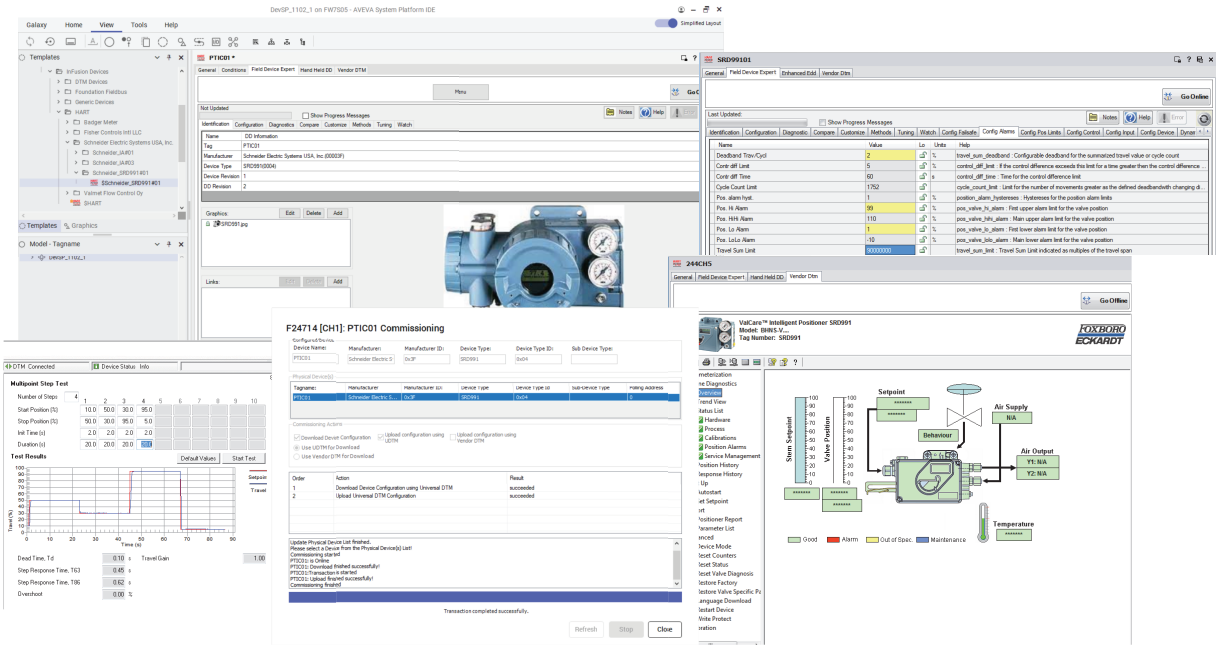
Foxboro™ DCS

Field Device Expert for HART Devices

PSS 41S-10FDMHRT

Product Specification

February 2024



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Features

Key Features

- A single, comprehensive application that provides entire lifecycle coverage of field device management tasks, including configuration, commissioning, maintenance, and diagnostics.
- Intelligent Device Commissioning Wizard provides an intuitive wizard that facilitates setting the instrument tags, downloading the configured parameter settings, and checking and confirming that the instrument tags and the Galaxy database are synchronized. The wizard is designed both to commission each device prior to plant startup and to replace a single non-functional device after years in service. Intelligent Device Commissioning for HART enables HART Device Commissioning in a single automated step. This is applicable for HART devices of any version and from any vendor. This capability includes:
  - Automatic sensing of HART instruments when attached to the I/O terminals of FBMs, Multiplexers, or Tricon CX HART enabled I/O modules
  - Establishing communications, and reading the tag name and device information
  - Downloading device configuration
  - Binding the device to all references in the system software configuration for Foxboro DCS
  - Provide hooks that enable the creation of loop-check sheets and loop drawings
  - Ability to re-enable the loop check, enabling loop check at periodical intervals
- FDT 2.0 compliant frame application (Field Device Expert Frame Application v4.0 and later) provides full support of both FDT/DTM + Enhanced EDDL technologies.
- One database shared (used) by both the Foxboro DCS and the Field Device Expert. Device configuration is always up to date and accurate, and that users are not required to enter the same data or configuration more than once.
- Bundled HART Device Description (DD) files certified by the FieldComm Group
- User Access: Access permissions for safety-related devices are aligned with IEC61511-1 (2016). Role-based access and privilege control to the Control Software and Field Device Expert functions, such as a user group with privileges for configuring Safety Devices.
- Device Identification Page and Device Info provides a “home page” for each field device that displays key attributes identifying the device, and system management parameters for the device. The details for each page are stored in a device info template, which can include items such as:
  - Graphics and document links to provide configuration guidelines, troubleshooting tips, maintenance manuals, procedures, notes, and other help to users for maintaining the devices.
  - An electronic notepad that can be used to provide specific instructions about deploying the device, certain configuration steps, or list tests needed for deployment. For device instances, you can view notes entered at the template level and record information about the specific device.
- Ability to export parameters to Microsoft Excel or comma-separated variable (. csv) files.
- Comprehensive HART Device template capability for reduced engineering effort.
- Advanced diagnostic features enable more accurate analysis and health diagnosis.

- Ability to compare snapshots of instrument configuration to help ensure synchronization of instrument settings with the Galaxy databases.
- Support for HART instrumentation connected to Foxboro FBMs, PROFIBUS Remote I/O, HART multiplexers, and Tricon CX.
- Support for a wide variety of other non-HART equipment, communication gateways, and instrumentation types based on standard FDT technology.
- Field Device Expert Workshop edition for bench-top setup, test, tagging, and configuration of instruments prior to plant installation.
- The DTM Network view provides a DTM Tree view of:
  - HART instruments connected to multiplexers
  - FoxCom instruments connected to Fieldbus Modules
  - Virtually any other process automation equipment managed and configured via FDT technology. For example, this capability can be used to provide a graphical user interface to see advanced diagnostics for the Foundation™ Fieldbus and PROFIBUS PA physical layer via third-party diagnostic modules having RS–485 or Ethernet interfaces.
  - HART instruments connected to Tricon CX
  - HART instruments connected to Modicon M580 ePAC
  - HART enabled Remote IO and Gateways that support FDT technology
- Device Snapshots capability allows a snapshot of all default parameters of a device at a certain moment in time. It provides an instrument technician the ability to compare the current set of parameters in the device with a previous set of parameters, so any changes made in between can be detected and restored in the device if needed. The last configuration gets polled automatically and same can be visualized in Field Device Expert and a user can save and store up to five snapshots. A Compare tab is also available for comparing and editing database values.

Key Benefits

- Faster time to production
  - Intelligent Commissioning Wizard reduces commissioning time (up to 75%) by automating HART device commissioning and documentation process, thus helping eliminating or reducing the level of manual effort required for checking and commissioning. With Intelligent Commissioning Wizard, engineers can now commission devices round the clock with no additional overtime cost.
  - Device Replacement Wizard significantly reduces time and expertise required to replace HART or Foundation Fieldbus (FF) devices, either individually or in bulk. It detects new devices, replaces Old Device Type with New Device Type, migrates parameters, and conditions without editing existing blocks or requiring deployment to the control processor.

- Increased safety and security
  - Single unified database helps eliminate possibility of costly detected errors. Valuable information is created during each phase of device management and it would be beneficial to save it into single database. This information can be utilized in many ways during the lifetime of the devices. A combined Single Information Repository helps eliminate duplication and mismatch issues commonly experienced with independent DCS and asset databases. This also saves additional effort by providing a single, unified backup.
  - Access permissions for safety related devices align with IEC61511-1 (2016).
  - Bundled HART DD: helps prevent users from browsing and downloading files from the Internet. The bundled HART DD and FF DD library provides increased security and saves valuable time during device commissioning, as engineers now no longer must search for files anymore.
  - The FDT 2.0 compliant frame leverages latest technologies (.NET over ActiveX/COM) and supports digital signatures to help prevent tampering.
- Truly open solution that allows users freedom of choice.
  - Field Device Expert offers interoperability with any device, from any vendor, with any protocol. With Foxboro interoperability and any bus capabilities, you can maintain your preferences because the system adapts to you. The choice is yours.
- Reduced maintenance effort with advanced diagnostic support
  - Support for vendor-embedded DTMs or EDD enables maintenance technical personnel to access advanced diagnostics written specifically for the concerned device by its vendor. Field Device Tool (FDT) or device type manager (DTM) enables flexible user interface, rich graphics, and comprehensive diagnostics for field devices, even complex devices such as positioners.

Managing HART Field Devices

With Field Device Expert, engineers and technicians plan, configure, commission, and maintain the configuration of HART™ devices from a remote location, typically the system's Engineering workstation.

Field Device Expert is a software application that provides online and offline functionality, covering the entire lifecycle of tasks to manage HART instruments such as configuration, commissioning, health and diagnostic analysis, device maintenance, and device replacement. It supports a wide variety of HART instrument connectivity to EcoStruxure™ Foxboro Fieldbus Modules, to PROFIBUS remote I/O modules, and to HART multiplexers. HART multiplexer connections are often used on safety systems.

Field Device Expert enables:

- Creating and managing HART device templates within the Control Software template toolbox.
- Linking those templates to Device Descriptions and Vendor DTMs, both made by the company that makes the instrument.
- Creating instances of HART device tags within the Control Software database and configuring the connection to the channels of the FBMs, HART Multiplexers, or Tricon CX.

Once Field Device Expert is opened, instrument specialists can configure, diagnose, commission, and replace:

- HART instruments
- HART multiplexers
- FoxCom instruments

- Triconex CX, (HART) communication modules
- Other non-HART instruments, field devices and communication gateways supported by FDT technology.

When integrated with the Control Software, instrument configuration data is stored in the Galaxy database. Security configuration and user privilege enforcement is coordinated between the Control Editors and Field Device Expert. Users may be restricted from accessing certain views, displays and functions, and from making changes to the HART instrumentation.

Field Device Expert's user interface is organized by a tab style toolbar menu. Depending on the level of the supporting technology of the Device Description and the availability of Vendor DTMs, there can be up to four main tabs on this menu:

- The **Field Device Expert** tab calls up displays based on the core parameter descriptions of the device description. These customizable views are useful for offline and online configuration as well as diagnostic analysis of the instrument.
- The **Hand Held DD** tab appears whenever the device description contains hand held menus. These views are primarily useful for online configuration. (This is an optional tab.)
- The **Enhanced EDD** tab appears for newer style/format DDs that describe menus and displays containing circular or vertical gauges to show device variable and trend plots to show time-based data stored within the instrument. These displays are primarily used for basic viewing of online device performance. (This is an optional tab.)
- The **Vendor DTM** tab appears if a DTM has been attached to the instrument template. With this technology an instrument's manufacturer or vendor can provide an advanced graphical user interface for maintaining, tuning, diagnosing, and analyzing the instrument. The technology is based upon a small executable Microsoft Windows application, provided by the vendor of the device, which is integrated into the Field Device Expert. Vendor DTMs are not needed in order to use HART instruments, but provide an optional advanced diagnostic capability more powerful than the other tabs. (This is an optional tab.)

Engineering Setup for HART Instrumentation

Field Device Expert provides advantages throughout a plant's lifecycle. It helps enable a faster startup phase by automating detection, configuration, commissioning, testing and reporting. During normal operation, it helps analyze and diagnose HART instrumentation in a running plant. And during the maintenance phase of a plant's lifecycle, it assists with replacement of existing devices with new devices.

The benefits of Field Device Expert are maximized by customizing the run time interaction displays that are part of the HART device template. This document starts from that point and walks through the HART capability from the beginning of the lifecycle. The first step is populating Field Device Expert with HART instrument templates for each instrument model type, each template linked to the corresponding Device Description (DD). If an instrument's manufacturer or vendor also makes available an FDT DTM for diagnostic analysis of the instrument, it is linked to the template during template creation.

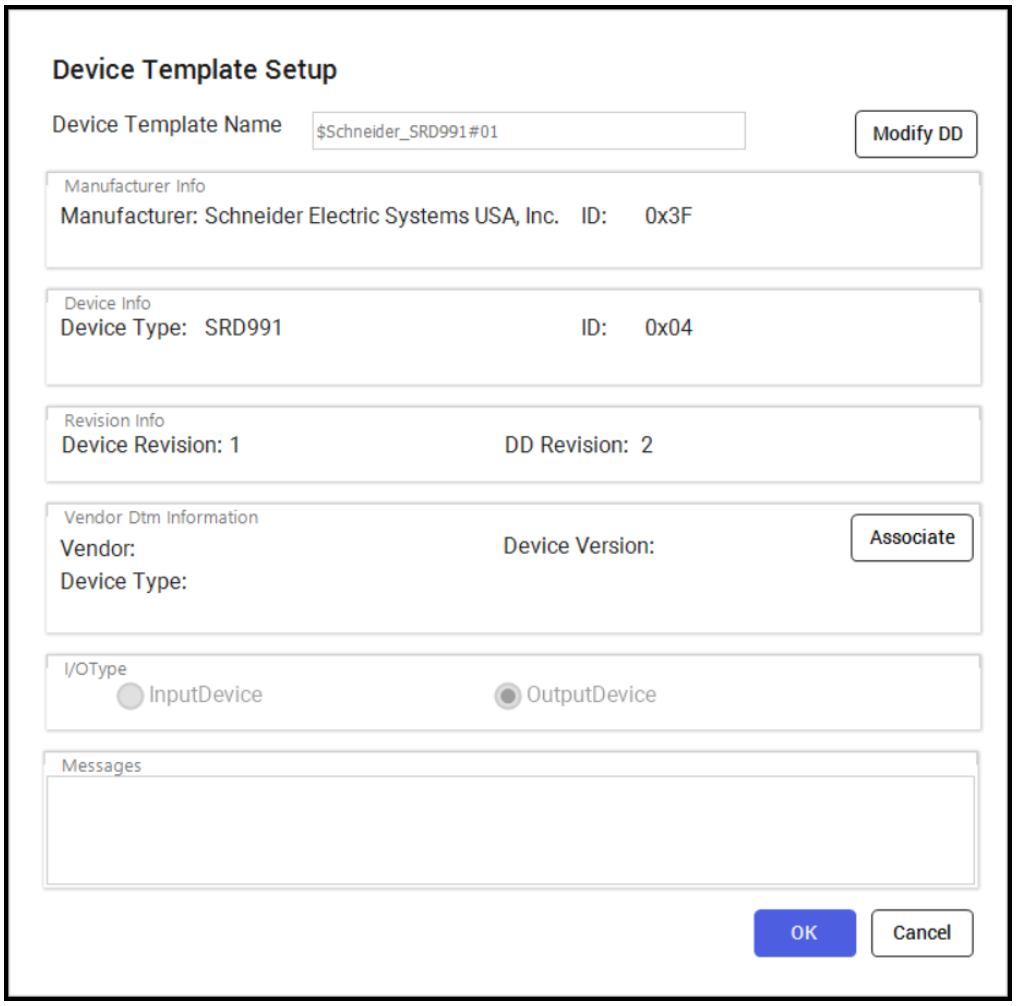
Table 1 - Advantages of Field Device Expert During Each Phase of a Plant's Lifecycle

Lifecycle Stage	Advantages
Startup	• Create and customize HART field device templates • Create HART instrument instances • Develop customizable device configuration displays • Use the Intelligent Commissioning Wizard for HART instruments to improve the speed and quality of site commissioning activities, reduce the level of manual checking and commissioning in plant setup, and improve startup times and cost on greenfield projects • Use the Device Commissioning Wizard to automate setting instrument tags, downloading the configured parameter settings, and synchronizing applicable instrument tags with the Galaxy database • Run DD methods • Synchronize the device and host databases
Normal operations	• Analyze and diagnose HART field devices, particularly where suboptimal HART instrument conditions have been detected
Maintenance and Device Replacement	• Optional Condition Monitoring capability helps identify HART field devices that require maintenance or replacing • Provide advanced tools such as **Device Snapshots** capability to perform advanced diagnostics • **Device Replacement Wizard** significantly reduces time and expertise required to replace HART or Foundation Fieldbus devices, either individually or in bulk.

Creating and Customizing HART Device Templates

The Template Toolbox view contains a hierarchical tree of field device templates. You can create the initial templates for each model of field device used in the plant by browsing and selecting the applicable DD file. This launches the template setup dialog box in which you can edit the template name, verifies the DD is for the expected device type, and may add an association to a Vendor DTM.

Figure 1 - Device Template Setup Dialog Box



The initial template has built-in default configuration and diagnostic screens. User customization is the next step in completing the setup of the template. Customization consists of:

- Editing the device configuration display and locking parameters that have the same setting in every instance.
- Adding or editing diagnostic displays.
- Adding or editing watch displays.
- Linking supporting documentation such as manuals, images, and notes to the identification display.
- Setting up permissions to access Field Device Expert functions or make instrument changes.
- Creating additional templates (nesting) to cover multiple device application situations.

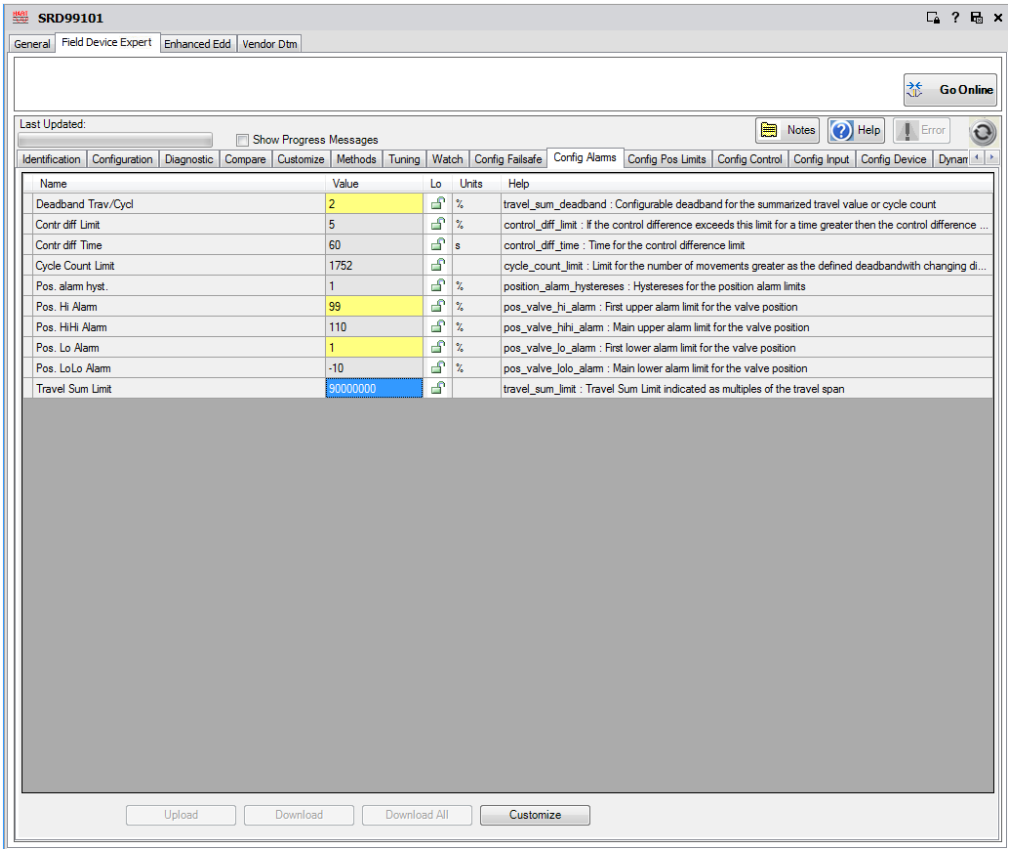
Optimizing Creation of Device Configuration Displays

Field Device Expert removes the repetitive engineering required to create each field device. The majority of engineering work can be done once in the Device Template, which then serves as the controller for each HART instance.

A key productivity feature is configuration inheritance. Typically, many parameters need to be identical for each instance of a HART instrument type. Locking those parameters in the template helps ensure each instrument has the same setting, reducing editing for each tag. You can subdivide parameters into more than one configuration display. For example, one configuration display can contain the common locked parameter settings, and another can contain the instance unique settings. Inheritance is a big time saver in managing design changes made after every instance is configured. You can also go back to the template, change a locked parameter, and the Galaxy database automatically updates every instrument instance with the change.

Another productivity gain can be made by customizing the parameters visible on the configuration displays. To reduce unnecessary clutter on the display, remove writable parameters that need not be configured. Also, you can rearrange the order of parameters so they are presented in the optimum order for the configuration process.

Figure 2 - Configuration Display



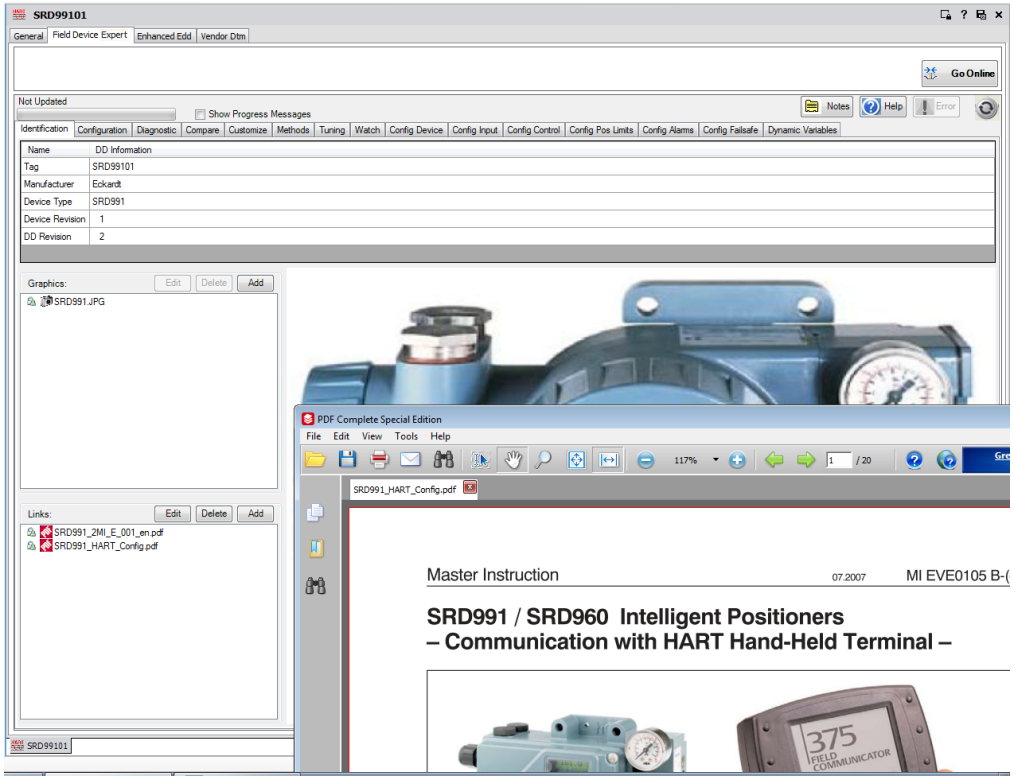
Online device configuration changes can also be performed from the Hand Held EDD or Enhanced EDD displays. However, these displays are not customizable.

Changes made from those displays also go into the Galaxy database, helping ensure configuration data is synchronized.

Building Device Home Pages and Linking Supporting Device Maintenance Documentation

Field Device Expert provides quick and easy access to documents, images, and files useful in engineering or maintaining a field device. Documents can be linked to the device identification display at the device and block level of each template. The document link system opens files in the same way as opening files from file viewing software on a personal computer. The linked document can be any Windows file type, including Adobe® Acrobat portable documents (.pdf), Microsoft® Word documents (. doc or .docx), Excel® spreadsheets (.xls or .xlsx), text files (.txt), and PowerPoint® slide shows (.ppt). A click of the link opens the file in its original application. This figure shows an instruction manual opened in Adobe Acrobat Reader.

Figure 3 - Field Device Expert Identification Page with Linked Document



You can build a “home page” for each field device that will appear when the device is invoked in Field Device Expert. Field Device Expert provides a toolset for building this device identification page, displaying key attributes and system management parameters for the device. The details for each page are stored in a device info template that can include items such as:

- Graphics and document links to provide configuration guidelines, troubleshooting tips, and other helpful information. Graphic links appear separately in an upper group, and the rest of the links appear in a lower group. Links at the template level inherit to the instance level. If desired, you can add additional links to instance specific documents and graphics at the instance level.
- Notes that will be inherited by the derived devices, attached at the template level, or extended at the tag level for a specific device instance. An electronic notepad can be used to provide specific instructions about deploying the device, configuration steps, or tests needed for deployment. For device instances, you can view notes entered at the template level and record information about the specific device.

Customizing Device Viewing Displays

Field Device Expert offers three types of displays beyond the traditional configuration display for instrument specialists to observe device conditions and diagnose detected problems online. You can set up as many, or as few, of these displays as desired, where a tab is created on the Field Device Expert menu. These types of displays are supported:

- The Diagnostic tab is an online, continuously updating display showing the most recent data values from the device.
- The Watch tab displays a real-time trend of up to eight device parameters and can be switched dynamically from a Trend Line Format to a Table Format where each row of the table represents one scan of the device.

Figure 4 - Watch Tab with Trend Format

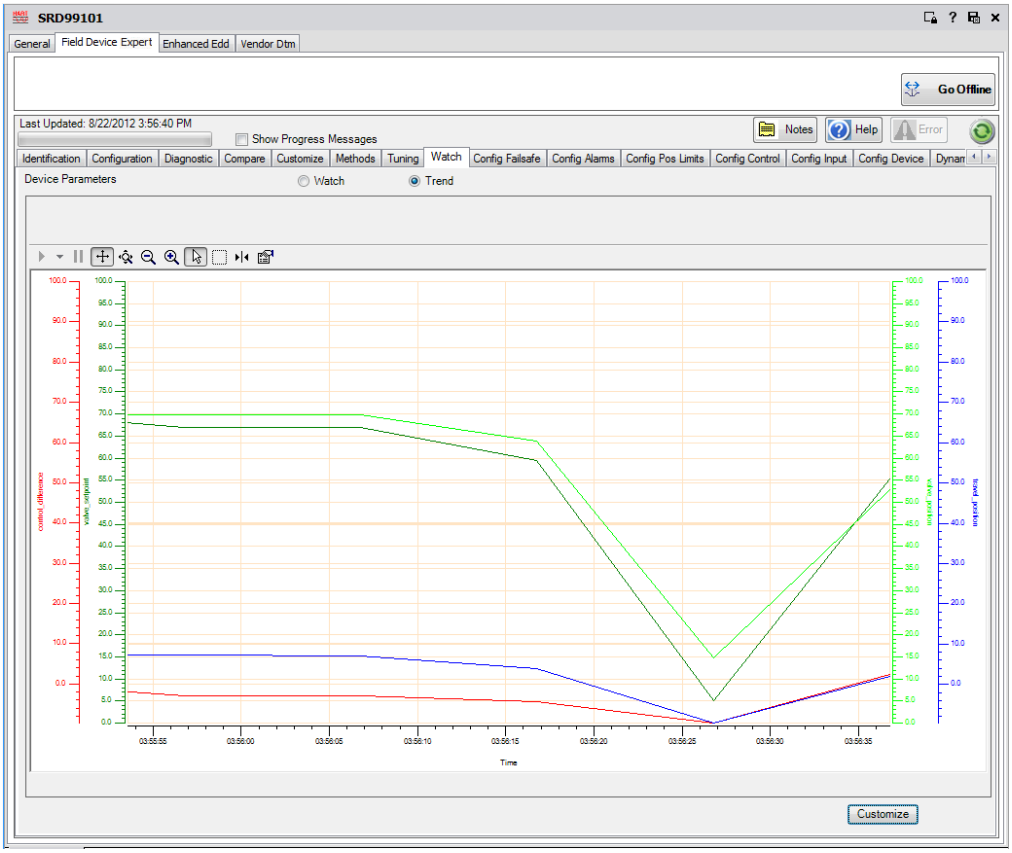
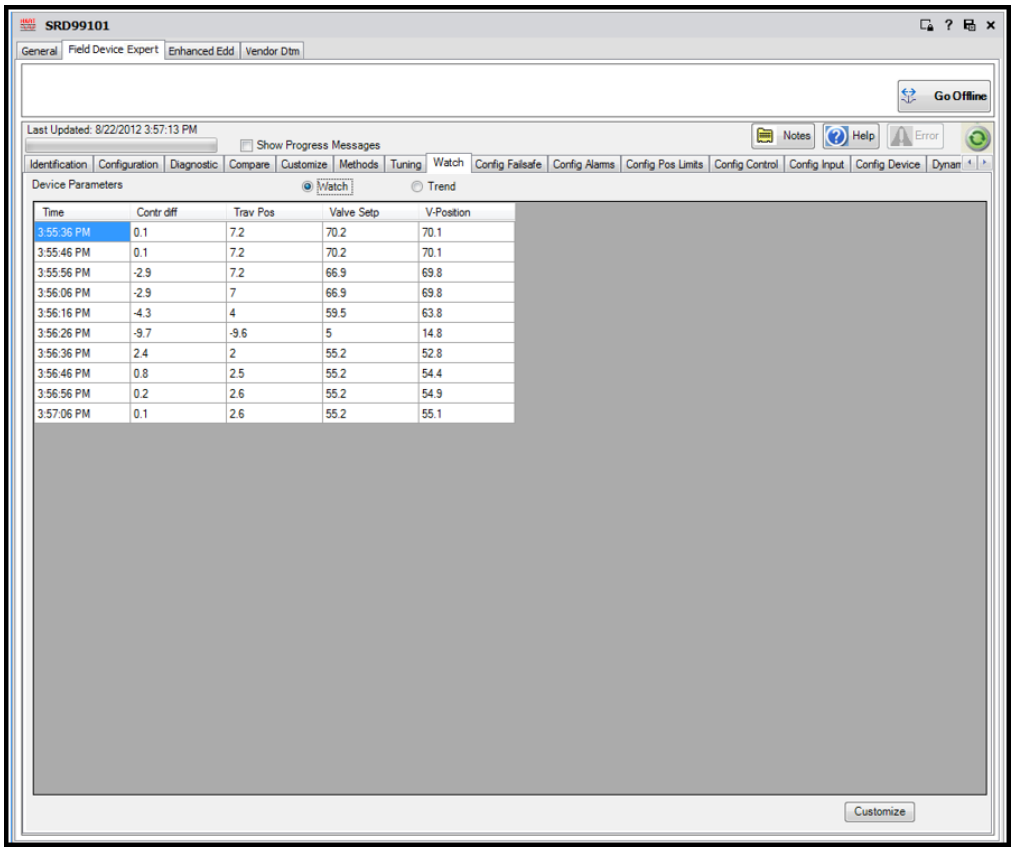
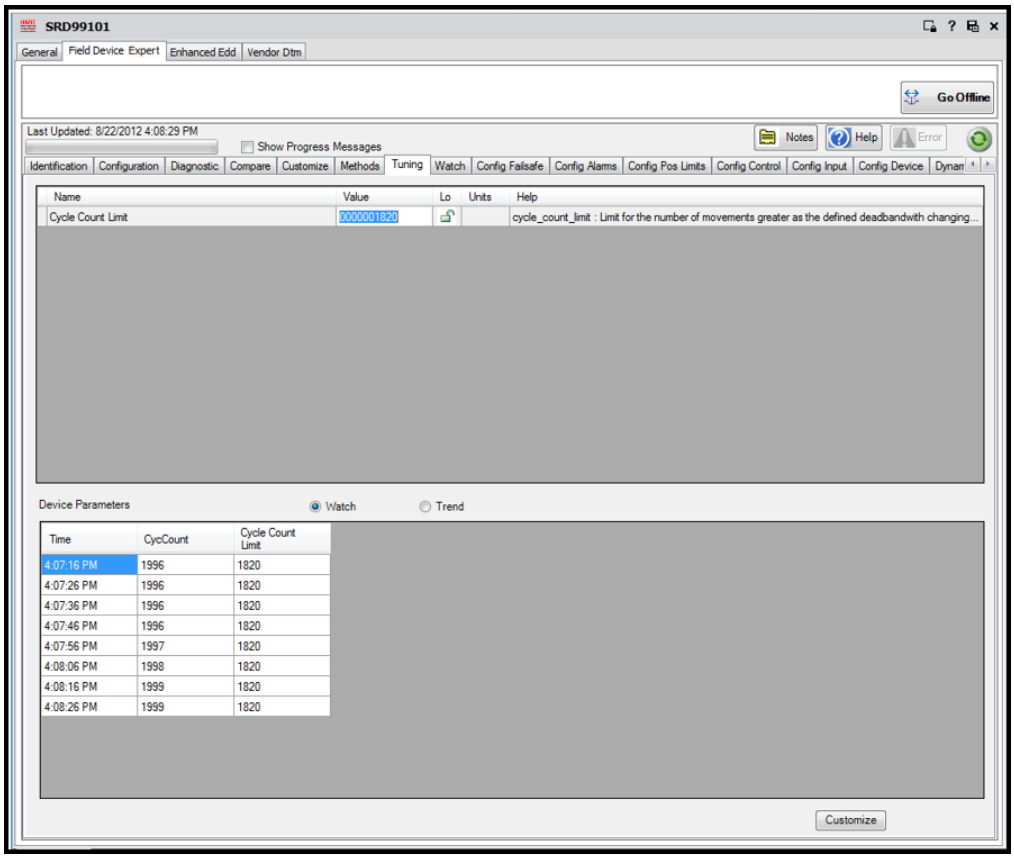


Figure 5 - Watch Tab with Table Format



- The Tuning tab is a continuously updating online display with a top section used to adjust or change up to eight instrument variables and a bottom section to watch the results on up to eight variables in either trend line or table format. The adjustable variables placed on the top area are typically used to change instrument state, mode or trigger a device method such as auto starting or calibration of a valve positioner.

Figure 6 - Tuning Display



Using DTM Network View

DTM View is used to support:

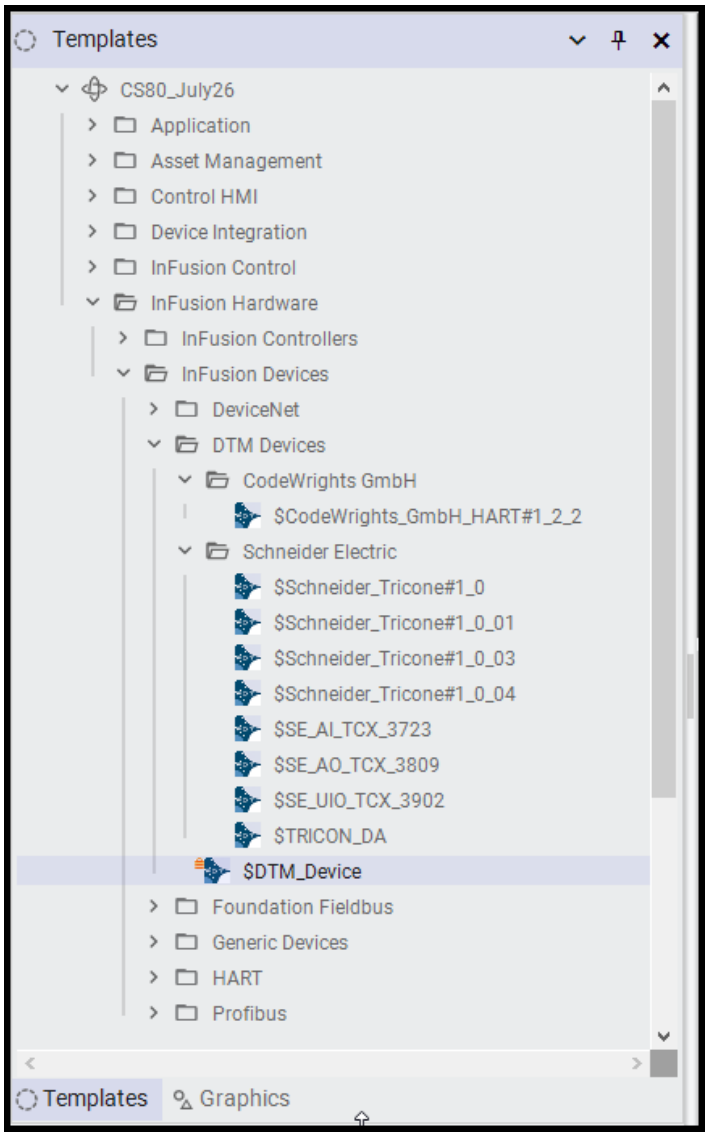
- HART instruments connected to multiplexers.
- FoxCom instruments connected to FBMs.
- Virtually any other process automation equipment managed and configured via FDT technology.

  For example, this capability can be used to provide a graphical user interface to see advanced diagnostics for the Foundation™ Fieldbus and PROFIBUS PA physical layer via third-party diagnostic modules having RS-485 or Ethernet interfaces.

This view is similar to traditional FDT frame applications. With a separate area in the Template Toolbox, DTM Devices, templates for the Communication DTMs and non-HART Device DTMs may be created. The hierarchical structure of the DTM network view consists of DD-based HART device instances nested below communication DTMs.

Vendor DTMs use the FoxCom instruments and other generic field device equipment. The DD technology is not used.

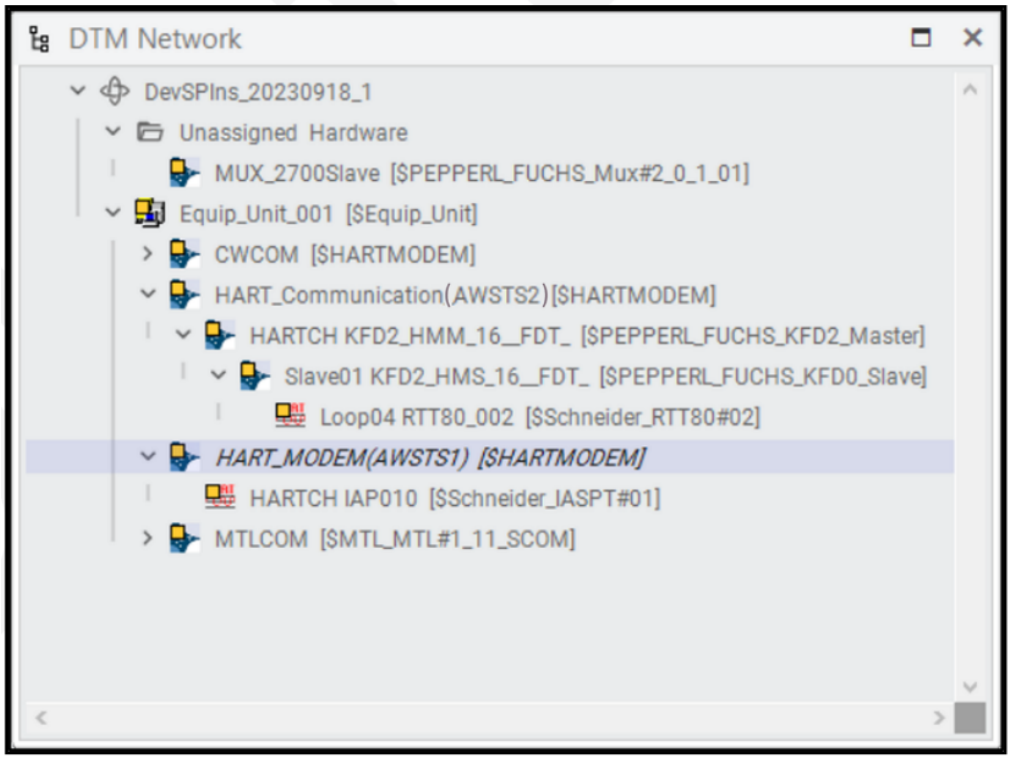
Figure 7 - DTM Devices Template Toolbox



The DTM Network View is most commonly used for HART multiplexers. HART instrument templates from the HART Devices area of the toolbox may be placed under the multiplexers in the topology. In this case the HART DDs are needed and the Vendor DTM is optional. For these HART instruments, each tab within the toolbar menu of Field Device Expert is enabled.

Field Device Expert may be launched to interact either with the Communication Gateways or the devices associated with them by browsing through the DTM view and clicking on the desired instance.

Figure 8 - DTM Network View



Customizing User Access

Field Device Expert is designed for Engineering and Maintenance specialists performing various tasks and with varying degrees of privilege. Users' configuration settings in Control Software pass to Field Device Expert when it is launched. There are four roles within Field Device Expert, conforming to the roles defined by the FDT standard.

Default settings for lesser privileged roles, such as the observer role, limit actions that can be performed within Field Device Expert. Restrictions are intended to help prevent unauthorized users from:

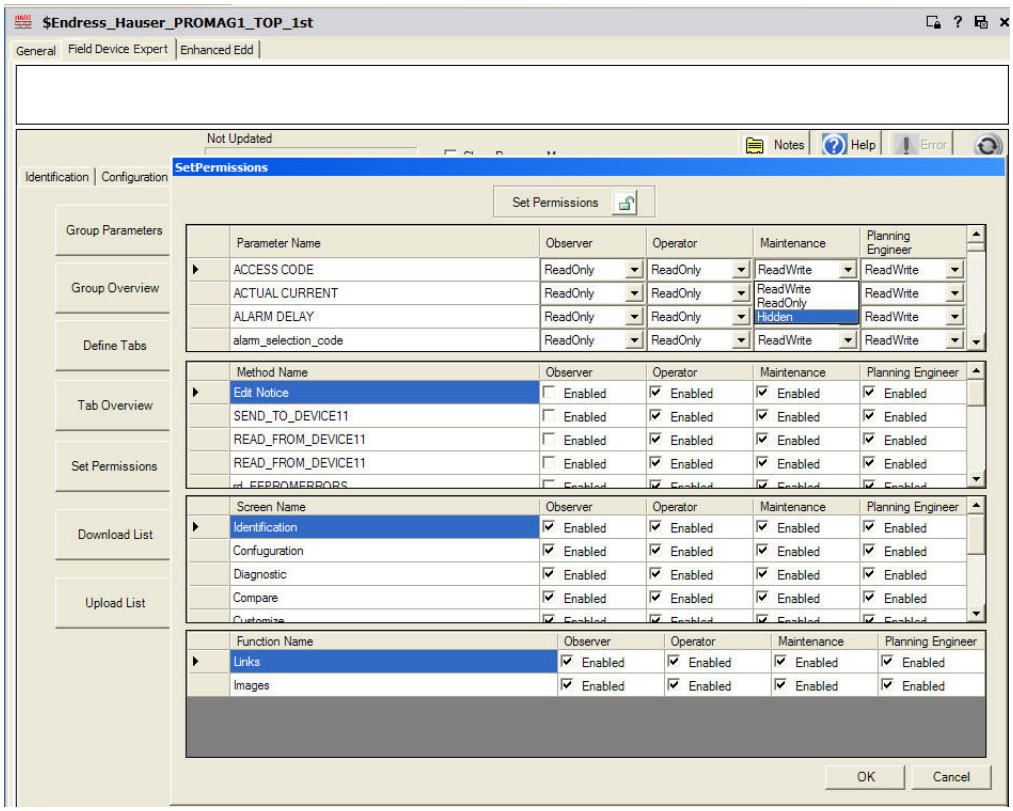
- Adding or altering a Field Device Expert display.
- Using a function or modifying device settings, such as activating a device download.
- Running a DD-based method that alters a device behavior or takes it offline, such as performing an auto-start calibration of a valve positioner.

Access permissions for safety related devices align with IEC61511-1 (2016).

This product also supports user access, only showing device related windows and helping prevent an Instrumentation Technician from accessing any control related functions in the Galaxy database.

Permissions can be altered for every HART instrument type or on a per-instrument type basis.

Figure 9 - Setting Permissions



Creating HART Instrument Instances

Field Device Expert provides tools to help with creating HART instrument instances.

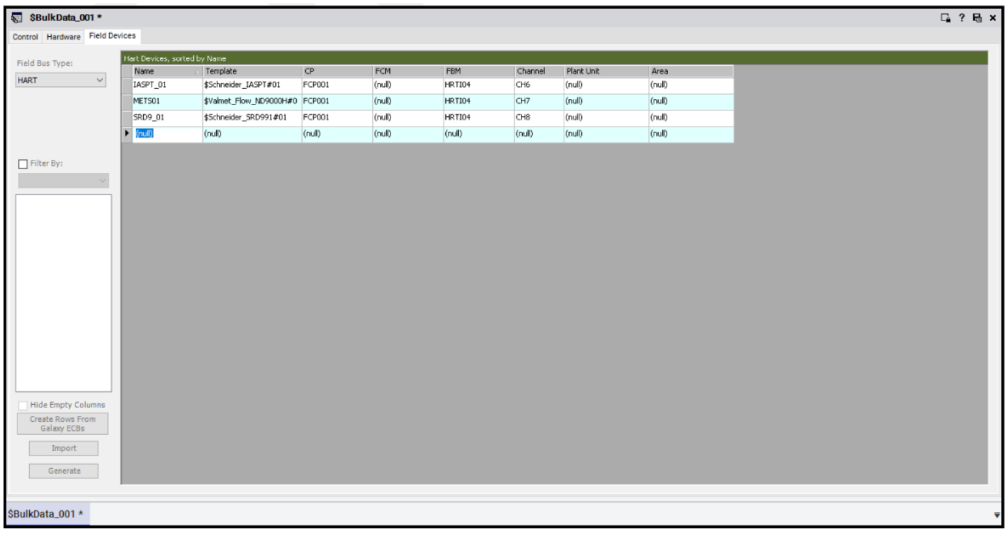
Adding Field Devices and Tags to the Database

New HART instrument instances are added to HART FBMs by dragging the desired template onto the desired channel, or by pointing to the channel and selecting the desired HART template from a list. The aspects of the template such as privileges, document links, display customizations, and parameter locks are inherited by the instance. If the template is associated with a vendor DTM, the instance is also associated with that DTM.

Bulk Generating HART Instrument Instances

Alternatively, for high productivity in creating a large number of instrument instances, use the Bulk Generation technique. As shown in this figure, with an editable grid, an instance can be created on each row, via matching the HART template to the selection of the desired FBM and Channel.

Figure 10 - HART Instrument Instance Bulk Generation



Support for HART Safety Field Devices

Control Software v7.0 or later supports the ability to set a HART field device as a safety device - that is, a device that is connected to a safety system (such as Triconex) and supports the directives in IEC61511-1 (2016). This restricts download/upload operation access to/from safety devices only to users who are members of the SafetyInstrumentEngineer user group. (Also, for download operations to safety devices, FoxCTS change tracking must be enabled.) The Control Software requests Galaxy login credentials from any SafetyInstrumentEngineer user attempting any download/upload-related operation on a safety device (including commissioning). Only users with the SafetyInstrumentEngineer role scan downloads and uploads to safety related devices.

Any download/upload-related operations in the Field Device Expert tabs are similarly restricted. The Safety Technician can configure safety devices in an environment where the rest of Foxboro DCS configuration is not visible.

Using the Intelligent Commissioning Wizard for HART Field Devices

Control Software v7.0 and later provides a new tool for configuring HART field devices – the Intelligent Commissioning Wizard. This tool centers on improving the speed and quality of site commissioning activities by automating HART device detection, configuration, commissioning, testing, and reporting. By automating steps in the overall commissioning process, the Wizard helps reduce the level of manual checking and commissioning in plant setup, improves startup times and cost on greenfield projects, and helps minimize costs, complexity, and risk to the project. The Wizard can also help reduce the number of hours needed to commission, verify, and report on the configured field devices.

The benefits of the Intelligent Commissioning Wizard extend beyond the site work. It drastically changes the way automation projects are executed by minimizing hardware dependencies and custom engineering.

As soon as the initial P&ID design is available, a project team located in a remote project office anywhere in the world can start building loops without I/O assignment and without creating HART devices in their system. The Intelligent Commission Wizard enables late binding; delaying the binding of the I/O references until the field

devices are installed and commissioned on-site. This provides flexibility in design, timing, and sequence of development activities.

With Control Software v7.0 or later, you can add custom user attributes to any block in ArchestrA IDE. With this, you can assign the Field Device tag with the physical tag of the HART Instrument to which the RIN/ROUT block needs to be connected. The Intelligent Commissioning Wizard uses this attribute to enable configuration of these devices.

The Intelligent Commissioning Wizard uses these attributes to speed configuration of the devices. Automatic configuration includes:

- Adding strategies and blocks for the devices
- Creating infrastructure for Device Condition Monitoring
- Deploying all devices to their associated Control Processor
- Commissioning all devices and uploading/downloading all parameters
- Enabling communication with the devices

Once the device has been bound and properly configured, a final loop test is performed. A commissioning report can be created including the loop drawing.

For Multiplexer and Tricon CX connected HART devices, these steps are run:

- Create the device instance based on the correct template. (If needed, a new template is generated based on the correct DD file.)
- Create the infrastructure for Device Condition Monitoring.
- Commission all devices and uploading and downloading all parameters.
- Perform the final loop test.

This feature is described in detail in *HART® Instrumentation Implementation Guide* (B0750CM).

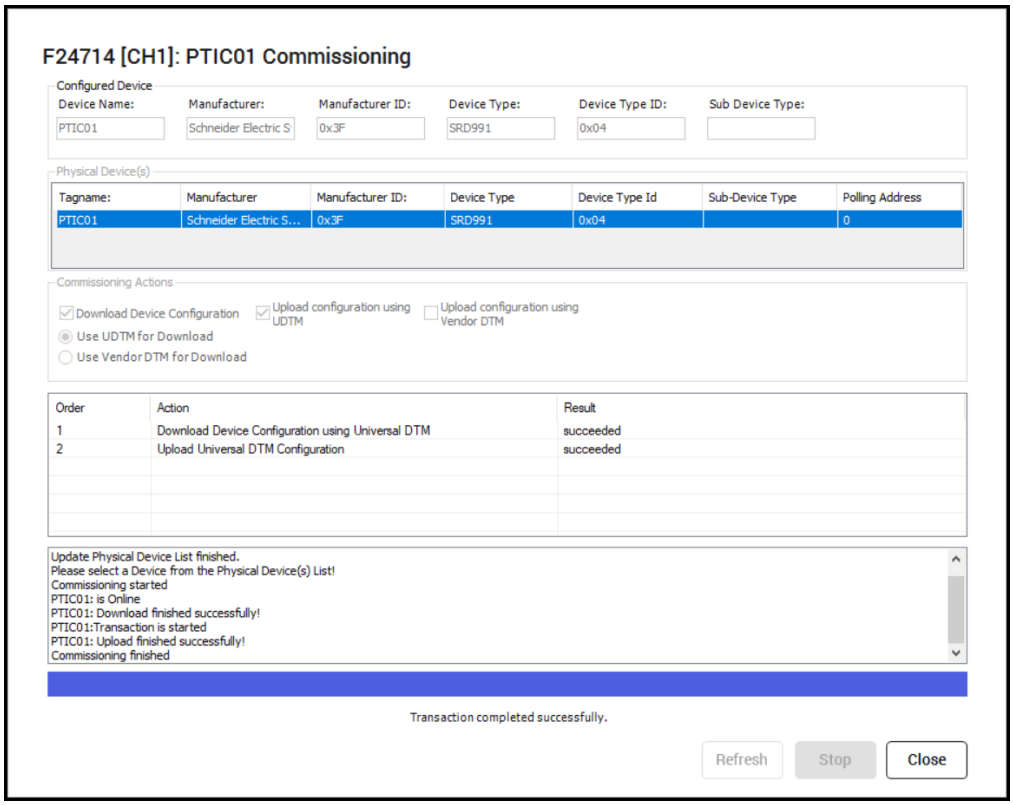
Commissioning or Replacing HART Devices

Field Device Expert provides tools for commissioning or replacing HART devices.

Device Replacement Wizard

Field Device Expert provides an intuitive Device Replacement Wizard that significantly reduces time and expertise required to replace HART or Foundation Fieldbus devices, either individually or in bulk.

Figure 11 - Device Replacement Wizard



The wizard can automatically:

- Set the HART tag to match the Galaxy database.
- Download parameters to the device according to the selections made in the device template.
- Upload back from the device to automatically synchronize the Galaxy database to the instrument. This is useful, for example, on parameters that are not downloaded.

Running DD Methods

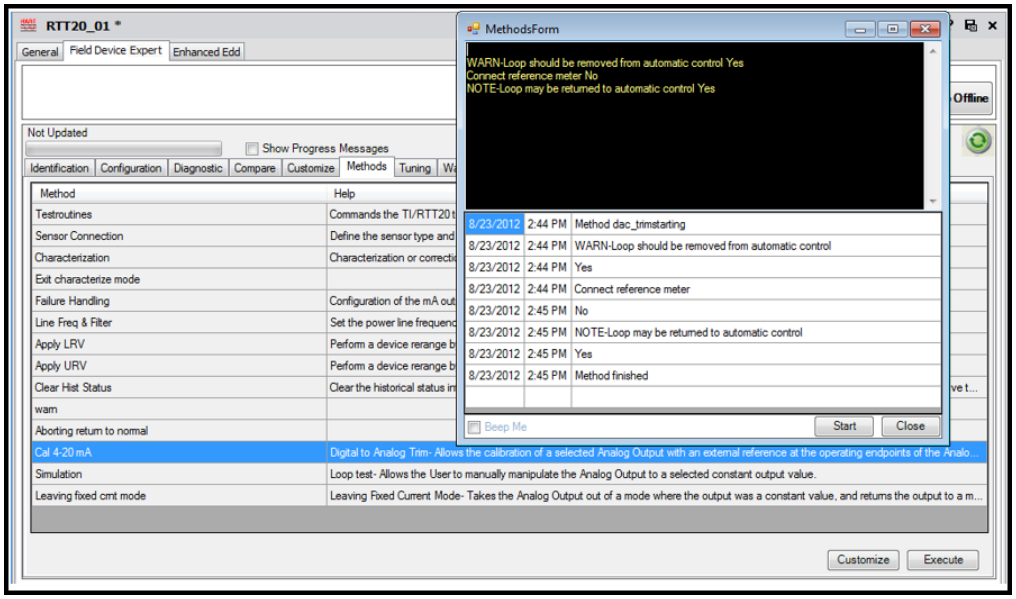
The Methods tab of Field Device Expert provides a convenient way for the user to run methods such as device calibration and commissioning routines that are built into the device description files. The upper portion of the screen lists the method choices available.

The middle portion of the screen dynamically shows progress of the method execution in the form of message transaction to and from the device.

The lower portion of the screen is a configurable watch window displaying up to eight block data variables in either trend or table format.

The Methods tab typically needs user interaction, as evidenced by the dialog box in this example in which you have to confirm everything is ready for the device to go out of service and begin its self calibration routine.

Figure 12 - Device Methods Screen

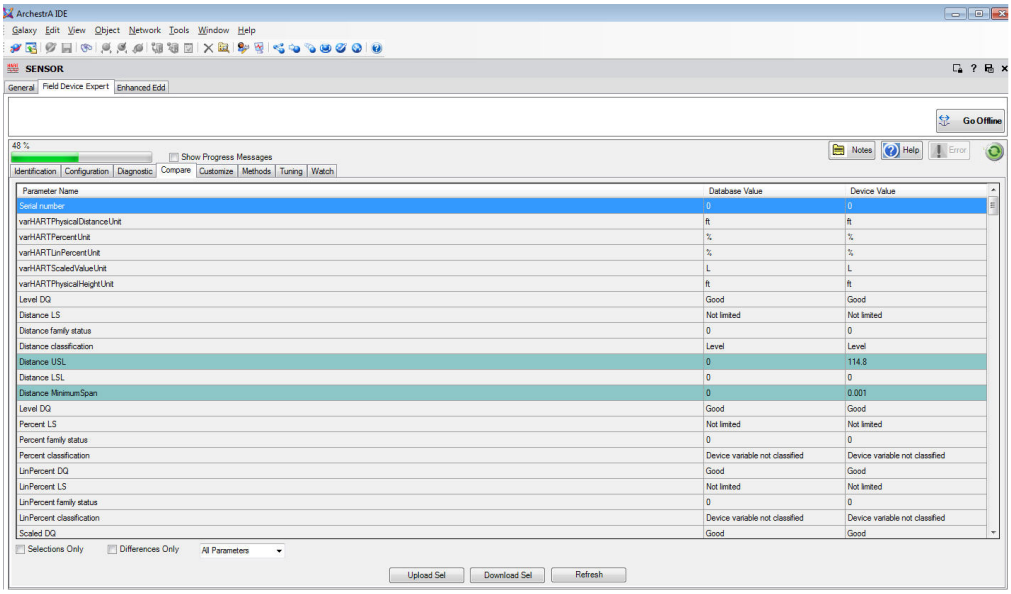


Up to three methods can be run now.

Synchronizing Device and Host Databases

In other systems, managing host system databases versus actual instrument settings can be a challenge, because they must match. With Field Device Expert, the Device Commissioning Wizard automatically synchronizes the instrument and the Galaxy databases. When you want to inspect the synchronization or perform manual synchronization operations, Field Device Expert provides a built-in Compare screen. To synchronize, select one or more parameters and upload the device value to the host database, or conversely, download the host database value to the device.

Figure 13 - Compare Screen



Taking Snapshots and Exporting Data

Field Device Expert enables you to:

- Take a “snapshot” of a device’s parameters at any point in time, so you can later compare them with current values.
- Export all parameters (database values, snapshot values, or device values) for a device, all devices on an FBM, or all devices on a control processor to Excel or comma-separated variable (.csv) files.
- Export all parameters for devices generated from the same template to easily compare the settings between various devices.

  This report can be exported to Excel or comma-separated variable (.csv) format.

Diagnosing Detected Problems in HART Instruments

Plants make use of HART technology to improve asset and operational excellence. Plants with legacy 4 mA to 20 mA instrumentation report they often spend more than 50% of their device maintenance effort either on routine instrument checks or on callouts where no detected problems are found. Our Foxboro portfolio has a comprehensive set of software to be used to provide dramatic improvements in the uptime and performance of HART instruments, enabling longer useful instrument life and improved productivity for maintenance personnel. Field Device Expert is the instrument specialist’s diagnostic and maintenance tool within that portfolio.

Maintenance staff can quickly examine device status and diagnose detected problems. Instead of having to make trips out to the device, most diagnostic and maintenance activities can be performed from workstations in areas that are convenient and help protect the maintenance staff. Field Device Expert screens can be customized to optimally present information for maintenance personnel. Trend and tabular watch screens can be particularly useful in dynamically observing device behavior.

Viewing Field Devices

Plant View provides a convenient mechanism to locate and open a field device for diagnostic viewing. This view has a free-form hierarchical structure where instruments are associated with a plant area. For example, pressure transmitter U2APT101 could be located in area A of the U2 Coker Unit.

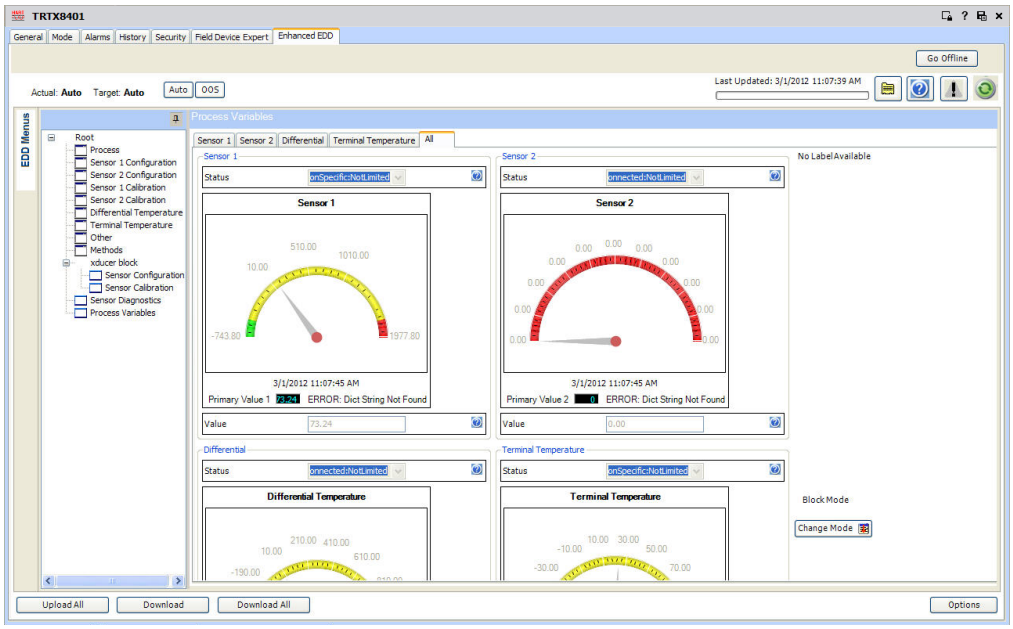
In addition, the Network View provides a mechanism to “walk down” the hierarchy to locate an instrument. For example, you go from control processor, to FBM, to the instrument itself.

Selecting and clicking on the instrument tag launches Field Device Expert.

Diagnosing Using Enhanced EDD

Enhanced EDD uses EDDL (Electronic Device Description Language) to create HART device descriptions. Previously, descriptions primarily provided parameter definitions such as name and data type. Enhancements have extended this technology, with which device vendors organize and define content to facilitate viewing and diagnosing of HART instruments. This has made it possible to organize a menu system that enables users to select the screen containing the information they require. Device vendors can now also define the screen content, including, for example, analog gauge style and trend type displays of measurements and instrument data. This figure shows a trend view of the terminal temperature of a transmitter and a menu of screens to see process variables, sensor diagnostics, and other screens for this device.

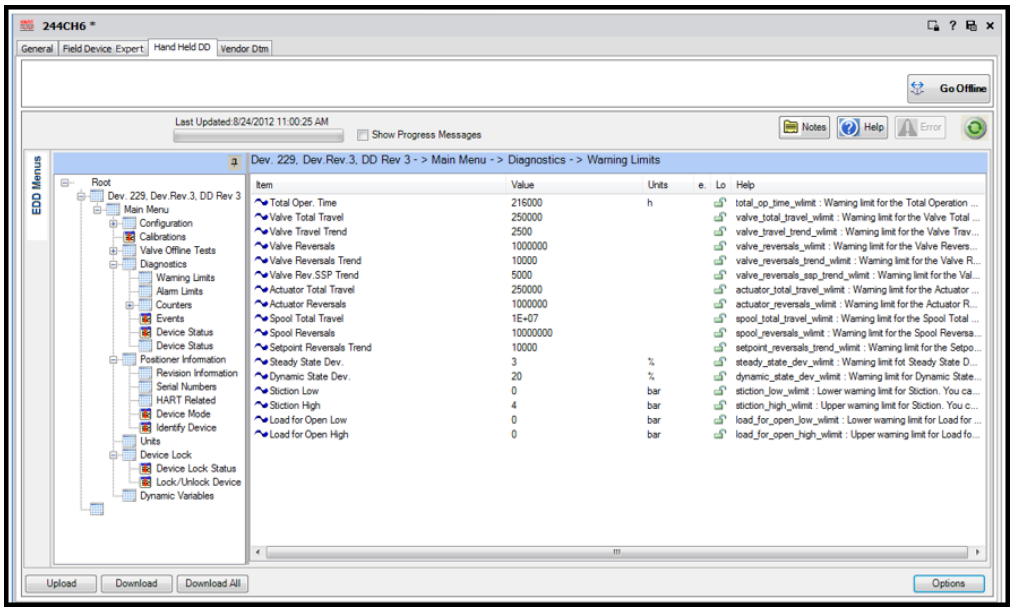
Figure 14 - Enhanced EDDL View



HART Hand Held DD Support

HART device descriptions can also contain EDDL for a hand held device. These are similar to the Enhanced EDDL displays, but often without as much diagnostic capability. When this is available in DD files, Field Device Expert automatically displays a Hand Held DD tab.

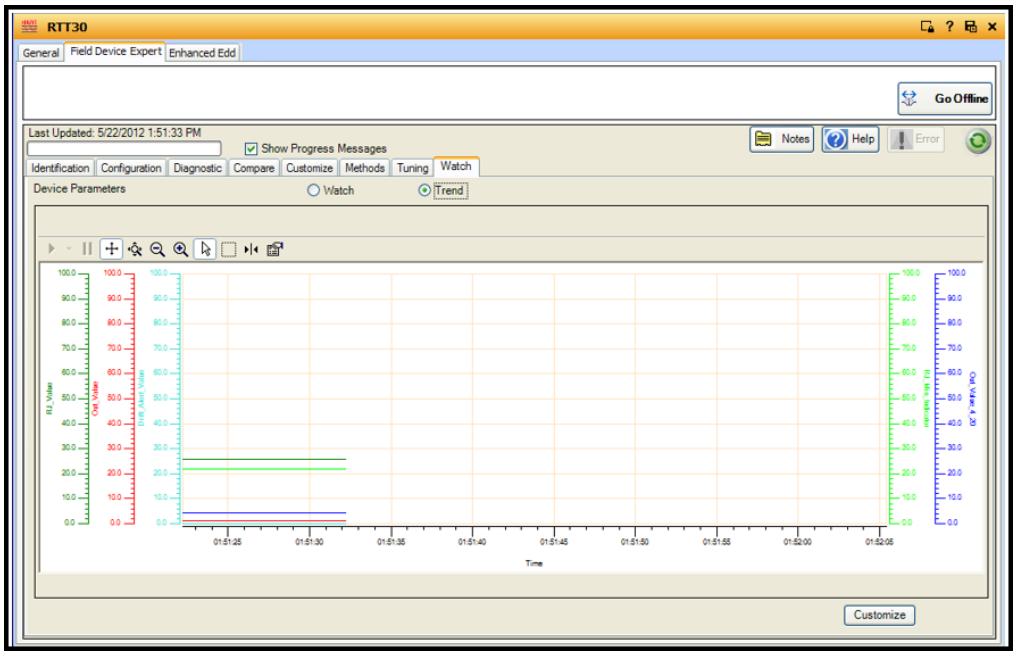
Figure 15 - Handheld EDDL Screen



Diagnosing Using Customized Field Device Expert Displays

The Field Device Expert tab, which renders basic/legacy device descriptions, provides a diagnostic interface either for those instruments not having enhanced electronic device descriptions (or vendor DTMs) and also an interface for those cases where it is desirable to customize the information presented. Multiple diagnostic, watch, or tuning format screens can be set up. This figure shows a customized watch display with key performance variables of an instrument in a trend format.

Figure 16 - Customized Watch Display

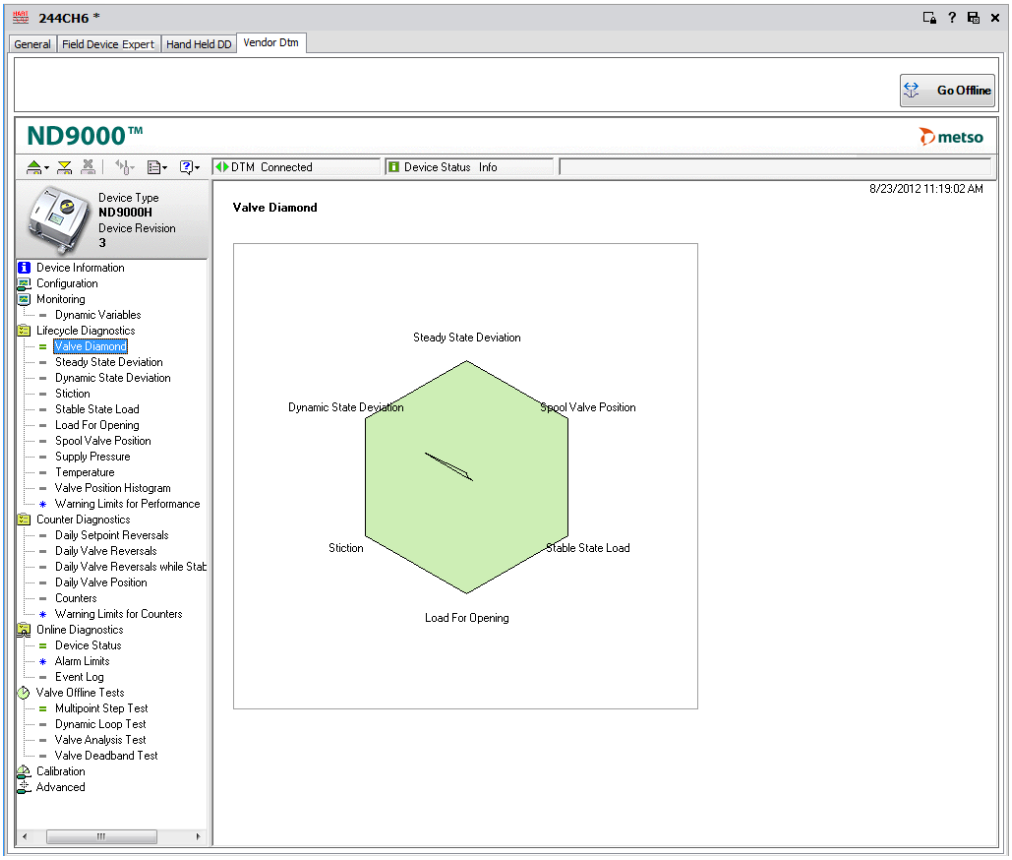


Diagnosing Using Vendor DTMs

The most dramatic improvements in device uptime are often achieved through the use of vendor DTMs (Device Type Managers), which provide device-specific user interfaces for advanced diagnostics. On valve positioners, for example, DTMs provide online views of valve health through data histograms and graphics that can help spot abnormal conditions such as:

- Load for opening can indicate seat wear in butterfly valves or crystallization in ball valves.
- Increased stem friction can indicate a sticking valve and is a predictive indicator of future accuracy problems or failure detection in valves.
- Decreased stem friction can indicate excessive wear or a valve shaft break.
- Abnormal changes in spool valve position may indicate detected problems such as an air leak in the actuator.
- Dynamic deviation can indicate how responsive the valve is.
- Steady state deviation can indicate how accurately the valve achieves setpoint.
- Partial stroke testing of valves in ESD applications can indicate if the valve is able to operate on demand.

Figure 17 - Valve Diamond Analysis



Remember that this vendor provides a built-in help system to guide users in using their DTM.

Figure 18 - Valve Response History

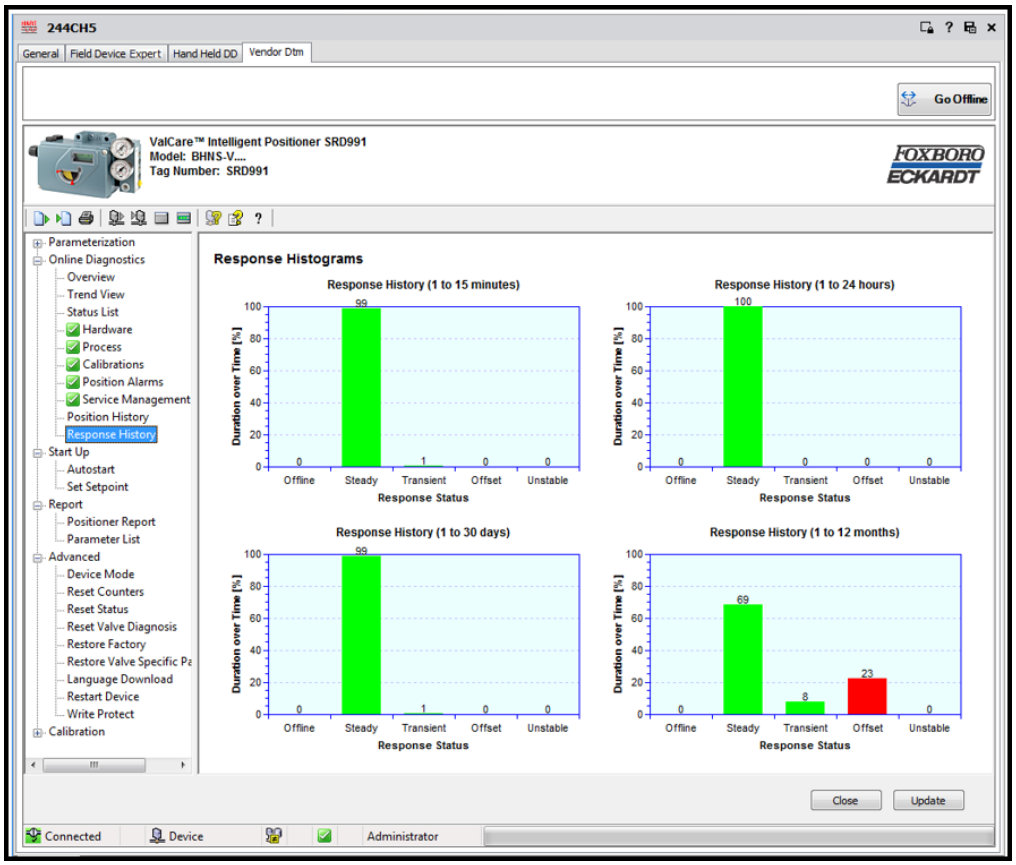
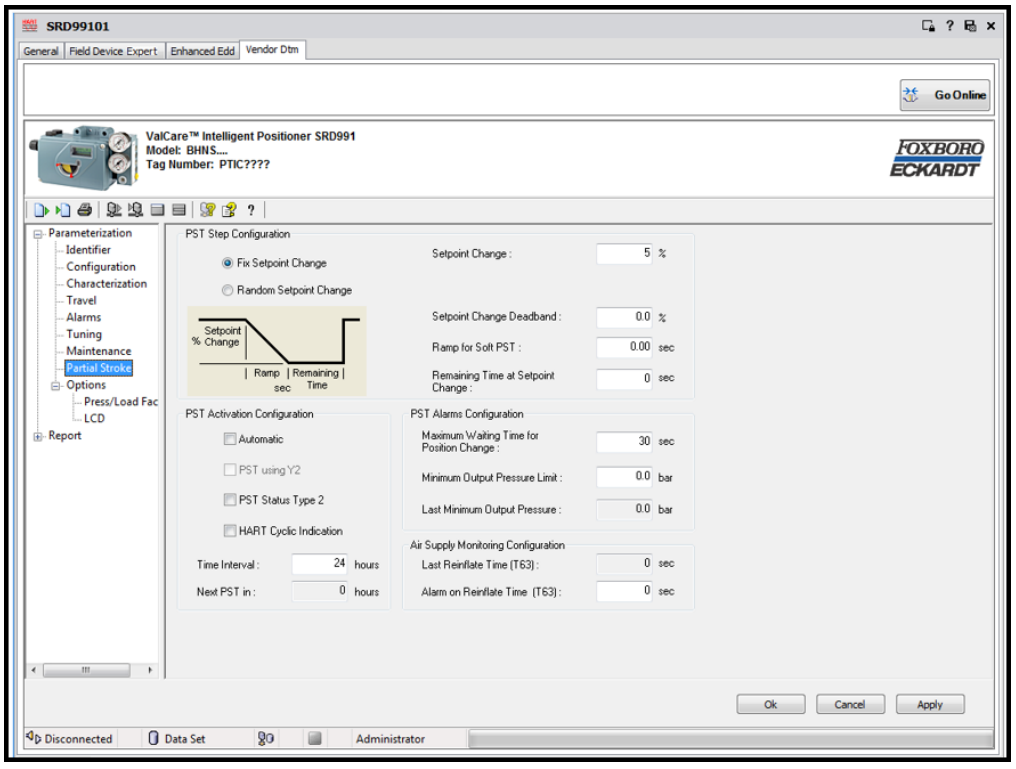


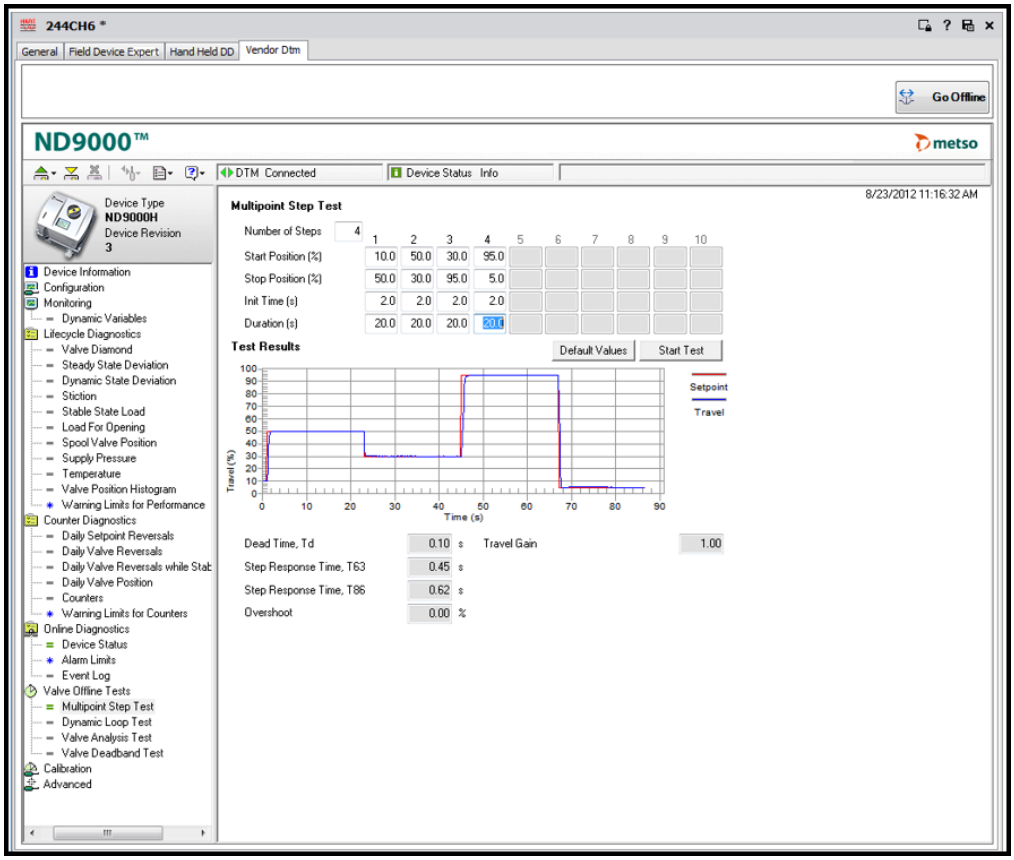
Figure 19 - Valve Process and Partial Stroke Status



The vendors typically provide offline tests that can drill down even deeper into valve problems detected and performance. For example:

- Step response tests can indicate how well the valve follows setpoint and validate how well the positioner is tuned.
- Signature tests can validate valve performance. The ability to archive and restore past valve signatures can help benchmark valve performance changes.

Figure 20 - Multipoint Step Response Test



Field Device Expert Workshop

The Control Room edition of Field Device Expert has the features as described previously. This edition is used on Foxboro DCS Control Workstations in combination with EcoStruxure™ Foxboro DCS Control Processors and 200 Series HART FBMs.

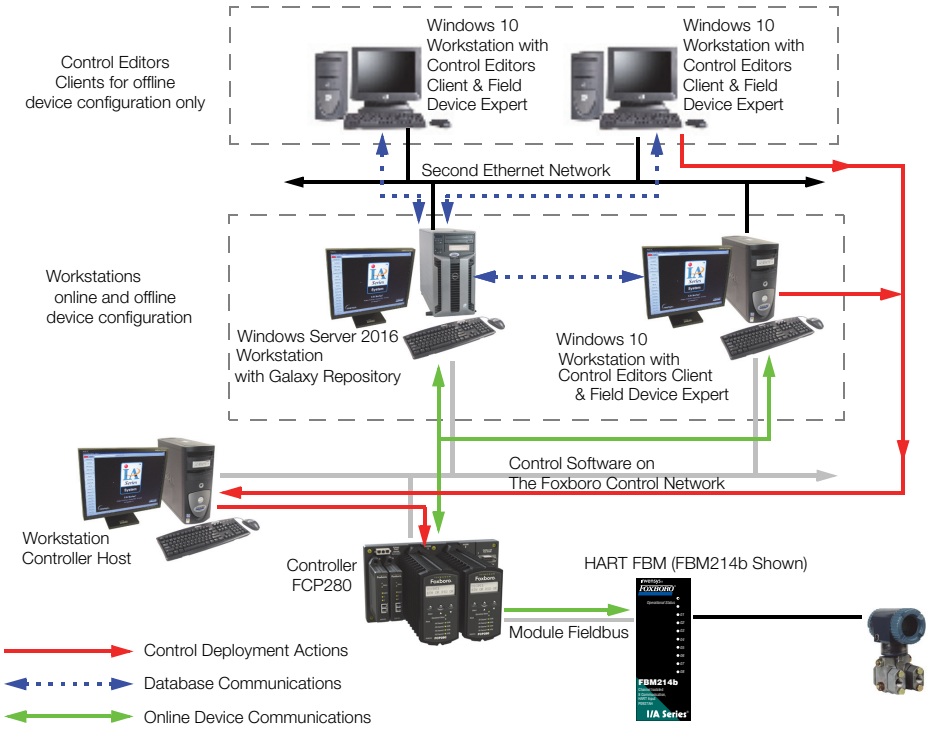
In addition, the Control Editors and Field Device Expert for HART devices are offered in a bundled instrument Workshop edition. This edition is used in a non-Foxboro DCS system setting to calibrate, pre-commission, or test instrumentation before installing and connecting to the HART FBM interface card. This edition provides workbench type functions:

- Running methods in the DD files through Field Device Expert.
- Exercising offline diagnostic tests, or running commissioning or calibration functions contained in an FDT compliant DTM made by the device vendor.
- Diagnosing the device using the universal screens of Field Device Expert.
- Setting or changing the tag of the device.
- Running Field Device Expert.
- Commissioning Wizard to commission a device before connecting to the Foxboro DCS system.

System Architecture

This figure illustrates the entire Control Room edition of Field Device Expert. The Control Software clients with both the Control Editors and Field Device Expert need to reside on the EcoStruxure™ Foxboro DCS Control Network in order to have online communications with HART instrumentation for configuration and diagnostics. They may be additionally situated on the control network, but this provides offline functionality only. The Control Software server with the Galaxy Repository having both the Control Editors and Field Device Expert software may reside on or off the control network.

Figure 21 - Typical System Architecture of the Control Editors and Field Device Expert



Supported FBM and Instrument Types

Supported HART FBM and HART-Capable FBM Types

FBM214, FBM214b, FBM214e, FBM215, FBM216, FBM216b, FBM218, FBM244, FBM245, FBM247, FBM248

Supported HART Instrument Types

HART instruments compliant to Version 5, 6, or 7 of the HART specifications may be used.

Wireless HART instruments may be connected through FBM232/233 EcoStruxure™ Foxboro™ DCS Field Device System Integrator Modules (FDSI) modules and the P&F WHA-GW-F2D2-0-A*-Z2-ETH gateway.

Supported FoxCom FBM Types

FBM243 and FBM246

Control Room Edition Hardware and Software Requirements

Hardware Requirements

Follow the hardware requirements for the Control Editors as specified in *Control Editors* (PSS 41S-10EDITOR).

Software Minimum Requirements

Follow the software requirements for the Control Editors as specified in *Control Editors* (PSS 41S-10EDITOR).

- S59 Field Device Expert Software License for each computer on which the software is installed

  You require each license specifying the HART option and each license specifying field device quantities equal to or greater than the number of HART instruments (plus instruments of other protocols covered by the S59 license) used site-wide.
- To take advantage of all the features described in this document, you require Control Software v7.3 or later.

Computer Requirements

- Laptop, desktop or server class computer
- Minimum of 16.0 GB free hard disk space
- Minimum of 4.0 GB RAM
- DVD or CD drive
- 4.18 Ghz Intel Pentium 4 processor (or newer)
- Windows 10 or Windows Server 2016 operating system
- Video Graphic Accelerator Card: 32 MB of memory
- Communications Network: 100 MHz TCP/IP Switched Ethernet
- PCI, USB, or Serial port form factor HART modem for instrument connectivity.

Related Documents

For information about:	See:
Control Room Edition hardware and software requirements	*Control Editors* (PSS 41S-10EDITOR)
FBM214b	*FBM214b, HART Communication Input Module* (PSS 41H-2S214)
FBM214e	*Compact FBM214e 16 Channel HART Communication Input Interface Module* (PSS 41H-2C214E)
FBM215	*FBM215 HART Communication Output Module* (PSS 41H-2S215)
FBM216b	*FBM216b Redundant HART® Communication Input Module* (PSS 41H-2S216)
FBM218	*FBM218 HART Communication Redundant Output Module* (PSS 41H-2S218)
FBM244	*FBM244, 0 to 20 mA I/O Module with HART Support* (PSS 41H-2S244)
FBM245	*FBM245, 0 to 20 mA I/O Module with HART Support (Redundant)* (PSS 41H-2S245)
FBM247	*FBM247, Current/Voltage Analog/Digital/Pulse I/O Configurable Module* (PSS 41H-2S247)
FBM248	*FBM248, Current/Voltage Analog/Digital/Pulse I/O Configurable Module (Redundant)* (PSS 41H-2S248)

WARNING: This product can expose you to chemicals including lead and lead compounds, which are known to the State of California to cause cancer and birth defects or other reproductive harm. For more information, go to www.p65warnings.ca.gov/.

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As standards, specifications, and design change from time to time, please ask for confirmation of the information given in this publication.

PSS 41S-10FDMHRT, Rev C