



# Vector Fins™

AWARD WINNING STABILIZERS



YACHTS

SUPERYACHTS

COMMERCIAL VESSELS

2019



**Nautilus Marine Services**

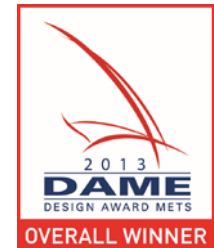
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# Award winning innovation



*"The elegantly curved fin better suits many of the modern hull forms to which stabilizers are becoming a standard fit!"*

- Dame Award jury validation -





*"It's quite a beautiful piece of engineering that will sit under the water and most people won't see!"*

- Bill Dixon -  
Jury Chairman, Dame Awards 2013

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# What do stabilizers do?

Stabilizer systems have been around for a long time, but are typically only used on larger passenger ships and super yachts. The dramatically increased comfort and usability of any boat, have made owners of also smaller leisure vessels wish for this.

When installing a high performing stabilization system onboard, you benefit from:

## Increased comfort on board

- More use of the boat as you can go out in more weather conditions.
- People that easily get seasick can now enjoy boating.
- Less wear and tear of the boat as you do not have to always head into or away from larger waves to avoid the uncomfortable rolling motion.

## Increased safety on board

- Reduced risk of accidents caused by unexpected boat roll.
- Increased crew awareness by less fatigue and discomfort.

## Less overall fuel consumption

While adding fins (or other stabilizer types), most systems will increase the fuel consumption a little at the same speed, fins by direct drag in the water, and gyros by adding weight. However, our claim is that the overall fuel consumption will be reduced because with stabilizers, you can take the direct route to where you wish to go, even in rough conditions. You can also choose a more fuel efficient speed, with the waves from the side, while still being comfortable (modern cruisers have less roll at higher speeds, thereby people often drive them hard to avoid the rolling). This is a generic statement for all fin stabilizer systems, with Vector Fins™, this improves even further, as described later for the added benefits of Vector Fins™.


## Increased second hand boat value

Surely, the boat will be a lot more attractive on the used boat market, boasting a system that allows people who might be prone to seasickness to reconsider their ability to enjoy the sea, and thereby adding a whole new range of potential buyers.



*"Stabilizers have one main purpose,  
to dramatically increase the comfort onboard"*





# The ultimate difference in onboard comfort!

As can be seen from numerous medical studies, different people have different levels of resistance to motion sickness which is the medical term for seasickness.

A boat has 6 degrees of freedom of movement, these being the 3 directions of linear movements and 3 directions of rotations. While all of these will have an effect on a person's senses, and all are to a degree influenced by waves, the most impact is typically from roll and it is also only roll that we can practically change a lot within reasonable forces which is why it is roll that boat stabilizers focus on reducing. What is also seen from medical studies is that the incident ratio of people getting motion sickness is also dependent on the frequency of the motions and of course, how violent the motions are.

An interesting fact is that frequencies that have the highest incident rate are between 0.1 and 0.4 Hz. This corresponds with roll periods between 2.5 and 10 seconds, that just happens to be the natural roll periods of nearly all leisure craft above 40'/12M. The worst range is between 0.15 and 0.3 Hz, where over 25% of all people are adversely affected by even quite small motions. This means that nearly all

extended families will have members that will not enjoy boating as much as they could.

What is also important to understand is that while the achieved roll reduction from a stabilization system is measured in how much the boat's roll angles are reduced, the practical effect is actually a lot higher for the people on board. This is because what our bodies feel, is not actually the motion, our bodies only sense the acceleration. Thereby, if you reduce the average roll angles by only 50%, you reduce the roll acceleration by about 75% (depending also on roll periods), reducing what causes seasickness and uncomfortable feelings by this percentage.

The typical sizing recommendations of Side-Power stabilizers ensure that even in rough conditions you will have roll angle reductions well over 50% "At Anchor", usually as much as 70% in conditions that you typically anchor in. This means that the chance of people becoming seasick on board is reduced by as much as 80 - 95%.

*"It is like riding on a  
Magic Carpet..."*

**John Maxey**, Fairline 78 owner

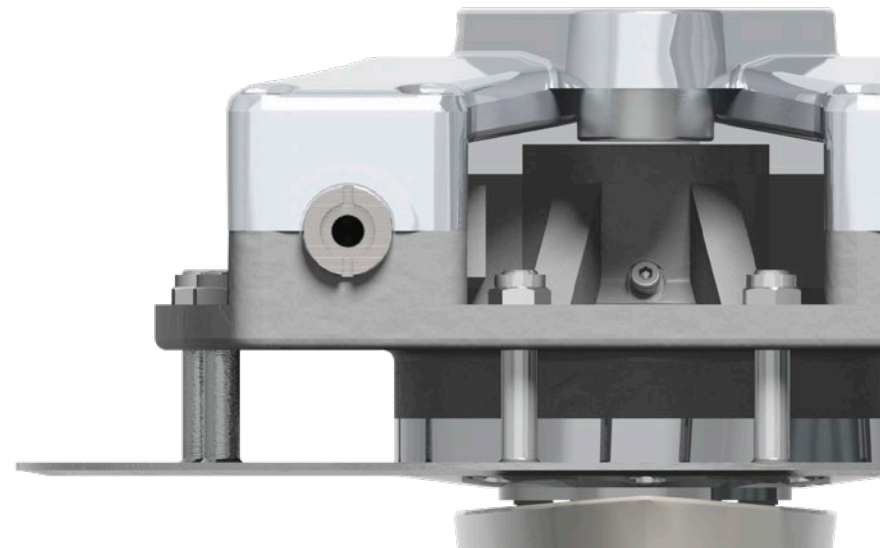
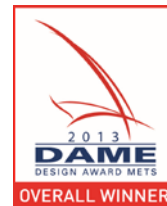


## Introducing a **revolutionary generation** of fin stabilizers

**Fin stabilizers is the only system that effectively handles both cruising and “at anchor” use, with the “at anchor” stabilization force deciding the size of the fins.**

Traditionally, larger fins provide more stabilization force, but also create more drag which equals higher fuel consumption, especially at higher speeds. This is an important point for most boat owners. Larger fins also means that the internal components grow in size, making it difficult to install them in an optimal position which in turn can result in the stabilizers having more negative side-effects like causing yaw (steering effects) and sway (side-way movements). Thereby, the overall situation often results in a compromise in fin size, so that most fast boats today do NOT have as much stabilization as most boat owners really want.

That is, until now!





## Vector Fins™ - a simple solution to a complex problem!

The Vector Fin™ stabilizers dramatically improve the roll reduction efficiency while at the same time reducing undesired yaw and sway motions caused by active fins.

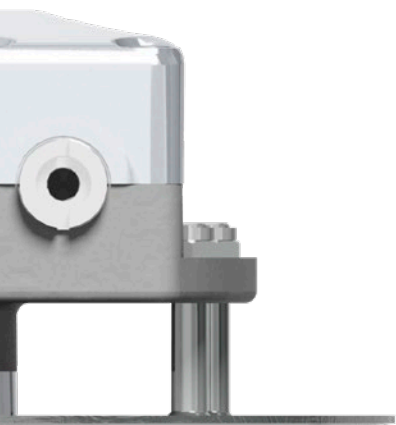
The huge benefits both in efficiency and reduced side-effects is beneficial for all boat types. This is particularly important for today's modern, fast cruisers where traditional flat fin stabilizers have typically not been able to satisfy the desired roll reduction without causing too many side effects.

The low weight and speed-efficient hull design cause short natural roll periods as well as it being easier to feel negative motions like sway and yaw in a lighter vessel.

Also, these hull designs follow the waves more rigidly and thereby require more stabilization force to be applied faster due to the shorter roll periods. So to avoid negative sensations for the guests, it is important to apply forces in the right direction.

This finally enables the use of fin stabilizers, getting all the benefits of a stabilization system that works well at "AnySpeed" also on smaller, lighter and faster vessels than what have traditionally chosen fin stabilizers.

**Up to 55% less side-effects than conventional stabilizer systems!**



Up to  
30% more efficient



# Underway

Unlike Gyro stabilizers that always have the same maximum total force they can apply to reduce roll, independent of boat speed or roll periods, fin stabilizers increase their stabilization force by both speed and roll period when "cruising".

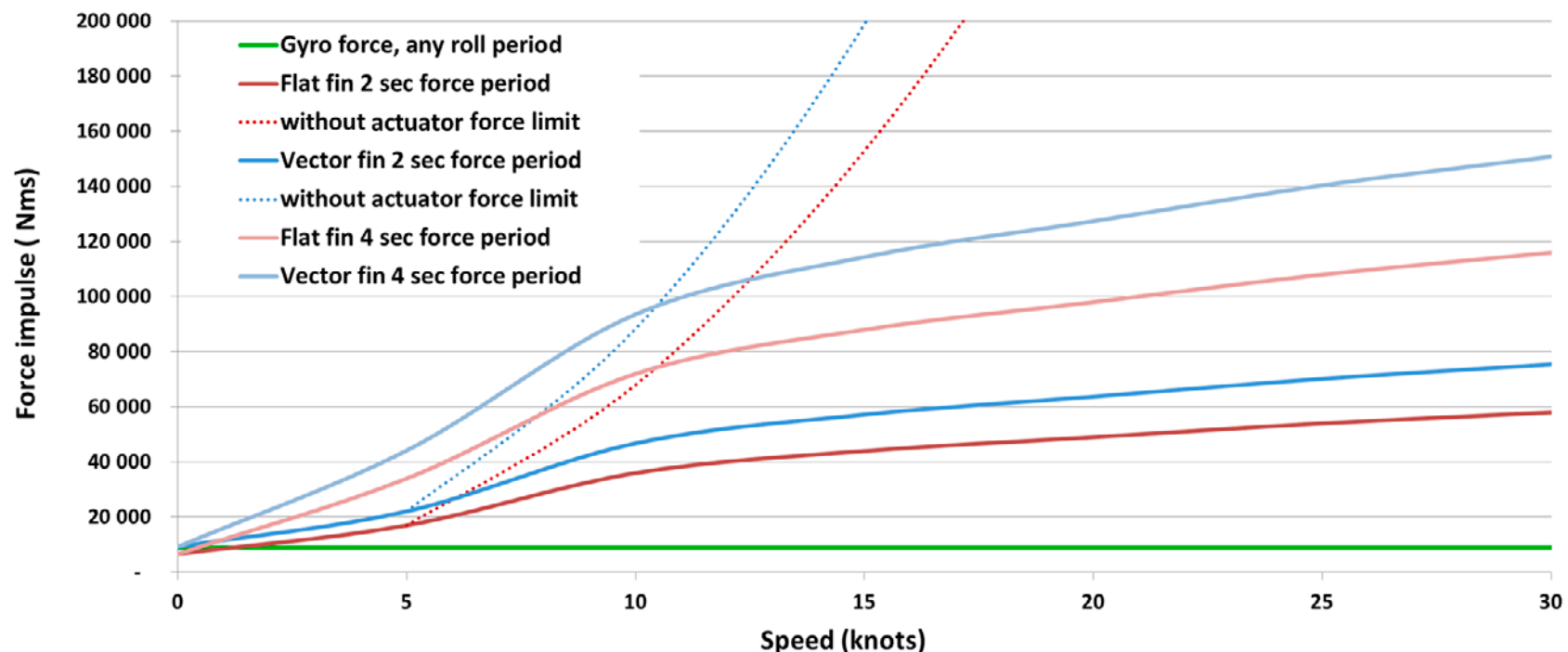
Fin stabilizers increase the possible force they can apply by the physical law of all forces where speed is a factor, by speed<sup>2</sup>, meaning a dramatic increase. Typically fin stabilizers do not totally utilize this potential because the forces become huge at higher speeds, so they are naturally limited by the force the actuator can apply to turn the fin to higher angles.

Fin stabilizers will also be able to apply a more total force to counter roll in a long roll period than in a short period. This is because it is the total force impulse over time that is important, and with the counter roll force being

caused by the fin acting in an angle on the passing water, it can continue for an unlimited period.

The force impulse is named "Nms" - Newton \* meter \* second, so with the time factor being principally unlimited, so is the force impulse. This is a huge benefit because bigger waves are typically longer, so this is not just theory. While underway, Vector Fins™ typically improve the roll reduction efficiency by about 30% compared to standard flat fins of the same size.

Due to the Vector Fins™ unmatched efficiency, the Side-Power system is therefore capable of reducing uncomfortable rolling motion of the boat up to 95% while cruising even in quite large waves, keeping you and your guests both comfortable and safe on board.



Up to  
50% more efficient



# At Anchor

Up to 50% more efficient than flat fin stabilizer systems

As most boat owners spend more time at anchor or on the dock rather than underway, it is critical that the stabilization system performs well at any speed, including no speed.

A stabilized boat offers a significant increase in onboard well-being. Moving around, getting the tender out, serving dinner or just getting in and out of the water for swimming becomes a lot easier and safer from a stabilized boat.

A good Any Speed stabilization system allows for comfortable use of your boat when you otherwise would, or at least should, have stayed in port.

Spend those amazing nights at anchor under the stars in a bay - instead of a busy harbor!




# Virtually no loss of speed

The Vector Fins™ generally create as much lift as they add drag  
- resulting in virtually no loss of speed and thereby no added fuel cost



# Verified stabilization test results:

Princess 56 with 0,6m<sup>2</sup> Vector Fins™

	No stabilizer	 Vector Fins™	Reduction of Roll	Reduction of Seasickness
<b>Cruising at 11 knots:</b>				
Max roll movement	10.4°	0.3°	97%	99.8%
Average roll movement	5.7°	0.15°	97%	99.9%
<b>At anchor:</b>				
Max roll angle	9.4°	2.6°	72%	92%
Average roll angle	4.1°	1.4°	66%	88%

# Side-Power stabilizer benefits

- Unlike Gyros, efficiency increases with speed
- Minimal to no increase in fuel consumption
- Minimal to no loss of speed
- Silent all night operation
- Minimal internal space requirement
- Also suitable for retrofit

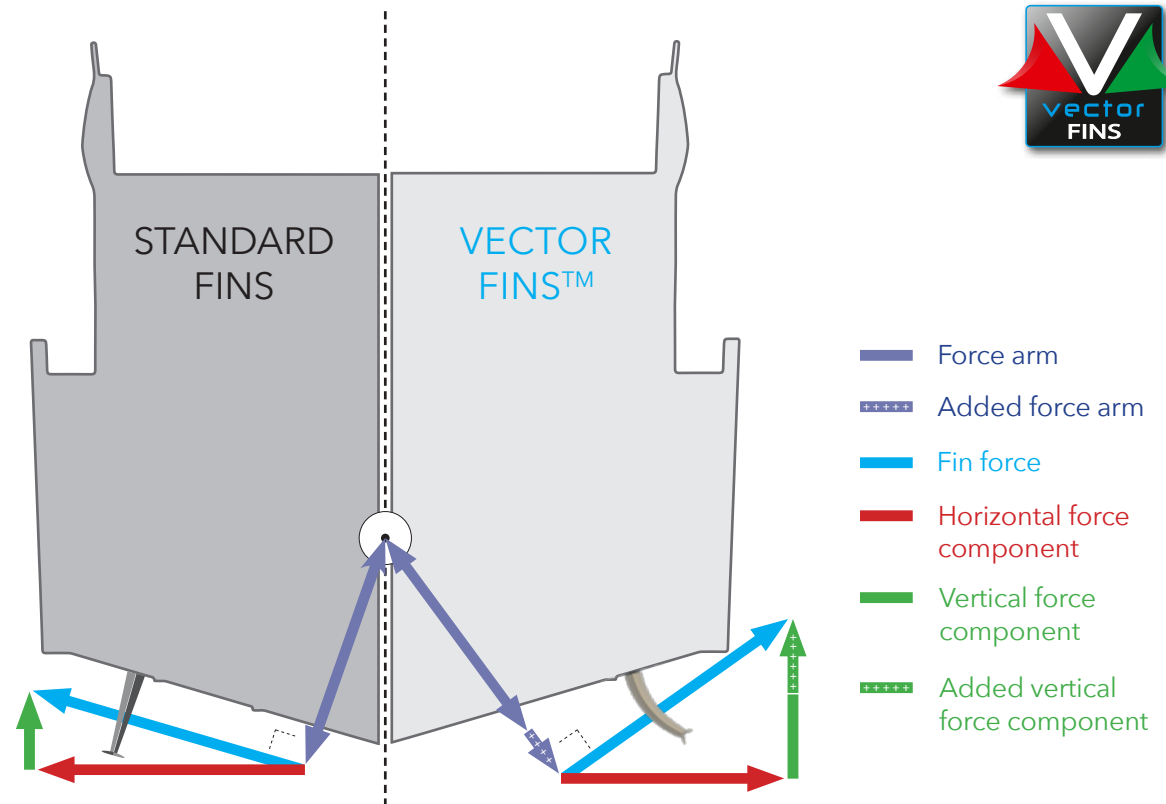


# Why are the Vector Fins™ so much better?

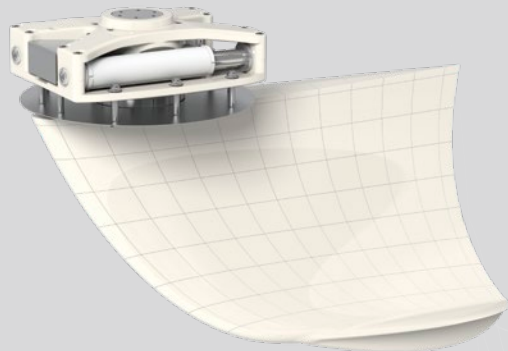
Vector Fins™ simply re-direct the force direction/ force vectors so that more of the force will benefit roll reduction and less force is wasted on the negative side-effects of yaw and sway that is unfavorable for a boat's handling and comfort on board.

The vertical concave shape of the fin creates a net force direction, both in cruising and in "At Anchor" situations, so the work is more "up/down" instead of side to side or almost horizontal, as flat fins work with forces parallel to the hull angle.

But there is more. By changing the net force angle, this also increases the leverage arm around the boat's rolling point, further increasing the physical forces that work on the boat to reduce roll. This provides a lot more roll stabilization per fin size, which means that drag, power consumption, internal space occupation as well as load on the mechanical parts is a lot less than with other fins that can give a similar roll reduction.



## Vector Fins™ features:



- Up to 50% more efficient than flat fins
- Up to 55% less side effects than flat fins
- Advanced hydrodynamic fin design
- 20% - 50% less resistance than other fins, results in virtually no loss of speed and thereby no added fuel consumption
- All fins are prepared for high efficiency in "Any Speed" - 2:1 size ratio, also "At Anchor"
- The fins are made as a "one shot" vacuum injected vinylester process over pre-shaped core material in a closed mold method.

Designed with roving and mat layers to ensure maximum strength and minimum weight. It can even withstand small damages without totally disintegrating afterwards as traditional production methods often allow.

Up to  
**55%**  
less side  
effects

Up to  
**50%**  
more  
efficient

# Floating lab

58 ft test vessel with a top speed of 37 knots,  
fully loaded with advanced sensors and logging  
facilities for data collection and analysis



# Research & Development

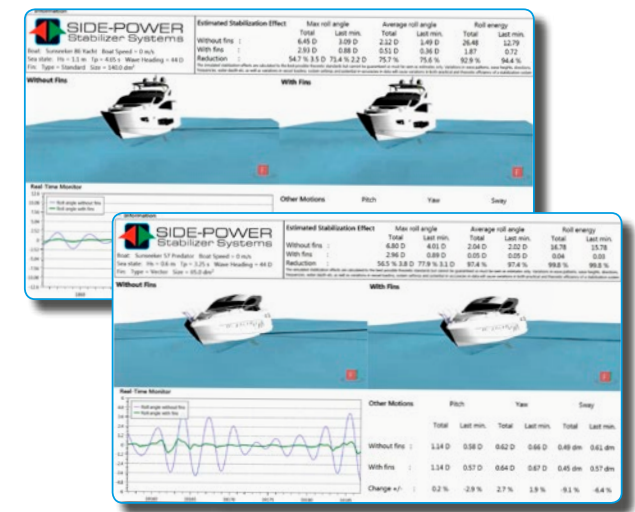
In our focus to develop the best products for the marine market, we continuously invest to make all our products even better. We continually develop systems designed to integrate with existing and future technology. Many of the products we develop are designed for the large Yacht and commercial industry however have perfect applications on all kinds of vessels.

To ensure the best possible quality in product development, we have built a dedicated 58 ft test vessel with a top speed of 37 knots. The boat functions as a floating lab, fully loaded with advanced sensors

and logging facilities for data collection and analysis.

During thousands of test hours, we have taken the time to learn about existing solutions and products to have the best possible background to design an even better product and to continuously improve our existing products.

Our original 3D based advanced simulation program, allows us to put 3D models of a vessel through a digital test under different sea conditions, providing vital data for choosing the best stabilization system.



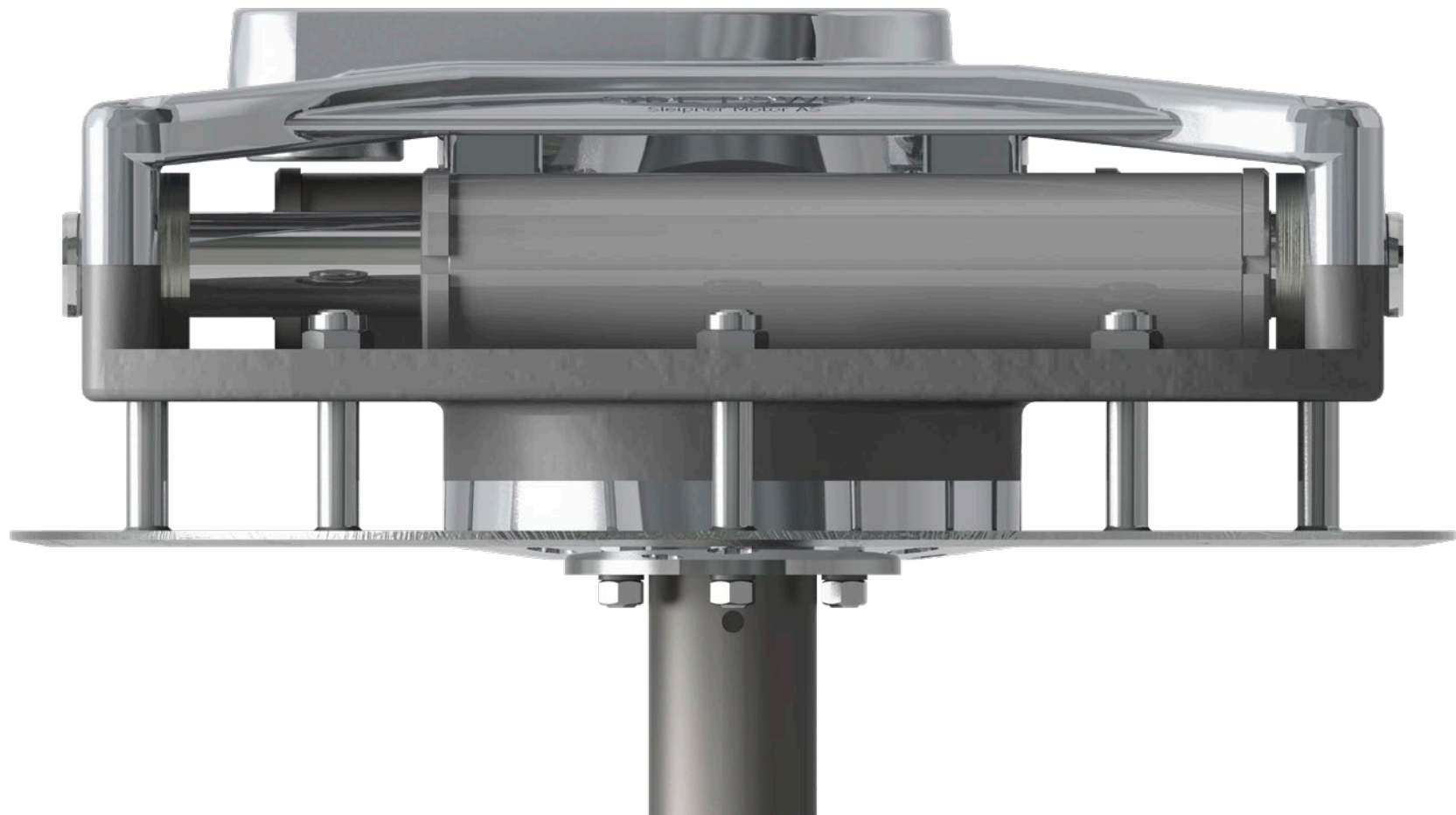
## Controller intelligence



- Continuous development of the best control software possible, cooperating with leading companies in control technologies.
- Color touch panel for ease of use and control.
- Self adjusting – advanced algorithms – also “Any/No Speed” functions for stabilization at anchor.
- Easy upgrade of software ensures future compatibility and improvements.
- Reverse gear position input, but also other sensors to safeguard that fins are centered and locked immediately if the boat is starting to move backwards.
- GPS speed input (no shaft sensor) helps control algorithms do the best possible job.
- S-link integrates common intelligence with thruster systems and main hydraulics.



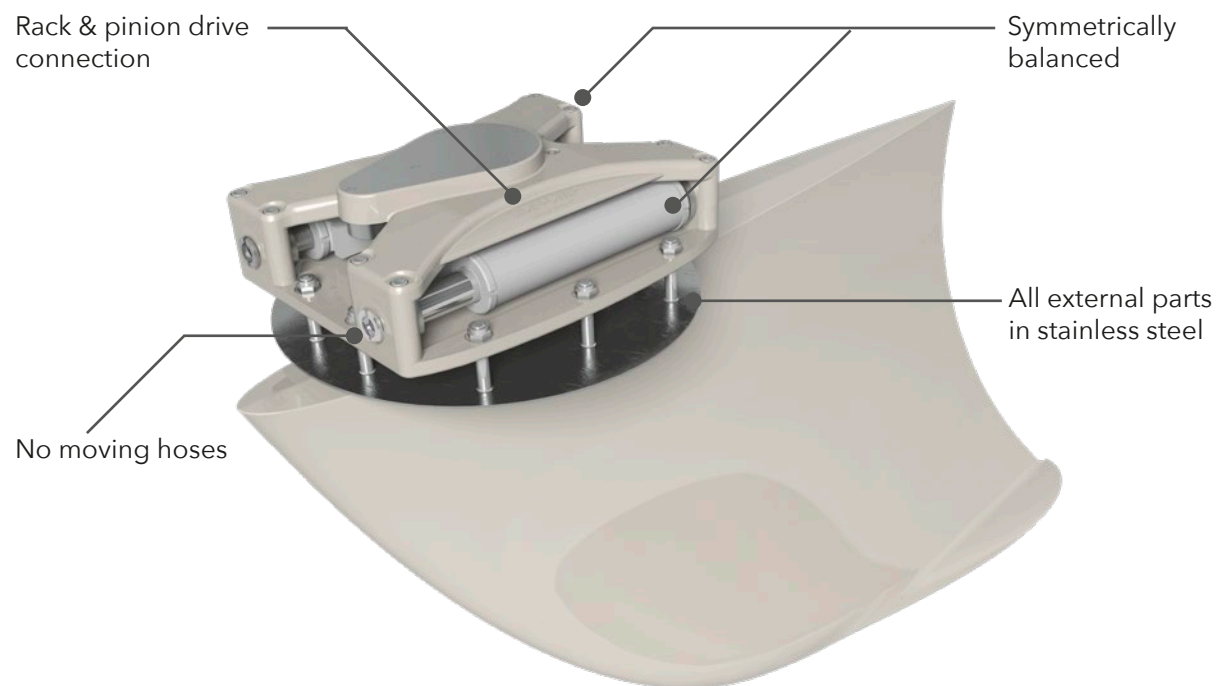
The most compact  
fin stabilizer actuator ever!



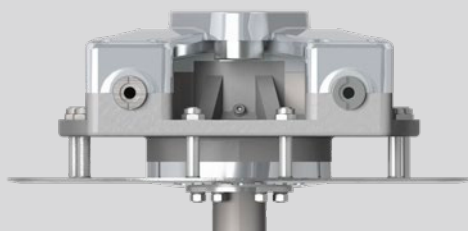
# Actuator SPS55B

The new SPS55B actuators for the **Vector Fins™** are incredibly compact and silent, designed to fit in the small available spaces in modern boats below 20m/70ft where living space is strongly prioritized.

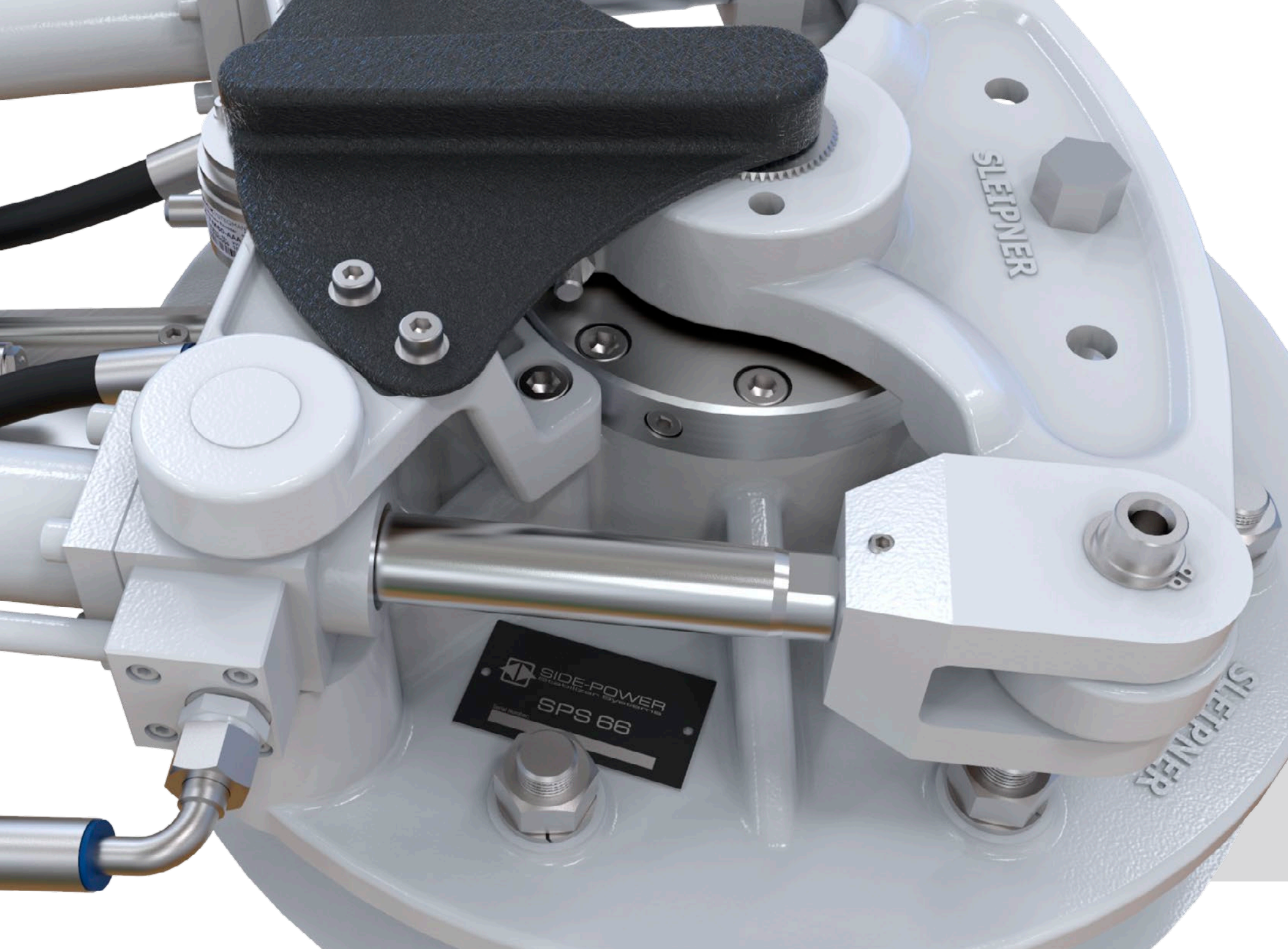
The SPS55B actuators have been designed to satisfy the needs of owner operated vessels with a total focus on reliability and hassle free operation, as well as ensuring a quiet operation as they will most likely be installed below the floor in living spaces.



## Construction benefits:



- Squared base plate provides large load distribution area to hull while still being able to install in tight areas between stringers and bulkheads.
- Dual, balanced cylinders provide symmetrical load and force.
- The actuator can be installed in any direction in the boat, the fin angle is totally independent of actuator direction.
- No moving hoses at all secures against leakages and potential wear, as well as making the installation easier.
- Oversized bearings for lifetime operation with only a minimal level of maintenance.
- Rack & pinion drive connection for quiet, reliable, long life operation, with very easy service when needed after thousands of operational hours.
- Fins are installed and removed very easily and quickly from the outside for best convenience in for example transport or other haul-out situations where this might be needed.
- Defined shaft-shear point in case of the fins accidentally hitting something.
- All exterior parts are in stainless steel.



SLEIPNER

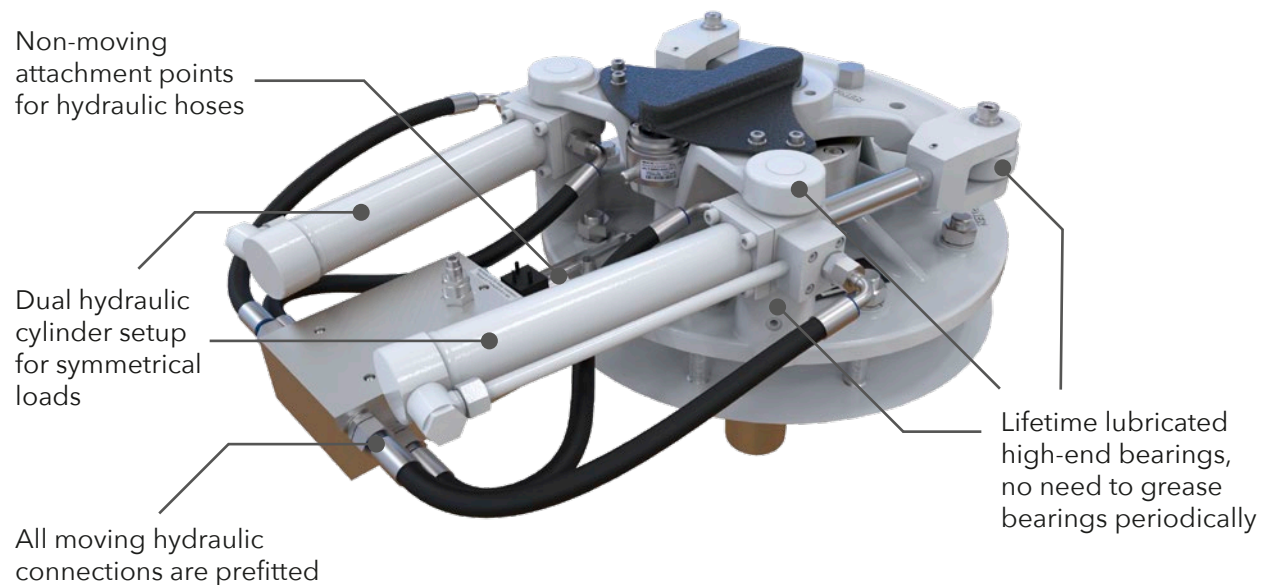
SIDE-POWER  
SPS 66

SLEIPNER

## Actuator SPS66B / 67B / 92B / 93B / 94B / 96B / 97B

The height inside the boat is often the key measurement to allow for installation in modern boats. The Side-Power actuators are typically 25% to 75% lower than others.

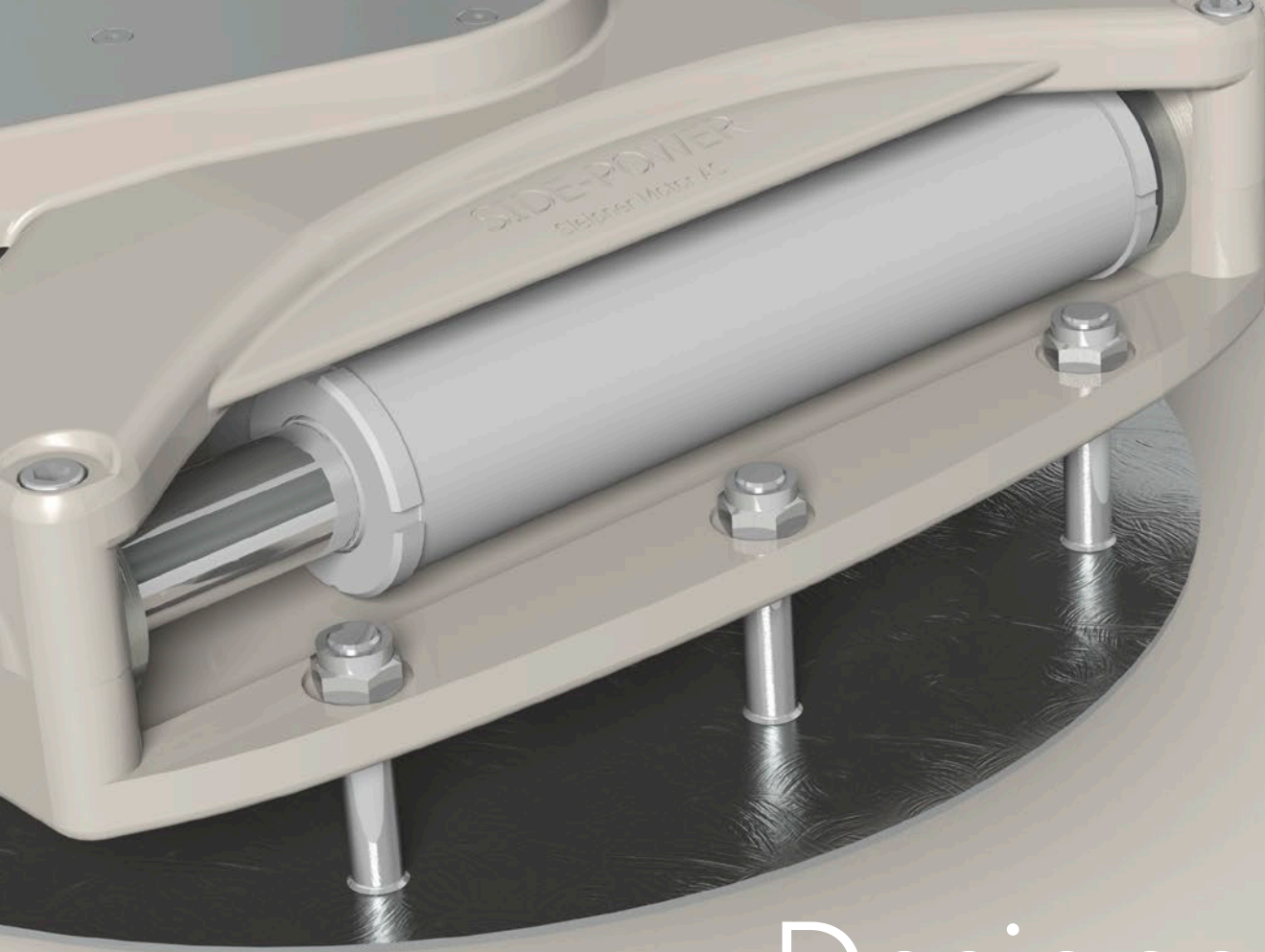
The Side-Power actuators for the **Vector Fins™** are constructed for easy installation and minimal noise reproduction.



### Construction benefits:

- Precision machining and assembly ensures a long lifetime and durability.
- No additional center lock, this is automatic in the standard hydraulic system - very safe due to the hydraulics having extreme safety limits.
- Dual cylinders provide
  - balanced load unlike single cylinder solutions.
  - less bearing load, thereby allowing for a more compact shaft bearing assembly.
- Purpose-designed dual shaft sealing - superior to standard Simmer Ring lip seals.
- Internal hydraulic connections on actuators are pre-fitted from factory, the installer only connects non-moving hoses/ pipes - Easier and safer.
- No complex adjustments required to set up controller with lots of factors, these are set automatically on first start-up of the boat.
- Most stabilizer systems require you to periodically service their bearings, meaning either a part change, lubrication and/or mechanical adjustments. Side-Power's latest generation of bearings do not need any of that, saving time and money for the owner with lifetime lubricated high-end bearings as standard, meaning one less service point on your vessel.
- Fins are installed and removed very easily and quickly from the outside for best convenience in transport or other haul-out situations where this might be needed.
- Defined shaft-shear point in case of the fins accidentally hitting something.
- All exterior parts are in stainless steel.

# Silent and reliable construction

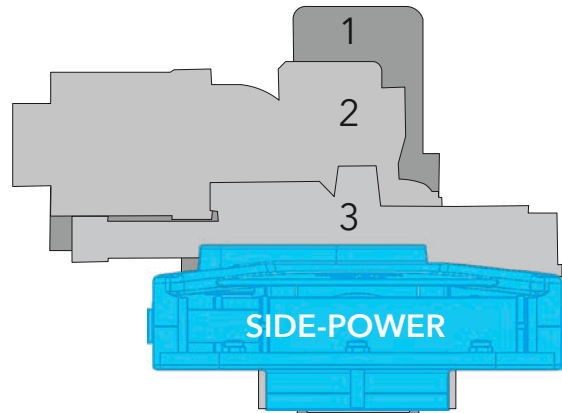


Designed to operate  
extremely quietly

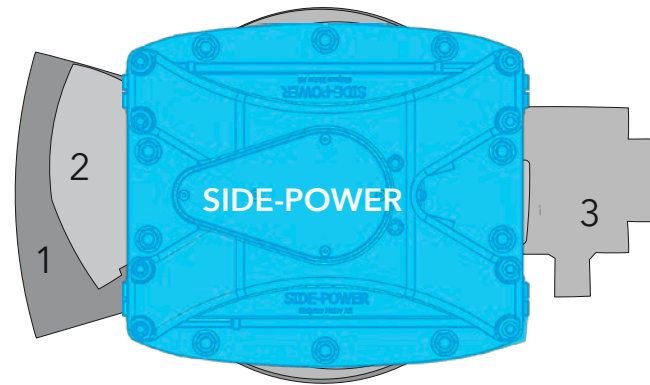
# Side-Power Actuators

- fit where others won't!

SPS55B



Side view



Top view

SPS66B

67B

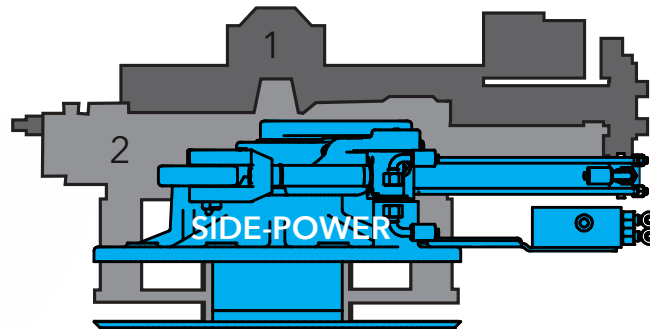
92B

93B

94B

96B

97B



Size of Side-Power actuators compared to other brand actuators (1, 2, 3) for similar fin sizes.

# Measurements Vector Fins™



Actuator:  
Vector Fin:

SPS55B  
VF650

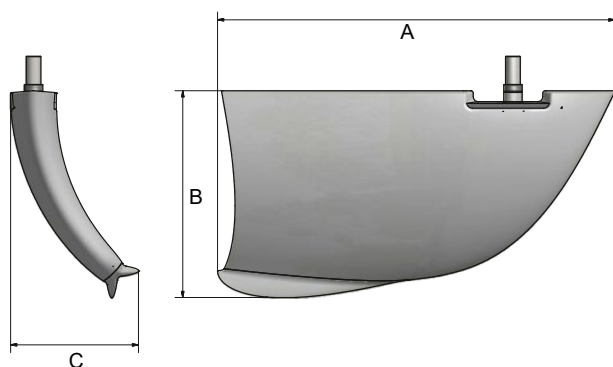
SPS55B  
VF800

SPS66B / SPS67B  
VF1050

SPS92B  
VF1350

SPS93B / SPS94B  
VF1650

SPS96B / SPS97B  
VF1950

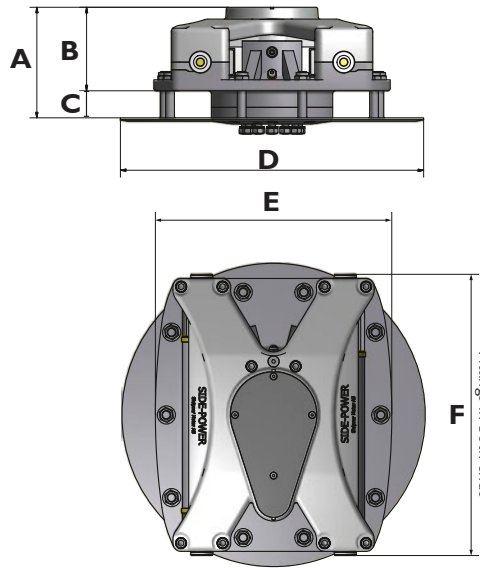


Vector Fin:	VF650	VF800	VF1050	VF1350	VF1650	VF1950
Size (m <sup>2</sup> • ft):	0.65 • 6.99	0.80 • 8.61	1.05 • 11.3	1.35 • 14.53	1.65 • 17.76	1.95 • 21.0
A (mm • in):	1272 • 50	1412 • 55.9	1618 • 63.7	1835 • 72.2	2079 • 81.9	2235 • 87.9
B (mm • in):	663 • 26.1	736 • 28.9	843 • 33.1	955 • 37.6	1054 • 41.5	1098 • 43.2
C (mm • in):	413 • 16.3	458 • 18	524 • 20.6	593 • 23.3	656 • 25.8	698 • 27.5

Fins have zero weight in water

US Patent US9527556 - Australian Patent 2013335369 - Patent pending PCT/NO2013/050067

# Measurements Actuators



**Actuator:** SPS55B

**A (mm • in):** 201 • 7.91

**B (mm • in):** 152 • 5.98

**C (mm • in):** 49 • 1.93

**D (mm • in):** 550 • 21.7

**E (mm • in):** 439 • 17.3

**F (mm • in):** 510 • 20.1

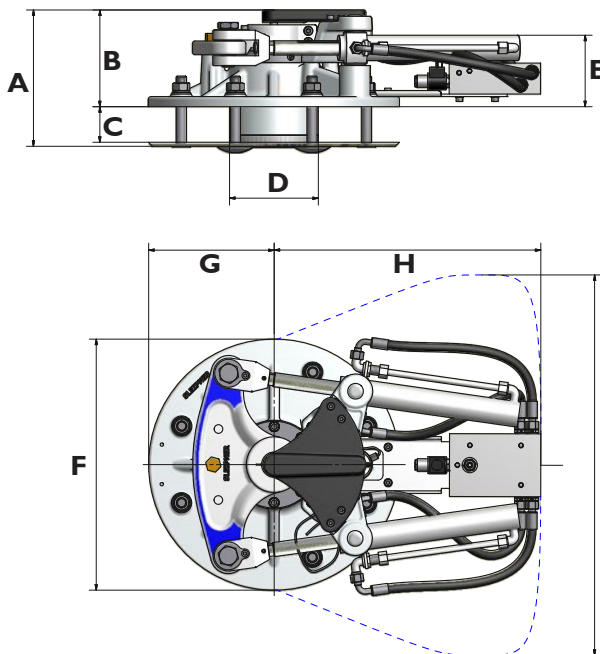
**Shaft Ø (mm • in):** 64 • 2.52

**Weight\* (kg • lbs):** 100 • 220

\*Complete actuator assembly, per side



Fin actuator assembly may be installed in any convenient radial 360° position in the hull.



**Actuator:** SPS66B SPS67B SPS92B SPS93B SPS94B SPS96B SPS97B

**A (mm • in):** 270 • 10.6 350 • 13.78 357 • 14.05 357 • 14.05 512 • 20.15 357 • 14.05 357 • 14.05

**B (mm • in):** 190 • 7.48 260 • 10.23 260 • 10.23 260 • 10.23

**C (mm • in):** 70 • 2.76 159 • 6.25 90 • 3.54 90 • 3.54 237 • 9.33 90 • 3.54 237 • 9.33

**D (mm • in):** 175 • 6.89 235 • 9.25 235 • 9.25 235 • 9.25

**E (mm • in):** 146 • 5.75 171 • 6.73 171 • 6.73 171 • 6.73

**F (mm • in):** 495 • 19.5 600 • 23.6 600 • 23.6 600 • 23.6

**G (mm • in):** 248 • 9.76 300 • 11.8 300 • 11.8 300 • 11.8

**H (mm • in):** 526 • 20.7 571 • 22.5 571 • 22.5 571 • 22.5

**I (mm • in):** 650 • 25.6 700 • 27.6 700 • 27.6 700 • 27.6

**Shaft Ø (mm • in):** 65 • 2.56 90 • 3.54 90 • 3.54 90 • 3.54

**Weight\* (kg • lbs):** 105 • 231 114 • 251 180 • 397 183 • 403 190 • 419 183 • 403 190 • 419

\*Complete actuator assembly, per side

# Power pack for standalone installations

## Compact, quiet and easy to install

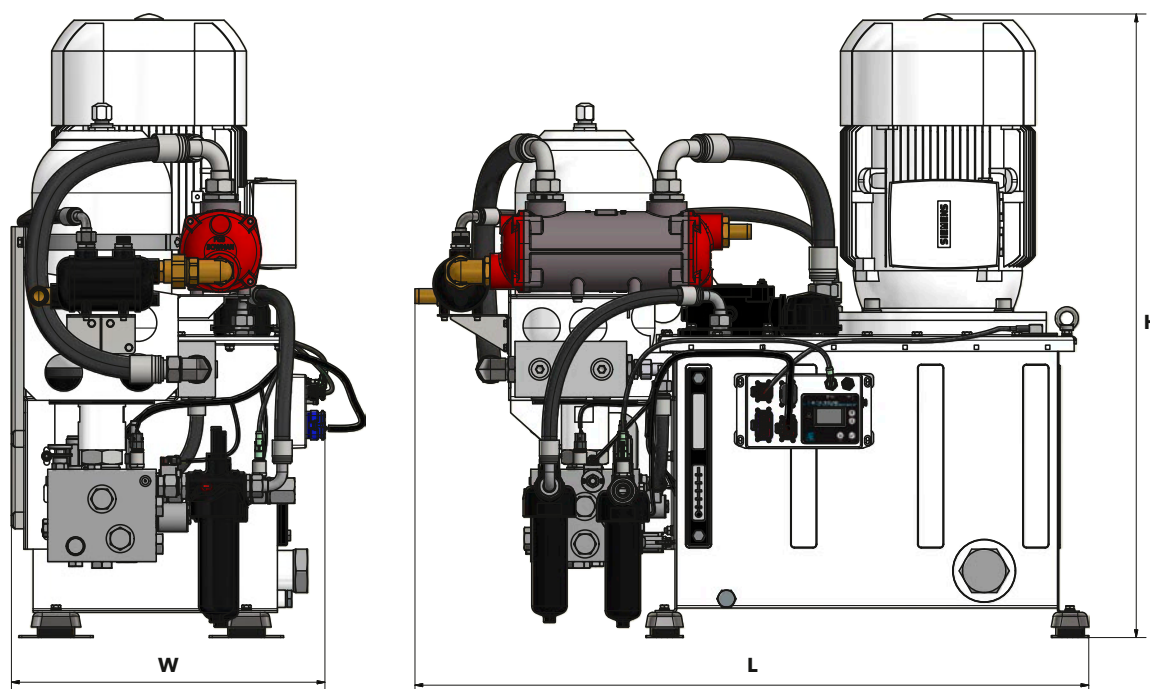
The compact power packs can run the stabilizer from the generator power at all times. An optional load sense pump can also be added to allow for stabilization while underway and with the generator shut down.

This pre-made system is used for installations where the vessel does not have a hydraulic thruster system. All of the hose and wire connections are pre-installed allowing for faster system install and startup in the field. Side-Power focused all of the connections on two sides of the tank allowing for the system to go in tight spaces. By separating electronic control boxes the systems can be installed in engine rooms and other technical spaces.

We also offer similar pre-connected and easy to install central hydraulic systems when other hydraulic consumers, typically thrusters, are required. These have a similar level of integration while of course being a bit larger due to the higher capacities required by thruster systems. When combined with a hydraulic thruster system, the stabilizers and thrusters talk to each other via our S-link CAN bus system, enabling automatic hydraulic power distribution to where it is needed at the time, and even stabilizer control from the inexpensive thruster control panels.



# Measurements Power pack



Power pack	10 4435B-W-01	10 4450B-W-01	10 4455B-W-01	10 4475B-W-xx-xx	10 44110B-W-xx-xx	10 44150B-W-xx-xx
Rated power (kw)	3.5	4.6	5.5	7.5	11	15
Weight (kg • lbs)	111 • 245	116 • 256	135 • 298	N/A	300 • 661	312 • 687
L (mm • in)	726 • 28.6	726 • 28.6	780 • 30.7	1087 • 42.8	1087 • 42.8	1087 • 42.8
W (mm • in)	432 • 17	432 • 17	465 • 18.3	506 • 19.9	506 • 19.9	506 • 19.9
H (mm • in)	762 • 30	756 • 29.8	790 • 31.1	1006 • 39.6	1006 • 39.6	1006 • 39.6
Generator load (kVA)*	4.6	6	7	9.8	13	18
For fin size (short roll period)	VF650 (SPS55)	VF800 (SPS55B)	-	VF1050 (SPS66B)	VF1350 (SPS93B)	VF1650 (SPS93B)
For fin size (long roll period)	VF650 (SPS55)	VF800 (SPS55B)	VF1050 (SPS66B)	VF1350 (SPS93B)	VF1350 (SPS93B)	VF1650 (SPS93B)

\* Single phase supply will increase current with factor 1.73 and will require more margins on generator capacity.

\* ECO mode available in new 2018 control system for reduced generator load.

# The Permanent Seasickness Cure







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# Worldwide sales and service



All Side-Power products  
fulfill the requirements of  
the relevant CE-directives.

Sleipner Motor AS constantly seeks ways of improving specifications, design and production. Thus alterations take place continuously. Whilst every effort is made to produce up-to-date literature, this brochure should not be regarded as a definitive guide to current specifications, nor does it constitute an offer for the sale of any particular product. All images used are for illustrative purposes. Alterations to actual product may occur.