing the I/O Test button displays a screen that shows the status of inputs and allows the manual operation of devices. If an input LED is blue, the input is not enabled. If green, the input is enabled. Any outputs enabled by pressing the button on the screen will be enabled until the button is released.



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4.1.4 ABOUT

Pressing the About button displays a screen with version information, developer information, and hardware information.



4.1.5 CLOSE PROGRAM

Pressing the Close Program button will cause the software application to terminate.

4.1.6 SHUT DOWN SYSTEM

The system can be shut down by pressing the Shutdown System button. Because the operating system is an embedded system, a proper shutdown sequence is not required, but always recommended. However, if the write-protect overlay is disabled, the system should be shutdown using the shutdown mechanisms incorporated in the operating system. Failure to do so could render the unit inoperable.

4.1.7 RESTART SYSTEM

The Restart System button works exactly like the Shutdown System button explained in the [Shutdown System](#) section of this manual, except the system will restart instead of shutting down.

4.1.8 CLOSE/CANCEL

Pressing the Close/Cancel button will close the menu screen.

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4.2 PRINT BUTTON



The Print button allows the user to manually print the results of the last test operation. If the button is disabled (grayed out), no print data exists (for example, deleted at the start of a new test cycle).

4.3 OPEN VACUUM VALVE

Pressing the Open Vacuum Valve button manually opens the vacuum valve until released

4.4 TEST STATUS DISPLAY

The Test Status Display is a multicolor indicator of the following states:

- In Cycle
- Passed
- Failed
- Aborted
- Faulted

4.5 I/O COMM LED

The I/O Comm virtual LED shows the status of the operations software connection to the Labjack I/O interface. When green, the operations software is connected to the Labjack. If red, the operations software and Labjack has become disconnected.

4.6 VACUUM VALVE LED

The Vacuum Valve virtual LED shows the state of the vacuum valve. When green, the valve is enabled/on. If blue, the valve is disabled/off.

4.7 SHORTED LED

Indicates the user pressed the Manual Test button during the Low Micron Setpoint procedure to short the pumpdown process.

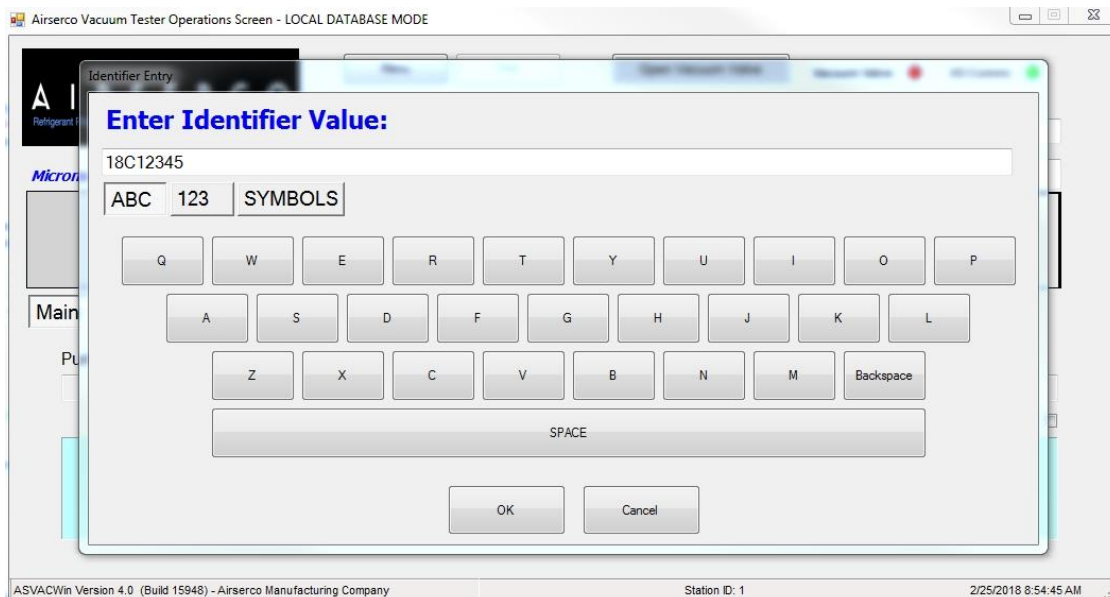
- Gray – Shorting the pumpdown is not available
- Blue – Shorting the pumpdown is available, but the Manual Test button has not been pressed
- Green – The Manual Test button has been pressed and the results record will show the pumpdown was shorted.

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4.8 IDENTIFIER # BUTTON

Pressing the Identifier button will display a screen that waits for a unique identifier to be entered. The value can be entered via the virtual keyboard. An example of a unique identifier would be a serial number – a unique value that identifies a particular item.



Preferably, a “wedge” scanner should be used to enter the unique identifier. By scanning a bar code using a wedge scanner (a type of scanner that operates like a keyboard), the user can scan a bar code label instead of entering values. This method is highly recommended to prevent typing mistakes.



The Identifier label is the default setting for the APC-2. This unique identifier term can be changed to whatever is desired (e.g. Serial Number) via the [Station Configuration](#) password protected setup screen or the AirExecutive setup program (if running in Enterprise mode with AllowLocalEdits disabled).



Do not attempt to use a scanner that does not act like a keyboard. For example, serial, USB, or Ethernet scanners will not work. Only a wedge scanner can be used (emulates keyboard entry).

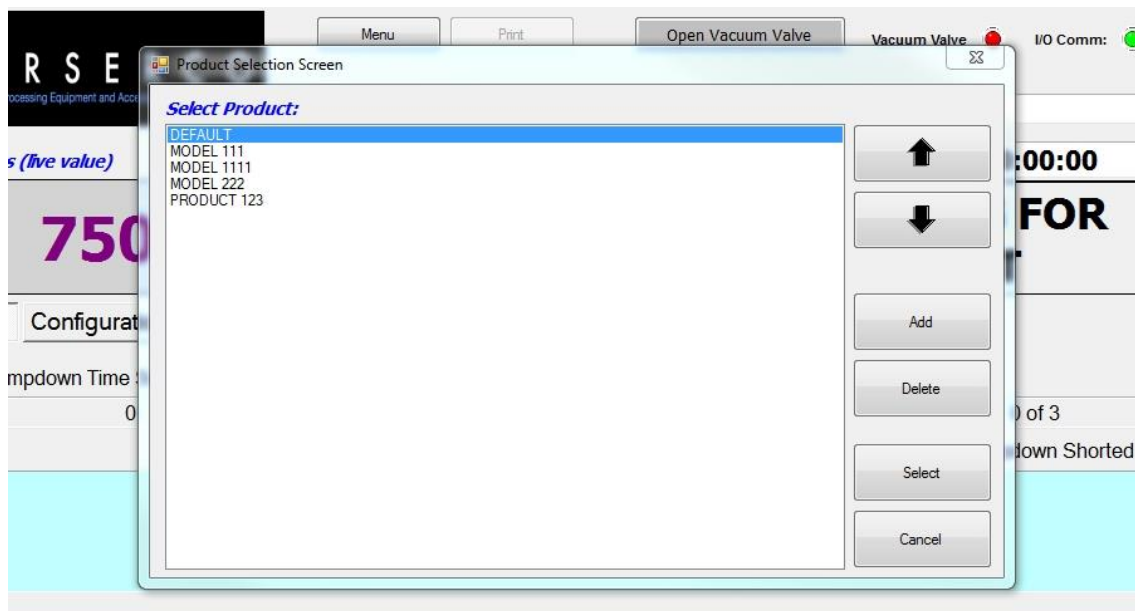
4.9 IDENTIFIER VALUE

The current value of the unique identifier is displayed here.

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4.10 PRODUCT

A preconfigured product number can be selected by pressing the Product button. When pressed, a screen will be displayed that allows choice via the touchscreen. All selection screens operate in the same manner.



- **Up Arrow** – will move the blue selection bar up
- **Down Arrow** – will move the blue selection bar down
- **Add** – displays a screen where a new product name can be entered.



Adding a new product only adds a new name. All parameter values associated with that product name must be configured in the Configuration->Product tab.

- **Delete** – will delete the highlighted product number
- **Select** – the currently highlighted product will be selected and made current
- **Cancel** – closes the product selection screen. If the highlight bar was moved to a different product, but not selected, no changes will be saved.



The Add and Delete buttons may be disabled, preventing local configuration, if the system is running in Enterprise mode with AllowLocalEdits disabled.

4.11 PRODUCT VALUE

Displays the currently selected product

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4.12 MICRONS

The amount of vacuum – scaled in microns – read from the Pirani transducer. This is a live value that is displayed unconditionally.

4.13 SETPOINT

The setpoint value displays the relevant target value during each procedure/test:

- Minimum Pumpdown Time in Seconds – the amount of pumpdown time in seconds.
- Time Below Setpoint - the micron level at which the Time Below Setpoint timer will start
- Low Micron Setpoint – the micron level that must be reached during the Low Micron Setpoint procedure
- Decay Test – the high micron setpoint. The high micron setpoint cannot be exceeded during the decay test.

4.14 MANUAL TEST BUTTON

The Manual Test Button is used to short the cycle during the Low Micron Setpoint procedure.



The Manual Test button will remain disabled if the Enable Manual Test checkbox is disabled.

4.15 TIME REMAINING

The amount of time remaining for the current procedure/test formatted as hours:minutes:seconds.

4.16 SNAPSHOT VALUES

When the test is complete, various snapshot values will be displayed:

- Pumpdown Time – the amount of time in minutes the unit took to pump down to the low pressure setpoint.
- Decay Pressure Snapshot – the amount of pressure in microns measured at the end of the test cycle
- Amount of Decay Snapshot – the amount of decay measured at the end of the test cycle
- Attempt – the number of attempts it took to complete the test cycle.

4.17 OPERATION ENABLED LEDS

The row of indicators above the output window simply reflect the enabled/disabled status of all procedures and tests. If blue, the procedure/test is disabled. If green, the procedure/test is enabled and will be required to successfully perform it's task.

4.18 OUTPUT WINDOW

The Output Window contains detailed information related to the testing cycle. This is very useful for diagnostic purposes. In fact, Airserco technical support may ask for the contents of this window to be copied and pasted into an email.

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4.19 STATUS DISPLAY

The status display provides the user a visual indication of the station's operational state or provide instruction as necessary.

4.20 SOFTWARE BUILD NUMBER

Software version and build number information is provided for diagnostic purposes.

4.21 STATION ID

The station ID is displayed to ensure Station ID values are unique in a networked environment.



It is critical that any Airserco product have a unique Station ID regardless of product type or mode of operation. Even if the units are not networked, this identifier helps maintain historical information which may be helpful in terms of diagnostics.

4.22 DATE AND TIME

The most important reason for the date and time indication is to show the application is functioning. If the clock updates correctly, the software is executing normally.

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5. CONFIGURATION

The APC-2 System can be configured at the station (if enabled via the [AllowLocalEdits](#) parameter if in Enterprise mode).

5.1 PASSWORDS

Passwords can be set that restricts a user's ability to make changes to the system. There are two passwords. The Setpoint Configuration Password is required to make changes to product settings. The Station Configuration Password is used to restrict a user's ability to make changes to the station. If a Password Hold Time value is set greater than zero, password entry will not be required for that time period after the password is entered.

5.1.1 DEFAULT PASSWORDS

The APC-2 unit ships from the factory with default passwords :

Default Setpoint Configuration Password – **Password1**

Default Station Configuration Password – **Password2**



If a zero-length password is saved, all restrictions are removed for that operation. Any user can make any changes. This is not recommended.



It is highly recommended that the default passwords be changed to more robust passwords before putting the unit into service.

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5.2 PRODUCT CONFIGURATION

Product setpoint values can be set at the Configuration tab. The current product is displayed to the right of the Product button. By pressing the EDIT button, the user may be required to enter the Setpoint Configuration Password. When the password requirement has been satisfied, a data entry screen will be displayed allowing a new value to be entered using a virtual keyboard. In the case of enable/disable settings, a screen containing a checkbox will be displayed.

5.2.1 MINIMUM PUMPDOWN TIME

The Minimum Pumpdown Time procedure opens the vacuum valve for a pre-defined period of time. If no other procedures or tests are enabled, the procedure will end with a PASS result. The Manual Test button cannot be used during this period.

Airserco Vacuum Tester Operations Screen - LOCAL DATABASE MODE



Menu Print Open Vacuum Valve
Shorted ☐ Vacuum Valve ☒ I/O Comm ☒

Identifier DEFAULT Product DEFAULT

Microns (live value) **750**
Setpoint **0**

WAITING FOR START
Manual Test

Main Configuration

Min Pumpdown Time Below Setpoint Low Micron Setpoint Decay Test Station

Minimum Pumpdown Enable **DISABLED** Change

Enable/Disable the Minimum Pumpdown Time procedure

Minimum Pumpdown Time (seconds)

60 Edit

The number of seconds the system will pumpdown

APC2 Version 5.0 (Build 19364) - Airserco Manufacturing Company
Station ID: 1
5/12/2020 11:07:54 PM

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➤ **Minimum Pumpdown Enable**

The Minimum Pumpdown Enable checkbox enables/disables the Minimum Pumpdown procedure. By pressing the CHANGE button, the procedure can be enabled and disabled by toggling the checkbox on the configuration screen. Press the OK button to save changes.

Minimum Pumpdown Time Enable Configuration

Minimum Pumpdown Time Enable ☐

OK Cancel

➤ **Minimum Pumpdown Time**

The Minimum Pumpdown Time is the amount of pumpdown time in seconds. The Manual Test button is not available during the Minimum Pumpdown Time procedure and the time must be completed. A value of zero will immediately advance to the next procedure/test (if enabled).

Min. Pump Time Setpoint In Seconds Configuration

Enter Minimum Pumpdown Time in Seconds:

60

ABC 123 SYMBOLS

1 2 3 4 5 6 7 8 9 0

. (period) Bk Space

OK Cancel



5.2.2 TIME BELOW SETPOINT

The Time Below Setpoint procedure opens the vacuum valve and waits for the micron level to drop below the Start Timer at Micron value. Once this micron level has been reached, the Time Below Setpoint timer will start and hold the vacuum valve open for the amount of time configured by the Time Duration Below Setpoint value. Once this time expires, this procedure will advance to the next procedure/test. If no other procedures or tests are enabled, the procedure will end with a PASS result. The Manual Test button cannot be used during this period.

Airserco Vacuum Tester Operations Screen - LOCAL DATABASE MODE

AIRSERCO
Refrigerant Processing Equipment and Accessories

Menu Print Open Vacuum Valve Shorted Vacuum Valve I/O Comm

Identifier DEFAULT Product DEFAULT

Microns (live value) **750** Setpoint **0** **WAITING FOR START** Manual Test

Main Configuration

Min Pumpdown Time Below Setpoint Low Micron Setpoint Decay Test Station

Time Below Setpoint Enable **DISABLED** Change
Enable/Disable the Time Below Setpoint procedure

Time Duration Below Setpoint (minutes)
10 Edit
The number of minutes the system will hold the micron level below the setpoint

Start Timer At Micron Value
50 Edit
The micron level at which the Time Duration Below Setpoint timer will start

Time Below Setpoint Timeout (minutes)
25 Edit
The maximum number of minutes allowed for the pressure to reach the setpoint

APC2 Version 5.0 (Build 19364) - Airserco Manufacturing Company Station ID: 1 5/12/2020 11:08:29 PM

➤ Time Below Setpoint Enable

The Time Below Setpoint Enable checkbox enables/disables the Time Below Setpoint procedure. By pressing the CHANGE button, the procedure can be enabled and disabled by toggling the checkbox on the configuration screen. Press the OK button to save changes.

Time Below Setpoint Enable Configuration

Time Below Setpoint Enable ☐

OK Cancel

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➤ **Start Timer At Micron Value**

The Start Timer at Micron Value is the micron level at which the Time Below Setpoint timer will start. Once the system reaches this micron level, the Time Duration Below Setpoint timer will start.

Start Timer at Micron Value in Microns Configuration

Enter Start Timer at Micron Value in Microns:

50

ABC 123 SYMBOLS

1 2 3 4 5 6 7 8 9 0

. (period) BkSpace

OK Cancel

➤ **Time Duration Below Setpoint**

The Time Duration Below Setpoint is the amount of time the system will hold the vacuum valve open after reaching the Start Timer at Micron value.

Time Below Setpoint In Minutes Configuration

Enter Time Below Setpoint in Minutes:

10

ABC 123 SYMBOLS

1 2 3 4 5 6 7 8 9 0

. (period) BkSpace

OK Cancel



➤ Time Below Setpoint Timeout

The Time Below Setpoint Timeout is the maximum amount of time allowed for the system to drop down to the Start Timer at Micron value. If the micron level does not drop down to the setpoint in this amount of time, a pumpdown fault will occur.

Time Below Setpoint Timeout In Minutes Configuration

Enter Time Below Setpoint Timeout in Minutes:

25

ABC 123 SYMBOLS

1 2 3 4 5 6 7 8 9 0

. (period) BkSpace

OK Cancel

5.2.3 LOW MICRON SETPOINT

The Low Micron Setpoint procedure opens the vacuum valve and waits for the micron level to drop below the Low Micron Setpoint value within the time specified by the Low Micron Setpoint Time value. If no other procedures or tests are enabled, the procedure will end with a PASS result. The Manual Test button **can** be used during this period if enabled.

Airserco Vacuum Tester Operations Screen - LOCAL DATABASE MODE

AIR SERCO
Refrigerant Processing Equipment and Accessories

Menu Print Open Vacuum Valve Shorted Vacuum Valve I/O Comm

Identifier DEFAULT Product DEFAULT

Microns (live value) **750** Setpoint **0** **WAITING FOR START** Manual Test

Main Configuration

Min Pumpdown Time Below Setpoint Low Micron Setpoint Decay Test Station

Low Micron Setpoint Enable **ENABLED** Change
Enable/Disable the Low Micron Setpoint procedure

Decrease Pumpdown Time on Retry **ENABLED** Change
If enabled, the Max Time to Reach Setpoint value will be reduced on retries

Enable Manual Test **ENABLED** Change
If enabled, the user can use the Manual Test button to advance to the decay test

Pumpdown Time Divisor On Retry 5 Edit
The value that the Low Micron Setpoint time will be divided on retries

Low Micron Setpoint (Microns) 50 Edit
The micron level required to advance to the decay test

Low Micron Setpoint Time (minutes) 25 Edit
The maximum number of minutes allowed to reach the Low Micron Setpoint

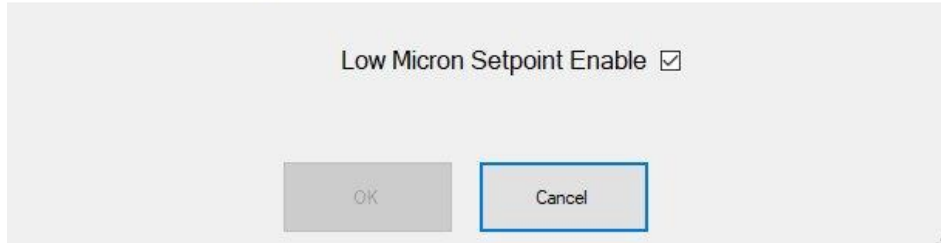
APC2 Version 5.0 (Build 19364) - Airserco Manufacturing Company Station ID: 1 5/12/2020 11:09:06 PM

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➤ Low Micron Setpoint Enable

The Low Micron Setpoint Enable checkbox enables/disables the Low Micron Setpoint procedure. By pressing the CHANGE button, the procedure can be enabled and disabled by toggling the checkbox on the configuration screen. Press the OK button to save changes.

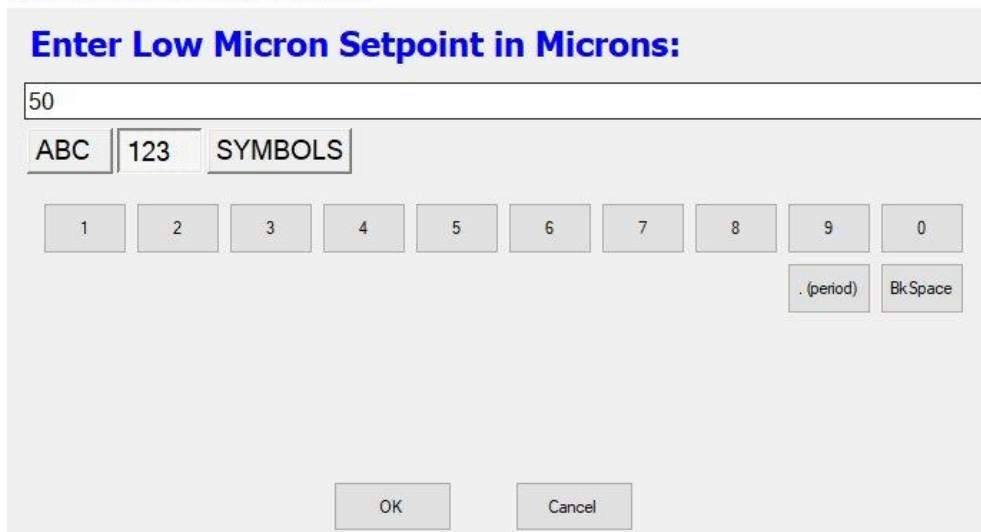
Low Micron Setpoint Enable Configuration



➤ Low Micron Setpoint

The Low Micron Setpoint is the micron level which the system must pump down to within the time specified by the Low Micron Setpoint Time value.

Low Micron Setpoint in Microns Configuration





➤ Low Micron Setpoint Time

The Low Micron Setpoint Time is the maximum amount of time allowed for the micron level to reach the Low Micron Setpoint value.

Low Micron Setpoint Time In Minutes Configuration

➤ Decrease Pumpdown Time on Retry

If the Decrease Pumpdown Time on Retry checkbox is checked, the Low Micron Setpoint Time will be divided by the Pumpdown Time Divisor on Retry value. As an example, if the Low Micron Setpoint Time is 15 minutes and the Pumpdown Divisor on Retry value is 5, all retries will have 3 minutes to pumpdown to the Low Micron Setpoint instead of 15 minutes. If the Decrease Pumpdown Time on Retry checkbox is **unchecked**, all retries will allow the full Low Micron Setpoint Time value. By pressing the CHANGE button, the procedure can be enabled and disabled by toggling the checkbox on the configuration screen. Press the OK button to save changes.

Decrease Pumpdown Time on Retries Configuration

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➤ Enable Manual Test

The Enable Manual Test checkbox allows the MANUAL TEST button to be pressed while in the Low Micron Setpoint procedure. If pressed, the procedure will be shorted and immediately advance to the Decay Test (if enabled) as if the micron value fell below the Low Micron Setpoint. By pressing the CHANGE button, the procedure can be enabled and disabled by toggling the checkbox on the configuration screen. Press the OK button to save changes.

Enable Manual Test Configuration

Enable Manual Test ☒

OK Cancel

➤ Pumpdown Divisor on Retry

The Low Micron Setpoint Time can be divided by the Pumpdown Divisor on Retry value when the procedure is being reattempted. As an example, if the Low Micron Setpoint Time were configured for 60 minutes and the Pumpdown Divisor on Retry value is configured for 10, the *working* Low Micron Setpoint Time would be 6 minutes on attempts 2 through the Decay Fail Count Setpoint value.

Pumpdown Divisor on Retry Setpoint Configuration

Enter Pumpdown Divisor on Retry value:

5

ABC 123 SYMBOLS

1 2 3 4 5 6 7 8 9 0

. (period) BkSpace

OK Cancel



Retry values for the Low Micron Setpoint procedure are not applicable if the Decay Test is not enabled. Retries are only initiated by the Decay Test.

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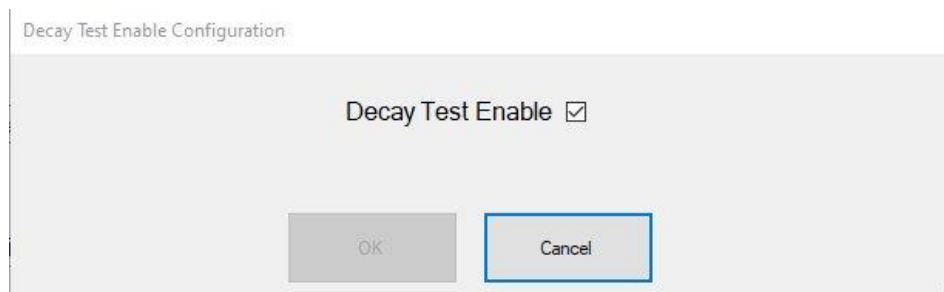


5.2.4 DECAY TEST

The Decay Test measures the micron rise after an appliance has been evacuated and the vacuum valve has been closed. During the Decay Test, the micron level must hold below the High Micron Setpoint for the amount of time specified by the Decay Test Time. The decay test relies on the [Low Micron Setpoint](#) procedure to be completed to ensure the system has been evacuated sufficiently. If the micron level rises above the High Micron Setpoint and the Decay Fail Count Setpoint is greater than zero, the system will run the Low Micron Setpoint procedure again up to the number of times configured by the Fail Count. When the micron value remains below the High Micron Setpoint for the amount of time specified by the Decay Test Time value, the decay test passes. If the decay test fails the number of times specified by the Decay Fail Count value, the test fails.

➤ Decay Test Enable

The Decay Test Enable checkbox enables/disables the Decay Test. By pressing the CHANGE button, the test can be enabled and disabled by toggling the checkbox on the configuration screen. Press the OK button to save changes.



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➤ High Micron Setpoint

The High Micron Setpoint is the maximum amount of decay in microns allowed during a test. This is an absolute value – not a relative value calculated by adding the setpoint value to the micron value when the decay test started. For example, if the decay test started with a micron value of 35 microns and the High Micron Setpoint is 750 microns, the test will fail if the micron value reaches 750 microns – not 785 microns. If the micron level exceeds the Decay Test Setpoint, the retry logic will be initiated. If the number of retries has not exceeded the Decay Fail Count Setpoint, the Low Micron Setpoint procedure will be automatically started so the Decay Test will run again. If the number of retries exceeds the Decay Fail Count Setpoint, the test will fail.

High Micron Setpoint in Microns Configuration

Enter High Micron Setpoint in Microns:

750

ABC 123 SYMBOLS

1 2 3 4 5 6 7 8 9 0

. (period) BkSpace

OK Cancel

➤ Decay Test Time

The Decay Test Time is the amount of time in seconds required for the decay test. If the micron level does not exceed the High Micron Setpoint at the end of this time period, the test has passed.

Decay Time Setpoint In Seconds Configuration

Enter Decay Time Setpoint in Seconds:

30

ABC 123 SYMBOLS

1 2 3 4 5 6 7 8 9 0

. (period) BkSpace

OK Cancel



➤ Decay Fail Count Setpoint

A failed decay test will be repeated the number of times set in the Decay Fail Count Setpoint until it passes. If the number of retries exceeds this setpoint, the test will fail.

Fail Count Setpoint Configuration

Enter Fail Count - Maximum Number Of Retries:

ABC

123

SYMBOLS

1

2

3

4

5

6

7

8

9

0

. (period)

BlkSpace

OK

Cancel

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5.2.5 IF TESTS ARE FAILING

As a general rule, if your tests are failing, you must either:

- a) Increase your Decay Test Setpoint
- b) Decrease your Low Micron Setpoint
- c) Increase minimum evacuation time.



The location of the Pirani sensor within the evacuating circuit is critical to understanding the actual vacuum within a system. If the Pirani is located close to the pump, it will indicate a lower micron level than if it was located in the middle of the circuit you are evacuating. This means that you should expect a significantly higher and faster micron rise after closing the vacuum solenoid valve, compared to if you were measuring vacuum in the middle or end of the circuit. This is because the pressure from one end of the circuit will continue to equalize throughout the system toward the vacuum pump, and toward the Pirani sensor. It is NOT (necessarily) evidence of a leak or outgassing.

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5.3 STATION CONFIGURATION

If enabled, Station Configuration values can be set by pressing the Station Configuration Edit button on the touchscreen. The station configuration screen is the only screen requiring a mouse and keyboard. By pressing/clicking the EDIT button, the user will be required to enter the Station Configuration Password (if a password has been set – refer to the [passwords section](#) of this document). Note that this password is not the same as required for modifying parameters, the Setpoint Configuration Password.



A keyboard with a built-in trackpad is recommended.

From a system design standpoint, the APC-2 is referred to as a “station”. This is because all systems are designed to be connected to a central network system. This does not mean, however, that each station *must* be connected to a central network system.

- a) **Unique Identifier Text** - Any value here will replace the name of the default identifier text. For example, if you prefer to refer to the identification of your product by serial number, changing that value to “Serial #” (without quotes) would change all references to that name.
- b) **Product Text** - Any value here will replace the name of the default product text. For example, if you prefer to refer to your product by model number, changing that value to “Model” (without quotes) would change all product references to that name.
- c) **Station Configuration Password** - this password protects all station/system values. If blank, the user will not be prompted for a password before making any value changes.
- d) **Setpoint Configuration Password** - this password protects all setpoint values. If blank, the user will not be prompted for a password before making any value changes.
- e) **Printer Name** - the path and printer name of the printer connected to the station.
- f) **Set Default** - the correctly formatted default printer name will be determined and updated.
- g) **Password Hold Time in Minutes** - because each parameter may be password protected, changing several parameter values may be somewhat cumbersome. By entering a value greater than 0 (zero), a password may be entered once and not be required again until the Password Hold Time expires.
- h) **Master Reset Time in Seconds** - holding the STOP button for the length of time specified in the Master Reset Time will cause the system to reset and initialize unconditionally.

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- i) **Unique Identifier Required** – if checked, an identifier must be entered before a cycle can start. For example, a serial number may be on a bar code label. Either using a wedge scanner, or typing in by hand, that serial number (the unique identifier) is entered. If results are saved, the results can be found by finding that serial number in the database.
- j) **Reset Unique Identifier** – if checked, the unique identifier will be cleared after every cycle. A new one must be entered/scanned before the next cycle can start.
- k) **Product Required** – if checked, a product must be selected before a cycle can start.
- l) **Reset Product ID** – if checked, the product selection will be cleared after every cycle.
- m) **Save Results** – if checked, the results of every test cycle will be saved to the database.
- n) **Save Fault History** – if checked, all faults will be saved to the database.
- o) **Auto Print on FAIL** – if checked, the printer will automatically print the results after a fail condition.
- p) **Auto Print on PASS** – if checked, the printer will automatically print the results after a pass condition.
- q) **Replicate Results** – if checked, results will be saved to the local database and when able, copied to the SQL database. This is helpful when network connectivity is not ensured; which could cause results data to be lost upon a fault condition. Only applicable in ENTERPRISE mode.
- r) **Allow Local Edits** – if checked, setpoint and configuration values can be modified at the station if running in Enterprise mode (password protected). Only applicable in ENTERPRISE mode.
- s) **Save Cycle Details** – if checked, all the information in the output window that is generated each cycle will be saved to the database.
- t) **Save** – Clicking on the Save button will save the values currently displayed on the screen.
- u) **Close** – will close the current screen. If the Save button has not been clicked after making changes, no changes will be saved.

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6. DATABASE

The APC-2 is available with a local database and a Microsoft SQL Server® database. Local data is stored on an SQLite Database (available at <https://www.sqlite.org/index.html>). SQLite is a self-contained, high-reliability, embedded, full-featured, public-domain, SQL database engine. The SQLite source code is in the public domain, and is free for use by anyone and for any purpose. No license is required.

The local database resides on the D drive of the APC-2 in the D:\Data directory.

The local database can be managed with a wide variety of free tools. It is recommended that the DBBrowser for SQLite (located at <http://sqlitebrowser.org/>) be used.

The Microsoft SQL Server® database is installed on a database server typically managed by a company's IT department. Details of that installation should be available from your local IT resource. Airserco can provide a database that can be attached to the database server. If scripts are required, contact Airserco technical support.

6.1 LOCAL ONLY TABLES

The following tables are located only in the local SQLite database and are read by all systems regardless of mode of operation when the software initializes.

a) Setup

- **StationID** – each Airserco product must have a unique station ID.
- **SystemModeTypeID** – the ID indicating the mode the station should operate under. This value must be one listed in the read-only table SystemModeTypes. Refer to the [System Modes](#) section of this document for further details.
- **SQLServerName** – the server in which the SQL database resides
- **DatabaseName** – the name of the database containing Airserco tables
- **DBUserName** – SQL user name
- **DBPassword** – SQL user password
- **CurrentProductID** – the ID of the product last selected. Used to make product selections persistent. This value must be one listed in the Products table.

b) NetworkConfiguration

- **AdapterName** – the name of the ethernet adapter as shown in Control Panel.
- **IPAddress** – the IP address you would like to set the unit to
- **Subnet Mask** – subnet mask for the IP address configured
- **Gateway** – the gateway address for the IP address configured
- **DNS** – DNS name
- **IsEnabled** – if checked, the unit will attempt to set itself to the IP address configured

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6.2 SYSTEM TABLES

The following tables are located in the local SQLite database and SQL Server database (if used). If the APC-2 is running in enterprise mode, the local tables are not used. If running in local mode, the SQL Server database does not need to exist. System tables are shared by all Airserco products.

a) Products

- **ID** – autoincrement ID. ProductID for products
- **Name** – unique name of the product



Important: The first record with ID = 1 must be the default record. Do not modify.

b) ResultTypes (read only)

- 1 = PASS
- 2 = FAIL
- 3 = ABORTED

c) SystemModeTypes (read only)

- 1 = BASIC
- 2 = LOCAL
- 3 = ENTERPRISE

6.3 APC-2 SPECIFIC TABLES

The following tables are located in the local SQLite database and SQL Server database (if used). If the APC-2 is running in enterprise mode, the local tables are not used. If running in local mode, the SQL Server database does not need to exist. APC-2 specific tables are only used with the Airserco APC-2 product.

a) APC2_FailTypes (read only)

- 1 = Pumpdown Failure
- 2 = Decay Test Failure

b) APC2_FaultTypes (read only)

- 1 = Runtime
- 2 = Validation Error
- 3 = Database Error
- 4 = Important Event

c) FaultHistory

- **StationID** – the unique station identifier
- **OperatorMessage** – the message that may have been displayed to the operator (may not always be applicable)
- **SourceModule** – the module in the application source code where the fault was detected (for diagnostics purposes)
- **SourceFunction** – the function in the application source code where the fault was detected (for diagnostics purposes)
- **SourceErrorDescription** – the error as generated
- **FaultTypeID** – the ID as specified in the read-only APC2_FaultTypes table
- **DateTimeStamp** – date/time the fault occurred

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d) APC2_StationConfig

- **StationID** – the value assigned to the APC-2 unit in its setup table
- **StationDescription** – (Enterprise mode/SQL table only)
- **UniqueIdentifierRequired**
- **ProductRequired**
- **ResetUniqueIdentifier**
- **ResetProductID**
- **SaveFaultHistory**
- **SaveResults**
- **UniqueIdentifierText**
- **ProductText**
- **AutoPrintOnPass**
- **AutoPrintOnFail**
- **PrinterName**
- **SetpointConfigurationPassword**
- **StationConfigurationPassword**
- **ReplicateResults**
- **AllowLocalEdits**
- **SaveCycleDetails** – save the cycle details in the output window to the results record
- **PasswordHoldTimeInMinutes**
- **MasterResetTimeInSeconds**

e) APC2_ResultsHistory (includes result values and setpoints as defined at time of test)

- **StationID** – the station's unique ID
- **GUIDString** – a unique identifier used for replication validation purposes
- **UniqueIdentifierString**
- **ProductID**
- **MinPumpdownEnabled**
- **MinPumpdowntimeInSeconds**
- **TimeBelowSetpointEnabled**
- **TimeDurationBelowSetpointInMinutes**
- **StartTimerAtMicronValue**
- **TimeBelowSetpointResultTypeID**
- **LowMicronSetpointEnabled**
- **LowMicronSetpointTimeInMinutes**
- **LowMicronSetpoint**
- **PumpdownTimeSnapshot**
- **PumpdownShorted**
- **LowMicronResultTypeID**
- **DecayTestEnabled**
- **HighMicronSetpoint**
- **DecayTestTimeInSeconds**
- **DecayPressureStartSnapshot**
- **DecayPressureEndSnapshot**
- **AmountOfDecaySnapshot**
- **DecayTestResultTypeID**
- **FailCount**

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- **FailCountSetpoint**
 - **ResultTypeID** – the ID as specified in the ResultsType table.
 - **FailTypeID** – the ID as specified in the APC2_FailTypes table
 - **CycleDetails**
 - **RecordComplete**
 - **DateTimeStamp**
- f) APC2_Specifications
- **ID** – autoincremented ID. May not be used/future use
 - **ProductID**
 - **MinPumpdownEnabled**
 - **MinPumpdowntimeInSeconds**
 - **TimeBelowSetpointEnabled**
 - **TimeDurationBelowSetpointInMinutes**
 - **PumpdownFailureTimeoutInMinutes**
 - **StartTimerAtMicronValue**
 - **LowMicronSetpointEnabled**
 - **LowMicronSetpointTimeInMinutes**
 - **LowMicronSetpoint**
 - **EnableManualTest**
 - **FailCountSetpoint**
 - **PumpdownDivisorOnRetry**
 - **DecreasePumpdownTimeOnRetriesEnable**
 - **DecayTestEnabled**
 - **HighMicronSetpoint**
 - **DecayTestTimeInSeconds**

6.4 SQL SERVER TABLES

The following tables are only located in the SQL Server database. If any Airserco product is running in basic/local mode, SQL Server tables are not used. SQL Server tables are shared by all Airserco products.

- a) APC_Stations
- **ID**
 - **Name**
- b) Users
- **ID**
 - **FirstName**
 - **LastName**
 - **LoginName**
 - **LoginPassword**
 - **ReadAccess**
 - **WriteAccess**
 - **IsAdmin**
 - **UserEnabled**
 - **LastModifiedDateTime**
- c) LoginHistory
- **UserID**
 - **IPAddress**
 - **DateTimeStamp**

End of document

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