



CLEANING STATION 601800



Getting Started Guide

Revision A Issued September 2016

Notice

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Introduction

Important: TA Instruments Manual Supplement

Please click the [TA Manual Supplement](#) link to access the following important information supplemental to this Getting Started Guide:

- TA Instruments Trademarks
- TA Instruments Patents
- Other Trademarks
- TA Instruments End-User License Agreement
- TA Instruments Offices

Notes, Cautions, and Warnings

This manual uses NOTES, CAUTIONS, and WARNINGS to emphasize important and critical instructions.

NOTE: A NOTE highlights important information about equipment or procedures.

CAUTION: A CAUTION emphasizes a procedure that may damage equipment or cause loss of data if not followed correctly

MISE EN GARDE: UNE MISE EN GARDE met l'accent sur une procédure susceptible d'endommager l'équipement ou de causer la perte des données si elle n'est pas correctement suivie.

A WARNING indicates a procedure that may be hazardous to the operator or to the environment if not followed correctly.

Un AVERTISSEMENT indique une procédure qui peut être dangereuse pour l'opérateur ou l'environnement si elle n'est pas correctement suivie.

Regulatory Compliance

Safety Standards

EMC Directive

This instrument has been tested to meet the European Electromagnetic Compatibility Directive (EMC Directive, 2004/108/EC). The Declaration of Conformity for your instrument lists the specific standards to which the unit was tested.

The instrument was designed specifically as a test and measuring device. Compliance to the EMC directive is through IEC 61326-1 Electrical equipment for measurement, control and laboratory use - EMC requirements (1998).

As noted in the IEC 61326-1, the instrument can have varying configurations. Emissions may, in non-typical applications, exceed the levels required by the standard. It is not practical to test all configurations, as the manufacturer has no control over the user application of the instrument.

Immunity Testing

The instrument was tested to the requirements for laboratory locations.

Emission Testing

The instrument fulfills the limit requirements for Class A equipment but does not fulfill the limit requirements for Class B equipment. The instrument was not designated to be used in domestic establishments.

Low Voltage Directive (Safety)

In order to comply with the European Low Voltage Directive (2006/95/EC), this equipment has been designed to meet IEC 1010-1 (EN 61010-1) standards. To comply with requirements in the USA, this instrument has been tested to the requirements of UL61010a-1.

Safety

Maintenance and repair of internal parts must be performed only by TA Instruments or other qualified service personnel.

WARNING: The operator of this instrument is advised that if the equipment is used in a manner not specified in this manual, the protection provided by the equipment may be impaired.

AVERTISSEMENT: L'utilisateur de cet instrument est prévenu qu'en cas d'utilisation contraire aux indications du manuel, la protection offerte par l'équipement peut être altérée.

Electrical Safety

DC voltages of 24V and less are present in this instrument. You must unplug the instrument before doing any maintenance.

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Chapter: 1

Introducing the Cleaning Station 601800

Overview

The Cleaning Station is an automated reaction cell cleaning accessory for the Affinity ITC, Nano ITC, and Nano DSC instruments. (The Affinity Auto instrument and Nano DSC Autosampler system inherently include cell cleaning functions.)

Three filtered cleaning solvent channels are provided. Cleaning fluids are routed in and out of the calorimeter reaction cells via the cleaning tool that is provided. A vacuum pump inside the Cleaning Station provides the motive force to circulate the fluids. The vacuum flasks that are provided with ITC and DSC instruments are used to collect the spent cleaning fluids.

Cleaning methods are defined in the method editor software, and are then downloaded into the Cleaning Station via the USB connection. The Cleaning Station can then run these stored methods in stand-alone operation without being connected to a computer. Individual methods are selected from the list, and may be reviewed in detail on the touch screen.

Proper solvent connections are critical for maintaining the integrity of the cleaning methods. Solvent ports are marked with numeric labels on the top and rear panels, matching the numbers referenced in the methods.

All functions of the Cleaning Station are controlled by the splash-resistant graphical touchscreen.



Figure 1 Cleaning Station 60180X.

System Components



Figure 2 System components.

- Cleaning Station
- Universal Power Adapter 100–240VAC / 24 VDC 1.0A with plug adapters
- USB Cable
- Vacuum line with quick connect fitting
- Bulk supply of silicone connection tubing (qty. 3.1 m [10 ft.])
- Adapters, 1/4”-28 threads per inch to hose barb (qty. 4)
- Card with instructions for downloading the Cleaning Station Method Editor software

Instrument Specifications

The table found below contains the technical specifications for the Cleaning Station.

Table 1: Cleaning Station Technical Specifications

Item/Area	Specifications
Dimensions	Height: 12.1 cm (4.75 inches) Width: 15.9 cm (6.25 inches) Depth: 22.2 cm (8.75 inches)
Weight	2.3 kg (5 lbs)
Electrical Power	Input 100–240 ACV 50/60 Hz 0.6A, Output 24 VDC 1.0A
Laboratory conditions	Temperature: 15 to 30°C Relative Humidity: 5 to 80% (non-condensing) Instrument is rated for indoor use only (degree of protection = IPX0) and should be located in a dust-free environment (Pollution Degree 2 Environment) Installation Category II Maximum Altitude: 2000 m (6560 ft)
Physical clearance	The immediate area surrounding the Cleaning Station must be available for the bulk cleaning fluid bottles
Emissions class	Class A
Temperature range (storage)	2 to 80°C

Rear Panel Connections



Figure 3 Rear panel of the Cleaning Station.

- Solvent Inlets (qty. 3, female 1/4"-28 ports)
- Solvent Outlet (Install the 1/4"-28-to-barb adapter; connects to side port on cell cleaning tool)
- Cleaning Port (Quick connect inlet to vacuum pump; connect to side arm on vacuum flask)
- Pump Outlet (Air exhaust outlet from the vacuum pump. Optional: connect a length of silicone tube and route to a waste collection flask)
- USB port (for downloading cleaning methods)
- DC power inlet (connect the supplied power adapter)

Chapter: 2

Installing the Cleaning Station

Unpacking/Repacking the Cleaning Station

CAUTION: To avoid mistakes, read this entire chapter before you begin installation.

MISE EN GARDE: Pour éviter de commettre des erreurs, lisez tout le chapitre avant de commencer l'installation.

The instructions needed to unpack and repack the instrument are found as separate unpacking instructions in the shipping box. You may wish to retain all of the shipping hardware and boxes from the instrument in the event you wish to repack and ship your instrument.

Choosing a Location

It is important to choose a location for the instrument using the following guidelines. The Cleaning Station should be:

In

- a temperature- and humidity-controlled area. Temperatures should be in range 15 to 30°C.

On

- a stable work surface.

Near

- a power outlet. See the [“Power Requirements”](#) section below.
- your computer.

Away from

- dusty environments.
- exposure to direct sunlight.
- direct air drafts (fans, room air ducts).
- poorly ventilated areas.

Power Requirements

The Cleaning Station requires a grounded, single-phase power source. The operating voltage and line frequency were preset at the factory for 100–240 VAC, 50 or 60 Hz operation.

Connecting the Cleaning Station

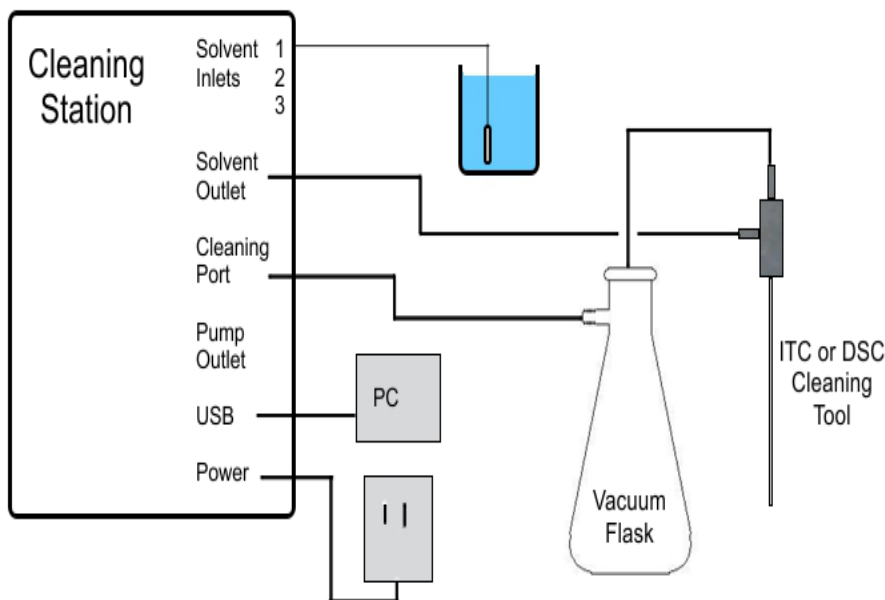


Figure 4 Connection Diagram for cleaning tool (Affinity ITC Standard and Low Volume, Nano ITC Standard and Low Volume, Cylindrical DSC)

- 1 Connect up to three cleaning solvents to the 1/4" - 28 threaded ports on the rear panel of the cleaning station. Use tubing with 0.040" or greater internal diameter. If using the supplied silicone tubing, install three 1/4"-28 barb adapters. Optionally, 1/8" tubes with 1/4"-28 nut terminations can be connected instead.
- 2 Connect the quick-connect of the large diameter vacuum tube (supplied with the calorimeter instrument) to the Cleaning Port, and the free end to the neck of the vacuum flask that shipped with the calorimeter instrument.
- 3 Connect a length of silicone tube to the rubber stopper and install the stopper in the top of the vacuum flask. Connect the free end of the silicone tubing to the top port of the cleaning tool.
- 4 Connect a 1/4" - 28 to barb adapter to the Solvent Outlet at the rear panel of the Cleaning Station. Connect a length of silicon tubing from the side port of the cleaning tool to the barb of the adapter.
- 5 Connect the plug of the provided 24 VDC power adapter to the DC power inlet on the rear panel of the Cleaning Station. Plug in the DC power adapter and the Cleaning Station will begin to operate.

The connections in the case of the capillary model of the Nano DSC are the same except for the instrument. Connect a length of silicone tubing from the vacuum flask to one of the access tube ports of the Nano DSC. Connect the diagonally opposite access tube port of the Nano DSC to the Solvent Outlet of the Cleaning Station. Connect a short piece of silicone tubing on the remaining two diagonally opposite ports on the Nano DSC. The cleaning solvents will flow through the Reference and Sample tubes in series.

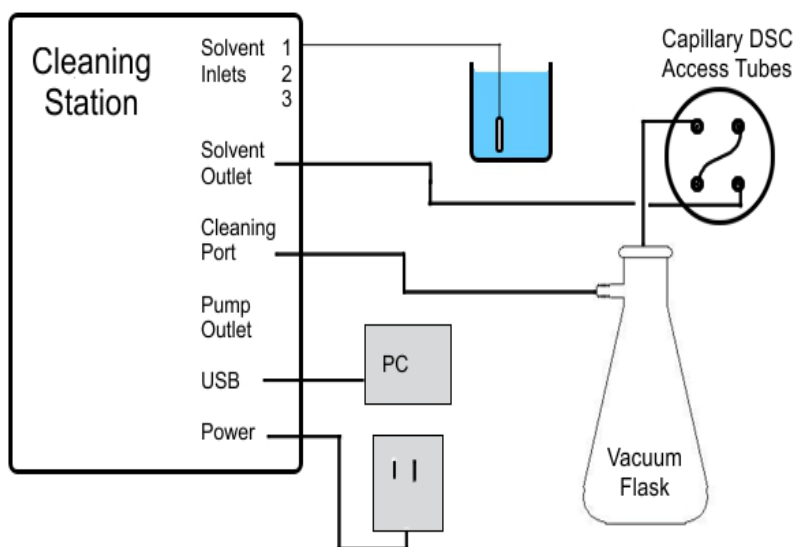


Figure 5 Connection Diagram for silicone tubes (Capillary DSC).

Cleaning Solvents

Three selectable channels for bulk fluids are provided in the Cleaning Station.

The Cleaning Station is constructed of chemically-resistant materials, allowing the use of detergents and strong acids and bases.

Thorough and aggressive cleaning is possible via the use of 2N sodium hydroxide, 0.1N formic acid, and 3-4% solutions of Contrad detergent. One port would typically be dedicated to deionized water for use as a general rinsing fluid. A length of silicone tubing is provided with the Cleaning Station. Cut appropriate lengths for solvent bottles to be located nearby.

Starting the Cleaning Station

To start the Cleaning Station, connect the coaxial power output plug into the receptacle on the rear panel of the cleaning Station, and plug the power adapter module into an available AC outlet.

Shutting Down the Cleaning Station

It is recommended that you rinse all of the solvent inlet channels with pure water, followed by air purges, before shutting the system down for extended periods of time.

The Cleaning Station can then be shut down by unplugging the power adapter.

Chapter: 3

Operation and Maintenance

If you have not done so already, install the Cleaning Station Method Editor software. A card is provided in the shipping box, indicating a web link for downloading the software.

When the Cleaning Station Method Editor starts, the following window displays:

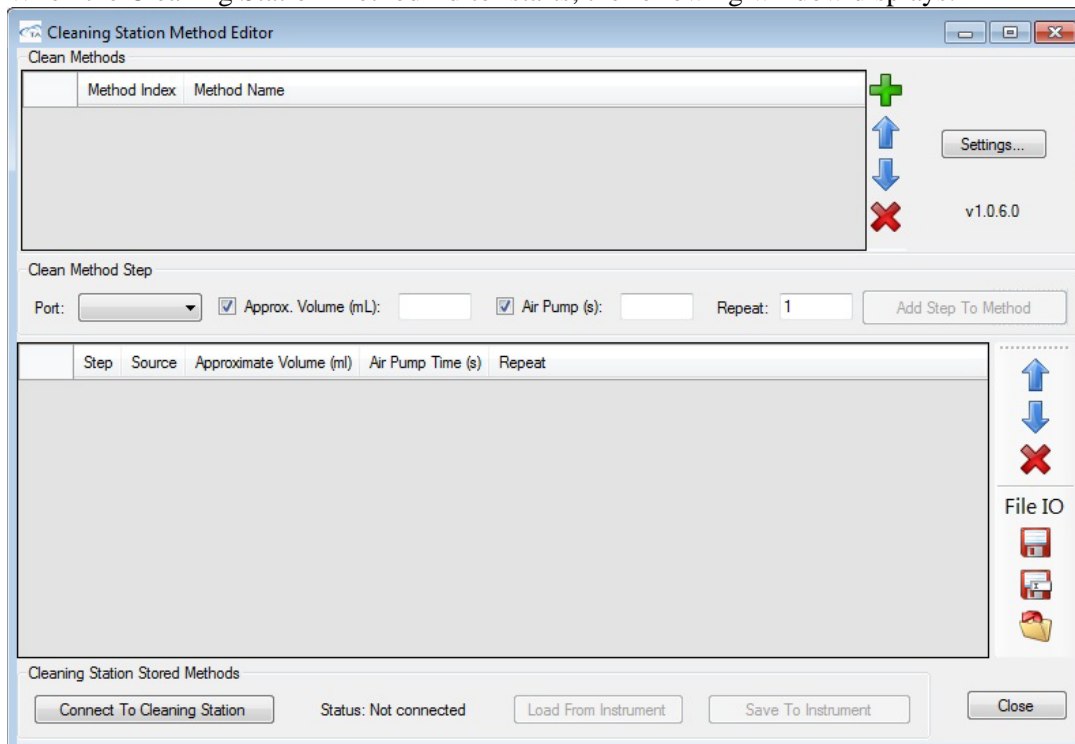


Figure 6 Cleaning Station Method Editor main page.

On the first use of the Cleaning Station, and if solvent vessels are changed to different sizes, click on the **Settings** button to configure the storage vessel volumes. This enables the software to warn you if a cleaning method has been defined that would probably exceed the available supply of a fluid.

Tip: check the fluid levels of the cleaning solvents before running cleaning methods.

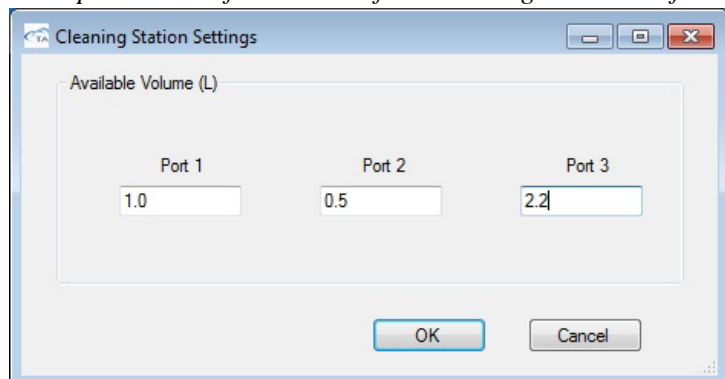


Figure 7 Cleaning Station settings.

Defining Cleaning Methods

Methods that have been previously defined and saved to files on the computer can be loaded from the Clean Methods drop-down menu.

To define a new method, click the **New Method** button and enter a display name. This is the name that appears in the list of downloaded methods in the Cleaning Station.

Tip: Use the text “ITC” or “DSC” in the name to identify the instrument that is the target of the cleaning method.

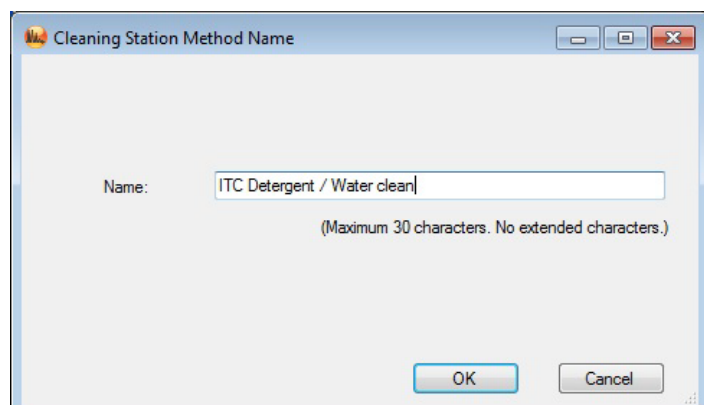


Figure 8 Method name.

Define a cleaning step as follows:

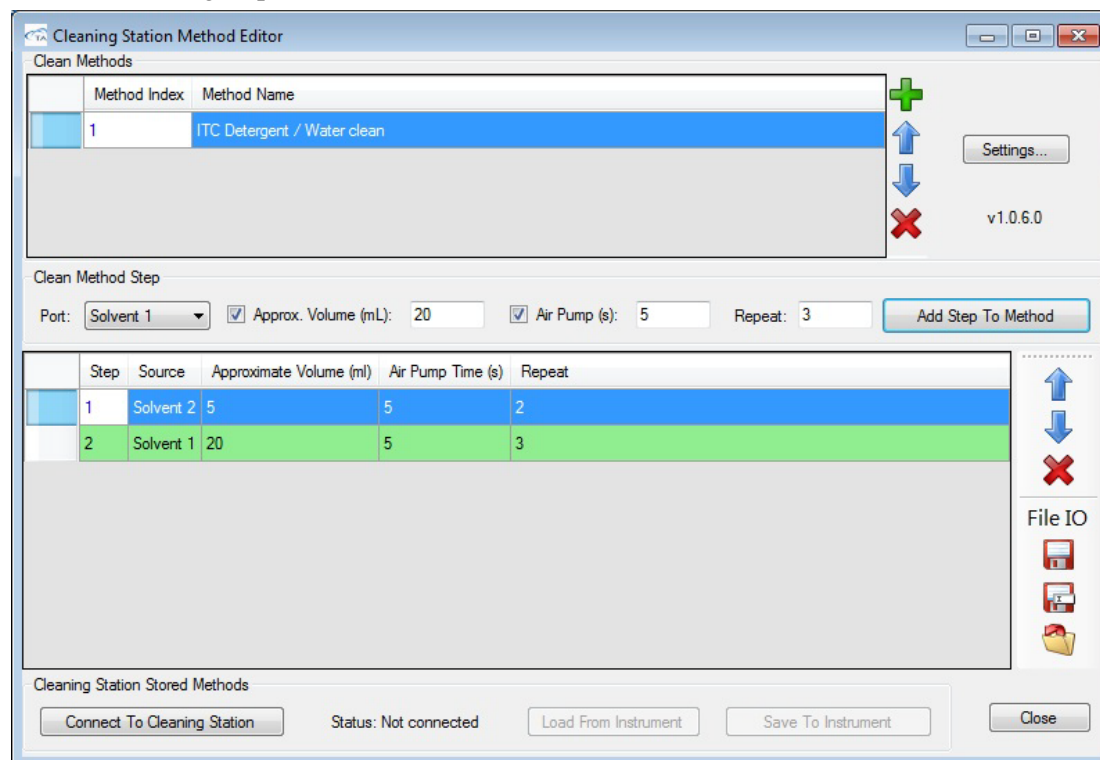


Figure 9

- 1 Select a port associated with the desired cleaning fluid
- 2 Select an approximate volume to flow through the cell

Tip: The volumes are approximate. The Cleaning Station will calculate a time to run the pump according to the calibration factor that is currently set.
- 3 Select whether an air purge is to be used to remove the fluid from the instrument cell, and how long it should run
- 4 Select the number of repeat cycles that are desired for this step. Each cycle consists of the defined fluid pumping interval followed by the air pumping interval (if used).
- 5 Click on the **Add Step to Method** button
- 6 Repeat for all desired cleaning steps.
- 7 Select either the **Save** or **Save As** icon to save the method.

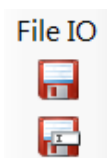


Figure 10 Save icon (top); Save As icon (bottom).

Loading Cleaning Methods in the Cleaning Station

Once methods have been defined in the Cleaning Station Method Editor they can be downloaded into the Cleaning Station.

- 1 Click on the **Connect to Cleaning Station** button at the lower left corner. The following message displays:

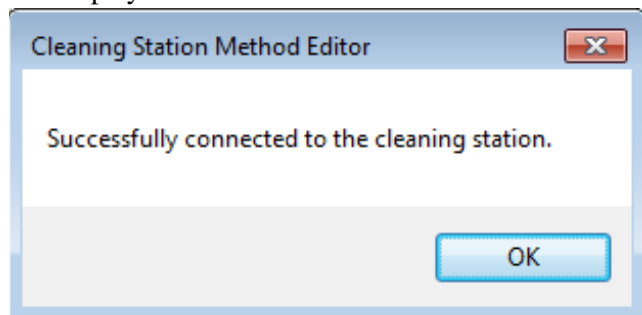


Figure 11 Successful connection message.

- 2 Click **OK**. The **Load from Instrument** and **Save to Instrument** buttons are now active. After you make your selection, a confirmation message displays.

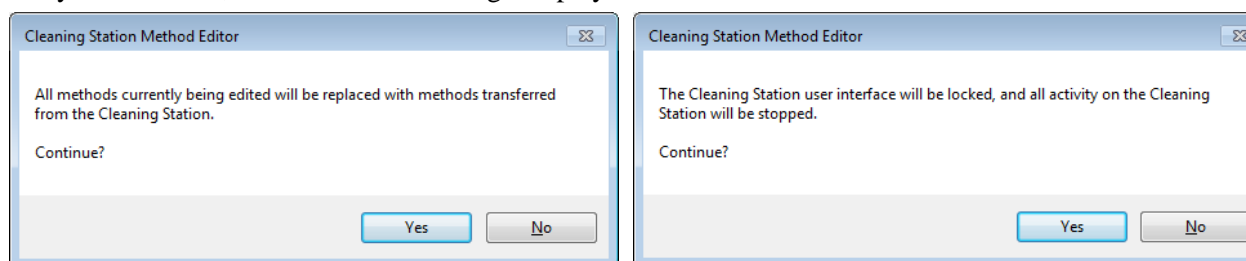


Figure 12 Load from Instrument confirmation (left); Save to Instrument confirmation (right).

- 3 Click **Yes**. When the download to the instrument has completed, you will hear a short beep, and then a confirmation message displays. Click **OK**.

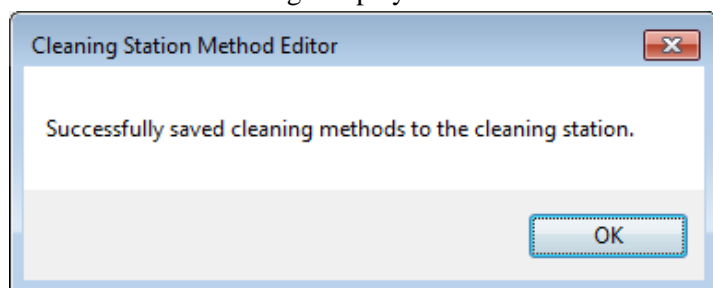


Figure 13 Successfully saved methods confirmation.

Erasing Cleaning Methods from the Cleaning Station Memory

To wipe clear all methods from the internal memory of the Cleaning Station, follow these steps.

Tip: Save the existing methods to disk before clearing, in case they may be useful in the future.

- Use the "X" button in the Method Editor to clear all methods from the software.
- Click **Save to Instrument**.

Operating the Cleaning Station

Power on the Cleaning Station. The main screen displays on the user interface.



Figure 14 Main screen on the Cleaning Station.

Reviewing a Method

To review a saved cleaning method or to select a method:

- 1 Press **Cleaning Methods** on the user interface.
- 2 Select a method from the list so that it becomes highlighted and then press **View**.

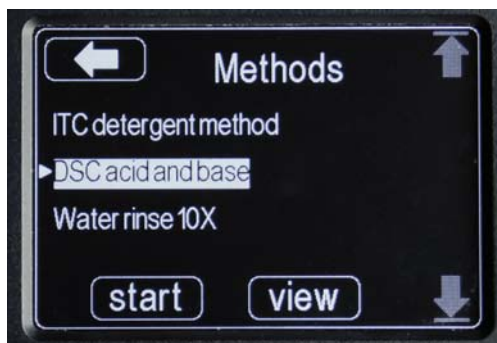


Figure 15 Methods list.

- 3 The sequence of cleaning steps in the method display. To exit this page and return to the Methods list, press the return arrow.

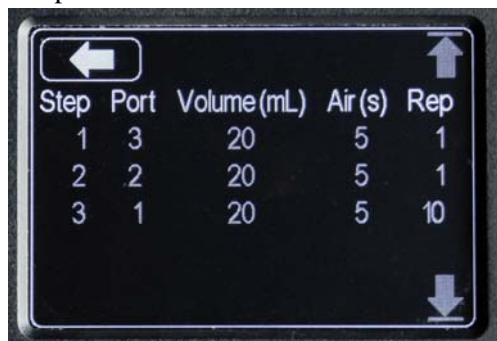


Figure 16 Sequence summary.

- 4 Press **Start** to display the method run page, and then press the arrow to start the method.

Pausing or Stopping a Running Method

The currently running method may be paused, if desired; for example, to give a chance to replenish a cleaning solvent that may have run out unexpectedly.

Press **Pause** to pause the method after the current step completes. When ready to continue, touch the **Pause** button again to resume the method. Press **Stop** to halt the method.



Figure 17 Start, Pause, Stop buttons.

NOTE: After stopping a method there is a mandatory air purge step added in order to clear any remaining fluid from the lines. The time remaining for this step counts down on the screen. The pump stops automatically after this purge interval completes.

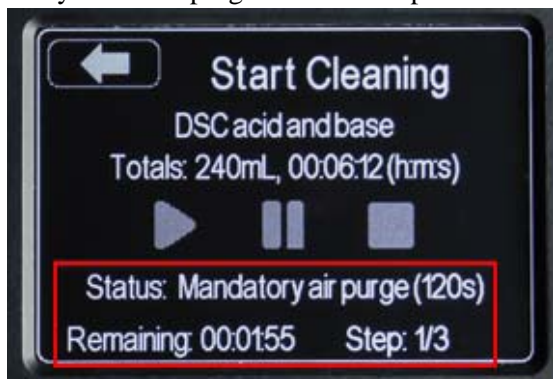


Figure 18 Mandatory air purge message displays on screen.

Manual Operation

From the Main menu on the user interface, select **Manual Control**. The Manual Control page allows you to select solvents and run the vacuum pump.



Figure 19

Press a port button to select a port. Press **Pump** to start or stop the vacuum pump.

Flow Rate Calibration

Cleaning Station methods are constructed in terms of the approximate desired volume of cleaning fluids that are to be drawn through the cleaning tool for each step. However, the Cleaning Station does not have a set specific rate of pumping fluids. Pumping is accomplished by means of a vacuum being drawn through a vacuum flask, and the fluids are then drawn through tubing and a cleaning tool, eventually making their way into that flask. The variable that is under direct control is the time that will be spent running the pump.

The actual rate of flow will be influenced by physical factors such as the ambient absolute atmospheric pressure, the vertical height of the liquid level in the bulk supply bottles, and the flow resistance of the tubing and inlet filter frits. The rate of flow will be relatively constant from channel to channel and from day to day, but could differ when the plumbing is changed, or perhaps between two laboratories that are situated at different elevations above sea level.

The Cleaning Station provides a calibration setting in order to maintain an approximation of the desired volumes of cleaning solvents that are called for in a method. The actual amounts may be slightly more or less than the defined amount. It is a good method design practice to select a volume that is slightly generous.

You can calibrate the flow rate by using the manual controls to set up a flow of a moderate amount of fluid, usually water, for some set amount of time (perhaps one or two minutes) and measure the actual delivered volume of fluid. Then when the method is run, the Cleaning Station will calculate the amount of time to run the pump at each step. The calibration steps outlined here use a graduated cylinder as the supply vessel, with volume readings taken before and after running the pump for some interval of time.

- 1 Set up the system connections as seen in the appropriate connection diagram. For instruments that use a cleaning tool, place that tool in the reaction cell of the calorimeter.
- 2 Insert the inlet tube from one of the ports into a 100 mL or 250 mL graduated cylinder.
- 3 Fill the cylinder to the top mark.
- 4 Using the manual operation page in the Cleaning Station, select the appropriate Port and then activate the pump for a set period of time, for example 1 minute. Note the actual running time to the nearest second.
- 5 Read the remaining volume in the graduated cylinder. Determine the volume of water that was pumped and calculate the flow rate in mL/minute.
- 6 Enter that calculated rate on the slider control in the **Settings** page of the Cleaning Station. Rates can be set in increments of 5 mL/minute.



Figure 20

The Cleaning Station is now ready to run methods according to the desired volumes of fluids as defined.

Screen Saver Function

After a period of inactivity the screen backlight shuts off. Touch anywhere on the screen to re-activate the display. There is no power switch on the device.

Maintenance

The exterior of the Cleaning Station may be cleaned with a soft cloth dampened with pure water. Do not use chemical solvents. The interior flow passages may be cleaned by pumping pure water.

In some cases, some fluid might make its way to the side arm of the vacuum flask during cleaning operations. This fluid goes through the vacuum pump and then exits through the exhaust port on the rear panel of the Cleaning Station. In this case, connect a short length of tubing and route it into a flask for collection before being discarded. The vacuum pump is constructed of chemically resistant materials and will not be harmed by this occasional exposure.

When the Cleaning Station is expected to remain idle for extended periods of time it is recommended that you first rinse the internal passages by pumping clean water through all three solvent inlet ports, with each step followed by air purges. The Cleaning Station can then be powered down by disconnecting the power plug from the rear panel, and unplugging the AC/DC power module.