There are three types of sailing rigs: **Masthead**, **fractional**, and **rotating**.

The **rotating** rig is the most efficient with the mast being supported by a single large shackle on the front of the mast, with the base sitting on a ball. The mast, which is normally wing-shaped, can then rotate in line with the wind. The main sail has a large roach and full battens. The jib is fractional. As there are no backstays with a rotating rig, it is not possible to carry a large headsail. The power from this rig comes from the main sail, which can be large. The single side shroud must go to a wide base, which is why it cannot be used on a narrow monohull. The wide shroud base and lack of headsail loads gives a low load system but unfortunately the whole mast is supported at only one position. The large fully roached main is very efficient.

The **fractional** rig is the next most efficient rig. The side supports to this mast can be any system but the headstay presents a problem. A permanent backstay can only be attached to the masthead and will bend the mast when the backstay is tensioned to support the headstay. Monohull fractional rig boats will have a crane at the top of the mast to push the backstay back as much as possible to allow the main to be as big as possible. Running backstays are necessary to support the headstay and to prevent the mast bending. Large Genoas are not possible. Multihulls, with their wide beam, are normally set up like the rotating mast, but fixed. The main sail is large with the small genoa. Fractional rig boats have a high mast failure rate.

The Gemini 105Mc uses the **masthead** rig. The masthead rig is the strongest because of the amount of shrouds that support the mast.

With the rig on the Gemini, we have found a way to retain the strength of the masthead rig but reduce the windage and get drive from the top of the sail. This new technology big head main sail works very well. The backstays are moved back on a 12" crane at the top of the mast. The main sail (7 ½ oz cloth weight) has an elaborate headboard and a fully battened main that goes behind the single backstay. This rig gives more power and can be used in higher winds because of the reduced windage and lower heeling moment.

There is a newly promoted type of rig called the **Cabospar**. This is an un-stayed mast with the boom being continuous around the mast, going forward to the tack of the jib. The jib is self-tacking, being less than a 100% jib. Without shrouds to keep the mast up, there are a lot of localized forces at cabin top. None of the un-stayed mast boats produced to date have been promoted as offshore boats.

From experience, once there starts to be any movement in an ocean going situation, this small movement rapidly expands to a serious problem. The Cabospar rig requires the same effort to set and reef as a normal rig. This rig will require the same effort as a normal rig with a self tacking jib when sailing to windward, will be less efficient on a reach (unless the sheets are eased like normal rig with a self tacking jib), but will be easier down wind when the rig can be rotated to be at right angles to the wind easily. Unfortunately, the rig is grossly under-canvased and spinnakers cannot be used. The rig has a few unique advantages such as backing up. This rig is ideal for a Pro.

Main Sail and Reefing

The standard main sail is fully battened and two reef points. Lazy jacks are included. These sails cannot be raised or lowered unless the boat is pointing into the wind. Gemini's pilothouse and the lack of heeling with wide flat decks makes sail handling easy.

Your 340 sq. ft. main sail is made of 7.3 oz. Dimension Dacron in a relatively soft finish for easier furling. The sail has a large roach and extends beyond the backstay giving additional area which contributes to greater speed and pointing angle. The sail has three full-length battens which support the roach. These battens are tightened by turning an adjustment screw in the batten-end fittings at the luff of the sail. The batten should be made tight enough so that there are no vertical wrinkles across the battened area of the sail. To remove the batten from the sail, the adjustment screw must be completely loosened.

The lazy jacks installed on the Gemini mast collect the main as it is lowered. It is not necessary to neatly flake the main when storing it. Your main will come with simple 3' line sections for sail ties. There are a number of additional sail tie options available for purchase at your local marine supply store. The included sail cover will minimize damaging sunlight and keep your sail in good condition for years to come.

Should your sail get dirty, you can clean the sail with standard clothes detergent - making sure to completely rinse the sail afterwards. In the case of grease, we have found gasoline to be the most effective means of breaking down the grease. The sail can then be further cleaned with detergent.

Reefing the Main

To reef the main, let the mainsheet go and slack off the jib just a little. Leave the rudder turned as if to tack the boat. The boat will then stop and remain at about an apparent wind angle of 50°. Hook the topping lift over the winch and down to the cleat to temporarily raise the boom about 18". Release the main halyard to lower the main sail until the eyelet at the front of the first reef point is in line with the gooseneck. Hook the eyelet over the hook on the gooseneck and re-tension the main halyard. Pull the reefing line (blue or red) under the boom until the back of the sail is pulled down to the boom, and cleat. Release the topping lift (the reason for raising the boom is to make it easier to pull the back of the reefing line to the boom.)

Genoa

Your 320 sq. ft. genoa is made of 5.5 oz. Contender Dacron. This is an exceptionally tight-weave fabric and is also a soft-finish cloth making the sail durable, resistant to stretching, and lessens the tendency to develop wrinkles as a result of roller furling. As an aid to reefing the genoa, the mid section of the luff of the sail is padded with a foam insert which helps keep the sail flat as it is rolled in. The sail has a strip of Sunbrella cloth on the leach and foot of the sail which is the longest-lasting sun protection material available. Reefing the genoa is a simple matter of pulling on the roller furling line after having let loose or eased the genoa sheets. Regarding the furling drum: it is highly advised to leave a small amount of tension on the furling line (by hand) to ease the sail out. This ensures that the line will wrap correctly around the furling drum without any tendency to foul.

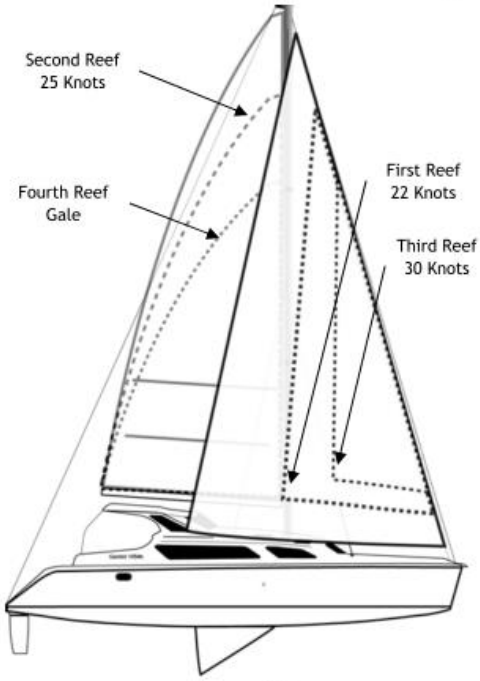
Spinnaker

For down wind, a spinnaker is essential for racing. A spinnaker's lightweight and shape enable the sail to be blown into a position which captures the maximum drive from the wind with the use of a spinnaker pole which positions the sail away from the wind shadow of the main. The spinnakers huge size gives spectacular down-wind speed. Gemini's performance also increases with the lift created by a spinnaker or full screacher sail.

A single luff spinnaker, which has many names, is designed for use without a pole. It is tacked to the base of the headstay like the Genoa, and has one set of sheets.

Screacher Sail

The optional screacher sail (Dimension Dacron cloth weight 4 oz) is a 420 square foot roller drifter (200%) fitted in front of the genoa. The sail is designed



with a low luff and permanent curve. This sail works well on a reach and close to the wind. The base of the sail is mounted on a curved track traveling between both hulls. For downwind use, the base of the sail can be moved to windward, lessening the main sail's wind shadow and increasing power. For upwind work in light air, the base of the sail can be positioned amidships.

The screacher lines connect through two snatch blocks on either side (at the base of the stanchions) and then to the pad eye on the back of the combing. The snatch blocks enable fine tuning the sail's roach for upwind or downwind performance.

To correctly tension the screacher halyard, first loosen the backstay with the backstay adjuster (if not already loose). Hand-tighten the screacher halyard, then re-tighten the backstay. Keep in mind, the screacher sail has a permanent curve built in and is not intended to be completely straightened. Do not attempt to tighten the screacher halyard using the winch.

The sail is protected from the sun with tedlar film which is light-weight and offers good UV protection. However, the tedlar film lacks durability so it is advisable to lower and stow the screecher if you don't plan on using it for a long stretch of time (more than 2 weeks). The sail furls on its own luff wire and it must be furled in the direction that tightens the lay of the luff wire. Furling the sail in the wrong direction will unlay the wire and possibly kink and break the wire. To be sure the sail is furled correctly, check to see that the clear tedlar film is on the outside of the furled sail.

To lower the sail, center the furling, un-cleat the halyard at the base of the mast and free the halyard stopper located about 5' up from the base of the mast. Slack the sail enough so that you can easily pull the quick-release pin from the base of the sail - being careful not to loose the pin overboard. Place the base of the sail into the sail locker and continue lowering the sail using the halyard.

Reefing

The roller genoa in the full out position has the genoa sheet going down at approximately 45° to the slider which is near the back of the track. As the sail is rolled in, it is necessary to move the slider forward. The approximate slider position, when the tack of the genoa is in line with the shroud, is with the slider level with the checkstay eye. The reason for the correct position of the slider is to put roughly equal tension on the leach and the foot of the sail. This position will change in different wind strengths. In lighter winds the slider is further aft putting less tension on the leach, allowing the leach to fall away and not rub on the shrouds or close up the slot. In stronger winds the slider is forward to put more tension on the leach which is being blown out with the stronger winds.

Suggested wind strength before reefing:

Main	Headsail	Roller Genoa	Wind Strength– Apparent
Full Main	Drifter	Full	15 knots
Full Main	Genoa	Full	18 knots
Full Main	Jib	First Reef	22 knots
Main - 1st Reef	Jib	First Reef	25 knots
Main - 1st Reef	Storm Jib	Second Reef	30 knots
Main - 2nd Reef	Storm Jib	Second Reef	Gale

To use the above guide, when the boat has a roller genoa, simply reduce the sail as indicated above. The roller genoa is reduced to a jib when the tack is level with the shrouds and then can be further reduced to storm jib when in line with the baby stay on the front deck.

As a rule of thumb, consider reefing whenever the boat heels to 7° or more. An inclinometer will assist in determining the degree of heel.

Heavy Weather

For offshore use, the catamaran is the safest choice of boat. The trimaran is the worst followed by the monohull. To understand what happens in rough conditions and large waves it is necessary to understand the motion of water in a wave.

In the crest of a wave, water particles are moving in the direction of the wave with say a speed of 12 knots. In the trough, the water particles are moving backwards at 12 knots. The water particles move in a circular motion. Although these waves appear to be moving, in fact nothing moves, there is just this circular motion of water. Otherwise the whole of the Atlantic would end up in Europe in a Gale.

All boats will lay beam to the waves and wind with no sails up.

In heavy weather, a monohull's keel can by its own worst enemy. In the trough of a wave when laying beam to, the deep keel is in static water, while the hull is on the surface where the water particles are moving towards the wave. This starts a pendulum motion with the boat rocking towards the wave. As the pulsation of the wave moves on the hull, it is