

Win-Situ 2000



User's Guide

September 2000

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1 INTRODUCTION



IN THIS SECTION . . .

- Overview of Win-Situ
- Installing Win-Situ

OVERVIEW OF WIN-SITU

Win-Situ™ 2000 is easy-to-use software that connects your computer to In-Situ's MiniTROLL.

Win-Situ 2000 also supports communication with In-Situ's TROLL 4000, Multi-Parameter TROLL 8000, and HERMIT 3000 devices.

Use Win-Situ 2000 to

- Set up a direct connection between a PC and one or more devices
- Set up a modem or radio connection to one or more devices
- Convert pressure measurements to depth or level readings
- Check the device's clock, pressure range, memory, and battery
- Set up custom data collection schedules ("tests")
- Take immediate "manual" readings
- Extract data from a device
- View, graph, and print test data files; transfer to Microsoft® Excel®
- Calibrate the device to monitor water quality parameters (when available)
- Upgrade device firmware (when available)

PROGRAM REQUIREMENTS

Win-Situ requires (at a minimum) a computer with a 486 processor, running Microsoft® Windows® 95, Windows 98, or Windows NT 4.0,

Service Pack 4 or higher, a serial communications port, 16 megabytes of RAM, a hard disk, VGA compatible 640 x 480 display, and a Windows-compatible mouse or other pointing device.

INSTALLING WIN-SITU 2000

Insert the Win-Situ 2000 CD or floppy disk in the appropriate drive of your computer.

- CD: If the CD-ROM drive is set to Auto-Play, the installation program will start automatically. If necessary, choose Run from the Windows Start Menu and type D:\Setup, where *D* is your CD-ROM drive.
- Floppy disk: Choose Run from the Windows Start Menu and type A:\Setup, where *A* designates your floppy disk drive.

Follow the instructions to install the program to your local hard drive. A shortcut will be created on the desktop:



For more information . . .

<i>How to</i>	<i>See page</i>
<i>Start Win-Situ</i>	3
<i>Navigate the Win-Situ screen</i>	8
<i>Connect to a device</i>	4
<i>Set the device clock</i>	5, 15
<i>Take a manual reading</i>	15
<i>Set up a data collection test</i>	25
<i>Give the device a unique name</i>	15
<i>Check the pressure range</i>	11-12
<i>Check the battery & memory capacity</i>	10
<i>Set up to measure water levels</i>	17
<i>Calibrate an MP TROLL for water quality</i>	24
<i>Check the firmware version</i>	10
<i>Set unit preferences</i>	14

2 GETTING STARTED



IN THIS SECTION . . .

- Connecting For the First Time
- Your Next Win-Situ Session
- About Sites and Connections

CONNECTING FOR THE FIRST TIME

STEP 1: CONNECT THE DATA LOGGER TO THE PC

Refer to the Operator's Manual for your data logger for specific information on connecting the device to your computer's serial port and supplying it with external power, if desired.



CAUTION: *In-Situ's MiniTROLL communicates via RS485 protocols. An RS485/RS232 converter is necessary to talk to a MiniTROLL.*

STEP 2: START WIN-SITU

Start Win-Situ with one of these methods:

- double-click the Win-Situ 2000 shortcut on the desktop
- use the Start Menu to select it from the item "In-Situ Inc."

Note that you cannot run Win-Situ from the CD or floppy disk; the program must be installed to your local hard drive (see page 2).

The Win-Situ application window appears. A new, empty site called “Home” is displayed at the top of the Navigation tree on the left side of the screen.

STEP 3: ADD A CONNECTION TO THE “HOME” SITE



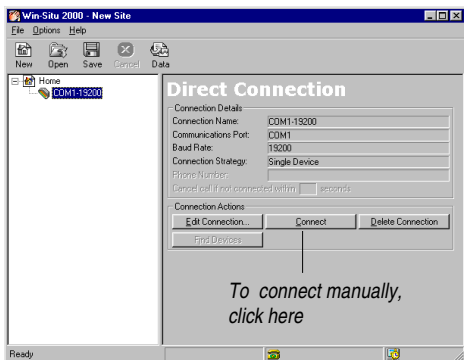
TIP: The first time you launch Win-Situ, the Connection Wizard starts automatically to help you add a connection.

A connection is simply a COM port on your computer. The Connection Wizard asks a few questions to help you specify the properties of this connection, including—

- **Connection Type:** To connect to an In-Situ data logging device attached to the COM port, select “direct” connection. For other types, see “About the Connection Wizard” on page 7.
- **Connection Strategy:** One device or more than one.
- **Communications Port:** The COM port (RS232 serial port) to which the device is attached.
- **Connection Speed:** Baud rate for communications.
- **Name (optional):** A default connection name is suggested.
- To have the wizard connect automatically to the attached device, be sure the option **Connect and find devices on “Finish”** is checked.

STEP 4: CONNECT

1. If you requested Win-Situ to connect and find devices, proceed to step 3.
2. To connect manually, click the **Connect** button.
3. The following will happen:
 - Win-Situ synchronizes the baud rate of the device to the host computer.



- Win-Situ “finds” (connects to) the device(s). For a modem connection, Win-Situ initiates a phone call.
- The status bar at the bottom of the screen shows the state of communications between Win-Situ and the device.
- After the connection is made, the device appears in the Navigation tree.



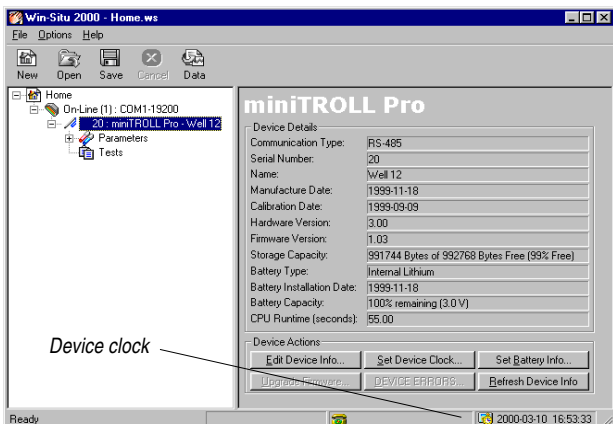
If the device does not appear in the tree, there may be a communication problem between Win-Situ and the device. Check these items: (1) the COM port, (2) the hardware connections, (3) the device's battery or external power.

4. Click to select the device in the Navigation tree. If more than one device was located, select the one you want to talk to first.

STEP 5: SET THE CLOCK

The device clock is shown in the right corner of the status bar. Data collection schedules depend on the device clock. Set it as follows:

1. With the device selected in the Navigation tree, click **Set Device Clock**.
2. Select one of these options:
 - If the device clock is wrong but the PC clock is right, select **Synchronize Device Clock to Computer Clock**.
 - To use a different time for the device, select the second option and enter the desired device time.
3. Click **Finish**. The new time will be sent to the device.



EXITING WIN-SITU

1. Select **Exit** from the File menu.
2. If changes have been made to the site, Win-Situ will ask if you want to save the modifications. Such modifications may include the initial configuration of an empty site, as well as unit preferences saved in the site file. Do one of the following:
 - Select **Yes** to save the current settings for future use. This site will open the next time you launch Win-Situ.
 - Select **No** to abandon the changes. In this case, the “Home” site will again open up blank when you start Win-Situ the next time.

For more information, see “About Sites and Connections” below.

YOUR NEXT WIN-SITU SESSION

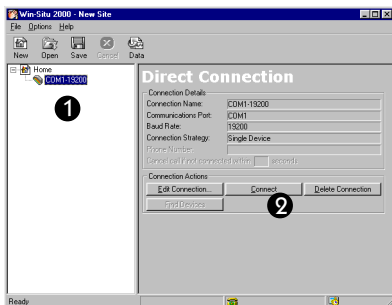
Each time you start Win-Situ, the site and the connection (if any) saved in your last session are displayed in the navigation tree.



TIP: To start Win-Situ from Windows Explorer, double-click a Win-Situ file in the folder where Win-Situ is installed. Win-Situ files have a .WS extension.

To connect:

1. Select the connection.
2. Click the Connect button.



ABOUT SITES AND CONNECTIONS

The site is the topmost node in Win-Situ’s Navigation tree. A site consists of one or more connections.

When you launch Win-Situ for the first time, a new, empty site called “Home” is opened and displayed at the top of the Navigation tree. You can add one or more connections to the site with the **Add Connection** button.

When learning to use the software in the office, with a direct connection to a device such as a TROLL or MiniTROLL, think of the site as your computer, and the connection as the COM port to which the device is physically connected. As you develop networks of instruments and

access them with different computers from different locations, you may find it useful to create and save a new site for each situation.

For example, your “Home” site could contain the port connections you normally use on your office computer. It might include one modem connection at 1200 baud for communicating with remote devices, and a direct connection at higher speed for talking directly to a device at your desk.

A field site could be configured for the COM port on your laptop. In addition, you may discover that long cable lengths require a lower baud rate for reliability at this site. After setting up two connections, you could save the site under a unique identifying name, then open it whenever you visit that site.

When setting up sites for later use, you may want to clear the checkbox **Connect and find devices on “Finish”** at the end of the Connection Wizard so the wizard does not automatically try to find attached devices.

SAVING ADDITIONAL SITE FILES

The **Save As** option on the File Menu can be used to save current connection information under a new filename. Similarly, you can set up a new site anytime by selecting **New** from the File Menu.

ABOUT THE CONNECTION WIZARD

The Connection Wizard will help you set up new connections. To add a connection to a site, select the site and click the **Add Connection** button. The Connection Wizard asks for the following:

The **Connection Type** controls many aspects of communication through the port. Available types are

- Direct Connection, for use when the device is attached directly to the PC
- Modem for a dial-up modem
- Spread-Spectrum Radio

Number of devices connected: Select “one” to speed up connection to a single device.

Communications Port: Select the appropriate RS232 serial port on the computer. For a Modem connection, enter the phone number—up to 40 characters; a comma designates a pause.

Connection Speed: New In-Situ data loggers are factory-set to 9600 baud, but you may select any rate; baud rates are automatically synchronized between devices and the host computer.

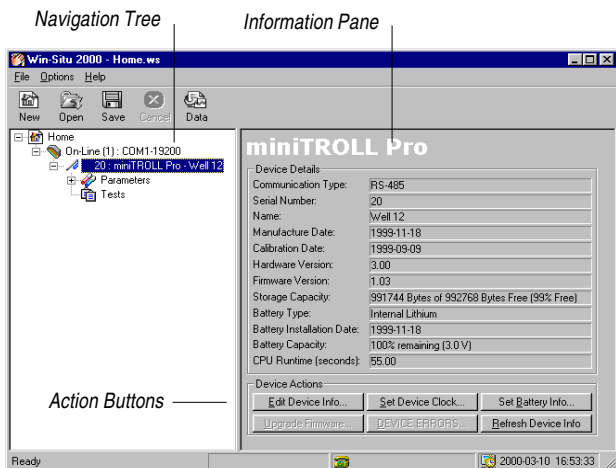
3 THE WIN-SITU ENVIRONMENT

IN THIS SECTION . . .

- The Win-Situ Workspace
- Navigation Tree Nodes
- Win-Situ Menus

THE WIN-SITU WORKSPACE

Win-Situ uses the familiar “navigation tree” to display your network on the left side of the screen. The pane on the right automatically displays information about the “node” selected in the tree. The information pane also contains buttons for actions you can perform.

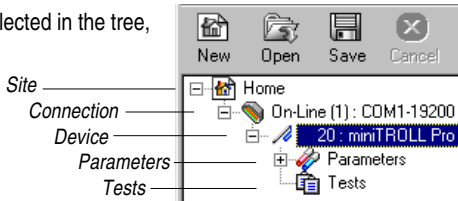


NAVIGATION TREE NODES

Sites, connections, devices, parameters, and tests are all “nodes” in the Navigation tree. The symbol + means a node can be expanded to show more nodes below it.

When a node is selected in the tree,

- the Information pane displays information about the selected node.



- the Information pane displays “action buttons” for the actions that can be performed on the selected node.



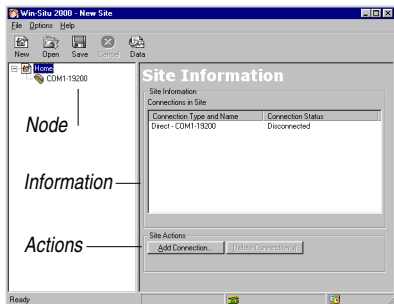
TIP: Some action buttons are available only after making a selection within the Information pane.

SITE NODE

When a site is selected, the Information pane shows the connection(s) in the site and their status.

Site Actions

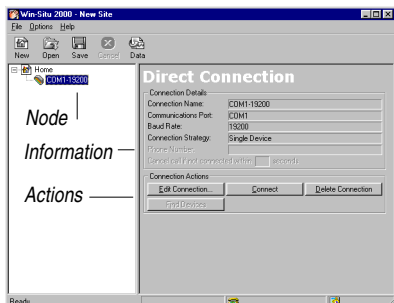
To add a connection, click the **Add Connection** button.



To delete one or more connections, select the connection in the Information pane and click **Delete Connection(s)**.

CONNECTION NODE

When a connection is selected, the Information pane shows the connection type, COM port, baud rate, connection strategy, and phone number for a modem connection.



Connection Actions

Edit Connection starts the Connection Wizard to help you change the properties of a connection.

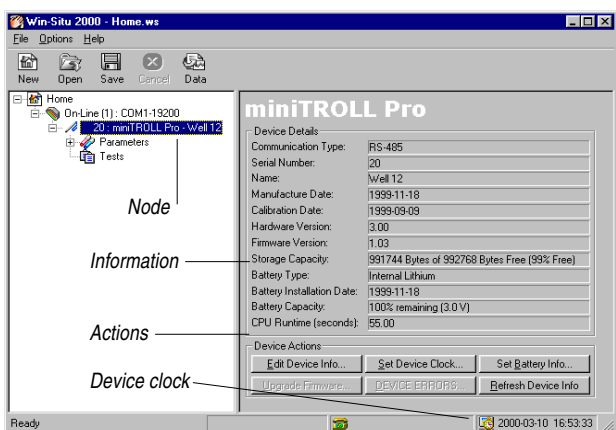
Connect opens the connection and locates devices. After the connection is made, this button changes to let you **Disconnect** from the device.

You can **Delete** or **Edit** a connection by choosing the appropriate action button.

Find Devices is a shortcut to get Win-Situ to display new devices in the tree without having to disconnect and re-connect.

DEVICE NODE

With a device selected, the Information pane shows device details: the date it was manufactured and calibrated, its hardware and firmware versions, storage capacity (memory), battery status (based on measured voltage), the device clock, and more. The example below is for a MiniTROLL.



Device Actions

Edit Device Info—Depending on the device type, you can set a custom name and change other settings. For more info see page 15.

Set Device Clock—For details, see page 15.

Refresh Device Info—to update the display.



TIP: Some action buttons are unavailable when a test is running.

Upgrade Firmware—Available if Win-Situ can upgrade the device to a newer firmware version. For more information, see page 16.

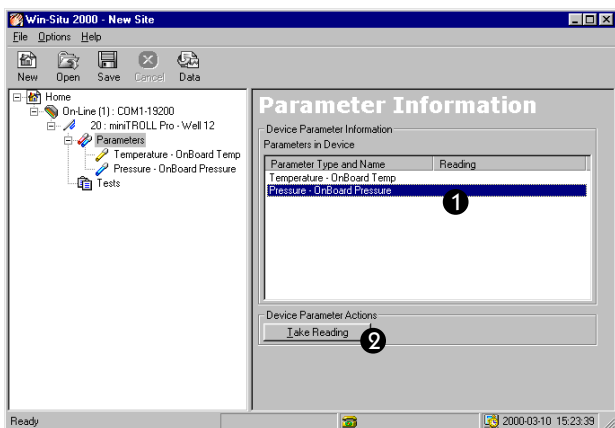
Device Errors—If device failures (e.g., power, memory, clock) have occurred, this button will be available to supply details.

PARAMETERS NODE (GROUP VIEW)

To view a list of all parameters the device can measure, select the Parameters node in the Navigation tree.

To access the action buttons:

1. Select a parameter in the Information pane. Select one or more by holding the CTRL key while clicking.
2. Select the action button.



For the external channels of a HERMIT 3000, additional action buttons are available.

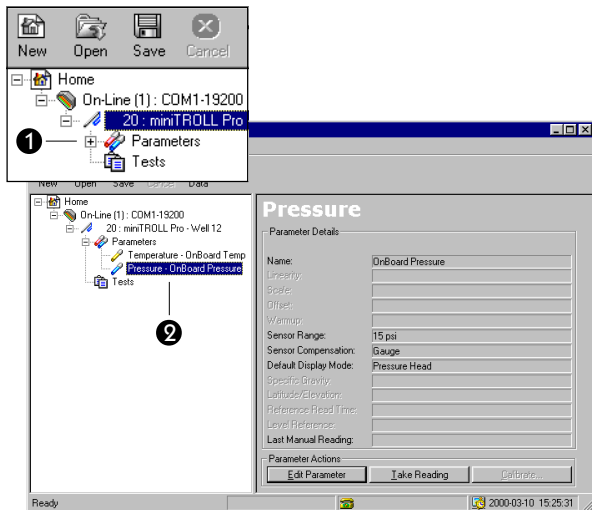


TIP: With any node selected, clicking the right mouse button displays a short, context-sensitive menu listing the same actions available on the action buttons.

SINGLE PARAMETER NODES

To view more detail for an individual parameter—including the pressure sensor range—and access more actions, view the single parameter display:

1. Expand the Parameters node by clicking the + symbol
2. Select the parameter of interest.



Parameter Actions

Edit Parameter—Pressure readings can be customized with this button. Refer to Section 5 for complete information. *Note:* This button is **Edit Channel** for a HERMIT 3000.

Take Reading—displays an instant reading.

Calibrate—for the water quality parameters of a Multi-Parameter TROLL 8000.

TESTS NODE (GROUP VIEW)

To view a summary of all the tests in the device, select the Tests node in the Navigation tree. Refer to Sections 8 and 9 for more information on tests.



Advantages of the Tests node (group view): (1) Group actions can be performed on multiple tests, and (2) New tests can be added to the device. Refer to Sections 8 and 9 for complete information on tests.

SINGLE TEST NODES

To view the details of an individual test, expand the Tests node by clicking the + symbol, then select the test of interest. Refer to Sections 8 and 9 for more information on tests.

WIN-SITU MENUS

The File Menu

Use this menu to exit Win-Situ. It also has options to create a new site, open a previously saved site, save current connection information in a new file, which can be useful in some situations. See “About Sites and Connections” on page 6 for details.

The Options Menu

Allows you to set preferences, including units for displaying data.

The Help Menu

Accesses an electronic version of this operator’s manual.

THE TOOLBAR

The toolbar buttons provide quick access to Win-Situ’s most useful operations:



opens a new, empty site



opens a previously saved site



saves the current site information



cancels the current locate or retrieve operation



starts Data Manager, Win-Situ’s companion application for displaying and graphing test data files

4 SPECIAL ACTIONS



IN THIS SECTION . . .

- Choosing Measurement Units
- Setting the Device Clock
- Taking “Manual” Readings
- Setting a Device Name
- Configuring TROLLs, MP TROLLs, and HERMITs for Telemetry/Network Communications
- Reloading Firmware

CHOOSING MEASUREMENT UNITS

Default units are used until you specify a choice of units. You can always change the units later, when displaying data in Data Manager. Unit preferences can be set at any time using the Options menu, and are saved in the Site file.



TIP: Unit Display Preferences affect only the display of data, not the data collected. To preserve unit selections for future sessions, be sure to save the site when exiting Win-Situ.

1. Select Preferences from the Options menu.
2. In the Modify Unit Display Preferences window, click to select the parameter whose unit you wish to change.
3. In the bottom half of the window, select the unit you want for the highlighted measurement.
4. Repeat for another measurement and unit, or click **OK**.

SETTING THE DEVICE CLOCK

Data collection schedules depend on the device's real-time clock. The clock is always displayed in the lower right corner of the screen in the Device Information pane. If the clock is wrong, set it as follows:

1. Select the device in the Navigation tree.
2. Select the action button **Set Device Clock**.
3. Select one of these options:
 - If the device clock is wrong but the PC clock is right, select **Synchronize Device Clock to Computer Clock**.
 - To use a different time for the device, select the second option and enter the desired device time.
4. Click **Finish**. The new time will be sent to the device.

TAKING "MANUAL" READINGS

Devices collect data in "tests" but you can get a quick "manual" reading from any device apart from a test, even while a test is running. This can aid in positioning a pressure probe in a well, and also confirm that the device is operating properly.

1. Navigate to the device's Parameters node.
2. In the Information pane, select a parameter.
3. Click **Take Reading**. A current reading will be displayed.
 - Readings will be in default units until you specify your unit preferences using the Options menu.
 - External probes with long warmup times will take longer to read.
 - If a test is running and the device is about to take a test reading, the request may have to be sent several times.



TIP: In Level display mode, two readings may be shown. For additional information, see page 20.

SETTING A DEVICE NAME

Win-Situ recognizes a device by its serial number. In addition, you can assign a meaningful description—such as a well or site name, location coordinates, etc.—to be displayed in the navigation tree and data files.

1. Select the device in the Navigation tree.
2. Select the action button **Edit Device Info**.
3. Enter a new name for the device (up to 16 characters)

4. Click **Finish**. Win-Situ will send the new name to the device and display it in the navigation tree.

CONFIGURING TROLLS, MP TROLLS, AND HERMITS FOR TELEMETRY/NETWORK COMMUNICATIONS

When planning to use a TROLL 4000, Multi-Parameter TROLL 8000, or HERMIT 3000 with a telemetry connection or RS422 network, connect *directly* to each logger and specify communication settings *before* final field installation.

1. Select the device in the Navigation tree.
2. Click the **Edit Device Info** button in the Information pane.
3. Select a Primary Connection Type for the device—how you intend to communicate with the device in its final setup. Select from
 - Direct
 - Modem
 - Spread Spectrum Radio
4. Specify whether the device will be used in an RS422 network
5. Select Pre- and post-transmission delays (or accept the defaults).

Win-Situ will set the required communication parameters in the device based on your selection. These settings insure that communications will not be lost should a reset condition occur.

UPGRADING FIRMWARE

The MiniTROLL is available in Standard, Advanced, and Professional versions, each offering a different feature set. The Standard and Advanced models may be field-upgraded by keying in an upgrade code, issued by In-Situ when an upgrade is purchased for a specific MiniTROLL serial number. In addition, In-Situ may distribute new firmware for data logging devices in the form of a file you can copy to the folder where Win-Situ is installed. If you have a Standard or Advanced MiniTROLL, or if Win-Situ detects a later version of firmware than that currently loaded in the device, the Upgrade Firmware action will be available in the Device Information pane.

1. Select the device in the Navigation tree.
2. Click the **Upgrade Firmware** button in the Information pane. If this button is not available, then Win-Situ cannot upgrade firmware.
3. Follow the instructions in the Upgrade Wizard.

5

PRESSURE PARAMETER SETUP



IN THIS SECTION . . .

- About the Pressure Parameter
- Editing the Pressure Parameter

ABOUT THE PRESSURE PARAMETER

In-Situ's MiniTROLL and TROLL 4000 measure two parameters: pressure (water level) and temperature. The Multi-Parameter TROLL 8000 and PXD pressure transducers also measure pressure. Options in the Parameter Wizard let you tell Win-Situ exactly how you want to display pressure measurements—as raw pressure head above the sensor, as depth, or as water level with a reference.

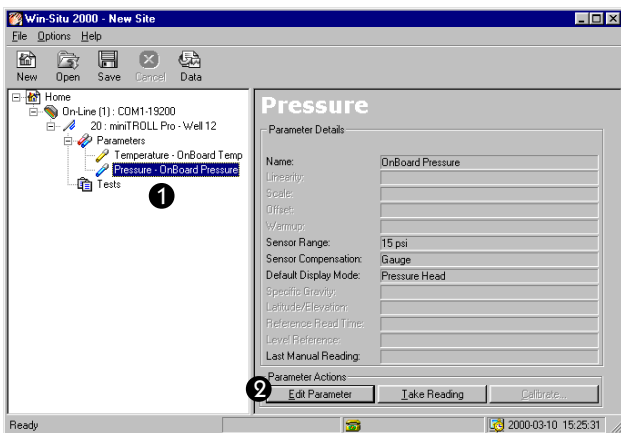
EDITING THE PRESSURE PARAMETER

The Parameter wizard can help you configure a pressure channel to display measurements just as you want them. The specified settings are easily changed from one mode to another, and any choice can be redone or undone later, when viewing test data.

1. In the navigation tree, select a pressure parameter.
2. In the Information pane, select the action button **Edit Parameter** (**Edit Channel** for an external pressure transducer).



If the device is running a test, the Edit Parameter function will not be available.



The Parameter Wizard will help you enter the required information. The choices are discussed below.

- Click **Finish** to complete the Wizard. Win-Situ will send the information to the device and update the display.



TIP: To change the units for pressure, depth, or level readings, select *Preferences* from the *Options* Menu.

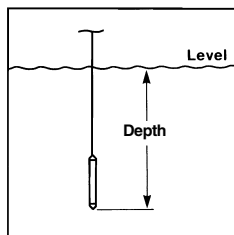
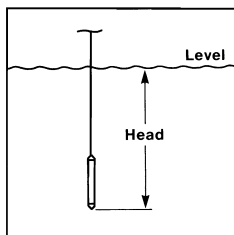
Name

A default name is supplied for display in the Navigation tree and test data files. If you choose, you can enter a custom name.

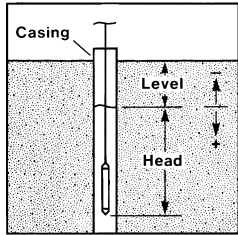
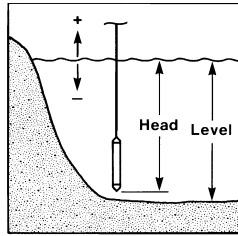
Display Mode

Select one of the following. Subsequent screens will be tailored to your choice.

- Pressure Head** displays the raw pressure exerted by the column of water above the pressure sensor, in kiloPascals, pounds per square inch, bars, or kilograms per square centimeter. If you choose this mode, click **Finish** to end the Wizard.
- Depth** converts the pressure of the water column to a depth reading, in meters, centimeters, feet, or inches.



- Level - Surface:** Commonly used for surface water elevations. Data file readings are “positive up.” Increasing water levels will result in increasing readings. Decreasing water levels correspond to decreasing readings.
- Level - Top Of Casing:** Commonly used for drawdown in groundwater wells. This mode is “positive down.” *Decreasing* water levels correspond to *increasing* readings, because the water level is getting further from the top of the well casing. *Increasing* water levels result in *decreasing* readings.



Level/Depth Conversion Information

The conversion from pressure in pounds per square inch (psi) to depth or level in meters or feet requires several conversion factors. Pressure in the English unit psi is converted to the SI unit Pascal (Pa). Conversion from Pascals to meters or feet requires two additional values:

- Liquid Density.** Pure groundwater at 20°C has a density of 0.998 g/cm³. Refer to the Appendix for a temperature/density table and a method for experimentally determining liquid density if the working fluid is not pure water.
- Gravitational Acceleration.** The acceleration due to gravity that an object experiences is location-specific. Given your latitude and elevation, Win-Situ can calculate a value for gravitational acceleration.

Earlier versions of Win-Situ before Win-Situ 2000 used a dimensionless specific gravity value to convert from pressure to feet or meters of fluid. A specific gravity of 1.0 is adequate for many groundwater applications.



TIP: *Either specific gravity or density, latitude & elevation may be used to convert from pressure (psi) to depth/level (meters or feet). A gain in accuracy may be realized by selecting the density, latitude & elevation option.*

Level Reference

User-specified starting point for level display modes. Here are some examples:

- **Surface:** Calculate the water level above mean sea level (MSL) and enter as the Level Reference. Data will be displayed as elevations above MSL.
- **TOC:** Measure the distance to the water surface from the top of the well casing (DTW) and enter as the Level Reference. Data will be displayed as DTW values.
- A Level Reference of 0 is equivalent to “zeroing” the probe. Data will be displayed as changes from the starting water level.

A current reading of the sensor depth is displayed in this screen; you can reposition the probe and update the reading with the Update Reading button.

Reference Time

The device takes a “snapshot” of the sensor’s raw pressure reading, then your Level Reference is substituted. You can specify that the snapshot be taken now or when the test starts. The data file will show the Reference (raw pressure) Reading and when it was taken.

- **Now:** the pressure is measured immediately and the value is stored until the test starts. All measurements taken during the test will be relative to the water level at the time you finished the wizard.



TIP: To display “manual” readings that take your Level Reference into account, select Reference Time: Now.

- **Start of Test:** the Reference measurement will be taken at time $t=0$. All measurements taken during the test will be relative to the water level at the moment the test starts.

6 HERMIT 3000 CHANNEL SETUP

IN THIS SECTION . . .

- About External Channels
- Editing External Channels

ABOUT EXTERNAL CHANNELS

The HERMIT 3000 data logger can accommodate up to eight 4-20 milliAmp probes, such as pressure transducers, attached to its eight numbered channel connectors. To interpret the output of each channel, Win-Situ requires specific information on the type of probe connected and its calibration coefficients. If your software supports the HERMIT 3000, you can supply this information by “editing” each channel individually.



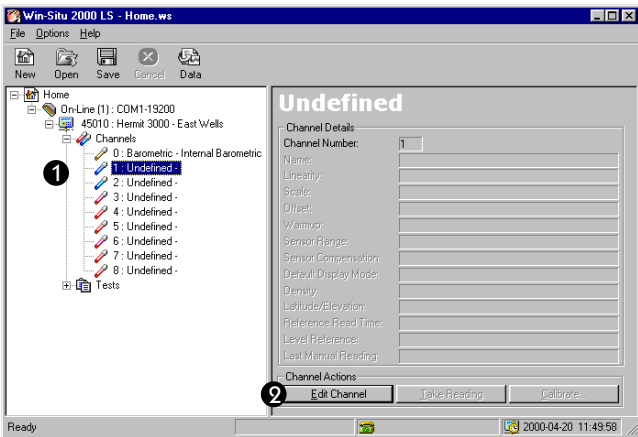
EDITING EXTERNAL CHANNELS

Use the following procedure to set up an external channel:

1. In the navigation tree for a HERMIT 3000, select a channel to which you have attached (or plan to attach) a 4-20 mA probe.
2. In the Information pane, select the action button **Edit Channel**.



If the HERMIT is running a test, the Edit Channel function will not be available.



The Channel Wizard will help you enter the required information. The choices are discussed below.

- Click **Finish** to complete the Wizard. Win-Situ will send the information to the device and update the display.



TIP: The HERMIT's internal barometric channel is always channel 0 and cannot be edited.

Type

Select the type of probe attached to this channel. Subsequent screens will be tailored to your choice. All but two of the types are self-explanatory:

- Select **Undefined** to clear a probe definition when removing a previously-attached probe. All channels start as Undefined types.
- Select **User-Defined** for a third-party probe, or if your type isn't listed. For In-Situ probes, the Linearity, Scale, and Offset coefficients determine the units for the readings, and conversions from one unit to another are easily done. The User-Defined type returns readings in the probe's "native unit," and conversions to other units are not possible. You'll also be asked to enter a **Warmup** time, in milliseconds. This is the time required to power the channel and return an accurate reading. You may have to determine this value by experiment. Maximum: 30,000 ms (30 seconds).

Calibration Coefficients

Enter the **Linearity**, **Scale**, and **Offset**.

- In-Situ pressure transducers display this information on the probe's data tag, and in accompanying calibration documents.
- For a User-Defined type, enter the range as the Scale, and zero for Linearity and Offset (unless you know them).
- If a coefficient is negative (e.g., Offset), be sure to enter a minus sign.

Name

A default name is supplied, but you can enter a more descriptive name to appear in the navigation tree and in the test data files—for example, the probe's model or serial number.



***TIP:** When editing a pressure channel, the wizard presents additional options. Refer to Section 5 for details.*

This completes the channel setup.

CHANNEL DEFINITIONS: BACKGROUND

The data logger stores one definition for each channel and uses it in any tests that include the channel. If you edit channel settings before a test runs, the new definition will be used in the test. If you edit a channel after a test has run, no changes will be made to the channel definition used in the test.

The data logger stores data in a binary format independent of your channel settings. After collecting and extracting data, you can choose to display data (and optionally create text files) using these settings, or you can change any of these settings at that time. Making changes later affects only the displayed data or created text files, but it will not change your original binary data file, unless you want it to. The result is a high degree of flexibility with no danger of changing—and thus possibly compromising—the original data.

7 WATER-QUALITY PARAMETER SETUP



IN THIS SECTION . . .

- About Water Quality Parameters

ABOUT WATER-QUALITY PARAMETERS

In-Situ's Multi-Parameter TROLL 8000 can measure three water-quality parameters in addition to pressure and temperature. The MP TROLL is available in two versions

- pressure, temperature, pH, dissolved oxygen (DO), and conductivity
- pressure, temperature, pH, DO, and oxidation-reduction potential (ORP)

If your software supports the MP TROLL, the **Calibrate** button is available when a water-quality parameter is selected in the Navigation tree. The calibration wizard will help you through the calibration process.



Complete procedures for calibrating the Multi-Parameter TROLL 8000 for pH, conductivity, DO, and ORP are found in the MP TROLL 8000 Operator's Manual.

8

TEST SETUP



IN THIS SECTION . . .

- About Tests
- Adding a Test to a Device: The Test Wizard

ABOUT TESTS

Collecting a set of data is called “running a test.” Many things that you do through Win-Situ can be visualized as actions performed on Tests. For example,

- to give the device instructions for collecting data you **add a test** to the device.
- when you want the device to end data collection you **stop a test**.
- to copy test data from the device to a host computer you **extract test data**.

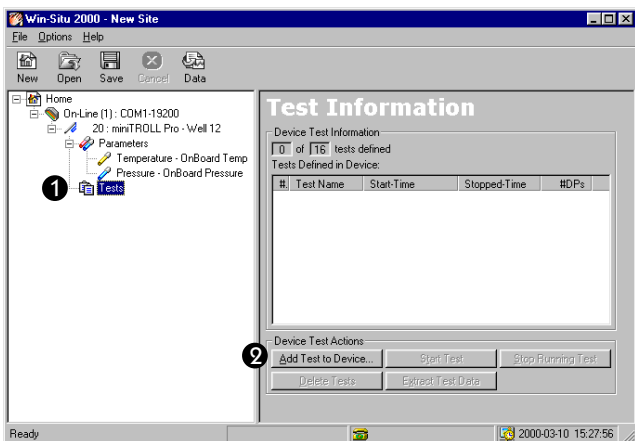
These actions are initiated by buttons in the Information pane when the device’s Tests node (group view) or a Single test is selected in the Navigation tree.



Advantages of the Tests node (group view): (1) the Add Test action is available, and (2) operations can be performed on multiple tests simultaneously.

ADDING A TEST TO A DEVICE: THE TEST WIZARD

1. Navigate to the device’s Tests node.



2. Select the action **Add Test to Device**. The Test Wizard will help you enter the information. The choices are discussed below.
3. Click **Finish** to complete the Test Wizard. Win-Situ will write the information to the device and display the new test properties in the Information pane.

Name (optional)

Enter up to 16 characters to uniquely identify the test in the Navigation tree and in the test data file.

Parameters

Select the parameters you want to measure. Remaining choices will be tailored to your selection. For example, a log test is not available when water-quality parameters are being measured with an MP TROLL 8000.

Test Type

Test types available depend on your device's firmware.

Linear. Measurements are evenly spaced and all measurements are stored.

Event. Measurements are evenly spaced, but you can record an "event" and conserve memory by having the device *store* only measurements that differ from the previous measurement by an amount you specify.

Log. Measurements are closely spaced at the start of the test and get further apart as the test progresses. All measurements are stored. The appendix describes the log schedule in more detail.

Linear Average. Available for TROLL and MiniTROLL level and temperature measurements, this type of test can smooth out anomalous highs and lows (e.g., from waves). Each stored measurement is the average of several rapid measurements.

Measurement Interval

The available interval depends on your choice of test type and parameters.

Minimum Linear Measurement Intervals				
Parameter	Mini TROLL	TROLL 4000	TROLL 8000	HERMIT 3000
Pressure	0.5 sec	3 sec	3 sec	10 sec
Water level	0.5 sec	3 sec	3 sec	10 sec
Temperature	0.5 sec	3 sec	3 sec	10 sec
pH	--	--	15 sec	15 sec
Conductivity	--	--	15 sec	--
ORP	--	--	15 sec	--
Dissolved oxygen	--	--	5 min	--

Start Option

Manual. The test can be started at any time by pressing the **Start** button—for example, to synchronize with an external event like starting a pump.

Scheduled. The test starts at the date and time you specify. The time shown is 10 minutes ahead of the current device time. Use the arrows beside the list boxes to choose a start time and date.



TIP: In entering the Scheduled Start time, keep in mind that when this test starts, it will automatically stop a currently running test.

This completes the test setup.



TIP: The end of a test cannot be programmed in advance. In most cases, the **Stop** button is the only way to end a test. Exceptions: A test stops automatically (1) when another test starts, and (2) when the device memory is full.

9 TEST OPERATIONS



IN THIS SECTION

- About Test Operations
- Starting a Test
- Stopping a Test
- Extracting and Viewing Data
- Deleting Tests

ABOUT TEST OPERATIONS

Test operations are initiated by action buttons in two places:

- the device's Tests node, where information about all tests is displayed and actions may be performed on multiple tests
- a single Test node, where actions are available for the selected test

The action buttons available depend on your test selection.

STARTING A MANUAL START TEST

1. Navigate to the device's Tests node.
2. In the Information pane, select a pending manual test.
3. Select the action **Start Test**.
4. Click **Yes** to confirm your selection.



Once a test starts, the following actions will not be available: Add Test, Delete Test(s), Edit Test, Set Device Clock, Edit Device Info, Edit Parameter.

- Win-Situ will start the test.

If a test is running, Win-Situ will stop the running test and then start the selected test. Depending on how busy the device is, this can happen virtually simultaneously.

STOPPING A TEST

The end of a test cannot be programmed in advance. In most cases, the **Stop** button is the only way to stop a running test. Exceptions: A test stops automatically when:

- another test starts
- the device's memory is full.

- Navigate to the device's Tests node.
- Click the **Stop Running Test** button. Since only one test can be running, you do not need to select a specific test.
- Click **Yes** to confirm your selection.
- Win-Situ will stop the test and update the display.

EXTRACTING & VIEWING DATA

This operation retrieves test data and saves it to a file on the host computer. You can view the file immediately after the download, or later.



TIP: You can extract and view data almost immediately after a Linear test starts, and about 10 seconds after a Log test starts.

- Navigate to the device's Tests node.
- In the Information pane, select one or more tests to extract. To select multiple tests, hold the CTRL key while clicking.
- Click the **Extract Test Data** button. Win-Situ extracts the test(s).

When the extraction is complete, Win-Situ displays the name(s) and locations of the test data file(s) on the host computer, and presents options:

- View** launches Data Manager to view the selected file
- Done** returns to Win-Situ



For complete information on working with test files in Data Manager, see Section 10.



TIP: “Extracting” puts a copy of a test data file on your computer, but does not delete the data from the device. To free up device memory, see *Deleting Tests*.



TIP: Win-Situ saves each test to a folder named “Data” in the folder where Win-Situ is installed. The file structure looks like this:

Win-Situ \ Data \ SN00120 2000-01-18 083000 drawdown.bin

Device serial number

Test start date (yyyy-mm-dd)

Test start time (hhmmss)

Test name

File type

DELETING TESTS

Tests are stored in the device memory until you delete them. This operation **permanently** removes selected tests from the device, and reorganizes the memory to optimize future data storage. Depending on how full the memory is, the process can take several minutes.



CAUTION: Be sure to extract data you want to save before deleting from the device. Once a test is deleted, the data cannot be retrieved!

1. Navigate to the device’s Tests node.
2. In the Information pane, select one or more tests to delete.
3. Press the **Delete Tests** button.
4. Click **Yes** to confirm your selection.
5. Win-Situ will delete the selected test(s) **permanently** from the device.



TIP: The Delete procedure can be used to cancel a pending scheduled test.

10

TEST DATA FILES



IN THIS SECTION . . .

- Overview of Data Manager
- Changing the Data Display
- Graphing Data
- Saving Text Files
- Exporting Data

OVERVIEW OF DATA MANAGER

Two areas of Win-Situ are concerned with test data files:

- The **Extract Test Data** button retrieves a test from the device and saves it to a file on the host computer.
- **Data Manager** starts automatically when you View the extracted data. It can also be run as a separate program for use with previously extracted files.

Data Manager can display any test data file as a report or a graph. It also has options that give you flexibility in displaying data.

STARTING DATA MANAGER AUTOMATICALLY

Win-Situ launches Data Manager automatically when you **Extract** a test and select the **View** option at the end of the download. Instructions for doing this are in Section 9, under “Extracting & Viewing Data.”

STARTING DATA MANAGER AS A STAND-ALONE APPLICATION

1. Start Data Manager using one of the following methods:

- In Win-Situ, select the **Data** button on the button bar.
 - Use the Windows Start menu to select it from the group In-Situ Inc.
2. Choose **Open** from the Data Manager File Menu.
 3. In the “Open” dialog box, select a .BIN file of test data that has been extracted from a device.




Data Manager is designed for use with .BIN files—the format used to extract data from a device. To avoid an error message when opening a file in Data Manager, always select a .BIN file.

4. Click **OK**. The file will open in the Data Manager window.

Data Manager, like other Windows applications, allows you to have multiple files open and switch between them. Use options on the Window menu to arrange the individual file windows.

CHANGING THE DATA DISPLAY


TO CHANGE MEASUREMENT UNITS

1. Select **Units** on the Settings menu, or click  on the toolbar
2. In the Unit Selection dialog box, highlight a measurement type in the list on the left.
3. In the list on the right, select the unit you prefer for the measurement.
4. Repeat for another measurement and unit, or click **OK**.

TO CHANGE HERMIT 3000 CHANNEL SETTINGS




CAUTION: *If the Channel Settings were entered correctly during channel setup, do not change them.*

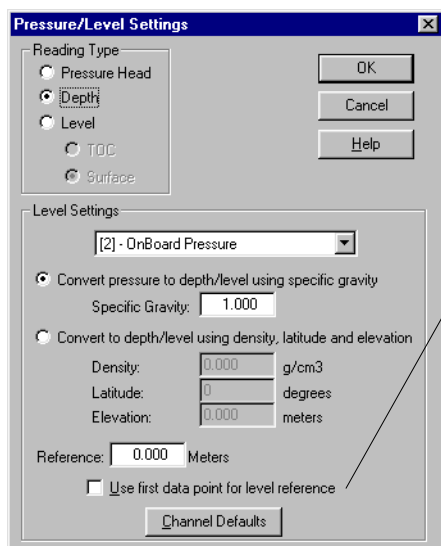
1. Select **Channel** on the Settings menu, or click  .
2. The Channel Settings dialog box displays the first test channel (or the Event channel for an Event test).
3. Use the arrow at the end of the Channel list box to display the test channels and select the one you want to change.
4. Enter the correct type and/or coefficient(s), and click **OK**.

The *Channel Defaults* button restores the original settings.

TO CHANGE PRESSURE/LEVEL SETTINGS


The data file is initially displayed using the settings specified when setting up the pressure channel. Refer to Section 5 for details on the settings.

1. Select **Pressure** from the Settings Menu, or click  .
2. In the Pressure/Level Settings dialog box, change any or all of the settings:
 - Reading Type: pressure head, depth, or level
 - Pressure to depth/level conversion using specific gravity or using density, latitude & elevation
 - Barometric compensation for HERMIT 3000 channels
 - Level reference
 - Time at which the reference reading is/was taken
3. Click **OK** to accept the changes and return to the data display. (The Channel Defaults button restores the original settings.)

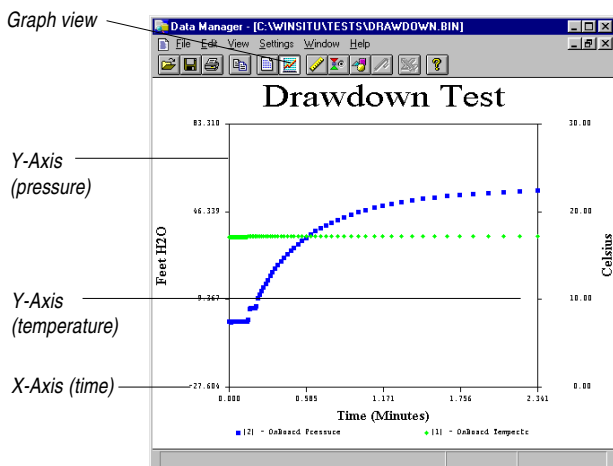


A check here means the reference reading will be set to the pressure head of the first measurement. If you originally chose to take the reference reading "at start of test," this option is not available.


GRAPHING DATA

Select the **Graph** option on the View Menu to view the data file in graph format or click  .

As with the Report format, the initial display reflects the choices you made when you defined the channels (or your most recent selections in the Pressure/Level Settings dialog box).



TO CHANGE GRAPH SETTINGS

1. To customize the look and content of a graph, select **Graph** from the Settings Menu, or click  on the toolbar.
2. In the Graph Settings dialog box make your selections in each group of settings:

General Settings

Graph Title: The default title suggested is the test name.

Lines/Symbols: The graph can show **symbols** for data points, **lines** connecting the data points, or both (symbols connected by lines).

Color: When this box is checked, the lines/symbols are displayed in color. When printing to a black-and-white printer, the symbols will be sharper if this box is cleared.

Symbol per every: The default is one symbol for each data point in the file. You can plot every other data point by entering "2" here, or every third by entering "3," and so on.

Adding and Removing Channels

Use the **Select Channels** button in the Graph Settings dialog box to remove channels from the graph. For example, if a test recorded water level and temperature, you may want to plot just water level. Or if your

test used more than the maximum of 2 types, the two chosen for the plot will be the first two in the test (i.e., the lowest channel numbers). You can use this procedure to plot channels other than the defaults.



TIP: A graph can show 2 measurement types (e.g., level and temperature), and up to 6 channels.

1. In the Graph Settings dialog box, click **Select Channels**.
2. In the Channel Selection dialog box, the plotted channels are shown in the Selected Channels list. Channels in the Available Channels list will not be plotted.
 - To **remove** a channel: highlight the channel in the Selected Channels list, then click < **Remove**.
 - To **add** a channel: highlight the channel in the Available Channels list, then click **Add** >.
3. Click **OK** through two dialog boxes. The graph will reappear with your selected channels plotted.

SCALING THE AXES

“Scale” refers to the range or extent of an axis, determined by its minimum value (starting point) and maximum value (ending point). Scaling can “zoom in” on an area of the data.

When a graph is first displayed, both axes are automatically scaled to include all the data in the file. This is “auto-scaling.” Anytime you change the Pressure/Level Settings, the Y-axis will be auto-scaled.

Auto-scaling produces an acceptable plot, but if you wish, you can customize it by scaling one or both axes, as described below.

X-Axis Scaling

Log Scale: Check this box to get a logarithmic X-axis. *Time units will be set to minutes if you select this option.*

Gridlines: Check this box for gridlines on the axis.

Selected: The minimum (MinX) and maximum (MaxX) time values plotted. To change the scale of the axis, enter the minimum and maximum values you want to plot.

Data Span: The minimum (MinX) and maximum (MaxX) time values in the data file. *Shown for your information only.*

Auto Scale X: Rescales the X-axis to include all the data in the file.

Y-Axis Scaling

Two measurement types can be shown. This means the graph can have two Y-axes. The scale for one is shown on the left, the other on the right. A pressure/level axis will always be on the left.

When two measurement types are plotted, each Y-axis is scaled independently. The current type is shown in the Measurement box, and its unit appears after the words "Y-Axis Scaling." To select a different type (if available), click the arrow at the end of the Measurement box to display the available types. Click the one for the axis you want to scale.

Inv. Scale: Check this box to invert the axis.

Log Scale: Check here for a logarithmic Y-axis (except temperature).


Gridlines: Check this box for gridlines on the axis.

Selected: The minimum (MinY) and maximum (MaxY) values plotted for this axis. When the range in the data file is small, the proposed scale is considerably wider than the data span. This range is chosen automatically by Data Manager. To change it, enter different MinY and MaxY values.

Data Span: The minimum (MinY) and maximum (MaxY) values in the data file for this axis. *Shown for your information only.*



Auto Scale Y: Rescales the Y-axis to its original settings.

SAVING TEXT FILES

1. Click  for Report view.
2. Select **Save As** from the File Menu.
3. In the Save File as Type box, select Text files (.TXT).
4. Supply a file name in the usual way and click **OK**. The original binary file remains unchanged. The new text file contains the data as currently displayed.

TRANSFERRING DATA TO EXCEL

If Microsoft Excel is properly installed on your computer, you can easily export a data file (report view) to an Excel spreadsheet.

1. Click  for Report view.
2. Select Transfer from the File Menu, or click  .

You can customize Data Manager to use an application other than Excel by editing the file DATAMGR.INI (in your Win-Situ folder) to include these lines:

```
[Export]
SSPath=<directory and exe name>
```

PRINTING DATA

To print the Report or Graph as currently displayed, select Print on the File Menu. Your Windows documentation has complete information on print options.

SAVING CHANGES

Data Manager shows when a file has been changed by displaying the word “Modified” at the lower right corner of the screen. When you close a file that has been modified, you have a choice of saving the changes or restoring the binary file to its original state.

EXITING DATA MANAGER

1. Select Exit from the File Menu.
2. If any open files have changed, Data Manager will ask whether you want to save changes.
 - If you click Yes, changes will be made to the original binary file.
 - If you click No, the changes will be lost.
 - If you'd like to preserve the changes, but without overwriting the original binary data file, select No, then save the changes in a text file. See “Saving Text Files” on page 36.

APPENDIX



LIQUID DENSITY

The conversion from PSI units to meters of H₂O, or feet of H₂O, requires several conversion factors. One of these is the density (ρ) of the aqueous solution being monitored. Pure groundwater at 20°C has a density of 0.998 grams per cubic centimeter (g/cm³).

Use the values in the table below for density if you do not otherwise know it. However, since these data assume pure water, there is no accommodation for other variables (such as salinity) which can affect your actual water conditions. (Alternatively, you could compute it; see the following procedure.)

Temp. (°C)	Density (g/cm ³)	Temp. (°C)	Density (g/cm ³)	Temp. (°C)	Density (g/cm ³)
1	0.999900	11	0.999605	21	0.997992
2	0.999941	12	0.999498	22	0.997770
3	0.999965	13	0.999377	23	0.997538
4	0.999973	14	0.999244	24	0.997296
5	0.999965	15	0.999099	25	0.997044
6	0.999941	16	0.998943	26	0.996783
7	0.999902	17	0.998774	27	0.996512
8	0.999849	18	0.998595	28	0.996232
9	0.999781	19	0.998405	29	0.995944
10	0.999700	20	0.998203	30	0.995646

DETERMINING DENSITY

The density of water in a well can be determined using an accurate tape measure and a pressure transducer. A change in pressure is recorded between two points as the transducer is lowered into the water and the corresponding change in depth is recorded using the measuring tape. Density is then calculated using a simple formula. This method is valid if the pressure and depth measurements are accurate and the water within the well is homogeneous throughout the entire depth of the well.

Note: Density can also be measured using a hydrometer if it is possible to withdraw a water sample from the well. We recommend an accuracy of ± 0.0005

Procedure

There are two possible methods for measuring the change in water depth. Choose the method that is the most convenient and accurate.

- Attach the tape measure to the transducer cable using an adhesive (e.g., duct tape). The tape measure can be attached to the transducer itself or to a segment of the cable that will be adjacent to the top of the well casing. Read the cable positions directly from the measuring tape. The measuring device must have a resolution of at least 1 mm or 1/16 in.
 - Alternatively, mark the positions of the cable with a felt tip pen. The distance between marks is then determined with a tape measure after the corresponding cable segment is removed from the well.
1. Lower the transducer into the well until it is submerged under about one meter of water.
 2. Secure the transducer at a fixed depth using the cable at the top of the well casing. Wait an hour or so for the system to equilibrate.
 3. Take an electronic pressure reading, manually, from the transducer and record this measurement in PSI. This is measurement P_1 .
 4. Read the tape measure relative to some fixed reference point (e.g., top of well casing) or mark the position on the cable with a felt tip pen. This is measurement L_1 .
 5. Lower the transducer at least three meters deeper into the water and repeat steps 3 and 4. These are measurements P_2 and L_2 .
 6. Density (ρ) in g/cm^3 is calculated using the following:

$$\rho = \frac{(P_2 - P_1) \times 6.894757}{g \times (L_2 - L_1)}$$

where g is the gravitational acceleration for the location of the well in m/s^2 . P must be in PSI units and L must be in meters.



TIP: If using a tape measure calibrated in feet, $1 \text{ ft} = 0.3048 \text{ m}$ (exactly).



Note: An error of 0.001 m (1 mm) in the depth measurement translates into an error of 0.00085 g/cm^3 for density.

LOG TEST SCHEDULE

Logarithmic (or simply “log”) sampling optimizes data collection speed and memory usage for pump and slug tests. The measurements begin closely spaced and the interval between measurements continuously increases. The device takes 40 log-normally distributed measurements per log decade of time. For example, from 10 to 100 minutes, measurements occur at approximately the following times:

1.	10.0 min.	21.	31.6 min.
2.	10.6 min.	22.	33.5 min.
3.	11.2 min.	23.	35.5 min.
4.	11.9 min.	24.	37.6 min.
5.	12.6 min.	25.	39.8 min.
6.	13.3 min.	26.	42.2 min.
7.	14.1 min.	27.	44.7 min.
8.	15.0 min.	28.	47.3 min.
9.	15.8 min.	29.	50.1 min.
10.	16.8 min.	30.	53.1 min.
11.	17.8 min.	31.	56.2 min.
12.	18.8 min.	32.	59.6 min.
13.	19.9 min.	33.	63.1 min.
14.	21.1 min.	34.	66.8 min.
15.	22.4 min.	35.	70.8 min.
16.	23.7 min.	36.	75.0 min.
17.	25.1 min.	37.	79.4 min.
18.	26.6 min.	38.	84.1 min.
19.	28.2 min.	39.	89.1 min.
20.	29.8 min.	40.	94.4 min.

The next log decade, from 100 to 1000 minutes, would look very similar, but decimal points would be shifted to the right by one place. Similarly, measurement times in any log decade can be deduced by examining the decade above, then shifting the decimal point right or left the appropriate number of places. There may be a slight numerical difference noted between time values from different logarithmic

decades due to machine floating-point roundoff, but the actual time value at which any given data point was taken will be reported accurately in the data file to the fourth decimal place.

The interval between measurements will continually lengthen, but your specified **Measurement Interval** serves as a “linearization” value such that the interval between measurements will never become greater than this value. For example, with a Measurement Interval of 20 minutes, the device’s sampling interval lengthens until a 20 minute interval is reached, then it begins to sample linearly from that time on at 20-minute intervals.

In a true logarithmic sampling scheme, the interval between points would be infinitely short at time $t=0$ (the start of the test), which implies infinitely rapid sampling. The device cannot sample faster than once every 300 milliseconds (0.3 seconds). Thus, a linear sampling rate of one point each 300 milliseconds occurs for the first 6 seconds into the test, then the logarithmic decline begins.

