



Versette User Manual

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For your safety, and in compliance with international regulations, the physical handling of this Thermo Scientific instrument **requires a team effort** to lift and/or move the instrument. This instrument is too heavy and/or bulky for one person alone to handle safely.

Notice on the Proper Use of Thermo Scientific Instruments

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Notice on the Susceptibility to Electromagnetic Transmissions

Your instrument is designed to work in a controlled electromagnetic environment. Do not use radio frequency transmitters, such as mobile phones, in close proximity to the instrument. For manufacturing location, see the label on the instrument.

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About this User Manual

The **Thermo Scientific™ Versette™** system is a versatile automated microplate and tube pipetting system designed to meet the demands of life science/research liquid manipulation at all stages and rates of production. This guide describes the installation setup, operation, and routine maintenance of the system.

Intended Use

The **Versette** system is intended for professional research use by trained personnel. The instrument is intended for automated microplate and tube pipetting. Use for diagnostic testing is excluded. It is recommended that Good Laboratory Practice (GLP) is followed to guarantee reliable analyses.

Intended Users

This user manual is written for the end user, for example, research scientist or laboratory technician, and provides information on the Thermo Scientific Versette, including the installation and operating instructions. The **Versette** system is intended for use by persons who have been trained on standard laboratory and equipment safety and use.

Read the manual in its entirety before operating the instrument.

How to Use this User Manual

This user manual is designed to give you the information to:

- Review safety precautions
- Set up the **Versette** system
- Use the **Versette** on board user interface software
- Perform dispensing procedures
- Perform basic cleaning and maintenance procedures
- Optimize the instrument performance

This user manual also describes all the features and specifications of the **Versette** system.

Related Documentation

In addition to this guide, Thermo Fisher Scientific provides the following documents for the **Versette** system:

- *Versette ControlMate™ User Manual*

Contacting Us

For the latest information on products and services, visit our website at:
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Safety and Special Notices

Make sure you follow the precautionary statements presented in this guide. The safety and other special notices appear in boxes. Thermo Fisher Scientific and any of its agents, affiliates, subsidiaries, or other relations, direct or casual, will not be held responsible for a user's failure to comply with safety devices and practices.



Safety and Special Notices Include the Following:

CAUTION Highlights hazards to humans, property, or the environment. Each CAUTION notice is accompanied by an appropriate CAUTION symbol.

IMPORTANT Highlights information necessary to prevent damage to software, loss of data, or invalid test results; or might contain information that is critical for optimal performance of the system.

Note! Highlights information of general interest.







Tip Highlights helpful information that can make a task easier.

Safety Symbols and Markings

These symbols are intended to draw your attention to particularly important information and alert you to the presence of hazards as indicated.

Safety Symbols and Markings Used on the Versette

The following symbols and markings appear on the type label and the instrument itself.

- **Power ON ▲**
-  **Power OFF ▲**
-  **Serial number ▲**
-  **Cat. number ▲**
-  **Date of manufacture ▲**
-  **Consult instructions for use ▲**
-  **WEEE symbol** This product is required to comply with the European Union's Waste Electrical & Electronic Equipment (WEEE) Directive 2002/96/EC. ▲

Warning and Other Markings Used in the Documentation

Symbols and markings appearing in this user manual are described on the following page:

CAUTION Symbol



CAUTION

Electric Shock: This instrument uses high voltages that can cause personal injury. Before servicing, shut down the instrument and disconnect the instrument from line power. Keep the top cover on while operating the instrument. Do not remove protective covers from PCBs.

Chemical: This instrument might contain hazardous chemicals. Wear gloves when handling toxic, carcinogenic, mutagenic, or corrosive or irritant chemicals. Use approved containers and proper procedures to dispose waste oil.

Heat: Before servicing the instrument, allow any heated components to cool.

Fire: Use care when operating the system in the presence of flammable gases.

Eye Hazard: Eye injury could occur from splattered chemicals or flying particles. Wear safety glasses when handling chemicals or servicing the instrument.

General Hazard: A hazard is present that is not included in the above categories. Also, this symbol appears on the instrument to refer the user to instructions in this manual.

CAUTION Symbol



CAUTION

Pinch Hazard: Moving parts can injure hands and/or other body parts. Use extreme care. Do not reach into an operating system. Always keep covers in place. Lift objects with care.

When the safety of a procedure is questionable, contact your local Technical Support organization for Thermo Scientific Products.

Introduction

System Features

The **Versette** system provides a flexible workstation that can be easily configured to match your process/production needs. The system can be configured to handle various deep or shallow well plates, a variety of interchangeable pipetting heads, and multiple system accessories. The **Versette** system provides a base unit with expendability to meet future production needs.

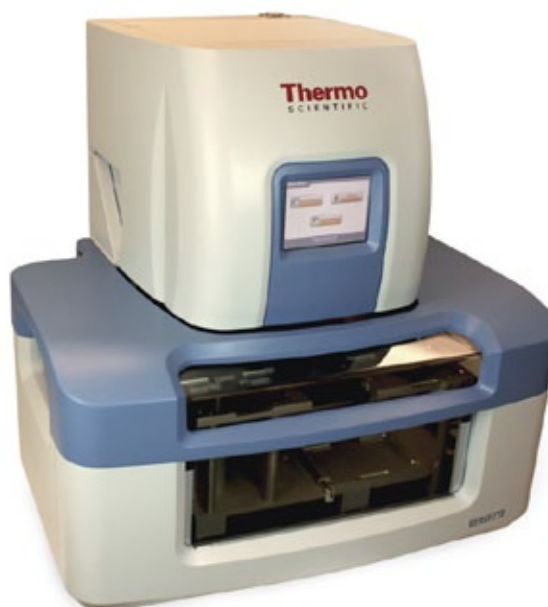


Figure 1 –Thermo Scientific Versette System

System features include:

- Rapid swapout 96- and 384-channel user interchangeable pipetting heads
- High-resolution linear plate movement allows accurate microplate positioning of 96 and 384 well plates
- Precise, accurate, and fast pipetting action

Efficient Pipette Tip Replacement

Compatible with multiple interchangeable pipetting heads, the **Versette** system provides versatile pipetting options for a broad range of applications that require 96– to 384–channel automated pipetting. The **Versette** system is compatible with disposable tip pipetting heads, with a total volume ranging from 0.5–300 μL .

Use of D.A.R.T. tips

The 96– and 384–channel pipetting heads use the Thermo Scientific D.A.R.T. tips, which use a surface seal to ensure accurate and precise pipetting across all channels.

Volumetric calibration

Versette systems are factory calibrated for typical fluid type/viscosities. Calibration settings can be stored in memory and applied when needed. In cases where liquids with different characteristics are used, the instrument can be recalibrated in the user's laboratory for most fluids. Please note that each calibration is specific for a fluid type at a given temperature range and dispense volume. For example, 150 μL of 70% Ethanol at 20°C. Refer to the **Thermo Scientific™ Versette™ ControlMate™ User Manual** for details.

Dispensing applications

The **Versette** system is ideal for precise, repeatable, high-speed, low-volume dispensing applications, including:

- Addition of buffers, dilutents, enzymes, substrates, ligands etc.
- Addition of labeled compounds, including fluorophores, radio labeled compounds
- Addition of microbeads for assays such as LOCI or loading combichem plates
- Addition of viscous solutions such as scintillation fluid or glycerol/sucrose solutions
- Antibody microarrays for multianalyte ELISAs
- Assay miniaturization
- Cell-based assays
- ELISA assays
- MSIA - Mass Spectrometric Immunoassays
- Fluorescence assays
- Full 96/384 plate sample transfers
- Full plate dilutions
- Full plate reformatting
- Full plate sample transfers
- IC50 Assays Luminescence assays
- Plate-to-plate transfers

Safety

There are no known hazards associated with the Versette system when it is operated in accordance with the instructions in this manual. However, you should be aware of situations that can result in serious injury.

Note! Do not perform troubleshooting procedures on the internal components unless instructed by qualified Thermo Fisher Scientific service personnel. ▲

Warnings

The following warnings describe conditions or situations that can cause personal injury. Throughout the manual, warnings will be marked with a Warning icon in the left margin.



WARNING: Highlights hazards to humans, property, or the environment. Each WARNING notice is accompanied by an appropriate WARNING symbol. ▲

- This equipment is to be used only as offered, for the purposes described in this manual, in accordance with standard industry safety practices, and common safety usage. This equipment is not intended for any other usage other than that described. Use of this equipment in any other application or manner, without the direct written consent of Thermo Fisher Scientific may constitute an unsafe practice, and will void all warranty on the part of the manufacturer.
- Do not modify the equipment, the safety shields, the components, nor any accessory, nor use, store, ship, or otherwise handle or cause to be handled this equipment in any manner other than that which is expressly offered for sale. Inappropriate use of this equipment, and unauthorized modifications of the equipment and any action of use of the equipment, storage of the equipment, shipping, or other handling of the equipment, in a manner not expressly authorized by Thermo Fisher Scientific will void any and all warranties and liabilities of the manufacturer, whether expressed or implied.
- The system's hood which covers the stage areas is coated with a material for EMC shielding. Removing the hood or damaging the hood's coating will void the CE certification for EMC, Class B emissions.
- Ensure that the power plug is connected to a power receptacle that provides voltage and current specified for the device. Use of incompatible line power can cause shock and fire hazard.
- Never use a two-prong adapter or connect the device into a two-prong receptacle. Use of a two-prong receptacle disables the electrical grounding and creates a severe shock hazard. Always plug the device directly into a three-prong receptacle with a functional ground.
- Do not use a power cord that is frayed or cut. Do not kink or strain the power cord. Use of a damaged power cord can cause shock and fire hazard.

- Never plug, unplug, or otherwise touch the power cord when your hands are wet. Contact with the cord can cause severe shock hazard.
- If you notice smoke or unusual odor or noise coming from the instrument, turn it off immediately, then unplug the power cord. Do not use the instrument until it has been serviced and inspected by Thermo Fisher Scientific or authorized service representative.
- Always turn off the power switch and unplug the power cord when servicing the device. Contact with internal components or other components connected to the line power can cause severe shock hazard. Perform only service procedures that are described in the manual or authorized by Thermo Fisher Scientific service personnel.
- Do not allow tools, objects or liquids to enter the instrument through ventilation slots or other openings. Contact with electrical or other internal components can cause severe shock hazard, fire hazard, or instrument malfunction. If a hazardous condition occurs, disconnect the instrument from the line power immediately.
- Keep hands away from moving parts (e.g., tips magazine mechanism, moving stages, and any peristaltic pump). Personal injury may result. Warning symbols on the device indicate areas of potential personal injury.
- Always ensure that the local supply voltage in the laboratory conforms to that specified on rating label on the power-connector on the instrument.
- Do not smoke, eat or drink while using the **Versette** system.
- Use protective gloves and eyewear and always wash your hands thoroughly after handling test fluids and/or touching potentially soiled areas/components.
- Observe normal laboratory procedures for handling potentially dangerous samples.
- Wear proper protection clothing, such as protective gloves, eyewear, and laboratory coats and/or other personal protection equipment, according to good laboratory practice and your facility requirements.
- Ensure that the working area is properly ventilated.

Cautions

CAUTION The following cautions describe conditions or situations that can cause damage to the instrument. ▲

- Do not install or operate unit in extreme environmental conditions (for example, direct sunlight, extreme temperature or humidity, or restricted ventilation). Refer to installation instructions for proper environmental conditions.
- When unpacking or transporting the system, always support the base to prevent damage to the instrument.
- The system is designed for use on a bench top. Set up the instrument on a sturdy bench or table that is capable of holding its weight and remains stable during its operation.
- Always turn off the power and unplug the system before cleaning the instrument.

- When disconnecting the power plug from the power receptacle, grip the plug itself, not the cord. Pulling on the cord can damage the cord, exposing the electrical wires, and cause a shock hazard.
- Use replacement fuses that conform to the current rating and specification. Use of improper fuses or short-circuiting the fuse holders can cause fire hazard or damage the instrument.
- Do not restrict movement of the plate stages and the dispense head.
- Use only accessories and replacement parts provided by, or recommended by Thermo Fisher Scientific. Use of improper accessories and parts can damage the instrument.
- Do not clean the instrument with abrasive cleansers, flammable or caustic solutions, or solvents (such as paint thinners or acetone). Use of such cleansers will damage the instrument housing and display.
- The following components of the system, syringes, and/or accessories may contact liquid directly; therefore, use only liquids that are compatible with these components:
 - Stainless steel
 - Nickel Titanium
 - Glass
 - Polypropylene tips
 - PMMA or PTFE vessels
 - Silicone
 - UHMW UPE

Note! Failure to observe these cautions may invalidate your warranty. If you have questions about any aspect of operating the system safely, contact Thermo Fisher Scientific. ▲

Instrument Safety and Guidelines for Use

This instrument is designed to provide full user protection. When correctly installed, operated and maintained, the instrument will present no hazards to the user. The following recommendations are provided to assist you and your safety personnel in enacting appropriate user safety protocols.

- Never modify the equipment or its components or accessories. Unauthorized modifications will void all warranties and negate any claims of recourse, including physical, personal, and financial, for the use, storage, shipment, or other handling of this equipment.
- Always follow basic safety precautions when using the **Versette** to reduce the risk of injury, biohazardous contamination, fire, or electric shock.
- Read this user manual in its entirety prior to operating the instrument. Failure to read, understand, and follow the instructions in the manual may result in damage to the instrument, injury to laboratory and operating personnel or poor instrument performance.
- Observe all “Warning”, “Caution”, and “Note” statements as well as safety symbols and markings on the instrument and in the documentation.

- The **Versette** is intended for laboratory research use only. Observe proper laboratory safety precautions, such as wearing protective clothing and following approved laboratory safety procedures.
- Use of the **Versette** system in ways other than those described in the documentation supplied with the equipment may result in injury to persons or damage to the property. Avoid unintended use of the equipment, for example, using incompatible materials, making unauthorized modifications, using incompatible or damaged parts, using unapproved auxiliary equipment or accessories, or operating equipment in excess of maximum ratings.
- Preventative maintenance instructions should be followed closely to keep the instrument in the best condition for maximum reliability. A poorly maintained instrument will not give the best results.

Recommended Safety and Personal Protective Equipment

All safety equipment should be clearly marked, easily accessible, and located in the immediate vicinity of the equipment. Recommended equipment includes spill cleanup kits, safety goggles, gloves and chemical-protecting clothing for the chemicals in use. All equipment should be used in accordance with safety equipment manufacturer's instructions, and your site-specific safety requirements, and any local, national, and/or international standard safety practices and codes.

Mechanical Hazards

System components can cause crush or pinch hazards. These locations include: system door, moveable shields, stages, and motors. Pipetting modules and pipetting heads can be heavy and awkward and can also result in personal injury if improperly handled.

Safety motion interlocks are provided on the system door to prevent motion while the door is open.



CAUTION CRUSH HAZARD! Never attempt to defeat a system interlock or operate the system with the covers and safety shields not properly installed and operating. ▲

Never reach into the work space while the instrument is performing any motion operation. If it is necessary to stop the operation of the equipment, turn the system off.

Electrical Hazards

The system is designed to be powered by 100 – 240 VAC. Input location is by removable pronged power cord. Power connection is located on the right side of the system.

CAUTION Follow standard safety practices: never remove panels or covers from the unit to access system electronics wiring. ▲

WARNING There are no user-replaceable parts inside the instrument. The user should not remove fixed covers from the **Versette** system. ▲

The same precautions applicable when using any electrical equipment should be observed with this instrument. Do not touch switches or electrical outlets with wet hands. Switch the instrument off before disconnecting it from the mains supply.

Chemical and Environmental Hazards

No chemicals are shipped with the system. The system is designed for use with a variety of chemicals, as supplied by the end user. Material Safety Data Sheets (M.S.D.S.) for every chemical used with the system should be available in close proximity to the unit at all times.

CAUTION Ensure that the system is kept in a clean condition at all times and free of any chemical residues. Follow all steps to properly clean and disinfect the system, as provided in the maintenance section of this manual. Consult your own safety professionals or Thermo Fisher Scientific representative with any questions. ▲

Infectious samples and corrosive fluids are commonly used with this equipment. The “hands-off” nature of the system allows the user to dispense into the reaction wells without direct contact with these fluids. However, the wells that have been in contact with potentially hazardous fluids must be handled with utmost care. Always wear hand and eye protections as well as corrosive resistant laboratory coats and any required personal protective equipment (PPE) for your specific solutions and their characteristics.

CAUTION Observe normal laboratory procedures for handling potentially hazardous samples. ▲

Defects and Abnormal Stresses

Whenever it is likely that the protection against safety hazards has been impaired, make the instrument inoperative and secure against any unintended operation.

The protection is likely to be impaired if, for example, the instrument:

- Shows visible damage.
- Fails to perform the intended functions
- Has been subjected to prolonged storage under unfavorable conditions
- Has been subjected to severe transport stresses

2

System Overview

General Description

The **Versette** system is a **versatile** automated microplate and tube pipetting system designed to meet the demands of life science/research fluid manipulation at all stages and rates of production. The system delivers accurate, precise, consistent and reliable performance for plate stamping, plate reformatting, serial dilution, assay setup and development, and other applications. The system features advanced 96- and 384-channel user interchangeable pipetting heads. The system can work as a standalone (in hood) benchtop device or may be integrated into an automated robotic liquid handling workflow solution.

The **Versette** system combines precision stepper-motor controlled stage motion with an automated pipetting head platform, enabling reliable tip access into all standard labware (96–384 wells). The system is also designed to perform serial dilutions in both portrait and landscape layouts (96 and 384 well plates).

Typical Applications

The **Versette** system can be configured for use in a variety of applications, including:

- plate stamping
- plate reformatting
- assay setup and development
- other applications
- Thermo Scientific™ KingFisher™ plate filling
- 96-channel low or medium-throughput plate stamping
- 384-channel medium throughput plate stamping
- matrix dilution

System Configuration

Features

All models share the following list of standard features:

- full color touch screen for system programming and control
- stepper motors for plate positioning (supports 96 and 384 well plates; also supports deep or shallow wells)
- 6 position stage
- stages are enclosed for user safety and process purity
- stages can accommodate microplates or tubes in tube rack adapter
- high-resolution linear microplate movement
- 2 fluid line inputs (wash and reagent addition)
- 1 fluid drain outlet
- fast pipetting speeds
- integrated reagent reservoir
- universal operating voltage (100 – 240VAC)
- RS-232 interfaces for connection to PC systems and/or ControlMate Windows-based PC interface software for advanced programming

Accessory Options

Table 1 – Accessories

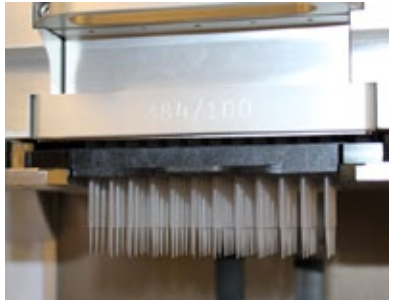

Item	Description
	<p>Rapid-connect 96- and 384-channel user interchangeable pipetting heads</p>
	<p>Disposable Tips (D.A.R.T. tips), provide rapid loading of 96- or 384- tips into the Versette system.</p>
	<p>Tip Wash Station - Used for washing both the interior and exterior walls of disposable pipetting tips, the wash station can be mounted on stage position 2 and connected to the buffer and waste lines. A liquid level sensor prevents overflow. Tip wash stations are available in 96 and 384 formats.</p>

Table 1 –Accessories

Item	Description
 <p>The image shows a white, vertical External Pump Module. It features three black peristaltic pumps stacked vertically. Each pump has a red 'Thermo' logo and a blue label. The top pump is labeled 'PUMP 1', the middle one 'PUMP 2', and the bottom one 'PUMP 3'. The module has a control panel on the left side with a power button and a dial.</p>	<p>External Pump Module - An optional three-pump module that contains three peristaltic liquid pumps which can be used for wash, reagent addition, and drain.</p>
 <p>The image shows a clear, rectangular plastic reagent reservoir. It has a grid of compartments on top, with several compartments containing small, clear vials. The reservoir is mounted on a white base.</p>	<p>Reagent reservoir: Reagent vessel for dispensing limited volume of reagent. Automatic fill reservoir is mounted on stage position 1.</p> <p>A separate fill line connects to an external peristaltic pump and reagent source. The reservoir provides on-demand supply of reagent. A non-contact liquid level sensor prevents overflow.</p>
 <p>The image shows a white, rectangular serial dilute magazine. It has a grid of 96 small circular wells arranged in 8 rows and 12 columns. The magazine is mounted on a white base.</p>	<p>650-08-9630SD</p> <p>Serial dilute magazine 96/30 µl (8/12)</p> <p>For use with short 30 µl tips</p>

Table 1 –Accessories

Item	Description
<p>A white plastic serial dilute magazine with a grid of 96 wells. The top row contains 8 larger wells, and the remaining 88 wells are smaller. A small tab at the bottom right has the part number '650-08-9630XLSD' printed on it.</p>	<p>650-08-9630XLSD Serial dilute magazine 96/30 µl (8/12) For use with extended length 30 µl tips</p>
<p>A white plastic serial dilute magazine with a grid of 96 wells. The top row contains 8 larger wells, and the remaining 88 wells are smaller. A small tab at the bottom right has the part number '650-08-96300SD' printed on it.</p>	<p>650-08-96300SD Serial dilute magazine 96/300 µl (8/12)</p>
<p>A white plastic serial dilute magazine with a grid of 384 wells. The top row contains 16 larger wells, and the remaining 368 wells are smaller. A small tab at the bottom right has the part number '650-08-384SD' printed on it.</p>	<p>650-08-384SD Serial dilute magazine 384/100 µl (16/24)</p>

Instrument Layout

This section provides an overview of the main system components.

Figure 2—Versette components - front view

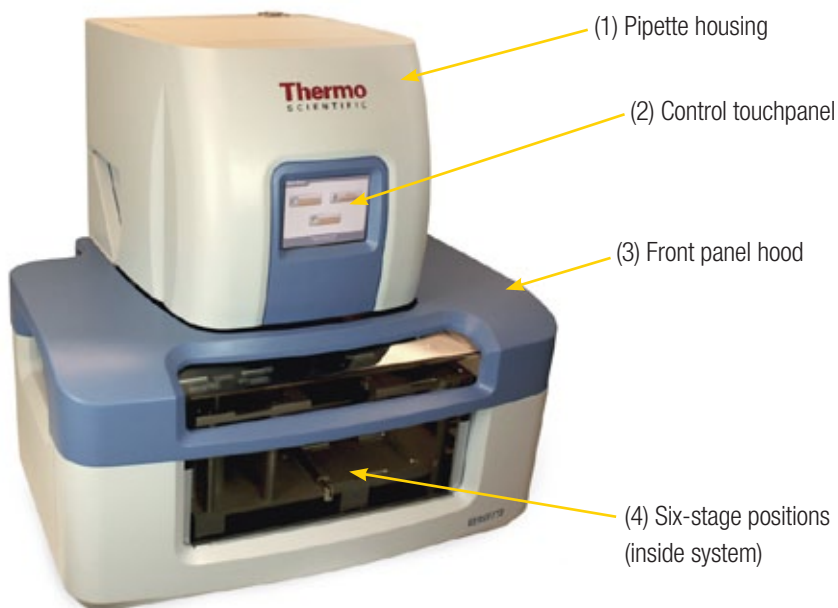
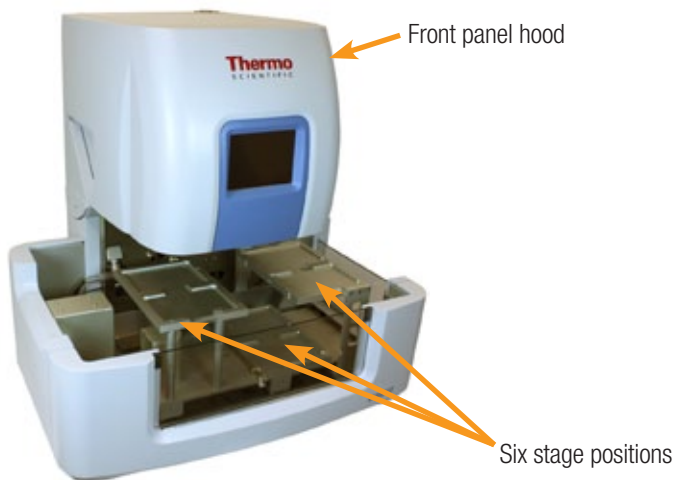


Table 2—System components

I.D.	Item	Description
1	Pipette housing	Houses pipetting head and tips.
2	Control touchpanel	Allows on-board system programming through wizard-based touchscreen prompts.
3	Front panel hood	The hinged hood can be raised to allow access to the internal components.
4	Stages	Configurable stage platforms for microplates, tubes, and vessels.

Figure 3—Versette - inside view



3	1	5	Stage Positions
4	2	6	

Table 3—6-stage system components

I.D.	Item	Description
1	Front panel hood	The hinged hood can be raised to allow access to the internal components.
2	Safety shields	Plastic covers on both sides of the instrument provide safety to the operator and reduce possible contamination of the work area.
3	Pipetting head	Pipettes aspirate and dispense fluids. Heads are user changeable.
4	Stages	Configurable stage platforms for microplates, tubes, and vessels.

IMPORTANT: Due to stage/head configuration limitations, serial dilutions can be performed as follows:

Column-wise: Stage 3 or Stage 4

Row-wise: Stage 3 or Stage 5

Stage Usage

The following tables detail the various configurable uses of the 6-stage system. Consult Thermo Fisher Scientific for additional options to meet your specific needs.

Table 4—6-stage system, stage usage

Stage	Usage					
	Microplate	Deep Well Block	Tube Rack	Auto-Fill Reagent Reservoir	Manually Filled Reservoir	Tip Wash Station
1	Yes	Yes	Yes	Yes	Yes	
2	Yes	Yes	Yes		Yes	Yes
3	Yes	Yes	Yes		Yes	
4	Yes	Yes	Yes		Yes	
5	Yes	Yes	Yes		Yes	
6	Yes	Yes	Yes		Yes	

Fluid Connections

Fluid connections are provided on the left side of the system

Figure 4—Versette, fluid connections, left side of unit

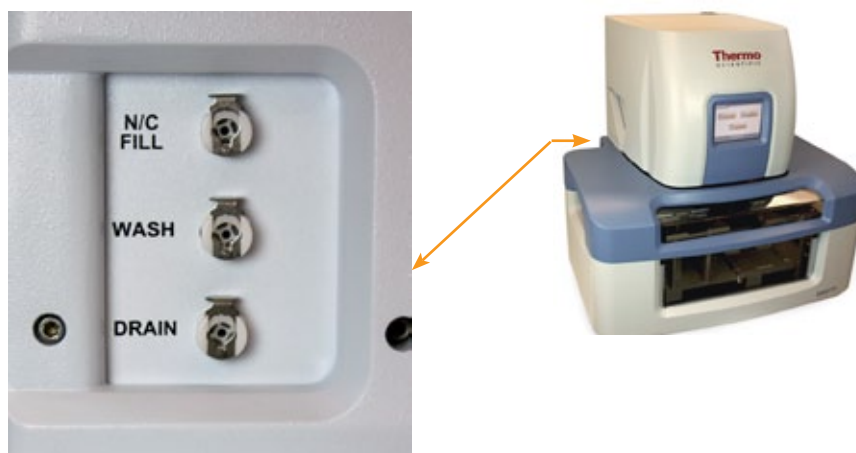


Table 5—Fluid connections

I.D.	Item	Description
1	WASH	Connect wash fluid pump to the WASH inlet when using an optional wash station.
2	N/C FILL	Connect dispense fluid pump to the Non-Contact FILL inlet when using the optional non-contact fill sensor.
3	DRAIN	Connect DRAIN pump to the DRAIN connection when using an optional wash station.

Power/Communication Connections

Figure 5—Versette, power/communications connections, right side of unit



Table 6—Power/communications connections

I.D.	Item	Description
1	PC	Not active.
2	FLASH	Flash drive port for uploading new firmware to Versette instrument.
3	RS-232	Port for connection to PC for programming with ControlMate Software

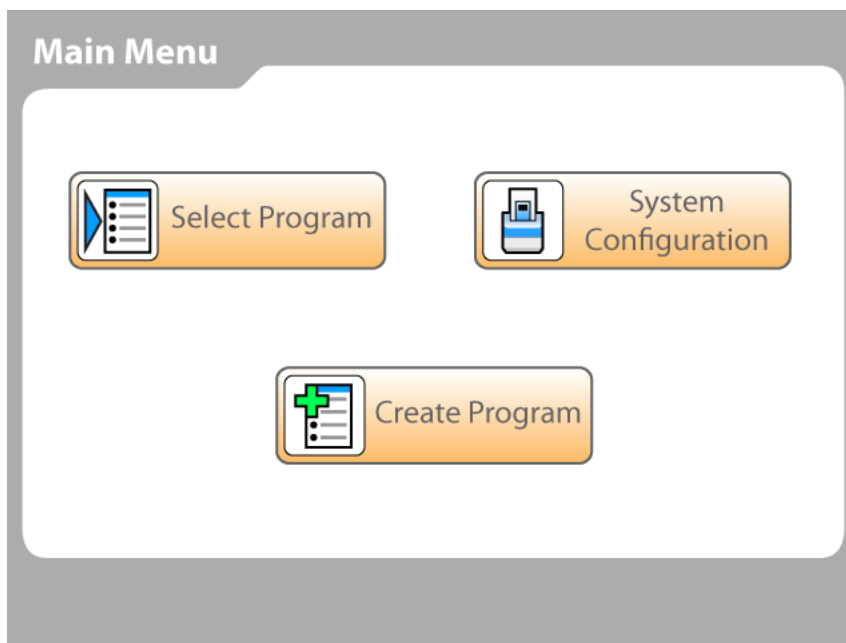
Table 6—Power/communications connections

I.D.	Item	Description
5	WASH	Connects to optional wash module, for automated control
4	FUSE, ON/OFF, Plug	Power Module: Power connection, on/off switch, integrated fuse holder
5	100/240 VAC Connector	Standard power connection for system.
6	I/O Power Switch	Turns system on or off.

Touchpanel

The system touchpanel provides a menu-based, wizard-based programming and operation prompts to allow rapid programming, configuration, and control of the system.

Figure 6—Touchscreen Main Menu Display



Other System Components

Pipetting heads

Air displacement interchangeable pipetting heads can be easily inserted into or removed from the base unit. Pipetting heads contain a silicone gasket that forms an airtight seal with tips in the tips magazine. Disposable Automated Research Tips (D.A.R.T. tips) are also available. Available head types:

- 96-channel pipetting heads
- 384-channel pipetting head

All pipetting heads include RFID tag for self recognition.

Table 7—Pipetting heads

Head Size/Type	Dispense Type	Volume Range	Part Number
96-channel	Air displacement	0.5–30 µl	650-06-9630
		5–300 µl	650-06-96300
384-channel	Air displacement	1.0–100 µl	650-06-384100

Tips magazine

The tips magazine is a plastic frame that holds 96- or 384- pipette tips. Disposable tips magazines (D.A.R.T. tips) can be used with the **Versette** system.

D.A.R.T. (Disposable Automated Research Tips) tips are compatible with the **Versette** system's 96- and 384-channel pipetting heads. Tips held in the D.A.R.T. tips magazine are placed on the device and seal directly against a silicone pad. This forms a definitive seal without the use of conventional tip fittings or o-rings. In addition to providing a cleaner seal that presents less opportunity for contamination, this method provides the added benefit of ensuring uniform tip height across all 96/384 pipette tips, which facilitates consistent drop delivery onto microplate surfaces. Filter tip options are available for disposable tips.

ControlMate Software

ControlMate software is provided with all **Versette** systems to allow advanced PC-based sequence and advanced program creation, and OLE options for robotic integration. The ControlMate software is also used to calibrate the instrument.

Programming consists of point and click options and easy sequence/step additions and changes to allow rapid, flexible development of custom dispense programs.

Installation

Site Requirements

Installation Environment

The **Versette** system is designed for operation in a clean, vibration-free environment. Refer to the following installation site requirements:

- Avoid excess moisture, dust, vibration
- Avoid direct sunlight or unnecessary UV light
- Avoid strong magnetic fields
- Make sure relative humidity is between 10% and 80% (non-condensing).
- Avoid large temperature fluctuations. The ambient temperature range should be between +4°C (39°F) and +40°C (104°F).
- Make sure the ambient air is clean and free of corrosive vapors, smoke and dust.
- The work area should be level, clean, and vibration-proof. Leave additional room for accessories, cables, and reagent bottles.
- The instrument operates at the following voltages:
 - U.S. Voltage Standard: 110 - 124 VAC, 60 Hz
 - European Standard: 240 VAC, 50 Hz

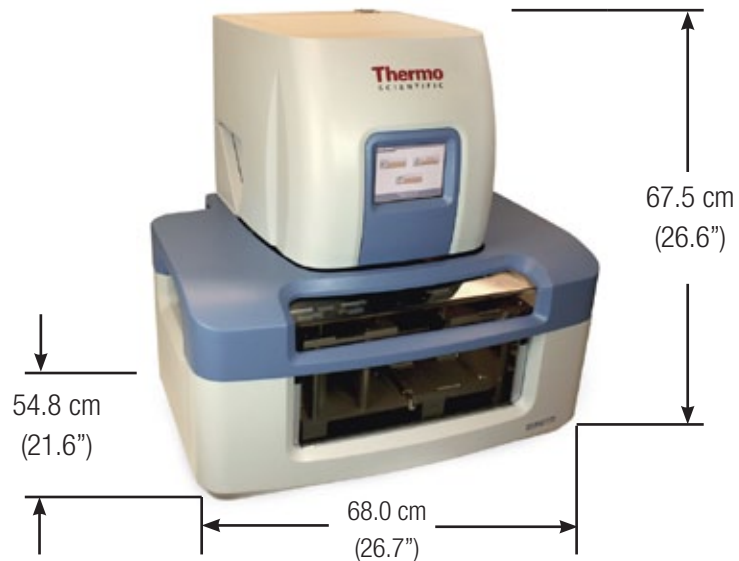
Leave sufficient space (at least 10 cm/4 in.) on both sides and at the back of the unit to allow adequate air circulation and/or to make any connections.

Place the instrument on a sturdy, level surface, for example on a laboratory bench or under an exhaust hood that is properly rated for the type of chemicals in use. The base system (without pipetting module, pipetting heads, and stage assembly) weighs approximately 36 kg (80 lbs.). Stages, heads, and additional components can add 4.5 to 27 kg (10 to 60 lbs.). The stage assembly weighs 18.1 kg (40 lbs.).

Required Space and Clearance

Leave sufficient space (at least 10 cm/4 in.) on each sides of the system and at the rear of the system to allow adequate air circulation and connection of cables and tubes. Sufficient space above the system is required for proper ventilation. A heat exhaust fan is located on the top rear cover of the system. Additional space for connection of power and communication cables on the right side of the system, and fluid connections on the left side of the system, is typically required. Minimum system dimensions are shown below.

Figure 7—System minimum dimensions (not including required space for ventilation and connections)



Delivery Check

This section covers the relevant procedures to be carried out on receipt of the instrument.

Checking Delivery

1. Check the enclosed packing list against order. Contact your local Thermo Scientific representative with any questions.
2. Visually inspect the transport package, the instrument and the accessories for any possible transport damage.
3. If the carton has been damaged in transit, it is particularly important that you retain it for inspection by the carrier in case there has also been damage to the instrument.
4. Neither the manufacturer nor its agents can be held responsible for any damage incurred in transit, but the manufacturer will make every effort to help obtain restitution from the carrier. Upon receipt of the carrier's inspection report, arrangements will be made for repair or replacement. If any parts are damaged, contact your local Thermo Scientific representative.

Unpacking

1. Move the packed instrument to its site of operation. To prevent condensation, the instrument should be left in its protective plastic wrapping until ambient temperature has been reached, typically 1 hour.
2. Unpack the instrument and accessories carefully. Remove the instrument from the package using a two-person lift and place it on a level surface.

Precautions and Limitations

Refer to the system safety cautions. See “Safety” on [page 15](#).

- Always ensure that the local supply voltage in the laboratory conforms to that specified on the power input panel.
- To ensure proper communications with a laptop or other computer, do not use an RS232 cable longer than 3 meters when connecting the computer to the system.
- Wear proper protection clothing, such as protective gloves, eyewear, and laboratory coats and/or other personal protection equipment, according to your standard laboratory practice and your facility requirements and any safety regulations for the area you are working in and the chemicals in use.
- Ensure that the working area is properly ventilated for the chemicals in use and that it meets or exceeds all user safety requirements and regulations, as directed by your safety officers. Consult Thermo with any questions.
- Never spill fluids in or on the equipment.

System Installation Procedure

Required Tools/Equipment

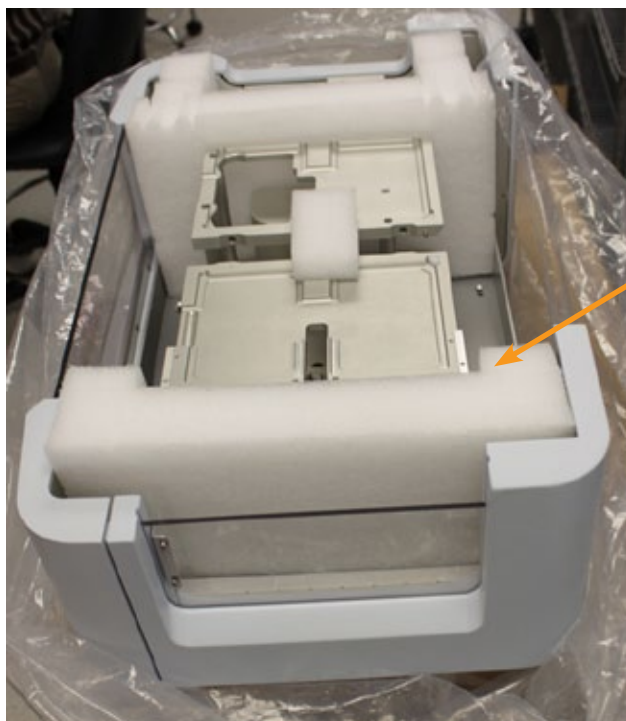
- Precision level (bull's eye level or similar level recommended)
- 4 mm, 3 mm, 2.5 mm, and 2 mm hex wrenches
- Phillips screwdrivers

Installation Steps

Installation consists of positioning the system in a proper work environment, installing any stages and covers, then connecting power, fluid, and any communication cables.

Step 1: Position the system

1. Remove the system from its packing container. Leave one end foam piece in place or install foam inserts, as necessary, to prevent the stages from sliding back and forth when you lift it, during the installation process.



Leave one foam end piece in place during install.

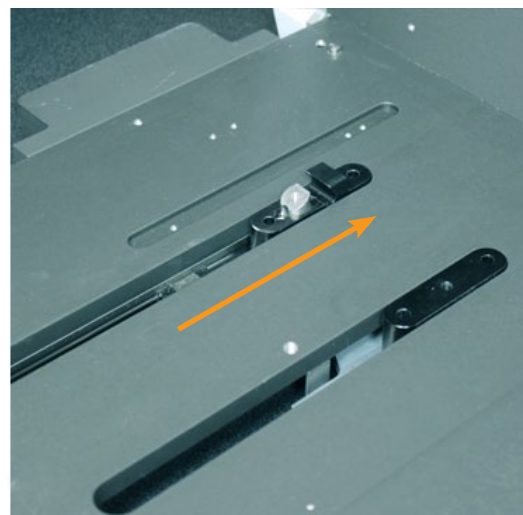
2. Position the system on a stable, vibration-free work platform, away from magnetic fields. Refer to the “[Site requirements](#)” on [page 33](#) for details. Use a precision level to ensure the installation work surface is level.

IMPORTANT The system must be installed in a very precise, level manner to ensure proper precision dispense quality and accuracy. Take care to place a precision level on multiple locations (front and back, left and right), on the system baseplate to ensure proper level of the system. If you have any questions, contact Thermo Fisher Scientific. ▲

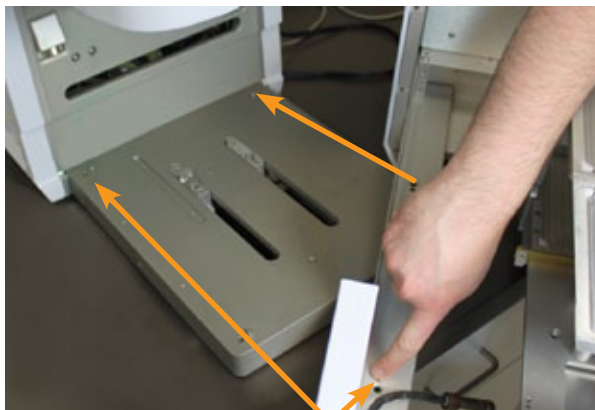
3. Remove the transport lock from the stage.



4. Verify that the power is off.
5. Manually move the stage locking pin to the rear of the base platform.



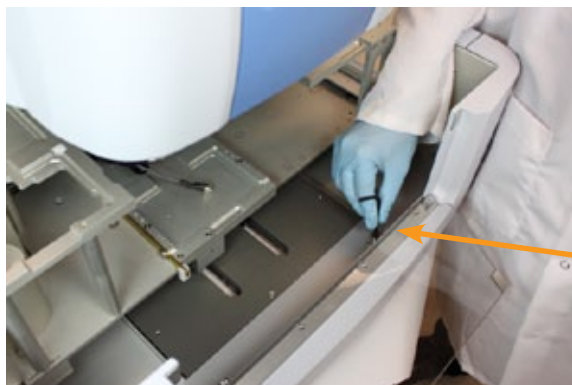
- Carefully place the stage assembly onto the base platform and align to the four corner pins as shown.



Align 4 corner holes and alignment posts



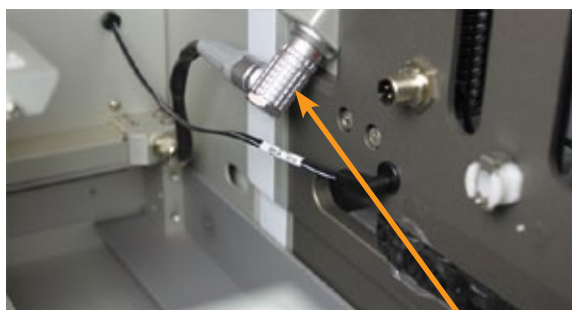
7. Connect the stage assembly onto the system platform with M6 x 12mm button head screws using a 4mm hex wrench



Install
screws

8. Attach the safety shield cable and the stage control cable to the system connections, as shown.

The control cable is “keyed” to match the pins in the connector, and must be pushed into place.



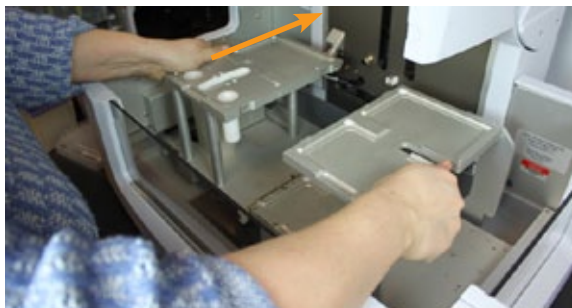
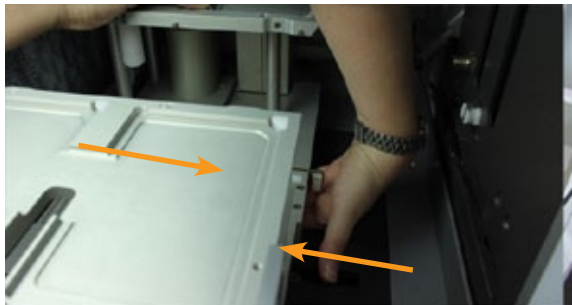
6-stage power/control connection

Shield Cable

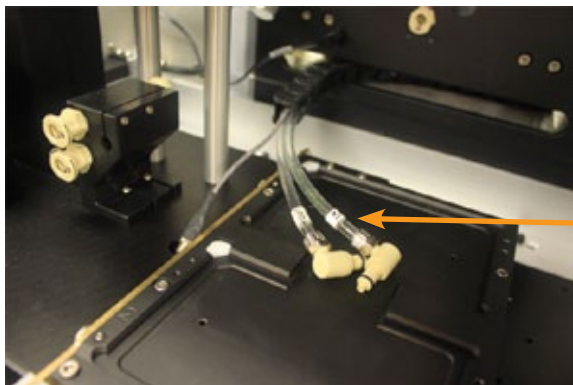
9. With one hand, reach over the stages and push the locking pin forwards towards you as you gently push the stage assembly towards the rear of the system.

Be sure to slide the locking pin forward and hold firmly while pushing the stages to the rear. The stage assembly should now engage the base pin and belt and slide with firm pressure, in and out.

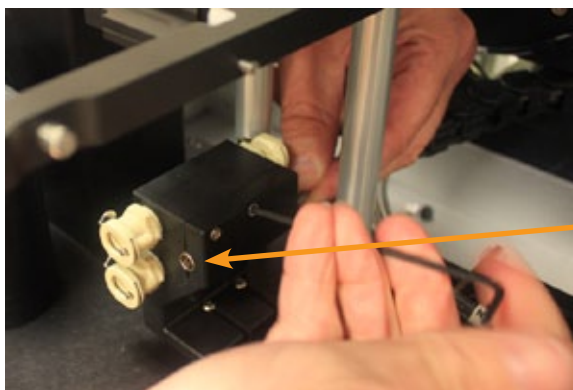
Do not slam or rattle the stage assembly. Simply press firmly.



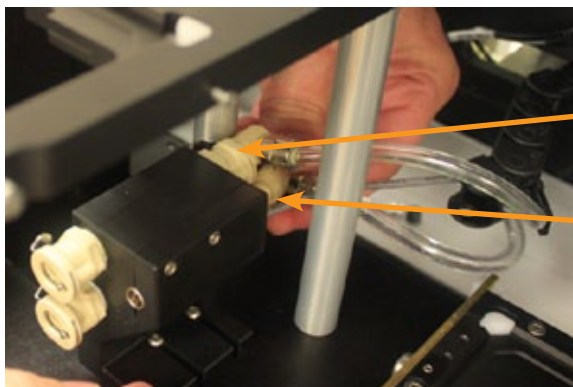
10. OPTIONAL: Attach the wash station water IN and OUT lines to the block, and attached the sensor to the block using the supplied nut.



Note labels on each line



Insert sensor cable through block and secure with screws



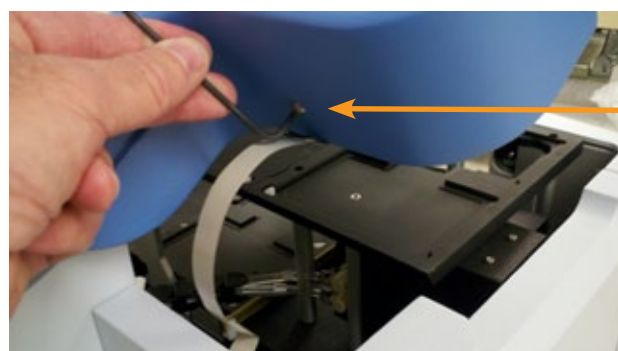
Insert "IN" tubing

Insert "OUT" tubing

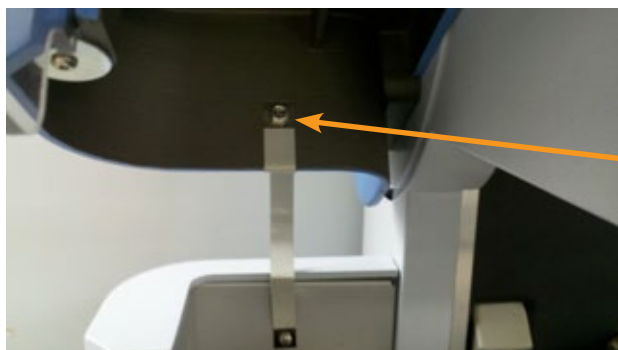
- Slide the blue safety shield assembly onto the system and attach with four supplied M5 x 10 mm shoulder screws using a 3 mm hex wrench.



- Lift the hood and attach the grounding strap from the stage to hood, as shown:



Loosen screw on outside then attach grounding strap to inside with screw, lockwasher, and nut.



Inside view, when properly installed



Outside view when properly installed

Step 4: OPTIONAL - External fluid and drain connections:

Three fittings are provided on the left side of the system:

- Non-Contact (N/C) Fill
- Wash station fill
- Drain

1. Position peristaltic pumps near the system.
The optional 3-pump unit is equipped with a forward/reverse switch for each pump to manually direct the flow of liquid, in or out of the system.
2. Make connections to the left side of the system using supplied quick-disconnect tubing adapters, detailed in the following steps:
 - a. Rotate pump clamp to the left side, then insert the tubing.



Shown with white tubing for clarity.
Use of clear tubing is recommended

- b. Push tubing all the way into the system. Be sure to push the tubing all the way into the clips on each side, as shown.



Push into clips on each side

c. Rotate clamp lever to right to lock tubing in place



Rotate clamp lever to right side to lock tubing in place



d. Connect fluid lines to left side of Versette system using supplied quick-disconnect fittings



3. Connect pump module electrical cable:
 - a. Connect the supplied communication cable to the pump module and to the Wash Module input on the **Versette** system.
 - b. Connect the power cable to the pump module.
 - c. Connect the pump cable to the WASH connector on the right side of the Versette base unit.

CAUTION Do not run pumps continuously for more than 10-15 minutes. In normal operation, the pumps will typically run for a few minutes at a time. Do not use the pumps for other purposes. ▲



Connect 15-pin communication cable to the pump module

Connect power cable



Step 5: Make electrical connections

All power connections to the **Versette** system are made on the right side of the system. Connect supplied power cable to the system and to a correctly installed line power outlet which has a protective conductor, also called earth or ground.

Use of a Reservoir with the Non-Contact Fill Option

A reservoir can be installed on stage 1 for automatic filling with the use of the non-contact fill option.

1. Attach the non-contact fill option onto the backplane, as shown using 2 screws provided and a 2 mm hex wrench



2. Connect fill tube to N/C fill connection, as shown.



3. Connect sensor power cable.



4. Connect the source fluid to the N/C fill position on the side of the system. See “[Fluid Connections](#)” on [page 28](#) and “[Step 4: OPTIONAL - External fluid and drain connections:](#)” on [page 43](#).

5. Set the liquid level:

There are two ways to set up the liquid level in the reservoir:

- 1) Place reservoir on Stage 1, then press and hold the N/C contact button on the pump (1st position on the pump) to create a flow of liquid into the reservoir through the fill nozzle. Once the desired level is achieved in the reservoir, release the button on the pump to stop the flow of liquid.
- 2) Fill the reservoir with the liquid to the correct level offline and place into Stage Position 1.



Press and hold the yellow SET button on the sensor until the green light starts to blink intermittently. Press the SET button again, the light will remain on.

Table 8—Reagent reservoirs

Item	Cat. No.
96-channel, 125 ml, Non-Sterile, Polypropylene	1064-05-8
96-channel, 125 ml, Sterile, Polypropylene	1064-15-8
96-channel, 220 ml, Non-Sterile, Polypropylene	1064-05-6
96-channel, 220 ml, Sterile, Polypropylene	1064-15-6
384-channel, 95 ml, Non-Sterile, Polypropylene	1064-05-7
384-channel, 95 ml, Sterile, Polypropylene	1064-15-7

6. See [“Reservoir and non-contact fill - Sequence Summary”](#) on [page 72](#) for GUI (graphic user interface) OR onboard software usage.

Using a Tip Wash Station

A Tip Wash Station washes both the interior and exterior walls of D.A.R.T. tips. Cleaning solution is connected to the wash station and a waste line is used to remove waste fluid. You can specify the number of wash cycles and related parameters through the onboard system software or through ControlMate software.

Tip Wash Stations are available for 96-channel and 384-channel pipetting heads. All tip wash stations are made of Polypropylene with Stainless Steel “Chimneys”. Wash fluid flows up through the “chimneys” to wash the inside and outside of the tips, and the excess flow is pulled out of the wash station through the “OUT” line, connected to a drain pump. An integrated fluid liquid level sensor serves as a safety fluid inlet shutoff in case the drain pump stops.

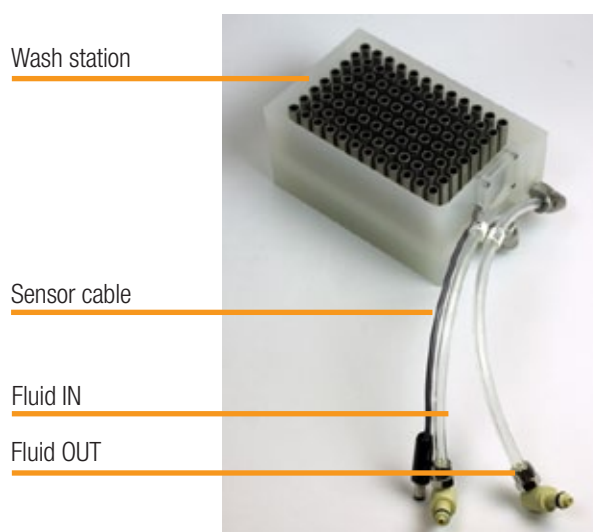


Table 9—Tip wash stations

Item	Cat. No.
96-channel, Tall Height	650-05-96TTW
384-channel, Tall Height	650-05-384TTW

1. Place the Tip Wash Station on stage 2, with the connections on the left side.
2. Connect the sensor cable and connect the fluid IN and fluid OUT connectors to the mating IN/OUT connectors.
3. Connect fill and drain pumps to the system. See [“System installation procedure”](#) on [page 36](#).
4. Refer to the ControlMate software or on-board system software to program a Move command (to move the stage below the pipette tips), and to set wash station parameters including tip position (vertically and horizontally), number of cycles, pump speed, etc. See [“Using a Tip Wash Station”](#) on [page 48](#).

4

Operation

The **Versette** system is designed for easy operation via an on-board wizard-based touchscreen menu system. You can also control the **Versette** through ControlMate PC-based software which is supplied with the instrument and is required to perform complex operations system calibration.

Principle of Operation

The **Versette** system executes a series of commands (called a **program** or **protocol**) to aspirate fluid from labware, and dispense this fluid into its labware, or to labware located on one of multiple stages in the system.

A simplified operation process is listed below:

1. Create a program to run a series of aspiration, movement, and dispense commands.
2. Install the desired pipetting head.
3. Connect a fluid source, or install fluid, as appropriate.
4. Install labware into the system.
5. Run the program.

As the **Versette** is a flexible system, actual operation will vary to meet the specific needs of the end user.

Precautions and Limitations

Refer to the safety section of this manual for detailed system safety cautions.

- Always follow your facilities safety and health instructions for all operation. Wear proper protective clothing, such as disposable gloves and laboratory coats, according to good laboratory practice.
- Ensure that the working area is properly ventilated for the chemicals in use, and that the **Versette** system is installed in an environment which is safe for the chemicals in use. Always follow your facility's safety guidelines and local, national, and international safety codes and procedures for the chemicals in use.

- Do not attempt to install or use the equipment if you are not properly trained for the tasks described.
- Always ensure that the supply voltage meets the specifications printed on the **Versette** system and detailed in this manual. The voltage supply should be checked by a certified electrician to verify proper voltage. If there are any questions, consult with Thermo support.
- Do not run the optional pumps continuously for more than 10–15 minutes. In normal operation, the pumps will typically run for a few minutes at a time. Do not use the pumps for other purposes.

Operational Check

Complete the following procedure to confirm the correct functioning of the system prior to normal use.

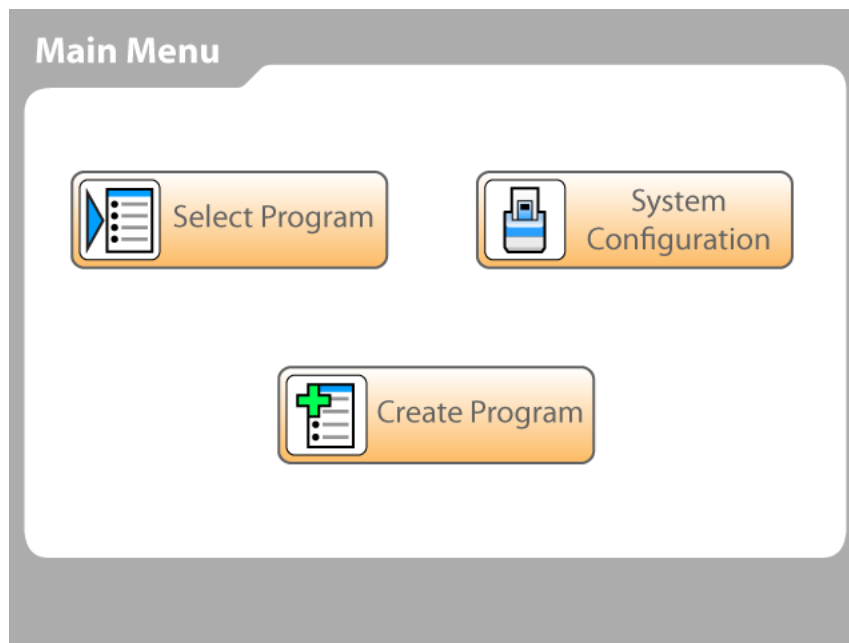
1. Verify that the safety shields are in place and closed.
 2. Verify that the power cable is connected to an appropriate power supply.
 3. Switch the instrument on using the power switch.
- If the instrument starts properly:
 - The display lights up.
 - The plate carrier moves to the home position and the dispense mechanism lifts to the up position.

Initial System Startup

1. Refer to “Installation” on [page 33](#) for system setup information.

2. Verify that the system safety shields are closed. Turn the system on (power switch on the right side) and wait for the touchscreen to initialize and display the main menu.

Figure 8—Main Menu



3. Calibrate the system. Refer to the calibration section of this manual.

Operation Overview

Operation consists of the following tasks (not all tasks are needed, depending on system setup and use):

1. Install optional equipment. For example, reagent reservoir, tip wash station, etc.
2. Turn the system on.
3. Create a program.
4. Run the program and follow any system prompts.

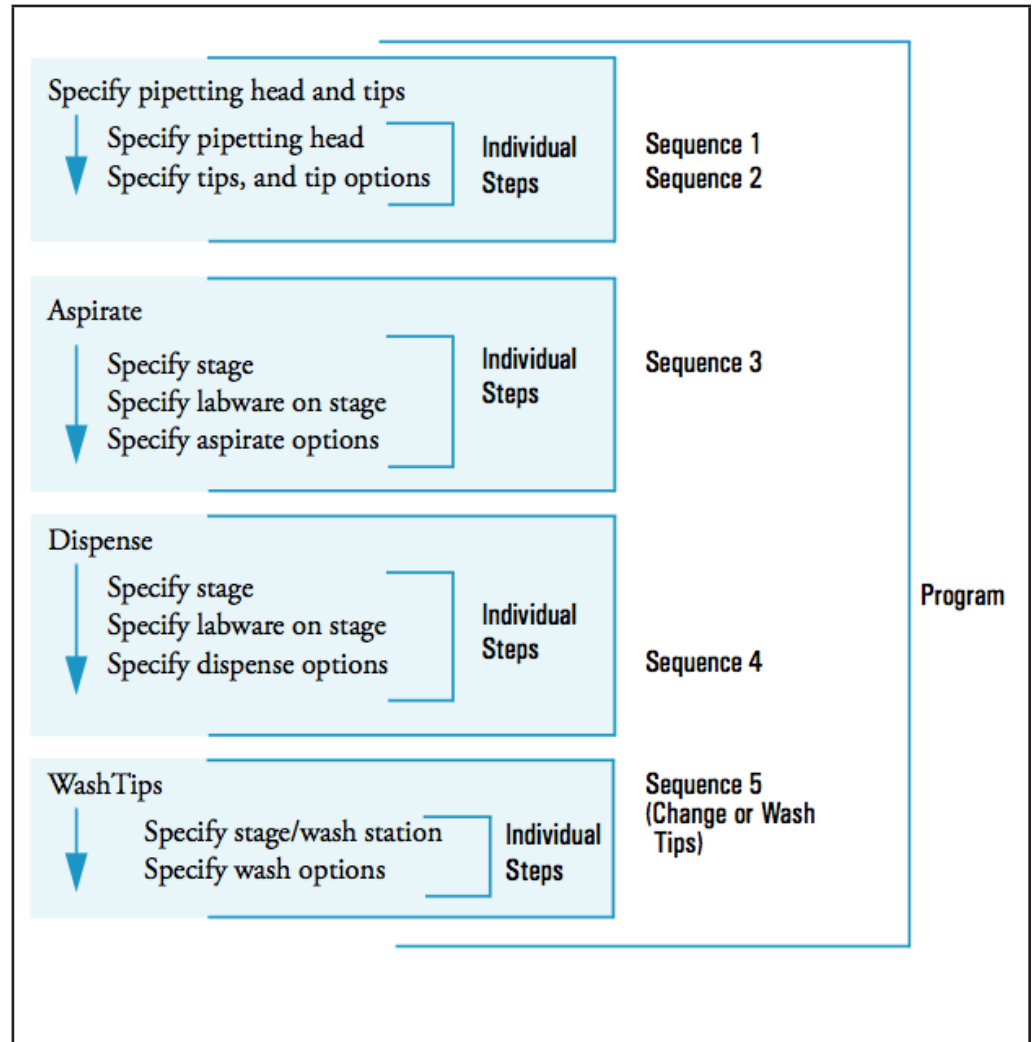
The following section details the use of the onboard software. Refer to the **ControlMate User Manual** for additional and alternative operation and calibration instructions. All procedures assume that the system has been calibrated. Refer to the calibration sections of this manual for details.

Programs

A pipetting program consists of multiple sequences (aspirate, dispense, wash, etc.) that are combined to accomplish a task. Each sequence consists of one or more “steps”

An example of a basic program and its components is shown below:

Figure 9—Sample basic program components



Typically, a pipette can aspirate sufficient fluid to dispense to a large number of wells in a microplate. Multiple dispense commands may follow in sequence. Additional program steps may include washing the pipette tips in an automated wash reservoir, and may include various speed adjustments for stage movements, dispense speed, etc. to ensure accurate dispense. Other commands may include mixing (a series of aspirations and/or dispenses in the same well or tube to mix the fluid in that well or tube or to equalize pressure in a pipette), and basic pause and position commands.

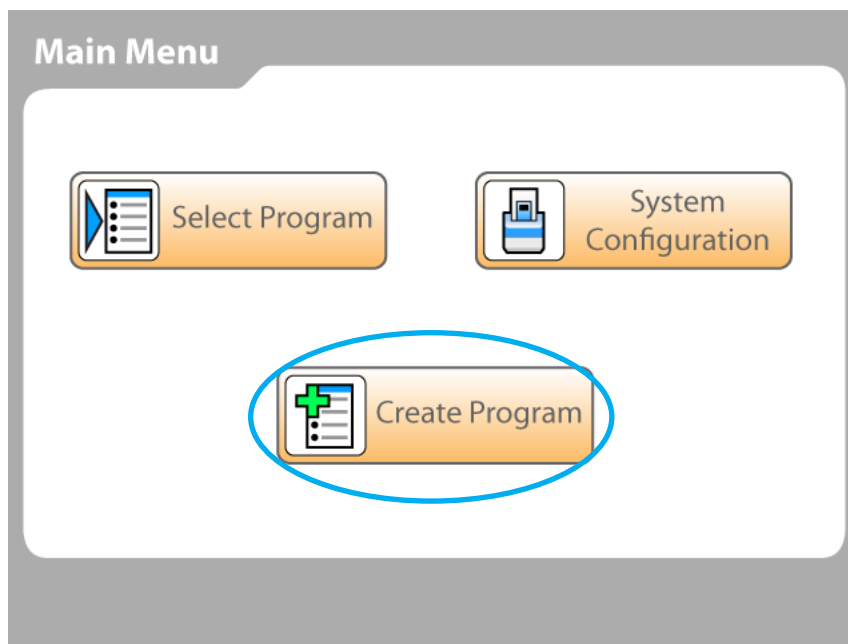
Touchscreen Operation

The system can be operated locally via the touchscreen, or remotely via a remote computer with ControlMate software. Most operations can be performed locally. This section details basic program creation and operation actions through the onboard touchscreen.

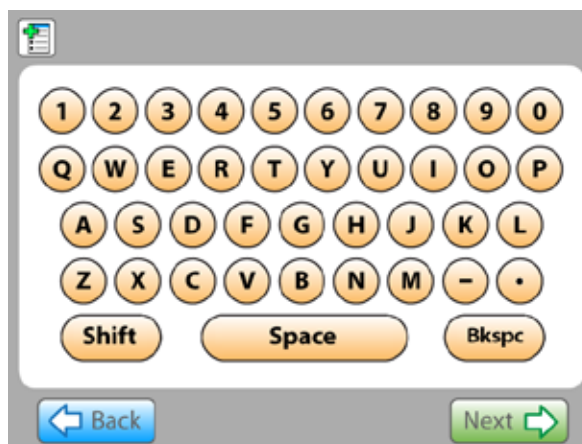
Creating an Aspirate/Dispense Program (Sequence)

The following example shows a typical on-screen process of creating a program.

1. Select “Create Program” from the Main Menu.

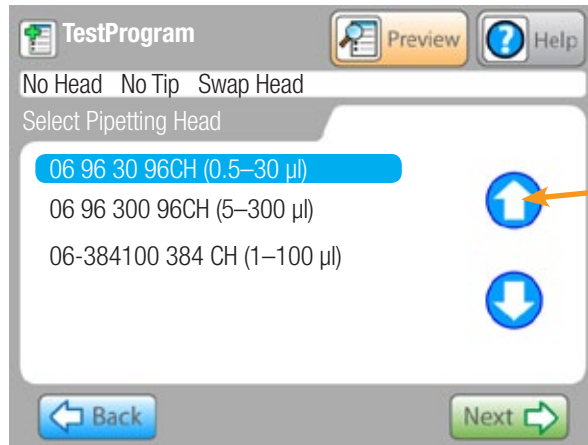
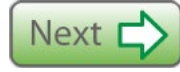


2. Use the keypad to enter a name for the program, then select



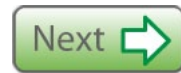
Upper and lower-case keypads are available using the Shift key to toggle between keypads.

3. Highlight the pipetting head from the list, then select

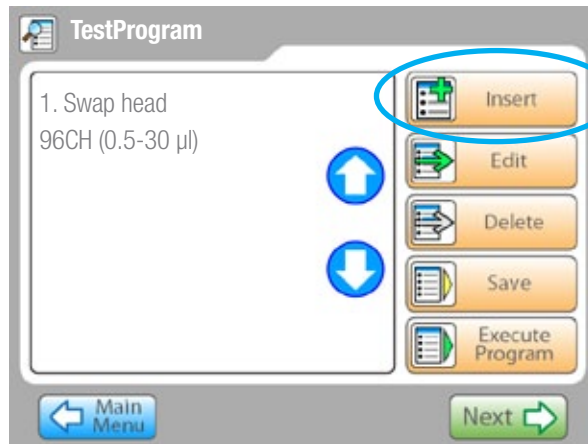


Use arrows to scroll to multiple pages

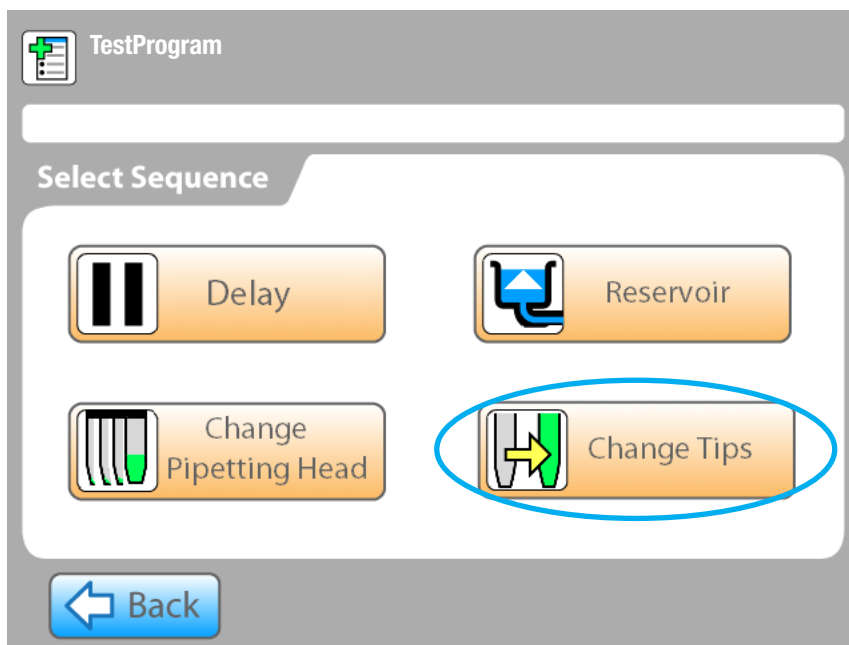
4. Select “**Installed**” if the head is currently installed, then select



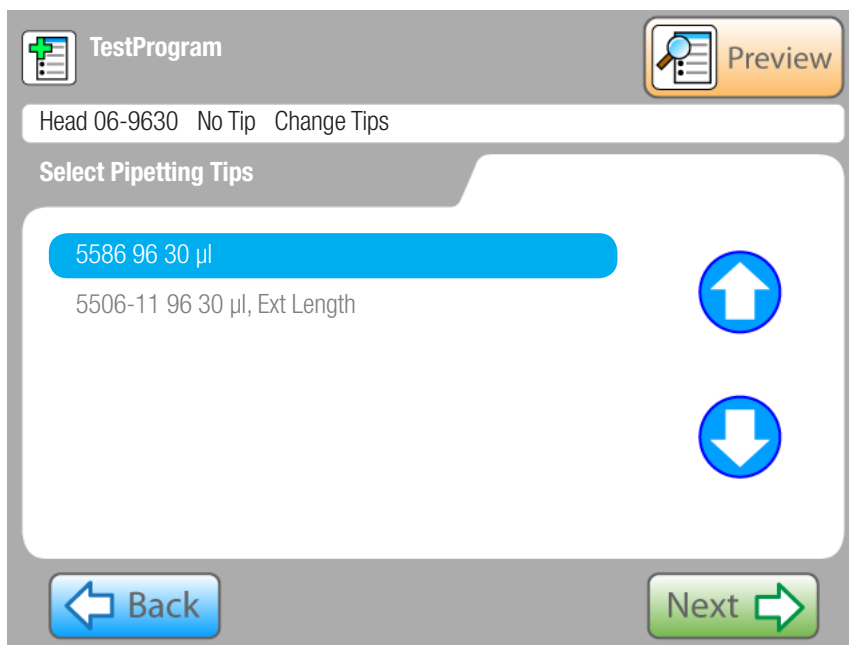
5. Select  to add a step.



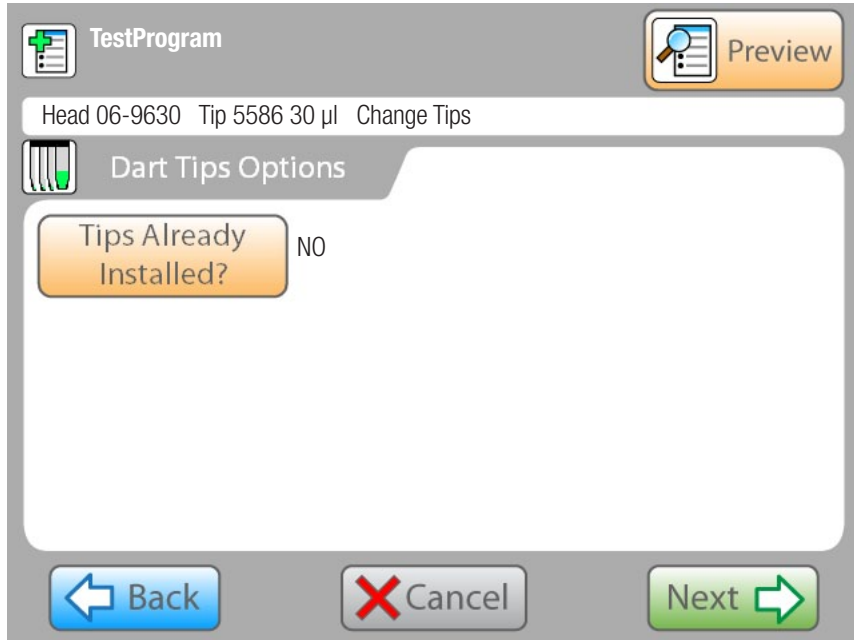
- Select  .



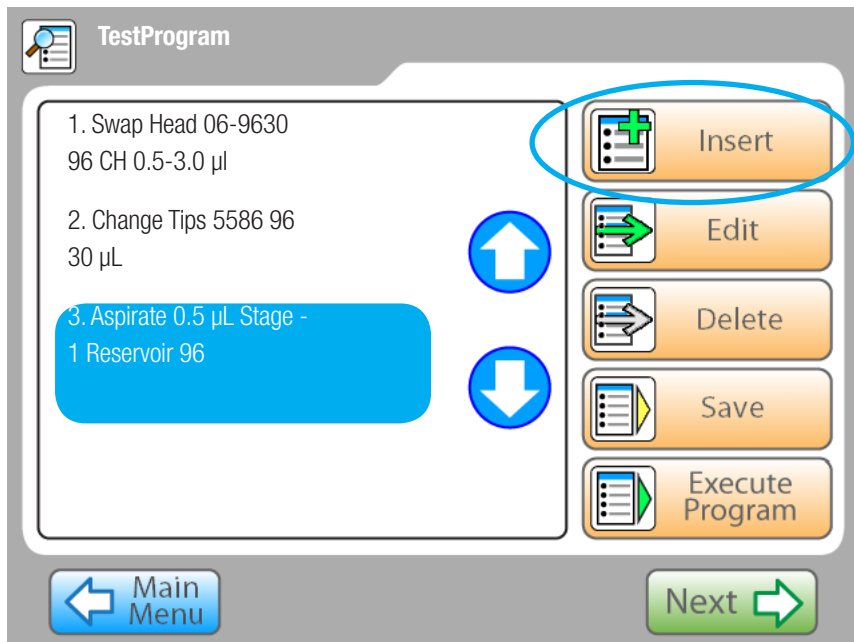
- Use the arrows to highlight the pipetting tip type from the listing, then select  .



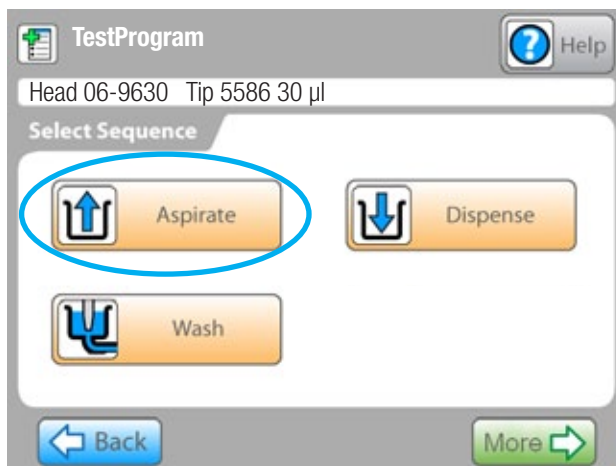
8. The screen display will vary for the type of pipetting head previously selected: If prompted, tell the system if D.A.R.T. tips are already installed in the system (toggle YES or NO), then select



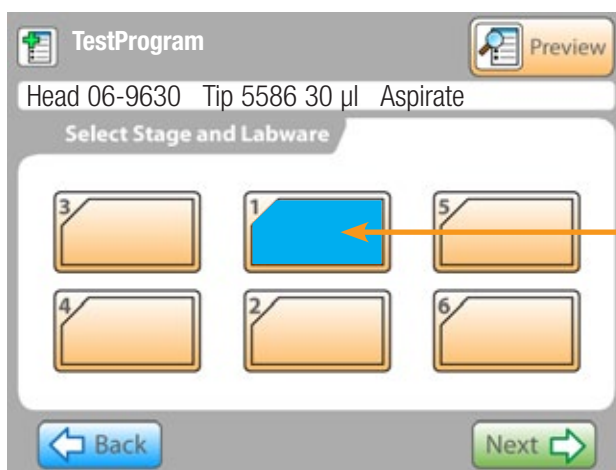
9. Select  to add a step.




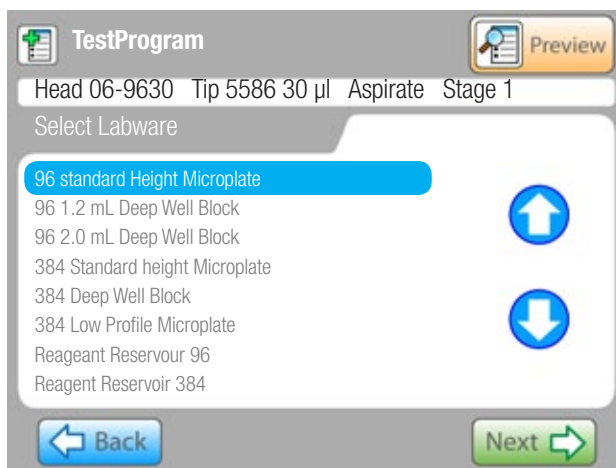
10. Select  Aspirate.



11. Select the stage where the pipettes will aspirate, then select .



12. Highlight the labware that will be used for aspiration, then select . The labware type listing will vary based on the selected pipetting head.



13. Enter all applicable aspiration variable settings.

Select “Advanced” to set advanced settings. When done, select

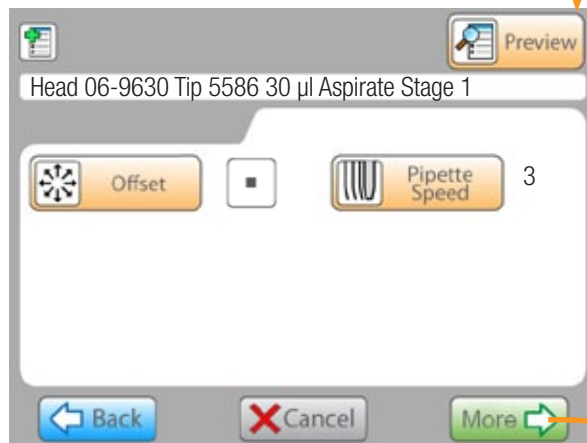



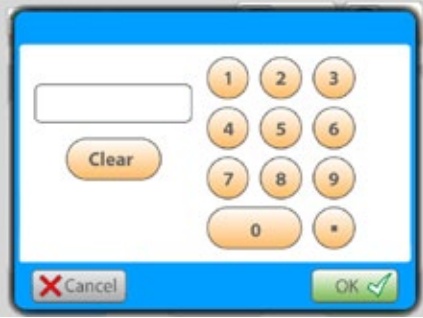
















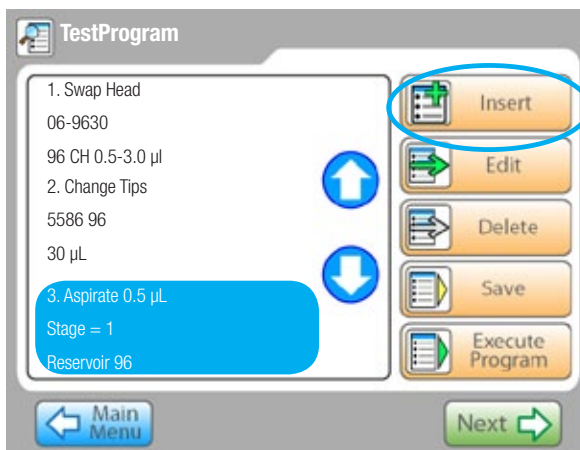
Table 10—Aspirate settings

Selection	Description	Default Setting
 Wells	The physical number of wells contained within the vessel.	Defaults to well count for previously selected labware.
 Liquid Class	<p>Select the type of liquid. This will enter corresponding settings for the pipetting head speed, motions, and internal settings to ensure accurate liquid aspiration (and dispense).</p> <p>Typical options include: Water, 1% BSA, Glycerine 30%, 90% DMSO, and 70% Ethanol.</p> <p>Please note that each calibration is for a specific fluid at a specific temperature range and a specific volume. For example, 150 μL of 70% Ethanol at 20°C.</p> <p>If your system is operating with these fluids at different dispense volumes or dispense temperatures other than those for which they were calibrated, or if you are using liquids other than those listed, refer to the Volumetric Calibration section of the <i>Versette ControlMate User Manual</i> for detailed instructions to enter or alter calibration settings.</p> <p>Typically, an end user may have multiple calibration entries for the same fluid, depending on desired dispense accuracy for a given process range. The system typically ships calibrated for the following fluids:</p> <p>Distilled water @ 20 - 22.5 Celsius 1% BSA @ 20 Celsius at 15 μL 70% Ethanol @ 20 Celsius 150 μL 30% Glycerol @ 20 Celsius at 30 μL 90% DMSO @ 20 Celsius at 5 μL</p> <p>The liquid class settings make small changes to increase or decrease the number of stepper motor counts required to achieve an extremely accurate volume movement based on liquid type and operating temperature. The settings are generated using a standard volumetric correction factor for the specific liquid type at the temperature range required.</p>	Water

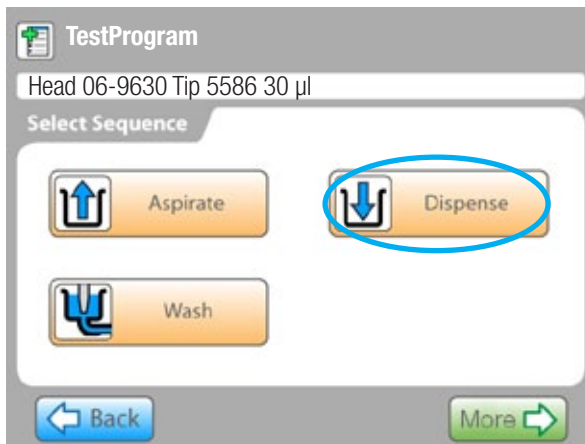
Selection	Description	Default Setting
	Enter the volume. 	
 Aspirating height	Height parameter tells how deep into the well tips will go in aspirate and dispense steps. * The default dispensing height is 1 mm above the selected plate.	Defaults to the physical height of the previously selected labware.
	Use this field to turn Tip Touch on or off.	Off
	Tip/well offset: It may be necessary to position the tips away from the center of each well. For example, when using low volumes it may provide more accuracy by positioning the tips in one of the well corners.	Off (Center) Options: - Back Left - Back - Back Right - Right Side - Center (Off) - Front Right - Front - Front Left - Left Side
	Select a pipette speed of 1 (slowest), 2, 3, 4, or 5 (fastest). Increase speed to increase throughput. Decrease speed to ensure proper aspiration of more viscous fluid. Consult Thermo applications for recommendations for any changes from the default setting.	3
	An air gap can be used to separate fluid in a column (pick up one fluid, then an air gap, then pick up another fluid), or for other advanced uses.	Off


Selection	Description	Default Setting
	Number of cycles to premix. Options are 0 through 10. Premix consists of an aspiration and dispense into the same well, to pre-mix the fluid prior to the final aspiration step.	0
	Volume of liquid to aspirate during a premix.	Off
	Select overstroke if this is the first aspirate prior to multiple dispenses. The overstroke sequence will aspirate additional fluid, then return a portion of this liquid to the source. This will ensure that the piston motor is primed and improves volumetric accuracy throughout all subsequent dispense allotments.	Off
	Imposes a slight dwell time within the fluid source to allow time for the fluid to saturate the tip, or dwell after dispense to allow time for a full dispense. This can ensure accurate aspiration or dispense.	Off (On = 1 sec)
	Blowout moves the pipetting head pistons past the “zero volume” dispense point, pushing a small amount of air after the liquid. This command aids in pushing any remaining liquid in or on the outer orifice of the tip or needle into the destination labware to completely dispense the liquid. Blowout can be used to overcome capillary action to ensure the complete dispense of all fluid in a pipette. Options are On and Off.	Off
	Number of cycles to mix. Options are 1 through 10.	Off
	Volume of liquid to dispense during a postmix.	Off

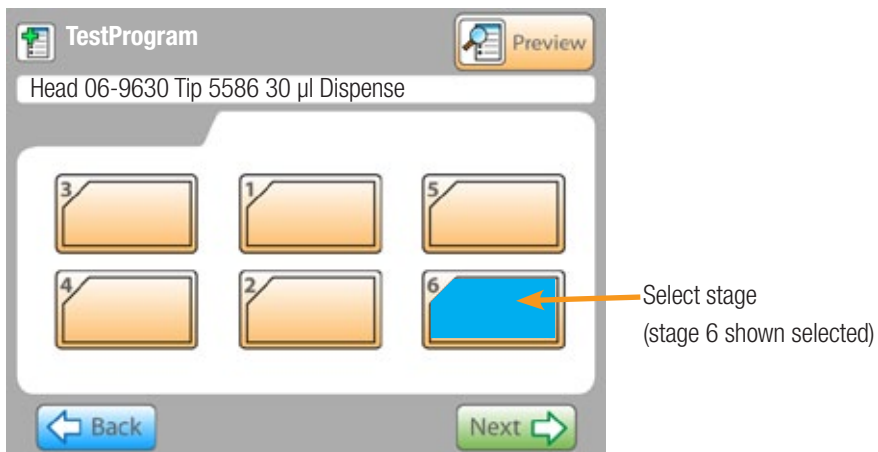
14. Select  to add a step.



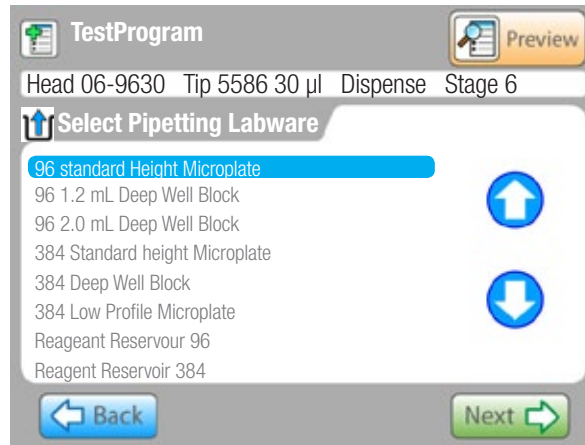
15. Select .



16. Select the stage where the pipette(s) will dispense fluid, then select .

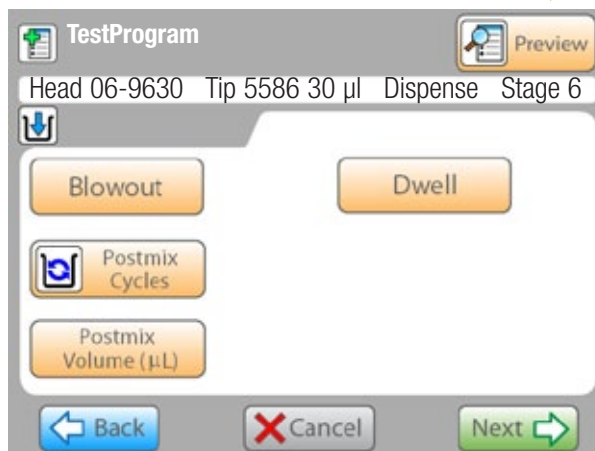
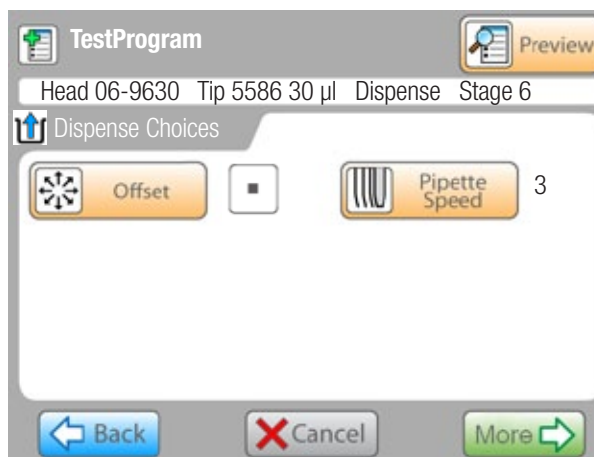
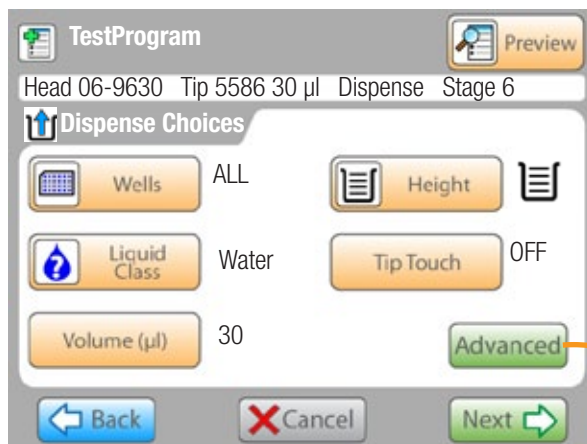


17. Highlight the labware that will be on the dispense stage, then select



18. Enter all applicable dispense variable settings.

Select "Advanced" to set advanced settings. When done, select



- Continue to follow the system prompts to enter any variables. When all parameters are set, the Command List screen will display. From this screen, you can scroll through your program and test each step or execute the full program

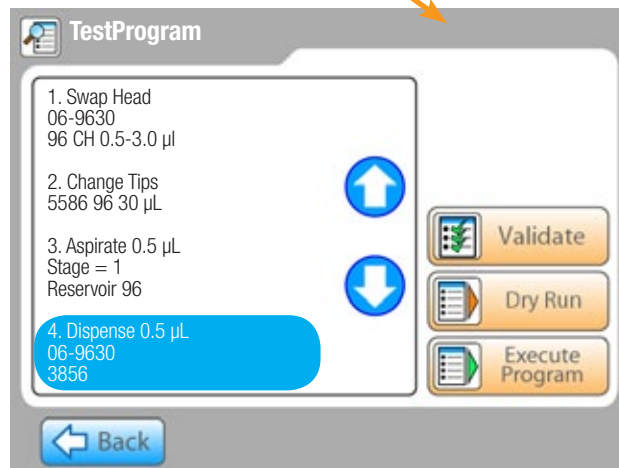
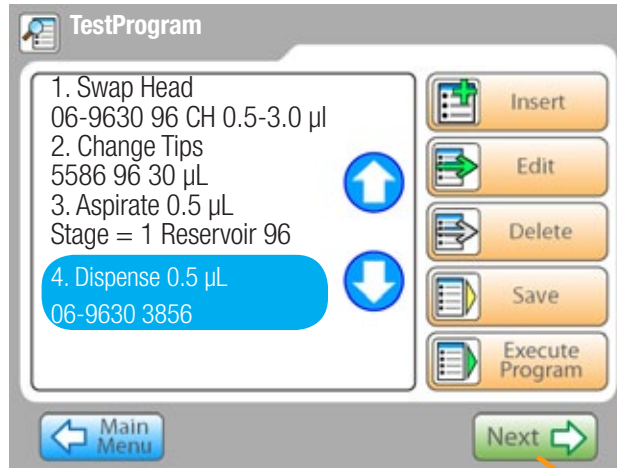





Table 11 – Sequence Review Screen

Selection	Description
Insert	Insert a new sequence.
Edit	Highlight a step, then select Edit to make changes to the step.
Delete	Delete the selected sequence.
Save	Save the displayed sequence.
Validate	Checks the program to verify that all parameters are applicable.

Selection	Description
 Execute Program	Begin program operations.
 Dry Run	Runs the program in a test mode, without actually aspirating or dispensing any fluid.
 Back	Return to previous screen.

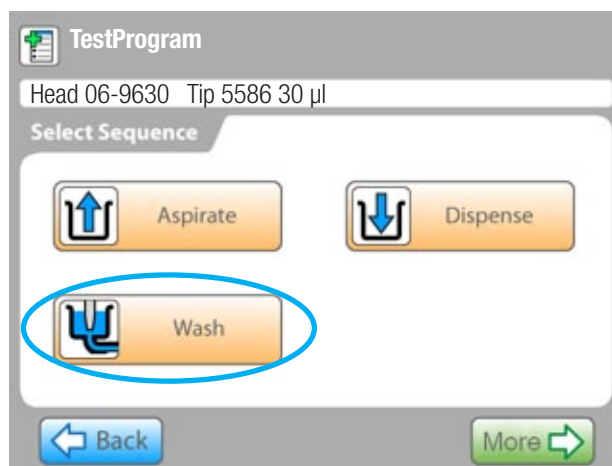
Wash - Sequence Summary

Washing the tips can remove persistent air bubbles and remove any potential contaminating fluids from the tips. During operation of a wash cycle, the system moves the tip wash station inline with the tips. A typical wash sequence is:

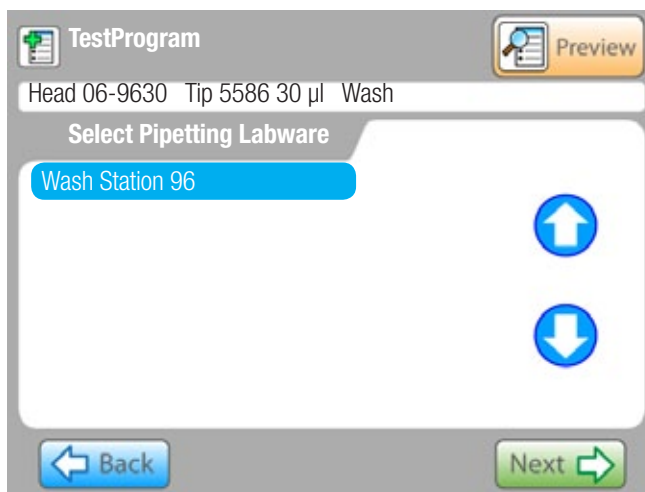
1. Blowout all fluid from the tip.
2. Aspirate fresh cleaning solution from the “chimneys”.
3. Dispense the wash fluid back into the chimney (See the ControlMate manual for additional features)
4. Repeat aspirations and dispenses, as desired.
5. Perform a final blowout of all fluid in the tips.

Although tip washing significantly reduces sample carryover by rinsing both the internal and external walls of the D.A.R.T. tips, carryover is never completely eliminated. To ensure zero carryover it is recommended that D.A.R.T. tips be replaced between sample transfers. See “Change Tips - Sequence Summary” on page 83.

1. Refer to “Creating an aspirate/dispense program (sequence)” on page 55 for complete details, then from the Select Sequence screen, select “Wash”



2. Select the pipetting labware.



3. Make any changes to the Wash settings, then select the “Next” button when done. Refer to the table below for setting details.

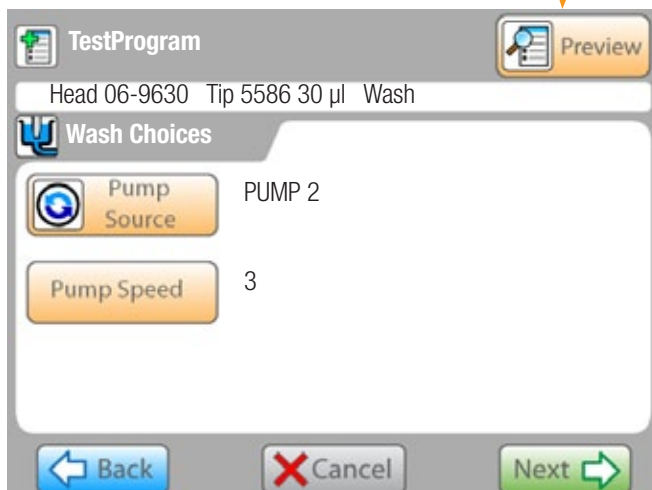
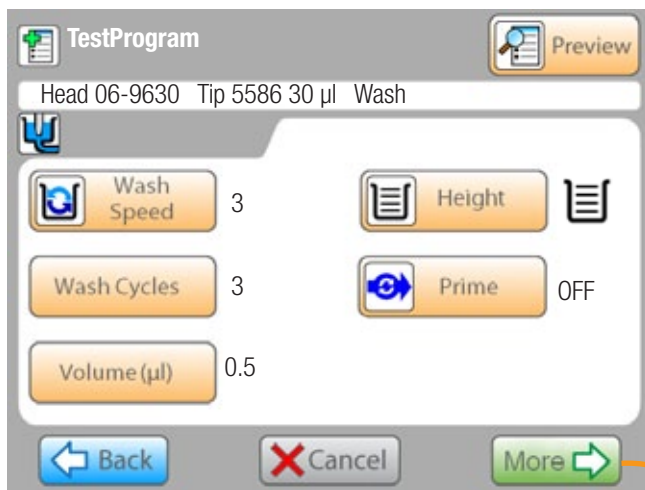










Table 12—Wash settings

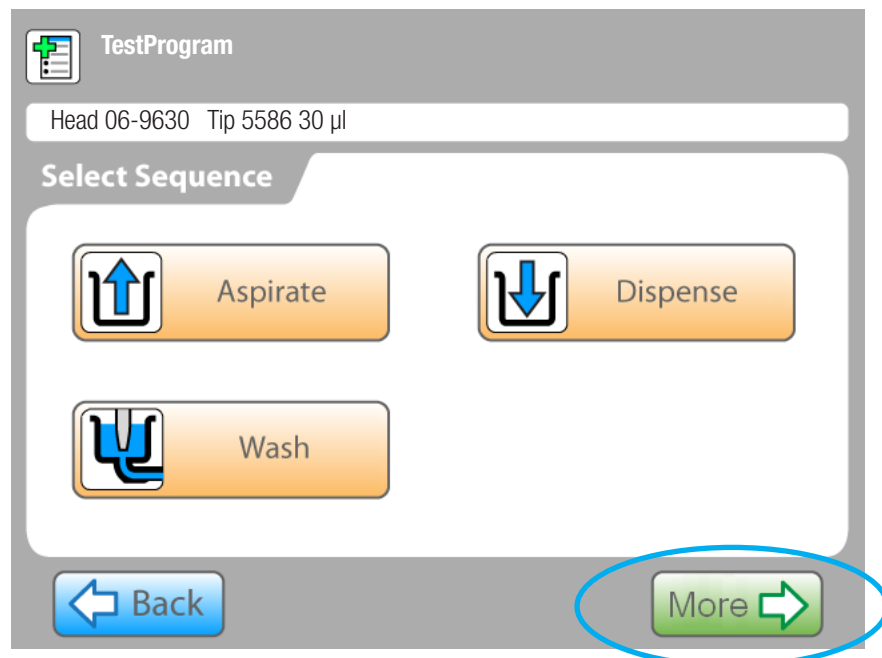
Selection	Description	Default Setting
 Wash Speed	The optimal wash speed for different liquids are factory set. For example, the optimal speed for water is 3. If a higher density solution is used, it requires a greater speed to move the corresponding volume. You can decrease the speed, for example, to reduce foaming.	3
 Wash Cycles	The number of wash cycles (aspirate then dispense into the wash well or tube).	3
 Volume (µl)	Enter the volume of fluid which will be aspirated into the pipette tip and then dispensed back out of the tip 	
 Height	The height above the base of the plate well or tube base at which the tip of the pipette will be located during the wash cycle. The system determines the position of the tips in the wash station based on the station default measurements.	Medium
 Prime	Asks the user to input a number, this number is the time (in seconds) the system will run before washing the tips, to ensure that the chimneys have no residual waste from previous runs, or to ensure that the chimneys are full of fluid. This creates an even flow of liquid through the chimneys to effectively wash the tips.	

Selection	Description	Default Setting
 Pump Source	Pump 2 supplies fluid to the wash station.	2
 Pump Speed	Select a pump speed of 1 (slowest), 2, 3, 4, or 5 (fastest). Increase speed to increase pump speed/speed of operation. Decrease speed to prevent frothing.	3

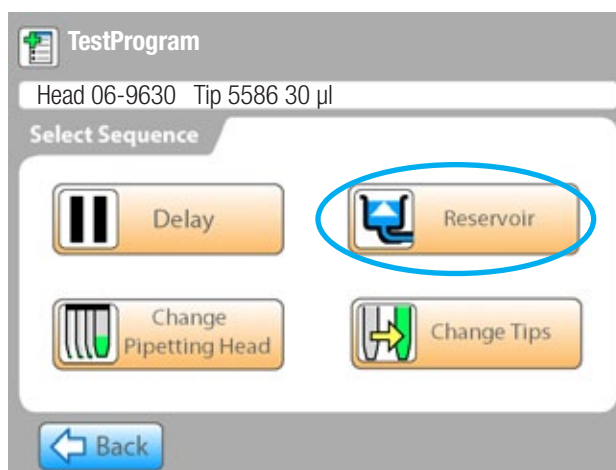
- When all parameters are set, the Command List screen will display. From this screen, you can scroll through your program and test each step or execute the full program. Refer to the Installation section of this manual for instruction to install and use a wash station.

Reservoir and Non-Contact Fill - Sequence Summary

- A reservoir can be installed on stage 1. See [“Use of a Reservoir with the Non-Contact Fill Option”](#) on page 46 for non-contact fill and reservoir setup instructions.
- Refer to [“Creating an aspirate/dispense program \(sequence\)”](#) on page 55 for complete details, then from the Select Sequence screen, select **“More”**.



3. Select "Reservoir".



4. Use the reservoir screen system prompts to set reservoir settings (fill and usage.)

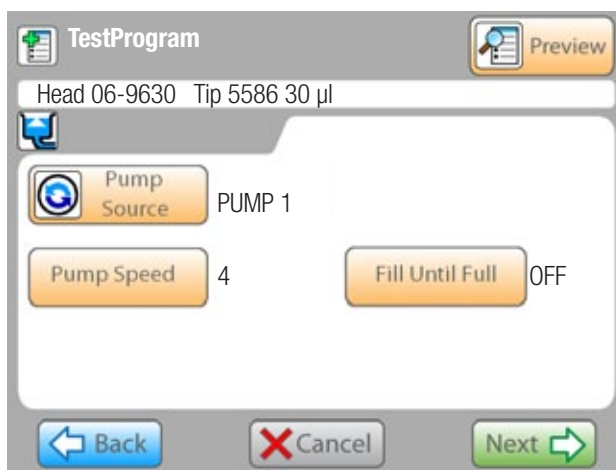





Table 13—Wash settings

Selection	Description	Default Setting
 Pump Source	Pump 1 supplies fluid to the reservoir station.	1
 Pump Speed	Select a pump speed of 1 (slowest), 2, 3, 4, or 5 (fastest). Increase speed to increase pump speed/speed of operation. Decrease speed to prevent splashing.	3
 Fill Until Full	When enabled, the reservoir will fill until the sensor detects that the reservoir is full, then shuts off the pump. This can be set ON or OFF.	Based on fill level of liquid (SET) in reservoir. See "Use of a Reservoir with the Non-Contact Fill Option" on page 46.

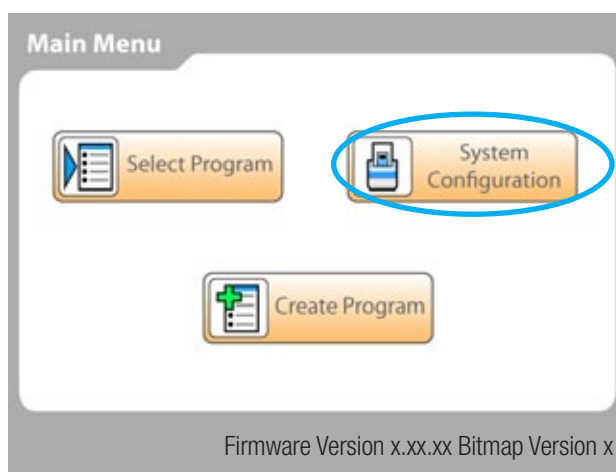
5. Continue to follow the on-screen menus to select any options for the reservoir pumping, location, and/or stage location.
6. When all parameters are set, the Command List screen will display. From this screen, you can scroll through your program to review the steps or execute the program. See [“Creating an aspirate/dispense program \(sequence\)”](#) on [page 55](#).

Installing a Pipetting Module (Cage)

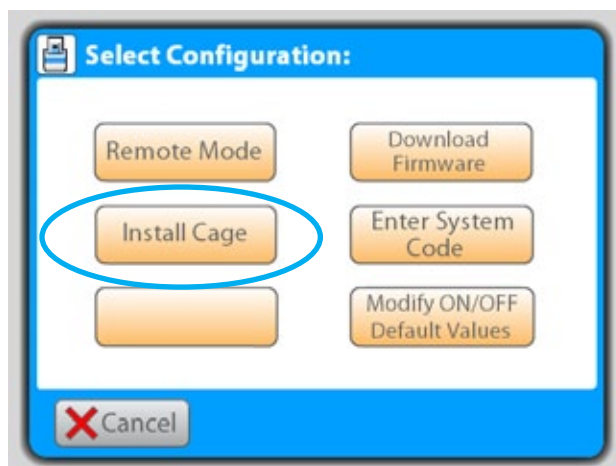
A pipetting module (Cage) contains a precision stepper motor and supporting equipment to position a pipette block and/or a pipetting head to perform the liquid aspiration and dispense actions.

The following steps details how to swap cages in a system. If a cage is not already installed, simply follow the system prompts to open and close the access door to continue. The cage motions and software are interlocked to prevent any motion. You must open and close the door to allow the software process to continue. Refer to the following steps:

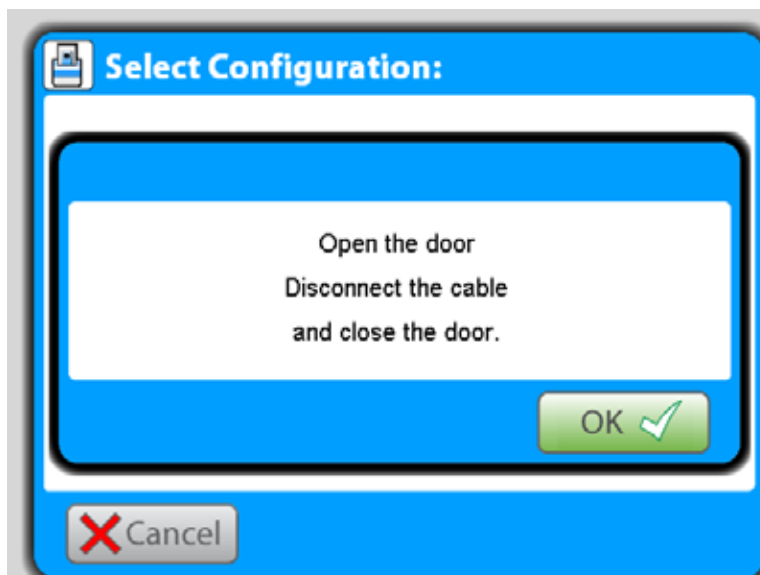
1. Select  from the Main Menu.



2. Select  .



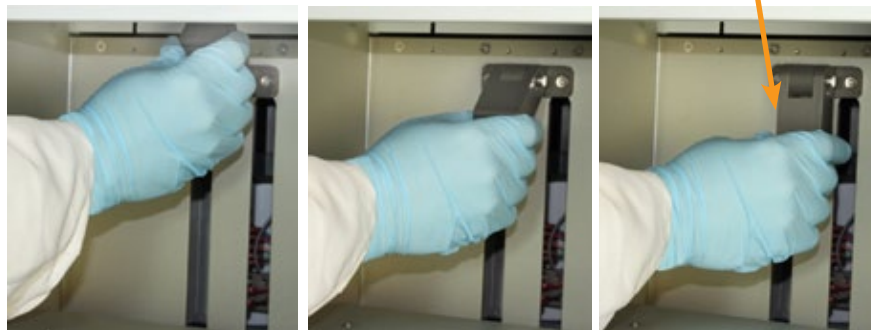
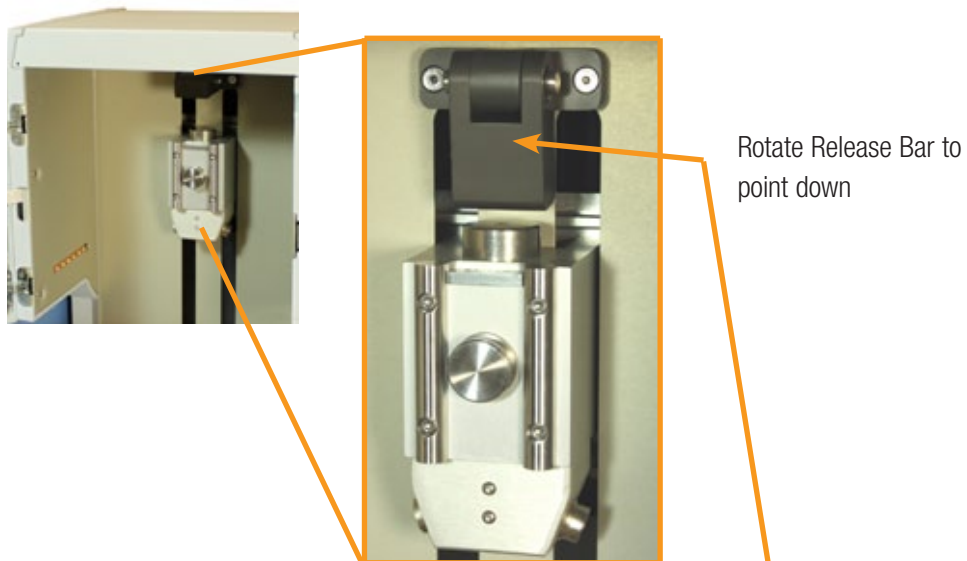
3. Follow the system prompts to open the door and disconnect the cage cable then select OK.



4. Wait for the pipetting module to reach the pre-load position, then open the door, rotate the cage release block down, close the door, then select OK. Refer to photos on the following page.



NOTE! The door interlock prevents motion with the door open. ▲



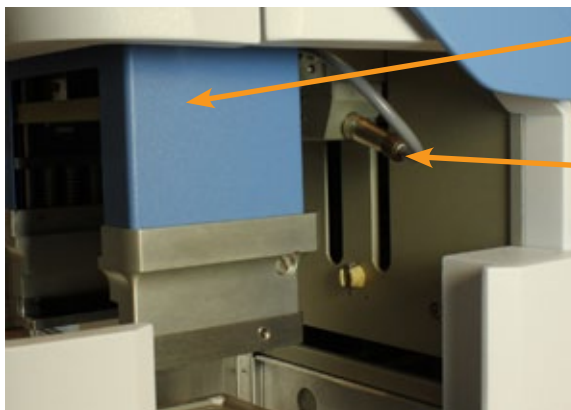
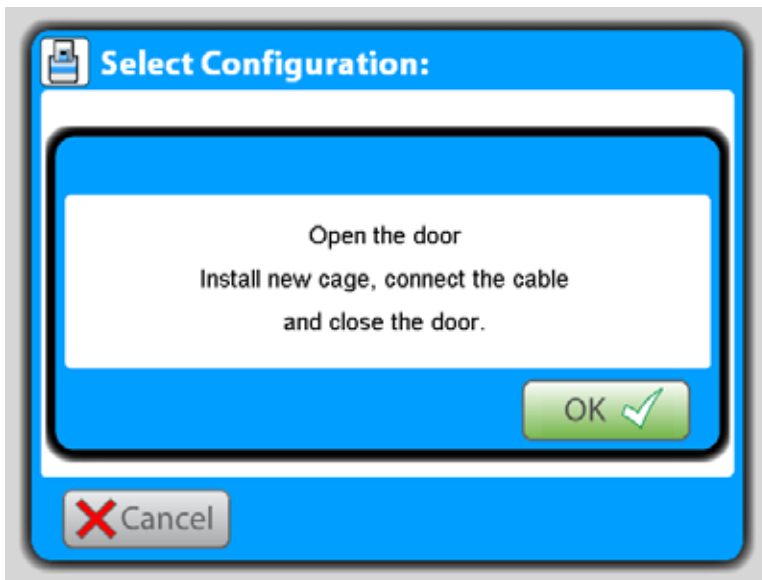
Rotate Release Bar to DOWN position

5. Follow the prompts to open the door. Remove the cage if present. Close the door then select OK.



6. Follow the prompts to open the door, install a new cage, and connect the cage cable. Close the door then select OK.

CAUTION Use care in lifting the pipetting module as they are heavy (approximately 10 kg/ 22 lbs.). ▲

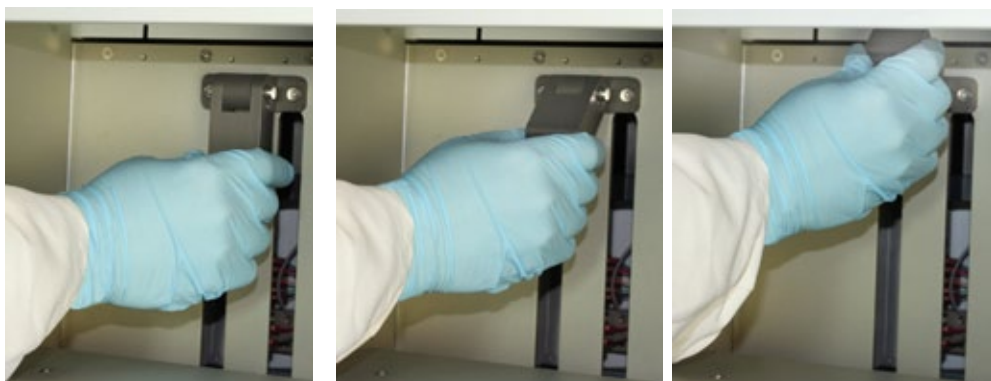
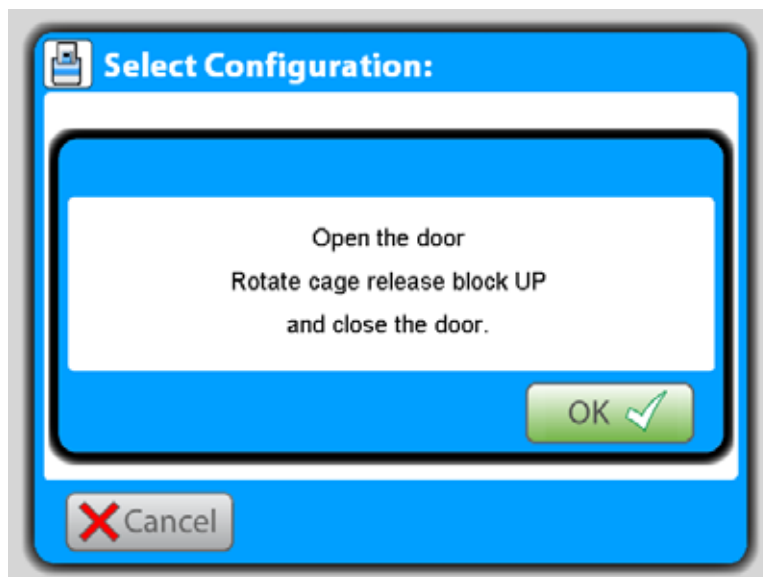


Carefully lift and position the Pipetting Module into system

NTC pipetting module:
Use right-side connector only.
(connector type may vary from that shown)

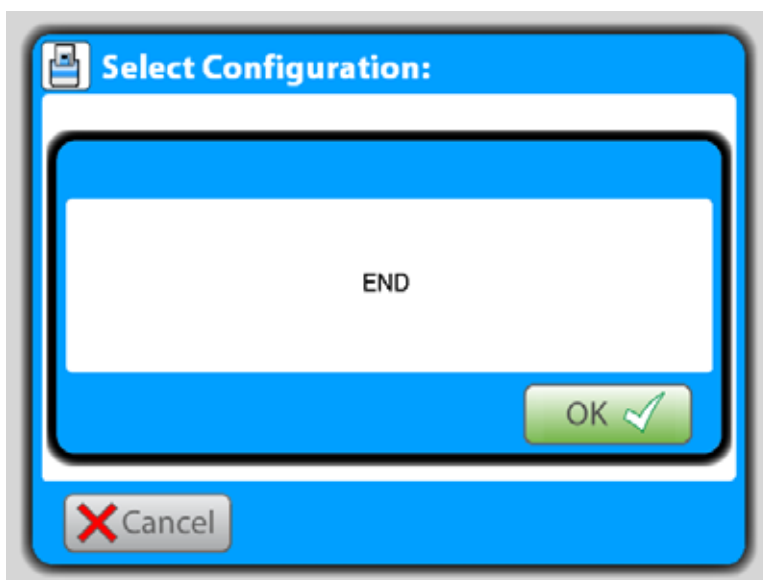
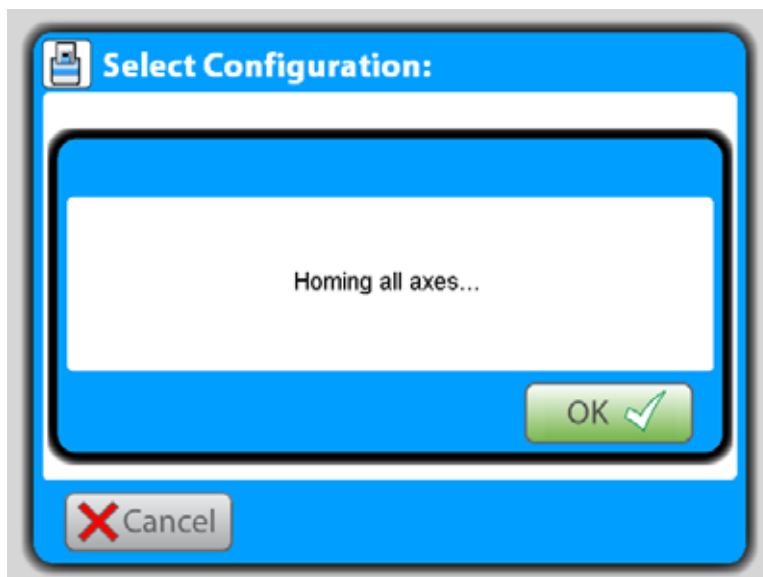
NOTE! Connection type may vary from that shown. Be sure to align any cable “key” to connect the cable and push to lock. ▲

7. Wait for the pipetting module to move down to the release position, then open the door, rotate the release bar to the UP position, as shown.



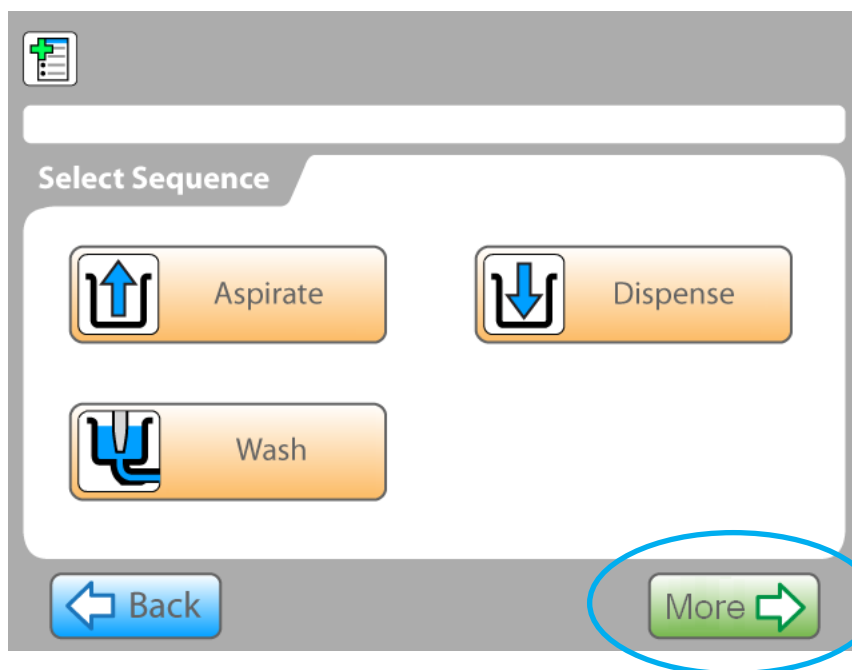
Rotate block to UP position.

8. Close the door then select OK, then wait for the system to home all axes, then select OK.

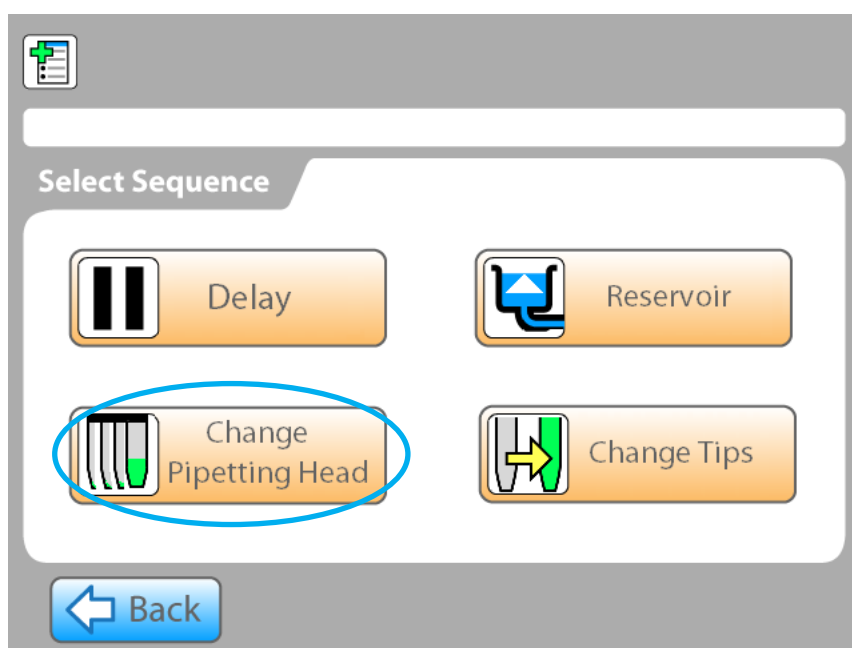


Installation of a Pipetting Head

1. Verify that the pipetting module is properly installed. Refer to “Installing a Pipetting Module (Cage)” on page 75 for instructions.
2. Refer to “Creating an aspirate/dispense program (sequence)” on page 55 for complete details, then from the Select Sequence screen, select “More”.



3. Select “Change Pipetting Head.”



4. Follow the system prompts. Wait for the pipetting module to move to the head loading position, then install a pipetting head into the pipetting module. Press the head in until it snaps in place

Pipetting head loading into NTC pipetting module



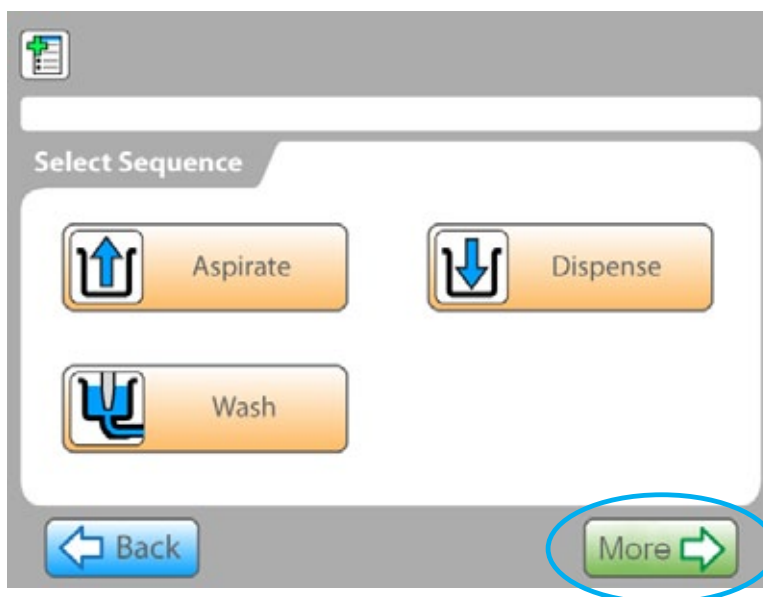
1. Carefully align pipetting head to slide in.
2. Slide pipetting head into pipetting module.
3. Press into pipetting module until it clicks in place.

5. When you change heads, the system may prompt you to enter tip details. Complete these items by following the screen prompts, if applicable.
6. When all parameters are set, the Command List screen will display. From this screen, you can scroll through your program and test each step or execute the full program. See [“Creating an aspirate/dispense program \(sequence\)”](#) on [page 55](#).

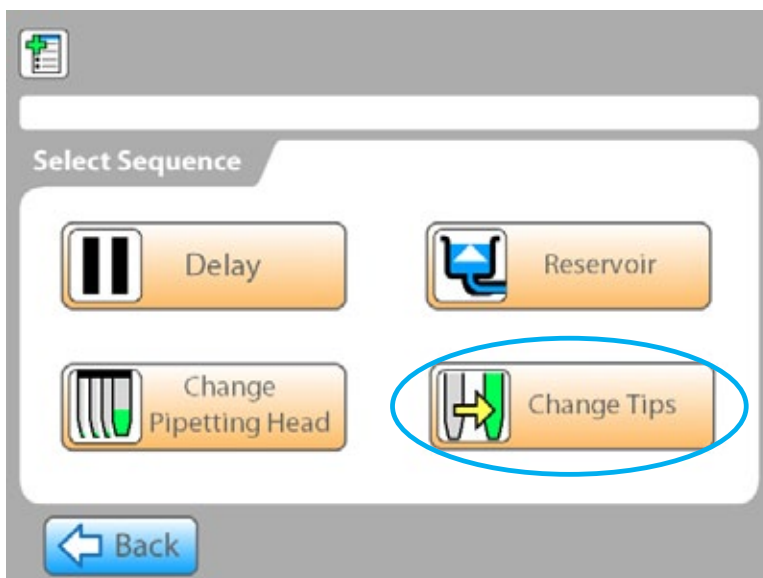
Change Tips - Sequence Summary


Pipette tips can be replaced quickly and easily in the Versette system. Tips can be changed before a run or during a run. To add the “Change Tips” sequence to a program:

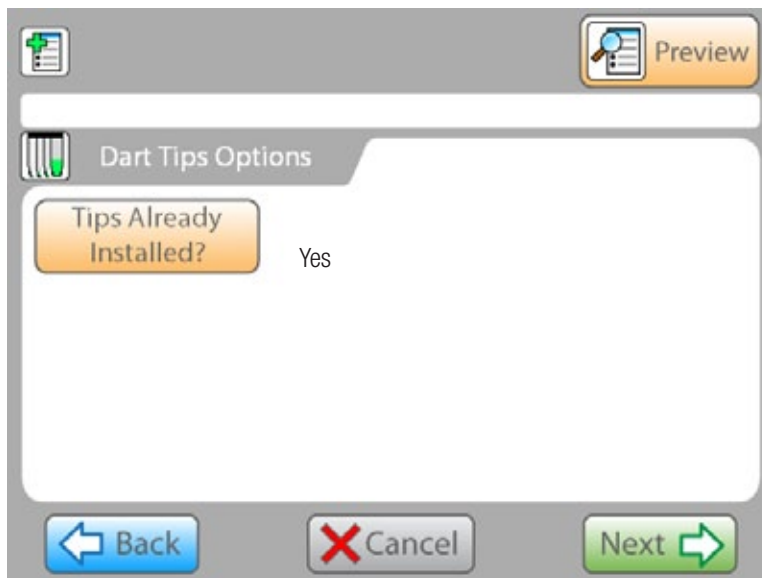
1. Refer to **“Creating an aspirate/dispense program (sequence)”** on **page 53** for complete details, then from the Select Sequence screen, select “More”.



2. Select **“More”**, then select **“Change Tips”**



3. Follow system prompts which will vary to match the type of head installed in the system. The screen display will vary for the type of pipetting head previously selected.
4. If prompted, tell the system if D.A.R.T. tips are already installed in the system (toggle YES or NO), then select .

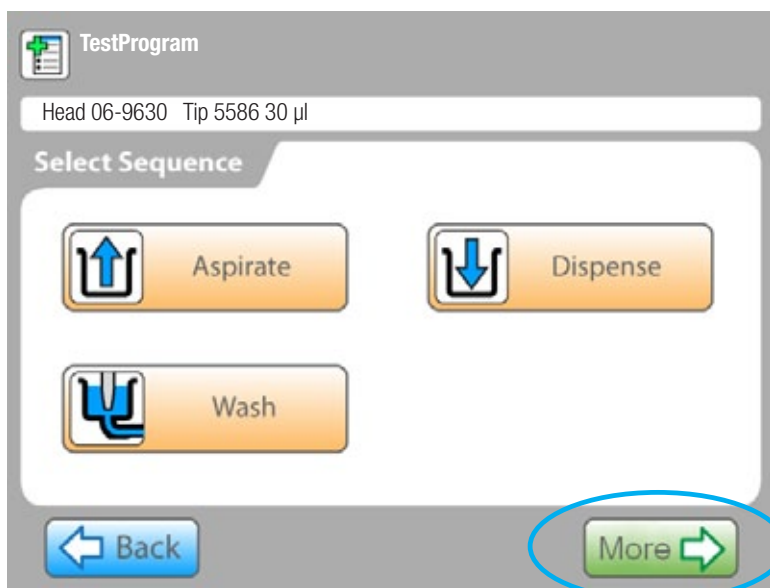


5. When all parameters are set, the Command List screen will display. From this screen, you can scroll through your program and test each step or execute the full program. See [“Creating an aspirate/dispense program \(sequence\)”](#) on [page 55](#).

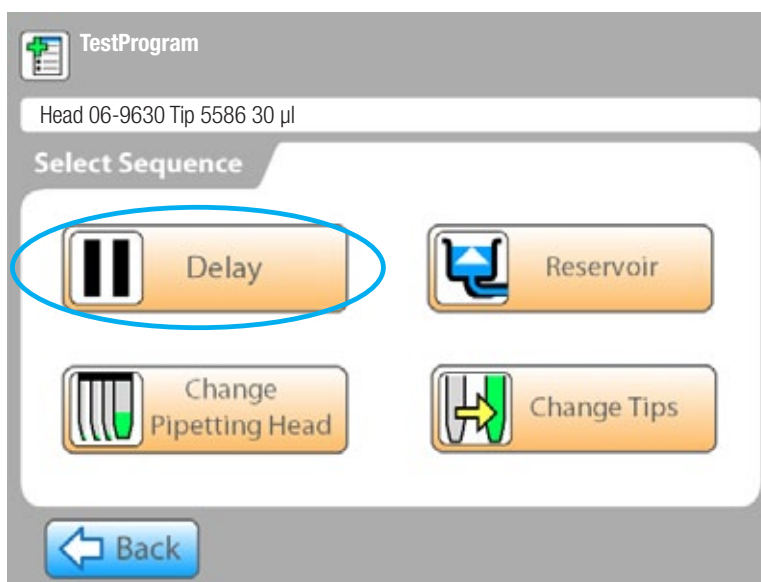
Delay - Sequence Summary

A delay sequence allows a programmed automatic timed delay, or prompts the operator to perform to take an action. To add the “Delay sequence to a program:

1. Refer to “[Creating an aspirate/dispense program \(sequence\)](#)” on page 55 for complete details, then from the Select Sequence screen, select “**More**”.



2. Select “Delay”.



3. Enter a delay in seconds, or select “**Wait for User**”, then enter a custom message if desired. Refer to table below.

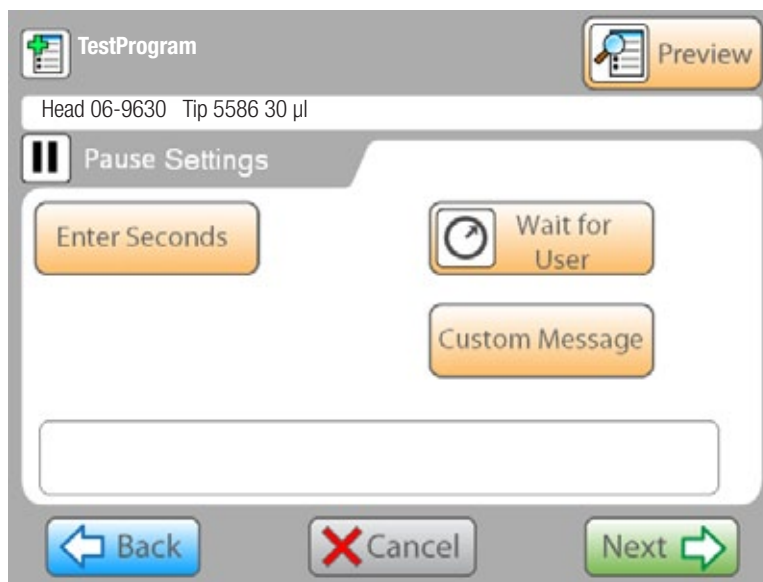


Table 14—Delay settings

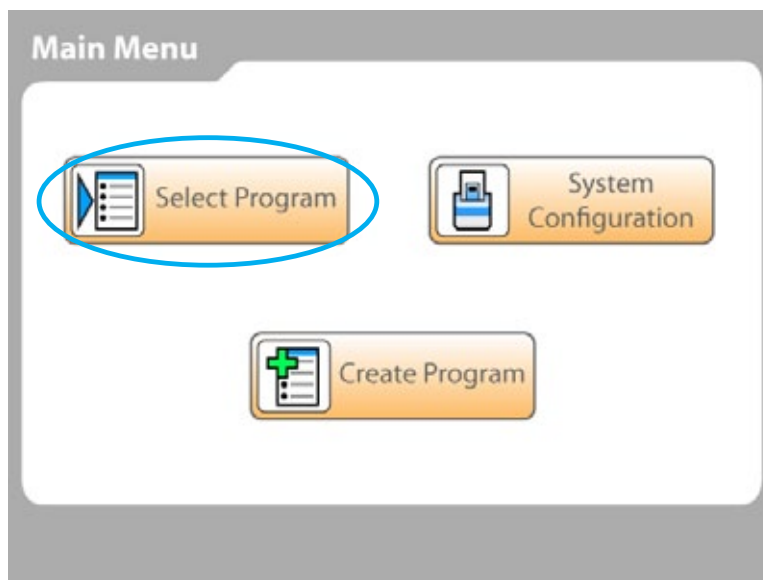
Selection	Description	Default Setting
	Enter the number of seconds to wait before proceeding to the next step.	0
	Select to delay until the user responds to a system prompt.	No
	Select to enter a custom message to the user. This message will be displayed during the delay cycle.	Off
Custom Message display	Displays custom message. Select “OK” to resume Versette Operation	

4. When all parameters are set, the Command List screen will display. From this screen, you can scroll through your program and test each step or execute the full program. See “[Creating an aspirate/dispense program \(sequence\)](#)” on [page 55](#).

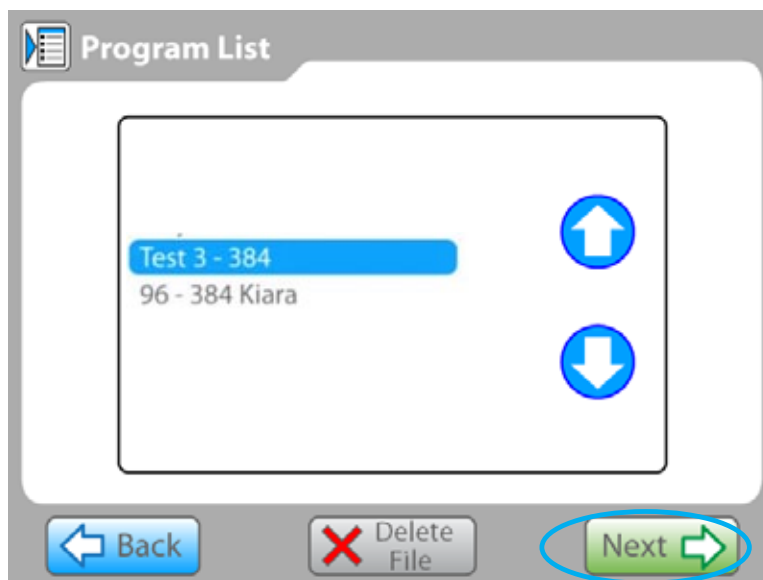
Selecting a Program

To select and run an existing program:

1. Choose "Select Program" from the Main Menu.



2. Use the arrows to highlight an existing program, then select "Next".



3. Highlight a program, then select "Next". The sequence will be displayed. Changes can be made on the displayed screen or the sequence can be run.

System Configuration

The System Configuration screens provide access to advanced functions, summarized below. Refer to the on-board software for any updates.

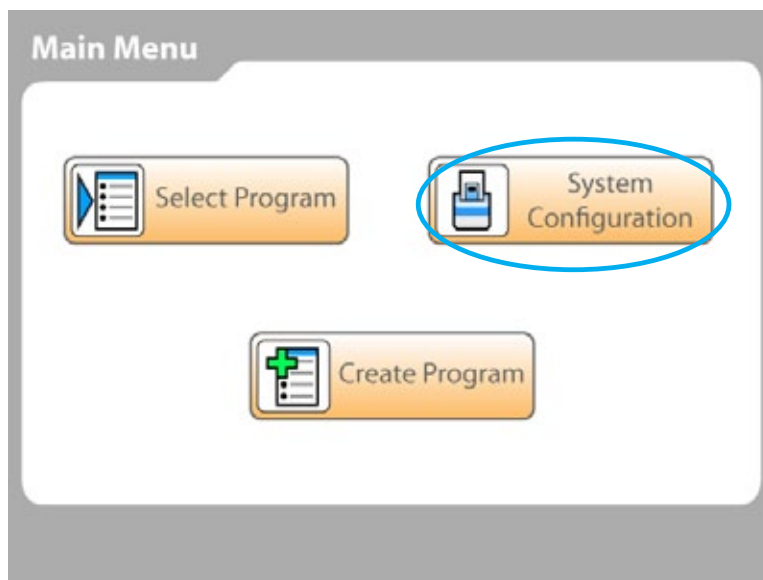
Table 15—System Configuration Options

Selection	Description	Default
Remote Mode	Selects Remote Mode operation to allow use of the system by a remote computer, for example, a laptop running ControlMate software.	Local
Install Pipetting Module	Follow prompts to install pipetting module. See "Installing a Pipetting Module (Cage)" on page 75.	
Download Firmware	Download firmware updates as directed by Thermo Fisher Scientific representative	
Enter System Code	Allows the user to enter service commands (service and advanced troubleshooting codes), if applicable for the system.	
Modify ON/OFF Default Values	Set default values for speed, cycles, volumes, and other actions as provided in the particular software release. Refer to example instructions below.	

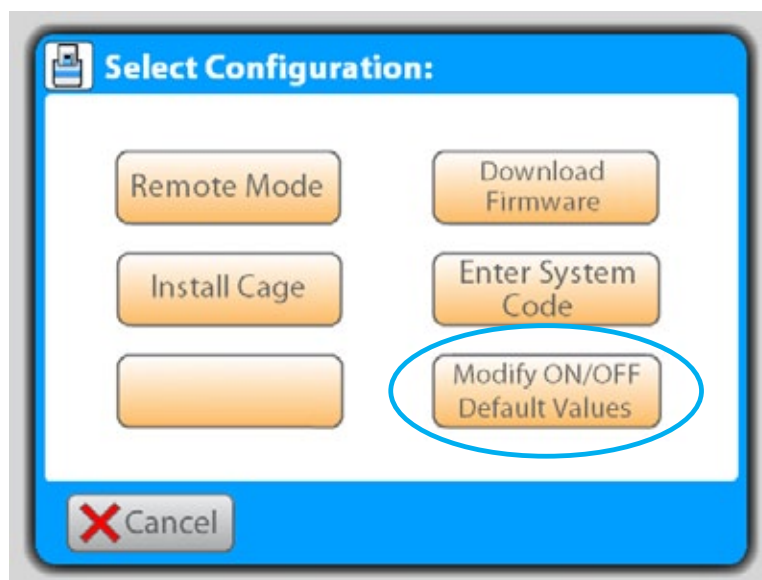
Various default speeds, cycles, volumes and other actions can be configured by the user, as provided via the on-board software screen programming. Examples are shown below. Refer to the on-board software installed on a particular system for any updates, limitations, and/or changes.

System Configuration Screens: Modification

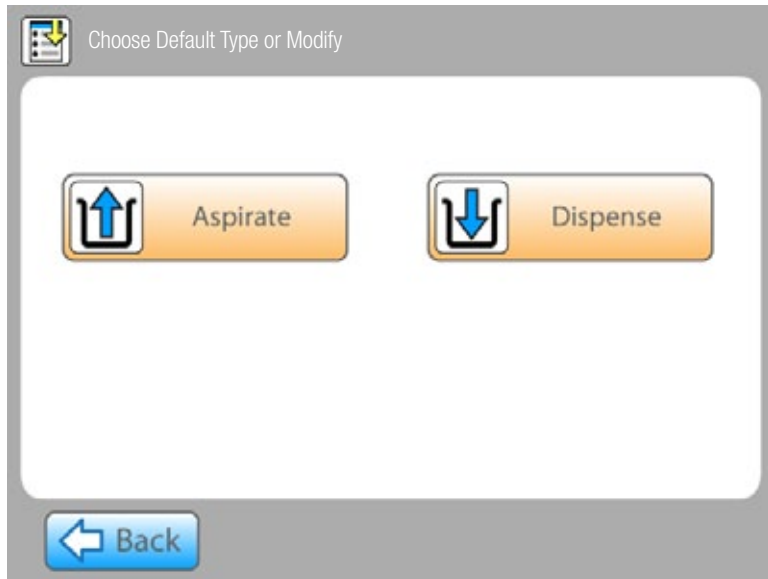
1. Choose **“Select Program”** from the Main Menu.



2. Select **“Modify ON/OFF Default Values”**



3. Select either “**Aspirate**” or “**Dispense**”.



4. Select an item, then enter a default value.



Table 16—System default options

Selection	Description	Default
Air Gap %	A percentage of the programmed aspiration volume which is used to create additional movement of the aspirate/dispense piston(s). The air gap can then be used to fully push the entire desired volume out of the pipette during dispense. See system optimization section of this manual.	10%
Prime % or Overstroke %	A percentage of the programmed aspiration which is then used to move the piston head to add additional fluid to the aspiration.	10%
Dwell Time	A value of 0.5 to 5.0 seconds. During aspiration, the tip will stay in the liquid source for the dwell time entered. During dispense, the tip will wait for the dwell time entered, before moving to its next commanded location.	0.0 sec.

System Shutdown

Emergency Interrupt

In case there is any abnormal situation during operation, such as fluids spilling inside the instrument, follow the steps below:

1. Switch OFF the instrument.
2. Unplug the instrument immediately from the power supply.
3. Carry out appropriate corrective measures. However, do not disassemble the instrument.
4. If the corrective measures taken do not help, contact authorized technical service or your local Thermo Scientific representative.

Normal Shutdown

Normal system shutdown may include removal of fluid vessels from the stages, removal of pipette tips, flushing/cleaning of all tubing, and powering off the system.

1. Remove used tips from the system.
2. Remove source fluids from the system.
3. Flush all tubing (connect inlets to cleaning solution) with appropriate fluid to clean any reagents or other fluids from the tubing lines. Use caution to select a cleaning fluid that is compatible with the source fluid you are using.
4. Perform a final flush of all tubing with distilled water.

IMPORTANT The flush time will vary for the cleaning solution you have used. It is essential that all cleaning solutions are removed from the inlet tubing and properly flushed to prevent future cross-contamination. ▲

5. Remove all plates, tubes, reservoirs and related accessories from the system.

CAUTION Typically, all vessels are properly cleaned per individual laboratory requirements. Follow your facility's instructions and all local and national regulations for proper cleaning and/or disposal. ▲

6. Turn off the system power switch.

ControlMate Software

ControlMate is a **Windows**[®]-based application that provides a graphical user interface for creating and running pipetting programs. From this application you can create and run a variety of pipetting operations, from repetitive liquid transfers to complex pipetting sequences.

Because the **ControlMate** software is tightly integrated with the **Versette** instrumentation, you can control all **Versette** functions from the software, such as: changing tips and pipetting heads, or fine-tuning plate movements to handle delicate pipetting operations.

This section covers software installation and setup. Refer to the **Versette ControlMate User Manual** for use instructions.

Minimum System Requirements

To ensure successful operation, hibernation and sleep mode on the laptop/computer needs to be disabled prior to installing ControlMate and subsequent running of protocols. Refer to the following pages for details.

Computer minimum requirements:

- Computer running Microsoft® Windows® XP sp3 or Windows® 7 (32- and 64-bit)
- Screen resolution set to at least 1024 x 768
- CD-ROM, removable drive, or network drive for access to installation software

Computer interface requirements:

RS-232 Serial connector cable no longer than 3 meters.

Note! To ensure proper communications with a laptop or other computer, do not use an RS232 cable longer than 3 meters when connecting the computer to the system. ▲

Serial connector details:

- Serial RS-232C
- 115,200 bps
- 8 data bits
- 1 stop bits
- Parity: none

If no RS-232 connection is available on the computer, a commercially available USB/Serial adapter may be used. Consult with your local computer specialist for compatibility and connectivity issues and requirements. Thermo Fisher Scientific recommends the Keyspan Hi-Speed USB Serial Adapter number USA-19HS, available from CDW as part number 555201 with UNSPC 43201408. This is a 9-pin D-Sub (DB-9) to 4-pin USB Type A adapter, serial connectivity technology with RS-232 data transfer rate of 230 Kbps, or equivalent. Please note that not all adapters will work with the **Versette** system.

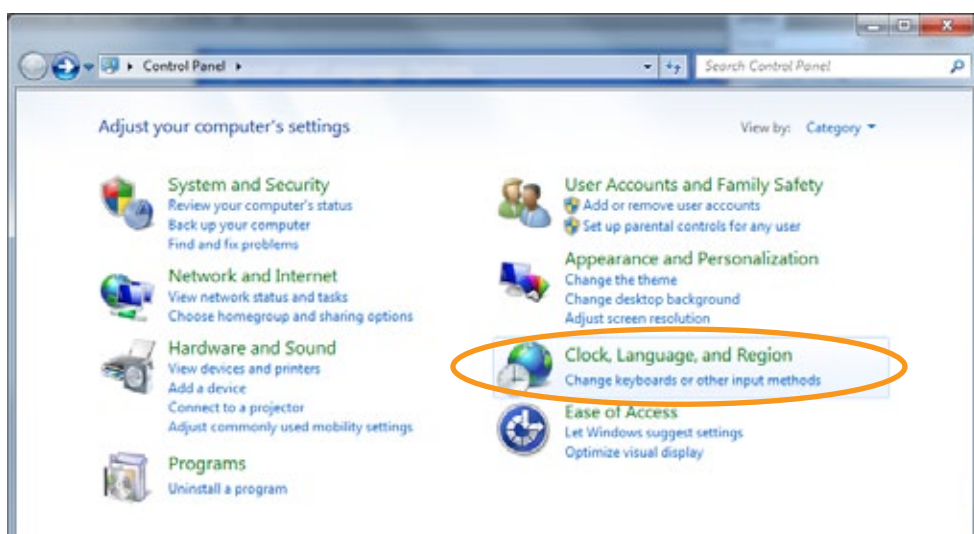
English Language Requirements

The Versette system uses English conventions for all numerical entries. For example, 1000 is entered as 1,000 and 1400 is entered as 1,400. For some regions or computers where English is not the default language, the computer's Regional Settings must be set to English to properly operate with ControlMate:

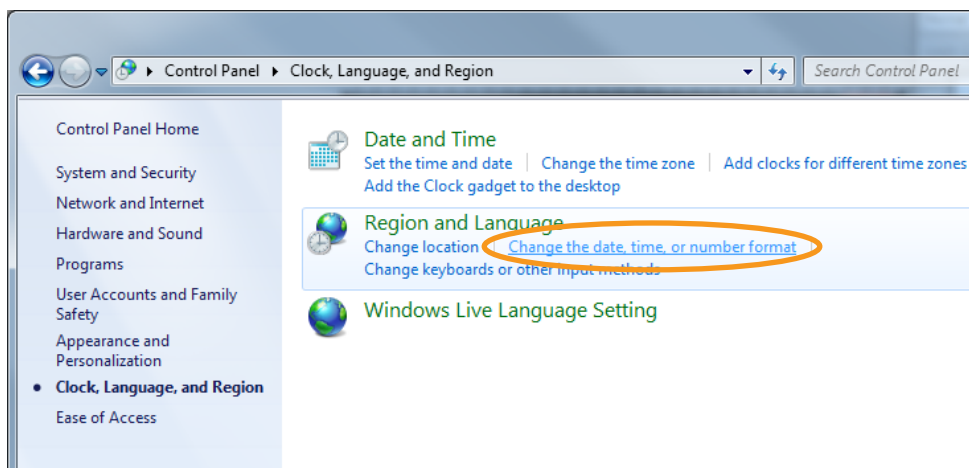
1. From the Windows Start Menu, select Control Panel.

2. Select “**Regional and Language Options**” (Windows® XP), or “**Clock, Language and Region**” (Windows 7).

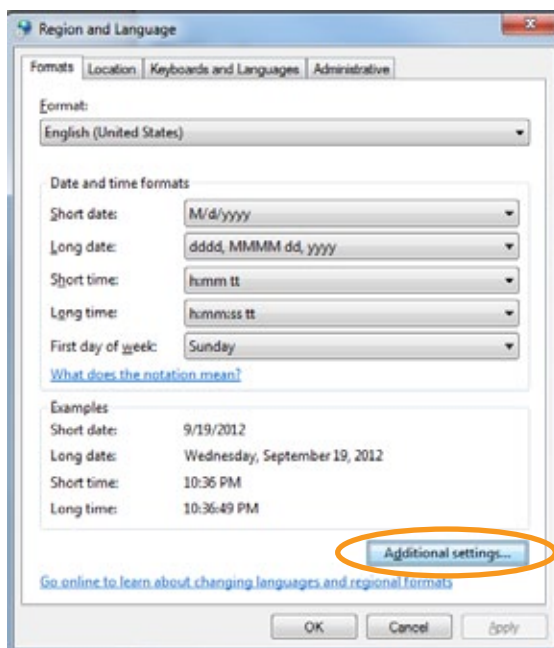
Note! The following instructions show Windows 7 screens. Similar screens are available for Windows XP. Consult your computer documentation for any variations/details as the menu selections can change.



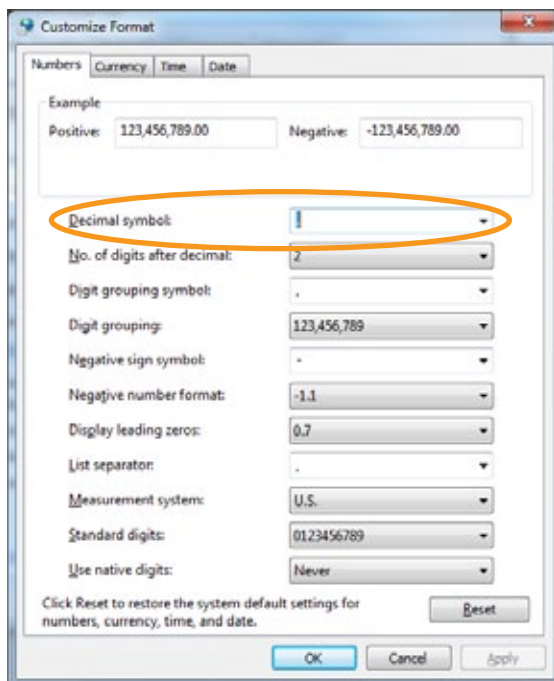
3. For Windows 7, under “**Region and Language**”, select “**Change the date, time, or number format**”.



4. In Windows 7, on the “**Region and Language**” screen, click “**Additional settings...**”.



5. Change decimal symbol from comma (,) to decimal (.).



6. Click “**Apply**”, then “**OK**” to close the window.

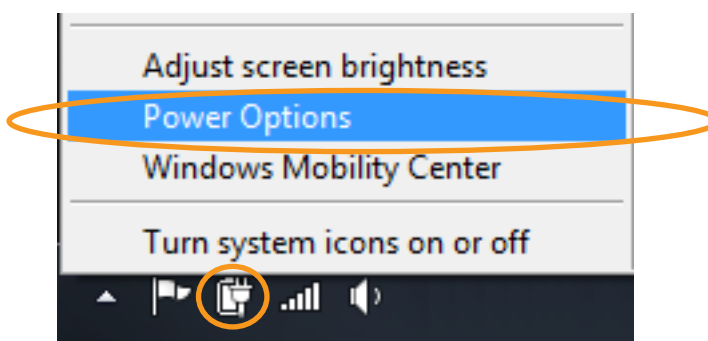
Installing ControlMate

The ControlMate software can be used from a CD, a flash drive, or installed from a common directory or server. The software can be downloaded from <http://controlmate.net/>.

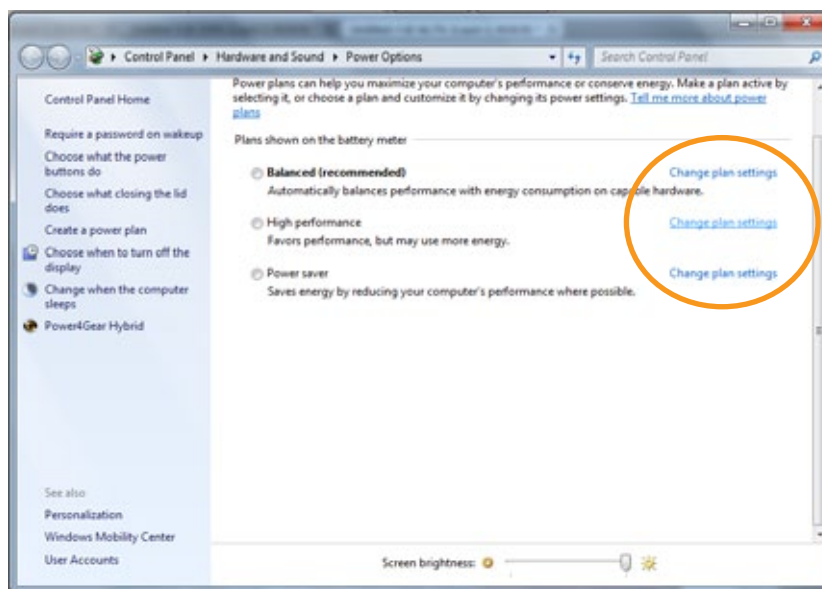
Disable hibernation and sleep mode on the laptop/computer prior to installing **ControlMate** and subsequent running of protocols.

Refer to your computer's documentation on power mode options for instructions. Typically these settings are available by right or left clicking on the power icon on the toolbar, then selecting a power option and disabling hibernation and sleep mode, as detailed in the following steps.

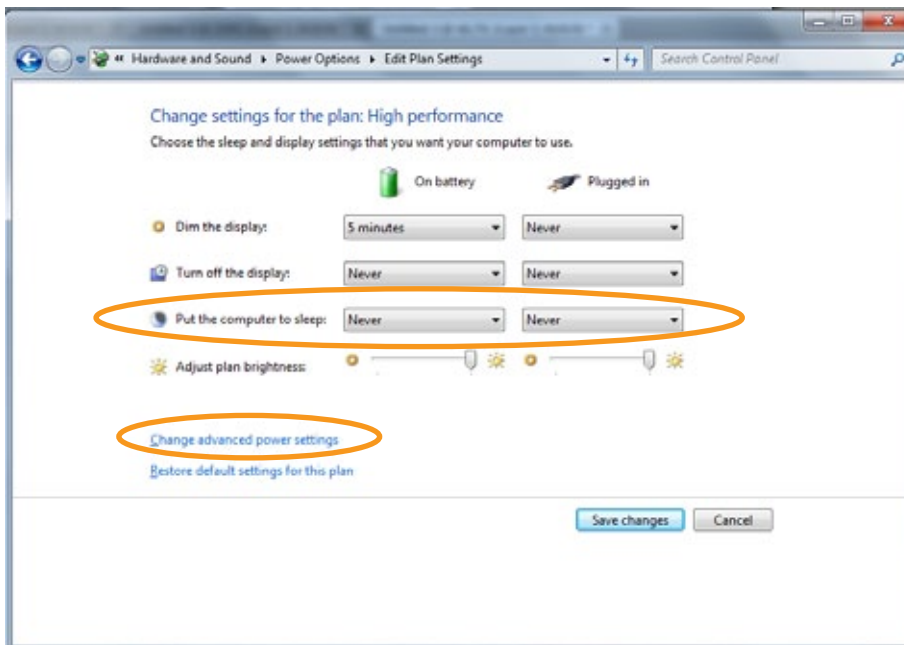
1. Right or left click on the power icon then select "**Power Options**". Alternatively, select Power Options through Windows Control Panel.



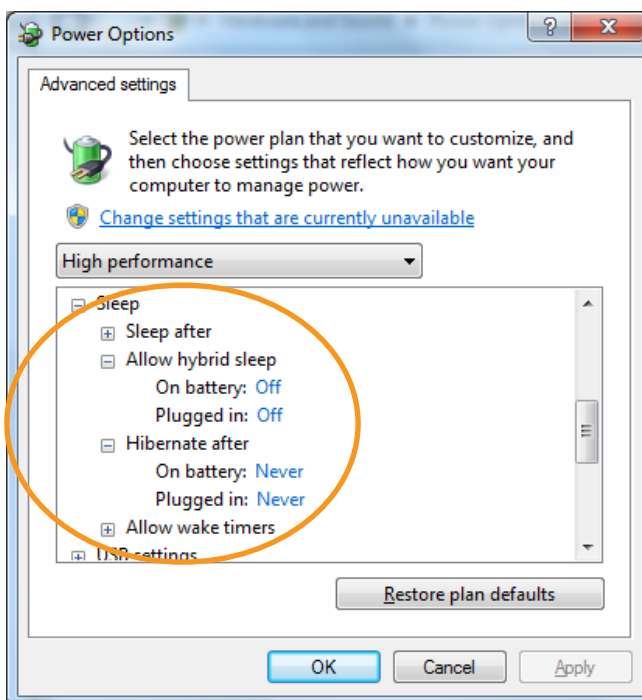
- a. Select "**Change plan settings**" for your selected power plan.



- b. Set sleep to “Never”, then select “Change advanced power settings”.

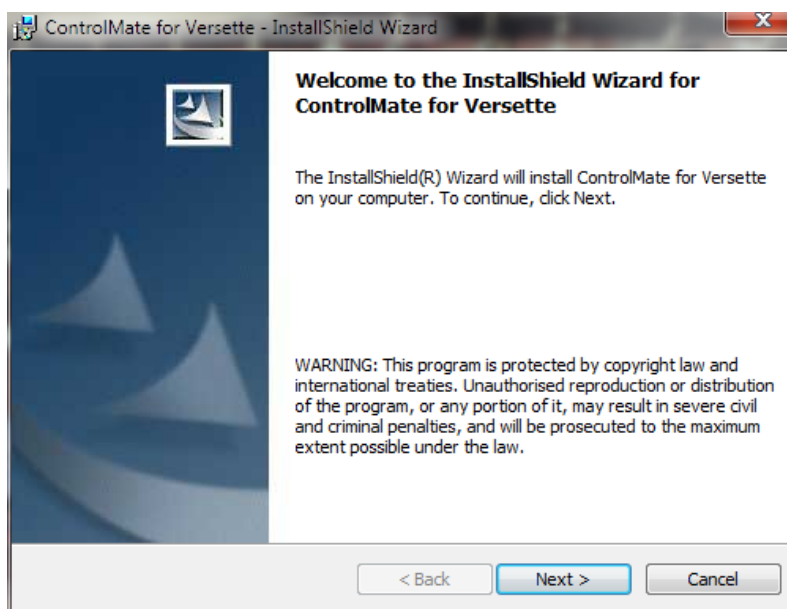


- c. On the “Advanced settings” screen, expand the “Sleep” setting then set all sleep and hibernations to “Never”. Click “Apply” then “OK” to save the changes.

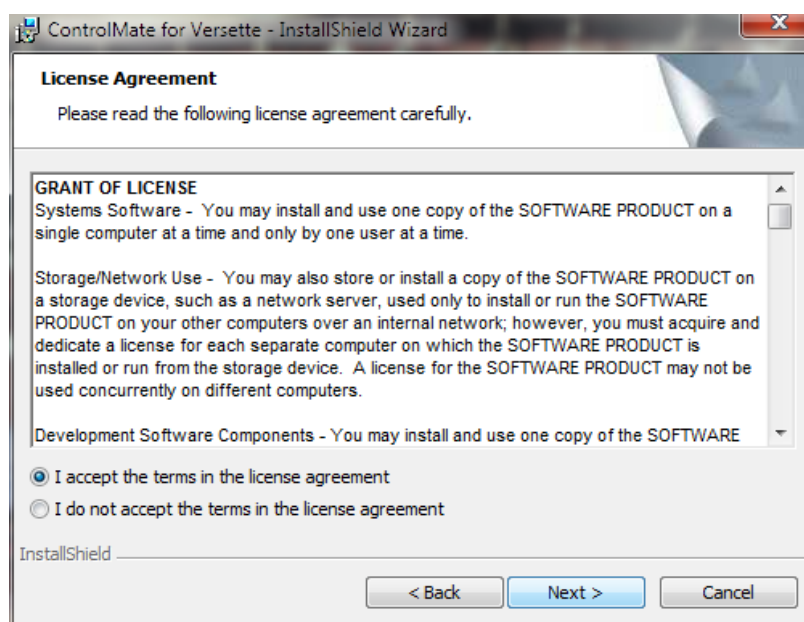


- 2. Locate the **setup.exe** file on your hard drive, flash drive, common drive, network, or CD, then double-click on the **setup.exe** file to launch the installation program.

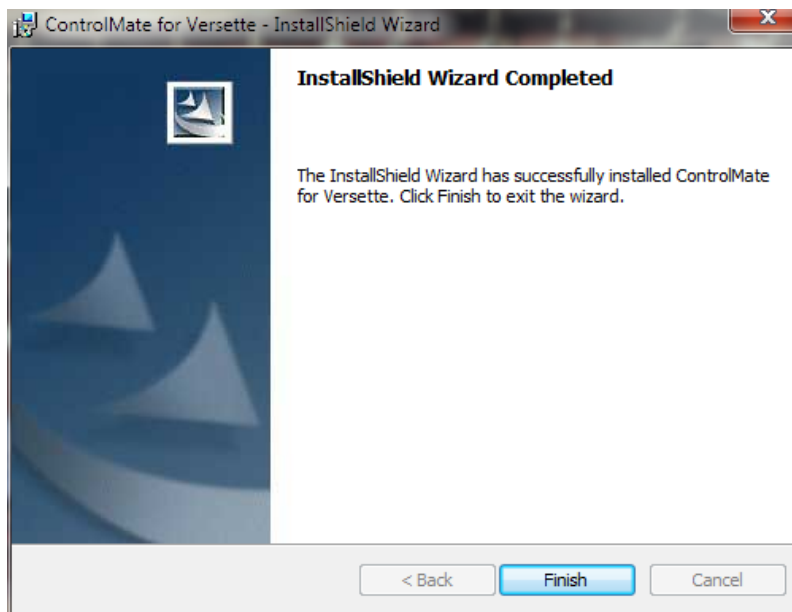
3. At the InstallShield Wizard, click **Next.**



4. Read the License Agreement, select "I accept the terms in the license agreement" to agree and continue to install the software, then click **Next**.



5. Wait for the ControlMate files to copy to your installation directory, then select “**Finish**” when displayed, to exit the wizard.



6. Refer to the **ControlMate User Manual** for use instructions.

5

Calibration



Calibrating the System Coordinates

Purpose/Summary

All systems are calibrated at the time of manufacture. Due to the precise nature of the equipment's motions, the "coordinate calibration" needs to be verified, and minor adjustments are typically required, upon installation. Calibration consists of placing "teach tools" in the system and moving the system stages and pipetting module to pre-defined coordinates. Minor adjustments to the precise calibration locations help to ensure precise aspiration and dispense.

When to Calibrate the System

The system's coordinate system should be calibrated upon installation and whenever the system is moved. The coordinate system can also be verified and/or adjusted at periodic intervals as determined by the usage and end-user.

Coordinate System

The coordinates used on the **Versette** system are standard geometric coordinates:

- X-axis: left-to-right position
- Y-axis: front-to-back position
- Z-axis: up and down (height) position

Skill Level

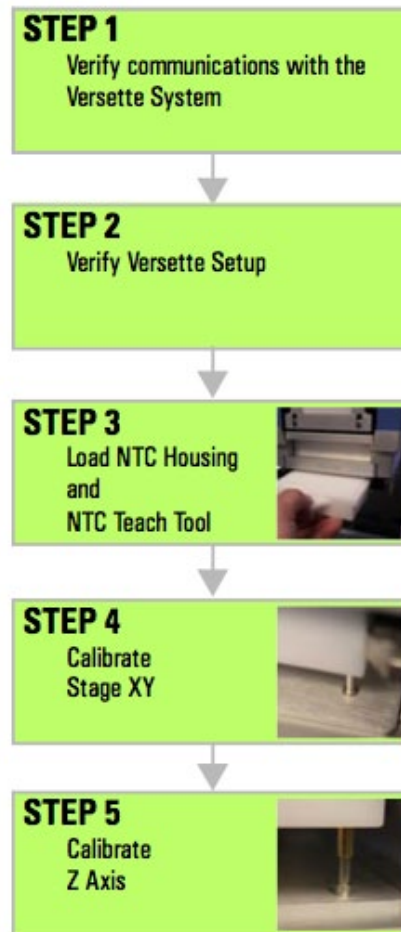
Coordinate calibration is typically performed by a trained professional but can be performed by most technicians who understand how to use the ControlMate software, are familiar and comfortable with working on precision equipment and with working with Windows-based software, and who understand basic X-axis (left-to-right), Y-axis (forward-to-back), and Z-axis (vertical) coordinates. The coordinate system is referenced from the front of the machine where the operator stands.

The following procedures use ControlMate software to calibrate the coordinate system. Refer to the **ControlMate User Guide** for additional information on the use of ControlMate software.

Versette System Calibration Flowchart

All calibration steps require the use of the [Calibration Plate](#). The methods are shown below:


Figure 10—Versette Calibration Master Flowchart

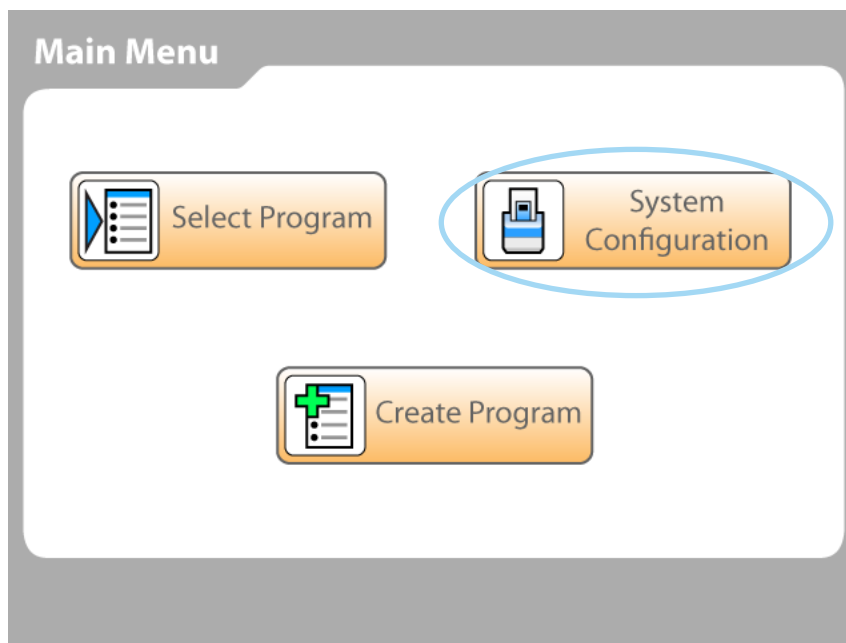


Required Equipment

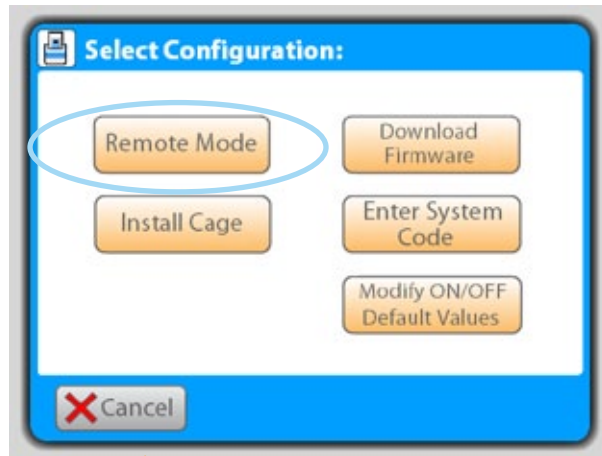
- **Versette** system with 6-stage assembly
- ControlMate software, installed on computer or laptop with communications cable
- Calibration Plate
- NTC Teach Tool

STEP 1: Verify Communications with the Versette System

1. Verify that the stage assembly has been installed properly on the system. See Installation section.
2. Connect the **Versette** to a computer running ControlMate software. Refer to the **ControlMate User Manual** for details on setting “View” options including icon size and text displays.
3. Select  from the Main Menu.



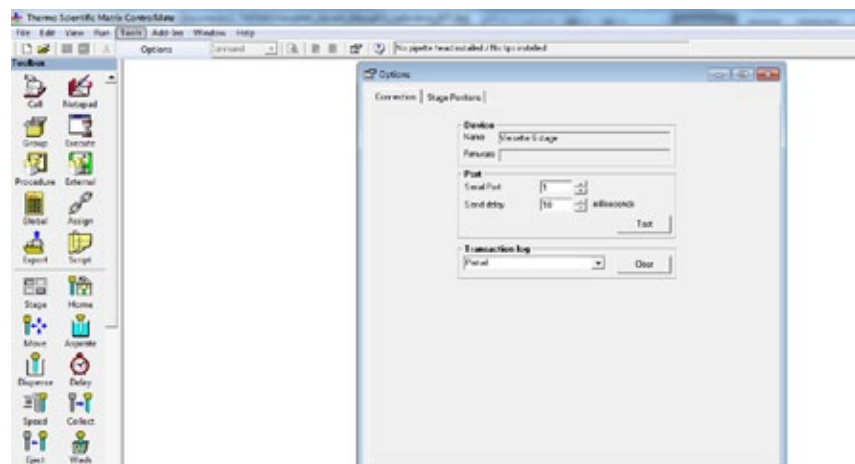
4. Select **Remote Mode** to set the system to remote operation.



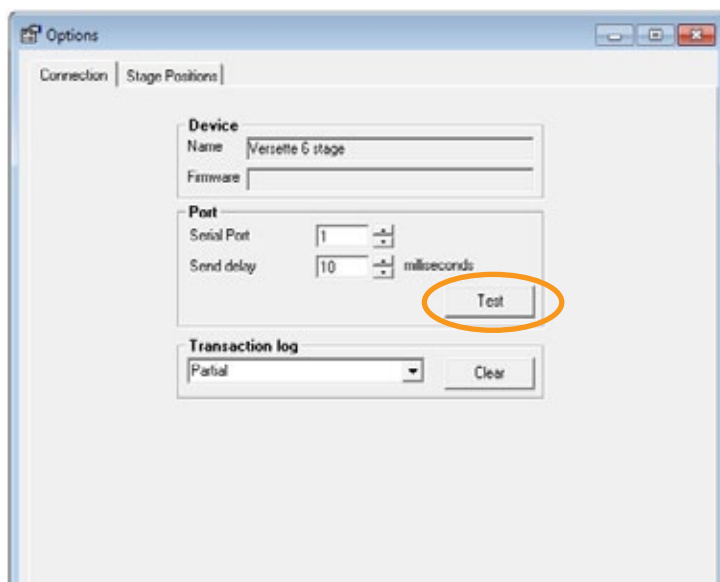
System operating in remote control mode



5. Using the ControlMate software, click on the Tools menu and select **“Options”**.



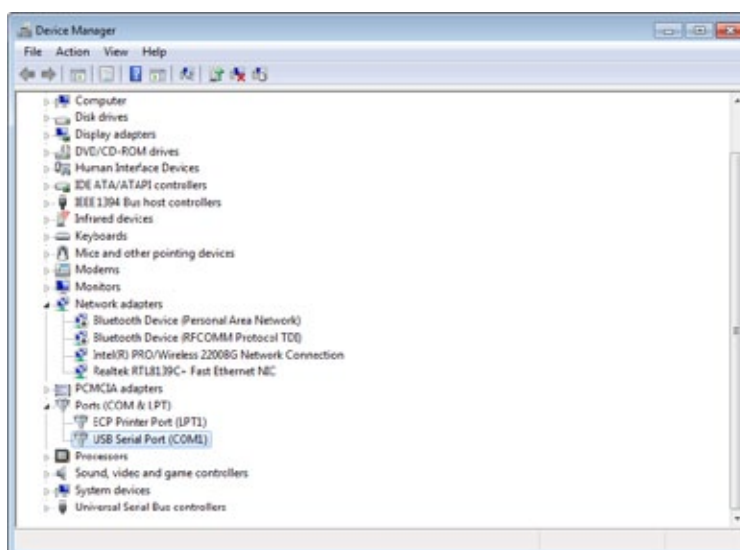
6. Click the “Test” button.



7. Verify that the Device Connection is OK.

The system defaults to Serial Port 1. If necessary, use the arrow keys to select the Serial Port (RS232 or RS232 Virtual Serial Communication port) for you computer connection and re-test. Always check your serial cable connections if there is a communication problem.

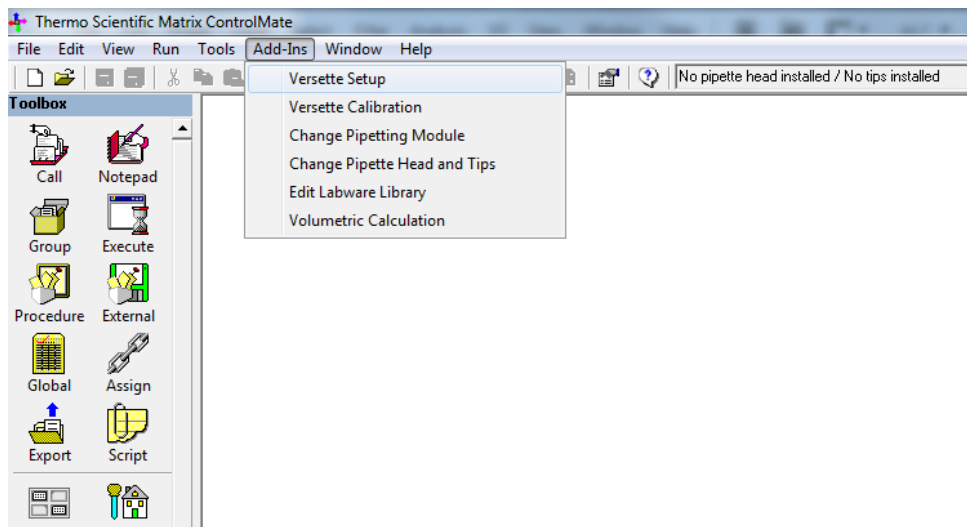
Note! If you are unable to connect, verify that your computer is recognizing the port that the communication cable is attached to on your computer. You do this through Device Manager. In Windows, select Start then Control Panel, then Hardware and Sound (on Windows 7 systems), then DeviceManager. The screen should display the port as shown below:



- Click on the Test button to verify that the Device Connection is OK.

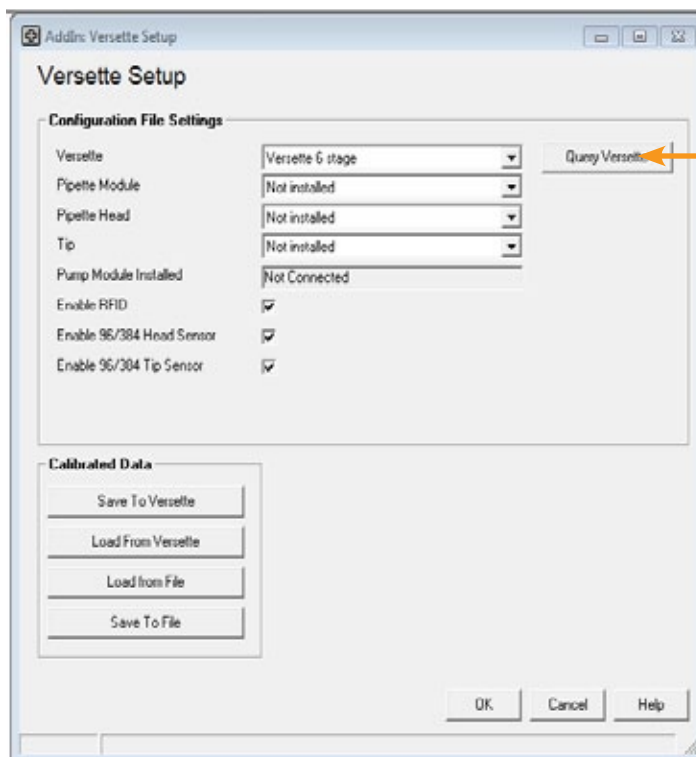
STEP 2: Verify Versette System Setup

- From the **Add-Ins** drop-down menu, select **“Versette Setup”**.



- Click the **“Query Versette”** button to confirm machine and ControlMate are properly communicating. Drop-down fields will automatically prefill with the appropriate information.

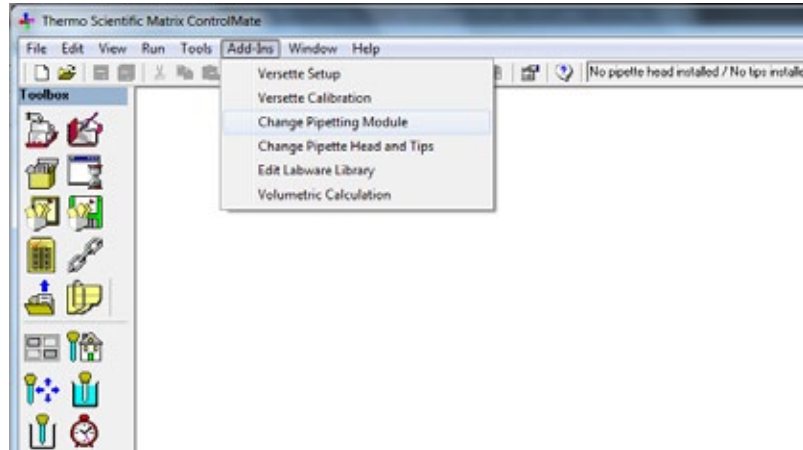
You can also make any changes to the Configuration File Settings by selecting the correct system configurations from the drop-down menus. Check marks should be placed next to all optional equipment as shown below (even if not installed, as it will not affect performance). A check mark should be placed next to the RFID at all times during calibration and normal system operation. This feature is only turned off during manufacture or field service troubleshooting activities. When finished, click **“OK”**



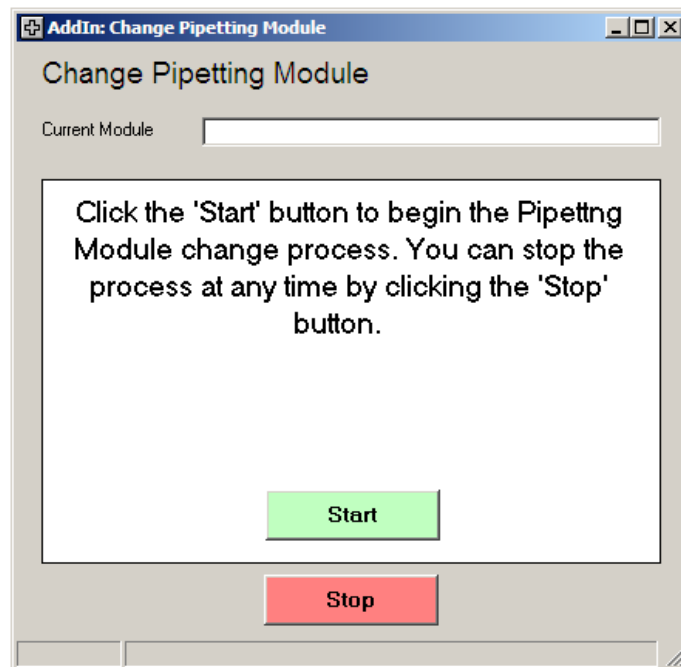
STEP 3: Install the NTC Pipetting Module and NTC Teach Tool

If not installed, install an NTC Pipetting Module as follows:

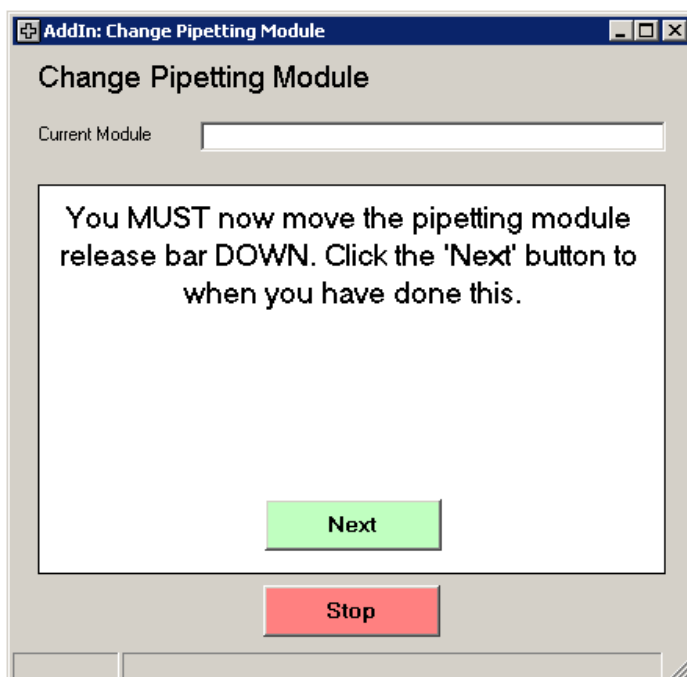
1. From the **Add-Ins** drop-down menu, select **“Change Pipetting Module”**.



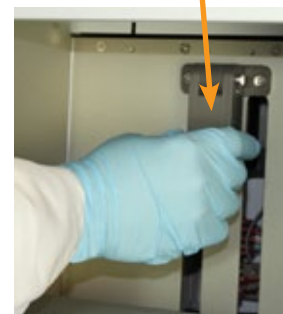
2. Follow the screen prompts to install an NTC pipetting module:
 - a. Verify that all safety shields are in place, then click **“Start”**.



- b. Move the release bar DOWN then click **“Next”**.

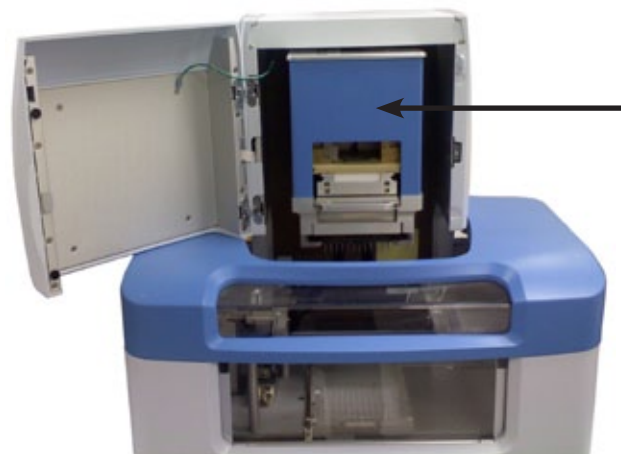
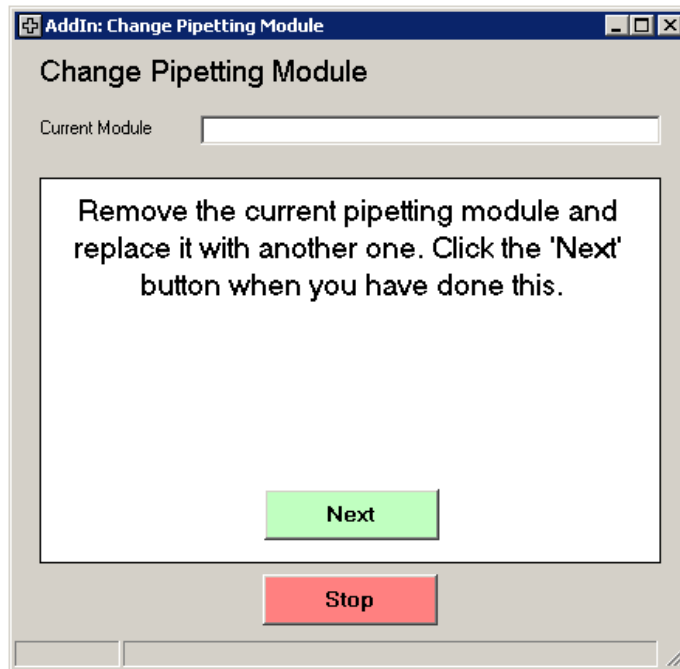


Rotate Release Bar to point down



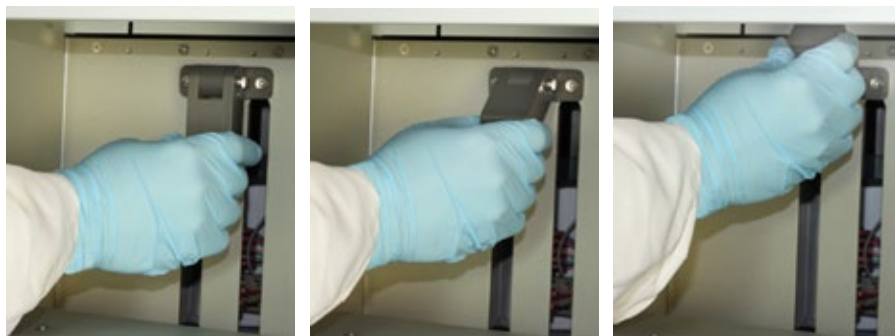
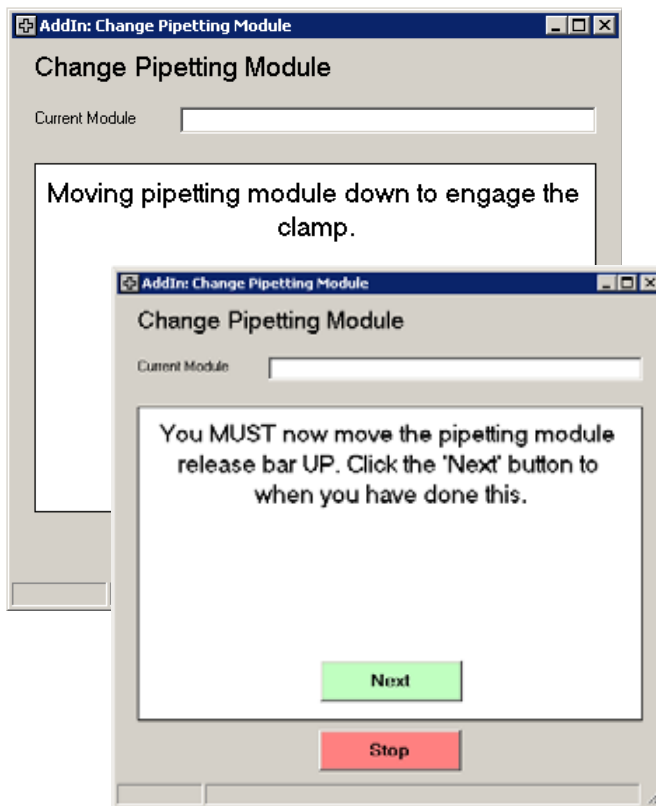
Rotate Release Bar to DOWN position.

- c. Carefully lift and position the pipetting module onto the pipetting module holder then click **“Next”**.



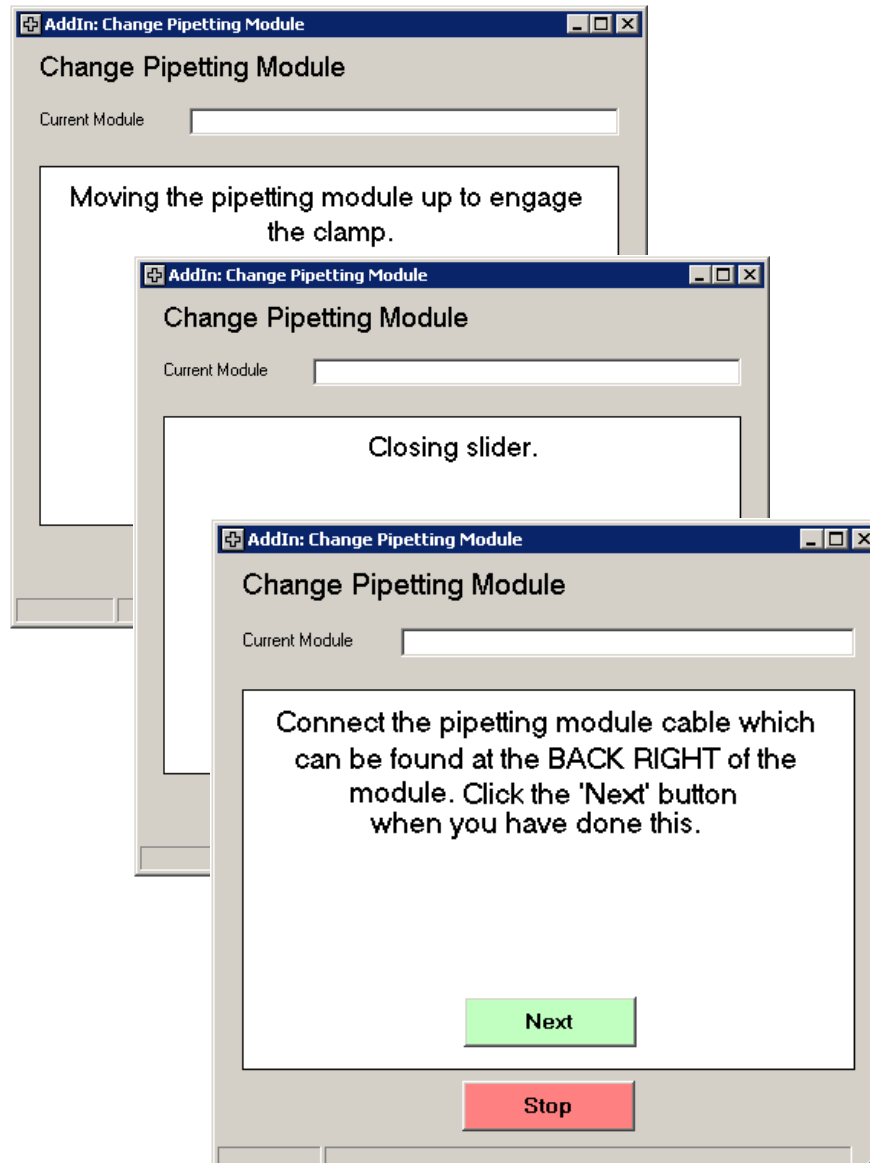
Carefully lift and position the pipetting module into the system

- d. Wait for the system prompt, then move the release bar UP, then click **“Next”**.



Rotate Release Bar to UP position.

- e. Wait for the system prompt then connect the pipetting module cable, then click “**Next**”.

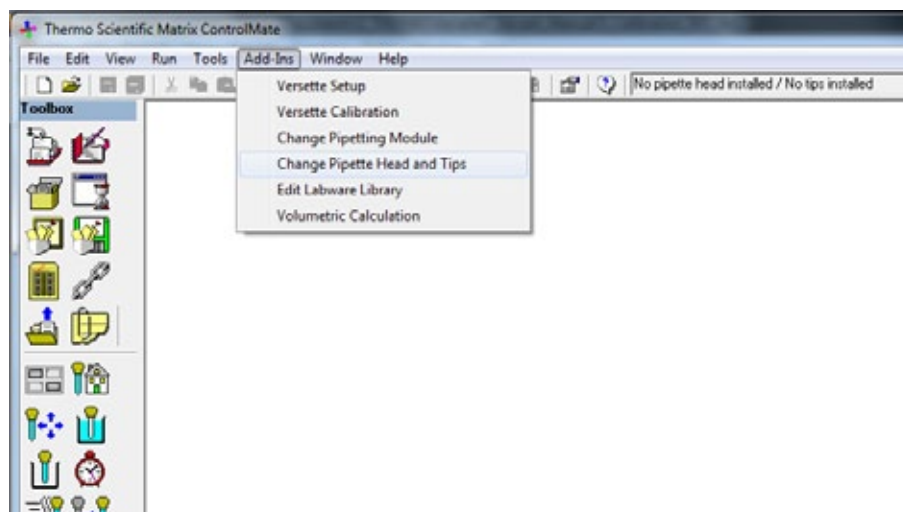


The cable connector may have red dots which align to the system connector. The dots are difficult to see due to their location. Follow the screen messages carefully and press in firmly to ensure proper connection.

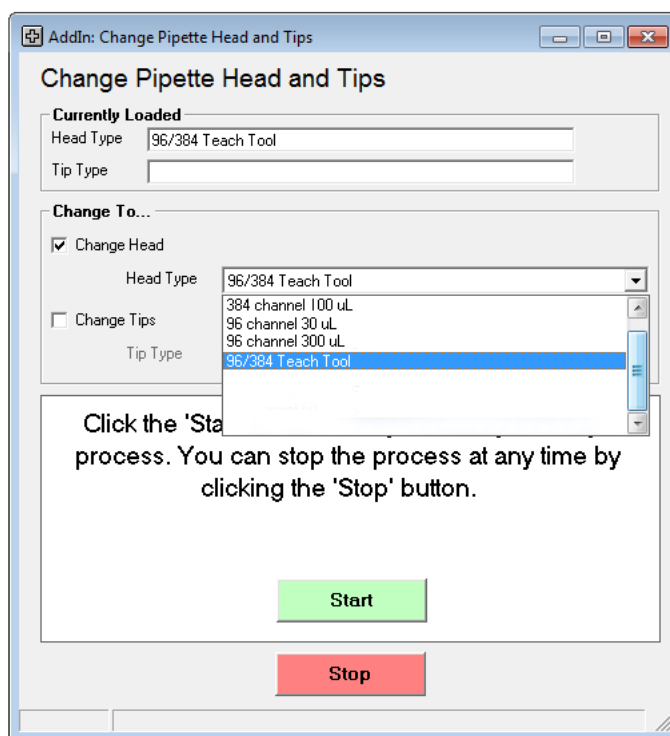
- f. Wait for the system to complete the load sequence and home all axes. Various messages will be displayed. When complete, the system will display “Change Complete...”. Close the window by clicking the “X” in the upper right-corner.

Note! If a head is already installed, simply open and close the door as requested to continue to work through the software/hardware interlock prompts. ▲

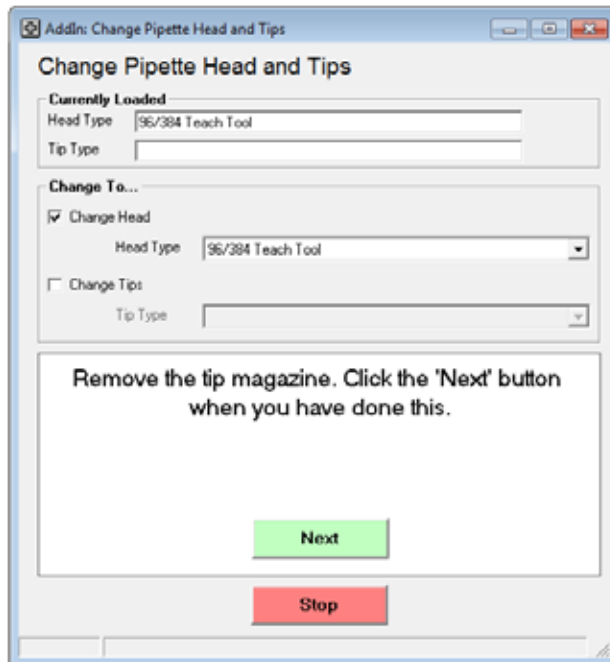
- From the **Add-Ins** drop-down menu, select **“Change pipetting head and Tips”**.



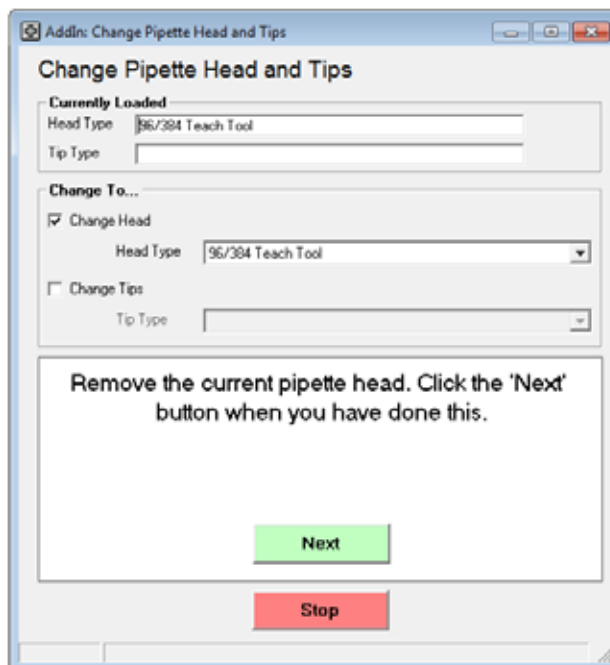
- Place a checkmark in **“Change Head”** then use the scroll-down field to select **“96/384 Teach Tool”**.



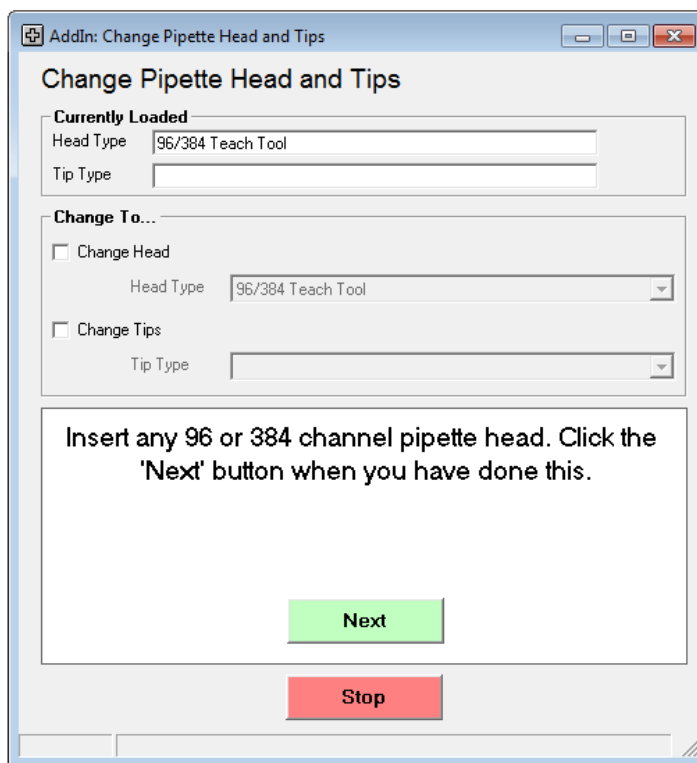
5. If a tip magazine is in the system, remove it, then click **Next**.



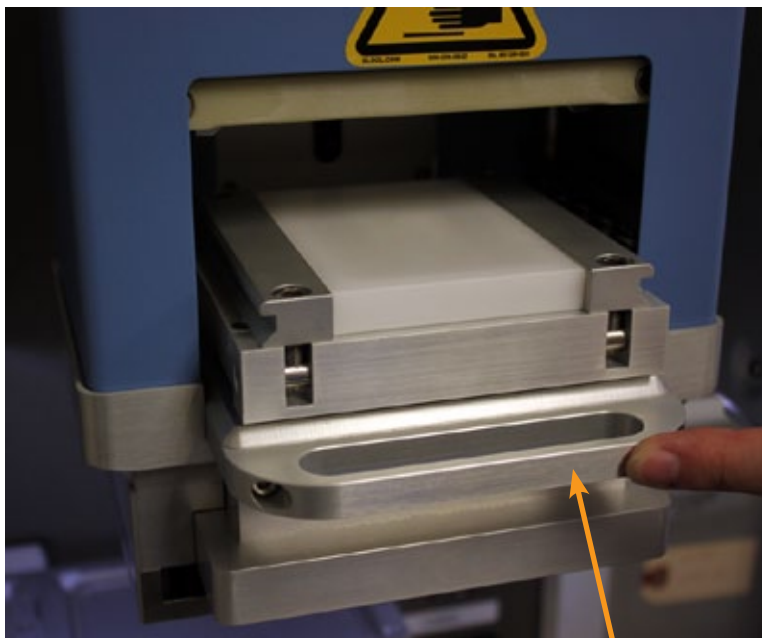
6. If a pipetting head is installed, remove it, then click **Next**.



7. Insert any 96- or 384- channel pipetting head, then click the **“Next”**.

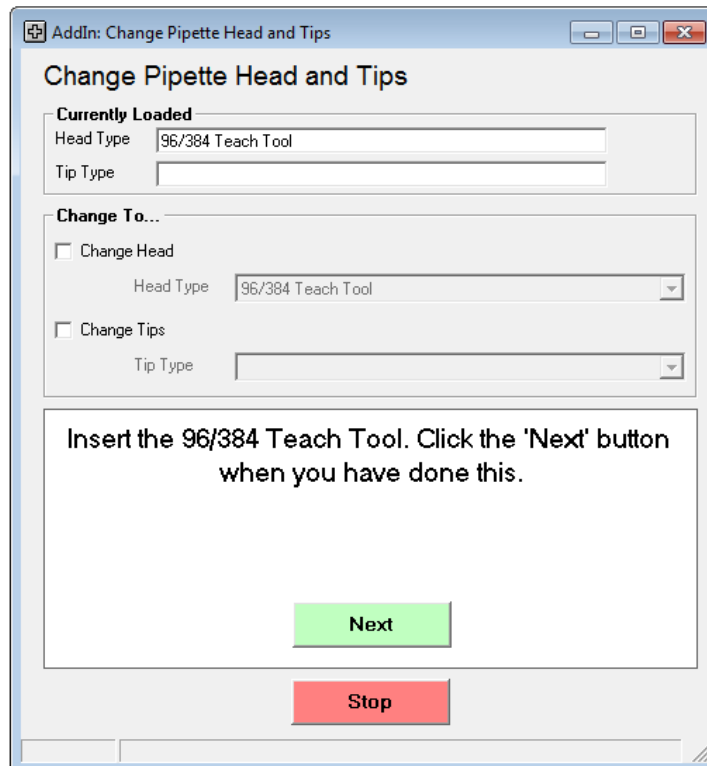


The screenshot shows a software window titled "AddIn: Change Pipette Head and Tips". The window has a title bar with standard Windows window controls. The main content area is titled "Change Pipette Head and Tips" and is divided into three sections. The first section, "Currently Loaded", contains two dropdown menus: "Head Type" set to "96/384 Teach Tool" and "Tip Type" which is empty. The second section, "Change To...", contains two checkboxes: "Change Head" and "Change Tips", both of which are unchecked. Below each checkbox is a dropdown menu, both currently set to "96/384 Teach Tool". The third section is a text box containing the instruction: "Insert any 96 or 384 channel pipette head. Click the 'Next' button when you have done this." Below the text box are two buttons: a green "Next" button and a red "Stop" button.



Press firmly in until the pipette head clicks in place.

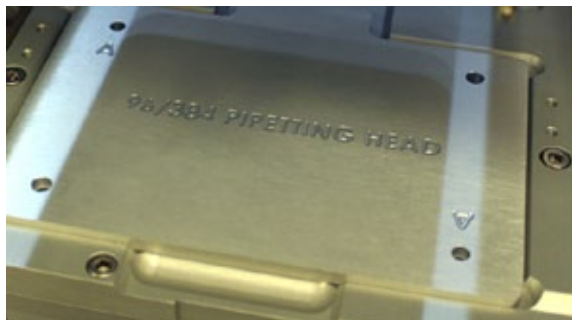
8. Insert the 96/384 Teach Tool, then click **“Next”**.



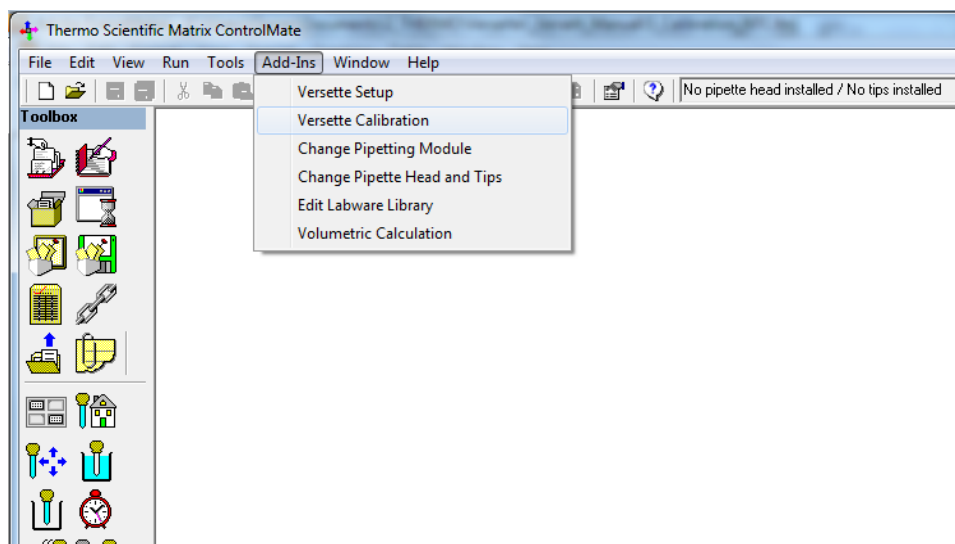
Press firmly in until the 96/384 teach tool clicks in place.

STEP 4: Calibrate Stage XY Coordinates

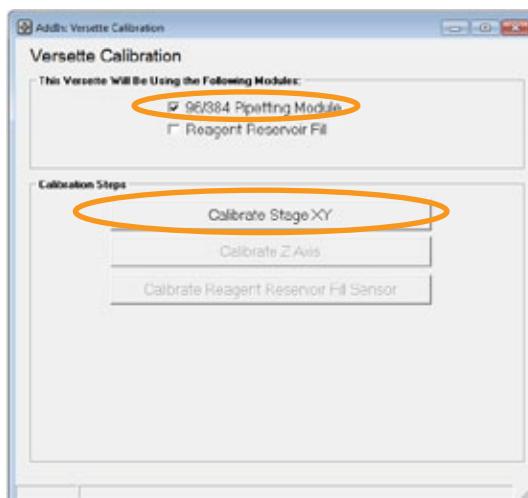
1. Place the **Calibration Plate** flat in position on Stage 2 with the **“96/384 PIPETTING HEAD”** side facing up.



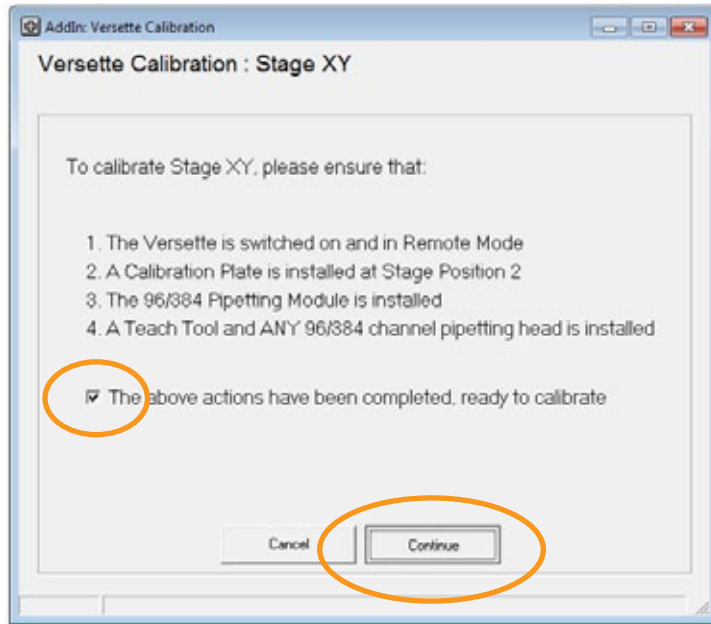
2. From the **Add-Ins** drop-down menu, select **“Versette Calibration”**.



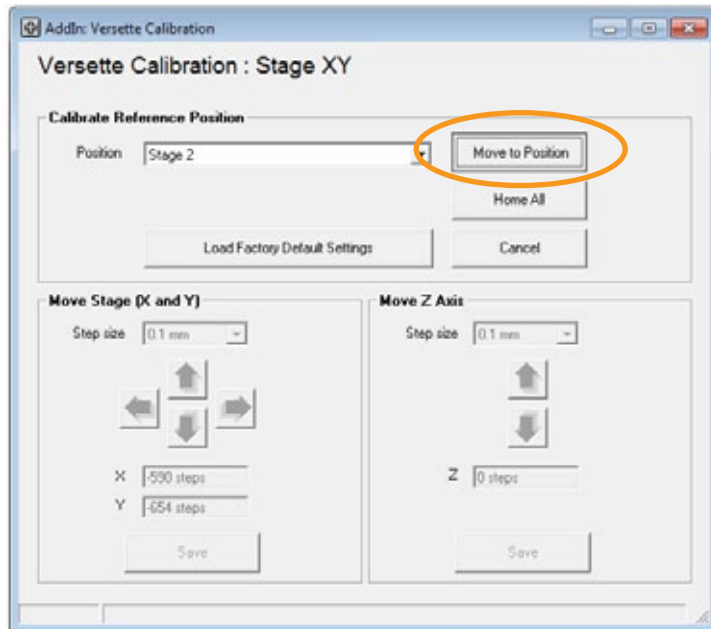
3. Select the 96/384 Pipetting Module then click **“Calibrate Stage XY”**.



4. Read and comply with any instructions. Place a check mark as noted below when all conditions are met, then click **“Continue”**.

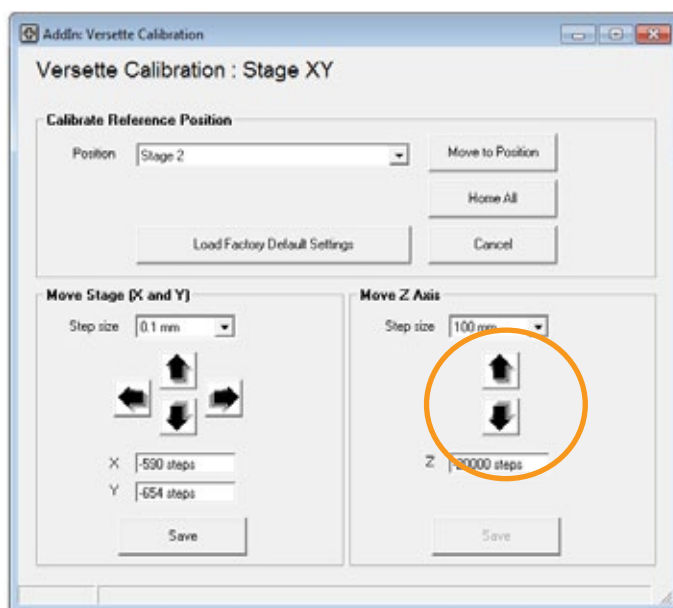


5. Select **Stage 2** from the drop-down menu (system defaults to Stage 2), then click **“Move to Position”**

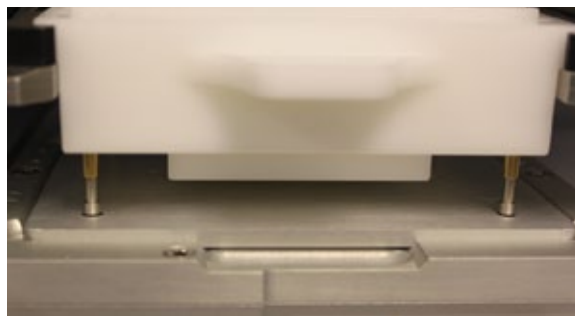


- After Stage 2 has moved in position under the teach tool, use **“Move Z Axis”** to lower the teach tool to approximately 1 mm above the Calibration Plate.
 - Select the appropriate **Step size** (0.1 mm, 1 mm, 10 mm, etc.), then click the Down arrow to move the pipetting module closer to the stage position.

CAUTION! Use care when moving the pipetting module to avoid hitting the stage. Select the smallest reasonable **Step size**. ▲

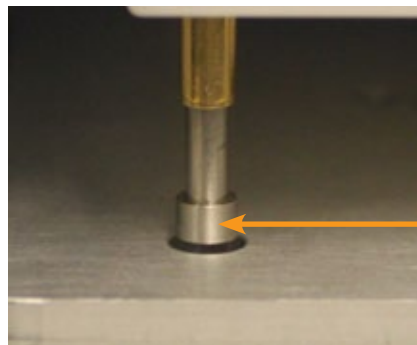
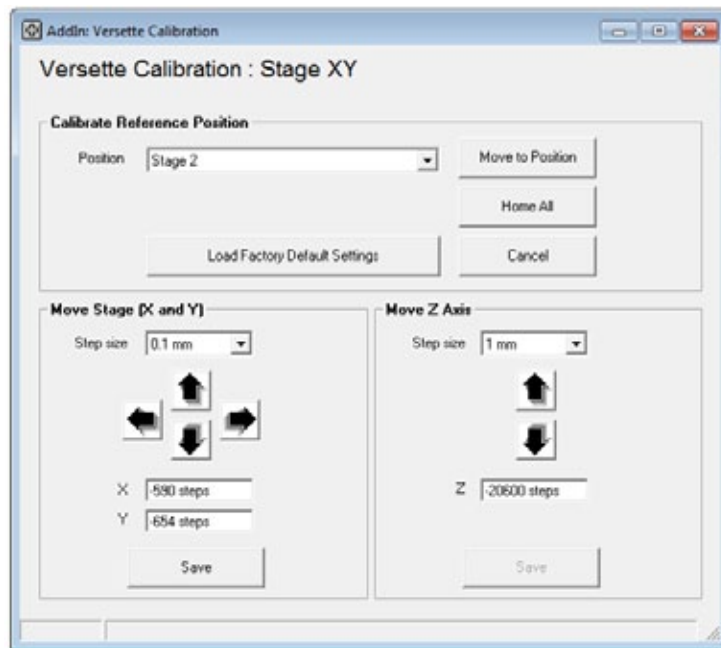


Lower NTC
teach tool close
to Calibration Plate.



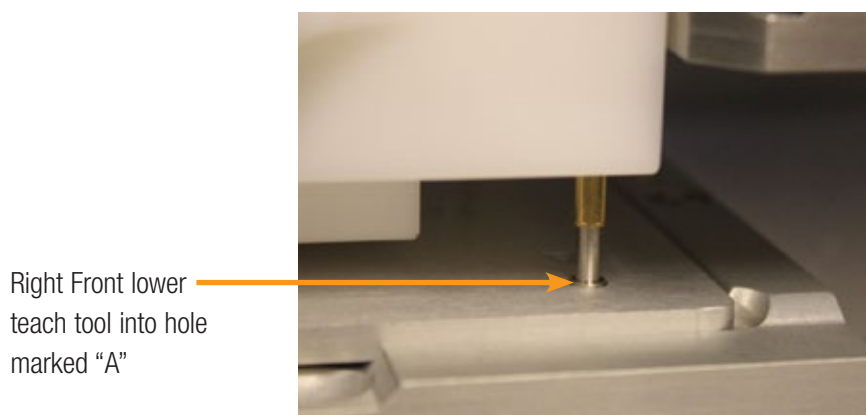
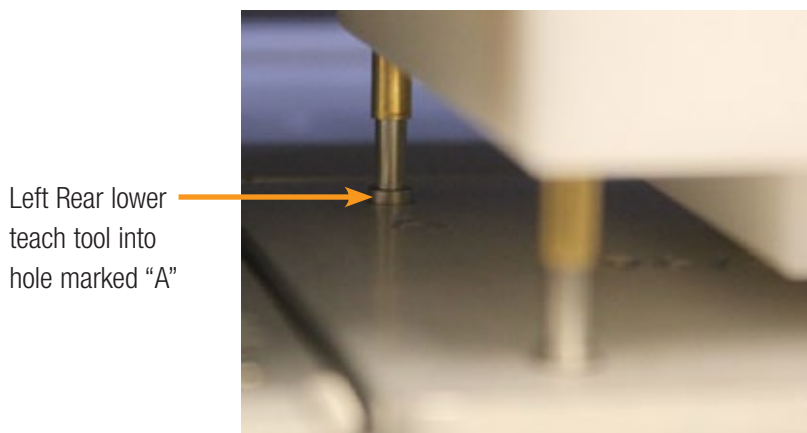
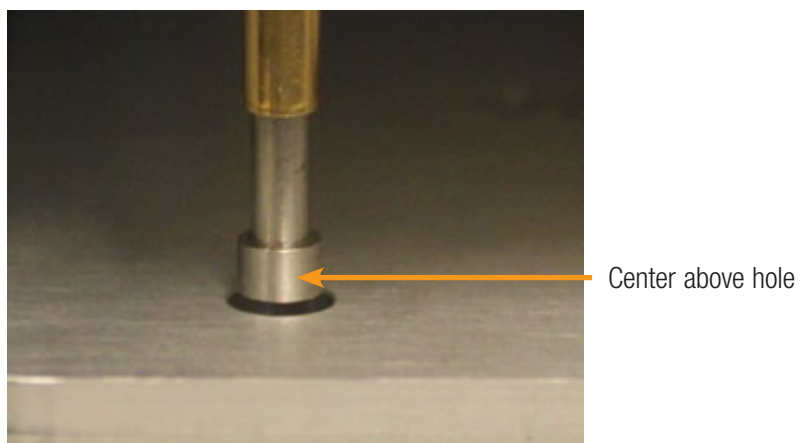
7. Check the alignment location. The teach tool posts should be positioned so that the posts will line up correctly to go into the plate holes.

If necessary, use the **Move Stage** (X and Y) commands to enter a **Step size** (typically 0.1 mm) then use the arrows to move the stage left or right, forward or back to achieve proper alignment. Take great care to ensure all four posts will line up properly into the plate holes. It is recommended to view the alignment from as many angles as practical.

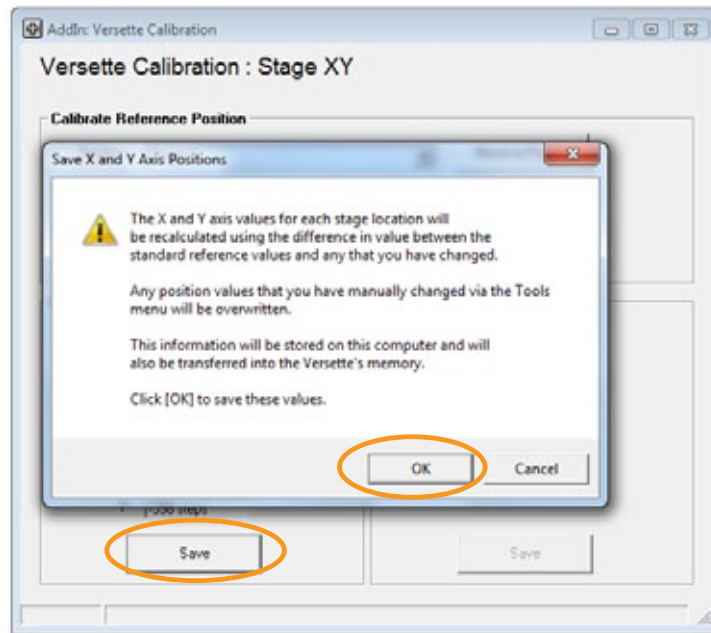


Center above
hole in "A" location

8. Lower the pipetting module slightly to verify that the X-axis and Y-axis alignments are properly set. Take care to check the left rear hole and the right front hole marked as “A” locations on the Calibration Plate are in alignment.

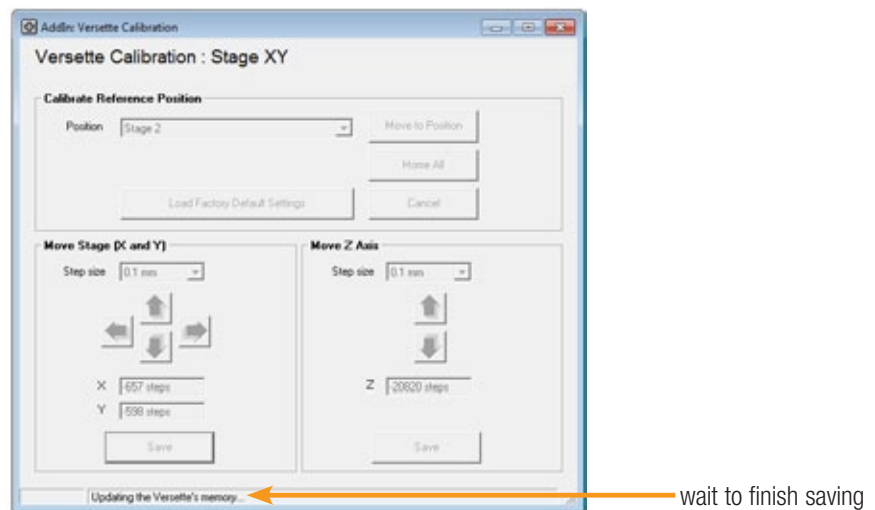


- Click **“Save”** to save the calibration coordinates, read the message, then click **“OK”**.



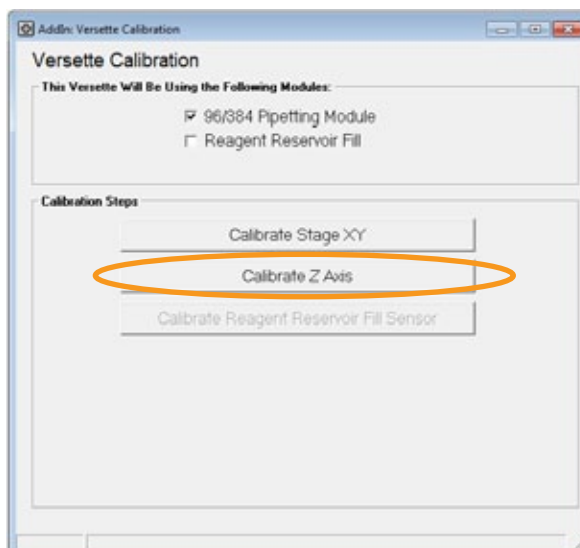
- Wait approximately 15-30 seconds or more for the system to save the changes. Do NOT close the window! Once the values are saved to the computer, the machine homes the Z Axis. The window will close automatically and return to the Calibration Menu. Wait for the cycle to complete and all motions to stop.

IMPORTANT If you close the window before the calibration is saved, you will need to restart the entire calibration process. You may also need to power-cycle the **Versette** system. ▲

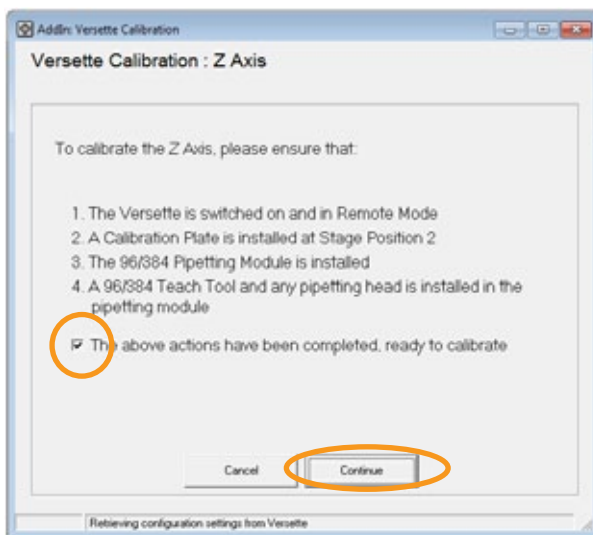


STEP 5: Calibrate the Z-axis

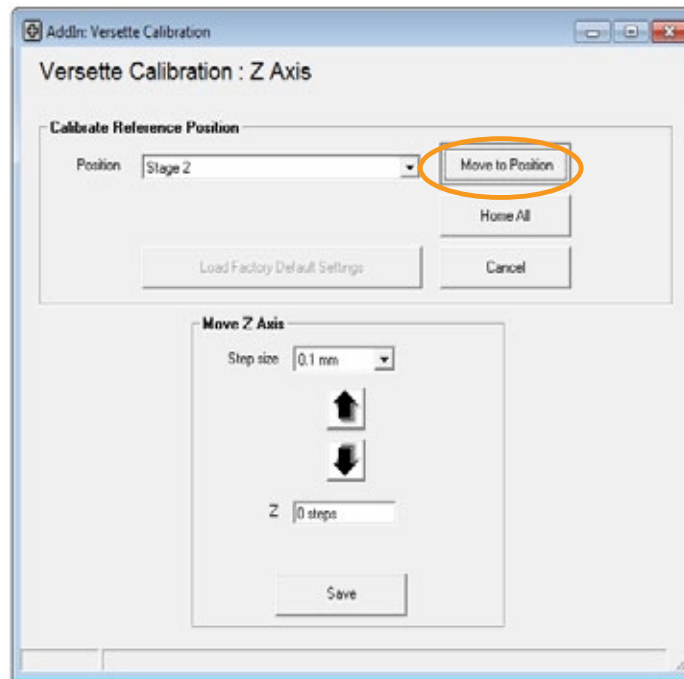
1. Select “**Calibrate Z-axis**”.



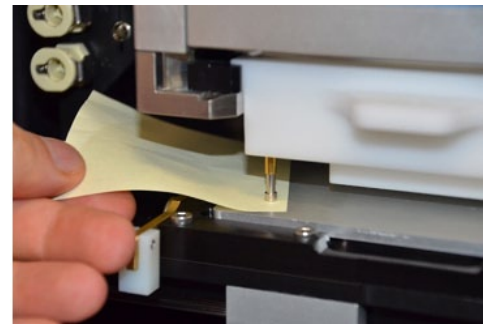
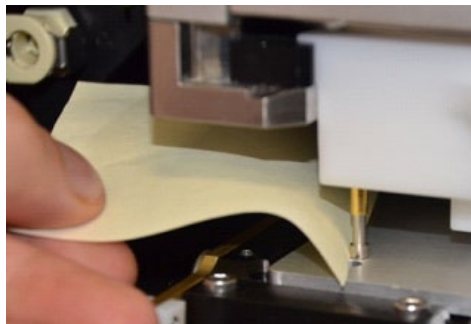
2. Read the instructions and verify that all items have been completed, then select the check box to continue, then click “**Continue**” to begin the calibration process.



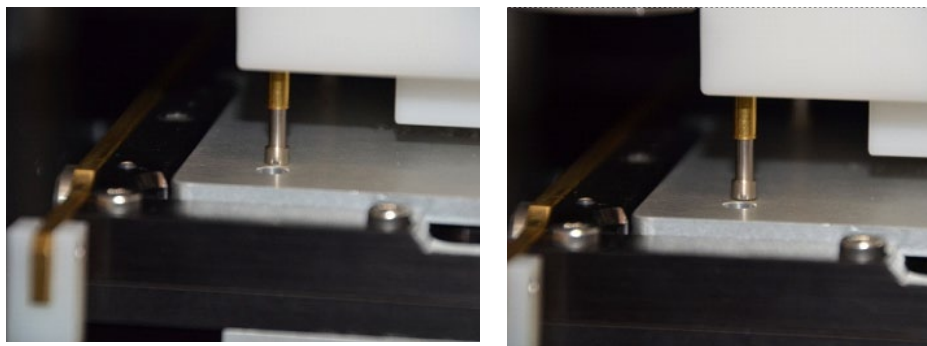
- The Z-Axis is calibrated from Stage 2. Verify that Stage 2 is displayed in the position box, then press “**Move to Position.**” The head and stages will move to position the Teach Tool over the Calibration Plate on Stage 2.



- Set the **Step size**, then use the arrows to move the teach tool down until it is just touching the calibration plate.
- Take a piece of paper the thickness of a standard notepad paper or a sticky note and try to slide the paper underneath the left front calibration pin. If the pin is touching the plate you should not be able to slide the paper underneath the pin.
- Move the step size up by 0.1mm increments until the paper can just slide underneath the pin.

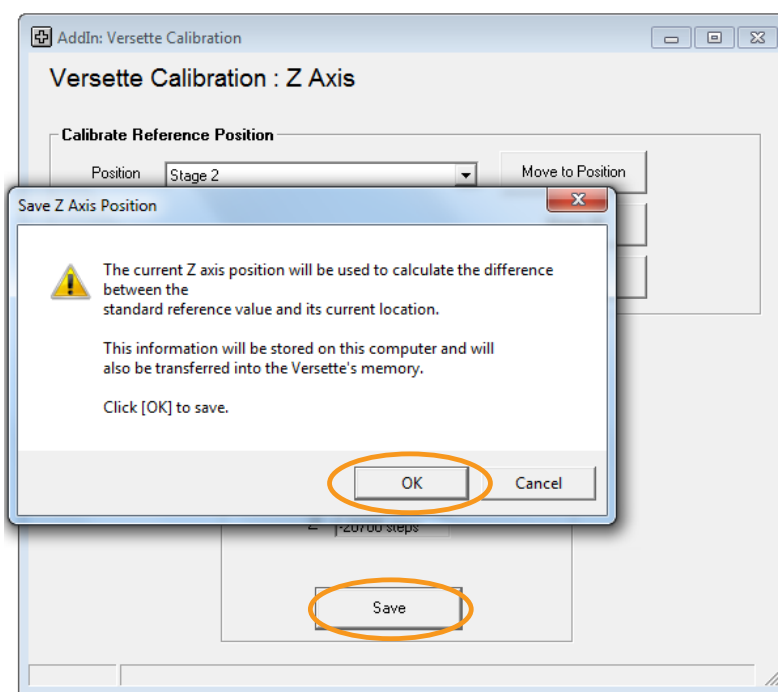


NOTE! For experienced users, you can also just visually verify that the pin is just off the calibration plate without using the piece of paper as a guide. Ensure that the left front pin is just touching the plate and then move the step size up by one 0.1mm increment. ▲



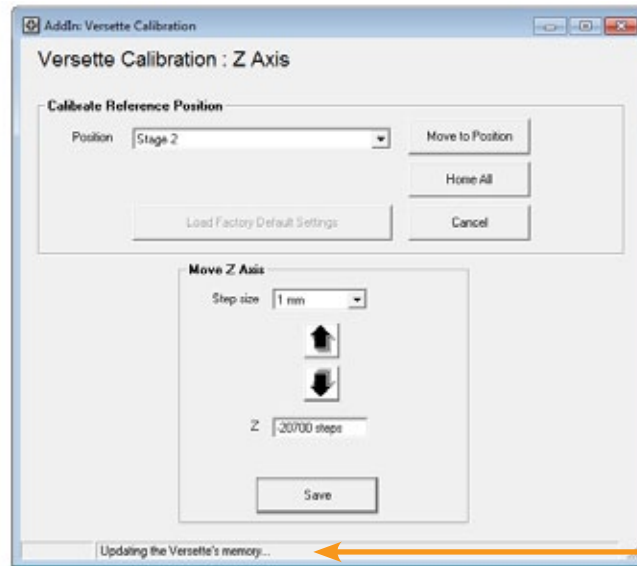
CAUTION If the front pins are different heights, use the longest pin. ▲

- Click **“Save”** to save the new calibration coordinates, then click **“OK”** on the pop-up window.



Wait approximately 15 to 30 seconds for the system to save the changes. Do NOT close the window! The window will close automatically and return to the Calibration Menu. Once changes are made, the machine will go through a homing cycle. Wait for the cycle to complete and all motions to stop.

IMPORTANT If you close the window before the calibration is saved, you will need to restart the entire calibration process. You may also need to power-cycle the **Versette** system. ▲

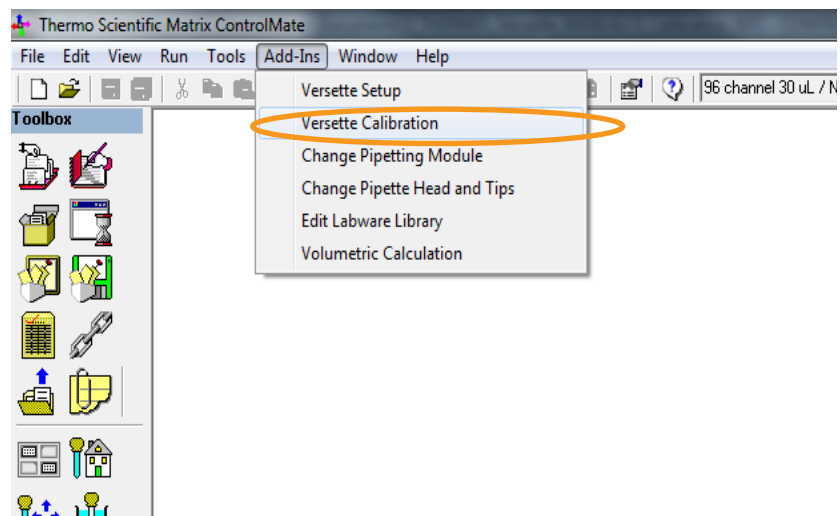


Wait while system updates.

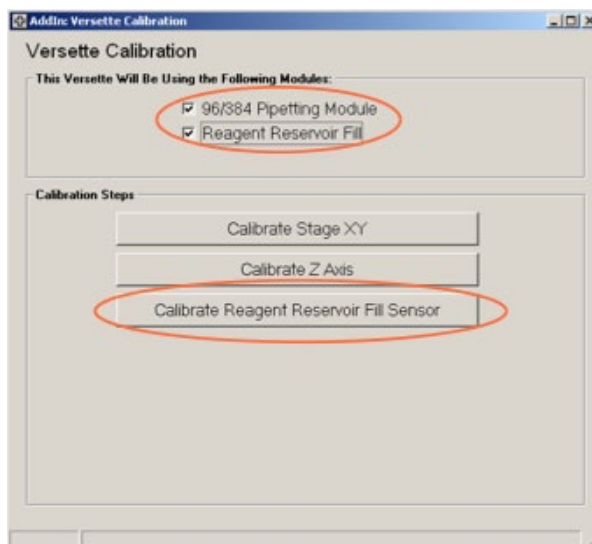
STEP 6: Calibrate Reagent Reservoir Fill Sensor

The following procedure should be used to calibrate the optional Reagent Reservoir Fill Sensor.

1. Select "**Versette Calibration**" from the Add-Ins menu, as shown:

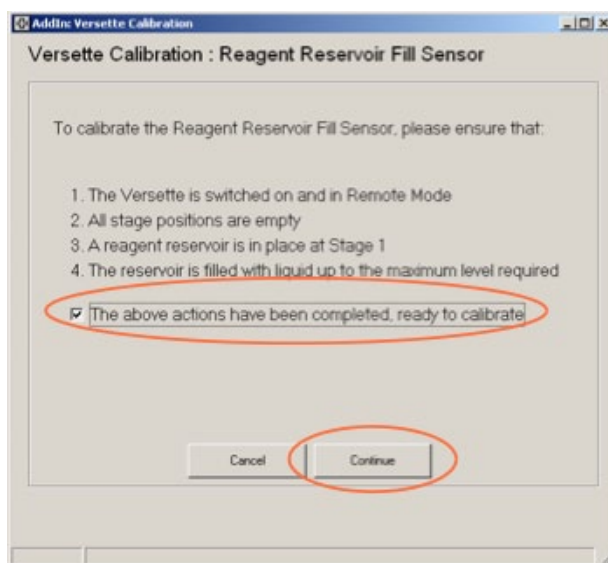


2. Ensure the “96/384 Pipetting Module” is already selected with a check mark, select “Reagent Reservoir Fill” module, then click “Calibrate Reagent Reservoir Fill Sensor”.

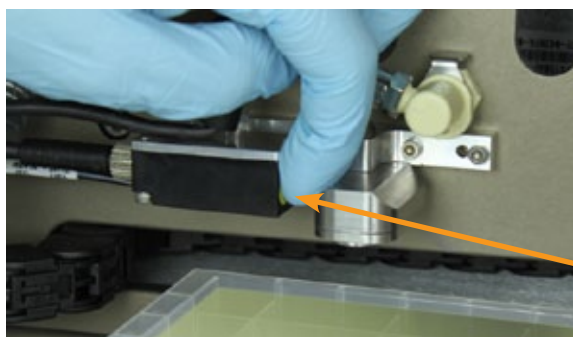
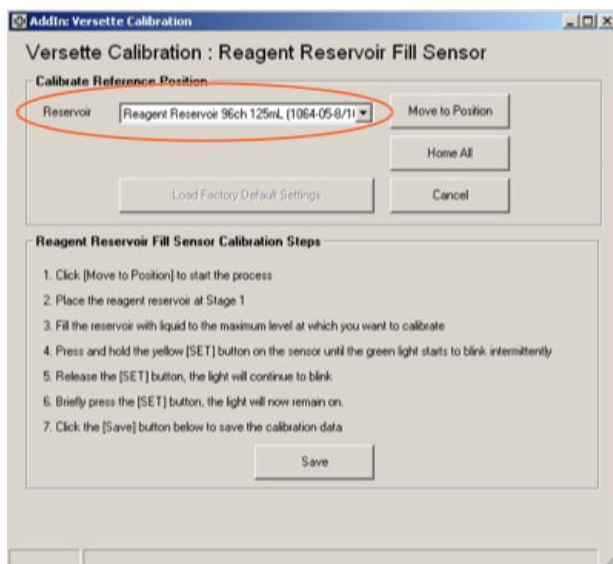


CAUTION DO NOT uncheck and re-check 96/384 module checkbox after **Versette** system has been calibrated as the machine could lose calibration parameters and might need to be re-calibrated. ▲

3. Read and verify all displayed requirements on the screen, then confirm by clicking on the check box area (see below) then select “Continue”.



4. Select the Reservoir type from the pull-down menu, then follow the on-screen calibration steps:
 1. Click “Move to Position” to start the process
 2. Place the reagent reservoir at Stage 1
 3. Fill the reservoir with liquid to the maximum level at which you want to calibrate
 4. Press and hold the yellow (SET) button on the sensor until the green light starts to blink intermittently
 5. Release the SET button, the light will continue to blink
 6. Briefly press the (SET) button, the light will now remain on
 7. Click the (SAVE) button on the screen to save the calibration data



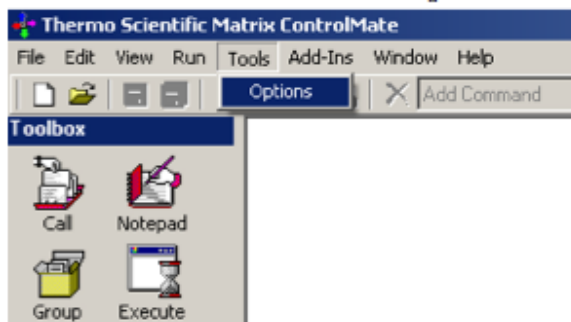
SET button

STEP 7: Optimizing Additional Stage Positions

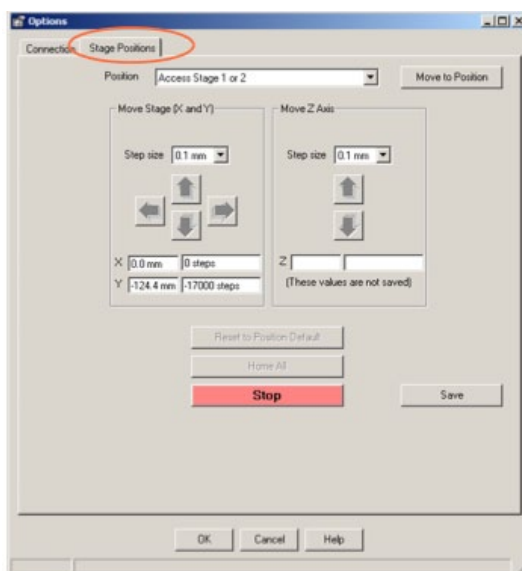
This step is performed in order to ensure all the stage positions have been properly calibrated based off the data that was referenced from calibrating the Stage 2 position.

In theory, once the Stage 2 position has been calibrated, all remaining stage positions (1,3,4,5,6) should also be in alignment. However, it is good practice to double-check and if necessary, make slight adjustments to the remaining stage positions as needed. This step is optional and can be performed at a later time if any of the stage positions need to be streamlined to work with a specific piece of labware that is either current in the default drop down list to choose from, or a new piece of labware that has been entered for use with a protocol/sequence. For information on adding/modifying/deleting labware refer to Editing the Labware Library section of this manual.

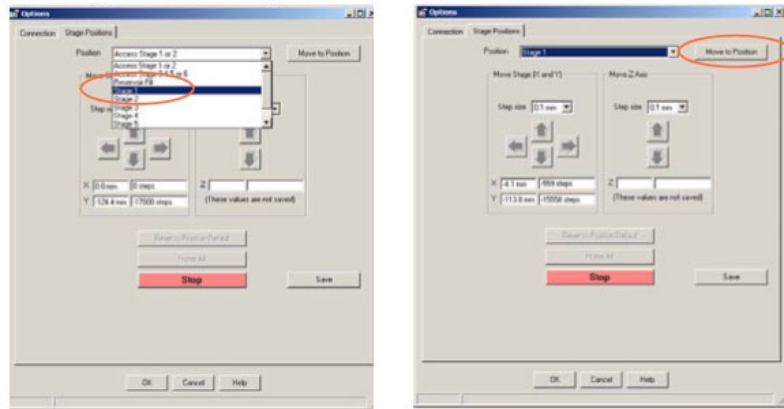
1. If not already installed, you will need to install any pipetting head and the 96/384 teach tool into the NTC pipetting module. Refer to “STEP 3: Install the NTC Pipetting Module and NTC Teach Tool” on page 108 for details on changing the pipette head.
2. From the Tools menu, select Options.



3. When the Options window opens, select the Stage Positions tab.

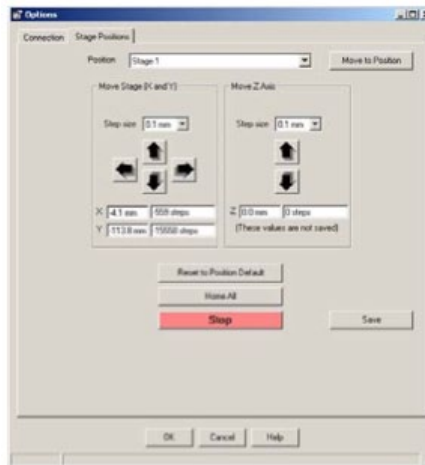


4. From the drop down menu, select one of the remaining stages to be verified/calibrated (1, 3, 4, 5, or 6). Since stage position 2 has already been calibrated, you do not need to verify/calibrate this position.
5. Place the Calibration Plate flat in position on Stage 1 with the “96/384 PIPETTING HEAD” side facing up.
6. Select Stage 1 from the drop-down menu then click “Move to Position”.



7. After Stage 1 has moved in position under the teach tool, use “Move Z Axis” to lower the teach tool to approximately 1 mm above the Calibration Plate. Select the appropriate Step size (0.1 mm, 1 mm, 10 mm, etc.), then click the Down arrow to move the pipetting module closer to the stage position

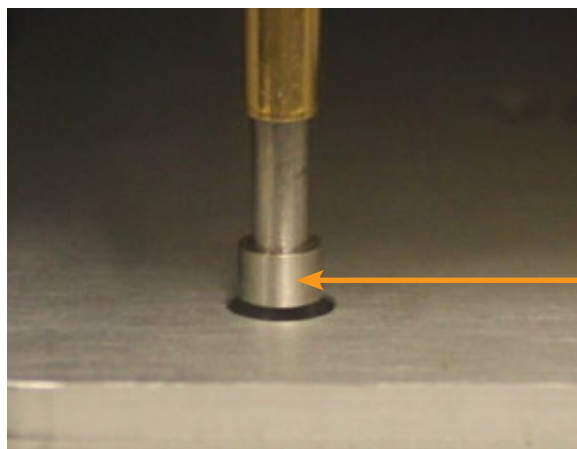
CAUTION Use care when moving the pipetting module to avoid hitting the stage. Select the smallest reasonable Step size. ▲



Lower NTC teach tool close to the Calibration Plate.

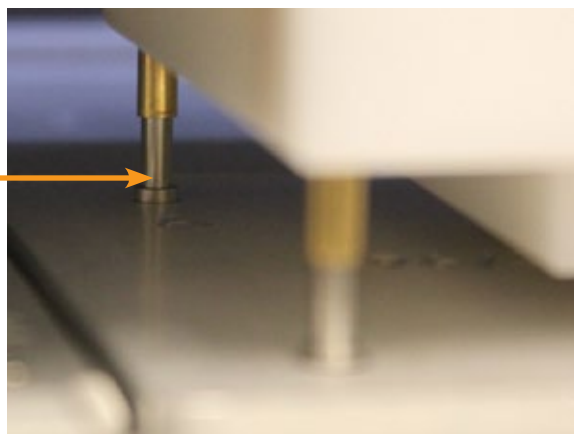


8. Lower the pipetting module slightly to verify that the X-axis and Y-axis alignments are properly set. Take care to check the left rear hole and the right front hole marked as "A" locations on the Calibration Plate are in alignment.

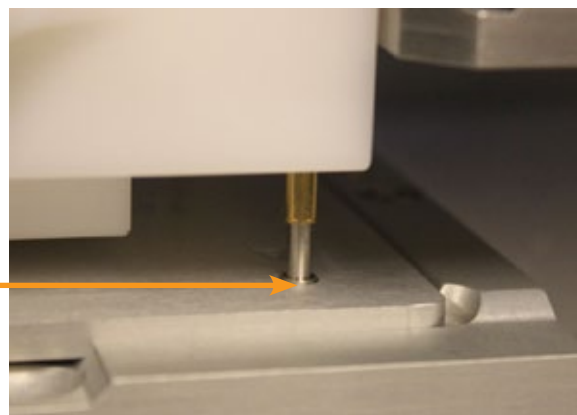


Center above hole

LEFT REAR
lower teach
tool into hole
marked "A"

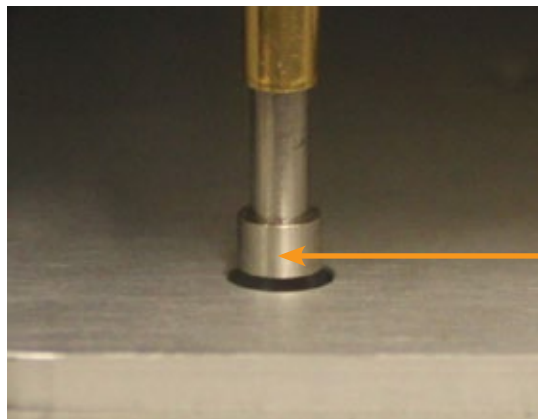
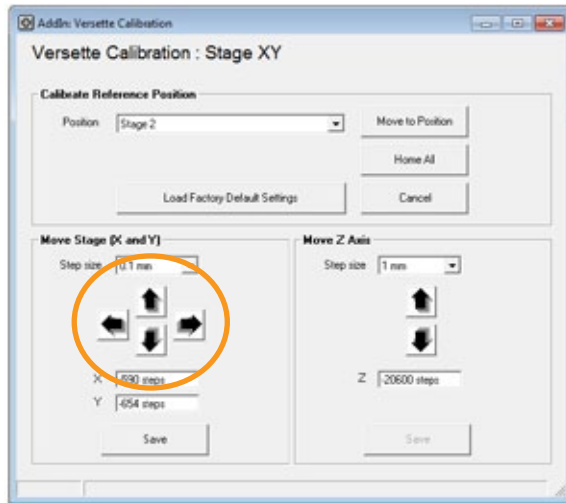


RIGHT FRONT
lower teach
tool into hole
marked "A"



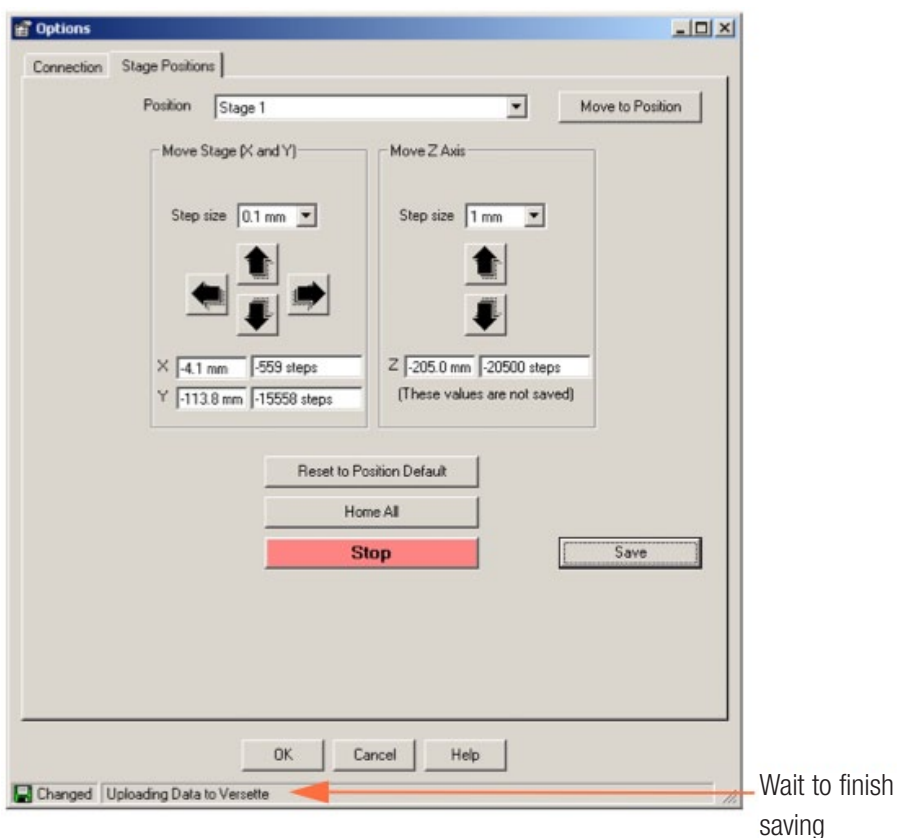
9. Check the alignment location. The teach tool posts should be positioned so that the posts will go into the plate holes.

If necessary, use the **Move Stage** (X and Y) commands to enter a **Step size** (typically 0.1 mm) then use the arrows to move the stage left or right, forward or back to achieve alignment. Take great care to be as ensure all four posts will go into the plate holes. It is recommended to view the alignment from as many angles as practical



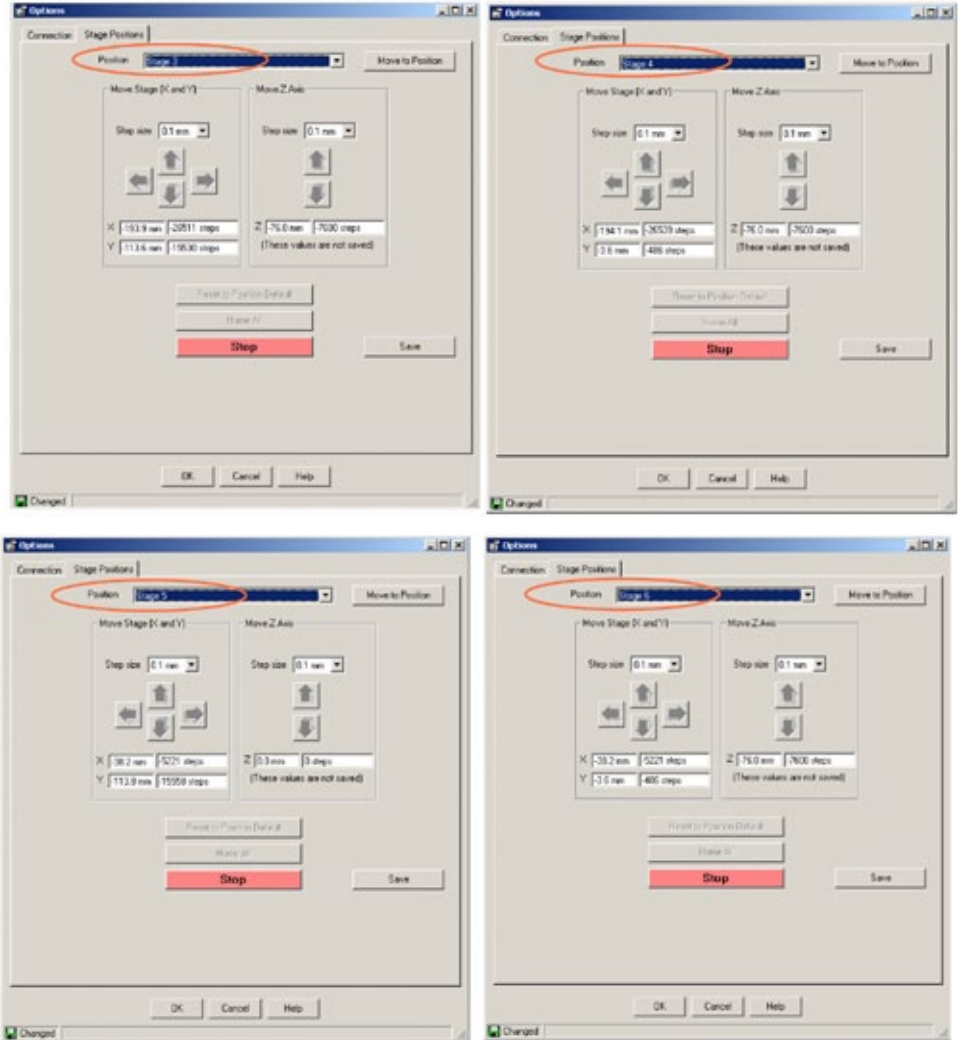
Center above hole
in "A" location

10. If you did not make any changes to either the X or Y axis steps, then skip to step 13.
11. If you have made changes to either the X or Y axis steps, then click “Save” to save the new calibration coordinates.
12. Wait approximately 15-30 seconds or more for the system to save the changes. Do NOT close the window! Once the values are saved to the computer, the “Uploading Data to Versette” message disappears. The Z axis remains lowered in the calibration plate and does not automatically home.

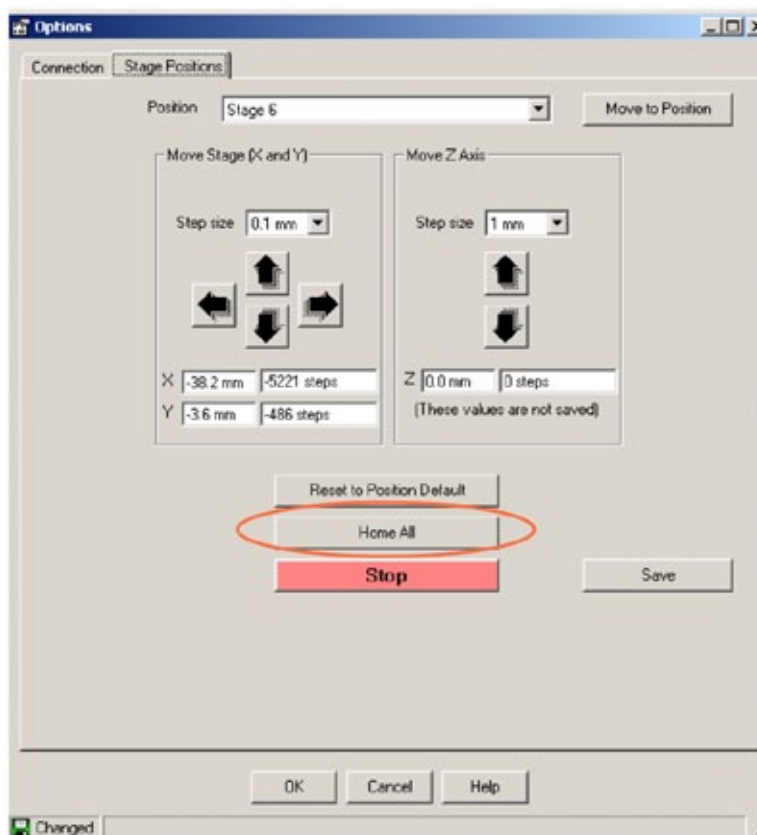


CAUTION IMPORTANT: If you close the window before the calibration is saved, you will need to restart the entire calibration process. You may also need to power-cycle the Versette system. ▲

13. Repeat steps 4 through 12 until all remaining stage positions have been verified/calibrated.



14. After the last stage position has been completed, click on the Home All button. The machine homes the Z Axis and homes the stage to the left of the machine. Wait for the cycle to complete and all motions to stop.



15. Close the Options window.

6

Frequently Asked Questions

Q&As

What liquid is recommended for washing fluid lines?

Distilled and filtered laboratory grade water and/or a detergent solution, for example, filtered 1% Micro-90[®], followed by distilled and filtered laboratory-grade water. Refer to the Maintenance section of this manual for details.

What should you do if the liquid foams during dispensing?

Some liquids foam more easily than others. One option is to reduce the dispense speed. There are five dispensing speeds available: 1 to 5 with 1 being the slowest speed.

Do you need specific plate adapters for the **Versette**?

No, the **Versette** has a fixed plate adapter and does not use any external plate adapters except for use with certain accessories.

Where can you see the **Versette** internal software version number?

The software version number is displayed on the System Configuration menu. It is also displayed on the Main Menu.

Pipetting Techniques

Precision and accuracy can be difficult to obtain when pipetting low volumes. This section describes the dispense procedure that was used to test the **Versette** for small volumes and discusses the critical parameters that affect pipetting performance.

Liquid handling operations, regardless of throughput, demand precision and accuracy to minimize experimental variation. Broadly, most applications include handling chemical buffers with varying properties and/or biological macromolecules. Modifying several minor parameters in automated liquid handling procedures can result in better performance and improved downstream results. Users can choose suitable parameters for appropriate reagents and introduce features in the software to achieve better performance for their respective liquid handling procedures.

Thermo Scientific ControlMate software interface offers several features to efficiently control the instrument. Optimization of these features will help achieve better liquid handling results.

Pipetting Techniques for Small Volumes

Critical parameters affecting performance include:

Air Gap

Air gap is a volume of air aspirated before any reagents. An air gap combined with a blowout will allow complete dispense of the liquid into the destination plate. Compare this to dispensing to a purge point using a manual pipetting technique.

Blowout

Blowout is the command used to move the pipetting head pistons past the “zero volume” dispense point, pushing a small amount of air after the liquid. This command in conjunction with the air gap will aid in pushing any remaining liquid in or on the outer orifice of the tip or needle into the destination labware to completely dispense the liquid. Blowout can be used to overcome capillary action to ensure the complete dispense of all fluid in a pipette. To use the blowout command, aspirate a small volume of air before aspirating the desired quantity of liquid. Dispense as normal, then actuate the blowout to drive the aspirated air, and any remaining fluid, out of the pipette.

The extra air volume should be great enough to overcome any capillary action in the small tip orifice. The air volume should be sufficient to assist the separation of the droplet from the tip to the well bottom, but not so great that air bubbles become a problem. Air blowout is often optimized by trial and error.

Aspiration and Dispense Speeds

The speed of aspiration and dispense will affect liquid handling results. In general, thick, viscous liquids require slower aspiration and dispense. The common occurrence of wicking (liquid adhering to the side of the tip or needle after dispense), hanging droplets (liquid not fully dispensing from the tip or needle), or full dispense of viscous liquids can be achieved by slowing the aspirate and/or dispense speeds. Slow pipetting speeds are best for smaller volumes as they prevent droplets that form at the end of the tips from contacting the sides or top of the wells.

Dwell Times

Dwell time is the amount of time the tips or needles remain in the aspirate or dispense location after moving liquid. This command allows time for pressure to equalize in all pistons and allows viscous liquids to completely aspirate or dispense. During the dispense step for a small volume it is important to use a Dwell Time to allow the volume droplet to form on the end of the pipet tip. As a general rule dwell times are dependant on the dispense volume and liquid type. Smaller dispense volumes require longer dwell times. (e.g., 0.5–1.0 μL dwell times should be 1.5–2.0 seconds).

Neat vs. Incremental Dispense

Neat dispense is the process of aspirating from a source and dispensing directly to the destination labware. The incremental pre-dispense cycle involves aspiration with a dispense prior to dispensing the desired volume in the destination labware. Incremental dispensing involves aspirating from the source and dispensing a portion of the aspirated volume to a multitude of destination plates.

Overstroke

An overstroke includes the aspiration of excess reagent and immediate dispensing of this fluid back to the source labware. A percentage of the programmed aspiration which is then used to move the piston head to add additional fluid to the aspiration.

Tip Heights

Tip height and placement in the labware well is an important factor in achieving optimal automated liquid handling performance.

Tip Height for dry dispense should be 0.1 to 0.3 mm above the well bottom to ensure that droplets make contact with the well bottom and are removed from the tip during the dispense step. Tip height requires some trial and error to determine the optimal distance from the well

bottom. A height that places the tips too deep in the wells will seal the tip to the well bottom and not allow the liquid to leave the tip. If the tips are not deep enough, the dispensed droplet will not make contact with the well bottom and will not remove the droplet from the tip.

Tip height for aspirate should be optimized from the top of the source liquid to minimize carryover to the destination plate.

Tip Touch

Tip touch is the “touch off ” on the side wall or bottom of a microplate well that removes droplets adhering to the pipetting head tip or needle after an aspirate or dispense. This command allows droplets to fall into the well rather than be carried away with the tips or needles.

Volume Correction

The ability to adjust pipetting head piston movements and timing for viscosity and specific gravity of solutions used in liquid handling aspirate and dispense procedures.

Maintenance and Service

Preventative Maintenance Schedule

Maintenance steps are summarized in the table below. Refer to each procedure's instructions on the following pages or in the Service Manual for complete details.

Table 17—Maintenance/check schedule

Frequency	Item	Action
Monthly	Inspect tubing and power cord	Verify that all tubing is secure and clean and in good condition. Verify power cord is in good condition and shows no signs of cracks or wear.
	Check non-contact liquid level sensor	Check for cleanliness and any damage.
	Inspect wash station	Check sensors, wiring, and tubing to ensure each item is clean and shows no signs of cracks or wear.
	Inspect external pumps	Verify that pumps and tubing are in good working order, clean, and with no signs of wear.
Yearly	Yearly service should be performed by trained maintenance technicians. Consult a Thermo Fisher Scientific representative for details.	

Cleaning Plate Stages

Clean the plate stage surfaces if needed using a soft cloth or tissue paper soaked in a mild detergent solution (e.g. dishwashing liquid), or 70% ethanol. Wipe up spills immediately. Do not use formaldehyde or strong alkaline solutions.

If you have spilled infectious agents on the plate carrier, see [“Decontamination procedure”](#) on [page 145](#) for instructions to clean and decontaminate the system.

Cleaning Reagent Reservoirs

A reagent reservoir should be cleaned after use and when you change the reagent.

1. Verify the system is off and all pumps are turned off.
2. Remove the reagent reservoir from the system.
3. Rinse or wash the reagent reservoir with water or detergent when necessary.
4. Rinse with distilled and filtered laboratory-grade water.
5. Dry the reagent reservoir before use.

Cleaning Pump Tubing

Fluid tubing can typically be cleaned with distilled and filtered laboratory grade water and/or a detergent solution, for example, filtered 1% Micro-90®, followed by flushing with distilled and filtered laboratory-grade water. Always use a cleaning solution and appropriate rinse steps compatible with the fluid in use. Typical tube cleaning:

1. Remove used tips from the system.
2. Remove source fluids from the system.
3. Flush all tubing (connect inlets to cleaning solution) with appropriate fluid to clean any reagents or other fluids from the tubing lines. Use caution to select a cleaning fluid that is compatible with the source fluid you are using.
4. Perform a final flush of all tubing with distilled water.

IMPORTANT: The flush time will vary for the cleaning solution you have used. It is essential that all cleaning solutions are removed from the inlet tubing and that the tubing is properly flushed to prevent future cross-contamination. ▲

Disposal of Materials

Follow laboratory and country-specific procedures for the disposal of biohazardous or radioactive waste. Refer to local regulations for the disposal of infectious material.

WARNING The samples can be potentially infectious. Dispose of all used plates, strips, syringes, disposable tips, etc., as biohazardous waste following your facility's instructions and all local and national standards and codes for the materials you are using. ▲

WARNING The touchpanel electronics contains a lithium (Li) battery. The used Li battery is regulated waste and must be disposed of according to local regulations. The Li battery has to be changed by an authorized service technician only. Instructions for changing the Li battery are described in the service manual. ▲

Decontamination Procedure

If you have spilled infectious agents, carry out the decontamination procedure.

Decontamination should be performed in accordance with normal laboratory procedures. Any decontamination instructions provided with the reagents used should be followed.

It is strongly recommended to perform the complete decontamination procedure before relocating the instrument from one laboratory to another or before sending it to service.

- Example of decontaminants:
- Ethanol 70%
- 5% Bleach and water solution
- Virkon® solution 1–3%
- Glutaraldehyde solution 4%
- Chloramine T
- Microcide SQ® 1:64
- Decon 90® min. 4%

CAUTION If local or laboratory regulations prescribe regular decontamination, do not use formaldehyde. ▲

WARNING The decontamination procedure should be performed by authorized trained personnel wearing disposable gloves, protective glasses and clothing in a well-ventilated room. ▲

1. Prepare the decontaminant: for example, 70% ethanol or 5% bleach (or another agent recommended by your safety officer).
2. Empty the reagent reservoir. Ensure that you are wearing disposable gloves.
3. Switch OFF the power and disconnect the power supply cable.
4. Disinfect the outside of the instrument using a cloth dampened with 70% ethanol.
5. Clean the instrument using a mild detergent (e.g. dishwashing liquid).
6. Remove any stains using 70% ethanol.
7. Disinfect the liquid path of the instrument with isopropanol, 10% solution of household bleach, or 70% ethanol.
8. Flush with distilled and filtered laboratory-grade water.
9. Clean and disinfect all components, tubings, accessories, as appropriate according to your standard laboratory procedures for the type of fluids and chemicals used in the system.

Packing for Service

To pack for service, follow the guidelines presented below.

CAUTION It is important that the instrument is thoroughly decontaminated before it is removed from the laboratory or any servicing is performed on it. ▲

When you ship the instrument for service:

1. Switch the power OFF and disconnect the power supply cable.
2. Remove all accessories and loose components and connections from the system.
3. Decontaminate the instrument. See “[Decontamination procedure](#)” on [page 145](#).
4. Install packing equipment (foam) as necessary to lock the stages in place, and prevent motion during shipment.
5. Follow standard packing practices to place the unit into a well padded, sturdy carton or crate suitable for shipping. Consult your local professional packer for support if necessary. It is critical that all components are properly protected during shipment.
6. Place the accessories box into a separate carton.
7. Inform about the use of hazardous materials. Enclose a dated and signed Certificate of Decontamination (see Appendix A: “Certificate of Decontamination”) both inside and attached to the outside of the package, in which you return your instrument (or other items).
8. Enclose the instrument serial number as well as the return authorization number given by your local Thermo Fisher Scientific representative.
9. Seal the box carefully and securely. Make sure all required information is clearly indicated on the outside of the carton and enclosed as instructed.

Refer to “General Specifications” for details on storage and transportation temperatures.

Touchpanel Software Upgrades

Upgrades to the touchpanel software can be installed via a USB memory stick or through laptop or network computer as required. Follow the instructions provided with the software upgrade kit.

Service Contracts

It is recommended to maintain and service the instrument regularly every 12 months on a contract basis by the manufacturer’s trained service engineers. This ensures that the product is properly maintained and gives trouble-free service. Contact the Thermo Fisher Scientific technical service department for more details.

Disposal of the Instrument

If the Versette has to be disposed of, follow the guidelines below.

WARNING Decontaminate the instrument before disposal. Refer to “[Decontamination procedure](#)” on page 145 and “[Appendix A - Certificate of Decontamination](#)” on page 161. ▲

Follow laboratory and country-specific procedures for biohazardous or radioactive waste disposal.

Dispose of the instrument according to the legislation stipulated by the local authorities concerning take-back of electronic equipment and waste. The procedures vary by country.

- Pollution degree:
2 (see “Safety specifications”)
- Method of disposal:
Electronic waste
Contaminated waste
(Infectious waste)

Regarding the original packaging and packing materials, use the recycling operators known to you. For more information, contact your local Thermo Fisher Scientific representative.

Technical Specifications

General Specifications

Thermo Fisher Scientific reserves the right to change any specifications without prior notice as part of our continuous product development program.

Table 18—General specifications

Item	Specification
Mechanical	
Height	67.5 cm (26.5 in.)
Depth	54.8 mm (21.6 in.)
Width	68.0 cm (26.8 in.)
Weight	54.4 kg (120 lbs.) Base (tower) & 6 Position Stage (heads / pipetting module not included) 18.1 kg (40 lbs.) 6 Position Stage 2.7 kg (6 lbs.) Hood 11.8 kg (26 lbs.) NTC Pipetting Module 12.7 kg (28 lbs.) Pump Module
Electrical	
Power requirements	AC 100~240V, 50/60Hz, 2 A. draw
Fuse	Refer to system label.
Environmental Requirements	
Operational environment	Indoor use only
Operating temperature	+4 to +40°C
Transportation conditions	-25°C to +50°C, packed in transport packaging

Table 18—General specifications

Item	Specification	
Humidity	Maximum relative humidity 80% for temperatures up to 31°C decreasing linearly to 50% relative humidity at 40°C	
Altitude	Up to 2000 m	
Supply voltage fluctuations	± 10% from nominal	
Installation category (overvoltage category)	II according to IEC 60664-1 (see Note 1)	
Pollution degree	2 according to IEC 60664-1 (see Note 2)	
Performance		
Dispensing accuracy	96–Channel 0.5–30 µl	± 2.0% or 0.15 µl
	96–Channel 5–300 µl	± 2.0% or 1.0 µl
	384–Channel 1.0–100 µl	± 2.0% or 0.50 µl
Dispensing precision	96–Channel 0.5–30 µl	± 1.5% or 0.10 µl
	96–Channel 5–300 µl	± 1.5% or 0.75 µl
	384–Channel 1.0–100 µl	± 1.5% or 0.25 µl
Speed (typical)	Plate to plate transfer:	
	Tip wash:	2:00 minutes (includes fill/empty and 10 µl mix)
	Mixing:	0:20 minute per 10 µl cycle (3x = 1:00)
Pipetting resolution	96– and 384–channel pipetting heads	Increments of 0.1 µl
Plate and tubes compatibility	Plates:	All standard SBS conforming low, standard and deep well 96- and 384-well formats
	Storage tubes:	0.5, 0.75, 1.4 ml TrakMate® tubes, as well as comparable volume Abgene® and Nunc® storage tubes.
Wash station	Available for 96 and 384 -channel pipetting heads	
System control		
Touchpanel control	5 x 7 in. touch-sensitive input panel with proprietary “wizard-based” (menu-driven) software	
PC control	Compatible with Windows XP sp3 and Windows 7 (32- and 64-bit)	
I/O switch	Input/output switch for external devices, 24 VDC, 0.4 A./switch (0.7 A. total)	
Robotic compatibility	Contact Thermo Scientific with your requirements.	

Note 1) The **installation category** (overvoltage category) defines the level of transient overvoltage which the instrument is designed to withstand safely. It depends on the nature of the electricity supply and its overvoltage protection means. For example, in CAT II which is the category used for instruments in installations supplied from a supply comparable to public mains, such as hospital and research laboratories and most industrial laboratories, the expected transient overvoltage is 2500 V for a 230 V supply and 1500 V for a 120 V supply.

2) The **pollution degree** describes the amount of conductive pollution present in the operating environment. Pollution degree 2 assumes that normally only nonconductive pollution, such as dust, occurs with the exception of occasional conductivity caused by condensation.

Safety Specifications

This section describes the safety specifications for the Versette instrument.

Electrically Charged Parts

The instrument is safe to operate with the covers fitted and they must not be removed during operation. The covers protect the user from live parts (motors, power supplies, etc.) and they should only be removed after switching the instrument off and disconnecting the main supply cable, and only by suitably qualified maintenance and repair personnel.

WARNING The instrument uses voltages dangerous for human beings. Before removing any covers, disconnect the instrument from the power supply. ▲

10

Troubleshooting

Computer Sleep Notice

To ensure successful operation, hibernation and sleep mode on the laptop/computer needs to be disabled prior to installing **ControlMate** and subsequent running of protocols.

Mechanical

Table 19—Troubleshooting, mechanical

Problem	Cause	Action Required
Overfill— tip wash station.	Fill sensor not properly set.	Check fill sensor.
Tubing in peristaltic pump slips.	Tubing improperly installed. Tubing wrong size. Tubing worn.	See installation section for proper installation of tubing. Use only the tubing size shown on the pump. Replace worn tubing.
Tips crash into microplate.	Mismatch of tips to plate type. Mismatch of D.A.R.T. tips to pipetting head. X, Y, or Z motions need to be calibrated.	Change tips or plate type. Check and replace with proper tips. Use ControlMate Software (refer to ControlMate manual) to perform calibrations.
No power.	Power cable loose or disconnected. Blown fuse.	Re-connect power cable. Check power inlet source then replace fuse.

Error Messages

Table 20—Troubleshooting, error messages

Problem	Cause	Action Required
X axis error, Y axis error.	Platform stage movement blocked.	<p>Check for obstructions to vessels on platform stages.</p> <p>Check for obstruction to platform stage tracks.</p> <p>Check X, Y, and Z calibrations using ControlMate Software.</p>
Stage “___” Z axis error.	<p>Pipetting head movement blocked.</p> <p>Pipette tips crash into vessel.</p>	<p>Check for obstruction to pipetting head or vertical track.</p> <p>Check for the correct combination of pipetting head, tips, and vessel type.</p> <p>Check Z calibration using ControlMate Software.</p>
Syringe motor error.	Pistons in pipetting head blocked or moved out of their physical range of motion.	<p>Check for obstructions in piston shafts.</p> <p>Check piston settings.</p>
Command transmission error.	<p>Device receives command it does not recognize.</p> <p>Command timeout is set too low.</p>	<p>Check for faulty data cable.</p> <p>Increase command timeout setting.</p>
ACK timeout.	Instrument does not respond to ControlMate commands.	<p>Check that the cables are correctly connected and that the power is switched on and available.</p> <p>Restart system.</p>



Ordering Information

Versette Base Units and Modules

System	Cat. No.
Versette base unit Requires pipetting module, pipetting head, and stage, accessories sold separately.	650-01-BS
96- and 384-head (NTC) pipetting module	650-02-NTC
Six-position stage, guard included	650-03-SPS
Pump module	650-04-PUMP

Versette Pipetting Heads

Head size/type	Dispense type	Volume range	Cat. No.
96-channel	Air displacement	0.5–30 µl	650-06-9630
		5–300 µl	650-06-96300
384-channel	Air displacement	1.0–100 µl	650-06-384100

Versette Accessories

Item	Cat. No.
96-channel tip wash station, tall height	650-05-96TTW
384-channel tip wash station, tall height	650-05-384TTW

Replacement Items

Contact Thermo Fisher Scientific for specific requirements for your system.

Item
Fuse, 6A, 250 VAC (2 required per system)
Tubing, inlet and outlet
Tip base replacement packs
Packaging, for shipment
RS232 communications cable
Power cords

Consumable Spare Parts

No chemicals and no consumable parts are supplied with this equipment.

Thermo Scientific™ Matrix™ D.A.R.T. Tips

Item	Qty.	Part Number
30 µl	20 magazines of 384 tips	5316
30 µl sterile	20 magazines of 384 tips	5317
30 µl sterile, filtered	20 magazines of 384 tips	5318
30 µl, extended length	20 magazines of 384 tips	5416
30 µl extended length sterile	20 magazines of 384 tips	5417
30 µl extended length sterile, filtered	20 magazines of 384 tips	5418
100 µl	20 magazines of 384 tips	5326
100 µl sterile	20 magazines of 384 tips	5327
100 µl sterile, filtered	20 magazines of 384 tips	5328
30 µl	20 magazines of 96 tips	5586
30 µl sterile	20 magazines of 96 tips	5587
30 µl sterile, filtered	20 magazines of 96 tips	5588
30 µl extended length	20 magazines of 96 tips	5506-11
30 µl extended length sterile	20 magazines of 96 tips	5507
30 µl extended length sterile, filtered	20 magazines of 96 tips	5508
300 µl	20 magazines of 96 tips	5516-11
300 µl sterile	20 magazines of 96 tips	5517-11
300 µl sterile, filtered	20 magazines of 96 tips	5518-11
300 µl extended length	20 magazines of 96 tips	5536
300 µl extended length sterile	20 magazines of 96 tips	5537
300 µl extended length sterile, filtered	20 magazines of 96 tips	5538
300 µl extended length, wide bore	20 magazines of 96 tips	5546
300 µl extended length, wide bore sterile	20 magazines of 96 tips	5547
300 µl extended length, wide bore, sterile, filtered	20 magazines of 96 tips	5548

Additional Accessories

Reagent Reservoirs

Item	Part Number
96-channel, 125 ml, Non-Sterile, Polypropylene	1064-05-8
96-channel, 125 ml, Sterile, Polypropylene	1064-15-8
96-channel, 220 ml, Non-Sterile, Polypropylene	1064-05-6
96-channel, 220 ml, Sterile, Polypropylene	1064-15-6
384-channel, 95 ml, Non-Sterile, Polypropylene	1064-05-7
384-channel, 95 ml, Sterile, Polypropylene	1064-15-7

Serial Dilution Magazines

Item	Part Number
Serial dilute magazine 96/30 μ l (8/12) For use with short 30 μ l tips	650-08-9630SD
Serial dilute magazine 96/30 μ l (8/12) For use with extended length 30 μ l tips	650-08-9630XLSD
Serial dilute magazine 96/300 μ l (8/12)	650-08-96300SD
Serial dilute magazine 384/30&100 μ l (16/24)	650-08-384SD



Appendix A - Certificate of Decontamination

THIS FORM MUST ACCOMPANY ALL SHIPMENTS	PHOTOCOPIABLE
Name:	_____
Company:	_____
Address:	_____
Tel./Fax:	_____
E-Mail:	_____
Item:	_____ Serial No. _____
<input type="checkbox"/>	I confirm that the returned items have not been contaminated by body fluids, toxic, carcinogenic or radioactive materials or any other hazardous materials.
<input type="checkbox"/>	I confirm that the returned items have been decontaminated and can be handled without exposing personnel to health hazards.
Materials used in this unit:	
Chemicals	_____
Biological	_____
Radioactive	_____
Decontamination procedure and solution/s used:	

Date and place:	_____
Signature:	_____
Name (block letters):	_____
The signature of a Radiation Safety Officer is also required when the unit has been used with radioactive materials. This unit is certified by the undersigned to be free of radioactive contamination.	
Date and place:	_____
Signature:	_____
Name (block letters):	_____

Glossary

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z

A

Aspirate To remove fluid from a well, tube, reservoir, or other vessel via one or more pipettes.

Aspirate height (depth) The distance down into the well that the pipette tip is positioned to extract fluid from the well. This field is used to represent a pre-set height, available within the aspirate command. This height is useful for setting a default height at which liquid is aspirated.

B

Blowout Blowout is the command used to move the pipetting head pistons past the “zero volume” dispense point, pushing a small amount of air after the liquid. This command in conjunction with the air gap will aid in pushing any remaining liquid in or on the outer orifice of the tip or needle into the destination labware to completely dispense of the liquid. Blowout can be used to overcome capillary action to ensure the complete dispense of all fluid in a pipette. To use the blowout command, aspirate a small volume of air before aspirating the desired quantity of liquid. Dispense as normal, then actuate the blowout to drive the aspirated air, and any remaining fluid, out of the pipette. The extra air volume should be great enough to overcome any capillary action in the small tip orifice. The air volume should be sufficient to assist the separation of the droplet from the tip to the well bottom, but not so great that air bubbles become a problem. Air blowout is often optimized by trial and error.

C

CE Marking “Conformité Européene” = European Conformity. CE Marking on a product is a manufacturer's declaration that the product complies with the essential requirements of the relevant European health, safety and environmental protection legislations, the product may be legally placed on the market and thus the CE Marking ensures the free movement of the product within EU.

D

Decontamination Removal or neutralization of radiologic, bacteriological, chemical or other contamination.

Dispense To place fluid into a well, tube, reservoir, or other vessel via one or more pipettes.

Dispense height (depth) The distance down into the well that the pipette tip is positioned to dispense fluid into the well (or tube, reservoir, or other vessel) via pipette. This is similar to the Aspirate Depth with the exception that it is used for determining a pre-set height for dispensing liquids.

Dry tips A dry tip is simply that: a tip which has not yet been exposed to fluid. During the first aspiration into a dry tip, a very small amount of fluid will saturate the dry air in the tip with moisture, while the vapor pressure increases above the liquid inside the tip. This loss of fluid to the vapor inside the tip can affect the very small dispenses. To ensure proper dispense, the use of a “dwell time”, an “overstroke” or implementing a “mix sequence” can compensate for any loss of fluid to the air within the tip. With an overstroke, extra fluid is drawn into the tip. With a mix sequence, fluid is aspirated then dispensed back to its source, then aspirated again. This process, with appropriate delays, will allow time for the dry air to saturate with fluid, and enable accurate dispenses with accurate fluid levels in the tips.

Dwell time The dwell time is used to specify a period of time over which to leave the tips in the sample immediately after aspirate or dispense. This allows for equalizing air pressure and liquid movement inside the tips.

L

Liquid Class See “[Volumetric Calibration](#)” on [page 162](#).

M

Mix command The mix command performs an aspiration followed by a dispense, into the same source location. This can be useful to pre-treat a dry pipette tip to ensure accuracy. See “Dry Tips”.

The Mix command should also be used to aspirate/dispense liquid in a vessel to re-suspend material in the vessel so that a homogenous solution can be created prior to aspiration.

N

NTC The NTC (96– and 384– channel) pipetting module houses the 96– and 384– well pipetting heads, and the NTC teach tool.

O

Overstroke Select overstroke if this is the first aspirate prior to multiple dispenses. The overstroke sequence will aspirate additional fluid, then return a portion of this liquid to the source. This will ensure that the piston motor is primed and improves volumetric accuracy throughout all subsequent dispense allotments.

Overstroke is the process of driving the pipetting head piston during aspiration to pickup more volume that will be required for the subsequent dispense. For example, if the dispense or series of dispenses will require a total volume of 10 μl , if the piston is driven to aspirate 12 μl , the overstroke of the piston is said to aspirate an additional 2 μl . Aspirating with overstroke on the first volume aspiration is useful at lower volumes and works to ensure consistency and accuracy throughout a series of incremental dispense steps. See also “Dry tips” on [page 161](#).

P

Pipetting module A mechanism that holds pipetting heads. The NTC houses the 96 and 384 well pipetting heads, and the NTC teach tool.

Post air gap This introduces an air gap following a aspiration to ensure that the liquid in the pipette tip does not leak during instrument movements or pauses.

Pre-air gap This introduces an air gap in the pipette before aspirating liquid. This gap above the liquid is then used during a dispense operation to push the liquid column fully and completely out of the pipette to ensure complete, accurate dispense.

S

Shape This represents the physical top shape of the well and can either be Square or Round.

Speed control The speed of the pipette pistons, as well as other system motions can be controlled to improve accuracy and precision for varying fluids. For example, the pipetting speed should be reduced when dispensing small volumes or when handling high viscosity liquids.

T

Tip touch This action causes the pipette tips to touch against a top side of a well after aspiration to remove fluid which may have adhered to the side or bottom of the tips. Tip Touch is essential for extremely low volume dispenses where accuracy is essential.

Tip/well offset Typically, aspirate and/or dispense actions take place at the center of a well. Selecting a tip/well offset sets the tip position either to a corner of the well, or to a specific X and Y axis offset value. This is typically used with low volume dispenses; for example, during a low-volume dispense, positioning the tips in the corner of a well provides additional surface area for the liquid to adhere.

V

Volumetric Calibration The process of calibrating the **Versette** system to precisely aspirate/dispense a particular fluid at a given temperature or temperature range and volume. Each system is factory calibrated for typical fluid type/viscosities. Calibration settings can be stored in memory and applied when needed. In cases where liquids with different characteristics are used, the instrument can be recalibrated in the user’s laboratory for most fluids. Please note that each calibration is specific for a fluid type at a given temperature range and

dispense volume. For example, 150 μ L of 70% Ethanol at 20°C. Refer to **the Versette ControlMate User Manual** for details.

Viscosity Viscosity describes a fluid's internal resistance to flow and can be thought of as a measure of fluid friction. Thus, water is "thin", having a lower viscosity, while glycerol is "thick", having a higher viscosity.

W

Well count The physical number of wells contained within the vessel. The value can be one of 96 or 384. The field is used for determining positional parameters for quadrants (division of the wells into blocks) etc.

Well depth The well depth value is used to define a preset height which defines the bottom of the well. The value entered must be measured from the well to top to the well bottom at the well geometric center.

Width The well width is especially important for determining well centers and tip touching. The field value represents the physical width of the well measured at the top of the well.

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