

# Microlab<sup>®</sup> STAR<sup>™</sup>



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## AUTOMATED WORKFLOW SOLUTIONS CENTERED AROUND YOUR ASSAY

The STAR combines Hamilton's patented pipetting technology including precise lock-and-key tip attachment, unrivaled liquid level detection, and comprehensive volume ranges to create flexible liquid handling workstations. Available in three base platform sizes, the STAR portfolio incorporates countless options to automate your workflows.

Hamilton Robotics has also partnered with top leaders in the biotechnology industry to provide Standard Solutions based on commonly automated applications. Offering ready-to-start protocols for a variety of applications such as NGS, ELISA, and forensic assays, our Standard Solutions provide a faster way to automate your processes.





## 1 PATENTED TECHNOLOGY

The STAR utilizes Hamilton's proprietary Compressed O-Ring Expansion (CO-RE®) technology. CO-RE minimizes the production of aerosols and allows disposable tips or washable, steel needles to be used on channels in the same run.

## 2 MULTI-FUNCTIONAL ARM

Our technology offers high pipetting accuracy and precision, from sub-microliter to large volumes, using Independent Channels and/or the Multi-Probe Head (MPH). Labware transportation is possible with the iSWAP® or CO-RE Grippers. The STAR can incorporate a camera, tube transportation, and other channel tools on a single arm.

Comprehensive pipetting range:

- 0.5  $\mu$ L to 1 mL using the 1 mL Independent Channel
- 50  $\mu$ L to 5 mL using the 5 mL Independent Channel
- 1  $\mu$ L to 1 mL using the CO-RE 96 MPH
- 0.1  $\mu$ L to 50  $\mu$ L using the CO-RE 384 MPH

## 3 FLEXIBLE SETUP

The high-capacity deck is customized specific to your workflow, accommodating a wide range of labware and automated devices that can easily be exchanged to support multiple assays on one platform.

## 4 SAMPLE TRACKING

Barcode scanning options, combined with the ability to verify sample transfers with a traceable, digital-audit trail, provide sample tracking and chain-of-custody processing.

## 5 INTEGRATED SOLUTIONS FOR AUTOMATED WORKFLOWS

Combine Hamilton's portfolio of Small Devices to automate your complete assays with options such as heating, shaking, incubation, positive pressure extraction, plate sealing, centrifugation, and more. Further expand your automated process with third-party device integration.

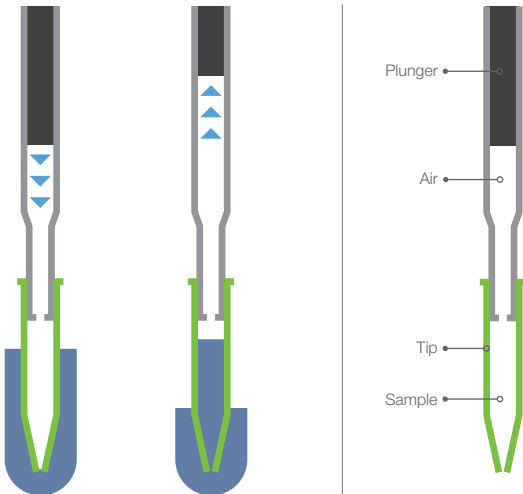
# Patented Pipetting Technology

## THE FOUNDATION OF PRECISION AND RELIABILITY

### AIR DISPLACEMENT PIPETTING

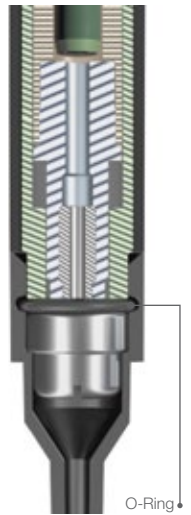
The STAR liquid handling platforms utilize air displacement technology, which is analogous to using a hand pipette, without the issues associated with liquid-filled pipetting systems.

- High pipetting accuracy and precision
- Dynamic pipetting range of 0.5  $\mu\text{L}$  to 1000  $\mu\text{L}$  using the 1000  $\mu\text{L}$  pipetting channel
- Provides increased robustness, less maintenance, and reduced risk of contamination and sample dilution



### COMPRESSED O-RING EXPANSION (CO-RE) TECHNOLOGY

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



- 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





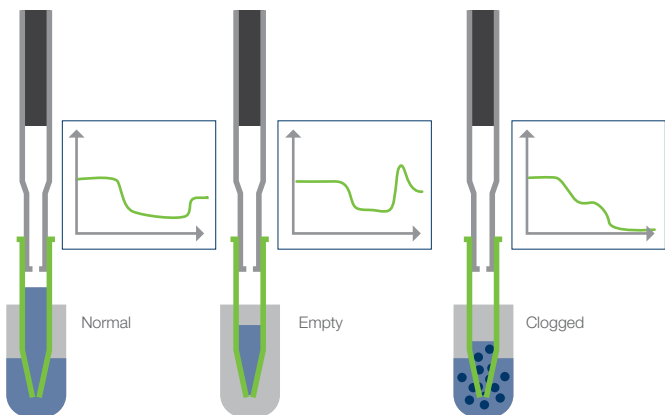
## DUAL LIQUID LEVEL DETECTION (pLLD AND cLLD)

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

## MONITORED AIR DISPLACEMENT (MAD)

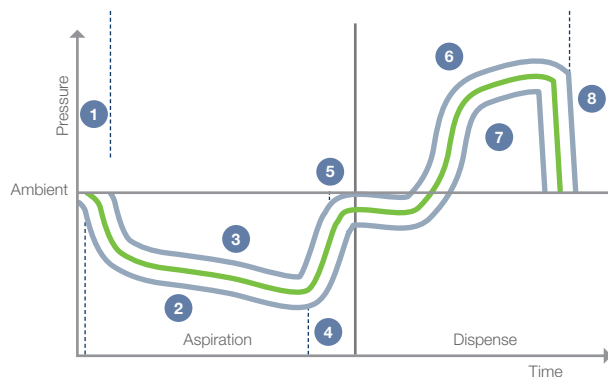
Monitoring the air-based pipetting action, each individual pipetting channel on the STAR can detect clots or empty wells in real time during the aspiration step. It can also be used to pipette highly volatile solvents. Delivering a confirmation of the successful aspiration, real-time tracking of the 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



## TOTAL ASPIRATION AND DISPENSE MONITORING (TADM™)

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.

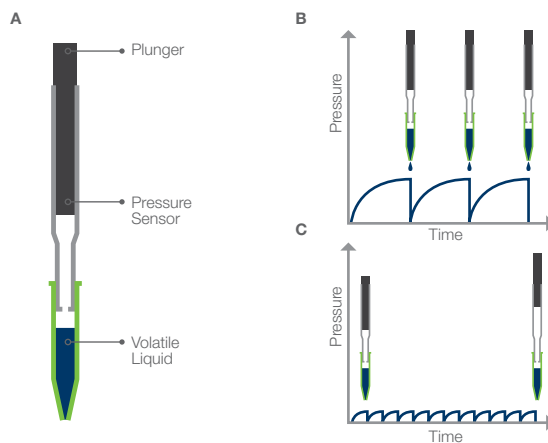


- |                           |  |
|---------------------------|--|
| 1 Measurement Not Working | 6 Dispense Speed Incorrect / Blocked Tip |
| 2 Blocked Tip, Blood Clot | 7 Leaky System                           |
| 3 Short Sample            | 8 Incorrect Volume                       |
| 4 Incorrect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

## 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



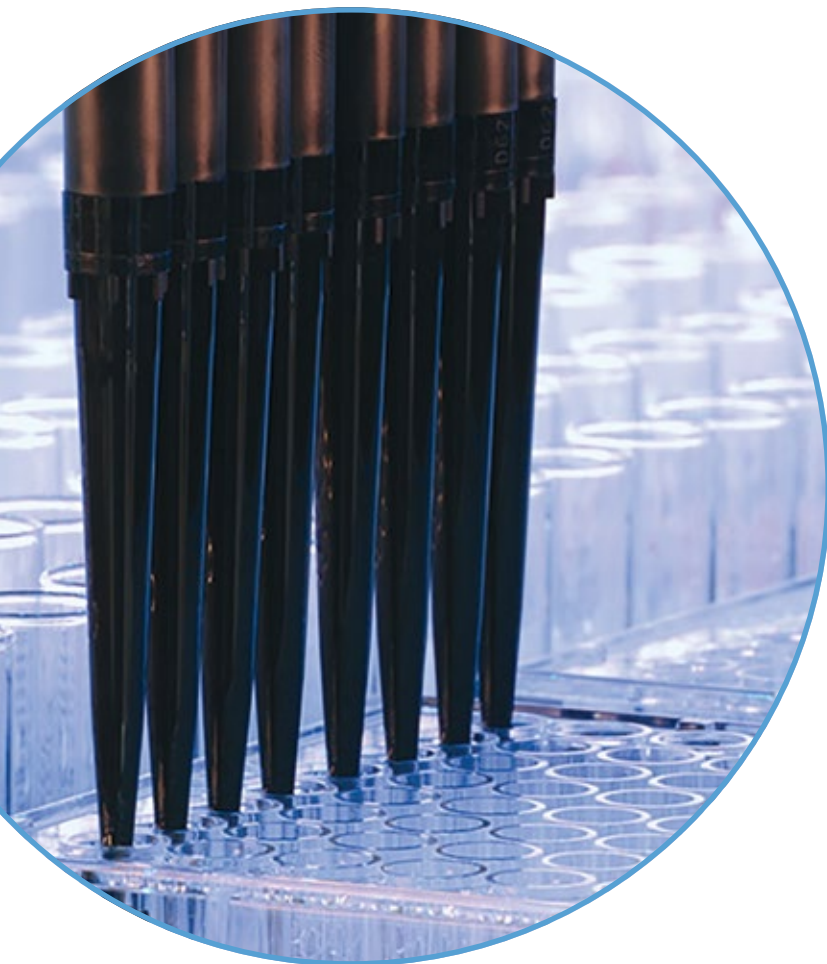
- A** Schematic sketch showing a pipetting channel with its pressure sensor. The volatile liquid contained in the tip vaporizes into the air space, building up pressure inside the pipetting channel.
- B** Pipetting without ADC, as the vapor pressure in the tip increases, a droplet forms at the end of 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.



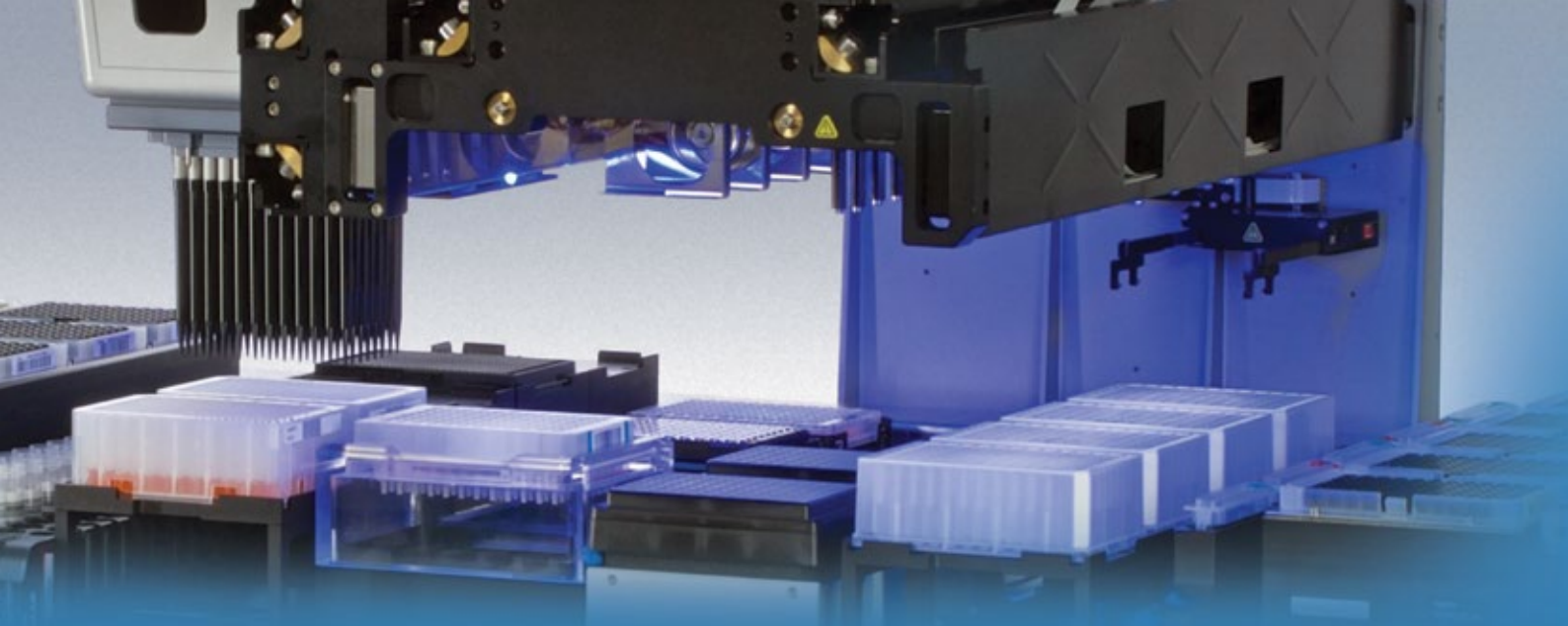
### CO-RE 1000 $\mu$ L PIPETTING CHANNEL

- Comprehensive volume range as low as 0.5  $\mu$ L and as high as 1000  $\mu$ L
- Unique, asymmetric, variable spanning of channels allows random access\* and supports complex pipetting patterns, enabling faster sample processing
- Up to 16 Independent 1000  $\mu$ L 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  $\mu$ L 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

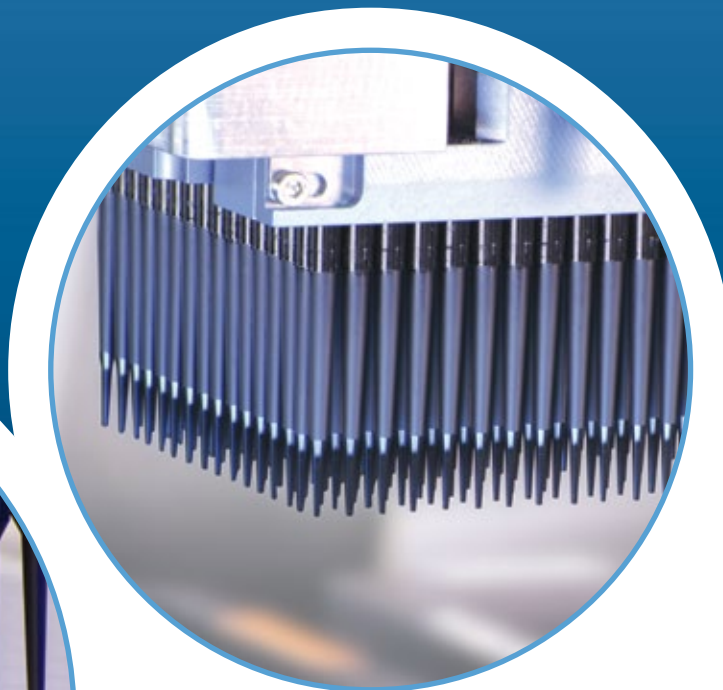


# MPH

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

- Volume range of 1  $\mu\text{L}$  to 1000  $\mu\text{L}$
- 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  $\mu\text{L}$  to 50  $\mu\text{L}$
- Capacitive Liquid Level Detection (cLLD) only
- Rocket tips turn 384 MPH into a 96 MPH with a volume range of 1  $\mu\text{L}$  to 300  $\mu\text{L}$

# Flexibility

## AUTOMATED SOLUTIONS FOR YOUR PROCESS

### LABWARE TRANSPORTATION

With multiple options for labware transportation, the STAR enables more fully automated workflows.



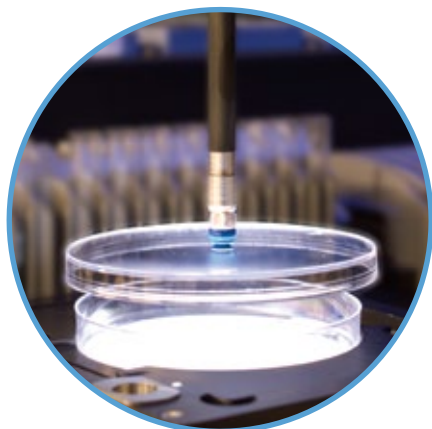
#### 1 iSWAP

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.



#### 2 CO-RE GRIPPER

This affordable transportation tool uses two Independent Pipetting Channels (1000  $\mu$ L 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 SUCTION TOOL

The CO-RE Suction Tool uses one Independent Pipetting Channel (1000  $\mu$ L) 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

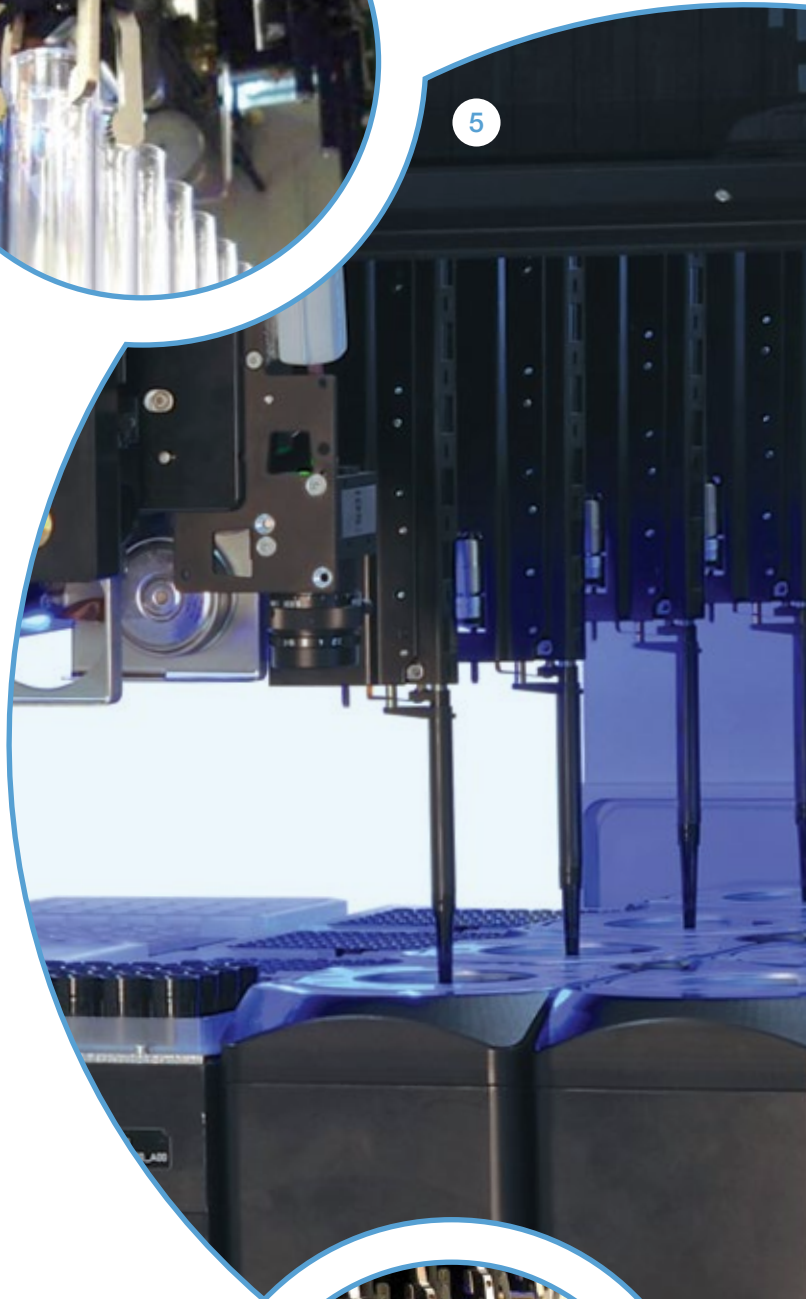
The Tube Gripper Channel is a dedicated tool for transporting tubes with diameters from 8 mm to 20 mm.

#### 5 TWISTER CHANNEL AND DECAPPER MODULE

Automated capping and decapping of 15 to 50 mL screw cap tubes and vials, transportation, and vortex mixing. 1D barcode reading for sample tracking is possible for sample tracking control.

#### 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.



# Safety

## COMPLETE PROCESS SECURITY AND TRACEABILITY

### LABWARE AND SAMPLE IDENTIFICATION

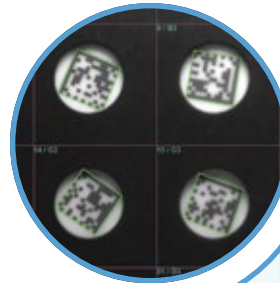
Options for barcode reading combined with our software increase safety to provide complete chain-of-custody processing.

#### ■ 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.



# Modular Design

## EASY-TO-CHANGE LAYOUT

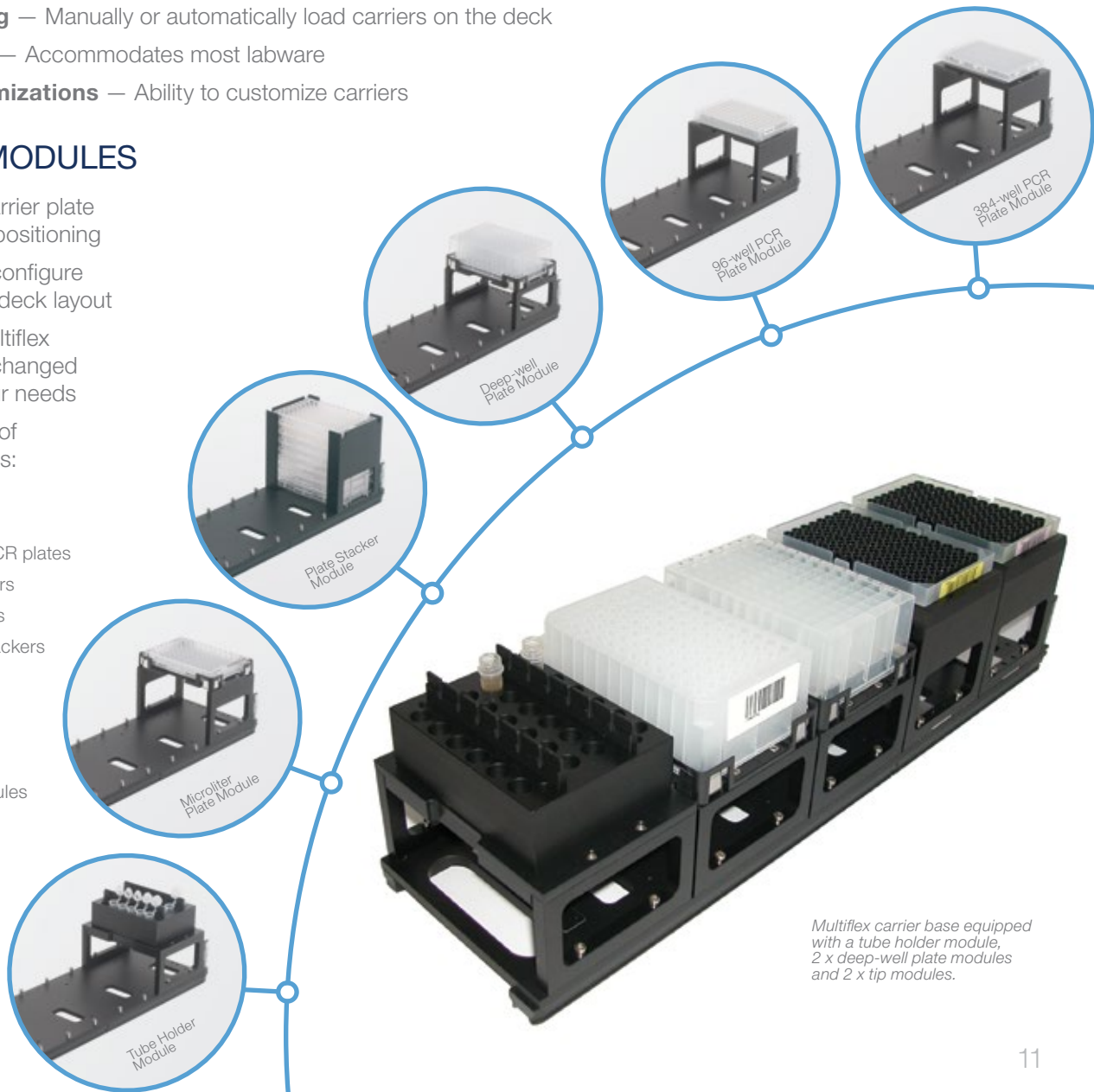
### CARRIERS

Hamilton designed carriers hold your labware and provide flexibility to configure the deck tailored specifically for your assays. The STAR 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 5 microplate or 32 tube positions, all accessible with the 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

### MULTIFLEX MODULES

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



*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 includes a comprehensive portfolio of integrated options to completely automate your workflow.

#### ■ [MPE]<sup>2</sup>

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

#### ■ Automated Plate Sealer

Seal a large variety of SLAS ANSI plates using optically clear or foil seals with our Automated Plate Sealer.

#### ■ 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.

#### ■ Hamilton Heater Shaker (HHS)

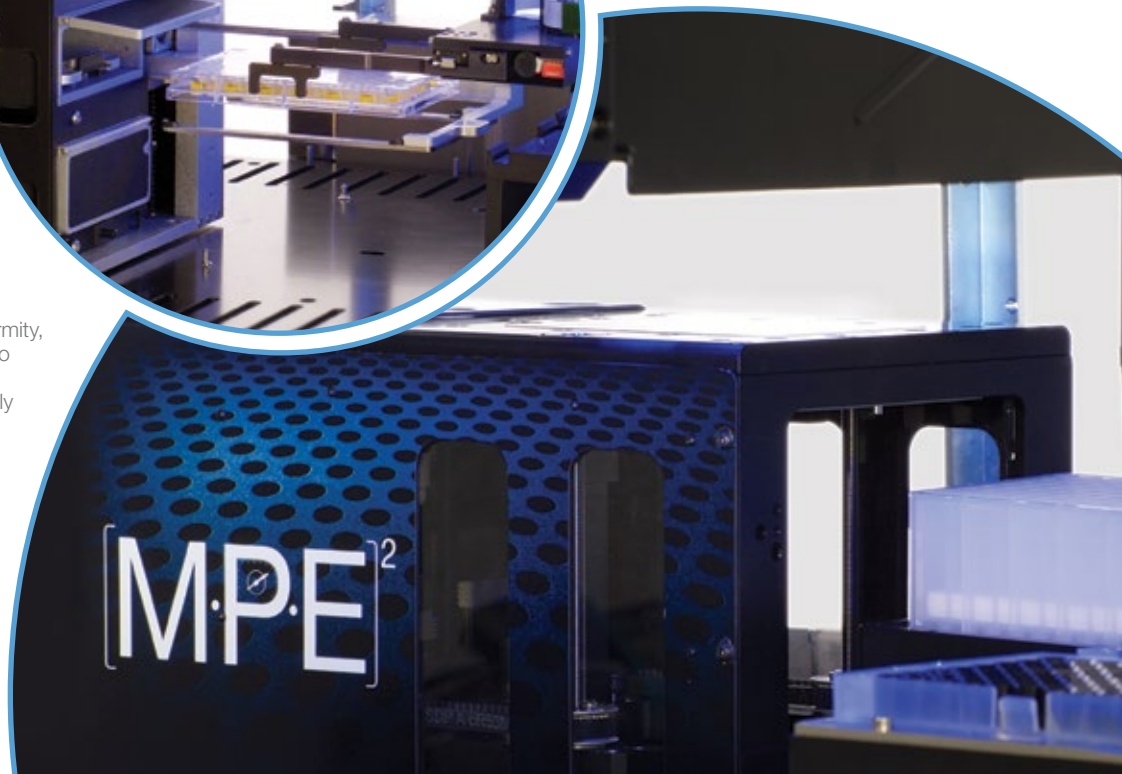
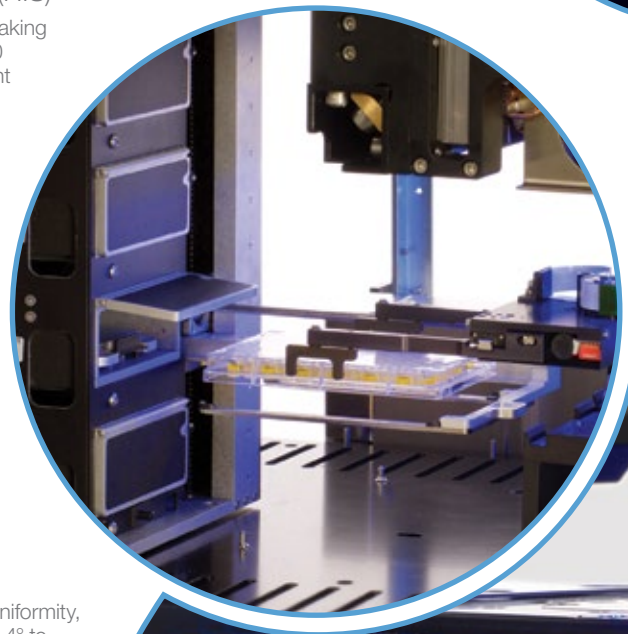
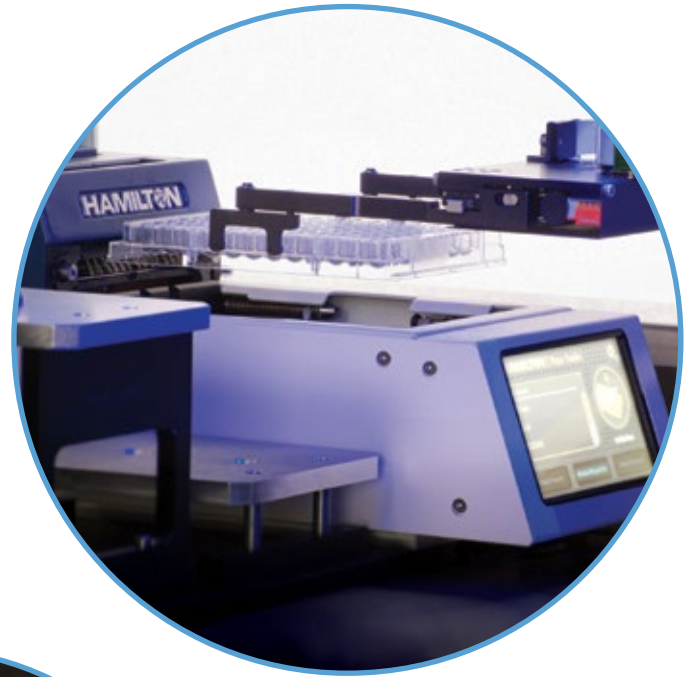
The compact HHS allows a wide heating range up to 105°C and shaking up to 2500 rpm with three radius options. Accommodates a large variety of SLAS ANSI format plates, including deep-well plates and Sarstedt tubes.

#### ■ 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.

#### ■ 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 with our HMotion, a small-footprint plate handling robot, to seamlessly integrate Hamilton Storage platforms, Hamilton Small Devices, and other third-party devices. The HMotion enables fully automated solutions for applications such as sample management systems for compound management and biobanking.

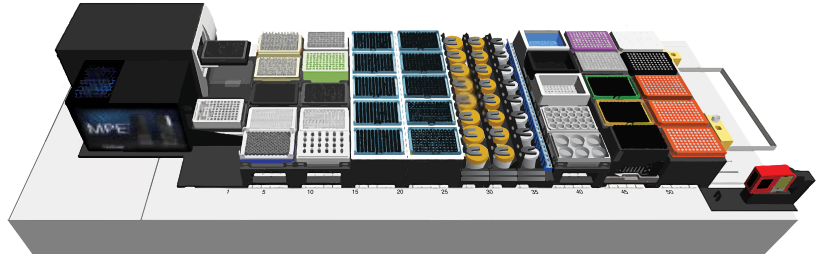


# Intuitive Software

## 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.



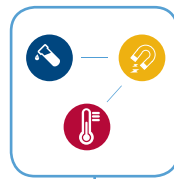
**Error Handling**  
VENUS provides multiple layers of error handling to ensure a user-friendly and error-free outcome.



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



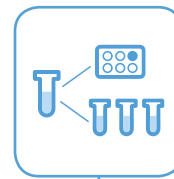
**Custom Dialogs**  
Create a simple graphical interface including images. Allows individualized input and output displays to walk your operators through the processes.



**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

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 Software

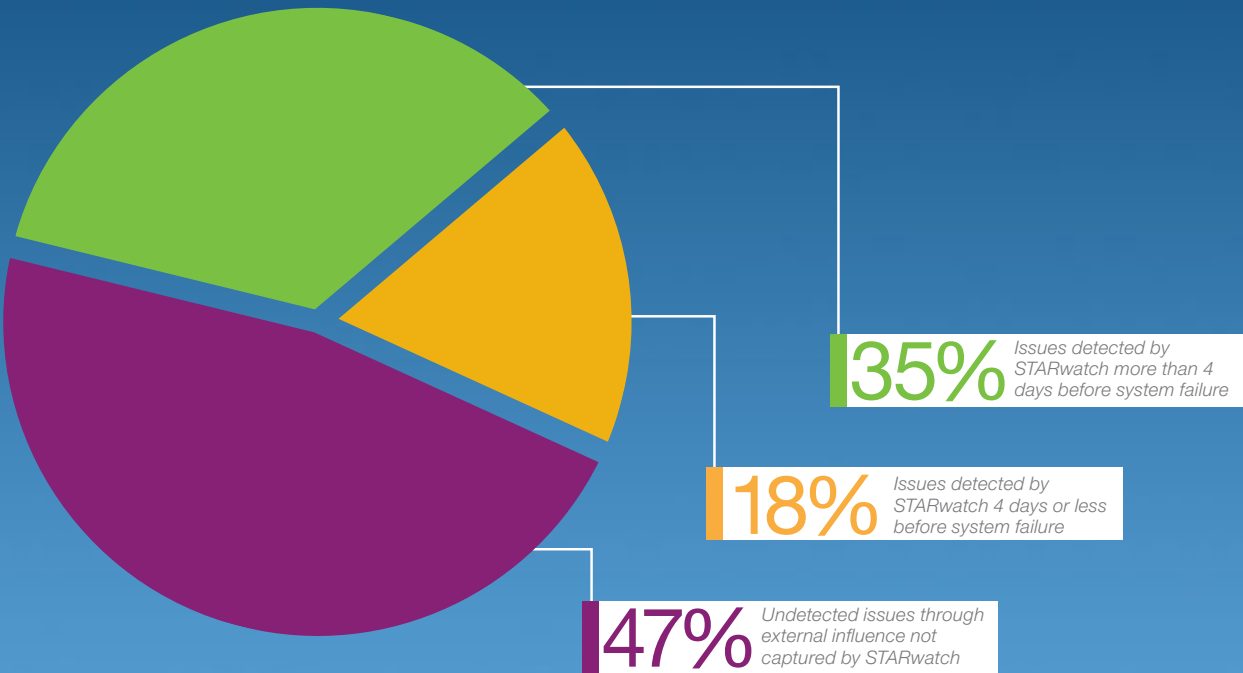
## CONDITION MONITORING WITH STARWATCH

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



## THE EFFECTIVENESS OF STARWATCH SOFTWARE



## CONFIGURE YOUR PIPETTING PLATFORM

### INDIVIDUAL PIPETTING CHANNELS AND MPH

- **1000  $\mu$ L Pipetting Channels** – Up to 16 Independent Channels on one arm
- **5 mL Pipetting Channels** – Up to 8 Independent Channels on one arm
- **Mixed Configuration** – Allows 1000  $\mu$ L and 5 mL Independent Channels on the same arm to suit your workflow
- **CO-RE 96 MPH** – 96 Multi-Probe Head with or without TADM
- **CO-RE 384 MPH** – 384 Multi-Probe Head

### AUTOMATION TOOLS

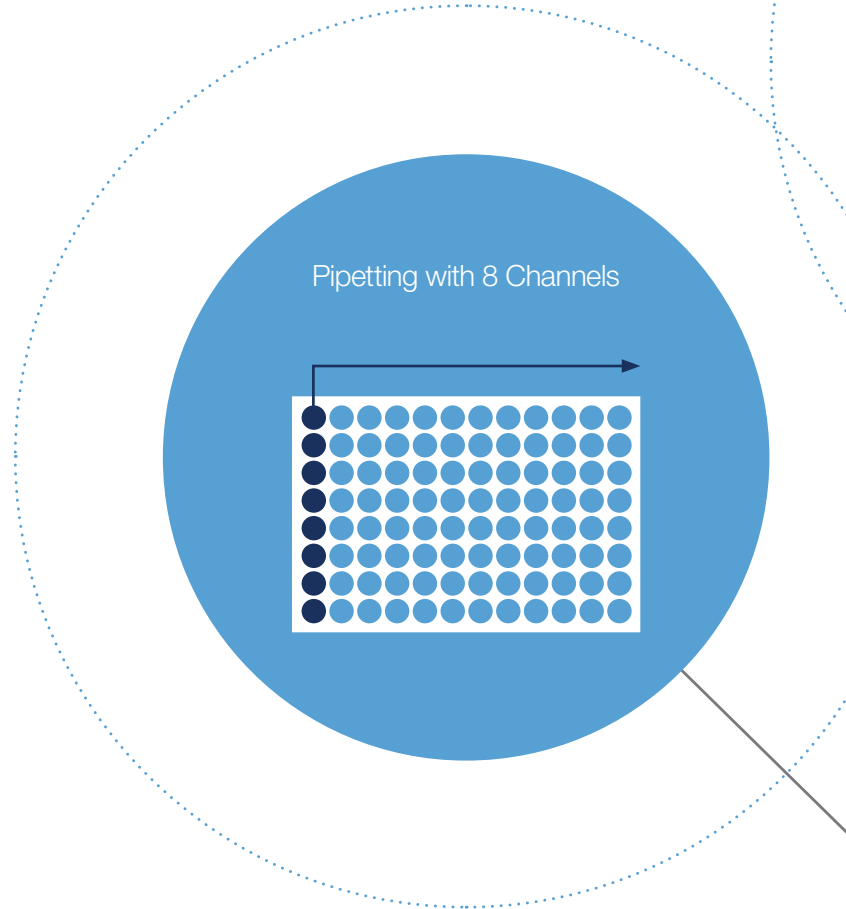
- **Microplate Handling** – iSWAP and CO-RE Gripper
- **Tube Handling** – Tube Gripper Channel
- **Decapping** – Twister Channel
- **Lid Handling** – CO-RE Lid Tool
- **Imaging Solutions** – Camera Channel

### MODULAR, SCALABLE DESIGN

The modular design of the STAR enables changes and upgrades to existing configurations to meet the demands of your changing workflows. Automating additional assays, increasing throughput, and adding additional pipetting tools enables the STAR to evolve to meet your new challenges.

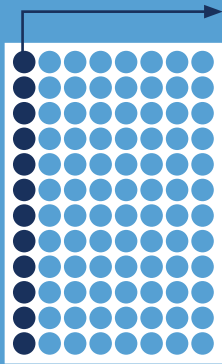
### UPGRADES

In addition to the wide range of functional deck equipment such as the vacuum station, heaters, coolers, and shakers that can be added, the STAR can be upgraded with additional Independent Pipetting Channels, MPH, Camera Channel, and more. Most upgrades can be performed in your lab within 1 to 2 days to minimize downtime, so start with a benchtop workstation knowing there are options to expand your system, if needed.



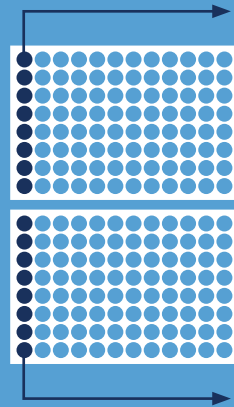


Pipetting with 12 Channels



INCREASE THROUGHPUT BY **50%**

Pipetting with 16 Channels



INCREASE THROUGHPUT BY **100%**





# 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



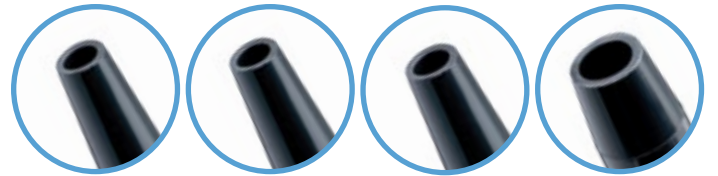
Available Options	Part Number	Case
250 µL Piercing Conductive Non-Sterile Filter Tips	235658	Case of 5760 tips (Blister 5 x 96 tips per rack)
250 µL Piercing Conductive Non-Sterile Non-Filter Tips	235805	Case of 5760 tips (Blister 5 x 96 tips per rack)
250 µL Piercing Conductive Sterile Filter Tips	235649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

# 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

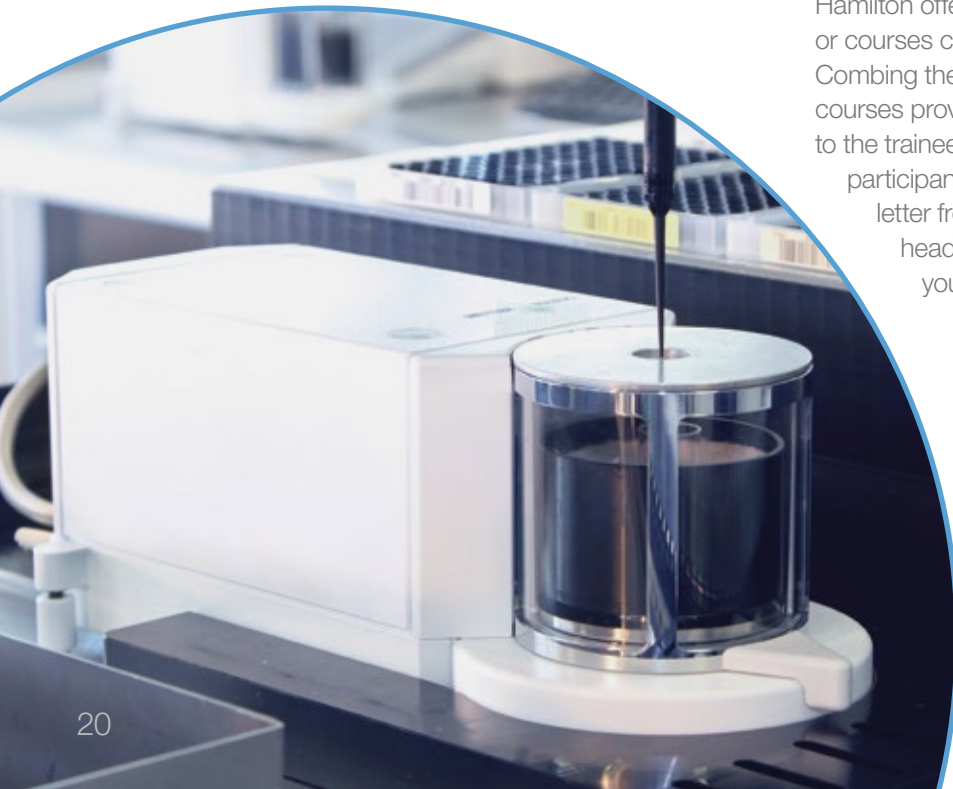
All Hamilton instruments are installed according to strict procedures in conformity with ISO 9001. Each system includes a comprehensive Installation Qualification (IQ) and Operational Qualification (OQ) with detailed documentation.

### 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 timeframe, 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.



#### 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.



#### 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.



#### 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.



#### 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.

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



# Specifications

## STARlet



## STAR



## STARplus



## Technical Specifications

	STARlet	STAR	STARplus
<b>Instrument W x H x D</b>	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)
<b>Work Area W x H x D</b>	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)
<b>Weight — 8 Channels</b>	135 kg	145 kg	205 kg
<b>Weight — 96 Probe Head and 8 Individual Channels</b>	150 kg	160 kg	220 kg
<b>Deck Capacity</b>	30 tracks (T) / 25 SLAS ANSI positions	54 tracks (T) / 45 SLAS ANSI positions	82 tracks (T) / 25 to 55 SLAS ANSI positions
<b>Combinations Allowed</b>	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; multiprobe 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
<b>Positional Accuracy</b>	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
<b>Labware</b>	All SLAS ANSI standard plate types up to 1536 wells and most commercially available tube types		
<b>Carriers</b>	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
<b>Tip sizes</b>	10 µL	300 µL	1000 µL	5 mL tips	50 µL and Rocket Tips
<b>Needle sizes*</b>	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%	*Using CO-RE 384 Probe Head as 96 Probe Head with Rocket tips. Stacked tip-racks available to increase deck capacity (NTR).		
5000 µL	5000 µL	1.5%	2.0%							

\* 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

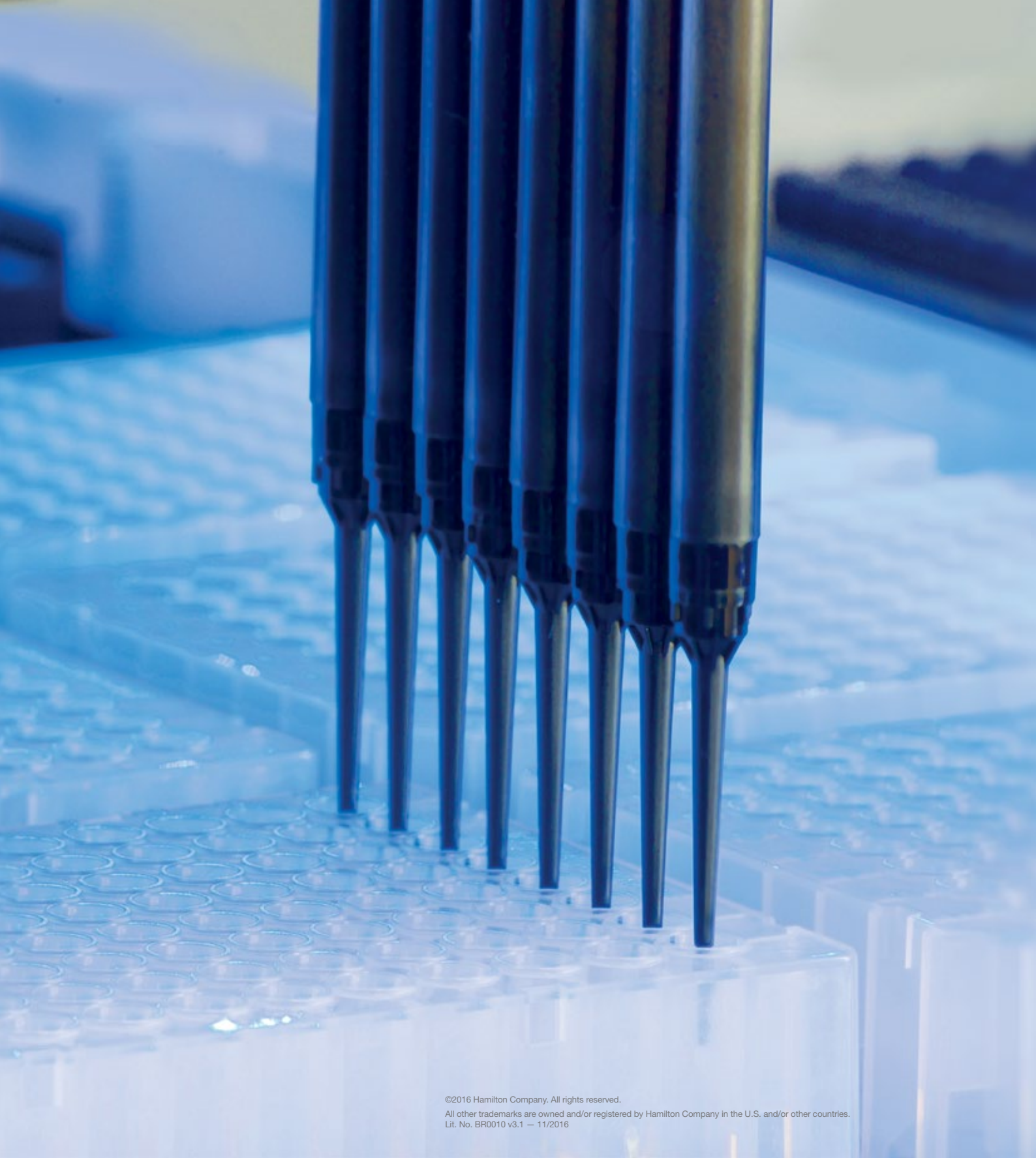
<b>Individual channels</b>	Capacitive liquid level detection (cLLD) and pressure (pLLD) on aspiration, cLLD on dispense, minimum volume 10 µL, depending on container type
<b>96 and 384 Probe Head</b>	Capacitive liquid level detection (cLLD)

## Throughput

<b>8 Channels</b>	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
<b>96 Probe Head</b>	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

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



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Lit. No. BR0010 v3.1 – 11/2016

**HAMILTON** 

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