

Prima O.D. Tuning Tips

By Ian Brown (Quantum Sail Design Group)

The Prima is certainly one of the success stories of the late nineties, competitive under IRC and with excellent One-Design racing around the country. Drawing on the collective experience of some of the most talented sail designers in the world, we have spent the last couple of seasons developing what have proved to be fast and easy to trim sails. Many iterations, hours of sailing and testing, and continuous small refinements have gone into making the sails what they are today. This guide offers some initial suggestions as to how to get the most out of our designs and your boat.

As with all tuning guides, this is just that, a guide. This information should not be taken as absolute. It is impossible to sail strictly by the numbers. Trim and tune are dynamic, requiring constant changes to get the most from the boat. It is more important to understand the concepts behind tuning, and the effects of the different controls so that you can learn how to shift gears. Keep an open mind and experiment in changing conditions to determine the right combination for the moment, or simply what works for your sailing style. There is no one way to make your boat go fast. The single most important thing is to recognise when you are slow and to do something about it.

Rig Tune and Basic Set Up

There are three goals to achieve in basic set up:

- Centre the mast in the middle of the boat and ensure that the mast is in column athwartships
- Set the correct amount of pre-bend for the conditions.
- Have the correct headstay tension for the conditions

Forestay tension and mastbend are the key variables in adapting the rig setup to specific conditions. As with all fractional rigs with swept back spreaders, forestay tension is directly related to shroud tension. The tighter the overall rig, (uppers and lowers), the greater the headstay tension. The other principle to remember is that we want more pre-bend in light air, and less and less as the breeze increases. By starting off with less pre-bend, the mast will not over bend when the backstay is pulled on hard. Conversely, in light air we want headstay sag and do not want to be using too much backstay to get the mainsail set up properly, so more pre-bend is desirable. With these points in mind, we recommend the following initial set up procedure.

1. Step the mast so that the measurement from the front of the mast to the main cabin bulkhead at the mast heel is 0.715m. This should be equal to the factory setting, but either way the mast heel should not be any further aft than this. Check that the mast is chocked centrally at the partners (check that the J measurement does not exceed the class maximum of 4.67m).
2. Make up all the standing rigging so that it is hand tight.
3. Centre the mast. Pull the main halyard down to the toerail abreast the chainplates and cleat off. The halyard can then be used to measure to the toerail on the other side of the boat so as to check that the mast is upright in the boat.
4. Check the mast rake. This is done by cleating the genoa halyard off so that the bottom of the snap shackle is level with the top of the black band at the gooseneck. Now swing the halyard to the forestay and mark the forestay where the bottom of the halyard shackle is. The distance from this point to the centre of the pin at the base of the forestay should be 2355mm. This will give you your median or 'base' mast rake.
5. Wind on the cap shrouds gradually, winding an even number of turns on each side to the point where you might expect the leeward shroud to be just tight when sailing to windward in a force 3. (It is easier to tension the caps if you bend the mast using the backstay on a boat with swept back spreaders). Now release the backstay
6. Wind on the upper diagonals to the point where they are a few turns beyond hand tight, but they should not be excessively tight. Check that the mast is still in column sideways by sighting up the luff groove from the tack position.
7. Wind up the lower diagonals so that they are at least as tight as the caps. This should pull the bottom panel of the mast aft far enough to make the fore and aft bend a little top end biased. Increased diagonal tension will straighten the mast fore and aft, and should be increased to the point where the pre-bend at rest is approximately 65mm (or to suit the specific mainsail design)
8. Again check that the mast is still straight sideways.
9. Go sailing and check that the spar bends uniformly both fore and aft and sideways, also that the leeward shroud behaves as in 4 above

Note: Once the mast has been set upright in the boat (section 4 above), always add an equal number of turns to port and starboard in subsequent steps. The only exception to this rule is if the diagonals need adjusting to bring the spar back into column.

Pre-bend and mainsail shape

Mainsail shape and conditions will dictate final rig tension. If the mainsail flattens out too quickly (characterised by overbend wrinkles running diagonally from clew to mid-mast), then you need tighter lowers and/or a shorter headstay to reduce bend and make the mainsail fuller. In heavy air you should be able to pull the backstay all the way on just before the overbend wrinkles appear.

If the mainsail is too full for the amount of backstay being used, as characterised by excessive backwinding, or a sail which is 'knuckled' and excessively round at the front, less lower tension and/or a longer headstay is necessary. Once the mast has been set with the correct forestay length and shroud tensions for medium air, these should be regarded as 'base' settings. These should give a measurement of 15.68m taken from maximum hoist on the genoa halyard to the tack loop at the base of the forestay. In light air decrease the tension on the lowers and add headstay length to induce additional pre-bend. Extra pre-bend and softer rig tension will also increase headstay sag creating more power in the genoa, which will also make it easier for the helmsman to 'feel' the boat and stay in the groove.

The uppers should not need to be adjusted providing you have an adjustable forestay. The upper diagonals (D2's) again should not need to be adjusted, but bear in mind that these also act as a control for mast bend. If the sail is too full in the upper sections, they may be too tight, and vice versa.

As a general guideline, in light airs ease the overall rig tension on the forestay and/or decrease the tension on the lowers to induce additional pre-bend. As the breeze builds, increase the overall rig tension to prevent the mast from overbending as the backstay is pulled on.

	0-7 knots	8-15 knots	16-22 knots	23+ knots
Lower Tension	Ease 1 turn	Base	Base	Tighten 2 turns
Forestay Tension	Ease 3 turns	Base	Tighten 5 turns	Tighten 8 turns from base
Mast Rake		2355mm		

Upwind Trim: Headsails

The Prima is an easily driven hull, but having the correct headsail trim is vital with small changes often making big differences. The headsails are designed to be used within the following ranges but bear in mind there is plenty of crossover:

- Code 1 (Light) 0-10 knots of true wind
- Code 2 (Medium) 8-18 knots of true wind
- Code 3 (Heavy) 16-25 knots of true wind

Both the Code 1 and 2 are the same size, though typically it is the Code 2 that gets most of the use. It can be used down the range in as little as 7 or 8 knots on flat water, and up to 20 knots if it is particularly lumpy. The Code 1 is a full powerful sail which will be fine in flat water up to 8 or 9 knots, more in choppy conditions. The Code 3 is slightly smaller and can also be used down the range in smoother water. Generally speaking you can probably get on it sooner than you think. This will certainly make the boat easier to control and more than likely will be faster as well.

Within this guide I will not endeavour to provide tips for each sail, but will consider the basic tools that the trimmer has at his disposal for any headsail.

1. Halyard: The basic rule is to use enough halyard tension to just smooth out the wrinkles in the luff. In light airs it is better to have slightly too little tension than too much. This makes the entry finer which will help with pointing, and will also power up the back of the sail. As the breeze increases, you need to use more halyard tension. This will round up the entry which makes the steering groove wider, and will also flatten the exit of the sail, which in turn de-powers it. Care should be taken towards the top end of any of the headsails as insufficient halyard tension and/or excessive forestay sag will result in the sail being 'too round' which produces excess drag causing the boat to heel over. Using lots of halyard tension helps to prevent this. It is vitally important that your jib halyard is marked so that you can easily re-produce fast settings.
2. Sheet Tension: the genoa sheet is perhaps the most important headsail control and must be played constantly, easing to accelerate, trimming to point. Sheet tension will change with every change in wind speed, but the basic premise is to trim as hard as possible without slowing the boat down. Remember speed first, then point. Adjustments are not as frequent in steadier breeze, but the sheet still needs to be adjusted for changes in wave patterns or to duck other boats. Sails can be sheeted harder in flat water than they can be in lumpy seas for the same windspeed. In light airs the genoa trimmer should be sat to leeward, and should be constantly monitoring the shape of the genoa relative to the speed of the boat. Having said all this, the range of sheet adjustment on the Prima is fairly small, with small alterations to sheet tension having quite dramatic effects on the position of the leech relative to the spreader tips i.e. the twist. The basic rule of thumb is sheet harder if you are fast, and try easing it slightly if you are slow.
3. Lead position: The base setting for the jib lead should apply equal tension to the foot and the leech of the jib. The standard method for determining the median sheet lead position is to head up slowly and watch the luff of the sail. It should luff at about the same time from top to bottom. In the real world the top will break slightly ahead of the bottom. If the top breaks too early, and the bottom of the sail is too flat, then the lead needs to be moved forward. If the foot of the sail is very round while the top of the leech is closed, the lead should be moved aft. The lead should be moved aft as the sail is sheeted in harder and operates closer to the top of its range. In light conditions, as the sheet is eased, the lead will need to move forward. A useful rule of thumb is that if you are needing to drop the traveller to keep the boat on its feet, then move the lead aft. Similarly, if the genoa is trimmed in

normally, the main has been flattened, and there is still excessive backwinding, move the lead aft. Basically, as you become over powered, move the lead aft, and do not worry if the top tell tales don't fly properly as you open the leech up. If your jib is trimmed so that the whole sail is working, but the mainsail is flogging to keep the boat on its feet, ease the jib. Give away the top of the sail to balance the boat allowing both sails to do some luffing.

4. The Jib Inhaul: it is not easy to give exact recommendations for the inhaul as different boats have been using varying amounts of inhaul with slightly different sheet tension and lead positions and getting comparable results. There are however a few general principles that you should be aware of. Pulling the clew of the sail in adds power and depth, and sheeting closer to the centreline allows for higher pointing. Inhauling also tends to slow the boat, and will tend to overpower and leave the boat feeling bound up if the clew is too far inboard. Get speed first, then shift into pointing mode by using the inhauler. In general terms you will use the most inhauler at the bottom end of the jibs range when the block should be pulled hard in against the coachroof grab handle. As the breeze builds, the clew should be eased outboard. As you begin to get overpowered the inhauler should be eased before the sheet is eased. This will help the boat to stay on its feet before giving away too much leech. The inhauler should certainly be used on the Code 1 and Code 2 jibs, but it can also be used to good effect on the code 3, especially in relatively flat water. Perhaps the one golden rule is that if you are in doubt, ease the inhauler.
5. Forestay Tension: The principles governing forestay tension are fairly straightforward. In light conditions you will need more forestay sag to make the genoa fuller and this is achieved through easing the forestay and/or lowers as detailed above. Similarly, in heavy conditions the rig is tightened helping to prevent forestay sag. This de-powers the jib and helps pointing. Please refer to the above table as a guide.

Upwind Trim: The Mainsail

Mainsail trim has two primary goals. First, balancing speed versus pointing by controlling the twist or how open the leech of the mainsail is. Second, keeping the right amount of overall power, helping to maintain a constant angle of heel and the right amount of weather helm. This section will address adjustments to mainsheet, traveller, outhaul, halyard, cunningham, vang and backstay.

1. Mainsheet: like the jib sheet, there is no one magic setting for the mainsheet. It should be adjusted continually with each change in wind speed and/or wave pattern. Basically, increasing mainsheet tension reduces twist and tightens the leech, which makes the boat point, but also slows it down. Easing the sheet induces twist, which accelerates air flow across the sail. This allows the boat to bear away and accelerate. Initially, the main should be sheeted until the top batten is parallel to the boom. At this point the top tell tale will be on the verge of stalling but should be flying about half of the time. Once the boat is upto speed, increase sheet tension until the boat starts slowing.

Remember, speed first then pointing. The art is to find the delicate balance between speed and pointing, always trying to trim as hard as possible without giving away too much speed.

In light air, the sail will be eased and twisted from the base position. In moderate air the sail will be sheeted hard with the top batten at least parallel. In heavy air the sail should be sheeted as hard as the angle of heel will allow. Bear in mind that in choppy seas, more twist is required to keep the boat moving, and on flat water you need harder leeches for pointing.

2. Traveller: the traveller serves two functions. Firstly, it controls the booms position relative to the centreline of the boat, and secondly it helps to steer the boat by controlling the helm and angle of heel in the puffs and lulls. To position the boom, set the twist with the mainsheet and use the traveller to put the boom on the centreline for maximum power and pointing. In light air the mainsheet will be eased to promote acceleration and keep the leech open and the traveller will be well to windward (300mm-400mm on the Prima) to keep the boom close to the centreline. In moderate conditions small adjustments will be necessary to control helm balance. It is important to dump the traveller quickly when a gust hits and you begin to get over powered, but equally important to pull it back on again as soon as the heel is controlled or the gust has passed. Wait too long and you have missed the opportunity to point once the boat has accelerated. As the wind speed increases the average position of the traveller will be further down the track. Think of the traveller as the 'tip meter' once the mainsheet has been set for twist. The traveller should be adjusted with every change in heel or any time the mainsheet is adjusted. The mainsheet trimmer should try to avoid dumping the mainsheet as a means to get the boat back on its feet as this gives up the leech and you will lose pointing ability. Careful use of the traveller and backstay should be sufficient to keep the main 'bladed' in most conditions without easing mainsheet.
3. Vang: the vang is primarily an offwind control. It takes over the job of pulling down and providing leech tension when the boom is eased out and the mainsheet no longer controls twist. However, upwind in heavy air the vang should be used to help out the mainsheet with the job of pulling down the boom and maintaining leech tension. If the vang is hard on, the mainsheet can be eased if necessary without giving up the leech too much. In light air make sure the vang is off using only enough tension to stop the boom from bouncing. In heavy air it may be necessary to ease the vang at the weather mark to assist with bearing away. Easing the mainsheet may not be enough.
4. Luff tension (halyard and cunningham): halyard and cunningham both tension the luff. Initial luff tension should be just enough to smooth out the wrinkles in the front of the sail. Leave a few wrinkles in the bottom third of the sail in light to moderate air. As the breeze increases more luff tension is required to prevent the draft in the sail from moving aft. Use the halyard first, and when the sail is at the black band use the cunningham. Do not under estimate the usefulness of the cunningham, it is one of the primary sail controls that many people choose to ignore. As soon as the boat is overpowered start pulling the cunningham on hard upwind. It is easier to adjust and fine tune the cunningham when sailing than the halyard.

5. Outhaul: the outhaul controls the depth in the lower third of the mainsail. If you need more helm and feel, ease the outhaul. Power in the bottom of the main will increase weather helm. In very light airs (less than 5 knots) the outhaul needs to be pulled out fairly hard in order to prevent flow separation in the mainsail. If the sail is too full in light airs it will stall. In 5-12 knots the outhaul can be eased slightly to increase power. Once the boat is fully powered with all the crew hiking (normally about 12 knots of wind) the outhaul should be maxed out. The outhaul should not be over eased when running, there is a fine line between needing power from depth and projected area. The outhaul should be eased however when reaching (unless you are over powered). Make sure that you have the outhaul calibrated so that you can repeat known fast settings (make sure all sail controls are calibrated for the same reason!)

6. Backstay: The Prima has a 48:1 backstay set on a fairly stiff mast, and is one of the most fundamental speed controls. Backstay tension does two things. Firstly, as the mast bends the upper two thirds of the mainsail flattens out and the leech opens up, thus de-powering the sail. Secondly, the headstay gets tighter (providing you have set up the pre-bend correctly to prevent over-bending), which prevents headstay sag, which in turn prevents the jib from getting too full as the breeze increases.

Broadly speaking as the breeze increases you will need more and more backstay. However, even in very light airs you may need to use a little backstay in order to help the mainsail leech to stay open. Since adjusting the backstay has a large and immediate effect on mainsail leech tension, main sheet tension may need to be adjusted at the same time. Bending the mast opens the leech, so you will need to add mainsheet as you add backstay, and ease mainsheet as you let the backstay off. You will also need to adjust the traveller accordingly.

Downwind Trim

The key to running effectively is to project as much area to windward as possible away from the mainsail, thus facilitating sailing deep. Do not get pre-occupied with having the clews at the same height as depicted by most sailing guides. You should start by altering the pole height so that the luff of the sail isn't breaking too high or too low. You should then set the leech accordingly by using the tweaker lines. Pulling the tweakers on will stabilise the spinnaker when it is windy but don't overdo it or the sail will stall. Use the centre seam as a guide to trim, which should be approximately perpendicular to the horizon. If it feels right it probably is right. The main thing when sailing downwind is to make sure the spinnaker is pressured up all the time. The trimmer and helmsman should be talking to each other continually so that the helmsman can get the boat really low when he has pressure and he doesn't sail too high when he needs more pressure. Twisting the mainsail will also help you get deep, but at the same time it will make the boat more unstable and less forgiving. Be prepared to adjust the vang continually downwind and sail where you are comfortable. Sailing downwind is at least as tactical as sailing upwind with huge gains to be made by sailing at the right angles on the right shifts. If you tack on shifts going upwind you should gybe on them going downwind.

Sail choice downwind is fairly straightforward. On a typical windward/leeward course, the 0.6oz 'floater' is used up to around 18-20 knots true wind (10-12 apparent). If there is any more breeze than this you are better off with the 0.9oz spinnaker which isn't actually any smaller. As the breeze moves forwards you will be able to use the 0.9oz in less wind. The asymmetric 1.5oz is very much a multi purpose sail. In lighter airs you can use it up to apparent wind angles of 55-60 degrees which is probably a good 10 degrees closer than you would get with a conventional spinnaker. On the other hand, if it is really breezy, you can fly it downwind as a 'chicken chute' and the fact that it is asymmetric is neither here nor there. Remember that the asymmetric reacher is smaller than the other spinnakers. The golden rule is that if you can fly one of the symmetric, then you should do. They are bigger, and by definition will be faster.

The crew should be well forward in light air, gradually moving aft and to weather as the breeze builds. The boat should ideally be heeled slightly to weather when going downwind which helps to project the spinnaker and helps the boat to drive off in the puffs. Weight should be shifted to stabilise the boat and promote surfing in heavy air. When it is breezy all the crew should be well aft, with one person being allocated as 'vang man' to de-power and power up the main as necessary.

Miscellaneous Tips

1. Crew weight upwind: sail with a constant angle of heel, and with as little weather helm as you can stand. Generally this will mean sailing as flat as possible. In light air the weight should be to leeward and forward to induce feel and helm. In less than 5 knots of breeze it pays to put a couple of crew members down below particularly in sloppy conditions when it will help prevent pitching. Once the boat is powered up all the crew should be hiking hard and be bunched together around the maximum beam. Again keeping the crew weight together helps to reduce pitching.
2. Remove all unnecessary items of kit from the boat. Encourage the crew to bring only what they are going to wear. You don't need to have a pair of boots and a pair of shoes on the boat for example. Stow any spare kit, fenders etc over the keel.
3. Make sure the bottom is clean and smooth. The class rules require the boat to be anti-fouled. This should however be rubbed flat with increasingly fine wet and dry paper. Do not underestimate how detrimental even a little bit of slime or weed can be to boatspeed. Being conservative we might say that having a dirty bottom will slow you down by 0.2 of a knot. This doesn't sound much but it equates to 400 yards an hour. In a two hour race this is nearly half a mile!
4. Make sure that all sail controls are visibly calibrated so that you can repeat known fast settings. This includes halyards and sheets.
5. Similarly, put marks on the spinnaker pole controls so that you can pre-set it accurately before hoisting.

6. Put three strips of white tape on the under side of the spreaders at 40mm intervals. This will help the genoa trimmers to replicate known settings.
7. Keep an open mind and do not be afraid to experiment. Perhaps the most important point to recognise is when you are slow, and then to do something about it!
8. Have fun!