

Filta-Max *xpress*

Pressure Elution Station

Operator's Guide

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Introduction

The Filta-Max *xpress** Pressure Elution Station is used to automate the elution of *Cryptosporidium* spp. oocysts and *Giardia* spp. cysts from Filta-Max *xpress** Filter Modules and Filta-Max* Filter Modules.

The Pressure Elution Station and elution procedures are designed for use with 10–1,000 L water samples.

Note: The recovery of *Giardia* spp. cysts from large-volume finished water samples may be affected by residual chlorine in the sample.¹

Safety

For your safety, read this guide thoroughly before using the Filta-Max *xpress* Pressure Elution Station.

IDEXX recommends that you perform your own safety assessments of the Filta-Max *xpress* Pressure Elution Station and follow your own in-house health and safety guidelines.

All water samples, spills, splashes, aerosols, filters, and eluates should be handled with at least the same precautions as the water source with regard to biohazards. The Pressure Elution Station does not render such samples to be safe and, in fact, concentrates the biological risks into the eluate.

Ensure that the connections between the Filter Housings and any sampling equipment are capable of withstanding the operating pressure of the elution station.

The Filta-Max *xpress* Pressure Elution Station weighs approximately 86 lb (38 kg). Be sure to use a table or bench that can support the weight of the instrument. Two people are required to lift the instrument. **Do not** use the pneumatic fittings that extend out of the back panel as a handle for lifting. This will loosen the fittings and potentially introduce an air leak.

Ensure that you understand all instructions and safety precautions listed in this manual. If you have any questions, contact IDEXX Technical Service as follows:

- In the United States call **+1 800 321 0207** or email **watertechnicalservice@idexx.com**.
- In Europe call **+44 (0)1638 676800** or email **emeatechsupport@idexx.com**.

Compliance

- European Union: EN61010-1: 2010 and EN-2-040
- US/MET NRTL Mark: UL 61010-1, 3rd Edition and UL 61010-2-040
- Canada/MET “c” Mark: CSA C22.2 No. 61010-1, 3rd Edition and CSA C22.2 No. 61010-2-040
- EN 61326-1:2013 PART 1: EU EMC Directive: EN 61000-4-3 Radiated Immunity
- 47: CFR Part 15, subpart B, Class A (FCC)
- ICES-003 Issue 4, February 2004, Class A
- CNS13438 (C6357): 2006: Taiwan/BSMI: CISPR32
- CNS13438 (C6357): 2006: Australia/NZ: Market Access
- VCCI V-1/93.11, V-2/97.04, V-3/97, R-1216, and C-1279 Class A ITE

Warnings

Warnings are designated by an exclamation mark inside a triangle and are highlighted in bold.



Warnings are also displayed as labels on the Filta-Max *xpress* Pressure Elution Station at strategic locations.

- Observe all warning labels.
- Never remove warning labels.
- Never operate a damaged or leaking unit.
- Always turn off the power and disconnect the power cord prior to performing any service or routine maintenance.
- Never operate the Filta-Max *xpress* Pressure Elution Station with a damaged power cord. When replacing the power cord, use only power cords with adequate rating.
- The Pressure Elution Station is designed with an electrical ground system. Never defeat any part of the protective earthing.
- Do not attempt to disassemble the unit. Refer all service and repairs to a qualified service technician.

Components

Pressure Elution Station

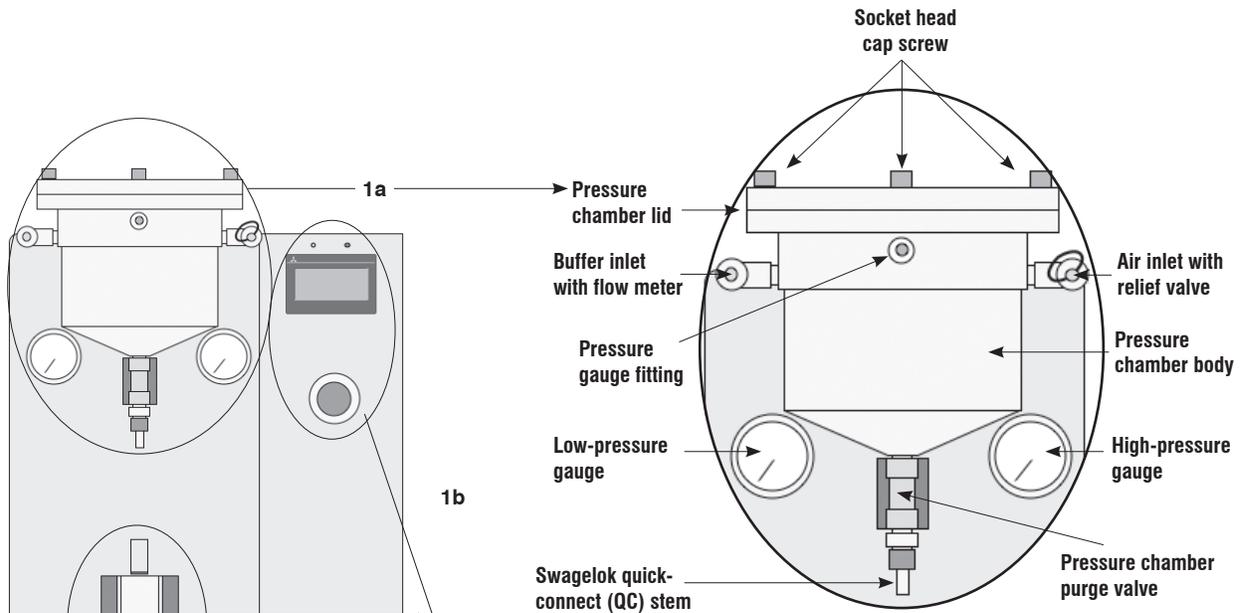


Figure 1a. Pressure chamber and gauges

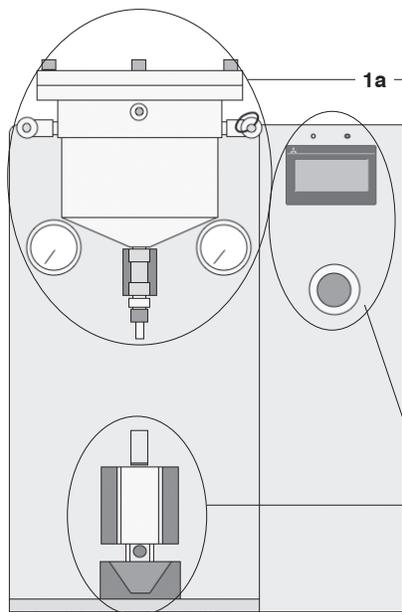


Figure 1b. Switches and buttons

Figure 1. Pressure Elution Station without a Filter Housing and diverter assembly

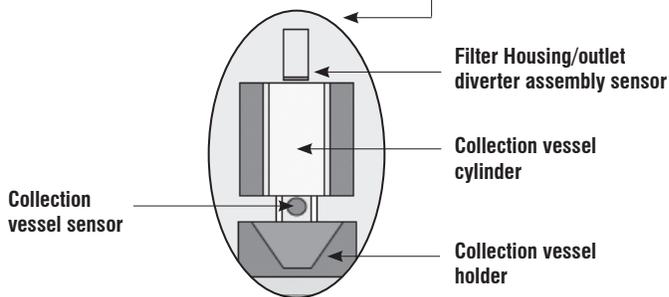


Figure 1c. Sensors, fittings, and vessels

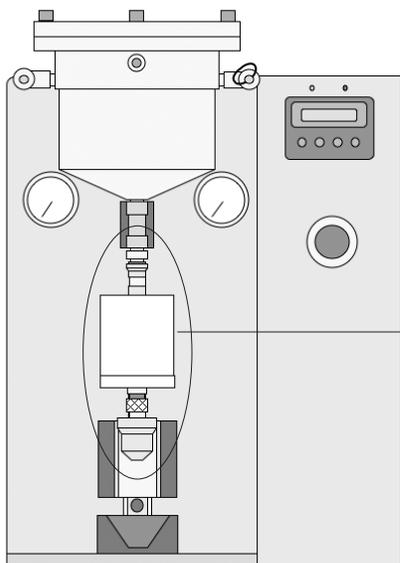


Figure 2. Pressure Elution Station with a Filter Housing and diverter assembly attached

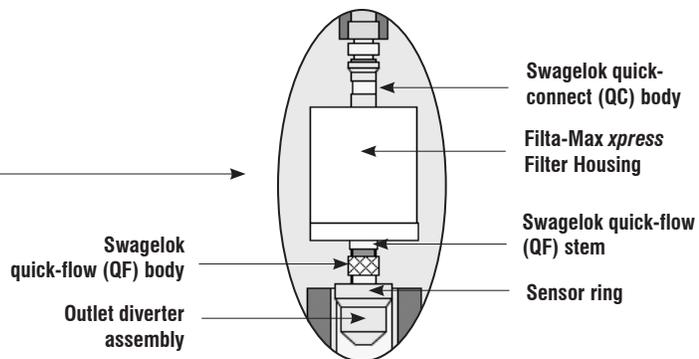


Figure 2a. Filta-Max *xpress* Filter Housing and diverter assembly

Pressure Elution Station system

- Filta-Max *xpress* Pressure Elution Station
- Buffer Reservoir Kit (one 10 L bottle and one 4 L bottle with lids)
- Outlet diverter (5-pack kit)
- Hose kit
- Accessory kit:
 - Power pack
 - *Filta-Max xpress Operator's Guide*
 - Pressure chamber O-ring
 - Tool kit (2 hex wrenches, quick-connect fitting, screwdriver)

Specifications

Technical specifications

- Dimensions: 28" H x 14" D x 20.5" W (711 mm H x 356 mm D x 521 mm W)
- Weight: 86 lb (37.7 kg)
- Minimum input pressure: 65 psig (4.5 bar)
- Maximum input pressure: 150 psig (10.3 bar)
- Working pressure: 72.5 to 116 psig (5.0 to 8.0 bar)
- Supply voltage (through an external power source):
100–240 V AC @ 47–63 Hz, output 4.2–5.0 A @ 24 V DC (limited power source only)
- Pressure Elution Station current rating: 4.2–5.0 A @ 24 V DC

Environmental conditions

- Intended for indoor use only
- Temperature range: ambient temperature of 16°C–24°C
- Humidity range: 0%–80% relative humidity
- Maximum altitude: 2,000 m (6,562 feet)
- Pollution degree: 2
- Overvoltage protection: category 2

Equipment, consumables, and reagents

The following additional equipment, consumables, and reagents are necessary for filter elution.

Equipment and consumables **not** supplied by IDEXX

- Sampling pump that is suitable for use with the sampling fittings or a suitable sampling rig for use with a pressurized water supply
- Platinum cured tubing (13–15 mm internal diameter) suitable for use with the sampling pump or pressurized water supply
- 500 mL centrifuge tubes and/or 50 mL conical centrifuge tubes (for double centrifugation)
- Centrifuge with capacity for 500 mL centrifuge tubes and/or 50 mL conical centrifuge tubes that is capable of reaching 2,000 × g (g-force or relative centrifugal force)
- Alcohol-soaked wipes, laboratory grade ethanol, or sodium hypochlorite solution
- Reagents:
 - Phosphate buffered saline (PBS)
 - Polyoxyethylene sorbitan monolaurate (TWEEN* 20)

For additional information on the reagents, see **"Preparing the buffer solution" on page 13**.

Equipment and consumables available from IDEXX

These items may be purchased from IDEXX. For more information, see Appendix A.

- Filta-Max *xpress* Filter Housing
- Filta-Max *xpress* Filter Module or Filta-Max Filter Module
- Filta-Max *xpress* Sampling Kit
- Filta-Max *xpress* Housing Conversion Kit

Setting up the Pressure Elution Station

Location

The Filta-Max *xpress* Pressure Elution Station and buffer reservoir bottle should be placed on a sturdy bench or laboratory surface capable of supporting both their weight and the force required to install and remove the Pressure Elution Station housing and fittings.

Power connection

- Connect the low-voltage cable to the inlet power socket on the back panel of the Pressure Elution Station.
- Connect the provided power supply to a suitable electrical outlet using a power cord with the appropriate rating (18 AWG/.75 mm²). The external power supply will function normally between 100 and 240 V AC at 47–63 Hz.

Connecting the air supply

Compressed air is required for the Pressure Elution Station to function properly because it supplies the air pressure needed to elute the Filter Modules. IDEXX supplies a hose kit that lets you connect either your facility's air supply or a compressor to the Pressure Elution Station. The hose kit consists of a 12-foot self-retracting hose and connector.

Compressed air must be oil and moisture free. IDEXX can supply an external air filter that attaches to the rear of the Pressure Elution Station to remove oil and moisture from the air.

Using your facility's air supply

If you use your own facility's air supply, check to ensure that the outlet pressure is between 5.0 bar and 8.0 bar (72.5 and 116 psig). The air supply must have a sufficient capacity to perform elution cycles whilst remaining above 5.0 bar (72.5 psig). Your facility's air supply may require filters to remove oil and moisture.

Use the quick-connect fittings supplied with the Pressure Elution Station or other appropriate fittings to connect the air supply. The connection is made at the back of the Pressure Elution Station at the air line inlet connector.

Before connecting and applying air pressure to the Pressure Elution Station, ensure that the lockable air inlet valve is in the OFF (EXH) position by turning it clockwise. When the connection has been made and there is pressure to the Pressure Elution Station, turn the lockable air inlet valve counterclockwise to the ON (SUP) position.

Connecting an air compressor to the hose kit

Note: The compressor must be oil free.

1. Prepare the air compressor for use according to its operating instructions.
Note: The components and their respective locations on the air compressor may vary with the model. Polytetrafluoroethylene (PTFE) tape, plumbing tape, or other appropriate sealant is recommended at all threaded connections.
2. Connect the swivel end of the 12-foot self-retracting hose (found in the Filta-Max *xpress* Hose Kit) to the air compressor's filter, which is attached to the regulator.
3. Ensure that the lockable air inlet valve on the Pressure Elution Station is in the OFF (EXH) position by turning it clockwise.
4. Connect the other end of the hose to the air line inlet connector on the Pressure Elution Station.

5. Follow the compressor's instruction manual to modulate the outlet pressure between 5.0 and 8.0 bar (72.5 and 116 psig).
6. Connect the air compressor's power cord to a suitable electrical outlet.
7. Turn the air compressor's ON/OFF switch to ON or AUTO.
8. Allow the air pressure in the receiver to build to at least 5.0 bar (72.5 psig).
Note: With the air compressor in auto mode, the motor will automatically stop when the pressure reaches a preset maximum and will restart when the pressure drops below a preset minimum. You can monitor the pressure in the receiver via the receiver pressure gauge. The minimum pressure required for use with the Pressure Elution Station is 5.0 bar. The air compressor should have a sufficient flow rate to maintain pressure above 5.0 bar during use.
9. To increase or decrease the outlet pressure, turn the pressure regulator's adjustment according to the manufacturer's instructions.
10. When you have attached the quick-connect fittings to the Pressure Elution Station and there is pressure, turn the lockable air inlet valve counterclockwise to the ON (SUP) position. The air supply is now ready for use with the Pressure Elution Station.
Note: If the pressure from the air supply falls below 5.0 bar (72.5 psig), there will be insufficient pressure to complete an elution cycle and a *Low Pressure* error message will be displayed. When processing multiple samples, be sure to monitor the pressure.

Checking the pressure regulator setting

With pressure supplied to the Pressure Elution Station and the lockable air inlet valve in the ON position, the high-pressure gauge should read approximately 5.0 bar (72.5 psig), while the low-pressure gauge should read approximately 0.38 bar (5.5 psig).

If the gauge readings are not correct, contact IDEXX Technical Service for assistance.

Note: The low-pressure regulator, a precision-regulator located within the Pressure Elution Station, will always release a small amount of air; a slight hissing sound is normal.

Assembling sampling and filtering equipment

Sampling

You can collect samples at the point of source or in the laboratory. IDEXX provides the equipment necessary to perform sample filtration using the Filta-Max *xpress* Filter Modules or Filta-Max Filter Modules, Filter Housings, and sampling and elution fittings (see Appendix A).

To set up the sampling equipment:

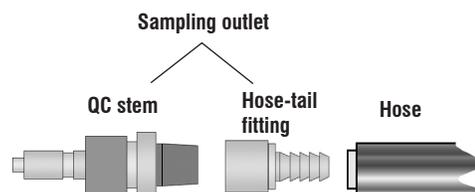
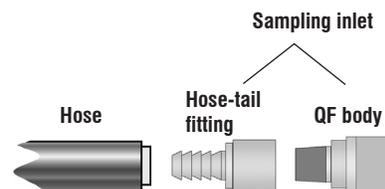
1. Connect the Swagelok* quick-flow (QF) body to the Swagelok hose-tail fitting to create the sampling inlet. Use PTFE tape to help form a seal.
2. Attach the sampling inlet to a hose that is connected to the water supply or a pump. If a pump (diaphragm, peristaltic, etc.) is used to sample water, it must be installed upstream of the Filter Housing.

Note: A hose clip is required to ensure that the seal between the hose and the sampling inlet is watertight.

3. Connect the Swagelok quick-connect (QC) stem to a Swagelok hose-tail fitting to create the sampling outlet. Use PTFE tape to help form a seal.

4. Attach the sampling outlet to a hose that is connected to a suitable waste outlet.

Note: A hose clip is required to ensure that the seal between the hose and the sampling outlet is watertight.



Operating pressure

A head pressure of 0.5 bar (7.5 psig) is required to generate flow through the Filter Module. The recommended operating pressure is 5.0 bar (72.5 psig), which should generate a flow of 1–2 liters per minute (LPM). The operating pressure should not exceed 8.0 bar (116 psig). Pressure spikes should be avoided where possible.

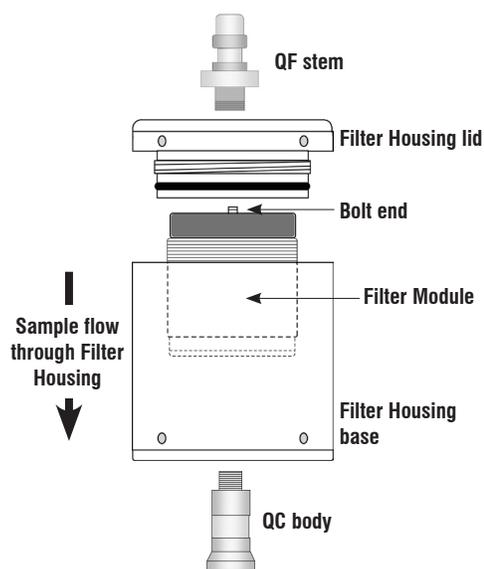
Assembling the Filter Module and filtering the sample

1. Place the Filter Module bolt-head down into a Filter Housing.
2. Tighten the lid until the two serial-numbered tag holes are aligned and a gap of approximately 0.5 mm is left between the lid and the base.
3. Tighten the lid an additional 1/8 of a turn past this point and then back again to align the tag holes. This step correctly seats the O-ring.
4. Connect the Filter Housing to the sampling setup by connecting the QF stem to the sampling inlet and the QC body to the sampling outlet.

Note: The QC body on the Filter Housing is self-sealing and does not require an additional seal.

5. Turn on the water supply and restrict the flow to 1–2 liters per minute using a suitable flow restrictor located downstream of the Filter Housing.
6. When sampling is complete, turn off the water supply.
7. Disconnect the Filter Housing from the sampling setup, and seal the QF stem using the stopper provided.

Note: You can perform sample filtration in suitable Filter Housings fitted with connectors other than those required for use with the Pressure Elution Station. In this case, the Filter Module must be transferred to a Filter Housing suitable for use with the Pressure Elution Station. For more information, refer to “Eluting the Sample.”



Operating the Pressure Elution Station

Preparing the buffer solution

Before you begin mixing the buffer solution, determine the amount of solution required for the number of samples you are going to elute. In addition, 400 mL of buffer solution is required for the initial system check of the Pressure Elution Station and for each subsequent elution.

Phosphate buffered saline solution may be purchased in a ready-made solution or may be prepared using individual ingredients as follows:

- Sodium chloride 8.0 g/L
- Potassium chloride 0.2 g/L
- Disodium hydrogen phosphate 1.15 g/L
- Potassium dihydrogen phosphate 0.2 g/L

To prepare 1 L of the buffer solution:

1. In a suitable container, add the individual ingredients for PBS to 1 L of reagent-grade water.
2. Place the container on a magnetic stirrer plate.
3. Add 0.1 mL of TWEEN 20, and mix for at least 10 minutes or until dissolved.

Note: TWEEN 20 is very viscous and requires careful pipetting. Wipe the outside of the pipette with a paper towel/tissue to ensure the correct amount is dispensed.

To fill the buffer reservoir:

The Buffer Reservoir Kit includes one 10 L bottle and one 4 L bottle. Because of the performance of the initial system check and buffer purge, two reservoirs are required. IDEXX suggests that the 10 L reservoir be used for the buffer solution and the 4 L reservoir be used for reagent-grade water.

The buffer reservoirs provided by IDEXX are manufactured from heavy-duty high density polyethylene (HDPE). Only heavy-duty reservoirs should be used in this application.

1. After mixing the buffer solution, decant it into a buffer reservoir bottle.
2. The closure cap is attached to the Pressure Elution Station by an air and liquid feed line. Attach the buffer reservoir to the cap.
3. Ensure there is a tight seal between the reservoir body and the closure cap.
Note: When the closure cap is new, the integral seal is quite stiff and may be difficult to tighten. After several uses, tightening the closure cap will become easier. Vacuum grease can be used to help make tightening easier.

Performing the initial system check

Before performing sample elution, you must perform an initial system and integrity check to ensure that no error messages are generated during sample elution. This initial step also serves to purge reagent-grade water from the lines and replace it with buffer solution.

1. Place a blank Filter Module into a Filta-Max *xpress* Filter Housing. (See **"Assembling the Filter Module and filtering the sample" on page 13** for instructions.)
2. This blank Filter Module can be reused for 1 month when performing the initial system check or when purging buffer solution from the system (see **"Purging the buffer solution" on page 19** for more information).
3. Complete steps 1–8 of **"Eluting the sample" on page 16**.
4. The Pressure Elution Station will run through a complete elution cycle. If no errors are generated, continue with steps 3–6 below. If a pressure or flow error occurs, refer to Appendix C.
5. At the end of the elution cycle, discard the liquid from the centrifuge tube.
6. You can reuse the centrifuge tube when performing the initial system check or when purging buffer solution from the system.
7. Disconnect the Filter Housing from the Pressure Elution Station, and then disconnect the outlet diverter fitting from the Filter Housing.
8. Clean the Swagelok QC stem on the elution station with alcohol-soaked wipes.
9. Because the system uses positive pressure to elute filters, there is limited to no risk of sample-to-sample cross-contamination.²
10. Proceed to "Transferring Filter Modules to an alternative housing" and/or "Eluting the sample."

Transferring Filter Modules to an alternative housing

If sample filtration was performed in a housing other than one suitable for use with the Pressure Elution Station, you must transfer the Filter Module to an appropriate housing before elution.

1. Remove the lid of the housing used for sampling or the transport container, and carefully transfer the Filter Module, bolt-head down, to a Filta-Max *xpress* Filter Housing, which will be used in the Pressure Elution Station.
2. Pour any remaining liquid from the Filter Housing or container into the centrifuge tube.
3. Rinse the Filter Housing or container with reagent-grade water, and transfer this rinse to the centrifuge tube. The total volume transferred to the centrifuge tube should not exceed 50 mL.
4. Seal the second housing as described in "[Assembling the Filter Module and filtering the sample](#)" on page 13.

Understanding the control panel

Instruments with a **four-button** control panel:

The menu screen displays the following:

- **F1** starts the elution cycle.
- **F2** checks the pressure.
With the buffer reservoir cap sealed, press and hold the **F2** button for 3 or more seconds. Listen for any air leaks, and monitor the low-pressure gauge for pressure changes.
- **F3** resets the cycle counter.
Press and hold the **F3** button for 3 seconds to display the number of cycles completed (i.e., the number of samples eluted).
Press and hold the **F3** button for 5 seconds to reset the counter to zero.
- **F3** and **F4** display total cycles run (this counter is not resettable).
Press and hold the **F4** button, and then press and hold the **F3** button to display the total number of cycles run on the Pressure Elution Station.

Instruments with a **touch-screen** control panel:

The menu screen displays the following:

- **Start** starts the elution cycle.
 - **Pressure Test** displays the Buffer Reservoir Pressure Test screen.
From the Buffer Reservoir Pressure Test screen:
 - Exit returns to the start screen.
 - **Start Test** starts the buffer reservoir pressure test.
 - With the buffer reservoir cap sealed, press and hold the **Start Test** button for 3 or more seconds. Listen for any air leaks, and monitor the low-pressure gauge for pressure changes.
 - **Line Purge** starts the line purge process
- Note:**
A Filter Housing without a Filter Module must be in place.
A centrifuge tube must be in the centrifuge tube holder.
The buffer reservoir must be empty.
The buffer reservoir cap must be securely sealed.

Press and hold the **Line Purge** button. This will lift the centrifuge tube and purge the fluid from the lines. Continue to hold the Line Purge button until all the fluid is purged, which usually takes about 10 seconds. Release the Line Purge button, press the **Exit** button to return to the start screen, and then remove the centrifuge tube.

- **User Cycles** resets the cycle counter.
Press the **User Cycles** button to display the Tests Count screen. This screen shows the number of cycles completed (i.e., the number of samples eluted).
From the Tests Count screen:
 - **Exit** returns to the start screen.
 - **Reset** resets the cycle counter to zero. Press and hold the **Reset** button for 5 seconds to reset the counter.
- **Total Cycles** displays the total cycles run (this counter is not resettable).
Press the **Total Cycles** button to display the total number of cycles run on the Pressure Elution Station.
From the Cycle Count screen:
 - **Exit** returns to the main start screen.
 - **Wash Time** shows the most recent wash cycle time in minutes.

Eluting the sample

1. Turn on the Pressure Elution Station by depressing the on/off switch to the **I** position. The green LED (power) and the red LED (machine ready) are lit.
The on/off switch is located on the back of the Pressure Elution Station.
2. Remove the lid from a 500 mL centrifuge tube, and place it into the collection vessel holder.
3. With the Filter Housing QF stem facing upward, attach the outlet diverter fitting to the QF stem by pulling back the collar and pushing the fittings together.
4. Turn the Filter Housing over, and place the outlet diverter over the centrifuge tube to catch any sample that may leak.
5. Connect the Filter Housing QC body to the QC stem on the Pressure Elution Station by pushing the fittings together.
Note: If you have already performed a system check, you can skip steps 6–7 and proceed directly to step 8.
6. Check that the air supply is set up correctly, the air line is connected to the Pressure Elution Station, and the air inlet valve is open.
Note: Compressed air must be used with the Pressure Elution Station.
7. Ensure that there is sufficient buffer solution in the buffer reservoir bottle and that the seal between the closure cap and the reservoir bottle is airtight.
8. To start the filter elution cycle:
On the **four-button control panel** press **F1**.
On the **touch-screen control panel** press **Start**.
IMPORTANT: During the elution cycle, the collection vessel holder and centrifuge tube are lifted into position. Do not override the door sensors as they protect you from pinch points produced by this movement. If the door sensors fail to function, do not place your hands or any objects in this area. Contact IDEXX Technical Service for assistance.
9. At the end of the elution cycle, disconnect the Filter Housing from the Pressure Elution Station by pushing the collar on the QC body upwards while pulling the Filter Housing down; then disconnect the outlet diverter fitting from the Filter Housing.

10. Open the Filter Housing, remove the Filter Module, and discard the Filter Module according to appropriate disposal regulations.
IMPORTANT: All Filter Modules should be autoclaved according to your standard autoclave waste disposal cycle.
11. Cap the centrifuge tube, and remove it from the collection vessel holder.
Note: The Pressure Elution Station contains several sensors. The Pressure Elution Station will not start an elution cycle if the centrifuge tube, the Filter Housing, or the outlet diverter are not in place. At the end of an elution cycle, the Pressure Elution Station will not start the next cycle unless the centrifuge tube is removed from the collection vessel holder and replaced with a fresh tube.
12. Clean the QC stem on the Pressure Elution Station with alcohol-soaked wipes.
13. Proceed with subsequent sample elutions.

Concentrating the eluates and resuspending the pellet before IMS

After eluting the samples, you must concentrate the eluates further by centrifugation before purifying them by immunomagnetic separation (IMS).

Centrifuge requirements (e.g., Hettich* Rotanta 460)

- Swing-out rotor
- Inserts and support cushions for 500 mL centrifuge tubes
- In good working order, with bucket supports lightly greased

Centrifuge setup

- Locate centrifuge to minimise vibration.
- Set RCF to $2000 \times g$.
- Set acceleration to maximum and deceleration to minimum, with the minimum amount of braking possible.
- Set time to 15 minutes, excluding ramp-up time.

To concentrate the eluates:

1. Balance the centrifuge tubes (collected in step 11 of ["Eluting the sample" on page 16](#)), the cushions, and the centrifuge buckets to within 0.5 g of each other.
Note: Failure to balance the tubes correctly can result in centrifuge imbalance and can affect the target sedimentation efficiency due to excessive vibration.
2. Centrifuge the samples at $2,000 \times g$ for 15 minutes (not including the time taken to reach $2000 \times g$), allowing the centrifuge to coast to a stop at the end of centrifugation. **DO NOT USE THE BRAKE.**
Note: The deceleration profiles of different centrifuge models can vary. For optimal performance, the centrifuge should not be braked during deceleration. Check the operator's guide provided with the centrifuge or the centrifuge vendor's technical service department for the centrifuge deceleration profile. Deceleration via braking can reduce method performance during this procedure.
The sample separates into supernatant and concentrated eluates, which often form a pellet at the bottom of the tube.

3. First aspiration:
 - a. Aspirate the supernatant immediately following centrifugation, leaving 25 mL of the supernatant in the tube.
 - b. Once aspiration is complete, vortex the sample at full speed for 20 seconds to disperse the pellet (extend vortexing time if needed).
 - c. Swirl and pour into a 50 mL centrifuge tube.
 - d. Add 10 mL reagent-grade water to the 500 mL centrifuge tube (this acts as a rinse).
 - e. Vortex the sample at full speed for 20 seconds.
 - f. Swirl and pour into the 50 mL centrifuge tube.
 - g. Add a second 10 mL reagent-grade water rinse to the 500 mL centrifuge tube.
 - h. Vortex the sample at full speed for 20 seconds.
 - i. Swirl and pour into the 50 mL centrifuge tube.

4. Second centrifugation:

Perform a second centrifugation of the 50 mL centrifuge tube containing your sample, using the following centrifuge setup:

Centrifuge requirements (e.g., Hettich Rotanta 460)

- Swing-out rotor
- Inserts and support cushions for 50 mL centrifuge tubes
- In good working order, with bucket supports lightly greased

Centrifuge setup

- Locate centrifuge to minimize vibration.
- Set RCF to $1500 \times g$.
- Set acceleration to maximum and deceleration to minimum, with the minimum amount of braking possible
- Set time to 15 minutes, excluding ramp-up time.

5. Second aspiration of supernatant:

- Carefully remove the 50 mL tube from the centrifuge.
- Aspirate to the 3 mL mark on the 50 mL tube.
- Perform IMS on the sample as soon as possible.

To resuspend the pellets:

1. From the centrifuge tube, aspirate the sample supernatant leaving approximately 7–8 mL in the tube.

Notes:

- Hold the pipette in the center of the tube, and aspirate the sample from the surface of the liquid. Avoid disturbing the pellet.
- Use a wide bore pipette (such as a 5 mL serological pipette) or equivalent attached to a vacuum source.
- Do not exceed a vacuum of -0.5 psig. The flow rate during this procedure should be approximately 200 mL per minute (+/- 20 mL).
- IDEXX suggests using a peristaltic pump attached to a waste trap for this procedure.

2. Resuspend the pellet by vortexing the sample for 20 seconds; extend the vortex time if required.

3. Transfer the sample to an L10 tube using a suitable pipette primed with buffer solution.
Note: Priming, by drawing up buffer into the pipette and subsequently expelling it, prevents any target organisms from sticking to the wall of the pipette.
4. Rinse the sides of the centrifuge tube twice with half the remaining volume of reagent-grade water, transferring each of these wash volumes to the same L10 tube. For example, if the volume remaining in the centrifuge tube is 7 mL, perform two rinses each with 1.5 mL of reagent water.
5. Perform IMS according to appropriate procedures, for example, *U.S. EPA Method 1622/1623, Microbiology of drinking water (2010)-Part 14-Methods for the isolation, identification and enumeration of Cryptosporidium oocysts and Giardia cysts* or other appropriate guidelines or manufacturer's instructions.

Purging the buffer solution

When all the Filter Modules have been eluted, you must remove any remaining buffer solution from the lines of the Pressure Elution Station by purging the system with reagent-grade water.

Note: If sample elution is performed infrequently during a day—for example, early morning and late afternoon—it is advisable to perform a buffer purge between elution events. This will increase the volume of buffer solution required.

1. Load a blank Filter Module into a Filta-Max *xpress* Filter Housing. (See "[Assembling the Filter Module and filtering the sample](#)" on page 13 for instructions.)
This blank Filter Module can be reused for one month to perform the initial system check or to purge buffer solution from the system.
2. Complete steps 1–8 of "[Eluting the sample](#)" on page 16.
3. When performing a buffer solution purge, replace the buffer solution with reagent-grade water. At the end of the elution cycle, discard the liquid from the centrifuge tube.
The centrifuge tube can be reused to perform the initial system check or to purge buffer solution from the system.
4. Disconnect the Filter Housing from the Pressure Elution Station, and then disconnect the outlet diverter fitting from the Filter Housing. The lines are now filled with reagent-grade water.
5. Clean the Swagelok QC stem on the Pressure Elution Station with alcohol-soaked wipes. Because the system uses positive pressure to elute filters, there is limited to no risk of sample-to-sample cross-contamination.²

Maintenance and cleaning

Follow the guidelines below when decontaminating the Filta-Max *xpress* system.

After each elution

- Clean the QC stem on the Filta-Max *xpress* Elution Station using an alcohol-soaked wipe or equivalent.
- Decontaminate the sampling kit, outlet diverter fittings, and the Filter Housing by soaking them in warm (40°C–60°C) water containing laboratory-grade detergent for 15–30 minutes. Then manually clean the equipment using a bottle brush or similar device, and rinse with (oo) cyst-free finished water and then with reagent-grade water.
- Should more stringent decontamination be required, equipment may be soaked for 30 minutes in a 6% solution of sodium hypochlorite (60 mL of household bleach in 1 L of water). Then manually clean the equipment using a bottle brush or similar device, and rinse with (oo) cyst-free finished water and then with reagent-grade water.
- Relubricate and/or replace all O-rings, as required.

On a daily basis

- Clean the surfaces of the Filta-Max *xpress* Pressure Elution Station with laboratory disinfectant or alcohol-soaked wipes.
- Clean the metal base plate and back plate (inside the door) using laboratory disinfectant or alcohol-soaked wipes. Keep the inside of the machine as clean and dry as possible; remove any spills between samples.
Note: With the air supply turned off, you can raise the collection vessel holder to improve access to the base plate.

On a monthly basis

If the Pressure Elution Station is not used for 2 weeks, then you should also clean the pressure chamber, following the steps below. The following tools are required and are supplied with each Filta-Max *xpress* Pressure Elution Station as part of the accessory kit:



Small 5/64" hex wrench

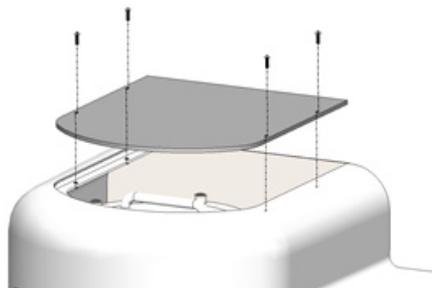


Large 5/16" hex wrench

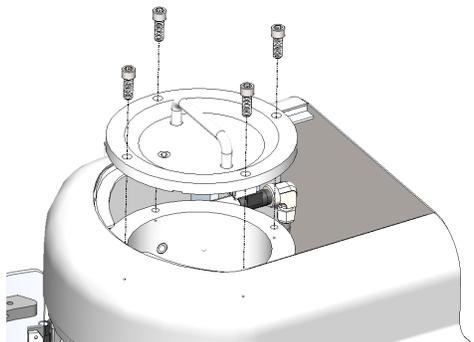


Angled screwdriver

1. Remove the four screws from the burgundy lid/cover using the small hex wrench provided, and then remove the lid/cover of the Pressure Elution Station.



2. Remove the four screws in the pressure chamber lid using the large hex wrench provided.
3. Locate the notch between the pressure chamber and the pressure chamber lid, and insert the angled screwdriver. Carefully lift the lid from its fixed position.



4. Clean the inside of the pressure chamber lid and buffer chamber with laboratory-grade ethanol.
5. Relubricate the pressure chamber O-ring on the pressure chamber lid with high vacuum grease. Take care not to damage the O-ring. Replace the O-ring if it is damaged or loose.
6. Replace the pressure chamber lid, taking care not to trap the O-ring.
7. Replace the four socket-head screws, and tighten them using the large hex wrench.
8. Replace the top lid of the Filta-Max *xpress* Pressure Elution Station, and tighten the screws using the small hex wrench.
9. Perform one or more elution cycles with reagent-grade water, as described in **"Purging the buffer solution" on page 19.**

Servicing the Pressure Elution Station

After 10,000 cycles, the Filta-Max *xpress* Pressure Elution Station should be serviced to ensure proper operation. A *Service Required* message will appear on the display panel when 10,000 cycles have been completed.

You can continue to use the Pressure Elution Station, but you should service the unit as soon as possible.

Service should be performed, in accordance with the service plan, by a qualified IDEXX Service Technician. Contact IDEXX Technical Service for assistance.

Storing the Pressure Elution Station

If the Pressure Elution Station will not be in use for longer than a week, store the unit appropriately, following the guidelines below, to ensure that the unit remains fully functional.

1. Purge the unit of buffer by running two complete elution cycles using reagent-grade water.
2. Drain the blue liquid feed line as follows.

Instruments with a four-button control panel:

A Filter Housing containing a Filter Module, an outlet diverter fitting, and a centrifuge tube must be in place before you begin.

- a. Remove the closure cap from the buffer reservoir, and then remove the silicon tube section that holds the tube weight.
- b. Ensure the buffer bottle is 3/4 full.
- c. Replace the closure cap.
- d. Start an elution cycle, and allow the first two cycles to complete.
Some instruments may display a *High Flow* error. This happens when the water in the lines has been replaced with air. Press the emergency stop button to reset the instrument. The purging (draining) process is now complete.
- e. Press the emergency stop button to halt the elution cycle process.
- f. Air dry the closure cap, feed lines, and silicon tubing before storage.

Note: Do not detach the closure cap from the air and blue liquid feed lines.

Instruments with a touch-screen control panel:

A Filter Housing without a Filter Module, an outlet diverter fitting, and a collection vessel must be in place before you begin.

- a. Detach the closure cap from the buffer reservoir.
- b. Empty the reagent-grade water from the buffer reservoir.
- c. Replace the closure cap.
- d. Press the **Pressure Test** button on the control panel.
- e. Press and hold the **Line Purge** button until all the fluid is purged from the line. This usually takes about 10 seconds.

Note: Pressing the Line Purge button will lift the centrifuge tube and purge the fluid from the lines.

- f. Press **Exit** to return to the start screen, and then remove the centrifuge tube.
- g. Dry the liquid feed tube and closure cap..

Note: Do not detach the closure cap from the air and blue liquid feed lines.

3. Clean the pressure chamber as follows:
 - a. Remove the pressure chamber lid.
 - b. Dry the inside of the chamber using paper towels.
 - c. Clean the inside of the pressure chamber using absolute ethanol, and allow the chamber to air dry.
 - d. Replace the pressure chamber lid.
4. Detach the Filter Housing and the diverter fitting, and remove the centrifuge tube.
5. Clean the inside of the unit following the procedure in "Maintenance and cleaning."
6. Detach the air supply.

To restart the Pressure Elution Station:

1. Reattach the air supply.
2. Fill the buffer reservoir with reagent-grade water and attach the closure cap.
3. Attach a Filter Housing and diverter to the Pressure Elution Station, and place a centrifuge tube in the holder.
4. Perform three elution cycles, and check for any errors or issues with functionality.
5. If the Pressure Elution Station has been stored for 2 weeks or longer, it is recommended that you clean the pressure chamber as described on pages 21 and 22.

Limited warranty

IDEXX Laboratories, Inc. ("IDEXX") warrants this product to conform to our published specifications, when stored under appropriate conditions and given normal, proper and intended usage, until the expiration of its stated shelf life, or, if none is stated, for one year from the date of delivery of this product to the original end user purchaser ("Buyer"). IDEXX agrees during the applicable warranty period to replace all nonconforming products within 30 days after date of return to IDEXX and without cost to Buyer. IDEXX shall not have any obligation under this Limited Warranty to make replacements which result, in whole or in part, from catastrophe, fault or negligence of the Buyer, or anyone claiming through or on behalf of the Buyer, or from improper use of the products, or use of the products in a manner for which they were not designed, or by causes external to the products.

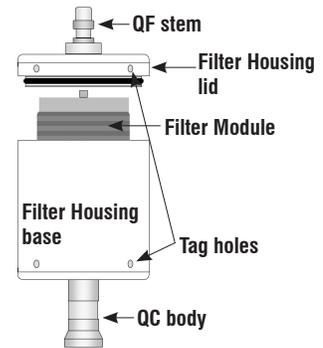
Buyer shall notify IDEXX of any products which it believes to be nonconforming during the warranty period. At IDEXX's option, such products shall be returned by Buyer, transportation and insurance prepaid, to IDEXX's designated facility for examination and testing. IDEXX shall repair or replace, within 30 days of receipt by IDEXX, any such product found to be so nonconforming and promptly return such products to Buyer, transportation and insurance prepaid. Should IDEXX's examination and testing not disclose any nonconformity covered by the foregoing warranty, IDEXX shall so advise Buyer and dispose of or return the product in accordance with Buyer's instructions and at Buyer's sole expense.

THE PROVISIONS OF THE FOREGOING LIMITED WARRANTY ARE IN LIEU OF ANY OTHER WARRANTY, WHETHER EXPRESSED OR IMPLIED, WRITTEN OR ORAL (INCLUDING ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE). IDEXX LIABILITY ARISING OUT OF THE MANUFACTURE, SALE, OR SUPPLYING OF THE PRODUCTS OR THEIR USE OR DISPOSITION, WHETHER BASED UPON WARRANTY, CONTRACT, TORT, OR OTHERWISE, SHALL NOT EXCEED THE ACTUAL PURCHASE PRICE PAID BY BUYER FOR THE PRODUCTS. IN NO EVENT SHALL IDEXX BE LIABLE TO BUYER OR ANY OTHER PERSON OR ENTITY FOR SPECIAL, INCIDENTAL, CONSEQUENTIAL, INDIRECT, OR EXEMPLARY DAMAGES (INCLUDING, BUT NOT LIMITED TO, LOSS OF PROFITS OR LOSS OF USE DAMAGES) ARISING OUT OF THE MANUFACTURE, SALE, OR SUPPLY OF THE PRODUCTS. THE FOREGOING WARRANTIES EXTEND TO BUYER ONLY AND SHALL NOT BE APPLICABLE TO ANY OTHER PERSON OR ENTITY INCLUDING, WITHOUT LIMITATION, CUSTOMERS OF BUYER.

Appendix A: Consumables

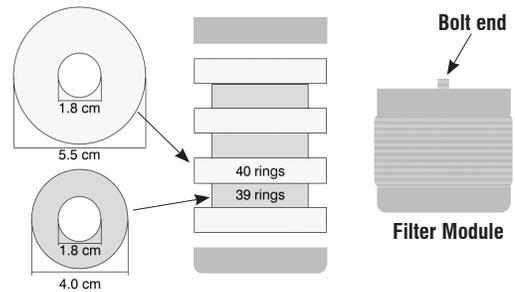
Filta-Max *xpress* Filter Housing

- Materials of construction: polyethylene terephthalate (PET) and O-rings (nitrile)
- Connections: Swagelok* quick-connect (QC body) and quick-flow (QF stem) fittings for connection to sampling and elution equipment
- Dimensions: 18.0 cm (7.2 in.) length, 8.5 cm (3.4 in.) diameter



Filta-Max *xpress* Filter Module (red caps)

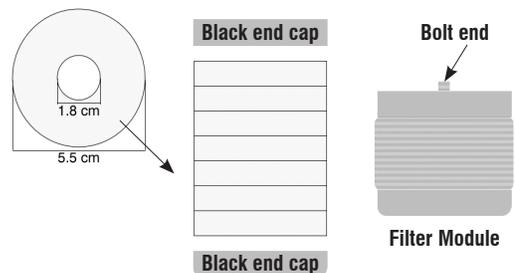
- Materials of construction: open-cell reticulated polyurethane rings in two sizes that are interlaced and compressed to form a filter.
Ring sizes:
 - 5.5 cm (OD) x 1.8 cm (ID) x 1.0 cm (D)
 - 4.0 cm (OD) x 1.8 cm (ID) x 1.0 cm (D)
- Pore size: 1.0 μ m nominal
- Dimensions:
 - 5.0 cm (2.0 in.) length
 - 5.5 cm (2.2 in.) diameter
- Storage: 16°C–24°C (60°F–74°F)



Filta-Max *xpress* Filter Module construction

Filta-Max Filter Module (black caps)

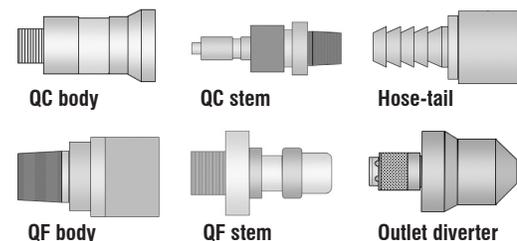
- Materials of construction: open-cell reticulated polyurethane rings compressed to form a filter.
Ring size:
 - 5.5 cm (OD) x 1.8 cm (ID) x 1.0 cm (D)
- Pore size: 1.0 μ m nominal
- Dimensions:
 - 5.0 cm (2.0 in.) length
 - 5.5 cm (2.2 in.) diameter
- Storage: 16°C–24°C (60°F–74°F)



Filta-Max Filter Module construction

Filta-Max *xpress* sampling and elution fittings

- Materials of construction: stainless steel (grade 316), O-rings (Viton*)
- Connection types: Swagelok QC body and QC stem, QF body and QF stem, hose-tail, and outlet diverter fitting

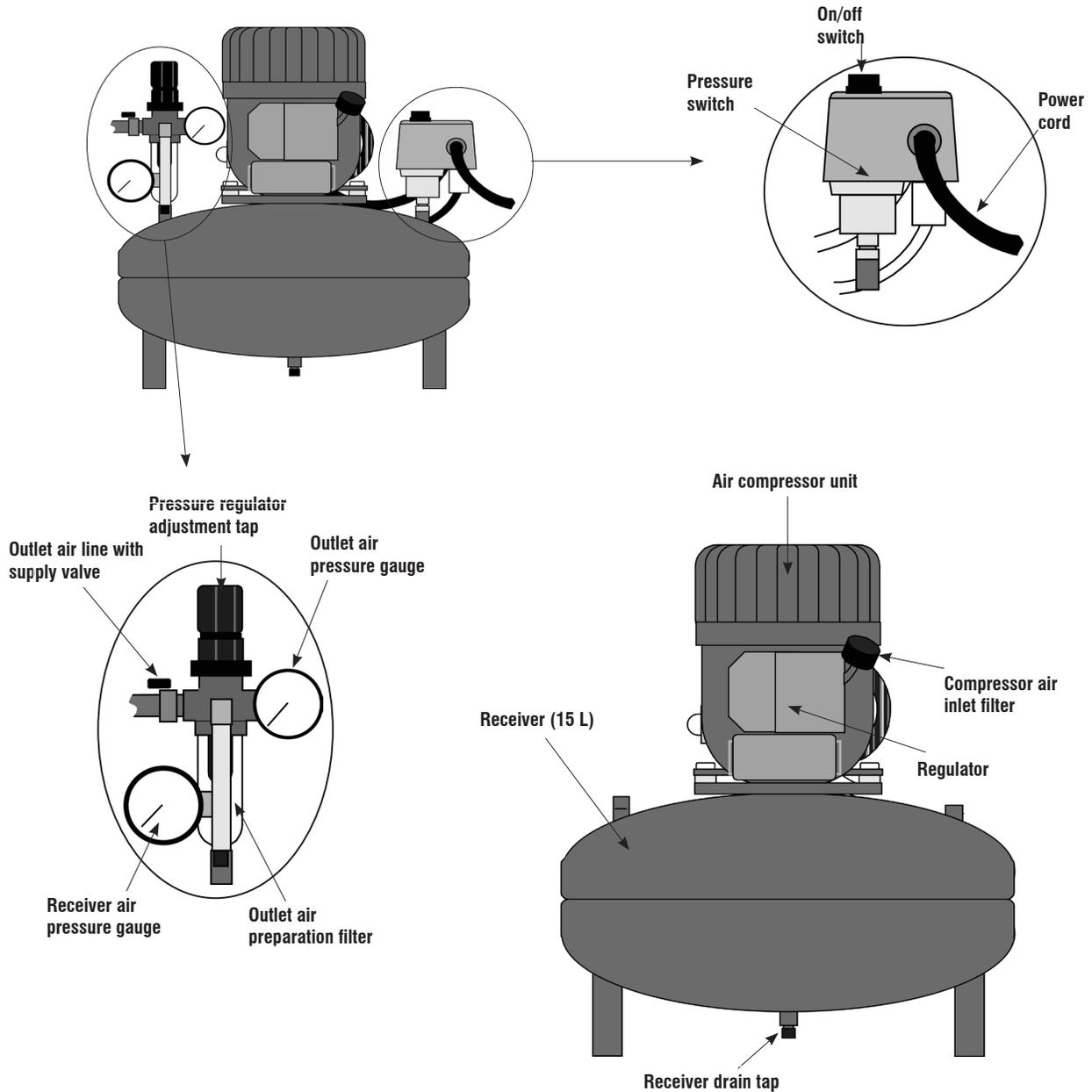


Appendix B: Air supply requirements

Compressed air is required for the Filta-Max *xpress* Pressure Elution Station to function properly because it supplies the air pressure needed to elute the Filter Modules. IDEXX supplies a hose kit that lets you connect your facility's air supply to the Pressure Elution Station. The hose kit consists of a 12-foot self-retracting hose and connector.

Note: The air supply should be set to a minimum pressure of 5.0 bar (72.5 psig) and a maximum of 8.0 bar (116 psig).

For details regarding the air supply, refer to pages 10–11 or call IDEXX Technical Service.



Appendix C: Troubleshooting

Contact IDEXX Technical Service for assistance:

- In the United States call **1-800-321-0207** or email watertechnicalservice@idexx.com.
- In Europe call **+44 (0)1638 676800** or email emeatechsupport@idexx.com.

Issue:	Check the following:
<i>No Flow</i> error message displayed, and the LED flashes red.	<ul style="list-style-type: none">• The air compressor is turned on, and the air compressor's inlet valve is open.• The air line is connected to the inlet connector on the Pressure Elution Station.• The lockable air inlet with relief valve on the elution station is open.• There is sufficient buffer solution in the buffer reservoir.
Buffer solution does not enter the chamber, the <i>Low Flow</i> error message is displayed, and the LED flashes red.	<ul style="list-style-type: none">• The air compressor is turned on, and the air compressor's inlet valve is open.• The pressure in the air compressor receiver is above 6.0 bar (87.0 psig).• The air line is connected to the inlet connector on the Pressure Elution Station.• The air compressor's outlet regulator is set to at least 5.0 bar.• The lockable air inlet with relief valve on the Pressure Elution Station is open.• The closure cap on the buffer reservoir bottle is sealed correctly and is airtight.
<i>Fill Error</i> message displayed.	<ul style="list-style-type: none">• The closure cap on the buffer reservoir bottle is sealed correctly and is airtight.• There is sufficient buffer solution in the buffer reservoir.• All tubes are attached correctly and are airtight.
<i>High Flow</i> error message is displayed, and the LED flashes red.	<ul style="list-style-type: none">• The air supply and low-pressure regulator settings are correct.• There is sufficient buffer solution in the buffer reservoir.• The liquid inlet tube, located below the closure cap, is below the level of the buffer solution and is attached to the blue liquid feed line (located above the closure cap).
Elution cycle starts but ceases midcycle; <i>Low Pressure</i> error message is displayed, and the LED flashes red.	<ul style="list-style-type: none">• There is sufficient pressure in the compressor receiver.• The alternative air supply, if in use, is functioning correctly.
<i>Chamber Pressure Error</i> message is displayed.	<ul style="list-style-type: none">• There is sufficient pressure in the compressor receiver.• The alternative air supply, if in use, is functioning correctly.• The pressure switch on the air compressor is set correctly.
<i>Containment Vessel Missing</i> error message is displayed.	<ul style="list-style-type: none">• A centrifuge tube has been placed in the collection vessel holder.
<i>Filter Module Missing</i> or <i>Diverter Missing</i> error message is displayed.	<ul style="list-style-type: none">• The Filter Housing contains a Filter Module and both are connected properly.• The outlet diverter is correctly attached to the Filter Housing.• The air pressure chamber, Filter Housing, and outlet diverter are aligned correctly.
<i>Door Open</i> error message is displayed.	<ul style="list-style-type: none">• The door to the Pressure Elution Station is closed properly.

Contacting IDEXX Technical Service

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Europe: +00800 4339 9111 • emeatechsupport@idexx.com

UK: +44 (0) 1638 676800 • emeatechsupport@idexx.com

China: +86 21 61279528

Japan: +81 422 71 5921

Australia: +1300 44 33 99

For countries not listed above, visit our website at idexx.com/water.

References

1. Drinking Water Inspectorate. *The enumeration of Giardia in drinking water: final report*. http://dwi.defra.gov.uk/research/completed-research/reports/DWI70-2-155_giardia.pdf. Published December 2003. Accessed August 20, 2014.
2. Data on file at IDEXX Laboratories, Inc., Westbrook, Maine USA.

