FJ Tuning Guide

Mast and Centerboard Positions for Windward Sailing

Wind	Mast butt (1)	Mast rake (2)	Centerboard (3)
light/moderate	8"5"-8"6"	perpendicular to deck or 19'4"-19'6"	2260mm
heavy	8'9"	18'10"-19'2"	2245mm

Note: Changing mast rake will significantly affect mast bend unless the spreader angle is reset.
12. distance from aft end of sail track to outer side of transom as measured along keelson
13. distance from upper mast band to top dead center of transom with jib hoisted and shrouds tight but no mast bend induced by shroud tension
14. distance from transom along centerline to leading edge of board at point it exits hull in fully lowered position

Jib Lead Position

light wind		moderate wind		heavy wind	
flat water	**chop**			**flat water**	**chop**
17"-19"	15 "	14 " 15 "		15 "-17"	15 "

distance from boat centerline to bearing surface of jib sheet lead
Note: For reaching or running, the jibsheets must be trimmed progressively farther outboard with Barber haulers to open the slot between main and jib as the boat turns from a closehauled course to a beam reach.

Mast Bend/Spreader Settings

	light wind	moderate wind	heavy wind

fore-and-aft bend: windward sailing	5"-6" (prebend)	3"-4" (flat water) 2"-3" (chop)	5"-8"
fore-and-aft bend: reaching/running	none	none	none
athwartships mast bend (deck to hounds - windward sailing	none	none	1" maximum (bend to windward)

Spreaders

height from deckline: 2310-2400mm
length: 17" (approximate; actual length will depend on height of spreaders above deckline)
push (measured by distance of spreader ends forward of straight line from chainplates to hounds):
1 " in light air (for prebend)
1" nominal settings in moderate to heavy air
poke (measured by distance of spreader ends outboard of straight line from chainplates to hounds):
1 " in light to moderate air (to prevent athwartships mast bend)

Tuning the International FJ

by Mike Wyatt

Hull: There is very little you can do to enhance the performance of the hull beside the standard things- clean, fair, etc. Reminder: Vanguard hulls after 1980 do not Measure; this applies to all CJs, CFJ's, and a few boats sold as legal FJs in 1980. Be aware!!!
The rudder: The rudder blade itself should be made of wood or fiberglass (vs. aluminum- it stalls). The thickness of the blade is largely fixed by the manufacturer but in general should be thicker for sailing in waves, where more rudder action is used, than in flat waters. The blade should be fair, with no nicks or gouges. Replacement rudders, blades are available through H&H Sailcraft.
The centerboard: thickness is limited to the 40mm maximum width of the centerboard slot. It must have a stop fixed so that the board cannot be rotated forward of vertical (forward edge of the board at 90 degrees as the boat floats).
Most current centerboards are of the "gybing" type, where the top of the board has a diamond shape, allowing the board to angle about 3 5 degrees upwind. This causes the boat to "crab" upwind, pointing higher. This effect can be achieved on older boards by fixing two thin battens 2/3 of the way toward the aft side, at the top of the board. Try first using duct tape. If you like it, you can then glass in the battens for a permanent installation. A bonus is that the battens tighten up the play in the board. The centerboard must also be free of dings and gouges.

You should have a centerboard gasket. Most centerboard gaskets are thick (.040) Mylar, and may be covered with adhesivecoated Dacron ("stickyback"). This material lasts for a long time. See a sailmaker for the Dacron material. The centerboard gasket can be glued to the hull using contact adhesive, but should have two 1/8" X 1/2" aluminum strips fixed longitudinally to hold the edges and to protect the gasket when dragging or running aground. The aluminum strips should have the fasteners (stainless flathead sheet metal screws) countersunk and faired in so as to provide the minimum turbulence.

Rig

The rig is the area of tuning with the most to be gained.

Mast position

The FJ is currently sailed with the butt of the mast located between 8'3" to 8'5" forward of the center (inside) of the transom.
Older FJs had the mast located farther forward; as much as 5" of this point. This setup (with the mast located too far forward) leads to lee helm unless enough aft rake is induced to balance the helm. With adequate rake in the mast to balance the helm, the boat lacks power to windward. Also, pointing is negatively affected with the rig this way.
Many FJ sailors are fitting devices that allow the adjustment of mast position while sailing; this can be accomplished by use of a traveler and track under the mast, or a low-friction material under the mast so it can slide. In either case, adjusting lines are used to move the mast.

Mast Rake

To measure mast rake: Fix a measuring tape to the main halyard, then raise the halyard until the shackle is at the top measuring band.
The mast, with the jib halyard tightened to a medium tension, rake measurement should be 19'3"19'5", measured from the main halyard in the "up" position to the center of the transom. The measurement of rake is from that point to the center of the transom. See the Steve Klotz article ("FJ Tuning Guide") for detailed numbers for various sailing conditions.
Place marks (use a Sharpie marker, or a commercial number sticker) so that you know what your settings are. Then, when you are "fast" on a particular day-mark down where you had everything set.

Rig (jib halyard/ jibstay) tension

In general- with the jib up, there should be sufficient tension in the rig so that there is minimal sag of the jibstay when closehauled upwind in a medium breeze.
In light air- more jibstay sag will power up the jib;
In heavier air (when you don't need more power), sag is bad.
The FJ uses no clips or jibhanks attaching the jib to the forestay; the forestay serves only to hold the mast up when the jib is not raised.

Jib sheeting

The jib is generally sheeted, closehauled, with the deepest draft point of the foot about 1 3 " inside the foredeck rail when closehauled in medium air. As the breeze freshens, you can sheet the jib closer; as the breeze lightens, looser.
Jib leads are generally about 15" off the centerline of the boat. A common way to achieve this, on "tank" boats (Vanguard, post 1985 H&H, and Sailnetics) is to use large blocks on the inside of the tanks, mounted to jib tracks. On seatmodel FJs (Advance, Dynamic Plastics, etc.), this requires that the jib leads be mounted on the seats inside.
Fore and aft, the jib tracks should be mounted to allow the jib leads to be slightly forward of the "mitreline" in the middle of the track. Keep in mind that this is all affected by sail cut, the mast position and rake discussed previously; make changes to the mast first, then to the jib leads.

NOTE: newer (post 1995") jibs tend to be cut fuller forward/flatter aft, and you need the jib to be sheeted "harder"- leads forward so as to close the leech and slot between the jib and main. If you have older sails, sheet about on the mitre line.

Mainsail

General: The main is adjusted so that (a) it has the right amount of "twist" (fall-off of the leech) (b) the right amount of draft (curve) in the sail for power, and (c) that the draft of the sail is in the proper position for optimal pointing.
In over-powered conditions- feel free to "dump" the main to keep the boat upright (after you are hiking and the crew trapezing of course). However- "never" (except in a hurricane) dump the jib- it gives you steerage in these conditions.
FJs can be either rigged using an aft bridle for the mainsheet, or using a midboom traveler arrangement.

Bridle (Vangsheeting)
The advantage to the aft bridle mainsheet is simplicity; there are fewer adjustments needed to control to the mainsail leech than with the mid-boom traveler arrangement. It also cleans up the inside of the boat, making it easier to move fore and aft. Bridle sheeting is used mainly on boats sailed in lighter winds.
A line bridle from the aft corners of the boat is used, with the mainsheet tied to the center of the bridle.
The mainsheet leads from the bridle,
upward through a block on the aft of the boom,
forward through a block at the midpoint of the boom (over the aftermost portion of the centerboard trunk)
then down to a mainsheet block on a swivel mounted on the trunk.
With bridle/vang-sheeting, the main control of the leech is accomplished using the boom vang (kicker) and the in/out position of the sail (the mainsheet).
Sighting the angle of the upper batten relative to the boom is the indicator used to set the leech or "twist".
Sheet the main approx. midboat (centered) upwind. In most conditions, no or very little vang is used -upwind. For excessive wind, let the main out to the corners to depower, do not dump the jib.
Off the wind, add vang tension until the upper batten is parallel to the angle that the boom makes relative to the boat. Sight up (or have the crew sight up) from under the boom until you get a feel for the right vang tension.
As the wind builds, more tension on the vang will be needed to maintain the correct "twist".

In drifting conditions (no visible wind) Sheet the main in only until the upper batten is parallel to the centerline of the hull (vs. to the boom angle as above).
Heel the boat (up to about 20-25 degrees) to add shape to the sails.

Midboom traveler
This is a method preferred by most FJ sailors (except in the light-air Midwest)- it better controls the mast bend and power for medium to heavy wind conditions.
The disadvantage of a mid-boom traveler is that it requires the balancing of three variables- sheet tension, traveler position, and vang- to control the mansail's leech. There are also added lines in the boat, and clutter, compared to end-boom sheeting ("vang-sheeting").
When using a midboom traveler, the traveler is pulled to windward to center the boom for upwind pointing. Allow the traveler to fall off to tighten the leech, pull it upwind as the breeze lightens to add shape to the mainsail. The sheet tension, vang, and traveler position are adjusted to get the optimal "twist" in the mainsail.
The rules as above (upper batten angle) still hold true. Upwind, in most conditions, the traveler is centered but, as the breeze lightens, the traveler will have to be pulled to windward to allow the boom to approach centerline for pointing.

Outhaul

The outhaul sets the draft, or power of the mainsail. Generally, the outhaul needs to be tight, and the main flat, for upwind pointing.
In light air (not drifters- see below), tighten outhaul upwind, loosen off wind for more power.
In drifting conditions, tighten outhaul to remove draft/flatten mainsail and allow wind to flow better over the sails.

Downhaul-cunningham

Tighten to add 6" horizontal wrinkles ("speed wrinkles") to the luff of the main. Position draft about 1/3 of the way aft from the mast. No outhaul or cunningham tension in light air.

Crew Weight Placement

This is extremely important on the FJ. The relatively wide transom will, if not lifted clear of the water in light-medium air, create suction and drag. You must move crew (both) forward to keep the transom out of the water. The normal position for the skipper is about at the aft edge of the centerboard trunk. The crew is normally against the shrouds.
Move aft to promote planing as the wind builds or as waves lift the stern. Don't worry about the transom suction in planing conditions!
In light air, heel the boat to add shape to the sails, and move forward to get the transom out of the water. In drifter conditions, heel as much as 20-25 degrees.
Move well forward in light air and the pointing will improve.
Try to sail the boat flat all the time by hiking/ trapezing or, in really gusty winds, spilling the main.
And- the most important tuning tip of all- have fun!!!

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