Farr 11s

11meter Canting Keel Racer

Frequently Asked Questions:

Why twin rudder and twin canards?

The choice of twin canards and twin rudders is ultimately linked to the beam of the boat. The wider the hull, the more the centerline area lifts up out of the water as it heels. With wide boats the efficiency of a centerline appendage (rudder, dagger board, or canard) is quickly reduced when the root of that foil reaches the surface of the water. The more heel the boat achieves the worse the appendage performs. Even if the top of the appendage is fully immersed at typical heel angles, there can be a time when the boat "over-heels" exposing the appendage top. Twin rudders or canards typically have a further advantage in that they will actually be immersed further with heel. As a result of this immersion twin aft rudders typically have more rudder control with increasing heel angle. Twin canards also allow the designer to pursue asymmetrically cambered foil shapes, which result in a larger effective span for a given amount of wetted surface area.

Why not use a steerable bow rudder?

In addition to the reasons listed above in the section “Why twin rudder and twin canards” the forward appendage (rudder, canard, etc.) wants to be lifted when reaching and running to produce the greatest efficiency. In summary, a configuration using twin canards combined with twin rudders produces a relatively simple configuration that maximizes efficiency and ensures the boat can be handled more easily when sailing near the limit of control.

How is canard handling envisioned for tacks and gybes?

When sailing downwind, the canards would not be needed and would both be up. When sailing upwind and tacking, the windward canard is lowered as the tack is initiated. The boat is tacked with both canards in the down position. After the tack is completed, the new windward canard is pulled up. Because the windward canard is not fully immersed and because it will effectively be cambered in the “wrong” direction it will be producing relatively little side force making it easily moveable by hand.

Are they lifted / lowered by hand or by mechanical means?

During typical controlled tack and gybe maneuvers the canard can be moved by hand as described above. In steady state sailing conditions when it is desirable to move the canard under load, the force to move the canard will be too large to allow simple hand adjustment. In that case the control lines have been positioned such that the free windward primary winch may be used.

What is the total board 'throw’?

The total range of canard throw is 2 meters.

What is the expected crew size / weight?

The client’s requirements for this design indicated a crew of 6 plus a guest, combining for an average total crew weight of 590kg. There will certainly be conditions where more total crew weight will produce improved results.

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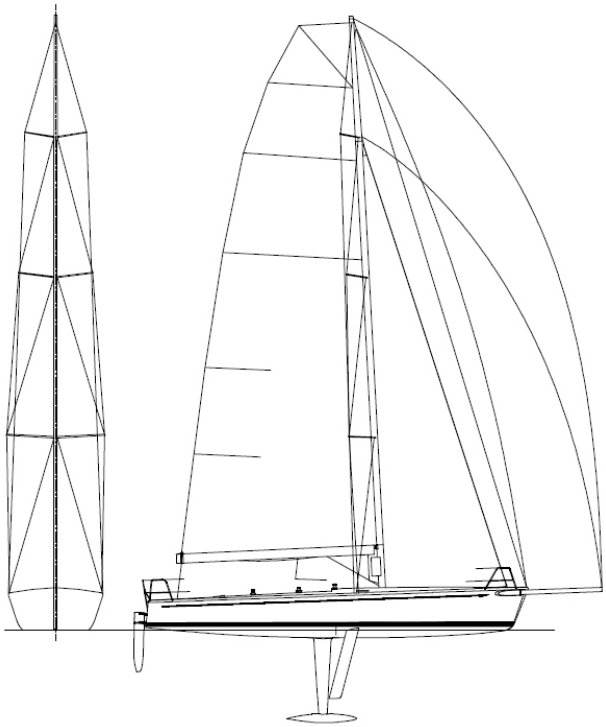
Is the heel still expected to be significant given the canting keel and crew weight?

The VPP work completed for this design indicates typical upwind heel angles of approximately 15 degrees. In way of reference, a larger canting keel boat typically operates with average upwind heel angles of around 20 degrees, while fixed keel yachts typically heel a bit more again, around an average of 23 degrees upwind. Optimum upwind heel angles are produced in a VPP by balancing a boat near maximum righting moment while maintaining the sailplan's maximum efficiency. A lower optimum heel angle indicates a boat whose maximum righting moment arrives relatively earlier.

Why so much bow rake and not a plumb bow like most modern designs?

The plumb or relatively upright stem angle's typical of today's boats are a product of fashion that has aligned itself with the common box rule type race boats we wish to emulate. When unconstrained by rules, designers are free to look for advantages in alternative concepts. In the case of this boat two major areas have pushed us in the direction of a more angled stem. The first is the desire to tack a removable masthead genoa forward of the forestay. This sail would be used in light air when racing under handicap systems that do not unfavorably treat such a sail. When sizing that masthead sail the resulting foot length positioned its tack well forward of the forestay requiring some form of structure to support it. The structure alone could have been provided by some other means like a portion of fixed bowsprit tube. When looking at the required structure we considered that a section of extended bow slope could also provide an added volume and flare to the topsides forward. The reserve buoyancy in that added geometry will be a benefit in waves and high speed running conditions where nose diving can be a concern. When discussing these possibilities with our client we decided together to pursue the less fashionable but perhaps more technically correct solution.



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