



Device Description User Manual

Logix® MD+ Positioners with HART®

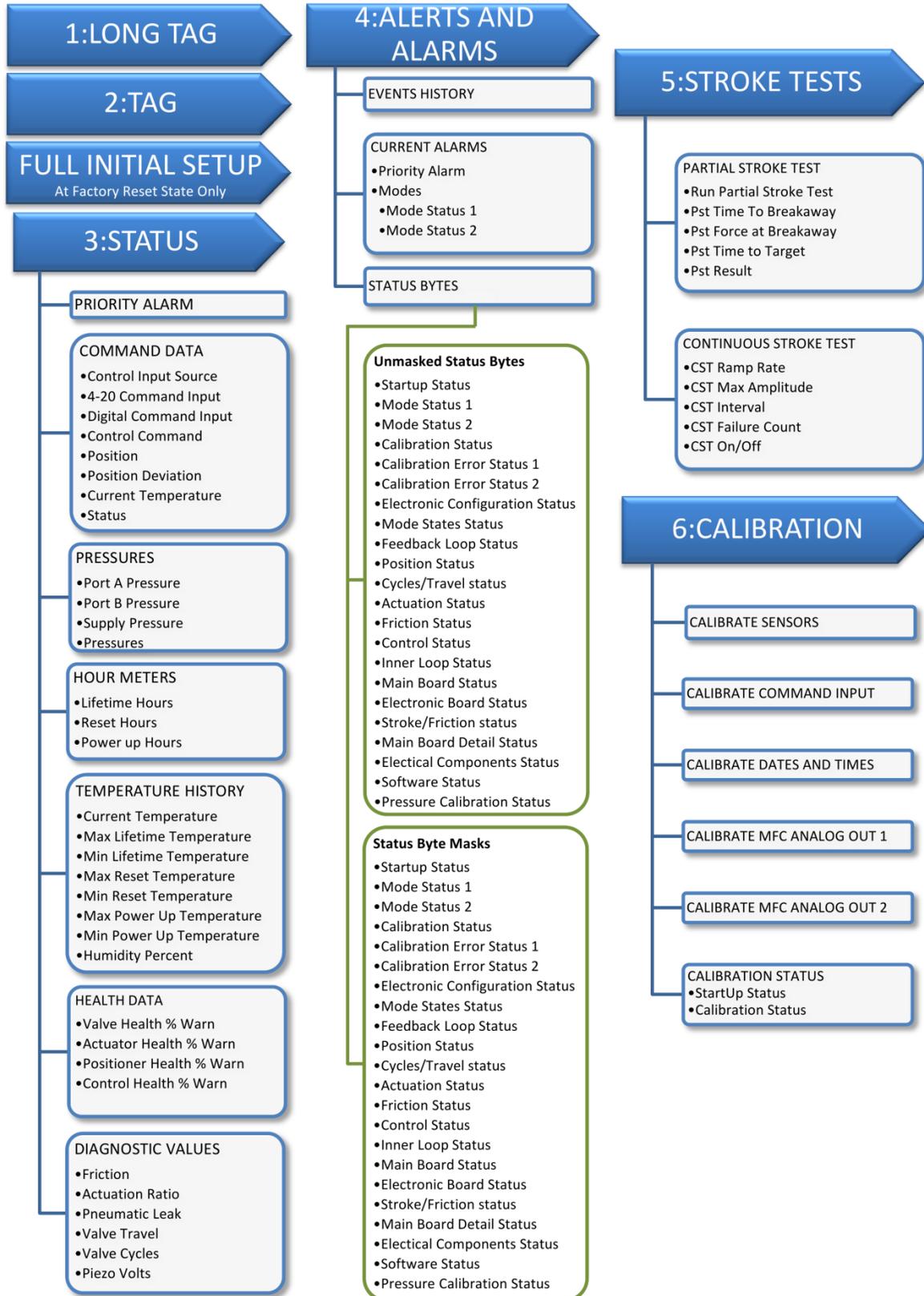


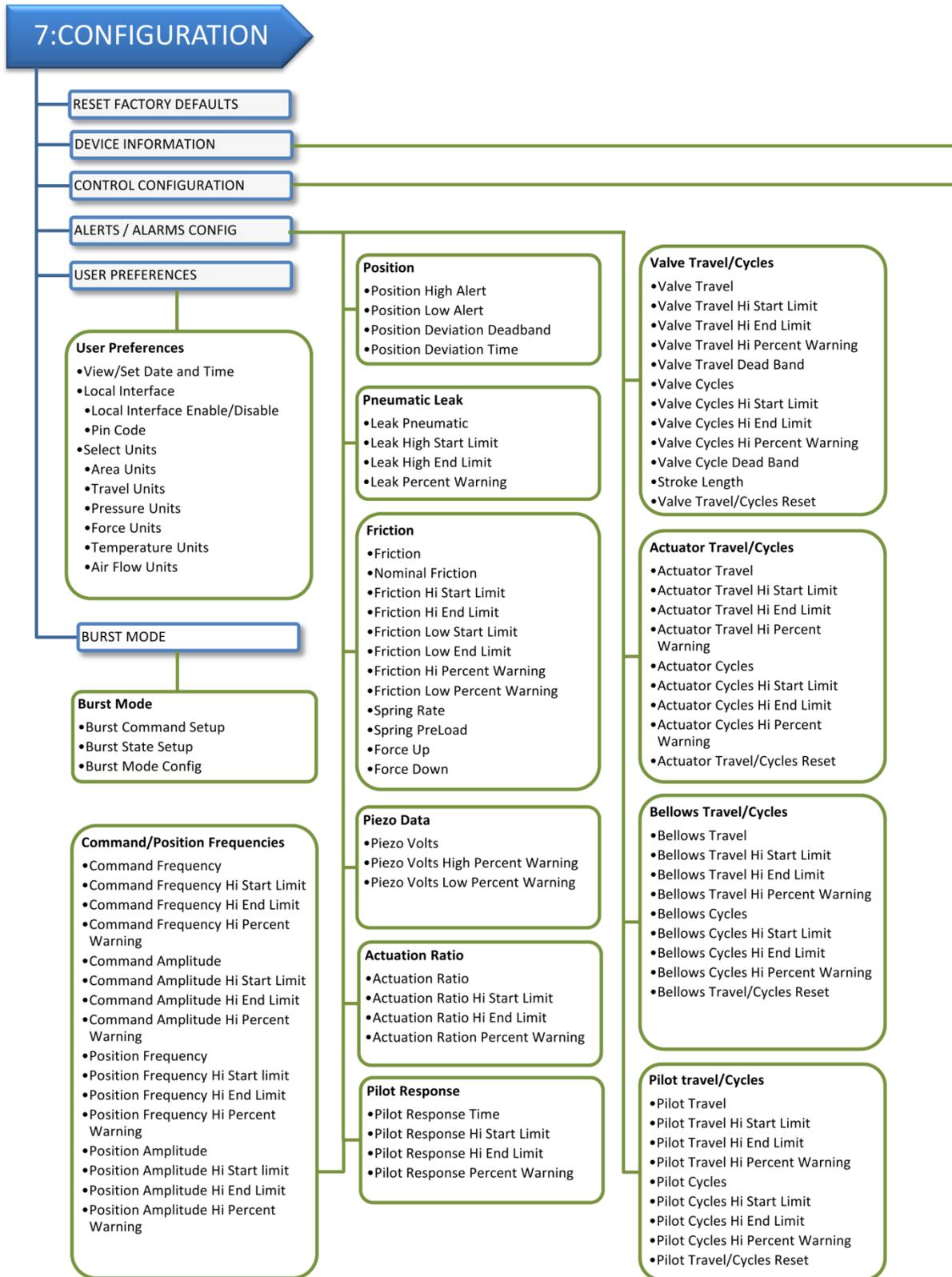


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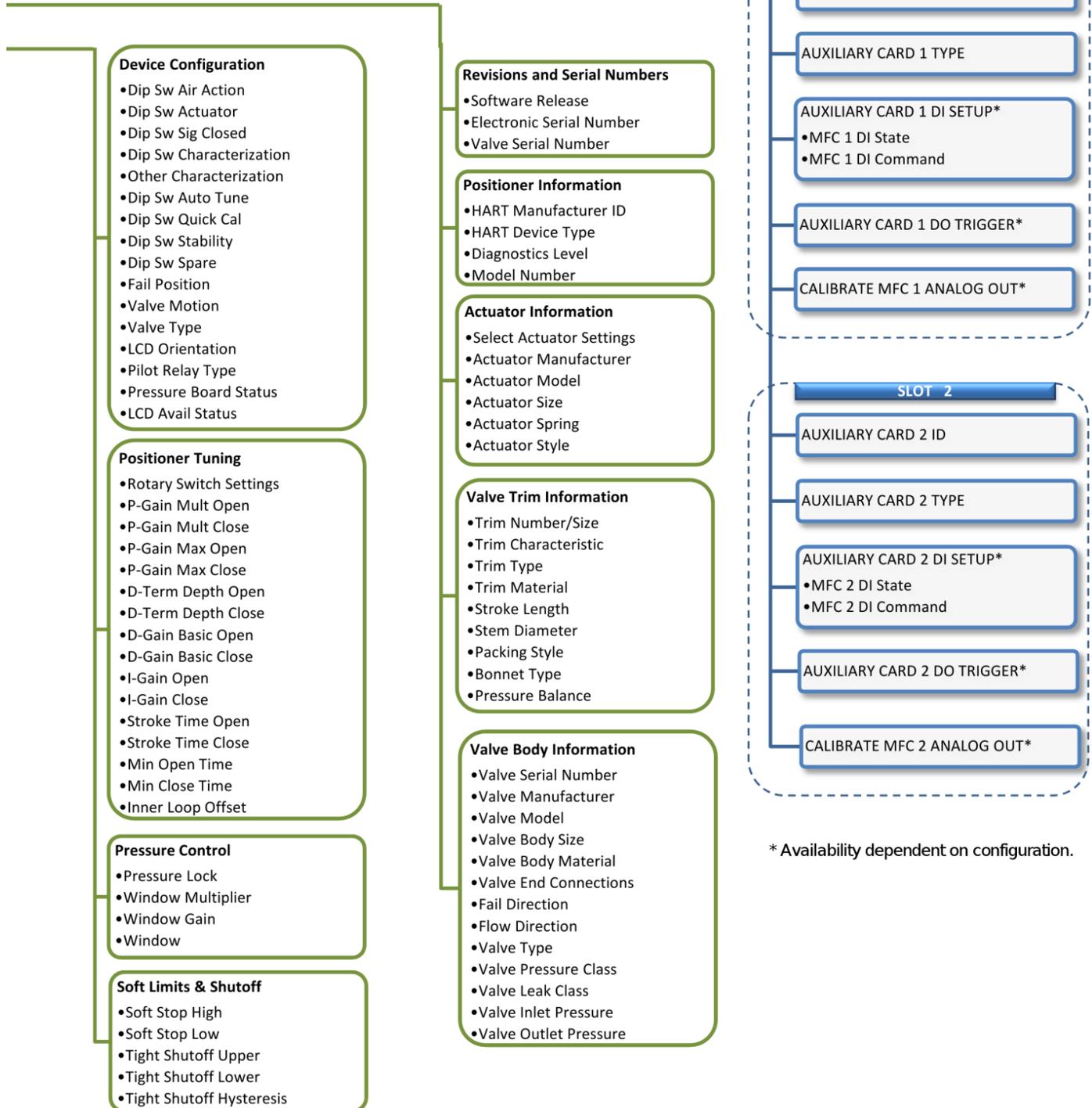
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DD MENU CHART





8: Auxiliary Cards



* Availability dependent on configuration.

GENERAL INFORMATION

Introduction

This document provides detailed information about the function of the Logix 520MD+ Device Description (DD). The DD follows the protocol provided by the HART Communication Foundation. For more information about downloading, installing and using HART DDs, visit

<http://www.hartcomm.org/>

Qualified Personnel

Qualified personnel are people who, on account of their training, experience, 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.

In using this software, the position and operation of the related valves can be affected. Product users and maintenance personnel should thoroughly review the effects of any functions before applying those functions.

Using This Document

The features listed below are numbered to correspond to their location in the DD menu tree. Some menu items may not be available depending on positioner upgrade status and the presence of auxiliary cards.

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.*

1 LONG TAG

Set the HART long tag. (For HART 6 only.)

2 TAG

Set the HART tag.

3* FULL INITIAL SETUP

Set basic values and perform calibrations required for positioner to control.

*This menu item is only available when the positioner in in Factory Reset state.

3 STATUS

View basic information about the current status of the positioner including basic on-line diagnostics.

3.1 Priority Alarm

View the highest priority alarm. For a complete list of current alarms, see Alarms and Alerts.

3.2 Command Data

View command and position information.

3.2.1 Control Input Source

Select either analog or digital command input source.

3.2.2 4-20 Command Input

View the analog command input value.

3.2.3 Digital Command Input

Set the digital command input value.

3.2.4 Control Command

View the final command after Characterization, Soft Limits, and Tight Shut-Off effects are applied.

3.2.5 Position

View the position of the valve.

3.2.6 Position Deviation

View the difference between the Control (Final) Command and the Position.

3.2.7 Current Temperature

The temperature of the positioner's main circuit board.

3.2.8 Current Humidity

The humidity of the positioner's main circuit board in relative percent (RH).

3.3 Pressures

View the pressure sensor values. Advanced or Pro diagnostics are required.

3.3.1 Port A Pressure

View the pressure at port A.

3.3.2 Port B Pressure

View the pressure at port B.

3.3.3 Supply Pressure

View the supply pressure.

3.3.4 Pressures

View a graph of Port A, Port B, and Supply pressures. (EDD only.)

3.4 Hour Meters

View the number of hours the positioner has been in operation.

3.4.1 Lifetime Hours

View the total number of hours the positioner has been in operation.

3.4.2 Reset Hours

View the number of hours the positioner has been in operation since the last factory reset was performed.

3.4.3 Power up Hours

View the number of hours the positioner has been in operation since the last time it was powered up.

3.5 Temperature History

View the positioner temperature and humidity information.

3.5.1 Current Temperature

View the current temperature inside the positioner.

3.5.2 Max Lifetime Temperature

View the maximum temperature the positioner has ever seen.

3.5.3 Min Lifetime Temperature

View the minimum temperature the positioner has ever seen.

3.5.4 Max Reset Temperature

View the maximum temperature the positioner has seen since the last factory reset was performed.

3.5.5 Min Reset Temperature

View the minimum temperature the positioner has seen since the last factory reset was performed.

3.5.6 Max Power Up Temperature

View the maximum temperature the positioner has seen since the last time the positioner was powered up.

3.5.7 Min Power Up Temperature

View the minimum temperature the positioner has seen since the last time the positioner was powered up.

3.5.8 Humidity Percent

View the current relative humidity inside the positioner.

3.6 Health Data

View the warning level for each category. The 520MD+ positioner monitors the conditions that affect the ability of the valve to respond. As these conditions worsen, a warning level is shown. A low value such as 0% indicates no warning. A high value such as 90% indicates the ability to control may be impaired soon. A value of 100 indicates that the valve may no longer be responsive.

3.6.1 Valve Health % Warning

The warning value from 0 to 100% based on warnings and alarms related to valve health such as friction. A lower value indicates less serious issues.

3.6.2 Actuator Health % Warning

The warning value from 0 to 100% based on warnings and alarms related to actuator health such as supply pressure. A lower value indicates less serious issues.

3.6.3 Positioner Health % Warning

The warning value from 0 to 100% based on warnings and alarms related to positioner health such as circuit board malfunction. A lower value indicates less serious issues.

3.6.4 Control Health % Warning

The warning value from 0 to 100% based on warnings and alarms related to control health such as deviation. A lower value indicates less serious issues.

3.7 Diagnostic Values

View basic diagnostic information. Pro diagnostics are required.

3.7.1 Friction

View the friction of the valve and actuator assembly.

3.7.2 Actuation Ratio

View the effort required to move the valve in the direction that compresses the spring. The ratio is the force required to overcome friction, spring, and process load forces over the force available from the current supply pressure.

3.7.3 Pneumatic Leak

View the pneumatic leakage of the actuator. This value does not include normal air consumption.

3.7.4 Valve Travel

View the amount the valve has traveled in percent of total stroke length.

3.7.5 Valve Cycles

View the number of cycles the valve has travelled. This is the number of times the valve has changed directions twice.

3.7.6 Piezo Volts

View the voltage supplied to the piezo element in the positioner's pilot relay. This should typically be between 0 and 24 VDC.

4 ALERTS AND ALARMS

View and manage alerts and alarms.

4.1 Events History

View the complete list of events (alarms, calibrations etc.). The latest event is shown first. Select OK to view previous events.

4.2 Current Alarms

View the current status of all alarms.

4.2.1 Priority Alarm

View the top priority alarm. Other alarms may be active. This alarm may be the root of the issue.

4.2.2 Modes

View the modes or behavior configurations of the positioner.

4.2.2.1 Mode Status 1

View the status of Digital Command, Tight Shut Off, Pressure Control, Soft Stop, and Backup Control modes.

4.2.2.2 Mode Status 2

View the status of Continuous Stroke Test, Training In Progress, Training Complete, Event Capture, Local Interface Lock, and Squawk modes.

4.3 Status Bytes

View a comprehensive list of status indicators. Mask unwanted alerts and alarms.

4.3.1 Unmasked Status Bytes

View the condition of each status indicator before masking. Masking prevents specific alerts and alarms from being included in the command 48 feedback.

4.3.1.1 Startup Status

View status of Power ON, Initializing, Stroke Calibration Required, Pressure Calibration Required, and Friction Calibration Required.

4.3.1.2 Mode Status 1

View status of Digital Command Mode, Tight Shut Off Mode, Pressure Control Locked, Soft Stop High Limit Alert, and Soft Stop Low Limit Alert.

4.3.1.3 Mode Status 2

View status of Continuous Stroke Test Mode, Training Mode In Progress, Training Mode Completed, Event Captured, Local Interface Off, and Squawk Mode.

4.3.1.4 Calibration Status

View status of Stroke Calibration in Progress, Setting Inner Loop Offset, Pressure Calibration in Progress, Friction

Calibration in Progress, Command Input Calibration in Progress, Analog Output Calibration In Progress, and Jog Calibration Set 100% Position.

4.3.1.5 Calibration Error Status 1

View status of Position Range Too Small, Position Sensor Below ADC Range, Position Sensor Above ADC Range, No Motion Time Out, Settle Time Out, and Inner Loop Offset Time Out.

4.3.1.6 Calibration Error Status 2

View status of Analog Output Range Too Small, Command Input Range Too Small, Command Input Below ADC Range, Command Input Above ADC Range, Stroke Shift, Stroke Span Increase, and Stroke Span Decrease.

4.3.1.7 Electronic Configuration Status

View status of Aux Card 1 Present, Aux Card 2 Present, Pressure Sensor Board Present, and LCD Present.

4.3.1.8 Mode States Status

View status of Factory Reset State, Calibration in Progress, Signature or Partial Stroke Test in Progress, Jog Command Mode, Partial Stroke Test Scheduled, and DI Command Override.

4.3.1.9 Feedback Loop Status

View status of Position Deviation Alarm, Position Sensor Failure Alarm, Valve Opened Too Far Warning, Valve Closed Too Far Warning, Backlash Warning, Backlash Alarm, Partial Stroke Test Failed Warning, and Continuous Stroke Test Failed Warning.

4.3.1.10 Position Status

View status of Position High Limit Alert, Position Low Limit Alert and Feedback Linkage Alarm.

4.3.1.11 Cycles/Travel status

View status of Valve Cycles Warning, Valve Travel Warning, Actuator Cycles Warning, Actuator Travel Warning, Bellows Cycles Warning, Bellows Travel Warning, Pilot Relay Cycles Warning, and Pilot Relay Travel Warning.

4.3.1.12 Actuation Status

View status of Supply Pressure High Warning, Supply Pressure Low Warning, Supply Pressure Low Alarm, Actuation Ratio Warning, Spring Unable to Fail Safe Warning, Pneumatic Leak Warning, Air Supply Humid Warning, and Air Supply Icing Warning.

4.3.1.13 Friction Status

View status of Friction High Warning, Friction High Alarm, Friction Low Warning, Friction Low Alarm, Valve Can't Open Alarm, and Valve Can't Shut Alarm.

4.3.1.14 Control Status

View status of Command Frequency Warning, Command Frequency Alarm, Command Amplitude Warning, Command Amplitude Alarm, Position Frequency Warning, Position Frequency Alarm, Position Amplitude Warning, and Position Amplitude Alarm.

4.3.1.15 Inner Loop Status

View status of Pilot Relay Response Warning, Pilot Relay Response Alarm, Piezo Voltage High Warning, Piezo Voltage High Alarm, Piezo Voltage Low Warning, Piezo Voltage Low Alarm, and Driver Module Alarm.

4.3.1.16 Main Board Status

View status of Main Board Electronic Failure Warning, Software Error Warning, Memory Error Warning, Temperature High Warning, and Temperature Low Warning.

4.3.1.17 Electronic Board Status

View status of Aux Card 1 Failure Warning, Aux Card 2 Failure Warning, Aux Card 1 No Loop Power, Aux Card 2 No Loop Power, Aux Card 1 Error, Aux Card 2 Error, Pressure Sensor Board Failure Warning, and Low Battery Warning.

4.3.1.18 Stroke/Friction status

View status of Reversed Spring, Insufficient Spring, and No Spring.

4.3.1.19 Main Board Status

View status of Humidity Sensor Failure, Oscillator Fault, Position Sensor ADC Failure, Supply Voltage Error, Reference Voltage Error, Shunt Voltage Error, and Piezo Voltage Error.

4.3.1.20 Electrical Components Status

View status of Pilot Can't Open, Pilot Can't Shut, Hall Sensor Failure, and ILO Out Of Range.

4.3.1.21 Software Status

View status of NVMEM CRC Error, RAM Error, RAM CRC Error, FLASH CRC Error, Watch Dog Time Out, Stack Overflow Warning, CPU Usage Warning, and Firmware Update Applied.

4.3.1.22 Pressure Calibration Status

View status of Port S Out Of Range, Port A Out Of Range, Port B Out Of Range, Port S Range too Small, Port A Range too Small, Port B Range too Small, and Pressure Sensor Failure.

4.3.2 Status Byte Masks

Mask status indicators from appearing in command 48. This applies only to warnings, alarms and alerts that affect the health of the system.

4.3.2.1 Startup Status

Mask Power ON, Initializing, Stroke Calibration Required, Pressure Calibration Required, and Friction Calibration Required.

4.3.2.2 Mode Status 1

Mask Digital Command Mode, Tight Shut Off Mode, Pressure Control Locked, Soft Stop High Limit Alert, and Soft Stop Low Limit Alert.

4.3.2.3 Mode Status 2

Mask Continuous Stroke Test Mode, Training Mode In Progress, Training Mode Completed, Event Captured, Local Interface Off, and Squawk Mode.

4.3.2.4 Calibration Status

Mask Stroke Calibration in Progress, Setting Inner Loop Offset, Pressure Calibration in Progress, Friction Calibration in Progress, Command Input Calibration in Progress, Analog Output Calibration In Progress, and Jog Calibration Set 100% Position.

4.3.2.5 Calibration Error Status 1

Mask Position Range Too Small, Position Sensor Below ADC Range, Position Sensor Above ADC Range, No Motion Time Out, Settle Time Out, and Inner Loop Offset Time Out.

4.3.2.6 Calibration Error Status 2

Mask Analog Output Range Too Small, Command Input Range Too Small, Command Input Below ADC Range, Command Input Above ADC Range, Stroke Shift, Stroke Span Increase, and Stroke Span Decrease.

4.3.2.7 Electronic Configuration Status

Mask Aux Card 1 Present, Aux Card 2 Present, Pressure Sensor Board Present, and LCD Present.

4.3.2.8 Mode States Status

Mask Factory Reset State, Calibration in Progress, Signature or Partial Stroke Test in Progress, Jog Command Mode, Partial Stroke Test Scheduled, and DI Command Override.

4.3.2.9 Feedback Loop Status

Mask Position Deviation Alarm, Position Sensor Failure Alarm, Valve Opened Too Far Warning, Valve Closed Too Far Warning, Backlash Warning, Backlash Alarm, Partial Stroke Test Failed Warning, and Continuous Stroke Test Failed Warning.

4.3.2.10 Position Status

Mask Position High Limit Alert, Position Low Limit Alert and Feedback Linkage Alarm.

4.3.2.11 Cycles/Travel status

Mask Valve Cycles Warning, Valve Travel Warning, Actuator Cycles Warning, Actuator Travel Warning, Bellows Cycles Warning, Bellows Travel Warning, Pilot Relay Cycles Warning, and Pilot Relay Travel Warning.

4.3.2.12 Actuation Status

Mask Supply Pressure High Warning, Supply Pressure Low Warning, Supply Pressure Low Alarm, Actuation Ratio Warning, Spring Unable to Fail Safe Warning, Pneumatic Leak Warning, Air Supply Humid Warning, and Air Supply Icing Warning.

4.3.2.13 Friction Status

Mask Friction High Warning, Friction High Alarm, Friction Low Warning, Friction Low Alarm, Valve Can't Open Alarm, and Valve Can't Shut Alarm.

4.3.2.14 Control Status

Mask Command Frequency Warning, Command Frequency Alarm, Command Amplitude Warning, Command Amplitude Alarm, Position Frequency Warning, Position Frequency Alarm, Position Amplitude Warning, and Position Amplitude Alarm.

4.3.2.15 Inner Loop Status

Mask Pilot Relay Response Warning, Pilot Relay Response Alarm, Piezo Voltage High Warning, Piezo Voltage High Alarm, Piezo Voltage Low Warning, Piezo Voltage Low Alarm, and Driver Module Alarm.

4.3.2.16 Main Board Status

Mask Main Board Electronic Failure Warning, Software Error Warning, Memory Error Warning, Temperature High Warning, and Temperature Low Warning.

4.3.2.17 Electronic Board Status

Mask Aux Card 1 Failure Warning, Aux Card 2 Failure Warning, Aux Card 1 No Loop Power, Aux Card 2 No Loop Power, Aux Card 1 Error, Aux Card 2 Error, Pressure Sensor Board Failure Warning, and Low Battery Warning.

4.3.2.18 Stroke/Friction status

Mask Reversed Spring, Insufficient Spring, and No Spring.

4.3.2.19 Main Board Status

Mask Humidity Sensor Failure, Oscillator Fault, Position Sensor ADC Failure, Supply Voltage Error, Reference Voltage Error, Shunt Voltage Error, and Piezo Voltage Error.

4.3.2.20 Electrical Components Status

Mask Pilot Can't Open, Pilot Can't Shut, Hall Sensor Failure, and ILO Out Of Range.

4.3.2.21 Software Status

Mask NVMEM CRC Error, RAM Error, RAM CRC Error, FLASH CRC Error, Watch Dog Time Out, Stack Overflow Warning, CPU Usage Warning, and Firmware Update Applied.

4.3.2.22 Pressure Calibration Status

Mask Port S Out Of Range, Port A Out Of Range, Port B Out Of Range, Port S Range too Small, Port A Range too Small, Port B Range too Small, and Pressure Sensor Failure.

5 STROKE TESTS

Run a partial stroke tests and view results. Configure the continuous stroke test.

⚠ DANGER: *Using this feature will 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.*

5.1 Partial Stroke Test

Run a partial stroke tests and view results.

5.1.1 Run Partial Stroke Test

Start a partial stroke test. Warning: The PST will cause valve movement.

5.1.2 PST Time To Breakaway

View the time required for the valve to begin movement.

5.1.3 PST Force at Breakaway

View the force recorded when the valve began to move. This force is valid for slow ramps only.

5.1.4 PST Time to Target

View the time taken for the position to come within 2% of the final command after the initial change in command.

5.1.5 PST Result

View the pass/fail result of the last partial stroke test.

5.2 Continuous Stroke Test

Configure the continuous stroke test (CST). This feature is NOT recommended for processes requiring highly accurate positioning, or for valves that are frequently adjusting position. The CST function superimposes a small, continuous bi-directional ramp over the input command. By constantly moving the valve, additional diagnostic data can be gathered that would otherwise be unavailable with a constant input command. The superimposed ramp reverses when the valve moves.

5.2.1 CST Ramp Rate

Set the rate of the superimposed ramp in percent/second.

5.2.2 CST Max Amplitude

Set the maximum ramp amplitude. The valve position will not always follow the full ramp amplitude. If the valve moves before the full ramp amplitude is reached, the superimposed ramp command will be reversed, edging the valve the other way. This way the actual movement of the valve is minimized.

5.2.3 CST Interval

Set the amount of time (in seconds) the positioner should wait between ramping attempts.

5.2.4 CST Failure Count

View the number of times the valve failed to move at the end of a ramp.

5.2.5 CST On/Off

Turn CST on or off. Warning: The CST will cause small periodic valve movements.

6 CALIBRATION

Calibrate all aspects of the positioner.

6.1 Calibrate Sensors

Calibrate the stroke, pressure sensors, friction feature, or all of them in one operation using the "Triple" calibration.

6.2 Calibrate Command Input

Calibrate the analog command input. Typically this will be 4 to 20 mA. However, a split range can be set also.

⚠ DANGER: *Using this feature will 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.*

6.3 Calibration Dates and Times

View a history of previous calibration dates and times.

6.4 Calibrate MFC Analog Out 1

Calibrate the analog output. A multi-function card (MFC) must be installed in slot 1 and configured for the AO function.

6.5 Calibrate MFC Analog Out 2

Calibrate the analog output. A multi-function card (MFC) must be installed in slot 2 and configured for the AO function.

6.6 Calibration Status

View details about the calibration flags.

6.6.1 StartUp Status

View the state of the positioner including Power ON, Initializing, Stroke Calibration Required, Pressure Calibration Required, and Friction Calibration Required.

6.6.2 Calibration Status

View the state of the positioner including Stroke Calibration in Progress, Setting Inner Loop Offset, Pressure Calibration in Progress, Friction Calibration in Progress, Command Input Calibration in Progress, Analog Output Calibration In Progress, and Jog Calibration Set 100% Position.

7 CONFIGURATION

View and set the configuration of the system.

7.1 Reset Factory Defaults

Reset all values back to the default state. This will affect the positioner behavior and configuration settings will be reset. After a factory reset, the positioner will need to be configured and stroke calibration will need to be performed.

⚠ DANGER: *Using this feature will result in valve movement and the inability to operate the valve until the positioner is calibrated. Notify proper personnel that the valve may stroke, and make sure the valve is properly isolated before proceeding.*

7.2 Device Information

View the information about the system .

7.2.1 Revisions and Serial Numbers

View information about the system revisions and serial numbers.

7.2.1.1 Software Release

View the software version number.

7.2.1.2 Electronic Serial Number

View the serial number assigned to the positioner. This number is listed on the positioner label.

7.2.1.3 Valve Serial Number

View the valve serial number. This number is entered by the user. See Valve Information.

7.2.2 Positioner Information

View information about HART and the positioner.

7.2.2.1 HART Manufacturer ID

View the positioner manufacturer.

7.2.2.2 HART Device Type

View HART device type of the positioner.

7.2.2.3 Diagnostics Level

View the diagnostic level of the positioner. Three levels are possible - Standard, Advanced, and Pro.

7.2.2.4 Model Number

View the positioner model number.

7.2.3 Actuator Information

View and set information about the actuators.

7.2.3.1 Select Actuator Settings

Select actuators from a list to automatically look up and store some of the actuator information.

7.2.3.2 Actuator Manufacturer

Select the actuator manufacturer from a list.

7.2.3.3 Actuator Model

Select the actuator model from a list.

7.2.3.4 Actuator Size

Select the actuator size. Selecting the area of the actuator is important for some of the diagnostics that deal with force, such as the friction values.

7.2.3.5 Actuator Spring

Select the actuator spring type from a list.

7.2.3.6 Actuator Style

Select the actuator style from a list.

7.2.4 Valve Trim Information

View and set information about the valve trim.

7.2.4.1 Trim Number/Size

Set the Trim Number/Size.

7.2.4.2 Trim Characteristic

Set the Trim Characteristic.

7.2.4.3 Trim Type

Set the Trim Type.

7.2.4.4 Trim Material

Set the Trim Material.

7.2.4.5 Stroke Length

Set the Stroke Length.

7.2.4.6 Stem Diameter

Set the Stem Diameter.

7.2.4.7 Packing Style

Set the Packing Style.

7.2.4.8 Bonnet Type

Set the Bonnet Type.

7.2.4.9 Pressure Balance

Set the Pressure Balance.

7.2.5 7.2.5.0 - Valve Body Information

View and set information about the valve body.

7.2.5.1 Valve Serial Number

Set the Valve Serial Number.

7.2.5.2 Valve Manufacturer

Set the Valve Manufacturer.

7.2.5.3 Valve Model

Set the Valve Model.

7.2.5.4 Valve Body Size

Set the Valve Body Size.

7.2.5.5 Valve Body Material

Set the Valve Body Material.

7.2.5.6 Valve End Connections

Set the Valve End Connections.

7.2.5.7 Fail Direction

Set the direction the valve is tubed to fail upon loss of pressure.

7.2.5.8 Flow Direction

Set if flow direction.

7.2.5.9 Valve Type

Set rotary or linear.

7.2.5.10 Valve Pressure Class

Set the Valve Pressure Class.

7.2.5.11 Valve Leak Class

Set the Valve Leak Class.

7.2.5.12 Valve Inlet Pressure

Set the Valve Inlet Pressure.

7.2.5.13 Valve Outlet Pressure

Set the Valve Outlet Pressure.

7.3 Control Config

Set parameters the affect the control of the valve. Warning: Adjusting the control configuration will affect the way the valve position is controlled.

7.3.1 Device Configuration

Override DIP switch settings, reverse the LCD, set fail position, view relay type

DANGER: *Changing the DIP Switch settings 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.*

7.3.1.1 Dip Sw Air Action

Override the DIP switch on the positioner to change the Air Action. Select Air to Open or Air to Close.

7.3.1.2 Dip Sw Actuator

Override the DIP switch on the positioner to change the Actuator action. Select Double or Single. This is only applicable for positioners with double acting relay modules.

7.3.1.3 Dip Sw Sig Closed

Override the DIP switch on the positioner to change the Signal at Closed. Select 4 mA or 20 mA.

7.3.1.4 Dip Sw Characterization

Override the DIP switch on the positioner to change the Characterization. Select Linear or Other. If Other is selected, choose a characterization curve using "Other Characterization" below.

7.3.1.5 Other Characterization

If the Characterization Dip Switch is set to "Other", select the desired characterization curve. The Custom curve has a default of equal percent for linear valves.

7.3.1.6 Dip Sw Auto Tune

Override the DIP switch on the positioner to change the Auto Tune setting. Select On or Off. Selecting On enables an auto tune feature that will automatically determine the positioner gain settings during a Quick-Cal. Selecting Off tells the positioner to use the factory preset tuning levels determined by the gain selector switch.

7.3.1.7 Dip Sw Quick Cal

Override the DIP switch on the positioner to change the Quick Cal mode. Select Auto or Jog. Select Auto under most circumstances. Select Jog if there is no hard stop on the valve at the 100% open position. When performing a Quick-Cal, the 100% position can be manually set.

7.3.1.8 Dip Sw Stability

Override the DIP switch on the positioner to change the Valve Stability. Select Low Friction or High Friction. Placing the switch to Lo Friction optimizes the response for low friction, high performance control valves. Placing the switch to the right optimizes the response for valves and actuators with high friction levels.

7.3.1.9 Dip Sw Spare

The Spare DIP typically has no function and is reserved for special features.

7.3.1.10 Fail Direction

Record the fail direction. Select Closed or Open. This entry does not affect the function of the positioner or the fail position of the valve. It is only a label.

7.3.1.11 Flow Direction

Record the flow direction. Select Over, Under or Other. This should represent the configuration of the valve.

7.3.1.12 Valve Type

Record the valve type. Select Linear or Rotary. This entry does not affect the function of the positioner. It is only a label.

7.3.1.13 LCD Orientation

Select the LCD orientation. Select Normal or Reversed. Reversed will flip the LDC display upside down.

7.3.1.14 Pilot Relay Type

View the pilot relay type. Spool relays have higher capacity. Poppet relays have lower air consumption.

7.3.1.15 Pressure Board Status

View if the pressure sensor board is installed.

7.3.1.16 LCD Avail Status

View if the LCD is installed.

7.3.2 Positioner Tuning

View and adjust tuning parameters

⚠ DANGER: *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.*

7.3.2.1 Rotary Switch Settings

View the rotary switch setting. This is a live manual tune selector. Use this as a first option when adjusting the tuning.

7.3.2.2 P-Gain Mult Open

Adjust the proportional gain multiplier in the open direction. Use caution when adjusting gain settings. Small changes can cause the valve position to go unstable.

7.3.2.3 P-Gain Mult Close

Adjust the proportional gain multiplier in the close direction. Use caution when adjusting gain settings. Small changes can cause the valve position to go unstable.

7.3.2.4 P-Gain Max Open

Adjust the maximum proportional gain setting in the open direction. Use caution when adjusting gain settings. Small changes can cause the valve position to go unstable.

7.3.2.5 P-Gain Max Close

Adjust the maximum proportional gain setting in the close direction. Use caution when adjusting gain settings. Small changes can cause the valve position to go unstable.

7.3.2.6 D-Term Depth Open

Adjust the derivative gain depth in the open direction. Use caution when adjusting gain settings. Small changes can cause the valve position to go unstable.

7.3.2.7 D-Term Depth Close

Adjust the derivative gain depth in the close direction. Use caution when adjusting gain settings. Small changes can cause the valve position to go unstable.

7.3.2.8 D-Gain Basic Open

Adjust the basic derivative gain in the open direction. Use caution when adjusting gain settings. Small changes can cause the valve position to go unstable.

7.3.2.9 D-Gain Basic Close

Adjust the basic derivative gain in the close direction. Use caution when adjusting gain settings. Small changes can cause the valve position to go unstable.

7.3.2.10 I-Gain Open

Adjust the integral gain in the open direction. Use caution when adjusting gain settings. Small changes can cause the valve position to go unstable.

7.3.2.11 I-Gain Close

Adjust the integral gain in the close direction. Use caution when adjusting gain settings. Small changes can cause the valve position to go unstable.

7.3.2.12 Stroke Time Open

Adjust the stroke time in the open direction. This time is determined at calibration. A smaller stroke time will increase the responsiveness in the open direction.

7.3.2.13 Stroke Time Close

Adjust the stroke time in the close direction. This time is determined at calibration. A smaller stroke time will increase the responsiveness in the close direction.

7.3.2.14 Min Open Time

Set the minimum open time. This is a speed limit for any movement of the valve in the open direction. The maximum rate will be 100% / Min Open Time.

7.3.2.15 Min Close Time

Set the minimum close time. This is a speed limit for any movement of the valve in the close direction. The maximum rate will be 100% / Min Close Time.

7.3.2.16 Inner Loop Offset

Set the Inner Loop Offset. This is automatically determined at calibration. Do not adjust this unless the positioner is not responding and the current value is not between 30% and 70%.

7.3.3 Pressure Control

View and set the pressure control lock parameters. When the Valve Stability DIP switch is set to High Friction and the deviation is less than the Window value, the position will be locked based on pressure control rather than position feedback. When the Valve Stability DIP switch is set to Low Friction, the pressure window is automatically optimized to be as small as possible.

7.3.3.1 Pressure Lock

View the status of the pressure lock.

7.3.3.2 Window Multiplier

Set the window multiplier value for automatic optimization of the pressure control window when the Valve Stability DIP switch is set to Low Friction. Typically this value does not need adjustment.

7.3.3.3 Window Gain

Set the window gain value for automatic optimization of the pressure control window when the Valve Stability DIP switch is set to Low Friction. Typically this value does not need adjustment.

7.3.3.4 Window

Set the size pressure control window when the Valve Stability DIP switch is set to Hi Friction. A larger window will stop valve oscillations caused by very high friction. A smaller window will allow more accurate valve positioning.

7.3.4 Soft Limits & Shutoff

Set Soft Limits that stop the valve from traveling beyond a set point. Set Shutoff limits that cause full pressure to close or open the valve.

7.3.4.1 Soft Stop High

Set the maximum valve position the final command will allow, regardless of the analog or digital input command. This is similar to placing a physical block on the valve stem to limit the amount the valve can open.

7.3.4.2 Soft Stop Low

Set the minimum valve position the final command will allow, regardless of the analog or digital input command. This is similar to placing a physical block on the valve stem to limit the amount the valve can close.

7.3.4.3 Tight Shutoff Upper

Set the upper command limit that will trigger the positioner to apply full supply pressure in the open direction. For example, after setting the Tight Shutoff Upper to 95%, if the positioner receives any input command greater than 95%, full supply pressure will be applied to open the valve.

7.3.4.4 Tight Shutoff Lower

Set the lower command limit that will trigger the positioner to apply full supply pressure in the close direction. For example, after setting the Tight Shutoff Upper to 5%, if the positioner receives any input command less than 5%, full supply pressure will be applied to close the valve.

7.3.4.5 Tight Shutoff Hysteresis

Enter the amount the command must backtrack in order for the positioner to return to regular control. For example, if the Tight Shutoff Upper is set to 90%, and Tight Shutoff Hysteresis is set at 2%. The command must return from 90% to 88% in order for the positioner to control normally. This is to prevent an oscillation in and out of Tight Shutoff mode.

7.4 Alerts / Alarms Config

View and set alarm and alert limits.

7.4.1 Position

View and set alarm and alert limits regarding position.

7.4.1.1 Position High Alert

Set the upper limit at which an alert will be sounded. The valve will be allowed to continue travel beyond this point.

7.4.1.2 Position Low Alert

Set the lower limit at which an alert will be sounded. The valve will be allowed to continue travel beyond this point.

7.4.1.3 Position Deviation Dead band

Set the amount of allowable deviation before sounding the Position Deviation alarm. The deviation must remain for the time set in the Position Deviation Time parameter.

7.4.1.4 Position Deviation Time

Set the amount of allowable time before sounding the Position Deviation alarm. The deviation must be outside of the deviation limit set in the Position Deviation Dead Band parameter.

7.4.2 Pneumatic Leak

View and set pneumatic leak limits.

7.4.2.1 Leak Pneumatic

View the amount of pneumatic leak beyond normal air consumption. This feature requires Pro diagnostics.

7.4.2.2 Leak High Start Limit

Set the pneumatic leak limit at which a warning will appear.

7.4.2.3 Leak High End Limit

Set the pneumatic leak limit at which a warning will show full severity.

7.4.2.4 Leak Percent Warning

View the severity of the pneumatic leak warning based on the Start and End limits.

7.4.3 Friction

View and set friction limits. This feature requires Pro diagnostics.

7.4.3.1 Friction

View the friction of the valve and actuator assembly.

7.4.3.2 Nominal Friction

View the last saved friction value.

7.4.3.3 Friction Hi Start Limit

Set the high friction limit at which a warning will appear.

7.4.3.4 Friction Hi End Limit

Set the high friction limit at which a warning will show full severity.

7.4.3.5 Friction Low Start Limit

Set the low friction limit at which a warning will appear.

7.4.3.6 Friction Low End Limit

Set the low friction limit at which a warning will show full severity.

7.4.3.7 Friction Hi Percent Warning

View the severity of the high friction warning based on the Start and End limits.

7.4.3.8 Friction Low Percent Warning

View the severity of the low friction warning based on the Start and End limits.

7.4.3.9 Force Up at 15 Percent

View the force required to move the valve up at 15% position.

7.4.3.10 Force Down at 15 Percent

View the force required to move the valve down at 15% position.

7.4.3.11 Force Up at 85 Percent

View the force required to move the valve up at 85% position.

7.4.3.12 Force Down at 85 Percent

View the force required to move the valve down at 85% position.

7.4.3.13 Spring Rate

View the calculated spring rate which is the force change over the full stroke. A negative value indicates the spring is pushing the valve in the close direction.

7.4.3.14 Spring Pre Load

View the estimated force of the spring at the close position. A negative value indicates the spring is pushing the valve in the close direction.

7.4.3.15 Force Up

View the force required to move the valve up under the most recent conditions.

7.4.3.16 Force Down

View the force required to move the valve down under the most recent conditions.

7.4.4 Piezo Data

View piezo data. The piezo is a small valve in the positioner that is controlled electronically and drives the pilot relay.

7.4.4.1 Piezo Command 1 Avg

View the average piezo command (1st aspect).

7.4.4.2 Piezo Command 2 Avg

View the average piezo command (2nd aspect).

7.4.4.3 Piezo Volts 1 Avg

View the average actual piezo voltage (1st aspect).

7.4.4.4 Piezo Volts 2 Avg

View the average actual piezo voltage (2nd aspect).

7.4.4.5 Piezo Volts

View current piezo voltage.

7.4.4.6 Piezo Volts High Percent Warning

Set the limit at which an Piezo Voltage High warning will appear.

7.4.4.7 Piezo Volts Low Percent Warning

Set the limit at which a Piezo Voltage Low warning will appear.

7.4.5 Actuation Ratio

View and set the Actuation Ratio alarm limits. The Actuation Ratio is the force required to actuate the valve as a percentage of the total force available. The value is an estimate of the force that would be required to move the

valve to the end of travel, fully compressing the actuator spring(s). It is affected by the process load, friction, spring force, and available supply pressure. This feature requires Pro diagnostics.

7.4.5.1 Actuation Ratio

View the current value of the Actuation Ratio.

7.4.5.2 Actuation Ratio Hi Start Limit

Set the limit at which an Actuation Ratio warning will appear.

7.4.5.3 Actuation Ratio Hi End Limit

Set the limit at which an Actuation Ratio warning will show full severity.

7.4.5.4 Actuation Ratio Percent Warning

View the severity of the Actuation Ratio warning based on the Start and End limits.

7.4.6 Pilot Response

View and set the Pilot Response warning limits. The pilot response is a measure of how rapidly the pilot relay is following the pilot relay command. Longer times indicate slower response. This feature requires Pro diagnostics.

7.4.6.1 Pilot Response Time

View the current value of the pilot response time. This is a measure of how rapidly the pilot relay is following the pilot relay command.

7.4.6.2 Pilot Response Hi Start Limit

Set the limit at which the Pilot Response warning will appear.

7.4.6.3 Pilot Response Hi End Limit

Set the limit at which the Pilot Response warning will show full severity.

7.4.6.4 Pilot Response Percent Warning

View the severity of the Pilot Response warning based on the Start and End limits.

7.4.7 Command/Position Frequencies

Set and view parameters associated with the command and position frequency amplitude. This feature requires Pro diagnostics.

7.4.7.1 Command Frequency

View the typical frequency of the command input cycling In cycles/hour.

7.4.7.2 Command Frequency Hi Start Limit

Set the limit at which the Command Frequency warning will appear.

7.4.7.3 Command Frequency Hi End Limit

Set the limit at which the Command Frequency warning will show full severity.

7.4.7.4 Command Frequency Hi Percent Warning

View the severity of the Command Frequency warning based on the Start and End limits.

7.4.7.5 Command Amplitude

View the typical amplitude of the command input.

7.4.7.6 Command Amplitude Hi Start Limit

Set the limit at which the Command Amplitude warning will appear.

7.4.7.7 Command Amplitude Hi End Limit

Set the limit at which the Command Amplitude warning will show full severity.

7.4.7.8 Command Amplitude Hi Percent Warning

View the severity of the Command Amplitude warning based on the Start and End limits.

7.4.7.9 Position Frequency

View the typical frequency of the position cycling in cycles/hour.

7.4.7.10 Position Frequency Hi Start limit

Set the limit at which the Position Frequency warning will appear.

7.4.7.11 Position Frequency Hi End Limit

Set the limit at which the Position Frequency warning will show full severity.

7.4.7.12 Position Frequency Hi Percent Warning

View the severity of the Position Frequency warning based on the Start and End limits.

7.4.7.13 Position Amplitude

View the typical amplitude of the valve position.

7.4.7.14 Position Amplitude Hi Start limit

Set the limit at which the Position Amplitude warning will appear.

7.4.7.15 Position Amplitude Hi End Limit

Set the limit at which the Position Amplitude warning will show full severity.

7.4.7.16 Position Amplitude Hi Percent Warning

View the severity of the Position Amplitude warning based on the Start and End limits.

7.4.8 Valve travel/Cycles

View and adjust the limits for the valve cycling and travel warnings.

7.4.8.1 Valve Travel

View the total valve travel.

7.4.8.2 Valve Travel Hi Start Limit

Set the limit at which the Valve Travel warning will appear.

7.4.8.3 Valve Travel Hi End Limit

Set the limit at which the Valve Travel warning will show full severity.

7.4.8.4 Valve Travel Hi Percent Warning

View the severity of the Valve Travel warning based on the Start and End limits.

7.4.8.5 Valve Travel Dead Band

Set the amount the valve must move in order to begin adding to the travel total.

7.4.8.6 Valve Cycles

View the total valve cycles.

7.4.8.7 Valve Cycles Hi Start Limit

Set the limit at which the Valve Cycles warning will appear.

7.4.8.8 Valve Cycles Hi End Limit

Set the limit at which the Valve Cycles warning will show full severity.

7.4.8.9 Valve Cycles Hi Percent Warning

View the severity of the Valve Cycles warning based on the Start and End limits.

7.4.8.10 Valve Cycle Dead Band

Set the amount the valve must move in order to begin adding to the travel and cycle totals.

7.4.8.11 Stroke Length

Enter the stroke length of the valve.

7.4.8.12 Valve Travel/Cycles Reset

Reset the valve travel or cycle counter.

7.4.9 Actuator Travel/Cycles

View and adjust the limits for the actuator cycling and travel warnings.

7.4.9.1 Actuator Travel

View the total actuator travel.

7.4.9.2 Actuator Travel Hi Start Limit

Set the limit at which the Actuator Travel warning will appear.

7.4.9.3 Actuator Travel Hi End Limit

Set the limit at which the Actuator Travel warning will show full severity.

7.4.9.4 Actuator Travel Hi Percent Warning

View the severity of the Actuator Travel warning based on the Start and End limits.

7.4.9.5 Actuator Cycles

View the total actuator cycles.

7.4.9.6 Actuator Cycles Hi Start Limit

Set the limit at which the Actuator Cycles warning will appear.

7.4.9.7 Actuator Cycles Hi End Limit

Set the limit at which the Actuator Cycles warning will show full severity.

7.4.9.8 Actuator Cycles Hi Percent Warning

View the severity of the Actuator Cycles warning based on the Start and End limits.

7.4.9.9 - Actuator Travel/Cycles Reset

Reset the actuator travel or cycle counter.

7.4.10 Bellows Travel/Cycles

View and adjust the limits for the bellows cycling and travel warnings.

7.4.10.1 Bellows Travel

View the total bellows travel.

7.4.10.2 Bellows Travel Hi Start Limit

Set the limit at which the Bellows Travel warning will appear.

7.4.10.3 Bellows Travel Hi End Limit

Set the limit at which the Bellows Travel warning will show full severity.

7.4.10.4 Bellows Travel Hi Percent Warning

View the severity of the Bellows Travel warning based on the Start and End limits.

7.4.10.5 Bellows Cycles

View the total bellows cycles.

7.4.10.6 Bellows Cycles Hi Start Limit

Set the limit at which the Bellows Cycles warning will appear.

7.4.10.7 Bellows Cycles Hi End Limit

Set the limit at which the Bellows Cycles warning will show full severity.

7.4.10.8 Bellows Cycles Hi Percent Warning

View the severity of the Bellows Cycles warning based on the Start and End limits.

7.4.10.9 Bellows Travel/Cycles Reset

Reset the bellows travel or cycle counter.

7.4.11 Pilot travel/Cycles

View and adjust the limits for the pilot relay cycling and travel warnings.

7.4.11.1 Pilot Travel

View the total pilot relay travel.

7.4.11.2 Pilot Travel Hi Start Limit

Set the limit at which the Pilot Relay Travel warning will appear.

7.4.11.3 Pilot Travel Hi End Limit

Set the limit at which the Pilot Relay Travel warning will show full severity.

7.4.11.4 Pilot Travel Hi Percent Warning

View the severity of the Pilot Relay Travel warning based on the Start and End limits.

7.4.11.5 Pilot Cycles

View the total pilot relay cycles.

7.4.11.6 Pilot Cycles Hi Start Limit

Set the limit at which the Pilot Relay Cycles warning will appear.

7.4.11.7 Pilot Cycles Hi End Limit

Set the limit at which the Pilot Relay Cycles warning will show full severity.

7.4.11.8 Pilot Cycles Hi Percent Warning

View the severity of the Pilot Relay Cycles warning based on the Start and End limits.

7.4.11.9 Pilot Travel/Cycles Reset

Reset the pilot relay travel or cycle counter.

7.5 User Preferences

View and set user preferences such as date, interface lock, and units.

7.5.1 View/Set Date and Time

View and set the positioner date and time.

7.5.2 Local Interface

Lock the local interface of the positioner and set a pin code. Locking the local interface prevents unauthorized changes from taking place at the positioner's button panel that affect the control or configuration of the positioner.

7.5.2.1 Local Interface Enable/Disable

Lock the local interface so that no adjustments can be made to the control or configuration of the positioner using the buttons on the positioner without a pin code. The gain switch will still be responsive.

7.5.2.2 Pin Code

Set a pin code to allow access to modify positioner control and configuration parameters at the positioner's local interface.

7.5.3 Select Units

Set desired units.

7.5.3.1 Area Units

Set area units (in², cm²)

7.5.3.2 Travel Units

Set travel units (%)

7.5.3.3 Pressure Units

Set pressure units (psi, bar, kg/cm², kPa)

7.5.3.4 Force Units

Set force units (lbf, kg, N)

7.5.3.5 Temperature Units

Set temperature units (degrees F, degrees C)

7.5.3.6 Air Flow Units

Set the air flow units (scfm, slpm, slph, Nm³/hr)

7.6 Burst Mode

Change burst mode settings and activate burst mode.

7.6.1 Burst Command Setup

Set burst mode to use command 1, 2, 3, 9, 33, or 48.

7.6.2 Burst State Setup

Select out of the following burst mode variables.

- Command (mA)
- Command % (Analog)
- Command % (Digital)
- Command %
- Command % Target
- Position %
- Deviation %
- Pilot Command %
- Pilot Position %
- Temperature User
- Actuation Ratio
- Pilot Response Time (T86)
- Pneumatic Leak
- Pressure Supply
- Pressure Deviation
- Pressure Port A
- Pressure Port B
- Friction

7.6.3 Burst Mode Configuration

Turn Burst mode on or off.

8 AUXILIARY CARDS

Manage auxiliary card configuration and view status. These menus change based on the presence of and configuration of the auxiliary cards.

8.1 Auxiliary Card 1 ID

View the auxiliary card present in slot 1. This feature is only present if an auxiliary card is in slot 1.

8.2 Auxiliary Card 1 Type

View and set the type configuration of the auxiliary card present in slot 1. This feature is only present if an auxiliary card is in slot 1.

⚠ DANGER: *Discrete input settings affect the valve movement by initiating a PST or moving to a set point according to the voltage supplied to the MFC. Verify connections and notify proper personnel that the valve may stroke, and make sure the valve is properly isolated before proceeding.*

8.3 Auxiliary Card 1 DI Setup

If the card in slot 1 is a Discrete Input, configure the settings.

8.3.1 MFC 1 DI State

Select the action when the DI state is triggered. Discrete input settings affect the valve movement by initiating a PST or moving to a set point according to the voltage supplied to the MFC. Verify connections before proceeding.

8.3.2 MFC 1 DI Command

If the DI action is Command Override, set the desired position where the valve should move when the DI state is triggered.

8.4 Auxiliary Card 1 DO Trigger

If the card in slot 1 is a Discrete Output, configure the settings.

8.4.1 Startup Status

Select DO in slot 1 to trigger on Power ON, Initializing, Stroke Calibration Required, Pressure Calibration Required, and Friction Calibration Required.

8.4.2 Mode Status 1

Select DO in slot 1 to trigger on Digital Command Mode, Tight Shut Off Mode, Pressure Control Locked, Soft Stop High Limit Alert, and Soft Stop Low Limit Alert.

8.4.3 Mode Status 2

Select DO in slot 1 to trigger on Continuous Stroke Test Mode, Training Mode In Progress, Training Mode Completed, Event Captured, Local Interface Off, and Squawk Mode.

8.4.4 Cal Status

Select DO in slot 1 to trigger on Stroke Calibration in Progress, Setting Inner Loop Offset, Pressure Calibration in Progress, Friction Calibration in Progress, Command Input

Calibration in Progress, Analog Output Calibration In Progress, and Jog Calibration Set 100% Position.

8.4.5 Cal Error Status 1

Select DO in slot 1 to trigger on Position Range Too Small, Position Sensor Below ADC Range, Position Sensor Above ADC Range, No Motion Time Out, Settle Time Out, and Inner Loop Offset Time Out.

8.4.6 Cal Error Status 2

Select DO in slot 1 to trigger on Analog Output Range Too Small, Command Input Range Too Small, Command Input Below ADC Range, Command Input Above ADC Range, Stroke Shift, Stroke Span Increase, and Stroke Span Decrease.

8.4.7 Electronic Configuration Status

Select DO in slot 1 to trigger on Aux Card 1 Present, Aux Card 2 Present, Pressure Sensor Board Present, and LCD Present.

8.4.8 Mode States Status

Select DO in slot 1 to trigger on Factory Reset State, Calibration in Progress, Signature or Partial Stroke Test in Progress, Jog Command Mode, Partial Stroke Test Scheduled, and DI Command Override.

8.4.9 Feedback Loop Status

Select DO in slot 1 to trigger on Position Deviation Alarm, Position Sensor Failure Alarm, Valve Opened Too Far Warning, Valve Closed Too Far Warning, Backlash Warning, Backlash Alarm, Partial Stroke Test Failed Warning, and Continuous Stroke Test Failed Warning.

8.4.10 Position Status

Select DO in slot 1 to trigger on Position High Limit Alert, Position Low Limit Alert and Feedback Linkage Alarm.

8.4.11 Cycles/Travel Status

Select DO in slot 1 to trigger on Valve Cycles Warning, Valve Travel Warning, Actuator Cycles Warning, Actuator Travel Warning, Bellows Cycles Warning, Bellows Travel Warning, Pilot Relay Cycles Warning, and Pilot Relay Travel Warning.

8.4.12 Actuation Status

Select DO in slot 1 to trigger on Supply Pressure High Warning, Supply Pressure Low Warning, Supply Pressure Low Alarm, Actuation Ratio Warning, Spring Unable to Fail Safe Warning, Pneumatic Leak Warning, Air Supply Humid Warning, and Air Supply Icing Warning.

8.4.13 Friction Status

Select DO in slot 1 to trigger on Friction High Warning, Friction High Alarm, Friction Low Warning, Friction Low Alarm, Valve Can't Open Alarm, and Valve Can't Shut Alarm.

8.4.14 Control Status

Select DO in slot 1 to trigger on Command Frequency Warning, Command Frequency Alarm, Command Amplitude

Warning, Command Amplitude Alarm, Position Frequency Warning, Position Frequency Alarm, Position Amplitude Warning, and Position Amplitude Alarm.

8.4.15 Inner Loop Status

Select DO in slot 1 to trigger on Pilot Relay Response Warning, Pilot Relay Response Alarm, Piezo Voltage High Warning, Piezo Voltage High Alarm, Piezo Voltage Low Warning, Piezo Voltage Low Alarm, and Driver Module Alarm.

8.4.16 Main Board Status

Select DO in slot 1 to trigger on Main Board Electronic Failure Warning, Software Error Warning, Memory Error Warning, Temperature High Warning, and Temperature Low Warning.

8.4.17 Electronic Board Status

Select DO in slot 1 to trigger on Aux Card 1 Failure Warning, Aux Card 2 Failure Warning, Aux Card 1 No Loop Power, Aux Card 2 No Loop Power, Aux Card 1 Error, Aux Card 2 Error, Pressure Sensor Board Failure Warning, and Low Battery Warning.

8.4.18 Stroke/Friction Status

Select DO in slot 1 to trigger on Reversed Spring, Insufficient Spring, and No Spring.

8.4.19 Main Board Status

Select DO in slot 1 to trigger on Humidity Sensor Failure, Oscillator Fault, Position Sensor ADC Failure, Supply Voltage Error, Reference Voltage Error, Shunt Voltage Error, and Piezo Voltage Error.

8.4.20 Electronic Comp Status

Select DO in slot 1 to trigger on Pilot Can't Open, Pilot Can't Shut, Hall Sensor Failure, and ILO Out Of Range.

8.4.21 Software Status

Select DO in slot 1 to trigger on NVMEM CRC Error, RAM Error, RAM CRC Error, FLASH CRC Error, Watch Dog Time Out, Stack Overflow Warning, CPU Usage Warning, and Firmware Update Applied.

8.4.22 Press Cal Status

Select DO in slot 1 to trigger on Port S Out Of Range, Port A Out Of Range, Port B Out Of Range, Port S Range too Small, Port A Range too Small, Port B Range too Small, and Pressure Sensor Failure.

8.5 Calibrate MFC 1 Analog Out

If the card in slot 1 is an Analog Output, perform an analog output calibration.

8.6 Auxiliary Card 2 ID

View the auxiliary card present in slot 2. This feature is only present if there is an auxiliary card in slot 2.

8.7 Auxiliary Card 2 Type

View and set the type configuration of the auxiliary card present in slot 2. This feature is only present if there is an auxiliary card in slot 2.

⚠ DANGER: *Discrete input settings affect the valve movement by initiating a PST or moving to a set point according to the voltage supplied to the MFC. Verify connections and notify proper personnel that the valve may stroke, and make sure the valve is properly isolated before proceeding.*

8.8 Auxiliary Card 2 DI Setup

If the card in slot 2 is a Discrete Input, configure the settings

8.8.1 MFC 2 DI State

Select the action when the DI state is triggered. Discrete input settings affect the valve movement by initiating a PST or moving to a set point according to the voltage supplied to the MFC. Verify connections before proceeding.

8.8.2 MFC 2 DI Command

If the DI action is Command Override, set the desired position where the valve should move when the DI state is triggered.

8.9 Auxiliary Card 2 DO Trigger

If the card in slot 2 is a Discrete Output, configure the settings.

8.9.1 Startup Status

Select DO in slot 2 to trigger on Power ON, Initializing, Stroke Calibration Required, Pressure Calibration Required, and Friction Calibration Required.

8.9.2 Mode Status 1

Select DO in slot 2 to trigger on Digital Command Mode, Tight Shut Off Mode, Pressure Control Locked, Soft Stop High Limit Alert, and Soft Stop Low Limit Alert.

8.9.3 Mode Status 2

Select DO in slot 2 to trigger on Continuous Stroke Test Mode, Training Mode In Progress, Training Mode Completed, Event Captured, Local Interface Off, and Squawk Mode.

8.9.4 Cal Status

Select DO in slot 2 to trigger on Stroke Calibration in Progress, Setting Inner Loop Offset, Pressure Calibration in Progress, Friction Calibration in Progress, Command Input Calibration in Progress, Analog Output Calibration In Progress, and Jog Calibration Set 100% Position.

8.9.5 Cal Error Status 1

Select DO in slot 2 to trigger on Position Range Too Small, Position Sensor Below ADC Range, Position Sensor Above ADC Range, No Motion Time Out, Settle Time Out, and Inner Loop Offset Time Out.

8.9.6 Cal Error Status 2

Select DO in slot 2 to trigger on Analog Output Range Too Small, Command Input Range Too Small, Command Input Below ADC Range, Command Input Above ADC Range, Stroke Shift, Stroke Span Increase, and Stroke Span Decrease.

8.9.7 Electronic Configuration Status

Select DO in slot 2 to trigger on nAux Card 1 Present, Aux Card 2 Present, Pressure Sensor Board Present, and LCD Present.

8.9.8 Mode States Status

Select DO in slot 2 to trigger on Factory Reset State, Calibration in Progress, Signature or Partial Stroke Test in Progress, Jog Command Mode, Partial Stroke Test Scheduled, and DI Command Override.

8.9.9 Feedback Loop Status

Select DO in slot 2 to trigger on Position Deviation Alarm, Position Sensor Failure Alarm, Valve Opened Too Far Warning, Valve Closed Too Far Warning, Backlash Warning, Backlash Alarm, Partial Stroke Test Failed Warning, and Continuous Stroke Test Failed Warning.

8.9.10 Position Status

Select DO in slot 2 to trigger on Position High Limit Alert, Position Low Limit Alert and Feedback Linkage Alarm.

8.9.11 Cycles/Travel Status

Select DO in slot 2 to trigger on Valve Cycles Warning, Valve Travel Warning, Actuator Cycles Warning, Actuator Travel Warning, Bellows Cycles Warning, Bellows Travel Warning, Pilot Relay Cycles Warning, and Pilot Relay Travel Warning.

8.9.12 Actuation Status

Select DO in slot 2 to trigger on Supply Pressure High Warning, Supply Pressure Low Warning, Supply Pressure Low Alarm, Actuation Ratio Warning, Spring Unable to Fail Safe Warning, Pneumatic Leak Warning, Air Supply Humid Warning, and Air Supply Icing Warning.

8.9.13 Friction Status

Select DO in slot 2 to trigger on Friction High Warning, Friction High Alarm, Friction Low Warning, Friction Low Alarm, Valve Can't Open Alarm, and Valve Can't Shut Alarm.

8.9.14 Control Status

Select DO in slot 2 to trigger on Command Frequency Warning, Command Frequency Alarm, Command Amplitude Warning, Command Amplitude Alarm, Position Frequency Warning, Position Frequency Alarm, Position Amplitude Warning, and Position Amplitude Alarm.

8.9.15 Inner Loop Status

Select DO in slot 2 to trigger on Pilot Relay Response Warning, Pilot Relay Response Alarm, Piezo Voltage High Warning, Piezo Voltage High Alarm, Piezo Voltage Low Warning, Piezo Voltage Low Alarm, and Driver Module Alarm.

8.9.16 Main Board Status

Select DO in slot 2 to trigger on Main Board Electronic Failure Warning, Software Error Warning, Memory Error Warning, Temperature High Warning, and Temperature Low Warning.

8.9.17 Electronic Board Status

Select DO in slot 2 to trigger on Aux Card 1 Failure Warning, Aux Card 2 Failure Warning, Aux Card 1 No Loop Power, Aux Card 2 No Loop Power, Aux Card 1 Error, Aux Card 2 Error, Pressure Sensor Board Failure Warning, and Low Battery Warning.

8.9.18 Stroke/Friction Status

Select DO in slot 2 to trigger on Reversed Spring, Insufficient Spring, and No Spring.

8.9.19 Main Board Status

Select DO in slot 2 to trigger on Humidity Sensor Failure, Oscillator Fault, Position Sensor ADC Failure, Supply Voltage Error, Reference Voltage Error, Shunt Voltage Error, and Piezo Voltage Error.

8.9.20 Electronic Comp Status

Select DO in slot 2 to trigger on Pilot Can't Open, Pilot Can't Shut, Hall Sensor Failure, and ILO Out Of Range.

8.9.21 Software Status

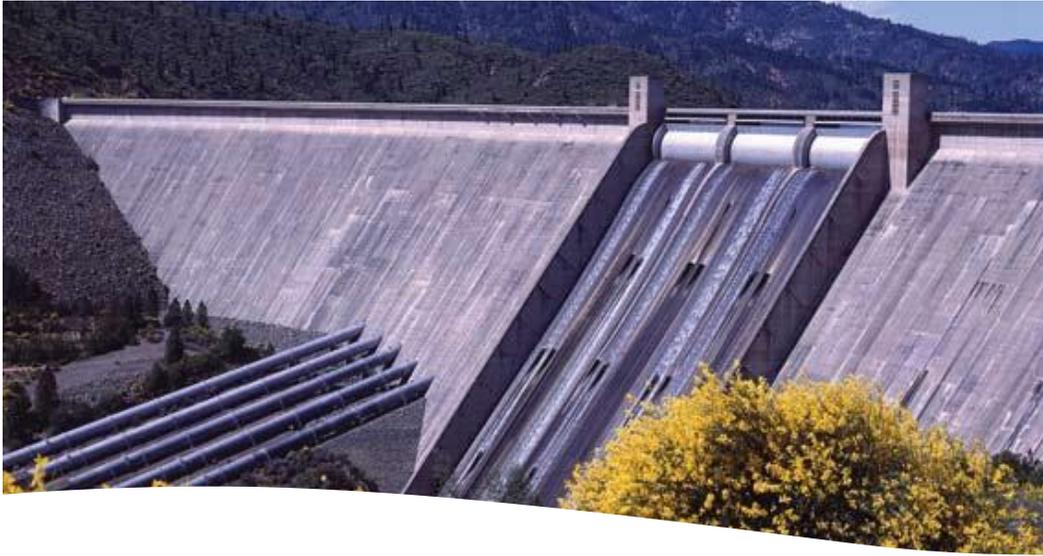
Select DO in slot 2 to trigger on NVMEM CRC Error, RAM Error, RAM CRC Error, FLASH CRC Error, Watch Dog Time Out, Stack Overflow Warning, CPU Usage Warning, and Firmware Update Applied.

8.9.22 Press Cal Status

Select DO in slot 2 to trigger on Port S Out Of Range, Port A Out Of Range, Port B Out Of Range, Port S Range too Small, Port A Range too Small, Port B Range too Small, and Pressure Sensor Failure.

8.10 Calibrate MFC 2 Analog Out

If the card in slot 2 is an Analog Output, perform an analog output calibration.

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Bulletin FCD-LGENSF0013-01

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