

## J-105 RIG TUNE GUIDE

July 2007

**1: Mast Rake.** Mast Rake dictates the amount of weather helm when sailing upwind. The J-105, being underpowered up to 10 knots, should be set up for as much rake as the class allows. The increased rake will induce weather helm, making the boat much more responsive and easier to drive in light to medium conditions. The three settings that determine mast rake are:

**A: "J" measurement.** The spar should be set at the deck with factory-supplied chocks. This will allow the spar to sit near the center of the hole in the deck.

**B: Mast Butt location.** We have determined that there is no way to measure the mast butt location from the bulkhead because of manufacturing differences from boat to boat. Therefore the mast butt should be moved to a position that allows the mast to sit in the boat with "0" prebend. By "0" prebend we mean that with "0" backstay tension and with your base setting on the shrouds (41,17,0), when sighting up the rig, the spar should be very straight. If your boat is in Maryland or New Jersey, U\S Sails would like to personally help with the tuning your rig. If you are out of the area we would like to speak with you by cell phone while you are placing the mast butt.

**C: Headstay length.** Set for maximum class allowed. 42' 9 1/8". One should measure from the center of the headstay pin on the mast, to the top of the furler drum (measurement A), then measure the height of the furler drum (measurement B), then from the underside of the furler drum to the intersection of the stem and sheer line (measurement C). The overall headstay length = A+B+C. [Revised 4/10/01]. See class rules for diagram. Once your forestay is set, you need not adjust it further.

### 2: Shroud Tensions: (Use PS 10 Loos Red Gauge)

**A:** Before setting shroud tension, it is very important that you make sure your spar is centered at the hounds. To center the spar first measure from the forestay pin back to a point on each side of the toe rail adjacent the spar and mark with permanent marker. Then attach a steel tape measure to the center Jib halyard. Raise the jib halyard a few feet and cleat. Then measure to each rail, adjusting each upper shroud until the measurement is the same on each side.

**B:** Once the spar is centered, tighten the uppers to 41 on your Loos Gauge. Tighten Intermediate shrouds to 17. The lowers should be slack. (approx. -"0" on the gauge). Your rig is now dock tuned for 10 to 16 knots. With the correct mast butt position, headstay length, "J" measurement, and shroud tensions, your J-105 will have the correct mast bend and forestay sag to accommodate your new set of Ullman Sails through a wide range of conditions.

**C: Adjusting shroud tensions for different conditions.** Through years of testing and sail development, we have simplified J-105 rig tuning into an easy to understand guide that will help you get excellent performance out of your boat. However by studying the rationale behind our tuning, you will understand why we do it. This should help increase your performance even further.

Upper shrouds: Upper shroud tension controls forestay sag and mast tip leeward sag.

Lowers shrouds: Lower shroud tension controls leeward mast sag and to some extent, lower mast bend.

Intermediate shrouds: Intermediate shroud tension controls mid to upper mast leeward sag.

Backstay: Backstay tension controls mid to upper mast bend and forestay sag. (Tension)

### **Leeward Mast Sag through Lower and Intermediate shroud adjustment.**

The J-105, being inherently under-powered below the 10-12 knot range, must be powered up every way possible in the lighter conditions. We have found that if tuned correctly, "Leeward Mast Sag" is a formidable weapon under 12 knots. Leeward mast sag has two important effects on the sail shape and the slot between your jib and mainsail. First, leeward mast sag adds luff curve to the mainsail, making a more powerful shape for the lighter conditions. Secondly, and most important, leeward mast sag narrows the slot between the leech of the jib and luff of the main. This in turn increases the pressure between the main and jib which increases lift on the leech of the main. More lift. More power and speed. Leeward mast sag is very much like barber hauling the jib. To achieve the correct Leeward sag, you should sight up the mast slot while sailing up wind. Although the tuning guide chart will get you very close to the correct sag, the smoothness of the sag should be checked by eye.

A quarter turn off on the lower can make a difference in the smoothness of your mast sag. The leeward mast sag should be a smooth curve starting from the gooseneck and continuing to the hounds where the uppers and forestay attach to the spar.

U\S sails perform best with approx 3/4" of leeward mast sag from 0-10 knots and 1/2" of sag from 10 to 16 knots. Once the boat starts to become overpowered, the spar should be tuned as straight athwart ship as possible, eliminating any leeward mast sag.

### **Mast Tip Sag\Forestay sag.**

The upper shroud tensions will control head stay sag and mast tip sag through a wide range of wind conditions. (40) (loos gauge) on your upper shrouds will give you enough headstay sag to keep your Ullman Jib powerful in the 10-16 conditions. At the same time, (40) is just enough tension to keep the tip of the mast from falling to leeward. When your mast tip leans to leeward, you are essentially dumping wind from the top of the mainsail, which in turn depowers the mainsail. Mast tip sag under 12 knots is slow.

As the breeze builds to the 16+ range, your jib will begin to become too round and full for optimum performance. You will also notice that your mast tip will begin to sag to leeward which is detrimental for the mainsail both in power and pointing. To compensate for the windier conditions, simply tighten your uppers to 51 (Loos Gauge). This tighter upper setting will once again give you the correct headstay sag and mast tip sag for optimum sail shape.

Once the breeze has built to 20+ you will want to eliminate any leeward mast sag. Use approx 20 on the lowers and 27 on the intermediates.

**Jib Lead Position:** The jib car block center should be approx. 15' 7 1/2" measured from toggle at base of forestay. When the jib is trimmed properly, the foot will appear somewhat flat and the top of sail will appear twisted. This is correct! Do not move the jib lead forward in light breeze.

Wind Speed	Uppers	Lowers	Intermediates
0-10	31	Loose	12
10-15	40	0	17
15-20	50	15-20	22
20+	60	20-24	27

Tip- up to 15 knots, fine tune lowers and intermediates so the mast has between  $\frac{3}{4}$ " and  $\frac{1}{2}$ " of smooth leeward mast sag.

Tip- Once the wind velocity is over 15 knots, the lowers should be tuned to approximately the same as the wind speed.

Tight lowers in 15 knots and over keep the lower mast from over-bending and inverting the mainsail.

Tight lowers allow you to use more back-stay without having the mainsail go inside out.

Tip- Over 15 knots.. Adjust uppers, lowers, and intermediates so they are just snug on the leeward side. This will keep your shroud tensions very close to the tuning chart.