YOU MUST READ AND UNDERSTAND THESE WARNINGS BEFORE USING THE EMRIVER MODEL

The Emriver Em3 model is very heavy when filled with water and sediment. A collapse of the model supports could severely injure or kill a person. Be absolutely sure you understand how to use the supports.

Use only the supports provided with your model. Despite weight-bearing claims, no standard production sawhorse is strong enough to safely support the Em3 model. Sawhorses and folding tables can collapse under dynamic or side loading.

Check all hardware on the supports before each use to be sure they are secure.

When setting up the box, the supports must be laterally level and aligned. They must also be aligned with the proper support point underneath the box. Otherwise the box could warp or could collapse when loaded. Make sure spreader bars are fully engaged.

Never set up the box on a surface with a slope exceeding 8% (a 7-inch drop in 7 feet).

Never use more than 40 gal (151 L) of water in the model. Using more than the maximum amount of water and sediment could cause the box or supports to collapse.

Never use more than the provided 240 lb (109 kg) of sediment in the box, and do not place any heavy objects in the box.

Never allow people to sit or stand on or in the box. Never get underneath the loaded box.

Use only the pump and power supply provided with the box. Read the manual that accompanies the power supply and be certain to connect it to a properly grounded outlet. Always use the Ground Fault Circuit Interrupter (GFCI) provided with your model.

When using a 12-volt battery to power the model, always use the Emriver Battery Adapter provided by Emriver, Inc. Never bypass the fuses.

When powering the model with a 12-volt battery, be sure you understand the dangers associated with charging and using lead-acid batteries, and consider using safer spill-proof batteries.

The box should only be used for its intended purpose as stated herein.

If any part of the box or pumping system is damaged, if you have any doubts about the electrical or structural safety of the model, or if you do not understand these directions, do not use this model.

Table of Contents

Introduction

This manual describes the safe use and maintenance of your Emriver Em3 river process geomodel. It is very heavy when filled with modeling media and water, and could be dangerous if not properly supported, assembled, and operated.

You must read, understand, and abide by all the instructions and warnings in this manual to avoid damage to the model or personal injury. Updates to this manual and other support for the Emriver Em3 can be found at http://www.emriver.com. Please contact us for additional support if your question cannot be answered online.

Parts and Accessories Checklist

Emriver Em3 parts and accessories:	Other parts and supplies you may want to have on hand:
☐ Emriver Em3 box ☐ Modeling media in 8 buckets ☐ Emriver Use and Care Manual ☐ Standpipe ☐ Emriver supports ☐ Two 27-gallon reservoirs ☐ One-inch tubing with fittings for reservoir valves ☐ Pump and filter with tubing attached ☐ Clamp for pump tubing ☐ Sediment trap ☐ Emriver Electronic Flow Controller ☐ Power supply ☐ GFCI-equipped outlet ☐ Culvert set ☐ Measuring tape ☐ Solid scoop ☐ Perforated scoop ☐ Riprap stones ☐ Simulated riparian vegetation ☐ Scrapers for moving media ☐ Blue and green dye ☐ Squeegee ☐ Plastic float for shaping media	☐ Paper towels and mop ☐ Shim materials ☐ Hand level ☐ Plastic buckets for sediment and water ☐ Garden hose ☐ Scraper/trowel ☐ Notebook ☐ Household bleach ☐ Small towels for drying hands ☐ Sieve ☐ Laser level (for use with Scientific/Academic Kit) ☐ 12-volt battery (for use with Emriver Battery Adapter) ☐ Battery charger (for use with Emriver Battery Adapter)

Accessories available for purchase from Emriver, Inc:	
☐ Digital Flow Controller ☐ Emriver Battery Adapter *Structures Kit:* ☐ Box culverts ☐ Walled culvert ☐ Double walled culvert ☐ Model houses	*Scientific/Academic Kit:* ☐ Emriver level rod and holder ☐ Graduated cylinder (250 ml) ☐ Graduated cylinder (1000 ml) ☐ Graduated beaker (2000 ml) ☐ Stopwatch ☐ Coarse mesh hand sieve ☐ Perforated scooper ☐ Hand size scooper (not perforated)

Assembly and Operation

WARNING
When fully charged with water, the model can weigh in excess of 1,200 lb (544 kg). Dynamic loading during use, caused by someone leaning on the model, for example, can greatly increase this load. A collapse of the model's supports could be dangerous and seriously damage the model. You must be certain the model is adequately supported and that you have read and understand all warnings.

STEP 1 – Set up the supports

Begin by setting up the aluminum supports. The shorter support will hold the downstream end of the box, so keep in mind how you would like the model oriented when placing the supports.

If the supports are not properly aligned, the box will twist when fully loaded, which may damage the box. To check alignment, look across the support points as shown in Figure 1. The supports must be both level and parallel.

Figure 1. Incorrect (left) and correct (right) support alignment. Crossbars must be both level and parallel when viewed as shown.

The supports should be set up so that the crossbars are 58 in. (1.5 m) apart and aligned as shown in Figure 1 to prevent damage to the box.

On uneven ground, use shims made from ¾ -inch plywood or 2-by-4 scraps under the support feet as necessary.

Be sure all four feet of each support are stable. One support is modified to provide clearance for the downstream reservoir (see Figure 3). Place the supports so this opening lies at the downstream end.
The supports provided have a difference in height of about 3 inches, yielding a box slope of 5%.

The slope of channels in the box will be determined by the position of the standpipe, so the exact box slope is not necessarily important.

Note: Labels on the supports display arrows that indicate proper placement and orientation of supports, with the shorter support at the geomodel's downstream end.

STEP 2 – Install the box

The box must be supported at the two reinforced ribs, and nowhere else. See Figure 2.

Figure 2. The support ribs are indicated with arrows. The box must only rest on the supports at the reinforced ribs shown.

CAUTION
The supports must be properly aligned with the support ribs on the box before any weight is added to the box.

When the supports are level and aligned, lift the box onto the supports. This task requires at least two people, because the box weighs 95 lbs (43 kg). Check to ensure that the box rests directly on top of the supports at the reinforced ribs shown in Figure 2.

Note: Gaps of more than 0.25 in (6 mm) between the box's reinforced support ribs and the support crossbars indicate that the supports are NOT properly aligned.

STEP 3 – Install the standpipe in the drain assembly

Install the standpipe by sliding it into the drain assembly from the **bottom of the box**. Insert the handle first. The seal may be damaged if you insert the standpipe from above. For initial setup, the standpipe should extend into the box approximately 2 inches (50 mm).

The standpipe will move much more freely in the drain assembly seal when wet — you may want to moisten the standpipe before inserting it.

The standpipe has been lubricated with a silicone grease to allow smooth action against the rubber seal. This lubricant is waterproof, nontoxic, and should last for many uses. As needed, apply a small amount to restore smooth movement. This silicone grease may be found at most hardware stores and is typically used for waterproofing electronics and o-rings. An extra tube of silicone grease has been provided with your model. **Keep the standpipe coated with a thin film of silicone grease** to ensure years of trouble-free operation.

STEP 4 – Position the reservoirs

The Em3 uses two reservoirs: an upstream reservoir and a downstream reservoir.

Figure 3. This is how the model should look after completing steps four and five. Note the orientation of the two reservoirs with respect to the upstream and downstream ends of the box.

The downstream reservoir features aluminum struts to support the sediment trap.
See Figure 4.

Figure 4. The downstream reservoir has aluminum struts.

Place the upstream reservoir (this one **does not** have aluminum struts) beneath the upstream end of the box so that the main valve faces toward the downstream end of the box. The drain valve has a fitting for a garden hose.

Figure 5. Place the reservoir beneath the upstream end of the box.

Place the downstream reservoir beneath the downstream end of the box, directly below the standpipe, so that the valve faces toward the upstream end of the box. Note that the support horse at the downstream end of the box has an opening for the reservoir. See Figure 6.

Figure 6. Place the downstream reservoir beneath the downstream end of the box.

STEP 5 – Attach reservoirs

When fully assembled, the tubing will run between the two reservoirs. See Figure 3.

Place the one-inch diameter tubing under the box. Feed the tubing underneath the supports.

Figure 7. The one-inch tubing connects the two reservoirs.

Attach the fitting on the tubing to the valve on the upstream reservoir. The reservoir valve plugs into the fitting on the tubing.

Figure 8. Attach the tubing fitting to the valve on the upstream reservoir.

Snap down the metal clips toward the tubing to secure the fitting to the valve.

Figure 9. Bend the metal clips down toward the tubing.

Figure 10. How the tubing fitting and reservoir valve look when properly connected. Note that the metal clips must be snapped down toward the tubing.

Repeat **Step 5** at the opposite end to attach the tubing to the downstream reservoir.

STEP 6 – Pump and Flow Outlet Assembly for K28 Owners

If you own a K500 digital flow controller, skip this step and see the separate instructions at the end of this manual.

Unscrew the top clamp of the flow outlet assembly at the upstream end of the table (green arrows in Figure 11) and insert the assembly as shown in Figure 11.

Screw the top clamp back on to the assembly (green arrows).

Attach the clear tubing to the pump and place the pump inside the upstream reservoir, lying on its side (Figure 12). Then attach the tubing to the outlet fitting and secure with the clamp as shown in Figure 11 (red arrow).

By loosening the two lower bolts (yellow arrow in Figure 11) you can slide the assembly along the rail and place it wherever you like. You can also attach 1 inch tubing to the barbed outlet if you like to use the outlet in various ways; it's designed to be very flexible in that respect. The assembly is made of standard US pipe fittings so you can add to and modify it if you wish.

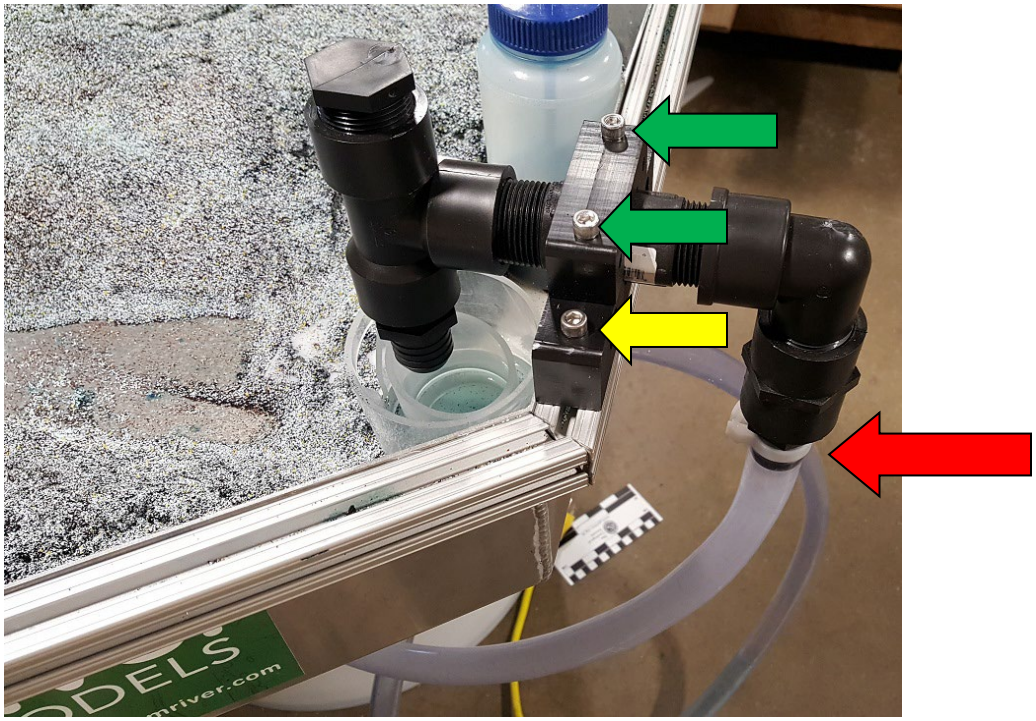


Figure 11. Flow outlet assembly.

Figure 12. Place the pump in the upstream reservoir. Note that you may have a pump and filter that look different than those in the photo, but the setup is the same for each.

Place the Energy Dissipater Unit underneath the outlet as shown in Figure 13.

Figure 13. Energy Dissipater Unit

STEP 7 – Position the sediment trap

Place the sediment trap on the aluminum struts in the downstream reservoir. Be sure the sediment trap sits directly below the standpipe.

Figure 14. Place the sediment trap on the aluminum struts in the downstream reservoir.

STEP 8 – Fill the box with modeling media (sediment)

Pour the media into the box one bucket at a time. Spread the media using the scraper included with your geomodel to distribute it evenly throughout the box.

> **Handling the media:** During experiments and demonstrations, sediment leaving the box will accumulate in the sediment trap. The rate at which the sediment trap fills is highly variable, depending on activity in the box.
> When the sediment trap becomes full, use the perforated scoop included with the Emriver model to return sediment to the box.

Allowing sediment to accumulate in the reservoirs will **NOT** harm the system. The filters are sized to allow the system to function normally even when completely buried in sediment. However, fine debris such as dirt, lint and pollen can accumulate in the media over time and clog the filters. Just give them a rinse now and then.

STEP 9 – Fill the reservoirs

Both reservoirs are graduated in US gallons. Each reservoir has a 27-gallon capacity. **Before filling the reservoirs, be sure the main valves are open to allow water to flow between the two reservoirs. Keep the drain valve closed.**

Using the graduations on the reservoirs, fill one reservoir with 20 gallons of water. Wait for the water to equalize between the two reservoirs. This may take a few minutes. Continue to fill the reservoirs until each reservoir contains 20 gallons for a total of 40 gallons in the system.

Position the reservoirs before filling them with water. **Do not move the reservoirs after they have been filled, as this will cause damage to the reservoirs. Do not fill the system with more than 40 gal of water.**

WARNING
Using more than 40 gal (151 L) of water could damage the box or cause it to collapse. Do not exceed this volume and **do not start the pump** until you have filled the reservoirs and carefully measured the total volume of water in the system.

WARNING
When full of water, each reservoir weighs over 175 lb (79 kg). They will be damaged or destroyed if moved when full.

STEP 10 – Power the pump

Attach the brick power supply to the leg of the taller support horse at the upstream end using the mushroom fasteners on the support horse and the brick power supply. Wrap the Velcro® strap around the support leg and the brick power supply to fasten securely.
See Figure 15.

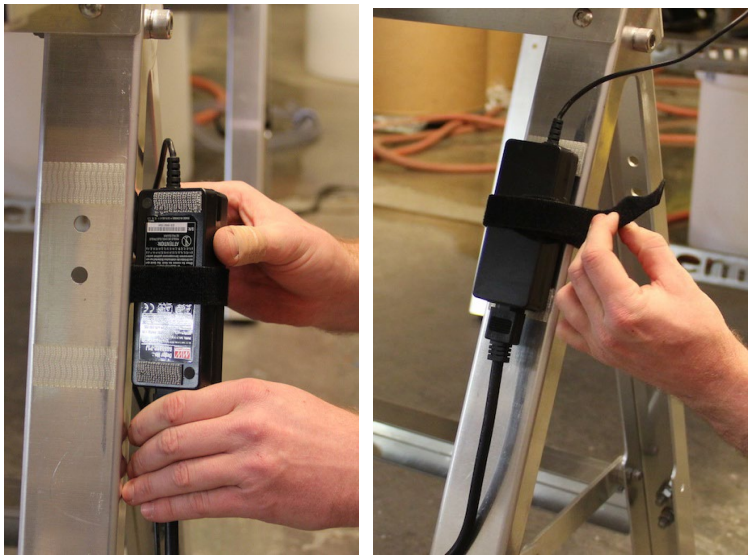


Figure 15. Attach the brick power supply to the upstream support horse using the mushroom fasteners. Wrap the Velcro® strap around the support leg.

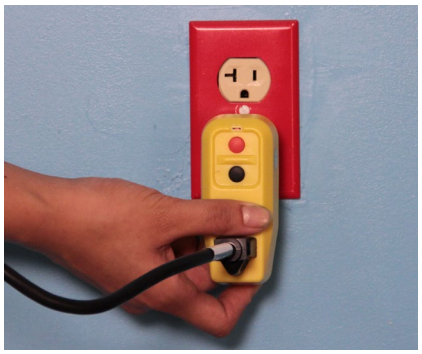


Figure 16. Always use the Ground Fault Circuit Interrupter (GFCI).

Connect the power cord to the Ground Fault Circuit Interrupter (GFCI). If you are using an extension cord, connect the extension cord to the GFCI. Do not plug the model's power cord directly into an outlet. **Always use the GFCI.**

This applies only to Emriver users in the USA. Export models are shipped with appropriate CE-approved power supplies and connectors.

STEP 11 – Attach the Electronic Flow Controller (Model K28, or older *Crayfish*)

Attach the flow controller to the upstream end of the box using the hook *(note that some older controllers have a Velcro connection)*. See Figure 17.

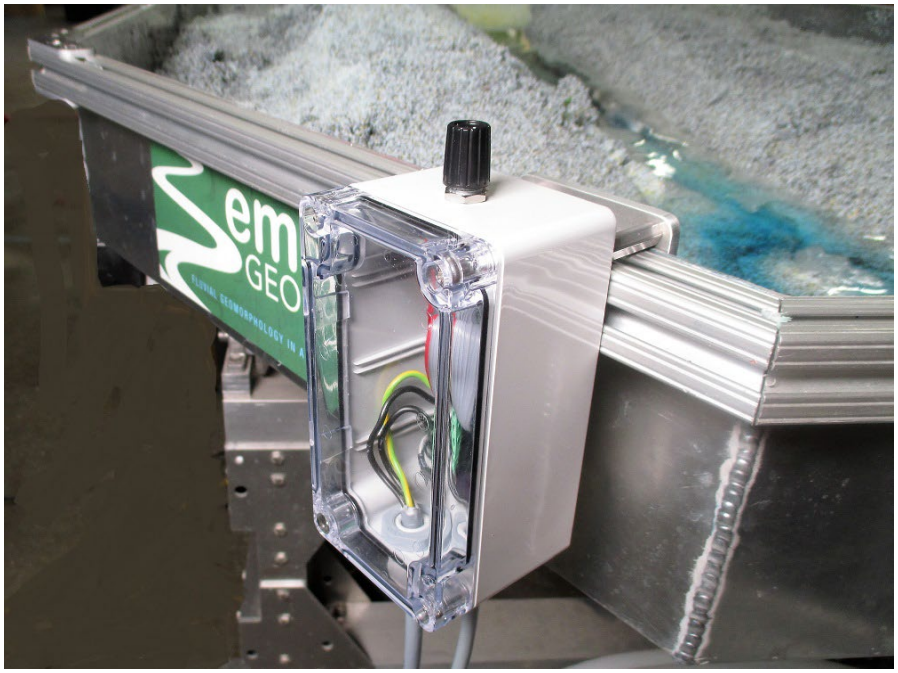


Figure 17. Attach the controller to the upstream end of the box.

**If you purchased a Digital Flow Controller (Model K500 or the older *Alix*) see the separate instructions.

STEP 12 – Connect power

Emriver system power connectors are color-coded. Connect the pump to the controller using the gray, blue, and orange connectors (note there is one red tab that is not a connector). Then, connect the controller to the power supply using the black and red connectors. See Figure 18. *Note that older models of the pump and controller have different connectors. The older models will not work with the new models as shown here. Simply match up the colors on the connectors.*

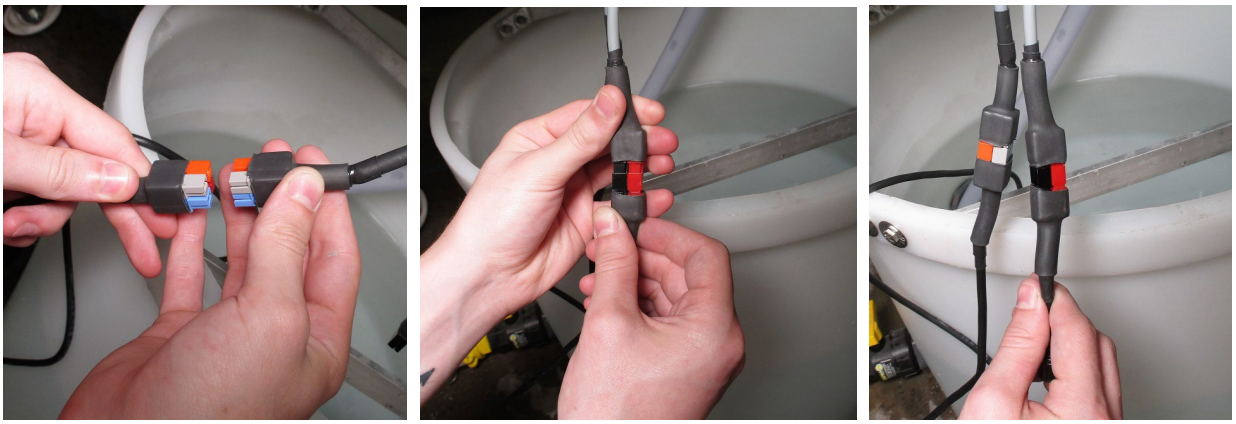


Figure 18. At left, the pump connects to the controller. At middle, the controller connects to the power supply.

A square, red indicator light in the circuit board displays when the power is on. Increase flow rate by turning the knob on the controller clockwise. Pressing the knob resets the flow to zero.

Troubleshooting: If the controller does not produce flow, and there are no lights on the circuit board, check the power supply to ensure that the cord is fully connected and that there is a light on the power brick.

If the power light is on, but there is no flow, check to see that the flow indicator LED is lit on the circuit board (round green light). If it is lit, check the connection between the controller and the pump. Also check for any obstructions or clogged filters. Expel all air from pump and hose. If the flow indicator LED is not lit, adjust the knob clockwise until the LED is lit and there is flow.

Setup Checklist

1. Read and understand all warnings in this manual.
2. Find a surface with a slope of less than 8%.
3. Set up the supports so the crossbars are 58 in. (1.5 m) apart, with a height difference of 3 in (76 mm). Check that the supports are aligned properly to avoid twisting of the box. **Check the supports for damage and loose connectors before setting up the model.**
4. One of the supports has an opening for the downstream reservoir – be sure to place this support at the downstream end with the opening for the reservoir facing out. Labels on the supports display arrows that indicate correct placement and orientation. Use these arrows as a guide for proper support setup and reservoir placement.
5. Place the box on the supports. Before adding any weight to the box, be sure that the support ribs on the box bottom rest directly on the supports, and that there are no gaps greater than 0.25 in (6 mm) between the supports and the box support ribs.
6. Insert the standpipe into the drain assembly from the bottom of the box so that the standpipe extends at least 2 in (50 mm) inside the box.
7. Place the upstream reservoir beneath the upstream end of the box with the valve facing downstream. Place the downstream reservoir beneath the downstream end of the box with the valve facing upstream.
8. Place the one-inch diameter tubing beneath the box so that it runs parallel to the length of the box. Attach the tubing's valve fitting to the valve on the upstream reservoir and the opposite valve fitting to the valve on the downstream reservoir. Snap the metal clamps down toward the tubing.
9. Place the pump inside the upstream reservoir. Attach the pump tubing to the outlet fitting at the upstream end of the box. Fasten the tubing clamp around the pump tubing where it covers the outlet fitting.
10. Place the sediment trap on the aluminum struts in the downstream reservoir. Be sure the sediment trap sits directly below the standpipe.
11. Fill the box with modeling media.
12. Fill the system with 40 gal (151 L) of water using the graduations on the sides of the reservoirs. Be sure the valves on the reservoirs are open while adding water. Add 20 gallons first and allow the water level to equalize between the two reservoirs before adding more water. **Do not fill the system with more than 40 gal (151 L) of water.**
13. Fasten the brick power supply to the leg of the upstream support. Plug the model's power cord into the GFCI provided with the model and plug the GFCI into a wall outlet. **Never plug the model's power cord directly into a wall outlet.**
14. Attach Electronic Flow Controller to the box at the upstream end.
15. Connect the flow controller to the pump and connect the power supply to the flow controller using the color-coded connectors. Adjust the knob on the controller to desired flow rate.
16. Begin demonstrations and experiments.

Disassembly, Transport and Storage

When breaking down the model, remember that **the reservoirs cannot be moved while full of water.**

- The upstream reservoir has a drain valve with a fitting to attach a garden hose which can lead to a floor drain or outside.
- You may also use the pump and tubing to drain the reservoirs.
- Remove the pump tubing from the outlet fitting at the upstream end of the box. Place the tubing into a media bucket (or any container that can be carried while full of water) or directly into a proper drainage area.
- Turn on the pump to move water from the reservoir to a smaller container or to a drain. Repeat until all of the water is removed from the reservoir.

As much as 20 gal (76 L) of "groundwater" will remain in the media and box after the pump has been turned off and flow from the standpipe has slowed to a deceptive trickle. Before storage of the model, most of this remaining water must be drained from the sediment. This water can take several hours to drain.

Pile the media at the upstream end of the box to aid drainage. You can also remove the standpipe to speed along the process. You may also elevate the upper end of the model with a 2-inch shim between the box's support rib and the support horse.

Note: To prevent growth of mold and bacteria, add about 10 ml of household bleach to the buckets if you plan to store them wet.

Maintenance and Care

- Drain the model and reservoirs after each use; do NOT leave water in the Emriver models.

- To keep your model sanitary, change out the water every day and drain the table by lowering the standpipe all the way.

- If you cannot change the water every day, add about 12 ml of household bleach to the reservoir every day, and run the pump to distribute it through the system. This will prevent algae and bacteria from colonizing the model. You may also use widely available home water filters to remove contaminants. **Adding too much bleach or chlorine can damage the aluminum parts.**

- Never use lithic materials (i.e., sand) in the Emriver tables.

- Do not use metallic objects in the model.

- Power down the pump and controller after each use by disconnecting the pump from the controller, and disconnecting the controller from the power supply.

- Do not use solvents, which may dissolve or weaken the plastic tubing. If the tubing is left in the sun while wet, it may support algae growth and become cloudy. Routing a mild bleach solution through the tubing after use will minimize this problem. Removing all standing water in the lines will help as well. If tubing becomes cloudy you may purchase a replacement from us, or buy from your local hardware store, but that which is supplied with your model is a high quality type and is longer lasting and more flexible.

- All bolts on the supports should be periodically checked for tightness. Loose or missing bolts will affect the strength of the supports. The bolts should be as tight as possible while still allowing the supports to fold.

- Clean the filter on the pump periodically by unscrewing the filter from the pump and thoroughly rinsing it inside and out.

Demonstrations and Experiments

The primary independent variables imposed on your experimental channels are channel slope and discharge. To gain familiarity with the capabilities of the model, it is best to begin by exploring both of these variables at relatively low values.

Slope is controlled by the slope of the box (which is 5% when you set up the model on a level surface) and by the elevation of the standpipe. Slope of your channels is also dependent, of course, on their sinuosity. It is best to begin with lower slopes. A small laser level can be used to explore the relative elevations of the upper end of the channel and the standpipe. Raising the standpipe to 2 inches will reduce the effective slope to 3%, and raising it fully will reduce the slope to nearly zero. This is the easiest way to control the slope of your model.

As you are learning to use the model, begin with low flows (about 25 ml/s, as seen in figure 19, left side). These flows may seem too low at first glance, but low flows often give the most interesting results. Higher flows will mobilize all sediment in the channel, which, in many demonstrations and experiments, will make it difficult to see specific processes. Try forming a channel with moderate flows (less than 75 ml/s), and then lowering the discharge to find the point at which sediment transport in the channel ceases. Work up from this point.

Figure 19. Low flow (left) and high flow (right) as it appears when looking at the EDU.

When forming experimental channels, mimic what you see in the field. For example, meandering gravel-bed rivers will have low point bars that slope gradually up to a floodplain, and relatively steep banks on the outsides of bends. Routing brief flood

pulses (high flows of about 190 ml/sec) through your channels will give them more realistic characteristics. Remember that your modeled channels should be in a near-equilibrium condition in order to show the effects of disturbances. The guidelines and videos at the following places will help you begin.

- www.emriver.com
- http://serc.carleton.edu/NAGTWorkshops/geomoph/emriver/index.html
- Emriver DVD (located in front flap of this manual); all videos are also available as Playlist on our YouTube channel. The link is available from our website.

When you notice media being scoured from in front of the EDU, you may replenish it by pushing the banks closer together adjacent to the scour or by sprinkling media directly into the stream. If you pile the media excavated from your initial channel near the EDU, you will have a ready supply. Placing 8-10 pieces of limestone riprap directly under the outlet of the EDU will further calm the stream and reduce scouring.

A straight channel from the EDU to the standpipe in your river model will eventually form meanders, point bars, cutbanks, and other river features just as in nature, but it may take a couple of hours for these features to fully develop. Below are a couple of initial conditions that can produce features more quickly for teaching and demonstrating.

Meandering Channels

To form an initial channel with a meander, distribute the media evenly in the box. Use a triangular scraper to inscribe the desired curves in the media, and then sculpt gentle banks with a scoop and plastic float.

Delta Building

To explore delta building and alluvial fans, move most of the media to the upstream 2/3 of the box and distribute it evenly. The downstream third of the box can have the aluminum 'bedrock' exposed, or may have a thin layer of media in it. You may wish to remove one 5-gallon bucket of media from the model.
Cut a straight or meandering incision in the media from the EDU to the beach and sculpt a gentle slope in the media away from your initial channel with the plastic scraper or the corner of a scoop. You may have media above the edge of the box at the upstream end of your model.

Raise the standpipe to 7cm (2.75") and start the pump, adjusting the flow to about 100 ml/s. The EDU will be about half-filled with water. Sediment will immediately begin moving downstream, and will be deposited in the forming lake at the downstream end of the model. As the lake fills, you will begin to see all the classic delta formation

phenomena in the model. Periodically raising and lowering the standpipe will mimic rising and falling tides or sea level change and introduce layers of complexity to the delta. Raising and lowering the flow rate of the pump will further add to the dynamic qualities of the model.

Stratigraphy

If you have color-coded media in your model, examining the stratigraphy can give fascinating insight into the depositional history of your experiments. As in nature, the most complex stratigraphy is often the result of long-term deposition under dynamic conditions. Flood sequences, meandering channels, delta building, and other fluvial processes all leave different marks on the stratigraphic record.

The best way to examine the stratigraphy in your model is to drain it overnight so the media can pack down. (Saturated media has lower cohesion than damp media.) Use the corner of a large scoop to cut V-shaped incisions laterally across the media bed. Cutting into the media this way magnifies the thickness of the layers and keeps the cut wall from collapsing.

Cleanup

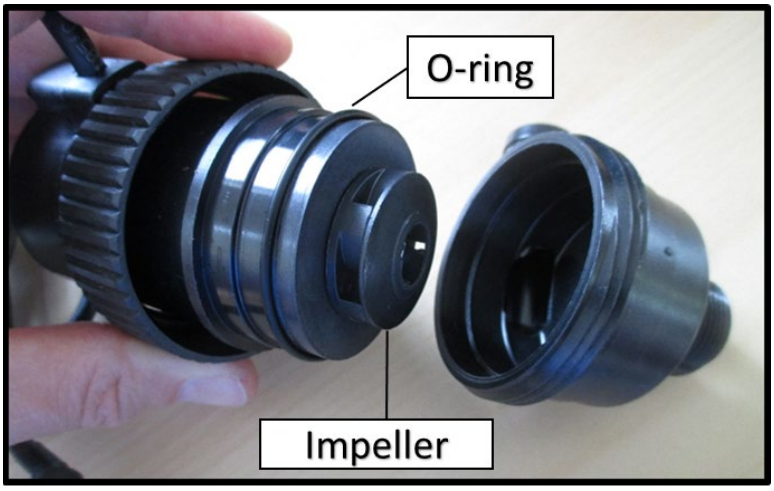
When you are ready to put your Em2 away, dry the media as much as possible by fully draining the model and piling the media in the middle of the box for a day or so if possible. Scoop as much media as you can back into the buckets. If the reservoir is still full of water, remove the standpipe, pull the inlet tube from the end of the hose, and use the pump to wash all remaining media out of the box and into the sediment trap. A small squeegee is ideal for coaxing the last bits of media to the hole.

Instructions for cleaning the GRI pump

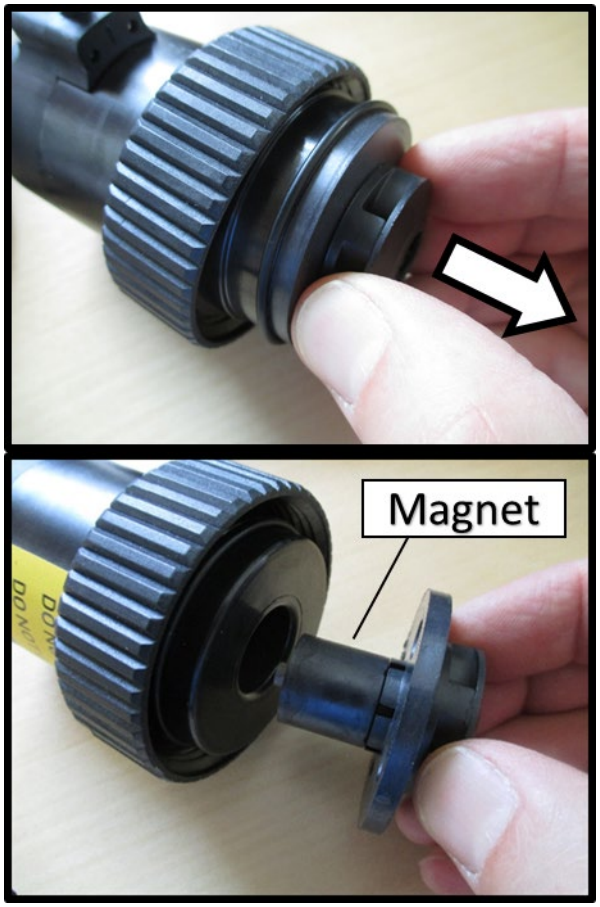
Your GRI pump should be checked monthly as part of routine maintenance. If you notice flow reduction or a complete cease in flow, disassemble and clean the pump following the instructions below. If you have questions in the process, please call Little River at 618-529-7423.

1. Disconnect GRI pump from controller and power supply.
2. Unscrew retaining ring.

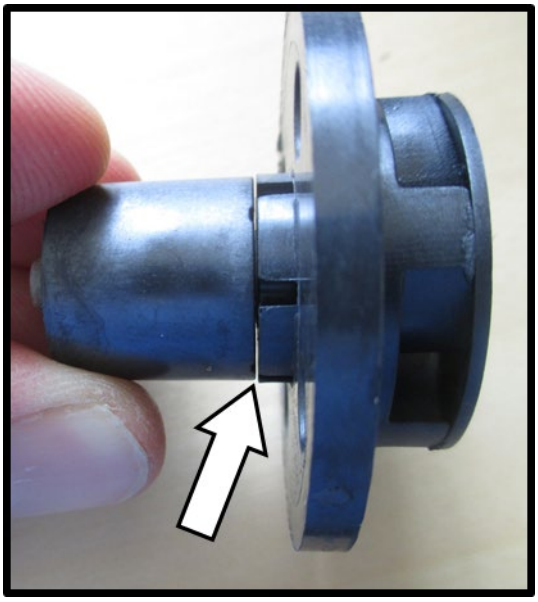
3. Pull threaded portion of pump housing to remove. Be careful not to remove the O-ring.

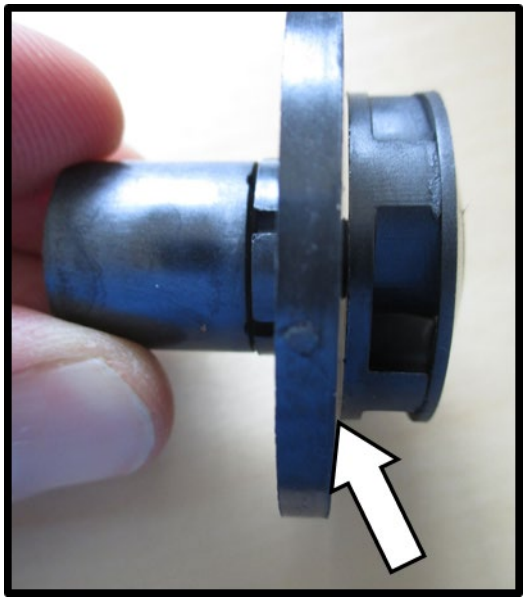


4. Remove the impeller by pulling it from the pump housing.

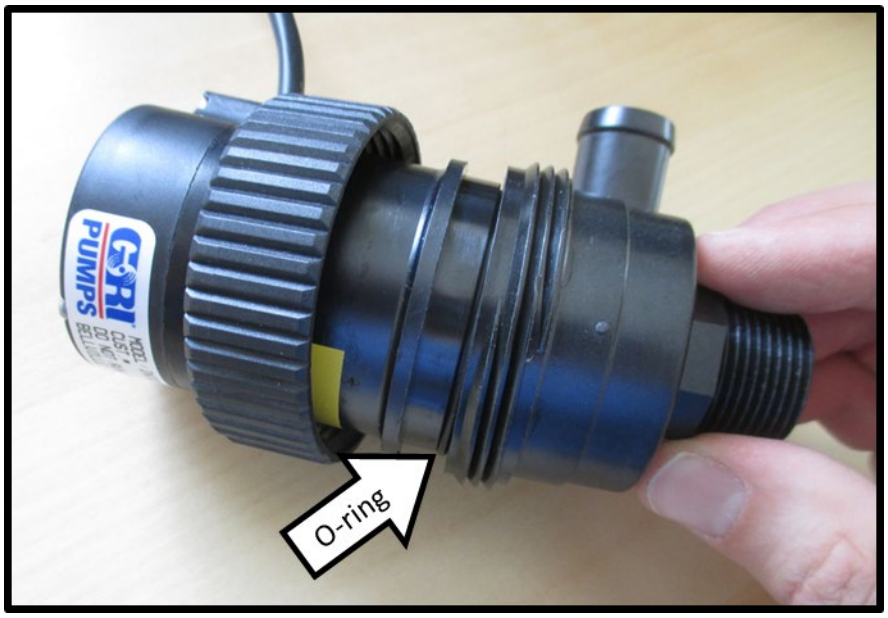


5. Clean all parts by rinsing with water. Make sure the narrow gaps around the impeller are clear of debris.





6. Moisten the whole unit to lubricate the O-ring and reassemble the pump by inserting the magnet and impeller into the housing. Make sure O-ring is in place and then press the threaded portion of the housing firmly onto the pump body. Tighten the retaining ring. When properly tightened, there should be no thread showing past the edge of the ring.



7. Attach filter and tubing. Submerge pump fully before restarting. Agitating the assembly lightly in the water will help clear air from the filter and pump.

Specifications

Emriver Component		Specifications
Modeling Media	Modeling media material	Particulate thermoset plastic
	Modeling media (sediment) dry wt	240 lbs (109 kg)
	Sediment specific gravity	1.55
	Sediment particle size	0.02 - 0.09 in. (0.5 - 2.1 mm) Alpha & Carbondale Mix 0.01 – 0.05 in. (0.25 – 1.2 mm) Memphis Mix
Box	Box weight	95 lbs (43 kg)
	Box dimensions	39 x 120 x 5.5 inches (1 x 3.05 x 0.14 m)
Reservoirs	Water capacity of each reservoir	27 gal (102 L)
	Total system water capacity	40 gal (151 L)
Pump	Pump capacity	12V DC marine pump, rated 500 gph at 2.0 amps
Entire system	Wt. of entire system (dry)	Approx. 400 lbs (181 kg)
	Wt of entire system (wet, @ 40 gal)	Approx 720 lbs (327 kg)
	Minimum floor space required for demonstration	9 ft x 16 ft (3 m x 5 m)