Steering and Control Line
Replacement Kit Instructions for
Mirage or Tandem Mirage

Kit Contents.

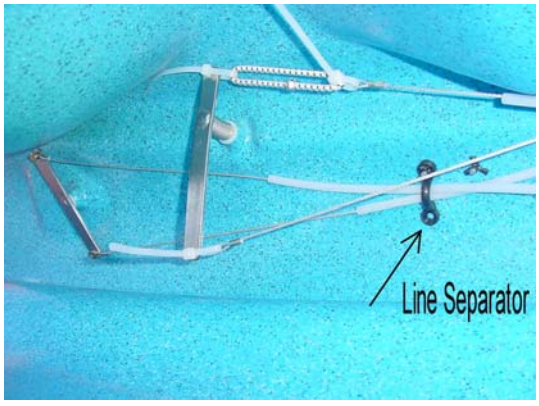
2 steering control lines and tube assemblies, (labeled)
1 up control line and tube assembly, (shortest, without swedged loop)
1 down control line and tube assembly. (Has loops swedged on both ends)
Two 3/16 inch shock cord loops for up/down line to arm.
Four Zip ties
Two linking loops

Tools Required
1/8th inch Allen wrench
Screw drivers
Knife or side cutters

This kit is intended…
to replace the rudder control lines when the original lines wear out. The following will help guide you through the removal and installation of the new system.

1. Disconnect the old lines from rudder area. (total of 4) Reach inside the 5 inch inspection port to remove the lines from the control cranks, and remove all 4 lines from the cranks. Note, while it is possible to do all this work with only your left hand, leaving the handles on is hard, you may want to temporally remove the handles to take the cranks out to change the lines. Cut the loops off. Note where the washers and spring go to reassemble. This is the preferred method if the handles will come off easily; (sometimes corrosion will make fittings difficult to separate.)
2. The control line tubes must be removed also. Use a straight blade screwdriver to pry the rivet out the back end of the boat. These are just a press fit of the plastic parts. No glue was used to seal. Once you can get a hand on the tube, pull it out the rest of the way.

Steering System Installation
3. The two 7/32" holes at the back and most outboard from the centerline are for the steering lines. Insert the steering line assembly into each hole, looped end first. Press the black plastic cap that is part of the tube assembly completely into the hole. If the cap is a little tight, a couple light taps with a hammer can get it in completely (note: it should be a tight fit). If metal rivets were used at the stern of the boat instead of the plastic part, the holes may need to be opened up a bit to accommodate the plastic part.
4. Feed the steering lines through the eyestrap (line separator) on the inside of the hull, about 16" back from the steering crank. See picture 1



Picture 1

5. Remove the steering handle by loosening setscrew from the steering crank. Connect the lines. With the crank in your left hand, point the shaft up at 45 degrees with the dimple on the bottom of the shaft
6. Install the left-hand steering line loop on to the lower steering crank post and the right hand line loop on the upper post. Insert the steering crankshaft, (using left hand) with plastic washer on the shaft, into the forward of the two holes. Slide the handle onto the shaft (using right hand) with the setscrew facing down. Tighten the setscrew into the shaft recess. You want the handle to be free to rotate.

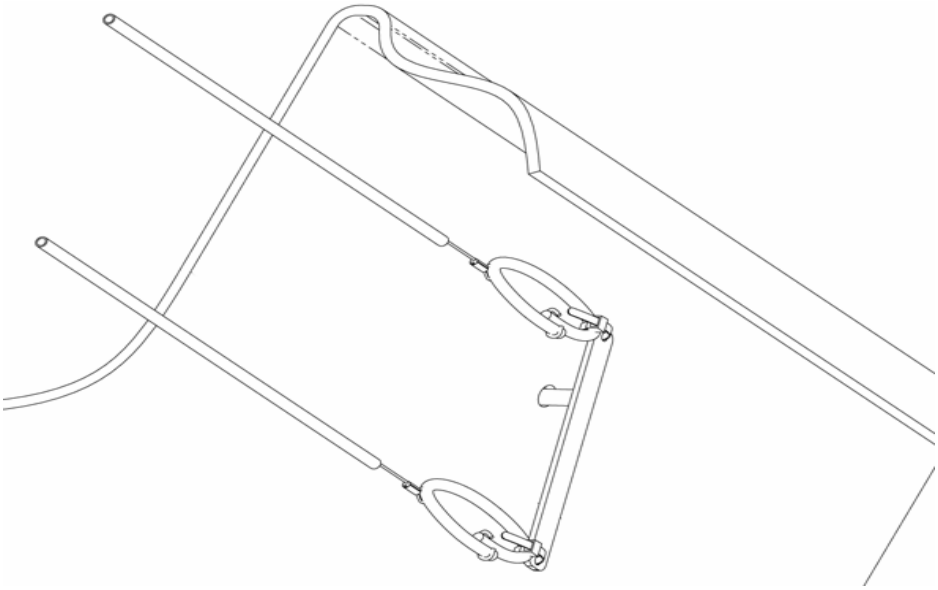
Rudder Up/Down System Installation

7. Install the shortest line by inserting the looped end through the centerline hole. Install the down control line (longest line) in the remaining hole. Press the Stainless steel collar in all the way.
8. Note: In this step, do not tighten the zip ties yet. Connect the lines. Be sure the lines are not tangled. Connect the loop of the up line with a zip tie to the 3/16 shock cord loop and another zip tie connecting the shock cord to the hole on the short arm on the control crank. You may find it is easier to connect these loops by working just outside of the hatch opening. Connect the down line loop to the hole on the crank (longest arm on the crank) with 3rd zip tie provided. See picture 1. Read the next note for early model types. Insert the shaft, from the inside, through the rear most hole. Position the crank so that the recess in the shaft is facing up. Slide the handle onto the shaft with the set screw facing up. This step is a bit tough, because; you have to overcome the tension of the spring. You may want a second set of hands, one set holding the hull while pushing the shaft through the hull and the other tightening the set screw into the shaft recess.

Notes

Some variations in production may have different cranks.

See Picture. The use of supplied linking loops (small plastic loops) may be necessary to join the parts if crank has the riveted posts to loop the lines onto.



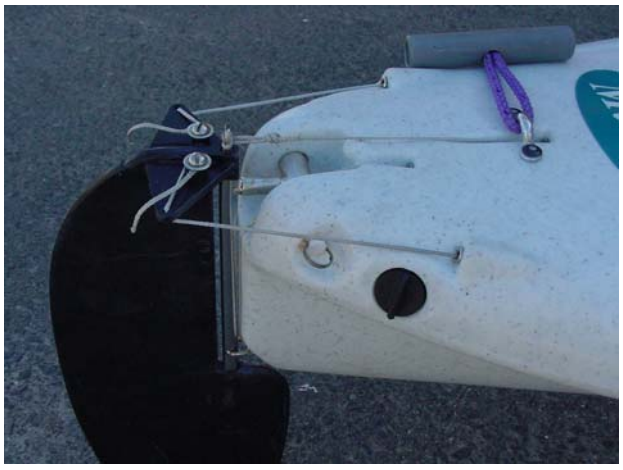
This crank doesn't have rivets, use a zip ties to attach the bungee to the cranks and bungee to the up/down control lines. If your up/down control crank does have rivets, use the small links and press the small loops over the rivet heads. Then use the zip ties to attach the bungee to the links and bungee to the up/down control lines.

Connecting the outside lines.

9. Take the down line (with the loop,) lay it over the rudder mount on the right side and through the bail on the lower part of the rudder mount. Slide the #10 screw retained from disassembly through the loop and screw it into the hole at the bottom of the transom. Keep the line on the top of the screw. See picture 2

Picture 2

10. Next, with the rudder in the down position, feed each steering line up through the outermost hole in the rudder horn and (see picture 3) under the washer and around the screw in a clockwise direction. Point the rudder and the steering handle straight forward, pull a minimum tension into each line and tighten the screws. It is desirable to have some friction in the steering system so that the rudder does not move from side to side without movement of the steering handle. The amount of friction is adjustable to the choice of the owner by tensioning the steering lines. Do not cut off any excess length for several weeks. The lines may shrink as they age which may require adjustment at some future date. Should the steering lines get too tight, they will effect the up/down control and make the boat harder to track straight.
11. Tie the up control line to the steel pin. For better wear against the constant motion of rotating, pass the line through the hole and around the pin, back through the hole in the opposite direction and then put in 2 or 3 half hitches.
12. Now everything is done except for tensioning the up/down control lines. The lines should be snug before adjusting the zip ties. Do this adjustment with the rudder in the down position. Tighten the down zip tie enough to keep the rudder from pivoting up when you pull back on it with about the same pressure that water flowing across it would create. Tighten the up line zip tie enough to hold the rudder straight out when fully uphauled.



Picture 3