



*SoftTools*TM Suite 7.0

**Quick Start Guide for *SoftTools* 7.0 with support for the
HART Communications Protocol on the Logix
1200/1200e, 3200IQ, and 500/500si Series Positioners**

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Flow Control Division

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Chapter 1: Preface

Welcome to Flowserve Valtek *SoftTools*™. This Quick Start Guide is designed to assist the user in setting up and initiating process control using the combined features of the *SoftTools* software, the HART® communications protocol, and a Logix™ series "smart" positioner.

SoftTools 7.0 is a complete software 'suite,' within which communication protocol software and instrument module software is combined to form a unique process control configuration, calibration and device monitoring system.



Chapter 2: Software Installation

System Requirements

The following hardware is required to use *SoftTools*:

1. A computer using a Pentium, higher, or compatible processor and running Windows 95, 98, NT, 2000, or XP.
2. CD-ROM drive
3. Mouse or other cursor-pointing device.
4. Memory requirements of 32MB RAM minimum, with 64MB RAM recommended.
5. Approximately 30MB disk space for installation.
6. Serial communication ports: 1 minimum available with 8 maximum possible.

Installing SoftTools 7.0

1. You must be an administrator on the system. If you do not have administrative rights, have your system administrator install and run *SoftTools* one time.
2. Insert the *SoftTools 7.0* program CD into the computer CD-ROM drive.
3. Click the **Start** button on the task bar.
4. Select **Run**. Type **e:\ SoftTools 7 Setup.exe** (to install from the E: drive) into the *Run* edit box; then click on the **OK** button.

Application Installation

1. At the *Welcome* message dialog, click on the **Next** button.
2. At the *Choose Destination Location* dialog, the user may accept the default directory from the dialog box or click on the **Browse** button to select an alternate destination folder. After selecting or editing a directory, click on the **Next** button.
3. At the *Select Program Manager Group*, click **Next**.
4. At the *Start Installation* dialog, click **Next**. If a previous installation is detected, click **Yes** to preserve data from an earlier version of *SoftTools*. Click **No** to continue without saving previous data.
5. Click **Finish** to complete the installation.

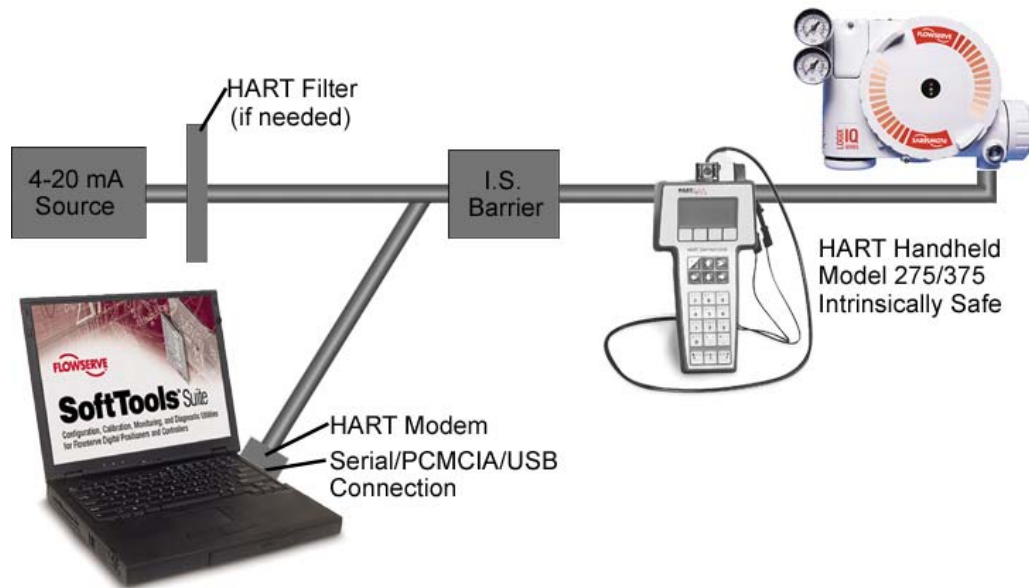
Instrument to Computer Connection

Make the physical connection between the PC and the positioner. Locate an available serial, PCMCIA or USB communications port on the computer and plug a HART modem into it. Attach the other end of the HART modem cable to the appropriate device or interface.

Many new computers (especially laptops) no longer have serial or PCMCIA connections, but do have USB ports. If the user already has a serial HART modem, a USB to RS 232 adapter is an inexpensive alternative to purchasing a new USB HART modem. Not all USB to RS 232 adapters communicate properly with the RS 232 HART modems. Flowserve-supported USB converters at this time include: Startech – Model #: ICUSB232, Belkin – Model #: F5U103, and Mactek – Model #: 010031.

USB adapters/modems typically come with driver software (usually on a CD). The user will be prompted to install the USB driver(s) when the USB adapter/modem is used for the first time. USB driver software is typically USB port specific. This means that if a laptop has two USB ports, and the user connects the adapter to USB Port 1 during driver installation, the adapter will only work on USB Port 1 after the driver(s) are installed. If the adapter/modem is later connected to USB Port 2, the adapter/modem may not work. To solve this problem, the USB adapter/modem should be connected to the same USB port every time *SoftTools* is used.

RECOMMENDATION: Users with multiple USB ports on their computers will want to **use the same USB port every time** they use *SoftTools*, and make sure that the proper USB adapter/modem drivers are installed for this USB port.



Chapter 3: Startup

Boot the system in preparation for starting the application:

Using SoftTools 7.0

1. From the Windows Toolbar, click on **Start**. Select **Programs/Flowserve/SoftTools/TechCheck**. The *TechBridge* splash screen, followed by the *TechCheck* splash screen displays. The application will initialize and install the *TechBridge*, *BridgeEx*, and *Alert Tool* icons into the *Windows System Tray*.
2. The Log In dialog will appear. Type "trial" without the quotes into the Password field. Click **OK** to finish logging into the system.

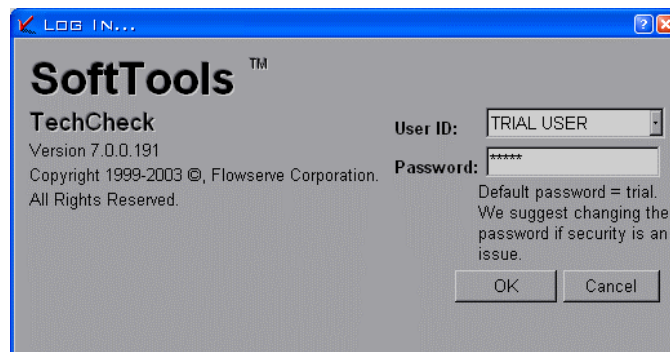


Figure 1 TechCheck Login

Using SoftTools TechCheck

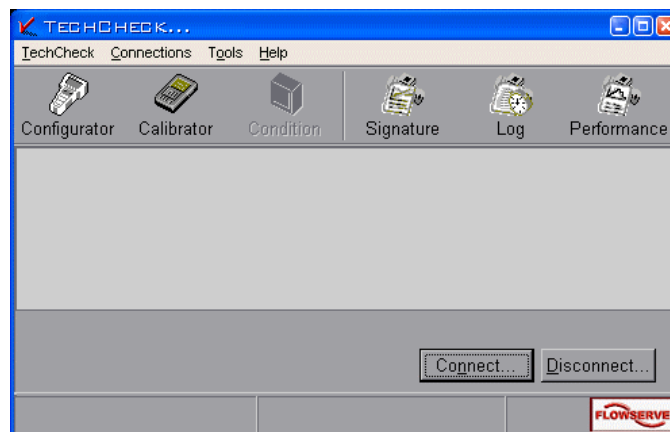


Figure 2 TechCheck Main menu

Before attempting the following procedure, see *Disabling FIFO Buffers* (Page 18). Please follow these instructions to make your initial connection to a field device on a HART modem.

1. Select **Connections** from the *TechCheck* Main menu.
2. Select **Set Up Field Network**.
3. Select the **HART** icon.
4. Right-click the **HART** icon.
5. Select **Add**.
6. Select and click **Server Port**.
7. On the *ADD SERVER PORT* window, use the **Com Port** pull down box to select the RS-232 port this connection will use. In the case where you are using a USB converter, select the communication port created by the installation of the USB hardware.

NOTE: Some USB converters will require you to check the RTS delay check box.

8. Click **OK**.
9. A **PORT** will be added to the Field Network tree.
10. Select the newly added **PORT** icon.
11. Right-click the **PORT** icon.
12. Select **Scan**.
13. Select and click **Field Devices**.
14. On the *Search for a Field Device to Add* window, click **Start**. The program scans from the **Start at Field Address** to the **Stop at Field Address**.
15. Responding devices appear in the grid on the bottom of the window. Usually, only one device will be attached to a modem.
16. Once the device is found, click **Stop** to quit scanning in order to avoid a lengthy search routine.
17. Click the **Close** just under the Estimated Time Remaining indicator.
18. Click the **Add** button to add the device to the Field Network Tree.
19. Select the newly added device.
20. Click **Install** to add the device to the *TechCheck* device selection list.
21. Click **Close** to return to *TechCheck*.

You are now ready to use the *TechCheck* application tools.

Return to the *TechCheck* main menu and click on **Tools**. For the initial use of *SoftTools TechCheck*, select **Use Configurator** and continue with the following instruction titled *Configurator Tool*. With a previously configured and calibrated device, select from among any of the *SoftTools Suite* application tools.

Using the Configurator Tool

After selecting and establishing communications with a device, configure the positioner. If the positioner was shipped factory-mounted to a valve, it is pre-configured and calibrated to work as is.

If working with a new positioner or retrofitting a positioner onto a different valve, parameters must be set to ensure that it will control the valve properly.

1. From the *TechCheck* main menu window, click on **Tools**.
2. Select **Use Configurator**. Or,

- Click on the **Configurator** toolbar button for direct access to the *Configurator* window.

The *Configurator* window contains three tabs: *Actuator*, *Positioner*, and *Valve*. Click on each tab to select and configure the settings for each component.

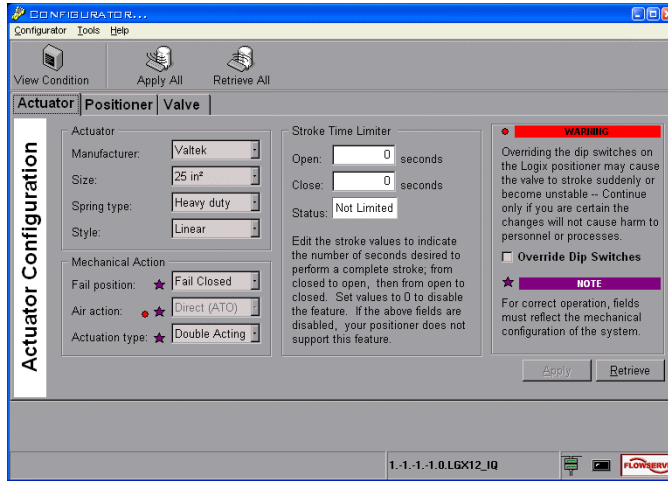


Figure 3 TechCheck Configurator window (Actuator Configuration Tab shown)

Click on the **Actuator** tab to display the *Actuator Configuration* screen. Check to make certain the actuator information and actions are set correctly.

- From within the *Actuator* screen, click on each combo box to ensure that the selections correspond to the installed actuator information.
- From within the *Mechanical Action* screen, click on each combo box to ensure that the selections correspond to the mechanical configuration of the device.

WARNING! Incorrect settings and/or overriding the DIP switches on the Logix positioner may cause the valve to stroke suddenly or become unstable.

Click on the **Positioner** tab to display the *Positioner configuration* screen. Click on each representative button to view and/or edit the configurable settings displayed within their respective windows.

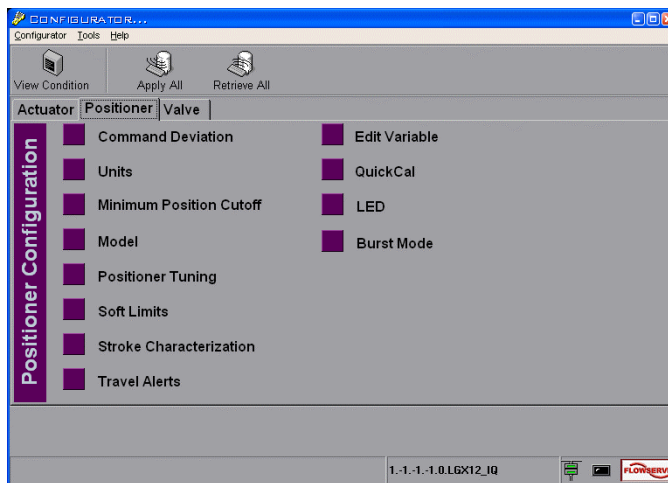


Figure 4 TechCheck Configurator window (Positioner configuration tab shown)

For the initial configuration of the device, Flowserve suggests the following configurable features of the positioner configuration screen receive attention:

1. Click on **Minimum Position Cutoff** to display its respective window. This feature prevents the valve from throttling near the seat. If the *Control* command becomes less than the *Minimum Position Cutoff* value, the positioner closes the valve. To use this feature, enter a desired cutoff value in percent of stroke. Click on the **Apply** button.
2. Click on **Model** to display its respective window. The Logix 1200e and 3200IQ series positioner is available in two models: The standard model with HART® communications and no pressure sensors. The advanced model with Port 1 and Port 2 actuator pressure sensors and HART® communications. Selecting the incorrect model prevents *SoftTools* from using all of its features.
3. Click on **Soft Limits** to display its respective window. When soft limits are applied, the positioner restricts *Control Command* to the given limits. If soft limits are to be used, enter the *High Limit* and *Low Limit* set-points to the desired level and click on the **Apply** button.
4. Click on **Stroke Characterization** to display its respective window. *Custom Characterization* enables the positioner to change its output signal as a function of the input signal. This allows the stroke movement of the closure member to be customized.

Click on the **Valve** tab to display the *Valve Configuration* screen. Click on each representative button to view and/or edit the configurable settings displayed within their respective windows.

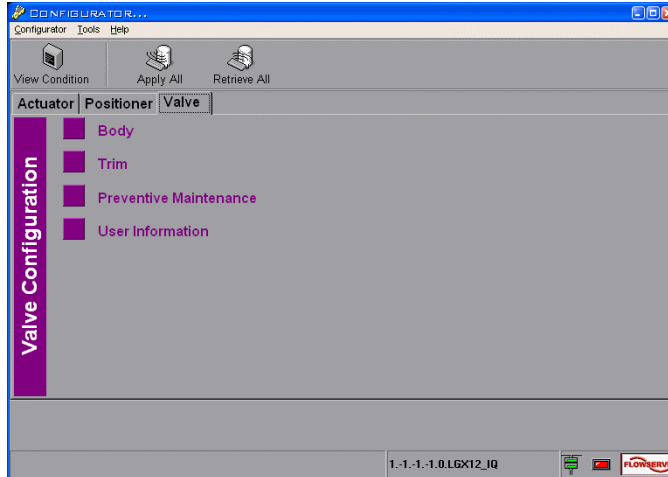


Figure 5 TechCheck Configurator window (Valve configuration tab shown)

1. Use the **Body** and **Trim** selections to display their respective windows and ensure the selections correspond to the installed valve body and trim information.
2. **Preventive Maintenance** and **User Information** selections allow user-defined configuration of closure member travel and cycling limits and units of measure throughout the device.

Reset

If it becomes desirable to reset the device to the factory default settings, proceed as follows:

From the *TechCheck Configurator* menu, click on **Configurator** and select **Reset Configuration**.

From the *Reset* window, you may set all non-volatile memory to factory defaults. Any custom configurations or settings are lost and the positioner will operate as a standard model (read the warning within the window). To reset the device, click on the **Reset** checkbox and click **Apply**.

Using the Calibrator Tool

The *Calibrator Tool* consists of several separate calibration windows and allows calibration of the actuator pressure sensors, the 4-20 mA current loop, and the closure member stroke position sensor. Select and perform each of the calibrations to ensure correct operation of the device. An additional function provides a means to check the device calibration.

1. From the main *TechCheck* window menu, click on **Tools**.
2. Select **Use Calibrator**. Or,
3. Click on the **Calibrator** toolbar button for direct access to the main *Calibrator* window.

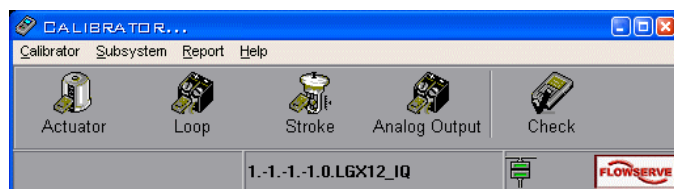


Figure 6 TechCheck Calibrator main menu window

To select a specific calibration type:

1. From the main *TechCheck Calibrator* window menu, click on **Subsystem**.
2. Select the type of calibration desired. Or,
3. Click on a toolbar button for direct access to the desired calibration type.

Click on **Calibrate Actuator Pressure Sensor** to display the *Calibrate Actuator Pressure Sensor* window. This calibration procedure is available only on 121X and 321X (advanced) models of the Logix positioners, and effects the calibration of the actuator pressure sensors.

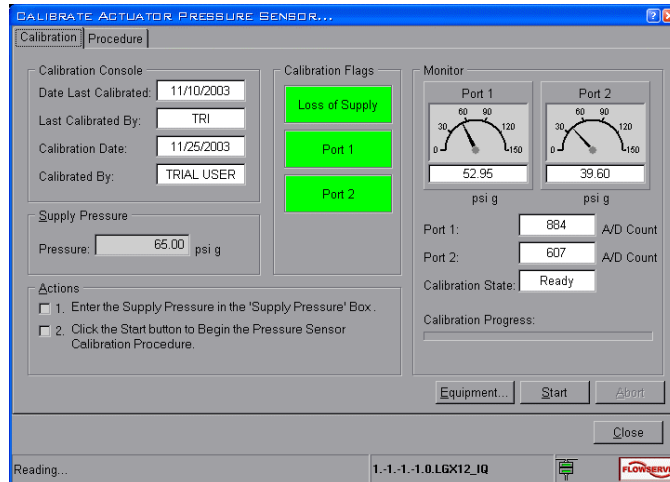


Figure 7 TechCheck Calibrator (Calibrate Actuator Pressure Sensor window)

To perform an actuator pressure sensor calibration:

1. Type in the supply pressure if the displayed pressure differs from the actual pressure.
2. Click on the **Start** button. The attached device automatically performs the calibration using the embedded internal calibration data.

NOTE: You must complete the entire procedure. The positioner is "offline" during calibration and does not return to service until the procedure is complete.

Click on **Calibrate Current Loop** to display the *Calibrate Current Loop* window. Perform this procedure to correctly calibrate the 4-20 mA input signal. This is a linear two-point range calibration on the input signal sensed by the Logix positioner. It requires that you set both the minimum and maximum current levels the positioner will sense as a command signal.

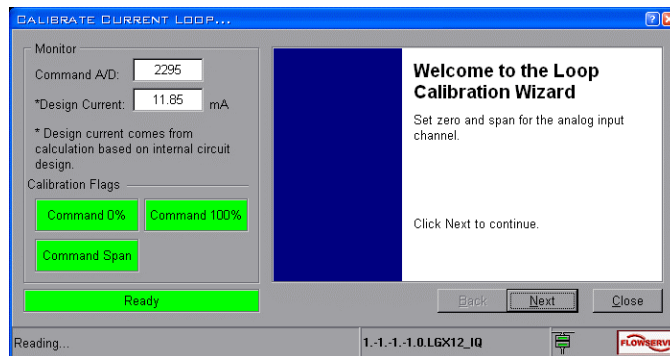


Figure 8 TechCheck Calibrator (Calibrate Current Loop window)

To perform a current loop calibration, follow the directions in the calibration wizard:

1. Set the variable current source to the desired absolute 0% command signal (usually 4 mA). Click the 0% level **Accept** button.
2. Set the variable current source to the desired minimum (usually 4 mA). If split-ranged application, minimum may be different (e.g. 12 mA).
3. Set the variable current source to the desired 100% command signal (usually 20 mA). Click the 100% level **Accept** button.

NOTE: You must complete the entire procedure. The positioner is "offline" during calibration and does not return to service until the procedure is complete.

Click on **Calibrate Stroke** to display the *Calibrate Stroke window*. The stroke calibration procedure moves the valve to a closed position and then to an open position. The positioner measures closure member position at the two points to ascertain each exact position, thereby correctly calibrating the stroke position sensor.

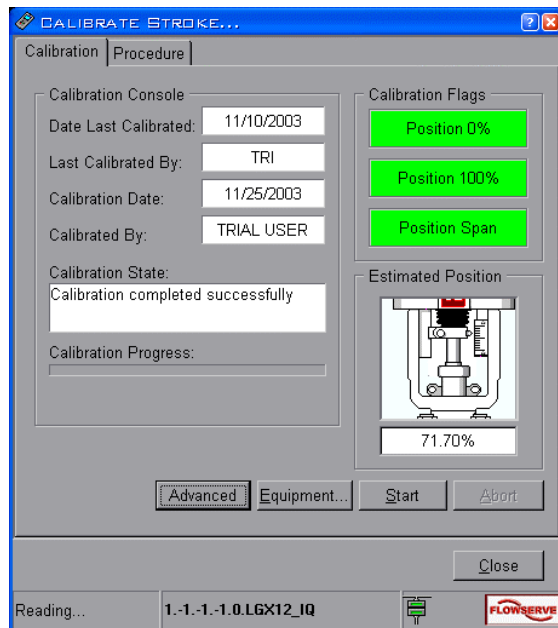


Figure 9 Stroke calibration window

To perform a stroke calibration on a "double-acting" actuator:

WARNING! This procedure causes stroke movement to occur. Follow your company guidelines to assure the safety of personnel and processes before proceeding.

1. Click on the **Start** button. The stroke calibration procedure is performed automatically.

Note: You must complete the entire procedure. The positioner is "offline" during calibration and does not return to service until the procedure is complete.

Click on **Check Calibration** to display the *Check Calibration window*. The check calibration procedure verifies the completed calibration performed to the attached device.

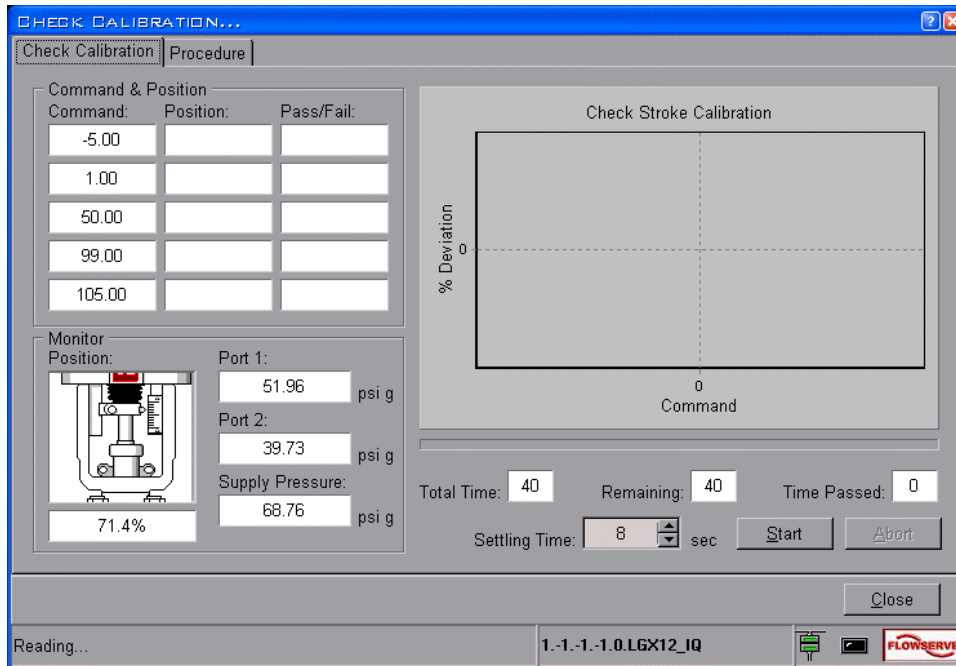


Figure 10 TechCheck Calibrator (Check Calibration window)

Before performing this procedure, it is important to have performed the *Actuator Pressure Sensor*, *Current Loop*, and *Stroke* calibrations. This procedure will stroke the closure member to five separate positions, wait for the selected *Settling Time*, and then compare *Command* to *Position* to affect a *Pass/Fail* calibration rating.

To perform a Check Calibration on a "double-acting" actuator:

WARNING! This procedure causes stroke movement to occur. Follow your company guidelines to assure the safety of personnel and processes before proceeding.

1. Using the spin button, select the desired *Settling Time* for each position.
2. Click on the **Start** button to initiate the procedure.

Calibration reports may be generated using additional functionality built into the *Calibrator Tool*.

1. From the main *TechCheck Calibrator* window menu, click on **Report**.
2. Click on **Create Report** to display the *Create Report* window.
3. Using the available combo boxes within the window, select the desired criteria with which to generate a calibration report.

Using the Condition Tool

While the positioner controls the device, you may monitor the ongoing status of its relationship with the closure member.

1. From the main *TechCheck* window menu, click on **Tools**.
2. Select **View Condition**. Or,
3. Click on the **Condition** toolbar button for direct access to the *Condition* window.
4. The *Condition* window contains dual functions: Within the *Monitor Status* tab, monitor the closure member position and positioner action in real time, while the valve is functioning in a process loop. Within the *View Variables* tab, alternately select among and view individual variables.

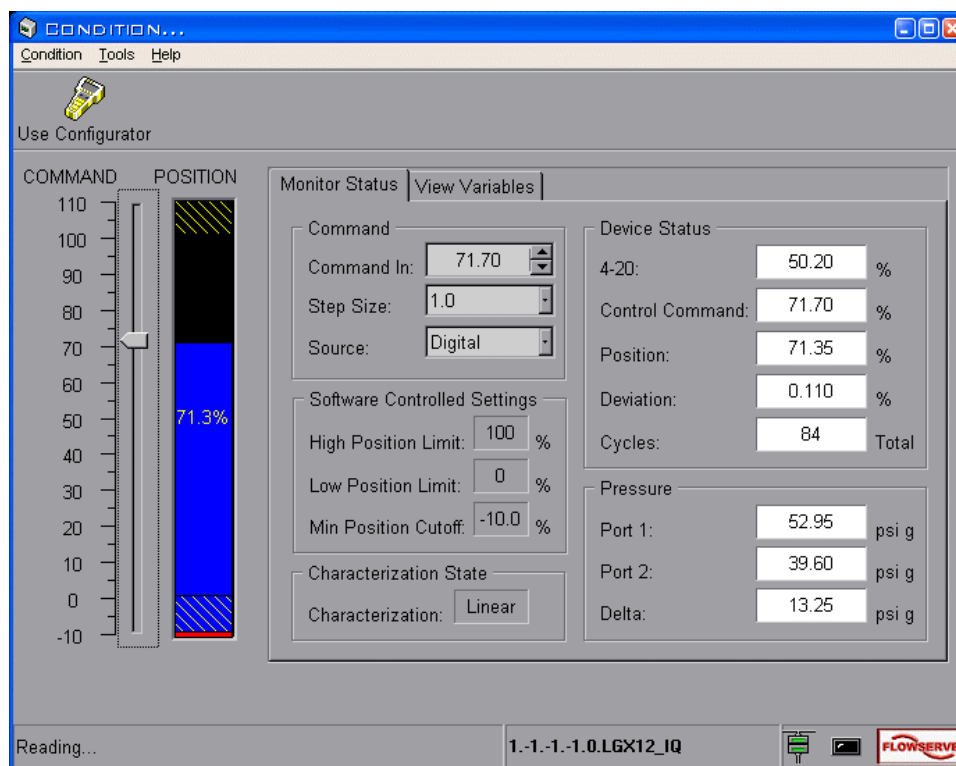


Figure 11 Condition window (Monitor Status tab selected)

Within the *Device Status* panel, the 4-20 mA dynamic display indicates the analog command to the positioner (in percentage). Changing the current loop level will cause the value indicated in the 4-20 mA display to change. The 4 mA should read approximately 0% and 20 mA should read approximately 100%. Perform a loop calibration to eliminate any error (refer to the *Calibrator* tool).

The *Position* indicator bar on the left side of the panel represents the position of the closure member in percent of full stroke. The indicator tracks the closure member position as the valve is stroked. If a large deviation exists between *Command In* and *Control* command (the actual command the positioner is using to position the valve), check to see if *Custom characterization* is active. If not, two options are available to correct it.

- Wait a few minutes. The positioner has an integrator built into its control algorithm that will slowly take out any deviation between the *Command In* and *Control* commands.
- Tune the positioner. Refer to “Positioner Tuning” in the *Configurator* tool for detailed information and instruction.

Selecting a Command Source

The positioner operates using either an analog or a digital command source. *Analog* command source indicates that the *Control* command originates from a 4-20 mA current source. *Digital* command source indicates that the *Control* command originates from a computer or other source that is capable of sending the command via the HART[®] communication connection. Select the command source as follows:

1. Click the combo box labeled **Source**.
2. Select **Digital** or **Analog** as desired. The program indicates the success of the source change.

Entering a Digital Command

For fine adjustments to the digital positioner, use the **Command In** spin button edit control.

1. Use the spin buttons within the control labeled **Command In** to increment/decrement the current value.
2. Highlight the value in the control box. Type in a new digital command percentage and press **ENTER** to transfer the new value to the positioner.

Selecting a Step Size

Set the step size as follows:

1. Click the combo box labeled **Step Size**.
2. Select the step size desired for the particular application. Sizes range from 10 through 1 to 0.1, as a percent of stroke. Press **ENTER** to transfer the new value to the positioner.

The program uses the newly selected step size for all subsequent adjustments made to the digital command percentage.

Viewing Individual Variables

To view individual variables, select the *View Variables* tab.

1. Choose a variable to view by alternately clicking on each button edit control beneath the *Variable #* label.

2. Select from a grid containing a list of variables available for viewing. Each choice made displays the variable number with its corresponding description and current value.

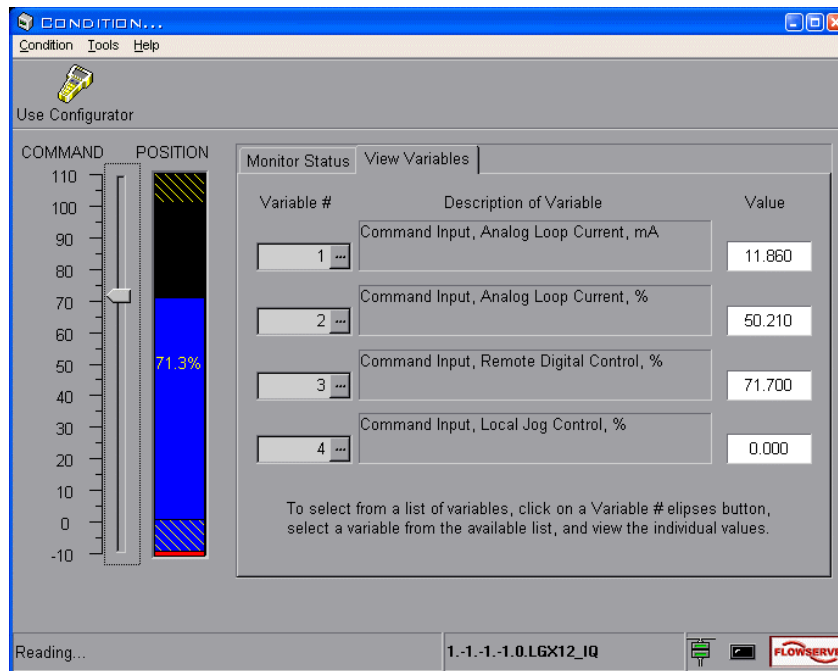


Figure 12 Condition window (View Variables tab selected)

Using the Alert Display

All windows involved in communication with the instrument contain the *Alert Display* LED visible within the status bar to the left of the Flowserve logo. If it becomes active, it blinks red. Place the cursor over it and right click the mouse. The *Alert Display* window shows and allows the user to view additional information and/or acknowledge any errors.

Security Administrator

If you wish to establish separate levels of access for users, proceed with the following:

1. Right-click on the *TechBridge* tray icon (this icon is usually located in the bottom right hand corner of the screen on the windows taskbar), and select **Open Security Administrator** from the pop-up menu. The *Security Check* window displays. Select **Admin** from the *Administrator ID:* combo box, and type your user password into the *Password:* edit box. The *Security Administrator* window displays.

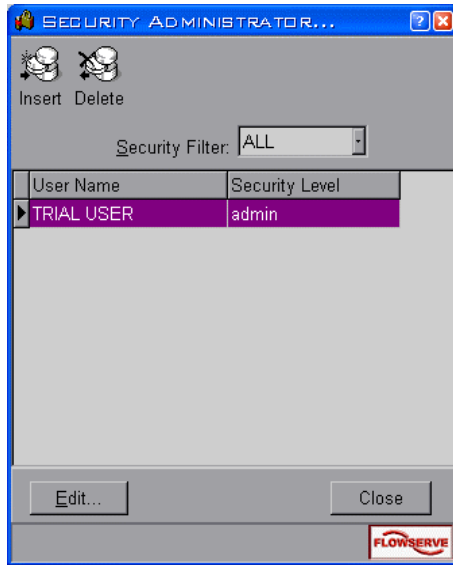


Figure 13 Security Administrator window

5. To insert a new user, click on the **Insert** tool button. The *Insert User* window displays.



Figure 14 Security Administrator Insert User window

6. Type a name into the *User Name* edit box. Using the *Security Level* combo box, select a user level designating access permissions. Type a password for the new user into the *Password* edit box and re-type the same password into the *Verify Password* edit box. Click on **OK**.
7. To edit a user, click on the **Edit** button. The *Edit User* window displays.



Figure 15 Security Administrator Edit User window

8. Type a name into the *User Name* edit box. Using the *Security Level* combo box, select a user level designating access permissions. Type a password for the edited user into the *Password* edit box and re-type the same password into the *Verify Password* edit box. Click on **OK**.
9. To delete a user, click on the **Delete** tool button. A confirmation window displays. Click on **Yes** to delete the user.

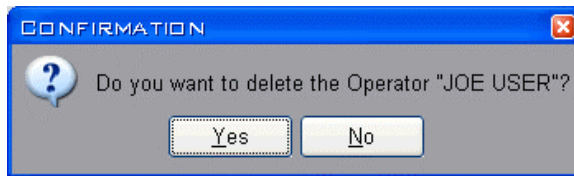


Figure 16 Security Administrator Confirm window

Using the Context-Sensitive Help System

To access the *SoftTools* 7.0 help system:

From any *SoftTools* menu, click on the **Help** menu item.

Click on **Contents and Index** to view the *Contents and Index* window of the help system, or...

Select a control on which you wish to receive help and press **F1** (it must be a control that can receive focus). A pop-up window containing help displays.

From the keyboard, access the *Contents and Index* window of the help system by pressing **F1**.

Disabling FIFO Buffers

With the advent of advanced serial port hardware, Microsoft® Windows gives the user the ability to configure how data is transferred out a serial port. A communication port works in units of characters. A single character is represented by a variable number of bits. The new hardware is capable of caching several characters before actually transmitting them out the port. The concept works well for devices that can handle more than one character at a time. Here-in lies the problem. Due to timing constraints in the HART protocol, the Logix positioner can only receive one character at

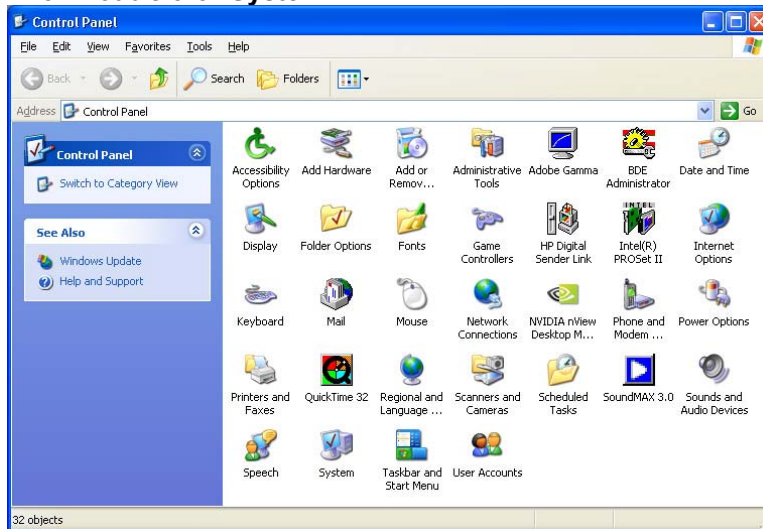
a time. In order for the positioner to receive data correctly, the user must turn off the FIFO buffers. The following procedure assists the user in turning off FIFO buffers.

Microsoft Windows NT

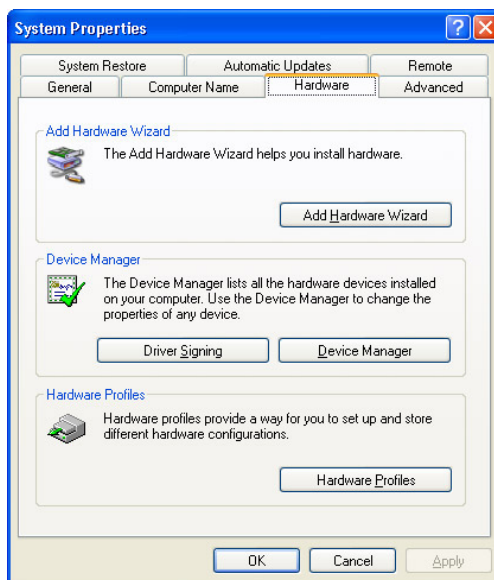
1. Click **Start**.
2. Click **Settings**.
3. Double click **Ports**.
4. Click **Advanced** on the **Ports** dialog.
5. Uncheck the **FIFO** check box.
6. Click **OK**.
7. Close the **Port** dialog.
8. Close the *Control Panel*.
9. Reboot the computer.

Microsoft Windows 98, 2000, and XP

1. Click **Start**.
2. Click **Control Panel** or **Settings**.
3. Double click **System**.

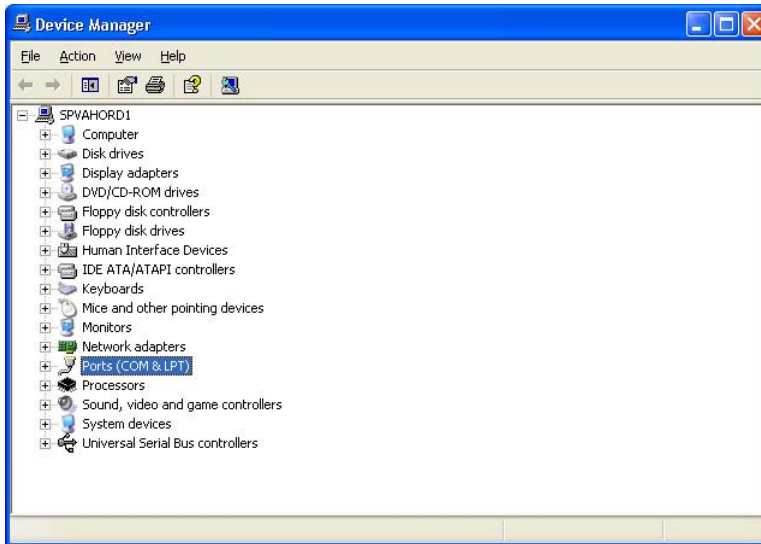


4. Click the **Hardware** tab.



5. Click the **Device Manager** button.

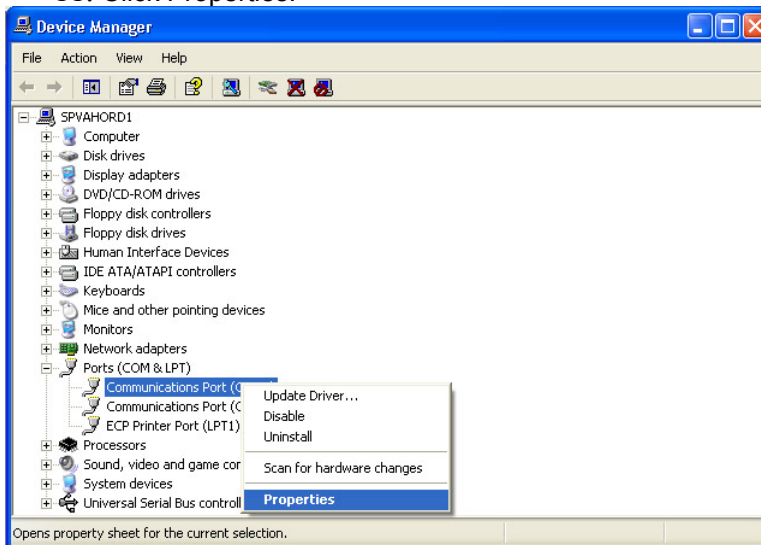
6. From the device selection list, expand the **Ports** item.



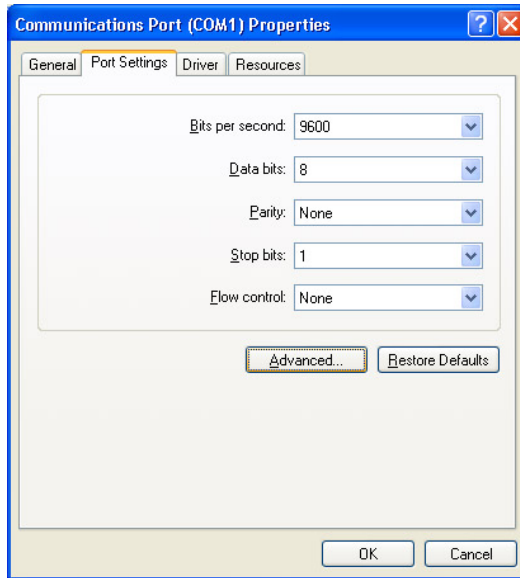
10. Right click the communication port you desire to use with *SoftTools*.

NOTE: USB adapter cables and modems will have their own COM ports assigned when the driver(s) are installed. This installation typically occurs the first time the adapter or modem is connected, and the drivers are installed using the manufacturer's installation software (typically on a CD). This is **not** usually COM Ports 1 or 2. Care must be taken to ensure that the correct COM port is selected, or the FIFO buffers will be disabled for the incorrect COM Port.

11. Click Properties.

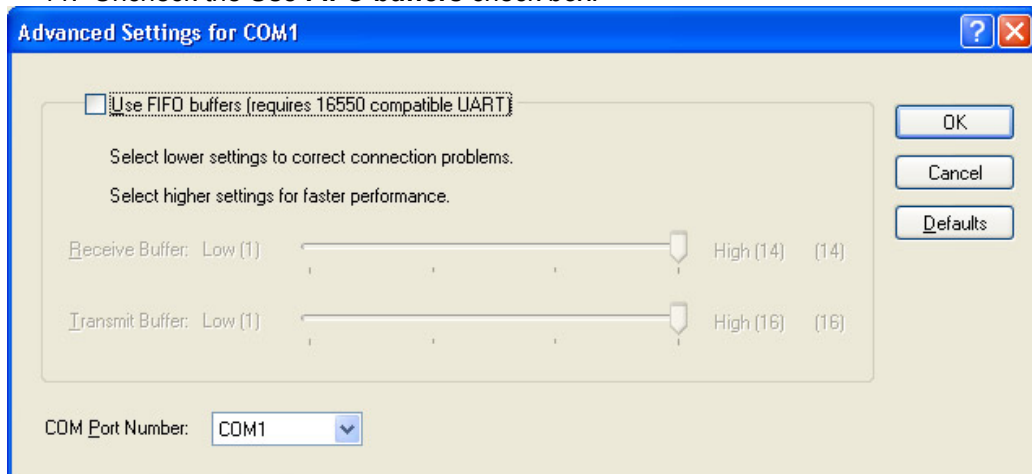


9. Click the **Port Settings** tab.



10. Click the **Advanced** button.

11. Uncheck the **Use FIFO buffers** check box.



12. Click **OK**.

13. Click **OK** on the *Properties* dialog.

14. Close the *Device Manager*.

15. Click **OK** on the *System Properties* window.

16. Restart the computer.

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