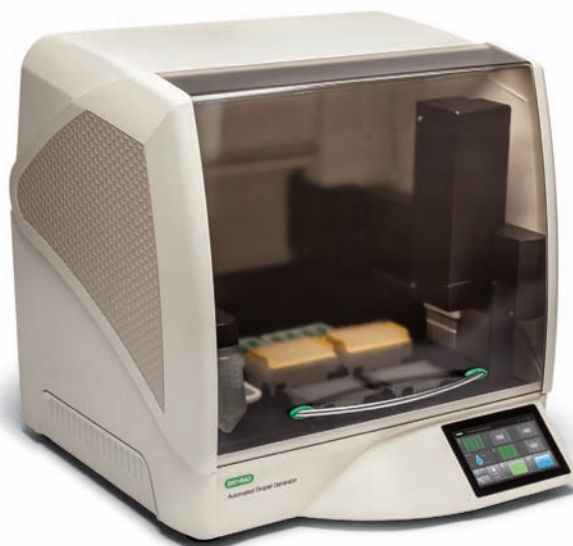


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# Automated Droplet Generator

## Instruction Manual

Catalog #1864101



**BIO-RAD**



## Bio-Rad Technical Support Department

The Bio-Rad Technical Support Department in the U.S. is open Monday through Friday, 5:00 AM to 5:00 PM, Pacific time.

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## Safety and Regulatory Compliance

This instrument has been tested and found to be in compliance with all applicable requirements of the following safety and electromagnetic standards:

- IEC 61010-1:2010 (3rd ed.), EN61010-1:2010 (3rd ed). Electrical Equipment for Measurement, Control, and Laboratory Use — Part 1: General requirements
- EN 61326-1:2006 (Class A). Electrical equipment for measurement, control, and laboratory use. EMC requirements, Part 1: General requirements
- UL 61010-1:2004, Laboratory equipment, Test & Measurement Equipment and Industrial Process Controls
- CAN/CSA 22.2 No 61010-1-04, Safety Requirements for Electrical. Equipment for Measurement, Control, and Laboratory Use, Part I: General. Requirements

This equipment generates, uses, and can radiate radiofrequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.



The CE mark indicates that the manufacturer ensures the product conforms with the essential requirements of the applicable EN directives.



The CSA mark indicates that the product has been tested to Canadian and U.S. standards, and it meets the requirements of those applicable standards.

This equipment has been tested and found to comply with the limits for a Class A digital device pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment.



The Waste Electrical and Electronic Equipment Directive symbol indicates that when the end-user wishes to discard this product, it must be sent to separate collection facilities for recovery and recycling.

This instrument is for use only by trained personnel.

Do not position the equipment so that it is difficult to operate the plug of the power supply.

## Instrument Safety Warnings

Alteration of this instrument voids the warranty and safety certification and creates a potential safety hazard. This instrument is intended for laboratory use only. Bio-Rad Laboratories is not responsible for any injury or damage caused by use of this instrument for purposes other than those for which it is intended, or by modifications of the instrument not performed by Bio-Rad Laboratories or an authorized agent. Follow the safety specifications listed here and throughout this manual. Use only the power cord supplied with the instrument, using only the plug adapter that corresponds to the electrical outlets in your region. Use of unapproved supermixes may harm the instrument and voids the warranty.

When lifting, two people are required. Grip from the underside, one person on each opposite side.

After unpacking for placement of equipment, transport per lifting instructions; place near grounded outlet with plug of power supply accessible.

## PPE (Personal Protective Equipment) Training

Proper use of gloves is recommended with use of oils and sample plates. OSHA requirements for PPE are set forth in the Code of Federal Regulations (CFR) at 29 CFR 1910.132 (General requirements); 29 CFR 1910.138 (Hand protection); 29 CFR 1926.95 (Criteria for standard personal protective equipment). Any gloves with impaired protective ability should be discarded and replaced. Consider the toxicity of the chemicals and factors such as duration of exposure, storage, and temperature when deciding to reuse chemically exposed gloves. Features to aid glove selection for handling of machines, assays, oils, and cleaning solvents:

- Butyl gloves are made of a synthetic rubber and protect against peroxide, hydrofluoric acid, strong bases, alcohols, aldehydes, and ketones
- Natural (latex) rubber gloves are comfortable to wear and feature outstanding tensile strength, elasticity, and temperature resistance
- Neoprene gloves are made of synthetic rubber and offer good pliability, finger dexterity, high density, and tear resistance; they protect against alcohols, organic acids, and alkalis
- Nitrile gloves are made of copolymer and provide protection from chlorinated solvents such as trichloroethylene and tetrachloroethene; they offer protection when working with oils, greases, acids, and caustic substances

## Transporting the Instrument

Avoid dropping or subjecting the instrument to shock when transporting.

## Biohazards

If biohazardous samples are present, adhere to the following guidelines and comply with any local guidelines specific to your laboratory and location.

### General Precautions

- Always wear laboratory gloves, coats, and safety glasses with side shields or goggles
- Keep your hands away from your mouth, nose, and eyes
- Completely protect any cut or abrasion before working with potentially infectious materials
- Wash your hands thoroughly with soap and water after working with any potentially infectious material and before leaving the laboratory
- Remove wristwatches and jewelry before working at the bench
- Store all infectious or potentially infectious material in unbreakable leak-proof containers
- Remove protective clothing before leaving the laboratory
- Do not use a gloved hand to write, answer the telephone, turn on a light switch, or touch anything that other people may touch without gloves
- Change gloves frequently. Remove gloves immediately when they are visibly contaminated
- Do not expose materials that cannot be properly decontaminated to potentially infectious material
- Upon completion of any operation involving biohazardous material, decontaminate the work area with an appropriate disinfectant (for example, a 1:10 dilution of household bleach)
- No biohazardous substances are exhausted during normal operations of this instrument

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# 1

# QX200 AutoDG Droplet Digital PCR System

## 1.1 Introduction

Bio-Rad's QX200 AutoDG Droplet Digital PCR (ddPCR) System combines water-oil emulsion droplet technology with microfluidics to perform accurate and precise digital PCR. The system consists of two instruments, an Automated Droplet Generator and a Droplet Reader, and associated consumables. The Automated Droplet Generator partitions each sample into ~20,000 uniform nanoliter-sized droplets in which nucleic acid molecules are distributed in a random fashion. Each droplet serves to partition the reactions. The 96-well PCR plate of droplets is removed from the AutoDG Instrument and sealed, and then PCR to end point is performed in a thermal cycler. Droplets from each sample are analyzed individually on the QX200 Droplet Reader; the droplets stream single file through the reader for fluorescence analysis.

PCR-positive and PCR-negative droplets are counted to provide absolute quantification of target DNA in digital form. Positive droplets, which contain at least one copy of the target DNA or RNA molecule, exhibit increased fluorescence compared to negative droplets. The fraction of PCR-positive droplets enables the target to be quantified according to the Poisson distribution. Alternatively, amplified products can be extracted from droplets following PCR for downstream applications, such as sequencing or cloning.

The QX200 System works with both hydrolysis probes and EvaGreen® fluorescence detection chemistries, and its flexible design allows for high throughput and ultra-sensitive detection.

The ddPCR System lets you:

- Achieve absolute quantification without the use of a standard curve
- Detect rare DNA target copies with unmatched sensitivity
- Determine copy number variation with unrivaled accuracy
- Measure gene expression levels with precision
- Design scalable assays for high sensitivity or high throughput
- Expand applications using flexible ddPCR chemistry — EvaGreen® or probes

Applications and uses include:

- Copy number variation
- Rare sequence detection
- Gene expression analysis
- Next-generation sequencing (NGS) library quantification
- Viral load determination
- Single cell gene expression analysis
- Absolute quantification
- Rare mutant detection
- miRNA analysis
- NGS sample preparation
- GMO detection
- Genome edit detection

This manual covers use of the Automated Droplet Generator and preparation for PCR. For information on the QX200 Droplet Reader, please refer to the QX200 Droplet Reader Instruction Manual, bulletin 10031906.

## 1.2 System Components

Bio-Rad's Automated Droplet Generator simplifies the Droplet Digital PCR workflow, making digital PCR both scalable and practical. The AutoDG Instrument prepares droplets for up to 96 samples at a time with minimal hands-on time required. In less than 45 minutes, a plate of droplets can be generated. The plate can then be sealed and processed in a thermal cycler, and then ddPCR analysis can be performed on either a QX100 or a QX200 Droplet Reader.

Automated droplet generation eliminates user-to-user variability that can be associated with manual droplet generation. The AutoDG Instrument's HEPA-filtered enclosure reduces contamination during droplet generation. Consumables are automation-friendly with SBS standard access.

The system's guided quick load allows users to get started faster. The large color touch screen provides simple setup and plate tracking. Select the desired number of columns across a 96-well plate, load Droplet Generation Oil and only the consumables you need as prompted by the system, and start the run. A countdown timer will display the time remaining so users can maximize their time in the lab. When the plate is ready, users are notified and a counter showing how much time has elapsed begins. Every run is stored in an exportable log file for future reference.

Following reaction preparation using ddPCR supermix, 22  $\mu$ l of each of up to 96 prepared samples (or blanks) in a 96-well plate are loaded into the Automated Droplet Generator. A bottle of Automated Droplet Generation Oil is loaded into the instrument, along with DG32 Cartridges and pipet tips for the AutoDG Instrument. There, the samples and oil are combined within the microchannels of the cartridge to create an emulsion of ~20,000 monodisperse, nanoliter-sized droplets for each of the samples. Following automated droplet generation, the 96-well PCR plate of droplets is sealed and PCR is performed to end point in a thermal cycler.

When cycling is complete, the plate is loaded into the QX200 Droplet Reader. The droplet reader sips each sample, singulates the droplets, and streams them in single file past a two-color detector. The detector reads each droplet and determines which contain a target (+) and which do not (-). If quantification of droplets is not required, PCR products can be extracted from droplets following thermal cycling for downstream applications, such as sequencing or cloning.

The Automated Droplet Generator includes the components listed in Table 1. Additional items required for the Droplet Digital PCR workflow (automated droplet generation, sealing, cycling, and reading) are listed in Table 2.

**Table 1. Automated Droplet Generator components.** Items shipped with the Automated Droplet Generator (catalog #1864101).

Component	Description	Catalog #
Automated Droplet Generator	Instrument used for automatic droplet generation	1864101
Power cord	Connects Automated Droplet Generator to power source	Call technical support
Cooling block accessory	Prevents evaporation during droplet generation	12002819
Oil purge reservoir	Collects oil waste from priming and flushing	Call technical support

**Table 2. Additional materials required for Droplet Digital PCR.**

Component	Description	Catalog #
<b>Automated Droplet Generator</b>		
DG32 Cartridges	Microfluidic cartridge with gasket used to mix sample and oil to generate droplets in the Automated Droplet Generator	1864108, 1864109
Droplet Generation Oils	Automated Droplet Generation Oil for EvaGreen®	1864112
	Automated Droplet Generation Oil for Probes	1864110
PCR Supermixes	QX200 ddPCR EvaGreen® Supermix	1864033, 1864034, 1864035, 1864036
	ddPCR Supermix for Probes (No dUTP)	1863023, 1863024, 1863025
	ddPCR Supermix for Probes	1863026, 1863010, 1863027, 1863028
	ddPCR Supermix for Residual DNA Quantification	1864037, 1864038, 1864039, 1864040
Controls	One-Step RT-ddPCR Advanced Kit for Probes	1864021, 1864022
	QX200 Buffer Control Kit for EvaGreen®	1864052
	QX200 Buffer Control Kit for Probes	1863052
Pipet Tips	Pipet Tips for Automated Droplet Generator	1864120, 1864121
Pipet Tip Bin	Pipet Tip Waste Bins for AutoDG	1864125
96-well PCR Plates	ddPCR 96-Well Plates	12001925
<b>Sealer and Thermal Cycler</b>		
Foil Seal	Pierceable Foil Heat Seal	1814040
Plate Sealer	PX1 PCR Plate Sealer	1814000
Thermal Cycler	C1000 Touch Thermal Cycler with 96–deep well reaction module	1851197
<b>QX200 Droplet Reader*</b>		
Droplet Reader Oil	ddPCR Droplet Reader Oil	1863004

\* For information on components shipped with QX200 Droplet Reader, see bulletin 10031906.

## 1.3 Installation and General Operation

Automated Droplet Digital PCR involves the following steps (4.5–5 hours for the complete workflow):

1. Prepare PCR-ready samples — combine nucleic acid sample (DNA or RNA), primers, and probes (FAM, VIC, or HEX) or intercalating dye (EvaGreen®) with Bio-Rad ddPCR Supermix (see Table 2).
2. Make droplets — load 22 µl of the ddPCR reaction into a 96-well PCR plate, seal the plate with Bio-Rad's Pierceable Foil Heat Seal and a PX1 PCR Plate Sealer, centrifuge for 30 sec at 1,000 rpm, and load the plate and required consumables into the Automated Droplet Generator to partition the sample into droplets. The Automated Droplet Generator uses microfluidics to combine oil and aqueous sample to generate the nanoliter-sized droplets required for ddPCR analysis. It processes up to 96 samples at a time in less than 45 min.

3. Perform PCR — remove the 96-well PCR plate containing droplets from the Automated Droplet Generator, seal the plate with foil, and perform PCR to end point (~40 cycles) using a PX1 Plate Sealer and C1000 Touch Thermal Cycler (see Table 2).
4. Read droplets — load the plate into the QX200 (or QX100) Droplet Reader and start your run. The droplet reader reads each droplet to determine which contain a target (+) and which do not (-).

If reading or quantifying droplets and recovering material from droplets in parallel, prepare two sets of reactions, one for each application. For example, a set of eight wells of droplets can be generated: four of these will be read after thermal cycling, and four will not be read.

5. Analyze results — the droplet reader connects to a laptop computer running QuantaSoft Software. The software provides a complete set of tools for setting up and naming samples, running and controlling the instrument, and analyzing results. It also reads the positive and negative droplets in each sample and plots the fluorescence, droplet by droplet. The fraction of positive droplets in a sample determines the concentration of target in copies/ $\mu\text{l}$ .

The QX200 ddPCR System is compatible with hydrolysis probe (TaqMan) chemistry and can detect up to two fluorophores and up to four targets at a time (FAM/VIC or FAM/HEX). It is also compatible with EvaGreen<sup>®</sup> chemistry. Use only the approved Bio-Rad supermixes listed in Table 2 with this system; using unapproved supermixes may harm the instrument and voids the warranty.

**Note:** The QX100 ddPCR System does not support EvaGreen<sup>®</sup> chemistry; running this chemistry will damage the instrument.

## 1.4 System Setup and General Operation Instructions

Connect the Automated Droplet Generator to a power source using the power cord and power adapter provided. Leave 2" (~5 cm) clear space behind and 5" (~13 cm) clear to the right and left of the instrument for proper ventilation. Position the instrument such that it can be easily disconnected from the power source, should that become necessary for servicing the equipment.

The Automated Droplet Generator is powered on by plugging it into a power source.



The Automated Droplet Generator must be installed by a Bio-Rad engineer.



# 2

## Using the Automated Droplet Generator

### 2.1 Powering On the Automated Droplet Generator

The Automated Droplet Generator (AutoDG) is designed to remain powered on in order to preserve positive airflow inside of the instrument and track consumable use. The instrument stays in an idle state when not being used. Please see Section 2.2 for instructions on starting a run from idle mode.

1. When powering on the Automated Droplet Generator, you will see a startup screen while the instrument powers on and performs a self-check. Please note that the door will close automatically.

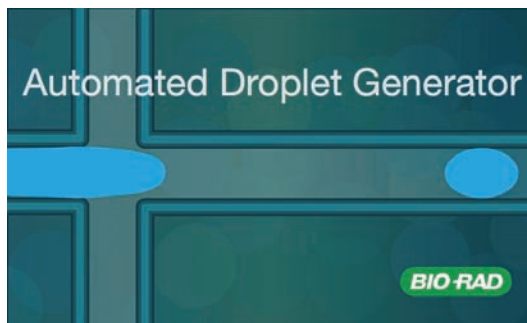


Fig. 1. Startup screen when instrument is powered on.

- If the instrument deck is empty, the indicator lights on the deck of the Automated Droplet Generator should be off, indicating that no consumables are present. The corresponding areas of the touch screen will be gray.

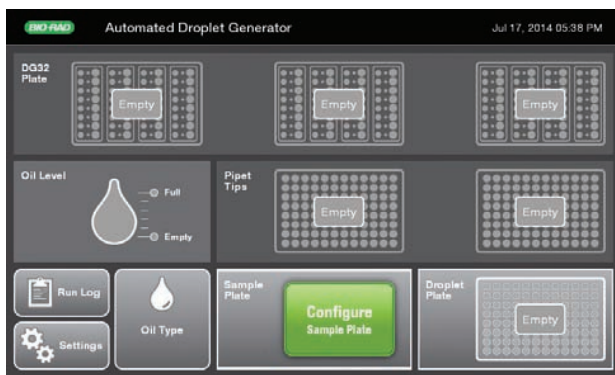


Fig. 2. Home screen, no consumables loaded.

If consumables were present in the instrument when power was lost or disconnected, an error message will appear prompting you to check and reset the consumables if necessary. The cartridges, gaskets, tips, and plates are all single-use consumables and should be discarded after use. If the consumables in the instrument are of questionable use after power loss, please remove and discard. Proceed to Section 2.2 to start a run on the AutoDG Instrument.

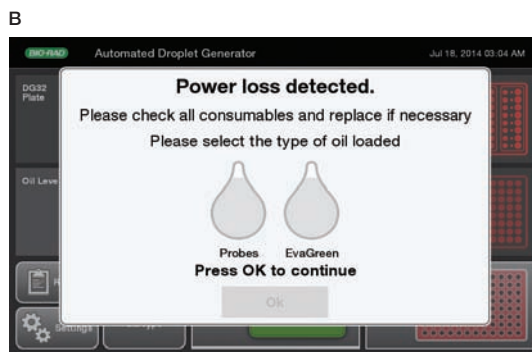
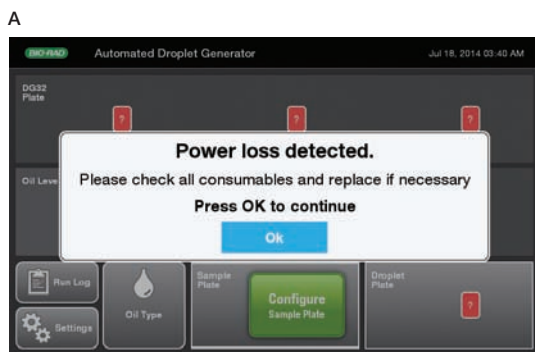


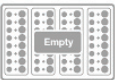
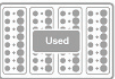
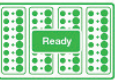
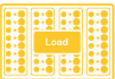
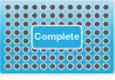

Fig. 3. Error messages displayed after power loss. A, when cartridges, tips, and/or plates are detected after power loss; B, when cartridges, tips, and/or plates as well as a bottle of oil are detected after power loss.



## 2.2 Starting a Run on the AutoDG Instrument

1. Bring the Automated Droplet Generator out of idle mode by touching the screen.
2. Check the indicator lights on the deck of the AutoDG Instrument and the consumable icons on the touch screen. Table 3 explains the deck lighting and touch screen icons and the instrument status they indicate.

**Table 3. AutoDG Instrument status as indicated by deck lighting and touch screen.**

Deck Lighting Status	Touch Screen Icon Status	Indication
Off	Gray, Empty 	Ready to configure a new run
Off	Gray, Used 	Ready to configure a new run; instrument will prompt for consumable replacement in used positions when the next run is configured
Green	Green, Ready 	Ready to configure a new run; consumables in the green positions are ready to be used
Yellow	Yellow, Load 	Run configured, load consumables as prompted (this status occurs only during run setup)
Blue	Blue, Complete 	Run complete and droplets ready; occurs only at droplet plate position
Red	Red, ? 	Consumable status unknown after power loss, please confirm manually



The Automated Droplet Generator accepts either a sealed or an open 96-well PCR plate containing 22  $\mu$ l prepared ddPCR reactions. Detailed sample preparation and reaction setup information can be found in the ddPCR Supermix product inserts.

3. To create a plate of droplets with the Automated Droplet Generator:
  - a. Touch **Configure Sample Plate** at the bottom center of the home screen.
  - b. Touch or swipe across the screen to select the columns in which your samples are located on the sample plate. Touching a selected column deselects it. You can touch any orientation of columns.
  - c. Name plate and/or add notes. Touch the fields to bring up a keyboard on the screen; type name and/or notes. Touch **OK** when done.

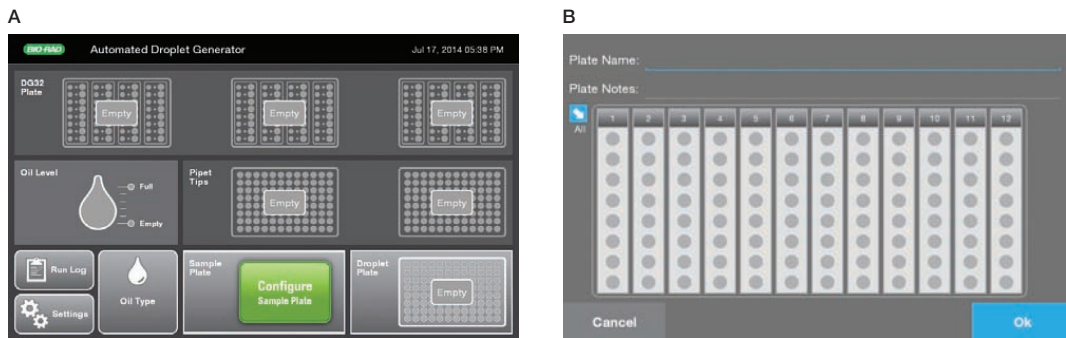


Fig. 4. Configuration screens. A, home screen; B, Configure Sample Plate screen.

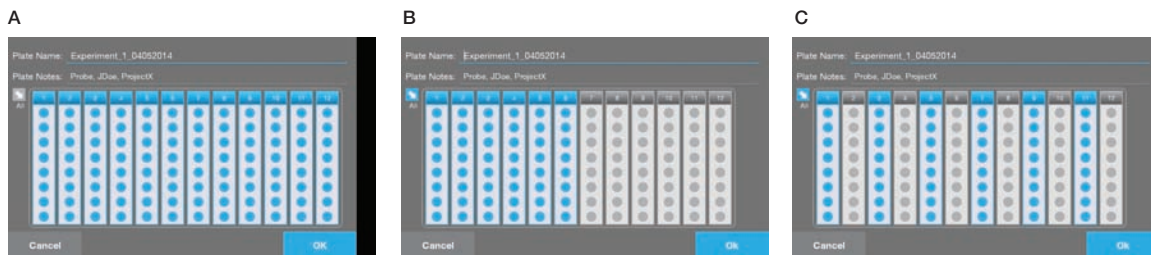
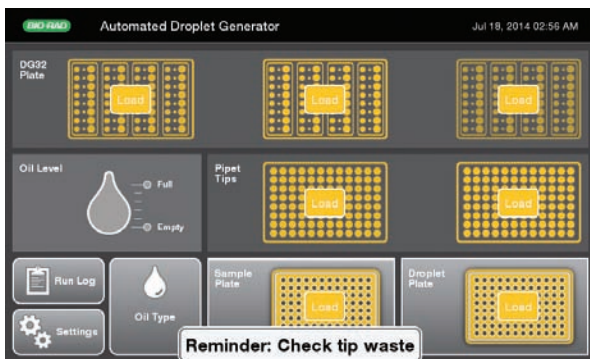


Fig. 5. Configure Sample Plate screen. A, full plate of samples selected; B, half plate of samples selected; C, alternating columns of samples selected.

4. Based on the number of columns selected in the previous step, the consumable icons on the screen will begin to blink yellow to indicate where new consumables need to be loaded into the instrument.
  - If the blinking yellow icon displays **Load** on the screen, remove the previously used consumable (if applicable) and load a new consumable into the designated area of the instrument
  - If the icon remains gray on the screen, that consumable is not needed to complete the currently configured run



**Fig. 6. The Automated Droplet Generator keeps track of the consumables so long as it is connected to a power supply.** Based on the number of columns configured, the system will prompt for only the consumables that need to be loaded to complete the run. In this example, a full plate has been selected.

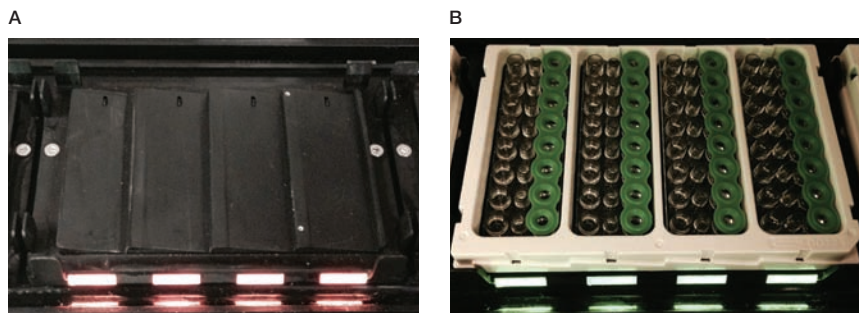
5. Open the door on the AutoDG Instrument by lifting up on the handle at the front of the instrument. The electronic braking system will assist you in this task and prevent the lid from closing accidentally.



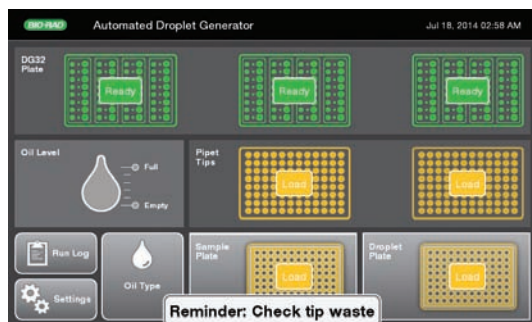
The Automated Droplet Generator door will close to protect the HEPA-filtered enclosure if left open for longer than 20 minutes while in idle mode (not generating droplets). There is an audible click when the door brake releases, and the door closes slowly. Please observe the pinch points of the instrument and keep hands clear.

To avoid contamination, load the consumables from the back to the front of the instrument. Nothing should be placed on the instrument deck outside of the dedicated consumable holders.


6. To load the DG32 AutoDG Cartridges along the back row of the instrument:
  - a. Remove the plastic wrapping from the DG32 Cartridges and place the cartridges, with the green gaskets to the right, into the three plate holders. The holders are keyed for proper orientation of each DG32 Cartridge to prevent incorrect loading.
  - b. The lights on the DG32 Plate Holders will change from yellow to green when the DG32 Cartridges are inserted correctly. If a light remains yellow, try repositioning the plate in a different orientation.
  - c. As the lights turn green on the deck, the corresponding icons on the touch screen will go from blinking yellow to solid green, and **Ready** will be displayed.



**Fig. 7. Loading DG32 Cartridges.** **A**, yellow lights indicate empty DG32 Cartridge holders on the AutoDG deck in the “Load” state; **B**, green lights indicate the DG32 Cartridge has been correctly loaded and is ready for droplet generation.



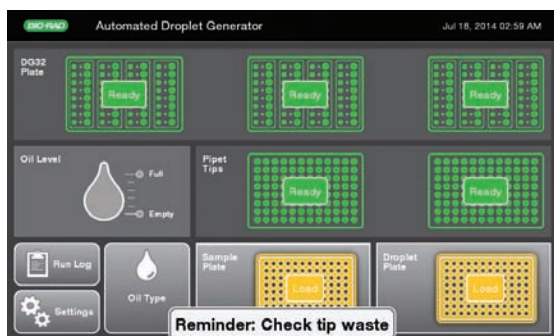
**Fig. 8. DG32 consumables have been correctly loaded.** The status changes to **Ready** on the DG32 Cartridge icons on the screen.



Do not disassemble DG32 Cartridges or store them in an environment exposed to dust or debris.

7. To load the AutoDG Pipet Tips along the center row of the instrument:
  - a. Remove the plastic wrapping and box lids from the tip boxes and place in the plate holders in the middle of the deck. Load only full tip boxes.
  - b. Remove the tip waste bin containing any tips from a previous run and replace with a clean waste bin.
  - c. The lights on the tip box holders will change from yellow to green when the tip boxes are inserted correctly.
  - d. As the lights turn green on the deck, the corresponding areas of the touch screen will go from blinking yellow to solid green, and **Ready** will be displayed.

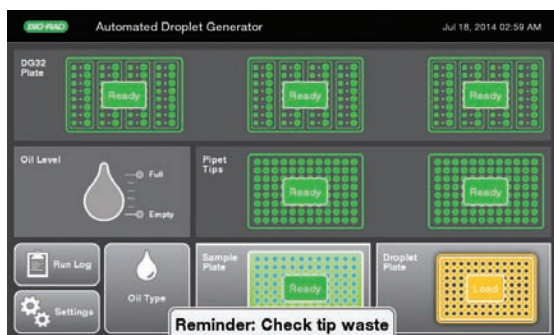
Please note that only AutoDG Pipet Tips should be used; other tips can damage the instrument.



**Fig. 9. Pipet tip boxes have been correctly loaded.** The green **Ready** icon appears on the Pipet Tip icons on the screen.

8. To load the ddPCR 96-Well Plate containing your prepared ddPCR reactions into the front row of the instrument:
  - a. The sample plate should be sealed with Bio-Rad's Pierceable Foil Heat Seal and a PX1 PCR Plate Sealer, and then centrifuged for 30 sec at 1,000 rpm, in advance of being loaded into the AutoDG Instrument. Each well should contain 22  $\mu$ l of your prepared ddPCR reaction. Please see the supermix product insert for more detailed information on ddPCR reaction setup.
  - b. Place the plate into the front left plate holder, labeled on the screen as **Sample Plate**. The holder is keyed for proper orientation and contains plate clips to support sealed plates.
  - c. The light on the Sample Plate holder will change from yellow to green when the plate is inserted correctly. If the light remains yellow, try repositioning the plate in a different orientation.
  - d. As the light turns green on the deck, the corresponding icon on the touch screen will go from blinking yellow to solid green, and **Ready** will be displayed.

Please note that a sample plate is required for every run, regardless of the number of columns selected.



**Fig. 10. Sample plate has been correctly loaded.** The status changes to **Ready** on the Sample Plate icon on the screen.



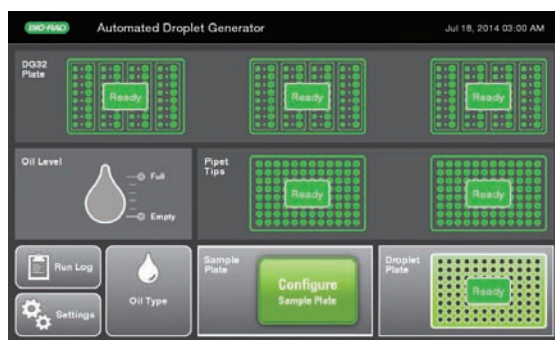
Place the cooling block upside down in a  $-20^{\circ}\text{C}$  freezer for at least 2 hours before configuring a run on the AutoDG Instrument and inserting the droplet plate assembly into the instrument. The block goes from a pink color at room temperature to a dark purple color when properly cooled.

9. To load the Droplet Plate assembly:

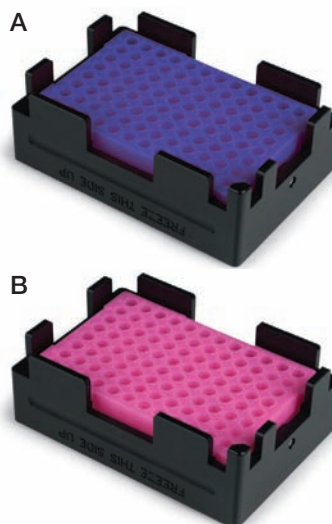
- Remove the cooling block from the freezer and place into the front right plate holder, labeled on the screen as **Droplet Plate**. The holder is keyed for proper orientation of the cooling block. The block should be a dark purple color, indicating it is at the proper temperature. If the block is pink, it has warmed up and should not be used (Figure 12).
- The light on the instrument will change from yellow to green when the block is inserted correctly. If the light remains yellow, try repositioning the block in a different orientation.
- As the light turns green on the deck, the corresponding area of the screen will go from blinking yellow to solid green, and **Ready** will be displayed.
- Place a clean ddPCR 96-Well Plate for droplet collection into the cooling block accessory. The cooling block is also keyed for proper orientation of the plate.

Please note that a clean droplet plate is required for every run, regardless of the number of columns selected. Once generated, the droplets will be dispensed into the same plate orientation as the ddPCR reactions when they were taken from the sample plate.

When putting the cooling block back in the freezer, place it upside down.



**Fig. 11.** Droplet plate and cooling block assembly have been correctly loaded. The status of the Droplet Plate icon on the screen changes to **Ready**.



**Fig. 12.** Cooling block. **A**, purple color indicates cooling block is ready to use for droplet generation. **B**, pink color indicates it should be placed in the freezer before use.



### Why do I need a cooling block?

The AutoDG Instrument uses a cooling method to prevent droplet evaporation, much like the Droplet Generator requires you to cover the wells once droplets are transferred.

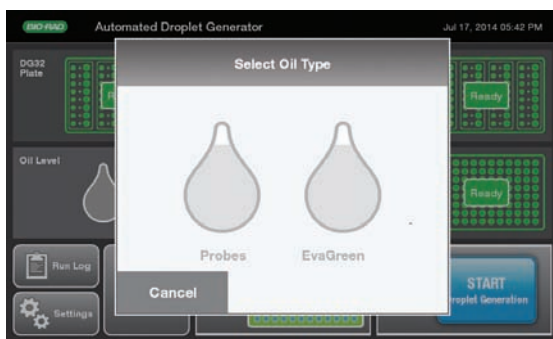
10. To load Automated Droplet Generation Oil into the instrument:

- Check the oil type on the screen. If it matches your chemistry, continue. If you need the other oil type, then follow steps b–e to change the oil bottle.
- Select the type of Automated Droplet Generation Oil by touching the droplet for either **Probes** or **EvaGreen** oil. The droplet you select will turn blue; touch **OK** to set the oil type.



Be sure the type oil to which you are changing is selected before removing the bottle to change the type.

- Remove the oil bottle from the tower of the oil delivery system at the front left corner of the instrument.
- Remove cap from the bottle of Automated Droplet Generation Oil and twist the bottle into the tower of the oil delivery system. Turn the bottle until it does not move; the label on the bottle should face out.
- The Oil Level icon on the screen will turn blue and display the current oil level of the bottle. The system will display the oil type at the bottom left of the screen as well.



**Fig. 13. Oil selection pop-up window.** Touch the oil type on the screen when prompted to select type before loading Automated Droplet Generation Oil.

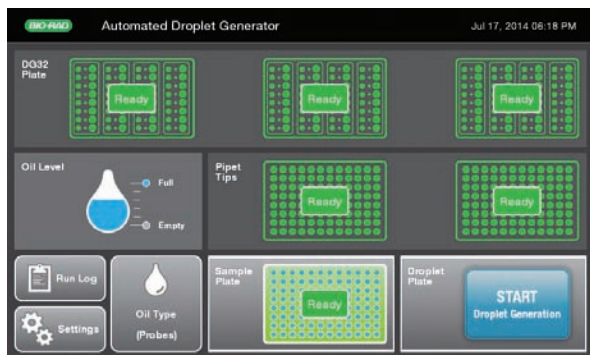
If a bottle of Automated Droplet Generation Oil was previously loaded, you may be prompted to confirm the type of oil currently loaded into the instrument.

If the last plate was run on the AutoDG Instrument with a different oil type than the one being currently loaded and selected, the instrument will perform a small volume purge of the oil through the delivery system and into the oil waste reservoir. The total run time will be a few minutes longer when this occurs, but droplet generation will not be impacted. To prevent this operation in the future, see Section 2.4 on advanced oil loading and switching.



Automated Droplet Generation Oil for EvaGreen® should be used only in combination with the QX200 ddPCR System and ddPCR EvaGreen® Supermix. The use of other supermixes can lead to poor results and result in damage to the QX200 Droplet Reader. The QX100 ddPCR System does not support EvaGreen® chemistry; running this chemistry will damage the instrument.

- Once all consumables are loaded and the corresponding lights on the deck and touch screen are green, a blue Start button will appear at the bottom right of the screen. Touch **Start** to bring up a confirmation window indicating the type of Droplet Generation Oil loaded, the number and orientation of columns selected for droplet generation, and any plate name and details entered during configuration of the sample plate.



**Fig. 14. Home screen.** All consumables are correctly loaded and the system is ready to start droplet generation.



**Fig. 15. Run confirmation screen.** A, full plate of samples selected; B, half plate of samples selected; C, alternating columns of samples selected.



12. Once you have confirmed the plate setup, touch **Start Run** to begin droplet generation. The door will automatically close at the beginning of the run and must remain closed during the run. Opening the door before the **Droplets Ready** message appears may cause the instrument to terminate the run and samples to be lost. Please see step 13 for information on aborting a run.

If the selected columns on the confirmation screen do not match the location of samples in your sample plate, touch **Back** to change. Touch the sample plate to bring up the Configure Sample Plate window and change your selection.

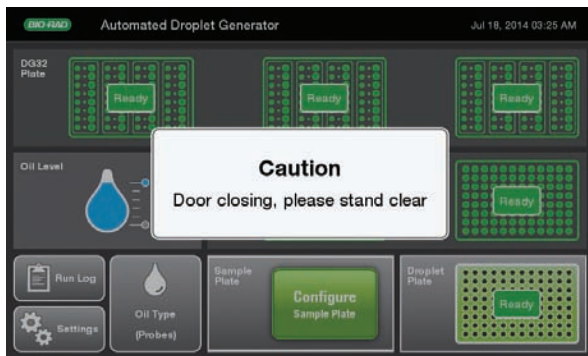


Fig. 16. The AutoDG door automatically closes at the start of each run. Door must remain closed until droplet generation is complete.

13. After a brief initialization, the Automated Droplet Generator will display a countdown timer on the screen with time remaining until the plate of droplets is ready. No additional action is needed until the plate is ready. The initialization can take 1–5 min, depending on whether the oil type has been changed or not (see Section 2.4).

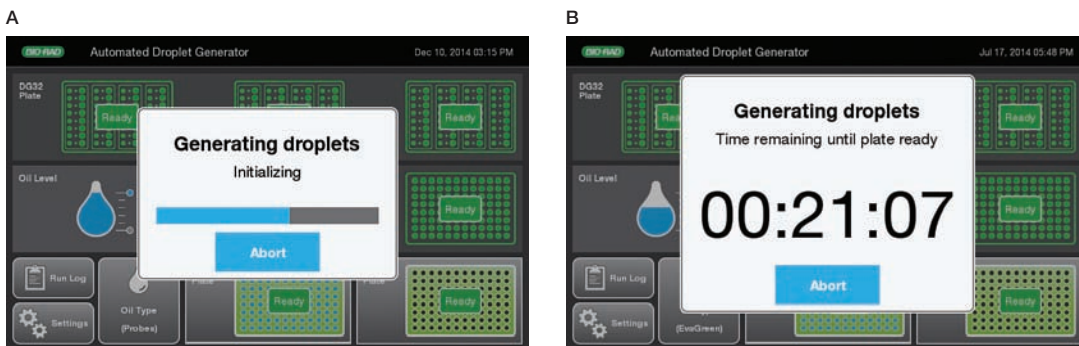


Fig. 17. Droplet generation initialization and countdown timer. A, initializing display with progress bar at the beginning of a run; B, countdown timer display indicates the time remaining until droplet generation is complete and the Droplet Plate can be removed.

If for any reason you need to stop the run, touch **Abort** on the countdown timer screen. A confirmation window will appear; touch **Yes** to abort the run or **No** to return to the countdown timer. Please note that stopping the Automated Droplet Generator during a run can result in loss of the current column of samples being processed.

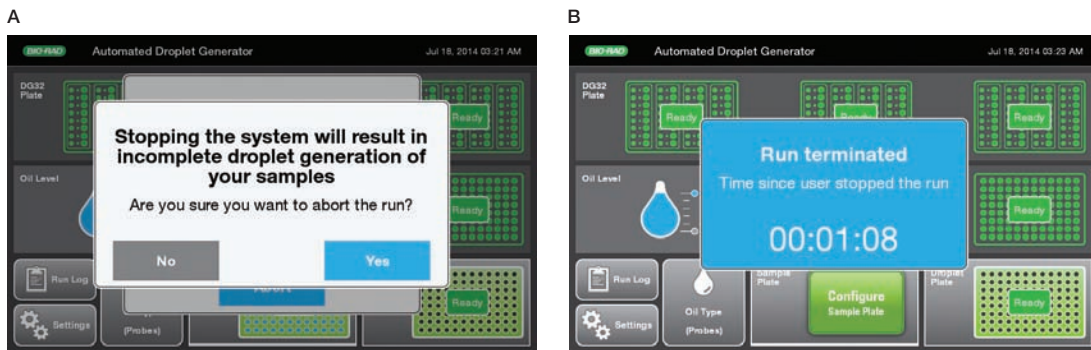


Fig. 18. Stopping a run. **A**, touching **Abort** will bring up a confirmation screen; **B**, system display with time since run aborted.

14. Once the plate of droplets is ready, the screen will display a finalizing window followed by a blue **Droplets ready** message with a timer showing time elapsed since complete.

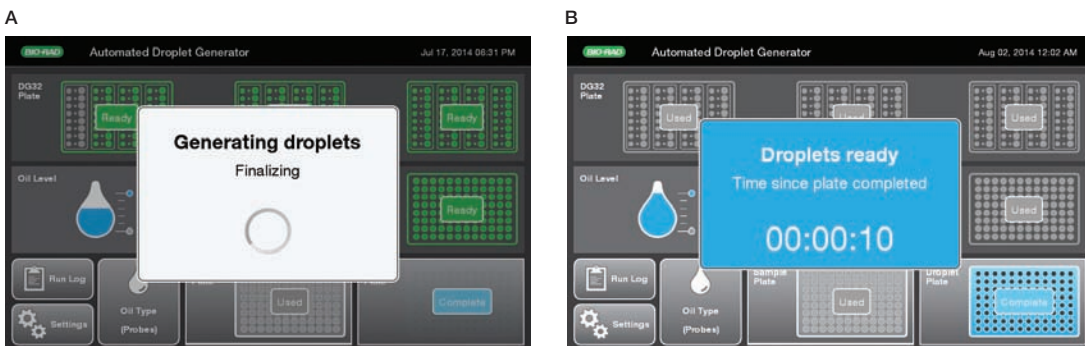


Fig. 19. End of a run. **A**, finalizing display at the end of a run; **B**, count-up display indicating the time that has elapsed since droplet generation was completed.

The Droplet Plate icon on the touch screen will pulse blue. The door on the instrument will unlock and the droplet plate, at the front right corner of the instrument and also illuminated blue, can be removed. Please wait to remove the oil bottle while the unused oil is being returned to it. When the orange message on the pop-up window disappears, it's safe to remove the oil bottle.

If any errors were encountered during the run, an error notification will appear below the timer. Touch **Errors encountered** to bring up the run logs and identify the error.



**Fig. 20. Droplet generation is complete.** Please wait to remove the oil bottle until the orange message disappears from the screen.

15. Remove the droplet plate and the cooling block assembly from the AutoDG Instrument. Use the PX1 PCR Plate Sealer and foil seals listed in Table 2 to seal the droplet plate within 30 min after completing droplet generation. Return the cooling block assembly to the freezer upside down to refreeze. Follow the Instructions in the PX1 PCR Plate Sealer Instruction Manual (bulletin 10023997).
  - a. Set the plate sealer temperature to 180°C and time to 5 sec.
  - b. Touch the arrow to open the PX1 tray door. Position the support block on the tray with the 96-well side facing up. Place the 96-well plate onto the support block and ensure that all plate wells are aligned with the support block.
  - c. Cover the 96-well plate with one sheet of pierceable foil seal. (The yellow label on the Bio-Rad heat seal bag identifies the sealing surface.) Do not attempt to place the frame over the foil-covered plate. The frame is for use only with other seals.
  - d. Once the 96-well plate is secured on the support block and covered with the pierceable foil seal, touch **Seal**. The tray will close and heat sealing will initiate.
  - e. When heat sealing is complete, the PX1 Plate Sealer door will open automatically. Remove the plate from the block. Remove the block from the PX1 Sealer.
  - f. Check that all the wells in the plate are sealed; the depressions of the wells should be visible on the foil. Once sealed, the plate is ready for PCR in a thermal cycler.
16. Remove from the AutoDG Instrument and discard any consumables that have been completely used. DG32 Cartridges, pipet tips, and 96-well plates are single-use consumables and are not reusable. The AutoDG Instrument will remember the status of the consumables as long as it remains powered on; if a consumable has been only partially used, leave it in the AutoDG Instrument for the next run.

Begin amplification (PCR) within 30 min of sealing the plate, or store the plate at 4°C for up to 4 hr prior to amplification. Refer to the supermix product inserts for cycling conditions.



Fig. 21. PX1 PCR Plate Sealer.

## 2.3 Subsequent Steps

Once the 96-well plate containing the droplets is sealed, place it into the thermal cycler for PCR amplification. Refer to the supermix product inserts for cycling conditions. When PCR amplification is complete, remove the 96-well plate from the thermal cycler and read the droplets using the QX100 or QX200 Droplet Reader (follow the instructions in the QX200 Droplet Reader Instruction Manual, bulletin 10031906).

If the goal is to read or quantify droplets and recover material from droplets in parallel, prepare two sets of reactions, one for each application. For example, a set of eight wells in a single DG8 Cartridge can be generated: four of these will be read after thermal cycling, and four will not be read. Refer to the QX200 Droplet Reader Instruction Manual, for more details.

## 2.4 Advanced Loading and Switching of Automated Droplet Generation Oils

When a new or different bottle of oil is loaded, or when power is lost, the Automated Droplet Generator will perform a small volume flush and prime of the oil delivery system. If the AutoDG Instrument has not been used for an extended time period (a week or more) but left powered on, it is recommended to perform a flush and prime routine before running a plate.

### 2.4.1 Loading a Bottle of Oil before Configuring a Plate

To save time at the beginning of a run, a bottle of Automated Droplet Generation Oil can be loaded into the instrument and the oil delivery system primed at any point. When there is no bottle of oil loaded into the instrument, the Oil Level display on the screen will not display an oil type and will appear gray to indicate the space is empty.

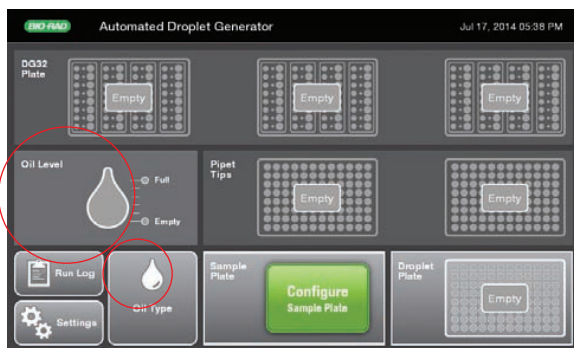


Fig. 22. Home screen with oil level and oil type waiting to be set.

1. Open the door of the AutoDG Instrument by lifting up on the handle until it clicks into a locked position.
2. Remove the cap from the bottle of AutoDG Oil and insert the bottle into the tower of the oil delivery system at the front left corner of the instrument.
3. Touch the **Oil Type** button on the home screen to bring up the Select Oil Type display.
4. Touch the droplet to indicate which type of oil has been loaded. To help differentiate, the AutoDG Oil for Probes bottle has a yellow label and contains a yellow straw, while the AutoDG Oil for EvaGreen® bottle has a green label and contains a green straw.

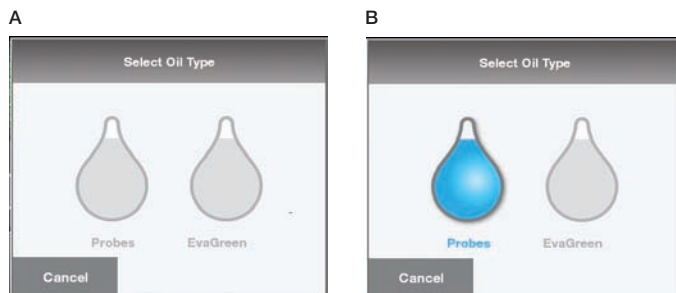
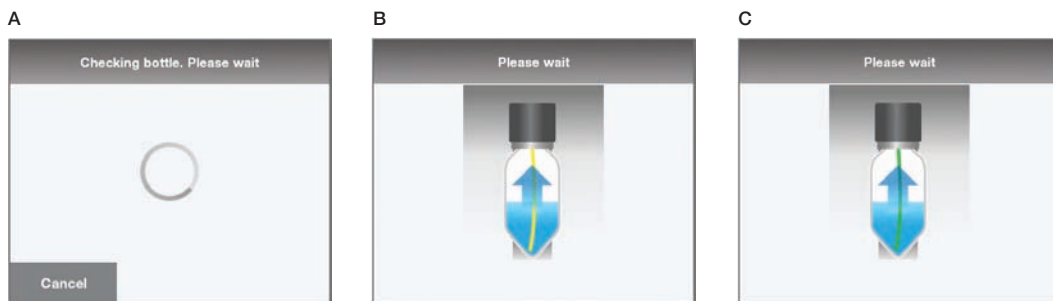


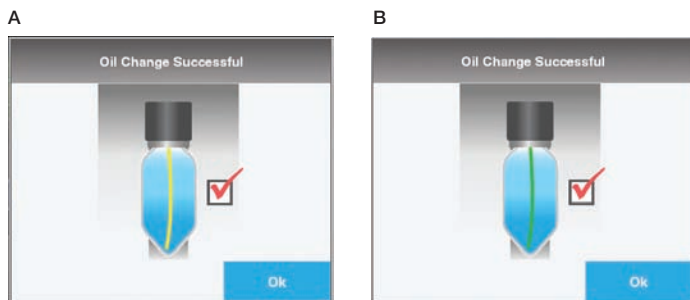
Fig. 23. Oil selection window. A, oil selection display; B, AutoDG Oil for Probes selected.

- The instrument will check that there is oil in the bottle. If you did not load a bottle (or insert the bottle completely) as described in step 2, you will be prompted to load a bottle of the oil type that you selected in the previous screen. Once correctly loaded, the AutoDG Instrument will begin the flush and prime routine.



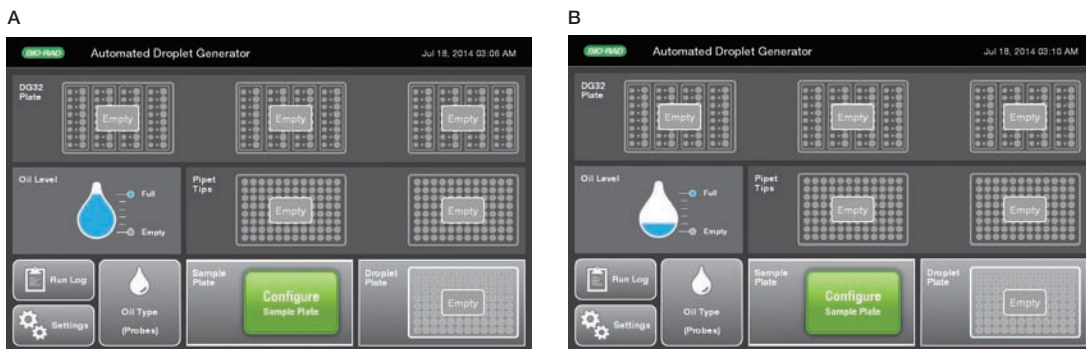
**Fig. 24. Flush and prime display.** **A**, display while the system checks for the bottle; **B**, display while the oil delivery system is primed with AutoDG Oil for Probes; **C**, display while the oil delivery system is primed with AutoDG Oil for EvaGreen®.

- Once complete, the instrument will display a screen confirming successful priming of the selected and loaded oil.



**Fig. 25. Oil change confirmation window.** **A**, successful priming of AutoDG Oil for Probes; **B**, successful priming of AutoDG Oil for EvaGreen®.

- Touch **OK** to return to the home screen. The Oil Type icon will now reflect the type of oil loaded and primed and the Oil Level icon will reflect the amount of oil in the bottle.



**Fig. 26. Oil Level display.** Home screen display showing **A**, a full bottle of AutoDG Oil for Probes loaded; **B**, a partial bottle of AutoDG Oil for Probes loaded.

## 2.4.2 Changing between AutoDG Oil Types

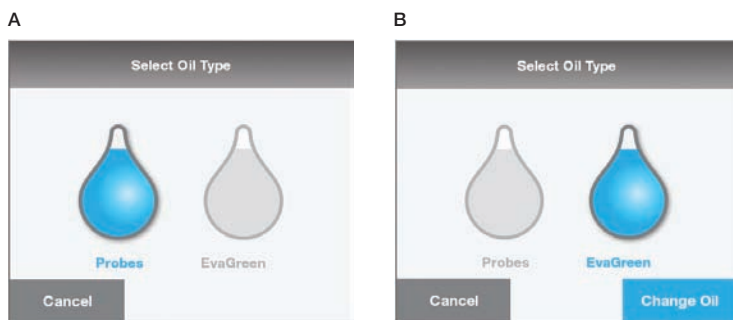
Automated Droplet Generation Oils can be changed and the oil delivery system primed at any time.

The flush and prime when changing chemistries is important for good ddPCR results.

The AutoDG Instrument will perform the flush and prime at the start of any run where the oil selected differs from that used in the previous run. Changing oils beforehand saves time at the beginning of the droplet generation process. Because the AutoDG Instrument keeps track of the type of oil used in a previous run, so long as it is powered on, it will perform this operation before beginning a plate of droplets with a different type of oil.

To perform the oil change at any time:

1. Open the door of the AutoDG Instrument by lifting up on the handle until it clicks into a locked position.
2. Touch the **Oil Type** button on the home screen to bring up the Select Oil Type display.
3. The oil type previously set in the instrument will be selected in blue. Touch the other type of oil to activate the **Change Oil** button.
4. Remove the bottle currently loaded and replace the cap tightly for storage.
5. Remove the cap from the alternate type of AutoDG Oil and insert the bottle into the tower of the oil delivery system at the front left corner of the instrument.



**Fig. 27. Switching oil types.** A, oil selection display with Probes selected; B, **Change Oil** button activated by touching the EvaGreen® droplet.

6. Once a new bottle is loaded, the AutoDG Instrument will begin the flush and prime routine.
7. Once complete, the instrument will display a screen confirming successful priming of the selected and loaded oil.
8. Touch **OK** to return to the home screen. The Oil Level icon will now reflect the amount of oil in the bottle, and the Oil Type icon will reflect the type of oil loaded and primed, which will now be different than previously displayed.

## 2.5 Accessing Run Logs

The AutoDG Instrument stores information about each run, including consumables used, rows of reactions processed, and any errors that may have occurred.

To access the run log:

1. Touch the **Run Log** button on the home screen.
2. To display detailed information about a run, touch the run.
3. Touch **OK** to return to the run log (and to export run log or exit).



Summary		Details	
Aug 26, 2014 11:19 AM	Terminated by system	<b>Start Date:</b>	Aug 26, 2014 10:52 AM
Aug 26, 2014 10:53 AM	Terminated by system	<b>End Date:</b>	Aug 26, 2014 10:53 AM
Aug 26, 2014 10:47 AM	Terminated by system	<b>Status:</b>	Terminated by system
		<b>Oil Type:</b>	Probes
		<b>Plate Name:</b>	
		<b>Errors:</b>	1 <a href="#">More Info</a>
		<b># DG8 Used:</b>	0
		<b># Tips Used:</b>	0
		<b># Sample Columns:</b>	1
		<b># Droplet Columns:</b>	0
		<b>Plate Notes:</b>	
		<b>Instrument Serial #:</b>	773BR1001
		<b>Software Version:</b>	1.0.38.0822

Export All Ok

Fig. 28. AutoDG Instrument run log. Display of runs completed or terminated.

Run Details	
<b>Start Date:</b>	Aug 26, 2014 10:52 AM
<b>End Date:</b>	Aug 26, 2014 10:53 AM
<b>Status:</b>	Terminated by system
<b>Oil Type:</b>	Probes
<b>Plate Name:</b>	
<b>Errors:</b>	1
<b># DG8 Used:</b>	0
<b># Tips Used:</b>	0
<b># Sample Columns:</b>	1
<b># Droplet Columns:</b>	0
<b>Plate Notes:</b>	
<b>Instrument Serial #:</b>	773BR1001
<b>Software Version:</b>	1.0.38.0822
<b>Firmware Version:</b>	1.10.38

Aug 26, 2014 10:53:29.842 AM Error 655364  
Please check the Left Pipet Tips and touch OK to continue

Ok

Fig. 29. Run Details screen. The run details are displayed on the left of the screen and the error details on the right. In this case the error was the lid of a pipet tip box being left on when the box was loaded into the instrument.

To export the run log:

1. Touch **Run Log** on the home screen.
2. To access USB port, remove the AutoDG Instrument's side panel to the right of the touch screen. Slide the magnetic panel down to release, then pull it straight out to remove.
3. Insert a USB key into the USB port on the side of the instrument.
4. Touch **Export All** at the bottom left of the screen.
5. Wait while the system exports the run logs to the USB key.
6. When finished, **Run logs successfully exported** will display on the screen. It is now safe to remove the USB key.
7. Replace the side panel.

If the USB key is not connected, the AutoDG Instrument will display **USB key not found. Please insert it and try again.** Insert the USB key and touch **Retry** to proceed.

## 2.6 AutoDG Workflow Tips for Success

### 2.6.1 Sample Preparation

- ddPCR Supermix tube completely and vortex vigorously at maximum speed for 15 sec
- Ensure the supermix concentration is 1x in final reaction
- Prepare sample in low-bind Eppendorf tubes or ddPCR 96-Well Plate (catalog #12001925)
- Use Rainin tips for all sample handling steps
- Ensure pipettor is calibrated according to manufacturing recommendations
- If the sample plate was stored at 4°C, let the sample plate equilibrate to room temperature before initiating the AutoDG run (approximately 10 min)
- Fill up the entire column in ddPCR plate with samples or control buffer

### 2.6.2 Plate Sealing

- Seal a plate with Bio-Rad's PX1 PCR Plate Sealer (catalog #1814000) at 180°C for 5 sec
- Use Pierceable Foil Heat Seal (catalog #1814040)
- Do not seal twice
- Use setting at 180°C for 5 sec
- Do not store block in PX1
- Do not roll the plate after sealing

### 2.6.3 Vortexing Plate

- Vortex entire plate with plate attachment for 15 sec at maximum speed (3200–3500 rpm) to mix sample vigorously and uniformly
- If vortex has only cup head, vortex the ddPCR Plate in at least 6 locations on the plate for 5 seconds at each spot at maximum speed (3200–3500 rpm)

**Note:** Alternate option for mixing: pipet up and down half volume of reaction 20 times per well

### 2.6.4 Centrifuging Plate

- Make sure to seal plate first to avoid contamination or debris in samples
- Centrifuge the plate at 1000 rcf for 1 minute and verify no bubbles on bottom of wells
- If there are bubbles on bottom of wells, flick wells or tap plate and centrifuge again

### 2.6.5 AutoDG Cooking Block

- Ensure cooling block is properly in place and flush in holder with new empty ddPCR Plate pressed firmly into cooling block
- Ensure there is no ice on the outside of the block that would prevent the plate from sitting flat
- Ensure cooling block is cold by ensuring that it does not have liquid sloshing inside

### 2.6.6 Environmental and Other

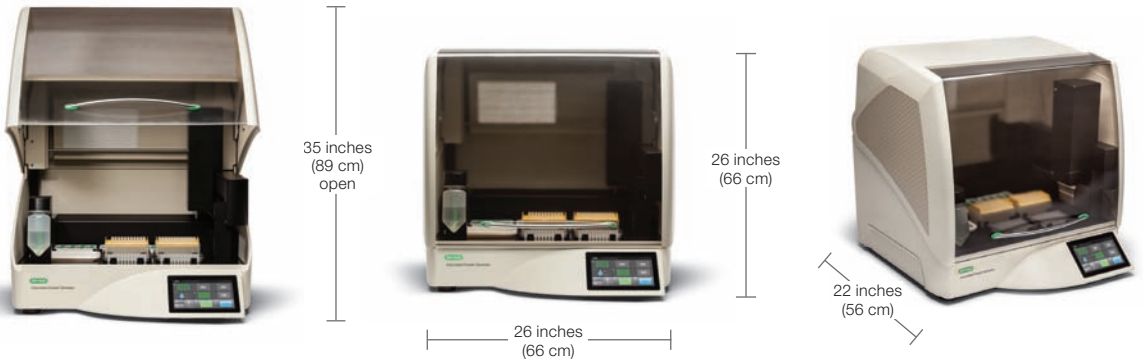
- Operate at room temperature between 18–30°C (ideally 23°C)
- The AutoDG should be located on a level, sturdy bench free from vibration
- When possible, avoid wearing latex gloves and touching the wells in ddPCR plate to avoid static electricity



# 3

## Specifications and Maintenance

### 3.1 Specifications



<b>Weight</b>	100 lb (45.4 kg)
<b>Size (W x D x H)</b>	26 x 22 x 26" (66 x 56 x 66 cm)
<b>Electrical requirements</b>	100–240 V, 50/60 Hz, 90 W; voltage fluctuations not to exceed +10% of ratings (for external power supply provided)
<b>Fuse</b>	4 A, 24 V internal (not user serviceable)
<b>Temperature</b>	18–30°C, optimal range is 23 ± 2°C
<b>Altitude</b>	0–6,500 ft (0–2,000 m), optimal range is 0–500 m
<b>Humidity</b>	50% max (noncondensing)
<b>Pollution degree</b>	2 (indoor use)
<b>Installation category</b>	II (external power supply plugs into standard AC receptacle)
<b>Ventilation requirement</b>	5" (13 cm) left and right of machine and 2" (5 cm) behind should be unobstructed for proper ventilation

## 3.2 Maintenance

### 3.2.1 General Care

Surfaces of the instrument may require general cleaning. Use deionized/distilled water for general wipe down with a slightly dampened cloth. For decontamination, 10% bleach followed by 70% ethanol and/or deionized/distilled water may be used on all surfaces except the door. Do not use acetone or tap water.

Inspect equipment regularly for damaged external components or wiring. Do not use if damaged.

Apply standard MSDS (Material Safety Data Sheet) and OSHA practices when handling and disposing of generated waste.

Bio-Rad droplet generation and reader fluids are based on fluorinated hydrocarbon chemistry and should be disposed of in accordance with institutional, state, and local regulations. These nonflammable fluids are inert and have low environmental impact and low toxicity. Collect waste in a polyethylene container and discard within one month.

Droplets made with Bio-Rad supermix have antimicrobial properties, but microbial growth is possible. The waste profile should contain the following: fluorinated hydrocarbons, water, fluorescent dye (from probes), intercalating dye, protein, and nucleic acids. The droplet generator is not intended to be used with biohazardous material.

Do not replace detachable power cord with an uncertified or an inadequately rated cord.

The Automated Droplet Generator is verified to be functioning to manufacturer specifications upon installation. Yearly preventive maintenance offered by Bio-Rad is recommended to ensure the instrument continues to function according to specifications.

### 3.2.2 Software and Firmware Updates

If Bio-Rad informs you that a new version of software and firmware are available for the Automated Droplet Generator, the upgrade can be performed with a USB key.

1. Remove AutoDG Instrument's side panel to the right of the touch screen. Slide the magnetic panel down to release, then pull straight out to remove the panel.
2. Insert a USB key into the USB port on the side of the instrument.
3. Touch the **Settings** button on the home screen.
4. Scroll down to the Update section of the menu and touch **Update Software and Firmware**.
5. Touch the **Update** button and wait while the system completes the upgrade.
6. When finished, a message will appear indicating it is safe to remove the USB key.
7. Replace the side panel and power cycle the instrument.

### 3.2.3 Cleaning the Oil Purge Reservoir

It is recommended that you clean the oil purge reservoir on a quarterly basis, or more frequently if switching AutoDG Oil chemistries (probe/EvaGreen®) frequently. The oil purge reservoir collects AutoDG Oil during the flush and prime routine; the collected oil is unused and has not come into contact with a ddPCR reaction. To access the oil purge reservoir:

1. Touch **Settings** on the home screen.
2. Under the System Maintenance section of the menu, touch **Remove Oil Purge Reservoir**.

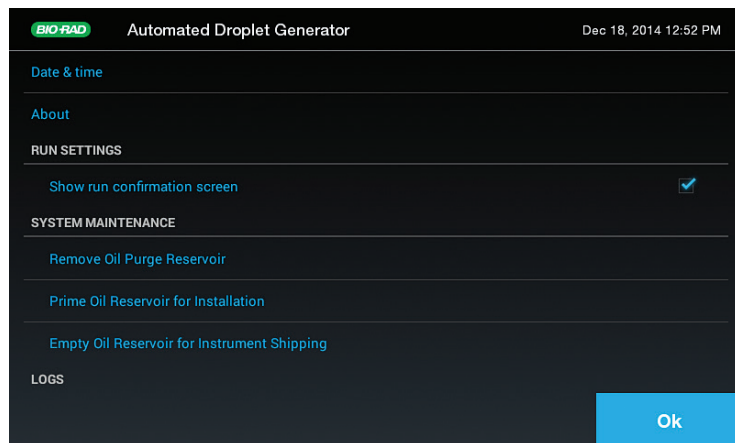


Fig. 30. System Maintenance section of the Settings menu.

3. If the door is open, it will close automatically and a message will appear. Touch **OK** to continue.
4. The droplet generation head of the AutoDG Instrument will slide out of the way, exposing the small oil purge reservoir. The screen will display a **Moving droplet generation head** message while this occurs.
5. Once complete, the onscreen instructions will prompt you to remove, clean, and replace the oil purge reservoir. Open the door and remove the reservoir from the back left corner of the instrument deck. The reservoir is magnetic and can be lifted easily.
6. Wash the oil purge reservoir with distilled water, dry completely, and replace.
7. Touch **OK** to close the door and move the droplet generation head back into place. The **Moving droplet generation head** message will once again be displayed while this occurs.
8. When finished, a complete message will appear, and you can touch **OK** to return to the Settings menu.





# 4

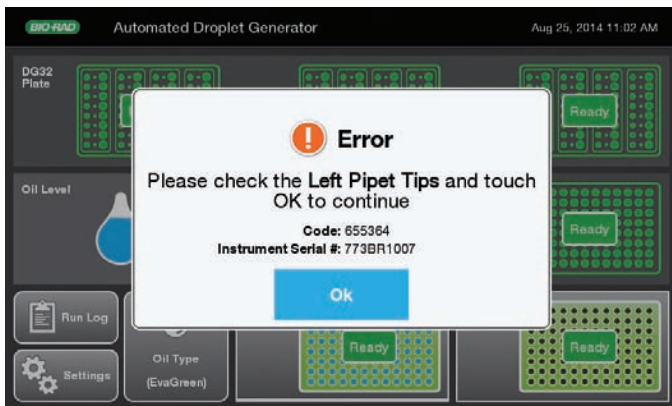
## Automated Droplet Generator Troubleshooting

The Automated Droplet Generator provides onscreen troubleshooting should an error occur. Guidance will be provided as to how to best resolve the error, or the instrument will advise that Bio-Rad Technical Support be contacted.

### 4.1 Restarting a Run after an Error

If the AutoDG Instrument encounters an obstruction during the run, it will stop the run and display an error message with the area of the deck that needs attention.

1. Open the door and remove the obstruction and/or replace the consumable indicated in the onscreen error message.
2. Close the door and touch **OK** on the error display.
3. Touch the **Configure Sample Plate** icon on the home screen; the AutoDG Instrument remembers the status of all consumables so long as it remains connected to a power supply.
4. On the screen, select the columns of samples remaining to be processed and touch **OK**.
5. Touch the **Start Droplet Generation** icon to resume the run.

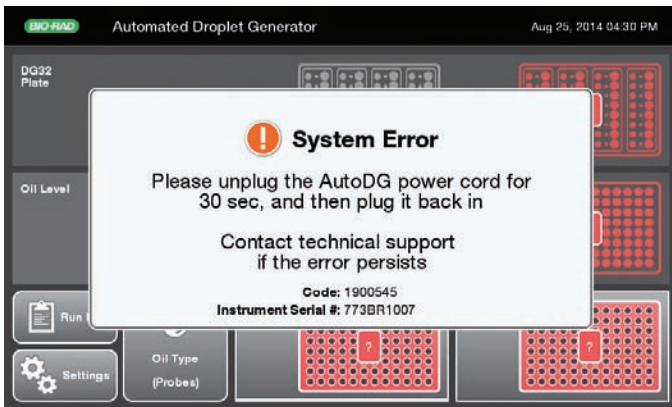


**Fig. 31. Example of an error message.** The run stops and an error message indicating the position and nature of the error displays on the touch screen. In this case the lid was left on the left-hand box of pipet tips when the box was loaded into the instrument.

## 4.2 Restarting a Run after a System Error

If the AutoDG Instrument encounters a system error during the run, it will stop the run and display an error message requiring power cycling.

1. Unplug the AutoDG Instrument from the power supply.
2. Wait 30 sec and plug it back in.
3. The AutoDG Instrument will not be able to recall the status of all consumables and will require manual confirmation (see Section 2.1).



**Fig. 32. Example of System Error message.** The run stops and power to the instrument must be cycled off and on.

4. Reset the unused consumables and touch **Configure Sample Plate** on the home screen.
5. Select the columns of samples remaining to be processed on the screen and touch **OK**.
6. Touch the **Start Droplet Generation** icon to restart the run.

## 4.3 Exporting Logs for Technical Support

In the event of a system error that cannot be resolved, please contact Bio-Rad Technical Support as indicated on the touch screen. The error number and serial number of your AutoDG Instrument are provided on the screen; please provide these to the technical support representative.

You will also be asked to export and submit the history and run logs for the Automated Droplet Generator. Please note that no sample data are transferred in this process, just the run log of the instrument. To export both history and run logs together:

1. Remove the AutoDG Instrument's side panel to the right of the touch screen. Slide the magnetic panel down to release, then pull straight out to remove the panel.
2. Insert a USB key into the USB port on the side of the instrument.
3. Touch **Settings** on the home screen. *Do not* select **Run Log** (Figure 33).
4. Scroll down to the **Logs** section of the menu.
5. Touch **Export all logs** at the bottom of the screen (Figure 34).
6. Please wait while the system exports the instrument logs to the USB key.
7. When finished, a **Data successfully exported** message will be displayed on the screen indicating it is now safe to remove the USB key.
8. Replace the side panel.

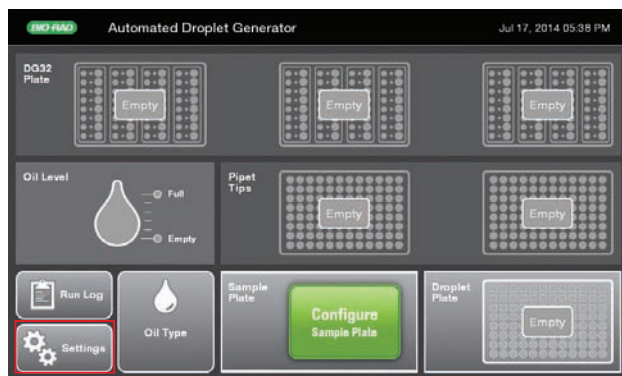


Fig. 33. Settings button on the home screen.

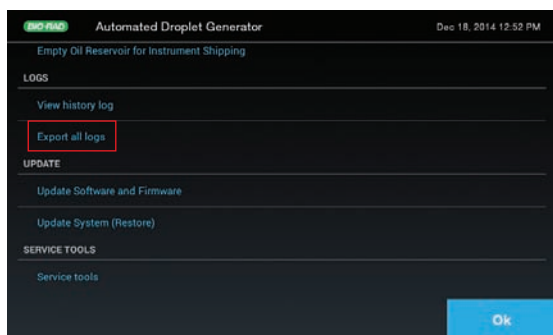


Fig. 34. Logs section of the Settings menu.

## 4.4 Additional Troubleshooting

Use the following table to help you troubleshoot issues with your AutoDG Instrument. If you have additional questions or if the recommended action does not resolve the problem, please contact Bio-Rad Technical Support.

**Table 4. Additional troubleshooting for the AutoDG Instrument.**

Issue	Possible Causes	Action
No screen display No response when you power on the instrument	Not connected to power source	Check power cord is securely connected
Screen display is missing characters, illegible, or not responsive to touch	LCD screen failure	Request service
Door won't open or is hard to open	Instrument is running Instrument is disconnected from a power supply	Wait for droplet generation to complete or touch <b>Abort</b> to terminate the run early. Once movement inside the instrument has stopped, the door will unlock and can be opened easily Connect the instrument to a power supply and wait for initialization to complete; the door will unlock and can be opened easily
Light under a consumable stays yellow	Consumable is not inserted all of the way or is in the incorrect orientation	Try positioning the consumable in a different orientation
Oil Level icon turns red	AutoDG Oil bottle contains less than a full plate's worth of oil and will require additional oil to complete the next run	Be prepared to insert a new bottle of oil during the setup process for the next plate

# Ordering Information

## QX200 AutoDG ddPCR System

Catalog #	Description
1864100	<b>QX200 AutoDG Droplet Digital PCR System</b> , includes Automated Droplet Generator, QX200 Droplet Reader, laptop computer, QuantaSoft Software
1864101	<b>Automated Droplet Generator</b> , includes Automated Droplet Generator, power cord, and accessories
1864003	<b>QX200 Droplet Reader</b> , includes droplet reader, ddPCR manual, plate holders, USB cable, power cord

## Consumables and Accessories for AutoDG

Catalog #	Description
1864108	<b>DG32 Automated Droplet Generator Cartridges</b> , 1 pkg of 30, enough for 10 x 96-well ddPCR plates
1864109	<b>DG32 Automated Droplet Generator Cartridges</b> , 1 pkg of 60, enough for 20 x 96-well ddPCR plates
1864110	<b>Automated Droplet Generation Oil for Probes</b> , 140 ml, enough for 20 x 96-well ddPCR plates
1864112	<b>Automated Droplet Generation Oil for EvaGreen®</b> , 140 ml, enough for 20 x 96-well ddPCR plates
1864120	<b>Pipet Tips for AutoDG System</b> , 1 pkg of 20, enough for 10 x 96-well ddPCR plates
1864121	<b>Pipet Tips for AutoDG System</b> , 1 pkg of 40, enough for 20 x 96-well ddPCR plates
1864125	<b>Pipet Tip Waste Bins for AutoDG System</b> , 1 pkg of 10, enough for 10 x 96-well ddPCR plates
1863004	<b>ddPCR Droplet Reader Oil</b> , 2 L (2 x 1 L)
12001925	<b>ddPCR 96-Well Plates</b> , 1 pkg of 25

## ddPCR Reagents

Catalog #	Description
1863023	<b>ddPCR Supermix for Probes (No dUTP)</b> , 2 ml (2 x 1 ml), 2x supermix
1863024	<b>ddPCR Supermix for Probes (No dUTP)</b> , 5 ml (5 x 1 ml), 2x supermix
1863025	<b>ddPCR Supermix for Probes (No dUTP)</b> , 25 ml (5 x 5 ml), 2x supermix
1863026	<b>ddPCR Supermix for Probes</b> , 2 ml (2 x 1 ml), 2x supermix
1863010	<b>ddPCR Supermix for Probes</b> , 5 ml (5 x 1 ml), 2x supermix

continues

**ddPCR Reagents (continued)**

Catalog #	Description
1863027	<b>ddPCR Supermix for Probes</b> , 25 ml (5 x 5 ml), 2x supermix
1863028	<b>ddPCR Supermix for Probes</b> , 50 ml (10 x 5 ml), 2x supermix
1864033	<b>QX200 ddPCR EvaGreen® Supermix</b> , 2 ml (2 x 1 ml), 2x supermix
1864034	<b>QX200 ddPCR EvaGreen® Supermix</b> , 5 ml (5 x 1 ml), 2x supermix
1864035	<b>QX200 ddPCR EvaGreen® Supermix</b> , 25 ml (5 x 5 ml), 2x supermix
1864036	<b>QX200 ddPCR EvaGreen® Supermix</b> , 50 ml (10 x 5 ml), 2x supermix
1864037	<b>ddPCR Supermix for Residual DNA Quantification</b> , 2 ml (2 x 1 ml), 2x supermix
1864038	<b>ddPCR Supermix for Residual DNA Quantification</b> , 5 ml (5 x 1 ml), 2x supermix
1864039	<b>ddPCR Supermix for Residual DNA Quantification</b> , 25 ml (5 x 5 ml), 2x supermix
1864040	<b>ddPCR Supermix for Residual DNA Quantification</b> , 50 ml (10 x 5 ml), 2x supermix
1864021	<b>One-Step RT-ddPCR Advanced Kit for Probes</b> , 2 ml (2 x 0.5 ml), 2x supermix
1864022	<b>One-Step RT-ddPCR Advanced Kit for Probes</b> , 5 ml (5 x 0.5 ml), 2x supermix
1863052	<b>ddPCR Buffer Control for Probes</b> , 9 ml (2 x 4.5 ml), 2x buffer
1864052	<b>QX200 Buffer Control for EvaGreen®</b> , 9 ml (2 x 4.5 ml), 2x buffer

**Thermal Cyclers and Plate Sealer**

Catalog #	Description
1851196	<b>C1000 Touch Thermal Cycler with 96-Well Fast Reaction Module</b> , includes C1000 Touch Thermal Cycler chassis, 96-well reaction module, USB flash drive
1851197	<b>C1000 Touch Thermal Cycler with 96-Deep Well Fast Reaction Module</b> , includes C1000 Touch Thermal Cycler chassis, 96-deep well reaction module, USB flash drive
1814000	<b>PX1 Plate Sealer</b> , includes heat sealing instrument, plate support block that holds 96-well and 384-well plates, sealing frame, power cord
1814040	<b>Pierceable Foil Heat Seal</b> , pkg of 100





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