AutoBlot 3000

Guide to Operation

MedTec, Inc.
November 2010

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Document Control Number: WI-101-1 Rev 1

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Both the AutoBlot 3000 and the 3000H comply with the essential requirements of the applicable European laws or Directives with respect to safety, health, environment and consumer protection.

SETTING UP THE AUTOBLOT 3000

General Description

The AutoBlot 3000 fully automates the Western blot assay. Following the manual addition of test samples, the AutoBlot incubates, washes, and performs subsequent reagent additions as defined by the operator during the programming phase. It permits easy setup with walk-away performance, sounding an alarm when the test is complete.

The 3000H model has a heated platform, magnetic stirrer, and heated bottle plate for hybridizations and stringent washes that require heat.

Both units are fully programmable from the front panel and store up to ten protocols within the unit, allowing for full customization of blot assays for dispense, incubation, and aspiration.

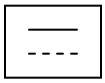
The AutoBlot dispenses and aspirates up to twenty strips in 90 seconds. This means the automated assay runs as quickly as the manual assay. The 3000 model dispenses up to six reagents, depending on the number of pumps purchased. The 3000H comes standard with six pumps.

Warning: The AutoBlot 3000 is for in vitro diagnostic use, however, the performance of the AutoBlot has not been established with specific in vitro diagnostic assays. The operator must evaluate the AutoBlot in conjunction with each specific in vitro assay they intend to run, including the establishment of new performance characteristics using the AutoBlot.

Safety

The AutoBlot 3000 is designed for safe operation. However, for your safety and the safety of others, the AutoBlot should be operated as specified in the Guide to Operations. Failure to do so could result in injury to yourself or others, or damage to the equipment. There are various symbols on the unit relating to safety.

 The international CAUTION label on the back of the unit indicates a potentially hazardous situation that could result in injury. You must refer to the Guide to Operations for instructions on the proper use and operation of the AutoBlot

 The black DIRECT CURRENT symbol printed on the serial number label indicates the unit runs on DC power.

Cautionary Note: If the event that a motor locks up while the AutoBlot is running, an alarm sounds and an error message displays. There is no danger to the operator should this occur. Refer to the Troubleshooting section for suggestions on corrective action.

Normal Environmental Conditions

The AutoBlot 3000 is designed to be safe under the following environmental conditions.

- Indoor use.
- Altitude up to 2000m.
- Temperature 5°C to 40°C.
- Maximum relative humidity 80% for temperatures up to 31°C.
- MAINS supply voltage fluctuations up to ±10% of the nominal voltage.
- Transient overvoltages typically present on the MAINS supply.
- Applicable RATED POLLUTION 2 degree.
- Category II installation.

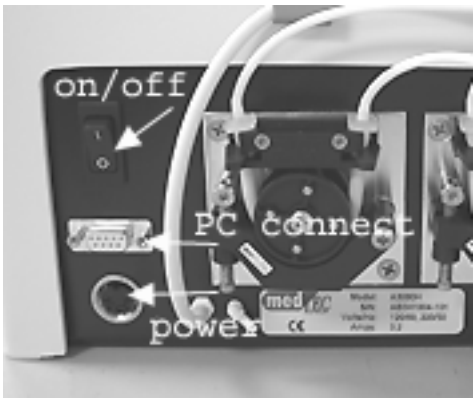
Unpacking the AutoBlot

Carefully unpack the instrument and inspect for damage that may have occurred during shipping. Notify the carrier immediately if there is any damage. **Save all packaging** in the event the instrument needs to be shipped or moved, or if the unit needs to be stored for a long period of time.

Box Labeling: The shipping box is labeled to indicate the following:

- the instrument must remain flat and packaged with the arrow indicating which end is up.
- the instrument is fragile and must be handled carefully.
- the shipping box is not waterproof.

Place the AutoBlot on a level work surface. Verify that the voltage shown on the manufacturer's label is the same as the voltage in your facility. Connect the power cord to the external power supply (the unit comes standard with a 24VDC, 2.08A max power supply. DO NOT use any other power supply – this could present a hazard). Plug the power supply into the back of the unit. Connect the power cord to a grounded receptacle.



The AutoBlot uses a power supply that permits a wide range of voltages and frequencies. Although line conditioners and surge protection are not required, the instrument may be plugged into either.

Turn the AutoBlot on by pressing the ON/OFF switch on the back of the unit. "**O**" represents OFF and "**I**" represents ON. The dispense arm moves to home position and the screen displays the company name and software version number.

Attach the two (2) aspirate tubes to the fittings on the lid of the waste bottle. The tubes are labeled "Connect to Waste Bottle". Either tube can connect to either of the fittings.

Included with your unit are 4-6 clear straws that can be attached to the end of the tubing that goes into the bottles. These straws help the tubing stay down in the bottle. Cut the flexible tubes to the minimum length needed to place the tubing in the bottles. The shorter the tubing, the less volume is required when priming the pumps.

Lock the pump pressure pads in place (see photo on page 19).

Validating for Cross Contamination

Before running patient samples, the instrument needs to be validated for the absence of cross channel contamination with each manufacturers' Western blot kit. To validate the instrument, run a complete panel with alternating negative and positive controls. Check for any positive bands that show up in the negative controls.

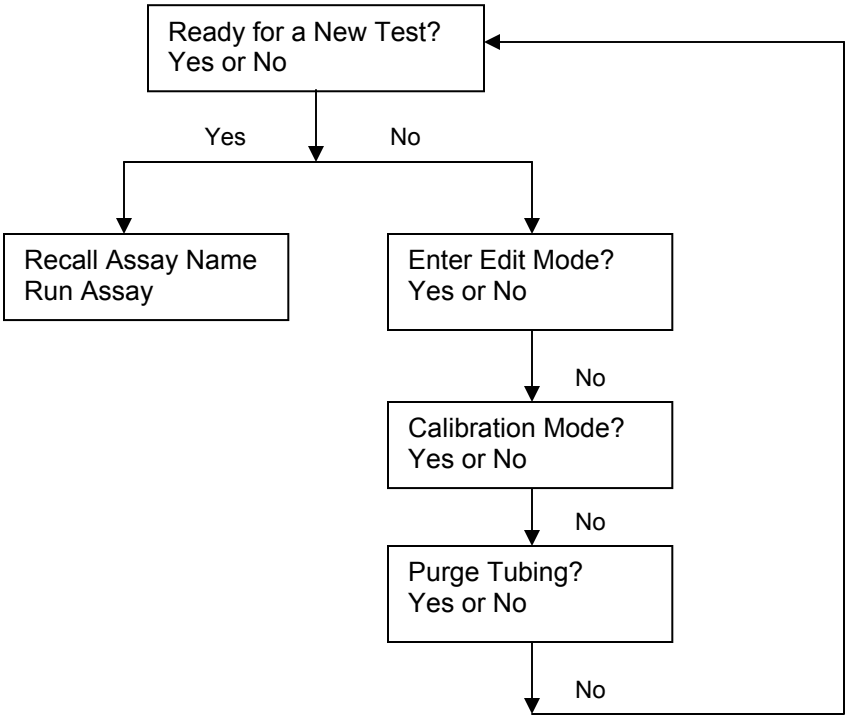
Keypad Conventions

There are five (5) keys on the AutoBlot keypad.

- **ENTER** is used to make a selection or to tell the AutoBlot to proceed with a process.
- **ALARM** silences alarms that turn on at various stages in the program.
- **PAUSE** temporarily halts the AutoBlot to allow time for you to prepare solutions, straighten a strip, or skip to a new step in the assay.
- The **YES** and **NO** arrow keys are used to select numbers and to accept or decline a process.

Design of the AutoBlot System

The following flow chart displays the layout of the various systems and how they are accessed in the program.



Ready for a New Test is the first prompt you receive when the AutoBlot is turned on. From here you can recall and run a previously programmed assay. This routine also contains the Pump Prime routine.

Edit Mode is used for programming the steps of a new assay or editing the steps of a previously programmed assay (see page 14).

Calibration Mode is used to calibrate the volume dispensed from each pump. The instrument has been calibrated by the manufacturer, however, it is best to recheck the calibration annually or whenever pump tubing is replaced. (see Annual Maintenance on page 20).

Purge Tubing is used to clean and empty the pump lines after an assay run (see Purge Tubing on page 18).

RUNNING AN ASSAY

Prepare for an Assay Run

Before beginning an actual assay, there are a few things that must be prepared first.

- **Mix the reagents.**
- **Wash all of the bottles thoroughly with DI water. Fill the bottles.**
- **Lock the pump pressure pads in place.**
- **Prepare the samples.**

Start the Test

Press YES at the *Ready for a New Test?* prompt.

Select the assay to be run from the list of available pre-defined assay programs. If your assay is not listed, program it now (see Programming an Assay on page 14), then return to this section for instructions on running the test.

Prime the pumps (each pump must be primed before running an assay in order to introduce liquid into the pump lines). Follow the prompts to prime each pump. During the priming routine press YES multiple times until fluid dispenses into the drip tray.

The first time you press YES the pump dispenses 2 ml into the line. Each subsequent time you press YES the pump dispenses 1 ml.

Once a pump is primed, press NO to move on to the next pump to be primed. You will only need to prime the pumps before the first assay run each day. Once liquid is introduced into each line there is no need to prime again.

Indicate the number of strips to be run by using the arrow keys to increment through the numbers on the display.

Place the tray on the tray platform.

Close the aspirate shield. The shield provides protection from aerosols generated during dispense and aspiration cycles. It should be kept closed during an assay run.

Start the test by pressing YES at the *Start Assay?* prompt.

As the automatic processing of the protocol begins, the various steps of the assay are displayed on the front of the instrument. Prompts come on at various points of the assay run instructing you to prepare samples, and to add reagents (if programmed for manual addition of reagents).

Positive and Negative Controls

Positive or negative controls should be placed in the troughs farthest from the aspirate arm drip tray; the negative control should be the furthest from the tray (looking at the front of the unit, these controls will be to the far left). This ensures that any problems (i.e. incorrect arm movement, loss of reagent, cross contamination) show up in the controls.

The PAUSE Key

The PAUSE key may be pressed any time the tray platform is rocking (the tray rocks during incubation) in order to tweeze a strip, prime a pump, or skip to another step in the program. After pressing PAUSE the test stops. The instrument remains in idle until a selection is made from the Pause Menu.

1: Return to Assay Restart the assay at the point of pause.

2: Prime Pumps? Enter the Pump Prime Routine.

3: Skip to Step? Restart the assay at a new step.

Note: 2:Prime and 3:Skip are not available while the instrument is dispensing or aspirating.

Resetting the AutoBlot

To reset the AutoBlot, simply turn the instrument off. The instrument must be off for at least six (6) seconds in order for it to reset. When the AutoBlot is turned back on it displays *Continue Test?.* Press NO to reset the instrument to the beginning of the test. Press YES to continue the assay at the point the AutoBlot was turned off.

Power Off

If power is lost for less than five (5) seconds, the test continues automatically when power returns. If power is off for longer than five (5) seconds the unit displays how long the power has been off and prompts *Continue Test?.*

Press YES to continue the assay at the point power was lost. Press NO to reset the unit.

Split Conjugate

The split conjugate feature enables you to run two sets of identical samples simultaneously in one tray, processing some of the panels with Conjugate 1 and the remaining panels with Conjugate 2. Turn on the split conjugate feature in Edit Mode Pause (see page 17). During startup the system prompts you for how many panels will use Conjugate 1 and how many will use Conjugate 2.

End of Assay Alarm

The end-of-assay alarm comes on at the completion of an assay. Press ALARM to turn off this alarm and acknowledge the end of the assay. The alarm automatically turns off after two (2) minutes and then prompts *Purge Tubing?* If you have completed all assay runs for the day, it is important the tubing be cleaned via the Purge Tubing Routine (see Purge Tubing on page 18). If you have another assay to run, press NO to skip the Purge Routine and begin another assay.

Overnight Assays: If you run an assay overnight that will finish before you arrive the next day, set your last step to a single DI rinse cycle with the aspiration turned off. This way the DI water remains in the tray overnight so the strips do not dry out. When you return the next day the system prompts you to aspirate the tray to complete the assay.

PROGRAMMING AN ASSAY

Most units come pre-programmed with your specific assay. Typically, pre-programmed assays from the manufacturer are locked and cannot be edited. If the AutoBlot does not have your assay already stored in its' memory, program the assay in Edit Mode. To enter Edit Mode press NO at *Ready for a New Test?* and then press YES at *Enter Edit Mode?* Use the arrow keys (< and >) to scroll through the list of assays. Each assay is listed with a corresponding assay number (1 through 10).

A previously defined assay can be selected for editing, or a new assay can be programmed by selecting an assay with the name EMPTY. Make a selection by pressing ENTER.

You also have the option to change the assay name. The assay name can be up to five characters long, including blanks. Press ENTER to select a letter or number and advance to the next letter space.

The AutoBlot can store up to ten programs in memory. Once an assay is saved, simply recall it after *Ready For a New Test?* and begin. If modifications are needed, recall the assay in Edit Mode, make the changes and resave it with the updates. To save a change, simply make the change and press ENTER. When the display updates to the next prompt, your changes have been saved.

Assay Steps

Assay programs in the AutoBlot are made up of a series of individual steps, or tasks, that are defined through the Edit routine. For example, a step might be a substrate incubation or a DI Rinse. The steps that define the assay are selected from a list of available steps displayed while in Edit Mode. Incubation times, reagent volumes, rocking speeds, and cycles are also defined at this time. Define each step in your assay by toggling through the choices using the arrow keys. Press ENTER to accept the step name. Save the assay routine by exiting Edit Mode.

Step Name	Description
EMPTY	Defining a step as "empty" ends the program at that point. Used only when modifying previously defined assays.
SKIP	Skip a step in a previously defined assay.
SOAK	A Soak step dispenses solution into the trays and then prompts you to add the strips.

Step Name	Description
SAMPL	A Sample incubation step prompts you to add samples.
WASH, DIH2O, SUBST, CONJ1, CONJ2, HYBRD	Default step names that can be customized for your specific assay requirements. To rename the pumps, go to *Enter Edit Mode* and press PAUSE. Scroll through the options until you find *Change Pump Names*.
PUMP1, PUMP2, PUMP3, PUMP4, PUMP5, PUMP6	Additional pump names for assays requiring steps other than already defined in your custom assays.

Alarms

The following alarms can be programmed into an assay:

Reagent Addition Alarm

The Reagent Addition Alarm turns on before the beginning of an incubation cycle. The first alarm comes on five (5) minutes before the end of the wash step and is an indication to prepare the reagent. Press the ALARM key to turn off this alarm. A second alarm will come on as a reminder to prime the pumps.

Variable Substrate Incubation Alarm

The Substrate Variable Incubation feature should be utilized for assays where the color development time is variable and some operator interaction is necessary in order to fully develop the bands. The variable substrate option is available only when a substrate step is defined. In order to do this, one of the custom pump names must be SUBST. Variable substrate allows you to observe the bands as they develop on the strip and to control the length of incubation as these bands develop.

If a variable incubation time is selected an alarm sounds at the end of the incubation time, giving you the option to continue the incubation or end it. If variable substrate incubation is used, be sure to program the minimum incubation time to allow time for band development.

The Variable Substrate Alarm comes on at the end of the preset incubation time. Press ALARM to turn this alarm off. The AutoBlot then prompts:

Continue Incubation
Press No to Stop

Substrate incubation continues until NO is pressed.

Edit Mode PAUSE

When PAUSE is pressed at the *Enter Edit Mode?* prompt, the AutoBlot enters a routine where the following features can be changed:

Erase An Assay	Erase an assay.
Change Pump Names	Change the custom pump names. **NOTE:** if your pre-programmed assays are locked, then you cannot change the pump names.
Split Conjugate	Sets Pump4 to Conj1 and Pump5 to Conj2 so you can run some of your sample strips with Conj1 and the remainder with Conj2.
Lock Assay	Lock an assay so it cannot be changed or erased (can be unlocked here also).
Modify Alarm	Change the cycle time of the alarm (how long the alarm stays on/off).

MAINTENANCE

The AutoBlot is relatively maintenance-free. However, there are several tasks that should be performed at the end of each day's run in order to keep the instrument in good working condition. In addition, it is recommended that the AutoBlot receive a more thorough Preventive Maintenance checkup annually.

Daily Maintenance

- Wipe down the instrument with a damp paper towel.
- Using isopropyl alcohol, wipe off the surfaces of the aspirate arm and dispense arm.
- Wash out all bottles to ensure a clean solution for the next assay. Use DI water and a 2% bleach solution as recommended on page 20.
- Clean both the aspirate and dispense tips with an alcohol swab. These tips must be kept clean in order to prevent clogs and to ensure that fluids are properly aspirated and dispensed. In order to prevent possible contamination, **DO NOT** use the same swab on the dispense tips that was used on the aspirate tips.
- Purge tubing (see below) when you are finished using the instrument for the day. You will also be prompted to wipe out the drip tray.

Purge Tubing Routine

The tubing should be kept clean to ensure good pumping action.

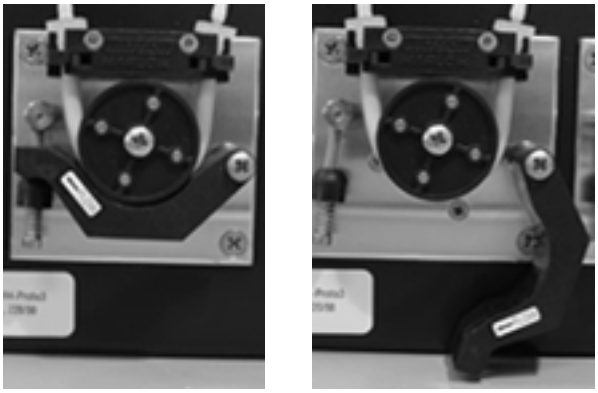
Use the Purge Tubing Routine to clear the pump tubing after the completion of an assay. Each pump should be purged after an assay run. This routine is accessed at the completion of an assay or after the Pump Calibration Routine.

Lift the pump tubes free of all bottles. Place all of the tubes into a bottle of appropriate cleaning solution and press ENTER at the *Place Tubes in Cleaner* prompt. It is recommended you use a 2% bleach solution (2 ml of generic brand bleach to 98 ml DI water) or a commercially available preparation that will not interfere with the assay but still remove any latent bacteria. The tubes will soak in the cleaning solution for five minutes to disinfect the tubes and then you will be prompted to *Put Tubes in DI.*

Place the tubes into a bottle of DI water and press ENTER. The system dispenses DI water through each pump tube and soaks the tubes for five minutes in order to dissolve any accumulation of salts. Then DI water is pumped through each tube again and the system prompts *Remove Tubes From DI.* Remove the tubes from the bottle of DI and place them on a clean paper towel. Press ENTER and the tubes will be pumped dry.

The system now prompts *Clean Drip Tray.* Wipe out the drip tray. Press ENTER when it is clean and the system prompts *Release Press Pad.*

Unlock the pressure pads on the pumps so the tubing can relax and press ENTER to complete the Purge Tubing Routine.



Pump Pressure Pad

Locked **Unlocked**

Weekly Maintenance

- Verify aspiration timing. This can be done during an assay run. Lift the aspirate shield and observe the aspirate and dispense cycles. Make sure that each trough is emptied 1-2 seconds before the arm lifts up and moves to the next trough.

Annual Maintenance

- In order to keep your AutoBlot in top working condition, it is recommended that it receive a Preventive Maintenance (PM) Checkup once a year. During a PM checkup, new tubing is installed, the pumps are recalibrated, the instrument is lubricated and cleaned, and the software is upgraded to the latest version (as required). All PM's and Service must be performed by a MedTec trained Service Technician to maintain warranty coverage.

- Check the incubation timer. The time remaining for an incubation displays on the front of the unit. Verify these times annually using a stopwatch. Because the display does not show seconds, be sure to start the stopwatch promptly at the beginning of a cycle or as soon as the display updates to a new time.

- Calibrate the pumps. The Pump Calibration Routine is used to adjust the "on" time of each pump. This allows for differences in how the tubing was installed in the pump, pump wear over time, and manufacturing tolerances. It is best to recheck the calibration annually **or whenever pump tubing is replaced.**

  To calibrate the pumps, press NO at *Enter Edit Mode?* If the tubing is new, exercise the tubing for proper break-in. Follow the prompts in pump calibration for exercising (see page 22 Exercising the Tubing).

- Prime the pumps before calibrating them (the AutoBlot will prompt you to prime before the calibration begins). **NOTE:**Before the pumps are calibrated, make sure the pressure pads have been locked for at

least one (1) hour in order to approximate real-life operating conditions. Disconnect the tubing from the dispense arm and place it in a 50ml graduated cylinder. Begin dispensing. The AutoBlot will prompt you to enter the amount actually dispensed. At that point the system makes calibrations and the routine will continue until exactly 40ml's is dispensed. Press ENTER to complete the calibration routine.

Tubing Replacement Kits

Tube replacement kits are available from MedTec. The tubing in these kits is cut to the proper length and marked for proper alignment.

NOTE: Proper tube lengths and installation are critical for proper performance of the arm assembly.

When you order a Tubing Kit from MedTec you will receive detailed instructions on how to replace the tubing.

Pump Tubing

The pump tubing is the short length of tubing that wraps around the pump. The pump tubing manufacturer gives a tubing life of approximately 1000 hours.

The pump tubing should be changed as follows (sooner if it breaks or gets dirty):

light use (1-2 assays/week)	change every two years
heavy use (1-2 assays/day)	change every year

NOTE: If the pump tubing is replaced the pumps must be exercised and recalibrated using the Pump Calibration Routine.

Exercising the Tubing

When new tubing is installed the pump delivery volumes will vary slightly until the tubing has relaxed into its new configuration around the pump rotor. In order to accelerate this process, the instrument has an Exercise Routine that automatically cycles through each pump. This Exercise Routine is accessed through the Pump Calibration Routine as follows:

Press No at *Ready for a New Test?.*
Press NO at *Enter Edit Mode?*
Press YES at *Calibrate Pumps?*

Be sure to have the pump pads locked in place and do not use any fluid in the system while exercising the tubing (the aspiration pump is turned off during this routine).

The tubing that is installed on the instrument does not need to be exercised. All tubing is exercised by the manufacturer before the instrument is shipped.

TROUBLESHOOTING GUIDE

In the event you are experiencing problems with your AutoBlot, refer to the following table for troubleshooting assistance. If you cannot find the solution to the problem using this guide, please call the MedTec Service Department. Under no circumstances should the instrument be opened. Attempting to service the instrument without the assistance of a service technician negates instrument warranty.

Problem	Possible Cause	Solution
Unit not dispensing.	1. Tubing not at bottom of bottle. 2. Bottles are empty. 3. Pump pressure pads not locked.	1. Push tubing to bottom of bottle. 2. Fill bottles. 3. Lock pump pressure pads.
Unit not aspirating.	1. Waste bottle not sealed properly. 2. Aspiration pump clogged.	1. Make sure waste bottle fittings are in place and lid is screwed on securely. 2. Fill a syringe with approx 2ml of DI water and force the water into the waste tube going from the waste bottle to the back panel.
Unit does not come on when ON/Off switch is used.	1. Instrument is not plugged in at wall or at the back of the unit.	1. Check the power cord and power supply to insure that are connections are in place.

Problem	Possible Cause	Solution
Splashing during dispense cycle.	1. Clogged dispense tube or nozzle.	1. Change out the nozzle. If problem persists, then change out the tubing.
Carriage Steps Lost Error	1. Tubing too tight or kinked	1. Install new tubing. 2. Check to make sure there is nothing blocking the movement of the carriage mechanism. If problem still persists, contact MedTec Service.
Rock Motor Steps Error	1. Rock motor fails to rock platform correctly	1. If platform is rocking – check to make sure nothing is impeding the movement of the rocker mechanism. 2. If platform is not rocking, contact MedTec Service.
Arm Steps Lost Error	1. Arm mechanism lost steps during the assay.	1. Check to make sure there is nothing blocking the movement of the arm mechanism. If problem still persists – contact MedTec Service.

TECHNICAL SPECIFICATIONS

Specification	AutoBlot 3000	AutoBlot 3000H
Dimensions	22 in x 18 in x 6.5 in. 559 mm x 457 mm x 165 mm	22 in x 18 in x 7.5 in. 559 mm x 457 mm x 191 mm
Weight	30 lbs (13.6 kg)	35 lbs (15.9 kg)
Capacity	20 strips	20 strips
Power	100-240V, 50 or 60Hz, 1.3amp max	100-240V, 50 or 60Hz, 3.2amp max
Software Updates	PC download	PC download
Reagent Bottles	500ml (wash buffer) 250ml (DI water)	500ml (wash buffer) 250ml (DI water)
Reagents	Standard: 4 Optional: 2	Standard: 6
Waste Bottle	1L	1L
Dispense Volume Range	0.5ml-3.0ml in 0.1ml increments accuracy ±10%	0.5ml-3.0ml in 0.1ml increments accuracy ±10%
Incubation Time	up to 24 hours for all incubation periods in increments of 1 minute	up to 24 hours for all incubation periods in increments of 1 minute
Number of Programmable Steps per assay	15 steps	15 steps
Max Relative Humidity	80%	80%
3000H Platform Temperature	N/a	30° C to 60° C (± 1.0° C)
3000H-specific specs	N/a	Heated platform, magnetic stirrer, heated bottle plate

PARTS AND CONTACT INFORMATION

Part Description	Catalog Number
AutoBlot 3000	MT07000
20-strip trays (AutoBlot 3000)	MT01001
Pump tubing kit (pump tubing only)	MT01049
Complete tubing kit (pump and bottle tubing)	MT01096
1000 ml waste bottle	MT01008
500 ml bottle	MT01009
250 ml bottle	MT01010
AutoBlot 3000 shipping box	MT07700
Guide to Operation	MT07600
AutoBlot 3000 Annual Service Contract	MT07001
AutoBlot 3000 Preventive Maintenance Checkup	MT07002

Call for current pricing or to request service. Please contact Customer Service for a Return Authorization Number prior to shipping units back for any reason.

Contact Information

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