

OPTIMIZING AUTOMATED PROCESSES AND WORKFLOWS

Achieve new levels of automation performance with intelligent, intuitive software

Automation has become integral to laboratory processes and workflows. It has transformed many laborious tasks into efficient, high-throughput processes and dramatically reduced the risk of human errors, thereby enhancing data accuracy and reproducibility. Laboratory automation has become ubiquitous in many pharmaceutical and biotechnology laboratories and supports a wide range of applications including drug discovery and development, synthetic biology, food and animal health, clinical diagnostics, and many others.

While the robotics, automation tools and instrumentation are important, creating an efficient, automated workflow relies equally as much on the use of a powerful automation software. Thermo Scientific™ Momentum™ Workflow Scheduling Software is an industry-leading software platform that enables users to define, execute, and monitor scientific processes and workflows. Momentum features ease of use, intelligent decision-making capabilities, powerful scheduling control, superior connectivity, and flexibility to attain new levels of performance.

EASE OF USE: AN INTUITIVE PLATFORM AND PROCESS GUIDE

With a graphical drag-and-drop process editor, Momentum allows users to build workflows in a similar manner to creating a flow chart. The flow of a process is easily managed using flow controls, which may be nested

and/or used in combination to create a desired behavior. Flow controls make it easy to co-ordinate operations in parallel, set time constraints, repeat processes, and even add work to a running batch.

The user-friendly interface also makes it easy to bring instruments offline, for manual use, maintenance, or to switch instruments in the system. This means the laboratory staff can still access and use equipment present on an integrated system for maximum productivity. If the device is needed again by the automation, it provides the user a readable, actionable prompt to bring the device back online.

Momentum is designed to partner with you throughout process creation to maximize uptime and reduce errors, with a built-in ability to Prevent, Anticipate, React, and Solve problems (PARS error-handling). This approach combines intelligent guidance during process creation, robot self-healing, runtime error mitigation, with easy and intuitive error recovery to maximize efficiency and uptime.

DECISION-MAKING CAPABILITIES: VARIABLES AND FLOW CONTROLS ENHANCE EFFICIENCY

Intelligent software, capable of event-driven scheduling is a powerful tool for optimizing performance, especially when combined with flow controls. Together these allow for dynamic processes, whereby the software relies on information to adapt to actual events of the automation and make on-the-fly decisions. For example, a workflow



involve growing cells to a certain confluence before processing. With Momentum, cell containing microplates can be read and, via a variable set in the process, the scheduler can determine whether to process the cells or return them for further incubation. Event-driven scheduling offers a high degree of flexibility, as dynamic process logic may be used to capture any workflow, enabling users to maintain critical times, add data events, trigger external applications, and track maintenance events.

POWER AND CONTROL: DYNAMIC SCHEDULING AND ATTRIBUTES

In addition to intuitive process creation and dynamic scheduling, through the use of attributes, Momentum enables users to track containers and individual wells throughout an entire process. A container may be accessed based on specific attributes such as users, date, process step, etc. For example, assay plates may be selected from a specific date, and directed to a process to seed a specific cell-line into the plates. Select plates may then be directed to a second process for treatment, and other plates may then be directed to a subsequent screening process. Further attributes such as the barcode feature make it easy to locate a plate anywhere in the process. Various attributes may be assigned to enable the execution of sequential workflows on the same container. If desired, the process can be made more granular, with attributes assigned to specific wells. Momentum harnesses

the power of attributes to support full process traceability in adherence with CFR21 Part 11 guidelines.

SUPERIOR CONNECTIVITY: DEDICATED CONNECTIVITY MODULE

Connecting automation systems into a larger data ecosystem is essential in most laboratories. Momentum's unique data capabilities, are enabled through the Unite module which simplify this process by allowing for the support of multi-part/form-data.

At a high level this works by extracting information from an external source, transferring it to a container, formatting information for Momentum or an external destination (including but not limited to .CSV, JSON, XML), and uploading the information to an external destination. Furthermore, the RESTful API enables third party applications to request work, and query the work and container status. As a result, Momentum enables connection to external applications such as LIMS (laboratory information management systems), ELNs (electronic laboratory notebooks), and other platforms to streamline data management and tracking. This connectivity also enables users to connect and synchronize applications across multiple different laboratory sites.

FLEXIBILITY: LARGE AND DIVERSE INSTRUMENT DRIVER LIBRARY

Many existing automation software platforms are confined to a limited range of movers and instruments. Momentum's open instrument design enables users to integrate a variety of tracks, robots, and other movers with an ever-expanding library of over 350 different instruments to create a complete system to meet the laboratory's specific needs. An optional SDK even allow customers to create their own drivers for novel devices.

All in all, Momentum workflow scheduling software is a powerful tool to simplify automation and achieve new levels of performance.

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