

# Instructions – Installing PWC Rails



This page includes installation instructions for the Tilt-Up Rails.

They can be easily adapted for the non-tilting Rails. See [www.pwcrails.com/tilt-up/installation.html](http://www.pwcrails.com/tilt-up/installation.html) for an online version with color pictures. The various pictures on [www.pwcrails.com/tilt-up](http://www.pwcrails.com/tilt-up) are intended as a supplement to these instructions.

You are responsible for the safe and secure installation and operation of your PWC Rails to your houseboat. If you are not confident in your ability to do this kind of job, we recommend that you hire someone to do it for you. Most marinas have several employees who will do this kind of work on the side...after hours. From start to finish, including the wiring, it should take about 2 or 3 hours to install your Rails. Some have done it in 1 hour, especially if they have done it on other boats.

Your Rails come with stainless steel hardware. Stainless steel threads tend to “gall” from the heat generated while turning the nuts. To prevent this, we suggest squeezing a little dish soap, or scraping some bar soap or Vaseline into the threads of the bolt. Even Chap Stick, or sunscreen will work. If you use a ratchet, turn it slowly so the threads don’t overheat...no faster than if you were using an end wrench. **DO NOT OVERTIGHTEN.**

Always wear safety glasses or goggles when drilling or doing other jobs with hand or electric tools.

**Included:** In addition to the Frame, Rails, and Winch, your PWC Rail kit includes all the hardware and parts you will need to install your Rails, including plastic spacers between the Rails and Frame

## There are 5 basic phases to the installation:

- 1) Mounting the Frame to your swim platform wall (4 bolts, 3/8” x 1.25”). The 1 ¼” length is long enough to go through the mounting Frame and your swim platform, and/or the forward wall of your swim platform. But if you need to go through any extra thickness, you will want to get longer bolts which are available at Home Depot, Lowes, or any other hardware store.
- 2) Affixing the rails to the frame (2 bolts, washers, nuts, and plastic spacers)
- 3) Mounting the winch (2 bolts and nuts)
- 4) Installing the lift arm (2 nuts and included brackets)
- 5) Wiring to your 12-volt source

Each of these 5 phases is described in detail below. We recommend that you read the loading and unloading instructions before reading the following installation instructions. It will help give context to the installation steps.

## Basic Tools needed for installation

- Battery Drill (do NOT use 110 volt power tools around water)
- 13/32 bit (this is a little larger than the 3/8” bolts that will mount the Frame to your swim platform)
- 3/16 bit
- 3/8, 1/2, and 9/16 end or ratchet wrenches
- Tape Measure
- Black electrical tape
- Safety Glasses – Always wear safety glasses when drilling or working with power tools

**Tools needed for wiring:** This will vary depending on where you connect your winch wiring. If you connect directly to a battery, then you will need a tool that fits the terminals on your battery, probably a 7/16 or ½ inch end wrench.

Please review the wiring section to determine what you will need in terms of tools.

## Unpacking your Rails

The kit is shipped with the Rails bolted to the Frame and the winch box secured inside the frame between the Rails. The lift-arm(s) is taped inside one of the rail-tubes. The nuts, bolts, and other attachment hardware is in a bag inside the winch box, or in the holes where they will be used. The shipping weight of the regular duty Rails is 75 pounds (100 for the Heavy-Duty Rails), but it rates higher than that because of the length (dimensional weight).

If your houseboat does not sit level in the water, you will want to mount your PWC Rail on the “high” side if the layout of your swim platform and ladder allows that. If your houseboat is not level after your Rails are installed and your PWC is loaded you will want to offset the new weight with some cement blocks or other suitable weight in the opposite front corner of your basement. This is a common solution, sometimes done by the houseboat factories on new boats.

When you choose which side you want your Rails mounted on your swim platform, you need to get in the water and look behind the vertical wall of the swim platform, armed with your tape measure (keep it dry). Make sure there is no framing that will interfere with the mounting bolts and nuts. If there is, you can move the Frame a little to one side or the other. If that doesn't solve the conflict, you can drill a new hole in the Frame to the side of one of the existing holes, enough to avoid or go through the framing. For your reference, the mounting holes in your PWC Rail Frame are 15 inches apart (center to center).

### Rub-Rail

If your houseboat has a rub-rail along the top of the forward wall of your swim platform, you have 3 choices:



- 1) Mount and tighten the Frame against the rub-rail at the top, with multiple washers or oversized nuts as spacers between the Frame and the wall on the lower bolts so the Frame is straight up parallel with the wall.
- 2) Same as above only without the spacer bolts. There is no rule that says the frame has to be parallel to the wall. It is OK if it is leaning a little...just doesn't look as good.
- 3) Recommended: Cut an 18-inch section of your rub-rail out so the frame fits flush against the wall. To do this, you would pry out the rubber to reveal the screws. Unscrew enough screws so that you can use a hacksaw or other cutting method to remove the section of rub-rail. When you tighten it back up, we recommend that you put screws close to each end of the newly-cut portions.

### Mounting the Frame

**Hint:** When drilling aluminum, if you have a 2-speed drill, set the speed to low. A slower speed will be more efficient.

The PWC Rail Frame is secured to your swim platform with 4 bolts. We have supplied multiple holes for the upper bolts so you can choose the highest possible holes that still go through your swim platform wall. Optionally, there are also holes in the bottom gusset of the Frame if you don't have a vertical wall at the front of your swim platform. Have someone press the PWC Rail Frame down into the carpet and against the forward wall of your swim platform. While they are holding it in place drill a 3/8" hole through your swim platform wall that matches one of the bottom corner holes in the frame. After you drill the hole, insert a bolt through it to assure that the frame doesn't move while you are drilling the next hole...still with someone pressing down on the frame. After you have drilled the bottom 2 holes and inserted bolts, drill the top holes...choosing the highest possible holes that will still go through your swim platform and allow you to get a washer and nut on. After you have drilled all 4 holes, remove the frame and vacuum or sweep away the aluminum shavings. Then replace the frame and proceed with mounting it. Remember to lubricate the bolts and turn the nuts slowly to avoid galling.

If there is no forward swim deck wall and only a hand-rail tube, you can affix your Frame with 2 bolts through the bottom, and secure it to the hand-rail tubing with u-bolts (not supplied). It will be strong enough with only 4 bolts down through the floor, but we recommend a couple as high up as possible on the back wall if possible.

The mounting bolt holes are designed so you can insert the carriage bolts into the holes (no washers) where they will stay (pound them in a little) without needing to be held with a wrench while you attach the washers and nuts on the inside of your swim platform wall with a 9/16" end wrench or ratchet. We recommend tethering the wrench to your wrist in case it slips out of your hand. Another safety measure is to use a floatation mat that is always under the work area while you attach the washer and nut.

Tighten the nuts as tight as you can get them with the maximum leverage of your end-wrench. It is difficult to get good leverage while in the water, so brace yourself as best you can and get it as tight as possible. After you use your Rails a couple of times, we recommend trying to re-tighten the nuts. You should check them once a year after that.

When you move your rails into position to attach them, we suggest you tether them with a short piece of rope so they are not accidentally knocked off into the water. All it takes is a split-second slip or mistake and they can disappear.

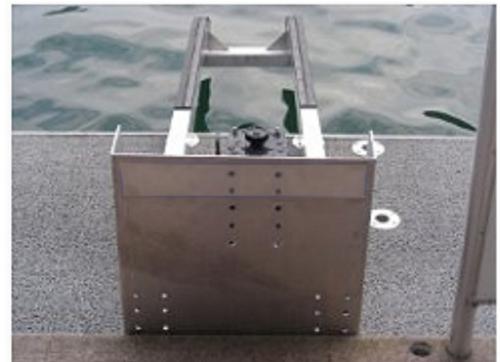
**Determining the Correct Rail Angle:** The ideal angle is when the rear of your PWC is 3 or 4 inches out of the water when loaded, and the tips of the Rails are also out of the water. Achieving this depends on more than one variable. You have to take into account how much your houseboat will lower in the water when the PWC is loaded. This will depend on the weight of your PWC and the size of your houseboat. Longer and wider houseboats won't be affected as much as smaller houseboats. It will also depend on whether or not your gas tanks are full. Another variable is how low or high your winch is mounted on the Frame (see loading instructions on [www.divnick.com/lift/pwc/tilt-up/loading-unloading.html](http://www.divnick.com/lift/pwc/tilt-up/loading-unloading.html)), and if you force the cable to wind up toward the top or bottom of the drum which changes the angle of the cable to your PWC. If the cable is pulling downward, the rear of the PWC will be out of the water more. If it is pulling upward, the rear of your PWC will be down more. You will have significant control over this when winching up your PWC.

So choosing a rail-angle is a little bit of trial and error. There is nothing wrong with choosing an angle that is your best guess, loading your PWC, and if you don't like the loaded angle, changing it...it is only 2 bolts (keep them lubricated).

We suggest that you begin with an angle so that the bottom of the entry-end of the Rails is about 3 inches above the water. If you have a smaller houseboat, you might start with 4 inches above the water. Attach the Rails with the bolt through the outside of the Frame, through the plastic spacer, and then through the holes in the front of the Rails. Secure with a washer and nut using a 9/16" wrench. Remember to lubricate the bolts and turn the nuts slowly to avoid galling. Tighten them until the plastic spacer can barely be rotated by hand.

### Mounting the Winch

Mounting the winch is very simple. The winch is mounted to the frame with just 2 bolts. There are multiple sets of height-holes to choose from. If you have a full size PWC, you will want to choose one of the top 3 sets of holes. If a low profile PWC, you will want to choose one of the lower sets of holes. The higher you affix your Rails, the higher the winch will need to be. There is nothing wrong with changing this position after you load your PWC if you find that you have mounted it too low or too high.



We suggest you begin with the second set of holes from the top.

Notice that the winch is offset a little from the center. This is so the cable will come off the drum in the center of the Frame.

Attach the winch with the two 5/16" stainless steel bolts (in a small poly bag) through the winch and Frame, and secured with the supplied nylock nuts using a 1/2" wrench.

### Test-Loading Your Rails

At this point, you need to test-load your new Rails. You can use jumper cables to connect your winch to a battery, or if you have already extended the winch wires as described in the wiring section below, you can connect them to a battery.

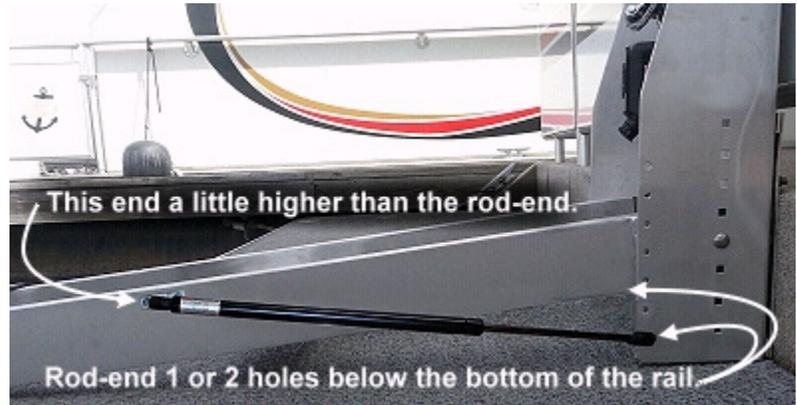
Test-loading will let you know if you have chosen the correct angle. For instance, if the rear of your PWC is touching the water, you will want to LOWER the front of the Rails in the Frame. Depending on how long your swim platform is, raising or lowering the pivot position 1 hole up or down (1.5" between the holes) will make an even greater difference at the rear of your PWC which is 9 to 12 feet long. When you are satisfied with the rail angle, proceed to the next step.



These pictures show lift arm mounting holes only on one side of the Frame. We have now added a row of holes on the other side in case you want to mount your lift arm there.

## Attaching the Lift-Arm(s)

The gas-filled lift arm is designed to help lift the Rails, and more importantly, to safely hold them in an upright position when you are using your swim platform. It is positioned (leveraged) in such a way to let the Rails rest firmly on the end of your swim platform, then, with a little bit of 1-handed lifting effort, they can be tilted up. The higher they are tilted, the greater the angle (leverage) of the lift-arm.



There are 8 square mounting holes on each side of the Frame. There are 7 round holes to the extreme edge of the right (starboard) side of the frame for installing the lift arm. You will attach the rod-end of the lift arm to one of these holes so that when you lower the Rails in the ready-to-load position, the cylinder end of the lift arm will be a little higher than the rod end, as illustrated in this picture. The rod-end needs to be 1 or 2 holes lower than the bottom of the rail.

Secure the ball-stud to the frame with a 5/16" nylock nut using a 1/2" end wrench, then press the socket of the rod-end of the lift arm over the ball until it snaps into place.

With the rod-end of the lift arm attached to the frame, the bracket attached to the cylinder-end of the lift arm, and the Rails **TILTED UP ALL THE WAY** (tie them or have someone hold them tight in the upright position firmly against the inside of the top of the Frame), align the bracket parallel to, and within about 1/8" of the edge of the rail tubing and mark a hole as shown below. Punch a dimple into the aluminum to help you center the bit. You can use the supplied self-tapping screws to make the hole if you have a socket driver that you can connect to a drill, but it is easier if you pre-drill the holes with a 3/16" bit, then you can use a ratchet wrench to finish cutting the hole and thread in the screw. **NOTE:** Stainless steel hardware is not as strong as regular steel. So don't over tighten...snug is enough!

With the bracket secured tightly with the top screw, unbolt the rod-end of the lift arm, OR raise the clip on the cylinder end as shown below so that you can move the lift arm out of the way of the bottom-hole in the bracket.

With the lift arm out of the way, punch and drill the bottom hole and secure with the second screw. Slide the clip back in place and re-attach the lift arm. It is now ready for operation.

We recommend that you check these screws for tightness from time to time. They generally hold very well on their own.

Note: The manufacturer of the lift arms recommends that you remove them during the winter and store them inside **WITH THE CYLINDER END ON TOP**. This keeps the seals lubricated.



## Wiring

A basic understanding of 12-volt wiring is necessary to connect the winch to a power source. If you aren't comfortable with that, you can ask a friend for their help, or most marinas have employees who are very comfortable with wiring.

Most of our customers connect directly to a battery. It is permissible to connect to another 12-volt source such as a fused connection that controls another device that would not be used at the same time as your winch, but it should be able to handle at least 50 amps which would be indicated by the fuse rating and be fed by at least 8 AWG wire.

In this PWC Rail application, the winch will never "dead-load" like it might if it were used on an off-road vehicle winched to a tree. So it should never require its maximum amperage. Still, if you connect it to a power source other than the battery, the recommended wiring should be at least 8 gauge. That said, during our design-phase, we tested the Rails many times with a 20-foot length of 12-gauge zip-wire temporarily clipped to a battery winching up a full-size 3-seater without any problem.

But for permanent installation, you would want to use 8 gauge stranded copper wire, which is very hard to find locally. Do not use 8 AWG speaker wire which is copper-coated aluminum and will not carry the necessary amperage.

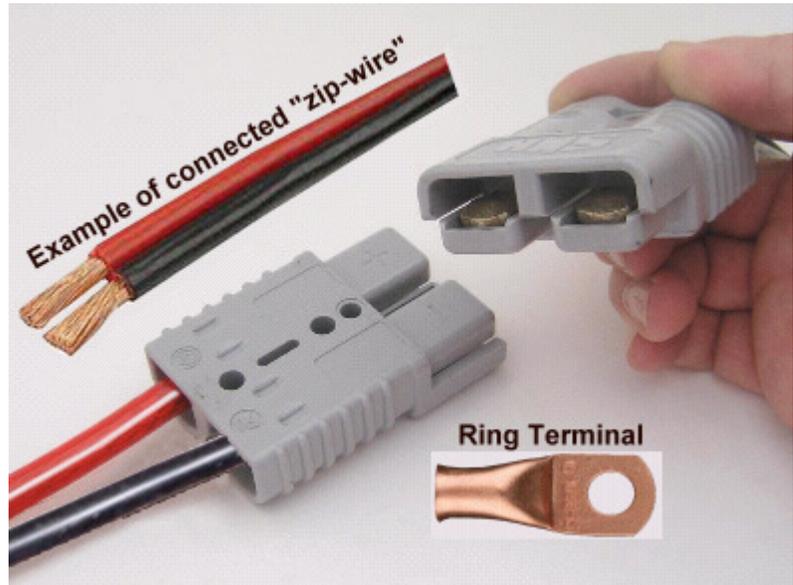
As described above, we provide 8-gauge copper zip-wire (both wires connected together with a web) for \$2 per foot. Our Frames have three optional-height 7/8" holes, through which you can run the wire. You will need to drill a matching hole in your swim platform wall. Most common bit sets have up to a 1/2" bit. You can enlarge it by angling the bit back and forth and "chewing" the hole larger.

You need to protect the wires as they pass through the aluminum holes. Some people just wrap them with black electrical tape. But most customers feed their wiring through a garden hose to completely shield it from the aluminum, and moisture or animals that might attempt to chew through the wiring insulation under your houseboat. You will want to use at least 5/8" hose, preferably 3/4" so it is easier to feed the zip-wire through the hose. You can buy 3/4" hose from any hardware store...just cut it to the length you need.

It is easiest to feed the zip-wire through if you first push a "fish-line" through the hose and then use it to pull the zip-wire. Some people have used bailing wire as a fish-line by bending the end over so it isn't sharp and pushes through more easily. But bailing wire isn't very stiff, so you will want to keep your hose as straight as possible while pushing it through. You will want to get the zip-wire wet with lubricant such as dish soap so it pulls through more easily. If you can't feed the wiring through the entire length of your hose/wire run, you can cut your hose into sections and then tape it together with black electrical tape. The point is, you will be adding a level of protection with a garden hose enclosing most of your wiring. If you choose to feed your wire through a long hose, we recommend that you cut the hose a little longer than you think you need for the entire route, then feed the wiring through the hose while you are on top of your deck, with help to keep the hose straight. After the wires are all the way through, then you can feed it through the Frame, through your swim platform wall, route it under your swim deck, and into your engine room. You can cut off any extra in the engine room. In other words, it is VERY difficult to push or pull the wiring through the hose if it is bent under-over-and-around in different directions.

There will be several support beams under your deck above which you can thread the wires or hose as high as possible away from the water. If you don't enclose it in a garden hose, wherever the wires touch aluminum, you should protect them...if nothing else, with multiple wraps of tape, but preferably with something more substantial such as a piece of rubber or short section of old garden hose. You can slit a section of garden hose and spread it over the zip-wire and then secure it with tape, zip-ties or other means.

If you are replacing existing rails with our Rails, you might already have wires under your swim platform to which you can connect our winch. That will reduce the length of wire needed, and avoid the need to drill a hole into your engine compartment. As an example, one of our customers replaced his older rails with a pair of ours. He connected one of the winches to his existing terminal that was already mounted behind a step without needing to cut-and-extend the 6 feet of wire that comes on the winch, and he connected the winch from the Rails on the other side of his swim platform to the same terminal with 8 feet of our zip-wire. While both winches are now connected to the same terminal feed, he only uses 1 winch at a time, so the amp-draw is never over loaded. By using his existing power source, he didn't have to drill any holes into his engine compartment.



If you do need to go through your engine compartment wall, you might be able to find an existing pass-through that has enough capacity through which to feed the winch wires. If not, drill a hole as high up as possible. If you are installing 2 PWC Rails, we recommend you route the wires from each winch to one point so you only have to drill 1 hole into your engine compartment. You will want to locate the hole so that you have a good path for the wires to reach your battery or other connection location. It will be easiest to drill through from inside the engine compartment.

### Safety Tethering

There are two kinds of tethering that we STRONGLY recommend:

1) When tilted up, wrap the winch line around the cross member to prevent unintended lowering of the Rails, as pictured to the right. Make sure the clutch button is DOWN to lock the cable.

2) When your PWC is loaded and winched up, we recommend that you add a secondary tether that connects your PWC to the winch frame or the railing of your houseboat (below right).

### Winterization

You should remove the winch and lift arm(s) and store them inside during the winter. You can tie your Rails in the upright position, securely tethered to your railing or upper deck for safety. Store your lift arms with the cylinder upright.

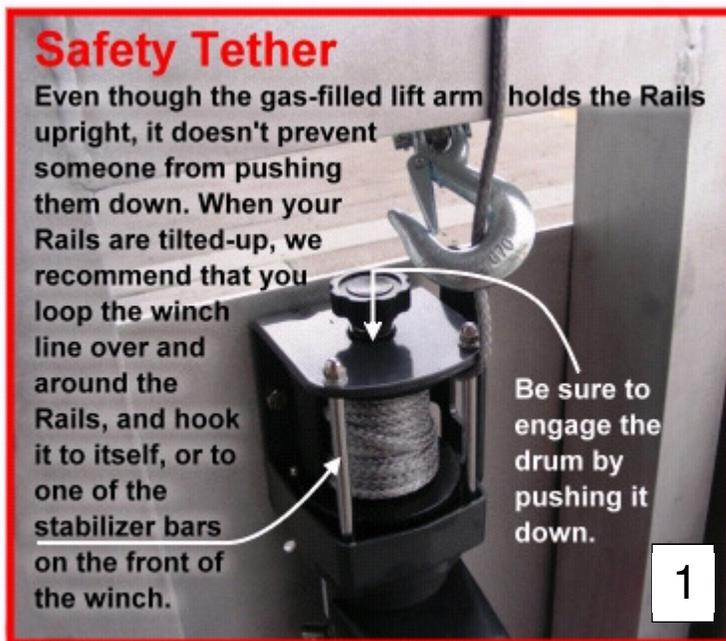
### Feedback?

As you install your PWC Rails, if these instructions don't match your installation, or if you come up with any suggestions to make these instructions clearer, please share them with me and include any pictures that can help in the explanation.

**Questions:** For your reference, the main PWC Rail website is [www.PWCRails.com](http://www.PWCRails.com)

If you have any questions about installation, please don't hesitate to ask. You can reach me personally at 1-937-384-0003 (Eastern USA) or send an email to [steve@divnick.com](mailto:steve@divnick.com)

*Steve Dimmick*



**Using the Sunbrella Winch Cover:** The winch cover protects your winch from direct rain. It has a grommet drain hole in the bottom in case a sideways rain makes its way into the cover. Fit the cover under the bottom of the motor first, then up and over the drum on top. The cable/rope extends out through the snap-opening on the right (Starboard) side of the cover.