Kari-Tek

Skeg Rudder System® Installation Instructions

Instructions for installation of Kari-Tek Skeg Rudder System®

These instructions cover the installation of the Kari-Tek Skeg Rudder System® into kayaks fitted with the Kari-Tek skeg and glide box.

There are six main stages involved in installing the Skeg Rudder System®:

- Fit the glide cylinder and skeg rudder cassette
- Connect the skeg hydraulic system
- Fit the tiller block
- Connect the rudder hydraulic system
- Bleed and adjust the skeg hydraulic system
- Bleed and adjust the rudder hydraulic system

Detailed instructions for each stage are given in the following sheets.

Skeg Rudder System® kit

Component List

Your Skeg Rudder System® kit contains the following:

Tiller block and rail assembly
Skeg Rudder cassette assembly
Rudder actuator ram assembly
Glide cylinder assembly
Bleed kit (feed tube, drain tube)
Two lengths 4mm nylon tube (skeg) green, clear
Two lengths 4mm nylon tube (rudder) red, blue
Two 1/8"BSP/4mm compression couplings
One long (M6x40) SS countersunk socket head screws
Four short (M6x20) SS countersunk socket head screws
Two short (M5x20) SS button head screws
One short (M6x20) SS domed head screw
One M6 nyloc nut
Two M6 half nuts
Three 19mm diameter rubber-bonded washers
Skeg Rudder System® stickers
Two small clamps (spring loaded clothes pegs)
Set of tube clips

Tools and Materials required

The following tools are needed to fit the Skeg Rudder System® into your kayak:

4mm allen key
10mm, 11mm and 13mm spanners
Water bottle
Drill bits: 4mm, 6mm and countersinking bits
Marker pen
Anti-freeze
Basin
ABS solvent cement
Junior hacksaw
Sharp knife

1. Fit the glide cylinder & skeg rudder cassette

- Dismantle all the fittings from the glide cylinder including the glide button leaving only the cylinder and lock nut

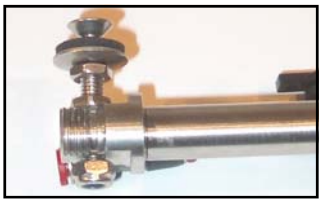
(see picture)

Tip! Press down on the coloured collar to release the tubes from the fittings. To reconnect, just push the end of the tube back into the fitting.

- Push the piston rod of the cylinder from the inside of the cockpit out through the hole in the glide box
- Screw the glide button back on to the end of the piston rod and tighten up the locknut. Working from inside the cockpit, screw the glide piston into the brass insert in the end of the glide box so that the face of the cylinder just protrudes into the glide box by about 0.5mm (1/32”). Thread and tighten the cylinder lock nut, finger tight only at this stage.

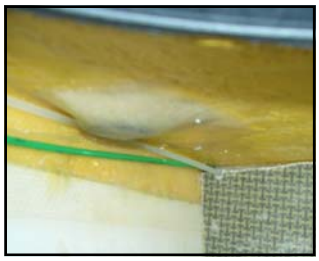
Glide cylinder inside cockpit

- Re-fit the two T connectors onto the cylinder, aligning them along the body of the cylinder. (*Tip!* Take care not to overtighten the connectors: tighten finger tight only then tighten a further quarter turn with a spanner).
- Rotate the cylinder so that the hole in the back end of the cylinder is perpendicular to the deck of the kayak at the point closest to the cylinder. From the inside of the kayak cockpit, drill a 6mm diameter hole through the kayak’s deck using the hole in the end of the cylinder as a guide. Countersink the hole from the outside.
- Place the long stainless steel countersunk socket head setscrew through the kayak deck. From the inside of the cockpit, thread the 19mm rubber-bonded washer onto the setscrew with the rubber side facing out towards the inside of the kayak deck.
- Thread the 2 half nuts onto the setscrew, then pass the end of the screw through the hole in the back of the cylinder.



Tip! See picture for order in which items are threaded onto the setscrew.

- Tighten up the outermost half nut onto the rubber-bonded washer to make a watertight seal against the kayak deck. Run the other half nut up against the side of the cylinder, then screw the M6 nyloc nut onto the end of the setscrew and tighten up against the side of the cylinder. Tighten the cylinder locknut fully.
- With a junior hacksaw, cut any excess off the tail of the setscrew.
- Drill two 4mm diameter holes through the bulkheads between the cockpit and the rear hatch, and push the two 4mm nylon tubes through the holes.



Example of tube routing through bulkhead immediately below deck

Tip! You may be able to reuse holes from your previous skeg installation, but otherwise drill the holes high up in the corner of the bulkheads for a neat finish (see picture).

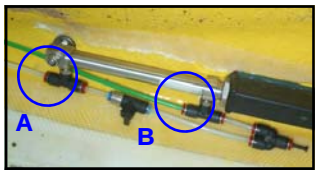
Take care when drilling the holes not to drill through the kayak deck!

- Screw the two 1/8”BSP compression couplings into the two holes on the nose of the skeg box.

Tip! Make sure not to lose the olives from inside the compression couplings.

2. Connect the skeg hydraulic system

- Reconnect the short lengths of tubing to the glide cylinder as shown on the picture. Do the same with the ends of the long lengths of tubing at the glide box end (in the cockpit). The clear tube connects to the T connector furthest from the glide box (A: see picture), the green tube to the other (B).



Green and clear tubes connected to glide cylinder

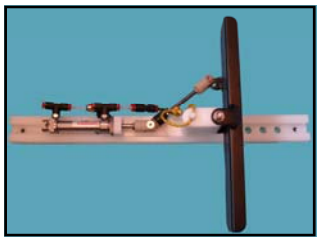
- Working inside the rear hatch, feed the other ends of the two long lengths of tubing through the compression couplings in the front of the skeg box as shown. The clear tube should be run through the fitting nearest the bottom of the hull.


Green and clear tubes connected to skeg box

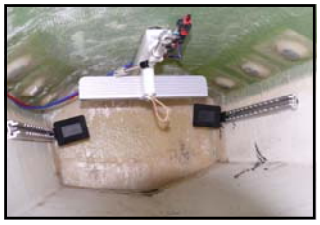
- Feed tubing through the skeg box couplings until you are happy with the routing of the tubes, making sure that there is enough nylon tubing in each hatch to allow the tubing to follow a neat path along the side of the hull when it is finally secured later.
- Mark tubing with a marker pen at the face of the compression coupling, then temporarily pull the tubes back out from the coupling.
- With a sharp knife, cut the tubes 25.5cm (green tube) and 37cm (clear tube) beyond the points you have just marked. ***Take care not to cut tube too short!***
- Push the tubes back through their respective compression couplings, but do not tighten the fittings yet: for the moment leave the tubes sticking out through the bottom of the skeg box.

3. Fit the tiller block

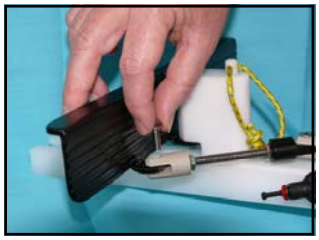
- The tiller pedal mounts on a ladder rail attached to the underside of the kayak cockpit. A sprung locking pin allows the position of the pedal on the rail to be adjusted.


Tiller pedal mounted on the ladder rail as supplied. The forward end of the rail is to the right in this image.

The rail needs to be fitted in the cockpit in a position which allows the required range of fore and aft adjustment of the pedal position. The precise location is a matter of personal preference, but you may find it useful to decide where to mount the rail in comparison with the existing position of your foot pegs. The forward end of the rail must be at least 70mm aft of the bulkhead to allow enough room for the operating tubes.


Example tiller block installation showing tiller pedal in relation to footpegs.

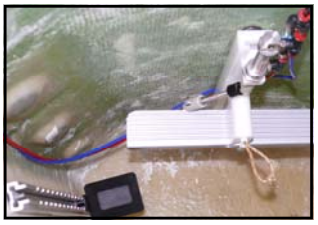
- Once you have decided how far forward from the cockpit rim the ladder rail should be mounted, use the rail as a template to drill two 6mm diameter holes in the front deck, aligned with the tapped holes in the ladder rail.
- Countersink the holes and then attach the rail to the underside of the deck using two of the M6x20 screws provided.
- Connect the tiller block ram to the operating pedal using one of the M5x20 countersunk screws provided.


Connecting tiller block ram to operating pedal. This is best done with the block removed from the rail.

- Mount the tiller block onto the ladder rail. Double check that the range of positions fore and aft for the operating pedal is as required.

4. Connect the rudder hydraulic system

- Working inside the cockpit, connect one end of the red and one end of the blue tube to the tiller block ram outlet ports. The ram is supplied with short stubs of hose to indicate which tube should be connected to which tube. The stubs can be removed by pressing down on the coloured plastic collar round the port, and may then be discarded. The ends of the tubes are a simple push fit into the outlet ports.
- Arrange the tubes to run towards the bow of the kayak as they leave the tiller block, and then loop them round to run towards the stern alongside the glide box as shown. Hold them in position using one of the clips provided. Make sure that there is enough tube to allow the full range of movement of the tiller block on the ladder rail without fouling the footpegs or kinking the tubes.



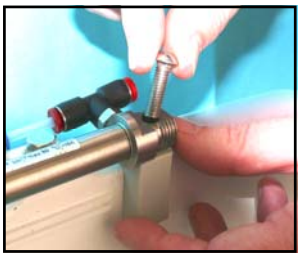
Routing of red and blue tubes from tiller block

- Route the tubes neatly aft from the cockpit to the back hatch, drilling holes in the bulkhead(s) where necessary. The clips supplied may be used to secure the tubes to the kayak.

  Tip! As for the skeg operating tubes, you may be able to reuse holes from your previous skeg installation, but otherwise drill the holes high up in the corner of the bulkheads for a neat finish (see picture). ***Take care when drilling the holes not to drill through the kayak deck!***

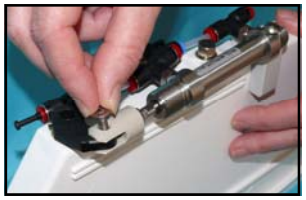
Rudder actuator ram assembly as supplied. The ram attaches to the top of the skeg box using the hole in the body of the ram, shown on the right in this image.

- The next step is to attach the rudder actuator ram assembly to the top of the skeg box.
- Working inside the back hatch, use the M6x20 domed head screw provided to attach the actuator ram to the tapped hole in the block on top of the skeg box. Position the ram with its connecting arm facing forward in the kayak, and with the T pieces over the top skeg box as shown. Take care not to overtighten the screw.



Attach ram to tapped block on top of skeg box.

- Still inside the back hatch, attach the connecting arm of the rudder actuator ram to the crank arm protruding from the top of the skeg box using one of the M5x20 countersunk screws provided as shown. Again, take care not to overtighten.



Attach actuator arm to rudder shaft crank arm.

- Now route the red and blue tubes to the hydraulic ports on the rudder actuating ram; the tubes loop round and connect to the ports from the stern of the kayak. The ram is supplied with stubs of tube in each port indicating which colour of tube should connect to which port. These stubs can be removed by pressing down on the coloured plastic collar round the port, and may then be discarded.
- Once you are entirely happy with the routing of the tubes to the ram ports, mark and cut them to length. The ends of the tubes are then a simple push fit into the outlet ports.
- This completes the assembly of the Skeg Rudder System—it only remains to bleed the skeg and rudder hydraulic systems.

5. Bleed the skeg hydraulic system

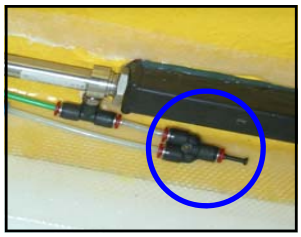
- The two hydraulic systems are now filled and bled, beginning with the skeg system.
- Open the bleed kit supplied and connect the bleed kit drain tube to the tubes at the skeg box end: simply take the two loose ends of the tubes, which you left sticking through the bottom of the skeg box, and push them into the holes on the 'Y' piece on the drain tube as shown. Place the end of the drain tube into a receptacle suitable to catch excess fluid.

Bleed kit Y piece connected to tubes protruding from underneath skeg box

- At the glide box end, open the bypass valve. The valve is open when the operating lever is aligned along the tube.

Close-up of bypass valve, shown in open position

- Remove the blanking plug from the 'Y' piece at the glide box (see picture)
- Put the blanking plug to one side – it will be needed again shortly!

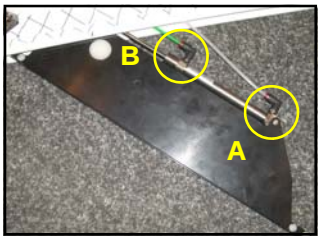


Blanking plug at glide box end

- Fit the end of the bleed kit feed tube into the 'Y' piece in place of the blanking plug. Fit the other end onto a water bottle or similar. *Tip! The bleed kit feed tube is supplied with a fitting which connects directly onto a Platypus type water bottle drinking tube.*

Blanking plug after removal: don't lose this!

- As when bleeding the skeg system, clamp shut the soft part of the feed tube. Have a second clamp to hand ready for use on the drain tube.
- Fill the water bottle with a solution of 75% water and 25% anti-freeze and secure above the kayak. *Tip! the higher up the water bottle, the more efficient will be the bleeding process.*
- Remove the clamp from the feed tube to allow the fluid to flow through the system, collecting in the receptacle at the drain tube end.
- While the fluid is flowing through both tubes, slide the glide button forwards and backwards to expel all air from the glide cylinder and tubes. Repeat if necessary until no more air bubbles are seen emerging from the drain tube.
- Place the clamps onto the soft parts of the drain tube first and secondly the feed tube.
- The final part of the bleeding process is to bleed the skeg operating cylinder, which is done before fitting to the kayak. Place the skeg cassette in a tub or basin of water and move the skeg blade up and down to expel all air out of the cylinder. When no more bubbles emerge, close the skeg blade while the cassette is still under the water.
- Remove the skeg cassette from the water and take to the kayak. Disconnect the green tube from the drain tube 'Y' piece and immediately plug it into the elbow nearest the skeg hinge (port B: see picture) on the cassette cylinder.
- Repeat for the clear tube, plugging it into the other elbow (port A).



Sliding the skeg cassette into the box: note position of the green and clear tubes

- Slide the skeg cassette into the skeg box making sure that the tubes are not twisted and that one runs either side of the rudder pivot shaft inside the skeg box.
- Secure in place with the two short stainless steel button head setscrews. Manually move the skeg blade to the up (retracted) position.

5. Bleed the skeg hydraulic system (continued)

- Remove the bleed kit feed tube from the glide cylinder 'Y' connector and replace the blanking plug. Slide the glide button to the up position (nearest the stern of the kayak). Close the by-pass valve by the glide cylinder: the valve is closed when the operating lever is at right angles to the tube.
- Working from inside the rear hatch, gently push the two tubes through the compression couplings to their full extent, to ensure that they do not interfere with the operation of the skeg blade.
- Tighten the compression couplings, taking care not to overtighten: tighten by hand first, and then a further quarter turn with a spanner.
- If you have not done so, using the clips provided fix the tubes to the inside of the hull to stop them from getting snagged when loading the hatches.

6. Adjust the skeg hydraulic system

- Push the glide button forward to deploy the skeg and then move it fully back to retract it again. If the skeg blade does not fully return into the skeg box, or if the blade does not fully deploy, then adjust as follows.
- Push the blade into the box manually, then temporarily open the bypass valve (The valve is open when the operating lever is aligned along the tube.)
- Slide the glide button slightly forward towards the skeg down position and close the bypass valve again.

Operating the glide button

- Push the glide button forward to operate the skeg again and repeat the previous step if necessary. The blade must deploy fully for the rudder tiller to operate.

7. Bleed the rudder hydraulic system

- Remove the 'Y' piece from the bleed kit drain tube, by pressing down on the coloured collar to release the tube.
- Working inside the rear hatch, open the bypass valve at the rudder actuating ram. The valve is open when the operating lever is aligned along the tube.


Close-up of bypass valve, shown in open position

- Remove the blanking plug from the 'Y' piece at the rudder actuator ram, in the same way as you did earlier for the blanking plug at the glide box. Put the blanking plug to one side – it will be needed again shortly!
- Fit one end of the bleed kit drain tube into the 'Y' piece in place of the blanking plug and place the other end of the tube into a receptacle suitable to catch excess fluid.
- Working inside the cockpit, open the bypass valve at the tiller block. The valve is open when the operating lever is aligned along the tube.
- Remove the blanking plug from the 'Y' piece at the tiller block. Put this blanking plug to one side also– it too will be needed again shortly!
- Clamp closed the soft part of the bleed kit feed tube, and if necessary, refill the feed container. Have the second clamp to hand ready for use on the drain tube.
- Fit the end of the bleed kit feed tube into the 'Y' piece at the tiller block in place of the blanking plug.
- Remove the clamp from the feed tube to allow the fluid to flow through the system, collecting in the receptacle at the drain tube end.
- While the fluid is flowing through both tubes, move the tiller pedal repeatedly through its full range to expel all air from the tiller operating cylinder. Continue until no more air bubbles are seen emerging from the drain tube.

7. Bleed the rudder hydraulic system (continued)

- Move the skeg glide button to fully deploy the skeg rudder blade. Grasp the blade and turn it from left to right through its full operating range repeatedly until no more air bubbles are seen emerging from the drain tube.

Skeg rudder blade deployed

- Clamp the drain tube closed with the second clamp, then clamp the feed tube closed also.
- Close the bypass valve at the rudder actuating ram in the back hatch, press down on the coloured collar on the 'Y' piece to release the drain tube and refit the blanking plug.
- Close the bypass valve at the tiller block in the cockpit, press down on the coloured collar on the 'Y' piece to release the feed tube and refit the blanking plug.

8. Adjust the rudder hydraulic system

- The final step is to adjust the rudder hydraulic system. Using the tiller pedal with the skeg rudder fully lowered, check that the rudder operates through its full range and that centre position on the pedal corresponds to the rudder blade being aligned straight fore and aft.
- If the centre position on the blade and pedal do not match then open the bypass valve at the tiller block, centre the tiller and rudder blade by hand then close the valve again.

Your Skeg Rudder System® is now ready for use! Happy Paddling.

45 Hillhead
Coylton
Ayrshire
KA6 6JT

Kari-Tek

01292 571019
sales@karitek.co.uk
www.karitek.co.uk