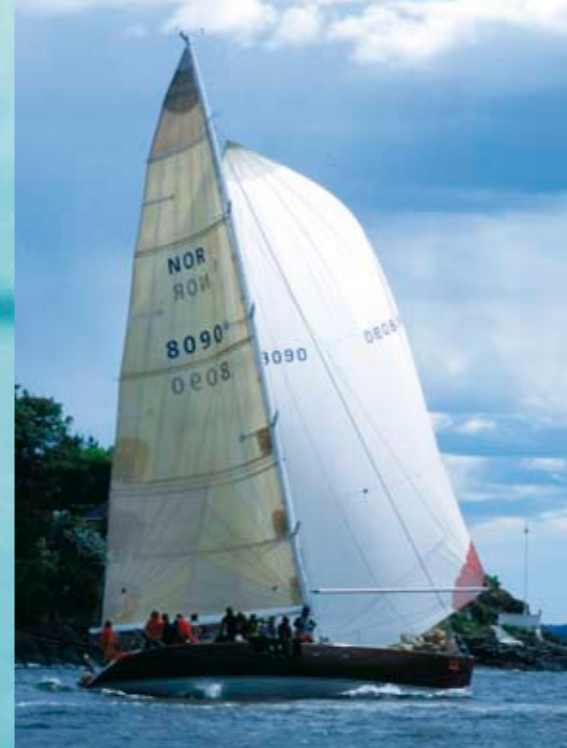
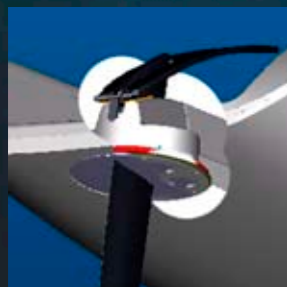


The "VarioRUDDER" or "Kullmann Rudder" system incorporates a radical shaftless construction giving a strong and simple fastening of fixed or movable appendages with low forces exerted on fasteners and bearings.

The VarioRUDDER™ is a patented system that makes it possible to change e.g. rudder, keel or drive span (depth) in a simple way while maintaining structural strength and reliability.



# VarioRudder™

Fixed or Variable Span Appendage Systems

"K19 is a sailboat with innovative solutions that in many ways allows it to define its own category. The boats functional and formal solutions are innovative and partly on a patented level, with special attention given to the keel, rudder and ropes". Norwegian Design Council.

"We are positive without doubt. You are in full control on all points of sail, at the same time the boat is demanding to get the maximum out of when racing. The boat had no planing level and just accelerated." Seilas magazine.

"In its category K19 is one of the best boats I have seen, - the design is a stroke of genius and it is well built..". Knut Frostad

"Baby Grand"; "Liftruder: Einfach genial, die Idee. -exzellente Segeleigenschaften bei reduziertem Tiefgang". Die Yacht.

"Die Ideen könnten vielen Yachten auf die Sprünge helfen". Yacht Revue.

"Wolf in sheeps clothes, sensational Norwegian High-Tech yacht". Seiling&Båtliv.

"World class Piano. An oceangoing Ferrari". Seilas.

"Wooden skin, - synthetic high-tech inside. Baby Grand Piano looks like a true thirties Art Deco mahogany yacht. But don't let that fool you, under the skin there is a very modern synthetic hart beating". Båtnyt.



**Award for Design Excellence**  
Awarded by the Norwegian Design Council

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# VarioRudder™

Fixed or Variable Span Patented Appendage Systems



*The VarioRudder system uses an appendage, be it rudder, foil, drive a.o., without a typical shaft and without any gap between the appendage and the canoe body.*

*For a steering appendage one may therefore use a thinner section blade and most notably there is no pressure loss at the rudder/ hull intersection providing you with a proper endplate and better efficiency.*

The VarioRudder system is in many ways analog to a "revolving daggerboard case" with a large diameter bearing and the appendage being fastened within. Modern sailboats are already halfway there as they struggle with making the rudder shaft strong enough and have to make them rectangular and half the chord of the blade..

*The installation may be made with retractable or interchangeable appendages, and may be fixed or movable.*

For powerboats, fast craft or commercial ships one could use full rudder at low speed and then fully retract the rudders at cruising speed for less resistance.

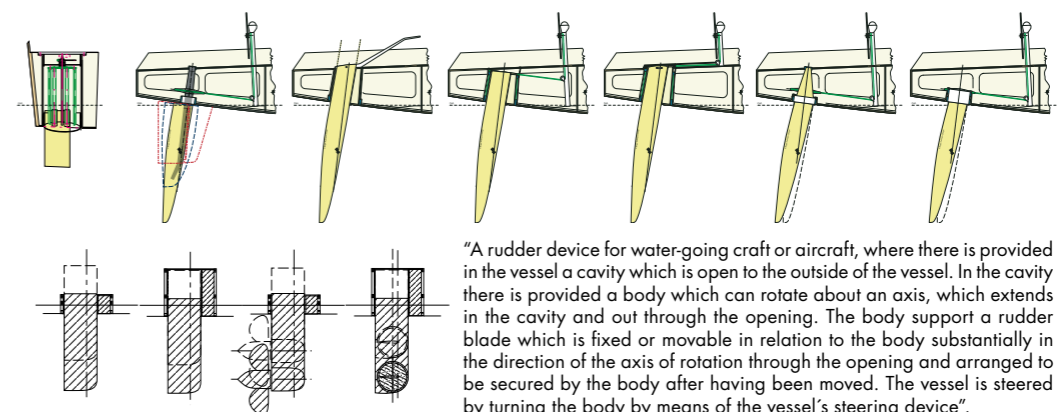
Motor Yachts with a fully enclosed twin VarioRudder system installed could also use the system both for steering and as roll stabilisers. Combined with an integrated bridge and/ or single joystick controls, a VarioRudder system can link with autorouting, dynamic positioning and autodocking systems. Contact us for info on such software/ hardware systems from Navicon AS.

"VarioRudder®" is covered by patents in most European Union countries, USA, New Zealand, Australia a.o.

- Any craft can use the system to get deeper and better rudder(s) to make them both faster and more controllable.
- No ventilation between blade and hull for higher lift efficiency.
- Fastening of rudder blade can be made stronger than for a conventional rudder. The rudder blade can be laminated in one single piece.
- Do away with the expensive rudder shaft.
- Fast Craft can fit slim rudders with extreme thickness-to-chord ratios.
- Adjust rudder depth continuously from full span to zero span, even when underway. (Depending on planform and racing rules).
- Take full advantage of a twin rudder installation by eliminating the unwanted drag of the windward rudder.
- Get access to shallow harbours and cruising grounds normally out of reach. "Beaching" is possible provided your keel does not let you down.
- In case of a rudder breakage, a new one can be substituted or repaired while the yacht is afloat.
- Adjust the weather helm (shifting CLR).
- Flat out racing monohulls and multihulls can take advantage of the system to pick the optimum rudders for a given seaconditions and wind strength altering surface area and planform. The wetted surface area can easily be adjusted.
- Facilitate transport by stowing the rudder safely inside the yacht or on deck.
- The large bearing diameter makes it possible to eliminate one or more rudder bearings. One will do in most cases. The large diameter means less forces exerted on bearings and hull structure.
- The inner drum eliminates the need for a separate quadrant for wheel steered craft.
- Easy dismantling of rudder assembly assures low maintenance and repair costs.
- Production costs compare favourably to other variable span or multirudder installations.



## POWER & SAIL • Leisure and Commercial • Automatic or Manual



"A rudder device for water-going craft or aircraft, where there is provided in the vessel a cavity which is open to the outside of the vessel. In the cavity there is provided a body which can rotate about an axis, which extends in the cavity and out through the opening. The body support a rudder blade which is fixed or movable in relation to the body substantially in the direction of the axis of rotation through the opening and arranged to be secured by the body after having been moved. The vessel is steered by turning the body by means of the vessel's steering device".