HAMILTON®

Microlab® STAR™ M

Automating Your Imagination

More **Functionality**

More **Safety**

More **Usability**

Microlab® STAR™ M

Reinventing the revolutionary automated liquid handling system

The new and upgraded STAR M combines all of Hamilton's superior and patented technologies in the most flexible and reliable liquid handling workstation.

The completely flexible design offers unlimited expandability from addition of single pipetting tools to doubling the workspace when enhancing a STARlet M to STARplus M.

Adding a second arm to a STAR M enables parallel sample processing.

The option of 3rd party integrations on either side guarantees the maximum degree of flexibility to quickly adapt to new laboratory needs.

Take advantage of Hamilton's unique CO-RE® technology, that ensures and verifies correct, force-free tip pick-up and ejection. Extend your STAR M's capabilities by choosing from the many available CO-RE add-ons like the CO-RE Grippers for handling labware and tips on deck.

More Functionality

Fully upgradable arms
Every STAR M can be upgraded in your lab with additional channels, imaging tools and Multi-Probe Heads.

96 Multi-Probe Head with TADM
The MPH 96 now comes with Hamilton's patented Total Aspiration and Dispense Monitoring capabilities as standard.

More Usability

VENUS four with enhanced Smart Steps
Effortlessly use the extended deck, make use of expanded error handling and streamline your methods with smarter sequence handling.

Integrated Dynamic Scheduler
The STAR M comes complete with the VENUS Dynamic Scheduler for easy and efficient workflow management.

Dynamic Liquid Classification, DLC
This artificial intelligence feature makes sure unknown liquids are pipetted with the highest possible precision you would expect from your STAR M.

More Safety

Total Aspiration and Dispense Monitoring, TADM
Enhanced pipetting safety with TADM: in addition to Monitored Air Displacement, this technology ensures 100% traceability of all pipetting steps.

STARwatch
By detecting necessary maintenance before the system actually fails, STARwatch ensures maximized up-time of your STAR M.
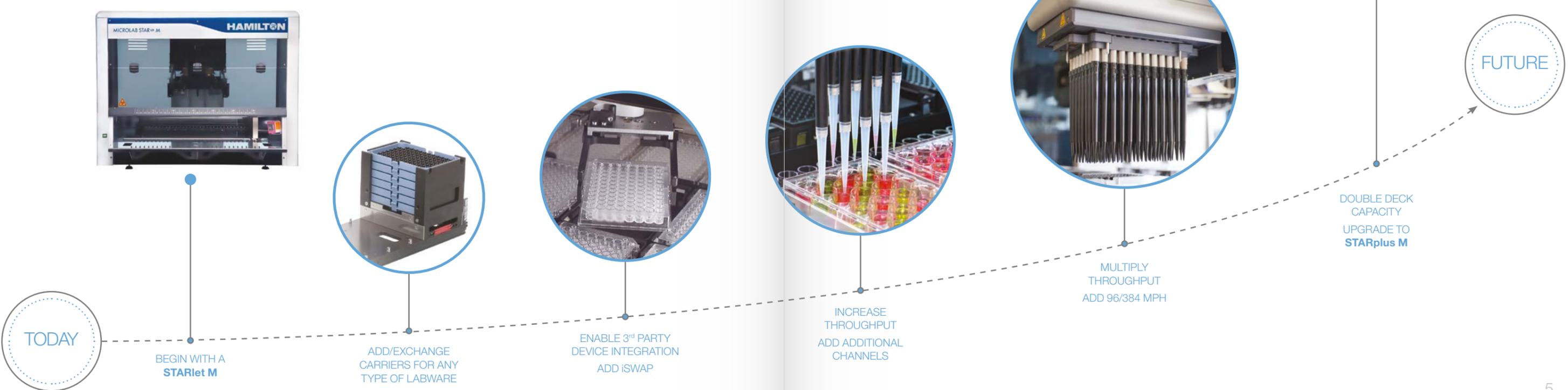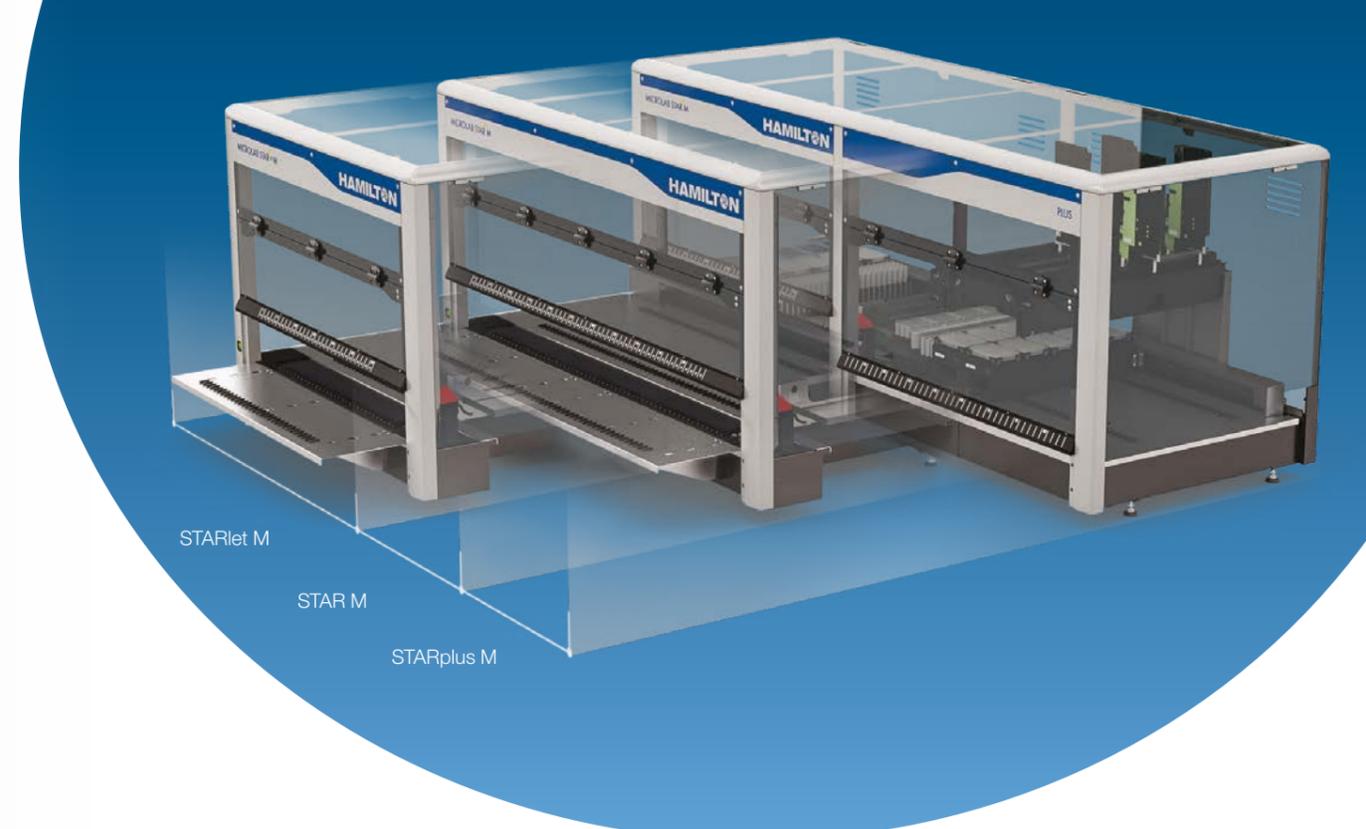
Modularity

INVEST IN YOUR ASSAY
STAR M GROWS WITH YOUR NEEDS

Most automation users have to adjust to completely changed requirements within two years of purchasing an automated liquid handling system. When the system requires more deck space, higher throughput or integration of 3rd party systems, users are often forced to buy a new system.

The STAR M instruments are designed form the ground-up to not only adapt lightly to new applications, but offer a design that can be completely upgraded in your lab. Thus offering users adaptation to changed requirements, making investments in new systems obsolete.

More modularity and more functionality on the STAR M

- Every STAR M can be upgraded with a Multi-Probe Head *(more on page 14/15)*
- CO-RE 96 MPH offers Total Aspiration and Dispense functionality *(more on page 12/13)*
- VENUS four offers enhanced SmartSteps and Dynamic Scheduling out of the box *(more on page 20)*

STARlet M

STAR M

STARplus M

FUTURE

DOUBLE DECK CAPACITY

UPGRADE TO **STARplus M**

MULTIPLY THROUGHPUT

ADD 96/384 MPH

INCREASE THROUGHPUT

ADD ADDITIONAL CHANNELS

ENABLE 3rd PARTY DEVICE INTEGRATION

ADD iSWAP

ADD/EXCHANGE CARRIERS FOR ANY TYPE OF LABWARE

BEGIN WITH A **STARlet M**

TODAY

Flexibility

CO-RE TECHNOLOGY FOR YOUR PROCESS

Labware Transportation

With multiple options for labware transportation, the STAR M always offers the best solution for your automation needs. Reducing complexity, most labware transportation can be done by the pipetting channels.

They multiply as affordable tool to transport plates, lids, and even tubes - completely safe and monitored by the channels' built-in security features.

1 iSWAP

This versatile option allows access to all internal deck positions, as well as external integrations on either the right or left side of the STAR instrument.

2 CO-RE Gripper

This affordable transportation tool uses two independent pipetting channels (1000 µL or 5 mL) in parallel to transport microplates, tip racks, or nested tip racks (NTR).
CO-RE Grippers optimize deck space by enabling stacking of microplates and NTR, while the gripper paddles are stored off deck next to the waste station.

3 CO-RE Lid Tool

The CO-RE Lid Tool uses one independent pipetting channel (1000 µL) and a small suction cup tool to transport flat, glossy surface objects such as microplates lids, Petri dish lids, and FlipTubes.

4 Tube Gripper Channel

The Tube Gripper Channel is a dedicated tool for transporting tubes with diameters from 8 mm to 20 mm.

5 Twister Channel and Decapper Module

Automated capping and decapping of 15 to 50 mL screw cap tubes and vials, transportation, and vortex mixing.

6 Imaging Solutions

Advanced imaging technology is possible with our high-resolution CCD Camera Channel. Images are analyzed by proprietary software. The Camera Channel offers solutions such as easyBlood for phase detection and separation, and easyPick for colony counting and picking.
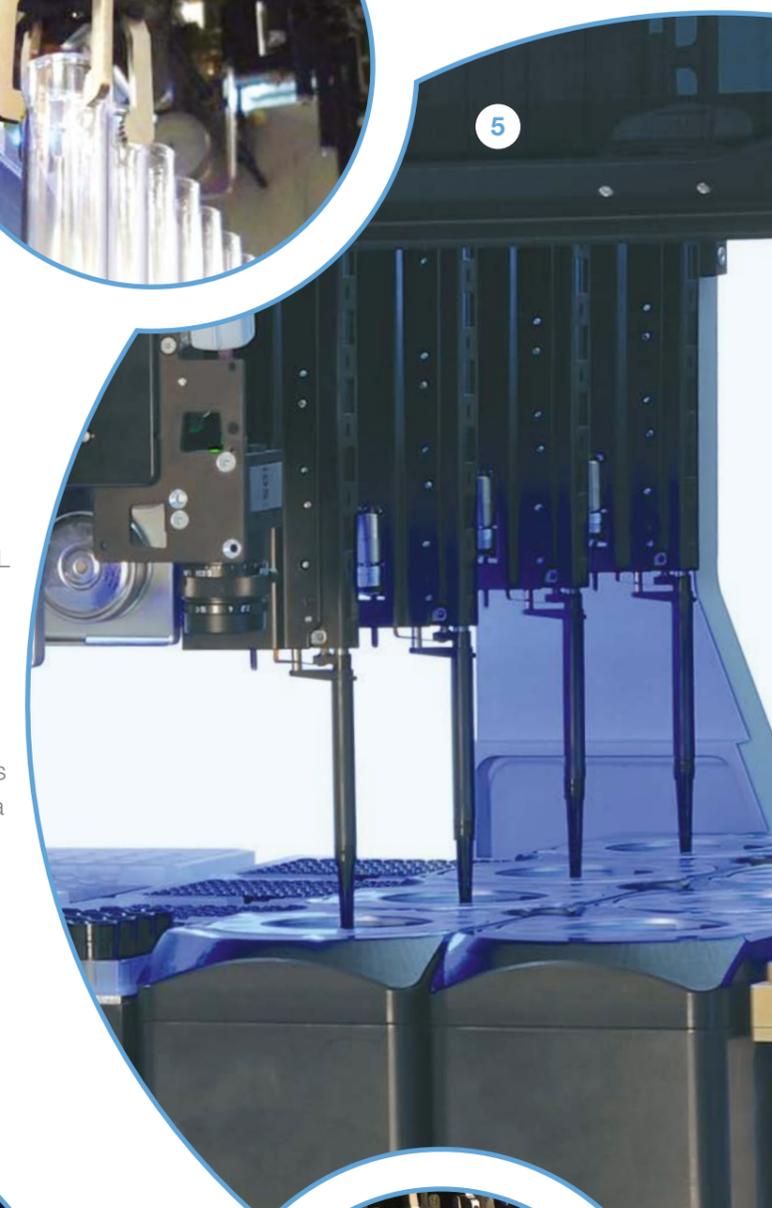
Efficiency

OPTIMAL SOLUTION FOR YOUR AUTOMATED APPLICATION

High Capacity Deck

Keeping the deck accessible for pipetting, 3rd party devices are efficiently integrated on the left or right side of the instrument - this way they can be easily accessed for service and operated manually.

Not only a Pipetting Channel, but a Multi-Functional Tool

Like a Swiss Knife, Hamilton's CO-RE technology enables the channels to fulfill multiple tasks: With additional tools they can be used for on-deck transports, lidding and de-lidding, capping and de-capping.

1 or 2 Arm Systems

Depending on your assay, a second arm can be useful to speed up processing times. Every STAR M instrument can be equipped with one or two arms (second arm can be upgraded at a later time).

Keeping Complexity Out

Every base configuration with one arm and 8 pipetting channels is already a powerful workflow system. No need for a second arm or compromise on accessible work space, if your application doesn't benefit from parallel processing.

Random Access on Deck

All STAR M systems feature a high-density workspace, that is completely accessible by all pipetting tools to efficiently automate your assay. In many cases this means your assay can be automated on a STARlet M, the smallest member of the STAR M family, saving valuable lab space. If you require additional pipetting space, any STARlet M can be upgraded to a STARplus M in your lab - doubling the workspace.

Extend your system

Need additional functionalities? Add 3rd party devices on either side of your STAR M, keeping your system's high deck capacity unchanged.
This way your additional systems like PCR cyclers, Capper/De-Capper, incubators, and storage solutions are easily accessible and double in functionality as they can be manually accessed.
If your STAR M wasn't ordered with an iSWAP, this gripper can be effortlessly added to your STAR M, right in your lab.

Worklist handling

VENUS four lets you easily use data for sample processing, whether it's reading from an Excel file or from your local LIMS. Since the channels have random access to each deck position, you do not have to worry where to place your samples on the deck. The ability to spread asymmetrically accelerates sample access and ease-up worklist handling as well.

Safety

COMPLETE PROCESS SECURITY AND TRACEABILITY

The majority of our customers need to guarantee the trueness of their results obtained on the liquid handling platform - especially in highly regulated labs. Hamilton's extensive security features guarantee a robot that monitors itself and can prove how results are reliably delivered. Increase your efficiency because attended runs become reality with a STAR M!

Labware and Sample Identification

The options for barcode reading combined with our software increase safety to provide complete chain-of-custody processing.

- **Autoload -** The Autoload provides automatic carrier/labware loading, 1D barcode reading of sample tubes, microplates, reagent troughs, and carriers. Verification of correct labware positions offers greater method security for automated processes. Optional 2D barcode reading is also available.

- **easyCode Carrier -** Offering 2D barcode reading in a small footprint, the easyCode Carrier is a high performance CCD camera with superior decoding software. Optionally, the easyCode Carrier Plus reads both 1D and 2D barcodes.

More safety on the STAR M

- TADM as standard on channels and CO-RE 96 MPH
- Optional 2D Barcode Reader on autoload
- STARwatch included during warranty
- Tightness check for channels and heads

Sample Identification on Assay Entry

The STAR M can automatically load carriers and samples, thereby ensuring correct loading, reading barcodes of samples (2D barcode reading optional). This high-throughput method allows for continuous sample loading and enables easy worklist handling.

Secure and Traceable

From Dual Liquid Level Detection to Total Aspiration and Dispense Monitoring the STAR M ensures and records all liquid handling steps for a complete sample tracking and chain-of-custody processing:

- Dual Liquid Level detection for polar and non-polar liquids
- Anti-Droplet Control (ADC) for volatile liquids
- Monitored Air Displacement (MAD) and Total Aspiration and Dispense Monitoring (TADM) for guaranteed sample transfers
- System-Liquid free pipetting channels enable contamination free pipetting

Internal Database

All sample handling steps are recorded in an internal, secured database. Even in the event of a power failure, everything is stored safely and cannot be altered: Complete audit trail.

Patented Pipetting Technology

THE FOUNDATION OF PRECISION AND RELIABILITY

Air Displacement Pipetting

1 The STAR liquid handling platforms utilize air displacement technology, which is analogous to using a hand pipette, without the issues associated with liquid-filled pipetting systems.

- High pipetting accuracy and precision
- Dynamic pipetting range of 0.5 µL to 1000 µL using the 1000 µL pipetting channel (up to 5000 µl with the STAR M's 5 ml channels)
- Provides increased robustness, less maintenance, and reduced risk of contamination and sample dilution

Plunger

Air

Tip

Sample
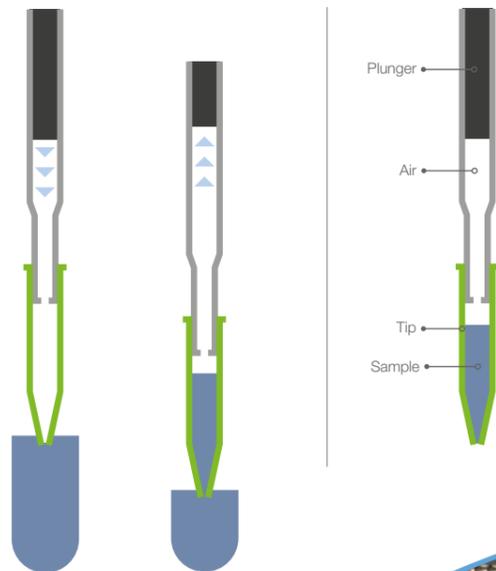
Compressed O-Ring Expansion (CO-RE) Technology

6 Automated liquid handling applications require precise tip attachment and positioning. To ensure such precision, Hamilton liquid handling workstations offer proprietary CO-RE technology.

6 CO-RE technology attaches disposable tips, washable steel needles, or transportation tools to the pipetting channels with a highly robust lock-and-key style mechanism. The system requires no vertical force for tip attachment or tip ejection, thus eliminating mechanical stress and improving overall system reliability, pipetting speed, positional accuracy, and dexterity.

O-Ring

- Eliminates aerosol formation during tip ejection
- Increases process safety by avoiding tip detachment
- Positive pressure seal provides ability to monitor pressure changes during pipetting for pLLD, MAD, and TADM
- Easily switch between disposable tips and washable needles with no manual intervention or hardware changes required

Dual Liquid Level Detection (pLLD and cLLD)

5
- Two modes of Liquid Level Detection (LLD) for Independent Channels:
  - Capacitive LLD (cLLD) detects conductive liquids
 - Pressure-based LLD (pLLD) detects all liquids including non-conductive solvents
- Detect foam or bubbles on liquid surfaces using dual LLD
- Differentiate between liquid phases, for example organic vs. inorganic

5
- CO-RE 96- and 384-MPH offer cLLD, eliminating the need to program specific pipetting-only heights

Monitored Air Displacement (MAD)

Monitoring the air-based pipetting action, each individual pipetting channel on the STAR M can detect clots or empty wells in real time during the aspiration step. It can also be used to pipette highly volatile solvents. Delivering a confirmation of the successful aspiration, real-time tracking of the aspiration performance with MAD offers a high level of certainty for your automated assays, providing reliable and consistent walk-away automation.

- Real-time detection of pipetting errors

Normal   Insufficient Liquid   Clogged Tip
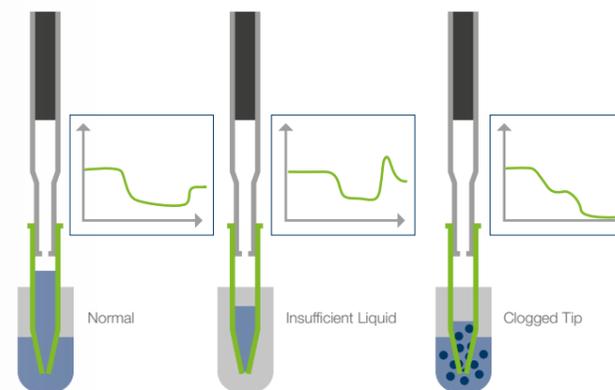
Total Aspiration and Dispense Monitoring (TADM™)

2 During sample transfers, parameters may be set up for real-time monitoring of each independent pipetting channel during the aspiration and dispensing steps. TADM verifies the sample transfer with a traceable digital audit trail.
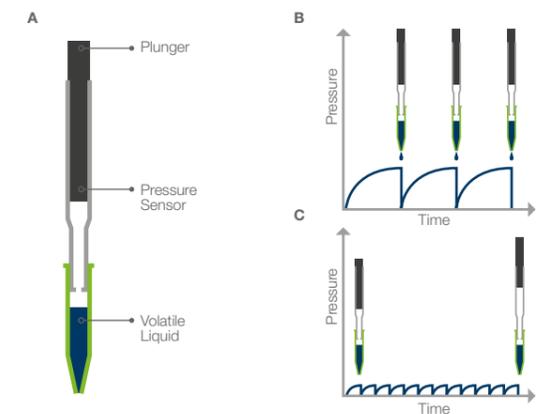
Pressure

Ambient

Aspiration   Dispense

Time
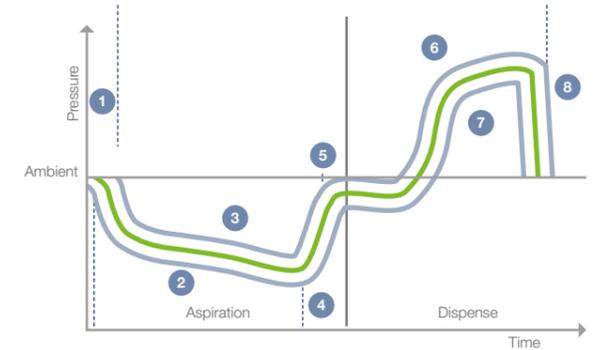
1 Measurement Not Working
2 Blocked Tip, Blood Clot
3 Short Sample
4 Incorrect Volume
5 Short / No Sample
6 Dispense Speed Incorrect / Blocked Tip
7 Leaky System
8 Incorrect Volume

Anti-Droplet Control (ADC™)

ADC detects and compensates for pressure changes in real time for each pipetting channel that are caused by the high vapor pressure of volatile organics. Upon activation, ADC compensates for pressure changes. This feature is only available with independent pipetting channels.

- Eliminates droplet formation

A   B

Plunger

Pressure Sensor

C

Time

Volatile Liquid

Pressure

Time

A Schematic sketch showing a pipetting channel with its pressure sensor. The volatile liquid contained in the tip vaporizes into the air space, building up pressure inside the pipetting channel.
B Pipetting without ADC, as the vapor pressure in the tip increases, a droplet forms at the end of the tip, reducing the pressure in the tip when it falls off.
C Pipetting with ADC, pressure differences are detected by the pressure sensor and thus will be compensated in real-time by plunger movements to prevent droplet formation and pressure buildup in the channel.

Fully Automated Workflows

ONE PIPETTING PLATFORM

Reliable, consistent, precise pipetting
with Independent Channels, CO-RE 96 MPH,
and/or CO-RE 384 MPH.

CO-RE 1000 µL Pipetting Channel

3 ■ Comprehensive volume range as low as 0.5 µL
and as high as 1000 µL

- Unique, asymmetric, variable spanning of channels allows random access* and supports complex pipetting patterns, enabling faster sample processing
  - Up to 16 Independent 1000 µL Pipetting Channels on one arm, doubling your throughput
  - Switch between disposable tips and washable, stainless steel needles without any hardware changes or manual intervention
    - Capable of piercing using disposable tips

5 mL Pipetting Channel

- Higher, comprehensive volume range from 50 µL to 5 mL
- Unique asymmetric, variable spanning of channels allows random access*
- Up to 8 Independent 5 mL Pipetting Channels on one arm
- Capable of piercing using disposable tips

* Depending on configuration

MPH

The Multi-Probe Head (MPH) speeds up pipetting processes with parallel liquid handling for high-throughput processing. Offering plate replication, plate reformatting, single-well pipetting, and row or column pipetting, the MPH supports a variety of pipetting processes. Small-footprint wash stations for the MPH are available for tip washing.

CO-RE 96 MPH

4 ■ Volume range of 1 µL to 1000 µL

- Capacitive Liquid Level Detection (cLLD)
- Optional pressure monitor using TADM allows for real-time monitoring of pipetting processes
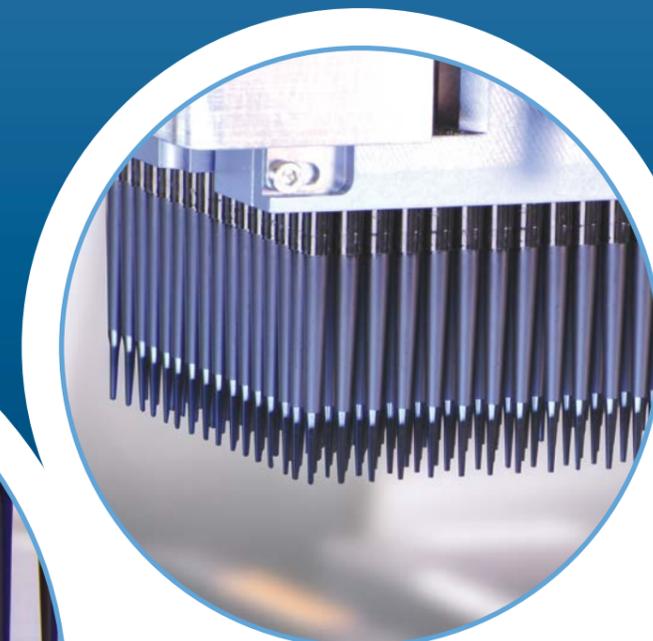
CO-RE 384 MPH

- Volume range of 0.1 µL to 50 µL
- Capacitive Liquid Level Detection (cLLD)
- Rocket tips turn 384 MPH into a 96 MPH with a volume range of 1 µL to 300 µL

Modular Design

EASY-TO-CHANGE LAYOUT

Carriers

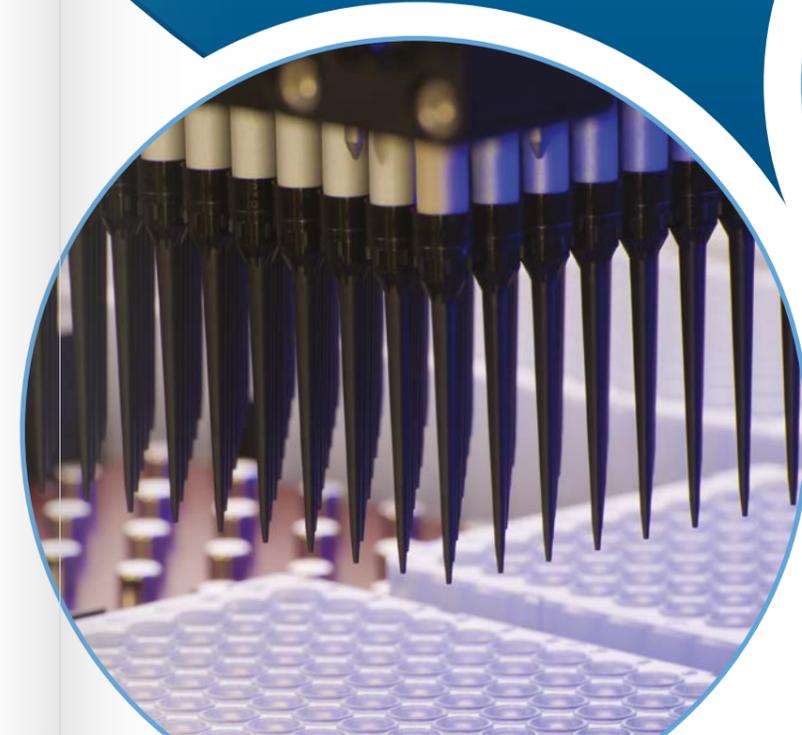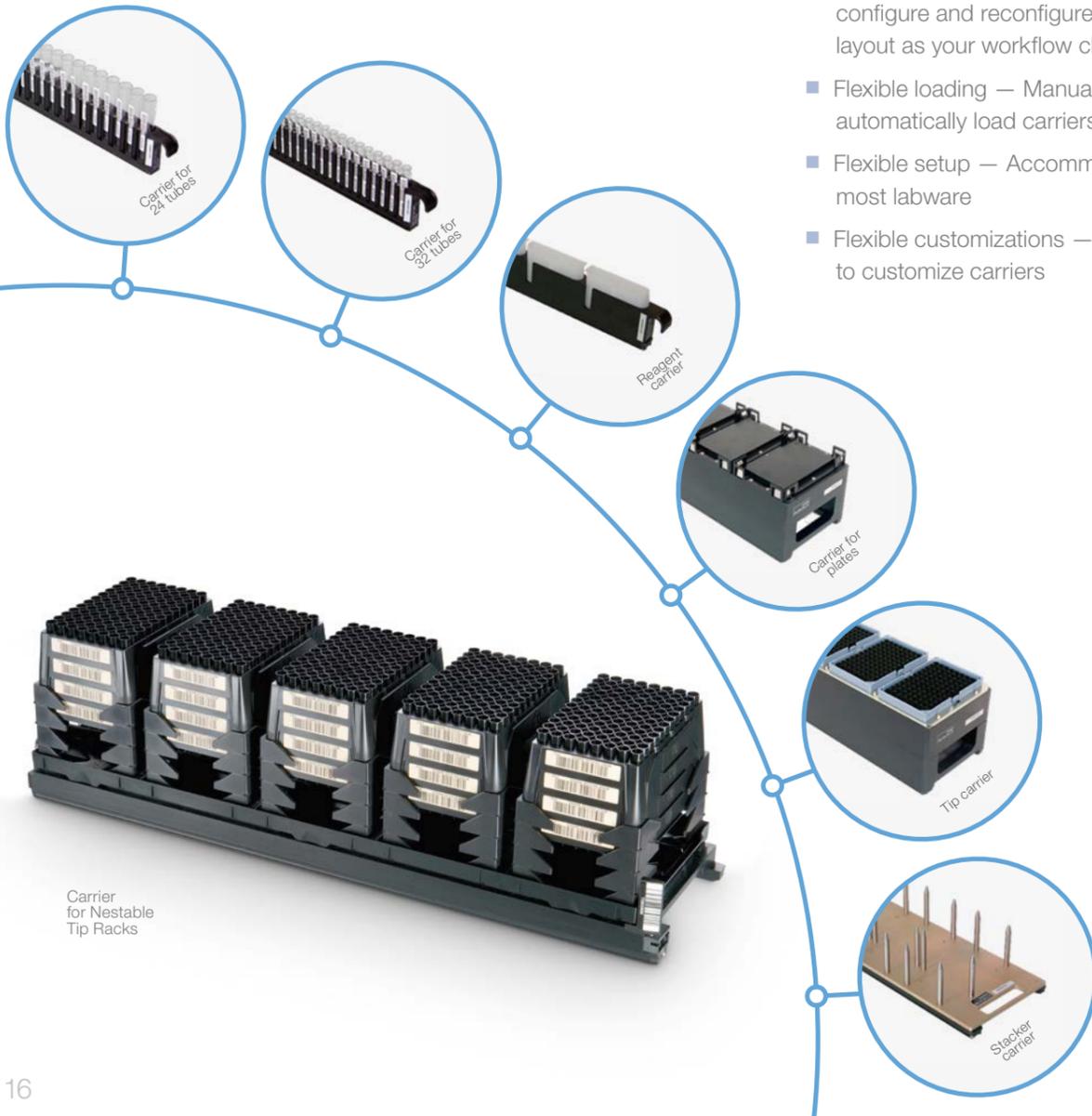Hamilton designed carriers hold your labware and provide flexibility to configure the deck tailored specifically for your assays. The STAR M offers higher deck capacity for labware which equates to more SLAS ANSI format positions. For example, from the front going to the back, the STAR deck can accommodate up to 5 microplates or up to 32 tube positions, all accessible by all pipetting channels.

- Flexible configurations — Easily configure and reconfigure the deck layout as your workflow changes
- Flexible loading — Manually or automatically load carriers on the deck
- Flexible setup — Accommodates most labware
- Flexible customizations — Ability to customize carriers

Carrier for 24 tubes

Carrier for 32 tubes

Reagent carrier

Carrier for plates

Tip carrier
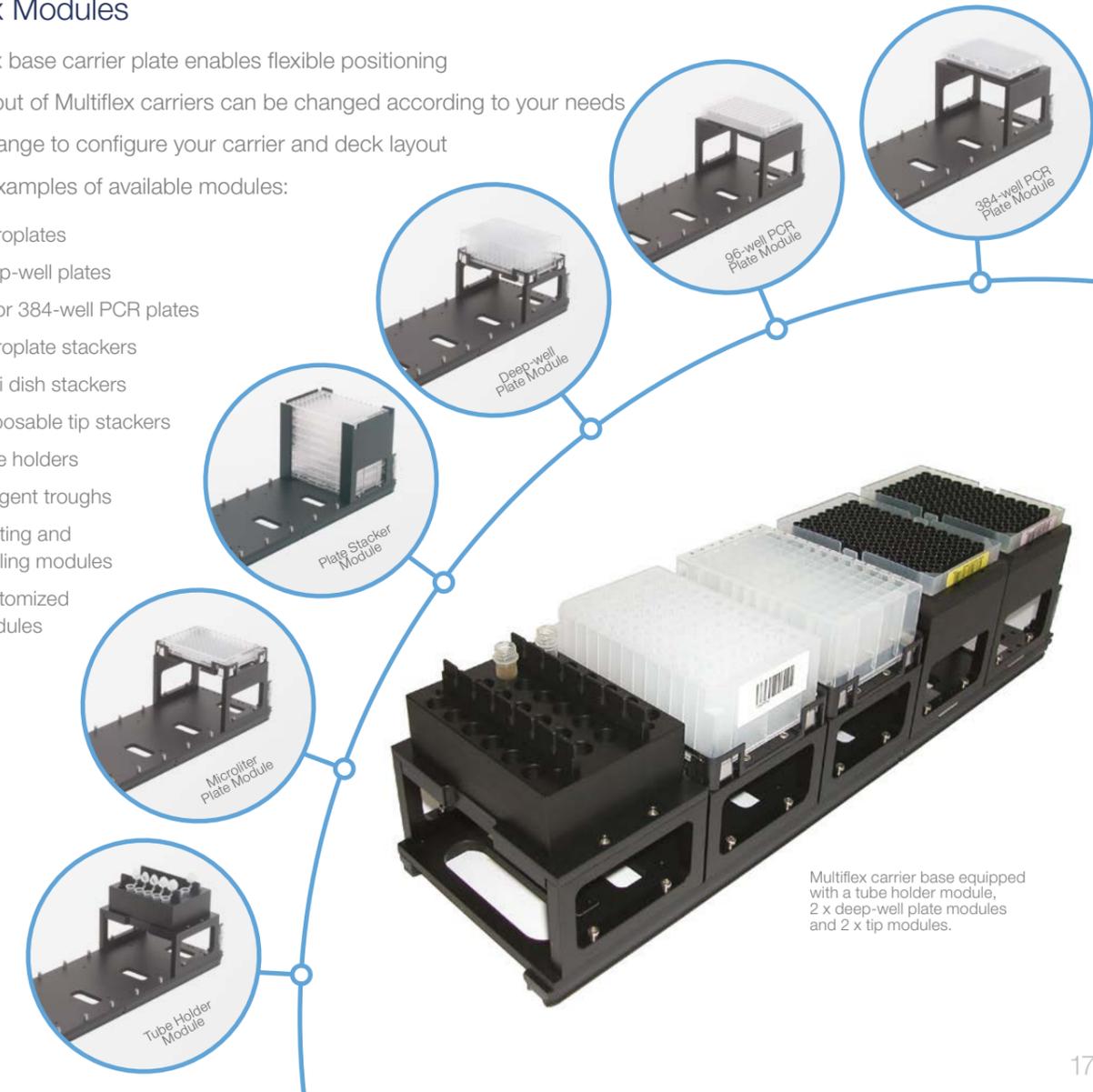
Stacker carrier

Carrier for Nestable Tip Racks

EASY INTEGRATIONS ON THE STAR M

1 **On Deck Thermal Cycler (ODTC)** - Combining simple integration with excellent well-to-well temperature uniformity, high heating and cooling rates from 4° to 99°C, with rapid transition into plateau temperature, the ODTC is perfect for fully automated thermal cycling.

2 **Vacuum System (CVS)** - 7-track-wide carrier equipped with a chamber for the automation of vacuum based kits for SPE, LC-MS, genomics and proteomics.

3 **Hamilton Heater Shaker (HHS)** - The compact HHS allows a wide heating range up to 105°C and shaking up to 2500 rpm with three orbit options. Accommodates a large variety of SLAS ANSI format plates, including deep-well plates and Sarstedt tubes.

Multiflex Modules

- Multiflex base carrier plate enables flexible positioning
- The layout of Multiflex carriers can be changed according to your needs
- Broad range to configure your carrier and deck layout
- A few examples of available modules:

  - Microplates
  - Deep-well plates
  - 96-or 384-well PCR plates
  - Microplate stackers
  - Petri dish stackers
  - Disposable tip stackers
  - Tube holders
  - Reagent troughs
  - Heating and cooling modules
  - Customized modules

96-well PCR Plate Module

384-well PCR Plate Module

Deep-well Plate Module

Plate Stacker Module

Microliter Plate Module

Tube Holder Module

Multiflex carrier base equipped with a tube holder module, 2 x deep-well plate modules and 2 x tip modules.

Automating Your Assays

UNLIMITED FLEXIBILITY

Integrated Tools

The STAR M includes a comprehensive portfolio of integrated options to completely automate your workflow.

- **Heating Cooling Module**
  On deck cooling and heating device from 0°C up to 99°C to control temperature; it can be either set manually on the module's controller or by a HSL Library.

- **Hamilton Incubator Shaker (HIS)**
  With 4 independent heating and shaking sites, a shaking range of 40 to 1200 rpm, and a heating range of ambient + 3°C to 60°C, the versatile HIS offers flexibility for your scientific workflows.

- **[MPE]²**
  Providing positive pressure SPE and evaporation in one small device, the [MPE]² is designed specifically to maintain equal pressure across the filter plate, eliminating the path of least resistance.

- **HEPA Filter Hood**

- **UV Light Package**
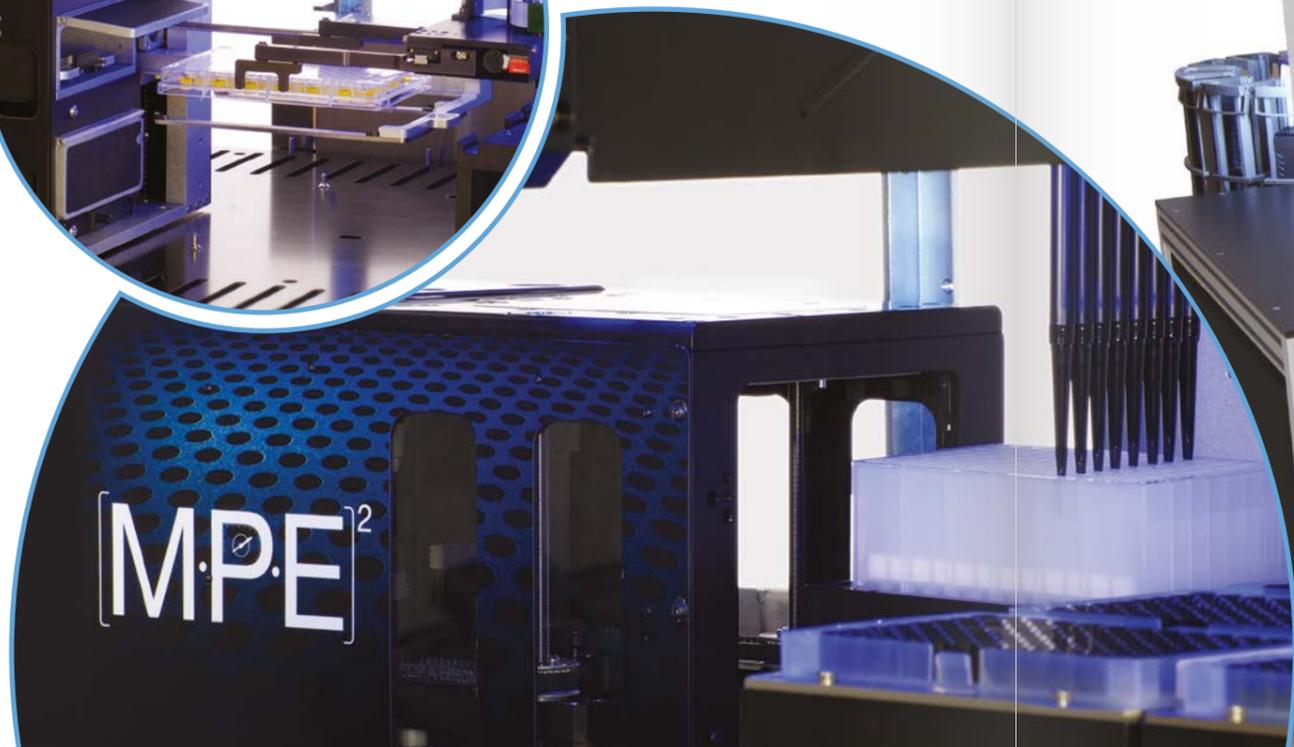
Applications

AUTOMATED WORKFLOW SOLUTIONS

To support your automated workflows, Hamilton employs a team of experts from a variety of scientific disciplines along with a continuously growing network of field-based applications specialists to support automating your assays. Working with our team, be confident that all of your application requirements will be met as we create the perfect automated solution for your laboratory.

From simple, benchtop solutions to complex, large-scale workflow automation, we provide solutions for a wide range of applications including genomics, cells and proteins, clinical diagnostics, forensic sciences, applied markets, drug discovery, industrial biotech, and biobanking.

Combine the STAR M with our HMotion, a small-footprint plate handling robot, to seamlessly integrate Hamilton Storage platforms, Hamilton Small Devices, and other 3rd devices. The HMotion enables fully automated solutions for applications such as sample management systems for compound management and biobanking.

Intuitive Software

SIMPLIFIED WORKFLOW

VENUS software

VENUS software provides basic or advanced programming, offering flexible assay setup without compromising your requirements. Intuitive editors provide full control over every aspect of your method.

VENUS is designed to be easy as you need, yet powerful enough to provide the flexibility to set up assays exactly the way you want them automated.

Start — "Add diluent" — "Transfer Samples" — "Shake" — "Incubate" — "Read" — End

Error Handling
VENUS provides multiple layers of error handling to ensure a user-friendly and error-free outcome.

Powerful Scripting
Method Editor allows you to create sequences to quickly automate workflows exactly the way you want the process to occur.

Custom Dialogs
Create a simple graphical interface including images. Allows individualized input and output displays to walk your operators through the processes.

Action Editor
The Action Editor is the fast way to create a method skeleton. It holds all possible actions (loading, pipetting, transportation, incubation, etc.) in a toolbox for simple drag-and-drop programming. The Action Editor allows quick throughput calculations and is the base for further customization.

SuperSimple Methods
Pre-programmed methods to execute the most common lab routines (copy plates, add buffer, serial dilution, etc.) provide plug-and-play method creation.

SmartSteps
Pre-programmed software modules to combine into a ready-to-use method.

StepTemplates
A skeleton of commonly used assay steps such as serial dilution, vacuum steps, stacked tip handling, and more.

21 CFR Part 11 Regulatory Tools

The software meets the regulatory requirements specified in 21 CFR Part 11, including controlled system access, human readable and printable files, electronic record creation, protection, and maintenance, as well as documentation and training requirements.

STARwatch

Condition Monitoring with STARwatch

STARwatch is a service that significantly increases uptime of an instrument and is exclusively available for STAR instruments. Running behind the scenes in VENUS, STARwatch continuously monitors the condition of your instrument. The captured data is automatically analyzed, and when critical patterns are recognized, Hamilton Service is immediately notified to provide proactive intervention.

- Increased system uptime through proactive intervention
- No workflow interruption
- Pre-planned service visits
- Faster service reaction time

without STARwatch   with STARwatch

unplanned downtime

planned service time
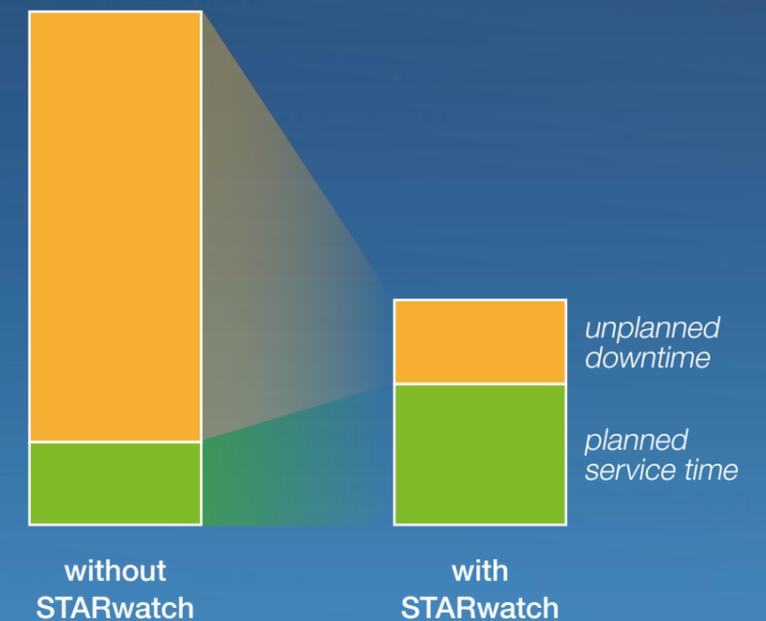
Significantly reduce unplanned downtime by constantly monitoring the system

20

21

STAR M | MODULARITY | FLEXIBILITY | EFFICIENCY | SAFETY | TECHNOLOGY | AUTOMATED WORKFLOWS | LABWARE | INTEGRATED TOOLS | APPLICATIONS | VENUS SOFTWARE | STARWATCH | CONSUMABLES | SPECIFICATIONS | SERVICE | ABOUT HAMILTON

Consumables

CO-RE Tips — 10 µL

Available Options	Part Number	Case
10 µL Conductive Non-Sterile Filter Tips	235901	Case of 5760 tips (Blister 5 x 96 tips per rack)
10 µL Conductive Non-Sterile Non-Filter Tips	235900	Case of 5760 tips (Blister 5 x 96 tips per rack)
10 µL Conductive Sterile Filter Tips	235936	Case of 5760 tips (Blister 5 x 96 tips per rack)
10 µL Conductive Sterile Non-Filter Tips	235935	Case of 5760 tips (Blister 5 x 96 tips per rack)

CO-RE Tips — 50 µL

Available Options	Part Number	Case
50 µL Conductive Non-Sterile Filter Tips	235948	Case of 5760 tips (Blister 5 x 96 tips per rack)
50 µL Conductive Non-Sterile Non-Filter Tips	235966	Case of 5760 tips (Blister 5 x 96 tips per rack)
50 µL Conductive Sterile Filter Tips	235979	Case of 5760 tips (Blister 5 x 96 tips per rack)
50 µL Conductive Sterile Non-Filter Tips	235978	Case of 5760 tips (Blister 5 x 96 tips per rack)
50 µL Clear Non-Sterile Non-Filter Tips	235836	Case of 5760 tips (Blister 5 x 96 tips per rack)
50 µL Clear Sterile Non-Filter Tips	235837	Case of 5760 tips (Blister 5 x 96 tips per rack)
50 µL Clear Non-Sterile Filter Tips	235829	Case of 5760 tips (Blister 5 x 96 tips per rack)
50 µL Clear Sterile Filter Tips	235831	Case of 5760 tips (Blister 5 x 96 tips per rack)

CO-RE Tips — 300 µL

Available Options	Part Number	Case
300 µL Conductive Non-Sterile Filter Tips	235903	Case of 5760 tips (Blister 5 x 96 tips per rack)
300 µL Conductive Non-Sterile Non-Filter Tips	235902	Case of 5760 tips (Blister 5 x 96 tips per rack)
300 µL Conductive Sterile Filter Tips	235938	Case of 5760 tips (Blister 5 x 96 tips per rack)
300 µL Conductive Sterile Non-Filter Tips	235937	Case of 5760 tips (Blister 5 x 96 tips per rack)
300 µL Clear Non-Sterile Non-Filter Tips	235834	Case of 5760 tips (Blister 5 x 96 tips per rack)
300 µL Clear Sterile Non-Filter Tips	235835	Case of 5760 tips (Blister 5 x 96 tips per rack)
300 µL Clear Non-Sterile Filter Tips	235830	Case of 5760 tips (Blister 5 x 96 tips per rack)
300 µL Clear Sterile Filter Tips	235832	Case of 5760 tips (Blister 5 x 96 tips per rack)

Piercing CO-RE Tips

Available Options	Part Number	Case
250 µL Piercing Conductive Non-Sterile Filter Tips	235658	Case of 5760 tips (Blister 5 x 96 tips per rack)
250 µL Piercing Conductive Non-Sterile Non-Filter Tips	235805	Case of 5760 tips (Blister 5 x 96 tips per rack)
250 µL Piercing Conductive Sterile Filter Tips	235649	Case of 5760 tips (Blister 5 x 96 tips per rack)
250 µL Piercing Conductive Sterile Non-Filter Tips	235659	Case of 5760 tips (Blister 5 x 96 tips per rack)

Slim CO-RE Tips

Available Options	Part Number	Case
300 µL Slim Conductive Non-Sterile Filter Tips	235647	Case of 3840 tips (Blister 5 x 96 tips per rack)
300 µL Slim Conductive Non-Sterile Non-Filter Tips	235806	Case of 3840 tips (Blister 5 x 96 tips per rack)
300 µL Slim Conductive Sterile Filter Tips	235646	Case of 3840 tips (Blister 5 x 96 tips per rack)
300 µL Slim Conductive Sterile Non-Filter Tips	235648	Case of 3840 tips (Blister 5 x 96 tips per rack)

Wide Bore CO-RE Tips

Orifice 0.71 mm   Orifice 1.2 mm   Orifice 1.55 mm   Orifice 3.2 mm

Available Options	Part Number	Case
300 µL Wide Bore (0.71 mm) Conductive Non-Sterile Filter Tips	235452	Case of 5760 tips (Blister 5 x 96 tips per rack)
300 µL Wide Bore (1.55 mm) Conductive Non-Sterile Filter Tips	235449	Case of 5760 tips (Blister 5 x 96 tips per rack)
300 µL Wide Bore (0.71 mm) Conductive Non-Sterile Non-Filter Tips	235688	Case of 5760 tips (Blister 5 x 96 tips per rack)
300 µL Wide Bore (1.55 mm) Conductive Non-Sterile Non-Filter Tips	235451	Case of 5760 tips (Blister 5 x 96 tips per rack)
1000 µL Wide Bore (1.2 mm) Conductive Sterile Filter Tips	235677	Case of 3840 tips (Blister 5 x 96 tips per rack)
1000 µL Wide Bore (1.2 mm) Conductive Non-Sterile Filter Tips	235678	Case of 3840 tips (Blister 5 x 96 tips per rack)
1000 µL Wide Bore (1.2 mm) Conductive Non-Sterile Non-Filter Tips	235679	Case of 3840 tips (Blister 5 x 96 tips per rack)
1000 µL Wide Bore (3.2 mm) Conductive Non-Sterile Non-Filter Tips	235444	Case of 3840 tips (Blister 5 x 96 tips per rack)

Rocket CO-RE Tips

Available Options	Part Number	Case
300 µL Rocket Conductive Non-Sterile Non-Filter Tips 384- to 96-head	235974	Case of 4800 tips (Blister 5 x 96 tips per rack)

CO-RE Tips — 1,000 µL

Available Options	Part Number	Case
1000 µL Clear Non-Sterile Filter Tips	235820	Case of 3840 tips (Blister 5 x 96 tips per rack)
1000 µL Clear Non-Sterile Non-Filter Tips	235822	Case of 3840 tips (Blister 5 x 96 tips per rack)
1000 µL Clear Sterile Filter Tips	235821	Case of 3840 tips (Blister 5 x 96 tips per rack)
1000 µL Clear Sterile Non-Filter Tips	235823	Case of 3840 tips (Blister 5 x 96 tips per rack)
1000 µL Conductive Non-Sterile Filter Tips	235905	Case of 3840 tips (Blister 5 x 96 tips per rack)
1000 µL Conductive Non-Sterile Non-Filter Tips	235904	Case of 3840 tips (Blister 5 x 96 tips per rack)
1000 µL Conductive Sterile Filter Tips	235940	Case of 3840 tips (Blister 5 x 96 tips per rack)
1000 µL Conductive Sterile Non-Filter Tips	235939	Case of 3840 tips (Blister 5 x 96 tips per rack)

CO-RE Tips — 4,000 µL – 5,000 µL

Available Options	Part Number	Case
4000 µL Conductive Non-Sterile Filter Tips; 4 Tips/Sheath	194053	Case of 96 tips (4 tips/sheath, individual bagged)
4000 µL Conductive Non-Sterile Filter Tips	184021	Case of 720 tips (Blister 5 x 24 tips per rack)
4000 µL Conductive Sterile Filter Tips	184023	Case of 720 tips (Blister 5 x 24 tips per rack)
5000 µL Conductive Non-Sterile Non-Filter Tips; 4 Tips/Sheath	194050	Case of 96 tips (4 tips/sheath, individual bagged)
5000 µL Conductive Non-Sterile Non-Filter Tips	184020	Case of 720 tips (Blister 5 x 24 tips per rack)
5000 µL Conductive Sterile Non-Filter Tips	184022	Case of 720 tips (Blister 5 x 24 tips per rack)

Nested 96-Tip Racks

NTR rack with 96 tips

Available Options	Part Number	Case
10 µL Nested Clear Non-Sterile Non-Filter Tips	235971	Case of 11520 tips (NTR 5 x 4 stack)
10 µL Nested Conductive Non-Sterile Non-Filter Tips	235949	Case of 11520 tips (NTR 5 x 4 stack)
10 µL Nested Conductive Sterile Non-Filter Tips	235983	Case of 11520 tips (NTR 5 x 4 stack)
50 µL Nested Clear Non-Sterile Non-Filter Tips NTR	235964	Case of 11520 tips (NTR 5 x 4 stack)
50 µL Nested Conductive Non-Sterile Non-Filter Tips NTR	235947	Case of 11520 tips (NTR 5 x 4 stack)
50 µL Nested Conductive Sterile Non-Filter Tips NTR	235987	Case of 11520 tips (NTR 5 x 4 stack)
300 µL Nested Clear Non-Sterile Non-Filter Tips NTR	235965	Case of 11520 tips (NTR 5 x 4 stack)
300 µL Nested Conductive Non-Sterile Non-Filter Tips NTR	235950	Case of 11520 tips (NTR 5 x 4 stack)
300 µL Nested Conductive Sterile Non-Filter Tips NTR	235985	Case of 11520 tips (NTR 5 x 4 stack)

Nested 384-Tip Racks

NTR for CO-RE 384 MPH stacked with 96 tips   NTR for CO-RE 384 MPH stacked with 384 tips

Available Options	Part Number	Case
50 µL Nested Clear Non-Sterile Non-Filter Tips 384 NTR	235446	Case of 7680 tips (NTR 5 x 4 stack; 384/rack)
50 µL Nested Clear Non-Sterile Non-Filter Tips 384/96 NTR	235447	Case of 1920 tips (NTR 5 x 4 stack; 96/rack)
50 µL Nested Conductive Non-Sterile Non-Filter Tips 384 NTR	235989	Case of 7680 tips (NTR 5 x 4 stack; 384/rack)
50 µL Nested Conductive Non-Sterile Non-Filter Tips 384/96 NTR	235993	Case of 1920 tips (NTR 5 x 4 stack; 96/rack)
50 µL Nested Conductive Sterile Non-Filter Tips 384 NTR	235694	Case of 7680 tips (NTR 5 x 4 stack; 384/rack)
50 µL Nested Conductive Sterile Non-Filter Tips 384/96 NTR	235695	Case of 1920 tips (NTR 5 x 4 stack; 96/rack)

Specifications

STARlet M

35.5 in
903 mm

44.25 in
1124 mm

Depth:
31.2 in
795 mm

STAR M

35.5 in
903 mm

65.5 in
1664 mm

Depth:
31.2 in
795 mm

STARplus M

35.5 in
903 mm

85 in
2160 mm

Depth:
31.2 in
795 mm

Technical Specifications

	STARlet M	STAR M	STARplus M
Instrument W x H x D	44.25 in (1124 mm) x 35.5 in (903 mm) x 31.2 in (795 mm) autoload: 39.6 in (1006 mm)	65.5 in (1664 mm, 1990 mm with multiprobe head) x 35.5 in (903 mm) x 31.2 in (795 mm) autoload: 39.6 in (1006 mm)	85 in (2160 mm) x 35.5 in (903 mm) x 31.2 in (795 mm) autoload: 39.6 in (1006 mm)
Work Area W x H x D	26.5 in (675 mm) x 7.6 in (195 mm) x 18.3 in (465 mm)	47.8 in (1215 mm) x 7.6 in (195 mm) x 18.3 in (465 mm)	67.1 in (1705 mm) x 7.6 in (195 mm) x 18.3 in (465 mm)
Weight — 8 Channels	135 kg	145 kg	205 kg
Weight — 96 Probe Head and 8 Individual Channels	150 kg	160 kg	220 kg
Deck Capacity	30 tracks (T) / 25 SLAS ANSI positions	54 tracks (T) / 45 SLAS ANSI positions	82 tracks (T) / 25 to 55 SLAS ANSI positions
Combinations Allowed	Maximum of 30 tube carriers (1 T) holding 24 or 32 tubes per carrier; maximum of 5 carriers (6 T) holding 5 tip racks or 5 plate positions per carrier	Maximum of 9 carriers (6 T) holding 5 plates or tip racks or per carrier; multi-probe head can reach up to 7 carriers on the deck and 65 mm beyond the deck (on the left side)	Maximum of 11 carriers (6 T) holding 5 plates or tip racks per carrier, plus 16 T for the waste container and on-deck components
Positional Accuracy	X-Y-Z positional accuracy of 0.1 mm	X-Y-Z positional accuracy of 0.1 mm	X-Y-Z positional accuracy of 0.1 mm
Labware	All SLAS ANSI standard plate types up to 1536 wells and most commercially available tube types		
Carriers	For all standard labware formats and according to customer requirements		

Tip and Volume Size

	Low Volume	Standard Volume	High Volume	Only for 5 mL Channel	Only for 384 Probe Head
Tip sizes	10 µL	300 µL	1000 µL	5 mL tips	50 µL and Rocket Tips
Needle sizes*	10 µL	300 µL	1000 µL	—	—

* Needles available only for individual channels.

Pipetting Specifications for Disposable Tips*

Individual Channels				CO-RE 96 Probe Head				CO-RE 384 Probe Head		
Tip Size	Volume	Precision	Trueness	Tip Size	Volume	Precision	Trueness	Tip Size	Volume	Precision
10 µL	0.5 µL	6.0%	10.0%	10 µL	1 µL	5.0%	5.0%	50 µL	0.1 µL	8.0%
10 µL	10 µL	1.0%	1.5%	10 µL	5 µL	2.0%	2.5%	50 µL	0.5 µL	6.0%
50 µL	1 µL	4.0%	5.0%	50 µL	5 µL	2.0%	2.5%	50 µL	1 µL	3.5%
50 µL	50 µL	0.75%	2.0%	50 µL	50 µL	1.0%	1.5%	50 µL	50 µL	2.0%
300 µL	200 µL	0.75%	1.0%	300 µL	50 µL	1.0%	1.5%	300 µL Rocket*	2 µL	4.0%
1000 µL	1000 µL	0.75%	1.0%	1000 µL	1000 µL	1.0%	1.0%			
5000 µL	5000 µL	1.5%	2.0%							

Using CO-RE 384 Probe Head as 96 Probe Head with Rocket tips. Stacked tip-racks available to increase deck capacity (NTR).

* Test criteria available upon request

Typical Pipetting Data for Needles* Individual Channels (Needles cannot be used on the CO-RE 96 and 384 Probe Heads)

Needle Size	Volume	Precision	Trueness
10 µL	1 µL	8.0%	5.0%
10 µL	5 µL	2.0%	2.5%
300 µL	50 µL	2.0%	2.0%
300 µL	200 µL	1.0%	1.0%
1000 µL	1000 µL	1.0%	2.0%

* Test criteria available upon request. For pipetting of less than 10 µL Hamilton recommends low volume disposable tips to achieve highest pipetting precision.

Liquid Level Detection

Individual channels	Capacitive liquid level detection (cLLD) and pressure (pLLD) on aspiration, cLLD on dispense, minimum volume 10 µL, depending on container type
96 and 384 Probe Head	Capacitive liquid level detection (cLLD)

Throughput

8 Channels	To fill one 96-well microtiter plate with 100 µL samples (new tips for each sample): 320s Aliquot reagent to a 96-well microtiter plate (<90 µL per well): 60s
96 Probe Head	Replication of one 96-well plate, 100 µL, with cLLD on aspiration: 35s (including new tips), Reformatting of four 96-well plates to one 384-well plate, 50 µL, new tips, with cLLD on aspiration: 140s

Operating Data

Maximum Power Consumption	600 VA or 1000 VA (depending on configuration)
Voltage	100 VAC (-15%) to 240 VAC (+10%)
Frequency	50 / 60 Hz ± 5%
Delayed Action Fuse	115 V~: 6.3 A, 230 V~: 3.15 A
Operating Temperature Range	15°C – 35°C (relative humidity 30% - 85% with no condensation)
Recommended PC	Intel Core 2 Duo, ≥ 4 GB RAM, 500 GB Hard Drive, 16x DVD +/-RW, DirectX 250 MB graphic card, MS Windows 7 Professional.
Communication	USB, RS232

Service

OUTSTANDING. RELIABLE. EVERYWHERE.

OUTSTANDING

Hamilton's service organizations are committed to providing the highest quality customer service and support in the industry. Our field service engineers are trained by certified Hamilton instructors and supported by either a local Hamilton service headquarters or by one of our distribution partners.

Hamilton's commitment to high quality standards is evident not only in our ISO-9001 certification, but also in the ongoing training provided through continuing education to all of our service engineers. With Hamilton as your automation partner, feel confident you're receiving the best support possible.

RELIABLE

Reliability is an essential part of our products and customer support. Investment in a high-performance liquid handling system sets high expectations for quality, reliability, and performance. From our in-house manufacturing with state-of-the-art quality control systems through final inspection, Hamilton guarantees the highest standards for all of our products. Our local service engineers and technical specialists are ready to help you whenever there is a need.

EVERYWHERE

Worldwide, we offer highly trained support from local service engineers. Our extensive field service and applications support network links our headquarters with worldwide subsidiaries to ensure quick responses with minimal downtime. Customer satisfaction is the top priority at Hamilton and we've built our worldwide support network to meet all of your needs.

SYSTEM INSTALLATION

All Hamilton instruments are installed according to strict procedures in conformity with ISO-9001. Each system includes a comprehensive Installation Qualification (IQ) and Operational Qualification (OQ) with detailed documentation.

SERVICE CONTRACTS

Ensure the performance and extend the life of your robotic system by choosing a Hamilton service contract. Service contracts include regular preventative maintenance for peak performance of your system. Purchasing a service contract allows costs to be budgeted in advance, and we offer several levels of coverage to support your needs.

TRAINING COURSES

Hamilton offers training courses suitable for a variety of users, or courses can be tailor-made to meet particular needs. Combining theoretical knowledge with practical applications, our courses provide comprehensive understanding of the content to the trainee. Upon successful completion of each course, participants receive a certificate or course confirmation letter from Hamilton. Training courses take place at our headquarters, local subsidiary offices, or on-site at your facility when needed.

About Hamilton

THE MEASURE OF EXCELLENCE®

Hamilton Company specializes in the development, manufacturing, and customization of precision measurement devices, automated liquid handling workstations, and sample management systems.

Hamilton's processes are optimized for quality and flexibility. Whether it's a custom needle with a quick delivery time-frame, a special length pH sensor, or a comprehensive solution to fully automate your assay workflow, trust that Hamilton's products will always meet your needs.

Our complete portfolio

Laboratory Products

Hamilton Laboratory Products manufactures Microliter™ and Gastight® syringes that set the standard for analytical fluid measurement. Other products include custom needles, semi-automated diluters and dispensers, polymeric HPLC columns, pH electrodes, pipettes, and more.

Robotics

Hamilton Robotics provides automated liquid handling workstations and laboratory automation technology for the scientific community. With a focus on innovative design, our products incorporate Hamilton's patented liquid handling technologies for fully automated solutions. In addition to liquid handling platforms, we also offer application-specific solutions, small devices, and consumables.

Storage

Hamilton Storage offers ultra-low temperature automated sample management systems for storage of a variety of labware. Hamilton's line of biobanking and compound management systems, benchtop devices, and consumables are designed for sample integrity, flexibility, and reliability.

Process Analytics

Hamilton Process Analytics includes innovative solutions for the online measurement of pH, dissolved oxygen, conductivity, ORP, viable cell density, and total cell density. Hamilton's proprietary Arc® intelligent sensor technology eliminates the need for transmitters and moves the functionality to your smartphone or tablet.

OEM Solutions

Many of the world's top manufacturers utilize Hamilton products and expertise to get their innovations to market faster with lower development and manufacturing costs. As an OEM partner, we offer the ability to integrate our proven syringe pumps or pipetting channels, customize our proven liquid handling platforms, or design a complete system to automate your novel chemistry.

Hamilton Company has been a leading global manufacturer for more than 60 years, with headquarters in Reno, Nevada; Franklin, Massachusetts; Timişoara, Romania; and Bonaduz, Switzerland; and subsidiary offices throughout the world.
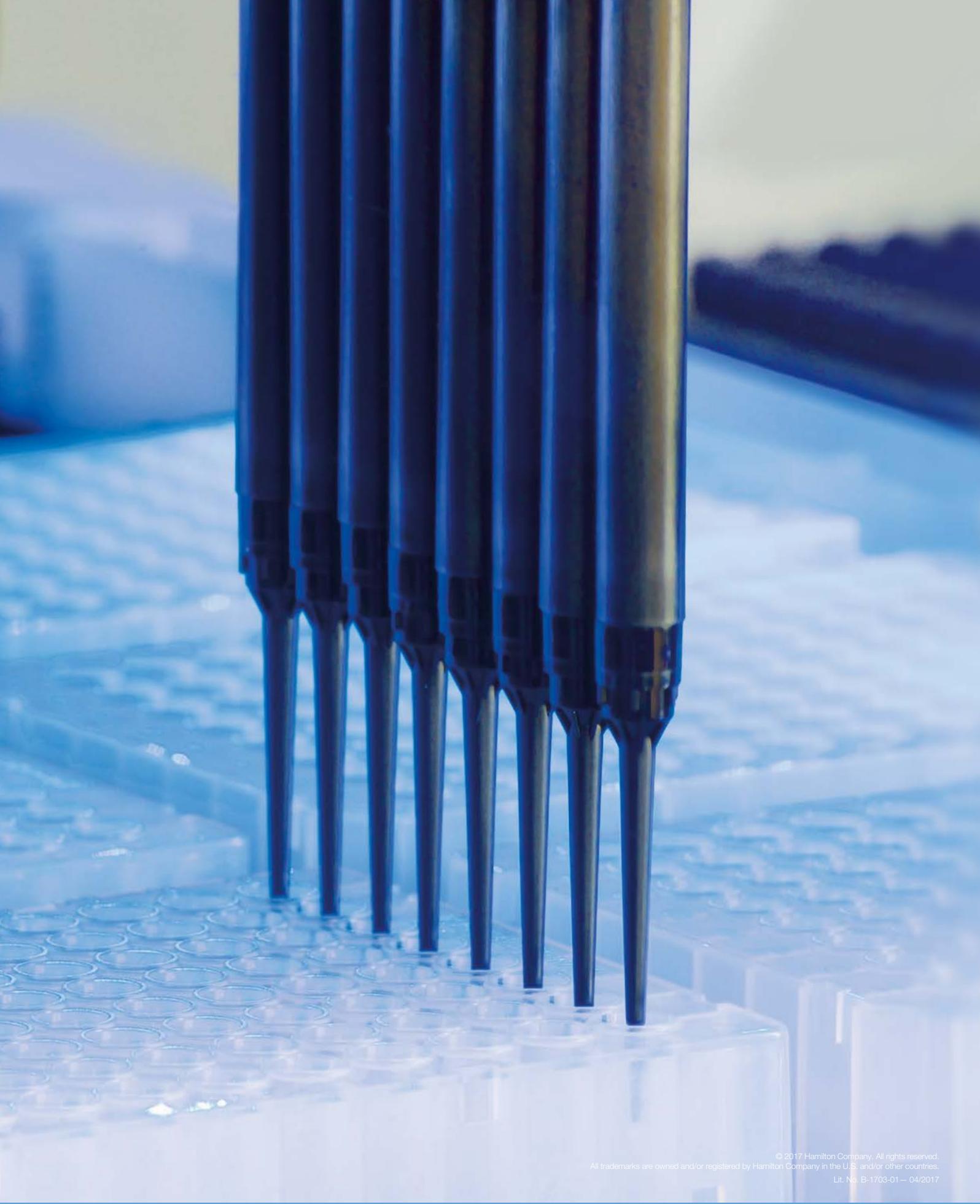
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