

1. Unpacking & Preparing the Analyzer for Installation

UNPACKING

Verify that the accessory box contains the following items:

- Operation and Maintenance Manual CD; Quick Setup Guide
- Performance Verification Certificate
- A/C power cord
- Mounting hardware
- Liquid-tight fittings to replace Input/Output wiring plugs
- Reagent – one-liter bottle, funnel, MSDS
- Reagent refill assembly with inflator bulb
- Columns – 1 reagent column, 1 zero column, MSDS for each
- Inlet tubing – Polypropylene, 1/4" OD x 1/8" ID x 100' (2 rolls for 3 or 4 stream)
- Outlet tubing – Polyethylene 3/8" OD x 1/4" ID x 50'
- Inlet filters – 15-micron (one required on each sample inlet)
- Vent plug
- Tubing cutter
- Data Card Reader (including CD and instructions)

Lift the Analyzer from the box. Two people should always handle the Analyzer by gripping the sheet metal enclosure only. Remove the foam end caps, protective bag, and any plastic used to protect the Analyzer during shipment. Perform the following steps:

1. Open the Analyzer door. Loosen the screws (4 or 6) on the electronics cover. Remove the cover and, if present, remove the foam packing insert. Reinstall the cover, and close the Analyzer door.
2. Remove the shipping plug above the reagent reservoir and store it inside the Analyzer door in the keyhole slot. Install the supplied vent plug in its place.

SELECTING A LOCATION

Allow 30 cm of clearance on the sides and top of the Analyzer for the plumbing and electrical connections; 30 cm from the bottom of the Analyzer, or shelf on which it sits, to the drain; 38 cm of clearance in the front of the Analyzer to allow for access to the inside of the chassis; and a minimum of 1 cm clearance between the back of the Analyzer and the wall for heat dissipation.

You will need a large Phillips screwdriver to attach the mounting brackets to the back of the instrument to mount the Analyzer to a wall or Analyzer rack. You will also need hardware to attach these brackets to a wall or rack. After installing the brackets, select a location based on site-specific requirements. Install the Analyzer using mounting bolts capable of supporting its weight.

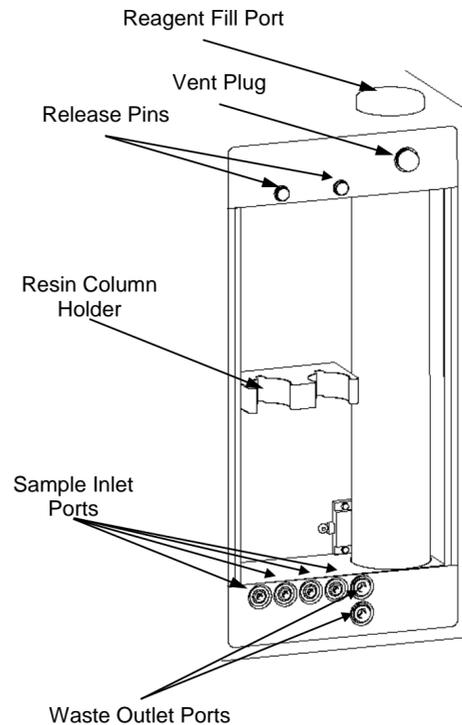
Overall Site Dimensions: Height: 97 cm
Width: 93 cm
Depth: 62 cm

Weight: 21.75 kg (48 lb)

The Analyzer is intended for indoor use only. Avoid mounting the Analyzer in direct sunlight as it may cause the instrument to overheat.

Avoid installing the Analyzer where it may be subject to splashing fluids that may enter the Analyzer through the cooling system and cause damage.

KEY COMPONENTS



INSTALLING CONSUMABLES

Note

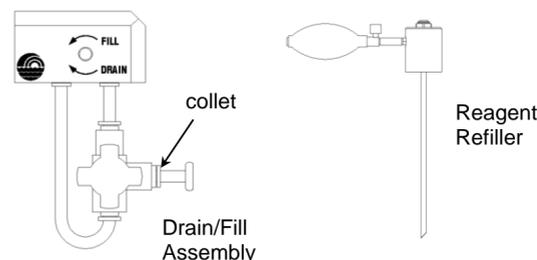
Reagent should last 3 months at the 12-min. interval and 45 days at the 6.5-min. interval.

Installing the Reagent

Option 1: Locate the reagent fill port at the top of the Analyzer. If this port is not accessible, skip to **Option 2**.

1. Unscrew the fill port cap and set it aside.
2. Remove the cap from the bottle of reagent, and pour the reagent into the Analyzer through the fill port using the funnel provided.
3. Replace the fill port cap, and screw it on until fingertight.
4. Discard the empty reagent container.

Option 2: If filling the reagent via the fill port on the top of the Analyzer is not possible, fill the reagent reservoir using the drain/fill assembly and reagent refiller.



2. Installing the Analyzer

Option 2 (continued):

1. Ensure that the Analyzer is turned OFF.
2. Remove the cap from the bottle of reagent, and screw the reagent refiller assembly onto the bottle; this assembly consists of a black rubber hand pump, 1/4" OD PFA tubing, and gray plastic cap with fittings.
3. The drain/fill assembly is installed on the Analyzer in the position normally occupied by the Reagent Column when it is shipped from the factory. However, if reagent is being refilled after the initial setup, remove the Reagent Column and mount the fill/drain assembly in its place. Ensure that the locking pin is engaged.
4. Remove the gray plug on the drain/fill assembly by pressing in on the white collet while pulling out on the plug.
5. Insert the end of the 1/4" OD PFA tube from the refiller into the valve collet on the drain/fill assembly.
6. Turn the valve on the drain/fill assembly counterclockwise to the "FILL" position.
7. Turn the vent on the black rubber hand pump of the refiller clockwise until it is closed.
8. Loosen the vent plug above the reagent reservoir by turning it counterclockwise two full turns.
9. Squeeze the hand pump to pressurize the contents of the reagent bottle, thereby pushing the reagent into the reagent reservoir of the Analyzer. As the last of the reagent is pumped out of the bottle, some air will enter the line and be pushed into the reservoir. This is normal.
10. Turn the vent on the hand pump counterclockwise until it is open, allowing pressure from the bottle to release. **Failure to vent the reagent bottle could result in reagent spillage during subsequent steps.**
11. Remove the reagent refiller assembly by disconnecting the tubing from the valve on the drain/fill assembly by pushing in on the collet while pulling out on the tubing.
12. Remove the drain/fill assembly by pulling out on the release pin and pulling down on the drain/fill assembly.
13. Tighten the vent plug above the reagent reservoir fingertight. Do not overtighten.
14. Clean the drain/fill assembly by filling the empty reagent bottle with DI water; attach the reagent refill assembly to the bottle and to the drain fill assembly as accomplished above. Expel water out of the bottle through the two holes in the top of the drain/fill assembly. Refill the bottle and repeat to ensure all reagent has been rinsed out of the drain/fill assembly. **Failure to perform this step may result in improper operation of the drain/fill assembly during subsequent filling operations.**
15. Reinsert the gray plug into the drain/fill assembly.
16. Store the drain/fill and refiller assemblies on the inside of the Analyzer door.

Installing the Reagent Column and Zero Column

IMPORTANT

For proper operation, ensure that the Zero Column is mounted in the right slot of the column holder and the Reagent Column is mounted in the left slot of the column holder.

Do not reuse drained reagent.

Do not remove columns while the Analyzer is turned on as reagent will continue to be pumped through the system.

Reagent Column (contains all black resin) –

1. Locate the reagent column mounting position directly below the text, "REAGENT COLUMN".
2. If present, remove the drain/fill assembly that may be mounted in this location by pulling the release pin out and then pulling the drain/fill assembly down. The release pin is located directly below the text, "REAGENT COLUMN". Store the drain/fill assembly on the inside lower left of the door, using the thumbscrew to attach it.
3. Wipe any residue off the tube stems behind the release pin using a Kimwipe moistened with DI water.
4. Remove the clear plastic tube that seals the two ports on the top of the reagent column.
5. Wipe any residue from the top of the reagent column using a Kimwipe moistened with DI water.
6. Orient the reagent column with the two ports on top and the side hole facing away from the Analyzer. Push the middle of the column into the holder (dark gray plastic bracket centered on the right side of the Analyzer), and then push the column up into its mounting location until it snaps into place.

Zero Column (contains half black resin and half white resin) –

1. Locate the zero-column mounting position on the right side of the Analyzer, directly below the text, "ZERO COLUMN".
2. If present, remove the bypass assembly that may be mounted in this location by pulling the release pin out and then pulling the bypass assembly down. The release pin is located directly below the text, "ZERO COLUMN". Store the bypass assembly on the inside lower right of the door, using the thumbscrew to attach it.
3. Wipe any residue off the tube stems behind the release pin using a Kimwipe moistened with DI water.
4. Remove the clear plastic tube that seals the two ports on the top of the zero column.
5. Wipe any residue from the top of the zero-column using a Kimwipe moistened with DI water.
6. Orient the zero column with the two ports on top and the side hole facing away from the Analyzer. Push the middle of the column into the holder (dark gray plastic bracket centered on the right side of the Analyzer), and then push the column up into its mounting location until it snaps into place.

2. Installing the Analyzer (cont.)

PLUMBING CONNECTIONS

Note

The Analyzer requires a minimum of 20 psi inlet pressure on each channel to operate properly. Below this pressure, the Analyzer will indicate "Low Sample Pressure" on the front display, and will either go into a standby mode if *all* channels are below 20 psi, or will advance to the next available channel if one or more channels are below 20 psi.

Sample Inlet Connection

- Run a length of tubing (maximum recommended length is 50') from the sample point to the Analyzer; a shutoff valve should be installed at the sample point. **DO NOT insert into the Analyzer inlet port now.**
- Connect the Analyzer end of the tubing to the inlet of the 15-micron filter (provided).
- Cut a 3" length of 1/4" OD sample tubing (provided), and connect one end to the outlet of the 15-micron filter.
- Prior to connecting the sample line to the Analyzer, flush the line for approximately 1 hour, reducing any conductivity introduced by the sample line.** If your Analyzer is capable of multistream sampling, install and flush the other sample line(s) in the same manner.
- After flushing is complete, push the other end of the 3" length of tubing into the sample inlet port on the right side of the Analyzer. Ensure the tubing is fully inserted into the port by pulling back gently on the tubing.

Waste Outlet Connection

IMPORTANT

All drain tubing and the vented drain should be positioned lower than the level of the Analyzer to minimize backpressure on the drain lines.

Do NOT connect the two drain lines using a tee or other connector. Pressure differences between the two lines can produce fluctuations in waste flow, resulting in unstable instrument performance.

Drain tubing is provided to transfer sample waste from the waste outlet(s) of the Analyzer to a vented site drain. Ensure that the drain is located lower than the level of the Analyzer. Use the provided tubing cutter to adjust the tubing length as necessary.

- Connect 3/8" OD drain tubing (provided) to the drain(s) on the right side of the Analyzer. Ensure the tubing is fully inserted into the port by pulling back gently on the tubing.
- Cut the tubing to length, and insert the free ends of the drain line(s) into the vented drain.

INITIATING SAMPLE FLOW TO THE ANALYZER

IMPORTANT

Perform the one-hour flush described under "Sample Inlet Connection" prior to initiating flow to the Analyzer.

Open the valve at the sample point(s). Water will fill the sample line(s), and some water will flow through the drain line(s). *Power to the Analyzer does not need to be on at this point.*

3. Electrical Installation

WARNINGS

A qualified electronics technician must perform all electrical installation activities.

The wall plug of the AC power cord is the main disconnect device for the Analyzer. Attach the power cord to the Analyzer **BEFORE** connecting it to mains power.

INSTALLING THE POWER CORD

Ensure that the power switch on the side of the Analyzer is OFF (O) before continuing. Remove the power cord connector cover. Insert the power cord plug in the connector and turn clockwise to tighten. The plug is polarized and only connects to the Analyzer one way. Then plug the cord into a grounded wall outlet.

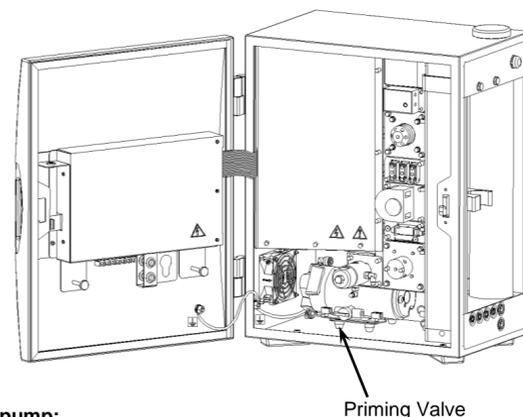
The Analyzer can operate on both 50 and 60 Hz AC (default setting is 60 Hz). To modify this setting, refer to Chapter 5 of the Operation and Maintenance Manual.

Turn power to the Analyzer ON (I). The Analyzer is now in a STANDBY mode – power is on, but analysis has not been initiated.

4. Final Steps

PRIMING THE REAGENT PUMP

Once the reagent column and reagent have been installed, the reagent pump must be primed. This is accomplished by using the priming valve, which is located in front of the reagent pump, as shown below.



To prime the pump:

- Turn on the Analyzer.
- Close the valve by turning it clockwise.
- Wait 10 –15 seconds.
- Open the valve by turning it counterclockwise.
- Wait 10 –15 seconds.
- Repeat Steps 2 – 5 ten times.
- Leave the valve in the open position.

This clears most of the air from the pump head and allows for better reagent pump performance.

Note

Proper operation of the reagent pump can be verified by observing reagent flowing into the reagent reservoir. In some instances, it may take several hours for the reagent pump to fully prime and achieve maximum reagent flow. Normal operation CAN proceed even during reduced reagent flow due to the small volumes of reagent used during analysis. If flow of reagent into the top of the reagent reservoir is not observed after 12 hours of operation, contact Technical Support or your local service provider.

4. Final Steps (cont.)

CONFIGURING and STARTING THE ANALYZER

Multistream units are shipped with only Sample Stream 1 ENABLED. If additional streams are connected to the Analyzer, configure those streams as follows:

Using the soft keys below the front panel display:

- Press **SETUP**, then use either arrow to scroll to **STREAM SETUP** and press **ENTER**.
- Use either arrow to scroll to **STREAM SETTINGS** and press **ENTER**.
- Note which sample stream is displayed (e.g., STREAM-1). If this is not the stream you wish to modify, press **NEXT** to advance to the desired stream.
- Use either arrow to move to and highlight DISABLED (or ENABLED) and press **EDIT**.
- Use either arrow to toggle to the desired state (ENABLED or DISABLED) and press **ENTER**.
- Press **NEXT** to select the next stream and repeat the process as necessary.
- When finished, press **EXIT** until you are returned to the main screen.

ALARM OUTPUTS and BINARY OUTPUTS

There are two alarm outputs and four binary outputs available. To access the menu, press **SETUP**. Using the arrow keys, highlight **INPUT/OUTPUT** and press **ENTER**. Highlight either **ALARM OUTPUTS** or **BINARY OUTPUTS** and press **ENTER**. The following choices are available:

OFF (disables the alarms or binary outputs; is the default setting)

STATE (activates when Analyzer stops, either by normal means or fatal error)

ERROR (activates when an error condition occurs)

BORON ANY STREAM (activates if preset threshold is met on any stream)

BORON STREAM X (activates if preset threshold is met on specific stream)

RES ERROR ANY STREAM (activates an *error* if resistivity is too low on any stream)

RES ERROR STREAM X (activates an *error* if resistivity is too low on specific stream)

RES WARN ANY STREAM (activates a *warning* if resistivity is too low on any stream)

RES WARN STREAM X (activates a *warning* if resistivity is too low on specific stream)

READY STREAM X (activates when measurement complete on specific stream)

To set a threshold level:

- Press **NEXT**.
- Use the up and down arrows to increment or decrement the highlighted digit.
- Use the right arrow to move to the next digit; repeat step 2.
- When done, press **NEXT** to save the threshold value and exit to the main screen.

Note

Pressing **EXIT** instead of **NEXT** will exit the setup menu without saving any values.

Refer to Chapter 6 of the Operation and Maintenance Manual for specifics on wiring the terminal blocks and configuring the Analyzer.

DEFAULT SETTINGS

Following is a list of default settings for many of the customizable features of the Analyzer. To modify these settings, refer to the appropriate chapter in the manual.

If no modifications to the default settings are needed, proceed to "STARTING ANALYSIS/RINSING DOWN THE ANALYZER."

Parameter	Default Setting	Other Options	To Modify:	
General Settings				
Mode	Analysis	Cell Slope Calibration; Cell Offset Calibration; Calibration; Verification	Chapter 5	
Sample Location	None	Customizable 14-character text field	Chapter 5	
Clock	Date/Time in Boulder, CO	Customizable	Chapter 5	
Stream Settings				
Flush Time (<i>applies to all available sample streams</i>)	2 minutes	Recommended: 1 minute per 20' of tubing length on longest tubing run	Chapter 5	
Sample Method (<i>applies to all available sample streams</i>)	Individual	Averaged (in this mode, the Analyzer produces a numerical result that is the average of 5 sequential analyses)	Chapter 5	
Analysis Time (<i>applies to all available sample streams</i>)	12 minutes	6.5 minutes (in this mode, the Analyzer will produce a numerical result more frequently, but the reagent will be exhausted more quickly)	Chapter 5	
Stream Name	Stream 1: Stream 2*: Stream 3*: Stream 4*:	Stream 1 Stream 2 Stream 3 Stream 4	Customizable 12-character text field (-x is appended to the end of the customized field, where x indicates the stream number 1, 2, 3 or 4)	Chapter 5
Enabled/Disabled	Stream 1: Enabled Stream 2*: Disabled Stream 3*: Disabled Stream 4*: Disabled	Enabled or Disabled	Chapter 5	
Samples/Stream	Stream 1: 10 Stream 2*: 10 Stream 3*: 10 Stream 4*: 10	Up to 240, in increments of 5	Chapter 5	
I/O Settings				
Binary Inputs	Disabled	State (start or stop); Stream X (enables or disables a specific stream)	Chapter 6	
AC Frequency	60Hz	50Hz	Chapter 6	
Analog Outputs (<i>one for each stream</i>)	No Output	Low Output; Boron; Calibrate	Chapter 6	
Alarm Outputs	Off	Boron; Resistivity Warning; Resistivity Error; New Boron Reading; Fatal Error; State (running or idle)	Chapter 6	
Serial Output	19200 Baud Rate	2400; 4800; 9600; 38400; 57600; 115200	Chapter 6	
Binary Outputs	Off	Boron; Resistivity Warning; Resistivity Error; New Boron Reading; Fatal	Chapter 6	
Printer Type	Seiko DPU-414	Citizen IDP 3110; no printer	Chapter 6	

* Apply only to multistream instruments

STARTING ANALYSIS / RINSING DOWN THE ANALYZER

To begin analysis, press **START**.

The basis of measurement for the UPW Boron Analyzer is differential conductivity. Consequently, the Analyzer's operation depends upon low background conductivity. It is common following initial installation for the Analyzer to experience high conductivity values as internal and external tubing 'rinses down'. It is expected that the Analyzer will 'reset' itself during the initial start-up as it attempts to rinse itself down. While it is resetting, the Analyzer will not countdown beyond the first 2 or 3 minutes. The display on the front of the Analyzer should indicate a "Low Sample Resistivity" condition. **This is NOT an indication that the process water being sampled has low resistivity; this is a consequence of sample being exposed to new sample tubing.** This is normal for the first several hours of operation and should clear after that, allowing the Analyzer to conduct a full countdown to sample measurement. Allow the Analyzer to rinse down a minimum of 12 hours before readings can be considered stable.