



Automated device commissioning with intelligent commissioning wizard

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Executive summary

Manufacturers face an ever-increasing demand to speed up the execution of megaprojects and shorten the period of plant shutdown, getting back into production as quickly as possible, so as to maximise operating efficiency in a fragile and rapidly changing economy. Larger projects mean larger and more complex automation systems configuration, commissioning of which constitute one of the last but critical tasks performed before a plant startup.

The current practice for configuration and commissioning of automation systems including field devices is not only tedious and time-consuming but also error prone. End users are now searching for new technologies and processes to eliminate, simplify and/or automate the steps in the overall commissioning minimising the cost, complexity and the risk of the project. It is critical to the success of the project to implement solutions that save time, reduce risk and increase accuracy.

The new **Intelligent Commissioning Wizard** from Schneider Electric enables device commissioning in a single step by completely automating the detection, configuration, commissioning and testing of HART field instrumentation connected to a Foxboro DCS.

This paper discusses limitations of the traditional methodology of configuration and commissioning of field devices and technologies that minimises the duration of the process and minimises the error, which in turn reduces the risk of delays, improving the business performance.

Limitations with traditional methodology of configuration and commissioning

Over the years, process automation projects are becoming increasingly complex and technologically demanding especially in large asset intensive industries — like mining, oil & gas, energy, utilities, etc. The duration of project execution and the risk of these megaprojects is becoming critical to the profitability of these companies. If executed successfully, these projects enhance shareholders' value; poor execution



can potentially impact the companies' performance, significantly putting the organisation's profitability and shareholders' value at risk. Recently, Booz Allen Hamilton, a strategy, technology, and engineering consulting firm with more than 100 years history did a survey with leaders from 20 companies—including super-majors, independents and EPC firms, as well as some heavy industry companies from the United States, Europe and Asia. More than half of the executives surveyed were dissatisfied with their company's overall project execution performance, citing high cost and schedule overruns that plague 40 percent of their projects. A 2014 report by EY (formerly ERNST & YOUNG) one of the top four professional business consulting and management consulting firms reveals that almost two thirds (64%) of multibillion-dollar megaprojects continue to exceed budgets, with three quarters (73%) missing project schedule deadlines.

As process industry projects become larger and larger, the resulting complexity of the automation systems also increases exponentially. Plant automation systems and field devices are not only the fundamental



building blocks of any asset intensive plant, but also represent significant capital and operational cost. Commissioning and configuration of field instruments and valves are the final but critical tasks on the critical path to plant start up and the impact on the overall project schedule and performance is significant.

While field instrumentation technology has made significant advances, device configuration and commissioning has remained largely manual and this does not help with the increase in the amount of data and parameters that field devices measure.

Some of the constraints associated with the traditional method of device commissioning include:

- **Manpower Intensive**

Traditional commissioning and configuration methodologies are cumbersome, time consuming and labour Intensive. The time required to configure and commission can range from as little as 15 minutes for low-complexity devices like pressure transmitters to more than 50 minutes for more complex assets like flow meters etc. Testing and report generation adds even more hours to the process

- **Error prone**

The risk of user error during manual commissioning and configuration is huge. It is easy to make typing errors during manual entry of device data and setting of operational parameters. The technician may miss configuring a new device in the network or forget to put the device back into operation after service

- **Expertise dependence**

Safe and reliable operation of the control system is dependent on field instruments and valves. This highly relies on the expertise of the technicians assigned

Taking into consideration constraints associated with traditional methods of configuring and commissioning of instruments and valves, business owners are looking for ways to simplify and/or automate the activity. In recent times, manufacturers are gravitating towards working with their instrument vendors to preconfigure devices before it is delivered to the site. But the premise that faster commissioning can be achieved by “fine tuning” the traditional approach is a fallacy and will only result in marginal improvements. The industry must make a paradigm shift by eliminating manual configuration, commissioning and testing altogether. The entire device commissioning process starting from device detection to configuration to commissioning, loop testing and reporting needs to be completely automated.

[Intelligent Commissioning Wizard – a paradigm shift in hart device commissioning](#)

The new **Intelligent Commissioning Wizard** embedded in the EcoStruxure™ Field Device Expert is a technology-enabled approach to commissioning of HART field instrumentation of any make or version connected to the EcoStruxure Foxboro DCS. It enables commissioning of HART Devices in a single step by completely automating detection, configuration, commissioning and testing. The Intelligent Commissioning Wizard even creates commissioning reports upon completion which further shortens the duration of the commissioning process.

Two use cases depending upon type of marshalling cabinet

Intelligent Commission Wizard supports both traditional and intelligent marshalling approach.

With traditional marshalling cabinets

Testing and report creation represent significant time and cost in the project scope. Intelligent Commissioning Wizard when used with traditional marshalling cabinets automates much of the testing and reporting to reduce both SAT (Site Acceptance Test) and commissioning duration. Intelligent Commissioning Wizard has the capability to verify the I/O card type and card channel assigned during the engineering phase vs what is built into the system cabinets, cross wiring in the marshalling cabinets, field cables and field junction boxes. A verification report is automatically generated upon completion.

With intelligent marshalling cabinets

Schneider Electric's Intelligent Field I/O Cabinets (Prefabricated marshalling cabinets with Intelligent I/Os) for both process and safety, together with Intelligent Commission Wizard and Schneider Electric's FLEX (Flexible, Lean Execution) project execution methodology has dramatically changed the way automation projects are executed.

System configuration at the project office

As soon as the initial P&ID designs are available, the project team located anywhere in the world can start building control loops without I/O assignments and without configuring HART devices in the system until the hardware is delivered to the site. The Intelligent Commission Wizard enables late binding where I/O references are not defined until the field devices are installed and commissioned on site. This decouples hardware and software design freeze, reduces risk and provides greater flexibility in the project, taking automation off the critical path.

Optimized site activities

While the system configuration is being done at the project office, the field team can

start field cable installation and termination simultaneously.

Automated Device commissioning using Intelligent Commissioning Wizard

Once the HART devices are connected to the Intelligent Enclosures, the Intelligent Commissioning Wizard can then be activated to perform the following actions with a single click.

- Automatic Binding of HART Devices
- Automatic Configuration of HART Devices
- Automatic Loop Test
- Automatic Report creation

Commissioning and configuration of new devices have long been a time consuming, tedious, task when conducted manually. While configuration, commissioning, testing of low-complexity devices might take as little as 15 minutes, the more complex assets can take an hour or more time. Testing and reporting further add to the duration of the task.

- **Automatic Binding and Configuration of HART Devices**

Based on the test done using automatic binding and configuration of HART devices, commissioning schedule has been demonstrated to be reduced by more than 70% majority of instrumentation like transmitters

- **Automatic Loop Tests**

Loop Tests has traditionally been done using two technicians; one in the field to simulate an analog value at the transmitter and the other at the automation system to check the corresponding value displayed in graphics and faceplates. Automatic Loop Tests completely automates the process and reduces the manpower requirement to one instead of two

- **Automatic Report Generation**

The automated process delivers more than 70% savings in time and effort per device and at the same time reduces errors and minimises the risk of schedule overrun. Applying these savings across hundreds and thousands of devices requires getting a new facility or an expansion up and running, the choice is apparent



About the author

Manoj Chandrasekharan is the Offer Director and a senior member of the Schneider Electric Process Automation Portfolio/Product Management team with responsibility for Asset Management across the DCS, PLC and SIS portfolio. He is a Mechanical Engineer with MBA from the University of Strathclyde, UK. He has vast experience in all aspects of business including strategic marketing, product management, business and sales management, consulting and services.

With over 25 years of experience in process automation and asset management, Mr. Chandrasekharan has most recently spent his time working at the leading edge of the development of asset management application software, both as an end user and with major process automation suppliers. During his time as an end user, he acquired significant experience in implementing large scale asset management solutions and providing training and consulting in the field of predictive maintenance.

Mr. Chandrasekharan is currently the Co-Chair of ISA WG 2.2. He has also previously represented Schneider Electric as the board member, China FDT Association and was the executive member of the Asia Pacific Foundation Fieldbus. He has published several papers in the field of asset management.

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Schneider Electric
35 rue Joseph Monier
92500 Rueil-Malmaison, France
Tel : +33 (0)1 41 29 70 00