

# LeakMaster

## GUARDIAN



## Operation Manual

Software Ver. 3.11.3.0

Designed and Manufactured by:  
LeakMaster Inc.

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## 2 Safety

It is extremely critical to read this manual in its entirety before starting the unit up. Throughout this manual, special notes are used to bring attention to possible conditions that may cause personal injury or damage to the system under certain circumstances. These notes are:

**WARNING:**

Tells you that personal injury may result if procedures are not followed correctly.

**IMPORTANT:**

Directs your attention to information that is critical to the understanding and use of a specific product or procedure.

### 2.1 SETUP SAFETY

#### 2.1.1 Shipping and Receiving

All system components are carefully packed for protection during transit. Upon receipt, all components should be carefully inspected for transit damage. If damage is apparent, notify LeakMaster Inc. and the carrier for claims inspection.

#### 2.1.2 Cleaning

Clean all system components thoroughly to remove any foreign material that may have accumulated during shipment.

#### 2.1.3 Adjustments

All system functions must be adjusted and operated only by those authorized personnel who have read and who thoroughly understand the descriptions of the various functions presented in this manual.

The setting of timers, pressures, outputs, etc. is chosen by the user for optimum operation. Any change in these settings by untrained personnel may jeopardize both system and user safety and cause a drop in efficiency.

Always refer to the correct assembly instructions and to the appropriate schematics when performing any service functions.

## 2.2 GENERAL SAFETY

Before attempting to perform any service functions, all users and service personnel should read this manual to become familiar with the complete operation of the system. Becoming familiar with system operation will greatly reduce the possibility of accidents or injury.

**IMPORTANT!**

**ONLY QUALIFIED OPERATORS AND MAINTENANCE PERSONNEL, WHO HAVE COMPLETE AND CORRECT KNOWLEDGE OF ALL SYSTEM OPERATIONS SHOULD PERFORM ANY OPERATIONS AND MAINTENANCE PROCEDURES.**

Always follow these warnings and safety procedures:

- **DO NOT operate solenoid valves by hand, as dangerous and unexpected actions can occur.**
- **Close all doors on the controller enclosure and any other remote mounted equipment during operation.**
- **Before attempting to power-up the system or any remote mounted equipment, make sure that no one is working on or near any components.**
- **Make sure that all tools, parts, etc. are not in a position to cause interference with system operation.**
- **Make sure that the air system is deactivated before performing any service functions.**
- **Deactivate system power before performing any maintenance.**
- **Make sure that all peripheral devices are properly grounded to minimize the effects of electromagnetic interference (EMI) or radio frequency interference (RFI).**

## 2.3 ELECTRICAL SAFETY

**WARNING!**

**ALL ELECTRICAL/ELECTRONIC TROUBLESHOOTING AND REPAIR MUST BE PERFORMED BY QUALIFIED AND PROPERLY TRAINED PERSONNEL.**

**!!! DANGER !!!**

**DO NOT touch electrically live components. Before performing any maintenance procedures, make sure that the power is OFF.**

Always follow these electrical system safety procedures:

- Remove all items, such as rings, metal necklaces and watches. These are electrical hazards.
- Wear safety glasses without metal rims or metal side shields.
- Use insulated tools when working on electrical equipment to reduce the possibility of shock.
- Know the amount of voltage present in all areas before troubleshooting.
- Make sure that all capacitors are discharged before handling.
- Use approved fuse pullers when changing fuses.
- Do not use jumper wires or fuse substitutes to replace regularly specified fuses.
- Always use the recommended fuse size per this manual.
- Before working on any circuit, check the circuit with the proper tester to determine if any voltage is present.

## 3 Introduction

### 3.1 Instrument Description and Test Methods

Thank you for your purchase of the LeakMaster Guardian leak test instrument. This instrument is specifically designed for quickly and economically testing components utilizing pressure decay or vacuum decay leak testing methods. This unit is capable of testing of either Pressure Decay Testing (volumetric leak rates), Pressure Loss over Time, Metered Volume, and Occlusion Testing. The unit is capable of storing 10 different user programs (program 11 is dedicated for self-testing). Each program can be configured for any available method of testing mentioned above. Please read this manual in its entirety before starting the unit up. LeakMaster is not responsible for damages to this unit due to inappropriate use.

#### 3.1.1 Pressure Decay Leak Testing (volumetric dependent SCCM mode)

Pressure Decay SCCM mode measures the pressure decay of a part and converts the pressure loss into a volumetric leak rate. SCCM (standard cubic centimeters per minute) is the most commonly used unit of measure for this type of testing.

Pressure Decay leak testing is a method used to detect leaks in the .5 – 500 sccm leak rate range with test pressure @ 100psi and below. The pressure loss characteristics of a master part with and without a known leak rate are memorized. Production parts are then referenced to these characteristics.

Pressure decay (SCCM mode) is a volume dependent test. If the production part volume is variable, the test results will be variable as well. Therefore this type of testing is typically used on parts that have fixed volumes. This means that the part does not vary in dead air volume from part to part.

Pressure decay (or vacuum decay) is a method where a test part is pressurized and the air is then trapped by valves. The pressure loss characteristics of a master part with and without a known leak rate are memorized. Production parts are then referenced to these characteristics. But how does the tester determine leak rates?

### 3.2.1.1 How does the tester determine volumetric leak rates?

Air leak rates are determined by the Ideal Gas Law which is calculating a simple algebraic equation. SCCM (standard cubic centimeters per minute) is the most commonly used unit of measure for pressure decay leak testing.

$$\text{Leak Rate (sccm)} = (\text{Pressure Loss in PSI}) (\text{Volume in cm}^3) (60) / (\text{Time}) (14.7)$$

When a tester is calibrating (or learning) a test part, the unknown part of the equation is volume. The volume is calculated after a two step calibration sequence which determines the internal test volume of the part being tested. This calculated volume is saved for the that particular test program and assumed to be the volume during production testing.

The first major parameter that is memorized during a calibration sequence is the amount of pressure loss or rise that occurs inside a “zero leak” master part. This is known as the **COMP** value because this value is compensated out of every test during production.

The second major parameter that is memorized during a calibration sequence is the amount of pressure loss that occurs inside a master part with a known calibrated leak orifice introduced. This is known as the **CAL** value. After the CAL value is determined, the volume can be calculated by using the equation above.

The tester will then assume that all production parts have this same test volume (for that particular program).

During production, the leak rate is the unknown part of the equation. Once the tester determines the pressure drop of the production part, it then calculates the leak rate.

Typical Pressure Decay Test Sequence:

1. **Fill Step:** The Fill valve opens to allow air to fill the test part. The vent valve closes to prevent fill air from coming out of the vent port.
2. **Isolate Step:** The Isolation (ISO) valve closes to trap the air in the test part.
3. **Stabilize Step:** The test pressure is allowed to stabilize. Fill valve closes to stop filling the part with air.
4. **Test Step:** The tester monitors pressure loss during the test step to determine leak rate.
5. **Exhaust Step:** The Isolation (ISO) valve turns off to allow the remaining air in the part to be exhausted through the test manifold.

### **A LEAK FREE MASTER PART IS ABSOLUTELY REQUIRED TO PROPERLY CALIBRATE A TEST PROGRAM!!**

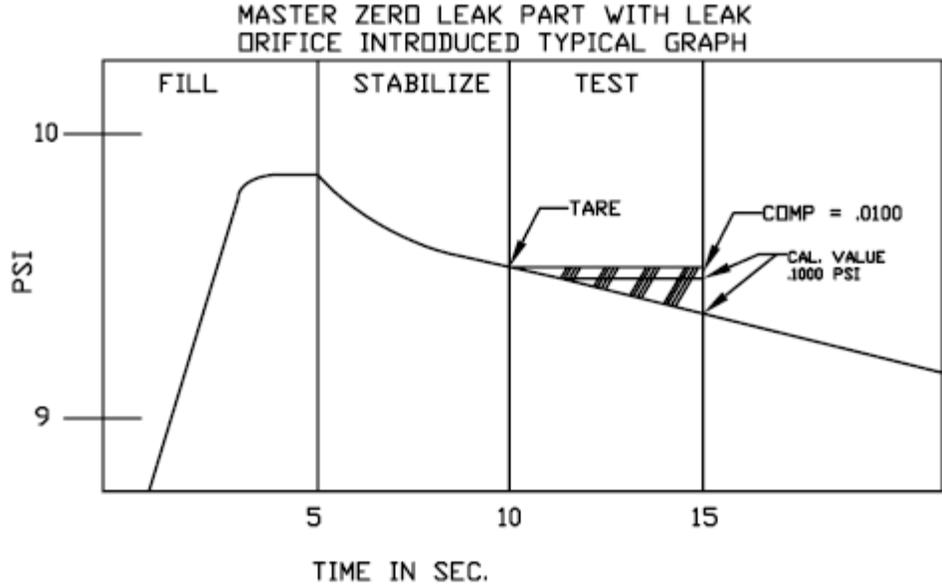
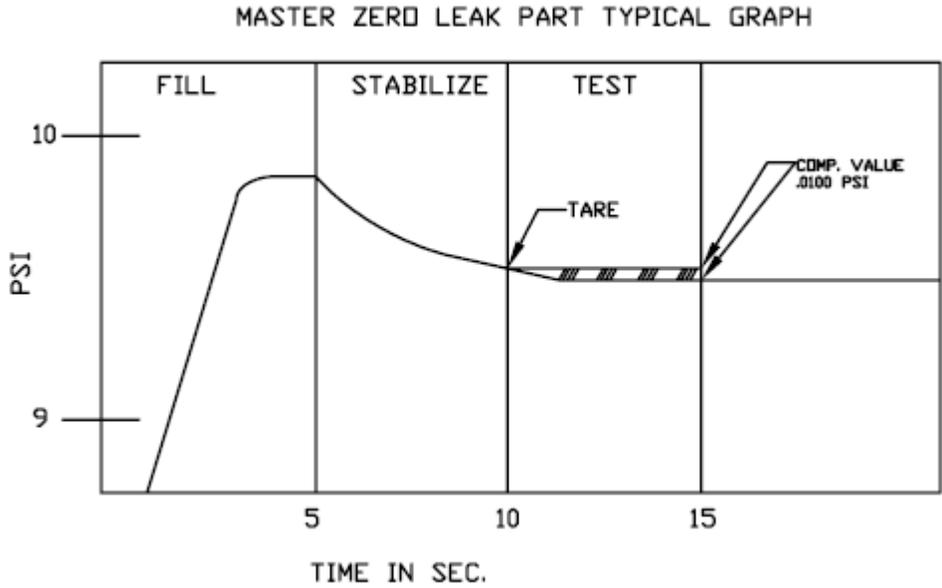
A leak free master part is one of the most critical parts of setting up an accurate leak tester. Make sure to create a master part if testing to SCCM leak rates.

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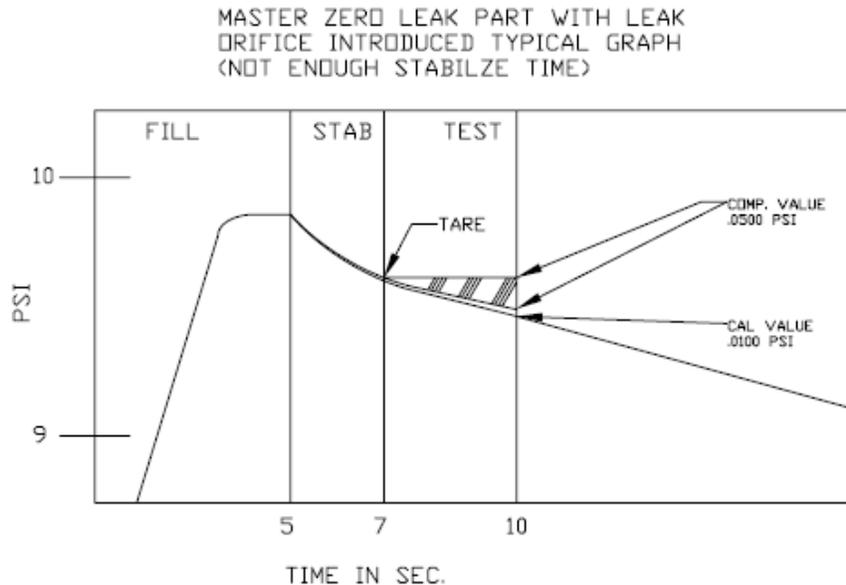
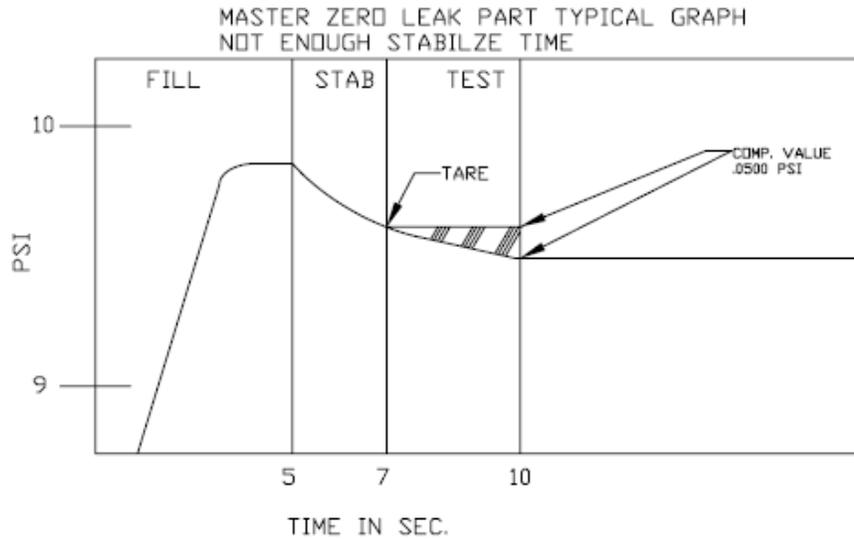
Typical Graphs of a Good Calibration Sequence



Notice the difference between the comp and cal values. The cal value is 10 times greater than the comp value. This would typically produce very repeatable test results.

Cal/Comp should be at least 5 or greater to achieve repeatable results. The cal value should typically be at least .020 PSI or greater for best repeatability as well.

## Typical Graphs of a Poor Calibration Sequence



Notice the difference between the comp and cal values. The comp value is 5 times greater than the cal value. This would typically produce very unrepeatable test results.

Cal/Comp should be at least 5 or greater to achieve repeatable results. Cal/Comp is .2 in this example. More stabilize time would be required to improve this test setup.

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### 3.1.2 Pressure Loss/Time Mode

Pressure Loss/Time (loss over time) testing is a leak decay test method used to detect pressure lost in a part. When using this method of test, air is delivered to the test part for a programmed amount of time (Fill time). The part is allowed to stabilize for a programmed amount of time (Stabilize time). The part is then monitored for decay of pressure for a programmed amount of time (Test time). At the end of the test time, the pressure loss value is logged and compared against the upper and lower leak pressure limits. If the final decay pressure falls within the programmed upper and lower pressure limits, the test passes. If the pressure falls outside of the programmed limits, the test fails.

Typical Pressure Loss/Time Test Sequence:

1. **Fill Step:** The Fill valve opens to allow air to fill the test part. The vent valve closes to prevent fill air from coming out of the vent port.
2. **Isolate Step:** The Isolation (ISO) valve closes to trap the air in the test part.
3. **Stabilize Step:** The test pressure is allowed to stabilize. Fill valve closes to stop filling the part with air. Vent valve is opened.
4. **Test Step:** The tester monitors pressure loss during the test step to determine pressure loss during the test step.
5. **Exhaust Step:** The Isolation (ISO) valve turns off to allow the remaining air in the part to be exhausted through the test manifold.

### 3.1.3 Metered Volume Test Mode

Metered Volume testing fills a part with a pre-determined volume of air at a set pressure. When the program is in this test mode, the manifold will remain pressurized ready to release the pressurized volume of air into the part. When the test is started the fill valve is closed isolating the air source so only the defined volume is released into the part. The isolation (ISO) valve is opened filling the part. When the fill step is complete the ISO valve closes trapping the air in the part so the pressure change can be measured. When it enters the test step, the pressure loss measurement begins. At the end of the test the pressure loss is displayed in pressure loss mode or the leak rate for pressure decay (sccm) mode.

If additional volume is necessary, it can be attached using the optional vacuum generator port. This port is directly attached to the main manifold and will remain pressurized when the tester is waiting to start a test.

#### \*\* IMPORTANT \*\*

When adding or removing additional volume to the optional vacuum generator port, power off the tester and turn off the air supply.

Typical Metered Volume Test Sequence:

1. **Pre-Test:** Prior to receiving a start test signal the vent valve turns on (closes) along with the fill valve (opens), the ISO valve turns on (closes) preventing the pressurized air from reaching the part. This will keep the manifold pressurized and ready when the test begins.
2. **Fill:** The fill valve turns off (closes) and the ISO valve turns off (opens). This turns off the air source and releases the volume of pressurized air filling the part.
3. **Stabilize Step:** The test pressure is allowed to stabilize. Vent valve is opened.
4. **Test Step:** The tester monitors pressure loss during the test step to determine pressure loss during the test step.
5. **Exhaust Step:** The Isolation (ISO) valve turns off to allow the remaining air in the part to be exhausted through the test manifold.

### 3.1.4 Occlusion Testing Mode (back pressure testing)

Occlusion testing is a test method used to detect obstructions in a part being tested. When using this method of test, air is delivered to the test part for a programmed amount of time (Fill time). At the end of the fill time, the back pressure detected is logged and compared against the upper and lower test pressure limits. If the final pressure falls within the programmed upper and lower pressure limits, the test passes. If the pressure falls outside of the programmed limits, the test fails.

This test type can also be added to a Pressure Decay Test. This can be added to this test types under the Tester Options sub menu on the Setup screen. Enabling this feature allows the user to perform an Occlusion test and then continue with the

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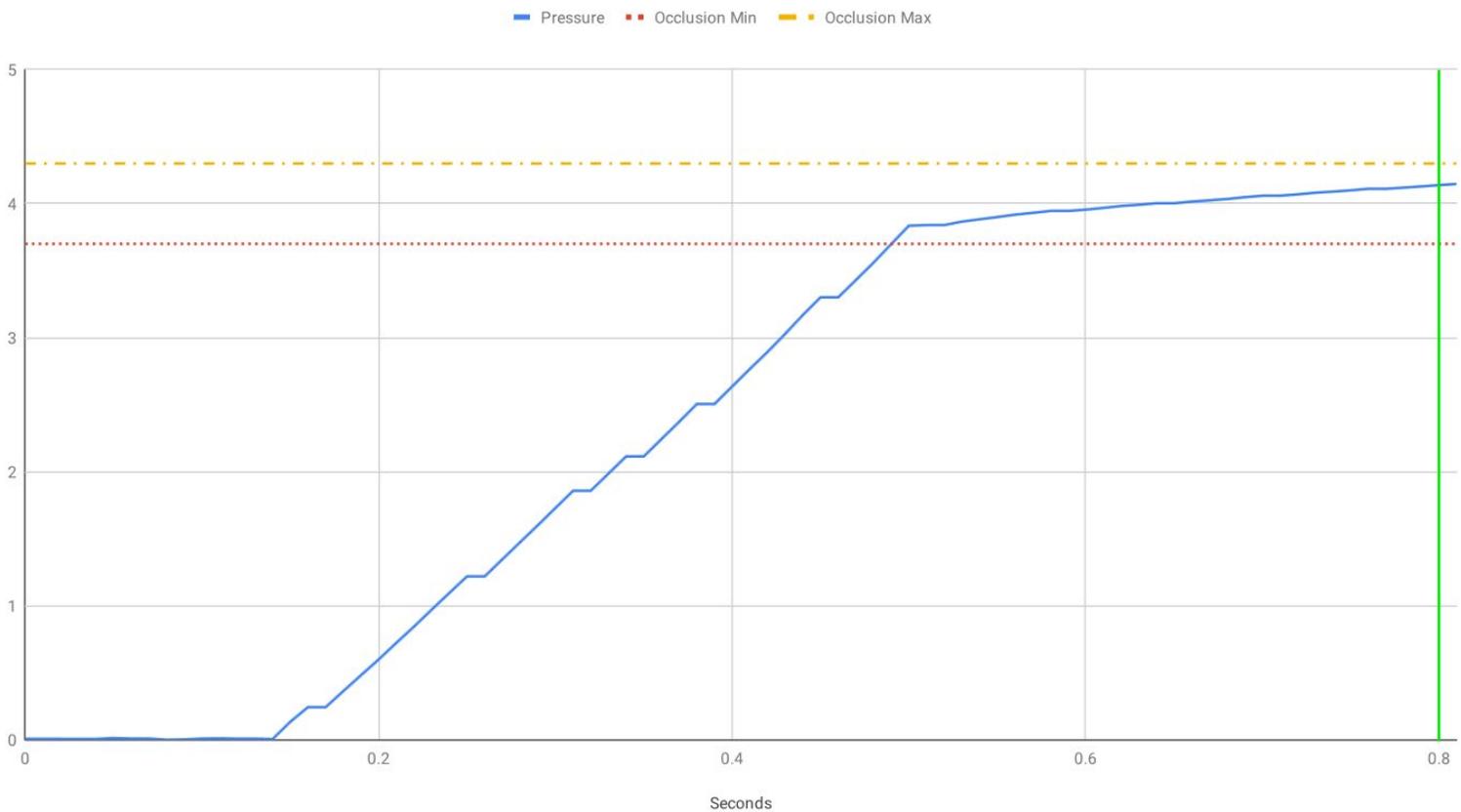
Pressure Decay test which results in reduced cycle time by eliminating program changing and venting.

Typical Occlusion Test Sequence:

1. **Fill Step:** The Fill Valve turns on (opens) to allow air to fill the test part. The Vent valve closes to prevent air from escaping to the vent port.
2. At the end of the Fill Step, the pressure is logged.
3. The logged pressure must fall within the Min and Max pressure limits to pass the test.

### Example Pressure Graph of an Occlusion Test

Occlusion Test



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### 3.1.5 Guardian Self-Test Program

The Guardian has a built-in self-test program #11. The test settings (other than pressure unit and pressure) are pre-configured and cannot be changed by the end user. To run the self-test, place the plug in the test port, set the pressure regulator and run the test.

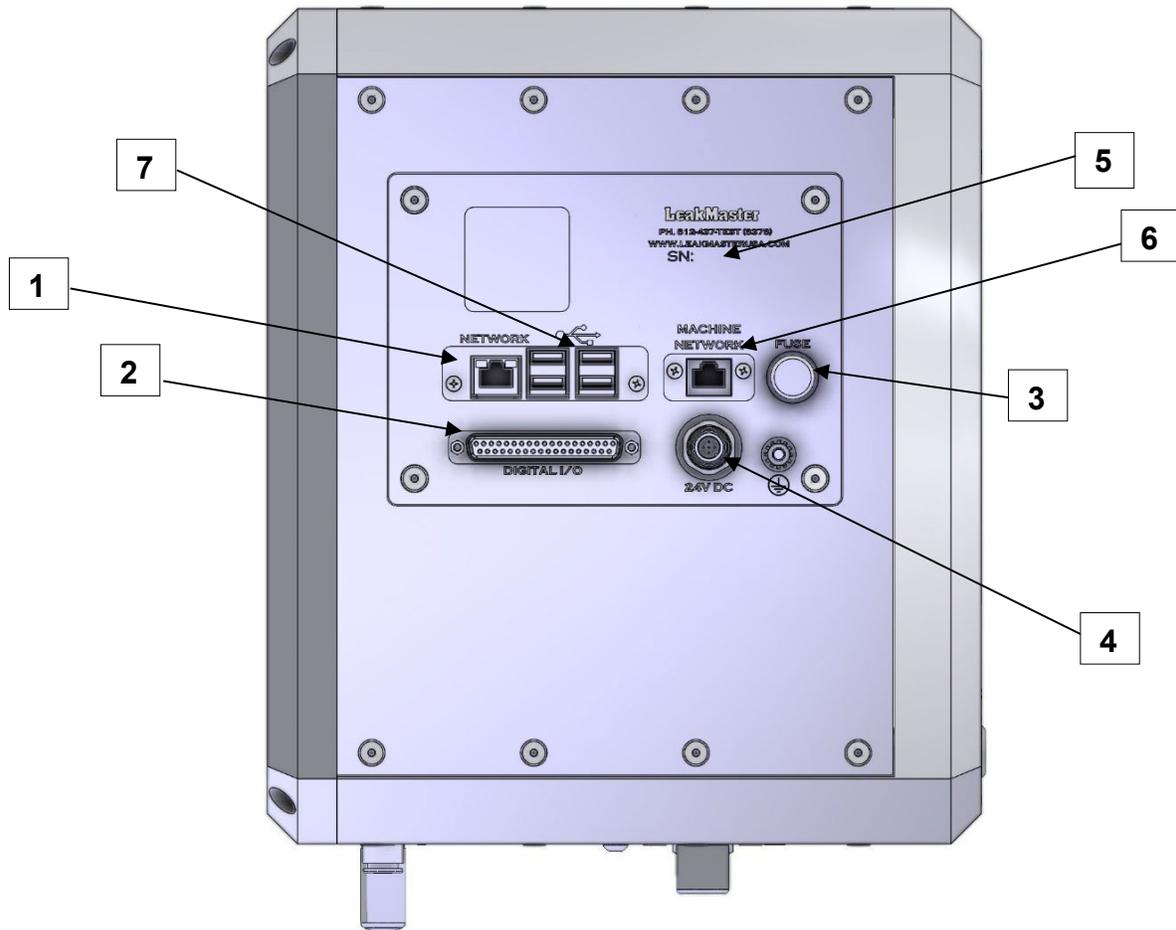
## 3.2 COMPONENT IDENTIFICATION

### 3.2.1 Tester Front Panel



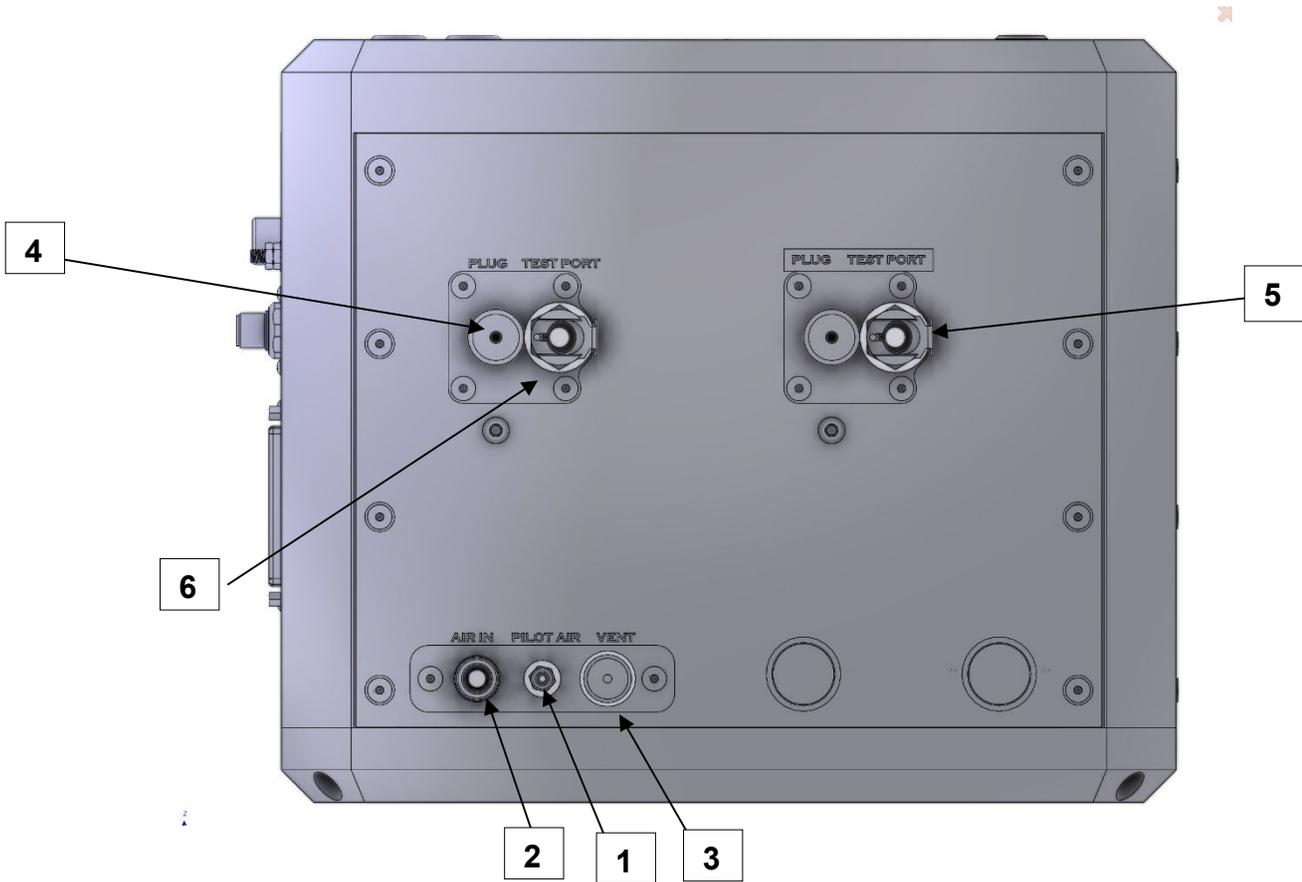
1. Power Button
2. Start Push Button
3. Stop Push Button
4. Operator Interface Touch Screen
5. Hinged Door on the Right-Hand Side.

## 3.2.2 Tester Left Panel (Electrical Interface)



1. Network RJ45 Ethernet Port (For connecting to the LAN, used for remote access)
2. Digital I/O Connector (DB37 connector), 16 Inputs, 16
3. Fuse (2 Amp)
4. M12 Bulkhead Power Connector (+24VDC only)
5. Serial Number Identification Location
6. Machine Network RJ45 Ethernet Port (Ethernet IP communications Port)
7. USB interface (4 port), used for connecting to USB compatible devices.

## 3.2.3 Bottom Panel (Pneumatic Interface)



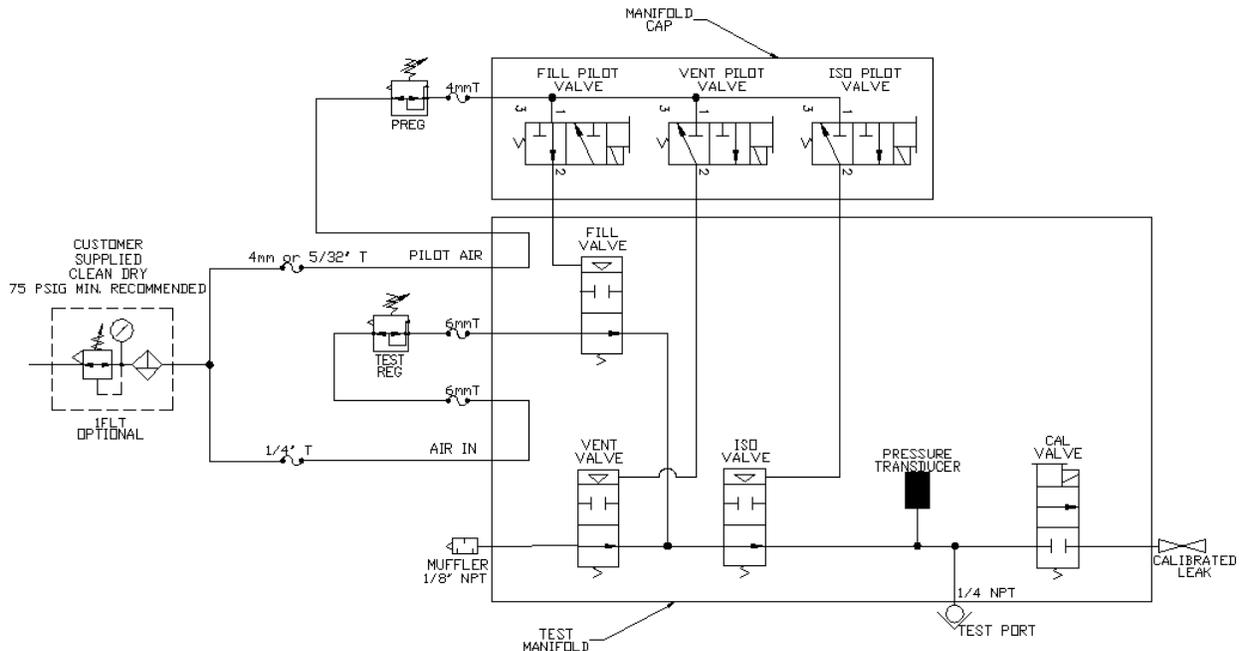
1. Pilot Air: 5/32" or 4 mm tube connection. Must be at least 75 PSI supply to this port.
2. Air In: 1/4" NPT port for air supply to the test manifold. This unit is supplied with a 3/8" tube fitting. This fitting can be replaced with any preferred tube size fitting. Pressure supplied to this port must be greater than the test pressure delivered to the part.
3. Vent port muffler. Test air vents out of this port upon test completion.
4. Test Plug. Used to plug into the Test Port to check internal test manifold for leaks and setting the test pressure upon startup.
5. Optional 2<sup>nd</sup> Manifold for Differential Pressure or Dual Channel.
6. Test Port: CPC quick connect fitting. This port delivers air to the part to be tested.

## 3.2.4 Pneumatic Supply

### IMPORTANT:

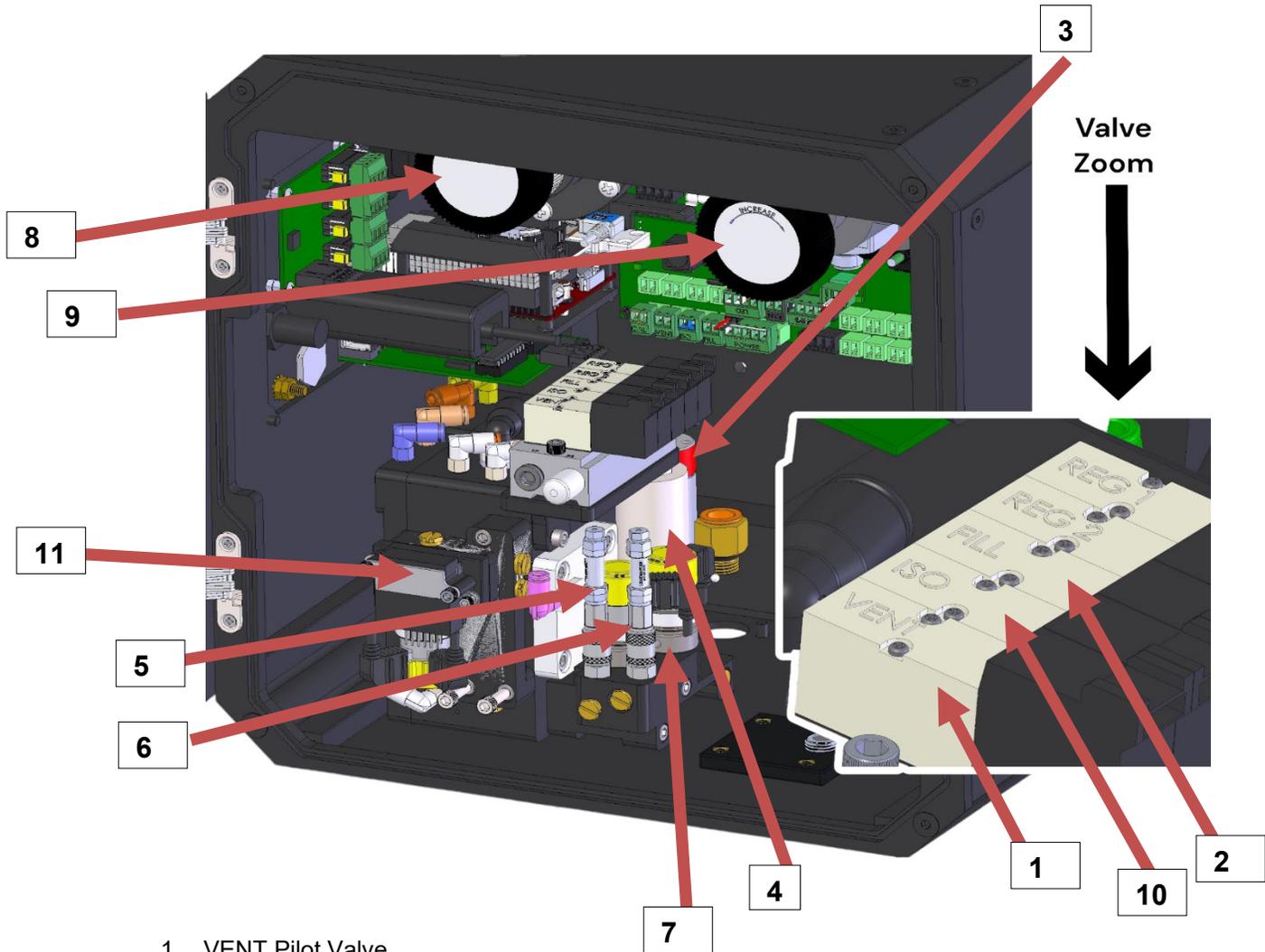
The pneumatic input supply should be greater than the test pressure for the application but must not exceed 120 psig. The Pilot Air pressure must be at least 75 PSI but must not exceed 120 psig. Always provide clean, dry air into the tester. LeakMaster recommends a .3-micron air filter for the incoming supply air. A .3-micron air prep unit can be purchased as an option. LeakMaster recommends a minimum of 1/4" supply line to the tester Air In port to ensure that proper air flow can be attained for filling parts quickly. It is critical to provide clean dry air for the proper functionality of the leak tester. If dirty/wet air is supplied through the tester, any damage due to this problem are not covered under warranty.

## 3.2.5 Internal Pneumatic Schematic



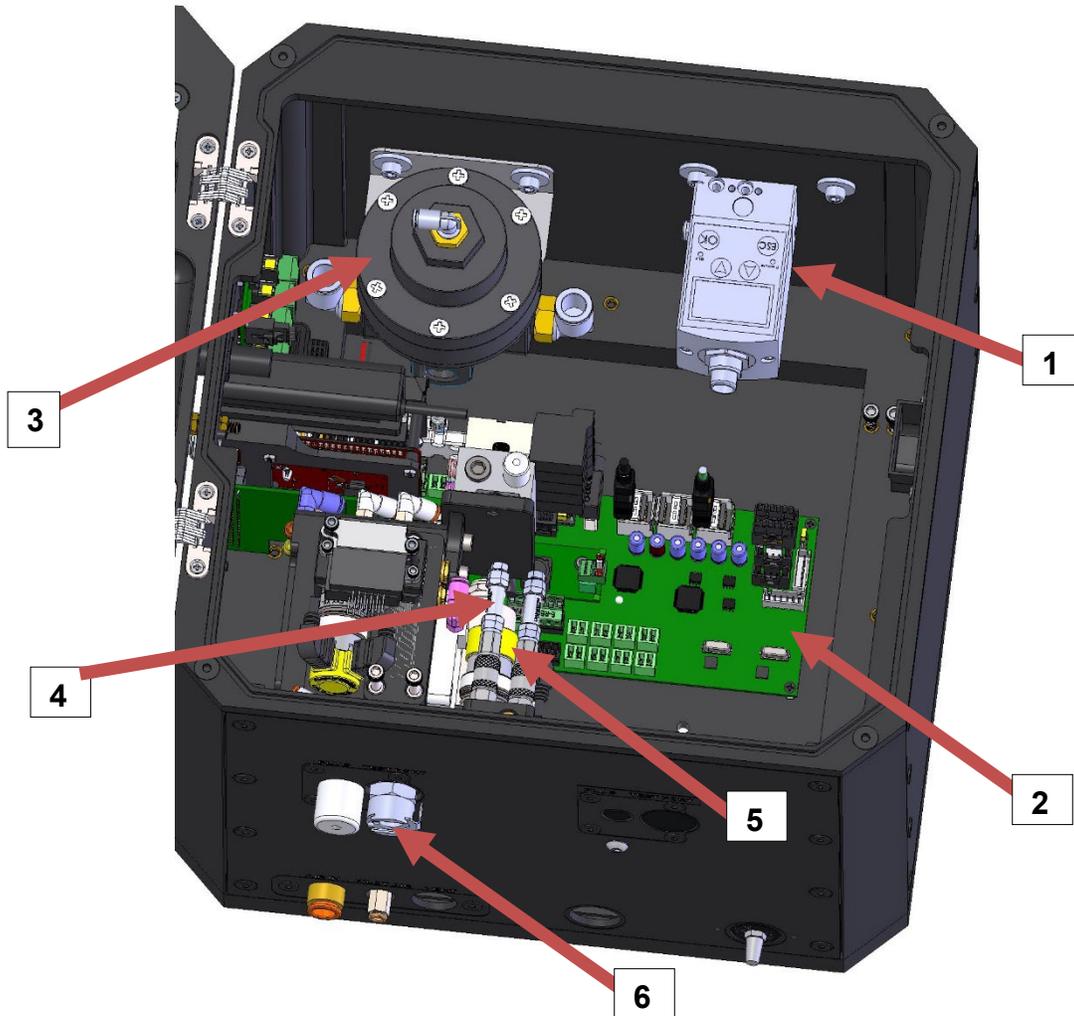
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3.2.6 Pneumatic Assembly Component Identification (Internal View) Manual Regulator Version



1. VENT Pilot Valve
2. FILL Pilot Valve
3. PREG, Pilot Pressure Regulator
4. Pressure Transducer
5. Calibrated Leak Standard (10-32 threaded port)
6. (If Applicable) 2<sup>nd</sup> Calibrated Leak Standard for ALO or Dual Channel.
7. CAL Valve (Yellow Cap)
8. TEST REG, Precision Air Regulator (This device regulates the test pressure to the part being tested)
9. (If Applicable) 2<sup>nd</sup> Precision Air Regulator
10. ISO Pilot Valve
11. (If Applicable) Mass Flow Sensor

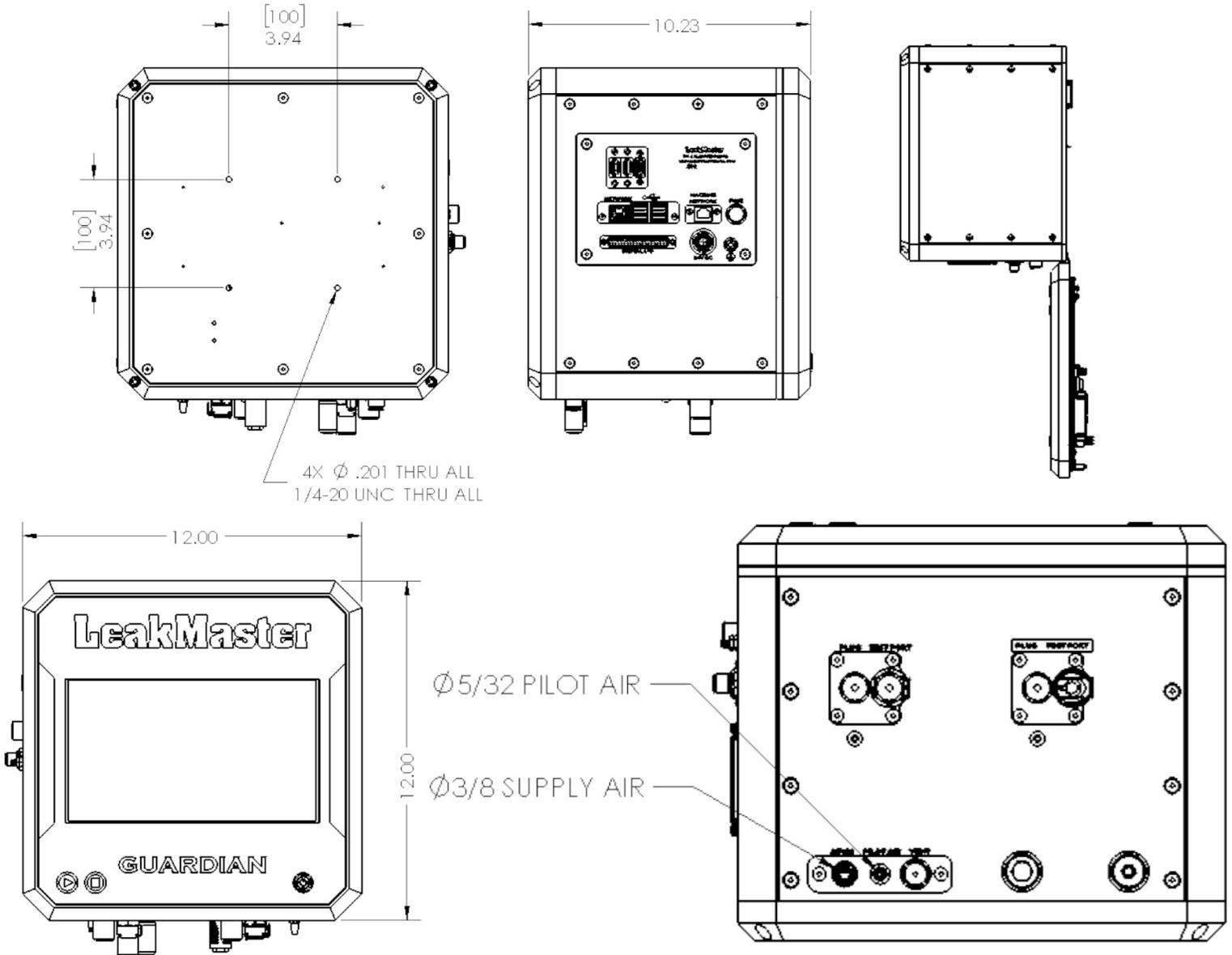
## 3.2.7 Pneumatic Assembly Component Identification (Internal View) Electronic Regulator Version



1. TEST REG, Precision Electronic Air Regulator (This device regulates the test pressure to the part being tested)
2. IO Board
3. Volume Booster
4. Calibrated Leak Standard (10-32 threaded port)
5. CAL Valve (Yellow Cap)
6. TEST PORT, CPC quick disconnect port that supplies air to the part being tested)

3.2.8 Mounting/External Dimensions

All Dimensions listed below are in inches.

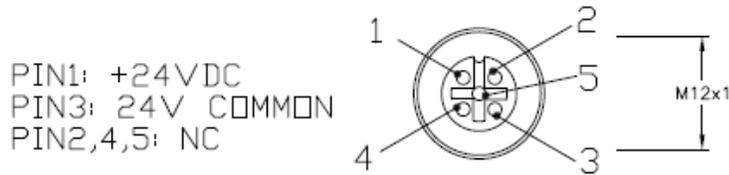


## 4 Electrical Wiring

### 4.1 POWER WIRING

**IMPORTANT:**

The LeakMaster Guardian leak tester is power by **24VDC**. **Do not connect anything other than 24VDC to connector on the back of the tester.** A standard unit draws .5A-1A at 24VDC. LeakMaster recommends a power supply that will supply a minimum of 2A. The tester can draw approximately .5A-1A depending upon the options purchased. A 120V – 24VDC power supply can be supplied as an option. The 24VDC connection is on the bottom of the unit. This connector is an M12 (Euro) 5 pin connector. A standard M12 (Euro) 4 pin or 5 pin cable can be used to supply the power into connector. Pin 1 (usually Brown) is the +24V connection. Pin 3 (usually Blue) is the 24V common.



The standard tester is supplied with a 5 meter power cable unless the optional 120V power adaptor is provided. An M12 (Euro) style connector can be used for this connection.

#### 4.1.1 OPTIONAL 120V POWER ADAPTER

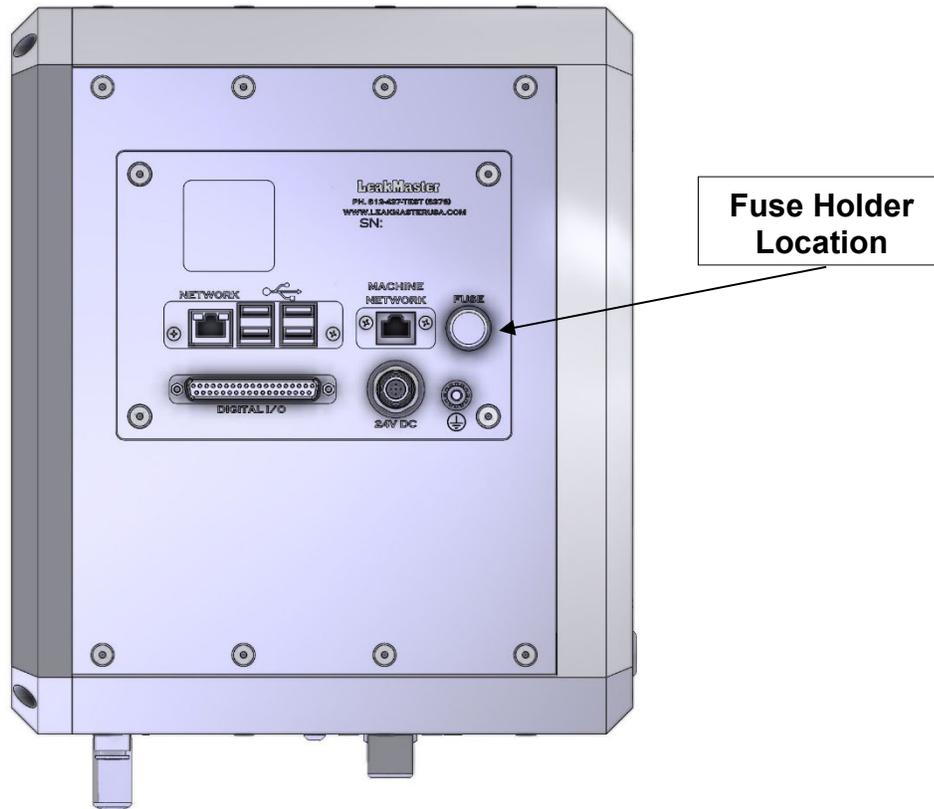
If the optional 120V power adaptor is purchased, a power supply is supplied instead of the 5 meter power cable. The power adapter is shown in the picture below. Plug the 120VAC end into a 120VAC receptacle. Plug the other end into the 24V power connector on the bottom of the tester. This power supply provides 24VDC with a maximum output of 4A.



## 4.2 FUSING

**IMPORTANT:**

The tester is supplied with a Littlefuse 0239002.MXP fuse located inside the fuse holder. This can be replaced with any equivalent 5x20mm 2 amp glass fuse. LeakMaster provides 1 spare Littlefuse 0239002.MXP 2A fuse that is taped to the inside of the enclosure. **Make sure to disconnect the incoming power when changing out a fuse.** This fuse can be changed by pushing in and twisting the fuse holder until it releases. Pull out the fuse and replace as necessary.

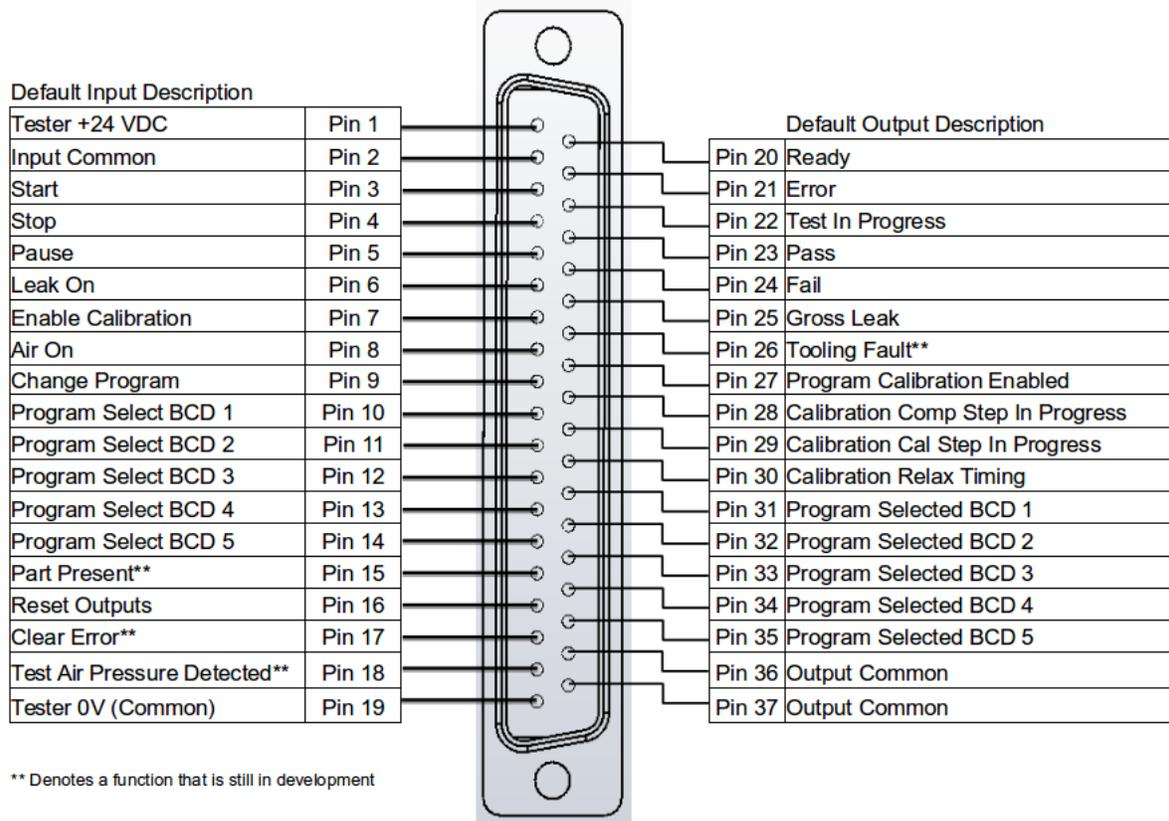


### 4.3 INPUTS/OUTPUTS

#### 4.3.1 Digital I/O Wiring (DB37 connector)

The diagram below shows how to interface the DB37 Digital I/O Connector (located on the back of the tester) to a PLC or PC for automatic operation. The digital inputs are PNP input devices (you supply +24VDC to turn the input ON). The outputs from the tester are +24VDC PNP (provides a +24V output).

**\*\*Important\*\*** The Tester +24 VDC on Pin 1 should not be connected to your 24v supply on your PLC. This 24 volt supply should only be used if you intend to build simple inputs such as isolated start/stop buttons.



### 4.3.2 Digital I/O Cable

The optional DB37 can be purchased through Leakmaster or another 3<sup>rd</sup> party. Before attaching any DB37 cable make sure to ohm out all cable connections to ensure they match the diagram on the previous page.

### 4.3.3 Input Descriptions

“START”: This input is used to start the test. When this input goes high, the tester will start a leak test sequence.

“STOP”: This input is used to stop the test. When this input goes high, the tester will stop the leak test sequence if the tester is testing.

“PAUSE”: This input is used to pause the leak test in its current step.

“LEAK ON”: Leak mode turns on the cal valve which introduces the installed calibrated leak orifice into the test circuit to simulate a leaking condition.

“ENABLE CALIBRATION”: This input will enable program calibration mode. The tester must be in a ready condition for this input to be accepted.

“AIR ON”: This input is used to enable air flow through the test port when the tester is not in cycle. This is typically used for troubleshooting purposes. If you want to try to find a leak after a failure, you can turn on this input to pressurize the part, and then look for the leak. When this input goes low, the part will be vented immediately.

“CHANGE PROGRAM”: When this input goes high, the BCD1-5 inputs are examined and converted to decimal. The decimal value of the BCD1-5 inputs is then selected as the active program.

“PROGRAM SELECT BCD 1-5”: These inputs are used to automatically select a program. These inputs are BCD inputs that are mapped to the program select register. These inputs are only read when the leak tester is not in cycle. These inputs can select program 1-10 only. Therefore, you must set the appropriate inputs high before the test is started and also initiate the "Change Program" input.

“RESET OUTPUTS”: When this input goes high, the last pass/fail output is cleared, also the last test pressure, pressure loss, and last test flow rate are set to 0.

Example of program selection via BCD Inputs:

BCD 5	BCD 4	BCD 3	BCD 2	BCD 1	PROG. SELECTED
0	0	0	0	1	= <b>1</b>
0	0	0	1	0	= <b>2</b>
0	0	0	1	1	= <b>3</b>
0	0	1	0	0	= <b>4</b>
0	0	1	0	1	= <b>5</b>
0	0	1	1	0	= <b>6</b>
0	0	1	1	1	= <b>7</b>
0	1	0	0	0	= <b>8</b>
0	1	0	0	1	= <b>9</b>
0	1	0	1	0	= <b>10</b>

### 4.3.1 Output Descriptions

“READY”: This output goes high anytime that the tester is ready to start a test. This output goes low when a test starts and stays low until after the Vent step.

“ERROR”: This output goes high anytime a major error occurs. This could be if the pressure transducer is not responding properly. This could also be if the outputs to the valves are not functioning properly. If this bit goes high, you may need to reboot the system or contact tech support for troubleshooting help.

“TEST IN PROGRESS”: This output goes high immediately when the test is started. This output stays high until the completion of test (until the Vent step is completed).

“PASS”: This output goes high immediately when a test has passed successfully (even if the Vent step is not complete). When this output goes high, it stays high until the next test cycle is initiated.

“FAIL”: This output goes high immediately upon a test failure (even if the Vent step is not complete). When this output goes high, it stays high until the next test cycle is initiated.

“GROSS LEAK”: This output goes high immediately upon a test failure when the minimum pressure limit is not achieved (even if the Vent step is not complete). When this output goes high, it stays high until the next test cycle is initiated.

“TOOLING FAULT”: This feature is under development.

“PROGRAM CALIBRATION ENABLED”: This output goes high when Calibration Mode is enabled. When this output goes high, it stays high until the program calibration is complete or disabled.

“CALIBRATION COMP STEP IN PROGRESS”: This output goes high when Calibration Comp Step is enabled. When this output goes high, it stays high until the program calibration comp step is complete or disabled.

“CALIBRATION CAL STEP IN PROGRESS”: This output goes high when Calibration Cal Step is enabled. When this output goes high, it stays high until the program calibration cal step is complete or disabled.

“CALIBRATION RELAX TIMING”: This output goes high when Calibration Relax Step Timer is enabled. When this output goes high, it stays high until the program calibration cal relax step is complete or disabled.

"PROGRAM SELECTED BCD 1-5": These inputs provide feedback of the Program number that is currently selected. BCD1 is the LSB and BCD5 is the MSB. These five bits can be converted to decimal to give proper feedback of the program number that is running. An example chart of these bits can be seen on the previous page.

## 5 NAVIGATING THROUGH THE TESTER MENUS

### 5.1 POWER UP DEFAULT SCREEN

The screen shown below is the Home Menu Screen. This screen is the one displayed upon power up.



#### 5.1.1 MENU DESCRIPTIONS

These menus can be pressed to navigate/view the other setting screens at any time. Simply press the desired menu to navigate to the desired screen. The SETTINGS menu has sub menus as well.

**RUN:** This is the actual run screen that provides live feedback of the test in progress. This screen provides all of the controls and status messages for the user to run the tester.

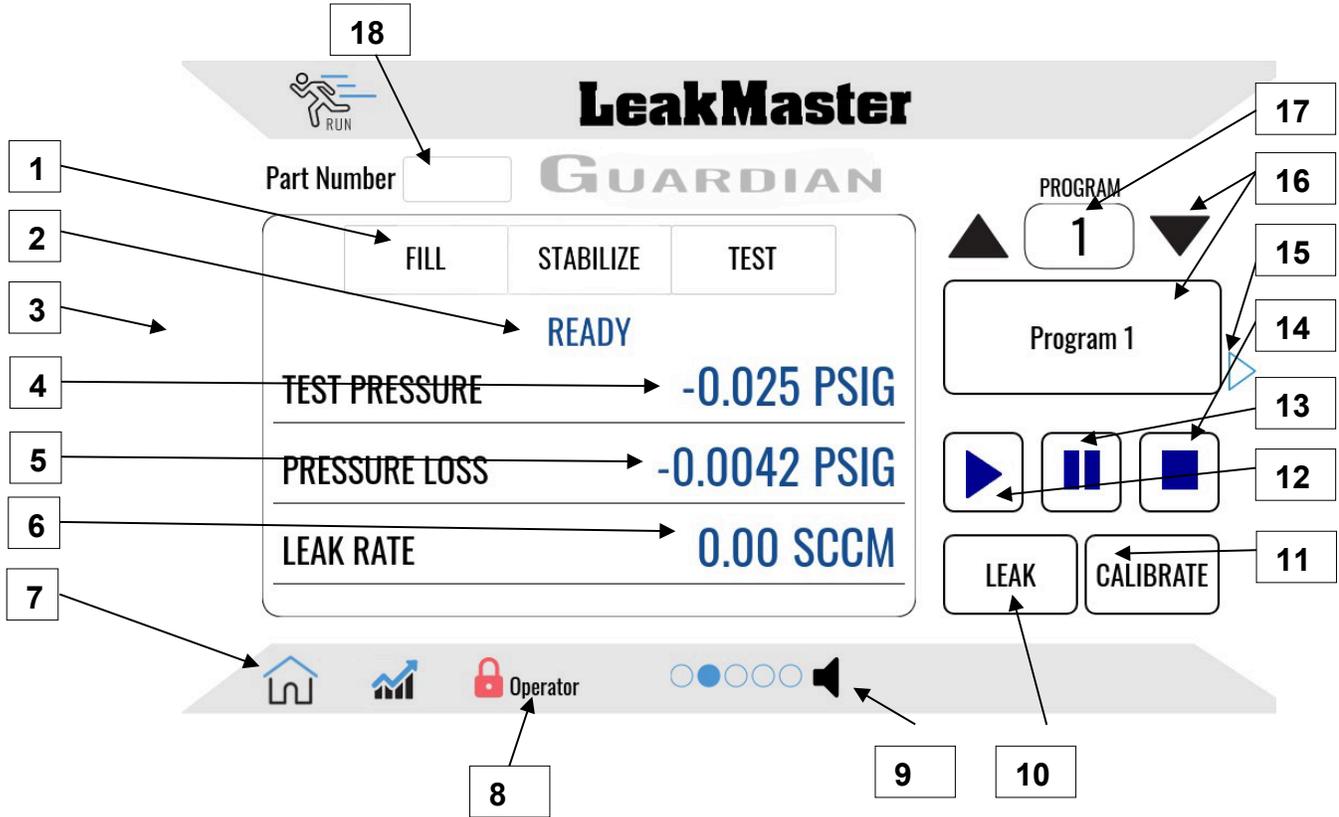
**PROGRAM:** This menu will allow the user to setup test parameters and limits for each leak test program. This menu is password protected.

**RESULTS:** This menu displays a chart with columns with the headings: Date/Time, Leak Rate, Test Pressure, Test Result Description Min. Leak Rate Limit, Max Leak Rate Limit, Comp. Value, Prog. #, and Program Name. This chart is data results from previous tests. This menu also allows the user to save the test results to a USB stick or to delete individual results or all previous test data.

**SETTINGS:** This menu contains sub menus for viewing and setting up general settings such as I/O viewing, changing the date/time, setting up a capability study, zeroing and spanning the transducers, network settings and software license entry.

## 5.2 RUN SCREEN

The screen shown below is the Run Screen. It provides live feedback and operator interface for running the tester.



1. STATUS BARS: Each step of the test (Fill, Stabilize, and Test) have an individual status bar that will be colored based upon the results of each step. The bar will track yellow through each step. Upon completion of each step, the bar will illuminate red or green for pass/fail. This allows the operator to determine which step failed the leak test.
2. STATUS: This displays the current status of the leak tester. (See Section 7 for a listing of status messages and their meanings)
3. SIDE TRIANGLE: Pressing this icon will display the menu to the left. In this scenario, the menu to the left would be the HOME menu.
4. TEST PRESSURE: This displays the current pressure seen on the test pressure transducer.

5. **PRESSURE LOSS:** Displays the pressure loss of the previous test. This value gets zeroed at the beginning of the test cycle and begins live displaying during the test step. At the end of the Test step this value locks in on the final value.
6. **LEAK RATE:** Displays the leak rate of the previous test. This value gets zeroed at the beginning of the test cycle and is displayed at the end of the test step.
7. **HOME ICON:** When pressed by the user, the screen will return to the Home menu.
8. **USER LOGIN:** This icon will either appear as a red "locked" icon or a green "unlocked" icon. This icon can be pushed to pull up the login window which allows users to login and make critical changes to the tester. This is password protected.
9. **VOLUME ICON:** This icon can be touched to mute the tester audio. Each touch of the touch screen generates a beep. If this is undesirable, simply mute the tester. Touching the icon while muted will re enable the sound.
10. **LEAK:** When pressed by the user, leak mode will be enabled. Leak mode turns on the cal valve which introduces the installed calibrated leak orifice into the test circuit.
11. **CALIBRATE:** When pressed, a calibration menu will pop up. You can follow the instructions and perform a program calibration from this pop-up menu. See section 6.2.2 for calibration description and procedures.
12. **START:** When pressed by the user, the leak test cycle will start a leak test. If the test has been paused, the START button will continue the cycle.
13. **PAUSE:** When pressed by the user, the leak test cycle will be paused in the current step.
14. **STOP:** When pressed by the user, the leak test cycle will be stopped immediately.
15. **SIDE TRIANGLE:** Pressing this icon will display the menu to the right. In this situation, the menu to the right will be the PROGRAM menu.
16. **PROGRAM NAME:** This box displays the program name of the program currently selected. The user can change the program by pressing the up or down buttons to increment or decrement to the next available program number or can touch the name which will pull up a menu to select from available programs that have been setup already.

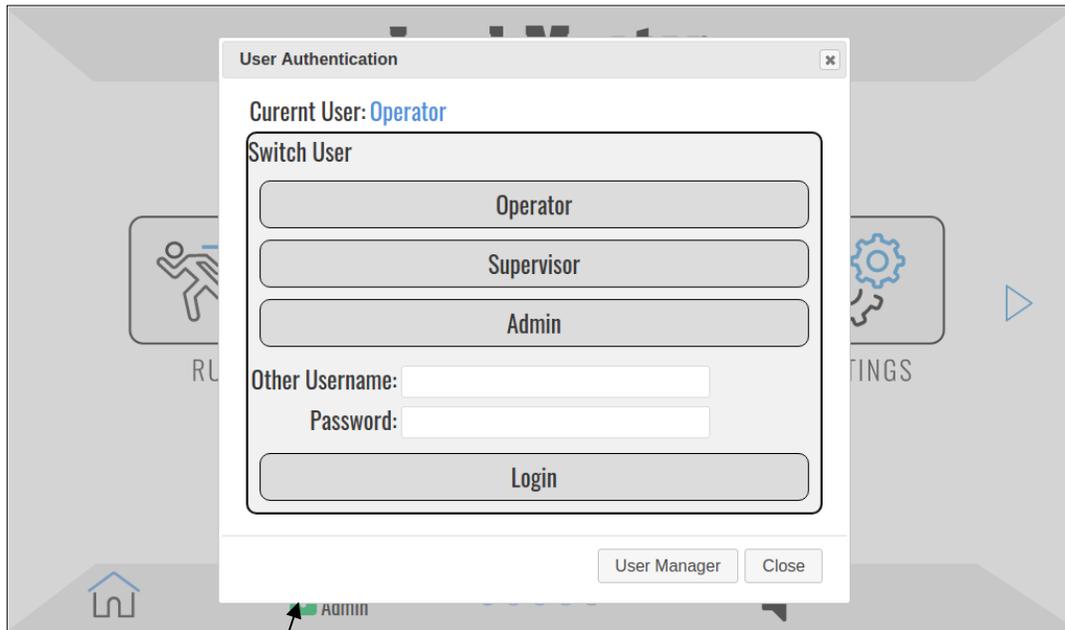
17. PROGRAM NUMBER: Displays the current program number that is selected.

18. PART NUMBER: User entered individual part identification number what will be logged in the results with the test. This field is cleared after the results are logged on each test.

## 5.3 PROGRAM MENU

This menu will allow the user to setup test parameters and limits for each leak test program. Prior to making any program changes or entries, the user will need to be logged in as a user with Admin or Supervisor privileges. The default password for the Admin user is "admin". **It is recommended that this be changed upon initial setup and saved somewhere secure.** If the password is lost, LeakMaster can provide a back-door password for recovery purposes.

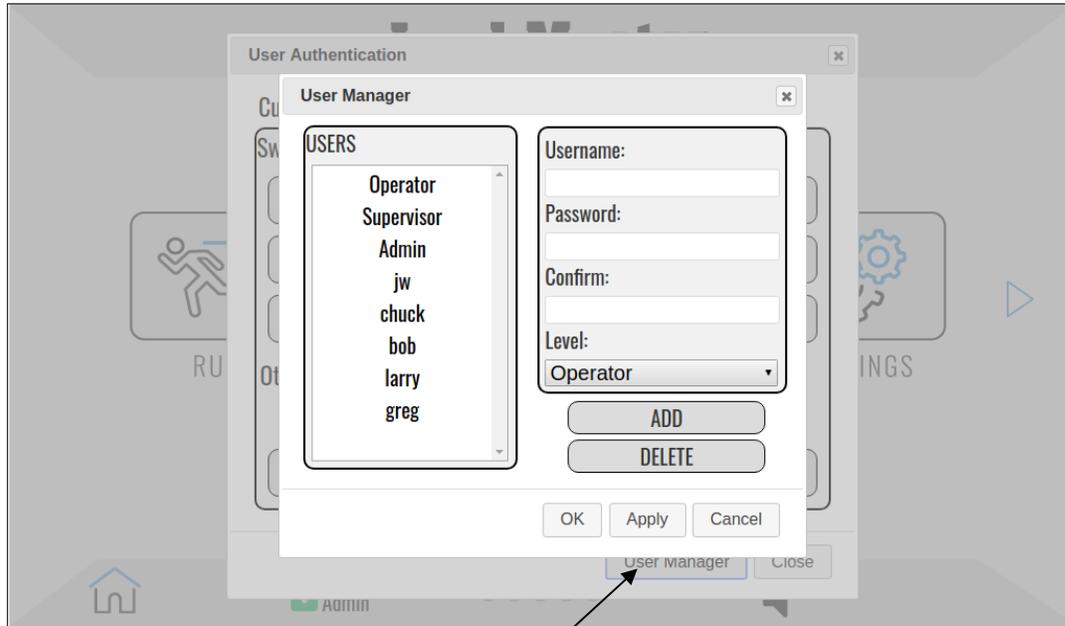
### 5.3.1 ADMIN LOGIN



Press the user icon. When the User Authentication window pops up, push the Admin button. When prompted, enter in the Admin password. Then press the Login button. At this point you will have access to modify all parameters. The Admin icon will be a Green "unlocked" icon to show that the login is successful. The Admin user will be automatically logged out upon 5 minutes of no activity. When this occurs, the Login Icon will appear as a Red "locked" icon.

You can setup multiple users with different levels of permissions. Press the User Manager button to setup new users. After users have been setup, it is recommended to login as a user (not Admin) for future logins.

## 5.3.2 User Manager

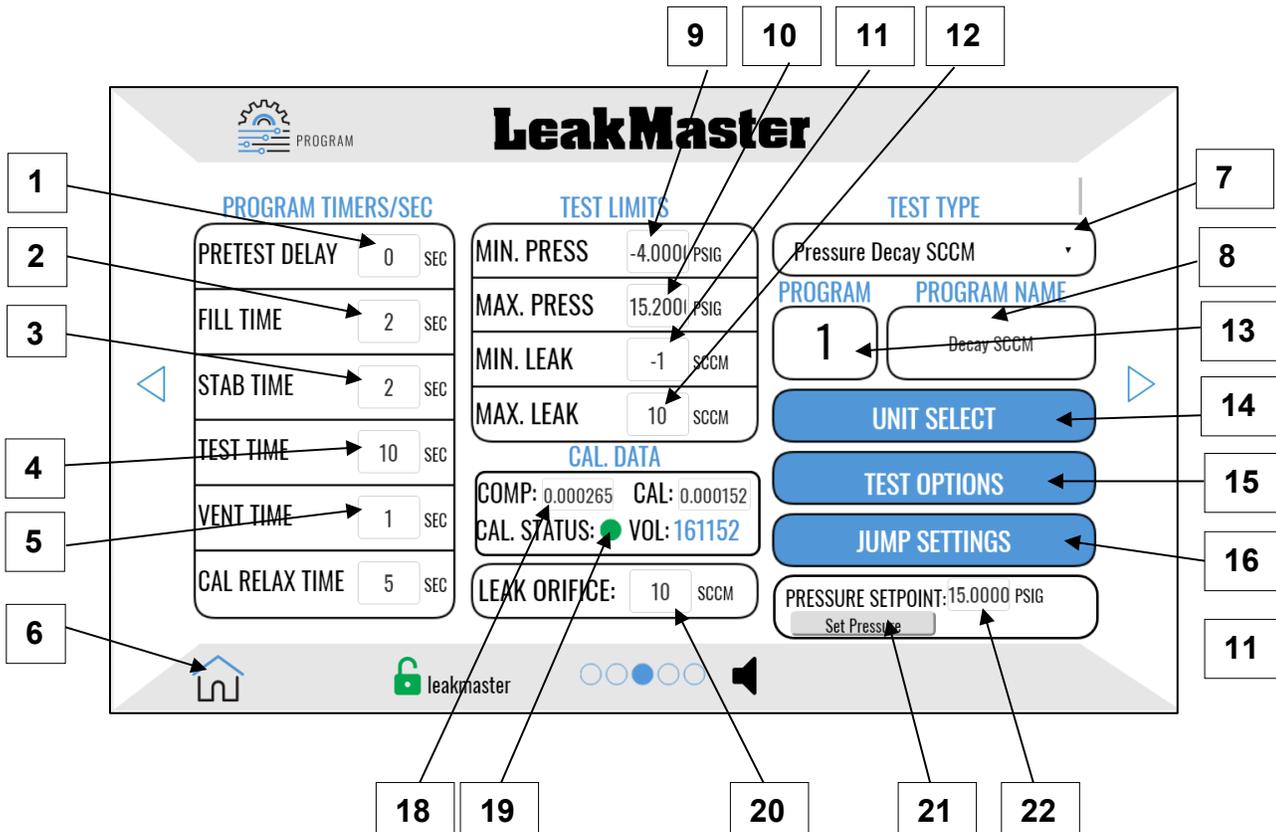


Upon pressing the User Manger button, the User Manager window will pop up. Push the ADD button to add a new user. Enter in the Username, Password, Password Confirm, and the Permission Level. Upon completion hit the Apply or OK button to save the new user information. The new user you entered will now appear under the USERS window. To remove a user, you simply select the user name from the USERS window and press the DELETE button.

## 5.3.3 Programming Menu (Pressure Decay SCCM Mode)

The menu shown below is the PROGRAM menu for Pressure Decay SCCM mode. This menu enables the user to setup program timers, test limits, program name, pressure unit selection, programmable output setup, jump settings, test pressure setup and to view calibration data for each program. No changes can be made unless the user has Supervisor or Admin privileges.

There is also a related test type called “External Fill Decay”, this test can be used to perform a pressure decay test, but the part is filled by an external source.



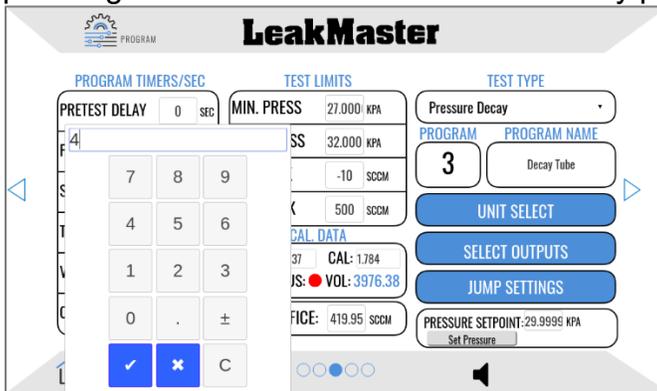
Items 1-5 are the program timers in the test sequence order from top to bottom (1-6).

1. PRETEST DELAY TIMER: The pretest delay step is the set amount of time after that must expire after the start signal received before the fill or prefill step starts. Enter this amount (if desired) by pressing the box to enable the numeric entry popup.
2. FILL TIME: The fill valve will turn on (open) for the set amount of time entered to deliver air to the test part. The Vent valve will turn on (close) to prevent air loss

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to the vent. Make sure to set enough time to completely fill the part to the desired test pressure. Enter this amount by pressing the box to enable the numeric entry popup.

3. STAB TIME: The ISO valve will close (to trap the air in the part) and the Fill valve will turn off (close) for the set amount of time entered. The stabilize step allows the part to stabilize (relax, cool, warm, stretch, etc.) Enter this amount by pressing the box to enable the numeric entry popup.



4. TEST TIMER: The tester monitors and records the pressure decay readings for the amount of time entered. Enter this amount by pressing the box to enable the numeric entry popup. When the test timer expires, the flow sensor reading is recorded and the leak rate is calculated.
5. VENT TIMER: The TEST valve will turn off (close) and the VENT valve will turn on (open) causing the air in the test part to vent through the VENT port on the back of the tester. Enter this amount by pressing the box to enable the numeric entry popup. Make sure to enter in enough time to completely vent the part.
6. HOME ICON: When pressed by the user, the screen will return to the Home menu.
7. TEST TYPE: This is a drop down menu that allows the user to select the desired test type for the current program. The choices in the menu are Pressure Decay SCCM, Pressure Loss/Time and Occlusion.
8. PROGRAM NAME: This allows the user to name each individual program with a desired name or number value. Press the box to enable the alphanumeric popup entry. Press enter when entry is complete.

**Items 9-12 are the program test limits.** The pressure must remain between the MIN and MAX PRESSURE limits during the test. After the Test step the Leak Rate must be between the MIN and MAX LEAK RATE limits. If the pressure or leak rate does not fall

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inside these limits, the test will fail. If the pressure and leak rate does fall inside these limits, the test will pass.

9. **MIN PRESS:** Pressing this numeric entry will pop up a numeric entry pad. A number can be entered into this entry pad for the Minimum Test Pressure in the selected pressure unit. This is a gross leak check to ensure that the part reaches a minimum pressure after the Fill and Stab Timer has expired. When setting the pressure setpoint, this field is automatically updated to 0.2 PSI (translated to the current unit) below the setpoint.
10. **MAX PRESS:** Pressing this numeric entry will pop up a numeric entry pad. A number can be entered into this entry pad for the Maximum Test Pressure for the test in the selected pressure unit. This is a check to ensure that the part does not exceed the maximum pressure anytime during the test. When setting the pressure setpoint, this field is automatically updated to 0.2 PSI (translated to the current unit) above the setpoint.
11. **MIN LEAK:** Pressing this numeric entry will pop up a numeric entry pad. A number can be entered into this entry pad for the Minimum Leak Rate Parameter.
12. **MAX LEAK:** Pressing this numeric entry will pop up a numeric entry pad. A number can be entered into this entry pad for the Maximum Leak Rate Parameter.
13. **PROGRAM BOX:** This box displays the program name and number of the program currently being viewed. The user can change the program by pressing the up or down buttons to increment or decrement the program number by one or the user can touch the program number box to manually enter the program number with a numeric entry popup.



Pressing the Add Program button will pop up a Select Available Program Number window as shown on the right. You will need to pick an available program number and press Select. After you have picked an available program you can setup the parameters for the new program.

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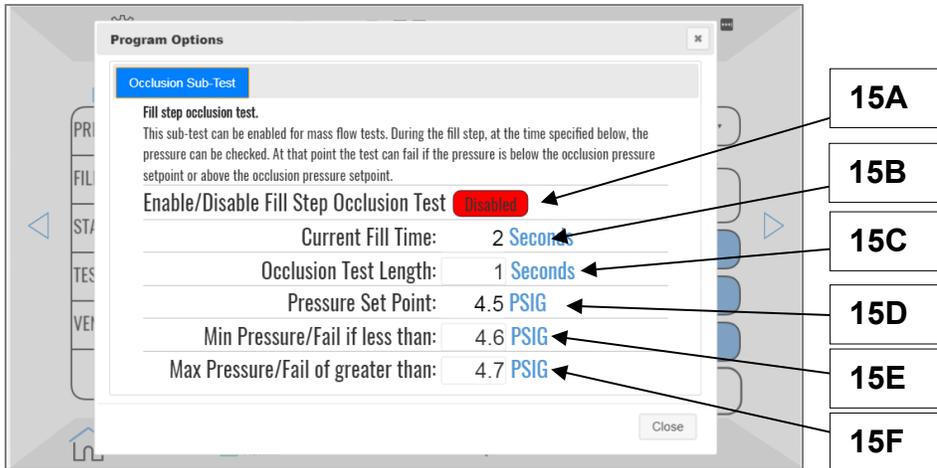
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- 14. UNIT SELECT:** When pressed, a popup window will be displayed as shown in the figure below. The user can then select the desired pressure and flow units for each program. Press the OK or X in the upper right corner to close the window.

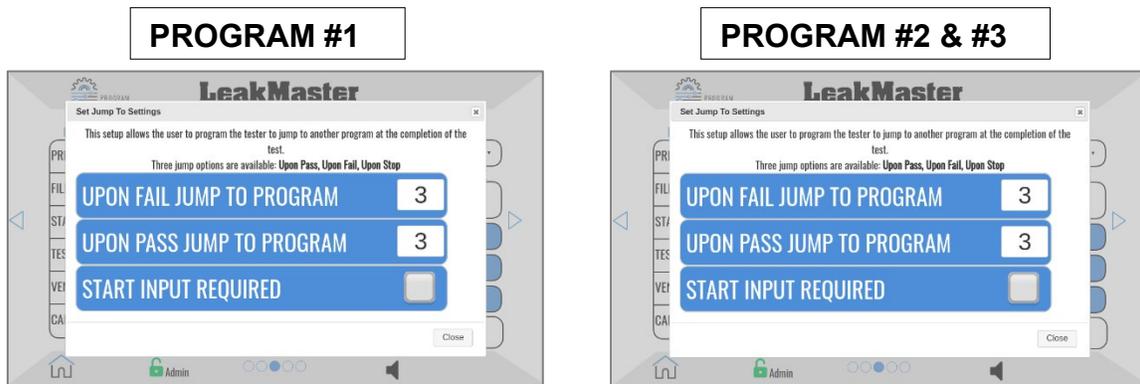


- 15. TEST OPTIONS:** Occlusion Sub Test:

The Occlusion Sub Test allows the user to perform an occlusion test (also known as a back pressure test) during the Fill step of the current program if enabled. This allows the user to perform an occlusion test without having to setup a separate program and helps reduce cycle time by eliminating running multiple programs. This sub test will examine the test pressure at the programmed moment in time (15C) and ensure that test pressure falls between the Min and Max pressure settings (items 15D and 15 E). The user will need to input items 15C, 15D, and 15E and press the Enable buttons (item 15A). In the example shown below, the tester will log the test pressure 1 second into the fill step and ensure that the test pressure falls within 4.6 and 4.7 PSIG. If the pressure falls within the pressure limits, the test will continue testing the current test. If the pressure does not fall within the pressure limits, the test will be failed and the current test will halt immediately. Items 15B and 15D are for reference only and are not programmable.



**16. JUMP SETTINGS:** When pressed, a popup window will be displayed as shown in the figure below. This allows a user to set the tester to automatically jump to other programs based upon certain conditions.

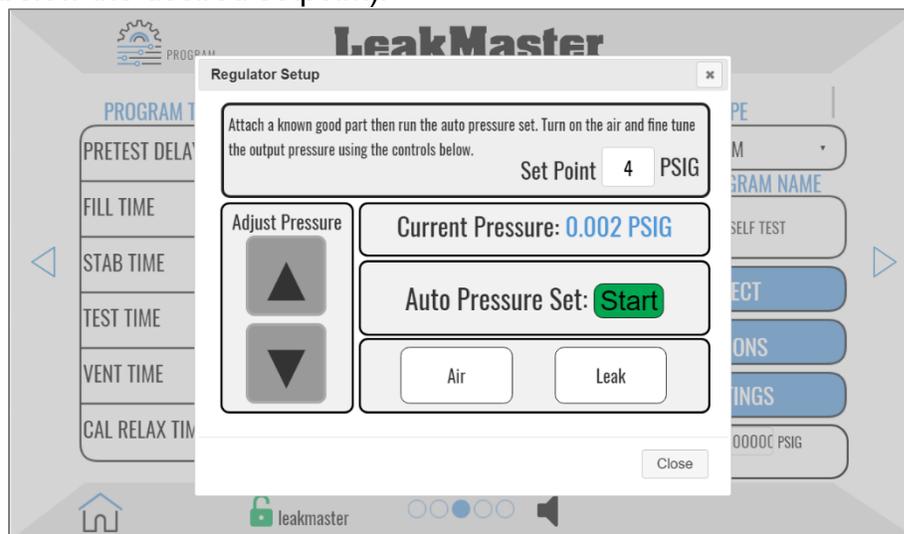


For this example, we are starting on program #1. If the part fails program #1, the tester will jump to program #2 and wait for a start signal. If the part passes program #1 the tester will jump to program #3 and wait for a start signal. Program #2 & #3, once complete (or if the stop button is pressed), will jump back to Program #1 (the original starting program).

**17. Items 19-22 are calibration data displays**

**18. COMP:** This is the Compensation Value (commonly referred to as Comp Value) after a successful calibration. The Compensation Value is the leakage detected of a zero-leak part. This value is compensated out of every test. The user can also manually enter a Compensation Value by pressing the number. Enter this amount by pressing the box to enable the numeric entry popup.

- 19. CAL STATUS:** This indicates the calibration status of the currently viewed program. A green dot indicates an automatic calibration has been completed on this program. A red dot indicates an automatic calibration has not been completed on this program. A calibration is not required to proceed with testing on a program in Mass Flow Mode.
- 20. LEAK ORIFICE VALUE:** Pressing this numeric entry will pop up a numeric entry pad. A number can be entered into this entry pad for the Leak Value of the calibrated leak orifice installed in the test manifold in sccm or SLPM (standard cubic centimeters per minute or standard liters/min). This lets the tester know the value of the installed calibrated leak standard.
- 21. SET PRESSURE:** Pressing the SET PRESSURE button will pop up the Regulator Setup window shown below. This allows the user to set the preferred test pressure and test the setting. The set point is displayed in the top bar. The current test pressure is displayed in the second box. Push the “Air” button to turn on the air to the tester (make sure the tester is either plugged or connected to a leak free part). This will allow you to see if the test pressure is hitting the set point pressure or not. If you are not happy with the current pressure results, you can manually adjust your regulator knob until the desired test pressure is achieved. If this tester is equipped with an electronic pressure regulator, you can press the Auto Pressure Set “Start” button. This will allow the tester to run through a calibration routine to teach the electronic regulator how to reach the set point pressure while connected to the current conditions. You can also turn on the internal leak, and set the test pressure to the leaking condition to ensure that the set point pressure is set to a leaking condition (with large leak reject leak rates this is sometimes desirable to make sure that the test pressure doesn’t drop to below the desired setpoint).

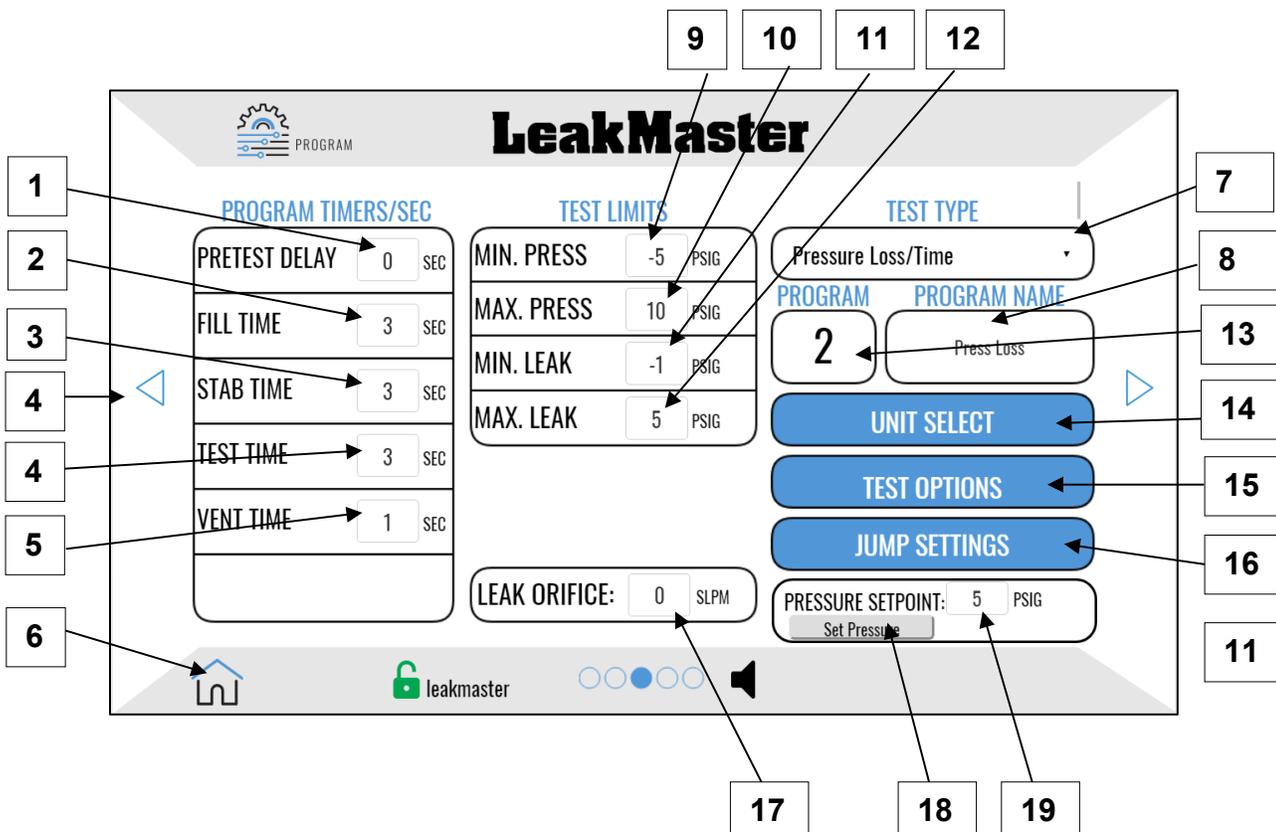


**22. PRESSURE SETPOINT:** Pressing this numeric entry will pop up a numeric entry pad. A number can be entered into this entry pad for the desired test pressure for the program. This serves no purpose except for visual reference on other screens. When changing this value the min/max pressure values will be set to +/- 0.2 PSI (converted to the selected pressure unit).

## 5.3.4 Programming Menu (Pressure Loss/Time Mode)

The menu shown below is the PROGRAM menu for Pressure Loss/Time mode. This menu enables the user to setup program timers, test limits, program name, pressure unit selection, programmable output setup, jump settings, test pressure setup and to view calibration data for each program. No changes can be made unless the user has Supervisor or Admin privileges.

There is also a related test type called “External Fill Loss/Time”, this test can be used to measure the pressure, but the part is filled by an external source.



Items 1-5 are the program timers in the test sequence order from top to bottom (1-6).

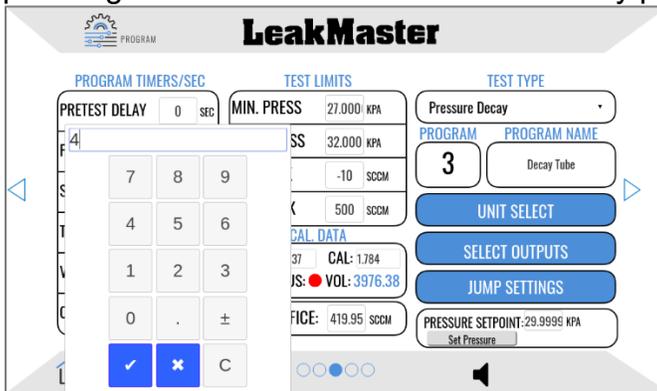
1. PRETEST DELAY TIMER: The pretest delay step is the set amount of time after that must expire after the start signal received before the fill or prefill step starts. Enter this amount (if desired) by pressing the box to enable the numeric entry popup.
2. FILL TIME: The fill valve will turn on (open) for the set amount of time entered to deliver air to the test part. The Vent valve will turn on (close) to prevent air loss to the vent. Make sure to set enough time to completely fill the part to the

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desired test pressure. Enter this amount by pressing the box to enable the numeric entry popup.

3. STAB TIME: The ISO valve will close (to trap the air in the part) and the Fill valve will turn off (close) for the set amount of time entered. The stabilize step allows the part to stabilize (relax, cool, warm, stretch, etc.) Enter this amount by pressing the box to enable the numeric entry popup.



4. TEST TIMER: The tester monitors and records the pressure decay readings for the amount of time entered. Enter this amount by pressing the box to enable the numeric entry popup. When the test timer expires, the flow sensor reading is recorded and the leak rate is calculated.
5. VENT TIMER: The ISO valve will turn off (open) and the VENT valve will (open) causing the air in the test part to vent through the VENT port on the back of the tester. Enter this amount by pressing the box to enable the numeric entry popup. Make sure to enter in enough time to completely vent the part.
6. HOME ICON: When pressed by the user, the screen will return to the Home menu.
7. TEST TYPE: This is a drop down menu that allows the user to select the desired test type for the current program. The choices in the menu are Pressure Decay SCCM, Pressure Loss/Time and Occlusion.
8. PROGRAM NAME: This allows the user to name each individual program with a desired name or number value. Press the box to enable the alphanumeric popup entry. Press enter when entry is complete.

**Items 9-12 are the program test limits.** The pressure must remain between the MIN and MAX PRESSURE limits during the test. After the Test step the Leak Rate must be between the MIN and MAX LEAK RATE limits. If the pressure or leak rate does not fall

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inside these limits, the test will fail. If the pressure and leak rate does fall inside these limits, the test will pass.

9. **MIN PRESS:** Pressing this numeric entry will pop up a numeric entry pad. A number can be entered into this entry pad for the Minimum Test Pressure in the selected pressure unit. This is a gross leak check to ensure that the part reaches a minimum pressure after the Fill and Stab Timer has expired. When setting the pressure setpoint, this field is automatically updated to 0.2 PSI (translated to the current unit) below the setpoint.
10. **MAX PRESS:** Pressing this numeric entry will pop up a numeric entry pad. A number can be entered into this entry pad for the Maximum Test Pressure for the test in the selected pressure unit. This is a check to ensure that the part does not exceed the maximum pressure anytime during the test. When setting the pressure setpoint, this field is automatically updated to 0.2 PSI (translated to the current unit) above the setpoint.
11. **MIN LEAK:** Pressing this numeric entry will pop up a numeric entry pad. A number can be entered into this entry pad for the Minimum Leak Rate Parameter.
12. **MAX LEAK:** Pressing this numeric entry will pop up a numeric entry pad. A number can be entered into this entry pad for the Maximum Leak Rate Parameter.
13. **PROGRAM BOX:** This box displays the program name and number of the program currently being viewed. The user can change the program by pressing the up or down buttons to increment or decrement the program number by one or the user can touch the program number box to manually enter the program number with a numeric entry popup.



Pressing the Add Program button will pop up a Select Available Program Number window as shown on the right. You will need to pick an available program number and press Select. After you have picked an available program you can setup the parameters for the new program.

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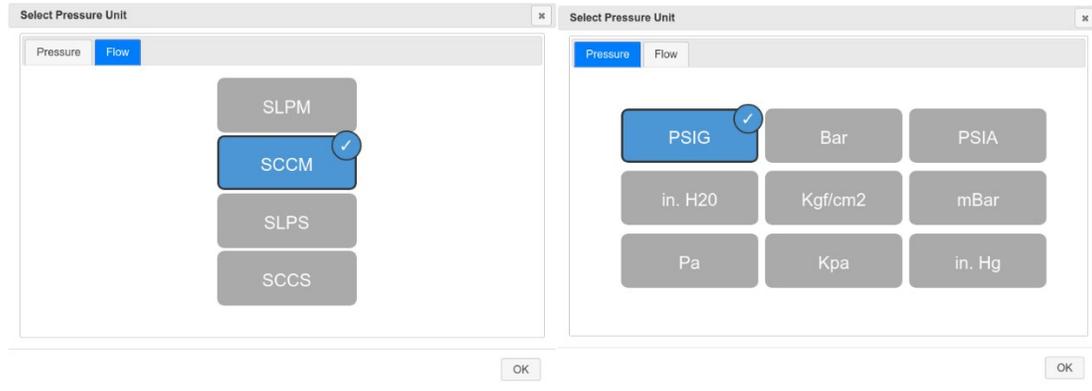
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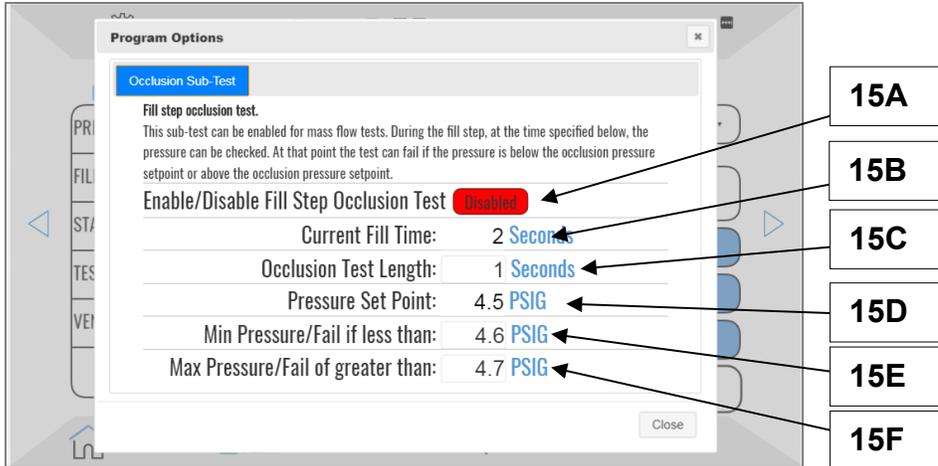
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- 23. UNIT SELECT:** When pressed, a popup window will be displayed as shown in the figure below. The user can then select the desired pressure and flow units for each program. Press the OK or X in the upper right corner to close the window.

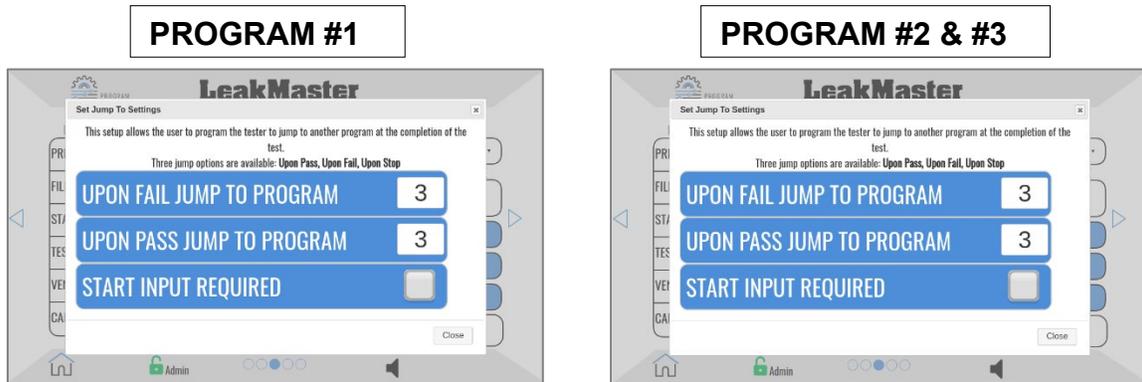


**14. TEST OPTIONS: Occlusion Sub Test:**

The Occlusion Sub Test allows the user to perform an occlusion test (also known as a back pressure test) during the Fill step of the current program if enabled. This allows the user to perform an occlusion test without having to setup a separate program and helps reduce cycle time by eliminating running multiple programs. This sub test will examine the test pressure at the programmed moment in time (15C) and ensure that test pressure falls between the Min and Max pressure settings (items 15D and 15 E). The user will need to input items 15C, 15D, and 15E and press the Enable buttons (item 15A). In the example shown below, the tester will log the test pressure 1 second into the fill step and ensure that the test pressure falls within 4.6 and 4.7 PSIG. If the pressure falls within the pressure limits, the test will continue testing the current test. If the pressure does not fall within the pressure limits, the test will fail and the current test will halt immediately. Items 15B and 15D are for reference only and are not programmable.



**15. JUMP SETTINGS:** When pressed, a popup window will be displayed as shown in the figure below. This allows a user to set the tester to automatically jump to other programs based upon certain conditions.



For this example, we are starting on program #1. If the part fails program #1, the tester will jump to program #2 and wait for a start signal. If the part passes program #1 the tester will jump to program #3 and wait for a start signal. Program #2 & #3, once complete (or if the stop button is pressed), will jump back to Program #1 (the original starting program).

**16. LEAK ORIFICE VALUE:** Pressing this numeric entry will pop up a numeric entry pad. A number can be entered into this entry pad for the Leak Value of the calibrated leak orifice installed in the test manifold in LPM or sccm (liters/min or standard cubic centimeters per minute). This lets the tester know the value of the installed calibrated leak standard. This input has no effect when using Pressure Loss/Time testing method.

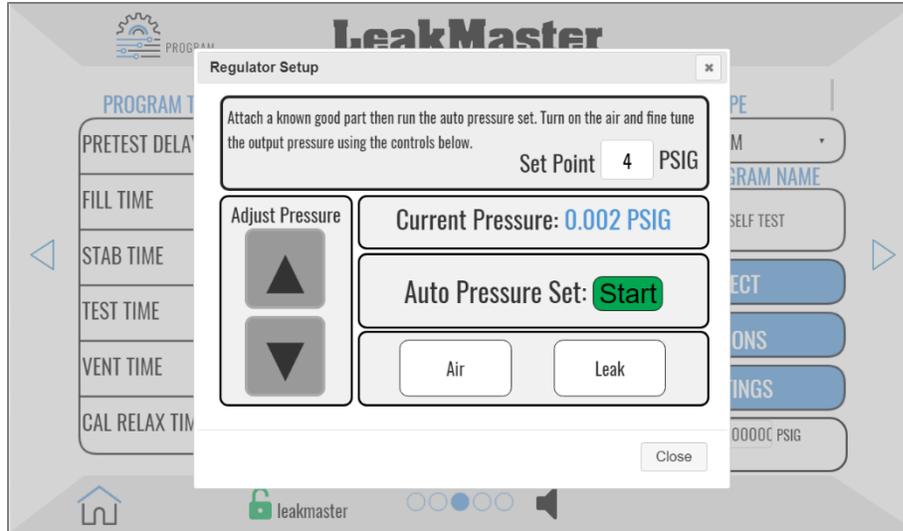
**24. SET PRESSURE:** Pressing the SET PRESSURE button will pop up the Regulator Setup window shown below. This allows the user to set the preferred test pressure and test the setting. The set point is displayed in the top bar. The current test pressure is displayed in the second box. Push the “Air” button to turn on the air to the tester (make sure the tester is either plugged or connected to a leak free part). This will allow you to see if the test pressure is hitting the set point pressure or not. If you are not happy with the current pressure results, you can manually adjust your regulator knob until the desired test pressure is achieved. If this tester is equipped with an electronic pressure regulator, you can press the Auto Pressure Set “Start” button. This will allow the tester to run through a calibration routine to teach the electronic regulator how to reach the set point pressure while connected to the current conditions. You can also turn on the internal leak, and set the test pressure to the leaking condition to ensure that the set point pressure is set to a leaking condition (with large leak reject leak rates this is sometimes desirable to make sure that the test pressure doesn’t drop to below the desired setpoint).

Note: If an electronic regulator is not installed the Auto Pressure Set feature will not be displayed.

### Auto Pressure Set Process

The Auto Pressure Set will calibrate the electronic pressure regulator to learn the proper setpoint to achieve the desired pressure.

1. When the Auto Pressure Set button is green and displays “Start”, press the green Start button.
2. The button will then turn red and display “Stop”. Press this button during the process to cancel.
3. The electronic regulator will adjust to a low pressure setpoint.
4. The electronic regulator will then adjust a higher pressure setpoint slightly above your pressure setpoint.
5. Once this process is complete the Auto Pressure Set button will turn from red to green indicating the process is complete.
6. Press the “Air” button to turn on the air supply to verify your pressure is correct.
7. Make fine adjustments to the final pressure with the up/down arrows on the left.



- 17. PRESSURE SETPOINT:** Pressing this numeric entry will pop up a numeric entry pad. A number can be entered into this entry pad for the desired test pressure for the program. This serves no purpose except for visual reference. When changing this value the min/max pressure values will be set to +/- 0.2 PSI (converted to the selected pressure unit).

## 5.3.5 External Fill Test Modes (Decay/Pressure Loss)

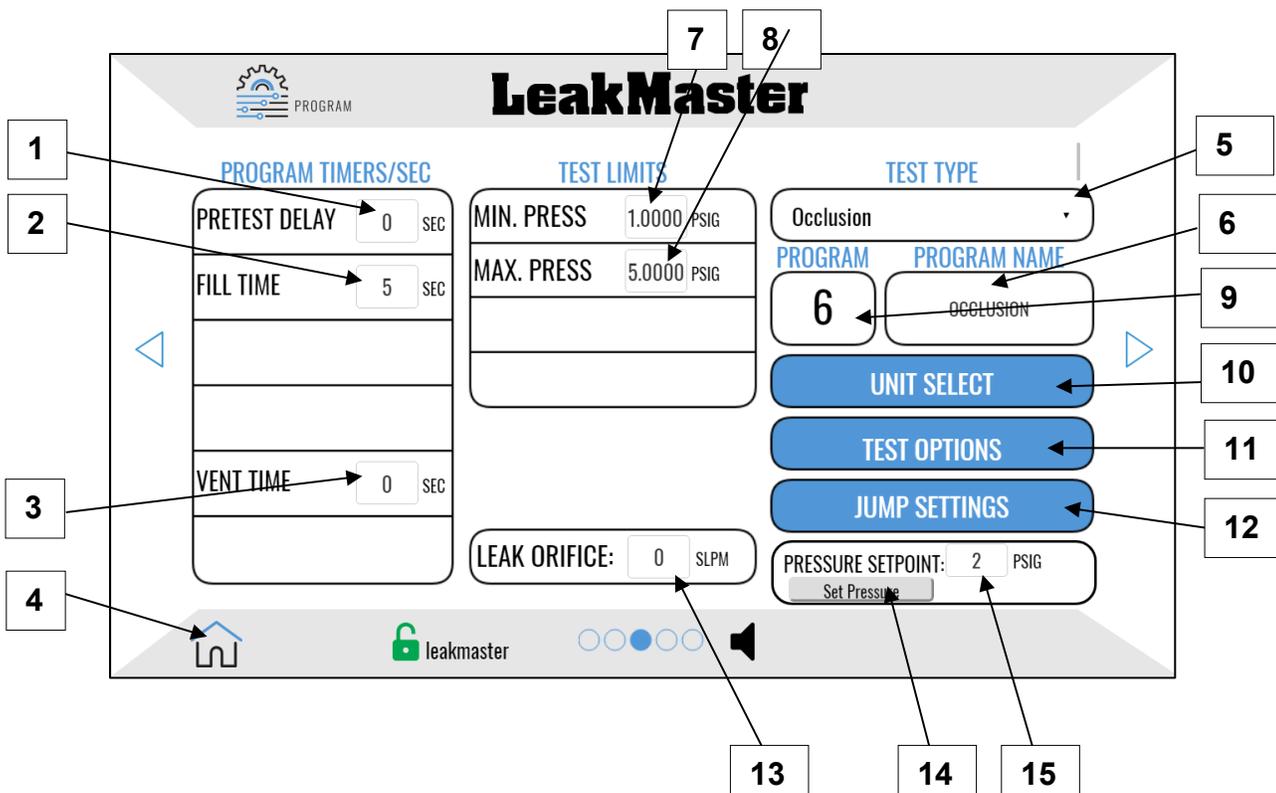
The external fill test types allow you to perform a Decay SCCM or a Pressure Loss test with the only difference is an external source will be triggered to fill the part. The LeakMaster tester will read the values of the pressure sensor and perform pass/fail calculations at the end of the test.

The recommended communication method is to use Ethernet/IP to determine when a test is in progress and can properly trigger an external fill valve to fill the part.

To use the Decay SCCM your controller will need to enable the calibration mode (See Ethernet/IP documentation on the bit to enable) and start the test. The test will run twice, the first time to calculate the COMP value, and the second to determine the CAL value. You can review these values on the program screen.

## 5.3.6 Programming Menu (Occlusion Testing Mode)

The menu shown below is the PROGRAM menu for Occlusion Mode. This menu enables the user to setup program timers, test limits, program name, pressure unit selection, programmable output setup, jump settings, test pressure setup and to view calibration data for each program. No changes can be made unless the user has Supervisor or Admin privileges.



**Items 1-3 are the program timers in the test sequence order from top to bottom (1-6).**

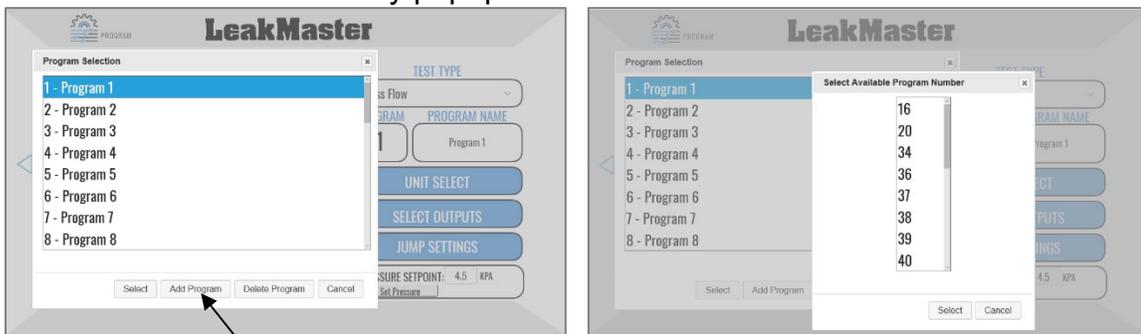
1. **PRETEST DELAY TIMER:** The pretest delay step is the set amount of time after that must expire after the start signal received before the fill or prefill step starts. Enter this amount (if desired) by pressing the box to enable the numeric entry popup.
2. **FILL TIME:** The fill valve will turn on (open) for the set amount of time entered to deliver air to the test part. The Vent valve will turn on (close) to prevent air loss to the vent. At the end of the Fill Time, the back pressure generated by the part is logged. Enter this amount by pressing the box to enable the numeric entry popup. If the logged back pressure is within the Min and Max Pressure limits (items 7 and 8), then the part will pass. If the pressure is outside of these limits the part will fail.
3. **VENT TIMER:** The Fill Valve will turn off (close), the ISO valve will turn off (open) and the VENT valve will (open) causing the air in the test part to vent through the VENT port on the back of the tester. Enter this amount by pressing the box to enable the numeric entry popup. Make sure to enter in enough time to completely vent the part.
4. **HOME ICON:** When pressed by the user, the screen will return to the Home menu.
5. **TEST TYPE:** This is a drop down menu that allows the user to select the desired test type for the current program. The choices in the menu are Pressure Decay SCCM, Pressure Loss/Time and Occlusion.
6. **PROGRAM NAME:** This allows the user to name each individual program with a desired name or number value. Press the box to enable the alphanumeric popup entry. Press enter when entry is complete.

**Items 9-12 are the program test limits.** The pressure must remain between the MIN and MAX PRESSURE limits during the test. After the Test step the Leak Rate must be between the MIN and MAX LEAK RATE limits. If the pressure or leak rate does not fall inside these limits, the test will fail. If the pressure and leak rate does fall inside these limits, the test will pass.

7. **MIN PRESS:** Pressing this numeric entry will pop up a numeric entry pad. A number can be entered into this entry pad for the Minimum Test Pressure in the selected pressure unit. This is a gross leak check to ensure that the part reaches a minimum pressure after the Fill and Stab Timer has expired. When setting the pressure setpoint, this field is automatically updated to 0.2 PSI (translated to the current unit) below the setpoint.

8. **MAX PRESS:** Pressing this numeric entry will pop up a numeric entry pad. A number can be entered into this entry pad for the Maximum Test Pressure for the test in the selected pressure unit. This is a check to ensure that the part does not exceed the maximum pressure anytime during the test. When setting the pressure setpoint, this field is automatically updated to 0.2 PSI (translated to the current unit) above the setpoint.

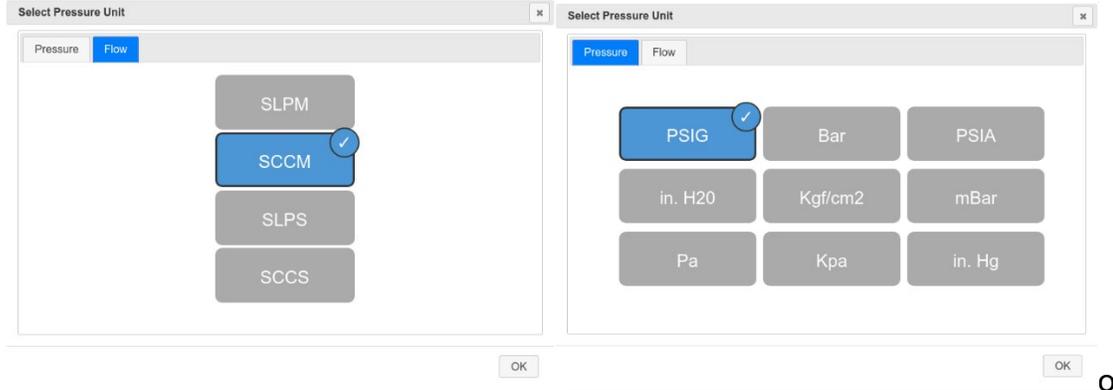
9. **PROGRAM BOX:** This box displays the program name and number of the program currently being viewed. The user can change the program by pressing the up or down buttons to increment or decrement the program number by one or the user can touch the program number box to manually enter the program number with a numeric entry popup.



Pressing the Add Program button will pop up a Select Available Program Number window as shown on the right. You will need to pick an available program number and press Select. After you have picked an available program you can setup the parameters for the new program.

25. **UNIT SELECT:** When pressed, a popup window will be displayed as shown in the figure below. The user can then select the desired pressure and flow units for each program. Press the OK or X in the upper right corner to close the window.

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## 10. TEST OPTIONS:

Occlusion Sub Test: This function is not available when using Occlusion Mode.

Quick Test Setting: This allows you to add up to three evaluation points during the test step allowing you to quickly fail, pass, or continue the test. This test is useful in programs with a long test time where you can do an early evaluation to see if you want to fail or pass the test early or continue the test. Up to three evaluation points with their own leak rate parameters can be configured.

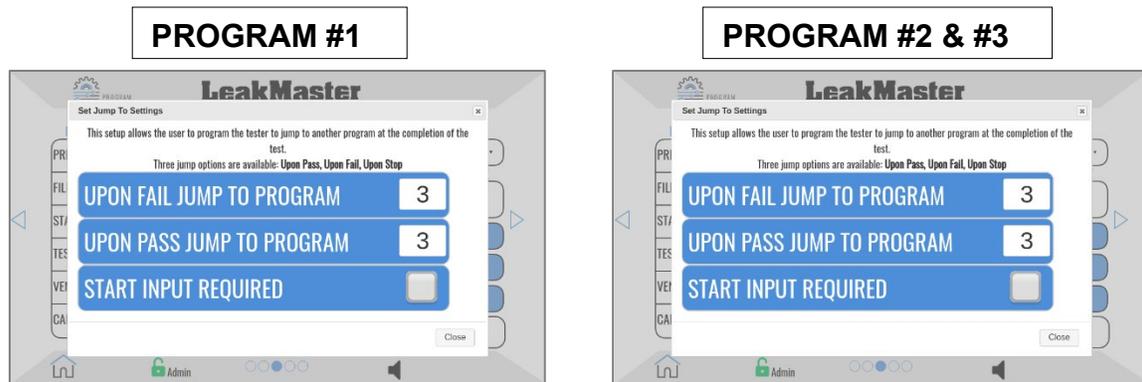


- 1. Evaluation Points:** There can be up to 3 evaluation points during the test step.
- 2. Enable Evaluation Point:** Select the Evaluation Point then check this box to enable or uncheck to disable this evaluation point.
- 3. Evaluation Time:** Selects the time in the test step to perform the selected quick test evaluation. The slider can be moved left and right to select a portion of the total test time.
- 4. Minimum Leak:** Adjust this to set the minimum leak rate for this evaluation point. Leak rates below this value will fail.
- 5. Continue Threshold:** This value between the min and max leak allows you to select a threshold where you can quickly pass a part or continue

the test. If you do not want to have an early pass then set this value to the minimum leak.

- 6. Max Leak:** Adjust this to set the maximum leak rate for this evaluation point. Leak rates above this value will fail.

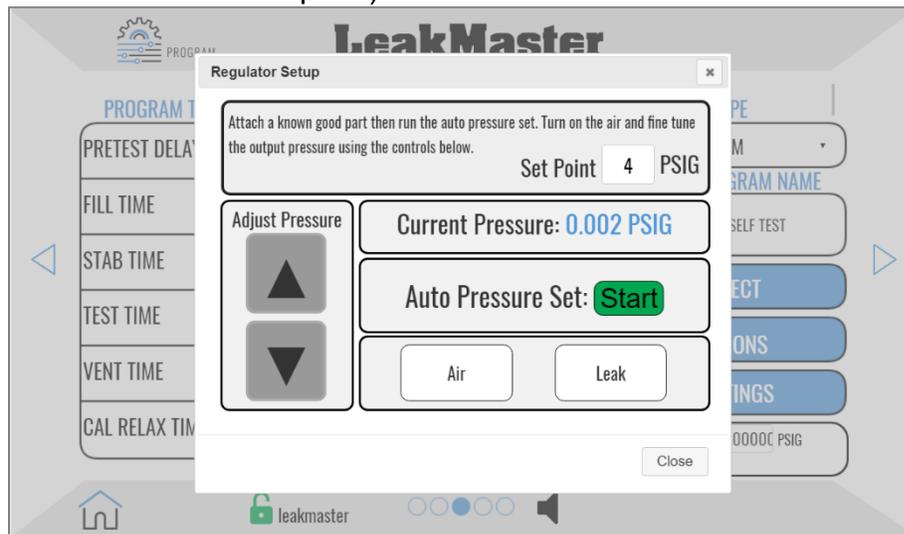
- 11. JUMP SETTINGS:** When pressed, a popup window will be displayed as shown in the figure below. This allows a user to set the tester to automatically jump to other programs based upon certain conditions.



For this example, we are starting on program #1. If the part fails program #1, the tester will jump to program #2 and wait for a start signal. If the part passes program #1 the tester will jump to program #3 and wait for a start signal. Program #2 & #3, once complete (or if the stop button is pressed), will jump back to Program #1 (the original starting program).

- 12. LEAK ORIFICE VALUE:** Pressing this numeric entry will pop up a numeric entry pad. A number can be entered into this entry pad for the Leak Value of the calibrated leak orifice installed in the test manifold in LPM or sccm (liters/min or standard cubic centimeters per minute). This lets the tester know the value of the installed calibrated leak standard. This input has no effect when using Pressure Loss/Time testing method.

**26. SET PRESSURE:** Pressing the SET PRESSURE button will pop up the Regulator Setup window shown below. This allows the user to set the preferred test pressure and test the setting. The set point is displayed in the top bar. The current test pressure is displayed in the second box. Push the “Air” button to turn on the air to the tester (make sure the tester is either plugged or connected to a leak free part). This will allow you to see if the test pressure is hitting the set point pressure or not. If you are not happy with the current pressure results, you can manually adjust your regulator knob until the desired test pressure is achieved. If this tester is equipped with an electronic pressure regulator, you can press the Auto Pressure Set “Start” button. This will allow the tester to run through a calibration routine to teach the electronic regulator how to reach the set point pressure while connected to the current conditions. You can also turn on the internal leak, and set the test pressure to the leaking condition to ensure that the set point pressure is set to a leaking condition (with large leak reject leak rates this is sometimes desirable to make sure that the test pressure doesn't drop to below the desired setpoint).



**13. PRESSURE SETPOINT:** Pressing this numeric entry will pop up a numeric entry pad. A number can be entered into this entry pad for the desired test pressure for the program. This serves no purpose except for visual reference. When changing this value the min/max pressure values will be set to +/- 0.2 PSI (converted to the selected pressure unit).

### 5.3.7 Programming Menu (Metered Volume)

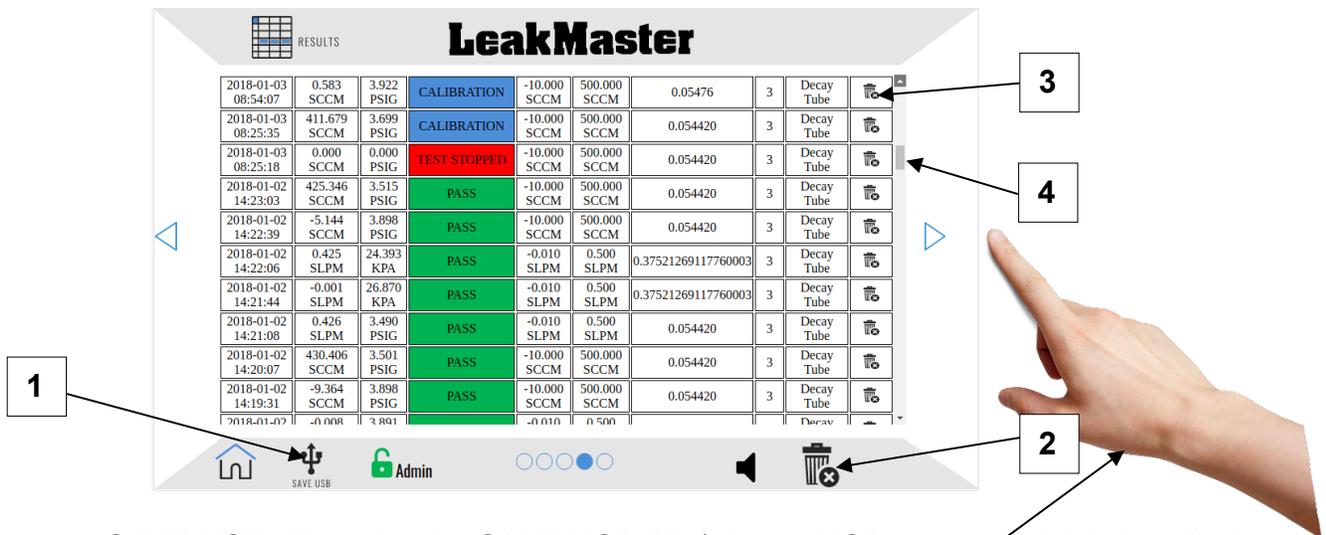
The programming menu for Metered Volume is the same as Pressure Loss over Time or Pressure Decay (sccm). See the corresponding sections:

Programming Menu (Pressure Loss/Time Mode) – For Metered Volume Press Loss

Programming Menu (Pressure Decay SCCM Mode) – For Metered Volume SCCM

### 5.4 RESULTS MENU (SAVING RESULTS TO .CSV FILE)

The RESULTS menu displays the data collected for Channel 1. The results table will hold the last 3,000 test results. Once 3,000 is reached the oldest result will be pushed out of the table. The file is saved as a csv (comma separated value) file. When saving, a folder is automatically created on the USB stick when saved for the first time. The folder is named LeakMaster. It also generates a sub folder “Guardian”. The csv file is saved in the Guardian sub folder. The file name is saved as a 17 digit number based on date and time the file was saved. Example file name: 2018-03-30-132926 (The 2018 designates the year, the 03 designates the month, the 30 designates the day, 13 designates the hour, 29 designates the minute, and 26 designates the second). The USB memory stick must be formatted for FAT 32 (typically FAT 32 is the standard format for most USB memory sticks).



1. SAVE USB: Pressing the SAVE USB PB (when a USB memory stick is installed in the USB port on the front of the tester) will pop up a confirmation window. If you touch the “Save to USB” button the collected results will be saved to the USB memory stick in csv file format. This file can be opened with a PC using Excel or Word Pad.
2. DELETE: Pressing the DELETE PB will clear all of the collected results in the table. The DELETE PB will pop a confirmation window that must be accepted. This prevents accidental deletion of results.
3. Mini Trash Can: Pressing this button will delete that single column of data.
4. Scroll Bar: Touch and Drag the scroll bar to scroll through previous results. (Note: you can touch and drag down anywhere on this screen to scroll down through previous results)

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Example of data file viewed in Excel:

Date	LeakRate	FlowUnit	TestPressure	PressureUnit	PassFail	PassFailDetail	LLL	ULL	LPL	UPL	CompValue	CalValue	CompVolume	TempF	TempC	ProgNum	ProgName
4/2/2018 12:32	17.765	sccm	0.490379	psig	Pass	TEST PASSED	0	30	0.4	0.6	0			86.0491	30.0273	2	Part# 1
4/2/2018 12:33	17.9028	sccm	0.492603	psig	Pass	TEST PASSED	0	30	0.4	0.6	0			86.0491	30.0273	2	Part# 1
4/2/2018 12:33	17.9525	sccm	0.489843	psig	Pass	TEST PASSED	0	30	0.4	0.6	0			86.7477	30.4154	2	Part# 1
4/2/2018 12:34	17.6285	sccm	0.491529	psig	Pass	TEST PASSED	0	30	0.4	0.6	0			86.0491	30.0273	2	Part# 1
4/2/2018 12:34	17.2611	sccm	0.491491	psig	Pass	TEST PASSED	0	30	0.4	0.6	0			86.0491	30.0273	2	Part# 1
4/2/2018 12:35	18.4181	sccm	0.491989	psig	Pass	TEST PASSED	0	30	0.4	0.6	0			86.2251	30.1251	2	Part# 1
4/2/2018 12:36	18.292	sccm	0.489805	psig	Pass	TEST PASSED	0	30	0.4	0.6	0			86.2251	30.1251	2	Part# 1
4/2/2018 12:36	17.7914	sccm	0.490763	psig	Pass	TEST PASSED	0	30	0.4	0.6	0			86.2251	30.1251	2	Part# 1
4/2/2018 12:37	18.1912	sccm	0.490418	psig	Pass	TEST PASSED	0	30	0.4	0.6	0			86.2251	30.1251	2	Part# 1
4/2/2018 12:37	18.7491	sccm	0.491261	psig	Pass	TEST PASSED	0	30	0.4	0.6	0			86.2251	30.1251	2	Part# 1
4/2/2018 12:38	18.3829	sccm	0.491606	psig	Pass	TEST PASSED	0	30	0.4	0.6	0			86.2251	30.1251	2	Part# 1
4/2/2018 12:38	18.2254	sccm	0.491108	psig	Pass	TEST PASSED	0	30	0.4	0.6	0			86.2251	30.1251	2	Part# 1
4/2/2018 12:39	17.4063	sccm	0.489153	psig	Pass	TEST PASSED	0	30	0.4	0.6	0			86.3957	30.2198	2	Part# 1
4/2/2018 12:39	18.1949	sccm	0.488616	psig	Pass	TEST PASSED	0	30	0.4	0.6	0			86.3957	30.2198	2	Part# 1
4/2/2018 12:40	17.8548	sccm	0.489881	psig	Pass	TEST PASSED	0	30	0.4	0.6	0			86.3957	30.2198	2	Part# 1
4/2/2018 12:40	17.8426	sccm	0.491146	psig	Pass	TEST PASSED	0	30	0.4	0.6	0			86.3957	30.2198	2	Part# 1

## 5.4.1 Daily Automatic Export

By adding a USB drive to one of the tester's USB ports, each day at midnight, the tester will automatically export the results from the previous day. This data can be viewed under the Leakmaster folder created on the USB device.

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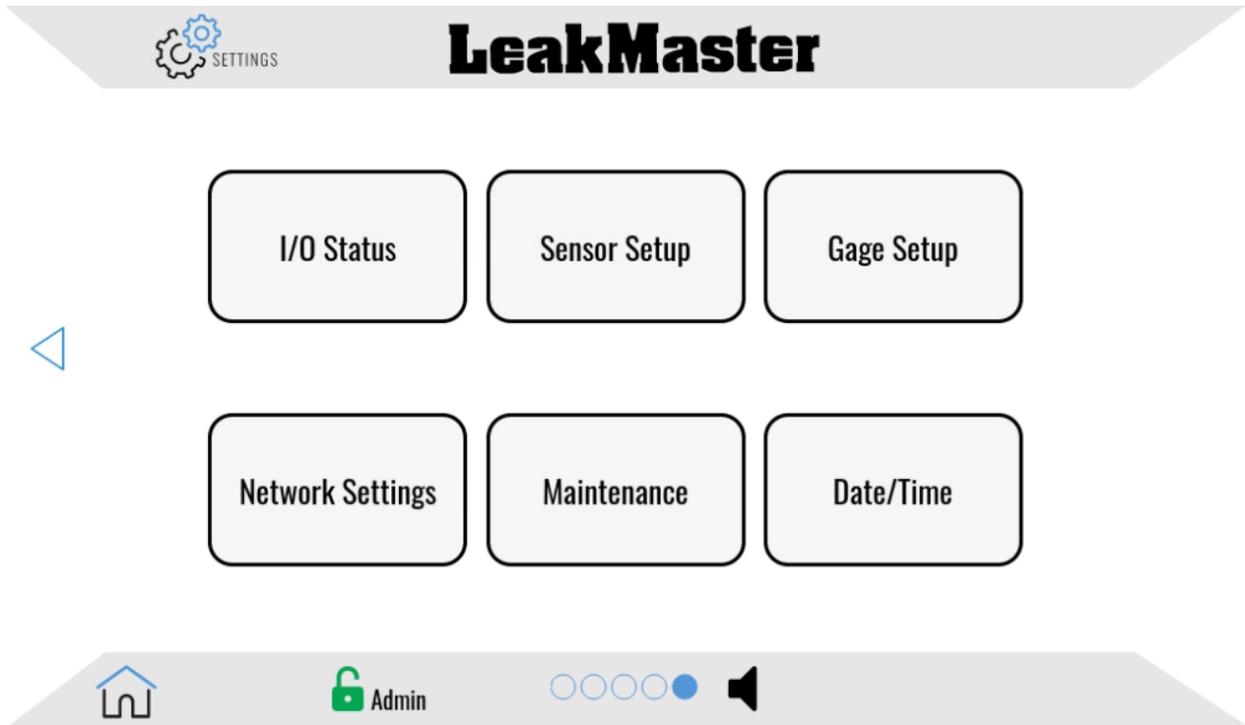
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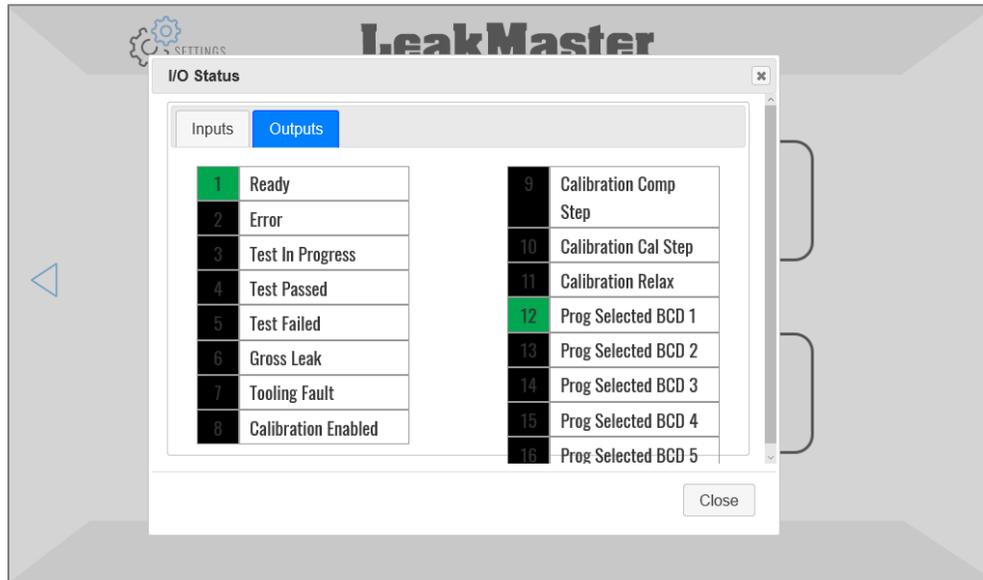
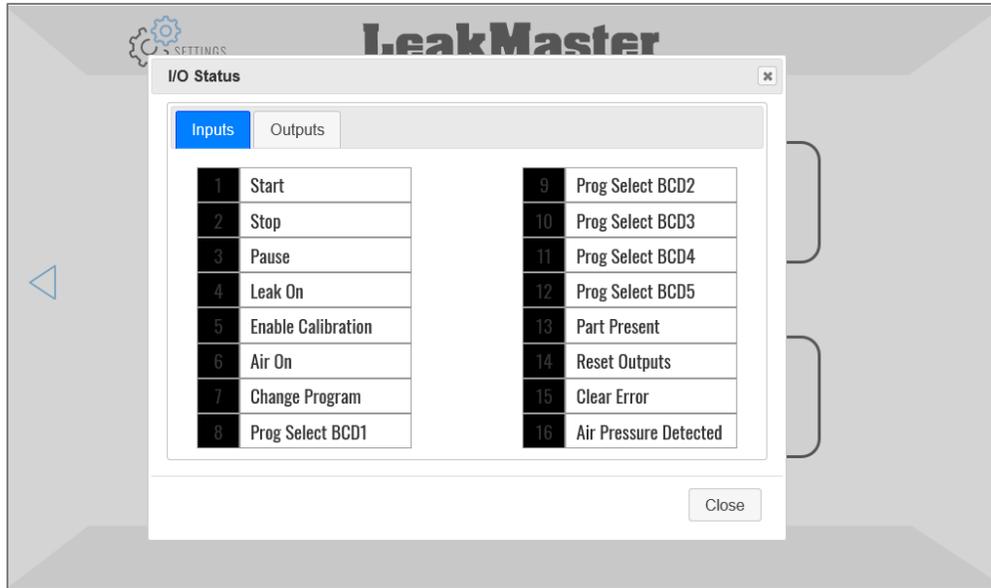
## 5.5 SETTINGS MENU

This menu contains sub menus for viewing and setting up general settings such as I/O viewing, changing the date, setting up a capability study, zeroing and spanning the transducers, and software license entry. Pushing any of the buttons shown below will pop up the subsequent sub menu.



## 5.5.1 I/O Status Menu

The I/O STATUS sub menu displays the current status of USER inputs and outputs. The description and timing of the I/O is described in the I/O section of the manual. Press the Inputs tab to view inputs. Press the Outputs tab to view outputs.



## 5.5.2 XDUCER SETUP MENU

**WARNING!!! Authorized Personnel Only!**  
**Making changes to the sensor span points can produce erratic results without the proper equipment and setup.**

The XDUCER SETUP sub menu displays menus that allow the user to make adjustments (zero and span) to the Test Pressure Transducer. It is critical to fully understand these operations before making any changes. You will need to have a certified Pressure Gauge to make changes to these settings. This should only be done during annual calibrations or if a sensor is being replaced. If any of the Span Points are labeled in green as shown below, then this means that they have been spanned. If any of the Span Points are red, then the span point has not been spanned. This tester is capable of more span points as well and a span point can be taught anywhere throughout the entire span.

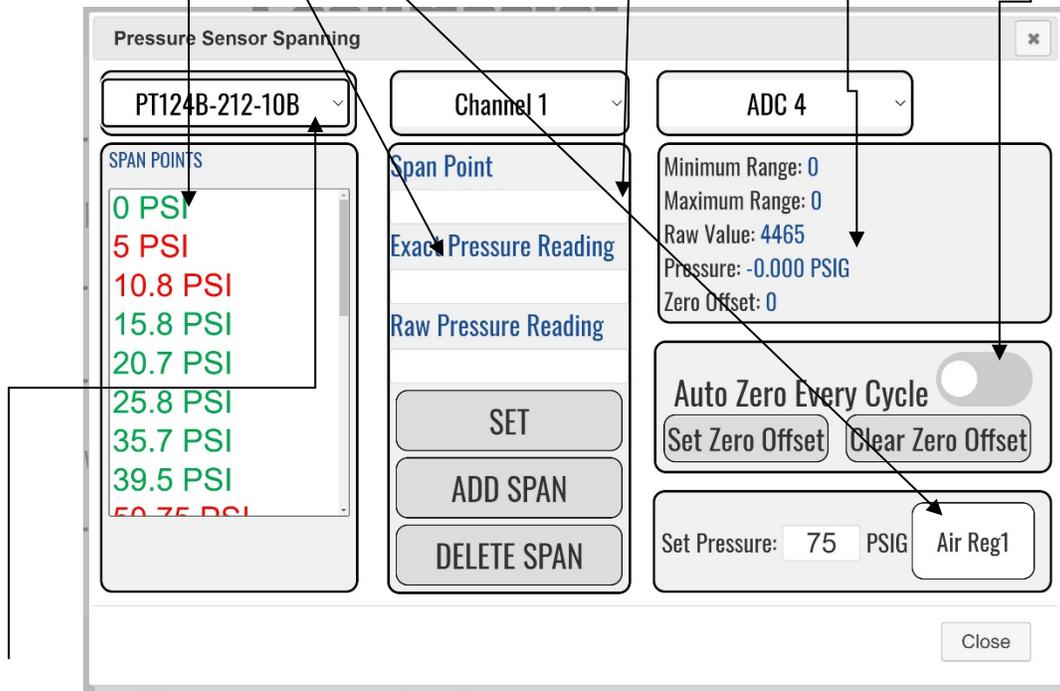
The user will need to be logged in as “calibrate”. The password for user calibrate is “changeme”.



5.5.1 SPANNING THE TEST PRESSURE TRANSDUCER

The process for zeroing the pressure transducer is as follows: **Note: The user must be logged in as calibrate.**

1. If there is a value other than 0 in the Zero Offset value, press the Clear Zero Offset button. The value of the Zero Offset should show a 0.
2. Connect a Certified Pressure Gauge to the test port on the front of the tester.
3. Touch the 0 PSI span point in the Span Points window on the left. The center window will display the 0 span point data.
4. Press the AIR button to deliver air pressure to the Test port.
5. Touch the desired span point that is nearest to the current live pressure.
6. Enter in the Exact Pressure Reading from the Certified Pressure Gauge here.
7. Press the Set button to log the new zero raw value. The Pressure should now read the same as the certified gauge.

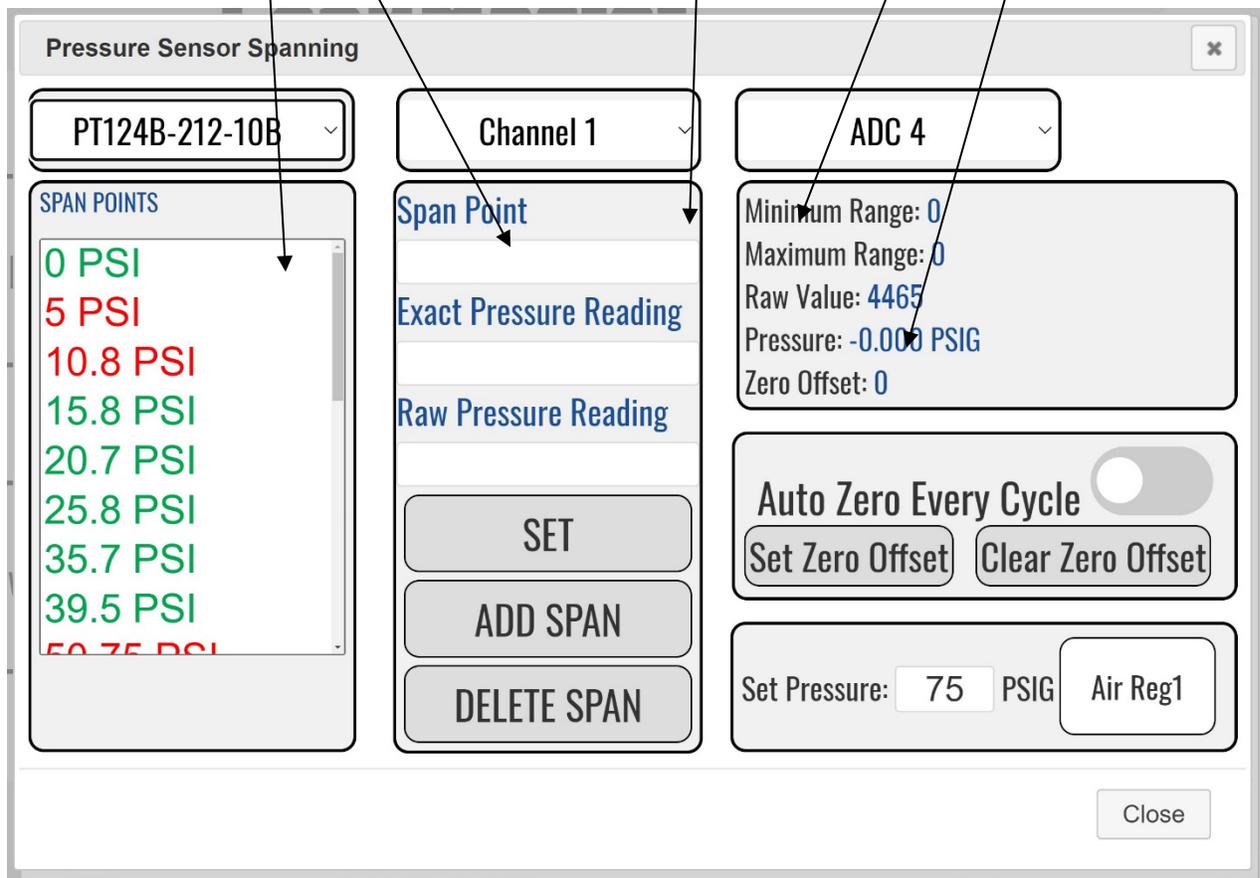


Sensor Model Number: This is a drop-down menu that allows the user to select the pressure sensor that is installed in the tester. The default pressure transducer for the is MS5803-xx (xx denotes the full scale range in Bar). This should not be changed unless replacing a transducer that is a different model which would be a very unlikely scenario.

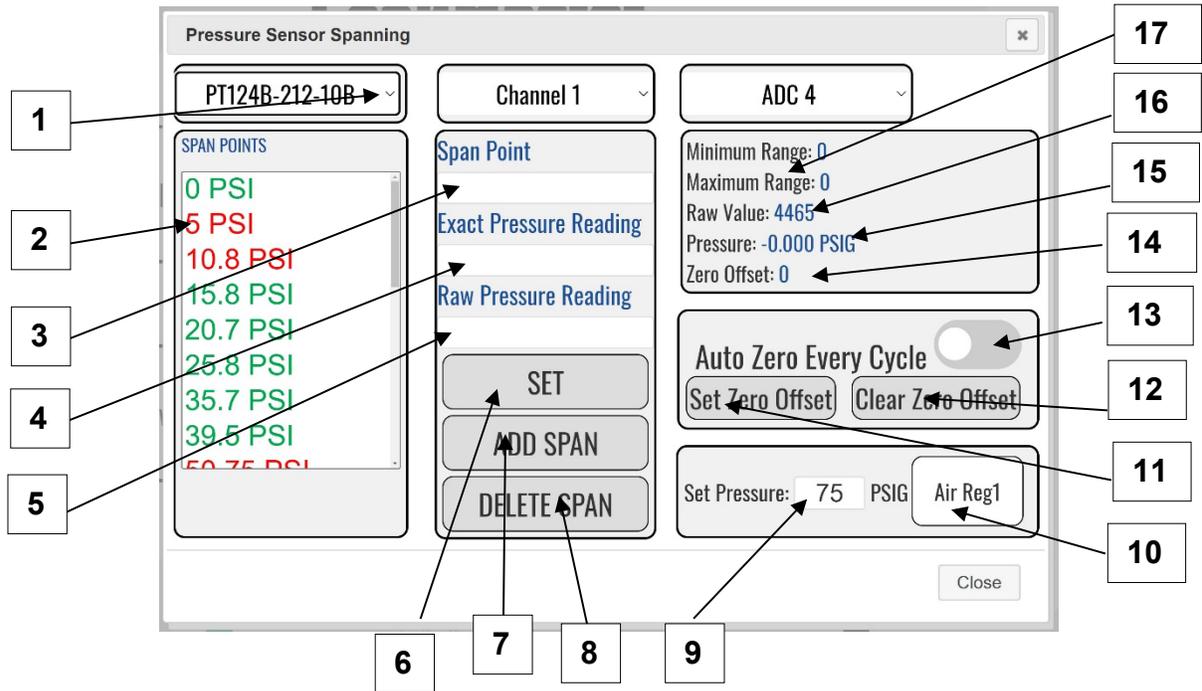
**Note: The Mass Flow Setup, tab on this menu is not functional because this feature does not apply to this model at this time.**

The process for spanning the pressure transducer is as follows: **Note: The user must be logged in as calibrate.**

1. Connect a Certified Pressure Gauge to the test port on the front of the tester.
2. Touch the desired span point in the Span Points window on the left. The center window will display the selected span point data.
3. Press the “Air” button in the lower left of the window. This will turn on the air at the Set Pressure
4. Enter in the Exact Pressure Reading from the Certified Pressure Gauge here.
5. Press the Set button to log the new zero raw value. The Pressure should now read the same as the certified gauge.



The user can add a span point as desired. The user can add as many span points as desired as well. Simply touch the Add Span button, name the Span Point, and follow the procedure above for setting the new span point. When finished with spanning, press the Close button or the X at the top right corner of the window.



1. TRANSDUCER SELECT DROP DOWN MENU: This displays the installed transducer part number. The drop-down menu allows for selecting for other models.
2. SPAN POINT SELECTION: Displays the span points that are available to be spanned.
3. SPAN POINT NAME: This displays the name of the currently selected span point.
4. EXACT PRESSURE READING: This is a numeric entry where the user can input the exact reading on the certified pressure gauge.
5. RAW PRESSURE READING: This displays the current raw digital value of the span point selected.
6. SET: Pushing this button will set the current span point that is selected. This saves the current raw digital value.
7. ADD SPAN: Pressing this button will add another span point.
8. DELETE SPAN: Pressing this button will delete the currently selected span point.

9. SET PRESSURE: Pressing this numeric entry will pop up a numeric entry pad. A number can be entered into this entry pad for the desired set pressure to apply to the pressure transducer. This is only functional with units that have a built-in electronic pressure regulator.
10. AIR: Pressing this button will turn on air to the test port. Make sure that your test port is plugged prior to pushing this button. The air will remain on until the button is pressed again. Upon enabling the air button, the button will turn yellow while
11. SET ZERO OFFSET: Pressing this button will set a zero offset.
12. CLEAR ZERO OFFSET: Pressing this button will clear the current zero offset.
13. AUTO ZERO EVERY CYCLE: Enabling this feature will zero the transducer at the start of every cycle. This option is only functional when an absolute pressure transducer is installed in the tester.
14. ZERO OFFSET: Displays the current zero offset value.
15. PRESSURE: This box displays the live pressure reading that the transducer is currently reading.
16. RAW VALUE: Displays the live current digital value of the pressure transducer.
17. MINIMUM/ MAXIMUM RANGE: Displays the minimum and maximum pressure value of the installed transducer in PSIG. These values cannot be modified.

### 5.5.2 SPANNING THE MASS FLOW SENSOR

The process for spanning a flow point is as follows: **Note: The user must be logged in as calibrate.**

1. Connect a precise flow control to the test port on the front of the tester. The back side of the flow control needs to be connected to a certified flow meter.
2. Push the Air button to deliver air to the flow control connected.
3. Select the flow point that you are trying to span by touching the span point under the span points menu. The span point will be displayed under the Span Point in the center column.
4. Adjust the flow control to the desired value. For example, if you are spanning a 5 SLPM span point, adjust the flow as close to 5 SLPM as possible.

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5. Enter the exact reading of the certified flow meter in the Exact Flow Reading in the center column.
6. Press the Set button to save the current span point.
7. Select the next span point that you would like to span and repeat steps 1-6.
8. Upon spanning all selected points, push the Air button to turn the air supply to the flow control off.

The screenshot shows the 'Flow Sensor Spanning' interface with the following elements:

- Sensor Selection:** A dropdown menu set to 'AWM43300V'.
- Channel Selection:** A dropdown menu set to 'Channel 1'.
- ADC Selection:** A dropdown menu set to 'ADC 2'.
- SPAN POINTS:** A list of span points: '0 SCCM', '50 SCCM 7.', and '100 SCCM'.
- Span Point 3:** '0' with a large '3.' next to it.
- Exact Flow Reading:** '0' with a large '5.' next to it.
- Raw Flow Reading:** '1625'.
- Buttons:** 'SET 6.', 'ADD SPAN', and 'DELETE SPAN'.
- Air Control:** 'Pressure Adjust' with up/down arrows, 'Air Reg1 2.', and 'Leak' buttons.
- Flow Data:** 'Mass Flow: -0.04', 'Mass Raw: -90', 'Pressure: 0.003 psig', 'Flow Offset: 0.000', and 'Flow Offset Enabled: Off'.
- Close Button:** A 'Close' button at the bottom right.

Sensor Full Scale: This is a drop down menu that allows the user to tell the tester what sensor is installed in the tester.

**Note: sccm stands for standard cubic centimeters per minute, SLPM stands for stand standard Liters per minute.**

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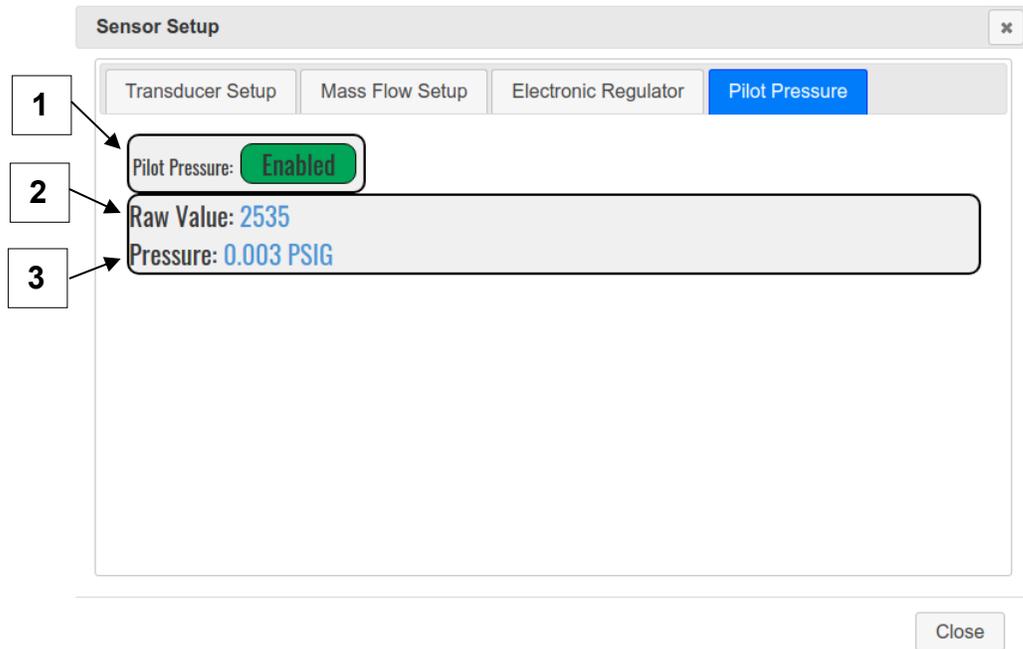
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## 5.5.3 PILOT PRESSURE TRANSDUCER

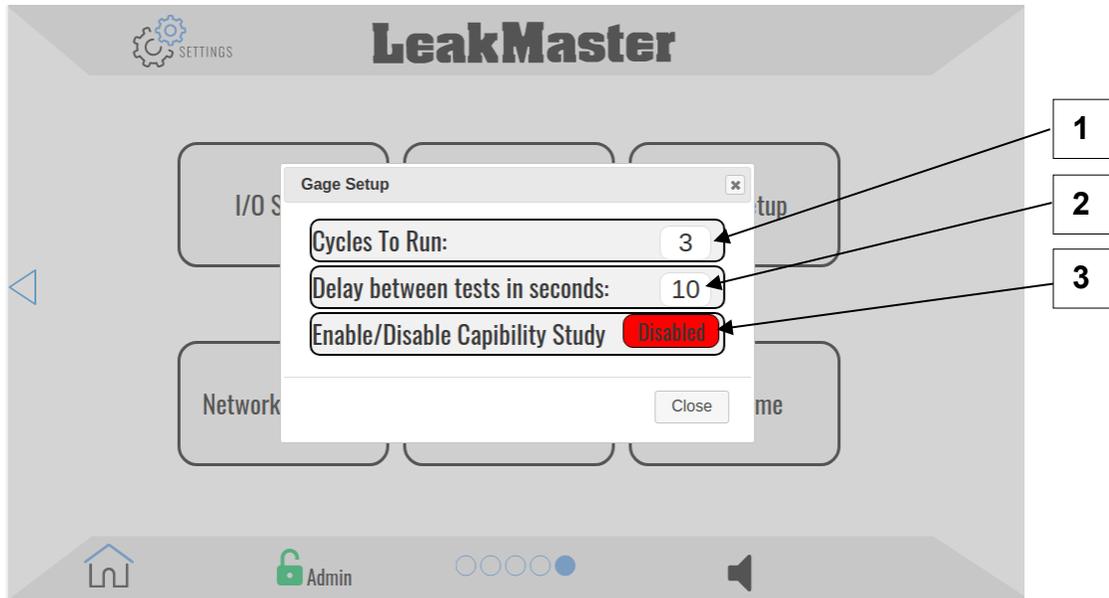
The PILOT PRESSURE tab indicates if a transducer to monitor the pilot pressure is installed.

1. Pilot Pressure sensor status. Green/Enabled indicates the pilot pressure transducer option is installed. Red/Disabled indicates the transducer option is not installed.
2. Raw value returned from the Pilot Pressure use for spanning and troubleshooting.
3. Current pilot pressure reading.



### 5.5.4 GAGE SETUP SUB MENU

The GAGE SETUP sub menu will enable the user to set the tester to run a set amount of cycles with a set delay in between each cycle automatically. This is useful when running a gage capability study. When CAPABILITY STUDY MODE is enabled, the tester will run the set number of tests. Upon completion, the CAPABILITY MODE will automatically be disabled. After enabling the capability study, return to the run screen and push the Start PB to start the study. If anytime during the Capability study the Stop button is pressed on the Run screen, the Capability Study mode will be disabled.

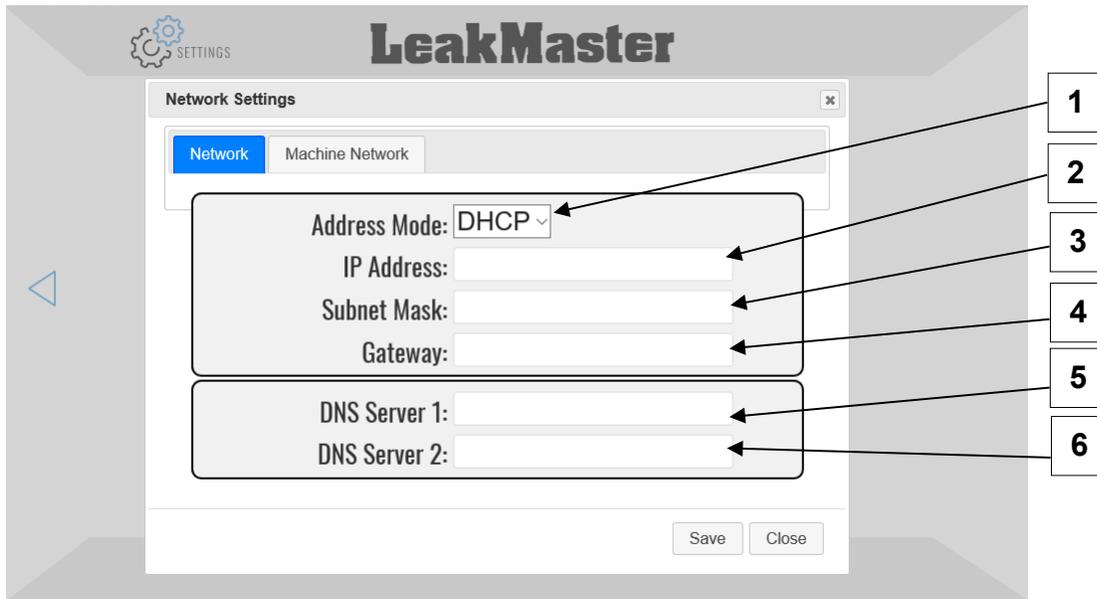


1. CYCLES TO RUN: Pressing this numeric entry will pop up a numeric entry pad. The user can enter the number of cycles to run for the capability study.
2. DELAY BETWEEN TESTS IN SECONDS: Pressing this numeric entry will pop up a numeric entry pad. The user can enter the amount of time in between each test cycle.
3. ENABLE/DISABLE CAPABILITY STUDY SWITCH.: Pressing this button when the switch is in the "OFF" position, will enable the automatic capability mode. Pressing the button when the switch is in the "ON" position, will turn off the capability mode.

## 5.5.5 NETWORK SETTINGS SUB MENU

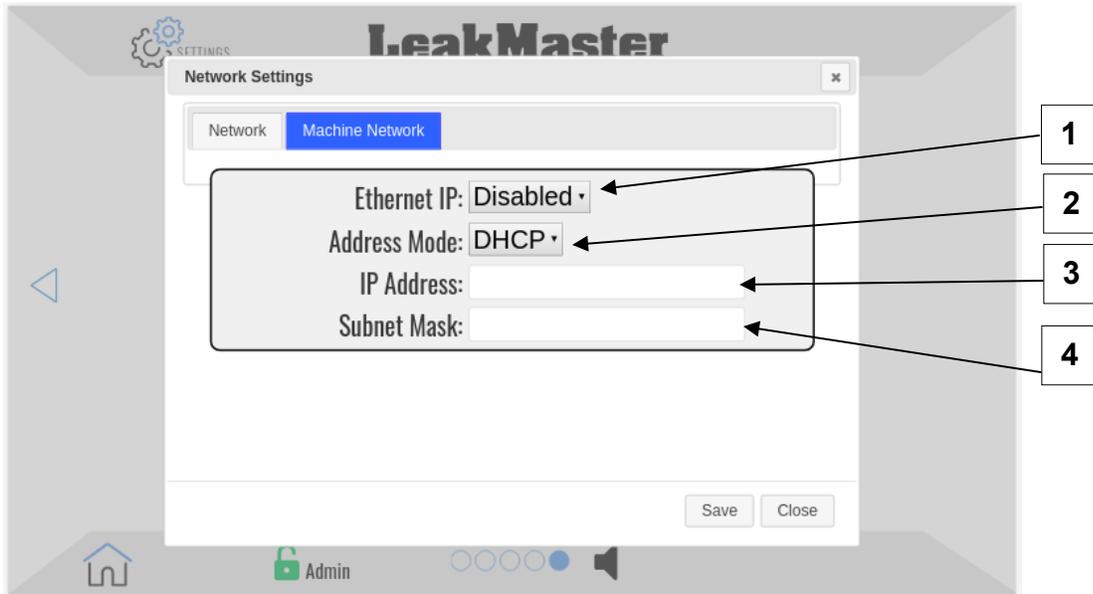
This menu allows the user to set the local network and machine network (Ethernet IP) IP addresses.

The Network sub tab (shown below) allows the user to set the IP address for the LAN which will then allow the user remote access from a PC, save data results, etc. The tester can be set for DHCP (automatically assigned IP address from a server or router) or Static.



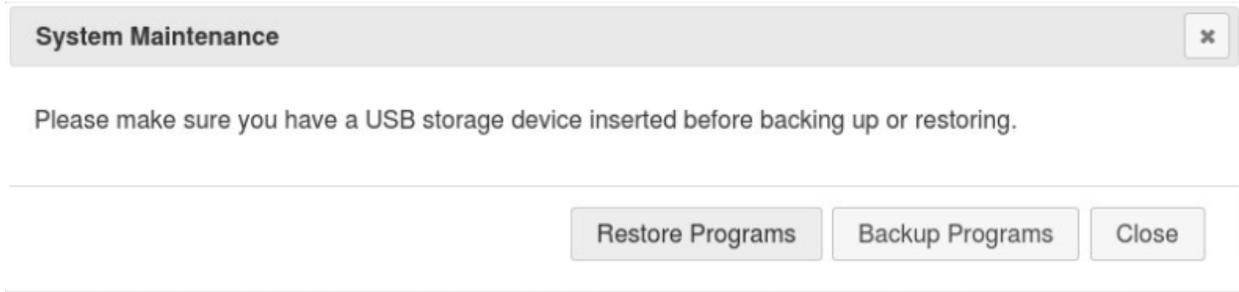
1. ADDRESS MODE: Pressing this drop-down menu will allow the user to select DHCP or Static IP address.
2. IP ADDRESS: Pressing this numeric entry will pop up a numeric entry pad. The user can enter the IP address that will be assigned to this network port if the Static Mode is selected. If DHCP is selected, this field will show the current IP assigned by the DHCP server.
3. SUBNET MASK: Pressing this numeric entry will pop up a numeric entry pad. The user can enter the subnet mask that will be assigned to this network port if the Static Mode is selected. If DHCP is selected, this field will show the current subnet mask assigned by the DHCP server.
4. GATEWAY: Pressing this numeric entry will pop up a numeric entry pad. The user can enter the gateway that will be assigned to this network port if the Static Mode is selected.
5. DNS Server 1: Pressing this numeric entry will pop up a numeric entry pad. The user can enter the DNS server 1 that will be assigned to this network port if the Static Mode is selected.
6. DNS Server 2: Pressing this numeric entry will pop up a numeric entry pad. The user can enter the DNS server 2 that will be assigned to this network port if the Static Mode is selected.

The Machine Network sub tab (shown below) allows the user to set the IP address for the Machine Network (Ethernet IP) which will then allow the tester to be controlled over Ethernet.



1. ETHERNET IP: Pressing this drop-down menu will allow the user to select Enable/Disable this communication function.
2. ADDRESS MODE: Pressing this drop-down menu will allow the user to select DHCP or Static IP address.
3. IP ADDRESS: Pressing this numeric entry will pop up a numeric entry pad. The user can enter the IP address that will be assigned to this network port if the Static Mode is selected. If DHCP is used on the machine network, this field will show the IP address assigned by the DHCP server.
4. SUBNET MASK: Pressing this numeric entry will pop up a numeric entry pad. The user can enter the subnet mask that will be assigned to this network port if the Static Mode is selected. If DHCP is used on the machine network, this field will show the subnet mask assigned by the DHCP server.

## 5.5.6 MAINTENANCE SUB MENU



This dialog allows you to backup and restore your program configuration.

### Backup Programs

Insert a USB drive into an available USB port on the tester. Press the “Backup Programs” button. If the backup is successful, a green message will appear in the upper right screen.

This saves a file in a .csv format in the Leakmaster\program-backups folder. The filename will be the serial number of the tester followed by -programs.csv

Example: 1234-programs.csv

### Restore Programs

This button will read the file from your USB drive saved from the Backup Program process. The file must be in the same location with the same filename saved from the backup program process.

### Copying Programs to Another Tester

Follow the above steps to backup the programs.

Place the USB drive in a computer and navigate to the LeakMaster -> program-backups folder. Files will be listed by the testers serial number. Copy the file to a new file and rename it to reflect the new tester’s serial number.

Example:

Old Tester Serial Number: 1234

New Tester Serial Number: 4321

Old Tester Filename: 1234-programs.csv

New Tester Filename: 4321-programs.csv

Once you have updated the filename, put the USB drive in the new tester and follow the steps above to restore the program.

### Data Tab

The data tab allows you to configure an HTTP endpoint to receive the detailed results at the end of a test. This feature uses the HTTP (or HTTPS) protocol to transfer a JSON formatted data structure to a data collection system capable of receiving HTTP webhooks.

To enable this feature, enter a valid URL of your data collection system's endpoint configured to receive this data.

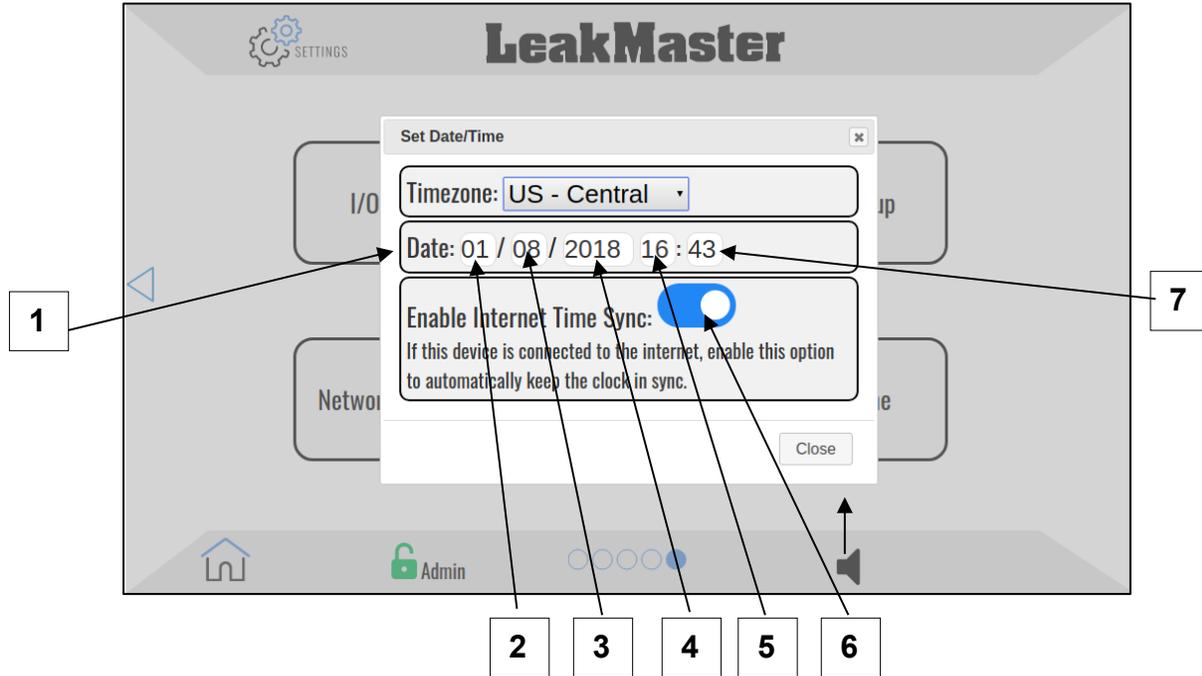
Example: <http://192.168.1.10/leakmasterData>

This data will be transferred once at the end of each test.

If the transfer fails, an error message will be displayed with details in the upper right corner of the screen with the details of the error. Most errors occur due to the data collection system endpoint name URL mismatch, firewall configuration on the data collection system, or the data collection system offline.

## 5.5.7 SET DATE/TIME MENU

The SET/DATE TIME sub menu enables the user to set the date and time to the current date and time.



1. CURRENT DATE/TIME: This column displays the current date and time in the tester.
2. MONTH ENTRY: Press this square to enable the popup numeric entry. Enter in the current month number, then press enter to complete. This is only enabled after software activation is complete.
3. DAY ENTRY: Press this square to enable the popup numeric entry. Enter in the current day of the month, then press enter to complete. This is only enabled after software activation is complete.
4. YEAR ENTRY: Press this square to enable the popup numeric entry. Enter in the current year, then press enter to complete. This is only enabled after software activation is complete.
5. HOUR ENTRY: Press this square to enable the popup numeric entry. Enter in the current hour (24 hour format), then press enter to complete.
6. ENABLE/DISABLE INTERNET CLOCK: Press this toggle switch to Enable and Disable Internet time sync.
7. MIN ENTRY: Press this square to enable the popup numeric entry. Enter in the current minute, then press enter to complete.

## **6 LEAK TEST VERIFICATION AND PROGRAM CALIBRATION PROCEDURES**

### **6.1 Program Calibration (sccm mode)**

#### **What is a program calibration and why do you need it?**

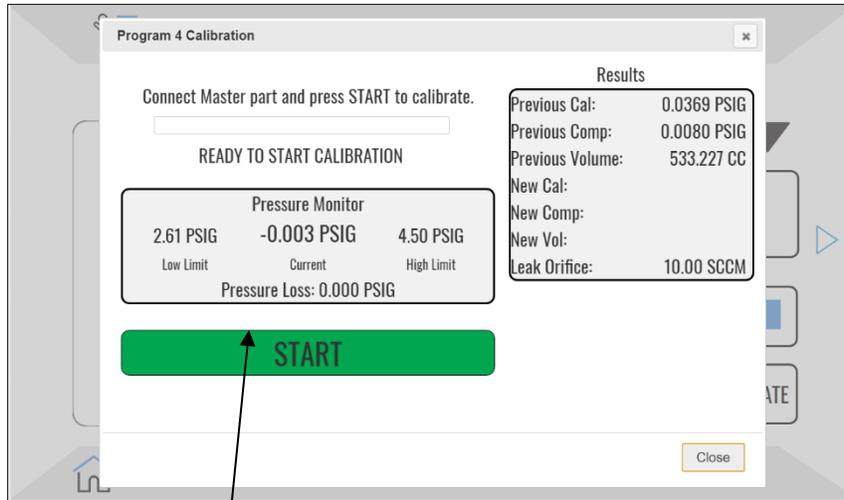
A program calibration is a means of teaching the test instrument what a good part looks like and what a bad part looks like. This is a two step testing process. The first step of the calibration is running a test on a non-leaking master part. This process will automatically memorize the pressure change that occurs while testing a zero-leaking part. All parts will stretch and will have different physics that take place when being pressurized. Even though the master doesn't leak, a pressure change will still generate a reading above or below zero based upon the stretching, cooling, or warming effect that is taking place when pressurizing a part. This pressure change that is recorded under these zero leak conditions is known as a Comp value (pressure change of a non leaking part). After the first calibration test is completed, the Calibration Relax timer will time out to allow the part to relax back to a normal stated. The tester will then initiate the second test of the calibration sequence. This test is the same as the first except for that they Cal Valve is turned on to introduce the calibrated leak standard into the test circuit. At the end of the second test, the pressure loss generated by the master part and the introduced calibrated leak standard is logged as the Cal value (pressure change of a reject part). The Cal Value can then be converted to determine the internal test volume of the part that was tested. This volume is calculated in CC (cubic centimeters).

**Note: The Comp value is always subtracted (compensated) from the pressure transducer reading during production testing.**

## How do I perform a Program Calibration?

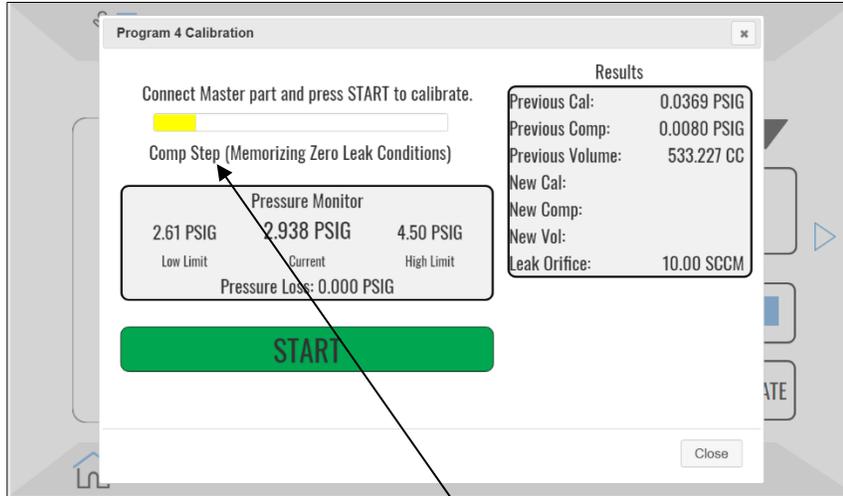
For starters, **you must have a leak free “Master” part connected to the tester.** You will also need to ensure that there is no leakage in any of the seal tooling, air fittings, and airlines.

From the Run menu, you can press the Calibrate button (you can also enable this with the digital I/O and over Ethernet IP). When the button is pressed a Program # Calibration window will pop up as shown below.

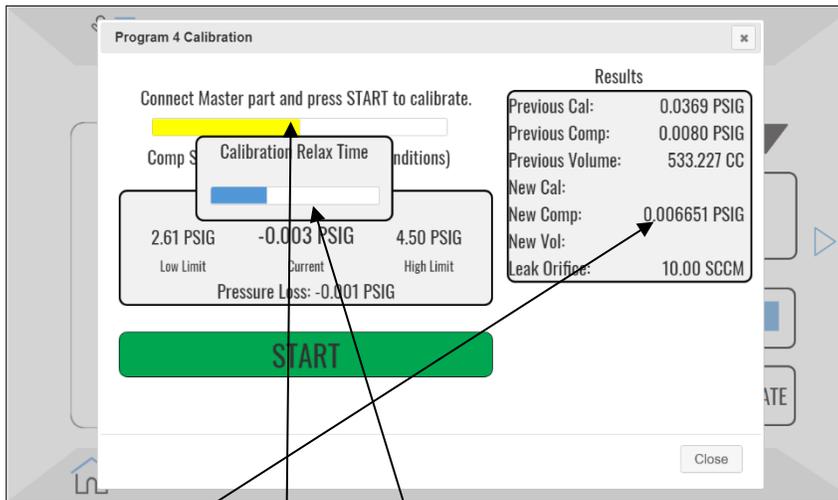


Auto Calibration should only be done if the verification procedure in Section 7.2 fails or when running the program for the first time.

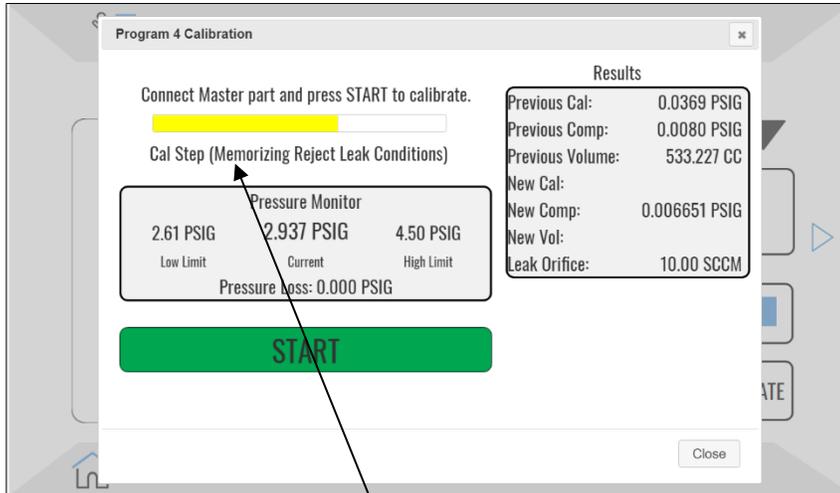
1. Connect the master “zero leak” part to the tester.
2. Push the green “START” button on the Program # Calibration window



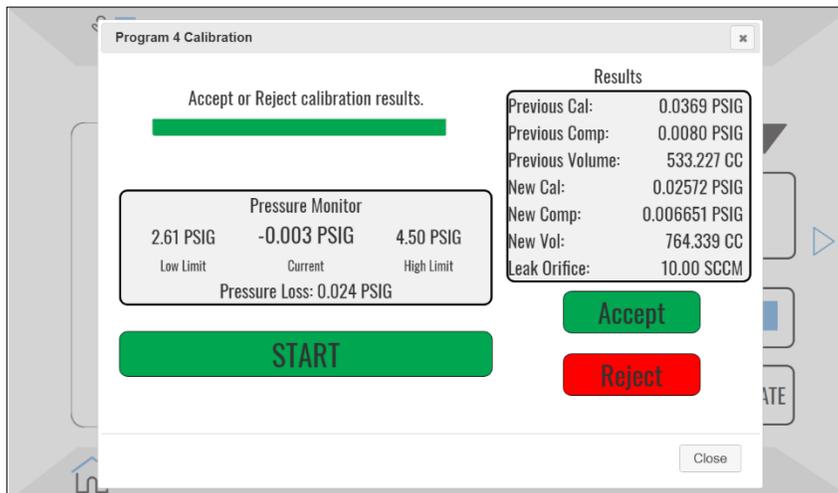
- The tester will run through a test cycle to memorize the zero leak characteristics to generate the Comp value. The “Comp Step (Memorizing Zero Leak Conditions)” message will be displayed. The status bar will fill with yellow (as shown above) based upon the amount of time that has passed during the calibration.



- When the first test is finished, a “New Comp.” value will be displayed. The Calibration Status Bar will be locked in yellow on the first half of the status bar. The Calibration Relax Time status bar will fill in blue as the calibration relax timer expires. Once this Calibration Relax Time expires, the second test of the calibration will begin.



- When the calibration relax timer expires, the second test will automatically initiate. The “Cal Step (Memorizing Reject Leak Conditions)” message will be displayed. The status bar will fill with yellow (as shown above) based upon the amount of time that has passed during the calibration.



- A “New Cal.” Value and New Volume calculation will be displayed. If you are satisfied with the new values, then press the green Accept button and the new values will be saved to the program. If you are not satisfied with the new values value, simply press the red Reject button to cancel the calibration. If you notice that the New Volume value is similar to the previous Volume value you will likely accept the calibrations. If you notice that the new Volume value is drastically different than the previous Volume value you should reject the calibration. If rejection is needed this is likely due to leaking seals or a leaking master part.
- The machine is ready for production testing.

***If after calibrating the tester, the tester still does not produce a repeatable test result, more test or stabilize time may need to be added to the test program.***

### **6.2 Leak Test Verification Procedures**

The following is a list of procedures for verifying that the tester is working properly. Any time the master “zero leak” part is tested, the test results should be 0 LPM or SCCM (+/- 5% of the reject leak rate). Any time that the master “zero leak” parts are tested during “LEAK SIMULATE MODE”, the test results should be +/- 5% of the value of the installed calibrated leak.

Example: reject leak rate = 20 sccm,  
Master part test should be between (-1) to 1 sccm.  
Master part with 20 sccm leak standard introduced should be between 19 – 21 sccm.

Zero Leak Verification should be done by following the following steps:

1. Place the master parts into the test fixture.
2. Engage the cycle start button.
3. After the cycle is complete, the test results should be 0 +/- 5% of the reject leak rate or installed calibrated leak).

Leak Verification should be done by following the following steps:

1. Place the master parts into the test fixture.
2. Engage the “Leak PB” to enable Leak Mode.
3. Engage the cycle start button.
4. After the cycle is complete, the test results should be the value of the installed calibrated leak orifice (+/- 5% of the installed calibrated leak).

If the verification procedure does not produce the results as described above, you should recalibrate the program.

## 7 TESTER STATUS MESSAGES

### 7.1 Status Messages and Probable Causes

The following is a list of the Test Status Messages.

- Test Status
- "READY" - Tester is ready to begin testing.
- "PREPARING PRESSURE REGULATOR" - The system is setting the electronic pressure regulator.
- "PRE-TEST DELAY" - Tester is waiting to start the test as set in the program settings.
- "FILLING" - Fill Step
- "STABILIZE" - Stabilize Step
- "TESTING" - Test Step
- "VENTING" - Vent Step
- "TEST PASSED" - Test Passed
- "TEST STOPPED BY USER" - Stop button was pressed by the user.
- "SWITCHING PROGRAM-WAITING TO START TEST" - If jump settings are set for a program, the tester is setting up for the new program it "jumped" to.
- "GAGE ENABLED-WAITING TO START TEST X" - In gage mode this is displayed during the delay between tests.
- "MINIMUM LEAK RATE" - Flow rate was below the minimum leak rate.
- "MAXIMUM LEAK RATE" - Flow rate was above the maximum leak rate.
- "FILL PRESSURE TOO LOW" - Pressure did not reach the minimum pressure at the end of the Fill step.
- "FILL PRESSURE TOO HIGH" - Pressure was above the maximum pressure limit at the end of the Fill step.
- "STABILIZE PRESSURE TOO LOW" - Pressure fell below the minimum pressure at the end of the Stabilize step.
- "STABILIZE PRESSURE TOO HIGH" - Pressure rose above the maximum pressure limit at the end of the Stabilize step.
- "TEST PRESSURE TOO LOW" - Pressure fell below the minimum pressure limit at the end of the Test step.
- "TEST PRESSURE TOO HIGH" - Pressure rose above the maximum pressure limit at the end of the Test step.
- "HIGH FLOW PROTECTION CUTOFF" - The flow rate through the flow sensor exceeded the sensors capacity. This could indicate a gross (very large) leak.
- "HIGH PRESSURE PROTECTION CUTOFF" - The pressure rose too far above the maximum pressure set point.

- "CALIBRATION INVALID - PLEASE RUN CALIBRATION" - In pressure decay mode, the tester must have a valid calibration to test.
- "INVALID TEST CONFIGURATION" - A setting in the test program is not set or is set incorrectly.
- "FLOW SENSOR READ FAULT" - Unable to read value from flow sensor, it is either offline, unplugged, or malfunctioning.
- "SENSOR FAULT CUTOFF" - An error occurred while reading the flow sensor during the test step.

## 8 COMMUNICATIONS

### 8.1 SERIAL COMMUNICATIONS

By adding an external USB to RS-232 serial port adapter you can use another computer or device to log test results. At the end of each test a comma separated string of data will be sent through the serial interface.

#### 8.1.1 Serial Port Configuration

Configure your computer or device for the following communication settings:

- Baud Rate: 19200
- Data Bits: 8
- Parity: None
- Stop Bits: 1

#### 8.1.2 Serial Data Format

When the test cycle is complete the results of the test will be send in a text string over the serial port in a comma separated format. Each lime is terminated with a carriage return (Hex: 0x0D).

Example String:

```
-0.001565,-5.221140,25,"psig","sccm","Fail","MIN LEAK",decay,-  
1.7,17,-5,10,0.004182,0.1126543,684.376,83.4743,4,"Program  
Name",8,10,2.25,1234
```

Data Fields:

- Test Pressure
- Leak Rate
- Pilot Pressure (Available on UltraFlow v3 and Guardian)
- Pressure Unit
- Flow Unit
- Pass/Fail
- Pass/Fail Summary
- Test Method
- Minimum Leak Limit
- Maximum Leak Limit
- Low Pressure Limit
- High Pressure Limit
- Comp Value
- Cal Value (Decay SCCM Tests)
- Part Volume (Decay SCCM Tests)

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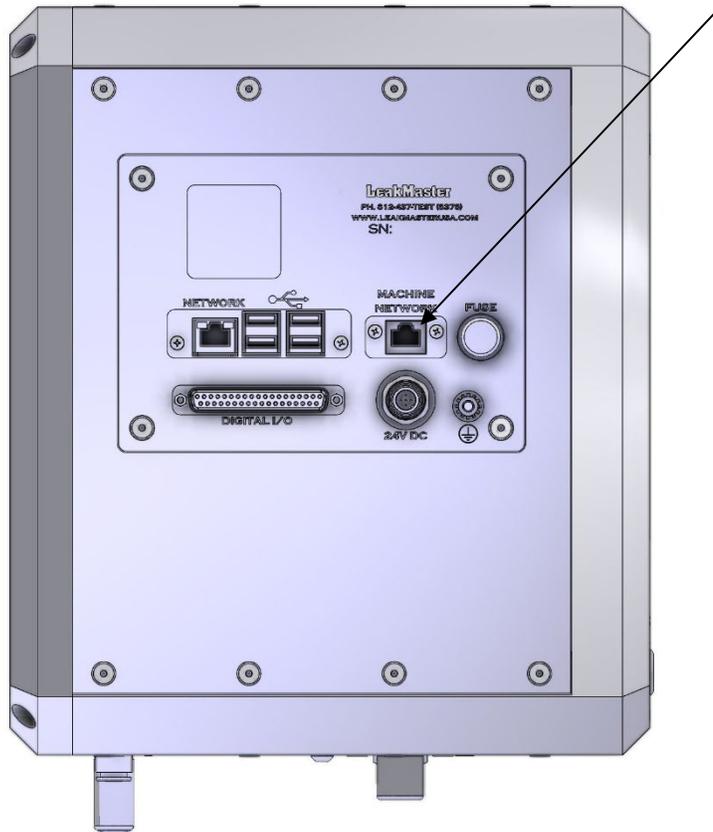
- Test Air Temperature
- Program Number
- Program Name
- Fill Time
- Stabilize Time
- Test Time
- Part Number

### 8.2 ETHERNET IP COMMUNICATIONS

This is a standard option that comes with the Guardian instrument.

#### 8.2.1 Wiring

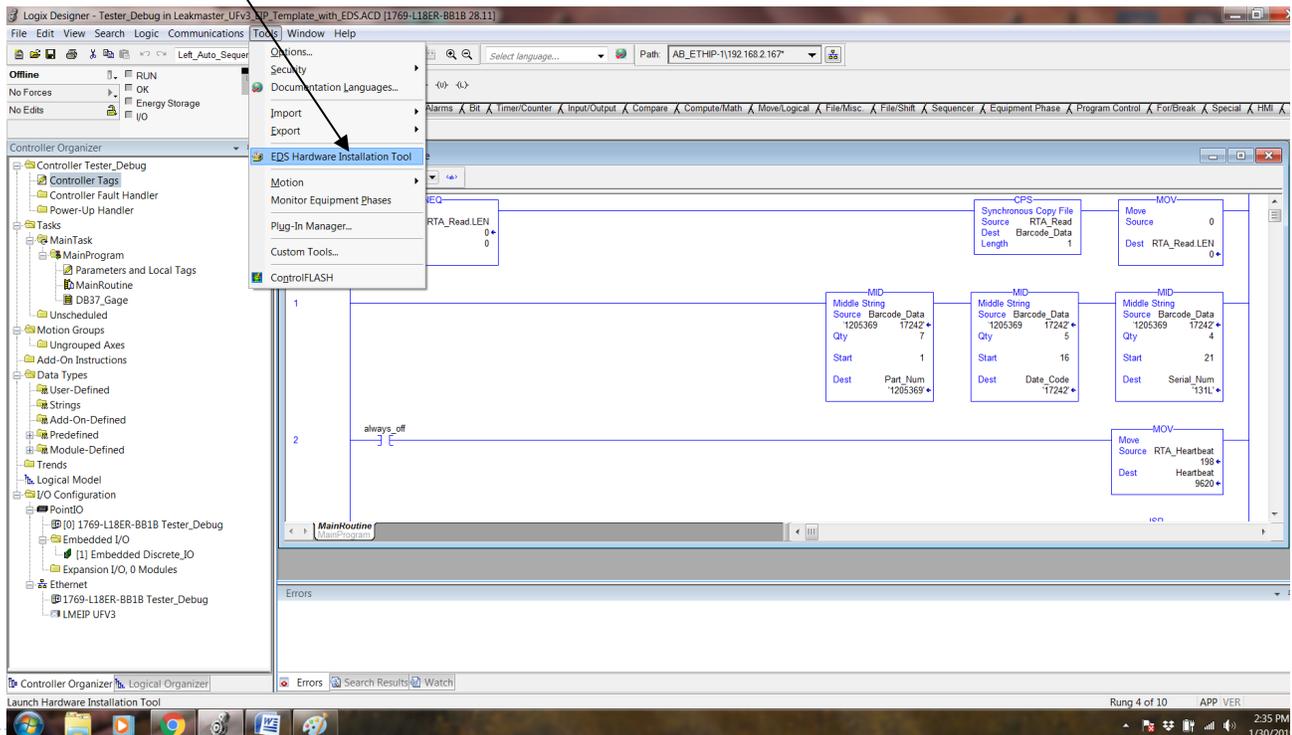
Plug an Ethernet cable from the Ethernet IP network into the port labeled Machine Network.



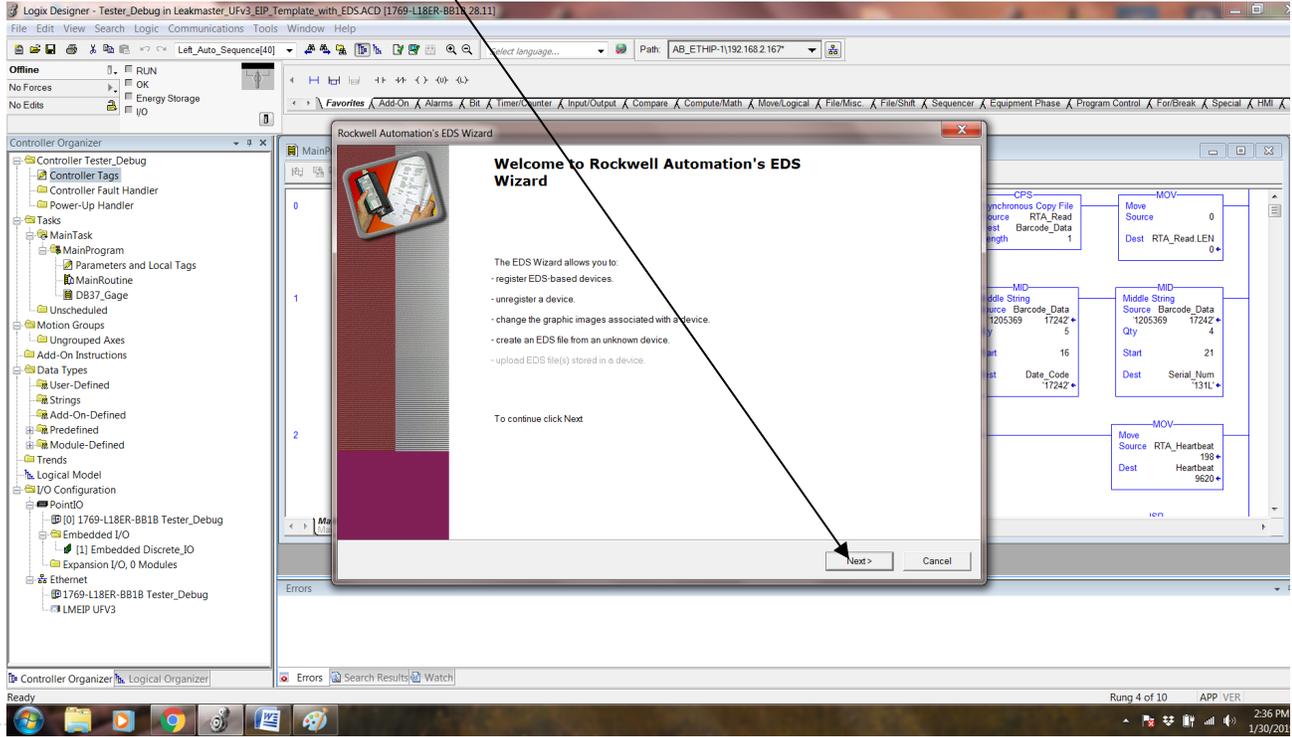
## 8.2.2 AB Control Logix Setup (using EDS add on profile)

The following steps display the steps required to introduce the tester to a Control Logix controls system using an EDS file. The EDS file allows for the automatic setup of I/O sizes and automatically imports the tag names and data types. This is the quickest and easiest way to setup a LeakMaster tester for Ethernet IP communications to an Allen Bradley PLC. **Contact [support@leakmasterusa.com](mailto:support@leakmasterusa.com) to acquire the latest EDS file for this instrument.**

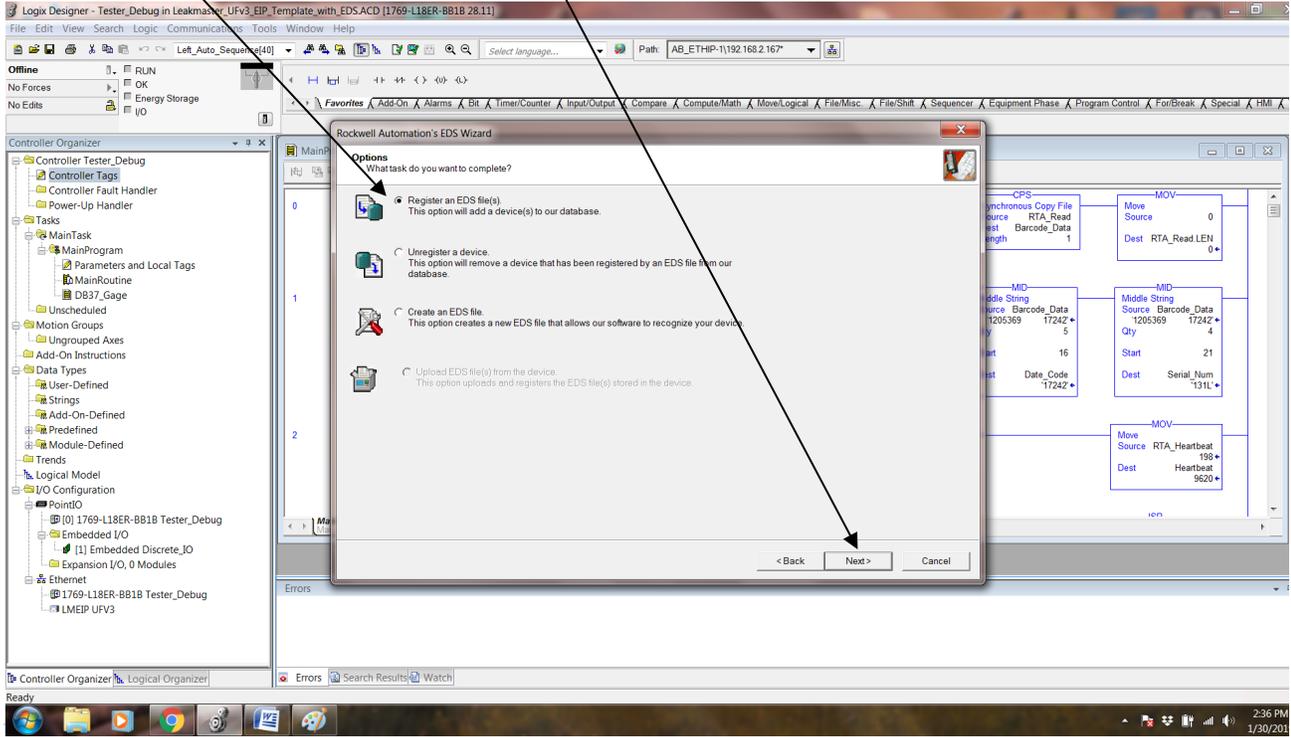
- 1) Once you have your Logix program started, under the tools menu, select EDS Hardware Installation Tool.



2) Once this menu pops up, click Next.

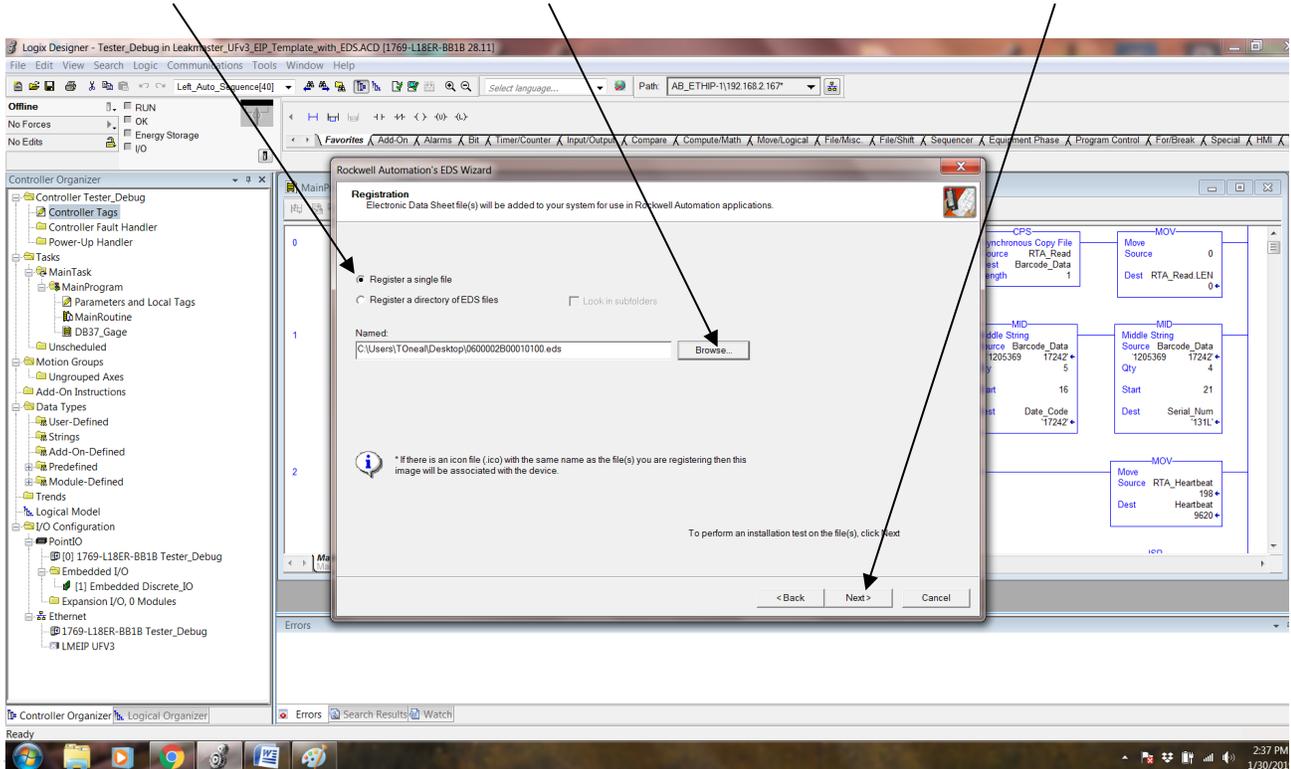


3) Select Register and EDS file, the click Next.

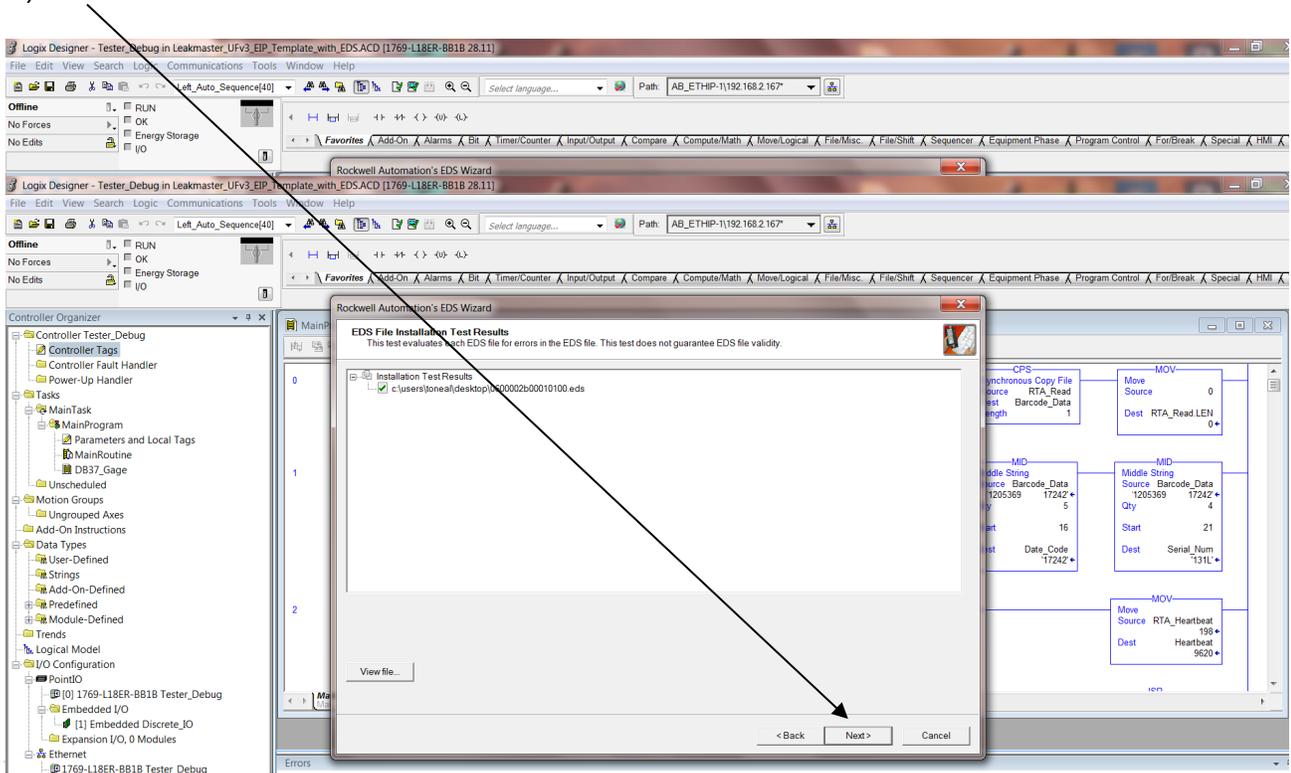


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4) Select Register a single file. Browse for the location of the EDS file. Click Next.



5) Click Next.



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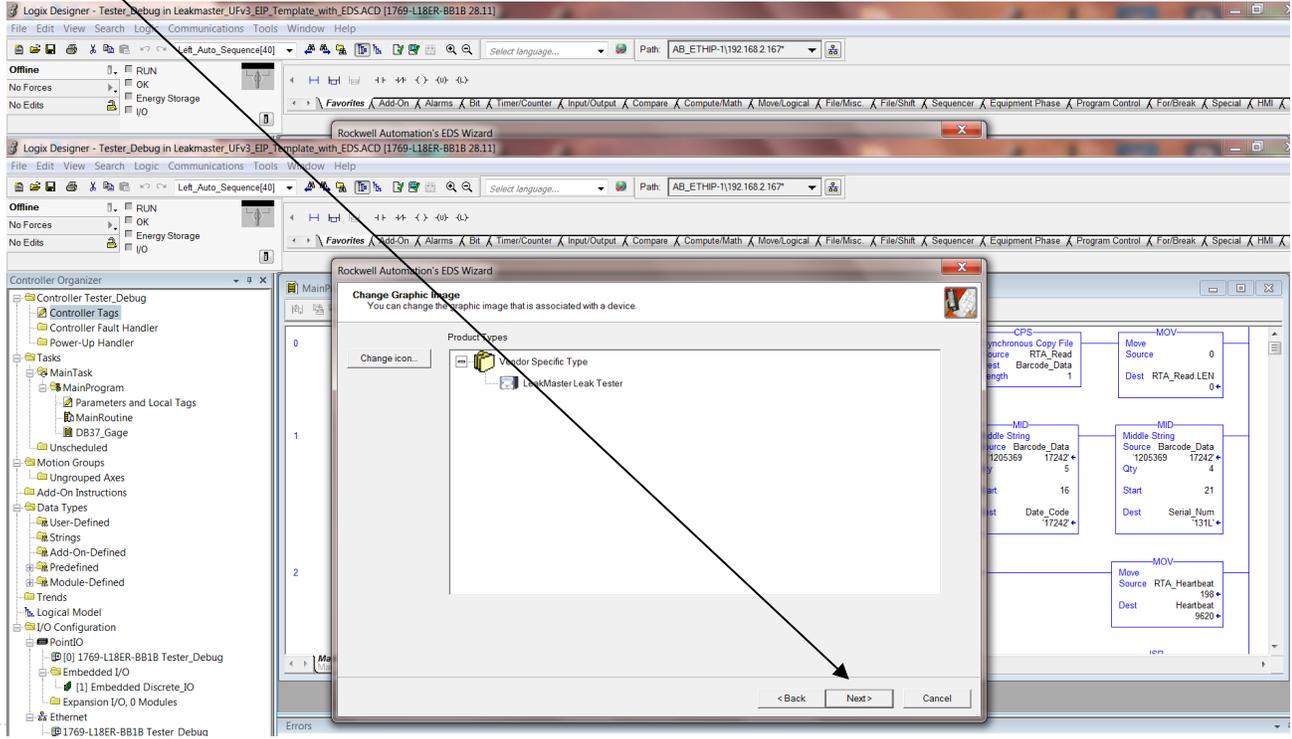
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Ph. 812-437-TEST

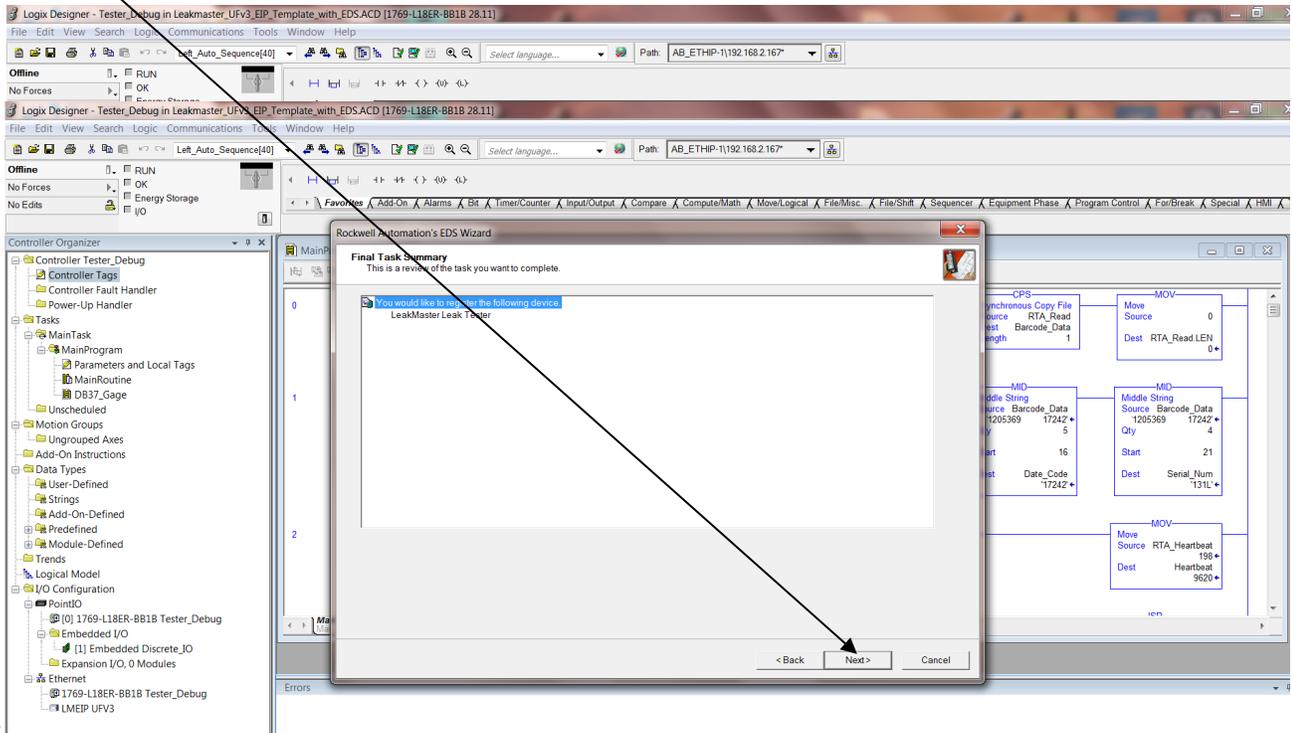
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6) Click Next.



7) Click Next.



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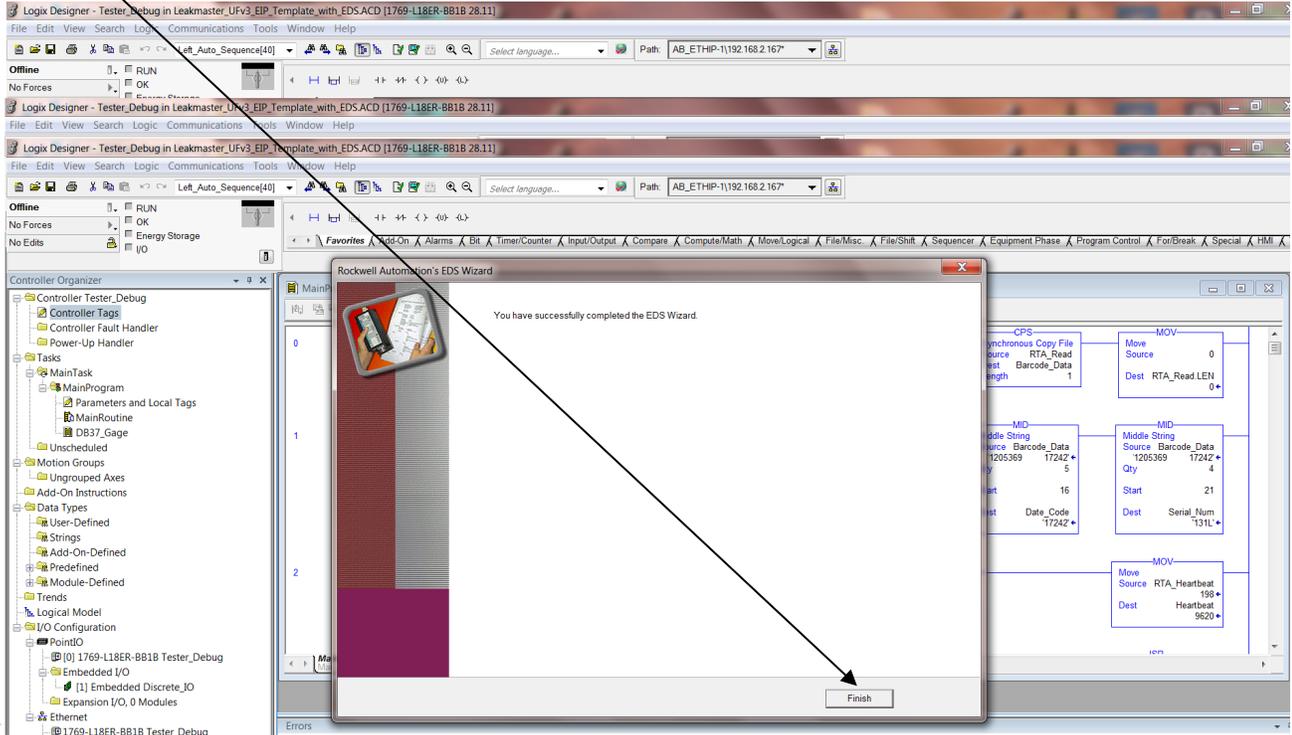
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Ph. 812-437-TEST

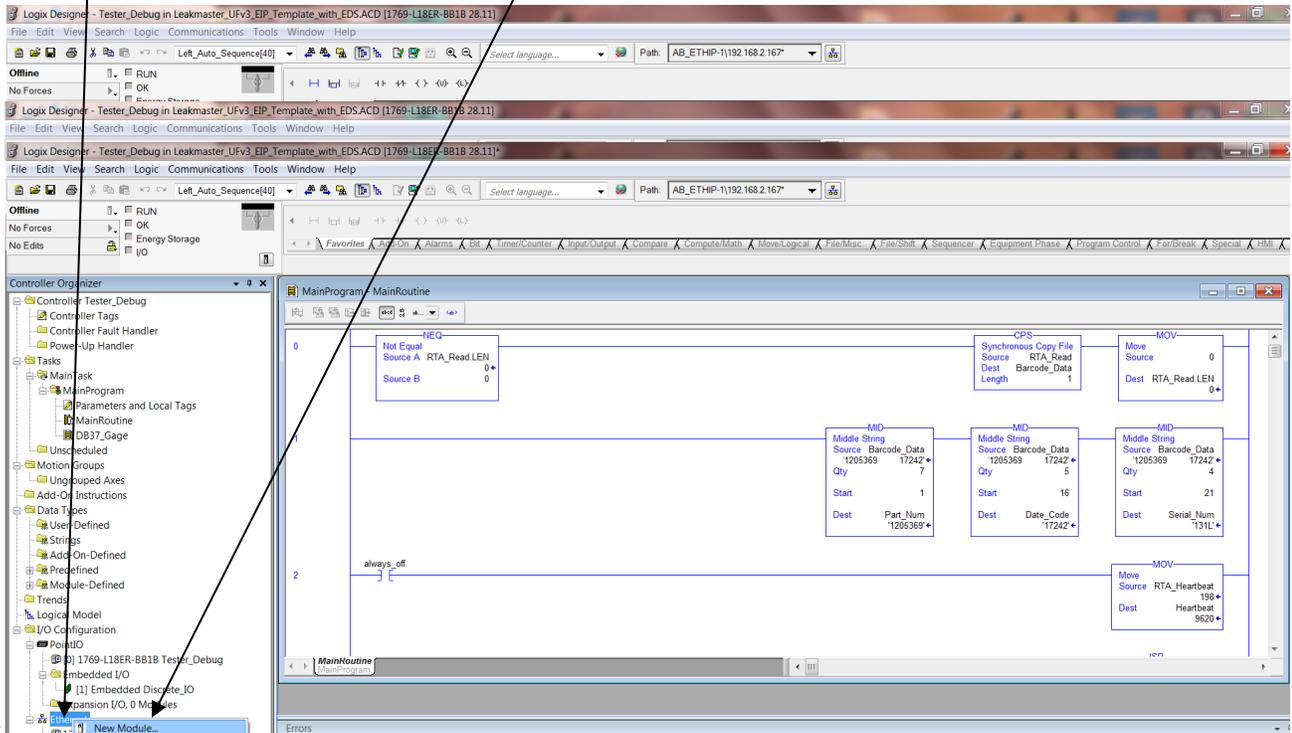
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8) Click Finish.



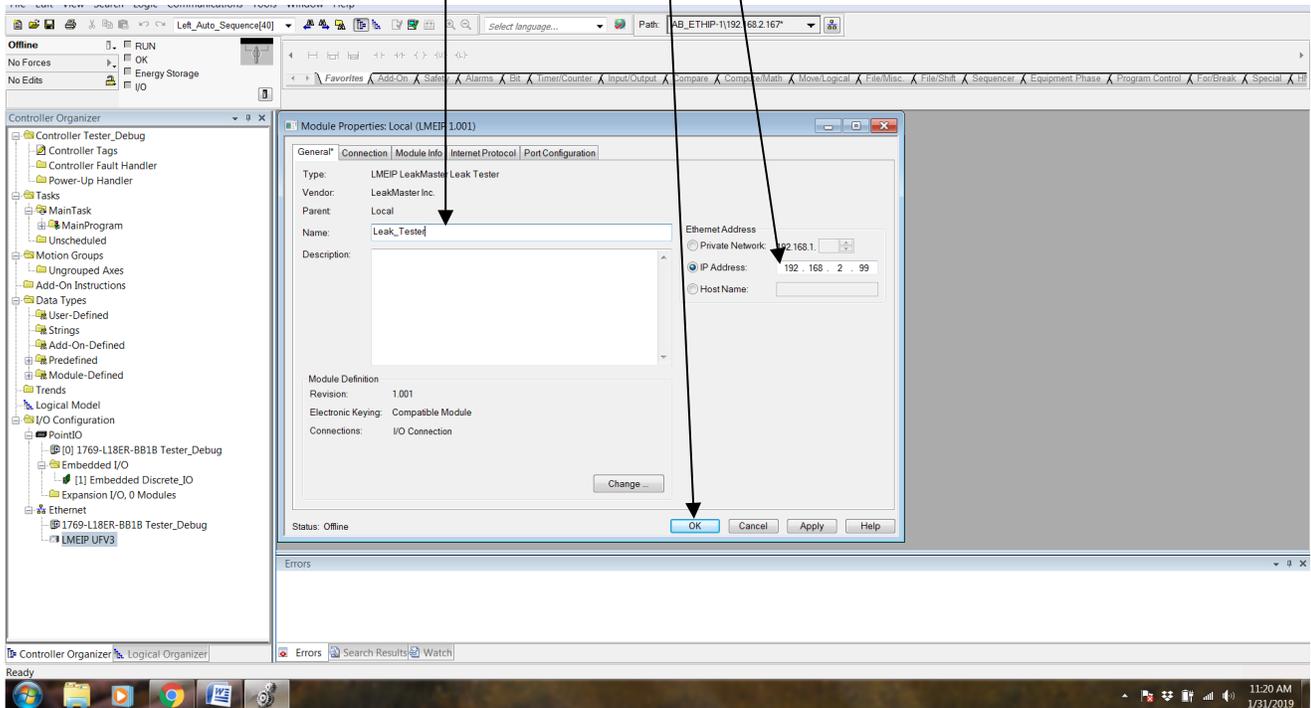
9) Right Click on Ethernet. Then Click New Module.



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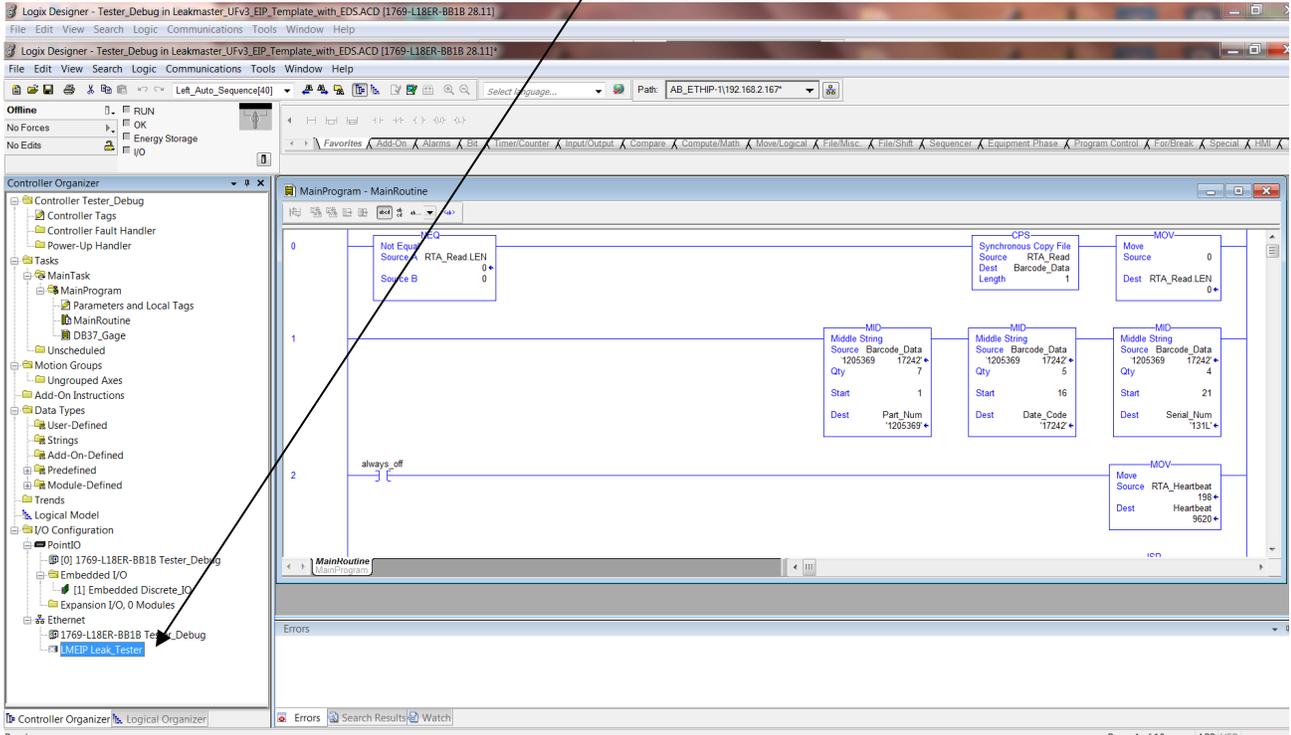


11) Under the General Tab, name the module to your preferred name. This example was named Leak\_Tester. Set the IP address to the desired IP address. This IP address must match the IP address assigned for the leak tester Machine Network settings. Click OK.



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12) You will now see that Ethernet module LMEIP Leak\_Tester has been added to the Ethernet network tree.



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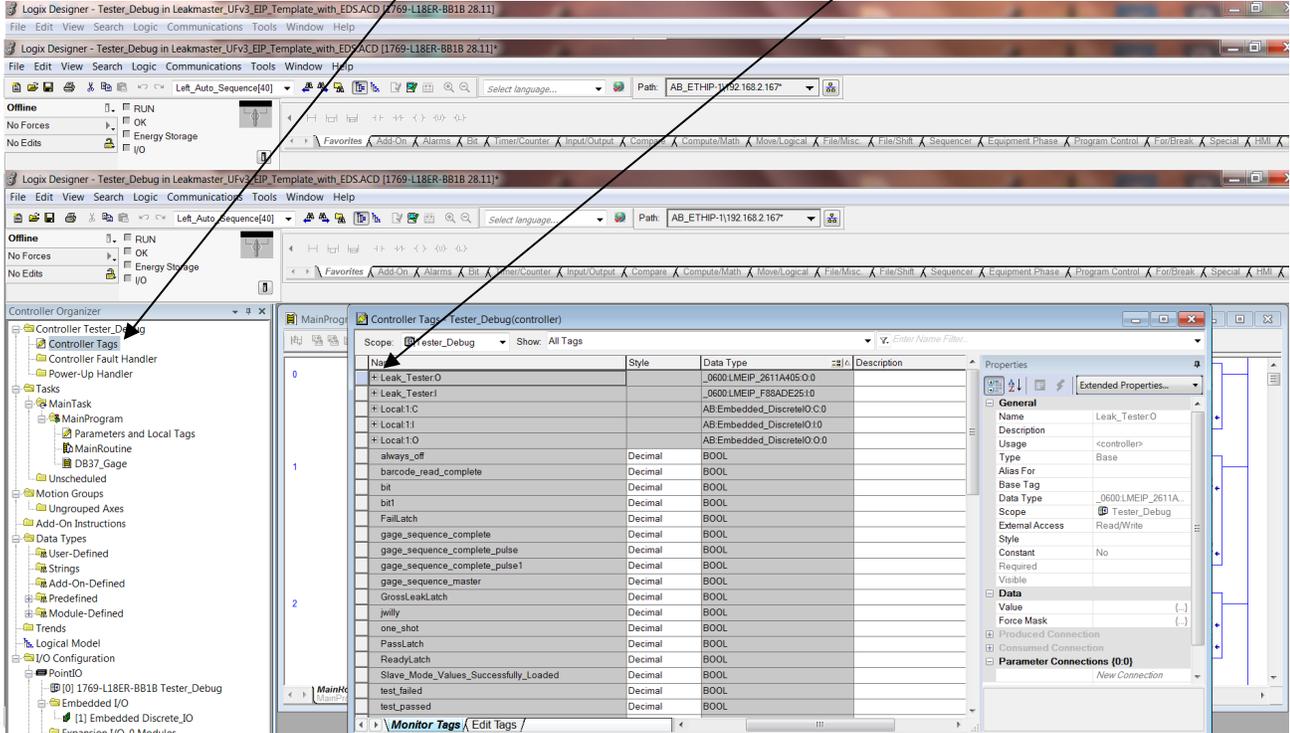
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- 13) You can now double click the Controller Tags icon to view the tags for the Leak\_Tester device that you added. You can then click and expand the inputs and outputs for this device by clicking the + sign on Leak\_Tester:O or Leak\_Tester:I.



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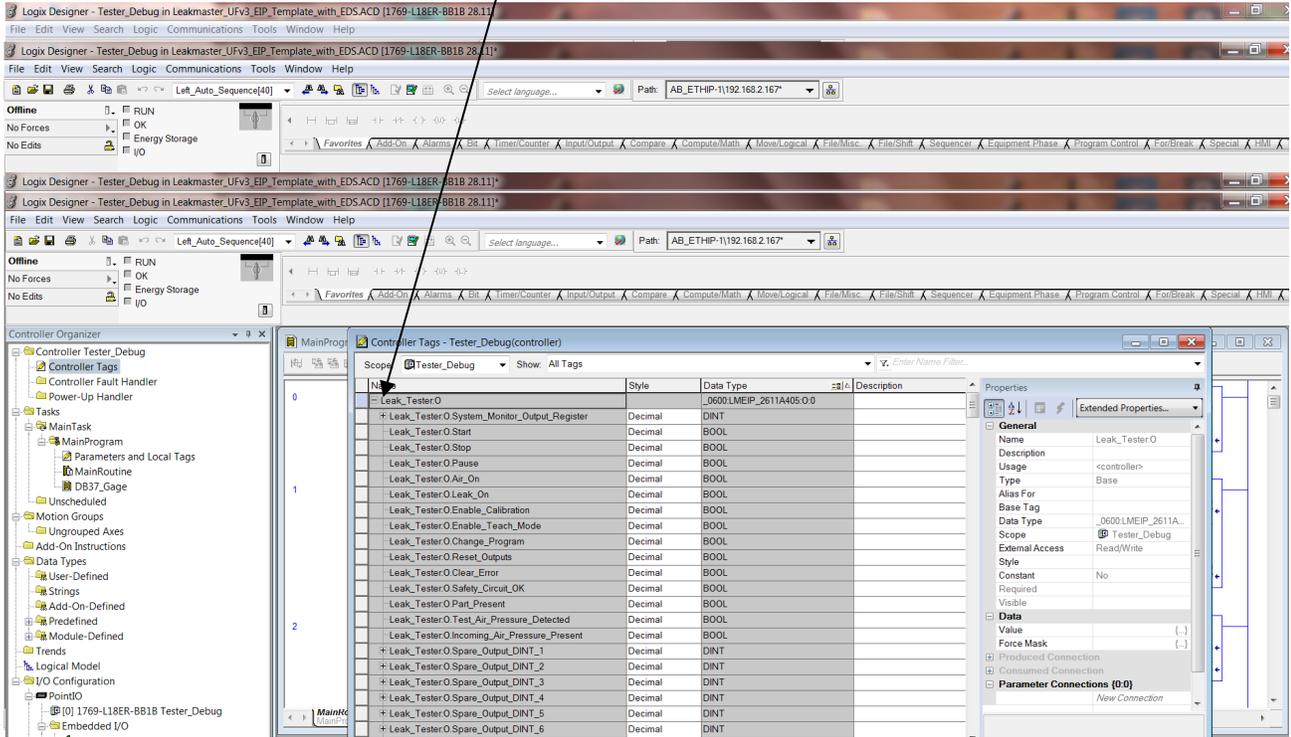
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14) Clicking the + sign on Leak\_Tester:O will expand and display all of the Output tags from the PLC to the leak tester.



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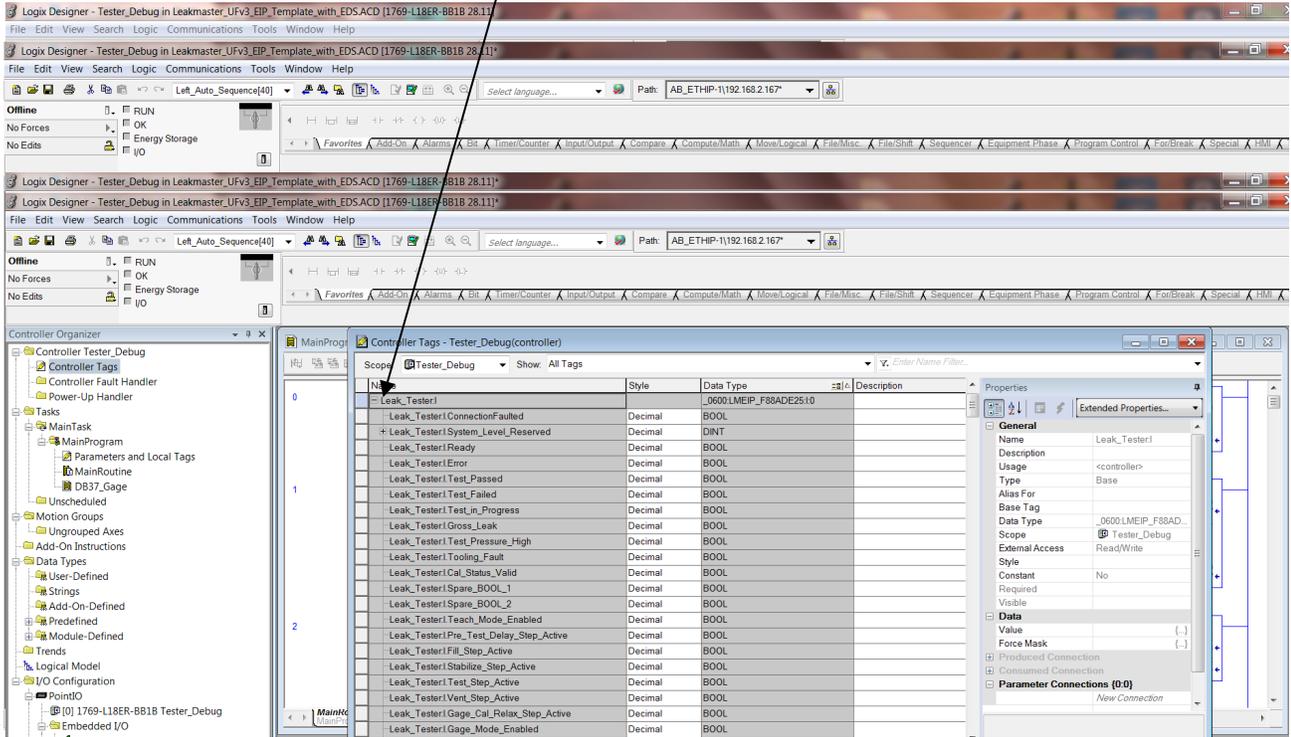
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15) Clicking the + sign on Leak\_Tester:I will expand and display all of the Input tags from the leak tester to the PLC.



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**8.2.3 Tag Descriptions when using EDS file**

<b>ADDRESS (Inputs) (Tester to PLC)</b>	<b>DATATYPE</b>	<b>DESCRIPTION</b>	<b>FUNCTION</b>
LEAK_TESTERI.System_Level_Reserved	DINT	System Level Monitor Word	
LEAK_TESTERI.ConnectionFaulted	BOOL	Leak Tester To PLC Heartbeat	This address will go high if the Ethernet connection status is bad.
LEAK_TESTERI.System_Level_Reserved	DINT	System_Level_Reserved	Reserved for future use.
LEAK_TESTERI.Ready	BOOL	Ready	This address will go high if the tester is ready to start a test.
LEAK_TESTERI.Error	BOOL	Error	This address will go high when any error condition exists.
LEAK_TESTERI.Test_Passed	BOOL	Test Passed	This address will go high as soon as a pass condition is detected (before the vent step is completed). This address will stay high until the next test is started.
LEAK_TESTERI.Test_Failed	BOOL	Test Failed	This address will go high as soon as a fail condition is detected (before the vent step is completed). This address will stay high until the next test is started.
LEAK_TESTERI.Test_in_Progress	BOOL	Test In Progress	This address will go high anytime a test is in progress.
LEAK_TESTERI.Gross_Leak	BOOL	Gross Leak	This address will go high anytime a gross leak failure is detected (before the vent step is completed). This address will stay high until the next test is started.
LEAK_TESTERI.Test_Pressure_High	BOOL	Test Pressure High	This address will go high anytime the test pressure is higher than the Maximum test pressure limit. This address will stay high until the next test is started.
LEAK_TESTERI.Tooling_Fault	BOOL	Tooling Fault	Under development
LEAK_TESTERI.Cal_Status_Valid	BOOL	Cal Status/Valid	This address will be high if the current program has a valid calibration.
LEAK_TESTERI.Spare_BOOL_1	BOOL	Cal Status/Valid	This address will be high if the current program has a valid calibration.
LEAK_TESTERI.Spare_BOOL_2	BOOL	Spare Bool	This address will be high if the current program has a valid calibration.
LEAK_TESTERI.Teach_Mode_Enabled	BOOL	SPARE	Reserved for future use.
LEAK_TESTERI.Teach_Mode_Enabled	BOOL	Teach Mode Enabled	Under development
LEAK_TESTERI.Pre_Test_Delay_Step_Active	BOOL	PreFill Step	This address will go high during the PreFill Step
LEAK_TESTERI.Fill_Step_Active	BOOL	Fill Step	This address will go high during the Fill Step
LEAK_TESTERI.Stabilize_Step_Active	BOOL	Stabilize Step	This address will go high during the Stabilize Step
LEAK_TESTERI.Test_Step_Active	BOOL	Test Step	This address will go high during the Test Step
LEAK_TESTERI.Vent_Step_Active	BOOL	Vent Step	This address will go high during the Vent Step

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LEAK_TESTER1.Gage_Cal_Relax_Step_Active	BOOL	Gage/Cal Relax Step	This address will go high when the Calibration Relax Timer is timing or when the Gage Relax Timer is timing.
LEAK_TESTER1.Gage_Mode_Enabled	BOOL	Gage Mode Enabled	This address will go high anytime the Gage Mode is enabled.
LEAK_TESTER1.Calibration_Enabled	BOOL	CalibrationEnabled	This address will go high anytime a program Calibration is enabled.
LEAK_TESTER1.Calibration_Comp_Step_Active	BOOL	Calibration Comp Step	This address will go high during the first step (compensation step) of a mass flow or pressure decay calibration routine.
LEAK_TESTER1.Calibration_Cal_Step_Active	BOOL	Calibration Cal Step	This address will go high during the second step (calibration step) of r pressure decay calibration routine. Does not apply to a mass flow test.
LEAK_TESTER1.Digital_IO_Status	DINT	Digital I/O Status Word	See bit descriptions below.
LEAK_TESTER1.Digital_Input_1_Status	BOOL	Digital Input 1 Status	This address returns the status of input 1 on the digital I/O connector (DB37 connector).
LEAK_TESTER1.Digital_Input_2_Status	BOOL	Digital Input 2 Status	This address returns the status of input 2 on the digital I/O connector (DB37 connector).
LEAK_TESTER1.Digital_Input_3_Status	BOOL	Digital Input 3 Status	This address returns the status of input 3 on the digital I/O connector (DB37 connector).
LEAK_TESTER1.Digital_Input_4_Status	BOOL	Digital Input 4 Status	This address returns the status of input 4 on the digital I/O connector (DB37 connector).
LEAK_TESTER1.Digital_Input_5_Status	BOOL	Digital Input 5 Status	This address returns the status of input 5 on the digital I/O connector (DB37 connector).
LEAK_TESTER1.Digital_Input_6_Status	BOOL	Digital Input 6 Status	This address returns the status of input 6 on the digital I/O connector (DB37 connector).
LEAK_TESTER1.Digital_Input_7_Status	BOOL	Digital Input 7 Status	This address returns the status of input 7 on the digital I/O connector (DB37 connector).
LEAK_TESTER1.Digital_Input_8_Status	BOOL	Digital Input 8 Status	This address returns the status of input 8 on the digital I/O connector (DB37 connector).
LEAK_TESTER1.Digital_Input_9_Status	BOOL	Digital Input 9 Status	This address returns the status of input 9 on the digital I/O connector (DB37 connector).
LEAK_TESTER1.Digital_Input_10_Status	BOOL	Digital Input 10 Status	This address returns the status of input 10 on the digital I/O connector (DB37 connector).
LEAK_TESTER1.Digital_Input_11_Status	BOOL	Digital Input 11 Status	This address returns the status of input 11 on the digital I/O connector (DB37 connector).

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LEAK_TESTER1.Digtial_Input_12_Status	BOOL	Digital Input 12 Status	This address returns the status of input 12 on the digital I/O connector (DB37 connector).
LEAK_TESTER1.Digtial_Input_13_Status	BOOL	Digital Input 13 Status	This address returns the status of input 13 on the digital I/O connector (DB37 connector).
LEAK_TESTER1.Digtial_Input_14_Status	BOOL	Digital Input 14 Status	This address returns the status of input 14 on the digital I/O connector (DB37 connector).
LEAK_TESTER1.Digtial_Input_15_Status	BOOL	Digital Input 15 Status	This address returns the status of input 15 on the digital I/O connector (DB37 connector).
LEAK_TESTER1.Digtial_Input_16_Status	BOOL	Digital Input 16 Status	This address returns the status of input 16 on the digital I/O connector (DB37 connector).
LEAK_TESTER1.Digtial_Output_1_Status	BOOL	Digital Output 1 Status	This address returns the status of output 1 on the digital I/O connector (DB37 connector).
LEAK_TESTER1.Digtial_Output_2_Status	BOOL	Digital Output 2 Status	This address returns the status of output 2 on the digital I/O connector (DB37 connector).
LEAK_TESTER1.Digtial_Output_3_Status	BOOL	Digital Output 3 Status	This address returns the status of output 3 on the digital I/O connector (DB37 connector).
LEAK_TESTER1.Digtial_Output_4_Status	BOOL	Digital Output 4 Status	This address returns the status of output 4 on the digital I/O connector (DB37 connector).
LEAK_TESTER1.Digtial_Output_5_Status	BOOL	Digital Output 5 Status	This address returns the status of output 5 on the digital I/O connector (DB37 connector).
LEAK_TESTER1.Digtial_Output_6_Status	BOOL	Digital Output 6 Status	This address returns the status of output 6 on the digital I/O connector (DB37 connector).
LEAK_TESTER1.Digtial_Output_7_Status	BOOL	Digital Output 7 Status	This address returns the status of output 7 on the digital I/O connector (DB37 connector).
LEAK_TESTER1.Digtial_Output_8_Status	BOOL	Digital Output 8 Status	This address returns the status of output 8 on the digital I/O connector (DB37 connector).
LEAK_TESTER1.Digtial_Output_9_Status	BOOL	Digital Output 9 Status	This address returns the status of output 9 on the digital I/O connector (DB37 connector).
LEAK_TESTER1.Digtial_Output_10_Status	BOOL	Digital Output 10 Status	This address returns the status of output 10 on the digital I/O connector (DB37 connector).
LEAK_TESTER1.Digtial_Output_11_Status	BOOL	Digital Output 11 Status	This address returns the status of output 11 on the digital I/O connector (DB37 connector).
LEAK_TESTER1.Digtial_Output_12_Status	BOOL	Digital Output 12 Status	This address returns the status of output 12 on the digital I/O connector (DB37 connector).

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LEAK_TESTER1.Digital_Output_13_Status	BOOL	Digital Output 13 Status	This address returns the status of output 13 on the digital I/O connector (DB37 connector).
LEAK_TESTER1.Digital_Output_14_Status	BOOL	Digital Output 14 Status	This address returns the status of output 14 on the digital I/O connector (DB37 connector).
LEAK_TESTER1.Digital_Output_15_Status	BOOL	Digital Output 15 Status	This address returns the status of output 15 on the digital I/O connector (DB37 connector).
LEAK_TESTER1.Digital_Output_16_Status	BOOL	Digital Output 16 Status	This address returns the status of output 16 on the digital I/O connector (DB37 connector).
LEAK_TESTER1.Spare_DINT_1	DINT	Spare	Reserved for future use.
LEAK_TESTER1.Spare_DINT_2	DINT	Spare	Reserved for future use.
LEAK_TESTER1.Spare_DINT_3	DINT	Spare	Reserved for future use.
LEAK_TESTER1.Spare_DINT_4	DINT	Spare	Reserved for future use.
LEAK_TESTER1.Spare_DINT_5	DINT	Spare	Reserved for future use.
LEAK_TESTER1.Program_Selected	DINT	Program Selected	This address will return the program number of the program that is currently selected.
LEAK_TESTER1.Pressure_Unit_ID	DINT	Pressure Unit ID	This address will return a number designation for the pressure unit that is selected for the current program. 0= PSI, 1= PSIG, 2= PSIA, 3= inH2O, 4= inHg, 5= Bar, 6= mbar, 7= Kpa, , 8= PA, 9= kgfcm2
LEAK_TESTER1.Flow_Unit_ID	DINT	Flow Unit ID	This address will return a number designation for the leak rate unit that is selected for the current program. 0 = SLPM, 1 = sccm, 2 = SLPM, 3= SLPS, 4= sccs
LEAK_TESTER1.Pass_Jump_To_Program	DINT	Pass Jump To Program	This address will return the current program Jump To Program Number if the program passes test.
LEAK_TESTER1.Fail_Jump_To_Program	DINT	Fail Jump To Program	This address will return the current program Jump To Program Number if the program fails test.
LEAK_TESTER1.Test_Type	DINT	Test Type	This address will return the current program test type. 0 or 1 = Mass Flow, 2 = Pressure Decay (sccm), 3 = Occlusion, 4= Pressure Loss over Time
LEAK_TESTER1.Number_of_Gage_Runs	DINT	Num of Gage Runs	This address will return the number of Gage cycles to run when Gage Mode is enabled.
LEAK_TESTER1.Gage_Test_Number	DINT	Gage Test Number	This address will return the current Gage Cycle number
LEAK_TESTER1.Fill_Step_Percentage_Complete	DINT	Fill Step Percent	This address will display a live percentage of completion for the Fill Step. 0-100 percent

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LEAK_TESTER1.Stabilize_Step_Percentage_Complete	DINT	Stabilize Step Percent	This address will display a live percentage of completion for the Stabilize Step. 0-100 percent.
LEAK_TESTER1.Test_Step_Percentage_Complete	DINT	Test Step Percent	This address will display a live percentage of completion for the Test Step. 0-100 percent.
LEAK_TESTER1.Vent_Step_Percentage_Complete	DINT	Vent Step Percent	This address will display a live percentage of completion for the Vent Step. 0-100 percent.
LEAK_TESTER1.Spare_DINT_6	DINT	User Level	0=nobody logged in, 1=Operator user logged in, 5=Supervisor user logged in, 9=Admin user logged in, 50=Calibrate user logged in. Reserved for future use.
LEAK_TESTER1.Spare_DINT_7	DINT	Spare	Reserved for future use.
LEAK_TESTER1.Spare_DINT_8	DINT	Spare	Reserved for future use.
LEAK_TESTER1.Spare_DINT_9	DINT	Spare	Reserved for future use.
LEAK_TESTER1.Spare_DINT_10	DINT	Spare	Reserved for future use.
LEAK_TESTER1.Spare_DINT_11	DINT	Spare	Reserved for future use.
LEAK_TESTER1.Spare_DINT_12	DINT	Spare	Reserved for future use.
LEAK_TESTER1.Spare_DINT_13	DINT	Spare	Reserved for future use.
LEAK_TESTER1.Spare_DINT_14	DINT	Spare	Reserved for future use.
LEAK_TESTER1.Spare_DINT_15	DINT	Spare	Reserved for future use.
LEAK_TESTER1.Spare_DINT_16	DINT	Spare	Reserved for future use.
LEAK_TESTER1.Spare_DINT_17	DINT	Spare	Reserved for future use.
LEAK_TESTER1.Prestest_Delay_Timer_Preset	FLOAT	Prestest Delay Time	This address will return the current program timer preset value of the Pretest Delay Timer.
LEAK_TESTER1.Fill_Timer_Preset	FLOAT	Fill Time	This address will return the current program timer preset value of the Fill Timer.
LEAK_TESTER1.StabilizeTimer_Preset	FLOAT	Stabilize Time	This address will return the current program timer preset value of the Stabilize Timer.
LEAK_TESTER1.Test_Timer_Preset	FLOAT	Test Time	This address will return the current program timer preset value of the Test Timer.
LEAK_TESTER1.Vent_Timer_Preset	FLOAT	Vent Time	This address will return the current program timer preset value of the Vent Timer.
LEAK_TESTER1.Cal_Relax_Timer_Preset	FLOAT	Cal Relax Time	This address will return the current program timer preset value of the Calibration Relax Timer.
LEAK_TESTER1.Gage_Relax_Timer_Preset	FLOAT	Gage Delay	This address will return the current program timer preset value of the Gage Relax Delay Timer.
LEAK_TESTER1.Minimum_Pressure_Limit	FLOAT	Minimum Pressure	This address will return the current program Minimum Pressure limit value.
LEAK_TESTER1.Maximum_Pressure_Limit	FLOAT	Maximum Pressure	This address will return the current program Maximum Pressure limit value.

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LEAK_TESTER.Minimum_Leak_Limit	FLOAT	Minimum Leak	This address will return the current program Minimum Leak Rate limit value.
LEAK_TESTER.Maximum_Leak_Limit	FLOAT	Maximum Leak	This address will return the current program Maximum Leak Rate limit value.
LEAK_TESTER.Pressure_Setpoint	FLOAT	Pressure Setpoint	This address will return the current program Minimum Pressure limit value.
LEAK_TESTER.Leak_Orifice_Value	FLOAT	Leak Orifice Value	This address will return the value of the installed calibrated leak standard.
LEAK_TESTER.Comp_Value	FLOAT	Comp Value	This address will return the current program Comp Value.
LEAK_TESTER.Cal_Value	FLOAT	Cal Value	This address will return the current program Cal Value. (Only applicable in decay sccm mode)
LEAK_TESTER.Volume	FLOAT	Volume	This address will return the current program Volume Calculation. (Only applicable in decay sccm mode)
LEAK_TESTER.Transducer_1_Pressure_Live	FLOAT	Transducer 1 Pressure Live	This address will return the live pressure of the test pressure transducer.
LEAK_TESTER.Transducer_1_Pressure_Loss_Live	FLOAT	Transducer 1 Pressure Loss Live	This address will return the live pressure loss value during the test step of a pressure decay test.
LEAK_TESTER.Flow_Sensor_1_Flow_Live	FLOAT	Flow Sensor 1 Flow Live	This address will return the live flow value of the flow sensor.
LEAK_TESTER.Transducer_2_Pressure_Live	FLOAT	Transducer 2 Pressure Live	Reserved for future use.
LEAK_TESTER.Transducer_2_Pressure_Loss_Live	FLOAT	Transducer 2 Pressure Loss Live	Reserved for future use.
LEAK_TESTER.Flow_Sensor_2_Flow_Live	FLOAT	Flow Sensor 2 Flow Live	Reserved for future use.
LEAK_TESTER.Final_Test_Pressure	FLOAT	Final Test Pressure	This address will return the final test pressure of the previous test.
LEAK_TESTER.Final_Pressure_Loss	FLOAT	Final Pressure Loss	This address will return the final pressure loss value of the previous pressure decay test. (Only applicable for decay sccm and pressure loss mode.)
LEAK_TESTER.Final_Leak_Rate	FLOAT	Final Leak Rate	This address will return the final leak rate of the previous test.
LEAK_TESTER.Spare_Real_1	FLOAT	Spare	Reserved for future use.
LEAK_TESTER.Spare_Real_2	FLOAT	Spare	Reserved for future use.
LEAK_TESTER.Spare_Real_3	FLOAT	Spare	Reserved for future use.
LEAK_TESTER.Spare_Real_4	FLOAT	Spare	Reserved for future use.
LEAK_TESTER.Spare_Real_5	FLOAT	Spare	Reserved for future use.
LEAK_TESTER.Spare_Real_6	FLOAT	Spare	Reserved for future use.
LEAK_TESTER.Spare_Real_7	FLOAT	Spare	Reserved for future use.
LEAK_TESTER.Pressure_Units_In_Ascii_0	SINT	Pressure Unit Char 1	Pressure unit of current test program in Ascii, Character 1
LEAK_TESTER.Pressure_Units_In_Ascii_1	SINT	Pressure Unit Char 2	Pressure unit of current test program in Ascii, Character 2

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LEAK_TESTERI.Pressure_Units_In_Ascii_2	SINT	Pressure Unit Char 3	Pressure unit of current test program in Ascii, Character 3
LEAK_TESTERI.Pressure_Units_In_Ascii_3	SINT	Pressure Unit Char 4	Pressure unit of current test program in Ascii, Character 4
LEAK_TESTERI.Pressure_Units_In_Ascii_4	SINT	Pressure Unit Char 5	Pressure unit of current test program in Ascii, Character 5
LEAK_TESTERI.Pressure_Units_In_Ascii_5	SINT	Pressure Unit Char 6	Pressure unit of current test program in Ascii, Character 6
LEAK_TESTERI.Pressure_Units_In_Ascii_6	SINT	Pressure Unit Char 7	Pressure unit of current test program in Ascii, Character 7
LEAK_TESTERI.Flow_Units_In_Ascii_0	SINT	Flow Unit Char 1	Flow unit of current test program in Ascii, Character 1
LEAK_TESTERI.Flow_Units_In_Ascii_1	SINT	Flow Unit Char 2	Flow unit of current test program in Ascii, Character 2
LEAK_TESTERI.Flow_Units_In_Ascii_2	SINT	Flow Unit Char 3	Flow unit of current test program in Ascii, Character 3
LEAK_TESTERI.Flow_Units_In_Ascii_3	SINT	Flow Unit Char 4	Flow unit of current test program in Ascii, Character 4
LEAK_TESTERI.Flow_Units_In_Ascii_4	SINT	Flow Unit Char 5	Flow unit of current test program in Ascii, Character 5
LEAK_TESTERI.Flow_Units_In_Ascii_5	SINT	Flow Unit Char 6	Flow unit of current test program in Ascii, Character 6
LEAK_TESTERI.Flow_Units_In_Ascii_6	SINT	Flow Unit Char 7	Flow unit of current test program in Ascii, Character 7
LEAK_TESTERI.Program_Name_In_Ascii_0	SINT	Program Name Char 1	Program Name of current test program in Ascii, Character 1
LEAK_TESTERI.Program_Name_In_Ascii_1	SINT	Program Name Char 2	Program Name of current test program in Ascii, Character 2
LEAK_TESTERI.Program_Name_In_Ascii_2	SINT	Program Name Char 3	Program Name of current test program in Ascii, Character 3
LEAK_TESTERI.Program_Name_In_Ascii_3	SINT	Program Name Char 4	Program Name of current test program in Ascii, Character 4
LEAK_TESTERI.Program_Name_In_Ascii_4	SINT	Program Name Char 5	Program Name of current test program in Ascii, Character 5
LEAK_TESTERI.Program_Name_In_Ascii_5	SINT	Program Name Char 6	Program Name of current test program in Ascii, Character 6
LEAK_TESTERI.Program_Name_In_Ascii_6	SINT	Program Name Char 7	Program Name of current test program in Ascii, Character 7
LEAK_TESTERI.Program_Name_In_Ascii_7	SINT	Program Name Char 8	Program Name of current test program in Ascii, Character 8
LEAK_TESTERI.Program_Name_In_Ascii_8	SINT	Program Name Char 9	Program Name of current test program in Ascii, Character 9
LEAK_TESTERI.Program_Name_In_Ascii_9	SINT	Program Name Char 10	Program Name of current test program in Ascii, Character 10

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LEAK_TESTERI.Program_Name_In_Ascii_10	SINT	Program Name Char 11	Program Name of current test program in Ascii, Character 11
LEAK_TESTERI.Program_Name_In_Ascii_11	SINT	Program Name Char 12	Program Name of current test program in Ascii, Character 12
LEAK_TESTERI.Program_Name_In_Ascii_12	SINT	Program Name Char 13	Program Name of current test program in Ascii, Character 13
LEAK_TESTERI.Program_Name_In_Ascii_13	SINT	Program Name Char 14	Program Name of current test program in Ascii, Character 14
LEAK_TESTERI.Program_Name_In_Ascii_14	SINT	Program Name Char 15	Program Name of current test program in Ascii, Character 15
LEAK_TESTERI.Program_Name_In_Ascii_15	SINT	Program Name Char 16	Program Name of current test program in Ascii, Character 16
LEAK_TESTERI.Program_Name_In_Ascii_16	SINT	Program Name Char 17	Program Name of current test program in Ascii, Character 17
LEAK_TESTERI.Program_Name_In_Ascii_17	SINT	Program Name Char 18	Program Name of current test program in Ascii, Character 18
LEAK_TESTERI.Program_Name_In_Ascii_18	SINT	Program Name Char 19	Program Name of current test program in Ascii, Character 19
LEAK_TESTERI.Program_Name_In_Ascii_19	SINT	Program Name Char 20	Program Name of current test program in Ascii, Character 20
LEAK_TESTERI.Program_Name_In_Ascii_20	SINT	Program Name Char 21	Program Name of current test program in Ascii, Character 21
LEAK_TESTERI.Program_Name_In_Ascii_21	SINT	Program Name Char 22	Program Name of current test program in Ascii, Character 22
LEAK_TESTERI.Program_Name_In_Ascii_22	SINT	Program Name Char 23	Program Name of current test program in Ascii, Character 23
LEAK_TESTERI.Program_Name_In_Ascii_23	SINT	Program Name Char 24	Program Name of current test program in Ascii, Character 24
LEAK_TESTERI.Program_Name_In_Ascii_24	SINT	Program Name Char 25	Program Name of current test program in Ascii, Character 25
LEAK_TESTERI.Program_Name_In_Ascii_25	SINT	Program Name Char 26	Program Name of current test program in Ascii, Character 26
LEAK_TESTERI.Program_Name_In_Ascii_26	SINT	Program Name Char 27	Program Name of current test program in Ascii, Character 27
LEAK_TESTERI.Program_Name_In_Ascii_27	SINT	Program Name Char 28	Program Name of current test program in Ascii, Character 28
LEAK_TESTERI.Program_Name_In_Ascii_28	SINT	Program Name Char 29	Program Name of current test program in Ascii, Character 29
LEAK_TESTERI.Program_Name_In_Ascii_29	SINT	Program Name Char 30	Program Name of current test program in Ascii, Character 30
LEAK_TESTERI.Program_Name_In_Ascii_30	SINT	Program Name Char 31	Program Name of current test program in Ascii, Character 31
LEAK_TESTERI.Part_Number_In_Ascii_0	SINT	Part Number Char 1	This register will return the current scanned (or loaded from the PLC) part number, Character 1

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LEAK_TESTERI.Part_Number_In_Ascii_1	SINT	Part Number Char 2	This register will return the current scanned (or loaded from the PLC) part number, Character 2
LEAK_TESTERI.Part_Number_In_Ascii_2	SINT	Part Number Char 3	This register will return the current scanned (or loaded from the PLC) part number, Character 3
LEAK_TESTERI.Part_Number_In_Ascii_3	SINT	Part Number Char 4	This register will return the current scanned (or loaded from the PLC) part number, Character 4
LEAK_TESTERI.Part_Number_In_Ascii_4	SINT	Part Number Char 5	This register will return the current scanned (or loaded from the PLC) part number, Character 5
LEAK_TESTERI.Part_Number_In_Ascii_5	SINT	Part Number Char 6	This register will return the current scanned (or loaded from the PLC) part number, Character 6
LEAK_TESTERI.Part_Number_In_Ascii_6	SINT	Part Number Char 7	This register will return the current scanned (or loaded from the PLC) part number, Character 7
LEAK_TESTERI.Part_Number_In_Ascii_7	SINT	Part Number Char 8	This register will return the current scanned (or loaded from the PLC) part number, Character 8
LEAK_TESTERI.Part_Number_In_Ascii_8	SINT	Part Number Char 9	This register will return the current scanned (or loaded from the PLC) part number, Character 9
LEAK_TESTERI.Part_Number_In_Ascii_9	SINT	Part Number Char 10	This register will return the current scanned (or loaded from the PLC) part number, Character 10
LEAK_TESTERI.Part_Number_In_Ascii_10	SINT	Part Number Char 11	This register will return the current scanned (or loaded from the PLC) part number, Character 11
LEAK_TESTERI.Part_Number_In_Ascii_11	SINT	Part Number Char 12	This register will return the current scanned (or loaded from the PLC) part number, Character 12
LEAK_TESTERI.Part_Number_In_Ascii_12	SINT	Part Number Char 13	This register will return the current scanned (or loaded from the PLC) part number, Character 13
LEAK_TESTERI.Part_Number_In_Ascii_13	SINT	Part Number Char 14	This register will return the current scanned (or loaded from the PLC) part number, Character 14
LEAK_TESTERI.Part_Number_In_Ascii_14	SINT	Part Number Char 15	This register will return the current scanned (or loaded from the PLC) part number, Character 15
LEAK_TESTERI.Part_Number_In_Ascii_15	SINT	Part Number Char 16	This register will return the current scanned (or loaded from the PLC) part number, Character 16
LEAK_TESTERI.Part_Number_In_Ascii_16	SINT	Part Number Char 17	This register will return the current scanned (or loaded from the PLC) part number, Character 17
LEAK_TESTERI.Part_Number_In_Ascii_17	SINT	Part Number Char 18	This register will return the current scanned (or loaded from the PLC) part number, Character 18

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LEAK_TESTER1.Part_Number_In_Ascii_18	SINT	Part Number Char 19	This register will return the current scanned (or loaded from the PLC) part number, Character 19
LEAK_TESTER1.Part_Number_In_Ascii_19	SINT	Part Number Char 20	This register will return the current scanned (or loaded from the PLC) part number, Character 20
LEAK_TESTER1.Part_Number_In_Ascii_20	SINT	Part Number Char 21	This register will return the current scanned (or loaded from the PLC) part number, Character 21
LEAK_TESTER1.Part_Number_In_Ascii_21	SINT	Part Number Char 22	This register will return the current scanned (or loaded from the PLC) part number, Character 22
LEAK_TESTER1.Part_Number_In_Ascii_22	SINT	Part Number Char 23	This register will return the current scanned (or loaded from the PLC) part number, Character 23
LEAK_TESTER1.Part_Number_In_Ascii_23	SINT	Part Number Char 24	This register will return the current scanned (or loaded from the PLC) part number, Character 24
LEAK_TESTER1.Part_Number_In_Ascii_24	SINT	Part Number Char 25	This register will return the current scanned (or loaded from the PLC) part number, Character 25
LEAK_TESTER1.Part_Number_In_Ascii_25	SINT	Part Number Char 26	This register will return the current scanned (or loaded from the PLC) part number, Character 26
LEAK_TESTER1.Part_Number_In_Ascii_26	SINT	Part Number Char 27	This register will return the current scanned (or loaded from the PLC) part number, Character 27
LEAK_TESTER1.Part_Number_In_Ascii_27	SINT	Part Number Char 28	This register will return the current scanned (or loaded from the PLC) part number, Character 28
LEAK_TESTER1.Part_Number_In_Ascii_28	SINT	Part Number Char 29	This register will return the current scanned (or loaded from the PLC) part number, Character 29
LEAK_TESTER1.Part_Number_In_Ascii_29	SINT	Part Number Char 30	This register will return the current scanned (or loaded from the PLC) part number, Character 30
LEAK_TESTER1.Part_Number_In_Ascii_30	SINT	Part Number Char 31	This register will return the current scanned (or loaded from the PLC) part number, Character 31
LEAK_TESTER1.Part_Number_In_Ascii_31	SINT	Part Number Char 32	This register will return the current scanned (or loaded from the PLC) part number, Character 32
LEAK_TESTER1.Part_Number_In_Ascii_32	SINT	Part Number Char 33	This register will return the current scanned (or loaded from the PLC) part number, Character 33
LEAK_TESTER1.Part_Number_In_Ascii_33	SINT	Part Number Char 34	This register will return the current scanned (or loaded from the PLC) part number, Character 34
LEAK_TESTER1.Part_Number_In_Ascii_34	SINT	Part Number Char 35	This register will return the current scanned (or loaded from the PLC) part number, Character 35

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LEAK_TESTER1.Part_Number_In_Ascii_35	SINT	Part Number Char 36	This register will return the current scanned (or loaded from the PLC) part number, Character 36
LEAK_TESTER1.Part_Number_In_Ascii_36	SINT	Part Number Char 37	This register will return the current scanned (or loaded from the PLC) part number, Character 37
LEAK_TESTER1.Part_Number_In_Ascii_37	SINT	Part Number Char 38	This register will return the current scanned (or loaded from the PLC) part number, Character 38
LEAK_TESTER1.Part_Number_In_Ascii_38	SINT	Part Number Char 39	This register will return the current scanned (or loaded from the PLC) part number, Character 39
LEAK_TESTER1.Part_Number_In_Ascii_39	SINT	Part Number Char 40	This register will return the current scanned (or loaded from the PLC) part number, Character 40
LEAK_TESTER1.Part_Number_In_Ascii_40	SINT	Part Number Char 41	This register will return the current scanned (or loaded from the PLC) part number, Character 41
LEAK_TESTER1.Part_Number_In_Ascii_41	SINT	Part Number Char 42	This register will return the current scanned (or loaded from the PLC) part number, Character 42
LEAK_TESTER1.Part_Number_In_Ascii_42	SINT	Part Number Char 43	This register will return the current scanned (or loaded from the PLC) part number, Character 43
LEAK_TESTER1.Part_Number_In_Ascii_43	SINT	Part Number Char 44	This register will return the current scanned (or loaded from the PLC) part number, Character 44
LEAK_TESTER1.Part_Number_In_Ascii_44	SINT	Part Number Char 45	This register will return the current scanned (or loaded from the PLC) part number, Character 45
LEAK_TESTER1.Part_Number_In_Ascii_45	SINT	Part Number Char 46	This register will return the current scanned (or loaded from the PLC) part number, Character 46
LEAK_TESTER1.Part_Number_In_Ascii_46	SINT	Part Number Char 47	This register will return the current scanned (or loaded from the PLC) part number, Character 47
LEAK_TESTER1.Part_Number_In_Ascii_47	SINT	Part Number Char 48	This register will return the current scanned (or loaded from the PLC) part number, Character 48
LEAK_TESTER1.Part_Number_In_Ascii_48	SINT	Part Number Char 49	This register will return the current scanned (or loaded from the PLC) part number, Character 49
LEAK_TESTER1.Part_Number_In_Ascii_49	SINT	Part Number Char 50	This register will return the current scanned (or loaded from the PLC) part number, Character 50
LEAK_TESTER1.Part_Number_In_Ascii_50	SINT	Part Number Char 51	This register will return the current scanned (or loaded from the PLC) part number, Character 51
LEAK_TESTER1.Part_Number_In_Ascii_51	SINT	Part Number Char 52	This register will return the current scanned (or loaded from the PLC) part number, Character 52

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LEAK_TESTER1.Part_Number_In_Ascii_52	SINT	Part Number Char 53	This register will return the current scanned (or loaded from the PLC) part number, Character 53
LEAK_TESTER1.Part_Number_In_Ascii_53	SINT	Part Number Char 54	This register will return the current scanned (or loaded from the PLC) part number, Character 54
LEAK_TESTER1.Part_Number_In_Ascii_54	SINT	Part Number Char 55	This register will return the current scanned (or loaded from the PLC) part number, Character 55
LEAK_TESTER1.Part_Number_In_Ascii_55	SINT	Part Number Char 56	This register will return the current scanned (or loaded from the PLC) part number, Character 56
LEAK_TESTER1.Part_Number_In_Ascii_56	SINT	Part Number Char 57	This register will return the current scanned (or loaded from the PLC) part number, Character 57
LEAK_TESTER1.Part_Number_In_Ascii_57	SINT	Part Number Char 58	This register will return the current scanned (or loaded from the PLC) part number, Character 58
LEAK_TESTER1.Part_Number_In_Ascii_58	SINT	Part Number Char 59	This register will return the current scanned (or loaded from the PLC) part number, Character 59
LEAK_TESTER1.Part_Number_In_Ascii_59	SINT	Part Number Char 60	This register will return the current scanned (or loaded from the PLC) part number, Character 60
LEAK_TESTER1.Part_Number_In_Ascii_60	SINT	Part Number Char 61	This register will return the current scanned (or loaded from the PLC) part number, Character 61
LEAK_TESTER1.Part_Number_In_Ascii_61	SINT	Part Number Char 62	This register will return the current scanned (or loaded from the PLC) part number, Character 62
LEAK_TESTER1.Part_Number_In_Ascii_62	SINT	Part Number Char 63	This register will return the current scanned (or loaded from the PLC) part number, Character 63
LEAK_TESTER1.Part_Number_In_Ascii_63	SINT	Part Number Char 64	This register will return the current scanned (or loaded from the PLC) part number, Character 64
LEAK_TESTER1.Part_Number_In_Ascii_64	SINT	Part Number Char 65	This register will return the current scanned (or loaded from the PLC) part number, Character 65
LEAK_TESTER1.Part_Number_In_Ascii_65	SINT	Part Number Char 66	This register will return the current scanned (or loaded from the PLC) part number, Character 66
LEAK_TESTER1.Part_Number_In_Ascii_66	SINT	Part Number Char 67	This register will return the current scanned (or loaded from the PLC) part number, Character 67
LEAK_TESTER1.Part_Number_In_Ascii_67	SINT	Part Number Char 68	This register will return the current scanned (or loaded from the PLC) part number, Character 68
LEAK_TESTER1.Part_Number_In_Ascii_68	SINT	Part Number Char 69	This register will return the current scanned (or loaded from the PLC) part number, Character 69

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LEAK_TESTERI.Part_Number_In_Ascii_69	SINT	Part Number Char 70	This register will return the current scanned (or loaded from the PLC) part number, Character 70
LEAK_TESTERI.Part_Number_In_Ascii_70	SINT	Part Number Char 71	This register will return the current scanned (or loaded from the PLC) part number, Character 71
LEAK_TESTERI.Part_Number_In_Ascii_71	SINT	Part Number Char 72	This register will return the current scanned (or loaded from the PLC) part number, Character 72
LEAK_TESTERI.Part_Number_In_Ascii_72	SINT	Part Number Char 73	This register will return the current scanned (or loaded from the PLC) part number, Character 73
LEAK_TESTERI.Part_Number_In_Ascii_73	SINT	Part Number Char 74	This register will return the current scanned (or loaded from the PLC) part number, Character 74
LEAK_TESTERI.Part_Number_In_Ascii_74	SINT	Part Number Char 75	This register will return the current scanned (or loaded from the PLC) part number, Character 75
LEAK_TESTERI.Part_Number_In_Ascii_75	SINT	Part Number Char 76	This register will return the current scanned (or loaded from the PLC) part number, Character 76
LEAK_TESTERI.Part_Number_In_Ascii_76	SINT	Part Number Char 77	This register will return the current scanned (or loaded from the PLC) part number, Character 77
LEAK_TESTERI.Part_Number_In_Ascii_77	SINT	Part Number Char 78	This register will return the current scanned (or loaded from the PLC) part number, Character 78
LEAK_TESTERI.Part_Number_In_Ascii_78	SINT	Part Number Char 79	This register will return the current scanned (or loaded from the PLC) part number, Character 79

ADDRESS (Outputs)(PLC to Tester)	DATATYPE	DESCRIPTION	FUNCTION
LEAK_TESTERO.System_Monitor_Output_Register	DINT	System Monitor Bits	Reserved
LEAK_TESTERO.Start	BOOL	Start	Setting this bit high will Start a test cycle if the tester is Ready and a valid program is selected.
LEAK_TESTERO.Stop	BOOL	Stop	Setting this bit high during a test will immediately Stop the test. This bit must be low to start a test.
LEAK_TESTERO.Pause	BOOL	Pause	Setting this bit high during a test will pause the test until the Start bit is set high.
LEAK_TESTERO.Air_On	BOOL	Air On	Setting this bit high will deliver test air to the test port.
LEAK_TESTERO.Leak_On	BOOL	Leak On	Setting this bit high will turn on the internal calibrated leak standard.
LEAK_TESTERO.Enable_Calibration	BOOL	Enable Calibration	Setting this bit high will enable program calibration mode.
LEAK_TESTERO.Enable_Teach_Mode	BOOL	Enable Teach	Under development

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LEAK_TESTERO.Change_Program	BOOL	Change Program	Setting this bit high will allow the current program to be changed to another program.
LEAK_TESTERO.Reset_Outputs	BOOL	Reset Outputs	Setting this bit high will the last pass/fail bits low, set the last test pressure, last test pressure loss, and last test flow rate to 0
LEAK_TESTERO.Clear_Error	BOOL	Clear Error	Setting this bit high will clear any errors if the error has been corrected.
LEAK_TESTERO.Safety_Circuit_OK	BOOL	Safety Circuit OK	Under development
LEAK_TESTERO.Part_Present	BOOL	Part Present	Under development
LEAK_TESTERO.Test_Air_Pressure_Detected	BOOL	Test Air Pressure Detected	Under development
LEAK_TESTERO.Incoming_Air_Pressure_Present	BOOL	Incoming Air Pressure Present	Under development
LEAK_TESTERO.Spare_Output_DINT_1	DINT	Spare	Reserved for future use.
LEAK_TESTERO.Spare_Output_DINT_2	DINT	Spare	Reserved for future use.
LEAK_TESTERO.Spare_Output_DINT_3	DINT	Spare	Reserved for future use.
LEAK_TESTERO.Spare_Output_DINT_4	DINT	Spare	Reserved for future use.
LEAK_TESTERO.Spare_Output_DINT_5	DINT	Spare	Reserved for future use.
LEAK_TESTERO.Spare_Output_DINT_6	DINT	Spare	Reserved for future use.
LEAK_TESTERO.Program_Select	DINT	Program Select	Set this register to the program number that you wish to select and then set the Change Program bit high to make the change.
LEAK_TESTERO.Pressure_Unit_ID_Slave	DINT	Pressure Unit ID	Set this register to the desired pressure unit (functions in Slave Mode only)
LEAK_TESTERO.Flow_Unit_ID_Slave	DINT	Flow Unit ID	Set this register to the desired leak rate unit (functions in Slave Mode only)
LEAK_TESTERO.Test_Type_Slave	DINT	Test Type ID	Set this register to the desired test type (Mass Flow or Pressure Decay) (functions in Slave Mode only)
LEAK_TESTERO.Spare_Output_DINT_7	DINT	Spare	Reserved for future use.
LEAK_TESTERO.Spare_Output_DINT_8	DINT	Spare	Reserved for future use.
LEAK_TESTERO.Spare_Output_DINT_9	DINT	Spare	Reserved for future use.
LEAK_TESTERO.Spare_Output_DINT_10	DINT	Spare	Reserved for future use.
LEAK_TESTERO.Spare_Output_DINT_11	DINT	Spare	Reserved for future use.
LEAK_TESTERO.Spare_Output_DINT_12	DINT	Spare	Reserved for future use.
LEAK_TESTERO.Spare_Output_DINT_13	DINT	Spare	Reserved for future use.
LEAK_TESTERO.Spare_Output_DINT_14	DINT	Spare	Reserved for future use.
LEAK_TESTERO.Spare_Output_DINT_15	DINT	Spare	Reserved for future use.
LEAK_TESTERO.Spare_Output_DINT_16	DINT	Spare	Reserved for future use.
LEAK_TESTERO.Spare_Output_DINT_17	DINT	Spare	Reserved for future use.
LEAK_TESTERO.Spare_Output_DINT_18	DINT	Spare	Reserved for future use.
LEAK_TESTERO.Spare_Output_DINT_19	DINT	Spare	Reserved for future use.
LEAK_TESTERO.Spare_Output_DINT_20	DINT	Spare	Reserved for future use.
LEAK_TESTERO.Spare_Output_DINT_21	DINT	Spare	Reserved for future use.
LEAK_TESTERO.Spare_Output_DINT_22	DINT	Spare	Reserved for future use.
LEAK_TESTERO.Spare_Output_DINT_23	DINT	Spare	Reserved for future use.
LEAK_TESTERO.Spare_Output_DINT_24	DINT	Spare	Reserved for future use.
LEAK_TESTERO.Spare_Output_DINT_25	DINT	Spare	Reserved for future use.

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LEAK_TESTERO.Spare_Output_DINT_26	DINT	Spare	Reserved for future use.
LEAK_TESTERO.Prestest_Delay_Timer_Slave	FLOAT	Prestest Delay Time	Set this register to the value that you want the Prestest Delay Time to be when running in Slave Mode.
LEAK_TESTERO.Fill_Timer_Slave	FLOAT	Fill Time	Set this register to the value that you want the Fill Time to be when running in Slave Mode.
LEAK_TESTERO.Stabilize_Timer_Slave	FLOAT	Stabilize Time	Set this register to the value that you want the Stabilize Time to be when running in Slave Mode.
LEAK_TESTERO.Test_Timer_Slave	FLOAT	Test Time	Set this register to the value that you want the Test Time to be when running in Slave Mode.
LEAK_TESTERO.Vent_Timer_Slave	FLOAT	Vent Time	Set this register to the value that you want the Vent Time to be when running in Slave Mode.
LEAK_TESTERO.Cal_Relax_Timer_Slave	FLOAT	Cal Relax Time	Set this register to the value that you want the Cal Relax Time to be when running in Slave Mode.
LEAK_TESTERO.Gage_Relax_Timer_Slave	FLOAT	Gage Delay	Set this register to the value that you want the Gage Relax Time to be when running in Slave Mode.
LEAK_TESTERO.Minimum_Pressure_Limit_Slave	FLOAT	Minimum Pressure	Set this register to the value that you want the Minimum Pressure Limit to be when running in Slave Mode.
LEAK_TESTERO.Maximum_Pressure_Limit_Slave	FLOAT	Maximum Pressure	Set this register to the value that you want the Maximum Pressure Limit to be when running in Slave Mode.
LEAK_TESTERO.Minimum_Leak_Limit_Slave	FLOAT	Minimum Leak	Set this register to the value that you want the Minimum Leak Limit to be when running in Slave Mode.
LEAK_TESTERO.Maximum_Leak_Limit_Slave	FLOAT	Maximum Leak	Set this register to the value that you want the Maximum Leak Limit to be when running in Slave Mode.
LEAK_TESTERO.Pressure_Setpoint_Slave	FLOAT	Pressure Set point	Set this register to the value that you want the test Pressure Setpoint to be when running in Slave Mode.
LEAK_TESTERO.Leak_Orifice_Value_Slave	FLOAT	Leak Orifice Value	Set this register to the value that you want the installed calibrated leak standard t to be when running in Slave Mode.
LEAK_TESTERO.Comp_Value_Slave	FLOAT	Comp Value	Set this register to the value that you want the Comp Value to be when running in Slave Mode.
LEAK_TESTERO.Cal_Value_Slave	FLOAT	Cal Value	Set this register to the value that you want the Cal Value to be when running in Slave Mode. (Only applicable when in pressure decay mode)
LEAK_TESTERO.Volume_Slave	FLOAT	Volume	Set this register to the value that you want the test Volume Value to be when running in Slave Mode. (Only applicable

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			when in pressure decay mode)
LEAK_TESTERO.Spare_Output_Real_1	FLOAT	Spare	Reserved for future use.
LEAK_TESTERO.Spare_Output_Real_2	FLOAT	Spare	Reserved for future use.
LEAK_TESTERO.Spare_Output_Real_3	FLOAT	Spare	Reserved for future use.
LEAK_TESTERO.Spare_Output_Real_4	FLOAT	Spare	Reserved for future use.
LEAK_TESTERO.Spare_Output_Real_5	FLOAT	Spare	Reserved for future use.
LEAK_TESTERO.Spare_Output_Real_6	FLOAT	Spare	Reserved for future use.
LEAK_TESTERO.Spare_Output_Real_7	FLOAT	Spare	Reserved for future use.
LEAK_TESTERO.Spare_Output_Real_8	FLOAT	Spare	Reserved for future use.
LEAK_TESTERO.Spare_Output_Real_9	FLOAT	Spare	Reserved for future use.
LEAK_TESTERO.Spare_Output_Real_10	FLOAT	Spare	Reserved for future use.
LEAK_TESTERO.Spare_Output_Real_11	FLOAT	Spare	Reserved for future use.
LEAK_TESTERO.Spare_Output_Real_12	FLOAT	Spare	Reserved for future use.
LEAK_TESTERO.Spare_Output_Real_13	FLOAT	Spare	Reserved for future use.
LEAK_TESTERO.Spare_Output_Real_14	FLOAT	Spare	Reserved for future use.
LEAK_TESTERO.Spare_Output_Real_15	FLOAT	Spare	Reserved for future use.
LEAK_TESTERO.Spare_Output_Real_16	FLOAT	Spare	Reserved for future use.
LEAK_TESTERO.Part_Number_Out_Ascii_0	SINT	Part Number Character 1	Set this register to the character 1 value of the part number to load a part number into the results data table.
LEAK_TESTERO.Part_Number_Out_Ascii_1	SINT	Part Number Character 2	Set this register to the character 2 value of the part number to load a part number into the results data table.
LEAK_TESTERO.Part_Number_Out_Ascii_2	SINT	Part Number Character 3	Set this register to the character 3 value of the part number to load a part number into the results data table.
LEAK_TESTERO.Part_Number_Out_Ascii_3	SINT	Part Number Character 4	Set this register to the character 4 value of the part number to load a part number into the results data table.
LEAK_TESTERO.Part_Number_Out_Ascii_4	SINT	Part Number Character 5	Set this register to the character 5 value of the part number to load a part number into the results data table.
LEAK_TESTERO.Part_Number_Out_Ascii_5	SINT	Part Number Character 6	Set this register to the character 6 value of the part number to load a part number into the results data table.
LEAK_TESTERO.Part_Number_Out_Ascii_6	SINT	Part Number Character 7	Set this register to the character 7 value of the part number to load a part number into the results data table.
LEAK_TESTERO.Part_Number_Out_Ascii_7	SINT	Part Number Character 8	Set this register to the character 8 value of the part number to load a part number into the results data table.
LEAK_TESTERO.Part_Number_Out_Ascii_8	SINT	Part Number Character 9	Set this register to the character 9 value of the part number to load a part number into the results data table.
LEAK_TESTERO.Part_Number_Out_Ascii_9	SINT	Part Number Character 10	Set this register to the character 10 value of the part number to load a part number into the results data table.

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LEAK_TESTERO.Part_Number_Out_Ascii_10	SINT	Part Number Character 11	Set this register to the character 11 value of the part number to load a part number into the results data table.
LEAK_TESTERO.Part_Number_Out_Ascii_11	SINT	Part Number Character 12	Set this register to the character 12 value of the part number to load a part number into the results data table.
LEAK_TESTERO.Part_Number_Out_Ascii_12	SINT	Part Number Character 13	Set this register to the character 13 value of the part number to load a part number into the results data table.
LEAK_TESTERO.Part_Number_Out_Ascii_13	SINT	Part Number Character 14	Set this register to the character 14 value of the part number to load a part number into the results data table.
LEAK_TESTERO.Part_Number_Out_Ascii_14	SINT	Part Number Character 15	Set this register to the character 15 value of the part number to load a part number into the results data table.
LEAK_TESTERO.Part_Number_Out_Ascii_15	SINT	Part Number Character 16	Set this register to the character 16 value of the part number to load a part number into the results data table.
LEAK_TESTERO.Part_Number_Out_Ascii_16	SINT	Part Number Character 17	Set this register to the character 17 value of the part number to load a part number into the results data table.
LEAK_TESTERO.Part_Number_Out_Ascii_17	SINT	Part Number Character 18	Set this register to the character 18 value of the part number to load a part number into the results data table.
LEAK_TESTERO.Part_Number_Out_Ascii_18	SINT	Part Number Character 19	Set this register to the character 19 value of the part number to load a part number into the results data table.
LEAK_TESTERO.Part_Number_Out_Ascii_19	SINT	Part Number Character 20	Set this register to the character 20 value of the part number to load a part number into the results data table.
LEAK_TESTERO.Part_Number_Out_Ascii_20	SINT	Part Number Character 21	Set this register to the character 21 value of the part number to load a part number into the results data table.
LEAK_TESTERO.Part_Number_Out_Ascii_21	SINT	Part Number Character 22	Set this register to the character 22 value of the part number to load a part number into the results data table.
LEAK_TESTERO.Part_Number_Out_Ascii_22	SINT	Part Number Character 23	Set this register to the character 23 value of the part number to load a part number into the results data table.
LEAK_TESTERO.Part_Number_Out_Ascii_23	SINT	Part Number Character 24	Set this register to the character 24 value of the part number to load a part number into the results data table.
LEAK_TESTERO.Part_Number_Out_Ascii_24	SINT	Part Number Character 25	Set this register to the character 25 value of the part number to load a part number into the results data table.
LEAK_TESTERO.Part_Number_Out_Ascii_25	SINT	Part Number Character 26	Set this register to the character 26 value of the part number to load a part number into the results data table.
LEAK_TESTERO.Part_Number_Out_Ascii_26	SINT	Part Number Character 27	Set this register to the character 27 value of the part number to load a part number into the results data table.

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LEAK_TESTERO.Part_Number_Out_Ascii_27	SINT	Part Number Character 28	Set this register to the character 28 value of the part number to load a part number into the results data table.
LEAK_TESTERO.Part_Number_Out_Ascii_28	SINT	Part Number Character 29	Set this register to the character 29 value of the part number to load a part number into the results data table.
LEAK_TESTERO.Part_Number_Out_Ascii_29	SINT	Part Number Character 30	Set this register to the character 30 value of the part number to load a part number into the results data table.
LEAK_TESTERO.Part_Number_Out_Ascii_30	SINT	Part Number Character 31	Set this register to the character 31 value of the part number to load a part number into the results data table.
LEAK_TESTERO.Part_Number_Out_Ascii_31	SINT	Part Number Character 32	Set this register to the character 32 value of the part number to load a part number into the results data table.
LEAK_TESTERO.Part_Number_Out_Ascii_32	SINT	Part Number Character 33	Set this register to the character 33 value of the part number to load a part number into the results data table.
LEAK_TESTERO.Part_Number_Out_Ascii_33	SINT	Part Number Character 34	Set this register to the character 34 value of the part number to load a part number into the results data table.
LEAK_TESTERO.Part_Number_Out_Ascii_34	SINT	Part Number Character 35	Set this register to the character 35 value of the part number to load a part number into the results data table.
LEAK_TESTERO.Part_Number_Out_Ascii_35	SINT	Part Number Character 36	Set this register to the character 36 value of the part number to load a part number into the results data table.
LEAK_TESTERO.Part_Number_Out_Ascii_36	SINT	Part Number Character 37	Set this register to the character 37 value of the part number to load a part number into the results data table.
LEAK_TESTERO.Part_Number_Out_Ascii_37	SINT	Part Number Character 38	Set this register to the character 38 value of the part number to load a part number into the results data table.
LEAK_TESTERO.Part_Number_Out_Ascii_38	SINT	Part Number Character 39	Set this register to the character 39 value of the part number to load a part number into the results data table.
LEAK_TESTERO.Part_Number_Out_Ascii_39	SINT	Part Number Character 40	Set this register to the character 40 value of the part number to load a part number into the results data table.
LEAK_TESTERO.Part_Number_Out_Ascii_40	SINT	Part Number Character 41	Set this register to the character 41 value of the part number to load a part number into the results data table.
LEAK_TESTERO.Part_Number_Out_Ascii_41	SINT	Part Number Character 42	Set this register to the character 42 value of the part number to load a part number into the results data table.
LEAK_TESTERO.Part_Number_Out_Ascii_42	SINT	Part Number Character 43	Set this register to the character 43 value of the part number to load a part number into the results data table.
LEAK_TESTERO.Part_Number_Out_Ascii_43	SINT	Part Number Character 44	Set this register to the character 44 value of the part number to load a part number into the results data table.

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LEAK_TESTERO.Part_Number_Out_Ascii_44	SINT	Part Number Character 45	Set this register to the character 45 value of the part number to load a part number into the results data table.
LEAK_TESTERO.Part_Number_Out_Ascii_45	SINT	Part Number Character 46	Set this register to the character 46 value of the part number to load a part number into the results data table.
LEAK_TESTERO.Part_Number_Out_Ascii_46	SINT	Part Number Character 47	Set this register to the character 47 value of the part number to load a part number into the results data table.
LEAK_TESTERO.Part_Number_Out_Ascii_47	SINT	Part Number Character 48	Set this register to the character 48 value of the part number to load a part number into the results data table.
LEAK_TESTERO.Part_Number_Out_Ascii_48	SINT	Part Number Character 49	Set this register to the character 49 value of the part number to load a part number into the results data table.
LEAK_TESTERO.Part_Number_Out_Ascii_49	SINT	Part Number Character 50	Set this register to the character 50 value of the part number to load a part number into the results data table.
LEAK_TESTERO.Part_Number_Out_Ascii_50	SINT	Part Number Character 51	Set this register to the character 51 value of the part number to load a part number into the results data table.
LEAK_TESTERO.Part_Number_Out_Ascii_51	SINT	Part Number Character 52	Set this register to the character 52 value of the part number to load a part number into the results data table.
LEAK_TESTERO.Part_Number_Out_Ascii_52	SINT	Part Number Character 53	Set this register to the character 53 value of the part number to load a part number into the results data table.
LEAK_TESTERO.Part_Number_Out_Ascii_53	SINT	Part Number Character 54	Set this register to the character 54 value of the part number to load a part number into the results data table.
LEAK_TESTERO.Part_Number_Out_Ascii_54	SINT	Part Number Character 55	Set this register to the character 55 value of the part number to load a part number into the results data table.
LEAK_TESTERO.Part_Number_Out_Ascii_55	SINT	Part Number Character 56	Set this register to the character 56 value of the part number to load a part number into the results data table.
LEAK_TESTERO.Part_Number_Out_Ascii_56	SINT	Part Number Character 57	Set this register to the character 57 value of the part number to load a part number into the results data table.
LEAK_TESTERO.Part_Number_Out_Ascii_57	SINT	Part Number Character 58	Set this register to the character 58 value of the part number to load a part number into the results data table.
LEAK_TESTERO.Part_Number_Out_Ascii_58	SINT	Part Number Character 59	Set this register to the character 59 value of the part number to load a part number into the results data table.
LEAK_TESTERO.Part_Number_Out_Ascii_59	SINT	Part Number Character 60	Set this register to the character 60 value of the part number to load a part number into the results data table.
LEAK_TESTERO.Part_Number_Out_Ascii_60	SINT	Part Number Character 61	Set this register to the character 61 value of the part number to load a part number into the results data table.

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LEAK_TESTERO.Part_Number_Out_Ascii_61	SINT	Part Number Character 62	Set this register to the character 62 value of the part number to load a part number into the results data table.
LEAK_TESTERO.Part_Number_Out_Ascii_62	SINT	Part Number Character 63	Set this register to the character 63 value of the part number to load a part number into the results data table.
LEAK_TESTERO.Part_Number_Out_Ascii_63	SINT	Part Number Character 64	Set this register to the character 64 value of the part number to load a part number into the results data table.
LEAK_TESTERO.Part_Number_Out_Ascii_64	SINT	Part Number Character 65	Set this register to the character 65 value of the part number to load a part number into the results data table.
LEAK_TESTERO.Part_Number_Out_Ascii_65	SINT	Part Number Character 66	Set this register to the character 66 value of the part number to load a part number into the results data table.
LEAK_TESTERO.Part_Number_Out_Ascii_66	SINT	Part Number Character 67	Set this register to the character 67 value of the part number to load a part number into the results data table.
LEAK_TESTERO.Part_Number_Out_Ascii_67	SINT	Part Number Character 68	Set this register to the character 68 value of the part number to load a part number into the results data table.
LEAK_TESTERO.Part_Number_Out_Ascii_68	SINT	Part Number Character 69	Set this register to the character 69 value of the part number to load a part number into the results data table.
LEAK_TESTERO.Part_Number_Out_Ascii_69	SINT	Part Number Character 70	Set this register to the character 70 value of the part number to load a part number into the results data table.
LEAK_TESTERO.Part_Number_Out_Ascii_70	SINT	Part Number Character 71	Set this register to the character 71 value of the part number to load a part number into the results data table.
LEAK_TESTERO.Part_Number_Out_Ascii_71	SINT	Part Number Character 72	Set this register to the character 72 value of the part number to load a part number into the results data table.
LEAK_TESTERO.Part_Number_Out_Ascii_72	SINT	Part Number Character 73	Set this register to the character 73 value of the part number to load a part number into the results data table.
LEAK_TESTERO.Part_Number_Out_Ascii_73	SINT	Part Number Character 74	Set this register to the character 74 value of the part number to load a part number into the results data table.
LEAK_TESTERO.Part_Number_Out_Ascii_74	SINT	Part Number Character 75	Set this register to the character 75 value of the part number to load a part number into the results data table.
LEAK_TESTERO.Part_Number_Out_Ascii_75	SINT	Part Number Character 76	Set this register to the character 76 value of the part number to load a part number into the results data table.
LEAK_TESTERO.Part_Number_Out_Ascii_76	SINT	Part Number Character 77	Set this register to the character 77 value of the part number to load a part number into the results data table.
LEAK_TESTERO.Part_Number_Out_Ascii_77	SINT	Part Number Character 78	Set this register to the character 78 value of the part number to load a part number into the results data table.

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LEAK_TESTERO.Part_Number_Out_Ascii_78	SINT	Part Number Character 79	Set this register to the character 79 value of the part number to load a part number into the results data table.
LEAK_TESTERO.Spare_Ascii_Out_String_Register_0	SINT	Spare Ascii Register, Character 0	For future use.
LEAK_TESTERO.Spare_Ascii_Out_String_Register_1	SINT	Spare Ascii Register, Character 1	For future use.
LEAK_TESTERO.Spare_Ascii_Out_String_Register_2	SINT	Spare Ascii Register, Character 2	For future use.
LEAK_TESTERO.Spare_Ascii_Out_String_Register_3	SINT	Spare Ascii Register, Character 3	For future use.
LEAK_TESTERO.Spare_Ascii_Out_String_Register_4	SINT	Spare Ascii Register, Character 4	For future use.
LEAK_TESTERO.Spare_Ascii_Out_String_Register_5	SINT	Spare Ascii Register, Character 5	For future use.
LEAK_TESTERO.Spare_Ascii_Out_String_Register_6	SINT	Spare Ascii Register, Character 6	For future use.
LEAK_TESTERO.Spare_Ascii_Out_String_Register_7	SINT	Spare Ascii Register, Character 7	For future use.
LEAK_TESTERO.Spare_Ascii_Out_String_Register_8	SINT	Spare Ascii Register, Character 8	For future use.
LEAK_TESTERO.Spare_Ascii_Out_String_Register_9	SINT	Spare Ascii Register, Character 9	For future use.
LEAK_TESTERO.Spare_Ascii_Out_String_Register_10	SINT	Spare Ascii Register, Character 10	For future use.
LEAK_TESTERO.Spare_Ascii_Out_String_Register_11	SINT	Spare Ascii Register, Character 11	For future use.
LEAK_TESTERO.Spare_Ascii_Out_String_Register_12	SINT	Spare Ascii Register, Character 12	For future use.
LEAK_TESTERO.Spare_Ascii_Out_String_Register_13	SINT	Spare Ascii Register, Character 13	For future use.
LEAK_TESTERO.Spare_Ascii_Out_String_Register_14	SINT	Spare Ascii Register, Character 14	For future use.
LEAK_TESTERO.Spare_Ascii_Out_String_Register_15	SINT	Spare Ascii Register, Character 15	For future use.
LEAK_TESTERO.Spare_Ascii_Out_String_Register_16	SINT	Spare Ascii Register, Character 16	For future use.
LEAK_TESTERO.Spare_Ascii_Out_String_Register_17	SINT	Spare Ascii Register, Character 17	For future use.
LEAK_TESTERO.Spare_Ascii_Out_String_Register_18	SINT	Spare Ascii Register, Character 18	For future use.
LEAK_TESTERO.Spare_Ascii_Out_String_Register_19	SINT	Spare Ascii Register, Character 19	For future use.
LEAK_TESTERO.Spare_Ascii_Out_String_Register_20	SINT	Spare Ascii Register, Character 20	For future use.

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LEAK_TESTERO.Spare_Ascii_Out_String_Register_21	SINT	Spare Ascii Register, Character 21	For future use.
LEAK_TESTERO.Spare_Ascii_Out_String_Register_22	SINT	Spare Ascii Register, Character 22	For future use.
LEAK_TESTERO.Spare_Ascii_Out_String_Register_23	SINT	Spare Ascii Register, Character 23	For future use.
LEAK_TESTERO.Spare_Ascii_Out_String_Register_24	SINT	Spare Ascii Register, Character 24	For future use.
LEAK_TESTERO.Spare_Ascii_Out_String_Register_25	SINT	Spare Ascii Register, Character 25	For future use.
LEAK_TESTERO.Spare_Ascii_Out_String_Register_26	SINT	Spare Ascii Register, Character 26	For future use.
LEAK_TESTERO.Spare_Ascii_Out_String_Register_27	SINT	Spare Ascii Register, Character 27	For future use.
LEAK_TESTERO.Spare_Ascii_Out_String_Register_28	SINT	Spare Ascii Register, Character 28	For future use.
LEAK_TESTERO.Spare_Ascii_Out_String_Register_29	SINT	Spare Ascii Register, Character 29	For future use.
LEAK_TESTERO.Spare_Ascii_Out_String_Register_30	SINT	Spare Ascii Register, Character 30	For future use.
LEAK_TESTERO.Spare_Ascii_Out_String_Register_31	SINT	Spare Ascii Register, Character 31	For future use.
LEAK_TESTERO.Spare_Ascii_Out_String_Register_32	SINT	Spare Ascii Register, Character 32	For future use.
LEAK_TESTERO.Spare_Ascii_Out_String_Register_33	SINT	Spare Ascii Register, Character 33	For future use.
LEAK_TESTERO.Spare_Ascii_Out_String_Register_34	SINT	Spare Ascii Register, Character 34	For future use.
LEAK_TESTERO.Spare_Ascii_Out_String_Register_35	SINT	Spare Ascii Register, Character 35	For future use.
LEAK_TESTERO.Spare_Ascii_Out_String_Register_36	SINT	Spare Ascii Register, Character 36	For future use.
LEAK_TESTERO.Spare_Ascii_Out_String_Register_37	SINT	Spare Ascii Register, Character 37	For future use.
LEAK_TESTERO.Spare_Ascii_Out_String_Register_38	SINT	Spare Ascii Register, Character 38	For future use.
LEAK_TESTERO.Spare_Ascii_Out_String_Register_39	SINT	Spare Ascii Register, Character 39	For future use.
LEAK_TESTERO.Spare_Ascii_Out_String_Register_40	SINT	Spare Ascii Register, Character 40	For future use.
LEAK_TESTERO.Spare_Ascii_Out_String_Register_41	SINT	Spare Ascii Register, Character 41	For future use.
LEAK_TESTERO.Spare_Ascii_Out_String_Register_42	SINT	Spare Ascii Register, Character 42	For future use.

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LEAK_TESTERO.Spare_Ascii_Out_String_Register_43	SINT	Spare Ascii Register, Character 43	For future use.
LEAK_TESTERO.Spare_Ascii_Out_String_Register_44	SINT	Spare Ascii Register, Character 44	For future use.
LEAK_TESTERO.Spare_Ascii_Out_String_Register_45	SINT	Spare Ascii Register, Character 45	For future use.
LEAK_TESTERO.Spare_Ascii_Out_String_Register_46	SINT	Spare Ascii Register, Character 46	For future use.
LEAK_TESTERO.Spare_Ascii_Out_String_Register_47	SINT	Spare Ascii Register, Character 47	For future use.
LEAK_TESTERO.Spare_Ascii_Out_String_Register_48	SINT	Spare Ascii Register, Character 48	For future use.
LEAK_TESTERO.Spare_Ascii_Out_String_Register_49	SINT	Spare Ascii Register, Character 49	For future use.
LEAK_TESTERO.Spare_Ascii_Out_String_Register_50	SINT	Spare Ascii Register, Character 50	For future use.
LEAK_TESTERO.Spare_Ascii_Out_String_Register_51	SINT	Spare Ascii Register, Character 51	For future use.
LEAK_TESTERO.Spare_Ascii_Out_String_Register_52	SINT	Spare Ascii Register, Character 52	For future use.
LEAK_TESTERO.Spare_Ascii_Out_String_Register_53	SINT	Spare Ascii Register, Character 53	For future use.
LEAK_TESTERO.Spare_Ascii_Out_String_Register_54	SINT	Spare Ascii Register, Character 54	For future use.
LEAK_TESTERO.Spare_Ascii_Out_String_Register_55	SINT	Spare Ascii Register, Character 55	For future use.
LEAK_TESTERO.Spare_Ascii_Out_String_Register_56	SINT	Spare Ascii Register, Character 56	For future use.
LEAK_TESTERO.Spare_Ascii_Out_String_Register_57	SINT	Spare Ascii Register, Character 57	For future use.
LEAK_TESTERO.Spare_Ascii_Out_String_Register_58	SINT	Spare Ascii Register, Character 58	For future use.
LEAK_TESTERO.Spare_Ascii_Out_String_Register_59	SINT	Spare Ascii Register, Character 59	For future use.
LEAK_TESTERO.Spare_Ascii_Out_String_Register_60	SINT	Spare Ascii Register, Character 60	For future use.
LEAK_TESTERO.Spare_Ascii_Out_String_Register_61	SINT	Spare Ascii Register, Character 61	For future use.

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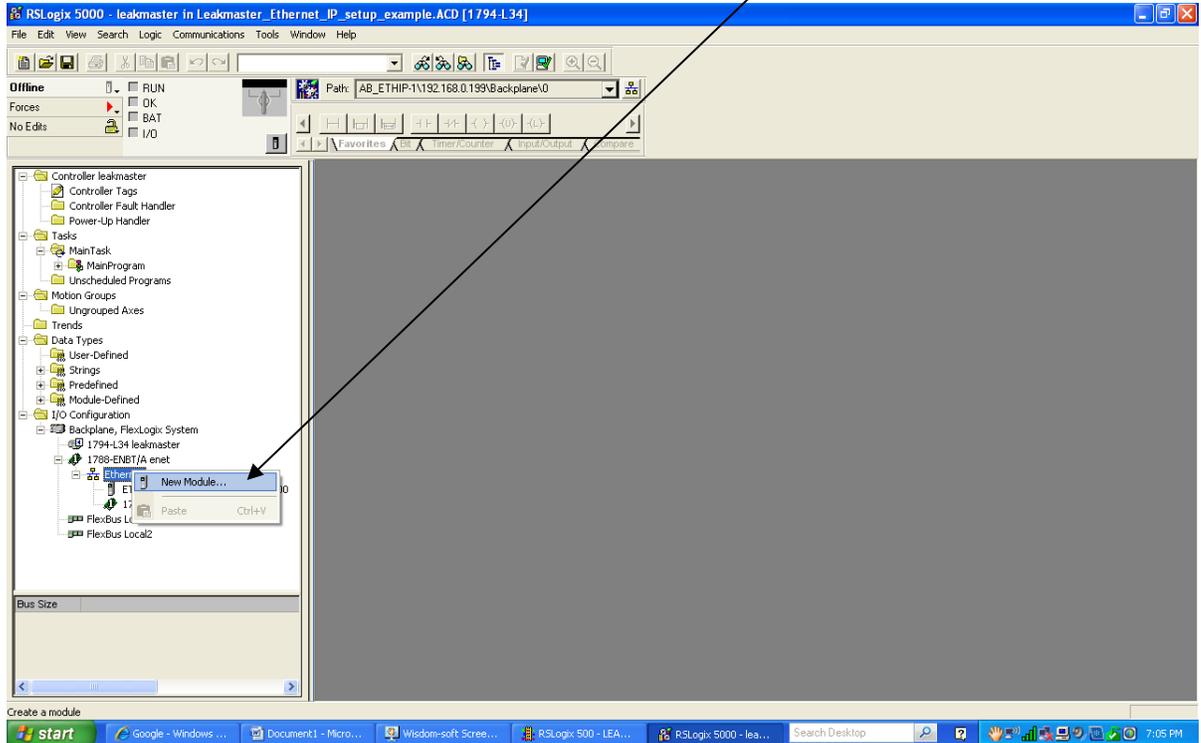
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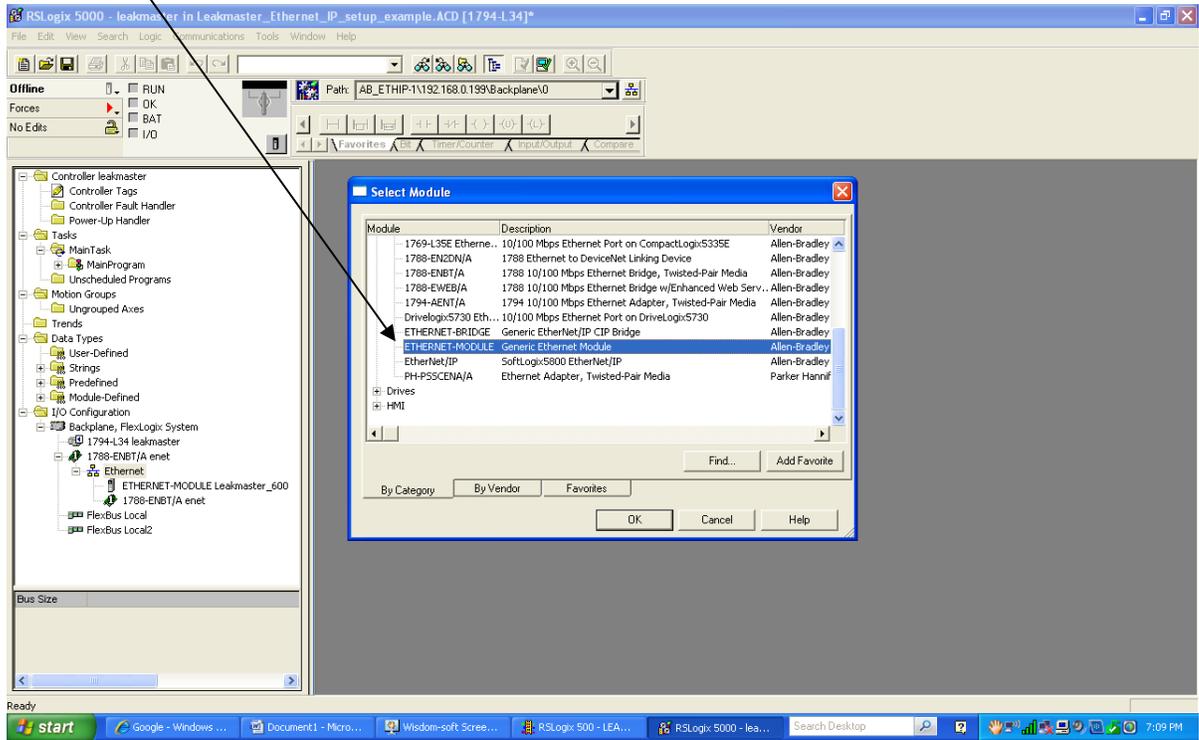
## 8.2.4 AB Control Logix Setup (using Generic Ethernet Driver)

The following steps display the steps required to introduce the tester to a Control Logix controls system. A sample Control Logix Program is included on the LeakMaster USB memory stick. This program comments all of the used addresses.

- 16) Once you have your Logix program started, Add a Generic Ethernet Module as shown below.



17) Select the ETHERNET-MODULE (Generic Ethernet Module) as shown below.



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1) Name the Module

2) Set Input Assy Inst. to 100  
Set Size to 100

3) Set Output Assy Inst. to 150  
Set Size to 100

4) Set Comm Format to  
Data - DINT

5) Set Config. Assy Inst. to 1  
Set Config. Size to 0

6) Assign the IP Address

7) Click the Connection  
tab

8) Click the check box  
to select Unicast

## Ethernet I/O Mapping

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After the Ethernet Module has been setup, the following Data points will be automatically created as shown below on the two screen shots. The I/O shown below already has comments in the Description column (they will not be present until the user enters them in or imports them from the example Control Logix program included in LeakMaster USB stick).

## Input Data:

Name	Value	Forc	Style	Data	Description
Leakmaster_EIP:1	{...}	{...}		AB.ETH...	
Leakmaster_EIP:1>Data	{...}	{...}	Decimal	DINT[10...	
Leakmaster_EIP:1>Data[0]	0		Decimal	DINT	System Level Monitor Bits
Leakmaster_EIP:1>Data[1]	0		Decimal	DINT	Remote Control Bits
Leakmaster_EIP:1>Data[2]	0		Decimal	DINT	Digital I/O Status Bits
Leakmaster_EIP:1>Data[3]	0		Decimal	DINT	Program Selected
Leakmaster_EIP:1>Data[4]	0		Decimal	DINT	Pretest Delay Time
Leakmaster_EIP:1>Data[5]	0		Decimal	DINT	Fill Time
Leakmaster_EIP:1>Data[6]	0		Decimal	DINT	Stabilize Time
Leakmaster_EIP:1>Data[7]	0		Decimal	DINT	Test Time
Leakmaster_EIP:1>Data[8]	0		Decimal	DINT	Vent Time
Leakmaster_EIP:1>Data[9]	0		Decimal	DINT	Cal Relax Time
Leakmaster_EIP:1>Data[10]	0		Decimal	DINT	Minimum Pressure
Leakmaster_EIP:1>Data[11]	0		Decimal	DINT	Pressure Setpoint
Leakmaster_EIP:1>Data[12]	0		Decimal	DINT	Leak Orifice Value
Leakmaster_EIP:1>Data[13]	0		Decimal	DINT	Comp Value
Leakmaster_EIP:1>Data[14]	0		Decimal	DINT	Cal Value
Leakmaster_EIP:1>Data[15]	0		Decimal	DINT	Volume
Leakmaster_EIP:1>Data[16]	0		Decimal	DINT	Pressure Unit ID
Leakmaster_EIP:1>Data[17]	0		Decimal	DINT	Flow Unit ID
Leakmaster_EIP:1>Data[18]	0		Decimal	DINT	Pressure Unit Char 1-4
Leakmaster_EIP:1>Data[19]	0		Decimal	DINT	Pressure Unit Char 5-8
Leakmaster_EIP:1>Data[20]	0		Decimal	DINT	Flow Unit Char 1-4
Leakmaster_EIP:1>Data[21]	0		Decimal	DINT	Flow Unit Char 5-8
Leakmaster_EIP:1>Data[22]	0		Decimal	DINT	Pass Jump To Program
Leakmaster_EIP:1>Data[23]	0		Decimal	DINT	Fail Jump To Program
Leakmaster_EIP:1>Data[24]	0		Decimal	DINT	Test Type
Leakmaster_EIP:1>Data[25]	0		Decimal	DINT	Num of Gage Runs

## Output Data:

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Name	Value	Style	Data Type	Description	
Leakmaster_EIP:O.Data	{ ... }	{ ... }	Decimal	DINT[10...	
Leakmaster_EIP:O.Data[0]	0	0	Decimal	DINT	System Monitor Bits
Leakmaster_EIP:O.Data[1]	0	2...	Decimal	DINT	Remote Control Bits
Leakmaster_EIP:O.Data[2]	0		Decimal	DINT	Program Select
Leakmaster_EIP:O.Data[3]	0		Decimal	DINT	Pretest Delay Time
Leakmaster_EIP:O.Data[4]	0		Decimal	DINT	Fill Time
Leakmaster_EIP:O.Data[5]	0		Decimal	DINT	Stabilize Time
Leakmaster_EIP:O.Data[6]	0		Decimal	DINT	Test Time
Leakmaster_EIP:O.Data[7]	0		Decimal	DINT	Vent Time
Leakmaster_EIP:O.Data[8]	0		Decimal	DINT	Cal Relax Time
Leakmaster_EIP:O.Data[9]	0		Decimal	DINT	Minimum Pressure
Leakmaster_EIP:O.Data[10]	0		Decimal	DINT	Maximum Pressure
Leakmaster_EIP:O.Data[11]	0		Decimal	DINT	Minimum Leak
Leakmaster_EIP:O.Data[12]	0		Decimal	DINT	Maximum Leak
Leakmaster_EIP:O.Data[13]	0		Decimal	DINT	Pressure Setpoint
Leakmaster_EIP:O.Data[14]	0		Decimal	DINT	Leak Orifice Value
Leakmaster_EIP:O.Data[15]	0		Decimal	DINT	Comp Value
Leakmaster_EIP:O.Data[16]	0		Decimal	DINT	Cal Value
Leakmaster_EIP:O.Data[17]	0		Decimal	DINT	Volume
Leakmaster_EIP:O.Data[18]	0		Decimal	DINT	Spare
Leakmaster_EIP:O.Data[19]	0		Decimal	DINT	Spare
Leakmaster_EIP:O.Data[20]	0		Decimal	DINT	Spare
Leakmaster_EIP:O.Data[21]	0		Decimal	DINT	Pressure Unit ID
Leakmaster_EIP:O.Data[22]	0		Decimal	DINT	Flow Unit ID
Leakmaster_EIP:O.Data[23]	0		Decimal	DINT	Test Type ID
Leakmaster_EIP:O.Data[24]	0		Decimal	DINT	Part Number 1-4
Leakmaster_EIP:O.Data[25]	0		Decimal	DINT	Part Number 5-8
Leakmaster_EIP:O.Data[26]	0		Decimal	DINT	Part Number 9-12

At this point the Ethernet IP configuration is complete. Please refer to the sample program to see how to implement the I/O or see the address mapping and descriptions on the following page.

## 8.2.5 Ethernet IP Generic I/O Address Map

Addresses start on the following page.

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ADDRESS	TYPE	DESCRIPTION	FUNCTION
<b>INPUTS</b>			
Leakmaster_EIP:I.DATA[0]	DINT	System Level Monitor Word	For Future Use
Leakmaster_EIP:I.DATA[1]	DINT	Test Status Word	See bit descriptions below.
Leakmaster_EIP:I.DATA[1].0	BOOL	Ready	This address will go high if the tester is ready to start a test.
Leakmaster_EIP:I.DATA[1].1	BOOL	Error	This address will go high when any error condition exists.
Leakmaster_EIP:I.DATA[1].2	BOOL	Test Passed	This address will go high as soon as a pass condition is detected (before the vent step is completed). This address will stay high until the next test is started.
Leakmaster_EIP:I.DATA[1].3	BOOL	Test Failed	This address will go high as soon as a fail condition is detected (before the vent step is completed). Once high, this address will stay high until the next test is started.
Leakmaster_EIP:I.DATA[1].4	BOOL	Test In Progress	This address will go high anytime a test is in progress.
Leakmaster_EIP:I.DATA[1].5	BOOL	Gross Leak	This address will go high anytime a gross leak failure is detected (before the vent step is completed). Once high, this address will stay high until the next test is started.
Leakmaster_EIP:I.DATA[1].6	BOOL	Test Pressure High	This address will go high anytime the test pressure is higher than the Maximum test pressure limit. Once high this address will stay high until the next test is started.
Leakmaster_EIP:I.DATA[1].7	BOOL	Tooling Fault	Under development
Leakmaster_EIP:I.DATA[1].8	BOOL	Cal Status/Valid	This address will be high if the current program has been previously calibrated.
Leakmaster_EIP:I.DATA[1].9	BOOL	SPARE	Reserved for future use.
Leakmaster_EIP:I.DATA[1].10	BOOL	SPARE	Reserved for future use.
Leakmaster_EIP:I.DATA[1].11	BOOL	Teach Mode Enabled	Under development
Leakmaster_EIP:I.DATA[1].12	BOOL	Pre Test Delay Step	This address will go high during the Pre Test Step
Leakmaster_EIP:I.DATA[1].13	BOOL	Fill Step	This address will go high during the Fill Step
Leakmaster_EIP:I.DATA[1].14	BOOL	Stabilize Step	This address will go high during the Stabilize Step
Leakmaster_EIP:I.DATA[1].15	BOOL	Test Step	This address will go high during the Test Step
Leakmaster_EIP:I.DATA[1].16	BOOL	Vent Step	This address will go high during the Vent Step
Leakmaster_EIP:I.DATA[1].17	BOOL	Gage/Cal Relax Step	This address will go high when the Calibration Relax Timer is timing or when the Gage Relax Timer is timing.
Leakmaster_EIP:I.DATA[1].18	BOOL	Gage Mode Enabled	This address will go high anytime the Gage Mode is enabled.

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Leakmaster_EIP:I.DATA[1].19	BOOL	Calibration Enabled	This address will go high anytime a program Calibration is enabled.
Leakmaster_EIP:I.DATA[11].20	BOOL	Calibration Comp Step	This address will go high during the first step (compensation step) of a mass flow or pressure decay calibration routine.
Leakmaster_EIP:I.DATA[1].21	BOOL	Calibration Cal Step	This address will go high during the second step (calibration step) of r pressure decay calibration routine. Does not apply to a mass flow test.
Leakmaster_EIP:I.DATA[2]	DINT	Digital I/O Status Word	See bit descriptions below.
Leakmaster_EIP:I.DATA[2].0	BOOL	Digital Input 1 Status	This address returns the status of input 1 on the digital I/O connector (DB37 connector).
Leakmaster_EIP:I.DATA[2].1	BOOL	Digital Input 2 Status	This address returns the status of input 2 on the digital I/O connector (DB37 connector).
Leakmaster_EIP:I.DATA[2].2	BOOL	Digital Input 3 Status	This address returns the status of input 3 on the digital I/O connector (DB37 connector).
Leakmaster_EIP:I.DATA[2].3	BOOL	Digital Input 4 Status	This address returns the status of input 4 on the digital I/O connector (DB37 connector).
Leakmaster_EIP:I.DATA[2].4	BOOL	Digital Input 5 Status	This address returns the status of input 5 on the digital I/O connector (DB37 connector).
Leakmaster_EIP:I.DATA[2].5	BOOL	Digital Input 6 Status	This address returns the status of input 6 on the digital I/O connector (DB37 connector).
Leakmaster_EIP:I.DATA[2].6	BOOL	Digital Input 7 Status	This address returns the status of input 7 on the digital I/O connector (DB37 connector).
Leakmaster_EIP:I.DATA[2].7	BOOL	Digital Input 8 Status	This address returns the status of input 8 on the digital I/O connector (DB37 connector).
Leakmaster_EIP:I.DATA[2].8	BOOL	Digital Input 9 Status	This address returns the status of input 9 on the digital I/O connector (DB37 connector).
Leakmaster_EIP:I.DATA[2].9	BOOL	Digital Input 10 Status	This address returns the status of input 10 on the digital I/O connector (DB37 connector).
Leakmaster_EIP:I.DATA[2].10	BOOL	Digital Input 11 Status	This address returns the status of input 11 on the digital I/O connector (DB37 connector).
Leakmaster_EIP:I.DATA[2].11	BOOL	Digital Input 12 Status	This address returns the status of input 12 on the digital I/O connector (DB37 connector).
Leakmaster_EIP:I.DATA[2].12	BOOL	Digital Input 13 Status	This address returns the status of input 13 on the digital I/O connector (DB37 connector).
Leakmaster_EIP:I.DATA[2].13	BOOL	Digital Input 14 Status	This address returns the status of input 14 on the digital I/O connector (DB37 connector).
Leakmaster_EIP:I.DATA[2].14	BOOL	Digital Input 15 Status	This address returns the status of input 15 on the digital I/O connector (DB37 connector).
Leakmaster_EIP:I.DATA[2].15	BOOL	Digital Input 16 Status	This address returns the status of input 16 on the digital I/O connector (DB37 connector).
Leakmaster_EIP:I.DATA[2].16	BOOL	Digital Output 1 Status	This address returns the status of output 1 on the digital I/O connector (DB37 connector).
Leakmaster_EIP:I.DATA[2].17	BOOL	Digital Output 2 Status	This address returns the status of output 2 on the digital I/O connector (DB37 connector).
Leakmaster_EIP:I.DATA[2].18	BOOL	Digital Output 3 Status	This address returns the status of output 3 on the digital I/O connector (DB37 connector).

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Leakmaster_EIP:I.DATA[2].19	BOOL	Digital Output 4 Status	This address returns the status of output 4 on the digital I/O connector (DB37 connector).
Leakmaster_EIP:I.DATA[2].20	BOOL	Digital Output 5 Status	This address returns the status of output 5 on the digital I/O connector (DB37 connector).
Leakmaster_EIP:I.DATA[2].21	BOOL	Digital Output 6 Status	This address returns the status of output 6 on the digital I/O connector (DB37 connector).
Leakmaster_EIP:I.DATA[2].22	BOOL	Digital Output 7 Status	This address returns the status of output 7 on the digital I/O connector (DB37 connector).
Leakmaster_EIP:I.DATA[2].23	BOOL	Digital Output 8 Status	This address returns the status of output 8 on the digital I/O connector (DB37 connector).
Leakmaster_EIP:I.DATA[2].24	BOOL	Digital Output 9 Status	This address returns the status of output 9 on the digital I/O connector (DB37 connector).
Leakmaster_EIP:I.DATA[2].25	BOOL	Digital Output 10 Status	This address returns the status of output 10 on the digital I/O connector (DB37 connector).
Leakmaster_EIP:I.DATA[2].26	BOOL	Digital Output 11 Status	This address returns the status of output 11 on the digital I/O connector (DB37 connector).
Leakmaster_EIP:I.DATA[2].27	BOOL	Digital Output 12 Status	This address returns the status of output 12 on the digital I/O connector (DB37 connector).
Leakmaster_EIP:I.DATA[2].28	BOOL	Digital Output 13 Status	This address returns the status of output 13 on the digital I/O connector (DB37 connector).
Leakmaster_EIP:I.DATA[2].29	BOOL	Digital Output 14 Status	This address returns the status of output 14 on the digital I/O connector (DB37 connector).
Leakmaster_EIP:I.DATA[2].30	BOOL	Digital Output 15 Status	This address returns the status of output 15 on the digital I/O connector (DB37 connector).
Leakmaster_EIP:I.DATA[2].31	BOOL	Digital Output 16 Status	This address returns the status of output 16 on the digital I/O connector (DB37 connector).
Leakmaster_EIP:I.DATA[3]	DINT	SPARE	Reserved for future use.
Leakmaster_EIP:I.DATA[4]	DINT	SPARE	Reserved for future use.
Leakmaster_EIP:I.DATA[5]	DINT	SPARE	Reserved for future use.
Leakmaster_EIP:I.DATA[6]	DINT	SPARE	Reserved for future use.
Leakmaster_EIP:I.DATA[7]	DINT	SPARE	Reserved for future use.
Leakmaster_EIP:I.DATA[8]	DINT	Program Selected	This address will return the program number of the program that is currently selected.
Leakmaster_EIP:I.DATA[9]	DINT	Pressure Unit ID	This address will return a number designation for the pressure unit that is selected for the current program. 0= PSI, 1= PSIG, 2= PSIA, 3= inH2O, 4= inHg, 5= Bar, 6= mbar, 7= Kpa, 8= PA, 9= kgfcm2
Leakmaster_EIP:I.DATA[10]	DINT	Flow Unit ID	This address will return a number designation for the leak rate unit that is selected for the current program. 0 = SLPM, 1 = sccm, 2= SLPM, 3= SLPS, 4= sccs
Leakmaster_EIP:I.DATA[11]	DINT	Pass Jump To Program	This address will return the current program Jump To Program Number if the program passes test.

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Leakmaster_EIP:I.DATA[12]	DINT	Fail Jump To Program	This address will return the current program Jump To Program Number if the program fails test.
Leakmaster_EIP:I.DATA[13]	DINT	Test Type	This address will return the current program test type. 0 or 1 = Mass Flow, 2 = Pressure Decay (sccm), 3 = Occlusion, 4= Pressure Loss over Time, 5= Metered Loss, 6= Metered Decay, 7= External Fill Loss, 8= External Fill Decay
Leakmaster_EIP:I.DATA[14]	DINT	Num of Gage Runs	This address will return the number of Gage cycles to run when Gage Mode is enabled.
Leakmaster_EIP:I.DATA[15]	DINT	Gage Test Number	This address will return the current Gage Cycle number.
Leakmaster_EIP:I.DATA[16]	DINT	Fill Step Percent	This address will display a live percentage of completion for the Fill Step. 0-100 percent.
Leakmaster_EIP:I.DATA[17]	DINT	Stabilize Step Percent	This address will display a live percentage of completion for the Stabilize Step. 0-100 percent.
Leakmaster_EIP:I.DATA[18]	DINT	Test Step Percent	This address will display a live percentage of completion for the Test Step. 0-100 percent.
Leakmaster_EIP:I.DATA[19]	DINT	Vent Step Percent	This address will display a live percentage of completion for the Vent Step. 0-100 percent.
Leakmaster_EIP:I.DATA[20]	DINT	Security Level	0=nobody logged in, 1=Operator user logged in, 5=Supervisor user logged in, 9=Admin user logged in, 50=Calibrate user logged in.
Leakmaster_EIP:I.DATA[21]	DINT	Spare	Reserved for future use.
Leakmaster_EIP:I.DATA[22]	DINT	Spare	Reserved for future use.
Leakmaster_EIP:I.DATA[23]	DINT	Spare	Reserved for future use.
Leakmaster_EIP:I.DATA[24]	DINT	Spare	Reserved for future use.
Leakmaster_EIP:I.DATA[25]	DINT	Spare	Reserved for future use.
Leakmaster_EIP:I.DATA[26]	DINT	Spare	Reserved for future use.
Leakmaster_EIP:I.DATA[27]	DINT	Spare	Reserved for future use.
Leakmaster_EIP:I.DATA[28]	DINT	Spare	Reserved for future use.
Leakmaster_EIP:I.DATA[29]	DINT	Spare	Reserved for future use.
Leakmaster_EIP:I.DATA[30]	DINT	Spare	Reserved for future use.
Leakmaster_EIP:I.DATA[31]	DINT	Spare	Reserved for future use.
Leakmaster_EIP:I.DATA[32]	FLOAT	Pretest Delay Time	This address will return the current program timer preset value of the Pretest Delay Timer.
Leakmaster_EIP:I.DATA[33]	FLOAT	Fill Time	This address will return the current program timer preset value of the Fill Timer.
Leakmaster_EIP:I.DATA[34]	FLOAT	Stabilize Time	This address will return the current program timer preset value of the Stabilize Timer.
Leakmaster_EIP:I.DATA[35]	FLOAT	Test Time	This address will return the current program timer preset value of the Test Timer.
Leakmaster_EIP:I.DATA[36]	FLOAT	Vent Time	This address will return the current program timer preset value of the Vent Timer.
Leakmaster_EIP:I.DATA[37]	FLOAT	Cal Relax Time	This address will return the current program timer preset value of the Calibration Relax Timer.

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Leakmaster_EIP:I.DATA[38]	FLOAT	Gage Delay	This address will return the current program timer preset value of the Gage Relax Delay Timer.
Leakmaster_EIP:I.DATA[39]	FLOAT	Minimum Pressure	This address will return the current program Minimum Pressure limit value.
Leakmaster_EIP:I.DATA[40]	FLOAT	Maximum Pressure	This address will return the current program Maximum Pressure limit value.
Leakmaster_EIP:I.DATA[41]	FLOAT	Minimum Leak	This address will return the current program Minimum Leak Rate limit value.
Leakmaster_EIP:I.DATA[42]	FLOAT	Maximum Leak	This address will return the current program Maximum Leak Rate limit value.
Leakmaster_EIP:I.DATA[43]	FLOAT	Pressure Setpoint	This address will return the current program Minimum Pressure limit value.
Leakmaster_EIP:I.DATA[44]	FLOAT	Leak Orifice Value	This address will return the value of the installed calibrated leak standard.
Leakmaster_EIP:I.DATA[45]	FLOAT	Comp Value	This address will return the current program Comp Value.
Leakmaster_EIP:I.DATA[46]	FLOAT	Cal Value	This address will return the current program Cal Value.
Leakmaster_EIP:I.DATA[47]	FLOAT	Volume	This address will return the current program Volume Calculation.
Leakmaster_EIP:I.DATA[48]	FLOAT	Transducer 1 Pressure Live	This address will return the live pressure of the test pressure transducer.
Leakmaster_EIP:I.DATA[49]	FLOAT	Transducer 1 Pressure Loss Live	This address will return the live pressure loss value during the test step of a pressure decay test.
Leakmaster_EIP:I.DATA[50]	FLOAT	Flow Sensor 1 Flow Live	This address will return the live flow value of the flow sensor.
Leakmaster_EIP:I.DATA[51]	FLOAT	Transducer 2 Pressure Live	Reserved for future use.
Leakmaster_EIP:I.DATA[52]	FLOAT	Transducer 2 Pressure Loss Live	Reserved for future use.
Leakmaster_EIP:I.DATA[53]	FLOAT	Flow Sensor 2 Flow Live	Reserved for future use.
Leakmaster_EIP:I.DATA[54]	FLOAT	Final Test Pressure	This address will return the final test pressure of the previous test.
Leakmaster_EIP:I.DATA[55]	FLOAT	Final Pressure Loss	This address will return the final pressure loss value of the previous pressure decay test.
Leakmaster_EIP:I.DATA[56]	FLOAT	Final Leak Rate	This address will return the final leak rate of the previous test.
Leakmaster_EIP:I.DATA[57]	FLOAT	Spare	Reserved for future use.
Leakmaster_EIP:I.DATA[58]	FLOAT	Spare	Reserved for future use.
Leakmaster_EIP:I.DATA[59]	FLOAT	Spare	Reserved for future use.
Leakmaster_EIP:I.DATA[60]	FLOAT	Spare	Reserved for future use.
Leakmaster_EIP:I.DATA[61]	FLOAT	Spare	Reserved for future use.
Leakmaster_EIP:I.DATA[62]	FLOAT	Spare	Reserved for future use.
Leakmaster_EIP:I.DATA[63]	FLOAT	Spare	Reserved for future use.
Leakmaster_EIP:I.DATA[64]	ASCII	Pressure Unit Characters 1-4	This register will return the current program pressure unit that is selected

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Leakmaster_EIP:I.DATA[65]	ASCII	Pressure Unit Characters 5-8	This register will return the current program pressure unit that is selected
Leakmaster_EIP:I.DATA[66]	ASCII	Flow Unit Characters 1-4	This register will return the current program flow unit that is selected
Leakmaster_EIP:I.DATA[67]	ASCII	Flow Unit Characters 5-8	This register will return the current program flow unit that is selected
Leakmaster_EIP:I.DATA[68]	ASCII	Program Name Characters 1-4	This register will return the current program name
Leakmaster_EIP:I.DATA[69]	ASCII	Program Name Characters 5-8	This register will return the current program name
Leakmaster_EIP:I.DATA[70]	ASCII	Program Name Characters 9-12	This register will return the current program name
Leakmaster_EIP:I.DATA[71]	ASCII	Program Name Characters 13-16	This register will return the current program name
Leakmaster_EIP:I.DATA[72]	ASCII	Program Name Characters 17-20	This register will return the current program name
Leakmaster_EIP:I.DATA[73]	ASCII	Program Name Characters 21-24	This register will return the current program name
Leakmaster_EIP:I.DATA[74]	ASCII	Program Name Characters 25-28	This register will return the current program name
Leakmaster_EIP:I.DATA[75]	ASCII	Program Name Characters 29-32	This register will return the current program name
Leakmaster_EIP:I.DATA[76]	ASCII	Part Number Characters 1-4	This register will return the current scanned (or loaded from the PLC) part number
Leakmaster_EIP:I.DATA[77]	ASCII	Part Number Characters 5-8	This register will return the current scanned (or loaded from the PLC) part number
Leakmaster_EIP:I.DATA[78]	ASCII	Part Number Characters 9-12	This register will return the current scanned (or loaded from the PLC) part number
Leakmaster_EIP:I.DATA[79]	ASCII	Part Number Characters 13-16	This register will return the current scanned (or loaded from the PLC) part number
Leakmaster_EIP:I.DATA[80]	ASCII	Part Number Characters 17-20	This register will return the current scanned (or loaded from the PLC) part number
Leakmaster_EIP:I.DATA[81]	ASCII	Part Number Characters 21-24	This register will return the current scanned (or loaded from the PLC) part number
Leakmaster_EIP:I.DATA[82]	ASCII	Part Number Characters 25-28	This register will return the current scanned (or loaded from the PLC) part number
Leakmaster_EIP:I.DATA[83]	ASCII	Part Number Characters 29-32	This register will return the current scanned (or loaded from the PLC) part number
Leakmaster_EIP:I.DATA[84]	ASCII	Part Number Characters 33-36	This register will return the current scanned (or loaded from the PLC) part number
Leakmaster_EIP:I.DATA[85]	ASCII	Part Number Characters 37-40	This register will return the current scanned (or loaded from the PLC) part number
Leakmaster_EIP:I.DATA[86]	ASCII	Part Number Characters 41-44	This register will return the current scanned (or loaded from the PLC) part number
Leakmaster_EIP:I.DATA[87]	ASCII	Part Number Characters 45-48	This register will return the current scanned (or loaded from the PLC) part number
Leakmaster_EIP:I.DATA[88]	ASCII	Part Number Characters 49-52	This register will return the current scanned (or loaded from the PLC) part number

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Leakmaster_EIP:I.DATA[89]	ASCII	Part Number Characters 53-56	This register will return the current scanned (or loaded from the PLC) part number
Leakmaster_EIP:I.DATA[90]	ASCII	Part Number Characters 57-60	This register will return the current scanned (or loaded from the PLC) part number
Leakmaster_EIP:I.DATA[91]	ASCII	Part Number Characters 61-64	This register will return the current scanned (or loaded from the PLC) part number
Leakmaster_EIP:I.DATA[92]	ASCII	Part Number Characters 65-68	This register will return the current scanned (or loaded from the PLC) part number
Leakmaster_EIP:I.DATA[93]	ASCII	Part Number Characters 69-72	This register will return the current scanned (or loaded from the PLC) part number
Leakmaster_EIP:I.DATA[94]	ASCII	Part Number Characters 73-76	This register will return the current scanned (or loaded from the PLC) part number
Leakmaster_EIP:I.DATA[95]	ASCII	Part Number Characters 77-80	This register will return the current scanned (or loaded from the PLC) part number
Leakmaster_EIP:I.DATA[96]	ASCII	Spare	Reserved for future use.
Leakmaster_EIP:I.DATA[97]	ASCII	Spare	Reserved for future use.
Leakmaster_EIP:I.DATA[98]	ASCII	Spare	Reserved for future use.
Leakmaster_EIP:I.DATA[99]	ASCII	Spare	Reserved for future use.
<b>OUTPUTS</b>			
Leakmaster_EIP:O.DATA[0]	DINT	System Monitor Bits	
Leakmaster_EIP:O.DATA[1]	BOOL	Remote Control Bits	This word contains all of the remote control bits.
Leakmaster_EIP:O.DATA[1].0	BOOL	Start	Setting this bit high will Start a test cycle if the tester is Ready.
Leakmaster_EIP:O.DATA[1].1	BOOL	Stop	Setting this bit high during a test will immediately Stop the test. This bit must be low to start a test.
Leakmaster_EIP:O.DATA[1].2	BOOL	Pause	Setting this bit high during a test will pause the test until the Start bit is set high.
Leakmaster_EIP:O.DATA[1].3	BOOL	Air On	Setting this bit high will deliver test air to the test port.
Leakmaster_EIP:O.DATA[1].4	BOOL	Leak On	Setting this bit high will turn on the internal calibrated leak standard.
Leakmaster_EIP:O.DATA[1].5	BOOL	Enable Calibration	Setting this bit high will enable program calibration mode.
Leakmaster_EIP:O.DATA[1].6	BOOL	Enable Teach	Under development
Leakmaster_EIP:O.DATA[1].7	BOOL	Change Program	Setting this bit high will allow the current program to be changed to another program.
Leakmaster_EIP:O.DATA[1].8	BOOL	Reset Outputs	Setting this bit high will the last pass/fail bits low, set the last test pressure, last test pressure loss, and last test flow rate to 0
Leakmaster_EIP:O.DATA[1].9	BOOL	Clear Error	Setting this bit high will clear any errors if the error has been corrected.
Leakmaster_EIP:O.DATA[1].10	BOOL	Safety Circuit OK	Under development
Leakmaster_EIP:O.DATA[1].11	BOOL	Part Present	Under development
Leakmaster_EIP:O.DATA[1].12	BOOL	Test Air Pressure Detected	Under development
Leakmaster_EIP:O.DATA[1].13	BOOL	Incoming Air Pressure Present	Under development
Leakmaster_EIP:O.DATA[2]	DINT	Spare	Reserved for future use.
Leakmaster_EIP:O.DATA[3]	DINT	Spare	Reserved for future use.

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Leakmaster_EIP:O.DATA[4]	DINT	Spare	Reserved for future use.
Leakmaster_EIP:O.DATA[5]	DINT	Spare	Reserved for future use.
Leakmaster_EIP:O.DATA[6]	DINT	Spare	Reserved for future use.
Leakmaster_EIP:O.DATA[7]	DINT	Spare	Reserved for future use.
Leakmaster_EIP:O.DATA[8]	DINT	Program Select	Set this register to the program number that you wish to select and then set the Change Program bit high to make the change.
Leakmaster_EIP:O.DATA[9]	DINT	Pressure Unit ID	Set this register to the desired pressure unit (functions in Slave Mode only)
Leakmaster_EIP:O.DATA[10]	DINT	Flow Unit ID	Set this register to the desired leak rate unit (functions in Slave Mode only)
Leakmaster_EIP:O.DATA[11]	DINT	Test Type ID	Set this register to the desired test type (Mass Flow or Pressure Decay) (functions in Slave Mode only)
Leakmaster_EIP:O.DATA[12]	DINT	Spare	Reserved for future use.
Leakmaster_EIP:O.DATA[13]	DINT	Spare	Reserved for future use.
Leakmaster_EIP:O.DATA[14]	DINT	Spare	Reserved for future use.
Leakmaster_EIP:O.DATA[15]	DINT	Spare	Reserved for future use.
Leakmaster_EIP:O.DATA[16]	DINT	Spare	Reserved for future use.
Leakmaster_EIP:O.DATA[17]	DINT	Spare	Reserved for future use.
Leakmaster_EIP:O.DATA[18]	DINT	Spare	Reserved for future use.
Leakmaster_EIP:O.DATA[19]	DINT	Spare	Reserved for future use.
Leakmaster_EIP:O.DATA[20]	DINT	Spare	Reserved for future use.
Leakmaster_EIP:O.DATA[21]	DINT	Spare	Reserved for future use.
Leakmaster_EIP:O.DATA[22]	DINT	Spare	Reserved for future use.
Leakmaster_EIP:O.DATA[23]	DINT	Spare	Reserved for future use.
Leakmaster_EIP:O.DATA[24]	DINT	Spare	Reserved for future use.
Leakmaster_EIP:O.DATA[25]	DINT	Spare	Reserved for future use.
Leakmaster_EIP:O.DATA[26]	DINT	Spare	Reserved for future use.
Leakmaster_EIP:O.DATA[27]	DINT	Spare	Reserved for future use.
Leakmaster_EIP:O.DATA[28]	DINT	Spare	Reserved for future use.
Leakmaster_EIP:O.DATA[29]	DINT	Spare	Reserved for future use.
Leakmaster_EIP:O.DATA[30]	DINT	Spare	Reserved for future use.
Leakmaster_EIP:O.DATA[31]	DINT	Spare	Reserved for future use.
Leakmaster_EIP:O.DATA[32]	FLOAT	Pretest Delay Time	Set this register to the value that you want the Pretest Delay Time to be when running in Slave Mode.
Leakmaster_EIP:O.DATA[33]	FLOAT	Fill Time	Set this register to the value that you want the Fill Time to be when running in Slave Mode.
Leakmaster_EIP:O.DATA[34]	FLOAT	Stabilize Time	Set this register to the value that you want the Stabilize Time to be when running in Slave Mode.
Leakmaster_EIP:O.DATA[35]	FLOAT	Test Time	Set this register to the value that you want the Test Time to be when running in Slave Mode.
Leakmaster_EIP:O.DATA[36]	FLOAT	Vent Time	Set this register to the value that you want the Vent Time to be when running in Slave Mode.
Leakmaster_EIP:O.DATA[37]	FLOAT	Cal Relax Time	Set this register to the value that you want the Cal Relax Time to be when running in Slave Mode.

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Leakmaster_EIP:O.DATA[38]	FLOAT	Gage Delay	Set this register to the value that you want the Gage Relax Time to be when running in Slave Mode.
Leakmaster_EIP:O.DATA[39]	FLOAT	Minimum Pressure	Set this register to the value that you want the Minimum Pressure Limit to be when running in Slave Mode.
Leakmaster_EIP:O.DATA[40]	FLOAT	Maximum Pressure	Set this register to the value that you want the Maximum Pressure Limit to be when running in Slave Mode.
Leakmaster_EIP:O.DATA[41]	FLOAT	Minimum Leak	Set this register to the value that you want the Minimum Leak Limit to be when running in Slave Mode.
Leakmaster_EIP:O.DATA[42]	FLOAT	Maximum Leak	Set this register to the value that you want the Maximum Leak Limit to be when running in Slave Mode.
Leakmaster_EIP:O.DATA[43]	FLOAT	Pressure Set point	Set this register to the value that you want the test Pressure Setpoint to be when running in Slave Mode.
Leakmaster_EIP:O.DATA[44]	FLOAT	Leak Orifice Value	Set this register to the value that you want the installed calibrated leak standard t to be when running in Slave Mode.
Leakmaster_EIP:O.DATA[45]	FLOAT	Comp Value	Set this register to the value that you want the Comp Value to be when running in Slave Mode.
Leakmaster_EIP:O.DATA[46]	FLOAT	Cal Value	Set this register to the value that you want the Cal Value to be when running in Slave Mode. (Only applicable when in pressure decay mode)
Leakmaster_EIP:O.DATA[47]	FLOAT	Volume	Set this register to the value that you want the test Volume Value to be when running in Slave Mode. (Only applicable when in pressure decay mode)
Leakmaster_EIP:O.DATA[48]	FLOAT	Spare	Reserved for future use.
Leakmaster_EIP:O.DATA[49]	FLOAT	Spare	Reserved for future use.
Leakmaster_EIP:O.DATA[50]	FLOAT	Spare	Reserved for future use.
Leakmaster_EIP:O.DATA[51]	FLOAT	Spare	Reserved for future use.
Leakmaster_EIP:O.DATA[52]	FLOAT	Spare	Reserved for future use.
Leakmaster_EIP:O.DATA[53]	FLOAT	Spare	Reserved for future use.
Leakmaster_EIP:O.DATA[54]	FLOAT	Spare	Reserved for future use.
Leakmaster_EIP:O.DATA[55]	FLOAT	Spare	Reserved for future use.
Leakmaster_EIP:O.DATA[56]	FLOAT	Spare	Reserved for future use.
Leakmaster_EIP:O.DATA[57]	FLOAT	Spare	Reserved for future use.
Leakmaster_EIP:O.DATA[58]	FLOAT	Spare	Reserved for future use.
Leakmaster_EIP:O.DATA[59]	FLOAT	Spare	Reserved for future use.
Leakmaster_EIP:O.DATA[60]	FLOAT	Spare	Reserved for future use.
Leakmaster_EIP:O.DATA[61]	FLOAT	Spare	Reserved for future use.
Leakmaster_EIP:O.DATA[62]	FLOAT	Spare	Reserved for future use.
Leakmaster_EIP:O.DATA[63]	FLOAT	Spare	Reserved for future use.

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Leakmaster_EIP:O.DATA[64]	ASCII	Part Number 1-4	Set this register to the character 1-4 value of the part number to load a part number into the results data table.
Leakmaster_EIP:O.DATA[65]	ASCII	Part Number 5-8	Set this register to the character 5-8 value of the part number to load a part number into the results data table.
Leakmaster_EIP:O.DATA[66]	ASCII	Part Number 9-12	Set this register to the character 9-12 value of the part number to load a part number into the results data table.
Leakmaster_EIP:O.DATA[67]	ASCII	Part Number 13-16	Set this register to the character 13-16 value of the part number to load a part number into the results data table.
Leakmaster_EIP:O.DATA[68]	ASCII	Part Number 17-20	Set this register to the character 17-20 value of the part number to load a part number into the results data table.
Leakmaster_EIP:O.DATA[69]	ASCII	Part Number 21-24	Set this register to the character 21-24 value of the part number to load a part number into the results data table.
Leakmaster_EIP:O.DATA[70]	ASCII	Part Number 25-28	Set this register to the character 25-28 value of the part number to load a part number into the results data table.
Leakmaster_EIP:O.DATA[71]	ASCII	Part Number 29-32	Set this register to the character 29-32 value of the part number to load a part number into the results data table.
Leakmaster_EIP:O.DATA[72]	ASCII	Part Number 33-36	Set this register to the character 33-36 value of the part number to load a part number into the results data table.
Leakmaster_EIP:O.DATA[73]	ASCII	Part Number 37-40	Set this register to the character 37-40 value of the part number to load a part number into the results data table.
Leakmaster_EIP:O.DATA[74]	ASCII	Part Number 41-44	Set this register to the character 41-44 value of the part number to load a part number into the results data table.
Leakmaster_EIP:O.DATA[75]	ASCII	Part Number 45-48	Set this register to the character 45-48 value of the part number to load a part number into the results data table.
Leakmaster_EIP:O.DATA[76]	ASCII	Part Number 49-52	Set this register to the character 49-52 value of the part number to load a part number into the results data table.
Leakmaster_EIP:O.DATA[77]	ASCII	Part Number 53-56	Set this register to the character 53-56 value of the part number to load a part number into the results data table.
Leakmaster_EIP:O.DATA[78]	ASCII	Part Number 57-60	Set this register to the character 57-60 value of the part number to load a part number into the results data table.
Leakmaster_EIP:O.DATA[79]	ASCII	Part Number 61-64	Set this register to the character 61-64 value of the part number to load a part number into the results data table.

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Leakmaster_EIP:O.DATA[80]	ASCII	Part Number 65-68	Set this register to the character 65-68 value of the part number to load a part number into the results data table.
Leakmaster_EIP:O.DATA[81]	ASCII	Part Number 69-72	Set this register to the character 69-72 value of the part number to load a part number into the results data table.
Leakmaster_EIP:O.DATA[82]	ASCII	Part Number 73-76	Set this register to the character 73-76 value of the part number to load a part number into the results data table.
Leakmaster_EIP:O.DATA[83]	ASCII	Part Number 77-80	Set this register to the character 77-80 value of the part number to load a part number into the results data table.
Leakmaster_EIP:O.DATA[84]	ASCII	Spare	Reserved for future use.
Leakmaster_EIP:O.DATA[85]	ASCII	Spare	Reserved for future use.
Leakmaster_EIP:O.DATA[86]	ASCII	Spare	Reserved for future use.
Leakmaster_EIP:O.DATA[87]	ASCII	Spare	Reserved for future use.
Leakmaster_EIP:O.DATA[88]	ASCII	Spare	Reserved for future use.
Leakmaster_EIP:O.DATA[89]	ASCII	Spare	Reserved for future use.
Leakmaster_EIP:O.DATA[90]	ASCII	Spare	Reserved for future use.
Leakmaster_EIP:O.DATA[91]	ASCII	Spare	Reserved for future use.
Leakmaster_EIP:O.DATA[92]	ASCII	Spare	Reserved for future use.
Leakmaster_EIP:O.DATA[93]	ASCII	Spare	Reserved for future use.
Leakmaster_EIP:O.DATA[94]	ASCII	Spare	Reserved for future use.
Leakmaster_EIP:O.DATA[95]	ASCII	Spare	Reserved for future use.
Leakmaster_EIP:O.DATA[96]	ASCII	Spare	Reserved for future use.
Leakmaster_EIP:O.DATA[97]	ASCII	Spare	Reserved for future use.
Leakmaster_EIP:O.DATA[98]	ASCII	Spare	Reserved for future use.
Leakmaster_EIP:O.DATA[99]	ASCII	Spare	Reserved for future use.

### 8.2.6 ETHERNET/IP Explicit Communications

Some PLCs such as Micrologics only support explicit communications. This is a simple request response sending commands to the tester and receiving a response back. The data bidirectionally is 32 bytes. This method will be expanded in the future to incorporate additional requests and commands, for now it allows basic tester control and retrieval of test results.

Assembly Instance 154(0x9A)

#### **Request Packet (PLC To Tester)**

Bits 0-3 – Command Bit – Future use, currently set this to 0. In the future this will be used for additional functions.

Bits 4-7 – Control Bits (Matching the current 32 input control bits used by Ethernet/IP Implicit Communications. See output section above for Leakmaster\_EIP:O.DATA[1]

Bits 8-11 – Program Select – DINT 32 bit integer program number (note you still must toggle the change program bit in the control bits to execute a program change after setting this value).

#### **Reply Packet (Tester to PLC)**

Bits 0-3 – Test State Bits – Matches the current 32 output test state bits currently used by Ethernet/IP implicit communications.

Bits 4-7 – Program Selected – DINT32 value of the program currently selected.

Bits 8-11 – Live Pressure – FLOAT32

Bits 12-15 – Live Pressure Loss – FLOAT32

Bits 16-19 – Final Test Pressure – FLOAT32

Bits 20-23 – Final Pressure Loss – FLOAT32

Bits 24-27 – Final Leak Rate – FLOAT32

## 8.3 PROFINET COMMUNICATIONS

Profinet support is an add-on option that must be purchased and installed prior to delivery of the tester. If this is not ordered from the factory, the end user will need to integrate a Ethernet IP to Profinet gateway device.

### 8.3.1 Wiring

Plug an Ethernet cable from the Profinet network into the left side of the tester in the Machine Network RJ45 port.



## 8.3.2 Tester Setup

Profinet communications are established with an Ethernet/IP to Profinet gateway. The tester is setup the same as Ethernet/IP with the exception of setting the “Profinet Gateway” option to “Enabled”. This will reverse the byte order of integer and floating-point values to be compatible with Profinet.

Network Settings

Network Machine Network

Ethernet IP: Enabled ▾

Address Mode: Static ▾

IP Address: 192.168.70.171

Subnet Mask: 255.255.255.0

Profinet Gateway: Disabled ▾ ⓘ

Save Close

## 8.3.3 Siemens TIA Setup

The following steps are required to introduce the tester to a Siemens controls system.

- Install the Anybus X-Gateway GDSML File
- Only if necessary – reset the Anybus X-Gateway Profinet interface to default in TIA software.
- Add the tester as a device.

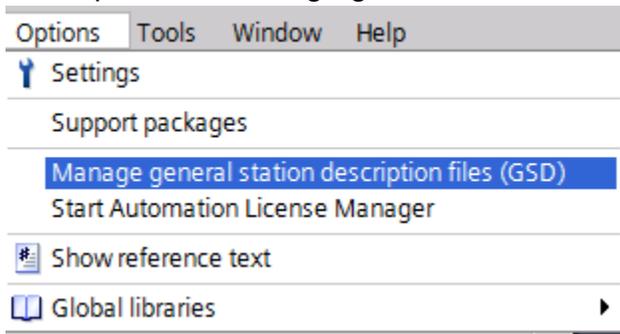
### Install GDSML File

In order to communicate with the Anybus X-Gateway you must first install the GSDML file from Anybus. This file can be downloaded from the following link (search “GSDML File for PROFINET” within the page):

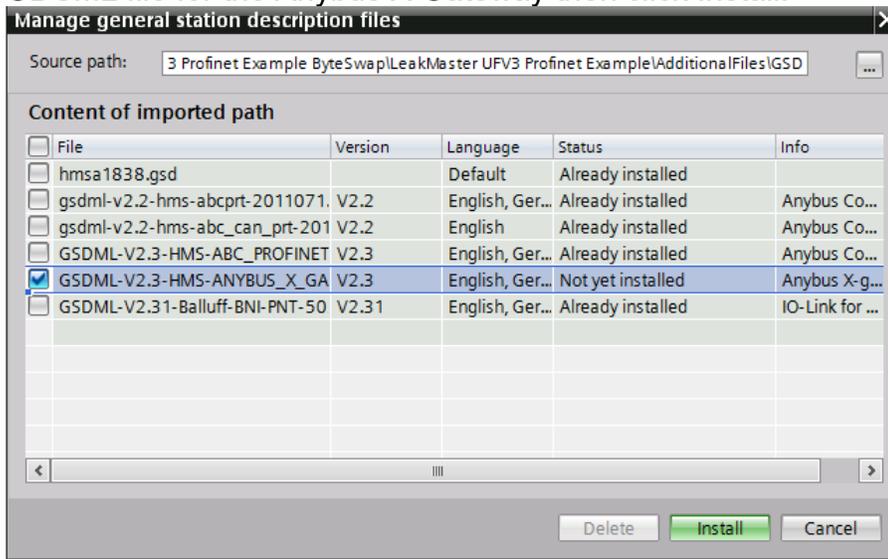
<https://www.anybus.com/support/file-doc-downloads/x-gateway-specific/?ordercode=AB7670>

1. Once the file has been downloaded, unzip it to a known location where you store your GDSML files.
2. Open Siemens TIA application.

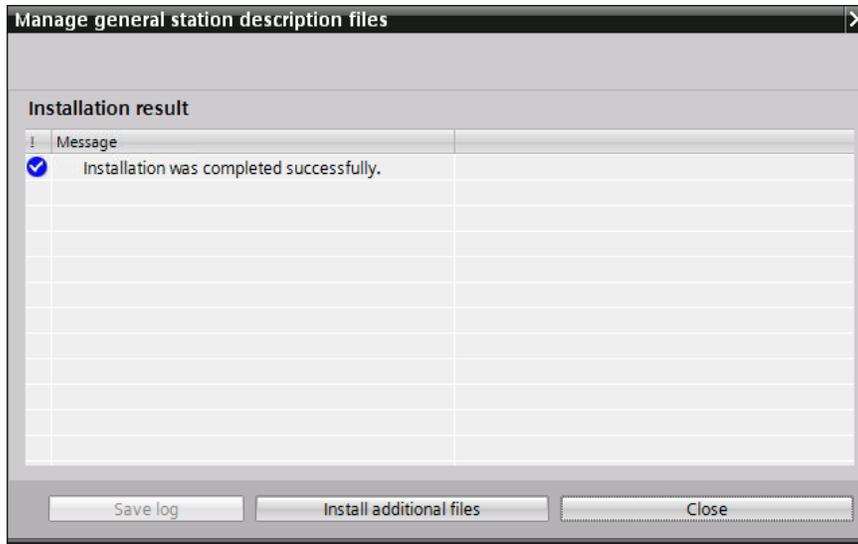
- Click Options -> Manage general station description files (GSD)



- Select the Source path where you unzipped the GSDML files. Check the GSDML file for the Anybus X Gateway then click Install.



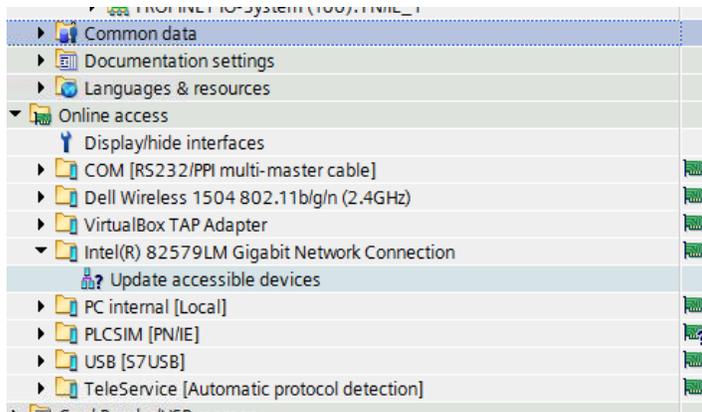
- Once the operation is complete you should receive the following message. You can close this dialog. The GSDML file for the gateway has been successfully installed.



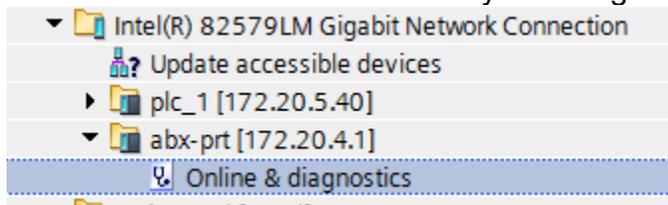
## Resetting Gateway To Factory Defaults

To add the LeakMaster tester to the TIA software it may be necessary to perform a factory reset on the XGateway device so TIA can properly configure the device.

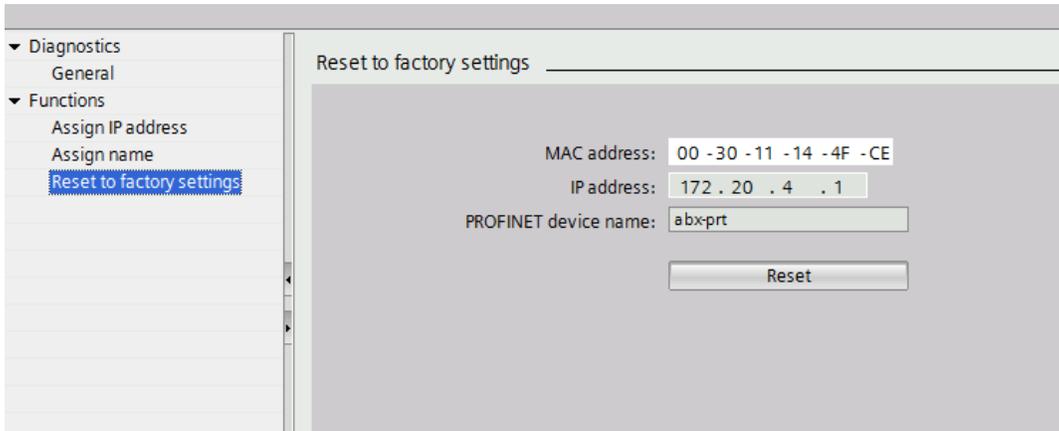
1. In the Project Tree, expand the Online Access section and locate the network device your Profinet devices are connected to. Double click on “Update accessible devices”



2. Once this is complete the new “abx-prt” should be displayed. Expand that device and double-click on “Online and Diagnostics”. \*\* Ensure you have the correct device selected to avoid accidentally resetting the settings on the wrong device.



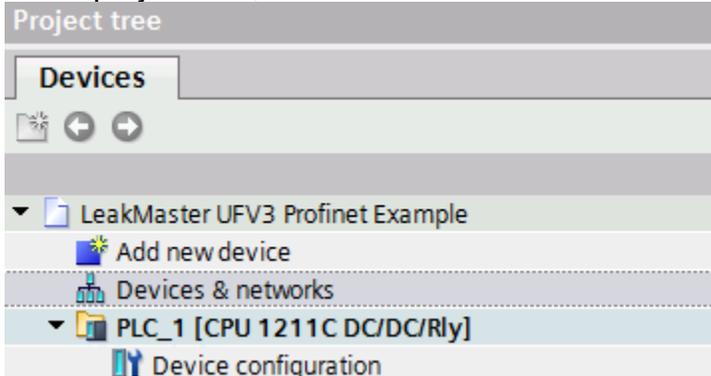
- The Online and Diagnostics window for the device will be displayed. Expand the “Functions” and choose “Reset to factory settings”. Verify the MAC address to ensure it matches the MAC address of the device you want to reset, then click “Reset”.



- The device will be reset and will be ready to be assigned to your project.

### Adding Device To TIA

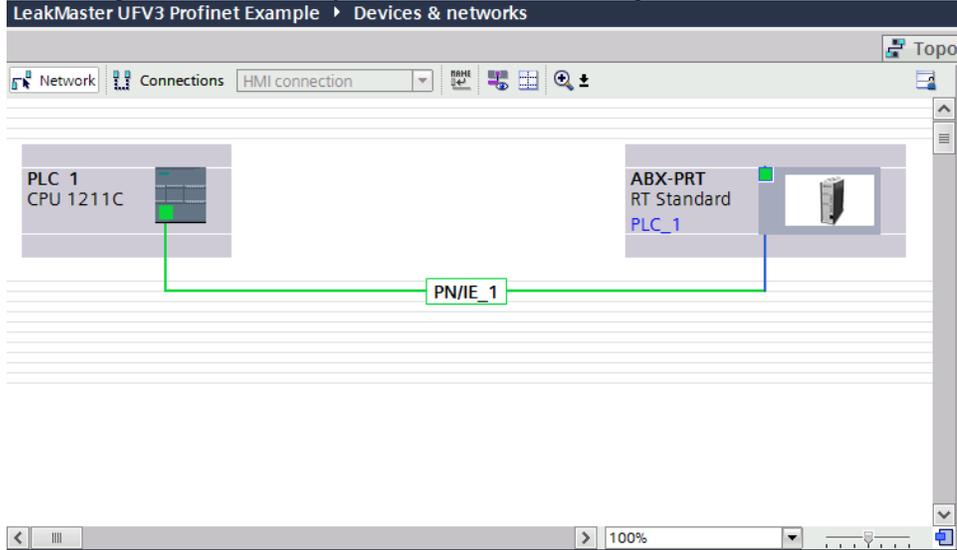
- In the project tree, double click on “Devices & Networks”.



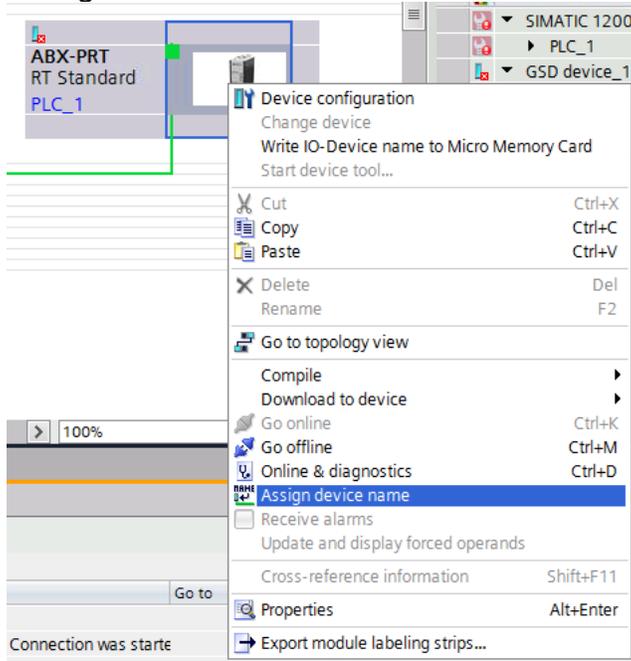
- In the “Hardware Catalog”, expand “Other field devices” -> “PROFINET IO” -> “Gateway” -> “HMS Industrial Networks” -> “Anybus X-gateway PN IO”. Drag the “RT Standard” into your Devices & Networks view next to your PLC.



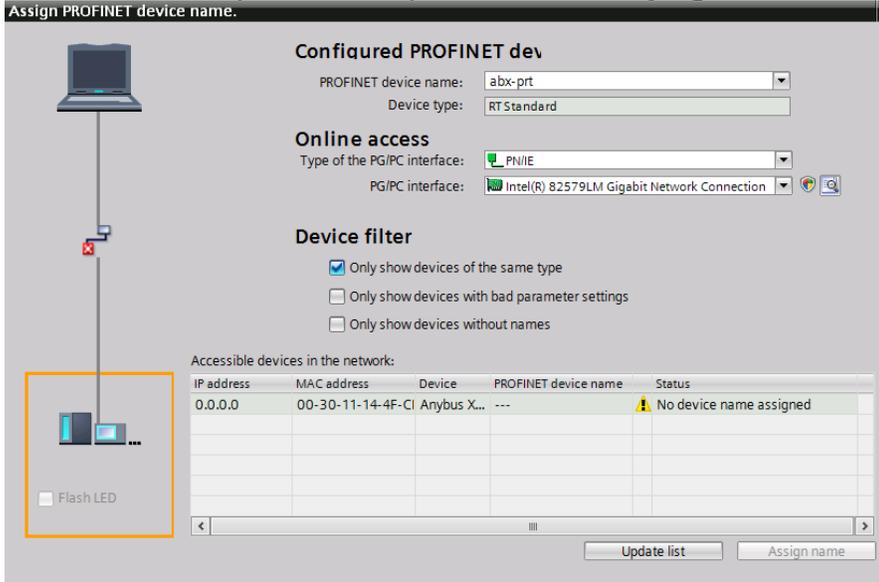
3. In the “Devices & Networks” screen drag a line from the green dot on the ABX-PRT to your PLC. Compile and download to your PLC.



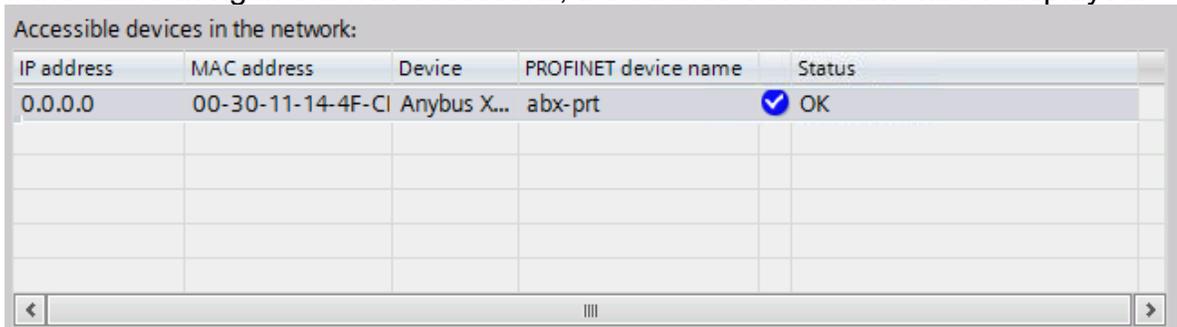
4. Go online and return to the “Devices & Network” screen, right click and choose “Assign Device Name”.



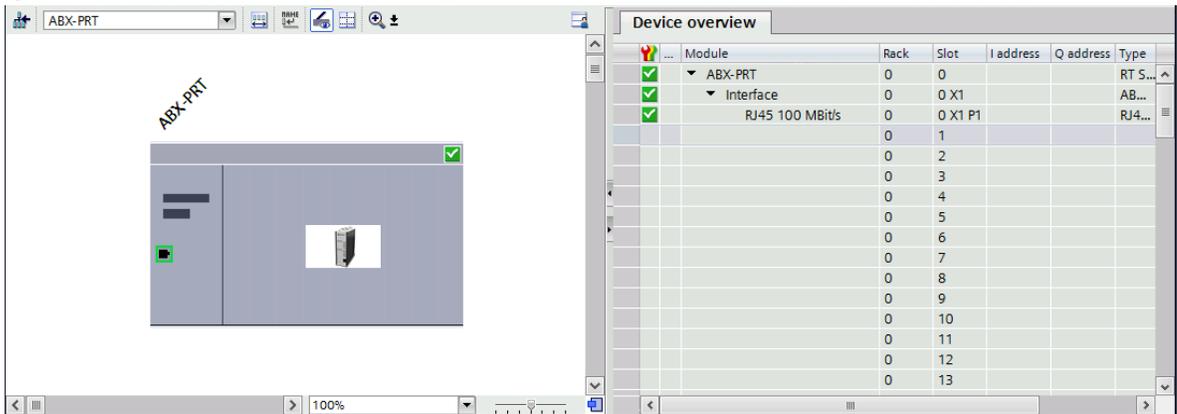
- Click on the Anybus X-Gateway device and click Assign Name. If your device does not show up choose “Update List” and try again.



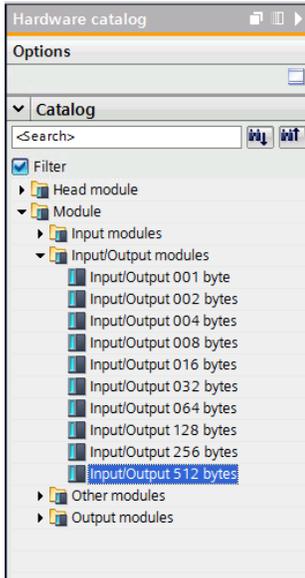
- If the name assignment was successful, then a blue checkmark will be displayed.



- Go to the device view for the ABX-PRT to view the available module slots.



8. From the Hardware Catalog drag and drop the Input/Output 512 bytes into slot 1.



This is the device overview with your I and Q addresses starting at 100 for this example. Be sure to align these addresses to meet your applications needs.

The screenshot shows a 'Device overview' window with a table of modules. The table has columns for Module, Rack, Slot, I address, Q address, and Type. The 'Input/Output 512 bytes\_1' module is installed in Rack 0, Slot 1, with I address 100...611 and Q address 100...611.

Module	Rack	Slot	I address	Q address	Type
ABX-PRT	0	0			RT S...
Interface	0	0 X1			AB...
RJ45 100 MBit/s	0	0 X1 P1			RJ4...
<b>Input/Output 512 bytes_1</b>	0	1	100...611	100...611	Inp...
	0	2			
	0	3			
	0	4			
	0	5			
	0	6			
	0	7			
	0	8			
	0	9			
	0	10			
	0	11			
	0	12			
	0	13			

**8.3.4 Profinet Generic I/O Address Map**

The I/O module in the previous section is mapped to IB100 through IB399 and QB100 through IB399. These I/O locations are custom configured by the user for each particular application. The mapping table in this document will refer to these addresses (100-399) for illustration purposes only. The byte offset values in the mapping table (n = starting register, n+1, n+2, etc...) will be added to the actual I/O registers assigned by the user.

The I/O mapping for the LeakMaster test unit is as follows:

Input Name	Input Function	Input Type	Input Address	Byte Offset
<b>Bit Level Status</b>				
Not Assigned	N/A	Word Address	IW100	N
Ready	This address will go high if the tester is ready to start a test.	Bit Address	I104.0	N+4 bit 0
Error	This address will go high when any error condition exists.	Bit Address	I104.1	N+4 bit 1
Test Passed	This address will go high as soon as a pass condition is detected (before the vent step is completed). This address will stay high until the next test is started	Bit Address	I104.2	N+4 bit 2
Test Failed	This address will go high as soon as a fail condition is detected (before the vent step is completed). This address will stay high until the next test is started	Bit Address	I104.3	N+4 bit 3
Test In Progress	This address will go high anytime a test is in progress.	Bit Address	I104.4	N+4 bit 4
Gross Leak	This address will go high anytime a gross leak failure is detected (before the vent step is completed). This address will stay high until the next test is started	Bit Address	I104.5	N+4 bit 5
Test Pressure High	This address will go high anytime the test pressure is higher than the Maximum test pressure limit. This address will stay high until the next test is started	Bit Address	I104.6	N+4 bit 6
Cal Status Valid	This address will be high if the current program has a valid calibration	Bit Address	I105.0	N+5 bit 0
High Leak Rate	This address will go high anytime the test leak rate exceeds the maximum leak rate. This address will stay high until the next test is started.	Bit Address	I105.1	N+5 bit 1
Low Leak Rate	This address will go high anytime the test leak rate is less than the minimum leak rate. This address will stay high until the next test is started.	Bit Address	I105.2	N+5 bit 2
PreFill Step	This address will go high during the PreFill Step	Bit Address	I105.4	N+5 bit 4

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Fill Step	This address will go high during the Fill Step	Bit Address	I105.5	N+5 bit 5
Stabilize Step	This address will go high during the Stabilize Step	Bit Address	I105.6	N+5 bit 6
Test Step	This address will go high during the Test Step	Bit Address	I105.7	N+5 bit 7
Vent Step	This address will go high during the Vent Step	Bit Address	I106.0	N+6 bit 0
Gage/Cal Relax Step	This address will go high when the Calibration Relax Timer is timing or when the Gage Relax Timer is timing	Bit Address	I106.1	N+6 bit 1
Gage Mode Enabled	This address will go high anytime the Gage Mode is enabled	Bit Address	I106.2	N+6 bit 2
Calibration Enabled	This address will go high anytime a program Calibration is enabled.	Bit Address	I106.3	N+6 bit 3
Calibration Comp Step	This address will go high during the first step (compensation step) of a mass flow or pressure decay calibration routine.	Bit Address	I106.4	N+6 bit 4
Calibration Cal Step	This address will go high during the second step (calibration step) of a pressure decay calibration routine. Does not apply to a mass flow test	Bit Address	I106.5	N+6 bit 5
Digital Input 1 Status	This address returns the status of input 1 on the digital I/O connector (DB37 connector).	Bit Address	I108.0	N+8 bit 0
Digital Input 2 Status	This address returns the status of input 2 on the digital I/O connector (DB37 connector).	Bit Address	I108.1	N+8 bit 1
Digital Input 3 Status	This address returns the status of input 3 on the digital I/O connector (DB37 connector).	Bit Address	I108.2	N+8 bit 2
Digital Input 4 Status	This address returns the status of input 4 on the digital I/O connector (DB37 connector).	Bit Address	I108.3	N+8 bit 3
Digital Input 5 Status	This address returns the status of input 5 on the digital I/O connector (DB37 connector).	Bit Address	I108.4	N+8 bit 4
Digital Input 6 Status	This address returns the status of input 6 on the digital I/O connector (DB37 connector).	Bit Address	I108.5	N+8 bit 5
Digital Input 7 Status	This address returns the status of input 7 on the digital I/O connector (DB37 connector).	Bit Address	I108.6	N+8 bit 6
Digital Input 8 Status	This address returns the status of input 8 on the digital I/O connector (DB37 connector).	Bit Address	I108.7	N+8 bit 7
Digital Input 9 Status	This address returns the status of input 9 on the digital I/O connector (DB37 connector).	Bit Address	I109.0	N+9 bit 0
Digital Input 10 Status	This address returns the status of input 10 on the digital I/O connector (DB37 connector).	Bit Address	I109.1	N+9 bit 1

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Digital Input 11 Status	This address returns the status of input 11 on the digital I/O connector (DB37 connector).	Bit Address	I109.2	N+9 bit 2
Digital Input 12 Status	This address returns the status of input 12 on the digital I/O connector (DB37 connector).	Bit Address	I109.3	N+9 bit 3
Digital Input 13 Status	This address returns the status of input 13 on the digital I/O connector (DB37 connector).	Bit Address	I109.4	N+9 bit 4
Digital Input 14 Status	This address returns the status of input 14 on the digital I/O connector (DB37 connector).	Bit Address	I109.5	N+9 bit 5
Digital Input 15 Status	This address returns the status of input 15 on the digital I/O connector (DB37 connector).	Bit Address	I109.6	N+9 bit 6
Digital Input 16 Status	This address returns the status of input 16 on the digital I/O connector (DB37 connector).	Bit Address	I109.7	N+9 bit 7
Digital Output 1 Status	This address returns the status of output 1 on the digital I/O connector (DB37 connector).	Bit Address	I110.0	N+10 bit 0
Digital Output 2 Status	This address returns the status of output 2 on the digital I/O connector (DB37 connector).	Bit Address	I110.1	N+10 bit 1
Digital Output 3 Status	This address returns the status of output 3 on the digital I/O connector (DB37 connector).	Bit Address	I110.2	N+10 bit 2
Digital Output 4 Status	This address returns the status of output 4 on the digital I/O connector (DB37 connector).	Bit Address	I110.3	N+10 bit 3
Digital Output 5 Status	This address returns the status of output 5 on the digital I/O connector (DB37 connector).	Bit Address	I110.4	N+10 bit 4
Digital Output 6 Status	This address returns the status of output 6 on the digital I/O connector (DB37 connector).	Bit Address	I110.5	N+10 bit 5
Digital Output 7 Status	This address returns the status of output 7 on the digital I/O connector (DB37 connector).	Bit Address	I110.6	N+10 bit 6
Digital Output 8 Status	This address returns the status of output 8 on the digital I/O connector (DB37 connector).	Bit Address	I110.7	N+10 bit 7
Digital Output 9 Status	This address returns the status of output 9 on the digital I/O connector (DB37 connector).	Bit Address	I111.0	N+11 bit 0
Digital Output 10 Status	This address returns the status of output 10 on the digital I/O connector (DB37 connector).	Bit Address	I111.1	N+11 bit 1
Digital Output 11 Status	This address returns the status of output 11 on the digital I/O connector (DB37 connector).	Bit Address	I111.2	N+11 bit 2
Digital Output 12 Status	This address returns the status of output 12 on the digital I/O connector	Bit Address	I111.3	N+11 bit 3

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	(DB37 connector).			
Digital Output 13 Status	This address returns the status of output 13 on the digital I/O connector (DB37 connector).	Bit Address	I111.4	N+11 bit 4
Digital Output 14 Status	This address returns the status of output 14 on the digital I/O connector (DB37 connector).	Bit Address	I111.5	N+11 bit 5
Digital Output 15 Status	This address returns the status of output 15 on the digital I/O connector (DB37 connector).	Bit Address	I111.6	N+11 bit 6
Digital Output 16 Status	This address returns the status of output 16 on the digital I/O connector (DB37 connector).	Bit Address	I111.7	N+11 bit 7
<b>Integer Values</b>				
Program Selected	This address will return the program number of the program that is currently selected.	Double Word Address	ID132	N+32
Pressure Unit ID	This address will return a number designation for the pressure unit that is selected for the current program. 0= PSI, 1= PSIG, 2= PSIA, 3= inH2O, 4= inHg, 5= Bar, 6= mbar, 7= Kpa, 8= kg/cm <sup>2</sup>	Double Word Address	ID136	N+36
Flow Unit ID	This address will return a number designation for the leak rate unit that is selected for the current program. 0 = SLPM, 1 = sccm, 2 = SLPM, 3= SLPS	Double Word Address	ID140	N+40
Pass Jump To Program	This address will return the current program Jump To Program Number if the program passes test.	Double Word Address	ID144	N+44
Fail Jump To Program	This address will return the current program Jump To Program Number if the program fails test.	Double Word Address	ID148	N+48
Test Type ID	This address will return the current program test type. 0 or 1 = Mass Flow, 2 = Pressure Decay (sccm), 3 = Occlusion, 4= Pressure Loss over Time	Double Word Address	ID152	N+52
Num of Gage Runs	This address will return the number of Gage cycles to run when Gage Mode is enabled	Double Word Address	ID156	N+56
Gage Test Number	This address will return the current Gage Cycle number	Double Word Address	ID160	N+60
Fill Step Percent	This address will display a live percentage of completion for the Fill Step. 0-100 percent	Double Word Address	ID164	N+64
Stabilize Step Percent	This address will display a live percentage of completion for the Stabilize Step. 0-100 percent.	Double Word Address	ID168	N+68
Test Step Percent	This address will display a live percentage of completion for the Test Step. 0-100 percent.	Double Word Address	ID172	N+72

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Vent Step Percent	This address will display a live percentage of completion for the Vent Step. 0-100 percent.	Double Word Address	ID176	N+76
Logged In User Level	0=nobody logged in, 1=Operator user logged in, 5=Supervisor user logged in, 9=Admin user logged in, 50=Calibrate user logged in.	Double Word Address	ID180	N+80
Reserved For Future Integer Use		Double Word Address	ID184 – ID224	N+84 – N+124
<b>Floating Point Values</b>				
Pretest Delay Time	This address will return the current program timer preset value of the Pretest Delay Timer.	Double Word Address	ID228	N+128
Fill Time	This address will return the current program timer preset value of the Fill Timer.	Double Word Address	ID232	N+132
Stabilize Time	This address will return the current program timer preset value of the Stabilize Timer.	Double Word Address	ID236	N+136
Test Time	This address will return the current program timer preset value of the Test Timer.	Double Word Address	ID240	N+140
Vent Time	This address will return the current program timer preset value of the Vent Timer.	Double Word Address	ID244	N+144
Cal Relax Time	This address will return the current program timer preset value of the Calibration Relax Timer.	Double Word Address	ID248	N+148
Gage Delay	This address will return the current program timer preset value of the Gage Relax Delay Timer.	Double Word Address	ID252	N+152
Minimum Pressure	This address will return the current program Minimum Pressure limit value.	Double Word Address	ID256	N+156
Maximum Pressure	This address will return the current program Maximum Pressure limit value.	Double Word Address	ID260	N+160
Minimum Leak	This address will return the current program Minimum Leak Rate limit value.	Double Word Address	ID264	N+164
Maximum Leak	This address will return the current program Maximum Leak Rate limit value.	Double Word Address	ID268	N+168
Pressure Setpoint	This address will return the current program Minimum Pressure limit value.	Double Word Address	ID272	N+172
Leak Orifice Value	This address will return the value of the installed calibrated leak standard.	Double Word Address	ID276	N+176
Comp Value	This address will return the current program Comp Value.	Double Word Address	ID280	N+180
Cal Value	This address will return the current program Cal Value. (Only applicable	Double Word Address	ID284	N+184

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	in decay sccm mode)			
Volume	This address will return the current program Volume Calculation. (Only applicable in decay sccm mode)	Double Word Address	ID288	N+188
Transducer 1 Pressure Live	This address will return the live pressure of the test pressure transducer.	Double Word Address	ID292	N+192
Transducer 1 Pressure Loss Live	This address will return the live pressure loss value during the test step of a pressure decay test.	Double Word Address	ID296	N+196
Flow Sensor 1 Flow Live	This address will return the live flow value of the flow sensor.	Double Word Address	ID300	N+200
Transducer 2 Pressure Live	Reserved for future use.	Double Word Address	ID304	N+204
Transducer 2 Pressure Loss Live	Reserved for future use.	Double Word Address	ID308	N+208
Flow Sensor 2 Flow Live	Reserved for future use.	Double Word Address	ID312	N+212
Final Test Pressure	This address will return the final test pressure of the previous test.	Double Word Address	ID316	N+216
Final Pressure Loss	This address will return the final pressure loss value of the previous pressure decay test. (Only applicable for decay sccm and pressure loss mode.	Double Word Address	ID320	N+220
Final Leak Rate	This address will return the final leak rate of the previous test.	Double Word Address	ID324	N+224
Reserved for future flowing point values.		Double Word Address	ID 328 – ID352	N+228 – N+252
<b>Character Strings</b>				
Pressure Unit Character Count	Contains the length in characters of the flow unit text.	Single Int	IB356	N+256
Pressure Unit Characters 1-7	Pressure unit character 1-7	Char	IB357-IB363	N+257 – N+263
Flow Unit Character Count	Contains the length in characters of the flow unit text.	Single Int	IB364	N+264
Flow Unit Characters 1-7	Flow unit characters 1-7	Char	IB365 – IB371	N+265 – N+271
Part Number Character Count	Contains the length of characters of the part number.	Single Int	IB372	N+272
Part Number Characters 1-79	Part number characters 1-79.	Char	IB373 – IB383	N+273 – N+283
Reserved for future character values.		Char	IB384 – IB499	N+284 – N+399

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Output Name	Output Function	Output Type	Output Address	Byte Offset
<b>Bit Level Control</b>				
Not Assigned	N/A	Word Address	IW100	N
Start	Setting this bit high will Start a test cycle if the tester is Ready and a valid program is selected.	Bit Address	Q104.0	N+4 bit 0
Stop	Setting this bit high during a test will immediately Stop the test. This bit must be low to start a test.	Bit Address	Q104.1	N+4 bit 1
Pause	Setting this bit high during a test will pause the test until the Start bit is set high.	Bit Address	Q104.2	N+4 bit 2
Air On	Setting this bit high will deliver test air to the test port.	Bit Address	Q104.3	N+4 bit 3
Leak On	Setting this bit high will turn on the internal calibrated leak standard.	Bit Address	Q104.4	N+4 bit 4
Enable Calibration	Setting this bit high will enable program calibration mode.	Bit Address	Q104.5	N+4 bit 5
Change Program	Setting this bit high will allow the current program to be changed to another program.	Bit Address	Q104.7	N+4 bit 7
Reset Outputs	Setting this bit high will the last pass/fail bits low, set the last test pressure, last test pressure loss, and last test flow rate to 0	Bit Address	Q104.8	N+4 bit 8
<b>Integer Values</b>				
Program Select	Set this register to the program number that you wish to select and then set the Change Program bit high to make the change.	Double Word Address	QD132	N+32
Pressure Unit ID	Set this register to the desired pressure unit (functions in Slave Mode only)	Double Word Address	QD136	N+36
Flow Unit ID	Set this register to the desired leak rate unit (functions in Slave Mode only)	Double Word Address	QD140	N+40
Test Type ID	Set this register to the desired test type (Mass Flow or Pressure Decay) (functions in Slave Mode only)	Double Word Address	QD144	N+44
Reserved for future integer values.		Double Word Address	QD148-QD227	N+48 – N+127
<b>Floating Point Values</b>				
Pretest Delay Time	Set this register to the value that you want the Pretest Delay Time to be when running in Slave Mode.	Double Word Address	QD228	N+128
Fill Time	Set this register to the value that you want the Fill Time to be when running in Slave Mode.	Double Word Address	QD232	N+132
Stabilize Time	Set this register to the value that you want the Stabilize Time to be when running in Slave Mode.	Double Word Address	QD236	N+136

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Test Time	Set this register to the value that you want the Test Time to be when running in Slave Mode.	Double Word Address	QD240	N+140
Vent Time	Set this register to the value that you want the Vent Time to be when running in Slave Mode.	Double Word Address	QD244	N+144
Cal Relax Time	Set this register to the value that you want the Cal Relax Time to be when running in Slave Mode.	Double Word Address	QD248	N+148
Gage Delay	Set this register to the value that you want the Gage Relax Time to be when running in Slave Mode.	Double Word Address	QD252	N+152
Minimum Pressure	Set this register to the value that you want the Minimum Pressure Limit to be when running in Slave Mode.	Double Word Address	QD256	N+156
Maximum Pressure	Set this register to the value that you want the Maximum Pressure Limit to be when running in Slave Mode.	Double Word Address	QD260	N+160
Minimum Leak	Set this register to the value that you want the Minimum Leak Limit to be when running in Slave Mode.	Double Word Address	QD264	N+164
Maximum Leak	Set this register to the value that you want the Maximum Leak Limit to be when running in Slave Mode.	Double Word Address	QD268	N+168
Pressure Set Point	Set this register to the value that you want the test Pressure Setpoint to be when running in Slave Mode.	Double Word Address	QD272	N+172
Leak Orifice Value	Set this register to the value that you want the installed calibrated leak standard t to be when running in Slave Mode.	Double Word Address	QD276	N+176
Comp Value	Set this register to the value that you want the Comp Value to be when running in Slave Mode.	Double Word Address	QD280	N+180
Cal Value	Set this register to the value that you want the Cal Value to be when running in Slave Mode. (Only applicable when in pressure decay mode)	Double Word Address	QD284	N+184
Volume	Set this register to the value that you want the test Volume Value to be when running in Slave Mode. (Only applicable when in pressure decay mode)	Double Word Address	QD288	N+188
Reserved for future floating point values.		Double Word Address	QD292 – QD352	N+192 – N+252
<b>Character Strings</b>				
Part Number String Length	Count of characters you will provide in the part number.	SINT	QD356	N+256
Part Number Characters 1-79	Part number characters 1-79	Char	QD357 – QD435	N+257 – N+335
Reserved for future characters.		Char	QD436 – QD499	N+336 – N+399

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