



10920 Madison Ave
Cleveland | Ohio | 44102 | USA
+ 1 216 281 1100
www.Meriam.com
(800) 817-7849

A trusted leader in measurement
and calibration solutions.

User Manual

The PIT5000: Pipeline Integrity Tester

A Pipeline Hydrostatic Testing Device



Introductory information

Notification Statements

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Notification Statements (continued)

NOTICE

voids the computer warranty

The computer that we have supplied is intended solely for the support of the PIT5000 application.

Using the computer for any other purpose voids the warranty and may impair its operation or performance.

Patent and trademark information

Patent statement

Meriam has patented the PIT5000:

Patent 8,935,106 USA.

Patent 2,756,486 Canada.

Trademark statements

All other trademarks are the property of their respective owners.

Safety Information



Preventing injury

Failure to follow all instructions could result in injury:

- Read the User Manual.
- Understand it.
- Follow all safety warnings and instructions provided with this product.
- Follow your employer's safety practices.

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

Safety Symbols	Explaining the symbols
	This is the Read Instruction Manual symbol. This symbol indicates that you must read the instruction manual.
	Indicates a potentially hazardous situation which, if not avoided, will result in death or serious injury.
	Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
	Indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury.
	Indicates information essential for proper product installation, operation or maintenance.

For your safety



Fire and/or explosion hazard

- Never use the PIT5000 in hazardous areas. This instrument is not intrinsically safe.
- Do not remove the **Control Panel** of the PIT5000. There are no customer serviceable components inside.



Power connections: DC and AC

- The PIT5000 input voltage should be in the range from 10.5 DC to 15.0 DC (12 V nominal).
- Do not apply any input voltage outside this range.
- A 12 V automotive style battery or the AC charger Meriam supplies are recommended.



Pressure limits and power issues

- Do not exceed the pressure limit listed in the [Specifications](#) of this manual.
- Failure to operate within the specified pressure limit could result in death or serious injury.
- Do not attempt to connect auxiliary equipment to the PIT5000 power source.



Hazardous voltage inside.

Risk of electric shock or burn.

The control panel should only be removed by authorized electrical technicians.

Protect the PIT5000



Protect the PIT5000

- The PIT5000 is water resistant only when the case lid is closed and fully latched.
- Protect the PIT5000 from water or liquid spills and from weather when the case lid is open for inspection or use.



Do not substitute parts

- Substitution of components may impair operation and safety.

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Meriam Contact Information

Meriam		
Address	Meriam 10920 Madison Avenue Cleveland Ohio 44102 USA	
Telephone	US customers:	(800) 817-7849
	International customers:	+ 1 216 281 1100
Fax	US customers:	+ 1 216 281 0228
	International customers:	+ 1 216 281 0228
E-mail addresses	Departments	E-mail addresses
	Return Material Authorization / Service & Repair Department	returnforms@meriam.com
	Sales	sales@meriam.com
Website	www.Meriam.com	
Local Meriam Representatives		
Find a local Meriam representative	• Use this link to help you find Meriam representative on this world map: REP LOCATOR. • Or, you may use this full website address to go to the same location: http://www.meriam.com/representatives-map/	

Glossary

Words and phrases	Definitions
12 V car adapter cable	Also known as a cigarette lighter adapter. This is an optional cable with DC-to-DC sockets.
Autoscale Graph	- The Autoscale function automatically rescales the axes of the currently selected graph based on the data it receives. - By default, autoscaling is always on.
Button or key	- A button always refers to an area on the screen that you can click to select functionality. - A key always refers to hardware push buttons on the keyboard that you can press.
Control Panel	The Control Panel is located in the bottom of the carrying case. It has the keyboard and these labeled areas: Power, Computer, and Measure.
Data Panel	The Data Panel displays in the PIT5000 application on the right side in all tabs. The panel displays different information including flashing red alarms and the following four buttons: Start Program , Begin Test , End Test , and Add Notes .
Digital Counter	A digital I/O device that provides 5 volts to the stroke counter and converts the stroke count to a digital signal to the computer via USB.
Dry contact set	The contacts in a <i>Dry contact set</i> do not have electrical power on them. The dry contacts are for the (non-supplied) pump stroke counter.
Edit box	Edit boxes (also known as fields) are for you to enter your data.
M12 connectors (M & F)	
Male NPT	NPT is an abbreviation of National Pipe Thread (Tapered). This is a standard male tapered pipe thread.
PIT5000	PIT is an acronym for <i>Pipeline Integrity Tester</i> .
P Leak Pressure	P Leak Pressure refers to <i>Preliminary Leak Test Pressure</i> . Some customers perform a 15-minute leak test before going to higher pressures.
Pressure Pipe	You may see different ways of expressing these concepts in printed material, on the PIT5000, and in the software. The most common are: - Press - P Leak and PLeak - PTest

Words and phrases	Definitions
PTest Instrument Pressure	• <i>PTest</i> is an abbreviation of the words <i>Pressure Test</i>. • <i>Instrument Pressure</i> refers to the pressure of the PIT5000 device.
Quick-test connection	The Quick-test connection is located on the Control Panel in the Measure pane.
RTD	RTD is an abbreviation of <i>Resistance Temperature Detectors</i> .
Strip Chart	Strip Chart is a tab in the PIT5000 application that displays a live plot of pipe pressure (Press), ambient temperature (T-Amb) and pipe temperature (T-Pipe) versus time in order to record the hydrostatic test and its duration.
Stroke Count versus Stroke Counter	• Stroke Count refers to number of recorded pump strokes. • Stroke Counter refers to the digital counter that records pump strokes. It is connected to the pump using the Stroke Counter cable.
Temperature Ambient	You may see different ways of expressing these concepts in printed material, on the PIT5000, and in the software. The most common are: • Tambient • T ambient • T-Amb • T Amb • Ambient Temp
Temperature Pipeline	You may see different ways of expressing these concepts in printed material, on the PIT5000, and in the software. The most common are: • Pipeline Temp • Pipe Temperature • Pipe temp • T • T-Pipe or T-pipe • T Pipe • T_{pipe}
V dc	Volts direct current.
V ac	Volts alternating current.

Receiving, unpacking, and setting up the PIT5000

Receiving and unpacking

Receiving the PIT5000

The PIT5000 may be shipped in multiple cartons. Review the packing list to confirm that you received all components.



Unpacking the PIT5000

Use caution when transporting the PIT5000 to prevent personal injury and damage to the equipment.

Don't lose any of the components

- Unpack the PIT5000 cartons.
- Take care not to lose any of the components.

Most components are relatively large.

However, **a small 316SS adaptor fitting** is included.

Gear Kit

The Gear Kit weighs 32 lbs. and includes these items:

- One (1) Pressure 150 ft. hose assembly.
- Two (2) 150 ft. cables with mating M12 connectors.
- One (1) Stroke Counter 150 ft. cable assembly.
- One (1) 12 V locking cable 25 ft. with ring terminals
- One (1) Battery Charger assembly.
- Two (2) RTD Probes.
- One (1) Quick-test × 1/4 inch Male NPT fitting.

Hardware

Recommended power connections with the PIT5000

Note: All batteries are 12 V dc.

Note: Never use the vehicle battery unless the engine is running and the alternator is working.

Battery to PIT5000



Charger to battery to PIT5000



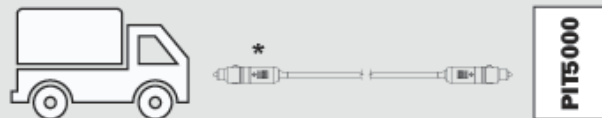
Vehicle to battery to PIT5000



Charger to PIT5000

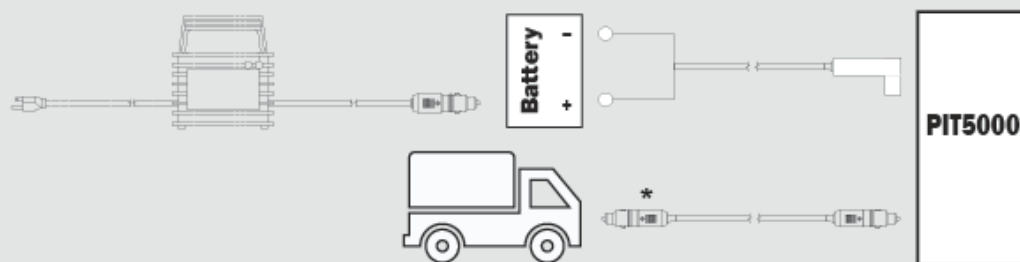


Vehicle to PIT5000



Unacceptable power connections with the PIT5000

Charger to battery and vehicle to PIT5000

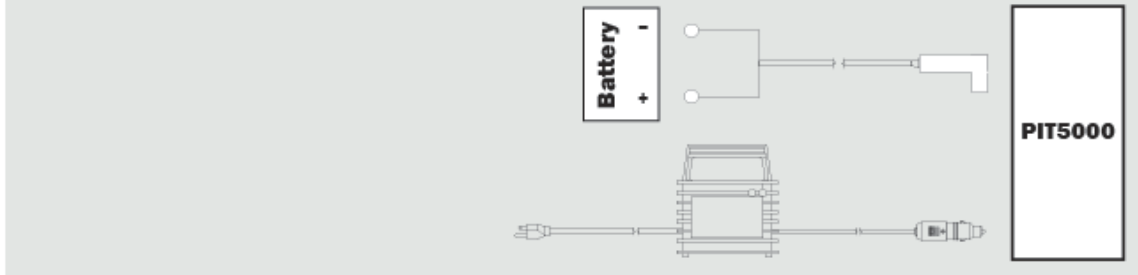


Temporary power connections with the PIT5000

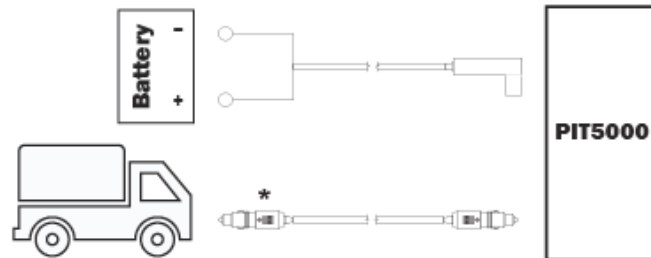
Note: Only recommended briefly while you switch power sources.

Note: Never use the vehicle battery unless the engine is running and the alternator is working.

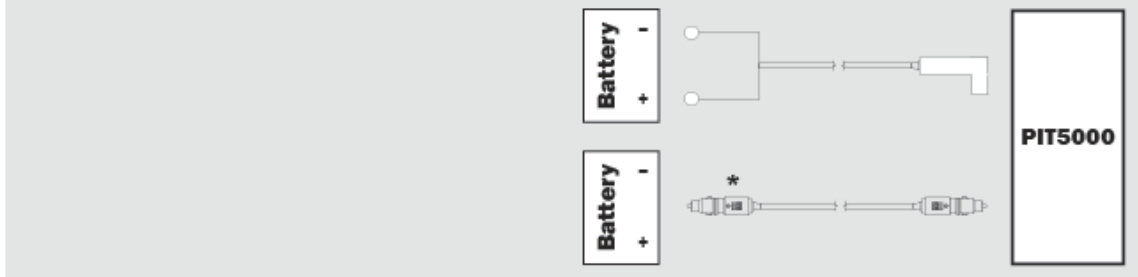
Battery and Charger to PIT5000 (two simultaneous connections)



Battery and Vehicle to PIT5000 (two simultaneous connections)



Battery and battery to PIT5000 (two simultaneous connections)

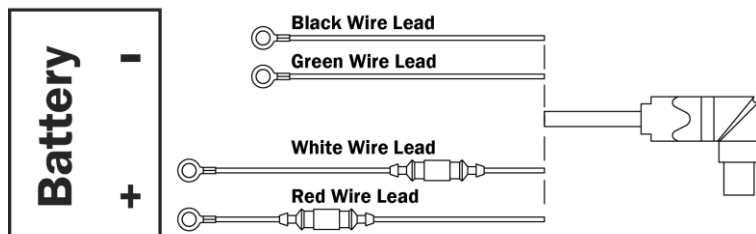


* Optional cable

Connecting the 12 V battery

Four wires to two battery lugs

1. Connect both the **Black** and **Green** wire leads to the **negative** battery terminal.
2. Connect both the **White** and **Red** wire leads to the **positive** battery terminal.



Computer mounting panel

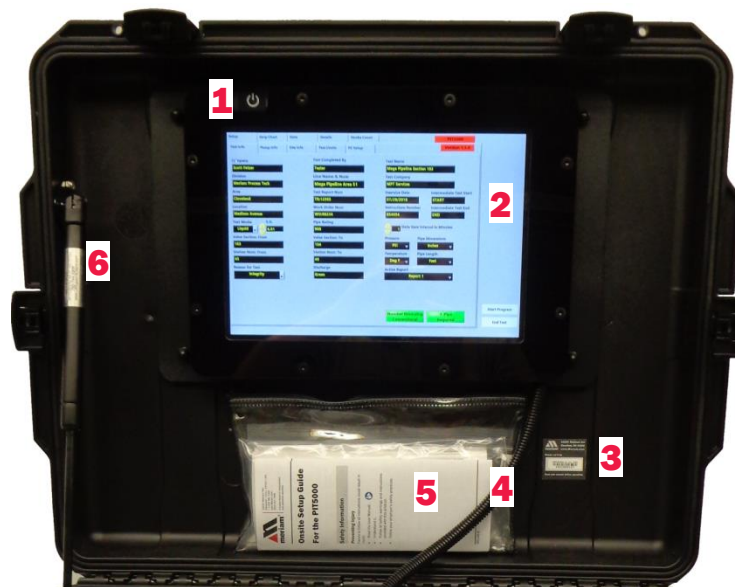
The computer

The computer has the PIT5000 application that collects measurement data and saves test data to its internal hard drive.

Note: The computer has an internal battery but it is normally powered by an external 12 V dc source.

Computer mounting panel

See the table below for a brief overview of the Computer mounting panel.



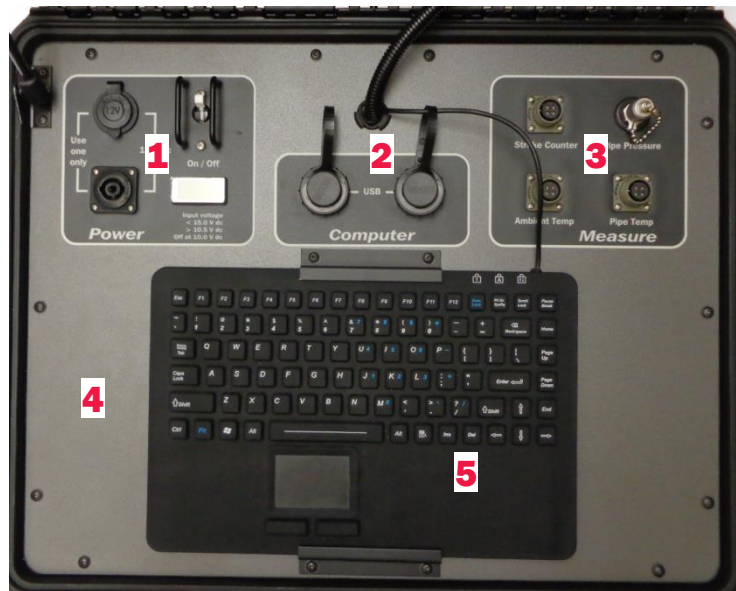
Computer mounting panel description

No.	Item	Description
1.	Power On button ⏻	The On / Off button is behind the Plexiglas panel.
2.	Computer	Windows 10, PIT5000 Application
3.	Nameplate	PIT5000 serial number, Meriam address, power.
4.	Computer power and USB cables	For the computer.
5.	Documentation pouch	Onsite Setup Guide and NIST Certificates.
6.	Lift support	This minimizes the risk caused by an accidental closure. It controls the closure speed.

Control panel

Control Panel

The control panel is divided into the following sections.



Control Panel description

Each of these sections listed in this table have their own figure and table on the following pages.

No.	Item	Description
1.	Power pane	Two power connections, toggle switch, LCD display
2.	Computer pane	Two auxiliary USB ports
3.	Measure pane	Stroke counter connection, connections for pressure and temperature.
4.	Control panel plate	The control panel should only be removed by authorized electrical technicians.
5.	Keyboard	A waterproof and contaminate-proof keyboard and touchpad.

1. Power pane

Power pane

The Power pane has two power connections.



Power pane description



Review the [Recommended and unacceptable connections](#) and the [Temporary connections](#) diagrams before making any power connections.

No.	Item	Description
1.	12 V car adapter	For connecting either the AC to DC charger or the optional DC to DC cable.
2.	Toggle switch	Move switch to turn On / Off.
3.	12 V dc power locking cable	The locking cable is the preferred battery connection. It provides less energy loss.
4.	LCD display	Digital battery voltage indicator. Note: If two batteries are connected using both 12 V dc connections on the Control Panel, then this display averages the voltage. This averaging makes the LCD unreliable.
5.	Input voltage list	It reminds you of three levels: 1. The highest allowable is 15.0 V. 2. An audible alarm sounds when the battery voltage goes below 10.5 V. 3. The PIT5000 shuts off at 10.0 V.

2. Power pane (continued)

Power source

Use the optional DC-to-DC cord (12 V outlet), the AC to DC charger, or the DC-to-DC locking connector cord.

1. Plug the power source into the 12 V dc locking connector or 12 V car adapter.
2. Move the toggle switch to the **On** position.

Note: Fuses provide protection against an electrical short.

AC power and the charger status

- A charger with a 115 V ac 50/60 Hz input cord (US plug) is standard with the PIT5000. You may use the charger to provide power to the PIT5000 or to charge the external battery.

Review the [Recommended and unacceptable connections](#) and the [Temporary connections](#) diagrams before making any power connections.

- The charger monitors the battery voltage while charging and automatically switches to maintenance mode when the battery is fully charged.
- You can monitor the battery condition using the 12 Volt power LCD indicator located on the Control Panel.

DC power

Standard: 12 V locking cable.

Optional: DC cord has a 12 V car adapter on each end.

Note: It can be used to power the PIT5000 anywhere a compatible 12 V dc car adapter is available. This can be especially useful when hydrostatic tests run longer than anticipated and the battery level gets low.

3. Computer pane

Computer pane

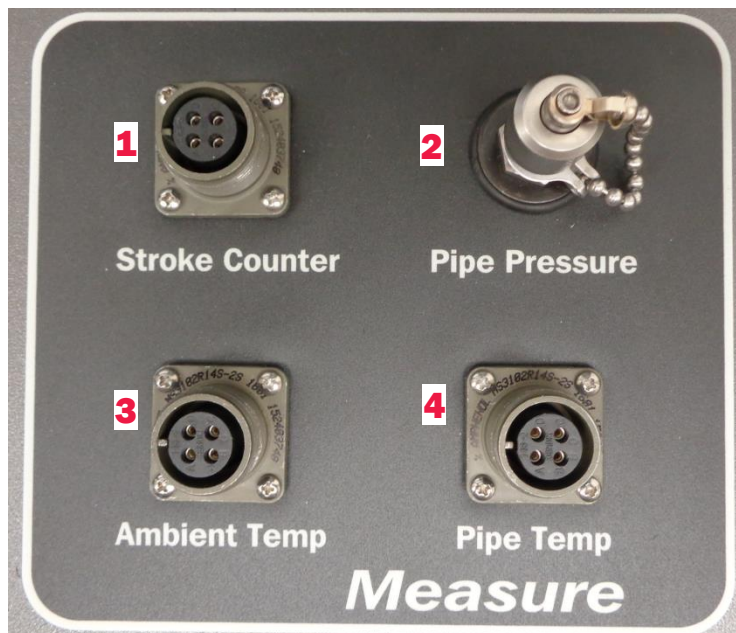
The Computer pane has two USB ports that can be used for any USB device such as a mouse or USB Flash Drive.



4. Measure pane

Measure pane

The Measure pane has four connections. See the next page for more information about these.



4. Measure pane (continued)

1 – **Optional: Connect the Stroke Counter cable to the Measure pane**

- Locate the Stroke Counter cable identified by an M12 connector at one end and spade terminals on the other.
- Connect the Stroke Counter cable to the **Measure** pane's M12 connector labeled **Stroke Counter**.
- Connect the spade terminals to the dry contacts on the pump.

Note: The PIT5000 has a digital counter that is equipped to supply power and count the strokes made by high-pressure, plunger pumps during pressurization of the pipe section under test and the subsequent pressure test.

2 - **Pressure hose**

- Locate the pressure hose and connect one end to the Quick-test connection located on the **Measure** pane.
- One Quick-test × 1/4" Male NPT adapter fitting is included for connecting to the pipe section under test.

3 & 4 - **Connect the RTD cables to the Measure pane**

- Connect one RTD cable to **Ambient Temp**.

Note: The two RTD cables are identified by M12 connectors at both ends.

- **Optional:** Connect the other RTD cable to **Pipe Temp**.

Note: If you do not require the **pipe temperature**, you can clear this measurement from the **Setup > Test Info** sub-tab.

5. Control panel



Control panel plate

The Control panel is a metal plate that has 14 screws around the perimeter to secure it to the carrying case.



Hazardous voltage inside.

Risk of electric shock or burn.

The control panel should only be removed by authorized electrical technicians.



6. Industrial Keyboard

Keyboard

Two brackets hold the keyboard in place: one at the top and one at the bottom. You may slide the keyboard to the right or to the left to use a mouse on either side.

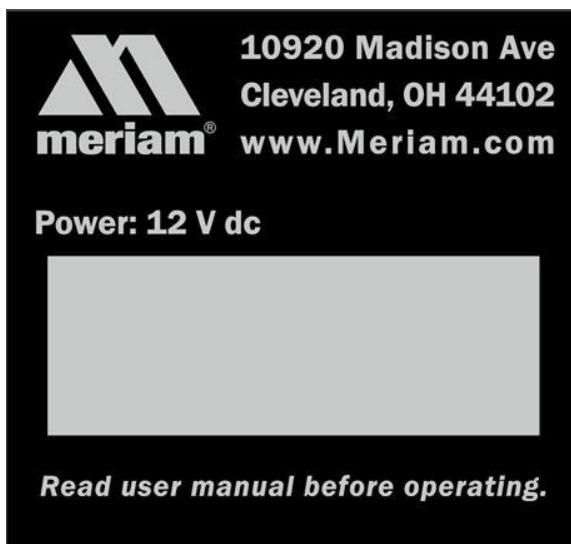
Note: No mouse is included.



7. Serial number label

Serial number label

The serial number label has the Meriam logo, the address, the website, and voltage.



Software

First—check the computer's time

Time impacts data logging and reports

The PIT5000 application uses the computer's time for data logging and in the reports so check the time.

Important: *You cannot change the time zones, only the time.*

One easy step to check the time

1. Press the **Window** key  once on the keyboard to open the Windows' Start Menu and check the time on the right side on the Taskbar.
2. Press the **Window** key once more to hide the Start Menu and Taskbar.
3. If the time is correct, then continue to the section [Second—zero the pressure.](#)
4. If the time is incorrect, continue on the next page.

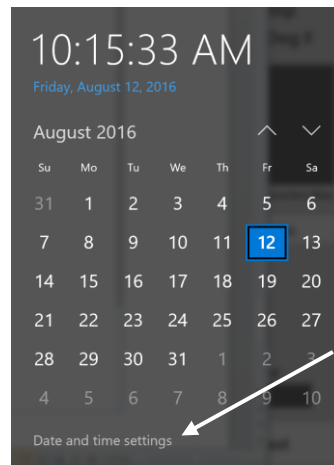
If the time is incorrect

Set the time in Windows 10

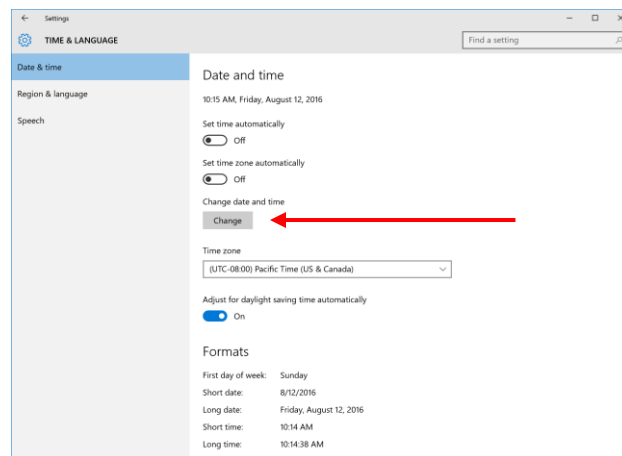
If the current time is incorrect, follow these steps to change it.

1. Click the **End Test** button and click **Yes** in the next window. (The PIT5000 application closes.)
2. Click the time in the right corner of Windows 10 and the following figure appears.
3. Click **Date and time settings** at the bottom.

See the arrow below.



4. Click the **Change** button in the **Time & Language** window. See the arrow below.



5. Click the close button "X" to view the Desktop and restart the PIT5000 application on the Desktop.



Second—zero the pressure

Zero the pressure

1. The PIT5000 pressure measurement should indicate zero at ambient air pressure, that is, current atmospheric pressure with no pressure hose connected.

Note: *Since ambient air pressure depends on altitude and weather, you should use the PIT5000 application to zero for the current conditions.*

2. The **Setup** tab and Test Info sub-tab are the tabs that appear when the PIT5000 application launches.
3. Click the **PC Setup** sub-tab and click the **Zero Pressure** button to zero the pressure measurement.

Flexibility in the PIT5000 application

No required edit boxes to fill-in

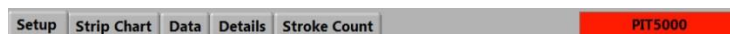
Most edit boxes in the **Setup** sub-tabs display on **Report 1** (the original PIT5000 report) and **Report 2** (the new enhanced report)

Note: *Enter the data your testing requires and consider entering N/A in edit boxes that you do not need. N/A would quickly identify them as not required information on reports.*

The main tabs in the application

Overview

The main tabs provide you with different views of live test readings. The main tabs are on the top row of the PIT5000 application. See the figure below.



Setup tab

The Setup tab has five (5) sub-tabs

Complete the edit boxes in **the Setup sub-tabs** that your testing requires before clicking the **Start Program** button.

The sub-tabs are in the second row under the main tabs. See the figure below.

Setup	Strip Chart	Data	Details	Stroke Count	PIT5000
Test Info	Pump Info	Site Info	Test Limits	PC Setup	Version 1.5.0

Setup tab locked

All editable information in the sub-tabs for **Setup** is locked *after* you click the **Start Program** or **Begin Test** buttons.

Note: The information remains viewable. A small button appears to the right of the main tabs. It has a down-arrow to view the various sub-tabs. See the section called [Locked data](#) for more information.

NOTICE

Test Info sub-tab—Report 1 (the original report)

Test Info sub-tab

Report 1 is the original PIT5000 report. It is the default setting. The **Active Report** drop-down gives you the option to select **Report 2**. This is the new, enhanced report.

See the section for [Report 2—the enhanced report](#).

Test Info figure for Report 1

Report 1 is the default report.

Change engineering units in Test Info

Select the engineering units for **Pressure**, **Temp**, and **Length** from the drop-down menus. The PIT5000 application uses the units you select to record and plot data. After you click the **Start Program** button, the selected units become active.

Pressure	psi, kg/cm ² , kPa, bar
Temperature	deg F, deg C
Length	feet, meters
Stroke Volume	gallons, liters

Test Info sub-tab—Report 1 (continued)

T-Pipe Required button

Some users may not require the pipe temperature to be plotted or recorded during the test. You may turn this function on or off.

- **T-Pipe Required** button with a green background is the default setting. Green means this function is *On*.
- Click the green button to turn it *Off* before you start a test program.
- **T-Pipe Not Required** button with a red background indicates the function is *Off*. This means that only the ambient temperature measurement is displayed and recorded. The Pipe Temp column in reports 1 and 2 does not record temperatures.

Data Save Interval in minutes

The computer automatically saves data sets to memory in one-minute intervals. That is why the default setting for **Data Save Interval in minutes** is set to 1.

- You can reduce the number of data sets provided in the final report by setting the **Data Save Interval in minutes** edit box to whatever value in minutes you require.

Examples: 1 = one data set per minute for the final report;
5 = one data set per 5-minute period for the final report.

- This setting controls what you see displayed in the **Data** tab and in **Reports 1 and 2**.

Pump Info sub-tab

Enter pressure pump information

By default, the **Stroke Count Required** button displays **YES**.

Enter the **Pump Model Number** and **Pump Serial Number**.

If the stroke count function is required

1. Enter the **Stroke Start Pressure**. This is the point that the application starts recording stroke counts.

Note: This number appears in the **Stroke Start** view-only box in the **Test Limits** sub-tab.

2. Enter the **Stroke Rate Target**. This is the pressure increase per minute that you expect to see while the pipe is pressurizing.

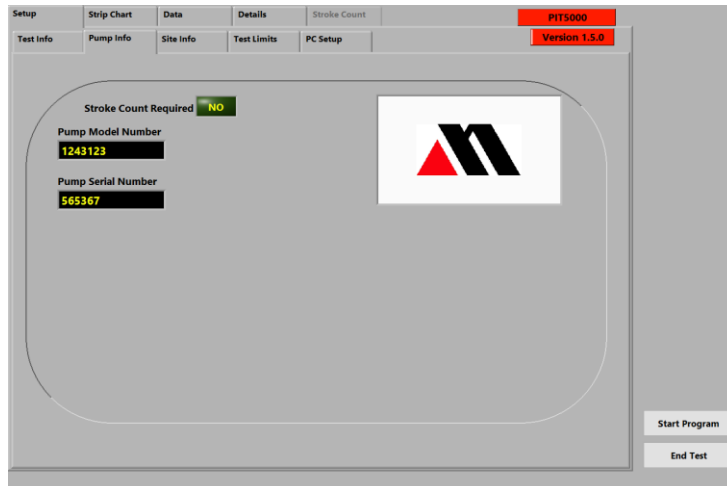
Note: The **Pump Contact Switch Closed** indicator provides visual verification that the contacts are opening and closing before you start the data logging process.

3. You can enter the pump's volume per stroke in either gallons or liters for the Stroke Counter. This enables the PIT5000 application to calculate and display the total volume added to the pipe section during the test program.

Pump Info sub-tab (continued)

If the stroke count function is *not* required

Click the **Stroke Count Required** button and the YES changes to **NO**.



Site Info sub-tab—Report 1 (the original report)

Report 1

The **Report 1** option (the default selection in the **Test Info** tab) gives you the original edit boxes and report.

Enter one pressure and several elevation points

1. High Pt Pressure and High Pt Elevation.
2. Low Pt Elevation.
3. Upstream Elevation.
4. Downstream Elevation.
5. The PIT5000 Sensor Elevation.

Note: The application uses this information to calculate the pressures at the other elevations.

Report 2

The **Report 2** option provides you with more information that you can add to the header of the report.

See the section [Report 2—enhanced report](#) for more information.

Test Limits sub-tab

The Test Limits



Enter the information for your Test Limits

Enter the following information:

1. **Test Time:** Hours and Mins.

Note: The Test Time appears as **Elapsed Time** in the Data Panel after you click Start Program or Begin Test buttons

2. **PTest Instrument Pressure:** This number was entered in the **PIT5000 Pressure** edit box in the **Site Info** sub-tab. This is the target test pressure at the PIT5000 location.

Note: Once a test begins, the PTest edit box in the **Data Panel** flashes red when the pressure goes above or below the PTest Limits.

3. **P Leak Pressure:** Enter the target preliminary leak test pressure.

Note: Some customers perform a 15-minute, preliminary leak test before going to higher pressures.

4. **Stroke Start:** This number was entered in the **Stroke Start Pressure** edit box in the **Pump Info** tab.
5. **Pressure Rate Limits:** Enter the target maximum or minimum pressurization rate in psi / minute. This sets the upper and lower range limit for the **Pressure Rate** in the Data Panel so it will flash red if you exceed it.
6. **PTest High and Low Limits:** Enter the upper and lower limit for PTest Instrument Pressure.

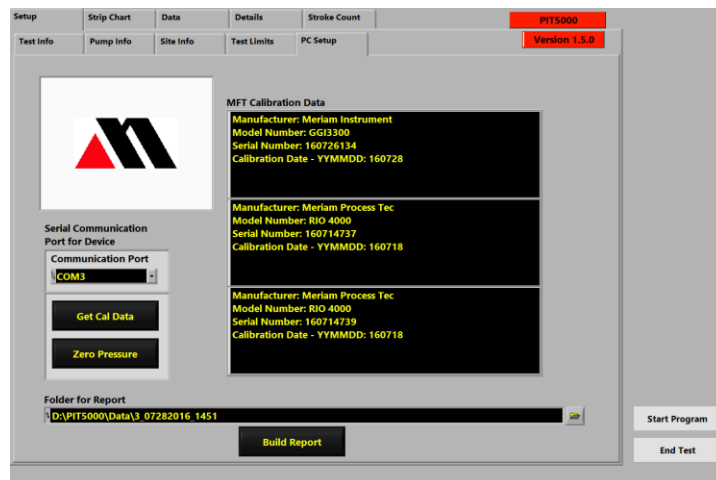
PC Setup sub-tab

The Get Cal Data button

The **PC Setup** sub-tab displays the following calibration information when you click this button:

- The Manufacturer.
- Model Number.
- Serial Number.
- Calibration Date.

Note: Measurement device serial numbers are not stored in the computer's memory. They are retrieved from the measurement device each time you click the **Get Cal Data** button.



The Communication Port

You should not have to use this drop-down. Only if no calibration data displays when you click **Get Cal Data** should you switch port numbers. **COM3** is the default port.

PC Setup sub-tab (continued)**Build Report button**

The Build Report button creates either Report 1 or 2 as Excel (XLSX) and PDF files. There are two situations when you might use this feature.

1. The test ends prematurely and the Excel and PDF files were not created by the computer. The Build Report feature uses the CSV file to create reports based on whatever data was saved.
2. If someone deleted the Excel (XLSX) or the PDF files, clicking this button creates those two files as long as the CSV file is still in a folder.

Locked data

View locked information

All editable data under the **Setup** tab is locked after you click the **Start Program** button. However, all of this data in the sub-tabs remains viewable.

- Click the **Setup** tab first.
- Click the drop-down button and select the sub-tab you want to view.

Note: The button is located to the right of the **Stroke Count** tab.

Example of a locked data sub-tab

In this example, the **Test Info** tab is dimmed to indicate it is locked. The **Data Panel** displays current test data.

Note: the flashing **red alarm** in the Data Panel indicates the range is above or below the range that you specified.

The screenshot shows the PIT5000 software interface. The top navigation bar includes tabs for Setup, Strip Chart, Data, Details, Stroke Count, and Test Info. The Setup tab is active, and its sub-tabs (Test Info, Pump Info, Site Info, Test Limits, PC Setup) are visible. The Test Info sub-tab is dimmed, indicating it is locked. The main area displays various test parameters in a form-like layout. On the right, the Data Panel shows real-time test data, including Pressure Rate (0.000 kg/cm2/Min), Ambient Temp (3261791 Deg C), and Pipeline Temp (5670169 Deg C). A flashing red alarm is visible in the Data Panel, indicating a range issue.

Page 2 of Site Info is not viewable

While locked, only page 1 of the Site Info sub-tab is viewable.

Note: This applies only to **Report 2**.

Report 2—the enhanced report

The advantage of Report 2

Report 2 provides you with the option of adding more information in the report header than Report 1 offers.

Test Info tab for Report 2

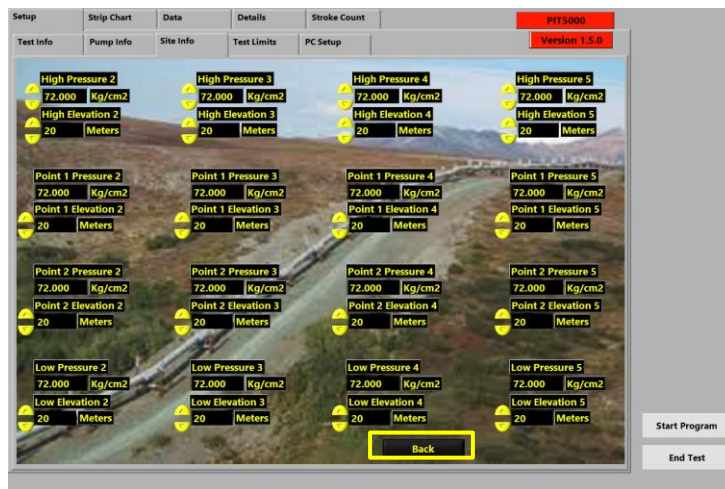
More edit boxes are available in this sub-tab when **Report 2** is selected.

Site Info tab for Report 2

The **Site Info** sub-tab looks similar to the **Report 1** window except that *Upstream* and *Downstream* are relabeled *Point Pressure 1* and *Point 2 Pressure*, and it has a **Next** button at the bottom of the window.

Site Info tab has a second page

The second page provides four more locations that are added to the data logging reports. The **Back** button is at the bottom of the sub-tab. See the figure below.



Data Panel

Where is the Data Panel located?

The Data Panel displays along the right side of all main tabs and all sub-tabs.

What does the Data Panel display *before* you click the Start Program button?

It displays only two buttons: *Start Program* and *End Test*.



Data Panel (continued)

What does the Data Panel display after you click the Start Program button?

It displays view-only boxes, three buttons, and the Add Notes edit box you see in the figure on the right.

Note: This data is logged in a report. The stroke count would be included in the logged data at this time if you had entered that information in the **Pump Info** sub-tab.

After you click the **Start Program** button, it is replaced with the **Begin Test** button that you see in the figure on the right.

Note: You can monitor the pressure and temperature readings before beginning a timed test. After you are satisfied that your initial test criteria is met, you start the timed test by clicking the **Begin Test** button.

PTest
0.0 PSI

Pressure Rate
0.0 PSI/Min

Ambient Temp
78.6 Deg F

Pipeline Temp
78.1 Deg F

60 characters Max

Add Note:

Begin Test

End Test

What does the Data Panel display after you click the Begin Test button?

It displays six view-only boxes, two buttons, and the Add Notes edit box you see in the figure on the right.

Note: this Elapsed Time is identical to what you see displayed in the **Details** tab.

PTest
500.5 PSI

PTest High Limit
600.0 PSI

PTest Low Limit
400.0 PSI

Ambient Temp
77.5 Deg F

Pipeline Temp
77.0 Deg F

Elapsed Time
0 00:00:39

60 characters Max

Add Note:

End Test

Data Panel (Continued)

What does the Data Panel display *when a timed-test is complete?*

The green indicator with **Time Complete** displays.

Note: Data logging continues until you click the **End Test** button.

The screenshot shows the Data Panel interface during a timed test. At the top, 'PTest' is displayed with a value of 496.6 PSI. Below this is a large green square with the text 'Time Complete'. Further down, 'Pressure Rate' is 0.1 PSI/Min, 'Ambient Temp' is 75.9 Deg F, and 'Pipeline Temp' is 75.4 Deg F. There is a text input field with a '60 characters Max' limit and an 'Add Note:' button. At the bottom, 'Elapsed Time' is 0 01:42:17, and there is an 'End Test' button.

The Data Panel also displays *flashing red alarms*

The view-only boxes on the Data Panel flash red when a measurement exceeds limits you entered into the **Setup** sub-tabs.

The screenshot shows the Data Panel interface with flashing red alarms. 'PTest' is 0.0 PSI. 'Pressure Rate' is 0.0 PSI/Min, 'Ambient Temp' is 78.6 Deg F, and 'Pipeline Temp' is 78.1 Deg F. The text input field and 'Add Note:' button are present. At the bottom, there are 'Begin Test' and 'End Test' buttons.

Add Note button

What is the Add Note button?

The **Add Note** button is available in the main tabs after you click the **Start Program** button or the **Begin Test** button:

When can notes be added?

You can add notes to the data log file any time that the **Add Note** edit box appears.

- Click in the **Add Note** edit box and type your note.
See the figure below.



Note: A note has a limit of 60 characters.

- When you finish typing, click the **Add Note** button. The note is merged into the data file along with its corresponding data log for a permanent record.
- You can review your notes at any time during the test in the **Data** tab in the **Notes** column.

Examples of notes added to the data log

Time:	Pressure:	AmbTemp:	Pipe Temp:	Stroke:	Notes:
8/15/2016 17:37	0.2 PSI	77.4 Deg F	74.2 Deg F	0	Begin Test
8/15/2016 17:38	22.7 PSI	77.1 Deg F	74.2 Deg F	29	
8/15/2016 17:39	50.9 PSI	76.9 Deg F	74.2 Deg F	56	
8/15/2016 17:40	59.0 PSI	76.6 Deg F	74.2 Deg F	56	
8/15/2016 17:41	59.0 PSI	76.3 Deg F	74.3 Deg F	56	
8/15/2016 17:42	59.0 PSI	76.1 Deg F	74.3 Deg F	56	
8/15/2016 17:43	59.0 PSI	76.0 Deg F	74.3 Deg F	56	
8/15/2016 17:44	59.0 PSI	75.8 Deg F	74.3 Deg F	56	
8/15/2016 17:45	59.0 PSI	75.6 Deg F	74.3 Deg F	56	
8/15/2016 17:46	59.0 PSI	75.5 Deg F	74.2 Deg F	56	
8/15/2016 17:47	59.0 PSI	75.4 Deg F	74.2 Deg F	56	
8/15/2016 17:48	59.0 PSI	75.3 Deg F	74.2 Deg F	56	
8/15/2016 17:49	59.0 PSI	75.3 Deg F	74.2 Deg F	56	
8/15/2016 17:50	59.0 PSI	75.3 Deg F	74.2 Deg F	56	
8/15/2016 17:51	59.0 PSI	75.3 Deg F	74.2 Deg F	56	
8/15/2016 17:52	59.0 PSI	75.3 Deg F	74.2 Deg F	56	Test Complete

End Test button

What happens when the End Test button is clicked?

A dialog box appears with one question and two choices:

Do you really want to stop the test?

1. Yes, I want to STOP the test.

Note: Clicking YES stops the test, saves the reports, and closes the PIT5000 application. The application will continue to display until the reports are saved. The longer the data log, the longer you will have to wait for the application to finish saving the files.

2. No, I want to continue.

Note: Clicking NO returns you to the ongoing test. Clicking the Close button (the "X") on the dialog box is the same as clicking NO.

Ready to shut down and disconnect?

Go to the [Shut down and disconnect](#) section to follow the proper procedure to close the PIT5000.

NOTICE

Transfer folders or files to a USB Flash Drive

There may be times when your only reason for turning the computer on is to transfer files from the computer to a USB Flash Drive.

Since turning on the computer automatically launches the PIT5000 application, click the **End Test** button on any tab or sub-tab to close the application as soon as it opens.

Click **File Explorer** on the taskbar to locate and transfer your folder or files. Each folder contains all the three file types (CSV, XLSX, PDF). All folders and files are located in **D:\PIT5000\DATA**.

Important: The keyboard and USB port may not function properly unless you have connected to a power source.

Strip Chart tab

View a live plot of pressure and temperature

When you click the **Start Program** button, the **Strip Chart** tab displays a live plot of **Press** (pressure), **T-Amb** (ambient temperature) and **T-Pipe** (pipe temperature) versus 24-hour time. (Data logging also begins.)

Strip Chart colors

- **White** is the **Press** (pressure) line
- **Red** is the **T-Amb** (ambient temperature) line
- **Green** is the **T-Pipe** (pipe temperature) line



Strip Chart scales

- The **Temperature** scale is on the left side of the Strip Chart. It is fixed at 0 deg F to 150 deg F (–20 deg C to 70 deg C).
- The **Pressure** scale is on the right side of the Strip Chart. It automatically adjusts (that is, Autoscales) as the pressure data changes.
- **Time** is displayed on the bottom of the Strip Chart in one-minute increments using the 24-hour clock. After you click **Begin Test**, time is displayed in whatever intervals you entered into the **Data Save Interval in Minutes** edit box in **Test Info** sub-tab.

Autoscale Graph On

The Autoscale Graph On indicator serves as a reminder that autoscaling is automatically turned on.

Strip Chart tab (continued)

Stroke indicator

The **Stroke** indicator is in the figure below..



Stroke indicator

The Stroke indicator can display four different states:

1. **Gray** – The pump switch contact is *open*. Indicator
2. **Green** – The pump switch contact is *closed* and the stroke count for this pressure interval has not exceeded the expected number of strokes by more than 50 % to reach the next pressure interval (based on the **Double Stroke** entry in the Stroke Count tab).
3. **Yellow** – The pump switch contact is closed and the stroke count is exceeding the expected number to reach the next pressure interval *by 50 % to 100 %* (based on what you entered in the edit box for **Double Stroke**).
4. **Red** –The pump switch contact is closed and the stroke count is *at or beyond* what you entered in the edit box for **Double Stroke** in the Stroke Count tab.

The Stroke Count number box

This view-only box displays the same information as the **Total Count** view-only box on the [Stroke Count](#) tab.

Data tab

Data tab overview

The Data tab provides a tabular display of data taken at predefined intervals. See the following chart about the interval times:

Between *Start Program* and *Begin Test*:

Data is automatically saved in:

1-minute intervals.

Between *Begin Test* to *Time Complete*:

The green indicator appears in the Data Panel when a timed test is complete. Data is automatically saved in:

intervals you selected in the [Test Info](#) sub-tab.

After *Time Complete*:

Data is automatically saved in:

1-minute intervals.

Data logging stops at End Test.

Pressure Rate information



Pressure Rate information is displayed in this tab during:

- **Pressurization** - after you click *Start Program* and before you click *Begin Test*.
- **Testing** when the pressure is stable – after you click *Begin Test*.
- **Depressurization** - after the *Test Time* has expired and until you click *End Test*.

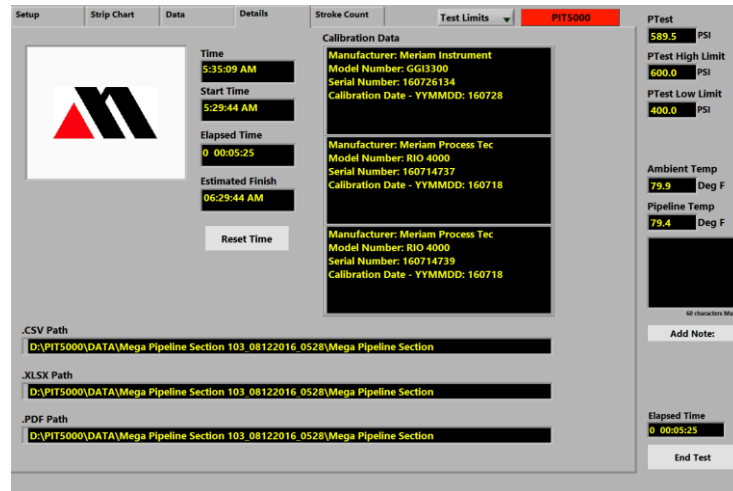
Details tab

NOTICE

The Details tab

The Details tab displays three areas of information: Time, calibration, and file names with the paths for your test reports.

Important: Live readings display in this tab only after you click **Start Program**.



The *Time* boxes before “Start Program”

None of the time boxes change or update before you click **Start Program**.

The *Time* boxes between “Start Program” and “Begin Test”

- **Time** and **Start Time** display the computer’s current time.
- **Estimated Finish** displays the *Start Time* plus *Test Time* (you entered *Test Time* in the **Test Limits** sub-tab).
- **Elapsed Time** remains blank.

The *Time* boxes between “Begin Test” and “End Test”

- **Time** displays the computer’s current time.
- **Start Time** displays the time that you clicked **Begin Test**.
- **Estimated Finish** displays the *Start Time* plus the *Test Time* that you entered in the **Test Limits** sub-tab.
- **Elapsed Time** display the time since you clicked **Begin Test**.

Details tab (reset, calibration, paths)

The Reset Time button

If you click the **Reset** button — after clicking the **Begin Test** button, then the three time boxes update:

- **Start Time** = the time when the **Reset** button was clicked.
- **Elapsed Time** = 0.
- **Estimated Finish** = Start Time + Test Time.

***Note:** The Timed Test resumes until you reach the new Estimated Finish.*

Calibration data

This Calibration data displays the Manufacturer, Module Number, Serial number, and Calibration Date for the measurement devices in use *after* you have clicked the **Start Program** button.

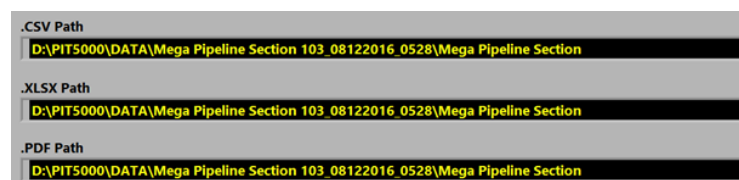
See the [PC Setup sub-tab](#) for an immediate display of the calibration data.

What does the path name mean?

The file path as it displays in the **Details** tab gives you the following information:

1. The folder name D:\PIT5000\Data.
2. The file name is the *Test Name* that you entered into the [Test Info sub-tab](#)
(in this example: Mega Pipeline Section 103_)
3. The date that the file was created in MMDDYYYY format
(in this example: 08122016_)
4. The time that the file was started in HHmm format using a 24-hour clock (in this example: 0528_).
5. The same file name is used for each of the three file types: CSV, XLSX, and PDF.

See the example below:



Details tab (do not delete these files)**NOTICE****Do not delete these files or folders**

Do not delete the following items:

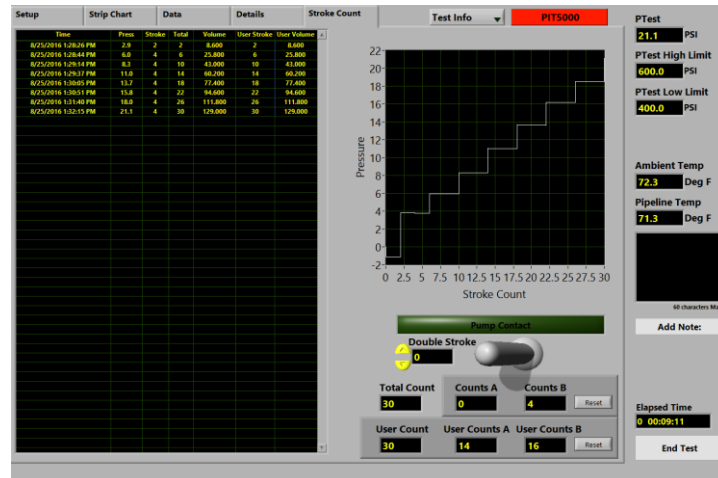
1. The folder called \DATA *because* the PIT5000 will no longer be able to save reports to the hard drive.
2. The templates for the two reports *because* the PIT5000 will no longer be able to save data.
 - a. PIT Report.xlsx
 - b. PIT Report Macro.xlsx.
3. Attempting to relocate the folder called \DATA has the same effect as deleting it.

Stroke Count tab

Stroke Count description

When you click the **Start Program** button, the **Stroke Count** tab displays the following information:

- Stroke count data sets in a tabular format.
- A live plot of pressure versus pump strokes.
- The Pump Contact indicator displays one of four colors.



The tabular data

A new line (or data set) is added to the tabular data based on what you entered in the **Pump Info** sub-tab:

- When the **Stroke Start Pressure** is reached during pressurization, this becomes the first line.
- Each time the pressure increases from the previous point by the **Stroke Rate Target** a new line is added.
- Each time you click a Stroke Count **Reset** button a new line is added.

Connect your set of dry contacts

Connect the stroke counter cable supplied by Meriam to your pump's dry contact set.

Note: The PIT5000 supplies +5 V dc output to the dry contact set and counts pump strokes based on contact closures.

Stroke Count tab (continued)

Pump Contact indicator

The Pump Contact indicator can display four different states:

6. **Gray** – The pump switch contact is *open*. Indicator
7. **Green** – The pump switch contact is *closed* and the stroke count for this pressure interval has not exceeded the expected number of strokes by more than 50 % to reach the next pressure interval (based on the **Double Stroke** entry).
8. **Yellow** – The pump switch contact is closed and the stroke count is exceeding the expected number to reach the next pressure interval *by at least 50 %* (based on what you entered in the edit box for **Double Stroke**).
9. **Red** – The pump switch contact is closed and the stroke count is *at or beyond* what you entered in the edit box for **Double Stroke**.

NOTICE

Proper interpretation of Stroke Counter data

Consult your company's stroke counter instructions for proper interpretation of this data.

Double Stroke Count box

This edit box always starts with zero. Unless you change the zero to another number, the view-only box in the **Data Panel** will always flash red because the number of pump strokes will always exceeds zero.

You can determine the **Stroke Rate Target** from the tabular data, data in edit boxes, or plotted stroke count data and then enter the **Double Stroke** value to activate colored alarm functions.

Stroke Count tab (continued)

The function of the animated toggle switch

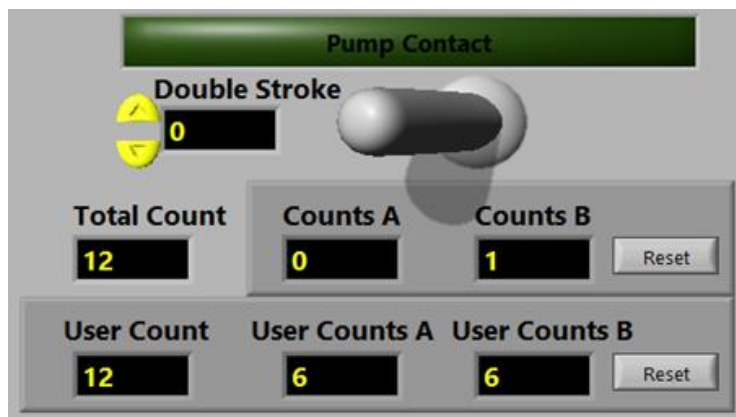
The animated toggle switch indicates the incremental counter—Counts A or Counts B—for the current interval. The counter that is not indicated by the animated toggle switch contains the previous interval stroke count. The toggle switch toggles between A and B each time a data set is added to the stroke count table.

Describing the animated toggle switch figure

Since the toggle switch points left (in the figure below):

- **Counts A** represents the current interval stroke count.
- **Counts B** represents the previous interval stroke count.

***Note:** When the toggle switch points right, then Counts A represents the previous interval stroke count and Counts B represents the current interval stroke count.*



Total Count of strokes

- The number of pump strokes is counted in **Total Count** Edit box throughout the pressurization period.
- Additionally, after the configured **Stroke Start Pressure** is reached, the pump strokes required to generate each pressure increment are counted and logged until the **PTest Instrument Pressure** is reached.

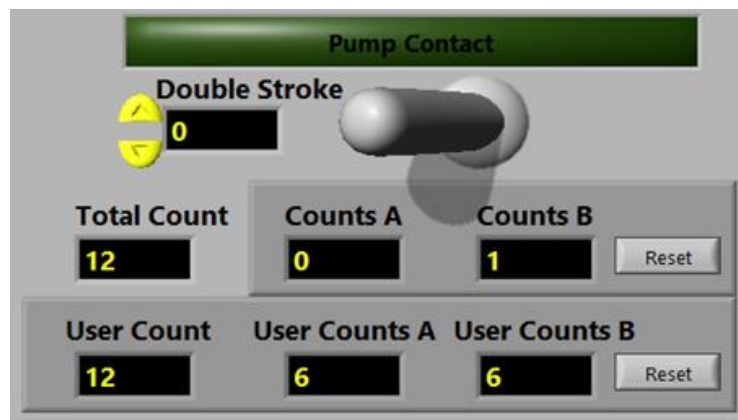
Stroke Count tab (continued)

Counts A and Counts B Reset

The Counts A and Counts B **Reset** button:

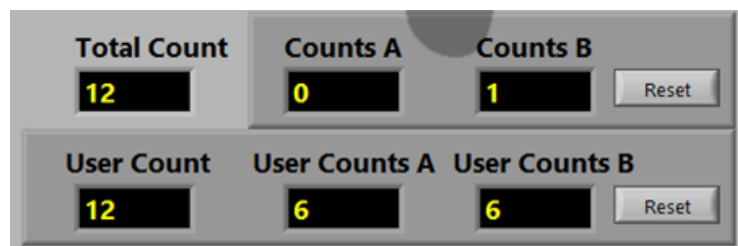
- Sets incremental Counts A and B to zero.
- Sets interval complete and enters a data set in the Stroke Count tabular data.
- Starts a new interval.

Note: the Count Reset buttons do not affect the **Total Count** edit box.



User Count

- The **User Count** is a total stroke count that you can restart (reset to zero) at any time.
- **User Count** is used to calculate the data in the **User Volume** column in the tabular data display.
- **User Counts A** represents the total counts for Counts A since the last reset.
- **User Counts B** represents the total counts for Counts B since the last reset.
- The User Count(s) **Reset** button sets User Count, User Counts A and User Counts B to zero.
- No data set is created after clicking this **Reset** button.



Shut down and disconnect

Close the PIT5000 Application

Close the PIT5000 application in any main tab by clicking the **End Test** button at the bottom of the **Data Panel**. You must answer the confirmation question with **YES**.

Turn off the power

1. Press the computer's Power button to turn it off.
2. Move the Power toggle switch to the **Off** position on the Control Panel.

Disconnect hose and cables

Relieve the pressure in the hose and disconnect the:

- Pressure hose.
- Power cable(s).
- Sensor cables.

Appendices

Returning for repair or calibration

First — Request a Number

In the event that a PIT5000 requires service and must be returned, please contact Meriam using one of the methods listed in the following table to request a **Return Material Authorization (RMA)** number:

Method	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
E-mail:	We need the following information in the email:	
	- Look for the serial number label in the Computer mounting panel to locate the model number & the serial number. - Give a brief description of the problem. - Send the e-mail to: returnforms@meriam.com	

Return Material Authorization

Do not send any unit for repair unless you contacted Meriam 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 Meriam 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 Meriam

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

Ship the box to

Meriam
10920 Madison Avenue
Cleveland, Ohio 44102
USA

Troubleshooting Guide

Symptom	Problem	Correction
An alarm sounds inside the PIT5000 case	Low battery voltage (< 10.5 V) has occurred and the internal power inverter's audible alarm sounds.	Connect charger to the battery and recharge it.
The voltmeter on control panel reads approximately 10.0 V or less. The computer does not turn on or there are no pressure or temperature measurements being read.	- Low battery voltage (< 10.0 V) has resulted in a shutdown of the internal power inverter. - No power is going to the measurement device or computer power cord.	- Turn the computer off if necessary. - Move the power toggle switch to Off. - Connect the charger to the battery and recharge it.
The PIT5000 battery does not charge.	Check for proper charger operation (output should be 12 V dc).	Replace charger if needed.
The voltmeter on the control panel reads > 10.5 V and the computer does not turn on or there are no pressure or temperature measurements being read.	The PIT5000 power toggle switch may be in the <i>Off</i> position.	Move the PIT5000 power toggle switch to the <i>On</i> position. Turn the computer on.
	Internal power inverter locked up.	- Turn computer off if necessary. - Move the power toggle switch to Off and wait 1 minute. - Connect the charger to the battery and recharge it.
	Internal power inverter fuse may have blown.	You will have to return the device for repair to Meriam because it indicates something is not working properly.
One or both temperature measurements fail to plot.	RTDs not properly connected.	- Check the connections of the RTD cable on the Control Panel and at the RTD. - There is a bad cable. - Swap RTD cables to see if the problem follows the cable (one measurement fails). - Replace the RTD cable as needed.

Symptom	Problem	Correction
Measurements (Press, T-Amb & T-Pipe) are not being plotted on the Strip Chart in PIT5000 application	This may be a USB communication port issue.	Check the Communication Port setting in the Setup tab > PC Setup sub-tab. It should display COM3 .
	The output measurement may have locked up.	• Turn the computer off. • Move the toggle power switch to Off and wait 1 minute. • Move the toggle power switch to On. • Turn the computer on.
	This may be a malfunction of the Serial to USB converter.	Replace Serial to USB converter.
The Stroke counter does not update in the PIT5000 application	The counter signal is not being received by the digital counter.	• Check connection of counter cable at the Control Panel and at the dry contacts at the pressure pump. • Confirm the counter cable is delivering 5 V dc to dry contacts.
The stroke counter cable does not deliver 5 V dc to the dry contacts you connected at the pump.	The PIT5000's digital counter has an output failure.	• Check wiring to the digital counter. • Replace the faulty wire as necessary.
The computer and measurement device do not turn on.	The power source is not connected.	Connect the 12 V supply.
	The power toggle switch is in the <i>Off</i> position.	Move the PIT5000 power toggle switch to the <i>On</i> position.
The time that is displayed on the Strip Chart's x-axis is incorrect.	The computer's clock needs to be set. Time zones are not used. Only Universal Coordinated Time (UTC) is used.	• Set the clock on the computer. • The PIT5000 application uses the computer clock for displaying time.
The PIT5000 application did not automatically start.	Start the PIT5000 application manually.	Double click the PIT5000 icon on desktop. 

Specifications

Case

Description	Durable case, hinged lid, four press & pull latches, weather resistant when closed.
Dimensions	External dimensions: Length × Width × Depth. 25 in × 20 in × 12 in (63.5 cm × 50.8 cm × 30.48 cm).
Weight	The case weight with the PIT5000 equipment is 42 lbs.
Mobility	- In-line wheels. - An extendable handle. - Three additional handles around the perimeter.

External Power

- 115 V ac to 12 V dc power supply (charger assembly) has a cord that is 9.5 feet.
- 12 V dc has a cord that is 25 feet (12 V locking, ring terminals).

Pressure limits



PIT5000 sensor: 0 psi to 3300 psi

- Do not exceed the sensor limit.
- Full Scale calibrated range = 100 % of range.
- The PIT5000 application does not alert you to pressure limits.

Stroke Counter

- PIT5000 supplies +5 V output to pump for Stroke Counter function.
- M12 connection to PIT5000 through the Meriam cable with number 8 spade terminals for connection to dry contacts.
- Maximum count rate: 300 strokes per minute.

Connections

Pressure	Quick-test fitting and hose.
Temperature	- One M12 (female) for ambient temperature. - One M12 (female) for pipe temperature.
Stroke Counter	M12 (female).
Power	12 V car adapter. 12 V locking connector.

Operating temperature range

Computer working temperature	5 °C to 35 °C (41 °F to 95 °F)
Storage temperature	-20 °C to 60 °C (-4 °F to 140 °F)

Specifications (continued)

Application update rates

Strip Chart

The Strip Chart updates once every two (2) seconds.

Data Logging

Between *Start Program* and *Begin Test*: Data is automatically saved in one-minute intervals.

Between *Begin Test* to *Time Complete*:

The green indicator appears in the Data Panel when a timed test is complete. Data is automatically saved in intervals you selected in the [Test Info](#) sub-tab.

After *Time Complete*: Data is automatically saved in one-minute intervals.

Data logging stops at End Test.

Certifications

- NIST traceable certificates for pressure and temperature modules.
- CE mark for the measurement device.
- CE mark for computer.

Part numbers

Contact Meriam about these part numbers

Contact sales@meriam.com for more information:

+ 1 216 281 1100 or (800) 817-7849.

Part Numbers	Descriptions
Replacement parts	
Z9A686	Battery Charger Assembly.
Z9A821	RTD Probe Assembly. Pt100, 4-wire, class A, Alpha Coefficient 0.003 85
Z9A1383	RTD Cable Assembly, 150 Ft.
Z9A1385	High Pressure Hose Assembly, 150 Ft. (rated for 5000 psi)
Z9A1386	Stroke Counter Cable Assembly, 150 Ft.
Z9A1395	Power cable 12 V Locking.
Z9P495	Quick-test Adapter.
Z9P555	Nylon Gear Bag.
Z9P562	Hose Reel.
Z9P1455	Fuse – 20 A 32 V ac / V dc for the 12 V locking cable assembly.
Optional parts	
Z9A685	12 V car adapter DC-to-DC cable.
Z9A805	Air Purge Kit.
Z9P511	Battery.
Z9P688	Battery Box.