**Magnis NGS Prep System Instrument Procedure**

1. **PRINCIPLE:**
	1. The Magnis NGS Prep System is an automated liquid handling system for next generation sequencing library preparation and/or target enrichment of human nucleic acid samples.
	2. The Agilent Magnis NGS Prep System offers start-to-finish automation of library preparation and target enrichment protocols for next generation sequencing (NGS). The resulting product is a target-enriched DNA library ready for sequencing.
	3. The instrument is controlled and operated through the LCD touchscreen on the front of the instrument.
2. **INSTRUMENT COMPONENTS:**
	1. See figures 1-4 below











* 1. **Indicator Lights:** You can quickly and easily check the status of the instrument based on the color of the LED indicator lights that illuminate the entire plate filling area.



1. **TURNING THE INSTRUMENT ON:**
	1. Press the power button on the front of the instrument. The light on the power button turns green, the instrument turns on, the LED indicator lights inside the instrument illuminate, and the software launches on the touchscreen.
	2. If pressing the power button fails to turn on the instrument, verify that the power switch on the back of the instrument is in the ON position.
2. **LOGGING INTO THE SYSTEM:**
	1. Access the Login screen of the software. The Login screen opens automatically after turning on the instrument.



* 1. If another user is already logged in, press the username at the bottom of the screen then press Log Out. The previously logged in user is logged out and the Login screen opens.
	2. Type the username and password for your account into the provided fields. The Agilent engineer or Agilent authorized service provider creates a user account during system installation that has advanced user access
	3. Press Login. You are now logged in to the software. Stand by as the system performs the series of preparatory activities.
	4. At the end of the preparatory activities, the software opens to the Home screen.
1. **SYSTEM START UP EVENTS:**
	1. Figure 5 shows the sequence of events for starting up the system.
	2. The preparatory activities, which are automatically performed by the system following software login, are described in Table 1.

Figure 5 Start up Events



Table 1 Preparatory activities



1. **USER ACCOUNTS**
	1. The access level assigned to a user account – Standard or Advanced – determines the user’s access to certain software settings and functions.
	2. Each user who uses the system needs an account.
	3. From the Home screen, press Settings.
	4. Press User Management.
	5. Press Add.
	6. In the Username field, enter a username for the new account.
		1. Usernames can contain a combination of letters and numbers, but numbers are only permitted at the end of the username (e.g., abc123).
		2. Do not include special characters in the username.
		3. Next to Access Level, select the access level (Standard or Advanced) for the new user.
		4. The default selection is Standard.
		5. In the Password and Confirm Password fields, enter a password for the account.
		6. Press OK to save the user account.
2. **PROGRAMMING SYSTEM SETTINGS**
	1. Set the chiller temperature
		1. When the system is running a protocol, the temperature of the chiller is dictated by the protocol parameters.
		2. During setup of a protocol run, however, the chiller is pre-cooled to the temperature specified on the Chiller Setting screen.
		3. The temperature is set to 12°C by default, but temperatures from 4°C to 12°C are permitted.
		4. Only users with Advanced access are permitted to set the chiller temperature.
			1. From the Home screen, press Settings.
			2. Press System Settings.
			3. Press Chiller Setting.
			4. On the Chiller Setting screen, enter the temperature for the chiller (°C) into the provided field.
			5. Press Close to save your changes.
	2. Set the time and date
		1. From the Home screen, press Settings.
		2. Press System Settings
		3. Press Date & time Settings.
		4. Set the date, time, and time zone as needed.
		5. Press Apply to save your changes.
	3. View the instrument serial number and software version
		1. From the Home screen, press Settings.
		2. Press System Settings.
		3. Press Instrument Settings. The Instrument Settings screen opens, displaying the serial number and firmware version.
3. **ENVIRONMENTAL REQUIREMENTS:**
	1. Maintain optimal environmental requirements.
		1. Ambient temperature between 15°C and 25°C
		2. Humidity levels between 30% and 70% non-condensing.
4. **PREPARE THE MAGNIS INSTRUMENT FOR RUNNING A PROTOCOL:**
	1. Before starting the run, check the ambient humidity on the hygrometer. If it is less than 30%, utilize the humidifier to increase the humidity. Fill both water bottles in the humidifier with DI water and set the fans to high.
	2. Verify that the instrument deck is cleared of any labware from previous runs.
	3. If the instrument is off, press the power button on the front lower left of the device.
		1. The instrument will turn on, the LED indicator lights will illuminate, and the software will launch on the touchscreen. During hardware initialization, the system moves all motorized parts through all sensor positions. This takes approximately 15 minutes.
		2. Log in to the software using the lab username “mgp” and password “1234”.
	4. If the power is already on, the system performs an Instrument Health Check each time a protocol run is initiated. This check is to ensure that the hardware is functioning within specifications. This takes about 5 minutes.
	5. Agilent recommends running the UV decontamination quick cycle procedure before every run. This cycle requires 30 minutes.
		1. Verify that the instrument deck is cleared of all labware, then make sure that the instrument door is closed.
		2. From the Home screen, press **Decontamination**.
		3. The Decontamination screen opens.
		4. Select **Quick cycle**, then touch the Start button.
		5. At the completion of the cycle, the UV light turns off and the instrument remains idle.
		6. If needed, press Abort at any time to stop the decontamination cycle.
5. **PREPARE THE REAGENTS AND PLASTICWARE:**
	1. Prepare the samples, target enrichment reagents, and other materials needed for the protocol run according to the user manual for your specific Magnis Target Enrichment Kit.
	2. The user manual contains details on the materials required to run a protocol and instructions on loading your DNA samples into the Magnis Sample Input Strip.
	3. The image below describes the orientation of the Magnis Sample Input Strips. Make sure to track the locations of your samples as you load them into the strip.



1. **SET UP AND INITIATE THE PROTOCOL RUN:**
	1. For detailed instructions on running a protocol for your particular sample type, refer to the user manual for your Magnis Target Enrichment Kit.
	2. From the Home screen, press Run Protocol.
	3. The system locks the instrument door and performs an IHC. At completion of the IHC, the Enter Run Info step opens.
	4. Complete the Run Setup steps and start the protocol run, as instructed in the user manual for your Magnis Target Enrichment Kit. The software walks you through the individual Run Setup steps (Figure 6), starting with the Enter Run Info step.
	5. Press the forward and back arrow buttons to navigate through the steps. Because the steps vary depending on the type or target enrichment you are running, you will need to refer to the instructions and screen images provided in the user manual for your Magnis Target Enrichment Kit.
	6. After you start the run, the system’s status indicator lights turn green, indicating that a protocol run is in progress. The lights change from green to blue upon completion of the run.
	7. If the system encounters an error during the protocol, the status indicator lights change to red and, if your account is configured for alerts, the system sends you an email notifying you of the error.

Figure 6: Run set up steps



1. **COLLECT FINAL LIBRARY SAMPLES AND CLEAN UP THE SYSTEM**
	1. At the completion of the run, the system keeps the prepared library solutions in the PCR plate on the thermal cycler module, which is held at 12°C for up to 72 hours. Collect the samples within that 72-hour period.
	2. Wait until the touchscreen indicates that the run is complete. Press OK when you are ready to collect the library samples from the instrument.
	3. The system transfers the libraries from the PCR plate to the green library strip tube in the chiller. Allow the instrument-mediated transfer process to complete before continuing.
	4. At the completion of the transfer process, fully open the instrument door and collect the final library samples (i.e., the green library strip tube) from the chiller module.
	5. Re-seal the wells of the strip tube using a fresh foil seal strip, then store at the temperature recommended in the user manual for your Magnis Target Enrichment Kit.
	6. If the optional pre-capture library QC samples were collected for the run, remove the blue QC sample strip from the chiller module. Process and store the samples as recommended in the user manual for your Magnis Target Enrichment Kit.
	7. Remove all remaining consumables from the instrument deck and dispose of them according to local guidelines. Close the instrument door.
	8. Log out of the software or turn off the instrument. To log out, press the username at the bottom of the screen then press Log Out.
	9. To turn off the instrument, press the power button on the front of the instrument.
2. **DECONTAMINATING WITH UV LIGHT:**
	1. Quick Cycle
		1. The Magnis/Magnis Dx NGS Prep System includes a UV tube that can be used to decontaminate the surfaces of the instrument deck. The quick cycle is a 30-minute decontamination. Agilent recommends running the quick cycle before each protocol run
			1. Verify that the instrument deck is cleared of all labware, then make sure that the instrument door is closed.
			2. From the Home screen, press Decontamination. The Decontamination screen opens
			3. At the top of the screen, select Quick cycle.
			4. Press Start.
			5. The decontamination cycle begins, and the screen displays a countdown of the time remaining.
			6. At the completion of the cycle, the UV light turns off and the instrument remains idle. If needed, press Abort at any time to stop the decontamination cycle.
	2. Extended Cycle
		1. The Magnis/Magnis Dx NGS Prep System includes a UV tube that can be used to decontaminate the surfaces of the instrument deck. The extended cycle is a 2-hour decontamination. Agilent recommends running the extended cycle in the event of a spill or leakage on the instrument deck. The system only permits running the extended cycle once every 7 days to protect the deck surfaces from excessive exposure to UV light.
			1. Verify that the instrument deck is cleared of all labware, then make sure that the instrument door is closed.
			2. From the Home screen, press Decontamination. The Decontamination screen opens.
			3. At the top of the screen, select Extended cycle.
			4. Press Start.
			5. The decontamination cycle begins, and the screen displays a countdown of the time remaining.
			6. At the completion of the cycle, the UV light turns off and the instrument powers down. If needed, press Abort at any time to stop the decontamination cycle.
3. **MAINTENANCE**
	1. Precautions
		1. Do not use solvents, such as acetone, benzene, or phenol-based agents to clean the system, as these could damage the instrument. If you have questions about the safety of a particular cleaning agent, contact Agilent Worldwide Technical Support.
		2. Wear gloves when cleaning the system.
		3. If you are cleaning the system due to a hazardous liquid spill, use appropriate personal protective equipment before coming in contact with the liquid.
		4. When cleaning the instrument deck, avoid the exposed electrical hardware of the heater/shaker/magnet (HSM) module.
		5. Do not spray water or cleaning agents directly onto the interior or exterior of the instrument. Instead, apply the cleaning agent to a soft cloth or wipe. Remove any excess liquid from the cloth or wipe before use to prevent introduction of liquid into instrument components.
		6. Do not use abrasive cloths or wipes to clean the system, especially on the window of the barcode scanner.
		7. Do not submerge the barcode scanner or any other instrument component in water.
	2. Cleaning the deck surface and instrument exterior
		1. Turn off the instrument at both the power button on the front and the power switch on the back and disconnect the power cord from the power supply.
		2. Use a soft cloth or wipe moistened with water, 70% isopropyl alcohol, 70% ethanol, or freshly diluted 10% bleach to clean the exterior of the instrument and the surfaces of the instrument deck.
		3. On the black surfaces of the instrument deck, cleaning with diluted bleach may leave a residue. Wipe away any residue using a dry cloth, or a cloth slightly moistened with water.
		4. Allow the cleaned surfaces to completely dry. If necessary, remove any remaining moisture with a dry, soft cloth.
		5. Reconnect the power cord to the power supply. Turn on the power switch at the back of the instrument, then press the power button on the front of the instrument.
		6. (Optional) Perform UV decontamination of the instrument deck using the 30-minute quick cycle.
	3. Cleaning the barcode scanner
		1. Agilent recommends avoiding all contact with the window of the barcode scanner. You can, however, clean the window using the instructions below if the window becomes visibly dirty or if the barcode scanner is not operating well.
		2. Turn off the instrument at both the power button on the front and the power switch on the back and disconnect the power cord from the power supply.
		3. Use a soft cloth or wipe moistened with water or a mild detergent-water solution to clean the window of the barcode scanner. If you use a detergent-water solution, follow with cleaning using a soft cloth moistened with water or 70% isopropyl alcohol. Do not touch the window with anything other than the soft cloth or wipe that you are using for cleaning.
		4. Remove any remaining moisture with a dry, soft cloth or wipe.
		5. Reconnect the instrument to power supply and turn on the power switch at the back of the instrument.
	4. Replacing the UV bulb and monitoring usage
		1. After 630 hours of UV-tube usage, the next time a decontamination cycle is initiated, the system notifies you to replace the UV tube. Replacement of the UV tube must be performed by an Agilent engineer or Agilent authorized service provider. Contact Agilent Worldwide Technical Support to schedule a UV tube replacement.
		2. After replacing the UV tube, the Agilent engineer or Agilent authorized service provider will reset its usage tracking to zero. The lifespan of the UV tube is 630 hours.
		3. To monitor usage:
			1. From the Home screen, press Settings. The Settings screens opens.
			2. Press Hardware Usage Tracking.
			3. The Hardware Usage Tracking screen opens. The screen displays the number of hours (h), minutes (m), and seconds (s) of use for the UV tube.
			4. Press Close to exit the screen.
4. **REFERENCES**
	1. Magnis/MagnisDx User Guide June 2019