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Vitals Reference Manual



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Table of Contents

Chapter 1: About This Manual	1
Purpose of This Manual	1
How to Use The Manual	2
Manual Updates and Revision Tracking	2
Revision History	2
Chapter 2: Safety	3
Operator Safety	3
Safety Symbols	4
Protective Equipment Requirements	5
Vitals Diagnostics	5
Chapter 3: Vitals Hardware and Software	9
Vitals System Architecture	9
System Requirements	11
Valve Operator Support and Compatibility	11
TC-100 Tablet Controller with Vitals Mobile-TC	12
Connection Options	12
Specifications	13
California Energy Commission Compliance	14
HC-100 Handheld Controller with Vitals Mobile-HC	14
Connection Options	14
Specifications	15
California Energy Commission Compliance	16
Chapter 4: Starting Up with Vitals	17
Installing Vitals Desktop	18
Vitals Mobile-TC	21
Vitals Mobile-HC	21
Foreign Language Support	24
Chapter 5: Using Vitals Mobile-TC (TC-100 Controller)	27
Starting Up	27
TC-100 Controller Functions	27
Tablet Settings	29
Initial TC-100 Setup	29
Vitals Mobile-TC Reference	32
Settings	33

Connection Tab	33
Adding a Valve Operator	41
Adding External GPS	45
Displaying and Searching Valve Information	48
Re-linking an Activity to a Different Valve	55
Valve Operation	59
Vitals Mobile Controller	59
Starting a New Activity with Existing Valve	62
Finding Valves on the Map	63
Starting a New Activity with a New Valve	64
Relinking an Activity to a Valve Record	66
Creating a New Valve Record	66
Relinking to an Existing Valve Record	70
Transducer Errors	74
Vitals Mobile Diagnostics	76
Brake Test	79
Counter Test	81
Hydraulics Test	84
Transducer Zero Torque Error	86
Using the Diagnostics Cable	88
Chapter 6: Using Vitals Mobile-HC (HC-100 Controller)	91
Starting Vitals Mobile	91
Main Screen Reference	93
Changing Controller Settings	96
Changing GPS Settings	104
ERV-750 or TM-7	106
Changing Bluetooth Device Names	110
External GPS	114
Vitals Mobile Controller Operation	119
Vitals Controller	119
Transducer Errors	122
Valve Operation with Data Logging	124
Starting a New Valve Activity	124
Using GPS Search	128
Accessing Saved Activities	130
Enabling and Using GPS	133
GPS Status Bar Statements and Enabling GPS Receivers	133
Logging GPS Positions	134
Vitals Mobile Notifications	134
Vitals Mobile Diagnostics	135
Brake Test	137
Counter Test	139
GPS Test	141
Hydraulics Test	142

Transducer Zero Torque Error	144
Using the Diagnostics Cable	146
Diagnostics Logs	147
Chapter 7: Using Vitals Desktop	149
Initial Start-Up	149
Database File Location	150
Screen Reference	152
Main Screen	152
Creating and Editing Valves and Activities	155
How Vitals Uses GPS Location Information	155
Valve Record	155
Activity Record	156
Remarks List Window	157
Analyzing Valve Data	158
Displaying Valve/Activity Records	158
Printing	161
Print Detail	161
Activity Report	162
Transferring Data Between Vitals Desktop and Vitals Mobile	164
TC-100 Data Transfer	164
TC-100 Flash Transfer	164
TC-100 Local Transfer	174
USB Flash Transfer with HC-100 Controller	179
Other Controllers Data Transfer	191
Data Transfer Review	193
Uploading Large Databases	198
Database Options	201
Database Setup	201
Customize Data Fields	202
Queries	203
Settings	204
Help Options	206
Chapter 8: Troubleshooting Guide	209

Chapter 9: Ordering Information	227
Ordering Replacement Parts	227
Repair Information	227
Warranty Information	228
Return Goods Address	228
Chapter 10: Vitals Valve Exercising Program	229
Function Overview	229
Jogging	230
Manual Mode	230
Chapter 11: Vitals Database Reference	231
Table Structure	231

Chapter 1

About This Manual

PURPOSE OF THIS MANUAL

This manual explains the functions of the Vitals system for valve operation and maintenance. Vitals version 3.8.4 includes the following components:

- Handheld controller (TC-100 or HC-100) for valve operation and data collection with the ERV-750, TM-7, and TM-6 valve operators.
- Vitals Mobile 3.8.4 software (and later), running on the handheld controller.
- Vitals Desktop 3.8.4 software for Window-based computers, for valve database management.

Chapter 3 describes the Vitals 3.8.4 hardware and software in detail.

When using Vitals version 3.8.4 for the first time, be sure to follow the procedures in Chapter 4, “Starting Up with Vitals”. The setup procedure requires that you have a Windows (version 7, 8, or 10) PC on which you can install Vitals Desktop 3.8.4.

If you are currently running Vitals Desktop 3.7, upgrade it to version 3.8 before using Vitals Mobile 3.8 (either TC or HC version). If you have older HC-100 controllers, also upgrade them to version 3.8. You should always be running the same Vitals version on all your devices.

In This Chapter

PURPOSE OF THIS MANUAL
HOW TO USE THE MANUAL
MANUAL UPDATES AND
REVISION TRACKING

Throughout this manual, refer to this column for cautions and notices with supplementary information.

This symbol indicates a user notice.



Notices provide additional information to supplement the instructions, or tips for easier operation.

Current versions of E.H. Wachs Company manuals are also available in PDF format. You can request an electronic copy of this manual by emailing customer service at sales@ehwachs.com.

HOW TO USE THE MANUAL

This manual is organized to help you quickly find the information you need. Each chapter describes a specific topic on using the Vitals controller and software.

Each page is designed with two columns. This large column on the inside of the page contains instructions and illustrations. The narrower column on the outside contains additional information such as special notes and definitions. Refer to it for safety notes and other information.

MANUAL UPDATES AND REVISION TRACKING

Occasionally, we will update manuals with improved operation or maintenance procedures, or with corrections if necessary. When a manual is revised, we will update the revision history on the title page.

You may have factory service or upgrades performed on the equipment. If this service changes any technical data or operation and maintenance procedures, we will include a revised manual when we return the equipment to you.

Revision History

Original December 2012
Rev. B, October 2014
Rev. C, June 2015
Rev. D, July 2017
Rev. E, November 2018
Rev. F, September 2019
Rev. G, September 2020
Rev. H, April 2021
Rev. I, August 2021
Rev. J, August 2022

Chapter 2

Safety

E.H. Wachs takes great pride in designing and manufacturing safe, high-quality products. We make user safety a top priority in the design of all our products.

Read this chapter carefully before operating the valve equipment using the Vitals controller (TC-100 or HC-100). It contains important safety instructions and recommendations.

OPERATOR SAFETY

Follow these guidelines for safe operation of the equipment.

- **READ THE OPERATING MANUAL.** Make sure you understand all setup and operating instructions before you begin.
- **INSPECT MACHINE AND ACCESSORIES.** Before starting the machine, look for loose bolts or nuts, leaking lubricant, rusted components, and any other physical conditions that may affect operation. Properly maintaining the machine can greatly decrease the chances for injury.
- **ALWAYS READ PLACARDS AND LABELS.** Make sure all placards, labels, and stickers are clearly legible and in good condition. You can purchase replacement labels from E.H. Wachs Company.
- **KEEP CLEAR OF MOVING PARTS.** Keep hands, arms, and fingers clear of all rotating or moving parts.

In This Chapter

OPERATOR SAFETY

VITALS DIAGNOSTICS



Look for this symbol throughout the manual. It indicates a personal injury hazard.

Always turn machine off before doing any adjustments or service.

- **SECURE LOOSE CLOTHING AND JEWELRY.** Secure or remove loose-fitting clothing and jewelry, and securely bind long hair, to prevent them from getting caught in moving parts of the machine.
- **KEEP WORK AREA CLEAR.** Keep all clutter and nonessential materials out of the work area. Only people directly involved with the work being performed should have access to the area.

Safety Symbols



This icon is displayed with any safety alert that indicates a personal injury hazard.

WARNING

This safety alert indicates a potentially hazardous situation that, if not avoided, **could** result in **death or serious injury**.

CAUTION

This safety alert, with the personal injury hazard symbol, indicates a potentially hazardous situation that, if not avoided, **could** result in **minor or moderate injury**.

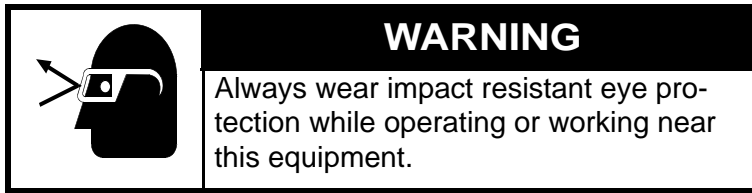
NOTICE

This alert indicates a situation that, if not avoided, **will** result in **damage to the equipment**.

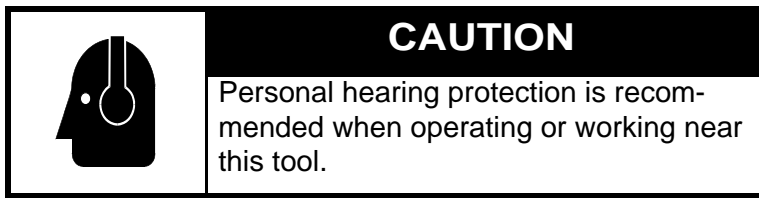
IMPORTANT

This alert indicates a situation that, if not avoided, **may** result in **damage to the equipment**.

Protective Equipment Requirements



For additional information on eye and face protection, refer to Federal OSHA regulations, 29 Code of Federal Regulations, Section 1910.133., Eye and Face Protection and American National Standards Institute, ANSI Z87.1, Occupational and Educational Eye and Face Protection. Z87.1 is available from the American National Standards Institute, Inc., 1430 Broadway, New York, NY 10018.



Hearing protectors are required in high noise areas, 85 dBA or greater. The operation of other tools and equipment in the area, reflective surfaces, process noises, and resonant structures can increase the noise level in the area. For additional information on hearing protection, refer to Federal OSHA regulations, 29 Code of Federal Regulations, Section 1910.95, Occupational Noise Exposure and ANSI S12.6 Hearing Protectors.

VITALS DIAGNOSTICS

The Diagnostics module of Vitals Mobile lets you test electronic and mechanical functions of the valve operator.

Vitals Diagnostics operates the valve operator; use the same safety precautions and procedures that you use when performing valve operations.

Do not use Vitals Diagnostics with the valve operator attached to a valve. Run Diagnostics only in the following circumstances:

- the valve operator is powered on and in operating position;
- the valve operator is **not** attached to a valve;
- all safe operating procedures are in place. See the User Manual for your valve operator.



Figure 2-1. The Diagnostics button on the main screen opens the Vitals Mobile Diagnostics program.

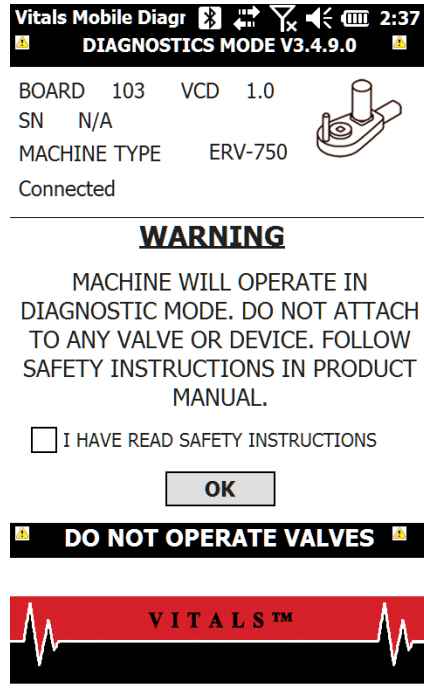


Figure 2-2. The Warning screen appears when you start Vitals Mobile Diagnostics. Read all safety instructions in the valve operator manual and verify by clicking the checkbox before you continue.



WARNING

Make sure that the valve operator is not attached to a valve when running Diagnostics. Keep clear of moving parts while running Diagnostics. Follow all safety procedures for using the valve operator.



Chapter 3

Vitals Hardware and Software

VITALS SYSTEM ARCHITECTURE

Figure 3-1 illustrates the Vitals 3.8.4 hardware and software architecture.

The **Vitals hardware** is a handheld control computer that operates E.H. Wachs valve exercising equipment, and stores and transfers valve operation data. There are two controller models:

- TC-100 tablet controller (introduced in 2021). Chapter 5 describes how to use the TC-100.
- HC-100 handheld controller (sold through early 2021). Chapter 6 describes how to use the HC-100.

The **Vitals software** has two components:

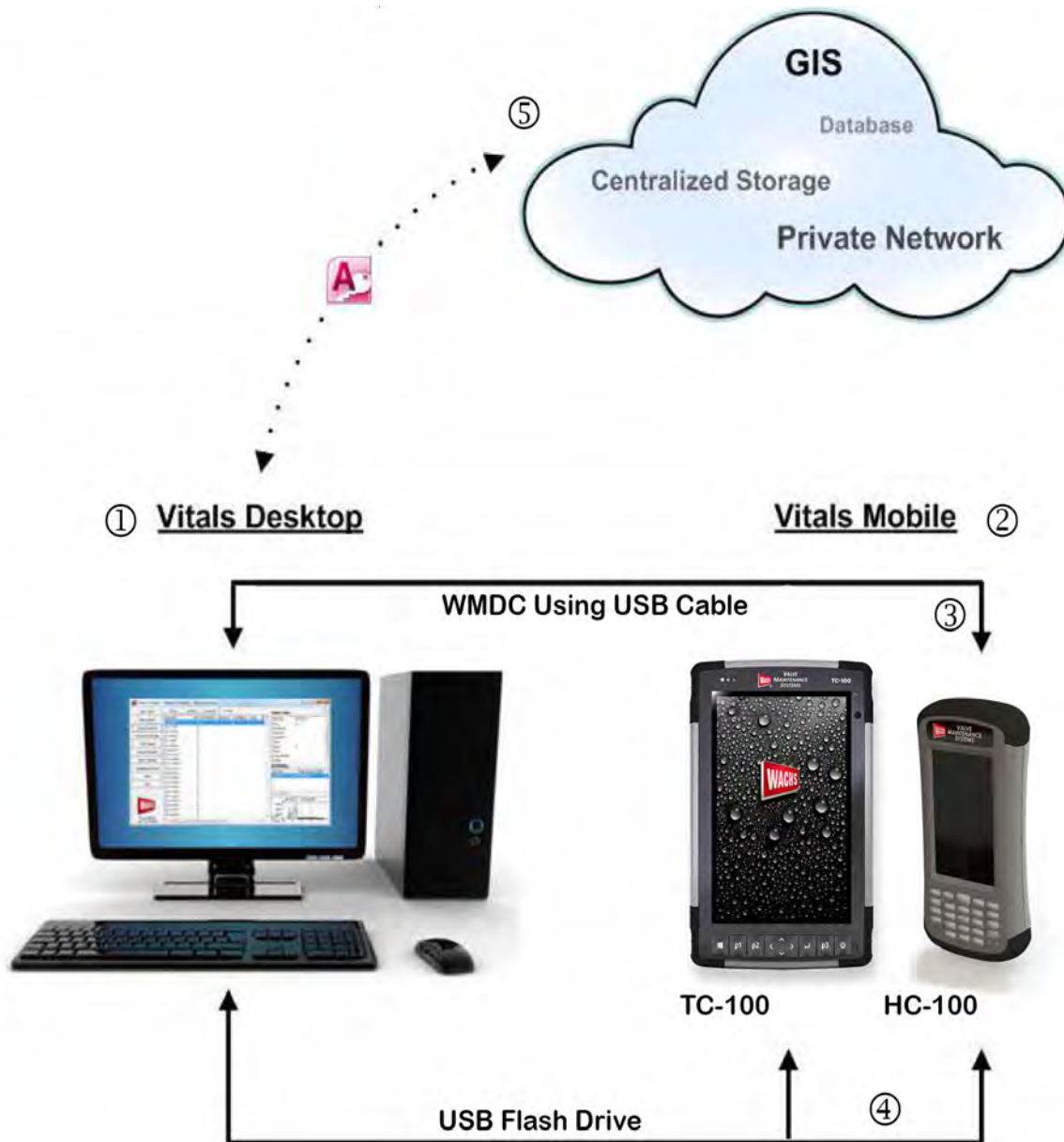
- *Vitals Desktop* runs on a Windows-based computer. Vitals Desktop lets you manage and analyze valve information and exercising data. Chapter 7 describes using Vitals Desktop.
- *Vitals Mobile* runs on the handheld controller. It operates the valve exercising equipment and logs valve exercising data.
 - The TC-100 tablet controller runs the Vitals Mobile-TC software.
 - The HC-100 handheld controller runs the Vitals Mobile-HC software.

In This Chapter

VITALS SYSTEM ARCHITECTURE

TC-100 TABLET CONTROLLER WITH VITALS MOBILE-TC

HC-100 HANDHELD CONTROLLER WITH VITALS MOBILE-HC



1. The master database resides in Vitals Desktop. Data is transferred between Vitals Mobile and Vitals Desktop during a data transfer.
2. The master database is replicated in Vitals Mobile during a data transfer. Any new valve data created in Vitals Mobile is downloaded into the master database during a data transfer.
3. Connection between Vitals Mobile-HC and Vitals Desktop can be made with the optional docking station or a wired USB connection, using Windows Mobile Device Center (WMDC).
4. USB flash drive transfer can be initiated from either the TC-100 or HC-100. Activity data is transferred to the Vitals Desktop database; the updated database is then transferred by flash drive back to the controller.
5. Data collected through the Vitals software suite can be exported from Vitals Desktop to your choice of GIS software, private network, or any other location, by your IT or GIS team. (This functionality is not supported by E.H. Wachs.) Vitals database is stored in Microsoft Access format. See Appendix B for Vitals database technical information.

Figure 3-1. The diagram illustrates the Vitals software and hardware architecture.

System Requirements

Vitals Desktop requires a Windows PC running Windows 7, 8, or 10, with a USB port. The PC USB port is used to connect to the Vitals controller, or to connect to a flash USB drive for Flash Transfer.

Vitals Mobile-TC runs on the TC-100 Tablet Controller. The TC-100 is a Windows 10 tablet with Vitals software installed to control E.H. Wachs equipment and manage valve data.

Vitals Mobile-HC runs on the HC-100 handheld controller. The HC-100 is a Windows Embedded Handheld device for operating E.H. Wachs equipment. Vitals Mobile-HC is also compatible with older controllers such as the Trimble Recon.

Valve Operator Support and Compatibility

The Vitals controllers running Vitals 3.8.4 are compatible with the following Wachs valve operators. Table 3-1 describes feature support for each valve operator.

- ERV-750
- TM-7
- TM-6

Table 3-1: Vitals Mobile 3.8.4 Feature Support

Feature	ERV-750	TM-7	TM-6
Manual/emergency valve operation	Yes	Yes	Yes
Automatic “No-assumption” valve exercising	Yes	Yes	Yes
Data logging	Yes	Yes*	Yes*
Bluetooth communication (requires Bluetooth module on valve operator)	Yes	Yes*	Yes*
Vitals Mobile Diagnostics	Yes	Yes**	Yes**

* May require board upgrade on older valve operators; contact E.H. Wachs with serial number for information.

** Not applicable for older TM-7/TM-6 units with silver/yellow controller boxes.



NOTE

Vitals Desktop 3.8.4 should be compatible with Windows Vista and XP. However, this has not been tested and is not supported, and E.H. Wachs does not guarantee compatibility. E.H. Wachs follows Windows’s lifecycle support guidelines.



NOTE

There is a known issue with Windows Mobile Device Center (WMDC) in Windows 10. The handheld controller may not connect to your Windows 10 computer until you enable WMDC. See “HC-100 not recognized when connected to PC” on page 209 in the Troubleshooting chapter.

TC-100 TABLET CONTROLLER WITH VITALS MOBILE-TC

The TC-100 is a tablet computer running the Windows 10 operating system. It is waterproof, dustproof, and can be used in temperatures from -4°F to +122°F (-20°C to +50°C). The TC-100 has integrated GPS and Bluetooth connectivity. See specifications below.

You can use an external GPS unit for higher-resolution mapping. Input requires NMEA-0183 data format, using Bluetooth.



Figure 3-2. The TC-100 handheld controller is a fully functional Windows 10 computer, running Vitals Mobile software.

Connection Options

Connection between the TC-100 and E.H. Wachs valve operating equipment is made using either the included 79-302-30 Machine Control Cable or the embedded wireless Bluetooth communication in the TC-100 (requires Bluetooth-equipped valve operator).

You can transfer valve and activity data between the TC-100 and your PC running Vitals Desktop using a USB flash drive. You can also set up the TC-100 on your network; see your IT person/department for assistance. The TC-100 operates as a fully functional Windows 10 tablet PC.

Specifications

Table 3-2: TC-100 Hardware Specifications

Operating System	Microsoft Windows 10
Processor	Quad-core Intel Pentium N4200
Memory	8 GB RAM
Storage Memory	128 GB. Expansion with Micro SD/SDXC slot.
Display	800 x 1280, 7" backlit LCD
Battery Life	Up to 12 hours (may be reduced running GPS)
Battery Charging	4-6 hours to full charge
Ports	Data: USB 3.0 host (full A), 3.5 mm audio jack. Power: 10-15.5 V, nominal 12 VDC.
Cameras	8 MP rear and 2 MP front
Wireless connectivity	Bluetooth 5.0 long range wireless. Wi-Fi 801.11a/b/g/n/ac 2.4 GHz and 5 GHz..
GPS	u-blox NEO-M8N GNSS with 72 tracking channels.
Size and weight	5.4" w x 8.48" l x 1.36" d (137 mm x 215 mm x 35 mm). 1.73 lb (770 g) with battery.
Temperature	Operating: -4°F to +122°F (-20°C to +50°C)
	Storage: -22°F to +158°F (-30°C to +70°C)
	Charging: 32°F to +122°F (0°C to +50°C)
Environmental	IP68 waterproof and dustproof
Drop	Shockproof: multiple drops from 4' (1.2 m) onto concrete



NOTE

The “BC” symbol on the cover of this manual signifies CEC compliance.

California Energy Commission Compliance

The battery charger supplied with the TC-100 has passed testing required by California Code of Regulations Title 20, using Test Method 10 CFR Section 430.23(aa) (Appendix Y to Subpart B), June 2016. Information on the charger’s certification is available at:

<https://cacertappliances.energy.ca.gov/Pages/Appliance-Search.aspx>

(No hyphen.) Search for company “Juniper Systems”, model “TC-100”.



NOTE

The Bluetooth module is rated for operation from -4°F to +122°F (-20°C to +50°C).

HC-100 HANDHELD CONTROLLER WITH VITALS MOBILE-HC

The HC-100 is a ruggedized handheld computer running the Windows Embedded Handheld operating system. It is waterproof and can be used in temperatures from -22°F to +140°F (-30°C to +60°C). The HC-100 has integrated GPS and Bluetooth connectivity. See specifications below.

You can use an external GPS unit for higher-resolution mapping. Input requires NMEA-0183 data format, using either Bluetooth or an RS-232 cable.

Connection Options

Connection between the HC-100 and E.H. Wachs valve operating equipment is made using either the included 79-302-10 Machine Control Cable or the embedded wireless Bluetooth communication in the HC-100 (requires optional Bluetooth module installed, and may require board upgrade on older TM machines).

The HC-100 connects to the PC running Vitals Desktop using a USB connection. You can connect the HC-100 directly to the PC USB port (using Windows Mobile Device Center), or transfer data using a USB flash drive.



An optional desktop dock (79-110-09), shown in the photo, is available to provide power and USB connection to the HC-100. The dock also has an Ethernet jack for connecting to a network.

Specifications

Table 3-3: HC-100 Hardware Specifications

Operating System	Microsoft Windows Embedded Handheld
Processor	1.0 GHz ARM Cortex A8 i.MX53
RAM	512 MB
Storage Memory	8 GB
Display	800 x 480, 4.3" WVGA LCD TFT
Battery Life	Up to 20 hours (may be reduced when running GPS)
Battery Charging	2-4 hours to full charge
Ports	Data: USB host (full A), USB client (Micro B), RS-232 9-pin. Power: 12, 24 VDC input, 10-36 V unregulated.
Wireless connectivity	Bluetooth wireless, 2.1 +EDR, Class 1.5, range greater than 100 ft (30 m). Wi-Fi 801.11b/g/n.
GPS	High-sensitivity GPS/GLONASS/SBAS
Size and weight	3.6" w x 7.25" l x 1.5" d (91 mm x 184 mm x 38 mm). 1.3 lb (590 g) with battery.

Table 3-3: HC-100 Hardware Specifications

Operating System	Microsoft Windows Embedded Handheld
Temperature	Operating: -22°F to +140°F (-30°C to +60°C)
	Storage: -22°F to +158°F (-30°C to +70°C)
Environmental	IP68 waterproof and dustproof
Drop	Shockproof: multiple drops from 5' (1.5 m) onto concrete

**NOTE**

The “BC” symbol on the cover of this manual signifies CEC compliance.

California Energy Commission Compliance

The battery charger supplied with the HC-100 has passed testing required by California Code of Regulations Title 20, using Test Method 10 CFR Section 430.23(aa) (Appendix Y to Subpart B), June 2016. Information on the charger’s certification is available at <https://cacertappliances.energy.ca.gov/Pages/ApplianceSearch.aspx>, company “Juniper Systems”, model “AR2”.

Chapter 4

Starting Up with Vitals

You will need Internet access to download the Vitals installation file. You will also need a USB port to connect to the HC-100 controller.

There are two steps to start up the Vitals 3.8.4 software. You must perform them in this order:

1. **Install Vitals Desktop.** Run the Vitals 3.8.4 installer on your Vitals Desktop Windows PC (Windows 7, 8, or 10). (You can download the installer from the Wachs Utility website at www.turnvalves.com.
 - If you already have Vitals Desktop installed, download and run the installer to update it to Version 3.8.
2. **Initializing Vitals Mobile.**
 - For the TC-100 controller, start up and configure your Windows account on the tablet. The *TC-100 Quick Setup Guide* included with your controller has a link to detailed instructions on the Wachs Utility website.
 - Connect the HC-100 controller to your PC, using the supplied USB cable, and follow the instructions in the “Installing Vitals Mobile” section below.

In This Chapter

WHAT'S INCLUDED

INSTALLING VITALS DESKTOP

VITALS MOBILE-TC

VITALS MOBILE-HC

FOREIGN LANGUAGE SUPPORT

WHAT'S INCLUDED

The Vitals Desktop 3.8.4 installer includes the following files:

- Vitals Desktop application
- Vitals Reference Manual PDF
- Language pack files
- Windows Mobile Device Center installation files
- Vitals Mobile-HC installation CAB file
- Vitals Mobile-TC installation MSIX file.

INSTALLING VITALS DESKTOP



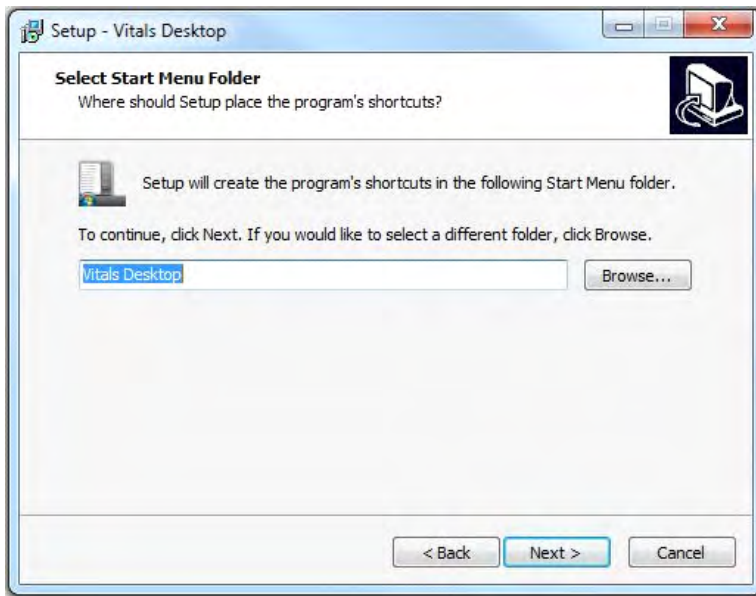
NOTE

Before running the installer, transfer any activities saved on the handheld controller to the Vitals database. See “Transferring Data Between Vitals Desktop and Vitals Mobile” on page 164.

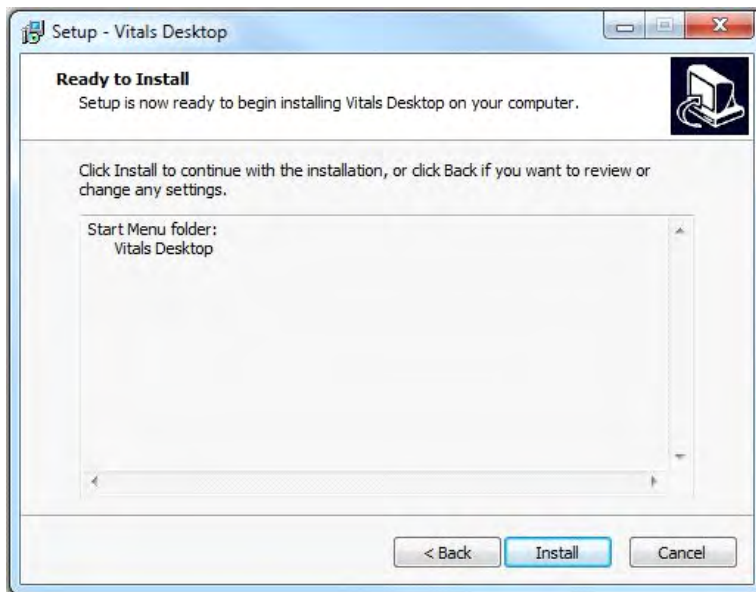
1. Run the downloaded installer file. The Setup Wizard should begin automatically.
2. The **Select Setup Language** window appears. Choose a language from the dropdown list and click **OK**.



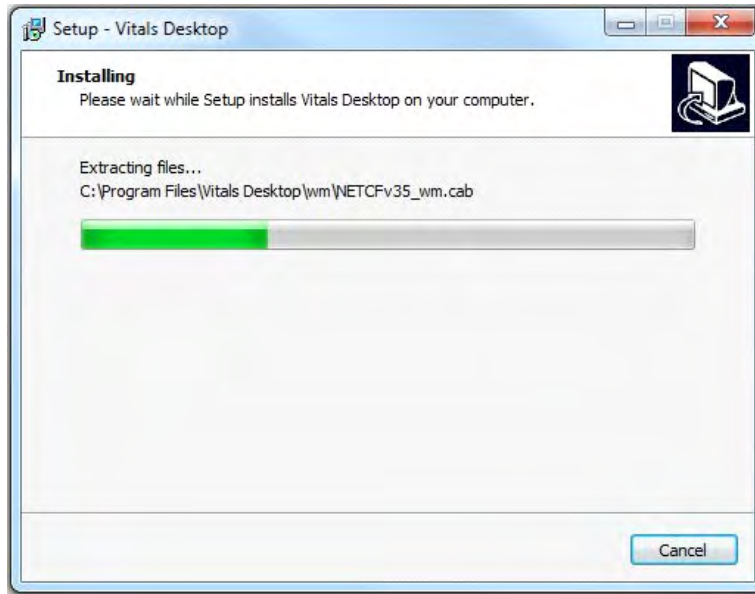
3. The **Setup - Vitals Desktop** window appears. Click **Next** to continue.
4. The **Vitals Installer Options** window appears. To proceed with the Vitals installation, select **Install Vitals 3.8.4 Software** and click **Next**. You can also choose to view the Vitals Reference Manual from this screen.
5. The **Information** window appears. Read through the Change Log and New Features to familiarize yourself with Vitals 3.8.4. Click **Next** to continue.
6. The **Select Start Menu Folder** window appears. Choose a location for the Vitals shortcut, or click **Next** to install the shortcut to its default location.



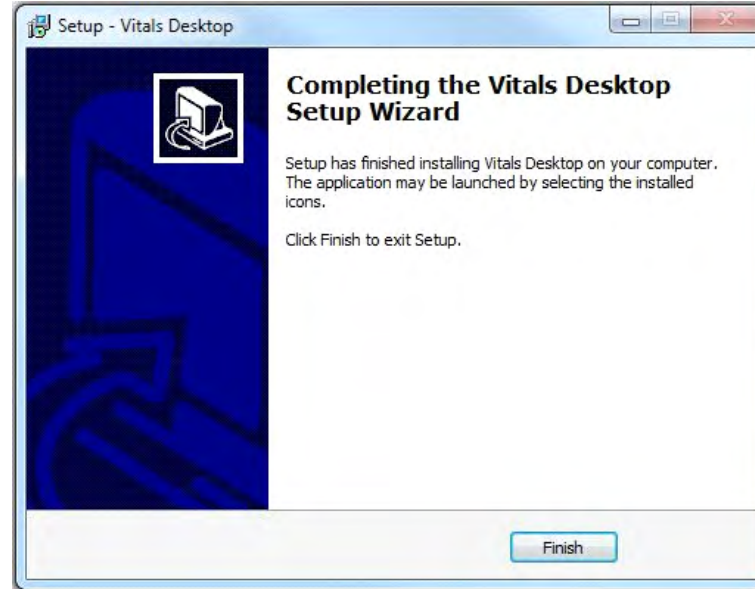
7. The **Ready to Install** window appears, showing the location of the Vitals Desktop Start Menu shortcut. (Another Vitals Desktop shortcut will be provided on the user's desktop.) Click **Next**.



8. The **Installing** window appears, showing the progress of the installation along with a list of files that are installed.



9. Once the installation is complete, the Setup Wizard will confirm that the installation has completed and Vitals Desktop has been installed. Click **Finish**. The Vitals Desktop software is now ready to use.



VITALS MOBILE-TC

Vitals Mobile-TC comes pre-installed on the TC-100 controller. As newer versions of Vitals Mobile-TC become available, they can be installed through the Settings screen in the application.

VITALS MOBILE-HC

Use this procedure for software installation if you have the HC-100 handheld controller.

Vitals Mobile-HC comes pre-installed on the HC-100 controller. As newer versions of Vitals Mobile-HC become available, they can be installed using the following procedure. (When there is a newer version of Vitals Mobile-HC, you will be prompted to install it on the HC-100 during a Data Transfer.) It is recommended to have the same versions of Vitals Mobile-HC and Vitals Desktop software.

You must have Vitals Desktop installed on your PC to perform the installation.

1. Connect the HC-100 to the PC using the supplied USB cable.
2. If the controller is off, turn it on by pressing the Power button.
3. Windows Mobile Device Center should open on the PC.



NOTE

If Windows Mobile Device Center doesn't open, see "Problems with Windows Mobile Device Center" in Chapter 7, Troubleshooting.



Figure 4-1. Windows Mobile Device Center will recognize the HC-100 controller.

4. Start the Vitals Desktop application.
5. In the Vitals Desktop menu, click **Data Transfer**. The **Data Transfer** dialog box should open. Click **START**.

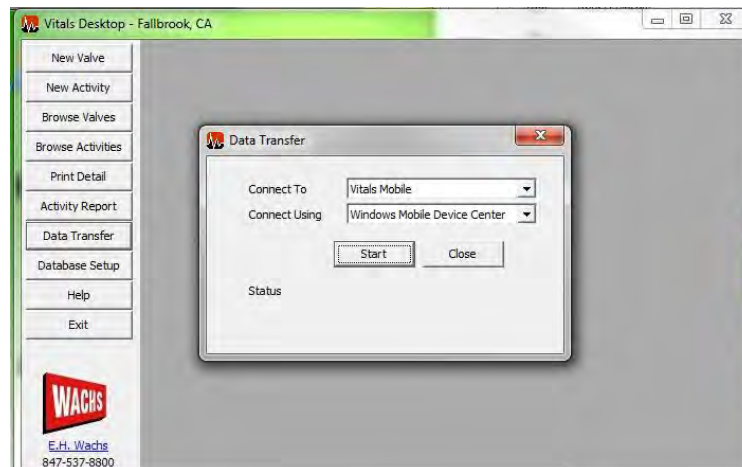


Figure 4-2. Click **Start** when the **Data Transfer** dialog appears.



NOTE

Once the installation starts, do not cancel it or close Vitals. You could lose activity data.

6. Vitals Desktop detects whether the controller has Vitals Mobile installed (including updates to the latest version). Click **Yes** to install Vitals Mobile.
7. The HC-100 screen shows the installation progress. **IMPORTANT:** Do not quit Vitals Desktop on the PC, or turn off the HC-100, during installation.



Figure 4-3. The HC-100 screen displays the installation progress.

8. A message confirms that the installation was successful.

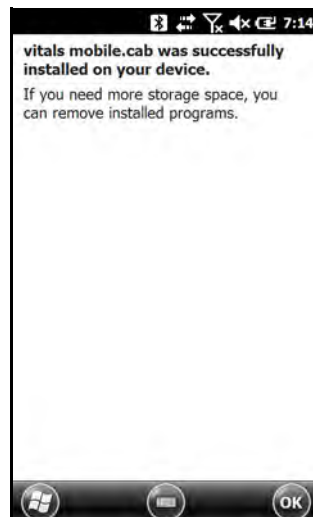


Figure 4-4. The HC-100 shows when the Vitals installation is complete.

9. After Vitals Mobile successfully installs on the controller, click the **OK** button in Vitals Desktop.
10. Vitals Desktop will sync the database on the HC-100. Click the **Close** button when data transfer is complete.



NOTE

Once the data transfer starts, do not cancel it or close Vitals. You could lose activity data.

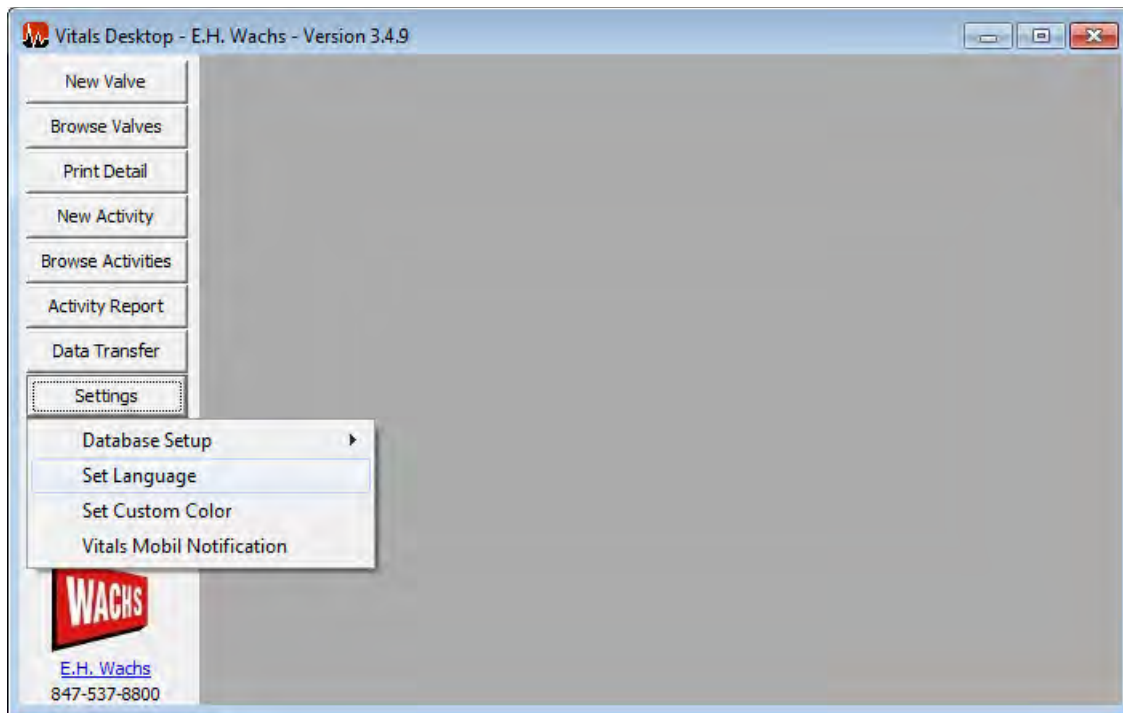
**NOTE**

Vitals Mobile-TC does not currently include foreign language support.

FOREIGN LANGUAGE SUPPORT

Foreign languages are supported by first installing the language file on the Vitals Desktop PC. During a Data Transfer, the available languages are pushed out to the Vitals Mobile.

1. Make sure the new language filename is in the format **strings.Language.txt**, where “**Language**” is the name of the language into which the file has been translated.
2. Copy the language file into the following directory on your computer: C:\Program Files\Vitals Desktop\strings.
3. Open Vitals Desktop and select **Settings >> Set Language**. Confirm that the new language has been added to the Vitals software.



4. A language in Vitals Desktop will be automatically uploaded to Vitals Mobile during a Data Transfer. To change the Vitals Mobile operating language, simply perform a Data Transfer while using the desired language on Vitals Desktop.

- In Vitals Desktop, some languages will require a change to the Administrative System Locale under the Region and Language settings on your Windows system in order to view special characters properly.
- Certain languages are not available in the Locale Settings on Windows Mobile devices. In order to view special characters for these languages, a language-specific firmware version is required.
- In order to easily input special characters for certain languages, third-party input software may be installed.



Chapter 5

Using Vitals Mobile-TC (TC-100 Controller)

The TC-100 tablet controller runs the Vitals Mobile-TC software. Vitals Mobile-TC operates the valve exerciser and stores valve exercising data. You can transfer valve records from your PC running Vitals Desktop to the controller, or enter valve records using Vitals Mobile-TC while in the field.

This chapter assumes you are familiar with how to operate a touchscreen tablet computer—including interface features such as tapping to select icons or data fields, touching and dragging icons on the screen, “swiping” on the screen, and typing with an on-screen keyboard.

STARTING UP

The *TC-100 Quick Setup Guide* is included in the box with the TC-100. Refer to this guide when unpacking and starting the tablet. The guide shows how to charge and configure the TC-100. The *Quick Setup Guide* includes a link to detailed instructions for Windows 10 setup on the Wachs Utility website.

TC-100 Controller Functions

The TC-100 tablet has a panel of control buttons below the screen.

In This Chapter

STARTING UP

DISPLAYING AND SEARCHING VALVE INFORMATION

VALVE OPERATION

VITALS MOBILE DIAGNOSTICS

**Attach holding strap
(either side of TC-100)**



P1/P2/P3 are programmable functions

Figure 5-1. TC-100 connections and control buttons

An optional dock is available. You can mount the TC-100 in the dock to charge and connect it to a wired network. The docking connector is on the left side of the tablet; it docks in landscape mode.

Press the TC-100 down onto the dock until it snaps in place. To remove it, press the release button on the front of the dock.

Tablet Settings

Swipe from the right edge of the screen toward the middle to display the Notifications and Device Settings menu.

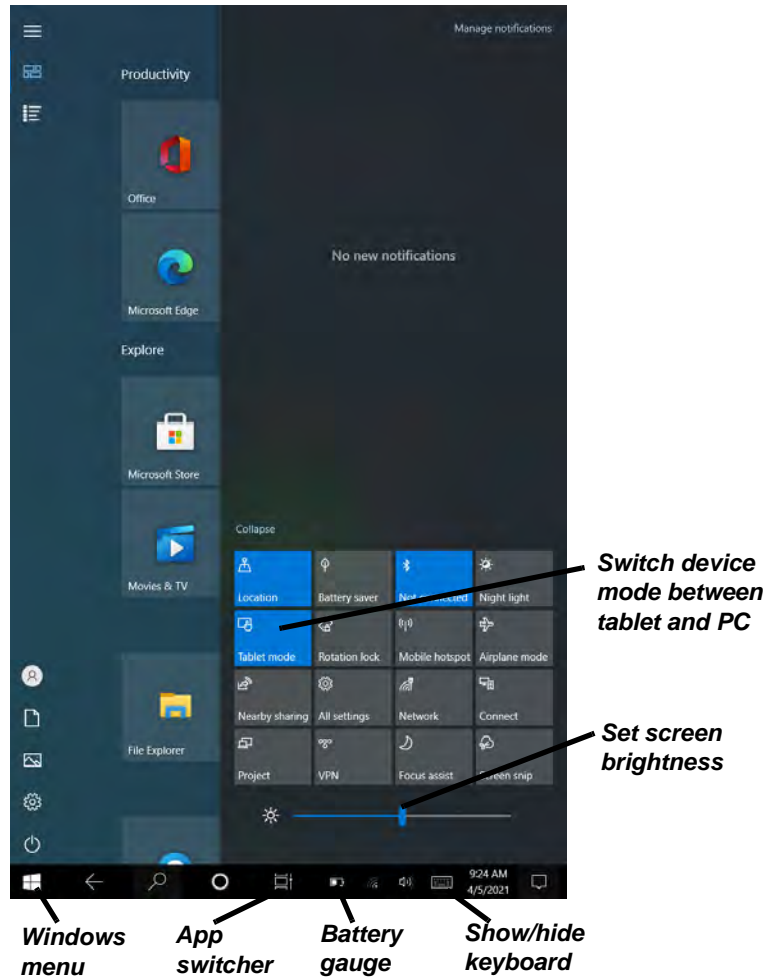


Figure 5-2. The figure shows the Notifications and Device Settings menu. Swipe from the right edge to show and hide the menu.

Tap on the left side of the screen or swipe again from the right to hide the settings.

Initial TC-100 Setup

The TC-100 functions as a standard Windows 10 computer. Initial setup is the same as for a new PC. Consult with your IT person or department for assistance, if necessary.

The TC-100 can be used as a non-networked, standalone device with a single user account for running the Vitals software. However, you will probably want to set up networking features such as wi-fi, file sharing, email, etc, to incorporate it into your office network.

1. Press the power button on the TC-100 tablet. You'll be prompted for Windows configuration information, including a user account.
2. When you login to your account, tap in the **Password** field to display the keyboard. Type in your tablet's password and tap the forward arrow to log in.

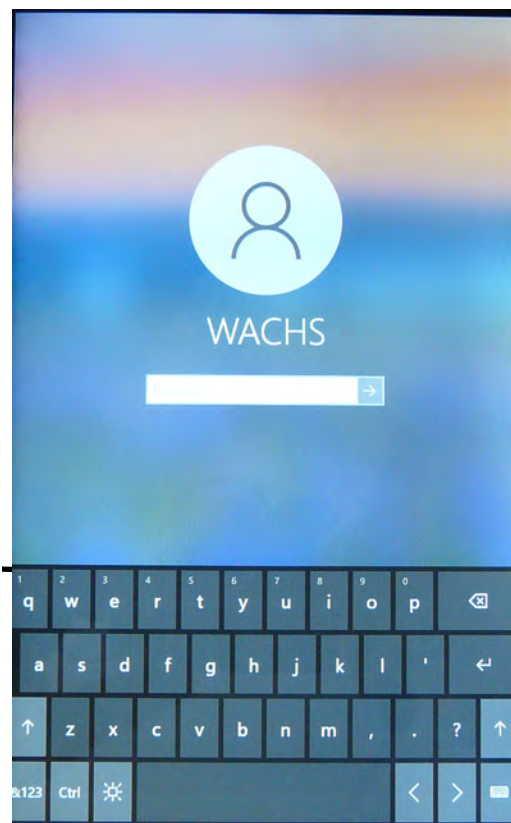


Figure 5-3. Tap the password field and type in the password to login.

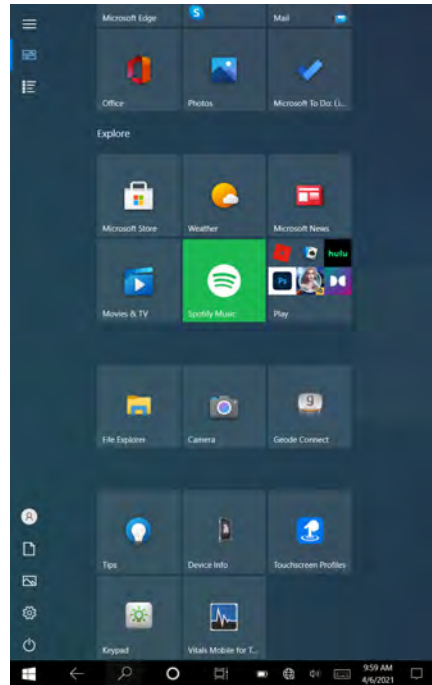


Figure 5-4. TC-100 initial screen in tablet mode. Scroll down to locate the Vitals Mobile icon.

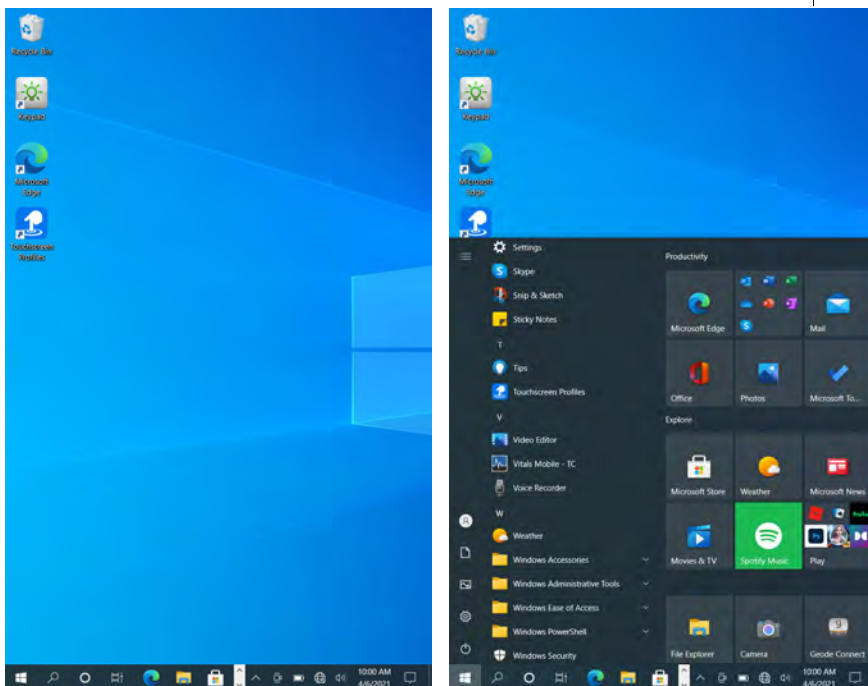


Figure 5-5. TC-100 initial screen in PC mode (left). Tap the Windows icon (right) and scroll down to locate the Vitals Mobile icon.

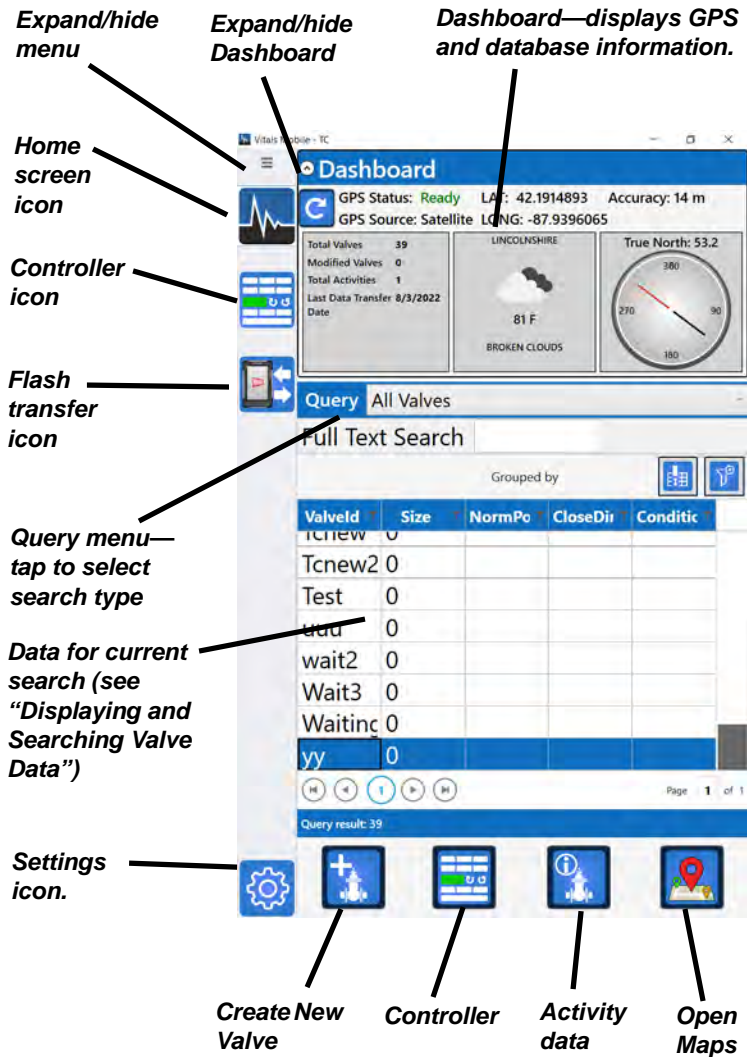


NOTE

On a new TC-100 with no Vitals data, the Query results will be blank.

Vitals Mobile-TC Reference

1. Tap the Vitals Mobile-TC icon. The app appears with the home page and All Activities Query results displayed.



Icons on bottom of screen appear when they are available:
 —a valve must be selected for the Activity data icon to appear
 —an activity with GPS data must be selected for Open Maps icon to be appear

Figure 5-6. Vitals Mobile-TC Home Screen

2. Use the menu icons on the left to access the main program functions:
 - Home Screen with valve and activity data

- Controller, for operating the TM or ERV-750 valve operator
- Flash transfer, for transferring activity data to Vitals Desktop.
- Settings, for changing program defaults.

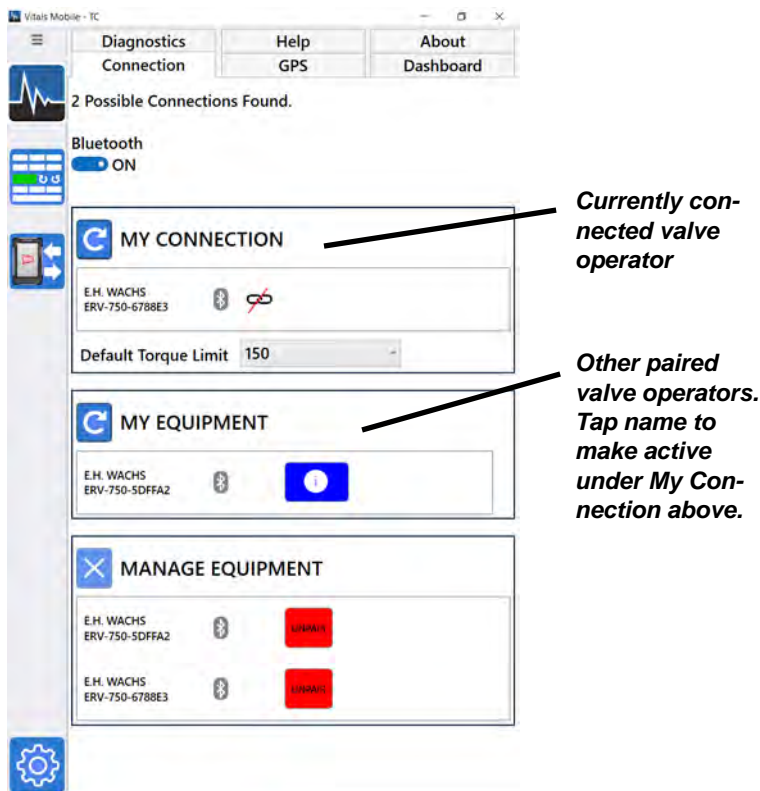
Settings

Tap the Settings icon to open the Vitals Mobile-TC settings screen. The default view is the **Connection** tab.

Touch any of the tabs to view that Settings screen.

Connection Tab

1. A list of paired machines appears on the Connection tab under **MY EQUIPMENT**. If multiple machines appear in the list, tap to select the one you want to use.



*Figure 5-7. Connection Settings. A list of paired valve operators appears under **MY EQUIPMENT**. Tap the name to make it active under **MY CONNECTION**. (Only one is active at a time.)*

2. You can set the default torque limit under **MY CONNECTION**. (This sets the torque limit for Vitals Mobile-TC, not for the selected valve operator. The torque level you select will be saved for all valve operations until you change it again.)

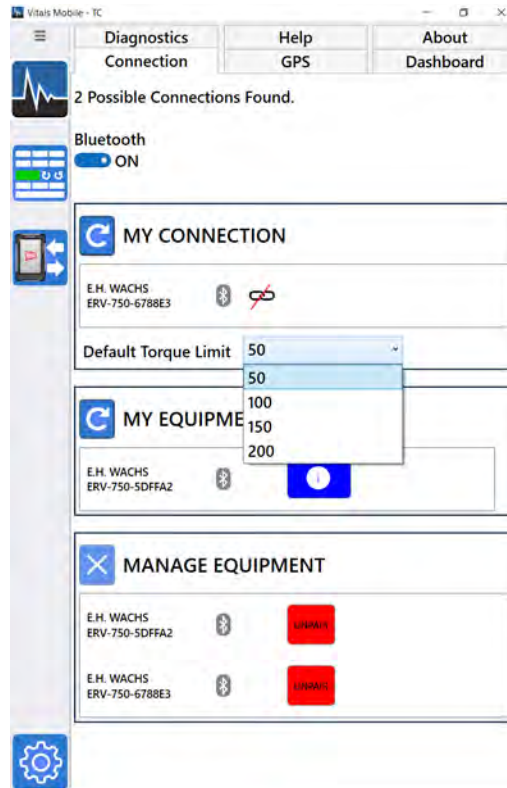


Figure 5-8. Set the Default Torque Limit for Vitals Mobile-TC using the drop-down menu.

3. Tap **MANAGE EQUIPMENT** to pair or unpair valve operators.
 - See “Adding a Valve Operator” on page 41 for connecting to new equipment.

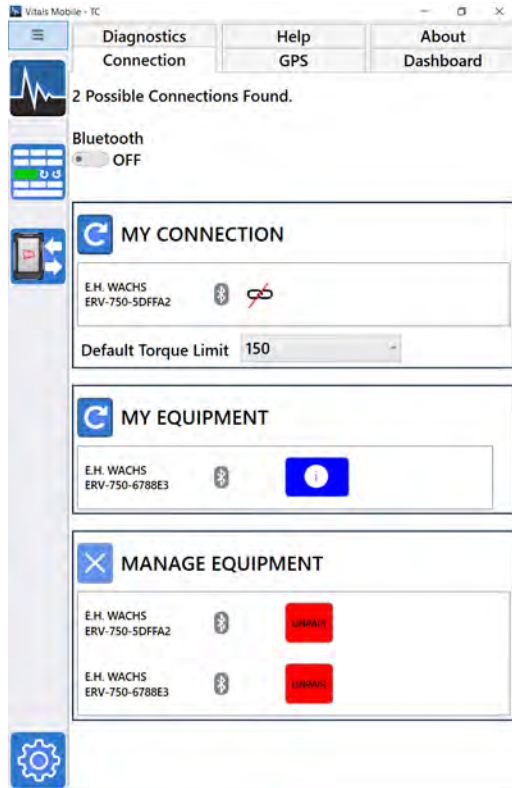
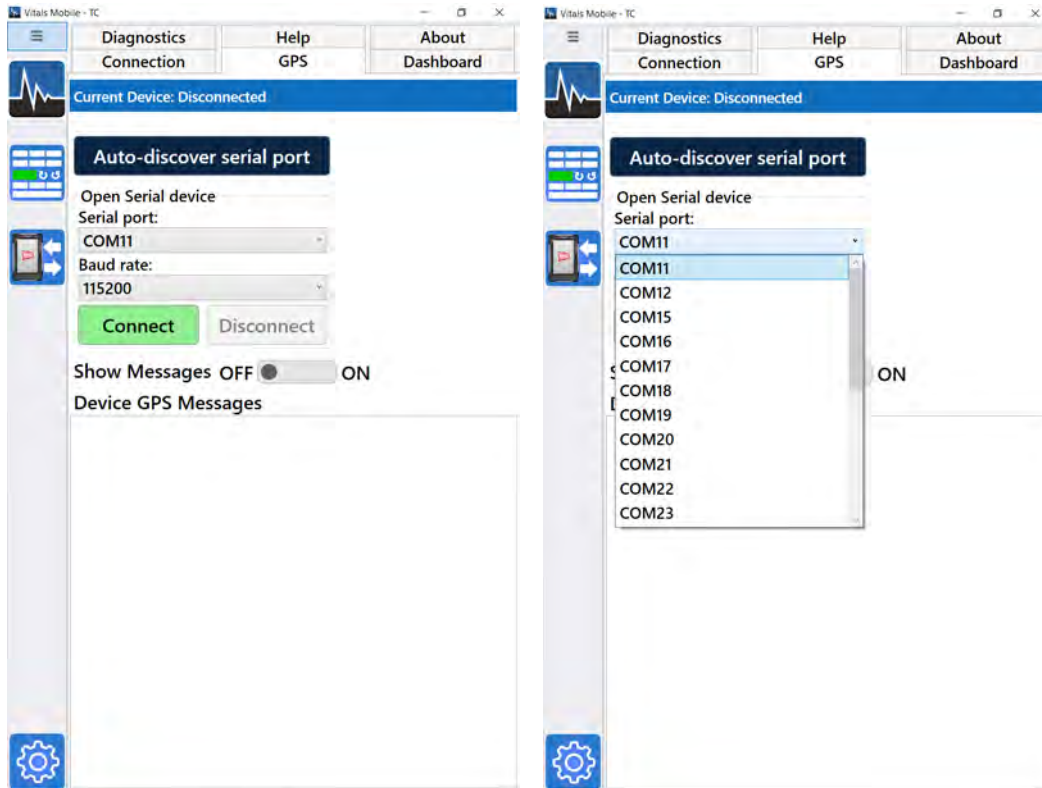


Figure 5-9. Pair and unpair machines under the **MANAGE EQUIPMENT** list.

GPS Tab

See “Adding External GPS” on page 45.

1. Tap the **GPS** tab.
2. Use **Auto-discover serial port** to search for an available GPS device, or manually select a device with the **Serial port** drop-down.



*Figure 5-10. Use the GPS tab to connect to an external GPS device. Either click **Auto-discover serial port**, or select the serial port manually.*

3. Tap the **Show Messages** toggle button to turn GPS message display on or off.

Dashboard Tab

1. Tap the **Dashboard** tab.
2. Tap the **Select Query** drop-down to select any of the Home Screen data queries. Then tap to select the fields you want to list on the Home Screen.
 - You can arrange the order of the fields by dragging them on the Home Screen.
 - Select a limited number of fields for display. If there are more than 3-5 fields displayed, the columns will be too narrow to read.
 - You can see the rest of the valve and activity data by selecting the specific record on the Home Screen.
3. After selecting the fields for the query, tap the Save icon.

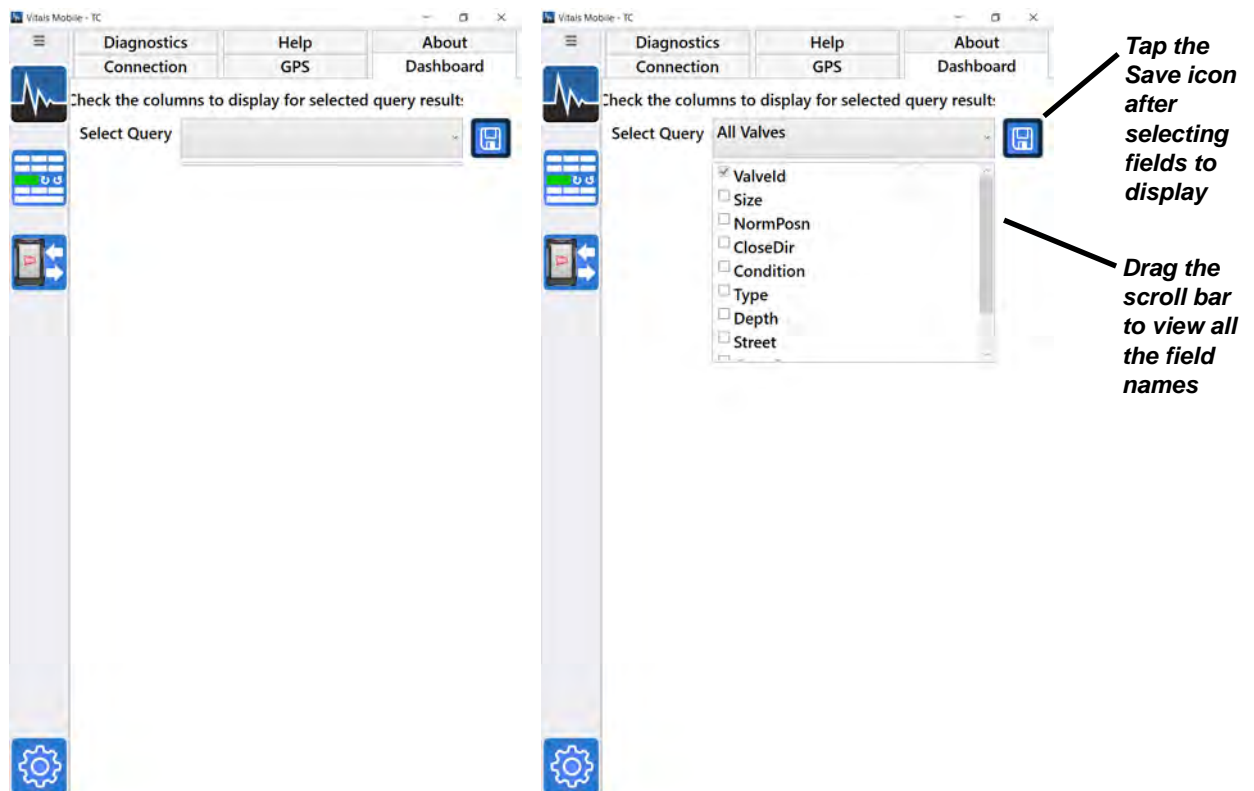


Figure 5-11. Dashboard Setting tab. Select a query to choose the fields for display.

Help Tab

1. Tap the **Help** tab.
2. The Help reference screen for Vitals Mobile-TC appears.
3. Tap **Vitals Manual** to access this manual from the **turnvalves.com** website. The manual is in PDF format. You can save it to your TC-100 device after downloading it.

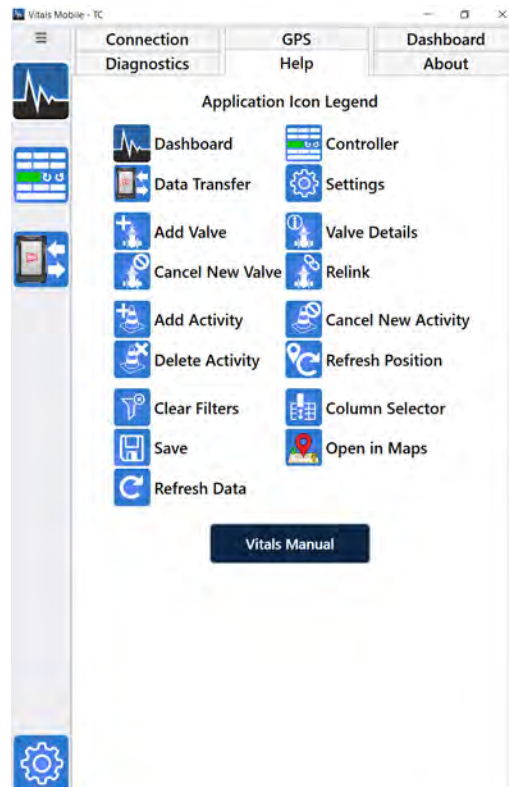


Figure 5-12. Vitals Mobile-TC Help reference screen.

About Tab

1. Tap the **About** tab.
2. The **About** tab displays device and software version information. You can tap **Check for Update** to see if a newer version of Vitals Mobile-TC is available.
 - You should back up your data using the Flash Transfer function before updating the software.
 - If you choose to install the update, you will be prompted to start the download. Once the download is complete, you will be prompted to run the installer for the new software version.
3. Exit and restart Vitals Mobile-TC after performing the software update.



Figure 5-13. The About tab shows version information and allows you to update Vitals Mobile-TC.

NOTE

The Clean Data feature will perform a database cleanup the next time you launch Vitals Mobile. The feature resets to No on startup, until you enable it again.

4. On the About screen, you can use the **Clean Data on Startup** feature to correct database errors. If you are seeing error messages when using Vitals, enable the Clean Data function.
5. To enable the Clean Data feature, tap the toggle switch. A message will appear asking you to confirm. Tap **Yes**.

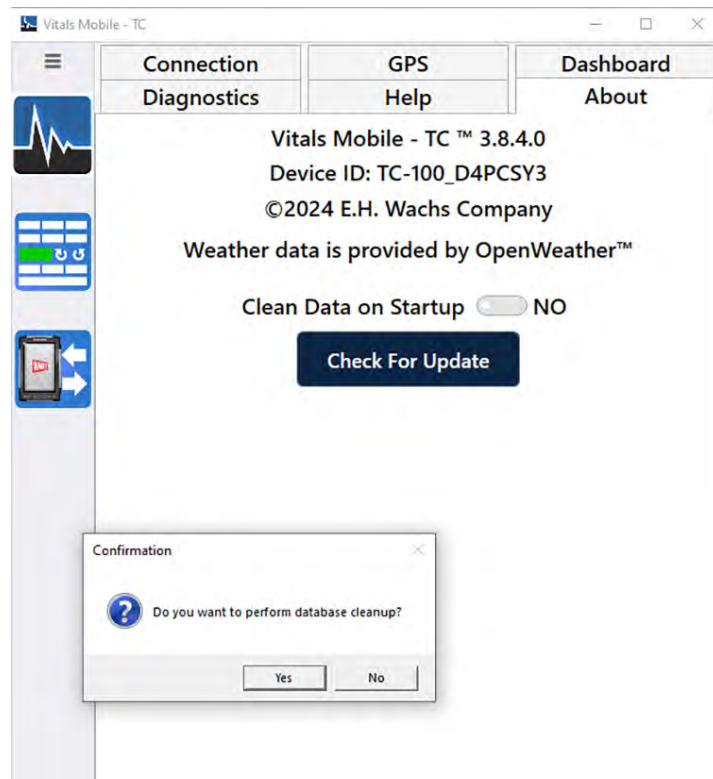


Figure 5-14. When you enable the Clean Data on Startup feature, you will be prompted to confirm.

6. The toggle switch will display **Yes**, and a message will inform you that Vitals will shut down to clean up the database.

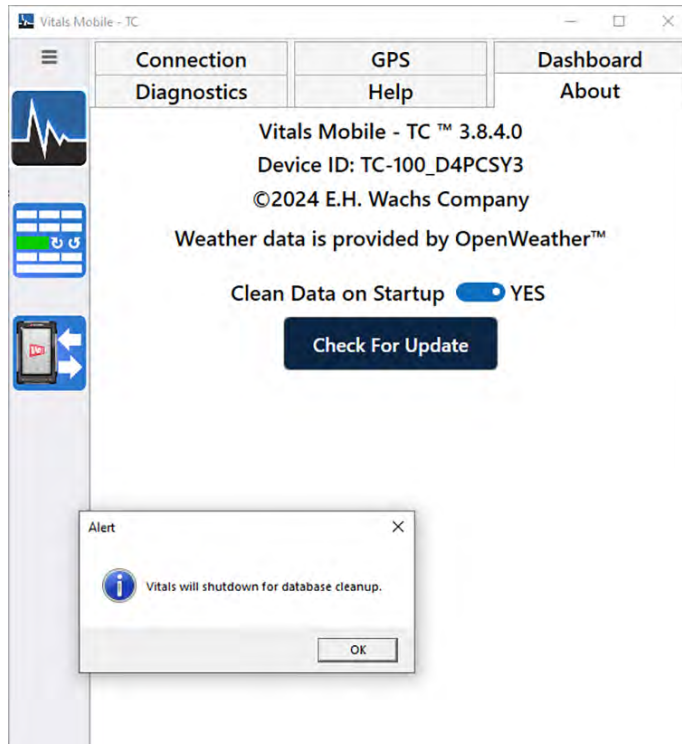


Figure 5-15. Vitals will shut down when you tap **OK**. When you restart the program, it will perform a database cleanup.

7. Tap **OK**. Vitals Mobile will shut down.
8. The next time you restart Vitals Mobile, it will perform a database cleanup.

Adding a Valve Operator

Add a connection to a valve operator in Settings, under the Connection tab.

Before connecting to a valve operator, turn its power on.

1. Tap the Vitals Mobile-TC Settings icon. The **Connection** tab appears by default.

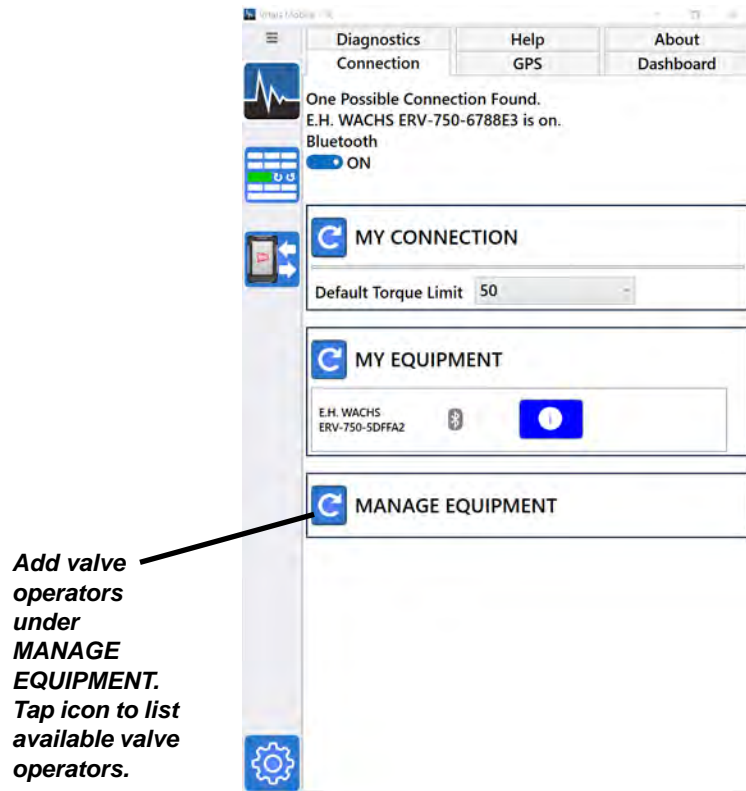


Figure 5-16. Adding valve operator connection.

2. Tap the icon for **MANAGE EQUIPMENT** to display available valve operators (both paired and unpaired). Make sure the valve operator is turned on.

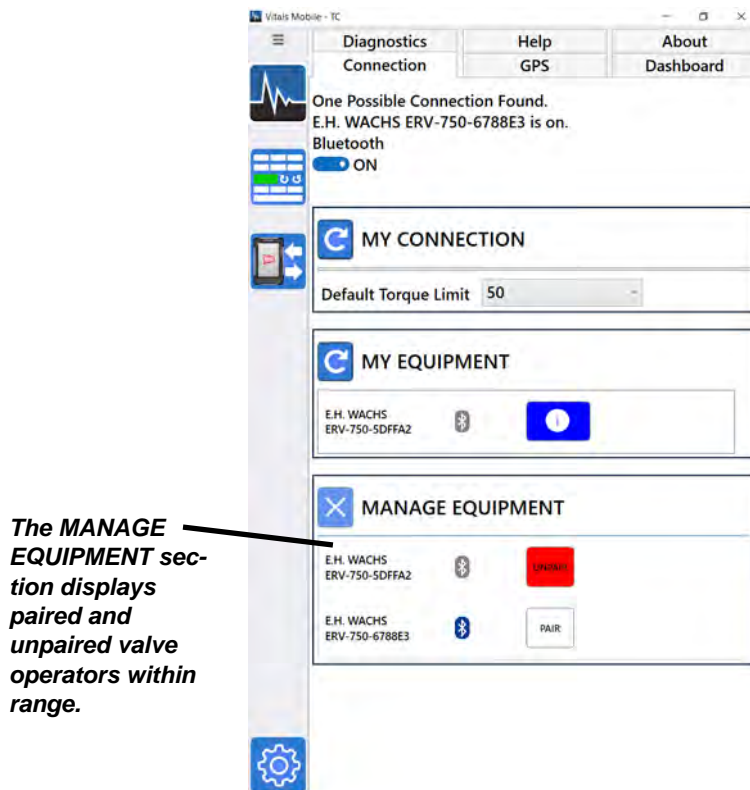


Figure 5-17. Display available valve operators under **MANAGE EQUIPMENT**.

3. Tap the **PAIR** button for the valve operator you want to connect to. A **Scanning...** message appears on the **MY CONNECTION** and **MY EQUIPMENT** sections while the connections are updated.

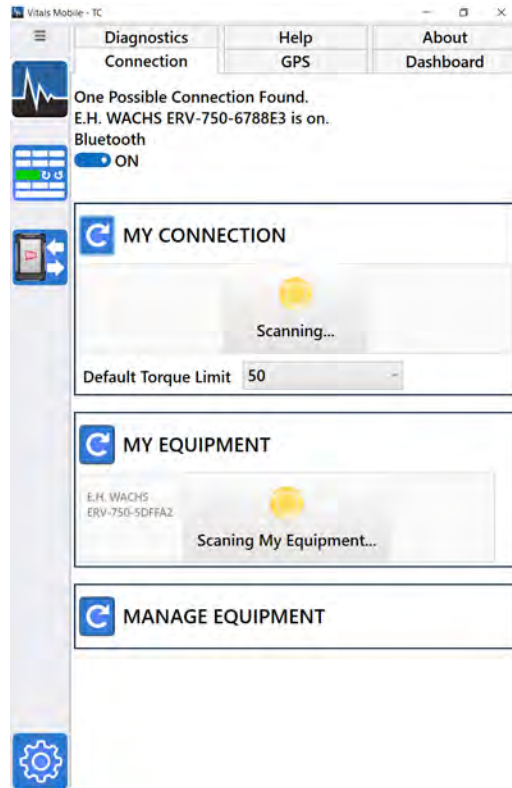


Figure 5-18. When you pair a new valve operator, connection information is updated.

4. The updated connections are listed. To change the active connection, select the new valve operator under **MY EQUIPMENT**.

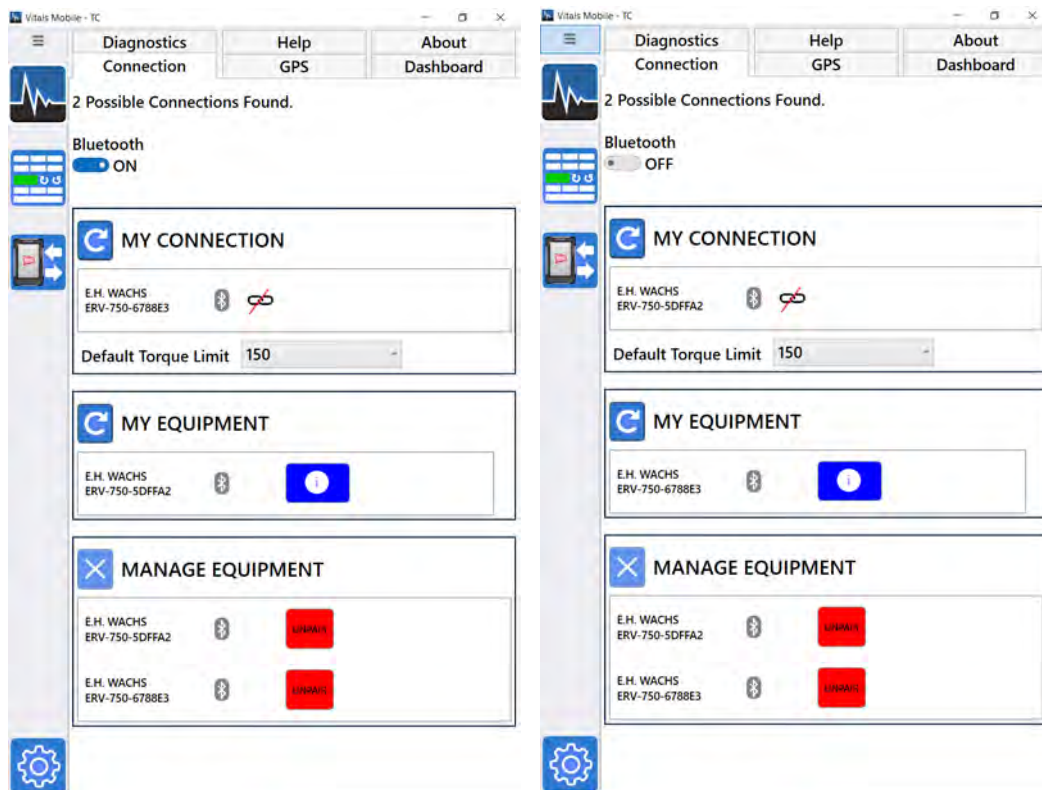


Figure 5-19. To change the connection, tap the new valve operator under **MY EQUIPMENT**.

Adding External GPS

1. Pair the GPS to the TC-100 according to the manufacturer's instructions.
2. On the TC-100, go to **Settings** and then **Bluetooth & other devices** to verify that the GPS is paired. Tap **More Bluetooth options**.

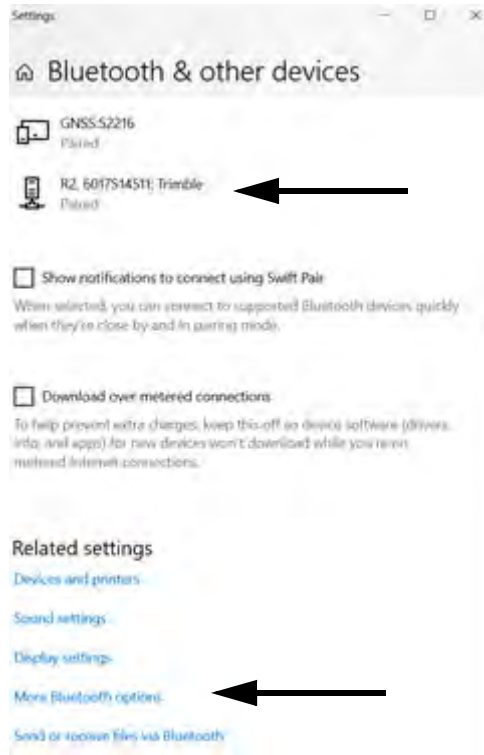


Figure 5-20. GPS Bluetooth options.



NOTE

This example shows the Trimble R2 sold by E.H. Wachs. The name will be different for other devices. This COM port is the one used by the GPS for the GGA NMEA data stream.



NOTE

External GPS devices should have GGA NMEA data enable at 1 or 2 Hz for use with Vitals. You also need to know the GPS device's baud rate.

3. Tap the **COM Ports** tab. Identify the **Outgoing COM** port for **R2 Trimble 'COM2'**. Write down the COM port. Click **OK**.

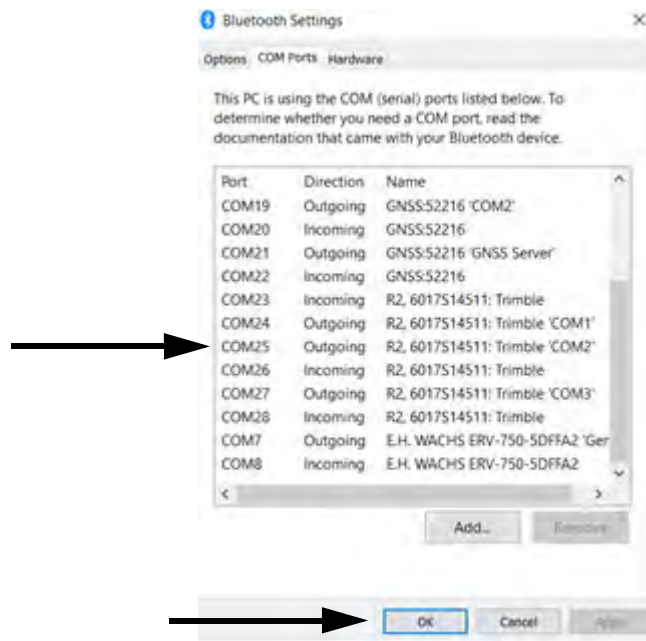


Figure 5-21. GPS COM port.

4. Launch Vitals Mobile. Tap the **Settings** button at the lower left, then tap the **GPS** tab at the top.



Figure 5-22. Vitals Mobile GPS settings.

5. Set the **Serial port** to the COM port you wrote down (**COM25** in the example).
6. Set the **Baud rate** for the GPS device (**4800** for the Trimble R2).
7. Tap **Connect**. The **Current Device** in the status line will update.

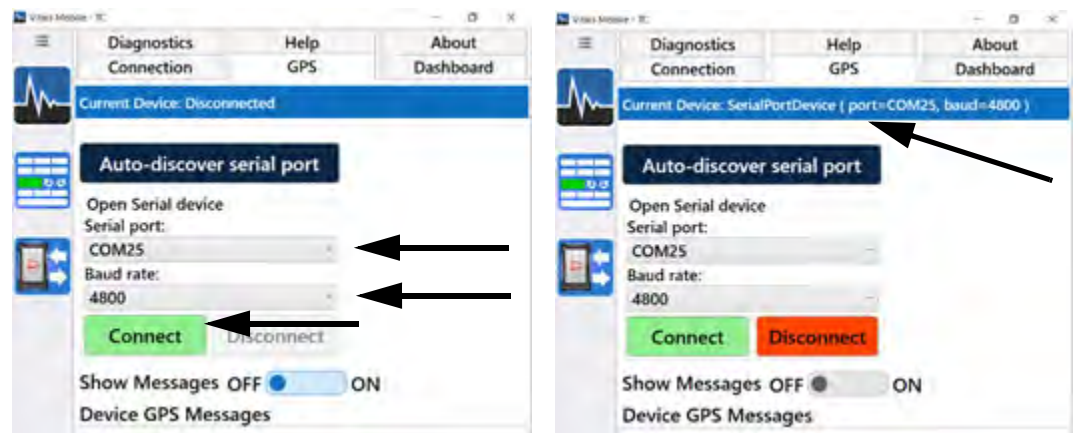


Figure 5-23. Setting GPS COM port settings.

8. Tap the **Dashboard** button to go to the home screen.
9. When the **GPS Status** updates to **Ready** and the **GPS Source** displays the correct COM port, activities will be saved with GPS data.

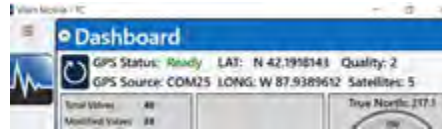


Figure 5-24. GPS Status Ready.

DISPLAYING AND SEARCHING VALVE INFORMATION



NOTE

You can hide the Dashboard to create more room to display valve data.

You can sort and display valve and activity data on the Home screen.

1. When you open Vitals Mobile-TC, the Home screen appears with Query results for All Activities.

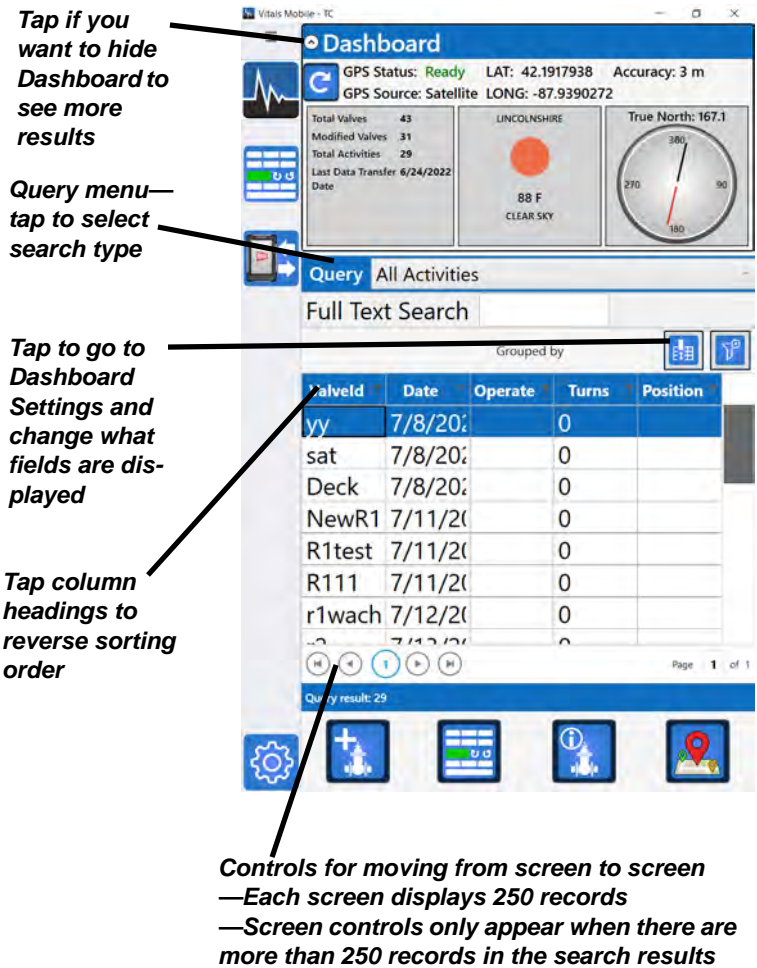


Figure 5-25. Vitals Mobile-TC Home Screen

- To change the Query type, tap on the Query menu and select the type of search.

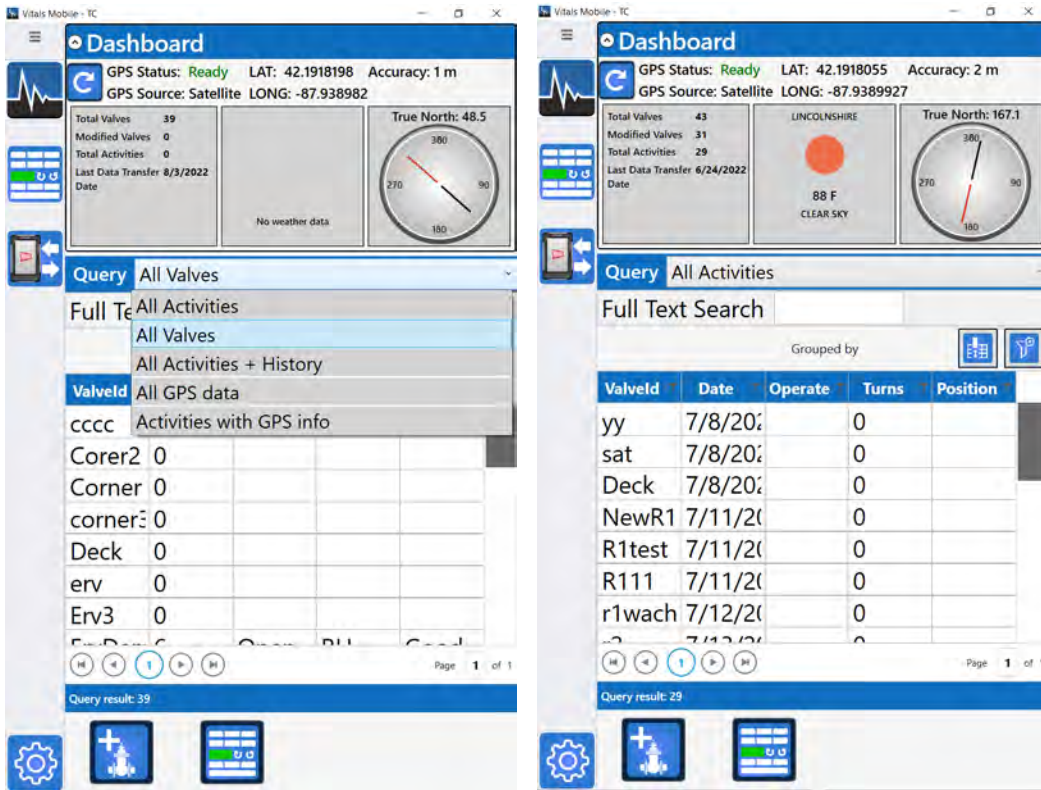


Figure 5-26. Tap the Query menu to select the data search (left). You can move the columns in the list by dragging the column headers left or right (right).

- **All Activities**—lists all activity records stored on the TC-100. You can select fields for display in the Dashboard Settings.
- **All Valves**—lists all valve records stored on the TC-100. You can select fields for display in the Dashboard Settings.
- **All Activities + History**—lists activities with **ValveID**, **Date**, **OperatedBy**, and **Turns** fields.
- **All GPS Data**—lists valve records that have GPS data, with **Latitude**, **Longitude**, **ValveID**, **Dist. from**, and **Heading**.
- **Activities with GPS info**—lists valves that have activities with GPS data, with **Latitude**, **Longitude**, **ValveID**, **Dist. from**, and **Heading**.

- Tap on an activity to highlight it. The Valve Details icon will highlight to show valve information is available.

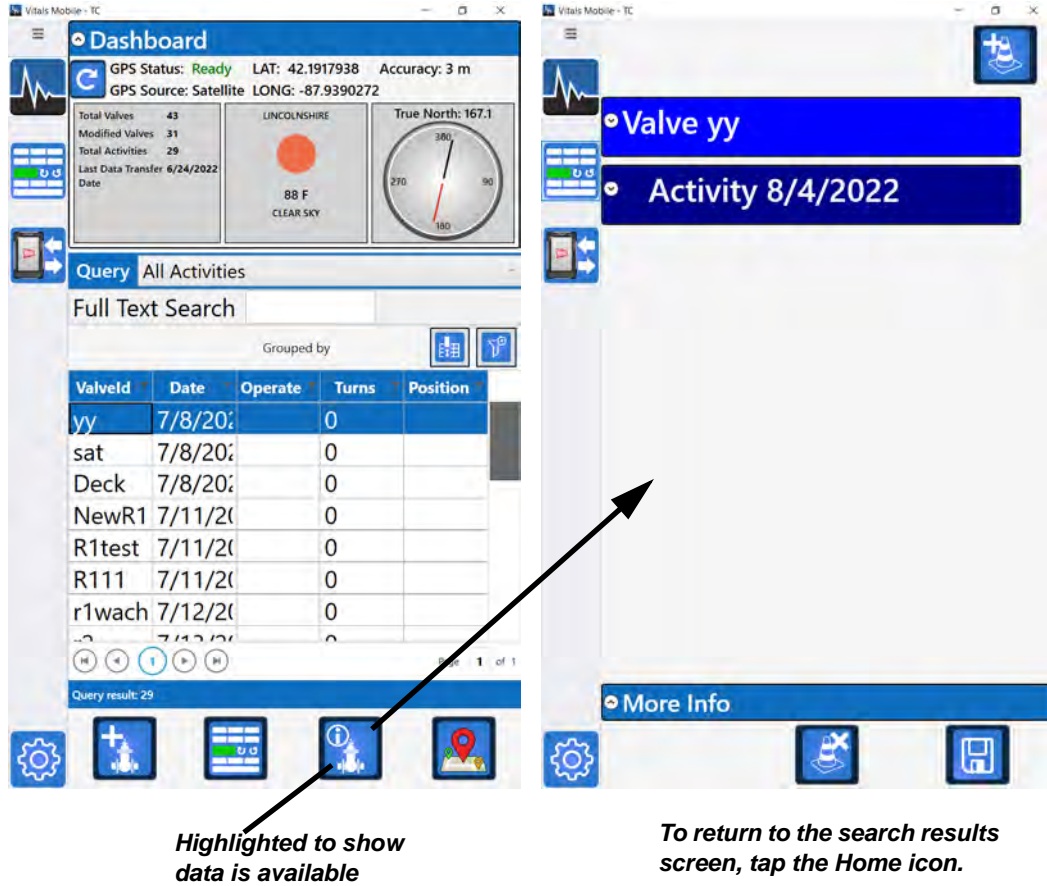


Figure 5-27. Select an activity in the list, and tap the Valve Details icon to display the valve data.

- Tap on the headings to expand the data records.

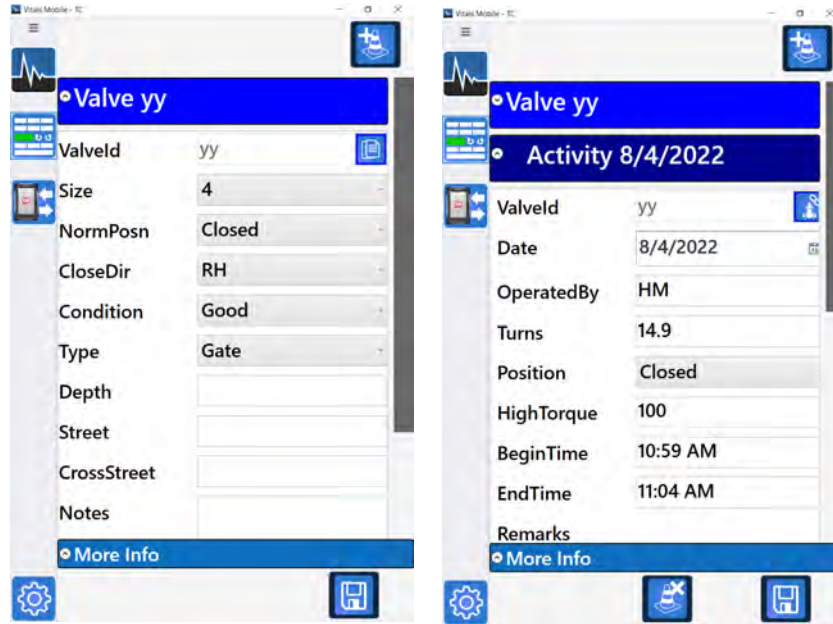


Figure 5-28. Tap the heading to display the available data.

- Tap **More Info** to display the torque chart, if one is available.

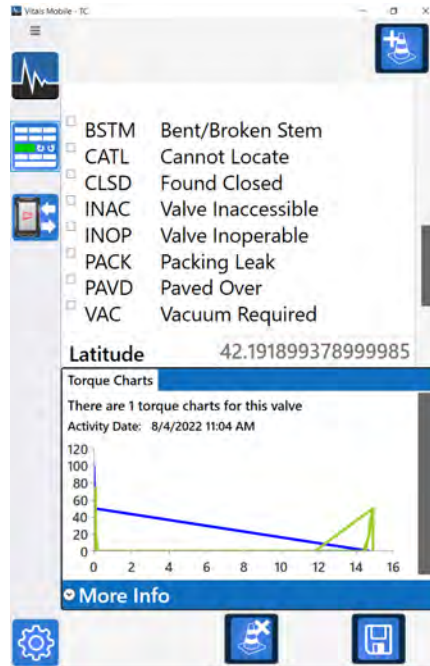


Figure 5-29. More Info displays the torque chart.

- You can group data by any of the displayed fields. Drag the field heading up into the Sort box.

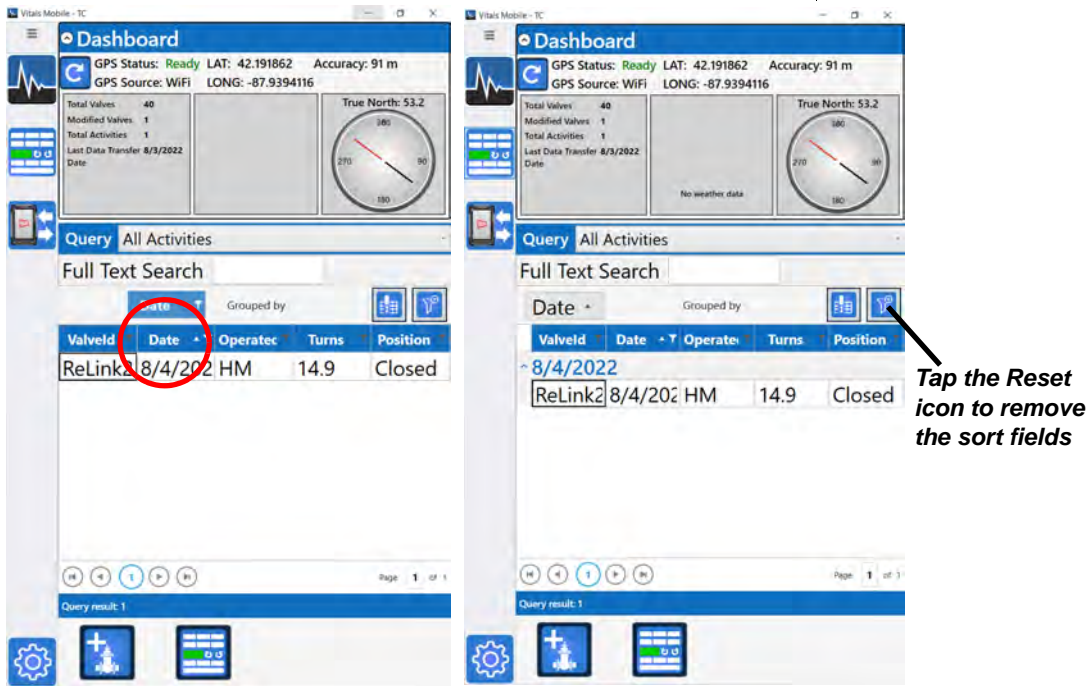


Figure 5-30. You can drag any of the field headers up into the Sort box to group the data (Date field shown).

- You can drag multiple field headings into the sort box.

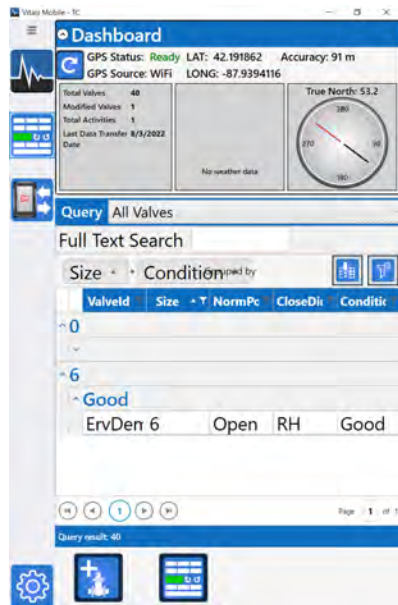


Figure 5-31. Group by multiple fields.

8. You can search within your query results by typing in the Full Text Search box. All displayed fields are searched. Results are updated as you search.

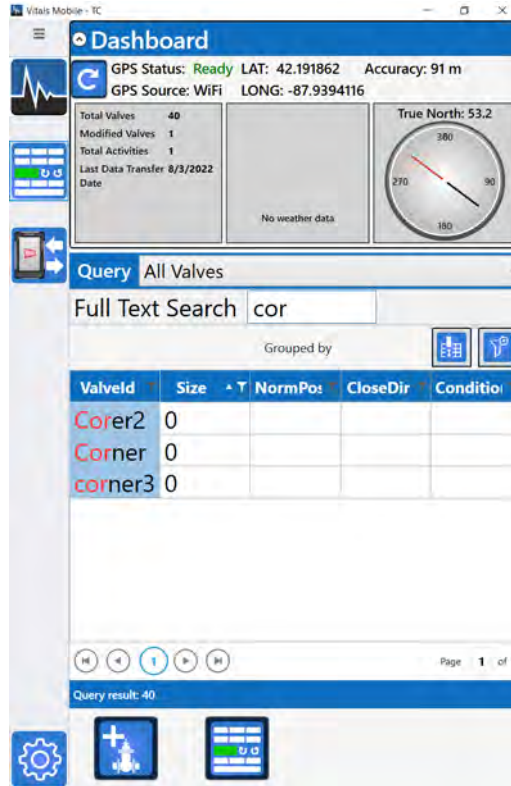


Figure 5-32. Type in the Full Text Search box to search the displayed results.

- When you select an activity or valve with GPS data, the Maps icon is highlighted. Tap the icon to open Maps and display the valve location.

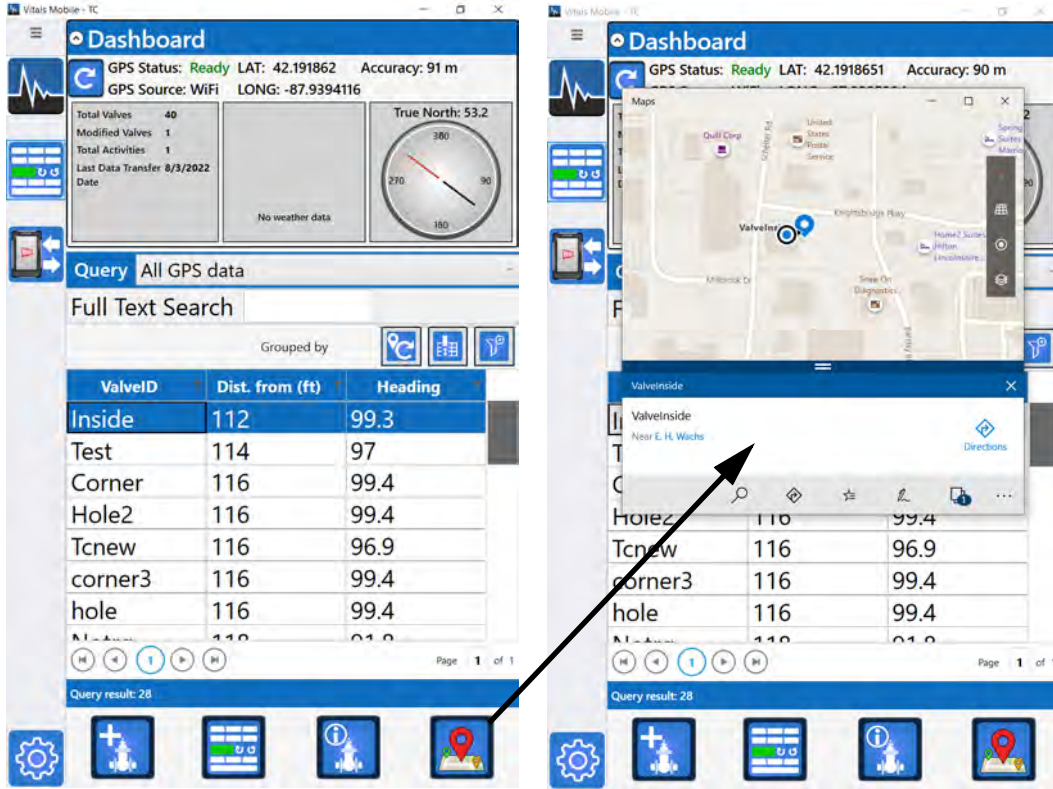


Figure 5-33. When the Maps icon is highlighted, you can tap it to display the valve location in Maps.

- **Maps is a separate app. You will have to return to Vitals Mobile-TC to continue.**

- From your search results, you can select valves and proceed to valve operation. See “Starting a New Activity with Existing Valve” on page 62.

Re-linking an Activity to a Different Valve

If you perform a valve activity assigned to the wrong Valve ID, you can re-link the activity to the correct valve.

- Search or display the valve activities to locate the valve activity you want to re-link.



NOTE

Live Maps data are available only when the TC-100 is online (connected to wi-fi or a mobile hotspot). To use Maps without an internet connection, download your local map. Tap the Windows icon, go to Settings, then Apps>Offline Maps. Find your location and download the map.

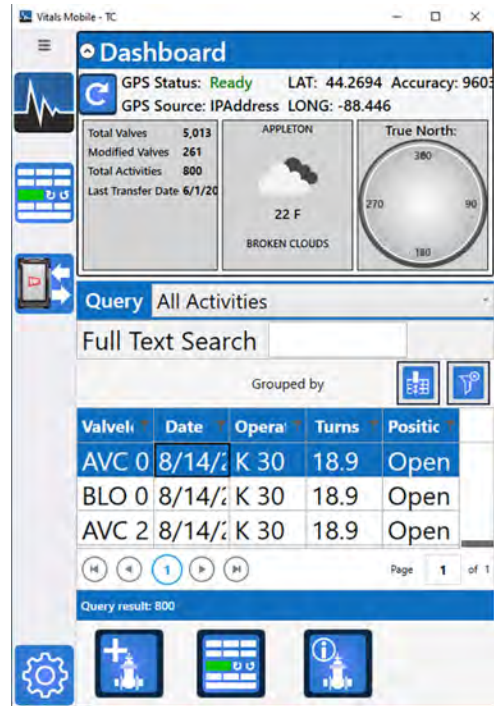


Figure 5-34. Locate the activity record you want to re-link to a different Valve ID.

2. Open the activity record.

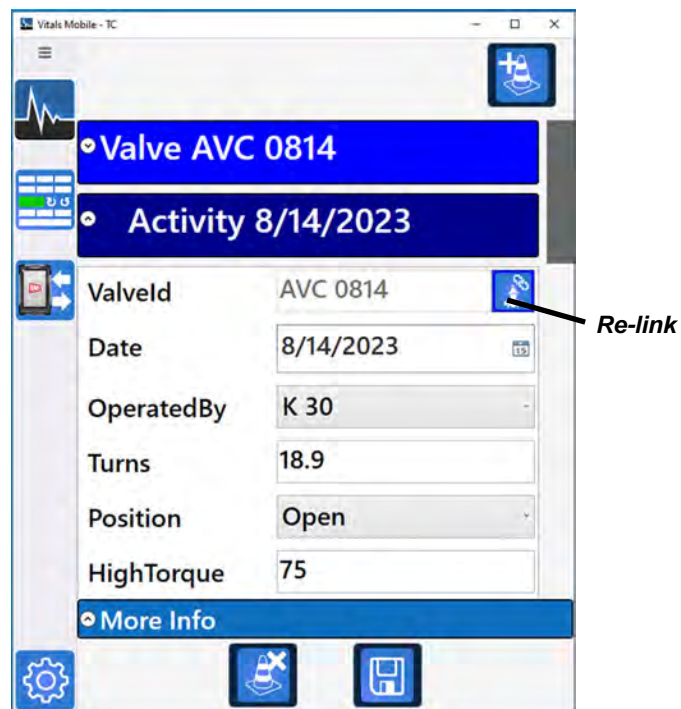


Figure 5-35. Open the activity record. The re-link button appears next to the Valve ID.

3. Tap the Re-link button next to the Valve ID. A message will appear asking you to confirm re-linking.

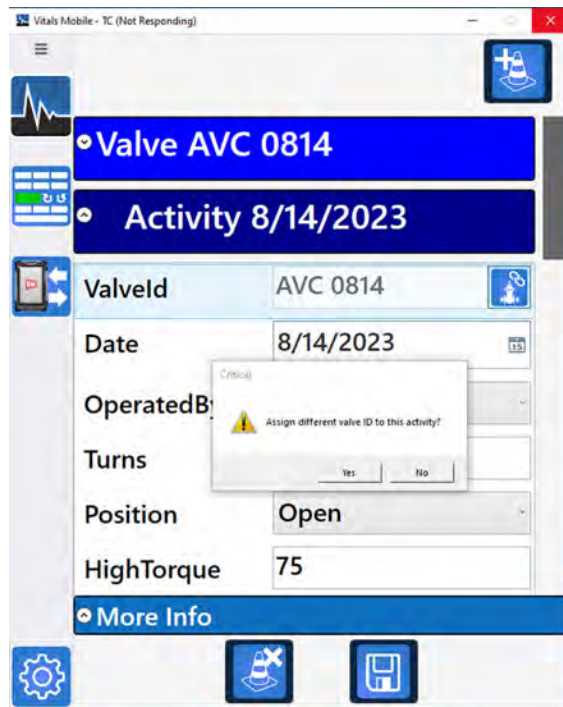


Figure 5-36. Tapping the Re-link button displays a message asking you to confirm. Tap **Yes** to continue.

4. The Valve (New) screen appears. Type in the Valve ID you want to assign the activity to.

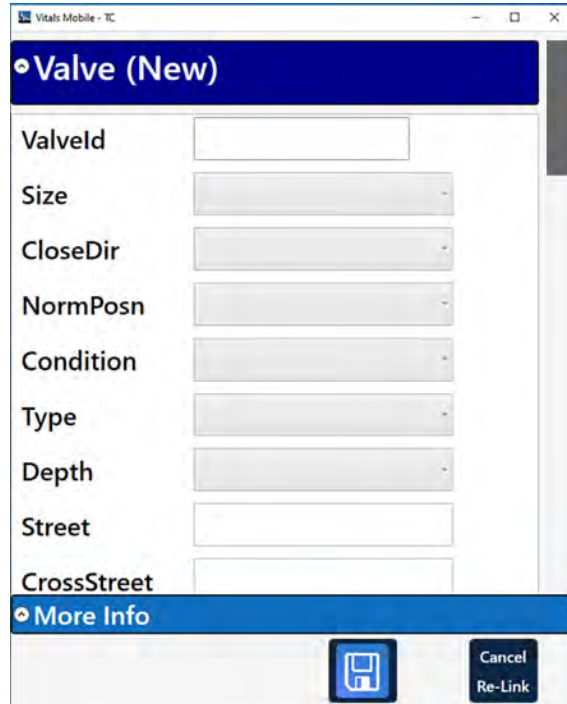


Figure 5-37. Type in the desired Valve ID and tap the Save button at the bottom. Tap **Cancel Re-Link** to cancel.

5. Tap the Save button to save the activity with the newly assigned Valve ID. The screen will return to the dashboard, and the activity list will show the activity linked to the new Valve ID.
- If you want to cancel, tap the **Cancel Re-Link** button. The screen will return to the dashboard, with the valve link unchanged.

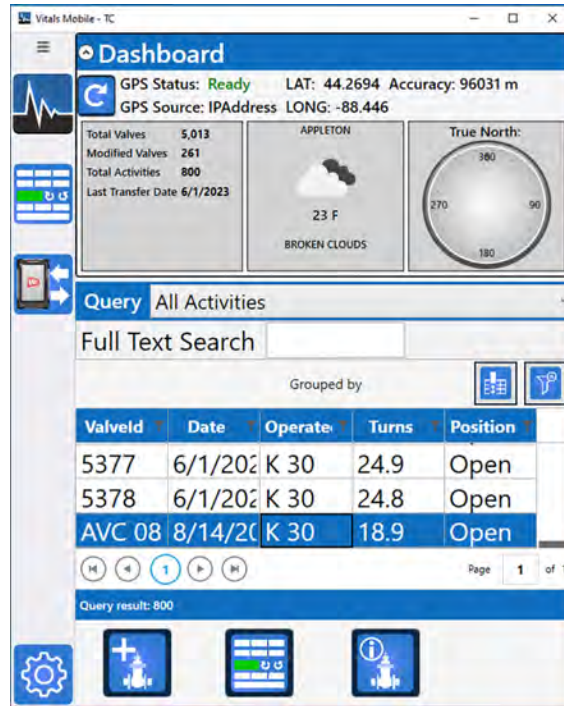


Figure 5-38. The activity list will show the activity linked to the new Valve ID.

VALVE OPERATION

Vitals Mobile Controller

The Vitals Controller is the program for operating E.H. Wachs valve operators. If using a cable connection, make sure the control cable is connected to the USB or serial port on the controller and to the port on the valve exerciser. If using a Bluetooth connection, make sure a Bluetooth module is properly installed and that the Bluetooth settings on the controller have been properly set up.

1. On the **Vitals Mobile** screen, tap the **Controller** button. The Controller screen appears. If a valve or activity was selected on the Home screen, that valve is selected by default.

E.H. Wachs "No-Assumption" Valve Exercising

When you run the valve operator in EXER mode, it uses the "no-assumption" exercising protocol to determine direction of valve rotation.

Refer to Appendix A for a detailed description of the no-assumptions protocol.

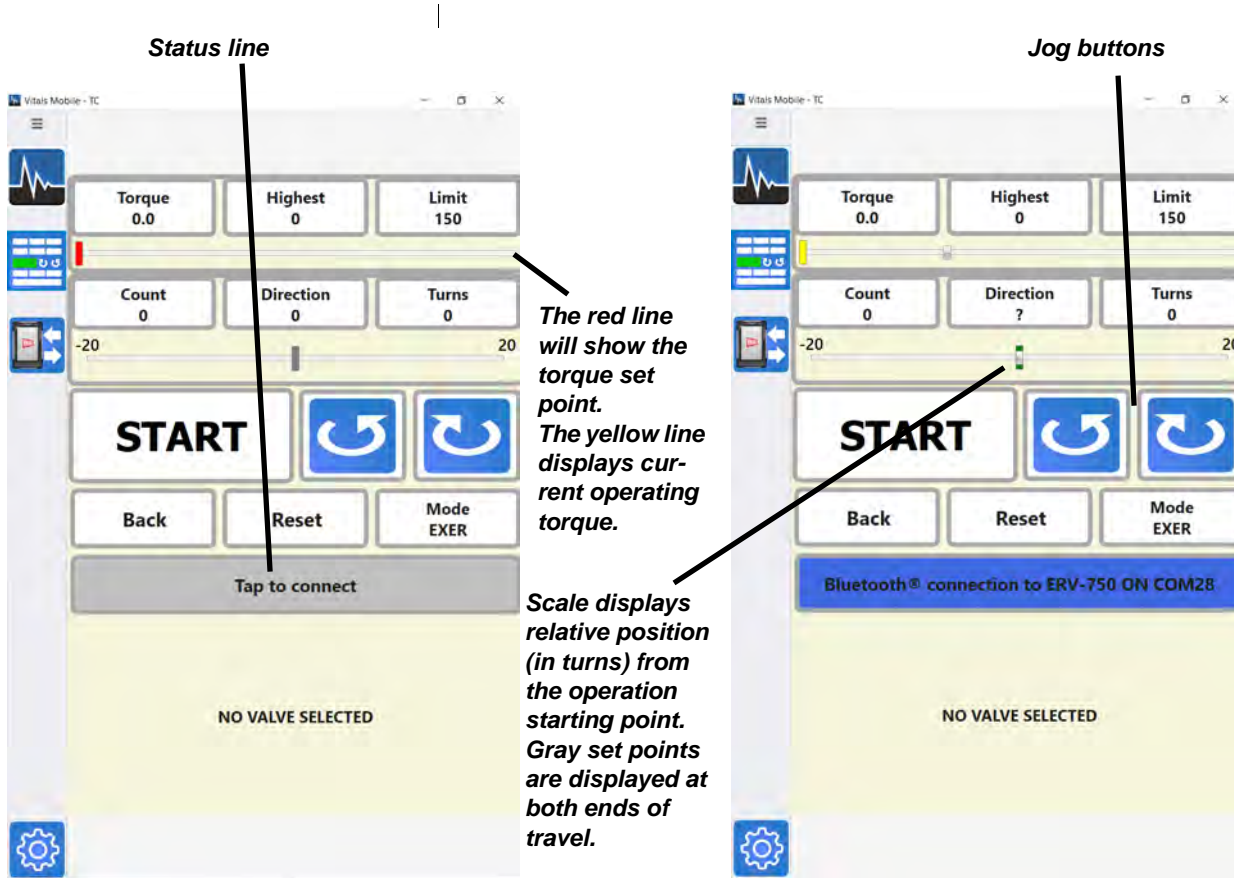


Figure 5-39. Controller screen with valve selected (left) and without valve (right).

If connection is not detected when the Vitals controller screen opens, a message will ask if you want to autoconnect. Tap **Yes**.

You can tap the **Tap to connect** button to try to make a connection to the valve operator using the saved port.

2. The **Torque** field displays the current operating torque.
3. The **Highest** field displays the highest torque level during the current operation.
4. The **Limit** field displays the current torque limit. (To change the default torque limit setting, tap the **Settings** icon and go to the **Controller Settings** tab.)
5. The **Count** field displays the current position, in number of turns from the starting point (positive or negative).
6. To override the automated exercising program and set a starting direction, tap the **Direction** button until either **RH** or **LH** appears. Leave the question mark in the display for automatic direction control.

7. The **Turns** field displays the total number of turns performed, in both directions, during the current operation.
8. Press **START** to begin the valve operation. The valve exerciser will run in the selected mode. The button will turn red and the text will change to **STOP**.
9. To turn the valve exerciser slightly in either direction (for positioning or installing the valve key), tap and hold on one of the **Jog** buttons. The operator will turn as long as you keep touching either of these buttons.
10. By default, the valve exerciser mode is **EXER**, which runs the valve exercising protocol. You can also operate in Emergency Mode (**EMER**) and Manual Mode (**MAN**). Tap the **Mode** button to switch modes.
11. Press **STOP** to end the valve operation. The button will blink white and green and the text will change to **START**.
12. To reset the valve operation readings and the operating defaults, tap and hold the **Reset** button.
13. Tap the **Back** button to go to the valve information screen for the current valve and enter remarks or other information. You can also create a new valve record in the database.
14. The status line shows details of the currently active connection or operation. You can tap the status line to toggle through current status messages, including operating values, connection messages, and exercising status messages.
15. If the status line is a string of numbers, it is displaying the current connection type and machine selection.
 - turn count
 - transducer 1 value
 - transducer 2 value
 - machine ID
 - machine status.

**CAUTION**

If you get a **Transducer Error** message during operation, there is something wrong with the transducers or cables. Operating with faulty transducer readings could cause valve damage. See “Transducer Errors” at the end of this section.

**NOTE**

See Appendix A for a description of the operating modes.

Starting a New Activity with Existing Valve

Before starting new activities, perform a data transfer with Vitals Desktop to sync any changes from the Vitals database to the controller.

1. Find the valve you want to operate by searching on the Home screen, using the Query and search functions.
2. Select the valve (or a related valve activity) in the results list.
3. Tap the New Activity icon. Enter any information you want on the Valve screen, then tap the Save icon.
4. Tap the Controller icon. The selected valve appears at the bottom of the screen. You can page through the valve data using the arrow buttons on-screen.



Figure 5-40. Start the valve activity for a selected valve.

5. Start the activity. See “Vitals Mobile Controller” on page 59.

Finding Valves on the Map

You can list valves that have GPS data by location, and show them using Maps. This allows you to find valves close to your current location.

1. Select the **All GPS Data** Query on the Home screen.
2. Tap the **Dist. from** column header to sort the closest valves to the top of the list.
3. Tap a valve record in the list to select it.
 - The Maps icon highlights to show GPS data is available.
4. Tap the Maps icon. The Maps app opens, with the selected valve shown on the map.



NOTE

Live Maps data are available only when the TC-100 is online (connected to wi-fi or a mobile hotspot). To use Maps without an internet connection, download your local map. Tap the Windows icon, go to Settings, then Apps>Offline Maps. Find your location and download the map.

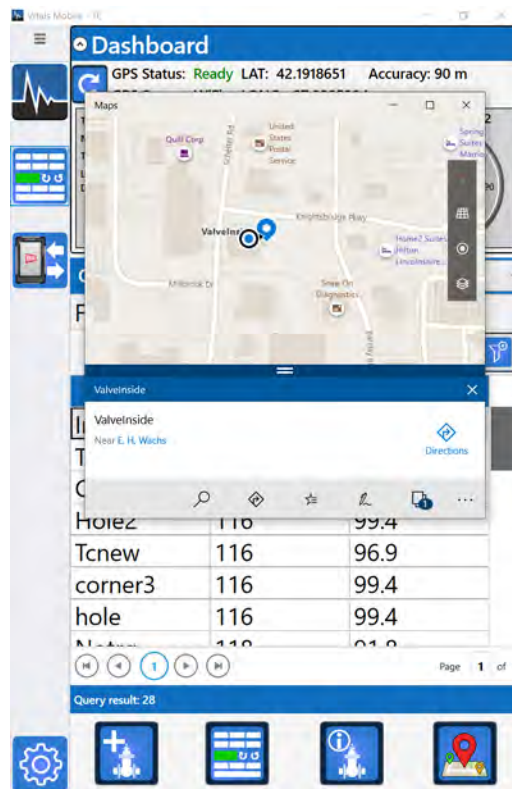


Figure 5-41. Showing valve location on map.



NOTE

Maps is a separate app. You will have to return to Vitals Mobile-TC to continue.

5. Use the Map controls to zoom the map view, and to show your location. Valves that are in the displayed map view will be shown on the map.

Starting a New Activity with a New Valve

Before starting new activities, perform a data transfer with Vitals Desktop to sync any changes from the Vitals database to the controller.

1. Tap the New Valve icon. The **New Valve** screen appears.

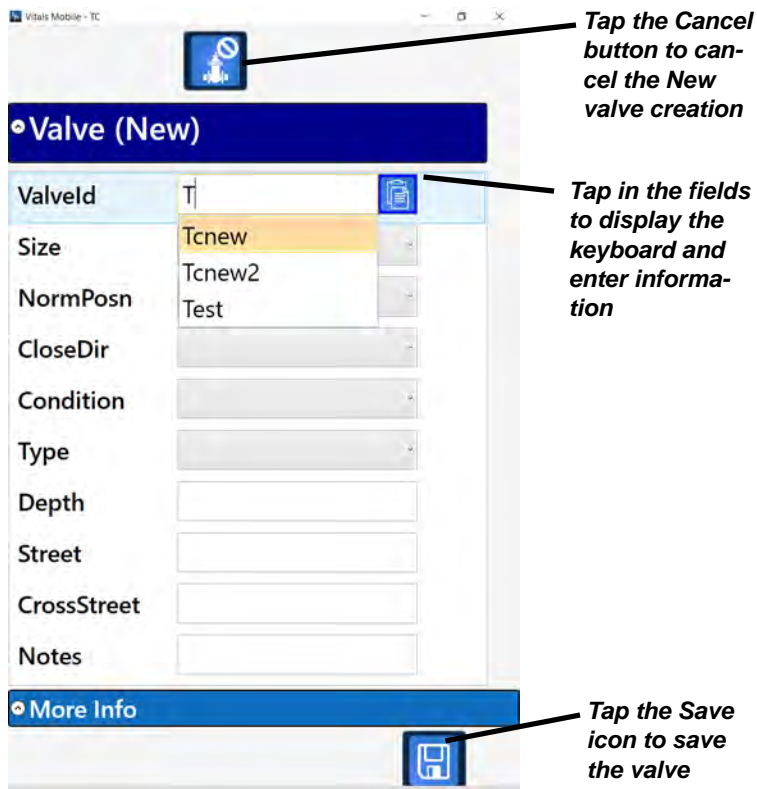


Figure 5-42. New valve screen.

2. Enter a valve ID and as much information about the valve as you want. Tap the Save button.
3. Tap the Controller icon. Perform the valve activity, then tap the **Back** button to save the activity information. See “Vitals Mobile Controller” on page 59.
4. You can also start a New Valve activity by going to the Controller first. The Controller appears with **NO VALVE SELECTED** at the bottom of the screen.

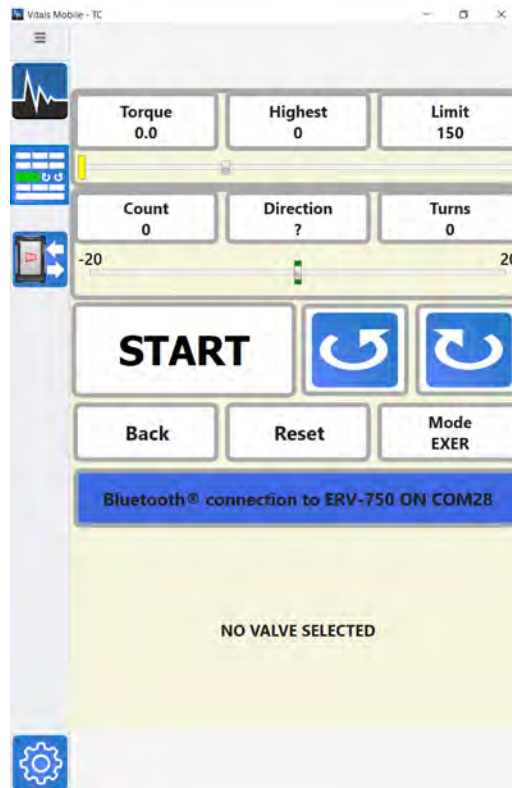


Figure 5-43. Controller screen with no valve selected.

5. After the valve operation, tap the Back button to enter valve data. Tap the Save icon to save the information.

Relinking an Activity to a Valve Record

You can relink a saved activity that is linked to the wrong valve record (ValveID). Create a new valve record if the valve is not in the Vitals database, or link the activity to an existing ValveID.

Creating a New Valve Record

Follow this procedure if the correct valve is not in the database.

1. Select the activity from the Dashboard screen, then tap the **Valve Details** button.

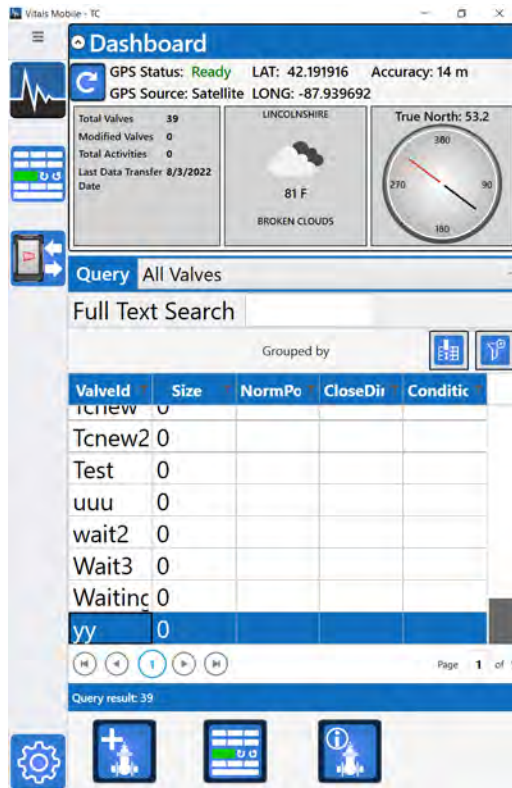


Figure 5-44. Valve listing.

- Expand the activity to view details. Click the **Relink** button next to the **ValveID**, and then click **Yes** in the pop-up message.

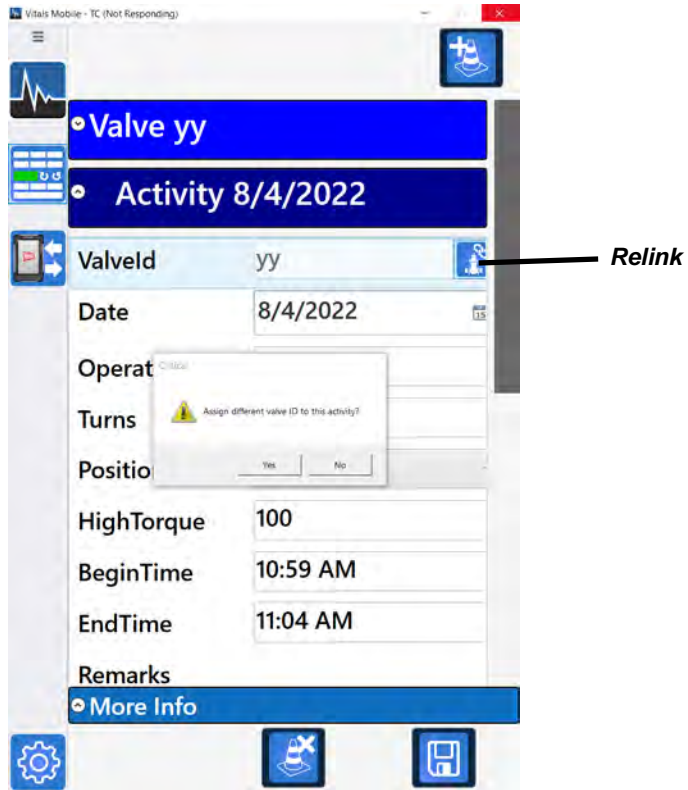
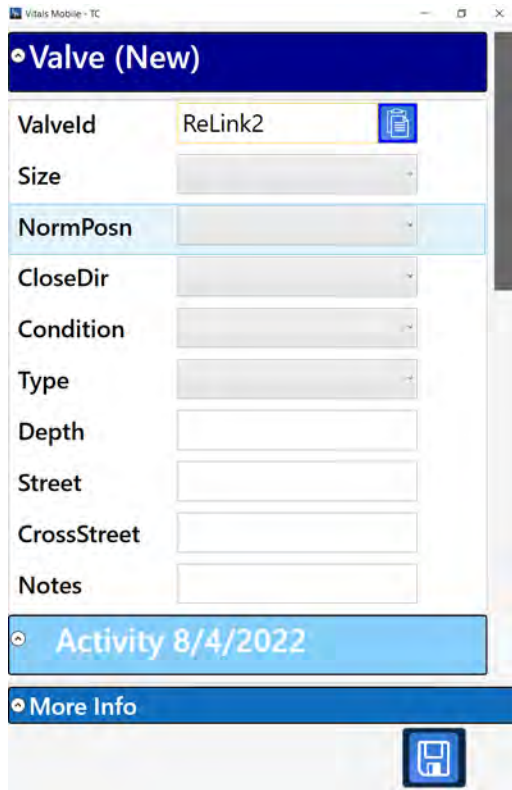


Figure 5-45.

3. Type in a **ValveID** for the new valve record. Enter additional valve information if required. Click **Save**.



The screenshot shows a mobile application window titled "Vitals Mobile - TC" with a "Valve (New)" form. The form contains the following fields:

- ValveID: ReLink2 (with a copy icon)
- Size: [Empty dropdown]
- NormPosn: [Empty dropdown]
- CloseDir: [Empty dropdown]
- Condition: [Empty dropdown]
- Type: [Empty dropdown]
- Depth: [Empty text input]
- Street: [Empty text input]
- CrossStreet: [Empty text input]
- Notes: [Empty text input]

Below the form is a blue bar with "Activity 8/4/2022" and a "More Info" button with a save icon.

Figure 5-46. Fill in new ValveID and any other required information.

4. To verify the relink, select the updated activity or valve from the Dashboard and click the **Details** button.

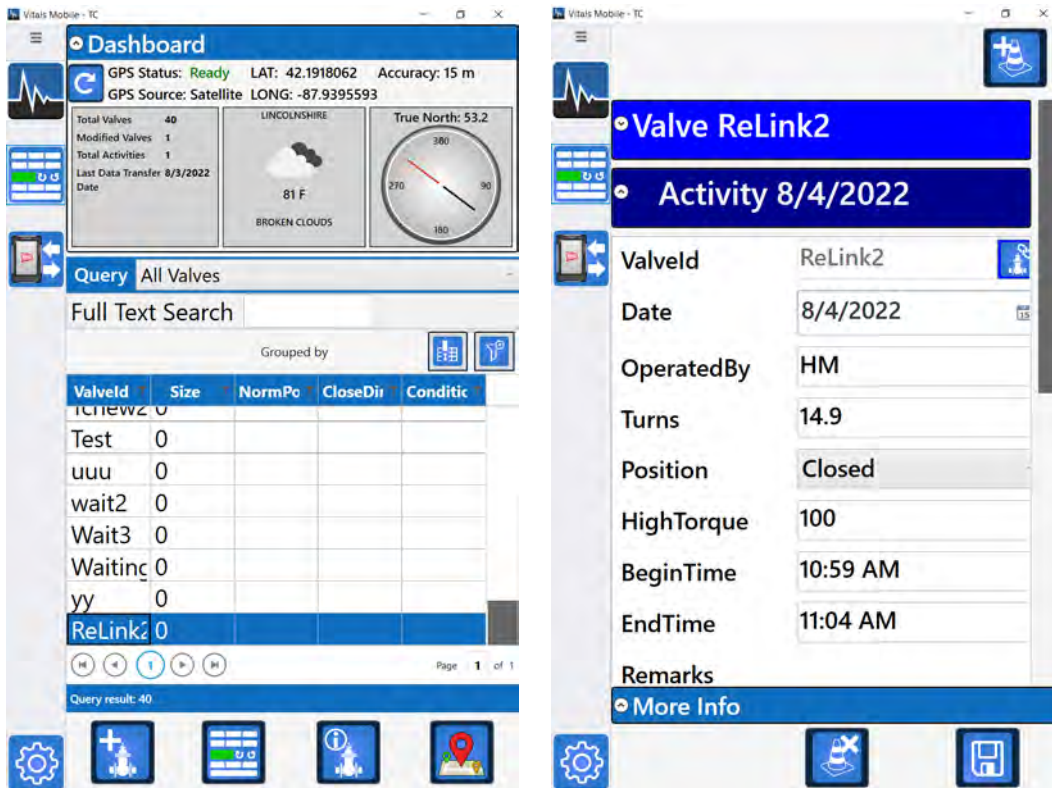


Figure 5-47. Verify activity is relinked to correct ValveID.

Relinking to an Existing Valve Record

Follow this procedure if the correct valve is already in the database, and you need to relink an activity to it.

1. From the Dashboard, open the valve record for the valve that should be linked to the activity. Tap **Valve Details**.

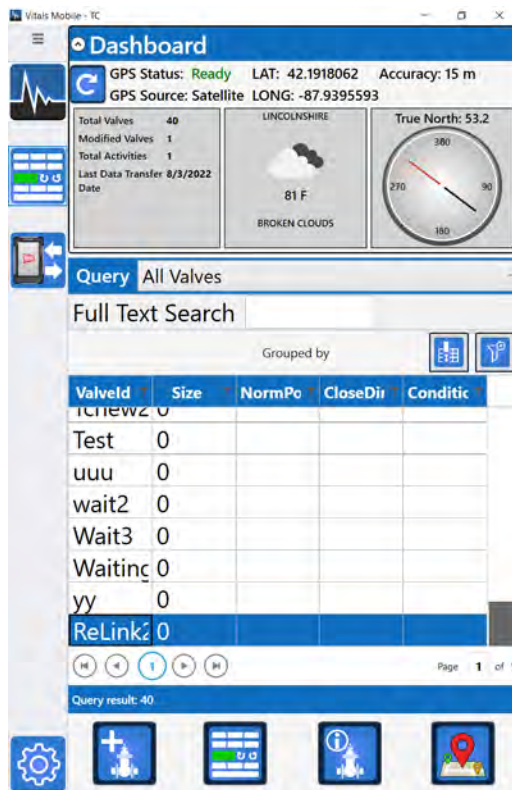


Figure 5-48. Display the valve list to select the correct valve for relinking.

- Expand the valve record and tap the Copy button next to the **ValveID**.

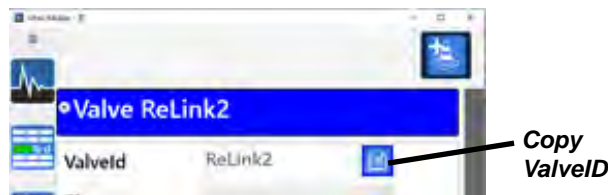


Figure 5-49. Copy the ValveID.

- Tap the **Home** button to go back to the Dashboard.
- Select the activity from the Dashboard screen, then tap the **Valve Details** button.

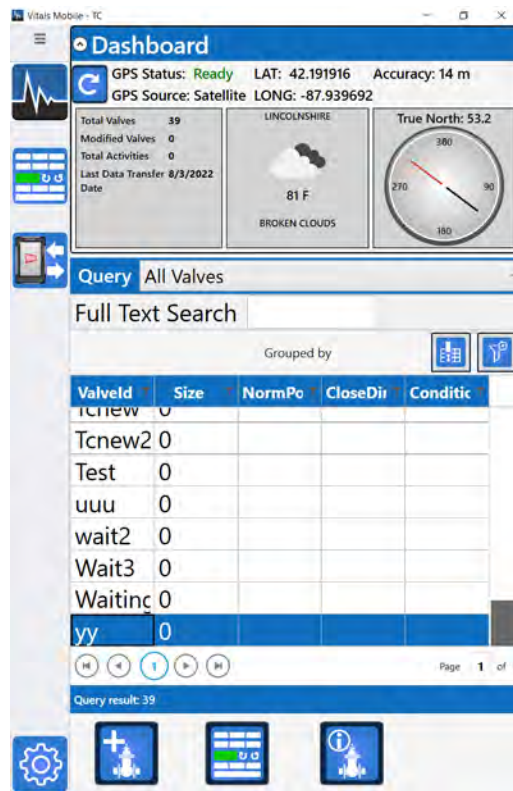


Figure 5-50. Select the valve from the valve list.

5. Expand the activity to view details. Click the **Relink** button next to the **ValveID**, and then click **Yes** in the pop-up message.

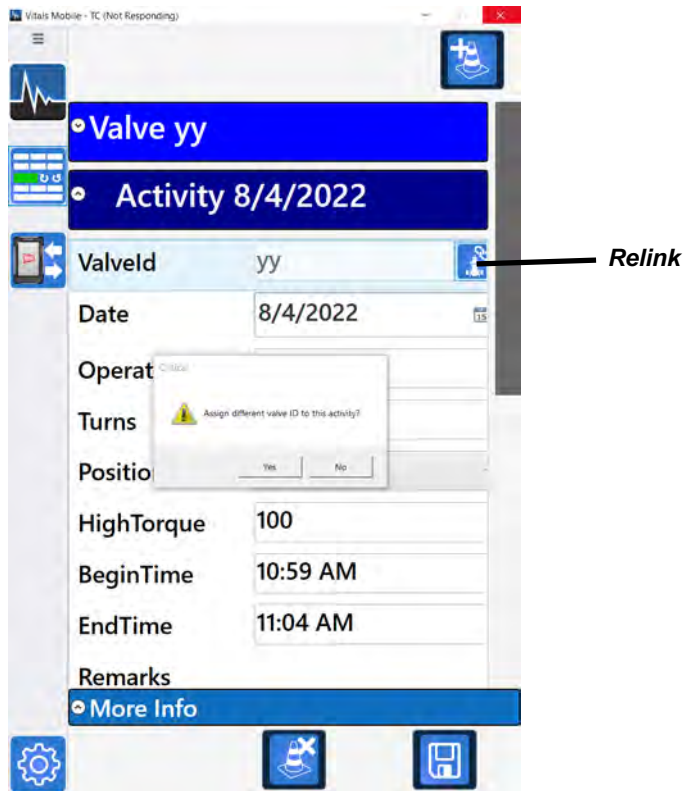


Figure 5-51. Tap the **Relink** button.

6. Tap the **Paste** button next to the **ValveID** field. The ValveID you copied will be entered in the field. Click **Save**.

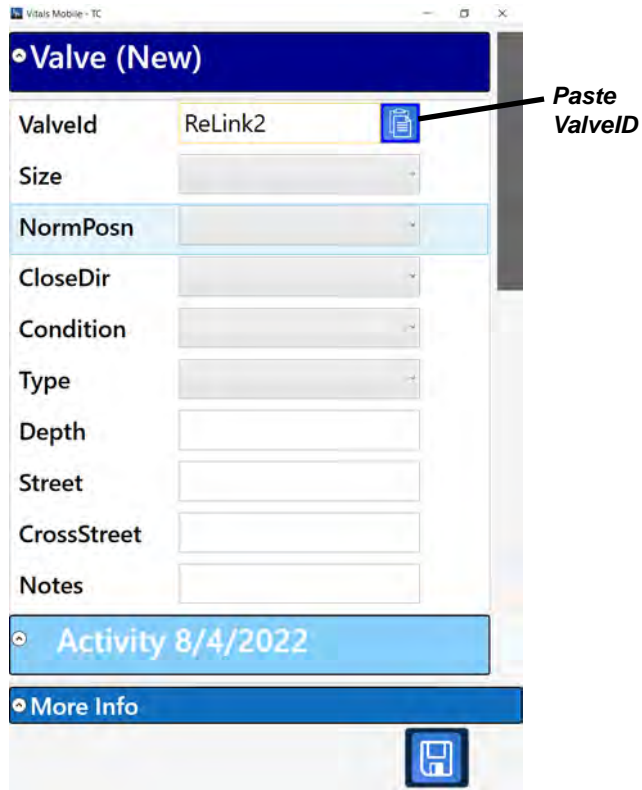


Figure 5-52. Paste in the correct ValveID and then tap **Save**.

Transducer Errors

If you get a **Transducer Error** message while operating the TM-7 or ERV-750, the transducer readings from the valve operator are out of normal range. This indicates a problem with either the transducers or cables. **Caution: Vitals uses transducer readings to calculate operating torque. Operating with incorrect readings can cause the machine to break a valve.**

Contact E.H. Wachs for service if your valve operator is generating **Transducer Error** messages.

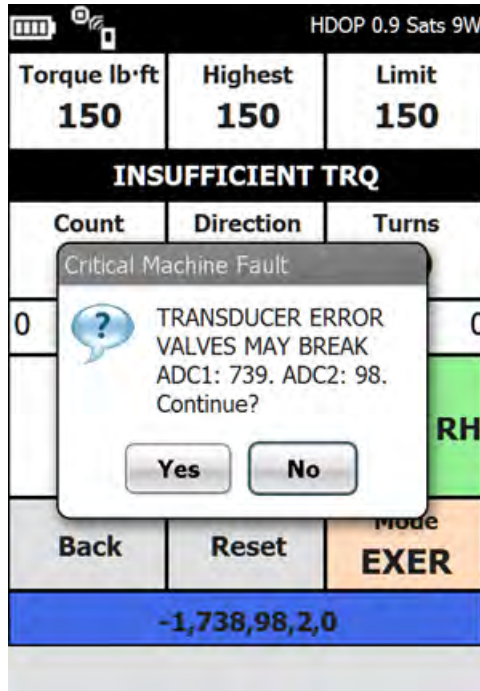


Figure 5-53. Example Transducer Error screen. If you tap **Yes**, the valve operation will continue. If you tap **No**, the valve operation will stop.

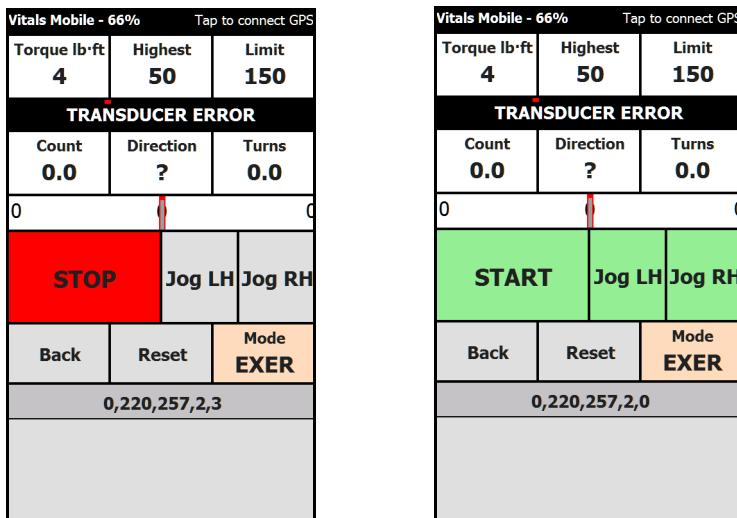


Figure 5-54. If you selected **Yes** to continue (left), the valve operation will continue. If you selected **No**, the valve operation is stopped. The message **TRANSUCER ERROR** is noted on the screen.

Using the valve operator with transducer errors (by clicking **Yes**) is **not** recommended. If necessary, you can still operate it, but torque control will not be reliable. Use caution to avoid damaging the valve.

VITALS MOBILE DIAGNOSTICS

Use the Vitals Mobile Diagnostics program to identify problems with the valve operator or GPS function.

Vitals Diagnostics operates the valve operator; use the same safety precautions and procedures that you use when performing valve operations.

Do not use Vitals Diagnostics with the valve operator installed on a valve. Run Diagnostics only in the following circumstances:

- the valve operator is powered on and in operating position;
- the valve operator is **not** engaged with a valve;
- all safe operating procedures are in place. See the User Manual for your valve operator.

Before using the Diagnostics program, make sure you are familiar with the safety instructions for your valve operator. Refer to the valve operator user manual.

1. Tap the Settings icon on the Home screen to display the Settings screen.
2. Under the **Connection** tab, make sure the valve operator you are testing is active under **MY CONNECTION**.
3. Tap the **Diagnostics** tab on the Settings screen. The Diagnostics **WARNING** screen appears.

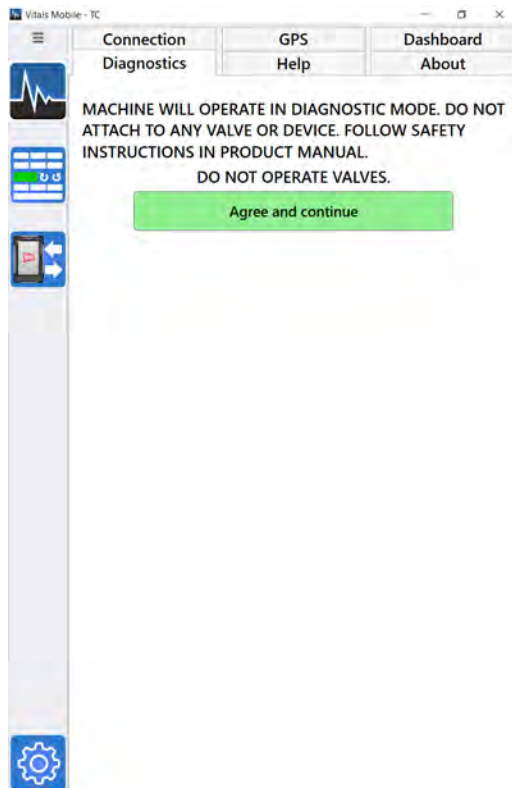


Figure 5-55. Vitals Diagnostic startup screen.

4. Do not use diagnostics with the valve operator mounted on a valve. Tap **Agree and Continue**.
5. The **SELECT TEST** screen appears.

**NOTE**

Vitals Diagnostics is designed to thoroughly check the data connection between the control board and the controller. Noise, incorrect data packets, etc. will prevent a connection.

To check for wiring/connector issues, use the Diagnostic Control Cable (for the TC-100, p/n 79-302-40). See “Using the Diagnostics Cable” on page 88.

(Vitals Mobile is not particular in establishing a machine connection. If Vitals Mobile connects, but Vitals Diagnostics does not, it indicates a connection issue.)

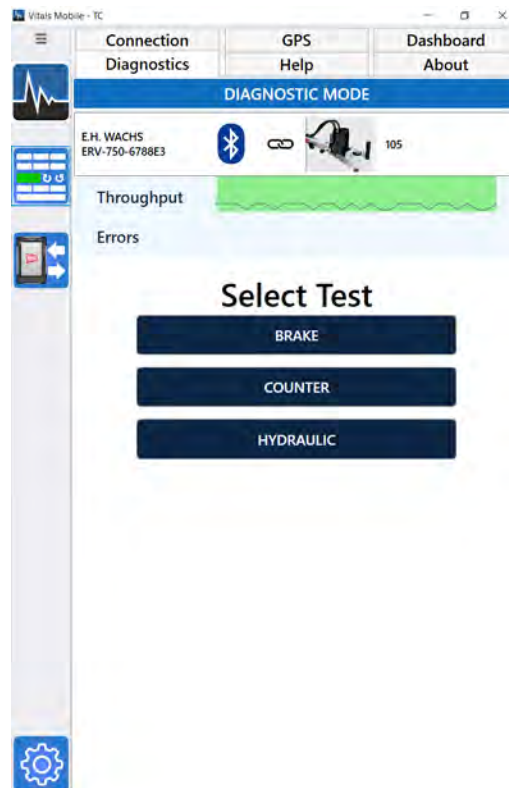


Figure 5-56. Vitals Diagnostics Select Test screen.

- The **BRAKE** test checks locking and releasing the valve operator brake.
- The **COUNTER** test checks the operation of the rotation counter.
- The **HYDRAULICS** test checks operation of the hydraulic system and the pressure transducers.
- **NOTE:** The **Errors** line below the **Throughput** graph displays the status of the data connection. Red bars in the graph indicate data connection failures.
 - An occasional red error bar is normal, but consistent or multiple error bars indicate a connection problem:

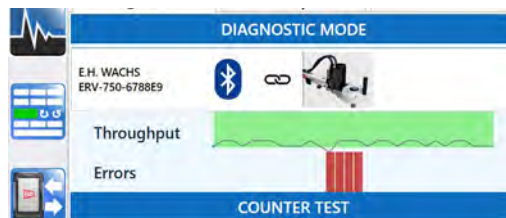


Figure 5-57. Multiple red error bars indicate a connection problem.

- Make sure you are using the controller close enough to the valve operator for a good Bluetooth connection, or connect the controller using the optional diagnostics cable.

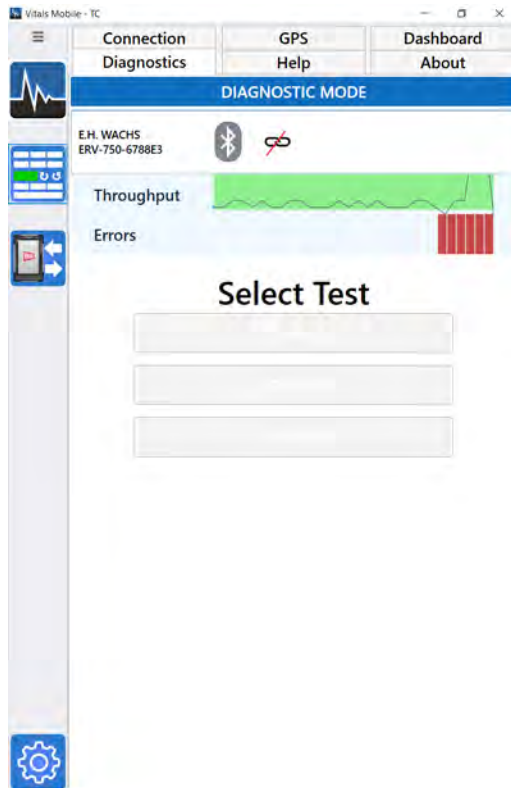


Figure 5-58. The red bars below the **Throughput** graph indicate data connection errors. If connecting with Bluetooth, try moving closer to the valve operator. You can also use the optional Diagnostics Cable.

6. Tap the button for the test you want to run. Refer to the following sections for instructions for each test.
7. After you have run the desired test(s), tap another Settings tab or program icon (Home, Controller, etc.) to continue.

Brake Test

1. When the brake test starts, the brake on the valve operator is locked. Tap and hold the green **PUSH** button.

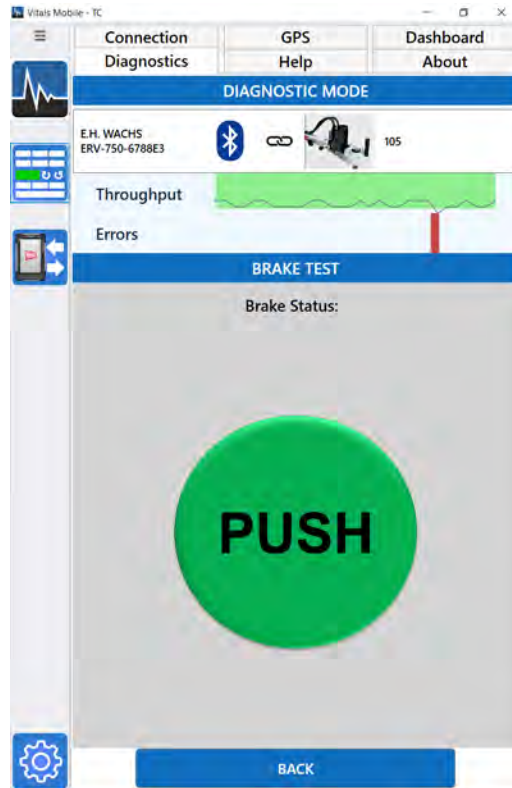


Figure 5-59. Test the brake by pressing and holding the PUSH button. The brake is released while you hold the button.

2. The button turns yellow and the status changes to **RELEASED**. Take your finger off the button to lock the brake again.

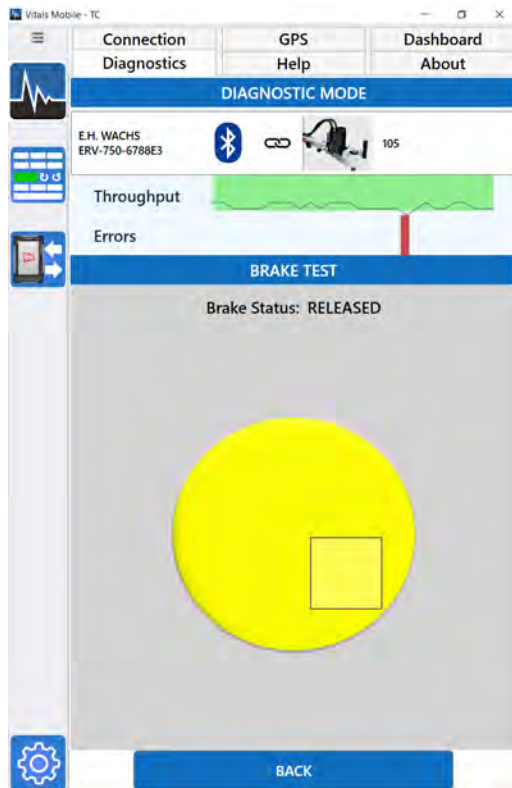


Figure 5-60. The button is yellow while the brake is released.

3. To exit the brake test, tap the **Back** button.

Counter Test

1. The direction button reads either **RH** (right-hand) or **LH** (left-hand). Tap the direction button to change the test direction.

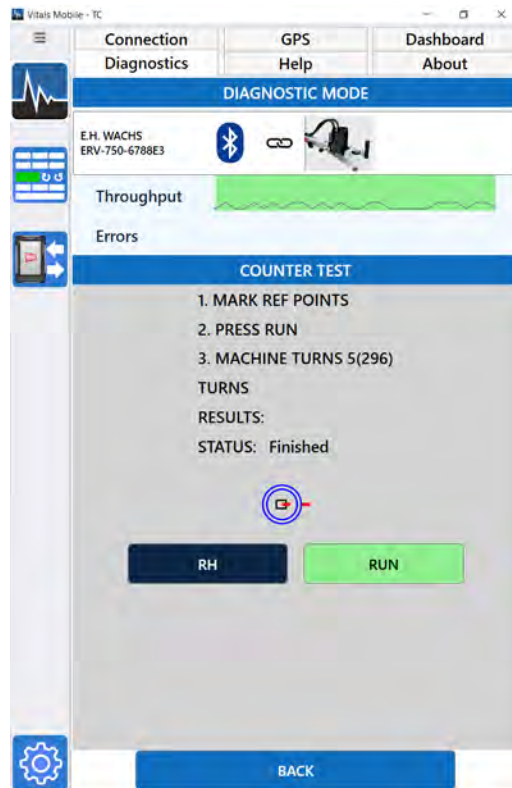


Figure 5-61. Start Counter Test screen.

2. Tap the **RUN** button to start the test. The test for the selected direction starts. The button changes to read **STOP**.

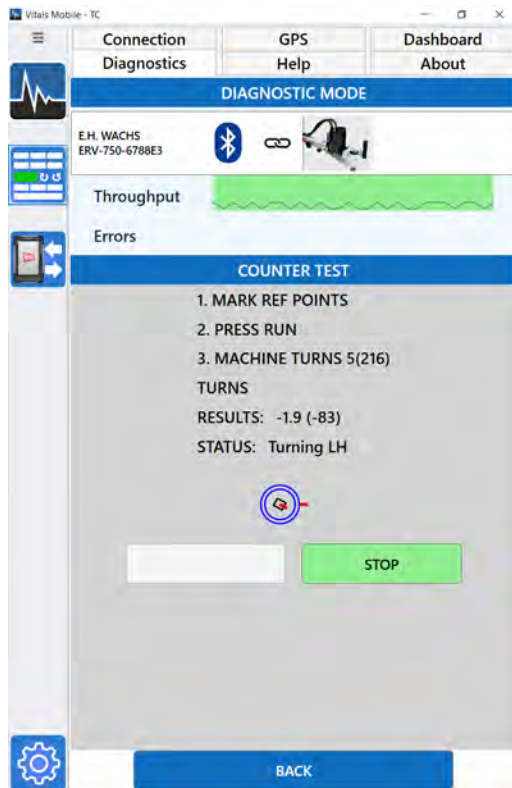


Figure 5-62. Counter Test running screen.

3. The status changes as the test is conducted. When the message at the bottom reads **Finished**, the test is complete.
4. If you want to test in the opposite direction, tap the direction button (**RH/LH**) to change it and tap **RUN**.

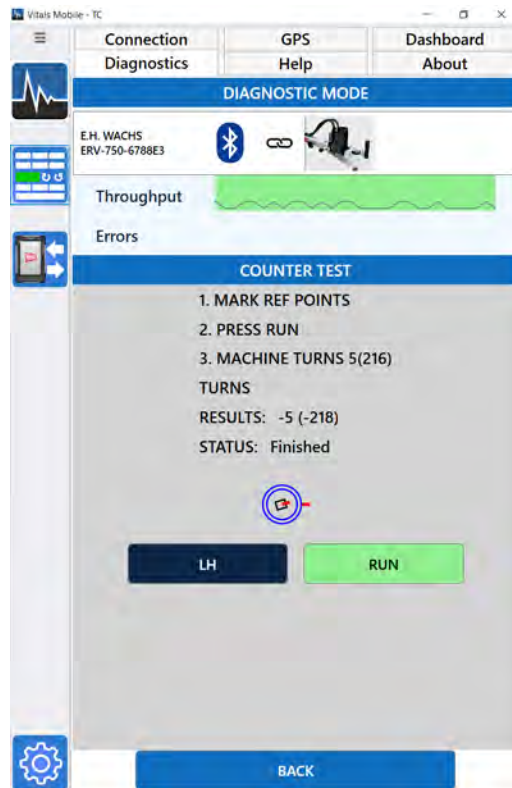


Figure 5-63. Counter Test finished screen.

5. To exit the counter test, tap the **Back** button.

Hydraulics Test

1. Tap to select the **FLOW (MIN or MAX)**, **PRESSURE (MIN or MAX)**, and **DIRECTION (LH or RH)**.



NOTE

When you start the Hydraulics Test, an error message appears if there is a transducer error. If you see this error message, follow the instructions in “Transducer Zero Torque Error” at the end of this section before performing the Hydraulics Test.

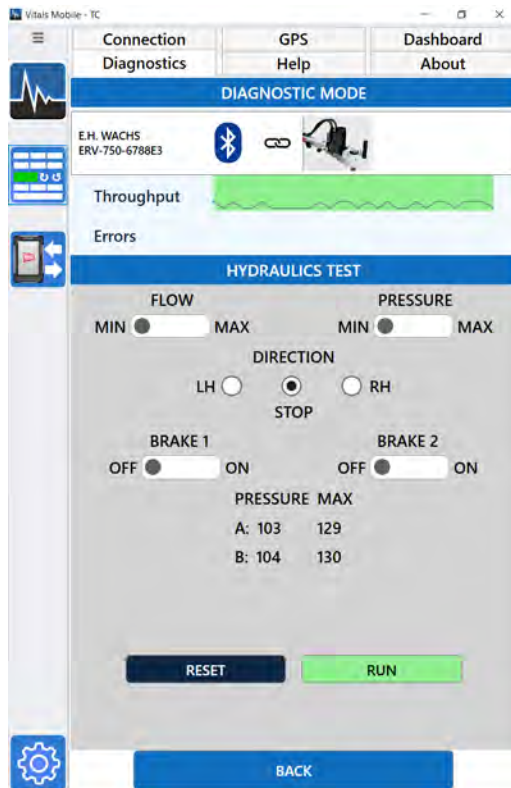


Figure 5-64. Hydraulics Test screen.

2. Tap the **RUN** button to start the test. The test for the selected parameters begins, and the button changes to read **STOP**.

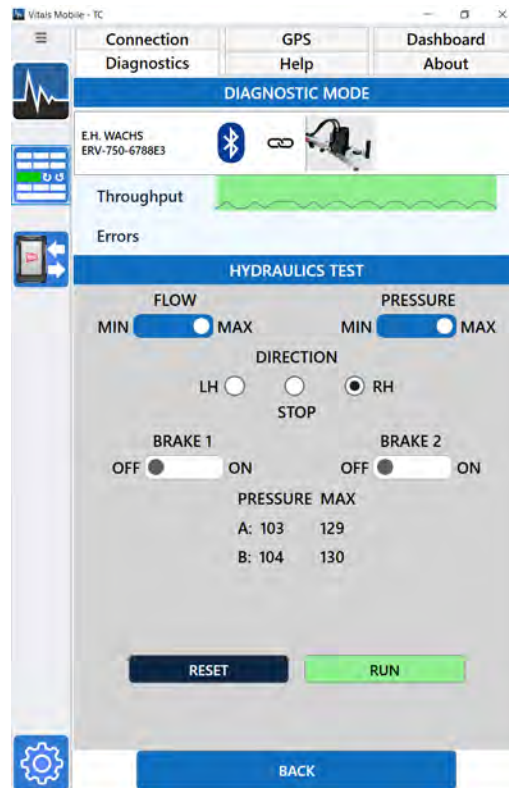


Figure 5-65. Hydraulics Test running screen.

3. The status changes as the test is conducted. Press the **STOP** button to end the test.
4. If desired, you can change the test parameters and run additional tests.
5. To exit the hydraulics test, tap the **Back** button.

Transducer Zero Torque Error

A transducer error may cause a **Transducer Zero Torque** error message when you start the Hydraulics Test. To correct the error, adjust the transducer potentiometer in the valve operator control box.

1. Remove the 4 screws in the control box cover, and take off the cover to access the control board.



NOTE

Do **NOT** run the Hydraulics Test while performing this adjustment. The valve operator must be in the stopped condition.

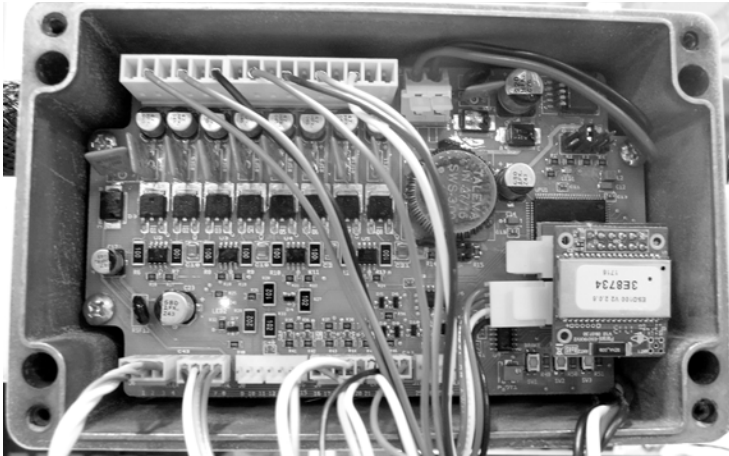
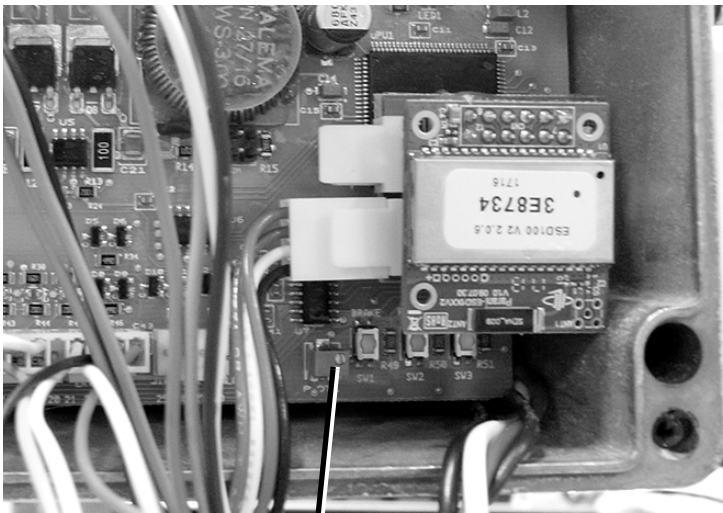


Figure 5-66. Open the control box to adjust the transducer potentiometer.

2. Locate the potentiometer on the control board. You will need a jeweler's screwdriver to adjust it.



Potentiometer adjustment screw

Figure 5-67. Locate the adjustment screw on the potentiometer.

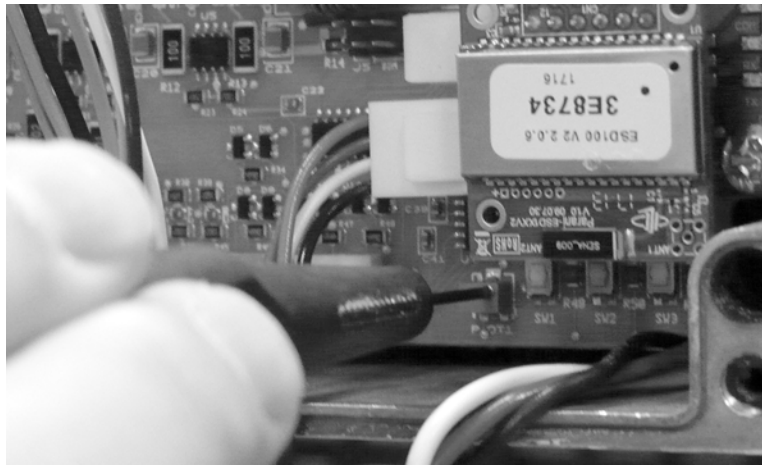
3. Turn the adjustment screw on the potentiometer while watching the value for **A** on the Vitals Diagnostics Hydraulics Test screen. Adjust the **A** value until **A** and **B** are equal.

IMPORTANT: Do **NOT** run the Hydraulics Test while performing this adjustment. The valve operator must be in the stopped condition.



NOTE

The actual values for **A** and **B** may vary, depending on whether hydraulic power is on. It doesn't matter what the values are when adjusting the potentiometer—only that you set them to be equal.



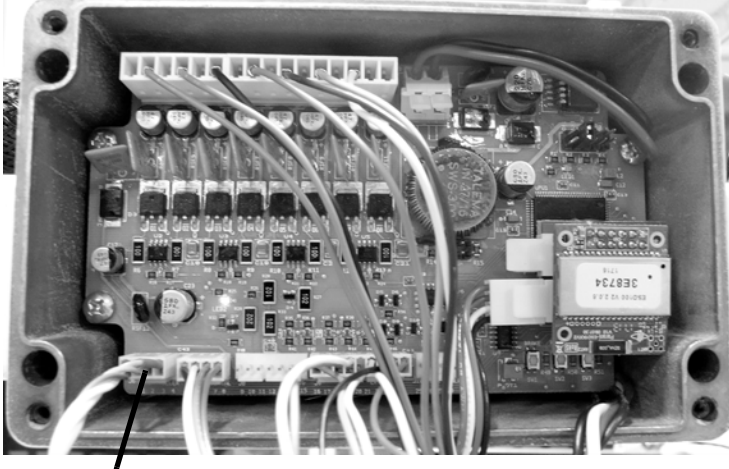
*Figure 5-68. Turn the adjustment screw until the **A** and **B** readings on the Hydraulics Test screen are equal.*

4. When the **A** and **B** readings are equal, replace the cover on the control box.
5. Continue with the Hydraulics Test by tapping the **RUN** button.

Using the Diagnostics Cable

To isolate possible wiring or connection issues, you can perform diagnostics using the optional Diagnostics Cable (part no. 79-302-40 for the TC-100).

1. Connect the USB end of the diagnostics cable to the port on the TC-100.
2. Remove the cover from the control box on the valve operator.
3. Remove the internal cable connection from the bottom left of the circuit board, as shown in Figure 5-69.
4. Plug the diagnostics cable into the circuit board where you removed the internal cable.



Remove the internal cable from the circuit board, and plug in the diagnostics cable

Figure 5-69. Plug the diagnostics cable directly into the circuit board in the valve operator control box.

5. Perform the diagnostics as described earlier in this section.
6. When finished, reconnect the internal cable and replace the control box cover.



Chapter 6

Using Vitals Mobile-HC (HC-100 Controller)

The HC-100 handheld controller runs the Vitals Mobile software. Vitals Mobile operates the valve exerciser and stores valve exercising data. You can transfer valve records from your PC running Vitals Desktop to the controller, or enter valve records using Vitals Mobile while in the field.

STARTING VITALS MOBILE

1. The Vitals Mobile icon appears on the HC-100 home screen. Tap the icon to start the program.

In This Chapter

STARTING VITALS MOBILE
PAIRING DEVICES USING
BLUETOOTH
VITALS MOBILE CONTROLLER
OPERATION
VITALS MOBILE DIAGNOSTICS



Figure 6-1. HC-100 home screen. Press the Home button on the keypad at any time to return to the home screen.

2. The **Vitals Mobile** main screen appears.

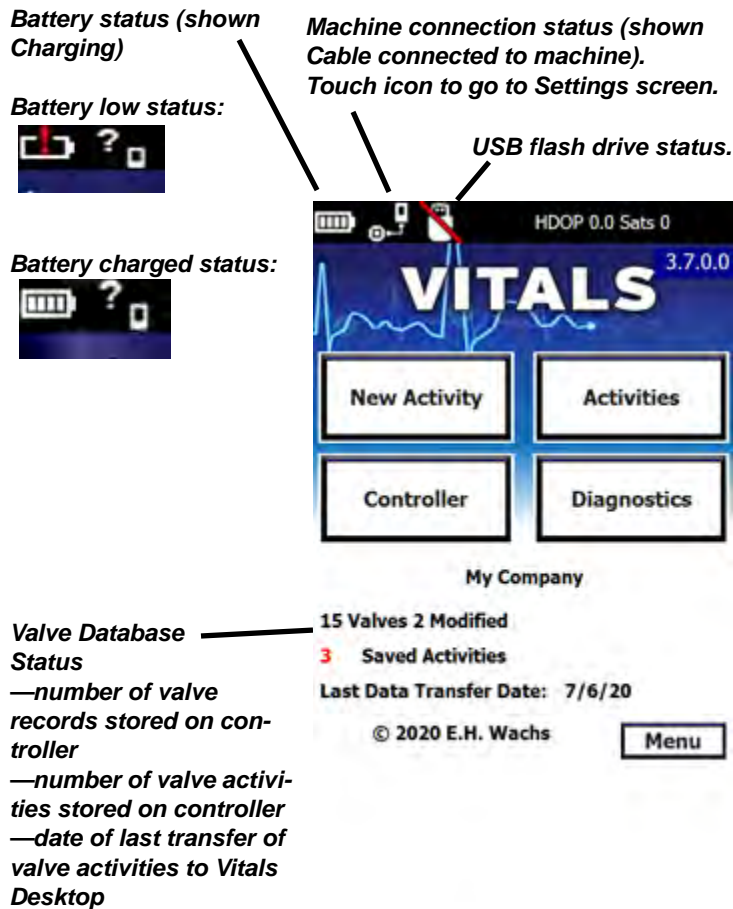


Figure 6-2. Vitals Mobile Main Screen

Main Screen Reference

- The **New Activity** button starts a new valve activity with data logging. Choose an existing valve ID, create a new one, or open the data entry screen. Search for nearby valves by pressing the **GPS Search** button.
- The **Activities** button opens the saved activities screen, containing a list of previously saved activities since the last Data Transfer.
- The **Controller** button opens the Vitals Controller program, enabling you to exercise a valve. Some activity information will be automatically entered, while most information will be left blank, giving you the option to enter data and save the activity after the exercise.
- The **Diagnostics** button opens the valve Diagnostics program, which helps identify valve operator problems.
- The **Menu** button displays the following commands.

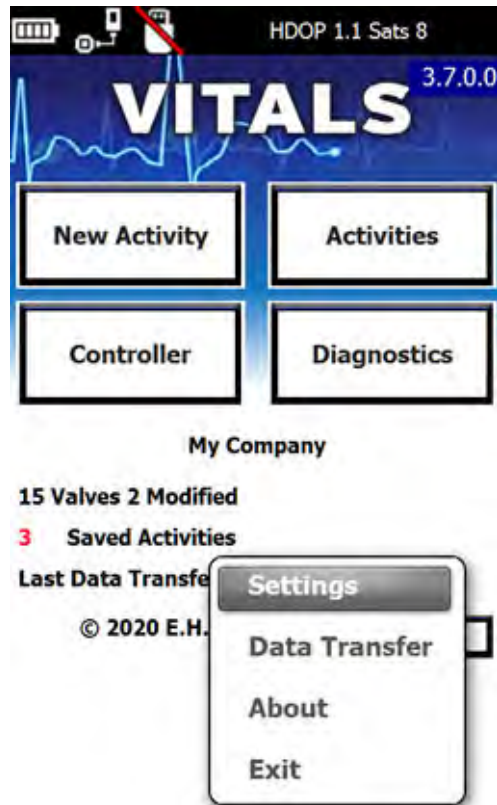


Figure 6-3. Vitals Mobile command menu.

- The **Settings** command opens the Vitals Mobile options screen. This screen contains settings for machine connection, GPS, and the default torque limit. (See “Changing Settings” below.)
- The **Data Transfer** command lets you transfer valve data to Vitals Desktop using a USB flash drive.
- The **About** command displays the Vitals Mobile **About** screen, with version information.
- The **Exit** command quits the Vitals Mobile program. To re-start the program, tap the Vitals Mobile icon on the HC-100 home screen.

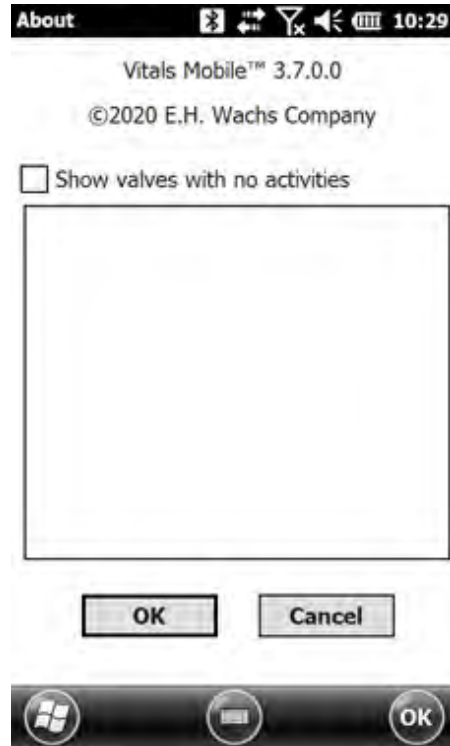


Figure 6-4. The About screen displays version information.

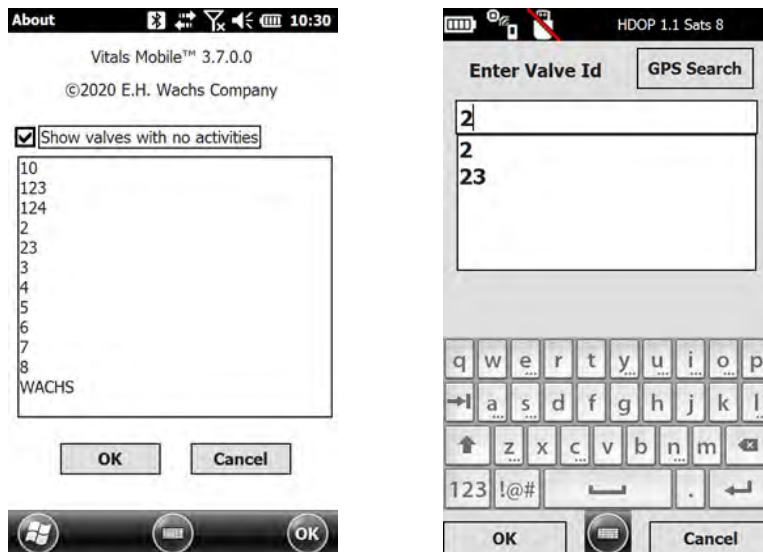


Figure 6-5. Tap the **Show valves with no activities** checkbox to display a list of valve in the database that have no activity records. Tap the Valve ID you want. The Enter Valve ID screen appears with the valve selected; tap OK to continue.

Changing Controller Settings

You can select the valve operator controller, the GPS (embedded or external), and USB data connection.

1. Tap the **Controller Settings** icon at the top of the Vitals home screen.

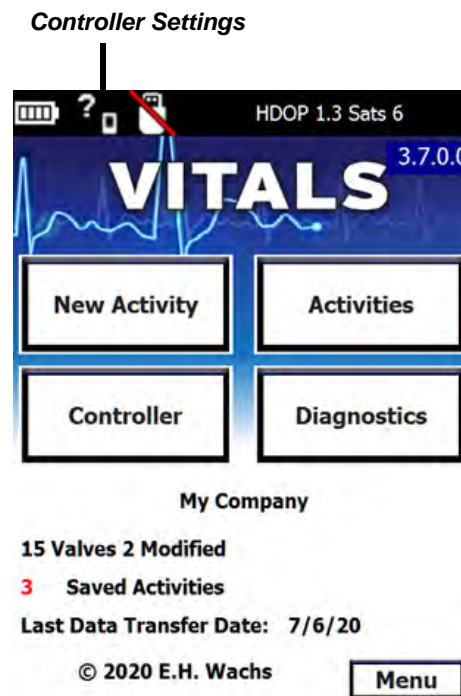


Figure 6-6. Tap the **Controller Settings** icon.

2. The **Controller Settings** screen appears.

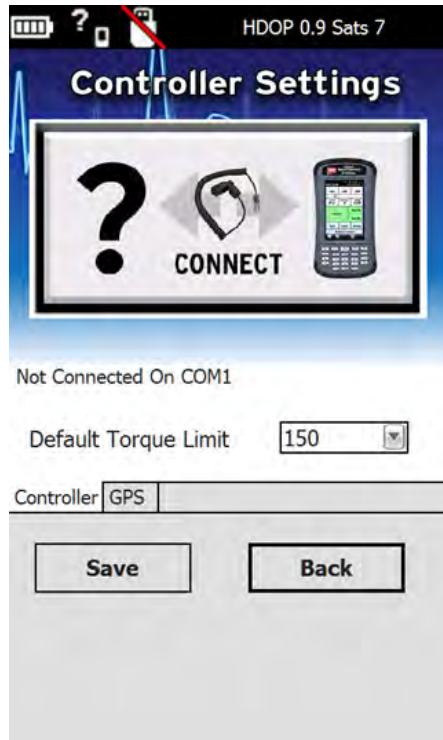


Figure 6-7.

3. Tap the **CONNECT** button to display the connections menu.

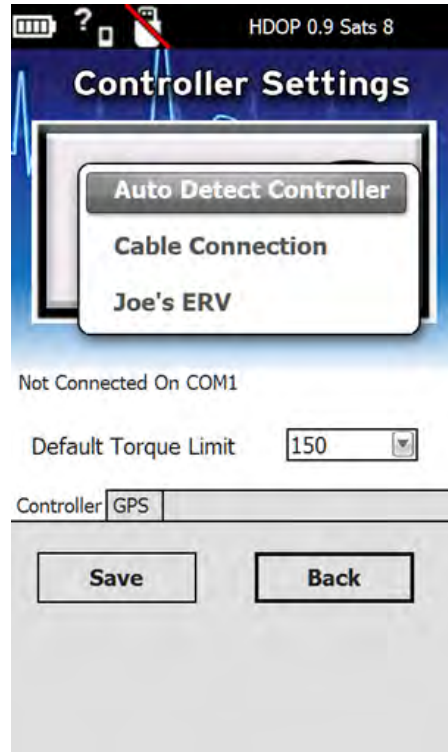


Figure 6-8. Connections menu.

4. Use **Auto Detect Controller** to check all COM ports for a valid machine connection (either cable or Bluetooth).
5. To make a cable connection to a device, tap **Cable Connection**.
 - If there is no device connected, a **Not Connected...** message will appear.



Figure 6-9. Controller Settings screen showing **Not Connected** message.

- If the cable is connected to a device, a **Connected with...** message will appear.

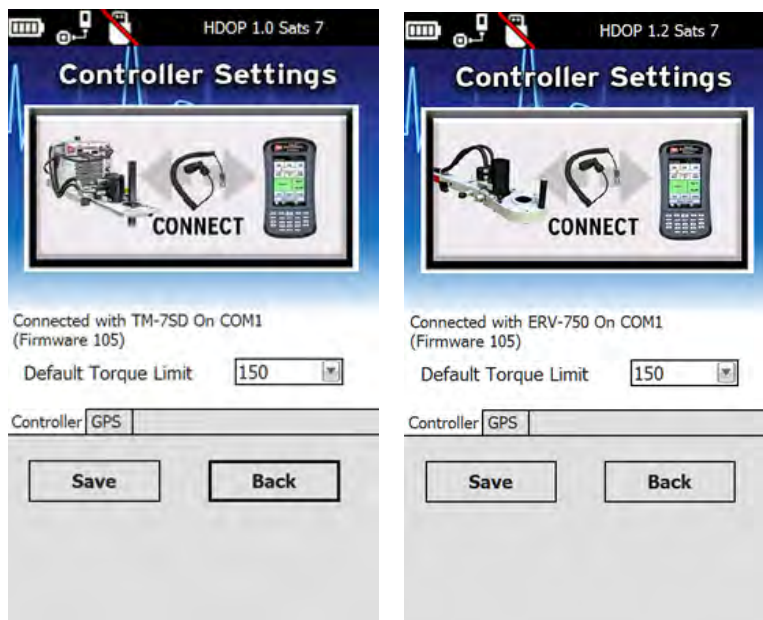


Figure 6-10. The images show the controller connected to the TM-7 (left) and ERV-750 (right).

6. To connect to a specific device, tap on its name in the menu (in this example, **Joe's ERV**).

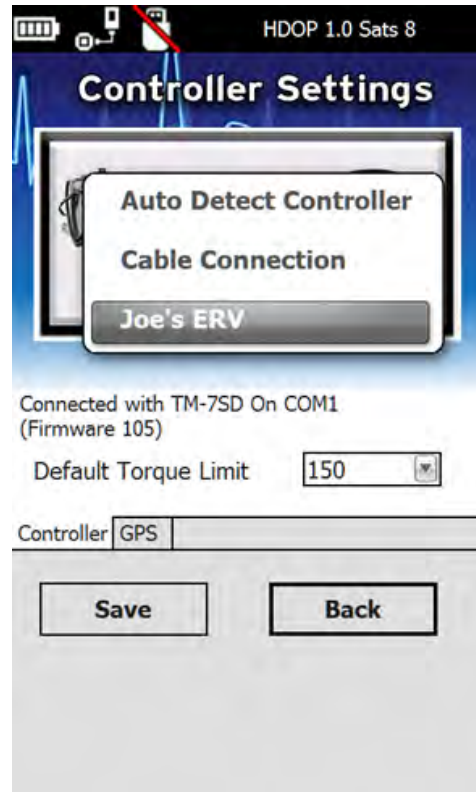


Figure 6-11.

- If the device is not connected, a **Not Connected...** message will appear.

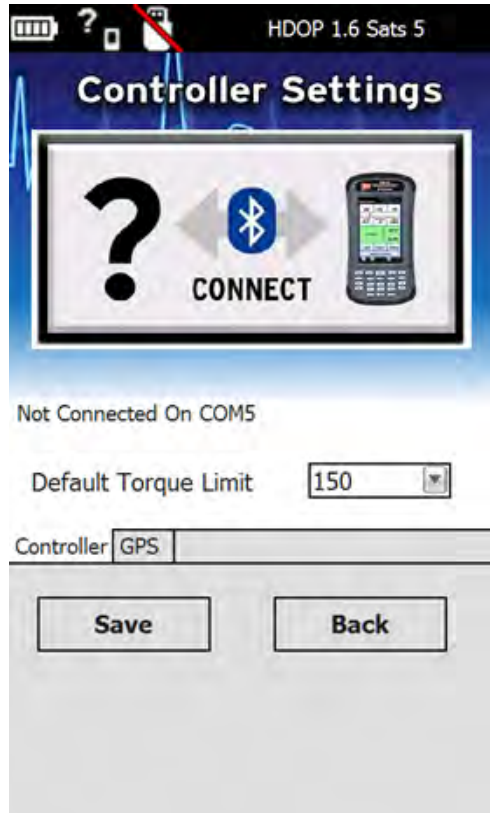


Figure 6-12.

- If the device is connected, a **Connected with...** message will appear.



Figure 6-13.

7. Tap the **Save** button to save the settings. The **Save** button will gray out when settings are saved.



NOTE

To go back without saving settings, click **No**, then **Back**.

*Figure 6-14. Tap **Save** to save settings, or **Back** to leave them unchanged.*

8. To change default torque settings, tap the **Default Torque Limit** menu when connected to the valve operator.
9. Tap the torque limit value you want, then tap **Save**.

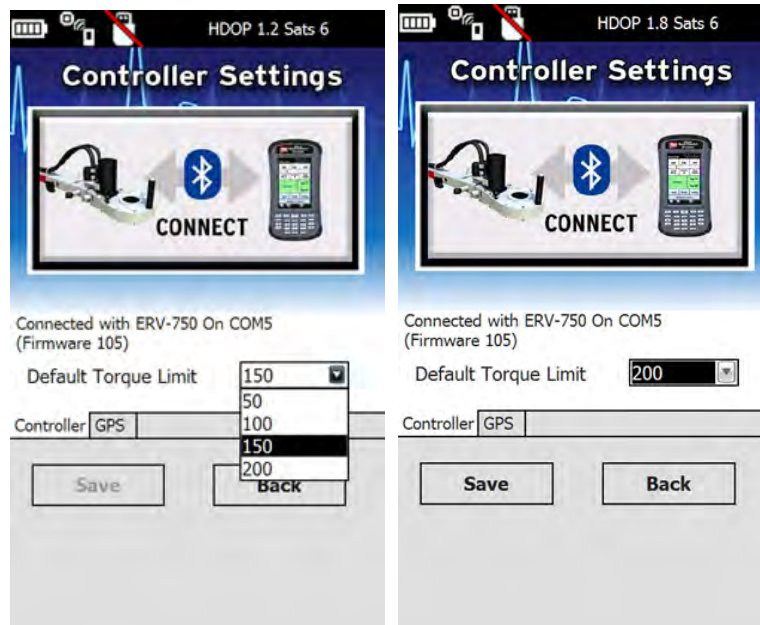


Figure 6-15. Select the desired torque limit and then tap **Save**.

Changing GPS Settings

1. To change GPS settings, tap GPS status at the top right of the Vitals screen.
 - If the internal GPS is connected, the **Connected Internal GPS** message appears.



NOTE

HC-100 internal GPS:
 GPS COM Port: COM8
 GPS Baud Rate: 115200.



Figure 6-16. Connected Internal GPS

- If the external GPS is connected, the **Connected External GPS** message appears.



Figure 6-17. Connected External GPS

2. Tap the **CONNECT** icon to select other GPS options.

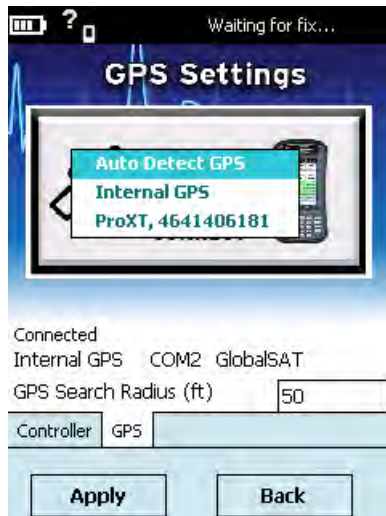
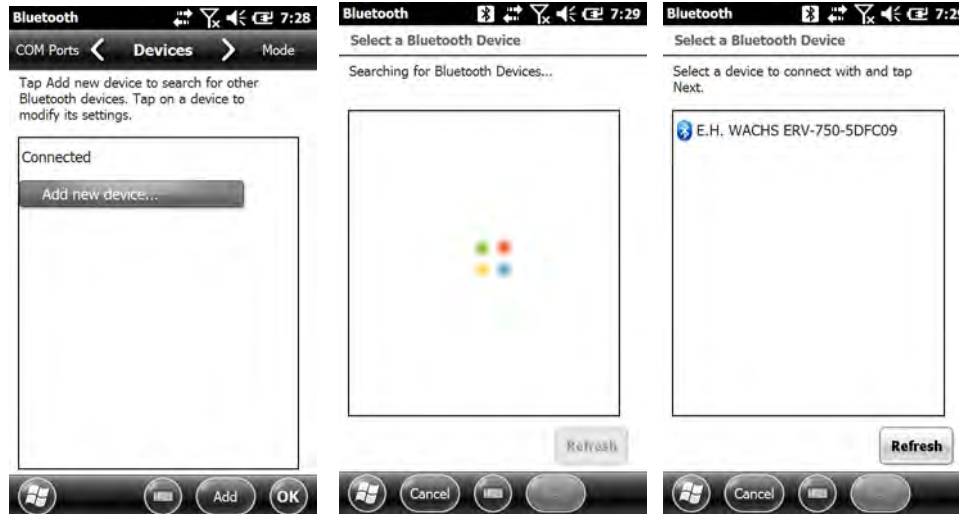


Figure 6-18.

PAIRING DEVICES USING BLUETOOTH

ERV-750 or TM-7

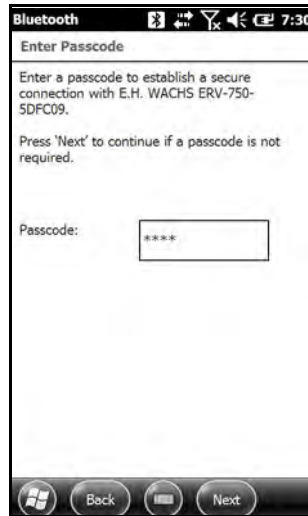
1. In the Home window, tap **Settings** and go to **Connections Bluetooth**. Tap **Add new device...**



2. Tap the **WACHS MACHINE** device and tap **Next**.



3. Tap the **Passcode** box and type “1234”. Tap **Next**.



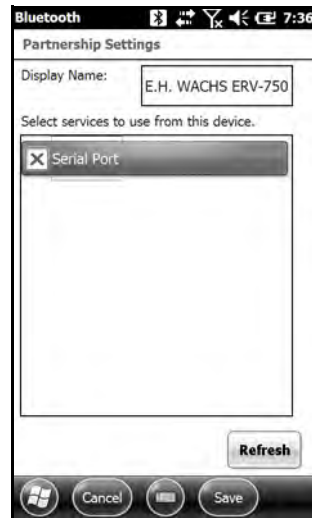
4. Tap **Done**.



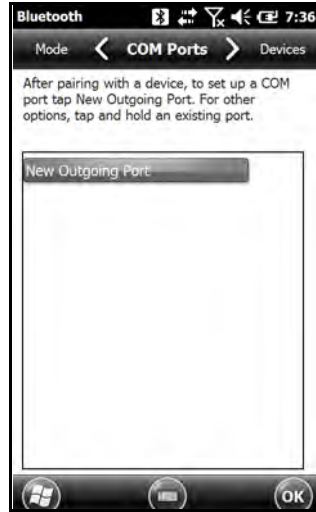
5. Tap **WACHS MACHINE** device again.



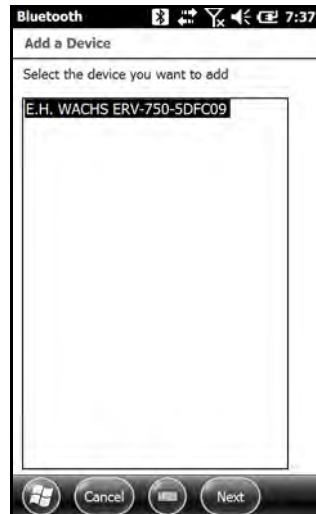
6. Check the **Serial Port** box and tap **Save**. (NOTE: You can customize the **Display Name**. Be sure to include the string "**ERV**", "**TM7**", or "**Wachs Machine**" in the display name.)



7. Tap on the **COM Ports** tab and tap **New Outgoing Port**.



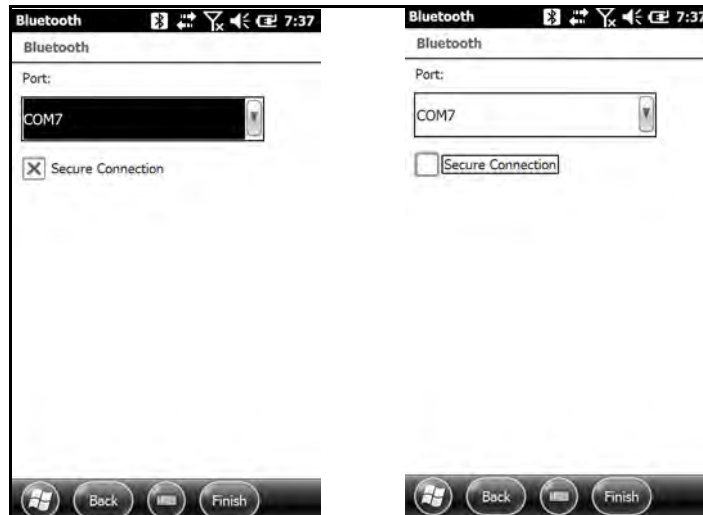
8. Tab the **WACHS MACHINE** device and tab **Next**.



**NOTE**

If no COM ports are available, you may need to remove unused COM port assignments. See “No COM ports are available for Bluetooth pairing” in Chapter 7, “Troubleshooting Guide”.

9. Select the **COM Port** (any unused port except **COM0** or **COM8**). Uncheck the **Secure Connection** box. Tap **Finish**.



Changing Bluetooth Device Names

If you change the name of a Bluetooth device, include the text “ERV”, “TM”, or “Wachs Machine” in the Display name. Vitals Mobile will only display devices with one of those text strings in the name. (This is to prevent connecting to any other, non-Wachs, Bluetooth devices.)

1. Tap the **Settings** button on the HC-100 home screen.



Figure 6-19. Tap the Settings button.

2. The **Settings** screen appears. Tap the **Connections** folder icon.

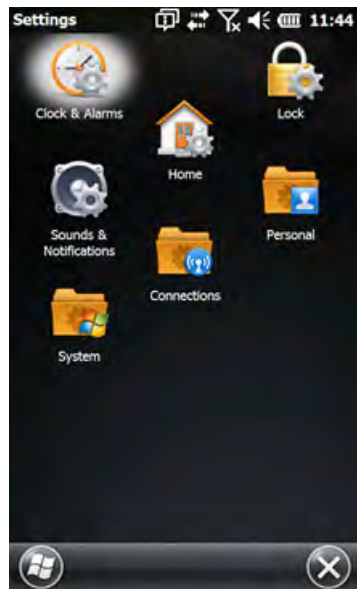


Figure 6-20.

3. The **Connections** screen appears. Tap the **Bluetooth** icon.

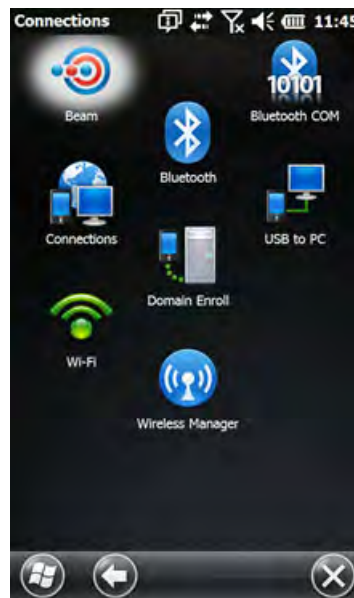


Figure 6-21.

4. The **Bluetooth** screen appears, with a list of **Devices**. Tap the Device name you want to change.



Figure 6-22.

5. The **Partnership Settings** screen appears, with the current Device Name in the **Display Name** field.



Figure 6-23.

6. Type the new **Display Name**. Tap **Save** at the bottom of the screen.

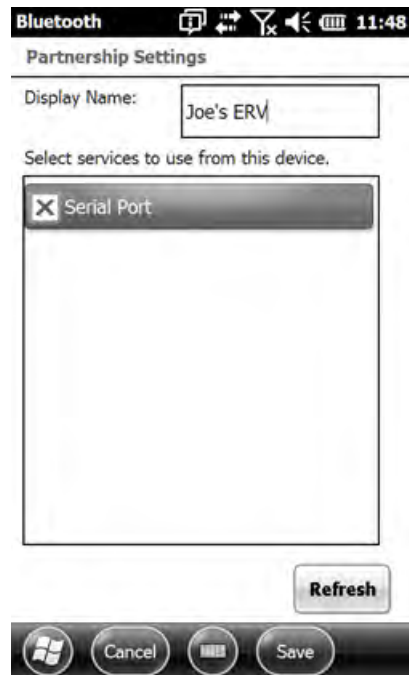


Figure 6-24.

7. The new name now appears on the **Bluetooth** screen.



NOTE

The Display Name must include one of the following text strings: “ERV”, “TM7”, or “Wachs Machine”.

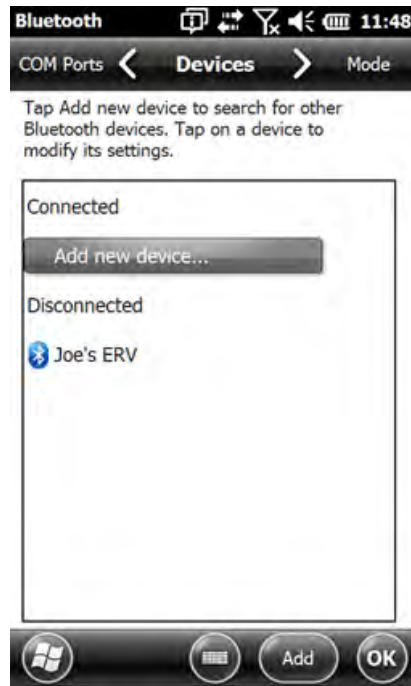


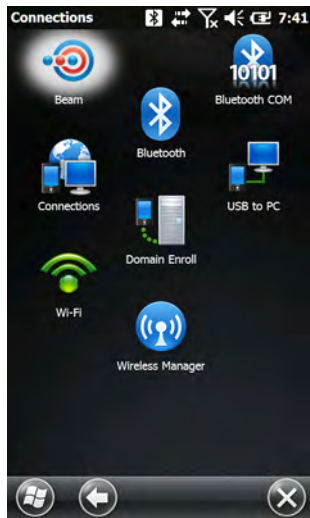
Figure 6-25.

External GPS

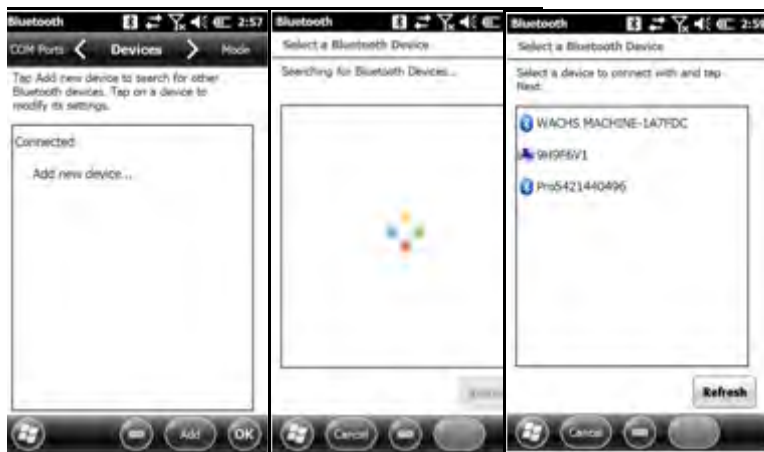
1. In the Home window, turn Bluetooth ON by tapping the Bluetooth icon. (The icon is blue when Bluetooth is ON.) Tap **Settings**.



2. Go to **Connections**.



3. Go to **Bluetooth** and tap **Add new device...**



4. Click **Pro** device and tap **Next**.





NOTE

E.H. Wachs' external Bluetooth GPS uses passcode 0000; other devices might have a different passcode.

5. Tap the **Passcode** field and enter "0000". Tap **Next**.



6. Tap **Done**.



7. Tap **Pro device** again.



8. You have the option to change the Display Name. Check the **Serial Port** box and tap **Save**.



9. Tap on the **COM Ports** tab and tap **New Outgoing Port**.



10. Tap the **Pro device** and tap **Next**.



11. Select the **COM Port**. Uncheck the **Secure Connection** box. Tap **Finish**.



NOTE

Select any unused COM port except **COM0** or **COM8**. Refer to *BlueTooth Pairing & Setup Instructions* (79-419-23).

VITALS MOBILE CONTROLLER OPERATION

Vitals Controller

The Vitals Controller is the program for operating E.H. Wachs valve operators. If using a cable connection, make sure the control cable is connected to the serial port on the controller and to the port on the valve exerciser. If using a Bluetooth connection, make sure a Bluetooth module is properly installed on the machine's electronic board and that the Bluetooth settings on the controller device have been properly set up.

1. On the **Vitals Mobile** screen, tap the **Controller** button.



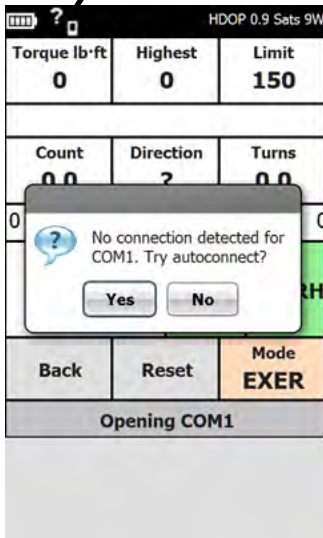
E.H. Wachs "No-Assumption" Valve Exercising

When you run the valve operator in EXER mode, it uses the "no-assumption" exercising protocol to determine direction of valve rotation.

Refer to Appendix A for a detailed description of the no-assumptions protocol.

If connection is not detected when the Vitals controller screen opens, a message will ask if you want to autoconnect. Tap **Yes**.

The Machine Connection Status icon shows the status at all times (shown with no connection).



You can tap the **Tap to connect** button to try to make a connection to the valve operator using the saved COM port in the settings.

2. The **Vitals Controller** screen appears.

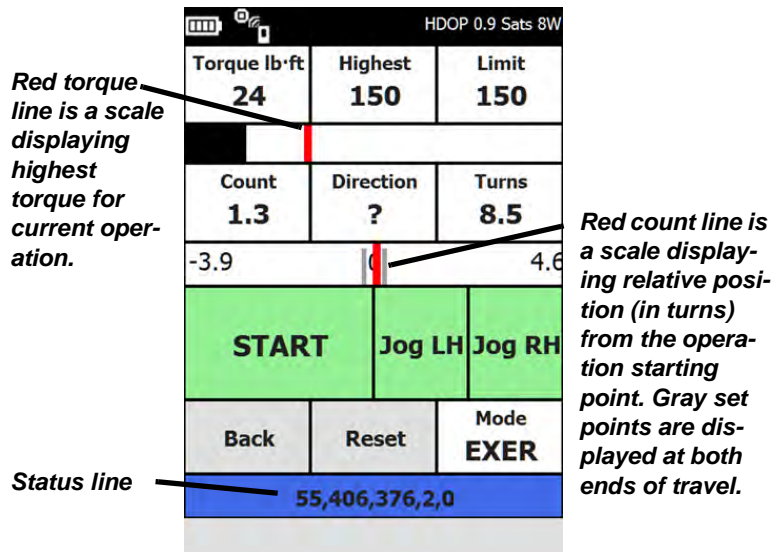


Figure 6-26. Vitals Controller

3. The **Torque lb-ft** field displays the current operating torque.
4. The **Highest** field displays the highest torque level during the current operation.
5. The **Limit** field displays the current torque limit. (To change the default torque limit setting, go **Back** to the main screen and tap the **Settings** button. Select a **Default Torque Limit** and tap the **Apply** button, then confirm the “Changing Settings” dialog.)
6. The **Count** field displays the current position, in number of turns from the starting point (positive or negative).
7. To override the automated exercising program and set a starting direction, tap the **Direction** button until either **RH** or **LH** appears. Leave the question mark in the display for automatic direction control.
8. The **Turns** field displays the total number of turns performed, in both directions, during the current operation.

9. Press **START** to begin the valve operation. The valve exerciser will run in the selected mode. The button will turn red and the text will change to **STOP**.
10. To turn the valve exerciser slightly in either direction (for positioning or installing the valve key), tap and hold on the **Jog LH** or **Jog RH** button. The operator will turn as long as you keep touching either of these buttons.
11. By default, the valve exerciser mode is **EXER**, which runs the valve exercising protocol. You can also operate in Emergency Mode (**EMER**) and Manual Mode (**MAN**). Tap the **Mode** button to switch modes.
12. Press **STOP** to end the valve operation. The button will blink white and green and the text will change to **START**.
13. To reset the valve operation readings and the operating defaults, tap and hold the **Reset** button.
14. The status line shows details of the currently active connection or operation. You can tap the status line to toggle through current status messages, including operating values, connection messages, and exercising status messages.
15. If the status line is a string of numbers, it is displaying the current connection type and machine selection.
 - turn count
 - transducer 1 value
 - transducer 2 value
 - machine ID
 - machine status.



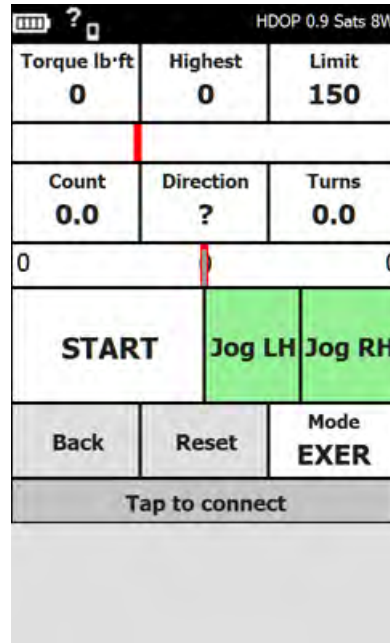
CAUTION

If you get a **Transducer Error** message during operation, there is something wrong with the transducers or cables. Operating with faulty transducer readings could cause valve damage. See “Transducer Errors” at the end of this section.



NOTE

See Appendix A for a description of the operating modes.



16. To exit the Vitals Controller program, tap the **Back** button.

Transducer Errors

If you get a **Transducer Error** message while operating the TM-7 or ERV-750, the transducer readings from the valve operator are out of normal range. This indicates a problem with either the transducers or cables. **Caution: Vitals uses transducer readings to calculate operating torque. Operating with incorrect readings can cause the machine to break a valve.**

Contact E.H. Wachs for service if your valve operator is generating **Transducer Error** messages.

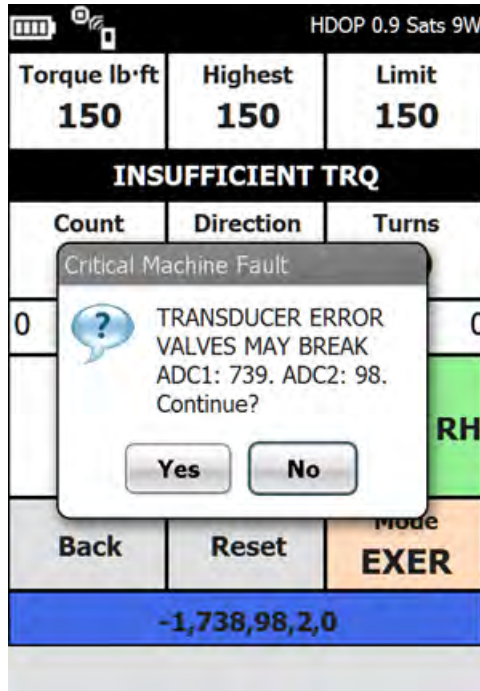


Figure 6-27. Example **Transducer Error** screen. If you tap **Yes**, the valve operation will continue. If you tap **No**, the valve operation will stop.

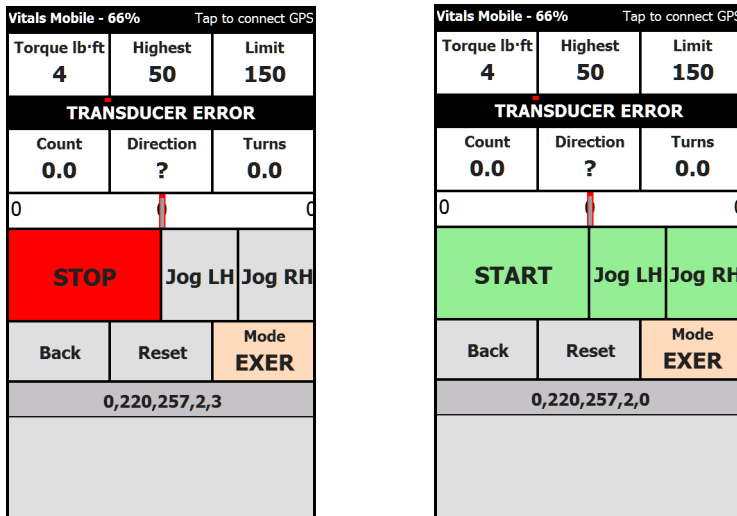


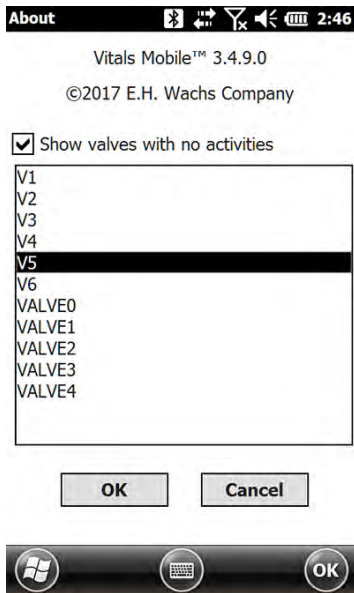
Figure 6-28. If you selected **Yes** to continue (left), the valve operation will continue. If you selected **No**, the valve operation is stopped. The message **TRANSUDCER ERROR** is noted on the screen.

Using the valve operator with transducer errors (by clicking **Yes**) is **not** recommended. If necessary, you can still operate



NOTE

You can list valves that have no activities by displaying the **About** screen (**Menu->About**) and tapping the **Show valves with no activities** checkbox.



After you select a valve ID and click **OK**, the valve record will appear and you can begin the activity.

This feature is a shortcut to find valves that you have not exercised from the list downloaded to Vitals Mobile.

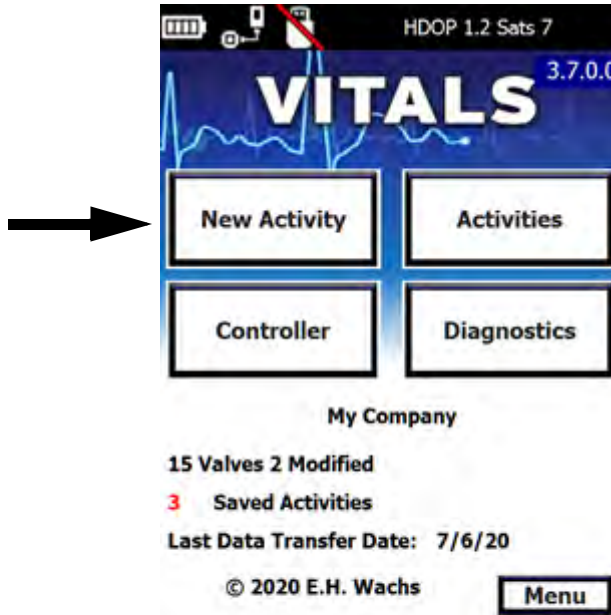
it, but torque control will not be reliable. Use caution to avoid damaging the valve.

Valve Operation with Data Logging

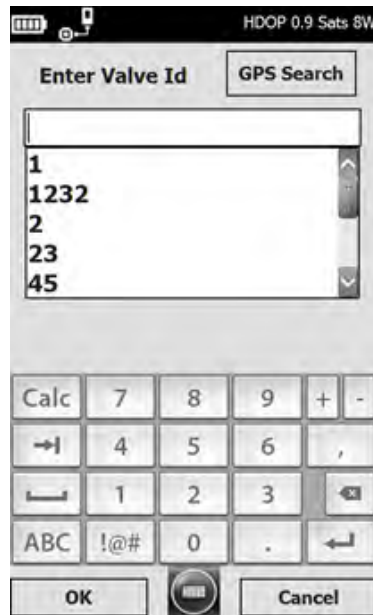
Starting a New Valve Activity

Before starting new activities, perform a data transfer with Vitals Desktop to sync any changes from the Vitals database to the controller.

1. Tap the **New Activity** button on the Vitals Mobile screen.



2. The **Valve ID** screen appears.



3. Tap the **Tap to select Valve ID** button. The **Enter Valve ID** screen appears, with a keypad at the bottom.



- Type in the ID of the valve you are exercising. Tap the **ABC** button to enter letters.

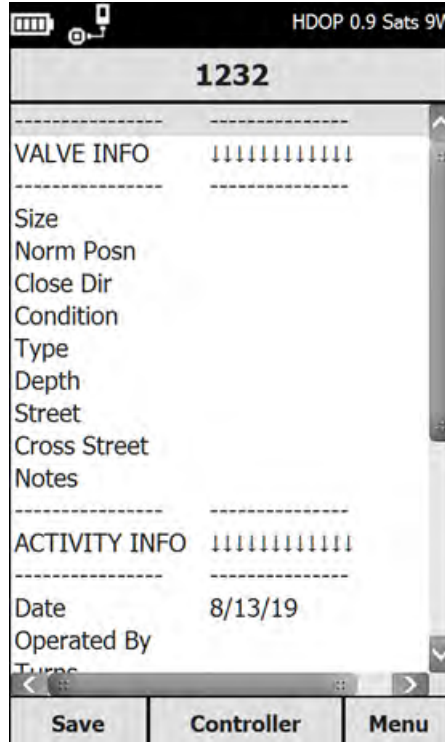


NOTE

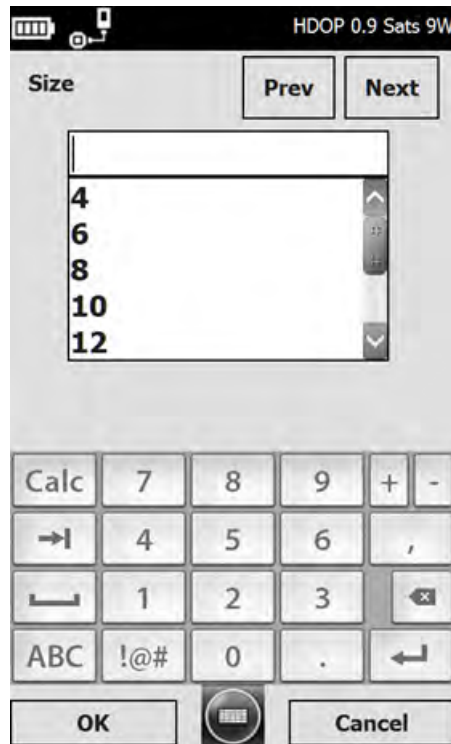
You can change the GPS search radius on the Settings screen. (See the “Changing Settings” section starting on page 96.)

- You can tap the **GPS Search** button to search the database for nearby valves (within a 50-foot radius). See “Using GPS Search” at the end of this section.

4. If the ID of the valve is not in the database, the screen will display **No records found**. You can tap the **OK** button to create a new valve record with the ID you typed.



5. To enter data for any of the fields on the Valve Record screen, tap the field name. A data entry screen will appear.



6. Enter the data and tap the **OK** button to return to the Valve Record screen. To continue to the next or previous field, tap the **Next** or **Prev** button.
7. When you have the GPS receiver enabled, the GPS device will automatically log coordinates and the **Latitude**, **Longitude**, and **GPS Positions** fields will be added to the activity record. (These values are averaged over the duration of the activity to improve accuracy.)
8. Tap **Controller** to enter the Vitals Controller screen. Tap **Menu** to view valve history specific to that valve, delete the valve activity, or open the options screen.
9. After entering information for a new valve activity and tapping the **Controller** button, operate the valve exerciser as described in section “Vitals Controller Operation”.
10. After the activity is complete, click the **Back** button on the Vitals controller screen, then click **Save** to save the activity record data.

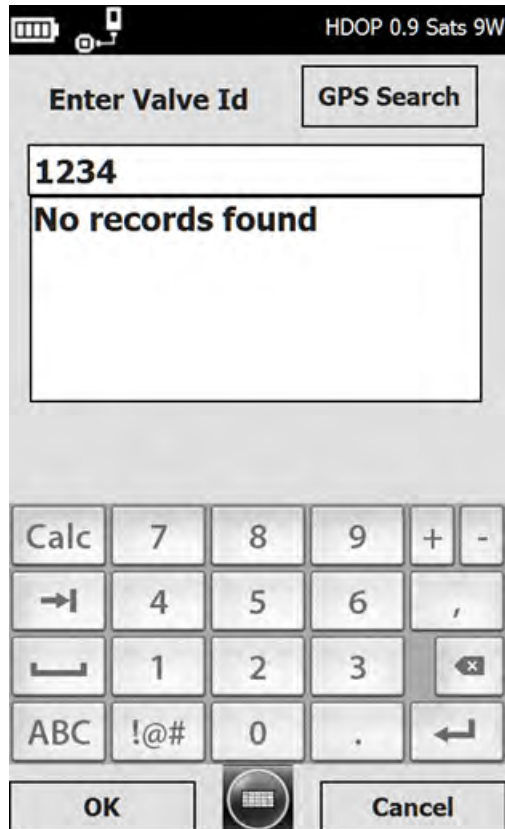
**NOTE**

Vitals Mobile saves latitude and longitude data **only** to the activity record. It never changes these values in the valve record.

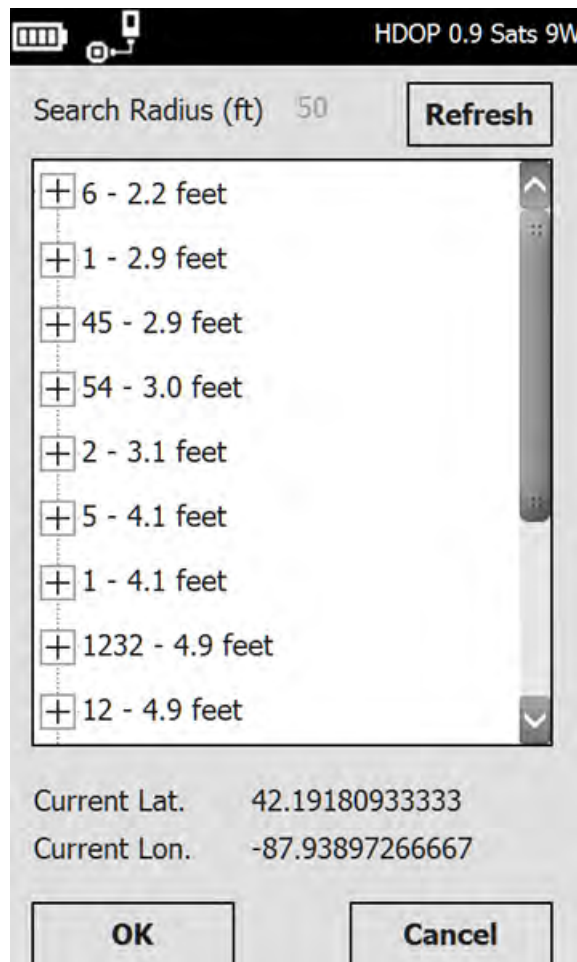
Using GPS Search

The GPS Search function allows you to find valves close to your current location. GPS Search uses valve location data from the valve record. If the valve record does not have location data, GPS Search uses data from activity records, if available.

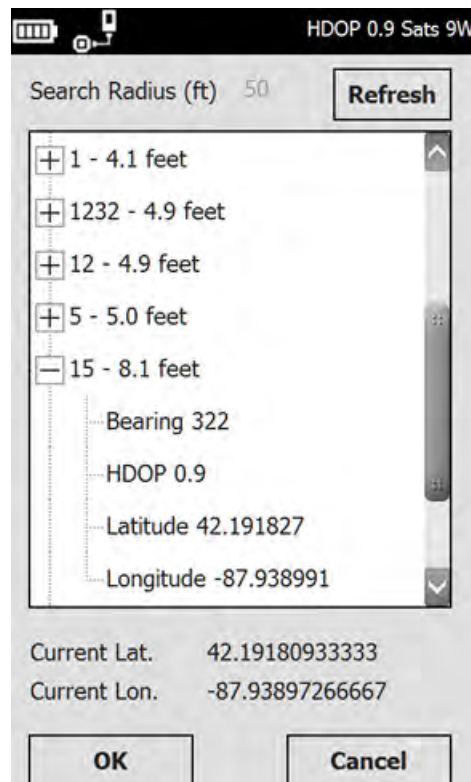
1. Tap the **GPS Search** button on the **Enter Valve ID** screen.



2. A list of valves within the search radius of your location appears. (The search radius appears at the top of the screen.)



- **Search Radius (ft)** is the currently set search radius. (You can change this on the Vitals Mobile Settings screen.)
 - **Current Lat.** is the latitude of the controller
 - **Current Lon.** is the longitude of the controller.
 - Tap the **Refresh** button to refresh the valve list and location data. (Even if you don't move, the data may change because of variance in the GPS signal.)
3. Tap a valve ID in the list to display its location information.



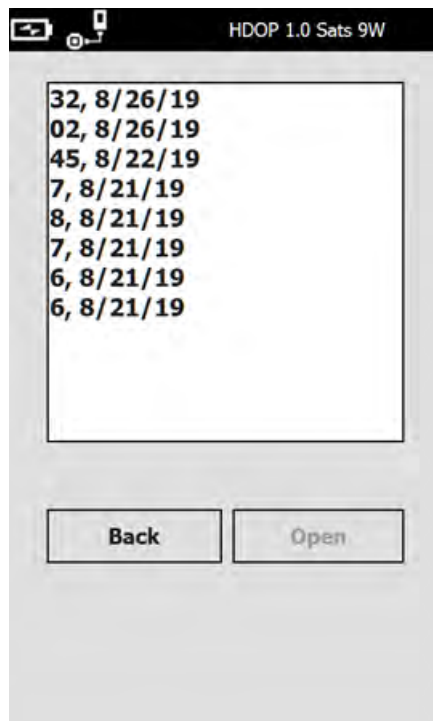
- **Bearing** is the degrees from north of the valve, relative to the position of the controller.
 - **HDOP** (Horizontal Dilution of Precision) is a measure of the GPS signal quality. The smaller the value, the better the signal (less than 1.0 is desired).
 - **Latitude** is the latitude for the valve stored in the valve record.
 - **Longitude** is the longitude for the valve stored in the valve record.
4. To start a new activity for a valve in the list, tap the valve ID to select it and tap the **OK** button. The **New Activity** screen appears with that valve selected.

Accessing Saved Activities

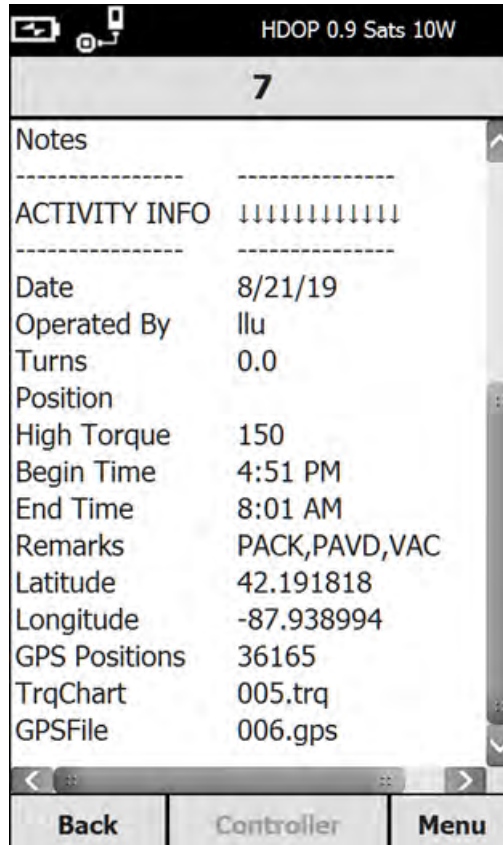
1. To access previously saved activities, tap the **Activities** button on the Vitals Mobile main screen.



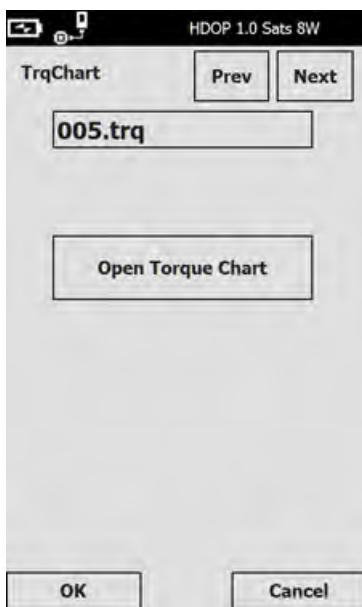
2. A screen appears with all of the activities that have been saved within Vitals Mobile since the last Data Transfer.



3. To edit a saved activity, highlight the desired valve and tap the **Open** button. The valve record screen will appear.



4. To edit the activity information, tap a field and update the information, as described above in “Starting a New Valve Activity”. To save the activity, tap the **Save** button. The **Controller** button is disabled to prevent overwriting a completed activity.
5. If you tap **TrqChart**, the **TrqChart** screen appears. You can search for a torque chart for the selected valve ID, and display the chart.



6. Tap the **OK** button to exit the Saved Activities screen.

Enabling and Using GPS

GPS Status Bar Statements and Enabling GPS Receivers

You can automatically detect and log valve positions using the GPS receiver installed in the HC-100. Enable the GPS



NOTE

Vitals Mobile will only save 999 torque charts. If 999 torque charts are saved and you start a new activity, you will get a message saying that no torque chart will be saved. You can still perform the activity. To record more torque charts, download saved activities to Vitals Desktop.

**NOTE**

HDOP is the Horizontal Dilution of Precision. The number immediately after HDOP provides an indication of the positional accuracy based on the current GPS signal and satellite positions. The smaller the number, the better the signal.

An HDOP of 1 is good. HDOP less than 1 indicates receiver is using SBAS to improve accuracy.

receiver first. Refer to the following messages at the top of the Controller screen.

- **Tap to connect GPS** - Indicates the GPS port is disconnected. Tap to enable GPS.
- **Connecting GPS** - Indicates the GPS port is being configured to receive data.
- **Waiting for data** - The GPS port has been opened and is waiting for GPS data.
- **Waiting for fix** - The GPS receiver is identifying GPS satellites from which to gather data for determining position. This may take several minutes.
- **HDOP 2.3 Sats 9W** - This is an example of the "connected" GPS status message. The numbers may differ depending on signal strength and number of satellites detected.

Logging GPS Positions

You can increase GPS accuracy by logging positions over a period of time. To do this, tap the **Tap to connect GPS** command in the top right corner of the Vitals Mobile screen.

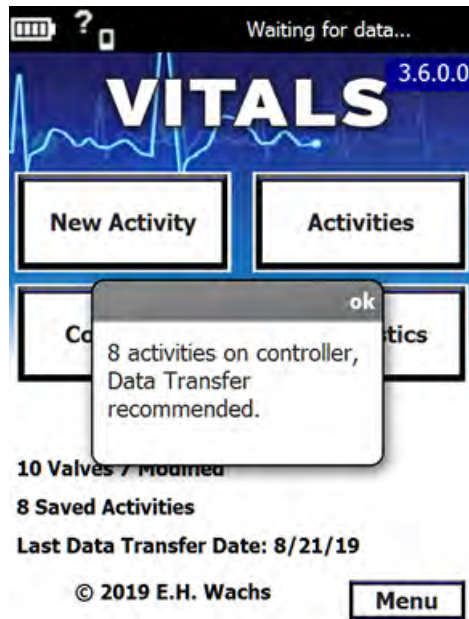
A “**connected**” GPS status message will appear, such as **HDOP 2.3 Sats 9W**, indicating that the GPS receiver is pulling coordinates.

To view the number of GPS readings and Latitude and Longitude coordinates, enter the valve record screen and scroll down to the **Latitude**, **Longitude**, and **GPS Positions** fields. The number of GPS positions increments with each GPS reading taken. The position is logged every 1.5 seconds.

Vitals Mobile Notifications

Notifications remind you to perform a data transfer when there are activities stored on the handheld controller. The notifications are triggered by number of activities and/or number of days since the last data transfer.

Pending notifications are displayed when Vitals Mobile starts up.



Tap **ok** to close the notification window. See “Transferring Data Between Vitals Desktop and Vitals Mobile” in Chapter 6 to transfer the activities.

You can edit the notification settings or turn this notification off within Vitals Desktop. See “Settings” on page 204.

VITALS MOBILE DIAGNOSTICS

Use the Vitals Mobile Diagnostics program to identify problems with the valve operator or GPS function.

Vitals Diagnostics operates the valve operator; use the same safety precautions and procedures that you use when performing valve operations.

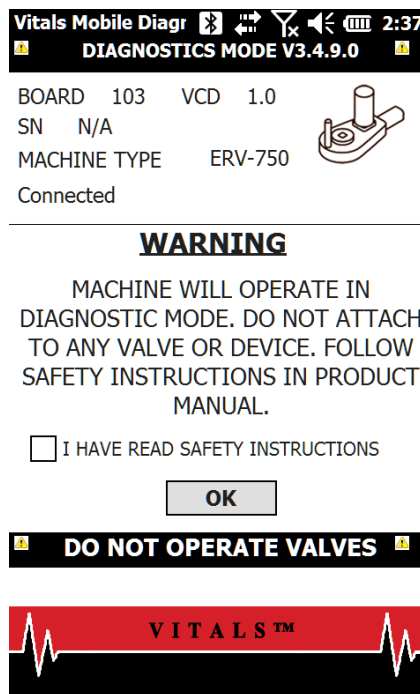
Do not use Vitals Diagnostics with the valve operator installed on a valve. Run Diagnostics only in the following circumstances:

- the valve operator is powered on and in operating position;

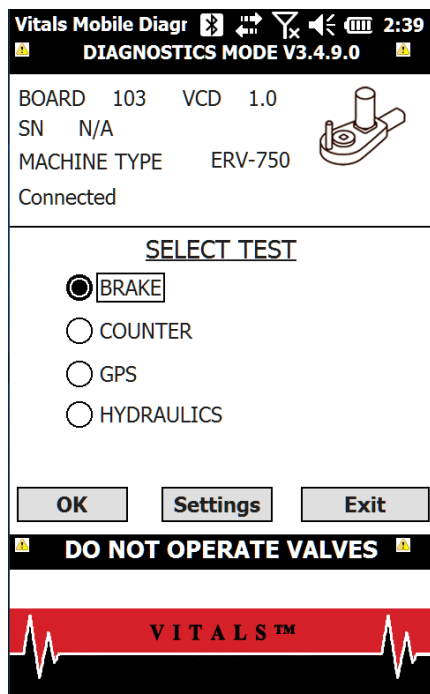
- the valve operator is **not** engaged with a valve;
- all safe operating procedures are in place. See the User Manual for your valve operator.

Before using the Diagnostics program, make sure you are familiar with the safety instructions for your valve operator. Refer to the valve operator user manual.

1. Tap the Diagnostics button on the Vitals Mobile main screen. The Diagnostics **WARNING** screen appears.



2. Tap to select the **I HAVE READ SAFETY INSTRUCTIONS** checkbox, then tap **OK**.
3. The **SELECT TEST** screen appears.



- The **BRAKE** test checks locking and releasing the valve operator brake.
 - The **COUNTER** test checks the operation of the rotation counter.
 - The **GPS** test checks the operation of the GPS unit.
 - The **HYDRAULICS** test checks operation of the hydraulic system and the pressure transducers.
4. Tap the checkbox for the test you want to run and tap **OK**.
 5. After you have run the desired test(s), return to the **SELECT TEST** screen and tap the **Exit** button to quit the Diagnostic program.

Brake Test

1. When the brake test starts, the brake on the valve operator is locked. Tap and hold the green **PUSH** button.

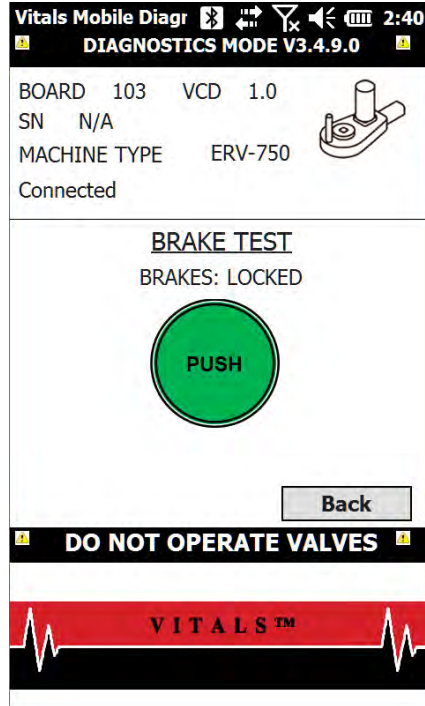


NOTE

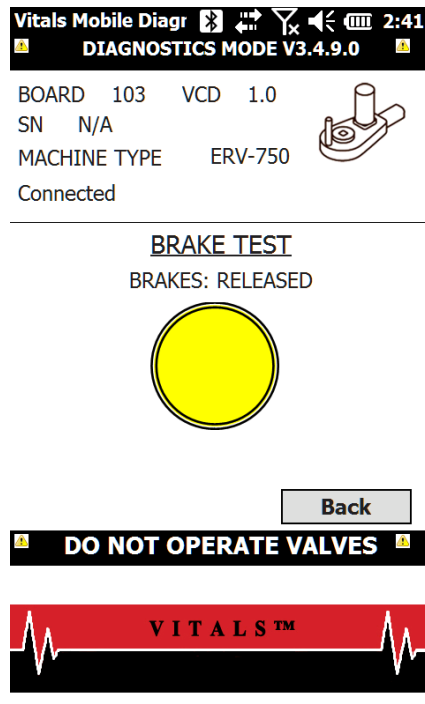
Vitals Diagnostics is designed to thoroughly check the data connection between the control board and the controller. Noise, incorrect data packets, etc. will prevent a connection.

To check for wiring/connector issues, use the Diagnostic Control Cable (for the HC-100, p/n 79-302-20).

(Vitals Mobile is not particular in establishing a machine connection. If Vitals Mobile connects, but Vitals Diagnostics does not, it indicates a connection issue.)



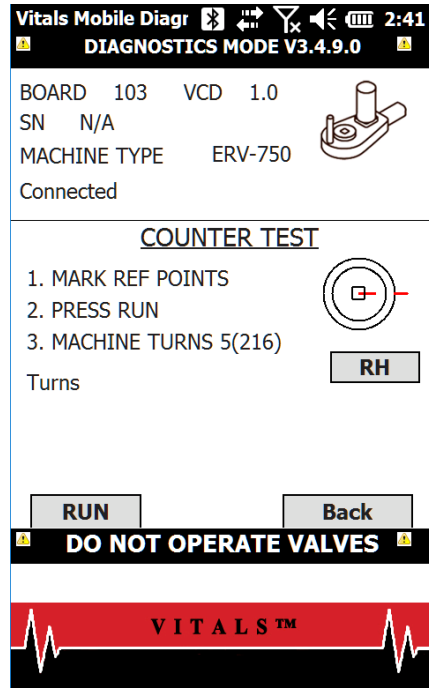
2. The button turns yellow and the status changes to **BRAKES: RELEASED**. Take your finger off the button to lock the brake again.



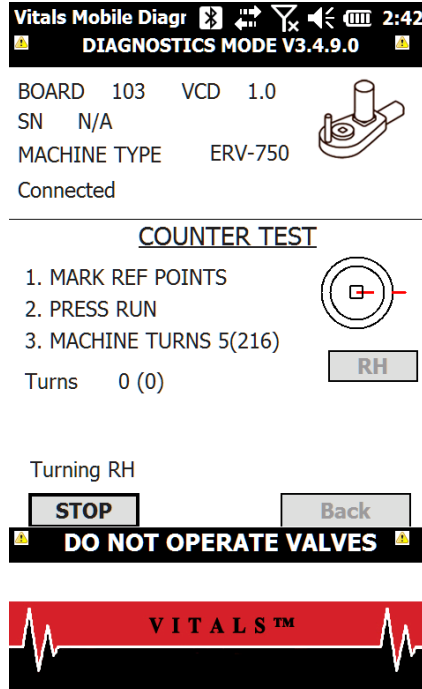
3. To exit the brake test, tap the **Back** button.

Counter Test

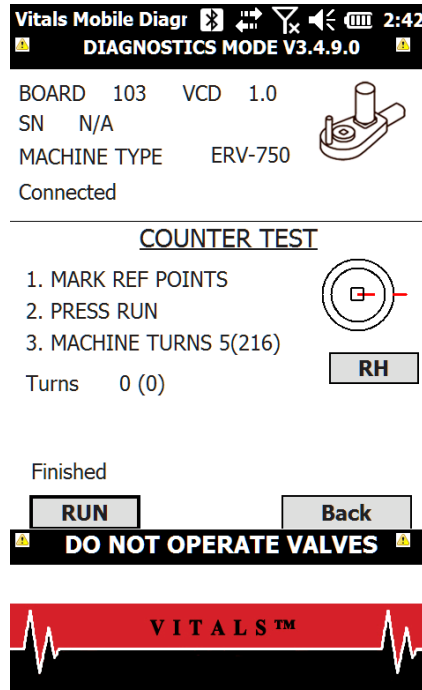
1. The direction button reads either **RH** (right-hand) or **LH** (left-hand). Tap the direction button to change the test direction.



2. Tap the **RUN** button to start the test. The test for the selected direction starts. The button changes to read **STOP**.



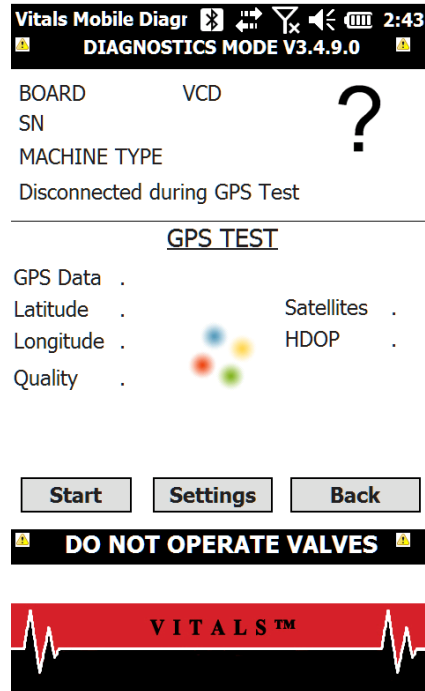
3. The status changes as the test is conducted. When the message at the bottom reads **Finished**, the test is complete.
4. If you want to test in the opposite direction, tap the direction button (**RH/LH**) to change it and tap **RUN**.



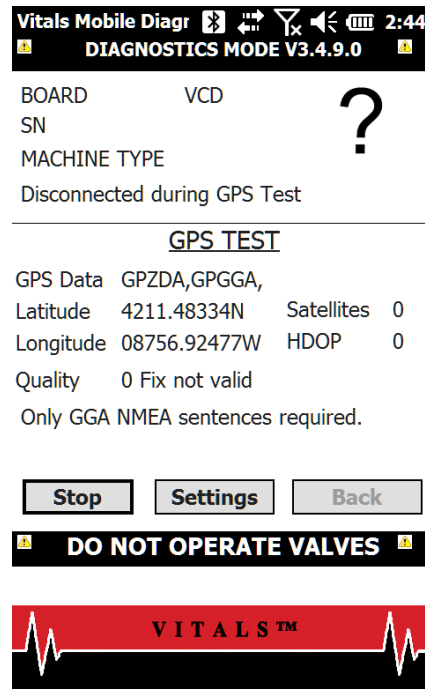
5. To exit the counter test, tap the **Back** button.

GPS Test

1. Tap the **START** button to start the test.



2. The test begins and the button changes to read **STOP**. The status changes as the test is conducted.

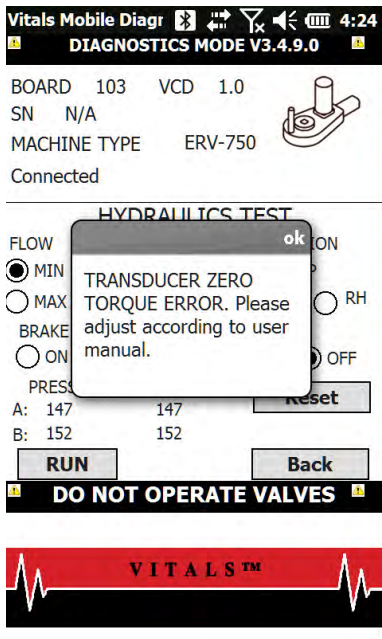


3. Press the **STOP** button to end the test.



NOTE

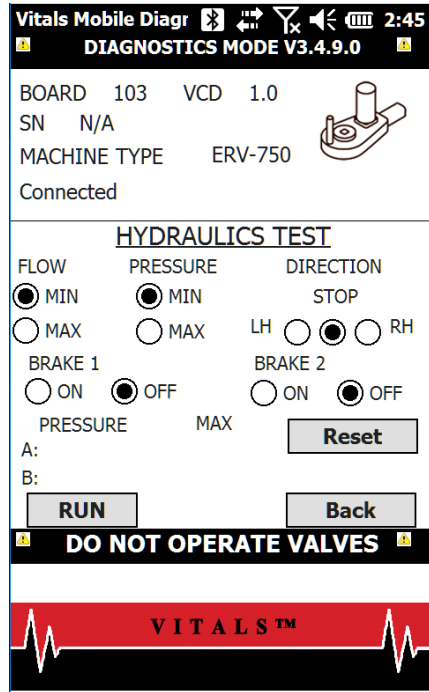
When you start the Hydraulics Test, an error message appears if there is a transducer error. If you see this error message, follow the instructions in “Transducer Zero Torque Error” at the end of this section before performing the Hydraulics Test.



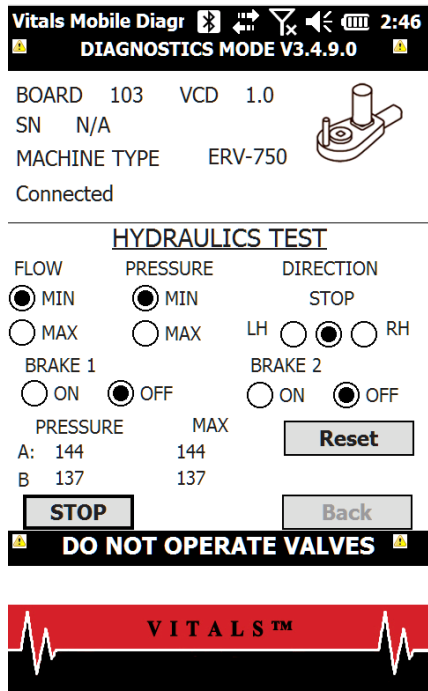
4. To exit the GPS test, tap the **Back** button.

Hydraulics Test

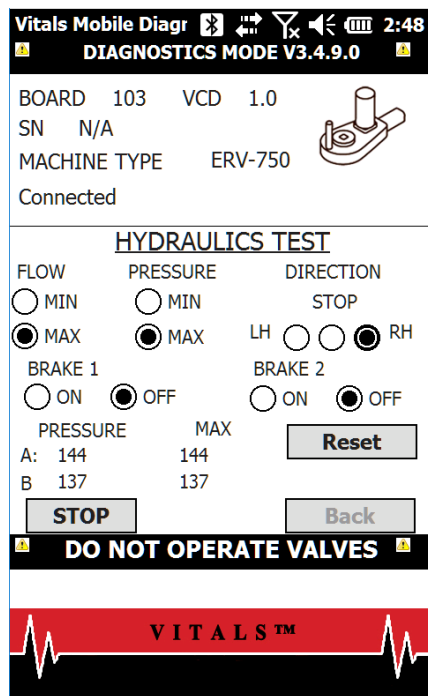
1. Tap to select the **FLOW (MIN or MAX)**, **PRESSURE (MIN or MAX)**, and **DIRECTION (LH or RH)**.



2. Tap the **RUN** button to start the test. The test for the selected parameters begins, and the button changes to read **STOP**.



3. The status changes as the test is conducted. Press the **STOP** button to end the test.
4. If desired, you can change the test parameters and run additional tests.



5. To exit the hydraulics test, tap the **Back** button.

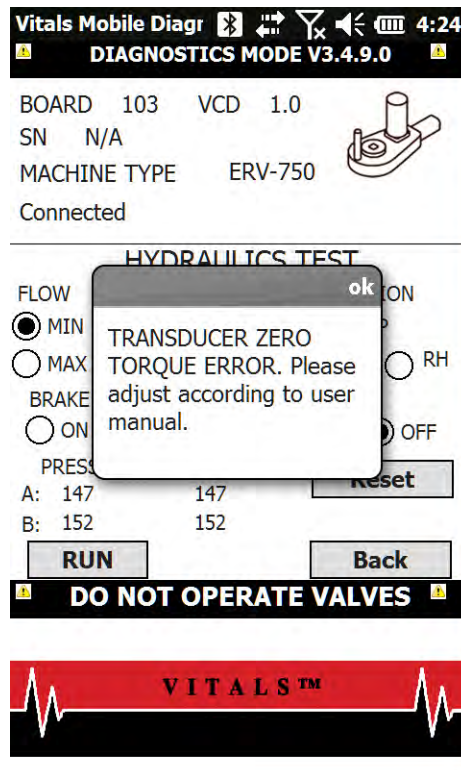


NOTE

Do **NOT** run the Hydraulics Test while performing this adjustment. The valve operator must be in the stopped condition.

Transducer Zero Torque Error

A transducer error may cause a **Transducer Zero Torque** error message when you start the Hydraulics Test. To correct the error, adjust the transducer potentiometer in the valve operator control box.



1. Remove the 4 screws in the control box cover, and take off the cover to access the control board.

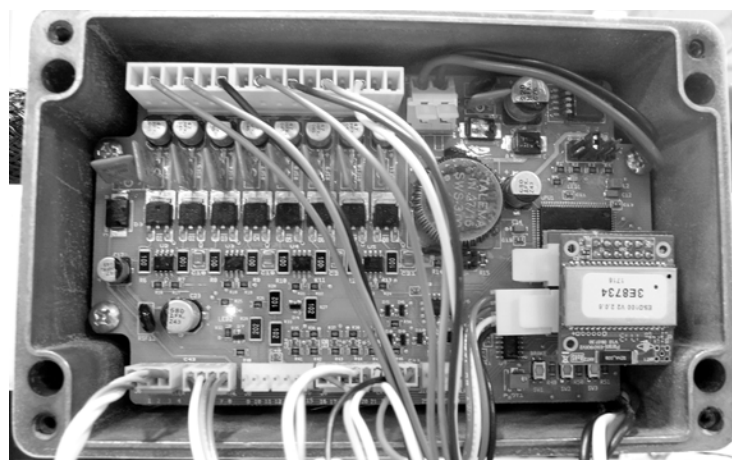
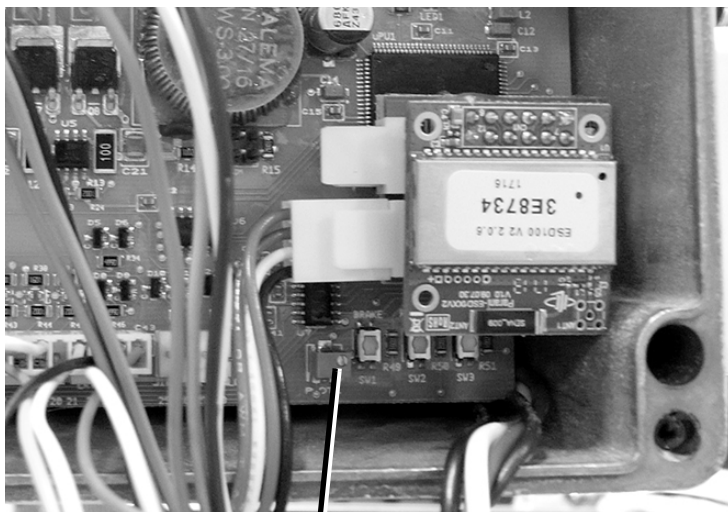


Figure 6-29. Open the control box to adjust the transducer potentiometer.

2. Locate the potentiometer on the control board. You will need a jeweler's screwdriver to adjust it.

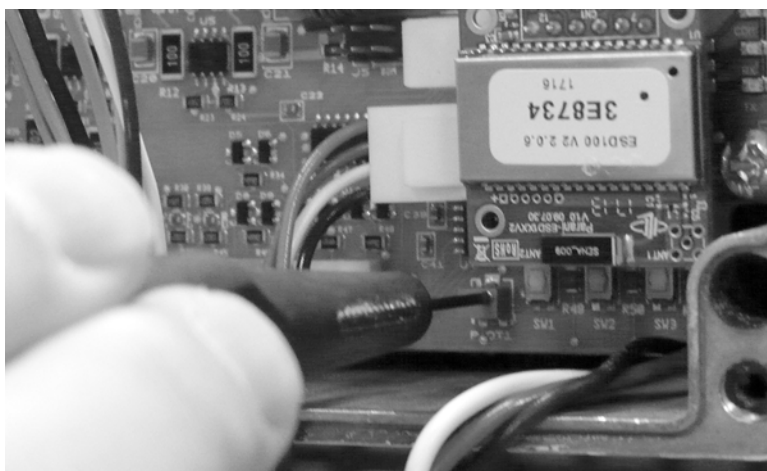


Potentiometer adjustment screw

Figure 6-30. Locate the adjustment screw on the potentiometer.

3. Turn the adjustment screw on the potentiometer while watching the value for **A** on the Vitals Diagnostics Hydraulics Test screen. Adjust the **A** value until **A** and **B** are equal.

IMPORTANT: Do **NOT** run the Hydraulics Test while performing this adjustment. The valve operator must be in the stopped condition.



*Figure 6-31. Turn the adjustment screw until the **A** and **B** readings on the Hydraulics Test screen are equal.*



NOTE

The actual values for **A** and **B** may vary, depending on whether hydraulic power is on. It doesn't matter what the values are when adjusting the potentiometer—only that you set them to be equal.

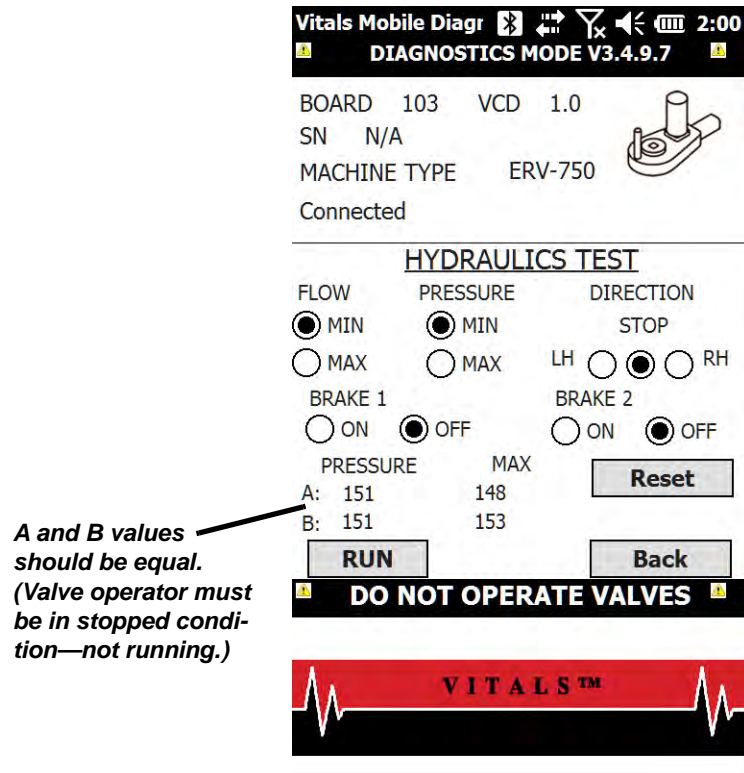


Figure 6-32. Adjust the potentiometer until the values for A and B are equal.

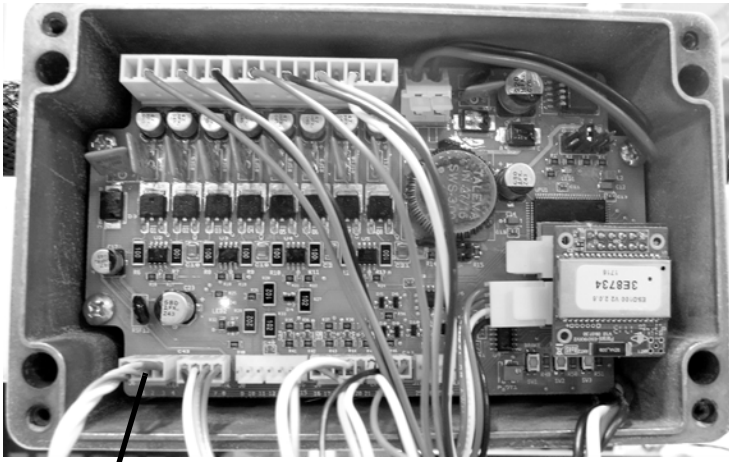
4. When the **A** and **B** readings are equal, replace the cover on the control box.
5. Continue with the Hydraulics Test by tapping the **RUN** button.

Using the Diagnostics Cable

To isolate possible wiring or connection issues, you can perform diagnostics using the optional Diagnostics Cable (part no. 79-302-20 for the HC-100).

1. Connect the serial port end of the diagnostics cable to the port on the HC-100.
2. Remove the cover from the control box on the valve operator.
3. Remove the internal cable connection from the bottom left of the circuit board, as shown in Figure 6-33.

4. Plug the diagnostics cable into the circuit board where you removed the internal cable.



Remove the internal cable from the circuit board, and plug in the diagnostics cable

Figure 6-33. Plug the diagnostics cable directly into the circuit board in the valve operator control box.

5. Perform the diagnostics as described earlier in this section.
6. When finished, reconnect the internal cable and replace the control box cover.

Diagnostics Logs

Vitals Mobile creates a log file any time Vitals Diagnostics is run, or any errors are detected while using Vitals Mobile. Error logs are transferred to the Vitals Desktop folder during a data transfer.

The log file is named **log.txt**. Log files are stored on the Vitals Desktop PC in the following location:

- C:\Program Files\Vitals Desktop\import

Email this log file to Tech Support when requested.



Chapter 7

Using Vitals Desktop

Vitals Desktop 3.8.4 provides a database for managing your valve records and tools for analyzing valve exercising data. You can create multiple database files, and can create valve records manually or import them from the Vitals Mobile device. Selected valve records can be exported to the controller to have it ready for valve operations in the field.

Vitals Desktop runs on a Windows-based PC. It is compatible with Windows 10, Windows 8, and Windows 7.

(Vitals Desktop 3.8.4 should be compatible with Windows XP. However, this has not been tested and is not supported. Compatibility is not guaranteed by E.H. Wachs.)

Instructions for installing Vitals Desktop are in Chapter 4.

INITIAL START-UP

When you start Vitals Desktop for the first time, you will be prompted to **Select a Default Language**.

In This Chapter

INITIAL START-UP
 DATABASE FILE LOCATION
 SCREEN REFERENCE
 CREATING AND EDITING VALVES AND ACTIVITIES
 ANALYZING VALVE DATA
 PRINTING
 TRANSFERRING DATA BETWEEN VITALS DESKTOP AND VITALS MOBILE
 DATABASE OPTIONS
 SETTINGS
 HELP OPTIONS



NOTE

You will also be prompted to **Select a Default Language** if a default language file is not present.



Figure 7-1. Select Default Language

The language you select will be automatically set on the handheld controller when you set it up with Vitals Desktop.

When you install Vitals for the first time on a computer, you will be asked to create a new database or locate an existing database the first time you start the program. (See “Database File Location” below for creating or locating a Vitals database file.)

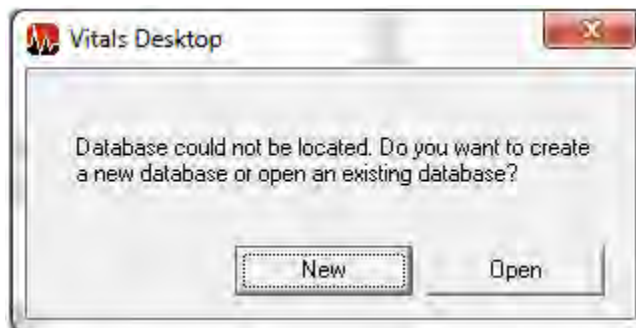


Figure 7-2. When you install Vitals for the first time and start the program, it will prompt you to create or find a database.

DATABASE FILE LOCATION

By default, Vitals Desktop creates its database file in the program’s directory (**Program Files/Vitals Desktop/db/**). If the database is deleted, or moved to a different location,

Vitals Desktop will display the following dialog when launched.

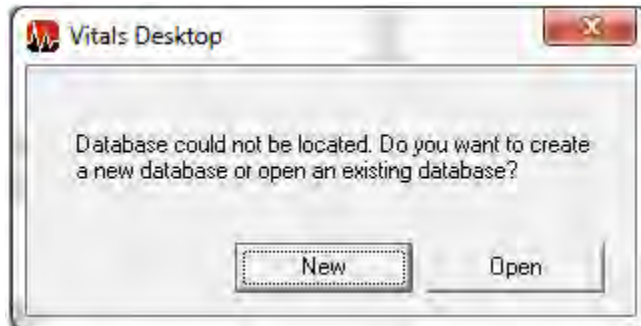


Figure 7-3. Vitals Desktop displays this notification if the database file is missing.

- To create a new database, click **New**. The Save As dialog appears. Name the database, select a location for it, and click **Save**.

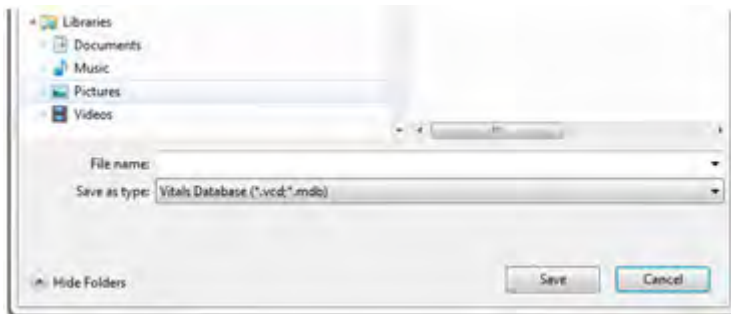


Figure 7-4. After clicking the **New** button, name and save the new Vitals database.

- To locate the existing database, click **Open**. The Open File dialog appears; browse to the location of the database file, click on the file to select it, and click **Open**.



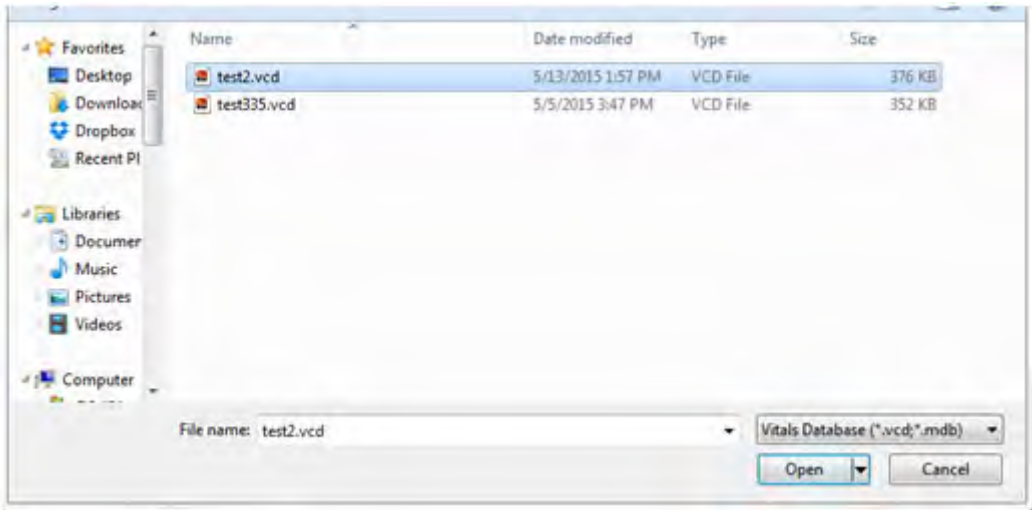
NOTE

The standard location for the Vitals database in the program's folder (**Program Files/Vitals Desktop/db/**). However, you can save the file in any directory or on a network server.



NOTE

To find a database file, you can search your computer drive for any file with a ".vcd" file extension.



*Figure 7-5. After clicking the **Open** button, browse to find the existing database, select the file, and click **Open**.*

SCREEN REFERENCE

This section describes the functions available on the Vitals Desktop 3.8.4 screens.

Main Screen

The Main Screen is displayed when Vitals Desktop 3.8.4 is first opened.

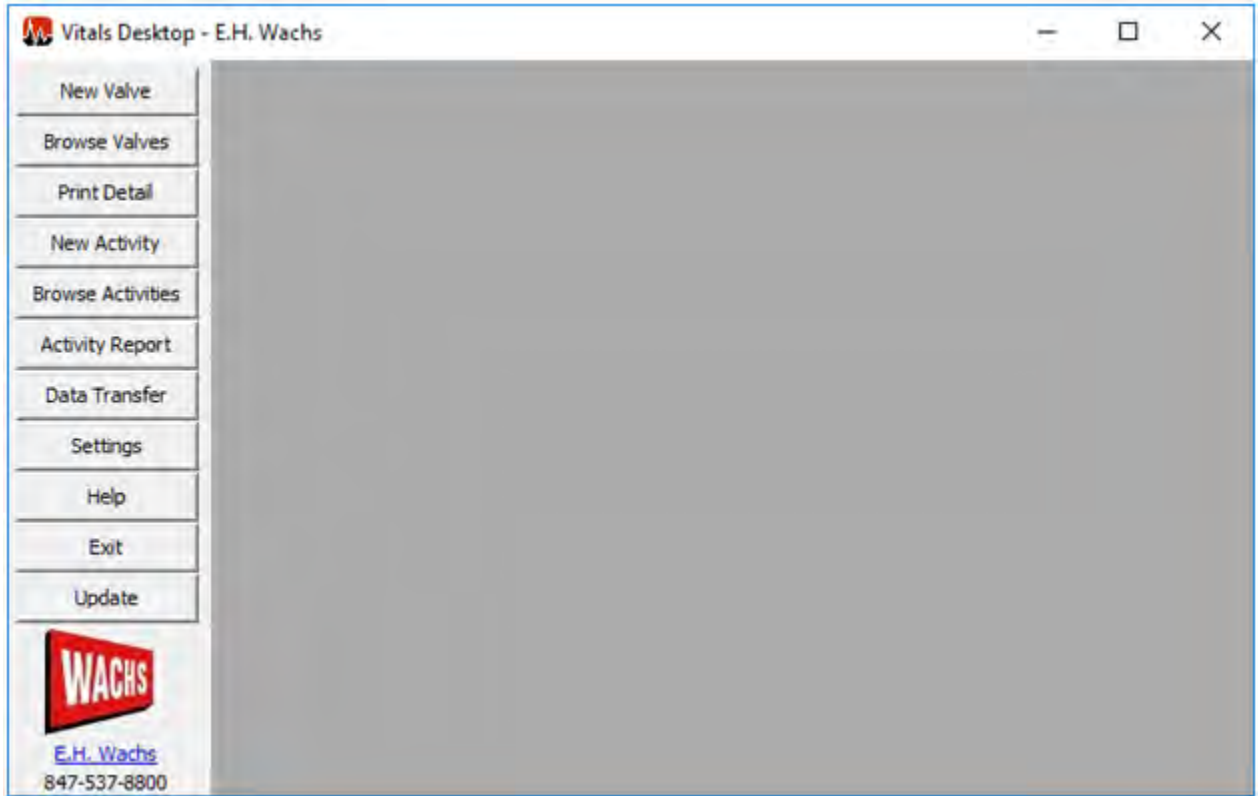


Figure 7-6. Vitals Desktop Main Screen

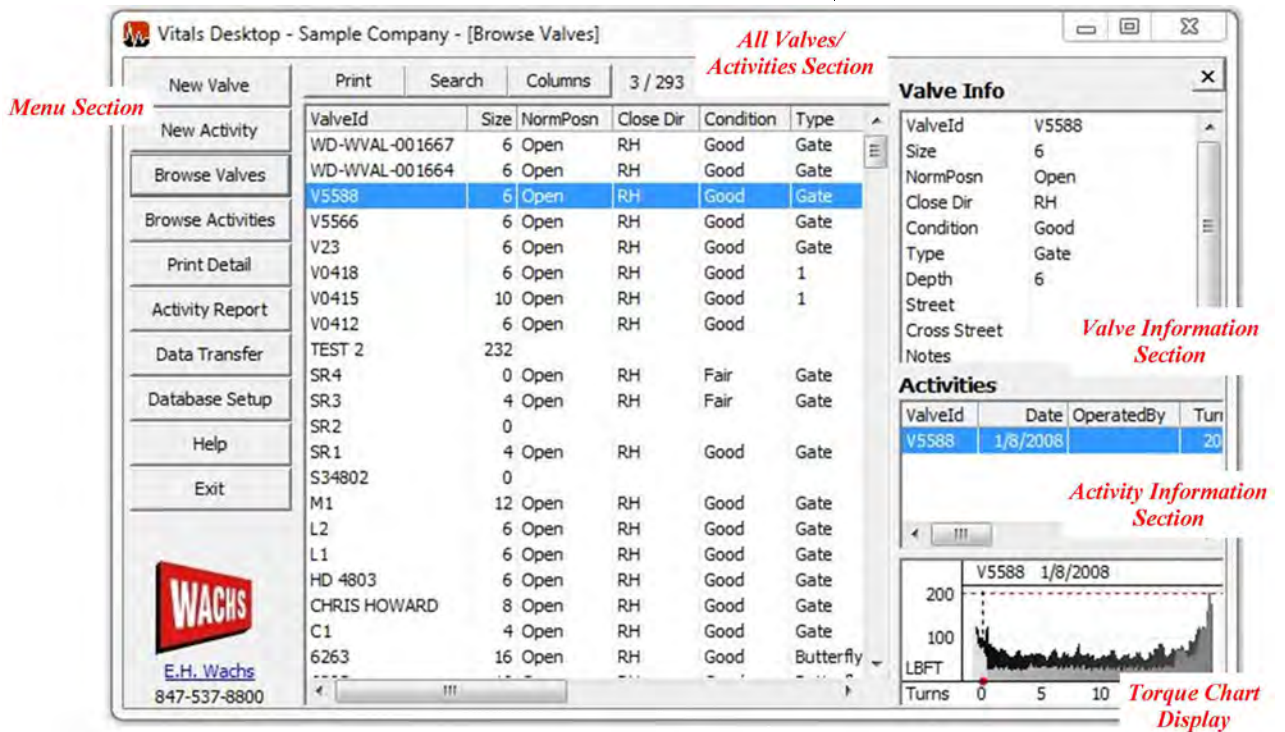


Figure 7-7. Vitals Desktop Screen Sections

- The Menu Section displays menu buttons for all application menu actions.
 - **New Valve** opens the New Valve window to create a valve record in the database.
 - **Browse Valves** lets you search for, review, and edit valve records.
 - **Print Detail** allows you to print the currently displayed data to the screen, a printer, or PDF.
 - **New Activity** opens the New Activity window, where you can manually enter data for a new activity.
 - Browse Activities lets you search for, review, and edit activity records.
 - **Activity Report** opens the Activity Report window, where you can search by date range.
 - **Data Transfer** starts a data transfer between Vitals Desktop and Vitals Mobile. You can transfer data by using a direct cable connection (to the HC-100, or older “Yellow Box” and “Silver Box” valve operator controllers); by using a USB flash drive; or by opening another database file on the Vitals Desktop computer.
 - **Settings** displays Settings menu commands. See “Settings” on page 204.
 - **Help** displays Help menu commands. See “Help Options” on page 206.
 - **Exit** quits the Vitals program.
 - **Update** checks your version of Vitals and lets you know if an updated version is available.
- The All Valves/Activities Section displays all valves or activities present in the currently open database, depending on whether you are browsing valves or activities.
- The Valve Information Section displays the valve records matching the current search/display criteria.
- The Activity Information Section displays the activity records matching the current search/display criteria. If you click on a valve record, the activities for that valve are displayed here.
- The Torque Chart Display shows the torque chart for the currently selected activity from the Activity Information section.

CREATING AND EDITING VALVES AND ACTIVITIES

If you need details about the structure of the Vitals valve database (for instance, for importing/exporting data to or from an external database), see Appendix B, “Vitals Database Reference”.

How Vitals Uses GPS Location Information

Vitals 3.8.4 includes **Latitude** and **Longitude** in the valve record. You must enter these values to the valve record manually, using your best available GPS data for the valve. (You can also add them when importing valve data from an external database.)

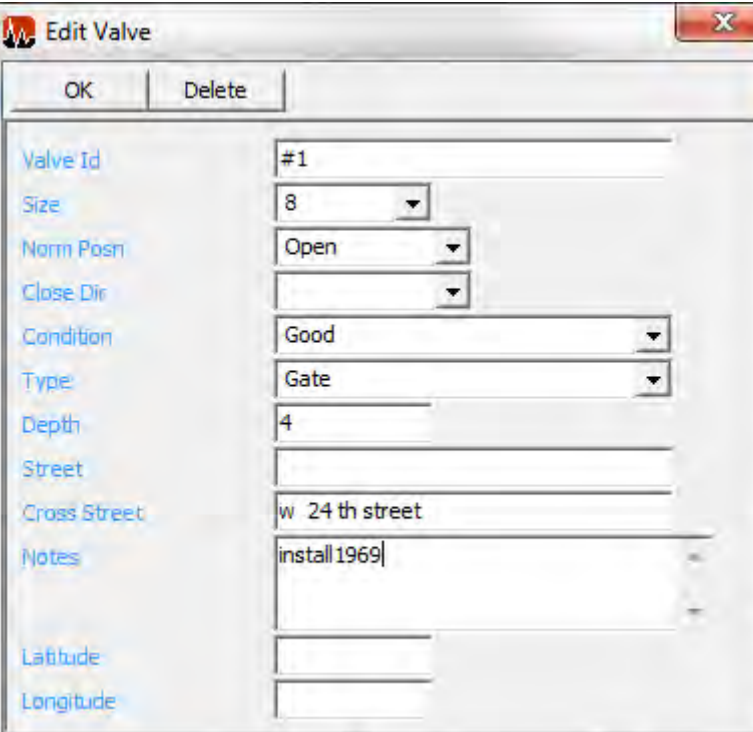
The latitude and longitude stored in the **valve record** are considered the reference, or “correct”, values. Vitals will look first to the valve record for GPS information about a valve (such as when doing a GPS search with Vitals Mobile). If there is no GPS information in the valve record, Vitals will use data from activity records for the valve.

Activity records have latitude and longitude values that are logged during the activity, using GPS measurements from the controller. These values may vary for a given valve, depending on the quality of the GPS readings during the activity, and may not be accurate. Note that Vitals Mobile only stores latitude and longitude data in **activity records**; it does not change the latitude and longitude in the **valve record**.

When Vitals needs location data for a valve that does not have latitude and longitude in the valve record, it reads from activity records for that valve and averages the available data.

Valve Record

Double click on any valve record in the Valves section to bring up the valve record window.



Valve Id	#1
Size	8
Norm Posn	Open
Close Dir	
Condition	Good
Type	Gate
Depth	4
Street	
Cross Street	w 24 th street
Notes	install 1969
Latitude	
Longitude	

Figure 7-8. Create/Edit Valve



NOTE

Latitude and Longitude values are not required, but are recommended for GPS searches.

- You can edit the information in the valve record, and click the **OK** button to save changes.
- Enter the **Latitude** and **Longitude** for the valve. The values in the valve record must be entered manually (or imported during a database import); use your most accurate GPS data for the valve.
- Click the **Delete** button to delete the valve record. You will be prompted to confirm that you want to delete it.
- You can also access this form and create a new valve record by clicking the **New Valve** button in the Menu Section on the left-hand side of Vitals Desktop.

Activity Record

Double click on any activity in the Activities section to display the activity record window.

Field	Value
ValveId	3385
Date	4/29/2009
OperatedBy	cardona
Turns	20.5
Position	Open
HighTorque	100
BeginTime	9:45 AM
EndTime	9:51 AM
Remarks	
Latitude	0
Longitude	0
ActivityId	194
GPSPositions	
TransferId	

Figure 7-9. Create/Edit Activity

- You can edit the information in the activity record, and click the **OK** button to save changes.
- Click the **Delete** button to delete the activity record. You will be prompted to confirm that you want to delete it.
- You can also access this form and create a new activity record by clicking the **New Activity** button in the Menu Section on the left-hand side of Vitals Desktop. (When creating a new activity for a specified valve ID, a valve with that ID must exist in the database.)

Remarks List Window

The Select Remarks window displays the remarks you have defined and allows you to create new remarks.



NOTE

When the user selects remarks on the handheld controller during an activity, the selected remarks are copied into the activity record.

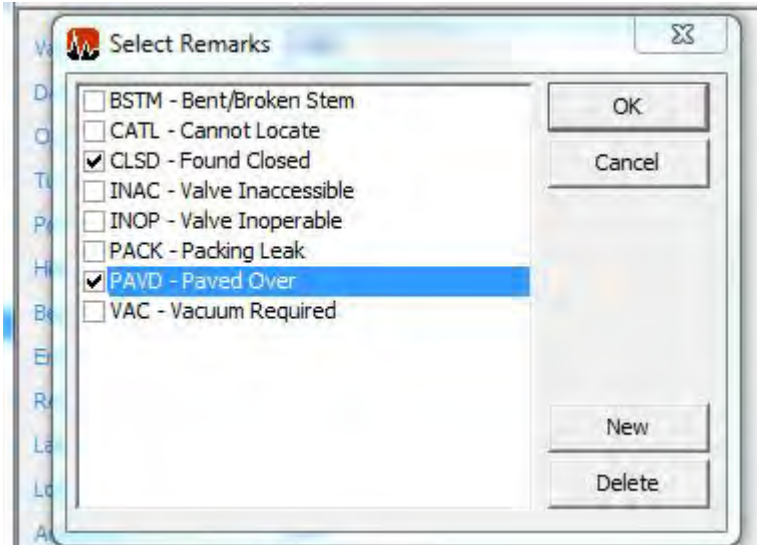


Figure 7-10. Select/Create Remarks

- The Select Remarks window is accessible by choosing the **Remarks** dropdown section in a New/Edit Activity window. (You can also access this window by clicking **Remarks List** in the Database Setup window.)
- Click **OK** or **Cancel** to close the Select Remarks window.
- Click **New** to enter a new remark.
- Click **Delete** to remove the highlighted remark from the list. You will be prompted to confirm that you want to delete the remark.
- The four-letter remark ID displays the ID of the remark. You cannot edit an existing remark ID.
- The remark description displays the description of the remark. The description can be up to 20 characters.

ANALYZING VALVE DATA

Displaying Valve/Activity Records

1. To display all the valve or activity records in the currently open database, click either the **Browse Valves** or **Browse Activities** button in the Menu Section on the left-hand side of Vitals Desktop.

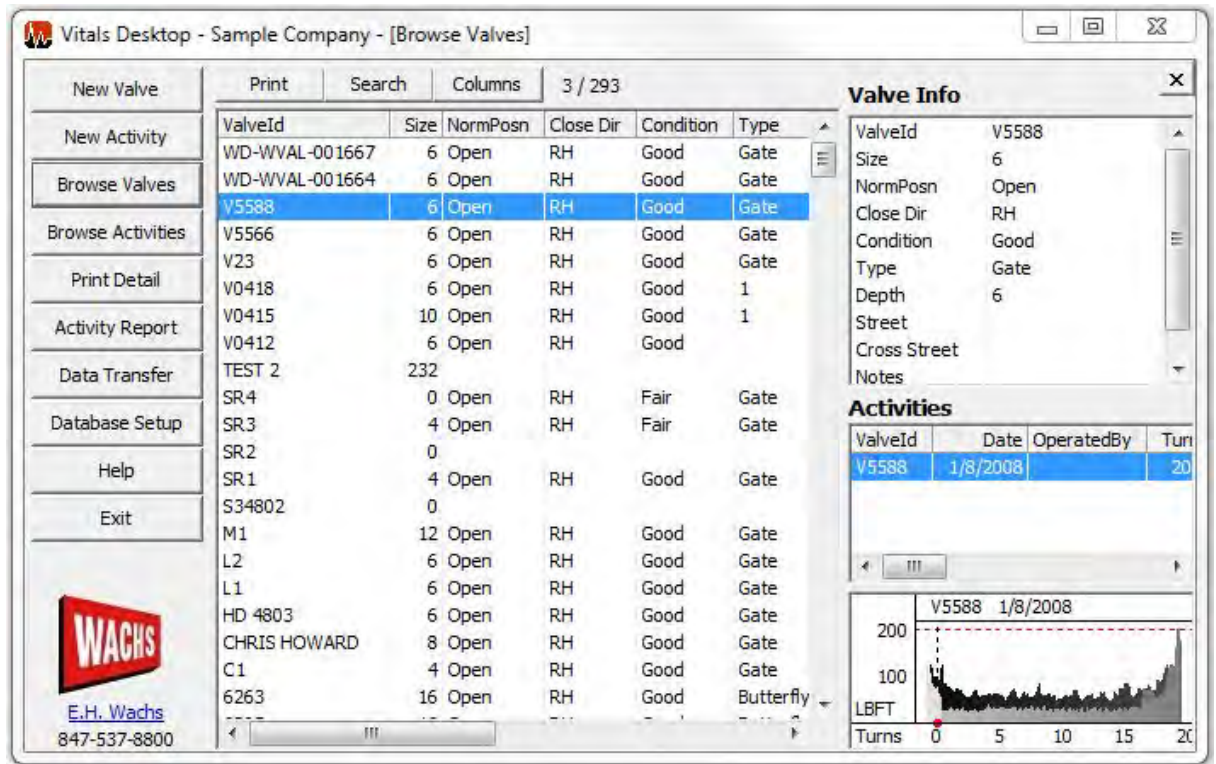


Figure 7-11. Browse Valves

- To display the torque chart for an activity, click on the activity in the Activities section of the screen. The torque chart appears below.
 - To view a larger version of a torque chart animation in its own window, double-click the torque chart graphic in the Torque Chart display section. To animate the torque chart, right-click the graphic and select **Animate**.
2. To search for valves/activities matching specific criteria, click the **Search** button in the All Valves/Activities section.



Figure 7-12. Valve Record Search

3. To select which fields appear on the valve/activity record screen, click the **Columns** button to bring up the Select Report Fields screen.

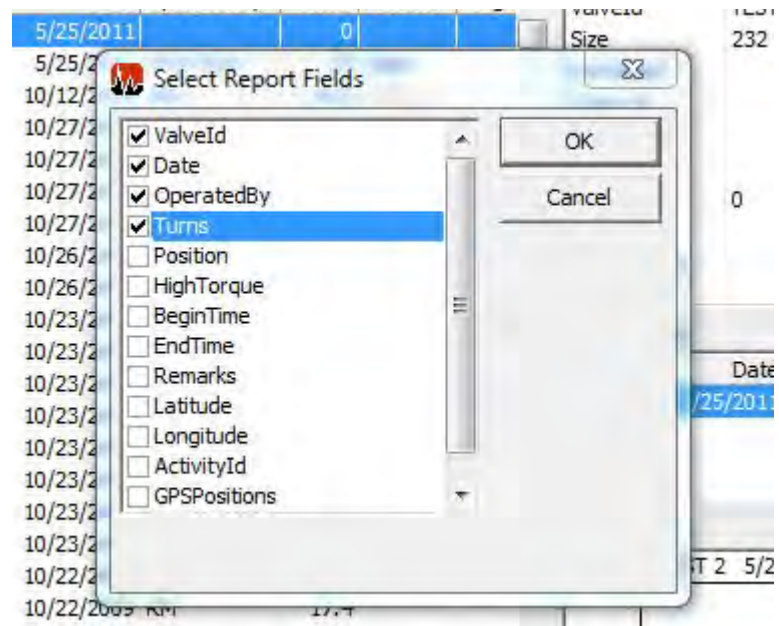


Figure 7-13. Select Report Fields

PRINTING

Print Detail

1. When you click **Print Detail**, the **Print Detail** dialog appears.

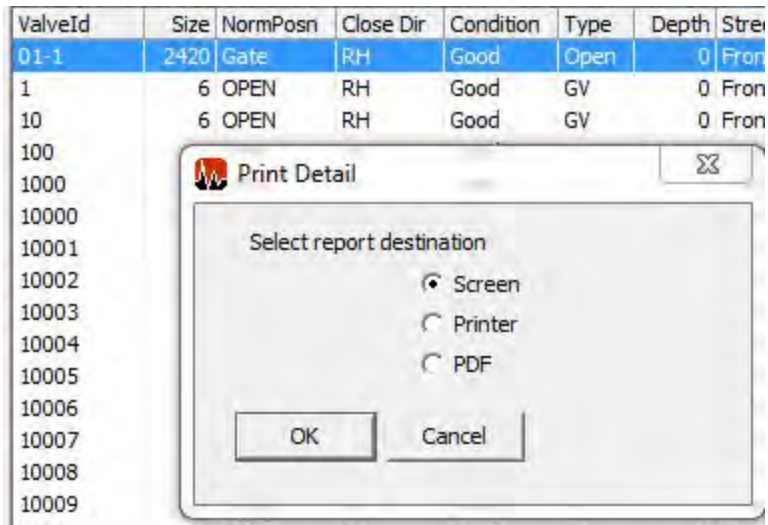


Figure 7-14. Print Detail

- Click a radio button titled **Screen**, **Printer**, or **PDF** to choose a location to print.
- Click **OK** to confirm printing.

Valve#CAR111 Detail

ValveId	CAR111
Size	0
NormPosn	
Close Dir	
Condition	
Type	
Depth	0
Street	
Cross Street	
Notes	
Latitude	
Longitude	

Activity #1 of 3 Activities

ValveId	Date	OperatedBy	Turns	Position	HighTorque
CAR111	4/20/2015		0		0
Begin Time	End Time	Remarks	Latitude	Longitude	ActivityId
8:48 AM	8:49 AM		42.425368	-88.632407	38

Activity #2 of 3 Activities

ValveId	Date	OperatedBy	Turns	Position	HighTorque
CAR111	4/20/2015		0		0
Begin Time	End Time	Remarks	Latitude	Longitude	ActivityId
8:45 AM	8:48 AM		42.425354	-88.632419	37

Activity #3 of 3 Activities

ValveId	Date	OperatedBy	Turns	Position	HighTorque
CAR111	4/17/2015		0		0
Begin Time	End Time	Remarks	Latitude	Longitude	ActivityId
10:27 AM	10:27 AM		42.425376	-88.63241	29

Figure 7-15. Sample Print Detail

Activity Report

1. When you click **Activity Report**, the **Activity Report** dialog appears.

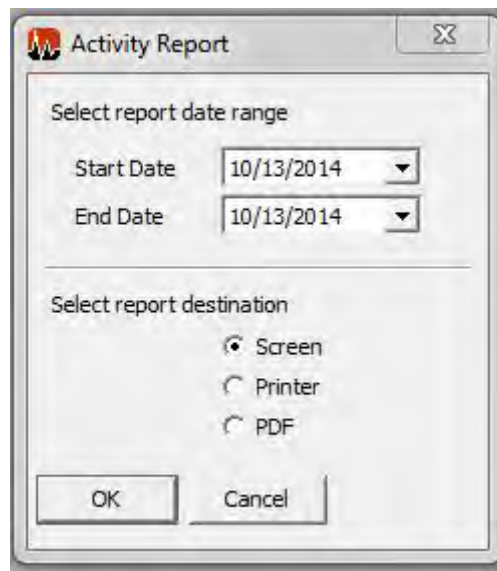


Figure 7-16. Activity Report

- Click the dropdown boxes next to Start Date and End Date to choose a date range of valves or activities for which you would like to produce a report.
- Click a radio button titled Screen, Printer, or PDF to choose a location to print.
- Click OK to confirm printing.

Sample Company - Valve Activity Report

Page 1 of 1

5/2/2012 - 5/2/2012

ValveId	V5588
Size	6
NormPosn	Open
Condition	Good
Type	Gate
Depth	6
StreetName	
Notes	
Grid	
ValveId	V5588
Date	5/2/2012
OperatedBy	
Turns	20.2
Position	
HighTorque	200
BeginTime	12:22 AM
EndTime	12:27 AM
Remarks	
Latitude	44.604069
Longitude	87.442492
ActivityId	171
GPSPositions	211

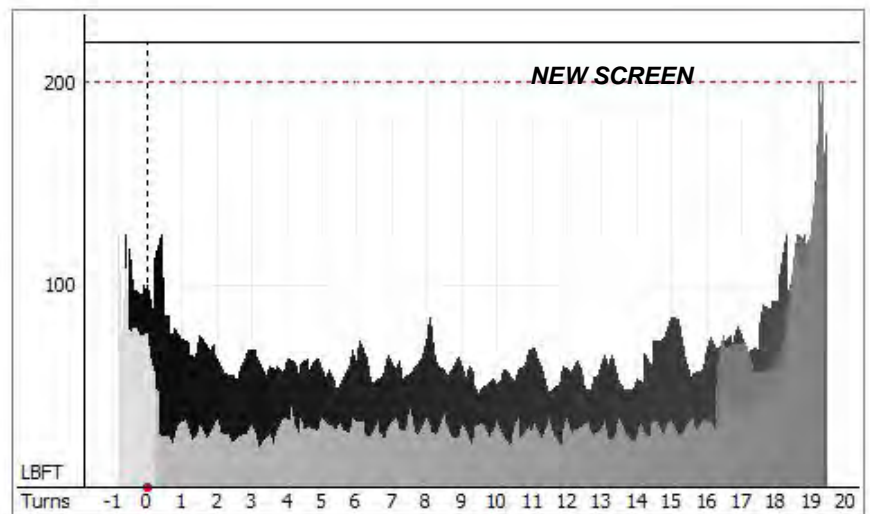


Figure 7-17. Sample Activity Report

TRANSFERRING DATA BETWEEN VITALS DESKTOP AND VITALS MOBILE

It is very important to understand where your master Vitals Desktop database is stored. It is highly recommended that the database reside on a network drive or other location accessible by all Vitals Desktop users. You should back up the Vitals Database periodically.

See the appropriate section below for:

- TC-100 Data Transfer
- HC-100 Data Transfer
- Other Controllers Data Transfer.

TC-100 Data Transfer

For the TC-100 controller, there are two data transfer methods:

- Flash Transfer—Uses a USB flash drive that you share between the devices.
- Local Transfer—If you have the optional TC-100 Office Dock and are running Vitals Desktop 3.8 on the TC-100, you can transfer data directly using Local Transfer.

You must be running Vitals Desktop version 3.8 (or later) to do data transfers with the TC-100. Update your Vitals Desktop version before transferring data.

TC-100 Flash Transfer

NOTE: Vitals Desktop 8.3 or higher is required for flash transfer.

Use a USB flash drive to transfer data between Vitals Desktop and Vitals Mobile-TC. The flash transfer process will automatically synchronize all valve and activity data between Desktop and Mobile.

These are the steps of the transfer process:

- Plug a USB flash drive into the TC-100 controller, and transfer the data to the flash drive.
- Plug the flash drive into the Vitals Desktop computer and transfer the data into Vitals Desktop.
- Export the updated Vitals database back to the flash drive.
- Plug the flash drive back into the Vitals controller and transfer the data to Vitals Mobile.

NOTE: It is possible to transfer data from multiple controllers to a single flash drive before importing the records into the desktop database. However, you will have to perform the import process individually for each handheld transfer. (The transfers will appear as separate folders on the import screen, shown in Figure 7-23.)

1. Tap the Flash Transfer icon in the Vitals Mobile-TC menu. The **Flash Transfer** screen appears.



NOTE

The USB flash drive must be formatted with the FAT32 file system. The drive must be compatible with the USB 1.1 standard. 8 GB capacity or less is recommended; larger drives take more time to load in the OS.

If the handheld controller won't read your USB flash drive, try another model with the correct specifications.

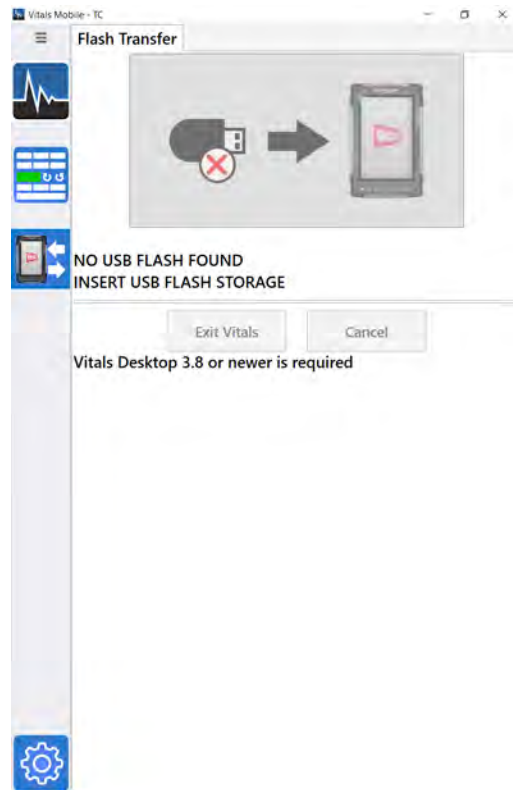


Figure 7-18. Tap the Flash Transfer icon to bring up the transfer screen.

2. Insert a USB flash drive into the port on the bottom of the TC-100. The Start button appears on the screen.

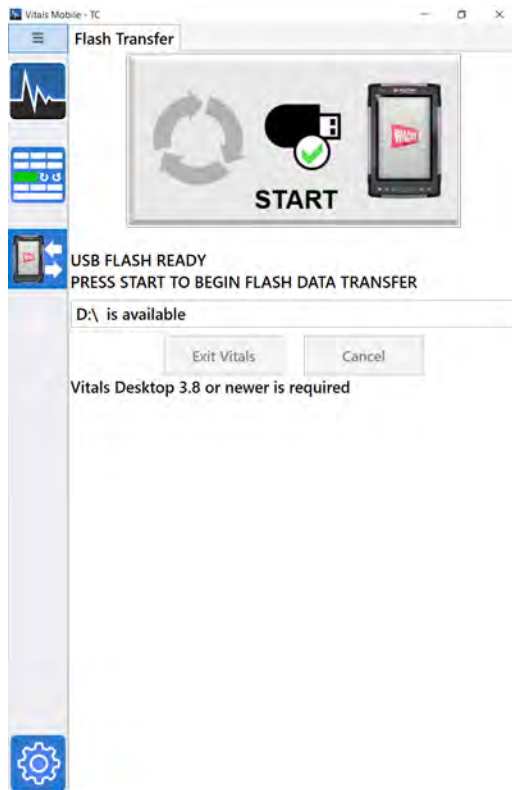


Figure 7-19. Tap Start when you see the USB Flash Ready message.

3. Tap the **Start** button. The screen will say **Copying**, then the **Files Copied** message appears.

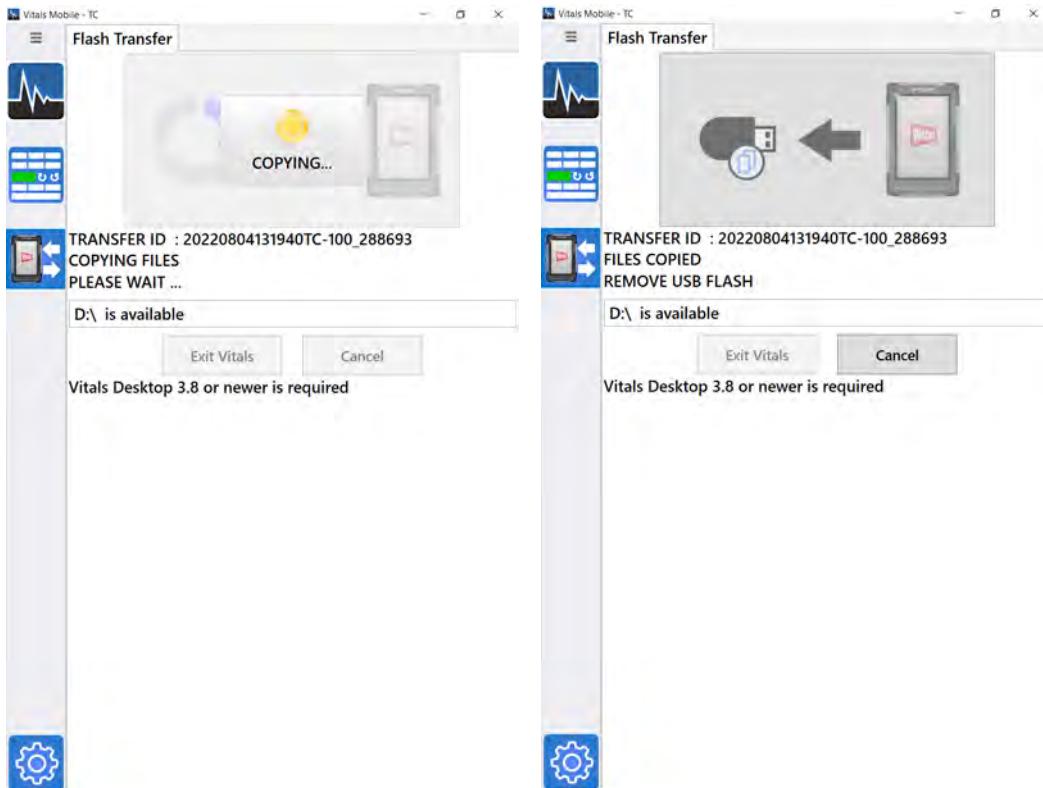


Figure 7-20. Data transfer in progress.

4. Remove the flash drive. A **Pending Desktop Data Transfer** message appears. (You will transfer the updated database back to the controller at the end of this procedure.)

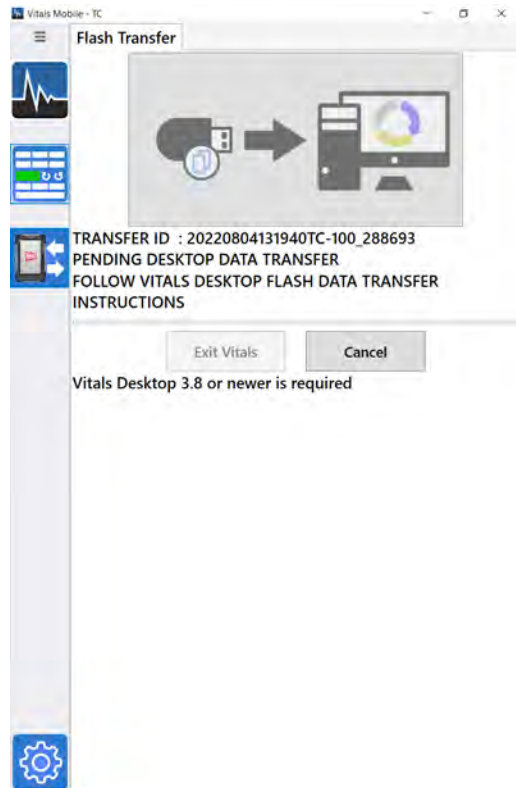


Figure 7-21. Pending Desktop transfer status.

5. Insert the flash drive into the Vitals Desktop computer.
6. Open Vitals Desktop and click the **Data Transfer** button. Select **Flash Transfer** from the **Connect To** drop-down menu. The screen will display a series of **START** messages.



Figure 7-22. Use the Flash Transfer connection.



NOTE

If there are data transfers from multiple handheld controllers on the flash drive, they will appear as separate folders. You will need to import each folder individually.

7. Click on the folder name for the transfer. The folder name is the same as the **Transfer ID** shown on the Vitals Mobile screen.

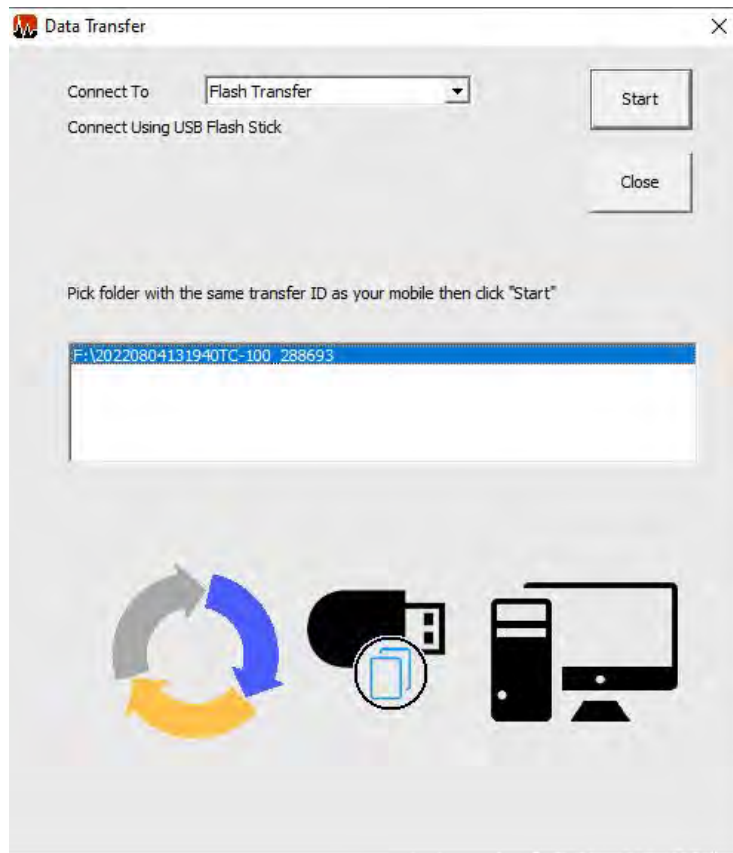


Figure 7-23. Select the name of the folder in the window. (Multiple folders will appear if there are transfers from multiple handheld controllers on the USB flash drive.)

8. Click the **Start** button. The **Updated Valves** import screen appears.

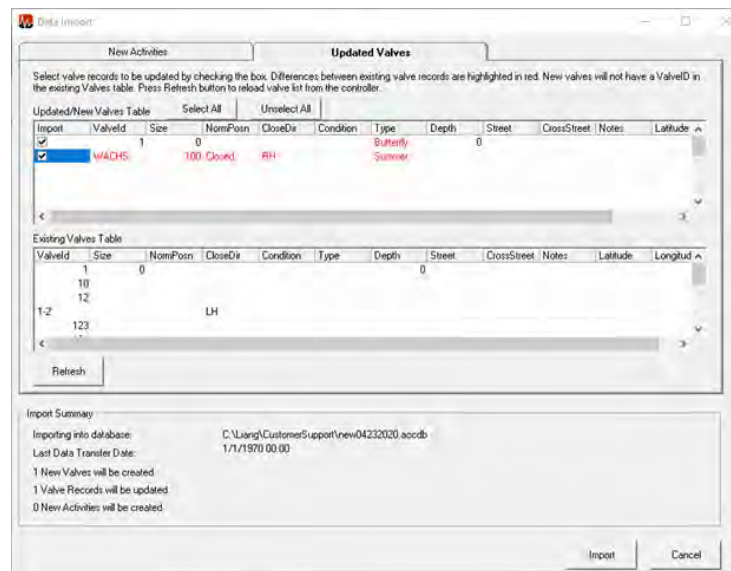


Figure 7-24. Updated Valves import screen.

9. Click the **Import** button. The new valve data is imported from the flash drive.
10. After the import is complete, export the database back to the flash drive. This ensures that all valve data on both Desktop and Mobile is synchronized.

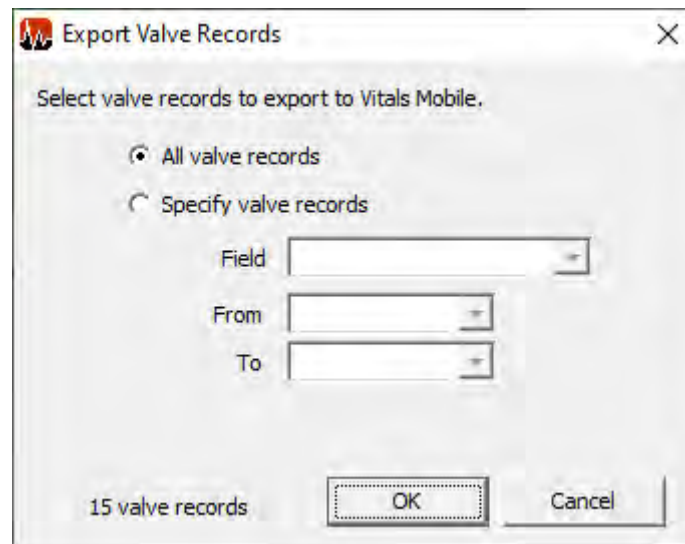


Figure 7-25. Export Valve Records screen.

11. A **Data has been exported** message will appear. Remove the flash drive from the Vitals Desktop computer.

12. Insert the flash drive into the tablet controller. An **Updating Vitals Mobile Files** message appears.

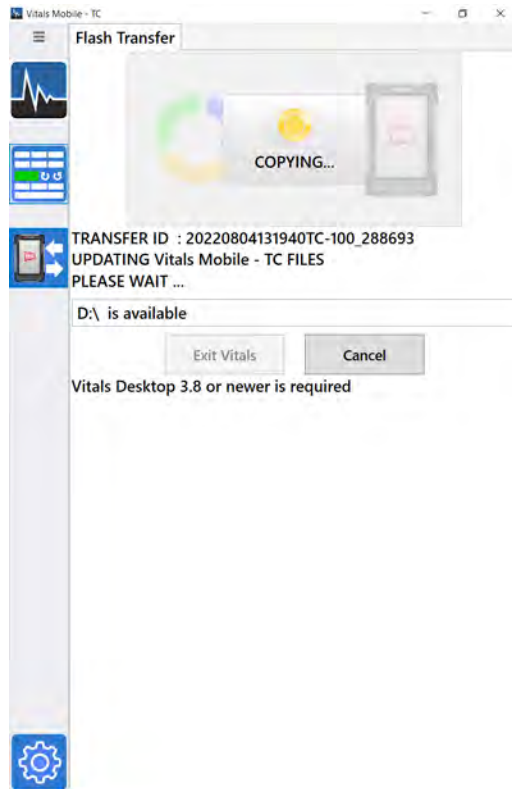


Figure 7-26. A status message appears while data is transferred back to Vitals Mobile.

13. When the update is complete, a **Data Transfer Finished** message appears. Tap the **Exit Vitals** button.

IMPORTANT

You **must** complete the final step of re-inserting the USB flash drive into the handheld controller. This synchronizes all the valve records in the desktop and handheld databases.

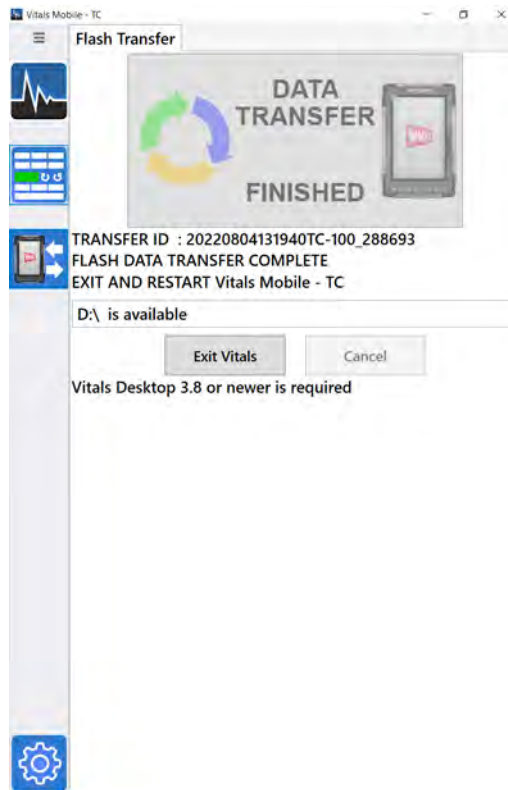


Figure 7-27. When the data transfer is finished, exit Vitals and restart.

14. Restart Vitals Mobile-TC.

TC-100 Local Transfer

You can perform a local transfer between Vitals Mobile-TC and Vitals Desktop if you have the optional TC-100 Office Dock and you are running Vitals Desktop on the TC-100.

(In this usage scenario, you are running Vitals Mobile-TC in the field for data logging, and running Vitals Desktop on the same TC-100 when in the office. To run Vitals Desktop on the TC-100, you must have it mounted in the Office Dock with external monitor, mouse, and keyboard, running it as a desktop PC.)

1. Exit Vitals Mobile-TC on the TC-100.
2. Mount the TC-100 in the Office Dock.
3. Launch Vitals Desktop.

- Click **Data Transfer**. The Data Transfer screen appears.
Click the **Connect to** menu and select **Local**.

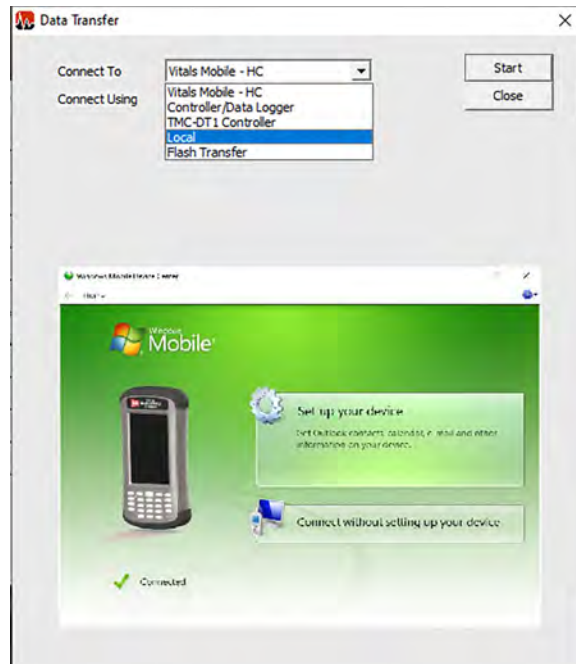


Figure 7-28.

- With **Local** selected, click **Start**.

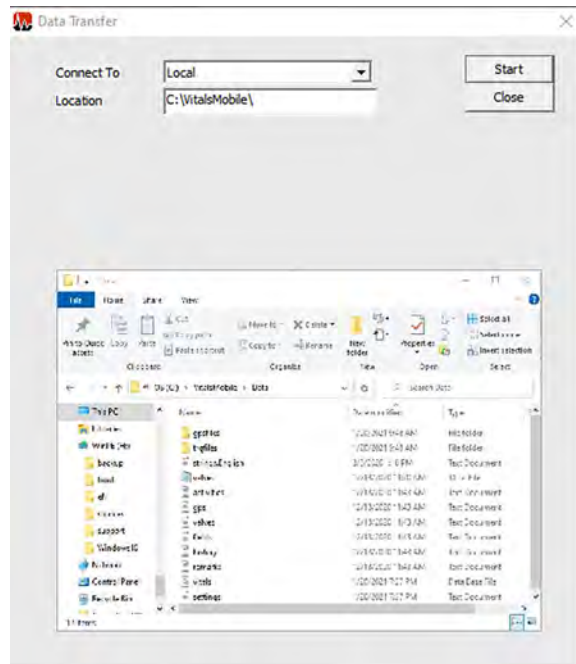


Figure 7-29.

6. If the **Database Mismatch** message appears, the database on Vitals Mobile-TC is different from the database currently open in Vitals Desktop.
 - In general, click **Import Activities**. This imports activity data without changing the database structure.
 - If the database in Vitals Desktop is blank or does not have any valves, you can click **Import Activities + All** valves. This will add all the valves from the controller to the local database.

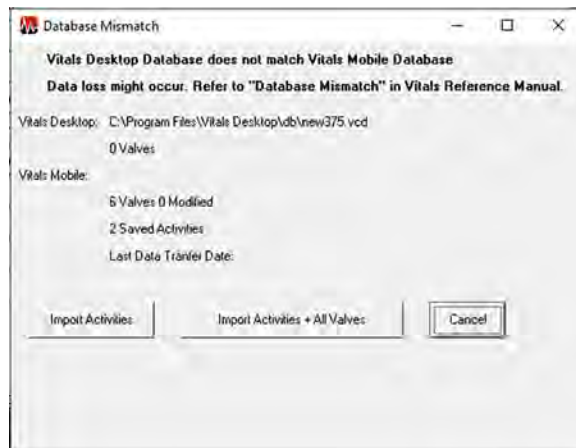


Figure 7-30. Database Mismatch will appear only if the imported data does not match the Vitals Desktop database structure.

7. The **Updated Valves** tab on the **Data Import** screen allows you to review new or changed valve data from Vitals Mobile-TC.

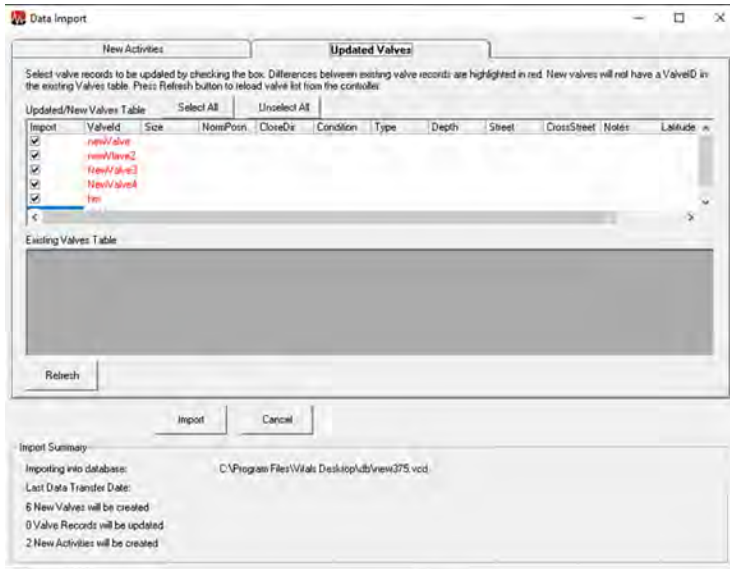


Figure 7-31.

8. The **New Activities** tab on the **Data Import** screen allows you to review new activity data from Vitals Mobile-TC.

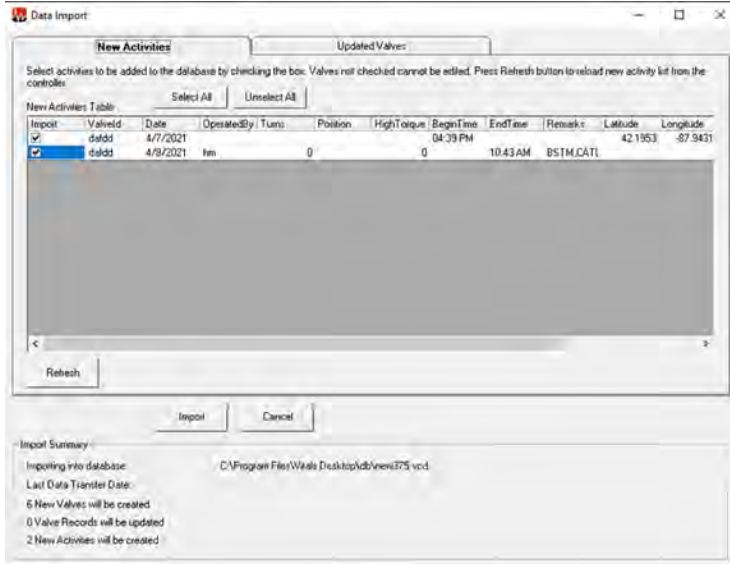


Figure 7-32.

9. When you have reviewed the data for import, click **Import** to continue.
10. After the import is complete, export the database back to Vitals Mobile-TC. This ensures that all valve data on both Desktop and Mobile is synchronized.



Figure 7-33.

11. The **Data has been exported** message will appear.

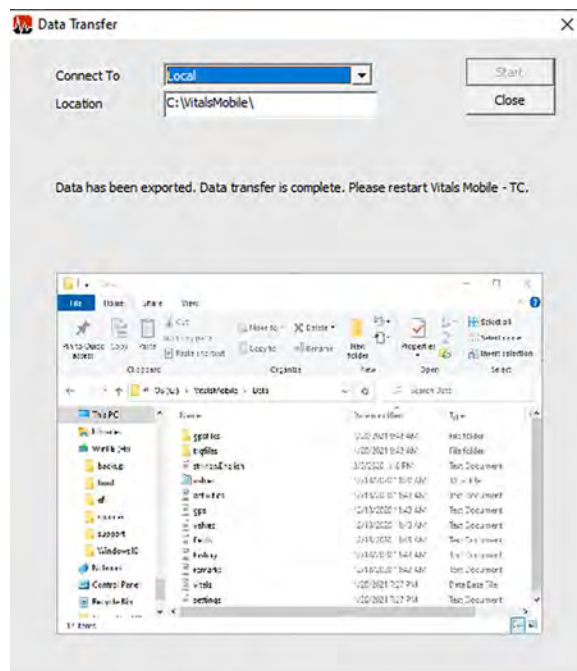


Figure 7-34.

12. Exit Vitals Mobile-TC.

HC-100 Data Transfer

For the HC-100 controller, there are two data transfer methods:

- Flash Transfer—Uses a USB flash drive that you share between the devices.
- Vitals Mobile-HC—Uses Window Mobile Device Center to create a USB (direct cable) link between the two devices.

USB Flash Transfer with HC-100 Controller

Use a USB flash drive to transfer data between Vitals Desktop and Vitals Mobile-HC. The flash transfer process will automatically synchronize all valve and activity data between Desktop and Mobile.

These are the steps of the transfer process:

- Plug a USB flash drive into the HC-100 controller and transfer the data to the flash drive.
- Plug the flash drive into the Vitals Desktop computer and transfer the data into Vitals Desktop.
- Export the updated Vitals database back to the flash drive.
- Plug the flash drive back into the HC-100 controller and transfer the data to Vitals Mobile-HC.

NOTE: It is possible to transfer data from multiple controllers to a single flash drive before importing the records into the desktop database. However, you will have to perform the import process individually for each handheld transfer. (The transfers will appear as separate folders on the import screen, shown in Figure 7-23.)

The following figures display the Data Transfer screens for the available connection types. Use the **Connect To** dropdown box to select the connection type.

- If connecting to a device running Vitals Mobile, connect the controller USB cable to the controller and to a USB port on your PC. In the **Connect To** dropdown box, select **Vitals Mobile HC**. The **Connect Using** dropdown box will automatically select **ActiveSync** or **Windows Mobile Device Center**.



NOTE

The USB flash drive must be formatted with the FAT32 file system. The drive must be compatible with the USB 1.1 standard. 8 GB capacity or less is recommended; larger drives take more time to load in the OS.

Not all USB flash drives are compatible with Windows Mobile 6.5. If the handheld controller won't read your USB flash drive, try another model with the correct specifications.



Figure 7-35. Data Transfer Start Screen for Vitals Mobile.

1. When you plug the flash drive into the controller, the USB flash drive status icon shows the drive is inserted.

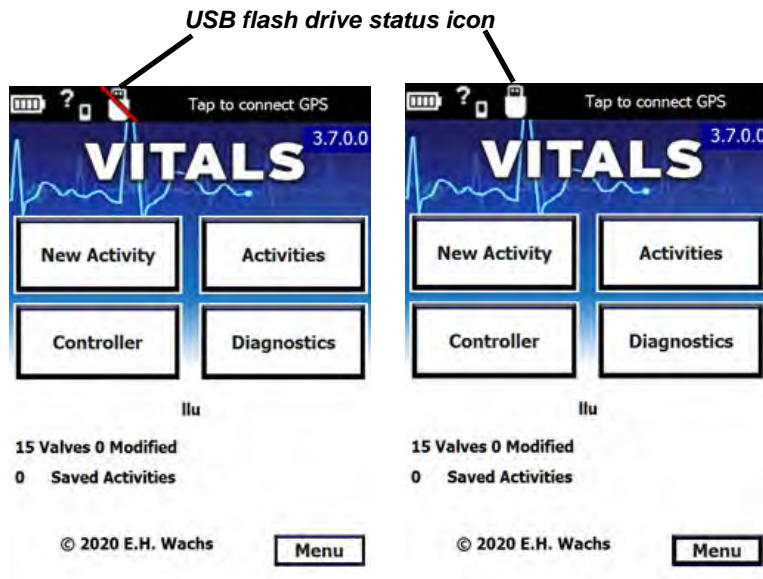


Figure 7-36. The USB flash drive status icon shows when a flash drive is inserted.

2. The Vitals Mobile **Menu** button has a **Data Transfer** command. You can open the Data Transfer feature by using the menu, or tapping the USB flash drive status icon when a flash drive is inserted.

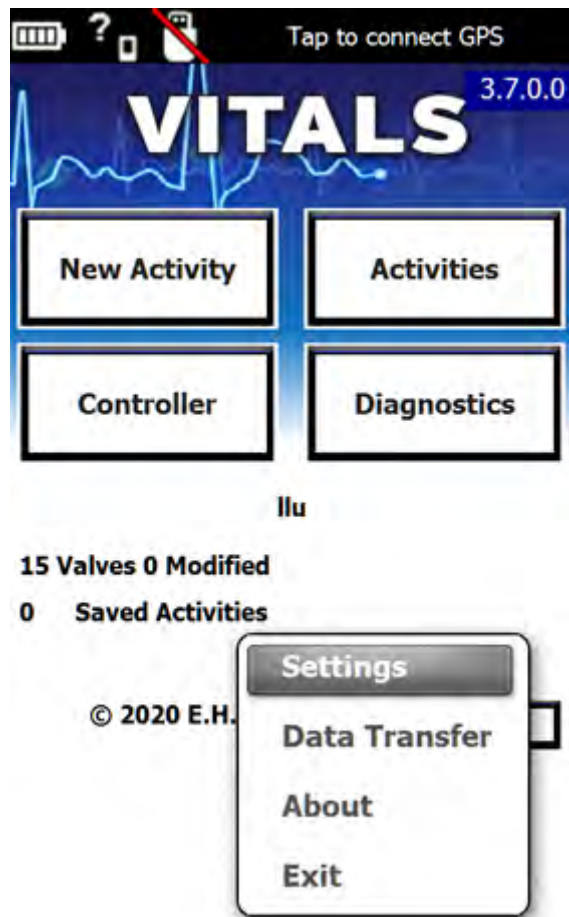


Figure 7-37. The Menu has a Data Transfer command.

3. If you try to start a data transfer with no flash drive inserted, an error screen appears.



Figure 7-38. Error message if no flash drive is inserted.

4. With the flash drive inserted, select **Data Transfer** to bring up the **Start** button.



Figure 7-39. The **Start** button appears when you select the **Data Transfer** command.

5. Tap **Start** to begin the transfer.
6. The transfer status is displayed, and a **FILES COPIED** message appears when it is complete.



Figure 7-40. The data transfer status is displayed.

7. Remove the flash drive. A **Pending Desktop Data Transfer** message appears. (You will transfer the updated database back to the controller at the end of this procedure.)



Figure 7-41. Pending Desktop transfer status.

8. Insert the flash drive into the Vitals Desktop computer.
9. Open Vitals Desktop and click the **Data Transfer** button. Select **Flash Transfer** from the **Connect To** drop-down menu. The screen will display a series of **START** messages.



Figure 7-42. Use the Flash Transfer connection.



NOTE

If there are data transfers from multiple handheld controllers on the flash drive, they will appear as separate folders. You will need to import each folder individually.

10. Click on the folder name for the transfer. The folder name is the same as the **Transfer ID** shown on the Vitals Mobile screen.



Figure 7-43. Select the name of the folder in the window. (Multiple folders will appear if there are transfers from multiple handheld controllers on the USB flash drive.)

11. Click the **Start** button. The **Updated Valves** import screen appears.

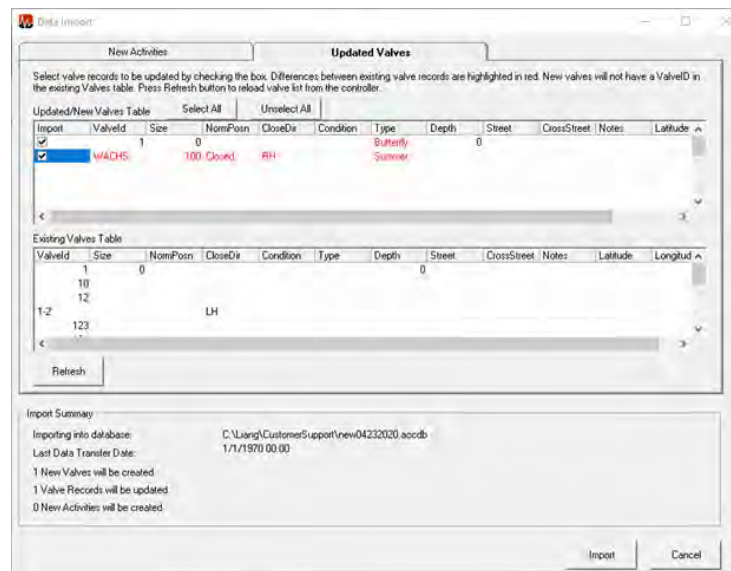


Figure 7-44. Updated Valves import screen.

12. Click the **Import** button. The new valve data is imported from the flash drive.
13. After the import is complete, export the database back to the flash drive. This ensures that all valve data on both Desktop and Mobile is synchronized.

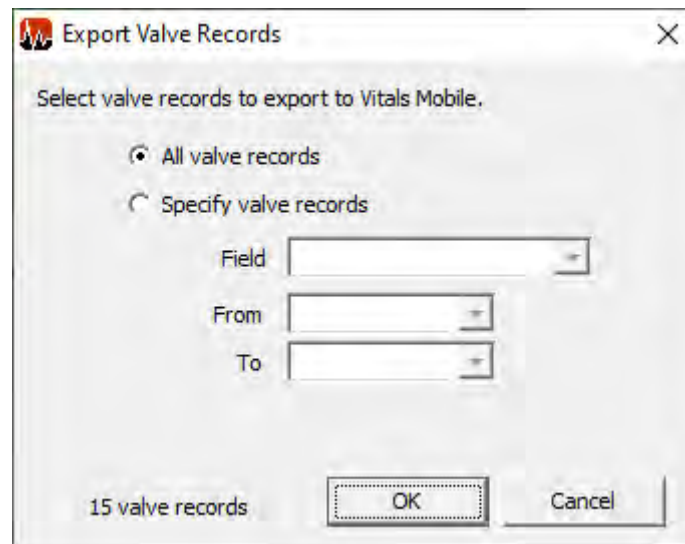


Figure 7-45. Export Valve Records screen.

14. A **Data has been exported** message will appear. Remove the flash drive from the Vitals Desktop computer.



Figure 7-46.

15. Insert the flash drive into the handheld controller. An **Updating Vitals Mobile Files** message appears.

IMPORTANT

You **must** complete the final step of re-inserting the USB flash drive into the handheld controller. This synchronizes all the activity records in the desktop and handheld databases.

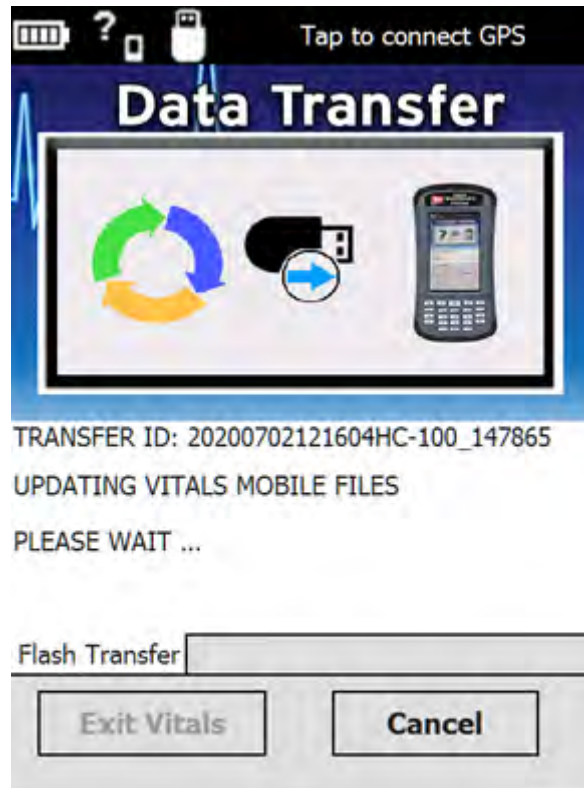


Figure 7-47. A status message appears while data is transferred back to Vitals Mobile.

16. When the update is complete, a **Data Transfer Finished** message appears. Tap the **Exit Vitals** button.

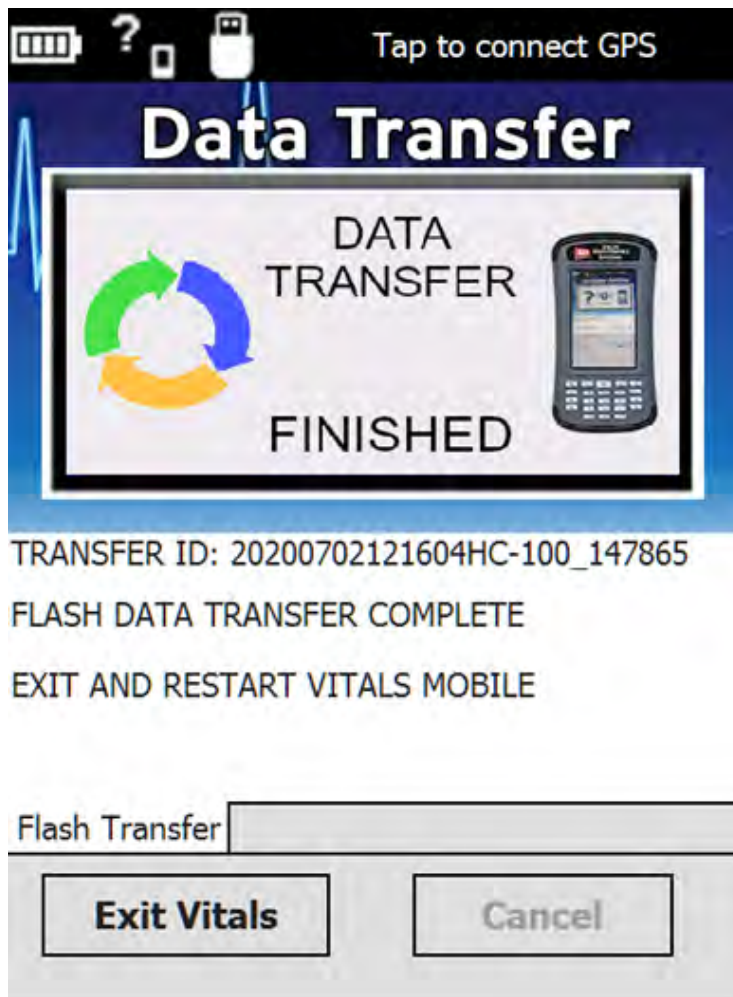


Figure 7-48. When the data transfer is finished, exit Vitals and restart.

17. Restart Vitals Mobile-HC.

Other Controllers Data Transfer

For P-2 or RS-2 machines using the Silver Box Controller/ Data Logger, or TM machines using TMC-DT1 Controller, there is one Data Transfer option for each.

- If connecting to a Silver Box controller, connect the Silver Box cable connection to the Silver Box controller and the RS232 connection to an RS232 port on your PC. In the **Connect To** dropdown box, select **Controller/Data Logger**. In the **Connect Using** dropdown box, select the COM port associated with your controller.



Figure 7-49. Data Transfer Start Screen for Silver Box Controller/Data Logger.

- If connecting to a Yellow Box controller, connect the Yellow Box cable connection to the Yellow Box controller and the RS232 connection to an RS232 port on your PC. In the **Connect To** dropdown box, select **TMC-DT1 Controller**. In the **Connect Using** dropdown box, select the COM port associated with your controller.



Figure 7-50. Data Transfer Start Screen for Yellow TMC-DT1 Controller.

Data Transfer Review

When you transfer activities into the Vitals Desktop database, the **Data Import** screen displays the activity records.



NOTE

If you are transferring data from a Yellow TMC-DT1 or Silver Box Controller, the Data Transfer Review and Database Mismatch steps are not applicable.

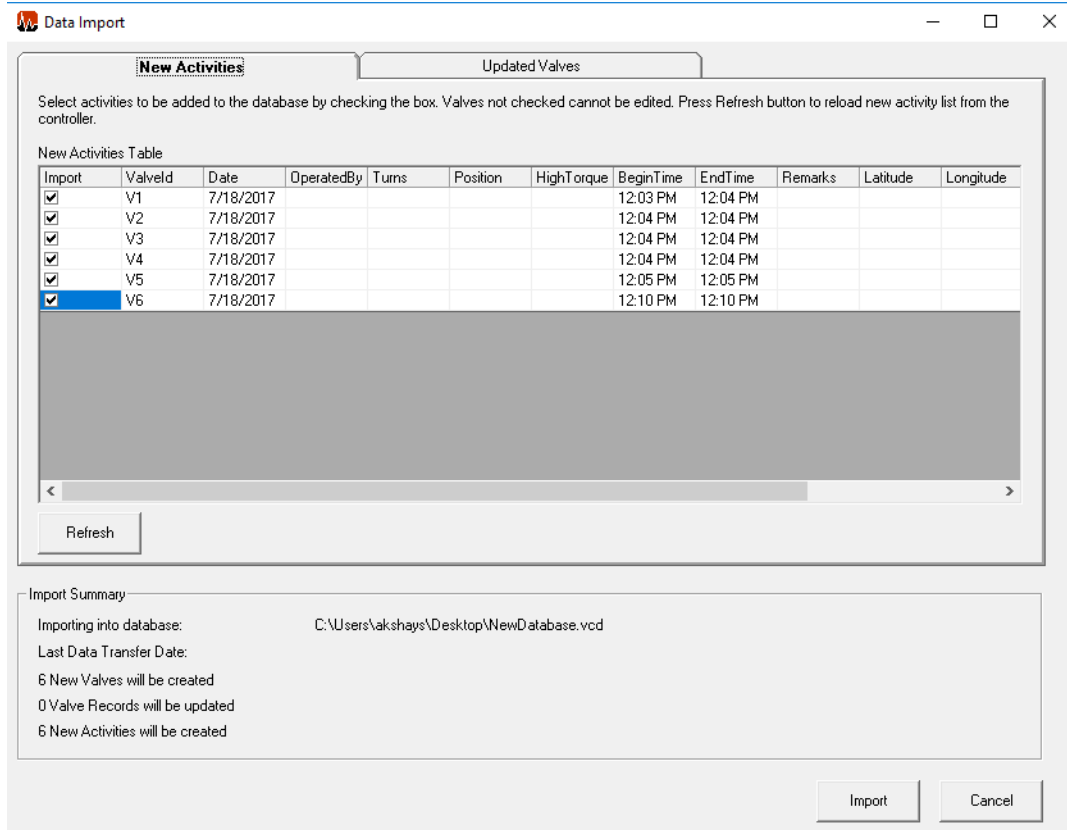


Figure 7-51. Data Import Screen

NOTE: If you get a **Database Mismatch** screen, refer to “Symptom: Database mismatch message after performing a Data Transfer.” on page 220.

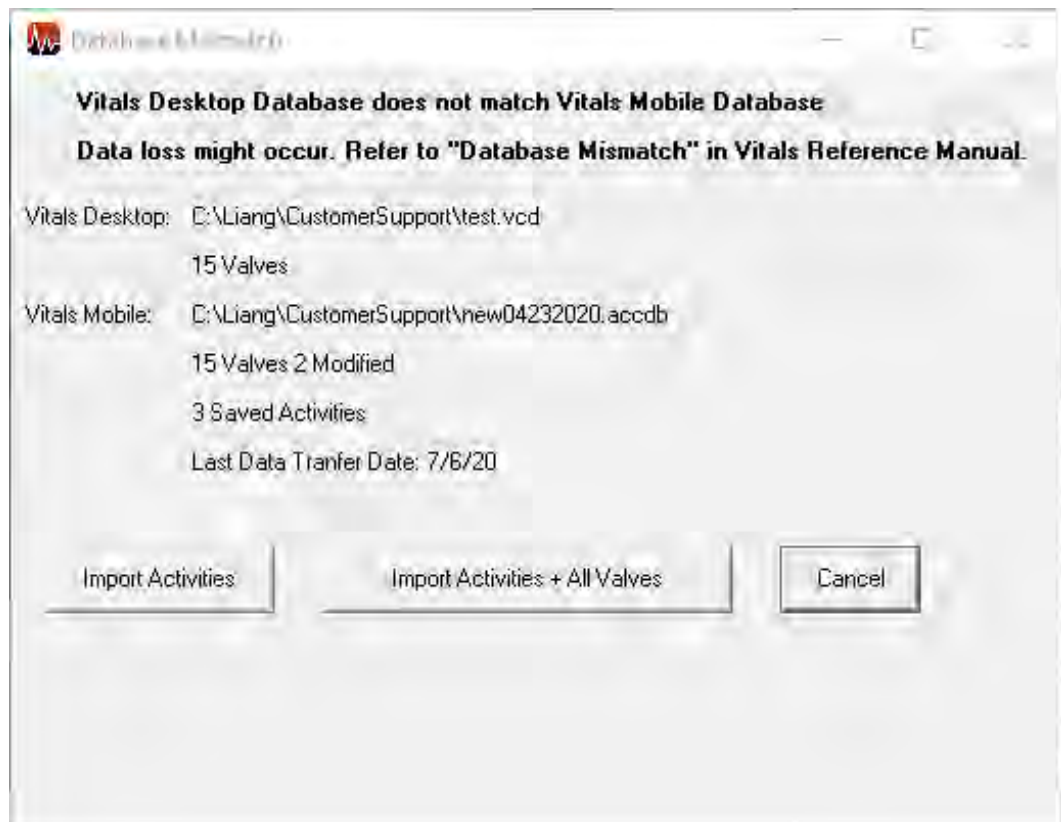


Figure 7-52. The Database Mismatch screen appears if there is a database error.

If there are activities you don't want to import, uncheck the box in the **Import** column.

You can edit details of the valve activities on the **New Activities** tab before completing the import. Click in the field you want to edit, and change the value or description. (You **cannot** change the Valve ID.)

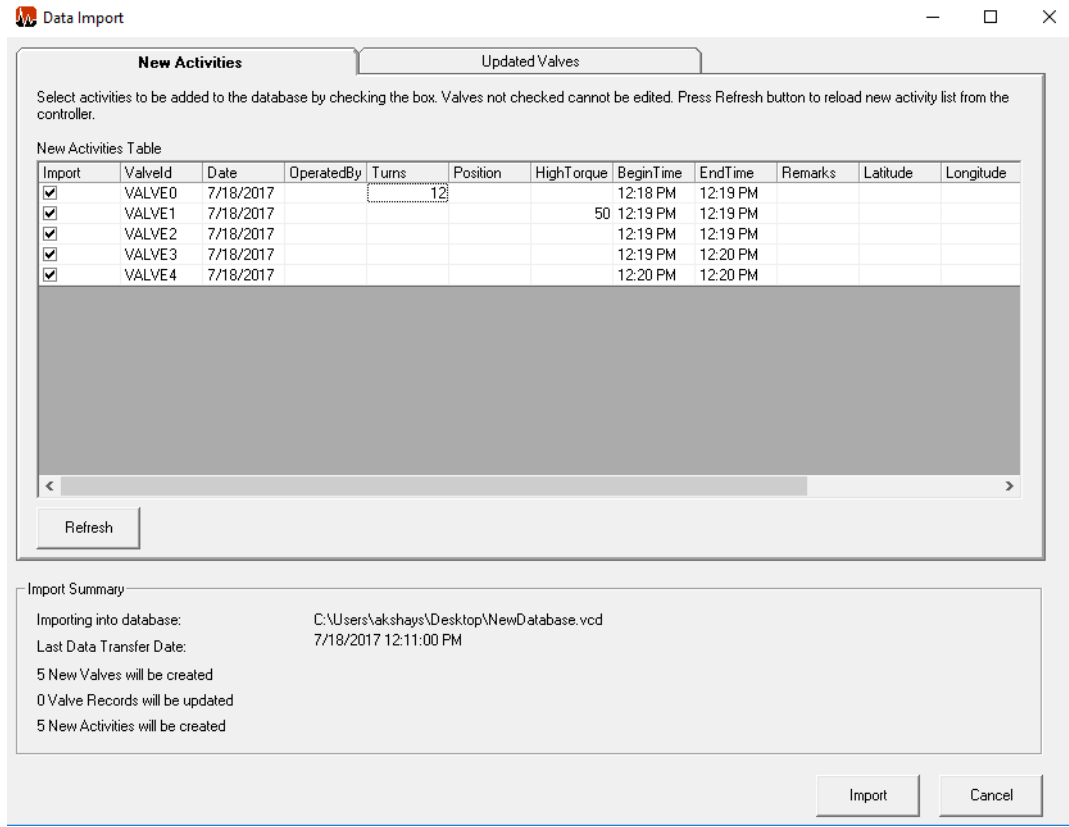


Figure 7-53. You can edit data on the Data Import screen, as shown in the **Turns** and **HighTorque** columns.

Click on the Updated Valves tab to review valve data that has been changed. Text in red indicates differences between data from Vitals Mobile and the data in the Vitals Desktop database. Valve records in red indicate new valves that are not in the database.

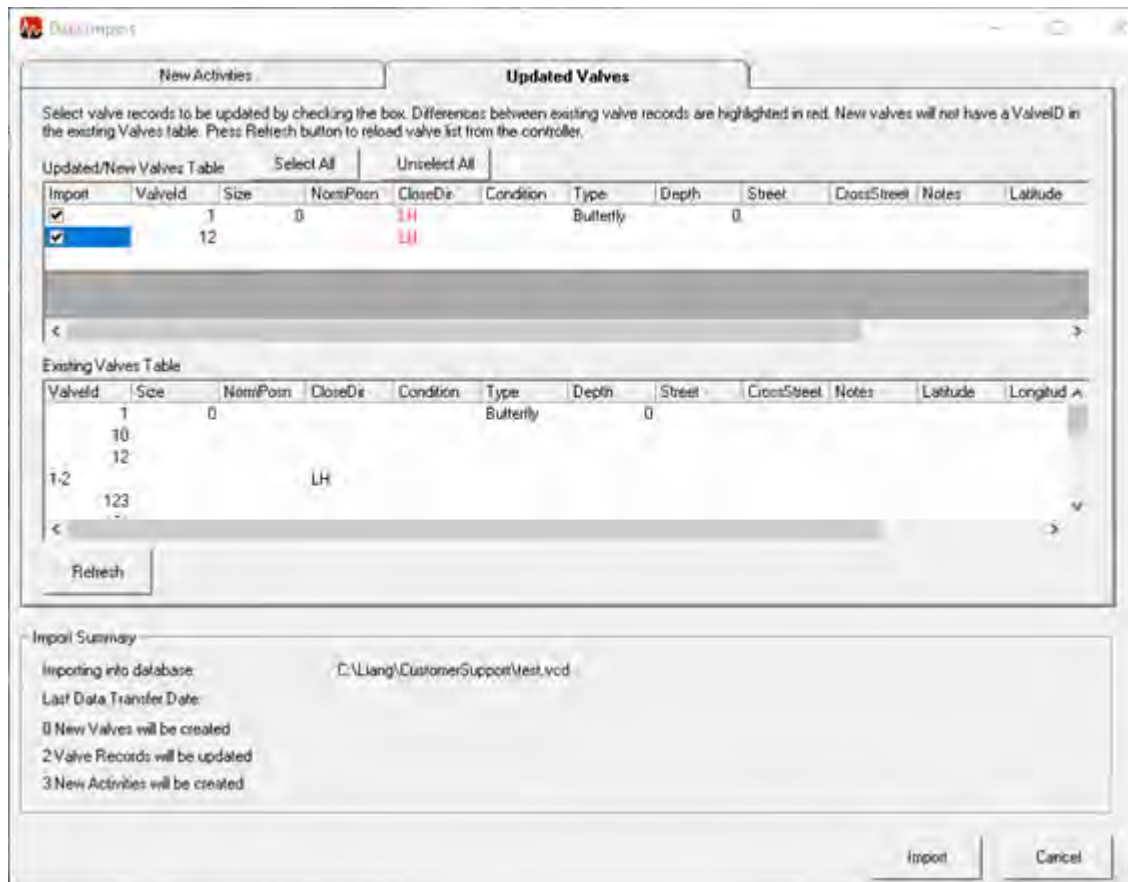


Figure 7-54. New valve data appears in red text on the **Updated Valves** tab of the **Data Import** screen.

You can edit details of the valve data on the **Updated Valves** tab before completing the import.

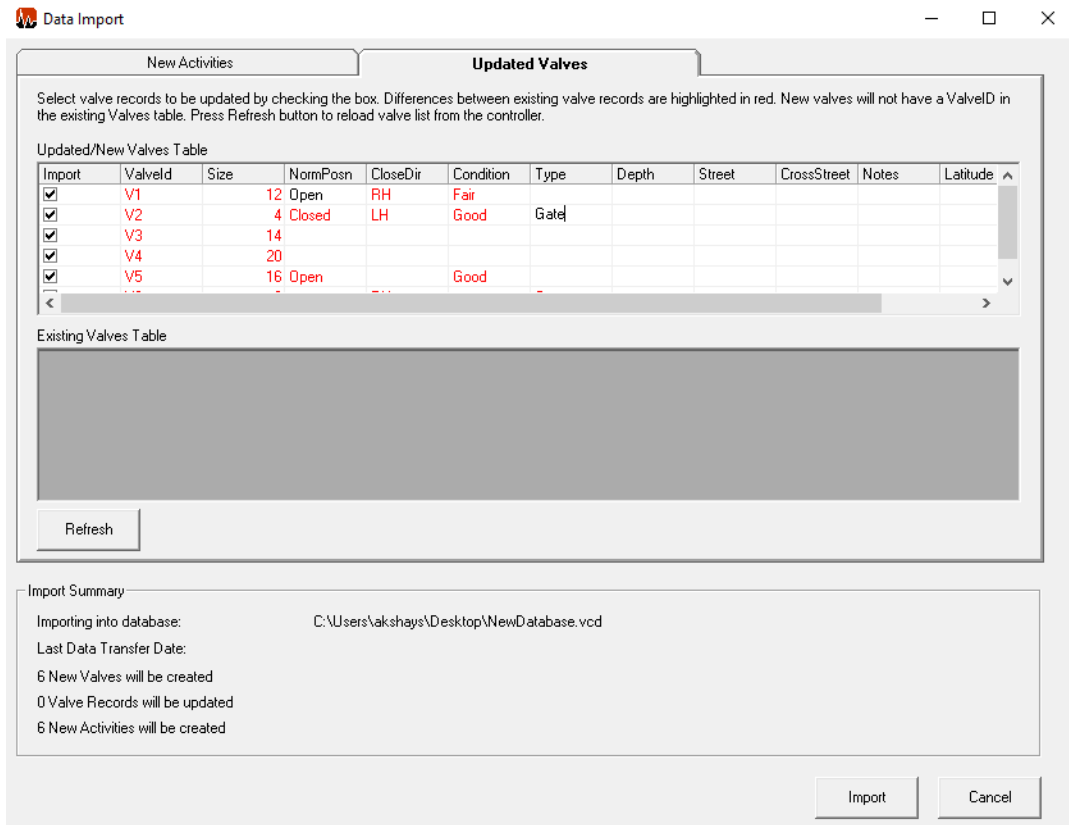


Figure 7-55. Data that you have added or edited appears in black text on the **Updated Valves** tab.

Any additions or changes will be saved to the Vitals database. The Import Summary highlights the changes. After you have reviewed the activity and valve data, click the Import button to import it. All valves are displayed.

Uploading Large Databases

On the HC-100 controller, responsiveness diminishes as the valve database size grows. Uploading data sets with more than 50,000 valves creates a slight lag.

If your database is over 50,000 valve records, a message will appear recommending you to select a range to upload. (You may still upload your entire database if you wish)



NOTE

Slow performance may also occur on the TC-100 controller in Legacy mode.

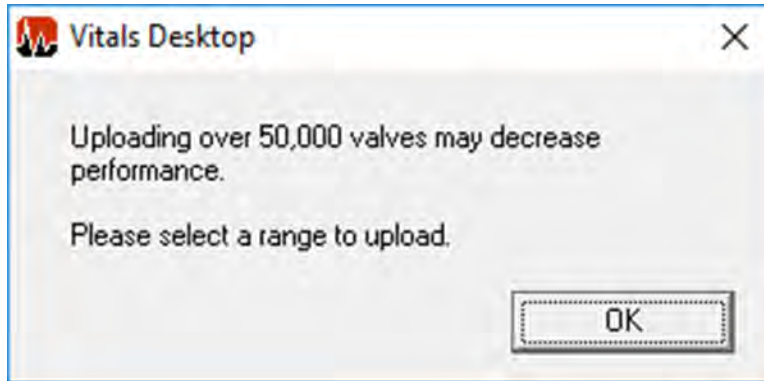


Figure 7-56. Over 50,000 Valve Record Message

To split your database into smaller sections for upload, perform the following steps.

1. Create a new field in your Valves table to identify distinct sections of your valve record structure, such as Grid. In this example, different Grid choices could be A, B, C, etc. Refer to “Customize Data Fields” in the “Database Options” section for more information on creating custom data fields.
2. Add the appropriate Grid choice for each valve record by editing the valve record information. Refer to “Valve Record” in the “Creating and Editing Valves and Activities” section for more information on editing valve records.
3. Start a Data Transfer and select **OK** when the range selection message appears. The Export Valve Records screen appears.



Figure 7-57. Select Valves to Export

4. Click the radio button **Specify valve records**. Select **Grid** in the **Field** dropdown and choose the grid(s) containing the valves you wish to upload. Notice that the number of valve records being transferred has been reduced to only those that meet the specified requirements.



Figure 7-58. Specify Valve Records - Custom Field Specification

5. Complete the remainder of the Data Transfer.

DATABASE OPTIONS

Database Setup

This section describes the actions you can perform with the currently open database. Click the **Settings** button and select the **Database Setup** command to see the database options.

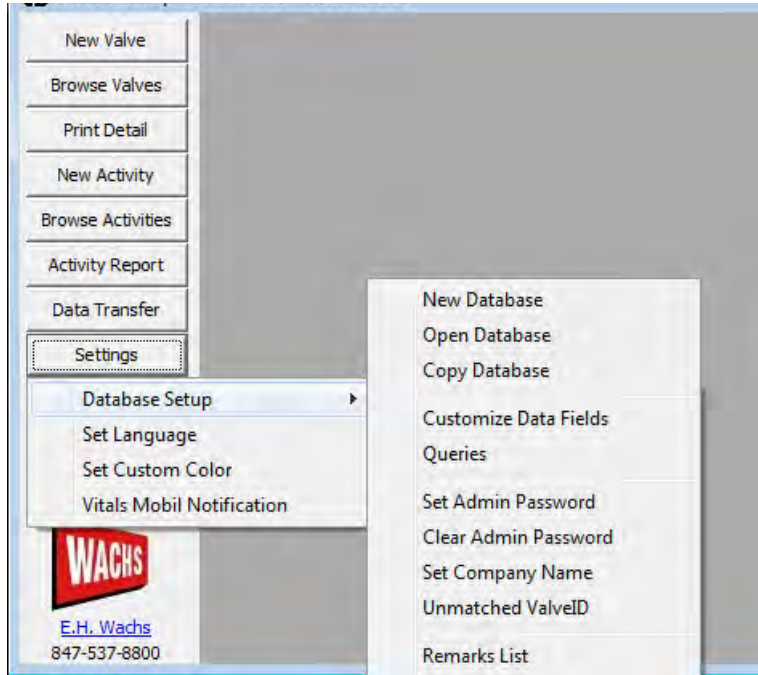


Figure 7-59. Database Setup Options

- **New Database** allows you to create a new blank database.
- **Open Database** allows you to open an existing database.
- **Copy Database** allows you to create a copy of an existing database.
- **Customize Data Fields** displays the Customize Data Fields screen, which allows you to create custom fields to your database for valves and activities. See section “Customize Data Fields” for more information.
- **Queries** displays the Query List screen, which allows you to create and run SQL queries against the currently open database. See section “Queries” for more information.
- **Set Admin Password** allows you to create a password to limit access to the Database Setup options.

- **Clear Admin Password** lets you remove password protection from the database. It will prompt you for the password when changing this setting.
- **Set Company Name** allows you to create or edit a company name associated with the currently open database.
- **Unmatched Valved** allows you to find activities from the Activities table that do not have an associated valve with the same ValveId in the Valves table. This option will allow you to create valves with ValveIds in the Valves table to ensure that all activities in the Activities table are associated with a valve in the Valves table.
- **Remarks List** displays the remarks you have defined and allows you to create new remarks. See section “Remarks List Window” for more information.

Customize Data Fields

This section describes the Customize Data Fields screen and how to create custom data fields.

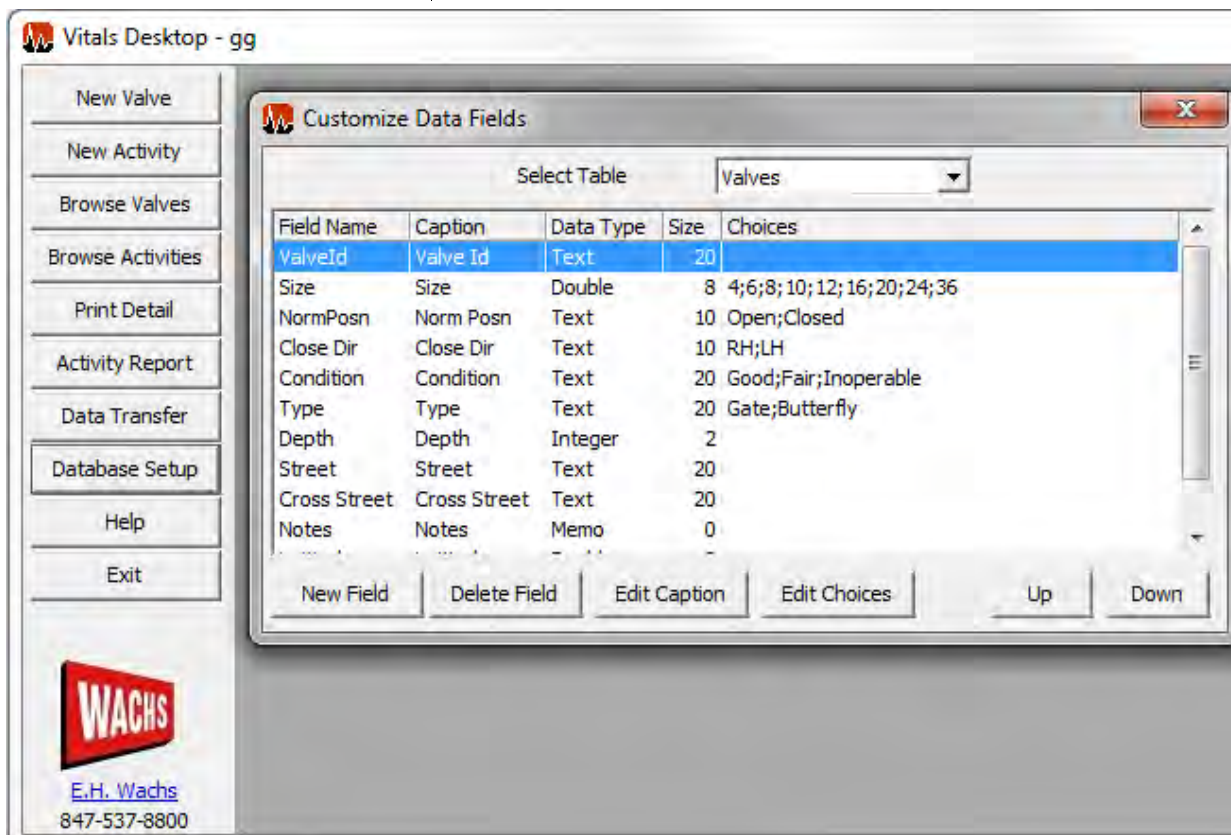


Figure 7-60. Customize Data Fields

- In the **Select Table** dropdown box, you can select whether you would like to add a data field to the Valves or Activities table.
- **Field Name** displays the name given to each data field, which is seen by the database.
- **Caption** displays the familiar name of each data field, which is seen by the user in Vitals Desktop and Vitals Mobile.
- **Data Type** displays the type of data that can be entered into each field.
- **Size** displays the maximum length each choice of a field.
- **Choices** displays the default options available for each field.
- Click **Delete Field** to delete a preexisting field. You will not be able to delete a field if there is information associated with a valve pertaining to that field.
- Click the **New Field** button to create a new custom data field. This will bring up the New Field screen. Here, you will be able to specify a Field Name and Data Type.
- Click the **Edit Caption** button to edit the caption associated with the highlighted data field.
- Click the **Edit Choices** button to edit the choices associated with the highlighted data field.
- Click the **Up** or **Down** arrows to choose the order in which the data fields are displayed when analyzing valve information.

Queries

This section describes the Queries screen and how to create, edit, run, and delete queries. All queries are written in SQL (Structured Query Language).

The Query List screen shows a list of created queries.

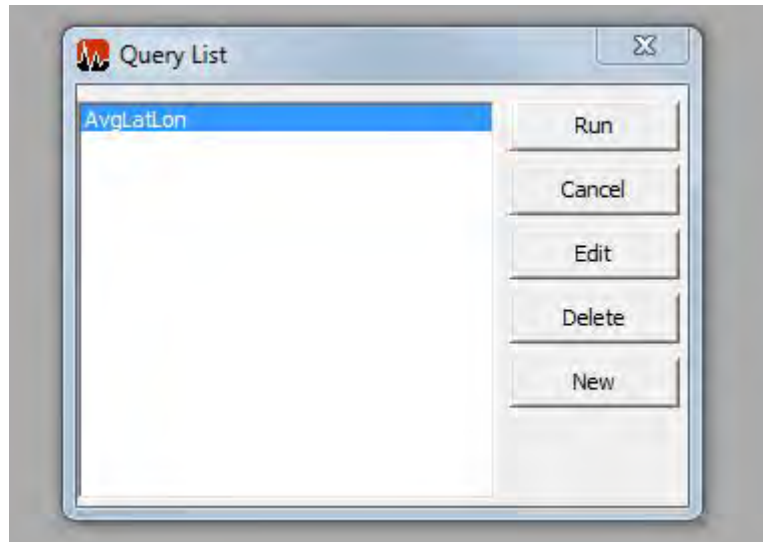
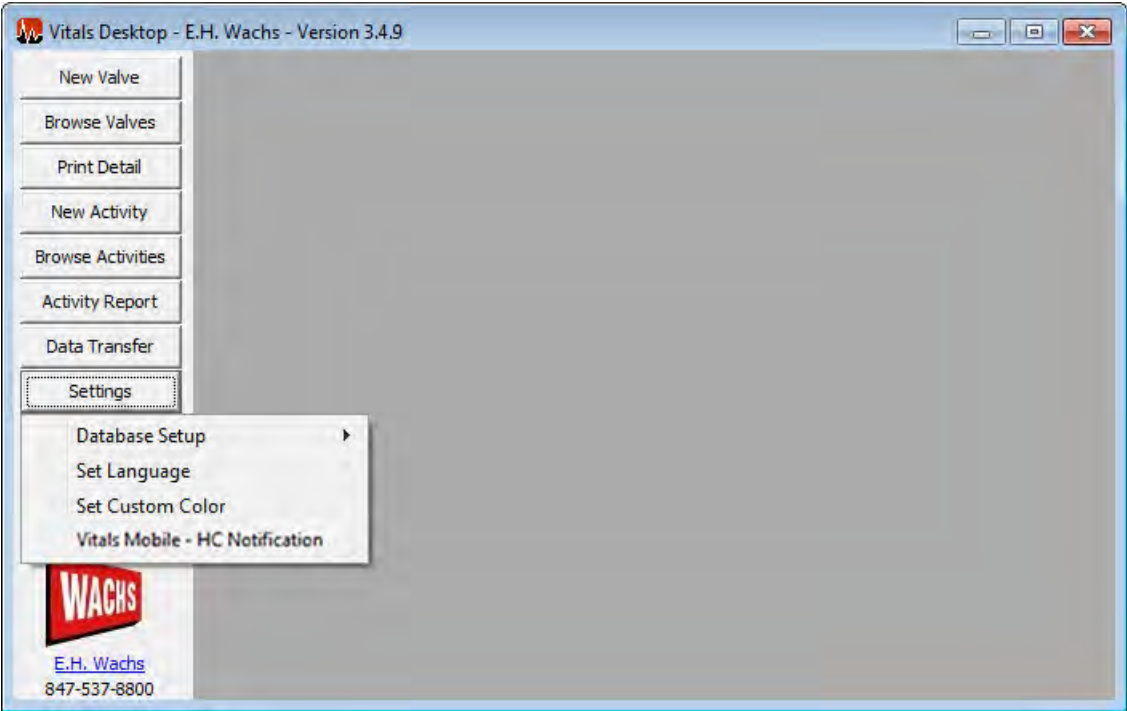


Figure 7-61. Query List

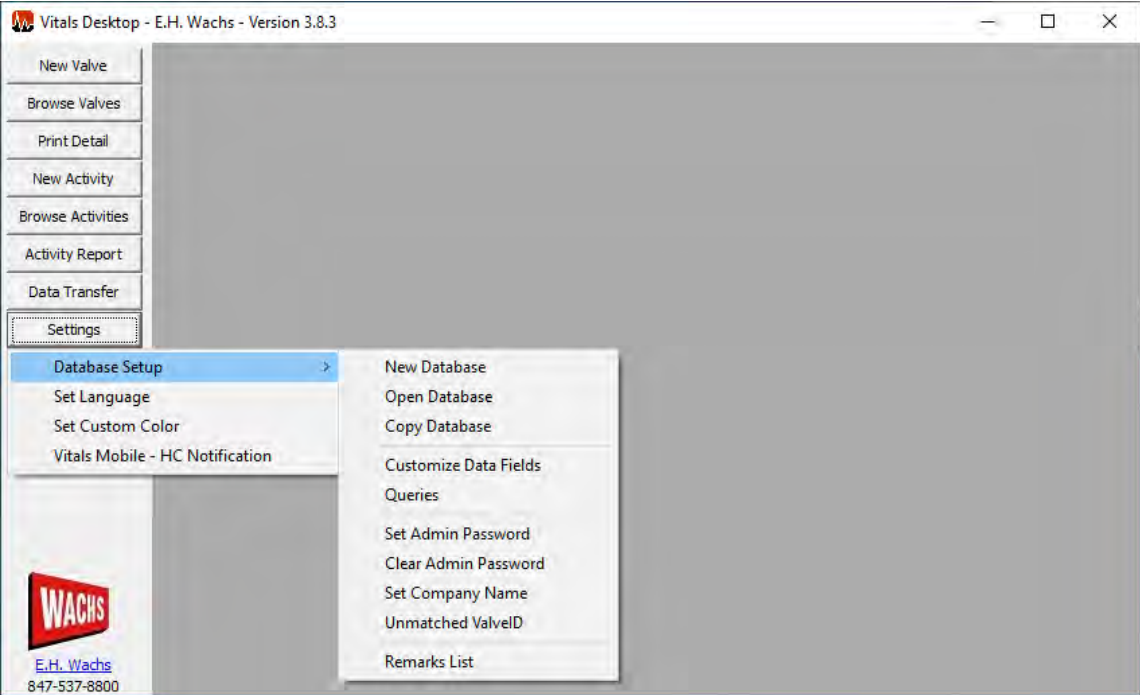
- Click the **Run** button to perform the highlighted query statement. This will return the valve or activity information specified in the query.
- Click the **Edit** button to edit the highlighted query.
- Click the **Delete** button to delete the highlighted query.
- Click the **New** button to create a new query using SQL.

SETTINGS

The **Settings** menu lets you configure Vitals Desktop options.



- **Database Setup** has commands for configuring the Vitals Desktop database.



- **Set Language** displays the Language screen, which allows you to select the default language. The selected language will be automatically configured on Vitals Mobile during the next data transfer.
- **Set Custom Color** displays a color dialog, allowing you to choose a custom color in which to display the currently open database.
- **Vitals Mobile - HC Notifications** lets you configure how Vitals Mobile notifies you of valve activities that have not been transferred to Vitals Desktop.

NOTE: Vitals Mobile HC only. Vitals 3.8 does not include the Notifications feature for Vitals Mobile TC.

HELP OPTIONS

This section describes the options available through the help dropdown menu in Vitals Desktop 3.8.4.

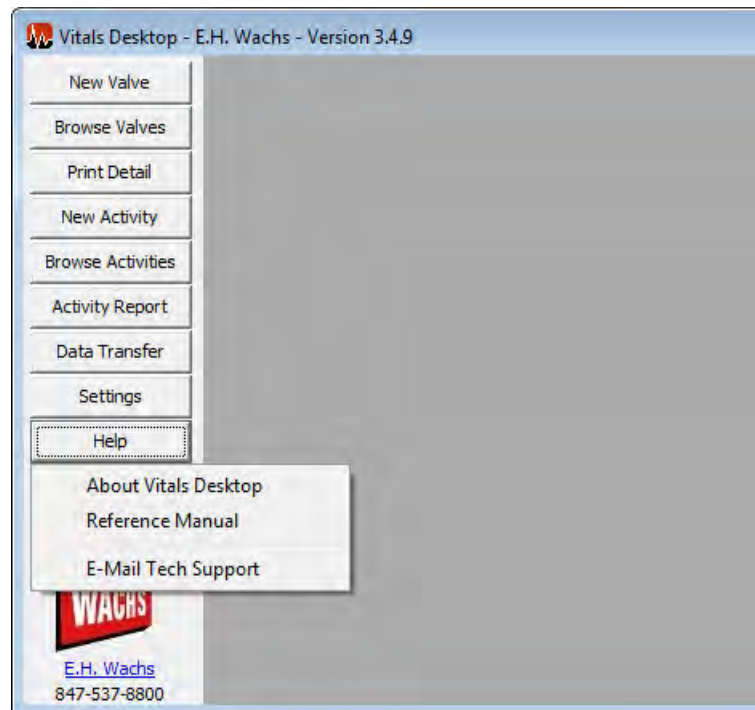


Figure 7-62. Help Options

- **About Vitals Desktop** displays an about screen with the software version number and the location where the currently open database is stored.

- **Reference Manual** opens a PDF of this reference manual for helpful information regarding the HC-100 controller, Vitals Desktop 3.8.4, and Vitals Mobile 3.8.4.
- **E-Mail Tech Support** opens a blank email message that the user can fill out with questions or concerns. Tech Support emails are sent to the technical/engineering staff at E.H. Wachs.



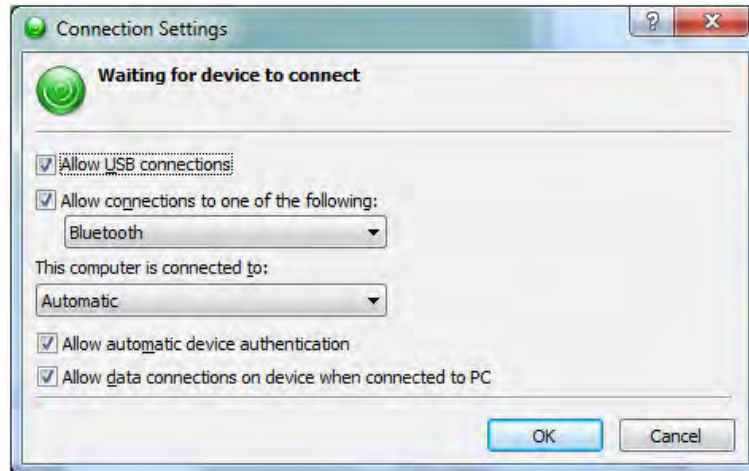
Chapter 8

Troubleshooting Guide

Symptom: HC-100 not recognized when connected to PC

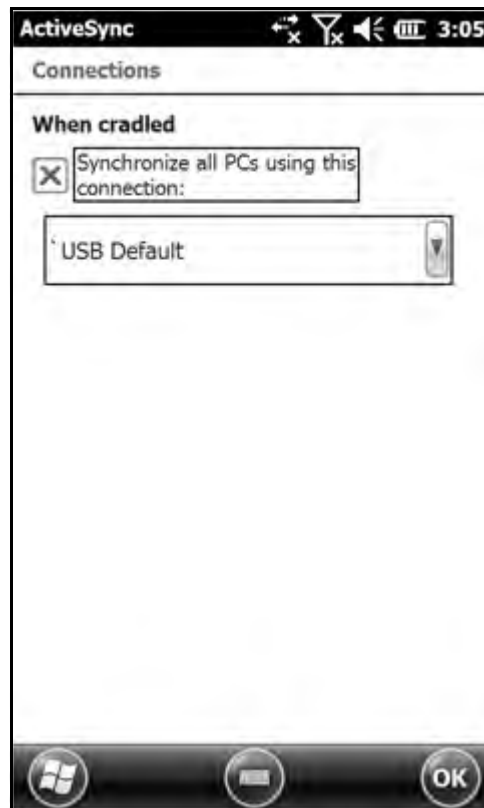
Many issues can affect HC-100 connectivity to the PC.

1. Issue with Windows Mobile Device Center (WMDC) in Windows 10 (particularly with Windows 10 Creators Update)
 - WMDC will not function by default in Windows 10. Instructions on enabling WMDC are on our website (www.turnvalves.com). Click on “Support”, then click on “Software Downloads” for information.
2. Problem with Windows Mobile Device Center
 - Check to make sure Windows Mobile Device Center is installed
 - i. Uninstall/remove Windows Mobile Device Center through the Control Panel.
 - ii. Re-install Windows Mobile Device Center from the Microsoft website. (32 and 64 bit installers can be found in C:\Program Files\Vitals Desktop\wm.
 - Firewall settings may prevent drivers from loading
 - Check Mobile Device Settings:



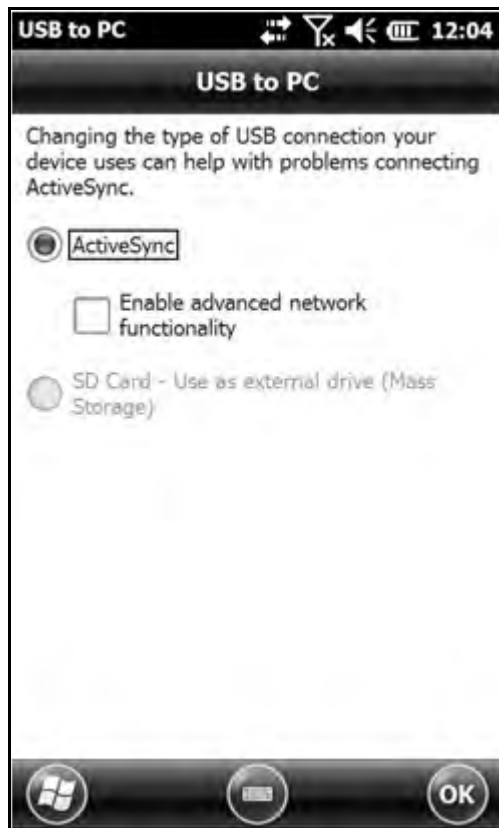
3. ActiveSync settings on HC-100

- Start Screen > Tap ActiveSync icon > Menu > Connections...



4. USB to PC setting on HC-100

- HC-100 Home Screen > Tap Settings icon > Tap Connections icon > Tap USB to PC icon:



Enable advanced network functionality is off by default.

5. Faulty USB cable.
 - Check connection with another USB cable.

Symptom: Running slow or locking up

Occasionally, software programs or the operating system on a device may cease to respond, leaving the device in a state where it cannot be used until some or all software programs are closed or the operating system is reset.

Stop Running Programs

1. Open Task Manager on the HC-100 to stop applications or end tasks. (Task Manager is on the HC-100 Home screen - Tap on Home button)
2. Tap on Menu > End All Tasks

Soft Reset

1. Try soft resetting the device by pressing and holding the Power (On/Off) key for 5-10 seconds until the Power Button menu appears. Tap Reset.

Restoring to Factory State (Clean Boot)

CAUTION: Restoring the HC-100 to its original factory state permanently erases data saved on the handheld, any software you installed, and any changes you made to the handheld, including changes to settings.

1. Back up files and programs you want to keep onto another computer.
2. Save open files and close running programs on the handheld. Press and hold the power button until the Power Button menu appears. Tap
3. *Reset*.
4. When the screen turns black, press and hold the power button again. The BIOS screen is shown.
5. Move the top slider on the screen to the right to set or clear factory defaults. This clean boots the handheld.
6. Tap *Exit*. The boot process continues.

Symptom: Touchscreen not accurate or responding to touch input

Touchscreen performance can be optimized for individual situation or whether using a finger vs. stylus input.

Adjust Touchscreen Settings

1. Settings>System>Touch
2. Select Touch Profile (Stylus 10 is the recommended default profile).
3. Finger and Stylus profiles available.

Use HC-100 stylus.

1. Wider tip stylus will actually work better than a fine tip stylus because the wider tip will activate more contact points at a time.

Use Hold To Zoom Feature

1. Press and hold down P1 button
2. Tap on the screen. Area around the tap location will zoom in allowing finer user touch input.
3. Release P1 button to zoom out

Soft Reset

1. Try soft resetting the device by pressing and holding the Power (On/Off) key for 5-10 seconds until the Power Button menu appears. Tap Reset.

Symptom: HC-100 turning off and rebooting

Low battery

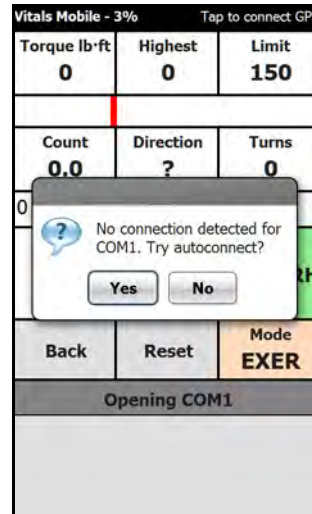
1. Charge battery
2. Keep HC-100 plugged-in (vehicle DC charger or AC charger) when not in use

Symptom: Vitals Mobile Controller Stops responding

Faulty machine connection

1. Soft reset HC-100
2. Check connection with Vitals Diagnostics
 - Vitals Diagnostics will not connect to machine with faulty connection. Vitals Mobile accepts an intermittent connection problem.
 - i. Diagnose source of faulty connection: control cable, wiring, connector corrosion, faulty equipment ground, faulty control board.

Symptom: The “No connection” message appears on the HC-100 while operating the ERV-750.



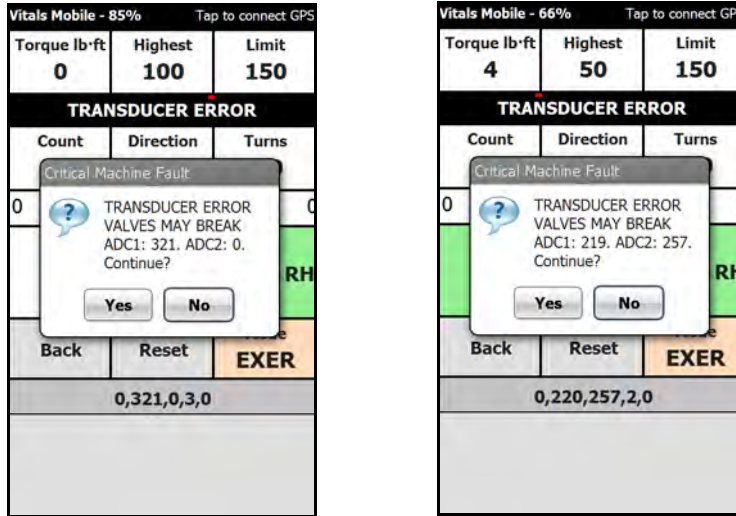
Connection to valve operator interrupted

1. Make sure the ERV-750 is powered on.
2. Make sure the cable is connected, or that a Bluetooth link has been established.
3. Pressing the brake button on an ERV-750 **with a version 1.01 control board** will interrupt the controller connection.
 - i. Tap Yes to autoconnect and re-establish the connection.
 - ii. If the controller is connected using Bluetooth, it may take 15-30 seconds to re-establish the link.
 - Version 1.01 control boards can be updated. Contact E.H. Wachs service for information.

Symptom: A “Transducer Error” message appears while operating the TM-7 or ERV-750.

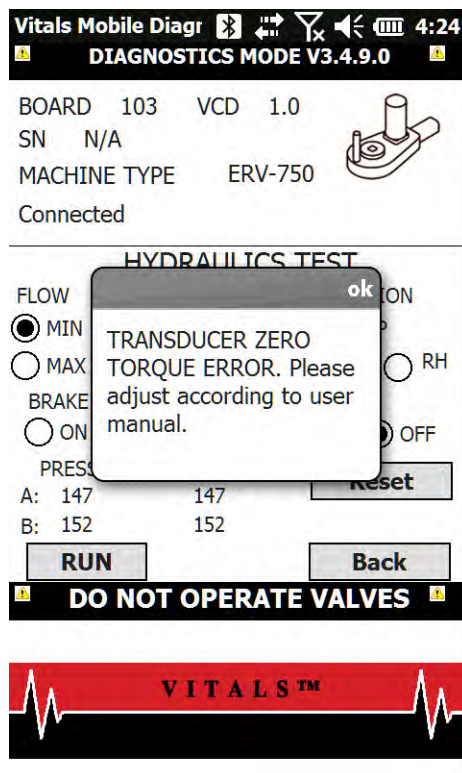
The transducer readings from the valve operator are out of normal range. This indicates a problem with either the transducers or cables.

Caution: Vitals uses transducer readings to calculate operating torque. Operating with incorrect readings can cause the machine to break a valve.



1. Contact E.H. Wachs for service if your valve operator is generating **Transducer Error** messages.

Symptom: A “*Transducer Zero Torque Error*” message appears starting the *Vitals Diagnostics Hydraulics Test*.



1. Adjust the transducer potentiometer. See “Transducer Zero Torque Error” on page 144.

Symptom: Runtime errors while using or installing Vitals Desktop.

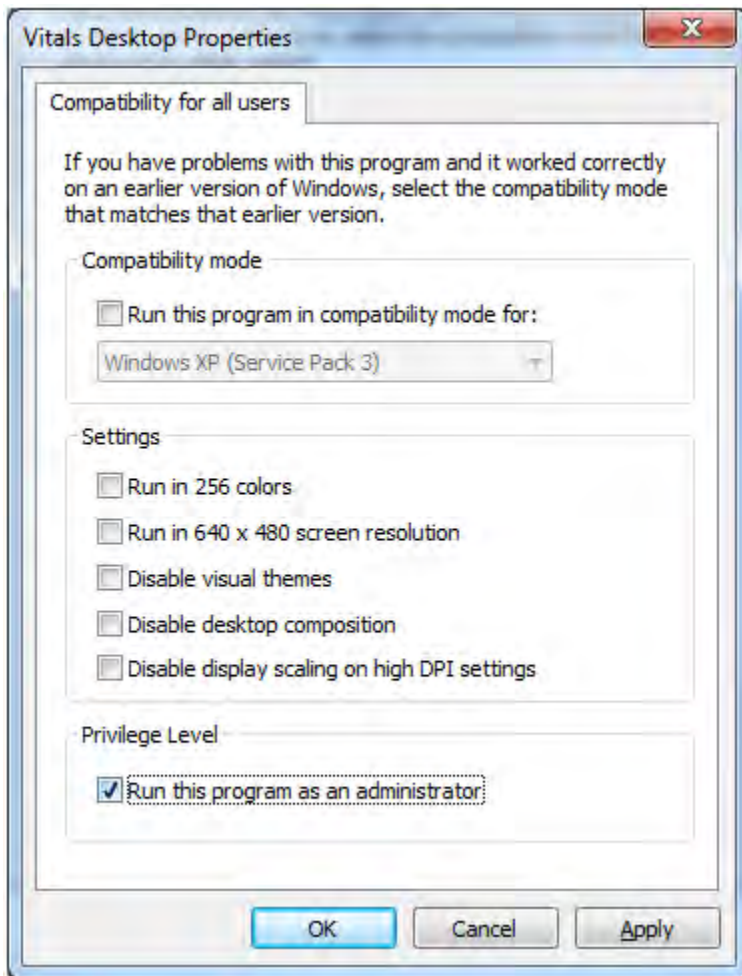
1. User account related
 - Lacking user account privileges
 - Log in to computer as Administrator
2. Vitals desktop related
 - Did not install correctly. Reinstall Vitals Desktop

Symptom: Runtime error shows up after doing a data transfer: Runtime error 53: File not found: rapi.dll.

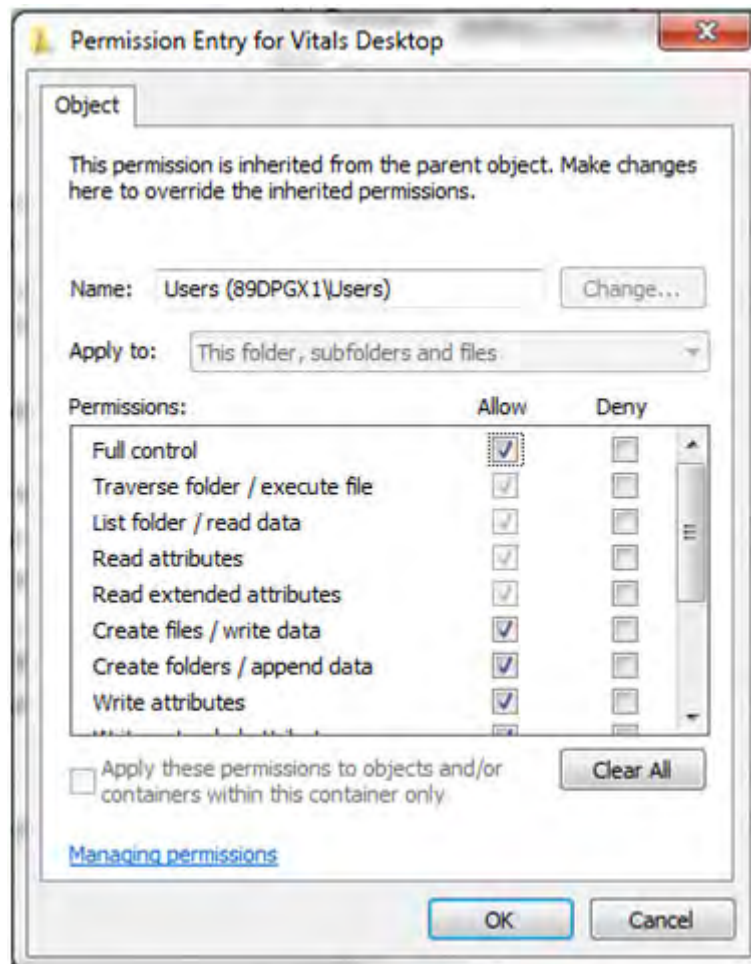
1. Windows Mobile Device Center
 - WMDC is not installed or is corrupted on PC. Install WMDC 6.1 by downloading it from the Microsoft Website.

Symptom: Runtime error shows up after trying to launch Vitals Desktop: Runtime error 75: Path\File access error

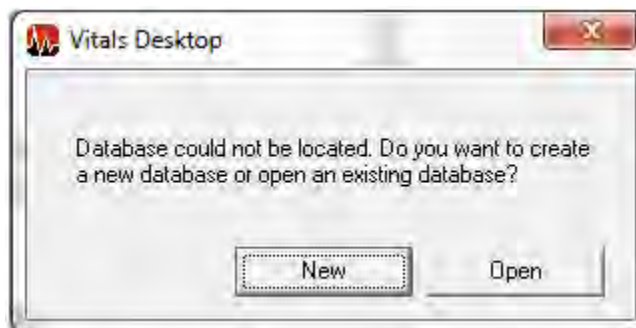
1. User account related
 - Lacking user account privileges
 - Log in to computer as Administrator
 - Run Vitals Desktop as Administrator



- Allow Full Control to user running Vitals Desktop
 - i. Right click in the Vitals Desktop folder (C:\Program Files\Vitals Desktop) and click **Properties**.
 - ii. Select the **Security** tab and then click **Advanced**.
 - iii. Click **Change Permissions** and then select the users that will be using Vitals Desktop. Click **Edit**.
 - iv. Check the **Full control** check box and click **OK**.

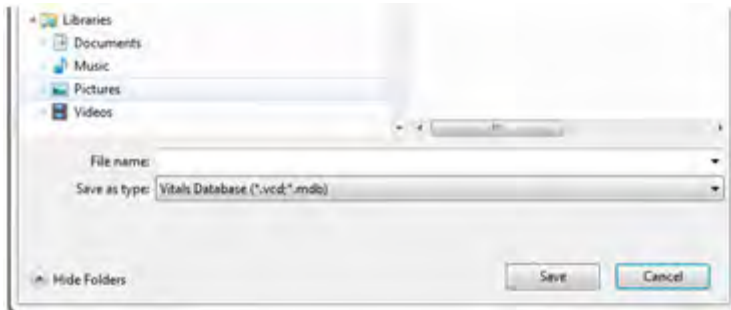


Symptom: “Database could not be located” message appears when Vitals Desktop is launched.

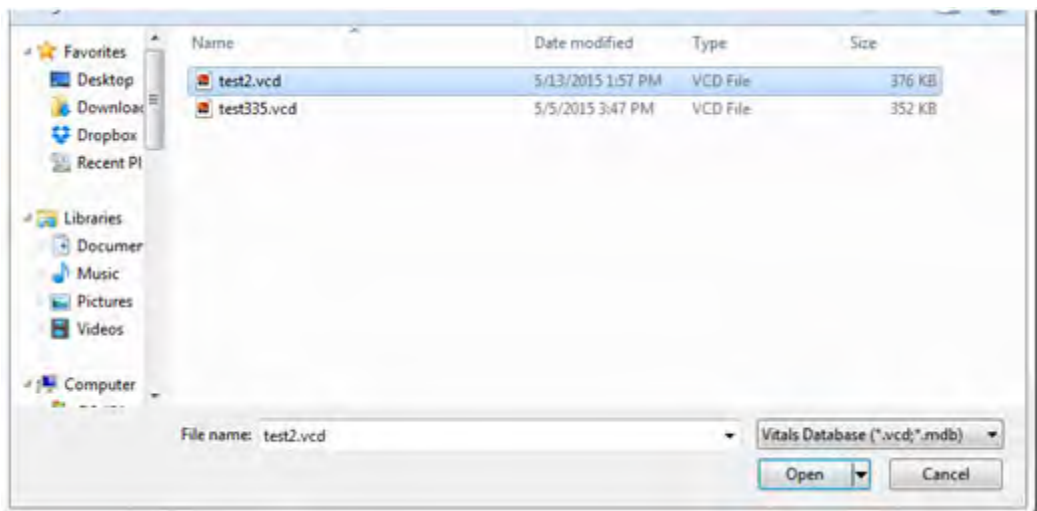


1. Directory related
 - This message will appear if the database is deleted or moved to another location.

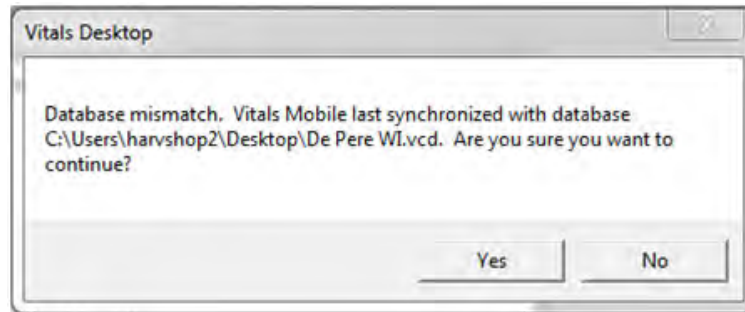
- i. To create a new database, click **New**. The Save As dialog appears; name the database and click **Save**.



- ii. To locate the existing database, click **Open**. The Open File dialog appears; browse to the location of the database file, click on the file to select it, and click **Open**.



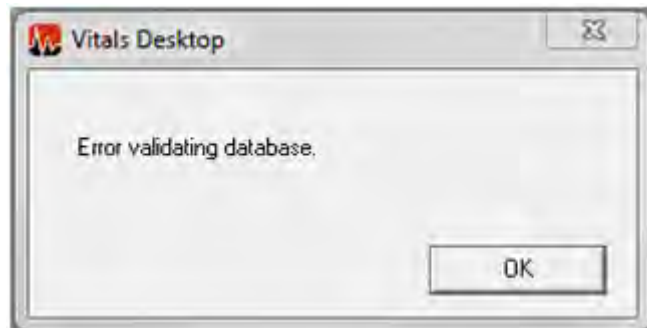
Symptom: Database mismatch message after performing a Data Transfer.



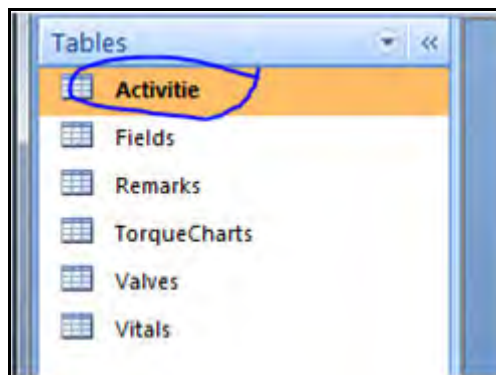
1. Directory related

- This message can appear when the default location of the Database is changed within Vitals Desktop. The file location in the message is the location for the very first database you created.
- Clicking yes will simply ignore the message and perform the Data Transfer to the database currently opened within Vitals Desktop.
- To avoid this message, do not change the file location of Vitals Database. Be careful with mapped drives or user level folders. It is recommended to use Windows UNC with an absolute path
- To eliminate this message, reinstall Vitals Mobile.
 - i. Uninstall Vitals Mobile on the handheld.
 - ii. Remove the Vitals Mobile folder from the File Explorer menu on the handheld.
 - iii. Reinstall Vitals Mobile from the PC running Vitals desktop. (If the location of the database is changed again in Vitals Desktop, the message will re-appear.)

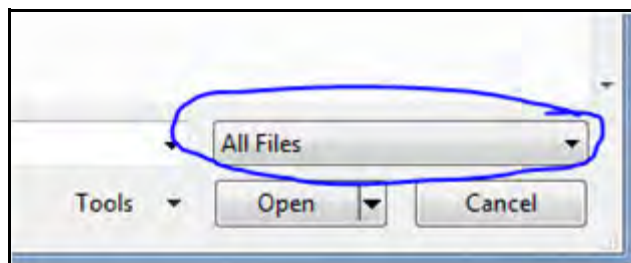
.Symptom: “Error validating database” appears after trying to open a database in Vitals Desktop.



1. Database table was changed with MS Access.



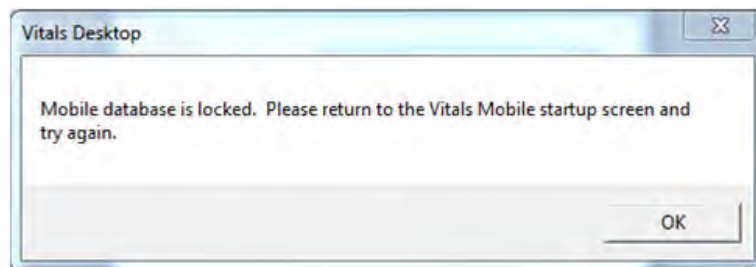
- One of the tables in the database was renamed using MS Access. In this example, the **Activities** table was renamed to **Activitie** (note the missing “s” at the end). These tables should not be renamed.
 - i. To fix this, open **Microsoft Office Access**, **Open**, and change the type to **All Files**.



- ii. Select the database with **.vcd** extension and open it

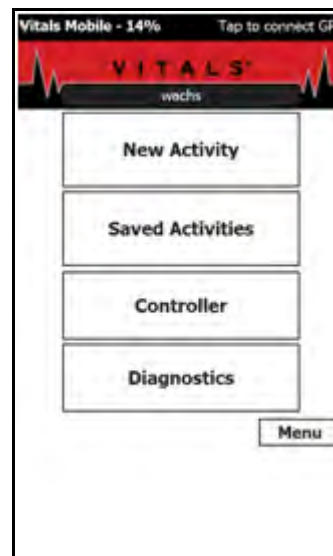
- iii. **Right click** on the table and click **Rename**.
 - iv. Rename to **Activities**.
 - v. Close Microsoft Office Access and open the database with Vitals Desktop.
- Tables required by Vitals are as follows: **Activities, Fields, Remarks, TorqueCharts, Valves** and **Vitals**. If these are missing or named differently, there will be problems when trying to open the database.

Symptom: “Mobile database is locked” message appears when performing a Data Transfer.



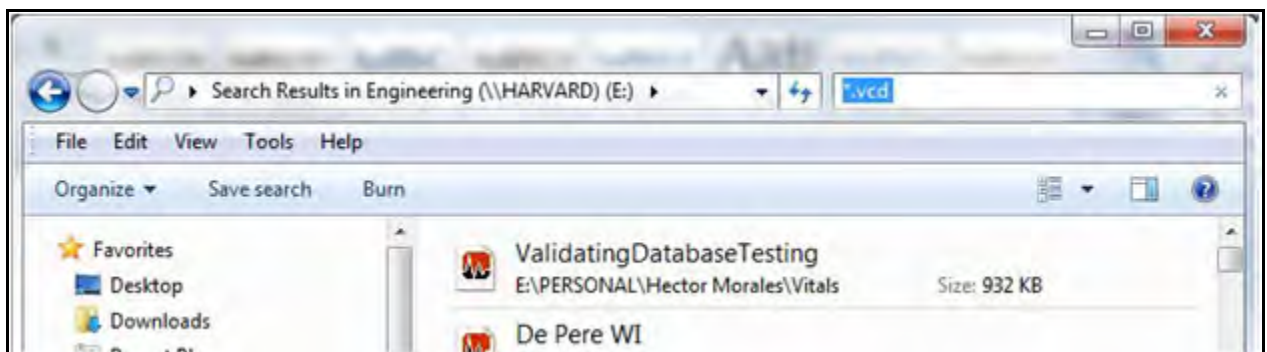
1. User Error

- This error message pops up when Vitals Mobile is not on the main screen.
 - i. Make sure Vitals Mobile is at the following screen, and then click on **Data Transfer** in Vitals Desktop.



Symptom: Can't find database (.vcd file) that was transferred from handheld controller to Vitals Desktop.

1. Directory related
 - Created a new database and saved it at another location and thus changing the default directory.
 - i. Perform a computer search by typing “*.vcd” in the search bar. (This is the extension for the database file when it is transferred to Vitals Desktop.)



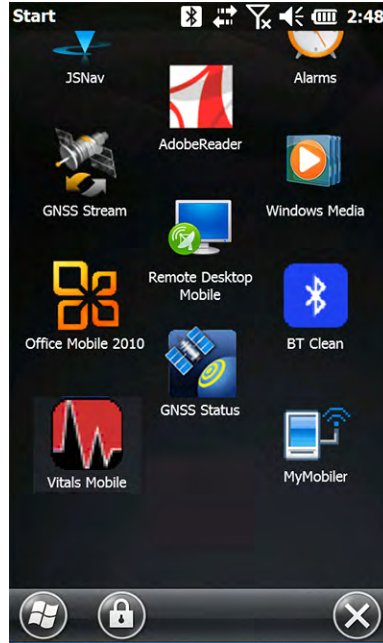
- ii. Click on Open Database under Database Setup and point to the directory containing vitalsdb.vcd.

1. Database file deleted or overwritten.

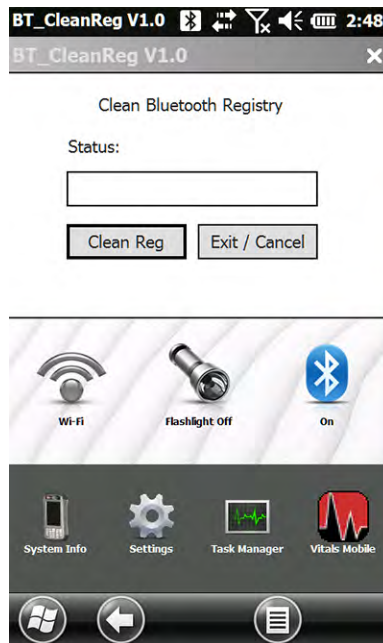
Symptom: No COM ports are available for Bluetooth pairing.

1. COM ports were not released when previous Bluetooth pairings were deleted.
 - Run the **BT Clean** app on the HC-100 to remove all COM port assignments and Bluetooth pairings. (If BT Clean is not on your HC-100, download it from the website at turnvalves.com. Click “Support”, then click “Software Downloads”.)

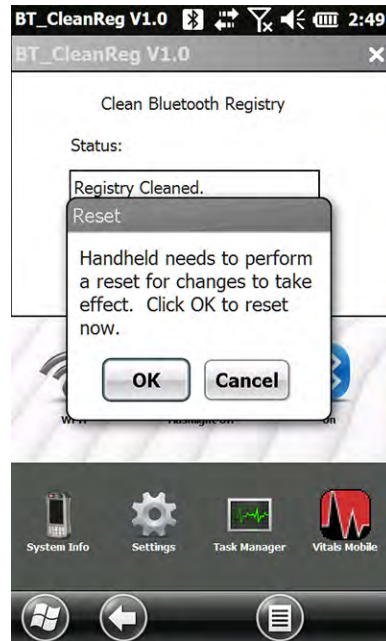
- i. Tap the **BT Clean** icon to start the app.



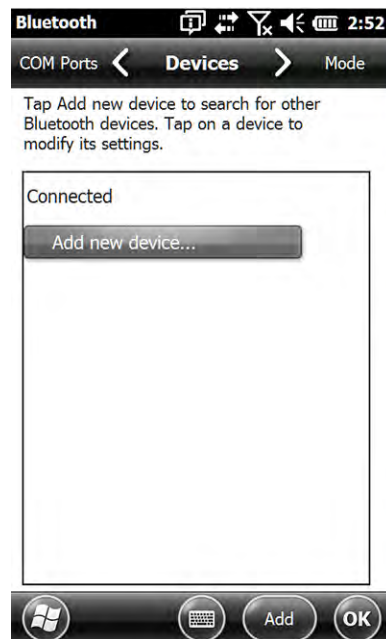
- ii. When the app opens, tap the **Clean Reg** button.



- iii. Tap the **OK** button to reset the ports and restart the handheld controller.



- iv. When the ports have been cleared, you can re-establish the Bluetooth link to the valve operator. Tap **Add new device**.



Symptom: Error message saying “Cannot find E. H. Wachs equipment.”

1. Valve operator may not be powered on.
 - i. Turn on the valve operator.
2. Bluetooth not connected.
 - i. Make sure the equipment is paired. See “Adding a Valve Operator” on page 41.

Symptom: Maps view not available in the field.

1. TC-100 is offline and local map is not downloaded.
 - i. Download local map when connected to wi-fi. Tap the Windows icon, go to Settings, then Apps>Offline Maps. Find your location and download the map.

Symptom: Query for All GPS Data comes back blank.

1. The GPS query requires valve geolocation data to return results.
 - i. Best practice is to have the valve latitude and longitude coordinates stored in the Valve table, using the most precise geolocation data available.
 - ii. Geolocation data in the Valve table is not required, if the valve has at least one activity in the Activities table with location data.

Chapter 9

Ordering Information

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To place an order, request service, or get more detailed information on any E.H. Wachs Company products, call us at one of the following numbers:

U.S. 800-323-8185

International: 847-537-8800

Or you can visit our website at:

www.turnvalves.com

ORDERING REPLACEMENT PARTS

When ordering parts, please provide the part description and part number for all parts you are ordering.

REPAIR INFORMATION

Please call us for an authorization number before returning any equipment for repair or factory service. We will advise you of shipping and handling. When you send the equipment, please include the following information:

- Your name/company name
- Your address
- Your phone number

In This Chapter

ORDERING REPLACEMENT PARTS

REPAIR INFORMATION

WARRANTY INFORMATION

RETURN GOODS ADDRESS

- A brief description of the problem or the work to be done
- The RMA number printed on the outside of the box or container.

Before we perform any repair, we will estimate the work and inform you of the cost and the time required to complete it.

WARRANTY INFORMATION

Enclosed with the manual is a warranty card. Please fill out the registration card and return to E.H. Wachs Company. Retain the owner's registration record and warranty card for your information.

RETURN GOODS ADDRESS

Return equipment for repair to the following address.

E.H. Wachs—Water Utility Products
600 Knightsbridge Parkway
Lincolnshire, Illinois 60069 USA

Appendix A

Vitals Valve Exercising Program

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Vitals provides two modes of valve operation.

- The 'EXERCISE' mode is designed to close and open (exercise) a valve as part of a maintenance routine, with minimal risk of damage to the valve.
- The 'EMERGENCY' mode is used when the valve must be closed quickly; a higher risk of valve damage is acceptable for the sake of speed.

The main difference between the modes is that the rate at which torque is increased is greater in the EMERGENCY mode.

The valve turning program relies on several control modes as the machine works through the valve turning process. The control mode of the machine varies based on the state of the valve turning operation (direction to turn the valve, valve stuck or turning) and the mode of operation.

Function Overview

At the start of the valve turning operation, the machine (and likely the user) has no way to know what state the valve is in when the machine is first connected. The torque required to turn the valve is unknown and the valve could be fully open, fully closed, or anywhere in between.

The machine starts with a torque LIMIT of 100 ft-lbs, but the machine attempts to move the valve back and forth with a lower torque call the SETPOINT. The machine attempts

to turn the valve up to the torque set by the SETPOINT. If it is not successful, the machine changes directions and tries again. The SETPOINT is then increased by a value dependent on the operating mode (EXERCISE or EMERGENCY), then the machine tries again.

The SETPOINT continues to increase, if the valve does not move, until it reaches the LIMIT. At this point the operator must decide to increase the LIMIT or try again at the same LIMIT. The LIMIT cannot be increased until the machine has tried to turn the valve at each of the SETPOINT torques and the required number of tries at the current LIMIT.

At the beginning of the valve turning operation, the direction to turn the valve is unknown. The user may optionally choose a direction for the machine to turn. Otherwise, the machine attempts to turn the valve in either the right hand (RH) or left hand (LH) direction until a specified number of turns (depending on EXERCISE or EMERGENCY mode) is reached.

Once an operating direction is established, it is referred to as the FORWARD direction regardless of whether it is RH or LH. Likewise REVERSE is the opposite of that direction. During the operation, if the valve reaches a point where it cannot be turned at the current torque, the machine attempts to work past the tight spot by reversing and incrementing SETPOINTS.

Jogging

In order to align the machine with the valve, it is often necessary to move the machine a small amount. This is accomplished with the JOG function. The direction of operation is set by the user. This is done by pressing a 'JOG RIGHT' or 'JOG LEFT' button on the controller. The torque limit is set to the current *LIMIT*. Operation continues in that direction until the button is released or the *LIMIT* is reached.

Manual Mode

This mode implements full control by the user. The user has complete control of the machine direction. Torque is limited only by the LIMIT value and LIMIT may be incremented at any time.

Appendix B

Vitals Database Reference

The Vitals database is stored in MS Access format. Vitals has its own file type, with a **.vcd** file extension.

There are 6 tables in the database. Four of them store the valve and activity data:

- **Valves**, which contains information about the valves and has a unique ValveID for each valve.
- **Activities**, which contains activity data and is linked to the Valve table by ValveID. Each activity has its own ActivityID.
- **TorqueCharts**, which contains torque information for each activity and is linked to the Activity table by ActivityID.
- **Remarks**, which contains pre-defined remarks that the user can select while doing an activity.

The other 2 tables store customer and database information:

- **Vitals** contains version and administrator information.
- **Fields** contains settings and field lookup information.

TABLE STRUCTURE

The following charts illustrate the field structure of each Vitals database table.

**NOTE**

Field size is in characters unless specified otherwise.

**CAUTION**

Field names marked with an asterisk (*) must not be deleted from the Vitals database structure. If you are editing the database structure, do not remove these fields. **Removing these fields will cause database errors.**

Valves Table		
Field Name	Data Type	Size
ValveId*	Text	20
Size*	Double	8 bytes
NormPosn*	Text	10
Close Dir*	Text	10
Condition*	Text	20
Type*	Text	20
Depth*	Integer	2 bytes
Street*	Text	20
Cross Street*	Text	20
Notes*	Memo	64000
Latitude	Double	8 bytes
Longitude	Double	8 bytes

Activities Table		
Field Name	Data Type	Size
ValveId*	Text	20
Date*	Date	8
OperatedBy*	Text	10
Turns*	Double	8 bytes
Position*	Text	10
HighTorque*	Integer	2 bytes
Begin Time*	Text	10
End Time*	Text	10
Remarks*	Text	100
Latitude*	Double	8 bytes
Longitude*	Double	8 bytes
GPS Positions*	Integer	2 bytes
ACTivityId*	Long Integer	4 bytes
TransferId*	Text	20

NOTE: The Remarks field contains remarks that the user has selected on the handheld controller while performing an activity.

TorqueCharts Table		
Field Name	Data Type	Size
ActivityID*	Number	2147483647 Max Value
ChartData*	Memo	64000

Remarks Table		
Field Name	Data Type	Size
RemarkID*	Text	4
Description*	Text	20

NOTE: Fields in the Remarks table appear as checkboxes in Vitals Mobile. The user can select these checkboxes to add the remarks to the activity record.

Fields Table		
Field Name	Data Type	Size
FieldName*	Text	50
Caption*	Text	50
Choices*	Memo	64000

NOTE: The Fields table stores pre-defined contents that the user can select from on the handheld controller.

For example, if you add a record to the table with the following values:

- FieldName: **Size**
- Caption: **Valve Sizes**
- Choices: **4;6;8;10;12;16;24**

the user will see the choices in a pull-down list under **Valve Sizes**. Selecting one of the choices will enter it into the valve record.

You can edit the choices for an existing field, or create new fields in other tables and specify their content in the Fields table.

Vitals Table		
Field Name	Data Type	Size
Version*	Text	50
CompanyName*	Text	50
AdminPassword*	Text	50
LockValves*	Yes/No	64000

