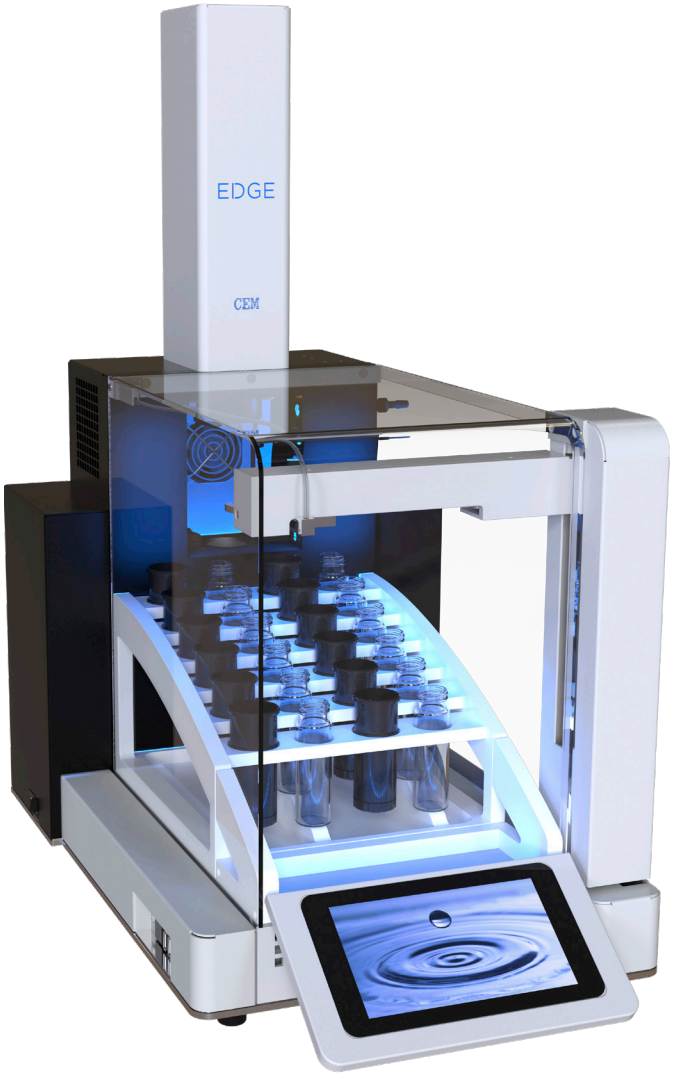
EDGE

Energized Dispersive Guided Extraction

Manual



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Contents

Safety

Safety Notations

This manual uses three safety alert words at points in the documentation where the user should be aware of potential hazards. The safety alerts are shown in color-coded boxes. The three words – NOTE, CAUTION, and WARNING – indicate differing levels of observation or action as described below:

NOTE
A **NOTE** is intended to provide emphasis on procedures that may be misinterpreted or overlooked, or to clarify confusing situations.

CAUTION
A **CAUTION** is intended to provide essential information and to emphasize procedures that, if not strictly followed, may result in improper instrument operation.

WARNING
A **WARNING** is intended to emphasize dangerous or hazardous conditions that may result in personal injury to the user and/or damage or destruction of the instrument.

PINCH POINT
A PINCH POINT is intended to keep hands clear during operation and if not avoided, could result in injury.

HOT
Surface is hot to the touch.

Introduction

About the Instrument

The EDGE® is the most advanced automated solvent extraction system available. By combining pressurized fluid extraction and dispersive solid phase extraction, the EDGE is able to drastically reduce sample preparation time and the potential for human error. The result is fast, simple, and efficient extractions.

This manual is intended for use by both novice and experienced users for the operation and maintenance of the EDGE automated extraction system. Additional information, including but not limited to: training notes and videos, application notes, software updates, and parts can be viewed on CEM's website at http://cem.com/edge.

This manual refers to EDGE software version 1.19 for all software information, including screenshots and technical information.

This Manual should be used in conjunction with the EDGE Site Prep Guide (P/N FM0067) and EDGE Packing Guide (P/N 600940.) Read and fully understand all documentation before operating the instrument.

Important Safeguards

General guidelines for safe operation of the EDGE system are presented below and all specific safety messages are located throughout the manual.

Proper precautions must be taken to avoid contact with reagents or reagent vapors. Protective gear should be worn as outlined in the user's safety program for hazardous materials and the reagent manufacturer's safety data sheet. Refer to these guidelines for proper handling and disposal of the reagents. Dispose of all waste in accordance with all applicable local, state, and federal health and safety recommendations.

Instrument Safeguards

- Service can only be performed by an authorized CEM service technician. The system must be disconnected from power supply prior to servicing.
- Do not tamper with the EDGE, including actions such as removing any components of the housing or manually trying to move the automation components.
- The exhaust hose must be connected and draw at least 30.5 CFM at the point of connection at all times as it is essential for removing harmful gases away from the EDGE instrument. Vapors should be vented into a fume hood by means of the exhaust hose only.
- NEVER place hands or any object into the automation area from the time "Start" is selected until the system is idle.
- Never place hands or objects in the actuator (vessel chamber) area unless instructed to do so.
- Only load or unload rack when the EDGE is in the idle state or when instructed to do so.
- If any damage to the instrument is noted, do not attempt instrument operation.
- Vessel Chamber area may be hot.
- Use only CEM specified consumables and accessories.

Sample Preparation Safeguards

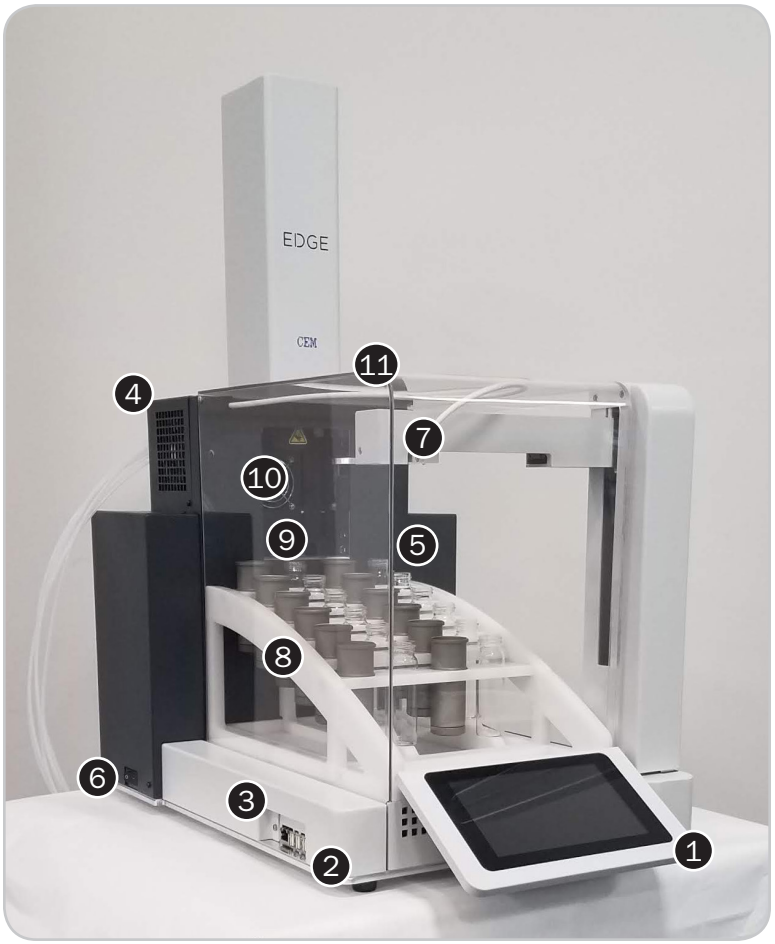
- Q-Cups® and Q-Discs® must be purchased directly from CEM Corporation or through its authorized dealer network.
- Proper precautions must be taken to avoid contact with reagents or reagent vapors. Protective gear should be worn as outlined in the user's safety program for hazardous materials and the reagent manufacturer's safety data sheet. Refer to these guidelines for proper handling and disposal of the reagents.
- Do not fill sample above the outer band of the Q-Cup
- For plastic samples, always stay below the melting point.
- The EDGE is not compatible with any strong acids or bases.

Heating Safeguards

- Ensure that the pressure of the solvent at the maximum set temperature is less than 200 psi.
- The system "Preheat" can be turned on/off in settings.
    - If preheat is off, the EDGE chamber will cool to below the temperature of the next sample in the queue.
    - If preheat is on, the EDGE chamber will heat according to the temperature setpoint of the method. Preheat will not exceed 100 °C
    - CEM does not recommend "Preheat" for heat sensitive analytes.

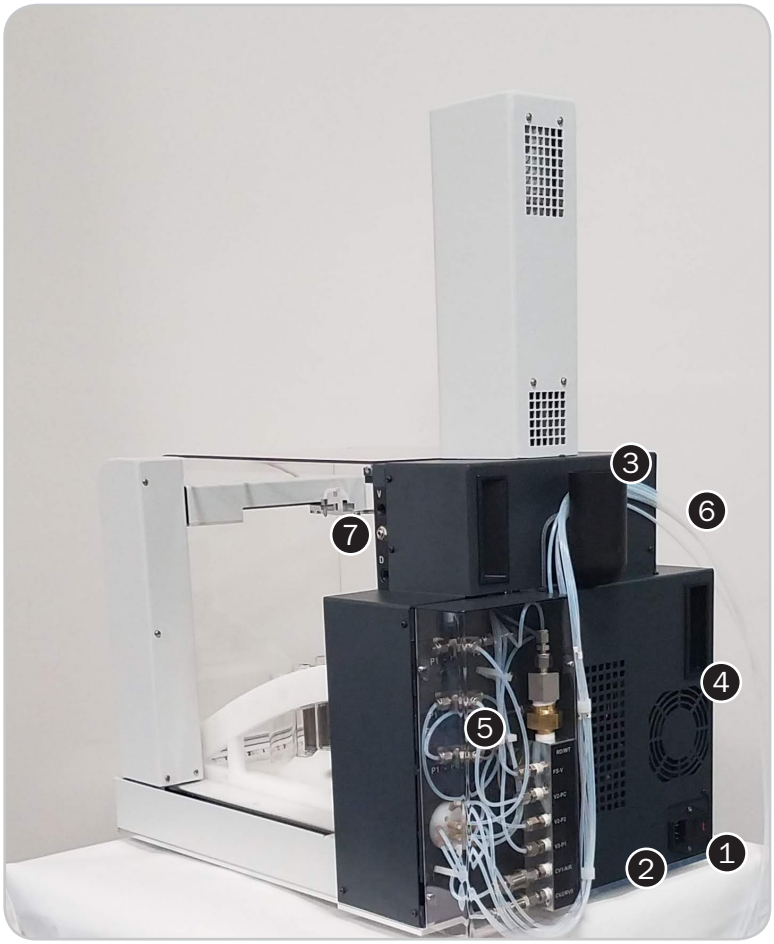
Instrument Overview

Front and Side View



	Item
1	Touch Screen Display
2	USB Ports (3)
3	Ethernet Port
4	Speaker
5	Autosampler Automation area
6	Power Switch
7	Dispense Needle
8	Removable Rack
9	Vessel Chamber
10	Actuator
11	Safety Enclosure

Back and Side View



	Item
1	Fuses/Fuse Holder
2	Power Inlet
3	Exhaust Assembly
4	Cooling Fan
5	Fluidics and Manifold
6	Solvent Lines
7	Waste (Vent, Drain & Sensor)

Software Overview

Software Icons

Icon	Description	Icon	Description	Icon	Description	Icon	Description
	Advanced View		Export		Loop 1		Simple View
	Back		Full Screen		Loop Infinity		System Menu
	CEM Method		Hide Keypad		New		Unload Rack Methods
	Copy		Home		Queue		User Method
	Cursor		Import		Revert		Volume High
	Delete		Information		Run		Volume Mute
	Edit		Load Rack Methods		Save		
	Exit Full Screen		Loading		Search		

Home Screen

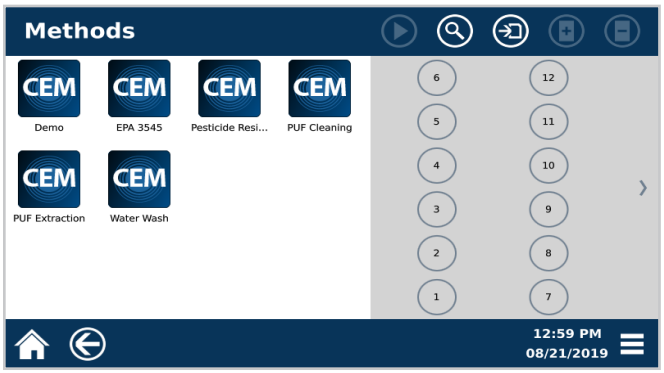
The Home screen is the first screen that appears when the system is turned on. Three areas are accessible from this screen: One Touch® Methods, User Methods, and System Menu.

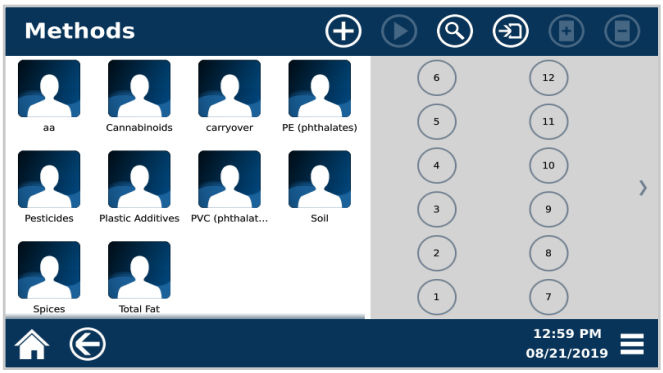
- One Touch Methods are methods created and optimized by CEM for a variety of sample types in an effort to reduce method development time required of user. These methods cannot be edited, but they can be copied into the User Methods area, where the parameters can be edited.
- User Methods are created by the user and can be edited at any time. These methods are typically for users with unique or specialized products that do not obtain optimal results using a One Touch Method. User Methods can be imported from another instrument.
- The System Menu icon provides access to any functionality that does not directly involve creating or running a method on the EDGE.

> **NOTE**
> A log-in screen may appear if an administrator turns auto-login to “off” in the “Users” -> “Settings” menu.

Methods Screen (One Touch and User)

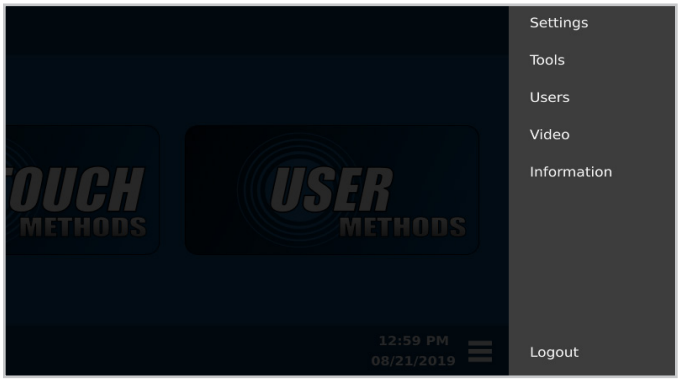
After choosing either the One Touch Methods (left) or User Methods (right), the method library and vial rack configuration will appear. Selecting a method will allow you to either select a position to begin running your samples or additional options, which are detailed in this manual.





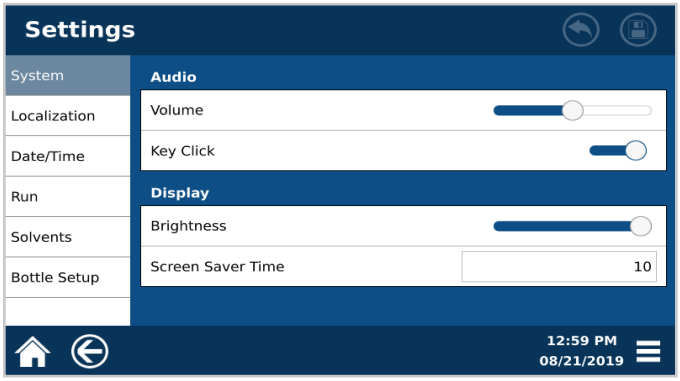
System Menu

The following is a basic review of each section of the System Menu to be used as a quick guide for locating software items and instrument functions.



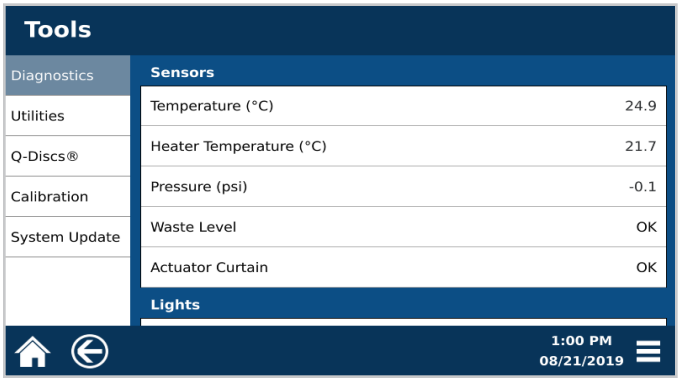
- Settings: Adjustable system settings necessary prior to running samples
- Tools: Calibration and Diagnostic tools to ensure proper system functionality
- Users: Location for creating and deleting different user accounts, as well as reviewing user logs if necessary
- Video: Videos for ensuring proper system handling and usage
- Information: System information including serial number, software version, contact information, etc.

Settings



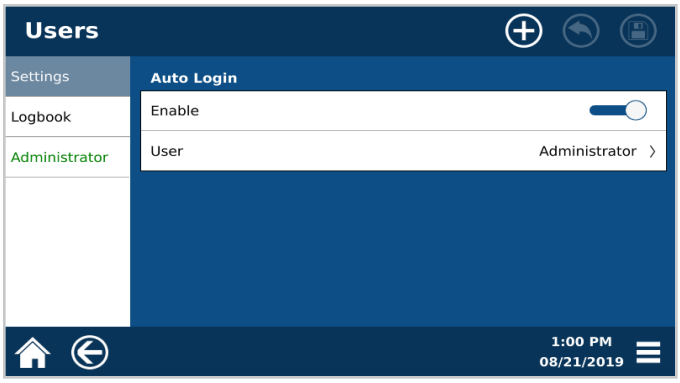
- System: Instrument settings for the audio and visual selections for the individual user
- Localization: Regional adjustments, including language and the preferred date and time format
- Date/Time: Location for setting the correct date and time
- Run: Adjustments to settings specific to each sample run including: sample ID format, test completion indicators, preheat temperature
- Solvents: List of solvents, where new solvents can be added, changed and deleted
- Bottle Setup: Location for identifying which solvent line corresponds to a particular bottle of solvent

Tools



- Diagnostics: A listing of real-time readings for many of the sensors and parts directly related to unit functionality, the option to manually maneuver the actuator, fan, pump and autosampler and turn lights ON/OFF
- Utilities: Functionality to ensure system is operating properly and to prepare the system for shipping
- Q-Discs: View Q-Disc availability and add Q-Discs by barcode scanner or manually
- Calibration: Calibration of the temperature, pressure, or autosampler
- System Update: Used for updating software when a new version is released

Users

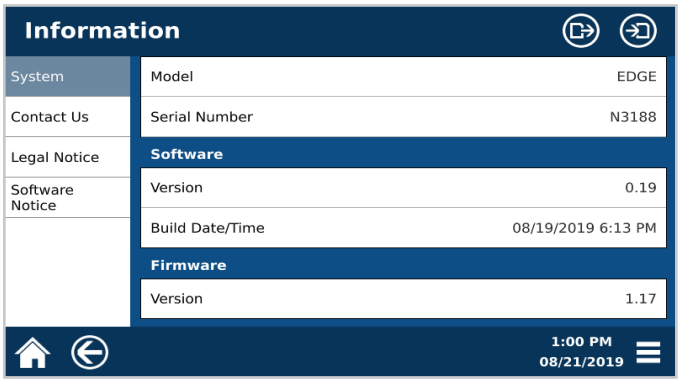


- Settings: Turning ON/OFF auto-login requirements for users
- Logbook: Audit trail for tracking user movement within software, including system and method editing
- Administrator: List of users are located beneath logs

Video

- Videos provide helpful information about the EDGE to ensure proper system handling and usage

Information



- System: Reference for serial number, software and firmware versions, and calibration dates
- Contact Us: Contact for CEM Headquarters and Subsidiaries
- Legal Notice: Legal information concerning the use and distribution of the EDGE and other CEM products
- Software Notice: System notification pertaining to the software currently loaded on the system

System Installation

Unboxing

1. Carefully inspect the shipping carton, the instrument and accessories for any damage that may have occurred during shipping. If the instrument or accessories have damage, contact the freight carrier to report the damage and file a damage report. Contact the CEM Service Department (inside the US 1-800-226-5228) or the nearest subsidiary or distributor (listed on www.cem.com/contact.html) to request service information.

> **⚠ WARNING**
> If any damage to the instrument is noted, do not attempt instrument operation.

2. Refer to the Packaging guide (P/N 600940) for detailed instructions on unboxing the EDGE.

System Setup

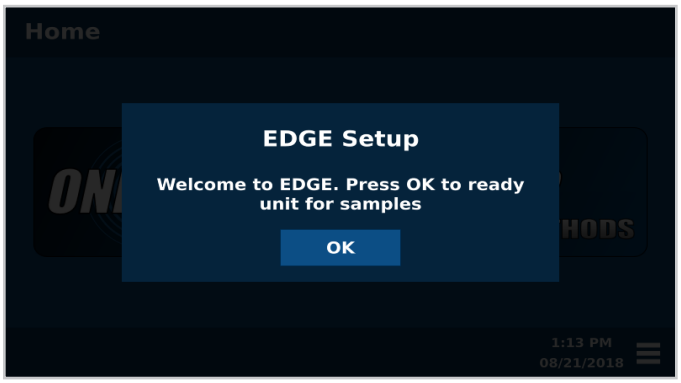
1. Attach the exhaust tubing to the exhaust output located on the rear of the system. The exhaust tubing is supplied in the EDGE accessory kit. The fume hood or exhaust line must draw at least 30.5 CFM at the point of connection and be no further than 10 foot away.


> **⚠ WARNING**
> The exhaust hose must be connected and draw at least 30.5 CFM at the point of connection at all times as it is essential for removing hazardous fumes and vapors away from the EDGE instrument. Vapors should be vented into a fume hood by means of the exhaust hose only.

> **ⓘ NOTE**
> An outside gas source is not required to setup or run the EDGE.

2. Plug the power cord into the instrument and the dedicated electrical receptacle. The instrument is supplied with a power cord, but an adequately rated power cord may be used.
3. Position the EDGE so there is open space to access the power switch and the racks can be easily loaded.

4. Install the barcode scanner.
    4.1. Open the box containing the barcode scanner.
    4.2. Locate the barcode USB key and insert it into the USB slot on the left side of the EDGE.
5. Locate the power switch on the left side of the instrument, and position it in the ON position.
6. When the system is first powered on during the install, a welcome message will appear. Follow the prompts in the software to complete EDGE Setup.



CAUTION

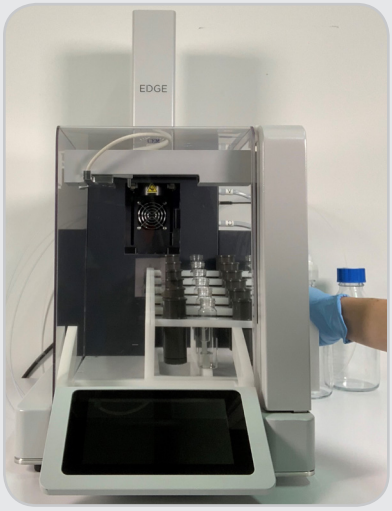
Remove both brackets as shown on the software screen with a screwdriver. Insert screws into the EDGE once finished and store brackets with packaging. The brackets will be needed if the EDGE needs to be shipped/transferred.

7. Attach the bottles.
    7.1. Attach the white bottle cap with waste sensor to the EDGE. Note the labels on the tubing extending from the waste cap and connect to the appropriate positions on the EDGE system: V= Vent, D=Dispense, and Black cord supplies power.
    7.2. Attach waste bottle.


    7.3. Add solvent to the appropriate bottles. Up to 6 bottle positions can be used.
    7.4. Secure the blue bottle caps (GL45) onto the solvent bottles.
    7.5. Thread the solvent tubing attached to the EDGE through the appropriate solvent bottle cap. Ensure tubing reaches the bottom of the solvent bottle.

NOTE

The solvent lines are labeled 1-6. Be aware of which solvent line is in which solvent, as this information will be used in “Bottle Setup and Configuration.”



WARNING

Do not tamper with the EDGE, including but not limited to removing any components of the housing or manually trying to move the automation components.

8. If the System Recovery screen appears, follow the prompts in the software.
   - Ensure that the autosampler is in a safe position. An example of an unsafe location would be if the fork is in a compromised position where it will crash into something if the autosampler attempts to move home. If this is the scenario, use the arrows to move the autosampler to a safe location before selecting “OK”.

CAUTION

Use caution when manually controlling the X, Y, and Z Controls. There are three distances for the autosampler. If you need to move the autosampler a short distance, select Ultra-fine. If you need to move it a moderate distance, select Fine, and select Coarse if you need to move a large distance. You can hold

down the arrows for constant movement. There are three coordinates: X moves the autosampler from left to right, Y moves the autosampler forward and back, and Z moves the autosampler up and down.

⚠ WARNING

NEVER place hands or any object into the area containing the rack while the EDGE is running a method or while the autosampler is in motion. Only load or unload rack when the EDGE is in the idle state.

NOTE

In order for the system to empty the syringe, the waste bottle and sensor must be connected.

9. Once “EDGE Setup” is complete and the autosampler is home, insert the rack.

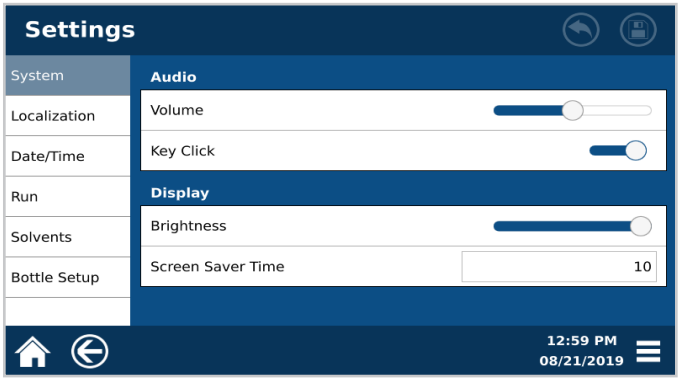
9.1. From the right side of the EDGE, slide the rack into place. The rack is in the proper positions once the magnets hold it securely in place.

10. Customize System settings.

10.1. Select the System Menu icon in the bottom right corner of the screen.

10.2. Select Settings.

10.3. Select the Localization tab.



10.4. If English is not the preferred language, select Language to scroll through, and select the applicable system language.

NOTE

If the language is changed, the EDGE will reboot once the Save icon is selected.

10.5. Select Date Format to enter the desired format for displaying the date (MM/DD/YYYY, DD/MM/YYYY, or YYYY/MM/DD).

10.6. Select Time Format to enter the desired format for displaying the time (12 Hour or 24 Hour).

10.7. Select the Date/Time tab, and set the correct Date and Time.

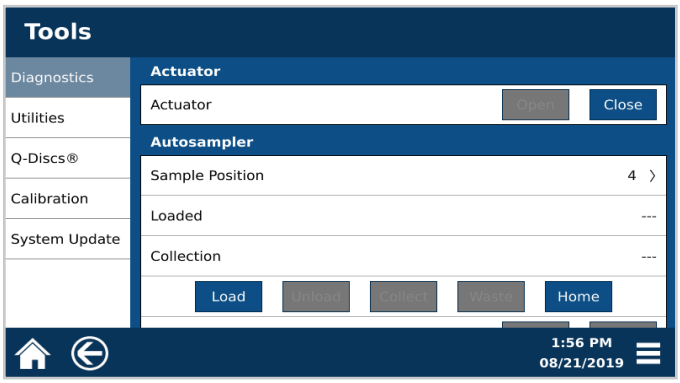
10.8. Additional System Settings can be adjusted at this time.

11. Verify Autosampler Calibration.

11.1. Select the System Menu icon in the bottom right corner of the screen.

11.2. Select Tools.

11.3. Scroll down to the bottom of the page to the Autosampler section.



CAUTION

When verifying the autosampler calibration, always select “Load,” “Collect,” and “Unload” in that order without skipping a function.

11.4. Place an assembled Q-Cup and collection vial/tube in position 4 of the rack. Remove the cap from the vial/tube before placing in autosampler.

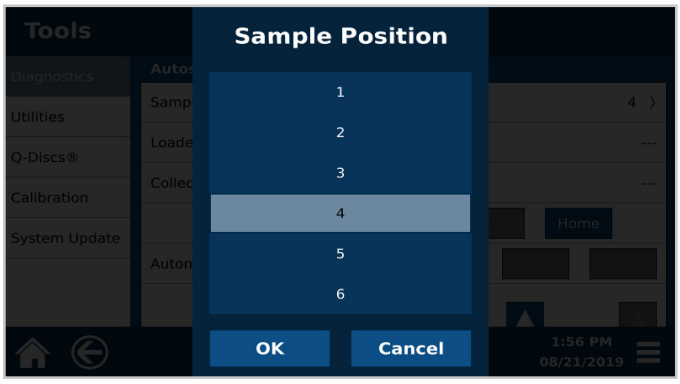
CAUTION

Remove cap from the vial/tube to prevent autosampler obstructions and to allow extract collection.

NOTE

Position 4 is used to verify the calibration. Moving the Q-Cup to and from this location requires the most distance traveled for all axes and is therefore the best test for the calibration.

11.5. Select “1” from Sample Position to display the sample position menu.



11.6. Select position “4” and then “OK.”

11.7. Select “Load.” The autosampler will load the Q-Cup into the vessel chamber.

NOTE

Pay attention to the Q-Cup during this time; the loading process should be smooth.

11.8. Select “Collect.” The dispense needle on the autosampler will move from the chamber to the collection vial in position 4 of the rack.

11.9. Select “Unload.” The autosampler will unload the Q-Cup from the vessel chamber and place it back into position 4 of the rack.

NOTE

If the autosampler crashes at any point during the verification, the autosampler will need to be calibrated. Please see “Autosampler Calibration.”

12. Verify the Waste Calibration.

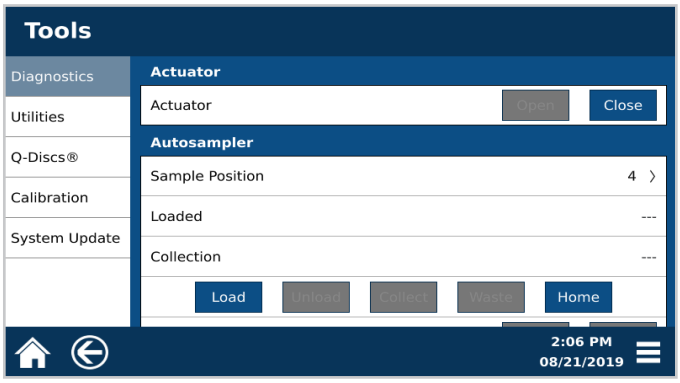
WARNING

Never place hands into the vessel chamber area when the EDGE is in use or powered on.

12.1. Select the System Menu icon in the bottom right corner of the screen.

12.2. Select Tools.

12.3. Select the Diagnostics tab and view the “Actuator” section.

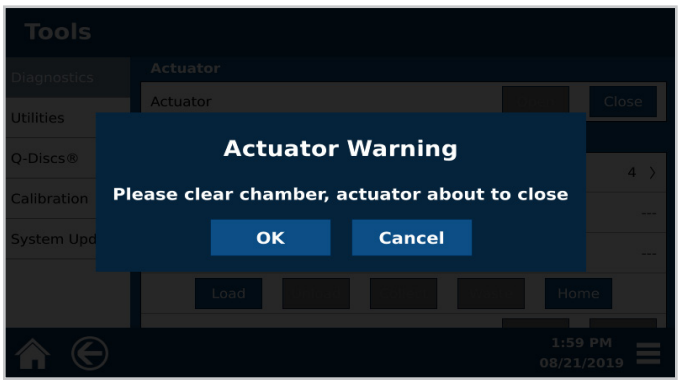


12.4. Select “Close.”

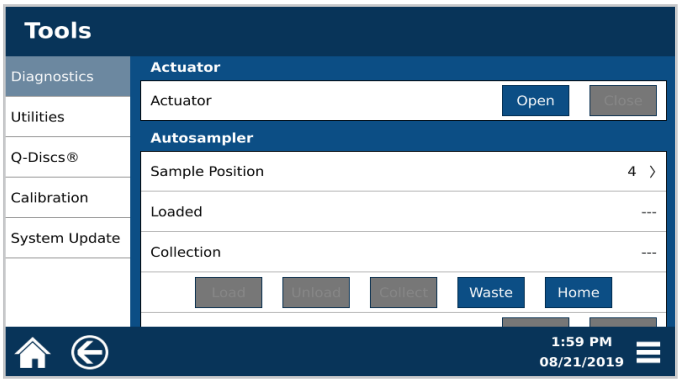
CAUTION

Do not leave the actuator in the closed position for longer than one hour.

12.5. A warning will appear. Select “OK” once chamber is clear.



12.6. Scroll down to the Autosampler section. Select “Waste.” The autosampler dispense needle will travel to the waste position. Observe the movement of the autosampler at this time. The dispense needle should glide smoothly in to the waste port. If movement is not smooth the waste position will need to be calibrated.



12.7. Select “Home.” The autosampler will travel to the home position.

12.8. Scroll upward to the Actuator section.

12.9. Select “Open.”

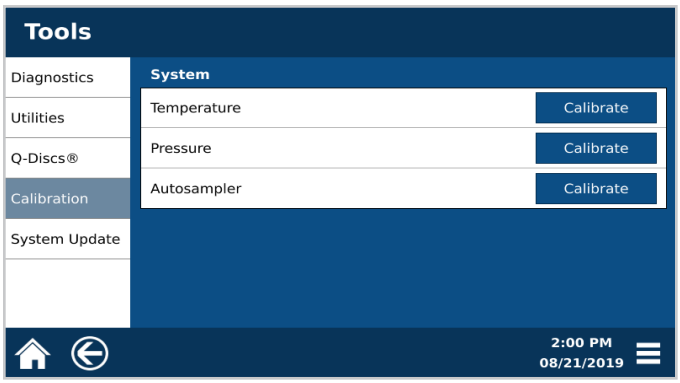
12.10. If the autosampler crashes at any point during the verification, the autosampler will need to be calibrated. Please see Calibrations section of this manual.

13. Calibrate Pressure.

13.1. Select the System Menu icon ☰ in the bottom right corner of the screen.

13.2. Select Tools.

13.3. Select Calibration.



13.4. Select Pressure “Calibrate.” This will take less than a minute.

13.5. Select “OK.”

14. System Setup is complete.

Sample Analysis

Sample Preparation

1. Add a Q-Disc to a clean Q-Cup.

   1.1. Remove bottom of Q-Cup by unscrewing.
   1.2. Place Q-Disc into bottom piece of Q-Cup.
   1.3. Place top piece of Q-Cup onto bottom piece and twist together until finger tight.
2. Weigh any sorbents, if needed for inline sample drying or cleanup, into Q-Cup.

> **NOTE**
> Do not add wet sample directly to the Q-Disc, make sure sorbent/drying agent is placed first.

3. Weigh sample into Q-Cup. The maximum sample size should be below the outer band of the Q-Cup that sits on the rack. Suggested sample weights are listed below.

Sample Weight	Maximum (g)
Food, Plant, and Animal Tissue	5
Oil and Plastic	2
Environmental and Regulatory	30
Peptides	<1
Miscellaneous	5

> **NOTE**
> The Q-Cup can only handle solid and semi-solid samples up to 30 grams, no liquids can be used. To determine if the sample will fit in the Q-Cup, add sample to a graduated cylinder; the Q-Cup can hold 50 mL. If the sample is above 50 mL, it will not fit in the Q-Cup.
>
> Mix dry samples with sand to disperse sample for better draining.

> **CAUTION**
> Overfilling may cause clogging, as it allows excess pressure to develop. DO NOT fill sample above the outer band of the Q-Cup.

4. Prepare up to 12 samples per rack to be run in series.

Prepare the EDGE

1. Load Q-Cups and collection containers on rack. The software will detect if a Q-Cup is not in place but cannot detect if the collection containers are missing.

- Glass vials or Centrifuge tubes may be used for the collection containers but must be accompanied by the appropriate rack
  - Centrifuge Tube Rack
  - Glass Vial Rack
- Up to 24 methods (2 racks of samples) can be loaded at a time

> **CAUTION**
> Remove the cap(s) from the vial(s)/tube(s) to prevent autosampler obstructions and to allow extract collection.

2. Place rack on the EDGE platform and slide into position until magnets lock.
3. Verify solvent bottle positions. See “Assign Solvent Bottle Positions” section for more details.
4. Ensure there is enough solvent in the solvent bottles.
5. Ensure there is enough room in the waste bottle.
6. Verify Q-Disc codes in software to determine if runs are available. See “Q-Discs” for detailed instructions.

Load Method

1. Load Methods.
   - To Load a single method in a position: Select desired method and then select the position on the rack. Continue selecting methods and rack positions.

NOTE

A specific method can be assigned to each sample. Up to 12 methods can be run per rack. The system will run the samples in numerical order, not in the order in which they were selected.

NOTE

A two cycle method with a total solvent volume greater than 40 mL will populate into two positions. You will need to prepare one Q-Cup and two collection vials. The two collection vials must be placed on the rack sequentially as shown in the image below. Do not place a Q-Cup in the second position.

- To populate all positions with a single method: Select desired method followed by the Load Rack icon in the top right corner of the screen. Select the right arrow to the right of the rack. Notice that all 24 samples have been selected.

2. Load methods for up to a batch size of 24 samples.

NOTE

The “Batch Size” can be assigned as 12 or 24 in the software. The batch size can be changed in the following location: Settings > Run > “Batch Size. A batch size of 24 will require 2 racks.

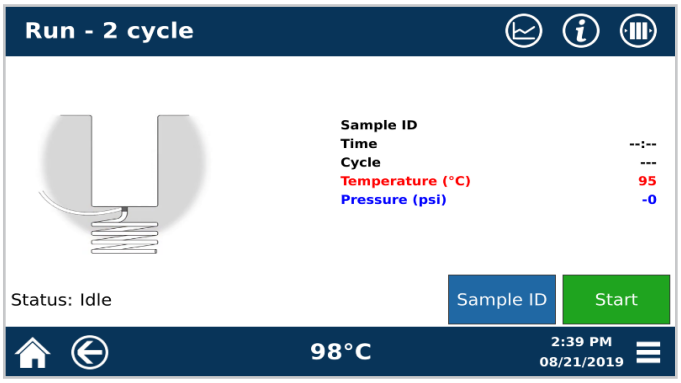
3. The chamber temperature will appear in the lower portion of the screen if the temperature is greater than 50 °C. The Preheat Temperature is the temperature the chamber heats to prior to running each extraction. The Preheat Temperature can be assigned as on/off in the following location: Settings > Run > “Preheat”.

NOTE

If preheat is turned on, the chamber will begin heating once samples are in the queue.

Run Sample

1. Select the Run icon at the top of the screen. If preheat is turned on, the chamber will begin the preheat now.



NOTE
All caps must be removed from collection tubes/vials prior to running samples.

2. Add a Sample ID if desired. The Sample ID for the first method needs to be loaded prior to starting, other Sample IDs can be added after.
   - **2.1.** Select the sample to give a sample ID.
   - **2.2.** Select the position/sample you would like to assign a name to and give the sample a unique name using the keypad.
   - **2.3.** Select “OK.”

NOTE
If a sample ID is not assigned, the sample prefix and number assigned in the database will be used. The Sample ID can be changed in the following location: Settings > Run > “Prefix” and “Number”.

3. Select “Start.” The EDGE will run all samples loaded in numerical order of the sample positions on the rack.

WARNING
The EDGE operates at temperatures and pressures up to 200 °C and 200 psi.

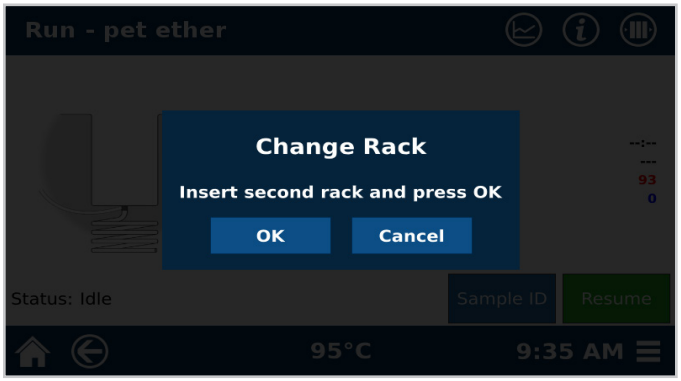
NEVER place hands or any object into the automation area from the time “Start” is selected until the system is idle.

NOTE
To display the temperature and pressure graph, select the Advanced View icon on the top right corner of the screen.

4. During analysis the user can view the sample queue by selecting the Queue icon in the top right corner.
   - Samples that are in the queue are green. Samples in green can be selected to remove from the queue; these samples will no longer run.
   - Samples that have been unselected will turn white. These samples can also be reselected.

- Samples that are running are dark blue.
- Samples that have already run are light blue.

5. If more than one rack is being run, the following message will be displayed once the first rack is finished. Change the rack BEFORE selecting “OK.”



CAUTION

The software will continue running methods in the queue for the second rack once “OK” is selected, even if the second rack was not inserted.

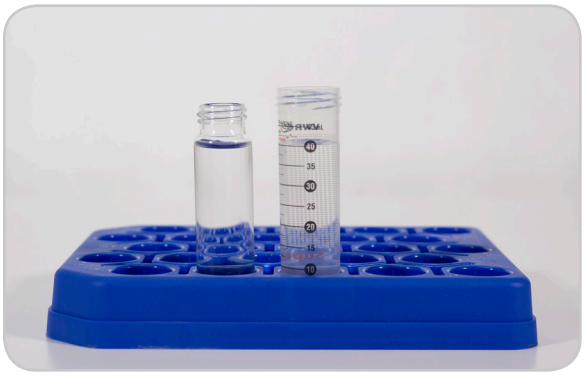
Sample Removal and Cleanup

1. Remove the rack.

WARNING

The Q-Cup(s) may still be hot to touch.

2. Remove collection container from rack. Collected extracts are cooled, filtered, and ready for analysis.



3. Remove Q-Cup from rack and discard Q-Disc and sample.
4. Clean Q-Cups with organic solvent. Optional cleaning procedures are outlined below using LUMINOX or pH-neutral and aluminum-safe cleaner.
   - Hand wash with warm soapy water
   - Sonicator
   - Automated dishwasher

Bottle Setup & Configuration

Solvent Compatibility

The EDGE is compatible with any solvent. Below is a list of some solvents with their characteristics and applications. Note that these are not the only solvents compatible with the EDGE and these are not the only applications that these solvents can be used for. The EDGE can handle a pH range of 4-9. The EDGE is not compatible with strong acids or bases.

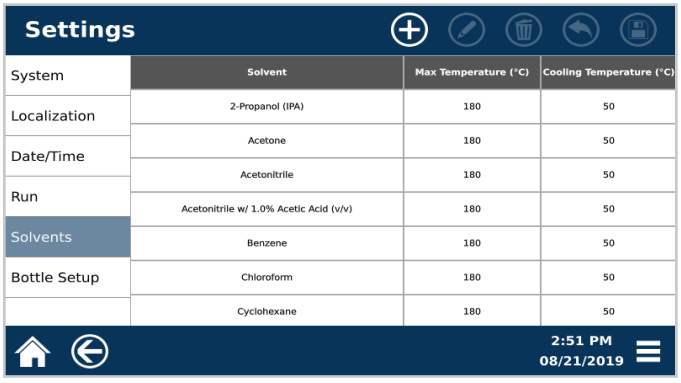
Solvent	Polarity	Boiling Point (°C)	Vapor Pressure (kPA)	Application
Water	Most Polar	100	2.4	Nutraceuticals
Methanol		64.6	16.9	Plastics
Acetonitrile		81.65	9.9	Pesticide Residues
Acetone		56.2	30	Environmental
Dichloromethane		39.8	58	Environmental
Toluene		110.6	3.8	Dioxins
Petroleum Ether		30-60	31	Total Fat
Hexane	Least Polar	69	17.6	Environmental

⚠ WARNING
The EDGE is not compatible with strong acids or bases.

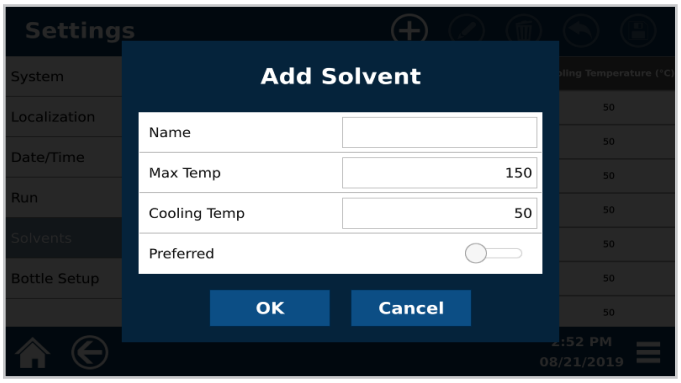
Add Solvent

Each Method will require a solvent for cycle parameters and wash method. The EDGE has 6 bottle positions that solvents cans be assigned to and can be used per method. See section below to add additional solvents or solvent mixtures to the database.

1. Select the System Menu ☰ icon in the bottom right corner of the screen.
2. Select Settings.
3. Select Solvents.



4. Select the New icon ⊕ in the upper right corner of the screen. A pop-up will appear.



5. Enter the solvent parameters: Name, Max Temp, and Cooling Temp.
   - The Max Temp is the maximum temperature a method using the solvent can be set to.

> **WARNING**
> Ensure that the pressure of the solvent at the maximum set temperature is less than 200 psi. If unsure of the Max Temp and Cooling Temp parameters, please contact CEM Corporation.

   - The Cooling Temp is the maximum temperature at which the system will start another run using the solvent.
6. Determine if the solvent is preferred, and toggle the switch to ON or OFF.
   - Only one solvent can be the preferred solvent.
   - When creating a method the preferred solvent will auto-fill but can be changed to another solvent.
   - The preferred solvent will be green in the “Solvent” list.
7. Select “OK.”
8. Select the Save icon.

> **CAUTION**
> The EDGE operates in a sealed environment allowing it to perform at an elevated temperature and pressure. The maximum temperature of the solvent is higher than the boiling point.

Edit Solvent

1. Select the System Menu icon in the bottom right corner of the screen.
2. Select Settings.
3. Select Solvents.
4. Select the solvent to edit.
5. Select the Edit icon at the top right of the screen.
6. Make desired changes to the “Max Temp”, “Cooling Temp”, and whether or not the solvent is “preferred.”
7. Select “OK.”
8. Select the Save icon at the top right of the screen.

Delete Solvent

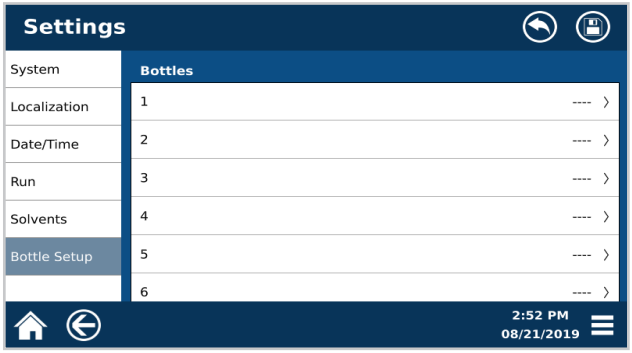
Only solvents created by the user can be deleted.

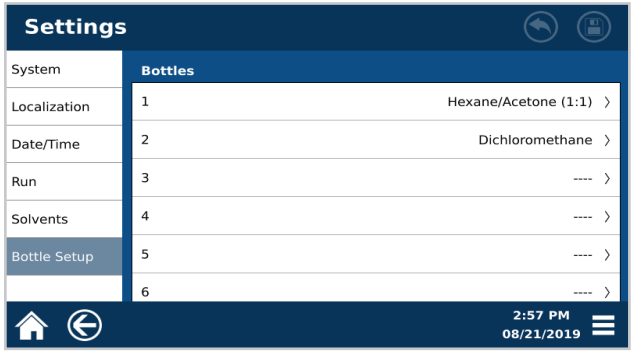
1. Select the System Menu icon in the bottom right corner of the screen.
2. Select Settings.
3. Select Solvents.
4. Select the solvent to delete.
5. Select the Delete icon at the top of the screen.
6. Select “Yes” to delete or “No” to return to previous screen.
7. Select the Save icon at the top of the screen.

Assign Solvent Bottle Positions

Add Solvent or Solvent Mixture to Solvent list before assigning Solvent to Bottle Positions. The option to prime lines will appear once bottle positions have been assigned and changes have been saved.

1. Select System Menu icon in the bottom right corner of the screen.
2. Select Settings.
3. Select Bottle Setup.

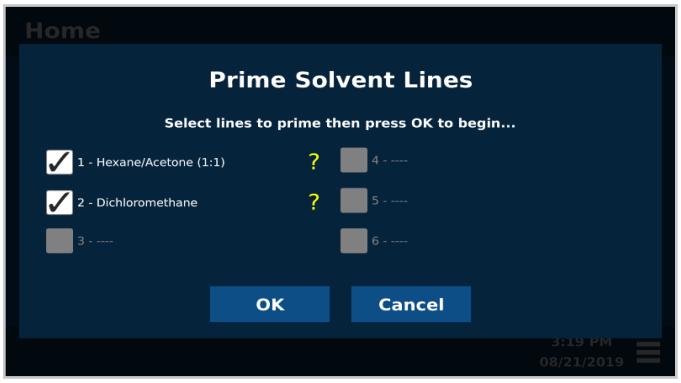




4. Select “–” or the solvent name you wish to replace in a bottle position.
5. Select the solvent to assign it to that bottle position. If the solvent you wish to add is not in the drop-down list, add your solvent or solvent mixture as outlined in the “Add Solvent” section of this manual.
6. Select “OK.”
7. Repeat steps 4-6 until desired positions have been assigned.
8. Select the Save icon at the top of the screen.
9. Upon saving, a prompt will ask you to prime solvent lines. This draws 20 mL of solvent through the lines and empties into the waste bottle to ensure the lines are primed prior to running samples. Select “Yes” to prime the lines.

> **NOTE**
> Waste bottle must be attached before priming solvent lines.

10. Select the lines you would like to prime, and press “OK.” The selected bottle position lines will be primed.



11. Once complete and a green check mark is shown, select “Close.”
12. If a green check mark is not shown, there is a possible leak in the solvent line. Please contact CEM Corporation.

Remove a Solvent from Bottle Setup Position

1. Select System Menu icon in the bottom right corner of the screen.
2. Select Settings.
3. Select Bottle Setup.
4. Select the desired bottle position.
5. Select the solvent to be removed.
6. Select “OK.”
7. Select the Save icon at the top right corner of the screen.

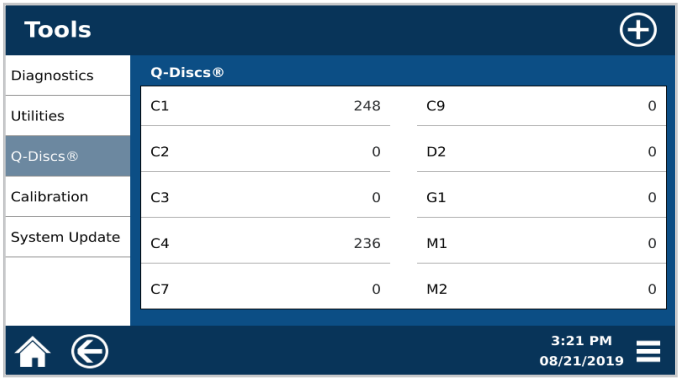
Q-Discs

The Q-Discs are disposable filtration discs that provide final filtration of the extract prior to analysis. The Q-Disc barcode must be added prior to sample analysis. Various types of discs are available for different applications and analysis techniques. Some Q-Discs will require a support Q-Disc, which will have to be added prior to the Q-Disc of choice. If this is not done properly, an error message will pop up to remind you to add the support Q-Discs first.

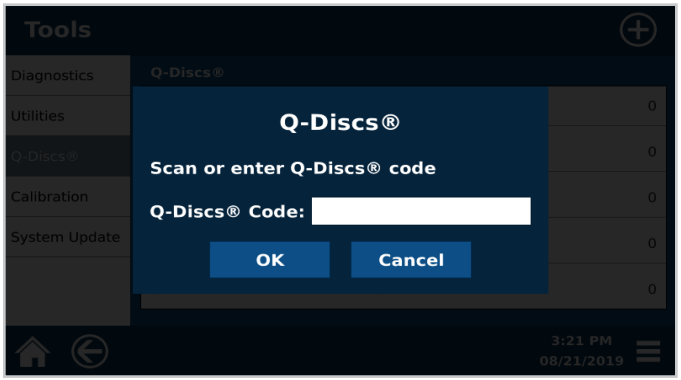
Q-Discs must be purchased directly from CEM Corporation or through its authorized dealer network.

Enter Q-Disc Code

1. Select System Menu icon in the bottom right corner of the screen.
2. Select Tools.
3. Select “Q-Discs.”



4. Select the New icon .
5. Manually type in the barcode on the Q-Disc box or use barcode scanner from the accessory kit.



6. Select “OK” to add the Q-Discs to the database.
   - If a valid code is entered then “successfully added...” will appear and the user will select “OK.”
   - If an invalid code is entered, then try re-entering the code. The Q-Disc codes are case sensitive and contain letters and numbers.

Q-Disc Comparison Guide

Select the appropriate Q-Disc for sample. Suggested sample types are listed below but are not the samples applicable for each Q-Disc.

Analysis Type	Suitable For	Sample Types	Q-Disc	Caution
Gas Chromatography or Gravimetric	Dry samples	Environmental samples including: Solids & PUF filters Total unbound fat food samples Plastics	C1 or C3	Do not use if using water for the extraction solvent
	Wet or dry samples	Wet, oily, or tar-like soil samples Fine powder food samples that do not drain with C1 or C3	C4 or C7	
	Coarse samples (less than 270 mesh	Use for samples that do not drain with the other C line filters	C9	Do not use if using water for the extraction solvent Use as support disc for M2
Liquid Chromatography	Dry samples	Pesticide residue in food applications	M1	Do not use if using water for the extraction solvent Do not use for wet samples
	Wet or dry samples Samples less than or equal to 5 g		M2	Always run with textured side up in Q-Cup Use C9 for support Do not heat above 100 °C Only use with ACN, alcohols, acetone, & H_2O
	Wet samples Samples more than 5 g		G1	Always sandwich with C9 Q-Discs

NOTE
Q-Discs are listed in order of increasing porosity.

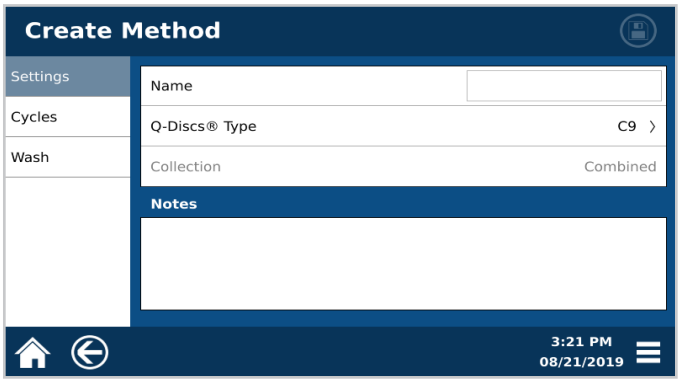
Methods

One Touch Methods are methods created and optimized by CEM for a variety of sample types to reduce the method development time and effort required by the user. These methods cannot be edited, but they can be copied into the User Methods folder, where the parameters can be edited.

User Methods are created by the user and can be edited at any time. These methods are typically for users with unique or specialized products that do not obtain optimal results using a One Touch Method. User methods can be imported and exported from another instrument.

Create Method

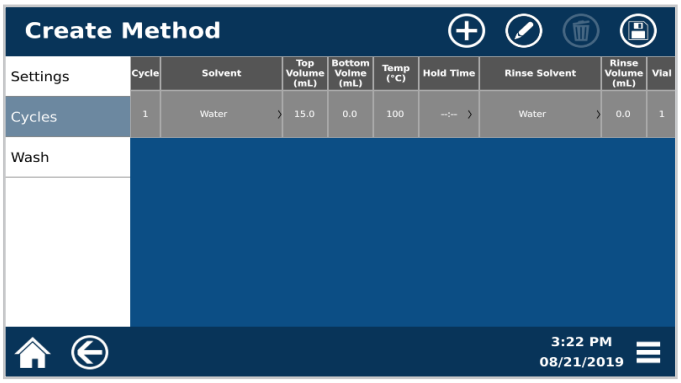
1. Select “User Methods” from the home screen.
2. Select the New icon in the top right corner of the screen.
3. Enter the appropriate “Settings”.



   3.1. Enter a unique method name to easily link the method to the sample type being analyzed.
   3.2. The preferred Q-Disc will auto fill. To change the Q-Disc, select “Q-Discs Type”.

> **NOTE**
> You will only be able to run the method if you have Q-Discs available. If you have not scanned them in yet, do so now.
>
> The preferred Q-Disc can be changed in the software Settings > Run > “Preferred Q-Discs”

   3.3. Enter notes specific to method, such as sample type and sample size.
4. Select the “Cycles” tab and enter the appropriate parameters.



4.1. Select the desired solvent for the cycle and rinse.

NOTE

It is suggested that the extraction solvent and rinse solvents be the same. The selected solvent must be assigned in "Bottle Setup." If you attempt to save a method using a solvent that is not assigned in bottle setup, a "Bottle Setup Missing Solvent" error will display. Refer to the "Bottle Setup & Configuration" section in this manual to properly assign a solvent line.

4.2. Select the solvent volume for Top Volume, Bottom Volume, and Rinse Volume. The maximum volume for one cycle is 40 mL.

EDGE Parameters	Minimum (mL)	Maximum (mL)	Suggested Volume (mL)
Top Volume	0	40	10-20
Bottom Volume	0	10	0-10
Rinse Volume	0	35	5-10
Total Volume Per Cycle	5	40	15-40

NOTE

For larger sample sizes filling the Q-Cup, the bottom add may need to be eliminated and added to the top add to ensure full saturation of solvent in sample.

4.3. Enter the desired temperature.

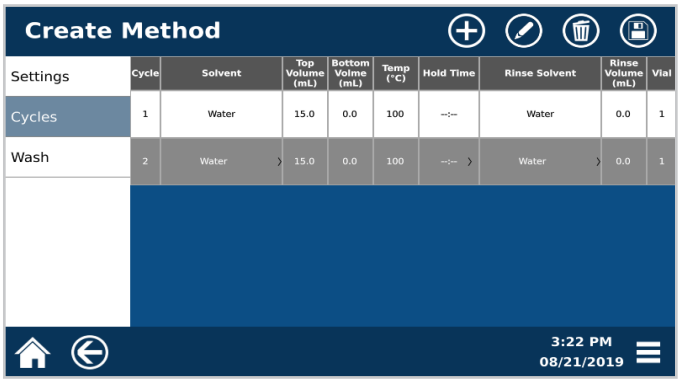
CAUTION

Maximum temperature will be solvent-dependent. The software will only allow safe running conditions.

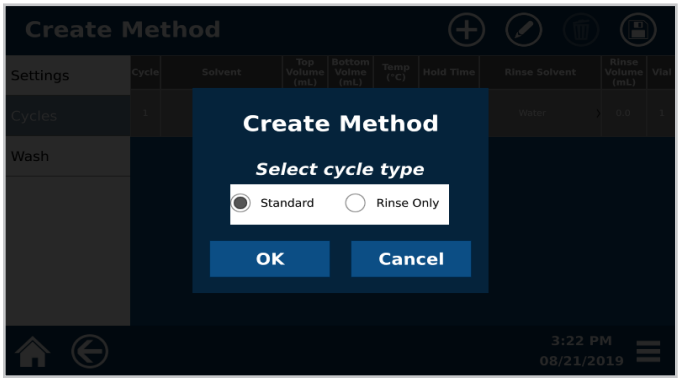
For plastic samples, the set temperature must be below the melting point.

4.4. Enter the desired Hold Time.

5. If applicable, add a second cycle. Multiple cycles may be necessary when analyte of interest is highly concentrated.



5.1. From the “Cycles” tab, select the New icon .



- Standard - Ability to change parameters as outlined in step 4
- Rinse Only - Ability to change rinse solvent and rinse volume only

5.2. The system will automatically populate the solvent volume so that the total solvent volume is 40 mL, which is the maximum that can be collected in one cycle.

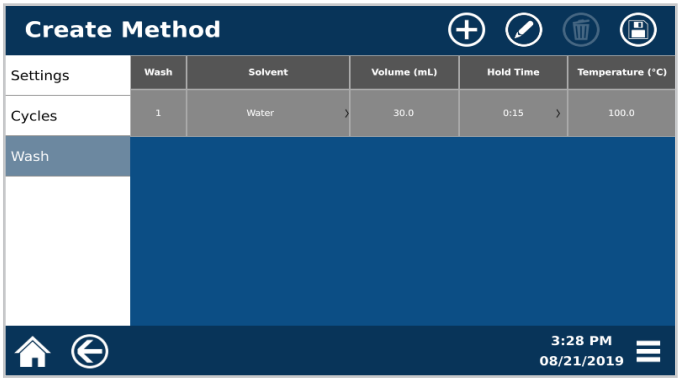
5.3. To edit the cycle, highlight the cycle.

5.4. Repeat all of step 4 to enter the Parameters.

5.5. After editing the cycles, select the “Settings” tab and select “separate” or “combined” as the collection type. The default collection type is “Combined”.

- Combined - If the total volume for all cycles is less than 40 mL the cycles will be collected in one vial.
- Separate - Each cycle will collect in a separate vial, regardless of cycle volume.

6. Select the “Wash” Tab.



6.1. Select highlighted area beneath “Solvent” to display the solvent menu.

6.2. Select the solvent that was used for the extraction.

NOTE
Water is recommended if salt is used during extraction or sample contains salt. If this is the case, a second wash cycle of the extraction solvent is recommended.
DCM is recommended for environmental samples. If this is the case, a second wash cycle of the extraction solvent is recommended.

6.3. Select highlighted area under “Volume (mL)” to change the volume using the keypad. The recommended volume is 10-30 mL.
6.4. Select the highlighted area under “Hold Time” to change the time using the keypad. The recommended time is 0:15.
6.5. Select the highlighted area under “Temperature” to change the temperature using the keypad. The default wash temperature is 100 °C. If the method temperature is above 100 °C, then a wash temperature of 150 °C is recommended.
6.6. If applicable, add additional wash cycles by repeating the steps above.

7. Select the Save icon at the top right of the screen to save any changes.

CAUTION
Observe the entire extraction process when establishing a procedure for the first time to ensure proper system functionality.

Edit Method

When a method is edited and saved, the original method and run data are no longer available.

1. Select the method to be edited.
2. Select the Edit icon at the top of the screen.
3. Select desired tab to edit (settings, cycles, or wash).
4. Edit parameters.

NOTE
See “Create Method” for specific details regarding method/wash parameters and cycles.

5. Select the Save icon.

Copy Method

A One Touch or User Method can be copied. If a One Touch Method is copied, it will be transferred into the User Methods folder.

1. Select the method to be copied, and select the Copy icon.
2. Create a new name for the method; after “OK” is selected, the method will be transferred into the User Methods folder and the “Edit Method” screen will appear.
3. Edit the desired parameters, and save method.

Delete Method

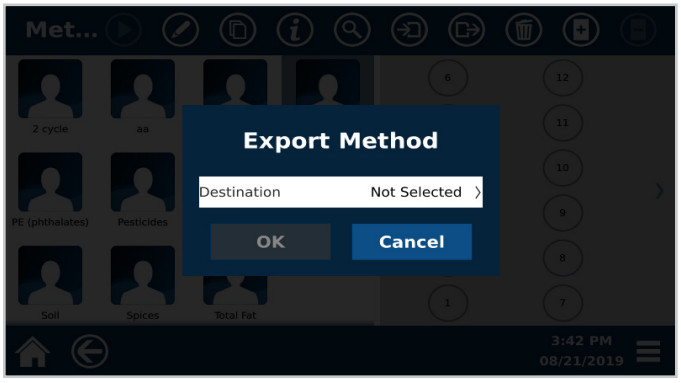
1. Select method to be deleted.

> **NOTE**
> Multiple methods can be deleted at a time by highlighting multiple methods.

2. Select Delete icon .
3. Select “OK” to delete the method(s) or “Cancel” to return to the previous screen.

Export Method

1. Insert a flash drive into the USB port on the EDGE.
2. From the methods screen, select the method(s) to export to the flash drive.
3. Select the Export icon .
4. Select the destination.

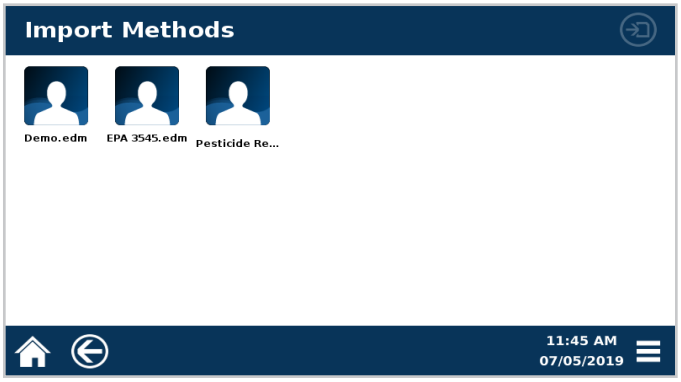


5. Select “OK” to Export the method(s) or “Cancel” to return to the previous screen.
6. Select “OK” when finished.

Import Method

Only Administrators can import methods.

1. To import a method, insert a flash drive in the USB port on the left side of the system.
2. Go to the Methods screen.
3. Select the Import icon .
4. Select the method(s) to import from the flash drive.



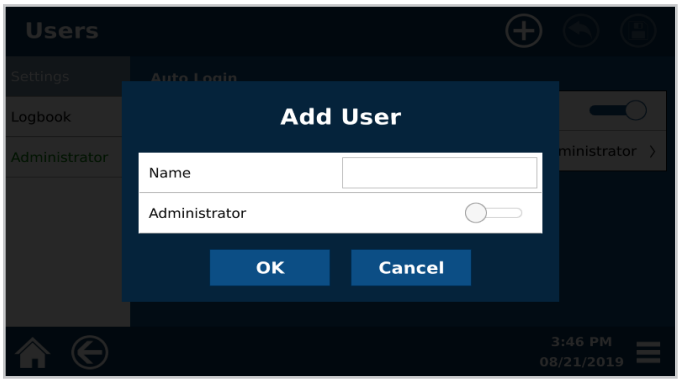
5. Select the Import icon .
6. Select “OK” once finished.

Users

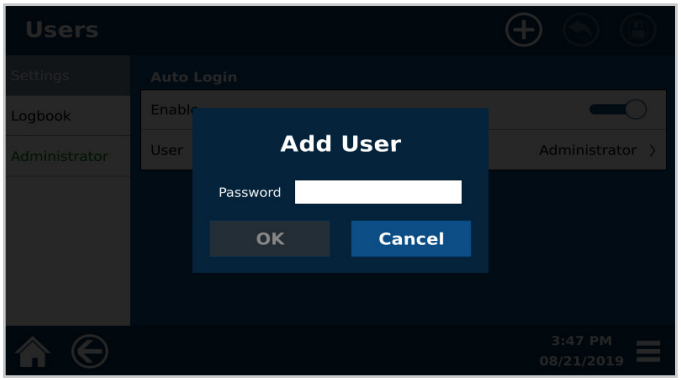
Only Administrators can create, edit, or delete users. A Basic (non-Administrator) user can only edit their password.

Create User

1. Select the System Menu icon in the bottom right corner of the screen.
2. Select Users.
3. Select New icon.



4. Select Name. Using the keypad, enter the desired name using a maximum of 16 characters. Press the Hide Keypad icon on the bottom right of the keypad to return to the Add User screen.
5. Assign the user as an administrator or non-administrator (basic). If toggled on, the user has full Administrator access and is able to create and edit methods and make system setting changes. If toggled off, the user only has Basic access, which is capable of choosing different methods and running samples only. While there may be multiple Administrator and Basic users, every system must maintain at least one Administrator.
6. Select ok.



7. Using the keypad, enter the desired password. Once the password is entered, confirm the password. Select the Hide Keypad icon to return to the Add User screen.
8. Select Ok and re-enter the password and select ok to save.
9. The software will indicate that an additional user has been entered into the database.
10. Additional users can be added at this time.

Edit/Delete User

1. Select the System Menu icon in the bottom right corner of the screen.
2. Select Users.
3. Select the user to edit/delete.
4. Select the Edit icon or Delete icon.
   - If Edit is selected, make the appropriate changes, and select the Save icon.
   - If Delete is selected, confirm that the user wishes to delete the selected user.

Auto Login

1. Select the System Menu icon in the bottom right corner of the screen.
2. Select Users.
3. “Auto Login” can be toggled on and off.
   - If Auto Login is set to “OFF”, the operator will have to choose a user and login each time the system is turned on.
   - If Auto Login is set to “ON”, the Home Screen will be displayed once the EDGE completes the initial powering.

Logbook

The User Logbook is an account of user activity including method import/export, methods run, user login/logout, and edit/delete users.

There is not a limit to how many methods/results that can be stored per user.

Data Management

The database only displays the last 50 samples per method. Older samples can be viewed by selecting the search icon in the methods screen and then filtering the results.

View Data

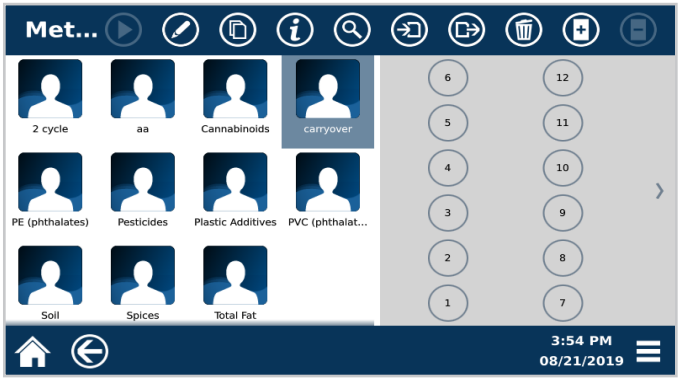
View data associated with a specific method. If a method is edited and saved, the original method and run data are no longer available.

1. Select a One Touch or User Method.
2. Select the Information icon.
3. The “Details” will provide information about the method and the samples (up to 50) will be listed in the order they were run (newest first).
4. Select the sample ID to view run data.

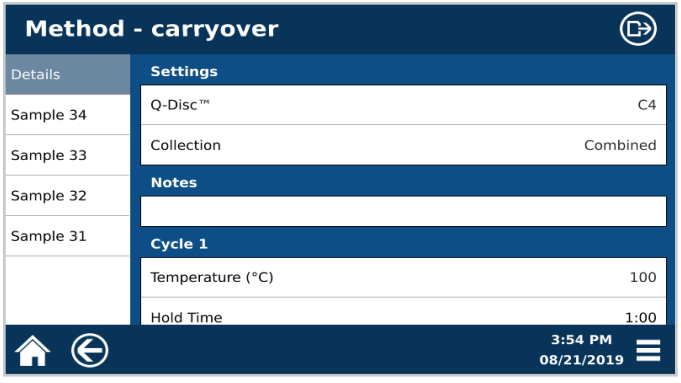
Export Data

Data including sample information, date/time and run data can be exported onto a flash drive. If a method is edited and saved, the original method and run data are no longer available.

1. Insert flash drive (USB) in the USB port of the EDGE.
2. Select the method to export data from.



3. Select the Info icon .

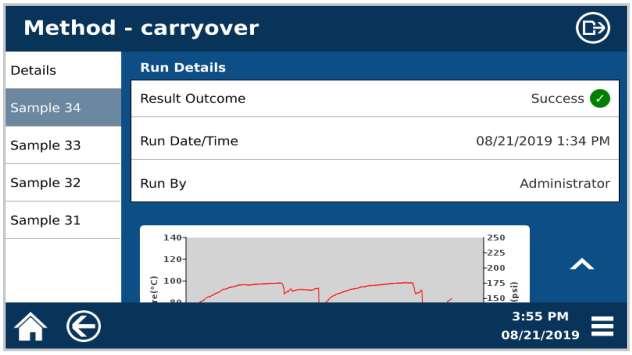


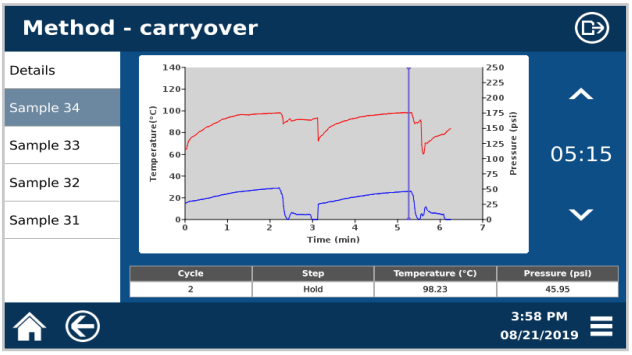
4. The method will be shown. Select a Sample ID to export from.

NOTE

If a method is edited, data prior to edit is no longer available. Only User Methods can be edited.

5. The run data can be observed in this screen. To see temperature/pressure at different times, touch and move the blue line or use the up and down arrows.



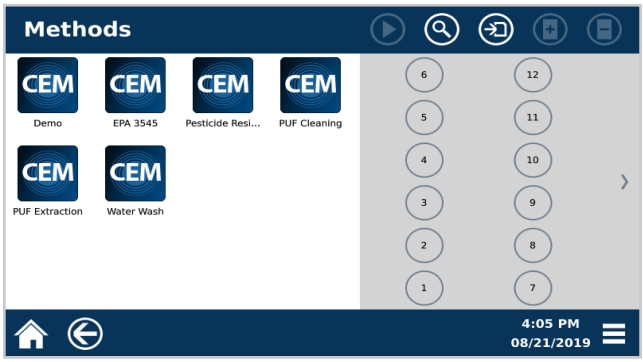


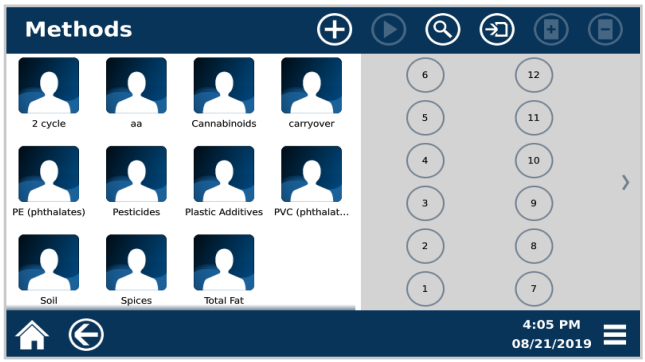
6. Select the Export icon .
7. Select csv or pdf.
8. Select “OK.”

Search Data

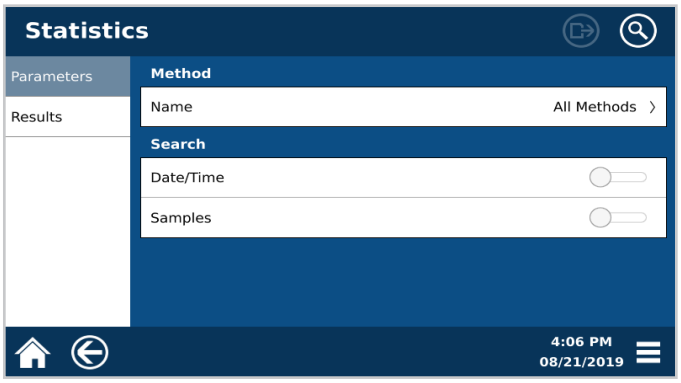
If a method is edited and saved, the original method and run data are no longer available.

1. From the methods screen, select the “search” icon .

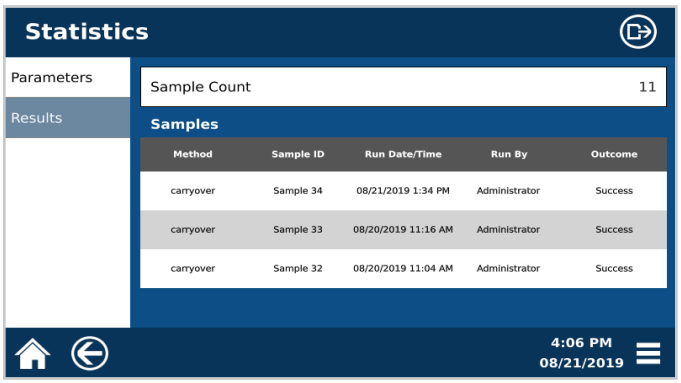




2. Data can be filtered by method name, date, time, and number of samples. Toggle each of these to search for specific samples.



3. Once filters are set up, select the Search icon and “Results” tab.



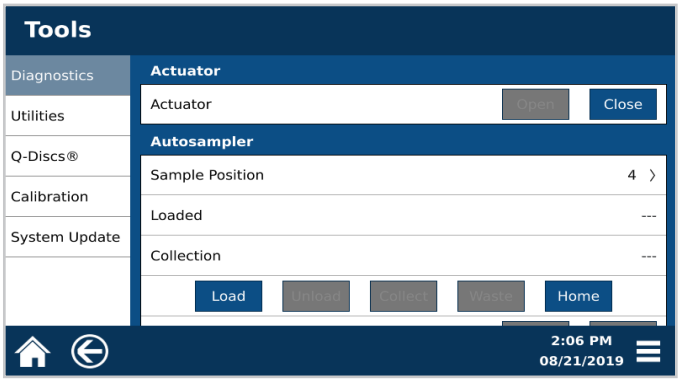
Calibrations

Verify Waste Calibration

The waste position requires calibration verification during the initial install, if the EDGE system is moved, and semi-annually.

> **⚠ WARNING**
> Never place hands into the vessel chamber area when the EDGE is in use or powered on.

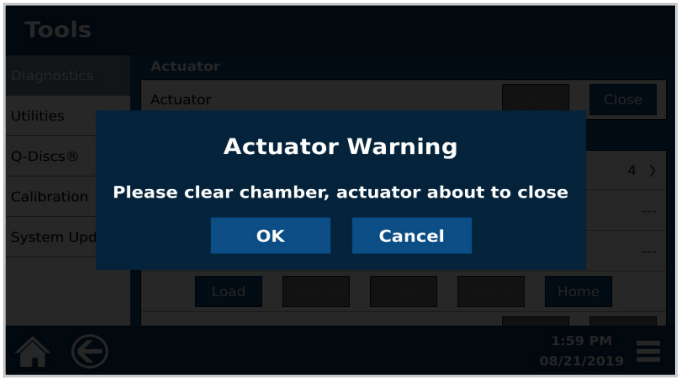
1. Select the System Menu icon ☰ in the bottom right corner of the screen.
2. Select Tools.
3. Select the Diagnostics tab and view the “Actuator” section.



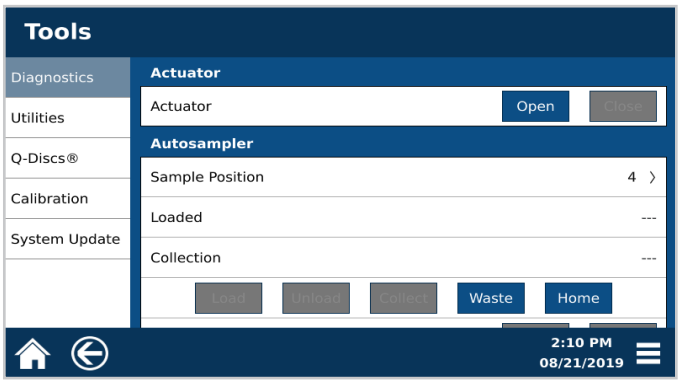
4. Select “Close.”

> **! CAUTION**
> Do not leave the actuator in the closed position for longer than one hour.

5. A warning will appear. Select “OK” once chamber is clear.



6. Scroll down to the Autosampler section. Select “Waste.” The autosampler dispense needle will travel to the waste position.



NOTE

Pay attention to the dispense needle during this time; it should enter into the waste port smoothly. If it doesn't, the waste position will need to be re-calibrated.

6.1. Select "Home." The autosampler will travel to the home position.
6.2. Scroll upward to the Actuator section.
6.3. Select "Open."

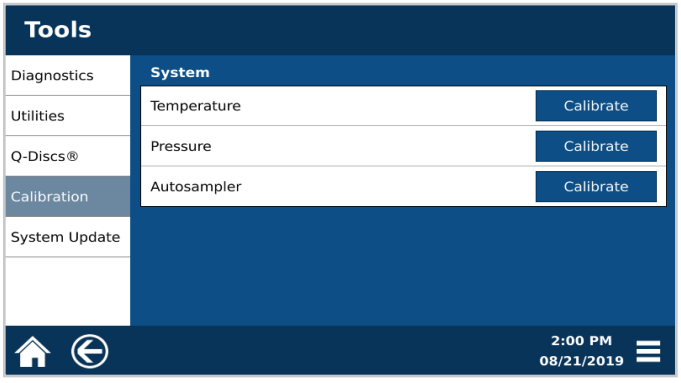
NOTE

If the autosampler crashes or movement is not smooth at any point during the verification, the autosampler will need to be calibrated. Please see "Autosampler Calibration."

Pressure Calibration

The pressure requires calibration during initial install, if the EDGE system is moved, and semi-annually.

1. Select the System Menu icon in the bottom right corner of the screen.
2. Select Tools.
3. Select Calibration.

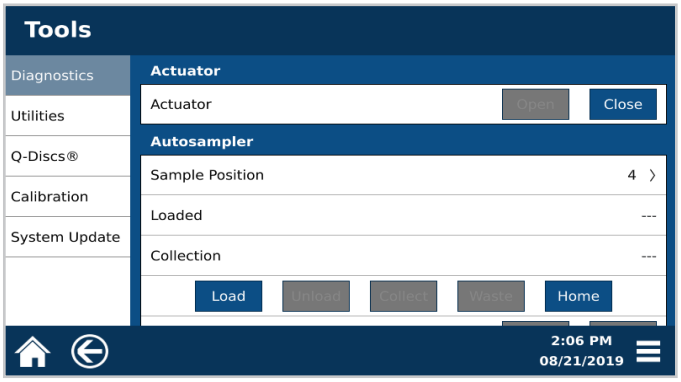


4. Select Pressure "Calibrate." This will take less than a minute.
5. Select "OK."

Verify Autosampler Calibration

The autosampler requires calibration verification during the initial install, if the EDGE system is moved, and semi-annually.

1. Select the System Menu icon in the bottom right corner of the screen.
2. Select Tools.
3. Scroll down to the bottom of the page to the Autosampler section.

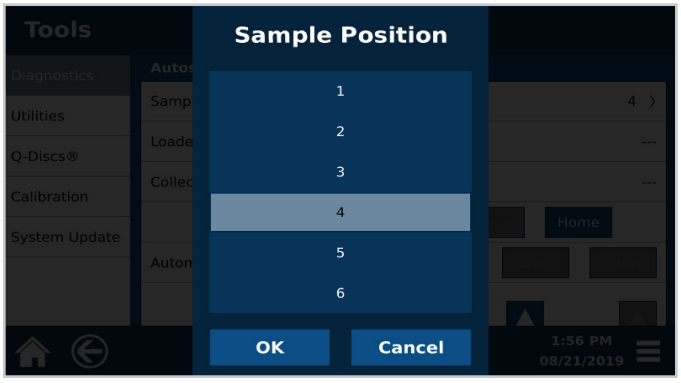


> **CAUTION**
> When verifying the autosampler calibration, always select “Load,” “Collect”, and “Unload” in that order without skipping a function.

4. Place a Q-Cup and collection vial in position 4 of the rack.

> **NOTE**
> Position 4 is used to verify the calibration. Moving the Q-Cup to and from this location verifies the interpolation of the calibration positions and is therefore the best test for the calibration.

5. Select “1” from Sample Position to display the sample position menu, and select position 4.



6. Select “OK.”
7. Select “Load.” The autosampler will load the Q-Cup into the vessel chamber.

> **NOTE**
> Pay attention to the Q-Cup during this time; the loading process should be very smooth.

8. Select “Collect.” The dispense needle on the autosampler will move to the collection vial in position 4 of the rack.
9. Select “Unload.” The autosampler will unload the Q-Cup from the vessel chamber and place it back into position 4 of the rack.

> **NOTE**
> If the autosampler crashes at any point during the verification, the autosampler will need to be calibrated. Please see “Autosampler Calibration.”

Autosampler Calibration

The Autosampler may require adjustment if movement is not smooth. For detailed instruction on calibrating the autosampler, please see the “Autosampler Calibration” video located in the System Menu or follow the instruction below.

There are 3 coordinates for the Autosampler: X, Y, and Z.

- X: Moves the autosampler fork right and left
- Y: Moves the autosampler forward and back
- Z: Moves the autosampler arm up and down

There are three settings for each coordinate: Coarse, Fine, and Ultrafine.

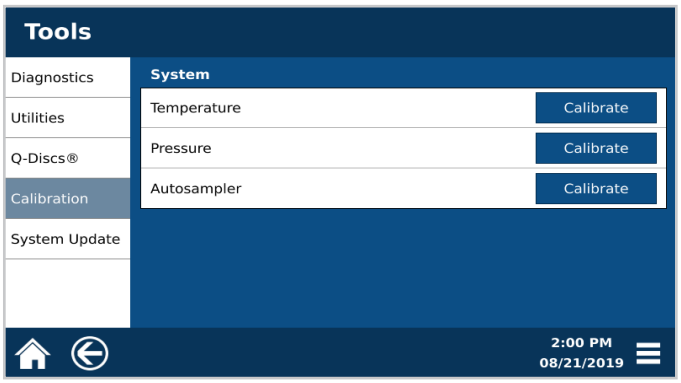
- Coarse: Moves the autosampler a large distance
- Fine: Moves the autosampler a moderate distance
- Ultrafine: Moves the autosampler tool a short distance

There will be 3 selections along the top of the screen: Back, Estimate, Skip.

- Back: Will home autosampler (if not already home) and go to the previous position; ie. position 7->1
- Estimate: Takes the autosampler to an estimated position based on the position that is currently being calibrated. Once autosampler moves, Home will appear.
- Skip: Skips a position if a position is not in need of calibration

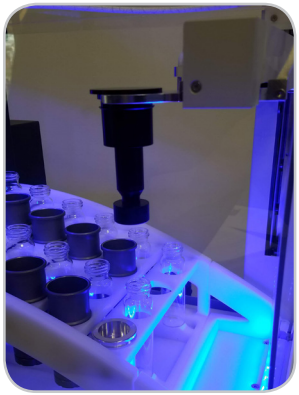
> **WARNING**
> NEVER place hands or any object into the automation area from the time “Start” is selected until the system is idle.

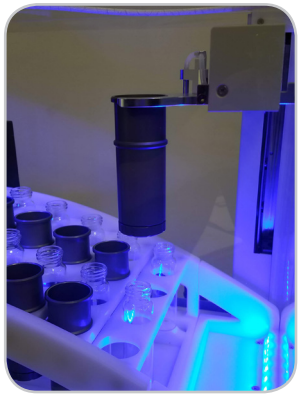
1. Select the System Menu icon in the bottom right corner of the screen.
2. Select Tools.
3. Select Calibration.



4. Select Autosampler “Calibrate.”
5. Select the tool that will be used for calibration: Q-Cup or Calibration Tool.
   - If calibration tool is available, select the image of the calibration tool.
   - If the calibration tool is not available, use a Q-Cup.
6. Select “OK” to begin calibration process.
7. Follow the prompts on the screen to begin calibration, and select “OK.”
8. If using the tool, place the bottom of the tool in position 1 of the autosampler rack.

9. Place the top of the calibration tool or the Q-Cup on the top of the autosampler fork. Make sure the top lip is sitting flush on the autosampler fork.



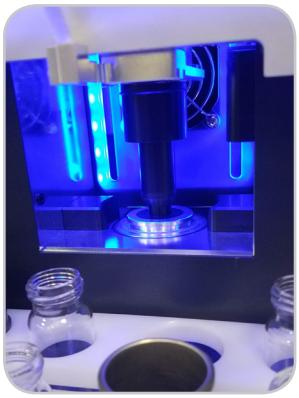
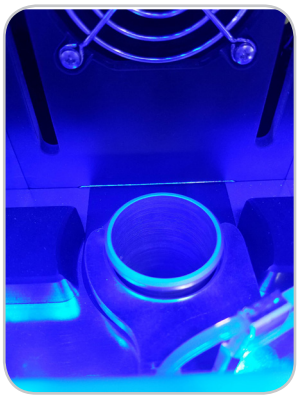


NOTE

If the tool crashes at any point, leave the system alone until it finishes moving, select “Home,” and restart calibration.

10. Select “Estimate.” The system will move the autosampler fork to an approximate location over to the position being calibrated.
11. Use the arrows and settings to adjust the tool or Q-Cup. The “OK” button will be grayed out until the tool is within the specified range.
12. Once in the specified range and the tools are flush or autosampler fork sits below Q-Cup lip, select “OK.”


13. You will then calibrate positions 7 and 12 the same way.
14. Calibrate the drop off position.
    - If using the calibration tool, place the bottom piece of the tool in the chamber.
15. Press estimate, and follow the same alignment procedure as before.
    - If using the tool, the top piece of the tool should glide into the bottom piece without hitting the sides of the tool. If the top piece of the tool moves as you are moving the Z-axis, the Y and Z coordinates are not properly aligned. Once the system is finished moving, select “Home,” ensure that the top piece is sitting on the fork correctly, select “Estimate,” and try again.

    Once the tool/Q-Cup looks aligned, select “Coarse,” and then select the Z-axis “up” arrow once and then down once. The tool/cup should move freely without hitting any sides. If this is not a smooth transition, retry calibrating the drop-off position before pressing ok.
16. Once the position is calibrated, press “OK” to proceed to the next step.
17. Remove the tool/cup from the system before calibrating the waste position; No tool/Q-Cup is used for calibrating the waste.
18. Select “Estimate.”
19. Move the autosampler using “Fine” and “Ultrafine” in small increments only. Move the autosampler until the needle is at least ¾ into the waste port.
20. Select “OK” to save calibration values.

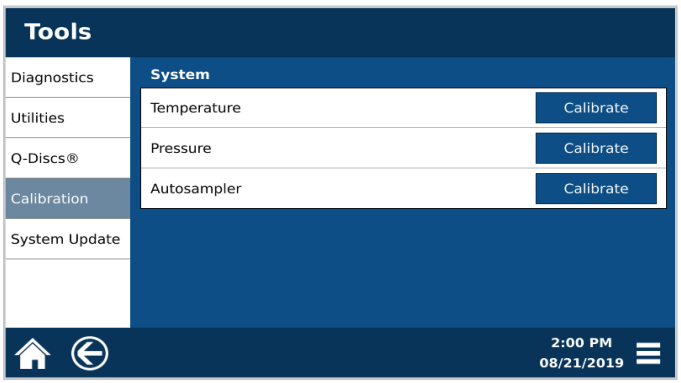
Temperature Calibration

This should be performed yearly by a CEM Service Engineer. Contact CEM Corporation before calibrating temperature.

> **⚠ WARNING**
> Do not place hands or objects in the actuator (vessel chamber) area unless instructed to do so.

> **NOTE**
> Before starting, water should be plumbed into one of the solvent lines. A NIST certified traceable thermometer will be needed to record the temperature during calibration.

1. Select the System Menu icon ☰ in the bottom right corner of the screen.
2. Select Tools.
3. Select Calibration.



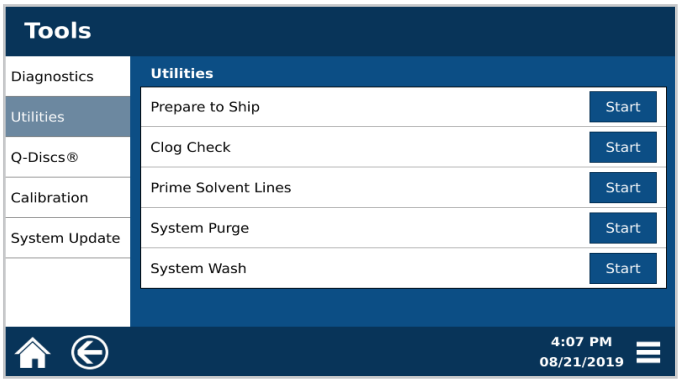
4. Select Temperature “Calibrate.”
5. Select “OK” to begin temperature calibration. The actuator will close, the dispense needle will travel to waste and the system will begin filling the chamber with water. Follow the remaining software prompts to complete the calibration.
   - **5.1.** After 10:00 min, you will be prompted to take the temperature of the water; be sure to stir the water.
   - **5.2.** After 0:60 seconds of stirring, the software will prompt you to type in the final temperature you are reading. Type in the value, and select “OK.”
   - **5.3.** Verify temperature reading, and select “OK.” The system will begin flushing the water into waste and will then return to the home position.
6. Once calibration is complete select “OK.”

Utilities

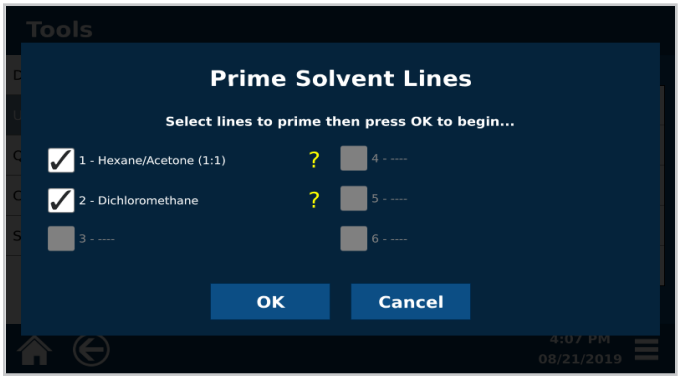
Prime Solvent Lines

Solvent bottle lines may need to be primed if the EDGE has been idle for an extended period of time or if bottles have run dry.

1. Select the System Menu icon in the bottom right corner of the screen.
2. Select Tools.
3. Select Utilities.



4. Select “Prime Solvent Lines.”



5. Select the solvent lines you would like to prime, and select “OK.”

> **NOTE**
> The only lines that are available to prime will be the ones setup in bottle setup. If you wish to prime more lines, they must first be assigned in bottle setup.

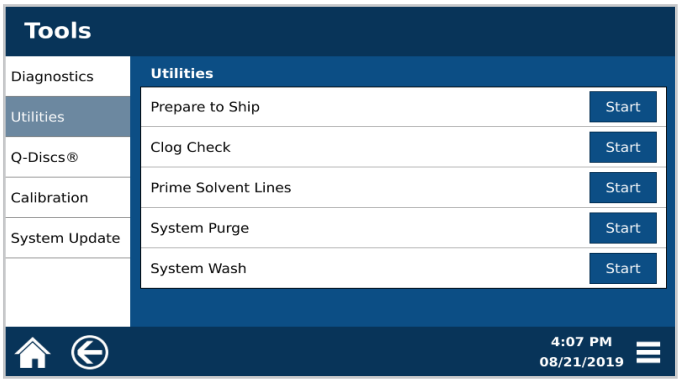
6. Once complete and a green check mark is shown, select “Close.”

> **NOTE**
> If a green check mark is not shown, there is a possible leak in the solvent line. Please contact CEM Corporation.

System Purge

System purge will dispense solvent in the chamber into the waste bottle. The system purge option only needs to be utilized if power is lost during a run or to determine system back pressure. System back pressure should be between 7.0 - 9.5 psi.

1. Select the System Menu icon in the bottom right corner of the screen.
2. Select Tools.
3. Select Utilities.



4. Select “System Purge.”
5. Select “OK” to begin purge. The actuator will close, the dispense needle will go to the waste position, and the pump will purge the system into the waste bottle.
6. Select “OK” when purge is complete.

System Wash

System Wash is recommended weekly or if they EDGE system will not be used for an extended period of time. A system wash adds 93mL to the chamber, heats and holds for 5:00 and purges into the waste.

1. Select System Menu icon located in the lower right corner of the screen.
2. Select Tools.
3. Select Utilities.
4. Select “System Wash.”
5. Select the desired solvent.

> **NOTE**
> Solvents must be listed in the bottle setup in order to be chosen for system washing.
>
> If water is selected, there will be two options, a clog cleanse or a system wash. The system wash performs the same with every solvent, the clog cleanse adds 30mL water to the chamber, heats and holds for 5:00 and purges into the waste.

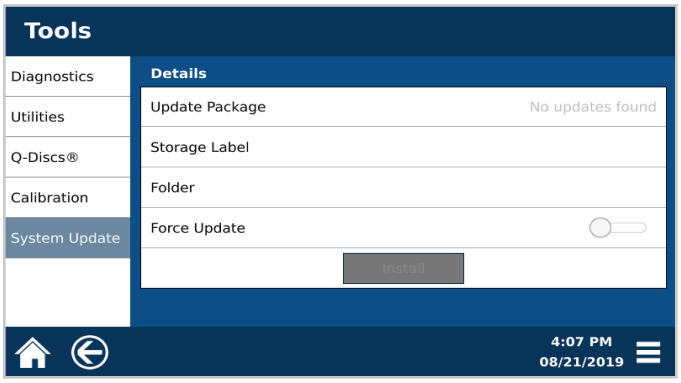
6. Select “OK.”

Software Update

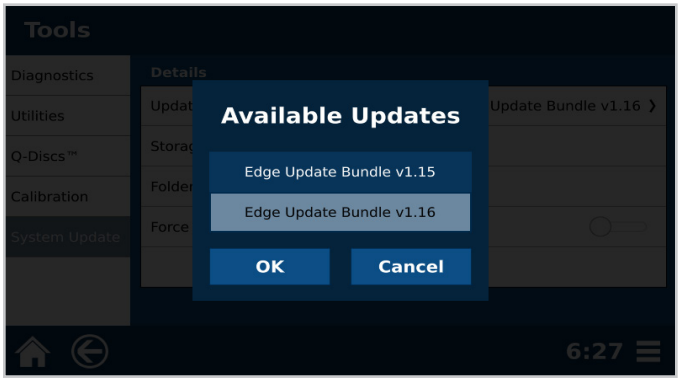
The current version of EDGE software can be found on the CEM website. Please register the EDGE Serial Number and create an account to access software updated.

How to Update Software

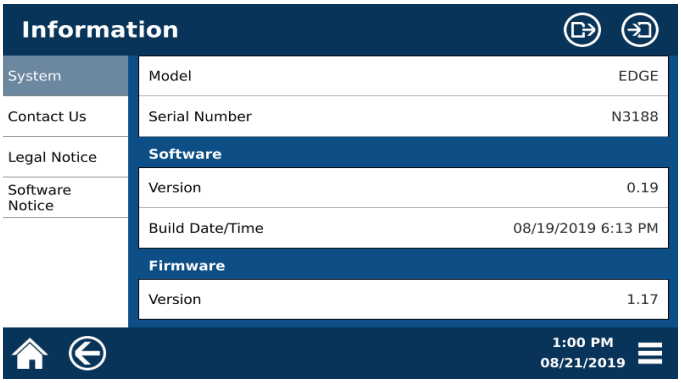
1. Download the EDGE software and copy onto USB stick.
2. Insert USB Stick containing the software update bundle (*.cib) into the EDGE USB port.
3. Select the System Menu icon in the bottom right corner of the screen.
4. Select Tools.
5. Select “System Update.”



6. Select “Update Package.”



7. Select the software version and select “OK”.
8. Toggle the “Force Update” to on.
9. Select “Install.” “Preparing Update...” will be shown on the screen and the system will automatically restart.
10. Upon restart, the system will automatically initiate the software update process.
11. To verify the software version, select the “System Menu” > “Information” > “System Information.”


Information
System
Contact Us
Legal Notice
Software Notice
Model
EDGE
Serial Number
N3188
Software
Version
0.19
Build Date/Time
08/19/2019 6:13 PM
Firmware
Version
1.17
1:00 PM
08/21/2019

System Repacking

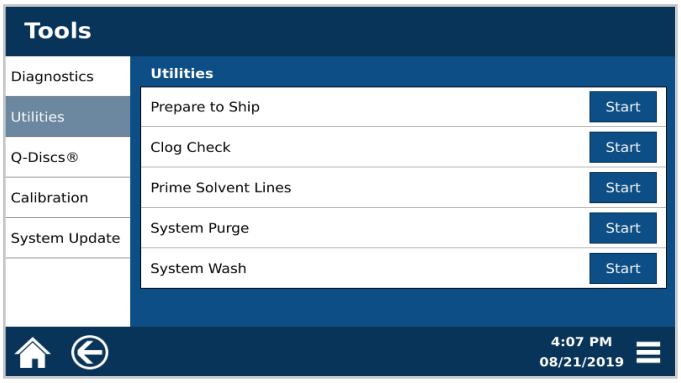
Prepare to Ship

Follow procedures below to prepare the EDGE for shipment. If shipping brackets are not available, please contact CEM Corporation.

1. Remove the rack from the EDGE platform.

> **CAUTION**
> Never ship unit with rack in position.

2. Select the System Menu icon located in the lower right corner of the screen.
3. Select Tools.
4. Select Utilities.



5. Select Prepare to Ship “Start.”
6. Follow prompts on the software screen to prime lines with water, flush chamber, dry lines, and add shipping brackets. If shipping brackets are not available, please contact CEM Corporation.

> **CAUTION**
> Solvent lines must be purged prior to packing or shipping instrument.

7. Select “OK.”
8. Follow the directions on the screen to align with the shipping brackets.

> **NOTE**
> Screws should be installed on the instrument already. Shipping brackets should be with the shipping boxes the system was delivered in. Remove appropriate screws, place bracket in position and re-install screws.

9. Once shipping brackets are installed, turn the EDGE off using the power switch located on the left side of the unit.
10. Disconnect the power cord from the EDGE and power receptacle.
11. Ensure all bottles and waste lines have been removed.

CAUTION
Never ship unit with waste lines or bottles in position.

12. Refer to the Packaging guide for the remaining steps to box the EDGE system.

Routine Maintenance

CEM suggests that you perform the routine maintenance on your EDGE as outlined below, along with having a CEM Certified Technician to come check out your system once a year.

Daily

- Ensure exhaust hose is attached
- Ensure clear safety enclosure is in place
- Check solvent bottle
- Check waste bottle
- Clean up spills with a clean soft cloth
- Inspect Q-Cups. Discard Q-Cup's that are not round or have dents.

Weekly

- System Wash

Monthly

- Check your consumable supplies to prevent early depletion. Q-Cups and Q-Discs must be purchased directly from CEM Corporation or through it's authorized dealer network.

⚠ WARNING
Ensure that system is idle, the power switch is positioned to off, and system is disconnected from the power supply prior to cleaning.

CAUTION
Only use water and a soft cloth to clean the system. Using other cleaning solutions, brushes, and materials can cause damage to the device.

- Clean the clear safety enclosure with a soft cloth dampened with water.
- Remove rack and wipe down EDGE surfaces and rack with a soft cloth dampened with water.
- Clean Actuator O-rings using a soft cloth dampened with water.

Annually

- Preventative Maintenance by CEM Certified Technician

This is performed by a CEM Certified Technician, once per year. However, should your individual requirements vary, a CEM Representative is available to assist in creating a schedule to meet your needs. Contact the CEM Contract Administrator at 800-726-3331 for assistance.

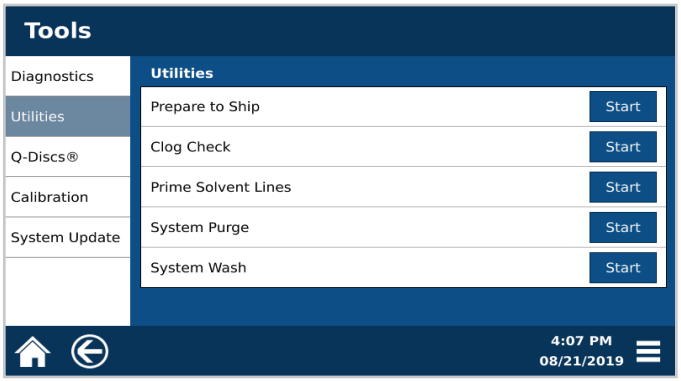
Troubleshooting

Problems and Possible Solutions

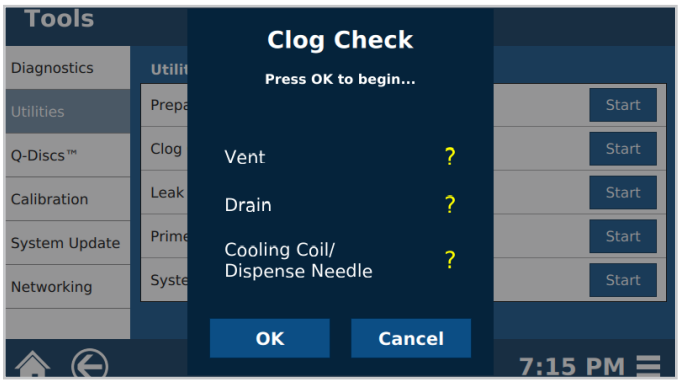
Problems	Possible Cause	Possible Solutions
Recoveries are low	Hold time not long enough	Increase hold time by 1:00
	Incorrect Temperature	Increase temperature by 10 °C.
		Decrease by 10 °C or turn preheat off for temperature sensitive analytes.
Water in the extract	Wet Sample	Increase drying agent
Possible System Clog	Slow sample draining	Increase pore size of Q-Disc. For cellulose, increase C#
		Mix dry samples with sand to disperse sample
	Q-Cup(s) overfilled	Clean the actuator. See “Routine Maintenance” for instructions. See “Sample Preparation” for preventative measures.
Solvent/Extract Recovery low	Solvent Bottle(s) empty	Add solvent
	Slow sample draining	Increase pore size of Q-Disc. For cellulose, increase C#.
		Mix dry samples with sand to disperse sample
Particulates in extract	Porosity of samples less than Q-Disc	Decrease pore size of Q-Disc. For cellulose, decrease C#
Q-Cup sticking to actuator	Q-Cup(s) dirty	Clean the Q-Cups. See “ for instruction
	Q-Cup(s) overfilled	Clean the actuator. See “Routine Maintenance” for instructions. See “Sample Preparation” for preventative measures
Max Pressure Exceeded	Pressure generated at temperature exceeds maximum system pressure	Decrease method temperature or decrease amount of sample

Clog Check

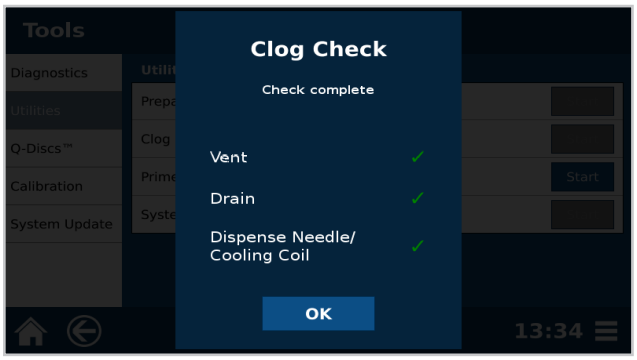
1. Select System Menu icon located in the lower right corner of the screen.
2. Select Tools.
3. Select Utilities.
4. Select Clog Check Start.

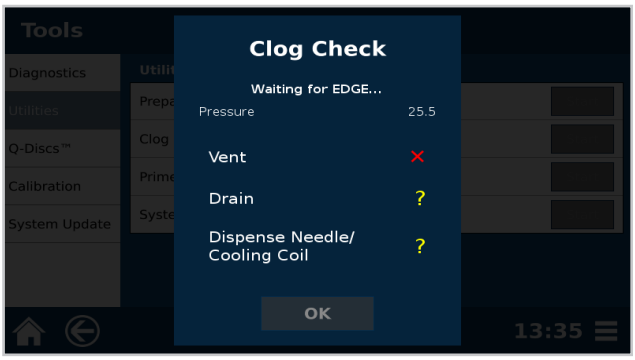


5. A screen will appear with a list of locations to check for a clog: Vent, Drain, Cooling coil/dispense needle. Select “OK” to begin clog check.



6. If green checks appear beside vent, drain, and cooling coil/dispense needle, then clog check has completed successfully. Select “OK.” If a red “x” appears, proceed with next step.





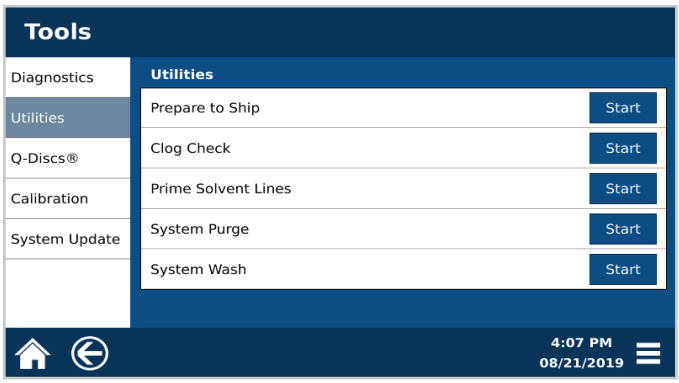
6.1. If red “X” appears, check inside chamber and dispense needle for any obstruction to solvent flow such as sample in chamber or needle.

⚠ WARNING
Never place hands into the vessel chamber area when the EDGE is in use or powered on.

NOTE
If Clog Check fails, the EDGE must be powered off/on before Clog Cleanse.

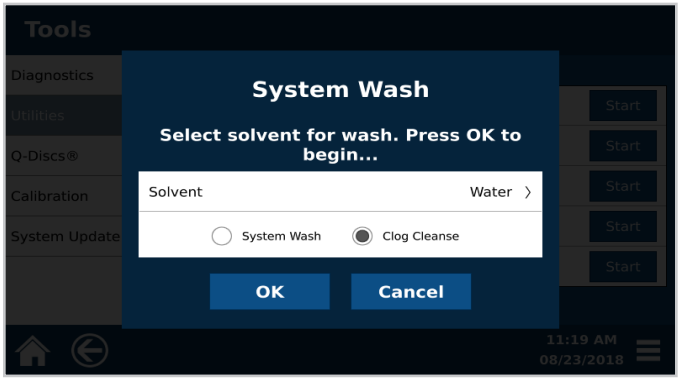
Water must be selected in bottle setup before proceeding with next step.

7. From the Tools screen select “Utilities”.



8. Select “System Wash” and “Start.”

9. Select “Water” as the solvent.



10. Select “Clog Cleanse” and “ok”. The system will perform a clog cleanse.

11. If there is still a clog, contact CEM Corporation.

Clog Recovery

If a possible clog is detected, the system will cool to below 30 °C and 0 psi. Once conditions are met, follow prompts on screen.

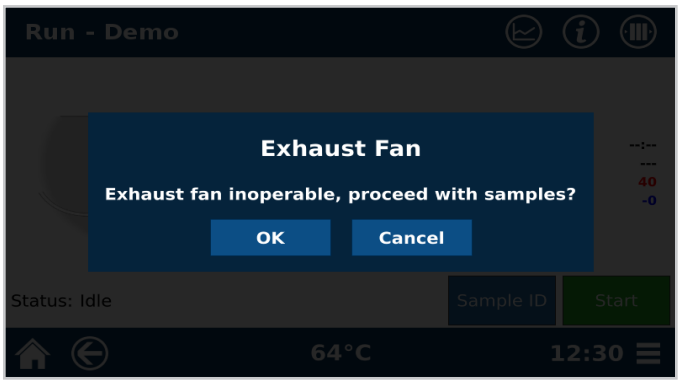
NOTE
If the room temperature is greater than 30 °C, then contact CEM to adjust the settings.

NOTE
Remove Q-Cup(s) and vial(s) from the rack to prevent cross contamination during the clog recovery process. Do not remove the Q-Cup from the vessel chamber.

NOTE
If system purges after Q-Cup is removed, either too much sample was added to Q-Cup or it was prepared incorrectly. Contact Molecular Support to make changes prior to running remaining samples.

If system clog, restart system and run clog check to determine origin of system clog. Run Clog cleanse to remove clog. If unsuccessful, contact service

Exhaust Fan Inoperable



⚠ WARNING

The exhaust hose must be connected and draw at least 30.5 CFM at the point of connection at all times as it is essential for removing harmful gases away from the EDGE instrument. Vapors should be vented into a fume hood by means of the exhaust hose only.

Upon pressing “Start” if the “Exhaust Fan” message appears, select “Cancel” and contact the CEM Service Department (inside the US1-800-226-5228) or the nearest subsidiary or distributor (listed on www.cem.com/contact.html) to request service information.

CEM advises not running the EDGE system if exhaust fan is inoperable. If “OK” is selected, the user acknowledges the exhaust fan is inoperable but would like to continue running the samples.

System Specifications

Location Requirements

- Has adequate ventilation that can be accessed via the exhaust hose (no further than 10’ away) to remove fumes from system
- Provides adequate space for sample handling
- Has a dedicated, grounded outlet no more than 5 ft (1.5 m) from unit
- Is free from vibration of large equipment
- Provides clear visual access to the display of the system
- The system weighs 70 lbs (31.75 kg) without rack or vessels
- Instrument Dimensions: 14.25” (37 cm) W x 25.53” (65 cm) D x 27.93” (71 cm) H
- Recommended counter space: 45” (115 cm) W x 30” (77 cm) D x 28” (71 cm) H
    - The above provides 12” (31 cm) of open space on the right side of the system so that the racks can be easily loaded and 18.75” (48 cm) on the left side of the system for sample preparation and access to the power switch
- Do not position the EDGE so it is difficult to access the power switch

Electrical Requirements

- Region Specific
    - 100 - 120 VAC, 50/60 Hz, 10 A
      or
    - 200 - 240 VAC, 50/60 Hz, 5 A
- Line voltage must not vary more than 10% of its specified level
- Dedicated, grounded outlet
- Instrument is supplied with a power cord or an adequately rated power cord may be used
- Fuses:
    - 100 - 120 VAC: 250 V, 10A 5 mm x 20 mm, fast acting
      or
    - 200 - 240 VAC: 250V, 5 A, 5 mm x 20 mm, fast acting

Environmental Requirements

- Indoor use only
- Altitude up to 2000 m
- Operating Temperature range of 50°F (10°C) to 85°F (29.4°C)
- A fume hood within 10 feet of unit or adequate exhaust that pulls a minimum of 30.5 CFM at point of connection
    - Instrument is supplied with a ten foot long exhaust hose with a 2” ID
- Relative humidity range of 10 % to 85%, non-condensing
- Overvoltage Category II
- Pollution degree 2

Warranty

Limited Warranty Information

What Is Covered:

CEM Corporation warrants that the instrument will be free of any defect in parts or workmanship and will, at its option, replace or repair any defective part (excluding consumables) or instrument.

For How Long:

This warranty remains in effect for 365 days from date of delivery to the original purchaser.

What Is Not Covered:

This warranty does not cover parts or workmanship damaged due to:

- Neglect, abuse or misuse,
- Damage caused by or to test samples,
- Damage incurred during instrument relocation,
- Damage caused by or to any attached equipment,
- Use of incorrect line voltages or fuses,
- Fire, flood, “acts of God” or other contingencies beyond the control of CEM Corporation,
- Improper or unauthorized repair, or
- Any other damage caused by purchaser or its agents.

Responsibilities of Purchaser:

To ensure warranty coverage, the purchaser must:

- Use the instrument according to directions,
- Connect the instrument properly to a power supply of proper voltage,
- Replace blown fuses,
- Replace consumables and
- Clean the instrument as required.

How to Get Service:

Purchaser should contact the Service Department of CEM Corporation or the nearest CEM subsidiary or distributor for return authorization and for proper crating and shipping instructions to return instrument, freight prepaid, for service. On-site repairs by an authorized service technician are available through the CEM Service Department. Travel costs will be charged to the purchaser for on-site repairs.

Within the U.S. Outside the U.S.
CEM Corporation CEM Corporation
3100 Smith Farm Rd. 3100 Smith Farm Rd.
Matthews, NC 28105-5044 Matthews, NC 28105-5044
(800) 726-5551 (704) 821-7015
Fax: (704) 821-4368 Fax: (704) 821-4368

Warranty Disclaimer:

CEM Corporation hereby excludes and disclaims any warranty of merchantability or fitness for any particular purpose. No warranty, express or implied, extends beyond the face hereof. CEM Corporation shall not be liable for loss of use of instrument or other incidental or consequential costs, expenses or damages incurred by the purchaser or any other user. This warranty is not transferable.

Purchaser's Rights under State Law:

This warranty gives the purchaser specific legal rights, and the purchaser may also have other rights that vary from state to state.

Technical Assistance

Applications Support

For the latest EDGE™ applications information, go to http://cem.com/edge/. The EDGE pages contain downloadable applications notes, a listing of recent posters, method notes and more. A registered account is required for download. CEM is proud to provide applications support for any solvent extraction related questions from a team of trained chemists with a complete extractions lab. For applications support, call (800) 726-3331 (inside the US) or (704) 821-7015 and ask for “Molecular Support”, or email CEM EDGE applications support at molecular.support@cem.com.

Technical Support

CEM is proud to provide technical support for the EDGE from a team of specially trained Service Technicians. For technical support in the US and Canada, call (800) 726-5551 or (704) 821-7015 and ask for “EDGE Service” or email service@cem.com. For technical support outside the US and Canada, contact your local CEM Subsidiary or Distributor.

Requested Information
When contacting CEM for support, please provide the following information about the instrument:

- EDGE Serial Number
- EDGE Firmware Version

Service can only be performed by an authorized CEM service technician.

Contact Information

CEM Corporation Headquarters

Toll-Free Phone (US/Canada): (800) 726-3331
Phone: (704) 821-7015
Service Hotline: (800) 726-5551
Fax: (704) 821-7894
Mailing Address: PO Box 200 Matthews, NC 28106-0200
Physical Address: 3100 Smith Farm Rd Matthews, NC 28104
Email (Applications Support): molecular.support@cem.com
Email (Technical Support): service@cem.com

CEM International Subsidiaries

France: CEM mWaves S.A.S.

Phone: (33-1) 69 35 57 80
Fax: (33-1) 60 19 64 91
Address: Immeuble Ariane Domaine Technologique de Saclay 4, rue René Razel 91892 ORSAY Cedex France
Web Address: http://www.cemfrance.fr
Email: info.fr@cem.com

Germany: CEM GmbH

Phone: 011-49-2842-9644-0
Fax: 011-49-2842-9644-11
Address: Carl-Friedrich-GauB-Str. 9 47475 Kamp-Lintfort Germany
Web Address: http://www.cem.de
Email: info@cem.de

Italy: CEM SRL

Phone: 390-35-896224
Fax: 390-35-891661
Address: Via Dell Artigianato, 6/8 24055 Cologno Al Serio (BG) Italy
Web Address: http://www.cemmicroonde
Email: info.srl@cem.com

Japan: CEM Japan K.K.

Phone: +81-3-5793-8542
Fax: +81-3-5793-8543
Address: 2-18-10 Takanawa Minato-Ku Tokyo 108-0074 Japan
Web Address: http://www.cemjapan.co.jp
Email: info@cemjapan.co.jp

UK: CEM Microwave Technology Ltd.

Phone: +44-1-280-822873
Fax: +44-1-280-822342

Address: 2 Middle Slade Buckingham Industrial Park MK18 1WA Buckingham Great Britain
Web Address: http://www.cemmicrowave.co.uk
Email: info.uk@cem.com

Ireland: CEM Technology (Ireland) Ltd.

Phone: +353 (0) 1 885-1752
Address: Sky Business Centre 9a Plato Business Park Damastown Dublin 15 Ireland
Web Address: http://www.cemmicrowave.co.uk
Email: info.ireland@cem.com

CEM Distributors

For a complete list of distributors of CEM products, including contact information, go to the CEM website (http://www.cem.com), select Contact, and then select your region to see a list of distributors by country.

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