

MARSXpress 2.0

Scientific Microwave System

Manual



CEM

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Safety

Safety Notations

This manual uses safety alert words at points in the documentation where the user should be aware of potential hazards.



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 correctly followed, may result in improper instrument operation and/or instrument damage.



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.



WARNING - EXPLOSION HAZARD

Potential for explosion/pressure hazard.



WARNING - HOT

Surface may be hot and can cause burns upon contact.



WARNING - ELECTRICAL HAZARD

Electrical shock hazard/Instrument damage.

Instrument Safety Notations



Indicates manufacturer declares conformity to applicable Essential Health and Safety Requirements of applicable European Directives.



Waste Electrical and Electronic Equipment (WEEE) Directive - In accordance with the European Union's WEEE Directive, this product is marked with the crossed-out wheeled bin symbol to indicate that it should not be disposed of with regular household waste. At the end of its life, return this product to a designated collection point for proper recycling and disposal. For more information about disposal and recycling, contact local authorities, waste disposal service, or the distributor from whom you purchased the product.



Introduction

About the Instrument

The MARSXpress 2.0™ is a microwave digestion instrument utilizing an 1800 watt dual-magnetron and advanced feedback system to monitor and control the rate of heating of the sample(s) in the microwave cavity. The MARSXpress 2.0 is designed to be operated as outlined in this manual. The MARSXpress™ and MARSXpress Plus™ vessel series are the only specifically designed vessels for this 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 www.cem.com.

This manual refers to MARSXpress 2.0 software version 1.04 for all software information, including screenshots and technical information. MARSXpress 2.0 software version 1.04 or newer is required for operation.

This manual contains proprietary information which shall not be reproduced or transferred to other documents or disclosed to others without prior written permission from CEM Corporation.

Hydrofluoric Acid (HF) is a highly corrosive inorganic acid; therefore, it must be handled with extreme caution.



WARNING

Proper precautions must be taken to avoid contact with acid or acid vapors. Personal protective equipment (PPE) should be worn as outlined in the user's safety program for hazardous materials and the manufacturer's safety data sheet. Refer to those guidelines for proper handling and disposal.

Read and fully understand all documentation before operating the instrument.

Intended Use



WARNING

If the instrument is used in a manner not specified by CEM Corporation in this manual, then the protection provided by the equipment may be impaired.

- The MARSXpress 2.0 has been designed and tested for laboratory use in digestion.
- Only use the device for applications that fall within the range of the intended use; otherwise, the protective and safety equipment of the device could fail.

User Qualifications



WARNING

It is the owner's responsibility to ensure all operators are sufficiently trained in the correct and safe use of the instrument.

Operators must have knowledge of chemistry and its rules. The user must:

- Have basic analytical chemistry knowledge.
- Have knowledge about the properties of the acids used and their health risks.
- Be trained for the special tasks and activities in the laboratory and know the relevant standards and regulations.
- Understand and carry out all the work described in the operating instructions on the instrument and recognize and avoid possible dangers independently.
- Not be impaired by the consumption of drugs, alcohol or medication.
- Participate in the installation of the instrument and be trained by CEM Corporation or its authorized dealer.
- Only those trained in the safe handling of HF should be allowed to use the instrument when using HF.

Common Abbreviations

Abbreviation	Definition	Abbreviation	Definition
A	ampere	LED	light-emitting diode
cm	centimeter	kg	kilogram
CSV	comma-separated value	m	meter
CFM	cubic feet per minute	mm	millimeter
dB	decibel	OD	outer diameter
°C	degrees Celsius	PPE	personal protective equipment
°F	degrees Fahrenheit	PDF	portable document format
D	depth	lb	pound
ft	foot	USB	universal serial bus
H	height	VAC	volts alternating current
Hz	Hertz	V	volts
in	inch	W	width
ID	inner diameter		

Important Safeguards

General guidelines for safe operation of the MARSXpress 2.0 are presented below and all specific safety messages are located throughout the manual.



WARNING

Microwave sample preparation imposes a unique set of safety considerations beyond the basics of good laboratory practice. Additional microwave safeguards for each vessel set are outlined in the appropriate vessel manual.

Instrument Safeguards

- Location, electrical, and environmental requirements are outlined in the “System Specifications” section of this manual and must be adhered to.
- DO NOT connect unit to a line voltage other than specified. Electrical shock hazard/Instrument damage.
- Requires dedicated, grounded outlet. Electrical shock hazard/Instrument damage.
- DO NOT position the instrument such that it is difficult to access the power connector. The power connector of the instrument must be readily accessible for mains disconnection if needed.
- Replace fuses with fuses of the size and rating specified by the text adjacent to the fuse holder. Incorrect fuse size may result in fire or inadequate equipment protection.
- High voltages and microwave irradiation. Service can only be performed by an authorized CEM service technician.
- DO NOT remove instrument covers. Electrical shock hazard. Only CEM authorized personnel are allowed to remove instrument covers. If servicing, disconnect the power cables before removing the instrument covers.
- DO NOT attempt instrument operation if any damage to the instrument is noted.
- DO NOT operate the instrument in the presence of flammable gases or fumes.
- Proper precautions must be taken to avoid contact with acid or acid vapors. Personal protective equipment (PPE) should be worn as outlined in the user’s safety program for hazardous materials and the manufacturer’s safety data sheet. Refer to these guidelines for proper handling and disposal.
- It is the owner’s responsibility to ensure all operators are sufficiently trained in the correct and safe use of the instrument.
- If the instrument is used in a manner not specified by CEM Corporation in this manual, then the protection provided by the equipment may be impaired.
- DO NOT install the MARSXpress 2.0 instrument inside of a fume hood. The exhaust hose must be connected and draw at least 100 CFM at the point of connection at all times as it is essential for removing harmful gases away from the instrument. Vapors should be vented into a fume hood by means of the exhaust hose only.

Operating Parameters

Operating parameters for each vessel set are outlined in the appropriate vessel manual. Read and fully understand all documentation before operating the instrument.

Vessel Safeguards

- Only use consumables, accessories, vessels and vessel components purchased directly from CEM or through its authorized dealer network.
- DO NOT run empty vessels.
- All vessel components must be dry prior to use.
- Always condition new liners and plugs. See the “New Liner and Plug Conditioning” section of the appropriate vessel manual for more details.
- See the “Operating Parameters” section of the appropriate vessel manual for minimum numbers of vessels required for digestion.
- DO NOT batch old liners with new liners unless new liners have been conditioned.
- Ensure vessels are assembled properly. See the “Perform a Digestion” section of the appropriate vessel manual for more details.
- Group liners with similar sample history and usage.
- Segregate liners for HNO_3 and non- HNO_3 applications.
- DO NOT use a new liner with a set of liners that has been run consistently until the new liner has been conditioned with that sample type.
- The fully loaded turntable without sample may be heavy (>25 pounds (11 kg)). Use caution when lifting and loading into the cavity. Do not place fingers beneath the turntable when placing in the cavity.
- Allow vessels to cool until completion of the cool down time before opening the microwave door.
- Bake-out liners to remove residual HNO_3 & NO_x gases. See the “Liner Bake-Out Procedure” section of the appropriate vessel manual for details.

Sample Preparation Safeguards

- Cover all solids in the reaction vessel with liquid.
- Never exceed the maximum working volume of the vessel.
- Exercise caution when using concentrated acids or bases.
 - Generally, a 10% or less concentration for bases is recommended.
 - DO NOT run vessels that have been previously run with acids for bases and vice-versa. If switching chemistries, contact CEM Corporation for recommendations.
- Run similar sample types with the same acid(s) and acid volume in each vessel.
- If mixing similar samples or blanks, distribute them evenly throughout the turntable. See the “Vessel Distribution” section of the appropriate vessel manual for details.
- Optimal acid volume for 55 mL and 75 mL Xpress Vessels is 10 mL and will result in more even heating.
- Maximum sample weight varies per vessel size and sample type. See the “Operating Parameters” section of the appropriate vessel manual for weights.
- Acid blanks cannot account for more than 25% of turntable when mixed with samples.
- If additional “placeholder” vessels are needed to meet the minimum vessel requirement or for more even turntable distribution, be mindful of the following:
 - If running samples, the placeholder vessel(s) should also contain the same sample matrix. If there is not enough sample to use in the placeholder vessel(s), samples with similar composition to the intended sample digestion should be used.
Example: If the intended digestion sample is ground tea leaves and there is not enough sample for placeholder vessels; use another ground leafy plant material at the same sample weight instead.
 - All vessels (including but not limited to sample vessels, method blank vessels, and placeholder vessels) should contain the same acid matrix and acid volume
 - Never fill the placeholder vessel(s) with water unless this matches the sample digestion being performed.
 - Never run empty vessels as placeholders or otherwise.

- DO NOT use water to dilute the acid(s) greater than 25% or to add volume before digestion. This can cause uneven heating of vessels.
- If spiking samples or acid blanks, DO NOT spike more than 20% of the acid volume being used. For example, if digesting with 10 mL of acid DO NOT spike in more than 2 mL of spike solutions. 10% spiking volume or less is optimal to promote even heating.

Microwave Safeguards

- Minimum volume for the MARSXpress 2.0 cavity is 10 mL of acid or 50 mL of water. DO NOT run empty vessels.
- Programmable temperature range is 50 °C to 210 °C
- Observe the positioning and balance of the turntable.
- Vessels must be evenly distributed throughout the turntable and the turntable must be fully seated on the drive lug.
- If a run is stopped or paused for more than 30 seconds during the digestion, DO NOT restart the method with hot vessels.
 - Allow vessels to cool until completion of the cool down time.
 - Vent vessels and reseal.
 - Restart method from the beginning.
- Bake out liners if TempGuard™ is triggered.

Compounds Unsuitable for Closed Vessel Microwave Digestion

Acid decomposition of certain chemical compounds or types of samples constitutes unreasonable, hazardous misuse of CEM microwave digestion systems.



WARNING - EXPLOSION HAZARD

Acid decomposition of certain chemical compounds or types of samples constitutes unreasonable, hazardous misuse of CEM microwave digestion systems.



WARNING

CEM will not be responsible for damage to equipment and facilities or personal injuries resulting from microwave digestion of samples that are deemed unsuitable for closed vessel microwave digestion.

The classes of compounds listed below are unsuitable for closed vessel microwave digestion because they are highly reactive with oxidizing acids and/or may become nitrated and potentially explosive. Absence of a particular chemical compound from this list does not imply microwave acid decomposition of such a sample is safe under all conditions.

- Explosives (TNT, Nitrocellulose, etc.)
- Propellants (Hydrazine, Ammonium Perchlorate, etc.)
- Pyrophoric chemicals
- Hypergolic mixtures (Nitric Acid and Phenol, Nitric Acid and Triethylamine, Nitric Acid and Acetone, etc.)
- Aviation Fuels (JP-1, etc.)
- Acetylides
- Glycols (Ethylene Glycol, Propylene Glycol, etc.)
- Perchlorates (Ammonium, Potassium, etc.)

- Perchloric Acid (HClO_4)
- Ethers (Cellosolve - Ethylene Glycol Phenyl Ether, etc.)
- Lacquers
- Alkanes (Butane, Hexane, etc.)
- Ketones (Acetone, Methyl Ethyl Ketone, etc.)
- Alcohols (Methanol, IPA, etc.)

**WARNING**

Contact CEM if the sample intended for digestion contains any of the compounds listed above.

Instrument Overview

Front and Side View



	Item	Description
1	Touch Screen Display	Shows menus, method parameters, etc.
2	Door Handle	Permits ease of opening instrument door
3	Visual Light Indicator	Depending on the instrument status, the LED status bar will display one of the following colors:blue (idle or paused), purple (initializing), white (microwaves on), teal (cooling) or orange (error)
4	Cooling Vent	Provides passive ventilation for electronics
5	USB Port	Data transfer and software/firmware update
6	Fuses	Prevent electrical power overload
7	Power Switch	Turns AC power on and off to the instrument
Not Pictured		
	Speaker	Audio for instrument

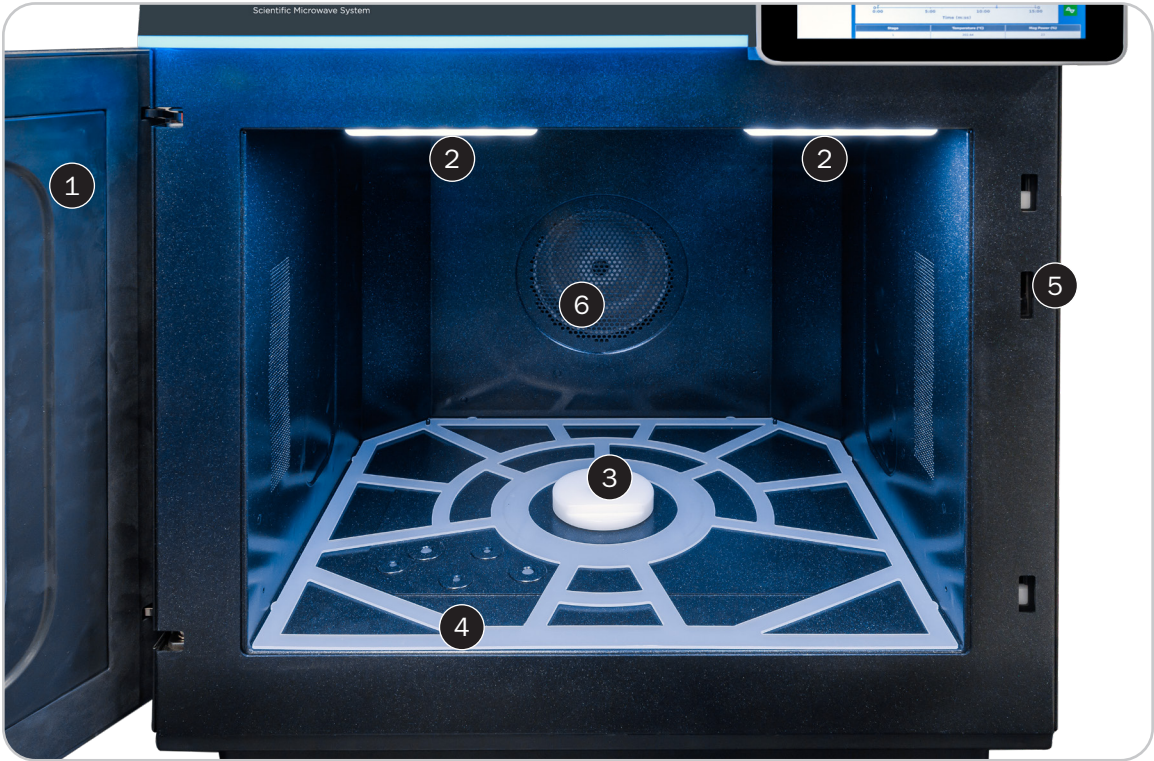
Back and Side View



	Item	Description
1	Cooling Vent	Provides passive ventilation for electronics
2	Cavity Exhaust Outlet	Exhausts fumes from the microwave cavity. Directs air from the microwave cavity at the rate of 3.6 m ³ /minute (125 ft ³ /minute)
3	Power Cord Receptacle	Receives the female end of the power cord
4	Cooling Fan	Draws room air past the electronics
5	Communication Access	Permits access to Ethernet and USB ports
Not Pictured		
	Nameplate	Lists model, serial number, operating voltage, frequency, and current draw

Cavity

Fluoropolymer-coated microwave cavity.



	Item	Description
1	Door Seal	Ensures tight fit between door and interior cavity of the MARSXpress 2.0 to prevent microwave leakage
2	Waveguide Covers	Evenly distribute microwaves into instrument cavity
3	Turntable Drive Lug	Allows the turntable drive shaft to pass through the cavity floor and engage the Turntable
4	Floor Mat	Protects the Teflon Coating on the floor of the MARSXpress 2.0 cavity
5	Door Interlock	Three (3) door safety interlocks and an interlock monitoring system to prevent microwave emission when the door is open
6	Exhaust Cover	Removes fumes from the fume cabinet
Not Pictured		
	Temperature Sensors	Measures temperature
	Turntable Sensor	Detects type of turntable
	Vessel Counting Sensor	Counts number of vessels in the turntable

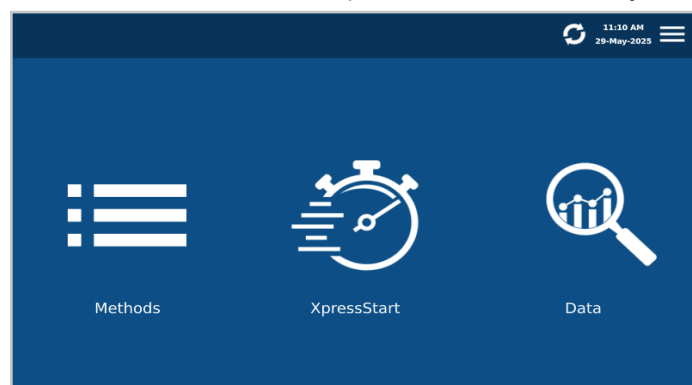
Software Overview

Software Icons

Icon	Description	Icon	Description	Icon	Description	Icon	Description
	Add		Data		Import		Save
	Admin		Delete		Information		Search
	Alert		Down		Logout		Settings
	Back		Edit		Methods		Stop
	Blower		Experiment ID		Network Access Active		Temperature
	CEM Method		Export		Network Access Inactive		Turntable
	Close		Filter		Pause		Undo
	Copy		Forward		Play		Up
	Cross-hair		Gesture		Power		Users
	Cursor		Home		Run Checks		Tools

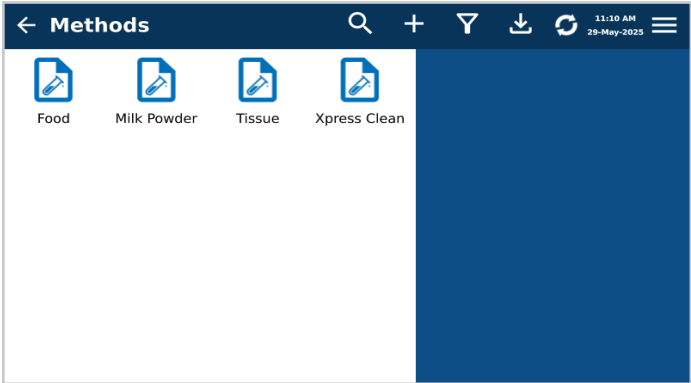
Home Screen

The Home screen is the first screen that appears when the system is turned on. Four (4) screens are accessible from this screen: Methods, Xpress Start, Data, and System Menu.



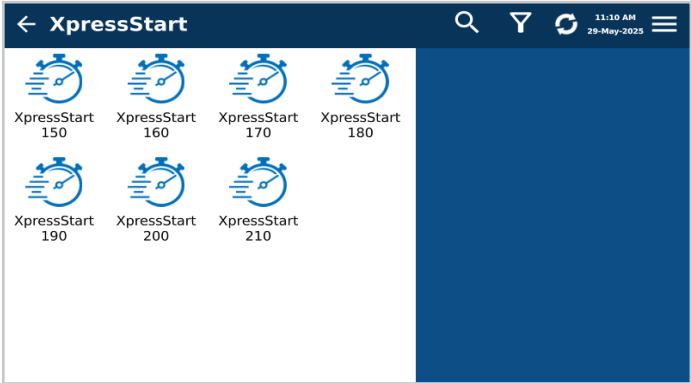
Methods Screen

Methods are created or imported by a user with administrative privileges and can be recalled for future use. Data associated with a method can also be recalled. By selecting the method and pressing the Information icon, snapshots of time-stamped runs can be recalled that include method parameters and the associated run data. CEM methods will appear in blue, whereas user created methods will appear in gray.



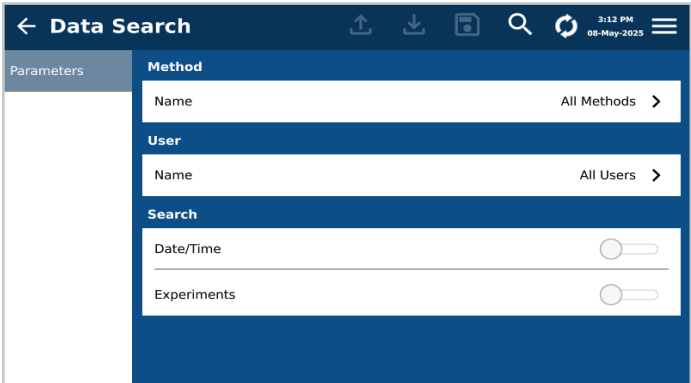
XpressStart Screen

XpressStart methods were created by CEM Applications Specialists and determine all parameters, adjust power output, and performs the digestion for all major sample types. XpressStart methods cannot be created, copied, edited, deleted, imported, or exported.



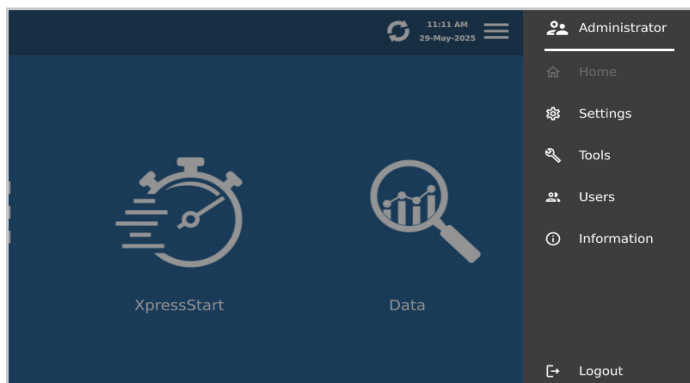
Data Screen

Provides the result log for each digestion performed and contains a complete list of time-stamped runs. Watermarks provide insight on result outcome of runs.



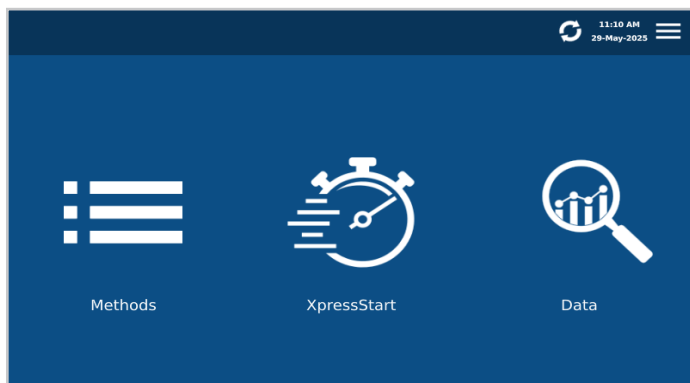
System Menu Screen

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. The current user is displayed at the top of the System Menu list.



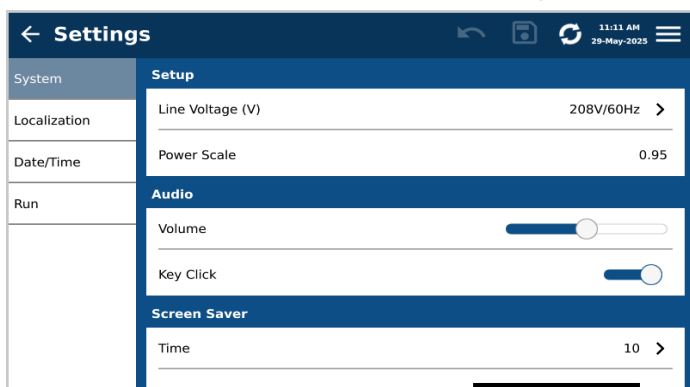
Home

Selecting “Home” from the System Menu list will display the Home screen.



Settings

Users can define and adjust necessary settings prior to running samples.



- System: Instrument settings for the line voltage, 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 and cooling setpoint

Tools

Calibration and Diagnostic tools are provided to ensure proper system functionality and update the software when a new version is released.

Tools	
Diagnostics	Sensors
Utilities	Line Frequency 60
System Update	Inner IR Temperature (°C) 22.4
Networking	Outer IR Temperature (°C) 23.3
	Door Open
	Flame Detect ✓
	Reactiguard ✓
	Thermal Switch

- **Diagnostics:** A listing of real-time readings directly related to unit functionality and the option to manually maneuver commonly used hardware
- **Utilities:** Allows for validation of the temperature, turntable, power, and exhaust as well as calibration of the temperature sensor and turntable
- **System Update:** Used for updating software when a new version is released
- **Networking:** View network connectivity

Users

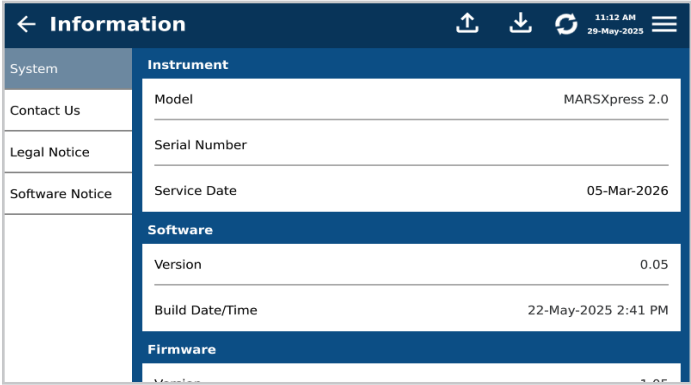
Location for creating and deleting different user accounts, as well as reviewing user logs if necessary.

Users	
Settings	Auto Login
Groups	Enable ☒
User Logs	User Administrator >
Administrator	Auto Logout
	Enable ☐

- **Settings:** Turning ON/OFF auto-login requirements for users
- **Groups:** Determines visible system functionality depending on the selected user group
- **User Logs:** Audit trail for tracking user movement within software
- **Current User:** List of users are located beneath logs. Green indicates the user who is currently logged in

Information

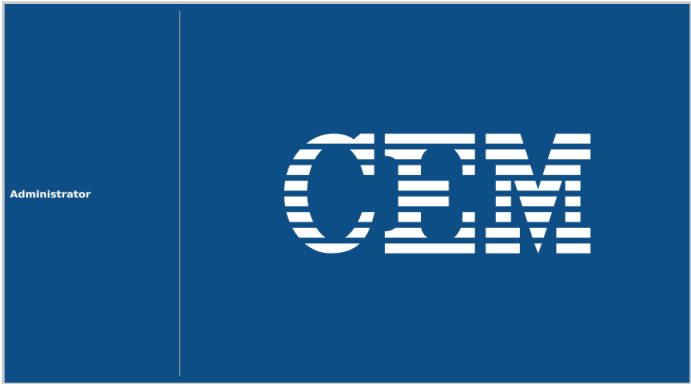
Protects the current user’s access or prevents unauthorized actions on the current login session



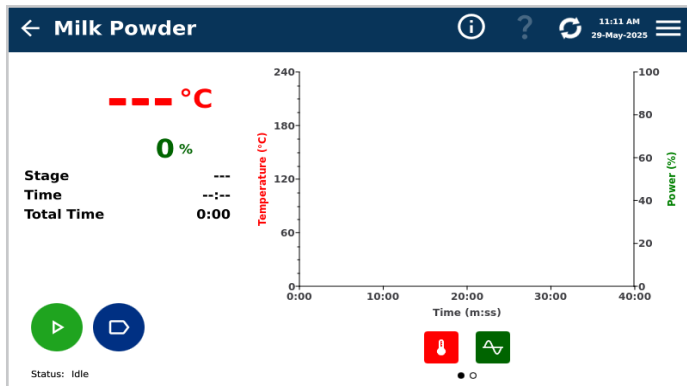
- System: Reference for serial number, software and firmware versions, and calibration dates
- Contact Us: Contact information for CEM Headquarters and Subsidiaries
- Legal Notice: Legal information concerning the use and distribution of the instrument and other CEM products
- Software Notice: System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

Logout

Displays system information including serial number, software version and contact information.



Run Screen



- Information: Provides time-stamped snapshots of runs, including method parameters and the associated run data
- Run Checks: Icon will be highlighted if system run checks do not meet criteria. If the icon is highlighted white, then select it to determine the cause. The Play icon will be grayed out and the Run Checks icon will be highlighted until all criteria is met.
- Turntable: Allows user to rotate turntable and determine alignment of turntable and drive lug

System Installation

Unboxing

1. View the "System Specifications" section of this manual and select a location that meets all requirements before installing the MARSXpress 2.0 instrument.
2. Carefully inspect the shipping carton 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 a local CEM Representative for assistance.



WARNING

If any damage to the instrument is noted, do not attempt instrument operation.

3. Pull plastic tab, swing handle open, and remove the plastic assembly from box. Repeat process on the remaining handles.



4. Use top handles to pull up and remove outer box by lifting straight up.



5. Remove the power cord and the accessory kit.



6. Carefully cut the tape on both sides of the inner box
7. Lay the sides of the box flat and remove the foam from the top of the system.
8. Using two people, lift the system, from the sides, onto bench top near exhaust service. Do not place the system in a fume hood.



WARNING

To avoid muscle strain or back injury, use lifting aids and proper lifting techniques when removing or replacing.

DO NOT install the MARSXpress 2.0 instrument inside of a fume hood.

9. Remove the plastic. Do not leave the plastic under the system.
10. Retain all packing material for use if returning the instrument to the manufacturer for service.

Hardware Setup

1. Carefully inspect 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 a local CEM Representative for assistance.



WARNING

If any damage to the instrument is noted, do not attempt instrument operation.

Do not tamper with the instrument.

2. Connect the exhaust hose to back of the system using the provided clamp.



WARNING

The exhaust hose must be connected and draw at least 100 CFM at the point of connection at all times as it is essential for removing harmful vapors away from the instrument. Vapors should be vented into a fume hood by means of the exhaust hose only.

Warranty can be invalidated if airflow requirements are not to specification.

3. Connect the opposite end of the exhaust hose to a fume hood that pulls a minimum of 100 CFM at point of connection.
4. Plug power cord into the system and a dedicated, grounded outlet. The instrument is supplied with a power cord, but an adequately rated power cord may be used.



WARNING

Electrical shock hazard/Instrument damage - DO NOT connect unit to a line voltage other than specified.

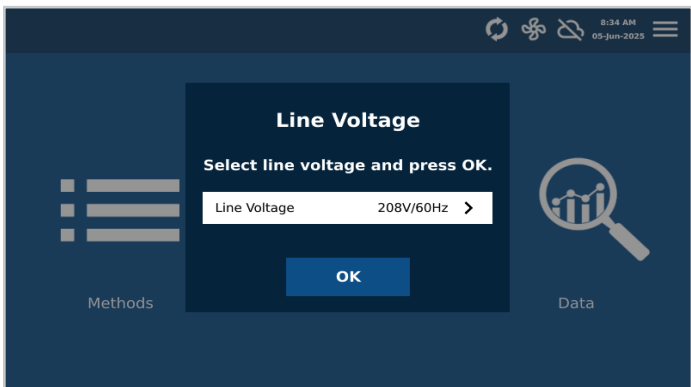
5. Position the instrument so the door is facing forward and there is open space to access the power switch and power cord.

Software Setup

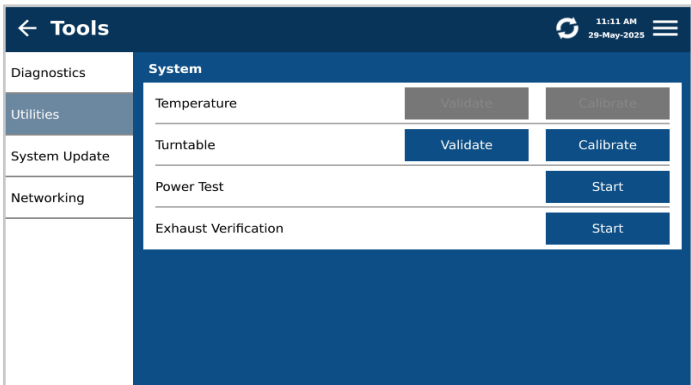
1. Locate the power switch on the right side of the instrument, and position it in the ON position.



2. When the system is first powered on, a “Line Voltage” message will appear. Determine the line voltage from outlet. Follow the instructions on the screen to assign the correct voltage. Once the voltage is selected, a prompt will appear notifying the user that the system will reboot.
- For 200 V, 50 Hz instruments, the voltage will automatically be selected.
- 60 Hz, 208 V or 230 V
 - 50 Hz, 200 V, 220 V, or 240 V



3. Verify the exhaust as outlined below.
- 3.1. Ensure that the exhaust hose is connected and has active draw.
- 3.2. Press the System Menu icon located in the top right corner of the screen.
- 3.3. Press “Tools” and the “Utilities” tab.



- 3.4.** Locate “Exhaust Verification” and press “Start.”
- 3.5.** Follow instructions located on the screen to complete validation. A green check will appear if the validation is successful. A red "X" will appear if a validation fails. If either of the validation point fails proceed as outlined below.
 - If the "Idle" validation fails, verify the connection to the exhaust.
 - If the "Active" validation fails, verify that the exhaust requirements have been met as outlined in the “System Specifications” section of this manual. If the exhaust requirements have been met and the ‘Exhaust Verification’ test still fails, contact CEM Service.



WARNING

DO NOT attempt unit operation if the “Exhaust Verification” test fails. Verify that exhaust requirements have been met and then contact CEM Service.

Warranty can be invalidated if airflow requirements are not to specification.

- 4.** Validate the turntable position as outlined below.
 - 4.1.** Press the System Menu icon in the top right corner of the screen.
 - 4.2.** Press “Tools” and the “Utilities” tab.
 - 4.3.** Locate “Turntable” and press “Validate.” Follow the instructions on the instrument to perform the turntable validation procedure. The MARSXpress or MARSXpress Plus turntable can be used. There are three (3) possible validation outcomes:
 - Does image match the vessels installed in turntable - verify that the vessel orientation matches the image on the screen
 - Validation canceled - user canceled the procedure
 - Validation error - contact a CEM representative
- 5.** System Setup is complete.

Perform a Digestion

Microwave sample preparation imposes a unique set of safety considerations beyond the basics of good laboratory practice. Additional safeguards for each vessel set are outlined in the appropriate vessel manual.

Detailed instructions for each vessel set are outlined in the vessel manual. Contact your CEM representative for additional support or if vessel set is not listed below.

Read and fully understand all documentation before operating the instrument.

MARSXpress Vessel Series

MARSXpress Vessel Series Manual - P/N 600968

MARSXpress Plus Vessel Series

MARSXpress Plus Vessel Series Manual - P/N 600969

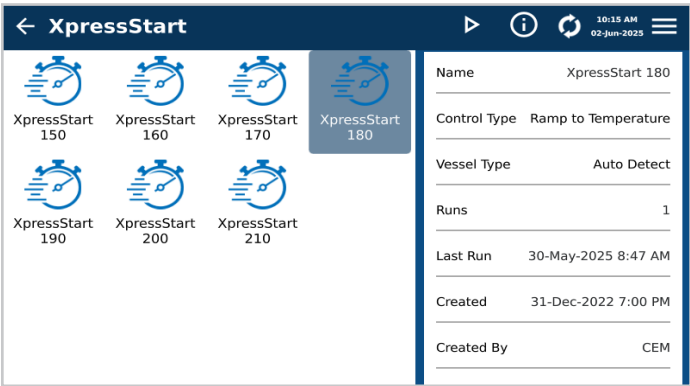
Data Search

The Data Search screen provides the result log for each digestion performed and contains a complete list of time-stamped runs. Watermarks provide insight on result outcome of runs.

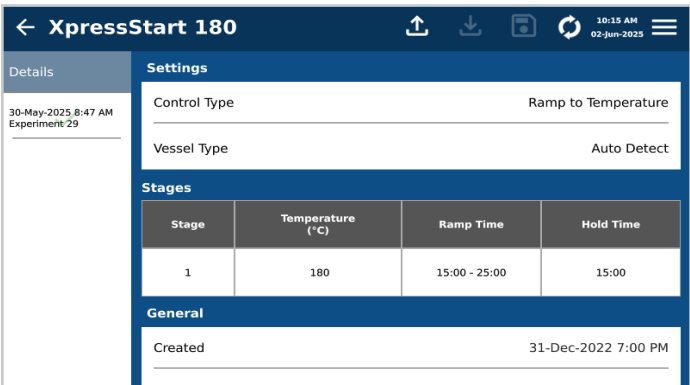
Watermark	Result Outcome	Explanation
Green Check Mark	Success	The run reached the setpoint temperature within 30 seconds of starting the Hold
Blue Exclamation Point	Setpoint Reached During Hold	The setpoint temperature was reached after 30 seconds into the Hold
	Setpoint Not Reached	The setpoint temperature was not reached during the Hold
Purple Question Mark	Unknown	Power to the instrument was shut off during the run
Red X Symbol	Error	An error occurred during the run
	Stopped By User	The run was stopped by the user

View Data for Specific Method

- From the Home screen, press the Methods or XpressStart icon.
- Press the method with the data to view. A preview of the method details will appear on the right of the screen.



- Press the Information icon to view additional details.



- The “Details” will provide information about the method and the run data will be listed in the order they were run (newest first). To view data using previous revisions of the method, select the correct Snapshot at the top of the screen (located above “Details”).
- Select the desired run data. Select the “Details,” “Graph,” “Statistics,” and “Samples” tab to view additional information.

- Details

←

XpressStart 180

↑

↓

10:16 AM

02-Jun-2025

Details

Details

Graph

Statistics

Samples

30-May-2025 8:47 AM

Experiment: 29

Result Outcome

Success

Vessel Type

Xpress (75mL)

Count

40

Run Date/Time

30-May-2025 8:47 AM

Run By

Administrator

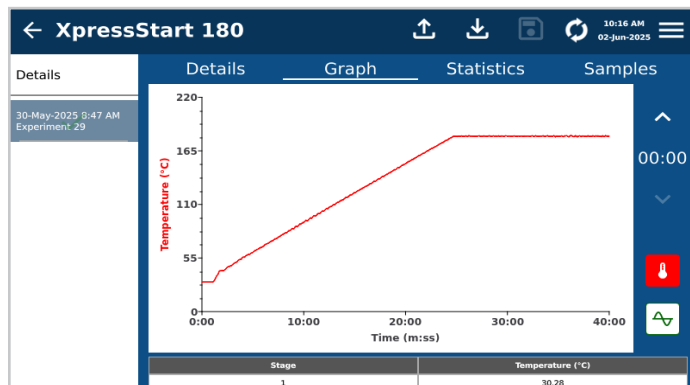
Run Version

0.05

Cooling Time

3:16

- Graph



- Statistics

←

XpressStart 180

10:16 AM

02-Jun-2025

Details

Details

Graph

Statistics

Samples

30-May-2025 9:47 AM
Experiment: 29

Vessel	Temperature (°C)
1	✓
2	✓
3	✓
4	✓
5	✓
6	✓
7	✓
8	✓

- Samples - information can be entered after a run as outlined in "Import Sample Information" section in this manual or manually by first highlighting the vessel number and then entering the data.

XpressStart 180					
Details		Graph		Statistics	
Samples					
Vessel	Sample ID	Mass (g)	Volume (mL)	Reagents	Description
1		0.0000	0.00		
2		0.0000	0.00		
3		0.0000	0.00		
4		0.0000	0.00		
5		0.0000	0.00		
6		0.0000	0.00		
7		0.0000	0.00		
8		0.0000	0.00		

- To export data, install a USB in the USB port on the right side of the instrument and press the Export icon.



NOTE

If contents of the USB do not appear within ten (10) seconds, then the USB may need to be reformatted to FAT32. Contact CEM Corporation for details.

Import Sample Information

This feature gives users the ability to import sample information.



NOTE

When the network drive is enabled in the MARSXpress 2.0 software, the USB storage compatibility is disabled and all information will be communicated to/from the network drive.

- Using a computer, create a CSV file on a USB drive (or, create the file in the transfer folder if using the network drive). Name the file as desired.
- Within the CSV file, label the first column in the header row "Vessel Number".
- At least one additional header column must contain the following name:
 - Vessel Number
 - Sample ID
 - Mass
 - Volume
 - Reagents
 - Description

	A	B	C	D	E	F
1	Vessel Number	Sample ID	Mass	Volume	Reagents	Description
2	1		2.045	12	HNO3	
3	5		2.089	12	HNO3	
4	9		1.934	12	HNO3	
5	13		2.123	12	HNO3	

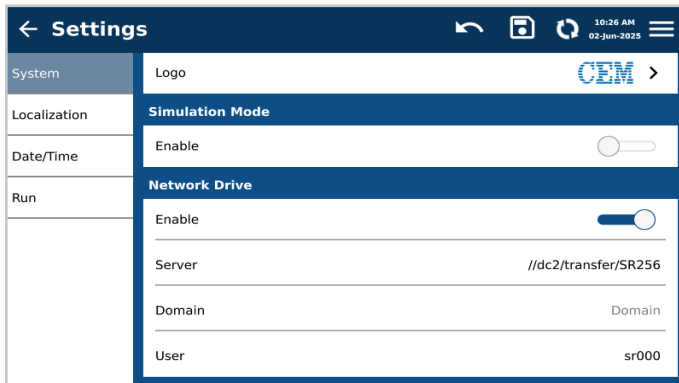
- If using a USB, insert the USB containing the sample queue data (*.csv file) into the USB port located on the side of the unit.

- | ← XpressStart 180 | |     | | 10:16 AM
02-Jun-2025 | | ≡ |
|---------------------------------------|---------|---|------------|-------------------------|----------|-------------|
| Details | Details | Graph | Statistics | Samples | | |
| 30-May-2025 9:47 AM
Experiment: 29 | Vessel | Sample ID | Mass (g) | Volume (mL) | Reagents | Description |
| | 1 | | 0.0000 | 0.00 | | |
| | 2 | | 0.0000 | 0.00 | | |
| | 3 | | 0.0000 | 0.00 | | |
| | 4 | | 0.0000 | 0.00 | | |
| | 5 | | 0.0000 | 0.00 | | |
| | 6 | | 0.0000 | 0.00 | | |
| | 7 | | 0.0000 | 0.00 | | |
| | 8 | | 0.0000 | 0.00 | | |

- ## Data Search

Network Connectivity

Network file sharing allows a designated user to import/export methods, import/export sample queues, export data, import/export system backup information, and update the software from a designated network location. When the network drive is enabled in the MARSXpress 2.0 software, the USB storage compatibility is disabled and all information will be communicated to/from the network drive.



Setup

1. Connect an Ethernet cable from a networked source to the MARSXpress 2.0. The MARSXpress 2.0 must be provided an IP address via Dynamic Host Configuration Protocol (DHCP).
2. From the home screen, select Settings -> System -> "Network Drive."
3. Select "Enable."
4. Enter the parameters outlined below. Consult with the user's IT department and note that the parameters are case sensitive.

Server: Samba share. The directory folder on the server must be empty.

Example:

IT Information

Server Name or IP address: Server XYZ or xxx.xxx.xxx.xxx

Directory on Server: path/to/desired/folder

User would enter on MARSXpress 2.0

Server: //Server XYZ/path/to/desired/folder or xxx.xxx.xxx.xxx/path/to/desired/folder

Domain: If left empty, domain will default to WORKGROUP

User: account on server. CEM recommends creating a user account for the MARSXpress 2.0 since only one account can be assigned to each MARSXpress 2.0.

5. Select the Save icon. The Network Drive icon will appear at the top of the screen. The following folders will be created within the directory folder on the server with the subfolders listed below:

Server XYZ/path/to/desired/folder/cem/marsxpress 2.0 or xxx.xxx.xxx.xxx/path/to/desired/folder/cem/marsxpress 2.0

- "backup" - Create or restore system backups - see "Maintenance Procedures" section
- "data" - Export data and generate reports - see "Data Search" section
- "images" - Import images for User Avatars, Screen Savers, or Logos
- "methods" - Import or Export Methods - see "Methods" section
- "screenshots" - Export screenshots from system - See "Software Overview" section
- "softwareupdates" - Install software packages - see "Software Update" section
- "samplequeue" - Import Sample Queue - see "Import Sample Information" in the "Data Search" section

**CAUTION**

DO NOT edit the names or delete these files.

6. Press the Network Drive icon and enter the password for the network user account assigned to the MARSXpress 2.0. When the Network Drive Connected icon appears, methods, data, and backup information will be stored on the designated network. Methods, data and backup information WILL NOT be stored if the Network Drive Disconnected icon appears.

**NOTE**

The user account's password will need to be entered into the MARSXpress 2.0 after every power up to continue file sharing.

When the network drive is enabled in the MARSXpress 2.0 software, the USB storage compatibility is disabled. To enable USB function, disable the network drive.

Methods

Pre-installed XpressStart Methods take the guesswork out of method creation and sample preparation. If there is not a current CEM Method to digest a sample, contact elemental.support@cem.com for applications assistance.

XpressStart methods cannot be created, copied, edited, deleted, imported, or exported.

Create a Method

If there is not a XpressStart method to digest a sample, a method can be programmed as outlined below. Only users with administrator or standard privileges can create methods.

1. From the Home screen, press the Methods icon.
2. Press the “+” icon at the top of the screen.
3. Press “Settings” on the left side of the screen.

The screenshot shows the 'Create Method' screen with the 'Settings' tab selected. The interface includes a top bar with a back arrow, the title 'Create Method', and icons for save, refresh, and a menu. On the left, there is a sidebar with 'Settings' and 'Stages' options. The main content area has a 'Name' input field, a 'Control Type' dropdown set to 'Ramp to Temperature', a 'Vessel Auto Detect' toggle switch, and a 'Notes' text area.

4. Enter the Name, Vessel Type, and Notes.
 - Name: Input a name for the method
 - Control Type: Ramp to Temperature
 - Vessel Auto Detect: enable or disable. Disabling "Vessel Auto Detect" will enable "Vessel Type"
 - Vessel Type: Xpress or Xpress Plus
 - Notes: Any notes entered in this box will appear in the Method and Method Report, but will not affect the run.
5. Press “Stages” on the left side of the screen.

The screenshot shows the 'Create Method' screen with the 'Stages' tab selected. The top bar is identical to the previous screen. The sidebar now has 'Stages' selected. The main content area displays a table with the following data:

Stage	Temperature (°C)	Ramp Time	Hold Time
1	180	15:00 - 25:00	5:00

Below the table is a large blue rectangular area for additional settings or notes.

- Stage: A minimum of one (1) and up to five (5) stages can be added.
- Temperature: 50 - 210 (°C)

- Ramp Time
Auto Detect Enabled (system defined): 15:00 - 25:00
Auto Detect Disabled (user defined): 15:00 - 60:00 (stage 1) and 5:00 - 60:00 (stages 2-5)
- Hold Time: 0 - 60 min per stage

6. Press the Save icon.

Edit Method

When a method is edited, a new Snapshot of the method will be taken. This will allow the user to recall the method parameters when viewing run data. Only users with administrator or standard privileges can edit methods. CEM methods cannot be edited.

1. From the Home screen, press the Methods icon.
2. Press the method to be edited.
3. Press the Edit icon at the top of the screen.
4. Select desired tab to edit: Settings or Stages.
5. Edit parameters. See the “Create Method” section for specific details.
6. Press the Save icon.

Copy Method

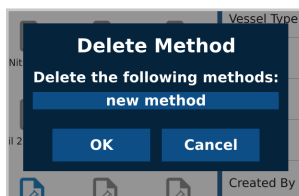
A method can be copied and edited if desired. Only users with administrator or standard privileges can copy methods.

1. From the Home screen, press the Methods icon.
2. Press the method to be copied.
3. Press the Copy icon at the top of the screen.
4. Create a new name for the method and press “OK” or cancel.
5. If “OK” is pressed, the method will be transferred into the User Methods folder and the “Edit Method” screen will appear.
6. Edit the desired parameters, and save method.

Delete Method

Only users with administrator or standard privileges can delete methods. Run data will no longer be available once a method is deleted.

1. From the Home screen, press the Methods icon.
2. Press method to be deleted. Multiple methods can be deleted at a time by highlighting multiple methods.
3. Press the Delete icon.



4. Press “OK” to delete the method(s) or “Cancel” to return to the previous screen.

Export Method

Only users with administrator or standard privileges can export methods.

**NOTE**

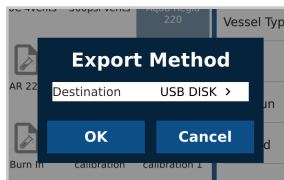
When the network drive is enabled in the MARSXpress 2.0 software, the USB storage compatibility is disabled and all information will be communicated to/from the network drive.

1. Insert a USB flash drive into a USB port on the MARSXpress 2.0.
2. From the Home screen, press the Methods icon.
3. Select the method(s) to export to the USB flash drive. Multiple methods can be exported at a time by long holding a method and then highlighting additional methods.
4. Press the Export icon.

**NOTE**

If the export icon does not appear within ten (10) seconds, then the USB may need to be reformatted to FAT32. Contact CEM Corporation for details.

5. Select the destination.



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

Import Method

Only users with administrator or standard privileges can import methods.

**NOTE**

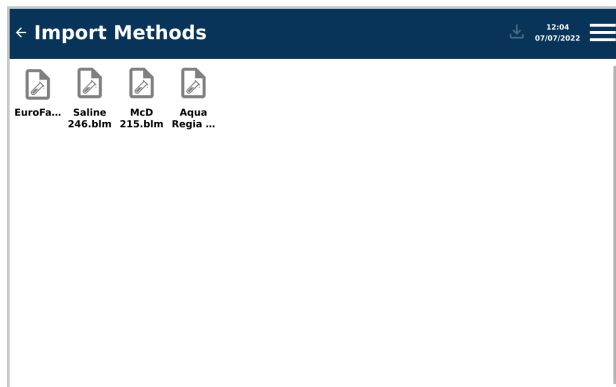
When the network drive is enabled in the MARSXpress 2.0 software, the USB storage compatibility is disabled and all information will be communicated to/from the network drive.

1. To import a method, insert a USB flash drive in the USB port on the system.
2. From the Home screen, press the Methods icon.
3. Press the Import icon along the top of the screen.

**NOTE**

If the Import icon does not appear within ten (10) seconds, then the USB flash drive may need to be reformatted to FAT32. Contact CEM Corporation for details.

4. Select the method(s) to import from the USB flash drive.



5. Press the Import icon.
6. Press "OK" once finished.

Users

The name of the user that is logged in is displayed at the top right corner of the screen. Users can be activated by disabling “Auto Login.” While there may be multiple administrator, standard, and basic users, every system must maintain at least one administrator.

Enable Users/User Groups

Auto login occurs until “Auto Login” is disabled. An administrator must be logged in to disable Auto Login.

1. From the Home screen, press the System Menu icon in the top right corner of the screen.
2. Press “Users.”
3. Press the Settings tab.
4. Change the “Enable User” toggle to “OFF.”
 - If Auto Login is set to “OFF”, the operator will have to choose a user and login each time the system is powered on.
 - If Auto Login is set to “ON”, the Home Screen will be displayed once the instrument completes the initial power up.
5. Press the Save icon. The next time the power is cycled, a log-in screen will appear.

Create User

Only an administrator can create a new user.

1. From the Home screen, press the System Menu icon in the top right corner of the screen.
2. Press “Users.”
3. Press the “New” icon in the upper right corner.
4. Enter the “ID” and “Name.”
5. Assign the user as an administrator, standard or basic.
6. Ensure that “Enabled” is toggled on.
7. Press “OK”.
8. Using the keypad, enter the desired password and press “OK”.
9. Re-enter the password and press “OK” to save.
10. The software will indicate that an additional user has been entered into the database.
11. Additional users can be added at this time.

Edit/Delete User

Only an administrator can edit/delete a user.

1. From the Home screen, press the System Menu icon in the top right corner of the screen.
2. Press “Users.”
3. Select the user to edit/delete.
4. Press the Edit icon or Delete icon.
 - If Edit is pressed, make the appropriate changes, and press the Save icon.
 - If Delete is pressed, confirm that the user wishes to delete the selected user.

User Groups

User Groups privileges are determined by the administrator(s); therefore, an administrator must be logged in as the current user.

1. Ensure that a user with administrative privileges is logged in.
2. From the Home screen, press the System Menu icon in the top right corner of the screen.
3. Press “Users.”
4. Make edits to the groups as needed. The following is the comprehensive list of user groups and default privileges.

	Administrator	Standard	Basic
Methods			
Run	x	x	x
Modify	x	x	
Data			
View	x	x	x
Search	x	x	x
System			
Settings	x		
Calibrate	x		
Update	x		

5. Press the Save icon.

User Logs

The User Logs are an account of user activity; excluding run data.

System Menu

Customize System Settings

System settings are determined by the administrator(s); therefore, an administrator must be logged in as the current user to adjust the settings. Changes made to these settings will be applied for all users.

1. Press the System Menu icon in the top right corner of the screen.
2. Press “Settings” and then press the Localization tab.
3. If English is not the preferred language, press Language to scroll through and select the applicable system language.



NOTE

If the language is changed, the MARSXpress 2.0 will reboot once the Save icon is selected.

4. Press Date Format to enter the desired format for displaying the date (MM/DD/YYYY, DD/MM/YYYY or YYYY/MM/DD).
5. Press Time Format to enter the desired format for displaying the time (12 Hour or 24 Hour).
6. Press the Date/Time tab, and set the correct date and time.
7. Additional System Settings can be adjusted at this time.
8. Press the Back icon to return to the Home Screen.

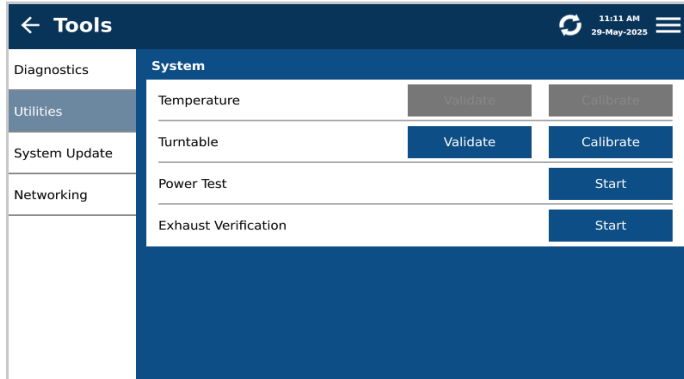
Validations

Temperature Validation

Temperature is validated using the AutoCal 2.0. Contact CEM or one of its authorized dealers.

Turntable Validation

1. Select the System Menu icon in the top right corner of the screen.
2. Select Tools.
3. Select the “Utilities” tab.



4. Follow the instructions on the software to perform the turntable validation procedure. The MARSXpress or MARSXpress Plus turntable can be used.
There are three (3) possible validation outcomes:
 - Does image match the vessels installed in turntable - verify that the vessel orientation matches the image on the screen
 - Validation canceled - user canceled the procedure
 - Validation error - contact a CEM representative

Power Test

The power test assesses the power applied to the vessel(s).

1. Press the System Menu icon located in the top right corner of the screen.
2. Press “Tools” and the “Utilities” tab.
3. Locate “Power Test” and press “Start.”
4. Follow instructions located on the screen to complete validation. The calculated wattage along with the initial and final temperature will be recorded in the user logs.

Exhaust Verification

The Exhaust Verification test determines if adequate exhaust flow is achievable at 2 different stages: idle and active. During the idle stage the blower is off and during the active stage the blower is on.

1. Ensure that the exhaust hose is connected and has active draw.
2. Press the System Menu icon located in the top right corner of the screen.
3. Press “Tools” and the “Utilities” tab.
4. Locate “Exhaust Verification” and press “Start.”

5. Follow instructions located on the screen to complete validation. A green check will appear if the validation is successful. A red "X" will appear if a validation fails. If either of the validation point fails proceed as outlined below.
- If the "Idle" validation fails, verify the connection to the exhaust.
 - If the "Active" validation fails, verify that the exhaust requirements have been met as outlined in the "System Specifications" section of this manual. If the exhaust requirements have been met and the 'Exhaust Verification' test still fails, contact CEM Service.



WARNING

DO NOT attempt unit operation if the "Exhaust Verification" test fails. Verify that exhaust requirements have been met and then contact CEM Service.

Warranty can be invalidated if airflow requirements are not to specification.

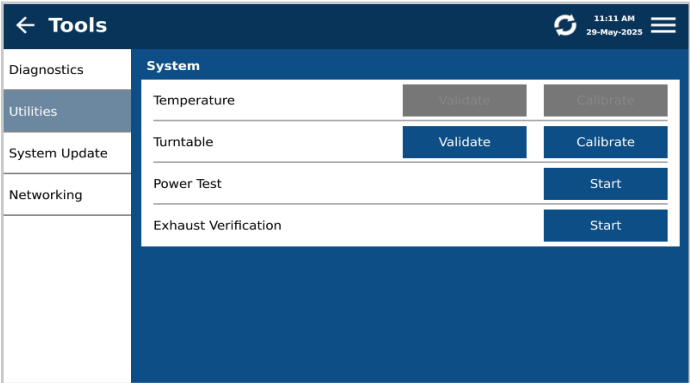
Calibrations

Temperature Calibration

Temperature is calibrated using the AutoCal 2.0. Contact CEM or one of its authorized dealers.

Turntable Calibration

- 1. Select the System Menu icon in the top right corner of the screen.
- 2. Select Tools.
- 3. Select the “Utilities” tab.



- 4. Follow the instructions on the software to perform the turntable calibration procedure. The MARSXpress or MARSXpress Plus turntable can be used for calibration.
There are three (3) possible validation outcomes:
 - Calibration saved
 - Calibration canceled - user canceled the procedure
 - Calibration error - contact a CEM representative

Software Update

How to Update Software

The software/firmware should be updated when a revised version is released. The software/firmware can be obtained from CEM's website www.cem.com. One user should be responsible for updating the software.



NOTE

When the network drive is enabled in the MARSXpress 2.0 software, the USB storage compatibility is disabled and all information will be communicated to/from the network drive.

1. Using a computer, download the MARSXpress 2.0 software and copy it onto the root directory of a USB.
2. Insert the USB containing the software update bundle (*.cib) into the USB port located on the side of the unit.
3. Press the System Menu icon in the top right corner of the screen.
4. Press "Tools."
5. Press "System Update."
6. Select the available software version and highlight the latest software version.



NOTE

If contents of the USB do not appear within ten (10) seconds, then the USB may need to be reformatted to FAT32. Contact CEM Corporation for details.

7. Press "Install." The software will begin updating, and the system will automatically restart.
8. Upon restart, verify the software version. Press the "System Menu" > "Information" > "System."

Maintenance Overview

A routine maintenance protocol is vital for the long-term operation of the MARSxpress 2.0. CEM suggests for routine maintenance to be performed as outlined below.

Additional maintenance procedures for the vessels are outlined in the appropriate vessel manuals and must be performed in addition to the MARSXpress 2.0 maintenance procedures.

As Needed Maintenance

- Clean surfaces of the instrument - see “Maintenance Procedures” section of this manual
- Perform System Validation tests - see “Validations” section of this manual
- Perform software updates - see “Software Update” section of this manual
- Install/Replace fuses - see “Maintenance Procedures” section of this manual

Weekly

- Exhaust hose cleaning - see "Maintenance Procedures" section of this manual

Semi-Annual Maintenance

- Visit www.cem.com to check for software updates

Annual Maintenance

- Preventative Maintenance by CEM Certified Technician.
Preventative maintenance is performed annually, or on a customized schedule to meet your needs. Contact your CEM representative for information regarding a service contract.

Maintenance Procedures

CEM suggests that you perform the routine maintenance on your instrument as outlined below. See the “Maintenance Overview” section for semi-annual and as-needed schedules.



WARNING

Proper precautions must be taken to avoid contact with acid or acid vapors. Personal Protective Equipment (PPE) should be worn as outlined in the user's safety program for hazardous materials and the acid manufacturer's safety data sheet. Refer to these guidelines for proper handling and disposal of the acids.

Clean Surfaces of the Instrument

1. Ensure the instrument is idle.
2. Remove the turntable.
3. For HF applications (ONLY): Hydrofluoric Acid (HF) is a highly corrosive inorganic acid; therefore, it must be handled with extreme caution. Boric Acid (at least 4% w/v) is to be used to neutralize HF. Once neutralized, proceed with the cleaning steps outlined below.
4. Wipe the inside of the cavity and exterior of the instrument with a clean, lint-free cloth dampened with warm soapy water. DO NOT use organic solvents or reagents to clean the instrument.
5. Allow the cavity to dry completely before resuming use.

Exhaust Hose Cleaning



WARNING

Acid can condense and collect inside the blower duct.

The exhaust hose must be connected and draw at least 100 CFM at the point of connection at all times as it is essential for removing harmful vapors away from the instrument. Vapors should be vented into a fume hood by means of the exhaust hose only.

1. Ensure instrument is powered OFF and mains power disconnected.
2. Remove the exhaust hose from the cavity exhaust outlet.
3. For HF applications (ONLY): Hydrofluoric Acid (HF) is a highly corrosive inorganic acid; therefore, it must be handled with extreme caution. Boric Acid (at least 4% w/v) is to be used to neutralize HF. Once neutralized, proceed with the cleaning steps outlined below.
4. Wipe the space inside the exhaust outlet with a paper towel or disposable cloth.
5. To clean the exhaust hose, disconnect it from the blower exhaust duct, flush it with water and allow to dry before reconnecting to the exhaust outlet.

Replace Fuses



WARNING

Incorrect fuse size may result in fire or inadequate equipment protection.

Replace 15 Ampere Fuses

1. Ensure instrument is powered OFF and mains power disconnected.
2. Remove the two (2) "F15A" fuse holders from the side of the instrument by twisting counter clockwise.
3. Locate the correct fuses inside the accessory kit: 200 - 240 VAC: 15 A fuse (F15AH250V).
4. Install the supplied fuses into the fuse holders.
5. Install the fuse and holders into the instrument and twist clockwise until tight.

Replace 2 Ampere Fuse

1. Ensure instrument is powered OFF and mains power disconnected.
2. Remove the "T2A" fuse holder from the side of the instrument by twisting counter clockwise.
3. Locate the correct fuse inside the accessory kit: 200 - 240 VAC: 2 A fuse (T2AH250V).
4. Install the supplied fuse into the fuse holder.
5. Install the fuse and holder into the instrument and twist clockwise until tight.

Transport, Storage and Disposal



WARNING

Proper precautions must be taken to avoid contact with acid or acid vapors. Personal protective equipment (PPE) should be worn as outlined in the user's safety program for hazardous materials and the manufacturer's safety data sheet. Refer to these guidelines for proper handling and disposal.

Prepare to Ship

Follow the procedures below to prepare the instrument for shipment.

1. Turn the instrument off using the power switch.
2. Disconnect the power cord from the instrument and power receptacle. Do not include the power cord with the instrument if it is returning to CEM for service.
3. Remove the exhaust hose. If liquid or residue is located in the cavity exhaust outlet of the instrument, see "Exhaust Hose Cleaning" in the "Maintenance Procedures" section of this manual.
4. Remove the turntable from the cavity.
5. For HF applications (ONLY): Hydrofluoric Acid (HF) is a highly corrosive inorganic acid; therefore, it must be handled with extreme caution. Boric Acid (at least 4% w/v) is to be used to neutralize HF. Once neutralized, proceed with the steps outlined below.
6. Wipe the inside of the fume cabinet with a clean, lint-free cloth. Place the instrument into the original packaging as outlined below.
7. Close one side of the inner box using tape.
8. Place the bottom foam just inside the box. Note the orientation of the foam and the cutouts.
9. Loosely place enough plastic sheeting to cover the unit over foam.
10. Using two (2) people, place the MARSXpress 2.0 onto the foam, making sure the unit aligns with the cutout.
11. Neatly place the plastic sheeting over the top of the unit.
12. Slide the unit and foam into the box.
13. Place on the edge protectors on the edges of the system.



14. Close the remaining side of the inner box using tape.
15. Insert the top foam set. Note the orientation of the foam and the cutouts.



16. Place the empty accessory kit box in between the two (2) foam pieces.



17. Place the outer carton over the unit, ensuring the cutouts line up with the inner carton.

18. Close the outer carton using tape.

19. Insert the shipping clamps in the 4 cutouts.



Disposal

Before disposing of this device or sending it away for repair, see the “Prepare to Ship” section outlined above.



NOTE

Dispose of the unit according to local and regional regulations.

Troubleshooting

Problems and Possible Solutions

Problems	Possible Cause	Possible Solutions
Instrument Inoperative	Instrument not plugged into electrical outlet	Plug power cord into system and a dedicated, grounded outlet. Adequately rated power cord may be used.
	Power switch not in "on" position	Position power switch to "on"
	Blown fuse	Contact your CEM representative
No Microwave Power	Instrument door ajar	Close MARSXpress 2.0 door before pressing start
	Incorrect percentage of power selected	View "Method" section for programming methods
	Low line voltage	Verify line voltage is within specifications
Temperature not reading correctly	IR sensor has debris	Wipe IR sensors with a lint free damp cloth.
	IR Sensor needs calibration	If AutoCal 2.0 Calibration device is available, calibrate sensor as outlined in this manual. If AutoCal 2.0 calibration device is not available, contact your CEM representative.
Play icon grayed out on Run screen	System does not meet run checks criteria	Select the run checks icon to determine what criteria is not met
Cooling time has increased	Insufficient exhaust/airflow	Perform an "Exhaust Validation" test as outlined in the "Validations" section of this manual to determine if adequate exhaust is achievable.
TempGuard error message appears	Temperature in any vessel exceeds the TempGuard threshold.	See the "Important Safeguards" section of this manual as well as the appropriate vessel manual for operating parameters.
ReactiGuard error message appears	Disturbance occurred inside the cavity	Allow vessels to cool for a minimum of 15 minutes before opening the microwave door. To prevent the possibility of severe burns, ensure that gloves and protective gear as outlined in your safety program are worn.

System Specifications

Location Requirements

- DO NOT install inside a fume hood
- DO NOT place items on top of the instrument
- Is free from vibration of large equipment
- Designated area with a sturdy, non-flammable workbench capable of handling at least 200 lb (91 kg)
- The system weighs 140 lb (63.5 kg) without vessels
- Adequate bench space
 - Footprint of unit: 21 in (53.3 cm) W x 25 in (63.5 cm) D x 23 in (59.2 cm) H
 - Recommended counter space: 37.5 in (95.3 cm) W x 28 in (71.1 cm) D. This provides at least 8 in (20.3 cm) of open space on each side and 3 in (7.6 cm) of open space on the back of the instrument for the exhaust hose connection and ventilation.
- Allows for easy access to the microwave and room for the door to extend fully at 20 in (50.8 cm)
- Shelves or cabinetry above unit is not recommended.
- Provides adequate space for sample handling
- Do NOT position the instrument such that it is difficult to access the power connector. The power connector of the instrument must be readily accessible for mains disconnection if needed.
- A fume hood within 8 ft (2.5 m) of unit or adequate exhaust that pulls a minimum of 100 CFM at point of connection
 - Vent hose is 8 ft (2.5 m) long with a 3 1/8 in (8 cm) OD x 2 13/16 in (7 cm) ID

Electrical Requirements

- MARSXpress 2.0 is Region Specific
 - 220/240 VAC, 50 Hz, 15 Amp @ 240 VAC
 - 200 VAC, 50 Hz, 15 Amp @ 200 VAC
 - 208/230 VAC, 60 Hz, 15 Amp @ 230 VAC
 - Instrument is supplied with a NEMA 6 -15 Plug
 - Receptacle non locking
- Line voltage must not be more than $\pm 10\%$ of its specified level
- Requires dedicated, grounded outlet no more than 8.2 ft (2.5 m) from unit
- Instrument is supplied with a region-specific power cord or an adequately rated power cord may be used
- Fuse Replacements
 - 220/240 VAC, 50 Hz
 - 15A, 250V, 6.3mm x 32mm, fast acting (F15AH250V)
 - 2A, 250V, 5mm x 20mm, slow blow (T2AH250V)
 - 200 VAC, 50 Hz
 - 15A, 250V, 6.3mm x 32mm, fast acting (F15AH250V)
 - 2A, 250V, 5mm x 20mm, slow blow (T2AH250V)
 - 208/230 VAC, 60 Hz
 - 15A, 250V, 6.3mm x 32mm, fast acting (F15AH250V)
 - 2A, 250V, 5mm x 20mm, slow blow (T2AH250V)

Environmental Requirements

- Indoor use only
- Altitude up to 6000' (2000 m)
- A Temperature range of 41 °F (5 °C) to 104 °F (40 °C)
- 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,
- Site Preparation specifications are not met or maintained
- 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.

CEM Corporation
3100 Smith Farm Rd.
Matthews, NC 28105-5044
(800) 726-5551
Fax: (704) 821-4368
Email: Service@cem.com
Website: <https://www.cem-service.com>

Outside the U.S.

CEM Corporation
3100 Smith Farm Rd.
Matthews, NC 28105-5044
(704) 821-7015
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 MARSXpress 2.0 applications information, go to <http://cem.com/marsxpress-2>.



CEM Corporation
MARSXpress 2.0
<http://cem.com/marsxpress-2>

CEM is proud to provide applications support for any acid digestion related questions from a team of trained chemists with a complete digestion lab. Contact your CEM representative for more information.

Technical Support

CEM is proud to provide technical support for the MARSXpress 2.0 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 “MARSXpress 2.0 Service” or email service@cem.com. For technical support outside the US and Canada, contact your local CEM Subsidiary or Authorized Dealer.

Requested Information

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

- MARSXpress 2.0 Serial Number
- MARSXpress 2.0 Software Version



CEM Corporation
Service
<http://www.cem-service.com>

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

Contact Information

Headquarters, Global Offices and Worldwide Distributors

For a complete list of subsidiaries and distributors of CEM products, including contact information, visit the link below.



CEM Corporation
Contact Us
<https://cem.com/contact-us>



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In the event that this manual is
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and the English-language version
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