User Manual

meriam®

HPT100 Hydro/Pneumatic Tester

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General Information

Notification Statements

Disclaimer

Hydro/Pneumatic Tester is a diagnostic instrument for measuring temperature, pressure, & number of pump strokes for pipeline tests. The Hydro/Pneumatic Tester does not assess successful completion of pipeline tests.

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Trademark statement

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Warranty

Components of this system are warranted under use against any and all manufacturing defects from the listed date of manufacture for one (1) year.

Any failure resulting from defective parts or faulty workmanship, as determined during evaluation by the manufacturer, will be repaired under warranty. This warranty will be null and void for any unit that has been subject to misuse, negligence, accident, or repairs other than those performed by Western Enterprises or an approved affiliate.

General Warnings and Cautions

Preventing injury

Failure to follow all instructions could result in injury:

- ▪ Read the entire manual before using the Hydro/Pneumatic Tester.
- ▪ Understand the contents before using the Hydro/Pneumatic Tester.
- ▪ Follow all safety warnings and instructions provided with this product.

Safety symbols

The following table defines the safety symbols, signal words, and corresponding safety messages used in the manual.
These symbols:

- ▪ Identify potential hazards.
- ▪ Warn you about hazards that could result in personal injury or equipment damage.

Safety symbols	Explaining the symbols
⚠ DANGER	Indicates a potentially hazardous situation which, if not avoided, will result in death or serious injury.
⚠ WARNING	Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
⚠ CAUTION	Indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury.
NOTICE	Indicates information essential for proper product installation, operation or maintenance.

For your safety

Fire and explosion hazard

⚠DANGER

- ▪ Never use the Hydro/Pneumatic Tester in hazardous areas.
- ▪ Don't open the Hydro/Pneumatic Tester housing. There are no customer serviceable components inside. Opening the housing voids the warranty.
- ▪ Substitution of components may impair operation and safety.

Pressure limits

⚠WARNING

- ▪ Don't exceed the sensor limit.
- ▪ Full Scale calibrated range = 110 % of range.
- ▪ Failure to operate within the specified pressure limits could result in death or serious injury.

Protect the Hydro/Pneumatic Tester

⚠CAUTION

- ▪ Protect the Hydro/Pneumatic Tester from water or liquid spills.

Prevent trip hazards

⚠CAUTION

1. Don't suspend any hose, cable, or input connections from the device.
2. Watch out for hoses, cables, or power cords when you set up device connections.

Perform these checks each time

1. Check the specified pressure and temperature connection types and rating ranges for accessories.
2. Only use third party accessories if they match the connection types and/or ratings of the device sensors.
3. Examine the power cord and adapter to make certain they are not damaged.
4. Place the device on a flat, stable surface before connecting cables or hoses.
5. Check the pressure hoses to make certain they have no cracks, holes, defects, or unusual wear and tear.

6. Look for cracks, residue, or other damage around the sensor ports. If you see any, **don't use the device**. Contact the appropriate personnel.
7. Check all input, hose, and cable connections to make sure they are correctly and securely attached.
8. Check the computer screen to make sure it is not cracked or damaged.

NOTICE

1. Don't let sharp or hard objects touch the screen.

Hydro/Pneumatic Tester

Features of the Hydro/Pneumatic Tester

The Hydro/Pneumatic tester kit includes:

HPT100 Hydro/Pneumatic Tester:

- 10.2 in. touchscreen computer
- Three RTD temperature sensors
- One Compound Isolated 3000 psi pressure sensor
- One pump stroke counter
- Wireless keyboard and mouse
- AC adaptor

Hose and Cables:

- One 150 ft. (45 m) pressure hose on reel
- Four 150 ft. (45 m) 4 pin M12 A coded cables on reels
- Three 9.9 ft. (3 m) 4 pin M12 A coded armored cable
- One 3.3 ft. (1 m) Stroke Counter fly wire lead to 4 pin M12 A coded cable

Fittings, Probes, & Terminals:

- Two 1/8" NPT to Quick Test fittings
- Two 1/4" NPT to Quick Test fittings
- Three class A RTD M12 A coded probes
- One electrical terminal kit

Battery Kit

- 12V, 18 Ah sealed lead acid battery
- 5A battery charger
- Battery power cable

Storage Cases

- One soft sided case
- One hard sided case

Serial number

The serial number is located on the bottom of the Hydro/Pneumatic Tester.

Sensors

Use two wrenches to install or remove the pressure connection
Connection: 1/8 in. female NPT, 316LSS.

- ▪ Use PTFE tape for NPT fittings.
- ▪ Always use a 3/4 in. wrench on the pressure manifold when you install or remove the 1/8 in. NPT fitting.
- ▪ Applying torque to the manifold can damage the enclosure and voids the warranty.
- ▪ Don't over tighten.

Sensor manifold types
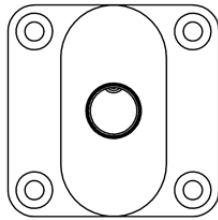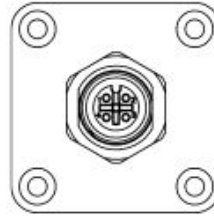
CI3000   RTD   Stroke Counter

No serviceable customer parts

NOTICE If you open the Hydro/Pneumatic Tester, you void the warranty.

Accessory specifications

RTD temperature probe type

- ▪ PT100 Class A, 4-Wire Platinum RTD Elements per IEC 60751 Standard
- ▪ 4 Pin M12 A coded connection

PT100
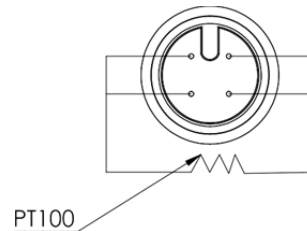
RTD temperature probe limits

- ▪ Functional measurement range: -50 °C to 250 °C

RTD temperature probe accuracy

- ▪ Tolerance: ± (0.15 + 0.002[t])°C

Pressure hose type

- ▪ Connection material: Stainless Steel
- ▪ Collar Material: Stainless Steel
- ▪ Hose core material: Stainless Steel
- ▪ Connection 1: Female Quick-test
- ▪ Connection 2: Female Quick-test

Pressure hoses limits

- ▪ Maximum allowable working pressure is 6900 psi at 140 °F.
- ▪ Rated temperature range: -40 °F to 450 °F.

Stroke Counter fly wires

- 4 Pin M12 A coded male connection
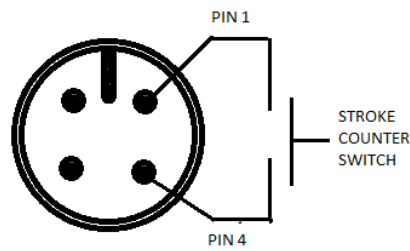
Stroke Switch

- "Dry" contact
- Single Pole, Single throw

Battery (P/N: Z9P1956)

- 12V dc
- 18 Ah
- Provides a run time of approximately 20 hours on a single charge

Battery Charger

- Input;
- 100 – 240 V ac 50/60 Hz
- Output
- 12 V dc
- 5 A dc

Battery Cable

- Positive Connection protected by 5A fuse
- Fuse Type: Glass 5A 5X20MM

Connecting to Power

There are three options for connecting the power for the HPT100. All of the accessories required to connect any of the options are included with the device. Connect the selected option to the device using the marked power port.

- ▪ Option 1: AC/DC power adapter
    - • When AC power is reliably available.

- ▪ Option 2: Battery & Battery Charger
    - • Use as an uninterruptable power supply for critical testing when AC power is available.

▪ Option 3: Battery
  • The provided battery will power the HPT100 for approximately 18 hours from a full charge.
  • Use a voltmeter (not included) to check the voltage level of the battery.

Connect pipe under test to a Hydro/Pneumatic Tester

The method of connecting the Hydro/Pneumatic Tester may differ from device to device. The Hydro/Pneumatic Tester is designed to give the operator maximum flexibility during test set up.

Customers can choose to use the included accessories or use their own vendors to purchase hoses, cables, RTD probes, etc. to meet their requirements.

1. Inspect the Hydro/Pneumatic Tester, cables, hose, probes, fittings, etc. prior to use.
2. Apply power to the Hydro/Pneumatic Tester and turn the device on.
3. Install the RTD probes into their required locations (pipe under test, fill dirt, ambient, etc.). A thermowell (not included) may be required for pipe installation.
4. Connect the RTD probes to the Hydro/Pneumatic Tester using the 150 ft. M12 cables.
   > Note: If the cables require extra protection near the RTD probe end, use the 9.9 ft. armored cables between the 150 ft. cables and the RTD probes.
5. Install required pressure fittings into the pipe under test. Use PFTE tape for NPT fittings.
   > Note: A valve may need to be installed to allow the pressure system to be vented for the purposes of zeroing the sensor or disconnecting the equipment.
6. Install pressure fitting into the Hydro/Pneumatic Tester. Use PFTE tape for NPT fittings.
7. Connect the pressure hose between the pipe fitting and the Hydro/Pneumatic Tester fitting.
   > Note: Before connecting the pressure sensor hose to the HPT100, turn the power on and make sure to zero the pressure sensor prior to completing the hook up.
8. If required, install the stroke counter fly wire adapter to the pump using the terminal kit.
9. If required, connect a 150 ft. M12 cable between the stroke counter fly wire cable and the Hydro/Pneumatic Tester.

Power up Hydro/Pneumatic Tester

- ▪ Connect the Hydro/Pneumatic tester to power source per above section "Connecting to power".
- ▪ Press the power button located on the front of the Hydro/Pneumatic Tester.
- ▪ The Hydro/Pneumatic Tester will go through a boot up sequence (< 1 min) and then go directly into setup mode.

Application

Control Selection

The following options are available to interact with the device:
1. Tap the touch screen to select a control.
2. Select a control by clicking it with the mouse
3. Use the keyboard to enter data.

Note: Keyboard and mouse dongle are located in the mouse battery compartment and plugs into the USB connection on the unit.

Main Screen

Once the Hydro/Pneumatic Tester boot sequence completes, the application loads to the Main screen. The user interacts with different controls on this screen to set up, run and review test data.
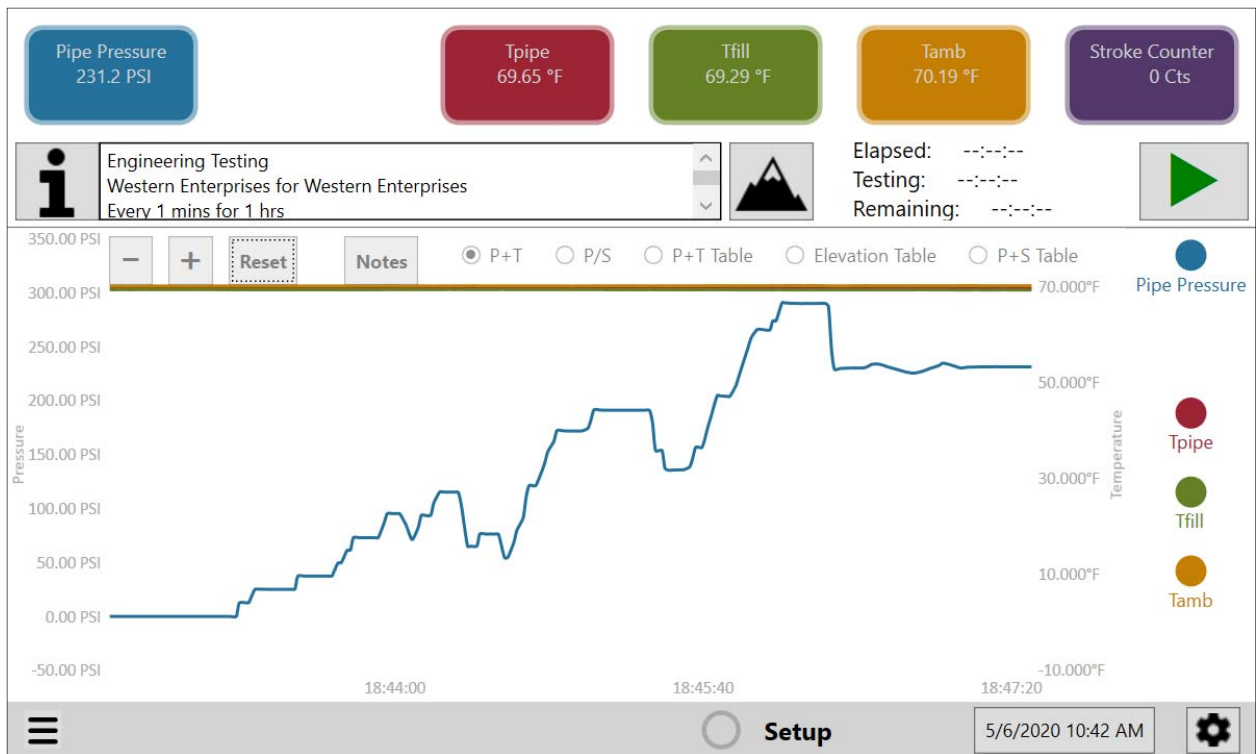
Measurement controls
- Five controls at the top of the screen display measurements.
- Different colors are used to distinguish the five sensors.
- Tap each control to make changes to the sensor settings.

Information button
- Pressing this button brings up the test information screens to enter test specific information.

▪ Test information is visible in the information window on the main screen.

Elevation button

▪ Active for hydrostatic tests only.
▪ Tapping this button brings up the information page to calculate pressures in the pipe due to change in pipe elevation.

Elapsed time

▪ Indicates the total time of data collection.

Testing time

▪ Indicates the accumulated time of a test period.

Remaining time

▪ Indicates the time remaining during a test period.

Start/Stop/Return Button

▪ Control to start and stop a data log.
▪ Control to return to set up from a data log review.
▪ Button changes function based on mode.

Status Bar

▪ Messages (such as alarms) to the user are displayed here.
▪ Status circle
  • Solid *Gray* means no data logging.
  • Blinking *Green* means data logging is recording data.
  • Solid *Red* means Hydro/Pneumatic Tester is locked while you review the log reports.

Note: The Menu, Setting, time adjustment, and indicator buttons are unavailable when the status circle is flashing green or red.

Menu Button

▪ Open prior tests for review.
▪ Transfer test files to a USB stick.
▪ Power down the HPT100.

Clock & Calendar

▪ Displays the current date and time
▪ Set the date and time

Settings Button

▪ Open settings page to manage the device.

Three modes in the application

The application has three modes of operation:

1. Setup mode.
   - Enter all test related data in this mode.
   - Setup is entered on boot up or after reviewing data by tapping **Return**.
2. Test mode.
   - The Hydro/Pneumatic Tester records data in this mode.
   - Test information entry is locked out.
   - The **Elapsed** timer begins to increment.
   - The user can enter notes in this mode.
   - Tapping the **Stopwatch** button will begin the test period and start the Testing and Remaining Timers.
   - Tapping the **Stopwatch** will end the test period.
   - The test may be started and ended multiple times without stopping data recording. The test period is reset each time test is started.
   - Test information is reviewable.
   - End data recording by tapping the **Stop** button.
3. Review mode.
   - Test information entry is locked out.
   - Review data and test information for any completed test in this mode.

Setup mode

Overview of Setup mode

The application opens in the **Setup** mode. All data is viewable in this mode. User defined data is able to be modified in **Setup** mode.

When in **Setup** Mode the Hydro/Pneumatic Tester:
1. Graphs live data.
2. No data is logged.
3. User can enter view or enter data in the information window and on information page by tapping the **Information** ℹ️ button.
4. Sensor features can be edited by tapping the sensor indicators.
5. Elevation points can be edited by tapping the **Elevation** button ⛰️.
6. Indicator in status bar is greyed out to and "Setup" message
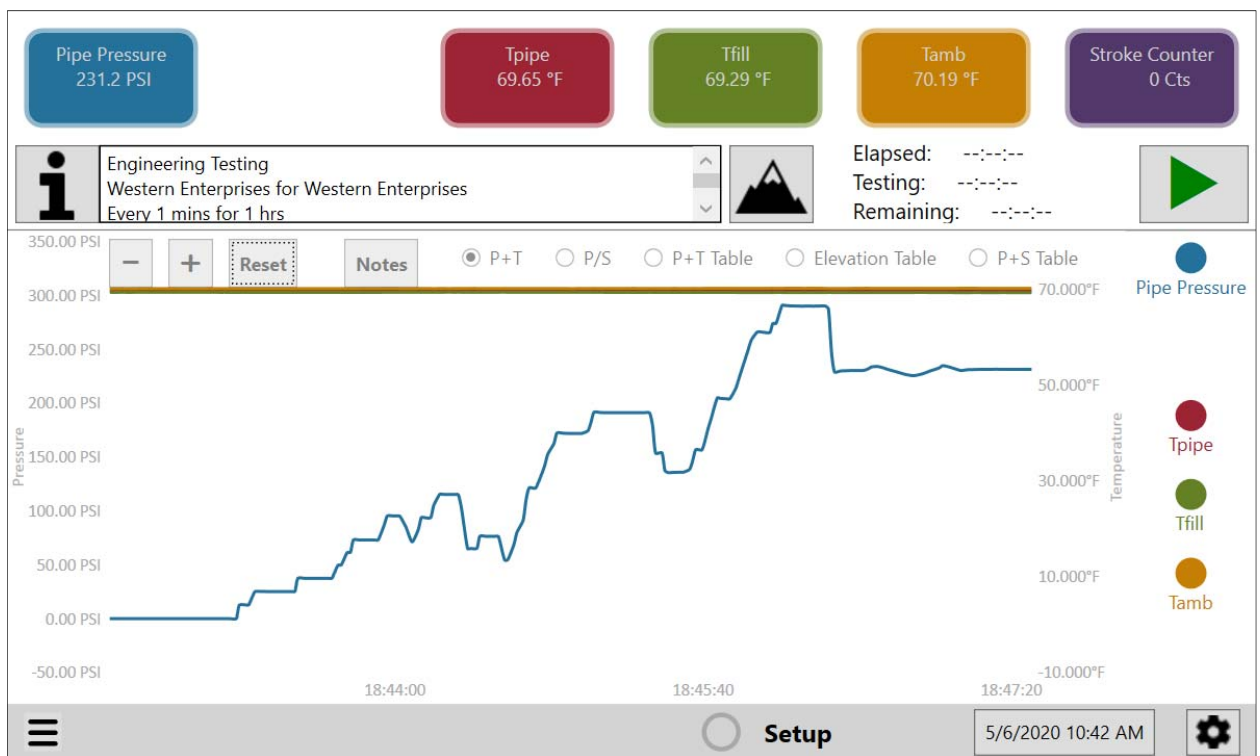
Test information in Setup mode

Tap the **Information** button $\mathbf{i}$ to access the test information pages. Enter the test specific information into the fields on each page. Select each page to edit with the control on the left.

Pipe Pressure 229.9 PSI		Tpipe 69.56 °F	Tfill 69.03 °F	Tamb 70.07 °F	Stroke Counter 0 Cts

General

General	
Pressurization	
Test Parameters	
Pipeline Operator	
Testing Company	
Pipe	

General

PipeLine Description*

Engineering Testing

Area
Square

Work Order Number
ABC123

Location
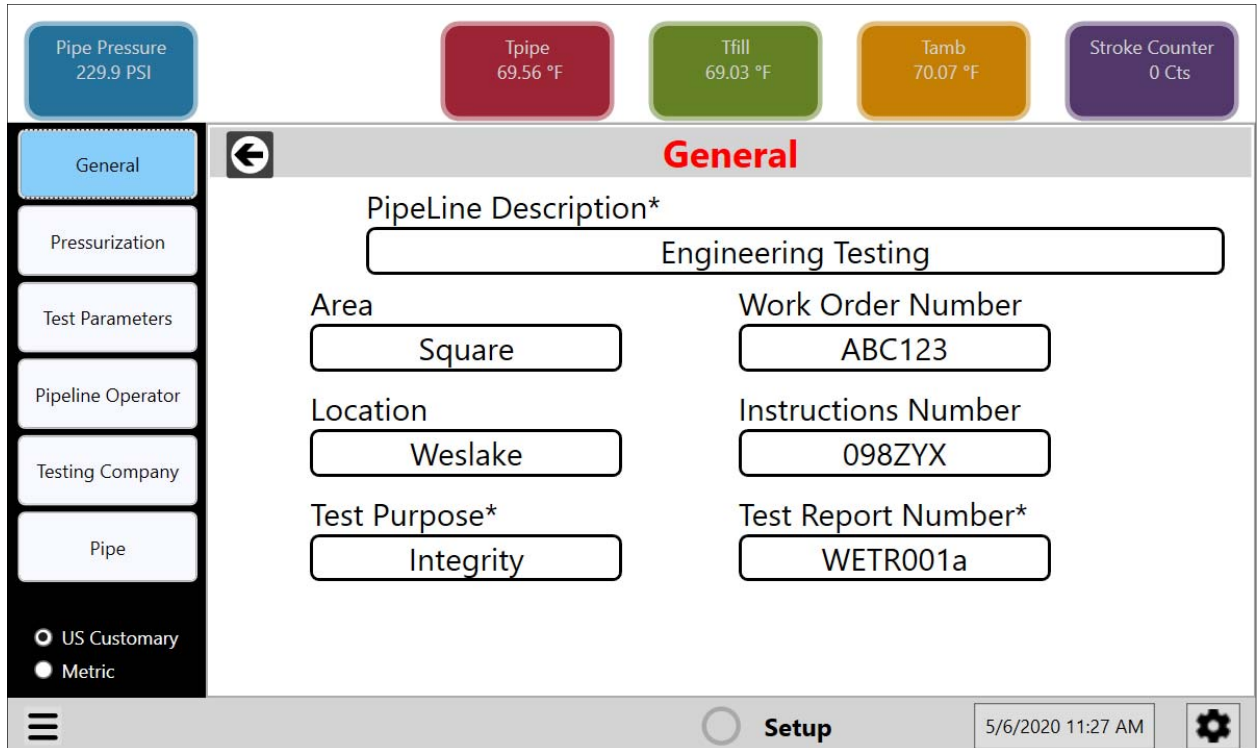Weslake

Instructions Number
098ZYX

Test Purpose*
Integrity

Test Report Number*
WETR001a

○ US Customary
● Metric

≡   ◯ **Setup**   5/6/2020 11:27 AM   ⚙

- ▪ Back Arrow
  - • Tap the back arrow button ⬅ to return to the main screen.
- ▪ Test Information Pages
  - • Tap a tab to enter a page to enter test information
  - • Required fields in these pages are marked with an asterisk (*).
- ▪ Units Selection
  - • Select between U.S. Customary and Metric units of measure for:
    - • Length (inches or centimeters), (feet or meters)
    - • Volume (US Gallons or Liters)
  - • Pressure and temperature units of measure are selected in the measurement controls.
  - • Changing units clears associated fields.

General

- Pipeline Description
  - Enter a brief description of the pipeline under test
  - Has a limit of 32 characters.
- Area
  - Enter a brief description of the area surrounding the pipeline under test
  - Has a limit of 32 characters.
- Location
  - Enter a brief description of the test location
  - Has a limit of 32 characters.
- Test Purpose
  - Enter the reason the test is being performed; new installation, revalidation, etc.
  - Has a limit of 32 characters.
- Work Order Number
  - Enter a work order number for the test.
  - Has a limit of 32 characters.
- Instructions Number
  - Enter a work instruction number for the test.
  - Has a limit of 32 characters.
- Test Report Number
  - Enter a test report number associated with the test
  - Has a limit of 32 characters.

Pressurization

- Monitor Pump
  - Select to monitor and log the stroke counter during pressurization pump.
    - Selected enables:
      - P/S graph & Table
      - Pump data entry
    - Unselected disables:
      - P/S graph & Table
      - Pump data entry
  - It is recommended that this option only be used when a non-compressible liquid, like water, is used as the test media. The volume calculation does not account for the compressibility of gases.
- Observe Every
  - Data logging sample rate for the pressurization phase of the test if monitoring the pump. Record a sample every x change in pressure based on selected units.
  - Required if monitoring pump.
  - Minimum numeric value: 1
  - Maximum numeric value: 100
- Pump Model Number
  - Enter the model number for pump used to pressurize pipe under test.
  - Has a limit of 32 characters.

- Pump Serial Number
    - Enter the serial number for pump used to pressurize pipe under test.
    - Has a limit of 32 characters.
- Initial Volume
    - Enter the volume of the test media that has been added to the pipe prior to counting pump strokes.
    - **Required if monitoring pump.**
    - Minimum value: 0.00
    - Maximum value: 9,999.99
    - Only accurate when non-compressible liquids, like water, are used as the test media.
- Volume/Stroke
    - Enter the volume of the test media that will be added to the pipe every completed stroke.
    - **Required if monitoring pump.**
    - Minimum value: 0.01
    - Maximum value: 9,999.99
    - Only accurate when non-compressible liquids, like water, are used as the test media.
- Final Volume
    - Calculated by the Hydro/Pneumatic Tester using: Initial Volume, Volume/Stroke, and the Stroke Count fields.
    - Only accurate when non-compressible liquids, like water, are used as the test media. The volume calculation does not account for the compressibility of gases.
- Pressurization Start
    - The Hydro/Pneumatic Tester automatically records the time the pressurization phase of the test was started when the **Record** button is tapped.
- Pressurization End
    - The Hydro/Pneumatic Tester automatically records the time pressurization phase of the test ends when the **Stopwatch** button is tapped to begin a test.
- Rate warnings
    - Select to enable the pressure rate alarm. The alarm will be triggered if the rate of pressurization falls outside a desired range.
    - Selected enables Highest Desired Rate & Lowest Desired Rate.
- Highest Desired Rate
    - Enter the maximum rate of pressurization.
    - Alarm will occur if the rate of pressurization exceeds this limit.
    - Must be greater than **Lowest Desired Rate**
    - Changing the pressure unit will clear this field.

- Lowest Desired Rate
  - Enter the minimum rate of pressurization.
  - Alarm will occur if the rate of pressurization falls below this limit.
  - Must be less than **Highest Desired Rate**
  - Changing the pressure unit will clear this field.

Test Parameters

- Test Medium
  - Enter a description of the medium used to pressurize the pipe under test. Example, Water, H20, Nitrogen, etc.
  - Has a limit of 8 characters.
- Hydrostatic
  - Select to run a hydrostatic test and enable elevation calculations.
  - Unselected to run a pneumatic test and disable elevation calculations.
- HT Elevation
  - Elevation of the Hydro/Pneumatic Tester while in use and required to accurately calculate pressures in the pipe under test due to changes in elevation.
  - Numeric format "x,xxx.x"
  - Minimum Value: -1600.0
  - Maximum Value: 999,999.9
- Specific Gravity
  - Enter the specific gravity of the Test Medium used to pressurize the pipe under test and required to accurately calculate pressures in the pipe under test due to changes in elevation.
  - Numeric format "x.xxx"
  - Minimum Value: 0.000
  - Maximum Value: 2.000
- Enable alarms

- • Select to enable high and low pressure warnings and alarms.
- • Unselect to disable high and low pressure warnings and alarms.
- • High Pressure Limit
  - • Maximum limit of desired test pressure range. Measured pressure values exceeding this value will cause an alarm.
  - • Numeric format "xx,xxx.x"
  - • Minimum Value: -14.5
  - • Maximum Value: 999,999.9
  - • Must be greater than *High Warning Level, Low Warning Level, and Low Pressure Limit.*
  - • Changing the pressure unit will clear this field.
- • High Warning Level
  - • A warning will occur measured pressure rises above the warning limit but is below the *High Pressure Limit.*
  - • Numeric format "xxx.x"
  - • Minimum Value: -14.5
  - • Maximum Value: 999,999.9
  - • Must be less than *High Pressure Limit* and greater than *Low Warning Level* and *Low Pressure Limit.*
  - • Changing the pressure unit will clear this field.
- • Low Warning Level
  - • A warning will occur measured pressure falls below the warning limit but is above the *Low Pressure Limit.*
  - • Numeric format "xxx.x"
  - • Minimum Value: -14.5
  - • Maximum Value: 999,999.9
  - • Must be less than *High Pressure Limit* and *High Warning Level* and greater than *Low Pressure Limit.*
  - • Changing the pressure unit will clear this field.
- • Low Pressure Limit
  - • Minimum limit of desired test pressure range. Measured pressure values below this value will cause an alarm.
  - • Numeric format "xx,xxx.x"
  - • Minimum Value: -14.5
  - • Maximum Value: 999,999.9
  - • Must be less than *High Pressure Limit, High Warning Level, and Low Warning Level.*
  - • Changing the pressure unit will clear this field.
- • Test Start
  - • The Hydro/Pneumatic Tester automatically records the time the test was started on with the tap of the **Stopwatch** button.
- • Test End

- The Hydro/Pneumatic Tester automatically records the time the test was ended with the tap of the **Stopwatch** button, reaching the test duration, or **Stop** button.
- Sample Every
    - Enter the time between data log samples.
    - Maximum sample rate of 1 sample per 1 minute.
    - Minimum sample rate of 1 sample every 60 minutes.
- Nominal Duration
    - Enter the expected length of time required to perform the test.
    - Minimum duration 1 hour.
    - Maximum duration 100 hours.
    - The HPT100 can record up to 100 hours of data. Once this limit is reached the data acquisition will end.

Pipeline Operator

| Pipe Pressure -0.1 PSI | Tpipe 69.57 °F | Tfill 69.35 °F | Tamb 70.04 °F | Stroke Counter 3 Cts |

Pipeline Operator

General | Pressurization | Test Parameters | Pipeline Operator | Testing Company | Pipe

Pipeline Operator*
Western Enterprises

Street Address*
875 Bassett Rd

Division*
Engineering

City*
Westlake

Contact*
John Doe

State*
Ohio

Phone*
440-871-2160

Zip Code*
44145

○ US Customary
● Metric

☰   ○ Setup   5/6/2020 10:13 AM   ⚙

- Pipeline Operator
  - Enter the name of the company that owns and operates the pipeline under test.
  - Has a limit of 32 characters.
- Division
  - Enter the division of the pipeline operating company that is performing/requesting the test.
  - Has a limit of 32 characters.
- Contact
  - Enter the name of the pipeline operator contact responsible for the testing
  - Has a limit of 32 characters.
- Phone
  - Enter the phone number of the Contact of the pipeline operator
  - Has a limit of 10 characters.
- Street Address
  - Enter the street address where the division of the pipeline operator is located.
  - Has a limit of 32 characters.
- City
  - Enter the name of the city where the division of the pipeline operator is located
  - Has a limit of 32 characters.
- State
  - Enter the name of the state where the division of the pipeline operator is located

- Has a limit of 32 characters.
- Zip Code
    - Enter the postal zip code where the division of the pipeline operator is located
    - Has a limit of 32 characters.

Testing Company

- Testing Company
  - Enter the name of the Testing Company responsible for performing the pipeline test.
  - Has a limit of 32 characters.
- Division
  - Enter the division of the pipeline operating company that is performing/requesting the test.
  - Has a limit of 32 characters.
- Contact
  - Enter the name of the testing company contact responsible for testing.
  - Has a limit of 32 characters.
- Phone
  - Enter the phone number of the Contact of the testing company.
  - Has a limit of 10 characters.
- Street Address
  - Enter the street address where the division of the testing company is located.
  - Has a limit of 32 characters.
- City
  - Enter the name of the city where the division of the testing company is located.
  - Has a limit of 32 characters.
- State
  - Enter the name of the state where the division of the testing company is located

- Has a limit of 32 characters.
- Zip Code
    - Enter the postal zip code where the division of the testing company is located
    - Has a limit of 32 characters.

Pipe

- Pipe Diameter
  - Enter the nominal diameter of the pipe under test.
  - Minimum value: 0.1
  - Maximum value: 999,999.9
- Pipe Length
  - Enter the length of the pipe under test
  - Minimum value: 0.1
  - Maximum value: 999,999.9
- Pipe Rating
  - Enter the pressure rating of the pipe under test
  - Has a limit of 8 characters.
- Pipe wall thickness
  - Enter a wall thickness for the pipe
  - Minimum value: 0.01
  - Maximum Value: 100.00
- Valve Section From/To
  - Enter the valve sections.
  - Has a limit of 8 characters.
- Station Number From/To
  - Enter the station numbers.
  - Has a limit of 8 characters.
- MAOP
  - Enter the Maximum Allowable Operating Pressure of the pipe under test.
  - Units are based on pressure unit selection
  - Minimum value: 0.0

- Maximum value: 999,999.9
- SMYS
    - Enter the Specified Minimum Yield Strength of the pipe under test.
    - Units are based on pressure unit selection
    - Minimum value: 0.0
    - Maximum value: 999,999.9

Elevation in Setup mode

The HPT100 is capable of calculating the pressure at up to five (5) pipeline elevations along the length of the pipe under test. In order to accurately calculate these pressures the HT Elevation, Test Medium, Specific Gravity and Hydrostatic fields on the **Test Parameters** page must be properly entered.

Tap the **Elevation** button 🔺 on the main screen to access the elevation set up page.

Pipe Pressure		Tpipe	Tfill	Tamb	Stroke Counter
-0.1 PSI		69.61 °F	69.34 °F	70.11 °F	3 Cts

Elevation

Name	Elev1			Add Location	Remove Location	Remove All
Elevation	-100					
Dist To HPT100	-500					

	Elev1	Elev2	Elev3	HPT100	Elev4	Elev5
Pressure PSI	135.9	92.6	49.3	-0.1	-43.8	-87.1
Elevation	-100	0	100	214	315	415
Distance	-500	-250	-125	0	250	500

☰   ◯ **Setup**   5/6/2020 10:19 AM   ⚙

- **Back Arrow**
  - Tap the back arrow button ⬅ to return to the main screen.
- **Name**
  - Enter the desired name of the test point
  - This name must be unique; the same name may not be used for another point.
  - Has a limit of 8 characters (including spaces).
- **Elevation**
  - Enter the elevation of the test point location.
  - Minimum Value: -1600.0
  - Maximum Value: 999,999.9
- **Dist To HPT100**
  - Enter the distance of the test point relative to the location of the HPT100.
  - This distance must be unique; the same distance may not be used for another point.
  - A negative sign (-) may be used to indicate relative position to HPT100.

•   The distance between the most extreme test points must be less than or equal to the *Pipe Length* as entered on the **Pipe** information page.

Example:

		Example 1	Example 2	Example 3	Example 4	Example 5
	Pipe Length (ft)	1000	1000	1000	1000	1000
Distance from HT	TP 1	-1000	-	-500	-750	-500
	TP2	-	-	-	-300	-
	HPT100	0	0	0	0	0
	TP3	-	-	-	300	300
	TP4	-	1000	500	750	500
	TP5	-	-	-	-	-
	Total TP Distance	1000	1000	1000	1500	1000
	Valid	✓	✓	✓	✗	✓

▪   **Add Location**
  •   Adds the elevation test point location to the elevation data table.
  •   All elevation test points must have unique names and distances or the **Add Location** button will not add the location.
▪   **Remove Location**
  •   Removes a selected elevation location from the elevation pressure table.
    •   Select a test point by tapping on the test point column to be deleted.
    •   Tap the **Remove Location** button to remove the selected location.
▪   **Remove All**
  •   The **Remove All** button allows the user to remove all elevation test point locations added by the user from the elevation pressure table.
▪   **Elevation Pressure Table**
  •   Shows elevation data for up to five (5) user defined test points.
  •   Test points are organized by distance from the Hydro/Pneumatic Tester.
    •   Negative distance values are shown to the left of the HT reference.
    •   Positive distance values are shown to the right of the HT reference.

Information Data Format

User defined Information data can be of two types:
- Text
  - Letter (A – Z)
  - Number (0 – 9)
  - Symbol (!, @, #, $, etc.)
  - These characters are not allowed for all text entries
    - \ / : * ? " < > | .
- Numeric
  - Number (0 – 9)
  - Symbol (-, .)

If the user entered data is not formatted correctly or exceeds the character limit the entry box will be highlighted with a yellow bar as shown in the example below.

Dist To HPT100   0

Pressure Measurement in Setup mode
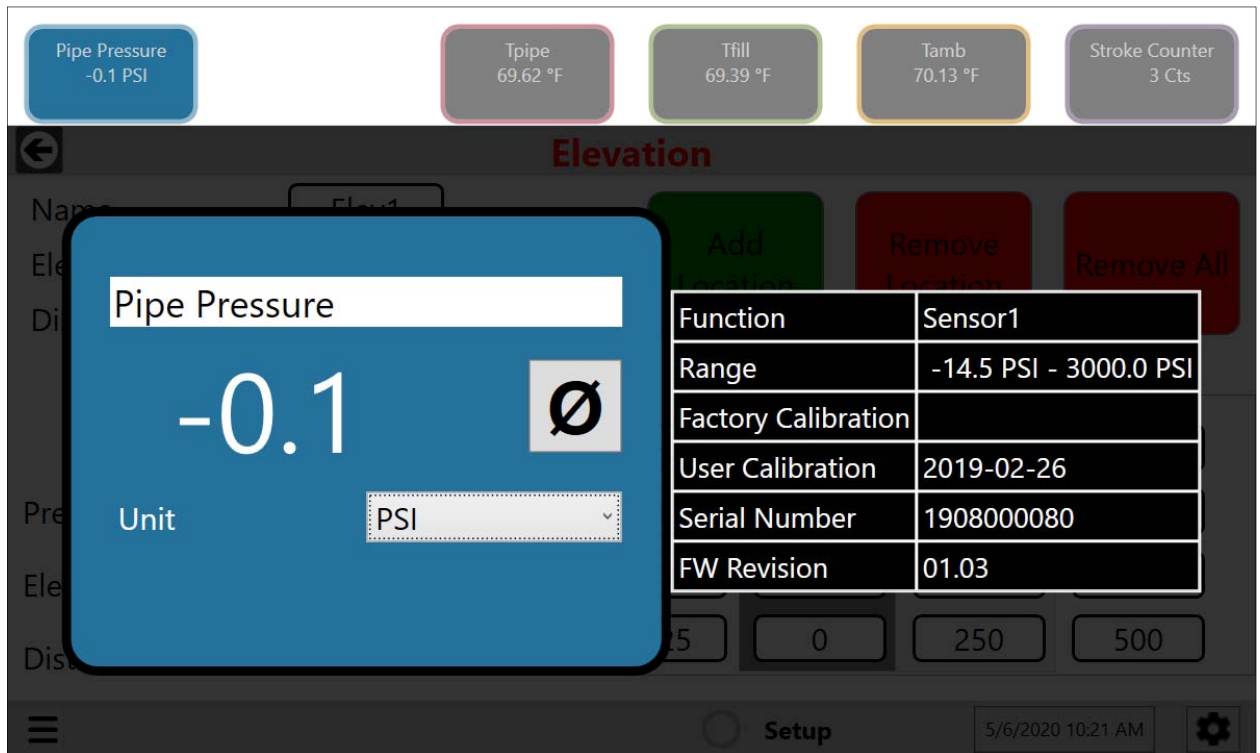
Pressure indicator

The pressure indicator displays the following information:

▪ Sensor name
▪ Current measurement value
▪ Units of measurement

Pressure features

Tap the pressure indicator to view the following items: current values, range, calibration date, serial number and firmware revision. These items are displayed in a table on the right.

▪ Set the primary units of measurement for the pressure sensor
▪ Set the sensor's name
▪ Zero the sensor
▪ Exit features by tapping the **indicator** button again.

Temperature Measurement in Setup mode

Temperature indicators

The three temperature indicators display:

- Sensor name
- Current measurement values
- Unit of measurement

Temperature features

Tap a temperature indicator to view the following items: current values, range, calibration date, serial number and firmware revision.
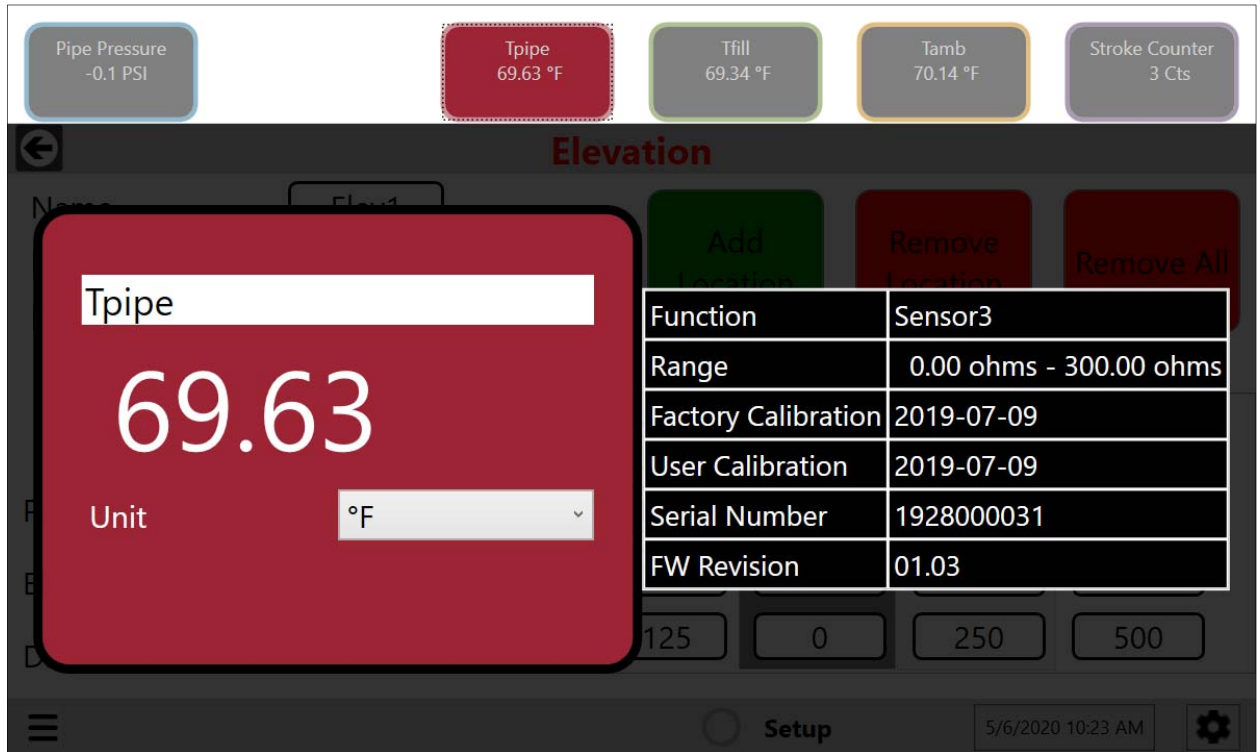
- Set the unit of measurement for all temperature sensors
- Set a specific sensor's name
- Exit features by tapping the **indicator** button again.

Pump Monitoring in Test mode
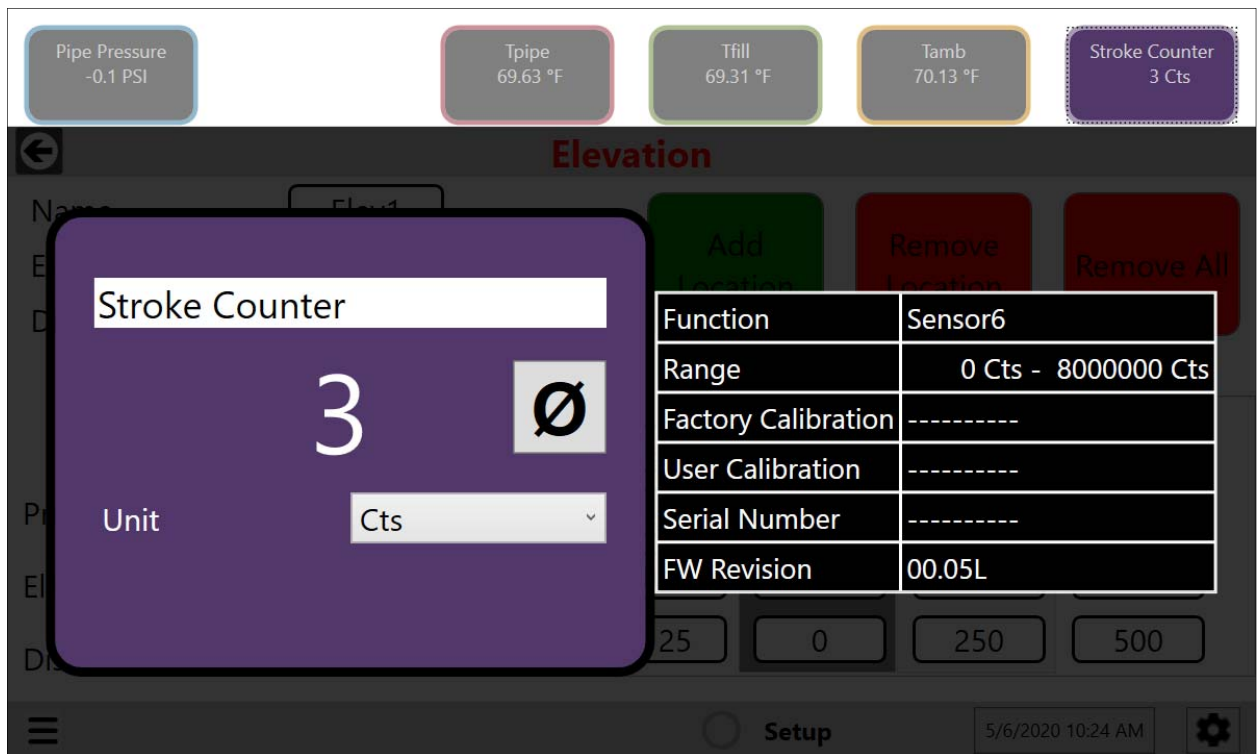
The stroke counter indicator displays the following information:
- Sensor name
- Current stroke count value
- Unit of measurement

Stroke counter features
Tap the **stroke counter** indicator to view the following items: current values, range, and firmware revision. These items are displayed in a table on the right.
- Set the sensor's name
- Zero the sensor

Exit features by tapping the **indicator** button again.

Data Displays in Setup Mode

Pressure & Temperature (P+T) vs. Time graph with controls
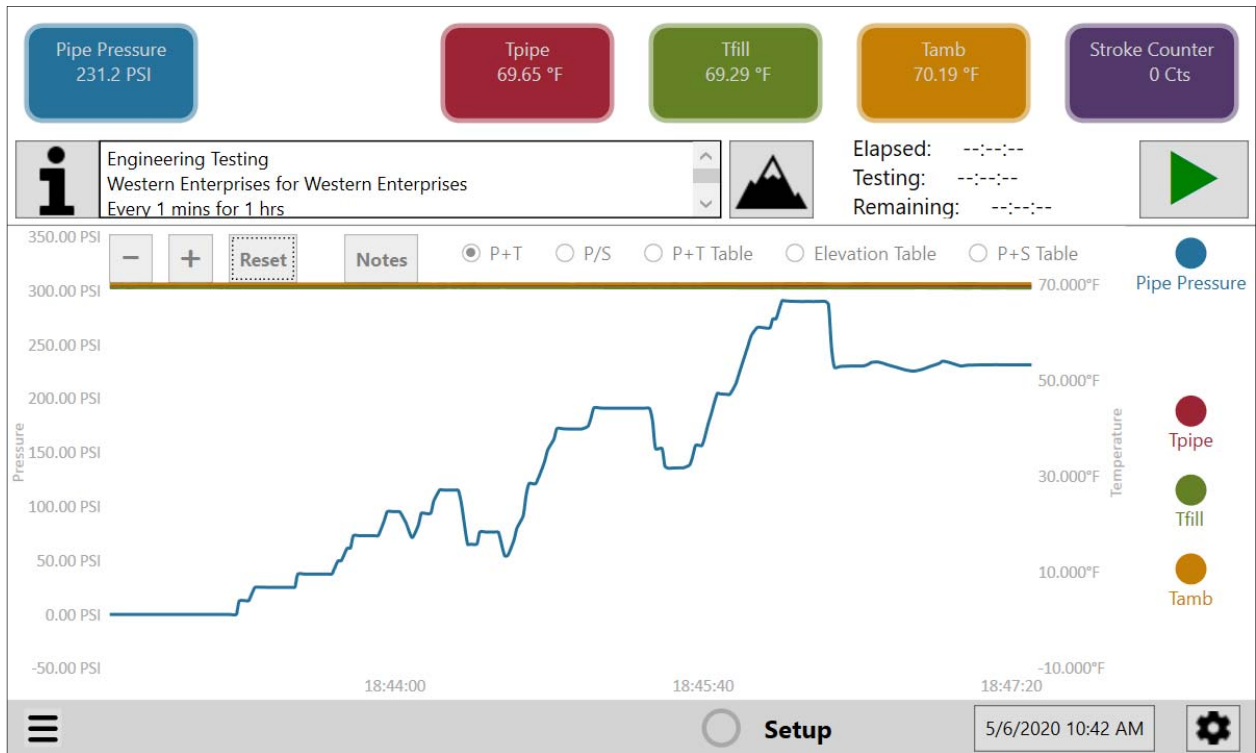
- ▪ Pressure and temperature are displayed against time. The graph is updated once every second.
- ▪ *Visibility controls*
  - • The four visibility controls are the circles on the right side of the graph. They match the colors of the pressure and temperature measurement indicators.
  - • Tap a visibility control to hide or display a measurement line in the graph.

Pressure vs. Stroke (P/S) graph with controls
- ▪ Pressure is displayed over increase in stroke count.

Pressure & Temperature (P+T) Table
- ▪ Not active in Setup mode.

Elevation Table
- ▪ Not active in Setup mode

Pressure & Stroke (P+S) Table
- ▪ Not active in Setup mode.

Notes in Setup mode

Note button

- ▪ Not Active in Setup mode.

Record Button in Setup Mode

When you tap the **Record** button in Setup mode, Test Mode is entered, data logging begins and the ***Stop*** button appears.

Test mode

Overview of Test mode

The application records data in the **Test** mode. All data is viewable in this mode. User defined data is not able to be modified in **Test** mode.

When **Test** Mode is entered the Hydro/Pneumatic Tester:
1. Clears the graphs.
2. Starts a new data log file.
3. Locks out changes to all user entered test information data. Data are viewable in the information window and on information page by tapping the **Information** **i** button.
4. Locks out changes to all sensor indicators.
5. Locks out changes to elevation data. Elevation data is viewable by tapping the **Elevation** button ▲.
6. Saves all data in a file for review.
7. Flashing green indicator in status bar and "Recording…" message.
8. Displays the total elapsed time from the tap of the Record button ▶.

*Note: The HPT100 will record data in **Test** mode up to a total of 100 hours. After 100 hours the HPT100 will automatically stop recording and enter **Review** mode.*
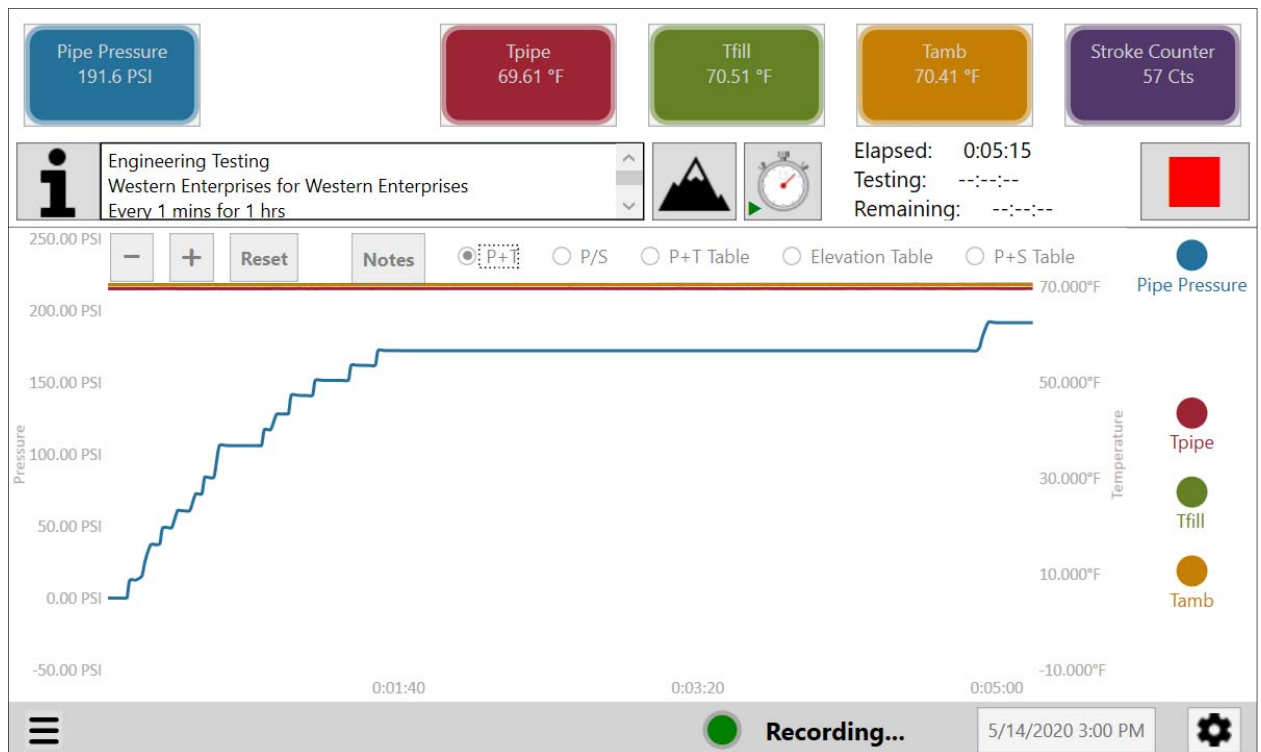
Test information in Test mode

Tap the **Information** button **i** to view the test information pages. View the test specific information in the fields on each page.

- ▪ Back Arrow
    - • Tap the back arrow button ⬅ to return to the main screen.
- ▪ Test Information Pages
    - • Tap a tab to enter a page to review test information.
    - • Changes to data are locked out in **Test** mode.
- ▪ Units Selection
    - • Unit selection is locked out in **Test** mode.

Elevation in Test mode

Tap the **Elevation** button ▲ on the main screen to view the live pressure calculation on the elevation page. Elevation points may not be added or removed in **Test** mode.

Tap the **Back Arrow** button ⬅ to return to the main screen.

Pressure Measurement in Test mode

Pressure indicator
The pressure indicator displays the following information:
- ▪ Sensor name
- ▪ Current measurement value
- ▪ Units of measurement

Pressure features – not available in Test mode.

Temperature Measurement in Test mode

Temperature indicators
The three temperature indicators display:
- ▪ Sensor name
- ▪ Current measurement values
- ▪ Unit of measurement

Temperature features – not available in Test mode.

Pump Monitoring in Test mode

Stroke Counter indicator
The stroke counter indicator displays the following information:
- ▪ Sensor name
- ▪ Current stroke count value

Stroke Counter features – not available in Test mode.

Data Displays in Test Mode

Pressure & Temperature (P+T) vs. Time graph with controls
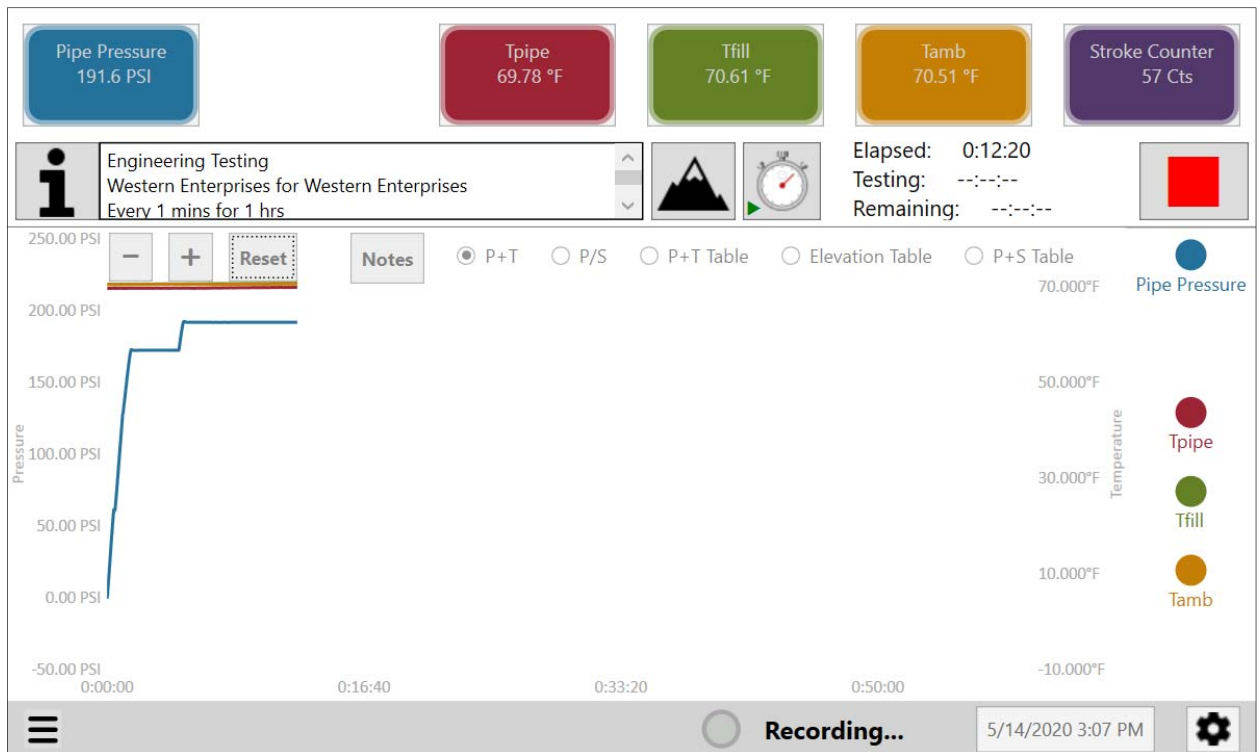
- ▪ Pressure and temperature are displayed against time. Graph is updated once every second.
- ▪ *Visibility controls*
  - • The four visibility controls are the circles on the right side of the graph. They match the colors of the pressure and temperature measurement indicators.
  - • Tap a visibility control to hide or display a measurement line in the graph.
- ▪ Zoom and Reset Controls
  - • Use "-" and "+" controls to zoom out and in.
  - • Reset will automatically resize the graph to its extents.

Pressure vs. Stroke (P/S) graph with controls
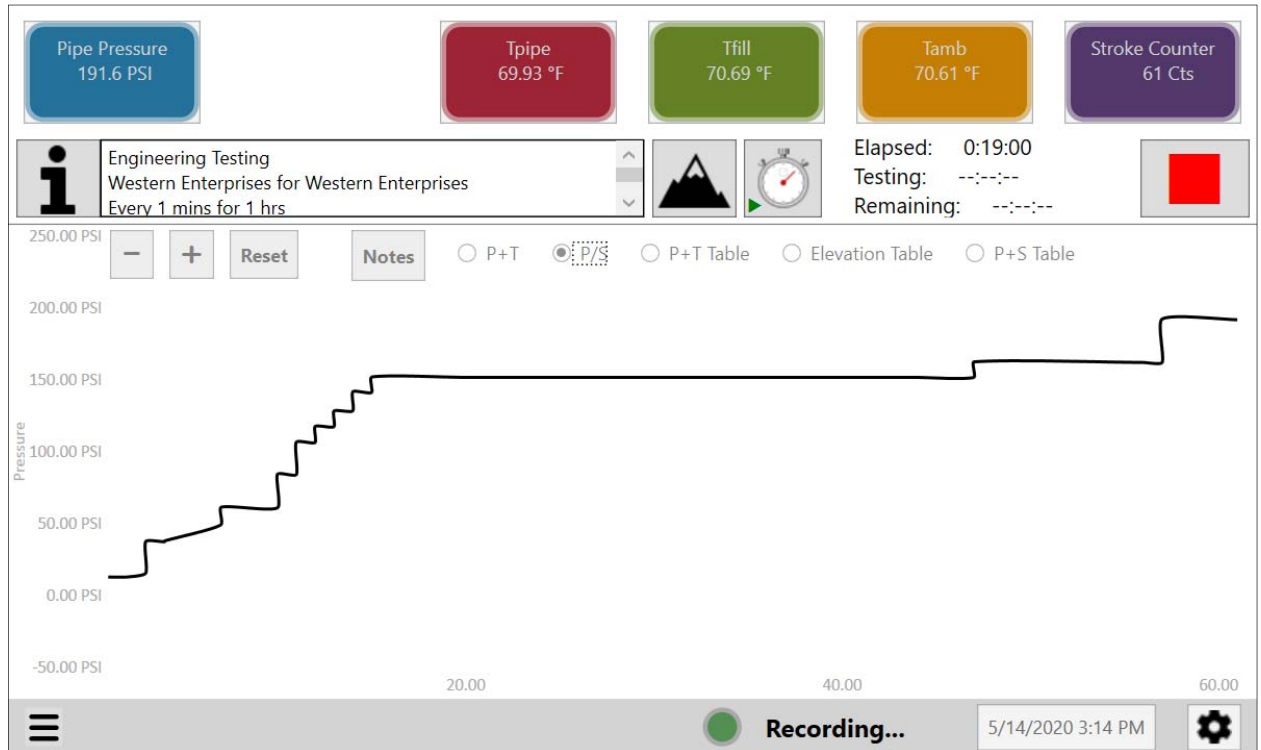
- ▪ Pressure is displayed over increase in stroke count.
- ▪ Graph is updated when the in stroke counter increments.
- ▪ Zoom and Reset Controls
    - • Use "-" and "+" controls to zoom out and in.
    - • Reset will automatically resize the graph to its extents.

Pressure & Temperature (P+T) Table

Pipe Pressure 191.6 PSI	Tpipe 70.01 °F	Tfill 70.75 °F	Tamb 70.72 °F	Stroke Counter 87 Cts

Engineering Testing
Western Enterprises for Western Enterprises
Every 1 mins for 1 hrs

Elapsed: 0:23:13
Testing: --:--:--
Remaining: --:--:--

Notes   ○ P+T   ○ P/S   ◉ P+T Table   ○ Elevation Table   ○ P+S Table

Time	Pipe Pressure	Tpipe	Tfill	Tamb	Stroke Counter
5/14/2020 2:55:26 PM	0.2	69.56	70.41	70.34	0
5/14/2020 2:56:26 PM	128.2	69.58	70.42	70.33	13
5/14/2020 2:57:26 PM	172.1	69.58	70.44	70.38	57
5/14/2020 2:58:26 PM	172.1	69.6	70.45	70.4	57
5/14/2020 2:59:26 PM	172.1	69.6	70.48	70.42	57
5/14/2020 3:00:26 PM	191.6	69.6	70.5	70.41	57
5/14/2020 3:01:26 PM	191.6	69.61	70.52	70.42	57
5/14/2020 3:02:26 PM	191.6	69.64	70.53	70.4	57
5/14/2020 3:03:26 PM	191.5	69.68	70.55	70.42	57
5/14/2020 3:04:26 PM	191.6	69.7	70.56	70.45	57
5/14/2020 3:05:26 PM	191.6	69.73	70.57	70.47	57
5/14/2020 3:06:26 PM	191.6	69.75	70.58	70.48	57

≡   ○ **Recording...**   5/14/2020 3:18 PM   ⚙

- Pressure, temperature, and stroke counter data are displayed with time stamps while recording data. The table is updated and data is logged at the **Sample rate** interval as defined on the *Test Parameters* page in the Test information pages.
- Notes are displayed with time stamps while recording data.
- Use the scroll bar to move the viewing area up or down to review the data.

Elevation Table

Pipe Pressure 191.6 PSI		Tpipe 70.14 °F	Tfill 70.87 °F	Tamb 70.83 °F	Stroke Counter 87 Cts

Engineering Testing
Western Enterprises for Western Enterprises
Every 1 mins for 1 hrs

Elapsed: 0:32:12
Testing: --:--:--
Remaining: --:--:--

Notes | ○ P+T | ○ P/S | ○ P+T Table | ◉ Elevation Table | ○ P+S Table

Time	Elev1	Elev2	Elev3	HPT100	Elev4	Elev5
5/14/2020 3:14:26 PM	327.56	284.26	240.96	191.60	147.87	104.57
5/14/2020 3:15:26 PM	327.56	284.26	240.96	191.60	147.87	104.57
5/14/2020 3:16:26 PM	327.56	284.26	240.96	191.60	147.87	104.57
5/14/2020 3:17:26 PM	327.56	284.26	240.96	191.60	147.87	104.57
5/14/2020 3:18:26 PM	327.56	284.26	240.96	191.60	147.87	104.57
5/14/2020 3:19:26 PM	327.56	284.26	240.96	191.60	147.87	104.57
5/14/2020 3:20:24 PM	Note entered					
5/14/2020 3:20:26 PM	327.56	284.26	240.96	191.60	147.87	104.57
5/14/2020 3:21:26 PM	327.56	284.26	240.96	191.60	147.87	104.57
5/14/2020 3:22:26 PM	327.56	284.26	240.96	191.60	147.87	104.57
5/14/2020 3:23:26 PM	327.56	284.26	240.96	191.60	147.87	104.57
5/14/2020 3:24:26 PM	327.56	284.26	240.96	191.60	147.87	104.57

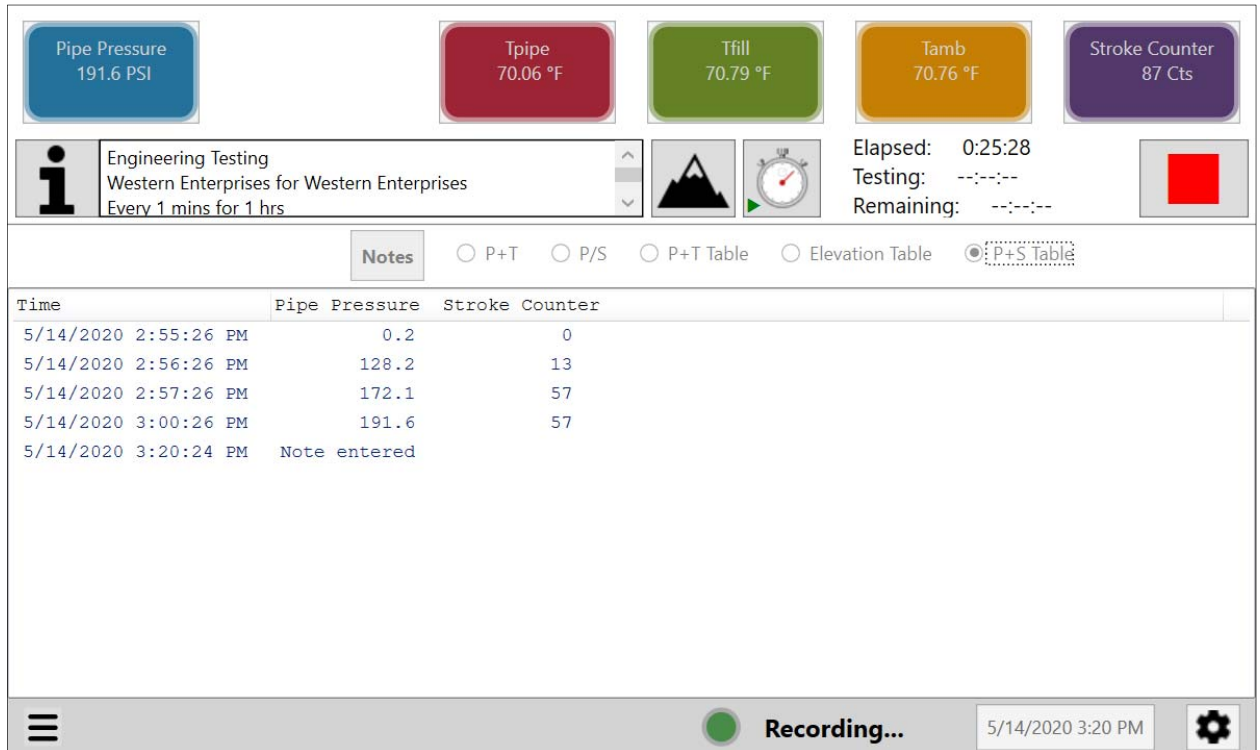● Recording...   5/14/2020 3:27 PM   ⚙

- Elevation pressure data are displayed with time stamps while recording data. Table is updated and data is logged at the **Sample rate** interval as defined on the *Test Parameters* page in the Test information pages.
- Notes are displayed with time stamps while recording data.
- Use the scroll bar to move the viewing area up or down to review the data.

Pressure & Stroke (P+S) Table

Pipe Pressure 191.6 PSI	Tpipe 70.06 °F	Tfill 70.79 °F	Tamb 70.76 °F	Stroke Counter 87 Cts

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Western Enterprises for Western Enterprises
Every 1 mins for 1 hrs

Elapsed: 0:25:28
Testing: --:--:--
Remaining: --:--:--

Notes   ○ P+T   ○ P/S   ○ P+T Table   ○ Elevation Table   ◉ P+S Table

Time	Pipe Pressure	Stroke Counter
5/14/2020 2:55:26 PM	0.2	0
5/14/2020 2:56:26 PM	128.2	13
5/14/2020 2:57:26 PM	172.1	57
5/14/2020 3:00:26 PM	191.6	57
5/14/2020 3:20:24 PM	Note entered	

☰   ● Recording...   5/14/2020 3:20 PM   ⚙

- ▪ Pressure and Stroke counter data are displayed with time stamps while recording data. Table is updated and data is logged at the **Observe every** rate interval as defined on the *Pressurization* page in the Test information pages.
- ▪ Notes are displayed with time stamps while recording data
- ▪ Use the scroll bar to move the viewing area up or down to review the data (not shown).

Notes in Test mode

Note button Notes

- ▪ Review and add notes at any point while recording data.
- ▪ Notes are time stamped and added to the data log file.
- ▪ Notes can be added from any of the data displays

Stopwatch button in Test mode

Stopwatch button

When you tap the **Stopwatch** button :
1. The test duration timer begins to increment
2. A vertical green line is placed on the P + T graph and a time stamped note is created to mark the time the test began.
3. The **Stopwatch** button changes to have a "stop" icon inside .
4. The **Add One Hour** +1 button appears

When you tap the **Stopwatch** button a second time:

1. A dialog appears asking to confirm ending the test duration early.
2. The test duration timer stops incrementing
3. A vertical Red line is placed on the P + T graph and a time stamped note is created to mark the time the test was stopped.
4. The **Stopwatch** button changes back to have a "record" icon inside .

5. The **Add One Hour** button disappears and any time added to the test duration will be retained for when then test is restarted with another press of the **Stopwatch** button

If you tap the **Stopwatch** button a third time:

1. The test duration timer is cleared and begins to increment again.
2. The green and red vertical indicators from the last stopwatch period are cleared. A new vertical green line is placed on the P + T graph and a time stamped note is created to mark the second time the test began.
3. The test duration will include any previously added time from use of the Add **One Hour button**.
4. The **Stopwatch** button changes to have a "stop" icon inside .

Tapping the **Stopwatch** button a fourth time will stop the duration timer as before and add the marker on the graph. The user may start and stop the **Stopwatch** function as often as required by the test.

Once the testing timer has reached the test duration a red line will be added to the P + T graph to mark the end of the test. The Hydro/Pneumatic Tester will continue to record data until the **Stop** button is tapped.

Stop Button in Test mode

When you tap the **Stop** button , a dialog box appears asking to confirm ending the data logging. Once confirmed data logging stops and the
Return button appears. Data logging stops taking measurements and:

1. Stops data additions to the graphs and table.
2. Creates a report.
3. Review mode opens.

Review mode

Overview of Review mode

All Data is viewable in this mode. User defined data is not able to be modified in R**eview** mode.

When **Review** Mode is entered the Hydro/Pneumatic Tester:
1. Stops adding data to the graphs and table.
2. Stops adding data to the data log file.
3. Locks out changes to all test information data. Data is viewable in the information window and on information pages by tapping the **Information** **i** button.
4. Locks out changes to all sensor features.
5. Locks out changes to elevation data. Elevation data is viewable by tapping the **Elevation** button ⛰.
6. Saves all data in a file for review.
7. Displays the vertical **Stopwatch** bars
8. Solid red indicator in status bar and "Review" message.
9. Displays the total elapsed time from the tap of the **Record** button ▶.
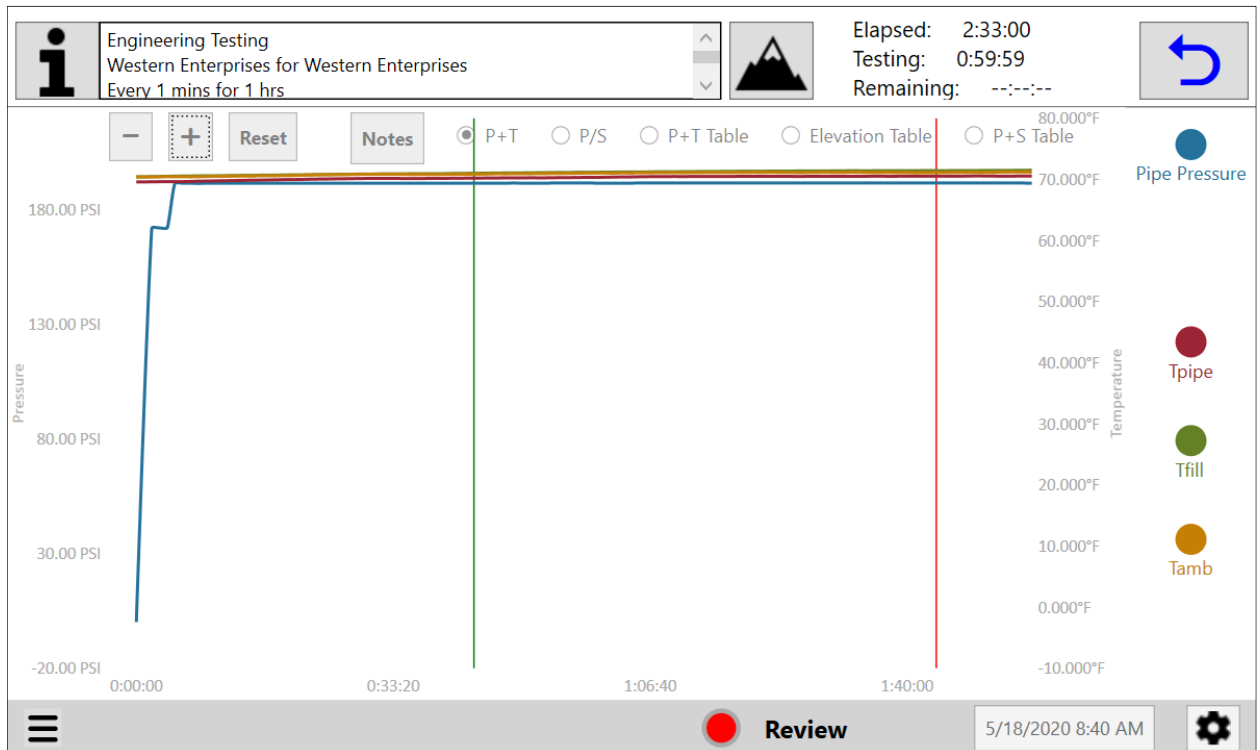
Test information in Review mode

Tap the **Information** button **i** to view the test information pages. View the test specific information in the fields on each page.

- Back Arrow
  - Tap the back arrow button ⬅ to return to the main screen.
- Test Information Pages
  - Tap a tab to enter a page to review test information.
  - Changes to data are locked out in **Review** mode.
- Units Selection
  - Unit selection is locked out in **Review** mode..

Elevation in Review mode

Tap the **Elevation** button ⛰ on the main screen to view the live pressure calculation on the elevation page. Elevation points may not be added or removed in **Review** mode.

⬅	**Elevation**				
Name	Elev1		Add Location	Remove Location	Remove All
Elevation	0				
Dist To HPT100	0				

	Elev1	Elev2	Elev3	HPT100	Elev4	Elev5
Pressure PSI	327.7	284.4	241.1	191.7	148.0	104.7
Elevation	-100	0	100	214	315	415
Distance	-500	-250	-125	0	250	500

🔴 **Review**   5/18/2020 8:49 AM   ⚙

Tap the **Back Arrow** button ⬅ to return to the main screen.

Pressure Measurement in Review mode

Pressure indicator

The pressure indicator and features are disabled and hidden in **Review** mode.

Temperature Measurement in Review mode

Temperature indicators

The three temperature indicators and features are disabled and hidden in **Review** mode.

Pump Monitoring in Review mode

Stroke Counter indicator

The stroke counter indicator and features are disabled and hidden in **Review** mode.

Data Displays in Review Mode

Pressure & Temperature (P+T) vs. Time graph with controls
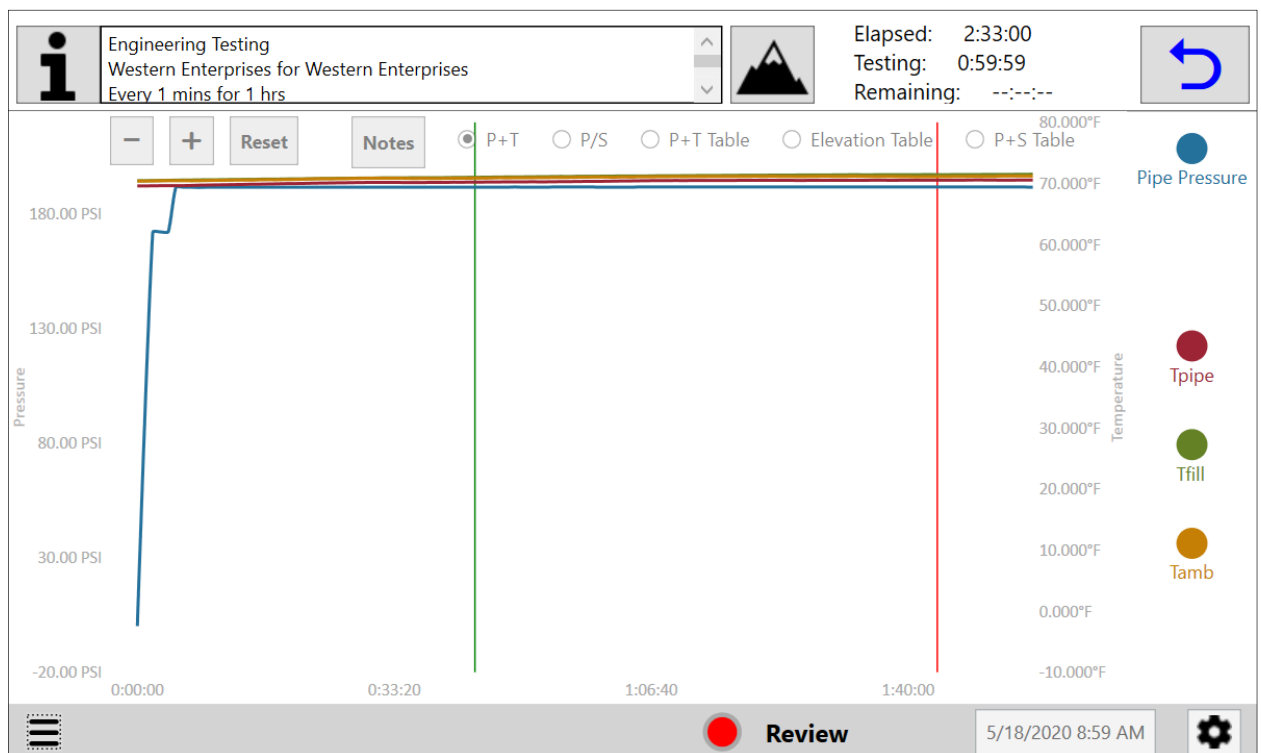
- ▪ Pressure and temperature are displayed against time.
- ▪ Logged data is graphed in review mode.
- ▪ *Visibility controls*
    - • The four visibility controls are the circles on the right side of the graph. They match the colors of the pressure and temperature measurement indicators.
    - • Tap a visibility control to hide or display a measurement line in the graph.
- ▪ Zoom and Reset Controls
    - • Use "-" and "+" controls to zoom out and in.
    - • Reset will automatically resize the graph to its extents.

Pressure vs. Stroke (P/S) graph with controls
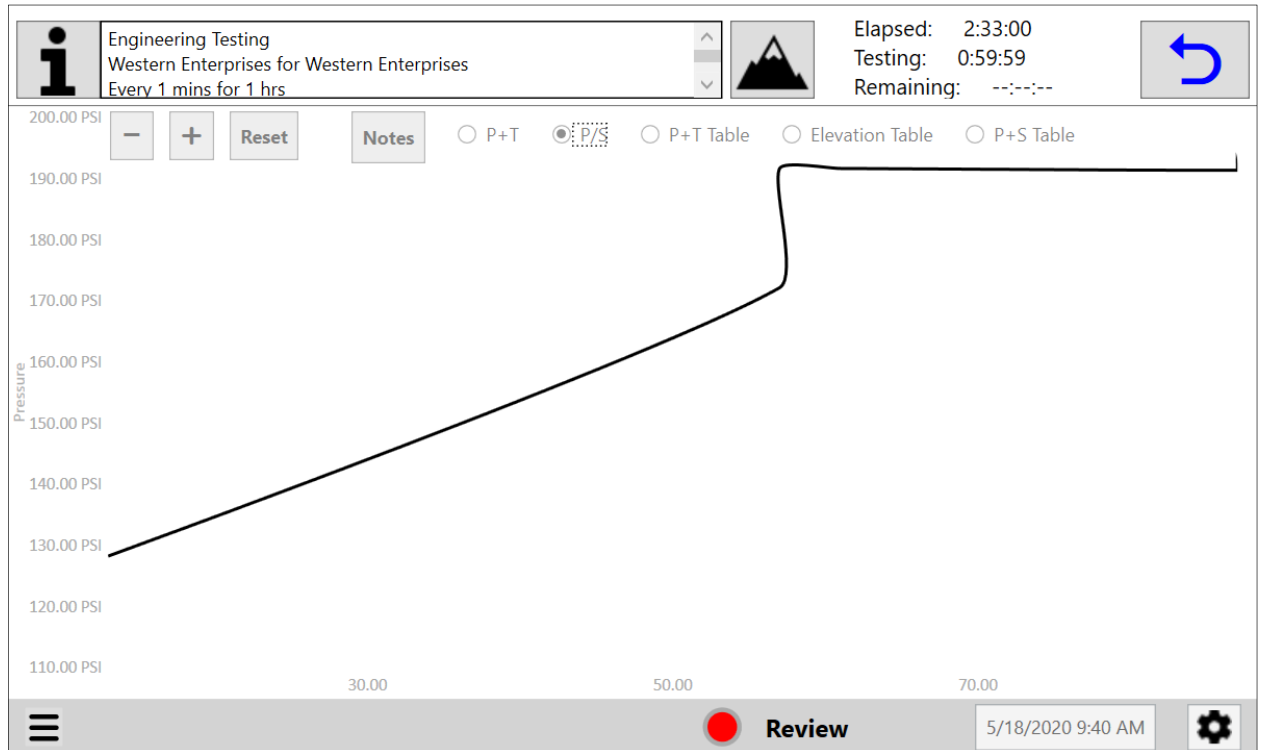
- Pressure is displayed over increase in stroke count.
- Logged data is graphed in review mode
- Zoom and Reset Controls
  - Use "-" and "+" controls to zoom out and in.
  - Reset will automatically resize the graph to its extents.

Pressure & Temperature (P+T) Table

Time	Pipe Pressure	Tpipe	Tfill	Tamb	Stroke Counter
5/14/2020 3:13:26 PM	191.6	69.9	70.67	70.57	57
5/14/2020 3:14:26 PM	191.6	69.93	70.69	70.6	61
5/14/2020 3:15:26 PM	191.6	69.95	70.71	70.61	61
5/14/2020 3:16:26 PM	191.6	69.96	70.71	70.64	61
5/14/2020 3:17:26 PM	191.6	69.99	70.73	70.68	87
5/14/2020 3:18:26 PM	191.6	70.01	70.75	70.72	87
5/14/2020 3:19:26 PM	191.6	70.03	70.77	70.73	87
5/14/2020 3:20:24 PM	Note entered				
5/14/2020 3:20:26 PM	191.6	70.05	70.77	70.74	87
5/14/2020 3:21:26 PM	191.6	70.07	70.8	70.75	87
5/14/2020 3:22:26 PM	191.6	70.08	70.8	70.76	87
5/14/2020 3:23:26 PM	191.6	70.1	70.82	70.79	87
5/14/2020 3:24:26 PM	191.6	70.12	70.84	70.81	87
5/14/2020 3:25:26 PM	191.6	70.14	70.83	70.82	87
5/14/2020 3:26:26 PM	191.6	70.14	70.86	70.81	87
5/14/2020 3:27:26 PM	191.6	70.14	70.88	70.83	87

Engineering Testing
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Every 1 mins for 1 hrs

Elapsed: 2:33:00
Testing: 0:59:59
Remaining: --:--:--

Notes ○ P+T ○ P/S ◉ P+T Table ○ Elevation Table ○ P+S Table

Review   5/18/2020 9:42 AM

- Logged pressure, temperature, and stroke counter data are displayed with time stamps.
- Notes are displayed with time stamps.
- Use the scroll bar to move the viewing area up or down to review the data.

Elevation Table

Time	Elev1	Elev2	Elev3	HPT100	Elev4	Elev5
5/14/2020 3:36:26 PM	327.56	284.26	240.96	191.60	147.87	104.57
5/14/2020 3:37:26 PM	327.56	284.26	240.96	191.60	147.87	104.57
5/14/2020 3:38:26 PM	327.56	284.26	240.96	191.60	147.87	104.57
5/14/2020 3:39:14 PM	Stopwatch started					
5/14/2020 3:39:26 PM	327.56	284.26	240.96	191.60	147.87	104.57
5/14/2020 3:40:26 PM	327.56	284.26	240.96	191.60	147.87	104.57
5/14/2020 3:41:26 PM	327.56	284.26	240.96	191.60	147.87	104.57
5/14/2020 3:42:26 PM	327.56	284.26	240.96	191.60	147.87	104.57
5/14/2020 3:43:26 PM	327.56	284.26	240.96	191.60	147.87	104.57
5/14/2020 3:44:26 PM	327.66	284.36	241.06	191.70	147.97	104.67
5/14/2020 3:45:26 PM	327.56	284.26	240.96	191.60	147.87	104.57
5/14/2020 3:46:26 PM	327.56	284.26	240.96	191.60	147.87	104.57
5/14/2020 3:47:26 PM	327.56	284.26	240.96	191.60	147.87	104.57
5/14/2020 3:48:26 PM	327.56	284.26	240.96	191.60	147.87	104.57
5/14/2020 3:49:26 PM	327.66	284.36	241.06	191.70	147.97	104.67
5/14/2020 3:50:26 PM	327.66	284.36	241.06	191.70	147.97	104.67

Engineering Testing
Western Enterprises for Western Enterprises
Every 1 mins for 1 hrs

Elapsed: 2:33:00
Testing: 0:59:59
Remaining: --:--:--

Notes   ○ P+T   ○ P/S   ○ P+T Table   ◉ Elevation Table   ○ P+S Table

Review   5/18/2020 9:43 AM

- ▪ Logged elevation pressure data are displayed with time stamps.
- ▪ Notes are displayed with time stamps.
- ▪ Use the scroll bar to move the viewing area up or down to review the data.

Pressure & Stroke (P+S) Table
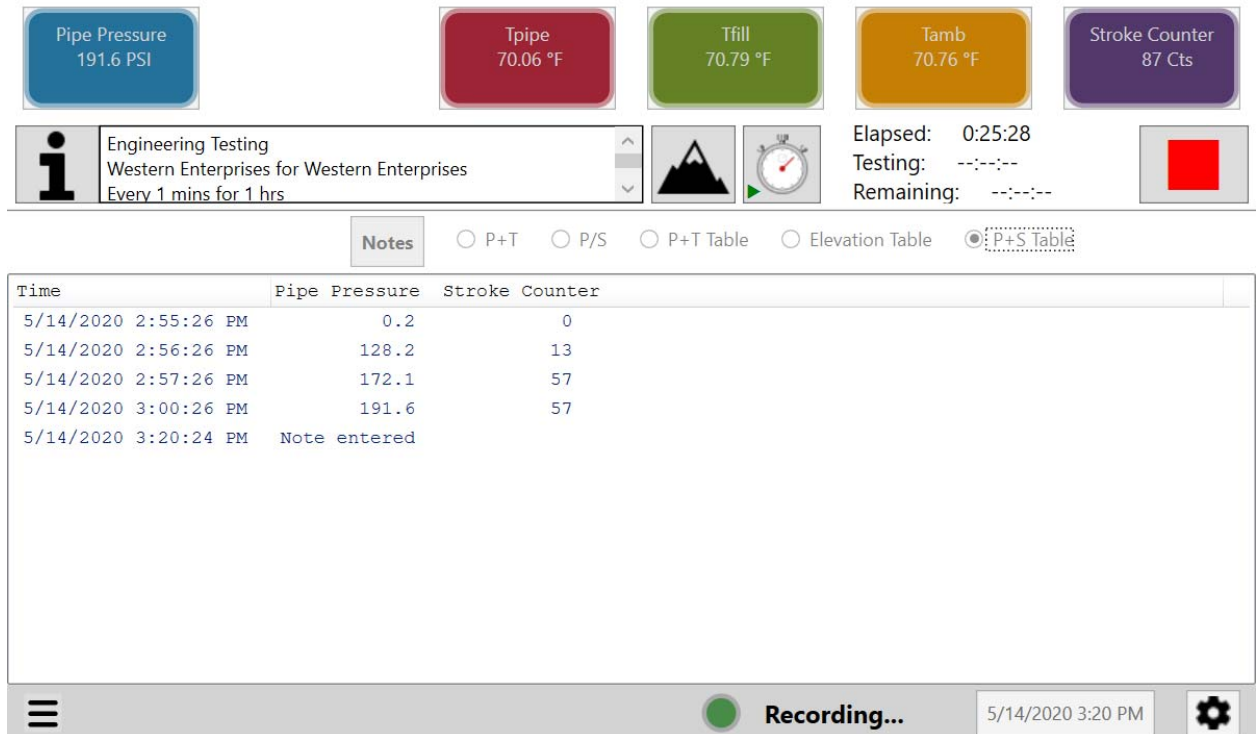
- Logged Pressure and Stroke counter data are displayed with time stamps.
- Notes are displayed with time stamps.
- Use the scroll bar to move the viewing area up or down to review the data (not shown).

Notes in Review mode

Press the note button [Notes] to review all notes added while in **Review** mode.

Return Button in Review mode

Return button

When you tap the **Return** button, the screen returns to the *Setup* screen and the ***Record*** button appears.
- The test information boxes can be edited.
- The graphs reset and start to display live data.
- The data in the tables are cleared

Application update rates

Graph update rates
- ▪ In **Setup** and **Test** modes, the graphs are updates once every **one second**.

Table update rates
- ▪ In **Setup** mode the tables are not updated.
- ▪ In **Test** mode:
  - • The P+T table is updated at data log sample rate set in *Sample every* on the *Test Parameters* information page.
  - • The Elevation table is updated at data log sample rate set in *Sample every* on the *Test Parameters* information page
  - • The P+S table is updated at data log sample rate set in *Observe every* on the *Pressurization* information page.

Data Logging update rates
- ▪ Data logging update rates are based on the rate you set in the *Sample every* field in the *Test Parameters* information page.
  - • Maximum rate is 1 sample every 1 minute
  - • Minimum rate is 1 sample every 60 minutes
- ▪ Stroke counter Data logging update rates are based on the rate you set in the *Observe every* field in the *Pressurization* information page.
  - • Maximum rate is 1 sample every change in 1 unit of measure
  - • Minimum rate is 1 sample every change in 100 units of measure
- ▪ Data logging starts when you tap the ***Record*** ▶ button.
- ▪ Data logging stops when you tap the ***Stop*** ■ button.

Settings

- ▪ Tap the **Settings** button ⚙ to enter the settings window where you can delete logs, view system information, calibrate the touch screen, and update the firmware and application from a USB drive.
- ▪ Tap the **Settings** button ⚙ again to return to the **Setup** screen.
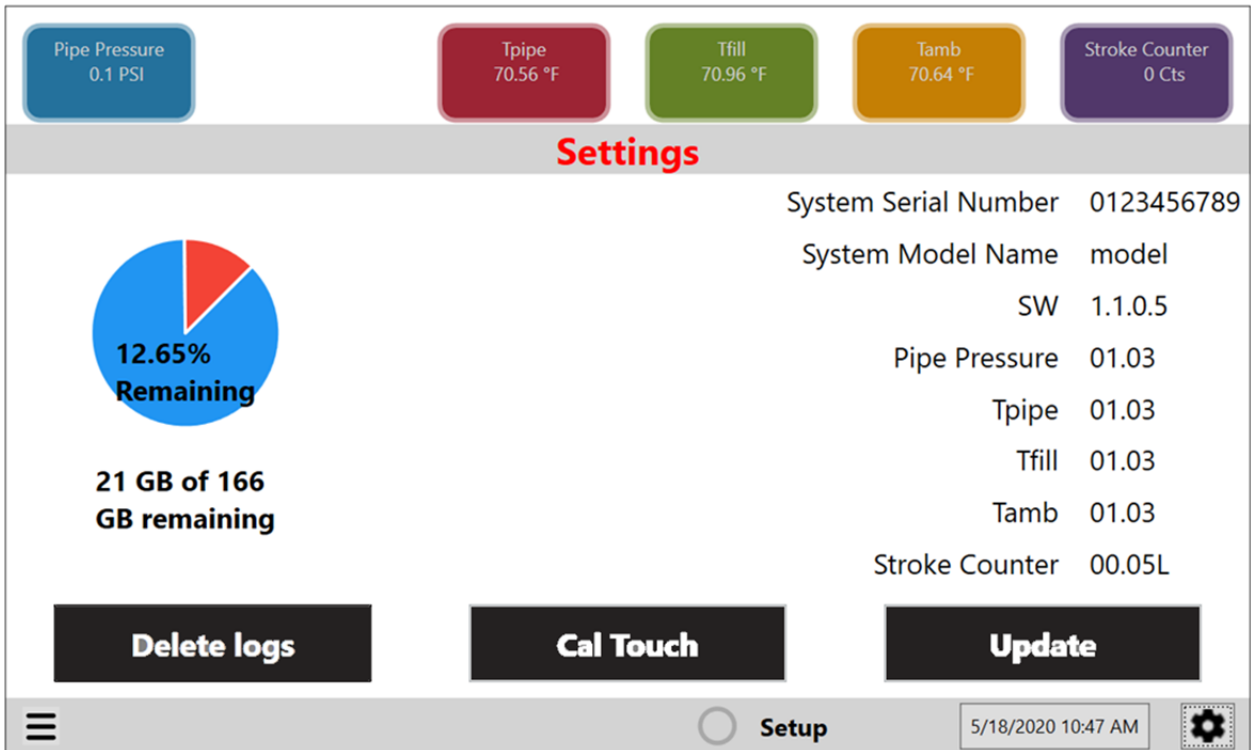
Storage status
- ▪ A pie chart with the percentage displays the remaining storage space.

Delete logs
- ▪ ***Delete logs*** button.
- ▪ Select one or all files to delete them.
- ▪ Press **Done** when finished
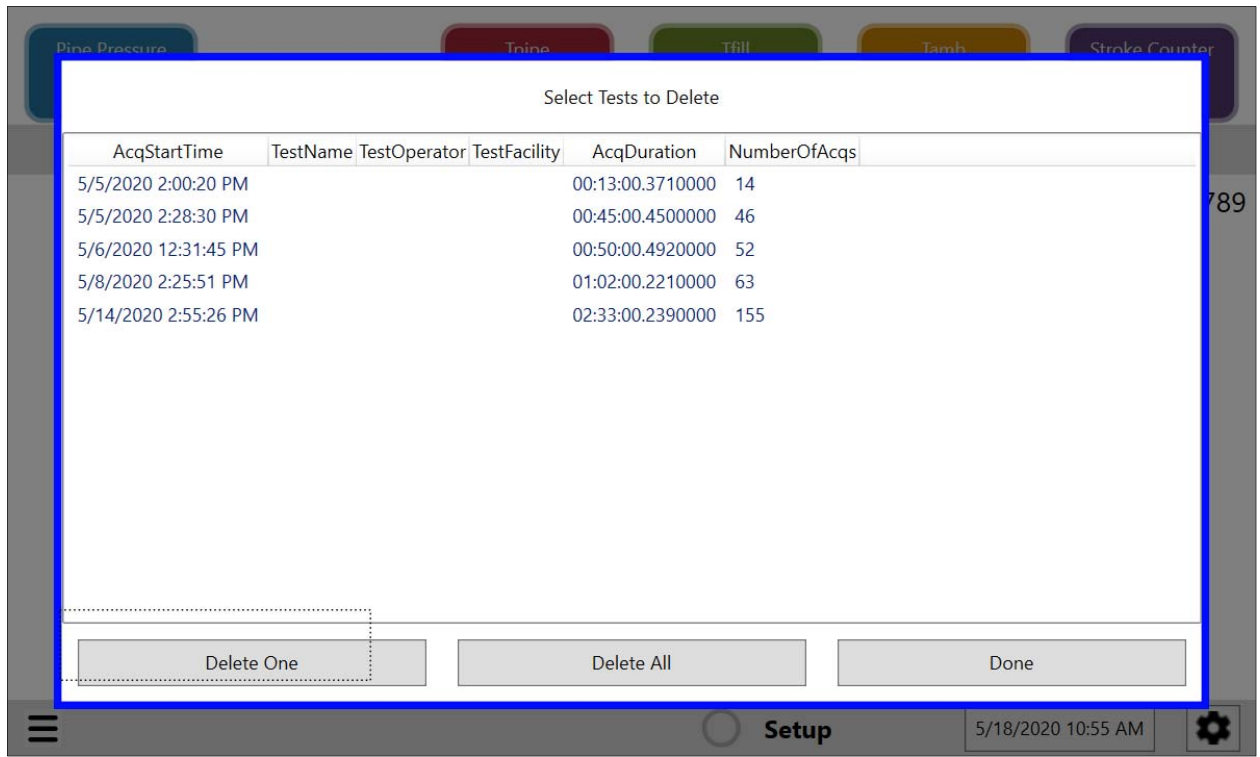
Update
- ▪ When available, download an update from www.meriam.com and copy it to a USB drive
- ▪ Plug the USB drive into the USB port to update the Hydro/Pneumatic Tester. This button is only active when a USB drive loaded with a valid software update is plugged in.
- ▪ Click the **Update** button to update the HPT100.

Calibrate Touch Screen (Cal Touch)
- ▪ Tap the **Cal Touch** button to perform a calibration of the computers touch screen.
- ▪ Follow the on screen prompts to touch and hold the target points for calibration.

System Information
- ▪ HPT100 serial number
- ▪ HPT model name
- ▪ Device application revision.
- ▪ Sensor names and firmware revisions.

Menu button

The **Menu** button ▤ provides you with these options:

- **Open prior test**
- **Transfer files**
- **Power off**
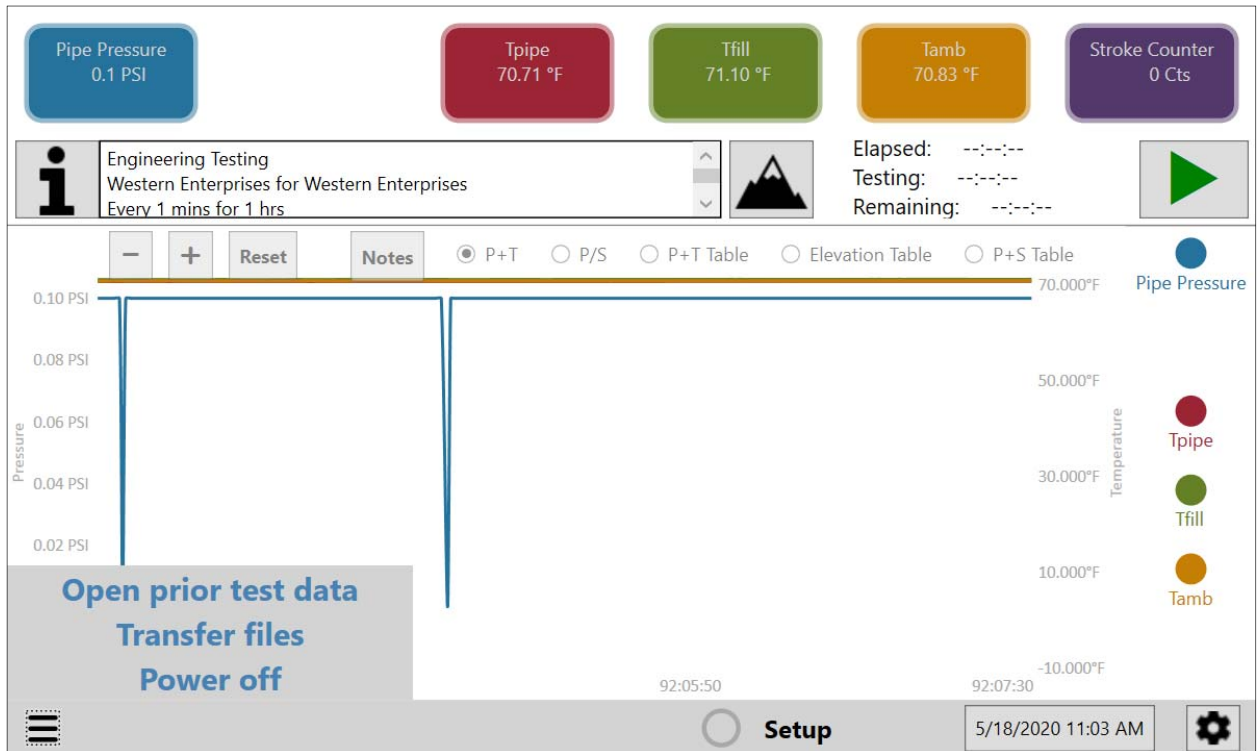
Open prior test data
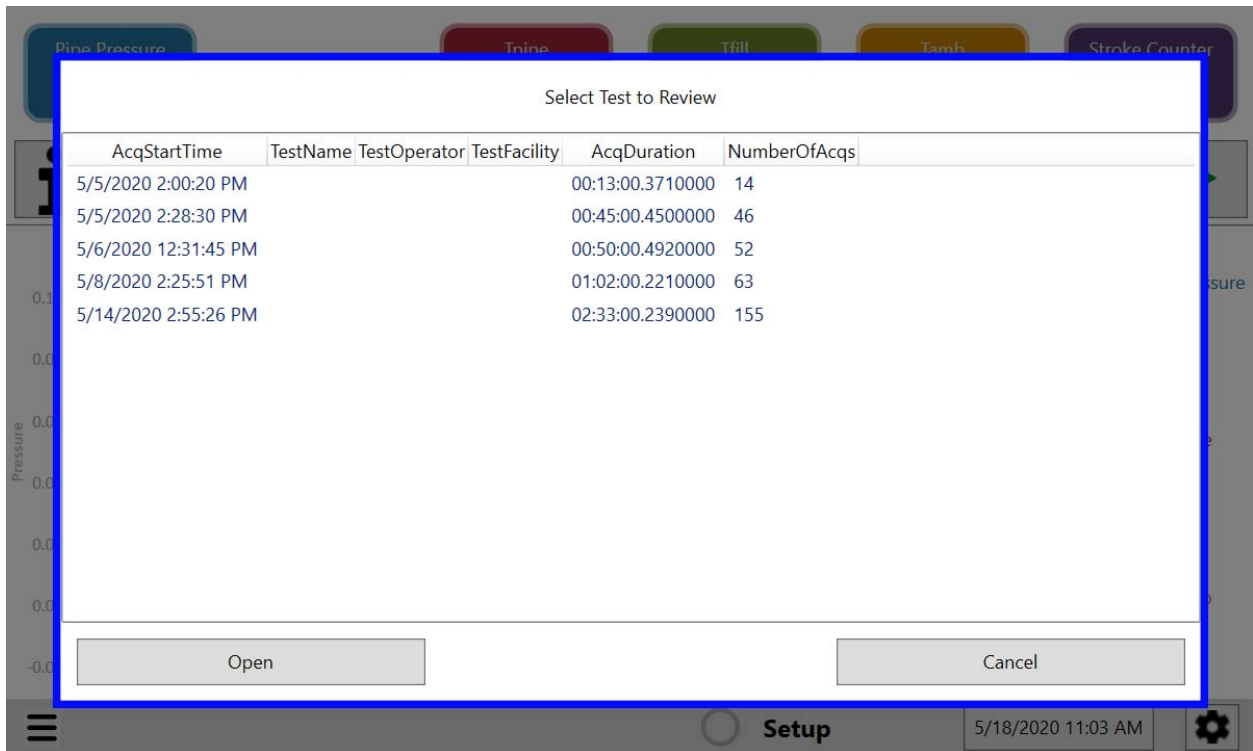
- ▪ Select any prior test file to display its data in the graph or table.
- ▪ **Open** button.
- ▪ Only available in "**Setup**" or "**Review**" mode, not available while recording data.

Transfer files
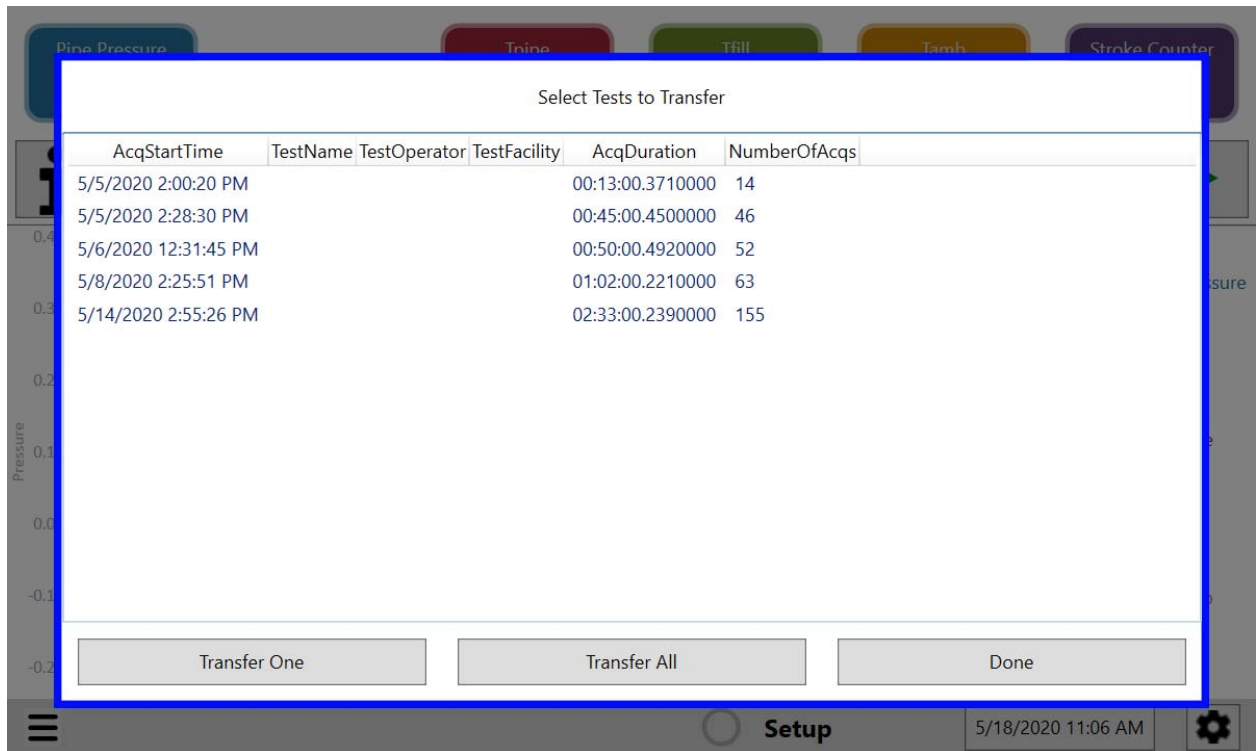
- ▪ Insert a USB stick into one of the USB ports on the side of the Hydro/Pneumatic Tester
- ▪ Select the file to transfer and tap the **Transfer One** button to transfer one file to the USB drive.
- ▪ Tap the **Transfer All** button to transfer all files to a USB drive.
- ▪ Log report names appear as duplicates. One file is TSV format and the other is PDF format.
- ▪ The folder name is **"HPT".**
- ▪ Only available in "**Setup**" mode, not available while recording data.

> **NOTICE** *You can't transfer files from USB drive to the Hard disk and you can't copy files on the hard disk.*

Power Off

NOTICE

Don't unplug the power cord while the application is running.

- Tap **Power off** from the **Menu** button ≡.
- After the computer turns off, unplug the power cord.
- Only available in "**Setup**" mode, not available while recording data.

*Note: Pressing the **Power** button and holding it for four seconds, shuts down the device.*

Power button
The power button is located on the front panel. The Meriam logo is on the left and the **Power** button is on the right.

Specifications

Power Requirements

Wall adaptor
- Input: 100 V ac to 240 V ac, 1.6 A, 50/60 Hz.
- Output: 12 V dc @ 9 A with 4 Pin Mini Din plug.

Battery Charger
- Input: 100 V ac to 240 V ac, 1.5 A, 50/60 Hz.
- Output: 13.8 V dc @ 5 A

Battery
- Sealed Lead Acid
- 12 V dc, 18 Ah

Hydro/Pneumatic Tester device
- Input: 12 V dc to 24 V dc @ 3 A maximum with 4 Pin Mini Din port.

Pressure measurement

Pressure sensor limits

⚠ **WARNING**

- Compound Isolated (CI) sensor
- Minimum rated pressure: -14.5 psi.
- Maximum rated pressure: 3000 psi gauge.
- Full Scale calibrated range = 110 % of range.
- Don't exceed the sensor limit of -14.5 psi to 3300 psi.

Pressure sensor accuracy
- ± (0.02 % of Full Scale + 0.005 % of Reading) total error band from –20 °C to 40 °C ambient.

Pressure sensor type
- The compound isolated type of pressure sensor can be used with gases and liquids compatible with 316LSS.
- 1/8 in. female NPT, 316LSS connection.

Temperature measurement

RTD temperature probe
- PT100 Class A, 4-Wire Platinum RTD Elements per IEC 60751 Standard.
- 100 Ω at 0 °C, 0.00385 TCR (alpha).
- Functional sensor measurement limits: -50 °C to 250 °C (-58 °F to 482 °F).

Temperature sensor and probe accuracy

- ± (0.15 + 0.002 |t|) °C total error band from -20 °C to 40 °C. ambient.
- End to end probe inclusive.

    Note: End to end probe inclusive accuracy only applies when using our recommended Class A PT100 RTD probe or your own vendor equivalent.

Environmental range

Operate and store this device in climate controlled facilities.

- Operating: 32 °F to 104 °F (0 °C to 40 °C)
- Storage: -4 °F to 140 °F (-20 °C to 60 °C)

Display

- 10.2 in. diagonal touchscreen with resistive touch
- 800 × 480 pixels

Materials

- Enclosure: Aluminum.
- End caps: PC + ABS
- Soft case: Nylon.
- Sensor manifolds: Stainless steel 316L.

Certifications

- NIST traceable certificates for pressure and temperature modules.

Dimensions

- External dimensions: Length × Width × Depth: 32.5 cm × 26.4 cm × 11.7 cm (12.8 in × 10.4 in × 4.6 in).

Weight

- Device: 9.0 lb.
- Device in soft case: 15.0 lb.
- Hard case weight (including device & accessories): 90 lbs.

Warm up time

- 5 minutes

Maintenance and cleaning

Don't void your warranty

NOTICE

Don't attempt to repair the Hydro/Pneumatic Tester or the warranty is void.

Cleaning

- ▪ Turn off the device and unplug the power cord before cleaning.
- ▪ Clean the device once a month using a damp, lint-free cloth—water or isopropyl alcohol only.

Recommended maintenance

- ▪ Western Enterprises recommends that you return the Hydro/Pneumatic Tester once a year for calibration.
- ▪ The device displays the last calibration date on-screen when you click a sensor's indicator.

Prepare for storage

- ▪ The recommended storage temperature is between: -20 °C to 60 °C (32 °F to 140 °F).

Recycling compliance

Dispose of the Hydro/Pneumatic Tester by following the applicable electronic recycling guidelines in your area.

Replacement Parts

Please contact customer service for replacement parts.

Kits & Assemblies	
ZHPT-KIT	HYDRO/PNEUMATIC TESTER KIT
ZHPT-100	HYDRO/PNEUMATIC TESTER
ZHPT-BATTERY	HYDRO TESTER BATTERY w/CABLES
ZHPT-TERMINAL	HYDRO TESTER TERMINAL KIT
Z9A1713-1	STROKE COUNTER CABLES ON REEL
Z9A1713-2	RTD CABLES ON REEL
Z9A1713-3	PRESSURE HOSE ON REEL

Accessories	
TLW-46BB-1	BLACK TILT LEG SET
Z9P1960	HARD CASE w/FOAM
Z9P1932	SOFT CASE
Z9P1931	WIRELESS KEYBOARD&MOUSE COMBO
HPT-01M	STROKE COUNTER FLY LEAD 40"
HPT-FP-03MA	M12 ARMORED CABLE 9'
HPT-FP-45M	M12 CABLE 150'
Z9P521	PROBE-RTD SENSOR
Z9P522	PRESSURE HOSE 5000 PSI, 150'
Z9P562	HOSE REEL
Z9P495	ADAPTER QT-1/4"NPT X MALE QTEST
Z9P525	ADAPTER QT-1/8"NPT X MALE QTEST
Z9P1956	12 V SEALED LEAD ACID BATTERY
Z9P1957	BATTERY CHARGER
Z9P1958	BATTERY POWER CABLE
Z9P1927	FIXED PLUG US WALL ADAPTOR
Z9P1927-1	4 PIN MINI DIN PWRSUPPLY BRICK

Troubleshooting

Temperature measurements display ??????

The RTDs are not properly connected.
1. Check the connections of the RTD cable on the panel and on the RTD.
2. If the connections are good, then swap the cable at the port.

Did the "??????" follow the cable?
Yes - the port is ok.
No - the port is the problem not the cable. If **yes**, then swap

the cable at the probe.

Did the "??????" follow the cable?
Yes - the cable is the problem.
No - the probe is the problem.

No measurements in the graph

Pressure and temperature measurements don't appear in the graph.
1. The visibility controls may be turned off. Tap them to see if they turn on.
2. The networked sensors may have locked up.
3. Turn the Hydro/Pneumatic Tester off.
4. Wait 1 minute.
5. Turn the Hydro/Pneumatic Tester on.

The application didn't start automatically

1. Press and hold the power button to turn the device off.
2. Tap the power button to turn the device on.

The battery loses charge

1. It is normal for the HPT100 to draw power even when turned off. Always unplug the cord from the unit when not in use.

Help

Register your product

We want you to get the most out of your purchase, and that starts with a few, easy registration steps.

1. Go to www.meriam.com
2. **In the Product Registration section, Register a product.**

Find downloads and documents

1. Go to www.meriam.com.
2. In the **Technical Resources** section, **Learn More**.
3. Select one of these categories to find the files you need:
   Product manuals | *User Manuals and Quick Start Guides*
   Downloads | *Applications (software), firmware, updates, installation instructions*
   Certifications | *Certifications and approvals*
   SDS (MSDS) | *Safety Data Sheets*

Returning for repair or calibration

If the device cannot be zeroed, calibrated, or is damaged, it must be returned to the factory for servicing.

First — Request a number

In the event that a device requires service and must be returned, please contact Western Enterprises using one of the methods listed in the following table to request a Return Material Authorization (RMA) number.

Method	Provide the following information
Website	http://www.meriam.com/resources/service-repair- authorization/ Complete the information online and submit the form.
Fax	If you printed and completed the Service & Repair Authorization form, then fax it to: US and International Customers **+ 1 216 281 0228**
Email	We need the following information in the email: • Look on the product label to find the model number & the serial number. • Give a brief description of the problem. • Send the e-mail to: returnforms@WesternEnterprises.com

Return Material Authorization

- Do not send any unit for repair unless you contacted Western / Scott Fetzer Co. for a Return Material Authorization (RMA) number.
- Important: If you have not received this number and have not clearly marked it on the package being shipped back, we will return the unit at your expense.
- The Western Service & Repair Department will provide you with this number when you complete the website form, fax or e-mail your information.
- An RMA number must accompany all incoming packages to insure proper tracking, processing, and repair work.

Questions? Call Western Enterprises

US Customers........................ (800) 817-7849
International Customers .... + 1 216 281 1100

Ship the box to

Western Enterprises 10920 Madison Avenue Cleveland Ohio
44102 USA

Western Contact Information

Meriam brought to you by Western Enterprises

Address

Western Enterprises
875 Bassett Rd.
Westlake, Ohio 44145 USA

Telephone

US customers   (800) 817-7849
International customers   + 1 216 281 1100

Fax

US and International customers   + 1 216 281 0228

E-mail addresses

Return Material Authorization and Service and Repair
Department
returnforms@WesternEnterprises.com

Websites

WesternEnterprises.com
Meriam.com

Find a local Meriam representative

Use this map to help you find a Meriam representative.
▪ http://www.meriam.com/representatives-map/