

EnTech Toolkit

- Advanced analysis and tuning technology improves performance for difficult control loops
- Easily collect plant test data and model identifications
- Optimal tuning for improved performance
- Advanced performance analysis to understand variability and diagnose root cause

Introduction

You want to be a best-cost producer in your industry and you are getting close. You want to maximize production rates, minimize feedstock and energy costs, and ensure your product meets specifications. You see the direct link between managing variability and having the attributes of an optimized process. But there are a number of issues in your process that you struggle to define and correct. Finding what is holding your plant back can spell the difference between a minor problem and an unplanned outage, wasted raw materials or misspent capital.

You need the right tools to ensure your control equipment and your process are running at peak performance. The EnTech Toolkit is an easy-to-use, PC-based solution that distills twenty years of direct experience in helping clients understand and solve their most complex process control problems.

The EnTech Toolkit is an add-on option to DeltaV InSight and may be used as a standalone tool for both DeltaV systems and non-DeltaV control systems.

Benefits

Advanced analysis and tuning technology improves performance for difficult control loops. The EnTech Toolkit tackles the most difficult loops in your plant with advanced statistical analysis tools and tuning optimization algorithms.



EnTech Toolkit for advanced loop analysis and tuning.

Easily collect plant test data and model identifications. The EnTech toolkit makes it easy to perform plant tests and identify process models for tuning and analysis.

Optimal tuning for improved performance Properly tuned loops can decrease process variability and increase profits through improved product quality, throughput, and equipment availability. The EnTech Toolkit provides many tuning options and addresses the most difficult loops with higher order and integrating process dynamics.

Advanced performance analysis to understand variability and diagnose root cause. For the advanced user, the EnTech Toolkit provides a sophisticated, easy-to-use statistical and spectral analysis technology. This technology provides insight into the characteristics of loop variability and the interactions and root cause of poor performance.

Product Description

The EnTech Toolkit is a data collection, analysis and advanced tuning package that provides the control engineer or technician with an easy-to-use vehicle for maintaining and improving control loop health. The EnTech Toolkit manages the collection of process data, analyzes the data using multiple mathematical techniques, and recommends control loop tuning procedures and parameters by referring to EnTech’s highly developed data-base of dynamic analysis and control programs.

Control loop tuning

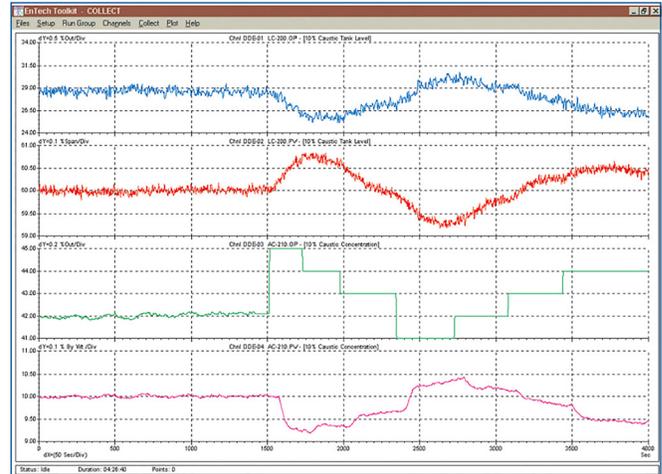
Your plant is a highly engineered and complex machine. Why resort to tuning it by feel? Backed by Emerson’s training and support services, the user will implement realistic and mathematically sound control tuning changes, based on understanding of process dynamics, the analysis and recommendations provided by the Toolkit, and effective tuning strategies. The user’s expertise plus Toolkit’s analytical power will get the best possible performance from your existing process control network.

The EnTech Toolkit is composed of the following main modules:

COLLECT is a flexible, data collection tool that prepares and identifies process data for the ANALYSE or TUNER modules. Data is collected from the DeltaV system or other distributed control system (DCS) using OPC communications provided with the DCS. To insure accurate analysis, the user must confirm that filtering on the inputs to the DCS is not excessive.

Proper organization and filing of data are essential for later recall, interpretation, and problem solution. COLLECT’s auto-save feature automatically saves data and increments file numbers at the end of each data run. The file format is automatically readable in ANALYSE and TUNER.

Process signal data is collected at user selectable periods as supported by the data collection protocol. OPC data collection on DeltaV may be as fast as every 30 seconds. Data may be collected for a few minutes, or several hours, on up to 256 process variables.



Collect displays and stores process data for analysis.

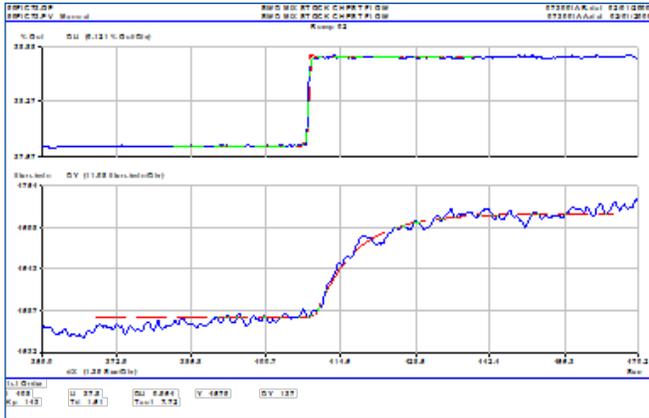
TUNER assesses open loop step tests and through its database of control loop dynamics and controller algorithms, the Tuner recommends tuning parameters to help meet process manufacturing objectives. TUNER’s recommendations may then be simulated before implementation.

Every part of the process has its own dynamics based on the process design, the process equipment, and production throughput. The dynamics of each process loop must be individually managed for optimum performance. To achieve overall manufacturing and quality control objectives, TUNER is designed to optimize the tuning of individual loops and the process as a whole.

TUNER accepts information regarding the loop type and control element type. The default raw data format is the format saved by COLLECT.

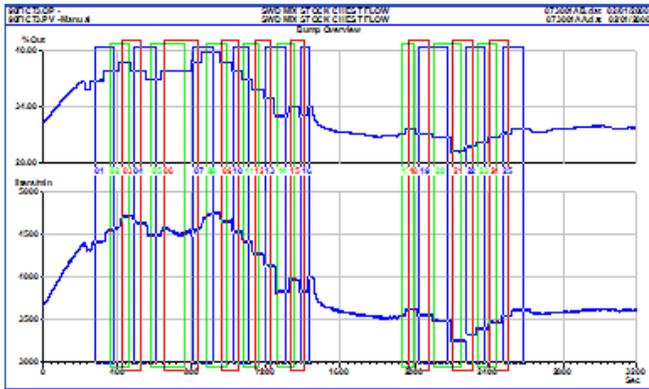
TUNER – Loop Overview and Tuning Recommendations.

From an encyclopedia of models, the user selects the response model that best defines the demonstrated characteristics. This model is fitted to each step response to determine process parameters that best define the response.



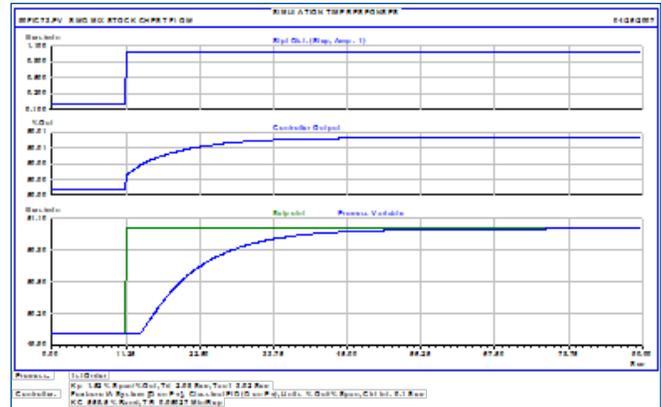
TUNER – Model Identification.

TUNER provides guidelines for minimizing variability. The Lambda tuning techniques employed are the most stable method available to industry. Tuner makes suggestions for loop tuning aggressiveness and provides warnings if sufficient data is not available. The user selects the value of Lambda (closed loop time constant). The Tuning Manager helps keep track of the changes made to tuning of all loops in a process area.



TUNER – Managing Multiple Plant Tests with Step Windows.

Users may test the solution in a simulator that shows the loop reaction to set point changes, load disturbances, and cyclic variation. Simulation results can be displayed in either frequency domain (Bode plot) or as time response. The user learns what variability can and cannot be removed.

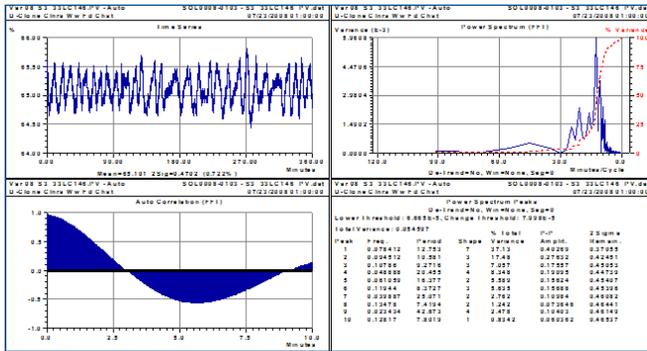


TUNER – Control Loop Simulation.

ANALYSE is a powerful analytical tool for assessing the dynamic performance of a process and its instrumentation and for isolating the characteristics of process variability.

Analysis of time series data is useful for defining the dynamics of the process, indicating poor control element response, assessing periodic cycling, or inferring cross correlation of data. The ANALYSE library includes Fourier and Fast Fourier Transforms, Correlation, Cumulative Variability, Histogram charting, filtering in addition to Time Series statistics. The combination of one or more techniques will help the educated user to recognize, understand and isolate the major contributors to process variation. The solution, such as valve maintenance or transmitter replacement, may be obvious. More complex issues, such as optimal control loop tuning, can be dealt with by TUNER.

Power spectra of the input variables will be similar to spectra of output variables if there is a significant process linkage. Cross-correlation may be used to diagnose interactions between different sources of process variability.



ANALYSE – Example Statistical and Spectral Analysis Data.

The default file format is the format saved by COLLECT, but data can be imported from ASCII also. For ease of interpretation, the user can amplify scaling, change from time to frequency scaling (linear or logarithmic) or mix and match the display arrangements.

Batch print operations allow hardcopy generation of multiple data files during off-peak hours.

To make the job of ongoing analysis and data file management even easier, the new Data Manager has been created. Data Manager creates various databases of key information contained in all the data files.

Ordering Information

Description	Model Number
EnTech Toolkit Add-on for DeltaV InSight* System-wide license; available from any DeltaV v13.3*** and later workstations where Full DeltaV InSight* can be accessed.	VE9141
EnTech Toolkit Standalone** For both DeltaV and non-DeltaV systems. Single workstation only.	VF9141

EnTech Toolkit System Requirements	
DeltaV Workstations	The EnTech Toolkit is supported on all standard DeltaV v13.3+ workstation and server hardware and software.
Laptop or Office PC	System Recommendations — EnTech Toolkit Standalone**
CPU	2.0 GHz dual core processor or better
Memory	Minimum: 4 GB
Display	Minimum: 1024 X 768 with 65K colors
Operating system	Windows 7 x86 x64 Windows Server 2008 Windows Server 2010 Windows 10 Windows Server 2016 * EnTech Toolkit is not supported on Windows XP
Disk space	4 GB free space

* EnTech Toolkit Add-on for DeltaV InSight is only applicable with a Full DeltaV InSight system license. This add-on license is not applicable for DeltaV InSight Basic license.
 ** EnTech Toolkit may be used on prior versions of DeltaV (pre-v13.3) using the Standalone license and dongle, but only when the EnTech Toolkit software is installed on a computer that is not a DeltaV workstation or server.
 *** EnTech Toolkit is supported on English language DeltaV workstations only.

Related Products

- DeltaV InSight.** Control performance monitoring and loop tuning application embedded in the DeltaV system. Identifies control problems and improves control performance with automatic process learning, loop diagnostics, on-demand and adaptive tuning, and automatic report generation.

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