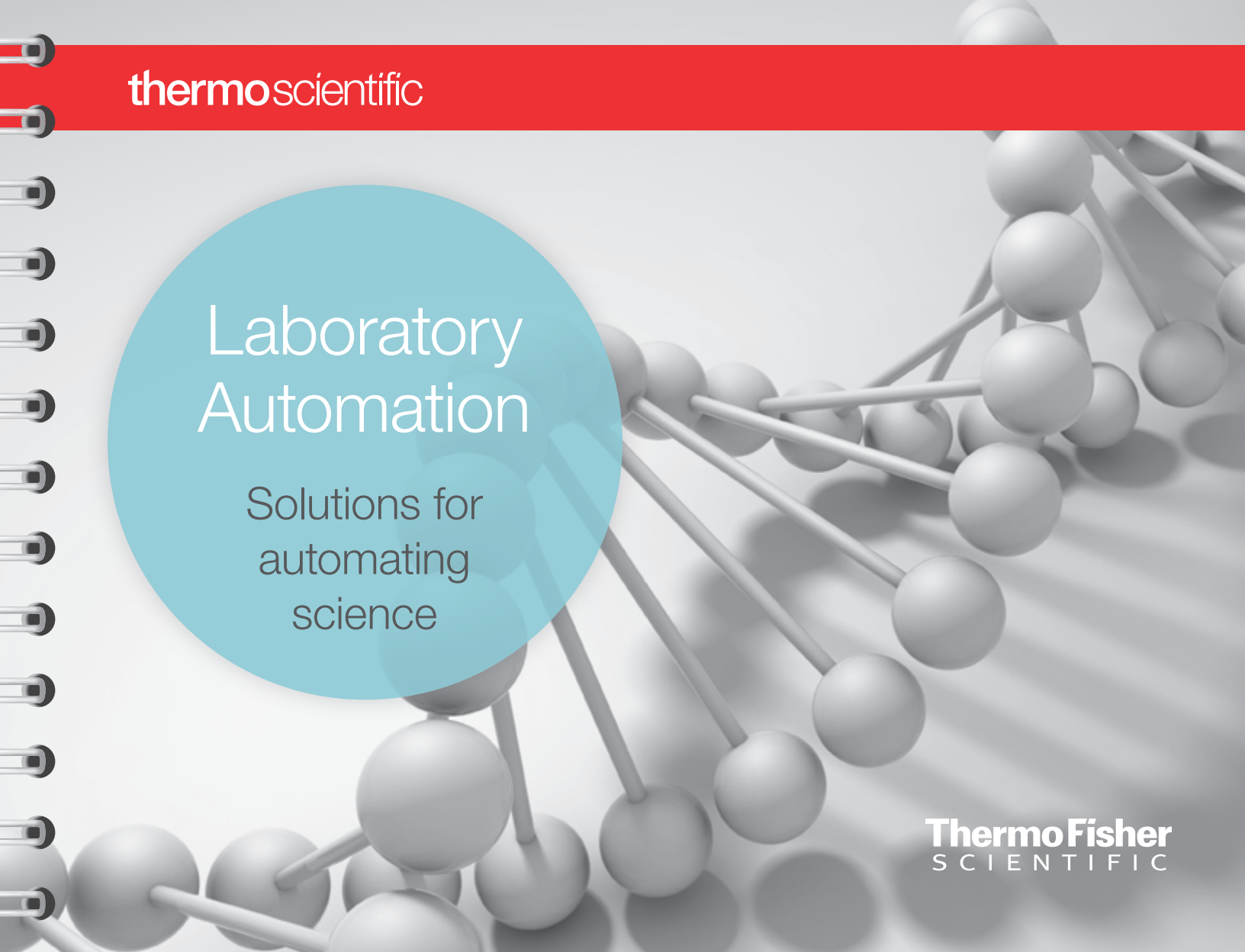
thermo scientific

Laboratory Automation

Solutions for automating science



ThermoFisher SCIENTIFIC

Lab Automation Inquiries **info.labautomation@thermofisher.com**

Global Service & Support **services.labautomation@thermofisher.com**

Choose Your Automation Journey

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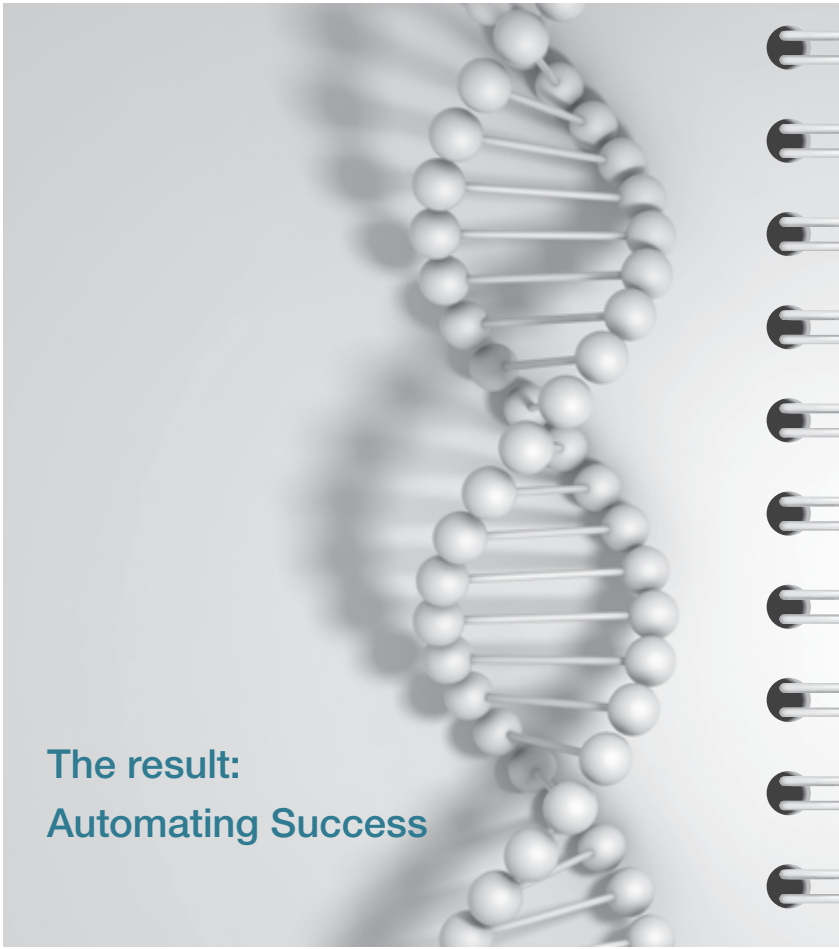
Laboratory Automation

Thermo Fisher Scientific Laboratory Automation has a proven track record, with decades of experience in automated incubation, laboratory robotics and workflow scheduling software. With installations and partnerships worldwide, we are fully committed to scientific advancement. Our experience allows us to provide solutions that increase productivity while delivering improved data reproducibility and quality.



The result:
Automating Success

Going automated—not just for throughput

When thinking of the benefits of automation, increased capacity and throughput often come to mind. Did you know that automating can also help:

- ✓ Increase data quality and reproducibility
- ✓ Improve process reliability and consistency
- ✓ Shorten research timelines and iteration cycles
- ✓ Reduce error rates
- ✓ Provide walkaway time and free up personnel for high value activities
- ✓ Generate data for Machine Learning applications and closed-loop science

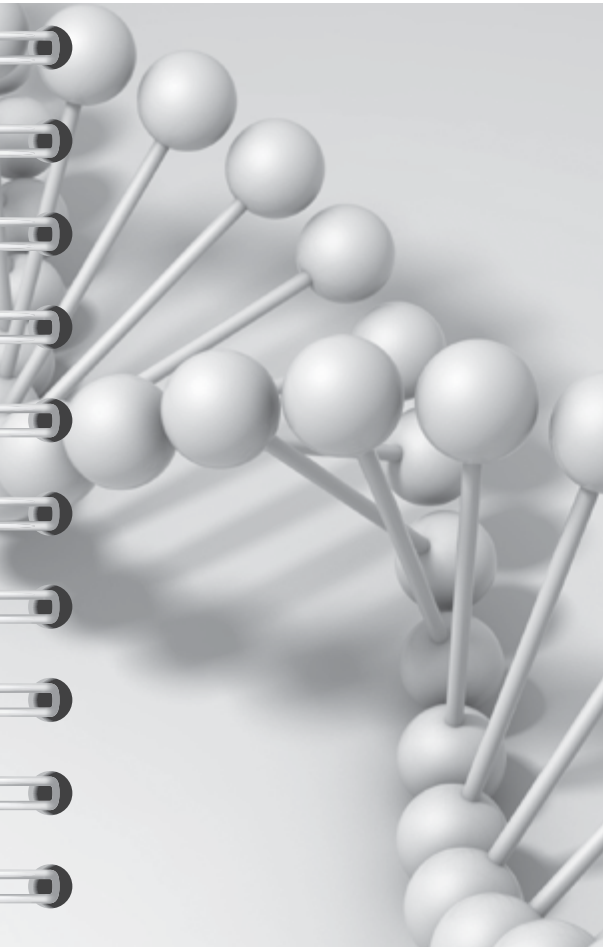
Whether you are looking to automate a simple operation or a sophisticated workflow, automation can help.

This guide will walk you through examples of scientists automating simple to complex workflows.

Contact us to discuss how we can build the right system for your science.

As you follow each scientist on their journey, you'll learn more about the Laboratory Automation portfolio of products

- Thermo Scientific™ Orbitor™ RS2 Microplate Mover
- Thermo Scientific™ Spinnaker™ Microplate Robot
- Thermo Scientific™ Spinnaker™ XT Microplate Robot
- Thermo Scientific™ F7 Robot
- Thermo Scientific™ Cytomat™ 2 C-LiN Automated Incubator Series
- Thermo Scientific™ Cytomat™ 2 C-LiN ToS Automated Incubator Series
- Thermo Scientific™ Cytomat™ 5 C Automated Incubator Series
- Thermo Scientific™ Cytomat™ 10 C Automated Incubator Series
- Thermo Scientific™ Cytomat™ 24 C Automated Incubator Series
- Thermo Scientific™ Cytomat™ SkyLine Automated Plate Storage and Delivery System
- Thermo Scientific™ BenchTrak™ Solution
- Thermo Scientific™ FastTrak™ Connector
- Thermo Scientific™ Vanquish™ UHLPC Loader
- Thermo Scientific™ inSPIRE™ Collaborative Laboratory Automation Platform
- Thermo Scientific™ SmartCart™ Docking Solution
- Thermo Scientific™ Momentum™ Workflow Scheduling Software



Which type of automation journey are you on?

Follow each scientist as they discover which automation is the best fit for their science...

Looking to automate instrument loading and unloading steps?

Instrument Loading Journey

Looking to automate a set of benchtop instruments or a simple process?

Simple Workflow Journey

Looking to automate multiple experiments?

Configurable Platform Journey

Looking to automate a variety of complex interconnected processes?

Large System Journey

Instrument Loading Journey

Your current science

- A relatively simple process involving instruments such as a reader, incubator, or washer
- Involves manual loading and unloading steps

Wish List

☐ Walk-away time

☐ Increase efficiency

☐ Reduce risk of sample handling errors

☐ Eliminate manual loading and unloading

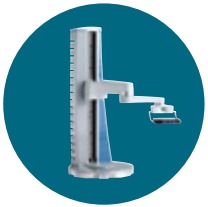
Automation can check these boxes

Recommended products for instrument loading

- Recommended
- Also a good option
- Likely not the best fit

Robotic Movers

Orbitor RS2 Mover


Spinnaker Robot

Spinnaker XT Robot

F7 Robot

Automated Incubators

Cytomat 2 C-LiN Series

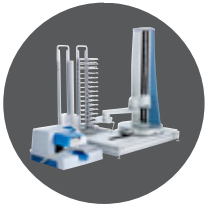
Cytomat 5 Series

Cytomat 10 Series

Cytomat 24 Series

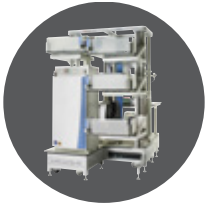
Cytomat SkyLine System

Automation Options


Track Options

Vanquish Loader

Collaborative Platform


inSPIRE Platform

SmartCart Solution

Software

Momentum Software

Why these products?

These products are best suited for the scientists looking to automate loading and unloading operations.

Orbitor RS2 Mover

A compact, quiet and reliable benchtop mover with an expansive 360° workspace. See page 27 for more information.

Cytomat 2 C-LiN Series

A dependable incubation solution with a broad range of options to address all your cell culture needs. See page 31 for more information.

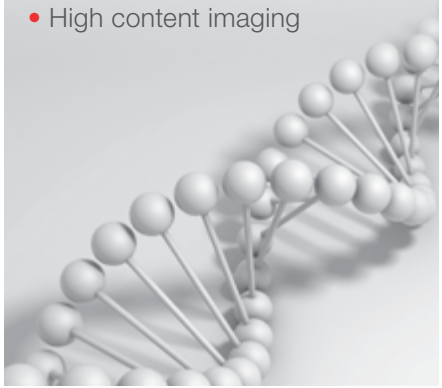
Momentum Software

An intuitive workflow scheduling software which provides all the tools you need to automate your science. See page 44 for more information.

Scientists who have completed this automation journey

Instrument loading journey applications

- Plate reading
- Sample prep
- Incubation
- PCR/qPCR
- Flow cytometry
- High content imaging



Instrument loading solutions are not limited to Thermo Fisher Scientific instruments.

Many Thermo Fisher Scientific instruments are designed to work in partnership with the Orbitor RS2 Mover. Look for the Automation-Ready icon in other Thermo Fisher Scientific life science instrument brochures.

Scientists save time and get 24/7 operation by coupling the Orbitor RS2 Mover with their qPCR devices.

Simple Workflow Journey

Current science

- A process involving a handful of instruments and/or experiments of increasing complexity

Wish List

- ☐ Walk-away time
- ☐ Increase efficiency and consistency
- ☐ Reduce the risk of sample handling errors
- ☐ Reduce the manual steps needed to complete the experiment
- ☐ Increase productivity

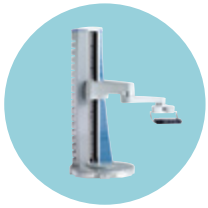
Automation can check these boxes

Recommended products for instrument loading

- Recommended
- Also a good option
- Likely not the best fit

Robotic Movers

Orbitor RS2 Mover


Spinnaker Robot

Spinnaker XT Robot

F7 Robot

Automated Incubators

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Cytomat 5 Series

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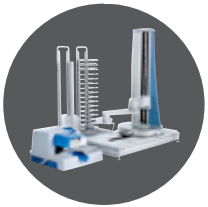
Cytomat 24 Series

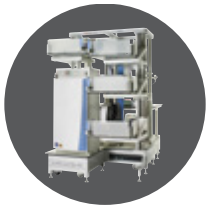
Cytomat SkyLine System

Automation Options


Track Options

Vanquish Loader

Collaborative Platform


inSPIRE Platform

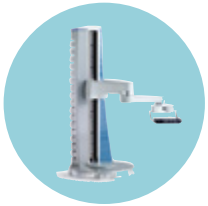
SmartCart Solution

Software

Momentum Software

Why these products?

These products are best suited for the scientists looking to automate a simple process.



Spinnaker Robot

A collaborative benchtop robot with integrated vision and 4-axes of motion, providing an advanced ability to access a wide range of instruments. See page 28 for more information.

Cytomat 5 Series

A mid-capacity incubation solution with state of the art technology providing super-fast access, a wide temperature range (4–50 °C) and dependable environmental conditions. See page 33 for more information.

Momentum Software

An intuitive workflow scheduling software which provides all the tools you need to automate your science. See page 44 for more information.

Scientists who have completed this automation journey

Simple workflow journey applications

- Screening
- Sample prep
- Immunoassays
- Cell based assays
- Nucleic acid extraction
- High content imaging

Many researchers have trusted our instruments to automate ELISA.

Others are using automation for their extraction/purification procedures.

Configurable Platform Journey

Current science

- A collection of processes or experiments which involve a variety of instruments

Wish List

- ☐ Walk-away time
- ☐ Increase efficiency and consistency
- ☐ Reduce the risk of sample handling errors
- ☐ Minimize the manual steps needed to complete the experiment
- ☐ Increase productivity
- ☐ Full confidence in experiment reproducibility
- ☐ Ability to run multiple experiments in parallel

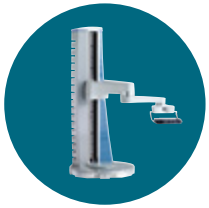
Automation can check these boxes

Recommended products for instrument loading

- Recommended
- Also a good option
- Likely not the best fit

Robotic Movers

Orbitor RS2 Mover


Spinnaker Robot

Spinnaker XT Robot

F7 Robot

Automated Incubators

Cytomat 2 C-LiN Series

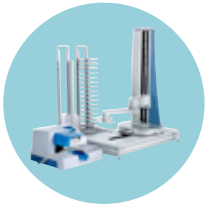
Cytomat 5 Series

Cytomat 10 Series

Cytomat 24 Series

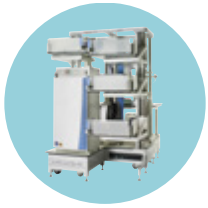
Cytomat SkyLine System

Automation Options


Track Options

Vanquish Loader

Collaborative Platform


inSPIRE Platform

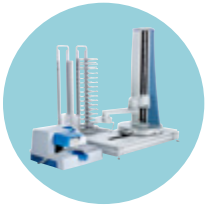
SmartCart Solution

Software

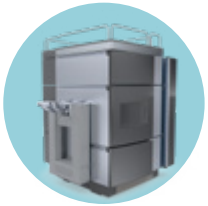
Momentum Software

Why these products?

These products are best suited for the scientist looking to automate a variety of experiments.



Track options



Vanquish Loader

Spinnaker XT Robot

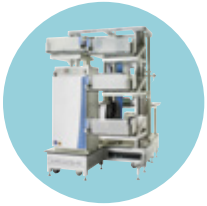
These options will allow you to cover a more complex workflow. BenchTrak solution and FastTrak connector expand the range and reach on a system. See page 38 for more information.

The Spinnaker XT robot is a taller version of the standard Spinnaker robot. See page 29 for more information. Automate your entire analytical workflow with the Vanquish loader. See page 39 to learn more information.

Cytomat 10 Series

Cytomat SkyLine System

High capacity incubation (Cytomat 10 series) for cell culture applications and high capacity ambient storage (Cytomat SkyLine system) for increased quantities of labware and pipette tips. See pages 34 and 36 for more information.



inSPIRE Platform

Momentum Software

inSPIRE, a collaborative laboratory automation platform that integrates everything you need for your automated workflow in a configurable, touch-enabled, and versatile platform. See page 40 for more information.

Momentum software is the powerful and intuitive workflow scheduling software capable of scheduling more complex workflows and fully-integrated with our collaborative automation features. See page 44 for more information.

Scientists who have completed this automation journey

Configurable platform journey applications

- Immunoassays
- QA/QC testing
- Screening
- Compound management
- Biochemical assays
- Sample preparation

Researchers find the configurable inSPIRE platform flexible to adapt to many applications. For example, nucleic acid extraction, quantification, and normalization.

Scientists use the configurable inSPIRE platform for analytic workflows.

Large System Journey

Current science

- A complex, multi-step process
- Multiple experiments which involve the coordination of many different instruments
- Unique instruments, layouts, and requirements

Wish list

- ☐ Walk-away time
- ☐ A more efficient process
- ☐ Reduce the risk of sample handling errors
- ☐ Minimize the manual steps needed to complete the experiment
- ☐ Increase instrument up-time
- ☐ Full confidence in experimental reproducibility
- ☐ Ability to run multiple experiments in parallel
- ☐ Solution designed to wholly address your unique needs

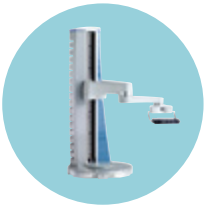
Automation can check these boxes

Recommended products for instrument loading

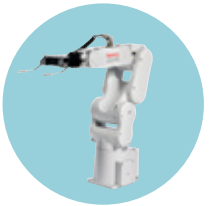
- Recommended
- Also a good option
- Likely not the best fit

Robotic Movers

Orbitor RS2 Mover


Spinnaker Robot

Spinnaker XT Robot


F7 Robot

Automated Incubators

Cytomat 2 C-LiN Series

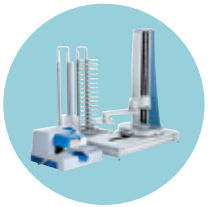
Cytomat 5 Series

Cytomat 10 Series

Cytomat 24 Series

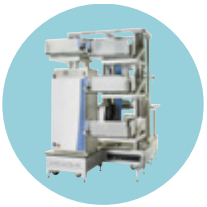
Cytomat SkyLine System

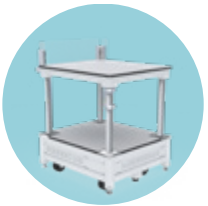
Automation Options


Track Options

Vanquish Loader

Collaborative Platform


inSPIRE Platform


SmartCart Solution

Software

Momentum Software

Why these products?

Any of the products we have walked through in this book could be applied to your custom solution. There are, however, two products that are usually specific to larger customer systems.

F7 Robot

An industrial robot with superior performance and a small footprint.

The F7 robot's advanced servo technology enables smooth motion without vibration even at full speed, optimizing efficiency and throughput. See page 30 for more information.

Cytomat 24 Series

Ideal for highest capacity incubation and random-access storage applications for up to 504 standard microplates per unit. See page 35 for more information.

SmartCart Solution

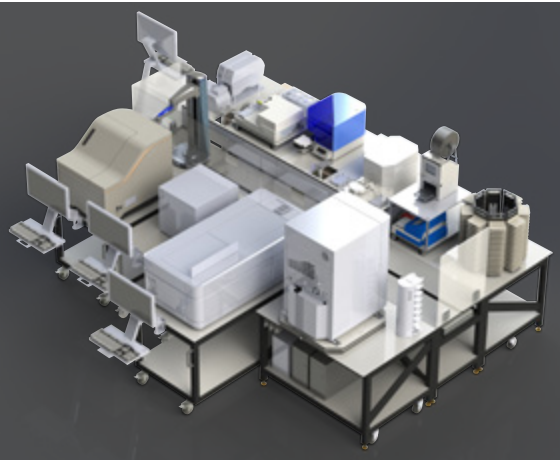
The SmartCart docking solution allows you to quickly and easily move devices or samples between systems. See page 42 for more information.

Scientists who have completed this automation journey

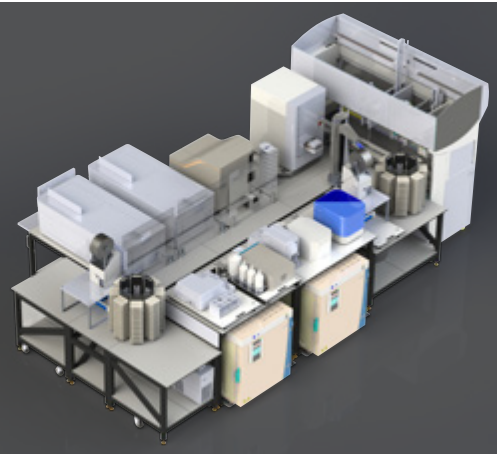
Large systems journey applications

- Protein expression
- Cell line development
- Screening
- Synthetic biology
- Compound management
- Biochemical assays
- Sample preparation
- Formulation testing

A fully-integrated solution for biochemical assays.



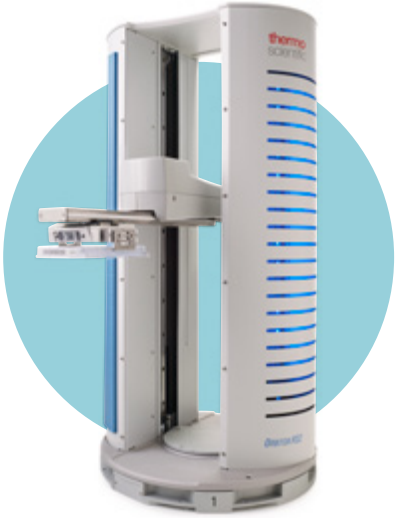
A system for cell-based screening with instrument docking.



Lab Automation Products

Orbitor RS2 Microplate Mover

With unmatched speed and accuracy, the Orbitor RS2 mover is the perfect solution to automate a variety of workflows.



Versatile—As one of the most flexible movers on the market, the Orbitor RS2 mover can evolve with your lab's needs. Orbitor RS2 mover solutions can easily be upgraded in the field, by adding devices to increase the capability and/or capacity of the system.

Efficient—The integrated barcode scanner enables sample tracking and inventory management. While plate detection in the gripper helps eliminate labware handling errors and reduces the risk of lost samples.

Safe—The Orbitor RS2 mover can work alongside you without guarding or shielding. The overhead gripper design is inherently safe and the built-in force control stops all movement at the slightest unexpected contact. Whether you are a novice or experienced automation user, you will appreciate the range of integrated safety features.

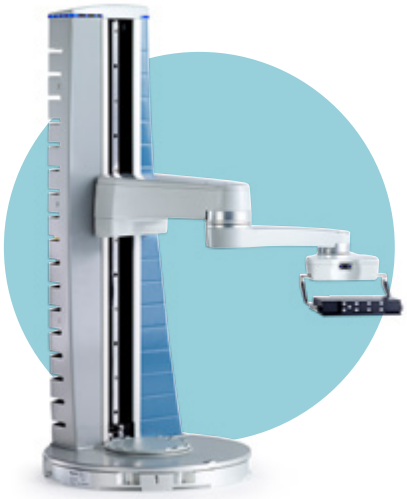
INSTRUMENT LOADING JOURNEY | SIMPLE WORKFLOW JOURNEY | CONFIGURABLE PLATFORM JOURNEY | LARGE SYSTEM JOURNEY

Find out more at
thermofisher.com/orbitorrs2

The Orbitor RS2 mover is available with a variety of plate storage and track options. Choose the configuration of hotels, stacks or track axis to match your requirements.

Spinnaker Microplate Robot

The Spinnaker robot is an advanced benchtop robot that is easy to use, teach, and maintain. It is the only SCARA type (Selective Compliance Articulated Robot Arm) lab automation robot with integrated vision-assisted teaching and barcode reading.



User-friendly—Designed for your research needs, the Spinnaker robot provides an extremely user-friendly experience. The Spinnaker robot's vision capability and easy-to-use software will guide you through a step wise procedure for configuring and teaching automation solutions.

Precise—With integrated vision, the Spinnaker robot provides self-correcting capabilities as well as powerful sample tracking and inventory management. Its software also includes a location verification routine enabling the mover to automatically compensate for instrument drift via "on-the-fly healing."

Reliable—With the Spinnaker robot you can walk away from your experiment with confidence. Features such as plate detection, built-in error recovery, automatic stop with unexpected collisions, built-in plate re-orientation and de-lidding, all work together to ensure the robust delivery of your results.

INSTRUMENT LOADING JOURNEY | SIMPLE WORKFLOW JOURNEY | CONFIGURABLE PLATFORM JOURNEY | LARGE SYSTEM JOURNEY

Find out more at
thermofisher.com/spinnaker

The Spinnaker robot is available in two heights allowing you to create benchtop or vertical solutions.

Spinnaker XT Microplate Robot

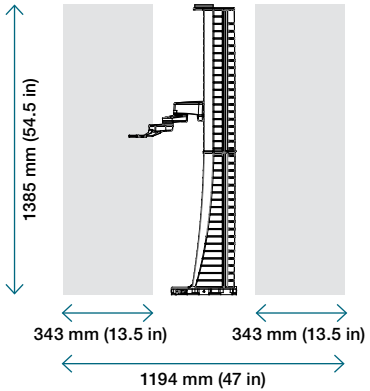
The Spinnaker XT robot has all the features of the standard Spinnaker robot, enabling space-saving vertical system configurations.

Key features

- On-the-fly healing
- Flexible plate handling
- Barcode reading
- Built-in vision
- 4-axis mover

Workspace

With this extra height you will be able to access more instruments and automate more of your workflow.



Find out more at
thermofisher.com/spinnaker

The Spinnaker XT robot is equipped with all of the advanced features found on the standard Spinnaker robot.

F7 Robot

The F7 robot combines the performance of an industrial robot with the application-driven benefits of a traditional Thermo Scientific laboratory robot. It's the ultimate solution for advanced motion applications.

Powerful—Compact but mighty, the F7 robot has a small footprint, but unmatched power to handle sophisticated workflows. Its compact controller and integrated lab-oriented software provides reliable performance and increased speed of movement of a wide variety of labware.

Flexible—The option of upright, angle, wall or invert wall mounting increases installation flexibility, allowing the F7 robot to be integrated into virtually any workspace. Track options provide further flexibility and the robot is able to access even the most challenging instruments due to the six-axis motion and wide range of available gripper fingers.

INSTRUMENT LOADING JOURNEY | SIMPLE WORKFLOW JOURNEY | CONFIGURABLE PLATFORM JOURNEY | LARGE SYSTEM JOURNEY

Find out more at
thermofisher.com/f7robot

Other industrial robots are available upon request.

Cytomat 2 C-LiN Series

The Cytomat 2 C-LiN series of automated incubators bring the latest incubation technology to a compact solution with a wide temperature range, and CO_2 control as standard.

Complete control—The most important feature of any incubator is providing the right conditions for the cells being used. The Cytomat 2 C-LiN series offers precise temperature, humidity and CO_2 control, plus other options that you can count on.

Proven protection—Keep your cells safe from contamination using the ContraCon decontamination routine which simplifies cleaning and eliminates variability in disinfection. This on-demand, automated 90 °C moist heat process is safe and provides you with true walk-away time. The controlled humidity option (Hydra-Smart) with its external water tank reduces the risk of external contaminants entering the incubator.

Unmatched speed—With an average access time of 12 seconds and a dedicated plate shuttle system, your automation system won't have to wait around! Handling speeds can be tailored for specific cell types with individual speed settings per microplate.

Find out more at
thermofisher.com/cytomat2

Like all members of the Cytomat automated incubator family, a 4–50 °C wide temperature range version and an ambient random-access hotel of the Cytomat 2 C-LiN series is available.

Cytomat 2 C-LiN ToS Series

The Tower Shaker (ToS) option for Cytomat 2 C450-LiN Series of automated incubators bring TRUE orbital shaking to automation.

Outstanding orbital shaking—The only solution that provides TRUE orbital shaking in two individual towers from top to bottom. It is ideal for applications requiring sample agitation and cells that need to be kept in suspension.

Simple and effective—The dual magnetic drive mechanism located at the top and bottom of the stackers are wear-free. The design ensures consistent shaking amplitude across all microplates without being affected by load, position, or the number of plates.

Fasten your plates—Active microplate clamp mechanism secures plates and lids separately up to a speed of 1200 rpm and 3 mm oscillating amplitude.

INSTRUMENT LOADING JOURNEY | SIMPLE WORKFLOW JOURNEY | CONFIGURABLE PLATFORM JOURNEY | LARGE SYSTEM JOURNEY

Find out more at
thermofisher.com/cytomat2tos

With individual shaker technology you can mix and match standard and Tower Shaker stackers for maximum flexibility for assay adoption.

Cytomat 5 C Series

The Cytomat 5 series of automated incubators combines superior environmental control, fast access times and versatility making it the ideal choice for mid-capacity incubation applications.

Consistent and reliable—Trust this incubator to maintain your ideal incubation conditions. Precise environmental conditions can be controlled across a wide range of temperatures and humidity levels. The Hydra-Smart technology (controlled humidity) with external water reservoir provides convenience and protection, while the ContraCon thermal, non-toxic decontamination routine allows for fully-automated decontamination between uses.

Fast and precise—The Cytomat 5 C series offers the fastest average access time in its class of less than 10 seconds. Combined with smooth and precise microplate handling, this makes the Cytomat 5 C series the right choice for a vast range of cell types and applications.

Flexible and versatile—The Cytomat 5 C series offers unparalleled flexibility to suit your automation. Available as bench-top and under-bench units and with up to 12 different location options for loading/unloading. Also available with an additional stacker position to increase capacity.

INSTRUMENT LOADING JOURNEY | SIMPLE WORKFLOW JOURNEY | CONFIGURABLE PLATFORM JOURNEY | LARGE SYSTEM JOURNEY

Find out more at
thermofisher.com/cytomat5

Like all members of the Cytomat automated incubator family, the Cytomat 5 C series is available with an anti-microbial solid copper chamber.

Cytomat 10 C Series

The Cytomat 10 series of automated incubators combines superior environmental control, fast access times and versatility making it the ideal choice for cell-based workflows requiring larger capacity incubation.

Greater capacity—Combining the same state of the art features in the Cytomat 5 C series (see previous page for details) with twice the capacity, the Cytomat 10 C series provides super fast access, a wide temperature range and dependable environmental control. This balance of capabilities and capacity makes the Cytomat 10 series a popular choice for a wide range of cell-based workflows.

Configurable—Extend the capabilities of your Cytomat C 10 series with options including 0_2 control, high humidity, an anti-microbial solid copper chamber, linear agitation as well as different transfer stations and stacker types.

Not only for incubation—Available in an ambient storage configuration, which delivers the fastest, high-capacity, random access hotel for up to 210 standard microplates.

INSTRUMENT LOADING JOURNEY | SIMPLE WORKFLOW JOURNEY | CONFIGURABLE PLATFORM JOURNEY | LARGE SYSTEM JOURNEY

Find out more at
thermofisher.com/cytomat10

In addition to incubation applications, Cytomat products can be configured for random-access ambient storage.

Cytomat 24 Series

The Cytomat 24 series of automated incubators is the ideal solution for fast high capacity incubation and storage with dependable sample protection for cell-based workflows.

Trusted—Designed in collaboration with industry partners from the pharmaceutical/biotherapeutics industries and with hundreds of units in the field, the Cytomat 24 series has an unrivaled track record in large capacity incubation and storage. The ContraCon decontamination routine and CO_2 comes as standard.

Flexible—Four possible gate positions and a single hand-off location allow for easy integration into any automation system. Additionally, all 24 stackers can be easily accessed through the front door of the unit. The general options like controlled humidity (Hydra-Smart) with the external water tank reduces the risk of contaimination entering the incubator. With a variety of options like the solid copper chamber, the Cytomat 24 series supports a broad range of workflows.

Space-saving—With its vertical design, the Cytomat 24 series provides a capacity of 504 standard microplates in a surprisingly small footprint. The unit is also equipped with casters for easy relocation.

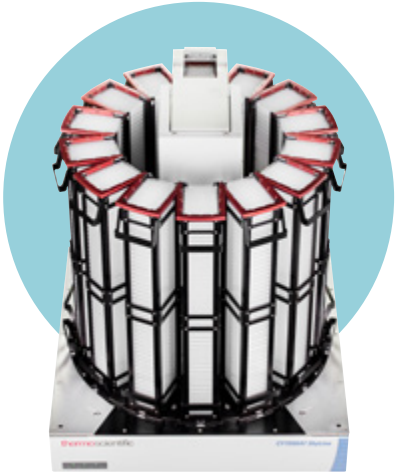
INSTRUMENT LOADING JOURNEY | SIMPLE WORKFLOW JOURNEY | CONFIGURABLE PLATFORM JOURNEY | LARGE SYSTEM JOURNEY

Find out more at
thermofisher.com/cytomat24

The Cytomat 24 series is also available in an ambient random-access storage option.

Cytomat SkyLine System

Reliable and robust labware storage and supply is critical for automation. The Cytomat SkyLine system combines large capacity storage with dependably fast and precise labware delivery.



Dependably fast—The Cytomat Skyline system's unique sequencing and centering system separates plates from a stack and presents them with unparalleled accuracy. With the fastest plate access time in its class, the Cytomat SkyLine system substantially improves system throughput.

Versatile—The Cytomat SkyLine system has the ability to receive plates back, enabling a plate to be taken, processed, and returned to the device. It can handle a wide variety of labware with the automated plate measurement feature including:

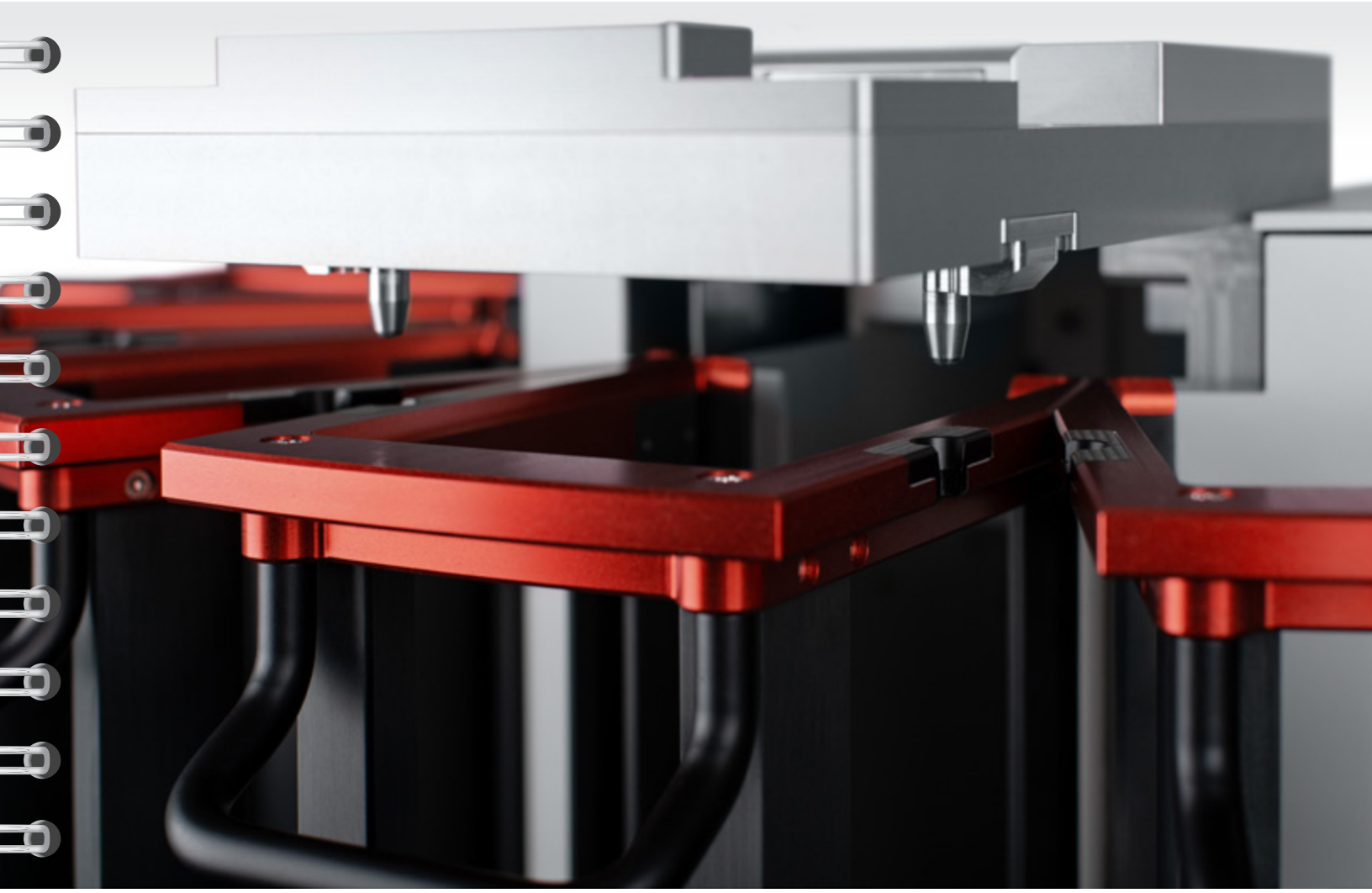
- 96, 384 and 1536-well microplates
- Standard and deepwell microplates
- Tip boxes

Innovative design—An integrated sensor calculates the number of plates in a stacker and an integrated barcode reader at the hand-off position allows for microplate identity tracking during loading and unloading.

INSTRUMENT LOADING JOURNEY | SIMPLE WORKFLOW JOURNEY | CONFIGURABLE PLATFORM JOURNEY | LARGE SYSTEM JOURNEY

Find out more at
thermofisher.com/cytomatskyline

The optional plate lift offers the ability to deliver plates from beneath the deck of any automation system.



BenchTrak Solution and FastTrak Connector Options

Put your Orbitor RS2 mover or Spinnaker robot on a BenchTrak solution to expand and maximize their reach. Alternatively or in conjunction, add a FastTrak connector to link multiple systems together.

Unique—The only robot and track on the market controlled by a PC, no bulky and noisy external controllers required.

Easy installation—The on-bench version of the BenchTrak solution fits seamlessly on existing lab benches without requiring additional infrastructure. It's a simple field upgrade to add the BenchTrak solution to an existing Orbitor RS2 mover or Spinnaker robot.

Modular—A complete suite of "click-in" components provides the expandability needed to adapt to changes in your science.

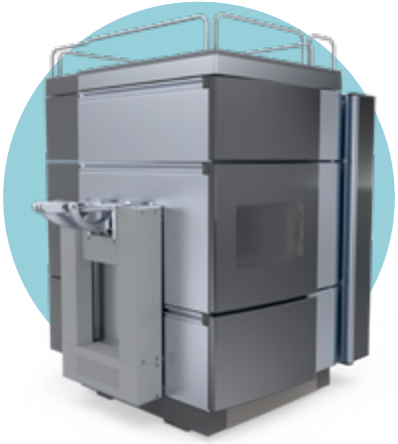
INSTRUMENT LOADING JOURNEY | SIMPLE WORKFLOW JOURNEY | CONFIGURABLE PLATFORM JOURNEY | LARGE SYSTEM JOURNEY

Find out more at **thermofisher.com/labautomation**

Available in a range of lengths to fit your lab space.

Vanquish Loader

The Vanquish loader enables labs to automate entire analytical workflows from sample prep to analysis. Effortlessly integrate the Vanquish loader with any Thermo Scientific™ Vanquish™ UHLPC System to provide superior performance, increased throughput, and ease-of-use.



Seamless integration—Automate your workflow creating an end-to-end solution with little to no human intervention.

Complete solution—Combine any Vanquish UHLPC system with the Vanquish loader and any automated sample prep system for a complete workflow solution, powered by Momentum software and integrated with any major Chromatography Data System (CDS). Prepared samples are transferred to the Vanquish UHLPC system using a Thermo Scientific robotic mover and transported to the Vanquish loader to provide a fully automated and connected solution.

INSTRUMENT LOADING JOURNEY | SIMPLE WORKFLOW JOURNEY | CONFIGURABLE PLATFORM JOURNEY | LARGE SYSTEM JOURNEY

Find out more at
thermofisher.com/vanquish

The Vanquish loader is ideal for analytical workflows in biologics, pharmaceutical discovery and development, QC, protein and metabolite analysis, and environmental applications.

inSPIRE Platform

The inSPIRE collaborative automation platform brings configurable and intuitive solutions to your lab. The innovative touch-enabled technology and flexible design deliver inSPIREd science.

Intuitive—The inSPIRE platform is designed to work collaboratively alongside you. Easily access an instrument for offline use and just as easily return it to the system when you're done. If the system needs an instrument before it is returned, it will alert you.

Interactive—Unique SmartHandle technology provides at-a-glance instrument status updates and provides touch control for instrument access.

Versatile—The platforms flexible design and space saving vertical orientation allow you to configure the right solution for your workflow. Choose from an extensive catalog of modular components to build the solution you need.

INSTRUMENT LOADING JOURNEY | SIMPLE WORKFLOW JOURNEY | CONFIGURABLE PLATFORM JOURNEY | LARGE SYSTEM JOURNEY

Find out more at
thermofisher.com/inspire

inSPIRE platform bundles are a great starting point to configure the best solution for your science.

1 At-A-Glace Information

Visual indicator of instrument and system health

SmartHandle color informs users of instrument, status, and overall system health. Instruments in warning or error states are identified by a SmartHandle color change which is easily identifiable from across the room.

2 SmartHandles

Quick and easy instrument access as needed

SmartHandles provide touch enabled automation control with haptic feedback allowing users to intuitively interact and share instruments with the inSPIRE platform. Requesting an instrument is easy! Simply grip the SmartHandle to get feedback. Feedback is provided by the color and pulse of the SmartHandle.

3 Flexible & Configurable

Superior instrument accessibility in a compact footprint vertical design

Configure or re-configure your inSPIRE platform to meet your needs through our large catalog of components. The modular design enables multiple systems to be joined together to create expanded workflow solutions.

4 Spinnaker XT Robot

Collaborative and safe by design

The inSPIRE platform uses the fully collaborative Spinnaker XT robot which has vision teaching, on-the-fly healing, built-in barcode reading for sample tracking, a full 360-degree workspace, built-in container re-orientation station and mover-based container de/re lidding.

5 SmartShelves

Actively positioned means no re-teaching required after manual use

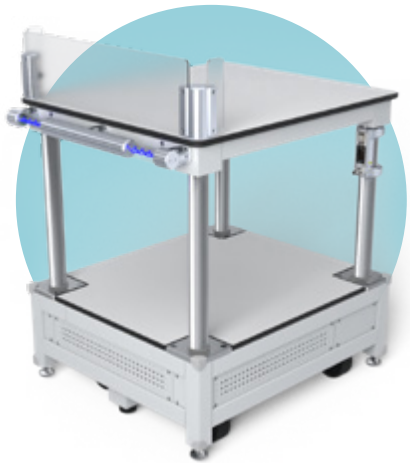
Quickly and easily supply power and communication to an instrument through each SmartShelf's built-in communication ports. Depending on the chosen instruments, up to four SmartShelves can be placed per inSPIRE platform central pole. Spill containment options are available.

Virtually configure your inSPIRE platform with the 3D configurator tool. Use this tool to:

- Design an inSPIRE platform by selecting a preconfigured application or from a list of instruments.
- Build the inSPIRE platform you designed and explore its components.
- Test a simulated workflow on the inSPIRE platform.

SmartCart Solution

The SmartCart docking solution allows you to reconfigure your automation system smartly. SmartCart solutions transform conventional docking methods providing the ultimate solution to your workflows.



Simple—SmartCart solutions are carefully engineered based on our core principles of light infrastructure and ease of use. Unlike classical docking solutions, SmartCart solutions do not involve heavy infrastructure or bulky docking stations. These light solutions challenge the conventional docking methods, thereby enabling you to decide how, where, and when to connect your workflows.

Collaborative—SmartCart solutions provide a way for you to reconfigure your systems smartly and efficiently with SmartHandle interactions. Through visual and haptic cues, SmartCart solutions will notify you about the status of your automation system, thus allowing you to be in full control of how you reconfigure your system.

Flexible—SmartCart solutions meet your evolving needs. They provide the flexibility for you to reconfigure your system openly and dynamically as your workflows and requirements change. Features ranging from physical connections, to the flexibility licensing structure of Momentum software ensure that you are not tied down to a static solution.

INSTRUMENT LOADING JOURNEY | SIMPLE WORKFLOW JOURNEY | CONFIGURABLE PLATFORM JOURNEY | LARGE SYSTEM JOURNEY

Find out more at
thermofisher.com/smartcarts

Available in different heights and widths to maximize flexibility.

Docking can help you move instruments of choice:

- To another location on your system
- To another area in your lab
- To a completely different system

1 At-a-glace Information
SmartHandles allow you to quickly determine the status of the cart and its devices, such as whether a device is being used by automation or available for use. They also allow for a way to interact with the SmartCart solution and smoothly remove it from a system

2 Onboard power
Power supply for onboard instrumentation

3 Connections
Quick connections for power, communication, and utilities at the chosen docking location or docking spot

4 Storage
Space for integrating cart electronics

5 Foot brake
Park your cart at a docking spot or anywhere away from the system and ensure that it is secure

6 Docking Spot
Flexible docking is supported. Dock wherever simple connections such as this are available for power, network (if required), and utilities (if required)

Standard model SmartCart back

Momentum Software

The Momentum workflow scheduling software combines power with ease of use.

Dynamic—Momentum software utilizes event-driven scheduling for optimal performance. With unrivaled logic for on-the-fly decisions and adaptability to current situations, you can have confidence in your system's performance.

Intuitive—The dashboard view coupled with an intuitive scheduling interface, featuring drag-and-drop process creation, makes creating and executing workflows simple.

Capable—The Momentum software instrument driver library is always growing. With more than 350 instruments and counting, you'll be able to automate a broad range of applications. You get access to the entire driver library when you buy Momentum software. That means you can switch between instruments on the system at no additional cost.

INSTRUMENT LOADING JOURNEY | SIMPLE WORKFLOW JOURNEY | CONFIGURABLE PLATFORM JOURNEY | LARGE SYSTEM JOURNEY

Find out more at
thermofisher.com/momentum

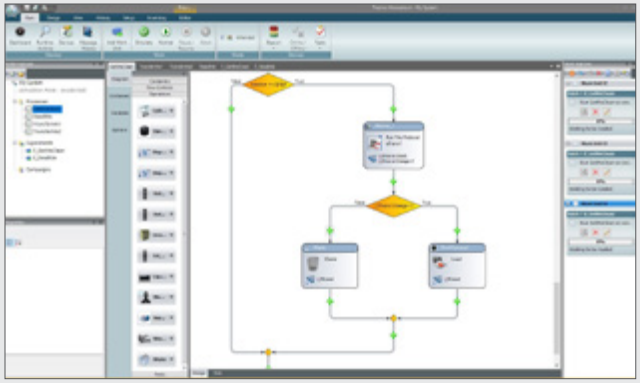
Keep your instrument library up-to-date with a Momentum Keeping Current subscription.

Momentum software interfaces

Easy to use—Momentum software is supplied with two distinct user interfaces: Dashboard and General. These two interfaces make Momentum software easy to use for novice to experienced users.

Dashboard

- Simplified and streamlined display
- Fully compatible with touchscreen displays
- Three sections: to monitor system, simply add work, and monitor status of the run



General

- Full scope of features in a format suitable for complex tasks
- Manage your automation system and all of its instruments and assets
- Start, stop, pause, add work and monitor your system

Momentum software features

Maximum control

Momentum software contains 12 flow controls. Flow controls give you the ability to manage the flow of process to create desired behaviors. This powerful feature puts you in control of how you want the system to run.

Error handling

Momentum software takes a proactive approach to error handling. The software partners with you all the way from system integration, through process creation, and running your system, to minimize errors and handle any that do occur elegantly.

Prevent—Guidance during processes creation

Anticipate—Robot self-healing

React—Runtime error mitigation

Solve—Easy and intuitive error recovery

Various modes for ultimate flexibility

Normal mode—Momentum software communicates with devices, issues commands, and oversees the system's operation

Simulation mode—Allows users to experiment with a virtual version of the system without impact or dependency on the actual system

Attended mode—Momentum software will prompt user with error recovery strategies

Unattended mode—Momentum software automatically attempts any applicable recovery actions

Trusted and secure accounts to control access to Momentum software's features

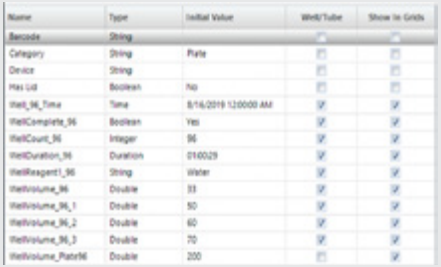
Operator—For users who require only limited access to Momentum software's features

Expert—All the same permissions as the operator account, as well as the ability to create and edit various elements within Momentum software, such as processes, experiments, and campaigns

Administrator—Administrators have access to the full breadth of Momentum software's features, including all permissions granted by the expert account, as well as the ability to adjust security settings and to create, edit, and delete user accounts

Ask about our optional security feature which enables 21 CFR Part 11 compliance.

Momentum software—variables, attributes and container types



Name	Type	Initial Value	Well/Tube	Show in Grids
Barcode	String			
Category	String	Plate		
Device	String			
Has Lid	Boolean	No		
Well_96_Time	Time	8/16/2019 12:00:00 AM		
WellComplete_96	Boolean	Yes		
WellCount_96	Integer	96		
WellDuration_96	Duration	010029		
WellReagent1_96	String	Water		
WellVolume_96	Double	33		
WellVolume_96_1	Double	50		
WellVolume_96_2	Double	60		
WellVolume_96_3	Double	70		
WellVolume_Plate96	Double	200		

These data features provide detailed workflow control at a plate and/or well level.

Data features that allow total control over your workflows

Variables—Variables can be used to add dynamic parameters to a process allowing on-the-fly decisions while the process is running. Variable types available in Momentum include:

- **Integers**—used as counters, for tracking the number of times an event has occurred
- **Double**—another number field, used for more precise data
- **String**—express information such as a name, container barcode, a short message
- **Time**—record the specific time at which an event occurs
- **Duration**—set or record the duration of an action or event
- **Boolean**—used to convey information about current state, or whether an event has occurred

Expression Builder—The Expression Builder includes mathematical operators, methods, expression templates, and other predefined components that allow you to quickly build complex expressions. These expressions can process data from a variety of sources, including variables and system constants.

Attributes—An attribute is essentially a variable which can be assigned at the plate or well level. Momentum comes with a default set of attributes and you can create your own. You can transfer attribute information between plates, between wells on same plate or to other plates, e.g. for lineage tracking.

Process containers—Process or temporary containers are used within a single process. They are manually loaded when starting work and unloaded when work is completed. Process containers are commonly used in workflows such as screening and sample preparation where a plate is loaded, processed and then removed from the system (unloaded or sent to waste).

Inventory containers—Inventory or persistent containers can be used within and across workflows. You can attach information to containers through attributes allowing for real-time process control and decision making. Inventory containers are used heavily in cell-based workflows where the status of the cells can impact the process steps and timing.

Attribute	What you may want to use it for
CellPlate.Barcode	Only process plates from a specific range of barcodes, or unload specific plates to a defined output location
TipBox.Tip_Count	Reuse liquid handling tips up to a specific number of times, or only use defined tips for certain types of transfers
Cell.Status	Perform extraction only on wells that have achieved a defined growth threshold, or flag cells with low confluence

Momentum processes can contain both container types providing the process control and data-tracking flexibility you need.

Momentum software connectivity tools

A suite of tools that allow for real-time, flexible, autonomous data integration

Go further by seamlessly connecting your lab automation with your digital ecosystem using Momentum's connectivity tools. Enable automated science by using these links to integrate AI and ML tools.

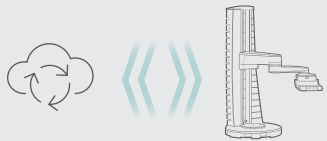
Unite Module—The Unite Module connects Momentum to external applications (e.g., LIMS and ELNs) so you can extract, use, duplicate, manipulate, format, and store data for use in your automated system.

Momentum RESTful API—The RESTful API consumes worklists and allows 3rd party applications to query Momentum status and work.

Supports a variety of technologies: REST API, .net binaries, SQL, as well as custom implementations. Ask for our most recent list of technologies.

How it works: An example workflow where the Unite Module handles simple through multi-part/form-data

1. Unite Module extracts or requests information from external source



2. Transfer external information to a container

3. Copy information from one container to another

4. Data Builder formats information for Momentum or external destination compatibility

5. Unite Module uploads formatted information to external destination

Keeping Current software subscription

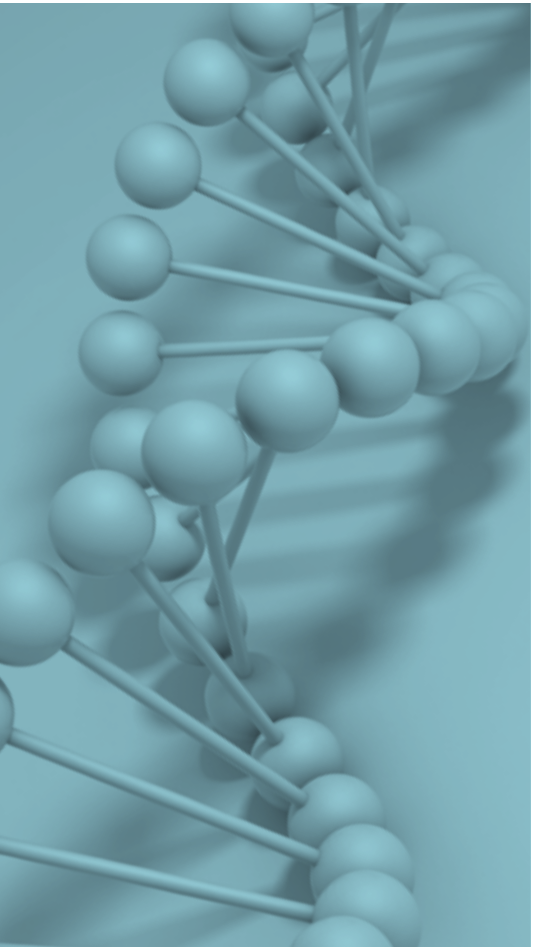
A convenient and affordable way to ensure your Momentum software is always up to date

Always have access to latest software versions and support tools, including:

- New Momentum releases
- New instrument drivers
- New feature familiarization
- Standard driver library updates
- Remote installation for all updates & upgrades
- Lab Automation Help Resources

Single and multi-year subscription options available. Bundle with other extended service offerings to create a specific support package for your needs.

Our Services



What we do:
Solutions for Automating Science

With decades of automation expertise, we partner with you to create the best solution for your workflow and needs.

The process is simple

1. Your local sales representative is your main point of contact. This local resource will be able to respond quickly and help you get started on your automation journey. For simple workflows, they can configure the final solution with you.

2. Often, you'll meet one or more individuals from our applications team. This team will work with you to fully understand your science and workflow to make sure the proposed solution meets your success criteria.

3. For very complex workflows, or those requiring custom engineering, we often will recommend a workshop approach where we assign a multi-functional team of sales, applications, product managers and engineers to jointly create a detailed solution.

When you're ready to move ahead, all the information gathered during this process will be passed on to our delivery team…

How we do it:
Delivering on our Commitments

When you've made your decision to automate, we understand it's critical that the delivery is as smooth as possible.

We achieve this by applying Quality Management and Project Management Principles throughout our delivery process, including:

- ✓ Dedicated project manager and execution team assigned for the duration of the project
- ✓ A detailed project timeline and a shared project communication space
- ✓ A complete set of project documentation
- ✓ Production under a Quality Management System
- ✓ Six stage delivery process with optional factory and site acceptance testing (FAT and SAT)
- ✓ Deployment services available to help the transition of the system into full operation

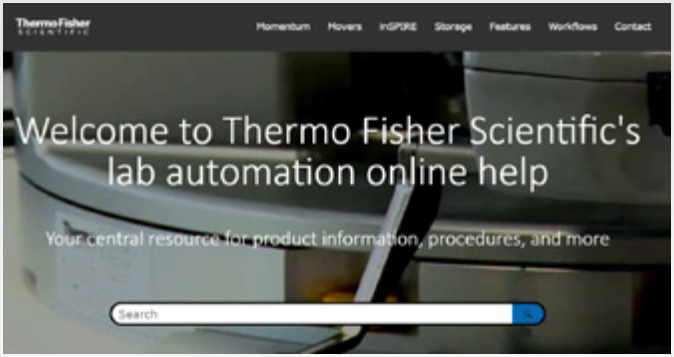
Of course, our partnership doesn't end when we deliver the solution...

Long-term commitment: To you

Your automation journey isn't over when the equipment arrives. We are committed to continuing our partnership providing exceptional service and support for as long as your journey continues.

Our support structure

- Technical support phone and email monitored by automation specialists to provide a fast and effective response
- Highly experienced global automation service team including field-based service engineers dedicated to laboratory automation
- Access to our online help resources for instruments and software
- Constant monitoring of service cases aiming to provide quick and definite solutions
- Escalation options when on-site visits are required
- Access to our online customer community forum



Long-term commitment: Service Plans

When your product warranty ends, you can rely on our tiered and customizable plans to ensure your system keeps performing reliably.

Our service plan highlights:

- Comprehensive hardware and Momentum software support
- Robot swap-out program
- Priority responses
- Preventative maintenance plans
- Refresher and new user training
- Support plans for 3rd party instruments
- Keeping Current subscription for Momentum software updates

The robot swap-out program minimizes the downtime in the unlikely event of issues with your robot. There's no need to wait for spare parts or repairs, we provide you a new robot with priority shipping. Each robot is supplied with a calibration file allowing for quick and painless drop-in replacement.

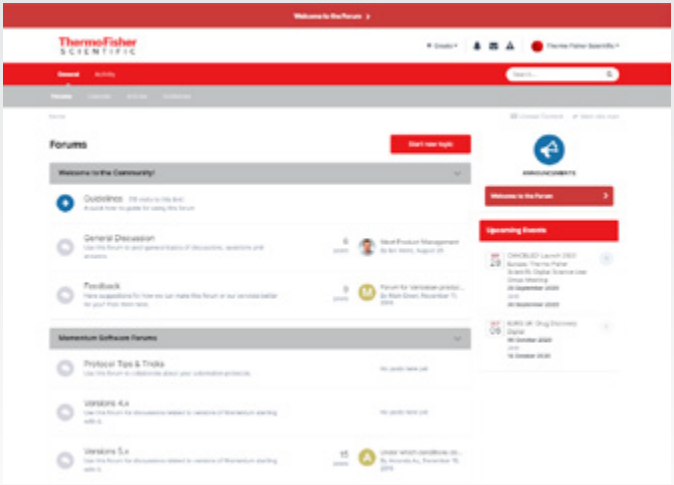
The swap-out program is available for the Spinnaker Robot, Orbitor RS2 Mover, and the Spinnaker XT Robot.

Long-term commitment: Community

As a customer you will be able to join our automation community to help you stay connected to us throughout your automation ownership journey.

The Community Forum is a platform for our automation users to collaborate, discuss, and stay informed. A place where you can ask questions, provide feedback, and receive answers from our automation experts and partners.

- Share best practices and learn from other automation users
- Get information on new instrument drivers, software releases, and product updates
- Ask questions, give feedback and get advice from our automation experts



The community forum allows you to learn from other automation users as well as the Thermo Fisher team.

Find out more at **thermofisher.com/labautomation**

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