Automated Serial Dilution

Protocol Guide

For Research Use Only. Not for use in diagnostic procedures.

Original Instructions

Agilent Technologies

Notices

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Automated Serial Dilution Protocol Guide

This guide contains the following topics:

About this guide

This guide describes how to run the Serial Dilution protocol for the Agilent G5591A Bravo BenchCel Workstation. This guide describes the default settings for the protocol task parameters. For instructions on how to modify the task parameters or create a different serial dilution protocol, see the *VWorks Automation Control User Guide*.

Assumptions

This guide assumes the following:

- The Agilent G5591A Bravo BenchCel Workstation has been installed and is operating correctly.
- The device teachpoints have been set and verified.
- You are familiar with the devices in the workstation and the VWorks Automation Control software.

Safety information

Ensure that you are properly trained in:

- General laboratory safety
- The correct and safe operation of the BenchCel Microplate Handler and Bravo Platform
- Emergency stops

For general safety precautions, intended product use statement, and the list of safety labels, see the *Automation Solutions Products General Safety Guide*.

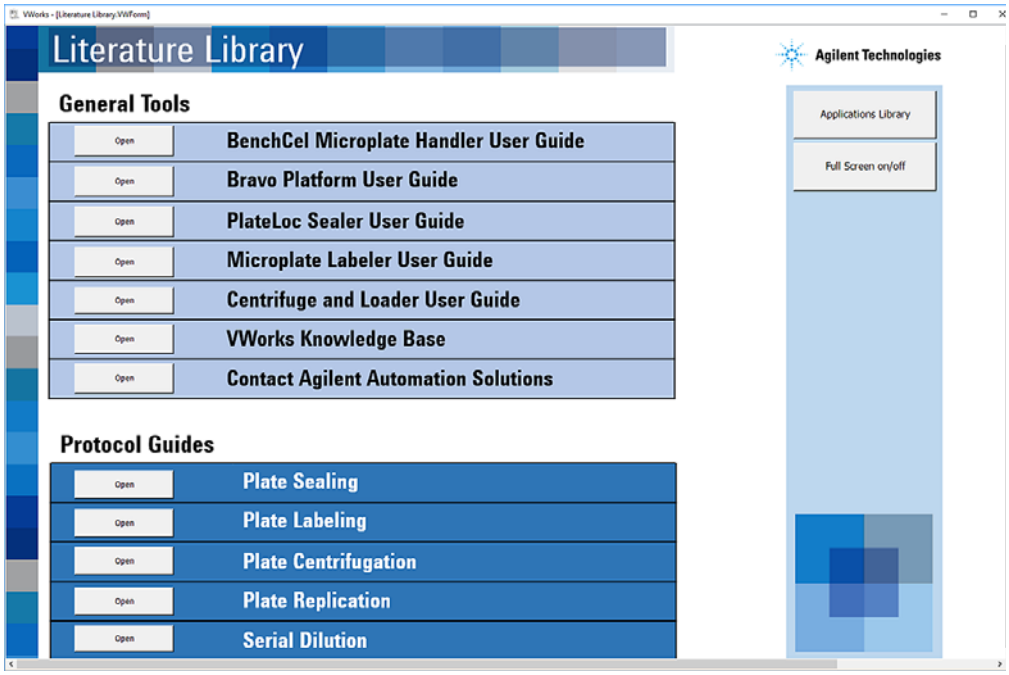
For detailed safety information, see the *BenchCel Microplate Handler User Guide* and the *G5562A, G5563A Bravo Platform User Guide.*

Related user guides

You should use this guide in conjunction with the following guides:

- *Automation Solutions Products General Safety Guide*. Provides general safety information and describes potential safety hazards that you might encounter when using Agilent Automation Solutions products.
- *BenchCel Microplate Handler User Guide*. Contains the safety guidelines and describes the installation, setup, operation, and maintenance procedures for the BenchCel Microplate Handler.
- *G5562A, G5563A Bravo Platform User Guide*. Describes the setup, operation, and maintenance procedures for the Bravo Platform.
- *VWorks Automation Control User Guide*. Describes how to create, run, import, and export protocols.
- *VWorks Automation Control Setup Guide*. Explains how to define labware, specify pipetting speed and accuracy, manage labware in storage, and manage user accounts.

You can access these guides in the **Literature Library** page of the BenchCel Workstations software interface.



You can find the user guides for all the Automation Solutions products in the VWorks knowledge base. You can open the knowledge base in the following ways:

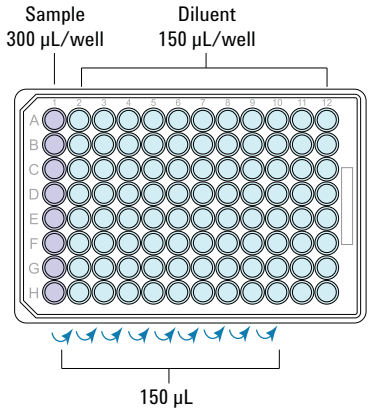
- In the BenchCel Workstations software, go to the **Literature Library** page, and then click **Open** for the **VWorks knowledge base**.
- Within the VWorks software, select **Help > Knowledge Base** or press F1.
- From the Microsoft Windows 10 **All Apps** menu, select **Agilent Technologies > VWorks Knowledge Base**.

You can also find these guides in the online VWorks knowledge base at www.agilent.com/chem/askb.

Protocol description

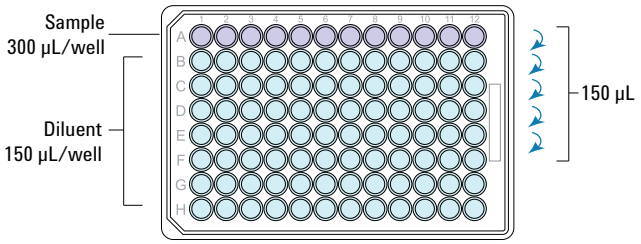
Serial Dilution protocol. Using the default settings, the protocol conducts a twofold dilution of the contents of a Sample plate into a 96-well Serial Dilution plate using one of the following orientations.

- **Column dilution**. The protocol sets up the Serial Dilution plate as follows:
  - 300 µL from the Sample plate in each well in column 1
  - 150 µL diluent per well in columns 2 through 12



The protocol conducts the serial dilution in 10 columns. Columns 11 and 12 contain only the diluent. First, the protocol transfers 150 µL from each well in Sample column 1 to the corresponding Diluent wells in column 2, mixes the contents of the wells in column 2, and then transfers 150 µL from each well in column 2 to the corresponding wells in column 3, and then mixes the contents of the wells. This process continues until column 10. After mixing the contents of the wells in column 10, the protocol aspirates 150 µL from each well in column 10 and dispenses this final volume to a Waste plate. All wells in the Serial Dilution plate contain 150 µL of liquid when the run is completed.

- **Row dilution**. The protocol sets up the Serial Dilution plate as follows:
  - 300 µL from the Sample plate in each well in row A.
  - 150 µL diluent in the remaining wells



The protocol conducts the serial dilution in 6 rows. Rows G and H contain only the diluent. First, the protocol transfers 150 µL from each well in Sample row A to the corresponding Diluent wells in row B, mixes the contents of the wells in row B, and then transfers 150 µL from each well in row B to the corresponding wells in row C, and then mixes the contents of the wells. This process continues until row F. After mixing the contents of the wells in row F, the protocol aspirates 150 µL from each well in row F and dispenses this final volume to a Waste plate. All wells in the Serial Dilution plate contain 150 µL of liquid when the run is completed.

Before you start

Hardware requirements

The following figure shows the basic G5591A Bravo BenchCel Workstation, which is required to run this Serial Dilution protocol. The BenchCel Microplate Handler in the workstation can be a BenchCel 2R, 4R, or 6R model. The following table describes the primary workstation components.

IMPORTANT If your workstation includes additional devices and you want to use this protocol, the VWorks device file that is linked to the protocol must be edited to include all the workstation devices before you can run the protocol successfully. For instructions on how to modify a device file and link to the protocol, see the *VWorks Automation Control User Guide*.

Figure G5591A Bravo BenchCel Workstation Workstation (BenchCel 6R) components

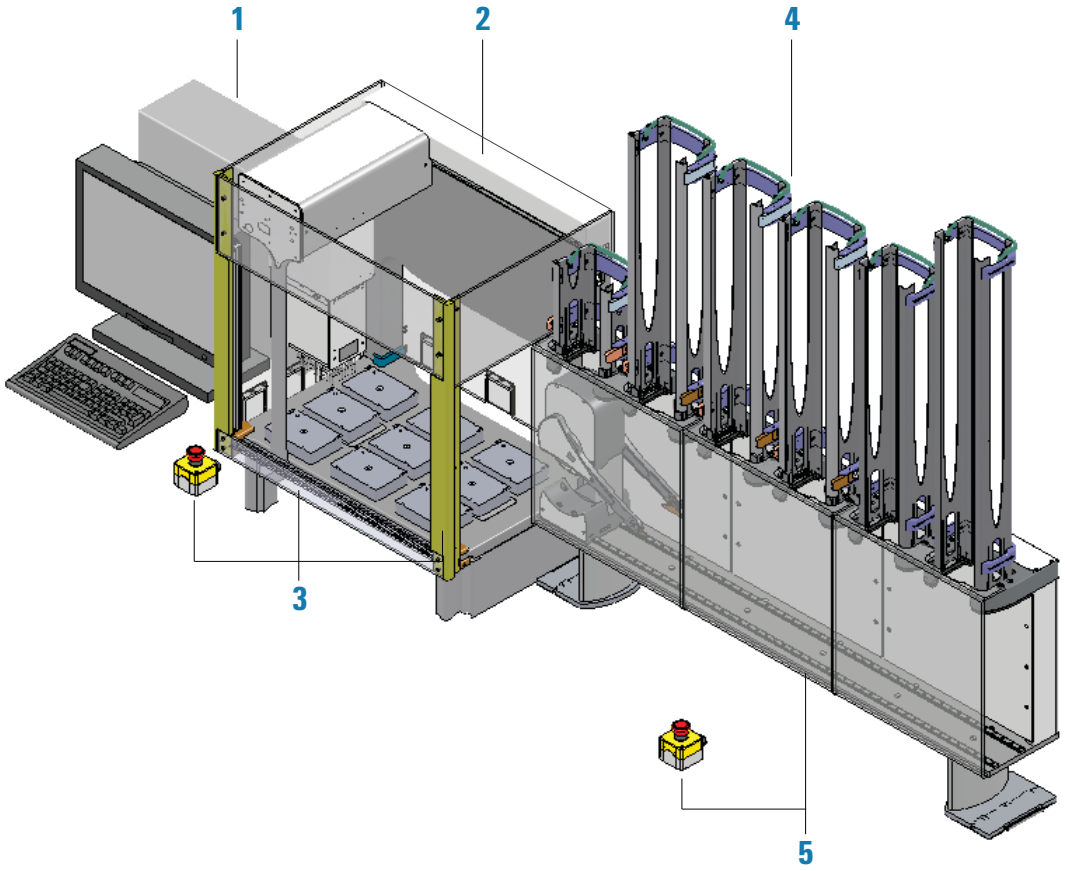
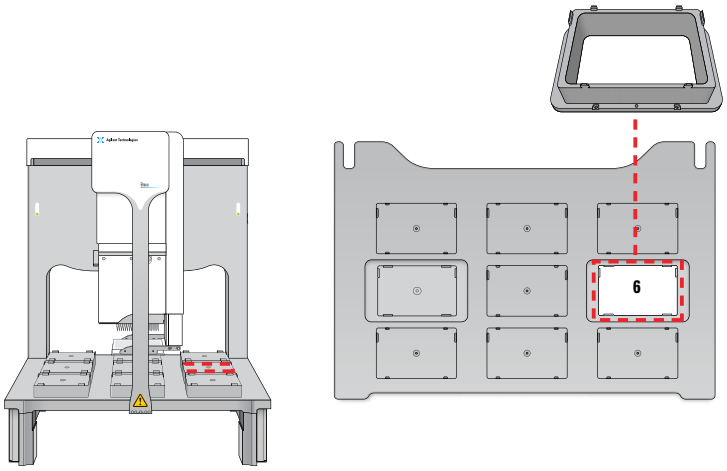


Table Components of the G5591A Bravo BenchCel Workstation Workstation (BenchCel 6R)

Item	Name	Description	See...
1	Computer and monitor	The controlling computer that runs the VWorks Automation Control software.	*VWorks Automation Control User Guide*
2	Bravo Platform	The automated liquid handler with nine deck locations for labware. The Bravo includes a gripper assembly that moves labware from one deck location to another. **IMPORTANT** This protocol requires the Tip Trash accessory installed at Bravo deck location 6. The Bravo deck risers are required to provide the extra height for trash collection in a trash receptacle (customer-supplied) below the deck.  **IMPORTANT** This protocol requires the 96LT Head to be installed on the Bravo Platform.	*G5562A, G5563A Bravo Platform User Guide*
3	Bravo safety equipment	The equipment that protects users from potential moving-parts hazards, including emergency-stop pendant, Light Curtain, and shields.	*G5562A, G5563A Bravo Platform Safety and Installation Guide*
4	BenchCel Microplate Handler	The device that stores stacks of labware and moves labware to and from the Bravo Platform. Depending on the BenchCel model, two, four, or six labware racks are installed on the stackers. • BenchCel 2R has two stackers for labware racks. • BenchCel 4R has four stackers for labware racks. • BenchCel 6R has six stackers for labware racks. The labware rack height can be 250-, 660-, or 860-mm.	*BenchCel Microplate Handler User Guide*
5	BenchCel safety equipment	An emergency-stop pendant and a shield in front of the BenchCel robot protect operators from moving-parts hazards.	*BenchCel Microplate Handler User Guide*

Software requirements

The minimum software requirements for running the protocol are as follows:

- Microsoft Windows 10 64-bit operating system
- VWorks Automation Control software 13.1

  IMPORTANT VWorks Administrator or Technician privileges are required to make any changes to the protocol task settings.

- BenchCel Workstations software 1.0

The BenchCel Workstations software includes the device profiles for connecting to your devices and the files required to run the BenchCel Workstation protocols.

Labware requirements

The labware that you use must have a corresponding labware definition in the VWorks software. The following table lists the labware types that the Serial Dilution protocol uses by default.

CAUTION Using labware that has not been defined in the Labware Editor can cause a collision, resulting in equipment damage. Ensure that the labware definition matches the labware that you use for the protocol.

The VWorks software includes over 70 labware definitions. If the labware that you want to use does not have a matching labware definition, you create one using the VWorks Labware Editor. Ensure that the BenchCel properties in the labware definition specifies the Stack holding method: Hold with stacker grippers. For detailed instructions on how to create labware definitions, see the *VWorks Automation Control Setup Guide*.

Labware type, part number (quantity)	Description
Full tip boxes 96 250-µL pipette tips Agilent 19477-002 (2, minimum)	• **Tip box for diluent**. These tips aspirate only from the Diluent reservoir and do not need to be changed during the protocol run, because of the low risk of cross-contamination. • **Tip box for dilution.** For each Serial Dilution plate, the protocol uses one column or one row of tips, depending on whether you are running serial dilution by column or by row. One full tip box is required for 12 Serial Dilution plates or 12 runs. The VWorks software tracks the tip usage. If you run the protocol over 12 times, the software displays a dialog box that allows you to pause the protocol and replenish the tip box with fresh tips.
Reservoir for diluent Agilent 96 Manual Fill Reservoir (1, minimum)	The labware type and location are configured in the VWorks Startup Protocol area. For instructions on how to select a different type of reservoir for this protocol, see the *VWorks Automation Control User Guide*.

Labware type, part number (quantity)	Description
Waste plate Greiner 655101 96-well microplate (Polystyrene, clear, round-well, flat bottom) (1, minimum)	The labware type and location are configured in the VWorks Startup Protocol area. For instructions on how to select a different type of reservoir for this protocol, see the *VWorks Automation Control User Guide*.
Sample plate* 96 Nunc Deep Well 1 mL microplate (Thermo Scientific 260251) (1, minimum)	Make sure the Sample plate contains the starting concentration of a compound to be diluted. The starting concentration should be in columns or rows of the Sample plate to correspond with the protocol orientation.
Serial Dilution plate* Greiner 655101 96-well microplate (Polystyrene, clear, round-well, flat bottom) (1, minimum)	One empty Serial Dilution plate is required for each protocol run. For example, to create 12 Serial Dilution plates, you would run the protocol 12 times. You specify the number of times to run when you set up the protocol. *Note:* A 660-mm labware rack can hold up to 50 Greiner 655101 microplates.

*For the Sample and Serial Dilution plates, you may choose from the labware list provided in the software. The labware type must be specified in the corresponding process of the protocol when you set up the protocol. See "Setting up the protocol" on page 14.

Recommended volumes for diluent and sample

The following volumes should allow you to run at least two Serial Dilution plates when using the protocol default settings:

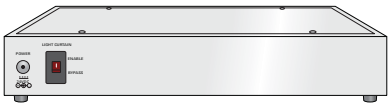
- Diluent reservoir (96 Manual Fill) 60 mL
- Sample plate (96 Nunc Deep Well) 1000 uL per well

Starting and setting up the workstation

Starting up the workstation

To start the workstation:

1 At the Robot Disable Hub ensure that the LIGHT CURTAIN switch remains set to ENABLE.



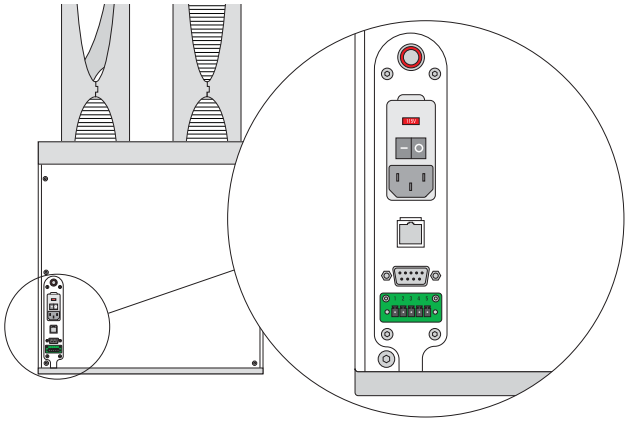
2 Start up the BenchCel Microplate Handler as follows:

a Position the BenchCel robot head underneath a stacker, and place the gripper arms to the left facing the Bravo Platform.

b Turn on the BenchCel air supply.

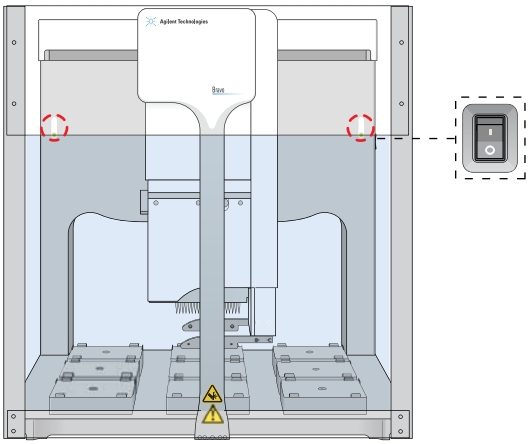
c Turn on the BenchCel power.

Figure BenchCel rear panel



d Wait for the BenchCel head to finish the homing routine.

3 Turn on the Bravo Platform. The front panel status lights turn blue.

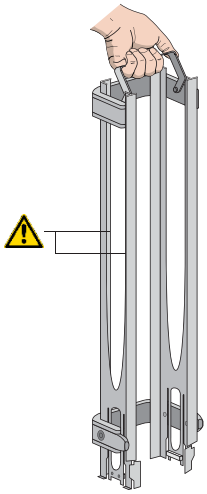


4 Turn on the computer and monitor. Wait for the Microsoft Windows operating system to finish starting up.

5 At the BenchCel Microplate Handler, install the labware racks on the stackers. See the *BenchCel Microplate Handler User Guide*.

IMPORTANT Make sure the BenchCel power and compressed air are turned on before you install or uninstall a labware rack.

Figure Labware rack, front-load



Opening the protocol

To open the protocol:

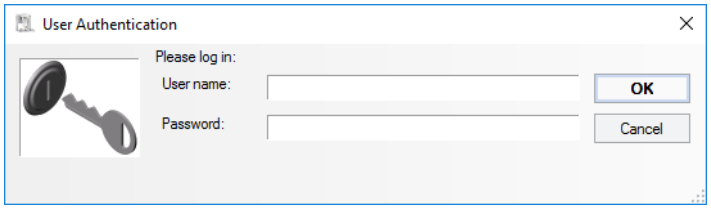
IMPORTANT Ensure that the VWorks software is closed before you start the BenchCel Workstations software.

To open the protocol:

1 Start the BenchCel Workstations software  .

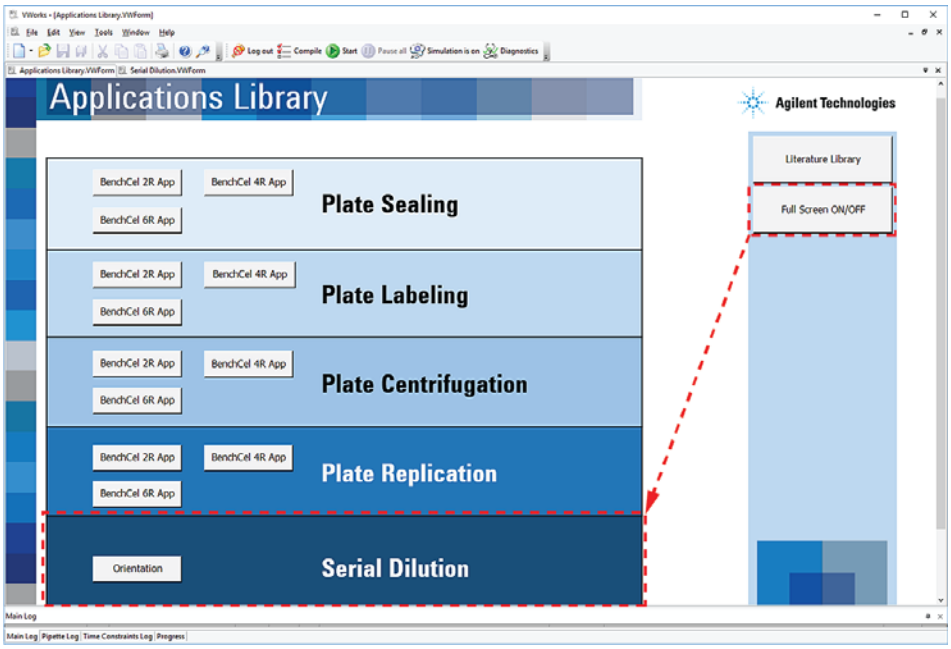
2 Click **App Library**. The VWorks software starts.

3 When the **User Authentication** dialog box opens, type your VWorks user name and password, and then click **OK**.



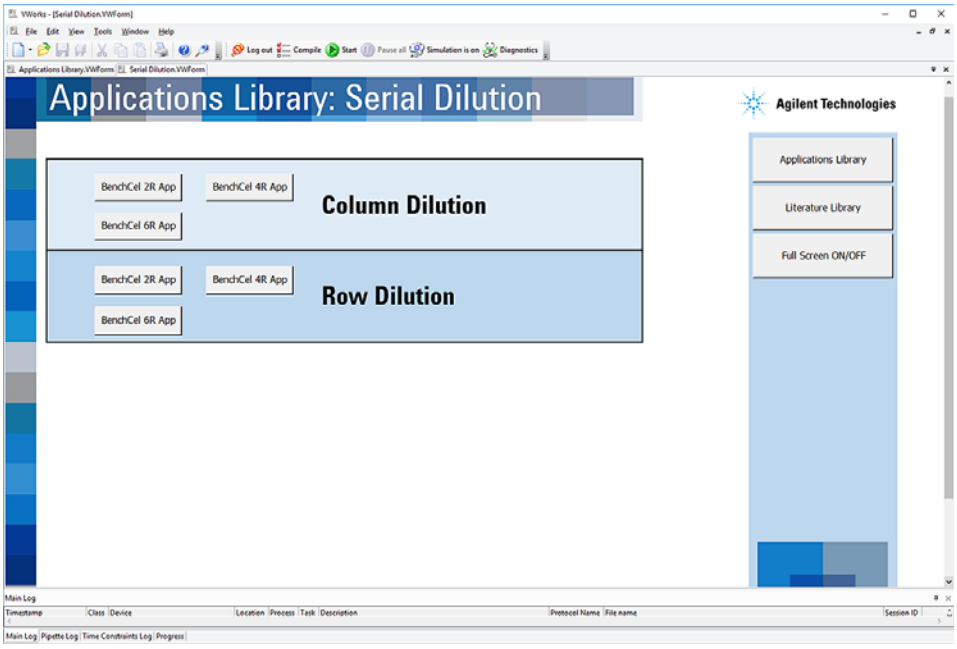
4 In the **Applications Library** form, click **Full Screen ON/OFF** to change the scale of the form display within the VWorks window so that the menubar and the Control and Standard toolbars are visible, as the following figure shows.

Note: If the toolbars are not displayed in the VWorks window, right-click in the window, and then select the corresponding toolbar from the shortcut menu.



5 In the **Serial Dilution** panel, click **Orientation**.

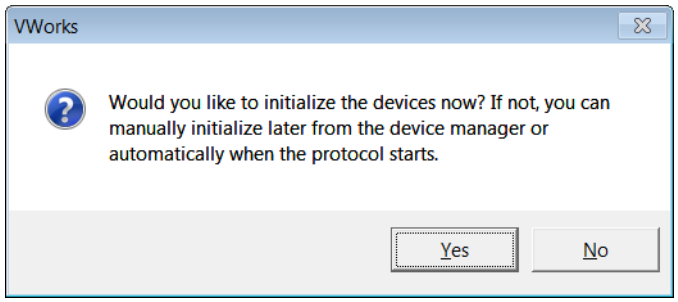
The Serial Dilution form opens.



6 Determine which of the following orientations to use, and then click the button for your BenchCel stacker configuration: BenchCel 2R App, BenchCel 4R App, or BenchCel 6R App.

- **Column Dilution**. The serial dilution progresses by columns (1–12) in the microplate.
- **Row Dilution**. The serial dilution progresses by rows (A–H) in the microplate.

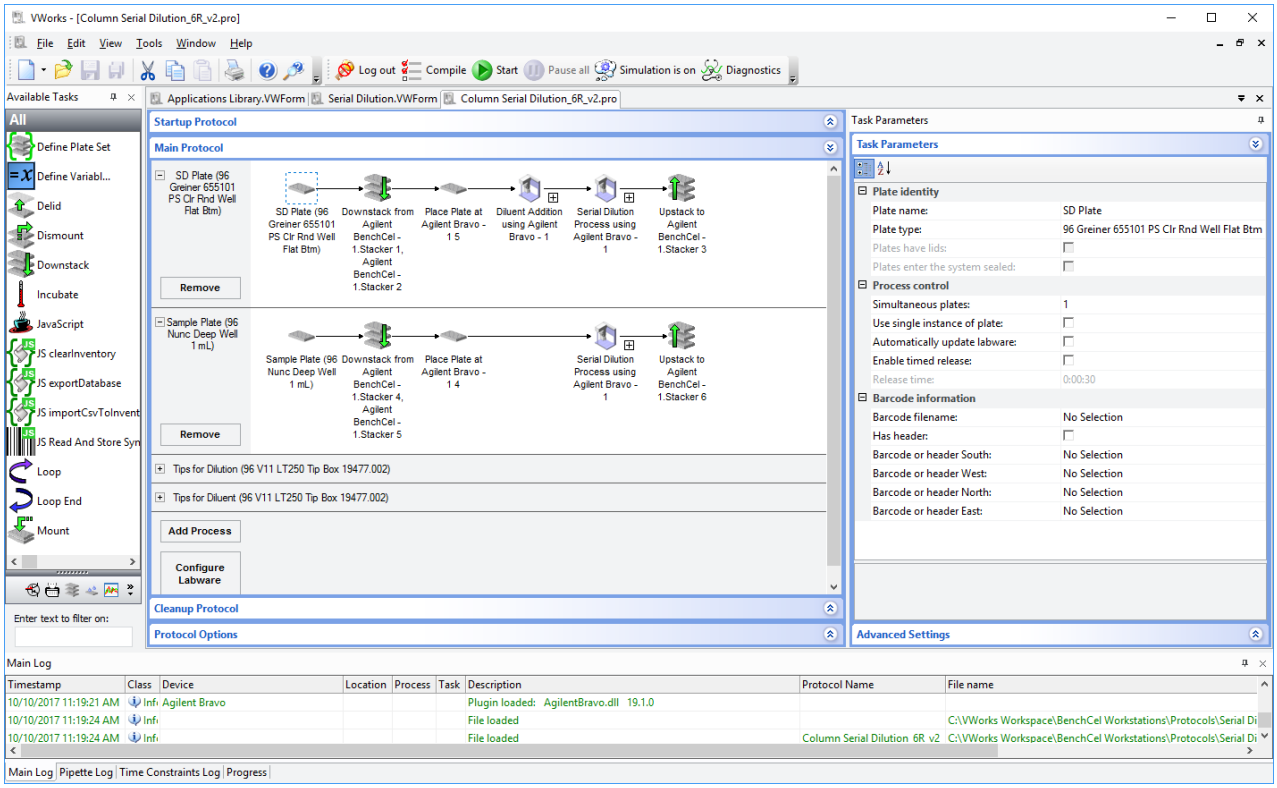
The VWorks initialization message appears.



7 Click **No**. You will initialize the devices when you start the protocol run.

The corresponding protocol opens in the VWorks window.

Figure Example of the VWorks window displaying the Column Serial Dilution 6R protocol



Setting up the protocol

To set up the protocol:

1. Review the default settings for the protocol task parameters and determine if any changes are required to the pipette settings, labware selections, and so forth. See "Protocol settings overview" on page 21.

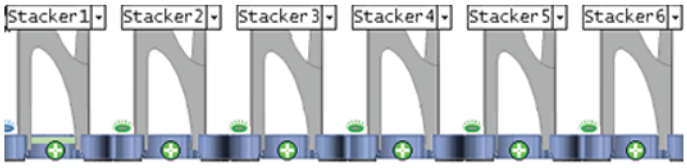
   IMPORTANT VWorks Administrator or Technician privileges are required to make any changes to the protocol task settings.

2. If you made any changes to the protocol task parameters in step 1, click **File > Save** on the VWorks menubar.
3. Fill the Sample plates and the Diluent reservoir to meet the volume requirements of your protocol settings.

   IMPORTANT Fill the labware immediately before run time to minimize evaporation.

4. At the BenchCel Microplate Handler, fill the labware racks on the BenchCel stackers with the specified labware:

   CAUTION Improperly seated labware can cause a hardware collision, resulting in equipment damage. Ensure that all labware are properly seated and in the correct orientation within the labware racks.

   a **Serial Dilution plates.** Fill the labware rack with the number of microplates required for the number of times you plan to run the protocol.

      By default, the protocol specifies the following stacker locations:

      - **2R protocol**. Stacker 1
      - **4R protocol**. Stacker 1
      - **6R protocol**. Stackers 1 and 2

   b **Sample plates.** Fill the labware rack with the total number of filled Sample plates.

      By default, the protocol specifies the following locations:

      - **2R protocol**. Skip this step. You will place the filled Sample plate on the Bravo deck in the next step.
      - **4R protocol**. Stacker 3
      - **6R protocol**. Stackers 4 and 5

   For detailed instructions on how to fill the racks, see the *BenchCel Microplate Handler User Guide*.

5 At the Bravo Platform, place the specified labware at the designated locations:

- **a** Deck location 1: Full tip box for Serial Dilution
- **b** Deck location 2: Full tip box for Diluent
- **c** Deck location 8: Empty waste plate
- **d** Deck location 9: Diluent reservoir
- **e** *2R protocols only*. Filled Sample plate at Bravo deck location 4

Figure Bravo deck layout for BenchCel 2R protocols (top view)

Figure Bravo deck layout for BenchCel 4R and 6R protocols (top view)

CAUTION Improperly seated labware can cause a hardware collision, resulting in equipment damage. Ensure that all labware are properly seated within the platepads.

6 Ensure that the receptacle for tip trash is in position below Bravo deck location 6.

Running the protocol

Before you start the run

WARNING **When you initialize the devices, the Bravo head and tie bar can move and the BenchCel robot can move. To prevent potential injury, keep clear of the devices while they are in motion.**

CAUTION A collision can occur if an object is placed in the path of the BenchCel gripper or Bravo head. To prevent potential equipment damage, ensure that the path is clear of objects, such as extra labware, that could cause a potential collision.

IMPORTANT Ensure that the Bravo 96LT head is mounted on the Bravo Platform and that no pipette tips are mounted on the head.

About performing a mock run (optional)

If you are unfamiliar with the protocol and would like to see how it operates and troubleshoot problems before running it with valuable samples and reagents, you can perform a mock run.

A mock run uses empty or water-filled labware. You prepare for a mock run the same way you would prepare for a real protocol run, except that you use empty labware for a totally dry run or labware containing water for a wet run.

Starting and monitoring the protocol run

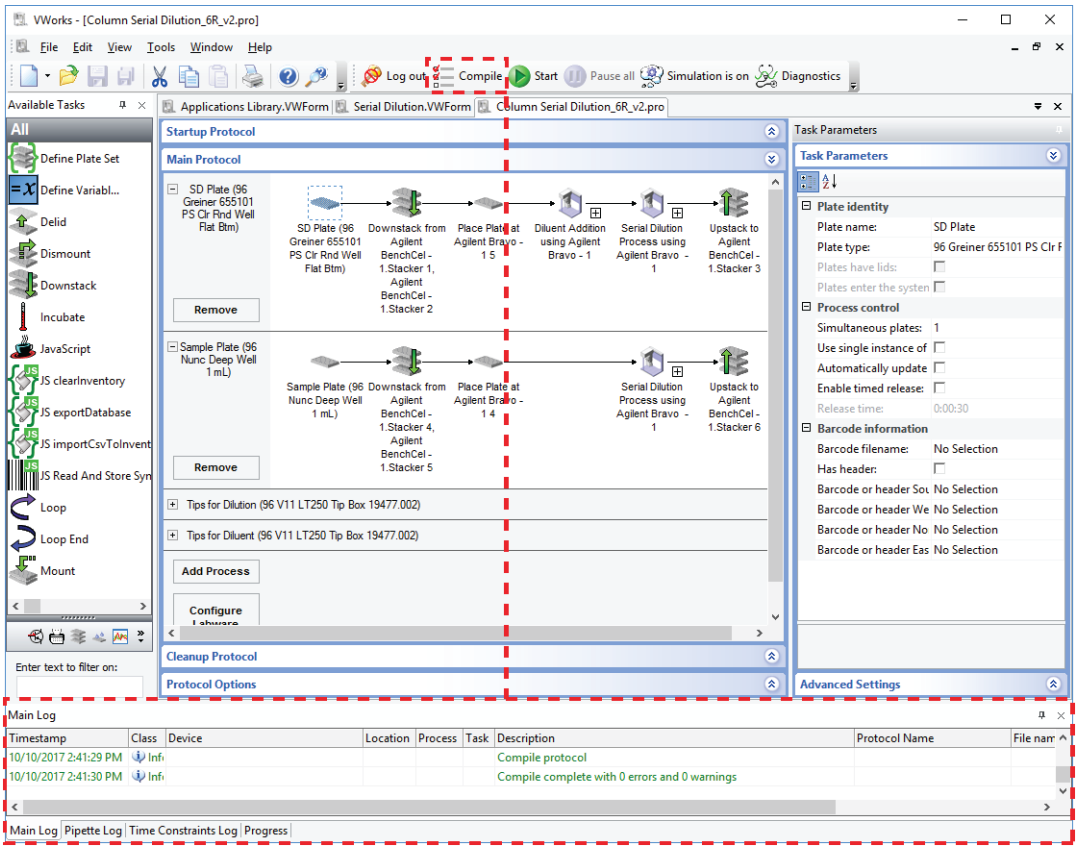
To start and monitor the protocol run:

1 Compile the protocol and troubleshoot any errors as follows:

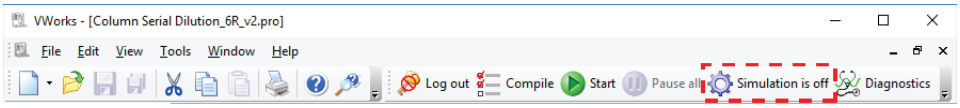
   a In the **VWorks** toolbar, click **Compile.** During the compiling process, the software reports errors found in the protocol and displays the errors in the Main Log area at the bottom of the VWorks window.

   Note: The software automatically compiles the protocol when you start a run.

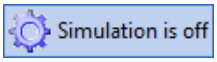
   b Review the error and warning messages in the Main Log. You should fix all the errors. You can choose to ignore some of the warnings.

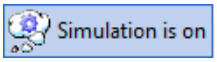


2 In the **VWorks** window, verify that the simulation setting is correct:



Click the **Simulation** button on the **VWorks** toolbar to toggle the simulation mode off and on.

- 

To perform a run on the hardware, verify that the **Simulation is off** label appears.
- 

To simulate the run in the software only, verify that the **Simulation is on** label appears.

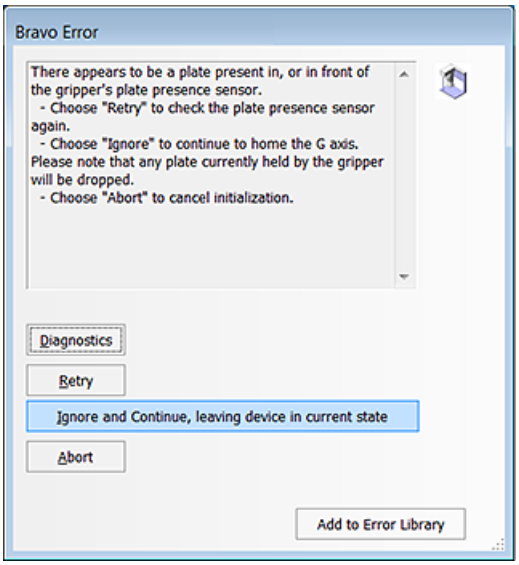
3 Click **Start** 

.

The initialization process starts and establishes communication with the BenchCel Microplate Handler and the Bravo Platform.

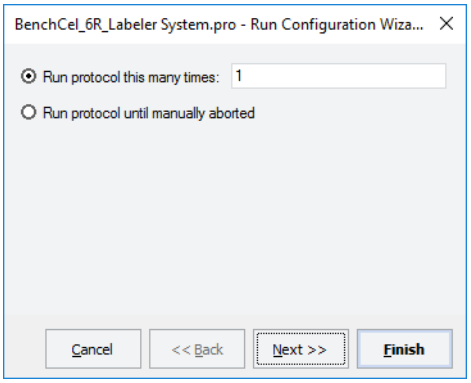
Note: If the devices have already been initialized, you can skip to step 6.

4 If the **Bravo Error** message appears stating **There appears to be a plate present**, verify that Bravo gripper is not holding labware, and then click **Ignore and Continue** to continue the initialization process.



5 If the **Verify that it is safe to home the W-axis** message appears, click **Retry** to continue homing the pipetting axis (*w*-axis).

6 When the **Run Configuration Wizard** opens:



Follow the instructions in the wizard and click **Next** or **Finish**, as applicable. The wizard allows you to specify:

- The number of times to run the protocol
- When to start the run:
  - As soon as possible
  - On a specific date and at a specific time
- The current state of the tip boxes, for example, whether any positions are empty
- The starting barcode, if applicable.
- Any notes that you want to enter about the protocol

CAUTION If you select the As soon as possible option, the protocol can start to run immediately after you complete the configuration wizard. Before you click Finish, verify that the system is set up and the protocol is ready to run.

7 When the **System Setup** message appears, verify that the labware are in the correct locations, and then do one of the following:

- If the setup is correct, click **Continue** to start the protocol.
- If the wrong labware type is loaded in a BenchCel stacker, click **Pause and Diagnose**.

  In the **Scheduler Paused** dialog box that opens, click **Diagnostics**, and open BenchCel Diagnostics to release the labware. After resolving the problem, click **Continue** in the **Scheduler Paused** dialog box.
- If the Bravo deck setup is not correct, make any required changes to the deck setup, and then click **Continue** in the **System Setup** message.

To monitor the progress of the run, check the **Progress** tab at the bottom of the VWorks window.

At the end of the run, the BenchCel stacker grippers automatically release the labware so that you can unload the labware from the racks.

A protocol complete message appears when the run finishes.

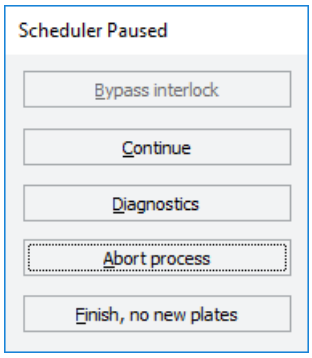
Pausing and continuing the run

To pause and continue the run:

1 Click **Pause all** 

.

The task currently in progress finishes before the protocol pauses. The Scheduler Paused dialog box opens.



2 When you are ready to resume the run, click **Continue** in the **Scheduler Paused** dialog box.

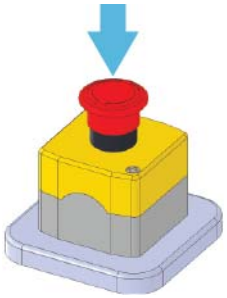
For details about the other options in the Scheduler Paused dialog box, see the *VWorks Automation Control User Guide*.

Stopping in an emergency

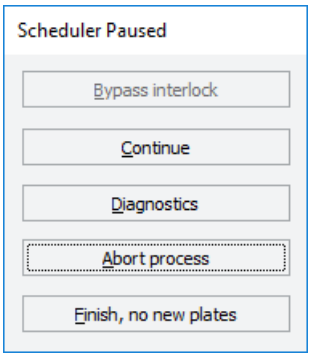
CAUTION You might not be able to resume a protocol after an emergency stop. Do not use an emergency stop to pause a run. To pause and continue a run, use the Pause button.

To stop in an emergency:

1 Press the red button on one of the emergency-stop pendants.



The Scheduler Paused dialog box opens.



To recover from an emergency stop:

1 Clear any obstacles from the Bravo Light Curtain. To reactivate the pendant, turn the red button clockwise. The spring-loaded button pops up.

2 Remove any dropped labware from the workstation. Remove the labware from the BenchCel gripper and Bravo Platform.

3 In the Scheduler Paused dialog box, select the appropriate command. For details, see the *VWorks Automation Control User Guide*.

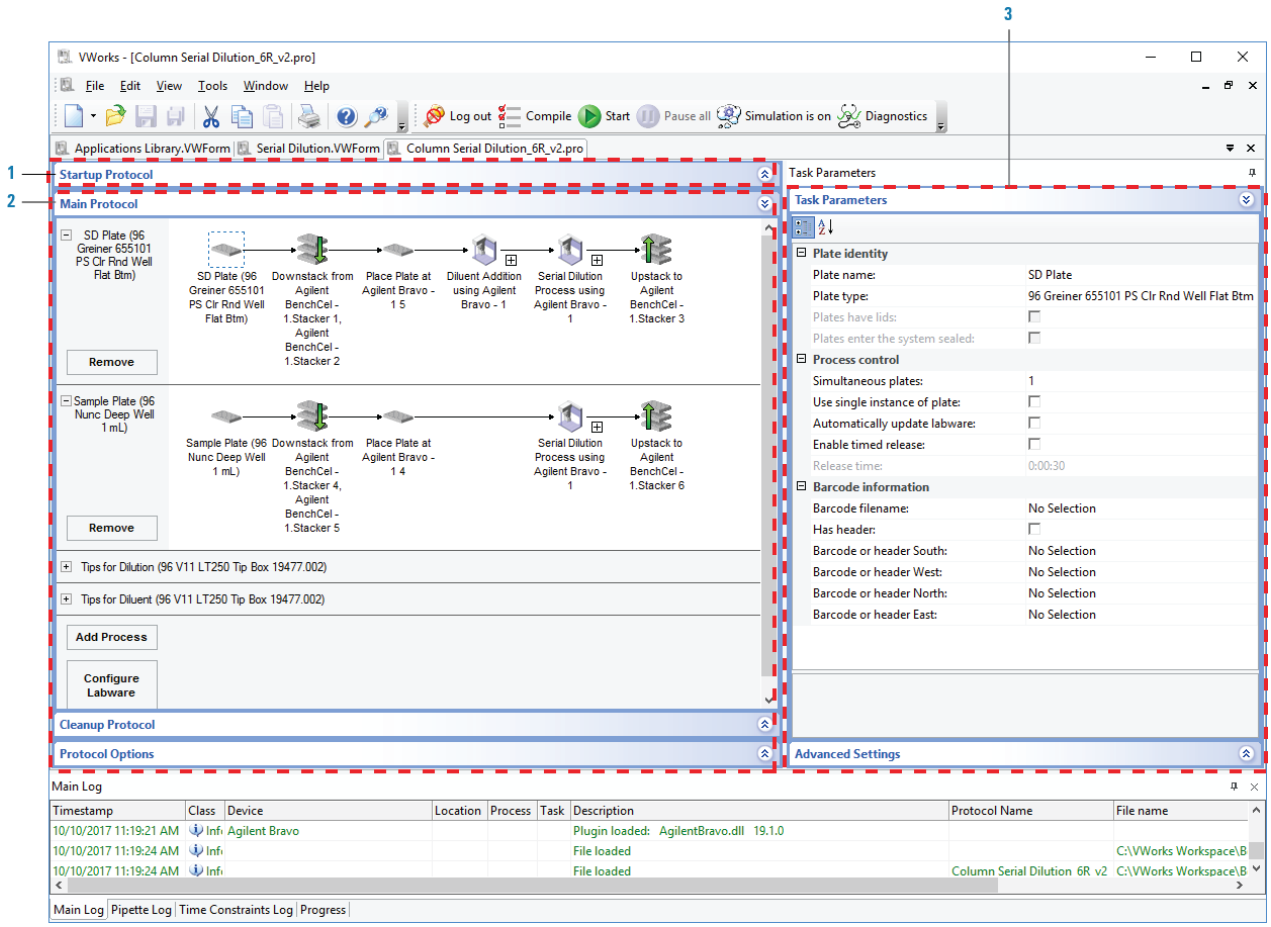
Depending on the state of the workstation when the emergency stop was activated, the run may not be recoverable.

Protocol settings overview

The protocol area of the VWorks window includes the following:

- **Startup Protocol** area (1). Specifies the labware types and locations of the Diluent reservoir and Waste plate, and Tip Trash Chute location on the Bravo deck.
- **Main Protocol** area (2). Contains the process lanes for the protocol.
- **Task Parameters** area (2). For each task that you select in a given process lane, the corresponding parameters appear in this area.

Figure VWorks protocol: (1) Startup Protocol area, (2) Main Protocol area, and (3) Task Parameters area



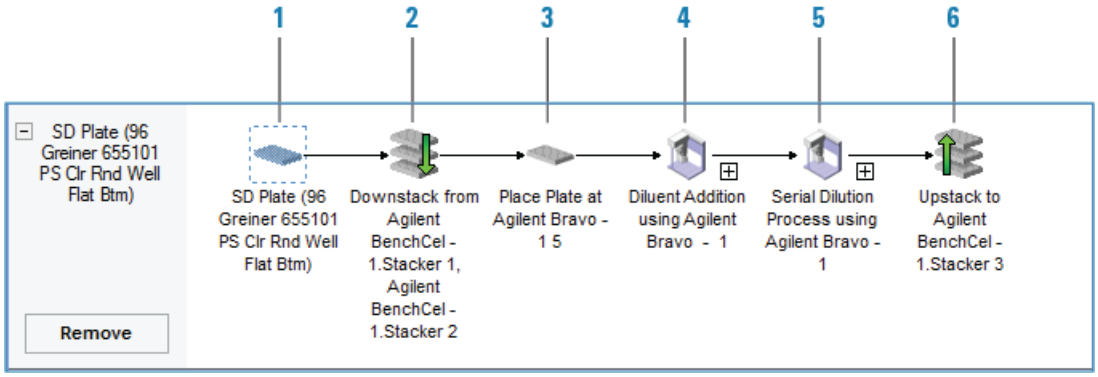
The Main Protocol area for the Serial Dilution protocol contains the following 4 process lanes, as the preceding figure shows:

- "SD Plate process" on page 22
- "Sample Plate process" on page 24
- "Tips for Dilution process" on page 26
- "Tips for Diluent process" on page 26

Note: The protocols for the column dilution and row dilution contain the same 4 process lanes, but differ in some of the labware locations and the Bravo Set Head Mode task settings.

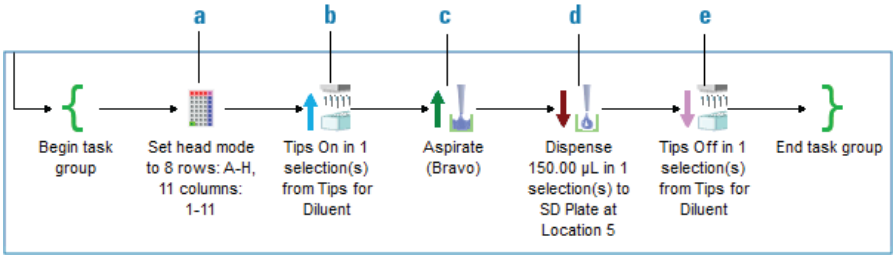
SD Plate process

The SD Plate process lane defines the tasks that process the Serial Dilution plate.



Item	Task name	Description
1	Process	Defines the plate parameters for the labware involved in this process: • Plate name: SD Plate (default) • Plate type: Greiner 655101 PS Clr Rnd Well Flat Btm (default) To change the values for these parameters, click the SD Plate icon in the process lane, and then edit the values in the Task Parameters pane.
2	Downstack	Specifies the stacker from which the BenchCel robot will get the SD Plate (Serial Dilution plate) to be placed on the Bravo deck. To change the specified stackers: **a** Click the **Downstack** task in the SD Plate process lane. **b** In the **Task Parameters** pane, click **Device Selection**. **c** Verify that the **Devices involved in** area lists the stackers that will hold the labware for the Serial Dilution plates to be processed. To remove a stacker from the list, double-click the stacker name. To move a device from the **Devices available to perform task** area, double-click the device name.
3	Place Plate	Specifies the Bravo deck location where the will BenchCel robot will place the SD Plate. For this protocol, this Place Plate task specifies deck location 5, as the figure shows.

Item	Task name	Description
4	Bravo Subprocess: Diluent Addition	Specifies the subprocess name and the tasks involved in the Diluent Addition subprocess.



a Set head mode task. Specifies the pipette head barrels to be used for this subprocess.

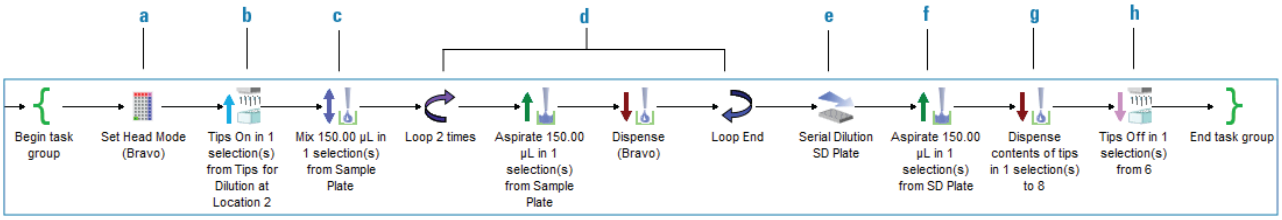
b Tips On task. Specifies the tips from the Tips for Diluent tip box at Bravo deck location 1.

c Aspirate task. Specifies the Diluent reservoir at Bravo deck location 9 and the aspirate parameters, such as the volume to aspirate.

d Dispense task. Specifies the volume to be dispensed in each well of the SD plate at deck location 5.

e Tips Off task. Specifies the Diluent tip box to which the tips will be returned for reuse.

Item	Task name	Description
5	Bravo Subprocess: Serial Dilution	Specifies the subprocess name and the tasks involved in the Serial Dilution subprocess.



a Set head mode task. Specifies the pipette head barrels to be used for this subprocess.

b Tips On task. Specifies the Tips for Dilution tip box at deck location 2.

c Mix task. Specifies the parameters for a mix in the source well of the Sample plate.

d Loop tasks. Specifies the Aspirate and Dispense task parameters to aspirate from the Sample plate and dispense 150 µL to each well in the specified column or row of the Serial Dilution plate.

e Serial Dilution task.

f Aspirate task. Specifies the final aspirate parameters to aspirate 150 µL from the dilution in column 10 or row F.

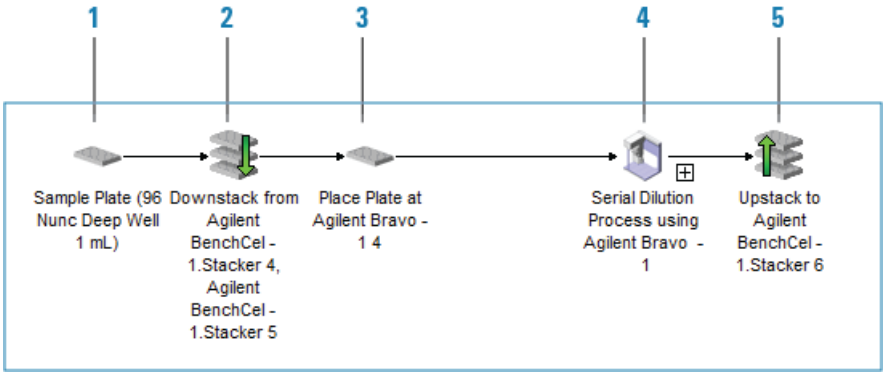
g Dispense task. Dispenses the remaining 150 µL volume into the Waste plate at deck location 8.

h Tips Off task. Ejects the tips to trash at deck location 6.

Item	Task name	Description
6	Upstack	Specifies the stacker to which the BenchCel robot will move the processed SD plate. For the Column Serial Dilution 6R protocol, this Upstack task specifies stacker 3 as the destination for the completed Serial Dilution plates. The upstack destination varies depending on the stacker configuration and the protocol orientation. To change the specified stackers: **a** Click the **Upstack** task in the SD Plate process lane. **b** In the **Task Parameters** pane, click **Device Selection**. **c** Verify that the **Devices involved in** area lists the stacker where the BenchCel robot will upstack the completed Serial Dilution plates. To remove a stacker from the list, double-click the stacker name. The **Devices available to perform task** area lists the stackers that are not used in the Upstack task. To move a stacker from this list to the **Devices involved in** list, double-click the device name.

Sample Plate process

The Sample Plate process lane defines the tasks that process the Sample plate. The following figure shows the process lane for the Serial Dilution 4R and 6R protocols. The Serial Dilution 2R protocol does not include tasks 2 and 4 shown in the figure, because the Sample plate remains at deck location 4 for the duration of the protocol.

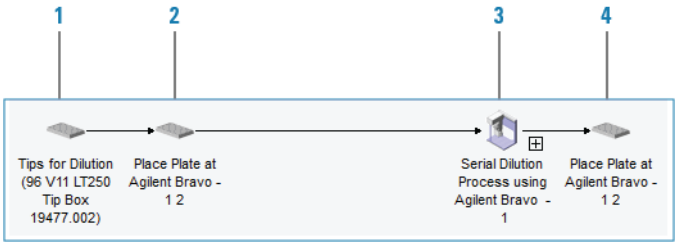


Item	Task name	Description
1	Process	Defines the plate parameters for the labware involved in this process, including: • Plate name: Sample Plate (default) • Plate type: 96 Nunc Deep Well 1 mL plate (default) To change the values for these parameters, click the Sample Plate icon in the process lane, and then edit the values in the Task Parameters pane.

Item	Task name	Description
2	Downstack	*Not applicable for the Serial Dilution 2R protocol.* Specifies the location where the Sample Plate will enter the process. The location can vary (BenchCel stacker or Bravo deck) depending on the BenchCel stacker configuration and the protocol orientation. For example, the Column Serial Dilution 2R protocol downstacks the Sample plate from Bravo deck location 4, but the Column Serial Dilution 4R protocol downstacks from BenchCel stacker 3. To change the specified location: **a** Click the **Downstack** task in the Sample Plate process lane. **b** In the **Task Parameters** pane, click **Device Selection**. **c** Verify that the **Devices involved in** area lists the device that will hold the Sample plates to be processed. To remove a device from the list, double-click the device name. To move a device from the **Devices available to perform task** area, double-click the device name.
3	Place Plate	Specifies the Bravo deck location where the Sample plate will be for the Serial Dilution subprocess. The location can vary depending on the BenchCel stacker configuration and the protocol orientation. For example, the Row Serial Dilution 2R protocol places the Sample plate on Bravo deck location 4, but the Column Serial Dilution 2R protocol places the Sample plate on Bravo deck location 8.
4	Bravo Subprocess: Serial Dilution	See the corresponding description for the "SD Plate process" on page 22.
5	Upstack	*Not applicable for the Serial Dilution 2R protocol.* Specifies the destination location for the used Sample plate. The location can vary (BenchCel stacker or Bravo deck) depending on the BenchCel stacker configuration and the protocol orientation. For example, the Column Serial Dilution 6R protocol specifies BenchCel stacker 6. But the Column Serial Dilution 2R protocol specifies Bravo deck location 7. To change the location: **a** Click the **Upstack** task in the Sample Plate process lane. **b** In the **Task Parameters** pane, click **Device Selection**. **c** Verify that the **Devices involved in** area lists the device that will hold the used Sample plate. To remove a device from the list, double-click the device name. To move a device from the **Devices available to perform task** area, double-click the device name.

Tips for Dilution process

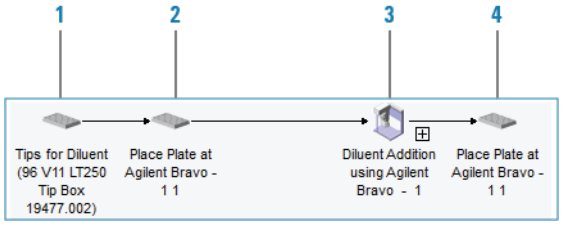
The Tips for Dilution process lane defines the tasks that process the tips used for the serial dilution.



Item	Task name	Description
1	Process	Defines the parameters for the labware involved in this process, including: • Plate name: Tips for Dilution (default) • Plate type: 96V11 LT250 Tip Box (default)
2	Place Plate	Specifies Bravo deck location 2 for this tip box.
3	Bravo Subprocess: Serial Dilution	See the corresponding description for the “SD Plate process” on page 22.
4	Place Plate	Specifies Bravo deck location 2 for this tip box.

Tips for Diluent process

The Tips for Diluent process lane defines the tasks that process the tips used for transferring liquid from the Diluent reservoir to the Serial Dilution plates.



Item	Task name	Description
1	Process	Defines the parameters for the labware involved in this process, including: • Plate name: Tips for Dilution (default) • Plate type: 96V11 LT250 Tip Box (default)
2	Place Plate	Specifies Bravo deck location 1 for this tip box.
3	Bravo Subprocess: Diluent Addition	See the corresponding description for the “SD Plate process” on page 22.
4	Place Plate	Specifies Bravo deck location 1 for this tip box.

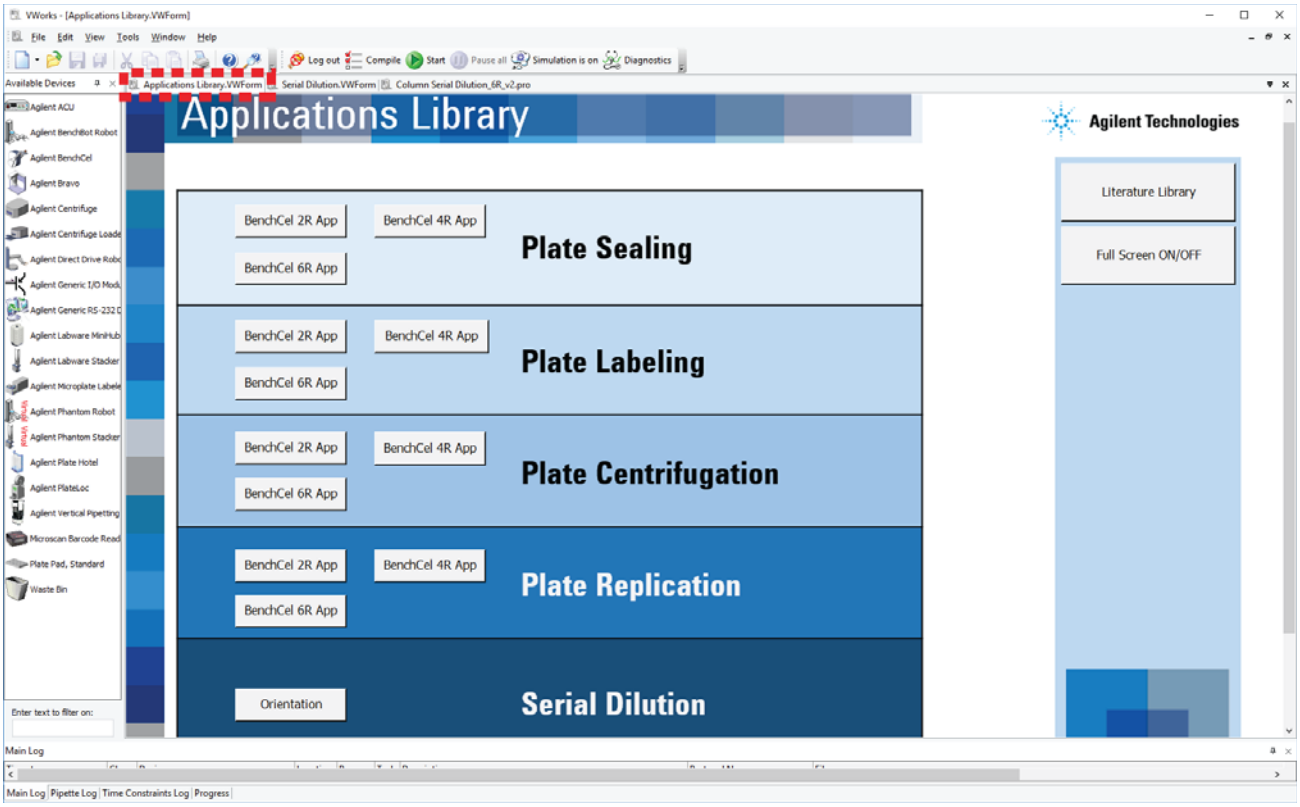
How to return to the Applications Library

To return to the Applications Library display:

In the VWorks window, click the **Applications Library.VWForm** tab at the top of the protocol area. The Applications Library form appears in the VWorks window, as the following figure shows.

From the Applications Library form, you can open a different protocol or display the Literature Library.

Figure VWorks window displaying the Applications Library form



Agilent Technologies

Protocol Guide

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