



Cornerstone™ Application Notes

Cornerstone Maintenance Station for Westlock Controls ICoT Positioner

Application Overview

Cornerstone software transforms a Windows based personal computer into the maintenance station you need to take full advantage of the smart features of the ICoT Positioner via the HART® protocol. Use Cornerstone Base Station or Cornerstone Configurator to configure, calibrate, assess status, perform diagnostics, monitor, and to extend access to positioner parameters and digital values to other Windows applications via Dynamic Data Exchange (DDE).

Cornerstone software incorporates integral support for the HART protocol, a de facto global communication standard for smart industrial instruments adopted by manufacturers world wide. Cornerstone products support a variety of options for HART communications using HART compatible hardware from several vendors. These options enable direct connection to the ICoT Positioner via HART modem, remote access via HART modem connected to the instrument loop (possibly also including long distance transmission over telephone lines), and the potential to connect a large population of ICoT Positioners over networks of HART compatible multiplexers.

Configuration

Cornerstone Base Station or Cornerstone Configurator work through an additional Cornerstone component, the ICoT Positioner ModLib, to realize custom support for the positioner. The ICoT ModLib offers both an "easy" and an "advanced" interface to the data base of positioner configuration parameters. The easy interface allows you to choose from predefined sets of indices or categories for the most commonly assigned parameter values. The advanced interface allows you to assign and adjust parameters with a much finer degree of control to meet your application requirements.

Status and Diagnostics

Standard HART status indicators are retrieved during every connection to the positioner. These standard status indicators are of limited value in managing the ICoT Positioner, since they do not reflect device specific errors and conditions. Cornerstone software interprets and presents the additional status bytes read from the positioner, which convey positioner status in complete detail. Additionally, limit switch information is transmitted to the Base Station or Configurator for display to the user.

The ICoT Positioner performs a variety of self diagnostics, including the self-test which may be initiated from the Cornerstone maintenance station. Whether self-running or technician initiated, status and warning messages are transmitted via the HART protocol over the communications link to the Cornerstone station. It's important to note that complete diagnostic information is always transmitted to the Base Station or Configurator, whereas if the positioner detects more than one error condition, only the higher numbered error code will be shown on the positioner's display.

On-line Access

Both Cornerstone Base Station and Cornerstone Configurator host the installation of Communications Interface Libraries (ComLibs) that allow third party HART compatible multiplexers to be connected to the Cornerstone maintenance station. These ComLibs establish an

extended link to the ICoT Positioners attached to the HART multiplexers. Over these HART multiplexer networks, many positioners may be managed, monitored and serviced from a single, centrally located station.

Network functions provided by the Cornerstone station include the ability to “learn” the connected positioners. With another Cornerstone option, the Instrument Status Monitor, the station can perform periodic status scan and track configuration changes made in the field. The monitoring of connected positioners utilizes the HART protocol to acquire and forward variables and status information to quality and SCADA applications, including ICoT advanced diagnostic software.

Calibration

Conduct multi-point tests to determine when calibration is necessary. Tests include:

- ◆ Input Test (Only with Base Station) - Assess the unit’s accuracy in converting the analog input signal into a digital value.
- ◆ Valve Position Test (Only with Base Station) - Characterize the positioner's response to an input varied over the range of the valve.
- ◆ Digital Position Test (Only with Base Station) - Test the positioner's ability to achieve a specified series of valve positions as assigned by varying the digital set point.

Perform all positioner trims, calibrations, and user controlled movements including:

- ◆ Input Calibration - Trim the signal processing performed by the analog input section of the smart positioner.
- ◆ Zero and Full Scale Calibration - When either a Zero or a Full Scale Calibration, Shallow or Deep, is performed, the positioner automatically measures the internal control signal required to push the valve to the Fully Closed or Fully Opened position, and then reads the position sensor feedback voltage at that position. Also, a zero pressure or a full scale pressure reading is automatically made for the pressure transducer.
- ◆ Shallow Calibration - The Shallow Calibration allows you to efficiently perform Zero and Full Scale positioner calibrations. Unlike the Deep Calibration option, you need not monitor or adjust the control loop current to complete a Shallow Calibration. Use the Shallow Calibration when the command range has been previously calibrated, and only the valve and transducer require calibration.
- ◆ Deep Calibration - During a Deep Zero or a Deep Full Scale Calibration, you are required to set the loop current to the value needed to push the valve to the specified Fully Open or Fully Closed position. The Deep Calibration is useful when the input command range is being changed. The Deep Zero Calibration operation offers a Close Very Tight option to make it possible for you to ensure that a very tight close will be achieved during normal operation.
- ◆ New Transducer Calibration - Perform the New Transducer Calibration whenever the I to P transducer is replaced. The positioner calibration is completely automatic once the command is sent to the positioner. Internally, the positioner automatically adjusts the electronics to compensate for manufacturing variance in idle current between transducers.
- ◆ Set Valve Position Dialog Box - Allows you to assign a specific digital set point and view the positioner's output position. While this dialog box is active, the normal current loop input to the positioner is ignored.