

CARIBONI | CARITEC

HYDRAULIC EQUIPMENT
CUSTOM ARRANGEMENTS

Ciao Carlo

20
27

CARIBONI CARIBONI CARIBONI CARIBONI

Courtesy Borlenghi

2027 CATALOGUE

HYDRAULIC EQUIPMENT
CUSTOM ARRANGEMENTS

CARIBONI CARITEC

Giovanni Cariboni was born in **Bellano** on **Lake Como**, on 16th November 1948. He first approached the world of sailing when he was very young and started sailing alone on a **12' Dinghy** at the age of 10. His first regatta on the **Snype** as a crew member was when he was only 14 years old and he continued to take part in the regatta, also joining the **FD** for another 2 years in the Italian seas.

He started sailing in the Star class when he was 16 years old, but after a year, he decided to move on the **5.50 s.i.** to gain experience in the international sailing environment. While he was studying at **Mechanical High School Giovanni**'s design experience began to flourish through the collaboration with **Eng. Carcano.**

During summer vacation, **Giovanni** worked with **Eng. Carcano** developing the **5.50 s.i. Volpina 1, Volpina 2, Volpina 3, Volpina 4 and Volpina 5**. At the end of high-school he re-started sailing on the **Star boat**. During military leave, he took part in the dedicated sailing group.

After that, he spent two years working as a teacher in the same high-school where he had studied. At the same time, he took part in the regatta as semi-professional. After that, he worked in a mechanical firm in **Lecco** as production manager and, at the age of 24, as designer of aluminium masts in a company called **Canclini.**



Giovanni Cariboni
working on a custom PTO arrangement

CARIBONI

Cariboni was founded in 1984 by Mr **Giovanni Cariboni**. Thanks to his experience as a sailor, he was able to easily approach the sailing market.

Right from the start of his business, Mr **Cariboni** designed and produced aluminium masts, and this activity continued until 1993, when this part of the production was stopped. In 1987, **Cariboni** engaged in its first production of hydraulic components on the boat **Masaiomè**.

In 1992, **Cariboni** was involved in the **Wallygator project**, which became a turning point in the philosophy of hydraulic systems. The boat had to be fully equipped with a hydraulic system. The project was completed in 1994, and the boat is still sailing. From that period on, **Cariboni** has concentrated his research and development on hydraulic systems, improving its products and its technology every year.

All the machinery is connected to the network by a PC where workers can visualize a 3D model of the piece that they are working on.

Our technicians are able to engineer any kind of product.

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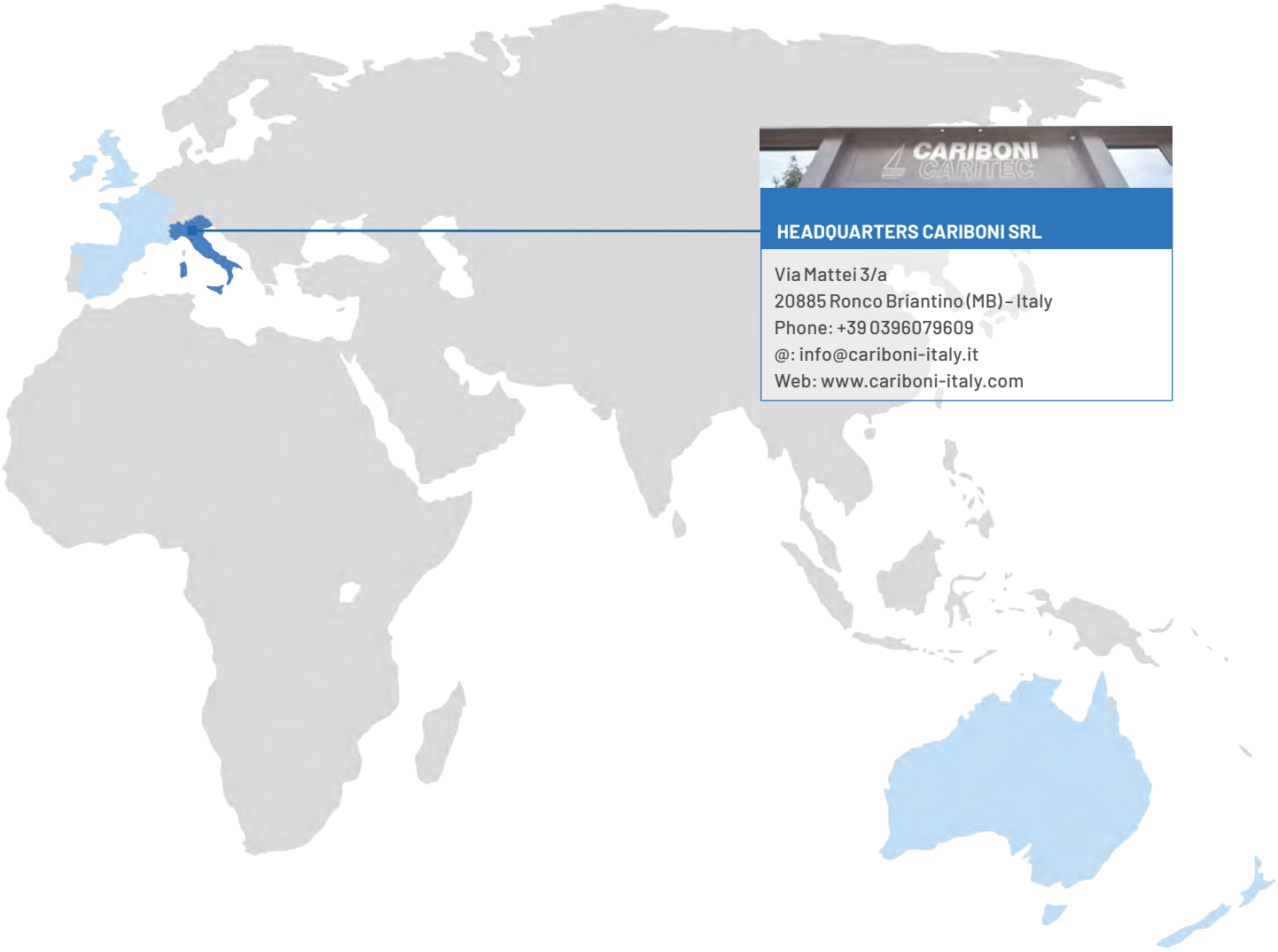
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Cariboni in Ronco Briantino is 30 minutes from Orio al Serio airport (Milano-Bergamo) and Linate (Milano city airport). The international Milano Malpensa hub is 1h 30m from the company.

Cariboni is open from Monday to Friday, from 8:00 am to 12:30 pm and from 2:00 pm to 6:30 pm.

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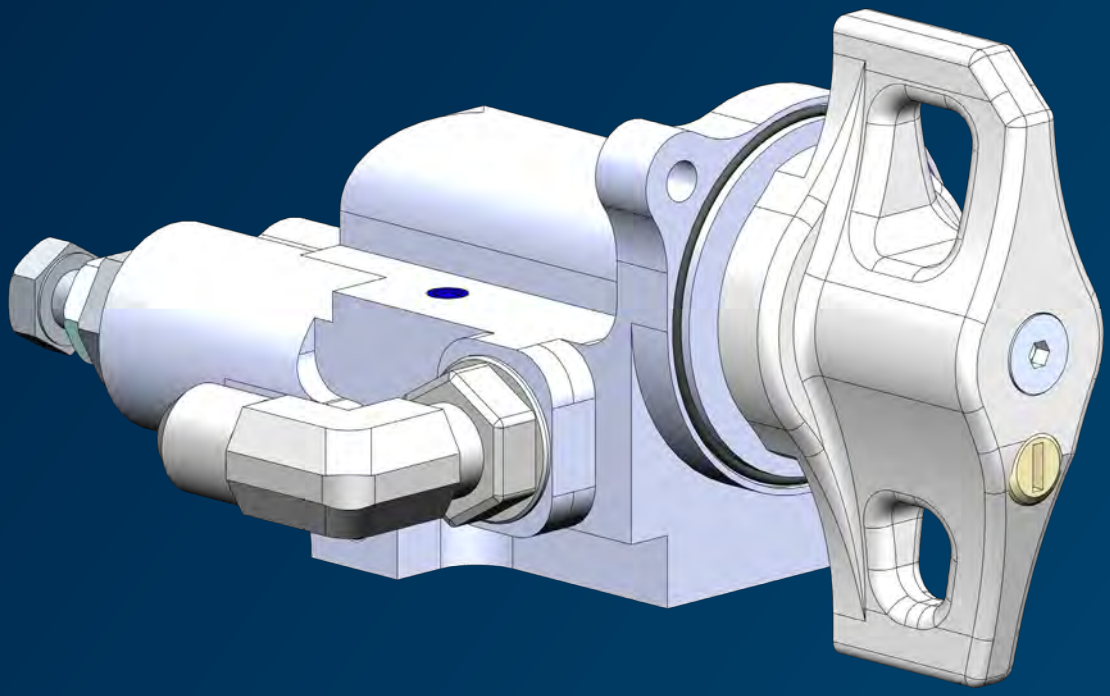
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MANUAL CONTROLS



The first manual valve was born in 2000 for AC yachts. Cariboni was the first company which introduced a new concept of manual hydraulic valve, based on pilot logic-elements. Starting from industrial high-tech components, the firm moved a step forward, setting a new benchmark in the marine world. Designed to work at higher pressure and to have the maximum control and reliability during the race, all manual valves are made of lightweight hard coated 7075-T651 aluminium body and they are all designed on the basis of the race know-how acquired from **TP52**, **AC**, **VOR 70** and **Open60** yachts.

Nowadays Caritec, the manual line of Cariboni, offers a complete range of manual controls for every kind of sailing boat and a full list of accessories. Every manual valve has a modular design in order to be easily put in a custom panel with other valves, pumps and accessories. All manual controls (valves, pumps, accessories) are designed to work up to 700 bar and can be customized with lightweight ABS, aluminium or titanium fittings. All valves have 3 positions: each cylinder can be controlled by its own valve to hold, pump and release.

Quad line: manual valves that derive from the race line, with the same mechanical design but reviewed for cruise-racer sailing boats. Single and double hand pumps can be fitted on manifold for compact manual panel.

Race line: lightness, reliability and top performances are the key words for these kinds of valves installed on most of the racing yachts. Lightweight single and double pumps, on line valves and accessories are available for pro racer.

Bagolin line: the smallest and lightest manual valve in our series. It can be operated manually or through a servo actuator.

QUAD LINE

Cariboni designed these new manual valves after the experience at the 2006 AC races. Drawing from the same mechanism of Race line valves, these new valves are designed to offer the best hi-tech manual control for cruise-race sailing yachts.

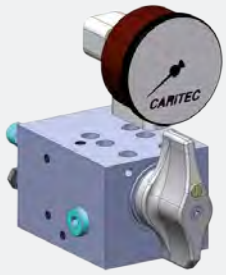
Thanks to the special fittings and fixing arrangements, the new Quad valves are used to create very compact manual panels which can be fitted on every boat. A maximum pressure valve for each function (even for the double valve) improves the reliability of the system and protects the ram and the hoses from overpressure.

As for the other Cariboni valves, each valve is able to control a single acting cylinder with a 3-position control knob (pump-hold-release) and is available with max pressure valve and manometer gauge. All Quad line valves can run at a 700 bar (10000 PSI) working pressure and up to 8 lpm maximum oil flow. All these valves can be fitted on linear or crossed standard arrangements.

Custom solutions with manual pump are available on request.



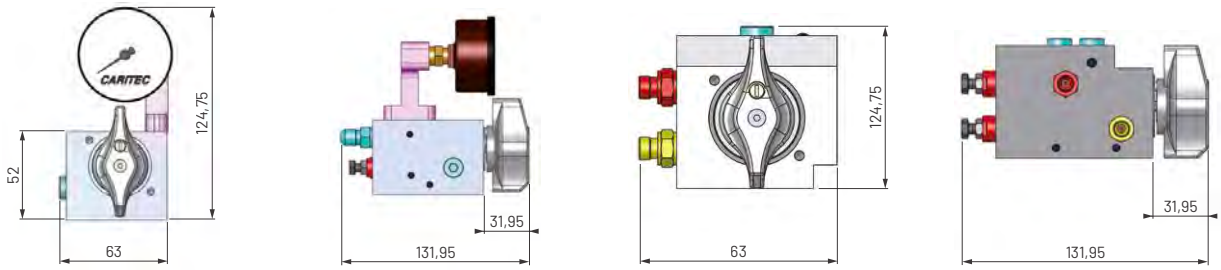
Quad panel: 4 single valves, a manual pump, an analogic manometer and an electric power button in just 300x200 mm! A highly compressed racing panel.

VALVE TYPE	MAIN FEATURES	APPLICATION
CM_VSBC_A_12322 	• Max working pressure: 700 bar (10000 PSI) • Weight: 0,76 kg (1,68 lb) • Max oil flow: 8 lpm • Black hard coated aluminium • Hold-pump-release positions • 20-700 bar max adjustable max pressure valve • Flow release control • 7/16" JIC UNF 37° stainless steel fitting [1] Polished stainless steel knob available on request	**Single valve with max pressure valve** • Single acting cylinder (backstay, forestay, inner forestay, halyard, outhaul, cunningham etc.) • Single acting boom vang • Back-up valve in automatic hydraulic system
CM_VSBC_A_08814 	• Max working pressure: 700 bar (10000 PSI) • Weight: 0,84 kg (1,85 lb) • Max oil flow: 8 lpm • Black hard coated aluminium • Hold-pump-release positions • 20-700 bar max adjustable max pressure valve • 0-600 bar analogical pressure gauge • 7/16" JIC UNF 37° stainless steel fitting [1] Polished stainless steel knob available on request	**Single valve with max pressure valve and manometer** • Single acting cylinder (backstay, forestay, inner forestay, halyard, outhaul, cunningham etc.) • Single acting boom vang • Back-up valve in automatic hydraulic system
CM_VD_A_08897 	• Max working pressure: 700 bar (10000 PSI) • Weight: 1,09 kg (2,41 lb) • Max oil flow: 8 lpm • Black hard coated aluminium • Hold - pump A - pump B positions • 20-700 bar max adjustable max pressure valve • Flow release control • 7/16" JIC UNF 37° stainless steel fitting both for A and B port [1] Polished stainless steel knob available on request	**Double valve** • Double acting cylinder • Double acting boom vang • Transom door system • Lifting keel manual back-up • Canting keel manual back-up • Max pressure valve on A and B port

(1) Custom fittings available on request (1/4" BSPP – 9/16" JIC UNF 37° – 3/8" BSPP).

All valve types can be placed on linear or crossed aluminium manifold for standard or custom manual panel.

QUAD LINE VALVE	
SINGLE VALVE MODEL WITH MAX PRESSURE VALVE AND GAUGE	DOUBLE VALVE MODEL



QUAD LINE PANELS

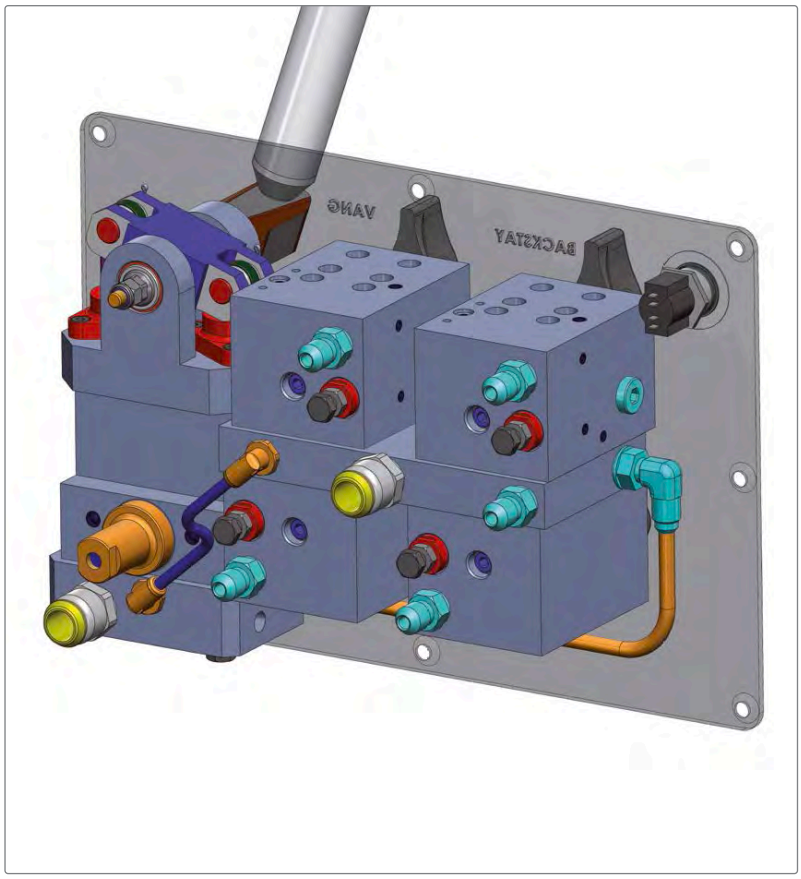
Quad line panels are the compact offer for race-cruising yachts. Thanks to the new valve design, Quad panels are very compact and can be installed on any kind of boat.

Shape and dimensions depend on the number of valves and pressure gauges installed. We offer a slim 2-valve panel (single valve, double or mixed), a BP3, BP4, BP5 (3, 4 or 5 single valves) or custom solutions with 10 valves or more on the same panel. A Quad line single or double manual pump (see "Manual Pump" paragraph for further information) can be added to every panel.

The Quad panels are made of hard black coated aluminium. Custom polished stainless steel and carbon fiber panels are available on request.

Each manual panel is available with an electric pump power supply that can reach 700 bar.

Quad panels are designed to work with pressurized oil tanks in order to increase the pumping performances and layout flexibility.



RACE LINE

The best choice for all racing yachts is the race line. The body is made of 7075-T651 hard coated aluminium fully machined for extreme weight saving.

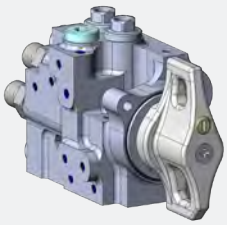
Like other Cariboni valves, each valve is able to control a single acting cylinder with a 3-position control knob (pump-hold-release).

All race line valves can run at over 700 bar (10000 PSI) working pressure and up to 8 lpm maximum oil flow; they can be fitted on linear or crossed standard arrangements with lightweight manifold.

All race line valves can be supplied with servo controls.



Luna Rossa catamaran
Manual valves, pumps and titanium rams.

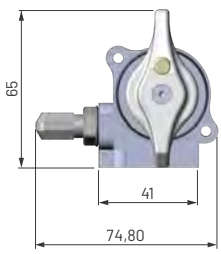
VALVE TYPE	MAIN FEATURES	APPLICATION
CM_VSBC_A_12254 	• Max working pressure: 700 bar (10000 PSI) • Weight: 0,311 kg (0,685 lb) • Max oil flow: 8 lpm • Hard coated aluminium • Hold-pump-release positions • Relief pressure valve incorporated • Flow release control • 7/16" JIC UNF 37° stainless steel fitting [1]	**Single valve with max pressure valve** It can be used to run every kind of single acting cylinder on race sailing yachts.
CM_VD_A_43442 	• Max working pressure: 700 bar (10000 PSI) • Weight: 0,789 kg (1,739 lb) • Max oil flow: 8 lpm • Hard coated aluminium • Hold – pump A – pump B positions • Relief pressure valve incorporated • Flow release control • 7/16" JIC UNF 37° stainless steel fittings • Pressure sensors can be incorporated	**Double acting cylinders** Lifting keel manual back-up Canting keel manual back-up

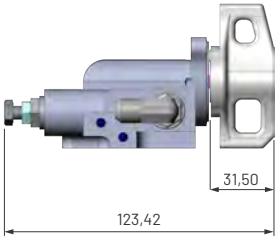
(1) Custom fittings **and in titanium alloy** available on request (1/4" BSPP – 9/16" JIC UNF 37° - 3/8" BSPP).

All valve types can be placed on linear or crossed lightweight aluminium manifold.

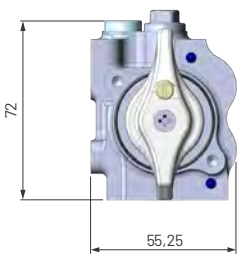
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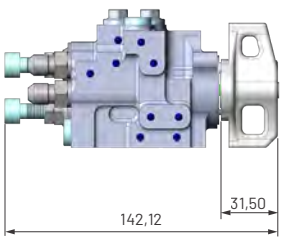
SINGLE VALVE MODEL WITH MAX PRESSURE VALVE





DOUBLE VALVE MODEL WITH MAX PRESSURE VALVES

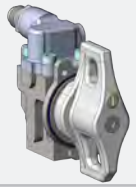


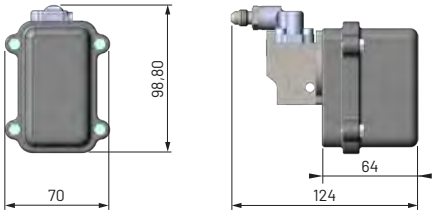


BAGOLIN LINE

After the presentation at the 2010 Mets Exhibition, several tests confirmed the efficiency of this new generation of manual race valves, the Bagolin valves.

The valves can be assembled in different ways: one/two/three in-line. Release speed can be easily controlled, thanks to the new manual knob.

VALVE TYPE	MAIN FEATURES	APPLICATIONS
BAGOLIN CM_VS_A_21284 	• Max working pressure: 700 bar (10000 PSI) • Weight: 0,174 kg (0,384 lb) • Max oil flow: 6 lpm • Hard coated aluminium • Hold – pump – release positions • Manual release control • 7/16" JIC UNF 37° stainless steel fittings[1]	• It can be used to run every kind of single acting cylinder on race sailing yachts • Each valve can be supplied with a servo actuator
BAGOLON CM_VS_A_17807 	• Max working pressure: 700 bar (10000 PSI) • Weight: 0,195 kg (0,43 lb) • Max oil flow: 12 lpm • Hard coated aluminium • Hold – Pump – release positions • Manual release control • 7/16 UNF JIC 37° stainless steel fittings [1]	Each valve can be supplied with a servo actuator



(1) Custom fitting and titanium alloy **available** on request.

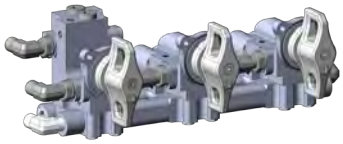
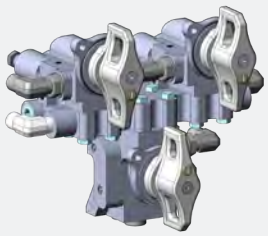
RACE LINE

RACE LINE VALVE PANELS & ARRANGEMENTS

Single and double valves can be placed on lightweight ergal 7075-T651 manifold for linear or crossed arrangements. Each arrangement is supplied with stainless steel fittings:

Aluminium or titanium fittings available on request.

Race line panels are designed to have pressurized suction and return lines and can be equipped with electric power pump back-up for maximum performances.

TYPE	NUMBER OF VALVES	WEIGHT
LINEAR ARRANGEMENT 	From 1 to 5 single or double valve as preferred, with or without max pressure valve	Weight for position (a valve for each, single or double): - 1 pos: 0,086 kg (0,19 lb) - 2 pos: 0,187 kg (0,41 lb) - 3 pos: 0,283 kg (0,62 lb) - 4 pos: 0,379 kg (0,84 lb) - 5 pos: 0,475 kg (1,05 lb)
CROSSED ARRANGEMENT 	From 1 to 8 single or double valve as preferred, with or without max pressure valve	Weight for position (a valve for each, single or double): - 1 pos: 0,086 kg (0,19 lb) - 2 pos: 0,187 kg (0,41 lb) - 3 pos: 0,270 kg (0,6 lb) - 4 pos: 0,370 kg (0,82 lb) - 5 pos: 0,440 kg (0,97 lb) - 6 pos: 0,539 kg (1,19 lb) - 7 pos: 0,610 kg (1,34 lb) - 8 pos: 0,710 kg (1,57 lb)

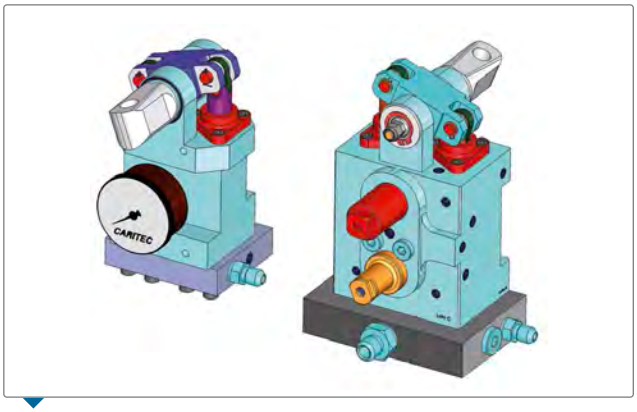
QUAD LINE PUMPS

Quad line pumps are based on the same mechanical design of race line pumps: the body is a single piece of 7075 lightweight hard coated aluminium.

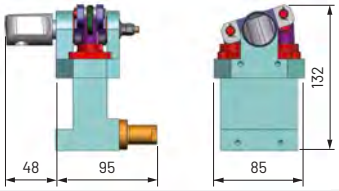
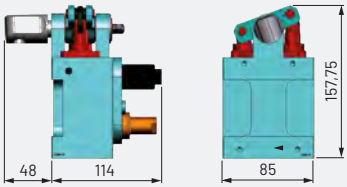
Two kinds of alternate manual quad pumps: the extreme compact and lightweight single speed pump and the powerful two speed pumps.

The two-speeds pumps have an adjustable auto shift system to switch from first gear to second gear.

Every pump has a maximum pressure valve to relieve pressure and protect the hydraulic system.



Quad line pumps.

PUMP TYPE	MAIN FEATURES & APPLICATIONS
IPA 0416 	**Single speed alternate pump** • Integrated max pressure valve • Displacement: 3,6 cc • Working pressure: 700 bar (10000 PSI) • Dry weight: 1,750 kg (3,86 lb) • Also available with integrated manometer
IPA 1225 	**Double speed alternate pump** • Adjustable auto-shift system • Integrated max pressure valve • Displacement: 3,4 cc (high pressure) 23,6 cc (high flow) • Working pressure: 700 bar (10000 PSI) • Dry weight: 3,9 kg (8,6 lb)

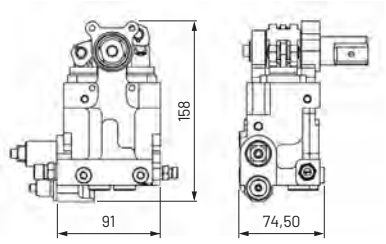
RACE LINE PUMPS

The race line manual pump is designed for the top performances requested by worldwide racing yachts.

Built with a solid 7075-T651 hard coated aluminium alloy, and lightweight components to reduce overall weight. High speed seals improve the flow of oil and the performance of the system.

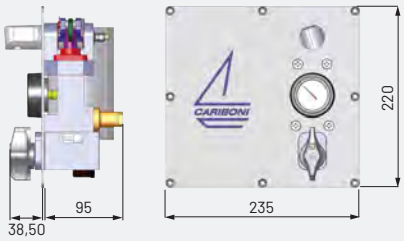
Race line pumps are ready to plug into a hydraulic system as the manifold is fully integrated in the pump design. A pressurized oil tank is suggested for top performances. Titanium and aluminium alloy fittings are available for extreme weight control.

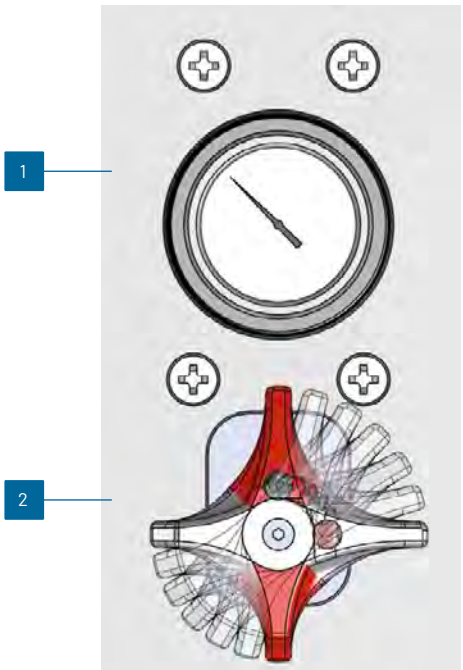
Custom arrangement available on request.

PUMP TYPE	MAIN FEATURES & APPLICATIONS
IPA 1225 R 	**Double speed alternate pump with auto shift and integrated max pressure valve.** • Bore & Stroke: 12x16,1 mm (high pressure), 25x20 mm (high flow) • Displacement: 3,6 cc (high pressure), 25,1 cc (high flow) • Dry weight: 2,100 kg (4,63 lb) • Max pressure: 700 bar (10000 PSI) • Titanium pistons, 17-4 PH stainless steel or titanium shaft

MANUAL PANELS

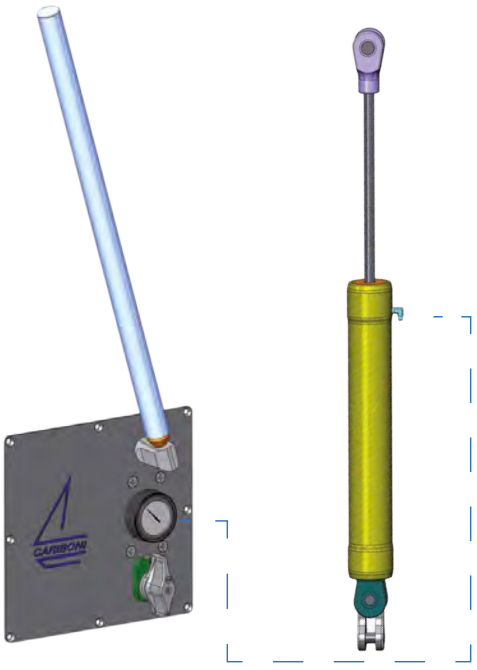
Our manual panels are made of lightweight aluminium alloy, but carbon fiber or stainless steel panels are also available on request.

TYPE	DESCRIPTION
IPA_1225_A_04417 	• Quad line double speed pump, with auto shift and max pressure valve. • Displacement: 3,6 cc (high pressure), 25,1 cc (high flow) • Release speed control • 45° pump handle movement • Dimensions: 150 x 250 mm • Weight: 4,580 kg (10,1 lb)
IPA_0416_A_12293 	• Dimensions 446x416 mm • Single speed alternate pump with max pressure valve • Release speed control valve • 0-400 bar analogical manometer • Up to 3 litres pressurized oil tank



(1) 0-400 bar analogical manometer gauge to check the real load on the cylinder. It shows the pressure both when you're pumping and holding the load.

(2) Release speed control: for smooth and sharp control of the hydraulic ram



Example of application

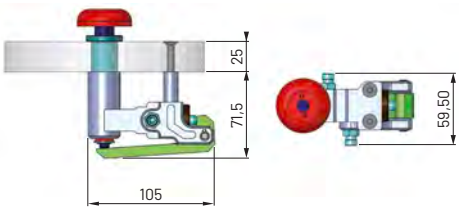
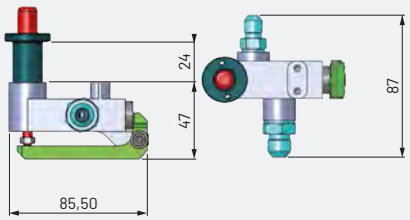
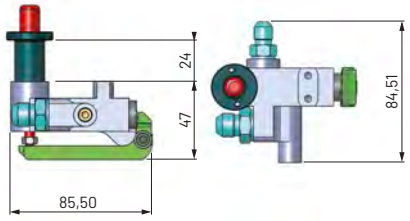
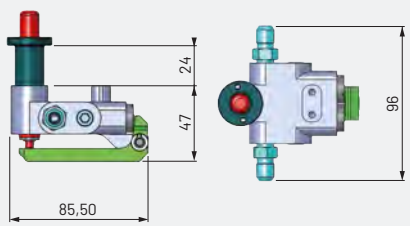
IN LINE VALVES

All in-line valves are made of hard coated 7075-T651 aluminium and are designed to work at 700 bar (10000 PSI).

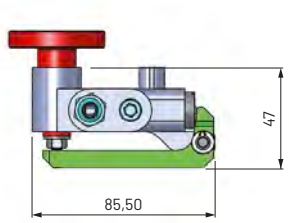
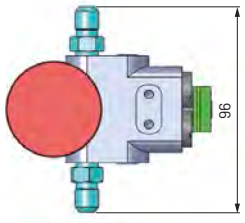
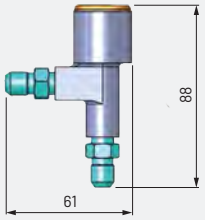
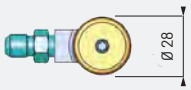
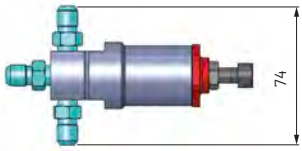
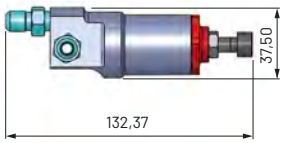
Each in-line valve is equipped with stainless steel fittings: extreme weight reduction can be achieved with optional titanium and aluminium fittings.



Installation of in-line valves.

TYPE	MAIN FEATURES & APPLICATIONS
	• Black line quick release valve (P to T line) • Black hard coated aluminium 7075 • Weight: 0,38 kg (0,84 lb) • Max working pressure: 700 bar (10000 PSI) Main applications: boom vang fast release, travellers, runners etc
	• Race line quick release (P to T line) • Hard coated aluminium 7075 • Weight: 0,235 kg (0,52 lb) • Max working pressure: 700 bar (10000 PSI) • Compatible with pressurized oil tank Main applications: boom vang fast release, travellers, runners etc
	• Race line quick release (P to T line) with flow control (you can reduce the release speed) • Hard coated aluminium 7075 • Weight: 0,286 kg (0,63 lb) • Max working pressure: 700 bar (10000 PSI) • Compatible with pressurized oil tank Main applications: back-up release valve for every cylinder
	• Race line by-pass valve (A to B and B to A) • Hard coated aluminium 7075 • Weight: 0,260 kg (0,57 lb) • Max working pressure: 700 bar (10000 PSI) • Compatible with pressurized oil tank Main applications: fast release for double acting cylinders, traveller fast release

IN LINE VALVES

TYPE	MAIN FEATURES & APPLICATIONS
 	• Race line link valve (A to B and B to A). • Hard coated aluminium 7075 • Weight: 0,52 kg (1,15 lb) • Max working pressure: 700 bar (10000 PSI) • Compatible with pressurized oil tank. Main applications: links the pressure line in hydraulic system
 	• Flow control valve (restriction from A to B. Flow is free from B to A) • Black hard coated aluminium • Weight: 0,18 kg (0,39 lb) • Max working pressure: 700 bar (10000 PSI) • Compatible with pressurized oil tank Main applications: release speed control in single and double acting cylinder
 	• Max pressure valve (reduce max pressure line) • Hard coated aluminium 7075 • Weight: 0,25 kg (0,55 lb) • Max working pressure: 700 bar (10000 PSI) • Compatible with pressurized oil tank Main applications: max pressure control in hydraulic system or in single/double acting cylinders

HYDRAULIC ACCESSORIES

A wise man once said: "Beauty is in the detail". **Every hydraulic system** needs a set of small parts which are just as important as the other "big" parts. **Fittings, filters, gauges, hoses, through deck glands etc**.

PRODUCT	DESCRIPTION

PRESSURE GAUGES AND SENSORS





- Analogue Ø 50 mm gauge can be fitted to any sort of hydraulic system to monitor the line pressure or the hydraulic ram working load.
- Pressure sensors are available in different ranges and output.

ONLINE FILTERS





- Cariboni oil filters are designed to work also with manual systems keeping a low pressure drop even at high flow.
- The filter houses are made in lightweight aluminium, and the cartridges can be replaced.

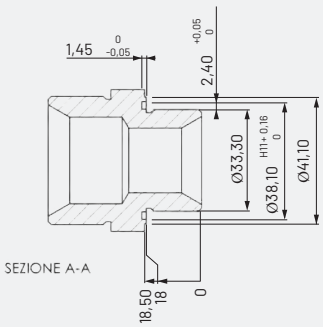
THROUGH DECK GLANDS



- Through deck glands are available in standard aluminium alloy or in polished stainless steel. Custom dimensions are available on demand.

ALUMINIUM LIGHTWEIGHT FITTINGS



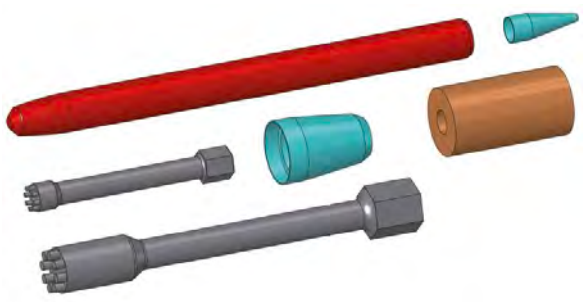


- Aluminium lightweight fittings are designed to reduce the overall weight of the hydraulic system to the minimum (you know, everything counts!)
  - 1/8" BSPP+OR – 7/16" JIC 37° (weight: 0,006 kg)
  - 1/4" BSPP+OR – 7/16" JIC 37° (weight: 0,010 kg)
  - 3/8" BSPP+OR – 7/16" JIC 37° (weight: 0,014 kg)
  - 1/4" BSPP+OR – 9/16" JIC 37° (weight: 0,010 kg)
  - 3/8" BSPP+OR – 9/16" JIC 37° (weight: 0,014 kg)
  - 1/2" BSPP+OR – 9/16" JIC 37° (weight: 0,022 kg)
  - 3/4" BSPP+OR – 9/16" JIC 37° (weight: 0,042 kg)
  - 3/8" BSPP+OR – 3/4" JIC 37° (weight: 0,016 kg)
  - 1/2" BSPP+OR – 3/4" JIC 37° (weight: 0,024 kg)
  - 3/4" BSPP+OR – 3/4" JIC 37° (weight: 0,044 kg)
  - 3/4" BSPP+OR – 3/4" BSPP SW. (weight: 0,064 kg)
  - 1" BSPP+OR – 1" BSPP SW. (weight: 0,094 kg)
- Same sizes are available made in titanium alloy too.

HYDRAULIC ACCESSORIES

PRODUCT	DESCRIPTION

CARIBONI CUSTOM TOOLS



- Custom tools to service our products available on demand

HYDRAULIC ACCESSORIES/ HOSES

HIGH PRESSURE HOSES

High pressure hoses with Kevlar reinforcement.
For top hydraulic systems with extreme lightweight specifications.



MODEL	I.D.	O.D.	Rmin	W.P.	B.P.	WEIGHT	FITTING
	mm	*mm*	*mm*	*bar*	*bar*	*kg/m*	
6700	4,0	8,0	40	500 (7200 PSI)	1500	0,04	7/16" UNF JIC 37°
0461 VHP	5,0	11,0	30	700 (10000 PSI)	2800	0,09	7/16" UNF JIC 37°
2A DN 10	10,0	19,5	152	700 (10000 PSI)	1080	0,25	9/16" UNF JIC 37°
2A DN 13	13,0	22,6	203	410 (6000 PSI)	1640	0,35	3/4" UNF JIC 37°

CARBON FIBER HOSES

MODEL	I.D.	O.D.	Rmin	W.P.	B.P.	WEIGHT	FITTING
	mm	*mm*	*mm*	*bar*	*bar*	*kg/m*	
A02311-2T/C 3/16"	4,8	7,5	30	700 (10000 PSI)	1600	0,028	7/16" UNF JIC 37°
A02312-2T/C 1/4"	6,4	10,2	40	700 (10000 PSI)	1600	0,055	7/16" UNF JIC 37°
A02313-3T/C 3/8"	7,9	14	50	500 (7200 PSI)	1500	0,112	9/16" UNF JIC 37°
A02315-3 T/C 1/2"	8,5	18	75	400 (5800 PSI)	1200	0,135	3/4" UNF JIC 37°
A02316-4 T/C 3/4"	17,5	25	140	400 (5800 PSI)	1200	0,250	3/4" BSP

HYDRAULIC ACCESSORIES/ OIL TANKS

We design and machine aluminium and carbon fiber oil tanks complete with accessories, air pressure gauges, fittings and oil levels.

Carbon fiber oil tanks are available in 3 different sizes and capacities:

- **SCP_2,1**: 2,1 litres, L=250 mm
- **SCP_5,1**: 5,1 litres, L=600 mm
- **SCP_9,4**: 9,4 litres, L=850 mm





Standard pressurized oil tanks, 2 and 4 litres volume.



Custom pressurized carbon fiber oil tank, 8 litres volume.



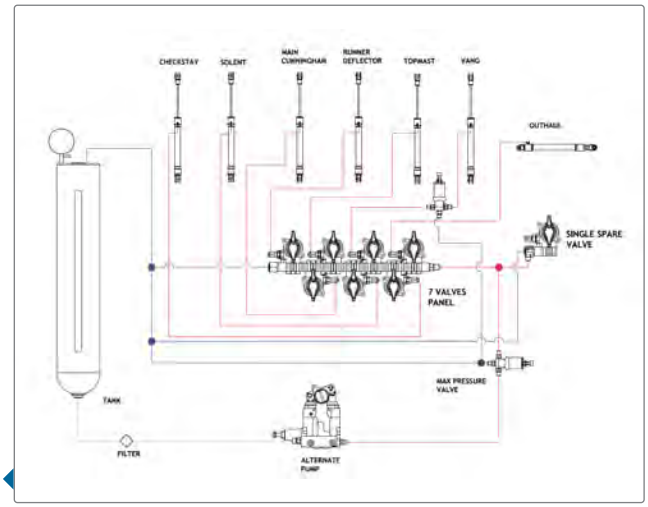
Custom pressurized carbon fiber oil tank with piston. 5 and 10 litres volume.

MANUAL SYSTEM

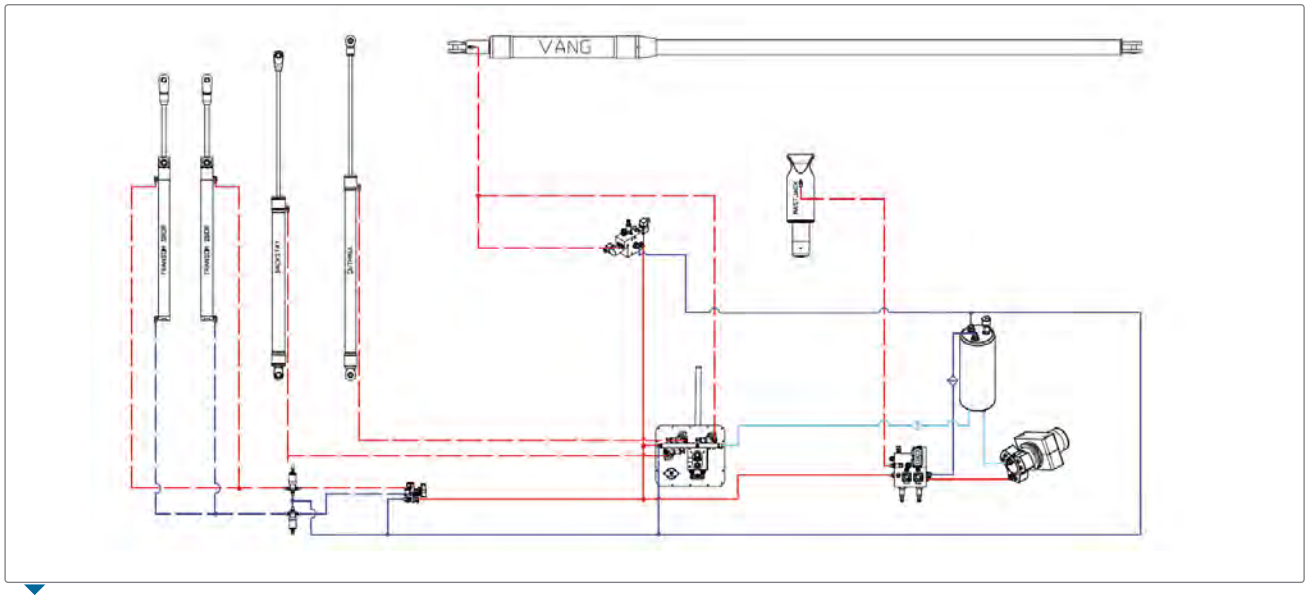


Maxi 72.

We design and supply a complete bespoke hydraulic system, including all accessories such as piping and fittings. The system is tested to assure that the connected components run smoothly. Technicians are available to install hydraulic systems or to oversee the installation at the shipyard.



An example of manual hydraulic deck equipment.

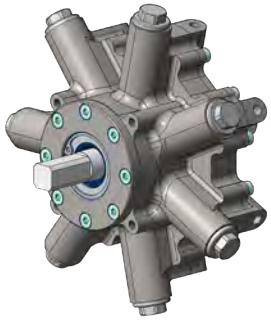
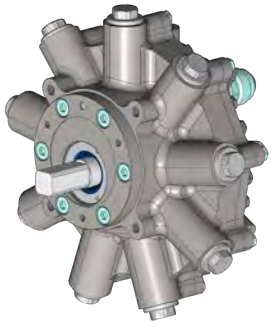
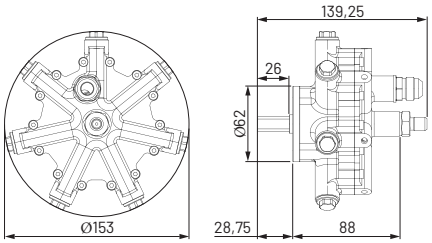
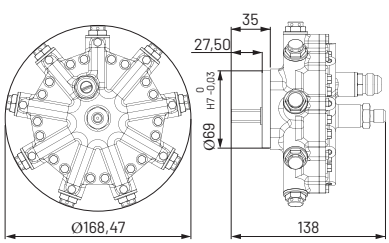


The hydraulic system of a 65' cruising yacht with manual and electric systems all in one.

ROTARY PUMPS

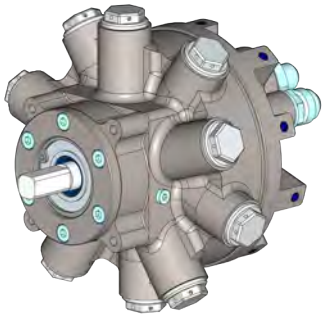
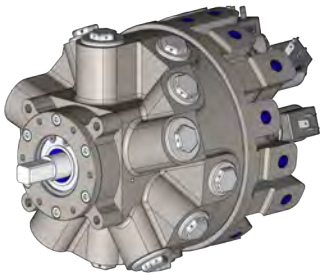
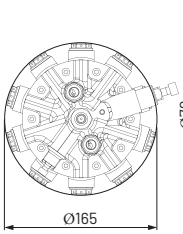
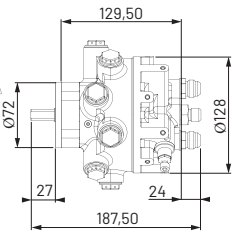
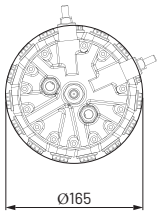
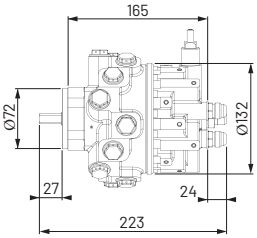
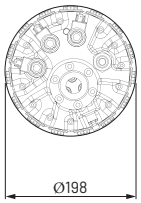
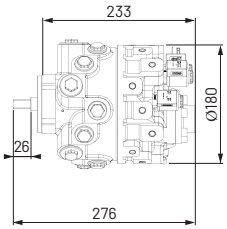
The careful design of each component always gives smooth and comfortable rotary movements, without any hard step for the grinder. The pump is self-priming and releases oil at the first 1/5 or 1/16 round (depending on the pump type).

Below is an overview of our radial pumps and their features.

TYPE	IPR 7	IPR 9	
			
DESCRIPTION	**7 radial pistons** Hard coated 7075 T6 aluminium alloy	**9 radial pistons** Hard coated 7075 T6 aluminium alloy	
			
PERFORMANCE	WORKING PRESSURE	700 bar (10000 PSI)	600 bar (8700 PSI)
	WEIGHT	1,35 kg (2,98 lb)	2 kg (4,41 lb)
	OIL FLOW PER TURN	7,69 cc	12,2 cc
	DIM Ø	153x88 mm	168x110,5 mm

(1) Electro valve option available.



	IPR 10	IPR 15	IPR 15 - 350
			
	10 radial pistons, 2 speed[1] Hard coated 7075 aluminium alloy. Autoshift system with adjustable valve. Relief valve incorporated.	**15 radial pistons, 3 speed**[1] Hard coated 7075 aluminium alloy. Autoshift system with adjustable valve. Relief valve incorporated.	**15 radial pistons, 7 speed** Hard coated 7075 aluminium alloy. Shift system actuated by integrated solenoid valves. Speed can be changed by the user. Relief valve incorporated.
	 	 	 
	700 bar (10000 PSI)	700 bar (10000 PSI)	350 bar (5000 PSI)
	2,8 kg (6,17 lb)	5,8 kg (12,79 lb)	7,8 kg (17,20 lb)
	16,54 cc (second speed) 5,09 cc (first speed)	23,46 cc (third speed) 12,01 cc (second speed) 5,09 cc (first speed)	66,70 cc (seventh speed) 54,66 cc (sixth speed) 43,90 cc (fifth speed) 34,80 cc (fourth speed) 31,80 cc (third speed) 22,80 cc (second speed) 12,05 cc (first speed)
	165x129,5 mm	156x165 mm	198x233 mm

HYDRAULIC CYLINDERS



A hydraulic ram seems to be a simple piece, but there are some features which tell a good product and the best product apart. We approach ram design from a purely technical perspective. Each ram is unique but all of them are designed considering:

Reliability – The real marine environment is far more demanding than any testing ground. During hard sailing, rams are stressed by many factors which all have to be considered in the design.

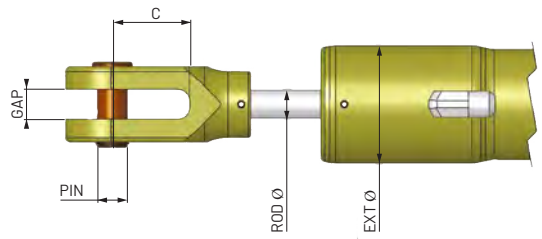
Lightness – Less weight on board means faster sailing and more efficiency, even if the boat is just cruising. We don't care if the ram is for a regatta boat or for a cruising one. We don't want a single gram of weight more than necessary on your boat.

Sailing approach – We focus increasing attention to functionality and to how the single piece is integrated on the boat.

STANDARD SINGLE ACTING CYLINDERS

Our single acting cylinders are available in different models. The cylinders are all supplied with standard rod and tube clevis terminals. Custom terminals are available on request (lashing, marine eye, pulley, tackle, etc...).

Tubes and terminals are made of black hard coated aluminium alloy (6082); rods are made of Nitronic 50, and pins are made of 17-4 PH stainless steel. All our cylinders have return spring air to easily release the load. Complete seal kits and service tools are available on request.



1 bar = 14,503 PSI

Custom size and stroke available on demand high performance 500 bar aluminium cylinders available on request

SIZE	CARIBONI MODEL	MAX PULL LOAD @ 350 BAR[1]	
		kg	*lb*
5	CL 019 S 0250	608	1341
	CL 019 S 0400		
	CL 019 S 0500		
6	CL 025 S 0270	1348	2971
	CL 025 S 0350		
	CL 025 S 0570		
7	CL 030 S 0250	2118	4670
	CL 030 S 0350		
	CL 030 S 0570		
10	CL 035 S 0250	3029	6678
	CL 035 S 0380		
	CL 035 S 0570		
12	CL 040 S 0250	3766	8303
	CL 040 S 0380		
	CL 040 S 0570		
17	CL 045 S 0250	4957	10928
	CL 045 S 0400		
	CL 045 S 0600		
20	CL 050 S 0280	6288	13863
	CL 050 S 0400		
	CL 050 S 0600		
23	CL 055 S 0300	7356	16216
	CL 055 S 0400		
	CL 055 S 0600		
28	CL 060 S 0300	8967	19768
	CL 060 S 0450		
	CL 060 S 0700		
32	CL 070 S 0350	11979	26409
	CL 070 S 0450		
	CL 070 S 0700		
50	CL 080 S 0450	16182	35676
	CL 080 S 0600		
	CL 080 S 1000		
60	CL 090 S 0450	20175	44478
	CL 090 S 0650		
	CL 090 S 1000		
86	CL 100 S 0450	25197	55548
	CL 100 S 0600		
	CL 100 S 1000		
110	CL 115 S 0500	33626	74131
	CL 115 S 0700		
	CL 115 S 1100		
160	CL 140 S 0500	50438	111197
	CL 140 S 0700		

Notes:
(1) Maximum pull working load at 350 bar with no gas pressure.
(2) Rod and tube terminal have the same pin & gap dimensions.

STANDARD SINGLE ACTING CYLINDERS

MAX YIELD LOAD		GAP & PIN²	C	ROD Ø	EXT Ø	STROKE	L MIN (PIN-TO-PIN)	DRY WEIGHT	OIL VOLUME
kg	*lb*	*mm*	*mm*	*mm*	*mm*	*mm*	*mm*	*kg*	*litres*
3865	8521	11,2	27	12	31	250	544	0,9	0,04
						400	693	1,0	0,07
						500	794	1,2	0,09
3865	8521	11,2	27	12	38	270	559	1,3	0,10
						350	659	1,4	0,13
						570	909	1,6	0,22
5631	12414	12,7	35	12	44	250	557	1,5	0,15
						350	674	1,8	0,21
						570	814	2,3	0,34
5631	12414	12,7	35	12	49	250	528	1,7	0,21
						380	680	2,0	0,32
						570	902	2,4	0,48
7738	17059	16	38	16	52	250	574	2,3	0,26
						380	721	2,6	0,40
						570	947	3,0	0,60
10650	23479	16	38	16	58	250	528	2,6	0,35
						400	703	3,4	0,56
						600	937	3,7	0,83
10650	23479	19	43	16	60	280	573	3,4	0,49
						400	705	4,7	0,70
						600	925	4,9	1,06
14028	30926	19	47	20	76	300	610	5,1	0,62
						400	720	5,8	0,82
						600	940	7,2	1,24
17870	39397	19	49	20	86	300	655	5,9	0,75
						450	820	6,7	1,13
						700	1095	8,2	1,76
26946	59406	22,2	57	25	94	350	720	9,4	1,18
						450	830	10,6	1,51
						700	1105	13,6	2,35
29505	65047	25,4	57	25	108	450	873	13,5	2,04
						600	1038	15,6	2,72
						1000	1478	23,0	4,54
44043	97098	31,8	63	30	122	450	940	20,0	2,51
						650	1160	24,0	3,62
						1000	1545	31,0	5,57
44043	97098	31,8	67	30	128	450	995	18,5	3,18
						600	1160	21,2	4,24
						1000	1600	28,5	7,06
61483	135547	40	70	35	145	500	1130	28,6	4,71
						700	1355	31,8	6,60
						1100	1795	39,6	10,37
81825	180393	45	80	40	174	500	1380	37,7	7,07
						700	1675	42,7	9,90

DOUBLE ACTING CYLINDERS

Double acting cylinders are used to control a movement under load both in pull and push mode.

Extra attention must be paid with **double acting cylinders**: when pushing, the rod of the cylinder is affected by a "buckling effect", which depends on the rod length and on the material it is made of. For this reason, double acting cylinders usually have a bigger rod diameter and they're custom designed.

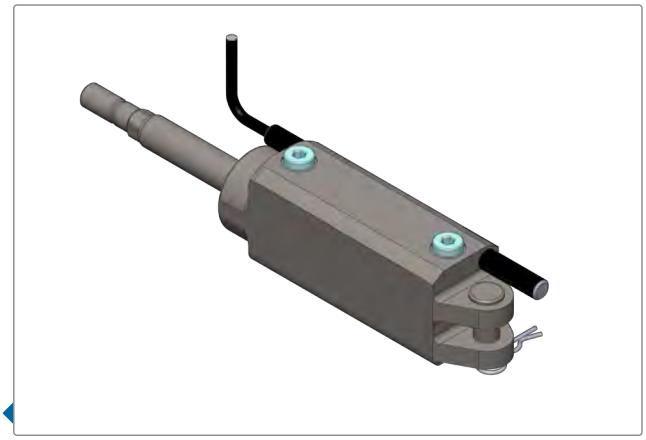
Below is a short list of double acting cylinders manufactured for fast cruiser and race sailing yachts: steering cylinder, mast base control, lifting keel locking pin, transom door, bimini control and many other applications.

Custom models and linear sensors are available on request.



Double acting cylinder with integrated linear sensor to control foil angle of 32' race catamaran.

MODEL	MAX PULL LOAD		MAX PUSH LENGTH		STROKE		WORKING PRESSURE		NOTES
	kg	*lb*	*kg*	*lb*	*mm*	*in*	*bar*	*PSI*	
CL 016 D 0160	215	474	105	231	160	6,30	140	2000	Aluminium & Nitronic
CL 019 D 0065	731	1611	1445	3186	65	2,56	500	7250	Ergal & Titanium
CL 025 D 0170	1034	2280	1200	2646	170	6,69	350	5000	Aluminium & Nitronic
CL 035 D 0546	1186	2616	700	1543	546	21,5	200	2900	Stainless steel & Nitronic
CL 045 D 0720	2250	4960	500	1102	720	28,35	250	3625	Aluminium & Nitronic
CL 055 D 0470	8500	18739	12109	26696	470	18,5	500	7250	Aluminium & Nitronic
CL 060 D 0560	4800	10582	1900	4188	560	22,05	250	3625	Aluminium & Nitronic
CL 070 D 0450	3908	8615	3908	8615	450	17,71	135	1958	Aluminium & Nitronic
CL 080 D 0600	10350	22818	10350	22818	600	23,6	250	3625	Aluminium & Nitronic
CL 090 D 1800	8100	17857	8100	17857	1800	70,87	180	2610	Titanium
CL 110 D 0596	26900	59304	21900	48281	596	23,46	350	5000	Titanium & Inconel
CL 135 D 0578	42600	93917	51068	112586	578	22,8	350	5000	Titanium & 17 -4 PH
CL 160 D 0937	42500	93696	79000	174195	937	36,89	500	7250	Titanium
CL 180 D 0041	59845	131936	64850	142970	41	1,61	250	3625	Stainless steel & Nitronic



Double acting cylinder in titanium with external linear sensor to control flap movement.

MAST JACK CYLINDERS

Mast jack cylinders are used to pre-tension the rig. We design and produce stainless steel mast jack cylinders to be integrated in the mast base. They can be placed with the bottom on a base, or upside down.

The mast-jack cylinders are usually made of 17-4PH stainless steel and designed to work at 700 bar (10000 PSI).

Lightweight mast jack cylinders are available for racing yachts.

Custom models are available on request.

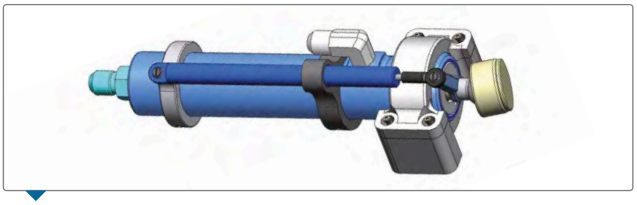


MODEL	WORKING LOAD		STROKE		OUTSIDE Ø		ROD Ø		BORE		WORKING PRESSURE		NOTES
	kg	*lb*	*mm*	*in*	*mm*	*in*	*mm*	*in*	*mm*	*in*	*bar*	*PSI*	
CL 060 S 0040	20000	44092	40	1,57	85	3,35	56	2,20	60	2,36	700	10000	Aluminium Weight: 4 kg
CL 065 S 0100	20295	44742	100	3,93	80	3,15	50	1,97	65	2,56	600	8700	17-4 PH Weight: 4,2 kg
CL 080 S 0125	35000	77161	125	4,92	100	3,95	60	2,36	80	3,15	700	10000	17 -4 PH steel Weight: 12,4 kg
CL 095 S 0100	35000	77161	100	3,94	111	4,37	60	2,36	95	3,74	484	7000	17 -4 PH steel Weight: 8,9 kg
CL 100 S 0055	35000	77161	55	2,17	124	4,88	80	3,15	100	3,94	437	6300	Titanium Weight: 7,6 kg
CL 100 S 0090	55000	121254	90	3,54	130	5,12	80	3,15	100	3,94	700	10000	17 -4 PH

CUSTOM HYDRAULIC CYLINDERS

We develop brand new cylinders made of any kind of material and size, to suit individual needs.

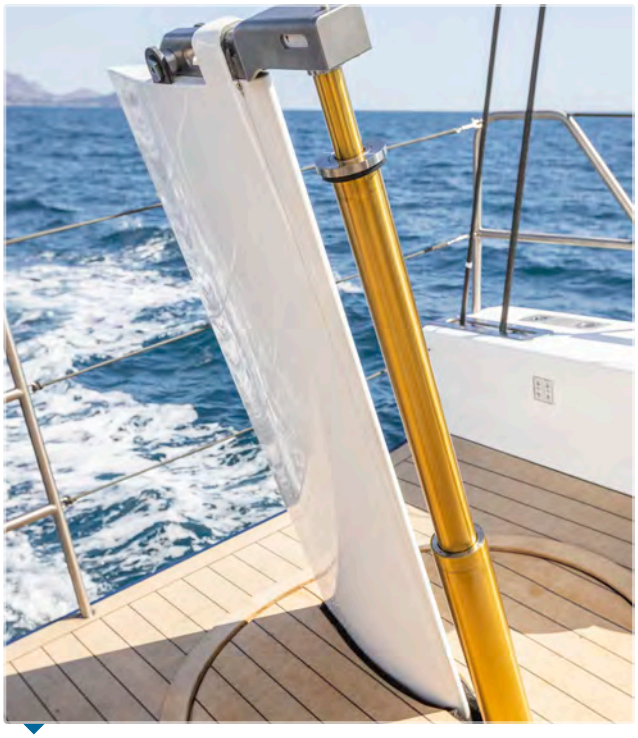
Single or double acting telescopic hydraulic cylinders, **oil dumpers**, **twin rod cylinders** are part of Cariboni's know how.



Titanium double acting cylinder with installed potentiometer sensor.



Stainless steel locking cylinder for a centerboard keel.



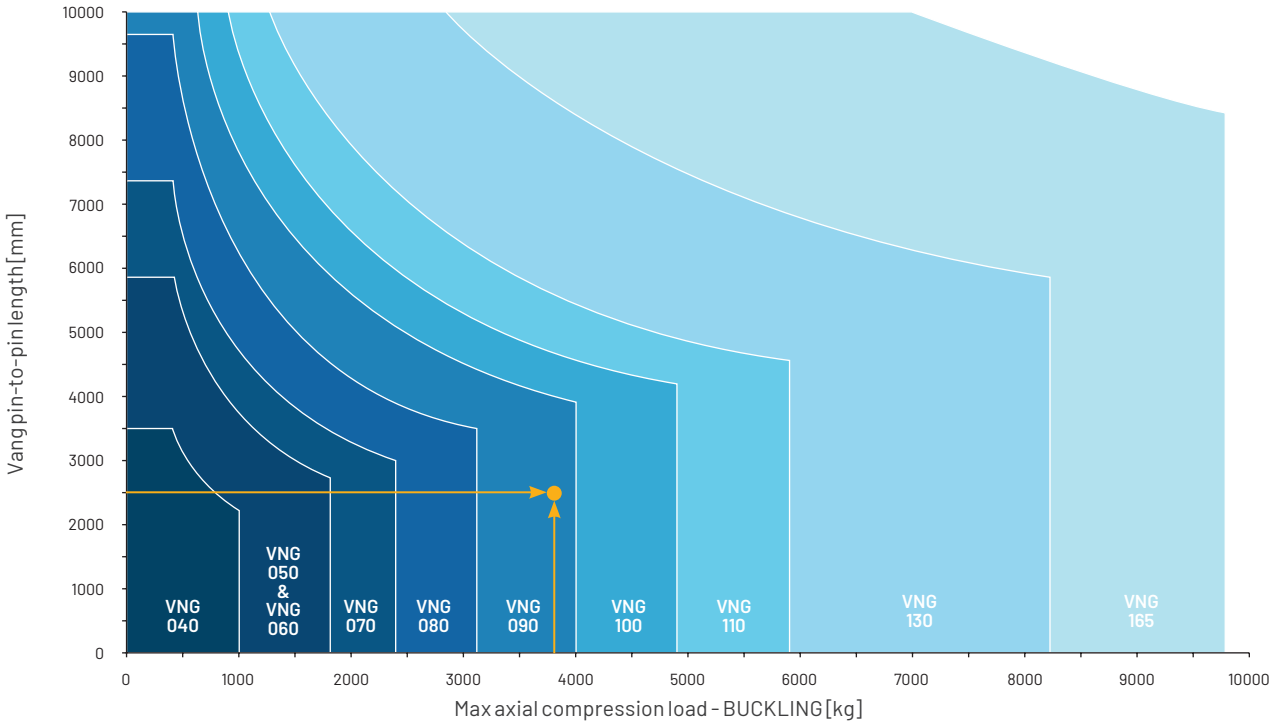
Double acting telescopic cylinder in titanium for rudder up and down.

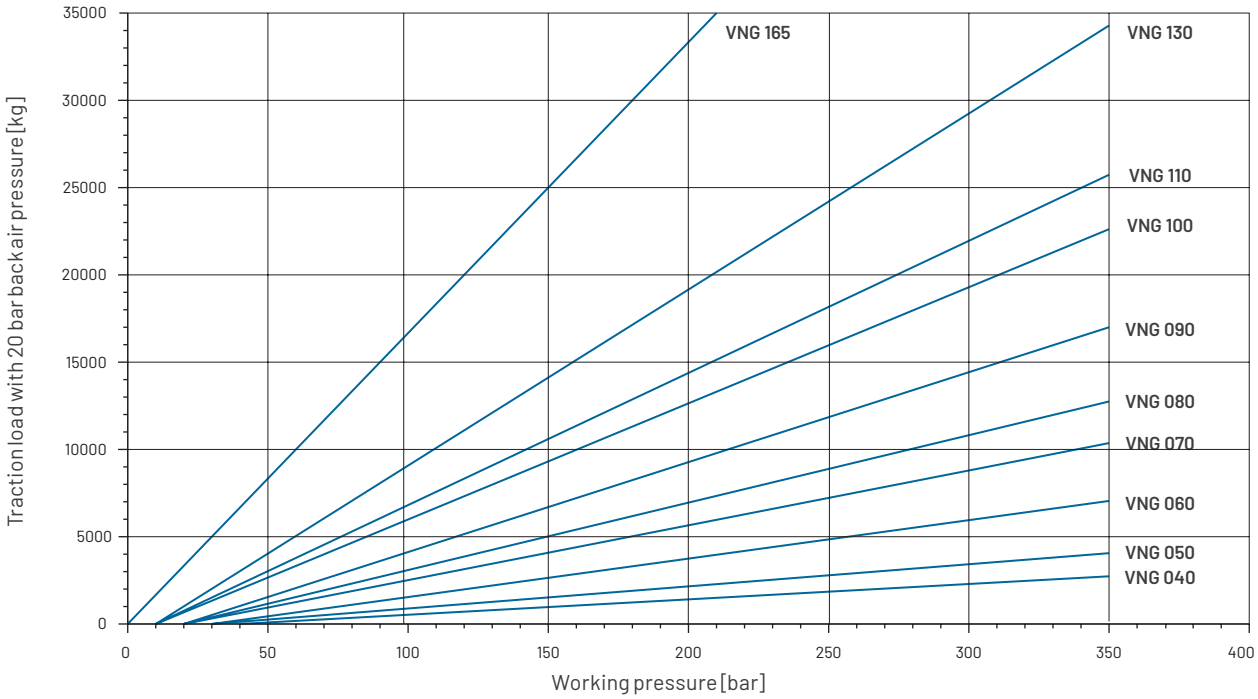
VANG

The best way to find the vang for you is easy. Follow these simple steps:

1. Have a look to the **rigging geometry** and find out the vang pin-to-pin distance (PCLC) with the boom in horizontal position
2. Calculate the **compression axial load** on the vang: we suggest you consider the weight of the boom vang, mainsail, accessories (furling boom, other hydraulic cylinders) and add the weight of two people hanging up by the end of the boom...yes, it really could happen!
3. Check in the **vang buckling diagram** for the size of your Cariboni vang
4. Check in the **traction load diagram** to see if the power of the vang is enough for your hydraulic system and the working pressure of the ram

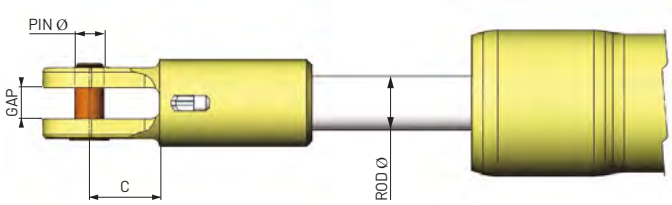
In the example shown in the diagram, with a 3800 kg of maximum axial compression load and 2500 mm of PCLC, the right choice is a VNG 90.





BOOM VANG MADE OF BLACK HARD COATED ALUMINIUM FOR SAILING YACHTS POLISHED STAINLESS CYLINDER AVAILABLE FOR EACH SIZE

SIZE	MODEL	MAX TRACTION LOAD [1]		MAX RETURN FORCE [2]		STROKE		ROD Ø	GAP	PIN	C	OIL VOL.	WEIGHT		
		kg	lb	kg	lb	mm	in	mm	mm	mm	mm	litres	Wkg [3]	a	c
17	VNG 40	3127	6894	384	847	250	9,84	22	16,3	16,0	36,0	0,2	6	0,00204	1,7
20	VNG 50	4483	9884	600	1324	280	11,02	30	16,3	15,5	32,5	0,4	8	0,00303	2,9
24	VNG 60	7566	16679	865	1906	280	11,02	30	16,3	15,8	33,0	0,6	9	0,00303	3,7
30	VNG 70	10897	24023	1177	2595	300	11,81	31,8	19,5	19,0	47,0	0,9	14	0,00335	8,6
40	VNG 80	13450	29652	1537	3389	350	13,78	40	23,0	22,0	52,0	1,3	23	0,00511	11,6
60	VNG 90	18214	40154	1945	4289	360	14,17	40	25,0	25,0	52,0	1,8	31	0,00596	11,7
70	VNG 100	23538	51892	2402	5295	400	15,75	40	32,6	28,0	64,0	2,6	41	0,00681	22,9
90	VNG 110	26675	58808	2906	6407	430	16,93	50,8	32,6	31,8	66,2	3,2	54	0,00766	29,2
100	VNG 120	33345	73513	PUSH/PULL		450	17,72	50	36	35	64	5,1	59	0,01158	20
110	VNG 130	35517	78301	4059	8949	500	19,69	65	36,0	35,0	78,0	5,0	88	0,01290	51,9
195	VNG 150	42803	94365	5404	11914	500	19,69	85	45,0	45,0	95,0	6,0	114	0,01915	51,5
260	VNG 165	56043	123552	PUSH/PULL		526	20,71	85	50,8	50,8	112,5	11,3	134	0,02384	51,1
300	VNG 180	62768	138380	7782	17156	550	21,65	100	55,0	55,0	125,0	9,7	196	0,02785	100
400	VNG 200	84064	185330	9607	21180	550	21,65	100	55,0	55,0	135,0	13,0	280	0,03321	166
–	VNG 220	101717	224248	PUSH/PULL		600	23,62	110	60,0	60,0	148,0	22,8	363	0,03856	232



BOOM VANG FOR RACE SAILING YACHTS WITH CARBON FIBRE EXTENSION HYDRAULIC RAM IN TITANIUM AND ALUMINIUM ALLOY

SIZE	MODEL	MAX TRACTION LOAD [1]		MAX RETURN FORCE [2]		STROKE		ROD Ø	GAP	PIN	C	OIL VOL.	WEIGHT
		kg	lb	kg	lb	mm	in	mm	mm	mm	mm	litres	
–	VNG 55 C	8971	19777	727	1602	280	11,02	28	16,3	16	35,5	0,49	4,80 kg w/o extension
–	VNG 60 C	10808	23828	865	1906	280	11,02	30	16,3	16	36,0	0,59	5,75 kg w/o extension
–	VNG 70 C	15516	34206	1177	2595	280	11,02	32	20,0	20	47,5	0,85	8,96 kg w/o extension
–	VNG 80 C	19215	42362	1537	3389	400	15,75	40	25,4	25	60,0	1,51	20,00 kg w/o extension
–	VNG 95 C	28021	61776	2168	4779	310	12,20	45	35,0	35	70,0	1,70	30,73 kg w/o extension

Notes:

(1) At 350 bar (5000 PSI) and no gas pressure. At 500 bar (7150 PSI) for carbon vang.

(2) At 30 bar (435 PSI) gas pressure. Return force can vary with gas pressure. The max value of return force depends on the PCLC.

(3) Weight for minimum length as example, please calculate the exact weight using the following formulas: Wkg = (PCLCmm x a) + c (PCLC is the vang length pin to pin cylinder closed in mm).

Wlb = Wkg x 2,205.

BICYLINDERS

During the Mets trade fair 2007, we presented its new revolutionary product: two hydraulic cylinders to control the headstay and the cunningham of TP52 yacht class, combined in a new benchmark hydraulic cylinder. Our bicylinder is the best choice for racing yachts that need to improve the control of their jibs.

When sailing, it is sometimes necessary to release the stay, but you have to remember to release the cunningham first to avoid overloading it. With our bicylinder you won't have this problem anymore: the cunningham cylinder is fixed on the headstay cylinder tube and, when you release the headstay, the cunningham follows it automatically.

Another winning idea of the bicylinder is to combine the tubes of the headstay and those of the cunningham cylinder in a single lighter and smaller double tube. This piece is machined from a single block of aluminium (or titanium) alloy in order to reduce the weight of the cylinder as much as possible.

The cunningham ram has a gas room for fast release even without traction load and the terminal rod has a standard female fork design.

The headstay tensioner tube terminal is ready to fit a PBO stay; the tube terminal is made of 17-4 PH to increase performances and avoid any problems from rust with carbon fiber headstay.

Bicylinder is fixed on board via the headstay terminal rod: it can be a female fork or a male terminal with a spherical joint for a self-alignment system under load. Standard Bicylinders have hard coated aluminium alloy tube, rod and tube terminals, nitrolic 50 rods and 17-4 PH headstay rod terminal.

Titanium or 17-4 PH models are available on request as are custom arrangements for terminal rods, strokes and bores.

Our Bicylinders are installed on racing and fast cruising yachts in different sizes and with customized terminals.



Bicylinder.

BICYLINDERS

MODEL	HEADSTAY RAM BORE		HEADSTAY RAM STROKE		HEADSTAY MAX PULL		CUNNINGHAM RAM BORE		CUNNINGHAM RAM STROKE		CUNNINGHAM MAX PULL		DRY WEIGHT	
	mm	*in*	*mm*	*in*	*kg*	*lb*	*mm*	*in*	*mm*	*in*	*kg*	*lb*	*kg*	*lb*
BCL 045 022 250	45	1,77	250	9,84	6809	15011	22	0,87	208	8,19	1537	3389	3,7	8,16
BCL 050 022 255	50	1,97	255	10,04	8711	19203	22	0,87	210	8,27	1537	3389	4,5	9,92
BCL 055 022 300	55	2,17	300	11,81	9803	21613	22	0,87	250	9,84	1537	3389	5,0	11,02
BCL 060 030 300	60	2,36	250	9,84	10000	22046	30	1,18	250	9,84	1261	2780	8,5	18,74
BCL 065 025 350	65	2,56	350	13,78	14975	33015	25	0,98	280	11,02	1925	4245	7,0	15,43
BCL 070 030 350	70	2,76	350	13,78	16012	35300	30	1,18	300	11,81	2818	6213	8,5	18,74
BCL 075 030 350	75	2,95	350	13,78	18418	40604	30	1,18	300	11,81	2818	6213	9,4	20,72
BCL 085 040 350	85	3,35	350	13,78	25319	55819	40	1,57	300	11,81	5380	11861	12,4	27,34
BCL 085 050 350	85	3,35	350	13,78	25456	56121	50[1]	1,97	165[1]	6,50	3603[1]	7943	18,9	41,67
BCL 090 045 250	90	3,54	250	9,84	25493	56202	45	1,77	230	9,06	6128	13510	14,8	32,63
BCL 090 055 600	90	3,54	600	26,62	19450[2]	42880	55[2]	2,17	265[2]	10,43	4662[2]	10278	26,0	57,32
BCL 095 055 190	95	3,74	190	7,48	14311[3]	31550	55[3]	2,17	120[3]	4,72	1865[3]	4112	15,1	33,29
BCL 100 055 250	100	3,94	250	9,84	35995	79355	55	2,17	300	11,81	6055	13344	26,2	57,74

(1) Pushing 2:1 cylinder.
(2) Pushing 2:1 cylinder, bicylinder working pressure @ 350 bar.
(3) Pushing 2:1 cylinder @ 150 bar, headstay @ 200 bar.



Bicylinder developed for class yacht races.



TP52.

INNER FORESTAY CYLINDERS

For fast cruiser sailing yachts, we offer a different solution based on a standard single acting cylinder which is fully installed under the deck for a flush design.

The system is composed of three main parts:

- a single acting cylinder
- a manual turnbuckle
- an upper guide tube

The hydraulic ram, placed on the lower part of the system, is fixed by a chainplate inside the boat and pulls down the stay with hydraulic power; a gas spring helps the system while easing.

The upper tube works as a guide for the piston where the lashing hook is fixed.

To easily combine those two parts, a turnbuckle is placed between the two rods to trim the distance between the hydraulic cylinder and the upper guide.

Both inner forestay models are available in many sizes and strokes to achieve design requirements.

The lashing hook is supplied with the forestay cylinder, and it is made of Dyneema®.



Inner forestay ram with lashing arrangement.

MODEL	MAX PULL LOAD		STROKE		L MIN (PIN TO DECK)		WEIGHT		WORKING PRESSURE		OIL VOL.
	kg	*lb*	*mm*	*in*	*mm*	*in*	*kg*	*lb*	*bar*	*PSI*	*litres*
PT 055 A 0250	7355	16216	250	9,8	1187	55,15	9,7	21,4	350	5000	0,5
PT 055 A 0300	7352	16208	300	11,8	1711	67,36	11,4	25,1	300	4300	0,7
PT 055 A 0340	4950	10913	340	13,4	1644	64,72	11,0	24,3	235	3400	0,7
PT 055 A 0400	7355	16216	400	15,7	1502	59,13	12,3	27,1	350	5000	0,8
PT 070 A 0260	11979	26409	260	10,2	1606	46,73	13,8	30,4	350	5000	0,9
PT 070 A 0270	11979	26409	270	10,6	1616	63,62	14,0	30,9	350	5000	0,9
PT 070 A 0300	11979	26409	300	11,8	1646	64,80	14,2	31,3	350	5000	1,0
PT 070 A 0350	11983	26418	350	13,8	1948	76,70	17,0	37,5	350	5000	1,2
PT 070 A 0400	8556	18863	400	15,7	2020	78,53	19,0	41,9	250	3600	1,5
PT 070 A 0600	8556	18863	600	23,6	2753	108,39	23,6	52,0	250	3600	2,3
PT 080 A 0300	15411	33975	300	11,8	2278	89,68	24,0	52,9	350	5000	1,3
PT 100 A 0350	11656	25697	350	13,8	1921	75,63	35,0	77,2	160	2300	2,5
PT 100 A 0500	25197	55548	500	19,7	2430	95,67	40,4	89,1	350	5000	3,5
PT 100 A 0700	19550	43100	700	27,6	3088	121,57	50,8	112,0	280	4000	4,8

Swan 82' design by Frers. With the under deck inner forestay hydraulic tensioners, a full flush and clean design of the bow is possible.



MAGIC DOOR SYSTEM

Magic Door is a smart system for sailing yachts transom doors.

With a simple and lightweight double acting cylinder and a smart pulley system, this product provides a hydraulic transom door on your boat.

Magic Door consists in a double acting cylinder with an ingenious 2:1 tackle system. The terminal rod has 4 sheaves in order to manage all the 4 sheets which drive the cars on the tracks at the same time.

The Magic Door can also be used to easily control the bath platforms reducing the space required for the technical room.

- LIGHTWEIGHT

Magic Door consists of a single hydraulic cylinder. All the ram components are made of lightweight hard coated aluminium. Rod and tube terminal sheaves are made of high strength plastic and Polizene®. Fittings and screws are in stainless steel in order to avoid any rust issues.

- COMPACT AND EASY TO PLACE ON BOARD

The double acting hydraulic ram can be placed in different ways in the boat garage: horizontal, vertical, port or starboard side, under the cockpit or on the bulkhead.

- SAFETY

The Magic Door system manages the movements of the door: it is possible to stop the system at any moment at no risk. Moreover, the sheets work as a bumper to protect the system from wave strikes and overloads.



Solaris 48': customer rods link the transom door to the cars on the track of the Magic Door system



The Magic Door ram controls the bath platform.

The Magic Door cylinder is also available with a compact and lightweight installation kit.

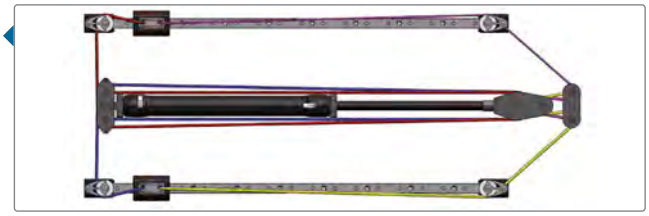
Pack counts:

- the Magic Door double acting hydraulic cylinder
- tracks with sheaves and cars for double rods system (700 mm stroke)
- Magic Door forehead pulley to drive the sheets to the tracks
- lightweight aluminium hydraulic power pack with integrated valves block and oil tank
- compact electric box with integrated power relay
- P67 stainless steel push buttons to move the transom door up and down



MODEL	BORE		STROKE [1]		WORKING PRESSURE		WORKING LOAD [2]		WEIGHT [3]	
	mm	*in*	*mm*	*in*	*bar*	*PSI*	*kg*	*lb*	*kg*	*lb*
CL 035 D 350	35	1,38	350	13,78	140	2000	1375	3032	2,5	5,51

(1) 350 mm cylinder stroke. 700 mm cars stroke due to 2:1 tackle.
(2) With 2:1 tackle the load on every car is split by half.
(3) Double acting cylinder weight.
The overall weight of the Magic Door Kit is 9.8 kg (21.56 lb).

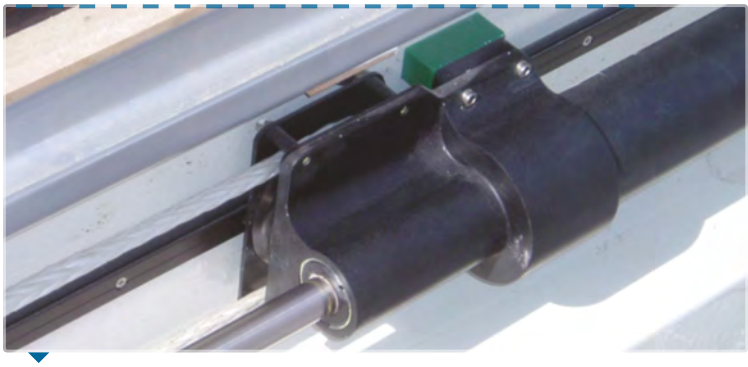


TRAVELLER CYLINDERS

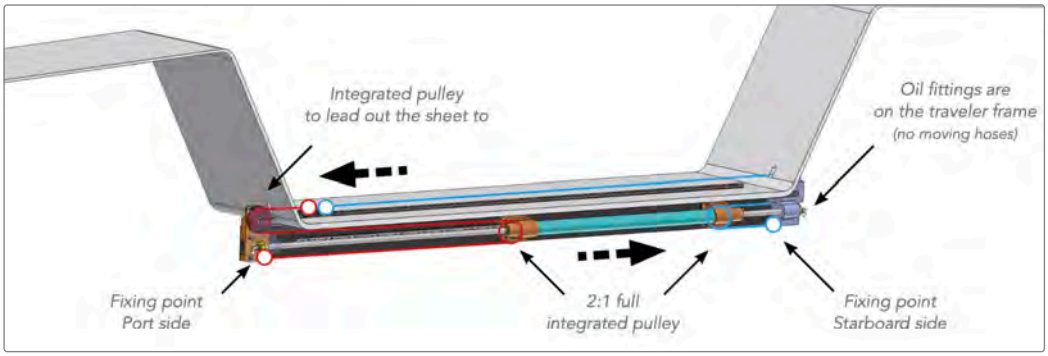
Designed for fast or race-cruiser sailing yachts, our hydraulic traveller lets you easily control the main or genoa cars.

The traveller has drilled rods: oil is pumped in the cylinder tube through the rod terminals which are fixed to the chassis of the system.

The same length of the main traveller track is guaranteed by the 2:1 integrated purchase system. Tube terminals have integrated pulleys for the tackle.



Hydraulic traveller installed on board.



The travellers are available with different types of chassis in order to follow the yacht design.

Black hard coated aluminium is used for tube and chassis; rods and pins are made of *Nitronic 50* and low friction peek is used for bearings.

The frame is available in lightweight black hard coated aluminium or carbon fibre. The frame can be removed, and it is possible to fix the traveller system straight to the bulkhead.

Custom models available on request.

MODEL	WORKING LOAD [1]		BORE Ø		ROD Ø		STROKE		OVERALL LENGTH	
	kg	lb	mm	in	mm	in	mm	in	mm	in
CL 040 DS 0800	1681	3707	40	1,57	20	0,79	800	31,5	2300	90,6
CL 040 DS 1000							1000	39,4	3130	123,2
CL 040 DS 1500							1500	59,1	3542	139,4
CL 050 DS 0300	2942	6487	50	1,97	20	0,79	300	11,8	1072	42,2
CL 050 DS 0900							900	35,4	2102	82,8
CL 050 DS 1700							1700	66,9	3802	149,7
CL 055 DS 1100	3363	7413	55	2,17	25	0,98	1100	43,3	2756	108,5
CL 055 DS 1400							1400	55,1	3265	128,5
CL 055 DS 2150							2150	84,6	4745	186,8
CL 60 DS 0400	4168	9189	60	2,36	25	0,98	400	15,7	1246	49,1
CL 60 DS 1200							1200	47,2	3254	128,1
CL 60 DS 2250							2250	88,6	4935	194,3
CL 65 DS 2430	5044	11120	65	2,54	25	0,98	2430	95,7	5211	205,2
CL 70 DS 1200	5604	12355	70	2,76	30	1,18	1200	47,2	3240	127,6
CL 70 DS 2400							2400	94,5	5434	213,9
CL85 DS 2755	8862	19537	85	3,35	30	1,18	2755	108,5	6984	275
CL 100 DS 2563	12750	28108	100	3,94	30	1,18	2563	100,9	6253	246,2

(1) Sheet working load at 350 bar (5000 PSI).

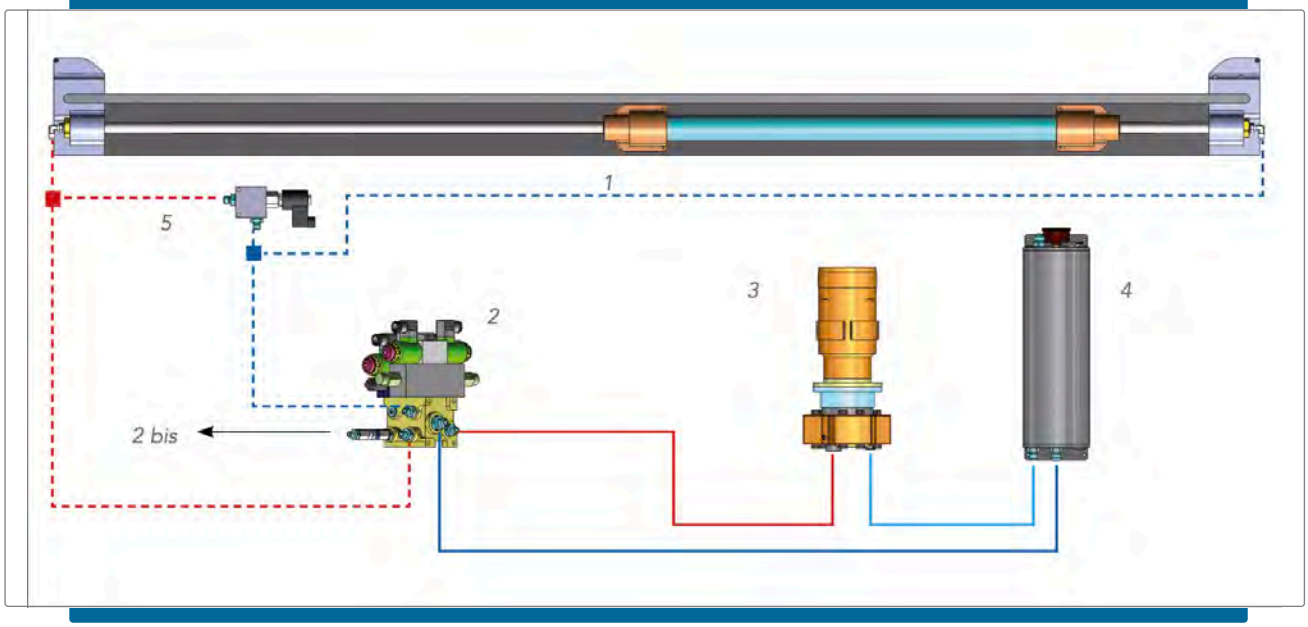


Hydraulic traveller installed on a 86' fast cruise yacht. The rod terminals are fixed on the boat and the tube slide on car driven by a track. No moving hoses, easy installation and few space requirement.

This double acting cylinder, closed to traveller arrangements is installed on a 90' race-cruiser yacht. It controls the jib car by two sheets and it is squeezed under the car track in a very small space.

Our package can be composed by:

- traveller double acting cylinder (with custom bore, stroke and arrangement) **(1)**
- valve block to drive the traveller system made with lightweight aluminium manifold and stainless steel fit tings **(2)**
- electric back-up for manual panel up to 500 bar **(2bis)**
- electric powerpack with high pressure piston pump and long life forced air cooled electric engine **(3)**
- pressurized aluminium oil tank **(4)**
- by-passed valve to bump the traveller when jibing/tacking or emergency **(5)**
- electric control box with stainless steel push buttons and proximity switches



Lighter and more compact systems, with a single acting cylinder, are available to control main car up from downwind up to the boat centre or to control jib in/out car.

magic trim



Magic Trim was developed in 1998. It was the first **hydraulic double acting cylinder** with integrated 4:1 tackle designed to work at two different speeds.

It is the result of one of **Giovanni Cariboni**'s purely innovative ideas and the product is Cariboni patented.

Nowadays, the **Magic Trim** appears on more than a hundred sailing boats all over the world, driven by the need to trim and release the sheets under big loads in a very short time. **Magic Trim** spans from a length of 30' to an unspecified length: the biggest size produced today is the **210**' of the Magic Titanium.

The idea – This is a simple and clever idea – a 4:1 tackle made of a double acting hydraulic cylinder with two sheaves mounted at both ends. When the actuator is extended, the sheet passing through the sheaves is trimmed by a length equal to four times its extension; on the contrary, when the actuator is shortened the sheet is released. With this revolutionary system, you can eliminate the need of winches on deck to trim the sails; the result is a clear deck with a powerful and accurate system to control the sails.

The main features – Magic Trim has a 4:1 tackle but the load transmitted to the fixing points of the ram is identical to the sheet working load thanks to the system design, which guarantees a lighter boat structure. Considering the same sheet load, Magic Trim is faster, lighter and more reliable than the traditional maneuvering systems. Therefore, it is successfully utilized by cruising and regatta sailing boats. With our hydraulic system, it is possible to have fast and slow regulations even with heavy loads just by pushing a button! For fine tuning, Magic Trim is available with fully integrated linear sensors and proportional control of speed. Magic Trim works with a designed working load and when the regulation is done, it can go up to 1.6 times the maximum designed working load; when higher values are applied, the sheet is automatically released, in order to preserve the boat equipment.

The main applications – Besides having a number of special applications, Magic Trim is normally used on sailing boats for the main sheet regulations, main sail traveller or jib sheet regulations, and in every other occasion where it is necessary to pull long sheets in a limited space (for lifting keel cylinder for example).

A MAGIC STORY...

1998 - Magic Trim
The original one, patented in 1998.
Cariboni improves hydraulic rams for sail trimming by developing the Magic Trim. Faster than conventional rams and with the peculiarity of having two speeds, it provides faster and smoother control of the sails with the best reliability.

2000 - Magic Simple
Designed for 2000 AC yachts, Magic Simple is the powerful solution to trim the highest load you can find on a race sailing yacht. Magic Trim Simple has a 2:1 tackle powered by a push cylinder in a compact and lightweight solution.

2001 - Magic Testa
A special version of Magic Trim, engineered for unique applications: these units have been installed on the 60' trimarans Tim and Bonduelle in which the mainsheet and the canting mast are hydraulically controlled by the Magic Testa cylinder.

2002 - Magic Trim Double
Magic Trim Double is the linear development of the Magic Trim and Magic Simple concept: a fast Magic Trim and the powerful Magic Simple all in one. Providing a smart system which matches the load on sheet and lets you save space, weight and power.

2004 - Magic Air
This special kind of Magic Trim has the same 4:1 tackle powered by the hydraulic push cylinder, but the ease of the sheet is driven by the air spring on the head ram. Thanks to Magic Air we're able to offer the same features as the standard Magic Trim with a lighter and more compact system.

2005 - Magic Trim + Magic Double arrangement
A Magic Trim ram to control the sheet faster and a Magic Double for quick trimming. This kind of arrangement often features custom sheaves solutions fully integrated on the two Magic, according to yacht design.

2007 - Smart Magic Trim
This is the Magic Trim for high-tech sailing yachts! What you can see from outside is just the slim shape of Magic Trim; but inside there is all the technology of a magnetic field linear sensor that is ready to manage the cylinder status time after time. This is the standard solution for a fully automatic sail trimming system.



1998 - Magic Trim.

2008 - Smart Magic Double
Smart Magic Double combines everything that you can ask of a hydraulic trim system: sharp control of the sheet with two integrated linear sensors; speed and power thanks to the Magic Double concept; safety and rapid control of the rams with incorporated max pressure and directional control valves. The ultimate solution for next century sailing yachts.



Wally 148'.

2009 - Magic Boom
Take a Cariboni Magic Trim, squeeze it on a modern sailing yacht and...boom! What you have is a Magic Boom! This kind of Magic Trim has special features in order to easily place the cylinder inside the sailing yacht booms.

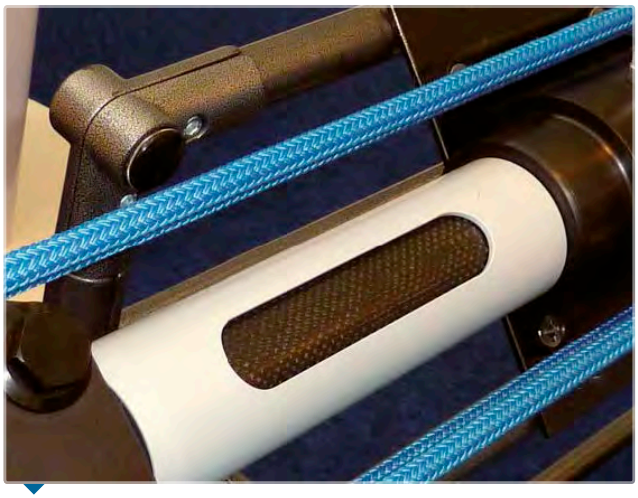
A MAGIC STORY...

2010 – Carbon Magic

Magic Trim with a special carbon fiber rod is available for racing yachts to cut down weight and boost the power of our hydraulic system. Carbon Magic works at higher pressure than standard rams and is half their weight with the same working load.
Less weight, more power, more efficiency.

Special Magic

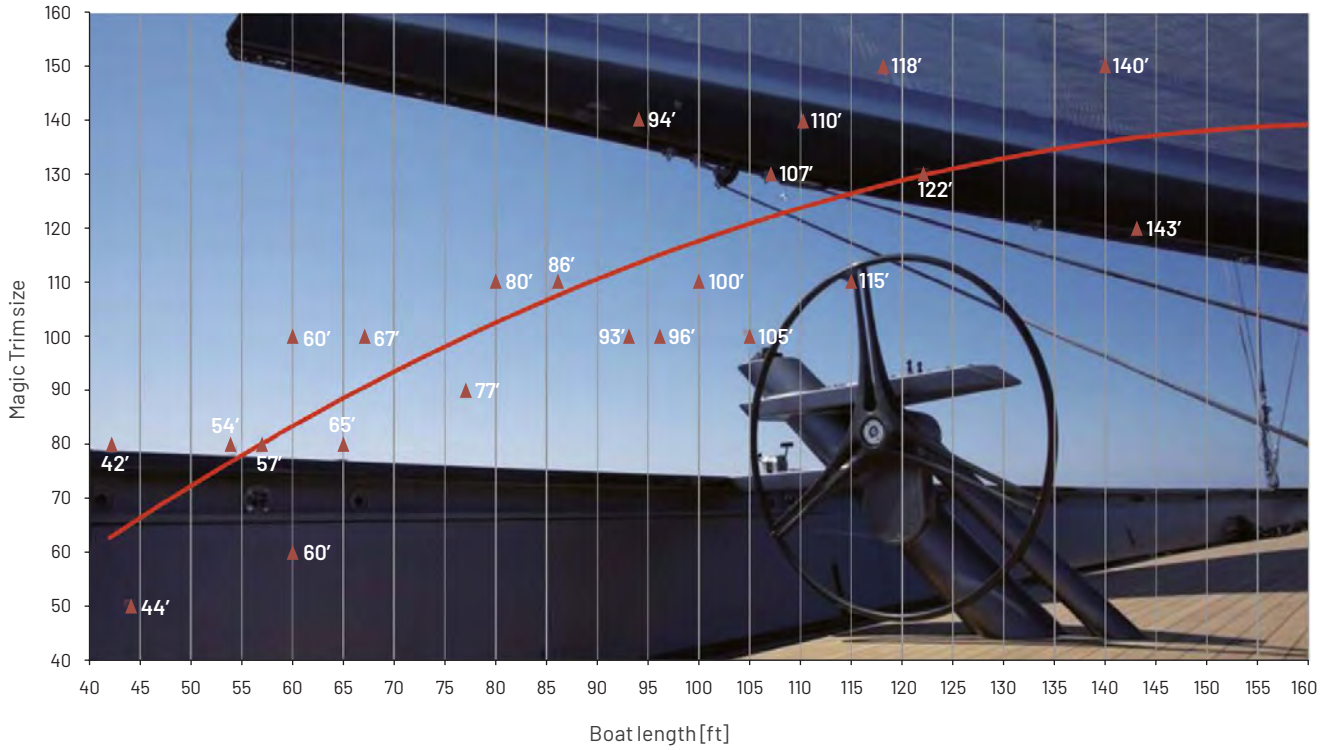
Every Magic Trim is special but, what do you call a Magic Trim with a titanium rod? Or another one with a 17-4 PH rod, a titanium tube and high strength aluminium alloy parts? These Magic trim cylinders are just another hallmark of Cariboni's readiness to meet custom needs. More power? Less weight? Something special? Just ask!



2010 - Carbon Magic.

...which goes on!

magic trim **FOR MAINSHEET**



HOW TO CHOOSE YOUR MAGIC TRIM FOR MAINSHEET

The buckling length is one of the Magic Trim size selection criteria. Here is a simple procedure to calculate the effective mainsheet stroke and therefore the minimum Magic Trim stroke required.

You need to know two things only:
- the effective mainsheet stroke
- the maximum load on mainsheet

Follow this easy example to calculate your mainsheet stroke:
d = distance between sheet and mast
b = distance between boom and deck
α = back spread angle
β = effective maximum mainsail angle

(ex: **α** -10° to avoid any contact between mainsail and cross-trees)

You have to calculate first of all the "**a**" length:

$$\mathbf{a} = 2 \times d \times \sin\left(\frac{\beta}{2}\right)$$

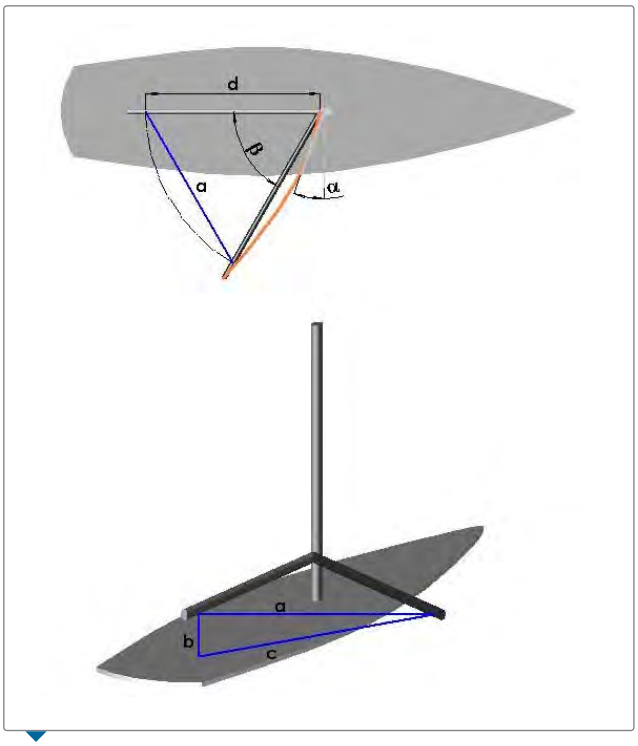
the "**c**" dimension:

$$\mathbf{c} = \sqrt{a^2 + b^2}$$

And the effective sheet stroke

s = **c** - **b**

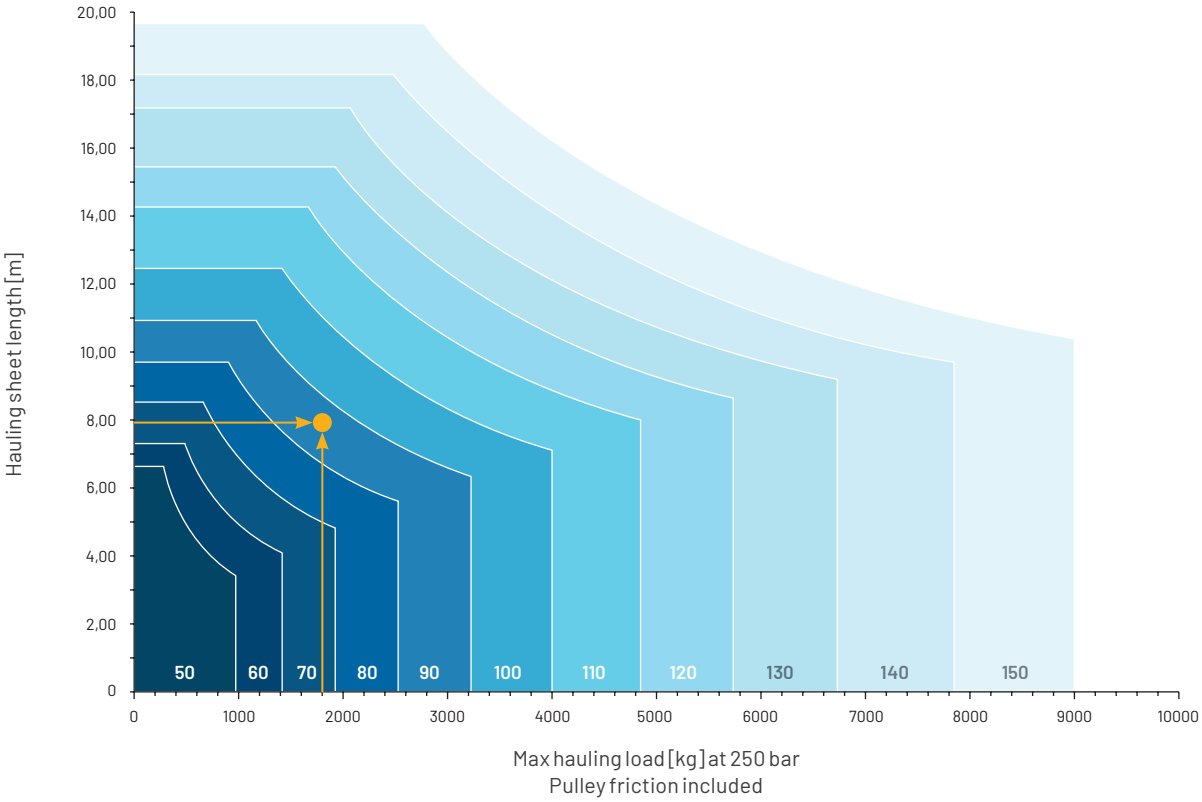
Suppose you have **d** = 10 m, **b** = 2,5 m and b = 60°, then you calculate:
a = **d** = 10 m
c = 10,3 m
s = 7,8 m



Mainsheet length.

Now put this sheet length and the maximum load on sheet into this diagram and find out which size your Magic Trim for mainsheet should be.

Example: effective mainsheet stroke s = 7,8 m, load on sheet of 1800 kg ⟶ Your Magic Trim is: MT_90_1850 (90 mm of bore, 7,8/4 = 1950 mm of stroke)

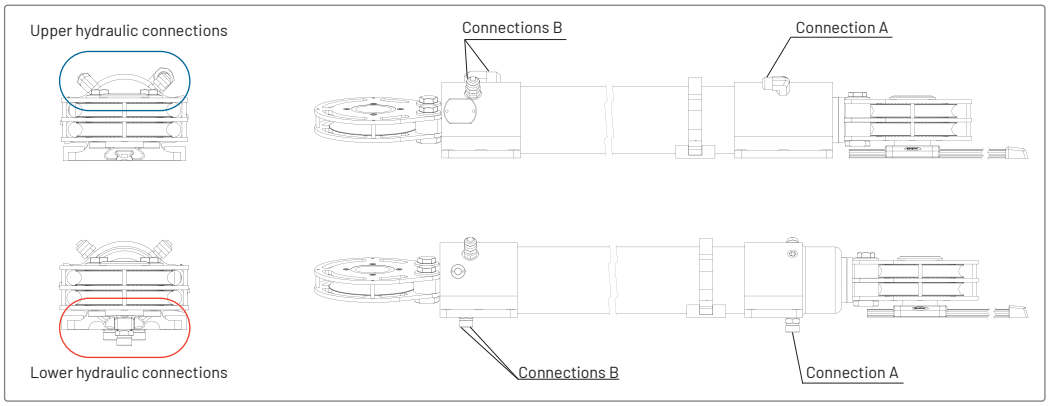


TECHNICAL SPECIFICATIONS

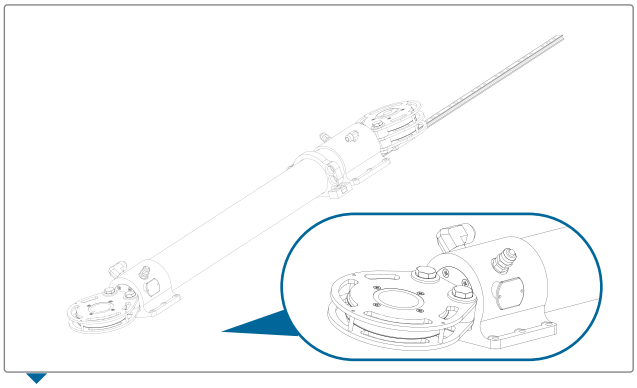
You can **calculate the overall length of your Magic Trim**, the dry weight and the working pressure of the cylinder by filling the form below (our example in blue).

MODEL	HAULING SHEET LENGTH	STROKE	MAGIC MAX LENGTH		MAGIC WEIGHT			WORKING PRESSURE		
		Y	CONST. LENGTH	LMAX	CONST. WEIGHT	WEIGHT COEFFICENT	WEIGHT	HAULING LOAD	PRESSURE COEFFICENT	PRESSURE
	S (mm)	*Y = S/4 (mm)*	*T*	*LMAX = S/2 + T (mm)*	*Q*	*U*	*W = Q + U*S/4 (kg)*	*F (kg)*	*C*	*P = F*C (bar)*
MAGIC 50			529		6,7	0,0072			0,1996	
MAGIC 60			532		8,2	0,0080			0,1388	
MAGIC 70			595		10,2	0,0115			0,1020	
MAGIC 80	7800	7800	644	4554	16,0	0,0119	39,25	1800	0,0781	141
MAGIC 90			766		24,6	0,0205			0,0617	
MAGIC 100			797		28,7	0,0235			0,0500	
MAGIC 110			800		30,7	0,0286			0,0413	
MAGIC 120			801		35,2	0,0331			0,0347	
MAGIC 130			884		46,5	0,0407			0,0296	
MAGIC 140			974		53,5	0,0441			0,0255	
MAGIC 150			1014		66,6	0,0492			0,0222	

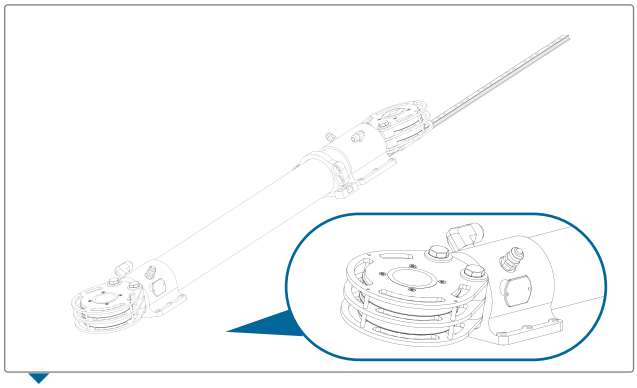
Magic Trim has two hydraulic connections ("A" and "B"): for better installation layout you can choose the place of your hydraulic connections in the upper side of the cylinder or in the lower side.



The Magic Trim is also available with a double fixed pulley. You need the double pulley option when you have a furling system and you need to change the length of the sheet for the sail to be furled.

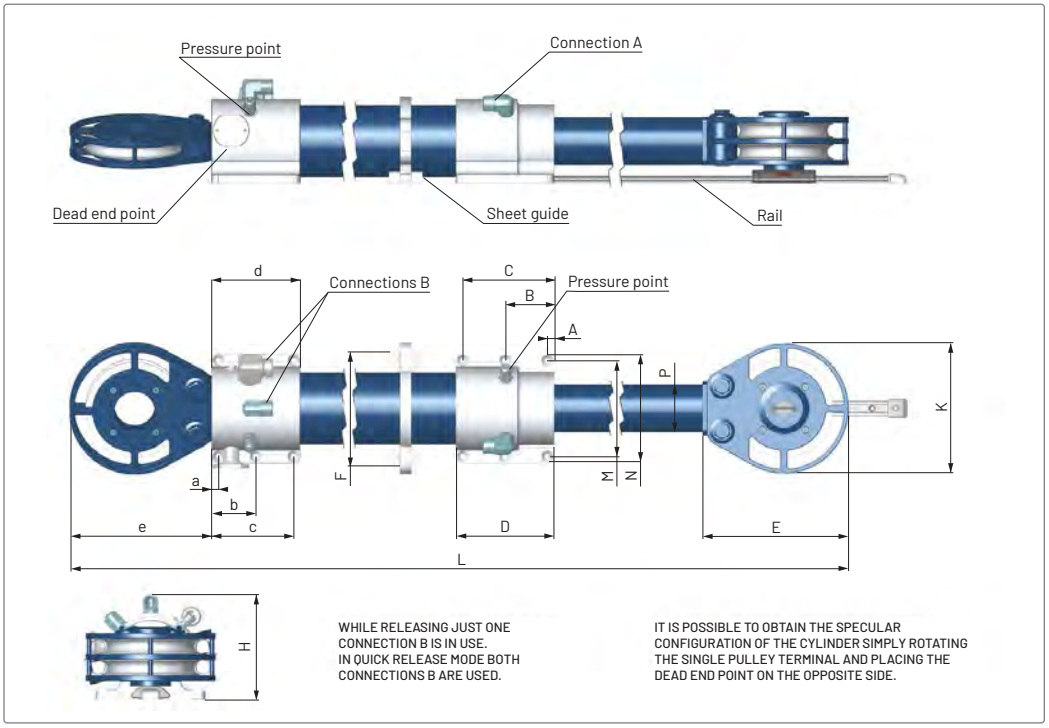


Single fixed pulley.



Double fixed pulley.

TECHNICAL SPECIFICATIONS



MODEL	A	B	C	D	E	a	b	c	d	e
	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)
MAGIC 50	10,00	69,50	129,00	139,00	168,50	10,00	105,00	-	115,00	163,50
MAGIC 60	10,00	106,00	-	116,00	165,00	10,00	106,00	-	116,00	162,00
MAGIC 70	10,00	75,00	140,00	150,00	184,75	10,00	60,00	110,00	120,00	176,94
MAGIC 80	10,00	80,00	-	90,00	203,50	10,00	60,00	110,00	120,00	194,50
MAGIC 90	12,00	55,50	99,00	111,00	257,50	12,00	74,00	136,00	148,00	253,50
MAGIC 100	12,00	87,25	162,50	174,50	260,50	12,00	79,00	146,00	158,00	252,50
MAGIC 110	12,00	59,55	107,10	119,10	266,58	12,00	85,00	158,00	170,00	258,58
MAGIC 120	15,00	87,50	160,00	175,00	285,00	15,00	83,25	151,50	166,50	278,00
MAGIC 130	19,50	97,50	175,50	193,50	298,25	15,00	89,00	163,00	178,00	291,25
MAGIC 140	15,00	102,75	190,50	205,50	327,00	15,00	91,25	167,50	182,50	320,00

MODEL	F	H	K	M	N	P	BOLTS Ø	MAX SHEET Ø	CONN. A	CONN.B
	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)		
MAGIC 50	135,00	110,00	149,00	105,00	125,00	42	8	14	9/16" UNF - JIC 37°	9/16" UNF - JIC 37°
MAGIC 60	151,00	114,00	147,00	110,00	130,00	50	8	14	9/16" UNF - JIC 37°	9/16" UNF - JIC 37°
MAGIC 70	164,50	123,20	155,00	130,00	150,00	60	8	16	3/4" UNF - JIC 37°	3/4" UNF - JIC 37°
MAGIC 80	174,50	131,75	180,00	140,00	160,00	70	8	18	3/4" UNF - JIC 37°	3/4" UNF - JIC 37°
MAGIC 90	225,00	157,50	235,00	165,00	188,00	75	10	20	3/4" UNF - JIC 37°	3/4" UNF - JIC 37°
MAGIC 100	233,00	173,00	231,00	171,00	195,00	85	10	20	3/4" BSP	3/4" BSP
MAGIC 110	231,00	181,57	239,00	182,00	206,00	95	10	22	3/4" BSP	3/4" BSP
MAGIC 120	248,00	193,45	262,00	205,00	235,00	100	12	22	3/4" BSP	3/4" BSP
MAGIC 130	280,00	208,18	274,00	218,00	248,00	110	12	24	3/4" BSP	3/4" BSP
MAGIC 140	290,00	215,00	290,00	220,00	250,00	120	12	24	3/4" BSP	3/4" BSP

SPRING PULLEY

Our spring pulley avoids any jamming of the line on the under deck hydraulic rams, while easing without load on the sheet.

This simple and clever idea stops the system when the load on the sheet becomes too low. This action protects the system from damage.

No hydraulic power is required.



Spring Pulley
Dimensions: 375 x 65 x 65 mm
Weight: 1,074 kg.

MODEL	OVERALL DIMENSIONS		MAX SHEET Ø		WEIGHT	
	mm	*in*	*mm*	*in*	*kg*	*lb*
SP 015	351 x 57 x 60 (h)	13,8 x 2,2 x 2,4 (h)	15	0,6	1,0	2,2
SP 024	310 x 57 x 73 (h)	12,2 x 2,2 x 2,9 (h)	24	0,9	1,2	2,6

MAGIC PULLER

Magic Puller is composed by a high efficiency hydraulic engine combined with a pulley or with a high strength rubber chain. This very compact system is driven by a proper hydraulic manifold which controls the speed of the system in order to keep load on the sheet in every circumstance.

Both models of Magic Puller are made of lightweight black hard coated aluminium alloy with low friction ball bearing and stainless steel oil fittings and screws.

Different sizes and custom solutions are available on request.

MODEL	MAIN DIMENSIONS		SHEET Ø [1]		WEIGHT		WORKING PRESSURE		NOTE
	mm	*in*	*mm*	*in*	*kg*	*lb*	*bar*	*PSI*	
	337 x 180 139 (h)	13,3x7,1 5,5 (h)	20	0,79	8,5	18,7	140	2000	For in-line arrangement. Under the deck mounting position
	302 x 283 164 (h)	11,9 x 11,1 6,45 (h)	20	0,79	7,65	16,8	250	3570	For step block arrangement. Deck mounting position

(1) Custom models **available** for bigger sheet diameter.



In line arrangement.

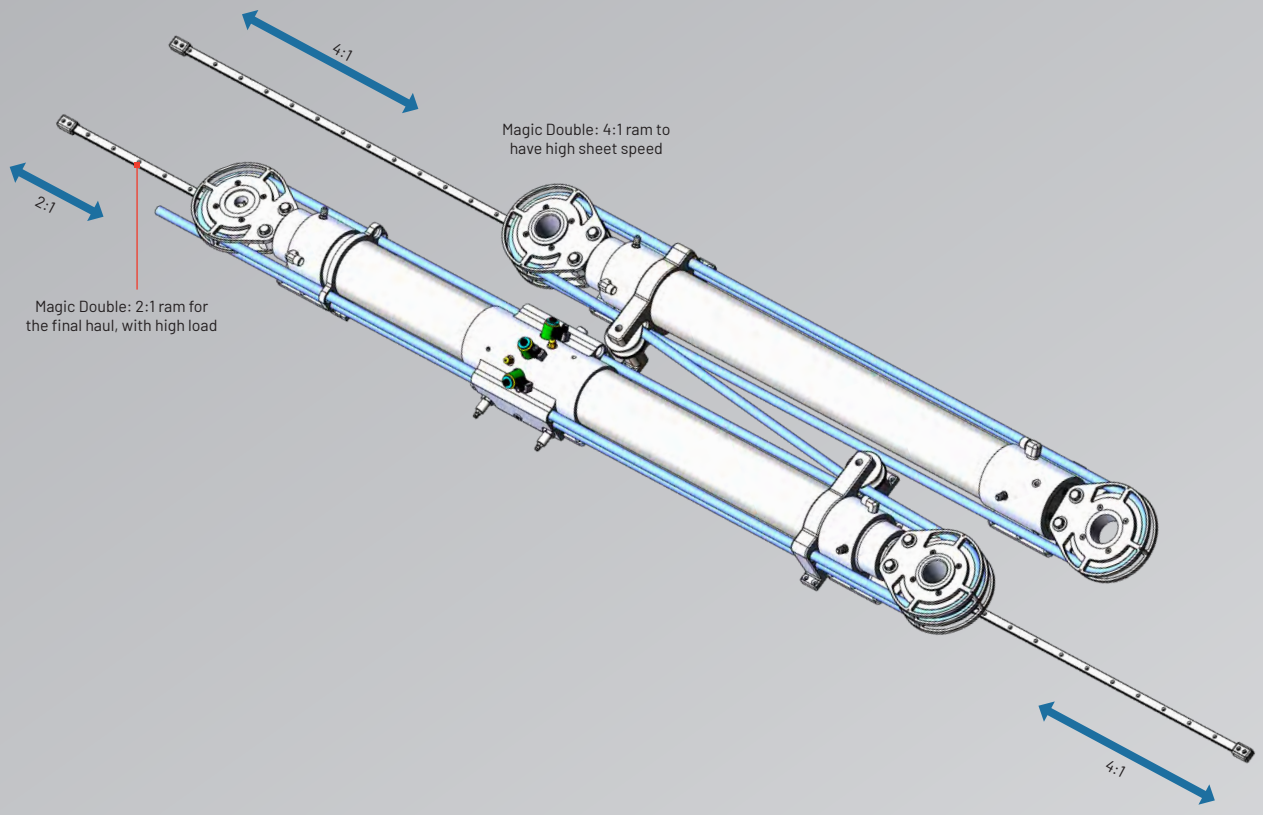


Step block arrangement.

magic double

Magic Double is composed of two integrated rams: one works as a 4:1 tackle to start quick hauling; the other works as a 2:1 tackle for the final powerful setting due to the exponential trend of the load.

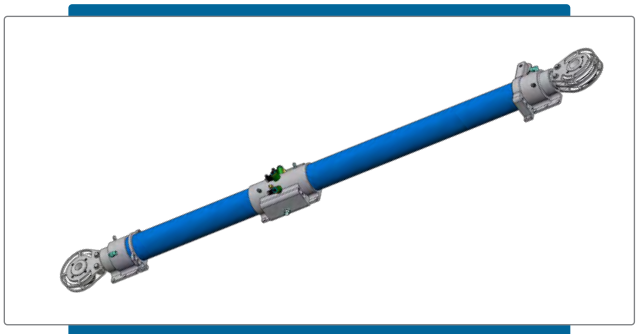
Compared to standard cylinders, **Magic Double** is smaller while taking the same load. Lower size, less oil volume, weight savings mean an increase in performance and speed.



SMART MAGIC DOUBLE

Smart Magic Double is a Magic Double with integrated valves in the central part of the cylinder. Directional valves and release valves are part of the ram so as to guarantee maximum system reliability and safety.

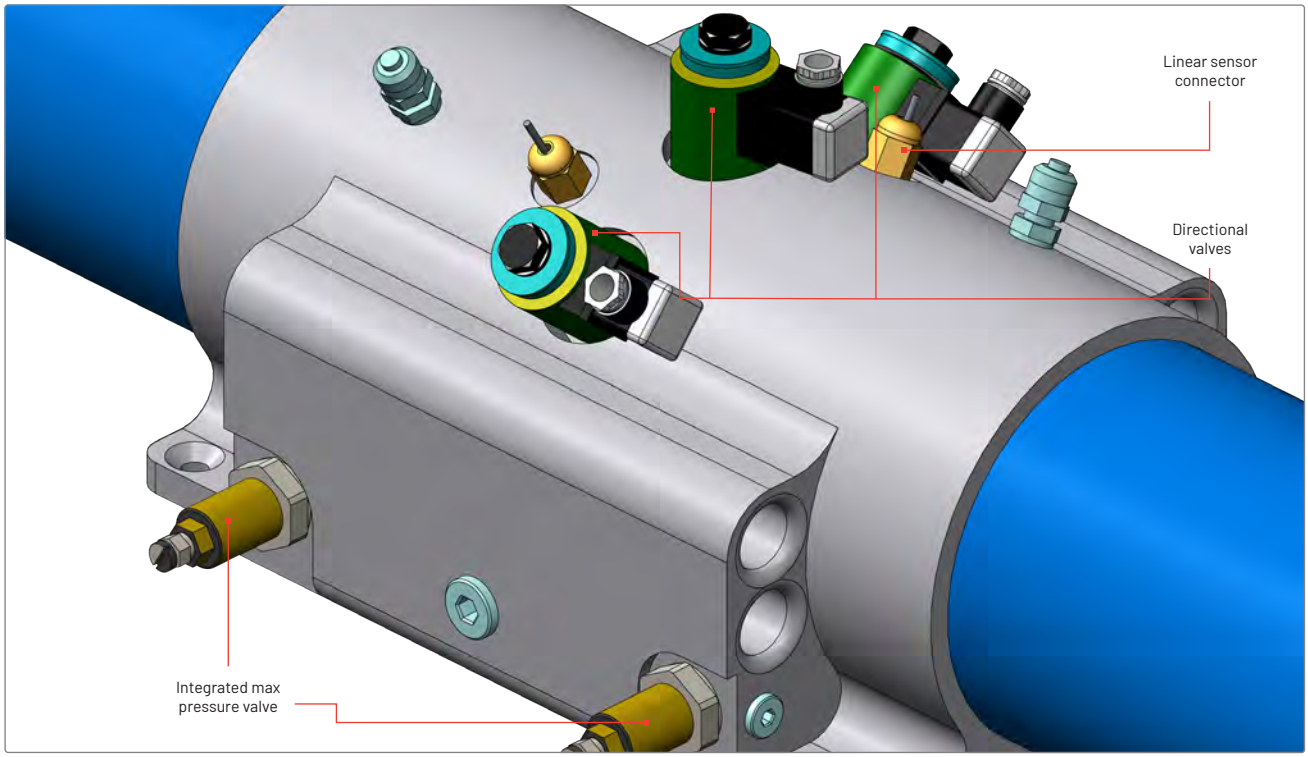
Smart Magic Double is often equipped with an integrated linear sensor to perfectly control the sheet.



- Smart Magic Double
- Bore: 140 mm
- Stroke: 1400 mm (4:1), 1000 mm (2:1)
- Hauling sheet length: 7,6 m
- Hauling load on sheet: up to 9 tons



Magic Trim and Smart Magic Double arrangements.





Wally 130' deck: Magic Trim and Smart Magic Double are used for the mainsheet and jib sheet. Thanks to these automatic systems, the deck is flush and free from winches and their sheets.

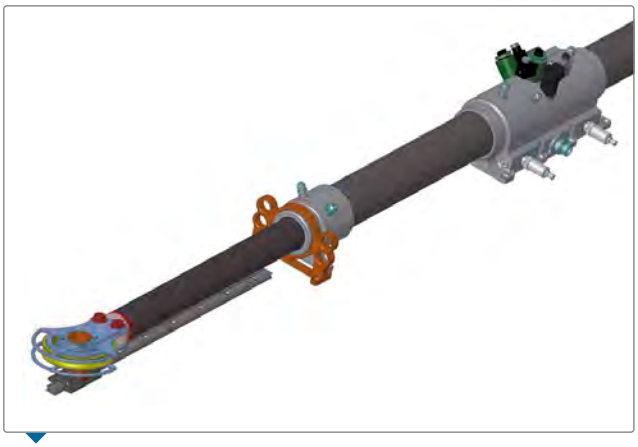
SMART CARBON / TITANIUM MAGIC DOUBLE

Here's the carbon fiber rod and titanium tube version of the Smart Magic Double.

Thanks to the unique characteristics of the carbon fiber, the new Magic Trim handles higher loads and longer hauling lengths than the conventional Double Magic Trim.

The titanium tubes allow a working pressure of up to 600 bar with lower weight and dimensions compared to a standard aluminium ram.

These carbon titanium Magic Double are all equipped with directional, max pressure valves and integrated linear sensors on the central hub for more control and maximum reliability.



Smart Carbon Magic Double.

MODEL	MAX HAULING LOAD		MAX HAULING LENGTH		WORKING PRESSURE 2:1 RAM		STROKE				BORE		DRY WEIGHT	
							2:1 ram		4:1 ram					
	kg	lb	mm	in	bar	PSI	mm	in	mm	in	mm	in	kg	lb
MD 090 0500-1250	6000	13200	6000	236	220	3190	500	19,68	1250	49,21	90	3,54	62	136
MD 090 0600-1570	6000	13200	7480	294	220	3190	600	23,62	1570	61,81	90	3,54	69	152
MD 090 0600-1800	6000	13200	8400	329	250	3625	600	23,60	1800	70,90	90	3,54	79	174
MD 100 0800-2150	7700	20900	10200	400	250	3625	800	31,50	2150	84,60	100	39,30	116	255
MD 110 1000-2300	9500	20900	11200	439	250	3625	1000	39,40	2300	90,50	110	4,30	182	401



Wally 110 with Magic Trim system for mainsheet and hydraulic rams.

SIMPLE *magic trim*

Simple Magic Trim derives from the idea of the Magic Trim, applied to very compact dimension and weight. This is a 2:1 tackle made by a single acting cylinder that works in compression. When the ram is extended, the sheet passing through the sheave is trimmed by a length equal to two times its extension. The ram is closed by the sheet load when the oil is released.

It is possible to control a single or a double sheet choosing the respective sheave. Even though the system is made by a tackle, the load transmitted to the fixing point is identical to the sheet working load.

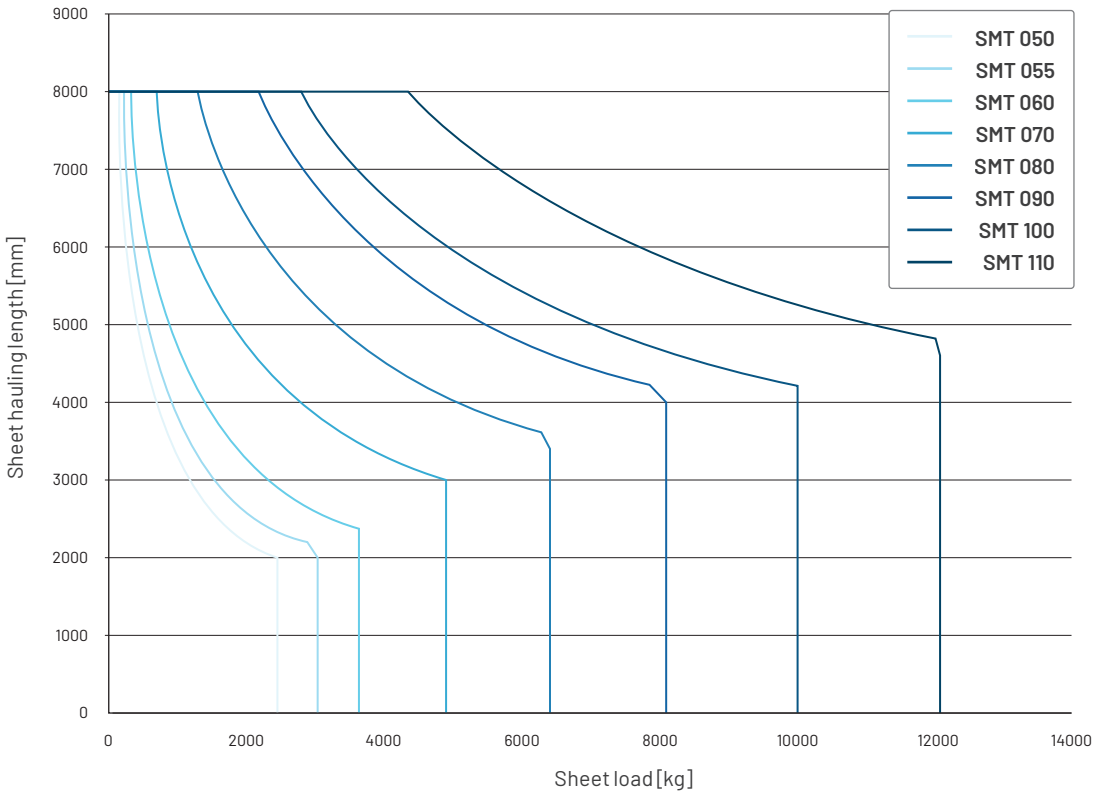


SIMPLE MAGIC TRIM

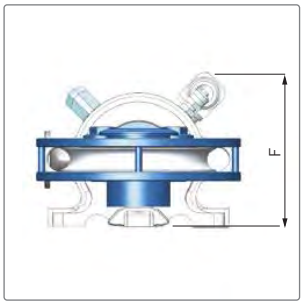


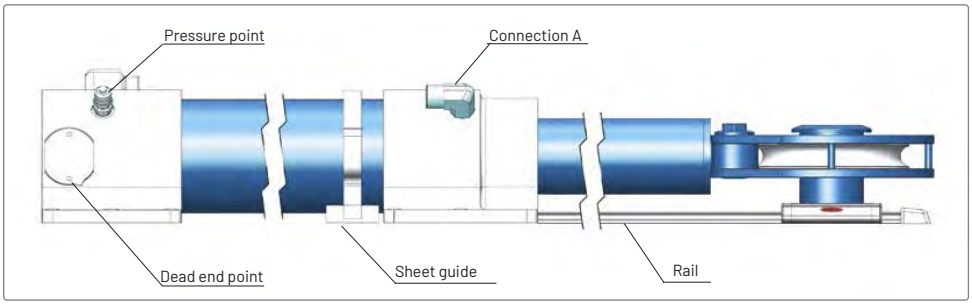
Titanium SMT 30 Ti for 2000 America's Cup.

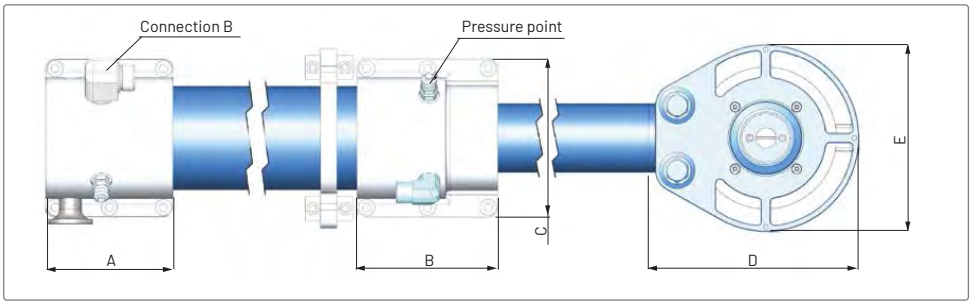
MODEL	MAX HAULING LOAD		MAX HAULING LENGTH		HAULING BREAKING LOAD		OIL FITTINGS	
	kg	*lb*	*bar*	*PSI*	*kg*	*lb*	*Connection A*	*Connection B*
SMT 050	2502	5516	250	3625	5000	11023	9/16 UNF – JIC 37°	9/16 UNF – JIC 37°
SMT 055	3027	6673	250	3625	6000	13228	9/16 UNF – JIC 37°	9/16 UNF – JIC 37°
SMT 060	3603	7943	250	3625	7000	15432	9/16 UNF – JIC 37°	3/4 UNF – JIC 37°
SMT 070	4904	10811	250	3625	10000	22046	9/16 UNF – JIC 37°	3/4 UNF – JIC 37°
SMT 080	6405	14121	250	3625	12000	26455	9/16 UNF – JIC 37°	3/4 UNF – JIC 37°
SMT 090	8106	17871	250	3625	16000	35274	3/4 UNF – JIC 37°	3/4 BSP
SMT 100	10008	22064	250	3625	20000	44092	3/4 UNF – JIC 37°	3/4 BSP
SMT 110	12109	26696	250	3625	24000	52911	3/4 UNF – JIC 37°	3/4 BSP



SIMPLE MAGIC TRIM







MODEL	BORE	A	B	C	D	E
	mm	*mm*	*mm*	*mm*	*mm*	*mm*
SMT 050	50	115	139,0	125	168,5	149
SMT 055	55	95	104,0	120	136,5	144
SMT 060	60	116	116,0	130	165,0	147
SMT 070	70	120	150,0	150	184,7	155
SMT 080	80	120	90,0	160	203,5	180
SMT 090	90	148	111,0	188	257,5	235
SMT 100	100	158	174,5	195	260,5	231
SMT 110	110	170	119,1	206	255,6	239

EASY SAILING

Easy Sailing means having fun with your sailing yacht by yourself: even on the modern mega-yachts a sailor can tack or jib by themselves just by pushing a button and feel free to sail alone!

Our Easy Sailing System increases boat security reducing human efforts and errors on winches to a minimum.

With the automatic mainsheet and jib control system, sailing is more fun, and every tacking or jibing will be a pleasure!

Easy Sailing System is a wise mix of all the best technologies available in the marine environment:

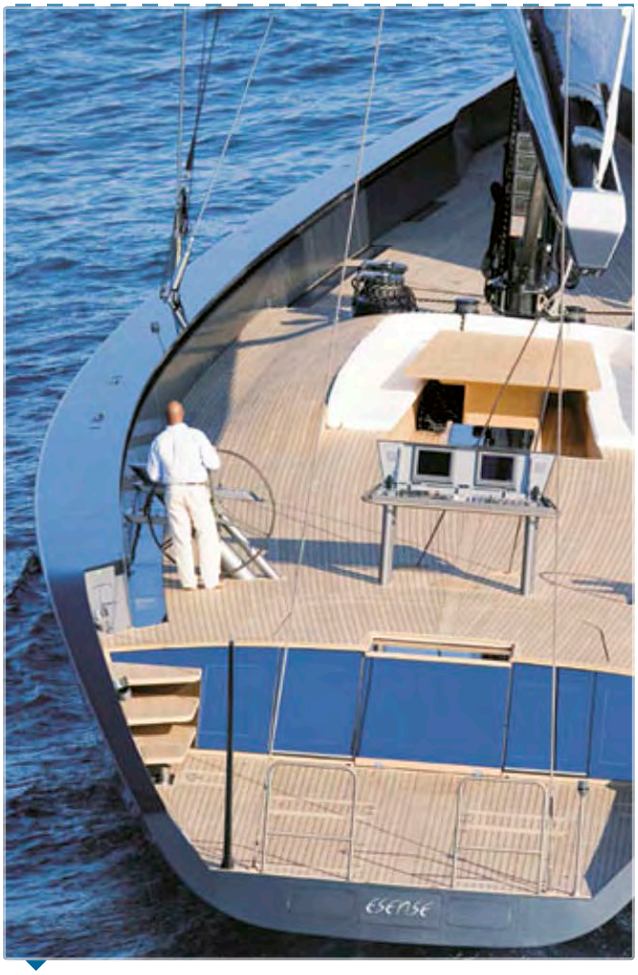
- lightweight hydraulic cylinders to control the sails (mainsheet, jib sheet, main car and jib cars)
- furlers for mainsails, staysail, jib and code zero sails
- aluminium hydraulic manifold blocks to drive all the hydraulic devices
- high efficiency electric powerpacks to supply the hydraulic system
- marine PLC electronic control to manage power with accuracy for a quick, smooth and safe movement of all the automations
- on/off standard and proportional control button panels make the helm man's life easy, giving them full control of the yacht

We can supply a fully integrated easy sailing system for small and large yachts.

In the 33' Wallynano, the Easy Sailing System is composed of:

- mainsheet Magic Trim ram with manual backup system
- jib sheet single acting ram with 2:1 tackle
- boom vang
- backstay ram with 2:1 tackle
- hydraulic system with aluminium manifold and 12 V 2500 Watt powerpack
- electronic control with PLC system

The system has a 250 bar working pressure and all the functions have a speed control. The mainsheet ram also has fast and trim speed both for hauling and for easing.



Wally 143; mainsheet and jib sheet are fully controlled by Magic Trim and Magic Double cylinders.

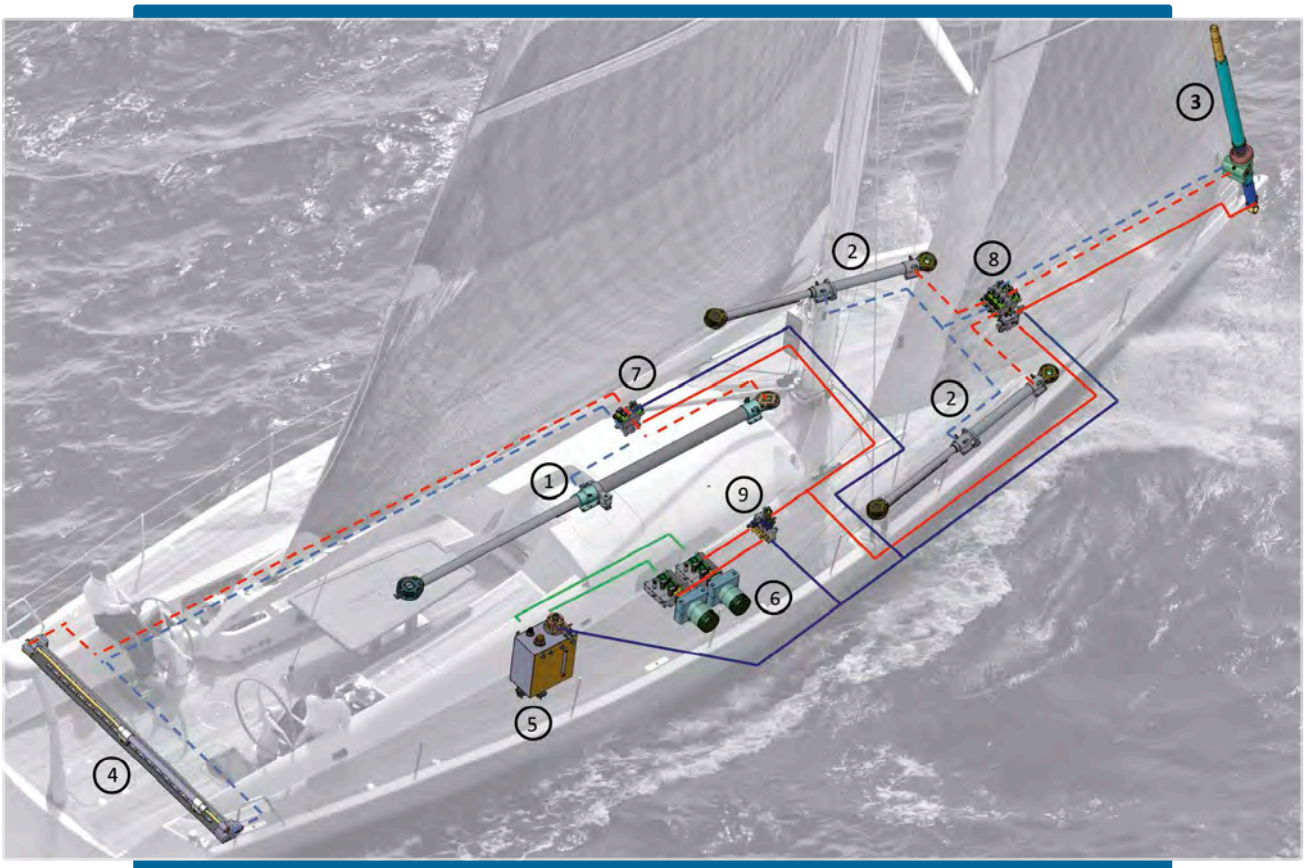


Wallynano 33' equipped with Easy Sailing System and hydraulic rams.



Solaris 60' with Magic Trim system for the mainsheet and Hydraulic Easy Sailing System.

EASY SAILING SYSTEM 60’ SKETCH EXAMPLE

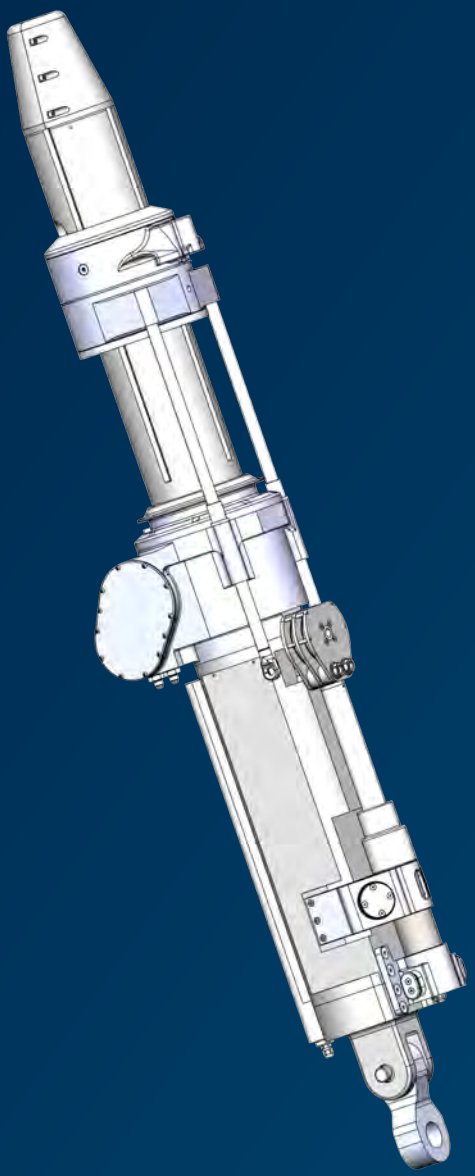


This is an example of a complete Easy Sailing System for a 60’ fast cruising sailing yacht. The system consists of:

1. Magic Trim for the mainsheet; trim and fast speed both in hauling and easing. Integrated linear sensors for full control of the mainsheet
2. two Magic Trims for the jib sheets: trim and fast speed both in hauling and easing for each side. Integrated sensors for auto-tacking system
3. Giro48P: hydraulic jib furler with hydraulic forestay for better control of the sail.
4. Traveller: double acting, double-rod traveller system with bump system to release the main car
5. lightweight aluminium oil tank with accessories to keep the oil cool
6. two powerpacks with high pressure gear pumps and a 4500 Watt electric engine to control mainsail and jib at the same time
7. aluminium manifold block to control the mainsheet ram and the traveller system with quick release and manual release
8. aluminium manifold to control the jib sheet rams, the jib furler and the stay tensioner. Automatic jib tacking system integrated in the manifold
9. aluminium main manifold with proportional control all functions’ speed for fine tuning

All Cariboni Easy Sailing Systems are supplied with custom electronic control and Easy Sailing System software; you can tune the ESS straight from your PC simply by moving your mouse!

FURLER



Compact dimensions, lightweight and reliability are the key features for any marine high-performance product. **Jib furlers** have the integrated stay tension ram. This is essential when the mast has angled spreaders.

An additional ram on the stay increases the safety of the system. Thanks to pressure valves on the stay line, unexpected problems of overload decrease.

For a complete rig setting, the **turnbuckle system** allows a mechanical adjustment which doesn't depend on the hydraulic tuning.

JIB FURLER

Compact dimensions, lightweight and reliability are the key features for any marine high-performance product.

We offer several furler sizes, with or without integrated tensioner.

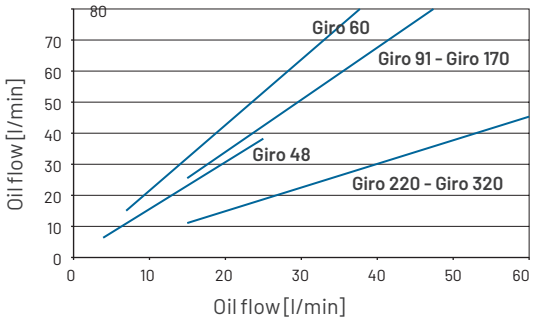
For a complete rig setting, a turnbuckle system allows a mechanical adjustment independent from hydraulic tuning. For a complete supply, aluminium and carbon fiber foils are available.

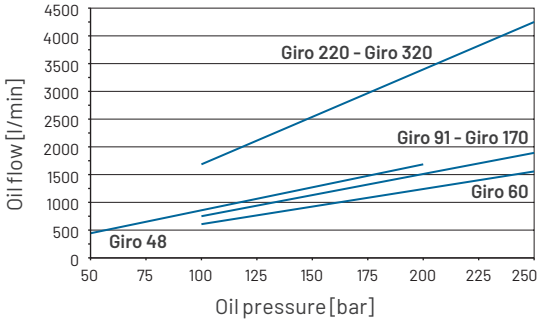
Lashing tack swivel and PBO arrangements for turnbuckle are available to increase reliability and reduce the overall weight of the rigging.



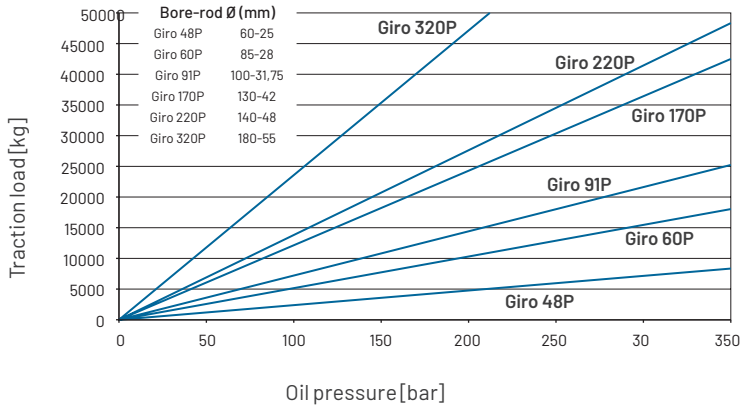
The fully integrated hydraulic stay tensioner is an essential feature when mast has angled spreaders: with the fine tuning of the load on the forestay you increase the performance of the sails and the reliability of all the rigging.

MODEL	STAY ROD SIZE	MAX FURLER PRESSION		STAY TENSION RAM STROKE		FURLER WEIGHT		OIL VOLUME
		bar	*PSI*	*mm*	*in*	*kg*	*lb*	*litres*
GIRO 48P	48	140	2031	100	3,94	29,6	65,23	0,23
GIRO 48	48	140	2031	-	-	21,5	47,40	-
GIRO 60P	60-76	200	2900	110	4,33	57,8	127,43	0,55
GIRO 60	60-76	200	2900	-	-	48,7	107,36	-
GIRO 91P	76-91-115	350	5076	150	5,91	119,4	267,64	1,06
GIRO 91	76-91-115	350	5076	-	-	92,4	203,70	-
GIRO 170P	150-170	350	5076	205	8,07	197,2	434,74	2,44
GIRO 220P	195-220	350	5076	202	7,95	246,0	542,32	2,74
GIRO 320P	Up to 320	350	5076	250	9,84	289,0	635,80	6,35





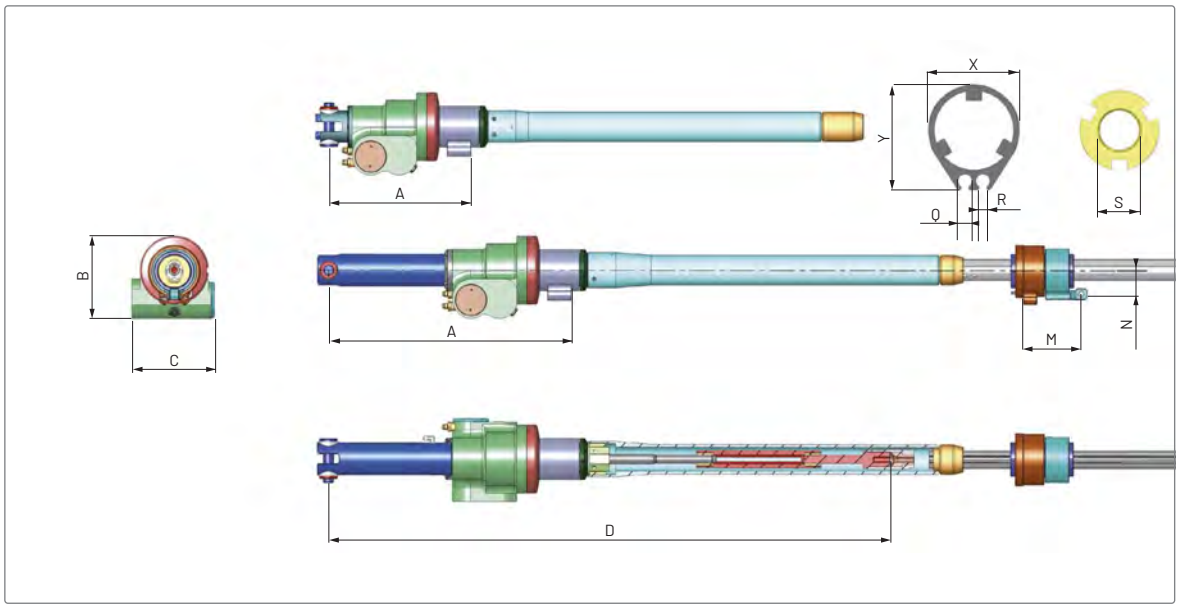
STAY TENSION RAM





Giro 91P and, on the bow, IG09000.

JIB FURLER



JIB FURLER														
MODEL	A		B		C		Dmax		Tstroke		OIL FITTINGS (UNF JIC 37°)			
	mm	in	mm	in	mm	in	mm	in	mm	in	A	B	T	Ram
GIRO 48P	342,75	13,49	207,25	8,16	208,30	8,20	1160,50	45,70	205,00	8,07	9/16"	9/16"	-	-
GIRO 48	596,25	23,47	207,25	8,16	208,30	8,20	1414,00	55,70	205,00	8,07	9/16"	9/16"	-	7/16"
GIRO 60P	402,00	15,83	262,50	10,33	229,80	9,05	1186,00	46,70	250,00	9,84	9/16"	9/16"	7/16"	-
GIRO 60	698,90	27,52	262,50	10,33	229,80	9,05	1658,70	65,30	250,00	9,84	9/16"	9/16"	7/16"	7/16"
GIRO 91P	509,70	20,07	333,13	13,12	297,75	11,72	1536,60	60,50	250,00	9,84	9/16"	9/16"	7/16"	-
GIRO 91	874,70	34,44	333,13	13,12	297,75	11,72	1901,60	74,87	250,00	9,84	9/16"	9/16"	7/16"	7/16"
GIRO 170P	963,00	37,91	354,86	13,97	313,00	12,32	1755,50	69,11	250,00	9,84	9/16"	9/16"	7/16"	7/16"
GIRO 220P	1017,00	40,04	406,00	15,98	356,00	14,02	2157,15	84,13	250,00	9,84	3/4"	3/4"	9/16"	7/16"
GIRO 320P	1180,00	46,46	406,00	15,98	356,00	14,02	2639,00	103,90	245,00	9,65	3/4"	3/4"	9/16"	7/16"

ALUMINIUM HEADFOIL														
MODEL		X		Y		Q		R		S		BAR LENGTH		WEIGHT [1]	
		mm	in	mm	in	mm	in	mm	in	mm	in	m	ft	kg/m	lb/ft
G 045	CF 30	34,50	1,36	42,00	1,65	7,00	0,27	3,55	0,14	14,00	0,55	4,0	13,12	1,04	0,70
G 055 Giro 48	CF 40	46,00	1,81	53,00	2,08	7,00	0,27	3,55	0,14	20,00	0,79	4,0	13,12	1,84	1,24
G 065 Giro 60-91	CF 60	57,00	2,24	65,00	2,56	7,00	0,27	3,55	0,14	30,00	1,18	4,5	14,76	2,60	1,75
G 080 Giro 91		80,00	3,15	90,70	3,57	8,00	0,31	4,34	0,17	50,00	1,97	4,5	14,76	4,91	3,30

(1) Weight includes connectors.

SWIVEL								
MODEL	M		N		MAX LOAD		WEIGHT	
	mm	in	mm	in	kg	lb	kg	lb
G 055	150,00	5,91	43,00	1,69	2600	5732	1,1	2,43
G 065	162,00	6,38	62,00	2,44	3600	7937	1,8	3,97
G 100	270,00	10,63	73,35	2,89	6000	13228	6,2	13,67

STRUCTURAL FURLER

The furler is designed for a composite torque cable. The tension on the stay can be controlled with the high-pressure cylinder inside the unit. The structural furler is lighter and smaller than a standard system as it is designed to completely furl and unfurl the sail. With the use of our top swivel the sail is furled both from the bottom and the top.

It can be designed with connection to the bottom bow or to the deck via an articulated connection.

The unit can be supplied with integrated cunningham **tensioner and/or linear sensor for the stay.**

The cunningham cylinder is a special version of a Simple Magic Trim which is fixed on the furler body.

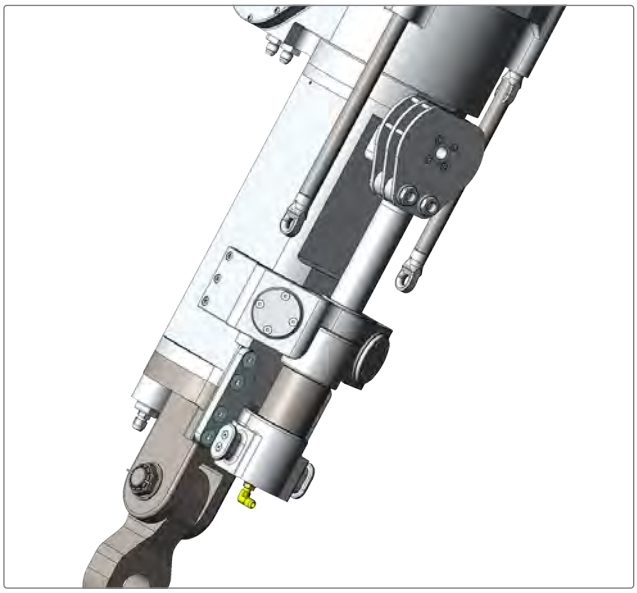
The integrated linear sensor for the stay cylinder completes the unit for full control. It automatically adjusts the mast rake while tacking or gybing.

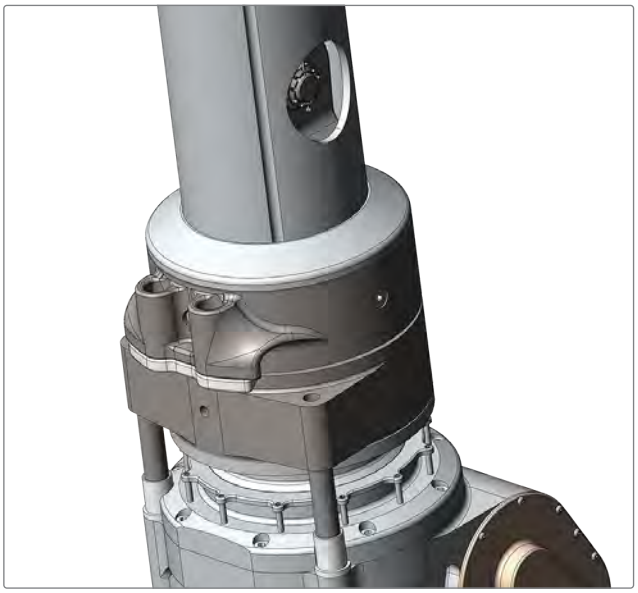


GIRO ST 080P.

MODEL	STAY MAX LOAD	MAX TENSIONER PRESSURE	FURLER MAX OIL PRESSURE [1]	MAXIMUM FLOW RATE	CUNNINGHUM MAX LOAD	FURL TORQUE	UNFURL TORQUE	WEIGHT	DIMENSIONS
	kg	*bar*	*bar*	*l/min*	*kg*	*Nm*	*Nm*	*kg*	*mm*
GIRO ST 070P STD	11121	418	140	20	6760	700	400	92	1620x370x261
GIRO ST 076P	21250	420	140	20	6000	700	400	127	1930x358x279
GIRO ST 080P	27500	500	140	20	6000	700	400	99	1719x358x279
GIRO ST 080P STD	19250	350	140	20	3500	700	400	107	1474x380x279
GIRO ST 120P	40000	495	250	100	9700	2000	1100	257	2191x620x500 [2]

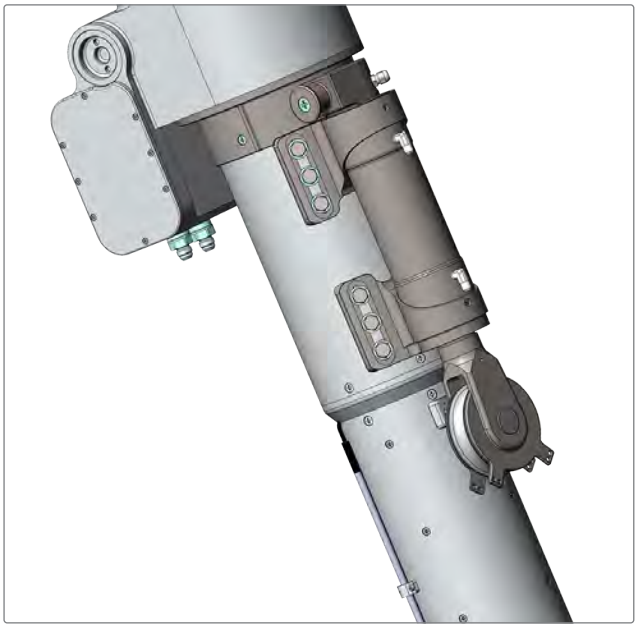
(1) The furler is designed to fully furl/unfurl the sail with no load on the sheet.
(2) Deck installation.

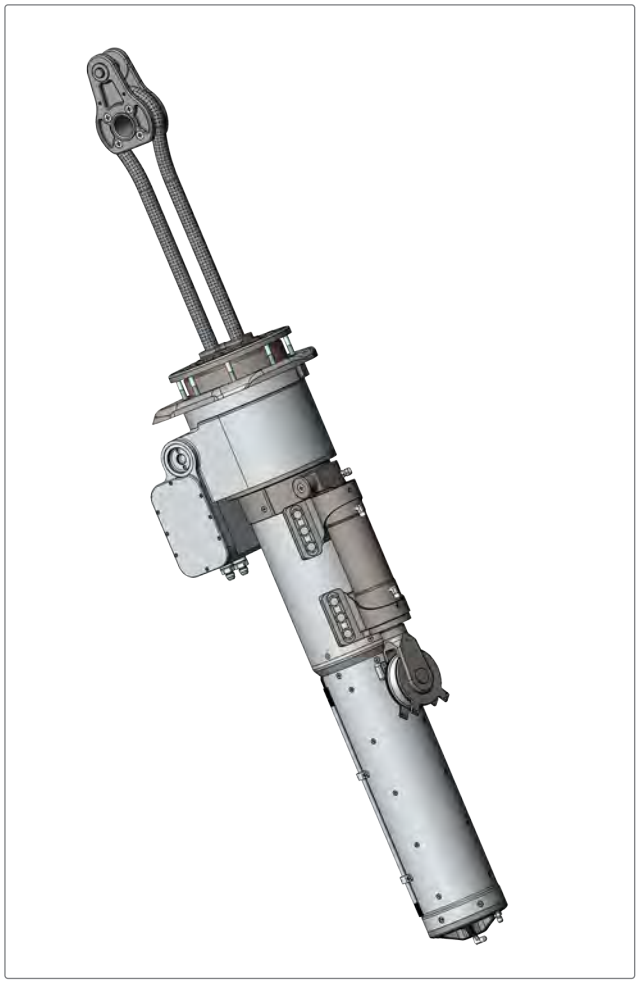




STRUCTURAL FURLER

MODEL	STROKE		STAY MAX LOAD		MAXIMUM FLOW RATE	FURL TORQUE	FURL SPEED	WEIGHT	DIMENSIONS	
	mm	*in*	*kg*	*lb*	*l/min*	*Nm*	*rpm*	*kg*	*mm*	*in*
STC 10 300	300	11,8	10000	22046	25	480	45	48	1048x239x297	41,3x9,4x11,7
STC 12 500	500	19,7	12000	26455	25	1305	16	69	825x281x330	32,5x11,1x13
STC 18 650	650	25,6	18000	39683	60	4450	29	109	1090x320x407	42,9x12,6x16
STC 24 400	400	15,7	24000	52911	30	2970	28	125	1332x328x425	52,4x12,9x16,7





CODE ZERO FURLER

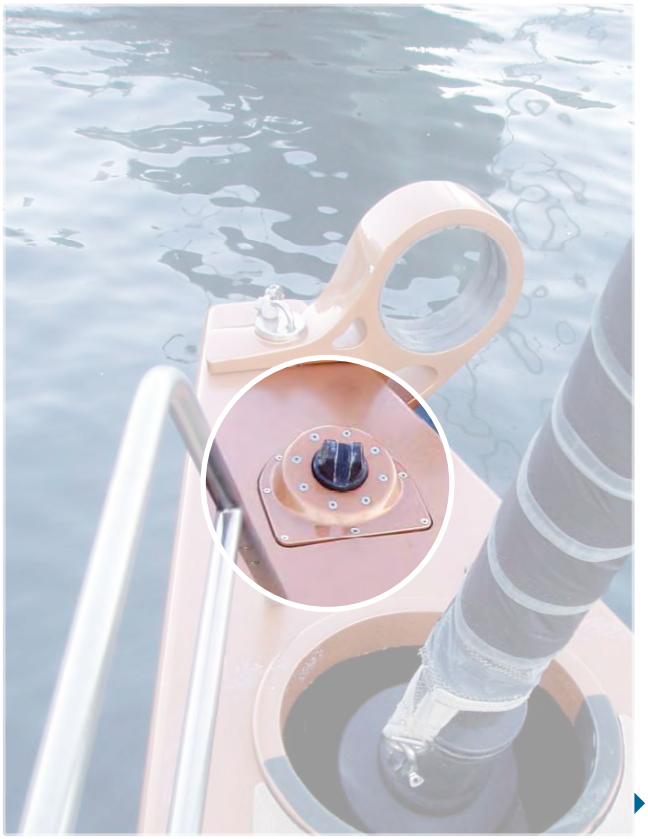
Our code zero furlers are lightweight solutions providing an automatic furler to control code zeros with on board hydraulics. They have a 100% waterproof black hard coated aluminium body for top performances and reliability.

All our furlers have fast pins for quick connection of the sail. Starting from the IG 09000 size, a manual back-up system allows sail furling without hydraulic power. A special gear system doesn't let the sail unfurl under high load and releases pressure on the hydraulic system while sailing.

Many types of fixing systems are available in all sizes. Custom length chain plate turnbuckles are available on request.



IG 09000 code zero furler.



An IG 09000 with a Giro91P on the bow of an 88' yacht.

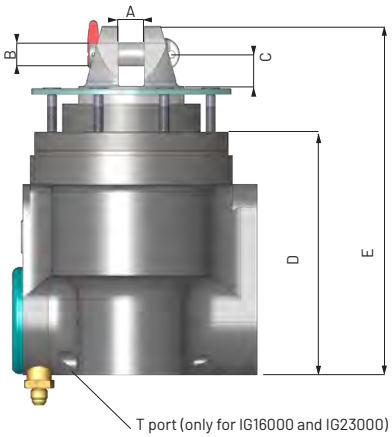
MODEL	HALYARD MAX WORKING LOAD		MAX OIL PRESSURE		MIN FLOW RATE	MAX SPEED @ MAX FLOW RATE	WEIGHT		DIMENSIONS
	kg[1]	*lb*[1]	*bar*	*PSI*	*lpm*	*rpm @ lpm*[2]	*kg*	*lb*	*mm*
IG 04500	4500	9921	140	2030	4	68 @ 25	9,2	20,3	170x170x185
IG 09000	9000	19841	140	2030	4	48 @ 20	16,7	36,8	204x207x280
IG 16000	16000	35273	400	5800	7	105 @ 48	35,0	77,2	227x262x298
IG 23000	23000	50705	400	5800	15	215 @ 128	67,8	149,5	303x331x368
IG 47000	47000	103400	400	5800	15	150 @ 200	135	297	511x404x356

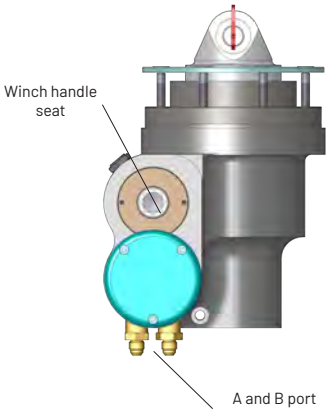
(1) Working load on halyard: traction load.
(2) Example for IG 04500: 68 revolutions per minute with 25 litres per minute of oil. No higher flow is allowed. For lower speed just reduce the amount of oil proportionally.
Faster models are available on request.

CODE ZERO FURLER

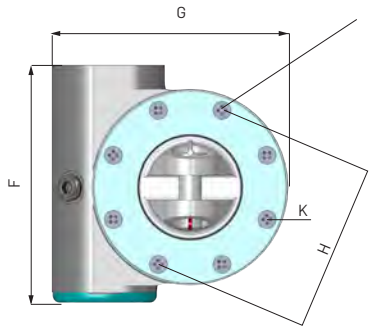
Below are all the main dimensions of our code zero furlers. IG 47000 also features a T port. The T port (or drain line) must be connected straight to the oil tank.

Only a directional valve is required to control the furler. In case of no turning of the furler, use of hydraulic pressure to keep the system in position or to avoid sail unfurling under load is not required.







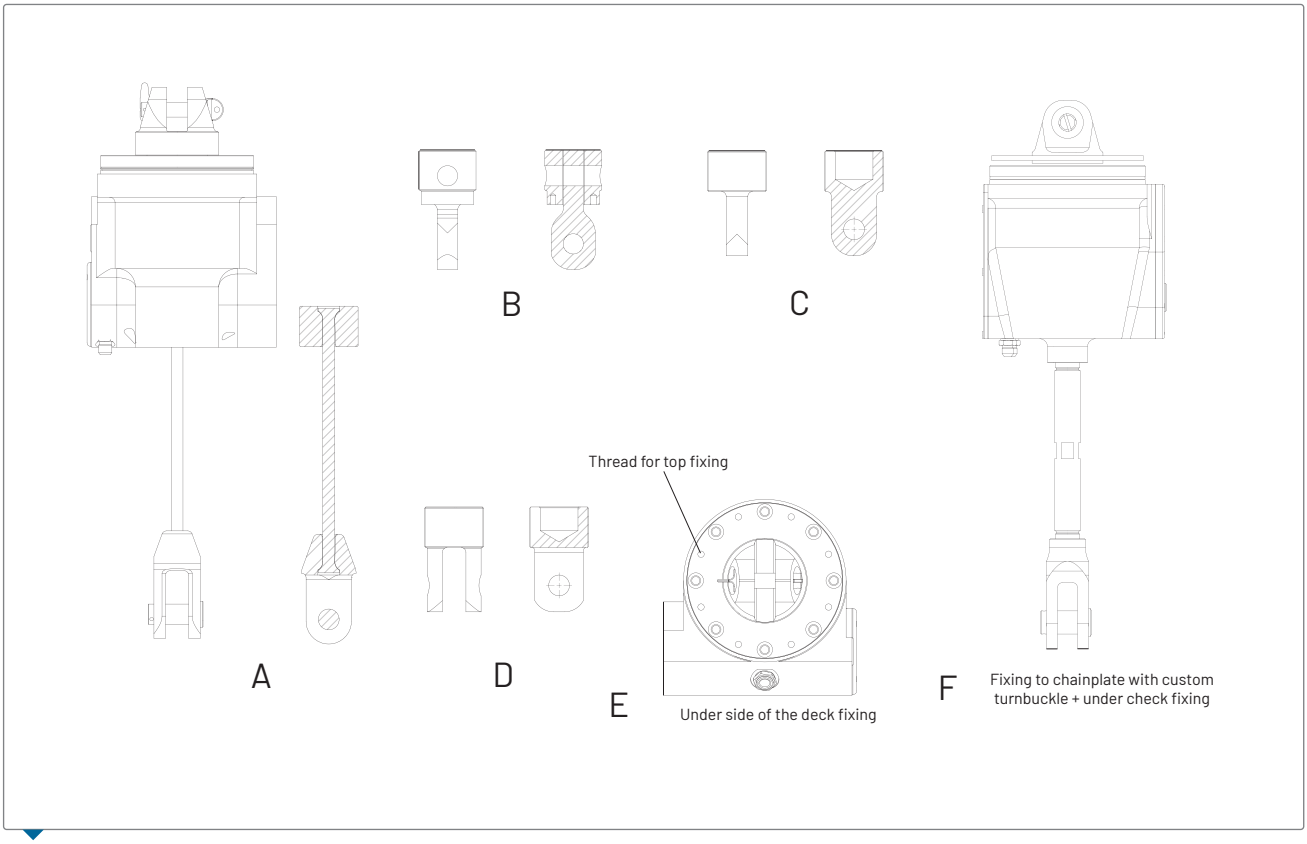


FURLER MAIN DIMENSIONS
The handle seat is on the opposite side for IG16000 and IG23000. No handle seat on IG04500.

MODEL	IG 04500		IG 09000		IG 16000		IG 23000		IG 47000	
DIM	*mm*	*in*	*mm*	*in*	*mm*	*in*	*mm*	*in*	*mm*	*in*
A	18,00	0,71	22,10	0,87	24,00	0,94	30,00	1,18	70,00	2,76
B	16,00	0,63	16,00	0,63	22,00	0,87	28,00	1,10	70,00	2,76
C	25,00	0,98	24,00	0,94	38,70	1,52	50,00	1,97	75,00	2,93
D	129,00	5,08	206,97	8,15	217,81	8,58	257,20	10,13	321,00	12,64
E	183,25	7,21	280,47	11,04	299,50	11,79	269,70	10,62	511,30	20,12
F	170,00	6,69	204,30	8,04	227,30	8,95	303,05	11,93	352,25	13,86
G	170,00	6,69	207,25	8,16	261,57	10,30	331,13	13,04	404,50	15,92
H	110,00	4,33	146,00	5,75	150,00	5,91	240,00	9,45	310,00	12,2

K threads	n° 8 M8	n° 8 M8	n° 8 M8	n° 8 M10	n° 8 M16
A and B port	9/16" UNF JIC 37°	9/16" UNF JIC 37°	9/16" UNF JIC 37°	9/16" UNF JIC 37°	3/4" UNF JIC 37°
T port	-	-	7/16" UNF JIC 37°	7/16" UNF JIC 37°	9/16" UNF JIC 37°

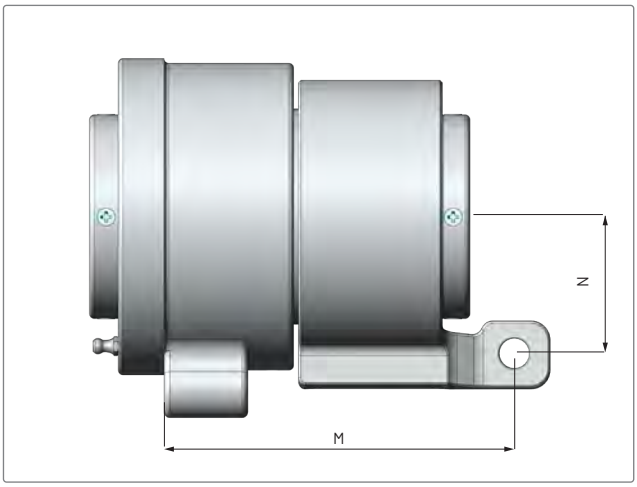
CODE ZERO FURLER



FIXING WAYS :
All fixing systems but "E" and "F" need a box to support the furler weight.
The box for system "A" must also support torque moment.
Max angle between furler axis and luff of the sail is 15°.

FOIL SWIVEL

MODEL	M		N		MAX LOAD		WEIGHT	
	mm	*in*	*mm*	*in*	*kg*	*lb*	*kg*	*lb*
G 055	150,00	5,91	43,00	1,69	2600	5732	1,1	2,43
G 065	162,00	6,38	62,00	2,44	3600	7937	1,8	3,97
G100	270,00	10,63	73,35	2,89	6000	13228	6,2	13,67

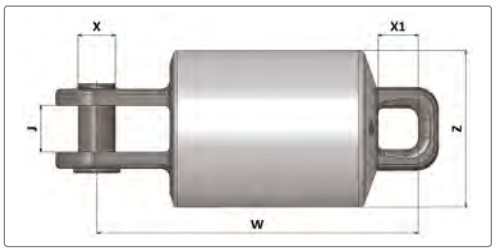


CODE ZERO SWIVEL

MODEL	J		W		X		X1		Z		MAX LOAD		WEIGHT	
	mm	in	mm	in	mm	in	mm	in	mm	in	kg	lb	kg	lb
FST 05 045	10,0	0,39	110,5	4,35	16,0	0,63	20,0	0,79	61,0	2,40	4500	9920	1,0	2,2
FST 06 4001	12,5	0,49	147,6	5,81	22,0	0,87	23,5	0,93	69,1	2,72	9000	19842	1,4	3,1
FST 08 016	18,0	0,71	211,5	8,33	30,0	1,18	27,5	1,08	105,0	4,13	16000	35275	3,9	8,6
FST 10 023[1]	30,0	1,18	362,0	14,25	30,0	30,0	50,4	1,98	180,0	7,09	23000	50706	41,8	92,2

(1) Stainless steel version.





STRUCTURAL FURLER SWIVEL

MODEL	PIN TO PIN		MAX BODY DIAMETER		MAX LOAD		WEIGHT	
	mm	in	mm	in	kg	lb	kg	lb
FST 060	308[1]	12,1	164	6,46	6000	13228	9,3	20,5
FST 120	225	8,9	87	3,43	12000	26455	5	11
FST 160	228	9,0	89	3,50	16000	35274	4,8	10,6
FST 190	239	9,4	108	4,25	19000	41800	7	15,4
FST 200	255	10,0	108	4,25	20000	44000	7,5	16.5
FST 220	316	12,4	144	5,70	22000	48400	14,2	31,2
FST 260	257	10,1	97	3,81	26000	57320	5,4	11,9
FST 270	326	12,8	145,5	5,73	27000	59400	14,8	32,5
FST 330	312	12,3	124	4,88	33000	72600	12,5	27,5
FST 240 LOCK	524	20,6	186 X 110[2]	7,32 X 4,33[2]	17500[3] / 6500[4]	38500 / 14300	14,4	31,7
FST 260 LOCK	399	15,7	175 X 88[2]	6,89 X 3,46[2]	20000[3] / 6000[4]	57320 / 13228	10,5	23,1
FST 290 LOCK	424	16,7	186 X 110[2]	7,32 X 4,33[2]	19000[3] / 10000[4]	50706 / 13328	13	28,7
FST 300 LOCK	411	16,2	189 X 114[2]	7,44 X 4,48[2]	20000[3] / 10000[4]	44000 / 22000	29	63,8
FST 570 LOCK	528,4	20,8	175 X 270[2]	6,89 X 10,6[2]	40000[3] / 17000[4]	88185 / 37479	50,5	111,3

(1) swivel total height.
(2) maximum body transversal dimensions.
(3) stay maximum load.
(4) lock maximum load.

FST 11 260
Titanium stay swivel



FST 04 060
Titanium openable halyard swivel



FST 11 260 LOCK
Titanium stay swivel with integrated halyard lock



CAPTIVE FURLER

A manual furler with an integrated stay tension ram. The rope is driven by a car into the spiral groove of a special drum. The car is driven by the same groove to set the rope without any jamming for maximum safety. This compact furler system enables installation below deck also on narrow bow yachts.

MODEL	ROD SIZE	FURLING ROUNDS	TRACTION LOAD @ 350 BAR		BREAKING LOAD		CYLINDER STROKE		DRUM Ø		PIN TO TACK DISTANCE		FURLER WEIGHT		OIL VOLUME
		n°	kg	lb	kg	lb	mm	in	mm	in	mm	in	kg	lb	litres
CF 30P	30	30	5340	11.772	14000	30864	113	5,22	156	6,14	349	13,72	18	39	0,17
CF 40P	40	32	7127	15.712	18000	39700	133	5,22	156	6,50	375	14,76	21	46	0,26
CF 60P	48-60	42	14.516	32002	31000	68342	191	7,51	220	8,66	498	19,61	42	92	0,78

Materials

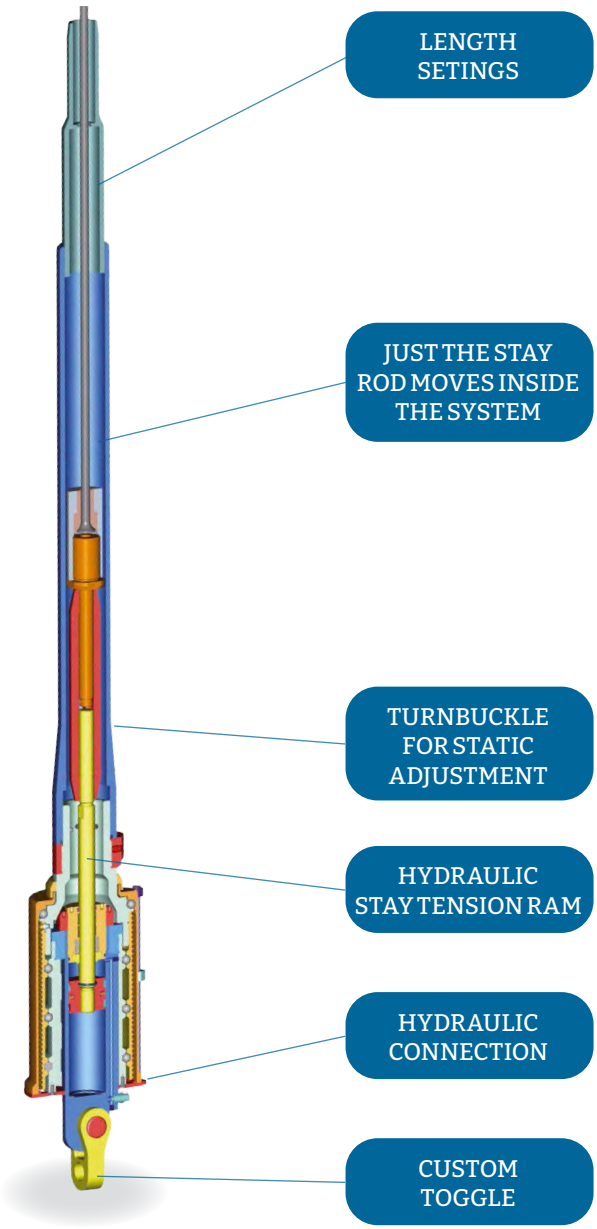
Furler: 6082T6 black hard coated aluminium
Spheres: Torlon®
Tack system: Dynema®
Rope: Dynema®
Cylinder tube: 17-4-PH stainless steel
Custom toggle: 17-4-PH stainless steel
Swivel: 6082T6 black hard coated aluminium



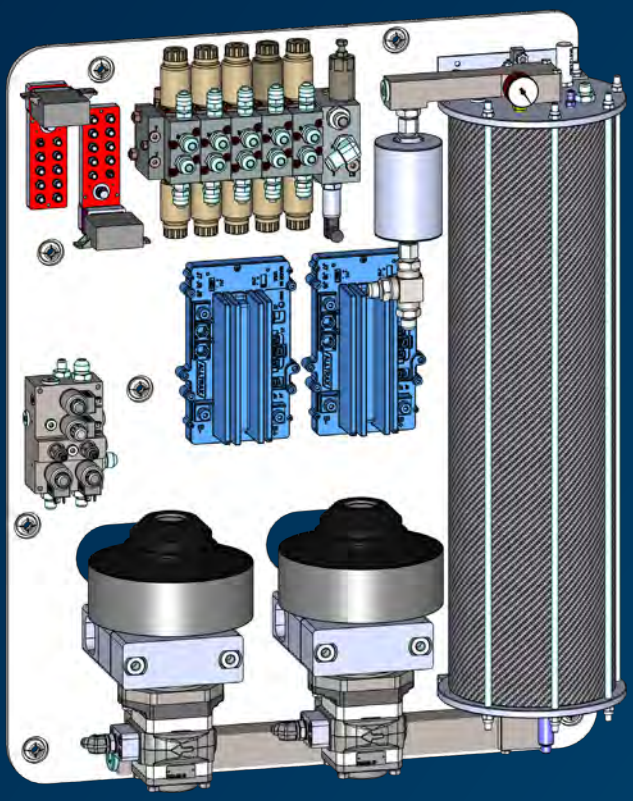
The captive furler drum with integrated stay tensioner.



Installation under the deck also for narrow bow yachts.



HYDRAULIC SYSTEM



We design, build, install and test end-to-end hydraulic systems for sailing yachts: power-packs, piping, manifolds, electric controls with basic or special hydraulic devices.

Our core values are:

- Reliability

- Lightness

- Innovative & Technological approach

Reliability - Hydraulic components, electric engines and electronic controls are all tested in our firm. We supply our standard systems with stainless steel fittings to avoid rust.

Lightness - Pumps are chosen based on the needs of the boat considering the lightest options available.

Innovative & Technological approach - For medium size systems, we supply de-located manifold arrangements which reduce the length and the weight of hoses and increase reliability. Cariboni special basic powerpack configuration includes a single electric motor combined with three auto-shift pumps.

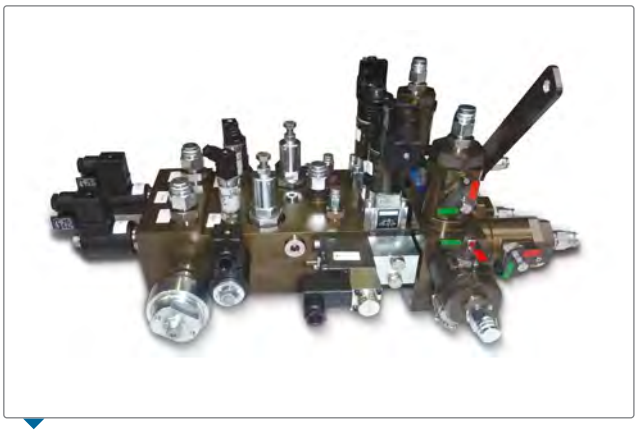
CUSTOM ARRANGEMENTS

Cariboni's hydraulic system is improved each year with the latest high-tech solutions.

The proportional valve sets a benchmark for the sailing world and is standard for our professional systems. The proportional controls of flow and pressure on hydraulic systems reduce unwanted peaks of pressure and increase hydraulic device control and reliability. We verified this technology on several yachts on their canting keel systems, for example.

A proportional board, with full marine coating and wide trim settings, is used for our PLC control to avoid any rust issues.

In order to increase electric efficiency and the lifetime of the electrical engine, we supply the soft start device together with our powerpack. This system controls electric current consumption of the DC electric engine, achieving a soft and smooth start and stop.



Canting keel manifold VOR 65 with proportional valves.

POWERPACK

We supply high-performance powerpacks for fast cruisers or race yachts. This kind of powerpack has a special high-pressure pump, made in light aluminium alloy that can reach up to 700 bar (10000 PSI).

If high pressure and high flow rates are required, special dual stage piston pumps are available with custom flange to fit high performance DC electric engines.

We design and assemble single and multi-electric pumps to satisfy all customer needs.



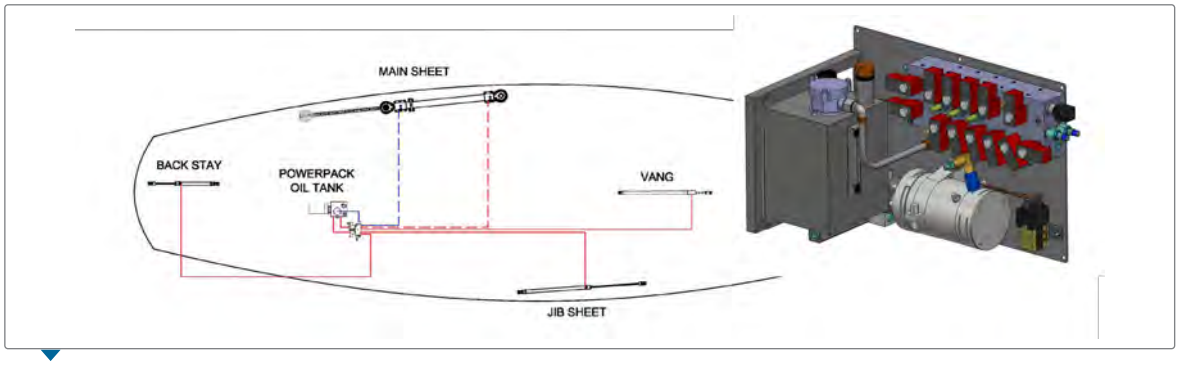
An example of three 700 bar electric powerpack with 4500 and 3000 Watt electric engines.

COMPACT ARRANGEMENTS

For smaller boats we create a compact system with oil tank, powerpack and manifold in aluminium alloy. Thanks to this hydraulic system the installation on board is easier and faster: the shipyard only needs to fix the panel with a few screws and plug the hoses to the cylinders.

Here is an example of an easy sailing yacht hydraulic system:

- **Magic Trim** for main sheet
- **two single acting cylinders** for jib sheet and backstay
- **vang cylinder**
- **compact hydraulic powerpack** with integrated oil tank and valves block.



Custom compact hydraulic system for a 33' sailing yacht.

MODEL	POWER	VOLTAGE	MAX FLOW @ 250 BAR	MAX FLOW @ 350 BAR	DIMENSIONS [1]		WEIGHT [1]	
	W	*V*	*l/min*	*l/min*	*mm*	*in*	*kg*	*lb*
1x2000	2000	24	3,8	2,7	Ø 128 X 314	Ø 5,0 X 12,4	10	22
1x2500	2500	12 OR 24	4,8	3,4	Ø 130 X 342	Ø 5,1 X 13,5	13	28,6
1x3000	3000	24	5,8	4,1	Ø 130 X 342	Ø 5,1 X 13,5	13	28,6
1x4500	4500	24	8,6	6,2	Ø 161 X 472	Ø 6,3 X 18,6	27,5	60,6
1x5000	5000	24	9,6	6,9	Ø 205 X 385	Ø 8,1 X 15,2	21,6	47,6
1x6000	6000	24	11,5	8,2	Ø 191 X 675	Ø 7,5 X 26,6	69	152

(1) indicative values depending on the type of pump installed.



Softstart device.



Wally Rocket compact hydraulic system.

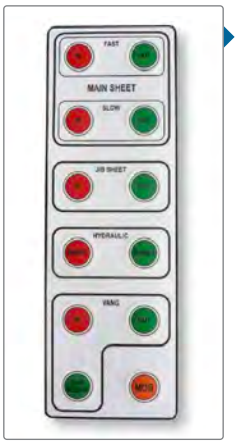
PUSH BUTTON PANELS

Waterproof button panels with customized graphic layout.

Panels are equipped with dome push buttons with LED backlights (a visual feedback signal for each button).

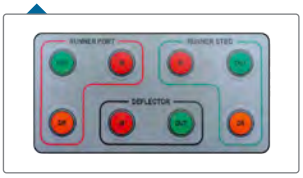
Supply voltage is 24 VDC with IDC 8x2 connectors. They can be installed both horizontally or vertically and they look flat. It is possible to get CAN BUS push button panels, with n.1 M12 output cable.

The panels are supplied with a standard 2,5 m cable (**It can be shorter or longer upon request**).



an example of push button panel, 12 buttons

an example of push button panel, 8 buttons



BUTTONS	WITHOUT CAN BUS		WITH CAN BUS	
	DIMENSIONS	WEIGHT (2,5 m cable included)	DIMENSIONS	WEIGHT (2,5 m cable included)
	mm	*g*	*mm*	*g*
2 IN LINE BUTTONS	100 x 40 x 14	250	-	-
3 IN LINE BUTTONS	140 x 40 x 14	270	-	-
4 IN LINE BUTTONS	180 x 40 x 14	284	-	-
4	80 x 80 x 14	340	80 x 80 x 23	342
6	120 x 80 x 14	360	120 x 80 x 23	434
8	160 x 80 x 14	660	160 x 80 x 23	554
10	200 x 80 x 14	720	200 x 80 x 23	674
12	240 x 80 x 14	750	240 x 80 x 23	794

HYDRAULIC WINCH MOTORS

Our light winch motors have been designed to provide high speed, high efficiency and low weight thanks to a body in hard coated aluminium. They can be installed on any winch model.

The disconnector feature can be added to the motor on request.



Hydraulic winch motors.

BUTTONS	DISPLACEMENT	SPECIFIC TORQUE	PEAK PRESSURE	MAX ROTATIONAL SPEED	DIMENSIONS (Ø x length)	WEIGHT
	cc/rev	*Nb/bar*	*bar*	*rpm*	*mm*	*kg*
M A 075	86	1,37	375	700	205 x 190	14
M A 110	115	1,83	400	650		
M A 130	129	2,05	375	650		

HYDRAULIC DREAM

Terminated on 2007, this astonishing 60 feet is still a benchmark for the sailing world in terms of style and hydraulic automation.

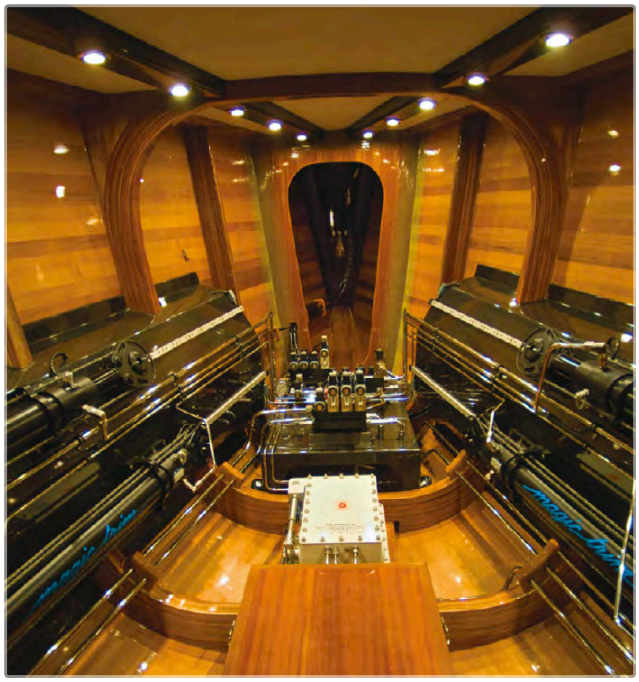
Designed by Tony Castro, "Sizzler" (name of the boat), is a, fully automatic wood day sailer.

Sizzler has:

- Magic Trim for mainsheet control
- Magic Trim for jib sheet with easy sailing system
- double acting vang with linear sensors for main furler
- jib furler with hydraulic tensioner
- hydraulic outhaul, halyard and backstay
- hydraulic winches
- bow and aft thrusters
- lifting keel with locking system
- hydraulic lifting cockpit table
- hydraulic sliding doors



All these devices are driven by Cariboni's hydraulic system, controlled with two joint PLCs.
However, the most impressive thing is the arrangement of all these parts in the boat: the Magic Trim cylinders are installed on a carbon fibre structure like sculptures.
All the pipes are made of polished stainless steel hose, hand wrought and fixed on the boat by custom made wood rings. At the end, a spectacular light system underlines the flush deck and all the on board equipment...

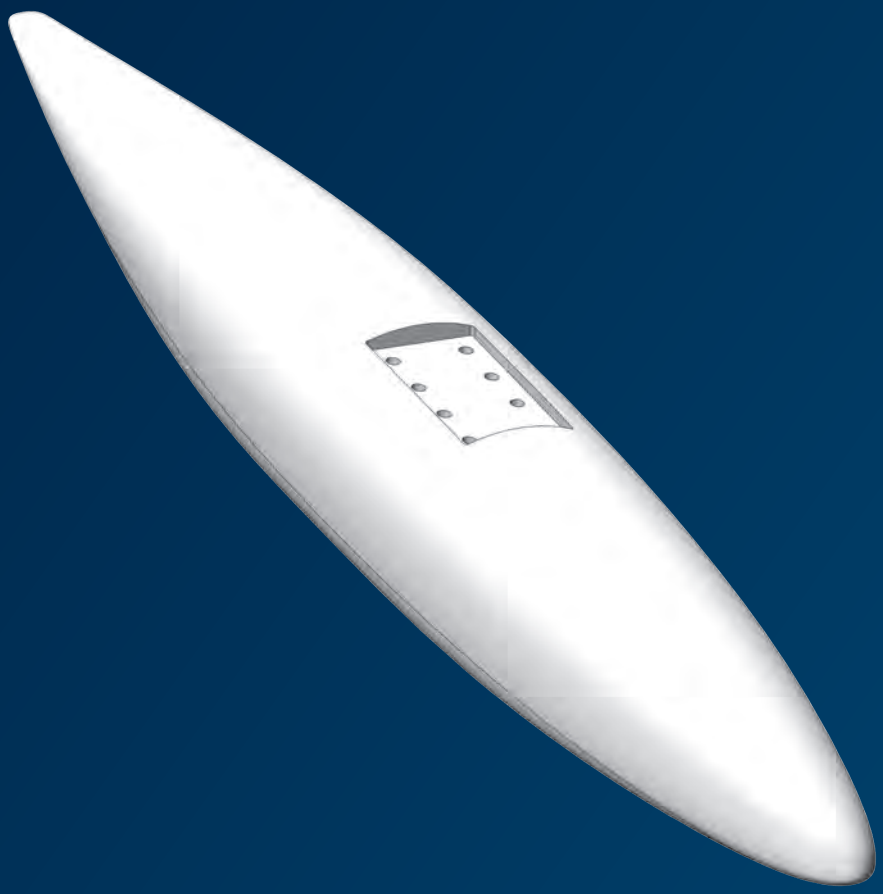




Art gallery-like installations on the Sizzler.



BULB-FIN



Milled **bulbs** can be designed and machined for all the needs.
It can be available with internal structure.

BULB

The advantages of a CNC milled bulb are:

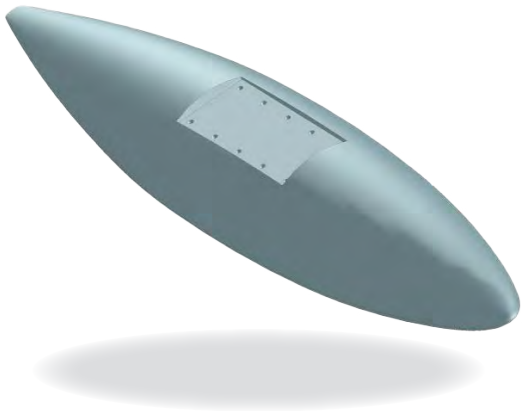
- **Best control of hydrodynamic shape** to increase underwater performances
- **Accurate control** of the bulb weight and its center of gravity
- **Lower center of gravity** compared to fin & bulb forged system

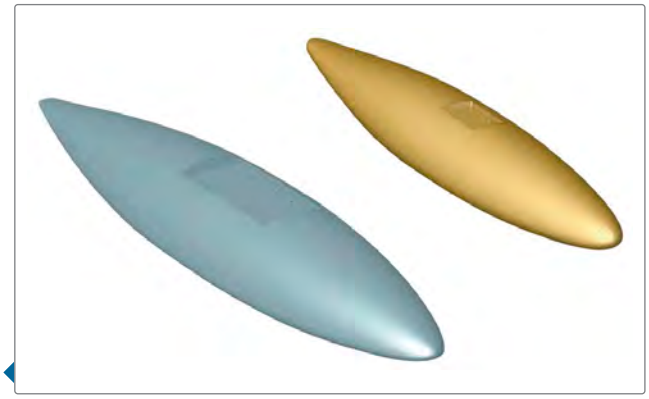
The steps to create a bulb are:

- **3D model** with the surfaces and the details to attach to the fin
- **based on the 3D design**, we machine a plastic model of the bulb which will be used to build the mold for the real lead one
- **the lead** is placed on our CNC milling machine to get the final shape.

Internally, we can produce any size of bulb: from the small 2 tons till 7 tons for a fast cruiser.

Bigger bulbs are also available on request.





Two 3D models of bulbs.



CNC milling machine.



Bulb ready to be painted.

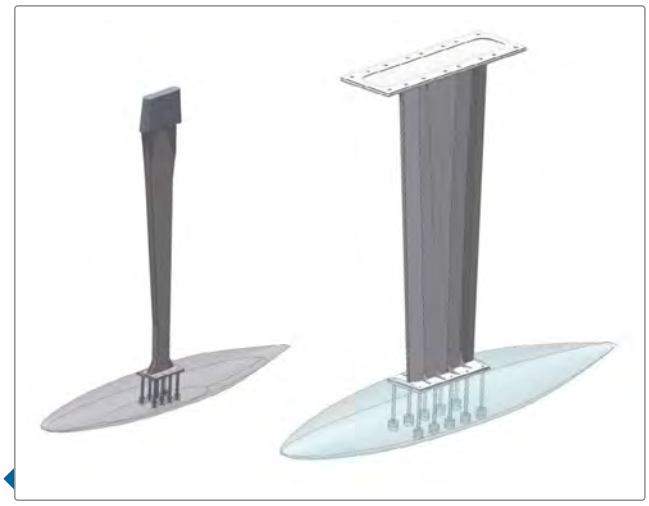

australia
wildlife
conservation

FIN

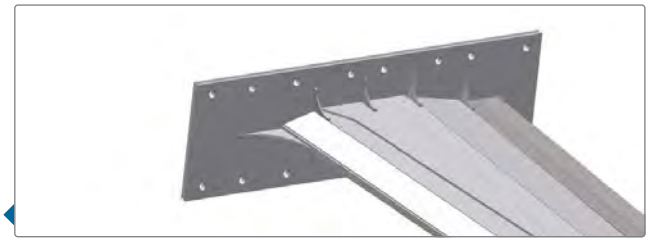
We have extensive experience in fin design and construction for any kind of sailing yacht.

Fins can be created from a forged piece of high strength steel or welding sheets in Weldox for a lighter solution with higher performance.

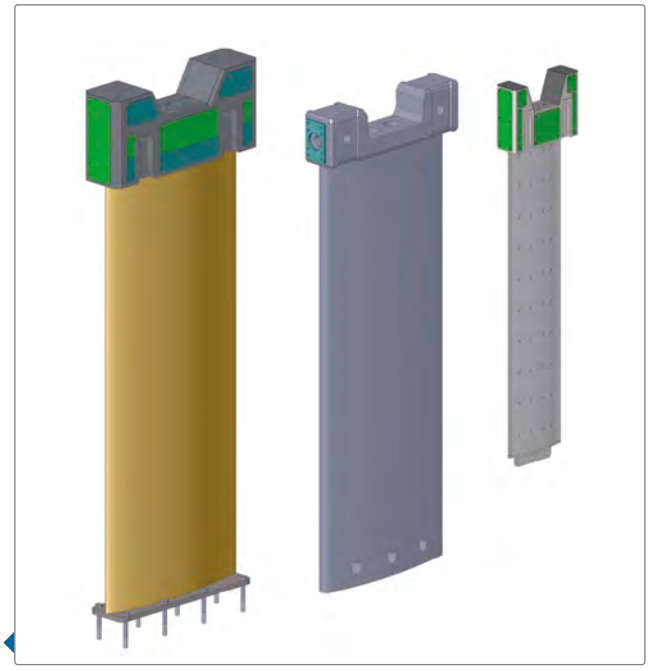
For high-performance sailing yachts, we offer our forged 17-4 PH fin. This kind of fin is from a forged block of material, which is machined with our milling machine, in order to obtain a light and small beam that will be the core of the fin.



The fin is CNC milling machined from a forged block to obtain the right shape.



A detail of the upper part or the fin with reinforcements.



From left to right, the fin for a 100', 82' and for a 40' racing sailing yacht.

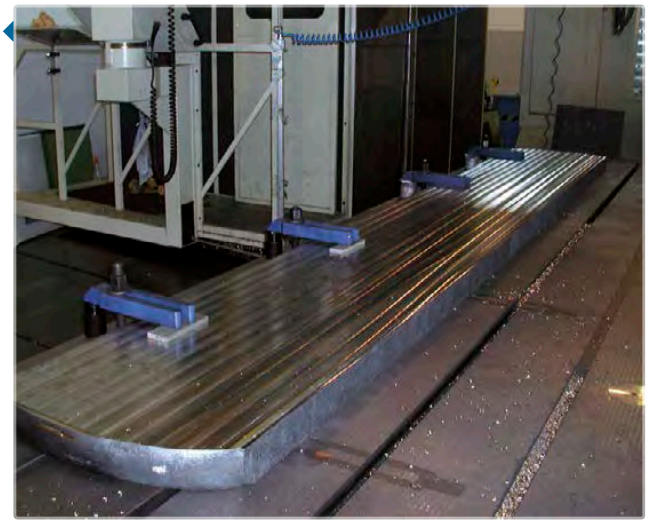


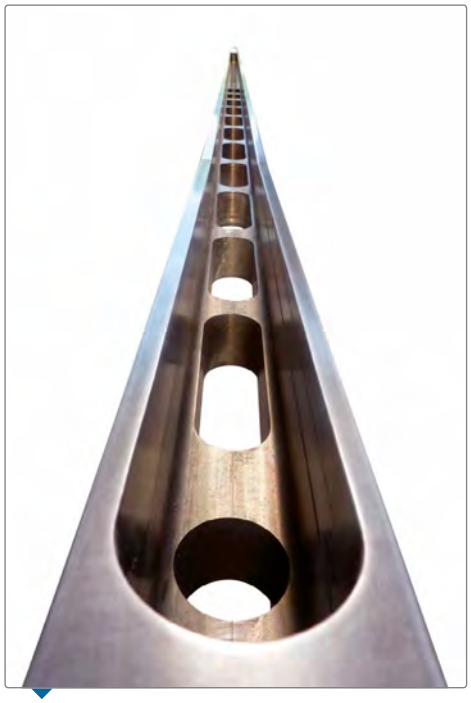
The lifting keel fin for a Comet 100' sailing yacht.

1 / 2: Two examples of canting keel fin made of 17-4 PH stainless steel. Both fins are machined out of a forged piece of steel and then finished at the CNC milling machine.
3: A welded model of Weldox steel: this fin has the rotating axis welded on the fin head.

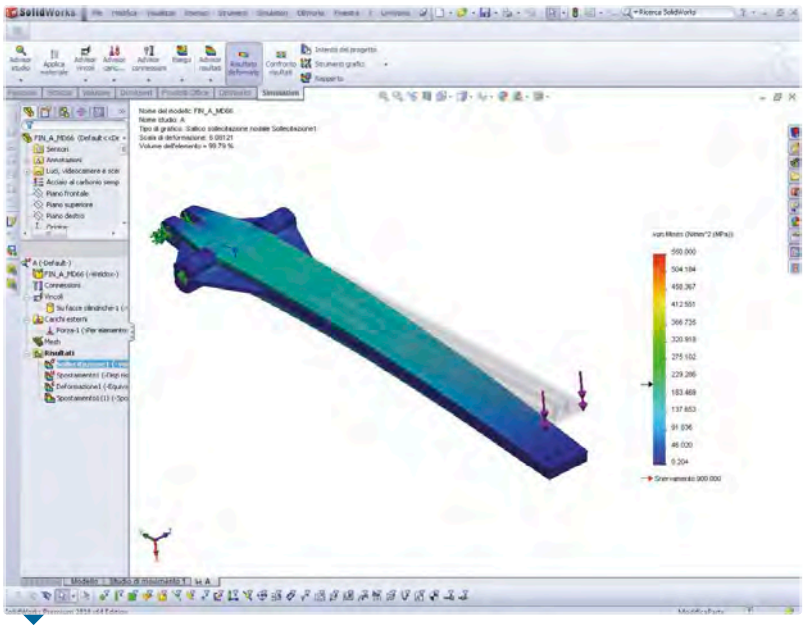


A 3400 mm of forged 17-4 PH steel at the CNC milling machine.



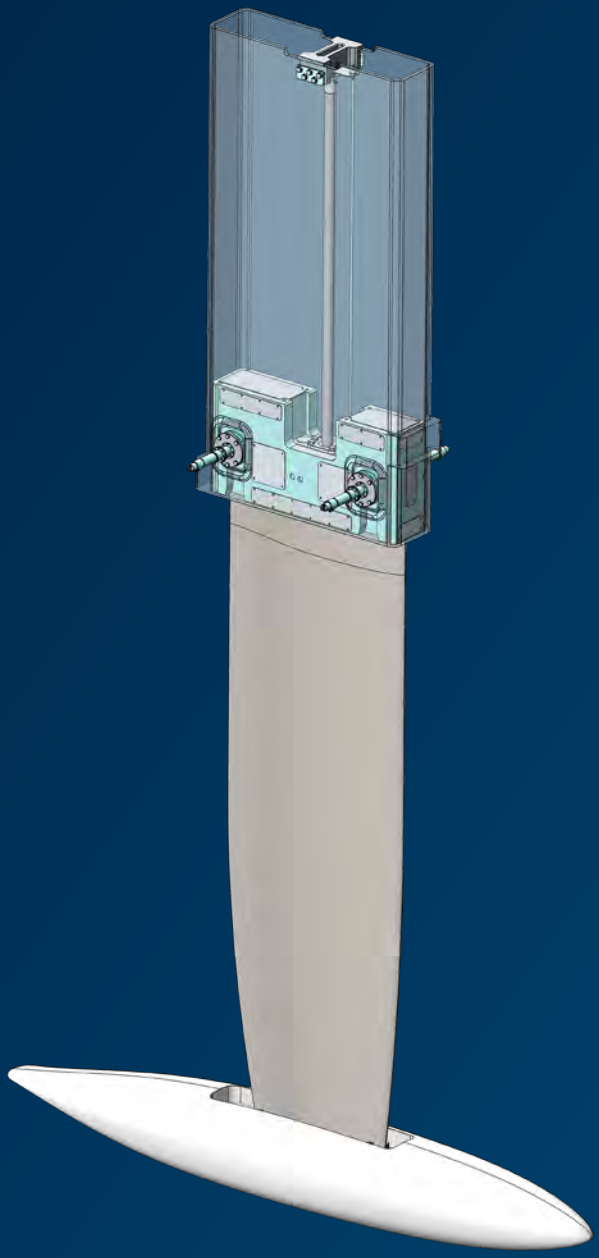


A forged fin made of 17-4 PH.
The structure is studied for maximum stiffness with minimum weight.



An example of stress study on a 67' canting keel fin.

LIFTING KEEL



7

LIFTING KEEL

Being able to lift the **keel** enables easy entry in shallow water harbors without reducing the performance of the boat. The peculiarity of our **lifting keel system** is that the fin is allocated, when in lower position, on 4 pins that contribute to transferring the loads to the keel box.

LIFTING KEEL

The main elements of our standard lifting keel system are:

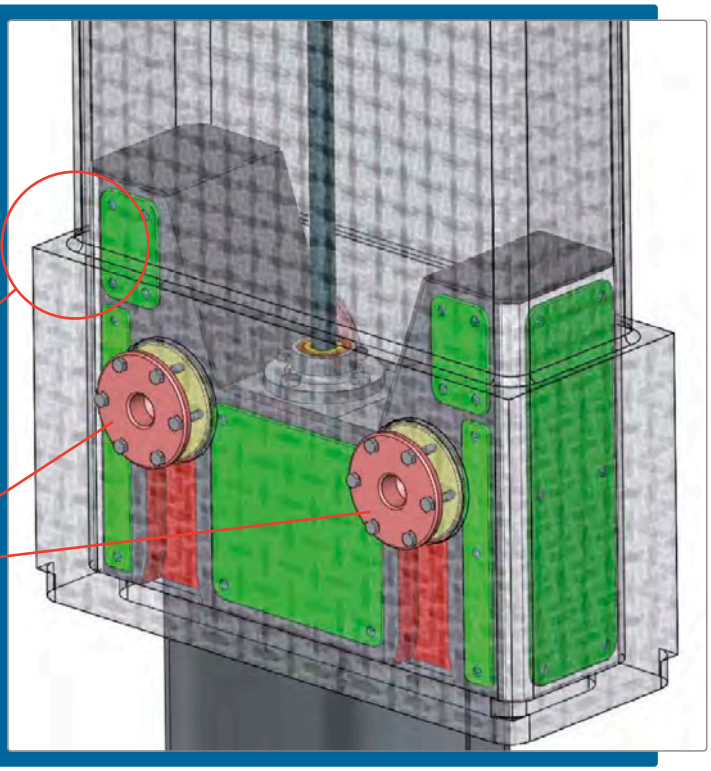
- **keel head**: made of stainless steel, with sliders with low friction and reduced swell water features. Machined with the CNC milling machine, it features seats for the 4 pins
- **lifting keel cylinder**: it is a double acting cylinder made of 17-4 PH that is flanged on the head
- **cylinder support**: made of stainless steel, it is placed on the top of the trunk and is designed to support the weight of the keel and the bulb
- **keel pins**: in stainless steel, they're the heart of our keel system as they contribute to holding the loads and they give stability to the system while sailing
- **locking cylinders**: made of stainless steel, they keep the keel in position in case of capsizing and they avoid lateral movement when the keel is lifted
- **keel box**: usually made of the same material as the boat (carbon fiber or fiber glass). To obtain the correct inner dimensions, we machine a pre-size male mold at the CNC milling machine
- **fin**: can be made of several materials, like Weldox, SAF or forged in stainless steel
- **testing**: keel box, fin, cylinder and pins are tested together prior to shipping to ensure perfect sliding inside the keel box



When the keel is fully down, it is stuck on the pins without any opportunity for unwanted movement.

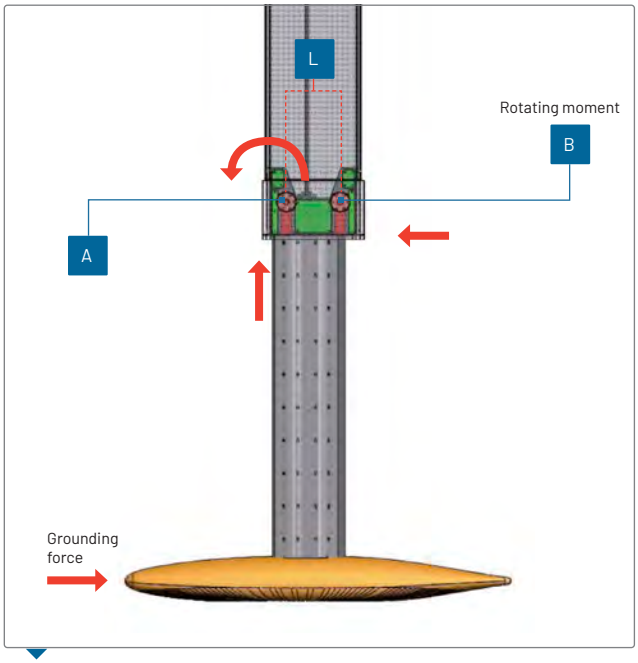
The trunk features reinforced sections in the lower part in order to keep grounding load as per other kinds of systems.

Pins are placed on the lower part of the trunk, and they transfer the loads to the keel box even in case of grounding.



If a grounding occurs, the keel pins contribute to transferring the loads to the keel box. The grounding load pushes the system to rotate around pin A.

- **Pin A** locks the horizontal load to balance the grounding load.
- **Pin B**, thanks to the stiffness of the keel head, contributes to keeping the fin in position and transfers the load to the keel box through the pins and the sliding guides.
- **The pins** are placed as far as possible from each other in order to provide good stability (L).
- **The lifting cylinder** doesn't keep any load higher than the designed compression load. The cylinder can keep the fin and the bulb in position in case of a capsizing.

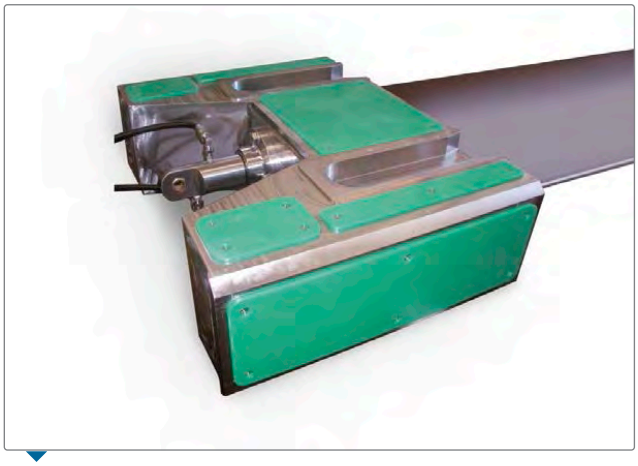


Loads in grounding scenario.

It is possible to connect locking cylinders made of stainless steel on the keel pins.

When the keel is up, the cylinders push against the keel shape to reduce any noisy movement of the keel during mooring. They have an integrated linear sensor used for the keel lifting system process.

The locking cylinders increase the security of the system in particular in case of a capsizing.



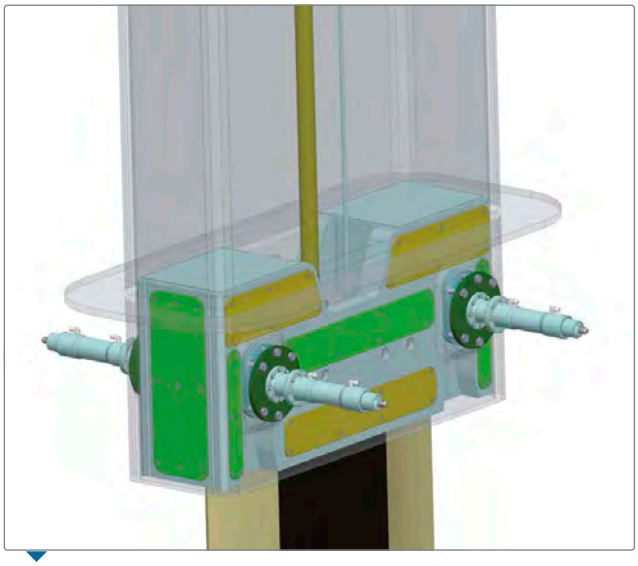
Fin head.

We also supply other types of lifting keel systems and hydraulic cylinders.

There are many ways to control a lifting keel and connect the lifting ram between the fin and the boat structure; the three typical systems are shown in the following images:

- **flanged connection**
- **bearing connection**

Both flanged and bearing connection reduce rod buckling and the size of the cylinder. The flanged connection arrangement needs a very precise guide system (0,5° max keel moving), which is not required in the bearing connection.



Locking system example in a 65' sailing yacht.

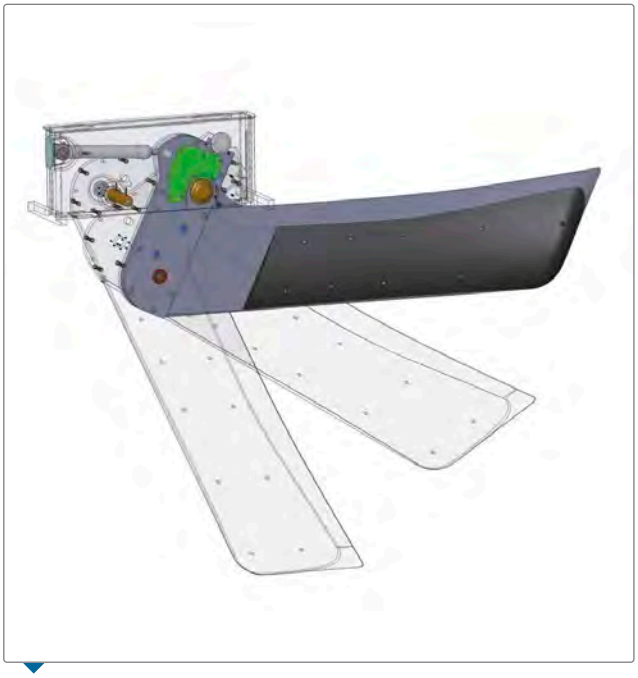
SWING KEEL

Another way to improve shallow water performance of a sailing boat is a swinging keel such as the one we designed and machined for a 35' project.

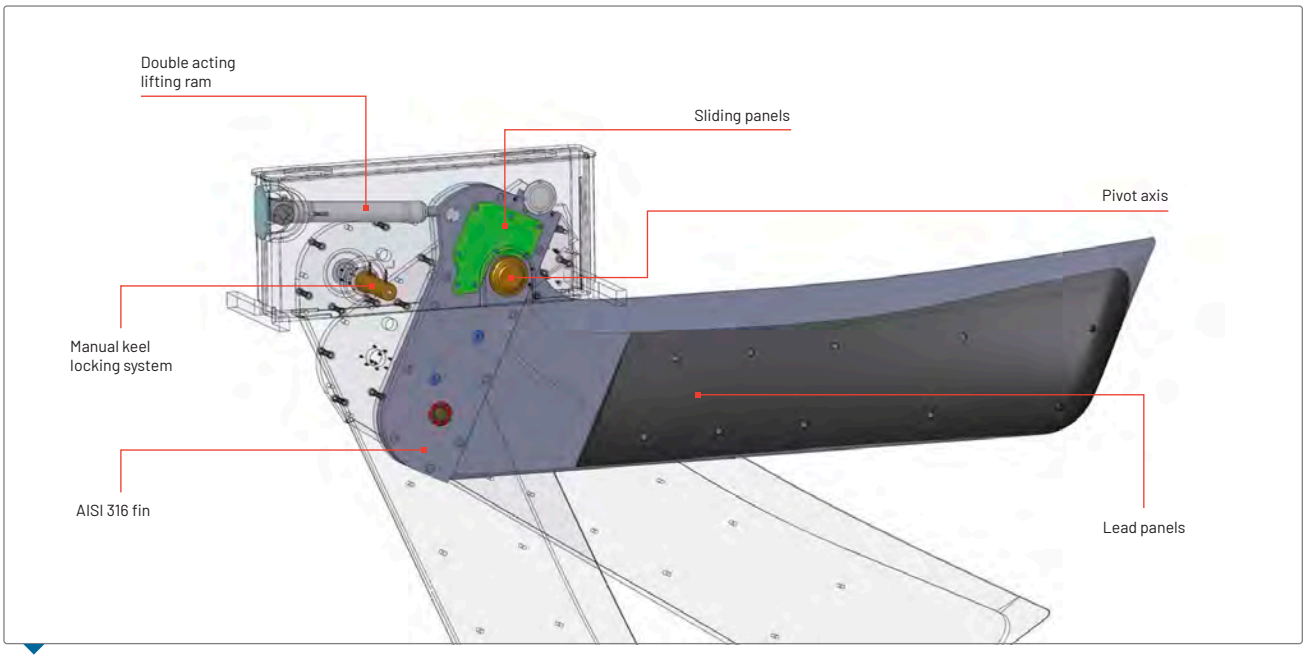
The keel has a pivot axis that goes through the boat. A double acting ram moves the keel up and down in order to reduce the overall draft of the boat (from 2 m to 0,58 m); the hydraulic ram, the bearings and the main axis are fully contained inside the watertight keel box.

The keel is powered by a compact DC powerpack.

The system is completed by a recovery and a manual locking system.



The pivoting keel assembly for a 35' day sailer.

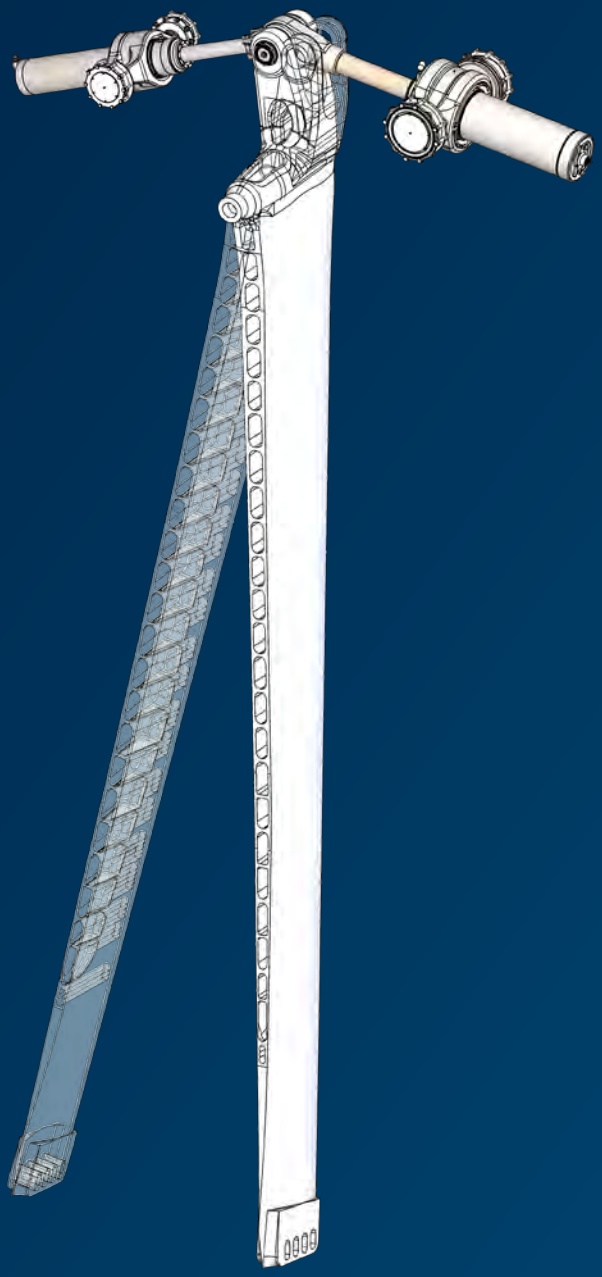


Main items on a pivoting keel.



Courtesy Borlenghi

CANTING KEEL SYSTEM



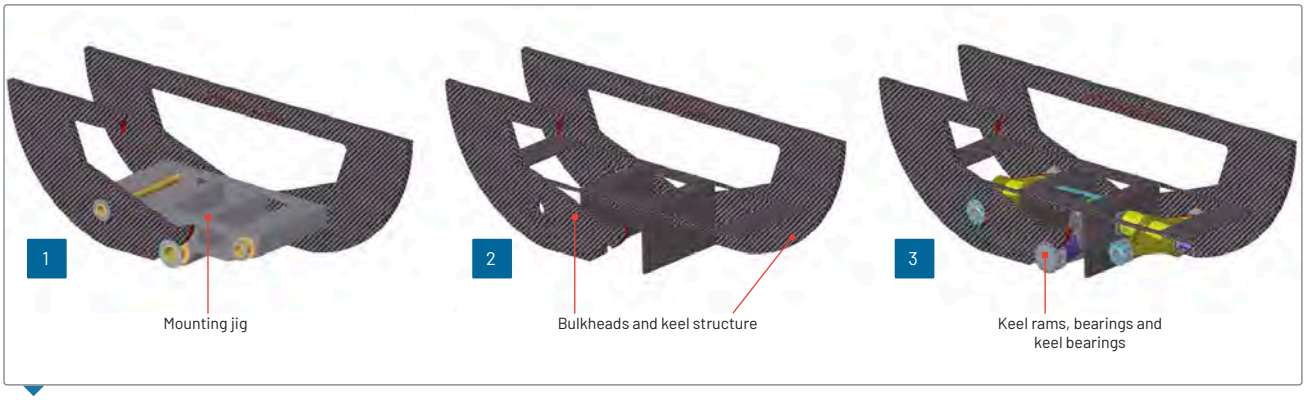
The **canting keel** feature dramatically improves the righting moment of the boat providing more power to race yachts or more comfortable sailing for cruisers.

Our experience in **canting keel systems** dates back to **1996**, when the **Junoplano** was designed. This single ram system, with a +/- 55° canting angle, has been a milestone in sailing history.

In every kind of **canting keel**, the system is watertight: the central part (where the keel head moves) is flooded, but the cylinders work in a dry area guaranteed by special custom rubber elements, placed between the rams and the longitudinal plates.

In order to reduce the overall weight of the **canting keel**, we developed an integrated system, all the parts are placed straight on the boat **bulkheads**. A **JIG** structure is supplied to the shipyard to place the bulkheads correctly, so they are aligned.

CANTING KEEL



Above you can see how the shipyard made the structural part of the canting keel system.
1) The JIG is placed between the two main bulkheads and glued on the hull.
2) JIG is removed and longitudinal plates and floor are placed between the bulkheads.
3) The canting keel system (rams, bearings and accessories) are placed on board.

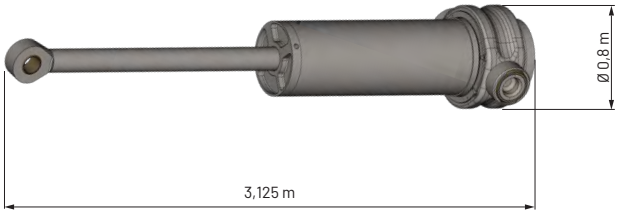


My Song 80'.

THE BIGGEST CANTING KEEL IN THE WORLD...

140' Mari-Cha IV is composed by a double acting cylinder with a 380 mm bore and a 1280 mm (358 tons working load) stroke.

The particular shape of the boat bulkheads needs a special asymmetrical bearing to be machined.





140' Mari-Cha IV.

...AND THE FASTEST

Only 6.5 seconds from -55° to +55°!

This is the outstanding performance of a canting keel system developed for the 90' "Genuine Risk".

The keel control is composed by two double acting cylinders fed by the PTO diesel engine pumps, with an extraordinary 55° canting keel angle.

The PLC system controls the performance of the boat in order to achieve performance, reliability and easy handling of the boat even with this huge amount of power. Manual control and deck equipment complete the hydraulic system of this milestone boat.



Genuine Risk.

CANTING & LIFTING KEEL SYSTEM

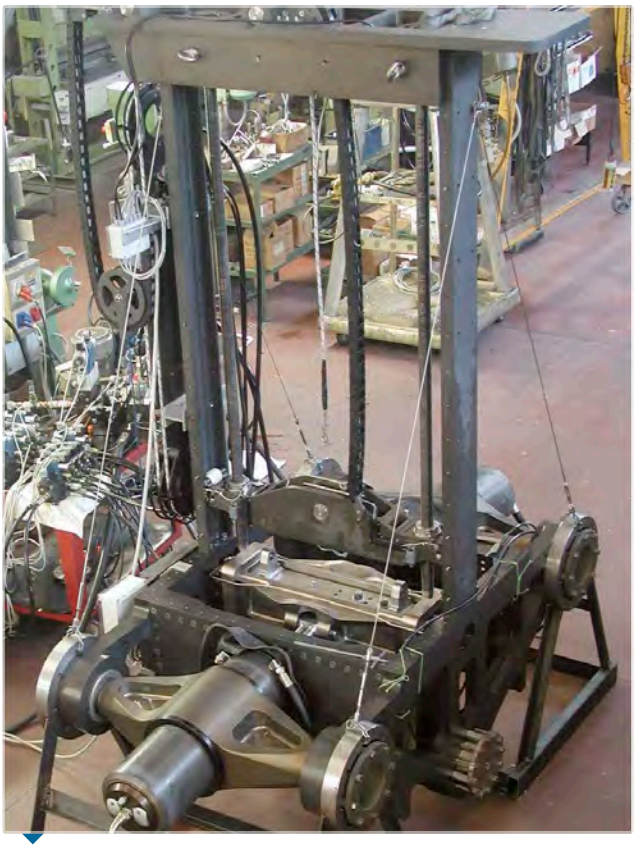
The canting and lifting keel system is composed by canting keel cylinders, a box which contains the fin, twin screws and a Magic Trim or a lifting cylinder.

The cylinders move the box that contains the fin; when the box is in central position, the lifting mechanism can be activated. The twin screws guarantee the alignment of the system, while the lifting mechanism bears most of the keel weight.

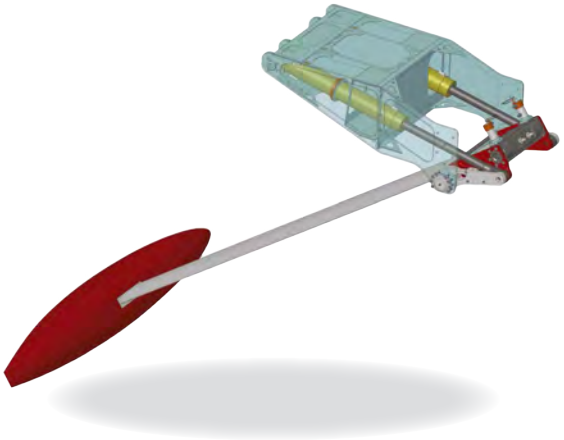
Safety: the canting system can operate with only one cylinder in case of an emergency.

The screws keep the keel lifted in case of lifting mechanism failure. They can also lower the keel in sailing position.

A CNC machined jig of the structure is supplied for the correct alignment of the bulkheads and for easy installation of the keel mechanism on the boat.



MAIN FEATURES for a 115' racer:
Max canting angle: 35°
Bulb weight: 11000 kg
Fin weight: 400 kg
Distance Bulb CG – Axis: 5200 mm
Distance Fin CG – Axis: 2000 mm
Lifting stroke: 1770 mm
Dimensions: 1150x2700x3020 mm
Weight: 1500 kg.



We developed the canting and lifting systems for small-medium size boats (50 ft – 30 ft), applying the same philosophy as larger boats.

Similar systems have been installed on regatta and cruise boats. In all cases, the canting keel system has noticeably enhanced performance.

The lifting keel allows the boat to access shallow waters.

Main characteristics:

- **keel** is CNC milled; leading/trailing edges can also be made in lighter material.
- **canting angle** from 40° to 55°.
- **canting cylinders** made of 17-4 PH.
- **optional frame** for transferring loads to bulkheads.
- **manual or Magic** Trim lifting.
- **PLC** driven automated keel control.



MAIN FEATURES for 69' cruiser/racer:
Max Canting Angle: 38°
Bulb weight: 5100 kg
Fin weight: 1550 kg
Lifting stroke: 1770 mm.

CRUISER AND CRUISER-RACER KEEL SYSTEM

The largest experience in canting, lifting and canting & lifting keel system in the world.

Cruiser and cruiser-racer: aluminium and stainless steel for top reliability and lightness.

YACHT	SIZE ft	MAIN SYSTEM[1]	YEAR
MILLS 62	62	CANTING KEEL, FIN, HYDRAULIC SYSTEM, SAILING CYLINDERS	WIP
MD78	78	LIFTING KEEL, KEEL, HYDRAULIC SYSTEM, SAILING CYLINDERS	2024
MILLS 41	41	LIFTING KEEL, FIN, HYDRAULIC SYSTEM, SAILING CYLINDERS	2023
ICE YACHTS - ICE 70 - 4	70	LIFTING KEEL, HYDRAULIC SYSTEM, SAILING CYLINDERS	2023
ICE YACHTS - ICE 70 - 3	70	LIFTING KEEL, HYDRAULIC SYSTEM, SAILING CYLINDERS	2023
KNIERIM 62	62	LIFTING KEEL, FIN, HYDRAULIC SYSTEM, SAILING CYLINDERS	2023
PERSICO MARINE - CS 80	80	CANTING KEEL, HYDRAULIC SYSTEM, SAILING CYLINDERS	2022
ICE YACHTS - ICE 70 - 2	70	LIFTING KEEL, HYDRAULIC SYSTEM, SAILING CYLINDERS	2022
ICE YACHTS - ICE 60 TARGA	60	LIFTING KEEL, HYDRAULIC SYSTEM, SAILING CYLINDERS	2022
MD TECHNOLOGIES - 62 - 2	62	LIFTING KEEL, FIN, HYDRAULIC SYSTEM, SAILING CYLINDERS	2022
NEO YACHTS & COMPOSITES - NEO 570	57	LIFTING KEEL, HYDRAULIC SYSTEM, SAILING CYLINDERS	2022
ICE YACHTS - ICE 70	70	LIFTING KEEL, HYDRAULIC SYSTEM, SAILING CYLINDERS	2021
NEO YACHTS & COMPOSITES - NEO 430 - 3	43	LIFTING KEEL, FIN, HYDRAULIC SYSTEM	2020
NEO YACHTS &	43	LIFTING KEEL, FIN, HYDRAULIC SYSTEM	2020
SOUTHERN WIND	96-3	LIFTING KEEL, FIN, HYDRAULIC SYSTEM, SAILING CYLINDERS	2020
MYLIUS - CK 60	60	CANTING KEEL, FIN, HYDRAULIC SYSTEM, SAILING CYLINDERS	2019
MAXI DOLPHIN	73	LIFTING KEEL, FIN, HYDRAULIC SYSTEM, SAILING CYLINDERS	2019
PERSICO MARINE - FY 65	65	LIFTING KEEL (1550 MM), HYDRAULIC SYSTEM, SAILING CYLINDERS	2019
ADRIA SAIL - HARRY 65	65	LIFTING KEEL, FIN, HYDRAULIC SYSTEM, SAILING CYLINDERS	2019
NACIRA	69	CANTING & LIFTING KEEL, FIN, HYDRAULIC SYSTEM, SAILING CYLINDERS	2019
MAXI DOLPHIN	73	LIFTING KEEL, FIN, HYDRAULIC SYSTEM, SAILING CYLINDERS	2018
FY 65 - PERSICO MARINE	65	LIFTING KEEL (1550 MM), HYDRAULIC SYSTEM, SAILING CYLINDERS	2018
SOUTHERN WIND	96-2	LIFTING KEEL, FIN, HYDRAULIC SYSTEM, SAILING CYLINDERS	2018
SOTO 77	77	LIFTING KEEL, FIN, HYDRAULIC SYSTEM, SAILING CYLINDERS	2017
SOUTHERN WIND	96-1	LIFTING KEEL, FIN, HYDRAULIC SYSTEM, SAILING CYLINDERS	2017
BOTIN 70	70	LIFTING KEEL, FIN, HYDRAULIC SYSTEM, SAILING CYLINDERS	2017
PREMIER COMPOSITE JV74	74	LIFTING KEEL, FIN, LIFTING CYLINDERS, LOCKING CYLINDERS	2017
SALONA 67	67	LIFTING KEEL, FIN, HYDRAULIC SYSTEM, SAILING CYLINDERS	2017
KING MARINE 65	65	LIFTING KEEL, FIN, HYDRAULIC SYSTEM, SAILING CYLINDERS	2015
CONRAD YCC 91	91	LIFTING KEEL, FIN, SAILING CYLINDERS	2014
KNIERIM 60	60	LIFTING KEEL, FIN, HYDRAULIC SYSTEM, SAILING CYLINDERS	2014
KNIERIM 65	65	LIFTING KEEL (1800 MM), FIN, HYDRAULIC SYSTEM, SAILING CYLINDERS	2013
SOTO 65	65	CANTING KEEL, HYDRAULIC SYSTEM, SAILING CYLINDER	2013
ICE 62	62	LIFTING KEEL (1550 MM), HYDRAULIC SYSTEM	2013
DINAMICA	31	LIFTING KEEL (UP TO 540 MM)	2012
BB	36	PIVOTING KEEL, FIN, HYDRAULIC SYSTEM	2011
KNIERIM 57 - OPAL	57	CANTING KEEL (ONE CYLINDER, 45°), FIN, HYDRAULIC SYSTEM, CYLINDERS	2011
DREAM 67	67	CANTING KEEL (ONE CYLINDER, 40°), FIN AND BULB, HYDRAULIC SYSTEM, CYLINDERS	2011
COMET 100	100	LIFTING KEEL (2200 MM), KEEL, FIN, LOCKING PINS, HYDRAULIC SYSTEM, FURLER, CYLINDERS	2011

(1) Where not indicated the fin was not supplied by Cariboni.

CRUISER AND CRUISER-RACER KEEL SYSTEM

YACHT	SIZE ft	MAIN SYSTEM[1]	YEAR
RO620	62	FIN AND BULB	2011
CONRAD	66	PIVOTING KEEL, LOCKING PINS, HYDRAULIC SYSTEM, TRANSOM DOOR, CYLINDERS	2009
AD 54	54	CANTING KEEL (ONE CYLINDER, 40°), MAGIC TRIMS, CYLINDERS, HYDRAULIC SYSTEM	2009
SHIPMAN	80	LIFTING KEEL (1430 MM), LOCKING PINS, TRANSOM DOOR	2009
ESTE CLASS 40	40	LIFTING KEEL (1500 MM), FIN, HYDRAULIC SYSTEM, KEEL, HEAD	2008
SHIPMAN 72	72	LIFTING KEEL CYLINDER (1430 MM), LOCKING CYLINDERS, TRANSOM DOOR CYLINDERS	2008
SHIPMAN 63	63	LIFTING KEEL CYLINDER (1430 MM), LOCKING CYLINDERS, TRANSOM DOOR CYLINDERS	2008
FINOT – OURSON RAPIDE	60	LIFTING KEEL (1500 MM), SPECIAL CYLINDER FOR LOCKING SYSTEM, HYDRAULIC SYSTEM, MAINSHEET MAGIC TRIM WITH AUTO-TACKING SYSTEM, ANCHOR STOWING, JIB FURLER, TURNING MAST CYLINDER.	2008
FY 61	61	LIFTING KEEL (2000 MM), HYDRAULIC SYSTEM	2006
KANAP-ONE	86	LIFTING KEEL (2000 MM), HYDRAULIC SYSTEM, TRANSOM DOOR, FURLERS, MANUAL CONTROL SYSTEM, CYLINDERS, MDA	2005
SHAKA	80	CANTING KEEL (40°, 2 CYLINDERS), EASY SAILING HYDRAULIC SYSTEM WITH MAGIC TRIM, CANARD, MANUAL CONTROL SYSTEM, FURLER, CYLINDERS, MDA	2005
BLUSAIL 54	54	LIFTING KEEL (2000 MM), HYDRAULIC SYSTEM, JIB FURLER, CYLINDERS, MDA	2004
RANDONNEUR 42	42	LIFTING KEEL (900 MM), HYDRAULIC SYSTEM	2004
FINOT 40	40	MAGIC TRIM FOR LIFTING KEEL (1360 MM), SPECIAL CYLINDERS FOR LOCKING KEEL, MANUAL CONTROL SYSTEM	2003
FETCH IV	79	LIFTING KEEL (1160 MM), HYDRAULIC SYSTEM, MANUAL CONTROL SYSTEM, CYLINDERS, MDA	2003
DANGEROUS BUT FUN	80	CANTING KEEL (40°, 2 CYLINDERS), EASY SAILING HYDRAULIC SYSTEM WITH MAGIC TRIM, CANARD, MANUAL CONTROL SYSTEM, FURLERS, CYLINDERS	2003
MAGNITUDE 80	80	CANTING KEEL (50°, 2 CYLINDERS), HYDRAULIC SYSTEM, MANUAL CONTROL SYSTEM, CYLINDERS, PEDESTAL PUMP	2003
KAURIS III	105	CANTING KEEL, (40°, 2 CYLINDERS), EASY SAILING HYDRAULIC SYSTEM WITH MAGIC TRIM AND AUTOMATIC TACKING FOR JIB, KEEL AND CANARD, CANARDS, FURLERS, MANUAL CONTROL SYSTEM, CYLINDERS, MDA	2002
AORI	80	CANTING KEEL (40°, 2 CYLINDERS), EASY SAILING HYDRAULIC SYSTEM WITH MAGIC TRIM, CANARD, MANUAL CONTROL SYSTEM, FURLERS, CYLINDERS	2002
ADP FINOT 52	52	MAGIC TRIM FOR LIFTING KEEL (1600 MM), MAGIC TRIM FOR MAIN SHEET	2001
ANYWAY	64	CANTING KEEL (40°, 2 CYLINDERS), HYDRAULIC SYSTEM,	2001
KRATOS	60	CANTING KEEL (40°, 2 CYLINDERS), HYDRAULIC SYSTEM, CANARD	2001
ONLY NOW	104	CANTING KEEL (40°, 2 CYLINDERS)	2001
TIKETITOO	88	CANTING KEEL (40°, 2 CYLINDERS), EASY SAILING HYDRAULIC SYSTEM WITH MAGIC TRIM, CANARD, FURLERS, CYLINDERS	2001
V .S. MARA	88	LIFTING KEEL (1900 MM), COMPLETE HYDRAULIC SYSTEM, CYLINDERS, MANUAL VALVES AND PUMP	2001
JULIA	43	CANTING & LIFTING KEEL (40°, 2 CYLINDERS), HYDRAULIC SYSTEM	2000
TOMTIT	55	LIFTING KEEL (1105 MM), EASY SAILING HYDRAULIC SYSTEM, WITH MAGIC TRIM AND AUTOMATIC JIB TACKING, CYLINDERS	2000
CARRERA (Wally 77.4)	77	LIFTING KEEL (1520 MM), EASY SAILING HYDRAULIC SYSTEM WITH MAGIC TRIM, CYLINDERS	1999
SHINING	65	MAGIC TRIM FOR LIFTING KEEL (2250 MM), HYDRAULIC SYSTEM, CYLINDERS	1999
TIKETITAN	88	CANTING KEEL (40°, 2 CYLINDERS), EASY SAILING HYDRAULIC SYSTEM WITH MAGIC TRIM, CANARD, FURLERS, CYLINDERS	1998
JUNOPLANO	60	CANTING KEEL (55°, 1 CYLINDER)	1997

(1) Where not indicated the fin was not supplied by Cariboni.

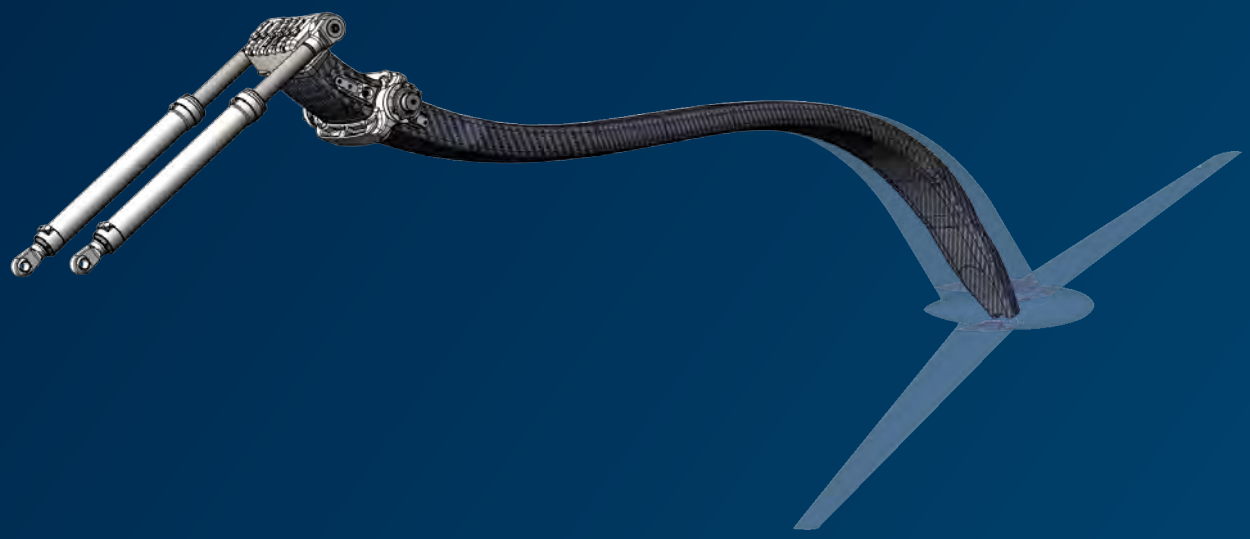
RACER KEEL SYSTEM

Racer yacht: titanium and 17-4 PH cylinders for top performances and reliability.

YACHT	SIZE ft	MAIN SYSTEM[1]	YEAR
RED HERRING II	70	CANTING KEEL, FIN, HYDRAULIC SYSTEM	WIP
HYPERSAIL	100	CANTING KEEL, KEEL, HYDRAULIC SYSTEM, SAILING CYLINDERS	WIP
MCe	100	CANTING KEEL, KEEL, HYDRAULIC SYSTEM, SAILING CYLINDERS	2024
NAUTOR CS 80	80	CANTING KEEL, KEEL, HYDRAULIC SYSTEM, SAILING CYLINDERS	2022
FELCI 33	33	CANTING KEEL, HYDRAULIC SYSTEM	2021
NAUTOR - CS 125	125	CANTING KEEL, HYDRAULIC SYSTEM, SAILING CYLINDERS	2021
MELGES 40	40	CANTING KEEL, HYDRAULIC SYSTEM - ONE DESIGN	2017
INFINITI 46	46	CANTING KEEL, HYDRAULIC SYSTEM, SAILING CYLINDERS, FIN	2015
KNIERIM KER 56	56	CANTING KEEL, HYDRAULIC SYSTEM, SAILING CYLINDERS	2015
NEW 3 - COMANCHE	100	CANTING KEEL, HYDRAULIC SYSTEM, SAILING CYLINDERS	2014
NANDOR FA	IMOCA 60	CANTING KEEL, HYDRAULIC SYSTEM	2014
VOR 65	65	CANTING KEEL, HYDRAULIC SYSTEM - ONE DESIGN	2013
FARR 11 S	34	CANTING KEEL, SAILING CYLINDERS	2013
BRENTA 33 SUPERSTAR	33	CANTING KEEL, FIN, HYDRAULIC SYSTEM, SAILING CYLINDERS	2012
ABU DHABI	VOR 70	CANTING KEEL, HYDRAULIC SYSTEM	2011
PUMA	VOR 70	CANTING KEEL, HYDRAULIC SYSTEM	2011
TELEFONICA	VOR 70	CANTING KEEL, HYDRAULIC DECK EQUIPMENT	2011
GROUPAMA	VOR 70	CANTING KEEL, HYDRAULIC SYSTEM, SAILING CYLINDERS	2011
STRAVAGANZA	42	CANTING KEEL, FIN, HYDRAULIC SYSTEM, SAILING CYLINDERS	2011
CHEMINEES POUJOULAT	IMOCA 60	CANTING KEEL, DECK EQUIPMENT, MANUAL HYDRAULIC SYSTEM	2011
HUGO BOSS	IMOCA 60	CANTING KEEL REFITTING (EX PINDAR), MANUAL HYDRAULIC SYSTEM	2011
GP42	42	KEEL FIN AND BULB	2009
VIRBAC	IMOCA 60	CANTING KEEL CYLINDERS	2009
PRB	IMOCA 60	CANTING KEEL CYLINDERS	2009
LUNA ROSSA	STP 65	LIFTING KEEL, DECK EQUIPMENT	2008
TH 38	38	CANTING KEEL, CANTING DAGGER BOARD, HYDRAULIC SYSTEM	2008
PUMA	VOR 70	CANTING KEEL, HYDRAULIC SYSTEM	2008
ERICSSON 3	VOR 70	CANTING KEEL, HYDRAULIC SYSTEM	2008
ERICSSON 4	VOR 70	CANTING KEEL, HYDRAULIC SYSTEM	2008
SAFRAN	IMOCA 60	CANTING KEEL, HYDRAULIC SYSTEM	2007
BEL	IMOCA 60	CANTING KEEL, HYDRAULIC SYSTEM	2007
AVIVA	IMOCA 60	CANTING KEEL CYLINDERS	2007
ECOUVER	IMOCA 60	CANTING KEEL CYLINDERS	2007
PINDAR	IMOCA 60	CANTING KEEL, HYDRAULIC SYSTEM, SPECIAL CYLINDERS AND COMPONENTS	2007
WILD LADY (Wilke)	49	CANTING & LIFTING KEEL, FIN, HYDRAULIC SYSTEM	2007-6
DELTA DORE	IMOCA 60	CANTING KEEL CYLINDERS	2006
ABN AMRO ONE	VOR 70	CANTING KEEL, HYDRAULIC SYSTEM, MANUAL CONTROL SYSTEM, CYLINDERS	2005
BRASIL 1	VOR 70	CANTING KEEL, HYDRAULIC SYSTEM, MANUAL CONTROL SYSTEM, CYLINDERS	2005
ABN AMRO TWO	VOR 70	CANTING KEEL, HYDRAULIC SYSTEM, MANUAL CONTROL SYSTEM, CYLINDERS	2005
MAIDEN	115	CANTING & LIFTING KEEL, HYDRAULIC SYSTEM, MANUAL CONTROL SYSTEM, SPECIAL CYLINDERS, WATER BALLAST SYSTEM, FRONT RUDDER	2003
MARI-CHA IV	140	CANTING KEEL	2003
GENUINE RISK	90	CANTING KEEL, HYDRAULIC SYSTEM, HYDRAULIC PROPULSION, MANUAL CONTROL SYSTEM, CYLINDERS, FRONT RUDDER FOR CBTF, MDA	2003
WIND	OPEN 50	CANTING KEEL	1999
FILA	OPEN 60	CANTING KEEL, HYDRAULIC SYSTEM, SPECIAL COMPONENTS	1997

(1) Where not indicated the fin was not supplied by Cariboni.

FOILING SYSTEM



9

FOILING SYSTEM

A different way of sailing, "**Flying on foils**". We have developed and produced different systems based on each boat's specific needs. Mainly applied to **racing boats**, it could be also implemented on fast cruising vessels. For boats from 25 feet upwards!

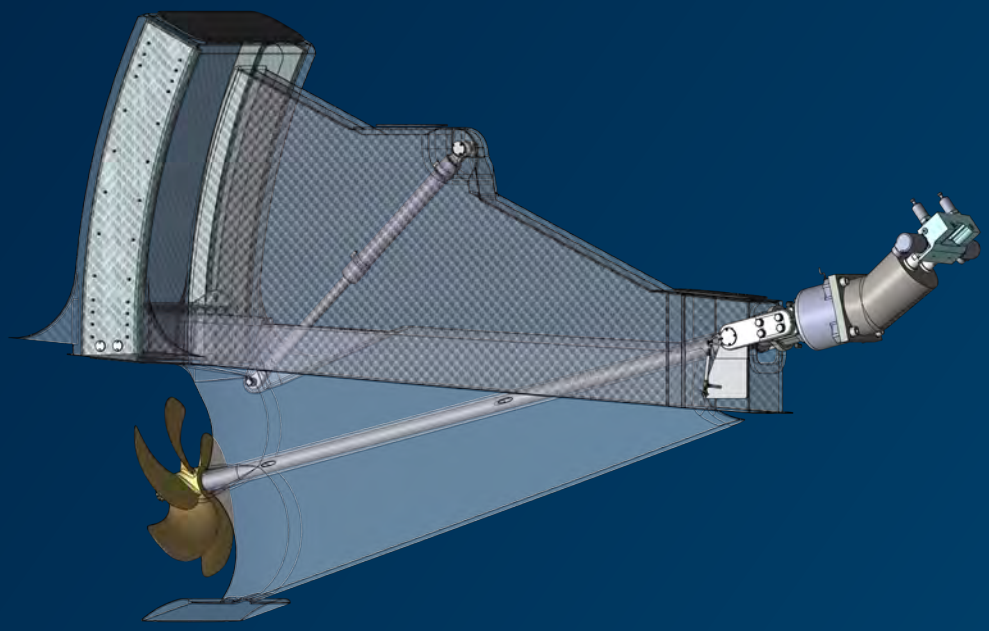
FOILING SYSTEM

YACHT	SIZE ft	MAIN SYSTEM	YEAR
HYPERSAIL	100	FOIL CONTROL, HYDRAULIC SYSTEM, SAILING CYLINDERS	WIP
RH410	280	FOIL CONTROL, HYDRAULIC SYSTEM, SAILING CYLINDERS	WIP
JK RTW	80	FOIL CONTROL, HYDRAULIC SYSTEM, SAILING CYLINDERS	WIP
BP FOILER	31	FOIL CONTROL, HYDRAULIC SYSTEM	2026
BGH - HSV	45	FOIL, FOIL CONTROL, PROPULSION SYSTEM	2024
AC75	75	FOIL CONTROL CYLINDERS, SAILING CYLINDERS	2024
LEQ12	40	FOIL CONTROL, HYDRAULIC SYSTEM, SAILING CYLINDERS	2023
AC40	40	FOIL CONTROL CYLINDERS, SAILING CYLINDERS	2023
BALTIC 111	111	CANTING FOIL CYLINDERS	2023
FLYING NIKKA	60	FOIL CONTROL, HYDRAULIC SYSTEM, SAILING CYLINDERS	2021
KM 45	45	FOILS AND FLAPS, FOIL CONTROL, HYDRAULIC SYSTEM, SAILING CYLINDERS	2021
AC 75	75	FOIL CONTROL, SAILING CYLINDERS	2021
TNZ 40	40	FOIL CONTROL, HYDRAULIC SYSTEM, SAILING CYLINDERS	2019
LR 7.5	25	FOIL CONTROL, HYDRAULIC SYSTEM, SAILING CYLINDERS	2019
AM 38	38	FOIL CONTROL, HYDRAULIC SYSTEM, SAILING CYLINDERS	2018




B&G
Cetilar

PROPULSION



10

PROPULSION

The retractable **propulsion** system is an innovative solution designed to enhance efficiency, maneuverability and versatility.

THRUSTER AND HYDRAULIC ROTATING PROPULSION

For Wally, Cariboni designed a new maneuvering and emergency system for large cruising yachts based on the use of two thrusters that operate both for propulsion in case of emergency and for maneuvering.

This system was featured for the first time on the Wally 105'.

Retractable and tunnel bow/stern thrusters are available for every size of boat.



Rotating propulsion.



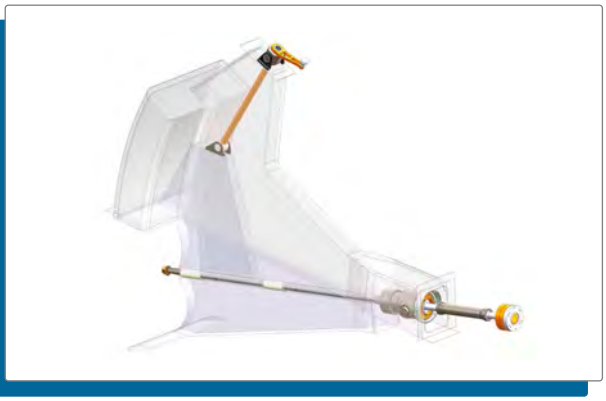
Nariida in action.

YACHT	SIZE ft	LIFTING PROPULSION TYPE	YEAR
BOTIN 70 - DJANGO	70	MANUAL LIFTING SYSTEM AND HOMOKINETIC JOINT	2024
JV79	79	HYDRAULIC LIFTING SYSTEM AND HYDRAULIC ENGINE	2024
NAUTOR - CS 80	80	HYDRAULIC LIFTING SYSTEM AND HYDRAULIC ENGINE	2022
WALLY 101	101	HYDRAULIC LIFTING SYSTEM AND HOMOKINETIC JOINT	2022
NAUTOR - CS 125	125	HYDRAULIC LIFTING SYSTEM AND HYDRAULIC ENGINE	2021
TM 54	54	MANUAL LIFTING SYSTEM AND HOMOKINETIC JOINT	2017
WALLY 93	93	HYDRAULIC LIFTING SYSTEM AND HYDRAULIC ENGINE	2017
CANNONBALL	72	MANUAL LIFTING SYSTEM AND HOMOKINETIC JOINT	2016
NEW 3 - COMANCHE	100	MANUAL LIFTING SYSTEM AND HYDRAULIC ENGINE	2014
ALEGRE 72	72	MANUAL LIFTING SYSTEM AND HOMOKINETIC JOINT	2013
WALLY 100 - MC3	100	HYDRAULIC LIFTING SYSTEM AND HYDRAULIC ENGINE	2012
KER 57	57	MANUAL LIFTING SYSTEM AND HOMOKINETIC JOINT	2011

LIFTING PROPULSIONS

LIFTING PROPULSION

- Light weight (11 kg in titanium version)
- Material: titanium or 17–4 PH
- Homokinetic joint
- Manual lifting system
- Engine power up to 110 hp
- Custom flange to adapt the system to any engine



HYDRAULIC LIFTING PROPULSION

- Light weight (33 kg in titanium version)
- Material: titanium or 17–4 PH
- Hydraulic engine directly connected to the shaft
- Titanium and NITRONIC 50 shaft
- Hydraulic lifting system
- Engine power up to 350 hp



HYDRAULIC LIFTING PROPULSION

- Material: titanium and aluminium
- Hydraulic engine directly connected to the shaft
- INCONEL shaft
- Hydraulic lifting system
- Engine power up to 350 hp



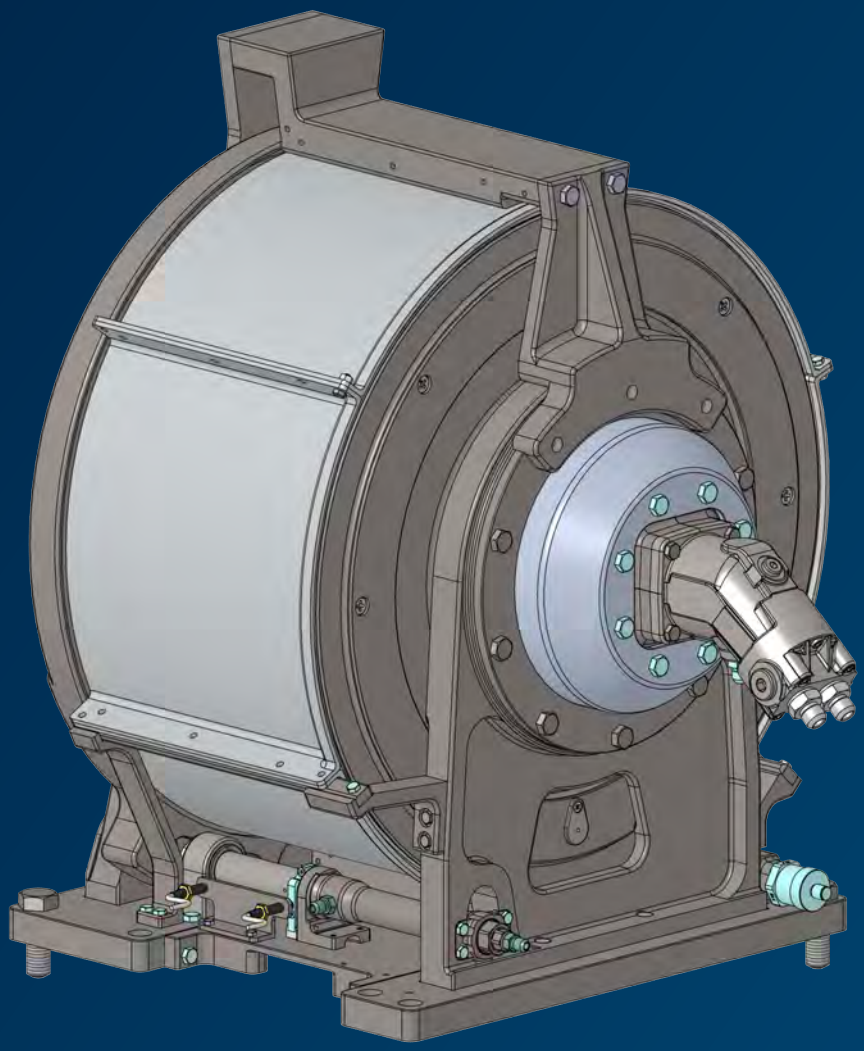


Alegre - Lifting propulsion.



Comanche – Hydraulic lifting propulsion.

SPECIAL PRODUCTS



11

SPECIAL PRODUCTS

Everything is possible...

ANCHOR STOWING

It is a simple yet clever idea: a helicoidal screw, driven by a hydraulic engine, acts on a gearbox to move the anchor arm in and out on the bow. The models are designed on the basis of to the maximum torque moment.

The body is made of lightweight hard coated aluminium, gears of 17-4 PH stainless steel and bronze.

The high torque hydraulic engine has a waterproof cover in order to protect it from marine corrosion.

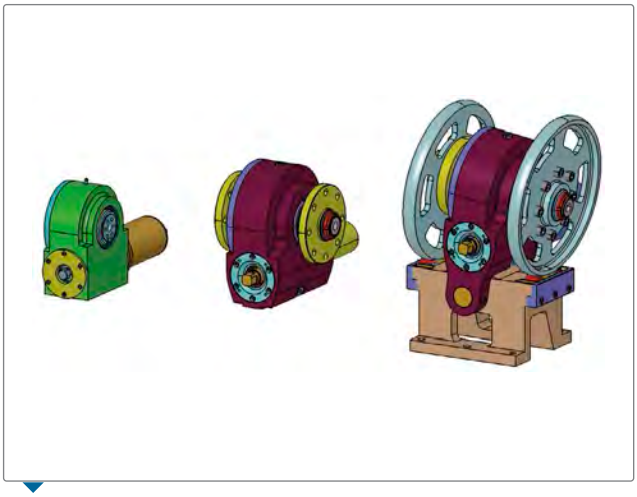
In case it is necessary to turn the headstay around, an additional feature can be added on the motor.



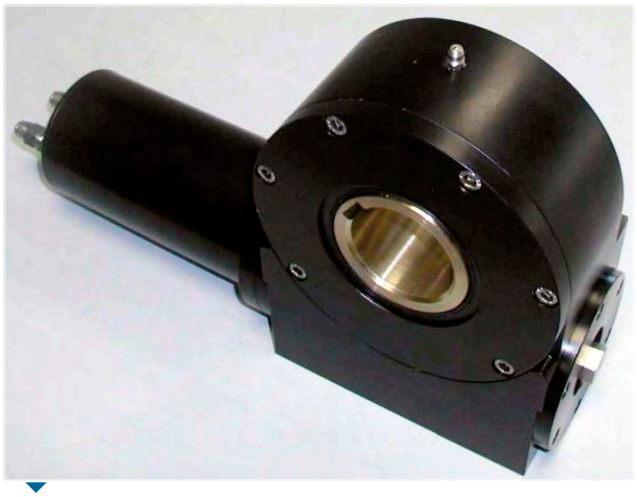
Anchor stowing motor.

MODEL	MAXIMUM MOMENT	DIMENSIONS		WEIGHT		WORKING PRESSURE		FLOW REQUIRED [1]
	Nm	*mm*	*in*	*kg*	*lb*	*bar*	*PSI*	*lpm*
AAS 800	800	350 x 220 x 206	13,8 X 8,7 X 8,1	16	35,3	140	2000	3
AAS 1300	1300	377 x 260 x 246	14,8 X 10,2 X 9,7	25	55,1	140	2000	3
AAS 3000	3000	528 x 338 x 308	20,8 X 13,3 X 12,1	49	108	165	2400	5

(1) Min flow required for maximum torque; lower flow reduces max torque available.
To define maximum anchor weight use following formulas
Max anchor weight = maximum moment / (anchor arm in mm x 9,81)
Max anchor weight lb = max anchor weight kg x 2,205.



From left to right: AAS 800, AAS 1300 and AAS 3000.

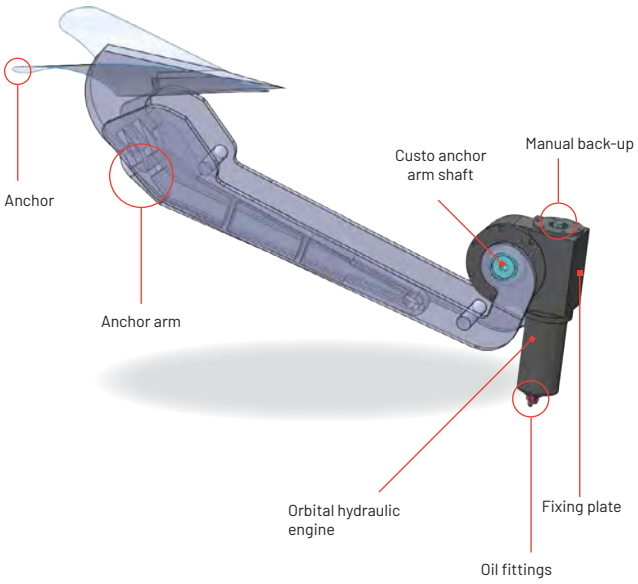


AAS 800.

ANCHOR STOWING SYSTEM KIT



AAS 800 fitted powerboat



ANCHOR STOWING SYSTEM KIT

Cariboni supplies a complete pack for anchor stowing based on its AAS models. This kit includes a compact lightweight powerpack, an ASS model depending on the anchor weight, a double acting cylinder and the compact electric control box.









1. Compact powerpack, with valves and integrated oil reservoir.
2. PLC system to control the powerpack and limit switches to automate the system.
3. CL16 double acting cylinder to open/close the hatch anchor
4. AAS_800 hydraulic anchor stowing system

RETRACTABLE TABLE

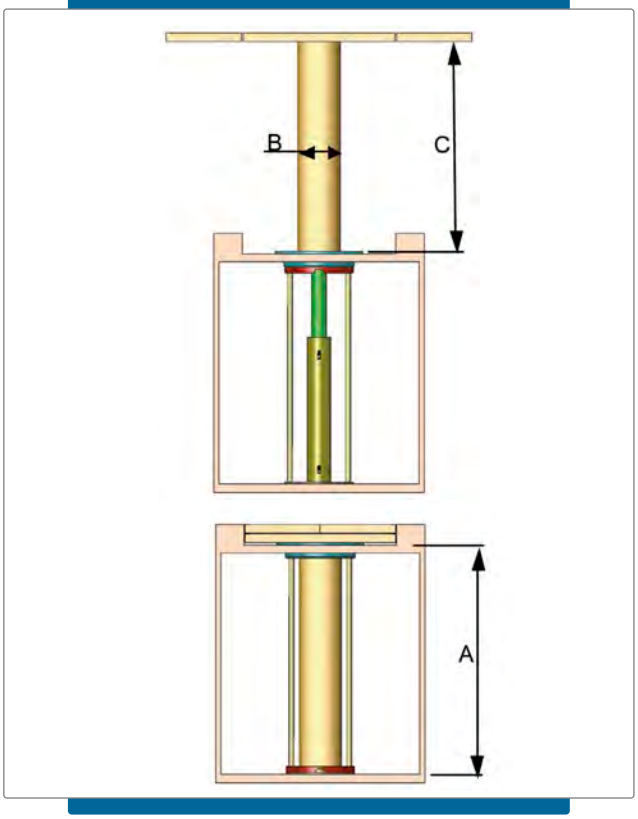
The retractable table has a telescopic hydraulic cylinder. A minimum of space is required, but it guarantees high stability in the open position.



TAV_MOB_04478

A. 790 mm
B. 80 mm
C. 720 mm
Black hard coated aluminium.

Custom models available



Two retractable tables fitted on the Tony Castro 60' "Sizzler".

With this solution you have a flat deck for sailing time and a highly comfortable and large table at the push of a button.





SERVICE UNIT

We produce special oil pump arrangements and complete service units for race boats and fast cruiser boats. A basic hydraulic system, composed of a single cylinder, can be managed with a mini powerpack which can nevertheless pump at high pressure.

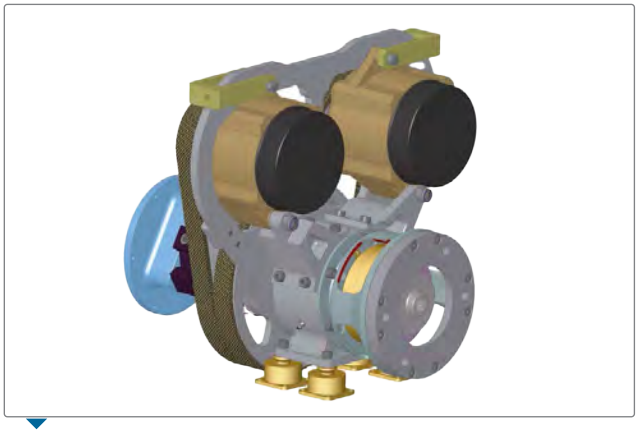
For bigger hydraulic systems on fast cruising boats, Cariboni designs, builds and tests custom solutions to plug hydraulic pumps on marine generators with a clutch.



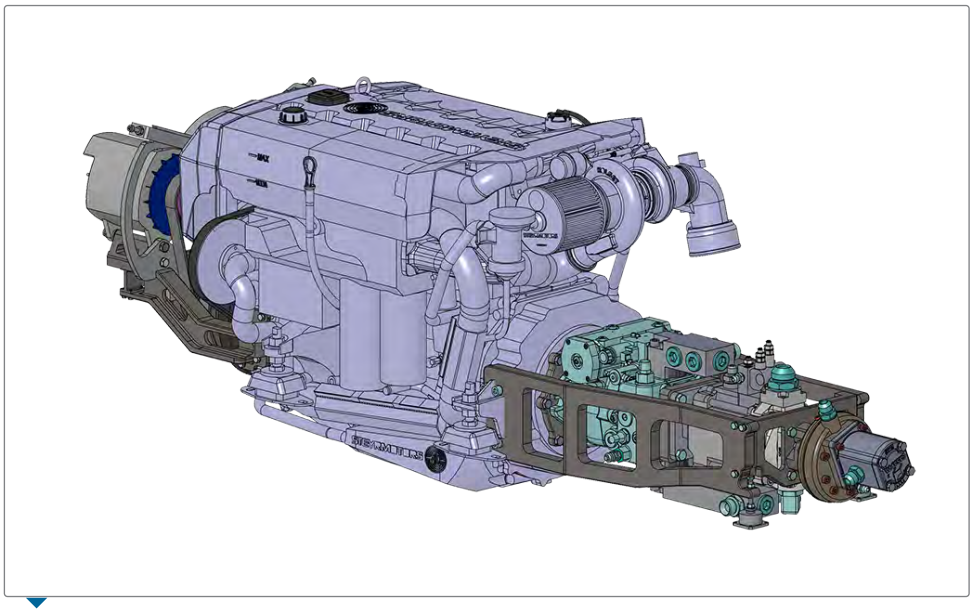
Service unit composed by pump, clutch and 2 alternators.



Pump assembled with custom clutch on 27kW generator PTO.
Flow rate = 67,5 lit/min
Max pressure = 250 bar.



Service unit, composed by clutch and 2 alternators.



Complete service unit installed on Diesel engine

LIFTING CANARD

PIN CONNECTION

The rod terminal has a spherical joint to be fixed on the boat structure.

The cylinder tube is fully inside the fin.

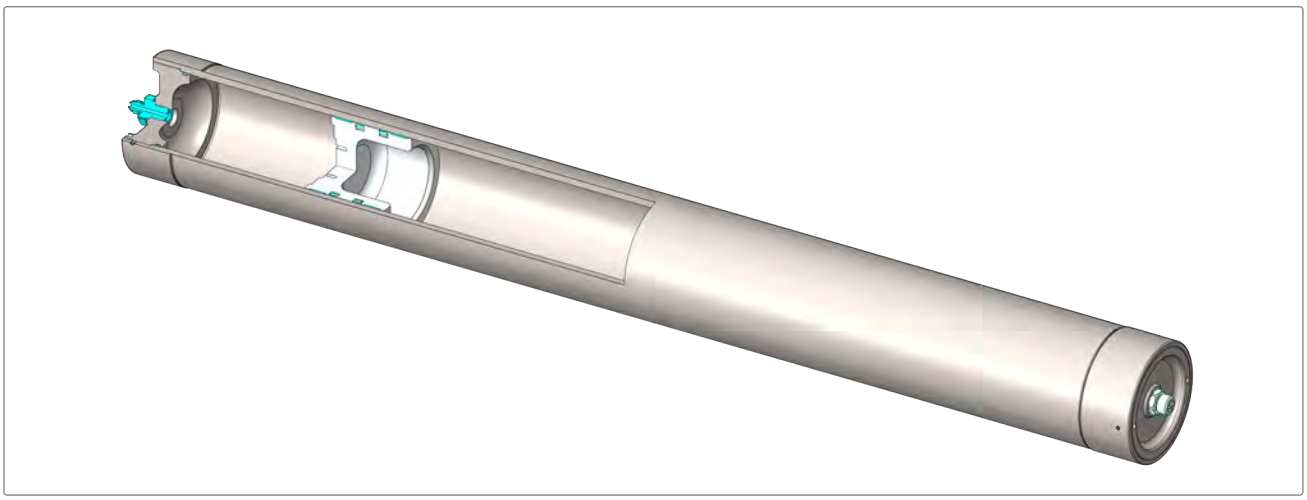
The tube terminal has a hole to hold the fin by a pin.



Wally 88' canards

PISTON ACCUMULATORS

MODEL	VOLUME	MAX PRESSURE	DIMENSIONS	WEIGHT
	L	*bar*	*mm*	*kg*
ACC A 075	0,75	350	Ø98 X 228	4,3
ACC A 125	1,25	600	Ø99 X 351	5,9
ACC A 200	2	600	Ø99 X 483	6,9
ACC A 450	4,5	350	Ø134 X 571	10,3
ACC A 500	5	350	Ø136 X 615	11,9
ACC A 600	6	350	Ø132 X 698	10,5
ACC A 1000	10	350	Ø134 X 1057	15,6

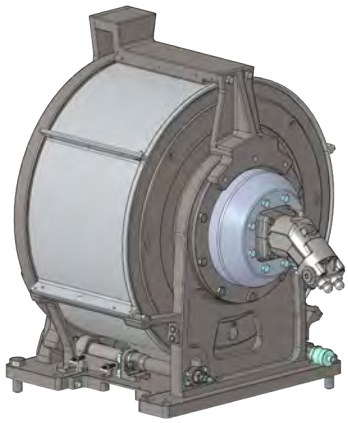


OTHER SPECIAL PRODUCTS...

JAMMER



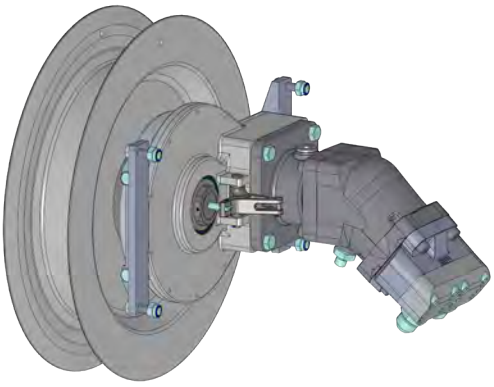




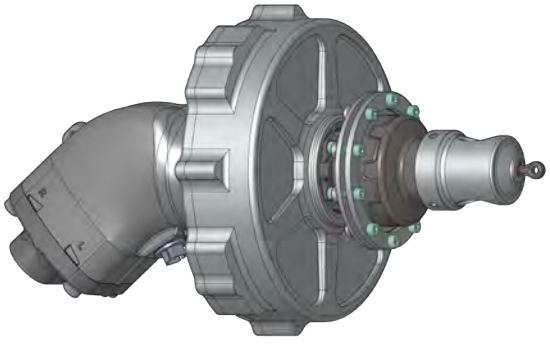
JIB SHEET RETRIEVER
Max line load: 600 kg
Max line speed: 350 m/min
Max pressure: 350 bar
Flow rate: 55 L/min.



HEAT EXCHANGER WITH TITANIUM PLATES

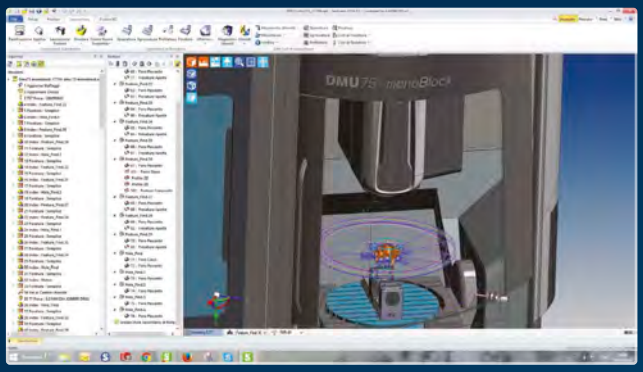


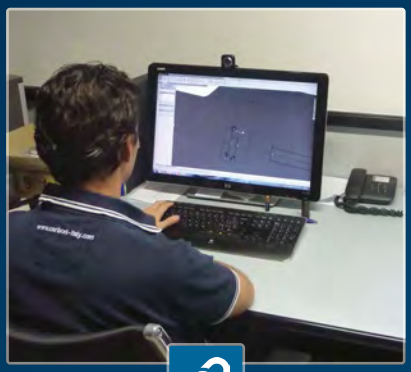
RETRIEVER



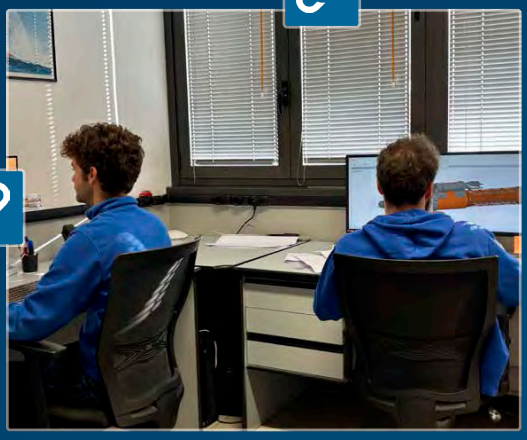
RETRIEVER

DESIGN & CNC









Design office



Cariboni's meeting room

You are always welcome!



DMU 90 P duoBLOCK – Five axis simultaneous machining with 900 mm X-axis, 1050 mm Y-axis, 850 Z-axis.
15000 rpm speedMASTER spindle and a tool magazine with 60 positions.



DMU 75 - Five-axis simultaneous machining with 750 mm X-axis traverse (75:750 mm), 20000 rpm speedMASTER spindle and a tool magazine with 60 positions.

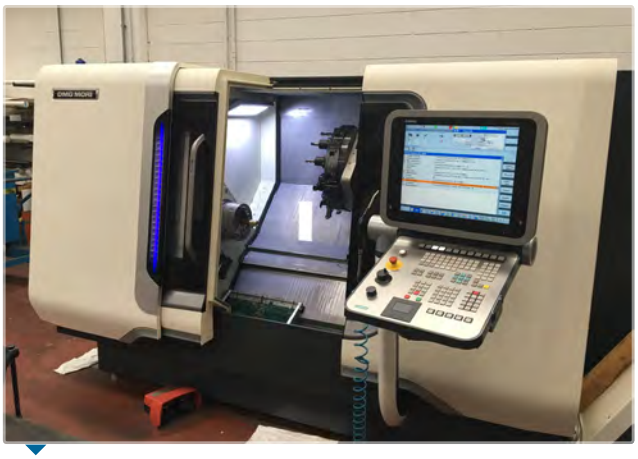


GF Machining Solutions CUT E 600 – With 600 X-axis, 400 Y-axis, 350 Z-axis, wire 0,25 mm max taper angle 30°/56 mm.



Seal machine.





DMG Mori - CTX Beta 800 - CNC lathe and milling machine, 4 axis. It is equipped with motorized tools, integrated mandrel motor and Y axis.

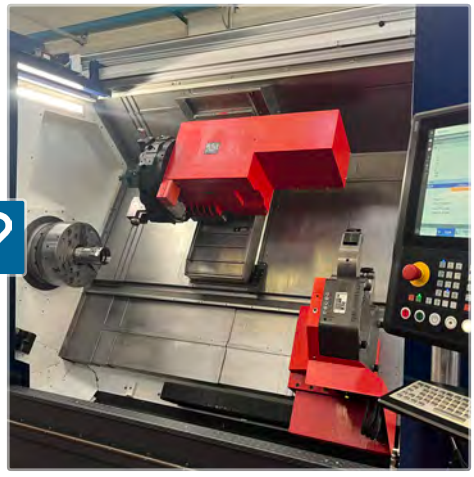


DMG Mori - CTX Alpha 500 - CNC lathe and milling machine, 4 axis. It is equipped with motorized tools, integrated mandrel motor and Y axis. It enables also off-center turning and milling.



Shark milling machine
Pieces are up to x 2500 y 1050 z 1200 mm.





Emco Maxx Turn 110 – CNC lathe and milling machine, 4 axis. It is equipped with motorized tools, integrated mandrel motor and Y axis. Max Ø: 560 mm. Max length: 3520 mm.



The "**Tiger - TLM 4**" CNC milling machine is the biggest machine of the firm. The bi-rotating head works over a volume of 4000x1200x1500 mm and has a target power of more than 28 kW. Fins and bulbs are machined out here as are the biggest parts for the custom arrangements.



The "**Zanoletti**" medium size 5 axes CNC lathe.
Small and medium size cylinder parts are machined here.



CNC grinding machine is used to machine the cylinders rods.



The "**PBR**" is the biggest lathe machine of the firm. It can machine tubes up to 3500 mm length with a diameter of 700 mm.
Big Magic Trim tube, rods and big cylinders components are made by this machine.



The "**Momac**" lathe machine is used to produce small to medium pieces up to 400 x 1000 mm. Pins, small cylinder pistons and parts of manual components are machined here.



The "**Tiger**" CNC milling machine is one of the most reliable machines. The "**Momac**" lathe machine is used to produce small to medium pieces up to 400 x 1000 mm. Pins, small cylinder pistons and parts of manual components are machined here.



The 2 lathe machines are used to produce special tools for our products and for easy adjustments on the test components.



Grinding machine **Delta compact plus X 1100 Y 600.**



The "**Mikron**" small CNC milling machine is mainly used for the production of manual system components such as pumps, valves and other small parts. It is a 5-axis mill with a working space of 710x500x500 mm.



The chain saw cuts every size of pieces (aluminium, steel and titanium).



The "**Lappatrice**" is our CNC lapping machine used for every type of cylinder or Magic Trim tube. It can handle up to 4.5 meters of tube with an internal diameter of 400 mm!



The oven for the heat treatment of special parts (like bolts for the canting keel systems). It can warm pieces up to 1100°C.



Assembly and testing area.

Engine testing room.









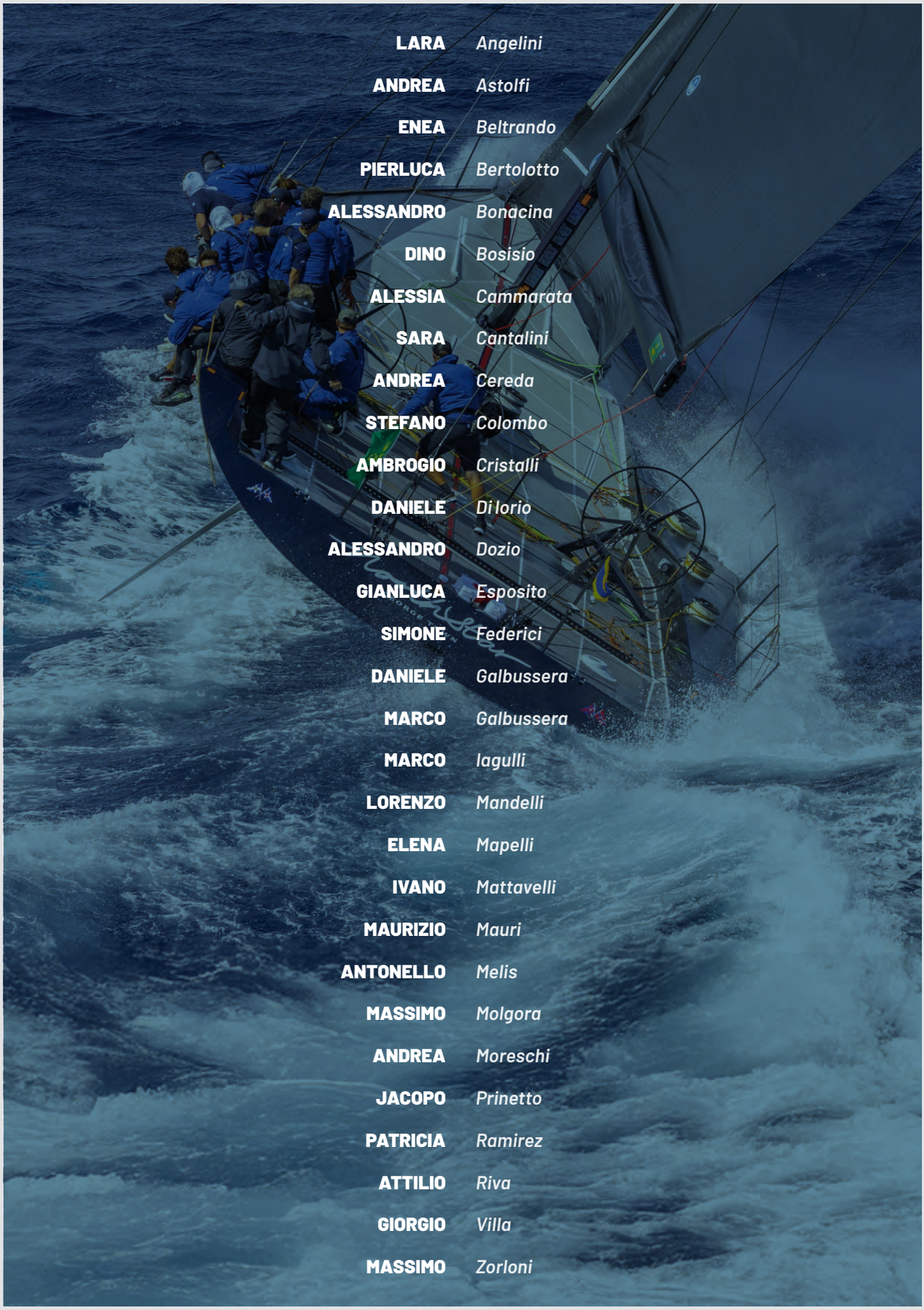


Bench test, with a length of 4200 mm, has been tought to test at 100% every size of Cariboni's ram.

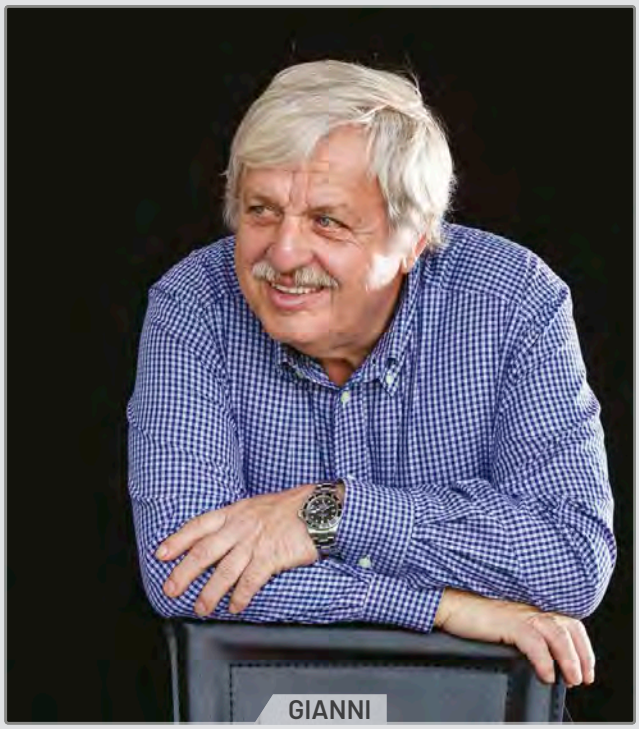


Kardex. Automatic warehouses. Seals, parts and tested products are all stored here managed by a software.

CARIBONI TEAM OCTOBER 2026



CARIBONI FAMILY



GIANNI



MARY



PAOLA



MARCO



YODA


CARIBONI

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