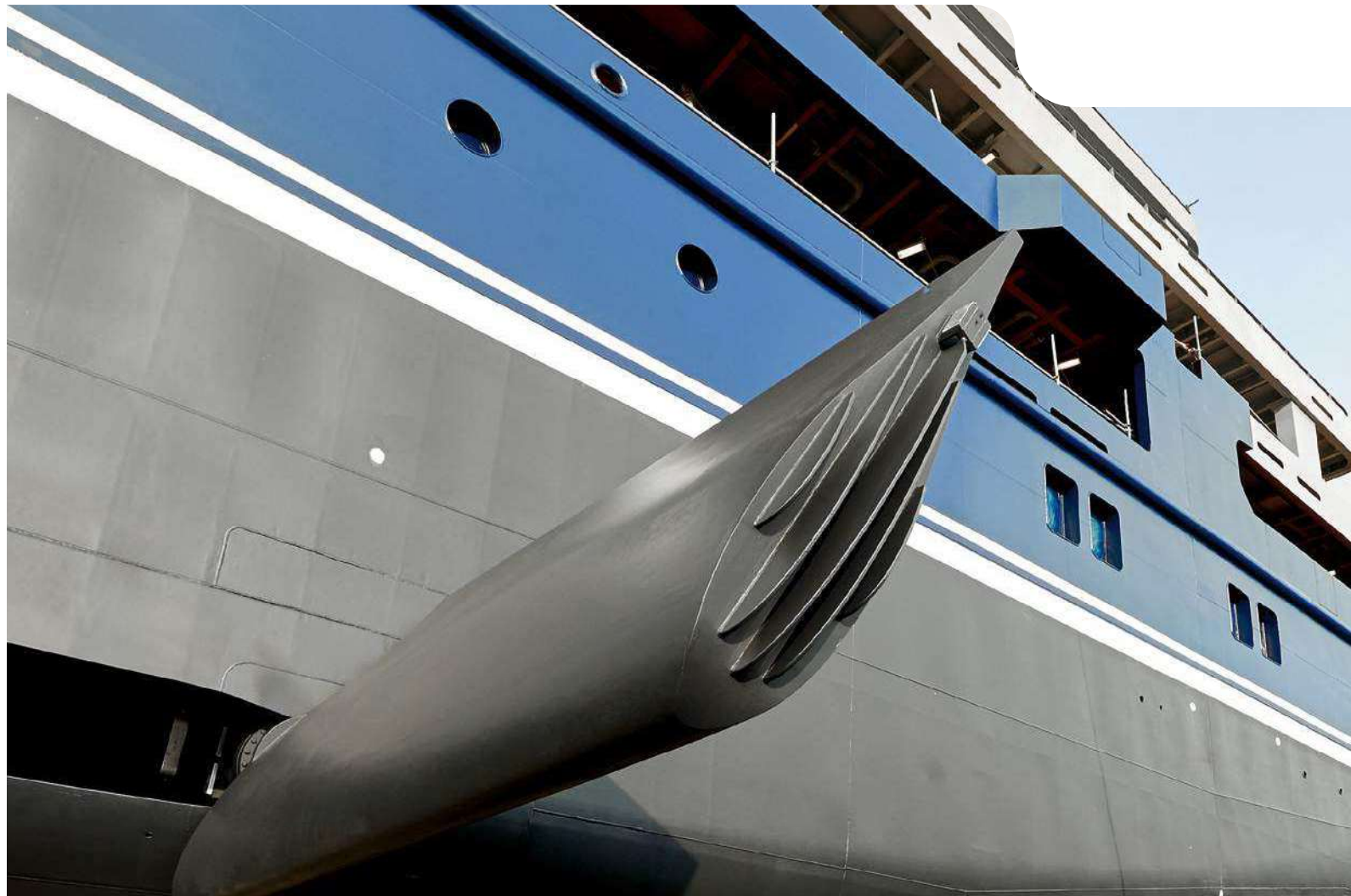


SKF Retractable fin stabilizer



SKF Stabilizer
Service

Stabilizing shipping since 1961

For more than half a century SKF Marine has been equipping ocean-going vessels with fin stabilizers and we have provided stabilization solutions for over 600 ships during that time. This has allowed us to amass a wealth of experience which we use to continuously develop our products and drive innovations. The results are embodied in reliable and efficient performance, excellent passenger comfort and the highest degree of safety for passengers, crew and cargo. As our customer, you will benefit from our in-depth and comprehensive advice coupled with top service throughout the full service life of your vessel.

Energy-efficiency and the environment firmly in focus

SKF Marine places the highest priority on protecting the environment and conserving our resources. In this context we have developed the dynamic stabilizer cover (available from 2017). This reduces drag at the fin box opening by up to 90 %, thereby achieving a fuel saving of over 1 %. Our energy-optimized hydraulic units reduce energy consumption by up to 20 % in comparison with conventional units, therefore also making their contribution to a sustainable approach to the environment and resources. Depending upon the type of vessel, other measures for increasing efficiency are available – please contact us for details.

SKF Marine fin stabilizers are of course compliant with the Vessel General Permit (VGP) 2013 regulations, which became effective in December 2013.

Innovation made by SKF Marine

At SKF Marine a dedicated research and development department is responsible for the continued and new development of fin stabilizers. This allows us to remain especially in touch with customer needs and enables us to guarantee that new

market and environmental requirements can be rapidly and reliably realized. We would also be pleased to realize special projects – such as a combination of fixed and retractable fin stabilizers – in cooperation with you.

Available to you 24/7

Once you decide to install SKF Marine fin stabilizers you can leave the rest up to us: from technical consulting during selection of the fin stabilizer type and design services during the planning phase, through smooth management of your project – including marine engineering integration and commissioning – right up to providing premium service over the full service life of your vessel.

We of course also take care of inspection and maintenance work, including retrofit solutions for the control unit. This allows us to keep your system fully functional and updated at all times.

Even when you need our assistance at short notice because of an urgent issue, our highly trained specialists can be deployed around the clock anywhere in the world – we make even the most complicated repairs possible within the shortest possible docking times.

Your service benefits:

- Qualified service personnel from Hamburg are available 24/7 and deployed worldwide
- Technical consulting during planning, installation and commissioning, including crew training courses
- Inspection and maintenance work
- Modification of existing units to VGP2013 standards
- Retrofit solutions for the control units
- Emergency service

We look forward to jointly developing solutions with you that are customized to your individual wishes and requirements. We will subsequently remain at your side – over the full service life of your vessel.



Your service contact:

Emergency phone number:

+49 (0) 172 437 47 78

(available 24 hours a day)

E-mail:

service-stabilizer@skf-marine.com



TWO DESIGNS
TYPE Z
AND TYPE S



SKF Retractable fin stabilizer

The two types of stabilizer from SKF Marine always ensure the highest possible stabilization performance – whether zero-speed and underway stabilization with the retractable fin stabilizer type Z or optimum underway stabilization with the retractable fin stabilizer type S.

General description

- Rotary vane fin actuators
- Fin can be housed completely inside without any hull protrusion, lower drag, reduced fuel consumption
- Patented anti-vortex tip fairings: increased lift, smaller fin area required, low drag, fuel saving

Main advantages of SKF Retractable fin stabilizer

Design

- Accumulator-supported hydraulic system: Reduced size of motors and pumps, lower demand on electrical current, lower peak load on power supply, decreased noise level, increased dynamic system response
- Compliance with classification societies' regulations, SOLAS and MARPOL 73/78 convention specifications
- Compliant with Vessel General Permit (VGP) 2013 regulations

Installation

- Integration into ship structure (fin box) designed in close collaboration with the shipyard
- Final manufactured unit, fully tested including operation and automation test
- Delivered ready-to-use to any shipyard worldwide
- Final installation to be done by shipyard; welding into the ship structure, installation with chocking fluid, wiring and cooler connection

Operation

- Easy operation by simple start or stop commands
- Control system's operation is fully adaptive to the ship speed, sea state and roll motion behaviour of the vessel. Manual adjustments by the crew are possible when required
- For manual control during inspections or any intermediate maintenance, use operation and service switches which are located inside the fin control cabinet
- Customized mode selection: Control system design enables single-fin or twin-fin operation
- Control system is fully integrated into the motor starter cabinets. No additional central control or sensor cabinets are required
- Touch control panel provides status, alarm and service information for best operational comfort and control

SKF Retractable fin stabilizer type Z

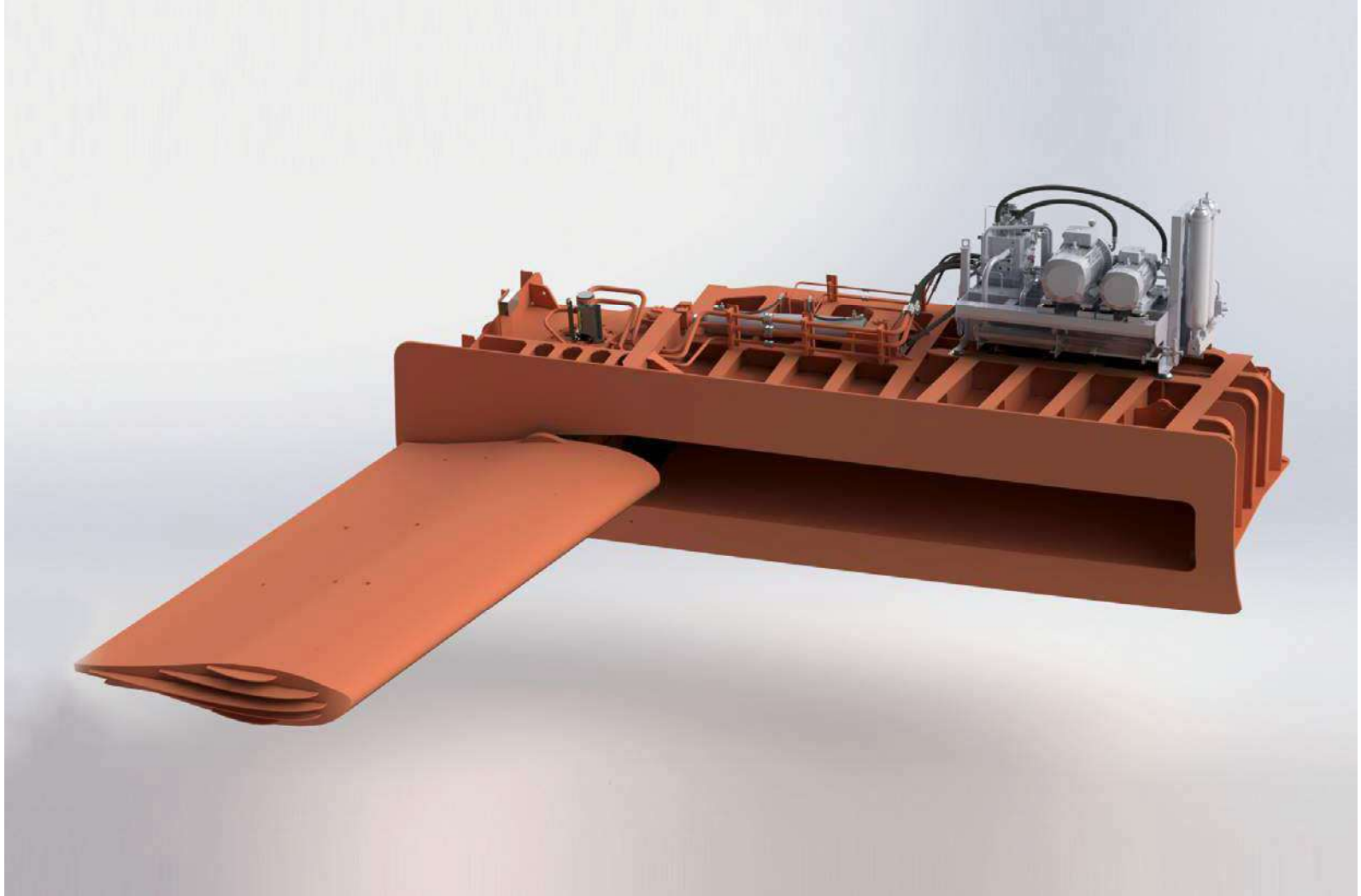
General description

- SKF retractable fin stabilizer for both zero speed and underway stabilization for all kinds of vessels
- $\pm 60^\circ$ working angle
- Fin area range up to 24 m²

Further design advantages

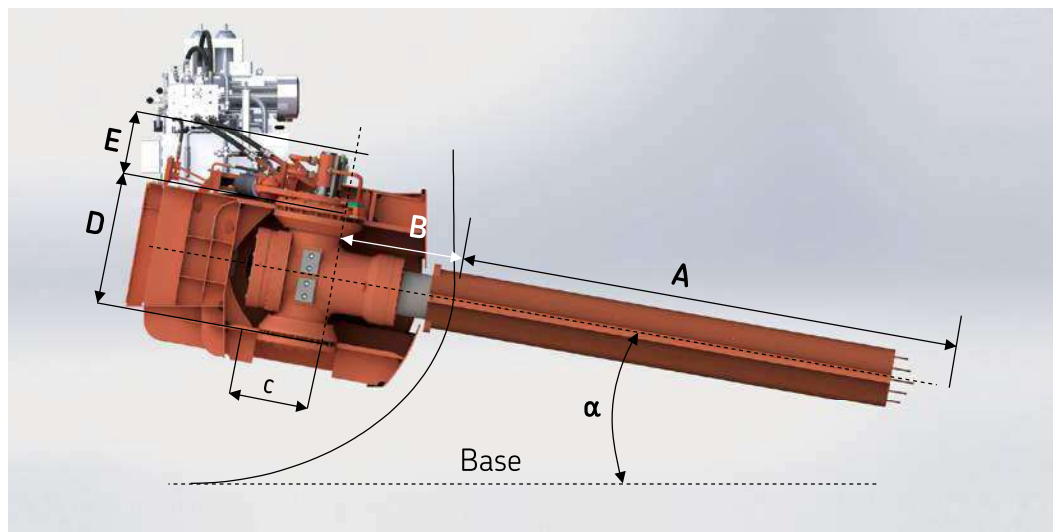
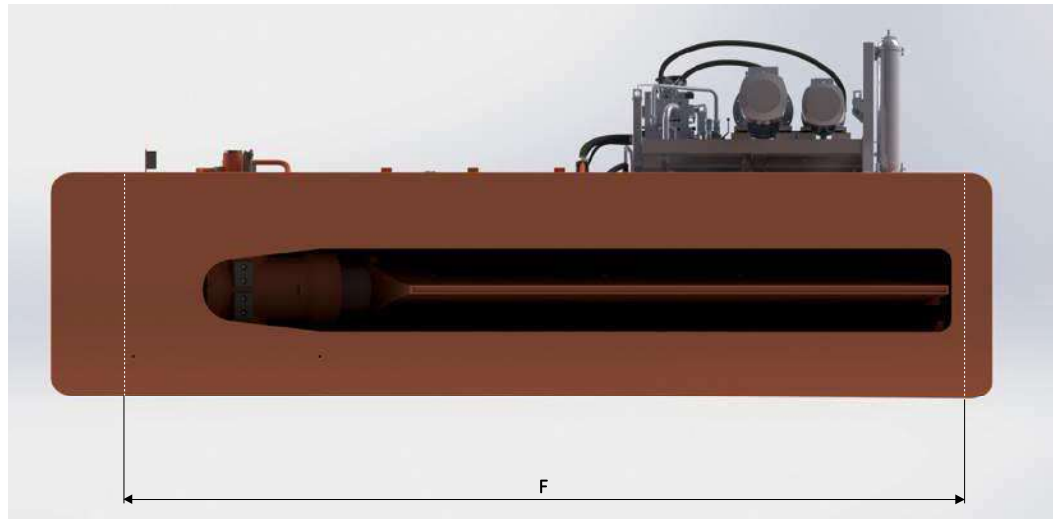
- Rotary vane fin actuators:
Extremely compact, powerful and highly reliable; torque transmission is free of unbalanced forces on the fin. This avoids additional loads on the bearings thus ensuring high fin movement precision and enabling $\pm 60^\circ$ working angle
- Benefits of $\pm 60^\circ$ working angle in zero speed mode:
 - Increased lift; better roll reduction
 - Smaller fin area; reduced resistance under way
- Concave fin profile with increased lift coefficient

Dimensions/Type	Z 300	Z 400	Z 500	Z 600
Fin area [m²] up to	9,00	13,00	17,00	21,00
A [m]	4,00	4,80	5,45	6,10
B [m]	0,95	0,99	1,40	1,65
C [m]	0,58	0,69	0,80	1,00
D [m]	0,95	1,22	1,40	1,54
E [m]	0,73	0,73	0,73	0,73
F_{min} [m]	6,20	7,20	8,50	9,60
α [deg]	15–30	15–30	15–30	15–30



TYPE Z STABILIZER

FOR ZERO SPEED
AND UNDERWAY
STABILIZATION



SKF Retractable fin stabilizer type S

General description

- SKF retractable fin stabilizer for underway stabilization of all kinds of vessel
- Flapped fin design
- Fin area range from 1,2 to 20 m²

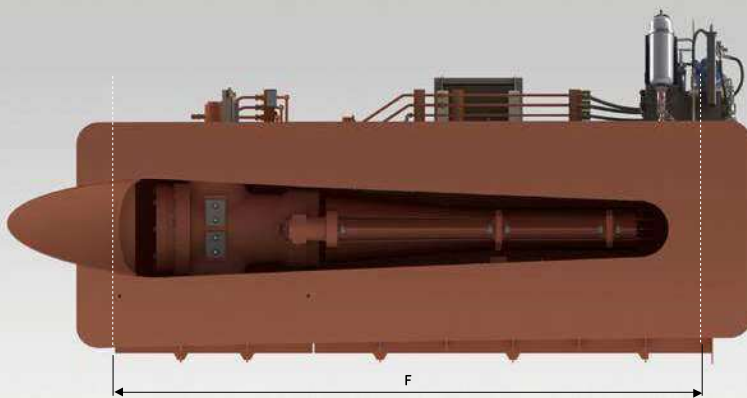
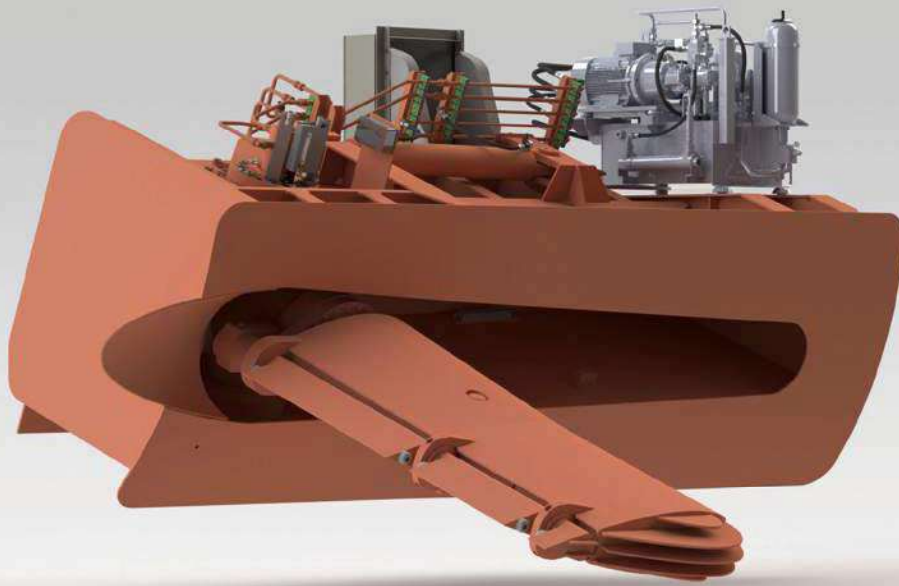
Further design advantages

- Flow-off recesses at fin box: low cavitation, minimal flow resistance
- Flapped fin design: synchronously actuated, up to 30 % increased lift compared to one-piece fin
- Rotary vane fin actuators: extremely compact, powerful and highly reliable; torque transmission is free of unbalanced forces on the fin, avoiding additional loads on the bearings and ensuring
- High fin movement precision

Application

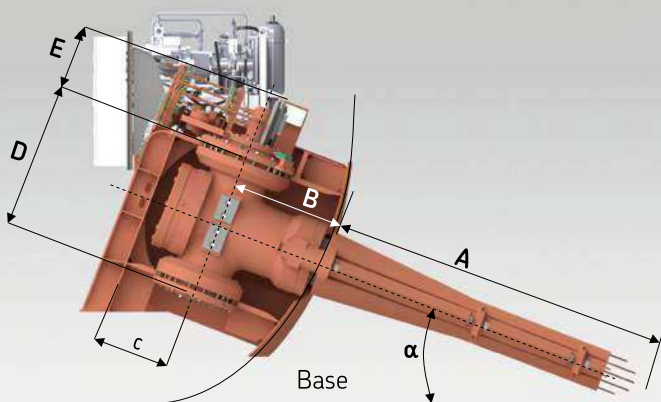
- Ultra High Lift (UHL) fin: specially designed tail flap for increasing the effective lift and roll reduction for low service speed.

Dimensions/Type	S 100	S 200	S 300	S 400	S 500	S 600	S 700	S 800
Fin area [m²]	1,20–1,80	2,00–2,70	3,00–4,20	4,80–6,80	6,50–9,30	8,00–12,00	12,50–16,00	16,30–20,00
A [m]	1,55–2,00	2,00–2,70	2,44–3,41	3,10–4,35	3,60–5,15	4,00–5,90	5,00–6,40	5,70–7,01
B [m]	0,60	0,71	0,95	0,99	1,20	1,33	1,60	1,88
C [m]	0,50	0,53	0,58	0,69	0,80	0,86	1,01	1,20
D [m]	0,78	0,52	0,96	1,22	1,40	1,54	1,70	1,90
E [m]	0,62	0,62	0,73	0,73	0,73	0,73	0,89	0,93
F_{min} [m]	3,00–3,40	3,50–4,30	4,30–5,20	5,00–6,30	5,90–7,50	6,50–8,40	7,90–9,30	9,10–10,50
α [deg]	15–30	15–30	15–30	15–30	15–30	15–30	15–30	15–30



TYPE S STABILIZER

FOR OPTIMUM
UNDERWAY
STABILIZATION

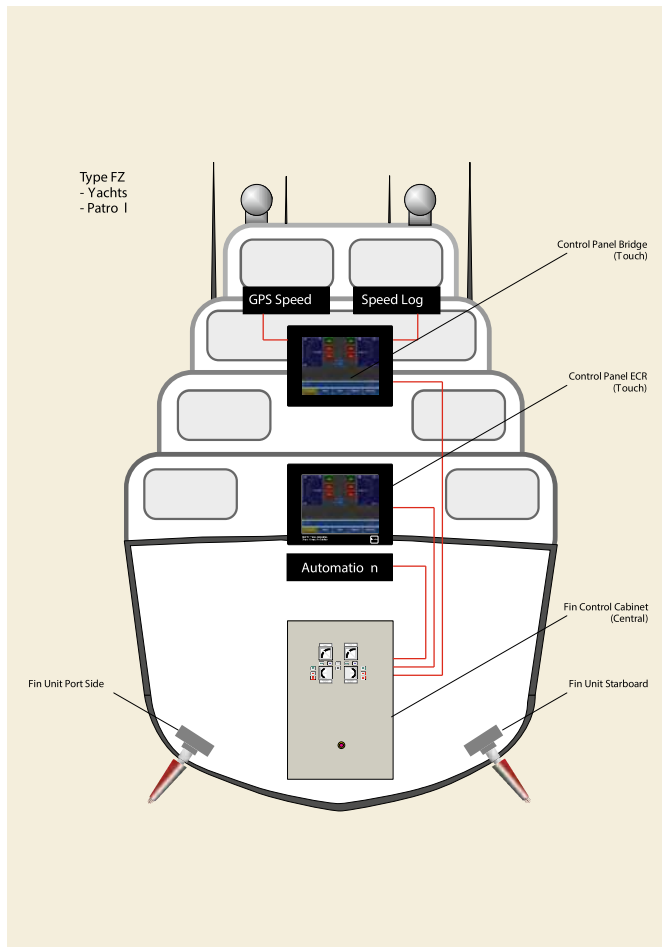


SKF Non-retractable fin stabilizer type FZ



General description

- SKF Non-retractable fin stabilizer for zero speed and under way stabilization for all kinds of vessels
- Rotary vane fin actuator
- $\pm 60^\circ$ working angle
- Fin area range from 2,7 to 12,4 m²



Advantages

Design

- Rotary vane fin actuator: Extremely compact, powerful and highly reliable; torque transmission is free of unbalanced forces on the fin, avoiding additional loads on the bearings and ensuring high fin movement precision, enabling $\pm 60^\circ$ working angle
- Benefits of $\pm 60^\circ$ working angle in zero speed mode:
 - increased lift: better roll reduction
 - smoother force transmission: reduced jerking effect, increased comfort
 - smaller fin area: reduced resistance under way
- Accumulator-supported hydraulic system: reduced size of motors and pumps, lower demand on electrical current, lower peak load on power supply, decreased noise level, faster dynamic system response, serves as a hydraulic power source for secondary equipment
- Compliance with classification societies regulations, SOLAS and MARPOL 73/78 convention specifications
- Compliant with Vessel General Permit (VGP) 2013 regulations

Installation

- Final manufactured unit, fully tested including operation and automation test
- Delivered ready-to-use to any shipyard worldwide
- Final works to be done by shipyard: welding into the ship structure, installation with chocking fluid, wiring and cooler connection

Operation

- Easy operation by simple start or stop commands
- Control system's operation is fully adaptive to the ship speed, sea state and roll motion behaviour of the vessel. Manual adjustments by the crew are possible when required
- For manual control, during inspections or any intermediate maintenance, operation and service switches are located inside the fin control cabinet
- The control system is fully integrated into the motor starter cabinet. No additional central control or sensor cabinet is required

- Customized mode selection: Control system design enables single-fin or twin-fin operation
- ECR Touch Control Panel provides identical control functions to the bridge control panel as well as providing additional status, alarm and service information for best operational comfort and control. It can be set to passive mode to prevent the stabilizers from being started unintentionally
- Low operational costs

Service

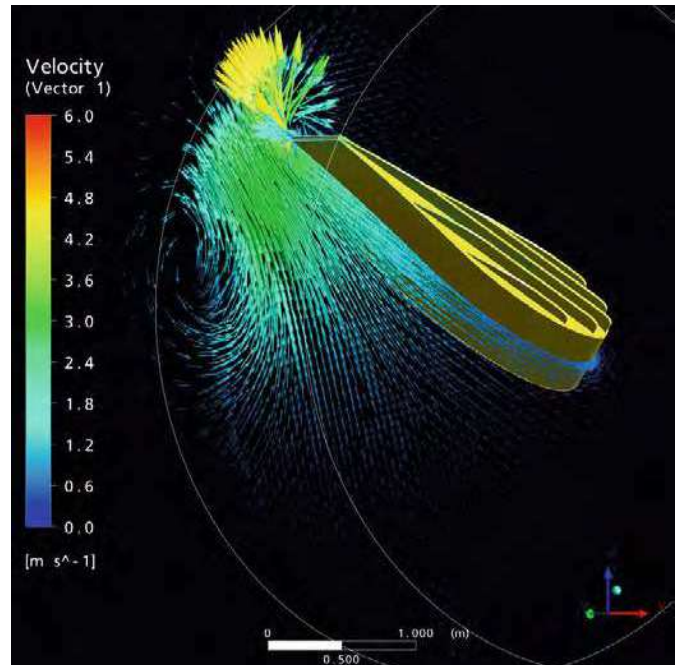
- 24/7 in-house service by highly trained personnel

Application

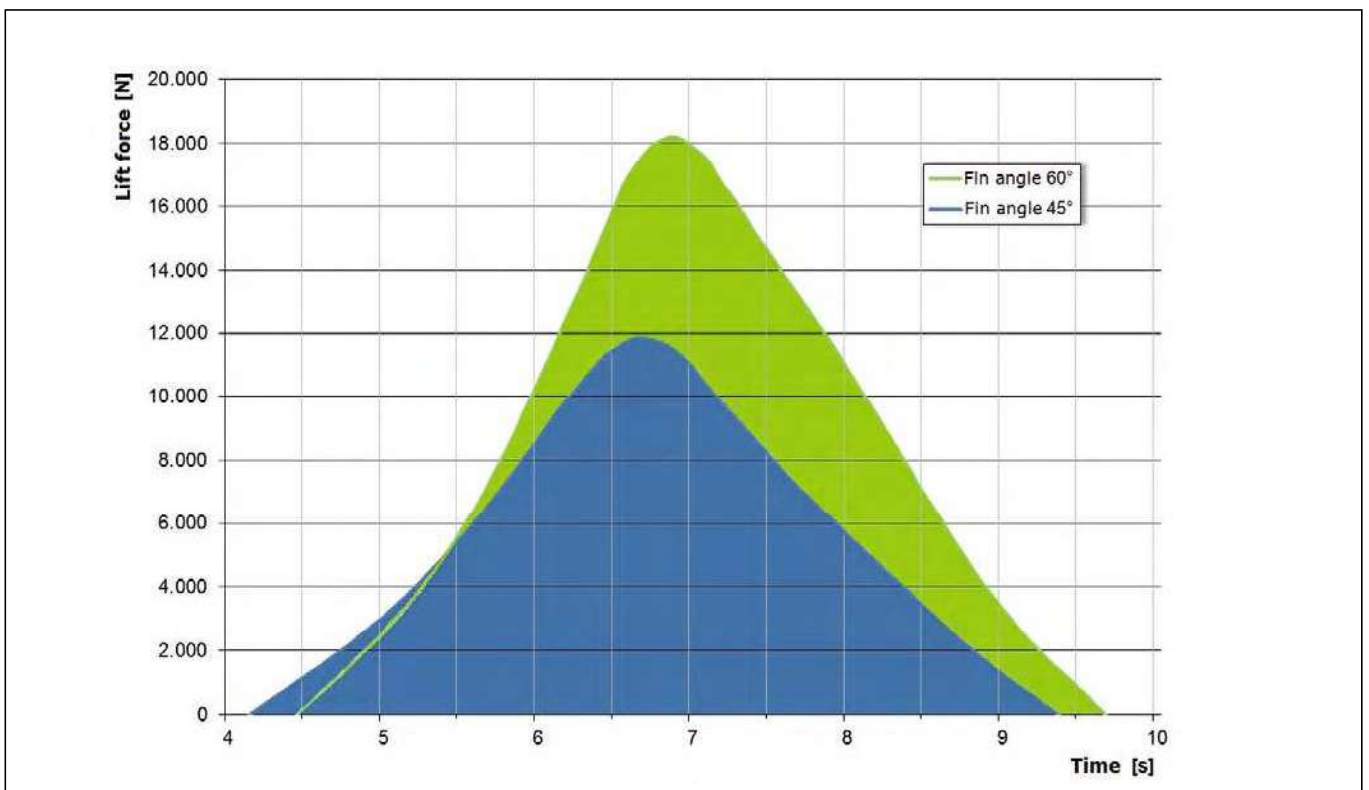
- Composite material fabricated fin available



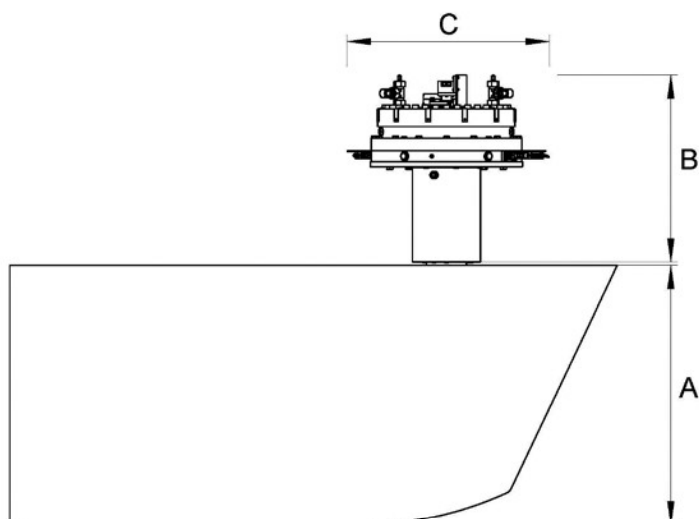
Non-retractable fin stabilizer with $\pm 60^\circ$ working angle



ZeroSpeed principle



Lift force gain for working angle of 60° compared with 45°



Dimensions/Type	FZ 100	FZ 200	FZ 300	FZ 400	FZ 500
Fin area up to [m²]	2,7	3,9	5,7	8,3	12,4
A [mm]	917–1 095	1 095–1 342	1 342–1 643	1 643–2 020	2 020–2 486
B [mm]	900	1 000	1 150	1 300	1 550
C [mm]	800	1 050	1 250	1 450	1 600

Fin outreach = A + 40 mm

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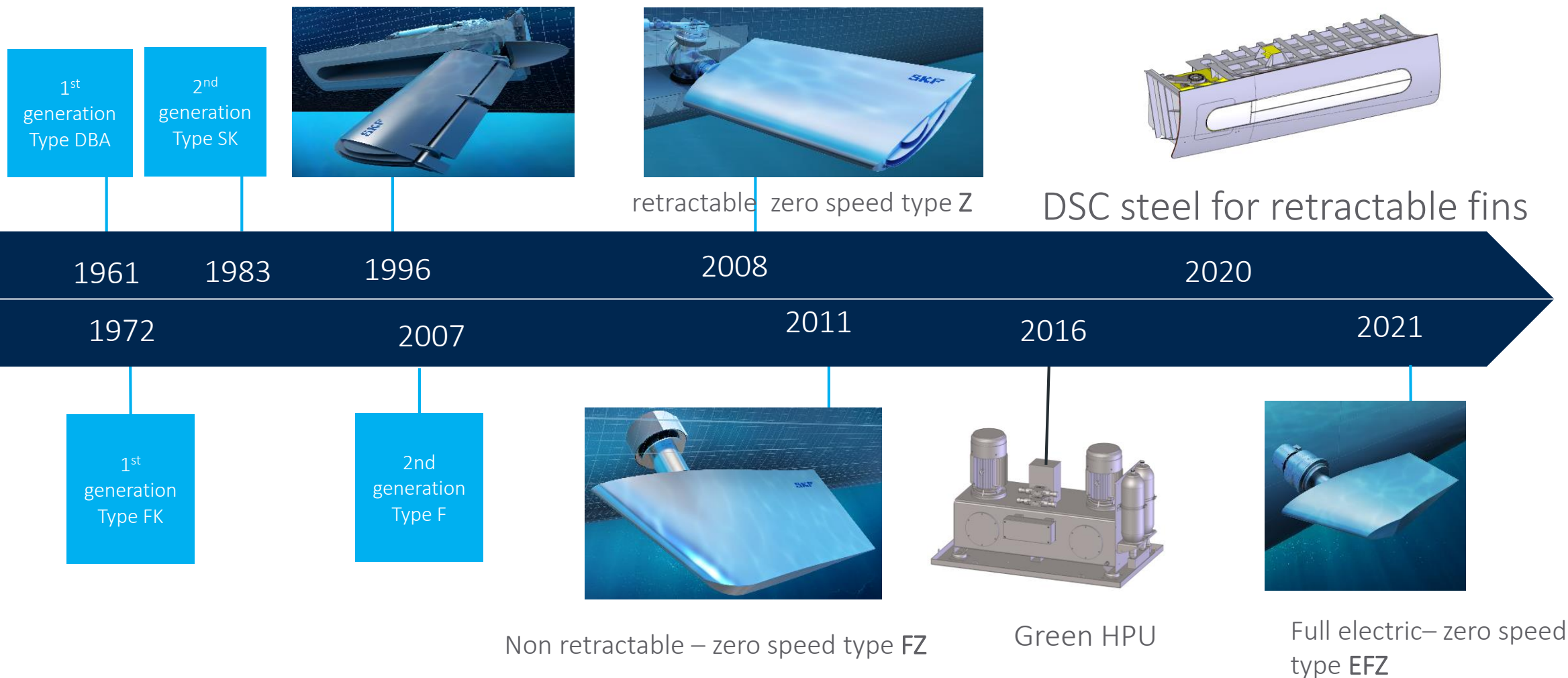
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Full Electric Fin stabilizer type „EFZ“



A part of our DNA: stabilizing the maritime business since 1961



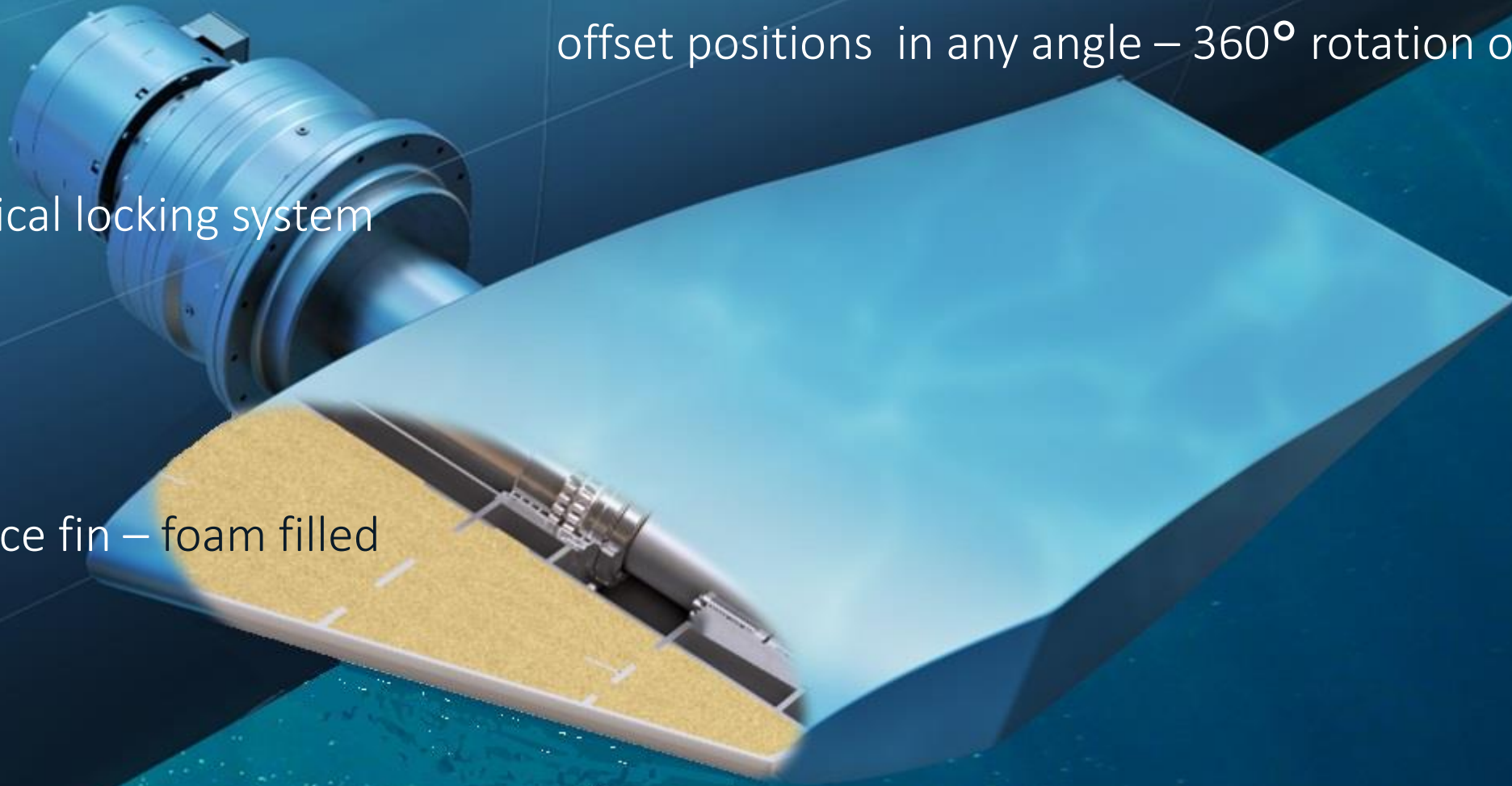
EFZ key facts

offset positions in any angle – 360° rotation of fin

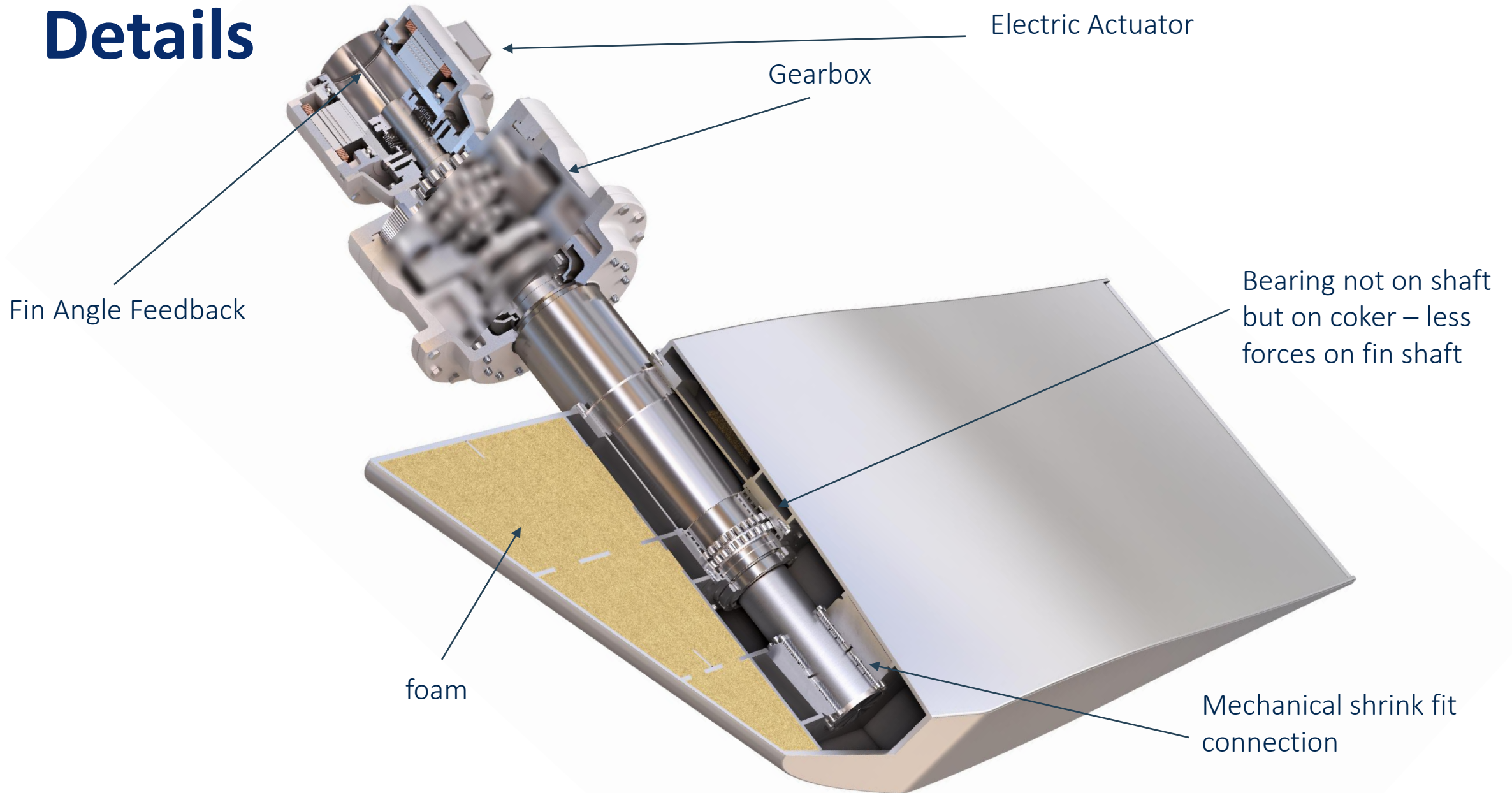
Mechanical locking system

Single piece fin – foam filled

High efficiency fin shape - Fin sizes from 4,5 until 10 sqm

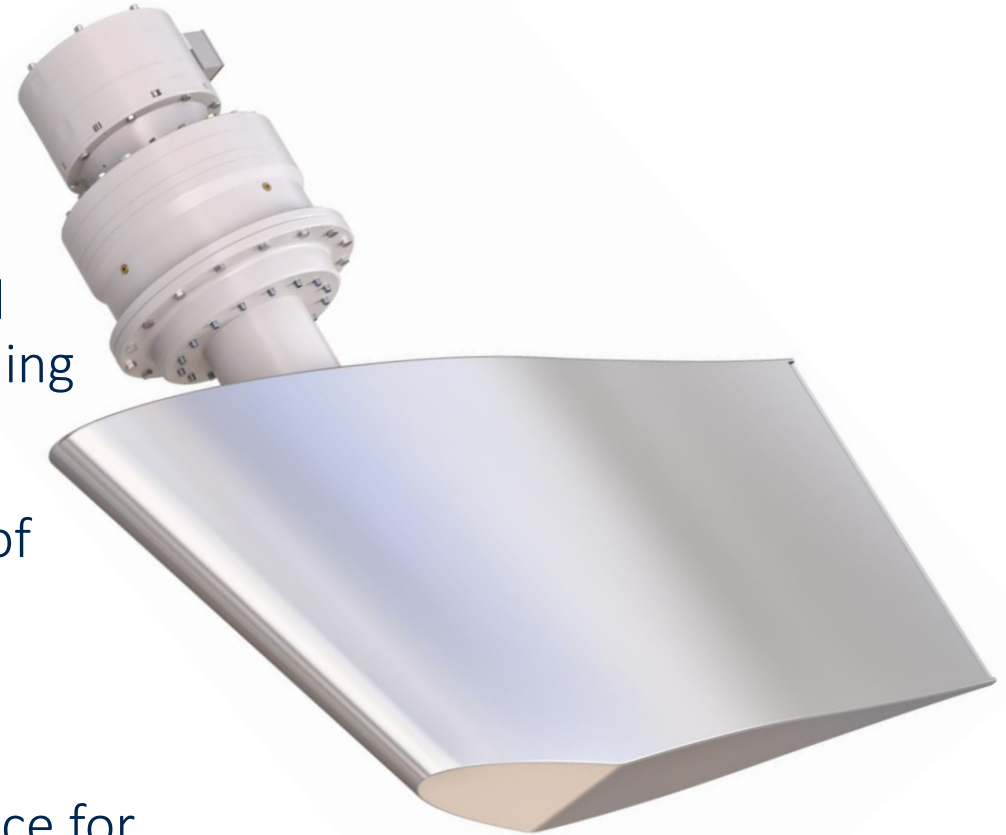


Details



Benefits

- **Silent operation:** Low vibration and reduced noise for an even more peaceful voyage
- **Efficiency:** No energy conversion needed from electric to hydraulic
- **Reversing of fins:** Can be turned 180° - unrestricted speed astern – no ahead movement of vessel at anchor – heading support (follow the sunset)
- **Recuperation:** Less power consumption due to buffering of energy by high-tech recuperation system
- **Low maintenance:** Due to few moving parts
- **Flexible arrangement:** Compact design, creating more space for equipment



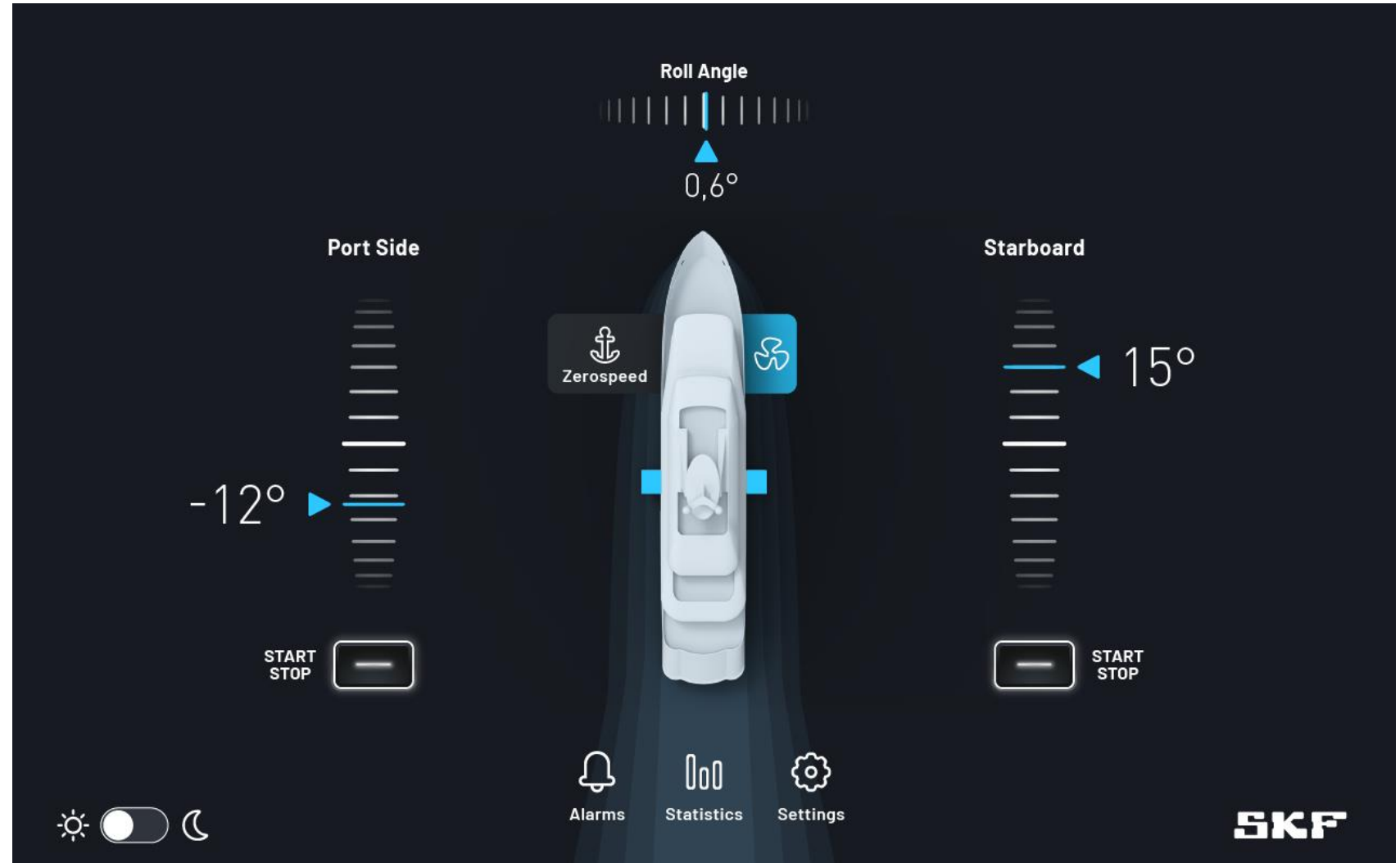
Switchboard

- Integrated air conditioning
- Alternatively connection to vessels A/C
- Switchboard design by SKF
- Switchboard integration and installation into vessel by shipyard
- Set up, commissioning by SKF specialists
- Integrated recuperation system
- Connection to vessels' system:
 - electric power
 - Cooling water (20°C)



Graphical User Interface

- State of the art user interface
- Night panel
- Maintenance overview page
- Remote access capability
- Integrated interactive troubleshooting



Comparism to SKF hydraulic system

	eFZ400	FZ400
Dimensions (mm)		
Actuator: Diameter x Height	900 x 1100	1000 x 600
FCC: Length x Width x Height	approx. 3200 x 500 x 2000	2 x 1000 x 300 x 1400
HPU (+oil pan) Length x Width x Height	-	2 x 2200 x 1200 x 1700
Weight (kg) Compared for electrical and hydr. Systems. Remaining weights (e.g. fin, shaft, trunk etc.) is not mentioned, as weights nearly the same for both systems		
Actuator:	approx. 2 x 2000	approx. 2 x 1250
FCC:	approx. 1200	approx. 2 x 150
HPU:	-	2 x 2200
In total (2 fin setup)	approx. 5200	approx. 7200
Electrical load:	Will be under the consumption of a comparable FZ stabilizer due to the better system efficiency	Depending on vessels parameters

Yacht Portfolio

SKF®

Vibration measurement, and
Automatic lubrication solutions

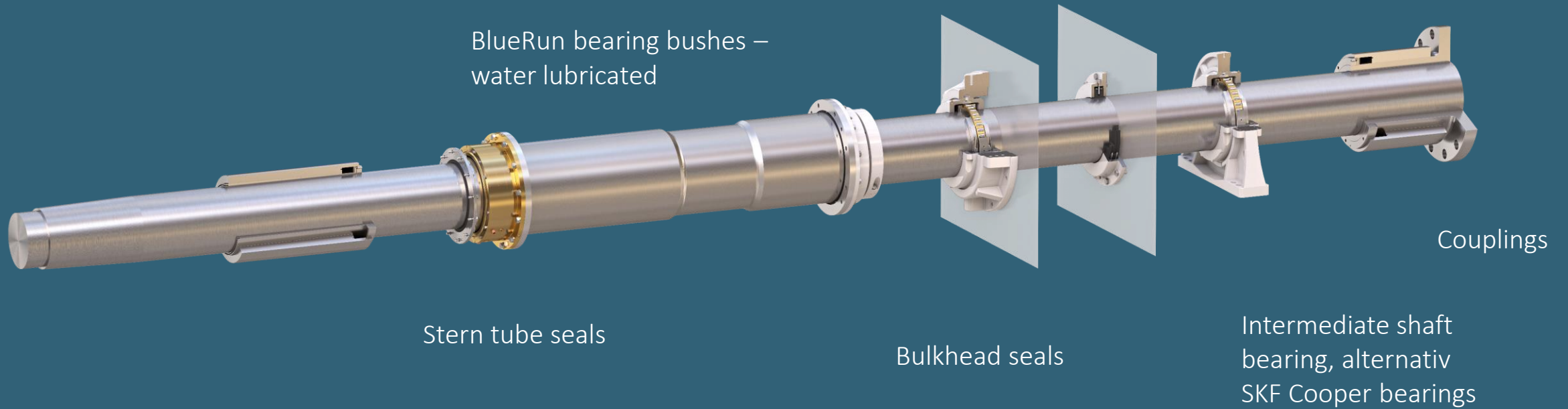


Fin stabilizers

Rotary vane and piston
type steering gear

Bilge water separators
and ballast water
treatment

Yacht Portfolio



SKF®