Instructions for rigging. Conditions for valid guarantee.

HINTS AND ADVICE

on rigging and tuning of your Seldén mast

SELDÉN


OPUS III

The rig

The rig – a combination of masts, booms, rigging and all types of equipment. It is obvious that the rig is a large and vital part of your yacht. Tuning for the best mix of performance, reliability and operating safely requires a degree of knowledge. With “Hints and advice”, we aim to share with you our practical experience. You probably know most of this, but there is always something new to learn.

The first part of the book describes stepping masts and preparations in general. It is **absolutely essential** that you read this information, no matter what type of rig you have.

After you have done that, please follow the rigging instruction appropriate to your rig type. **This is, of course, important from a safety point of view, but it is also a condition of our guarantee.**

If you feel uncertain about the tuning of your rig, we recommend that tuning is checked by an experienced rigger.

The mast and rigging must be inspected regularly, as well as prior to, and during every longer passage. This includes a close inspection of every part of the rig. If the mast has been unstepped, the initial tuning performed in the marina should be checked and adjusted during sailing.

We will also give you an insight into how our rigs should be handled in practice, and the best way for you to look after your rig to ensure that it performs well for many years.

When you read “Hints and advice”, you might come across some unfamiliar technical terms. Nautical language is famous for using words which are unfamiliar to many eople. We suggest you have our product catalogue to hand alongside “Hints and advice”, as it has an alphabetical index and illustrations of most of the components of a rig.

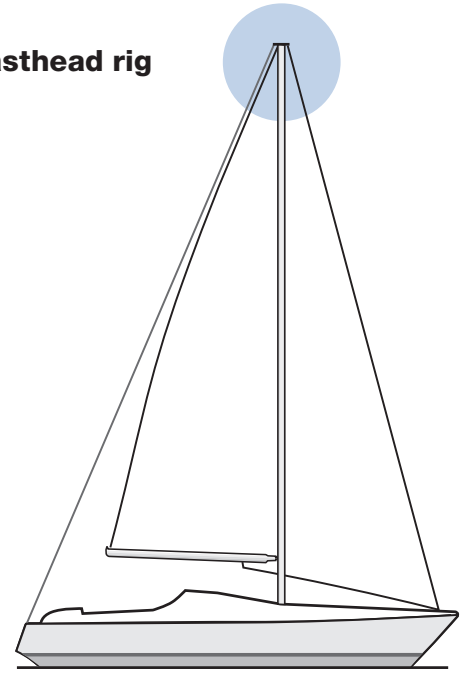
We hope you’ll find “Hints and advice” useful.

Fair winds,
The Seldén Group

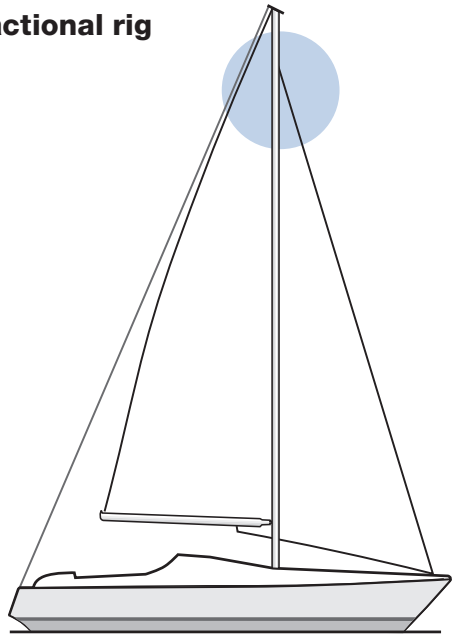
Bear in mind that, as the yacht's Owner, you are responsible for any accidents or damage resulting from negligence or poor handling. Seldén's "Hints and advice" is an educational aid, but ultimately, the safety of vessel and crew depend on the care and judgement exercised by the yacht's skipper.

Rig types

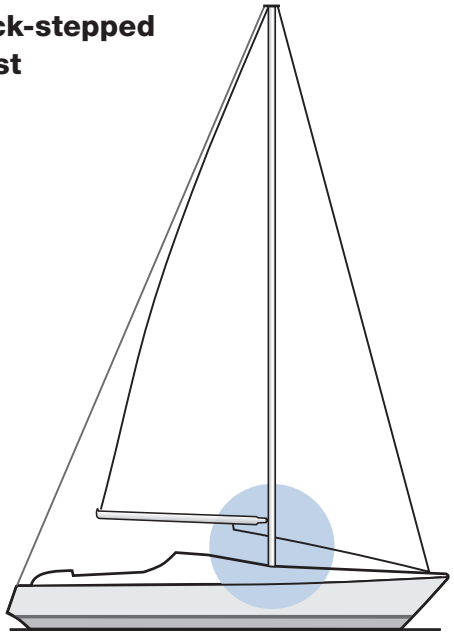
Masthead rig



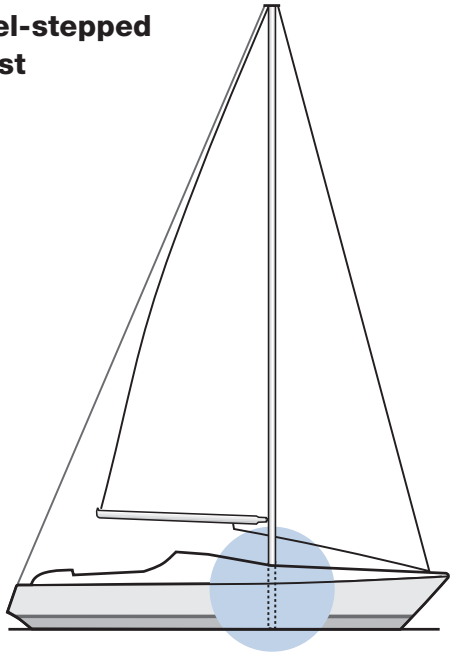
Fractional rig



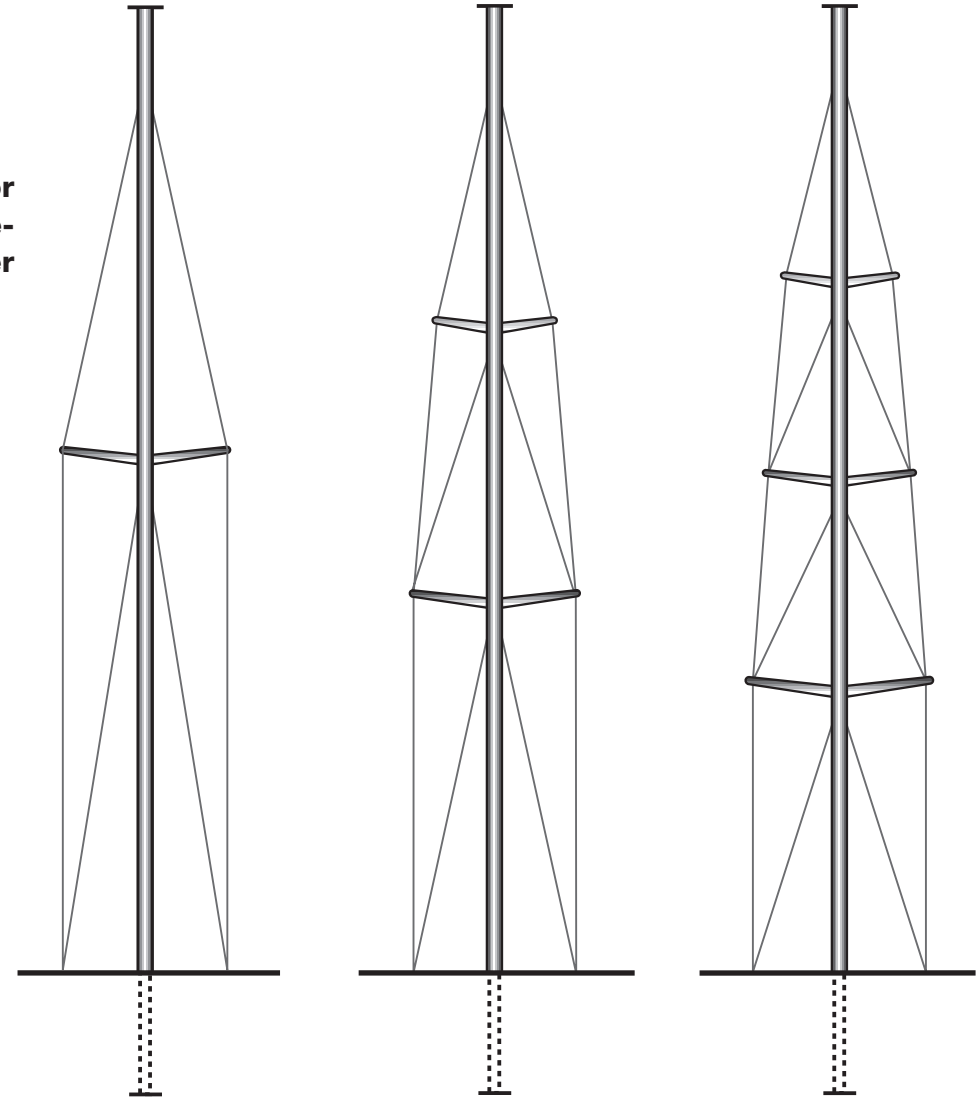
Deck-stepped mast



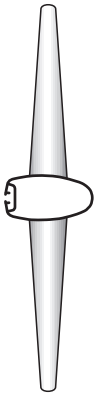
Keel-stepped mast



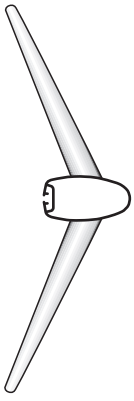
Single or multiple-spreader rigs



In-line spreaders



Swept spreaders



Longitudinal rigging

Backstay: Stays the top of the mast against movement forwards. The backstay tension is adjusted using some form of tensioning device to control mast-bend and forestay tension.

Forestay: Sail-carrying stay for the genoa and jib. Prevents the top of the mast moving aft. The tension of the forestay is affected by the backstay, cap shrouds (on rigs with swept spreaders), runners and the sheeting of the mainsail.

Cutter stay: Sail-carrying inner stay for jib or staysail. On a masthead rig, if it can be attached within 6% of the fore-triangle height below the forestay fitting, it can be tensioned by the backstay. If it is attached lower down, runners or possibly forward-angled jumpers must be used.

Inner forestay: Attached about 60% of the fore-triangle height above the deck. This stay does not carry a sail, but is intended only to stay the mid-section of the mast fore-and-aft, in conjunction with checkstays.

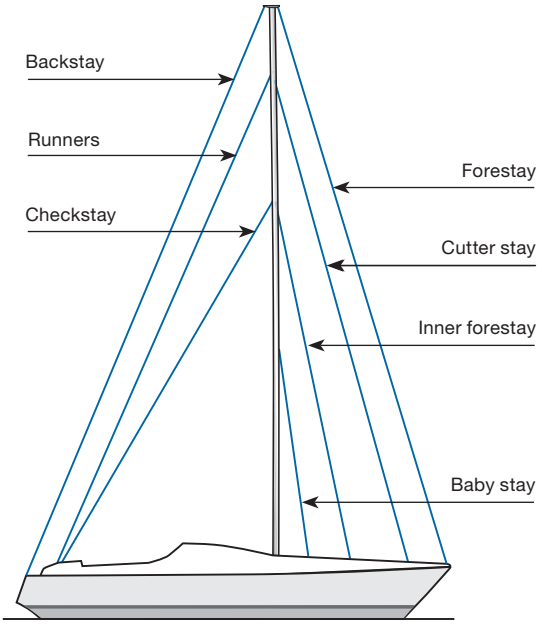
Baby stay: Attached in the region of the lower spreaders. The stay is not sail-carrying, but is intended to stay the lower panel of the mast fore-and-aft, in conjunction with aft lower shrouds.

Runners: Also known as ”running backstays”. On a masthead rig, runners interact with a cutter stay. They are more commonly found on fractional rigs, where they are used to tension the forestay. Runners consist of two wires attached to the sides of the mast. The runners are adjusted using tackles at their lower ends. The windward runner is always under tension. The leeward runner is always slack, otherwise it would interfere with the mainsail and boom. Runners fitted close to the yacht’s midships line only affect the fore-and-aft staying of a mast with in-line spreaders. If they are fitted to the yacht’s quarters they also affect the lateral rigging.

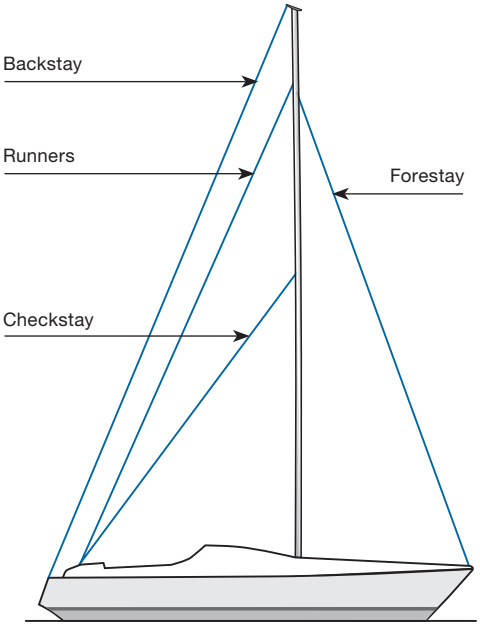
Checkstays: Function in principle as runners, but are attached lower down the mast. They are intended to stabilise the mid-section of the mast to prevent uncontrolled mast-bend and pumping. Checkstays normally interact with the inner forestay.

Triatic stay: Forestay for a mizzen mast. Attached between the masthead fittings. On smaller yachts, the stay is led through a block at the mizzen mast top down to the deck, where the length can be adjusted.

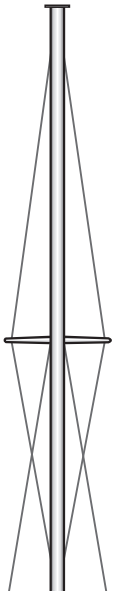
Masthead rig



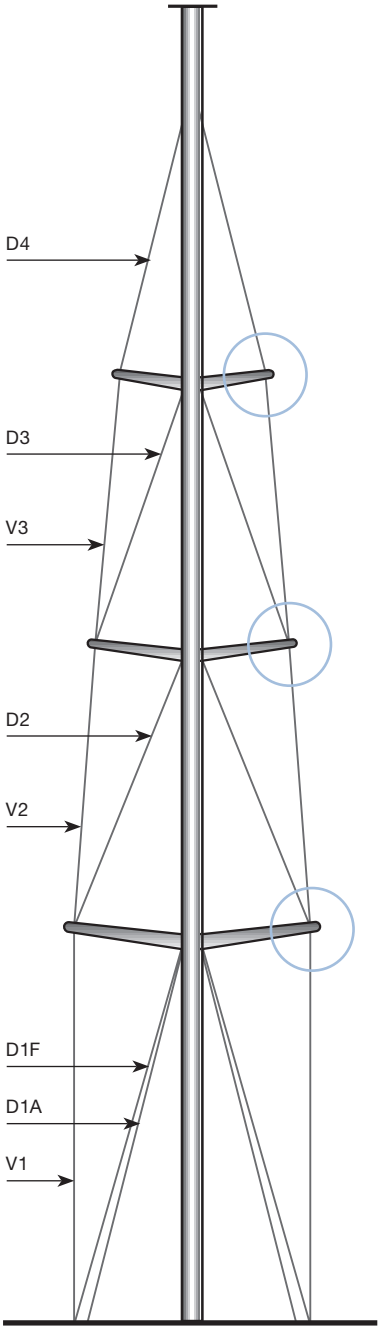
Fractional rig



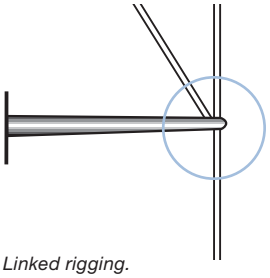
Lateral rigging



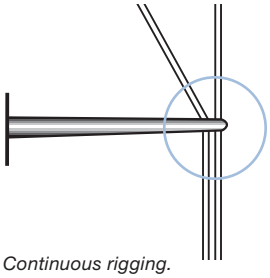
Jumper arrangement
This type of arrangement is designed for fractionally rigged yachts. The jumper struts are normally angled forward. The jumper arrangement stays the top mast, not only athwartships but also fore-and-aft. The use of jumper struts enables the top mast to be given a more slender taper. A jumper arrangement might be necessary when using a masthead gennaker/spinnaker or for stabilising the top of the mainsail.



D = Diagonals V = Verticals



Linked rigging.



Continuous rigging.

Cap shrouds: (V1-V3, D4) Stay the mast against lateral (athwartship) loads. Attached near the masthead on a masthead rig, and at forestay level on a fractional rig. The cap shrouds are led via spreaders to the boat's chain plates.

Jumper stay (''jumper''): Permanent arrangement for staying a long mast top on a fractionally rigged mast.

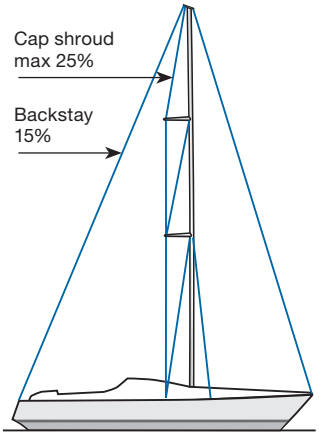
Intermediate shrouds: (D2-D3) Fitted on multiple-spreader rigs, and attached in the area of the upper spreaders. Fitted with links in the lower spreader tips (linked rig) or pass over the spreader tips and continue down to the deck (continuous rig). The intermediate shrouds stay the upper spreader area against movement athwartships.

Lower shrouds: Attached in the area of the lower spreaders. Stay the spreader-area athwartships. Often fitted as forward lowers (D1F) and aft lowers (D1A), which also stabilise the mast fore-and-aft, as well as determining mast-bend.

Masthead, multi-spreader rig, swept spreaders, forward and aft lower shrouds.

Alternatively baby stay and aft lower shrouds.
Keel-stepped masts and deck-stepped masts are trimmed same way.
For specific instructions for keel-stepped masts, see page 24.

This type of rig is very demanding on the sailor, since it is complex to tune and to handle. In general, this type of rig needs more tension in the shrouds than a rig with in-line spreaders.



At the crane

- Read the “At the crane” section on pages 22-23.
- Lift the mast and place it on the T-base.
- Attach the cap shrouds, backstay, forestay and lower shrouds.
- Tighten the cap shrouds, forestay and backstay hand-tight so that the mast is stayed both laterally and longitudinally.
- Lower and remove the lifting strop. Move the yacht away from the crane.

Tuning

- Check the mast rake. Adjust if necessary using toggles on the forestay.
- Tension the backstay to 15% of the breaking load of the wire. This puts the forestay under tension corresponding to about 20% of its breaking load. Since the backstay makes a wider angle with the mast, the forestay load will be greater. Make a mark on your backstay
  tensioner so that you will always know when normal load (15%) has been achieved. Use the “folding rule method”, see page 32, to find the correct setting. Leave the folding rule on the backstay.
- Tension the cap shrouds to 15% of the breaking load of the wire. See the “folding rule method”. Count and make a note of the number of turns on both the port and starboard rigging screws required to increase the tension by 5% (1 mm stretch). Leave the folding rule on the shroud.

Continued...

- Give the mast a slight positive pre-bend using the interplay between the forward and aft lower shrouds. The job of the aft lower shrouds is to reduce the bend to the amount originally determined.
- Tension the backstay to 15% of the breaking load of the wire. Over a short period (a few hours) the load may be increased, but not to more than 30% of the breaking load of the wire. To achieve this loading, you will need a backstay tensioner. Make two marks on this so that you know when the normal (15%) and maximum (30%) loads have been reached. Use the "folding rule method" to find the correct setting. Since the backstay makes a wider angle with the mast, the forestay load will be about 40% of the breaking load of the wire when you put the "maximum load" on the backstay.

Tuning under sail

- Sail the yacht and check that the cap shrouds do not begin to slacken until about a 20° angle of heel.
- While sailing, check that the mast is straight laterally. Adjust this if necessary using the forward lower shrouds and intermediate shrouds.
- Reef the sail and check the mast for lateral straightness. If the deviation from the straight line is greater than 5 mm, the lower shrouds or the intermediate shrouds must be adjusted.
- While sailing, check the longitudinal trim of the mast. The mast must have a slight positive bend at the spreader area. Sight up the mast from deck level. Adjust if necessary by tuning the interplay between the aft- and forward lower shrouds or cutter stay/runner. With an increasing load on the forestay, the masthead will want to move forwards, with the risk of a negative bend. This must be prevented. Even if the masthead in its original position is well aft, it is usually necessary to use some sort of backstay tensioner to counteract this movement.

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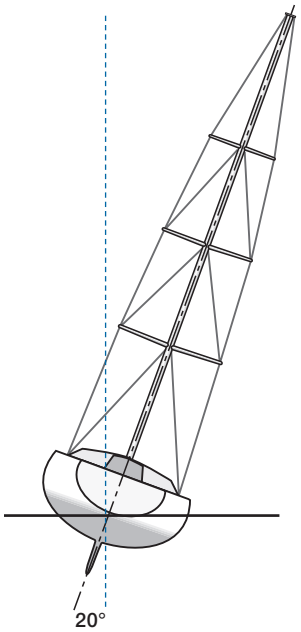


- When you are satisfied with the tuning, lock the rigging screws.
- A new rig on a new yacht will need adjusting after sailing for some time. When the tuning at the end of the first season is satisfactory, mark the setting on the rigging screws. Enter your figures on page 90. This makes it easy to tune the rig at the start of the next season.

Cutter stay and runners

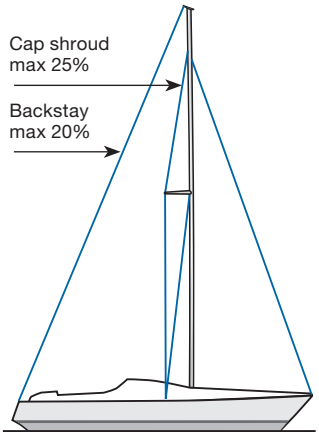
A cutter stay in combination with runners also affects the forward bend of the mast. Runners are tensioned with winches and/or tackles to a maximum of 30% of their breaking load.

Fractional rig, one set of swept spreaders, single aft lower shrouds

Keel-stepped masts and deck-stepped masts are trimmed same way. For specific instructions for keel-stepped masts, see page 24.

In general, this type of rig needs more tension in the shrouds than a rig with in-line spreaders. The tension in the forestay is affected by three components;

1. The cap shrouds
2. The backstay
3. The sheeting of the mainsail



At the crane

- Read the “At the crane” section on pages 22-23.
- Lift the mast and place it on the T-base.
- Attach the cap shrouds, backstay, and forestay.
- Tighten the cap shrouds, forestay and backstay temporarily so that the mast is stayed both laterally and longitudinally.
- Lower the lifting strop and remove it. Attach the lower shrouds. Move the yacht away from the crane.

Tuning

- Check the mast rake. Adjust if necessary using toggles on the forestay.
- Tension the cap shrouds to 15% of the breaking load of the wire. See the “folding rule method”, page 32. Leave the folding rule on the shroud.
- Roughly straighten the mast using the lower shrouds. Check that the mast is straight by sighting up the luff groove, all the way up from deck level.
- Increase the cap shrouds tension to 20% of the breaking load of the wire. Count and make a note of the number of turns on both the port and starboard rigging screws required to increase the tension by 5% (1 mm stretch).
- Tune the mast straight again using the lower shrouds.
- Tension the backstay hard, but not exceeding 20% of the breaking load of the wire. Make a mark on your backstay tensioner or tackle so that you will always know when this normal load has been achieved. Use the “folding rule method” to find the correct setting. This will reduce the tension of the cap shrouds.

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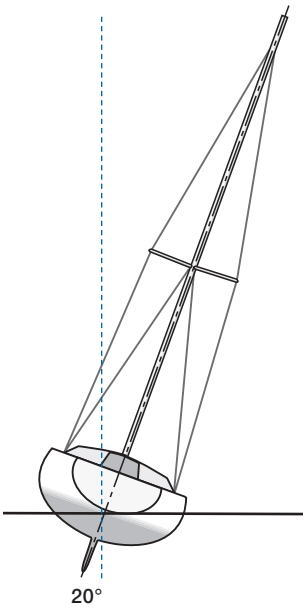
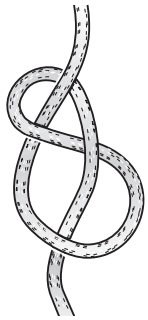


- Increase the cap shroud tension back to 20% of the breaking load of the wire.
- Slacken the backstay completely.
- Now check the cap shrouds tension. It should not exceed 25% of the breaking load of the wire.
- If the backstay has a rigging screw that cannot be adjusted when sailing, it must be tensioned hard enough to create a slight bend of the masthead.

Tuning under sail

- At about a 20° angle of heel and maximum pre-tension (20%) on the backstay, the leeward cap shroud must not be slack. If it is, increase the shrouds pre-tension, but not to more than 25% of the breaking load of the wire (the same number of turns on the rigging screws as per your previous note).
- Tune the mast straight laterally using the lower shrouds.
- Check the tune for different backstay tensions and different sail combinations (reef).
- The backstay must not be allowed to completely slacken at any time. If the masthead is able to move forwards, the mast is in danger of buckling aft. If using a tackle, put a stopper-knot in the tail to limit the reduction in backstay tension.
- If a backstay flicker is used, please note that it does not affect the tension of the stay at all.



Stopper-knot (figure-of-eight).

To ensure good fore-and-aft stability for this type of rig, it is very important that the leeward cap shroud is tight.

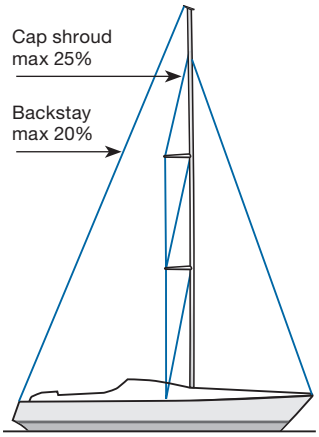
This high level of pre-tension will generate deformation on all grp hulls. As far as strength is concerned, the hull should be able to support these loads, but the deformation will make it necessary to check the tuning while sailing. This is particularly important when the yacht is new and at the start of every season.

The backstay must not be slackened to the extent that the mast takes a negative mast curve!!

Fractional, multi-spreader rig, swept spreaders

Keel-stepped masts and deck-stepped masts are trimmed same way. For specific instructions for keel-stepped masts, see page 24.

This type of rig is very demanding on the sailor, since it is complex to tune and to handle. In general, this type of rig needs more tension in the shrouds than a rig with in-line spreaders. The tension in the forestay is affected by three components;
1. The cap shrouds
2. The backstay
3. The sheeting of the mainsail



At the crane

- Read the “At the crane” section on pages 22-23.
- Lift the mast and place it on the T-base.
- Attach the cap shrouds, backstay, forestay and lower shrouds.
- Tighten the cap shrouds, forestay and backstay hand-tight so that the mast is stayed both laterally and longitudinally.
- Lower and remove the lifting strop. Move the yacht away from the crane.

Tuning

- Check the mast rake. Adjust if necessary using toggles on the forestay.
- Tension the cap shrouds to 15% of the breaking load of the wire. See the “folding rule method”, page 32. Leave the folding rule on the shroud.
- Roughly straighten the mast using the lower and intermediate shrouds. Note that the intermediate shroud tension should be fairly low at this stage, only sufficient to keep the mast straight. Check that the mast is straight by sighting up the luff groove, all the way up from deck level.
- Increase the cap shrouds tension to 20% of the breaking load of the wire. Count and make a note of the number of turns on both the port and starboard rigging screws required to increase the tension by 5% (1 mm stretch).
- Tune the mast straight again using the lower shrouds and the intermediate shrouds.

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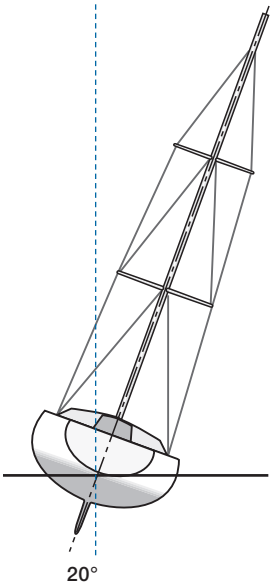

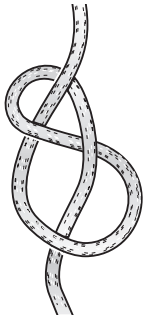

Stopper-knot (figure-of-eight).

To ensure good fore-and-aft stability for this type of rig, it is very important that the leeward cap shroud is tight.

This high level of pre-tension will generate deformation on all grp hulls. As far as strength is concerned, the hull should be able to support these loads, but the deformation will make it necessary to check the tuning while sailing. This is particularly important when the yacht is new and at the start of every season.

The backstay must not be slackened to the extent that the mast takes a negative mast curve!!

- Tension the backstay hard, but not exceeding 20% of the breaking load of the wire. Make a mark on your backstay tensioner so that you will always know when this normal load has been achieved. Use the “folding rule method” to find the correct setting. This will reduce the tension of the cap shrouds.
- Increase the cap shroud tension back to 20% of the breaking load of the wire.
- Slacken the backstay completely.
- Now check the cap shrouds tension. It should not exceed 25% of the breaking load of the wire.
- If the backstay has a rigging screw that cannot be adjusted when sailing, it must be tensioned hard enough to create a slight bend of the masthead.

Tuning under sail

- At about a 20° angle of heel and maximum pre-tension (20%), on the backstay, the leeward cap shroud must not be slack. If it is, increase the pre-tension, but not to more than 25% of the breaking load of the wire (the same number of turns on the rigging screws as per your previous note).
- Tune the mast straight laterally using the lower shrouds and the intermediate shrouds.
- Check the tune for different backstay tensions and different sail combinations (reef).
- The backstay must not be allowed to completely slacken at any time. If the masthead is able to move forwards, the mast is in danger of buckling aft. If using a tackle, put a stopper-knot in the tail to limit the reduction in backstay tension.