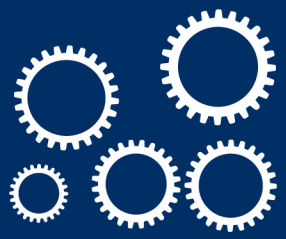
The use of software in commissioning & balancing



sys-tek

TECHNICAL COMMISSIONING & ENGINEERS

www.sys-tek.com

The use of software in commissioning & balancing

Commissioning, in all its forms, is a process that ensures that all building systems, equipment, and operations function optimally.

Commissioning & TAB providers have long sought a means to perform their work more efficiently & effectively. In the past, Cx or TAB projects required reams of paper and extreme organization to perform the work. It was not uncommon for paperwork to disappear or get ruined. This then required the work previously performed to be redone. Talk about inefficient and ineffective! At the end of the day, the final deliverable to the client was vast amounts of paper that would eventually get put on a shelf and lost forever.

Advances in technology have facilitated a somewhat slow migration towards electronic data collection and storage. Most of today's TAB companies use Excel workbooks to manage and store test data. This is a substantial improvement from manually recording data on paper. Ironically, the newer industry of Commissioning still has a majority of service providers still using paper.

Back in 2007, sys-tek recognized the necessity to leverage software and technology to move towards a paperless service offering. Thus began the search for a solution. The software offerings we discovered focused around a data collection method where the software provider stored all collected data on their servers. For sys-tek, this model was not a fit. The decision was made to exploit our knowledge of the Tridium Niagara AX platform to create our own solution, which led to the development of sys-tek's Cx/TAB Kit.

Why leverage technology?

50%

The why to using software is somewhat company specific. One universal benefit of software is the ease with which electronic files can be backed up to a server, the cloud, or portable drives. When properly utilized, software can push a company towards standardization in testing methodologies and the look and feel of final reports. These ideals were what started moving sys-tek down the path of software development.

Benefits for service providers when software is utilized may include:

- Automatic generation of Cx/TAB documentation and forms
- Repeatability of tests and engineering calculations
- Advanced equipment/system performance testing and analysis
- Graphical nature of data presentation provides a much easier means for entering and managing information
- Web-based access to data eliminates the need to sift through volumes of paper data
- Energy analysis of equipment, systems, and buildings
- Assurance that all i's are dotted and t's are crossed throughout the Cx and/or TAB process
- Ability for service providers to implement Monitoring Based Commissioning (MBCx)

Benefits for the end user when software is utilized may include:

- Advanced equipment/system performance testing and analysis
- Graphical nature of data presentation provides a much easier means for understanding information
- Web-based access to data eliminates the need to sift through volumes of paper data
- Energy analysis of equipment, systems, and buildings
- Assurance that all i's are dotted and t's are crossed throughout the Cx and/or TAB process
- Ability for service providers to implement Monitoring Based Commissioning (MBCx)

Using our experience and expertise with the Tridium Niagara AX platform, we have developed a very dynamic and diverse software suite. Testing methodology and approach are now standardized and built into the software. This ensures that when a piece of equipment is tested, mandatory readings and validations are performed every time.

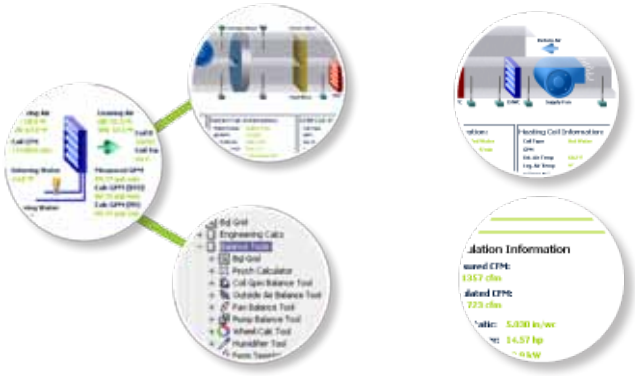
Cx/TAB Kit Software

sys-tek is revolutionizing building commissioning with the Cx/TAB Kit

Handling all aspects of Commissioning and Balancing projects from beginning to end

To better serve our clients, sys-tek has developed a ground-breaking Commissioning/Testing Adjusting, and Balancing Software Kit. The Cx/TAB Kit provides you with a dynamic means of performing Commissioning and TAB projects. Use of the Cx/TAB Kit provides consistency to the Commissioning process. The ability to automatically create documents and the use of built-in analytical tools generates the potential to cut Commissioning time in half.

Not only does the Cx/TAB Kit make users more competitive, cutting Commissioning time in half, but the end user gets information presented in a usable fashion. A unique part of the documentation is the enhanced presentation of data. Data for each piece of equipment is presented in a graphical format.



The Cx/TAB Kit comes in three separate software packages:

- Commissioning and TAB
- Report Writer
- Continuous Commissioning and M&V

COMMISSIONING AND TAB

Features of the Kit

Device Database

Whether generating a proposal or creating a Commissioning Plan, the first step with any Commissioning/TAB project is the generation of the device database. Adding a new device to the system consists of selecting the device type and then answering equipment specific questions. Once the device is configured, specific Commissioning tests are generated based upon user input. Custom tests can be generated and added to any device to meet the needs of engineered supplied sequences.

HVAC Devices

Each device has sections for the following data:

- System Manual Data
- Preventative Maintenance Data
- Trouble Shooting Tips
- BAS Control Points
- Setpoints
- TAB Forms
- Field Installation Verification Tests (FIV)
- Functional Performance Tests (FPT)
- Design Checks
- IAQ Calculator (AHUs & RTUs Only)
- Device Printout (Graphical Representation of Equipment)

Custom Tests

Custom tests are built in this feature. Custom tests are user created and are comprised of the various building blocks used for the automatically generated tests. Custom tests can be added to any device in the database.

Integrated Tests

Integrated tests are comprised of system level tests. These tests are configured based upon the devices entered into the device database. Integrated tests include recovery and failure tests for the various systems.

Lighting

HVAC systems are a large portion of any Commissioning project. In addition to HVAC Commissioning, LEED requires lighting systems to be commissioned as well. To ensure proper Commissioning of lighting systems, the Cx/TAB Kit has a section dedicated to this. The lighting feature has the ability to test networked and non-networked lighting control systems. Similar to the devices section, adding a lighting control device is a simple click along a device selection.

Critical Electrical Systems

This feature is dedicated to Commissioning of mission critical electrical distribution systems. Systems include main electrical switchgear, generator paralleling gear, automatic transfer switches, and standby emergency generators.

Team Member Management (TMM)

TMM houses all members of the Commissioning Team that will work on the project. Cx/TAB Kit team members are given specific roles and when logged in, activity times are tracked. This enables activity times to be tracked and budgets managed.

Issue Log & Observation Reports

During Commissioning, operational issues may present themselves. Commissioning issues are stored in the issues log. An important feature is the ability to easily add issues to a Commissioning report. All reports and issues are stored and monitored within the Cx/TAB Kit database. Issue logs and reports can be generated at any time during Commissioning for dispersion to owners, architects, engineers and contractors.

Cx/TAB Kit Meetings & To-Do Lists

Another important item in Commissioning is tracking meetings and to-do lists. Meeting information is stored in the Cx/TAB Kit for easy reference and use. To-do lists are used internally by the Commissioning team or as part of Commissioning meetings.

Cx/TAB Kit Tools

Under the tools folder, various analysis tools are available with the ability to add numerous types of Commissioning tools. Lab system commissioning is housed under the tools folder as well as engineering calculations and balance tools.

Commissioning Proposal

Once the device database has been created, several features in the Cx/TAB Kit become available. One of these features is the ability to dynamically generate a Commissioning services proposal specific to the project. Proposals are configured by specifying what services shall be performed. Selections include TAB, FIV, FPT, LEED Fundamental, and LEED Enhanced. Any and all combinations of Commissioning services can be configured for a proposal.

Energy Analysis

There are several benefits to Commissioning: improved building operation, enhanced system documentation, and system optimization. Energy analysis plays a large role in system optimization. The Cx/TAB Kit has an energy analysis feature built into the software. Several different analysis features are included to enable efficient analysis of different energy savings features. The energy analysis database is developed automatically from the device database created earlier. The energy analysis models the system based upon configuration parameters for each device. Once an analysis is configured and built, the resulting yearly information is compiled; total kWh, Total MBH, estimated cost to operate the facility, and anticipated carbon footprint in tons of CO2. Carbon footprint is determined by the selected state where the building is located.

REPORT WRITER

Report writing made simple

The Cx/TAB Kit has built-in exporters that compile testing data and export the data as a .csv file to your computer. Once the file is on your local computer, the Cx/TAB Kit Report Writer software is utilized. The software compiles Excel files broken up in a manner easy for printing.

The following exporters/reports are included in the Cx/TAB Kit and Report Writer software:

Project Report

This is the staple report of the Cx/TAB Kit. This report prints out the Setpoints, FIV forms, and FPT tests for each device. Reports can run in the Commissioning plan mode, which will configure the forms for inclusion in the Commissioning plan.

Design Tests Report

Specialized design tests are created for each device added to the Cx/TAB Kit database. These tests verify equipment and system sizing. The report compiles all of the test data individually by each device.

System Manual Report

System manual information is created for each device. System manual information includes preventative maintenance procedures, troubleshooting tips, and control points. The report collects the system manual data on a per device basis.

Test Description Report

This report is designed specifically for the final commissioning report. Descriptions of all FPT tests are printed out on a per test type basis.

Energy Analysis Report

This report prints out all pertinent energy analysis data on a per analysis basis.

Issue Log Report

A quick printout of the Cx/TAB Kit's issue log is generated. The issue log is sortable based upon all of the issue criteria.

Observation Report

Observation/recommendation reports are printed on a per report basis. Observation/recommendation reports are developed to provide information to the project team.

To-Do List Report

To-Do List reports allow tasks to be formulated and assigned to Cx/TAB Kit team members and the project team. Reports are printed on a per list basis.

Meeting Report

To ensure all pertinent data is housed in the Cx/TAB Kit database, the ability to store Commissioning reports is provided. Meetings are printed on an individual meeting basis.

Incomplete Forms Report

To aid in the management of Cx/TAB Kit projects, an incomplete forms report can be developed. This report finds all incomplete or blank data on forms and generates a detailed report.

TAB Report

TAB forms are marked for printing in the Cx/TAB Kit. Once marked for printing, all pertinent balance forms are printed on a per device basis.

M&V Points Report

Integration point lists are generated on a per device basis. The point lists are designed to be given to the BAS Contractor to ensure a smooth transition in the M&V Process.

M&V Charts Report

Report generation is comprised of automatically downloading all trend and analysis data. Once the data is downloaded, it is formatted into Excel files and charts are automatically created.

CONTINUOUS COMMISSIONING AND M&V

A software & hardware solution

The Commissioning M&V Kit is designed to provide continuous Commissioning of building systems. The unique design of this software facilitates the integration of Building Automation Systems (BAS), and dynamically performs system trending and analysis. This software was developed around Tridium's Niagara AX Framework. This software has the ability to integrate with most BAS or SCADA systems. Once integrated, the software will provide real-time trending of specified control points and perform detailed analysis of individual system operations. The Cx/TAB Kit is revolutionizing the way Building Commissioning is approached. The Kit is designed specifically to facilitate LEED Energy and Atmosphere Credit #5 – Measurement & Verification. The software removes the burden of storing countless trends in the BAS. All trend data is now stored in the Cx/TAB Kit.

The Cx/TAB Kit is designed to provide for an ease of system management. Data is segmented by system type. A listing of all required BAS integration points is generated by the software. The point lists provide all data trended, monitored, and analyzed by this software package.

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For more information, please visit www.sys-tek.com or contact us at 816.229.9009