LeakMaster

**ULTRAFLOW V3**


ULTRAFLOW V3 STANDARD
PN#UFV3


ULTRAFLOW V3 REMOTE SCREEN
PN#UFV3-RT

# Operation Manual

Software Ver. 3.9.1.0

**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 FOREWORD

Thank you for your purchase of the LeakMaster UltraFlow V3 leak test instrument. This instrument is specifically designed for quickly and efficiently testing large components. This unit is capable of Mass Flow Testing, Pressure Decay Testing (sccm or pressure loss), and Occlusion Testing (back pressure testing). 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 Mass Flow Leak Testing

The UltraFlow V3 leak tester is used to detect leaks from 1 sccm up to 300 LPM.

The UltraFlow V3 tester utilizes Mass Flow which is a method where a test part is pressurized, and the replacement air required to maintain the set point pressure is then measured by the mass flow meter to measure the leak rate. The UltraFlow V3 is specifically designed to deliver and maintain large amounts of airflow to effectively test large test items and drastically reduce cycle time.

### 3.1.2 How does the tester determine leak rates? (Mass Flow)

Typical Mass Flow 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. **Stabilize Step:** Once the part is full of air, the Fill Valve stays on (open) and the Test Valve turns on (opens) to introduce the mass flow sensor into the test circuit and allows the part to stabilize.
3. **Test Step:** The Fill Valve closes and the Test Valve remains on (open). The mass flow sensor monitors the amount of replacement air required to maintain the set point pressure.
4. **Exhaust Step:** The Test Valve closes to isolate the mass flow sensor from the vented air. The Vent Valve turns off which opens the test part to the vent port which allows the remaining air in the part to be exhausted through the test manifold and out the vent port through the bottom of the tester.

### 3.1.3 Pressure Leak Testing (Pressure Decay SCCM Mode)

When using Pressure Decay Mode, 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.

Leak Rate (sccm) = (Pressure Loss in PSI) (Volume in cm3) (60)/ (Time) (14.7)

When a test program is calibrating (or learning) a test part, the unknown part of the equation is volume.

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 change of the production part, it then calculates the leak rate.

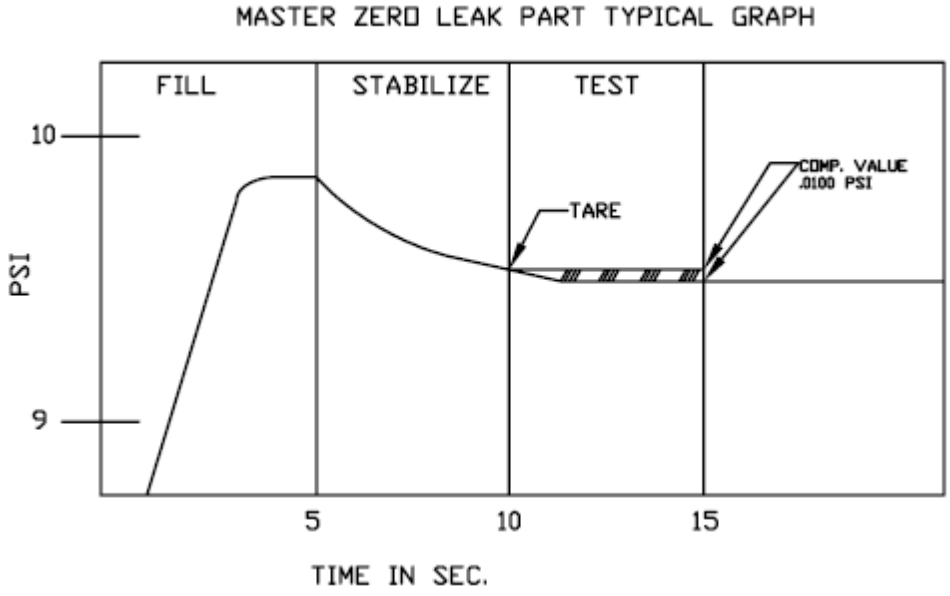
Typical Pressure Decay Test Sequence:

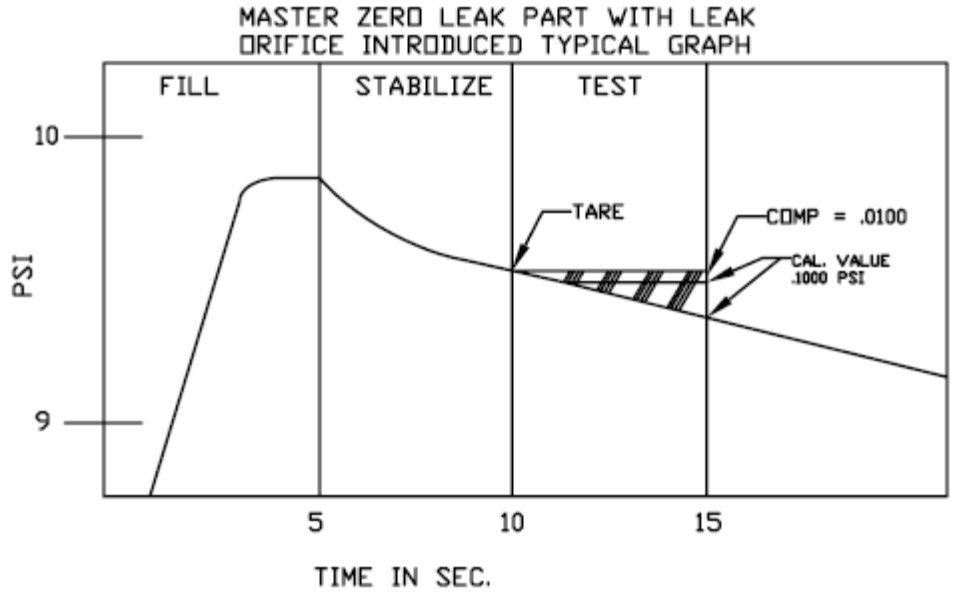
1. **Fill Step:** The Fill Valve turns on (opens) to allow air to fill the test part. The Vent valve closes to prevent air from escaping to the vent port.
2. **Stabilize Step:** The Fill Valve turns off (closes) to trap the air in the part. The test pressure is allowed to stabilize. All valves are closed during this step.
3. **Test Step:** The tester monitors pressure loss during the test step to determine leak rate. All valves are closed during this step
4. **Exhaust Step:** The vent valve is deengerized which opens the vent valve to allow the part to vent back to atmospheric pressure.

**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.

## Typical Graphs of a Good Calibration Sequence

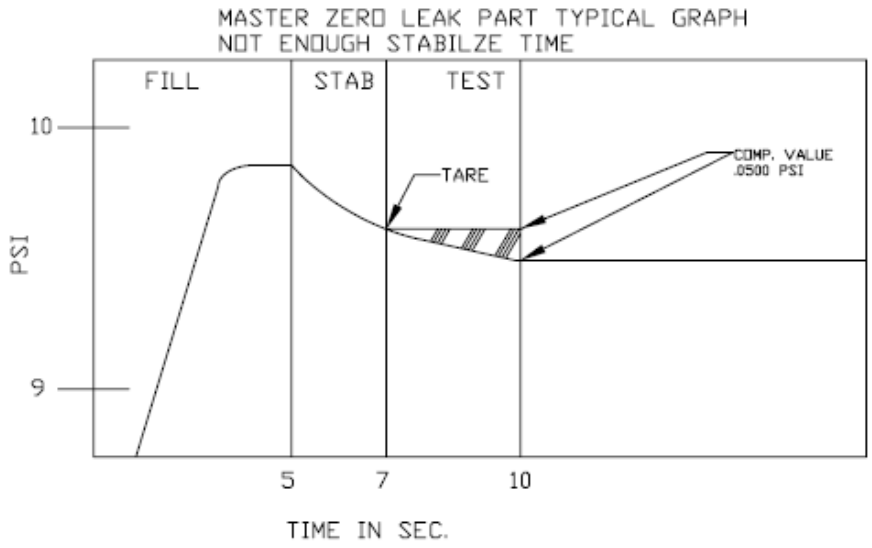


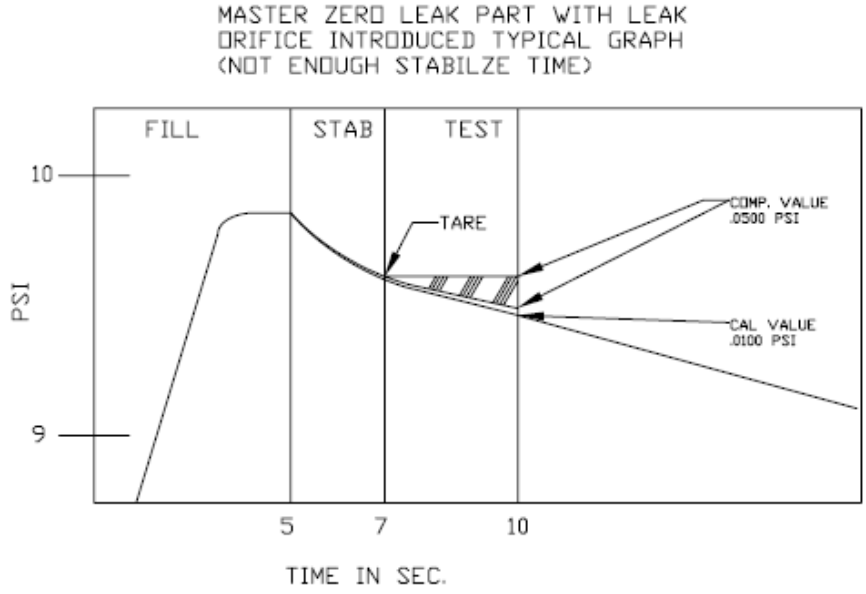




Notice the difference between the comp and cal values. The cal value is 10 times greater than the comp value. This would typically produce very repeatable test results.

Cal/Comp should be at least 5 or greater to achieve repeatable results.

## 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.

### 3.1.4 Pressure Leak Testing (Pressure Loss/Time)

When using Pressure Loss/Time, a part is pressurized to a set point pressure. The part is then allowed to stabilize. During the Test Step, the amount of pressure lost during the Test Step is calculated. This pressure loss value must fall within the Min/Max limits for a pass condition. This test method simply passes/fails parts dependent upon how much pressure is lost during the test step. This is not a volumetric leak rate method of test (sccm or SLPM).

Typical Pressure Loss 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. **Stabilize Step:** The Fill Valve turns off (closes) to trap the air in the part. The test pressure is allowed to stabilize. All valves are closed during this step.
3. **Test Step:** The tester monitors pressure loss during the test step to determine leak rate. All valves are closed during this step
4. **Exhaust Step:** The vent valve is deengerized which opens the vent valve to allow the part to vent back to atmospheric pressure.

### 3.1.5 Occlusion Testing (back pressure testing)

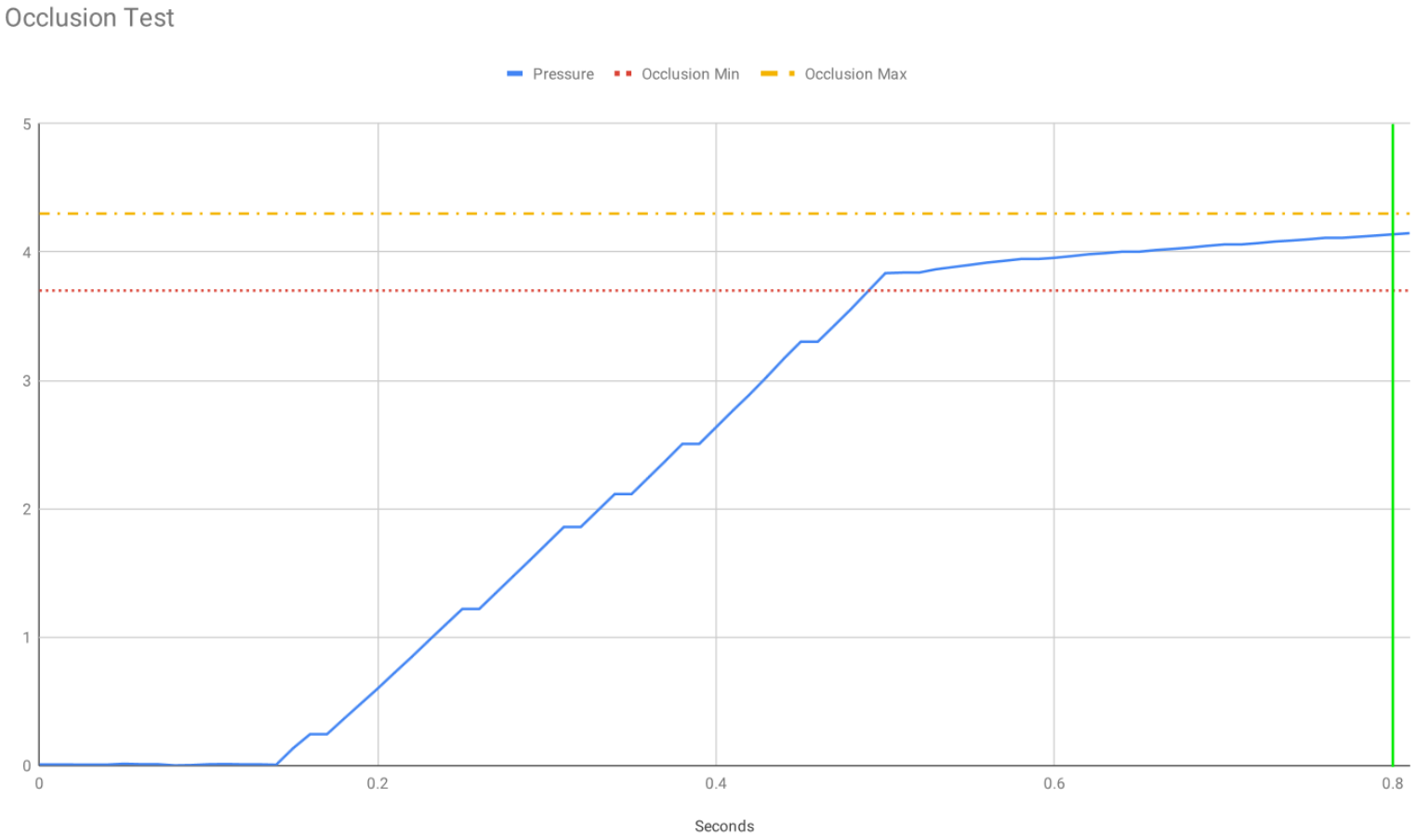
Occlusion testing is a test method used to detect obstructions in a part being tested. When using this method of test, air is delivered to the test part for a programmed amount of time (Fill time). At the end of the fill time, the back pressure detected is logged and compared against the upper and lower 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 Mass Flow or Pressure Decay Test. This can be added these test types under the Tester Options sub menu on the Setup screen. Enabling this feature allows the user to perform and Occlusion test and then continue with Mass Flow or 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

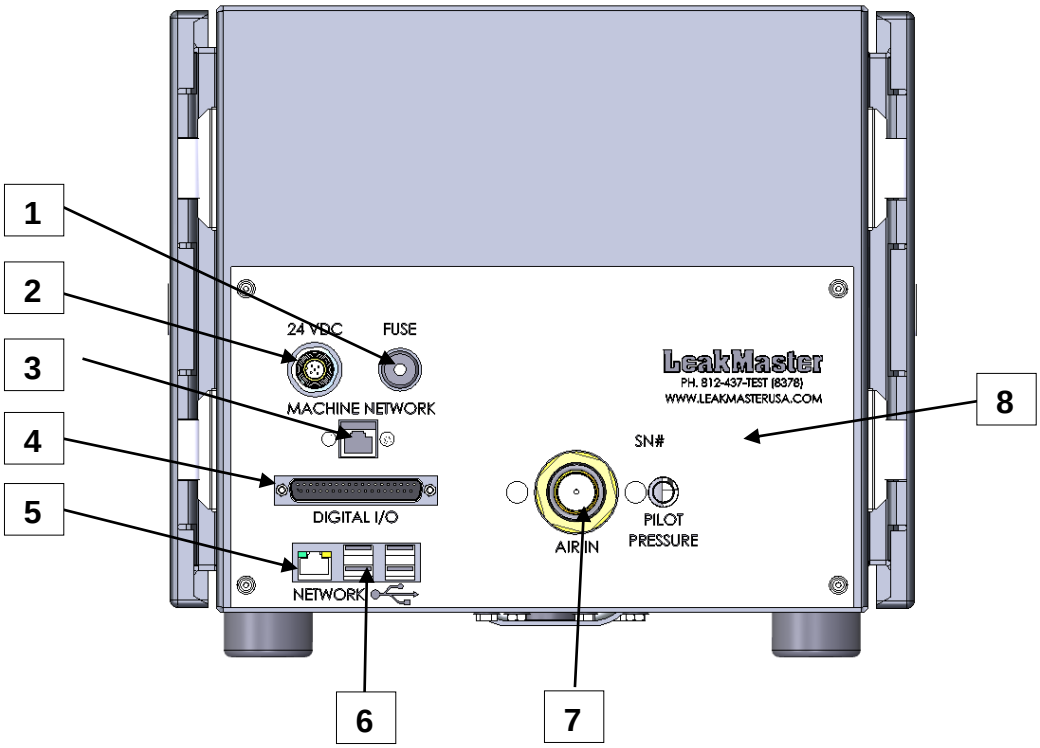


## 3.2 COMPONENT IDENTIFICATION (Standard Model)

### 3.2.1 Tester Front Panel


1. Operator Interface Touch Screen
2. Power Switch
3. USB interface connector
4. Test Port (Test air is delivered out of this port to the part being tested)
5. Start: When pressed by the user, the leak test cycle will begin.
6. Stop: When pressed by the user, the leak test cycle will be stopped immediately
7. LED Status Indicator (Blue=Ready, Green=Pass, Red=Fail, Yellow=Testing)

### 3.2.2 Tester Rear Panel



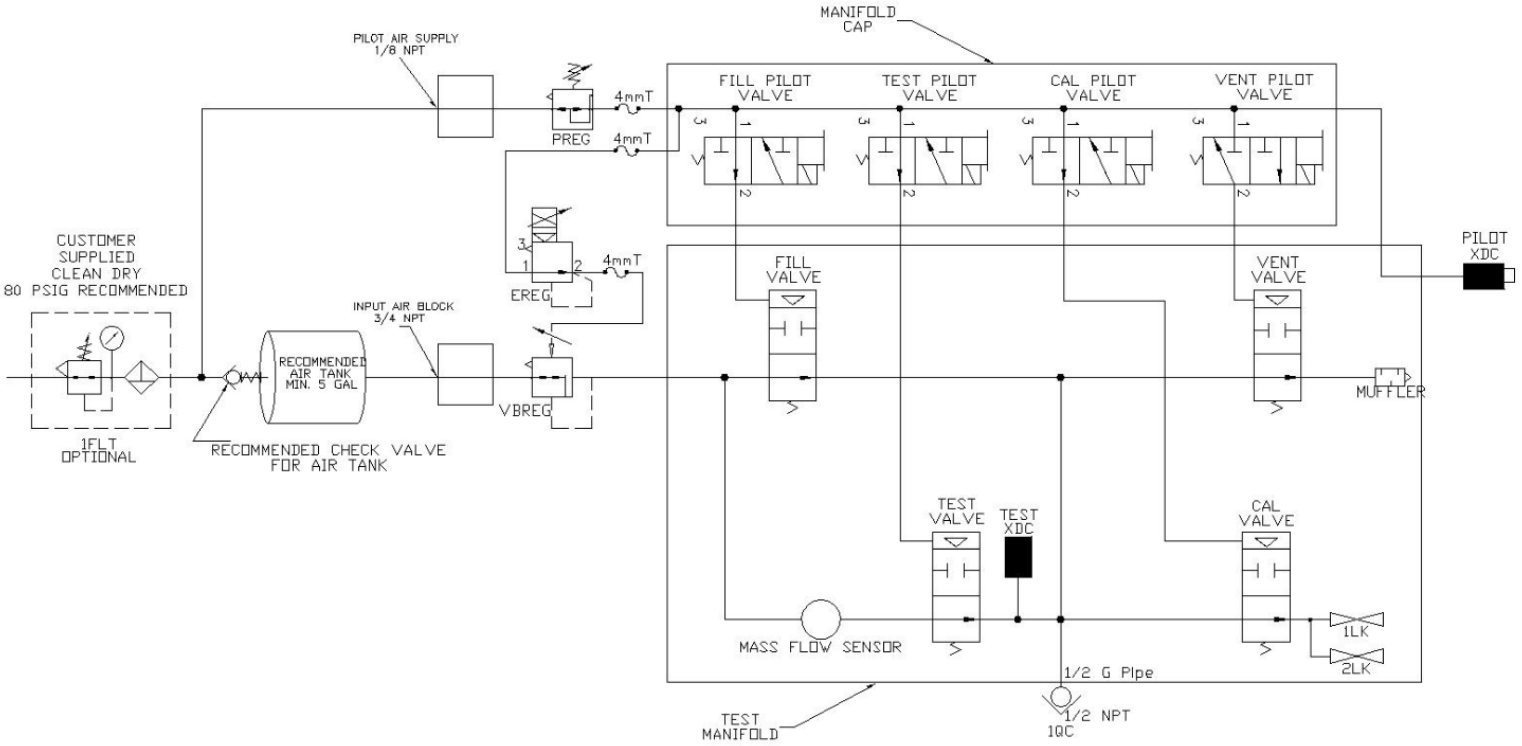

1. Fuse (3 Amp)
2. M12 Bulkhead Power Connector (+24VDC only)
3. Machine Network RJ45 Ethernet Port (Ethernet IP communications Port)
4. Digital I/O Connector (DB37 connector), 16 Inputs, 16 Outputs
5. Network RJ45 Ethernet Port (For connecting to the LAN, used for remote access)
6. USB interface (4 port), used for barcode scanners, printers, etc.
7. Air Supply Input (45 – 100 PSI) (3/4”NPT)
8. Serial Number Identification Location
9. Pilot Pressure Supply Input (60-100 PSI) (1/8” NPT)

### 3.2.3 Pneumatic Supply

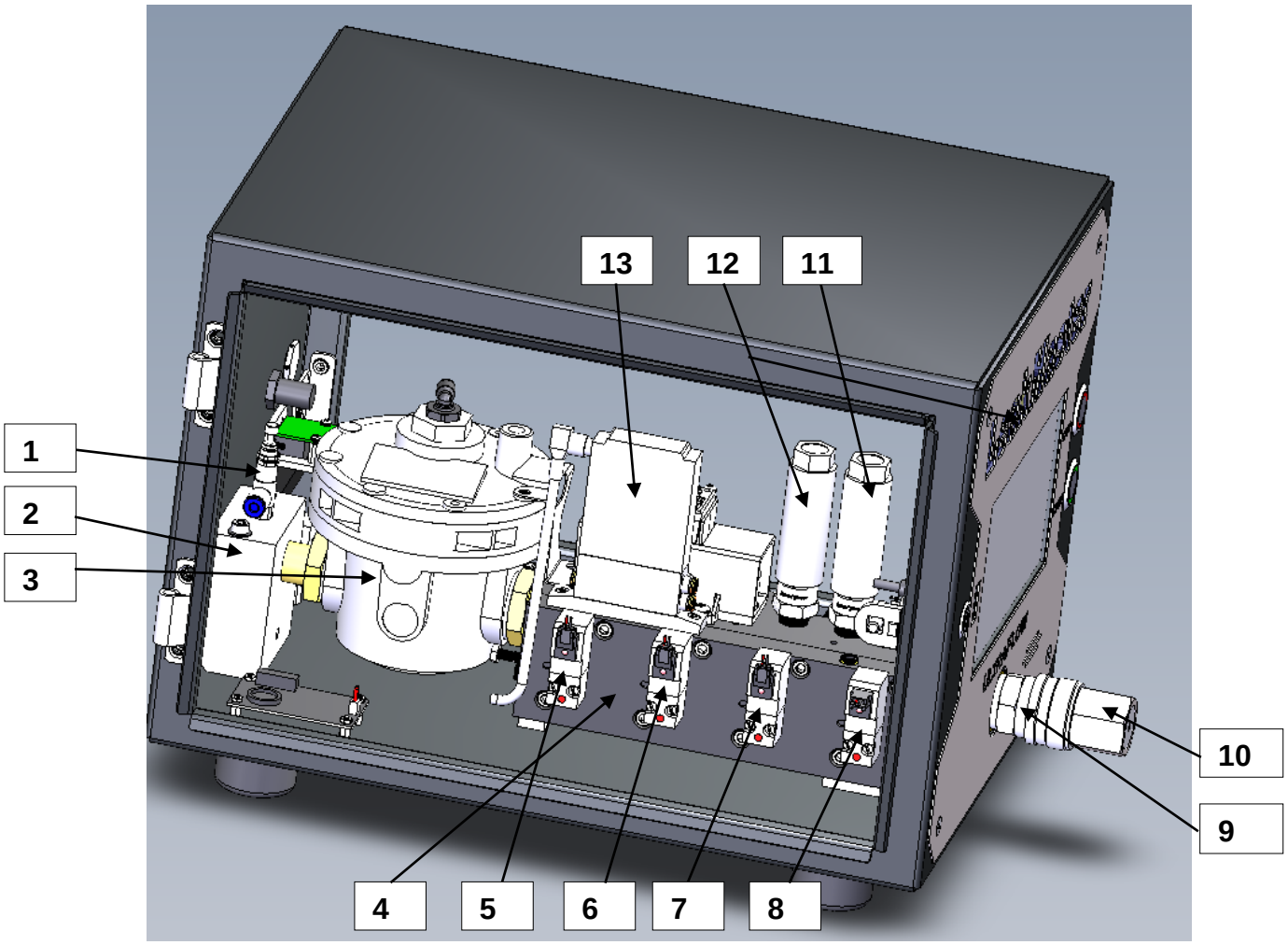
**IMPORTANT:**

The pneumatic input supply should be minimum of 45 psig but must not exceed 120 psig. **LeakMaster recommends a setting of 80 PSI. 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 3/4" supply line to the tester to ensure that proper air flow can be attained for filling parts quickly.** If mass flow testing will be utilized, LeakMaster recommends providing a 5 -10 gallon reservoir tank with a check valve on the inlet of the tank. This will provide stable air to the tester and prevent erratic leak test results from occurring and prevent other equipment from robbing air from the system. **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 damages due to this problem are not covered under warranty.**

### 3.2.4 Internal Pneumatic Schematic

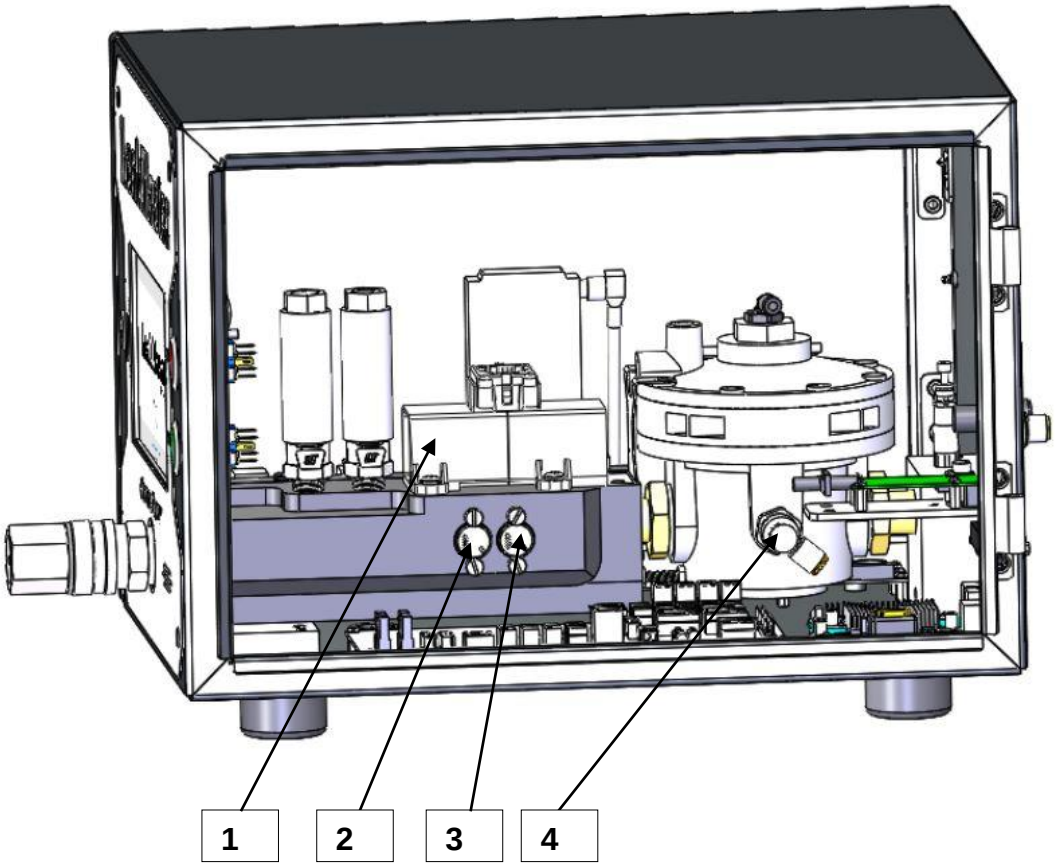


### 3.2.5 Pneumatic Assembly Component Identification (Internal View Left Side) Electronic Regulator Version



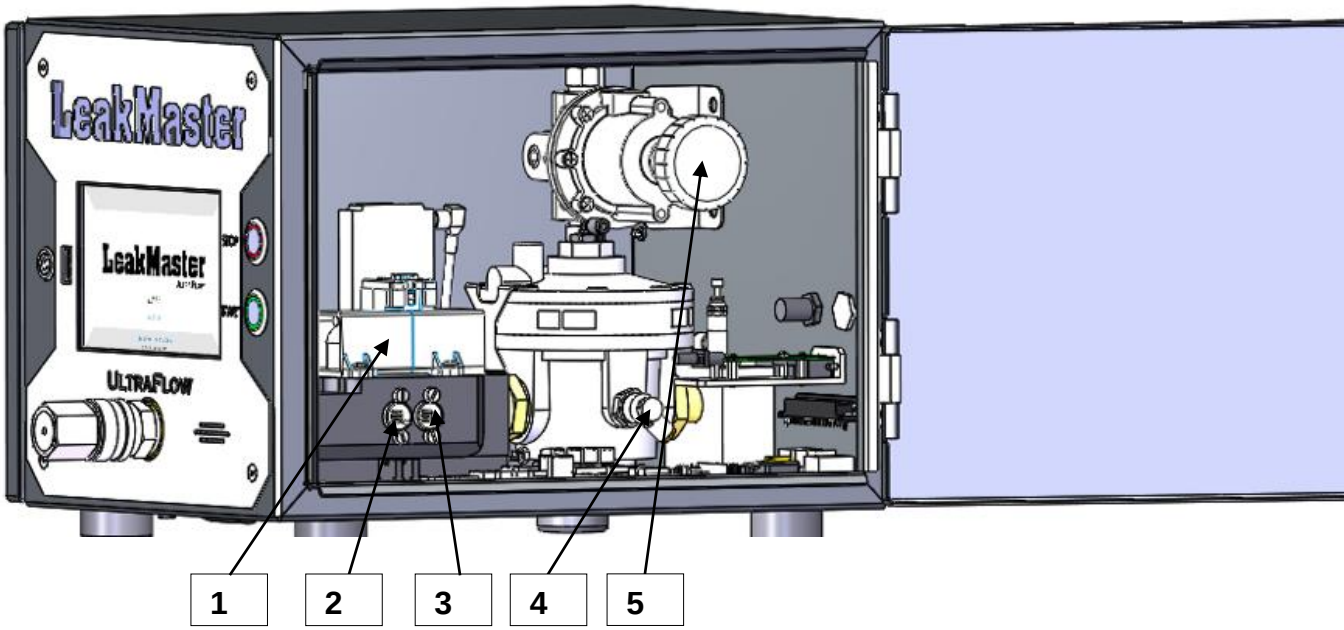

1. PREG, Pilot Pressure Regulator. This device sets the air pressure that is delivered to the pilot valves that operate the internal air valve pistons. This pressure is set at the factory and should not be adjusted without consulting LeakMaster.
2. INPUT AIR BLOCK, (Supply air to this block from the back of the tester, 3/4" NPT)
3. VBREG, Volume Booster Regulator (This device regulates the test pressure)
4. Manifold Cap
5. FILL Pilot Valve
6. TEST Pilot Valve
7. CAL Pilot Valve
8. VENT Pilot Valve
9. 1 QC, Channel 1 Test Port Quick Connect (Swagelok QC8 Body 1/2" G Thread)
10. Swagelok QC8 Stem, 1/2" NPT (for user adapted fittings and test line to part)
11. 2LK, Allotted for a second calibrated leak orifice if necessary (for applications above 100 LPM)
12. 1 LK, Default calibrated leak orifice position
13. EREG, Controls the pressure that is delivered to VBREG. This device electronically controls the test pressure for each program which allows this tester to be able to run multiple test pressures dependent upon the program setting. This EREG is replaced my manual regulator in the event the tester is ordered with a manual regulator (usually in the event of test pressures below 1 PSI).

### 3.2.6 Pneumatic Assembly Component Identification (Internal View Right Side) Electronic Regulator Version




1. MASS FLOW SENSOR, Flow sensor that is used to detect leakage during a test.
2. TEST XDC, Pressure transducer that monitors the test pressure delivered to the test part.
3. PILOT XDC, Pressure transducer that monitors the pilot pressure delivered to the pilot valves and test regulators.
4. Bleeder Valve, Flow control that allows the Volume Booster to become a bleeding regulator. This device controls how responsive the Volume Booster is. This device is set at the factory and should not be adjusted without consulting LeakMaster.

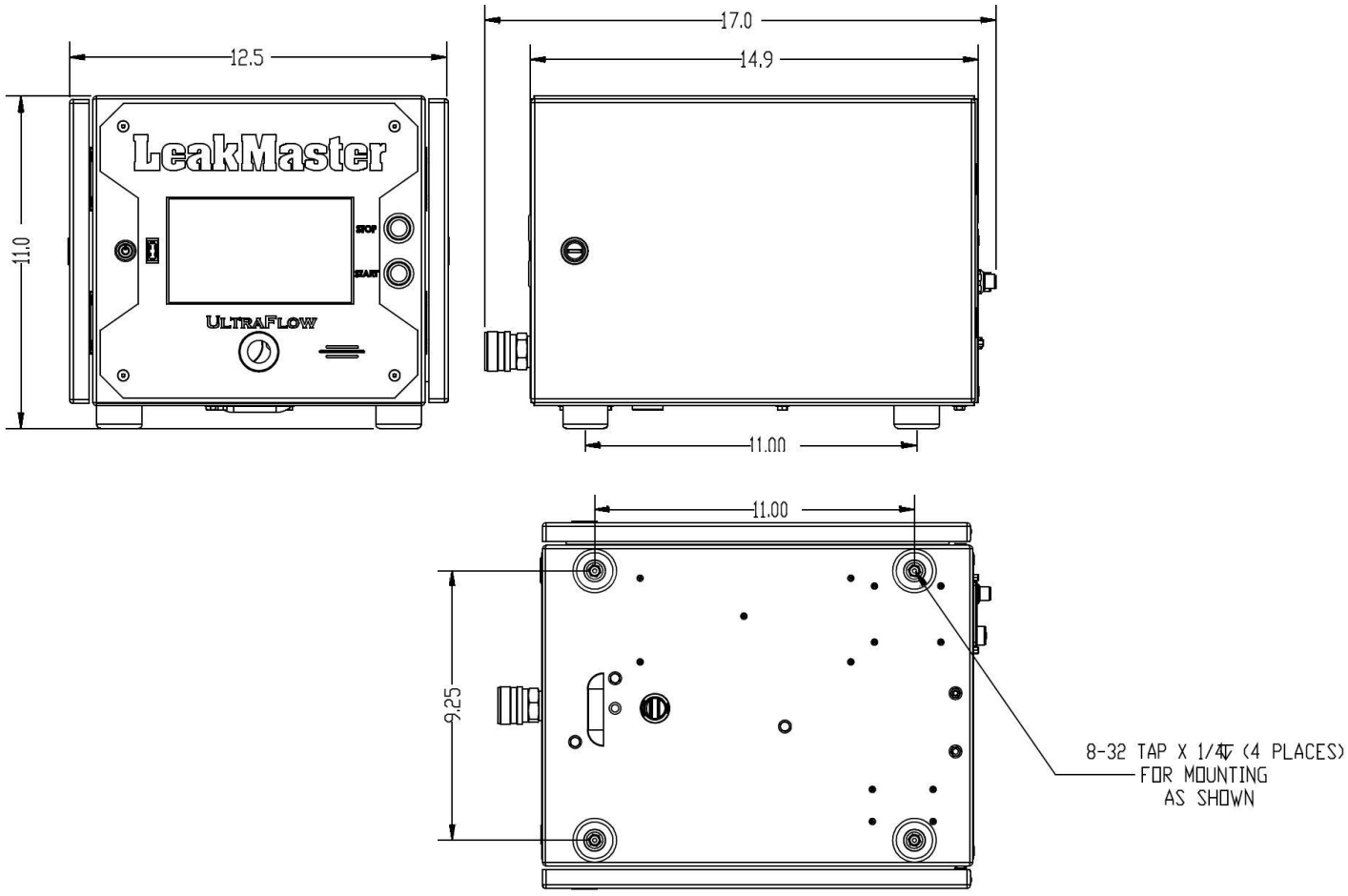
### 3.2.7 Pneumatic Assembly Component Identification (Internal View Right Side) Manual Regulator Version




1. MASS FLOW SENSOR, Flow sensor that is used to detect leakage during a test.
2. TEST XDC, Pressure transducer that monitors the test pressure delivered to the test part.
3. PILOT XDC, Pressure transducer that monitors the pilot pressure delivered to the pilot valves and test regulators.
4. Bleeder Valve, Flow control that allows the Volume Booster to become a bleeding regulator. This device controls how responsive the Volume Booster is. This device is set at the factory and should not be adjusted without consulting LeakMaster.
5. Manual Regulator: This manual regulator sets the test pressure on the manual regulator version. Turning the knob clockwise will increase the test pressure. Turning the knob counter clockwise will decrease the test pressure.

### 3.2.8 Mounting/External Dimensions (UFV3)

All Dimensions listed below are in inches.



## 3.3 COMPONENT IDENTIFICATION (Remote Screen Model)

The remote screen model contains the same components as the standard model but with a compact footprint and remote screen so the HMI can be placed in a convenient location for the operator.

### 3.3.1 Tester Front Panel (UFV3-RT)


1. Test Port (Test air is delivered out of this port to the part being tested)

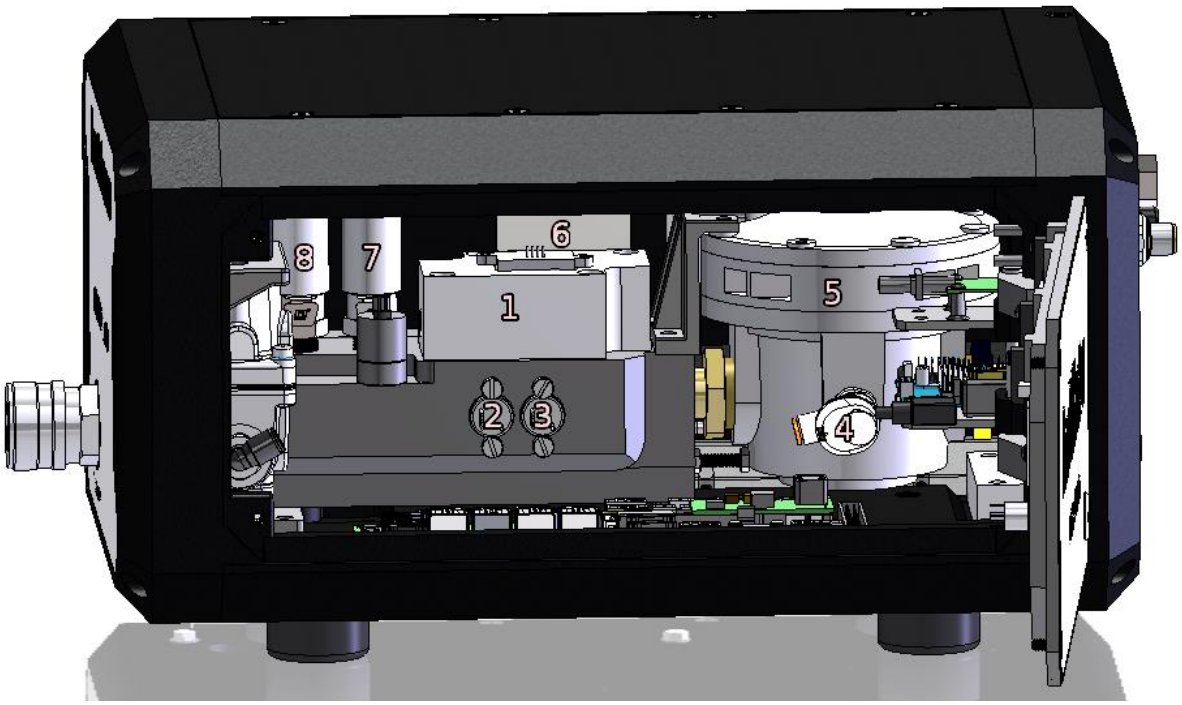
### 3.3.2 Access Panel (UFV3-RT)


1. Access Panel (Opens to allow access inside tester)
2. LED Status Indicator (Blue=Ready, Green=Pass, Red=Fail, Yellow=Testing)
3. Power Switch
4. Access Panel Screws (Loosen to open access door. Door swings to the right)

### 3.3.3 Rear Panel (UFV3-RT)


1. Fuse (2 Amp)
2. M12 Bulkhead Power Connector (+24VDC only)
3. Machine Network RJ45 Ethernet Port (Ethernet IP communications port)
4. Digital I/O Connector (DB37 connector), 16 inputs, 16 outputs
5. Network RJ45 Ethernet Port (For connecting to the LAN, used for remote access)
6. USB Interface (4 port), used for barcode scanners, printers, etc.
7. Air Supply Input (45 – 100 PSI) (3/4” NPT)
8. Pilot Air Supply (5/32” or 4mm tube connection) (Minimum of 75 PSI)
9. Serial Number
10. Remote Screen Power USB
11. Remote Screen Touch USB
12. Remote Screen HDMI

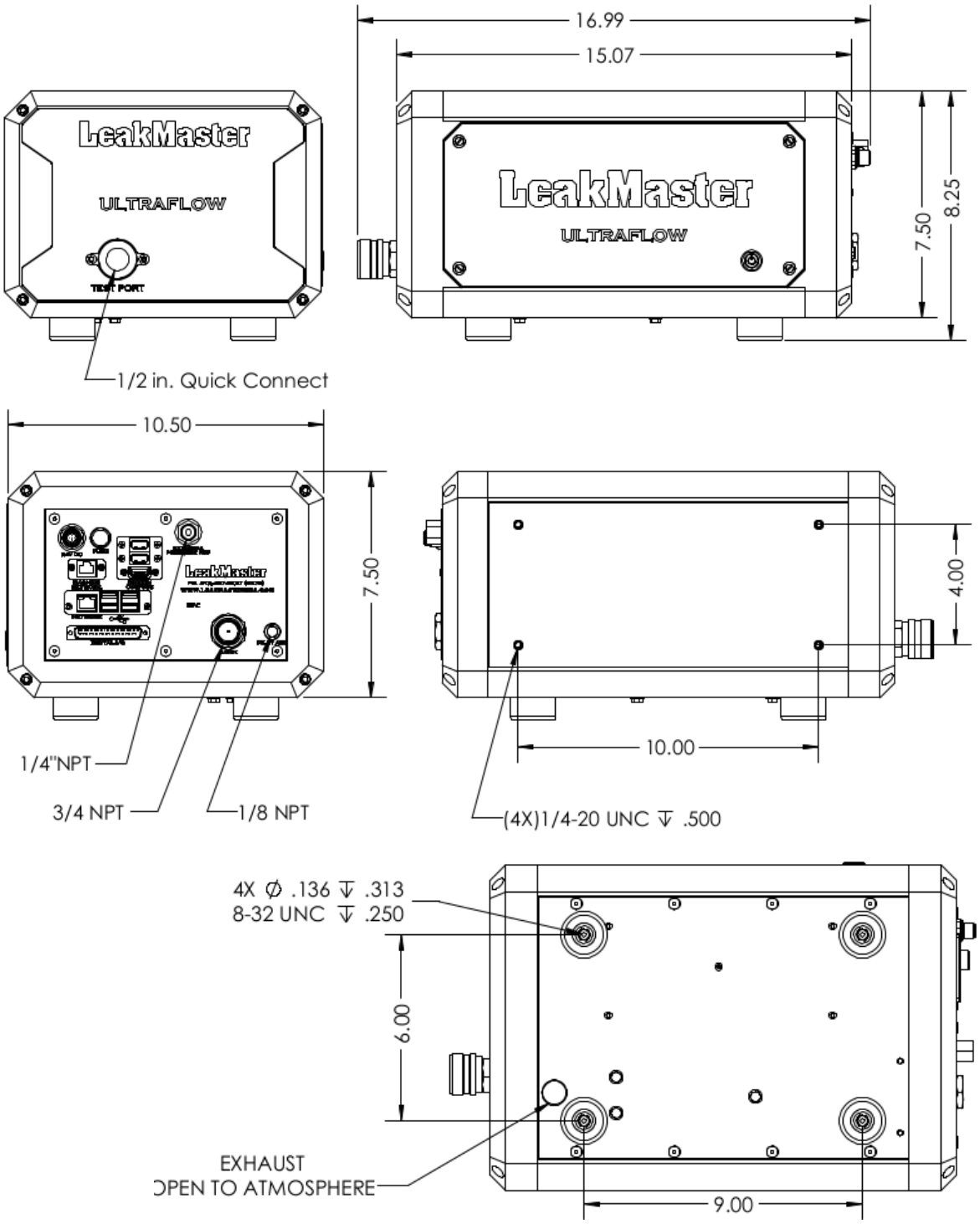
### 3.3.4 Pnumatic Assembly Component Identification (Internal View Access Panel Side) Electronic Regulator (UFV3-RT)

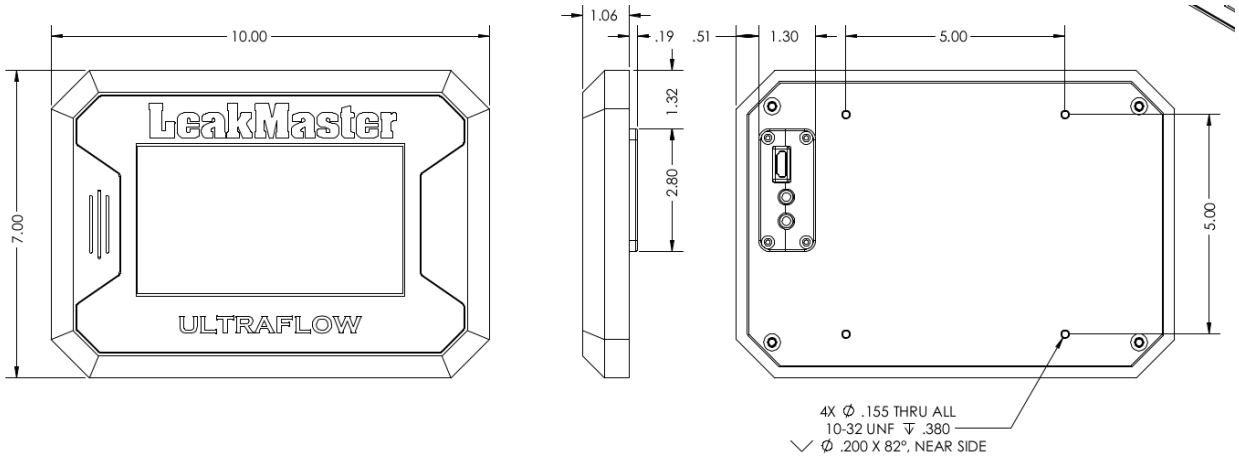



1. MASS FLOW SENSOR – Flow sensor that is used to detect leakage during a test.
2. TEST XDC – Pressure transducer that monitors the test pressure delivered to the test part.
3. PILOT XDC – Pressure transducer that monitors the pilot pressure delivered to the pilot valves and test regulators.
4. BLEEDER VALVE – Flow control that allows the volume booster to become a bleeding regulator. This device controls how responsive the volume booster is. This device is set at the factory and should not be adjusted without consulting LeakMaster.
5. VBREG – Volume Booster Regulator (This device regulates the test pressure).
6. EREG – Controls the pressure that is delivered to VBREG. This device electronically controls the test pressure for each program which allows this tester to be able to run multiple test pressures dependent upon the program setting. This EREG is replaced with a manual regulator when the tester is ordered with a manual regulator (typically for test pressures at or below 1PSI).
7. 1LK – Default calibrated leak orifice position.
8. 2LK – Allotted for a second calibrated leak orifice if necessary (for applications above 100 LPM).

### 3.3.5 Mounting/External Dimensions (UFV3-RT)

All dimensions shown in inches.




10.00
7.00
LeakMaster
ULTRAFLOW
1.06
.19
.51
1.30
5.00
1.32
2.80
5.00
4X Ø .155 THRU ALL
10-32 UNF ↧ .380
Ø .200 X 82°, NEAR SIDE

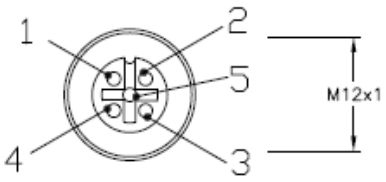
# 4 Electrical Wiring

## 4.1 POWER WIRING

**IMPORTANT:**

The LeakMaster UltraFlow V3 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 back 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.

PIN1: +24VDC
PIN3: 24V COMMON
PIN2,4,5: NC




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

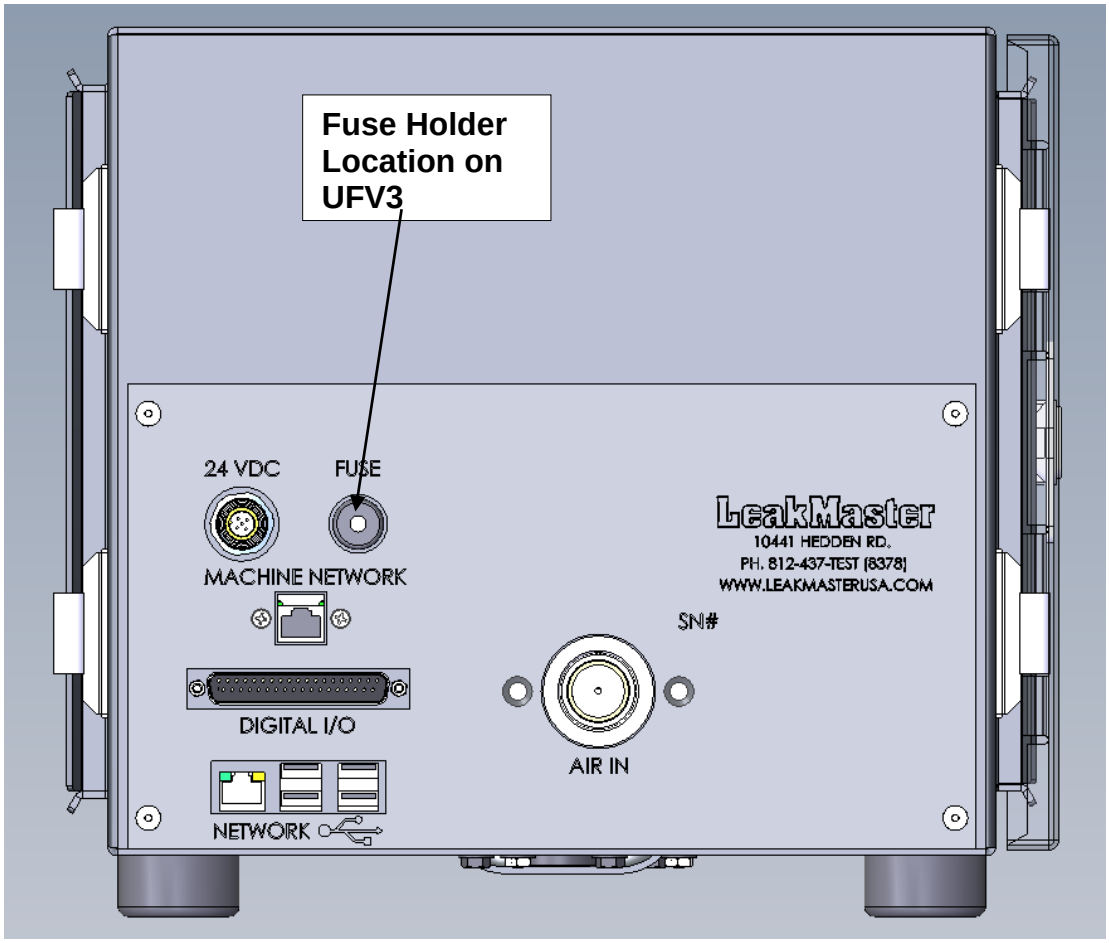
### 4.1.1 OPTIONAL 120V POWER ADAPTER

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 back 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 door 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.



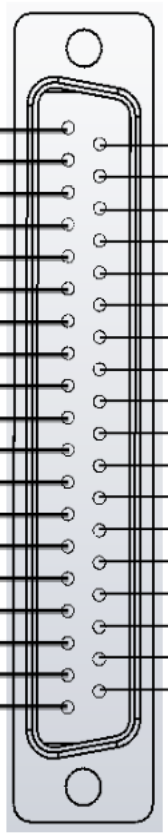

Fuse Holder Location on UFV3-RT
2
1
FUSE
10
11
12
EXTERNAL PRESSURE REF
3
MACHINE NETWORK
SCREEN OUTPUTS
LeakMaster
PH. 812-437-TEST (8378)
WWW.LEAKMASTERUSA.COM
5
6
NETWORK
SN: 9
4
DIGITAL I/O
7
AIR IN
8
PILOT AIR

## 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.



| Default Input Description | |
|---|---|
| Tester +24 VDC | Pin 1 |
| Input Common | Pin 2 |
| Start | Pin 3 |
| Stop | Pin 4 |
| Pause | Pin 5 |
| Leak On | Pin 6 |
| Enable Calibration | Pin 7 |
| Air On | Pin 8 |
| Change Program | Pin 9 |
| Program Select BCD 1 | Pin 10 |
| Program Select BCD 2 | Pin 11 |
| Program Select BCD 3 | Pin 12 |
| Program Select BCD 4 | Pin 13 |
| Program Select BCD 5 | Pin 14 |
| Part Present** | Pin 15 |
| Reset Outputs | Pin 16 |
| Clear Error** | Pin 17 |
| Test Air Pressure Detected** | Pin 18 |
| Tester 0V (Common) | Pin 19 |

| | Default Output Description |
|---|---|
| Pin 20 | Ready |
| Pin 21 | Error |
| Pin 22 | Test In Progress |
| Pin 23 | Pass |
| Pin 24 | Fail |
| Pin 25 | Gross Leak |
| Pin 26 | Tooling Fault** |
| Pin 27 | Program Calibration Enabled |
| Pin 28 | Calibration Comp Step In Progress |
| Pin 29 | Calibration Cal Step In Progress |
| Pin 30 | Calibration Relax Timing |
| Pin 31 | Program Selected BCD 1 |
| Pin 32 | Program Selected BCD 2 |
| Pin 33 | Program Selected BCD 3 |
| Pin 34 | Program Selected BCD 4 |
| Pin 35 | Program Selected BCD 5 |
| Pin 36 | Output Common |
| Pin 37 | Output Common |

** Denotes a function that is still in development

### 4.3.2 Digital I/O Cable

The optional DB37 can be purchased through Leakmaster or another 3rd 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. This input must be low before a test can be started.

“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 1-31 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 | = | **1** |
| 0 | 0 | 0 | 1 | 0 | = | **2** |
| 0 | 0 | 0 | 1 | 1 | = | **3** |
| 0 | 0 | 1 | 0 | 0 | = | **4** |
| 0 | 0 | 1 | 0 | 1 | = | **5** |
| 0 | 0 | 1 | 1 | 0 | = | **6** |
| 0 | 0 | 1 | 1 | 1 | = | **7** |
| 0 | 1 | 0 | 0 | 0 | = | **8** |
| 0 | 1 | 0 | 0 | 1 | = | **9** |
| 0 | 1 | 0 | 1 | 0 | = | **10** |
| 0 | 1 | 0 | 1 | 1 | = | **11** |
| 0 | 1 | 1 | 0 | 0 | = | **12** |
| 0 | 1 | 1 | 0 | 1 | = | **13** |
| 0 | 1 | 1 | 1 | 0 | = | **14** |
| 0 | 1 | 1 | 1 | 1 | = | **15** |
| 1 | 0 | 0 | 0 | 0 | = | **16** |
| 1 | 0 | 0 | 0 | 1 | = | **17** |
| 1 | 0 | 0 | 1 | 0 | = | **18** |
| 1 | 0 | 0 | 1 | 1 | = | **19** |
| 1 | 0 | 1 | 0 | 0 | = | **20** |
| 1 | 0 | 1 | 0 | 1 | = | **21** |
| 1 | 0 | 1 | 1 | 0 | = | **22** |
| 1 | 0 | 1 | 1 | 1 | = | **23** |
| 1 | 1 | 0 | 0 | 0 | = | **24** |
| 1 | 1 | 0 | 0 | 1 | = | **25** |
| 1 | 1 | 0 | 1 | 0 | = | **26** |
| 1 | 1 | 0 | 1 | 1 | = | **27** |
| 1 | 1 | 1 | 0 | 0 | = | **28** |
| 1 | 1 | 1 | 0 | 1 | = | **29** |
| 1 | 1 | 1 | 1 | 0 | = | **30** |
| 1 | 1 | 1 | 1 | 1 | = | **31** |

### 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 desire 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.

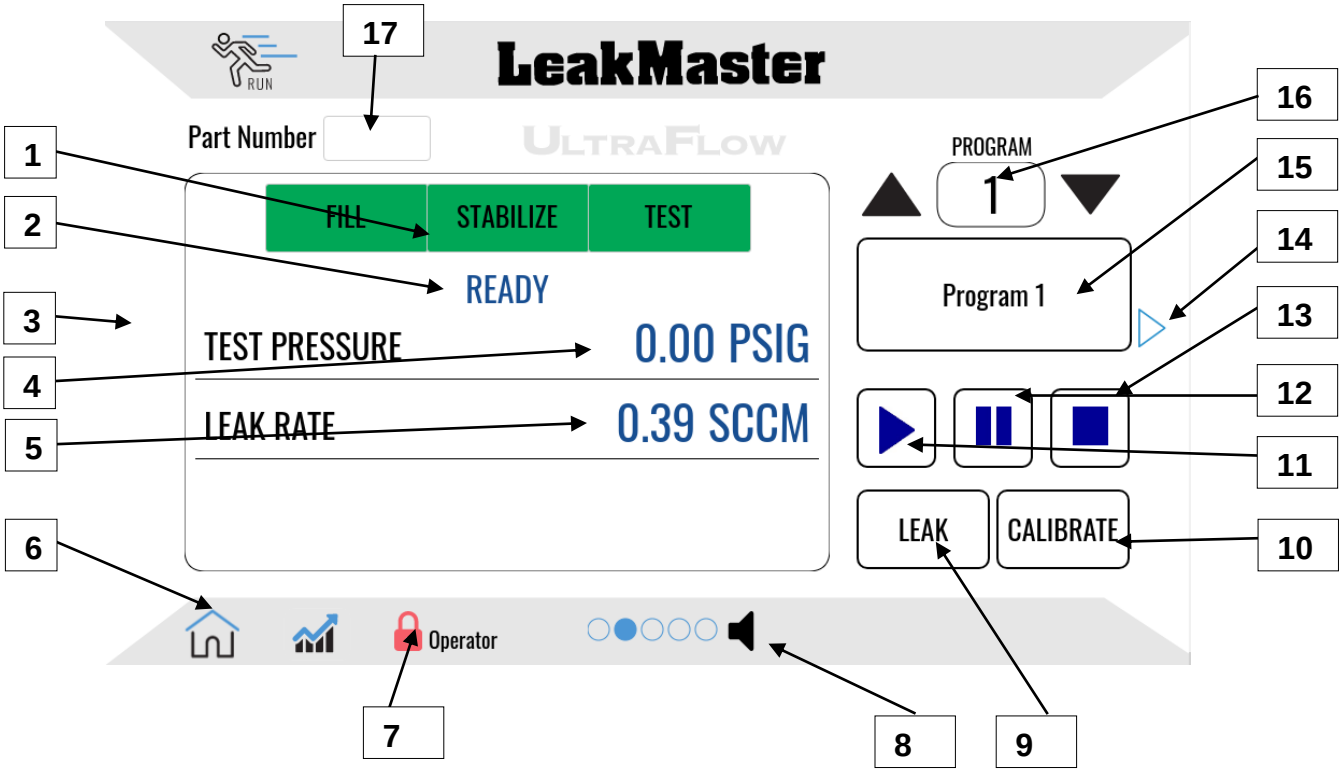
**PROGRAM:** This menu will allow the user to setup test parameters and limits for each leak test program. This menu is password protected.

**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 right would be the HOME menu.

4. TEST PRESSURE: This displays the current pressure seen on the test pressure transducer.

5. 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. The value of this display becomes live upon entering the Test step when in Mass Flow Mode.

6. HOME ICON: When pressed by the user, the screen will return to the Home menu.

7. 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.

8. 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.

9. 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.

10. CALIBATE: 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.

11. 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.

12. PAUSE: When pressed by the user, the leak test cycle will be paused in the current step.

13. STOP: When pressed by the user, the leak test cycle will be stopped immediately.

14. 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.

15. 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.

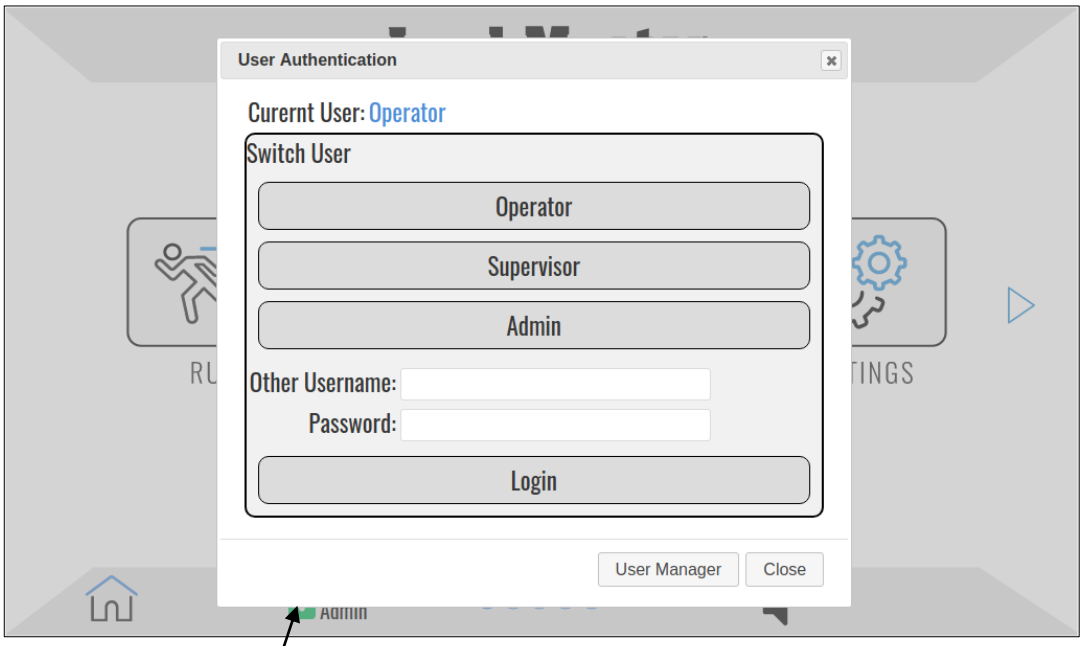
16. PROGRAM NUMBER: Displays the current program number that is selected.

17. 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.

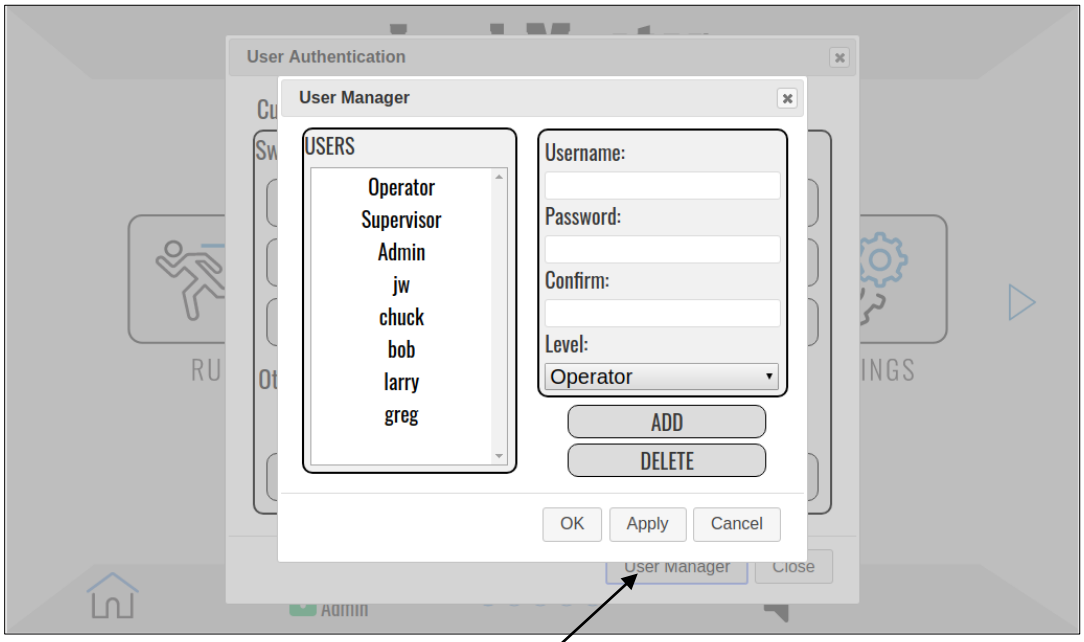
### 5.3.1 ADMIN LOGIN




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.

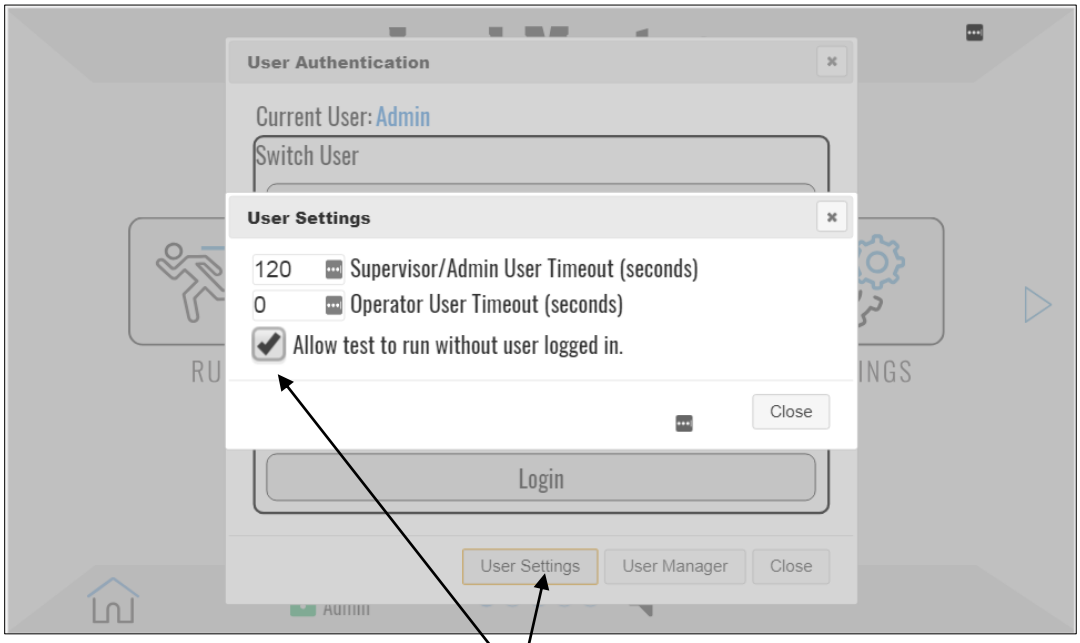
You can setup multiple users with different levels of permissions. Press the User Manager button to setup new users. After users have been setup, it is recommended to login as a user (not Admin) for future logins.

### 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 User Settings

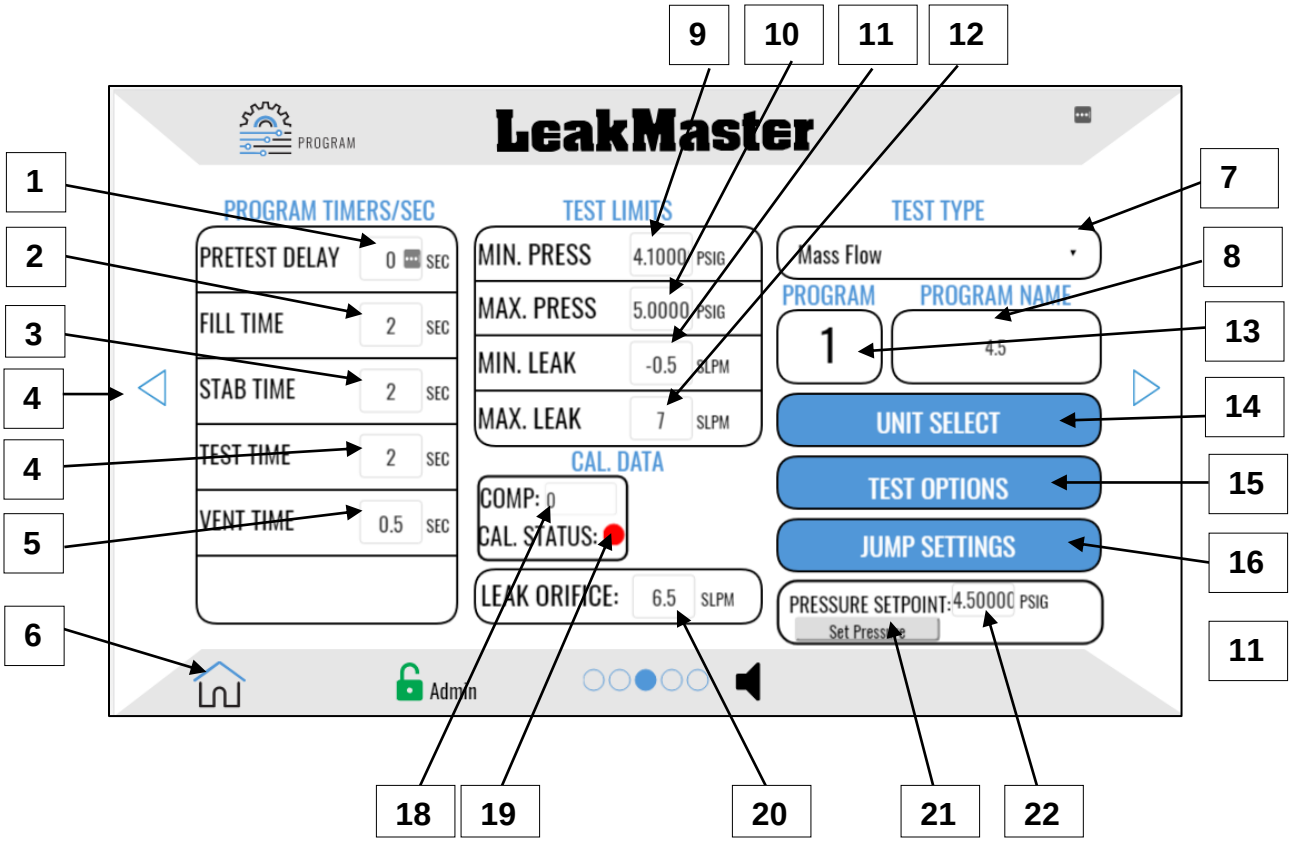



Upon pressing the User Settings button, the User Settings window will pop up. These settings allow the user to set the amount of time before a user is logged out.

The user can also check or uncheck this box to allow the tester to run with or without a user logged in. If the box is checked, then the tester can run a test without a user logged in. If the box in not checked, then the tester will only run if a user is logged in.

### 5.3.4 Programming Menu (MASS FLOW MODE)

The menu shown below is the PROGRAM menu. 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.

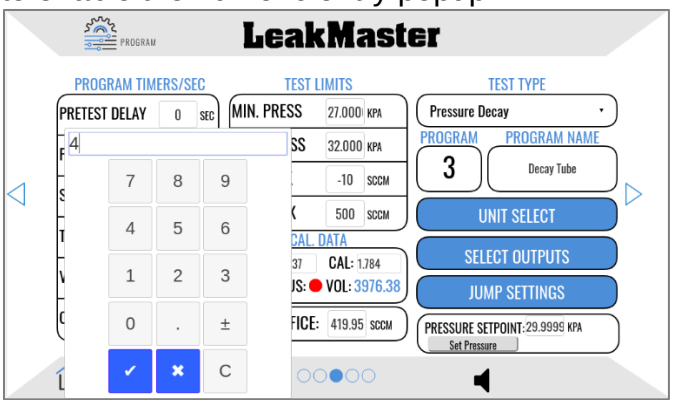



**Items 1-5 are the program timers in the test sequence order from top to bottom (1-6).**

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. 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 fill valve will remain on (open) and the TEST valve will turn on (open) 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 TEST valve will remain on and the FILL valve will turn off (close). The tester monitors and records the flow sensor 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 MASS FLOW and PRESSURE DECAY.

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

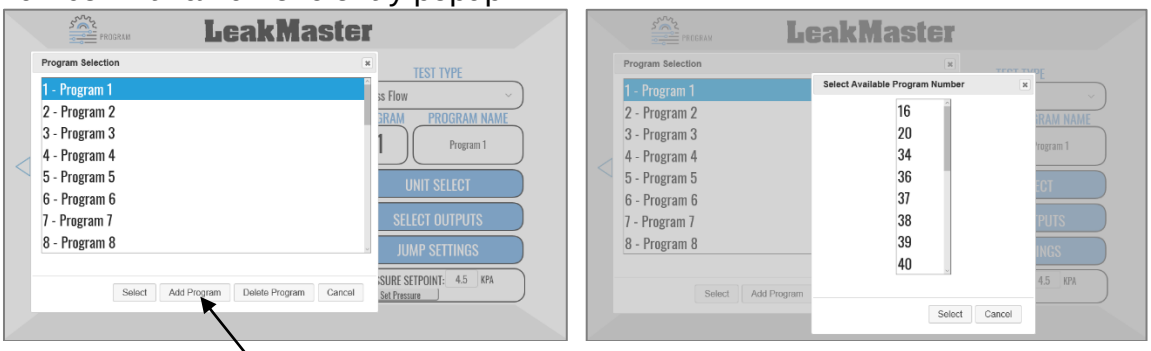
**9.** MIN PRESS: Pressing this numeric entry will pop up a numeric entry pad. A number can be entered into this entry pad for the Minimum Test Pressure in the selected pressure unit. This is a gross leak check to ensure that the part reaches a minimum pressure after the Fill and Stab Timer has expired. 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.

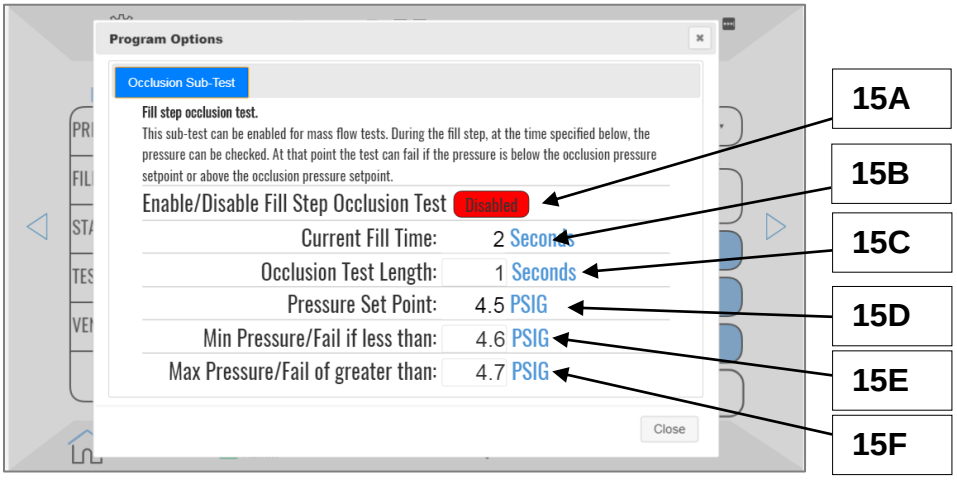



Pressing the Add Program button will pop up a Select Available Program Number window as shown on the right. You will need to pick an available program number and press Select. After you have picked an available program you can setup the parameters for the new program.

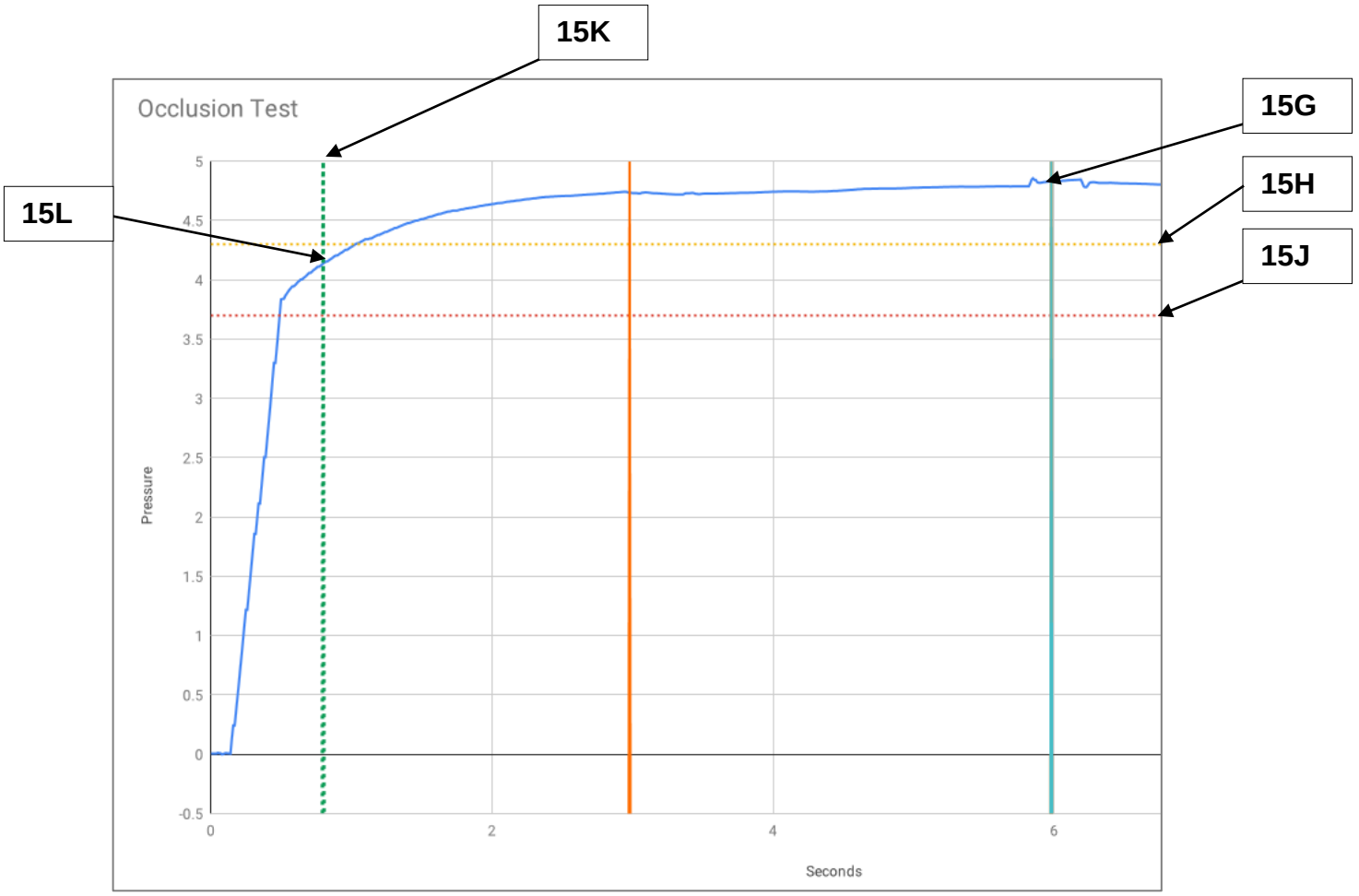
**14.** UNIT SELECT: When pressed, a popup window will be displayed as shown in the figure below. The user can then select the desired pressure and flow units for each program. Press the OK or X in the upper right corner to close the window.

**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 hault immediately. Items 15B and 15D are for reference only and are not programmable.



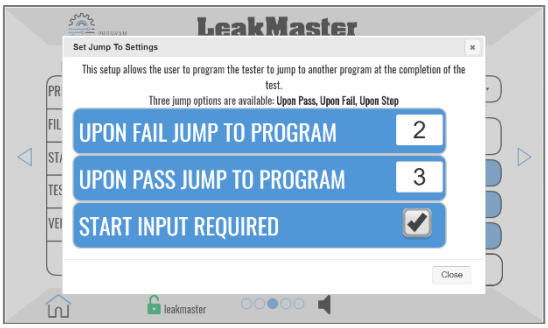
Occlusion Sub Test Graph Example:



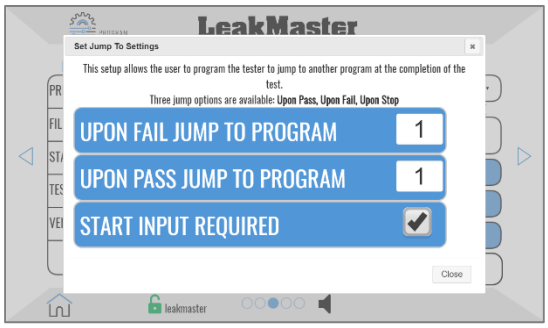

15G: Test Pressure
15H: Max Pressure Setting
15J: Min Pressure Setting
15K: Occlusion Test Length Setting
15L: Occlusion Pressure Log Point

**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.

**PROGRAM #1**




**PROGRAM #2 or #3**




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. If the Start Input Required box is not checked, the program will run immediately (automatically). If the Start Input Require box is checked, the next program will not run until a start command is initiated.

**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 LPM (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

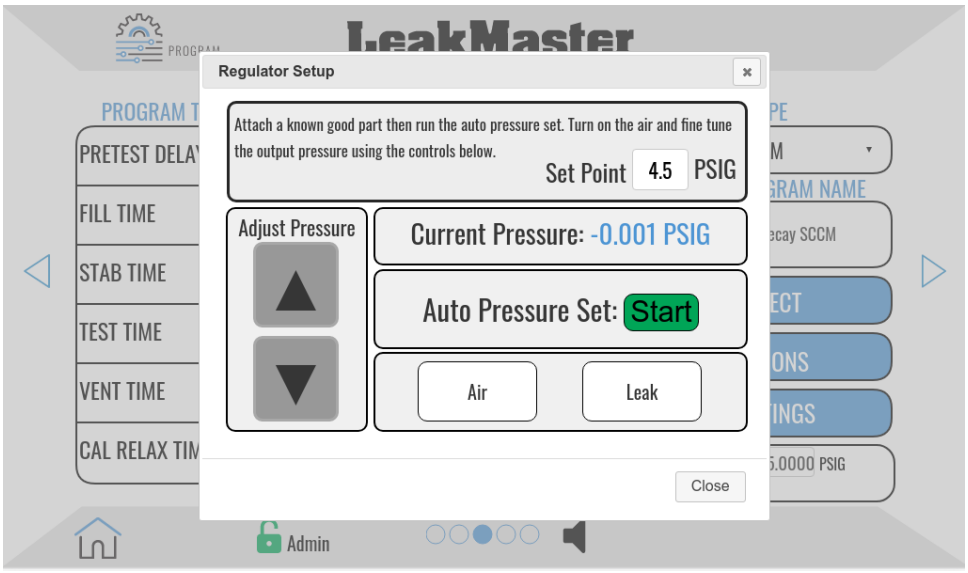
on the air to the tester (make sure the tester is either plugged or connected to a leak free part). This will allow you to see if the test pressure is hitting the set point pressure or not. If this tester is equipped with an electronic pressure regulator and you are not happy with the current pressure results, you can push 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 calibrate to the leaking condition to ensure that the set point pressure is set to a leaking condition (with large leaks 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.

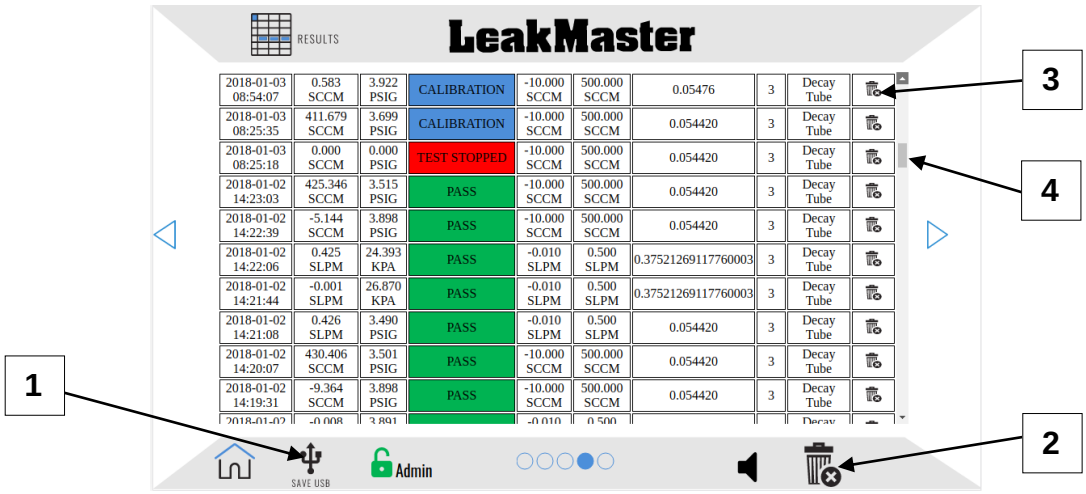
1. When the Auto Pressure Set button is green and displays "Start", press the green Start button.
2. The button will then turn red and display "Stop". Press this button during the process to cancel.
3. The electronic regulator will adjust to a low pressure setpoint.
4. The electronic regulator will then 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.




**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. When changing this value the min/max pressure values will be set to +/- 0.2 PSI (converted to the selected pressure unit).

## 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 Ultraflow. The csv file is saved in the Ultraflow 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. ARROW LEFT: Pressing this button will shift the table columns to the left to view the left most columns of data.

Example of data file viewed in Excel:

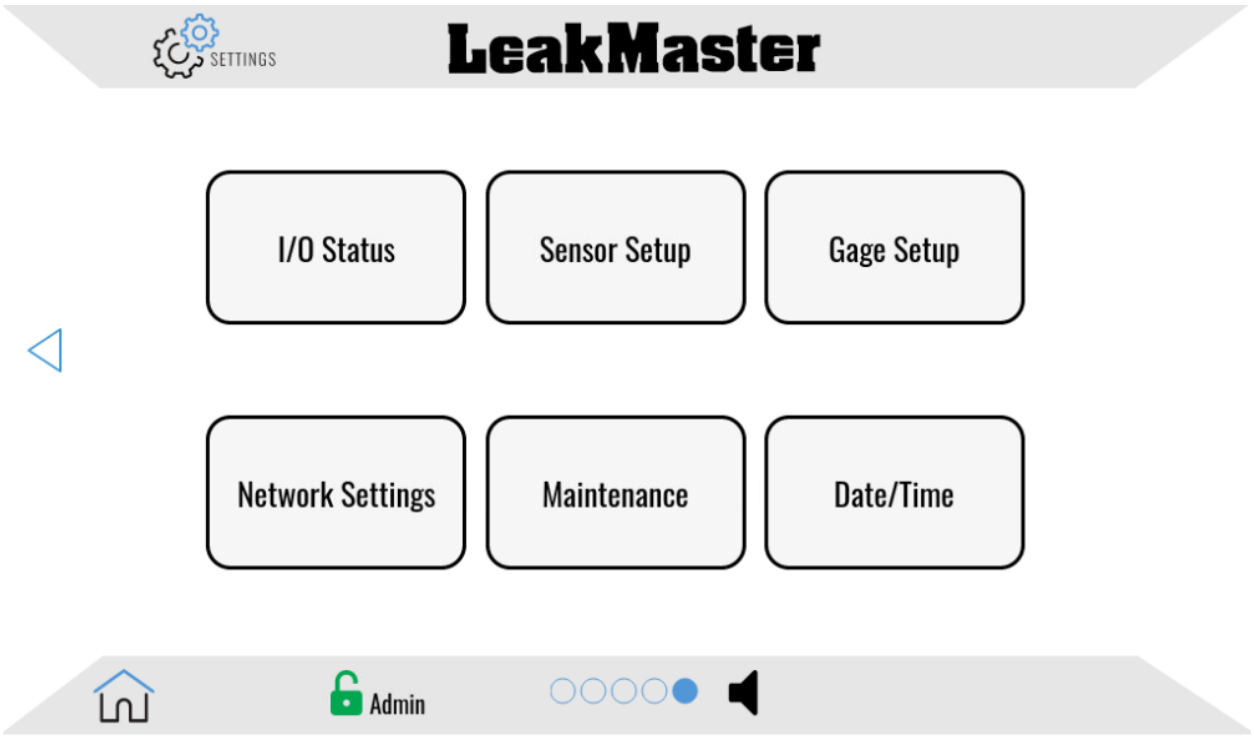
| Date | LeakRate | FlowUnit | TestPressure | PressureUnit | PassFail | PassFailDetail | LLL | ULL | LPL | UPL | CompValue | CalValue | CompVolume | TempF | TempC | ProgNum | ProgName |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4/2/2018 12:32 | 17.765 | sccm | 0.490379 | 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.

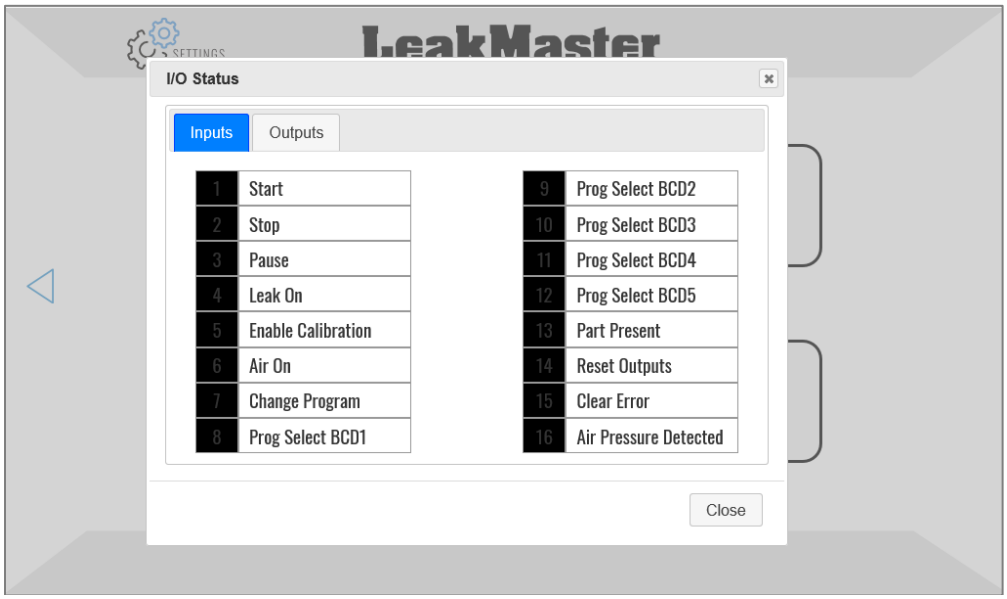
## 5.5 SETTINGS MENU

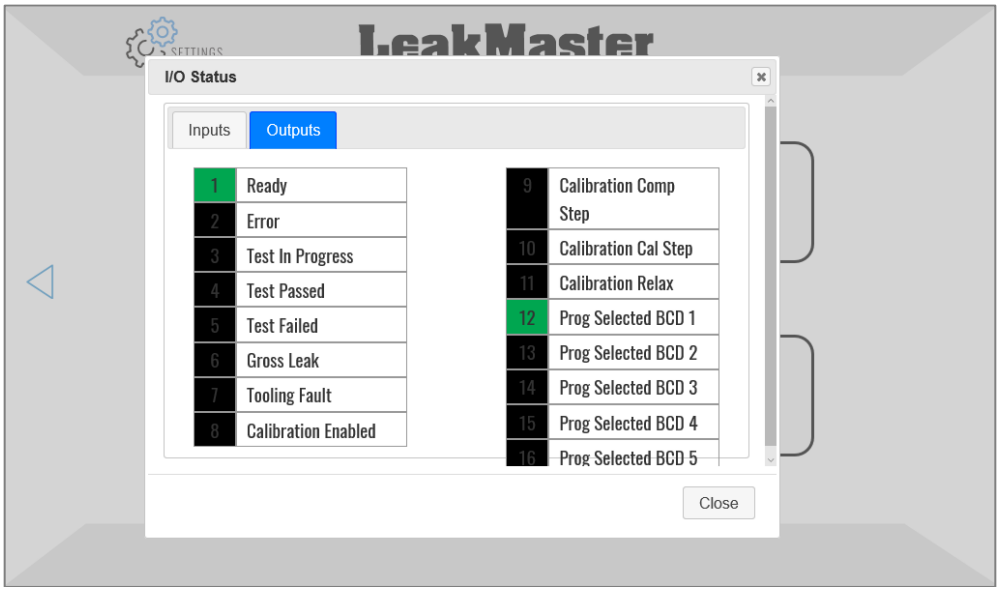
This menu contains sub menus for viewing and setting up general settings such as I/O viewing, changing the date, setting up a capability study, zeroing and spanning the transducers, and software license entry. Pushing any of the buttons shown below will pop up the subsequent sub menu.



### 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 SENSOR SETUP MENU

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

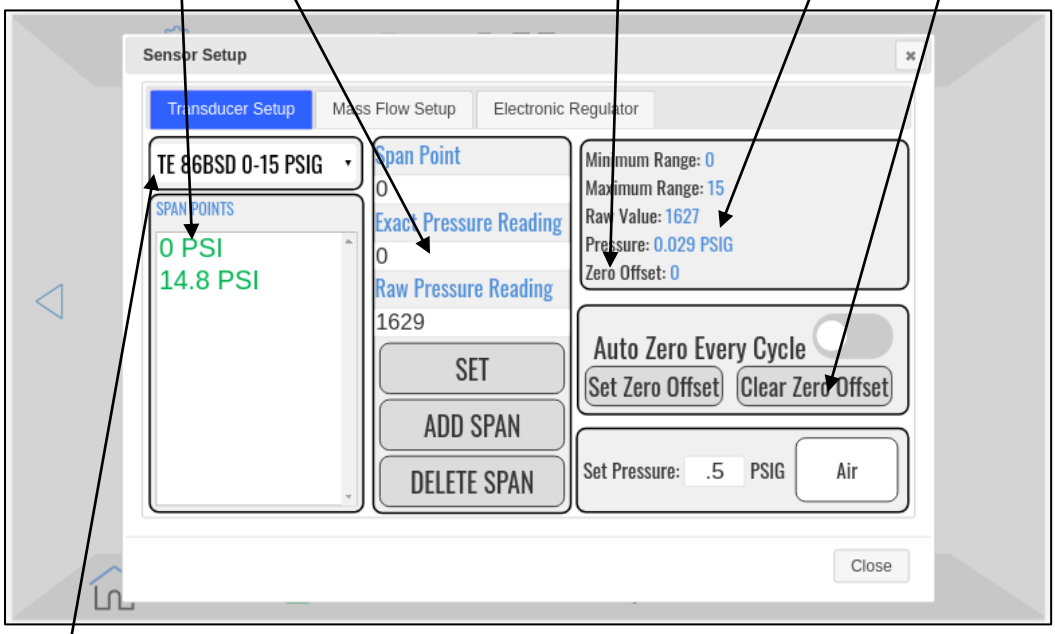
The SENSOR SETUP sub menu displays menus that allow the user to make adjustments (zero and span) to the Mass Flow Sensor and the Test Pressure Transducer. It is critical to fully understand these operations before making any changes. You will need to have a flow control, certified Flow Meter, and certified 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. The mass flow sensors are digital linear flow sensors. However, the sensors have a certain amount of accuracy through the linear line. For this reason, LeakMaster spans every 5% (20 points) through the full scale of the sensor to ensure maximum accuracy throughout the entire scale. This tester is capable of more span points as well and a span point can be taught anywhere throughout the entire span. LeakMaster will also always create a span point at the reject leak limit if it is known prior to shipment.

**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.**

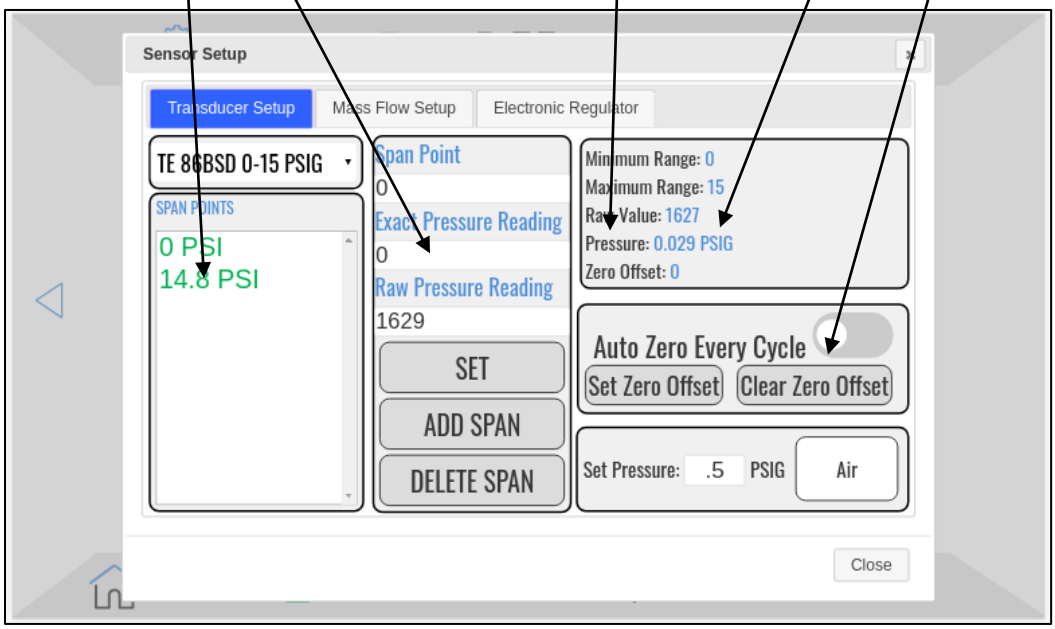
1. If there is a value other than 0 in the Zero Offset value, press the Clear Zero Offset button. The value of the Zero Offset should show a 0.
2. Connect a Certified Pressure Gauge to the test port on the front of the tester.
3. Touch the 0 PSI span point in the Span Points window on the left. The center window will display the 0 span point data.
4. 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.



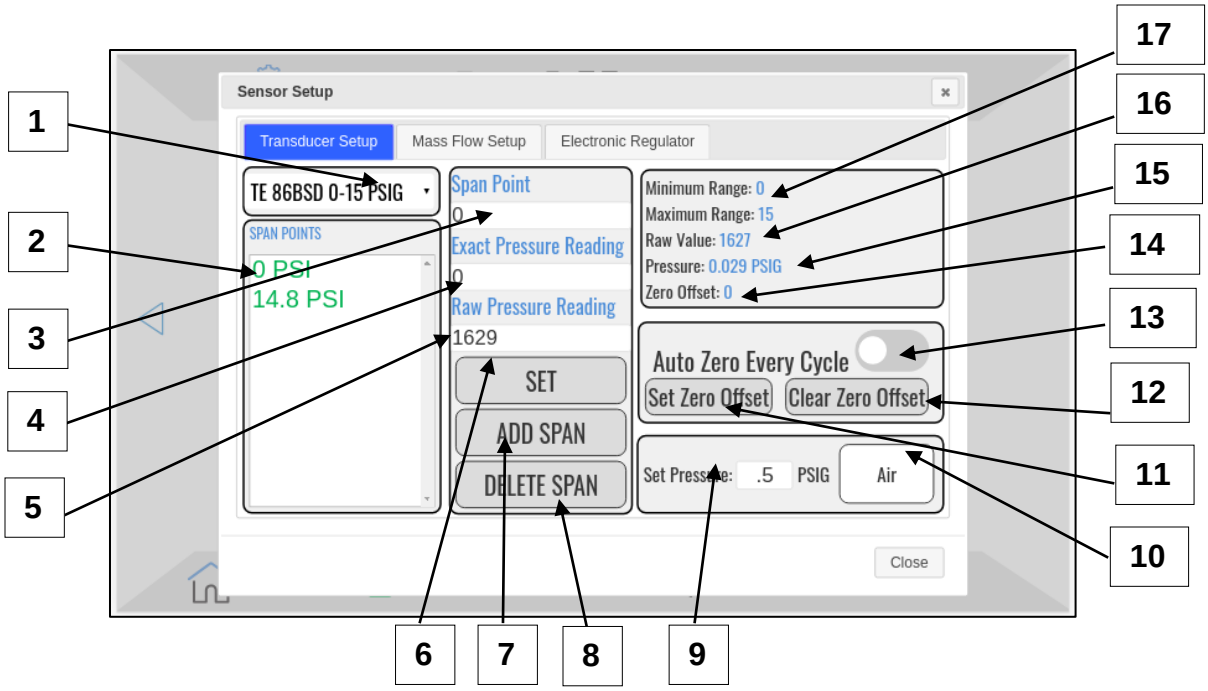

Sensor Model Number: This is a drop-down menu that allows the user to select the pressure sensor that is installed in the tester. The default pressure transducer for the UltraFlow V3 is TE 86BSD 0-15 PSIG. This should not be changed unless replacing a transducer that is a different model which would be a very unlikely scenario.

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 will 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. The default pressure transducer for the UltraFlow V3 is TE 86BSD 0-15 PSIG. This should not be changed unless replacing a transducer that is a different model which would be a very unlikely scenario.

2. SPAN POINT SELECTION: Displays the span points that are available to be spanned.
3. SPAN POINT NAME: This display 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.

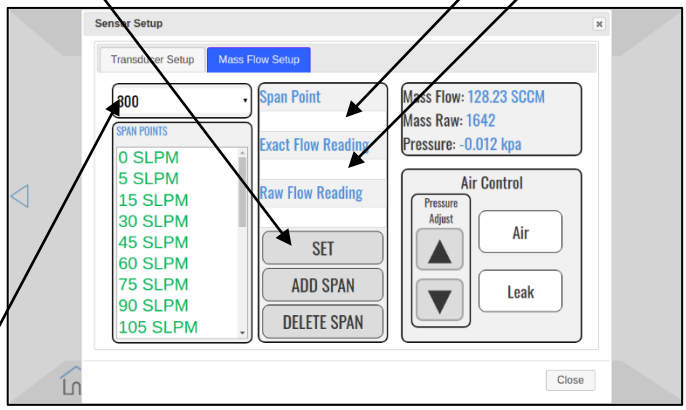
16. RAW VALUE: Displays the live current digital value of the pressure transducer.

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.
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.

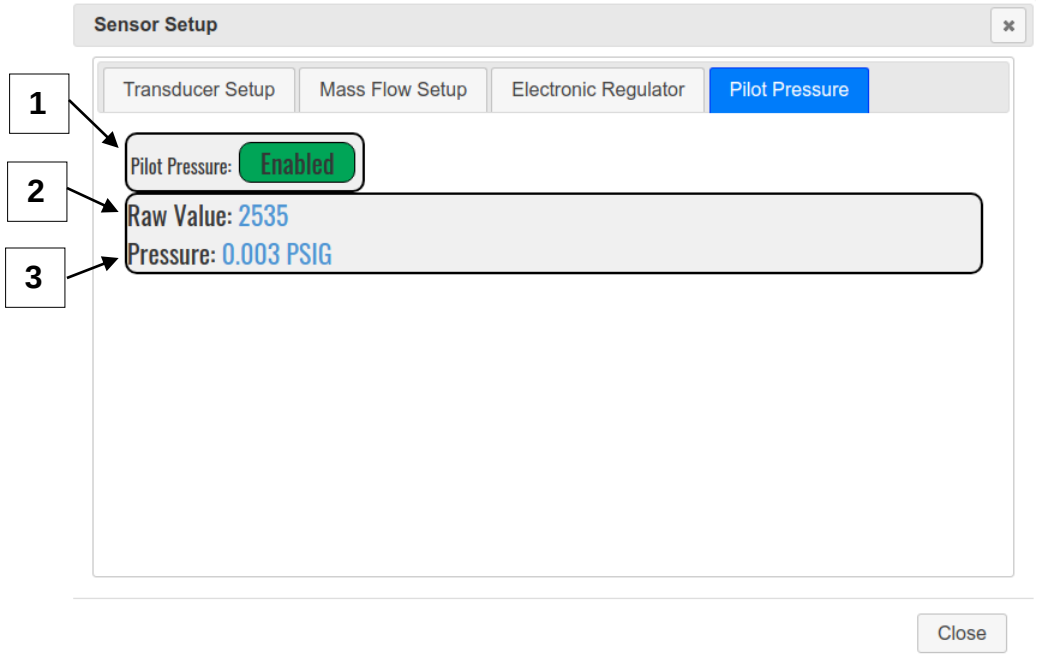



Sensor Full Scale: This is a drop down menu that allows the user to tell the tester what sensor is installed in the tester. The options are +/- 200 sccm, +/- 750 sccm, 0-10 SLPM, 0-50 SLPM, 0-100 SLPM, 0-200 SLPM, 0-300 SLPM. Note: sccm stands for standard cubic centimeters per minute, SLPM stands for stand standard Liters per minute.

### 5.5.3 PILOT PRESSURE TRANSDUCER

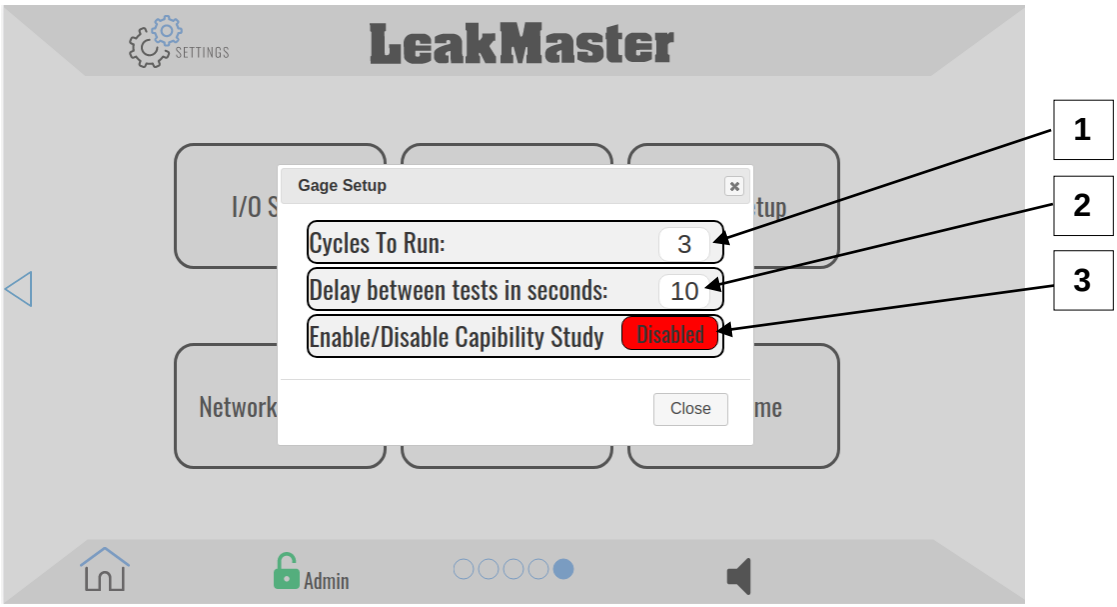
The PILOT PRESSURE tab indicates if a transducer to monitor the pilot pressure is installed.

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.



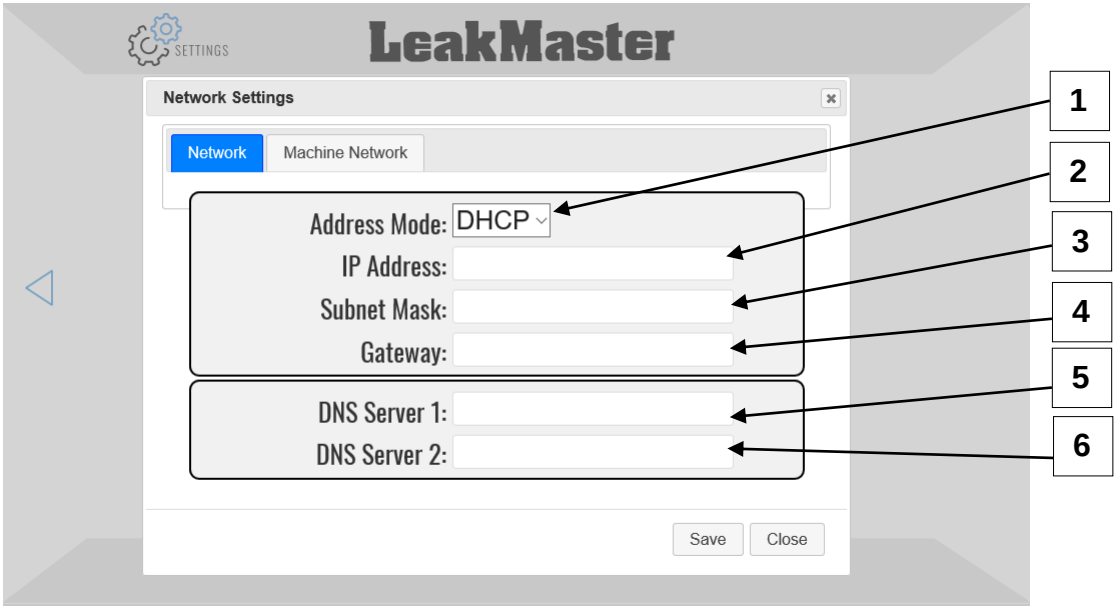

1. CYCLES TO RUN: Pressing this numeric entry will pop up a numeric entry pad. The user can enter the number of cycles to run for the capability study.

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.

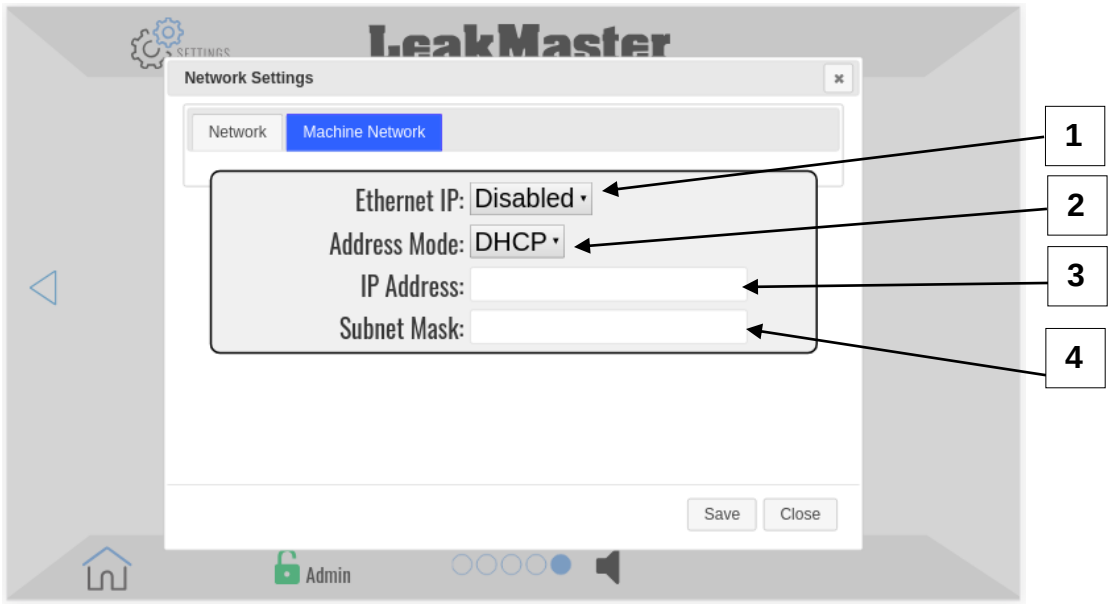
### 5.5.5 NETWORK SETTINGS SUB MENU

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.



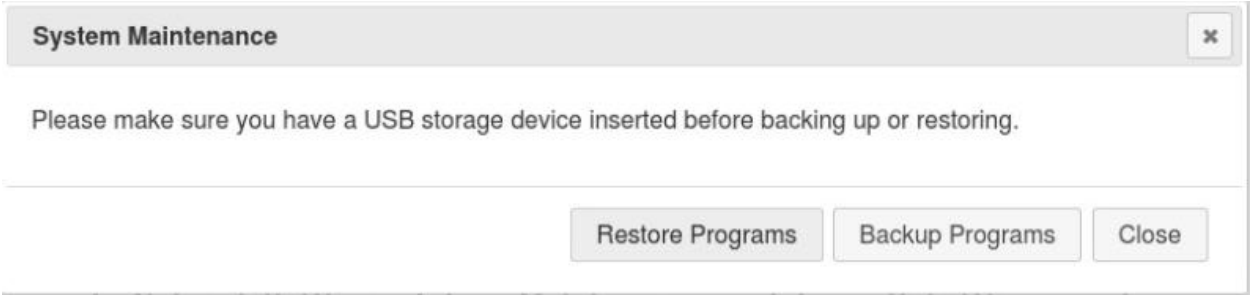

1. ETHERNET IP: Pressing this drop-down menu will allow the user to select Enable/Disable this communication function.

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.

Once the program file read is complete, reboot the tester by powering off and back on using the power button on the tester. Once rebooted your programming should be loaded.

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
(more on next page)

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.

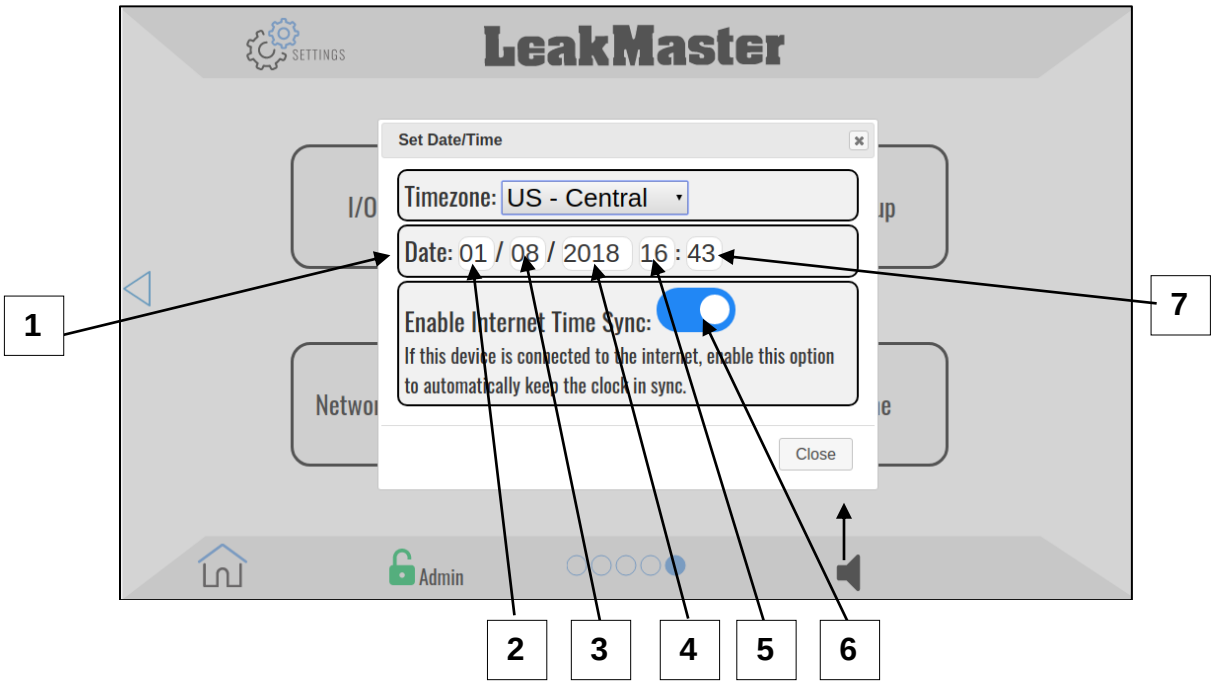
Example: http://192.168.1.10/leakmasterData

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 (Mass Flow Mode)

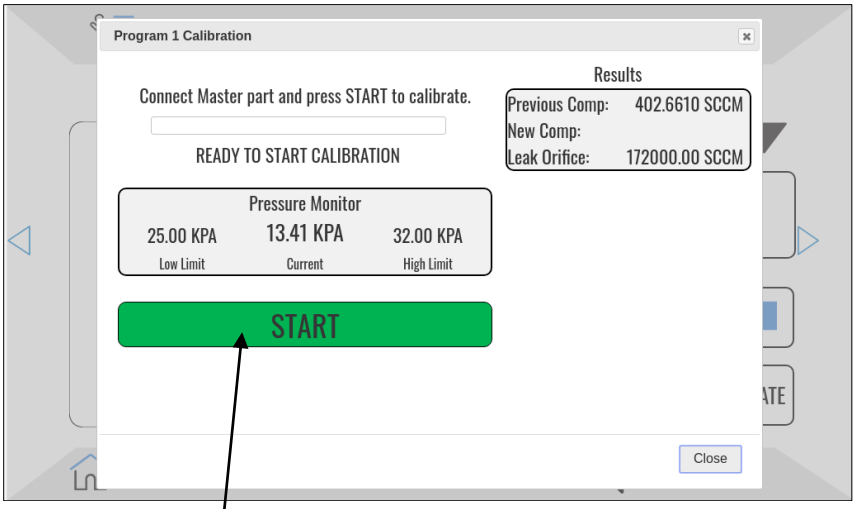
**What is a program calibration and why do you need it?**

A program calibration is a means of teaching the test instrument what a good part looks like. In mass flow mode, this will automatically compensate the leakage seen from 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, the mass flow sensor can 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 flow reading that is seen under these zero leak conditions is known as a Comp value. The Comp value is then subtracted (compensated) from the flow sensor reading during production testing. This procedure also allows the user to run the instrument at faster cycle times by not forcing the part to completely stabilize before looking for leak values.

## How do I perform a Program Calibration? (Mass Flow Mode)

For starters, you need to ensure that you 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.

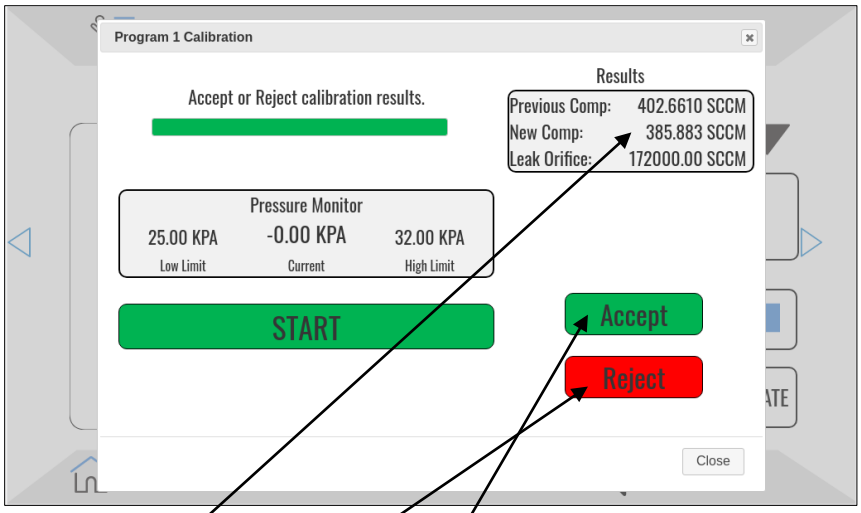



Auto Calibration should only be done if the verification procedure in Section 7.2 fails or when running the program for the first time.

1. Connect the master “zero leak” part to the tester.

2. Push the green “START” button on the Program # Calibration window

3. The tester will run through a test cycle to memorize the zero leak characteristics. The status bar will fill with yellow based upon the amount of time that has passed during the calibration. When the cycle is complete, the status display should display “Accept or Reject Calibration Results” (as shown below).




4. A “New Comp.” value will be displayed. If you are satisfied with the new comp value, then press the green Accept button and the new comp value will be saved to the program. If you are not satisfied with the new comp value, simply press the red Reject button to cancel the calibration. If you notice that the comp value is similar to the previous comp value you will likely accept the calibrations. If you notice that the new comp value is drastically different than the previous comp value you should reject the calibration. If rejection is needed this is likely due to leaking seals or a leaking master part.

5. 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 Program Calibration (Pressure Decay SCCM Mode)

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

When using Pressure Decay Mode, 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.

Leak Rate (sccm) = (Pressure Loss in PSI) (Volume in cm3) (60)/ (Test Time) (14.7)

When a test program is calibrating (or learning) a test part, the unknown part of the equation is volume. When using Pressured Decay SCCM Mode, a calibration is a two step process.

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.

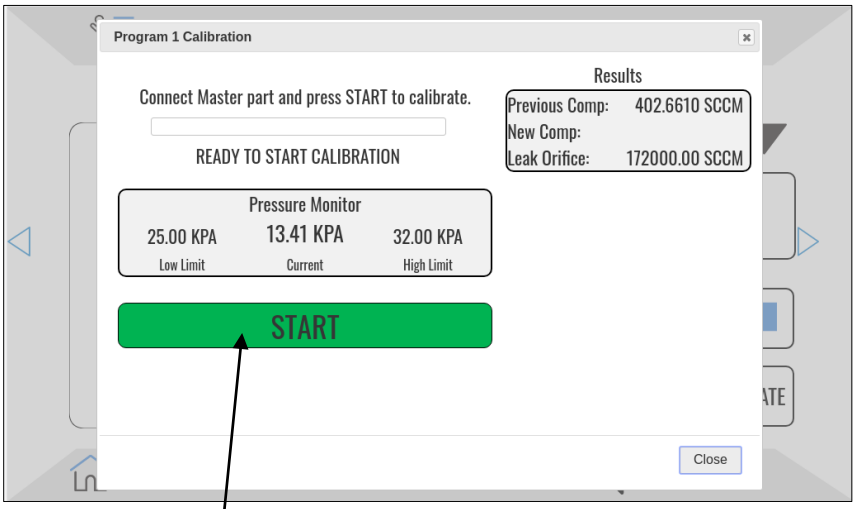
The tester will then assume that all production parts have this same test volume (for that particular program).

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

**How do I perform a Program Calibration? (Pressure Decay SCCM Mode)**

For starters, you need to ensure that you 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.

6. Connect the master “zero leak” part to the tester.

7. Push the green “START” button on the Program # Calibration window

8. The tester will run through a two test cycles. The first test cycle will memorize the zero leak characteristics. The status bar will fill with yellow based upon the amount of time that has passed during the calibration. Upon completion of the first cycle, the Calibration Relax Time will start. When the Relax Time is completed, the second test cycle will start. During this test cycle, the Cal Valve will be enabled which introduces a known leak value into the test circuit. When the second test is complete, the status display will display “Accept or Reject Calibration Results”. If the results of the calibration look acceptable, push the Accept button (note there should be sufficient separation between the Comp and Cal Values as noted in earlier chapters).

9. 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 to achieve optimum repeatability.***

## 6.3 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 LPM,
Master part test should be between (-1) to 1 LPM.
Master part with 20 LPM orifice introduced should be between 19 – 21 LPM.

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.
- "OCCLUSION PRESSURE HIGH" - The logged occlusion pressure exceeded the Max Pressure limit of the occlusion test.
- "OCCLUSION PRESSURE LOW" - The logged occlusion pressure fell below the Min Pressure limit of the occlusion test.

# 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)
- 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)

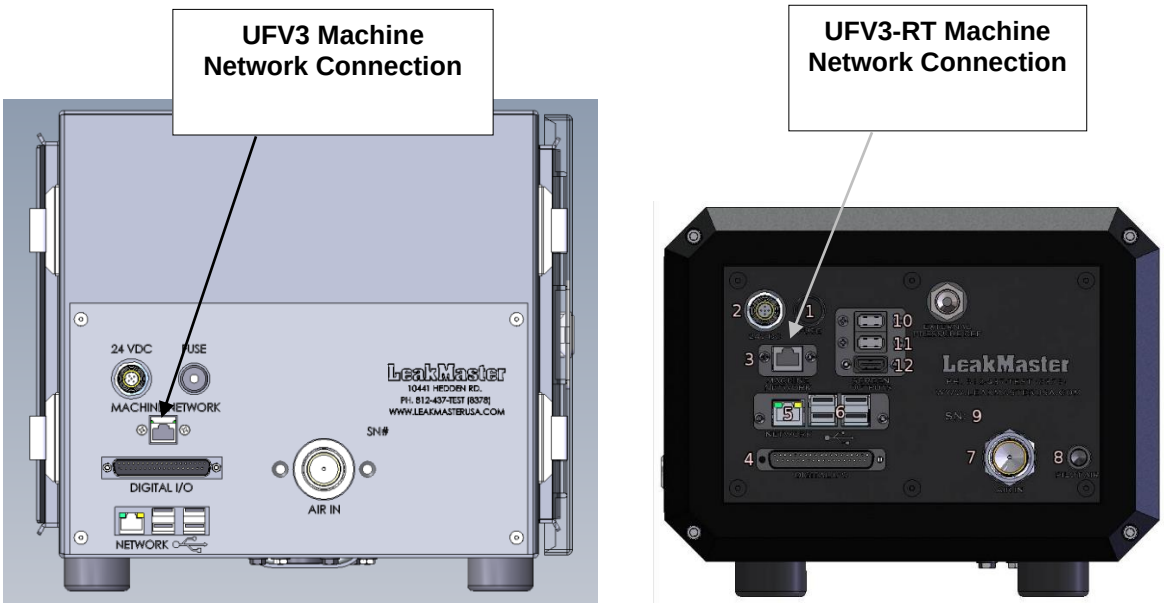
- Part Volume (Decay SCCM Tests)
- Test Air Temperature
- Program Number
- Program Name
- Fill Time
- Stabilize Time
- Test Time
- Part Number

## 8.2 ETHERNET IP COMMUNICATIONS

This option is not a standard option. This must be purchased and installed prior to delivery of the tester.

### 8.2.1 Wiring

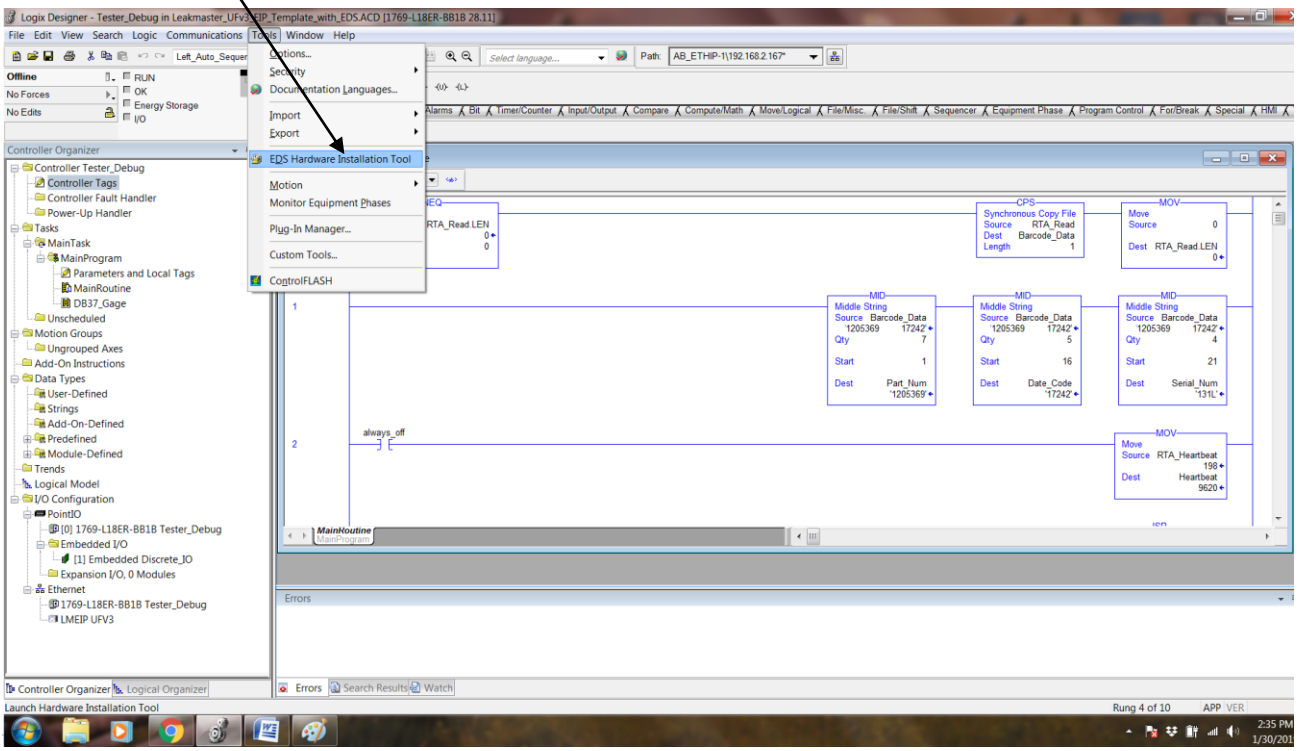
Plug an Ethernet cable from the Ethernet IP network into the back of the tester in the Machine Network RJ45 port.



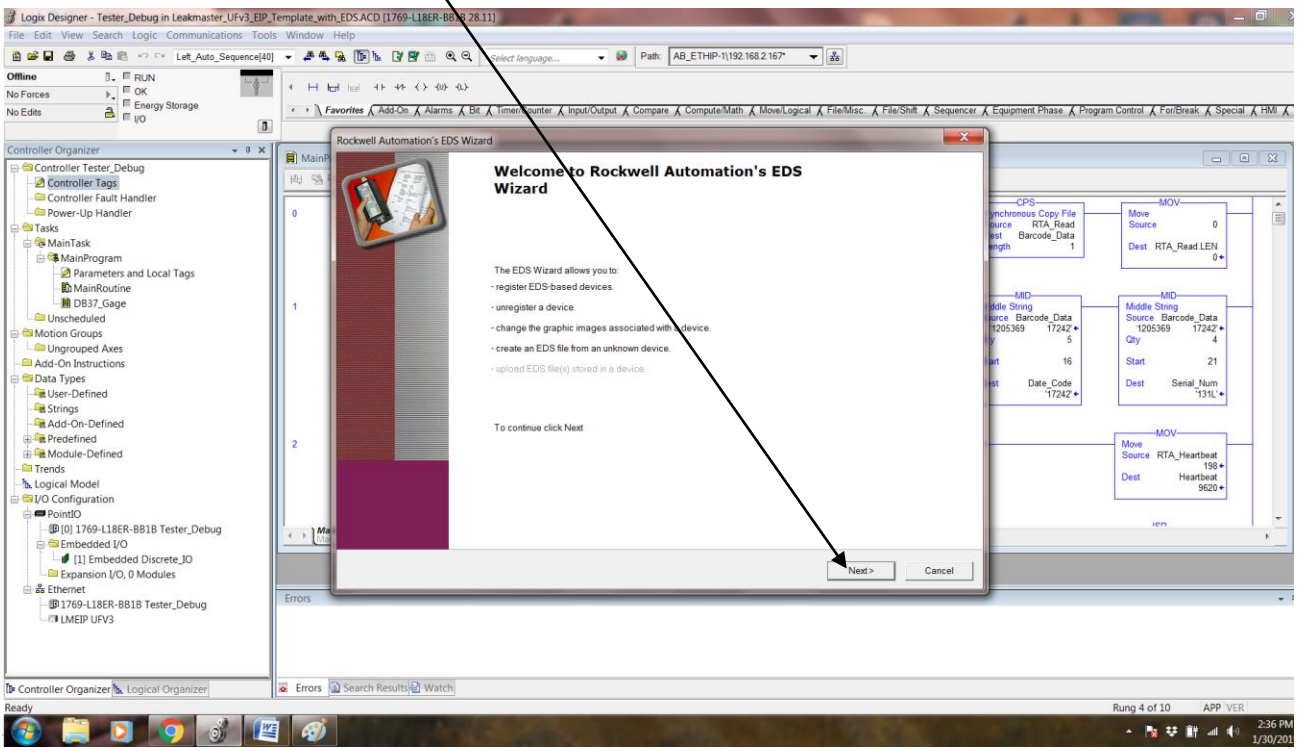
### 8.2.1 AB Control Logix Setup (using EDS add on profile)

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 to acquire the latest EDS file for this instrument.**

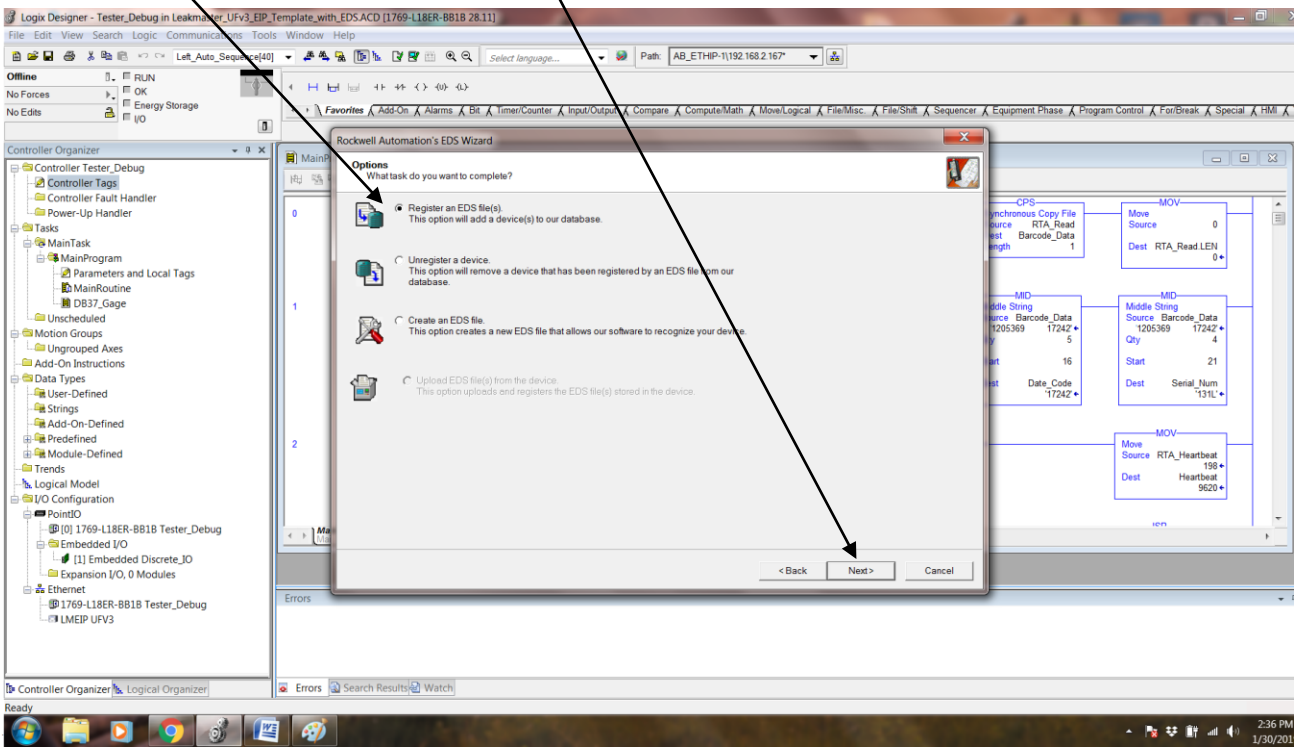
1) Once you have your Logix program started, under the tools menu, select EDS Hardware Installation Tool.



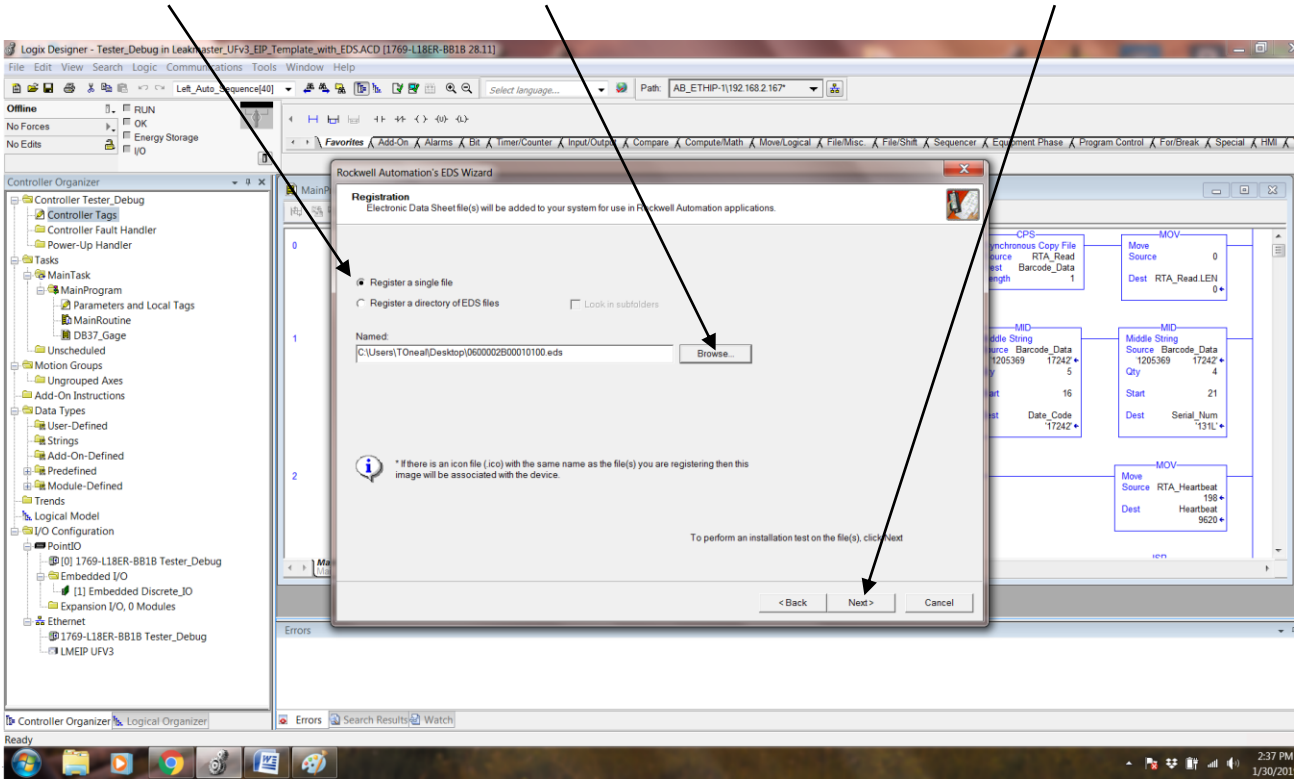
2) Once this menu pops up, click Next.



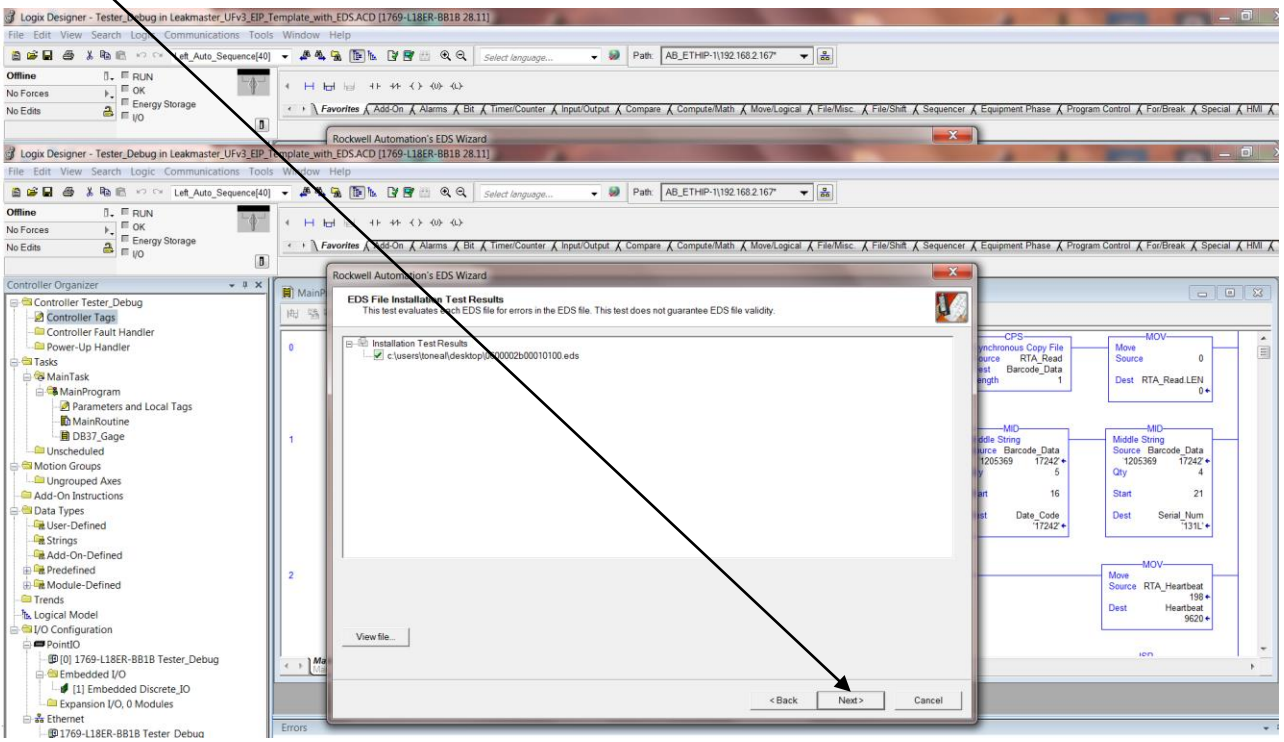
3) Select Register and EDS file, the click Next.



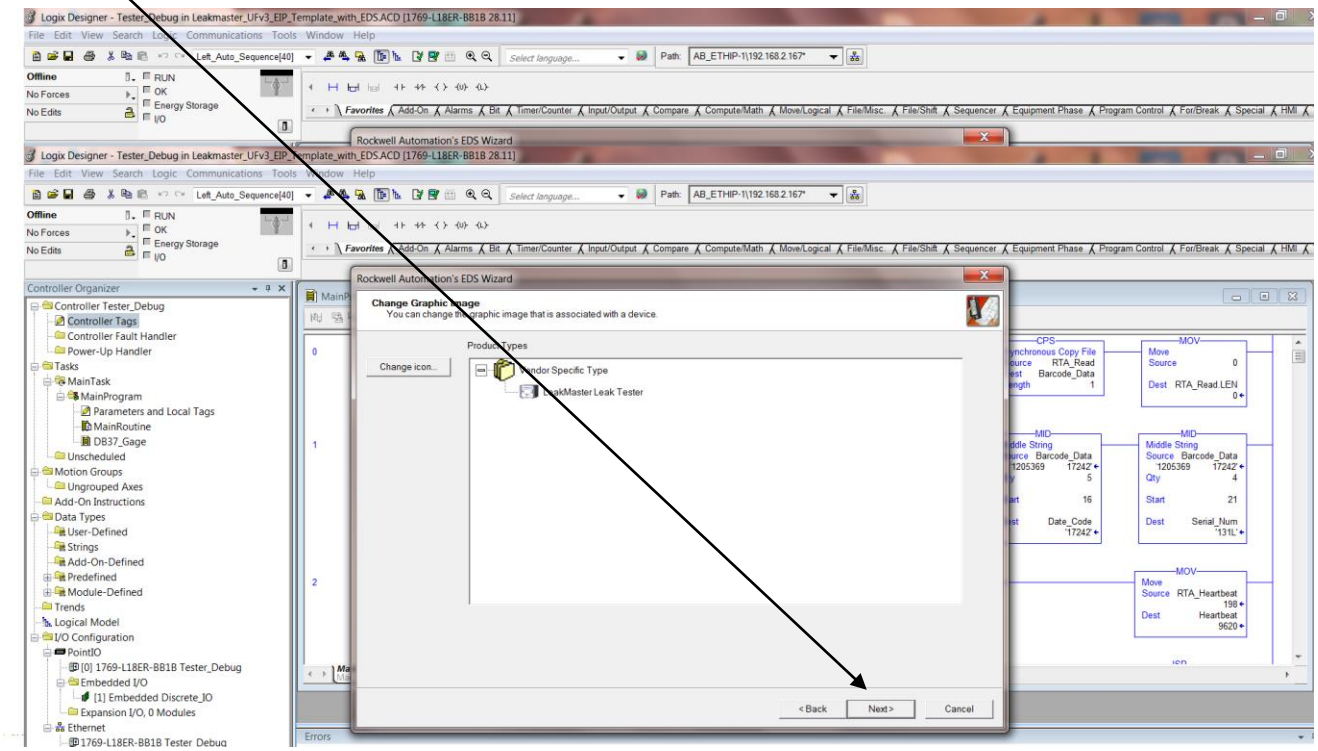
4) Select Register a single file. Browse for the location of the EDS file. Click Next.



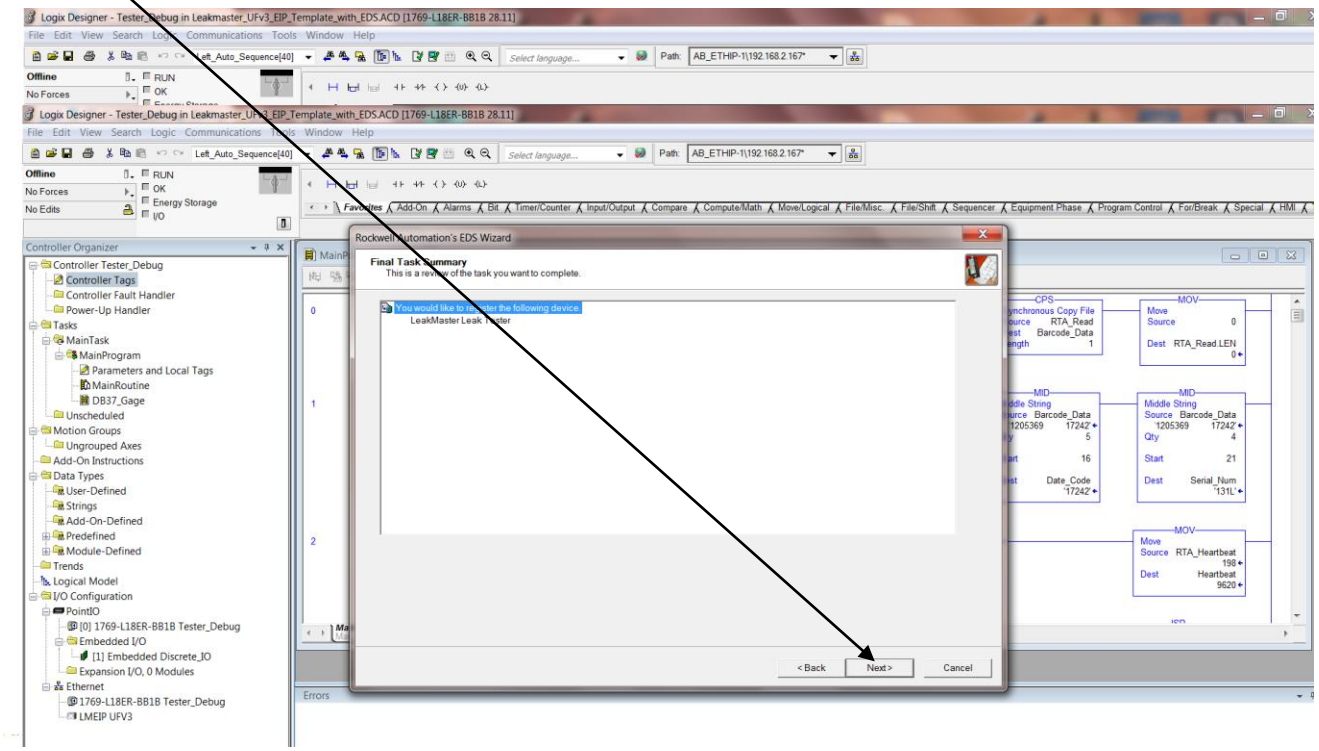
5) Click Next.



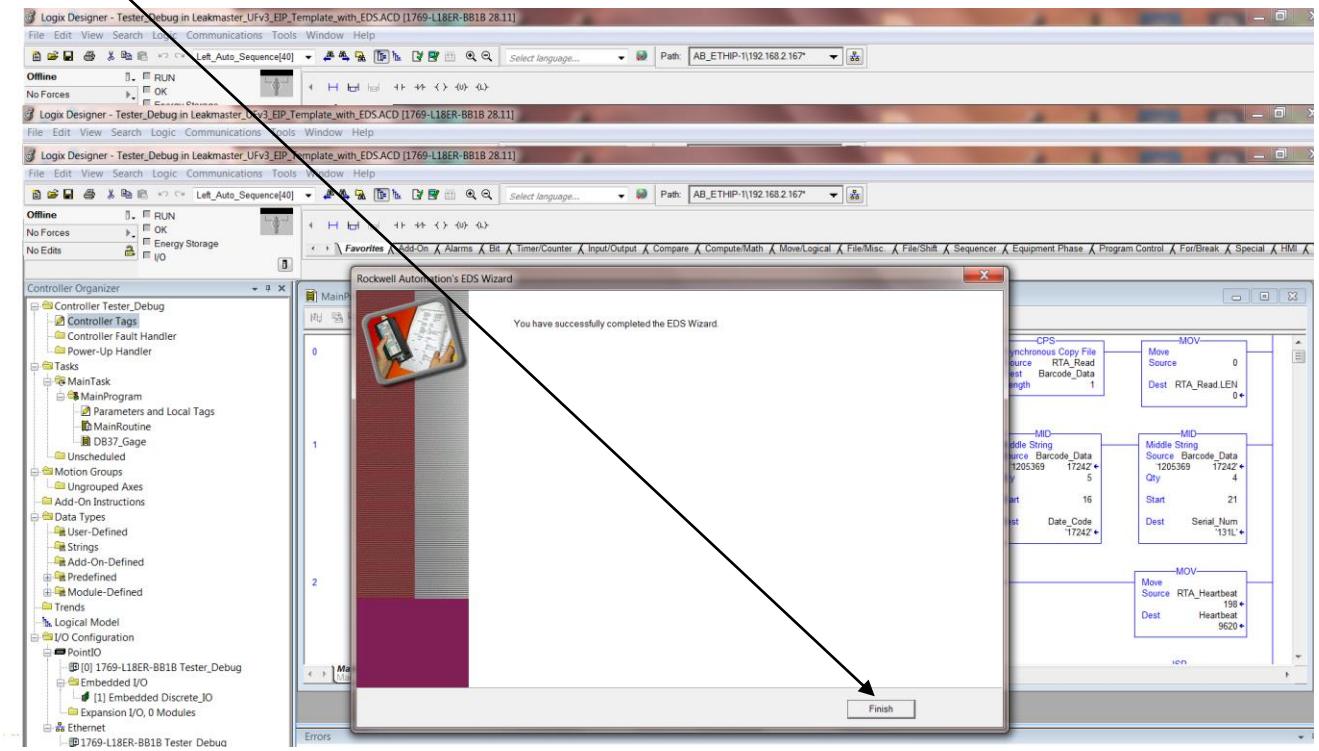

6) Click Next.



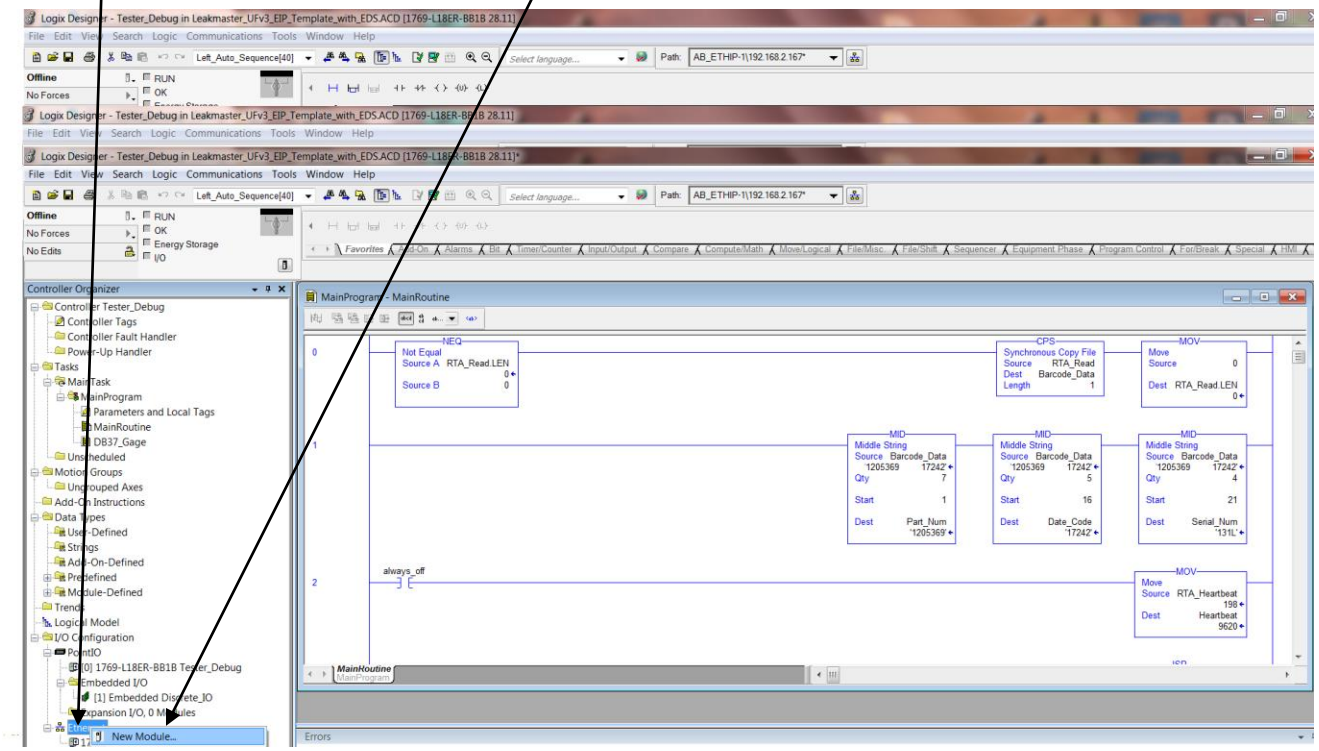
7) Click Next.


Rockwell Automation's EDS Wizard
Final Task Summary
This is a review of the task you want to complete.
You would like to register the following device.
LeakMaster Leak Tester
< Back
Next >
Cancel

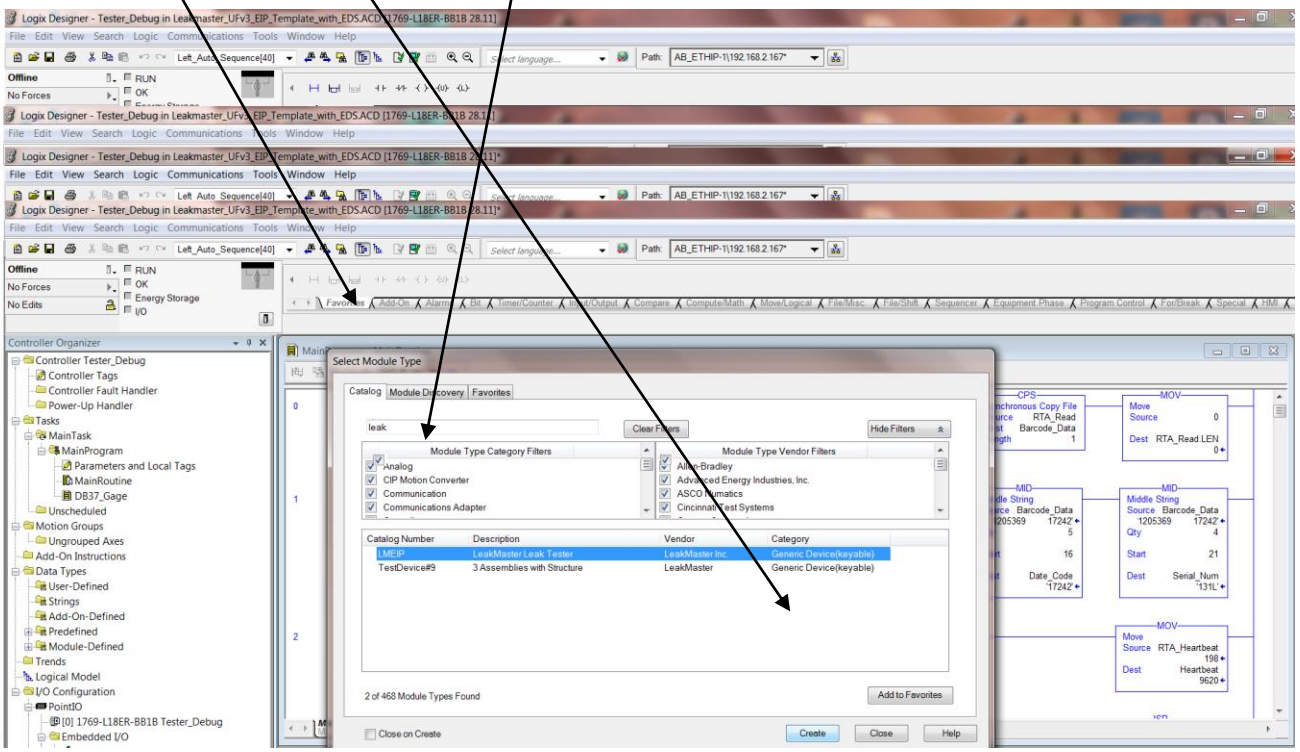
8) Click Finish.



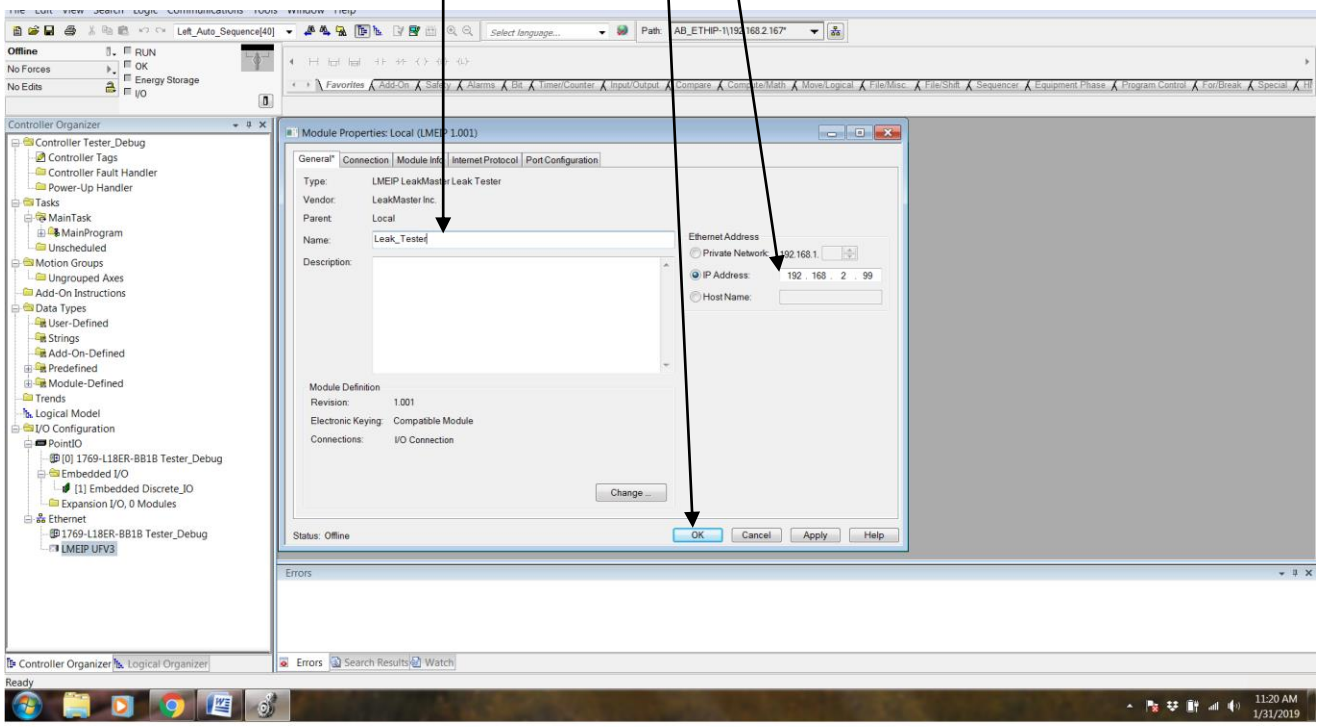

9) Right Click on Ethernet. Then Click New Module.



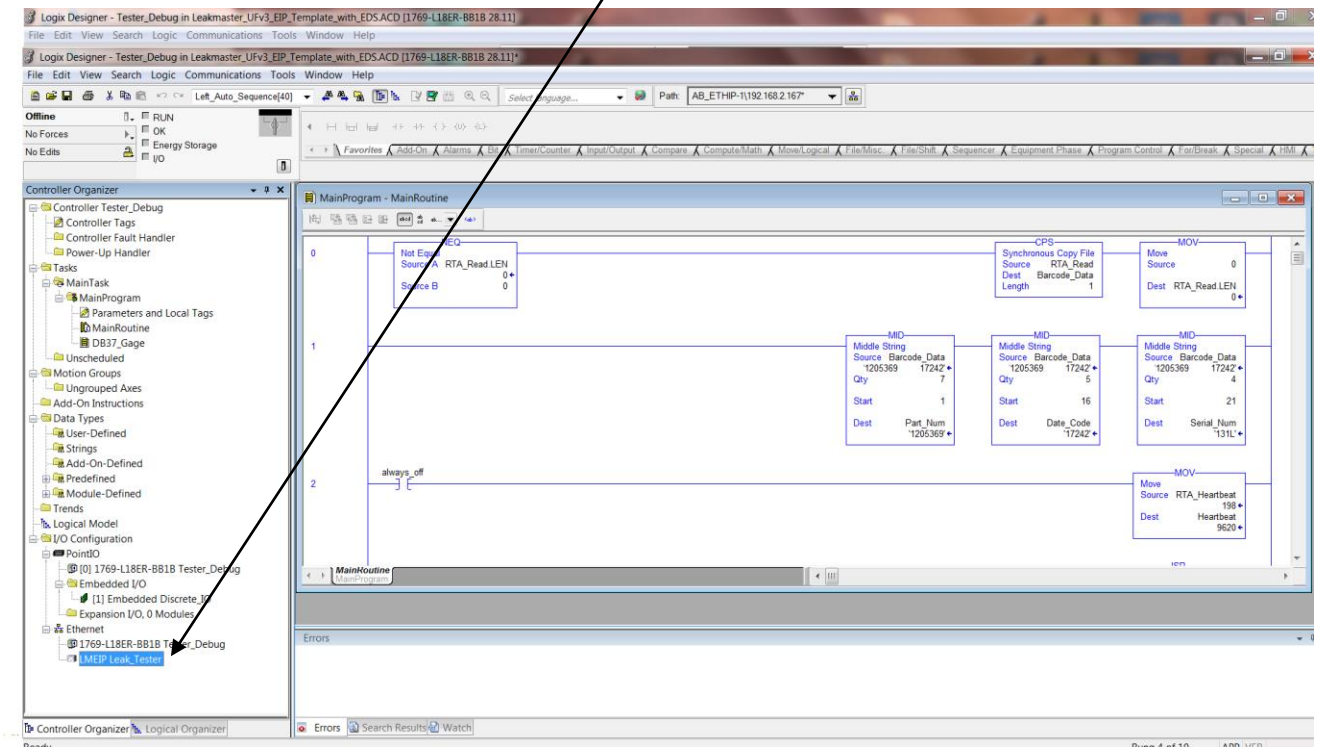
10) Type "leak" in the filter column. Select LMEIP under the Catalog Number column. Then click Create.



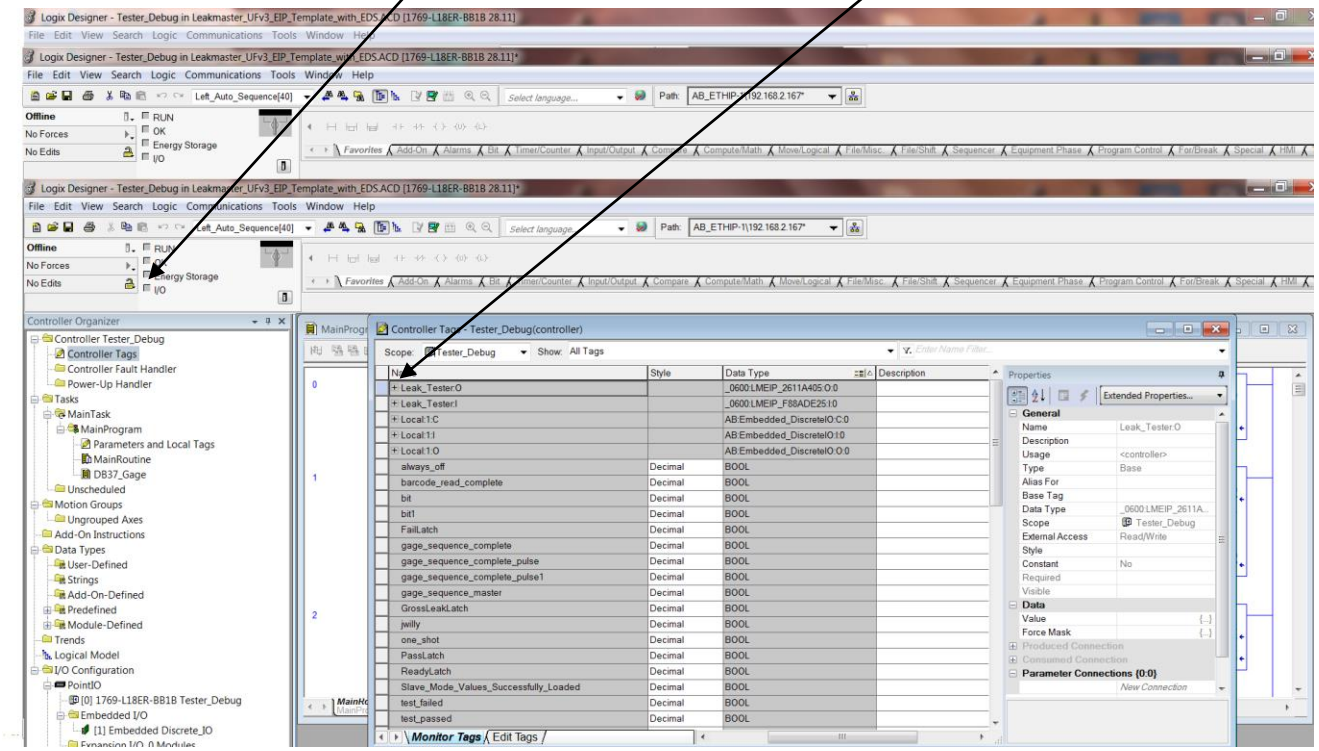
11) Under the General Tab, name the module to your preferred name. This example was named Leak_Tester. Set the IP address to the desired IP address. This IP address must match the IP address assigned for the leak tester Machine Network settings. Click OK.



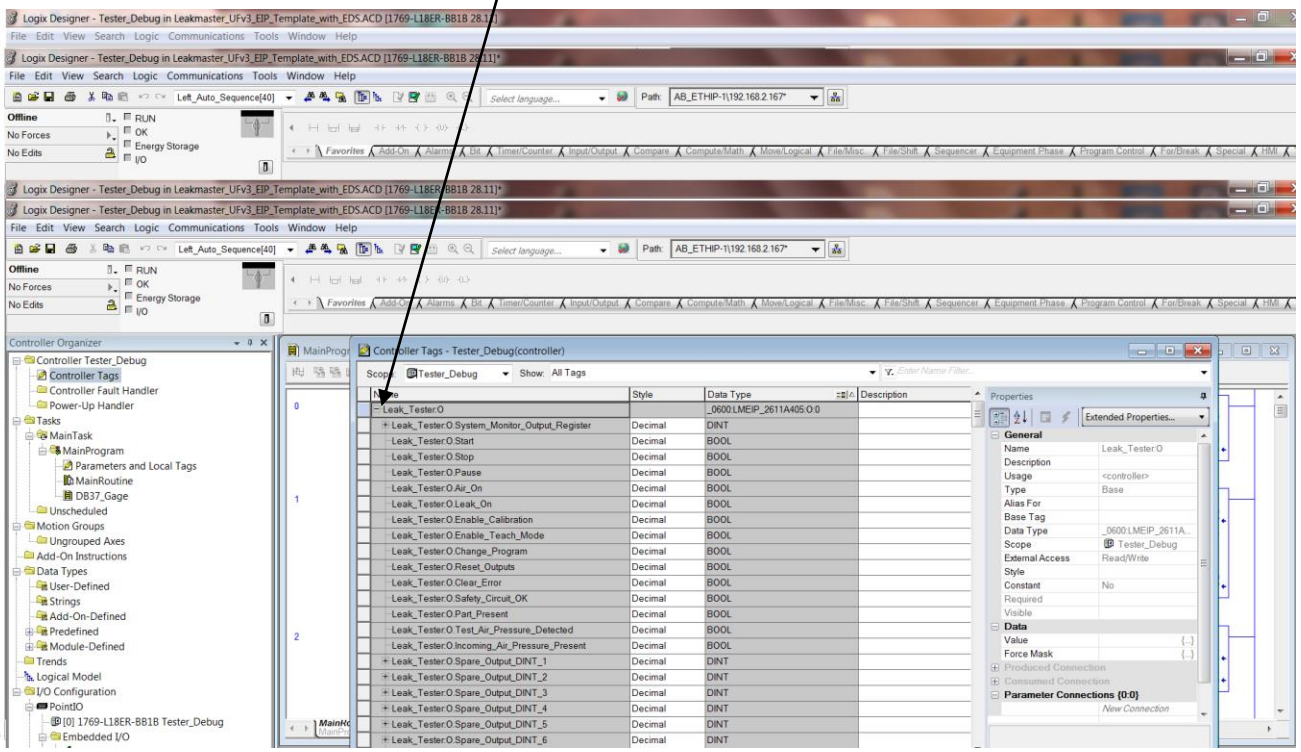
12) You will now see that Ethernet module LMEIP Leak_Tester has been added to the Ethernet network tree.



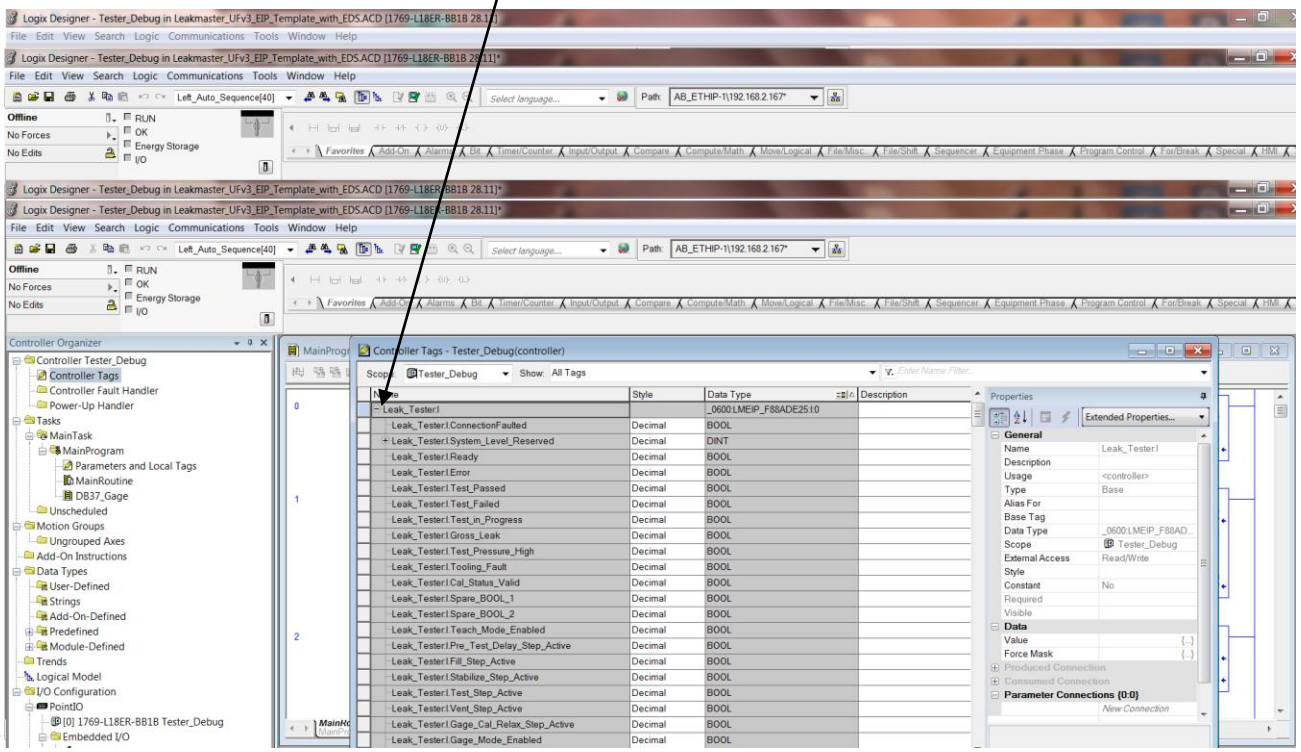
13) You can now double click the Controller Tags icon to view the tags for the Leak_Tester device that you added. You can then click and expand the inputs and outputs for this device by clicking the + sign on Leak_Tester:O or Leak_Tester:I.



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



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



## 8.2.2 Tag Descriptions when using EDS file

| ADDRESS (Inputs) (Tester to PLC) | DATATYPE | DESCRIPTION | FUNCTION |
|---|---|---|---|
| UFV3:I.System_Level_Reserved | DINT | System Level Monitor Word | |
| UFV3:I.ConnectionFaulted | BOOL | Leak Tester To PLC Heratbeat | This address will go high if the Ethernet connection status is bad. |
| UFV3:I.System_Level_Reserved | DINT | System_Level_Reserved | Reserved for future use. |
| UFV3:I.Ready | BOOL | Ready | This address will go high if the tester is ready to start a test. |
| UFV3:I.Error | BOOL | Error | This address will go high when any error condition exists. |
| UFV3:I.Test_Passed | BOOL | Test Passed | This address will go high as soon as a pass conditon is detected (before the vent step is completed). This address will stay high until the next test is started. |
| UFV3:I.Test_Faile d | BOOL | Test Failed | This address will go high as soon as a fail conditon is detected (before the vent step is completed). This address will stay high until the next test is started. |
| UFV3:I.Test_in_Progress | BOOL | Test In Progress | This address will go high anytime a test is in progress. |
| UFV3:I.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. |
| UFV3:I.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. |
| UFV3:I.Tooling_Fault | BOOL | Tooling Fault | Under development |
| UFV3:I.Cal_Status_Valid | BOOL | Cal Status/Valid | This address will be high if the current program has a valid calibration. |
| UFV3:I.Spare_BOOL_1 | BOOL | Cal Status/Valid | This address will be high if the current program has a valid calibration. |
| UFV3:I.Spare_BOOL_2 | BOOL | Spare Bool | This address will be high if the current program has a valid calibration. |
| UFV3:I.Teach_Mode_Enabled | BOOL | SPARE | Reserved for future use. |
| UFV3:I.Teach_Mode_Enabled | BOOL | Teach Mode Enabled | Under development |
| UFV3:I.Pre_Test_Delay_Step_Active | BOOL | PreFill Step | This address will go high during the PreFill Step |
| UFV3:I.Fill_Step_Active | BOOL | Fill Step | This address will go high during the Fill Step |
| UFV3:I.Stabilize_Step_Active | BOOL | Stabilize Step | This address will go high during the Stabilize Step |
| UFV3:I.Test_Step_Active | BOOL | Test Step | This address will go high during the Test Step |
| UFV3:I.Vent_Step_Active | BOOL | Vent Step | This address will go high during the Vent Step |
| UFV3:I.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. |
| UFV3:I.Gage_Mode_Enabled | BOOL | Gage Mode Enabled | This address will go high anytime the Gage Mode is enabled. |
| UFV3:I.Calibration_Enabled | BOOL | CalibrationEnabled | This address will go high anytime a program Calibration is enabled. |

| | | | |
|---|---|---|---|
| UFV3:I.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. |
| UFV3:I.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. |
| UFV3:I.Digital_IO_Status | DINT | Digtial I/O Status Word | See bit descriptions below. |
| UFV3:I.Digtial_Input_1_Status | BOOL | Digital Input 1 Status | This address returns the status of input 1 on the digital I/O connector (DB37 connector). |
| UFV3:I.Digtial_Input_2_Status | BOOL | Digital Input 2 Status | This address returns the status of input 2 on the digital I/O connector (DB37 connector). |
| UFV3:I.Digtial_Input_3_Status | BOOL | Digital Input 3 Status | This address returns the status of input 3 on the digital I/O connector (DB37 connector). |
| UFV3:I.Digtial_Input_4_Status | BOOL | Digital Input 4 Status | This address returns the status of input 4 on the digital I/O connector (DB37 connector). |
| UFV3:I.Digtial_Input_5_Status | BOOL | Digital Input 5 Status | This address returns the status of input 5 on the digital I/O connector (DB37 connector). |
| UFV3:I.Digtial_Input_6_Status | BOOL | Digital Input 6 Status | This address returns the status of input 6 on the digital I/O connector (DB37 connector). |
| UFV3:I.Digtial_Input_7_Status | BOOL | Digital Input 7 Status | This address returns the status of input 7 on the digital I/O connector (DB37 connector). |
| UFV3:I.Digtial_Input_8_Status | BOOL | Digital Input 8 Status | This address returns the status of input 8 on the digital I/O connector (DB37 connector). |
| UFV3:I.Digtial_Input_9_Status | BOOL | Digital Input 9 Status | This address returns the status of input 9 on the digital I/O connector (DB37 connector). |
| UFV3:I.Digtial_Input_10_Status | BOOL | Digital Input 10 Status | This address returns the status of input 10 on the digital I/O connector (DB37 connector). |
| UFV3:I.Digtial_Input_11_Status | BOOL | Digital Input 11 Status | This address returns the status of input 11 on the digital I/O connector (DB37 connector). |
| UFV3:I.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). |
| UFV3:I.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). |
| UFV3:I.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). |
| UFV3:I.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). |
| UFV3:I.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). |
| UFV3:I.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). |
| UFV3:I.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). |
| UFV3:I.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). |

| | | | |
|---|---|---|---|
| UFV3:I.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). |
| UFV3:I.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). |
| UFV3:I.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). |
| UFV3:I.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). |
| UFV3:I.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). |
| UFV3:I.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). |
| UFV3:I.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). |
| UFV3:I.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). |
| UFV3:I.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). |
| UFV3:I.Digtial_Output_13_Status | BOOL | Digital Output 13 Status | This address returns the status of output 13 on the digital I/O connector (DB37 connector). |
| UFV3:I.Digtial_Output_14_Status | BOOL | Digital Output 14 Status | This address returns the status of output 14 on the digital I/O connector (DB37 connector). |
| UFV3:I.Digtial_Output_15_Status | BOOL | Digital Output 15 Status | This address returns the status of output 15 on the digital I/O connector (DB37 connector). |
| UFV3:I.Digtial_Output_16_Status | BOOL | Digital Output 16 Status | This address returns the status of output 16 on the digital I/O connector (DB37 connector). |
| UFV3:I.Spare_DINT_1 | DINT | Spare | Reserved for future use. |
| UFV3:I.Spare_DINT_2 | DINT | Spare | Reserved for future use. |
| UFV3:I.Spare_DINT_3 | DINT | Spare | Reserved for future use. |
| UFV3:I.Spare_DINT_4 | DINT | Spare | Reserved for future use. |
| UFV3:I.Spare_DINT_5 | DINT | Spare | Reserved for future use. |
| UFV3:I.Program_Selected | DINT | Program Selected | This address will return the program number of the program that is currently selected. |
| UFV3:I.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= inH20, 4= inHg, 5= Bar, 6= mbar, 7= Kpa, 8= PA, 9= kgfcm2 |
| UFV3:I.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 |
| UFV3:I.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. |
| UFV3:I.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. |

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|---|---|---|---|
| UFV3:I.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 |
| UFV3:I.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. |
| UFV3:I.Gage_Test_Number | DINT | Gage Test Number | This address will return the current Gage Cycle number |
| UFV3:I.Fill_Step_Percentage_Complete | DINT | Fill Step Percent | This address will display a live percentage of completion for the Fill Step. 0-100 percent |
| UFV3:I.Stabilize_Step_Percentage_Complete | DINT | Stabilize Step Percent | This address will display a live percentage of completion for the Stabilize Step. 0-100 percent. |
| UFV3:I.Test_Step_Percentage_Complete | DINT | Test Step Percent | This address will display a live percentage of completion for the Test Step. 0-100 percent. |
| UFV3:I.Vent_Step_Percentage_Complete | DINT | Vent Step Percent | This address will display a live percentage of completion for the Vent Step. 0-100 percent. |
| UFV3:I.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. |
| UFV3:I.Spare_DINT_7 | DINT | Spare | Reserved for future use. |
| UFV3:I.Spare_DINT_8 | DINT | Spare | Reserved for future use. |
| UFV3:I.Spare_DINT_9 | DINT | Spare | Reserved for future use. |
| UFV3:I.Spare_DINT_10 | DINT | Spare | Reserved for future use. |
| UFV3:I.Spare_DINT_11 | DINT | Spare | Reserved for future use. |
| UFV3:I.Spare_DINT_12 | DINT | Spare | Reserved for future use. |
| UFV3:I.Spare_DINT_13 | DINT | Spare | Reserved for future use. |
| UFV3:I.Spare_DINT_14 | DINT | Spare | Reserved for future use. |
| UFV3:I.Spare_DINT_15 | DINT | Spare | Reserved for future use. |
| UFV3:I.Spare_DINT_16 | DINT | Spare | Reserved for future use. |
| UFV3:I.Spare_DINT_17 | DINT | Spare | Reserved for future use. |
| UFV3:I.Pretest_Delay_Timer_Preset | FLOAT | Pretest Delay Time | This address will return the current program timer preset value of the Pretest Delay Timer. |
| UFV3:I.Fill_Timer_Preset | FLOAT | Fill Time | This address will return the current program timer preset value of the Fill Timer. |
| UFV3:I.StabilizeTimer_Preset | FLOAT | Stabilize Time | This address will return the current program timer preset value of the Stabilize Timer. |
| UFV3:I.Test_Timer_Preset | FLOAT | Test Time | This address will return the current program timer preset value of the Test Timer. |
| UFV3:I.Vent_Timer_Preset | FLOAT | Vent Time | This address will return the current program timer preset value of the Vent Timer. |
| UFV3:I.Cal_Relax_Timer_Preset | FLOAT | Cal Relax Time | This address will return the current program timer preset value of the Calibration Relax Timer. |
| UFV3:I.Gage_Relax_Timer_Preset | FLOAT | Gage Delay | This address will return the current program timer preset value of the Gage Relax Delay Timer. |
| UFV3:I.Minimum_Pressure_Limit | FLOAT | Minimum Pressure | This address will return the current program Minimum Pressure limit value. |

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|---|---|---|---|
| UFV3:I.Maximum_Pressure_Limit | FLOAT | Maximum Pressure | This address will return the current program Maximum Pressure limit value. |
| UFV3:I.Minimum_Leak_Limit | FLOAT | Minimum Leak | This address will return the current program Minimum Leak Rate limit value. |
| UFV3:I.Maximum_Leak_Limit | FLOAT | Maximum Leak | This address will return the current program Maximum Leak Rate limit value. |
| UFV3:I.Pressure_Setpoint | FLOAT | Pressure Setpoint | This address will return the current program Minimum Pressure limit value. |
| UFV3:I.Leak_Orifice_Value | FLOAT | Leak Orifice Value | This address will return the value of the installed calibrated leak standard. |
| UFV3:I.Comp_Value | FLOAT | Comp Value | This address will return the current program Comp Value. |
| UFV3:I.Cal_Value | FLOAT | Cal Value | This address will return the current program Cal Value. (Only applicable in decay sccm mode) |
| UFV3:I.Volume | FLOAT | Volume | This address will return the current program Volume Calculation. (Only applicable in decay sccm mode) |
| UFV3:I.Transducer_1_Pressure_Live | FLOAT | Transducer 1 Pressure Live | This address will return the live pressure of the test pressure transducer. |
| UFV3:I.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. |
| UFV3:I.Flow_Sensor_1_Flow_Live | FLOAT | Flow Sensor 1 Flow Live | This address will return the live flow value of the flow sensor. |
| UFV3:I.Transducer_2_Pressure_Live | FLOAT | Transducer 2 Pressure Live | Reserved for future use. |
| UFV3:I.Transducer_2_Pressure_Loss_Live | FLOAT | Transducer 2 Pressure Loss Live | Reserved for future use. |
| UFV3:I.Flow_Sensor_2_Flow_Live | FLOAT | Flow Sensor 2 Flow Live | Reserved for future use. |
| UFV3:I.Final_Test_Pressure | FLOAT | Final Test Pressure | This address will return the final test pressure of the previous test. |
| UFV3:I.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. |
| UFV3:I.Final_Leak_Rate | FLOAT | Final Leak Rate | This address will return the final leak rate of the previous test. |
| UFV3:I.Spare_Real_1 | FLOAT | Spare | Reserved for future use. |
| UFV3:I.Spare_Real_2 | FLOAT | Spare | Reserved for future use. |
| UFV3:I.Spare_Real_3 | FLOAT | Spare | Reserved for future use. |
| UFV3:I.Spare_Real_4 | FLOAT | Spare | Reserved for future use. |
| UFV3:I.Spare_Real_5 | FLOAT | Spare | Reserved for future use. |
| UFV3:I.Spare_Real_6 | FLOAT | Spare | Reserved for future use. |
| UFV3:I.Spare_Real_7 | FLOAT | Spare | Reserved for future use. |
| UFV3:I.Pressure_Units_In_Ascii_0 | SINT | Pressure Unit Char 1 | Pressure unit of current test program in Ascii, Character 1 |
| UFV3:I.Pressure_Units_In_Ascii_1 | SINT | Pressure Unit Char 2 | Pressure unit of current test program in Ascii, Character 2 |
| UFV3:I.Pressure_Units_In_Ascii_2 | SINT | Pressure Unit Char 3 | Pressure unit of current test program in Ascii, Character 3 |
| UFV3:I.Pressure_Units_In_Ascii_3 | SINT | Pressure Unit Char 4 | Pressure unit of current test program in Ascii, Character 4 |

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|---|---|---|---|
| UFV3:I.Pressure_Units_In_Ascii_4 | SINT | Pressure Unit Char 5 | Pressure unit of current test program in Ascii, Character 5 |
| UFV3:I.Pressure_Units_In_Ascii_5 | SINT | Pressure Unit Char 6 | Pressure unit of current test program in Ascii, Character 6 |
| UFV3:I.Pressure_Units_In_Ascii_6 | SINT | Pressure Unit Char 7 | Pressure unit of current test program in Ascii, Character 7 |
| UFV3:I.Flow_Units_In_Ascii_0 | SINT | Flow Unit Char 1 | Flow unit of current test program in Ascii, Character 1 |
| UFV3:I.Flow_Units_In_Ascii_1 | SINT | Flow Unit Char 2 | Flow unit of current test program in Ascii, Character 2 |
| UFV3:I.Flow_Units_In_Ascii_2 | SINT | Flow Unit Char 3 | Flow unit of current test program in Ascii, Character 3 |
| UFV3:I.Flow_Units_In_Ascii_3 | SINT | Flow Unit Char 4 | Flow unit of current test program in Ascii, Character 4 |
| UFV3:I.Flow_Units_In_Ascii_4 | SINT | Flow Unit Char 5 | Flow unit of current test program in Ascii, Character 5 |
| UFV3:I.Flow_Units_In_Ascii_5 | SINT | Flow Unit Char 6 | Flow unit of current test program in Ascii, Character 6 |
| UFV3:I.Flow_Units_In_Ascii_6 | SINT | Flow Unit Char 7 | Flow unit of current test program in Ascii, Character 7 |
| UFV3:I.Program_Name_In_Ascii_0 | SINT | Program Name Char 1 | Program Name of current test program in Ascii, Character 1 |
| UFV3:I.Program_Name_In_Ascii_1 | SINT | Program Name Char 2 | Program Name of current test program in Ascii, Character 2 |
| UFV3:I.Program_Name_In_Ascii_2 | SINT | Program Name Char 3 | Program Name of current test program in Ascii, Character 3 |
| UFV3:I.Program_Name_In_Ascii_3 | SINT | Program Name Char 4 | Program Name of current test program in Ascii, Character 4 |
| UFV3:I.Program_Name_In_Ascii_4 | SINT | Program Name Char 5 | Program Name of current test program in Ascii, Character 5 |
| UFV3:I.Program_Name_In_Ascii_5 | SINT | Program Name Char 6 | Program Name of current test program in Ascii, Character 6 |
| UFV3:I.Program_Name_In_Ascii_6 | SINT | Program Name Char 7 | Program Name of current test program in Ascii, Character 7 |
| UFV3:I.Program_Name_In_Ascii_7 | SINT | Program Name Char 8 | Program Name of current test program in Ascii, Character 8 |
| UFV3:I.Program_Name_In_Ascii_8 | SINT | Program Name Char 9 | Program Name of current test program in Ascii, Character 9 |
| UFV3:I.Program_Name_In_Ascii_9 | SINT | Program Name Char 10 | Program Name of current test program in Ascii, Character 10 |
| UFV3:I.Program_Name_In_Ascii_10 | SINT | Program Name Char 11 | Program Name of current test program in Ascii, Character 11 |
| UFV3:I.Program_Name_In_Ascii_11 | SINT | Program Name Char 12 | Program Name of current test program in Ascii, Character 12 |
| UFV3:I.Program_Name_In_Ascii_12 | SINT | Program Name Char 13 | Program Name of current test program in Ascii, Character 13 |
| UFV3:I.Program_Name_In_Ascii_13 | SINT | Program Name Char 14 | Program Name of current test program in Ascii, Character 14 |
| UFV3:I.Program_Name_In_Ascii_14 | SINT | Program Name Char 15 | Program Name of current test program in Ascii, Character 15 |
| UFV3:I.Program_Name_In_Ascii_15 | SINT | Program Name Char 16 | Program Name of current test program in Ascii, Character 16 |
| UFV3:I.Program_Name_In_Ascii_16 | SINT | Program Name Char 17 | Program Name of current test program in Ascii, Character 17 |
| UFV3:I.Program_Name_In_Ascii_17 | SINT | Program Name Char 18 | Program Name of current test program in Ascii, Character 18 |
| UFV3:I.Program_Name_In_Ascii_18 | SINT | Program Name Char 19 | Program Name of current test program in Ascii, Character 19 |
| UFV3:I.Program_Name_In_Ascii_19 | SINT | Program Name Char 20 | Program Name of current test program in Ascii, Character 20 |

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|---|---|---|---|
| UFV3:I.Program_Name_In_Ascii_20 | SINT | Program Name Char 21 | Program Name of current test program in Ascii, Character 21 |
| UFV3:I.Program_Name_In_Ascii_21 | SINT | Program Name Char 22 | Program Name of current test program in Ascii, Character 22 |
| UFV3:I.Program_Name_In_Ascii_22 | SINT | Program Name Char 23 | Program Name of current test program in Ascii, Character 23 |
| UFV3:I.Program_Name_In_Ascii_23 | SINT | Program Name Char 24 | Program Name of current test program in Ascii, Character 24 |
| UFV3:I.Program_Name_In_Ascii_24 | SINT | Program Name Char 25 | Program Name of current test program in Ascii, Character 25 |
| UFV3:I.Program_Name_In_Ascii_25 | SINT | Program Name Char 26 | Program Name of current test program in Ascii, Character 26 |
| UFV3:I.Program_Name_In_Ascii_26 | SINT | Program Name Char 27 | Program Name of current test program in Ascii, Character 27 |
| UFV3:I.Program_Name_In_Ascii_27 | SINT | Program Name Char 28 | Program Name of current test program in Ascii, Character 28 |
| UFV3:I.Program_Name_In_Ascii_28 | SINT | Program Name Char 29 | Program Name of current test program in Ascii, Character 29 |
| UFV3:I.Program_Name_In_Ascii_29 | SINT | Program Name Char 30 | Program Name of current test program in Ascii, Character 30 |
| UFV3:I.Program_Name_In_Ascii_30 | SINT | Program Name Char 31 | Program Name of current test program in Ascii, Character 31 |
| UFV3:I.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 |
| UFV3:I.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 |
| UFV3:I.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 |
| UFV3:I.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 |
| UFV3:I.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 |
| UFV3:I.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 |
| UFV3:I.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 |
| UFV3:I.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 |
| UFV3:I.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 |
| UFV3:I.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 |
| UFV3:I.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 |
| UFV3:I.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 |

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|---|---|---|---|
| UFV3:I.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 |
| UFV3:I.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 |
| UFV3:I.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 |
| UFV3:I.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 |
| UFV3:I.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 |
| UFV3:I.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 |
| UFV3:I.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 |
| UFV3:I.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 |
| UFV3:I.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 |
| UFV3:I.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 |
| UFV3:I.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 |
| UFV3:I.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 |
| UFV3:I.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 |
| UFV3:I.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 |
| UFV3:I.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 |
| UFV3:I.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 |
| UFV3:I.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 |
| UFV3:I.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 |
| UFV3:I.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 |
| UFV3:I.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 |

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|---|---|---|---|
| UFV3:I.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 |
| UFV3:I.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 |
| UFV3:I.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 |
| UFV3:I.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 |
| UFV3:I.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 |
| UFV3:I.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 |
| UFV3:I.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 |
| UFV3:I.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 |
| UFV3:I.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 |
| UFV3:I.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 |
| UFV3:I.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 |
| UFV3:I.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 |
| UFV3:I.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 |
| UFV3:I.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 |
| UFV3:I.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 |
| UFV3:I.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 |
| UFV3:I.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 |
| UFV3:I.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 |
| UFV3:I.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 |
| UFV3:I.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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|---|---|---|---|
| UFV3:I.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 |
| UFV3:I.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 |
| UFV3:I.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 |
| UFV3:I.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 |
| UFV3:I.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 |
| UFV3:I.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 |
| UFV3:I.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 |
| UFV3:I.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 |
| UFV3:I.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 |
| UFV3:I.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 |
| UFV3:I.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 |
| UFV3:I.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 |
| UFV3:I.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 |
| UFV3:I.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 |
| UFV3:I.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 |
| UFV3:I.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 |
| UFV3:I.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 |
| UFV3:I.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 |
| UFV3:I.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 |
| UFV3:I.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 |

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|---|---|---|---|
| UFV3:I.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 |
| UFV3:I.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 |
| UFV3:I.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 |
| UFV3:I.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 |
| UFV3:I.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 |
| UFV3:I.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 |
| UFV3:I.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** |
|---|---|---|---|
| UFV3:O.System_Monitor_Output_Register | DINT | System Monitor Bits | Reserved |
| UFV3:O.Start | BOOL | Start | Setting this bit high will Start a test cycle if the tester is Ready and a valid program is selected. |
| UFV3:O.Stop | BOOL | Stop | Setting this bit high during a test will immediately Stop the test. This bit must be low to start a test. |
| UFV3:O.Pause | BOOL | Pause | Setting this bit high during a test will pause the test until the Start bit is set high. |
| UFV3:O.Air_On | BOOL | Air On | Setting this bit high will deliver test air to the test port. |
| UFV3:O.Leak_On | BOOL | Leak On | Setting this bit high will turn on the internal calibrated leak standard. |
| UFV3:O.Enable_Calibration | BOOL | Enable Calibration | Setting this bit high will enable program calibration mode. |
| UFV3:O.Enable_Teach_Mode | BOOL | Enable Teach | Under development |
| UFV3:O.Change_Program | BOOL | Change Program | Setting this bit high will allow the current program to be changed to another program. |
| UFV3:O.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. |
| UFV3:O.Clear_Error | BOOL | Clear Error | Setting this bit high will clear any errors if the error has been corrected. |
| UFV3:O.Safety_Circuit_OK | BOOL | Safety Circuit OK | Under development |
| UFV3:O.Part_Present | BOOL | Part Present | Under development |
| UFV3:O.Test_Air_Pressure_Detected | BOOL | Test Air Pressure Detected | Under development |
| UFV3:O.Incoming_Air_Pressure_Present | BOOL | Incoming Air Pressure Present | Under development |
| UFV3:O.Spare_Output_DINT_1 | DINT | Spare | Reserved for future use. |
| UFV3:O.Spare_Output_DINT_2 | DINT | Spare | Reserved for future use. |
| UFV3:O.Spare_Output_DINT_3 | DINT | Spare | Reserved for future use. |

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| UFV3:O.Spare_Output_DINT_4 | DINT | Spare | Reserved for future use. |
| UFV3:O.Spare_Output_DINT_5 | DINT | Spare | Reserved for future use. |
| UFV3:O.Spare_Output_DINT_6 | DINT | Spare | Reserved for future use. |
| UFV3:O.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. |
| UFV3:O.Pressure_Unit_ID_Slave | DINT | Pressure Unit ID | Set this register to the desired pressure unit (functions in Slave Mode only) |
| UFV3:O.Flow_Unit_ID_Slave | DINT | Flow Unit ID | Set this register to the desired leak rate unit (functions in Slave Mode only) |
| UFV3:O.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) |
| UFV3:O.Spare_Output_DINT_7 | DINT | Spare | Reserved for future use. |
| UFV3:O.Spare_Output_DINT_8 | DINT | Spare | Reserved for future use. |
| UFV3:O.Spare_Output_DINT_9 | DINT | Spare | Reserved for future use. |
| UFV3:O.Spare_Output_DINT_10 | DINT | Spare | Reserved for future use. |
| UFV3:O.Spare_Output_DINT_11 | DINT | Spare | Reserved for future use. |
| UFV3:O.Spare_Output_DINT_12 | DINT | Spare | Reserved for future use. |
| UFV3:O.Spare_Output_DINT_13 | DINT | Spare | Reserved for future use. |
| UFV3:O.Spare_Output_DINT_14 | DINT | Spare | Reserved for future use. |
| UFV3:O.Spare_Output_DINT_15 | DINT | Spare | Reserved for future use. |
| UFV3:O.Spare_Output_DINT_16 | DINT | Spare | Reserved for future use. |
| UFV3:O.Spare_Output_DINT_17 | DINT | Spare | Reserved for future use. |
| UFV3:O.Spare_Output_DINT_18 | DINT | Spare | Reserved for future use. |
| UFV3:O.Spare_Output_DINT_19 | DINT | Spare | Reserved for future use. |
| UFV3:O.Spare_Output_DINT_20 | DINT | Spare | Reserved for future use. |
| UFV3:O.Spare_Output_DINT_21 | DINT | Spare | Reserved for future use. |
| UFV3:O.Spare_Output_DINT_22 | DINT | Spare | Reserved for future use. |
| UFV3:O.Spare_Output_DINT_23 | DINT | Spare | Reserved for future use. |
| UFV3:O.Spare_Output_DINT_24 | DINT | Spare | Reserved for future use. |
| UFV3:O.Spare_Output_DINT_25 | DINT | Spare | Reserved for future use. |
| UFV3:O.Spare_Output_DINT_26 | DINT | Spare | Reserved for future use. |
| UFV3:O.Pretest_Delay_Timer_Slave | FLOAT | Pretest Delay Time | Set this register to the value that you want the Pretest Delay Time to be when running in Slave Mode. |
| UFV3:O.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. |
| UFV3:O.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. |
| UFV3:O.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. |
| UFV3:O.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. |
| UFV3:O.Cal_Relax_Timer_Slave | FLOAT | Cal Relax Time | Set this register to the value that you want theCal Relax Time to be when running in Slave Mode. |

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| UFV3:O.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. |
| UFV3:O.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. |
| UFV3:O.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. |
| UFV3:O.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. |
| UFV3:O.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. |
| UFV3:O.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. |
| UFV3:O.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. |
| UFV3:O.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. |
| UFV3:O.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) |
| UFV3:O.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 when in pressure decay mode) |
| UFV3:O.Spare_Output_Real_1 | FLOAT | Spare | Reserved for future use. |
| UFV3:O.Spare_Output_Real_2 | FLOAT | Spare | Reserved for future use. |
| UFV3:O.Spare_Output_Real_3 | FLOAT | Spare | Reserved for future use. |
| UFV3:O.Spare_Output_Real_4 | FLOAT | Spare | Reserved for future use. |
| UFV3:O.Spare_Output_Real_5 | FLOAT | Spare | Reserved for future use. |
| UFV3:O.Spare_Output_Real_6 | FLOAT | Spare | Reserved for future use. |
| UFV3:O.Spare_Output_Real_7 | FLOAT | Spare | Reserved for future use. |
| UFV3:O.Spare_Output_Real_8 | FLOAT | Spare | Reserved for future use. |
| UFV3:O.Spare_Output_Real_9 | FLOAT | Spare | Reserved for future use. |
| UFV3:O.Spare_Output_Real_10 | FLOAT | Spare | Reserved for future use. |
| UFV3:O.Spare_Output_Real_11 | FLOAT | Spare | Reserved for future use. |
| UFV3:O.Spare_Output_Real_12 | FLOAT | Spare | Reserved for future use. |
| UFV3:O.Spare_Output_Real_13 | FLOAT | Spare | Reserved for future use. |
| UFV3:O.Spare_Output_Real_14 | FLOAT | Spare | Reserved for future use. |
| UFV3:O.Spare_Output_Real_15 | FLOAT | Spare | Reserved for future use. |
| UFV3:O.Spare_Output_Real_16 | FLOAT | Spare | Reserved for future use. |
| UFV3:O.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. |
| UFV3:O.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. |

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| UFV3:O.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. |
| UFV3:O.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. |
| UFV3:O.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. |
| UFV3:O.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. |
| UFV3:O.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. |
| UFV3:O.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. |
| UFV3:O.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. |
| UFV3:O.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. |
| UFV3:O.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. |
| UFV3:O.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. |
| UFV3:O.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. |
| UFV3:O.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. |
| UFV3:O.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. |
| UFV3:O.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. |
| UFV3:O.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. |
| UFV3:O.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. |

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| UFV3:O.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. |
| UFV3:O.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. |
| UFV3:O.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. |
| UFV3:O.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. |
| UFV3:O.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. |
| UFV3:O.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. |
| UFV3:O.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. |
| UFV3:O.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. |
| UFV3:O.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. |
| UFV3:O.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. |
| UFV3:O.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. |
| UFV3:O.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. |
| UFV3:O.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. |
| UFV3:O.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. |
| UFV3:O.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. |
| UFV3:O.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. |

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| UFV3:O.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. |
| UFV3:O.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. |
| UFV3:O.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. |
| UFV3:O.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. |
| UFV3:O.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. |
| UFV3:O.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. |
| UFV3:O.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. |
| UFV3:O.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. |
| UFV3:O.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. |
| UFV3:O.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. |
| UFV3:O.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. |
| UFV3:O.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. |
| UFV3:O.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. |
| UFV3:O.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. |
| UFV3:O.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. |
| UFV3:O.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. |

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| UFV3:O.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. |
| UFV3:O.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. |
| UFV3:O.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. |
| UFV3:O.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. |
| UFV3:O.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. |
| UFV3:O.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. |
| UFV3:O.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. |
| UFV3:O.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. |
| UFV3:O.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. |
| UFV3:O.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. |
| UFV3:O.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. |
| UFV3:O.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. |
| UFV3:O.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. |
| UFV3:O.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. |
| UFV3:O.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. |
| UFV3:O.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. |

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| UFV3:O.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. |
| UFV3:O.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. |
| UFV3:O.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. |
| UFV3:O.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. |
| UFV3:O.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. |
| UFV3:O.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. |
| UFV3:O.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. |
| UFV3:O.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. |
| UFV3:O.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. |
| UFV3:O.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. |
| UFV3:O.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. |
| UFV3:O.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. |
| UFV3:O.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. |
| UFV3:O.Spare_Ascii_Out_String_Register_0 | SINT | Spare Ascii Register, Character 0 | For future use. |
| UFV3:O.Spare_Ascii_Out_String_Register_1 | SINT | Spare Ascii Register, Character 1 | For future use. |
| UFV3:O.Spare_Ascii_Out_String_Register_2 | SINT | Spare Ascii Register, Character 2 | For future use. |
| UFV3:O.Spare_Ascii_Out_String_Register_3 | SINT | Spare Ascii Register, Character 3 | For future use. |
| UFV3:O.Spare_Ascii_Out_String_Register_4 | SINT | Spare Ascii Register, Character 4 | For future use. |
| UFV3:O.Spare_Ascii_Out_String_Register_5 | SINT | Spare Ascii Register, Character 5 | For future use. |

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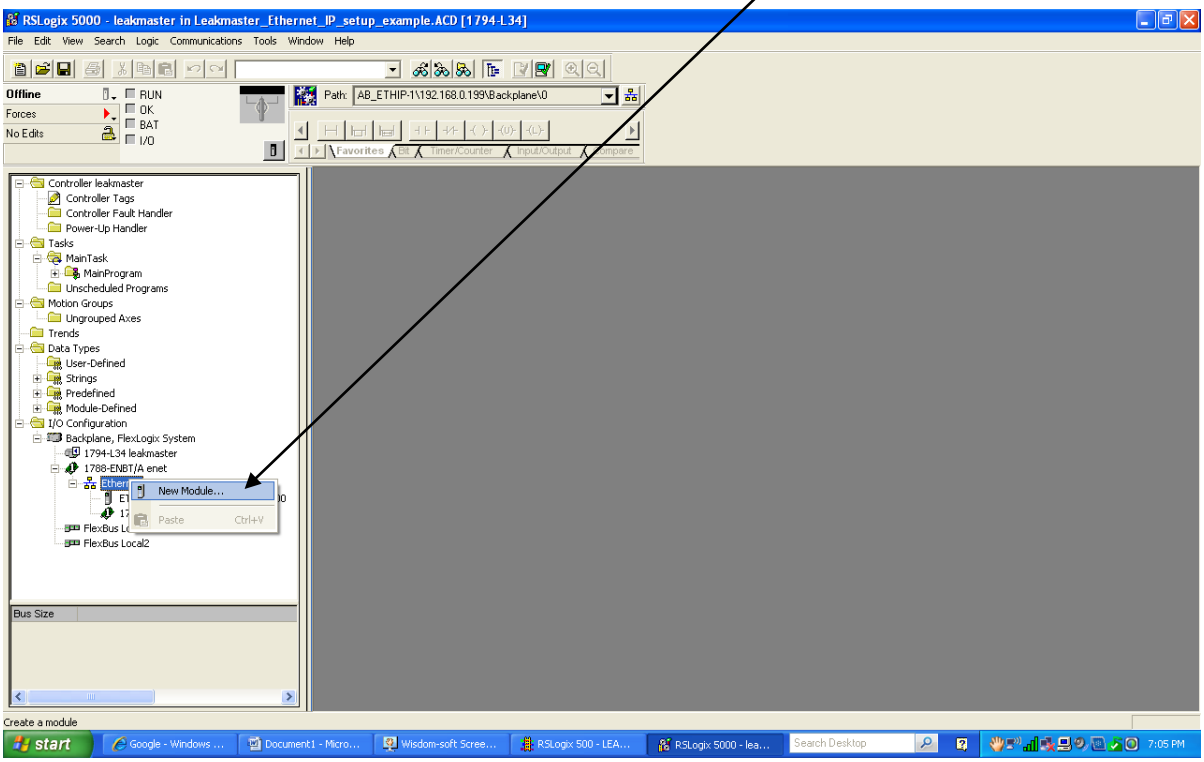
| UFV3:O.Spare_Ascii_Out_String_Register_6 | SINT | Spare Ascii Register, Character 6 | For future use. |
| UFV3:O.Spare_Ascii_Out_String_Register_7 | SINT | Spare Ascii Register, Character 7 | For future use. |
| UFV3:O.Spare_Ascii_Out_String_Register_8 | SINT | Spare Ascii Register, Character 8 | For future use. |
| UFV3:O.Spare_Ascii_Out_String_Register_9 | SINT | Spare Ascii Register, Character 9 | For future use. |
| UFV3:O.Spare_Ascii_Out_String_Register_10 | SINT | Spare Ascii Register, Character 10 | For future use. |
| UFV3:O.Spare_Ascii_Out_String_Register_11 | SINT | Spare Ascii Register, Character 11 | For future use. |
| UFV3:O.Spare_Ascii_Out_String_Register_12 | SINT | Spare Ascii Register, Character 12 | For future use. |
| UFV3:O.Spare_Ascii_Out_String_Register_13 | SINT | Spare Ascii Register, Character 13 | For future use. |
| UFV3:O.Spare_Ascii_Out_String_Register_14 | SINT | Spare Ascii Register, Character 14 | For future use. |
| UFV3:O.Spare_Ascii_Out_String_Register_15 | SINT | Spare Ascii Register, Character 15 | For future use. |
| UFV3:O.Spare_Ascii_Out_String_Register_16 | SINT | Spare Ascii Register, Character 16 | For future use. |
| UFV3:O.Spare_Ascii_Out_String_Register_17 | SINT | Spare Ascii Register, Character 17 | For future use. |
| UFV3:O.Spare_Ascii_Out_String_Register_18 | SINT | Spare Ascii Register, Character 18 | For future use. |
| UFV3:O.Spare_Ascii_Out_String_Register_19 | SINT | Spare Ascii Register, Character 19 | For future use. |
| UFV3:O.Spare_Ascii_Out_String_Register_20 | SINT | Spare Ascii Register, Character 20 | For future use. |
| UFV3:O.Spare_Ascii_Out_String_Register_21 | SINT | Spare Ascii Register, Character 21 | For future use. |
| UFV3:O.Spare_Ascii_Out_String_Register_22 | SINT | Spare Ascii Register, Character 22 | For future use. |
| UFV3:O.Spare_Ascii_Out_String_Register_23 | SINT | Spare Ascii Register, Character 23 | For future use. |
| UFV3:O.Spare_Ascii_Out_String_Register_24 | SINT | Spare Ascii Register, Character 24 | For future use. |
| UFV3:O.Spare_Ascii_Out_String_Register_25 | SINT | Spare Ascii Register, Character 25 | For future use. |
| UFV3:O.Spare_Ascii_Out_String_Register_26 | SINT | Spare Ascii Register, Character 26 | For future use. |
| UFV3:O.Spare_Ascii_Out_String_Register_27 | SINT | Spare Ascii Register, Character 27 | For future use. |
| UFV3:O.Spare_Ascii_Out_String_Register_28 | SINT | Spare Ascii Register, Character 28 | For future use. |
| UFV3:O.Spare_Ascii_Out_String_Register_29 | SINT | Spare Ascii Register, Character 29 | For future use. |
| UFV3:O.Spare_Ascii_Out_String_Register_30 | SINT | Spare Ascii Register, Character 30 | For future use. |
| UFV3:O.Spare_Ascii_Out_String_Register_31 | SINT | Spare Ascii Register, Character 31 | For future use. |
| UFV3:O.Spare_Ascii_Out_String_Register_32 | SINT | Spare Ascii Register, Character 32 | For future use. |
| UFV3:O.Spare_Ascii_Out_String_Register_33 | SINT | Spare Ascii Register, Character 33 | For future use. |
| UFV3:O.Spare_Ascii_Out_String_Register_34 | SINT | Spare Ascii Register, Character 34 | For future use. |
| UFV3:O.Spare_Ascii_Out_String_Register_35 | SINT | Spare Ascii Register, Character 35 | For future use. |

| | | | |
|---|---|---|---|
| UFV3:O.Spare_Ascii_Out_String_Register_36 | SINT | Spare Ascii Register, Character 36 | For future use. |
| UFV3:O.Spare_Ascii_Out_String_Register_37 | SINT | Spare Ascii Register, Character 37 | For future use. |
| UFV3:O.Spare_Ascii_Out_String_Register_38 | SINT | Spare Ascii Register, Character 38 | For future use. |
| UFV3:O.Spare_Ascii_Out_String_Register_39 | SINT | Spare Ascii Register, Character 39 | For future use. |
| UFV3:O.Spare_Ascii_Out_String_Register_40 | SINT | Spare Ascii Register, Character 40 | For future use. |
| UFV3:O.Spare_Ascii_Out_String_Register_41 | SINT | Spare Ascii Register, Character 41 | For future use. |
| UFV3:O.Spare_Ascii_Out_String_Register_42 | SINT | Spare Ascii Register, Character 42 | For future use. |
| UFV3:O.Spare_Ascii_Out_String_Register_43 | SINT | Spare Ascii Register, Character 43 | For future use. |
| UFV3:O.Spare_Ascii_Out_String_Register_44 | SINT | Spare Ascii Register, Character 44 | For future use. |
| UFV3:O.Spare_Ascii_Out_String_Register_45 | SINT | Spare Ascii Register, Character 45 | For future use. |
| UFV3:O.Spare_Ascii_Out_String_Register_46 | SINT | Spare Ascii Register, Character 46 | For future use. |
| UFV3:O.Spare_Ascii_Out_String_Register_47 | SINT | Spare Ascii Register, Character 47 | For future use. |
| UFV3:O.Spare_Ascii_Out_String_Register_48 | SINT | Spare Ascii Register, Character 48 | For future use. |
| UFV3:O.Spare_Ascii_Out_String_Register_49 | SINT | Spare Ascii Register, Character 49 | For future use. |
| UFV3:O.Spare_Ascii_Out_String_Register_50 | SINT | Spare Ascii Register, Character 50 | For future use. |
| UFV3:O.Spare_Ascii_Out_String_Register_51 | SINT | Spare Ascii Register, Character 51 | For future use. |
| UFV3:O.Spare_Ascii_Out_String_Register_52 | SINT | Spare Ascii Register, Character 52 | For future use. |
| UFV3:O.Spare_Ascii_Out_String_Register_53 | SINT | Spare Ascii Register, Character 53 | For future use. |
| UFV3:O.Spare_Ascii_Out_String_Register_54 | SINT | Spare Ascii Register, Character 54 | For future use. |
| UFV3:O.Spare_Ascii_Out_String_Register_55 | SINT | Spare Ascii Register, Character 55 | For future use. |
| UFV3:O.Spare_Ascii_Out_String_Register_56 | SINT | Spare Ascii Register, Character 56 | For future use. |
| UFV3:O.Spare_Ascii_Out_String_Register_57 | SINT | Spare Ascii Register, Character 57 | For future use. |
| UFV3:O.Spare_Ascii_Out_String_Register_58 | SINT | Spare Ascii Register, Character 58 | For future use. |
| UFV3:O.Spare_Ascii_Out_String_Register_59 | SINT | Spare Ascii Register, Character 59 | For future use. |
| UFV3:O.Spare_Ascii_Out_String_Register_60 | SINT | Spare Ascii Register, Character 60 | For future use. |
| UFV3:O.Spare_Ascii_Out_String_Register_61 | SINT | Spare Ascii Register, Character 61 | For future use. |

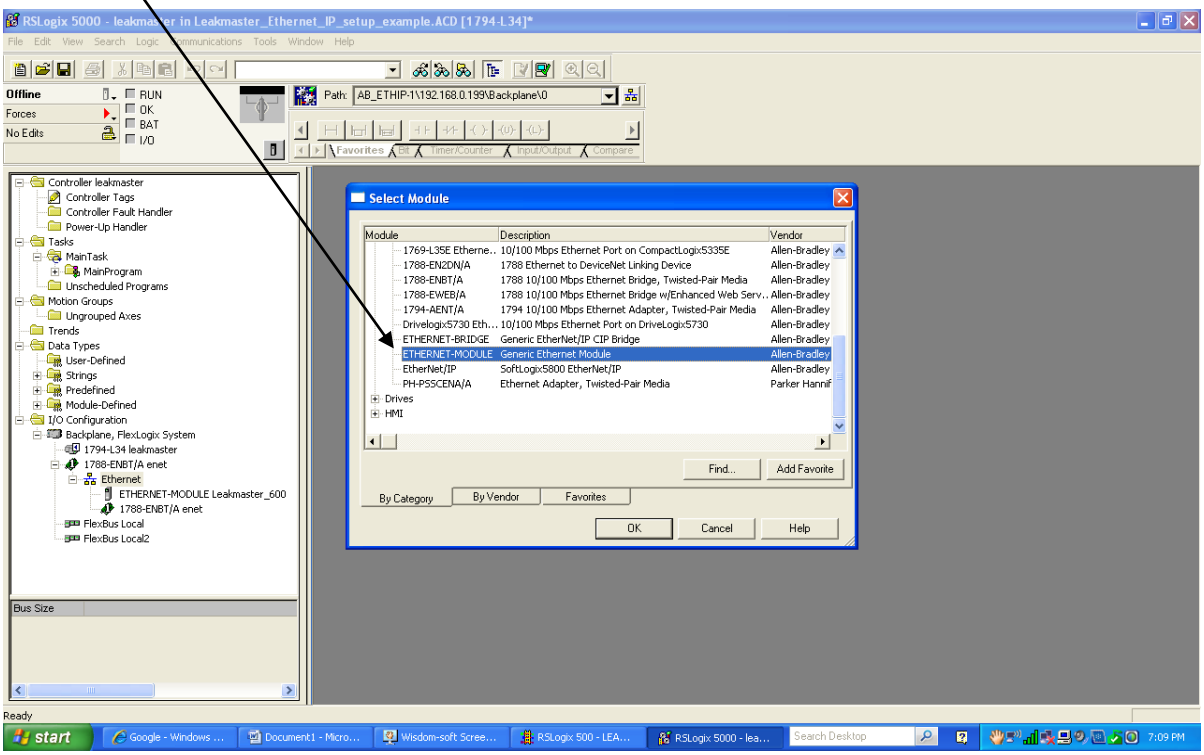
### 8.2.3 AB Control Logix Setup (using Generic Ethernet Driver)

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.




1) Name the Module

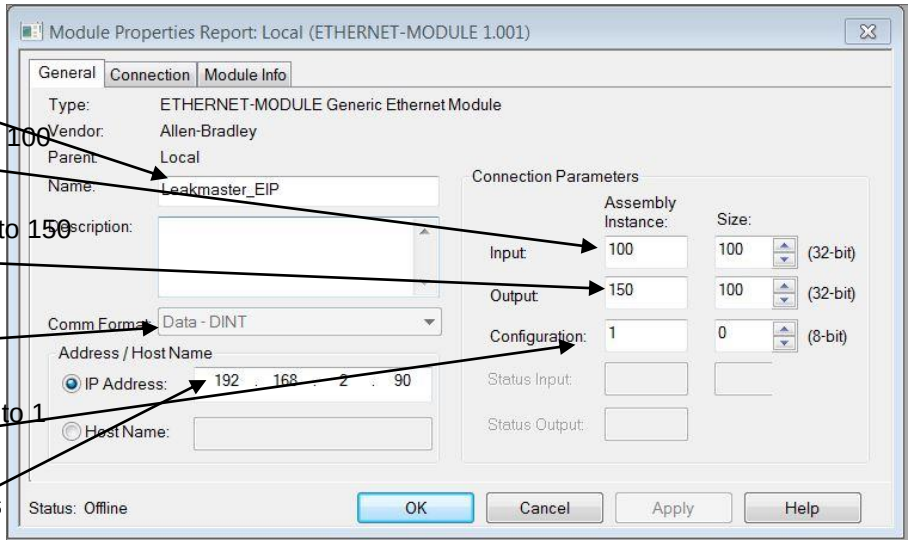
2) Set Input Assy Inst. to 100
Set Size to 100

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

4) Set Comm Format to
Data - DINT

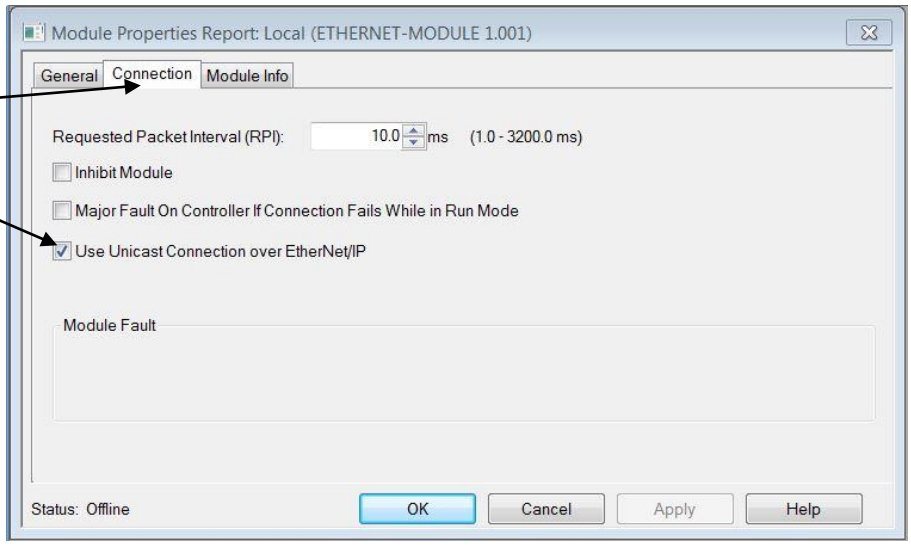
5) Set Config. Assy Inst. to 1
Set Config. Size to 0

6) Assign the IP Address



7) Click the Connection tab

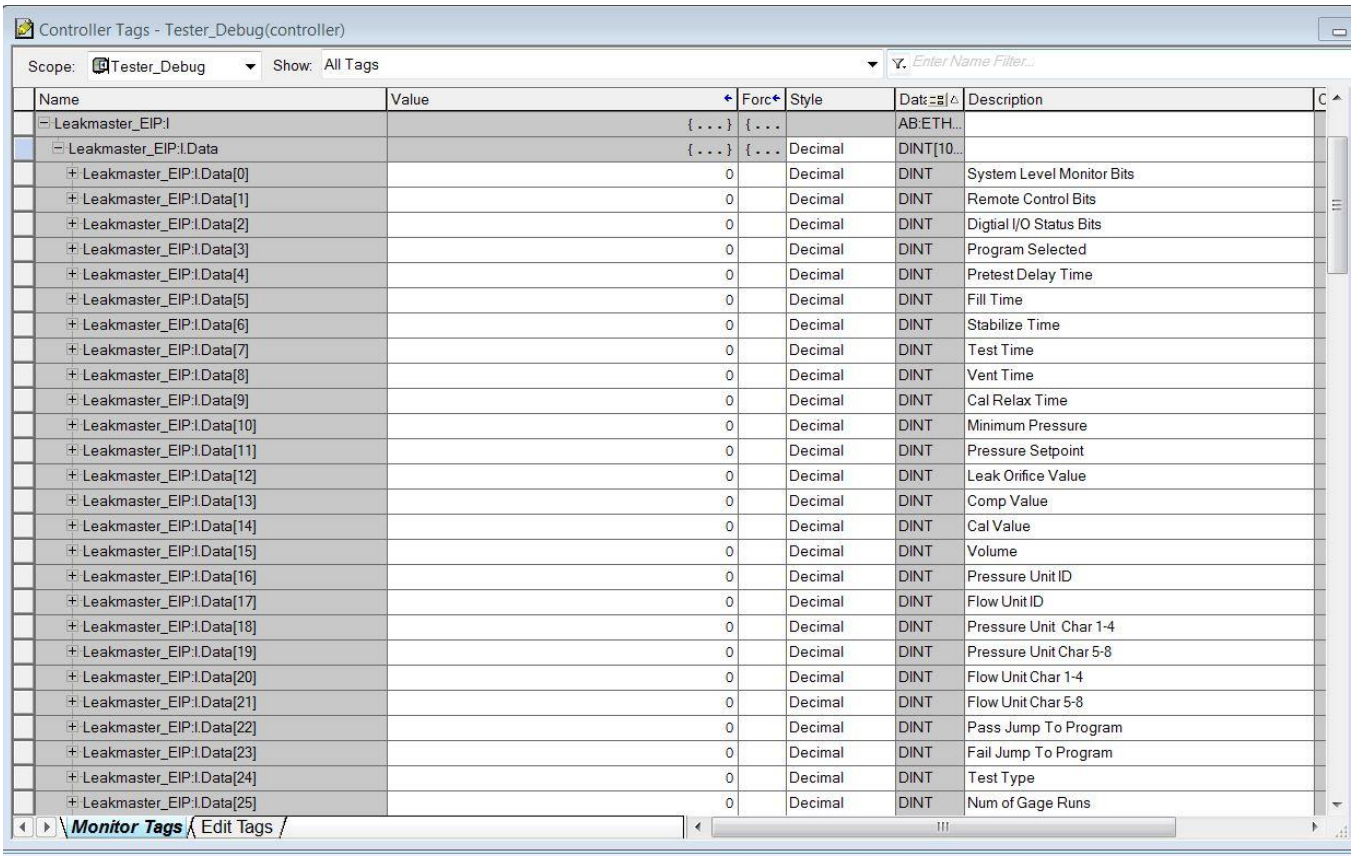
8) Click the check box to select Unicast



# Ethernet I/O Mapping

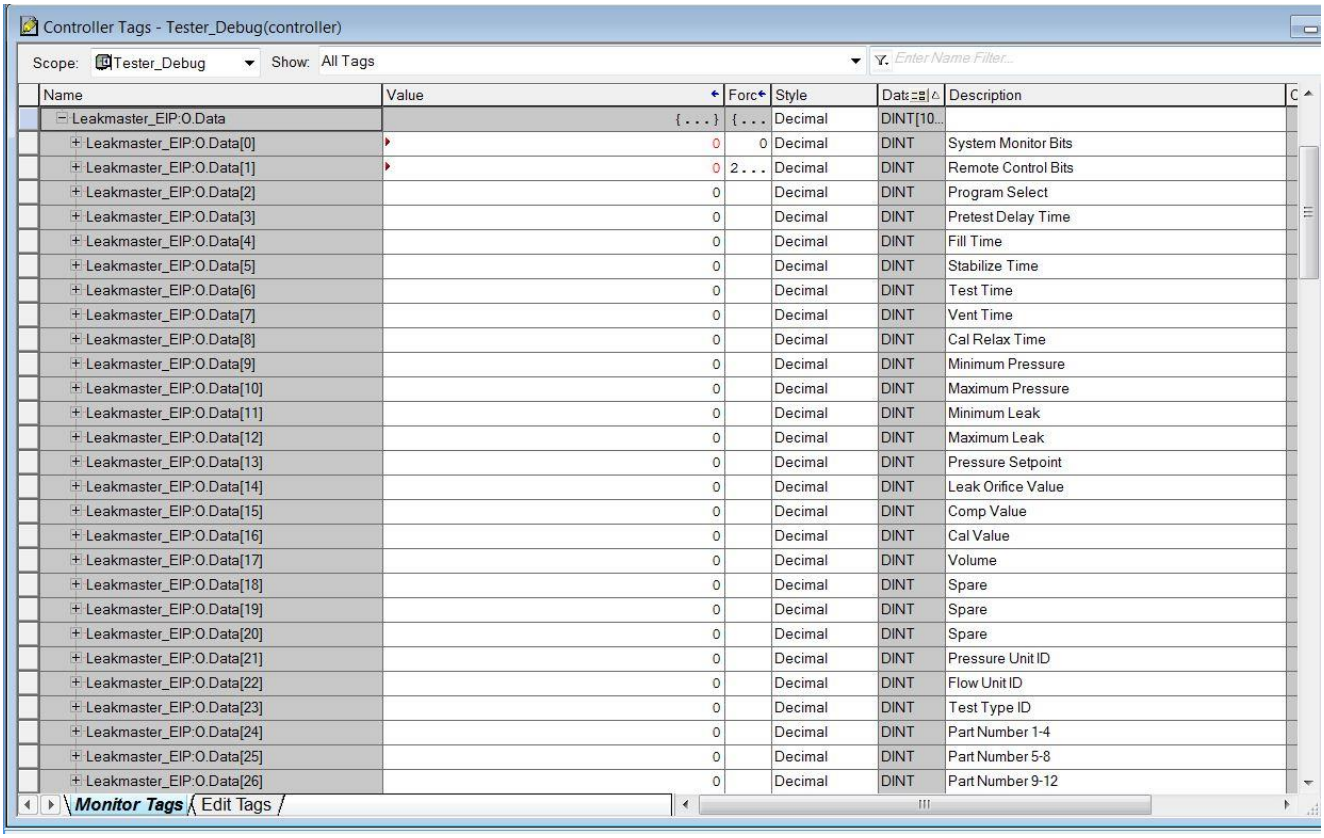
After the Ethernet Module has been setup, the following Data points will be automatically created as shown below on the two screen shots. The I/O shown below already has comments in the Description column (they will not be present until the user enters them in or imports them from the example Control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

Input Data:




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

Output Data:




| Name | Value | Force | 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.

### 8.2.4 Ethernet IP Generic I/O Address Map

| ADDRESS | TYPE | DESCRIPTION | FUNCTION |
|---|---|---|---|
| **INPUTS** | | | |
| 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 conditon 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 conditon 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 | 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. |
| Leakmaster_EIP:I.DATA[1].10 | BOOL | 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. |
| 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. |
| 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 | Digtial 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). |
| 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= inH20, 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. |
| 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 |
| 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. |
| 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 |
| 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 |
| 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. |
| **OUTPUTS** | | | |
| 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. |
| 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 theCal Relax Time to be when running in Slave Mode. |
| 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. |
| 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. |
| 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. |

### 8.2.5 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).

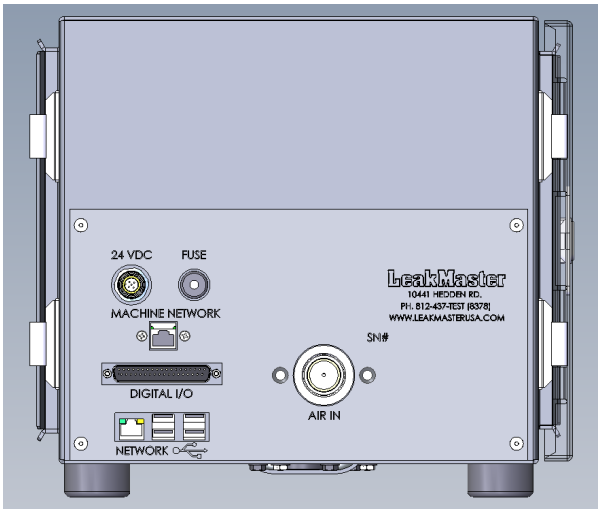
**Reply Packet (Tester to PLC)**
Bits 0-3 – Test State Bits – Matches the current 32 output test state bits currently used by Ethernet/IP implicit communications.
Bits 4-7 – Program Selected – DINT32 value of the program currently selected.
Bits 8-11 – Live Pressure – FLOAT32
Bits 12-15 – Live Pressure 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.

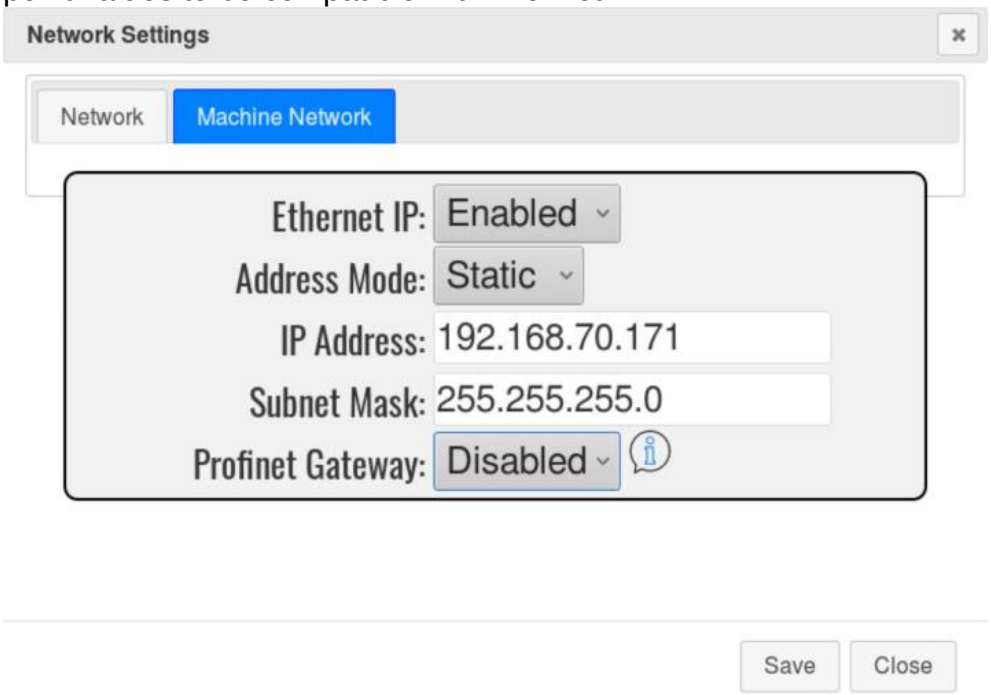
### 8.3.1 Wiring

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


24 VDC
FUSE
MACHINE NETWORK
LeakMaster
10441 HEDDEN RD.
PH. 812-437-TEST (8378)
WWW.LEAKMASTERUSA.COM
SN#
DIGITAL I/O
AIR IN
NETWORK

### 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.




### 8.3.3 Siemens TIA Setup

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

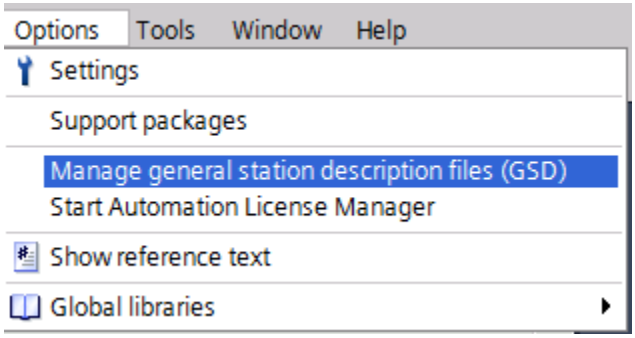
- Install the Anybus X-Gateway GDSML File
- Only if necessary – reset the Anybus X-Gateway Profinet interface to default in TIA software.
- Add the tester as a device.

**Install GDSML File**

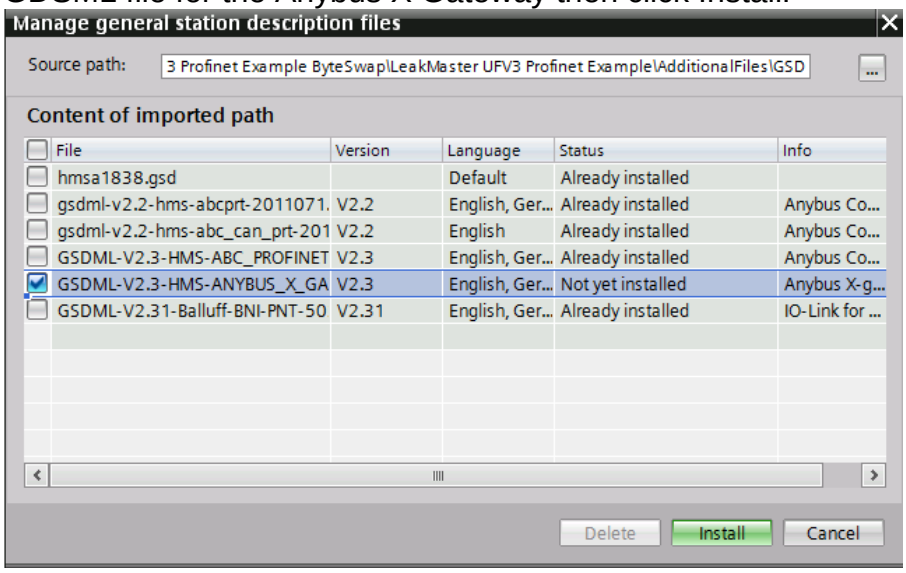
In order to communicate with the Anybus X-Gateway you must first install the GSDML file from Anybus. This file can be downloaded from the following link (search "GSDML File for PROFINET" within the page):
https://www.anybus.com/support/file-doc-downloads/x-gateway-specific/?ordercode=AB7670

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

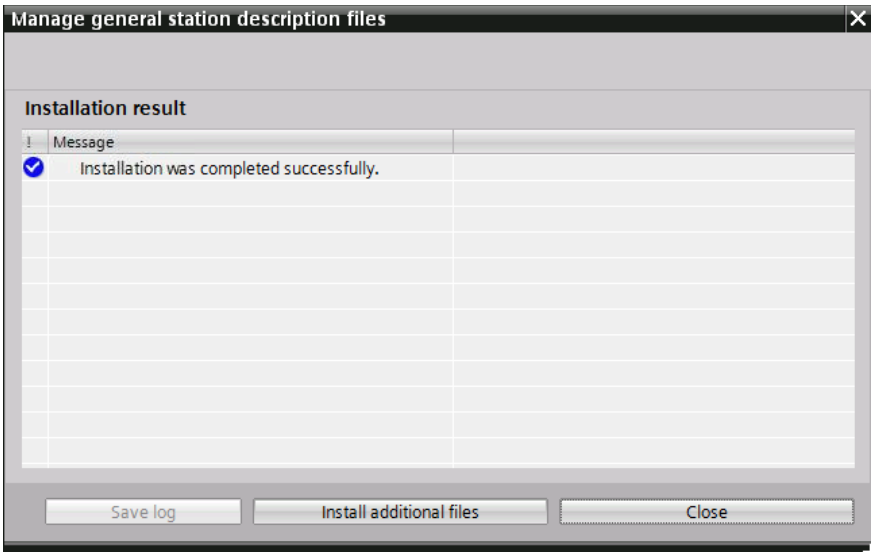
3. Click Options -> Manage general station description files (GSD)




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



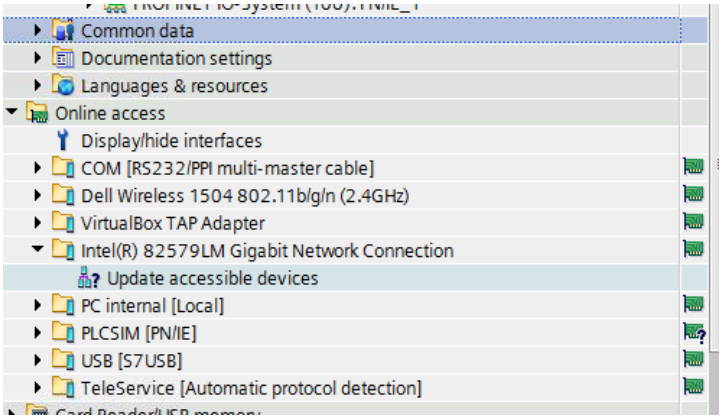

5. Once the operation is complete you should receive the following message. You can close this dialog. The GSDML file for the gateway has been successfully installed.



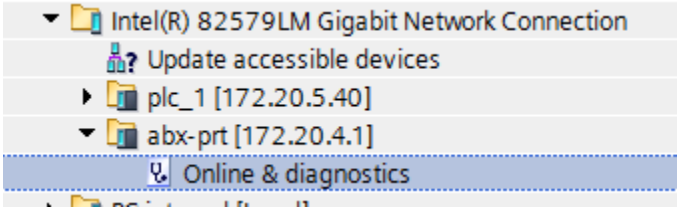

## Resetting Gateway To Factory Defaults

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.

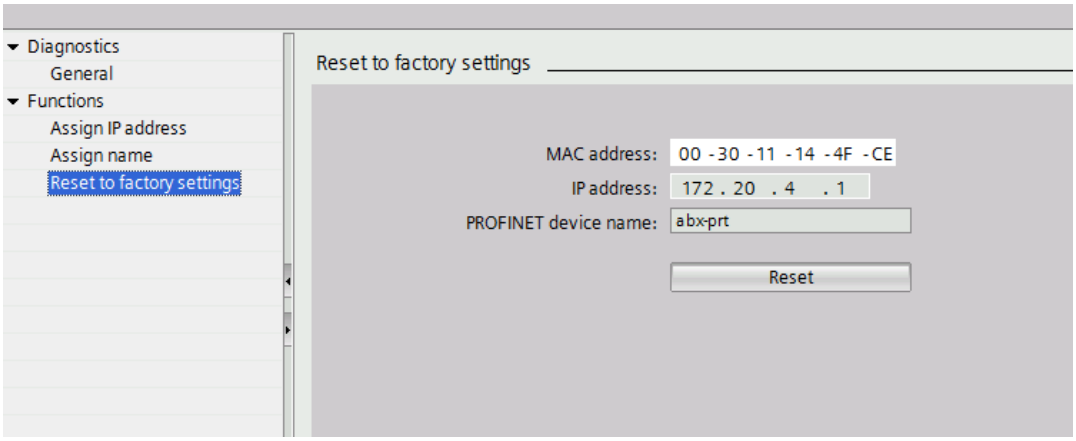
1. In the Project Tree, expand the Online Access section and locate the network device your Profinet devices are connected to. Double click on “Update accessible devices”




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 accidently resetting the settings on the wrong device.



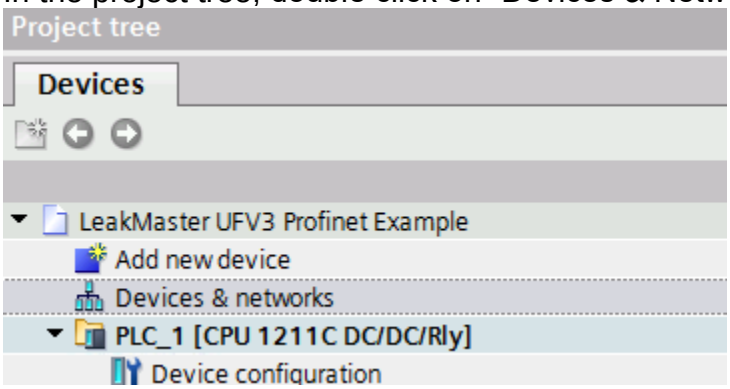
3. The Online and Diagnostics window for the device will be displayed. Expand the “Functions” and choose “Reset to factory settings”. Verify the MAC address to ensure it matches the MAC address of the device you want to reset, then click “Reset”.



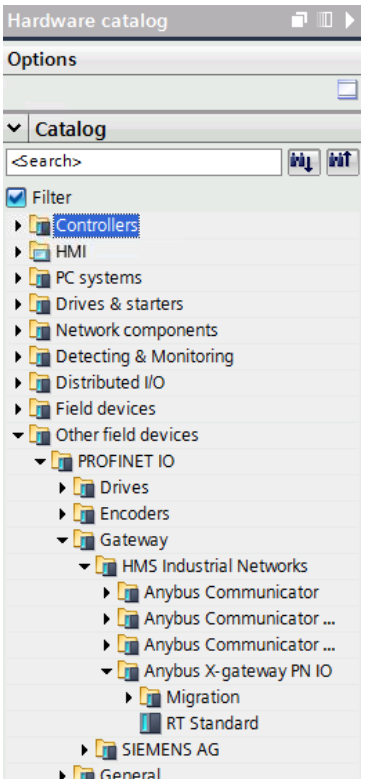

4. The device will be reset and will be ready to be assigned to your project.

## Adding Device To TIA

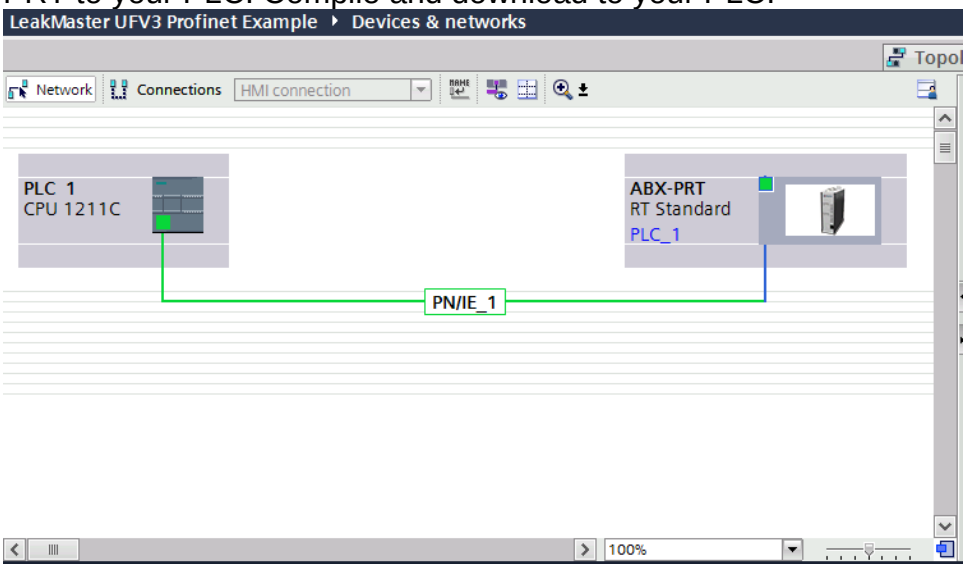
1. In the project tree, double click on “Devices & Networks”.



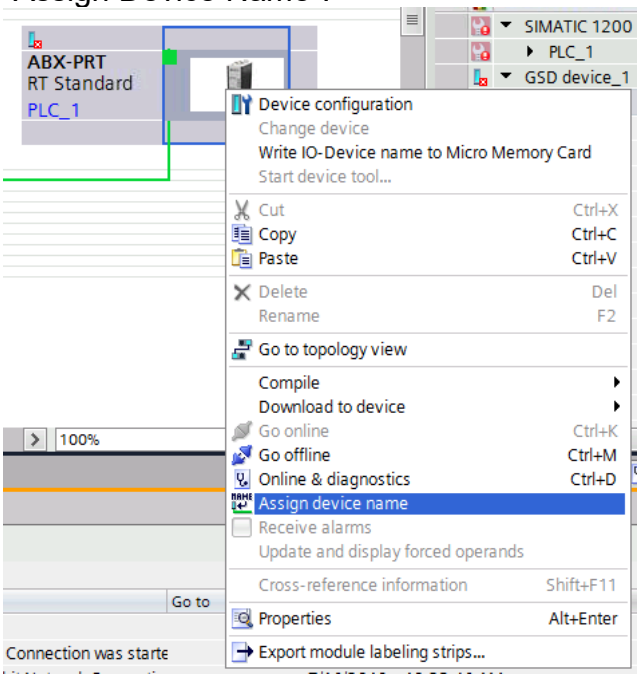

2. In the “Hardware Catalog”, expand “Other field devices” -> “PROFINET IO” -> “Gateway” -> “HMS Industrial Networks” -> “Anybus X-gateway PN IO”. Drag the “RT Standard” into your Devices & Networks view next to your PLC.


Hardware catalog
Options
Catalog
<Search>
Filter
Controllers
HMI
PC systems
Drives & starters
Network components
Detecting & Monitoring
Distributed I/O
Field devices
Other field devices
PROFINET IO
Drives
Encoders
Gateway
HMS Industrial Networks
Anybus Communicator
Anybus Communicator ...
Anybus Communicator ...
Anybus X-gateway PN IO
Migration
RT Standard
SIEMENS AG
General

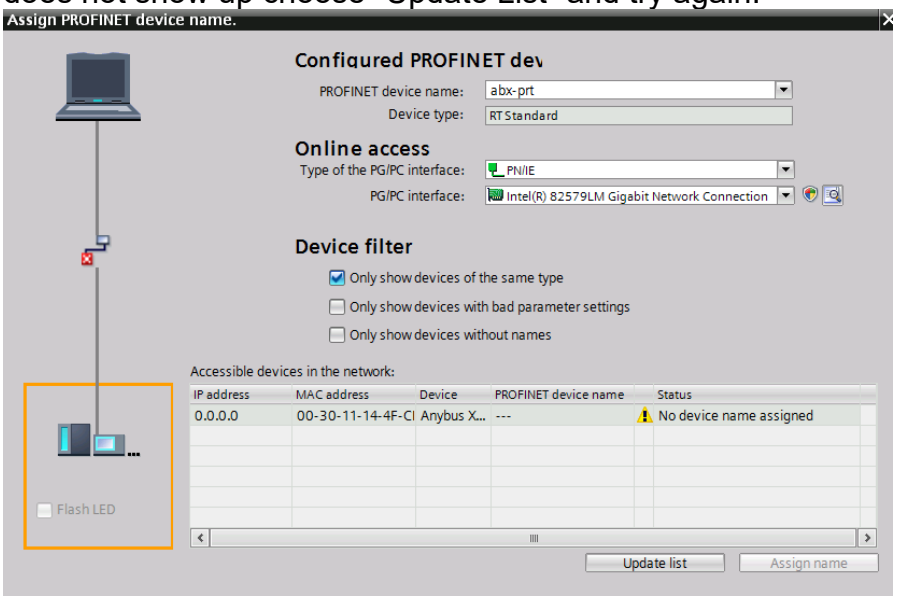
3. In the “Devices & Networks” screen drag a line from the green dot on the ABX-PRT to your PLC. Compile and download to your PLC.



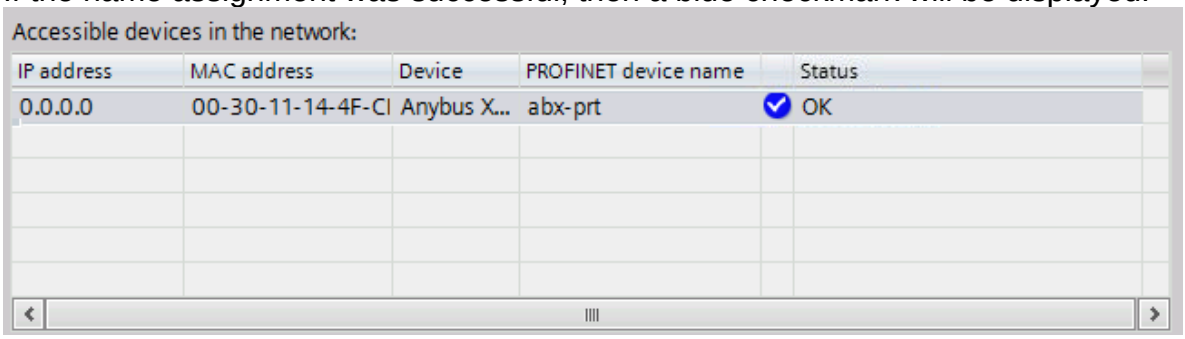

4. Go online and return to the “Devices & Network” screen, right click and choose “Assign Device Name”.



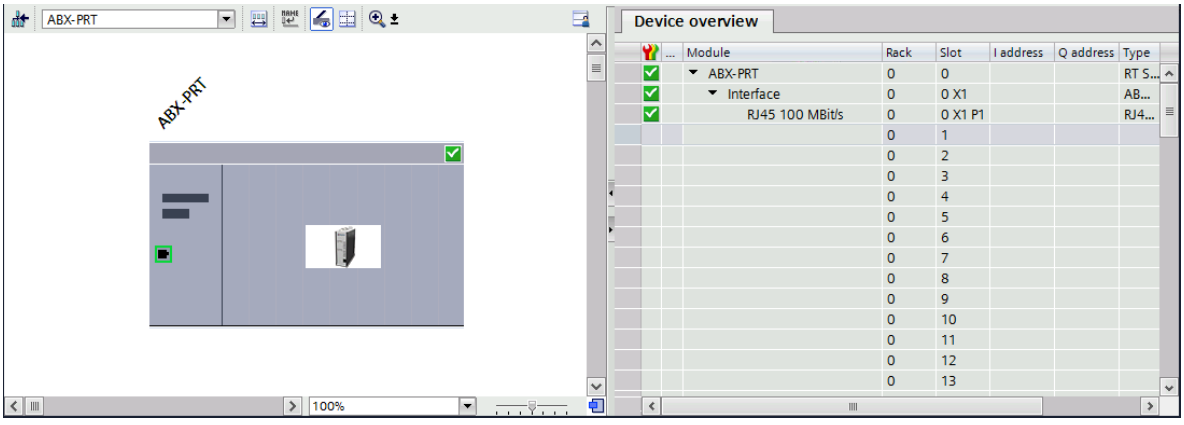
5. Click on the Anybus X-Gateway device and click Assign Name. If your device does not show up choose “Update List” and try again.



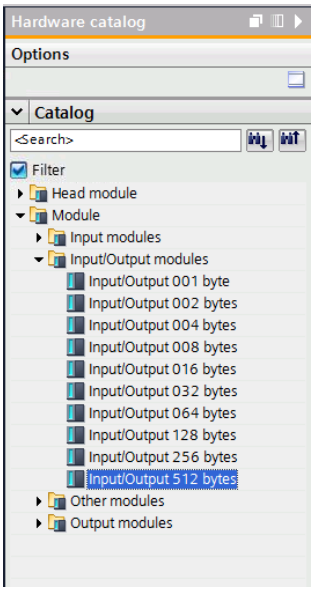

6. If the name assignment was successful, then a blue checkmark will be displayed.



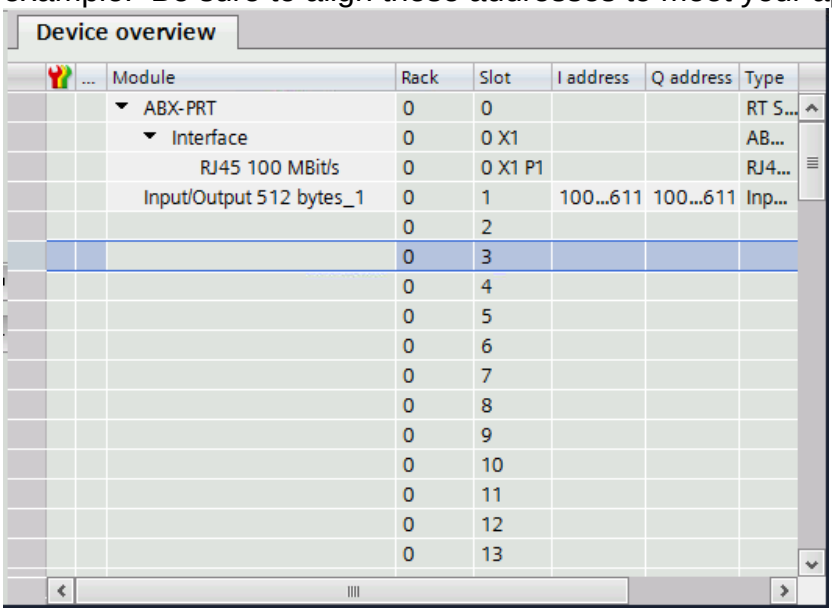

7. Go to the device view for the ABX-PRT to view the available module slots.



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.



### 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 |
|---|---|---|---|---|
| **Bit Level Status** | | | | |
| 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 | Bit Address | I105.4 | N+5 bit 4 |

| | | | | |
|---|---|---|---|---|
| | PreFill Step | | | |
| 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 r 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 | Bit Address | I109.1 | N+9 bit 1 |

| | | | | |
|---|---|---|---|---|
| | input 10 on the digital I/O connector (DB37 connector) | | | |
| 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 | Bit Address | I111.2 | N+11 bit 2 |

| | | | | |
|---|---|---|---|---|
| | (DB37 connector). | | | |
| Digital Output 12 Status | This address returns the status of output 12 on the digital I/O connector (DB37 connector). | Bit Address | I111.3 | N+11 bit 3 |
| 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 |
| **Integer Values** | | | | |
| 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= inH20, 4= inHg, 5= Bar, 6= mbar, 7= Kpa, 8= kgfcm2 | 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 | Double Word Address | ID168 | N+68 |

| | | | | |
|---|---|---|---|---|
| | Stabilize Step. 0-100 percent. | | | |
| 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 |
| 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 |
| **Floating Point Values** | | | | |
| 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 | Double Word | ID276 | N+176 |

| | | | | |
|---|---|---|---|---|
| | the installed calibrated leak standard. | Address | | |
| 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 in decay sccm mode) | Double Word Address | ID284 | N+184 |
| 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 2Pressure 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 |
| **Character Strings** | | | | |
| 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 |

| Output Name | Output Function | Output Type | Output Address | Byte Offset |
|---|---|---|---|---|
| **Bit Level Control** | | | | |
| 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 |
| **Integer Values** | | | | |
| 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 |
| **Floating Point Values** | | | | |
| 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 | Double Word Address | QD236 | N+136 |

| | | | | |
|---|---|---|---|---|
| | running in Slave Mode. | | | |
| 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 |
| **Character Strings** | | | | |
| 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 |