



ValveSight™ Diagnostics DTM Manual

Logix® MD+ Positioners with HART®

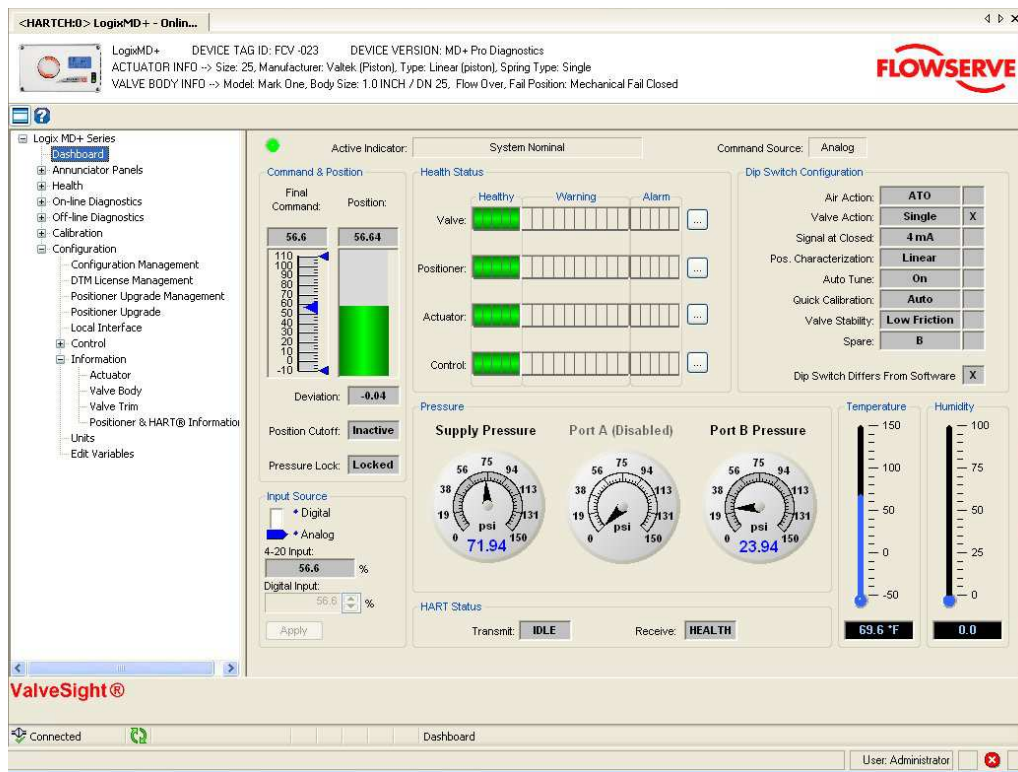




Table of Contents

LOGIX MD+ 3

QUICK START GUIDE 4

 SYSTEM REQUIREMENT 6

 DTM INSTALLATION 8

 CREATE A FIELD NETWORK 10

 DTM LICENSING 16

BASIC DASHBOARD..... 17

ADVANCED DASHBOARD..... 20

ANNUNCIATOR PANELS 25

 ALARMS ANNUNCIATOR..... 26

 MANAGEMENT ANNUNCIATOR 43

 EVENT HISTORY 55

HEALTH 58

 VALVE HEALTH 59

Friction..... 64

Bellows Cycles & Travel 72

 POSITIONER HEALTH..... 76

Teperature & Humidity..... 82

Pilot Relay 84

Piezo Voltage 88

 ACTUATOR HEALTH 90

Actuator Pnuematic Leak..... 94

Supply Pressure 97

Actuation Ratio 100

Actuator Cycles & Travel..... 102

 CONTROL HEALTH 106

Deviation..... 110

Position Alerts..... 113

Command Frequency 116

Command Amplitude 119

Position Frequency..... 122

Position Amplitude..... 125

 TRAINING 128

ON-LINE DIAGNOSTICS..... 130

 DATA MONITOR 131

 TRENDS 137

 CONTINUOUS STROKE TEST..... 142

OFF-LINE DIAGNOSTICS 144

 RAMP TEST 145

Ramp Compare..... 155



- STEP TEST 160
 - Step Test Compare* 167
- HDRL TEST 171
 - HDRL Compare* 179
- PARTIAL STROKE TEST 183
 - Partial Stroke Compare* 189
 - Partial Stroke Schedule* 193
- CALIBRATION 195**
 - SENSOR CALIBRATION 196
 - COMMAND CALIBRATION 202
 - CALIBRATION ERRORS 206
- CONFIGURATION 213**
 - CONFIGURATION MANAGEMENT 214
 - DTM LICENSE MANAGEMENT 223
 - POSITIONER UPGRADE MANAGEMENT 225
 - POSITIONER UPGRADE 229
 - LOCAL INTERFACE 231
 - CONTROL 237
 - Position Shutoff* 238
 - Soft Limits* 240
 - Positioner Gain* 242
 - Pressure Control* 245
 - Stroke Characterization* 247
 - Stroke Characterization (Custom) 254
 - INFORMATION 259
 - Actuator* 260
 - Valve Body* 262
 - Valve Trim* 264
 - Positioner & HART® Information* 266
 - CARD SLOT 268
 - Multi-Function Card* 269
 - Analog Output Calibration 271
 - Discrete Output (DO) 275
 - UNITS 277



Welcome to the Logix MD+



Welcome to the Flowserve ValveSight® DTM for the Logix MD+ series digital positioners. This package offers unparalleled functionality for configuring, calibrating, maintaining and diagnosing control valve operation.

This package follows the standard FDT/DTM conventions. The Frame application controls the menu bar at the top of the page and the Frame connection tree at the far left of the frame window.

The DTM application contains a menu tree on the left side showing the available pages for configuring, calibrating, maintaining and diagnosing control valve operation.

At the top of the DTM window, the device tag is shown, and some basic information for the actuator and valve that is currently connected to the system.

The bar right below the device information contains two icons, one to toggle the menu bar on and off and the other to show this help.

At the bottom of the page below the Flowserve logo is an icon indicating the status of the connection to the field device. If the icon has a green check and the tow plugs touching it indicates that communications are taking place and the device shown at the top of the page is online. Two green arrows to the right of the connection symbol are visible when the DTM is requesting information from the device.



Quick Start Guide

GENERAL INFORMATION

This Document

This document details the installation and functions of the ValveSight® Device Type Manager (ValveSight DTM) for the Logix® MD+ series of digital positioners including the Logix 520MD+.

Qualified Personnel

Qualified personnel are people who, on account of their training, experience and instruction and their knowledge of relevant standards, specifications, accident prevention regulations and operating conditions, have been authorized by those responsible for the safety of the plant to perform the necessary work and who can recognize and avoid possible dangers.

Additionally, product users and maintenance personnel should thoroughly review the Logix MD+ Series Digital Positioner Instruction, Operation, Maintenance and Safety Manual prior to installing, operating, or performing maintenance on the valve or positioner.

System Disclaimer

The installation instructions herein show an example of how to install, navigate, or commission the ValveSight Logix MD+ DTM in a WINDOWS 7 64 bit operating system, using the fdtCONTAINER FRAME Application. Any variation of operating system and/or FRAME application may result in a different procedure to install, operate, or commission the ValveSight Software.

Terms Concerning Safety

The safety terms DANGER, CAUTION and NOTE are used in these instructions to highlight particular dangers and/or to provide additional information on aspects that may not be readily apparent.

To avoid possible injury to personnel or damage to valve parts, DANGER and CAUTION notes must be strictly followed. Modifying this product, substituting non-factory parts or using maintenance procedures other than outlined could drastically affect performance and be hazardous to personnel and equipment, and may void existing warranties.

NOTE: *indicates and provides additional technical information, which may not be very obvious even to qualified personnel.*

CAUTION: *Indicates that minor personal injury and/or property damage can occur if proper precautions are not taken.*



DANGER: *Indicates that death, severe personal injury and/or substantial property damage can occur if proper precautions are not taken.*

Compliance with other, not particularly emphasized notes, with regard to transport, assembly, operation and maintenance and with regard to technical documentation (e.g., in the operating instruction, product documentation or on the product itself) is essential, in order to avoid faults, which in themselves might directly or indirectly cause severe personal injury or property damage.



System Requirement

Computer System

The ValveSight® DTM has been successfully tested with the following Operating System with a minimum of 512 M RAM:

- Windows XP
- Windows 7

Power Supply

- Non-filtered, 4-20 mA

Modem

- IFAC HART Modem
- Viator RS 232 Serial HART Modem
- UX Multiplexor

Communication DTM

- CodeWrite COMM DTM
- M&M – OEM HART COMM DTM (recommended)
- Yokogawa COMM DTM
- ABB COMM DTM

FRAMES

The ValveSight Logix MD+ DTM has been successfully tested in the following FRAME Applications:

- fdtCONTAINER FRAME Application
- PactWare (Point to Point) FRAME Application

DD Testing

The DD has been successfully tested on the following system components:

- HART Tokenizer Version 6
- SDC-625
- 475 HandHeld

Certifications

- Logix MD+ DTM Certification with FDT Group will be performed after field trial tests.
- DD Certification with the HART foundation will be performed after field trial tests.

System Assumptions

This Quick Start Guide document will assume that you already have the FRAME Application and Communication DTM installed.

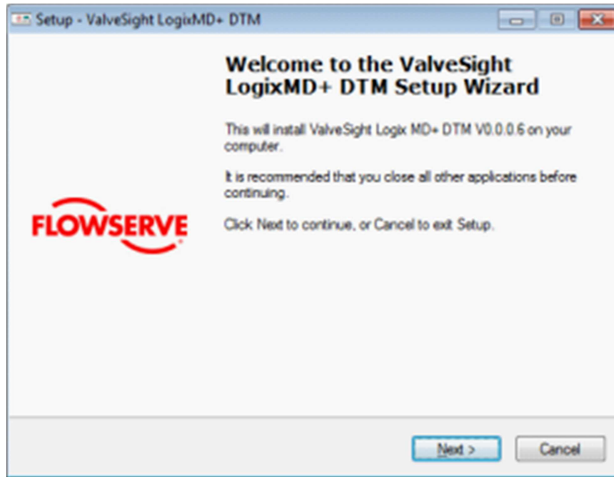


DTM Installation

Please log in to the Flowserve FTP Site (ftp://fcdftp) or open the CD to download the Logix MD+ ValveSight DTM, FdtCONTAINER, or HART COMM DTM Installs. These installs will allow you to install the ValveSight Logix MD+ DTM, FRAME application, and COMM DTM respectively.

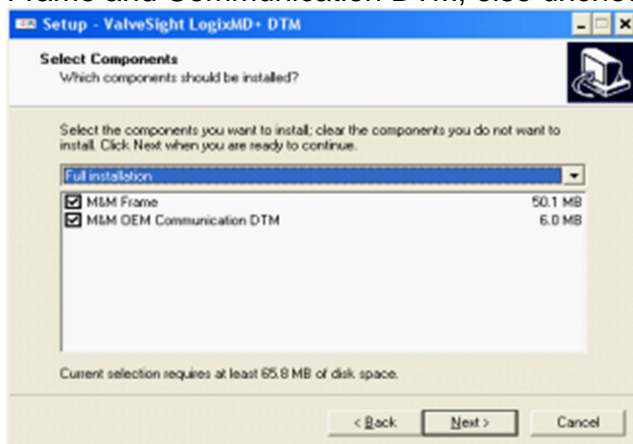
NOTE: This document will ONLY cover the installation of the Logix 520MD+ ValveSight DTM.

Follow the installation instructions



Frame and COMM DTM Install

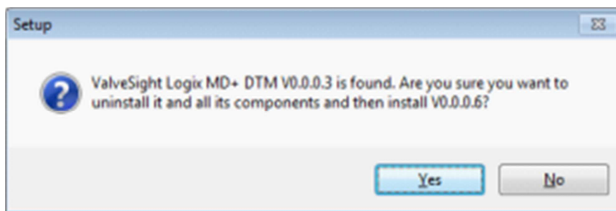
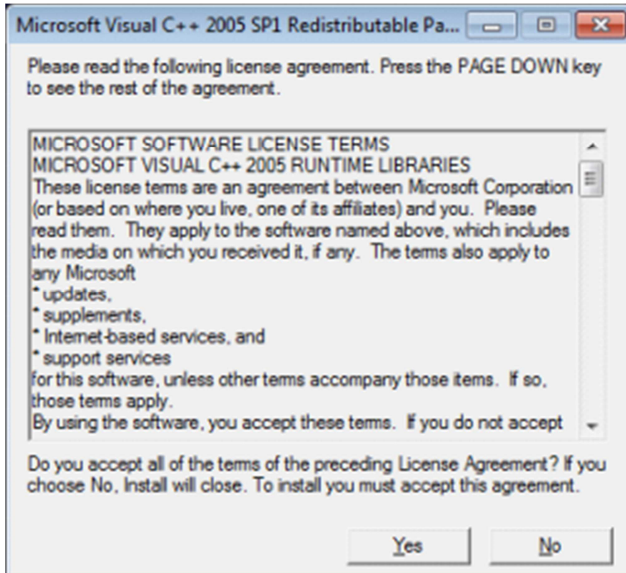
If you do not have the FRAME Application or the HART Communication DTM installed, check the two boxes below and follow the installation instruction for both Frame and Communication DTM, else uncheck the already installed component.



Runtime Libraries

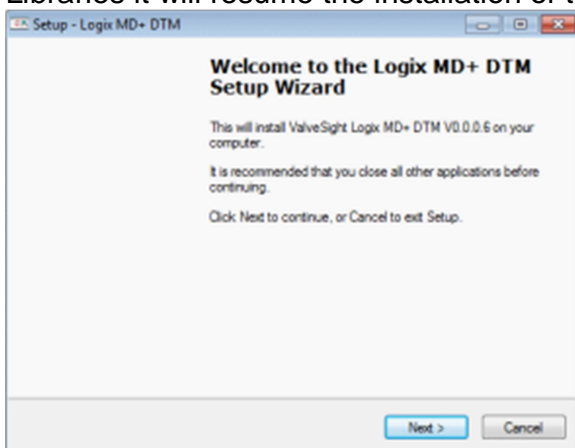
The ValveSight installation will check to see if the computer already has the necessary Microsoft Libraries, else it will prompt you to install the Libraries. Select

“Yes” on the following pages.



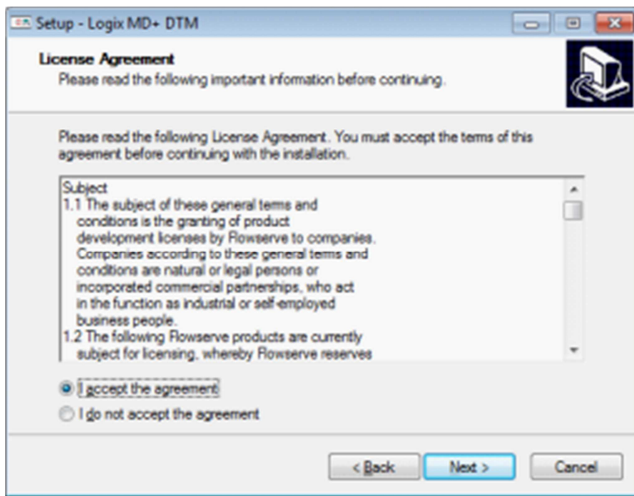
Resuming ValveSight Install

Once the install complete the installation and the Dongle and the Microsoft Runtime Libraries it will resume the installation of the DTM. Click Next



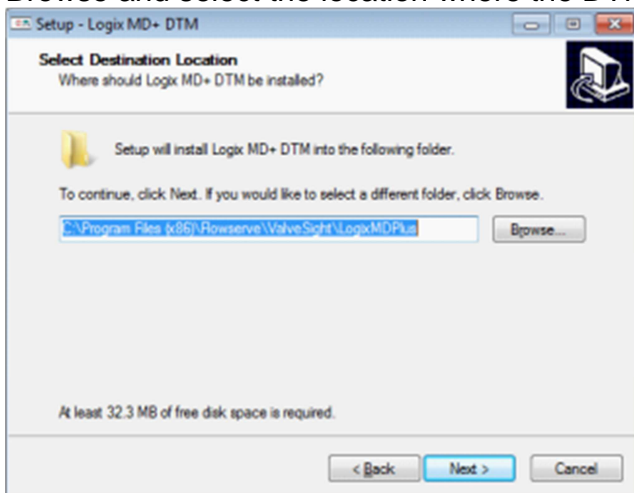
Accept the Agreement

Read and accept the agreement, then click next.



Select DTM destination

Browse and select the location where the DTM will install:

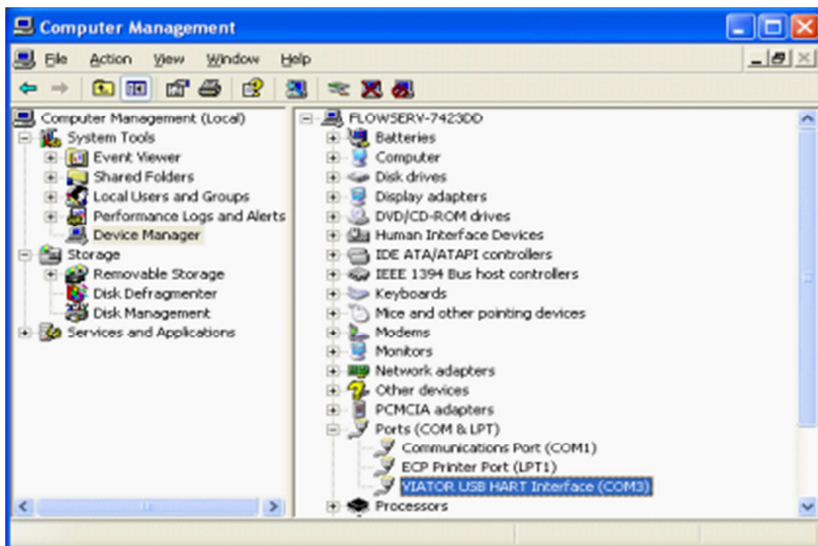


Follow and complete the installation as prompted.

Create a Field Network

HART Modem

- If the modem is a serial port, move on to the next step
- The USB Modem requires that you install the driver for it. Make sure you remember what slot you put the USB Driver, in case you unplug and plug in a different slot you will need to install the driver for the different slot.
- Right Click on My Computer and select Manage.
- Click on Device Manager and select Ports
- Check what port the modem was installed

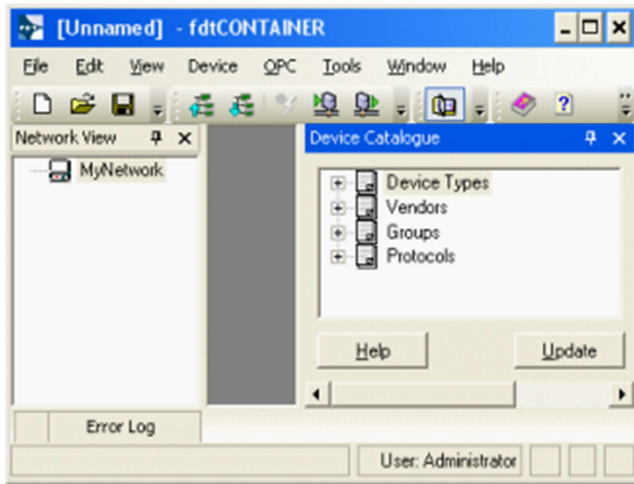


Create a Field Network

The remainder of the Quick Start Guide will give instructions on how to create a Field Network using the fdtCONTAINER FRAME Application.

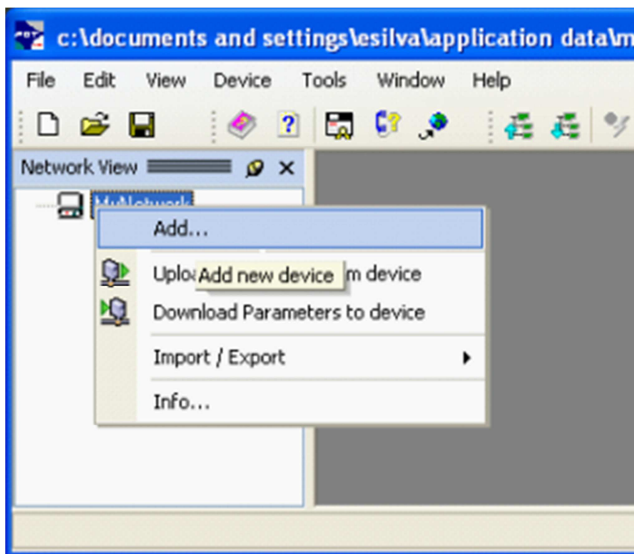
Device Catalog

Double click on the FDT Container, which is the M&M • Frame to open it. You will see a widow on the right of the page called "Device Catalog". At the bottom of the page, click on Update. This should allow the Frame to identify both the COMM DTM and the ValveSight DTM.

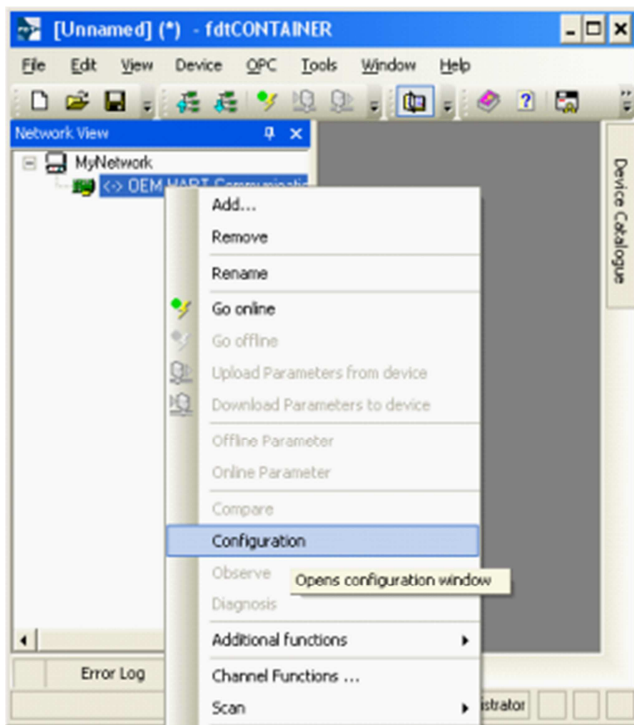


Add the COMM DTM

On the left side of the page you will see a window “Network View”. Right click on the My Network icon. Select “Add...”

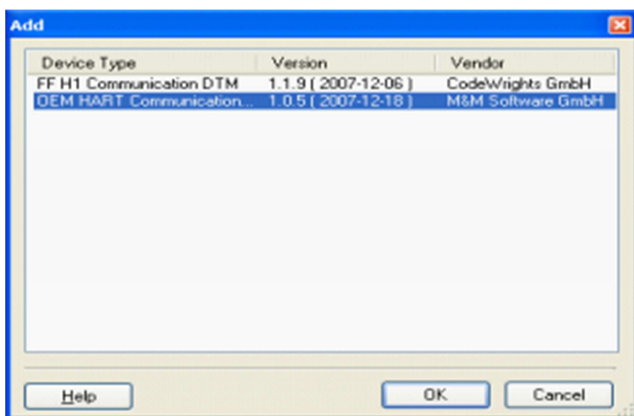


To configure the communication port, right click the OEM HART Communication DTM in the “Network Views” window. Select “Configuration”.



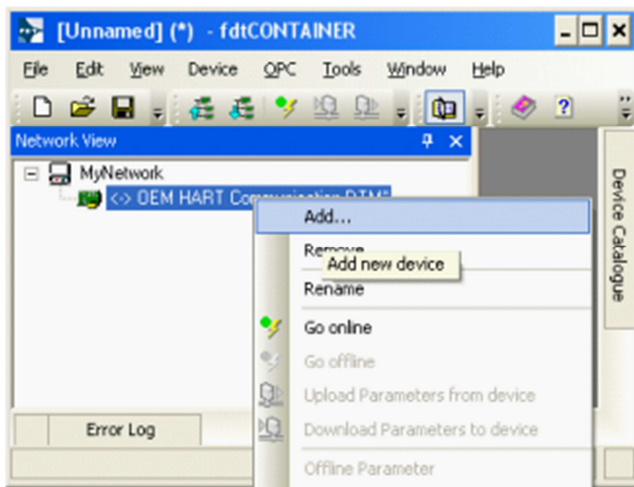
Set Port Address

- Select the correct port where the modem is installed.
- Check with the modem manufacturer to select the correct “Access Mode”.
- Under the “Communications Mode”, set the correct “Access Mode”
- Click the Apply or Ok button to apply modem configuration changes.

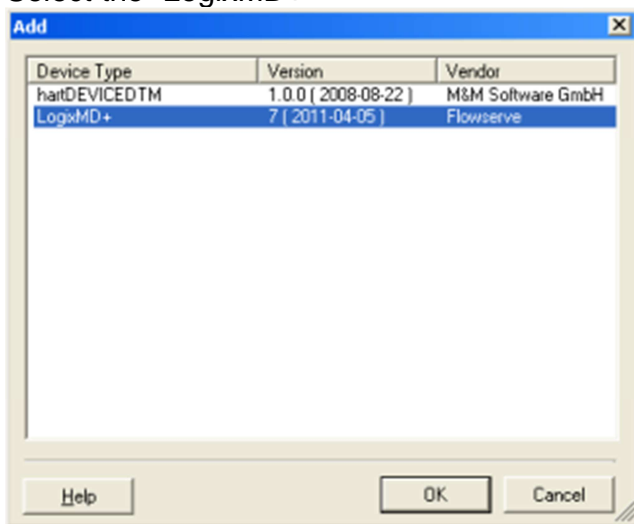


Add ValveSight Logix MD+ DTM

To add the ValveSight Logix MD+ DTM, right click on the OEM HART Communication DTM in the “Network Views” window and select “Add”.



Select the “LogixMD+”

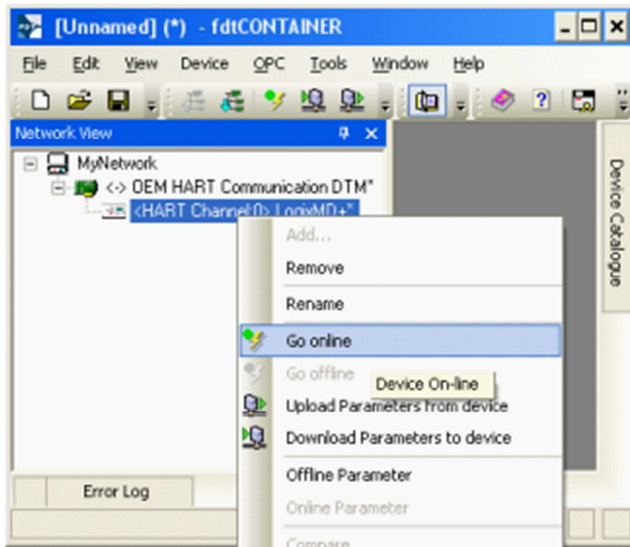


Optional: Save the project to your desktop or somewhere easy to remember. This will save you time so you do not have to create a field network in the future.

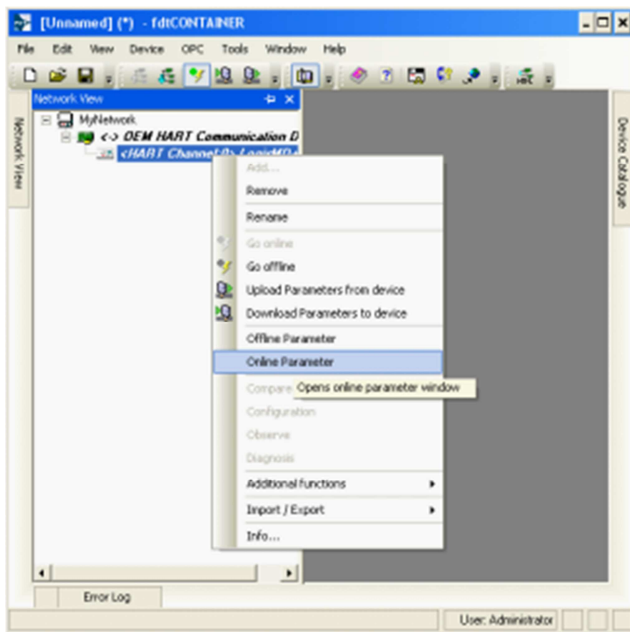
Starting the ValveSight MD+ DTM

To launch the ValveSight DTM, ensure the modem is connected to a device and the device is powered on.

Right click on the “**HART Channel 0> LogixMD+**” and select “Go Online”



Double click the “HART Channel 0> LogixMD+”, or right click and select Online Parameter



Troubleshooting

If communications is not established:

1. Verify the HART modem is functional. Some HART modems will report a positive self-check, but still be non-functional.
2. If another primary master is connected in the system, use a communication DTM other than the M&M fdtCONTAINER. This communication DTM does not support a primary master other than itself.



DANGER: *Using certain features of the DTM can result in valve movement and the inability to operate the valve until the operation is complete. Notify proper personnel that the valve may stroke, and make sure the valve is properly isolated before proceeding.*

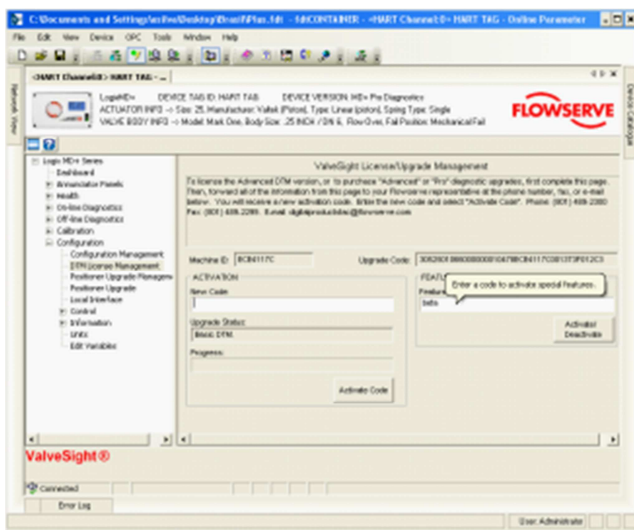
DTM Licensing

License ValveSight

To take advantage of the full diagnostic capabilities of ValveSight®, license the Advanced ValveSight DTM for the Logix MD+.

Steps to license the Advance DTM:

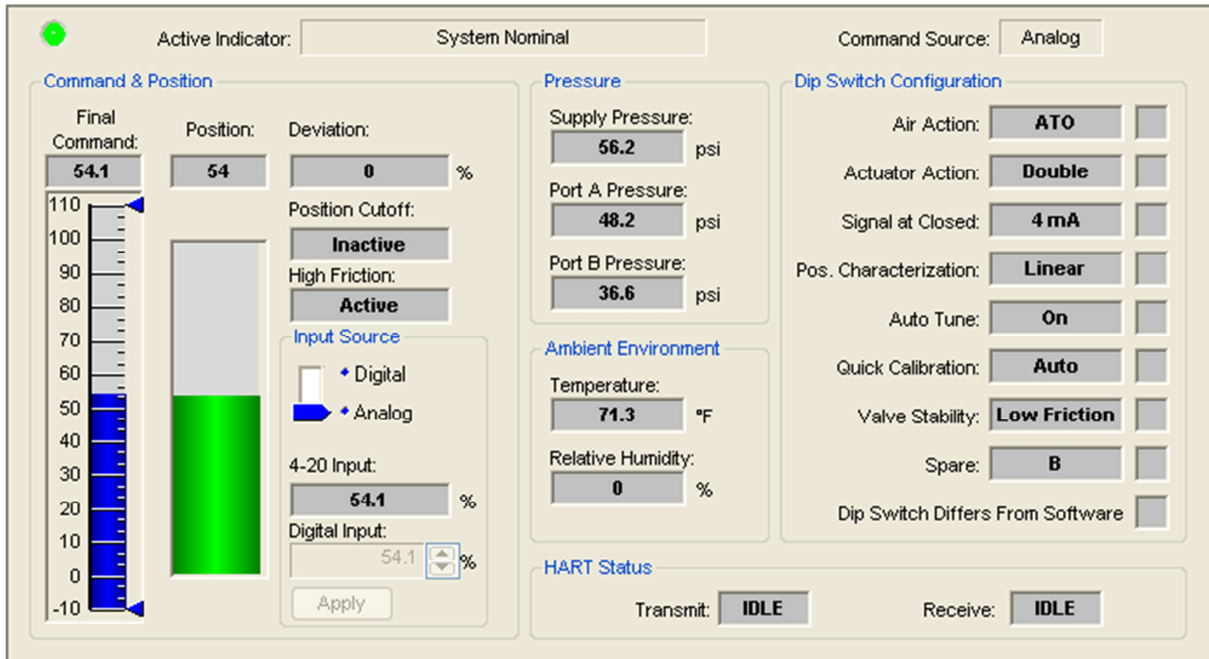
1. In the menu tree, select “Configuration” -> “DTM License Management”
2. Write “beta” in the “Feature code:” (make sure it is all lower case)
3. Click the “Activate / Deactivate”



NOTE: The ValveSight Advance License will only apply to the specific PC.

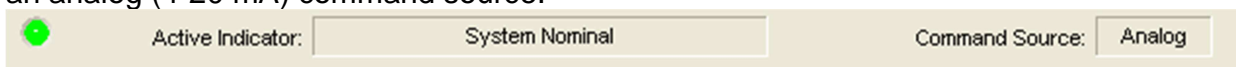
Basic Dashboard

The *Basic Dashboard* is a high level view of the status of the positioner. It is the main view of the ValveSight® DTM.



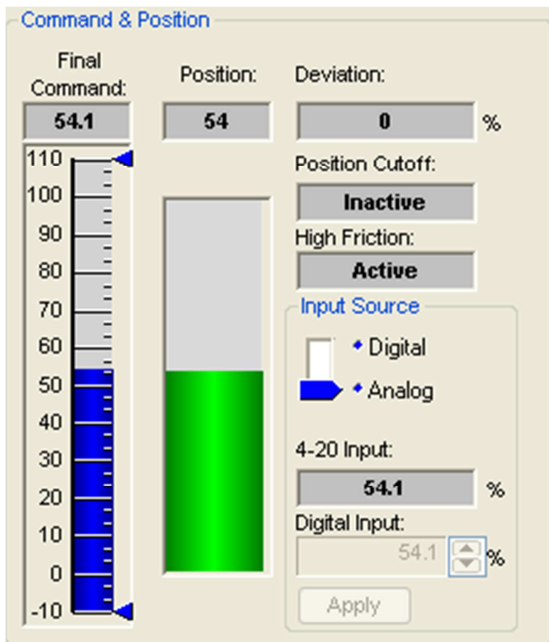
Status Area

The *Active Indicator* area shows the status of the most relevant active indicator. The color of the "LED light" corresponds to the Active Indicator and the first color of the blink code sequence on the positioner. Generally green indicates no immediate issues. Yellow indicates a developing issue. Red indicates the ability to control may be compromised. A detailed list of the indicators is given in the [Alarm Configuration - Alarm Annunicator](#) page. The *Command Source* field indicates whether the positioner is being controlled by digital or an analog (4-20 mA) command source.



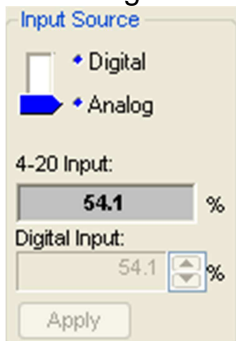
Command and Position

This area contains graphical representations of the valve command and position. The blue bar tracks the final command value (after adjustments for characterization curves). The green position bar indicates the current measured position of the valve. The smaller pointers show the settings of the travel alert settings (these can be changed on the Travel Alerts page located under Alarms/Alerts). Grayed out zones at the top or bottom of the graphs indicate the settings of soft travel limits.



Input Source

Select the analog or digital control mode. In analog mode, the positioner will position the valve according to the 4-20 mA supplied current. In digital mode, the positioner will position according to the value entered in the *Digital Input* field.



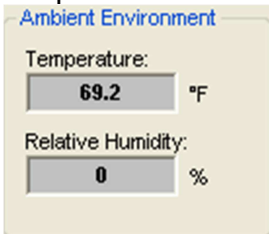
Pressure

Supply, port A and port B pressures are seen in this box. If the *Supply Pressure* field is yellow or red, there is a problem with the supply pressure to the positioner. The fields in the *Pressure* box are only active if the positioner is upgraded to have Advanced or Pro diagnostics.



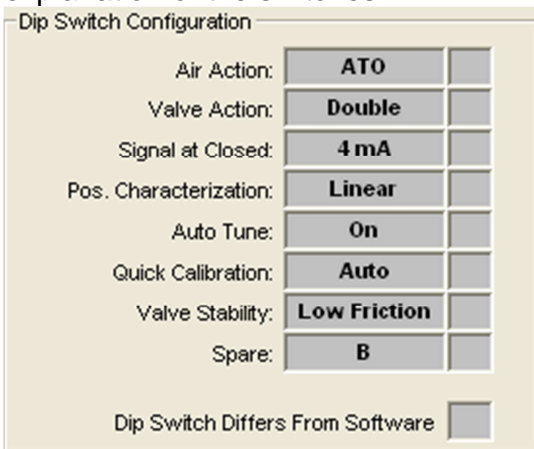
Ambient Temperature

The temperature and relative humidity inside the positioner are shown here. The units for temperature can be changed in the Positioner Configuration - Units page.



Dip Switch Configuration

The box shows the current configuration of the DIP switches on the front of the positioner. These switches should be set on the positioner before calibration. The configuration that is set by the DIP switches can be overridden in the software using the DTM. (See the *Basic/Local Interface page* of the DTM). If this is the case, an X will be shown in the box to the right of the item. Be careful when changing the configuration in software because performing a position calibration (Quick-Cal) will reset the configuration according to the physical DIP switch settings. See you instructions for the positioner for a detailed explanation of the switches.



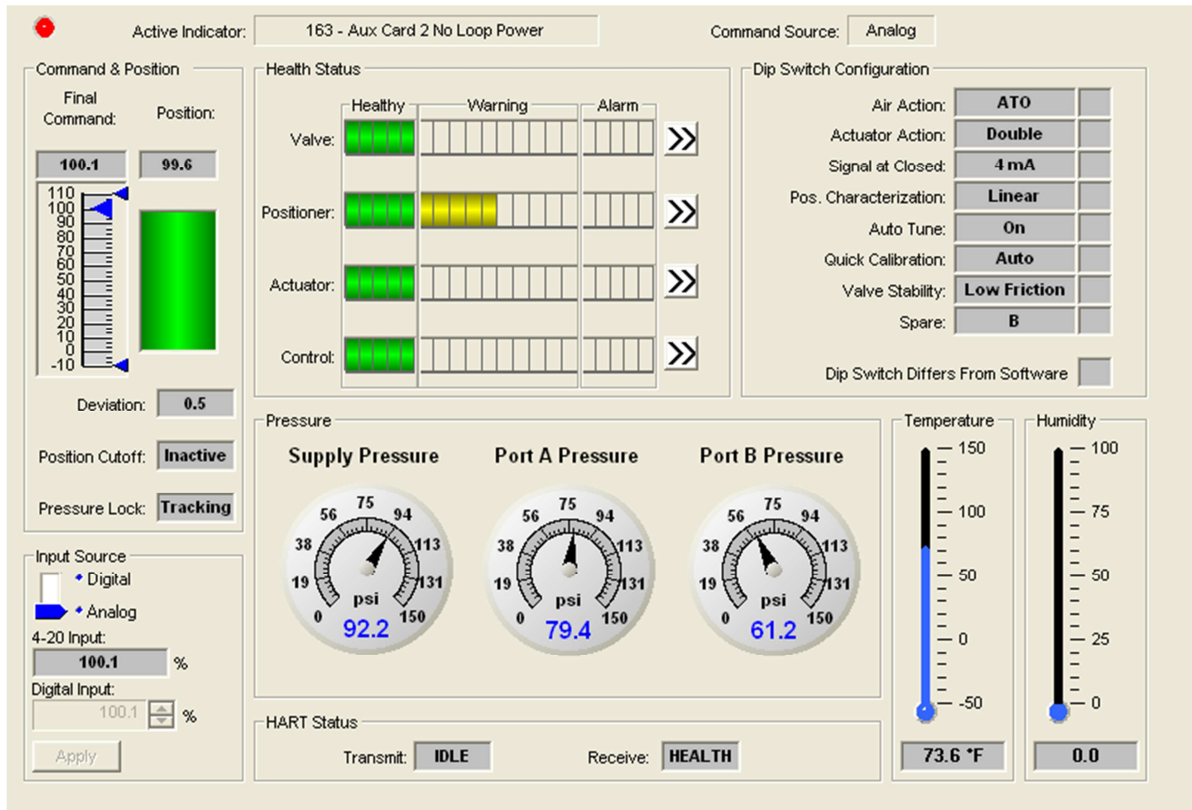
HART Status

Communication with the DTM is displayed here. The *Transmit* field displays a data packet transmitted to the positioner. The *Receive* field shows data packets received from the positioner. These are constantly updating. If they appear static, there may be a problem with communications.



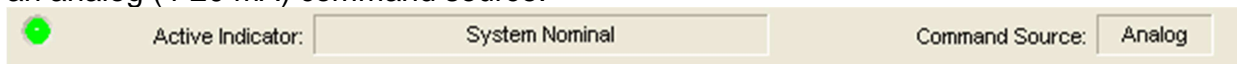
Advanced Dashboard

The *Dashboard* view is the main diagnostic view of the ValveSight® DTM. Generally, the color green signifies a healthy condition, yellow signifies some degradation has taken place, and red signifies a problem that needs to be addressed right away. You can identify problems right away by observing any red areas on this page.



Status Area

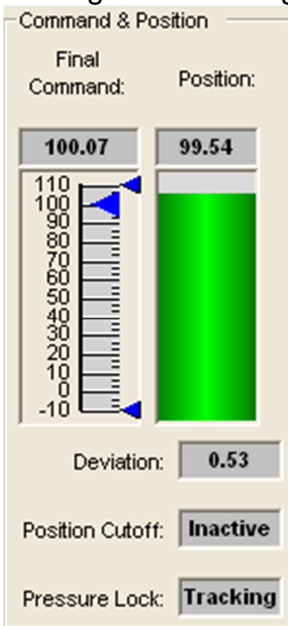
The *Active Indicator* area shows the status of the most relevant active indicator. The color of the "LED light" corresponds to the Active Indicator and the first color of the blink code sequence on the positioner. Generally green indicates no immediate issues. Yellow indicates a developing issue. Red indicates the ability to control may be compromised. A detailed list of the indicators is given in the [Alarm Configuration - Alarm Annunciator](#) page. The *Command Source* field indicates whether the positioner is being controlled by digital or an analog (4-20 mA) command source.



Command and Position

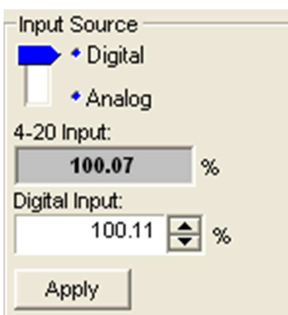
This area contains graphical representations of the valve command and position. The blue pointer tracks the final command value after adjustments for characterization curves, Soft Limits, and Tight Shut Off. The green position bar indicates the current measured position of the valve. The smaller pointers show the settings of the travel alert settings (these can be changed on the *Travel Alerts* page located under *Alarms/Alerts*). Grayed out

zones at the top or bottom of the graphs indicate the settings of Soft Limits. The command chart also displays the settings for travel limits and position Tight Shut Off (Minimum Position Cut Off (MPC)) limits. If the positioner has been configured for Tight Shut Off this will show up in the field below the position bar. The *Pressure Lock* field indicates if the positioner is locked on a steady command by controlling the pressures, or tracking a moving command signal.



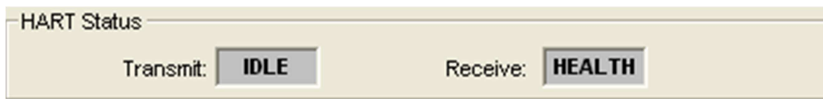
Input Source

The command source can be changed to analog or digital mode. In analog mode, the positioner will position the valve according to the 4-20 mA supplied current. In digital mode, the positioner will position the valve according to the value entered in the *Digital Input* field.



HART Status

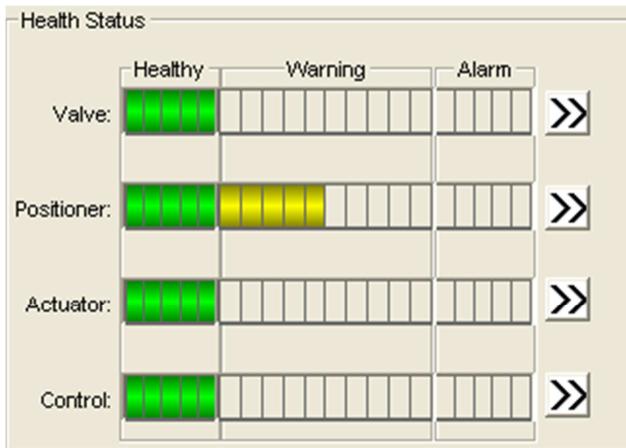
The status of HART communication with the DTM is displayed here. The *Transmit* field displays a data packet transmitted to the positioner. The *Receive* field shows data packets received from the positioner. These are constantly updating. If they appear static, there may be a problem with communications.



Health Status

The *Health Status* box has health indication bars for *Valve, Position, Actuator, and Control* which are displayed in 4 bar graphs in the center of the dashboard. These are powerful, visual diagnostic tools. Information from all of the diagnostic indications are rolled up into these health bars. As the graphs turn color (from green to yellow to red) they indicate developing issues. The health of the four key components of a control valve can be identified quickly by looking at the color of the bar. If the bars only show green then everything is operating within normal limits and no further action is required. If the bar is partially yellow it is pointing out a degraded condition. The further the bar goes to the right the more serious the degradation. If the bar is red then action should be taken immediately because the ability to control may be compromised. To learn more about any of the 4 health areas, click the double arrows (»») button at the end of the bar. This leads to the detailed health status page for that particular item.

NOTE: *Health Status bars are only available with the Advanced ValveSight® license viewing positioners with Advanced or Pro diagnostics. See the licensing and upgrade pages under Positioner Configuration in the DTM for more information.*



Dip Switch Configuration

The box shows the current configuration of the DIP switches on the front of the positioner. These switches should be set on the positioner before calibration. The configuration that is set by the DIP switches can be overridden in the software using the DTM. (See the *Basic/Local Interface page* of the DTM). If this is the case, an X will be shown in the box to the right of the item. Be careful when changing the configuration in software because performing a position calibration (Quick-Cal) will reset the configuration according to the physical DIP switch settings. See you instructions for the positioner for a detailed explanation of the switches.

Dip Switch Configuration

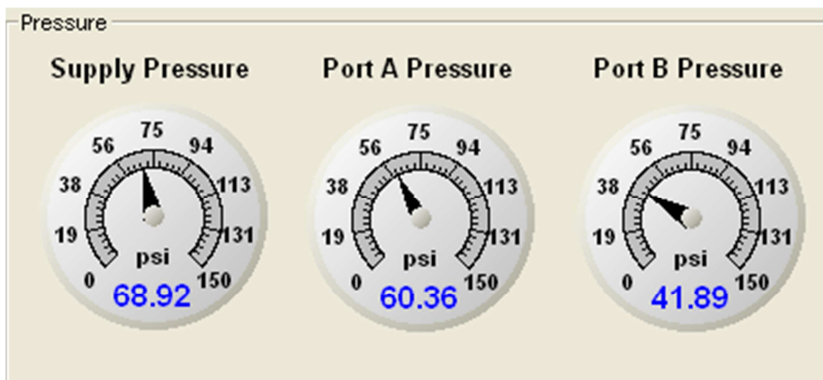
Air Action:	ATO	<input type="checkbox"/>
Valve Action:	Double	<input type="checkbox"/>
Signal at Closed:	4 mA	<input type="checkbox"/>
Pos. Characterization:	Linear	<input type="checkbox"/>
Auto Tune:	On	<input type="checkbox"/>
Quick Calibration:	Auto	<input type="checkbox"/>
Valve Stability:	Low Friction	<input type="checkbox"/>
Spare:	B	<input type="checkbox"/>

Dip Switch Differs From Software

Pressure

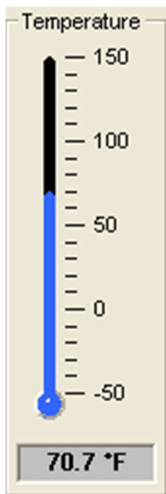
Pressure values are shown here. The units for pressure can be changed in the Positioner Configuration - Units page. The pressure gages for Port 1 and Port 2 read directly from the pressure sensors in the positioner. For single acting configurations, the Port 2 gage is not be active. Should the DTM view a device with no pressure sensors, all 3 gauges will be inactive. Pressure sensors are calibrated in the factory. A pressure calibration is not required unless there has been sever pressure or thermal stress on the positioner. See the Calibration - Sensor Calibration page.

NOTE: Pressure gauges are only available while viewing positioners with Advanced or Pro diagnostics. See the Positioner Upgrade page under Positioner Configuration in the DTM for more information.



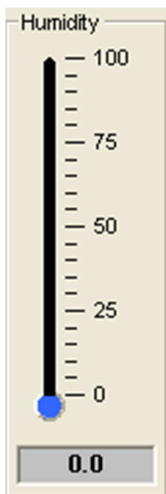
Temperature

This gage shows the temperature on the circuit board in the positioner. The units for temperature can be changed in the Positioner Configuration - Units page.



Humidity

This gage shows the Humidity on the circuit board inside the positioner. Since the positioner should be run with a dry air supply, this value should be near zero most of the time. Elevated humidity inside the positioner may significantly shorten the life of the positioner. Sensor accuracy is +/-10% RH. The sensors are calibrated in the factory. No other calibration is required.





Annunciator Panels

Annunciator Panels allow quick viewing of the current state and history of diagnostic indicators and allows masking of alarms, warnings and alerts. This selection automatically redirects to the *Alarms Annunciator* page.

Alarms Annunciator The *Alarm Annunciator* page displays the status of all diagnostic indicators. The status is shown in by the indicator "light". The checkboxes allow masking of indicators.

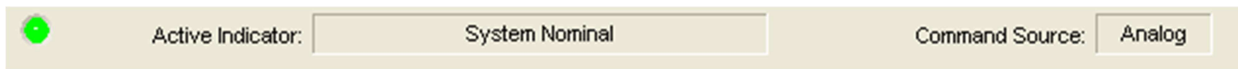
The screenshot shows the Alarms Annunciator interface with the following sections:

- Active Indicator:** Position Frequency Warning (Yellow light)
- Command Source:** Digital
- Cycles & Travel Status:**
 - Valve Cycles (Green light, unchecked)
 - Valve Travel (Green light, unchecked)
 - Actuator Cycles (Green light, unchecked)
 - Actuator Travel (Green light, unchecked)
 - Bellows Cycles (Green light, unchecked)
 - Bellows Travel (Green light, unchecked)
 - Pilot Cycles (Green light, unchecked)
 - Pilot Travel (Green light, unchecked)
- Electronic Error Status:**
 - Aux. Card 1 Fail (Grey light, unchecked)
 - Aux. Card 1 No Loop Power (Grey light, unchecked)
 - Aux. Card 1 Error (Grey light, unchecked)
 - Aux. Card 2 Fail (Grey light, unchecked)
 - Aux. Card 2 No Loop Power (Grey light, unchecked)
 - Aux. Card 2 Error (Grey light, unchecked)
 - Press. Board Fail WRN (Green light, unchecked)
 - Low Battery Warning (Green light, unchecked)
- Actuation Status:**
 - Supply Press. High (Green light, unchecked)
 - Supply Press Lo (Green light, unchecked)
 - Actuation Ratio (Green light, unchecked)
 - Spring Fail (Green light, unchecked)
 - Pneumatic Leak (Green light, unchecked)
 - Air Supply Humid (Green light, unchecked)
 - Air Supply Icing (Green light, unchecked)
- Feedback Loop Status:**
 - Position Deviation (Green light, unchecked)
 - Psn. Sensor Fail (Green light, unchecked)
 - Closed Too Far (Green light, unchecked)
 - Opened Too Far (Green light, unchecked)
 - PST Failed (Green light, unchecked)
 - CST Failed (Green light, unchecked)
- Mode Status:**
 - Factory Reset State (Green light, unchecked)
 - Calibration in Prog. (Green light, unchecked)
 - Signature or PST (Green light, unchecked)
 - Jog Cmd. Mode (Green light, unchecked)
 - PST Scheduled (Green light, unchecked)
 - DI Cmd. Override (Green light, unchecked)
- Main Board Status:**
 - Main Board Fail (Green light, unchecked)
 - Software Error (Green light, unchecked)
 - Memory Error (Green light, unchecked)
 - Temperature High (Green light, unchecked)
 - Temperature Low (Green light, unchecked)
- Inner Loop Status:**
 - Pilot Response (Green light, unchecked)
 - Piezo Volts High (Green light, unchecked)
 - Piezo Volts Low (Green light, unchecked)
 - Driver Module (Green light, unchecked)
- Position Status:**
 - Soft Stop High Alert (Green light, unchecked)
 - Soft Stop Low Alert (Green light, unchecked)
 - Psn. High Limit Alert (Green light, unchecked)
 - Psn. Low Limit Alert (Green light, unchecked)
 - Feedback Linkage ALM (Green light, unchecked)
- Friction Status:**
 - Friction High (Green light, unchecked)
 - Friction Low (Green light, unchecked)
 - Valve Can't Open (Green light, unchecked)
 - Valve Can't Shut (Green light, unchecked)
- Control Status:**
 - Cmd. Frequency (Green light, unchecked)
 - Cmd. Amplitude (Green light, unchecked)
 - Psn. Frequency (Yellow light, unchecked)
 - Psn. Amplitude (Green light, unchecked)
- Legend:**
 - Status (Green light)
 - Masked (checked checkbox)

Buttons: Apply, Retrieve, Print Report

Status Area

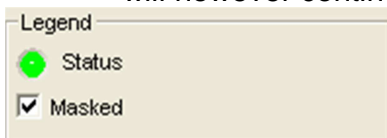
The *Active Indicator* area shows the status of the most relevant active indicator. The color of the "LED light" corresponds to the Active Indicator and the first color of the blink code sequence on the positioner. Generally green indicates no immediate issues. Yellow indicates a developing issue. Red indicates the ability to control may be compromised. A detailed list of the indicators is given below. The *Command Source* field indicates whether the positioner is being controlled by digital or an analog (4-20 mA) command source.



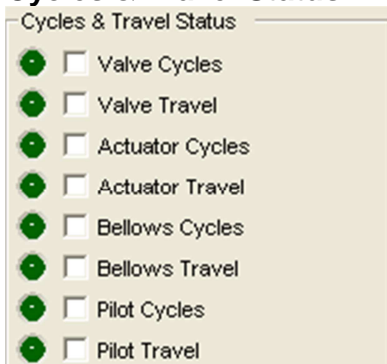
Legend

Each indicator group box may contain the following components:

- An "LED light" indicates health status. Warning and alarm limits (set by the user in many cases) determine the conditions when the color will turn from green to yellow to red. The most sever of the indicators on this page will be shown in the health bar on the Dashboard.
 - **Dark Green** circle indicates a healthy condition where no attention is needed.
 - **Light Green** indicates an occurrence of a normal activity that does not affect the health of the valve system.
 - **Yellow** circle indicates that an active warning, alert or mode is present.
 - **Red** circle indicates that an active alarm or state is present that could seriously limit the operation of the valve.
 - **Gray** circle indicates that the feature or condition is not available because the configuration of the hardware or software does not support it.
- A checkbox indicates the masked status. Check to mask. If a particular indicator is masked, it will not be shown in the active indicator field at the top of each screen, affect the status of the health bars on the main dashboard, be sent in command 48, or be seen on the blinking LEDs on the positioner. It will however continue to show on this page.



Cycles & Travel Status



Valve Cycles

- **Definition:** The valve cycle limit has been exceeded.



- **Implications:** Each cycle represents two reversals of the direction of valve movement. The cycle counting criterion and count limit are set by the user to track the usage of the valve.
- **Possible Solutions:** Follow routine procedures for maintenance when the limit is reached such as checking the packing tightness, and checking linkages for wear, misalignment, and tightness. After maintenance, reset the cycle accumulator.

Valve Travel

- **Definition:** The total accumulated valve travel limit has been exceeded.
- **Implications:** The travel is accumulated in both directions. The travel counting criterion and limit are set by the user to track the usage of the valve.
- **Possible Solutions:** Follow routine procedures for maintenance when the limit is reached such as checking the packing tightness, and checking linkages for wear, misalignment, and tightness. After maintenance, reset the travel accumulator.

Actuator Cycles

- **Definition:** The actuator cycle limit has been exceeded.
- **Implications:** Each cycle represents two reversals of the direction of valve movement. The cycle counting criterion and count limit are set by the user to track the usage of the valve.
- **Possible Solutions:** Follow routine procedures for maintenance when the limit is reached such as checking the actuator seals and lubrication. After maintenance, reset the travel accumulator.

Actuator Travel

- **Definition:** The total accumulated actuator travel limit has been exceeded.
- **Implications:** The travel is accumulated in both directions. The travel counting criterion and limit are set by the user to track the usage of the valve.
- **Possible Solutions:** Follow routine procedures for maintenance when the limit is reached such as checking the actuator seals and lubrication. After maintenance, reset the travel accumulator.

Bellows Cycles

- **Definition:** The bellows cycle limit has been exceeded.
- **Implications:** The bellows may be reaching the end of its fatigue life. Each cycle represents two reversals of the direction of bellows movement. The cycle counting criterion and count limit are set by the user to track the usage of the valve.
- **Possible Solutions:** Follow routine procedures for maintenance when the limit is reached such as checking bellows for cracking or leaking. After maintenance, reset the cycle accumulator.

Bellows Travel

- **Definition:** The bellows cycle limit has been exceeded.

- **Implications:** The bellows may be reaching the end of its fatigue life. Each cycle represents two reversals of the direction of valve movement. The cycle counting criterion and count limit are set by the user to track the usage of the valve.
- **Possible Solutions:** Follow routine procedures for maintenance when the limit is reached such as checking bellows for cracking or leaking. After maintenance, reset the cycle accumulator.

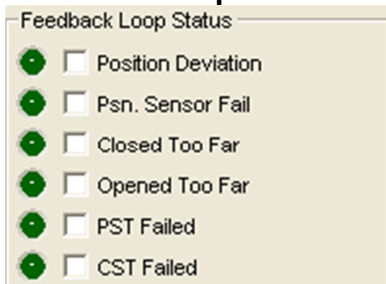
Pilot Cycle

- **Definition:** The pilot relay cycle limit set by the user has been exceeded.
- **Implications:** The pilot relay cycles indicate the activity level of the pilot relay as it maintains a valve’s position. Excessive cycles can contribute to a worn relay which can lead to high air consumption.
- **Possible Solutions:** Inspect for high air consumption and signs of wear.

Pilot Travel

- **Definition:** The total accumulated pilot relay travel (% of full relay span) set by the user has been exceeded.
- **Implications:** The pilot relay travel indicates the activity level of the relay as it maintains a valve’s position. Excessive travel can contribute to a worn pilot relay which can lead to high air consumption.
- **Possible Solutions:** Inspect for high air consumption and signs of wear.

Feedback Loop Status



Position Deviation

- **Definition:** The device is not controlling at the set point.
- **Implications:** The difference between the command and the actual position has been greater than the user-set limit for longer than a user-set time.
- **Possible Solutions:** Review active alarms and warnings to find root causes of this alarm. The deviation settings can be changed in the Valve Health page of the DTM.

Position Sensor Fail

- **Definition:** The feedback arm may be disconnected from the valve assembly.
- **Implications:** The feedback arm may be disconnected from the valve assembly or the sensor has failed.

- **Possible Solutions:** Check the feedback arm linkage. Recalibrate. If the problem persists return the unit for repair.

Closed Too Far

- **Definition:** The valve has closed farther than it did at the last calibration.
- **Implications:** While the valve was in use, it closed farther than it did at the last calibration by 0.5%.
- **Possible Solutions:** Check the feedback arm linkage and ensure the valve stem connection is tight. Recalibrate the stroke. If the process cannot be interrupted a service technician may be able to adjust the calibration.

Opened Too Far

- **Definition:** The valve has opened farther than it did at the last calibration.
- **Implications:** While the valve was in use, it opened farther than it did at the last calibration by 0.5%.
- **Possible Solutions:** Check the feedback arm linkage and ensure the valve stem connection is tight. Recalibrate the stroke. If the process cannot be interrupted a service technician may be able to adjust the calibration.

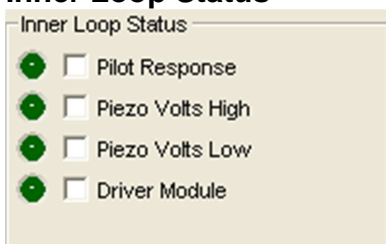
PST Failed -

- **Definition:** Measured times or forces during the last partial stroke test did not pass the criteria set by the user.
- **Implications:** This may be an indication of corrosion build-up on the valve stem or in the actuator, low or restricted supply pressure, or a sticking positioner relay.
- **Possible Solutions:** This warning will clear upon completion of a successful partial stroke test.

CST Failed

- **Definition:** During the continuous stroke test, the valve did not move after 5 consecutive attempts.
- **Implications:** This could mean the valve has increased friction, a change in process load or inadequate supply pressure.
- **Possible Solutions:** Check friction, supply pressure and other alarms or warnings that would indicate difficulty in moving the valve. Check packing, and air supply. The warning will clear when the CST function is turned off or when a successful attempt to move the valve occurs.

Inner Loop Status



Pilot Response

- **Definition:** The pilot relay is sticking or slow to respond.
- **Implications:** This affects the responsiveness, increases the chance of limit cycling and excessive air consumption. The pilot relay is part of the inner loop and consists of the driver module assembly with piezo (I-P relay) which is coupled to the spool valve or poppet. The value of this indicator corresponds with inner loop lag. Delayed response can be caused by a partially clogged piezo or debris, oil, corrosion, or ice on the spool, or low supply pressure.
- **Possible Solutions:** Check response of the valve. If OK, adjust Pilot Relay Response limits. Check supply pressure. Check the spool or poppet for debris, oil, corrosion, ice on the spool. Clean or replace the spool or poppet assembly. Replace the piezo or driver module assembly. Maintain a clean, water-free air/gas supply.

Piezo Volts High

- **Definition:** The voltage driving the piezo is above the warning limit.
- **Implications:** This could indicate an error with the relay or the main board. This may result from an extended period of inactivity, but in this case should not persist for more than 30 minutes when the valve is controlling. The positioner may still be functioning, but have reduced performance under some circumstances.
- **Possible Solutions:** Ensure the supply pressure is not low. If alarm persists for more than 30 minutes, the Piezo assembly is damaged. Replace the pilot relay.

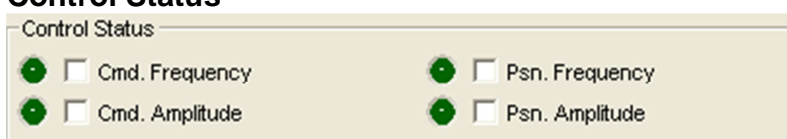
Piezo Volts Low

- **Definition:** The voltage to the piezo is too low.
- **Implications:** The piezo may be damaged. This may prevent the proper failure position upon loss of signal/power. This condition may occur briefly on an air-to-close valve that is held for long periods of time in the closed position, or an air-to-open valve held in the open position.
- **Possible Solutions:** Ensure the supply pressure is not low. If alarm persists for more than 30 minutes, the Piezo assembly is damaged. Replace the pilot relay.

Driver Module

- **Definition:** Driver module alarm.
- **Implications:** The pilot relay can't open, the pilot relay can't shut, or the Hall sensor circuit has failed.
- **Possible Solutions:** Check the internal wiring connections. Replace the pilot relay.

Control Status



Command Frequency

- **Definition:** The frequency of the command signal is above the warning or alarm limit. This could mean the control loop is oscillating faster than normal.
- **Possible Solutions:** Verify the limits are set at an appropriate level. Review the control loop parameters and equipment. Adjust as necessary.

Command Amplitude

- **Definition:** The amplitude of the command signal is above the warning or alarm limit. This could mean the control loop has larger swings than desirable.
- **Possible Solutions:** Verify the limits are set at an appropriate level. Review the control loop parameters and equipment. Adjust as necessary.

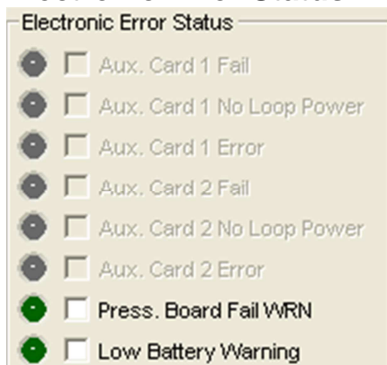
Position Frequency

- **Definition:** The frequency of the position signal is above the warning or alarm limit. The positioner is controlling the position of the valve with rapid corrections.
- **Possible Solutions:** Verify the limits are set at an appropriate level. Adjust the selectable Gain switch to a lower setting or use the "Hi Friction" setting. Perform a QUICK-CAL which sets the gains based on valve response. Check for high friction. If the problem persists replace the relay.

Position Amplitude

- **Definition:** The amplitude of the position signal is above the warning limit. The positioner is controlling the position of the valve with large corrections.
- **Possible Solutions:** Verify the limits are set at an appropriate level. Adjust the selectable Gain switch to a lower setting or use the "Hi Friction" setting. Perform a QUICK-CAL which sets the gains based on valve response. Check for high friction. If the problem persists replace the relay.

Electronic Error Status



Aux. Card 1 Fail

- **Definition:** Auxiliary Card 1 is not communicating.
- **Possible Solutions:** Check auxiliary card connection to the main

board. If the problem persists, replace the card.

Aux. Card 1 No Loop Power

- **Definition:** Auxiliary Card 1 has no loop current.
- **Possible Solutions:** Check auxiliary card connection to loop current. If the problem persists, replace the card.

Aux. Card 1 Error

- **Definition:** Auxiliary Card 1 has an electrical problem.
- **Possible Solutions:** MFC: Check auxiliary loop wiring and ensure adequate compliance voltage. Replace card if condition persists

Aux. Card 2 Fail

- **Definition:** Auxiliary Card 1 is not communicating.
- **Possible Solutions:** Check auxiliary card connection to the main board. If the problem persists, replace the card.

Aux. Card 2 No Loop Power - Auxiliary Card 2 has no loop current

- **Definition:** Auxiliary Card 2 has no loop current.
- **Possible Solutions:** Check auxiliary card connection to loop current. If the problem persists, replace the card.

Aux. Card 2 Error

- **Definition:** Auxiliary Card 2 has an electrical problem.
- **Possible Solutions:** MFC: Check auxiliary loop wiring and ensure adequate compliance voltage. Replace card if condition persists

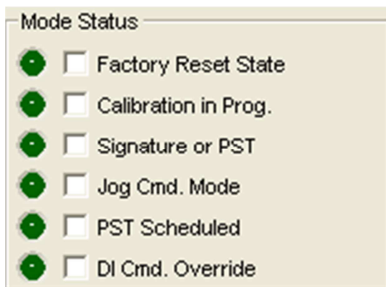
Pressure Board Fail Warning

- **Definition:** One or more pressure sensors may have failed.
- **Possible Solutions:** Check the supply pressure to ensure it is between 1.3 and 10.3 bar (19 and 150 PSI). Check the pressure sensor board connections. Recalibrate the pressure sensors. If the problem persists, replace the pressure sensor board.

Low Battery Warning

- **Definition:** The battery for the real time clock is low.
- **Implications:** The battery is designed for a 15+ year life with the positioner unpowered. The battery is not required for the positioner to control properly, but is used only to maintain the time and date upon loss of power. The time and date affect the time stamps of alarms, warnings and other events. This warning could be caused by rapidly power cycling the positioner.
- **Possible Solutions:** The battery is not replaceable. Verify or reset the time and date. Replace the main board if the problem persists for several days.

Mode Status



Factory Reset State

- **Definition:** The positioner is in factory reset state.
- **Implications:** Calibration is required to enable control.
- **Possible Solutions:** Perform a Stroke Calibration (QUICK-CAL).

Calibration in Progress

- **Definition:** A calibration is in progress.
- **Possible Solutions:** The calibration can be canceled from the Sensor Calibration page of the DTM, from the handheld, or by briefly pressing the BACK button.

Signature or PST

- **Definition:** The positioner is in Out Of Service (OOS) mode because a test or signature has been initiated. These include Step Test, Ramp Test, or Partial Stroke Test.
- **Possible Solutions:** Signatures and tests can be defined, initiated, and cancelled through the Off-Line Diagnostics pages of the DTM.

Jog Command Mode

- **Definition:** The positioner has been placed in a local override mode where the valve can only be stroked using the UP and DOWN buttons.
- **Implications:** The positioner will not respond to analog or digital input commands from HART.
- **Possible Solutions:** Control the valve using the UP and DOWN buttons. This mode may be cancelled by briefly pushing the QUICK-CAL/ACCEPT button.

PST Scheduled

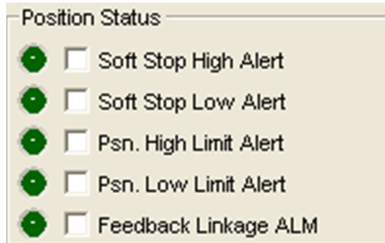
- **Definition:** The schedule established by the user shows that a partial stroke test is due.
- **Possible Solutions:** Follow internal procedures to initiate a partial stroke test (PST). A partial stroke test will cause the valve to move suddenly and the positioner will not respond to commands while the PST is in progress. See the Partial Stroke Test page of the DTM to verify PST settings.

DI Command Override

- **Definition:** The Multi-Function Card has been configured as a Discrete Input (DI) and to override the input command, positioning the valve at a preconfigured set point. The DI signal is active and the positioner is attempting to control the valve at the set point.
- **Possible Solutions:** Configure the DI function and set point using the menu, a handheld or the Multi-Function Card Configuration page of the

DTM.

Position Status



Soft Stop High Alert

- **Definition:** The Final Command would move the valve beyond the user-set Soft Limit, but the internal software is holding the position at the limit.
- **Implications:** The function is similar to a mechanical limit stop except it is not active if the unit is un-powered.
- **Possible Solutions:** If more travel is needed, reset the Soft Limits. If not, adjust the Final Command signal back into the specified range.

Soft Stop Low Alert

- **Definition:** The Final Command would move the valve beyond the user-set Soft Limit, but the internal software is holding the position at the limit.
- **Implications:** The function is similar to a mechanical limit stop except it is not active if the unit is un-powered.
- **Possible Solutions:** If more travel is needed, reset the Soft Limits. If not, adjust the Final Command signal back into the specified range.

Position High Limit Alert

- **Definition:** The position has reached or is exceeding a user defined upper position indicator.
- **Implications:** This is similar to a limit switch indicator.
- **Possible Solutions:** Set the limit to a higher value if more travel is needed, or adjust the command signal back in the specified range.

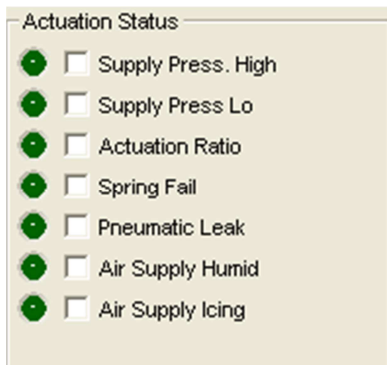
Position Low Limit Alert

- **Definition:** The position has reached or is exceeding a user defined lower position indicator similar to a limit switch indicator.
- **Implications:** This is similar to a limit switch indicator.
- **Possible Solutions:** Set the limit to a lower value if more travel is needed, or adjust the command signal back in the specified range.

Feedback Linkage Alarm

- **Definition:** The feedback linkage is broken or the position feedback POT is out of range.
- **Possible Solutions:** Fix broken linkage or adjust feedback arm until full motion is within the range of the POT.

Actuation Status



Supply Pressure High

- **Definition:** The supply pressure is above the user set warning limit.
- **Implications:** Supply pressure that exceeds the maximum rating on the actuator can become a potential hazard.
- **Possible Solutions:** Regulate the supply pressure at the positioner below the maximum limit recommended for your actuator. Recalibrate pressure sensors. Check the pressure sensor board connections. Replace pressure sensor board if necessary.

Supply Pressure Low

- **Definition:** The supply pressure is below the user set warning or alarm limit.
- **Implications:** Low supply pressure can cause poor valve response or positioner failure. The minimum recommended supply pressure for proper operation is 1.3 bar (19 PSI).
- **Possible Solutions:** Regulate the supply pressure at the positioner above 1.3 bar (19 PSI). Ensure system air/gas supply is adequate. Repair kinked or restricted supply tubing. Check for pneumatic leaks in the actuator and actuator tubing. Recalibrate pressure sensors. Check the pressure sensor board connections and replace pressure sensor board if necessary.

Actuation Ratio

- **Definition:** The force required to control the system is close to the maximum available force.
- **Implications:** Actuation Ratio is based on the ratio of available force to the required force to fully actuate. Control may be lost if this ratio reaches 100%. It is affected by the process load, friction, spring force, and available supply pressure.
- **Possible Solutions:** Increase the supply pressure. Reduce the friction. Check the actuator spring. Resize the actuator. Adjust user set limits.

Spring Fail

- **Definition:** Upon loss of air supply, the valve may not move to the fail-safe position.
- **Implications:** The spring alone is not adequate to overcome the friction and process load in the system. The system is relying on pneumatic force to actuate in the direction the spring is pushing. The failsafe

spring may have failed, or it was not sized properly for the application. Friction or process load may have increased.

- **Possible Solutions:** Repair or replace actuator spring. Check for high friction. Reduce process load.

Pneumatic Leak

- **Definition:** The positioner has detected a leak in the actuation assembly.
- **Implications:** Leakage from the actuator can cause decreased responsiveness and excessive air/gas consumption.
- **Possible Solutions:** Repair pneumatic leaks at the tubing junctions and actuator seals. Check spool valve for excessive wear.

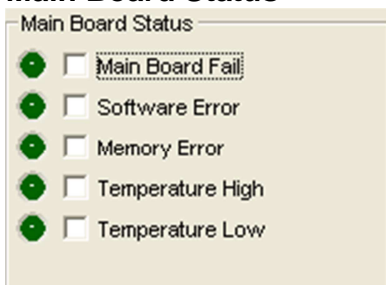
Air Supply Humid

- **Definition:** The supply gas has high relative humidity which can lead to condensation on electronic components and failure of electronic functions.
- **Possible Solutions:** Ensure supply gas is clean and dry. Check and clean the regulator filter.

Air Supply Icing

- **Definition:** The supply gas has high relative humidity and the temperature is close to 0 °C (32 °F). Under these conditions ice may form in the pilot relay causing diminished or total loss of position control.
- **Possible Solutions:** Ensure supply gas is clean and dry. Check and clean the regulator filter.

Main Board Status



Main Board Fail

- **Definition:** There has been an oscillator fault, position sensor ADC failure, supply voltage error, reference voltage error, shunt voltage error, or piezo voltage error.
- **Possible Solutions:** This may be caused by transient conditions. If the error persists, replace the main board.

Software Error

- **Definition:** There has been a watch dog time out, stack overflow warning, or CPU usage warning.
- **Possible Solutions:** If the problem persists, perform a factory reset. If it still persists, reprogram or replace the main board.

Memory Error

- **Definition:** The microprocessor's memory has a problem.
- **Possible Solutions:** Error may clear with time. If error persists, cycle power and complete a QUICK-CAL. If the error still persists, perform a factory reset, reprogram or replace the main circuit board.

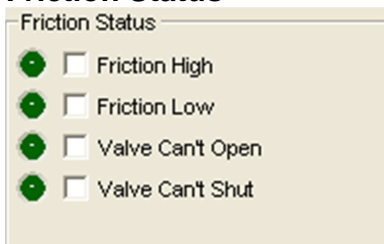
Temperature High

- **Definition:** The temperature of the internal electronics has exceeded the manufacturer set limit of 85°C (176°F). High temperature may affect performance or limit the life of the positioner.
- **Possible Solutions:** Regulate the temperature of the positioner by shading or cooling supply gas. If the temperature reading is in error, replace the main board.

Temperature Low

- **Definition:** The temperature of the internal electronics has exceeded the manufacture set limit of -40°C (-40°F). Low temperature may inhibit responsiveness and accuracy.
- **Possible Solutions:** Regulate the temperature of the positioner. If the temperature reading is in error, replace the main circuit board.

Friction Status



Friction High

- **Definition:** The valve and actuator friction has passed the user set limit.
- **Implications:** High friction can cause loop oscillations, poor position control, jerky motion, or valve sticking. It can be caused by build-up from the process on the stem, trim or seat, by a failing bearing or guides in the valve and actuator, galling of the trim or stem, excessively tightened packing, linkages, or other valve or actuator mechanical issues.
- **Possible Solutions:** Determine if the friction is significantly interfering with the valve control. If not, consider increasing the friction warning limit. Consider the following to reduce friction: Stroke the valve to clear off build-up. Clear any external mechanical obstruction, loosen the packing, clean the stem, repair or replace the actuator. Highly localized friction or very jerky travel can indicate internal galling. Repair or replace internal valve components.

Friction Low

- **Definition:** The friction has passed below the user set limit.
- **Implications:** Low friction is an indication of improperly loaded packing and, in severe cases, can be an indication of the process fluid leaking at

the valve stem.

- **Possible Solutions:** Check for packing leak. Tighten or replace the valve packing.

Valve Can't Open

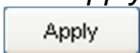
- **Definition:** Pressure has been applied (or removed) to open the valve, but the valve is not opening.
- **Implications:** This may be caused by excessive friction.
- **Possible Solutions:** Verify adequate supply pressure is applied. Verify the feedback linkage is connected. View the friction trends if available. Consider the following: Clear any external or internal mechanical obstruction, loosen the packing, clean the stem, repair or replace the actuator, repair the valve if galling is suspected.

Valve Can't Shut

- **Definition:** Pressure has been removed (or applied) to close the valve, but the valve is not closing.
- **Implications:** This may be caused by excessive friction.
- **Possible Solutions:** Verify adequate supply pressure is applied. Verify the feedback linkage is connected. View the friction trends if available. Consider the following: Clear any external or internal mechanical obstruction, loosen the packing, clean the stem, repair or replace the actuator, repair the valve if galling is suspected.

Action Buttons

The *Apply* button will save changes to the connected device.



The *Retrieve* button will retrieve the latest information from the device.



The *Print Report* button will print a report to default printer (see example below).

Information includes:

- Information about the connected device
- The active status of the alarms, warnings and alerts.
- The masked status.
- The current value (where applicable).
- The value threshold (where applicable).





NOTE: It is possible to print the report to save to a **PDF** file. Instructions:

1. Download and install the free version of PDFCreator.
2. Install the PDFCreator
3. Set PDFCreator as the default Printer



4. Click Print Report and save the report to a pdf file in your computer.

Alarms/Alerts Report

Logix MD+ DEVICE TAG ID: HART TAG DEVICE VERSION:MD+ Pro Diagnostics

ACTUATOR INFO --> Size: 25, Manufacturer: Valtek (Piston), Type: Linear (piston), Spring Type: Single

VALVE BODY INFO --> Model: Mark One, Body Size: .25 INCH / DN 6, Flow Direction: Flow Over, Fail Position: Mechanical Fail Closed

Cycles & Travel Status	Active	Masked	Value	Threshold	
Valve Cycles	<input type="checkbox"/>	<input type="checkbox"/>	144	4500000	
Valve Travel	<input type="checkbox"/>	<input type="checkbox"/>	161 x 10e2 %	360000	
Actuator Cycles	<input type="checkbox"/>	<input type="checkbox"/>	144	4500000	
Actuator Travel	<input type="checkbox"/>	<input type="checkbox"/>	161 x 10e2 %	360000	
Bellows Cycles	<input type="checkbox"/>	<input type="checkbox"/>	144	3600000000	
Bellows Travel	<input type="checkbox"/>	<input type="checkbox"/>	161 x 10e2 %	36000000	
Pilot Cycles	<input type="checkbox"/>	<input type="checkbox"/>	29579	45000000	
Pilot Travel	<input type="checkbox"/>	<input type="checkbox"/>	19077	3600000	x 10e4 %

Feedback Loop Status

Position Deviation	<input type="checkbox"/>	<input type="checkbox"/>	0	10	+/- %
Psn. Sensor Fail	<input type="checkbox"/>	<input type="checkbox"/>			
Closed Too Far	<input type="checkbox"/>	<input type="checkbox"/>			
Opened Too Far	<input type="checkbox"/>	<input type="checkbox"/>			
PST Failed	<input type="checkbox"/>	<input type="checkbox"/>			
CST Failed	<input type="checkbox"/>	<input type="checkbox"/>			

Inner Loop Status

Pilot Response Alarm	<input type="checkbox"/>	<input type="checkbox"/>	0	500	ms
Pilot Response Warning	<input type="checkbox"/>	<input type="checkbox"/>	0	200	ms
Piezo Volts High Alarm	<input type="checkbox"/>	<input type="checkbox"/>	12	22.7	V
Piezo Volts High Warning	<input type="checkbox"/>	<input type="checkbox"/>	12	20.0	V
Piezo Volts Low Alarm	<input type="checkbox"/>	<input type="checkbox"/>	12	-8.0	V
Piezo Volts Low Warning	<input type="checkbox"/>	<input type="checkbox"/>	12	2.0	V
Driver Module	<input type="checkbox"/>	<input type="checkbox"/>			

Control Status

Cmd. Frequency Alarm	<input type="checkbox"/>	<input type="checkbox"/>	0	3600	cycles/hr
Cmd. Frequency Warning	<input type="checkbox"/>	<input type="checkbox"/>	0	2400	cycles/hr
Cmd. Amplitude Alarm	<input type="checkbox"/>	<input type="checkbox"/>	0	120	%
Cmd. Amplitude Warning	<input type="checkbox"/>	<input type="checkbox"/>	0	110	%
Pos. Frequency Alarm	<input type="checkbox"/>	<input type="checkbox"/>	20	3600	cycles/hr
Pos. Frequency Warning	<input type="checkbox"/>	<input type="checkbox"/>	20	1800	cycles/hr
Pos. Amplitude Alarm	<input type="checkbox"/>	<input type="checkbox"/>	0.3	120	%
Pos. Amplitude Warning	<input type="checkbox"/>	<input type="checkbox"/>	0.3	110	%

4/27/2012 1:13:05 PM
Page 1/3



Electronic Error Status

	Active	Masked	Value	Threshold
Aux. Card 1 Fail	<input type="checkbox"/>	<input type="checkbox"/>		
Aux. Card 1 No Loop Powe	<input type="checkbox"/>	<input type="checkbox"/>		
Aux. Card 1 Error	<input type="checkbox"/>	<input type="checkbox"/>		
Aux. Card 2 Fail	<input type="checkbox"/>	<input type="checkbox"/>		
Aux. Card 2 No Loop Powe	X	<input type="checkbox"/>		
Aux. Card 2 Error	<input type="checkbox"/>	<input type="checkbox"/>		
Press. Board Fail WRN	<input type="checkbox"/>	<input type="checkbox"/>		
LowBatteryWarning	<input type="checkbox"/>	<input type="checkbox"/>		

Mode Status

	Active	Masked	Value	Threshold
Factory Reset State	<input type="checkbox"/>	<input type="checkbox"/>		
Calibration in Prog.	<input type="checkbox"/>	<input type="checkbox"/>		
Signature or PST	<input type="checkbox"/>	<input type="checkbox"/>		
Jog Cm d. Mode	<input type="checkbox"/>	<input type="checkbox"/>		
PST Scheduled	<input type="checkbox"/>	<input type="checkbox"/>		
DI Cmd. Override	<input type="checkbox"/>	<input type="checkbox"/>		

Position Status

	Active	Masked	Value	Threshold
Soft Stop High Alert	<input type="checkbox"/>	<input type="checkbox"/>		110 %
Soft Stop Low Alert	<input type="checkbox"/>	<input type="checkbox"/>		-10 %
P sn. High Limit Alert	<input type="checkbox"/>	<input type="checkbox"/>		110 %
P sn. LowLimit Alert	<input type="checkbox"/>	<input type="checkbox"/>		-10 %

Actuation Status

	Active	Masked	Value	Threshold	Unit
Supply Press. High	<input type="checkbox"/>	<input type="checkbox"/>	91.6	150	psi
Supply Press. Low Alarm	<input type="checkbox"/>	<input type="checkbox"/>	91.6	17	psi
Supply Press. LowWarning	<input type="checkbox"/>	<input type="checkbox"/>	91.6	22	psi
Actuation Ratio	<input type="checkbox"/>	<input type="checkbox"/>	0	90	%
Spring Fail	<input type="checkbox"/>	<input type="checkbox"/>			
Pneumatic Leak	<input type="checkbox"/>	<input type="checkbox"/>	0	0.3	scfm
Air Supply Humid	<input type="checkbox"/>	<input type="checkbox"/>			
Air Supply Icing	<input type="checkbox"/>	<input type="checkbox"/>			

Main Board Status

	Active	Masked	Value	Threshold	Unit
Main Board Fail	<input type="checkbox"/>	<input type="checkbox"/>			
Software Error	<input type="checkbox"/>	<input type="checkbox"/>			
Memory Error	<input type="checkbox"/>	<input type="checkbox"/>			
Temperature High	<input type="checkbox"/>	<input type="checkbox"/>	73.6	176	°F
Temperature Low	<input type="checkbox"/>	<input type="checkbox"/>	73.6	-40	°F



Friction Status

Friction High Alarm	<input type="checkbox"/>	<input type="checkbox"/>	17.3	41.4	lbf
Friction High Warning	<input type="checkbox"/>	<input type="checkbox"/>	17.3	29.4	lbf
Friction Low Alarm	<input type="checkbox"/>	<input type="checkbox"/>	17.3	5.2	lbf
Friction Low Warning	<input type="checkbox"/>	<input type="checkbox"/>	17.3	11.2	lbf
Valve Can't Open	<input type="checkbox"/>	<input type="checkbox"/>			
Valve Can't Shut	<input type="checkbox"/>	<input type="checkbox"/>			

Management Annunciator

The *Management Annunciator* page displays all modes, setup, configuration and calibration errors and their current status. If a particular indicator is not wanted then a check in the box for a particular item will mask that item and it will not be shown in the active indicator field at the top of each page nor will it affect the status of the health bar on the main dashboard view.

The screenshot shows the Management Annunciator interface with the following sections:

- Active Indicator:** A green LED indicator.
- System Nominal:** A dropdown menu currently set to "System Nominal".
- Command Source:** A dropdown menu currently set to "Analog".
- Start Up Status:**
 - Initializing
 - Stroke Cal. Required
 - Press. Cal. Required
 - Friction Cal. Required
- Mode Status:**
 - Digital Cmd. Mode
 - Tight Shut Off Mode
 - Pressure Ctrl. Lock
 - CST Mode
 - Training In Prog.
 - Training Complete
 - Event Captured
 - Local Interface Enabled
 - Squawk Mode
 - Backup Control Mode
- Calibration Error Status:**
 - Position Range Small
 - Position < ADC Range
 - Position > ADC Range
 - No Motion Time Out
 - Settle Time Out
 - ILO Time Out
 - AO Range Small
 - Cmd. Range Small
 - Cmd. < ADC Range
 - Cmd. > ADC Range
 - Stroke Shift
 - Stroke Span Increase
 - Stroke Span Decrease
- Calibration Progress Status:**
 - Stroke Cal. in Prog.
 - AMGT_IDC_CHECKMGTSETIL
 - Pressure Cal. in Prog.
 - Friction Cal. in Prog.
 - Cmd In Cal. in Prog.
 - A/O Cal. in Prog.
 - Jog Cal - Set 100%
- Electronic Config Status:**
 - Aux. Card 1 Present
 - Aux. Card 2 Present
 - Press. Board Present
 - LCD Present
- Legend:**
 - Status
 - Active
 - Masked

Buttons at the bottom: Apply, Retrieve, Print Report

Status Area

The *Active Indicator* area shows the status of the most relevant active indicator. The color of the "LED light" corresponds to the Active Indicator and the first color of the blink code sequence on the positioner. Generally green indicates no immediate issues. Yellow indicates a developing issue. Red indicates the ability to control may be compromised. A detailed list of the indicators is given in the [Alarm Congfiguraion - Alarm Annunicator](#) page. The *Command Source* field indicates whether the positioner is being controlled by digital or an analog (4-20 mA) command source.

Partial screenshot showing:






- Active Indicator:** Green LED indicator.
- System Nominal:** Dropdown menu.
- Command Source:** Dropdown menu set to "Analog".

Legend

Each indicator group box may contain the following components:

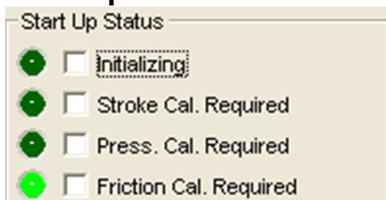
- An "LED light" indicates health status. Warning and alarm limits (set by the

user in many cases) determine the conditions when the color will turn from green to yellow to red. The most severe of the indicators on this page will be shown in the health bar on the Dashboard.

-  **Dark Green** circle indicates a healthy condition where no attention is needed.
-  **Light Green** indicates an occurrence of a normal activity that does not affect the health of the valve system.
-  **Yellow** circle indicates that an active warning, alert or mode is present.
-  **Red** circle indicates that an active alarm or state is present that could seriously limit the operation of the valve.
-  **Gray** circle indicates that the feature or condition is not available because the configuration of the hardware or software does not support it.
- A checkbox indicates the masked status. Check to mask. If a particular indicator is masked, it will not be shown in the active indicator field at the top of each screen, affect the status of the health bars on the main dashboard, be sent in command 48, or be seen on the blinking LEDs on the positioner. It will however continue to show on this page.



Start Up Status



Initializing

- **Definition:** The positioner has powered up and is displaying a blink sequence 3 times.
- **Possible Solutions:** Wait for 3 blink sequences to complete.

Stroke Calibration Required

- **Definition:** A factory reset was performed and the positioner has not yet been calibrated. The unit will not respond to commands and will remain in the fail-safe position until a calibration is successfully completed.
- **Possible Solutions:** Perform a Stroke Calibration (QUICK-CAL) by holding the QUICK-CAL/ACCEPT button down for 3 seconds, or perform a Pressure or Friction calibration if desired. See the Calibration section of the IOM for warnings.

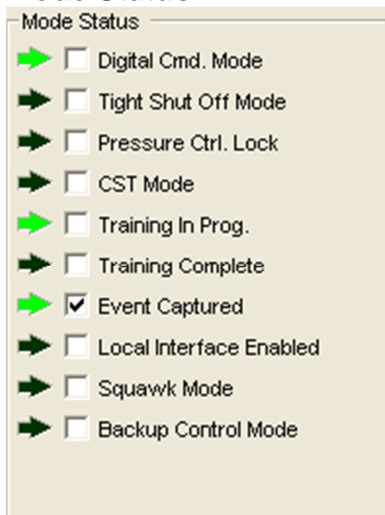
Pressure Calibration Required

- **Definition:** A Factory Pressure Calibration has not been performed. Unlike a regular pressure sensor calibration, a Factory Pressure Calibration saves the calibration values to memory, making them available should a factory reset be performed. Proper pressure sensor calibration is required for proper pressure sensing and diagnostics. Calibration values from a regular pressure sensor calibration will be lost when a factory reset is performed. Typically no pressure calibration is required with a new positioner.
- **Possible Solutions:** After replacing a main board or a pressure sensor board, perform a Factory Pressure Calibration. To do this, see the Pressure Sensor Board Removal and Installation section of the IOM.

Friction Calibration Required

- **Definition:** No friction calibration has been performed since the last factory reset. The friction calibration determines a preliminary friction value, spring forces and direction and other information used for proper diagnostics. If no friction calibration is performed, the positioner will soon determine the operating friction, but other diagnostic information will be missing.
- **Possible Solutions:** Perform a Friction Calibration using the display menu, handheld, or Sensor Calibration page of the DTM. See the Calibration section of the IOM for warnings.

Mode Status



Digital Command Mode

- **Definition:** The input command is set by a digital HART command instead of the 4-20 mA signal.
- **Possible Solutions:** The input command source can be changed back to the 4-20 mA signal by using a handheld, the Dashboard page of the DTM, or performing a manual Command Reset. Perform the Command Reset during a QUICK-CAL by holding both the UP and DOWN buttons and briefly pressing the QUICK-CAL/ACCEPT button. A new QUICK-CAL must be performed after resetting.



Tight Shut Off Mode

- **Definition:** - (Also called MPC.) The Final Command is beyond the user set limit for the tight shutoff feature and the positioner is applying full actuator pressure to close (or open) the valve. This is a normal condition for all valves when closed. The factory default setting triggers this at command signals below 1%. This indication may also occur on 3 way valves at both ends of travel if the upper Tight Shut Off value has been set.
- **Possible Solutions:** If tight shutoff is not desired reset the tight shutoff limits or adjust the command signal inside of the specified Tight Shut Off values.

Pressure Control Lock

- **Definition:** The pressures are held constant (locked), improving the stability of the valve position. When the position of the valve gets very close to the commanded position, the positioning algorithm will change to pressure control. The point at which the pressure control is locked depends on the Valve Stability switch on the positioner. When the switch is set to "Lo Friction", the locking point is self-adjusting to optimize accuracy. When the switch is set to "Hi Friction" and the deviation is smaller than +/- 1.0% (default), the pressure "locks". The High Friction window size can be changed to optimize the response for valves and actuators with high friction levels. This setting slightly slows the response and will normally stop limit cycling that can occur on high friction valves.
- **Possible Solutions:** If "Hi Friction" is set and this indicator never comes on, the error band limits may need to be adjusted using the Pressure Control page of the DTM or the Display Menu. Use the Valve Stability Configuration Switch to toggle the Valve Stability from "Lo Friction" to "Hi Friction" mode. A QUICK-CAL must be performed to apply the switch settings. If a QUICK-CAL cannot be performed, use the DTM to activate and set the "Hi Friction" window setting. .

CST Mode (Continuous Stroke Test Mode)

- **Definition:** When there is no variation in the command input, this feature is deliberately moving the valve as little as possible in order to perform diagnostics and ensure the valve is functioning.
- **Possible Solutions:** If more stability is required, turn off Continuous Stroke Test mode, or configure the rate of travel, period, and allowable movement using the Continuous Stroke page of the DTM.

Training Mode

- **Definition:** The positioner is gathering data for a certain period of time. This data can be used in the DTM to help set reasonable limits for diagnostic warnings and alarms.
- **Possible Solutions:** Training has no effect on control. Allow the training to finish if the process conditions are typical. Or start the training over if new process conditions have been applied. See the Training Mode page in the DTM for configuration.



Training Complete

- **Definition:** The positioner has finished gathering data for the specified amount of time. This data can now be used to benchmark typical conditions.
- **Possible Solutions:** Data is available to set more meaningful diagnostic warning and alarm limits.

Event Captured

- **Definition:** A user-defined condition was met and a data file was generated to show conditions at the time of the event.
- **Possible Solutions:** Use the Event Capture page of the DTM to view the data captured during the event.

Local Interface Enabled

- **Definition:** Control and configuration features are locked at the positioner's local interface. This is to prevent unauthorized or accidental adjustments. The buttons can still be used to view information on the LCD. The status code is only present for a short time when the user attempts to make a change through the display menu.
- **Possible Solutions:** The DTM's Local Interface page is used to unlock the local interface, turn this feature on and off, and to set the PIN. For temporary access, a Personal Identification Number (PIN) can be entered from the positioner if an LCD is installed.

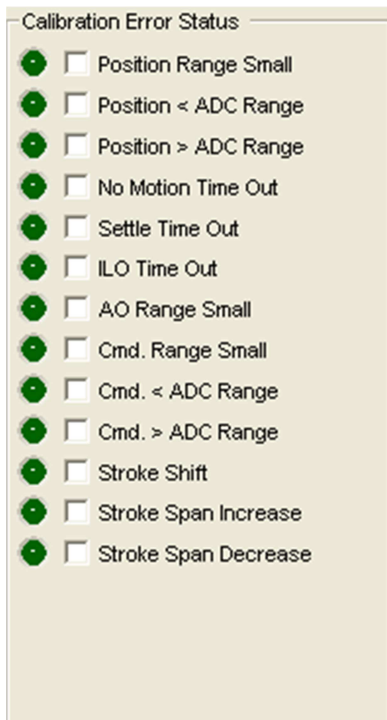
Squawk Mode

- **Definition:** A user has set the positioner to flash a special sequence so that it can be visually located.
- **Possible Solutions:** This mode is cancelled if one of the following occurs: 1) The QUICK-CAL/ACCEPT button is briefly pressed. 2) The Squawk mode is selected again remotely. 3) More than one hour has passed since the command was issued.

Backup Control Mode

- **Definition:** The positioner is controlling the position based on actuator pressures instead of the feedback POT.
- **Possible Solutions:** The feedback linkage is probably broken or the feedback arm needs to be rotated because the POT is out of range.

Calibration Error Status



Position Range Small

- **Definition:** During calibration, the range of motion of the position feedback arm was too small for optimum performance.
- **Possible Solutions:** Check for loose linkages and/or adjust the feedback pin to a position closer to the follower arm pivot to create a larger angle of rotation and recalibrate. The minimum angle of rotation should be greater than 15 degrees. Briefly pressing the QUICK-CAL/ACCEPT button acknowledges this condition and the positioner will operate using the short stroke calibration if otherwise a good calibration.

Position < ADC Range

- **Definition:** During calibration, the feedback sensor moved beyond its range of operation at the 0% (closed) position.
- **Possible Solutions:** Adjust the positioner mounting, linkage or feedback potentiometer to move the position sensor back into range then restart the calibration.

Position > ADC Range

- **Definition:** During calibration, the feedback sensor moved beyond its range of operation at the 100% (open) position.
- **Possible Solutions:** To correct the condition, adjust the positioner mounting, linkage or feedback potentiometer to move the position sensor back into range then restart the calibration.

No Motion Time Out

- **Definition:** During a stroke calibration, there was no valve motion detected. Because some valves are quite large, this indicator can take up to 9 minutes to detect an error.

- **Possible Solutions:** Check linkages and air supply to make sure the system is properly connected. If the time out occurred because the actuator is very large then simply retry the QUICK-CAL and the positioner will automatically adjust for a larger actuator by doubling the time allowed for movement. This error may be cleared by briefly pushing the QUICK-CAL/ACCEPT.

Settle Time Out

- **Definition:** During calibration, the position feedback sensor showed movement, but did not settle.
- **Possible Solutions:** Check for loose linkages or a loose positioner sensor. This error may appear on some very small actuators during the initial calibration. Recalibrating may clear the problem, or this error may be cleared by briefly pushing the QUICK-CAL/ACCEPT button.

ILO Time Out

- **Definition:** During calibration the Inner Loop Offset (ILO) value did not settle. This could result in less accurate positioning.
- **Possible Solutions:** Repeat the stroke calibration to get a more accurate ILO value. To proceed using the less accurate ILO value, this error may be cleared by briefly pushing the QUICK-CAL/ACCEPT button. Lowering the setting on the gain selection switch may help if the actuator is unstable during the calibration.

AO Range Small

- **Definition:** During an Analog Output Calibration the difference between the milliamp signal at 0% and the milliamp signal at 100% was too small.
- **Possible Solutions:** Recalibrate making sure to use a larger difference between signal limits. This notification can be cleared by briefly pressing the QUICK-CAL/ACCEPT button.

Command Range Small

- **Definition:** During a Command Loop Calibration, the difference between the signal at 0% and the signal at 100% was too small. The system is designed to accept a difference greater than 5 mA.
- **Possible Solutions:** Recalibrate making sure to use a larger difference between command signal limits. The difference must exceed 5 mA.

Command < ADC Range

- **Definition:** During Command Loop Calibration, the 0% signal was out of the Analog to Digital Converter (ADC) range.
- **Possible Solutions:** The system is designed to accept a signal that is above 10 ADC counts. Recalibrate making sure the ADC counts are above that limit.

Command > ADC Range

- **Definition:** During Command Loop Calibration, the 100% signal was out of the Analog to Digital Converter (ADC) range.
- **Possible Solutions:** The system is designed to accept a signal that is below 4085 ADC counts. Recalibrate making sure the ADC counts are

below that limit.

Stroke Shift

- **Definition:** The 0% and 100% valve positions have both shifted in the same direction since the last stroke calibration. This may be related to a bent or adjusted feedback linkage, loose positioner mounting, or an over rotated feedback potentiometer.
- **Possible Solutions:** Ensure the feedback linkage is not bent and the positioner is mounted securely. If the feedback potentiometer is over-rotated, repeat the stroke calibration until the Stroke Shift error is no longer present. This notification can be cleared by briefly pressing the QUICK-CAL/ACCEPT button.

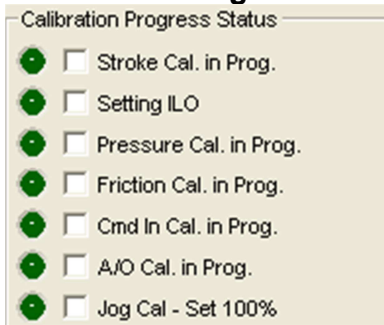
Stroke Span Increase

- **Definition:** The 0% and 100% valve positions are farther apart compared to the last stroke calibration. This could indicate seat wear.
- **Possible Solutions:** Inspect valve or schedule valve for inspection. This notification can be cleared by briefly pressing the QUICK-CAL/ACCEPT button

Stroke Span Decrease

- **Definition:** The 0% and 100% valve positions are closer together compared to the last stroke calibration. This could indicate debris or build up at valve seat.
- **Possible Solutions:** Inspect valve or schedule valve for inspection. This notification can be cleared by briefly pressing the QUICK-CAL/ACCEPT button.

Calibration Progress Status



Stroke Calibration in Progress

- **Definition:** A stroke calibration sequence is in progress.
- **Possible Solutions:** The calibration can be canceled from the Sensor Calibration page of the DTM, from the handheld, or by briefly pressing the Abort button.

Setting ILO

- **Definition:** This is an automatic step in the calibration process that is done with the valve at 50% position. This must be completed for proper calibration.
- **Possible Solutions:** The calibration can be canceled from the Sensor Calibration page of the DTM, from the handheld, or by briefly pressing

the Abort button.

Pressure Calibration in Progress

- **Definition:** A pressure calibration sequence is in progress.
- **Possible Solutions:** The calibration can be canceled from the Sensor Calibration page of the DTM, from the handheld, or by briefly pressing the Abort button.

Friction Calibration in Progress

- **Definition:** A friction and diagnostic calibration sequence is in progress.
- **Possible Solutions:** The calibration can be canceled from the Sensor Calibration page of the DTM, from the handheld, or by briefly pressing the Abort button.

Command In Calibration in Progress

- **Definition:** The command input calibration sequence is in progress.
- **Possible Solutions:** The calibration can be canceled from the Sensor Calibration page of the DTM, from the handheld, or by briefly pressing the Abort button

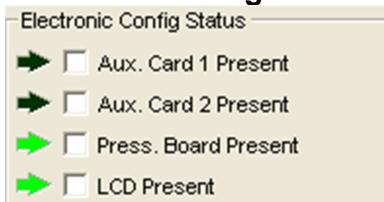
A/O Calibration in Progress

- **Definition:** The analog output calibration sequence is in progress.
- **Possible Solutions:** The calibration can be canceled from the Sensor Calibration page of the DTM, from the handheld, or by briefly pressing the Abort button

Jog Calibration in Progress

- **Definition:** During a jog calibration, the unit is waiting for the user to manually adjust the valve position to the desired 100% open position.
- **Possible Solutions:** Use the Up and Down buttons on the positioner to adjust the valve to the desired fully open position. The QUICK-CAL/ACCEPT button to accept.

Electronic Configuration Status



Aux. Card 1 Present

- **Definition:** An auxiliary card is present in slot 1.
- **Possible Solutions:** Two cards may be installed. See manual for more details.

Aux. Card 2 Present

- **Definition:** An auxiliary card is present in slot 2.
- **Possible Solutions:** Two cards may be installed. See manual for more details.

Pressure Board Present

- **Definition:** Pressure sensors are physically present in the positioner.

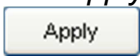
- **Possible Solutions:** The sensors are required for many of the diagnostic and performance features. Positioner can accurately control without pressure sensors if the pressure sensor ports have been properly plugged.

LCD Present

- **Definition:** An LCD display is present on this unit.
- **Possible Solutions:** The LCD enhances the local user interface with additional features.

Action Buttons

The *Apply* button will save changes to the connected device.

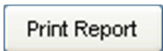


The *Retrieve* button will retrieve the latest information from the device.



The *Print Report* button will print a report to default printer (see example below).
Information includes:

- Information about the connected device
- The active status of the alarms, warnings and alerts.
- The masked status.
- The current value (where applicable).
- The value threshold (where applicable).



NOTE: It is possible to print the report to save to a **PDF** file. Instructions:

1. Download and install the free version of PDFCreator.
2. Install the PDFCreator
3. Set PDFCreator as the default Printer
4. Click Print Report and save the report to a pdf file in your computer.



Alarms/Alerts Report

Logix MD+ DEVICE TAG ID: HART TAG DEVICE VERSION:MD+ Pro Diagnostics
 ACTUATOR INFO --> Size: 25, Manufacturer: Valtek (Piston), Type: Linear (piston), Spring Type: Single
 VALVE BODY INFO --> Model: Mark One, Body Size: .25 INCH / DN 6, Flow Direction: Flow Over, Fail Position: Mechanical Fail Closed

Start Up Status	Active	Masked
Initializing	<input type="checkbox"/>	<input type="checkbox"/>
Stroke Cal. Required	<input type="checkbox"/>	<input type="checkbox"/>
Press. Cal. Required	<input type="checkbox"/>	<input type="checkbox"/>
Friction Cal. Required	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Mode Status	Active	Masked
Digital Cmd. Mode	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Tight Shut Off Mode	<input type="checkbox"/>	<input type="checkbox"/>
Pressure Ctrl. Lock	<input type="checkbox"/>	<input type="checkbox"/>
CST Mode	<input type="checkbox"/>	<input type="checkbox"/>
Training In Prog.	<input type="checkbox"/>	<input type="checkbox"/>
Training Complete	<input type="checkbox"/>	<input type="checkbox"/>
Event Captured	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Local Interface Enabled	<input type="checkbox"/>	<input type="checkbox"/>
Squawk Mode	<input type="checkbox"/>	<input type="checkbox"/>

Calibration Error Status	Active	Masked
Position Range Small	<input type="checkbox"/>	<input type="checkbox"/>
Position < ADC Range	<input type="checkbox"/>	<input type="checkbox"/>
Position > ADC Range	<input type="checkbox"/>	<input type="checkbox"/>
No Motion Time Out	<input type="checkbox"/>	<input type="checkbox"/>
Settle Time Out	<input type="checkbox"/>	<input type="checkbox"/>
ILO Time Out	<input type="checkbox"/>	<input type="checkbox"/>
AO Range Small	<input type="checkbox"/>	<input type="checkbox"/>
Cmd. Range Small	<input type="checkbox"/>	<input type="checkbox"/>
Cmd. < ADC Range	<input type="checkbox"/>	<input type="checkbox"/>
Cmd. > ADC Range	<input type="checkbox"/>	<input type="checkbox"/>
Stroke Shift	<input type="checkbox"/>	<input type="checkbox"/>
Stroke Span Increase	<input type="checkbox"/>	<input type="checkbox"/>
Stroke Span Decrease	<input type="checkbox"/>	<input type="checkbox"/>



Calibration Progress Status	Active	Masked
Stroke Cal. in Prog.	<input type="checkbox"/>	<input type="checkbox"/>
Setting ILO	<input type="checkbox"/>	<input type="checkbox"/>
Pressure Cal. in Prog.	<input type="checkbox"/>	<input type="checkbox"/>
Friction Cal. in Prog.	<input type="checkbox"/>	<input type="checkbox"/>
Cmd In Cal. in Prog.	<input type="checkbox"/>	<input type="checkbox"/>
A/O Cal. in Prog.	<input type="checkbox"/>	<input type="checkbox"/>
Jog Cal - Set 100%	<input type="checkbox"/>	<input type="checkbox"/>

Position Status	Active	Masked
Aux. Card 1 Present	<input type="checkbox"/>	<input type="checkbox"/>
Aux. Card 2 Present	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Press. Board Present	<input checked="" type="checkbox"/>	<input type="checkbox"/>
LCD Present	<input checked="" type="checkbox"/>	<input type="checkbox"/>

4/27/2012 11:09:20 AM Page 2/2

Event History

The *Event History* page lists alarms, warnings, alerts, modes and calibration events that have become active or changed states. A time is given for each event.

Active Indicator: Friction Calibration Required Command Source: Digital

Select History (Click Retrieve to View)

- Last Calibration Events (40)
- Last Alarm and Warning Events (200)
- Last Calibration and Alarm Events (32)

HISTORY

Date	Time	State	Error #	Indicator
14.5.12	13:47:37	OFF	81	Calibration In Progress
14.5.12	13:47:37	OFF	24	Stroke Calibration in Progress
14.5.12	13:47:15	ON	81	Calibration In Progress
14.5.12	13:47:15	ON	24	Stroke Calibration in Progress
14.5.12	11:45:58	OFF	80	Factory Reset State - Calibrate.
12.5.12	16:21:10	ON	17	Training Mode In Progress
11.5.12	16:21:25	ON	223	Firmware Update Applied
25.4.12	16:39:23	OFF	17	Training Mode In Progress

Description:
The positioner is in factory reset state. Calibration is required to enable control.

Retrieve
Print Report

Status Area

The *Active Indicator* area shows the status of the most relevant active indicator. The color of the "LED light" corresponds to the Active Indicator and the first color of the blink code sequence on the positioner. Generally green indicates no immediate issues. Yellow indicates a developing issue. Red indicates the ability to control may be compromised. A detailed list of the indicators is given in the [Alarm Configuration - Alarm Annunicator](#) page. The *Command Source* field indicates whether the positioner is being controlled by digital or an analog (4-20 mA) command source.

Active Indicator: System Nominal Command Source: Analog

Select History

This box radio buttons to allow for selection of the set of events to view. The Event History displays the date and time when the event occurred, indicates the state of the event (On or Off), and the event indicator description. All information is read from the positioner (while connected to Device).

- The Last Calibration Events radio button displays the last 40 calibrations with

time information.

- The Last Alarm and Warning Events radio button displays the last 200 alarms, warnings and alerts with time information.
- The Last Calibration and Alarm Events radio button displays the 32 events with time information.

To see a detailed description of a specific event, click on the grid to select a row. The description will be shown in the box below.



The Clear History button will delete the existing event history from the device.

Retrieve

The Retrieve button will retrieve the event history of the selected history from the device.

The Print Report button will print to the default printer the following: (See an example report below.)

Print Report

Information about the connected device

- The selected event history (calibration, alarms and warnings, or both)
- Each event detail retrieved from device:
 - Date
 - Time
 - State
 - Error #
 - Indicator

NOTE: It is possible to print the report to save to a **PDF** file. Instructions:

1. Download and install the free version of PDFCreator.
2. Install the PDFCreator
3. Set PDFCreator as the default Printer
4. Click Print Report and save the report to a pdf file in your computer.



Event History Report

Logix MD+ DEVICE TAG ID: HART TAG DEVICE VERSION: MD+ Pro Diagnostics
 ACTUATOR INFO --> Size: 25, Manufacturer: Valtek (Piston), Type: Linear (piston), Spring Type: Single
 VALVE BODY INFO --> Model: Mark One, Body Size: .25 INCH / DN 6, Flow Direction: Flow Over, Fail Position: Mechanical Fail Closed

Selected History

- Last Calibration Events (40)
- Last Alarm and Warning Events (200)
- Last Calibration and Alarm Events (32)

Event History

Date	Time	State	Error #	Indicator
4/25/12	16:39:23	OFF	17	Training Mode In Progress
4/25/12	16:14:21	OFF	165	Aux Card 2 Error
4/25/12	16:14:21	ON	163	Aux Card 2 No Loop Power
4/25/12	16:14:21	ON	165	Aux Card 2 Error
4/25/12	16:14:19	ON	0	No Data
3/23/12	16:22:8	OFF	0	No Data
3/23/12	16:24:24	ON	122	Supply Pressure Low Alarm
3/21/12	16:28:13	ON	17	Training Mode In Progress
3/20/12	17:10:9	OFF	82	Signature or Partial Stroke Test in Progress
3/20/12	17:9:54	ON	82	Signature or Partial Stroke Test in Progress
3/20/12	16:30:58	OFF	81	Calibration In Progress
3/20/12	16:30:58	OFF	24	Stroke Calibration in Progress
3/20/12	16:30:48	OFF	165	Aux Card 2 Error
3/20/12	16:30:42	ON	165	Aux Card 2 Error
3/20/12	16:30:34	OFF	80	Factory Reset State - Calibrate.
3/20/12	16:30:34	ON	81	Calibration In Progress
3/20/12	16:30:34	ON	24	Stroke Calibration in Progress
3/20/12	16:28:12	ON	223	Firmware Update Applied
3/20/12	16:28:12	ON	0	No Data
3/20/12	16:18:54	OFF	0	No Data
3/2/12	12:43:12	ON	0	No Data
3/2/12	12:36:5	OFF	0	No Data
2/27/12	11:12:10	ON	0	No Data
2/10/12	17:9:2	OFF	0	No Data
2/1/12	13:57:11	ON	0	No Data
1/31/12	16:0:54	OFF	0	No Data
1/30/12	15:48:56	ON	0	No Data
1/30/12	15:48:46	OFF	0	No Data
1/30/12	15:48:44	ON	0	No Data
1/30/12	15:48:28	OFF	0	No Data
1/30/12	10:42:29	ON	0	No Data

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Page 1/2



Health

Health pages allow quick viewing of the state of all diagnostics. This selection automatically redirects to the *Valve Health* page.

Valve Health

The *Valve Health* page shows information about all indicators related to the condition of the valve.






Status Area

The *Active Indicator* area shows the status of the most relevant active indicator. The color of the "LED light" corresponds to the Active Indicator and the first color of the blink code sequence on the positioner. Generally green indicates no immediate issues. Yellow indicates a developing issue. Red indicates the ability to control may be compromised. A detailed list of the indicators is given in the [Alarm Congfiguraion - Alarm Annunicator](#) page. The *Command Source* field indicates weather the positioner is being controlled by digital or an analog (4-20 mA) command source.

Indicators

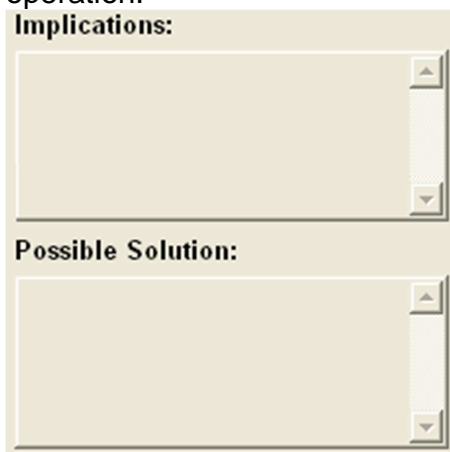
Each indicator group box may contain the following components:

- An "LED light" indicates health status. Warning and alarm limits (set by the user in many cases) determine the conditions when the color will turn from green to yellow to red. The most sever of the indicators on this page will be shown in the health bar on the Dashboard.
 - **Dark Green** circle indicates a healthy condition where no attention is needed.

-  **Light Green** indicates an occurrence of a normal activity that does not affect the health of the valve system.
-  **Yellow** circle indicates that an active warning, alert or mode is present.
-  **Red** circle indicates that an active alarm or state is present that could seriously limit the operation of the valve.
-  **Gray** circle indicates that the feature or condition is not available because the configuration of the hardware or software does not support it.
- A checkbox indicates the masked status. Check to mask. If a particular indicator is masked, it will not be shown in the active indicator field at the top of each screen, affect the status of the health bars on the main dashboard, be sent in command 48, or be seen on the blinking LEDs on the positioner. It will however continue to show on this page.
- A radio button that when selected will show the Implications and Possible Solutions related to the selected indicator.
- lbf The current value and units.
-  A button to set values to 0.
- [Configure](#) A link to redirect the DTM to the configuration page.

Implications and Possible Solutions

When a radio button is checked for an indicator, the related implications and possible solutions are displayed. The Implications field describes the conditions that trigger the indicator. The Possible Solutions field describes actions you might take to restore normal operation.



The screenshot shows two vertically stacked text areas. The top one is labeled 'Implications:' and the bottom one is labeled 'Possible Solution:'. Both areas are currently empty and have scroll bars on their right sides.

NOTE: Flowserve does not recommend any action, only lists possible actions that could restore the system to normal operation. Qualified maintenance personnel should evaluate the possible solutions, all safety procedures and all other applicable factors on a case by case basis when determining the best action to take.

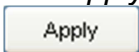
Legend

The legend shows the purpose of the icons.

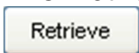


Action Buttons

The *Apply* button will save changes to the connected device.



The *Retrieve* button will retrieve the latest information from the device.



Indicators

Friction High

- **Definition:** The valve and actuator friction has passed the user set limit.
- **Implications:** High friction can cause loop oscillations, poor position control, jerky motion, or valve sticking. It can be caused by build-up from the process on the stem, trim or seat, by a failing bearing or guides in the valve and actuator, galling of the trim or stem, excessively tightened packing, linkages, or other valve or actuator mechanical issues.
- **Possible Solutions:** Determine if the friction is significantly interfering with the valve control. If not, consider increasing the friction warning limit. Consider the following to reduce friction: Stroke the valve to clear off build-up. Clear any external mechanical obstruction, loosen the packing, clean the stem, repair or replace the actuator. Highly localized friction or very jerky travel can indicate internal galling. Repair or replace internal valve components.

Friction Low

- **Definition:** The friction has passed below the user set limit.
- **Implications:** Low friction is an indication of improperly loaded packing and, in severe cases, can be an indication of the process fluid leaking at the valve stem.
- **Possible Solutions:** Check for packing leak. Tighten or replace the valve packing.

Valve Cycles

- **Definition:** The valve cycle limit has been exceeded.
- **Implications:** Each cycle represents two reversals of the direction of valve movement. The cycle counting criterion and count limit are set by the user to track the usage of the valve.
- **Possible Solutions:** Follow routine procedures for maintenance when the limit is reached such as checking the packing tightness, and

checking linkages for wear, misalignment, and tightness. After maintenance, reset the cycle accumulator.

Valve Travel

- **Definition:** The total accumulated valve travel limit has been exceeded.
- **Implications:** The travel is accumulated in both directions. The travel counting criterion and limit are set by the user to track the usage of the valve.
- **Possible Solutions:** Follow routine procedures for maintenance when the limit is reached such as checking the packing tightness, and checking linkages for wear, misalignment, and tightness. After maintenance, reset the travel accumulator.

Bellows Cycles

- **Definition:** The bellows cycle limit has been exceeded.
- **Implications:** The bellows may be reaching the end of its fatigue life. Each cycle represents two reversals of the direction of bellows movement. The cycle counting criterion and count limit are set by the user to track the usage of the valve.
- **Possible Solutions:** Follow routine procedures for maintenance when the limit is reached such as checking bellows for cracking or leaking. After maintenance, reset the cycle accumulator.

Bellows Travel

- **Definition:** The bellows cycle limit has been exceeded.
- **Implications:** The bellows may be reaching the end of its fatigue life. Each cycle represents two reversals of the direction of valve movement. The cycle counting criterion and count limit are set by the user to track the usage of the valve.
- **Possible Solutions:** Follow routine procedures for maintenance when the limit is reached such as checking bellows for cracking or leaking. After maintenance, reset the cycle accumulator.

Valve Can't Open

- **Definition:** Pressure has been applied (or removed) to open the valve, but the valve is not opening.
- **Implications:** This may be caused by excessive friction.
- **Possible Solutions:** Verify adequate supply pressure is applied. Verify the feedback linkage is connected. View the friction trends if available. Consider the following: Clear any external or internal mechanical obstruction, loosen the packing, clean the stem, repair or replace the actuator, repair the valve if galling is suspected.

Valve Can't Shut

- **Definition:** Pressure has been removed (or applied) to close the valve, but the valve is not closing.
- **Implications:** This may be caused by excessive friction.
- **Possible Solutions:** Verify adequate supply pressure is applied. Verify the feedback linkage is connected. View the friction trends if available. Consider the following: Clear any external or internal



mechanical obstruction, loosen the packing, clean the stem, repair or replace the actuator, repair the valve if galling is suspected.

Closed Too Far

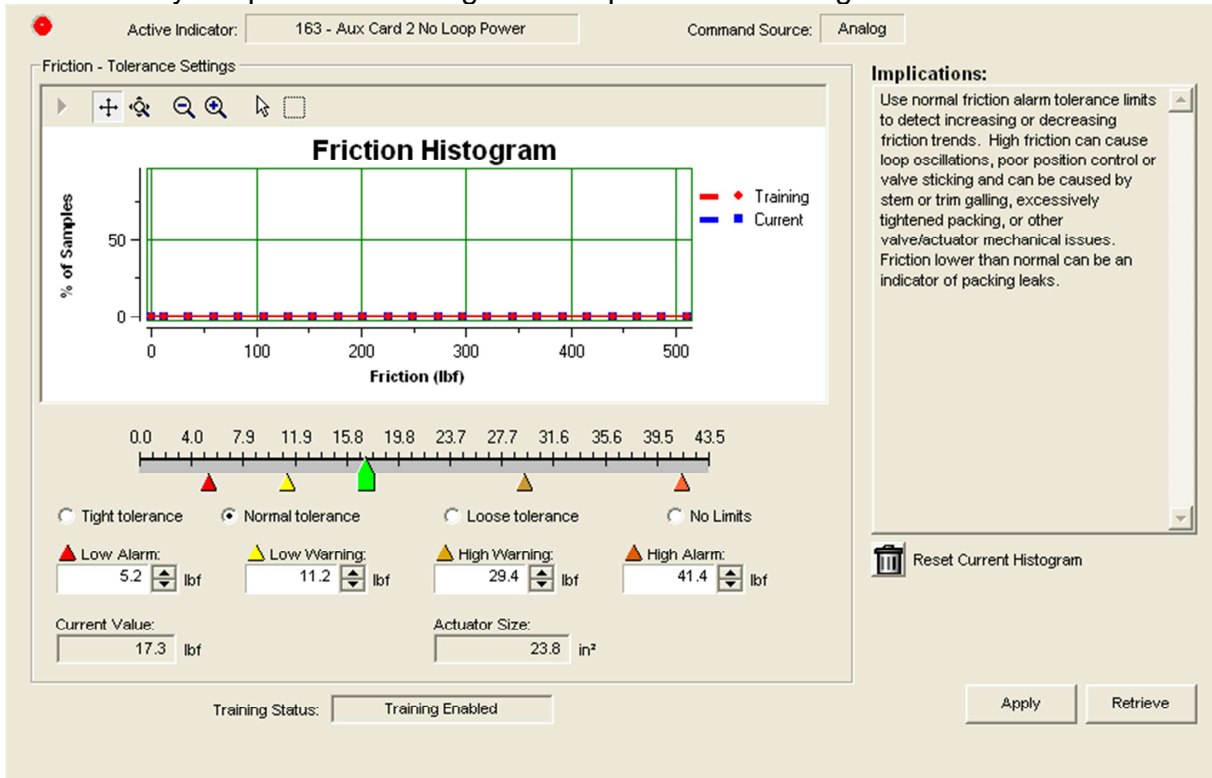
- **Definition:** The valve has closed farther than it did at the last calibration
- **Implications:** While the valve was in use, it closed farther than it did at the last calibration by 0.5%.
- **Possible Solutions:** Check the feedback arm linkage and ensure the valve stem connection is tight. Recalibrate the stroke. If the process cannot be interrupted a service technician may be able to adjust the calibration.

Opened Too Far

- **Definition:** The valve has opened farther than it did at the last calibration
- **Implications:** While the valve was in use, it opened farther than it did at the last calibration by 0.5%.
- **Possible Solutions:** Check the feedback arm linkage and ensure the valve stem connection is tight. Recalibrate the stroke. If the process cannot be interrupted a service technician may be able to adjust the calibration.

Friction

The *Friction Tolerance Settings* page allows you to adjust the warning and alarm limits related to friction. Friction is the force required to move the valve assembly. Friction is calculated by the positioner during normal operation or during a friction calibration.



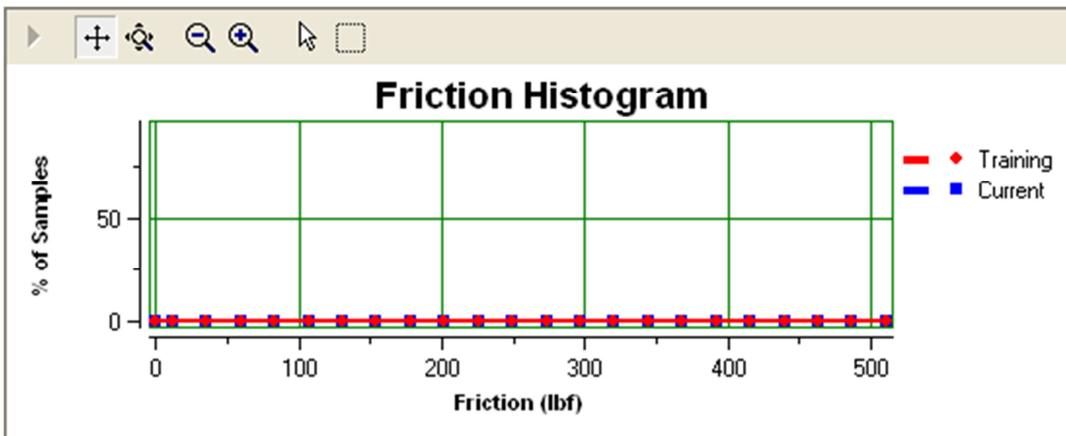
Status Area

The *Active Indicator* area shows the status of the most relevant active indicator. The color of the "LED light" corresponds to the Active Indicator and the first color of the blink code sequence on the positioner. Generally green indicates no immediate issues. Yellow indicates a developing issue. Red indicates the ability to control may be compromised. A detailed list of the indicators is given in the [Alarm Configuration - Alarm Annunciator](#) page. The *Command Source* field indicates whether the positioner is being controlled by digital or an analog (4-20 mA) command source.



Friction Histogram

The graph displays a histogram with current values and a histogram with data gathered during the training period. This is an easy way to see the range of typical values to set meaningful warning and alarm limits. It is also helpful to see how the data may have shifted since the training period. The histogram is frequently updated when the positioner is in operation.



Reset Current Histogram

The reset button will clear the Current histogram, but leave the Training histogram.



Current Value

This is the value calculated by the positioner. This value is initially set during a Friction Calibration, then updated during operation.

Current Value:
 lbf

Actuator Size

Verify that the actuator size is accurate. Changing the actuator size will affect the friction values. Actuator size can be adjusted on the Configuration - Information - Actuator page of the DTM.

Actuator Size:
 in²

Friction Warning and Alarm Limits

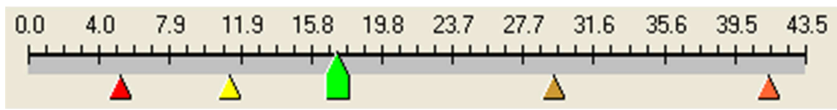
The friction limits (Low Alarm Limit, Low Warning Limit, High Warning Limit, and High Alarm Limit) can be easily adjusted on this page. These limits affect the health bar indicator on the Dashboard. For example, as the friction increases and passes the High Warning, the health bar will begin to turn yellow. As it approaches the High Alarm, the health bar will be completely yellow. When it passes the High Alarm, the health bar will turn red.

Setting Friction Limits

Here are three ways to adjust the friction warning and alarm limits.

NOTE: The apply button must be selected for the changes to take affect.

1. Move the scale indicators. A scale indicating the current friction values and the warning and alarm limits is shown. The limits can be adjusted by "dragging" each limit indicator with a mouse click.



2. Use the input boxes. Numbers can be directly typed. Clicking on the up and down arrows will also change the value.

Low Alarm: lbf
 Low Warning: lbf
 High Warning: lbf
 High Alarm: lbf

3. Select a radio button. To automatically set friction tolerance limits, select one of the 4 radio buttons.

Tight tolerance
 Normal tolerance
 Loose tolerance
 No Limits

Upon selecting one of the tolerance buttons, a description of each setting (Tight tolerance, Normal Tolerance, Loose tolerance, and No Limits) is shown in the **Implications** box.

Implications:

Use normal friction alarm tolerance limits to detect increasing or decreasing friction trends. High friction can cause loop oscillations, poor position control or valve sticking and can be caused by stem or trim galling, excessively tightened packing, or other valve/actuator mechanical issues. Friction lower than normal can be an indicator of packing leaks.

Upon selecting one of the tolerance buttons, the limits will automatically adjust according to the following table.

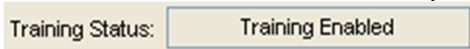
	Friction Low Alarm	Friction Low Warning	Friction High Warning	Friction High Alarm
Tight	45%	80%	140%	210%
Normal	30%	65%	170%	240%
Loose	10%	45%	210%	280%
No Limits	0	0	10000	10000

NOTE: Before setting automatic friction values, ensure the Current Value is reasonable, or that the valve has been in service for a period of time.

Training Status

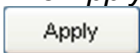
Training Status is present on this page because one or more fields or graphs shows data that was gathered during the training process. The field shows one of the following states:

- Training Enabled - which indicates system data is being recorded. Training should run during normal system behavior.
- Training Disabled - which indicates NO system data is being recorded.
- Training Complete which indicates that the time period for training has expired and the data is stored in the positioner.



Action Buttons

The *Apply* button will save changes to the connected device.



The *Retrieve* button will retrieve the latest information from the device.



Warning and Alarms

Friction High

- **Definition:** The valve and actuator friction has passed the user set limit.
- **Implications:** High friction can cause loop oscillations, poor position control, jerky motion, or valve sticking. It can be caused by build-up from the process on the stem, trim or seat, by a failing bearing or guides in the valve and actuator, galling of the trim or stem, excessively tightened packing, linkages, or other valve or actuator mechanical issues.
- **Possible Solutions:** Determine if the friction is significantly interfering with the valve control. If not, consider increasing the friction warning limit. Consider the following to reduce friction: Stroke the valve to clear off build-up. Clear any external mechanical obstruction, loosen the packing, clean the stem, repair or replace the actuator. Highly localized friction or very jerky travel can indicate internal galling. Repair or replace internal valve components.

Friction Low

- **Definition:** The friction has passed below the user set limit.
- **Implications:** Low friction is an indication of improperly loaded packing and, in severe cases, can be an indication of the process fluid leaking at the valve stem.
- **Possible Solutions:** Check for packing leak. Tighten or replace the valve packing.

Valve Cycles & Travel

The *Valve Cycles and Travel* page allows you to set warning limits related to the number of valve cycles and the valve travel. The cycles and travel are recorded by the positioner during normal operation. These limits affect the health bar indicator on the Dashboard. For example, as the valve cycles increase and pass the *Initial Warning*, the health bar will begin to turn yellow. As it approaches the *Final Warning*, the health bar will be completely yellow.

Active Indicator: Command Source:

Valve Cycles

0 1100000 2200000 3300000 4400000 5500000

Current Value: Cycle Deadband: % Initial Warning: Full Warning:

Training Cycles Rate: cycles/day

Valve Travel

0 88000 176000 264000 352000 440000

Current Value: x 100% Travel Deadband: % Initial Warning: x 100% Full Warning: x 100%

Accumulated Travel: in. Training Travel Rate: %/day

Training Status:

Status Area

The *Active Indicator* area shows the status of the most relevant active indicator. The color of the "LED light" corresponds to the Active Indicator and the first color of the blink code sequence on the positioner. Generally green indicates no immediate issues. Yellow indicates a developing issue. Red indicates the ability to control may be compromised. A detailed list of the indicators is given in the [Alarm Configuration - Alarm Annunciator](#) page. The *Command Source* field indicates whether the positioner is being controlled by digital or an analog (4-20 mA) command source.

Active Indicator: Command Source:

Adjusting Limits

There are two ways to adjust the settings.

1. Move the scale indicators. The limits can be adjusted by "dragging" each limit indicator with a mouse click.



2. Use the input boxes. Numbers can be directly typed. Clicking on the up and down arrows will also change the value.

▲ Full Warning:
 ▲

NOTE: The apply button must be selected for the changes to take affect.

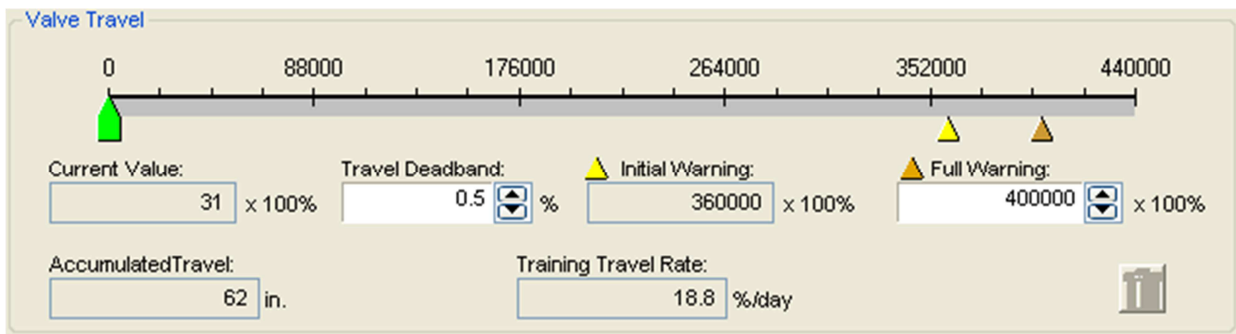
Set Valve Cycles Limits

The *Current Value* is the number of *Valve Cycles* counted by the positioner. The *Cycle Deadband* is the minimum amount of travel required in each direction before the cycle is counted. The *Initial Warning* is the point at which the *Valve Cycle Warning* will begin. The *Full Warning* is where the health bar on the Dashboard will show fully yellow. The *Full Warning* value is the only limit that can be modified. The *Initial Warning* is always 90% of the *Full Warning* value. The reset button will set the *Current Value* to zero. The *Training Cycle Rate* field displays average number of cycles per day of the valve during the training period. For more information about Training, see the [Health - Training](#) page.

Valve Cycles

Set Valve Travel Limits

The *Current Value* is the total valve travel recorded by the positioner. The *Travel Deadband* is the minimum amount of travel required before the travel is counted. The *Initial Warning* is the point at which the *Valve Travel Warning* will begin. The *Full Warning* is where the health bar on the Dashboard will show fully yellow. The *Full Warning* value is the only limit that can be modified. The *Initial Warning* is always 90% of the *Full Warning* value. The reset button will set the *Current Value* to zero. The *Accumulated Travel* is the same as the *Current Value*, but converted to the stroke length units of measure selected by you. To change the units of measure for the stroke length, see the [Configuration - Information - Actuator](#) page. The *Training Travel Rate* field displays average amount of travel per day of the valve during the training period. For more information about Training, see the [Health - Training](#) page.



Training Status

Training Status is present on this page because one or more fields or graphs shows data that was gathered during the training process. The field shows one of the following states:

- Training Enabled - which indicates system data is being recorded. Training should run during normal system behavior.
- Training Disabled - which indicates NO system data is being recorded.
- Training Complete which indicates that the time period for training has expired and the data is stored in the positioner.

NOTE: The Training function requires the Pro positioner upgrade level (522MD+).

Training Status:

Action Buttons

The *Apply* button will save changes to the connected device.

The *Retrieve* button will retrieve the latest information from the device.

Warning and Alarms

Valve Cycles

- **Definition:** The valve cycle limit has been exceeded.
- **Implications:** Each cycle represents two reversals of the direction of valve movement. The cycle counting criterion and count limit are set by the user to track the usage of the valve.
- **Possible Solutions:** Follow routine procedures for maintenance when the limit is reached such as checking the packing tightness, and checking linkages for wear, misalignment, and tightness. After maintenance, reset the cycle accumulator.

Valve Travel

- **Definition:** The total accumulated valve travel limit has been exceeded.
- **Implications:** The travel is accumulated in both directions. The travel counting criterion and limit are set by the user to track the usage of the valve.



- **Possible Solutions:** Follow routine procedures for maintenance when the limit is reached such as checking the packing tightness, and checking linkages for wear, misalignment, and tightness. After maintenance, reset the travel accumulator.

Bellows Cycles and Travel

The *Bellows Cycles and Travel* page allows you to set warning limits related to the number of bellows cycles and the bellows travel. The cycles and travel are recorded by the positioner during normal operation. These limits affect the health bar indicator on the Dashboard. For example, as the bellows cycles increase and pass the *Initial Warning*, the health bar will begin to turn yellow. As it approaches the *Final Warning*, the health bar will be completely yellow.

Guardian II Cycle Life*

Valve Size (inches)	ANSI Pressure Class	Full Stroke Cycles at 70° F (21° C)			
		150 psi (10.3 Bar)		600 psi (41.4 Bar)	
		Minimum	Average	Minimum	Average
½, ¾, 1	150, 300	2,000,000	5,000,000+	125,000	780,000
1½, 2	150, 300	2,000,000	5,000,000+	90,000	500,000
3	150, 300	520,000	2,000,000	40,000	250,000
4	150	500,000	2,500,000	—	—
4	300	275,000	1,400,000	33,000	160,000
6	150	200,000	1,300,000	—	—
6	300	100,000	550,000	17,000	90,000
8	150	375,000	1,350,000	—	—
8	300	56,000	350,000	21,000	110,000

*Bellows life is affected by unequal loads applied to the bellows, called "bellows squirm." With the Guardian II design, the outside of the bellows is pressurized, providing a stable pressure load on the bellows and reducing bellows squirm. External pressurization also increases the maximum allowable pressure rating of the bellows.

From the technical brochure for Valtek Guardian II Metal Bellows Seal Control Valves.

Status Area

The *Active Indicator* area shows the status of the most relevant active indicator. The color of the "LED light" corresponds to the Active Indicator and the first color of the blink code sequence on the positioner. Generally green indicates no immediate issues. Yellow indicates a developing issue. Red indicates the ability to control may be compromised. A detailed list of the indicators is given in the [Alarm Configuration - Alarm Annunciator](#) page. The *Command Source* field indicates whether the positioner is being controlled by digital or an analog (4-20 mA) command source.



Adjusting Limits

There are two ways to adjust the settings.

1. Move the scale indicators. The limits can be adjusted by "dragging" each limit indicator with a mouse click.



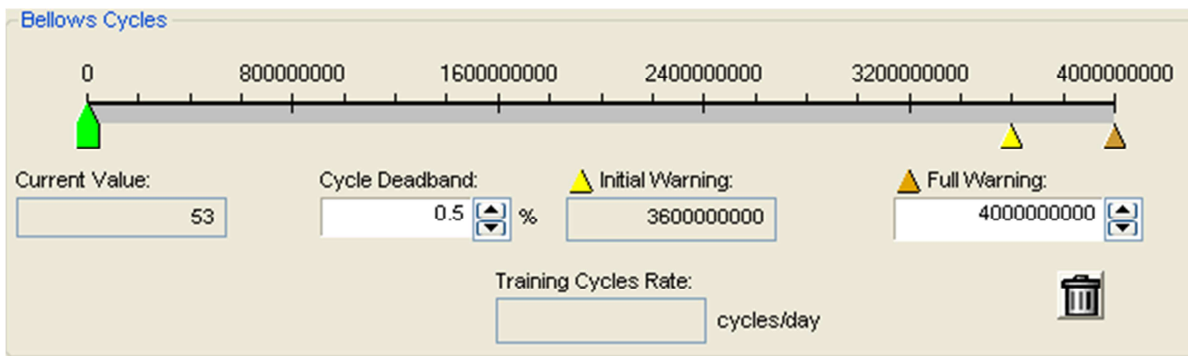
2. Use the input boxes. Numbers can be directly typed. Clicking on the up and down arrows will also change the value.



NOTE: The apply button must be selected for the changes to take affect.

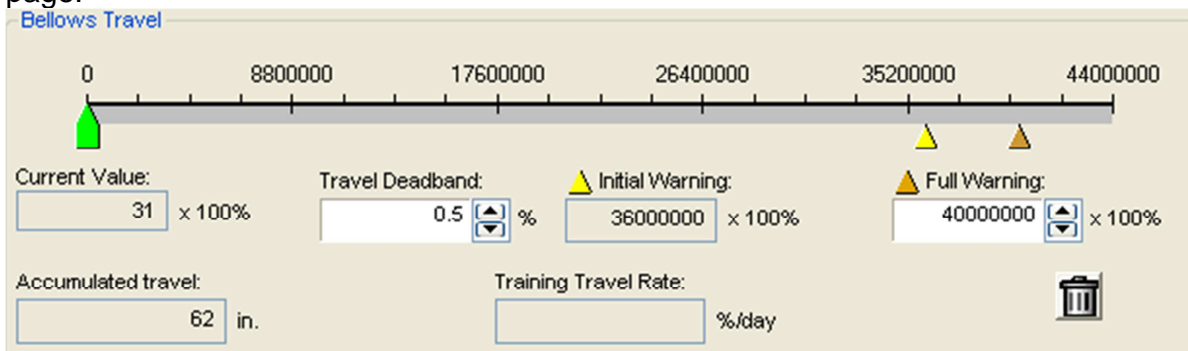
Set Bellows Cycles Limits

The *Current Value* is the number of *Bellows Cycles* counted by the positioner. The *Cycle Deadband* is the minimum amount of travel required in each direction before the cycle is counted. (This is the same variable as Valve Cycles Deadband.) The *Initial Warning* is the point at which the *Bellows Cycle Warning* will begin. The *Full Warning* is where the health bar on the Dashboard will show fully yellow. The *Full Warning* value is the only limit that can be modified. The *Initial Warning* is always 90% of the *Full Warning* value. The reset button will set the *Current Value* to zero. The *Training Cycle Rate* field displays average number of cycles per day of the bellows during the training period. For more information about Training, see the [Health - Training](#) page.



Set Bellows Travel Limits

The *Current Value* is the total bellows travel recorded by the positioner. The *Travel Deadband* is the minimum amount of travel required before the travel is counted. (This is the same variable as Valve Travel Deadband.) The *Initial Warning* is the point at which the *Bellows Travel Warning* will begin. The *Full Warning* is where the health bar on the Dashboard will show fully yellow. The *Full Warning* value is the only limit that can be modified. The *Initial Warning* is always 90% of the *Full Warning* value. The reset button will set the *Current Value* to zero. The *Accumulated Travel* is the same as the *Current Value*, but converted to the stroke length units of measure selected by you. To change the units of measure for the stroke length, see the [Configuration - Information - Actuator](#) page. The *Training Travel Rate* field displays average amount of travel per day of the bellows during the training period. For more information about Training, see the [Health - Training](#) page.



Training Status

Training Status is present on this page because one or more fields or graphs shows data that was gathered during the training process. The field shows one of the following states:

- Training Enabled - which indicates system data is being recorded. Training should run during normal system behavior.
- Training Disabled - which indicates NO system data is being recorded.
- Training Complete which indicates that the time period for training has expired and the data is stored in the positioner.

NOTE: The Training function requires the Pro positioner upgrade level (522MD+).

Training Status: Training Enabled

Action Buttons

The *Apply* button will save changes to the connected device.



The *Retrieve* button will retrieve the latest information from the device.



Warning and Alarms

Bellows Cycles

- **Definition:** The bellows cycle limit has been exceeded.
- **Implications:** The bellows may be reaching the end of its fatigue life. Each cycle represents two reversals of the direction of bellows movement. The cycle counting criterion and count limit are set by the user to track the usage of the valve.
- **Possible Solutions:** Follow routine procedures for maintenance when the limit is reached such as checking bellows for cracking or leaking. After maintenance, reset the cycle accumulator.

Bellows Travel

- **Definition:** The bellows cycle limit has been exceeded.
- **Implications:** The bellows may be reaching the end of its fatigue life. Each cycle represents two reversals of the direction of valve movement. The cycle counting criterion and count limit are set by the user to track the usage of the valve.
- **Possible Solutions:** Follow routine procedures for maintenance when the limit is reached such as checking bellows for cracking or leaking. After maintenance, reset the cycle accumulator.

Positioner Health







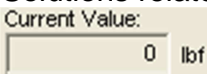

The *Positioner Health* page shows information about all indicators related to the condition of the positioner.

Status Area

The *Active Indicator* area shows the status of the most relevant active indicator. The color of the "LED light" corresponds to the Active Indicator and the first color of the blink code sequence on the positioner. Generally green indicates no immediate issues. Yellow indicates a developing issue. Red indicates the ability to control may be compromised. A detailed list of the indicators is given in the [Alarm Configuration - Alarm Annunciator](#) page. The *Command Source* field indicates whether the positioner is being controlled by digital or an analog (4-20 mA) command source.

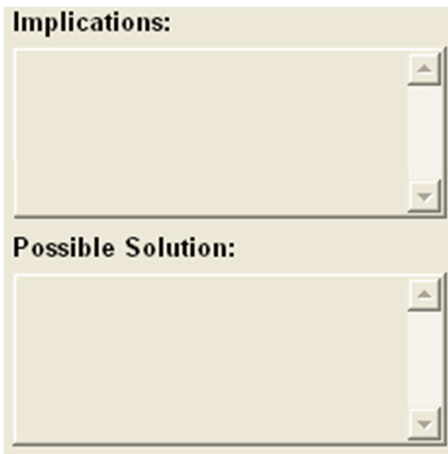
Indicators

Each indicator group box may contain the following components:

-  An "LED light" indicates health status. Warning and alarm limits (set by the user in many cases) determine the conditions when the color will turn from green to yellow to red. The most severe of the indicators on this page will be shown in the health bar on the Dashboard.
 -  **Dark Green** circle indicates a healthy condition where no attention is needed.
 -  **Light Green** indicates an occurrence of a normal activity that does not affect the health of the valve system.
 -  **Yellow** circle indicates that an active warning, alert or mode is present.
 -  **Red** circle indicates that an active alarm or state is present that could seriously limit the operation of the valve.
 -  **Gray** circle indicates that the feature or condition is not available because the configuration of the hardware or software does not support it.
- A checkbox indicates the masked status. Check to mask. If a particular indicator is masked, it will not be shown in the active indicator field at the top of each screen, affect the status of the health bars on the main dashboard, be sent in command 48, or be seen on the blinking LEDs on the positioner. It will however continue to show on this page.
- A radio button that when selected will show the Implications and Possible Solutions related to the selected indicator.
-  The current value and units.
-  A button to set values to 0.
- [Configure](#) A link to redirect the DTM to the configuration page.

Implications and Possible Solutions

When a radio button is checked for an indicator, the related implications and possible solutions are displayed. The Implications field describes the conditions that trigger the indicator. The Possible Solutions field describes actions you might take to restore normal operation.



NOTE: Flowserve does not recommend any action, only lists possible actions that could restore the system to normal operation. Qualified maintenance personnel should evaluate the possible solutions, all safety procedures and all other applicable factors on a case by case basis when determining the best action to take.

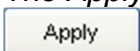
Legend

The legend shows the purpose of the icons.



Action Buttons

The *Apply* button will save changes to the connected device.



The *Retrieve* button will retrieve the latest information from the device.



Warnings and Alarms

Pilot Response

- **Definition:** The pilot relay is sticking or slow to respond.
- **Implications:** This affects the responsiveness, increases the chance of limit cycling and excessive air consumption. The pilot relay is part of the inner loop and consists of the driver module assembly with piezo (I-P relay) which is coupled to the spool valve or poppet. The value of this indicator corresponds with inner loop lag. Delayed response can be caused by a partially clogged piezo or debris, oil, corrosion, or ice on the spool, or low supply pressure.
- **Possible Solutions:** Check response of the valve. If OK, adjust Pilot



Relay Response limits. Check supply pressure. Check the spool or poppet for debris, oil, corrosion, ice on the spool. Clean or replace the spool or poppet assembly. Replace the piezo or driver module assembly. Maintain a clean, water-free air/gas supply.

Piezo Volts High

- **Definition:** The voltage driving the piezo is above the warning limit.
- **Implications:** This could indicate an error with the relay or the main board. This may result from an extended period of inactivity, but in this case should not persist for more than 30 minutes when the valve is controlling. The positioner may still be functioning, but have reduced performance under some circumstances.
- **Possible Solutions:** Ensure the supply pressure is not low. If alarm persists for more than 30 minutes, the Piezo assembly is damaged. Replace the pilot relay.

Piezo Volts Low

- **Definition:** The voltage to the piezo is too low.
- **Implications:** The piezo may be damaged. This may prevent the proper failure position upon loss of signal/power. This condition may occur briefly on an air-to-close valve that is held for long periods of time in the closed position, or an air-to-open valve held in the open position.
- **Possible Solutions:** Ensure the supply pressure is not low. If alarm persists for more than 30 minutes, the Piezo assembly is damaged. Replace the pilot relay.

Temperature High

- **Definition:** The temperature of the internal electronics has exceeded the manufacturer set limit of 85°C (176°F). High temperature may affect performance or limit the life of the positioner.
- **Possible Solutions:** Regulate the temperature of the positioner by shading or cooling supply gas. If the temperature reading is in error, replace the main board.

Temperature Low

- **Definition:** The temperature of the internal electronics has exceeded the manufacture set limit of -40°C (-40°F). Low temperature may inhibit responsiveness and accuracy.
- **Possible Solutions:** Regulate the temperature of the positioner. If the temperature reading is in error, replace the main circuit board.

Air Supply Humid

- **Definition:** The supply gas has high relative humidity which can lead to condensation on electronic components and failure of electronic functions.
- **Possible Solutions:** Ensure supply gas is clean and dry. Check and clean the regulator filter.

Aux. Card 1 Fail

- **Definition:** Auxiliary Card 1 is not communicating.
- **Possible Solutions:** Check auxiliary card connection to the main board. If the problem persists, replace the card.



Aux. Card 1 No Loop Power

- **Definition:** Auxiliary Card 1 has no loop current.
- **Possible Solutions:** Check auxiliary card connection to loop current. If the problem persists, replace the card.

Aux. Card 1 Error

- **Definition:** Auxiliary Card 1 has an electrical problem.
- **Possible Solutions:** MFC: Check auxiliary loop wiring and ensure adequate compliance voltage. Replace card if condition persists

Aux. Card 2 Fail

- **Definition:** Auxiliary Card 1 is not communicating.
- **Possible Solutions:** Check auxiliary card connection to the main board. If the problem persists, replace the card.

Aux. Card 2 No Loop Power - Auxiliary Card 2 has no loop current

- **Definition:** Auxiliary Card 2 has no loop current.
- **Possible Solutions:** Check auxiliary card connection to loop current. If the problem persists, replace the card.

Aux. Card 2 Error

- **Definition:** Auxiliary Card 2 has an electrical problem.
- **Possible Solutions:** MFC: Check auxiliary loop wiring and ensure adequate compliance voltage. Replace card if condition persists

Pressure Board Fail Warning

- **Definition:** One or more pressure sensors may have failed.
- **Possible Solutions:** Check the supply pressure to ensure it is between 1.3 and 10.3 bar (19 and 150 PSI). Check the pressure sensor board connections. Recalibrate the pressure sensors. If the problem persists, replace the pressure sensor board.

Low Battery Warning

- **Definition:** The battery for the real time clock is low.
- **Implications:** The battery is designed for a 15+ year life with the positioner unpowered. The battery is not required for the positioner to control properly, but is used only to maintain the time and date upon loss of power. The time and date affect the time stamps of alarms, warnings and other events. This warning could be caused by rapidly power cycling the positioner.
- **Possible Solutions:** The battery is not replaceable. Verify or reset the time and date. Replace the main board if the problem persists for several days.

Main Board Fail

- **Definition:** There has been an oscillator fault, position sensor ADC failure, supply voltage error, reference voltage error, shunt voltage error, or piezo voltage error.
- **Possible Solutions:** This may be caused by transient conditions. If the error persists, replace the main board.

Software Error

- **Definition:** There has been a watch dog time out, stack overflow



warning, or CPU usage warning.

- **Possible Solutions:** If the problem persists, perform a factory reset. If it still persists, reprogram or replace the main board.

Memory Error

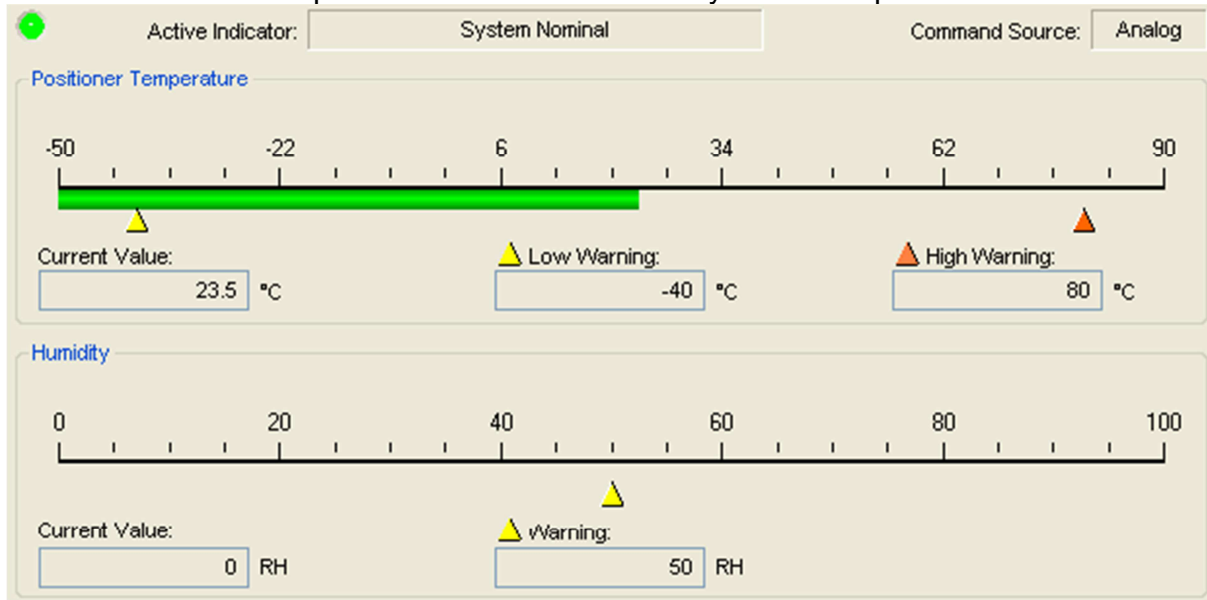
- **Definition:** The microprocessor's memory has a problem.
- **Possible Solutions:** Error may clear with time. If error persists, cycle power and complete a QUICK-CAL. If the error still persists, perform a factory reset, reprogram or replace the main circuit board.

Air Supply Icing

- **Definition:** The supply gas has high relative humidity and the temperature is close to 0 °C (32 °F). Under these conditions ice may form in the pilot relay causing diminished or total loss of position control.
- **Possible Solutions:** Ensure supply gas is clean and dry. Check and clean the regulator filter.

Temperature & Humidity

The *Temperature and Humidity* page displays the current values and related warning limits. The values reflect temperature and relative humidity inside the positioner.



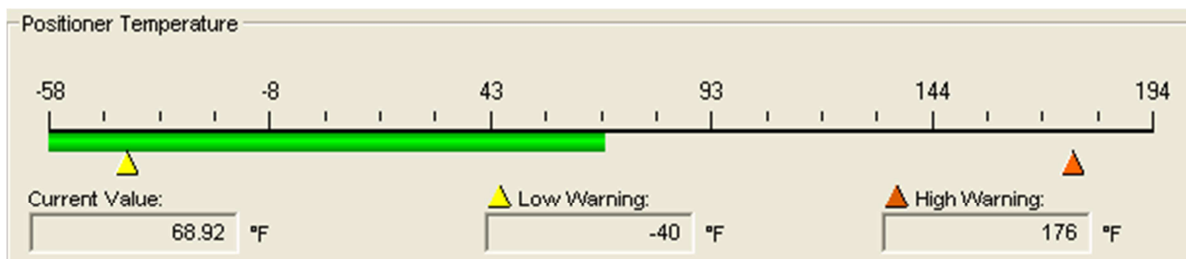
Status Area

The *Active Indicator* area shows the status of the most relevant active indicator. The color of the "LED light" corresponds to the Active Indicator and the first color of the blink code sequence on the positioner. Generally green indicates no immediate issues. Yellow indicates a developing issue. Red indicates the ability to control may be compromised. A detailed list of the indicators is given in the [Alarm Configuration - Alarm Annunciator](#) page. The *Command Source* field indicates whether the positioner is being controlled by digital or an analog (4-20 mA) command source.



Positioner Temperature

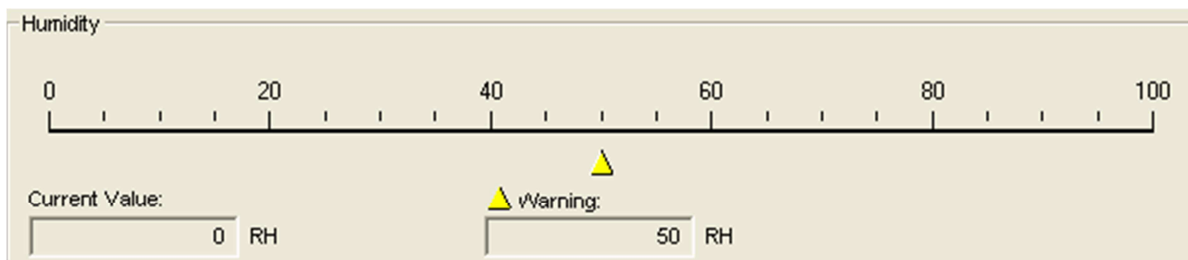
The *Positioner Temperature* box displays a scale with the actual positioner temperature, a *Temperature Value* field with a numeric display of the temperature, a *Low Warning* field, and a *High Warning* field. Any temperature outside of these limits will cause the health bar to turn yellow.



Positioner Humidity

The *Positioner Humidity* box displays a scale with the actual positioner humidity and the Air Supply Humid Warning limit. The humidity warning limit is not user settable and will be triggered according to the rules below.

- Temperature is less than 35 F (1.7 C) and RH > 80%.
- Temperature is between 35 and 40 F(1.7-4.4 C) and RH > 70%.
- Temperature is between 40 and 45 F(4.4-7.2 C) and RH > 60%.
- Temperature is above 45 F(7.2 C) and RH > 50%.



Warnings and Alarms

Temperature High

- **Definition:** The temperature of the internal electronics has exceeded the manufacturer set limit of 85°C (176°F). High temperature may affect performance or limit the life of the positioner.
- **Possible Solutions:** Regulate the temperature of the positioner by shading or cooling supply gas. If the temperature reading is in error, replace the main board.

Temperature Low

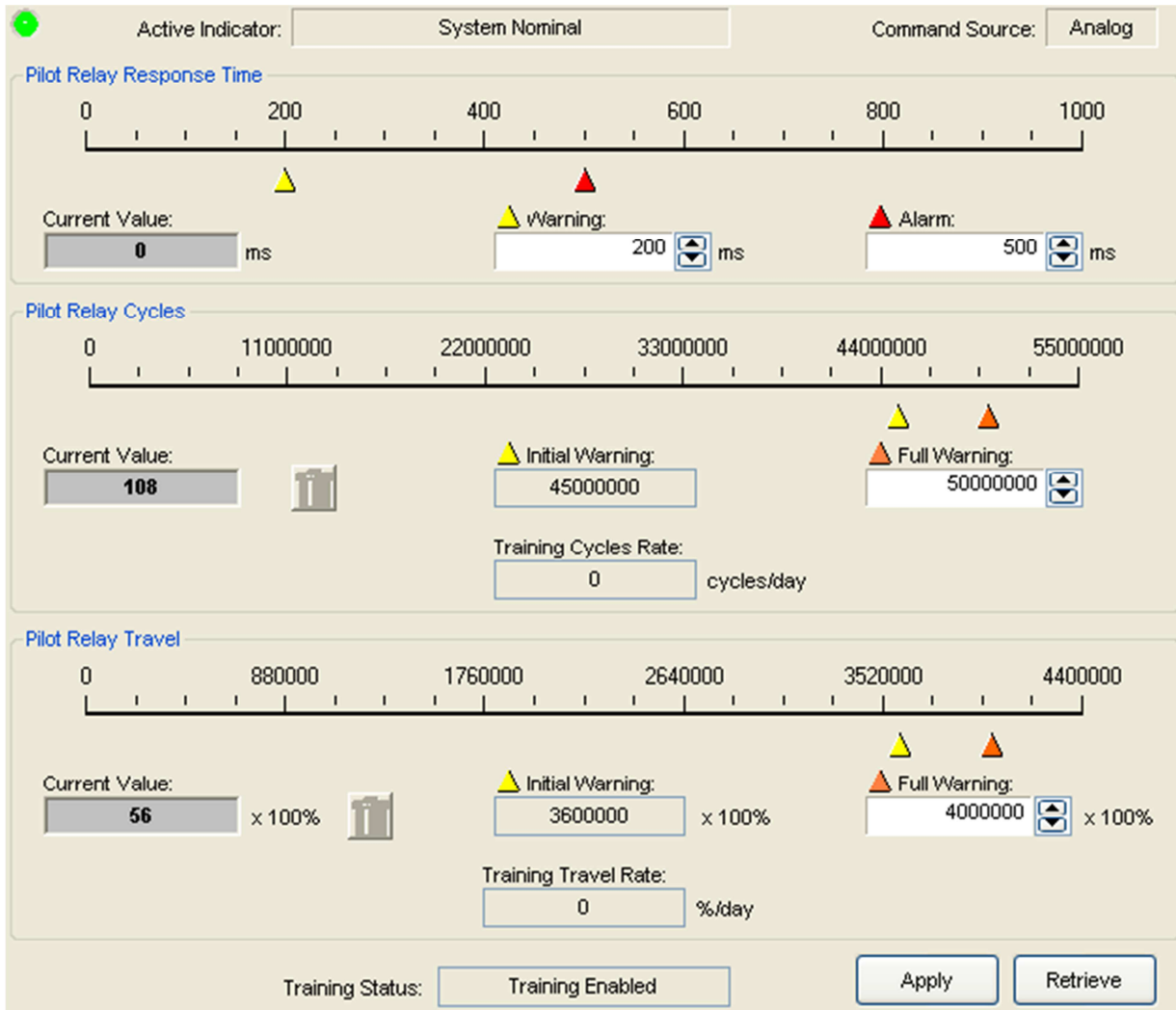
- **Definition:** The temperature of the internal electronics has exceeded the manufacture set limit of -40°C (-40°F). Low temperature may inhibit responsiveness and accuracy.
- **Possible Solutions:** Regulate the temperature of the positioner. If the temperature reading is in error, replace the main circuit board.

Air Supply Humid

- **Definition:** The supply gas has high relative humidity which can lead to condensation on electronic components and failure of electronic functions.
- **Possible Solutions:** Ensure supply gas is clean and dry. Check and clean the regulator filter.

Pilot Relay

The *Pilot Relay* page shows detailed information about the responsiveness and travel of the pilot relay. The pilot relay is sometimes called the I/P relay (I to P relay). It converts a voltage to pneumatic output by controlling a spool or poppet valve. A hall effect sensor detects the location of the spool or poppet. The controller adjust the location of the spool or poppet to control the air to the actuator.



Status Area

The *Active Indicator* area shows the status of the most relevant active indicator. The color of the "LED light" corresponds to the Active Indicator and the first color of the blink code sequence on the positioner. Generally green indicates no immediate issues. Yellow indicates a developing issue. Red indicates the ability to control may be compromised. A detailed list of the indicators is given in the [Alarm Configuration - Alarm Annunciator](#) page. The *Command Source* field indicates whether the positioner is being controlled by digital or an analog (4-20 mA) command source.

● Active Indicator: System Nominal Command Source: Analog

Adjusting Limits

There are two ways to adjust the settings.

1. Move the scale indicators. The limits can be adjusted by "dragging" each limit indicator with a mouse click.



2. Use the input boxes. Numbers can be directly typed. Clicking on the up and down arrows will also change the value.

▲ Warning: ms

NOTE: The *Apply* button must be selected for the changes to take affect.

Pilot Relay Response

The Pilot Relay Response Time is the measure of the time it takes for the pilot relay to respond. This value is displayed in milliseconds. Normally movement in the relay take less than 0.05 seconds so a value of 50 or less is normal. The *Current Value* field displays the typical time to respond. A response time over the *Warning* limit will cause the health bar on the dashboard to turn yellow. A response time over the *Alarm* limit will cause the health bar on the dashboard to turn red.

Pilot Relay Response Time

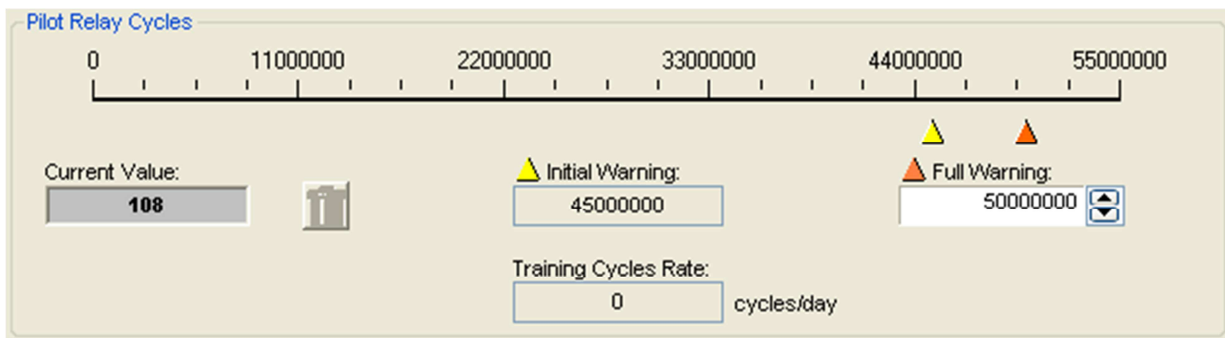
Current Value: ms

▲ Warning: ms

▲ Alarm: ms

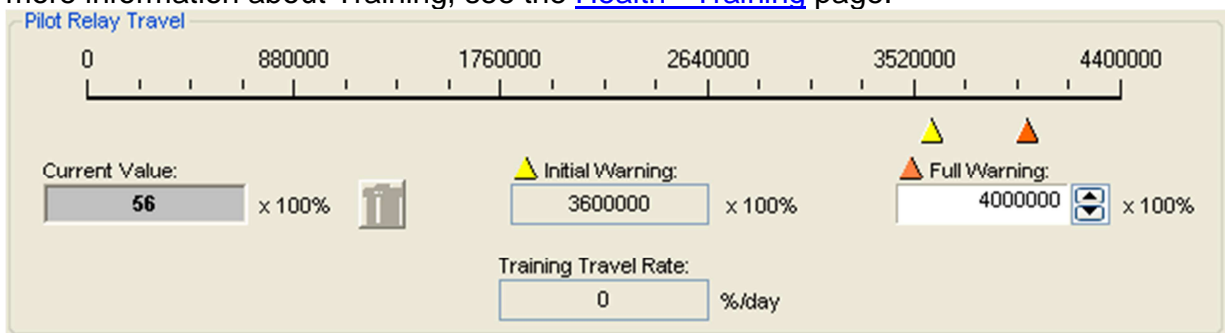
Set Pilot Relay Cycle Limits

The *Current Value* is the total pilot relay cycles recorded by the positioner. The *Initial Warning* is the point at which the *Pilot Relay Cycles Warning* will begin. The *Full Warning* is where the health bar on the Dashboard will show fully yellow. The *Full Warning* value is the only limit that can be modified. The *Initial Warning* is always 90% of the *Full Warning* value. The reset button will set the *Current Value* to zero. The *Training Cycles Rate* field displays average amount of cycles per day of the bellows during the training period. For more information about Training, see the [Health - Training](#) page.



Set Pilot Relay Travel Limits

The *Current Value* is the total pilot relay travel recorded by the positioner. The *Initial Warning* is the point at which the *Pilot Relay Travel Warning* will begin. The *Full Warning* is where the health bar on the Dashboard will show fully yellow. The *Full Warning* value is the only limit that can be modified. The *Initial Warning* is always 90% of the *Full Warning* value. The reset button will set the *Current Value* to zero. The *Training Travel Rate* field displays average amount of travel per day of the bellows during the training period. For more information about Training, see the [Health - Training](#) page.



Training Status

Training Status is present on this page because one or more fields or graphs shows data that was gathered during the training process. The field shows one of the following states:

- Training Enabled - which indicates system data is being recorded. Training should run during normal system behavior.
- Training Disabled - which indicates NO system data is being recorded.
- Training Complete which indicates that the time period for training has expired and the data is stored in the positioner.

NOTE: The Training function requires the Pro positioner upgrade level (522MD+).

Training Status: Training Enabled

Action Buttons

The *Apply* button will save changes to the connected device.

Apply

The *Retrieve* button will retrieve the latest information from the device.

Retrieve

Warnings and Alarms

Pilot Response

- **Definition:** The pilot relay is sticking or slow to respond.
- **Implications:** This affects the responsiveness, increases the chance of limit cycling and excessive air consumption. The pilot relay is part of the inner loop and consists of the driver module assembly with piezo (I-P relay) which is coupled to the spool valve or poppet. The value of this indicator corresponds with inner loop lag. Delayed response can be caused by a partially clogged piezo or debris, oil, corrosion, or ice on the spool, or low supply pressure.
- **Possible Solutions:** Check response of the valve. If OK, adjust Pilot Relay Response limits. Check supply pressure. Check the spool or poppet for debris, oil, corrosion, ice on the spool. Clean or replace the spool or poppet assembly. Replace the piezo or driver module assembly. Maintain a clean, water-free air/gas supply.

Pilot Cycle

- **Definition:** The pilot relay cycle limit set by the user has been exceeded.
- **Implications:** The pilot relay cycles indicate the activity level of the pilot relay as it maintains a valve's position. Excessive cycles can contribute to a worn relay which can lead to high air consumption.
- **Possible Solutions:** Inspect for high air consumption and signs of wear.

Pilot Travel

- **Definition:** The total accumulated pilot relay travel (% of full relay span) set by the user has been exceeded.
- **Implications:** The pilot relay travel indicates the activity level of the relay as it maintains a valve's position. Excessive travel can contribute to a worn pilot relay which can lead to high air consumption.
- **Possible Solutions:** Inspect for high air consumption and signs of wear.

Piezo Voltage

The *Piezo Voltage* page shows detailed information about the circuit that drives the piezo valve in the pilot relay. The piezo valve converts the voltage to a pressure that acts to move the poppet or spool.

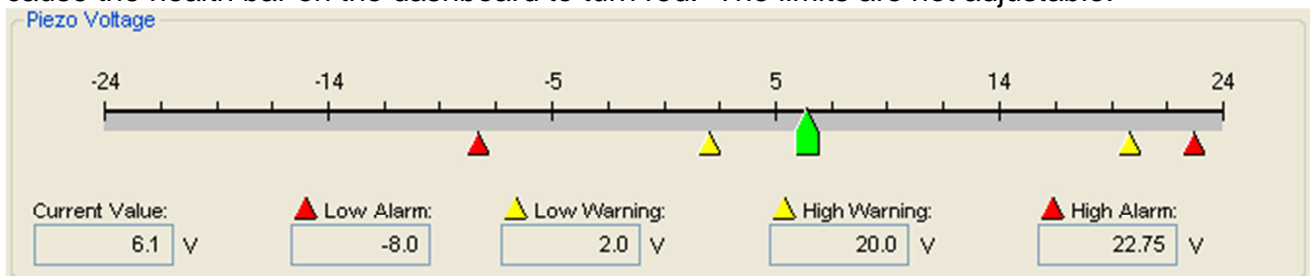
Status Area

The *Active Indicator* area shows the status of the most relevant active indicator. The color of the "LED light" corresponds to the Active Indicator and the first color of the blink code sequence on the positioner. Generally green indicates no immediate issues. Yellow indicates a developing issue. Red indicates the ability to control may be compromised. A detailed list of the indicators is given in the [Alarm Configuration - Alarm Annunciator](#) page. The *Command Source* field indicates whether the positioner is being controlled by digital or an analog (4-20 mA) command source.



Piezo Voltage

The Piezo Voltage shows the Piezo Voltage and the warning and alarm limits. The *Current Value* field displays the measured piezo voltage. A voltage outside the *Warning* limits will cause the health bar on the dashboard to turn yellow. A voltage outside the *Alarm* limits will cause the health bar on the dashboard to turn red. The limits are not adjustable.



Warnings and Alarms

Piezo Volts High

- **Definition:** The voltage driving the piezo is above the warning limit.
- **Implications:** This could indicate an error with the relay or the main board. This may result from an extended period of inactivity, but in this case should not persist for more than 30 minutes when the valve is controlling. The positioner may still be functioning, but have reduced performance under some circumstances.
- **Possible Solutions:** Ensure the supply pressure is not low. If alarm persists for more than 30 minutes, the Piezo assembly is damaged. Replace the pilot relay.

Piezo Volts Low

- **Definition:** The voltage to the piezo is too low.
- **Implications:** The piezo may be damaged. This may prevent the proper failure position upon loss of signal/power. This condition may occur briefly on an air-to-close valve that is held for long periods of time



in the closed position, or an air-to-open valve held in the open position.

- **Possible Solutions:** Ensure the supply pressure is not low. If alarm persists for more than 30 minutes, the Piezo assembly is damaged. Replace the pilot relay.

Actuator Health








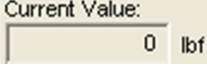

The *Actuator Health* page shows information about all indicators related to the condition of the actuator.

Status Area

The *Active Indicator* area shows the status of the most relevant active indicator. The color of the "LED light" corresponds to the Active Indicator and the first color of the blink code sequence on the positioner. Generally green indicates no immediate issues. Yellow indicates a developing issue. Red indicates the ability to control may be compromised. A detailed list of the indicators is given in the [Alarm Configuration - Alarm Annunicator](#) page. The *Command Source* field indicates whether the positioner is being controlled by digital or an analog (4-20 mA) command source.

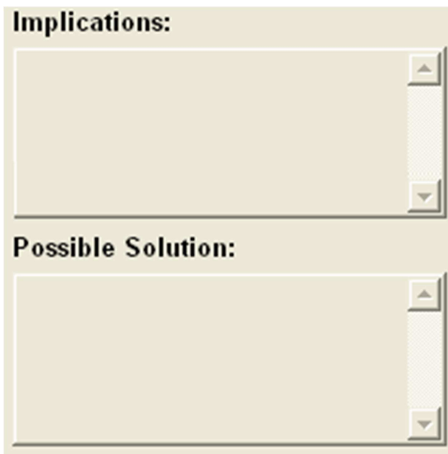
Indicators

Each indicator group box may contain the following components:

-  An "LED light" indicates health status. Warning and alarm limits (set by the user in many cases) determine the conditions when the color will turn from green to yellow to red. The most severe of the indicators on this page will be shown in the health bar on the Dashboard.
 -  **Dark Green** circle indicates a healthy condition where no attention is needed.
 -  **Light Green** indicates an occurrence of a normal activity that does not affect the health of the valve system.
 -  **Yellow** circle indicates that an active warning, alert or mode is present.
 -  **Red** circle indicates that an active alarm or state is present that could seriously limit the operation of the valve.
 -  **Gray** circle indicates that the feature or condition is not available because the configuration of the hardware or software does not support it.
- A checkbox indicates the masked status. Check to mask. If a particular indicator is masked, it will not be shown in the active indicator field at the top of each screen, affect the status of the health bars on the main dashboard, be sent in command 48, or be seen on the blinking LEDs on the positioner. It will however continue to show on this page.
-  A radio button that when selected will show the Implications and Possible Solutions related to the selected indicator.
-  The current value and units.
-  A button to set values to 0.
- [Configure](#) A link to redirect the DTM to the configuration page.

Implications and Possible Solutions

When a radio button is checked for an indicator, the related implications and possible solutions are displayed. The Implications field describes the conditions that trigger the indicator. The Possible Solutions field describes actions you might take to restore normal operation.



NOTE: Flowserve does not recommend any action, only lists possible actions that could restore the system to normal operation. Qualified maintenance personnel should evaluate the possible solutions, all safety procedures and all other applicable factors on a case by case basis when determining the best action to take.

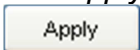
Legend

The legend shows the purpose of the icons.



Action Buttons

The *Apply* button will save changes to the connected device.



The *Retrieve* button will retrieve the latest information from the device.



Warnings and Alarms

Supply Pressure High

- **Definition:** The supply pressure is above the user set warning limit.
- **Implications:** Supply pressure that exceeds the maximum rating on the actuator can become a potential hazard.
- **Possible Solutions:** Regulate the supply pressure at the positioner below the maximum limit recommended for your actuator. Recalibrate pressure sensors. Check the pressure sensor board connections. Replace pressure sensor board if necessary.

Supply Pressure Low

- **Definition:** The supply pressure is below the user set warning or alarm

limit.

- **Implications:** Low supply pressure can cause poor valve response or positioner failure. The minimum recommended supply pressure for proper operation is 1.3 bar (19 PSI).
- **Possible Solutions:** Regulate the supply pressure at the positioner above 1.3 bar (19 PSI). Ensure system air/gas supply is adequate. Repair kinked or restricted supply tubing. Check for pneumatic leaks in the actuator and actuator tubing. Recalibrate pressure sensors. Check the pressure sensor board connections and replace pressure sensor board if necessary.

Actuation Ratio

- **Definition:** The force required to control the system is close to the maximum available force.
- **Implications:** Actuation Ratio is based on the ratio of available force to the required force to actuate. Control may be lost if this ratio reaches 100%. It is affected by the process load, friction, spring force, and available supply pressure.
- **Possible Solutions:** Increase the supply pressure. Reduce the friction. Check the actuator spring. Resize the actuator. Adjust user set limits.

Spring Fail

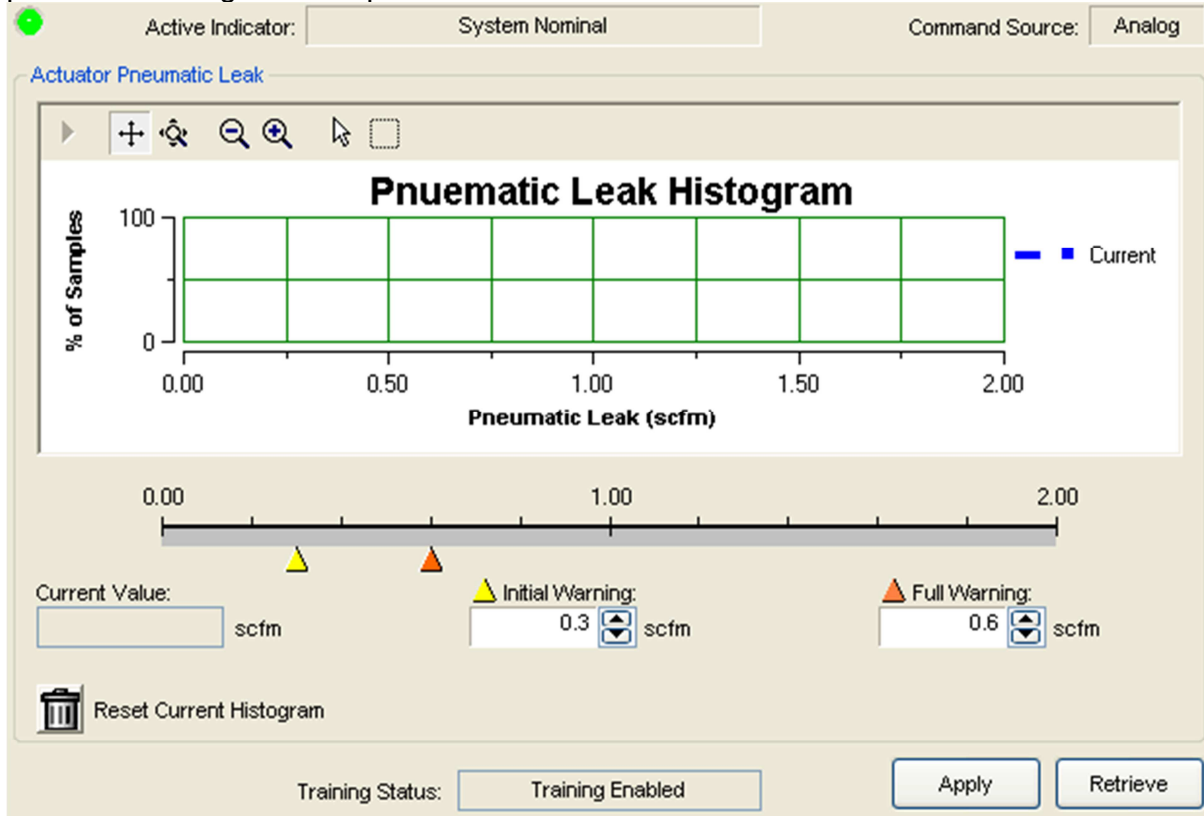
- **Definition:** Upon loss of air supply, the valve may not move to the fail-safe position.
- **Implications:** The spring alone is not adequate to overcome the friction and process load in the system. The system is relying on pneumatic force to actuate in the direction the spring is pushing. The failsafe spring may have failed, or it was not sized properly for the application. Friction or process load may have increased.
- **Possible Solutions:** Repair or replace actuator spring. Check for high friction. Reduce process load.

Pneumatic Leak

- **Definition:** The positioner has detected a leak in the actuation assembly.
- **Implications:** Leakage from the actuator can cause decreased responsiveness and excessive air/gas consumption.
- **Possible Solutions:** Repair pneumatic leaks at the tubing junctions and actuator seals. Check spool valve for excessive wear.

Actuator Pneumatic Leak

The *Actuator Pneumatic Leak* page allows you to view the current value and set warning limits related to the pneumatic leak detected by the positioner. Leak is detected by the positioner during normal operation whenever the valve moves.



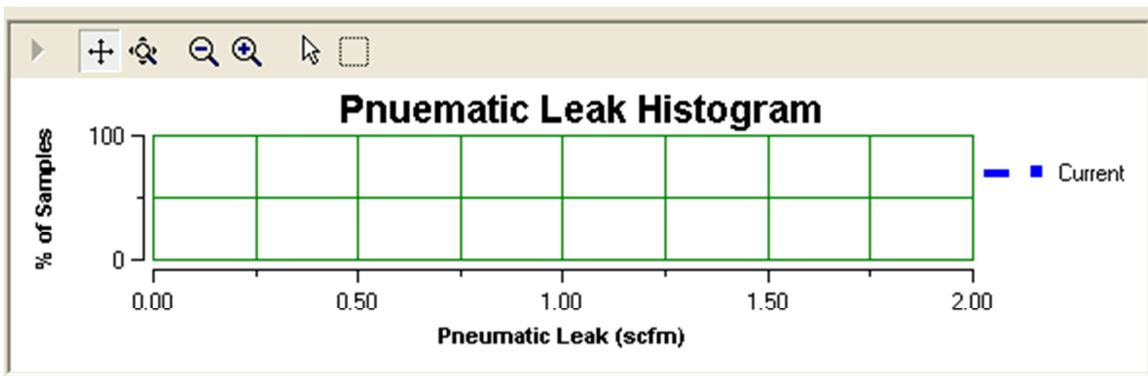
Status Area

The *Active Indicator* area shows the status of the most relevant active indicator. The color of the "LED light" corresponds to the Active Indicator and the first color of the blink code sequence on the positioner. Generally green indicates no immediate issues. Yellow indicates a developing issue. Red indicates the ability to control may be compromised. A detailed list of the indicators is given in the [Alarm Configuration - Alarm Annunciator](#) page. The *Command Source* field indicates whether the positioner is being controlled by digital or an analog (4-20 mA) command source.



Pneumatic Leak Histogram

The graph displays a histogram with current values and a histogram with data gathered during the training period. This is an easy way to see the range of typical values to set meaningful warning and alarm limits. It is also helpful to see how the data may have shifted since the training period. The histogram is frequently updated when the positioner is in operation.



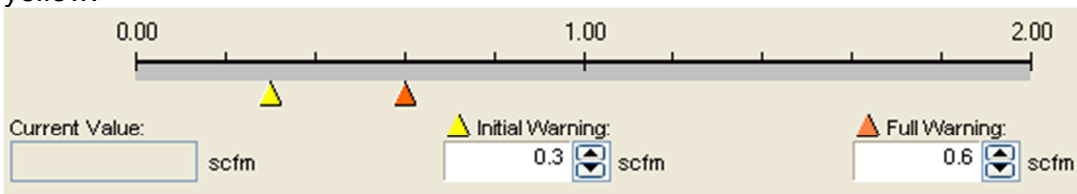
Reset Current Histogram

The reset button will clear the Current histogram, but leave the Training histogram.



Pneumatic Leak

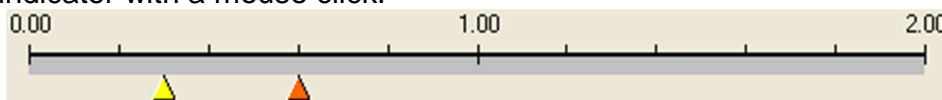
Pneumatic leak is detected by the positioner. The Current Value field shows the leak. The valve must move (even if it is a very small amount) before the value can be updated. The Initial Warning and Full Warning limits affect the health bar indicator on the Dashboard. For example, as the pneumatic leak increase and pass the *Initial Warning*, the health bar will begin to turn yellow. As it approaches the *Final Warning*, the health bar will be completely yellow.



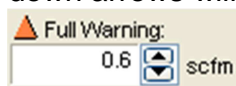
Adjusting Limits

There are two ways to adjust the settings.

1. Move the scale indicators. The limits can be adjusted by "dragging" each limit indicator with a mouse click.



2. Use the input boxes. Numbers can be directly typed. Clicking on the up and down arrows will also change the value.



NOTE: The apply button must be selected for the changes to take affect.

Training Status

Training Status is present on this page because one or more fields or graphs shows data that was gathered during the training process. The field shows one of the following states:

- Training Enabled - which indicates system data is being recorded. Training should run during normal system behavior.
- Training Disabled - which indicates NO system data is being recorded.
- Training Complete which indicates that the time period for training has expired and the data is stored in the positioner.

NOTE: The Training function requires the Pro positioner upgrade level (522MD+).

Training Status:

Action Buttons

The *Apply* button will save changes to the connected device.

The *Retrieve* button will retrieve the latest information from the device.

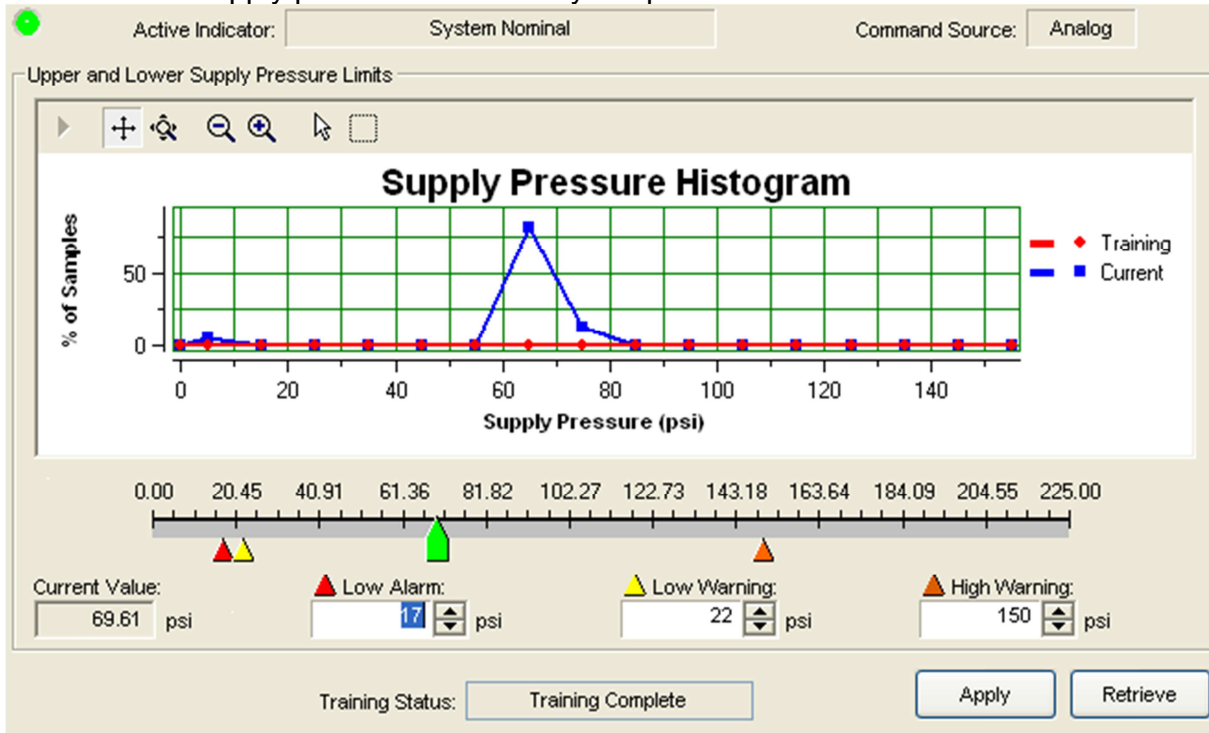
Warnings and Alarms

Pneumatic Leak

- **Definition:** The positioner has detected a leak in the actuation assembly.
- **Implications:** Leakage from the actuator can cause decreased responsiveness and excessive air/gas consumption.
- **Possible Solutions:** Repair pneumatic leaks at the tubing junctions and actuator seals. Check spool valve for excessive wear.

Supply Pressure

The *Supply Pressure* page allows you to view the current value and set warning limits related to the supply pressure detected by the positioner.



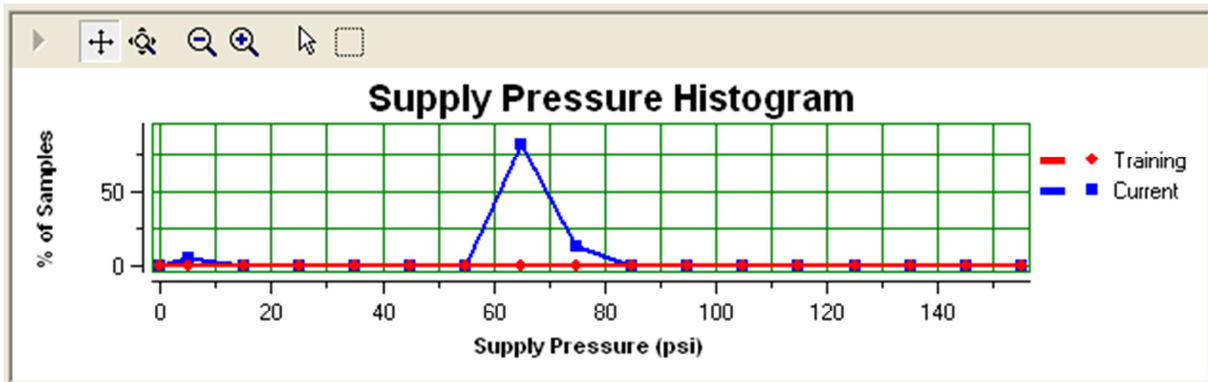
Status Area

The *Active Indicator* area shows the status of the most relevant active indicator. The color of the "LED light" corresponds to the Active Indicator and the first color of the blink code sequence on the positioner. Generally green indicates no immediate issues. Yellow indicates a developing issue. Red indicates the ability to control may be compromised. A detailed list of the indicators is given in the [Alarm Configuration - Alarm Annunciator](#) page. The *Command Source* field indicates whether the positioner is being controlled by digital or an analog (4-20 mA) command source.



Supply Pressure Histogram

The graph displays a histogram with current values and a histogram with data gathered during the training period. This is an easy way to see the range of typical values to set meaningful warning and alarm limits. It is also helpful to see how the data may have shifted since the training period. The histogram is frequently updated when the positioner is in operation.



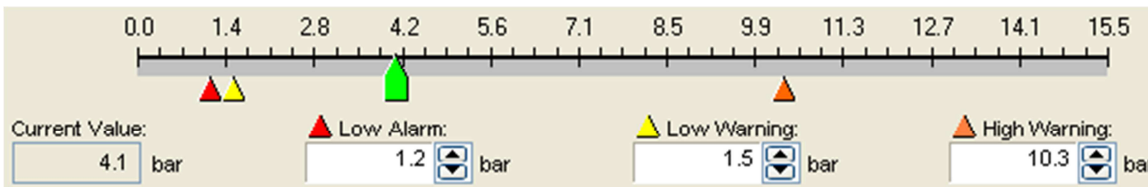
Reset Current Histogram

The reset button will clear the Current histogram, but leave the Training histogram.



Supply Pressure

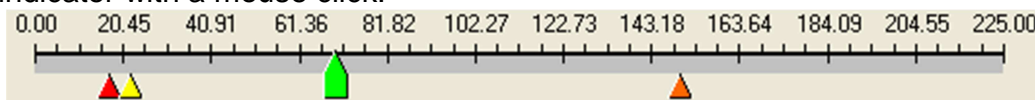
Supply Pressure is detected by the positioner. The *Current Value* field shows the supply pressure. The supply pressure limits (*Low Alarm Limit*, *Low Warning Limit*, and *High Warning Limit*) can be easily adjusted on this page. These limits affect the health bar indicator on the Dashboard. For example, as the supply pressure drops below Low Warning, the health bar will begin to turn yellow. As it approaches the Low Alarm, the health bar will be completely yellow. When it passes the Low Alarm, the health bar will turn red.



Adjusting Limits

There are two ways to adjust the settings.

1. Move the scale indicators. The limits can be adjusted by "dragging" each limit indicator with a mouse click.



2. Use the input boxes. Numbers can be directly typed. Clicking on the up and down arrows will also change the value.



NOTE: The apply button must be selected for the changes to take affect.

Training Status

Training Status is present on this page because one or more fields or graphs shows data that was gathered during the training process. The field shows one of the following states:

- Training Enabled - which indicates system data is being recorded. Training should run during normal system behavior.
- Training Disabled - which indicates NO system data is being recorded.
- Training Complete which indicates that the time period for training has expired and the data is stored in the positioner.

NOTE: The Training function requires the Pro positioner upgrade level (522MD+).

Training Status:

Action Buttons

The *Apply* button will save changes to the connected device.

The *Retrieve* button will retrieve the latest information from the device.

Warnings and Alarms

Supply Pressure High

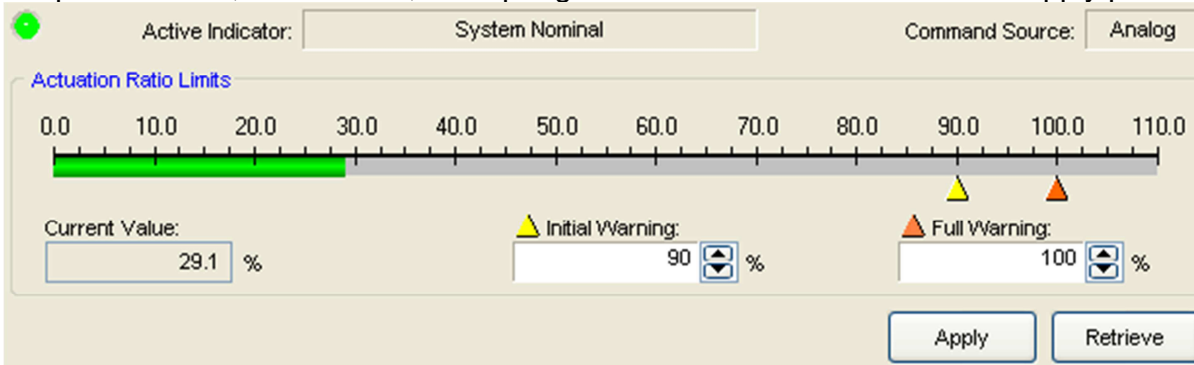
- **Definition:** The supply pressure is above the user set warning limit.
- **Implications:** Supply pressure that exceeds the maximum rating on the actuator can become a potential hazard.
- **Possible Solutions:** Regulate the supply pressure at the positioner below the maximum limit recommended for your actuator. Recalibrate pressure sensors. Check the pressure sensor board connections. Replace pressure sensor board if necessary.

Supply Pressure Low

- **Definition:** The supply pressure is below the user set limit.
- **Implications:** Low supply pressure can cause poor valve response or positioner failure. The minimum recommended supply pressure for proper operation is 1.3 bar (19 PSI).
- **Possible Solutions:** Regulate the supply pressure at the positioner above 1.3 bar (19 PSI). Ensure system air/gas supply is adequate. Repair kinked or restricted supply tubing. Check for pneumatic leaks in the actuator and actuator tubing. Recalibrate pressure sensors. Check the pressure sensor board connections and replace pressure sensor board if necessary.

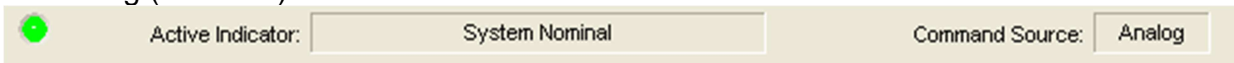
Actuation Ratio

The *Actuation Ratio* page allows you to set warning limits related to the number of actuation ratio determined by the positioner. The Actuation Ratio relates to the overall ability of the system to actuate through the entire stroke. It is based on the thrust requirements due to the process load, friction load, and spring and considers the available air supply pressure.



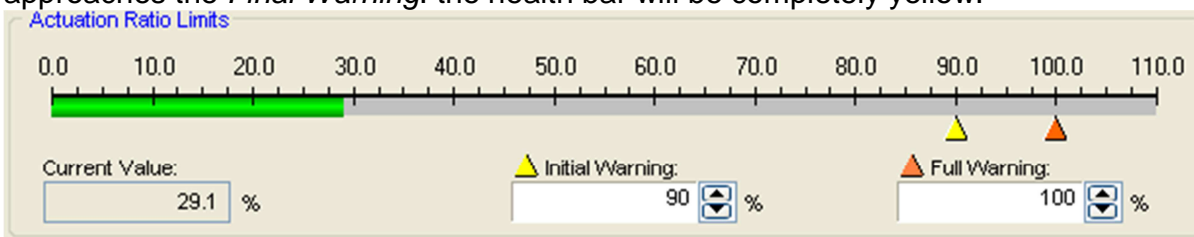
Status Area

The *Active Indicator* area shows the status of the most relevant active indicator. The color of the "LED light" corresponds to the Active Indicator and the first color of the blink code sequence on the positioner. Generally green indicates no immediate issues. Yellow indicates a developing issue. Red indicates the ability to control may be compromised. A detailed list of the indicators is given in the [Alarm Configuration - Alarm Annunicator](#) page. The *Command Source* field indicates weather the positioner is being controlled by digital or an analog (4-20 mA) command source.



Actuation Ratio

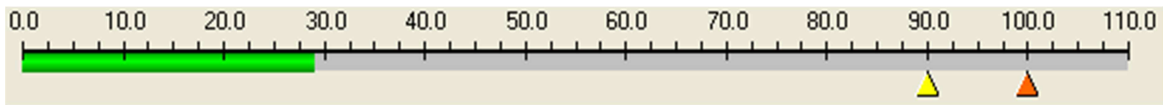
These limits affect the health bar indicator on the Dashboard. For example, as the actuation ratio increases and passes the *Initial Warning*, the health bar will begin to turn yellow. As it approaches the *Final Warning*, the health bar will be completely yellow.



Adjusting Limits

There are two ways to adjust the settings.

1. Move the scale indicators. The limits can be adjusted by "dragging" each limit indicator with a mouse click.



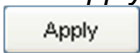
2. Use the input boxes. Numbers can be directly typed. Clicking on the up and down arrows will also change the value.

▲ Full Warning:
 %

NOTE: The apply button must be selected for the changes to take affect.

Action Buttons

The *Apply* button will save changes to the connected device.



The *Retrieve* button will retrieve the latest information from the device.



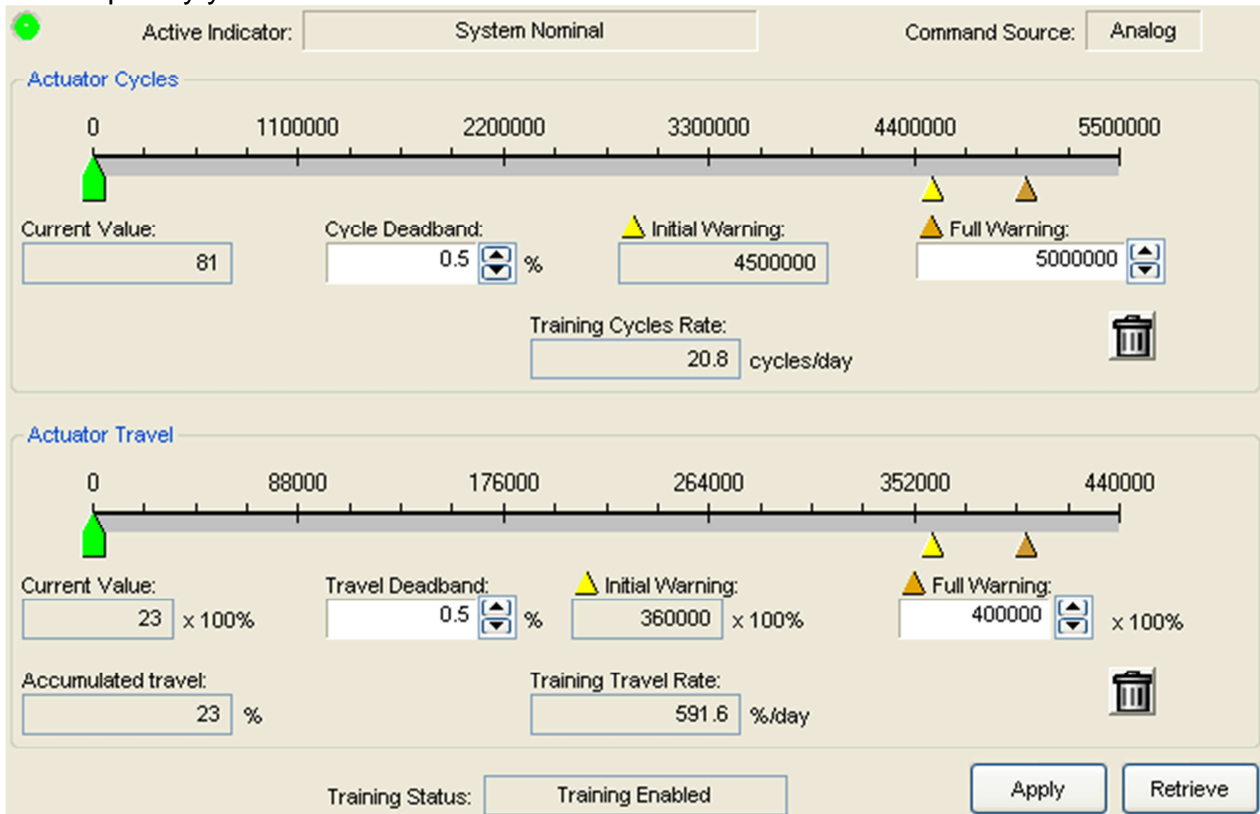
Warnings and Alarms

Actuation Ratio

- **Definition:** The force required to control the system is close to the maximum available force.
- **Implications:** Actuation Ratio is based on the ratio of available force to the required force to fully actuate. Control may be lost if this ratio reaches 100%. It is affected by the process load, friction, spring force, and available supply pressure.
- **Possible Solutions:** Increase the supply pressure. Reduce the friction. Check the actuator spring. Resize the actuator. Adjust user set limits.

Actuator Cycle & Travel

The *Actuator Cycles and Travel* page allows you to set warning limits related to the number of actuator cycles and the actuator travel. The cycles and travel are recorded by the positioner during normal operation. These limits affect the health bar indicator on the Dashboard. For example, as the actuator cycles increase and pass the *Initial Warning*, the health bar will begin to turn yellow. As it approaches the *Final Warning*, the health bar will be completely yellow.



Status Area

The *Active Indicator* area shows the status of the most relevant active indicator. The color of the "LED light" corresponds to the Active Indicator and the first color of the blink code sequence on the positioner. Generally green indicates no immediate issues. Yellow indicates a developing issue. Red indicates the ability to control may be compromised. A detailed list of the indicators is given in the [Alarm Congfiguraion - Alarm Annunicator](#) page. The *Command Source* field indicates whether the positioner is being controlled by digital or an analog (4-20 mA) command source.



Adjusting Limits

There are two ways to adjust the settings.

1. Move the scale indicators. The limits can be adjusted by "dragging" each limit

indicator with a mouse click.



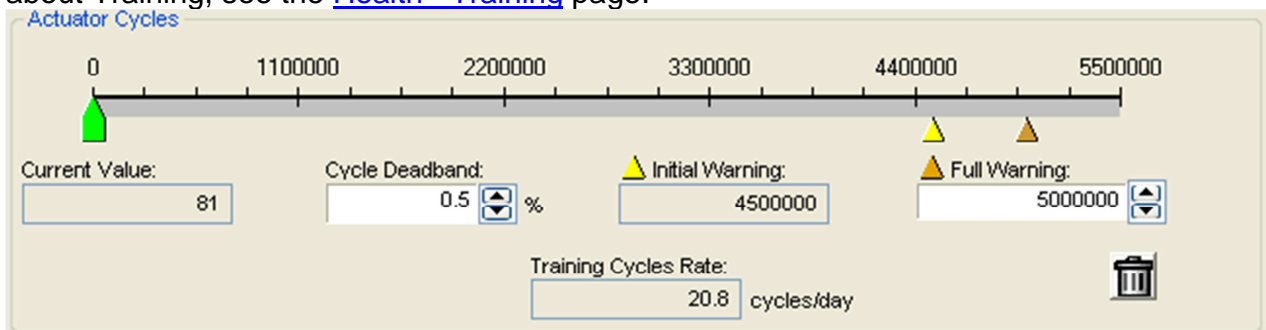
2. Use the input boxes. Numbers can be directly typed. Clicking on the up and down arrows will also change the value.

▲ Full Warning:
 × 100%

NOTE: The apply button must be selected for the changes to take affect.

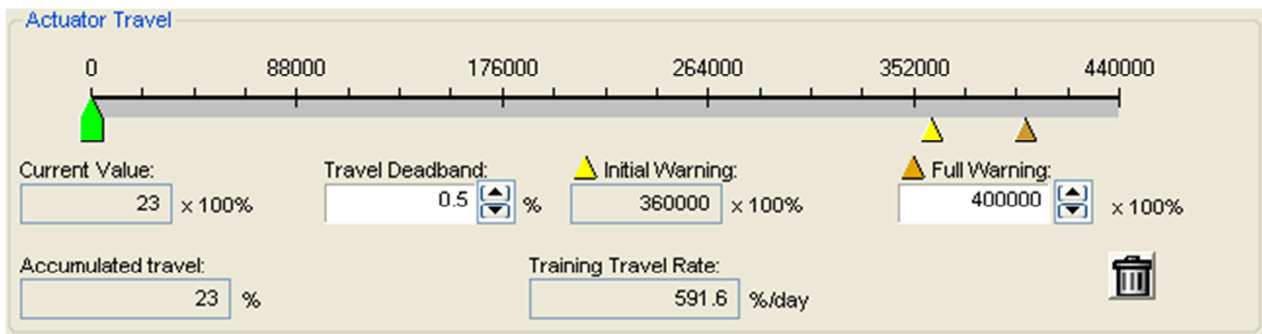
Set Actuator Cycles Limits

The *Current Value* is the number of actuator cycles counted by the positioner. The *Cycle Deadband* is the minimum amount of travel required in each direction before the cycle is counted. (This is the same variable as Valve Cycles Deadband.) The *Initial Warning* is the point at which the *Actuator Cycle Warning* will begin. The *Full Warning* is where the health bar on the Dashboard will show fully yellow. The *Full Warning* value is the only limit that can be modified. The *Initial Warning* is always 90% of the *Full Warning* value. The reset button will set the *Current Value* to zero. The *Training Cycle Rate* field displays average number of cycles per day of the actuator during the training period. For more information about Training, see the [Health - Training](#) page.



Set Actuator Travel Limits

The *Current Value* is the total actuator travel recorded by the positioner. The *Travel Deadband* is the minimum amount of travel required before the travel is counted. (This is the same variable as Valve Travel Deadband.) The *Initial Warning* is the point at which the *Actuator Travel Warning* will begin. The *Full Warning* is where the health bar on the Dashboard will show fully yellow. The *Full Warning* value is the only limit that can be modified. The *Initial Warning* is always 90% of the *Full Warning* value. The reset button will set the *Current Value* to zero. The *Accumulated Travel* is the same as the *Current Value*, but converted to the stroke length units of measure selected by you. To change the units of measure for the stroke length, see the [Configuration - Information - Actuator](#) page. The *Training Travel Rate* field displays average amount of travel per day of the actuator during the training period. For more information about Training, see the [Health - Training](#) page.



Training Status

Training Status is present on this page because one or more fields or graphs shows data that was gathered during the training process. The field shows one of the following states:

- Training Enabled - which indicates system data is being recorded. Training should run during normal system behavior.
- Training Disabled - which indicates NO system data is being recorded.
- Training Complete which indicates that the time period for training has expired and the data is stored in the positioner.

NOTE: The Training function requires the Pro positioner upgrade level (522MD+).

Training Status: Training Enabled

Action Buttons

The *Apply* button will save changes to the connected device.

Apply

The *Retrieve* button will retrieve the latest information from the device.

Retrieve

Warning and Alarms

Actuator Cycles

- **Definition:** The actuator cycle limit has been exceeded.
- **Implications:** Each cycle represents two reversals of the direction of actuator movement. The cycle counting criterion and count limit are set by the user to track the usage of the actuator.
- **Possible Solutions:** Follow routine procedures for maintenance when the limit is reached such as checking the packing tightness, and checking linkages for wear, misalignment, and tightness. After maintenance, reset the cycle accumulator.

Actuator Travel

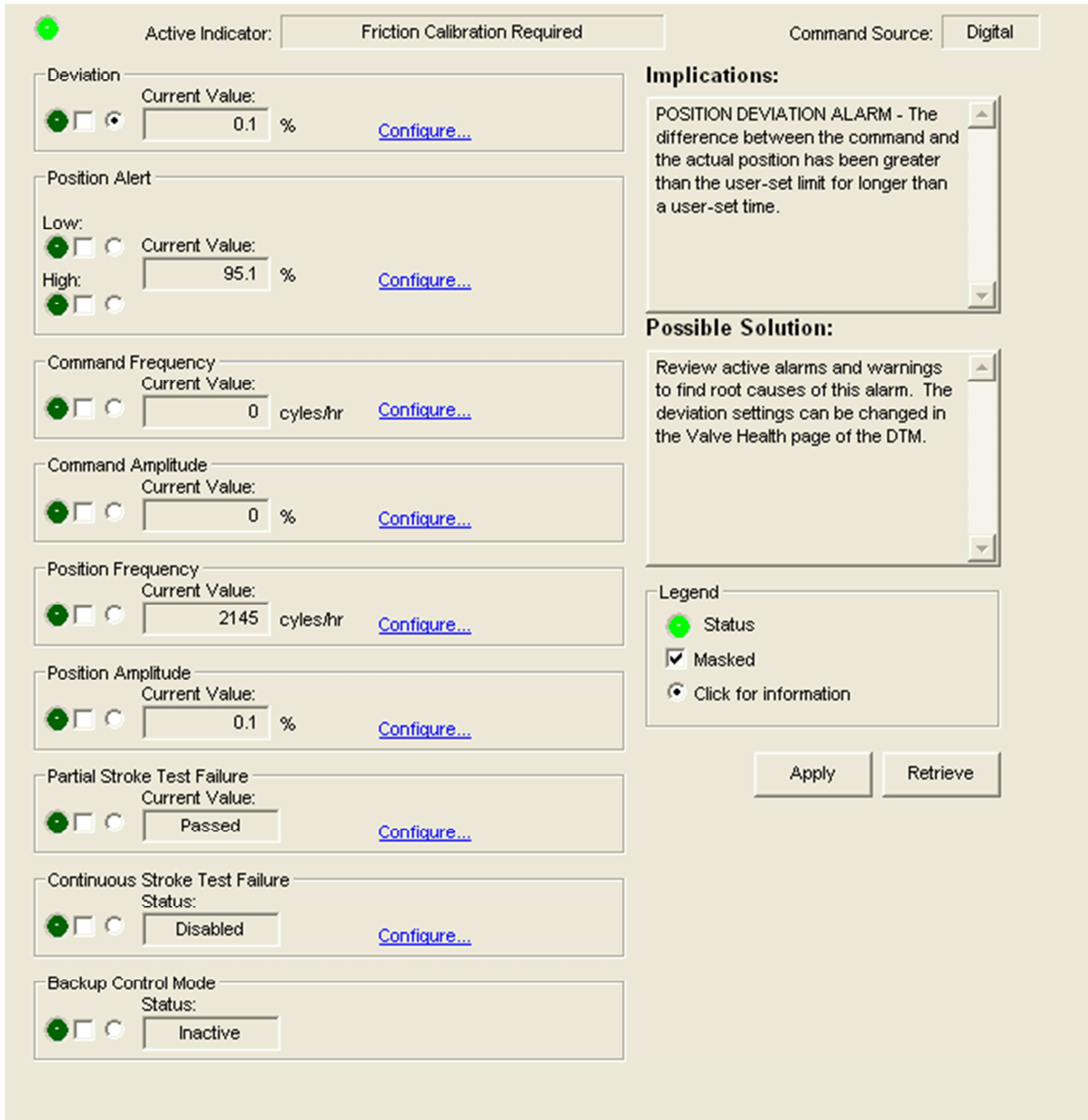
- **Definition:** The total accumulated actuator travel limit has been exceeded.
- **Implications:** The travel is accumulated in both directions. The travel counting criterion and limit are set by the user to track the usage of the actuator.



- **Possible Solutions:** Follow routine procedures for maintenance when the limit is reached such as checking the packing tightness, and checking linkages for wear, misalignment, and tightness. After maintenance, reset the travel accumulator

Control Health

The *Control Health* page shows information about all indicators related to the controllability of the valve.



Active Indicator: Command Source:

Deviation
Current Value: % [Configure...](#)

Position Alert
Low: %
High: % [Configure...](#)

Command Frequency
Current Value: cyles/hr [Configure...](#)

Command Amplitude
Current Value: % [Configure...](#)

Position Frequency
Current Value: cyles/hr [Configure...](#)

Position Amplitude
Current Value: % [Configure...](#)

Partial Stroke Test Failure
Current Value: [Configure...](#)

Continuous Stroke Test Failure
Status: [Configure...](#)

Backup Control Mode
Status:

Implications:
POSITION DEVIATION ALARM - The difference between the command and the actual position has been greater than the user-set limit for longer than a user-set time.

Possible Solution:
Review active alarms and warnings to find root causes of this alarm. The deviation settings can be changed in the Valve Health page of the DTM.

Legend
 Status
 Masked
 Click for information

Status Area







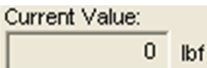

The *Active Indicator* area shows the status of the most relevant active indicator. The color of the "LED light" corresponds to the Active Indicator and the first color of the blink code sequence on the positioner. Generally green indicates no immediate issues. Yellow indicates a developing issue. Red indicates the ability to control may be compromised. A detailed list of the indicators is given in the [Alarm Configuration - Alarm Annunciator](#) page.

The *Command Source* field indicates whether the positioner is being controlled by digital or an analog (4-20 mA) command source.



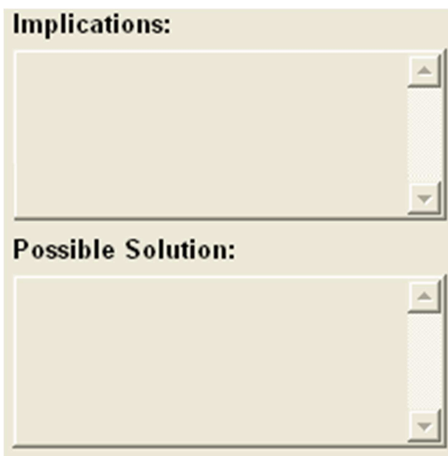
Indicators

Each indicator group box may contain the following components:

-  An "LED light" indicates health status. Warning and alarm limits (set by the user in many cases) determine the conditions when the color will turn from green to yellow to red. The most severe of the indicators on this page will be shown in the health bar on the Dashboard.
 -  **Dark Green** circle indicates a healthy condition where no attention is needed.
 -  **Light Green** indicates an occurrence of a normal activity that does not affect the health of the valve system.
 -  **Yellow** circle indicates that an active warning, alert or mode is present.
 -  **Red** circle indicates that an active alarm or state is present that could seriously limit the operation of the valve.
 -  **Gray** circle indicates that the feature or condition is not available because the configuration of the hardware or software does not support it.
- A checkbox indicates the masked status. Check to mask. If a particular indicator is masked, it will not be shown in the active indicator field at the top of each screen, affect the status of the health bars on the main dashboard, be sent in command 48, or be seen on the blinking LEDs on the positioner. It will however continue to show on this page.
- A radio button that when selected will show the Implications and Possible Solutions related to the selected indicator.
-  The current value and units.
-  A button to set values to 0.
- [Configure](#) A link to redirect the DTM to the configuration page.

Implications and Possible Solutions

When a radio button is checked for an indicator, the related implications and possible solutions are displayed. The Implications field describes the conditions that trigger the indicator. The Possible Solutions field describes actions you might take to restore normal operation.



NOTE: Flowserve does not recommend any action, only lists possible actions that could restore the system to normal operation. Qualified maintenance personnel should evaluate the possible solutions, all safety procedures and all other applicable factors on a case by case basis when determining the best action to take.

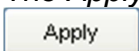
Legend

The legend shows the purpose of the icons.

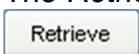


Action Buttons

The *Apply* button will save changes to the connected device.



The *Retrieve* button will retrieve the latest information from the device.



Warnings and Alarms

Position Deviation

- **Definition:** The device is not controlling at the set point
- **Implications:** The difference between the command and the actual position has been greater than the user-set limit for longer than a user-set time.
- **Possible Solutions:** Review active alarms and warnings to find root causes of this alarm. The deviation settings can be changed in the Valve Health page of the DTM.

Position Alerts

- **Definition:** The position has reached or is exceeding a user defined upper position indicator. This is similar to a limit switch indicator.



- **Possible Solutions:** Set the limit to a lower or higher value if more travel is needed, or adjust the command signal back in the specified range.

Command Frequency

- **Definition:** The frequency of the command signal is above the warning or alarm limit. This could mean the control loop is oscillating faster than normal.
- **Possible Solutions:** Verify the limits are set at an appropriate level. Review the control loop parameters and equipment. Adjust as necessary.

Command Amplitude

- **Definition:** The amplitude of the command signal is above the warning or alarm limit. This could mean the control loop has larger swings than desirable.
- **Possible Solutions:** Verify the limits are set at an appropriate level. Review the control loop parameters and equipment. Adjust as necessary.

Position Frequency

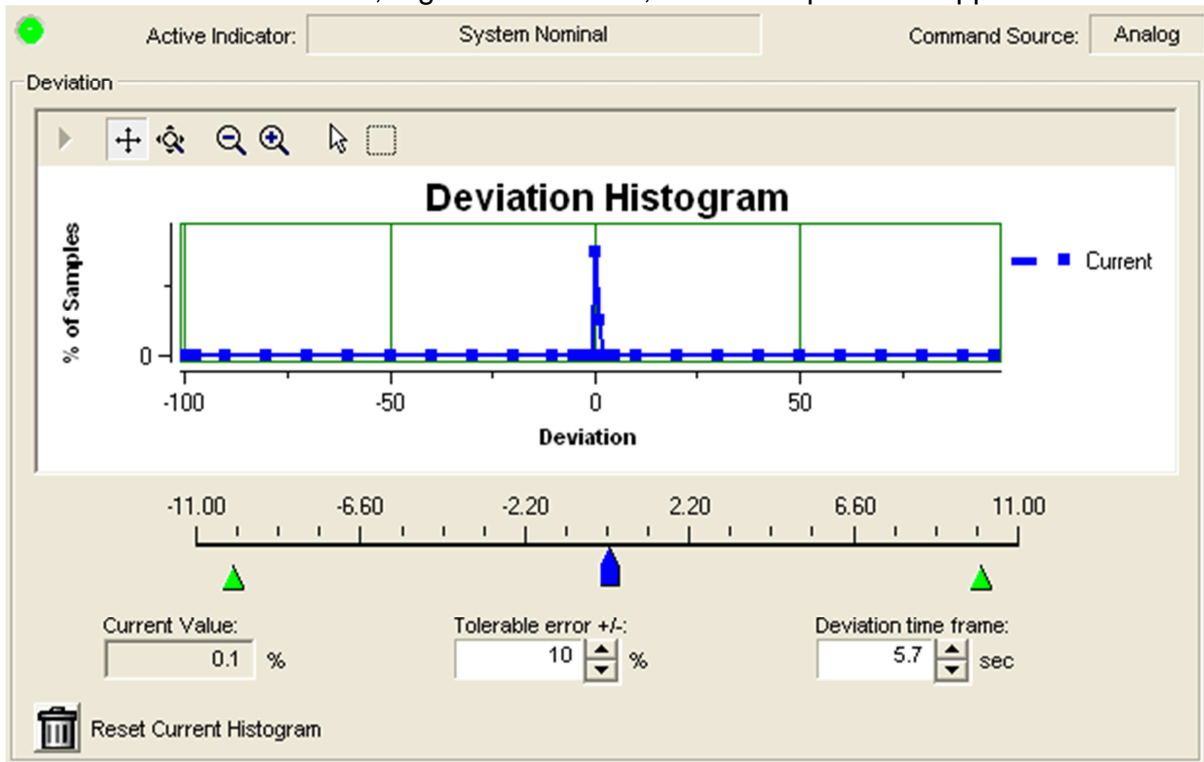
- **Definition:** The frequency of the position signal is above the warning or alarm limit. The positioner is controlling the position of the valve with rapid corrections.
- **Possible Solutions:** Verify the limits are set at an appropriate level. Adjust the selectable Gain switch to a lower setting or use the "Hi Friction" setting. Perform a QUICK-CAL which sets the gains based on valve response. Check for high friction. If the problem persists replace the relay.

Position Amplitude

- **Definition:** The amplitude of the position signal is above the warning limit. The positioner is controlling the position of the valve with large corrections.
- **Possible Solutions:** Verify the limits are set at an appropriate level. Adjust the selectable Gain switch to a lower setting or use the "Hi Friction" setting. Perform a QUICK-CAL which sets the gains based on valve response. Check for high friction. If the problem persists replace the relay.

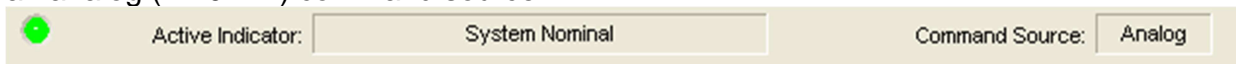
Deviation

The *Deviation Page* allows you to view and set limits related to the *Deviation Alarm*. Deviation is a comparison between the current position of the valve and the final command signal. If the difference exceeds the tolerable error limit for longer than the deviation time frame selected, then the alarm is activated. (See the example illustration below.) The final command signal may be different than the input 4-20 mA input command if a Characterization Curve, Tight Shutoff Limit, or Soft Stop Limit is applied.



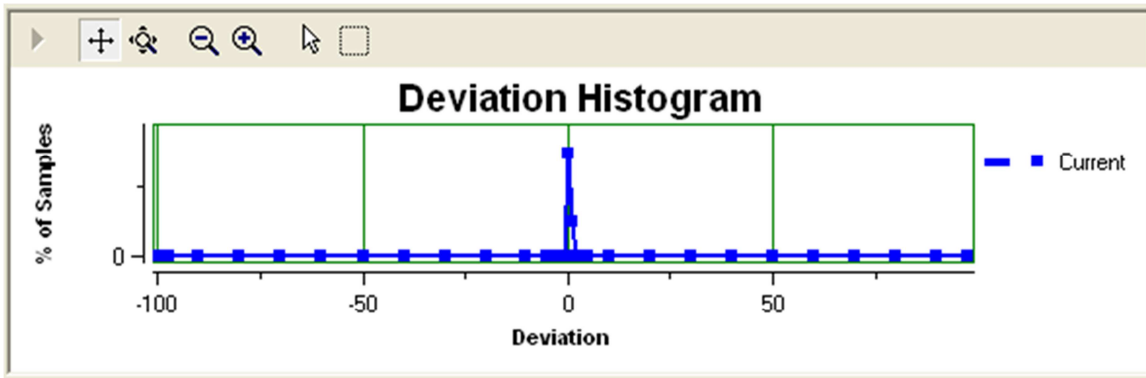
Status Area

The *Active Indicator* area shows the status of the most relevant active indicator. The color of the "LED light" corresponds to the Active Indicator and the first color of the blink code sequence on the positioner. Generally green indicates no immediate issues. Yellow indicates a developing issue. Red indicates the ability to control may be compromised. A detailed list of the indicators is given in the [Alarm Configuration - Alarm Annunciator](#) page. The *Command Source* field indicates whether the positioner is being controlled by digital or an analog (4-20 mA) command source.



Deviation Histogram

The graph displays a histogram with current values and a histogram with data gathered during the training period. This is an easy way to see the range of typical values to set meaningful warning and alarm limits. It is also helpful to see how the data may have shifted since the training period. The histogram is frequently updated when the positioner is in operation.



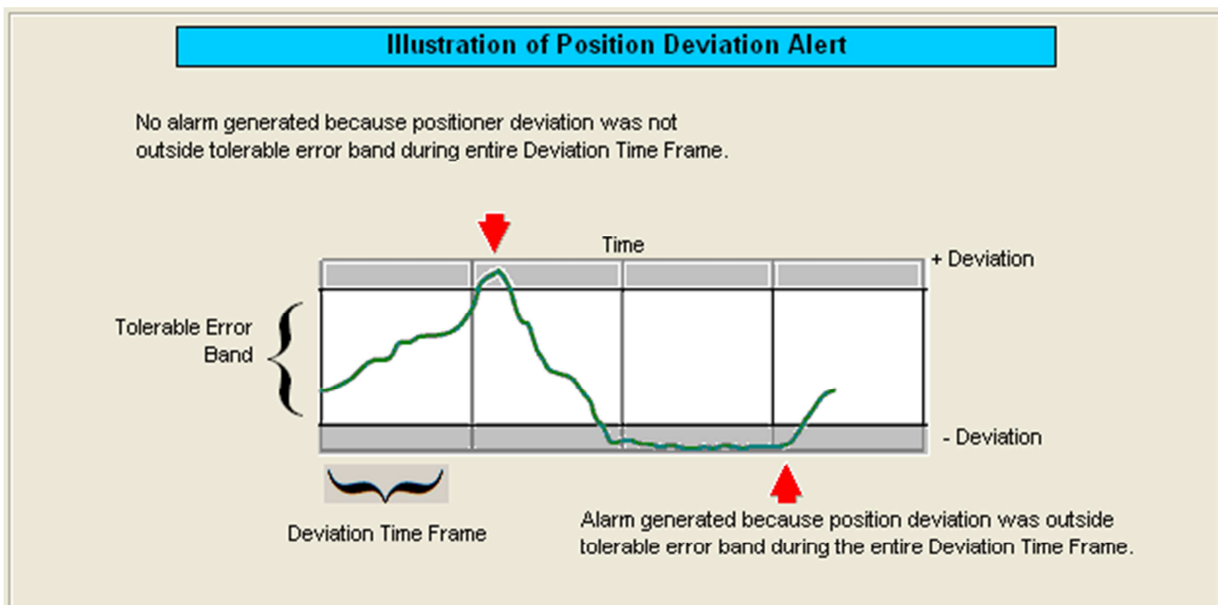
Reset Current Histogram

The reset button will clear the Current histogram, but leave the Training histogram.



Position Deviation

Deviation is detected by the positioner. The *Current Value* field shows the latest deviation value. The deviation limits (*Tolerable Error +/-*, and *Deviation Time Frame*) can be easily adjusted on this page. These limits affect the health bar indicator on the Dashboard. When the deviation limit has been greater than the Tolerable Error for longer than the Deviation Time Frame, the Position Deviation alarm will be activated and the health bar on the dashboard will turn red. The illustration at the bottom of the page is a graphical representation showing how these factors work and when an alert is generated.



Adjusting Limits

There are two ways to adjust the settings.

1. Move the scale indicators. The limits can be adjusted by "dragging" each limit indicator with a mouse click.



2. Use the input boxes. Numbers can be directly typed. Clicking on the up and down arrows will also change the value.

Tolerable error +/-:
 %

NOTE: The apply button must be selected for the changes to take affect.

Training Status

Training Status is present on this page because one or more fields or graphs shows data that was gathered during the training process. The field shows one of the following states:

- Training Enabled - which indicates system data is being recorded. Training should run during normal system behavior.
- Training Disabled - which indicates NO system data is being recorded.
- Training Complete which indicates that the time period for training has expired and the data is stored in the positioner.

NOTE: The Training function requires the Pro positioner upgrade level (522MD+).

Training Status:

Action Buttons

The *Apply* button will save changes to the connected device.

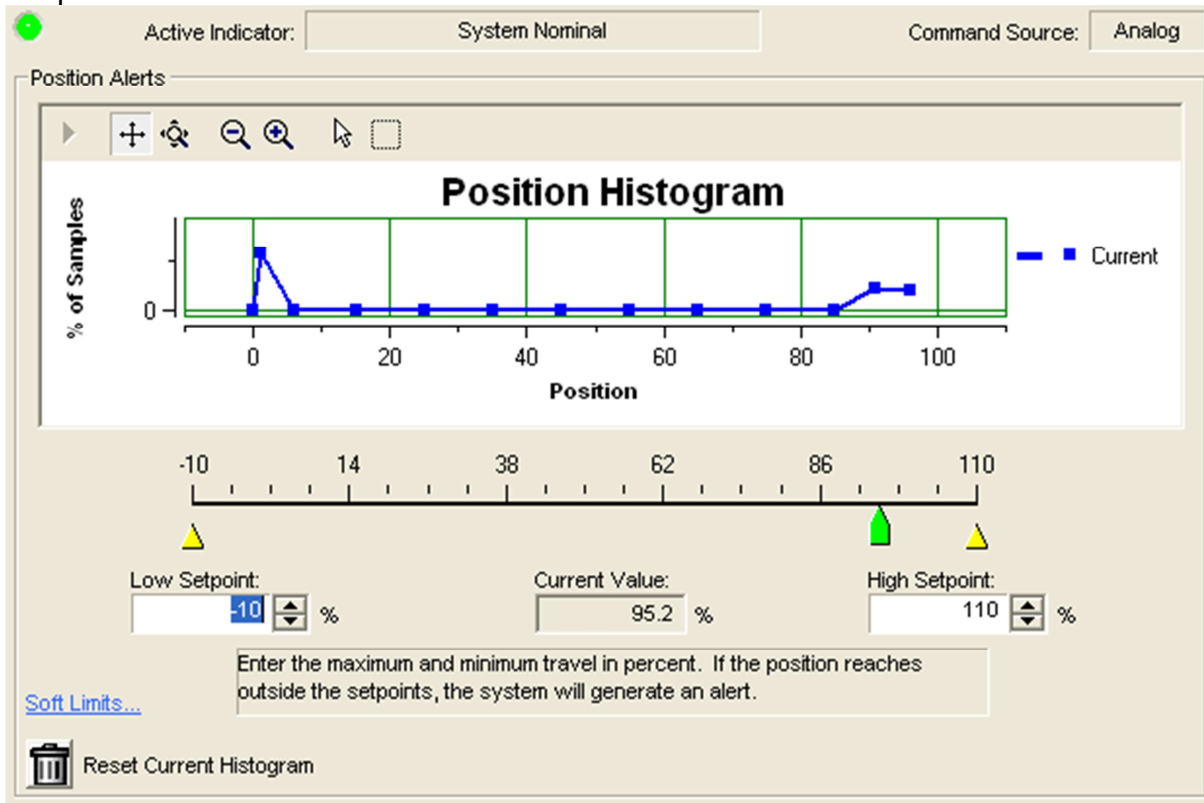
The *Retrieve* button will retrieve the latest information from the device.

Warnings and Alarms

- **Definition:** The device is not controlling at the set point
- **Implications:** The difference between the command and the actual position has been greater than the user-set limit for longer than a user-set time.
- **Possible Solutions:** Review active alarms and warnings to find root causes of this alarm. The deviation settings can be changed in the "Tolerable error +/-" and "Deviation time frame" fields.

Position Alerts

The *Position Alerts* page allows you to view the current value and set warning limits related to the valve position detected by the positioner. The Position Alert compares the current position of the valve with the low and high set-point. If the position exceeds the low or high set-point than the alert is activated.



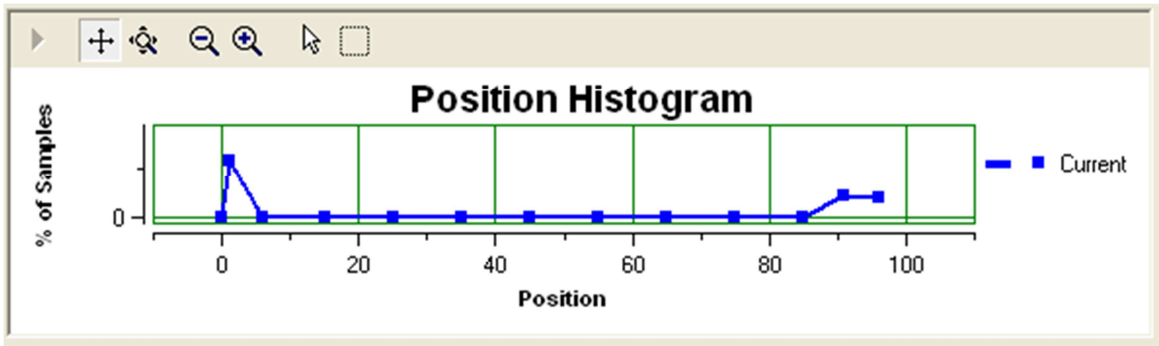
Status Area

The *Active Indicator* area shows the status of the most relevant active indicator. The color of the "LED light" corresponds to the Active Indicator and the first color of the blink code sequence on the positioner. Generally green indicates no immediate issues. Yellow indicates a developing issue. Red indicates the ability to control may be compromised. A detailed list of the indicators is given in the [Alarm Configuration - Alarm Annunciator](#) page. The *Command Source* field indicates whether the positioner is being controlled by digital or an analog (4-20 mA) command source.



Position Histogram

The graph displays a histogram with current values and a histogram with data gathered during the training period. This is an easy way to see the range of typical values to set meaningful warning and alarm limits. It is also helpful to see how the data may have shifted since the training period. The histogram is frequently updated when the positioner is in operation.



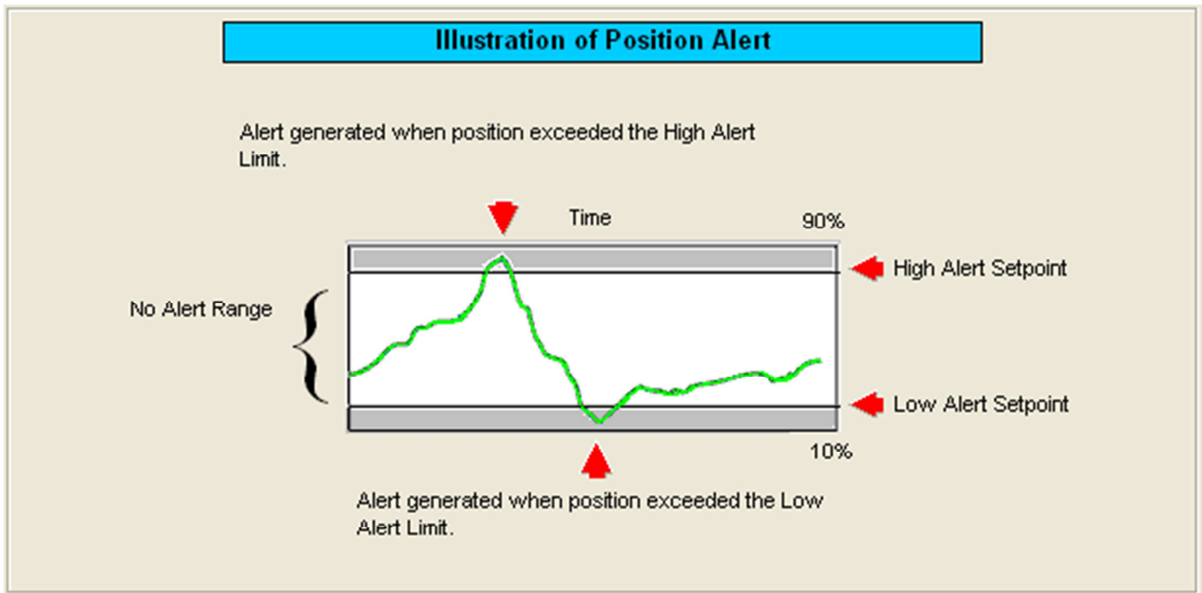
Reset Current Histogram

The reset button will clear the Current histogram, but leave the Training histogram.



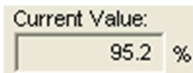
Position Alert

The position alert will be activated immediately when the position passes the set point as shown in the illustration below. The default limits are 110% and -10%.



Current Value

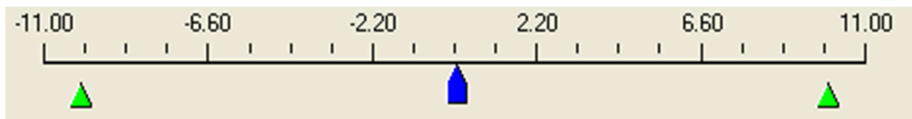
This is the value calculated by the positioner.



Adjusting Limits

There are two ways to adjust the settings.

1. Move the scale indicators. The limits can be adjusted by "dragging" each limit indicator with a mouse click.



2. Use the input boxes. Numbers can be directly typed. Clicking on the up and down arrows will also change the value.

Tolerable error +/-:
 %

NOTE: The apply button must be selected for the changes to take affect.

Training Status

Training Status is present on this page because one or more fields or graphs shows data that was gathered during the training process. The field shows one of the following states:

- Training Enabled - which indicates system data is being recorded. Training should run during normal system behavior.
- Training Disabled - which indicates NO system data is being recorded.
- Training Complete which indicates that the time period for training has expired and the data is stored in the positioner.

NOTE: The Training function requires the Pro positioner upgrade level (522MD+).

Training Status:

Action Buttons

The *Apply* button will save changes to the connected device.

The *Retrieve* button will retrieve the latest information from the device.

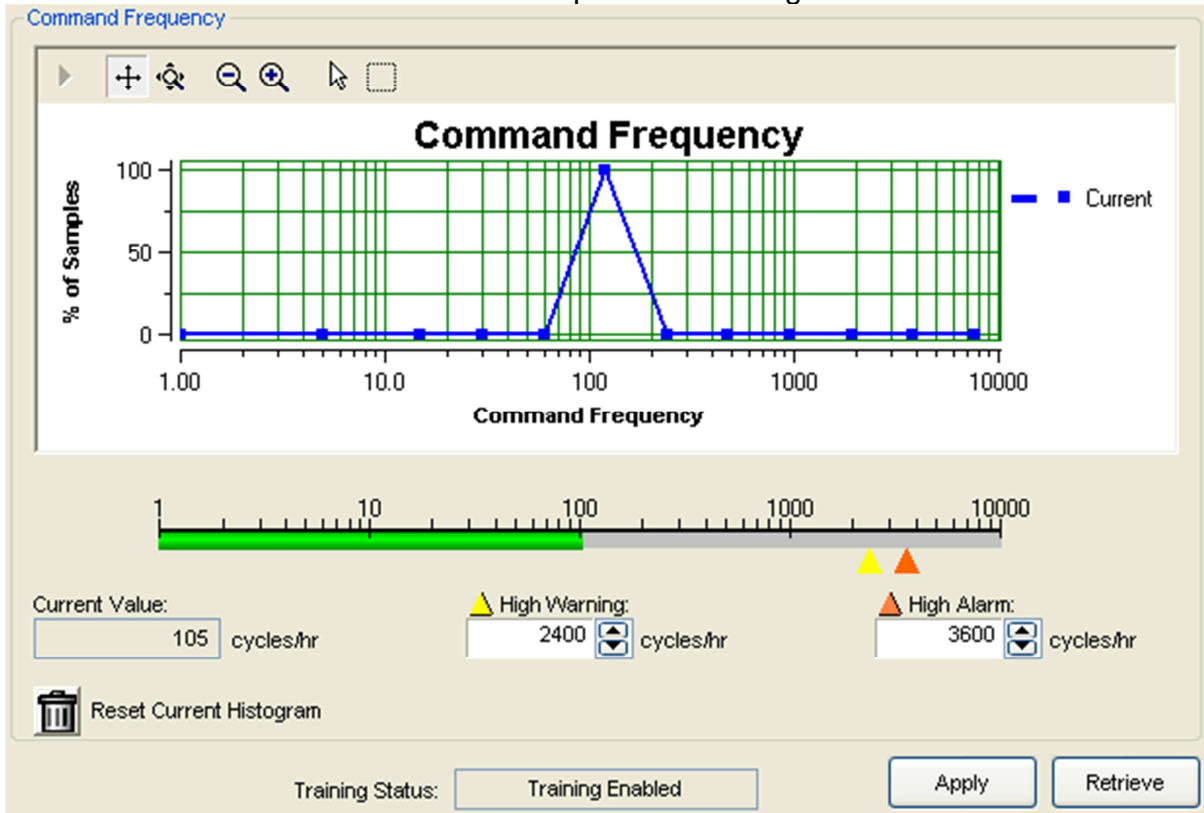
Warnings and Alarms

Position Alerts

- **Definition:** The position has reached or is exceeding a user defined LOW/HIGH position indicator. This is similar to a limit switch indicator.
- **Possible Solutions:** Set the limit to a lower or higher value if more travel is needed, or adjust the command signal back in the specified range.

Command Frequency

The *Command Frequency* page allows you to view the current value and set warning limits related to the command frequency detected by the positioner. The *Command Frequency* is the number of times the command to the positioner changes direction in an hour.



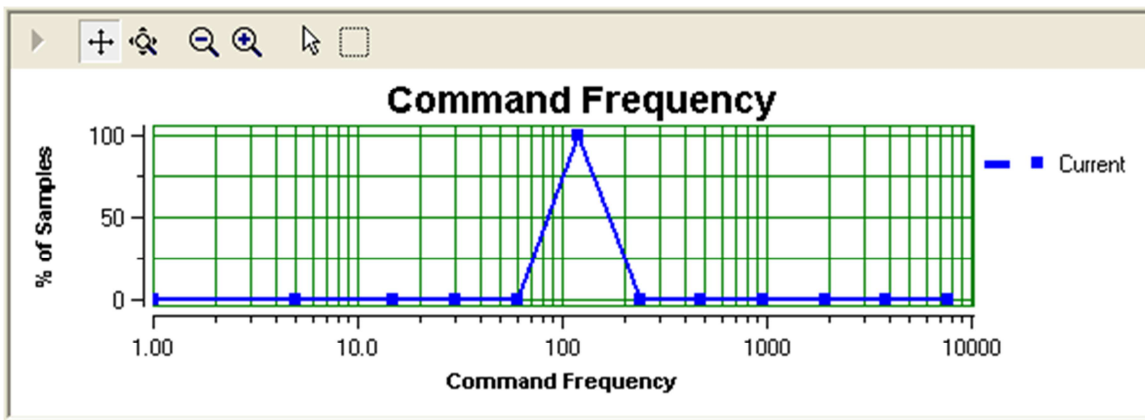
Status Area

The *Active Indicator* area shows the status of the most relevant active indicator. The color of the "LED light" corresponds to the Active Indicator and the first color of the blink code sequence on the positioner. Generally green indicates no immediate issues. Yellow indicates a developing issue. Red indicates the ability to control may be compromised. A detailed list of the indicators is given in the [Alarm Configuration - Alarm Annunicator](#) page. The *Command Source* field indicates whether the positioner is being controlled by digital or an analog (4-20 mA) command source.



Command Frequency Histogram

The graph displays a histogram with current values and a histogram with data gathered during the training period. This is an easy way to see the range of typical values to set meaningful warning and alarm limits. It is also helpful to see how the data may have shifted since the training period. The histogram is frequently updated when the positioner is in operation.



Reset Current Histogram

The reset button will clear the Current histogram, but leave the Training histogram.



Current Value

This is the value calculated by the positioner and is updated frequently.

Current Value:
 cycles/hr

Command Frequency Limits

The *Command Frequency* limits (High Warning Limit, and High Alarm Limit) can be easily adjusted on this page. These limits affect the health bar indicator on the Dashboard. For example, as the command frequency increases and passes the High Warning, the health bar will begin to turn yellow. As it approaches the High Alarm, the health bar will turn red.

Adjusting Limits

To adjust the limits, use the input boxes. Numbers can be directly typed. Clicking on the up and down arrows will also change the value.

High Warning:
 cycles/hr

NOTE: The apply button must be selected for the changes to take affect.

Training Status

Training Status is present on this page because one or more fields or graphs shows data that was gathered during the training process. The field shows one of the following states:

- Training Enabled - which indicates system data is being recorded. Training should run during normal system behavior.
- Training Disabled - which indicates NO system data is being recorded.
- Training Complete which indicates that the time period for training has expired and the data is stored in the positioner.

NOTE: The Training function requires the Pro positioner upgrade level (522MD+).



Training Status:

Action Buttons

The *Apply* button will save changes to the connected device.

The *Retrieve* button will retrieve the latest information from the device.

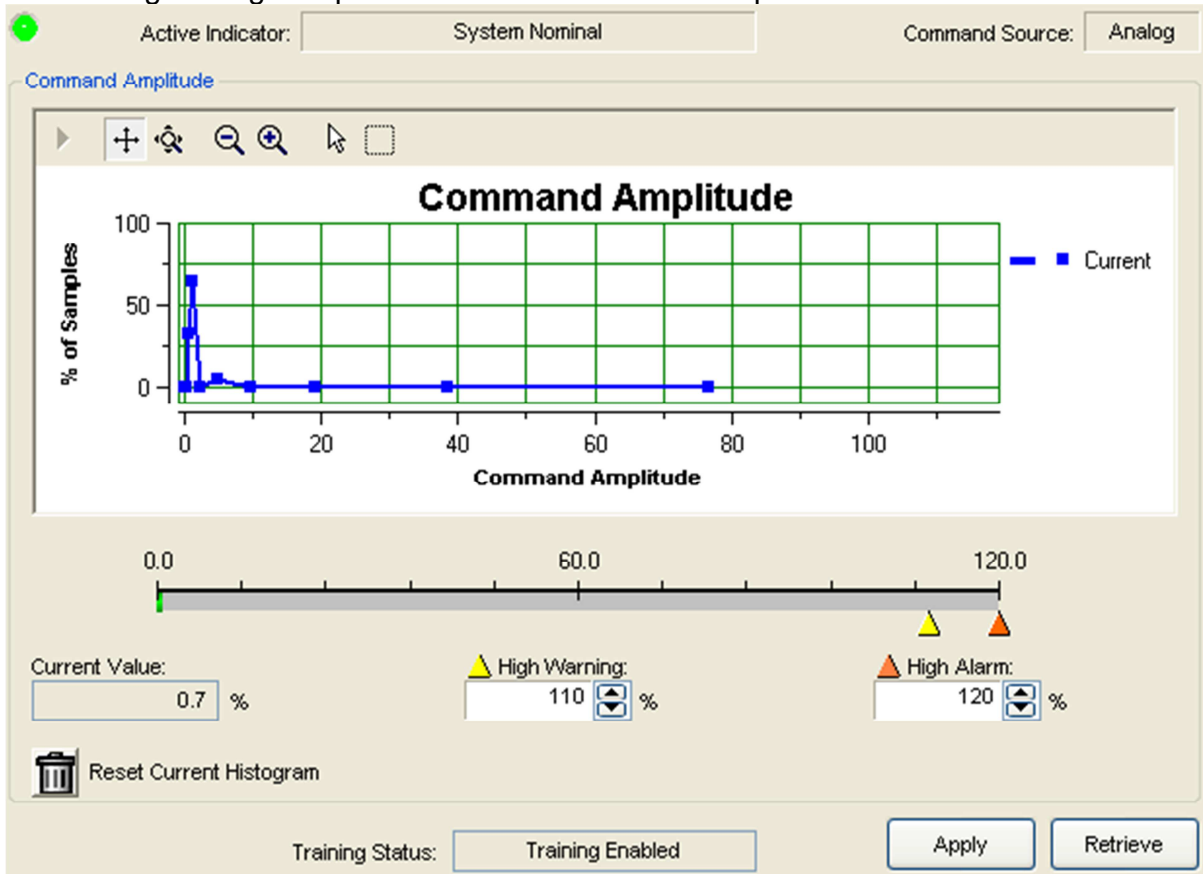
Warnings and Alarms

Command Frequency

- **Definition:** The frequency of the command signal is above the warning or alarm limit. This could mean the control loop is oscillating faster than normal.
- **Possible Solutions:** Verify the limits are set at an appropriate level. Review the control loop parameters and equipment. Adjust as necessary.

Command Amplitude

The *Command Amplitude* page allows you to view the current value and set warning limits related to the command amplitude detected by the positioner. The *Command Amplitude* is the running average amplitude of the command to the positioner.



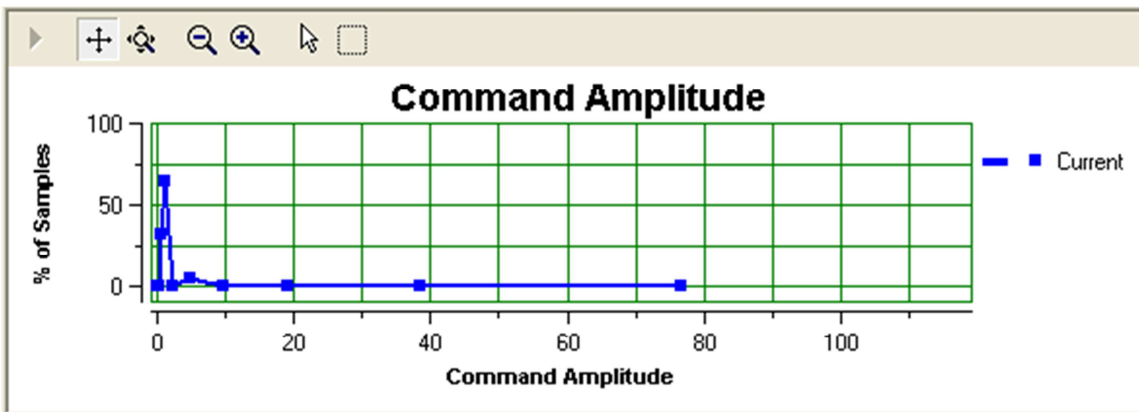
Status Area

The *Active Indicator* area shows the status of the most relevant active indicator. The color of the "LED light" corresponds to the Active Indicator and the first color of the blink code sequence on the positioner. Generally green indicates no immediate issues. Yellow indicates a developing issue. Red indicates the ability to control may be compromised. A detailed list of the indicators is given in the [Alarm Configuration - Alarm Annunciator](#) page. The *Command Source* field indicates whether the positioner is being controlled by digital or an analog (4-20 mA) command source.



Command Amplitude Histogram

The graph displays a histogram with current values and a histogram with data gathered during the training period. This is an easy way to see the range of typical values to set meaningful warning and alarm limits. It is also helpful to see how the data may have shifted since the training period. The histogram is frequently updated when the positioner is in operation.



Reset Current Histogram

The reset button will clear the Current histogram, but leave the Training histogram.



Current Value

This is the value calculated by the positioner and is updated frequently.

Current Value:
 %

Command Amplitude Limits

The *Command Amplitude* limits (High Warning Limit, and High Alarm Limit) can be easily adjusted on this page. These limits affect the health bar indicator on the Dashboard. For example, as the command amplitude increases and passes the High Warning, the health bar will begin to turn yellow. As it approaches the High Alarm, the health bar will turn red.

Adjusting Limits

To adjust the limits, use the input boxes. Numbers can be directly typed. Clicking on the up and down arrows will also change the value.

High Warning:
 cycles/hr

NOTE: The apply button must be selected for the changes to take affect.

Training Status

Training Status is present on this page because one or more fields or graphs shows data that was gathered during the training process. The field shows one of the following states:

- Training Enabled - which indicates system data is being recorded. Training should run during normal system behavior.
- Training Disabled - which indicates NO system data is being recorded.
- Training Complete which indicates that the time period for training has expired and the data is stored in the positioner.

NOTE: The Training function requires the Pro positioner upgrade level (522MD+).

Training Status:



Action Buttons

The *Apply* button will save changes to the connected device.



The *Retrieve* button will retrieve the latest information from the device.



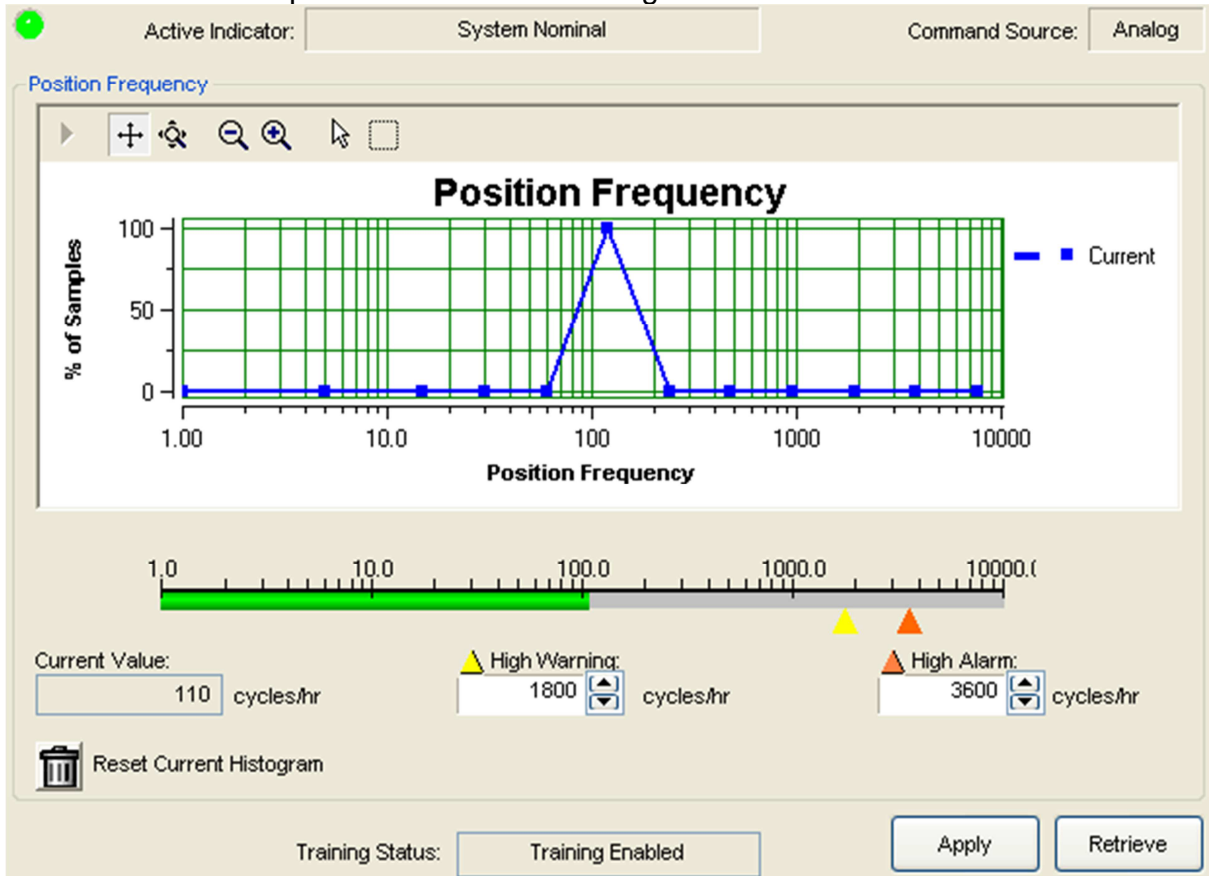
Warnings and Alarms

Command Amplitude

- **Definition:** The amplitude of the command signal is above the warning or alarm limit. This could mean the control loop has larger swings than desirable.
- **Possible Solutions:** Verify the limits are set at an appropriate level. Review the control loop parameters and equipment. Adjust as necessary.

Position Frequency

The *Position Frequency* page allows you to view the current value and set warning limits related to the position frequency detected by the positioner. The *Position Frequency* is the number of times the position of the valve changes direction in an hour.



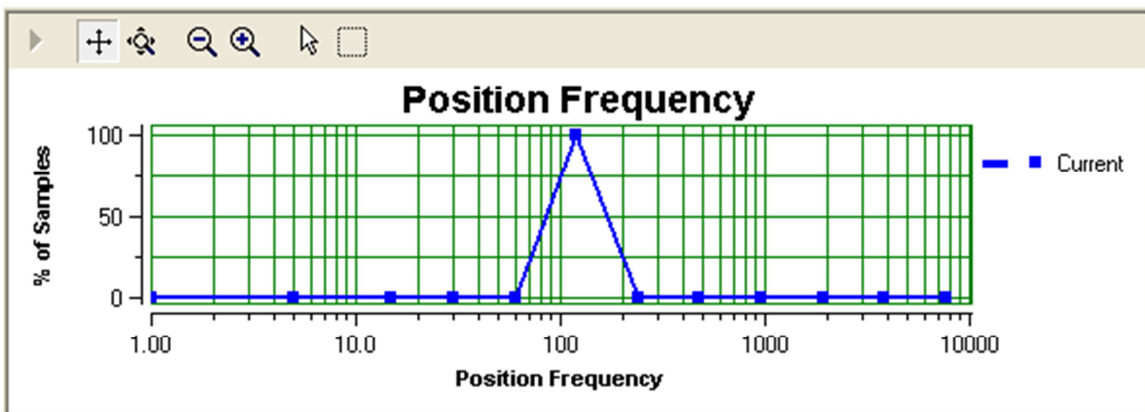
Status Area

The *Active Indicator* area shows the status of the most relevant active indicator. The color of the "LED light" corresponds to the Active Indicator and the first color of the blink code sequence on the positioner. Generally green indicates no immediate issues. Yellow indicates a developing issue. Red indicates the ability to control may be compromised. A detailed list of the indicators is given in the [Alarm Configuration - Alarm Annunciator](#) page. The *Command Source* field indicates whether the positioner is being controlled by digital or an analog (4-20 mA) command source.



Position Frequency Histogram

The graph displays a histogram with current values and a histogram with data gathered during the training period. This is an easy way to see the range of typical values to set meaningful warning and alarm limits. It is also helpful to see how the data may have shifted since the training period. The histogram is frequently updated when the positioner is in operation.



Reset Current Histogram

The reset button will clear the Current histogram, but leave the Training histogram.



Current Value

This is the value calculated by the positioner and is updated frequently.

Current Value:
 cycles/hr

Position Frequency Limits

The *Position Frequency* limits (High Warning Limit, and High Alarm Limit) can be easily adjusted on this page. These limits affect the health bar indicator on the Dashboard. For example, as the position frequency increases and passes the High Warning, the health bar will begin to turn yellow. As it approaches the High Alarm, the health bar will turn red.

Adjusting Limits

To adjust the limits, use the input boxes. Numbers can be directly typed. Clicking on the up and down arrows will also change the value.

High Warning:
 cycles/hr

NOTE: The apply button must be selected for the changes to take affect.

Training Status

Training Status is present on this page because one or more fields or graphs shows data that was gathered during the training process. The field shows one of the following states:

- Training Enabled - which indicates system data is being recorded. Training should run during normal system behavior.
- Training Disabled - which indicates NO system data is being recorded.
- Training Complete which indicates that the time period for training has expired and the data is stored in the positioner.

NOTE: The Training function requires the Pro positioner upgrade level (522MD+).

Training Status:



Action Buttons

The *Apply* button will save changes to the connected device.



The *Retrieve* button will retrieve the latest information from the device.



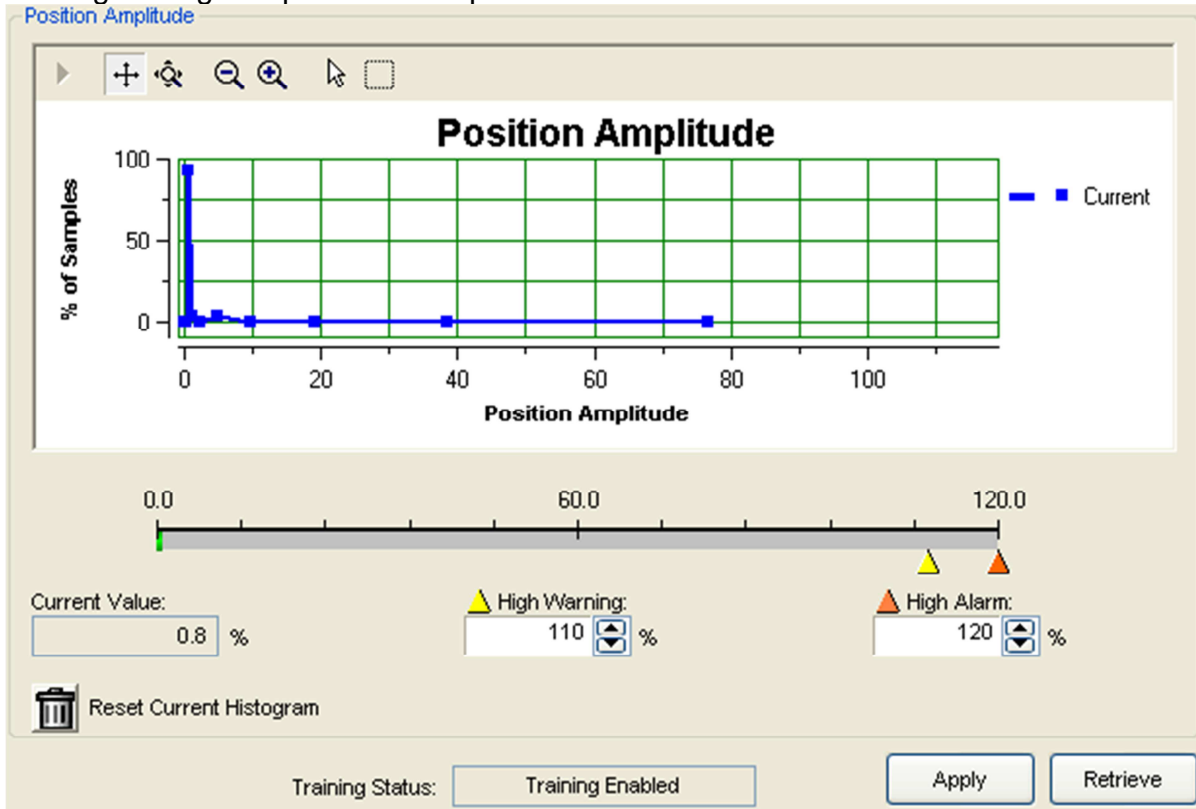
Warnings and Alarms

Position Frequency

- **Definition:** The frequency of the position signal is above the warning or alarm limit. The positioner is controlling the position of the valve with rapid corrections.
- **Possible Solutions:** Verify the limits are set at an appropriate level. Adjust the selectable Gain switch to a lower setting or use the "Hi Friction" setting. Perform a QUICK-CAL which sets the gains based on valve response. Check for high friction. If the problem persists replace the relay.

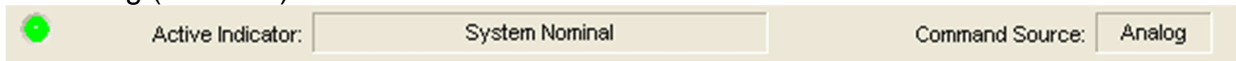
Position Amplitude

The *Position Amplitude* page allows you to view the current value and set warning limits related to the position amplitude detected by the positioner. The *Position Amplitude* is the running average amplitude of the position of the valve.



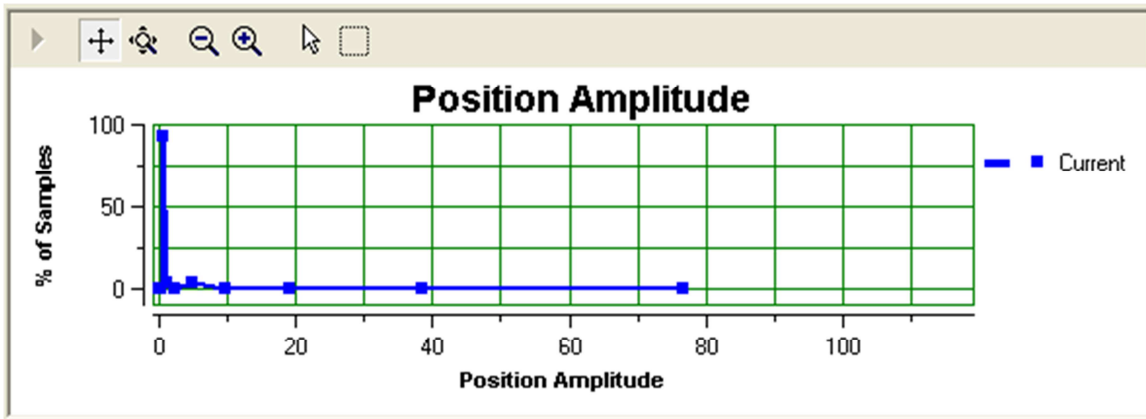
Status Area

The *Active Indicator* area shows the status of the most relevant active indicator. The color of the "LED light" corresponds to the Active Indicator and the first color of the blink code sequence on the positioner. Generally green indicates no immediate issues. Yellow indicates a developing issue. Red indicates the ability to control may be compromised. A detailed list of the indicators is given in the [Alarm Configuration - Alarm Annunicator](#) page. The *Command Source* field indicates whether the positioner is being controlled by digital or an analog (4-20 mA) command source.



Position Amplitude Histogram

The graph displays a histogram with current values and a histogram with data gathered during the training period. This is an easy way to see the range of typical values to set meaningful warning and alarm limits. It is also helpful to see how the data may have shifted since the training period. The histogram is frequently updated when the positioner is in operation.



Reset Current Histogram

The reset button will clear the Current histogram, but leave the Training histogram.



Current Value

This is the value calculated by the positioner and is updated frequently.

Current Value:
 %

Position Amplitude Limits

The *Position Amplitude* limits (High Warning Limit, and High Alarm Limit) can be easily adjusted on this page. These limits affect the health bar indicator on the Dashboard. For example, as the position amplitude increases and passes the High Warning, the health bar will begin to turn yellow. As it approaches the High Alarm, the health bar will turn red.

Adjusting Limits

To adjust the limits, use the input boxes. Numbers can be directly typed. Clicking on the up and down arrows will also change the value.

High Warning:
 %

NOTE: The apply button must be selected for the changes to take affect.

Training Status

Training Status is present on this page because one or more fields or graphs shows data that was gathered during the training process. The field shows one of the following states:

- Training Enabled - which indicates system data is being recorded. Training should run during normal system behavior.
- Training Disabled - which indicates NO system data is being recorded.
- Training Complete which indicates that the time period for training has expired and the data is stored in the positioner.

NOTE: The Training function requires the Pro positioner upgrade level (522MD+).

Training Status:



Action Buttons

The *Apply* button will save changes to the connected device.



The *Retrieve* button will retrieve the latest information from the device.



Warnings and Alarms

Position Amplitude

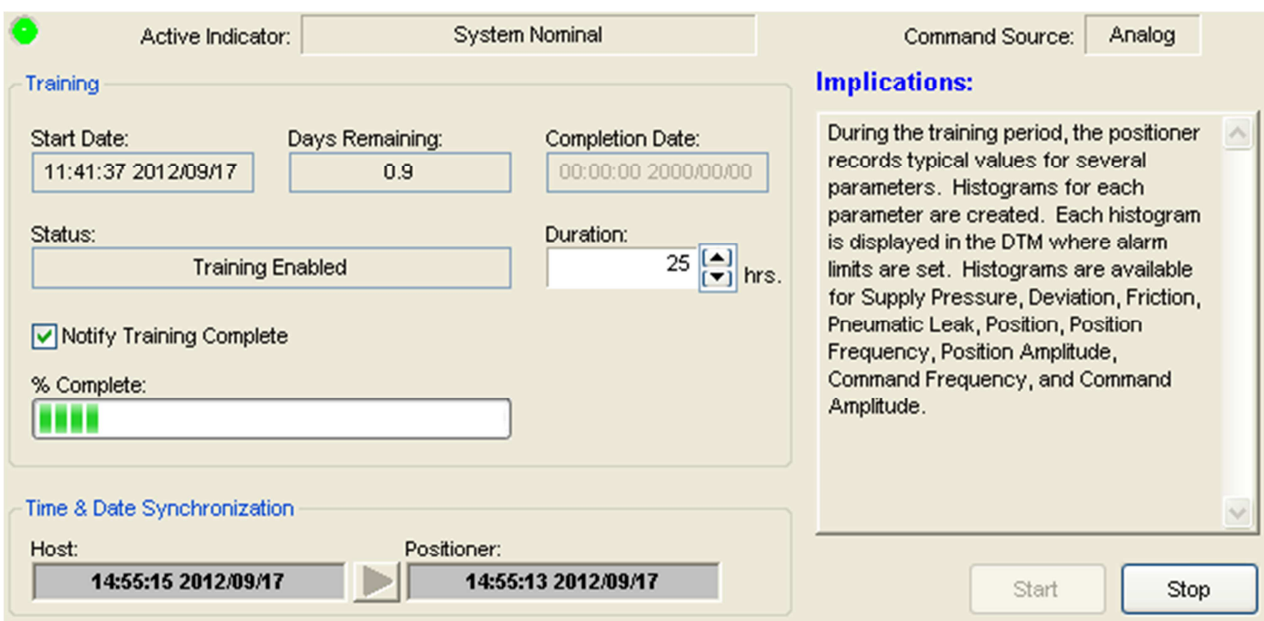
- **Definition:** The amplitude of the position signal is above the warning limit. The positioner is controlling the position of the valve with large corrections.
- **Possible Solutions:** Verify the limits are set at an appropriate level. Adjust the selectable Gain switch to a lower setting or use the "Hi Friction" setting. Perform a QUICK-CAL which sets the gains based on valve response. Check for high friction. If the problem persists replace the relay.

Training

The *Training* page allows you to view information about the training period. During the training period, the positioner records system data and creates histograms of several parameters. The histogram data and graphs are displayed in the DTM pages where the related alarm limits are set. The training period should be run during normal operation, when there are no issues. It should run over a time period that includes normal process variations. By default, the training will begin automatically after 24 hours of continuous operation and last 90 days (2160 hours). For more recorded system data, see [Trends](#).

During Training, the positioner data for the following:

- Supply Pressure
- Deviation
- Friction
- Pneumatic Leak
- Position
- Position Frequency
- Position Amplitude
- Command Frequency
- Command Amplitude



Active Indicator: System Nominal Command Source: Analog

Training

Start Date: 11:41:37 2012/09/17 Days Remaining: 0.9 Completion Date: 00:00:00 2000/00/00

Status: Training Enabled Duration: 25 hrs.

Notify Training Complete

% Complete:

Time & Date Synchronization

Host: 14:55:15 2012/09/17 Positioner: 14:55:13 2012/09/17

Implications:

During the training period, the positioner records typical values for several parameters. Histograms for each parameter are created. Each histogram is displayed in the DTM where alarm limits are set. Histograms are available for Supply Pressure, Deviation, Position, Position Frequency, Position Amplitude, Pneumatic Leak, Friction, Command Frequency, and Command Amplitude.

Start Stop

Status Area

The *Active Indicator* area shows the status of the most relevant active indicator. The color of the "LED light" corresponds to the Active Indicator and the first color of the blink code sequence on the positioner. Generally green indicates no immediate issues. Yellow indicates a developing issue. Red indicates the ability to control may be compromised. A detailed list of the indicators is given in the [Alarm Congfiguraion - Alarm Annunicator](#) page. The *Command Source* field indicates weather the positioner is being controlled by digital or

an analog (4-20 mA) command source.



Training Area

The *Start Date* shows the date that the training began.

The *Days Remaining* show the number of days before the training will be complete.

The *Completion Date* shows the completion date of the last training period.

The *Duration* shows the number of hours the training mode will run.

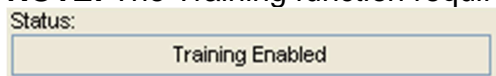
Checking the *Notify Training Complete* box will generate an alert when the training is complete. At that time, you may review alarms related to training to ensure they are within reasonable boundaries.

Training Status


The field shows one of the following states:

- Training Enabled - which indicates system data is being recorded. Training should run during normal system behavior.
- Training Disabled - which indicates NO system data is being recorded.
- Training Complete which indicates that the time period for training has expired and the data is stored in the positioner.

NOTE: The Training function requires the Pro positioner upgrade level (522MD+).



Time & Date Synchronization

When the positioner is not in training the arrow  will be enable to synchronize the positioner date and time with the host computer date and time.

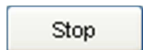


Action Buttons

The *Start* button begin training.



The *Stop* button end the training mode. No histograms will be available if the Training mode is stopped.



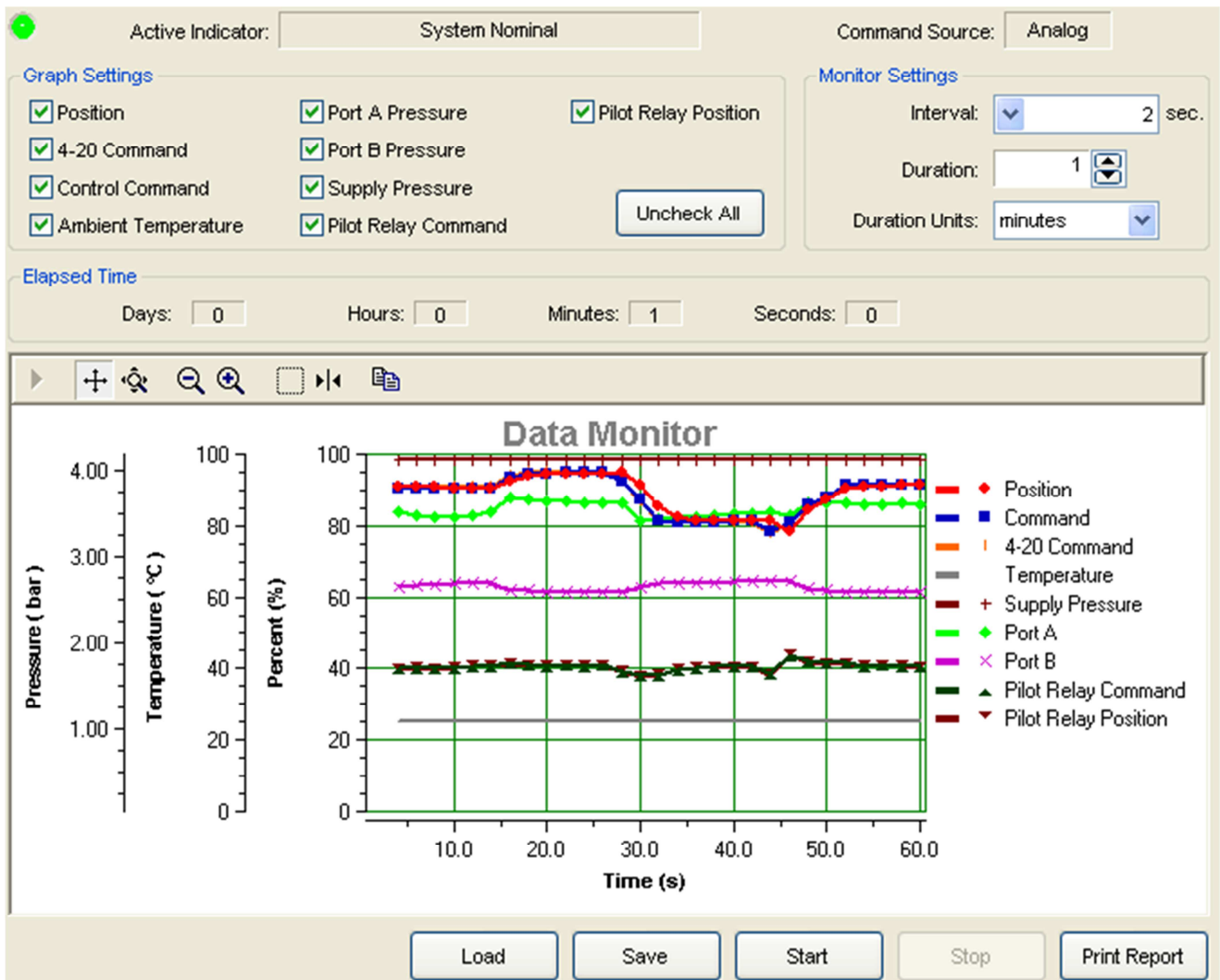


On-line Diagnostics

On-line diagnostics pages provide ways to view and analyze the valve and positioner while it is controlling. This selection automatically redirects to the *Data Monitor* page.

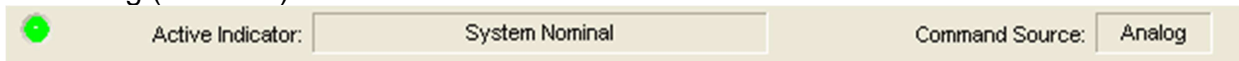
Data Monitor

The *Data Monitor* page displays a graph used to monitor a valve's current state. When running, the graph will update with current data. This data can be saved to a file. A report can also be automatically generated.



Status Area

The *Active Indicator* area shows the status of the most relevant active indicator. The color of the "LED light" corresponds to the Active Indicator and the first color of the blink code sequence on the positioner. Generally green indicates no immediate issues. Yellow indicates a developing issue. Red indicates the ability to control may be compromised. A detailed list of the indicators is given in the [Alarm Configuration - Alarm Annunciator](#) page. The *Command Source* field indicates whether the positioner is being controlled by digital or an analog (4-20 mA) command source.



Graph Settings

This box allows for the selection of items to be shown on the graph. All of the data is acquired regardless of this setting. Any item can be hidden or shown after the data has been downloaded from the positioner. The "**Uncheck All**" button will remove all the selected boxes.

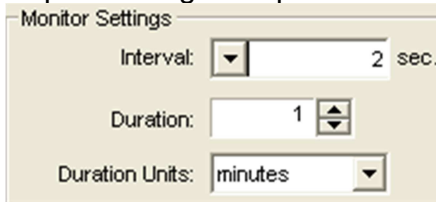


Graph Settings

<input checked="" type="checkbox"/> Position	<input checked="" type="checkbox"/> Port A Pressure	<input checked="" type="checkbox"/> Pilot Relay Position
<input checked="" type="checkbox"/> 4-20 Command	<input checked="" type="checkbox"/> Port B Pressure	
<input checked="" type="checkbox"/> Control Command	<input checked="" type="checkbox"/> Supply Pressure	
<input checked="" type="checkbox"/> Ambient Temperature	<input checked="" type="checkbox"/> Pilot Relay Command	<input type="button" value="Uncheck All"/>

Monitor Settings

The *Monitor Settings* box sets the *Interval* between data points, the *Duration* of the logging, and the *Duration Units*. Two seconds is the fastest acquisition interval for the logger (due to the speed of HART communications). If you are on a large network, latency times may require a longer acquisition interval.



Monitor Settings

Interval: sec.

Duration:

Duration Units:

Data Capture Timing

The data is plotted on the graph at different times depending on transmission rates. A data sample is requested after the first interval has passed. After the data sample has been received, the values are plotted at the next time interval. For example, if the time interval is 5 seconds and it takes 2.5 seconds to request and receive the data sample, the first data points will be plotted at the 8th second on the graph (5 seconds + 2.5 seconds = 7.5 seconds. Then rounded up to 8 seconds). At 10 seconds, another data sample will be requested. It will be plotted at the 13th second on the graph.

Elapsed Time

This box displays the time that has passed since the monitor was started.






Elapsed Time

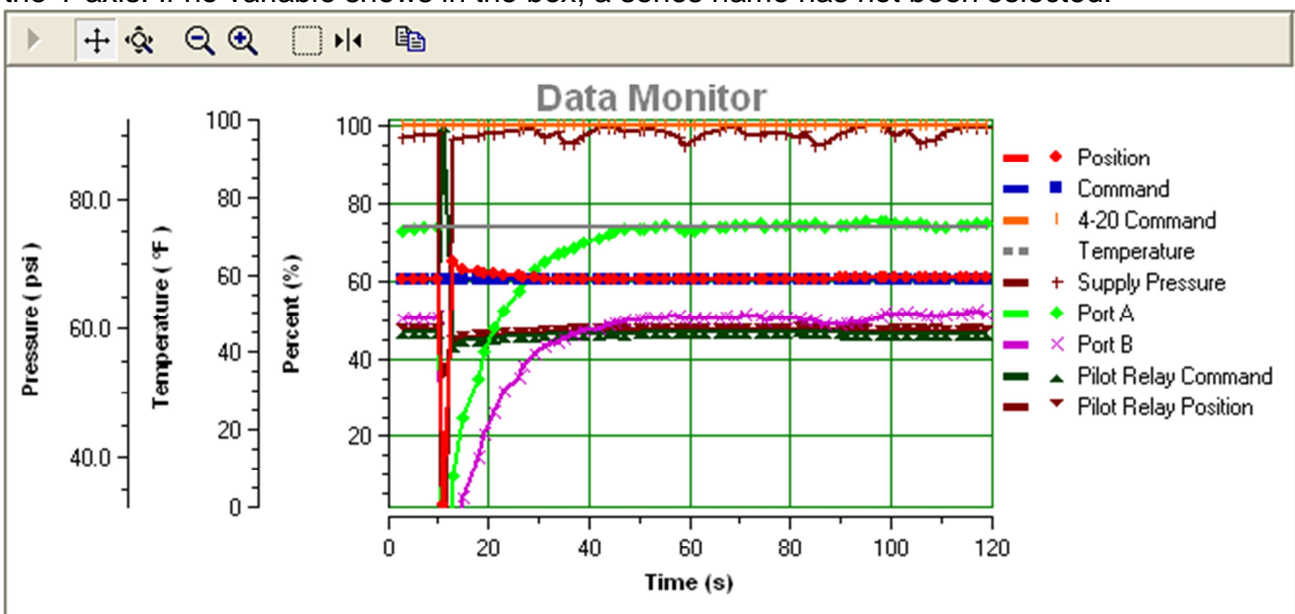
Days: Hours: Minutes: Seconds:

Graph Settings

At the top of the graph are several controls for viewing the graph.

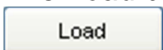
-  The *Restore* icon restores a graph that has been zoomed or adjusted.
-  The *Scroll* icon will allow the scales on the graph to be scrolled. Click the icon, then dragging the scale up or down.
-  The *Zoom* icon will allow the scales on the graph to be zoomed or expanded. Click on the scale and dragging the scale up or down to zoom in or out.

- The *Zoom Out All Axes* icon scales all axes by clicking on the graph.
- The *Zoom In All Axes* icon scales all axes by clicking on the graph.
- The *Zoom Box* icon allows a portion of the visible graph to be magnified. Click on the icon then click and drag over the graph data to be magnified.
- The *Cursor* icon allows a labeled marker to be placed on the graph which shows the coordinates of the graph. Click on the icon, then select the series name from the legend on the right of the graph. Now move the cursor to the location of interest. The first number on the cursor shows the location on the X axis, and the second number shows the location on the Y axis. If no variable shows in the box, a series name has not been selected.

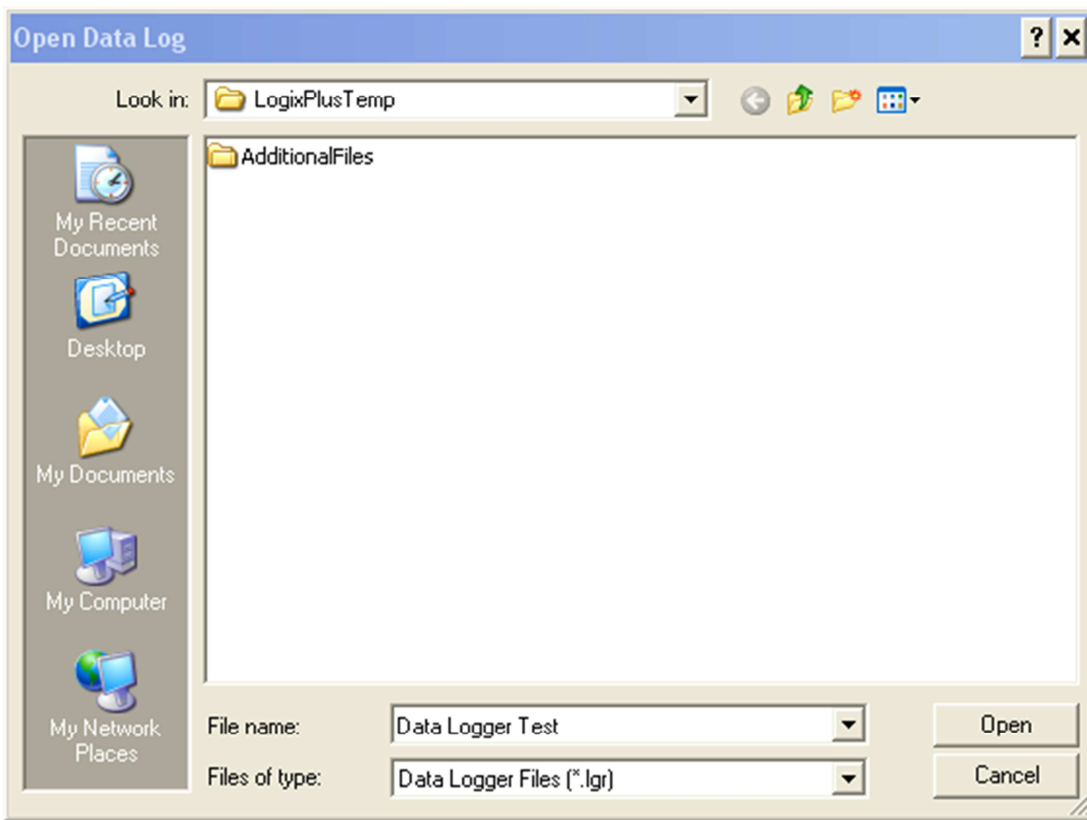


Action Buttons

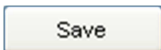
The *Load* button will load a Data Monitor test from file.



If your frame setting allows private dialogs, the "Load" button will be enabled and it will display an open dialog to select the desired (*.lgr) data logger file to load. Select a file and click open to load a previous stored Data Monitor file for viewing.

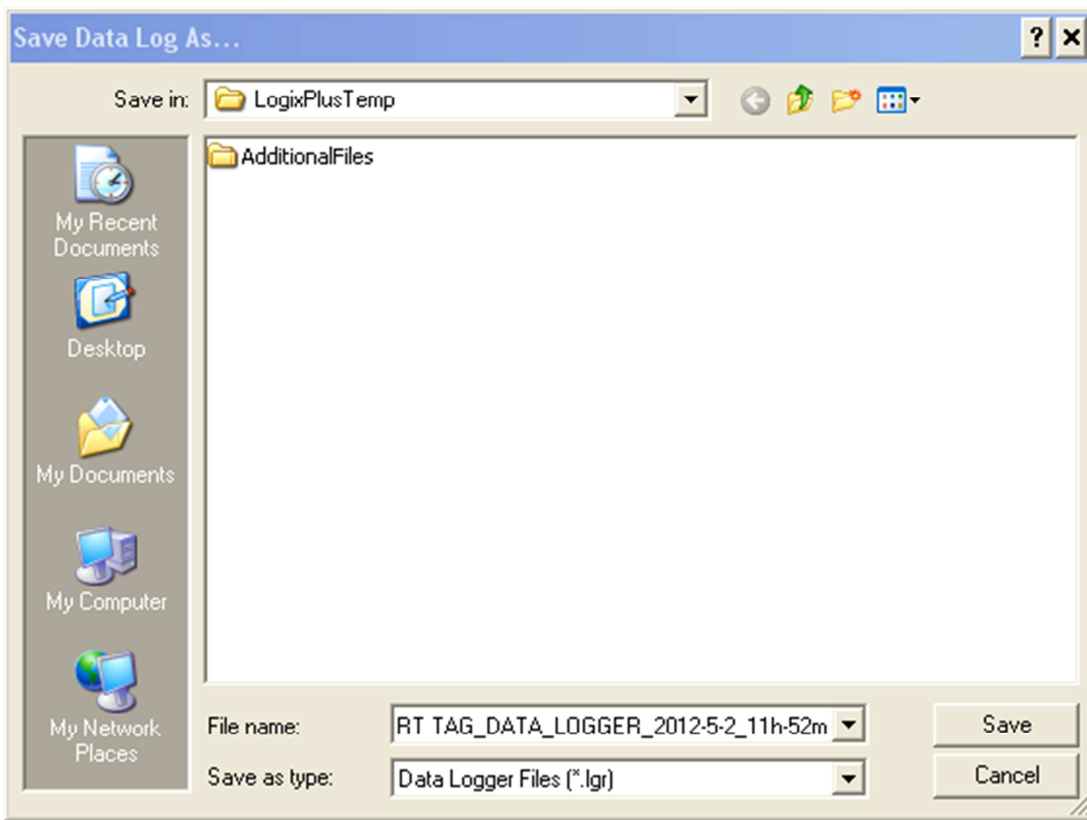


The Save button saves the existing Data Monitor test to a file.

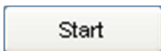


If your Frame setting allows private dialogs, the "Save" button will be enabled and it will display a Save dialog to save the current data logger test to a file. The "Save" dialog will display a default name including the following:

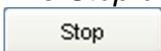
- Device Tag ID
- DATA_LOGGER_
- Year
- Month
- Day
- Time



The *Start* button will clear the existing data and start recording a new set of data.



The *Stop* button will stops the data logger.



The *Print Report* button will print a data logger test report to the default printer. The report is automatically generated and is sent to the host computer's default printer.



NOTE: It is possible to print the report to save to a **PDF** file. Instructions:

1. Download and install the free version of PDFCreator.
2. Install the PDFCreator
3. Set PDFCreator as the default Printer
4. Click Print Report and save the report to a pdf file in your computer.



Data Monitor Report

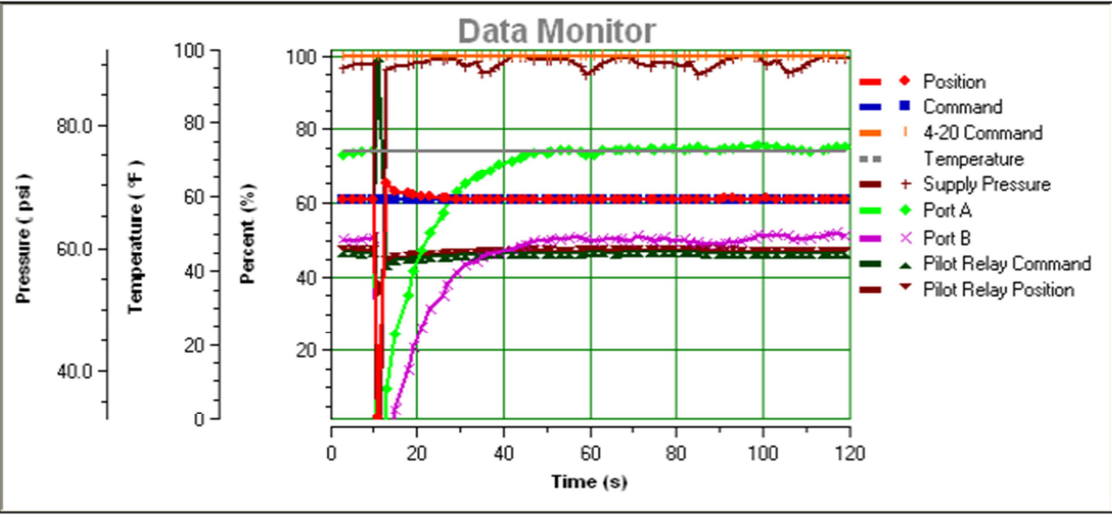
Logix MD+ DEVICE TAG ID: HART TAG DEVICE VERSION: MD+ Pro Diagnostics
 ACTUATOR INFO -> Size: 25, Manufacturer: Valtek (Piston), Type: Linear (piston), Spring Type: Single
 VALVE BODY INFO -> Model: Mark One, Body Size: .25 INCH / DN 6, FlowDirection: FlowOver, Fail Position: Mechanical Fail Closed

Monitor Settings

Interval: 2 sec.
 Duration: 2
 Duration Units: minutes

Elapsed Time

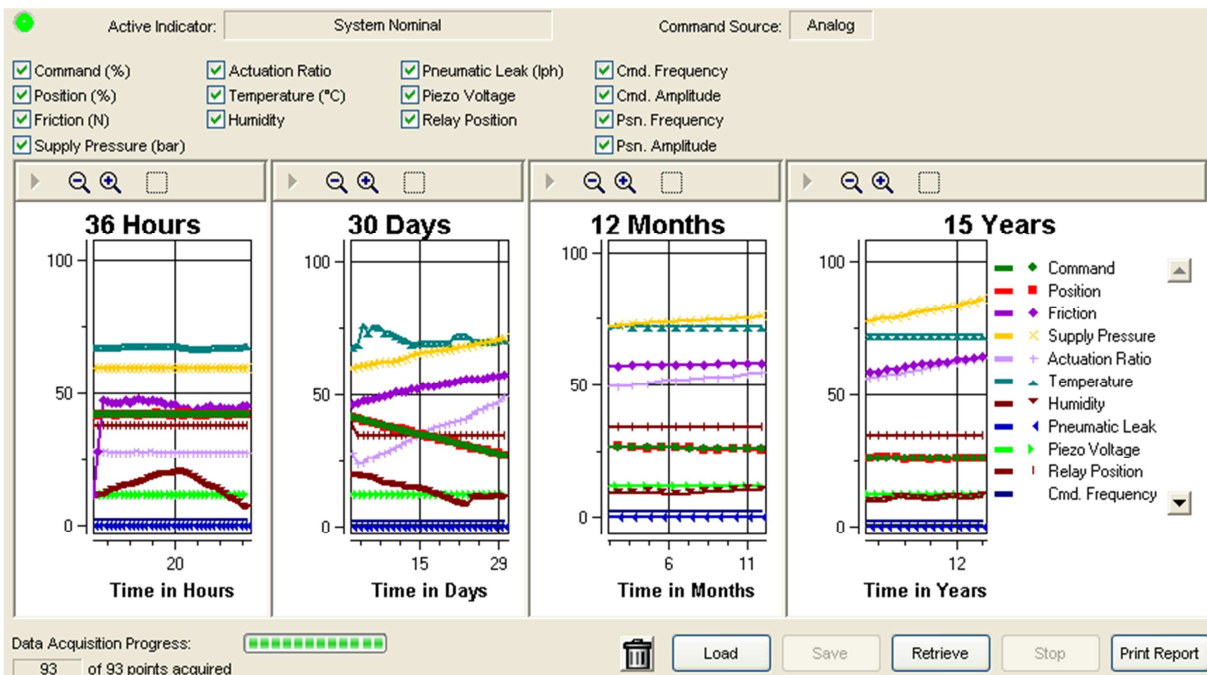
Days: 0 Hours: 0
 Minutes: 2 Seconds: 0



Trends

The *Trends* page displays a graph showing data gathered by the positioner over a long period of time. When this page is first loaded, it will automatically download the trend data from the positioner memory. The data includes values from several important system parameters. Viewing these trends can help detect issues that may affect the control of the valve and become worse over time. The trends are stored with 4 levels of resolution.

1. The **36 hour** graph shows the average of each measured value by hour for the last 36 hours.
2. The **30 days** graph shows the average of each measured value by day for the last 30 days.
3. The **12 months** graph shows the average of each measured value by month for the last 12 months.
4. The **15 years** graph shows the average of each measured value by year for up to 15 years.



Status Area

The *Active Indicator* area shows the status of the most relevant active indicator. The color of the "LED light" corresponds to the Active Indicator and the first color of the blink code sequence on the positioner. Generally green indicates no immediate issues. Yellow indicates a developing issue. Red indicates the ability to control may be compromised. A detailed list of the indicators is given in the [Alarm Congfiguraion - Alarm Annunicator](#) page. The *Command Source* field indicates whether the positioner is being controlled by digital or an analog (4-20 mA) command source.







Graph Series Selection

This area allows for the selection of items to be shown on the graph. All of the data is acquired regardless of this setting. Any item can be hidden or shown after the data has been downloaded from the positioner.

<input checked="" type="checkbox"/> Command (%)	<input checked="" type="checkbox"/> Actuation Ratio	<input checked="" type="checkbox"/> Pneumatic Leak (lph)	<input checked="" type="checkbox"/> Cmd. Frequency
<input checked="" type="checkbox"/> Position (%)	<input checked="" type="checkbox"/> Temperature (°C)	<input checked="" type="checkbox"/> Piezo Voltage	<input checked="" type="checkbox"/> Cmd. Amplitude
<input checked="" type="checkbox"/> Friction (N)	<input checked="" type="checkbox"/> Humidity	<input checked="" type="checkbox"/> Relay Position	<input checked="" type="checkbox"/> Psn. Frequency
<input checked="" type="checkbox"/> Supply Pressure (bar)			<input checked="" type="checkbox"/> Psn. Amplitude


Graph Settings

At the top of the graph are several controls for viewing the graph.

-  The *Restore* icon restores a graph that has been zoomed or adjusted.
-  The *Zoom Out All Axes* icon scales all axes by clicking on the graph.
-  The *Zoom In All Axes* icon scales all axes by clicking on the graph.
-  The *Zoom Box* icon allows a portion of the visible graph to be magnified. Click on the icon then click and drag over the graph data to be magnified.

Data Acquisition Progress

This field shows the download progress of the trend data. Once the trend data has been retrieved the progress bar is blank.

Data Acquisition Progress: 

93 of 93 points acquired

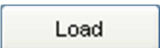
Reset Trends

Delete all trend data from device and graph.

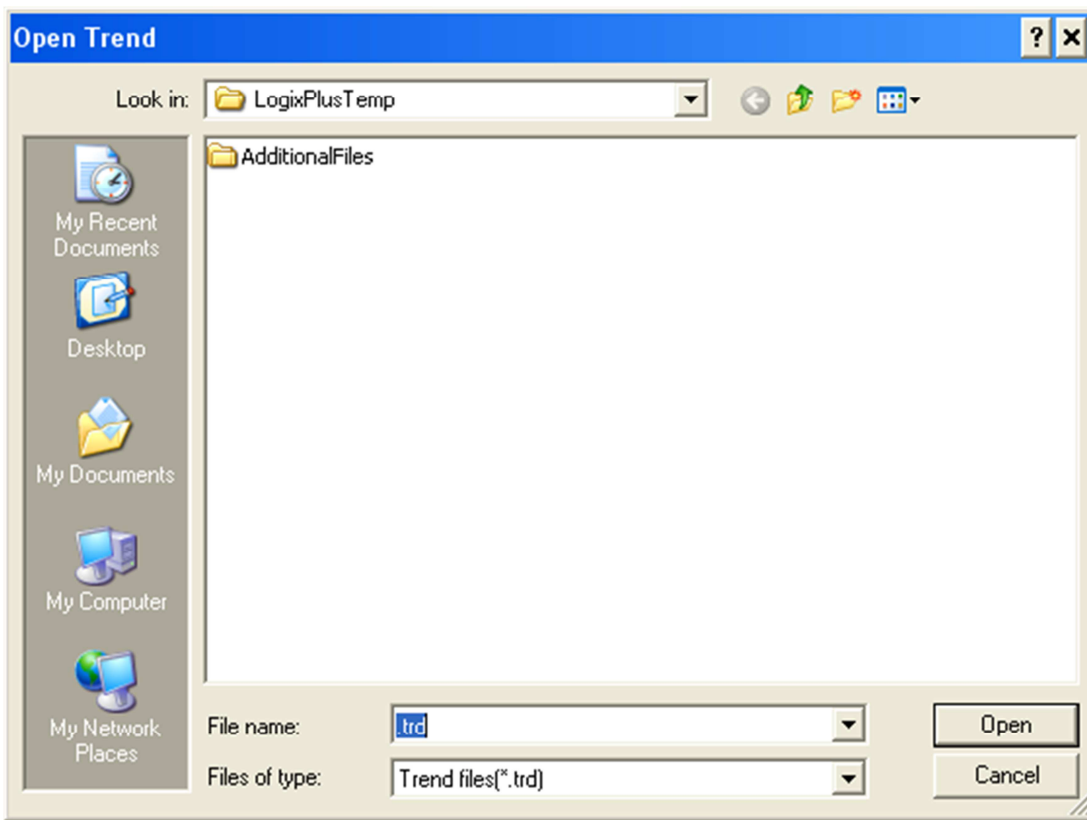


Action Buttons

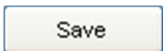
The *Load* button will load a Data Monitor test from file.



If your Frame setting allows private dialogs, the "Load" button will be enabled and it will display an open dialog to select the desired (*.trd) trend file to load. Select a file and click open to load a previous stored trend for viewing.

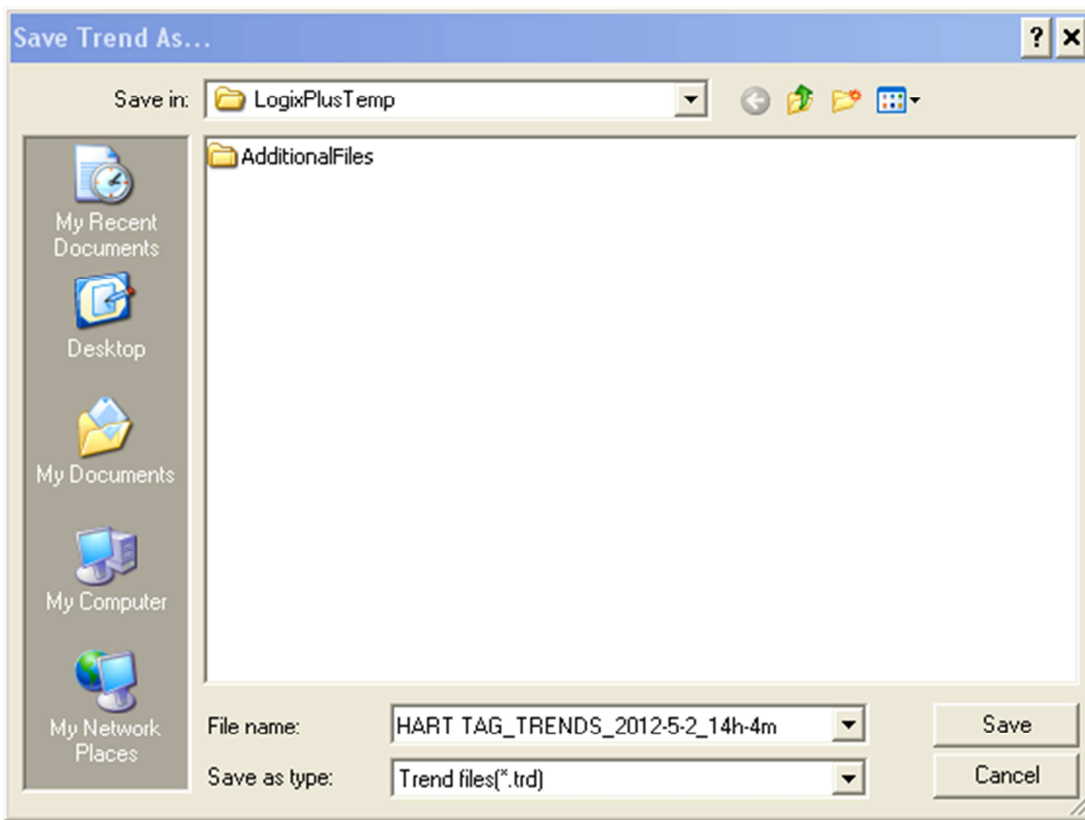


The Save button saves the existing Trend to a file.



If your Frame setting allows private dialogs, the "Save" button will be enabled and it will display a Save dialog to save the current data logger test to a file. The "Save" dialog will display a default name including the following:

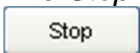
- Device Tag ID_
- Trends_
- Year
- Month
- Day
- Time



The *Retrieve* button clears the existing trend data and start a new data acquisition from device. The DTM menu selection is unavailable during data acquisition.



The *Stop* button stops the acquisition of the trend data.



The *Print Report* button prints the Trend report to the default printer.



NOTE: It is possible to print the report to save to a PDF file. Instructions:

1. Download and install the free version of PDFCreator.
2. Install the PDFCreator
3. Set PDFCreator as the default Printer
4. Click Print Report and save the report to a pdf file in your computer.

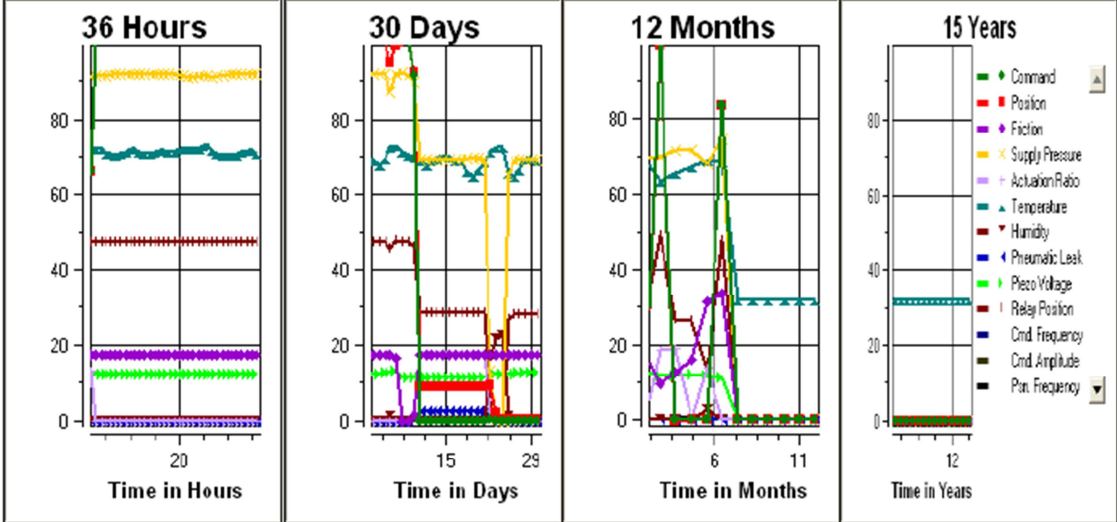


Trend Report

Logix MD+ DEVICE TAG ID: HART TAG DEVICE VERSION: MD+ Pro Diagnostics
 ACTUATOR INFO -> Size: 25, Manufacturer: Valtek (Piston), Type: Linear (piston), Spring Type: Single
 VALVE BODY INFO -> Model: Mark One, Body Size: .25 INCH / DN 6, FlowDirection: FlowOver, Fail Position: Mechanical Fail Closed

Legend

- | | | |
|---|---|--|
| <input checked="" type="checkbox"/> Command (%) | <input checked="" type="checkbox"/> Temperature (F) | <input checked="" type="checkbox"/> Cmd. Frequency |
| <input checked="" type="checkbox"/> Position (%) | <input checked="" type="checkbox"/> Humidity | <input checked="" type="checkbox"/> Cmd. Amplitude |
| <input checked="" type="checkbox"/> Friction (lbf) | <input checked="" type="checkbox"/> Pneumatic Leak (scfm) | <input checked="" type="checkbox"/> Psn. Frequency |
| <input checked="" type="checkbox"/> Supply Pressure (psi) | <input checked="" type="checkbox"/> Piezo Voltage | <input checked="" type="checkbox"/> Psn. Amplitude |
| <input checked="" type="checkbox"/> Actuation Ratio | <input checked="" type="checkbox"/> Relay Position | |



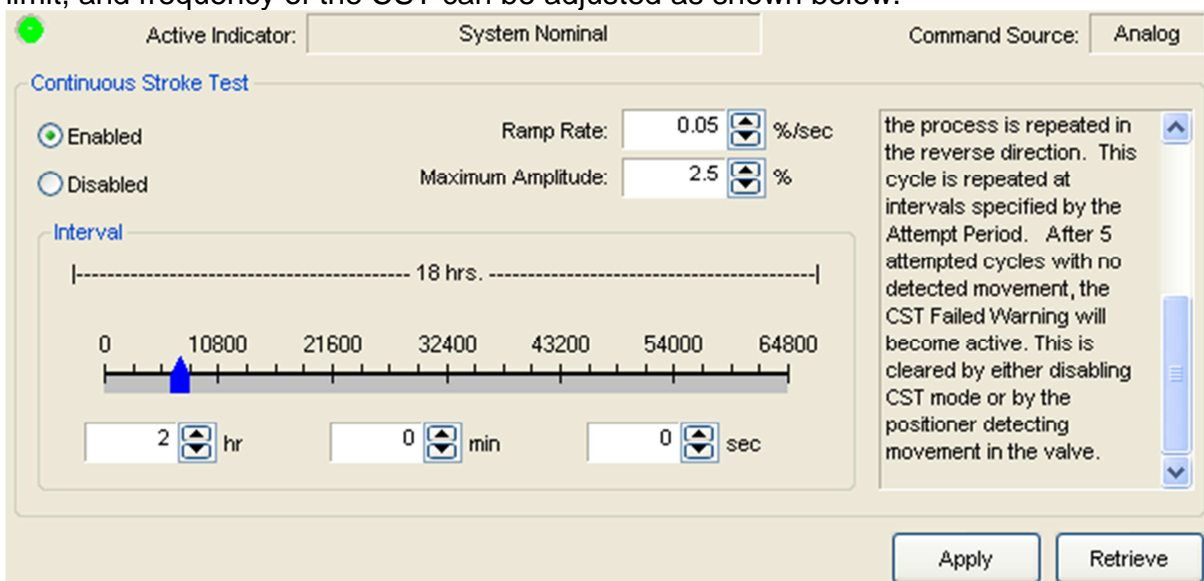
Continuous Stroke Test

The *Continuous Stroke Test* page allows you to set parameters and enable the continuous stroke testing (CST) feature.

NOTE: This feature will add a small deviation to the valve position. This feature is not recommended for valves intended for high accuracy or stability.

For valves that are normally held at a constant position for extended periods of time, the CST feature can provide assurance that the valve is still responsive. When CST is enabled, the positioner will cause a very small amount of valve movement. From this movement, the positioner can find information about the health of the valve, actuator and positioner.

To achieve the CST function, the positioner adds a small deviation to the command. By default, the deviation is ramped at a rate of 0.05%/second up to 5%. However, the instant the valve moves, the ramp reverses and begins to grow in the opposite direction. So, with low friction, the actual movement will be quite small. If the valve does not move by the time the deviation equals 5%, the ramp reverses and a counter will start. After 5 consecutive failed attempts to move, the CST warning will appear. This is cleared by either disabling CST mode or by the positioner detecting movement in the valve. The ramp rate, maximum limit, and frequency of the CST can be adjusted as shown below.



Status Area

The *Active Indicator* area shows the status of the most relevant active indicator. The color of the "LED light" corresponds to the Active Indicator and the first color of the blink code sequence on the positioner. Generally green indicates no immediate issues. Yellow indicates a developing issue. Red indicates the ability to control may be compromised. A detailed list of the indicators is given in the [Alarm Configuration - Alarm Annunciator](#) page. The *Command Source* field indicates whether the positioner is being controlled by digital or an analog (4-20 mA) command source.

Active Indicator: System Nominal
Command Source: Analog

Settings

The *Enable* button will begin the CST after the apply button is selected.

The *Disable* button will end the CST after the apply button is selected.

Enabled
 Disabled

The *Ramp Rate* value controls the rate of change of the additional command. The *Maximum Amplitude* value controls the maximum amount of additional command. This does not mean the valve will actually move this much. If valve movement is detected in any amount, the additional command will immediately change direction.

Ramp Rate: 0.05 %/sec
 Maximum Amplitude: 2.5 %

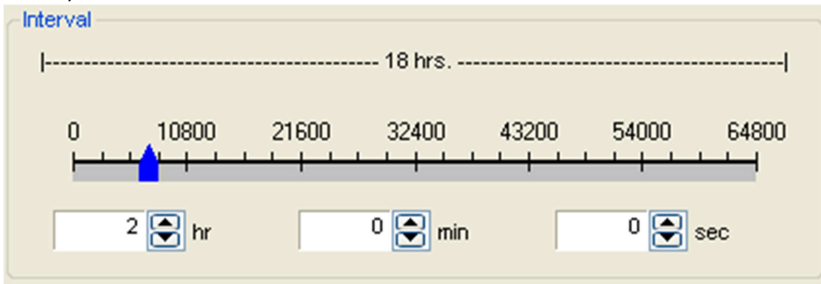
The *Interval* values control how often the CST is performed. Use the blue slider or type the hour, minute and second values in the fields.

Interval

----- 18 hrs. -----

0 10800 21600 32400 43200 54000 64800

2 hr 0 min 0 sec



Action Buttons

The *Apply* button will save changes to the connected device.

Apply

The *Retrieve* button will retrieve the latest information from the device.

Retrieve

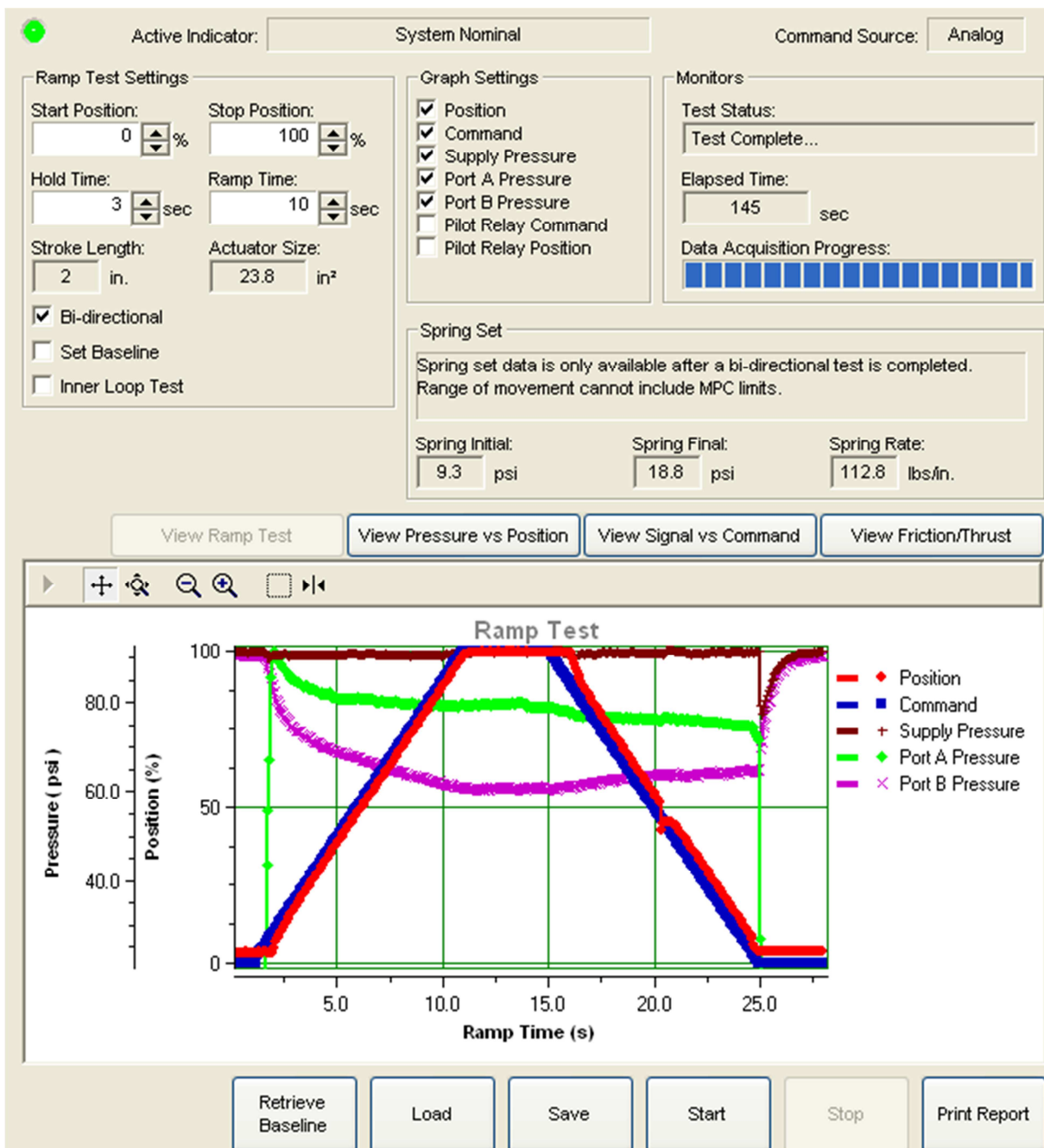


Off-line Diagnostics

Off-line Diagnostics pages provide ways to view and analyze the valve and positioner while it is off-line, not controlling. This selection automatically redirects to the *Ramp Test* page.

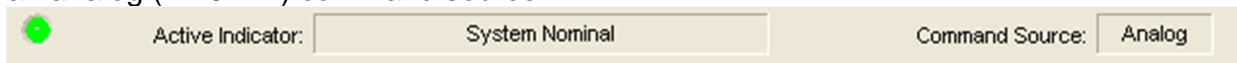
Ramp Test The *Ramp Test* page allow you to adjust settings and run a ramp test. The ramp test is a powerful tool for bench testing valves in a shop or installed valves that are not in service and can be fully or partially stroked. By ramping the valve with a known input and monitoring the response, changes over time can be noted and used to pinpoint developing or existing problems.

CAUTION: During a test the valve will not respond to control signals and movement of the valve stem will occur.



Status Area

The *Active Indicator* area shows the status of the most relevant active indicator. The color of the "LED light" corresponds to the Active Indicator and the first color of the blink code sequence on the positioner. Generally green indicates no immediate issues. Yellow indicates a developing issue. Red indicates the ability to control may be compromised. A detailed list of the indicators is given in the [Alarm Congfiguraion - Alarm Annunicator](#) page. The *Command Source* field indicates weather the positioner is being controlled by digital or an analog (4-20 mA) command source.



Ramp Test Settings

The *Start Position* and *Stop Position* are used to specify where the valve position will begin and end during the ramp test. Normally the most informative signatures cover the full range of travel of the valve and the characteristic saturation at each end of travel. Each signature contains a fixed number of data points (208) so if any problems are seen from the larger signature then a smaller range signature can be run specifically in an area of interest for greater resolution.

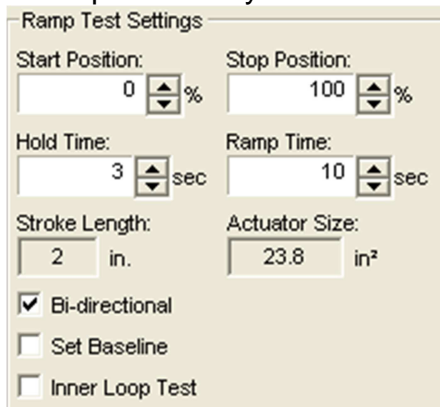
The *Hold Time* is the time the command will remain at the end of the ramp to allow the valve to continue moving and stabilize. The ramp always includes a one-second stabilization period at the beginning of each ramp.

The *Ramp Time* controls the speed of the ramp. Generally larger valves should be ramped slower than small ones to better observe their behavior.

The *Bi-directional* check box indicates that the ramp will run in both directions. The first direction will be from the start position to the stop position. The second direction will be in reverse.

The *Set Baseline* check box indicates the signature will be stored in a different memory location in the positioner. This baseline can remain in the positioner even if other tests are completed and can be retrieved at any time.

The *Inner Loop Test* check box indicates the ramp will apply the settings to the pilot relay position instead of the valve position. This is not a common use of the ramp test, but can be helpful to verify the condition and responsiveness of the pilot relay.



The image shows a "Ramp Test Settings" dialog box with the following fields and options:

- Start Position: 0 %
- Stop Position: 100 %
- Hold Time: 3 sec
- Ramp Time: 10 sec
- Stroke Length: 2 in.
- Actuator Size: 23.8 in²
- Bi-directional
- Set Baseline
- Inner Loop Test

Graph Settings

This area allows for the selection of items to be shown on the graph. All of the data is acquired regardless of this setting. Any item can be hidden or shown after the data has been downloaded from the positioner.

Graph Settings

- Position
- Command
- Supply Pressure
- Port A Pressure
- Port B Pressure
- Pilot Relay Command
- Pilot Relay Position

Monitors


Test Status indicates the current state of the test.

Elapsed Time shows how many seconds have passed since the ramp test began. This includes time for data acquisition.

Monitors

Test Status:

Elapsed Time:
 sec

Data Acquisition Progress:


Spring Set

The Spring Set box shows information about the spring forces in the actuator.

Spring Initial is the pressure required to initially move the valve as the valve is beginning to compress the spring.

Spring Final is the pressure required position the valve at the end of travel where the spring is fully compressed.

Spring Rate is the average force divided by the distance traveled during spring compression.

Spring Set

Spring set data is only available after a bi-directional test is completed.
 Range of movement cannot include MPC limits.

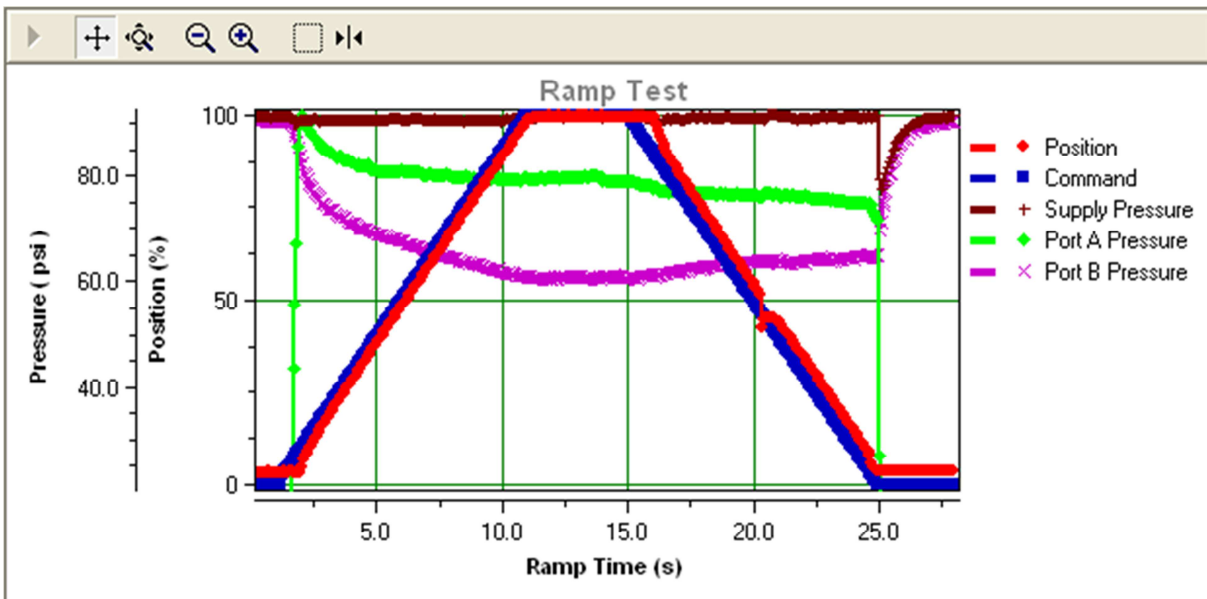
Spring Initial: psi

Spring Final: psi

Spring Rate: lbs/in.

View Ramp Test

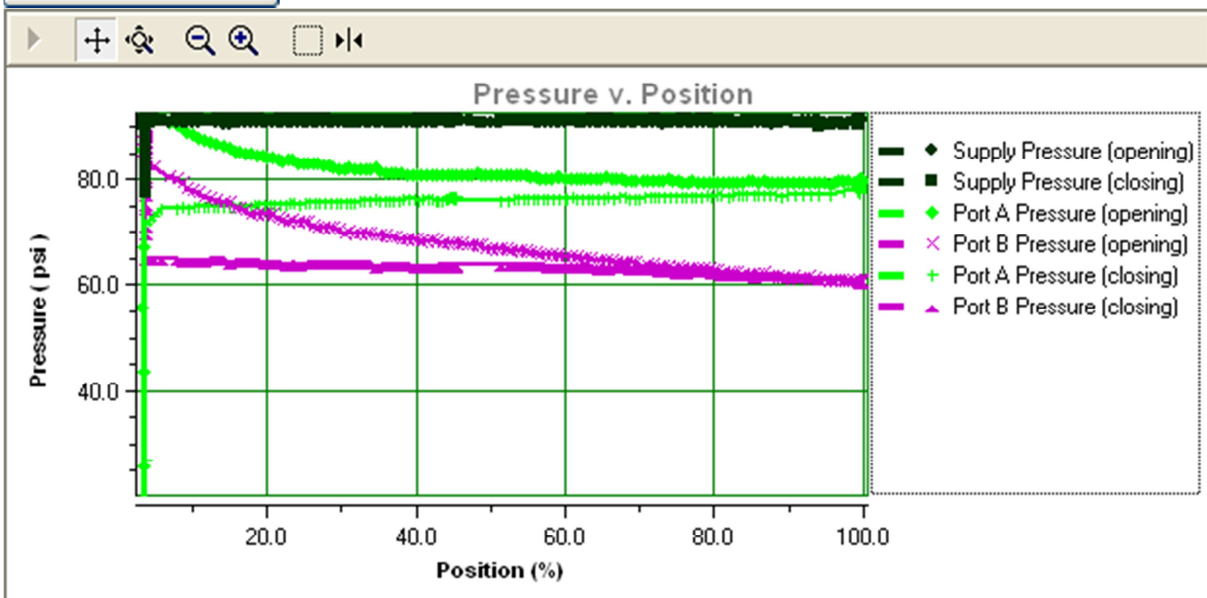
This graph shows the parameters relative to time.



View Pressure vs. Position

This graph shows the pressure parameters relative to the valve position. If a bi-directional signature has been taken it shows the both sets of pressures. The pressures are not the same in a bi-directional test due to the friction in the valve. The pressures are only shown for positions from 5-95% this is to remove the effects of saturating the actuator at the ends of travel. Any spikes or irregularities in the pressure can indicate problems at that point in the vale travel where the irregularity occurs.

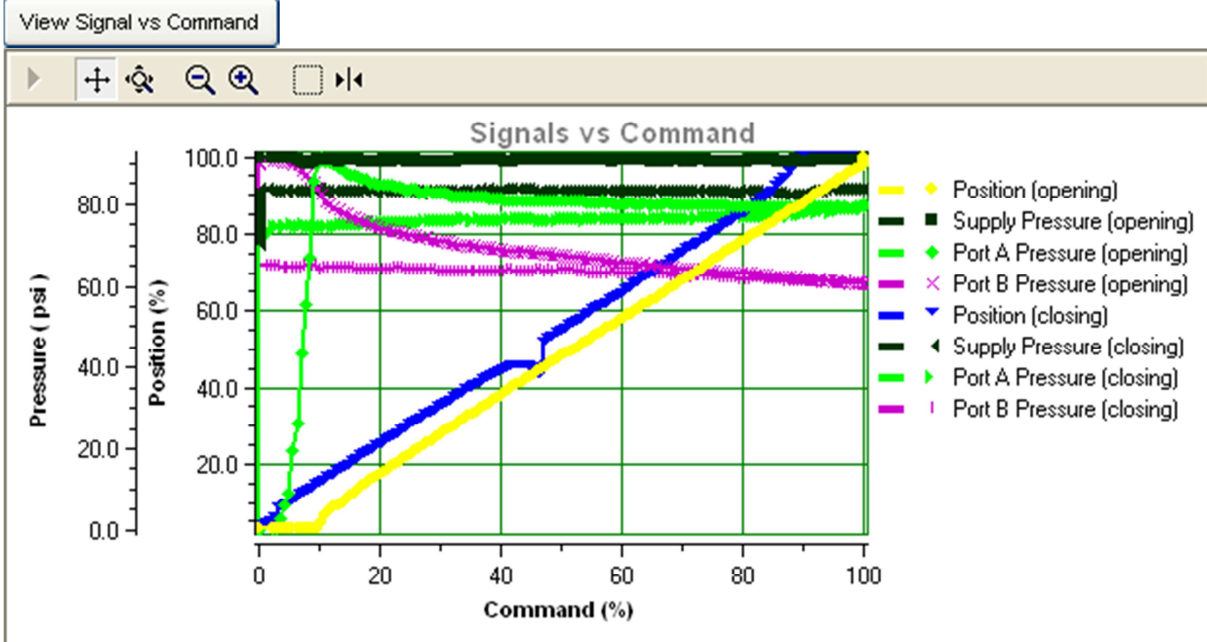
View Pressure vs Position



View Signals vs. Command

This graph shows the parameters relative to the command. If a bi-directional signature has been taken it shows the both sets of signals relative to the command. This graph is useful

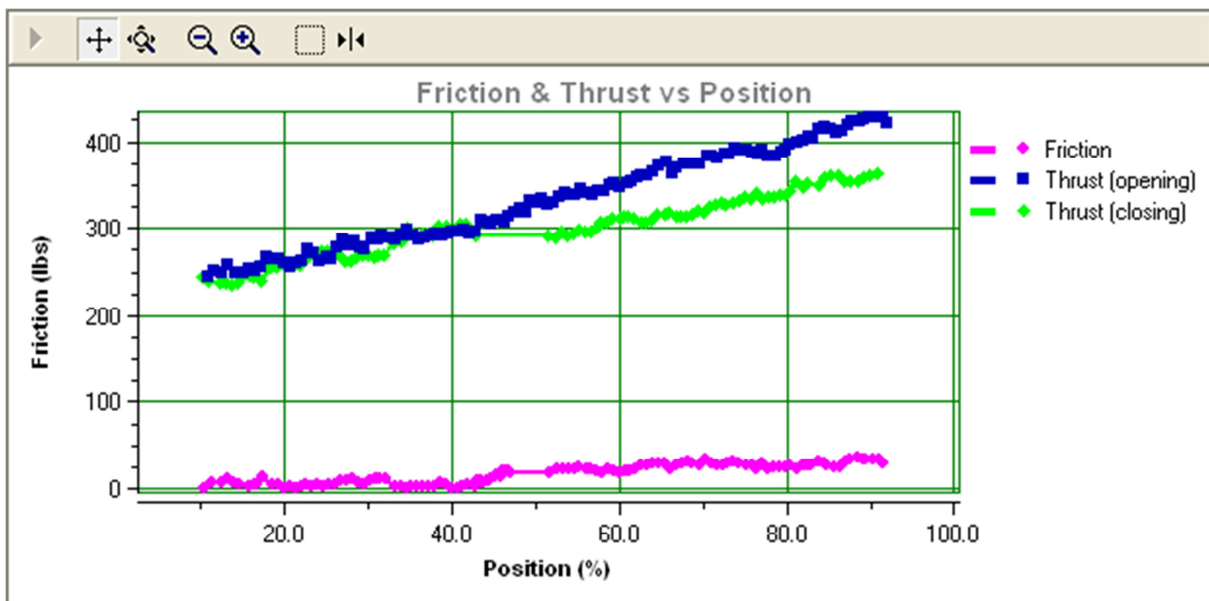
for checking for abnormal dynamic error in the system. Note that the test duration can dramatically affect the dynamic error if the test has been set-up to stroke too quickly for a particular actuator size.



View Friction/Thrust

This graph shows the friction in the valve based on the pressures measured during the signature test. This friction is independent of the friction calculation that is shown in the valve health screen. The friction values will change based on the speed of the ramp test because of pressure latency in the air lines. Slower ramp tests will provide more consistent friction values. Note that, for this graph to be accurate, the proper actuator size must have been entered in the [Actuator](#) information page.

View Friction/Thrust



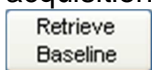
Graph Settings

At the top of the graph are several controls for viewing the graph.

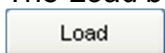
- The *Restore* icon restores a graph that has been zoomed or adjusted.
- The *Scroll* icon will allow the scales on the graph to be scrolled. Click the icon, then dragging the scale up or down.
- The *Zoom* icon will allow the scales on the graph to be zoomed or expanded. Click on the scale and dragging the scale up or down to zoom in or out.
- The *Zoom Out All Axes* icon scales all axes by clicking on the graph.
- The *Zoom In All Axes* icon scales all axes by clicking on the graph.
- The *Zoom Box* icon allows a portion of the visible graph to be magnified. Click on the icon then click and drag over the graph data to be magnified.
- The *Cursor* icon allows a labeled marker to be placed on the graph which shows the coordinates of the graph. Click on the icon, then select the series name from the legend on the right of the graph. Now move the cursor to the location of interest. The first number on the cursor shows the location on the X axis, and the second number shows the location on the Y axis. If no variable shows in the box, a series name has not been selected.

Action Buttons

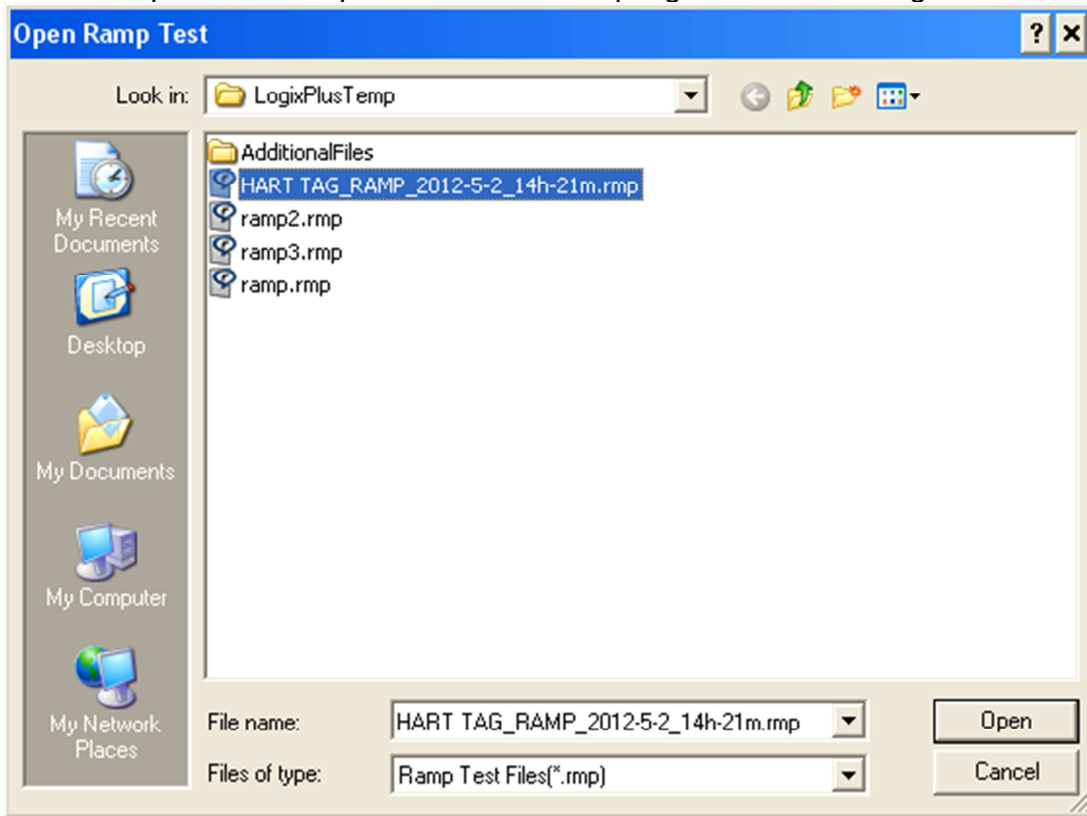
The *Retrieve Baseline* button clears the existing data and starts a new data acquisition from the baseline memory of the device. The DTM menu selection is unavailable during data acquisition.



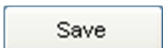
The *Load* button will load a Ramp test from file.



If your Frame setting allows private dialogs, the "Load" button will be enabled and it will display an open dialog to select the desired (*.rmp) ramp signature file to load. Select a file and click open to load a previous stored ramp signature for viewing.

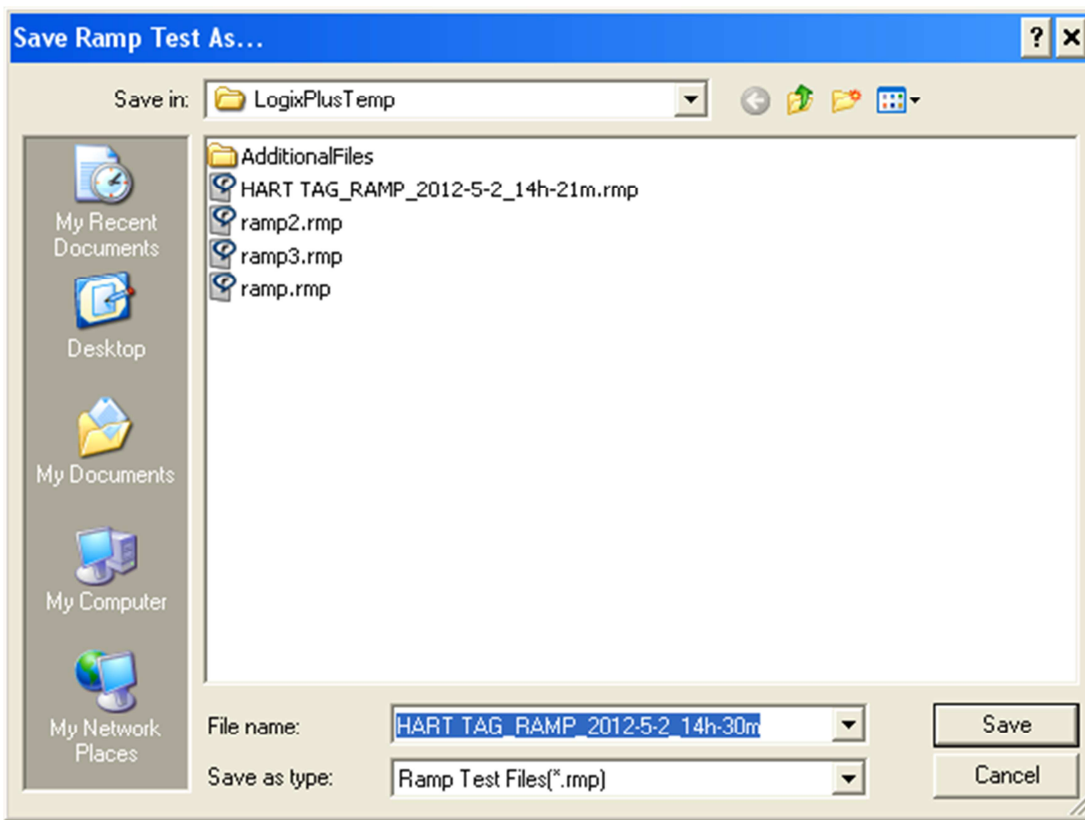


The Save button saves the existing Ramp test to a file.

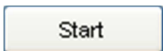


If your Frame setting allows private dialogs, the "Save" button will be enabled and it will display a Save dialog to save the current ramp signature test to a file. The "Save" dialog will display a default name including the following:

- Device Tag ID_
- Ramp_
- Year
- Month
- Day
- Time



The *Start* button will clear the existing data and start the test.

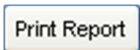


CAUTION: During a test the valve will not respond to control signals and movement of the valve stem will occur.

The *Stop* button stops data acquisition and the test.



The *Print Report* button sends the report to the default printer.



NOTE: It is possible to print the report to save to a **PDF** file. Instructions:

1. Download and install the free version of PDFCreator.
2. Install the PDFCreator
3. Set PDFCreator as the default Printer
4. Click Print Report and save the report to a pdf file in your computer.



Ramp Test Report

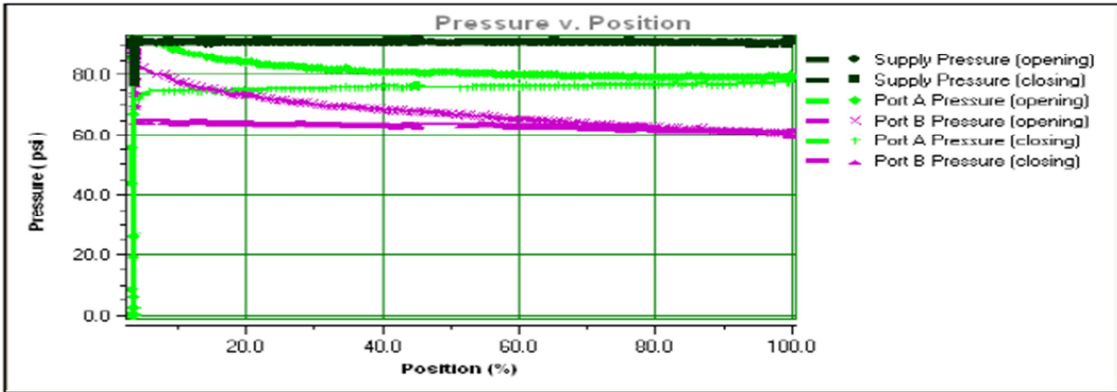
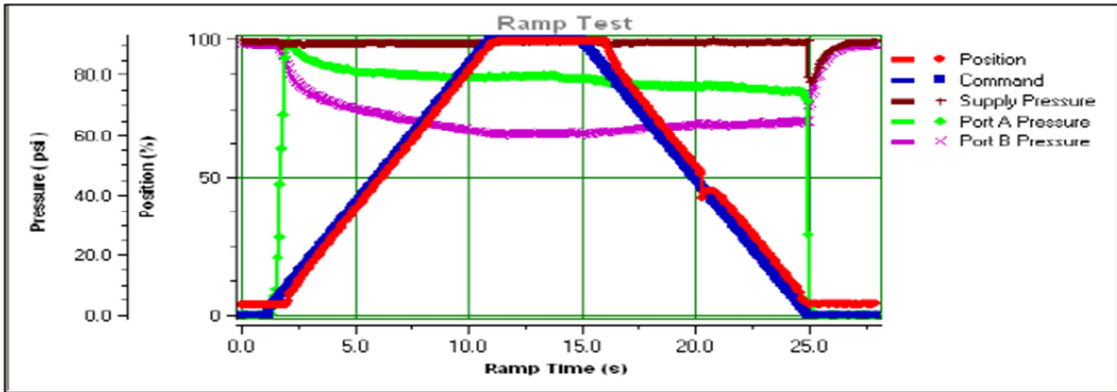
Logix MD+ DEVICE TAG ID: HART TAG DEVICE VERSION: MD+ Pro Diagnostics
 ACTUATOR INFO --> Size: 25, Manufacturer: Valtek (Piston), Type: Linear (piston), Spring Type: Single
 VALVE BODY INFO --> Model: Mark One, Body Size: .25 INCH / DN 6, FlowDirection: FlowOver, Fail Position: Mechanical Fail Closed

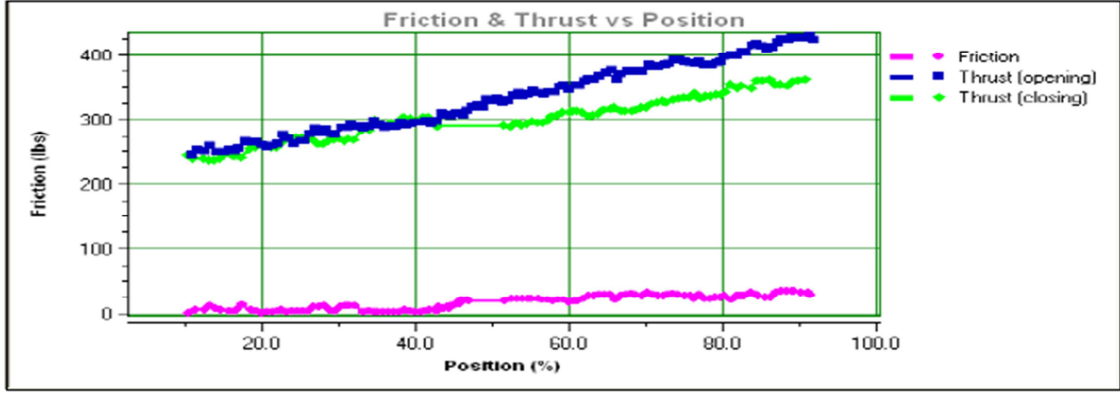
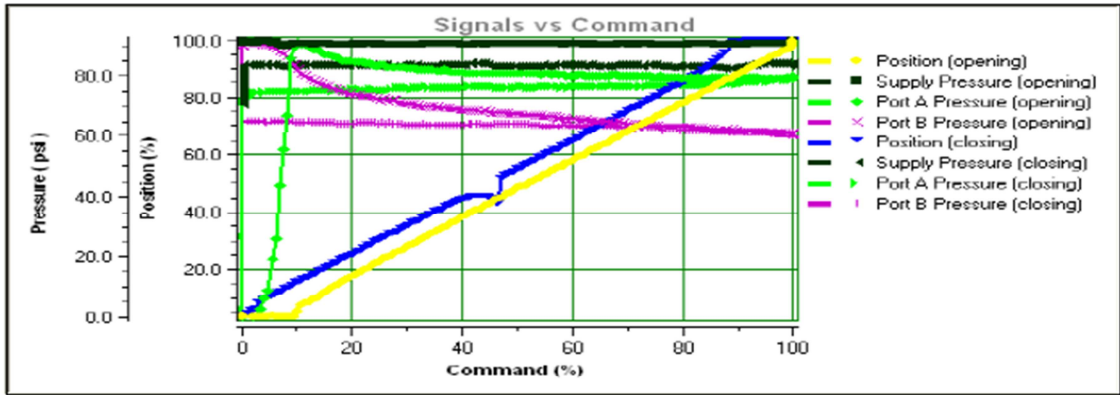
Ramp Test Settings

Start Position:	0 %	Ramp Time:	10 sec
Stop Position:	100 %	Bi-directional	<input checked="" type="checkbox"/>
Hold Time:	3 sec	Test Date:	5/2/2012

Spring Set

Spring Rate:	112.8 lbs/in.	Stroke Length:	2 in.
Spring Initial:	9.3 psi	Actuator Size:	23.8 in2
Spring Final:	18.8 psi		







Ramp Test Compare

The *Ramp Test Comparison* page displays two previously saved ramp test files for a side-by-side comparison. The comparison includes file information, spring set information, ramp test settings, and graphed data. Difference data is also displayed on the graphs.

File Information:

Tag:	File Date:	Filename:
1... HART TAG	2/6/2012	HART TAG_RAMP_2012-2-6_6h-57m.rmp
2... HART TAG	9/18/2012	HART TAG_RAMP_2012-9-18_14h-35m.rrr

Ramp Test Settings

	1	2	
Start Position:	10	10	%
Stop Position:	90	90	%
Hold Time:	1	1	sec.
Ramp Time:	2	2	sec.
Stroke Length:	1	1	?
Actuator Size:	23.8	153.6	in ²
Single acting:	<input type="checkbox"/>	<input type="checkbox"/>	
Sensors available:	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Bi-directional:	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	

Graph Settings

1	2	Δ	
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Position
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Command
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Supply Pressure
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Port A
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Port B
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Pilot Relay Command
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Pilot Relay Position

Spring Set

	1	2	
Spring Rate:	168.6	403.8	lbs/in.
Spring Initial:	6.4	0.7	psi
Spring Final:	13.5	1.1	psi

Comparison Views

Ramp Test	Pressure vs Position	Signal vs Command	Friction/Thrust
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Ramp Test

Print Report

File Information

The File Information area allows you to load two files. The files are loaded by selecting the "1..." and "2..." buttons. This area then shows the tag ID, the date the file was saved, and the file name for each file.

File Information:

Tag:	File Date:	Filename:
1... HART TAG	2/6/2012	HART TAG_RAMP_2012-2-6_6h-57m.rmp
2... HART TAG	9/18/2012	HART TAG_RAMP_2012-9-18_14h-35m.rrr

Graph Settings

This area allows for the selection of items to be shown on the graph. You can select between data sets from file 1, file 2, and the differences.



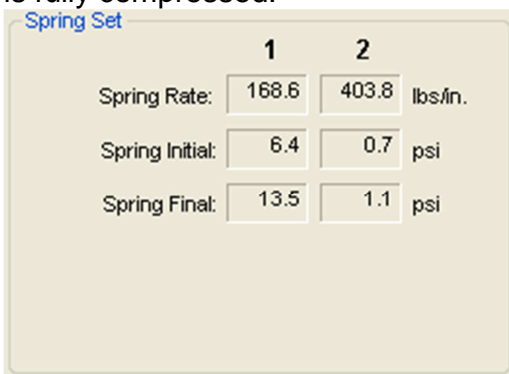
Spring Set

The Spring Set box shows information about the spring forces in the actuator.

Spring Rate is the average force divided by the distance traveled during spring compression.

Spring Initial is the pressure required to initially move the valve as the valve is beginning to compress the spring.

Spring Final is the pressure required position the valve at the end of travel where the spring is fully compressed.



Ramp Test Settings

The Ramp Test Settings area contains the information used to run the ramp test and other information that may affect the results. This information is shown for each file in a side-by-side comparison. Where settings differ, the name is highlighted.

Ramp Test Settings		1	2	
Start Position:		10	10	%
Stop Position:		90	90	%
Hold Time:		1	1	sec.
Ramp Time:		2	2	sec.
Stroke Length:		1	1	?
Actuator Size:		23.8	153.6	in ²
Single acting:		<input type="checkbox"/>	<input type="checkbox"/>	
Sensors available:		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Bi-directional:		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	

Graph pages

The graphs are identical to those shown in the ramp test (Ramp Test, Pressure vs Position, Signal vs Command and Friction/Thrust) but they each show the data for both files along with differences between the two files.

Comparison Views Ramp Test Pressure vs Position Signal vs Command Friction/Thrust

Action Buttons

The *Print Report* button sends the report to the default printer.

Print Report

NOTE: It is possible to print the report to save to a **PDF** file. Instructions:

1. Download and install the free version of PDFCreator.
2. Install the PDFCreator
3. Set PDFCreator as the default Printer
4. Click Print Report and save the report to a pdf file in your computer.



Ramp Test Comparison Report

Logix MD+

File Information:

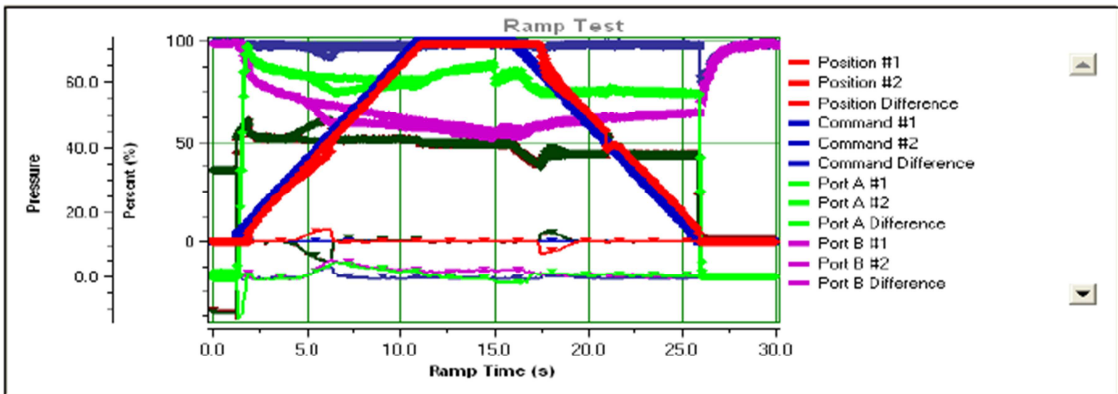
File #1		File #2	
Tag:	HART TAG	Tag:	HART TAG
File Date:	12/12/2011	File Date:	12/12/2011
Filename:	ramp.rmp	Filename:	ramp3.rmp

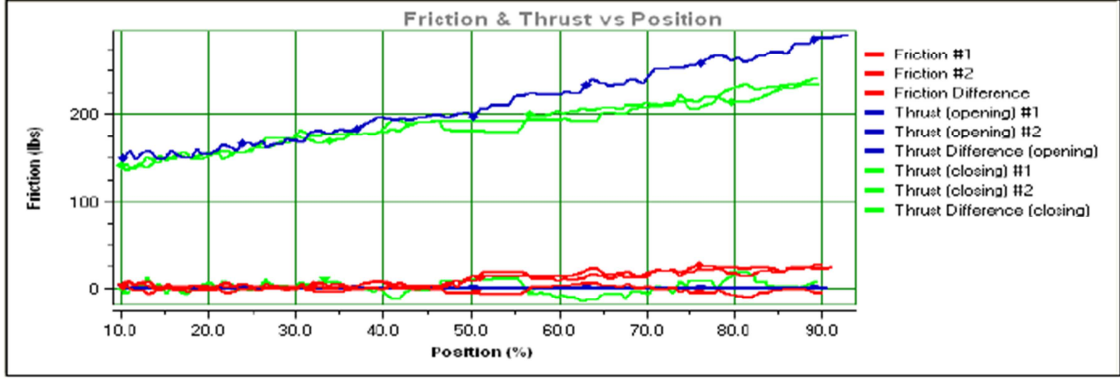
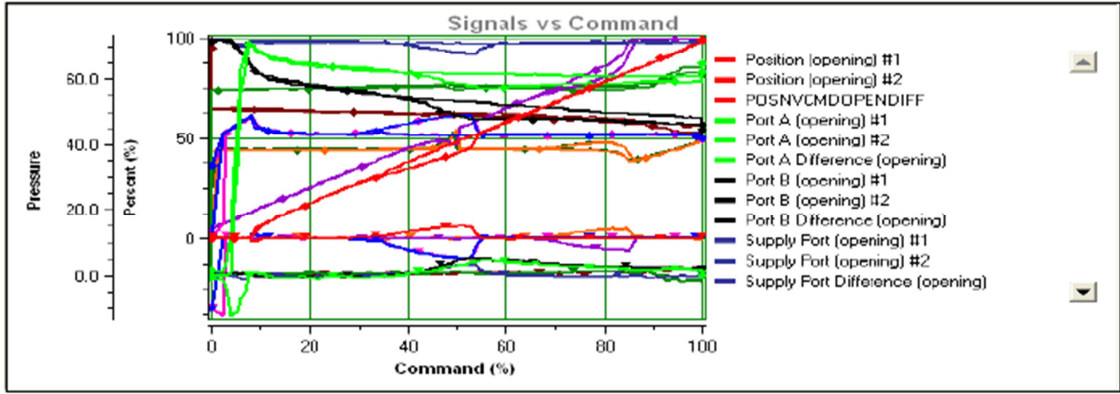
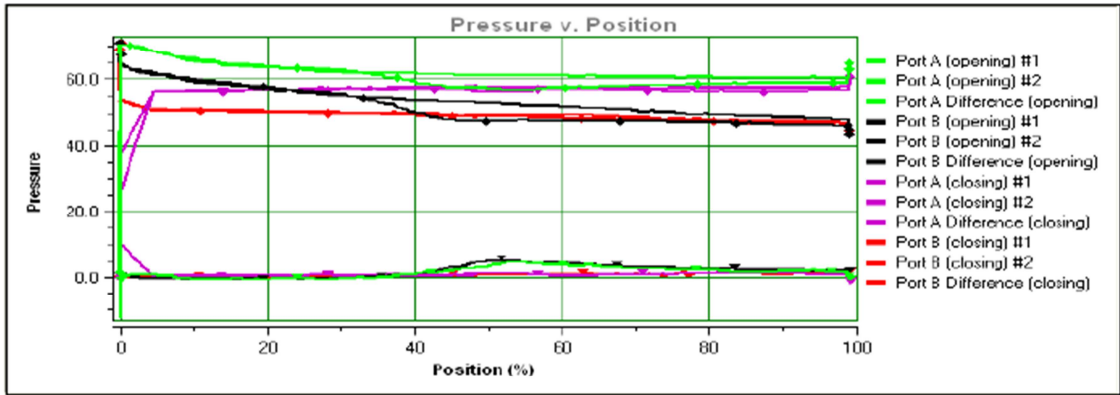
Ramp Test Settings

	#1	#2
Start Position:	0	0 %
Stop Position:	100	100 %
Hold Time:	3	3 sec
Ramp Time:	10	10 sec
Stroke Length:	2	2 in.
Actuator Size:	23.8	23.8 in ²
Single acting:	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Sensors available:	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Bi-directional:	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Spring Set

	#1	#2
Spring Rate:	87.1	87.8 lbs/in.
Spring Initial:	5.5	5.4 psi
Spring Final:	12.8	12.8 psi

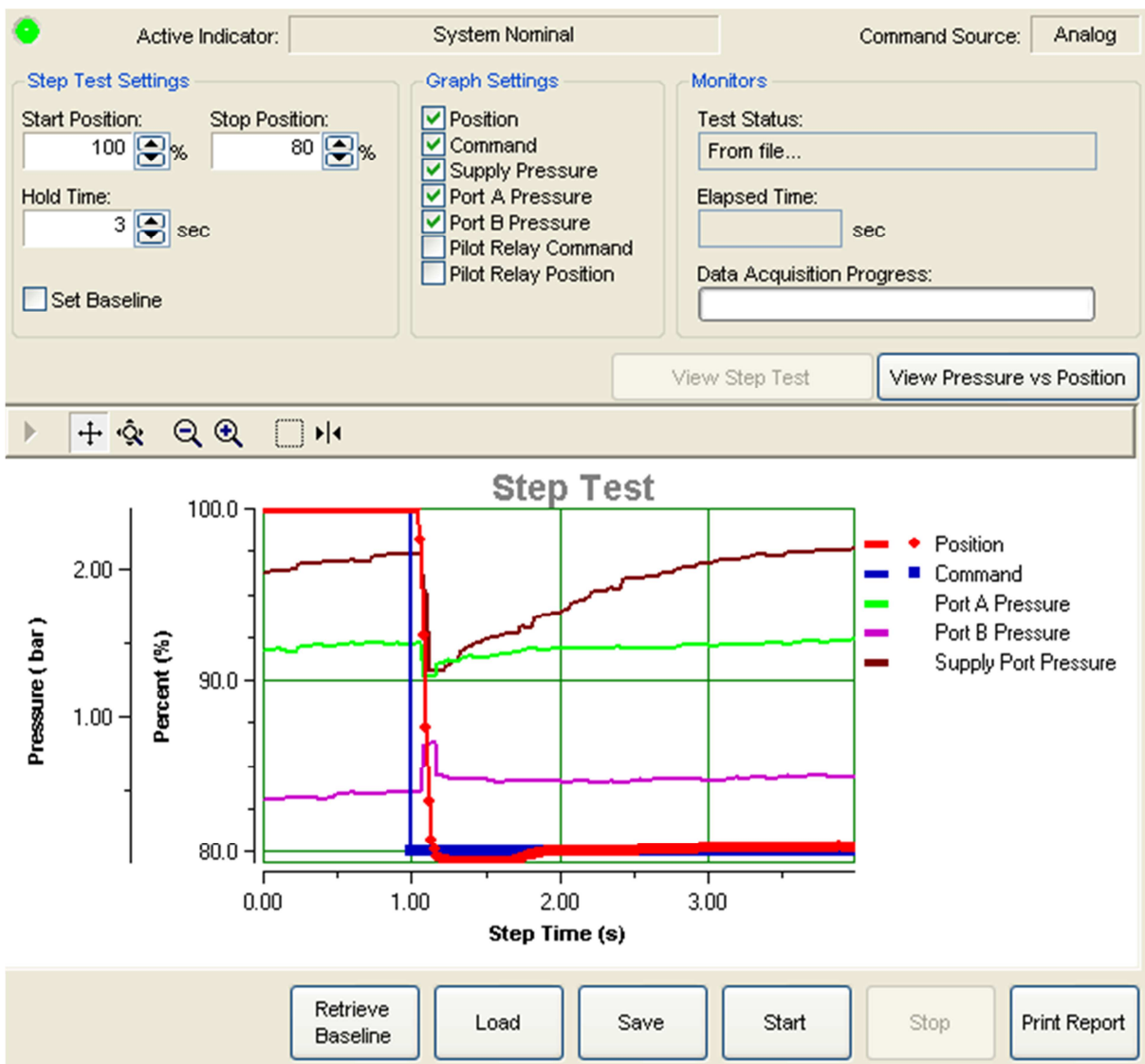




Step Test

The *Step Test* page allow you to adjust settings and run a step test. Step tests are a powerful tool for bench testing valves in a shop or installed valves that are not in service and can be fully or partially stroked. By stepping the valve with a known step size and monitoring the response, changes over time can be noted and used to pinpoint developing or existing problems.

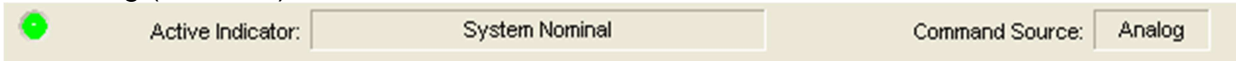
CAUTION: During a test the valve will not respond to control signals and movement of the valve stem will occur.



Status Area

The *Active Indicator* area shows the status of the most relevant active indicator. The color

of the "LED light" corresponds to the Active Indicator and the first color of the blink code sequence on the positioner. Generally green indicates no immediate issues. Yellow indicates a developing issue. Red indicates the ability to control may be compromised. A detailed list of the indicators is given in the [Alarm Congfiguraion - Alarm Annunicator](#) page. The *Command Source* field indicates weather the positioner is being controlled by digital or an analog (4-20 mA) command source.

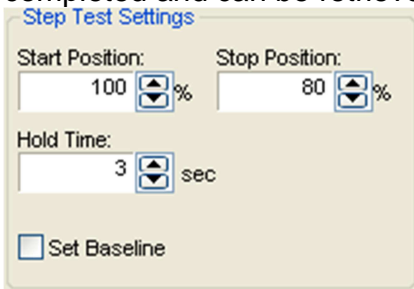


Step Test Settings

The *Start Position* and *Stop Position* are used to specify where the valve position will begin and end during the step test.

The *Hold Time* is the time the command will remain at the end of the step to allow the valve to continue moving and stabilize. The step test always includes a one-second stabilization period at the beginning of each test.

The *Set Baseline* check box indicates the signature will be stored in a different memory location in the positioner. This baseline can remain in the positioner even if other tests are completed and can be retrieved at any time.



Graph Settings

This area allows for the selection of items to be shown on the graph. All of the data is acquired (and saved) regardless of this setting. Any item can be hidden or shown after the data has been downloaded from the positioner.



Monitors

Test Status indicates the current state of the test.

Elapsed Time shows how many seconds have passed since the step test began. This includes time for data acquisition.

Monitors

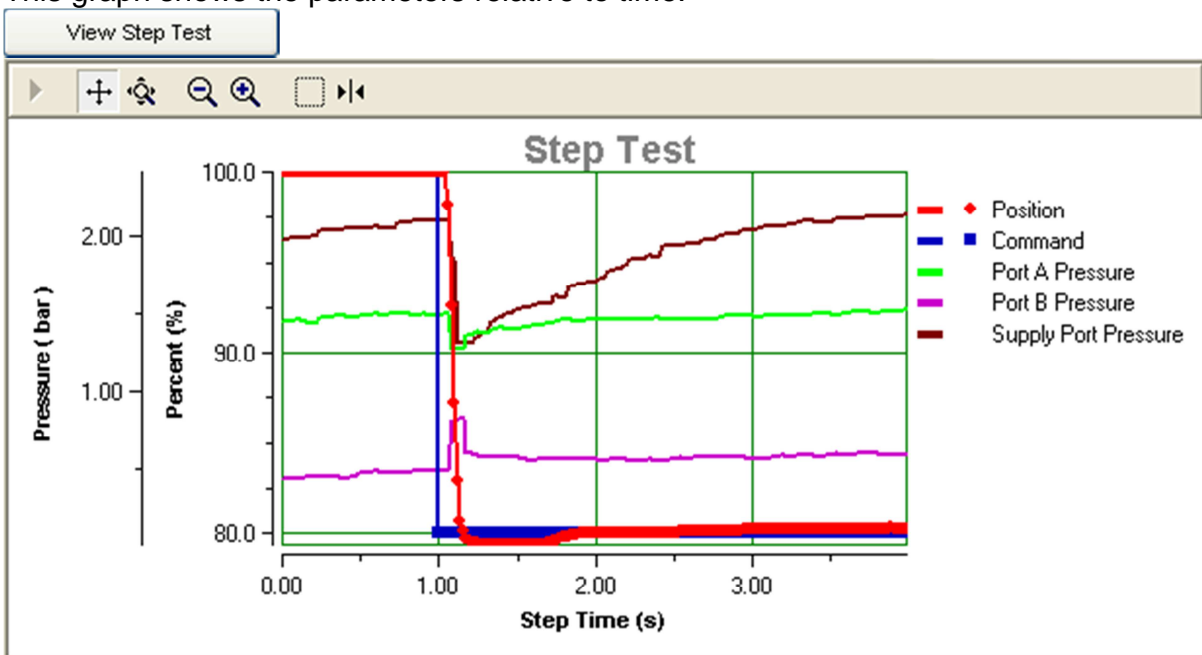
Test Status:

Elapsed Time:
 sec

Data Acquisition Progress:

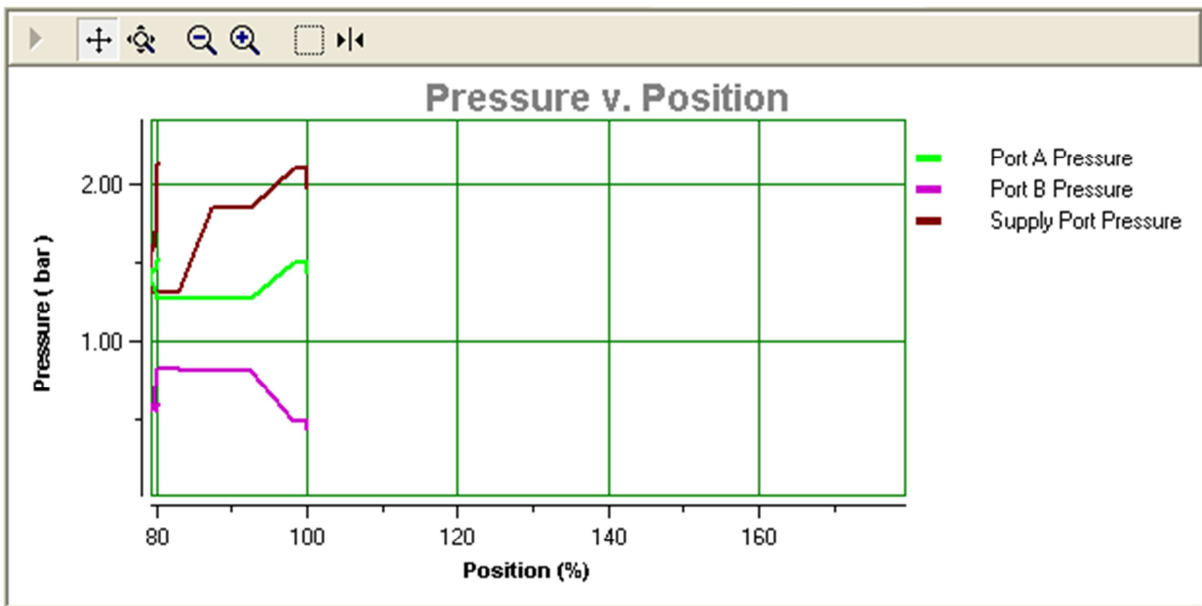
View Step Test

This graph shows the parameters relative to time.



View Pressure vs. Position

This graph shows the pressure parameters relative to the valve position.



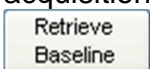
Graph Settings

At the top of the graph are several controls for viewing the graph.

- The *Restore* icon restores a graph that has been zoomed or adjusted.
- The *Scroll* icon will allow the scales on the graph to be scrolled. Click the icon, then dragging the scale up or down.
- The *Zoom* icon will allow the scales on the graph to be zoomed or expanded. Click on the scale and dragging the scale up or down to zoom in or out.
- The *Zoom Out All Axes* icon scales all axes by clicking on the graph.
- The *Zoom In All Axes* icon scales all axes by clicking on the graph.
- The *Zoom Box* icon allows a portion of the visible graph to be magnified. Click on the icon then click and drag over the graph data to be magnified.
- The *Cursor* icon allows a labeled marker to be placed on the graph which shows the coordinates of the graph. Click on the icon, then select the series name from the legend on the right of the graph. Now move the cursor to the location of interest. The first number on the cursor shows the location on the X axis, and the second number shows the location on the Y axis. If no variable shows in the box, a series name has not been selected.

Action Buttons

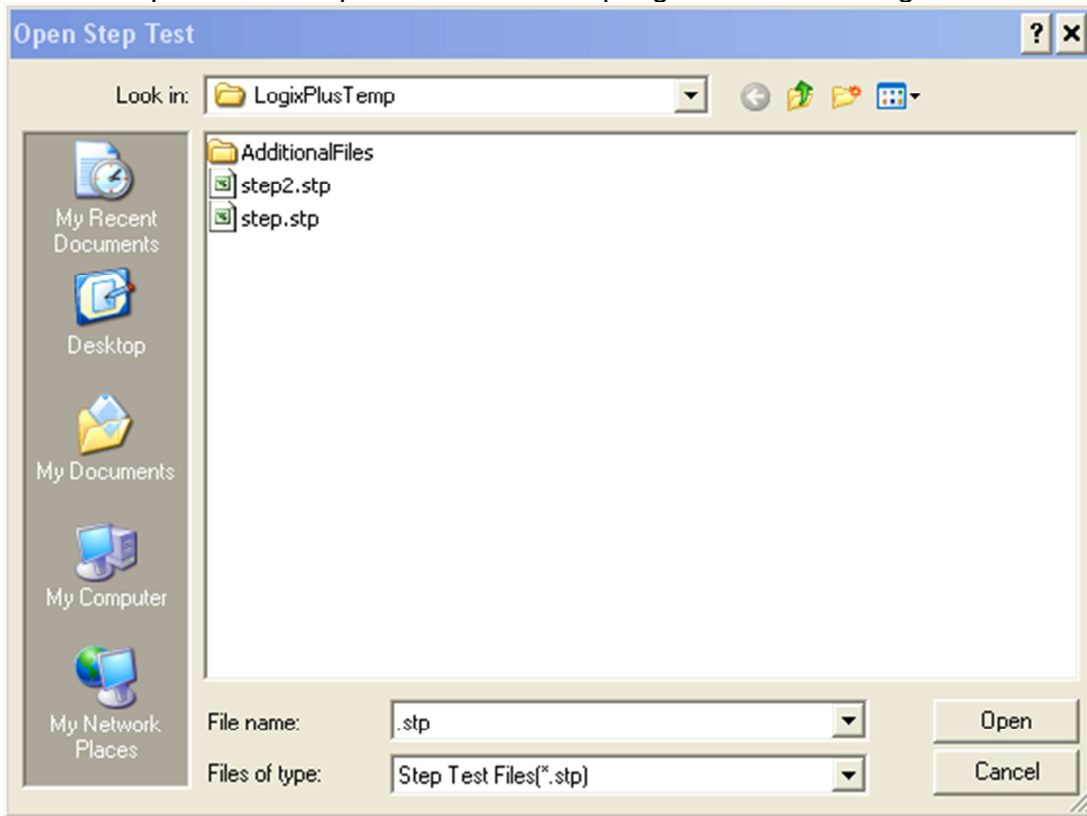
The *Retrieve Baseline* button clears the existing data and starts a new data acquisition from the baseline memory of the device. The DTM menu selection is unavailable during data acquisition.



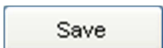
The *Load* button will load a test from file.



If your Frame setting allows private dialogs, the "Load" button will be enabled and it will display an open dialog to select the desired (*.stp) step signature file to load. Select a file and click open to load a previous stored step signature for viewing.

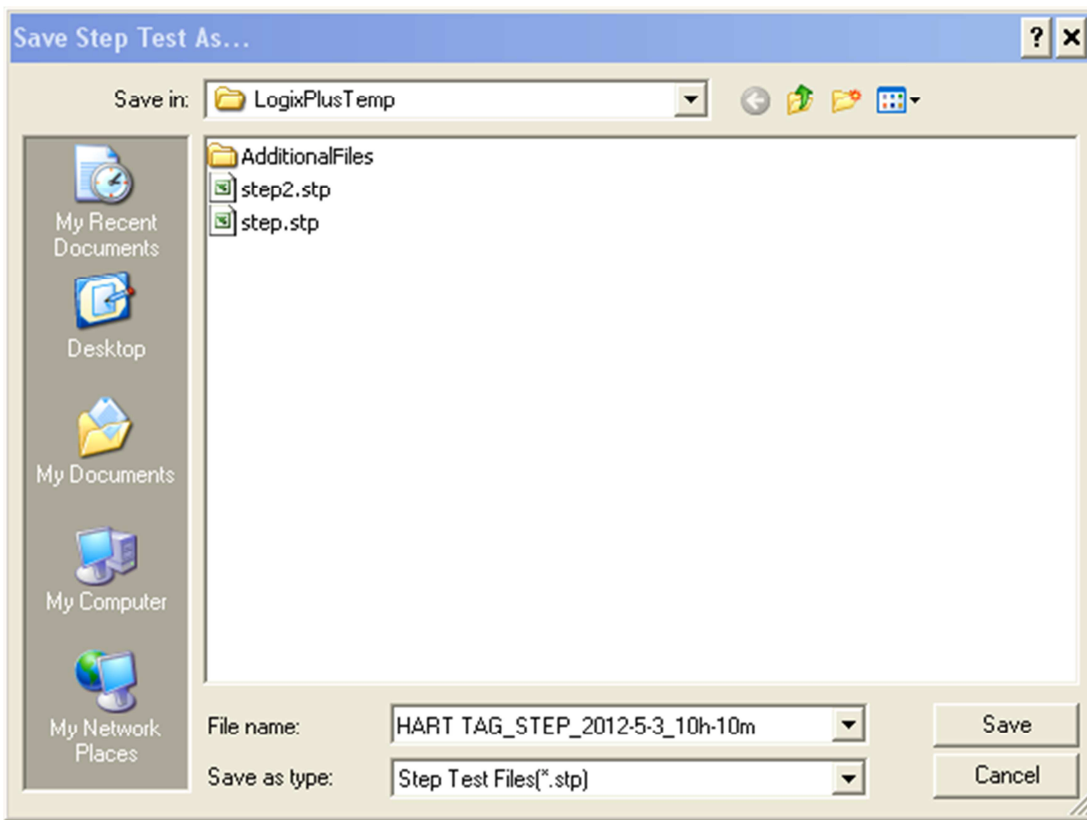


The Save button saves the existing test to a file.



If your Frame setting allows private dialogs, the "Save" button will be enabled and it will display a Save dialog to save the current step signature test to a file. The "Save" dialog will display a default name including the following:

- Device Tag ID_
- Step_
- Year
- Month
- Day
- Time



The *Start* button will clear the existing data and start the test.



CAUTION: During a test the valve will not respond to control signals and movement of the valve stem will occur.

The *Stop* button stops data acquisition and the test.



The *Print Report* button sends the report to the default printer.



NOTE: It is possible to print the report to save to a **PDF** file. Instructions:

1. Download and install the free version of PDFCreator.
2. Install the PDFCreator
3. Set PDFCreator as the default Printer
4. Click Print Report and save the report to a pdf file in your computer.

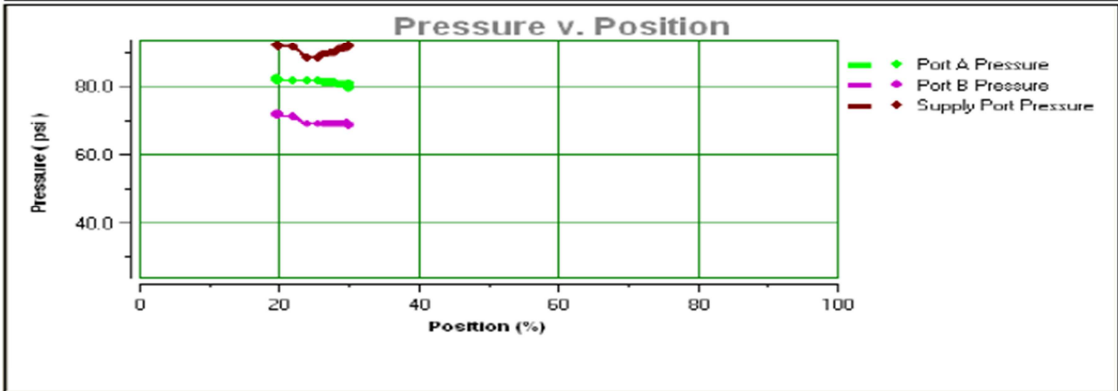
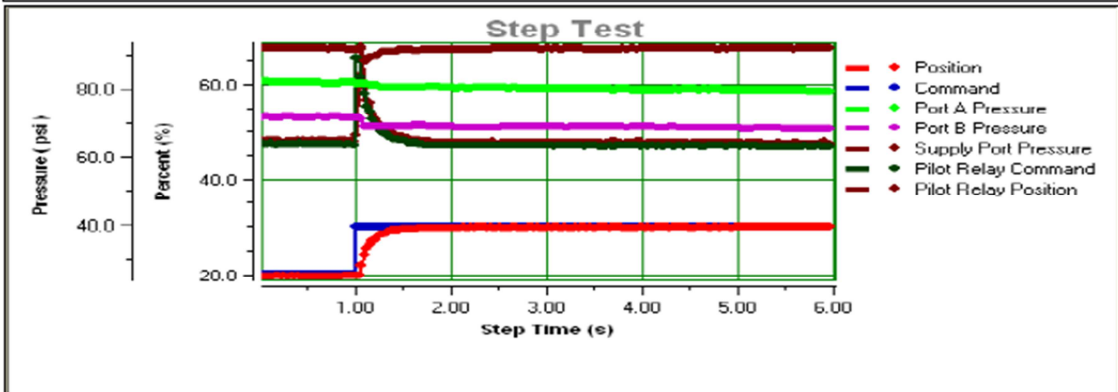


Step Test Report

Logix MD+ DEVICE TAG ID: HART TAG DEVICE VERSION: MD+ Pro Diagnostics
 ACTUATOR INFO -> Size: 25, Manufacturer: Valtek (Piston), Type: Linear (piston), Spring Type: Single
 VALVE BODY INFO -> Model: Mark One, Body Size: .25 INCH / DN 6, FlowDirection: FlowOver, Fail Position: Mechanical Fail Closed

Step Test Settings

Start Position: 20.1 % Test Date: 5/3/2012
 Stop Position: 30.1 %
 Hold Time: 5 sec



Step Test Compare

The *Step Test Comparison* page displays two previously saved step test files for a side-by-side comparison. The comparison includes file information, step test settings, and graphed data. Difference data is also displayed on the graphs.

File Information:

	Tag:	File Date:	Filename:
1...	LOGIX520	4/23/2012	LOGIX520_STEP_2012-4-23_15h-45m.stp
2...	LOGIX520	4/23/2012	LOGIX520_STEP_2012-4-23_15h-47m.stp

Graph Settings

1 2 ▲

- Position
- Command
- Supply Pressure
- Port A Pressure
- Port B Pressure
- Pilot Relay Command
- Pilot Relay Position

Step Test Settings

	1	2
Start Position:	100	100 %
Stop Position:	80	80 %
Hold Time:	3	3 sec.
Single acting:	<input type="checkbox"/>	<input type="checkbox"/>
Sensors available:	X	X

Comparison Views: Step Test Pressure vs Position

Step Test

Print Report

File Information

The File Information area allows you to load two files. The files are loaded by selecting the "1..." and "2..." buttons. This area then shows the tag ID, the date the file was saved, and the file name for each file.

File Information:

	Tag:	File Date:	Filename:
1...	LOGIX520	4/23/2012	LOGIX520_STEP_2012-4-23_15h-45m.stp
2...	LOGIX520	4/23/2012	LOGIX520_STEP_2012-4-23_15h-47m.stp

Graph Settings

This area allows for the selection of items to be shown on the graph. You can select between data sets from file 1, file 2, and the differences.

Graph Settings

1 2 Δ

Position

Command

Supply Pressure

Port A

Port B

Pilot Relay Command

Pilot Relay Position

Step Test Settings

The Step Test Settings area contains the information used to run the step test and other information that may affect the results. This information is shown for each file in a side-by-side comparison. Where settings differ, the name is highlighted.

Step Test Settings

	1	2	
Start Position:	100	100	%
Stop Position:	80	80	%
Hold Time:	3	3	sec.
Single acting:	<input type="checkbox"/>	<input type="checkbox"/>	
Sensors available:	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	

Graph pages

The graphs are identical to those shown in the step test (Step Test and Pressure vs Position) but they each show the data for both files along with differences between the two files.

Comparison Views

Step Test Pressure vs Position

Action Buttons

The *Print Report* button sends the report to the default printer.

Print Report



NOTE: It is possible to print the report to save to a **PDF** file. Instructions:

1. Download and install the free version of PDFCreator.
2. Install the PDFCreator
3. Set PDFCreator as the default Printer
4. Click Print Report and save the report to a pdf file in your computer.



Step Test Comparison Report

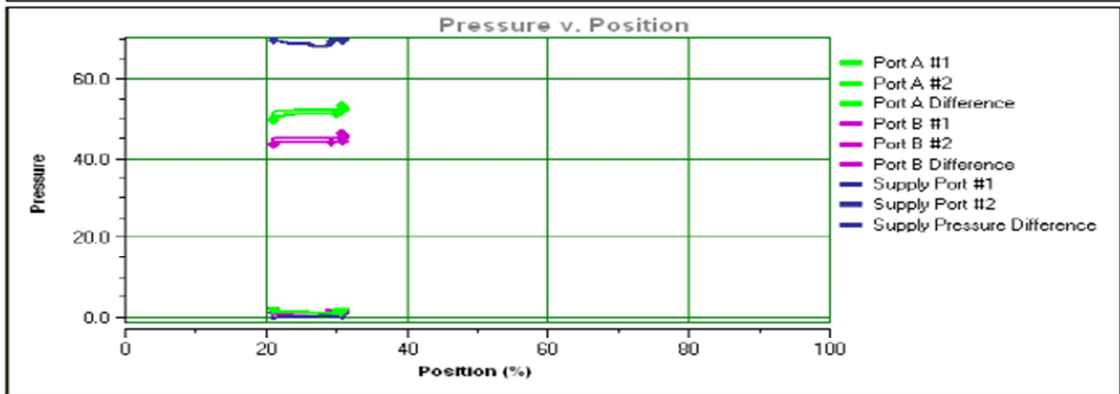
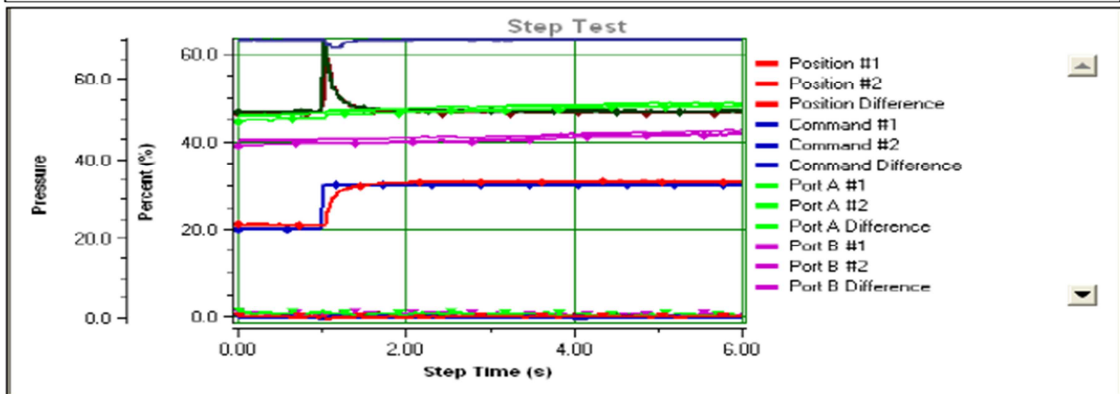
Logix MD+

File Information:

	Tag:	File Date:	Filename:
File #1	HART TAG	12/20/2011	step.stp
File #2	HART TAG	12/20/2011	step2.stp

Step Test Settings

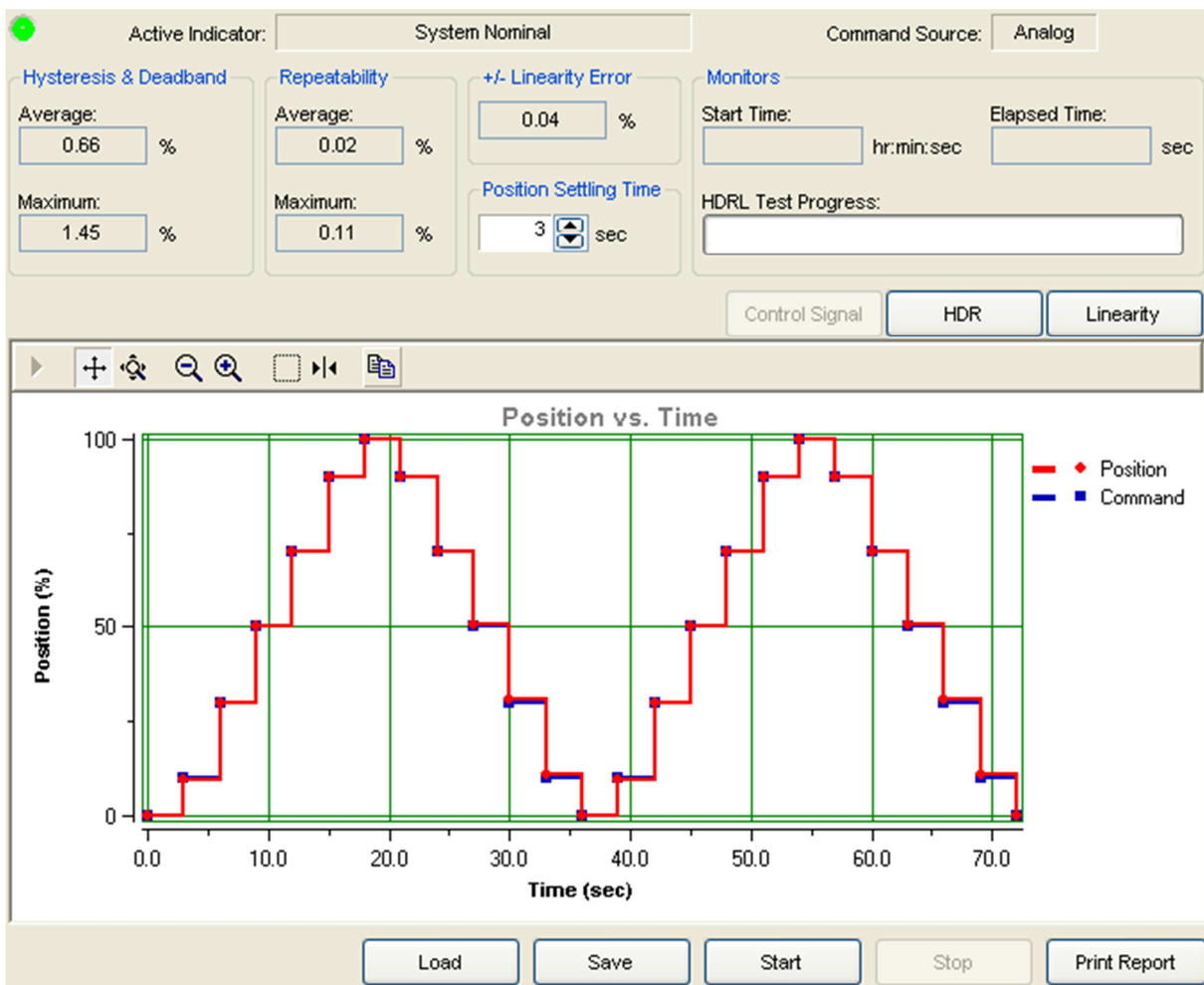
	Start Position:	Stop Position:	Hold Time:	Single acting:	Sensors available:
1	20 %	30 %	5 sec	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2	20.1 %	30.1 %	5 sec	<input type="checkbox"/>	<input checked="" type="checkbox"/>



HDRL Test

The HDRL page allow you to adjust settings and run an HDRL test. Hysteresis, Deadband, Repeatability and Linearity (HDRL) tests are powerful tools for bench marking valve performance in a shop or installed valves that are not in service. By stepping the valve up and down through these preset points and monitoring the response, a valve assembly can quickly be tested and verified that it is operating to specification.

CAUTION: During a test the valve will not respond to control signals and movement of the valve stem will occur.



Status Area

The *Active Indicator* area shows the status of the most relevant active indicator. The color of the "LED light" corresponds to the Active Indicator and the first color of the blink code sequence on the positioner. Generally green indicates no immediate issues. Yellow indicates a developing issue. Red indicates the ability to control may be compromised. A detailed list of the indicators is given in the [Alarm Congfiguraion - Alarm Annunicator](#) page. The *Command Source* field indicates weather the positioner is being controlled by digital or

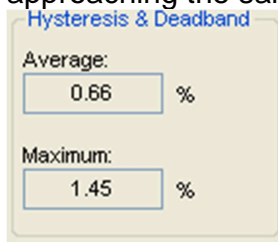


an analog (4-20 mA) command source.



Hysteresis And Deadband

The *Average* and *Maximum* values from the test for the combined hysteresis and deadband are shown. The positioner has no method to separate the hysteresis from the deadband. This measures how close the position feedback value gets to the same position when approaching the same position from different directions.



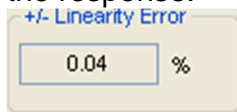
Repeatability

The *Average* and *Maximum* values from the test for the repeatability of the system are shown. Repeatability measures how close the position feedback comes to the same position when approached from the same direction each time.



+/- Linearity Error

The +/- *Linearity Error* value shows how closely the system follows a straight line, best fit to the response.

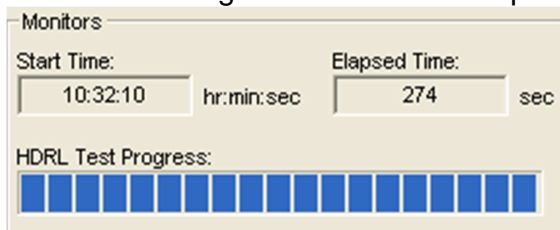


Monitors

Start Time is the time the test started.

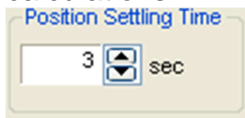
Elapsed Time is the time in seconds that have passed since the test started.

HDRL Test Progress shows the completion status.

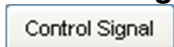


Position Settling Time

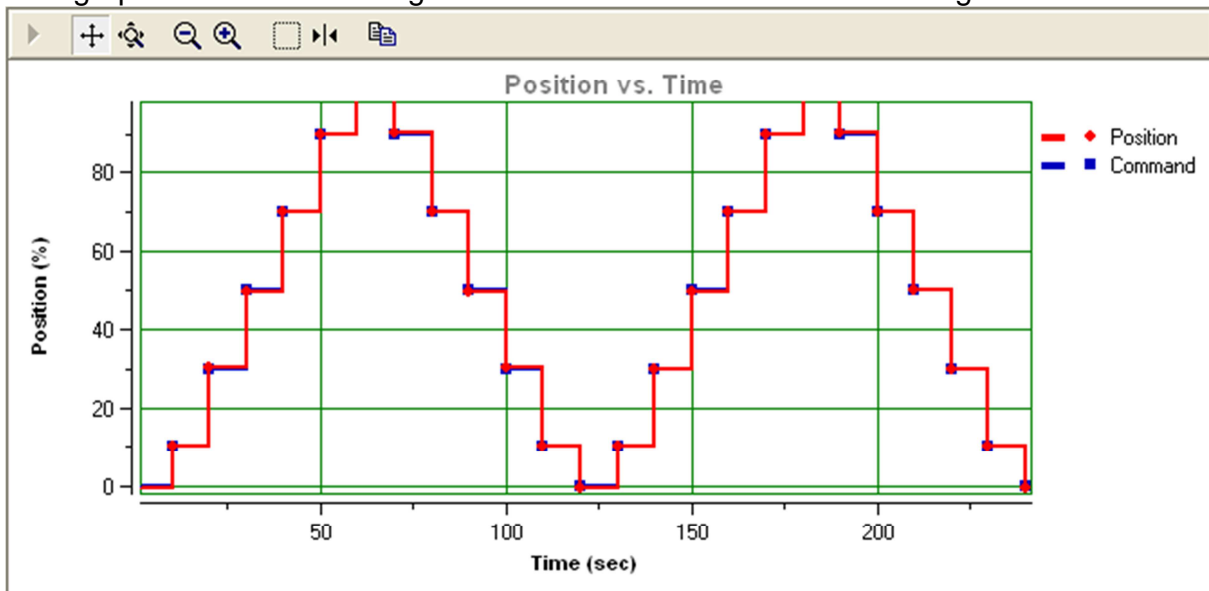
The *Position Settling Time* field is used to select the waiting time between each step. The settling time must provide sufficient delay between steps to allow stabilization. Generally larger valves should have a longer settling time than small ones to accurately observe their behavior. If the settling time is set too short, it can adversely affect the performance calculations.



Control Signal



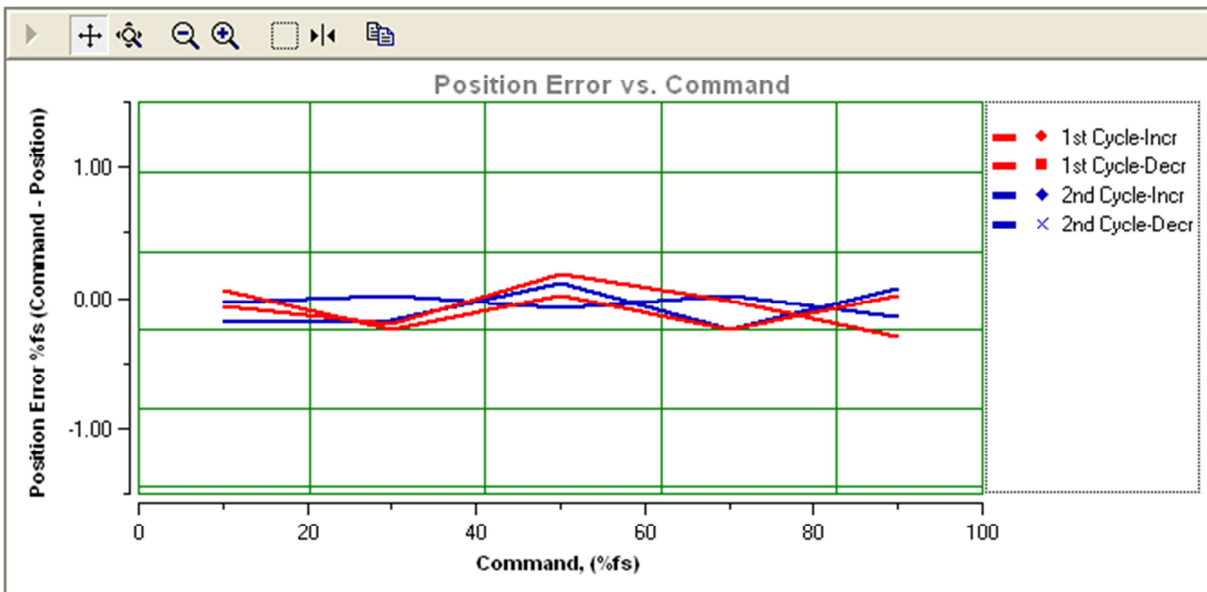
This graph shows all of the signals relative to time on the x axis during the test.



HDR



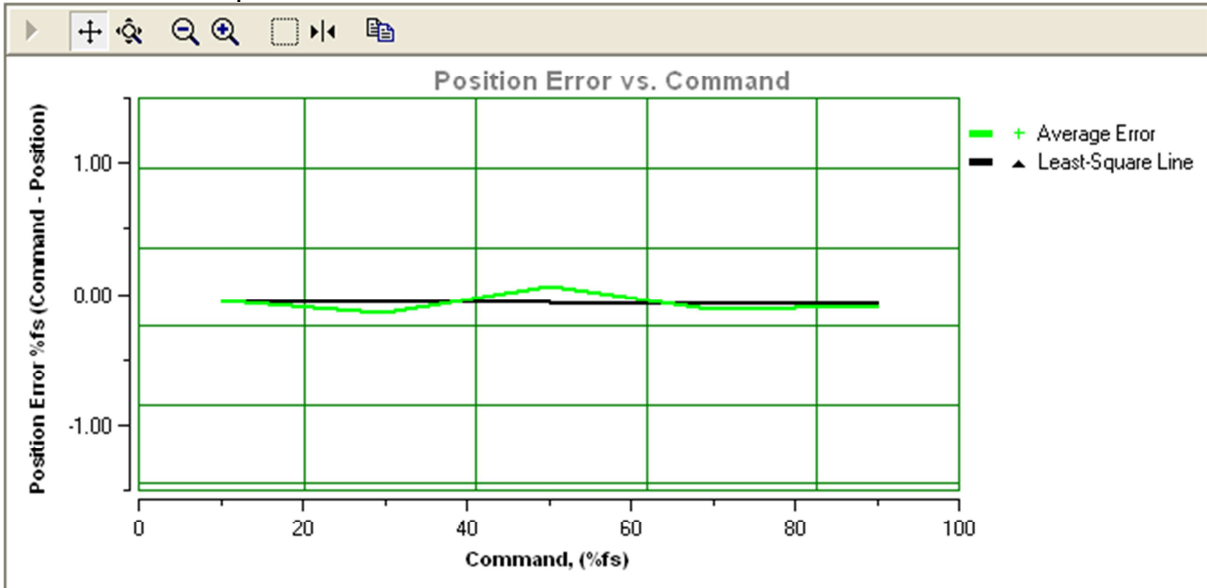
This graph shows the calculated hysteresis + deadband and repeatability values over the command.



Linearity

Linearity

This graph shows the position error (or how closely the valve follows a straight line) over the commanded position.



Graph Settings


At the top of the graph are several controls for viewing the graph.


- ▶ The *Restore* icon restores a graph that has been zoomed or adjusted.
- ⊕ The *Scroll* icon will allow the scales on the graph to be scrolled. Click the icon, then dragging the scale up or down.
- 🔍 The *Zoom* icon will allow the scales on the graph to be zoomed or expanded. Click on

the scale and dragging the scale up or down to zoom in or out.

 The *Zoom Out All Axes* icon scales all axes by clicking on the graph.

 The *Zoom In All Axes* icon scales all axes by clicking on the graph.

 The *Zoom Box* icon allows a portion of the visible graph to be magnified. Click on the icon then click and drag over the graph data to be magnified.

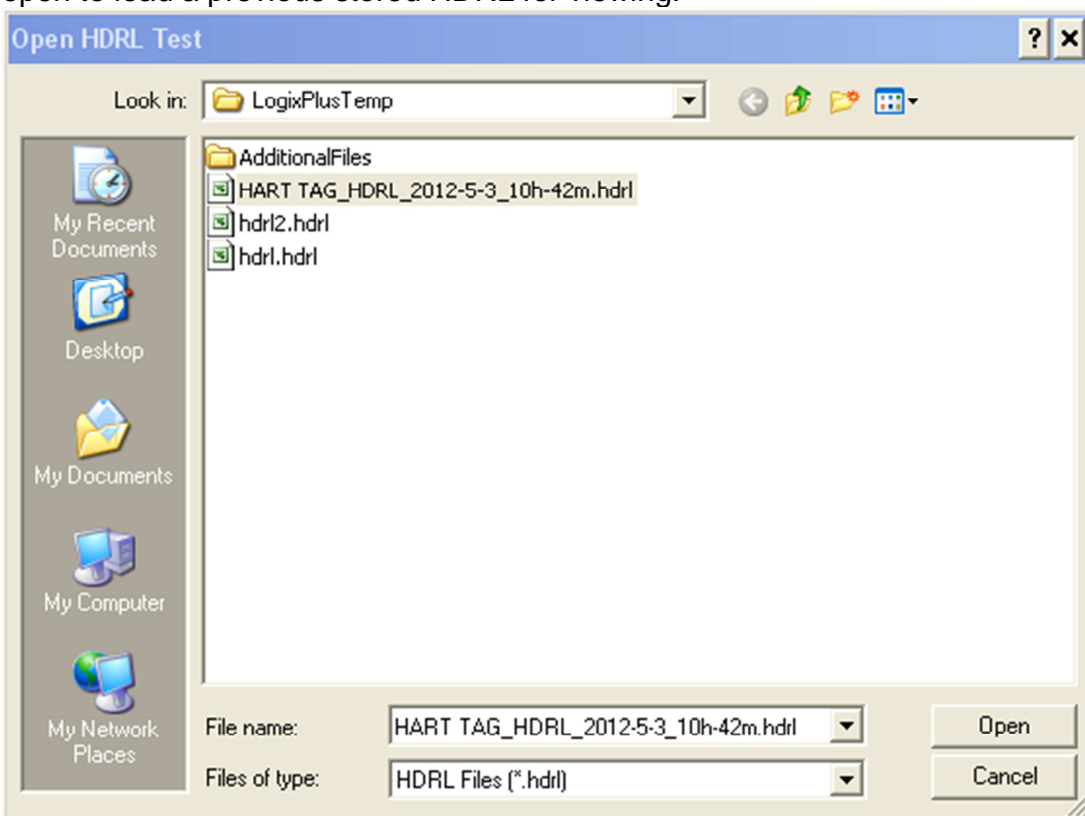
 The *Cursor* icon allows a labeled marker to be placed on the graph which shows the coordinates of the graph. Click on the icon, then select the series name from the legend on the right of the graph. Now move the cursor to the location of interest. The first number on the cursor shows the location on the X axis, and the second number shows the location on the Y axis. If no variable shows in the box, a series name has not been selected.

Action Buttons

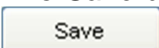
The *Load* button will load a test from file.



If your Frame setting allows private dialogs, the "Load" button will be enabled and it will display an open dialog to select the desired (*.hdrl) HDRL file to load. Select a file and click open to load a previous stored HDRL for viewing.



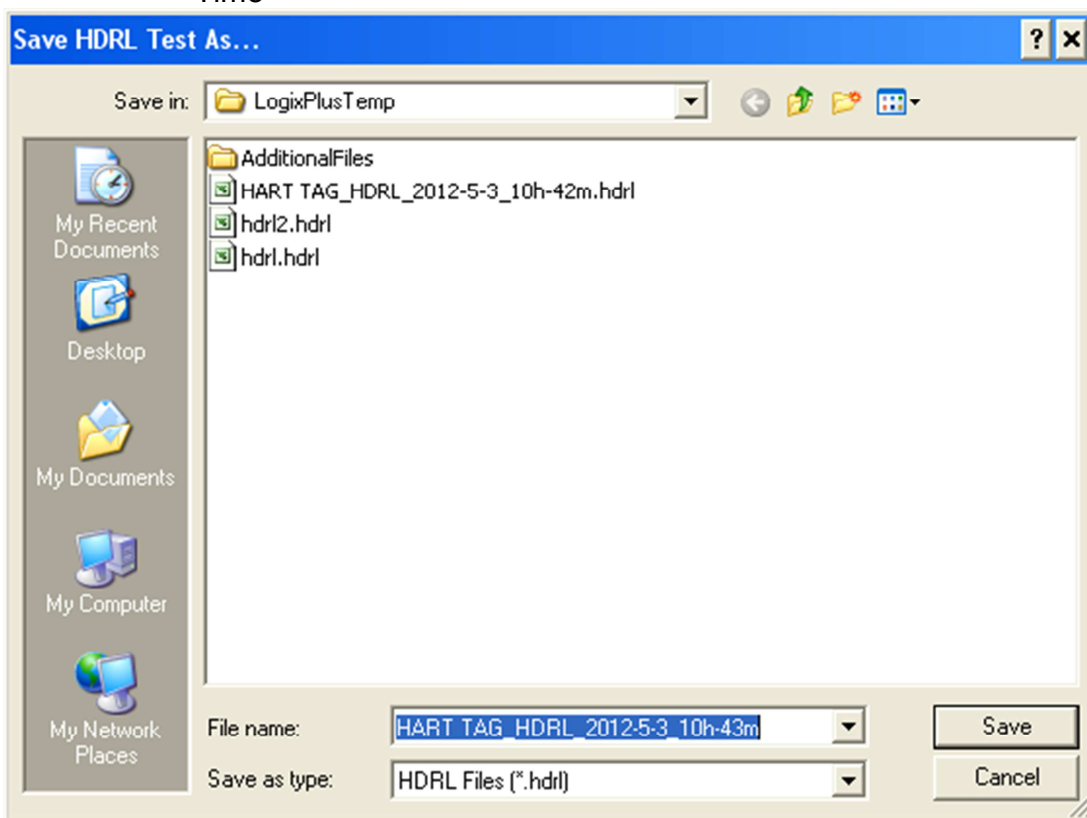
The *Save* button saves the existing test to a file.



If your Frame setting allows private dialogs, the "Save" button will be enabled and it will

display a Save dialog to save the current HDRL test to a file. The "Save" dialog will display a default name including the following:

- Device Tag ID_
- HDRL_
- Year
- Month
- Day
- Time

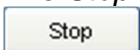


The *Start* button will clear the existing data and start the test.

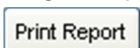


CAUTION: During a test the valve will not respond to control signals and movement of the valve stem will occur.

The *Stop* button stops data acquisition and the test.



The *Print Report* button sends the report to the default printer.





NOTE: It is possible to print the report to save to a **PDF** file. Instructions:

1. Download and install the free version of PDFCreator.



2. Install the PDFCreator
3. Set PDFCreator as the default Printer
4. Click Print Report and save the report to a pdf file in your computer.



HDRL Test Report

Logix MD+ DEVICE TAG ID: HART TAG DEVICE VERSION: MD+ Pro Diagnostics

ACTUATOR INFO -> Size: 25, Manufacturer: Valtek (Piston), Type: Linear (piston), Spring Type: Single

VALVE BODY INFO -> Model: Mark One, Body Size: .25 INCH / DN 6, Flow Direction: Flow Over, Fail Position: Mechanical Fail Closed

Hysteresis & Deadband

Average:	0.2 %
Maximum:	0.3 %

Repeatability

Average:	0.1 %
Maximum:	0.3 %

+/- Linearity Error

0.1339 %

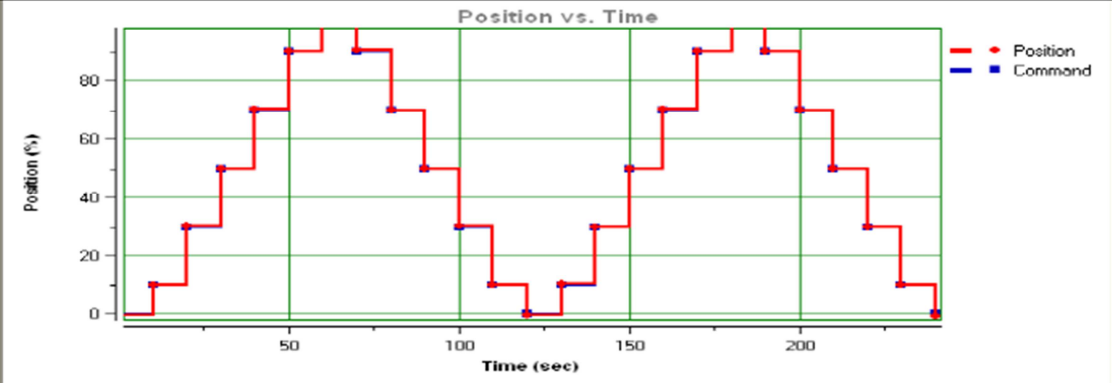
Test Settings

Position Settling Time:	3 sec
-------------------------	-------

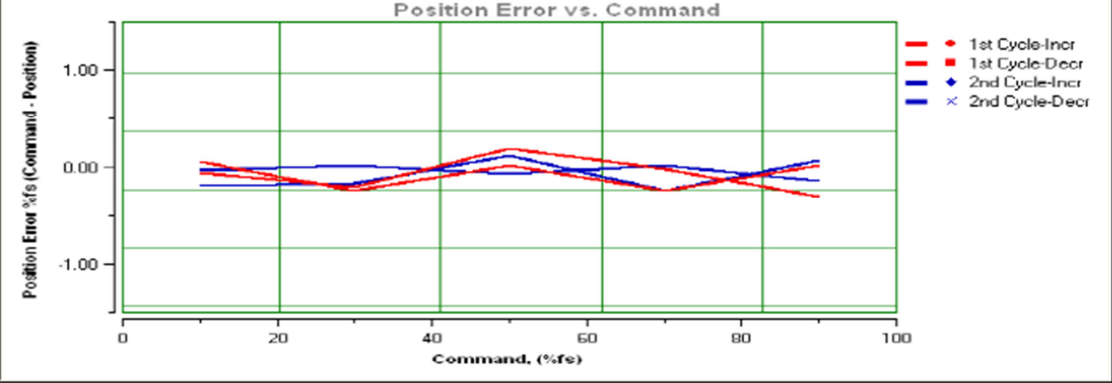
Test Date:

5/3/2012

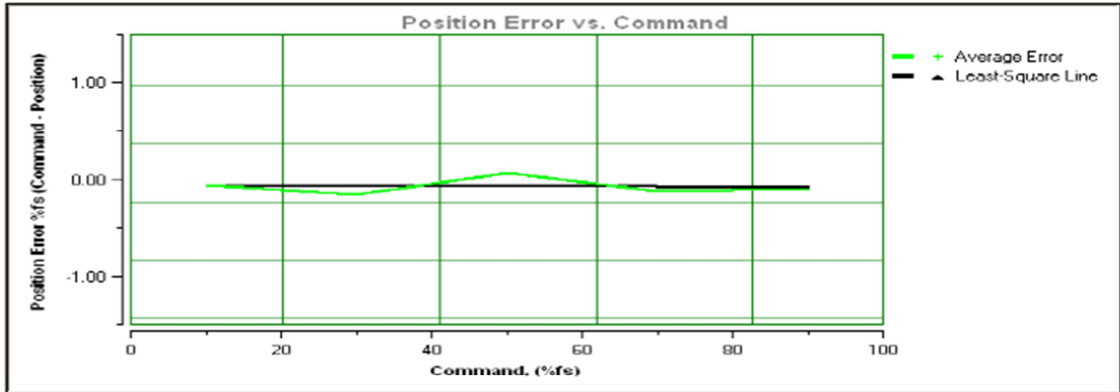
Position vs. Time



Position Error vs. Command



5/3/2012 10:44:23 AMPage 1/2





HDRL COMPARE

The *HDRL Compare* page displays two previously saved HDRL files for a side-by-side comparison. The comparison includes file information, hysteresis and deadband, repeatability, linearity error and graphed data.

File Information:

	Tag:	File Date:	Filename:	Position Settling Time
1...	HART TAG	1/0/24604	HART TAG_HDRL_2012-2-7_14h-35m.hdr1	3 sec
2...	LOGIX520	0/0/0	LOGIX520_HDRL_2012-4-23_16h-0m.hdr1	3 sec

Hysteresis & Deadband

	Average:	Maximum:
1	0.66 %	1.45 %
2	0.09 %	0.21 %
Δ	0.56 %	1.24 %

Repeatability

	Average:	Maximum:
1	0.02 %	0.11 %
2	0.09 %	0.24 %
Δ	0.06 %	0.13 %

+/- Linearity Error

1	0.04 %
2	0.05 %
Δ	0 %

Comparison Views: Control Signal | HDR | Linearity

Position vs. Time

Print Report

File Information

The files are loaded by selecting the "1..." and "2..." buttons. This area then shows the tag ID, the date the file was saved, the file name and the position settling time for each file.

File Information:

	Tag:	File Date:	Filename:	Position Settling Time
1...	HART TAG	1/0/24604	HART TAG_HDRL_2012-2-7_14h-35m.hdr1	3 sec
2...	LOGIX520	0/0/0	LOGIX520_HDRL_2012-4-23_16h-0m.hdr1	3 sec

Hysteresis and Deadband

This area shows the values for the average and maximum combined hysteresis and deadband. It also shows the difference between the values of the first file compared to the second file.

Hysteresis & Deadband			
	Average:		Maximum:
1	0.3 %		0.6 %
2	0.5 %		0.7 %
Δ	0.142 %		0.13 %

Repeatability

The Repeatability area shows the values for the average and maximum repeatability. It also shows the difference between the values from the first file compared to the second file.

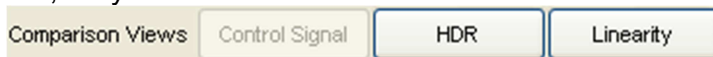
Repeatability			
	Average:		Maximum:
1	0.1 %		0.2 %
2	0.1 %		0.3 %
Δ	0.0161 %		0.1399 %

Linearity Error

The Linearity Error area shows the values of linearity. It also shows the difference between the values from the first file compared to the second file.

+/- Linearity Error		
1	0.1015 %	
2	0.0734 %	
Δ	0.028 %	

The graphs are identical to those shown in the HDRL page (Control Signal, HDR, Linearity); but, they each show the data for both files.



Action Buttons

The *Print Report* button sends the report to the default printer.



NOTE: It is possible to print the report to save to a **PDF** file. Instructions:

1. Download and install the free version of PDFCreator.
2. Install the PDFCreator
3. Set PDFCreator as the default Printer
4. Click Print Report and save the report to a pdf file in your computer.



HDRL Test Comparison Report

MD+

File Information:

	Tag:	File Date:	Filename:	
File #1	HART TAG	12/11/12	hdrl.hdrl	5 sec.
File #2	HART TAG	0/0/0	hdrl2.hdrl	5 sec.

Hysteresis && Deadband

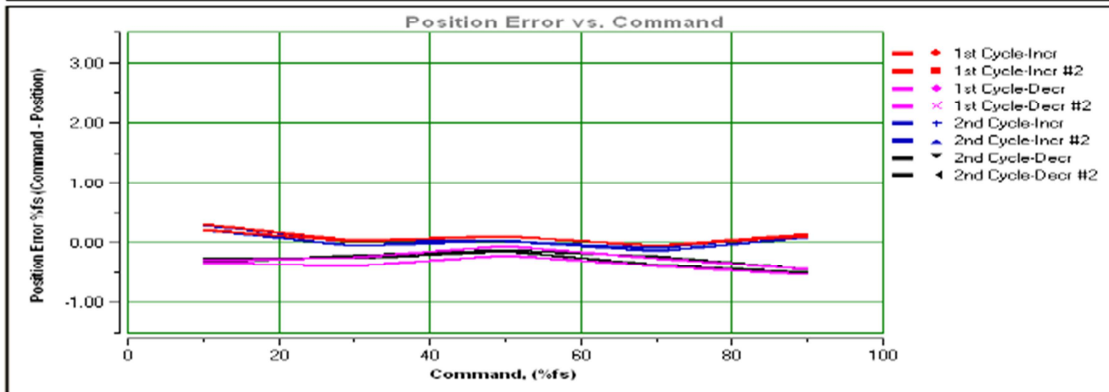
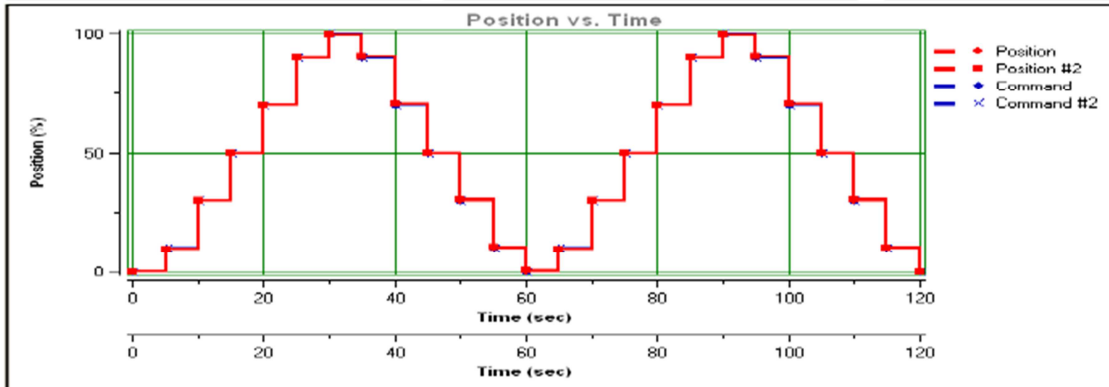
	Average:		Maximum:	
1	0.3	%	0.6	%
2	0.5	%	0.7	%
Δ	0.142	%	0.13	%

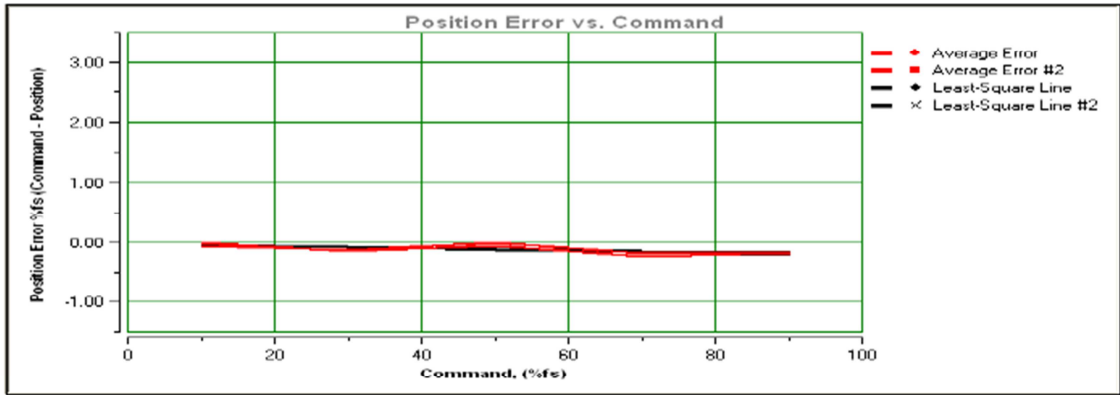
Repeatability

	Average:		Maximum:	
1	0.1	%	0.2	%
2	0.1	%	0.3	%
Δ	0.0161	%	0.1399	%

+/- Linearity Error

1	0.1015	%
2	0.0734	%
Δ	0.028	%





Partial Stroke Test

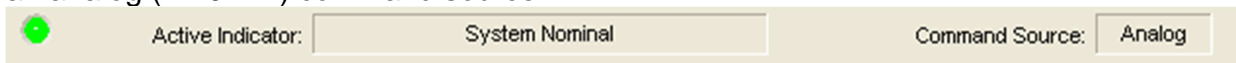
The *Partial Stroke Test* page allow you to adjust settings and run a step test. The Partial Stroke Test (PST) is a powerful tool for "in-service testing" of valves that are normally fixed at one end of travel. Normally this is used with safety valves that are fully open and can be stroked partially closed without affecting the process. The PST steps the valve with a known step size, and monitors the response time. Increasing stroking times can indicate that the valve may need service.

CAUTION: During a test the valve will not respond to control signals and movement of the valve stem will occur.

The screenshot displays the Partial Stroke Test (PST) software interface. At the top, the 'Active Indicator' is 'System Nominal' and the 'Command Source' is 'Analog'. The 'Partial Stroke Test Settings' section includes: Start Position (100%), Stop Position (90%), Time Limit (3 sec), Hold Time (2 sec), Ramp Time (0 sec), and an 'Execute extended diagnostics' checkbox. A 'Set Baseline' checkbox and an 'Apply' button are also present. The 'Graph Settings' section on the right has checkboxes for Position, Command, Supply Pressure, Port A Pressure, Port B Pressure, Pilot Relay Command, and Pilot Relay Position, all of which are checked. The 'Monitors' section shows 'Test Status' as 'Test Complete...' and a 'Partial Stroke Progress' bar. The 'Results' section displays 'Time to Breakaway' (0.3 sec), 'Time to Target' (Pass/Fail indicator), 'Force at Breakaway' (1233.8 N), and 'Result' (Passed). The main graph, titled 'Partial Stroke Test', plots Pressure (bar) and Percent (%) against Time (ms). The graph shows a step change in position from 100% to 90% at approximately 1000 ms, with corresponding changes in command, supply pressure, and port pressures. A legend on the right identifies the data series: Position (red diamond), Command (blue square), Supply Pressure (brown plus), Port A (green diamond), and Port B (magenta cross). At the bottom, there are buttons for 'Retrieve Baseline', 'Retrieve Last', 'Load', 'Save', 'Start', 'Stop', and 'Print Report'.

Status Area

The *Active Indicator* area shows the status of the most relevant active indicator. The color of the "LED light" corresponds to the Active Indicator and the first color of the blink code sequence on the positioner. Generally green indicates no immediate issues. Yellow indicates a developing issue. Red indicates the ability to control may be compromised. A detailed list of the indicators is given in the [Alarm Congfiguraion - Alarm Annunicator](#) page. The *Command Source* field indicates weather the positioner is being controlled by digital or an analog (4-20 mA) command source.



Partial Stroke Test Settings

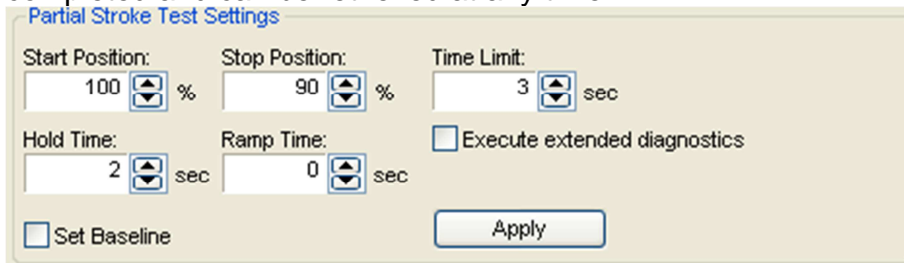
The *Start Position* and *Stop Position* are used to specify where the valve position will begin and end during the step test.

The *Time Limit* is a limit on how fast the valve must move to within 2% of the final position in order to pass the test.

The *Hold Time* is the time the command will remain at the end of the step to allow the valve to continue moving and stabilize. The test always includes a one-second stabilization period at the beginning of each test.

The *Ramp Time* is how long the command will take to reach the stop position.

The *Set Baseline* check box indicates the signature will be stored in a different memory location in the positioner. This baseline can remain in the positioner even if other tests are completed and can be retrieved at any time.



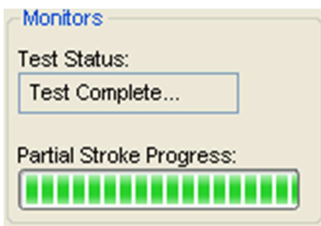
Graph Settings

This area allows for the selection of items to be shown on the graph. All of the data is acquired (and saved) regardless of this setting. Any item can be hidden or shown after the data has been downloaded from the positioner.



Monitors

The Monitors box shows information regarding the **Test Status** and the **Partial Stroke Test Progress** of the test.



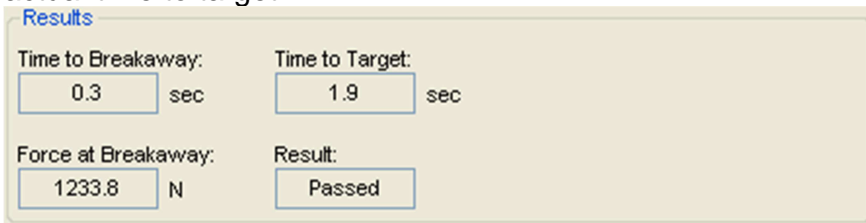
Results

Time to Breakaway is the time required to begin valve movement and is recorded when the valve has moved ½% from the starting position.

Force at Breakaway is the force in the actuator measured at the breakaway point.








Time to Target is the actual time it took for the valve to arrive within 2% of the final value.

Result gives a pass/fail indication of the test based on the reference time to target and the actual time to target.



Graph Settings

At the top of the graph are several controls for viewing the graph.

-  The *Restore* icon restores a graph that has been zoomed or adjusted.
-  The *Scroll* icon will allow the scales on the graph to be scrolled. Click the icon, then dragging the scale up or down.
-  The *Zoom* icon will allow the scales on the graph to be zoomed or expanded. Click on the scale and dragging the scale up or down to zoom in or out.
-  The *Zoom Out All Axes* icon scales all axes by clicking on the graph.
-  The *Zoom In All Axes* icon scales all axes by clicking on the graph.
-  The *Zoom Box* icon allows a portion of the visible graph to be magnified. Click on the icon then click and drag over the graph data to be magnified.
-  The *Cursor* icon allows a labeled marker to be placed on the graph which shows the coordinates of the graph. Click on the icon, then select the series name from the legend on the right of the graph. Now move the cursor to the location of interest. The first number on the cursor shows the location on the X axis, and the second number shows the location on the Y axis. If no variable shows in the box, a series name has not been selected.

Action Buttons

The *Retrieve Baseline* button clears the existing data and starts a new data acquisition from the baseline memory of the device. The DTM menu selection is unavailable during data acquisition.



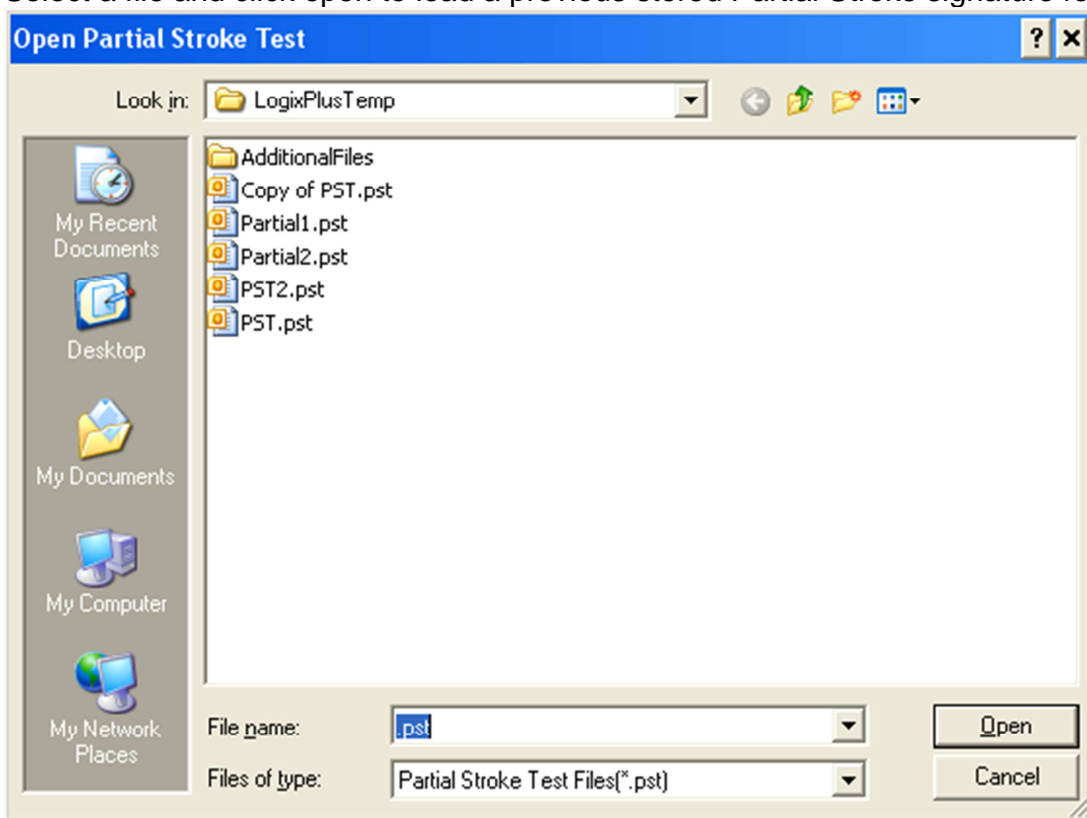
The *Retrieve Last* button clears the existing data and starts a new data acquisition from the memory of the device. *Retrieve Last* must be selected in order to see the graphed data. The DTM menu selection is unavailable during data acquisition.



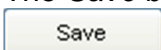
The *Load* button will load a test from file.



If your Frame setting allows private dialogs, the "Load" button will be enabled and it will display an open dialog to select the desired (*.pst) Partial Stroke signature file to load. Select a file and click open to load a previous stored Partial Stroke signature for viewing.



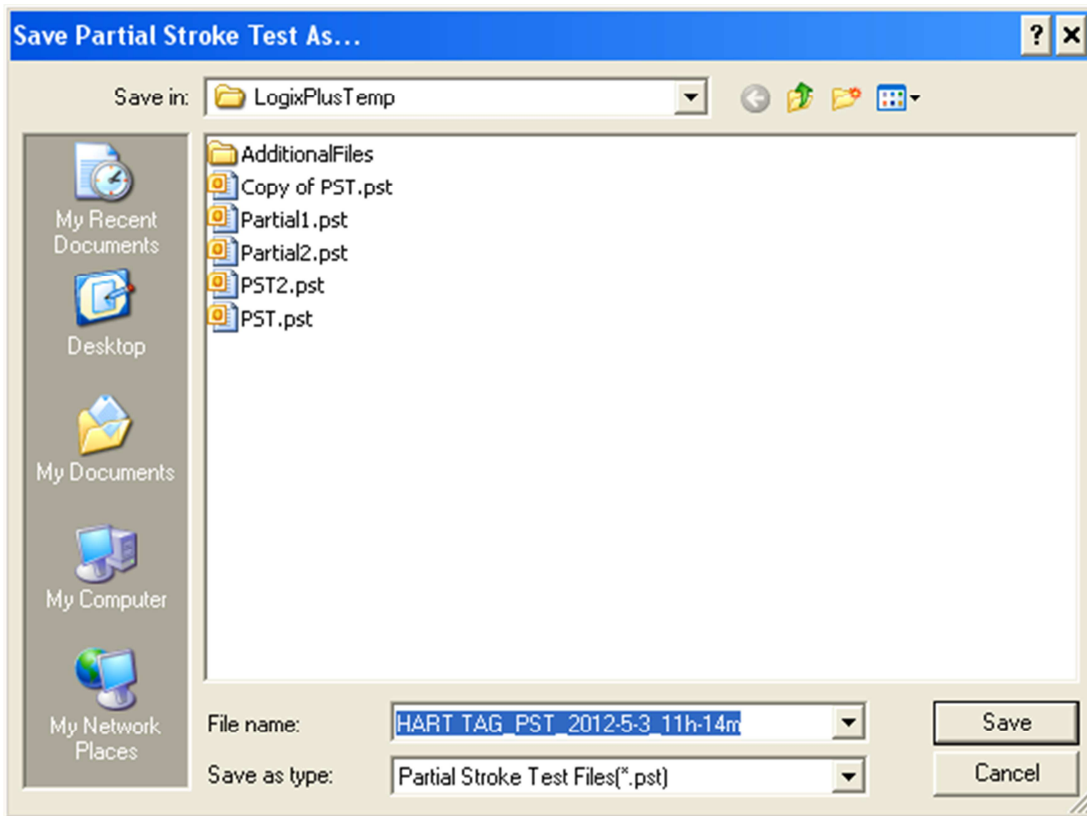
The *Save* button saves the existing test to a file.



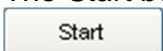
If your Frame setting allows private dialogs, the "Save" button will be enabled and it will display a Save dialog to save the current Partial Stroke signature test to a file. The "Save" dialog will display a default name including the following:

- Device Tag ID_
- PST_
- Year

- Month
- Day
- Time

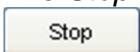


The *Start* button will clear the existing data and start the test.

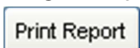


CAUTION: During a test the valve will not respond to control signals and movement of the valve stem will occur.

The *Stop* button stops data acquisition and the test.



The *Print Report* button sends the report to the default printer.



NOTE: It is possible to print the report to save to a **PDF** file. Instructions:

1. Download and install the free version of PDFCreator.
2. Install the PDFCreator
3. Set PDFCreator as the default Printer
4. Click Print Report and save the report to a pdf file in your computer.



Partial Stroke Test Report

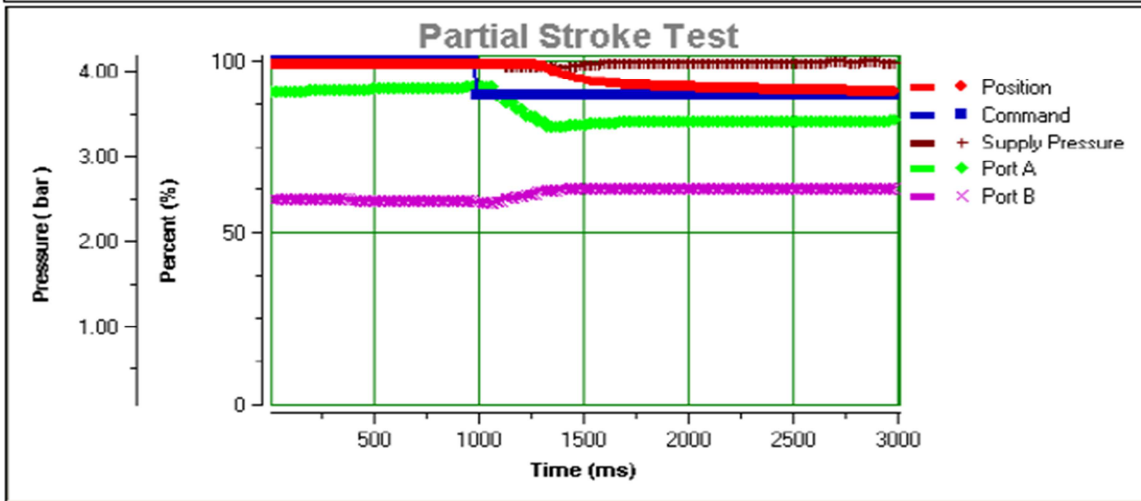
Logix MD+ DEVICE TAG ID: HART TAG DEVICE VERSION:MD+ Pro Diagnostics
ACTUATOR INFO --> Size: 25, Manufacturer: Valtek (Piston), Type: Not configured, Spring Type: Not configured, Fail Position: Not configur
VALVE BODY INFO --> Model: Not configured, Body Size: Not configured, Flow Direction: Not configured

Partial Stroke Test Settings

Start Position:	100%	Time to Target:	3 sec
Stop Position:	90%	Ramp Time:	0 sec
Test Date:	9/18/2012	Hold Time:	2 sec

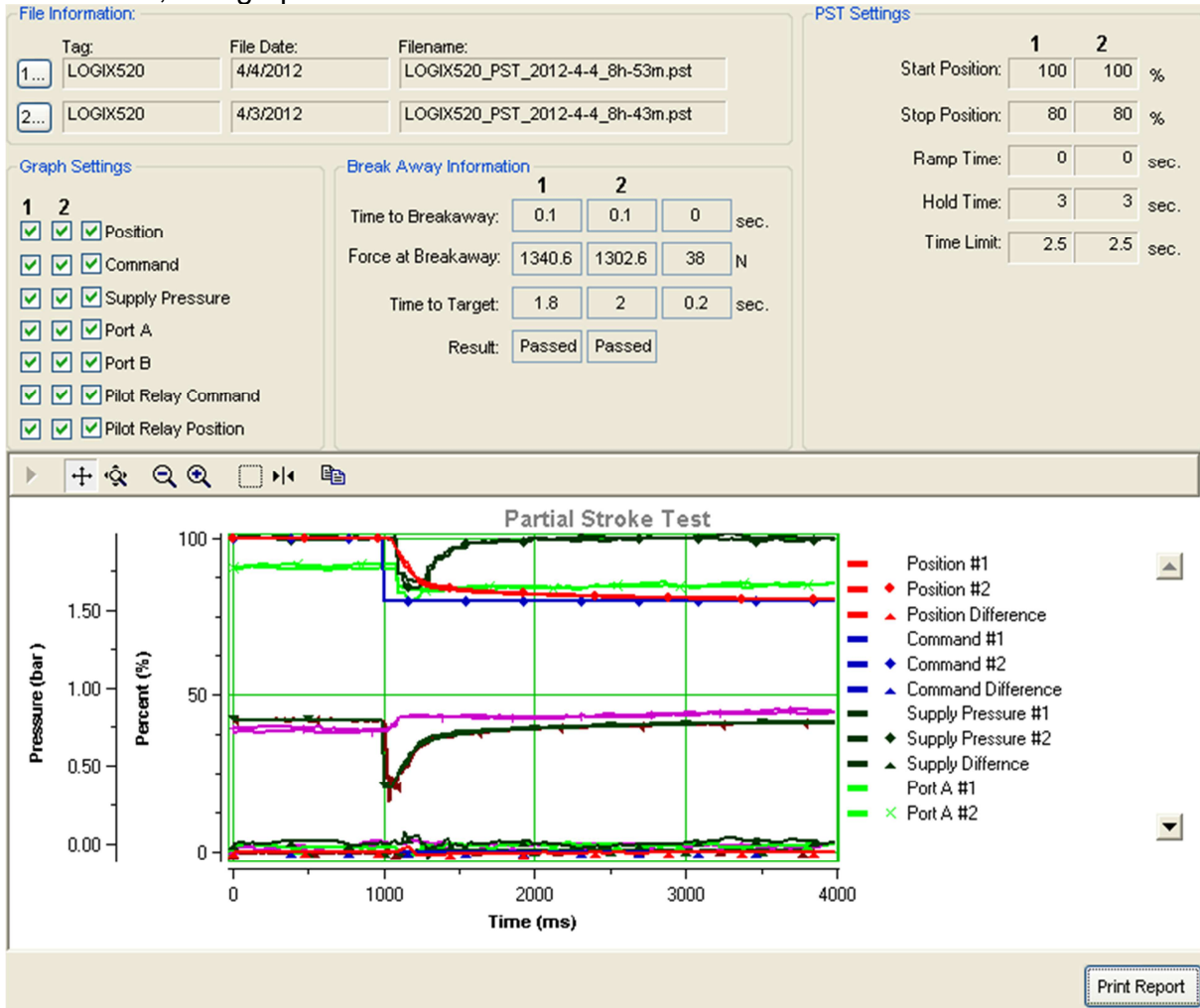
Break Away Information

Time to Breakaway:	0.3 sec	Time to Target:	1.9 sec
Force at Breakaway:	1233.8N	Result:	Incomplete



Partial Stroke Compare

The *Partial Stroke Compare* page displays two previously saved PST files for a side-by-side comparison. The comparison includes file information, PST settings, break away information, and graphed data.



Status Area

The *Active Indicator* area shows the status of the most relevant active indicator. The color of the "LED light" corresponds to the Active Indicator and the first color of the blink code sequence on the positioner. Generally green indicates no immediate issues. Yellow indicates a developing issue. Red indicates the ability to control may be compromised. A detailed list of the indicators is given in the [Alarm Congfiguraion - Alarm Annunicator](#) page. The *Command Source* field indicates whether the positioner is being controlled by digital or an analog (4-20 mA) command source.



File Information

The files are loaded by selecting the "1..." and "2..." buttons. This area then shows the tag

ID, the date the file was saved, and the file name for each file.

File Information:			
	Tag:	File Date:	Filename:
1...	HART TAG	5/3/2012	HART TAG_PST_2012-5-3_11h-18m.pst
2...	HART TAG	5/3/2012	2HART TAG_PST_2012-5-3_11h-18m.pst

Break Away Information

The Partial Stroke Test Settings area contains the information used to run the partial stroke test and the pass/fail criteria. This information is shown for each file in a side-by-side comparison.

The Break Away Information area shows the values for the results of the partial stroke test including the time until initial movement, pressure at break away, time to target and pass or fail results. It also shows the difference between the values from the first file compared to the second file.

Break Away Information				
	1	2	Δ	
Time to Breakaway:	0.4	0.4	0	sec.
Force at Breakaway:	428	428	0	lbf
Time to Target:	0.4	0.4	0	sec.
Result:	Pass	Pass		

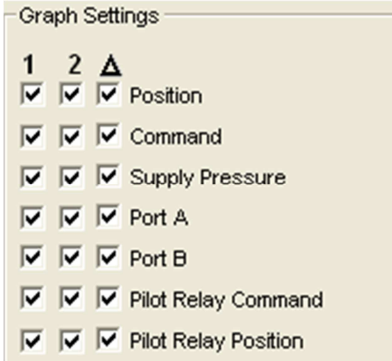
PST Settings

The PST Settings area contains the information used to run the PST test and other information that may affect the results. This information is shown for each file in a side-by-side comparison.

PST Settings			
	1	2	
Start Position:	80	80	%
Stop Position:	90	90	%
Ramp Time:	4	4	sec.
Hold Time:	6	6	sec.
Time Limit:	5	5	sec.

Graph Settings

This area allows for the selection of items to be shown on the graph. You can select between data sets from file 1, file 2, and the differences.

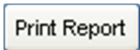


The image shows a 'Graph Settings' dialog box with a title bar. It contains three columns of checkboxes labeled '1', '2', and a triangle symbol (representing differences). The rows of data are: Position, Command, Supply Pressure, Port A, Port B, Pilot Relay Command, and Pilot Relay Position. All checkboxes in all columns are checked.

	1	2	Δ	
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Position
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Command
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Supply Pressure
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Port A
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Port B
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Pilot Relay Command
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Pilot Relay Position

Action Buttons

The *Print Report* button sends the report to the default printer.



NOTE: It is possible to print the report to save to a **PDF** file. Instructions:

1. Download and install the free version of PDFCreator.
2. Install the PDFCreator
3. Set PDFCreator as the default Printer
4. Click Print Report and save the report to a pdf file in your computer.



Partial Stroke Test Comparison Report

Logix MD+

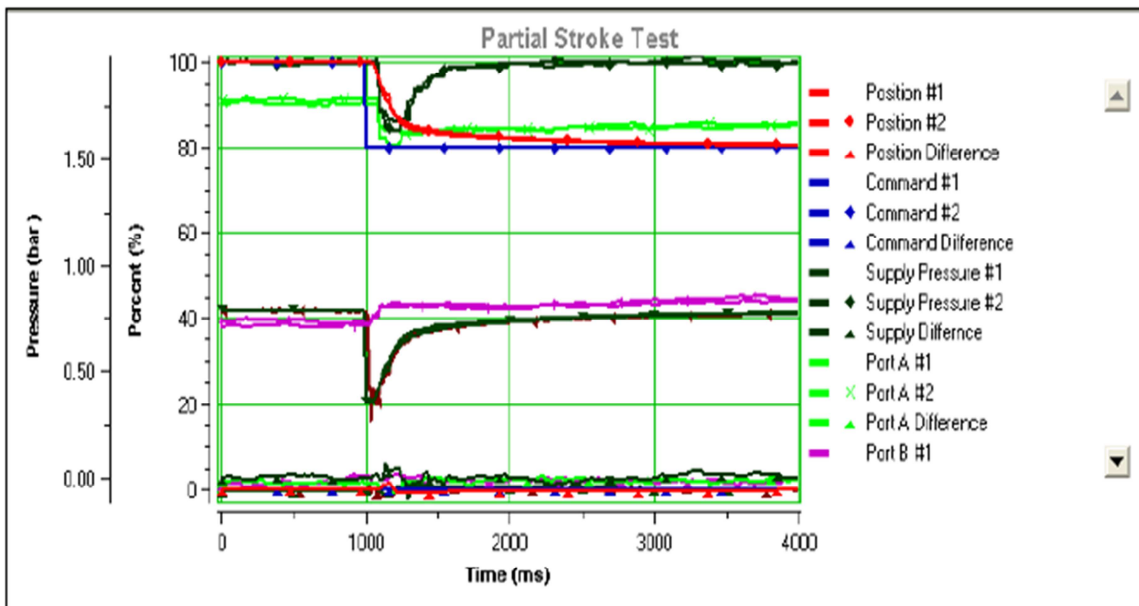
File Information:

	Tag:	File Date:	Filename:
File #1	LOGIX520	4/4/2012	LOGIX520_PST_2012-4-4_8h-53m.pst
File #2	LOGIX520	4/3/2012	LOGIX520_PST_2012-4-4_8h-43m.pst

	Start Position:	Stop Position:	Time Limit:	Hold Time:	Ramp Time:
1	100 %	80 %	2.5 sec.	3 sec.	0 sec.
2	100 %	80 %	2.5 sec.	3 sec.	0 sec.

Break Away Information

	Time to Breakaway	Time to Target:	Force at Breakaway:	Result:
1	0.1 sec.	1.8 sec.	1340.6 N	Passed
2	0.1 sec.	2 sec.	1302.6 N	Passed
Δ	0 sec.	0.2 sec.	38 N	



Partial Stroke Schedule

The *Partial Stroke Schedule* page allows you to enable an automatic partial stroke test from a predefined schedule date and time.

CAUTION: Selecting the "Automatically Run PST" option will cause the partial stroke test to run on the scheduled date and time with no further user input.

Status Area

The *Active Indicator* area shows the status of the most relevant active indicator. The color of the "LED light" corresponds to the Active Indicator and the first color of the blink code sequence on the positioner. Generally green indicates no immediate issues. Yellow indicates a developing issue. Red indicates the ability to control may be compromised. A detailed list of the indicators is given in the [Alarm Configuration - Alarm Annunicator](#) page. The *Command Source* field indicates whether the positioner is being controlled by digital or an analog (4-20 mA) command source.

Partial Stroke Test Schedule

The *Automatically Run PST* option will cause the partial stroke test to run on the scheduled date and time. Use this option only if you are certain this will not cause an unwanted process interruption.

Automatically Run Test

CAUTION: Selecting the "Automatically Run PST" option will cause the partial stroke test to run on the scheduled date and time with no further user input.

The *Set PST Alert* checkbox will cause the PST Alert to become active at the scheduled date and time. This can be cleared using the *Acknowledge* button.

Set PST Alert

The Positioner Time and Date is displayed. This can be updated on the [Positioner and HART Information](#) page.



Positioner Time & Date:
08:57:26 2012/09/19

The *Testing Interval* allows you to define how often the PST will automatic run or the alert will become active.

Testing Interval:
6 mos

Scheduled Start Date allows you to define the exact start Date of the PST.

Schedule Start Date:
Year: 2012, Month: 9, Day: 19

Scheduled Start Time allows you to define the exact time of day to start the automatic PST.

Schedule Start Time:
Hour: 8, Minute: 58

Action Buttons

The *Acknowledge* button clears the *Partial Stroke Test Scheduled Alert* until the next scheduled date. Running a partial stroke test also clears the alert.

Acknowledge

The *Apply* button writes the settings to the positioner.

Apply

The *Retrieve* button reads the settings from the positioner.

Retrieve



Calibration

Calibration pages allow simple calibration of all sensors and functions. This selection automatically redirects to the *Sensor Calibration* page.



Sensor Calibration

The *Sensor Calibration* page allows you to calibrate the feedback pot, the pressure sensors and determine the friction and spring rate.

Active Indicator: Command Source:

Select Calibration(s)

Triple Stroke (Quick-Cal) Friction Pressure

Pressure calibration also calibrates the stroke. Friction calibration is available after a valid pressure calibration.

Calibration History

	Stroke (Quick-Cal)	Friction	Pressure
Date Last Calibrated:	14.09.2012 12:03:09	14.09.2012 11:58:27	14.09.2012 12:03:09
Last Calibrated by:	***	***	***

Positioner Date & Time: [Configure...](#) New Calibration by:

[History...](#)

Actuator Configuration

Manufacturer: Model: Size: cm²

Supply Pressure

The pressure sensors have been factory calibrated. They typically do not need recalibration unless they have been replaced or endured severe environmental stress.

Pressure: bar [Zero Supply...](#)

Sensor Values

Supply Port	Port A	Port B	Position
Values: <input type="text" value="4.1"/> bar	<input type="text" value="3.6"/> bar	<input type="text" value="2.6"/> bar	<input type="text" value="91.2"/> %
A/D Count: <input type="text" value="19551"/>	<input type="text" value="20854"/>	<input type="text" value="17393"/>	<input type="text" value="1130"/>

Calibration Status

Calibration State: [Errors...](#) Calibration Progress: [Friction Tolerances...](#)

NOTE: Report printing is only available after a calibration is completed.

Status Area

The *Active Indicator* area shows the status of the most relevant active indicator. The color of the "LED light" corresponds to the Active Indicator and the first color of the blink code sequence on the positioner. Generally green indicates no immediate issues. Yellow indicates a developing issue. Red indicates the ability to control may be compromised. A detailed list of the indicators is given in the [Alarm Congfiguraion - Alarm Annunicator](#) page. The *Command Source* field indicates weather the positioner is being controlled by digital or an analog (4-20 mA) command source.

Active Indicator: Command Source:

Select Calibration

Select the *Triple* to perform a combined calibration that calibrates the internal pressure sensors of the positioner, the travel of the valve position (zero and span), followed by a few short sequence of movements that allows the positioner to calculate the friction value for the valve assembly. Select the , Friction, or Pressure to calibrate the respective selection individually. Typically pressure sensors do not require calibration.

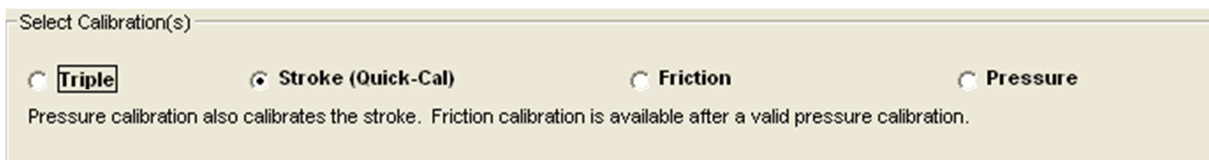
Select the *Stroke (QuickCal)* button to quickly calibrate the position feedback sensor. The actual DIP switch settings on the positioner will be applied, even if they were changed using the DTM. See the [Local Interface](#) page of the DTM to view the configuration of the DIP switches.

Select the *Friction* button to run a calibration routine that determines the valve friction and actuator spring characteristics. The actuator size is used to determine the forces. Ensure the correct actuator information is entered below. Friction calibration is valid after a valid pressure calibration.

NOTE: Friction forces may change quickly when a valve is first placed into service. This is typically due to breaking in the packing.

Select the *Pressure* button to calibrate the pressure sensors. Pressure sensors are calibrated at the factory and typically do not need to be re-calibrated. However, if a new pressure sensor board has been installed it will need calibration. Enter the supply pressure below before starting the calibration. The positioner uses the supply pressure value during the calibration. The positioner will fully pressurize each side of the actuator in order to complete this calibration. The pressure calibration also calibrates stroke.

NOTE: Pressure calibrations can be stored in permanent memory so they won't be erased when performing a factory reset. To do this, calibrate the pressure sensors, then using *Edit Variables* page, write a value of 1 to variable 104. To open the *Edit Variables* page, go to the *DTM License Management* page and type "tech" into the *Feature Code* field. The *Edit Variables* page will appear at the bottom of the menu tree.



Calibration History

The "Calibration History" group box shows information about the latest calibrations. These items are retrieved from the positioner and cannot be edited. When performing a new calibration, the positioner will automatic store new calibration history data, which includes the positioner date and time and the name or initials of the person performing the calibration.

Date Last Calibrated shows the dates and times when each of the calibrations were last

performed.

Last Calibrated By shows the initials of the person who performed each of the last calibrations.

The *History* link navigates to the *Event History* page where results from the last 40 calibration events can be viewed.

Positioner Date and Time shows the current values from the positioner. To adjust the positioner date and time, click on the “Configure” link.

Use the *New Calibration By* field to enter the name or initials of the person performing a new calibration. This field is limited to 3 characters.

Calibration History

	Stroke (Quick-Cal)	Friction	Pressure
Date Last Calibrated:	14.09.2012 12:03:09	14.09.2012 11:58:27	14.09.2012 12:03:09
Last Calibrated by:	***	***	***
Positioner Date & Time:	09/19/2012 10:18:58		New Calibration by:
History...	Configure...		***

Actuator Configuration

The *Actuator Configuration* box allows you to enter the actuator size. This is used for friction and other force calculations. To automatically find the actuator size, select the *Manufacturer* and *Model*. Or select other and type the area in the *Size* field. Select apply to write these values to the positioner before starting a calibration.

Actuator Configuration

Manufacturer:	Model:	Size:	Apply
Valtek (Piston) ▼	25 ▼	153.6 cm ²	Apply

Supply Pressure

Enter the supply pressure in the *Pressure* field and click *Apply* to write the value to the positioner. The positioner must have the current supply pressure entered for an accurate calibration. This box is unavailable if only a stroke calibration is selected above. The default for this field is the pressure used for the last calibration.

The Supply Pressure calibration does not calibrate the zero value of the sensor that is measuring the supply pressure. In order to do this, select the *Zero Supply* link.

Supply Pressure

The pressure sensors have been factory calibrated. They typically do not need recalibration unless they have been replaced or endured severe environmental stress.

Pressure:

4.1 bar

[Zero Supply...](#)

Zero Supply

Follow the instruction on the page to capture the zero value for the supply pressure sensor. The *A/D Counts* show the output of the analog to digital converter for the supply pressure sensor.

Capture Zero will record the A/D count to the positioner with supply pressure of zero. *Finish* applies the new value and redirects back to the Sensor Calibration page.

Active Indicator: Command Source:

If it is possible to SAFELY remove the air supply from the positioner, do so at this time so that the system can capture the zero value for the supply sensor. Otherwise, click the Sensor Calibration link to proceed with this calibration.

After removing the air supply and the the A/D Count has settled, click Capture Zero.

A/D Count:

Restore the air supply; then, click Finish.

[Sensor Calibration...](#)

Sensor Values

The Sensor Values group box displays the values based on the last calibration, and A/D count for the supply port sensor, Port A sensor, Port B sensor, and the Position sensor in the device. The A/D counts are shown strictly as a diagnostic to indicate that there is a signal coming from the sensors and also to estimate the stability of the pressures and position. If the A/D counts read zero, then the sensor has most likely failed and should be replaced.

Supply Port		Port A		Port B		Position	
Values:	91.2 psi	0.7 psi	89.9 psi	-1.1 %			
A/D Count:	40538	15024	34856	3810			

Calibration Status

The *Calibration Status* group box updates any progress of the current calibration. The *Calibration State* field shows detailed information about the current calibration. Depending on the latency of the communication connection to the positioner, not all steps may be shown during a calibration. This is due to the fact that the positioner may complete several steps before the display can be updated. Click on the *Errors* link to see any errors that may have occurred during the calibration. *Calibration Progress* indicates the overall progress. The *Friction Tolerances* link redirects to the Friction page where friction alarms and warnings may be set.

Calibration Status

Calibration State: [Errors...](#)

Calibration Progress:

[Friction Tolerances...](#)

Action Buttons

Click the *Start Calibration* button to perform the selected calibration.

Clicking the *Abort* button to end the calibration in process and resume normal operation.



The *Print Report* button sends the report to the default printer. The report contains information from the last successful Stroke, Pressure and Friction calibrations.



NOTE: It is possible to print the report to save to a **PDF** file. Instructions:

1. Download and install the free version of PDFCreator.
2. Install the PDFCreator
3. Set PDFCreator as the default Printer
4. Click Print Report and save the report to a pdf file in your computer.



Sensor Calibration

Logix MD+ DEVICE TAG ID: HART TAG DEVICE VERSION: MD+ Pro Diagnostics
 ACTUATOR INFO -> Size: 25, Manufacturer: Valtek (Piston), Type: Linear (piston), Spring Type: Single
 VALVE BODY INFO -> Model: Mark One, Body Size: .25 INCH / DN 6, FlowDirection: FlowOver, Fail Position: Mechanical Fail Closed

Calibration Results

Calibration State Calibration completed successfully.
Positioner Date & Time: 05/03/2012 13:31:50

Stroke (Quick-Cal)

Last Calibrated by: ***		Stroke Calibration Flags	
Date Last Calibrated:	05/03/2012 13:29:56		
Inner Loop Offset:	47.41 %	Position Range Small	<input type="checkbox"/>
A/D Value at 0% Position:	61065	Position < ADC Range	<input type="checkbox"/>
A/D Value at 100% Position:	48502	Position > ADC Range	<input type="checkbox"/>
A/D Range:	12563	No Motion Time Out	<input type="checkbox"/>
		Settle Time Out	<input type="checkbox"/>
		ILO Time Out	<input type="checkbox"/>
		Stroke Cal. Required	<input type="checkbox"/>

Actuator

Last Calibrated by: ***		Pressure Calibration Flags	
Date Last Calibrated:	05/03/2012 13:29:56		
Supply		Press. Board Fail WRN	<input type="checkbox"/>
Supply Pressure:	72 psi	Press. Cal. Required	<input type="checkbox"/>
A/D Value at low pressure:	18445		
A/D Value at high pressure:	40837		
A/D Range:	22392		
Port A			
A/D Value at low pressure:	14735		
A/D Value at high pressure:	37202		
A/D Range:	22467		
Port B			
A/D Value at low pressure:	13734		
A/D Value at high pressure:	35247		
A/D Range:	21513		

Friction

Last Calibrated by: ***		Friction Calibration Flags	
Date Last Calibrated:	05/03/2012 13:31:35		
Actuator Size:	23.8 in2	Friction Cal. Required	<input type="checkbox"/>

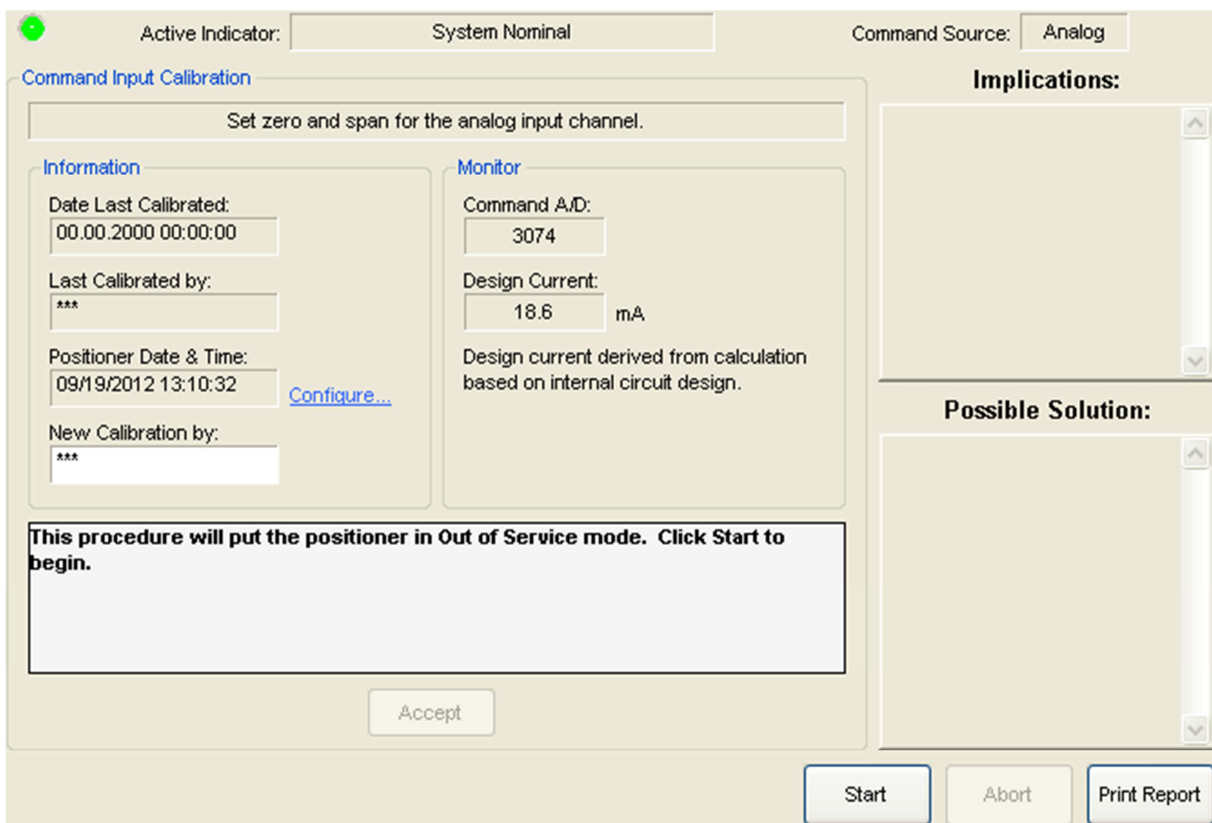
Command Calibration

The *Command Calibration* page is used to adjust the range of the positioner input signal. The default input range is 4 to 20 mA. A split-range calibration can be performed here by adjusting the input span to something other than 4-20 mA. Once setup properly this calibration is usually not required for ongoing maintenance.

The command calibration is a step-by-step Wizard calibration. Towards the bottom of the page, a text field indicates actions required for the next step. When the action indicated in the text field is completed, click the “Accept” button.

CAUTION: During an input signal calibration, the positioner will not respond to command changes.

NOTE: An unfiltered external current source must be connected to the positioner in order to complete the calibration.



Active Indicator: ● System Nominal Command Source: Analog

Command Input Calibration

Set zero and span for the analog input channel.

<p>Information</p> <p>Date Last Calibrated: 00.00.2000 00:00:00</p> <p>Last Calibrated by: ***</p> <p>Positioner Date & Time: 09/19/2012 13:10:32 Configure...</p> <p>New Calibration by: ***</p>	<p>Monitor</p> <p>Command A/D: 3074</p> <p>Design Current: 18.6 mA</p> <p>Design current derived from calculation based on internal circuit design.</p>
--	--

Implications:

Possible Solution:

This procedure will put the positioner in Out of Service mode. Click Start to begin.

Accept

Start Abort Print Report

Status Area

The *Active Indicator* area shows the status of the most relevant active indicator. The color of the "LED light" corresponds to the Active Indicator and the first color of the blink code sequence on the positioner. Generally green indicates no immediate issues. Yellow indicates a developing issue. Red indicates the ability to control may be compromised. A detailed list of the indicators is given in the [Alarm Configuration - Alarm Annunciator](#) page.



The *Command Source* field indicates whether the positioner is being controlled by digital or an analog (4-20 mA) command source.

Active Indicator: Command Source:

Information

When performing a new calibration, the positioner will automatically store a new calibration history, which includes the positioner date and time and the name or initials of the person performing the calibration. It is recommended to change the “New Calibration by” field to the name or initials of the person performing the calibration.

Date Last Calibrated field the date and time of the last valid Input calibration.

Last Calibrated By shows the initials or name of the last person to perform the input calibration.

Positioner Date and Time shows the current values from the positioner. To adjust the positioner date and time, click on the “Configure” link.

Use the *New Calibration By* field to enter the name or initials of the person performing a new calibration. This field is limited to 3 characters.

Information

Date Last Calibrated:

Last Calibrated by:

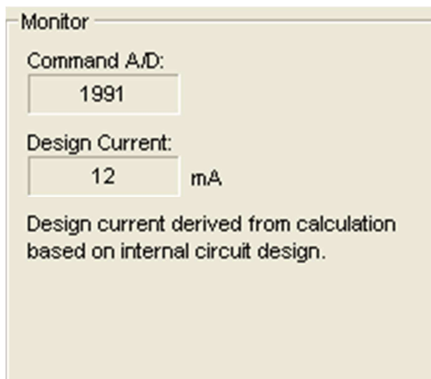
Positioner Date & Time:
 [Configure...](#)

New Calibration by:

Monitor

Command A/D displays the output of the analog to digital converter on the positioner. This is the value the positioner will use to determine the input current.

Design Current shows the internal calculation of the input current. This is for reference only.

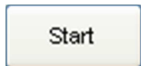


Implications and Possible Solutions

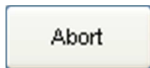
In the case an error occurs during the calibration, the right side of the page the page provides instant feedback of the implications of the errors and the possible solution to fix the error. If no errors occur during the calibration the implications and possible solution fields will remain blank.

Action Buttons

Click the *Start Calibration* button to perform the calibration.



Click the Abort button to end the calibration in process and resume normal operation.



The *Print Report* button sends the report to the default printer.



NOTE: It is possible to print the report to save to a **PDF** file. Instructions:

1. Download and install the free version of PDFCreator.
2. Install the PDFCreator
3. Set PDFCreator as the default Printer
4. Click Print Report and save the report to a pdf file in your computer.



Command Input Calibration Report

Logix MD+ DEVICE TAG ID: HART TAG DEVICE VERSION:MD+ Pro Diagnostics
 ACTUATOR INFO -> Size: 25, Manufacturer: Valtek (Piston), Type: Linear (piston), Spring Type: Single
 VALVE BODY INFO -> Model: Mark One, Body Size: .25 INCH / DN 6, FlowDirection: FlowOver, Fail Position: Mechanical Fail Closed

Calibration Information

Calibration State: Calibration completed successfully.
Positioner Date & Time: 05/03/2012 13:43:56

Calibration Results

Last Calibrated by:		***		Command In Calibration Flags	
Date Last Calibrated:	05/03/2012 13:42:49	Active	Masked		
A/D Value at 4mA:	663	Cmd. < ADC Range	<input type="checkbox"/>	<input type="checkbox"/>	
A/D Value at 0%:	662	Cmd. > ADC Range	<input type="checkbox"/>	<input type="checkbox"/>	
A/D Value at 100%:	3309	Cmd. Range Small	<input type="checkbox"/>	<input type="checkbox"/>	
A/D Range:	2647				

Calibration Errors

The *Calibration Error* page displays all calibration status indicators and their current status. If a particular indicator is not wanted then a check in the box for a particular item will mask that item and it will not be shown in the active indicator field at the top of each page nor will it affect the status of the health bar on the main dashboard view.





Status Area

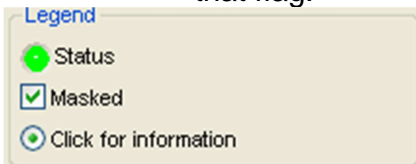
The *Active Indicator* area shows the status of the most relevant active indicator. The color of the "LED light" corresponds to the Active Indicator and the first color of the blink code sequence on the positioner. Generally green indicates no immediate issues. Yellow indicates a developing issue. Red indicates the ability to control may be compromised. A detailed list of the indicators is given in the [Alarm Configuration - Alarm Annunciator](#) page. The *Command Source* field indicates whether the positioner is being controlled by digital or an analog (4-20 mA) command source.

Legend

Each indicator group box may contain the following components:

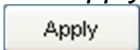
- An "LED light" indicates health status. Warning and alarm limits (set by the user in many cases) determine the conditions when the color will turn from green to yellow to red. The most severe of the indicators on this page will be shown in the health bar on the Dashboard.
 - **Dark Green** circle indicates a healthy condition where no attention is needed.
 - **Light Green** indicates an occurrence of a normal activity that does not affect the health of the valve system.

-  **Yellow** circle indicates that an active warning, alert or mode is present.
-  **Red** circle indicates that an active alarm or state is present that could seriously limit the operation of the valve.
-  **Gray** circle indicates that the feature or condition is not available because the configuration of the hardware or software does not support it.
- A checkbox indicates the masked status. Check to mask. If a particular indicator is masked, it will not be shown in the active indicator field at the top of each screen, affect the status of the health bars on the main dashboard, be sent in command 48, or be seen on the blinking LEDs on the positioner. It will however continue to show on this page.
-  Clicking on a button will display the Implications and Possible Solutions for that flag.



Action Buttons

The *Apply* button will save changes to the connected device.



The *Retrieve* button will retrieve the latest information from the device.



Stroke Calibration Flags



Stroke Calibration Required

- **Definition:** A factory reset was performed and the positioner has not

yet been calibrated. The unit will not respond to commands and will remain in the fail-safe position until a calibration is successfully completed.

- **Possible Solutions:** Perform a Stroke Calibration (QUICK-CAL) by holding the QUICK-CAL/ACCEPT button down for 3 seconds, or perform a Pressure or Friction calibration if desired. See the Calibration section of the IOM for warnings.

Position Range Small

- **Definition:** During calibration, the range of motion of the position feedback arm was too small for optimum performance.
- **Possible Solutions:** Check for loose linkages and/or adjust the feedback pin to a position closer to the follower arm pivot to create a larger angle of rotation and recalibrate. The minimum angle of rotation should be greater than 15 degrees. Briefly pressing the QUICK-CAL/ACCEPT button acknowledges this condition and the positioner will operate using the short stroke calibration if otherwise a good calibration.

Position < ADC Range

- **Definition:** During calibration, the feedback sensor moved beyond its range of operation at the 0% (closed) position.
- **Possible Solutions:** Adjust the positioner mounting, linkage or feedback potentiometer to move the position sensor back into range then restart the calibration.

Position > ADC Range

- **Definition:** During calibration, the feedback sensor moved beyond its range of operation at the 100% (open) position.
- **Possible Solutions:** To correct the condition, adjust the positioner mounting, linkage or feedback potentiometer to move the position sensor back into range then restart the calibration.

No Motion Time Out

- **Definition:** During a stroke calibration, there was no valve motion detected. Because some valves are quite large, this indicator can take up to 9 minutes to detect an error.
- **Possible Solutions:** Check linkages and air supply to make sure the system is properly connected. If the time out occurred because the actuator is very large then simply retry the QUICK-CAL and the positioner will automatically adjust for a larger actuator by doubling the time allowed for movement. This error may be cleared by briefly pushing the QUICK-CAL/ACCEPT.

Settle Time Out

- **Definition:** During calibration, the position feedback sensor showed movement, but did not settle.
- **Possible Solutions:** Check for loose linkages or a loose positioner sensor. This error may appear on some very small actuators during the initial calibration. Recalibrating may clear the problem, or this error may be cleared by briefly pushing the QUICK-CAL/ACCEPT button.

ILO Time Out

- **Definition:** During calibration the Inner Loop Offset (ILO) value did not settle. This could result in less accurate positioning.
- **Possible Solutions:** Repeat the stroke calibration to get a more accurate ILO value. To proceed using the less accurate ILO value, this error may be cleared by briefly pushing the QUICK-CAL/ACCEPT button. Lowering the setting on the gain selection switch may help if the actuator is unstable during the calibration.

•

Stroke Shift

- **Definition:** The 0% and 100% valve positions have both shifted in the same direction since the last stroke calibration. This may be related to a bent or adjusted feedback linkage, loose positioner mounting, or an over rotated feedback potentiometer.
- **Possible Solutions:** Ensure the feedback linkage is not bent and the positioner is mounted securely. If the feedback potentiometer is over-rotated, repeat the stroke calibration until the Stroke Shift error is no longer present. This notification can be cleared by briefly pressing the QUICK-CAL/ACCEPT button.

Stroke Span Increase

- **Definition:** The 0% and 100% valve positions are farther apart compared to the last stroke calibration. This could indicate seat wear.
- **Possible Solutions:** Inspect valve or schedule valve for inspection. This notification can be cleared by briefly pressing the QUICK-CAL/ACCEPT button

Stroke Span Decrease

- **Definition:** The 0% and 100% valve positions are closer together compared to the last stroke calibration. This could indicate debris or build up at valve seat.
- **Possible Solutions:** Inspect valve or schedule valve for inspection. This notification can be cleared by briefly pressing the QUICK-CAL/ACCEPT button.

Command Input Calibration Flags



Command Range Small

- **Definition:** During a Command Loop Calibration, the difference between the signal at 0% and the signal at 100% was too small. The system is designed to accept a difference greater than 5 mA.
- **Possible Solutions:** Recalibrate making sure to use a larger difference between command signal limits. The difference must exceed 5 mA.

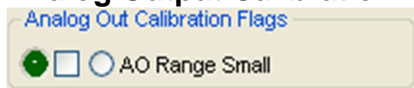
Command < ADC Range

- **Definition:** During Command Loop Calibration, the 0% signal was out of the Analog to Digital Converter (ADC) range.
- **Possible Solutions:** The system is designed to accept a signal that is above 10 ADC counts. Recalibrate making sure the ADC counts are above that limit.

Command > ADC Range

- **Definition:** During Command Loop Calibration, the 100% signal was out of the Analog to Digital Converter (ADC) range.
- **Possible Solutions:** The system is designed to accept a signal that is below 4085 ADC counts. Recalibrate making sure the ADC counts are below that limit.

Analog Output Calibration Flags



AO Range Small

- **Definition:** During an Analog Output Calibration the difference between the milliamp signal at 0% and the milliamp signal at 100% was too small.
- **Possible Solutions:** Recalibrate making sure to use a larger difference between signal limits. This notification can be cleared by briefly pressing the QUICK-CAL/ACCEPT button.

Pressure Calibration Flags



Pressure Calibration Required

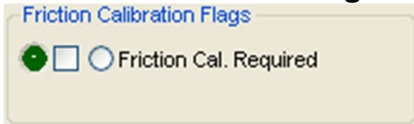
- **Definition:** A Factory Pressure Calibration has not been performed. Unlike a regular pressure sensor calibration, a Factory Pressure Calibration saves the calibration values to memory, making them available should a factory reset be performed. Proper pressure sensor calibration is required for proper pressure sensing and diagnostics. Calibration values from a regular pressure sensor calibration will be lost when a factory reset is performed. Typically no pressure calibration is required with a new positioner.
- **Possible Solutions:** After replacing a main board or a pressure sensor board, perform a Factory Pressure Calibration. To do this, see the Pressure Sensor Board Removal and Installation section of the IOM.

Pressure Board Fail Warning

- **Definition:** One or more pressure sensors may have failed.
- **Possible Solutions:** Check the supply pressure to ensure it is between 1.3 and 10.3 bar (19 and 150 PSI). Check the pressure sensor board connections. Recalibrate the pressure sensors. If the problem persists,

replace the pressure sensor board.

Friction Calibration Flags



Friction Calibration Required

- **Definition:** No friction calibration has been performed since the last factory reset. The friction calibration determines a preliminary friction value, spring forces and direction and other information used for proper diagnostics. If no friction calibration is performed, the positioner will soon determine the operating friction, but other diagnostic information will be missing.
- **Possible Solutions:** Perform a Friction Calibration using the display menu, handheld, or Sensor Calibration page of the DTM. See the Calibration section of the IOM for warnings.

Calibration in Progress Flags

Stroke Calibration in Progress

- **Definition:** A stroke calibration sequence is in progress.
- **Possible Solutions:** The calibration can be canceled from the Sensor Calibration page of the DTM, from the handheld, or by briefly pressing the Abort button.

Setting ILO

- **Definition:** This is an automatic step in the calibration process that is done with the valve at 50% position. This must be completed for proper calibration.
- **Possible Solutions:** The calibration can be canceled from the Sensor Calibration page of the DTM, from the handheld, or by briefly pressing the Abort button.

Friction Calibration in Progress

- **Definition:** A friction and diagnostic calibration sequence is in progress.
- **Possible Solutions:** The calibration can be canceled from the Sensor Calibration page of the DTM, from the handheld, or by briefly pressing the Abort button.

Pressure Calibration in Progress

- **Definition:** A pressure calibration sequence is in progress.
- **Possible Solutions:** The calibration can be canceled from the Sensor Calibration page of the DTM, from the handheld, or by briefly pressing the Abort button.

Command In Calibration in Progress

- **Definition:** The command input calibration sequence is in progress.
- **Possible Solutions:** The calibration can be canceled from the Sensor Calibration page of the DTM, from the handheld, or by briefly pressing



the Abort button

A/O Calibration in Progress

- **Definition:** The analog output calibration sequence is in progress.
- **Possible Solutions:** The calibration can be canceled from the Sensor Calibration page of the DTM, from the handheld, or by briefly pressing the Abort button

Jog Calibration in Progress

- **Definition:** During a jog calibration, the unit is waiting for the user to manually adjust the valve position to the desired 100% open position.
- **Possible Solutions:** Use the Up and Down buttons on the positioner to adjust the valve to the desired fully open position. The QUICK-CAL/ACCEPT button to accept.



Configuration

Configuration pages provide easy ways to configure the positioner. This selection automatically redirects to the *Configuration Management* page.

Configuration Management

The *Configuration Management* page provides for back-up and restore support for positioners that have a customized configuration. If there has been no custom set-up, then the local DIP switch settings will provide all of the configuration data necessary for a replacement unit. If a configuration is applied to a different positioner than the one it was retrieved from, it is highly recommended that a quick calibration be performed after to ensure proper operation.

Active Indicator: System Nominal
Command Source: Analog

Positioner Configuration Management

Retrieve configuration from the positioner and load into memory. Save configuration stored into memory to a disk. Load into memory a configuration that has been stored to a disk. Apply the configuration that has been loaded into memory to the positioner.

Apply/Retrieval Progress:Abort

Variable #	Description	Value	
1	Command Input, Analog Loop Current, mA	10.7	▲
2	Command Input, Analog Loop Current, %	41.6	▼
3	Command Input, Digital Control	41.6	
4	Command Input, Internal Control - Device Out Of Service	18.8	
6	Command Input, Currently Selected Command	41.6	
7	Command Input, Actual Target, %	41.6	
8	Setup, Control Enable/Configuration	112	
10	Control, Valve Stem Position	41.6	
11	Control, Absolute Value of Deviation	0.1	
12	Control, Deviation	-0.1	
13	Control, N Value for Best of N Command Filter	1	
14	Calibration, Command Configuration	0	
15	Control, Pressure Control Sum	0	▼

Apply
Retrieve
Load
Save
Print Report
Print Parameters

Status Area

The *Active Indicator* area shows the status of the most relevant active indicator. The color of the "LED light" corresponds to the Active Indicator and the first color of the blink code sequence on the positioner. Generally green indicates no immediate issues. Yellow indicates a developing issue. Red indicates the ability to control may be compromised. A detailed list of the indicators is given in the [Alarm Configuration - Alarm Annunciator](#) page. The *Command Source* field indicates whether the positioner is being controlled by digital or an analog (4-20 mA) command source.

Active Indicator: System Nominal
Command Source: Analog

Apply/Retrieval Progress



The *Apply/Retrieval Progress* bar shows actual progress. The *Abort* button will abort the current *Apply/Retrieval*.



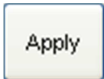
Variable Table

The Variable # is for reference when working with Flowserve technical support. The variables here can be edited using the *Edit Variables* page of the DTM. To open the *Edit Variables* page, go to the *DTM License Management* page and type "tech" into the *Feature Code* field. The *Edit Variables* page will appear at the bottom of the menu tree.

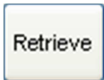
CAUTION: Use caution and guidance from Flowserve technical support when using the *Edit Variables* page. Changing some variables may cause valve movement.

Action Buttons

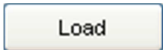
Click the *Apply* button to load the parameters to the positioner.



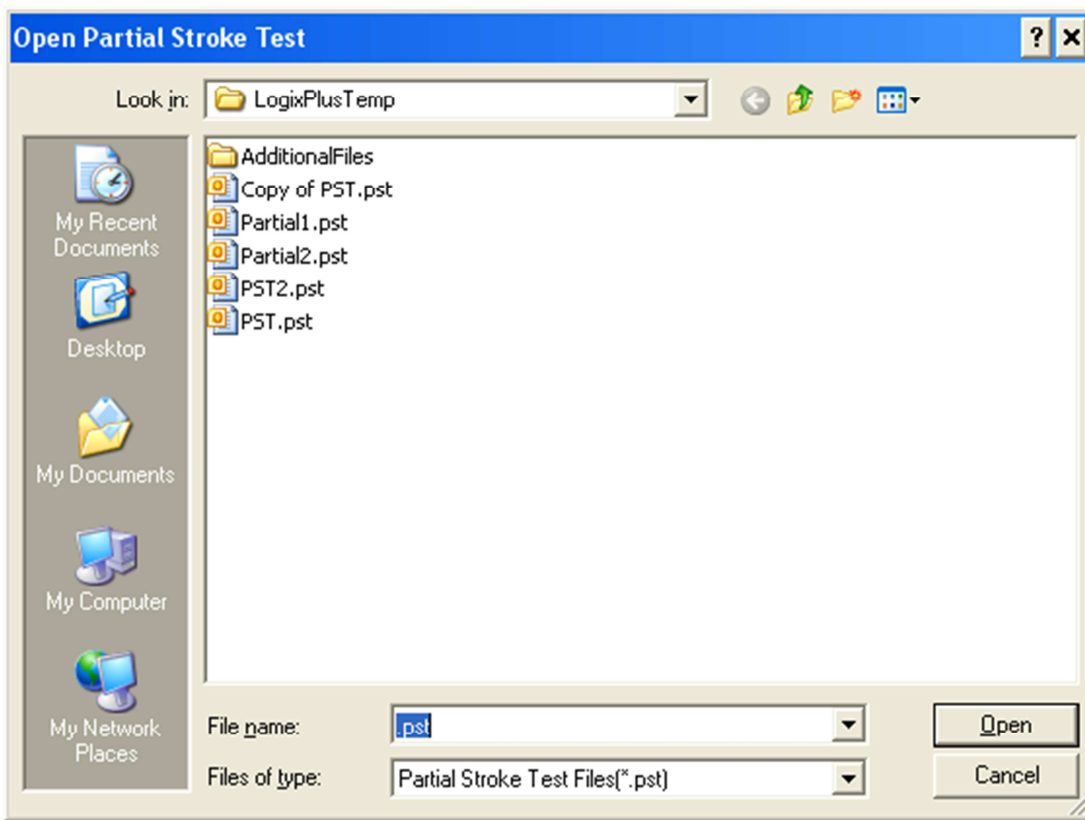
Click the *Retrieve* button to load the parameters from the positioner.



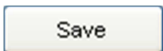
The *Load* button will load a test from file.



If your *Frame* setting allows private dialogs, the "Load" button will be enabled and it will display an open dialog to select the desired (*.cfg) Configuration file to load. Select a file and click open to load a previous stored Configuration for viewing.

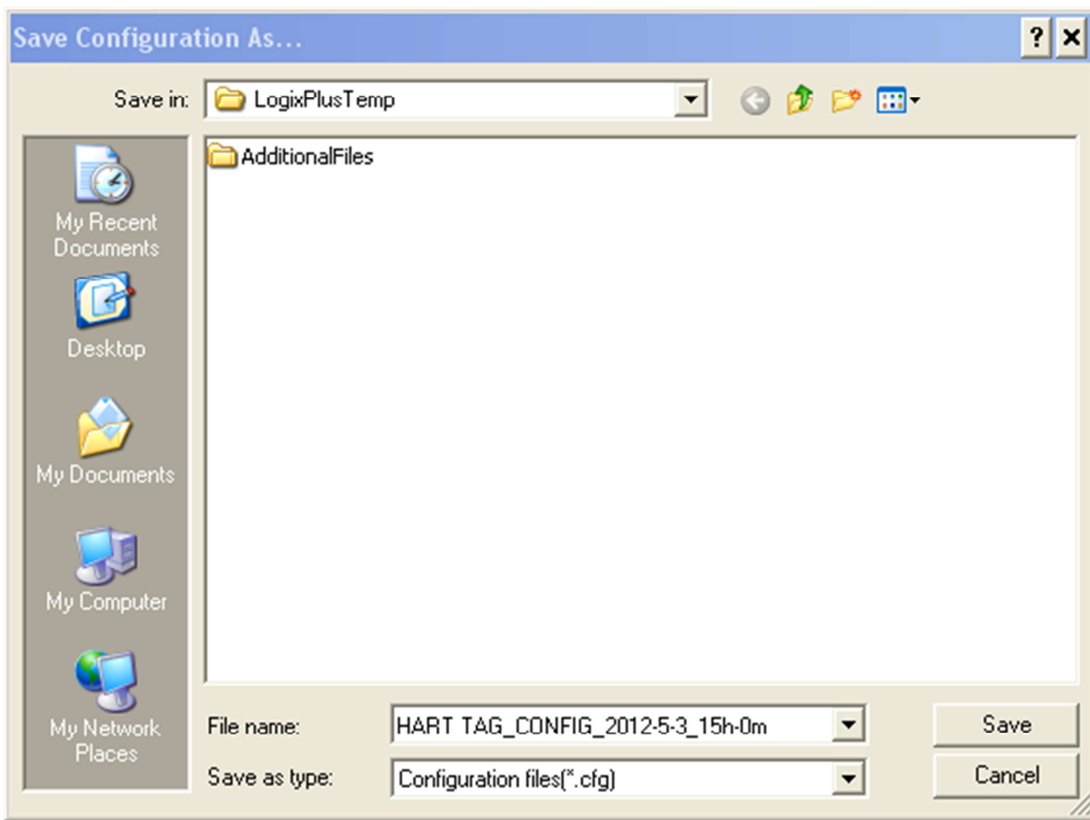


The Save button will save the existing test to a file.



If your Frame setting allows private dialogs, the "Save" button will be enabled and it will display a Save dialog to save the current Configuration to a file. The "Save" dialog will display a default name including the following:

- Device Tag ID_
- Configuration_
- Year
- Month
- Day
- Time



The *Print Report* button sends the report to the default printer.



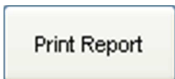
NOTE: It is possible to print the report to save to a **PDF** file. Instructions:

1. Download and install the free version of PDFCreator.
2. Install the PDFCreator
3. Set PDFCreator as the default Printer
4. Click Print Report and save the report to a pdf file in your computer.

The description is

At the bottom of the screen, are buttons to move "*Back*" up the menu, "*Apply*" the entire positioner configuration to the device, "*Retrieve*" the positioner configuration from the device, "*Load*" a previously stored configuration for viewing, "*Save*" a copy of the current configuration, and "*Print Report*" a positioner configuration.

The *Print Report* button will print the configuration report to the default printer.





NOTE: It is possible to print the report to save to a **PDF** file. Instructions:

1. Download and install the free version of PDFCreator.
2. Install the PDFCreator
3. Set PDFCreator as the default Printer



4. Click Print Report and save the report to a pdf file in your computer.

Valve Configuration Report

Logix MD+ DEVICE TAG ID: HART TAG DEVICE VERSION: MD+ Pro Diagnostics

ACTUATOR INFO --> Size: 25, Manufacturer: Valtek (Piston), Type: Linear (piston), Spring Type: Single

VALVE BODY INFO --> Model: Mark One, Body Size: .25 INCH / DN 6, Flow Direction: Flow Over, Fail Position: Mechanical Fail Closed

Valve Body

Tag:	HART TAG
Serial Number:	
Manufacturer:	Valtek
Model:	Mark One
Body Size:	.25 INCH / DN 6
Body Material:	Alloy 20
End Connections:	Sep. Flange
Flow Direction:	Flow Over
Pressure Class:	CL 150
Leak Class:	Class I

Valve Trim

Number/Size:	0.10 - 0.12 in (2.5 - 3.0 mm)
Characteristic:	Equal %
Spring Type:	Cam Control
Material:	Stainless Steel
Stroke Length:	1
Stroke Units:	%
Stem Diameter:	0
Packing Style:	Single Packing PTFE

Actuator * Correct selection critical to diagnostic functions.

Air Action:	ATO
* Manufacturer:	Valtek (Piston)
* Model:	25
* Size:	23.8 in ²
Spring Type:	Single
Style:	Linear (piston)
Fail Position:	Closed
* Actuator Action:	Double
Pilot Relay:	Spool
Pressure Units:	psi

5/3/2012 3:01:44 PM
Page 1/2



Positioner

Positioner Model:	Logix MD+
Upgrade Status:	MD+ Pro Diagnostics
Local Interface:	Enabled
Signal at Closed:	4 mA
Characterization:	Linear
Characterization Setting:	Custom
Auto Tune:	On
Valve Stability:	Low Friction
Continuous Stroke Test	Disabled
Quick Calibration:	Auto
Embedded Code Version:	1.04i
Gain Switch Setting:	E
Inner Loop Offset:	47.4
Pressure Sensor Board:	Press. Board Present
Card Slot 1	Not Available
Card Slot 2	Multi-function Card:Analog Output (AO)
Pressure Control:	Disabled
Feedback Pot Rotation:	Clockwise

Positioner Gains

	Opening	Closing
Stroke Times from Calibration	0	0 sec.
P-Gain	180	75
I-Gain	360	150
D-Gain	7	3
Stroke Rate Limits	0.6	0.3 sec / 100% travel

HART® Information

Device Type:	Logix MD+
Message:	HART MESSQGE
Descriptor:	HART DESCRIPTOR
HART® Date:	1912-03-12

The *Print Parameters* button will print a list of all parameters to the default printer. It is a



long report (about 10 pages).

Print Parameters



Valve Parameter Report

Logix MD+ DEVICE TAG ID: HART TAG DEVICE VERSION:MD+ Pro Diagnostics
 ACTUATOR INFO -> Size: 25, Manufacturer: Valtek (Piston), Type: Linear (piston), Spring Type: Single
 VALVE BODY INFO -> Model: Mark One, Body Size: .25 INCH / DN 6, FlowDirection: FlowOver, Fail Position: Mechanical Fail Closed

Variable #	Value	Description
1	12	4-20 Command (mA)
2	50.2	4-20 Command (%)
3	47.4	Calibration, Inner Loop Offset
4	0	Command Input, Internal Control - Device Out Of Service
6	0	Command Input, Currently Selected Command
7	0	Command Input, Actual Target, %
8	113	Setup, Control Enable/Configuration
10	-0.2	Control, Valve Stem Position
11	0.2	Control, Absolute Value of Deviation
12	0.2	Control, Deviation
13	1	Control, N Value for Best of N Command Filter
14	0	Calibration, Command Configuration
15	0	Control, Pressure Control Sum
16	0	Control, Integral Sum
17	47.4	Calibration, Inner Loop Offset
18	0	Control, Pilot Command
20	71.2	Status, Supply Pressure in Psi
21	67.3	Status, Differential Pressure in P si
22	3.8	Status, Port A Pressure in Psi
23	70.7	Status, Port B Pressure in Psi
24	1.8	Control, Instantaneous Proportional Gain
25	180	Setup, Proportional Gain Open
26	75	Setup, Proportional Gain Close
27	16	Setup, Proportional Gain Multiplier Open
28	3	Setup, Proportional Gain Multiplier Close
29	360	Setup, Integral Gain Open
30	150	Setup, Integral Gain Close
31	0	Control, Instantaneous Derivative Gain
32	1	Setup, Derivative Depth Open
33	1	Setup, Derivative Depth Close
34	7	Setup, Derivative Gain Open
35	3	Setup, Derivative Gain Close
37	1	Setup, Pressure Control Multiplier
38	0	Status, The Target Pressure for Pressure Control



539	153	Status, Multi-Function Card 2 ADC Counts
540	0	Status, Multi-Function Card 1 Output mA
541	4	Status, Multi-Function Card 2 Output mA
542	0	Status, Multi-Function Card 1 Input mA
543	4	Status, Multi-Function Card 2 Input mA
544	Not triggered	Status, Multi-Function Card 1 DO State
545	Not triggered	Status, Multi-Function Card 2 DO State
546	Triggered	Status, Multi-Function Card 1 DI State
547	Triggered	Status, Multi-Function Card 2 DI State
548	535	Calibration, Multi-Function Card 1 4mA Output DAC Count
549	535	Calibration, Multi-Function Card 2 4mA Output DAC Count
550	3345	Calibration, Multi-Function Card 1 20m A Output DAC Count
551	3345	Calibration, Multi-Function Card 2 20m A Output DAC Count
552	535	Calibration, Multi-Function Card 1 0% Output DAC Count
553	535	Calibration, Multi-Function Card 2 0% Output DAC Count
554	3345	Calibration, Multi-Function Card 1 100% Output DAC Count
555	3345	Calibration, Multi-Function Card 2 100% Output DAC Count
558	No action	Setup, Multi-Function Card 1 DI Trigger Config
559	Trigger Command Override	Setup, Multi-Function Card 2 DI Trigger Config
560	0	Setup, Multi-Function Card 1 DI Command
561	0	Setup, Multi-Function Card 2 DI Command
582	4-20 Command (%)	Setup, Device Variable Slot 1
583	Control Signal (%)	Setup, Device Variable Slot 2
584	Supply Pressure	Setup, Device Variable Slot 3
585	Position (%)	Setup, Device Variable Slot 4

DTM License Management

The *DTM License Management* page allows you to license the DTM with advanced features. It also allow you to change the language.

ValveSight DTM License Management

A license to access the advanced features of the DTM can be managed on this page. You may choose to purchase a DTM license code or a dongle. Both provide advanced DTM features. If you choose to purchase a code, forward your Machine ID to your Flowserve representative at the phone number, fax, or e-mail below. Enter the code below and select Activate Code. If you purchase a dongle, plug the dongle into a USB port, then start the DTM. The dongle is transferable to any computer. Phone: (801) 489-2300 Fax: (801) 489-2299 E-mail: digitalproductstac@flowserve.com

Machine ID: Upgrade Code:

ACTIVATION

New Code:

Upgrade Status:

Progress:

FEATURES

Feature code:

Information

The *Machine ID* identifies the host computer.

The *Upgrade Code* is the code currently applied to you positioner.

Activation

To license the advance ValveSight™ DTM, contact your Flowserve representative. During the purchase of the license, you will be asked to provide the *Machine ID*. After the purchase, you will be provided with a *New Code* which should be entered into its respective field found in the *Activation* area. Click Activate Code to apply the Advanced ValveSight™ DTM license.

ACTIVATION

New Code:

Upgrade Status:

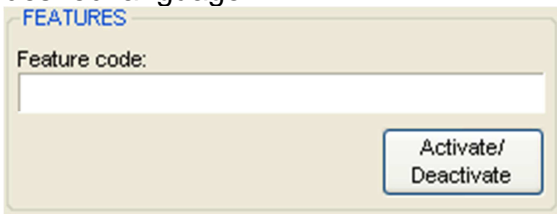
Progress:

NOTE: The ValveSight™ DTM can also be upgraded or managed through a dongle. The

Dongle can be purchased with a ValveSight™ DTM license and it will automatic license any computer where the dongle is directly attached to the USB port.

Features

The *Feature Code* allows you to activate or deactivate special DTM functionality. Enter the desired code and click the *Activate/Deactivate* button. If the feature is not activated, the code allows you to activate it. To deactivate the feature enter the same code and click the *Activate/Deactivate* button. For languages, deactivate is not used. Simply select the desired language.



Feature	Feature Code	Description
Technical DTM Pages	tech	Shows additional DTM pages. These are typically not used except by trained technical support personnel. Tech Annunciator - A page displaying low level alarms. Tech Sensors - A page displaying complete sensor data. Edit Variables - A page allowing editing of many of the variables from the Configuration Management page.
Private Dialogs	166A	This code allows you to override a frame setting that disallows the DTM to display certain types of dialogs. These dialogs, termed Private Dialogs, are what you interface generates to allow you to save/load files, print graphs, and other functions that would need a dialog to allow you to enter filenames and pick printers, etc. The ABB® frame, for instance, does not allow the use of Private Dialogs without you manually setting the DTM to allow their use.
German	1031	Change the DTM language to German.
English	1033	Change the DTM language to English.
French	1036	Change the DTM language to French.
Italian	1040	Change the DTM language to Italian.
Portuguese	1046	Change the DTM language to Portuguese.
Spanish	3082	Change the DTM language to Spanish.



Positioner Upgrade Management

The *Positioner Upgrade Management* page allows you to see and manage positioner Upgrades that are purchased. To upgrade a positioner, see the [Positioner Upgrade](#) page. When Upgrades are purchased, the *Upgrade Code* supplied by Flowserve is applied on this page. The Upgrades available for use are shown on this page. For more mobility, Upgrades may be purchased on a dongle that is transferable from computer to computer.

A positioner may be purchased at any upgrade level. For example:

A 520MD+ has Standard diagnostics with all features used for valve control.

A 521MD+ has Advanced diagnostics with the ability to detect pressures at port A, port B and the supply line.

A 522MD+ has Pro diagnostics with full diagnostic capabilities.

A positioner must be a Standard to upgrade to Advanced, and must be an Advanced to upgrade to a Pro.



ADD POSITIONER UPGRADES

Positioners may be upgraded, enhancing the diagnostic features. Upgrade levels provide increased functionality beginning at Standard, then Advanced and finally Pro. You may choose to purchase upgrades using a code, or a dongle. If you choose to purchase a code, forward all numbers on this page with the desired Advanced and Pro upgrades you wish to purchase to the phone number, fax, or e-mail below. Enter the code below and select Activate. If you choose to purchase a dongle, plug the dongle into a USB port, then start the DTM. The upgrade codes can be applied directly to the positioner. Once applied to a positioner, the upgrade is permanent. Phone: (801) 489-2300 Fax: (801) 489-2299 E-mail: digitalproductstac@flowserve.com

"ADVANCED" UPGRADES INFO	"PRO" UPGRADES INFO
Total Advanced Upgrades Purchased: <input type="text" value="7"/>	Total Pro Upgrades Purchased: <input type="text" value="9"/>
Advanced Upgrades already used: <input type="text" value="6"/>	Pro Upgrades already used: <input type="text" value="7"/>
Advanced Upgrades remaining: <input type="text" value="1"/>	Pro Upgrades remaining: <input type="text" value="2"/>
Additional Advanced Upgrades desired: <input type="text"/>	Additional Pro Upgrades desired: <input type="text"/>

Upgrade Code: Machine ID:

New Code:

Upgrade Status: Progress:

TRANSFER UPGRADES TO DONGLE

TRANSFER "ADVANCED" UPGRADES	TRANSFER "PRO" UPGRADES
Advanced Upgrades Available: <input type="text" value="1"/>	Pro Upgrades Available: <input type="text" value="2"/>
Dongle Upgrades: <input type="text"/>	Dongle Upgrades: <input type="text"/>
Advanced Upgrades to Transfer: <input type="text"/>	Pro Upgrades to Transfer: <input type="text"/>
Transfer Status: <input type="text"/>	Transfer Status: <input type="text"/>

Advanced/Pro Upgrades Info

Total Upgrades Purchased shows the number of Upgrades that have been purchased and applied to the host computer.

Upgrades Already Used shows the number of Upgrades from this computer that have either been applied to positioners or transferred from this computer to a dongle.

Upgrades Remaining shows the number of Upgrades available to use.



"ADVANCED" UPGRADES INFO	"PRO" UPGRADES INFO
Total Advanced Upgrades Purchased: <input type="text" value="7"/>	Total Pro Upgrades Purchased: <input type="text" value="9"/>
Advanced Upgrades already used: <input type="text" value="6"/>	Pro Upgrades already used: <input type="text" value="7"/>
Advanced Upgrades remaining: <input type="text" value="1"/>	Pro Upgrades remaining: <input type="text" value="2"/>
Additional Advanced Upgrades desired: <input type="text"/>	Additional Pro Upgrades desired: <input type="text"/>

Activate Code

The *Upgrade Code* is the code that manages Upgrades currently applied to you positioner. The *Machine ID* identifies the host computer.

Use the *New Code* to type or paste the code supplied by Flowserve.

Click *Activate Code* to apply the *New Code*.

Upgrade Status shows the status of the activation.

Progress shows the completion of the activation.

Upgrade Code: <input type="text" value="30525010690000000104785C00E21 3001090A012C0"/>	Machine ID: <input type="text" value="5C00E213"/>
New Code: <input type="text"/>	<input type="button" value="Activate Code"/>
Upgrade Status: <input type="text"/>	Progress: <input type="text"/>

TRANSFER UPGRADES TO DONGLE

The *Transfer Upgrades to Dongle* allows the transfer of purchased Advanced or Pro upgrades to a dongle. The upgrades in the dongle can be used in different computers to upgrade devices using the Logix MD+ ValveSight™ DTM. To transfer upgrades, type the desired number of upgrades to transfer in the *Upgrades To Transfer* field, and click transfer.



Upgrade Available shows the number of Upgrades available on the computer to transfer to the dongle.

Dongle Upgrades shows the number of Upgrades that are currently on the dongle.

Upgrades to Transfer is the number of Upgrades that will be transferred to the dongle.

Transfer Status is the progress towards completion.

Click the *Transfer* button to complete the transaction.



TRANSFER UPGRADES TO DONGLE

TRANSFER "ADVANCED" UPGRADES	TRANSFER "PRO" UPGRADES
Advanced Upgrades Available: <input type="text" value="1"/>	Pro Upgrades Available: <input type="text" value="2"/>
Dongle Upgrades: <input type="text"/>	Dongle Upgrades: <input type="text"/>
Advanced Upgrades to Transfer: <input type="text"/>	Pro Upgrades to Transfer: <input type="text"/>
Transfer Status: <input type="text"/>	Transfer Status: <input type="text"/>

NOTE: To use the upgrades in the dongle you must have the dongle attached to the computer's USB port. The transfer of upgrades is only from computer to dongle.

Positioner Upgrade

The *Positioner Upgrade* page allows you to upgrade positioners.

The screenshot shows the 'Positioner Upgrade' interface. At the top, it says 'Positioner Upgrade' and 'Upgrades Available'. Below this is a table with two rows and two columns. The first row is 'Upgrade From Dongle' with a radio button, showing 20 upgrades for 'Advanced' and 20 for 'Pro'. The second row is 'Upgrade From Computer' with a radio button, showing 0 for 'Advanced' and 2 for 'Pro'. Below the table is a progress bar with 15 green segments, labeled 'Standard', 'Advanced', and 'Pro'. The 'Upgrade Status' box shows 'Current diagnostic level: Advanced'. The 'Upgrade Progress' box is empty. An 'Upgrade' button is at the bottom right.

		Upgrades Available	
		Advanced	Pro
Upgrade From Dongle	<input type="radio"/>	20	20
Upgrade From Computer	<input type="radio"/>	0	2

Upgrade Status: Current diagnostic level: Advanced

Upgrade Progress:

Upgrade

Upgrades Available

Upgrade from Dongle shows how many Upgrades are available from the dongle. Select this to use an Upgrade from the dongle.

Upgrade from Computer shows how many Upgrades are available from the host computer. Select this to use Upgrades from the computer.

This is a close-up of the 'Upgrades Available' table from the previous screenshot.

		Upgrades Available	
		Advanced	Pro
Upgrade From Dongle	<input type="radio"/>	20	20
Upgrade From Computer	<input type="radio"/>	0	2

Upgrade Status

The *Upgrade Status* box displays the current diagnostic level of the positioner. This is also shown in the status bar.

When upgrades are available in the dongle or in the computer, click on the radio button to select where to upgrade the positioner from. Once the location of the upgrade selected, the Upgrade button will become available. Click the Upgrade button to complete the upgrade of the positioner.

Upgrade

Select the *Upgrade* button to upgrade the positioner to the next diagnostic level. The Upgrade Progress bar shows the process completion status.

For example, beginning with a Standard positioner, select the *Upgrade From Computer*



option. Now clicking the Upgrade button will apply Advanced diagnostics to the positioner and decrease the number of Advanced Upgrades from the computer by one. Clicking on the Upgrade button again will apply Pro diagnostics to the positioner and decrease the number of Pro Upgrades from the computer by one.

When the positioner already has Pro level diagnostics, no upgrades will be available and the upgrade button will remain subdued.

If more licenses are needed, go to the [Positioner Upgrade Management](#) page to purchase more upgrades.

Basic/Local Interface


The *Local Interface* page allows you to view and adjust the basic configuration of the positioner, adjust display settings and set the Tamper Lock PIN.

Active Indicator: System Nominal
Command Source: Analog


Tamper Lock

NOTE: In order to prevent unintentional adjustments of the configuration, tuning, or control of the valve, the Tamper Lock feature may be used. This is set in the DTM and disables the buttons and menus except for the ability to view the status of the positioner. When locked, the positioner may be temporarily unlocked by entering a PIN. (An LCD is required to enter the PIN.) Or, the positioner can be unlocked from the DTM.

4 Digit PIN #: 1234
 Tamper Lock Status:
 Off On



Positioner Gain



LCD Display Orientation

Reverse

Normal

Squawk Mode Status(LED)

Off On

Dip Switch Configuration

Active Switch Settings indicate how the positioner dip switches are configured in the software. Physical Switch Settings indicate how the dip switches are currently set on the positioner. **WARNING:** Active switch settings may be changed from this screen. Changing these settings may cause sudden stroke movement. Follow company procedures to assure the safety of personnel and processes.

Active Dip Switch Settings (Software)

Air Action:	ATO	<input type="checkbox"/>	ATC
Actuator Action:	Double	<input type="checkbox"/>	Single
Signal at Closed:	4 mA	<input type="checkbox"/>	20 mA
Characterization:	Linear	<input type="checkbox"/>	Custom
Auto Tune:	On	<input type="checkbox"/>	Off
Quick Calibration:	Auto	<input type="checkbox"/>	Jog
Valve Stability:	Lo Friction	<input type="checkbox"/>	High Friction
Spare:	A	<input type="checkbox"/>	B

Physical Dip Switch Settings (Positioner)

Air Action:	ATO	<input type="checkbox"/>	ATC
Actuator Action:	Double	<input type="checkbox"/>	Single
Signal at Closed:	4 mA	<input type="checkbox"/>	20 mA
Characterization:	Linear	<input type="checkbox"/>	Custom
Auto Tune:	On	<input type="checkbox"/>	Off
Quick Calibration:	Auto	<input type="checkbox"/>	Jog
Valve Stability:	Lo Friction	<input type="checkbox"/>	High Friction
Spare:	A	<input type="checkbox"/>	B

Apply
Retrieve

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232

Status Area

The *Active Indicator* area shows the status of the most relevant active indicator. The color of the "LED light" corresponds to the Active Indicator and the first color of the blink code sequence on the positioner. Generally green indicates no immediate issues. Yellow indicates a developing issue. Red indicates the ability to control may be compromised. A detailed list of the indicators is given in the [Alarm Congfiguraion - Alarm Annunicator](#) page. The *Command Source* field indicates weather the positioner is being controlled by digital or an analog (4-20 mA) command source.

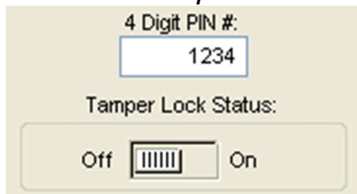


Tamper Lock

The *Local Interface* box contains an On/Off switch. In order to prevent unintentional adjustments of the configuration, tuning, or control of the valve, the Tamper Lock feature may be used. This is set in the DTM and disables the buttons and menus except for the ability to view the status of the positioner. When locked, the positioner may be temporarily unlocked by entering a PIN. (An LCD is required to enter the PIN.) Or, the positioner can be unlocked from the DTM.

In the *4 Digit PIN #* field, enter the PIN. The default PIN is 1234.

Click the *Tamper Lock Status* switch to activate or deactivate the tamper lock feature.



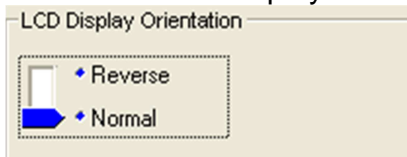
Positioner Gain

View the position of the Selectable Gain Switch. This may only be adjusted at the positioner. Use the Selectable GAIN Switch to adjust the gain at any time during operation. This adjustment takes effect immediately. For faster response select settings above "E" (F-J). For more stable response, select settings below "E" (B-D). To perform a Quick-Cal without affecting custom gain settings, select "A".



LCD Display Orientation

Allows the LCD display to change orientation. Right side up or Upside down.



Normal Orientation



Reverse Orientation - Though the positioner is mounted upside down, the display can still be read.



Squawk Mode

This switch Activates or Deactivates the Squawk mode of the positioner. Squawk Mode causes the LED lights to rapidly flash green-green-red-red, and the LCD to flash also.



Dip Switch Configuration

The *DIP Switch Configuration* area allows you to view and change the basic configuration of the positioner.

The *Active Dip Switch Settings (Software)* on the left side show the settings currently applied to the positioner. These settings are adjustable.

CAUTION: Adjusting the Air Action, Actuator Action, or Characterization switches will cause the valve to move.

The *Physical Dip Switch Settings (Positioner)* settings on the right side show the position of the DIP switches on the positioner.

During a Quick-Cal (initiated by holding down the Quick-Cal button for 3 seconds) the

software settings are reset to match the physical DIP switches. Therefore use caution when changing these settings from the DTM and change the physical DIP switches to match the desired configuration to avoid confusion. The settings are not reset to match the physical DIP switches when running calibrations from the DTM or a handheld device.

Active Dip Switch Settings (Software)			Physical Dip Switch Settings (Positioner)		
Air Action:	ATO <input type="checkbox"/>	ATC <input type="checkbox"/>	Air Action:	ATO <input type="checkbox"/>	ATC <input type="checkbox"/>
Actuator Action:	Double <input type="checkbox"/>	Single <input type="checkbox"/>	Actuator Action:	Double <input type="checkbox"/>	Single <input type="checkbox"/>
Signal at Closed:	4 mA <input type="checkbox"/>	20 mA <input type="checkbox"/>	Signal at Closed:	4 mA <input type="checkbox"/>	20 mA <input type="checkbox"/>
Characterization:	Linear <input type="checkbox"/>	Custom <input type="checkbox"/>	Characterization:	Linear <input type="checkbox"/>	Custom <input type="checkbox"/>
Auto Tune:	On <input type="checkbox"/>	Off <input type="checkbox"/>	Auto Tune:	On <input type="checkbox"/>	Off <input type="checkbox"/>
Quick Calibration:	Auto <input type="checkbox"/>	Jog <input type="checkbox"/>	Quick Calibration:	Auto <input type="checkbox"/>	Jog <input type="checkbox"/>
Valve Stability:	Lo Friction <input type="checkbox"/>	High Friction <input type="checkbox"/>	Valve Stability:	Lo Friction <input type="checkbox"/>	High Friction <input type="checkbox"/>
Spare:	A <input type="checkbox"/>	B <input type="checkbox"/>	Spare:	A <input type="checkbox"/>	B <input type="checkbox"/>

Air Action Switch

This must be set to match the configuration of the valve/actuator mechanical tubing connection since the tubing determines the air action of the system.

If Single Acting (Poppet) Relay

ATO - Increasing pressure from Port B (labeled “Y1”) causes the valve to open.

ATC - Increasing pressure from Port B (labeled “Y1”) causes the valve to close.

If Double Acting (Spool) Relay

ATO - Increasing pressure from Port A (labeled “Y1”) causes the valve to open.

ATC - Increasing pressure from Port A (labeled “Y1”) causes the valve to close.

Actuator Action Switch

This must be set to match the configuration of the actuator and is used in some diagnostics.

Double - Select Double when both sides of the actuator are pressurized.

Single - Select Single when only one side of the actuator is pressurized.

Signal at Closed Switch

Normally this will be set to 4 mA for an Air-To-Open actuator configuration, and 20 mA for Air-To-Close.

4 mA - Selecting 4 mA will make the valve close when the signal is low (4 mA) and open when the signal is high (20 mA).

20 mA - Selecting 20 mA will make the valve close when the signal is high (20 mA) and open when the signal is low (4 mA).

NOTE: When using an Analog Output (AO) function of the Multi-Function Card, the AO signal corresponds with the Signal At Closed selection. If the valve closes with a 4 mA signal, the AO will show a 4 mA signal at closed. If the valve closes with a 20 mA signal, the AO will show a 20 mA signal at closed.

Characterization Switch

This allows a better match between the input command and the actual fluid flow through the valve. This feature is typically used with valves that have non-linear flow characteristics.

The positioner makes a correction by applying an adjustment to the input command according to a characterization curve.

Linear - Select Linear if the actuator position should be directly proportional to the command input signal. (For most rotary valves, this setting gives an =% Cv characteristic due to their inherent =% characteristics.)

Other - Select Other if one of the pre-set characterization curves or a custom curve is desired. The default will be the Custom curve which is populated with a standard 30:1 equal percent rangeability curve which generally opens less than the input command. To select one of the other curve options, see the [Stroke Characterization](#) page of the DTM.

Auto Tune Switch

Changing this from the DTM will have no effect.

This switch controls whether the positioner will automatically tune itself during the stroke calibration (Quick-Cal), or use preset tuning parameters.

On - Selecting On enables an auto tune feature that will automatically determine the positioner gain settings. The automatic tuning will be based on response parameters measured during the latest Quick-Cal. The valve response is a combination of these response parameters and the current position of the Selectable GAIN Switch.

Off - Selecting Off forces the positioner to use one of the factory preset tuning sets determined by the Selectable GAIN Switch. Settings “B” through “J” are progressively higher predefined tuning sets.

Selecting “A” on the Selectable Gain Switch during a Quick-Cal allows you to use and preserve manually adjusted gains.

Quick Calibration Switch

Changing this from the DTM will have no effect.

This switch selects between Auto and Jog calibration modes.

Auto - Use the Auto setting if the fully opened position of the valve has a mechanical stop. This is typical for most valves. In Auto mode during a stroke calibration (Quick-Cal), the positioner will fully close the valve and register the 0% position, then fully open the valve to register the 100% position.

Jog - Use the Jog setting if the fully opened position of the valve has no hard stop, but needs to be set manually. In Jog mode during a stroke calibration (Quick-Cal), the positioner will fully close the valve and register the 0% position, then wait for you to move the valve to the 100% open position using the ▲Up and ▼Down buttons. Press the ►ACCEPT/QUICK-CAL button to accept the 100% location.

Valve Stability Switch

This switch adjusts the position control algorithm of the positioner for use with low-friction control valves or high-friction automated valves.

Lo Friction - Placing the switch to Lo Friction optimizes the response for low friction, high performance control valves. This setting provides for optimum response times when used with most low friction control valves.

Hi Friction - Placing the switch to the right optimizes the response for valves and actuators with high friction levels. This setting slightly slows the response and will normally stop limit cycling that can occur on high friction valves. See section 10.3.7 Configuration (Pressure



Control) for more details.

Spare Switch
Not used.

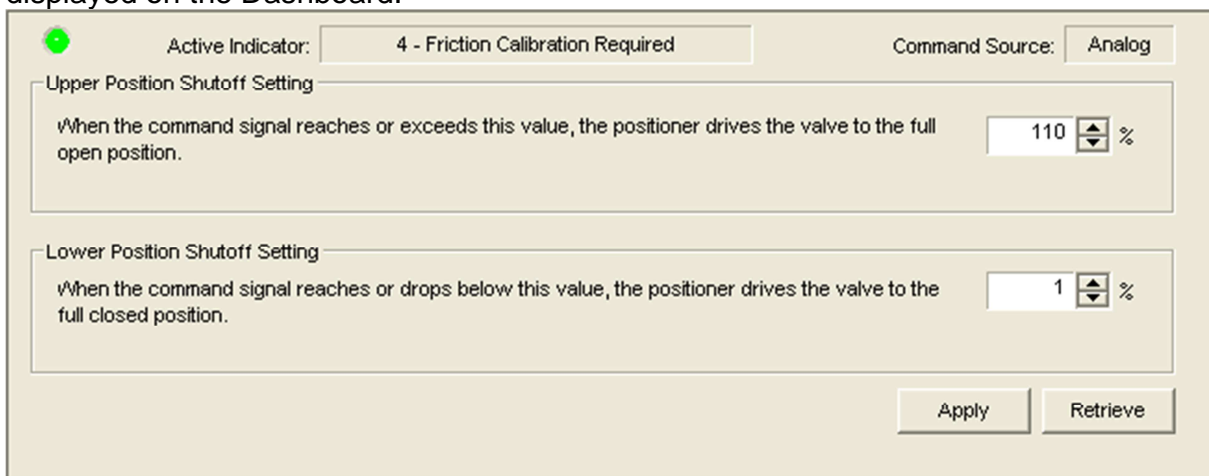


Control

Control pages provide ways adjust the control of the valve beyond what can be done with the 4-20 mA signal. This selection automatically redirects to the *Position Shutoff* page.

Position Shutoff

The *Position Shutoff* page allows you to change the position shutoff limits. Tight Shutoff (also called Minimum Position Cutoff or MPC) mode is used to ensure a fully open or fully closed position. Under normal operation, the positioner is balancing the pressure in the actuator to maintain the position of the valve. When the commanded position moves past a position shutoff limit, the positioner will engage all available force to move the valve to a fully closed or open position. One side of the actuator will be saturated with full supply pressure while the other side will be left with no pressure. The status of this mode is displayed on the Dashboard.



Active Indicator: 4 - Friction Calibration Required Command Source: Analog

Upper Position Shutoff Setting
 When the command signal reaches or exceeds this value, the positioner drives the valve to the full open position. 110 %

Lower Position Shutoff Setting
 When the command signal reaches or drops below this value, the positioner drives the valve to the full closed position. 1 %

Apply Retrieve

Status Area

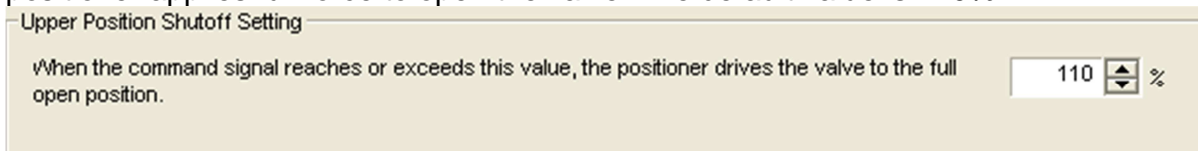
The *Active Indicator* area shows the status of the most relevant active indicator. The color of the "LED light" corresponds to the Active Indicator and the first color of the blink code sequence on the positioner. Generally green indicates no immediate issues. Yellow indicates a developing issue. Red indicates the ability to control may be compromised. A detailed list of the indicators is given in the [Alarm Congfiguraion - Alarm Annunicator](#) page. The *Command Source* field indicates weather the positioner is being controlled by digital or an analog (4-20 mA) command source.



Active Indicator: System Nominal Command Source: Analog

Upper Position Shutoff Setting

The "Upper Position Shutoff Setting" box shows the input command signal above which the positioner applies full force to open the valve. The default value is 110%.



Upper Position Shutoff Setting
 When the command signal reaches or exceeds this value, the positioner drives the valve to the full open position. 110 %

Lower Position Shutoff Setting

The "Lower Position Shutoff Setting" box shows the input command signal below which the positioner applies full force to close the valve. The default value is 1%



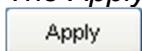
Lower Position Shutoff Setting

When the command signal reaches or drops below this value, the positioner drives the valve to the full closed position.

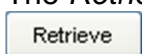
1 %

Action Buttons

The *Apply* button will save changes to the connected device.



The *Retrieve* button will retrieve the latest information from the device.



Soft Limits

The *Soft Limits* are software controlled travel stops for the valve assembly. This feature is used to simulate physical blocks on the valve that restrict movement past a set point. Once the *Soft Limit* is set, the positioner will not attempt to move the valve position (final command) beyond the set point, regardless of the analog or digital command input signal. Since they are software controlled, soft limits are not held in the memory on loss of signal or air because the software is not able to control the valve in these situations. If soft limits are active, they show as grey areas at either end of travel on the main dashboard view.

Active Indicator: 4 - Friction Calibration Required Command Source: Analog

Soft Limit Settings

Low Setpoint: -10% High Setpoint: 110%

The maximum and minimum travel range in percent is identified by a high and low limit setpoint. Travel is restricted to within the range of these two limits. See Soft Limit illustration.

[Position Alerts...](#) Apply Retrieve

Illustration of Soft Limits

Command Time 110%

Allowed Travel Range

Position

High Soft Limit Setpoint

Low Soft Limit Setpoint

-10%

Status Area

The *Active Indicator* area shows the status of the most relevant active indicator. The color of the "LED light" corresponds to the Active Indicator and the first color of the blink code sequence on the positioner. Generally green indicates no immediate issues. Yellow indicates a developing issue. Red indicates the ability to control may be compromised. A detailed list of the indicators is given in the [Alarm Configuration - Alarm Annunciator](#) page. The *Command Source* field indicates whether the positioner is being controlled by digital or an analog (4-20 mA) command source.

Active Indicator: System Nominal Command Source: Analog

Soft Limit Settings

The *Low Setpoint* field is the value of the input command signal below which the positioner will drive the valve to a fully closed position using the available supply pressure. The default



setting for this feature is 1%, meaning that any signal below 1% will drive the valve to a fully saturated condition to achieve the best shutoff possible.

The *High Setpoint* is the value of the input command signal above which the positioner will stop following the command signal. Normally this limit is set to 110% so it is not activated. The only reason that a valve is normally saturated open is for a 3-way valve that must seat at both ends of travel. The illustration at the bottom of the page is a graphical representation showing how the soft limits work.

Click the *Position Alert* link to see a histogram of typical valve position.

Soft Limit Settings

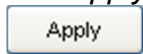
Low Setpoint: % High Setpoint: %

The maximum and minimum travel range in percent is identified by a high and low limit setpoint. Travel is restricted to within the range of these two limits. See Soft Limit illustration.

[Position Alerts...](#)

Action Buttons

The *Apply* button will save changes to the connected device.



The *Retrieve* button will retrieve the latest information from the device.



Positioner Gain

The *Position Gain* page allows you to change the maximum travel rates and the gains of the positioner.

CAUTION: Changing the tuning parameters can affect how the valve controls and may cause sudden valve movement. Notify proper personnel that the valve may stroke, and make sure the valve is properly isolated before proceeding.

● Active Indicator: System Nominal
Command Source: Analog

Stroke Rate Limits

These settings slow the maximum rate of travel. Enter 0 for fastest response.

Maximum rate of travel in the OPENING direction.	Maximum rate of travel in the CLOSING direction.
<input style="width: 80%;" type="text" value="0"/> ▲▼ sec / 100% travel	<input style="width: 80%;" type="text" value="0"/> ▲▼ sec / 100% travel

Positioner Gains

The gains are set automatically during quick calibration, and typically do not require modification. Changing these values will affect valve responsiveness.

<p>Opening</p> <p>P-Gain <input style="width: 80%;" type="text" value="168"/> ▲▼</p> <p>I-Gain <input style="width: 80%;" type="text" value="336"/> ▲▼</p> <p>D-Gain <input style="width: 80%;" type="text" value="7"/> ▲▼</p>	<p>Closing</p> <p>P-Gain <input style="width: 80%;" type="text" value="93"/> ▲▼</p> <p>I-Gain <input style="width: 80%;" type="text" value="186"/> ▲▼</p> <p>D-Gain <input style="width: 80%;" type="text" value="3"/> ▲▼</p>	<p>Positioner Gain</p>
--	---	-------------------------------

Stroke Times from Calibration

The stroke times are set automatically during quick calibration, and typically do not require modification. Changing these values will affect valve responsiveness by causing a recalculation of the P, I, and D gains.

Open: <input style="width: 80%;" type="text" value="0.6"/> sec	Close: <input style="width: 80%;" type="text" value="0.3"/> sec
--	---

Apply
Retrieve

Status Area

The *Active Indicator* area shows the status of the most relevant active indicator. The color of the "LED light" corresponds to the Active Indicator and the first color of the blink code sequence on the positioner. Generally green indicates no immediate issues. Yellow indicates a developing issue. Red indicates the ability to control may be compromised. A detailed list of the indicators is given in the [Alarm Configuration - Alarm Annunciator](#) page. The *Command Source* field indicates whether the positioner is being controlled by digital or an analog (4-20 mA) command source.

Active Indicator: Command Source:

Stroke Rate Limits

The *Stroke Rate Limits* area displays the maximum rate of travel in the opening and closing directions. Limiting the rate of travel can be helpful to prevent surging process flow.

Stroke Rate Limits

These settings slow the maximum rate of travel. Enter 0 for fastest response.

Maximum rate of travel in the OPENING direction.	Maximum rate of travel in the CLOSING direction.
<input type="text" value="0"/> <input type="button" value="▲"/> <input type="button" value="▼"/> sec / 100% travel	<input type="text" value="0"/> <input type="button" value="▲"/> <input type="button" value="▼"/> sec / 100% travel

Positioner Gains

Positioner gains are set atomically during the Quick-Cal process and typically do not require modification. Change these values will affect responsiveness. Opening values will affect the responsiveness in the opening direction. Closing values will affect the responsiveness in the closing direction. Positioner Gain is the easiest way to adjust the responsiveness. This may only be adjusted at the positioner. Use the Selectable GAIN Switch to adjust the gain at any time during operation. This adjustment takes effect immediately. For faster response select settings above "E" (F-J). For more stable response, select settings below "E" (B-D). To perform a Quick-Cal without affecting custom gain settings, select "A".

Positioner Gains

The gains are set automatically during quick calibration, and typically do not require modification. Changing these values will affect valve responsiveness.

<p>Opening</p> <p>P-Gain <input type="text" value="168"/> <input type="button" value="▲"/> <input type="button" value="▼"/></p> <p>I-Gain <input type="text" value="336"/> <input type="button" value="▲"/> <input type="button" value="▼"/></p> <p>D-Gain <input type="text" value="7"/> <input type="button" value="▲"/> <input type="button" value="▼"/></p>	<p>Closing</p> <p>P-Gain <input type="text" value="93"/> <input type="button" value="▲"/> <input type="button" value="▼"/></p> <p>I-Gain <input type="text" value="186"/> <input type="button" value="▲"/> <input type="button" value="▼"/></p> <p>D-Gain <input type="text" value="3"/> <input type="button" value="▲"/> <input type="button" value="▼"/></p>	<p>Positioner Gain</p>
--	---	-------------------------------

Stroke Time from Calibration

The *Stroke Time from Calibration* area displays the stroke time in seconds measured during quick calibration.

Stroke Times from Calibration

The stroke times are set automatically during quick calibration, and typically do not require modification. Changing these values will affect valve responsiveness by causing a recalculation of the P, I, and D gains.

Open: <input type="text" value="0.6"/> sec	Close: <input type="text" value="0.3"/> sec
--	---



Action Buttons

The *Apply* button will save changes to the connected device.

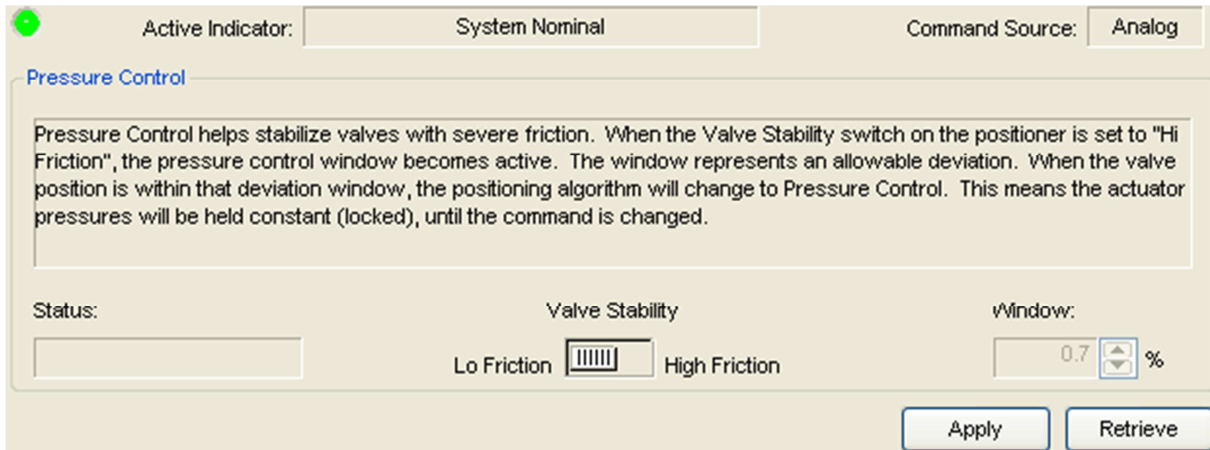


The *Retrieve* button will retrieve the latest information from the device.



Pressure Control

The *Pressure Control* feature helps stabilize valves with severe friction. When the Valve Stability switch on the positioner is set to “Hi Friction”, the pressure control page becomes active. The window represents an allowable deviation. When the valve position is within that deviation window, the positioning algorithm will change to Pressure control. This means the actuator pressures will be held constant (locked), until the command is changed.



Status Area

The *Active Indicator* area shows the status of the most relevant active indicator. The color of the "LED light" corresponds to the Active Indicator and the first color of the blink code sequence on the positioner. Generally green indicates no immediate issues. Yellow indicates a developing issue. Red indicates the ability to control may be compromised. A detailed list of the indicators is given in the [Alarm Configuration - Alarm Annunicator](#) page. The *Command Source* field indicates weather the positioner is being controlled by digital or an analog (4-20 mA) command source.



Pressure Control

The *Status* field displays the current status of the pressure control function. *Pressure Control Locked* indicates the pressures are being held constant. *Pressure Control Inactive* indicates the positioner is attempting to move the valve closer to the setpoint.

The Valve Stability field will displays the which control method is being used. *High Friction* will attempt to move the valve until the deviation is less than the value listed in the *Window* field. Once there, the positioner will hold the valve steady by controlling the pressures in the actuator. *Friction Low* will behave the same, but does not use the *Window* value. Instead, it minimizes the window size based on how well the positioner is performing. Select *High Friction* only if the valve cannot be controlled by adjusting gains, reducing friction or any other means of stabilizing the valve.

NOTE: Valve Stability is also selected with one of the DIP switches located on the positioner. When performing a Quick-Cal, the Valve Stability function will be reset to match



the configuration shown on the DIP switch.

Action Buttons

The *Apply* button will save changes to the connected device.



The *Retrieve* button will retrieve the latest information from the device.





Stroke Characterization

The *Stroke Characterization* page enables you to change the relationship between the command input and the valve position. This relationship is shown by the characterization curve. The characterization curve changes the Input Command (4-20) into a corresponding Final Command. The actual valve position corresponds to the Final Command as shown on the Dashboard.

The curves may be selected on the Characterization page or by using the DIP switches on the positioner. To change the characterization curve on this screen, select the Override DIP Switches button, and then choose the desired curve from the Characterization Selection dropdown box. Press Apply and the changes will take effect immediately. The Retrieve button will display the curve presently used by the positioner.

To customize the custom curve, select the Customize link. This can be done before or after the Custom curve is applied.

When changing the characterization curve, consider disabling the local interface with the tamper lock feature on the [Local Interface](#) screen. Otherwise the changes you make will be discarded when another Quick-Cal is performed. The Quick-Cal always uses settings shown on the DIP switches on the positioner.

Active Indicator: System Nominal Command Source: Analog

WARNING
 Overriding the DIP switches on the Logix positioner may cause the valve to stroke suddenly. Continue only if you are certain the changes will not cause harm to personnel or processes.

NOTE
 If the "Dip Switches" on the Characterization Configuration displays "OTHER" the device will revert to the characterization type specified by the DIP switch settings at the next Quick-Cal procedure.

Dip Switch Differs From Software

Characterization Configuration

Characterization Selection: Linear [Customize...](#) Retrieval Progress: ████████████████████

Characterization Curve

Apply Retrieve

Status Area

The *Active Indicator* area shows the status of the most relevant active indicator. The color of the "LED light" corresponds to the Active Indicator and the first color of the blink code sequence on the positioner. Generally green indicates no immediate issues. Yellow indicates a developing issue. Red indicates the ability to control may be compromised. A detailed list of the indicators is given in the [Alarm Congfiguraion - Alarm Annunicator](#) page. The *Command Source* field indicates whether the positioner is being controlled by digital or an analog (4-20 mA) command source.

Active Indicator: System Nominal Command Source: Analog

DIP Switch Differs From Software

A DIP Switch on the positioner selects between the *Linear* curve and *Other* curves. This can be changed on this screen. If it is changed here, the DIP switch setting will no longer be accurate. This check box shows that the DIP switch on the positioner is indicating something different than the software is using. When a Quick-Cal is performed, it will always revert to the DIP switch settings.

Dip Switch Differs From Software

Characterization Configuration

From the *Characterization Selection* drop down menu, select the desired curve.

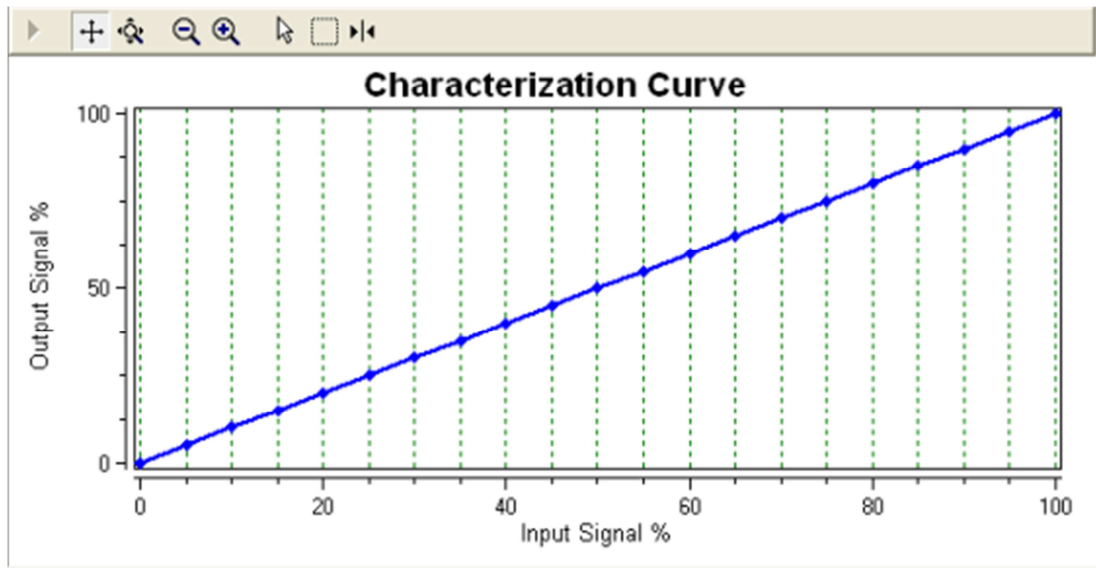
Use the *Customize* link to customize a curve.

The *Retrieval Progress* shows the status of retrieving the curve from the positioner.

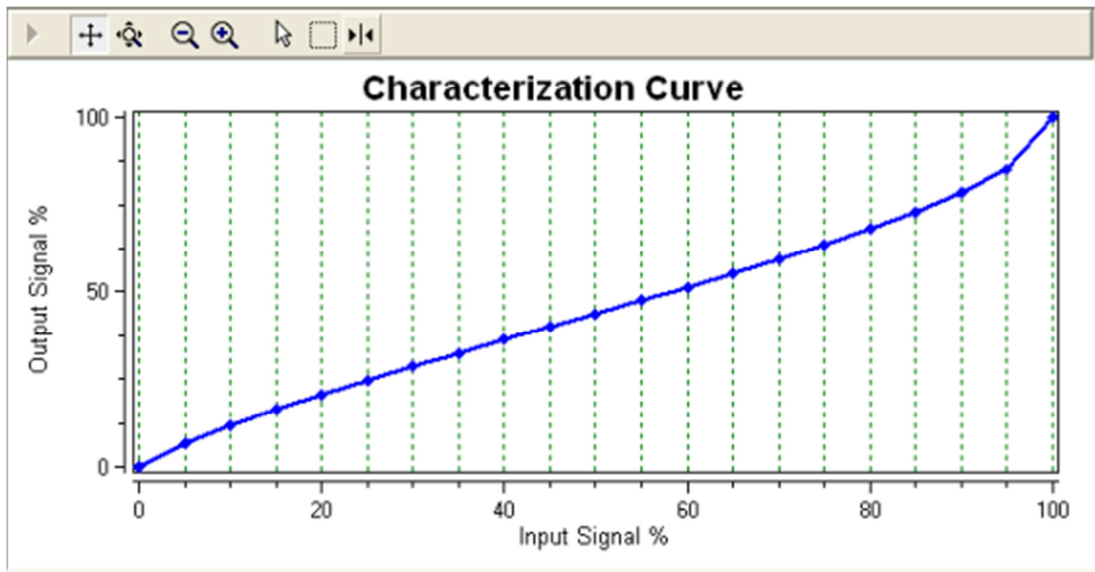
CAUTION: *Overriding the DIP switches on the Logix positioner may cause the valve to stroke suddenly. Continue only if you are certain the changes will not cause harm to personnel or processes.*

Characterization Curves

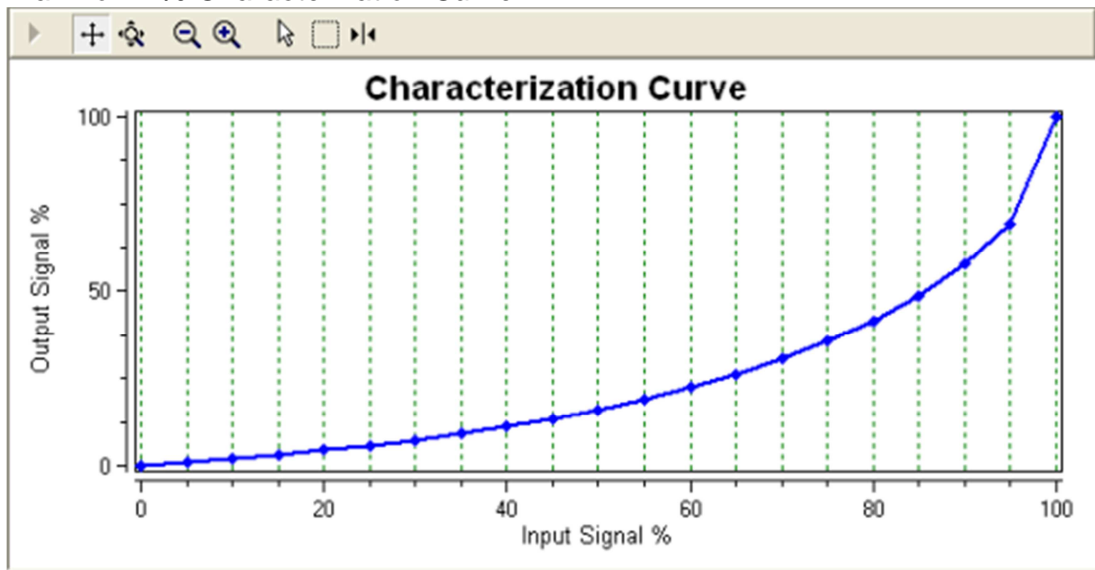
Linear Characterization Curve



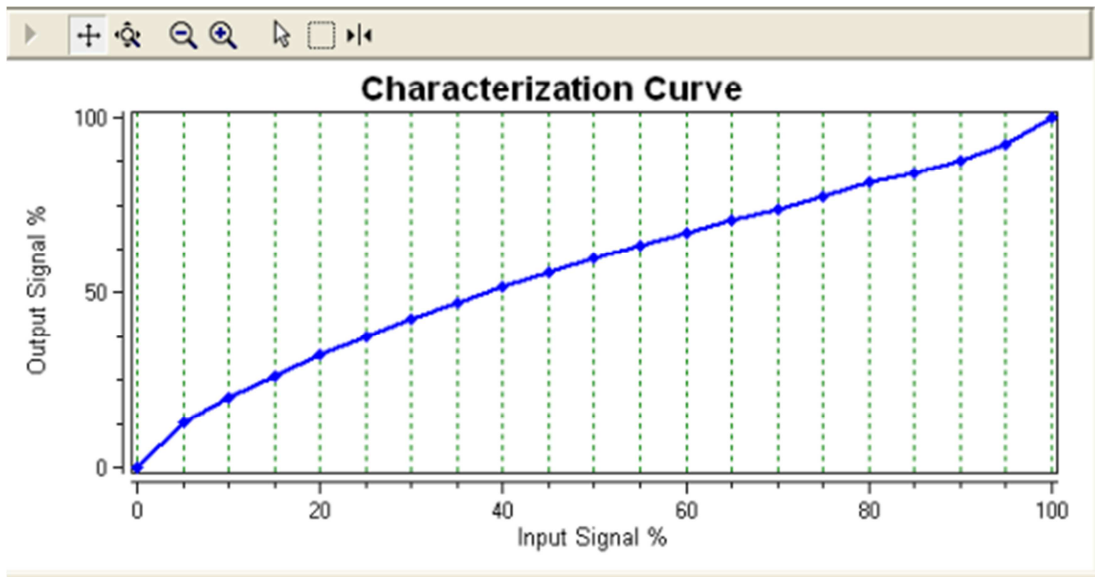
MaxFlow Linear Characterization Curve



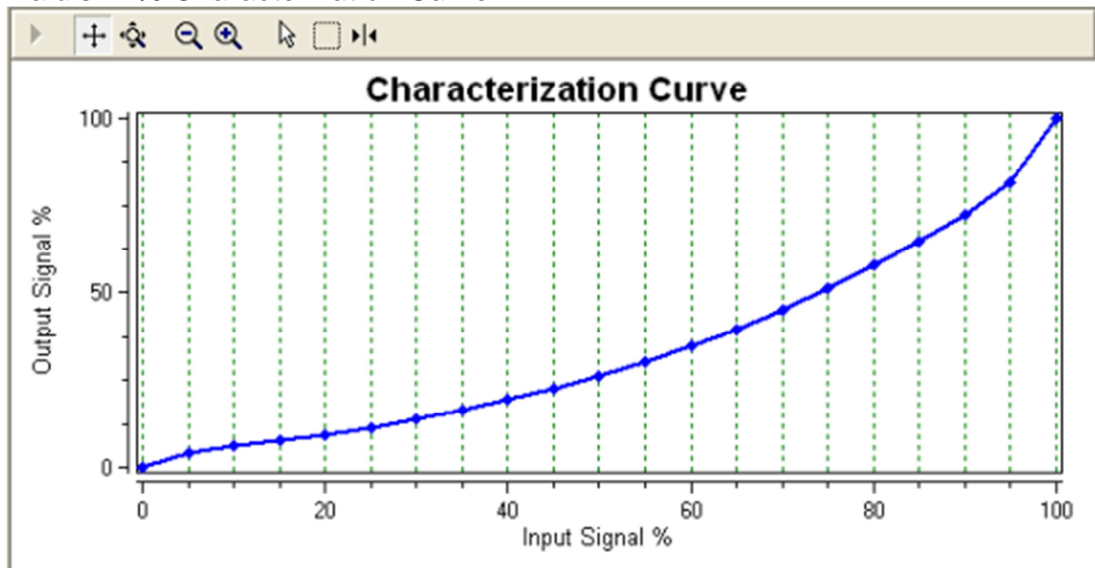
MaxFlow =% Characterization Curve



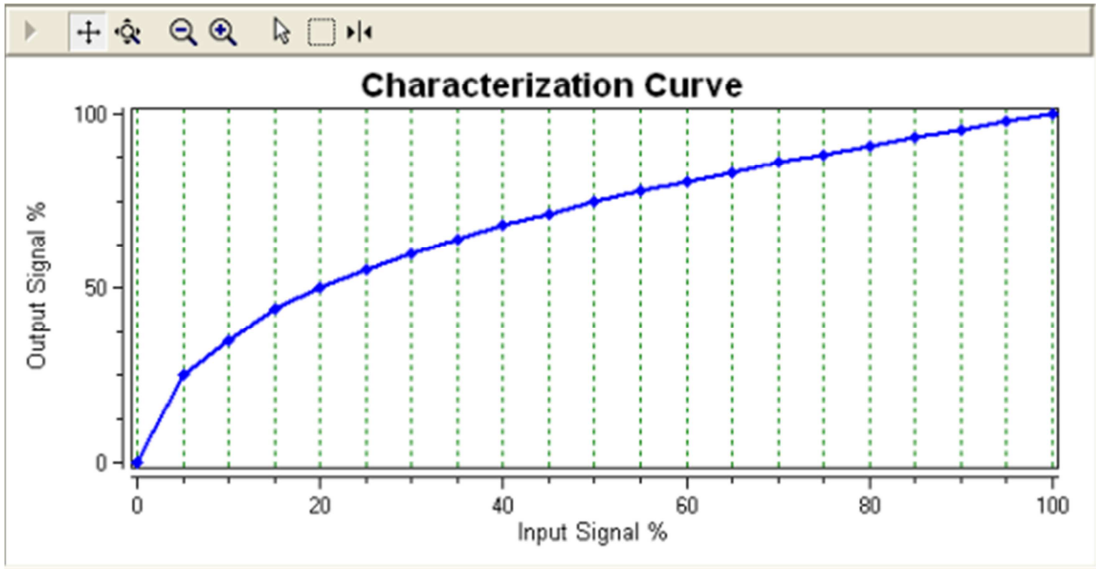
Valdisk Linear Characterization Curve



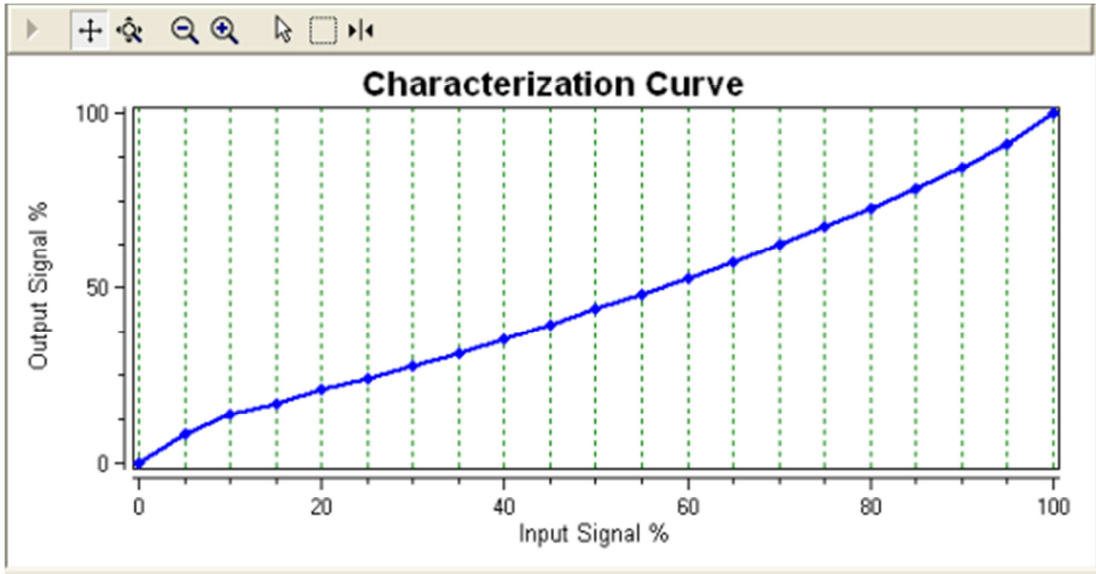
Valdisk =% Characterization Curve



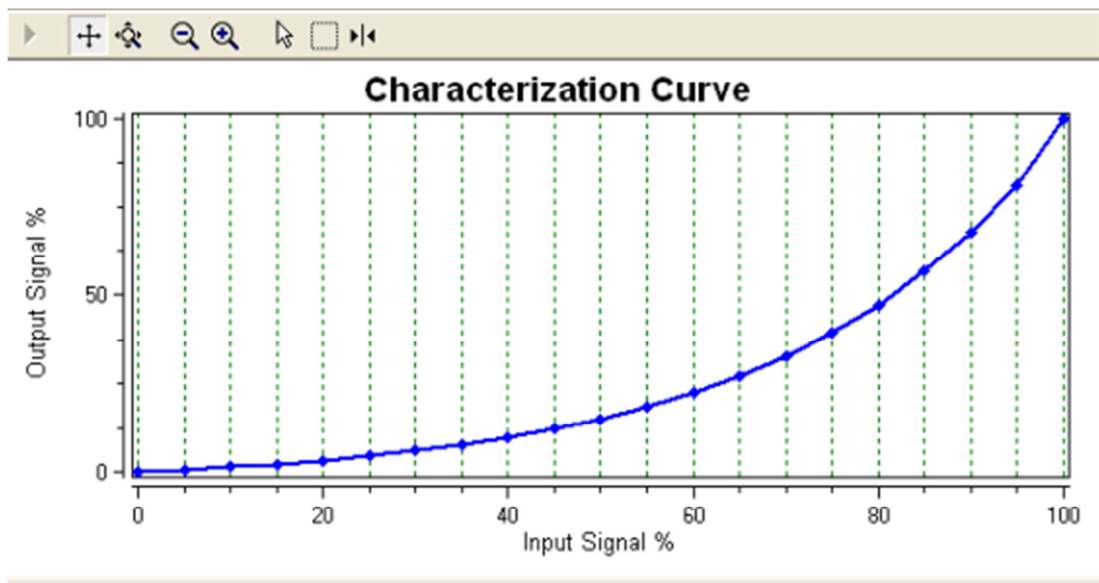
ShearStream Linear Characterization Curve



ShearStream =% Characterization Curve










Custom Characterization Curve



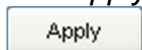
Graph Settings

At the top of the graph are several controls for viewing the graph.

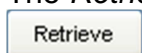
-  The *Restore* icon restores a graph that has been zoomed or adjusted.
-  The *Scroll* icon will allow the scales on the graph to be scrolled. Click the icon, then dragging the scale up or down.
-  The *Zoom* icon will allow the scales on the graph to be zoomed or expanded. Click on the scale and dragging the scale up or down to zoom in or out.
-  The *Zoom Out All Axes* icon scales all axes by clicking on the graph.
-  The *Zoom In All Axes* icon scales all axes by clicking on the graph.
-  The *Zoom Box* icon allows a portion of the visible graph to be magnified. Click on the icon then click and drag over the graph data to be magnified.
-  The *Cursor* icon allows a labeled marker to be placed on the graph which shows the coordinates of the graph. Click on the icon, then select the series name from the legend on the right of the graph. Now move the cursor to the location of interest. The first number on the cursor shows the location on the X axis, and the second number shows the location on the Y axis. If no variable shows in the box, a series name has not been selected.

Action Buttons

The *Apply* button will save changes to the connected device.



The *Retrieve* button will retrieve the latest information from the device.



Stroke Characterization (Custom)

The *Stroke Characterization (Custom)* page enables you to create a custom relationship between the command input and the valve position. This relationship is shown by the characterization curve. The characterization curve changes the *Input Command* (4-20) into a corresponding *Final Command*.

Active Indicator: System Nominal Command Source: Analog

WARNING
Applying new custom characterization values while the positioner is set to CUSTOM will cause closure member movement.

Characterization Setting: Linear Retrieval Progress: [Progress Bar]

Characterization Curve

Output Signal % vs Input Signal %

Optional Linkage Linearization Procedure

1. Ensure stroke calibration has been performed.
2. Adjust command signal so feedback arm is parallel to the slot in the take-off arm.
3. Enter feedback arm length. Arm Length: in.
4. Verify stroke length from Valve Trim page. Stroke Length: 1 in. Position: %
5. After calculating, select Apply to store the curve to the positioner. Then change the characterization setting to Custom.

Calculate Error:

Buttons: Load Save Apply Retrieve

Characterization Curve

Inherent Rangeability (R)

$$n=100 \left[R \left(\frac{i}{100} - 1 \right) - \frac{1}{R} \right]$$

30 [Up/Down] [Reset] [Refresh]

Input Signal %	Output Signal %
0	0
5	0.6
10	1.4
15	2.2
20	3.3
25	4.5
30	5.9
35	7.6
40	9.7
45	12.1
50	14.9
55	18.3
60	22.3
65	27.1
70	32.7
75	39.4
80	47.3
85	56.7
90	67.8
95	81
100	100

Status Area

The *Active Indicator* area shows the status of the most relevant active indicator. The color of the "LED light" corresponds to the Active Indicator and the first color of the blink code sequence on the positioner. Generally green indicates no immediate issues. Yellow indicates a developing issue. Red indicates the ability to control may be compromised. A detailed list of the indicators is given in the [Alarm Configuration - Alarm Annunciator](#) page. The *Command Source* field indicates whether the positioner is being controlled by digital or an analog (4-20 mA) command source.

Active Indicator: System Nominal Command Source: Analog

Characterization Configuration

The *Characterization Selection* field displays which curve is active in the positioner. The custom curve can be generated on this page, but must be activated by changing the curve to Custom on the [Stroke Characterization](#) page.

The *Retrieval Progress* bar shows the status of retrieving the curve from the positioner.

Characterization Curve

The *Characterization Curve* box allows you to quickly load a rangeability curve or manually modify the curve.

Inherent Rangeability (R) is defined as the change in which the deviation from a desired inherent flow characteristic will not exceed some stated controllable limits. It is generally used to describe the ratio of the minimum controllable flow to the maximum controllable flow in terms of Valve Cv. In practice, the inherent rangeability is the ratio between maximum and minimum controllable Cv, where Cv is the valve flow coefficient representing valve capacity.

In the formula,

n is the *Output Signal*

R is the value in the input field (default is 30)


i is the *Input Signal*

Inherent Rangeability (R)

$$n = 100 \left[R \left(\frac{i}{100} - 1 \right) - \frac{1}{R} \right]$$










Selecting the graph button  will calculate the new curve based on the R value.

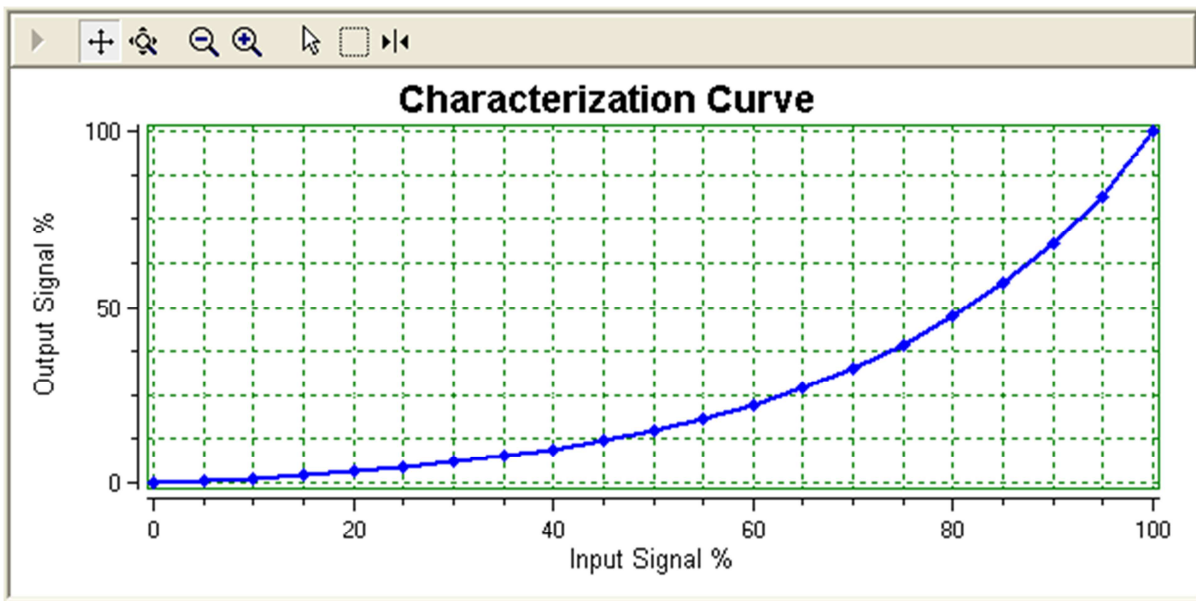
Selecting the button  will reset the curve to the last retrieved or applied curve.

The *Input Signal* column represents the X axis of the graph and is not adjustable. The *Output Signal* column represents the Y axis of the graph. The Output Signal may be edited by typing, clicking the up/down buttons or dragging points on the the graph.

	Input Signal %	Output Signal %
1.	0	0
2.	5	0.6
3.	10	1.4
4.	15	2.2
5.	20	3.3
6.	25	4.5
7.	30	5.9
8.	35	7.6
9.	40	9.7
10.	45	12.1
11.	50	14.9
12.	55	18.3
13.	60	22.3
14.	65	27.1
15.	70	32.7
16.	75	39.4
17.	80	47.3
18.	85	56.7
19.	90	67.8
20.	95	81
21.	100	100

At the top of the graph are several controls for viewing the graph.

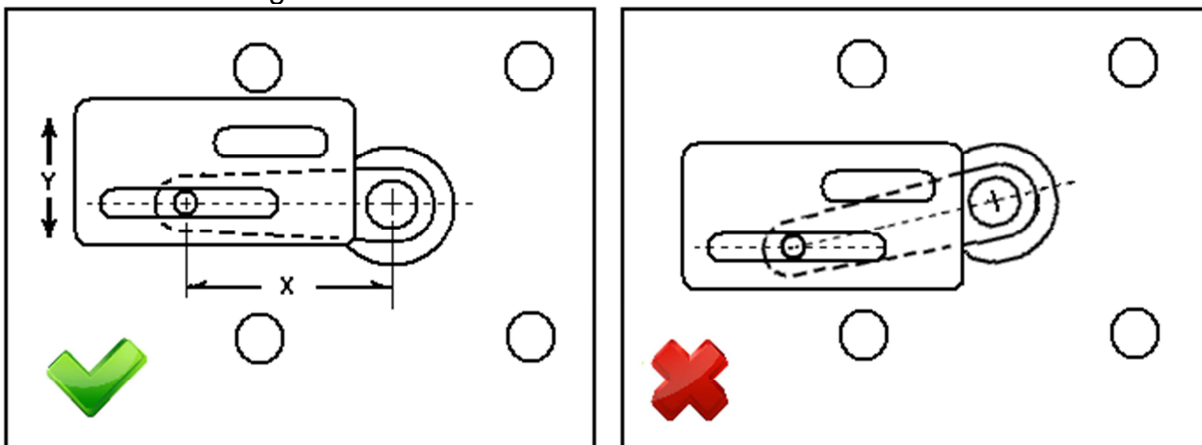
-  The *Restore* icon restores a graph that has been zoomed or adjusted.
-  The *Scroll* icon will allow the scales on the graph to be scrolled. Click the icon, then dragging the scale up or down.
-  The *Zoom* icon will allow the scales on the graph to be zoomed or expanded. Click on the scale and dragging the scale up or down to zoom in or out.
-  The *Zoom Out All Axes* icon scales all axes by clicking on the graph.
-  The *Zoom In All Axes* icon scales all axes by clicking on the graph.
-  The *Zoom Box* icon allows a portion of the visible graph to be magnified. Click on the icon then click and drag over the graph data to be magnified.
-  The *Cursor* icon allows a labeled marker to be placed on the graph which shows the coordinates of the graph.



Optional Linkage Linearization Procedure

This procedure is used when position linearity is critical. On linear valves, the configuration of the positioner's rotating feedback shaft and linkage can introduce a small amount of nonlinearity when compared to an LVDT (Linear Variable Differential Transformer) or other external position device. This nonlinearity can be removed using this procedure. As each step is completed, click the related check box.

1. Ensure a stroke calibration has been performed.
2. Adjust the command signal so the feedback arm is parallel to the slot in the take-off arm as shown in the diagram.



3. Enter the feedback arm length represented by distance X in the diagram.
4. Verify the stroke length from the [Valve Trim](#) page. This is the full length of travel in direction Y in the diagram.
 Select the *Calculate* button.
5. After calculating, the graph will be populated with the new curve. Select the *Apply* button to store the curve to the positioner. Then change the characterization settings to *Custom*.

These are two separate steps. (The positioner can have the new custom curve stored, but not have it selected.)

Optional Linkage Linearization Procedure

1. Ensure stroke calibration has been performed.

2. Adjust command signal so feedback arm is parallel to the slot in the take-off arm.

3. Enter feedback arm length. Arm Length: in.

4. Verify stroke length from Valve Trim page. Stroke Length: in.

Position: %

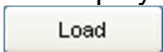
5. After calculating, select Apply to store the curve to the positioner. Then change the characterization setting to Custom.

Error:

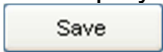
Follow any instructions in the *Error* field.

Action Buttons

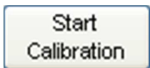
If your Frame setting allows private dialogs, the *Load* button will be enabled. Selecting it will display an open dialog to load the desired file.



If your Frame setting allows private dialogs, the *Save* button will be enabled. Selecting it will display an open dialog to save the desired file.



Click the *Start Calibration* button to perform the selected calibration.



Clicking the *Abort* button to end the calibration in process and resume normal operation.





Information

Information pages show the physical attributes of the actuator, valve, valve trim and positioner. This selection automatically redirects to the *Actuator* page.

Actuator

The *Actuator* page allows you to record information about the actuator.

Active Indicator: System Nominal Command Source: Analog

Actuator

Manufacturer: Valtek (Piston) ▼

Model: 25 ▼

* Size: 153.6 cm²

Spring Type: Not configured ▼

Style: Not configured ▼

Mechanical Action

Fail Position: Not configured ▼

* Actuator Action: Double Single

* Correct selection critical to diagnostic functions.

Apply Retrieve

Status Area

The *Active Indicator* area shows the status of the most relevant active indicator. The color of the "LED light" corresponds to the Active Indicator and the first color of the blink code sequence on the positioner. Generally green indicates no immediate issues. Yellow indicates a developing issue. Red indicates the ability to control may be compromised. A detailed list of the indicators is given in the [Alarm Configuration - Alarm Annunicator](#) page. The *Command Source* field indicates weather the positioner is being controlled by digital or an analog (4-20 mA) command source.

Active Indicator: System Nominal Command Source: Analog

Actuator

The *Actuator* area stores information about the actuator.

The *Manufacturer* field has a drop down menu of actuator manufactures.

The *Model* field has a drop down menu of actuator models.

The *Size* field is automatically populated if the *Manufacturer* and *Model* are selected. If Other is selected in the *Model* field, a number may be typed into the *Size* field.

The *Spring Type* field has a drop down menu of actuator spring configurations.

The *Style* field has a drop down menu of actuator connection styles such as linear and rotary.

Actuator

* Manufacturer: Valtek (Piston) ▼

* Model: 25 ▼

* Size: 23.8 in²

Spring Type: Single ▼

Style: Linear (piston) ▼

Mechanical Action

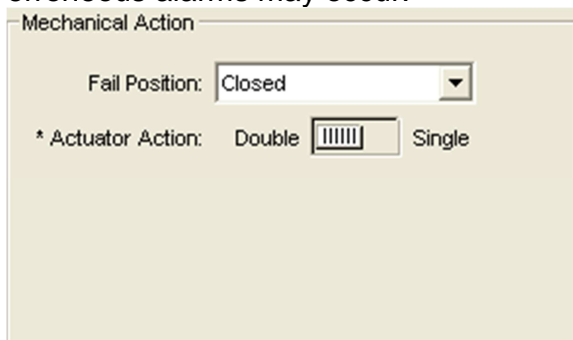
The *Mechanical Action* area is for the selection of the positioner mechanical *Fail Position* and the *Actuation Type*.

The *Fail Position* should be selected to match the tubing and actuator spring position.

CAUTION: The Fail Position is only a record and will not change the fail position of the valve.

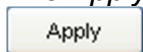
The actuator Action should be selected to match the tubing of the actuator. Select Double only if a double acting relay is used on a double acting actuator.

NOTE: The correct selection of Actuator Action is critical to the diagnostic functions or erroneous alarms may occur.

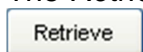


Action Buttons

The *Apply* button will save changes to the connected device.



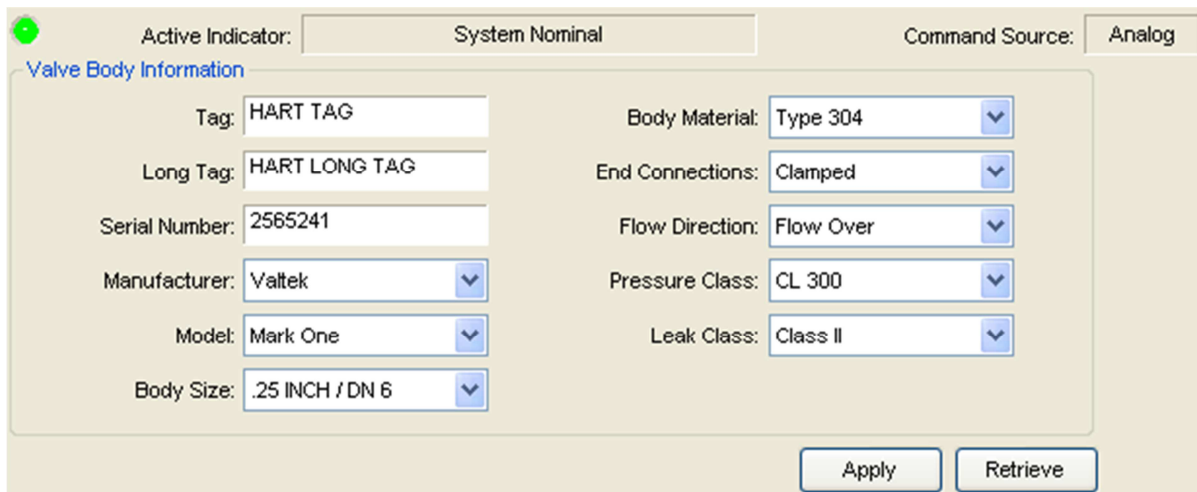
The *Retrieve* button will retrieve the latest information from the device.



Valve Body

The *Valve Body* page allows you to record information about the connected valve assembly.

NOTE: This information is for record keeping and information purposes only and does not affect the operation of the positioner or control valve.



Status Area

The *Active Indicator* area shows the status of the most relevant active indicator. The color of the "LED light" corresponds to the Active Indicator and the first color of the blink code sequence on the positioner. Generally green indicates no immediate issues. Yellow indicates a developing issue. Red indicates the ability to control may be compromised. A detailed list of the indicators is given in the [Alarm Configuration - Alarm Annunciator](#) page. The *Command Source* field indicates whether the positioner is being controlled by digital or an analog (4-20 mA) command source.



Valve Body Information

Tag stores a name up to 8 characters.

Long Tag stores a name of up to 20 characters (HART 6 and 7 only.)

Serial Number stores a number of up to 10 characters.

The *Manufacturer* field has a drop down menu of valve manufactures.

The *Model* field has a drop down menu of valve models.

The *Body Size* field has a drop down menu of valve sizes.

The *Body Material* field has a drop down menu of common valve materials.

The *End Connections* field has a drop down menu of common connection types.

The *Flow Direction* field has a drop down menu of flow directions (over, under, etc.)

The *Pressure Class* field has a drop down menu of common pressure classes.

The *Leak Class* field has a drop down menu of common leak classes.



Action Buttons

The *Apply* button will save changes to the connected device.



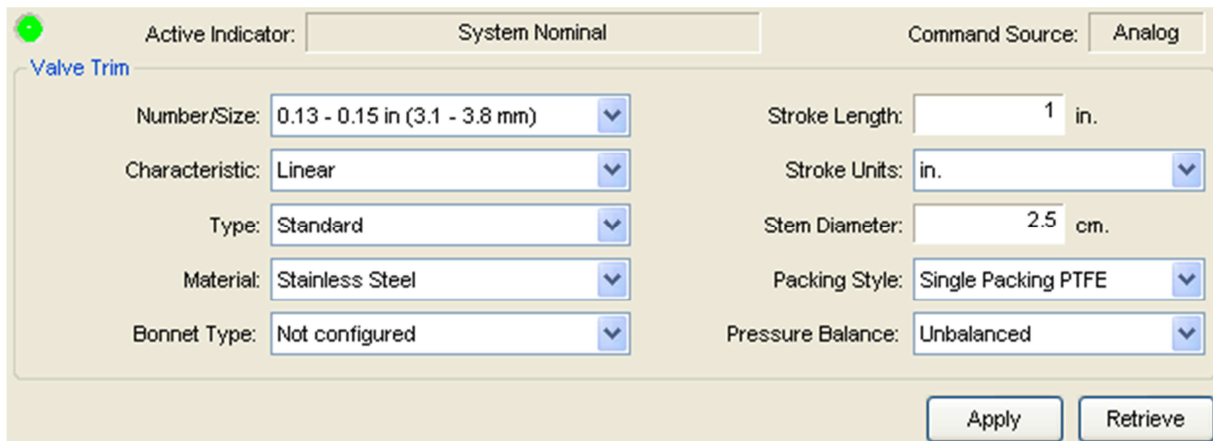
The *Retrieve* button will retrieve the latest information from the device.



Valve Trim

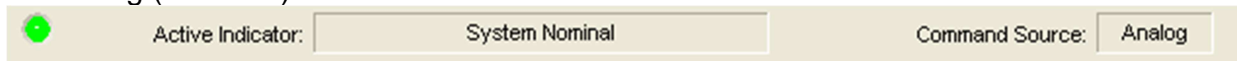
The *Valve Trim* page allows you to record information about the connected valve assembly.

NOTE: This information is for record keeping and information purposes only and does not affect the operation of the positioner or control valve.



Status Area

The *Active Indicator* area shows the status of the most relevant active indicator. The color of the "LED light" corresponds to the Active Indicator and the first color of the blink code sequence on the positioner. Generally green indicates no immediate issues. Yellow indicates a developing issue. Red indicates the ability to control may be compromised. A detailed list of the indicators is given in the [Alarm Configuration - Alarm Annunciator](#) page. The *Command Source* field indicates whether the positioner is being controlled by digital or an analog (4-20 mA) command source.



Valve Trim

The *Number/Size* field has a drop down menu of trim sizes.

The *Characteristic* field has a drop down menu of possible trim characteristics. This is different than the characterization curve that may be applied by the positioner.

The *Type* field has a drop down menu of trim types.

The *Material* field has a drop down menu of trim materials.

The *Bonnet Type* field has a drop down menu of bonnet types.

In the *Stroke Length* field enter the stroke length of the valve.

NOTE: The correct selection of Stroke Length is important for stroke counting diagnostics.

In the *Stroke Units* field enter the desired units.

In the *Stem Diameter* field enter the stem diameter. The units can be changed on the [Units](#) page of the DTM.

The *Packing Style* field has a drop down menu of packing styles.

The *Pressure Balance* field has a drop down menu of trim balance styles.

Action Buttons



The *Apply* button will save changes to the connected device.



The *Retrieve* button will retrieve the latest information from the device.



Positioner & HART® Information

The *Positioner & HART Information* page allows you to see HART information, the positioner time, service hours and revisions.

Status Area

The *Active Indicator* area shows the status of the most relevant active indicator. The color of the "LED light" corresponds to the Active Indicator and the first color of the blink code sequence on the positioner. Generally green indicates no immediate issues. Yellow indicates a developing issue. Red indicates the ability to control may be compromised. A detailed list of the indicators is given in the [Alarm Congfiguraion - Alarm Annunicator](#) page. The *Command Source* field indicates whether the positioner is being controlled by digital or an analog (4-20 mA) command source.

HART® Information


This area allows you to document the HART® configuration of the positioner.

The *Device Type* is displayed.


Type in the *Message* field (twenty-four 24 characters) and the *Descriptor* field (twelve 12 characters) to save custom information about the valve assembly.

The *HART Date* can be entered in the input fields or entered using the button labeled *Synchronize HART Date with Today*.


HART® Information

Device Type:	Logix MD+	HART® Date:	Year: 1912	Month: 07	Day: 23
Message:	LOGIX 520MD+	Today's Date:	2012-09-24		
Descriptor:	HART DESCRIPTOR	Synchronize HART Date with Today: 			

Time Synchronization

Computer Time & Date is displayed from the host computer.
The *Positioner Time & Date* is displayed from the positioner.
The arrow button  will write the computer time to the positioner.

Time Synchronization

Computer Time & Date:		Positioner Time & Date:
16:57:41 2012/09/24		16:57:36 2012/09/24

Service Hours

Hours in Service shows the number of hours the positioner has been running. If the positioner is disconnected, this timer will stop.
Lifetime High Temperature shows the maximum temperature the positioner has measured with the sensor on the circuit board while powered.
Lifetime Low Temperature shows the minimum temperature the positioner has measured with the sensor on the circuit board while powered.

Service Hours

Hours in Service:	Lifetime High Temperature:	Lifetime Low Temperature:
241.4	53.6 °C	20 °C

Revisions

Firmware shows the revision of the firmware.
Hardware shows the revision of hardware.

Revisions

Firmware:	Hardware:
1.5	0

Action Buttons

The *Apply* button will save changes to the connected device.

The *Retrieve* button will retrieve the latest information from the device.



Card Slot

Card Slot pages change depending on which auxiliary cards are installed. They provide easy ways to configure and check the status of the auxiliary cards. This selection automatically redirects to the page associated with the installed card. If no card is installed, this page will not show in the menu.

Multi-Function Card

The *Multi-Function Card* page allows you to configure the Multi-Function Card (MFC) as an analog output, a discrete output, or a discrete input. This page will only be present if an MFC is present in a positioner slot. There are two separate versions of the MFC for slot 1 and slot 2.



Status Area

The *Active Indicator* area shows the status of the most relevant active indicator. The color of the "LED light" corresponds to the Active Indicator and the first color of the blink code sequence on the positioner. Generally green indicates no immediate issues. Yellow indicates a developing issue. Red indicates the ability to control may be compromised. A detailed list of the indicators is given in the [Alarm Configuration - Alarm Annunciator](#) page. The *Command Source* field indicates whether the positioner is being controlled by digital or an analog (4-20 mA) command source.



Not Configured

Select Not Configured disable the Card.



Discrete Input (DI) to Initiate PST

Select *Discrete Input (DI) to Initiate PST* to configure the MFC Card to trigger a partial stroke test. When over 10 volts are applied to the card, the partial stroke test will be initiated.

Select *Configure* link to set the PST settings.



Discrete Input (DI) to Initiate PST [Configure...](#)

Discrete Input (DI) to Drive Valve Position

Select *Discrete Input (DI) to Drive Valve Position* to configure the MFC Card to drive the valve to the *Desired Position* when over 10 volts are applied to the card.

Discrete Input (DI) to Drive Valve Position Desired Position:

Analog Output (AO)

Select *Analog Output (AO)* to enable the card to produce a 4-20 mA signal corresponding to the position of the valve. If a range other than 4-20 mA is desired, select the *Configure* link to calibrate the output.

Analog Output (AO) [Configure...](#)

Discrete Output (DO)

Select *Discrete Output (AO)* to enable the card to produce a low current when an selectable alarm is active. The DO will generate a high current (> 2.2 mA, typically 6 mA) when the alarm is not active and a low current (between 100 uA and 1 mA) when the alarm is active. Select the *Configure* link to select the alarm that will change the output of the card. More than one alarm may be selected at a time.

Discrete Output (DO) [Configure...](#)

Action Buttons

The *Apply* button will save changes to the connected device.

The *Retrieve* button will retrieve the latest information from the device.

Analog Output Calibration

If the Multi-Function Card (MFC) is configured as an Analog Output, this page allows you to calibrate the the configuration of the MFC Card to function as an Analog Output.

Status Area

The *Active Indicator* area shows the status of the most relevant active indicator. The color of the "LED light" corresponds to the Active Indicator and the first color of the blink code sequence on the positioner. Generally green indicates no immediate issues. Yellow indicates a developing issue. Red indicates the ability to control may be compromised. A detailed list of the indicators is given in the [Alarm Congfiguraion - Alarm Annunicator](#) page. The *Command Source* field indicates weather the positioner is being controlled by digital or an analog (4-20 mA) command source.

Calibration Information

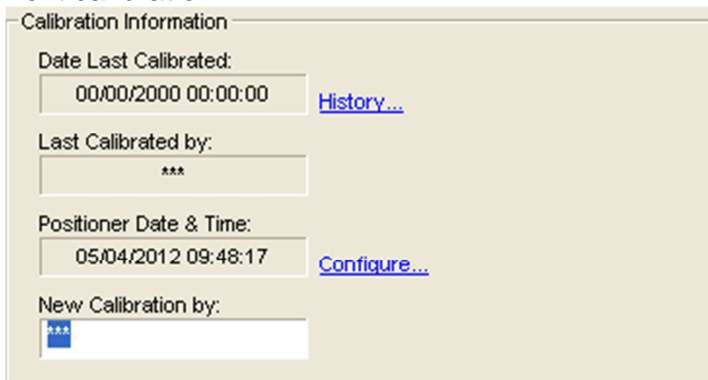
This area displays information about the last analog output calibration.

Date Last Calibrated shows the time and date of the last analog output calibration. Select the *History* link to view the *Event History* page where up to 40 of the most recent calibrations can be viewed.

Last Calibrated By displays the 3-digit name or initials of the person who performed the last calibration.

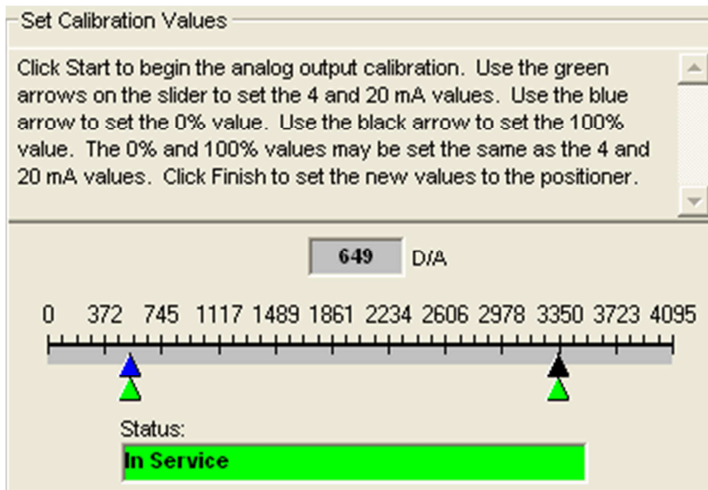
Positioner Date & Time allows you to verify the accuracy of the time and date stamp that is stored with each calibration event.

New Calibration By displays the 3-digit name or initials of the person who is performing the next calibration.



Set Calibration Values

This area provides instruction on how to calibrate the Analog Output card and provides the arrows on the slider to set the 4 and 20 mA values. Use the sliders to set the output values as directed.



Implications and Possible Solutions

In the case an error occurs during the calibration, the right side of the page provides instant feedback of the implications of the errors and the possible solution to fix the error. If no errors occur during the calibration the implications and possible solution fields will remain blank.

Action Buttons



The *Start* button will start the calibration.



The *Abort* button cancels the calibration. Values that were set will become active.



The *Finish* button activates the new calibration parameters.



The *Print Report* button sends the report to the default printer.



NOTE: It is possible to print the report to save to a **PDF** file. Instructions:

1. Download and install the free version of PDFCreator.
2. Install the PDFCreator
3. Set PDFCreator as the default Printer
4. Click Print Report and save the report to a pdf file in your computer.



Analog Output Calibration Report

Logix MD+ DEVICE TAG ID: HART TAG DEVICE VERSION: MD Pro Diagnostics
 ACTUATOR INFO -> Size: 25, Manufacturer: Valtek (Piston), Type: Linear (piston), Spring Type: Single
 VALVE BODY INFO -> Model: Mark One, Body Size: .25 INCH / DN 6, FlowDirection: Flow Over, Fail Position: Mechanical Fail Closed

Calibration Results

Last Calibrated by:		***	Analog Out Calibration Flags	
Date Last Calibrated:	00/00/2000 00:00:00	Active	Masked	
A/D Value at 4mA:	535	AO Range Small	<input type="checkbox"/>	<input type="checkbox"/>
A/D Value at 0%:	535	Aux. Card 2 Fail	<input type="checkbox"/>	<input type="checkbox"/>
A/D Value at 20mA:	3345	Aux. Card 2 No Loop Power	<input type="checkbox"/>	<input type="checkbox"/>
A/D Value at 100%:	3345	Aux. Card 2 Error	<input type="checkbox"/>	<input type="checkbox"/>

Discrete Output (DO)

If the Multi-Function Card (MFC) is configured as an Discrete Output, this page allows you to select all warnings and alarm that will cause the MFC to generate a low output signal when triggered. The DO will generate a high current (> 2.2 mA, typically 6 mA) when the alarm is not active and a low current (between 100 uA and 1 mA) when the alarm is active. More than one alarm may be selected at a time.

●
Active Indicator:

System Nominal

Command Source:

Analog

Note: Select all events that will trip the Discrete Output (DO) Signal.

Cycles & Travel Status <ul style="list-style-type: none"> <input type="checkbox"/> Valve Cycles <input type="checkbox"/> Valve Travel <input type="checkbox"/> Actuator Cycles <input type="checkbox"/> Actuator Travel <input type="checkbox"/> Bellows Cycles <input type="checkbox"/> Bellows Travel <input type="checkbox"/> Pilot Cycles <input type="checkbox"/> Pilot Travel 	Electronic Error Status <ul style="list-style-type: none"> <input type="checkbox"/> Aux. Card 1 Fail <input type="checkbox"/> Aux. Card 1 Error <input type="checkbox"/> Aux. Card 1 No Loop Power <input type="checkbox"/> Aux. Card 2 Fail <input type="checkbox"/> Aux. Card 2 No Loop Power <input type="checkbox"/> Aux. Card 2 Error <input type="checkbox"/> Press. Board Fail WRN <input type="checkbox"/> Low Battery Warning 	Actuation Status <ul style="list-style-type: none"> <input type="checkbox"/> Supply Press. High <input type="checkbox"/> Supply Press Lo <input type="checkbox"/> Actuation Ratio <input type="checkbox"/> Spring Fail <input type="checkbox"/> Pneumatic Leak <input type="checkbox"/> Air Supply Humid <input type="checkbox"/> Air Supply Icing
Feedback Loop Status <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Position Deviation <input type="checkbox"/> Psn. Sensor Fail <input type="checkbox"/> Closed Too Far <input type="checkbox"/> Opened Too Far <input type="checkbox"/> PST Failed <input type="checkbox"/> CST Failed 	Mode Status <ul style="list-style-type: none"> <input type="checkbox"/> Factory Reset State <input type="checkbox"/> Calibration in Prog. <input type="checkbox"/> Signature or PST <input type="checkbox"/> Jog Cmd. Mode <input type="checkbox"/> PST Scheduled <input type="checkbox"/> DI Cmd. Override 	Main Board Status <ul style="list-style-type: none"> <input type="checkbox"/> Main Board Fail <input type="checkbox"/> Software Error <input type="checkbox"/> Memory Error <input type="checkbox"/> Temperature High <input type="checkbox"/> Temperature Low
Position Status <ul style="list-style-type: none"> <input type="checkbox"/> Soft Stop High Alert <input type="checkbox"/> Soft Stop Low Alert <input type="checkbox"/> Psn. High Limit Alert <input type="checkbox"/> Psn. Low Limit Alert 	Friction Status <ul style="list-style-type: none"> <input type="checkbox"/> Friction High <input type="checkbox"/> Friction Low <input type="checkbox"/> Valve Can't Open <input type="checkbox"/> Valve Can't Shut 	Inner Loop Status <ul style="list-style-type: none"> <input type="checkbox"/> Pilot Response <input type="checkbox"/> Piezo Volts High <input type="checkbox"/> Piezo Volts Low <input type="checkbox"/> Driver Module
Control Status <ul style="list-style-type: none"> <li style="width: 50%;"><input type="checkbox"/> Cmd. Frequency <li style="width: 50%;"><input type="checkbox"/> Psn. Frequency <li style="width: 50%;"><input type="checkbox"/> Cmd. Amplitude <li style="width: 50%;"><input type="checkbox"/> Psn. Amplitude 		Legend <ul style="list-style-type: none"> ● Status <input checked="" type="checkbox"/> Selected

Apply

Retrieve

Status Area







The *Active Indicator* area shows the status of the most relevant active indicator. The color of the "LED light" corresponds to the Active Indicator and the first color of the blink code sequence on the positioner. Generally green indicates no immediate issues. Yellow indicates a developing issue. Red indicates the ability to control may be compromised. A

detailed list of the indicators is given in the [Alarm Congfiguraion - Alarm Annunicator](#) page. The *Command Source* field indicates weather the positioner is being controlled by digital or an analog (4-20 mA) command source.

Active Indicator:
Command Source:

Legend

Each indicator group box may contain the following components:

- A checkbox indicates which alarms will cause the DO generate a low output signal.
-  An "LED light" indicates health status. Warning and alarm limits (set by the user in many cases) determine the conditions when the color will turn from green to yellow to red. The most sever of the indicators on this page will be shown in the health bar on the Dashboard.
 -  **Dark Green** circle indicates a healthy condition where no attention is needed.
 -  **Light Green** indicates an occurrence of a normal activity that does not affect the health of the valve system.
 -  **Yellow** circle indicates that an active warning, alert or mode is present.
 -  **Red** circle indicates that an active alarm or state is present that could seriously limit the operation of the valve.
 -  **Gray** circle indicates that the feature or condition is not available because the configuration of the hardware or software does not support it.

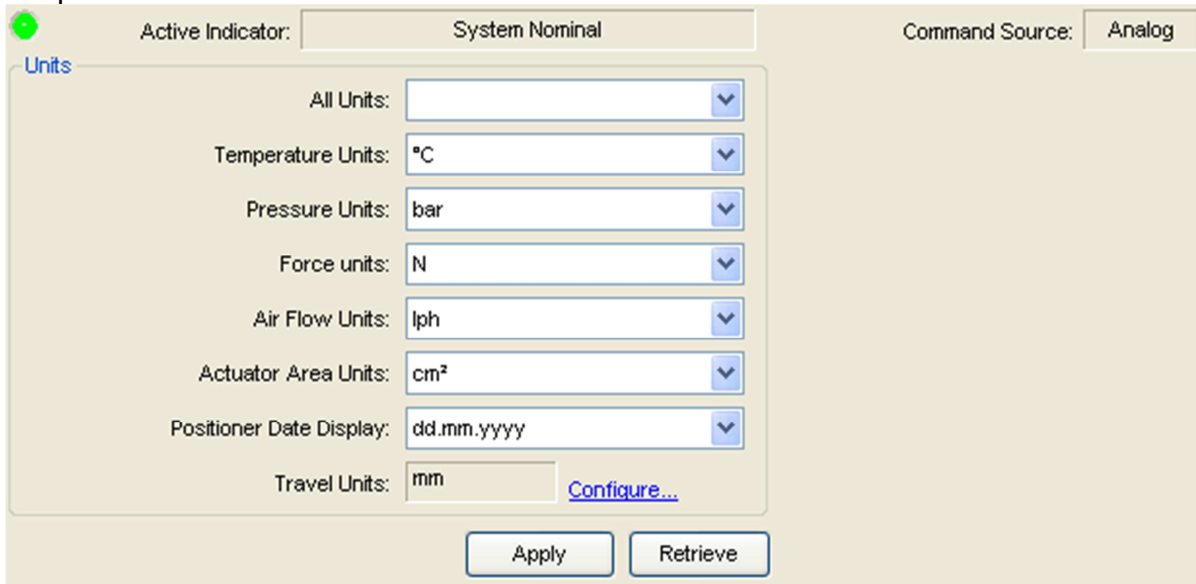
Action Buttons

The *Apply* button will save changes to the connected device.

The *Retrieve* button will retrieve the latest information from the device.

Units

The *Units* page allows you to change the units of measure in all places in the DTM and on the positioner.



Status Area

The *Active Indicator* area shows the status of the most relevant active indicator. The color of the "LED light" corresponds to the Active Indicator and the first color of the blink code sequence on the positioner. Generally green indicates no immediate issues. Yellow indicates a developing issue. Red indicates the ability to control may be compromised. A detailed list of the indicators is given in the [Alarm Configuration - Alarm Annunciator](#) page. The *Command Source* field indicates whether the positioner is being controlled by digital or an analog (4-20 mA) command source.



Units

Units of measure change the values displayed on DTM screens and the positioner. The Units page allows the selection of each unit individually, or *All Units* field sets all units to either North American or International System of Metric Units (SI).

Selecting "North American Units" in the *All Units* field sets all units to the North American default:

- Internal temperature = °F
- Pressure = psi
- Force = lbf
- Air Flow = scfm
- Actuator Area = in²
- Date Format = mm/dd/yyyy

Selecting "S.I. Units" in the *All Units* field sets all units to the international default:

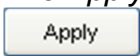


- Internal temperature = °C
- Pressure = bar
- Force = N
- Air Flow = lph
- Actuator Area = cm²
- Date Format = dd.mm.yyyy

Follow the *Configure* link to set the *Travel Units*.

Action Buttons

The *Apply* button will save changes to the connected device.



The *Retrieve* button will retrieve the latest information from the device.





ValveSight™ Diagnostics DTM Manual for Logix MD+ Positioner with HART® FCD- LGENSF0014-00



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