Molecular Devices

SkanWasher 400

User Guide

AN ALL-INCLUSIVE AUTOMATIC MICROPLATE WASHER

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Chapter 1: Introduction

Overview

The need to thoroughly wash unbound antigens, antibodies, binding proteins, enzymes, or receptors from a solid-phase binding support is one of the most important steps in the enzyme-linked immunosorbent assay (ELISA). The SkanWasher 400 meets this demand and those of other numerous laboratory assays now being performed in 96-well microplates where thorough washing is an essential component of the assay.

The SkanWasher 400 is designed to wash 96-well microplates. The process of setting up wash parameters is flexible and allows you to modify or choose the following settings:

- Aspirate probe height and position in the well for low residual volume.
- Dispense probe height and position in the well for washing the active part of well.
- Inlet wash buffer flow rate for gentle or hard wash.
- “Overflow” washing.
- Microprocessor-controlled timing.
- Aspiration from the top of the well with adjustable lift speed.
- Wash all 96 wells simultaneously.
- Dispense only function.
- Dispense volume adjustment.

About This Guide

Chapter 1: This section will give you an introduction to the manual and details of what to expect in this Guide.

Chapter 2: Installation instructions will be outlined.

Chapter 3: Details will be given on unit parts to introduce common terminology used throughout the manual.

Chapter 4: This section will detail use of the software to set up programs and configuration of the instrument.

Chapter 5: General operations will be detailed.

Chapter 6: Detailed procedures will be listed for care and maintenance of instrument.

Chapter 7: Troubleshooting tips, error messages, and advanced troubleshooting will be outlined.

Appendix: This section will include instrument specifications, RS-232 commands, shipping information, and program sheets.

Key to Symbols

Symbols are used throughout this Guide to indicate important or helpful information that is not directly part of an instruction. The symbols used are the following:

▲ **CAUTION:** Alerts user to situations that could result in instrument damage or failure to complete a procedure.

!! IMPORTANT: Information that you need to know to perform a task properly.

TIP: Helpful information that can simplify a task.

Safety Features

The SkanWasher 400 is equipped with three sensors that help to safeguard operation before the actual wash. When starting the program, the SkanWasher 400 automatically verifies the status of the following:

- Pressure pump operating at the correct level
- Microplate in the microplate lift
- Space remaining in the waste reservoir

Sensors can be disabled through the Setup menu / Edit Options. Consult page 20 for procedure.

Serial Number

The serial number of the unit can be found on the back panel of the instrument.

Package Content

The SkanWasher 400 system includes the following:

SkanWasher 400 Instrument

- Microplate lift
- Tool kit, including probe cleaner and hex wrenches
- Power cord
- Instruction manual

Reservoir and Tubing

- Buffer reservoir (4 L)
- Rinse reservoir (4 L)
- Waste reservoir (10 L) with level sensor and waste tubing (red)
- Tubing set
  - Inlet tubing (blue and green)
  - Pressure tubing (yellow)

> **TIP:** Save the packing material. You may need it for later transport of the unit.

Step 1 Verify voltage is properly set for incoming line voltage.

- Check the current voltage setting in the red window of the voltage setting switch.

> **!! IMPORTANT:** Voltage setting switch is located below the main power receptacle on the back of the instrument.

Step 2 Change voltage setting, if indicated.

- Remove the switch using a small screwdriver inserted into red window.
- Turn the switch until the proper setting faces outward.
- Reinstall switch.

Step 3 Connect the power cord.

> ▲ **CAUTION:** Before connecting the main power, ensure that the voltage switch on the back of the instrument is set correctly for the incoming line voltage (Step 1).

- Insert the power cord into the receptacle located on the back of the instrument.
- Plug the power cord into the main power outlet.

Step 4 Connect Waste Reservoir (refer to Figure 1).

- Connect the outlet tubing line (red) from the waste reservoir to the **Outlet** port on the back of the instrument.
- Connect the waste alarm cable from the waste reservoir to the **Waste Alarm** port on the back on the instrument.

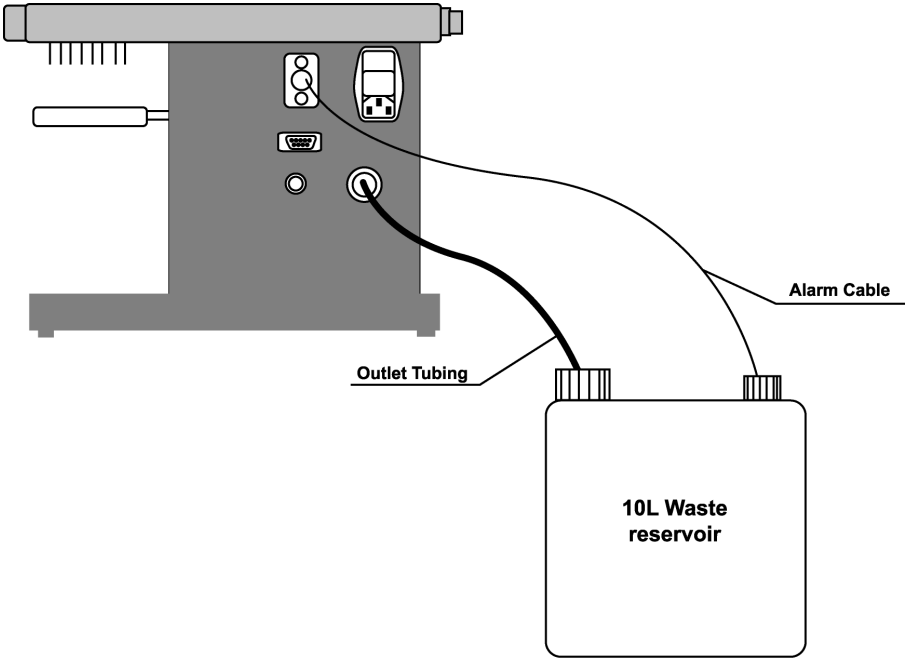

Figure 1: Waste reservoir

Step 5 Connect the Wash and Rinse Liquids (refer to Figure 2).

> ▲ **CAUTION:** It is recommended to use the reservoir bottles provided by Molecular Devices. These bottles can withstand the high pressure (up to 0.6 bar) created by the internal pressure source of the SkanWasher 400.

- Connect the Y-shaped pressure tubing (yellow) from the wash buffer or rinse reservoir to the **Pressure** port on the back of the instrument.

  (The large connector at the end of the tubing will be used for emptying of the head and will not be connected during normal operation.)

- Connect the tubing from the wash buffer (blue) or rinse reservoir (green) to the **Inlet** port on the left side of the instrument.

> **!! IMPORTANT:** Only one reservoir bottle can be connected at one time for either wash buffer or rinse solution since the unit has only one inlet port. Two 4-liter bottles are supplied with the instrument. Do not fill the reservoir bottles completely. Allow approximately 20% free space for air pressure.

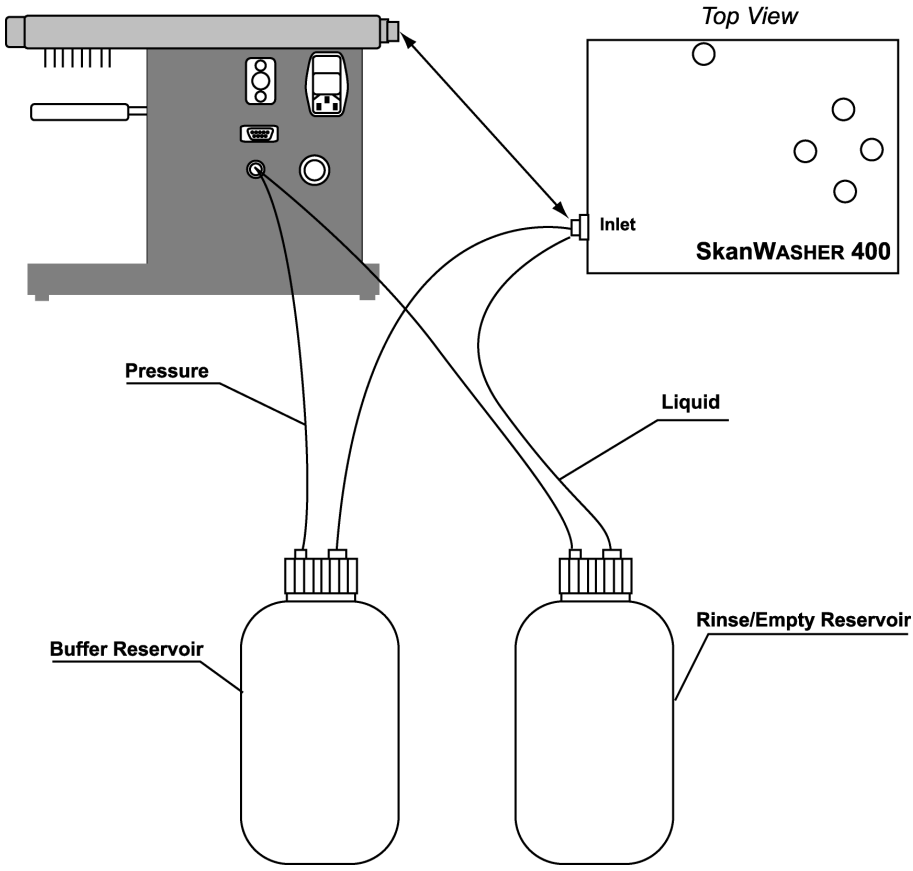

Figure 2: Wash and rinse liquid reservoirs

Step 6 Insert microplate lift.

- Select the appropriate plate type (round or flat-bottomed wells) in use by selecting the correct printed pattern on the side of the microplate holder (See Figure 3).
- Push the plate holder onto the two rods on the microplate lift (see Figure 4).

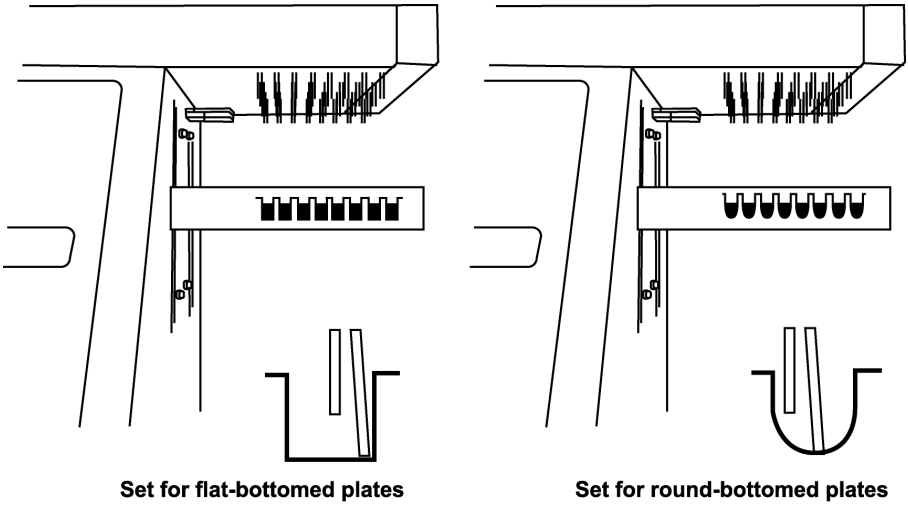

Figure 3: Microplate holder, flat- or round-bottom plates

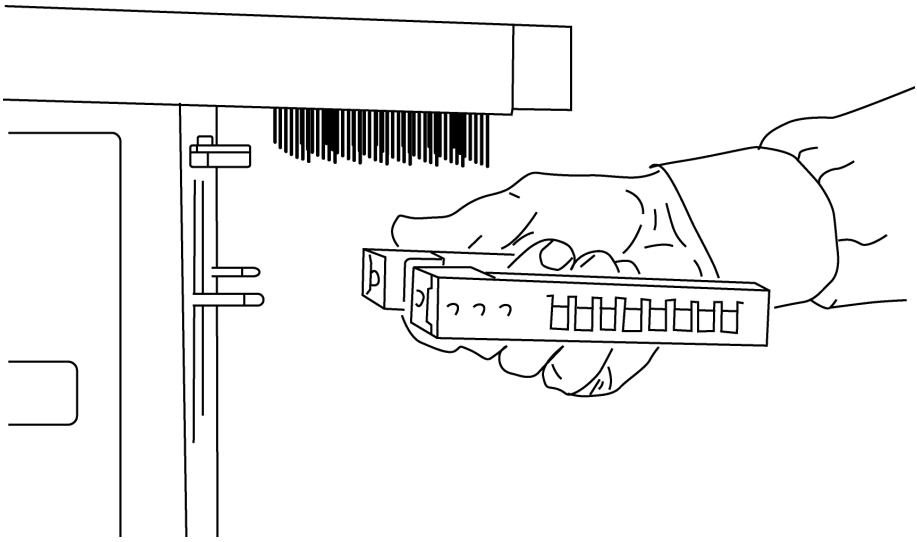

Figure 4: Microplate holder and lift

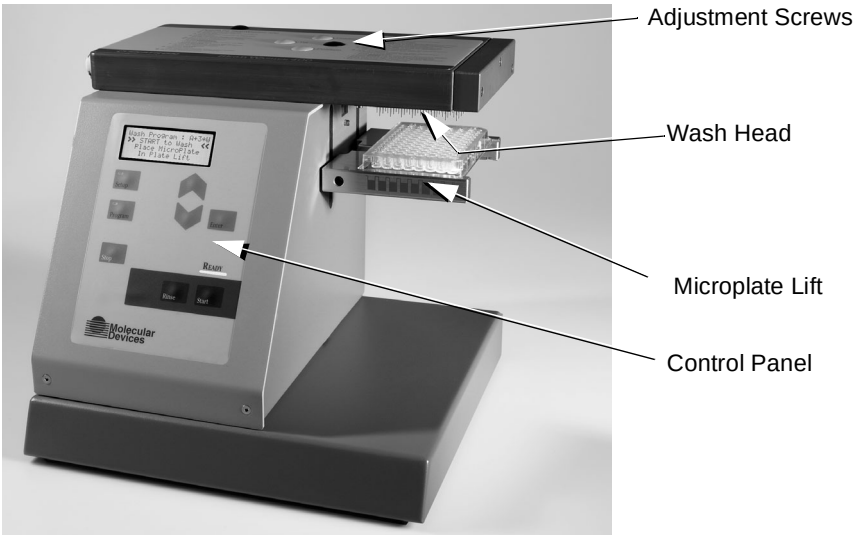

Figure 5: SkanWasher 400

Wash Head

- The wash head contains 96 paired probes: the longer probes are used when aspirating and the shorter probes are used when dispensing.
- The wash head is removable, using the two **adjustment screws,** to allow access to its internal channels for cleaning and maintenance.

Microplate Lift

- The microplate lift ensures that the microplate is positioned accurately during each stage of the wash program.
- The vertical velocity of the lift is fixed except during the aspirate function: the longer the aspirate time, the slower the lift moves upward toward the aspirate probes.This creates a very gentle aspiration and avoids disturbing the coating in the well.
- The lift can accommodate both flat- and round-bottom plates. A pattern of the plate type is printed on the side of the microplate holder. To accommodate the other type of microplate, the microplate holder is removed, turned around, and replaced.
- The lift automatically returns to the home position (lower) when the instrument is powered on.

Control Panel

The control panel located on the front of the SkanWasher 400 contains eight touch keys, three LEDs, and an LCD display, all of which are used to program and control the instrument.

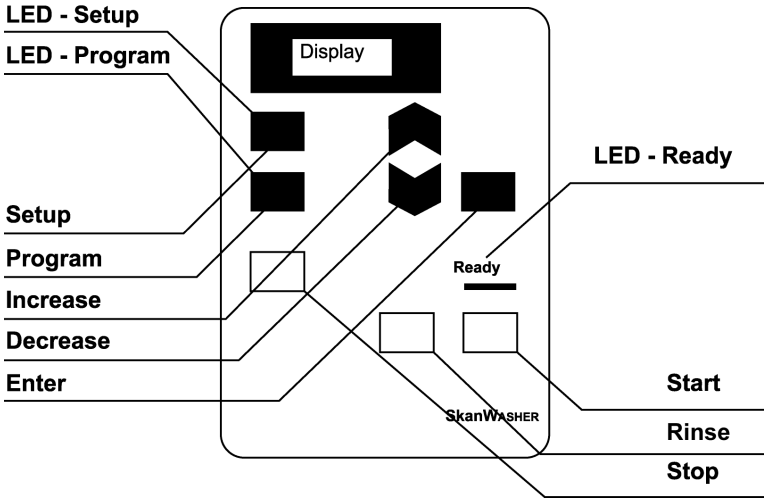

Figure 6: Control panel, LCD and touch keys

The control panel can be divided into three separate parts detailed below:

- LCD Display
  Displays messages during programming, setup, and during a run.
- Setup/Program
  The five dark gray keys ([Setup], [Program], [Enter], and the up and down arrow keys) are used to select and enter parameters when programming the SkanWasher 400. When the [Setup] or [Program] key is pressed, its corresponding LED will light.
- Wash
  - The three light gray keys([Start], [Rinse], and [Stop]) are used to run a pre-selected wash sequence or the rinse/prime sequence. When the SkanWasher 400 is ready for wash, the **Ready** LED light turns on.
  - The [Stop] key is used to halt operation in the event of a problem.
    - Press the [Stop] key to interrupt current operation, and the LCD will display a stop message.
    - Press the [Stop] key a second time to return to the main menu. (The microplate lift will move down to home position.)

LED Display

There are three LEDs that light up indicating various functions:

Setup: LED will light when user is in setup mode.

Program: LED will light when user is in program mode.

Ready: LED will light when unit is ready for wash.

Instrument Rear Connections

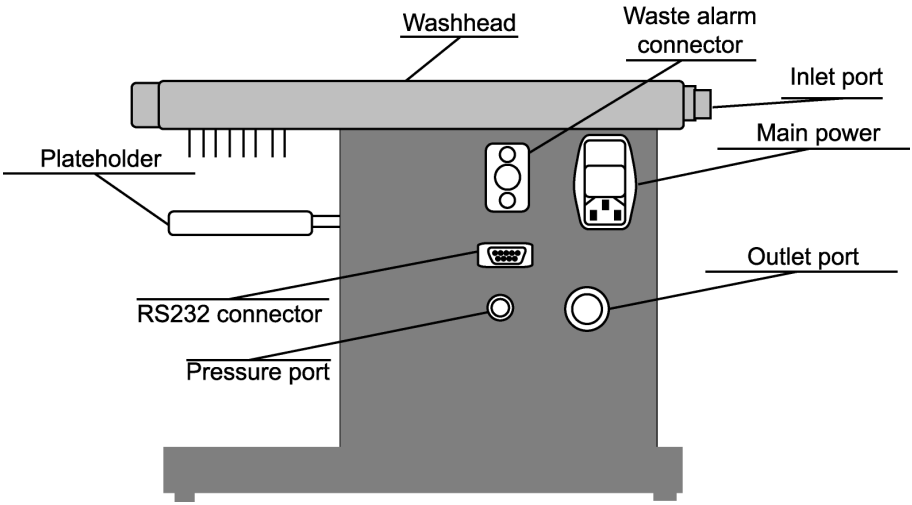

Figure 7: Rear of the SkanWasher 400

Part	Description
Inlet port	Located on the left side of the unit's wash head. One liquid container can be connected to this port. Two 4 L reservoir bottles are provided with the system to accommodate a buffer (blue color-coded tubing) and rinse (green color-coded tubing) solution. Note: Only one reservoir bottle can be connected to the unit at a time.
Outlet port	Located on the back panel of the unit. The waste collection reservoir is connected to this port via the waste tubing (red color coded). It is recommended to use the waste reservoir that is provided with the system.
Pressure port	Located on the back panel of the unit. The Y-shaped pressure tubing (yellow color coded) is connected to this port from the buffer/rinse reservoir bottle. The larger connector is used only during *Empty Head Procedure* and not during normal operation.
Main power	Located on the back panel of the unit. This contains the main power receptacle, which includes the power switch and fuses. A voltage switch located below the power cord receptacle allows the user to set the instrument for the local main voltage supply (110-220 VAC or 220-240 VAC). The selected voltage setting will be visible in the red window. Two power cords are included with the system to handle either voltage settings.
Waste alarm connector	Located on the back panel of the unit. The waste alarm cable is connected to this port.
RS-232 connector	Located on the back panel of the unit. A RS-232 interface cable is connected to this port to allow for communication with a computer. Note: Instrument is not robotic friendly.
Microplate holder	Most commonly available 96-well microplates may be used with this instrument, including V- and C- shaped bottom plates. The instrument is factory set for flat-and round- bottom microplates. To ensure excellent aspiration and low residual volume, the aspiration probe must be positioned at the bottom of the well. This can be adjusted through the onboard software.

Internal Washer Parts

Internal Vacuum Source

The instrument is equipped with an internal vacuum pump that requires no adjustment or preparation before use.

Internal Pressure Source

The instrument is equipped with an internal pressure pump that creates air pressure in the liquid reservoirs, eliminating the need for gravity feed. The pressure level can be adjusted between 0.0 and 0.6 bar (approximately 9 psi). The air pressure is supplied through the small quick couplings on the rear side of the instrument labeled Pressure port (Figure 7). The default air pressure value is 0.25 bar (approximately 4 psi). The air pressure value can be set for each wash program through the on-board software and adjusted for different assays.

> **TIP:** Adjusting the level of the air pressure also adjusts the flow rate of the liquid entering the microplate wells.

Chapter 4: Software Configuration

The SkanWasher 400 allows up to eight different user-defined and programmed wash sequences to be stored in memory with a battery backup. Each wash program has the following options:

- Air pressure from the internal pressure pump can be varied to control inlet liquid flow.
- Volume adjustment, conversion factor, and σV can be used to fine-tune the dispense volume to adjust for the different viscosities of various liquids.
- The position (height) of the aspirate probe above the bottom of the well during aspiration can be varied. The amount of fluid kept in the well can be adjusted.
- Dispense probe height position in the well during washing can be set.
- Up to 16 wash sequence steps can be selected. Each step can be one of the following:
  - Aspirate, time in seconds [2–10 sec.]
  - Wash, time in seconds [0.1–10 sec.]
  - Dispense, volume in µl [100–900 µl]
  - Soak/pause, time in minutes and seconds [1 sec.–3 min.]

The washer is pre-programmed with four typical wash sequences. These may be removed or changed as necessary.

At the end of Appendix E, a blank program guide sheet is included to facilitate programming. Duplicate this sheet for your own use to save a hard copy of each program for reference purposes.

Setup Function

- The [Setup] key is used to enter the **Setup** window.
  When in Setup mode, the [Setup] key is used to move backward. If an error occurs, press the [Setup] key to go back a step.
- The [Enter] key is used to select an item in a list or a value.
- The arrow keys ⮝⮟ are used to place the cursor on an item in a list or to scroll through values. To continue to scroll through values, keep the arrow key depressed.

When pressing the [Setup] key, the Setup Main menu will display two options:

Edit Program A wash program can be edited or created using this selection.

Edit Options Instrument parameters can be viewed and sensor enabled/ disabled.

Edit Program

Step 1 Press [Setup] to enter the Setup window. The Setup LED will illuminate.

Step 2 Select Edit Program.

- Use Up/Down arrow keys to move cursor to selection.
- Press [Enter].

Step 3 Select the program to be edited or select an open space to create a new wash program.

- Use the Up/Down arrow keys to move cursor to selection.
- Press [Enter].

> **!! IMPORTANT:** To save the changes made, Exit/Save must be selected after program setting completed.

Program Configuration	Description
Exit/Save	Use to exit program. User able to save or reject data before exiting.
Name	◆ Program name selected up to 5 characters. ◆ Select each character by using the up or down arrow buttons. ◆ Press Enter to move to the next character position. ◆ Characters can be capital or lower-case letters, digits, or special characters such as brackets, asterisks, colons, etc. ◆ Delete program by moving ▲▼ arrows to blank space.
Air Pressure	Pressure set for internal air pressure pump. ◆ Set to any value from 0.0 to 0.6 bar (approximately 9 psi). ◆ Pressure is changed to adjust the inlet wash liquid flow. ◆ To disable the pressure pump, select 0.0 bar. ◆ For normal wash, select 0.25 bar (approximately 4 psi).
Volume Adjust	Adjustment can be made to fine tune the dispensed volume using dispense or wash functions. The instrument is set at a default of 1.00 which can handle water and 0.02% Tween. If a viscous material is used, increase the dispense volume by increasing the factor.
Set Aspirate Position	The position of the aspirate probe is adjusted using this setting. ◆ This position is the height above the bottom of the well during aspiration. ◆ Place microplate in lift and press Enter to raise microplate to probes. Use up/down arrow buttons to set at correct height. See Figure 8. ◆ For low residual volume, the aspirate probe must be close to the bottom of the well. Total adjustable distance is 6 mm.

Program Configuration	Description
Set Dispense Position	The position of the dispense probe is adjusted using this setting. ◆ Place microplate in lift and press Enter to raise microplate to probes. Use up/down arrow buttons to set at correct height. See Figure 9. ◆ Total adjustable distance is 6 mm.
Wash Program 1-16	Up to 16 wash steps can be added. There are seven wash step selections available for each step: Rinse time, Disp volume, Soak / Pause, Wash volume, Wash time, Aspirate, and End Wash. See Table 1 on page 19 for descriptions.

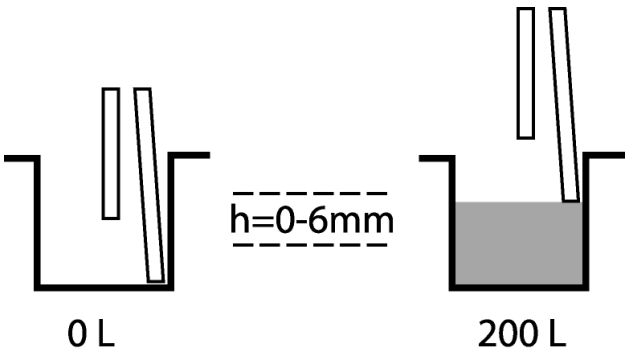

Figure 8: Aspirate probe height position

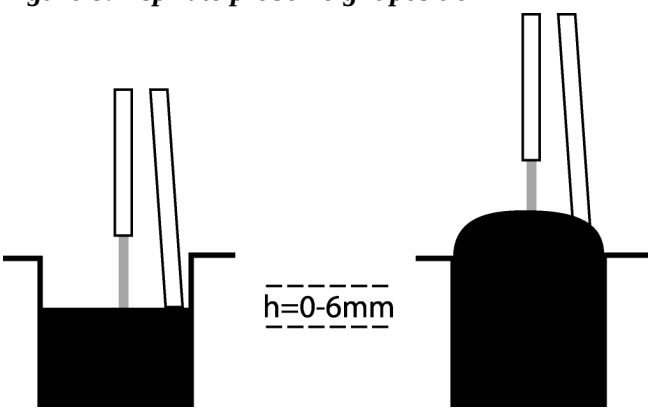

Figure 9: Dispense probe height position

Wash Step Selections

Each program can have up to 16 wash steps. There are seven wash step selections available for each step. Press [Enter] to enter selection and use up/down arrow buttons to change settings. Press [Enter] to select.

Wash Step	Description
Rinse Time	Set time in seconds from 0.1 to 10 seconds
Disp Volume	Set dispense volume from 100-350 µl
Soak/Pause	Set soak/pause time from 5 seconds to 2 minutes 50 seconds
Wash volume	Set volume of wash from 100-900 µl
Wash time	Set time from 0.1 to 10 seconds
Aspirate	Set aspiration time from 2.0 - 10 seconds. Lift velocity is varied with selected aspirate time.The lift velocity is automatically set so that at the last second of the aspiration, the aspirate probes are at the bottom of the well. Aspirate times longer than 5 seconds will have the same lift velocity as the 5 seconds setting. Aspirate time = 2.0 second lift velocity approximately 1 second Aspirate time = 5 second lift velocity approximately 4 seconds
End Wash	Set for last step of wash.

Table 1: Wash Step Selections

!! IMPORTANT: To save the changes made, Exit/Save must be selected after program setting completed.

Save Program

Step 1 From Edit Program Menu press the Up arrow key and select Exit/ Save.

Step 2 Press [Enter].

Step 3 Press Up arrow key to select **Yes-Save** at question *Save made changes?*

Step 4 Press [Enter].

> **!! IMPORTANT:** Program will enter this save window if user attempts to exit without saving. If Setup key pressed to return to the Setup Main menu without saving, changes will not be stored in memory.

Edit Options

When selecting Edit Options from the Setup Main Menu, there are two options to choose:

- **Sensor On/Off**
- **Read Sensor**

Sensor On/Off

The sensors can be enabled or disabled by selecting this option.

Step 1 Press [Setup] on the Control Panel to enter the Setup Main Menu.

Step 2 Press Down-arrow key to select Edit Options.

Step 3 Press [Enter].

Step 4 Select Sensor On/Off by pressing [Enter].

Step 5 Use Up arrow key to select either *Enabled* or *Disabled.*

Step 6 Press [Enter].

When Sensor is enabled, the following parameters must be valid to start a wash:

- Air pressure must be close to the selected value.
- A microplate must be on the microplate holder.
- The waste reservoir must not be full.

> **!! IMPORTANT:** When sensors disabled, all three safety features will be disengaged.

Read Sensor

Instrument parameters can be verified using this Edit Option. Five sensor values are displayed for read only purposes. No changes can be made from this screen. The five sensor values are from the following readings:

Air Pressure	Value is actual air pressure on internal pressure source displayed in bar. Changes can be made through software program. This sensor can be disabled through Edit Options/Sensor On/Off.
Vacuum	Value is vacuum pressure, displayed in mbar. No changes can be made through software program.
µP	Shows the status of the microplate lift 0-position sensor. Displays in (+) or (-). This sensor can be disabled through Edit Options/Sensor On/Off.
PL	Shows the status of the plate lift 0-position sensor. Displays in (+) or (-).
WF	Shows the status of the waste level sensor. Displays in (+) or (-). This sensor can be disabled through Edit Options/Sensor On/Off.

Starting a Wash Program

Step 1 Edit or create wash program using the Edit Program through Setup Main Menu.

Step 2 Verify appropriate liquid is in reservoir bottle.

Step 3 Verify connections.

- Verify buffer reservoir is connected to Inlet port and pressurized.
- Verify waste bottle is connected to Waste port.

Step 4 Prime system.

- Place sample microplate on the microplate holder.
- Check pattern on the side of microplate holder to verify that the holder is in the correct plate configuration.
- Press [Rinse] key to enter prime program.
- Press [Start].
- Repeat 3 times.

Step 5 Choose Wash Program.

- Press Program key from control panel (Program LED will illuminate).
- Select a Wash program using the Up/Down Arrow keys to move cursor to previously created/edited program.
- Press [Enter].

> **TIP:**
>
> - Program mode can be entered only when system is Ready. (Ready LED will illuminate).
> - If system is in Setup menu, press [Setup] key to return to Main Menu.
> - To exit the Program mode without selecting a program, press the [Program] key.

Step 6 Place microplate in Microplate Holder.

Check pattern on the side of microplate holder to verify that the holder is in the correct plate configuration.

Step 7 Press Start key.

Step 8 Repeat Step 5-8 to wash additional plates.

Step 9 At end of run, run a rinse program using rinse solution (consult page 25).

Daily Maintenance

Run daily maintenance at the end of each run **and** end of day. Decontaminate the instrument, externally and internally, after using infectious materials in the instrument. Commercially available laboratory decontaminants may be used. Follow their manufacturer's directions for proper use.

> ▲ **CAUTION:** Consult chemical resistance chart to verify that decontaminant solution will not harm materials used on the SkanWasher 400.

Step 1 Disconnect buffer inlet and pressure tubing from instrument.

Step 2 Connect rinse inlet and pressure tubing to instrument and rinse reservoir bottle (distilled water).

Step 3 Verify waste tubing is connected to outlet port.

Step 4 Insert a clean microplate into the microplate holder.

Step 5 Press the [Rinse] key to enter the Rinse/Prime mode.

Step 6 Press the [Rinse] key a second time to start the rinse program.

The rinse program will rinse for 5 seconds and then soak the probe tips for 5 seconds. This cycle is repeated 3 times.

Step 7 Remove microplate by pressing the [Stop] key twice.

Step 8 If end of the day, proceed with *Empty Wash Head* Procedure.
Or
If further washing will be performed later the same day, turn instrument off and start new wash with prime.

Empty Wash Head Procedure

Modifications were made on the pressure tubing and reservoir cap. Use the Y-shaped air pressure tubing with 2 small connectors and 1 larger connector. The rinse reservoir cap has a connection for the small connector on the air pressure tubing and for the large connector on the liquid tubing (identical to buffer reservoir). During normal operations, the large connector from the pressure tubing remains unconnected until emptying of the wash head procedure is performed.

Step 1 Verify Daily Maintenance performed.

Step 2 Disconnect liquid line from the Inlet port on the instrument's wash head.

Step 3 Connect large connector from pressure tubing to Inlet port.

Step 4 Verify waste tubing is connected to outlet port.

Step 5 Insert an empty microplate into the microplate holder.

Step 6 Start Rinse program.

- Press the [Rinse] key to enter the Rinse/Prime mode.
- Press the [Rinse] key a second time to start the rinse program. (This will blow air through the washhead to remove any remaining liquid.)

Step 7 Remove microplate by pressing the [Stop] key twice.

Step 8 Reconnect inlet tubing.

- Disconnect pressure tubing from Inlet port.
- Reconnect liquid tubing to Inlet port.

Step 9 Instrument may be turned off.

> **!! IMPORTANT:** Prime instrument at next day of use with buffer solution. Follow instructions in *Operation* chapter.

Weekly Maintenance

Perform maintenance once a week or after use of a contaminated solution in instrument to decontaminate system as well as clean probes.

> **!! IMPORTANT:** Perform *Daily Maintenance* before running a decontaminant solution through instrument to rinse out all buffer products.

Step 1 Perform Daily Maintenance to rinse system.

Step 2 Fill a reservoir bottle with 2% bleach solution or other decontaminant solution (maximum bleach solution allowable to use is 10%).

Step 3 Connect tubing to instrument.

- Connect rinse inlet and pressure tubing to new reservoir bottle.
- Verify waste tubing is connected to outlet port.

Step 4 Insert a clean microplate into the microplate holder.

Step 5 Start Rinse program.

- Press the [Rinse] key to enter the Rinse/Prime mode.
- Press the [Rinse] key a second time to start the rinse program. (The rinse program will rinse for 5 seconds and then soak the probe tips for 5 seconds. This cycle is repeated 3 times.)

Step 6 Soak Probes.

- Press [Stop] key to pause when instrument is in first soak cycle of Rinse program.
- Let probes sit 5 minutes in decontaminant solution.
- Continue Rinse program by pressing [Rinse] key twice.

Step 7 Replace reservoir bottle with rinse reservoir bottle filled with distilled water.

Step 8 Start Rinse program.

- Press the [Rinse] key to enter the Rinse/Prime mode.
- Press the [Rinse] key a second time to start the rinse program. (The rinse program will rinse for 5 seconds and then soak the probe tips for 5 seconds. This cycle is repeated 3 times.)

Step 9 Repeat Rinse program 5 times.

Step 10 Remove microplate by pressing the [Stop] key twice.

Step 11 If end of the day, proceed with *Empty Wash Head Procedure*.

Advanced Maintenance

Clogged Probes or Rinse Inlet Channels

Clogged Probes

Probes have the potential of being clogged by small particles from the wash liquid, crystallization or protein build-up. It is important to perform Daily and Weekly maintenance to keep probes free of debris.

Step 1 Perform Daily Maintenance to rinse system.

Step 2 Perform Weekly Maintenance to clean probes.

Step 3 Clear particles from probes.

- Identify which probe is clogged.
- Use a probe cleaner to clear the probe.

Step 4 Replace reservoir bottle with rinse reservoir bottle filled with distilled water.

Step 5 Verify waste tubing is connected to outlet port.

Step 6 Perform a forward flush to remove the particles.

- Press the [Rinse] key to enter the Rinse/Prime mode.
- Press the [Start] key a second time to start the prime program.
- Repeat 3 times.

Step 7 Run a wash program to verify that particles are removed.

Step 8 If particles not removed, proceed to *Rinse Inlet Channels* or *Rinse Outlet Channels.*

Rinse Inlet Channels

If it is determined that the dispense probes (shorter probes) are clogged, follow this procedure after performing the *Clogged Probes* procedure to dislodge particles.

Step 1 Open the inlet channel seal to get access to the wash head inlet channel (see Figure 10).

- Remove two hex wrench screws using the hex wrenches available in the tool kit.
- Pull out the wash head block to expose the inlet channels.

Step 2 Place a container under area to collect water overflow (water will flush out through the holes in the back of the wash head).

Step 3 Disable sensors from Setup/Edit Option/Sensor On/Off (consult page 20 for instructions).

Step 4 Fill a reservoir bottle with distilled water.

Step 5 Connect tubing to instrument.

- Connect rinse inlet and pressure tubing to new reservoir bottle.
- Verify waste tubing is connected to outlet port.

Step 6 Perform a forward flush to remove the particles.

- Press the [Rinse] key to enter the Rinse/Prime mode.
- Press the [Start] key a second time to start the prime program. (Water will flush out through the holes in the back of the wash head.)
- Repeat if indicated.

Step 7 Reseat inlet channel seal block in the wash head.

Step 8 Run a wash program to verify that particles are removed (see Operation, Step 5).

Step 9 If particles not removed, and one probe can be identified to be clogged, replace probe.
Or
If particles not removed, please consult Technical Support to have inlet channel replaced.

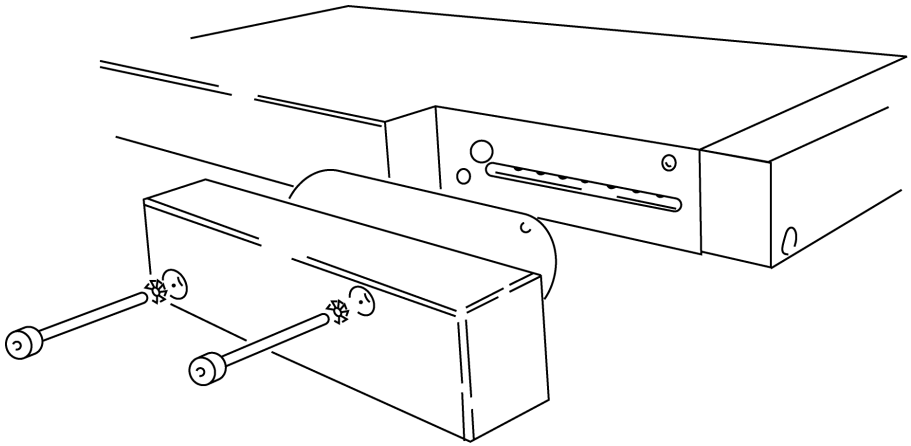

Figure 10: Wash head inlet channel seal block

Rinse Outlet Channels

If it is determined that the aspirate probes (longer probes) are clogged, follow this procedure after performing the *Clogged Probes* procedure to dislodge particles.

Step 1 Open the outlet channel seal block to get access to the wash head outlet channel (see Figure 11).

- Remove two hex wrench screws using the hex wrenches available in the tool kit.
- Pull out the wash head block to expose the outlet channels.

Step 2 Observe for particles in outlet channel.

Step 3 If particles not removed, and one probe can be identified to be clogged, replace probe.
Or
If particles not removed, please consult Technical Support to have outlet channel replaced.

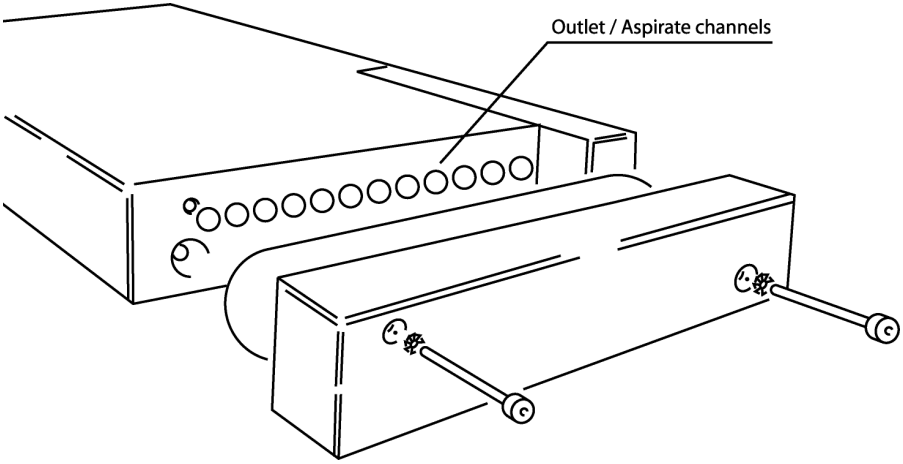

Figure 11: Wash head outlet channel seal block

Replacing Probes

Individual probes can be replaced if identified to be the sole problem.

Step 1 Identify if aspirate or dispense probe is to be replaced.

- Inlet Probe used for dispense probe (part #1700-0190, pkg. 10/box).
- Outlet Probe used for aspirate probe (part #1700-0239, pkg. 10/box).

Step 2 Pull out probe with pliers.

Step 3 Insert new probe, push probe in until it touches the washhead.

Step 4 Apply glue around probe at the point of entry at the wash head Commercially available glue recommended: Loctite *QuickTite Super Glue Easy Squeeze Gel* or Locktite 290 *Loctite Threadlocker Green* (does not set up as quickly as QuickTite).

Microplate Lift Adjustment (Tilt and Vertical)

The microplate lift is factory adjusted for optimal operation and should normally not need further adjustments. Dispense and aspirate probe placements can be adjusted for each program through software setup.

> ▲ **CAUTION:** The Microplate Lift adjustment (Tilt and Vertical Adjustment) should be performed only by qualified service personnel or when instructed by a Technical Support Representative.

Step 1 Remove the three gray caps on top of the wash head.

Step 2 Position Adjustment

- Use a hex wrench to loosen the screws marked **Tilt Adjustment Screw** and **Position Adjustment Screws** on the top of the wash head.
- Adjust the plate to the desired position.
- Retighten the position adjustment screws.

Step 3 Tilt Adjustment

- Tighten the **Tilt Adjustment Screw** to tilt the placeholder upward; loosen this screw to tilt the plateholder down.

> ▲ **CAUTION:** Don't use force to tilt the plate holder. If you need to tilt it more than 2-3 mm, the position adjustment screws must be loosened.

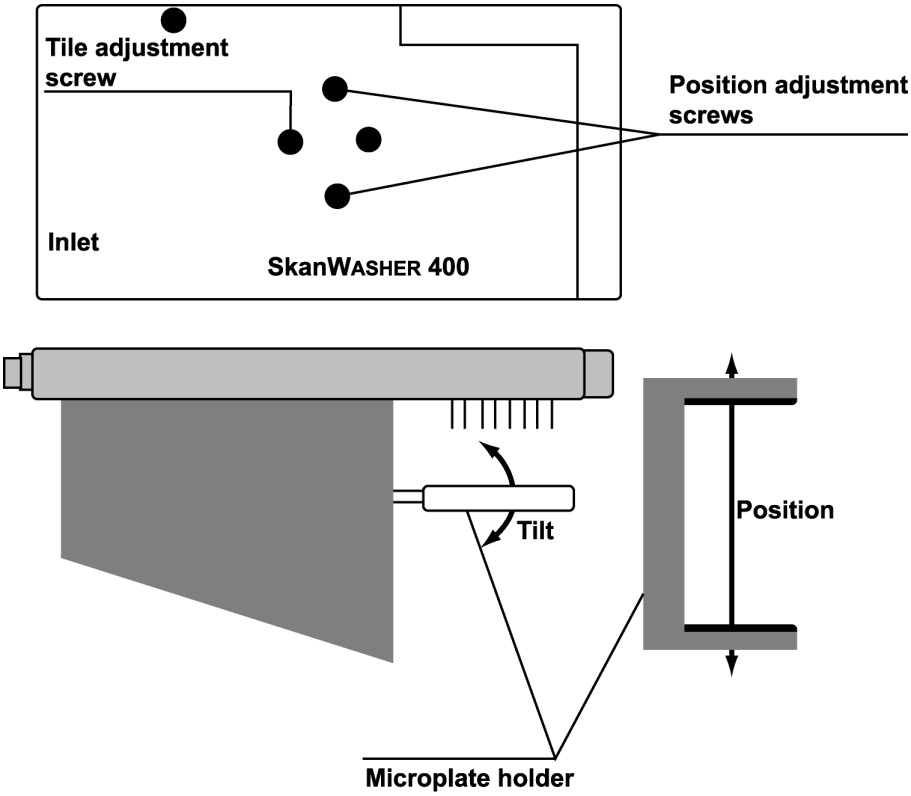

Figure 12: Microplate lift adjustment

Troubleshooting Chart

If you experience a problem during operation of the SkanWasher 400 and don't know how to resolve it, the following table may prove helpful. Table 2 below lists problems and possible resolutions. For problems not listed here, or if the listed resolution does not fix the problem, please call the Technical Support department at Molecular Devices (outside the U.S. and Canada, please contact your local representative for assistance).

Table 2: Troubleshooting Chart

Problem	Possible Remedies
No power to instrument; instrument will not turn on.	• Check that power cord is plugged in. • Check power active to source outlet. • Check voltage selection switch. • Check power supply.
Air in lines.	Prime lines: increase air pressure to 0.5 bar, then press [Rinse] and [Start].
Uneven aspiration.	• Clean probes. • Check spacing between ends of probes and bottom of wells. • Check microplate alignment (see page 31).
Dripping from aspiration probes.	• Increase aspiration time. • Check valves.
Clogged aspiration probes.	• Use wire probe cleaner. • Consult *Clogged Probe* procedure. • Soak probes overnight in DI water.
Uneven dispenses.	• Perform *Clogged Probe* procedure. • Increase air pressure.
Dripping from dispense probes.	• Check for grime on probes. Perform *Clogged Probe* procedure. • Check wash head. Prime system.

Table 2: Troubleshooting Chart

Problem	Possible Remedies
Programs not retained in instrument memory.	Battery on main board may be low: battery life is from three to five years. Test the battery strength to see if it needs to be replaced. Strength should be 3.68 volts ± 5%. Battery replacement is a Lithium battery ER 6/3, 6V and replacement should be performed by a qualified service representative.
Pump continues to run.	Remove tubing from back of washer at pressure fitting. If pump stops, the problem is probably the tubing caps. If the pump continues running, it is most likely another internal problem. Call Technical Support.

Advanced Troubleshooting

Aspirate Probe Horizontal Adjustment

Step 1 Locate the two rods that support the microplate holder.

Step 2 Locate the two screws that secure the two rods to the plate lift mechanism.

Step 3 Loosen both screws.

Step 4 Adjust rods in/out as necessary.

Step 5 Fasten both screws.

Step 6 Remount wash head and verify positioning of probes.

Step 7 If necessary, readjust.

Error Messages

When an error condition occurs, the SkanWasher 400 stops operation and an alarm signal is heard. The LED Ready light flashes and a message is shown in the display.

The sensor check is performed once when the [Start] key is pressed to initiate a wash. During the wash, the SkanWasher 400 does not check the sensors.

Error	Cause	Thing to Try
E-02 Air Pressure Pressure High ⮝⮟ Low ➢ Verify Setup	The [Start] key is pressed for wash or rinse/prime. The actual air pressure is not equal to the set air pressure value.	**Low:** Probably a leak. Check that all reservoir caps are tightened. **High:** Due to changed air pressure setting. The previously used wash program had a higher air pressure setting. Open reservoir cap to release excess air pressure.
E-03 MicroPlate No Plate In Lift ➢➢ Insert Plate	The [Start] key has been pressed for wash or rinse/prime but no microplate is in the plate holder.	Insert a microplate.
E-04 Waste Full Waste Reservoir ➢➢ Empty Waste	The [Start] key has been pressed for wash or rinse/prime, but the waste reservoir is full.	Empty the waste reservoir to continue. Press the [Stop] key to return from the Error position.

Appendix A: RS-232 Operation

Introduction

The SkanWasher 400 is supplied with an RS-232 connector that allows two-way communication interface. A separate computer may control the SkanWasher 400. The protocol for this communication is designed as a one-character command/reply protocol. The standard protocol contains the following communications: start, stop, program selection, error messages, ready, and wake-up calls.

The RS-232 connection on the SkanWasher 400 is a female 9-pin receptacle that can be connected directly to a serial port on a PC, for example.

> **!! IMPORTANT:** Skanwasher 400 can be interfaced with a computer system but the microplate lift NOT robotic compatible.

Parameters

Baud rate:	9,600 baud
Data bits	8
Parity	None
Stop bits	1

The SkanWasher 400 comes with an RS-232 cable having 9-pin male/female connectors. The communication protocol is designed for single-character commands. No data handshake control is implemented, nor are hardware, DTR/DSR, RTS/CTS, software, or Xon/Xoff. Hardware handshake lines are interconnected in the 9-pin female connector.

Communication Protocol

The communication protocol is designed as a one-character command/reply protocol. The host sends one ASCII character and the SkanWasher 400 replies that the command has been received and performs the action.

Commands entered by pressing keys on the front panel of the SkanWasher 400 are accepted in the same way as those sent via serial communication.

Table A-1: Character Commands Recognized

Command Sent from Host	Description	Reply from SkanWasher 400
"G"/"g" 47h/67h	Start—This performs the same function as pressing the Start key on the control panel. The SkanWasher 400 begins washing the microplate using the currently selected wash program. If sensor check is enabled, air pressure, waste level, and whether or not a microplate is present will be verified prior to initiating the wash. Start command accepted→Reply "G" Not accepted due to sensor alarm→Reply "E" When wash sequence finished→Reply "!"	"G" - 47h "E" - 45h "!" - 21h
"S"/"s" 57h/73h	Stop—interrupt the current action of the SkanWasher. This command performs the same function as pressing the Stop key on the control panel. The Stop command must be sent twice: 1. Stop→Interrupt operation→Reply "S" 2. Stop→Return to Ready mode→Reply "!"	"S" - 53h "!" - 21h
"!" - 21h	Attention—The SkanWasher does not perform an action but sends a reply that it has received a command and is responding. Reply "!"	"!" - 21h
"1" - 31h "2" - 32h ------ "8" - 38h	Select wash program. The wash program is chosen by the controls on the SkanWasher 400. Only defined wash programs can be selected. Select program accepted→Reply "n" where "n" is the program selected. Select program not defined→Reply "#"	"n" - 3nh n: selected program # - 23h
Other Commands	Command not accepted by the SkanWasher 400: Reply→"?"	"?" - 3Fh

Table A-2: Character Replies Sent

Command Sent from Host	Description
"!" - 21h	Attention—The SkanWasher sends this comand when it is ready to handle new commands (when it is in waiting/ready mode). This command is sent during the following conditions: • when powering up • when ready with a wash sequence • when replying to the second Stop command • when an error state is released
"#"	The host tried to select a wash program that was not defined. The SkanWasher 400 will only accept a select program command if the wash program number (between 1 and 8) has been defined.
"1" - 31h "2" - 32h ------ "8" - 38h	The wash program now selected.
"?" - 3Fh	Command error reply sent during one of the following situations: • The command sent from the host is not defined in the SkanWasher 400 protocol. • Start or Select Program command is sent from the host while the SkanWasher 400 is washing a microplate.
"E" - 45h	Error—The SkanWasher 400 detects an error state when the Start command is sent. The error state can be ended by one of the following: • Removing the reason for the error • Sending a Stop command.

Table A-2: Character Replies Sent

Command Sent from Host	Description
"G"/"g" 47h/67h	Start—This performs the same function as pressing the Start key on the control panel. The SkanWasher 400 begins washing the microplate using the currently selected wash program. If sensor check is enabled—air pressure, waste level, and whether or not a microplate is present will be verified prior to initiating the wash. Start command accepted→Reply "G" Not accepted due to sensor alarm→Reply "E" When wash sequence finished→Reply "!"
"S"/"s" 57h/73h	Stop—interrupt the current action of the SkanWasher. This command performs the same function as pressing the Stop key on the control panel. The Stop command must be sent twice: 1. Stop→Interrupt operation→Reply "S" 2. Stop→Return to Ready mode→Reply "!"

Appendix B: Shipment

Prior to transporting the SkanWasher 400, carry out the following steps.

Step 1 Decontaminate the system following *Weekly Maintenance* procedure. If radioactive materials are used, use appropriate decontaminate solution for each material.

Step 2 Perform *Empty Head* procedure to empty dispense head of all fluid.

Step 3 Clean exterior surface of instrument with alcohol followed by water.

Step 4 Remove the microplate holder.

Step 5 Secure the wash head using foam and tape.

Step 6 Complete and sign the decontamination form.

Step 7 Ship in the original packaging material and cardboard box.

Appendix C: Specifications

Physical

- Dimensions
  - Length . . . . . 32 cm
  - Width. . . . . 33 cm
  - Height . . . . . 31 cm
- Weight . . . . . 10.9 kg
- Shipping weight. . . . . 16.75 kg
- Power source . . . . . 110/230 VAC ± 10%, 50/60 Hz
- Electronic. . . . . Based on ‘51 family micro computer
- Setup memory . . . . . Lithium battery, 8 wash programs + instrument parameters
- Pumps . . . . . Internal pressure and vacuum pumps
- Internal pressure . . . . . Membrane air pump, 0-0.6 bar
- Waste pump . . . . . Membrane pump
- Microplate lift . . . . . Step motor driven

Performance

- Aspirate . . . . . < 2 µl average residual volume/well
- Dispense
  - Precision . . . . . <2% CV
  - Accuracy . . . . . ± 3%
- Internal volume . . . . . Wash head prime volume < 35 ml
- Well flow rate (water and 0.2% Tween)
  - At air pressure 0.25 bar. . . . Typical flow rate 253 µl/s
  - At air pressure 0.50 bar. . . . Typical flow rate 366 µl/s

Chemical

- Housing . . . . . Painted, marine-grade aluminum
- Microplate holder . . . . . Anodized, marine-grade aluminum
- Wash elements. . . . . Stainless steel probes
- Wash head . . . . . PVC
- Valve . . . . . Viton-membrane, solenoid operated
- Waste pump . . . . . Neoprene membranes
- Inlet/outlet/pressure ports . . . . . Polypropylene quick disconnect, Viton O-rings

Molecular Devices

Molecular Devices Corporation
1311 Orleans Drive
Sunnyvale, CA 94089 USA

Appendix D: Decontamination Form

In order to protect personnel involved in servicing instruments, parts, or accessories, one must ensure that risk factors hazardous to health (infectious material, radioactive isotopes) are removed from the item in question.

This form must be signed and acompany the SkanWasher 400 instrument, parts, or accessories, when returning for service or return after used for demonstration purposes. If not, the recipient has the right to reject the equipment.

Product Description: _____

_____

Catalog Number: _____ Serial Number: _____

Method of Decontamination: _____

_____

_____

_____

I confirm that the above item has undergone an appropriate procedure of decontamination at this facility before being handed over, or transmitted, to you for service or return of item after used for demonstration purposes.

Name: _____

Institution: _____

Address: _____

_____

City/State/Zip: _____

Country: _____

Date: _____ Signed: _____

Appendix E: Wash Program Sheets

SkanWasher 400 Wash Program Sheet

Program 1

Wash programs are pre-set at the factory. These programs may be edited.

Program Number	**1**	**Program Name**	**A + 3 * W**
Date	**16.04.1998**	**Signature**	**HT**
Description	Demo program, Aspirate followed by 3 times wash.		
Aspirate probe needs to be adjusted to microplate to be used.			

Instrument Parameters

Air Pressure	0.25 [bar]	**Volume Adjust σV**	[-]
Aspirate Probe	0.0 [mm]	**Dispense Probe**	2.0 [mm]

Wash Sequence

1. Wash Step	■ Aspirate	☐ Wash	☐ Dispense	☐ Soak	☐ Rinse	2.0	sec/____ µl
2. Wash Step	☐ Aspirate	■ Wash	☐ Dispense	☐ Soak	☐ Rinse	1.5	sec/____ µl
3. Wash Step	■ Aspirate	☐ Wash	☐ Dispense	☐ Soak	☐ Rinse	2.0	sec/____ µl
4. Wash Step	☐ Aspirate	■ Wash	☐ Dispense	☐ Soak	☐ Rinse	1.5	sec/____ µl
5. Wash Step	■ Aspirate	☐ Wash	☐ Dispense	☐ Soak	☐ Rinse	2.0	sec/____ µl
6. Wash Step	☐ Aspirate	■ Wash	☐ Dispense	☐ Soak	☐ Rinse	1.5	sec/____ µl
7. Wash Step	■ Aspirate	☐ Wash	☐ Dispense	☐ Soak	☐ Rinse	4.0	sec/____ µl
8. Wash Step	☐ Aspirate	☐ Wash	☐ Dispense	☐ Soak	☐ Rinse	_____	sec/____ µl
9. Wash Step	☐ Aspirate	☐ Wash	☐ Dispense	☐ Soak	☐ Rinse	_____	sec/____ µl
10. Wash Step	☐ Aspirate	☐ Wash	☐ Dispense	☐ Soak	☐ Rinse	_____	sec/____ µl
11. Wash Step	☐ Aspirate	☐ Wash	☐ Dispense	☐ Soak	☐ Rinse	_____	sec/____ µl
12. Wash Step	☐ Aspirate	☐ Wash	☐ Dispense	☐ Soak	☐ Rinse	_____	sec/____ µl
13. Wash Step	☐ Aspirate	☐ Wash	☐ Dispense	☐ Soak	☐ Rinse	_____	sec/____ µl
14. Wash Step	☐ Aspirate	☐ Wash	☐ Dispense	☐ Soak	☐ Rinse	_____	sec/____ µl
15. Wash Step	☐ Aspirate	☐ Wash	☐ Dispense	☐ Soak	☐ Rinse	_____	sec/____ µl
16. Wash Step	☐ Aspirate	☐ Wash	☐ Dispense	☐ Soak	☐ Rinse	_____	sec/____ µl

SkanWasher 400 Wash Program Sheet

Program 2

Wash programs are pre-set at the factory. These programs may be edited.

Program Number	**1**	**Program Name**	**A + 4 * W**
Date	**25.04.1998**	**Signature**	**HT**

Description Demo program, Aspirate followed by 4 times wash 250 ml & aspirate.

Aspirate probe needs to be adjusted to microplate to be used.

Instrument Parameters

Air Pressure	0.25 [bar]	**Volume Adjust σV**	[-]
Aspirate Probe	0.0 [mm]	**Dispense Probe**	2.0 [mm]

Wash Sequence

1. Wash Step	■ Aspirate ☐ Wash ☐ Dispense ☐ Soak ☐ Rinse 2.0 sec/____ µl
2. Wash Step	☐ Aspirate ■ Wash ☐ Dispense ☐ Soak ☐ Rinse _____ sec/ 250 µl
3. Wash Step	■ Aspirate ☐ Wash ☐ Dispense ☐ Soak ☐ Rinse 2.0 sec/____ µl
4. Wash Step	☐ Aspirate ■ Wash ☐ Dispense ☐ Soak ☐ Rinse _____ sec/ 250 µl
5. Wash Step	■ Aspirate ☐ Wash ☐ Dispense ☐ Soak ☐ Rinse 2.0 sec/____ µl
6. Wash Step	☐ Aspirate ■ Wash ☐ Dispense ☐ Soak ☐ Rinse _____ sec/ 250 µl
7. Wash Step	■ Aspirate ☐ Wash ☐ Dispense ☐ Soak ☐ Rinse 2.0 sec/____ µl
8. Wash Step	☐ Aspirate ■ Wash ☐ Dispense ☐ Soak ☐ Rinse _____ sec/ 250 µl
9. Wash Step	■ Aspirate ☐ Wash ☐ Dispense ☐ Soak ☐ Rinse 4.0 sec/____ µl
10. Wash Step	☐ Aspirate ☐ Wash ☐ Dispense ☐ Soak ☐ Rinse _____ sec/____ µl
11. Wash Step	☐ Aspirate ☐ Wash ☐ Dispense ☐ Soak ☐ Rinse _____ sec/____ µl
12. Wash Step	☐ Aspirate ☐ Wash ☐ Dispense ☐ Soak ☐ Rinse _____ sec/____ µl
13. Wash Step	☐ Aspirate ☐ Wash ☐ Dispense ☐ Soak ☐ Rinse _____ sec/____ µl
14. Wash Step	☐ Aspirate ☐ Wash ☐ Dispense ☐ Soak ☐ Rinse _____ sec/____ µl
15. Wash Step	☐ Aspirate ☐ Wash ☐ Dispense ☐ Soak ☐ Rinse _____ sec/____ µl
16. Wash Step	☐ Aspirate ☐ Wash ☐ Dispense ☐ Soak ☐ Rinse _____ sec/____ µl

SkanWasher 400 Wash Program Sheet

Program 3

Wash programs are pre-set at the factory. These programs may be edited.

Program Number	**1**	**Program Name**	**A 2 W S A**
Date	**15.04.1998**	**Signature**	**HT**

Description Demo program, Aspirate followed by two times wash.

Leaving the wells filled with wash buffer, soak for 5 seconds then finally an aspirate.

Aspirate probe needs to be adjusted to microplate to be used.

Instrument Parameters

Air Pressure	0.25	[bar]	**Volume Adjust σV**		[-]
Aspirate Probe	0.0	[mm]	**Dispense Probe**	2.0	[mm]

Wash Sequence

1. Wash Step	■ Aspirate	☐ Wash	☐ Dispense	☐ Soak	☐ Rinse	2.0	sec/____	µl
2. Wash Step	☐ Aspirate	■ Wash	☐ Dispense	☐ Soak	☐ Rinse	1.0	sec/____	µl
3. Wash Step	■ Aspirate	☐ Wash	☐ Dispense	☐ Soak	☐ Rinse	2.0	sec/____	µl
4. Wash Step	☐ Aspirate	☐ Wash	■ Dispense	☐ Soak	☐ Rinse	_____	sec/ 200	µl
5. Wash Step	☐ Aspirate	☐ Wash	☐ Dispense	■ Soak	☐ Rinse	5.0	sec/____	µl
6. Wash Step	■ Aspirate	☐ Wash	☐ Dispense	☐ Soak	☐ Rinse	4.0	sec/____	µl
7. Wash Step	☐ Aspirate	☐ Wash	☐ Dispense	☐ Soak	☐ Rinse	_____	sec/____	µl
8. Wash Step	☐ Aspirate	☐ Wash	☐ Dispense	☐ Soak	☐ Rinse	_____	sec/____	µl
9. Wash Step	☐ Aspirate	☐ Wash	☐ Dispense	☐ Soak	☐ Rinse	_____	sec/____	µl
10. Wash Step	☐ Aspirate	☐ Wash	☐ Dispense	☐ Soak	☐ Rinse	_____	sec/____	µl
11. Wash Step	☐ Aspirate	☐ Wash	☐ Dispense	☐ Soak	☐ Rinse	_____	sec/____	µl
12. Wash Step	☐ Aspirate	☐ Wash	☐ Dispense	☐ Soak	☐ Rinse	_____	sec/____	µl
13. Wash Step	☐ Aspirate	☐ Wash	☐ Dispense	☐ Soak	☐ Rinse	_____	sec/____	µl
14. Wash Step	☐ Aspirate	☐ Wash	☐ Dispense	☐ Soak	☐ Rinse	_____	sec/____	µl
15. Wash Step	☐ Aspirate	☐ Wash	☐ Dispense	☐ Soak	☐ Rinse	_____	sec/____	µl
16. Wash Step	☐ Aspirate	☐ Wash	☐ Dispense	☐ Soak	☐ Rinse	_____	sec/____	µl

SkanWasher 400 Wash Program Sheet

Program 4

Wash programs are pre-set at the factory. These programs may be edited.

Program Number	**4**	**Program Name**	**C : A + D**
Date	**15.04.1998**	**Signature**	**HT**

Description Demo program, to be used with Coomb's wash. High inlet liquid pressure / flow to resuspend cell pellet. Aspirate followed by a dispense.

Aspirate probe needs to be adjusted to microplate to be used.

Instrument Parameters

Air Pressure	0.40	[bar]	**Volume Adjust σV**		[-]
Aspirate Probe	0.0	[mm]	**Dispense Probe**	2.0	[mm]

Wash Sequence

1.	Wash Step	■ Aspirate	☐ Wash	☐ Dispense	☐ Soak	☐ Rinse	2.0 sec/____ µl
2.	Wash Step	☐ Aspirate	☐ Wash	■ Dispense	☐ Soak	☐ Rinse	_____ sec/ 200 µl
3.	Wash Step	☐ Aspirate	☐ Wash	☐ Dispense	☐ Soak	☐ Rinse	_____ sec/____ µl
4.	Wash Step	☐ Aspirate	☐ Wash	☐ Dispense	☐ Soak	☐ Rinse	_____ sec/____ µl
5.	Wash Step	☐ Aspirate	☐ Wash	☐ Dispense	☐ Soak	☐ Rinse	_____ sec/____ µl
6.	Wash Step	☐ Aspirate	☐ Wash	☐ Dispense	☐ Soak	☐ Rinse	_____ sec/____ µl
7.	Wash Step	☐ Aspirate	☐ Wash	☐ Dispense	☐ Soak	☐ Rinse	_____ sec/____ µl
8.	Wash Step	☐ Aspirate	☐ Wash	☐ Dispense	☐ Soak	☐ Rinse	_____ sec/____ µl
9.	Wash Step	☐ Aspirate	☐ Wash	☐ Dispense	☐ Soak	☐ Rinse	_____ sec/____ µl
10.	Wash Step	☐ Aspirate	☐ Wash	☐ Dispense	☐ Soak	☐ Rinse	_____ sec/____ µl
11.	Wash Step	☐ Aspirate	☐ Wash	☐ Dispense	☐ Soak	☐ Rinse	_____ sec/____ µl
12.	Wash Step	☐ Aspirate	☐ Wash	☐ Dispense	☐ Soak	☐ Rinse	_____ sec/____ µl
13.	Wash Step	☐ Aspirate	☐ Wash	☐ Dispense	☐ Soak	☐ Rinse	_____ sec/____ µl
14.	Wash Step	☐ Aspirate	☐ Wash	☐ Dispense	☐ Soak	☐ Rinse	_____ sec/____ µl
15.	Wash Step	☐ Aspirate	☐ Wash	☐ Dispense	☐ Soak	☐ Rinse	_____ sec/____ µl
16.	Wash Step	☐ Aspirate	☐ Wash	☐ Dispense	☐ Soak	☐ Rinse	_____ sec/____ µl

SkanWasher 400 Wash Program Sheet

Program Number		**Program Name**	
Date		**Signature**	

Description

Instrument Parameters

Air Pressure	[bar]	**Volume Adjust σV**	[-]
Aspirate Probe	[mm]	**Dispense Probe**	[mm]

Wash Sequence

1. Wash Step	☐ Aspirate	☐ Wash	☐ Dispense	☐ Soak	☐ Rinse	_____ sec/____ µl
2. Wash Step	☐ Aspirate	☐ Wash	☐ Dispense	☐ Soak	☐ Rinse	_____ sec/____ µl
3. Wash Step	☐ Aspirate	☐ Wash	☐ Dispense	☐ Soak	☐ Rinse	_____ sec/____ µl
4. Wash Step	☐ Aspirate	☐ Wash	☐ Dispense	☐ Soak	☐ Rinse	_____ sec/____ µl
5. Wash Step	☐ Aspirate	☐ Wash	☐ Dispense	☐ Soak	☐ Rinse	_____ sec/____ µl
6. Wash Step	☐ Aspirate	☐ Wash	☐ Dispense	☐ Soak	☐ Rinse	_____ sec/____ µl
7. Wash Step	☐ Aspirate	☐ Wash	☐ Dispense	☐ Soak	☐ Rinse	_____ sec/____ µl
8. Wash Step	☐ Aspirate	☐ Wash	☐ Dispense	☐ Soak	☐ Rinse	_____ sec/____ µl
9. Wash Step	☐ Aspirate	☐ Wash	☐ Dispense	☐ Soak	☐ Rinse	_____ sec/____ µl
10. Wash Step	☐ Aspirate	☐ Wash	☐ Dispense	☐ Soak	☐ Rinse	_____ sec/____ µl
11. Wash Step	☐ Aspirate	☐ Wash	☐ Dispense	☐ Soak	☐ Rinse	_____ sec/____ µl
12. Wash Step	☐ Aspirate	☐ Wash	☐ Dispense	☐ Soak	☐ Rinse	_____ sec/____ µl
13. Wash Step	☐ Aspirate	☐ Wash	☐ Dispense	☐ Soak	☐ Rinse	_____ sec/____ µl
14. Wash Step	☐ Aspirate	☐ Wash	☐ Dispense	☐ Soak	☐ Rinse	_____ sec/____ µl
15. Wash Step	☐ Aspirate	☐ Wash	☐ Dispense	☐ Soak	☐ Rinse	_____ sec/____ µl
16. Wash Step	☐ Aspirate	☐ Wash	☐ Dispense	☐ Soak	☐ Rinse	_____ sec/____ µl

SkanWasher 400 Wash Program Sheet

Program Number		**Program Name**	
Date		**Signature**	
Description			

Instrument Parameters

Air Pressure	[bar]	**Volume Adjust σV**	[-]
Aspirate Probe	[mm]	**Dispense Probe**	[mm]

Wash Sequence

1. Wash Step	☐ Aspirate	☐ Wash	☐ Dispense	☐ Soak	☐ Rinse	_____ sec/____ µl
2. Wash Step	☐ Aspirate	☐ Wash	☐ Dispense	☐ Soak	☐ Rinse	_____ sec/____ µl
3. Wash Step	☐ Aspirate	☐ Wash	☐ Dispense	☐ Soak	☐ Rinse	_____ sec/____ µl
4. Wash Step	☐ Aspirate	☐ Wash	☐ Dispense	☐ Soak	☐ Rinse	_____ sec/____ µl
5. Wash Step	☐ Aspirate	☐ Wash	☐ Dispense	☐ Soak	☐ Rinse	_____ sec/____ µl
6. Wash Step	☐ Aspirate	☐ Wash	☐ Dispense	☐ Soak	☐ Rinse	_____ sec/____ µl
7. Wash Step	☐ Aspirate	☐ Wash	☐ Dispense	☐ Soak	☐ Rinse	_____ sec/____ µl
8. Wash Step	☐ Aspirate	☐ Wash	☐ Dispense	☐ Soak	☐ Rinse	_____ sec/____ µl
9. Wash Step	☐ Aspirate	☐ Wash	☐ Dispense	☐ Soak	☐ Rinse	_____ sec/____ µl
10. Wash Step	☐ Aspirate	☐ Wash	☐ Dispense	☐ Soak	☐ Rinse	_____ sec/____ µl
11. Wash Step	☐ Aspirate	☐ Wash	☐ Dispense	☐ Soak	☐ Rinse	_____ sec/____ µl
12. Wash Step	☐ Aspirate	☐ Wash	☐ Dispense	☐ Soak	☐ Rinse	_____ sec/____ µl
13. Wash Step	☐ Aspirate	☐ Wash	☐ Dispense	☐ Soak	☐ Rinse	_____ sec/____ µl
14. Wash Step	☐ Aspirate	☐ Wash	☐ Dispense	☐ Soak	☐ Rinse	_____ sec/____ µl
15. Wash Step	☐ Aspirate	☐ Wash	☐ Dispense	☐ Soak	☐ Rinse	_____ sec/____ µl
16. Wash Step	☐ Aspirate	☐ Wash	☐ Dispense	☐ Soak	☐ Rinse	_____ sec/____ µl

Molecular Devices

Molecular Devices Corporation
1311 Orleans Drive
Sunnyvale, CA 94089 USA

Appendix F: Warranty

Molecular Devices Corporation warrants this product against defects in material or workmanship as follows:

- All parts of the SkanWasher are warranted for a period of one(1) year from the original date of delivery.
- All labor charges to repair the product for a period of one (1) year from the original date of delivery will be paid by Molecular Devices Corporation.
- This warranty covers the SkanWasher system only and does not extend to any computer, printer, reagents, disposables, or additional software used with this system.

Labor and Parts

To obtain warranty service during the applicable warranty period, you must take the product or deliver the product properly packaged in the original shipping materials and carton to an authorized Molecular Devices Corporation service facility. You must call or write to the nearest Molecular Devices Corporation service facility to schedule warranty service. You may call Molecular Devices Corporation at the telephone number or address below to locate the nearest service facility. At the time of requesting warranty service, you must present proof of purchase documentation which includes the date of purchase, and Molecular Devices Corporation must have the Warranty Registration form completed, signed, and returned by you within ten (10) working days of the date of delivery.

This warranty covers only defects arising under normal usage and does not cover malfunctions or failures from misuse, abuse, neglect, alterations, modifications, or repairs by other than an authorized Molecular Devices Corporation service facility.

Repair or replacement as provided under this warranty is the exclusive remedy to the purchaser (the “Buyer”). Molecular Devices Corporation (the “Seller”) shall not be liable for any incidental or consequential damages for breach of any express or implied warranty on this product, except to the extent required by applicable law. The Seller specifically excludes all express and implies warranties including without limitation any implied warranty that the products sold under this agreement are merchantable or are fit for any particular purpose, except such warranties expressly identified as warranties and set

forth for any particular purpose, except such warranties expressly identified as warranties and set forth in the Seller's current user guide, catalog, or written guarantee covering such product. The Seller also makes no warranty that the products sold under this agreement are delivered free of the rightful claim of any third party by way of patent infringement or the like. If the Buyer furnishes specifications to the Seller, the Buyer agrees to hold the Seller harmless against any claim that arises out of compliance with the specifications.

Any description of the products contained in this agreement is for the sole purpose of identifying them. Any such description is not part of the basis of the bargain and does not constitute a warranty that the products shall conform to that description. Any sample or model used in connection with this agreement is for illustrative purposes only, is not part of the basis of the bargain, and is not to be construed as a warranty that the products will conform to the sample or model. No affirmation of fact or promise made by the Seller, whether or not in this agreement, shall constitute a warranty that the products will conform to the affirmation or the promise.

For the name of the nearest authorized Molecular Devices Corporation service facility, please contact Molecular Devices at one of the following telephone numbers:

408-747-1700

800-735-5577 (US & Canada)

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