

Courtesy of Carlo Borlenghi



*CARIBONI*



**CARIBONI**  
**CARITEC**

HYDRAULIC EQUIPMENT  
CUSTOM ARRANGEMENTS

**2025**



*[...] It is never easy, but when you do achieve the goal  
it does feel even better.  
It is another great success for Cariboni  
And you should all be very proud  
Of that you have created here.*

*THANKS!*

*Volvo Ocean Race*





**Giovanni Cariboni**  
*working on a custom PTO arrangement*

Giovanni Cariboni was born in Bellano on the Lake of Como the 16th of November 1948.

He approached to the sail world when he was very young and he started sailing alone on a Dighy 12' at the age of 10.

He took part in the regatta on the Snype as a crew member when he was only 14 years old and he continued to take part in the regatta also with the FD for other 2 years in the Italian seas.

He started sailing on the Star class when he was 16 years old, but after one year, he decided to move on the 5.50 s.i. to be able to gain experience in the international sail environment.

While he was studying at the Mechanical High School Giovanni's design experience began growing up thanks to the collaboration with Eng. Carcano.

During summer vacation, he was collaborating with Eng. Carcano developing the 5.50 s.i. Volpina 1, Volpina 2, Volpina 3, Volpina 4 and Volpina 5.

At the end of the high-school he re-started to sail on the Star boat.

During the military period, he took part of the military sailing group.

After that, he spent two years working as a teacher in the same high-school where he has studied.

At the same time he participated to the regatta as semi-professional.

After that, he worked in a mechanical firm in Lecco as production manager and, at the age of 24, he worked as designer of aluminium masts in Canclini company.



## ***CARIBONI***



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

In the beginning of his activity, Mr Cariboni was used to design and produce aluminium masts, and this activity was carried on until 1993, when this part of the production has been stopped. In 1987, Cariboni was caught up in its first production of hydraulic components on the boat Masaiomè.

In 1992, Cariboni was involved in the Wallygator project, and this has represented a turning point in the philosophy of the hydraulic system. It was required to fully equip the boat with an hydraulic system. The project was completed in 1994 and the boat is still sailing. From that period Cariboni has concentrated his research and development on the hydraulic system, improving every years its products and its technology.

Nowadays Cariboni is a family business company and it counts around 20 people and 3 freelancers for the installation on board.

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

Our technicians are able to engineer any kind of product thanks to Solidworks, Cosmos and CAM Surfcam.



4

WHERE



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

Cariboni is open from Monday to Friday,  
from 8.00am to 12.30am and  
from 14.00pm to 18.30pm.



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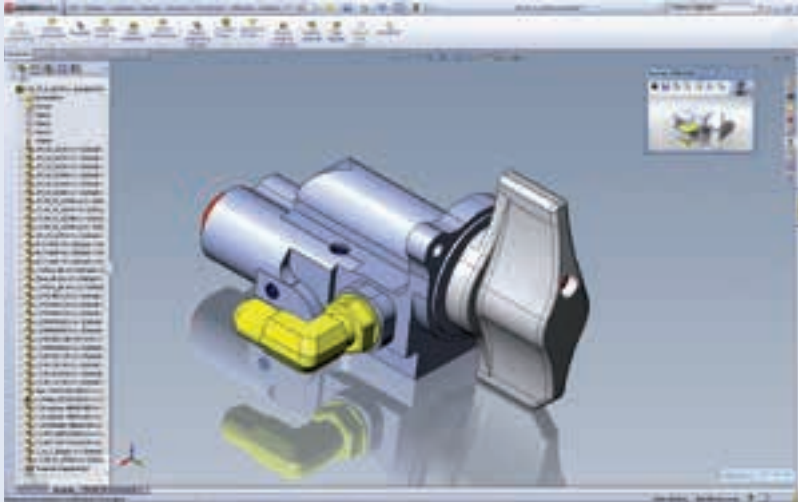
MANUAL CONTROL	QUAD LINE	10
	RACE LINE	12
	BAGOLIN LINE	13
	QUAD LINE PUMPS	14
	RACE LINE PUMPS	14
	MANUAL PANELS	15
	IN-LINE VALVES	16
	HYDRAULIC ACCESSORIES	18
	MANUAL SYSTEM	21
	ROTARY PUMPS	22
HYDRAULIC CYLINDERS	STANDARD SINGLE ACTING CYLINDERS	26
	DOUBLE ACTING CYLINDERS	28
	MAST JACK CYLINDERS	29
	CUSTOM HYDRAULIC CYLINDERS	29
	VANG	30
	BICYLINDERS	32
	DECK ORGANIZERS	33
	INNERFORESTAY CYLINDERS	34
	MAGIC DOOR SYSTEM	35
	TRAVELER CYLINDERS	36
MAGIC TRIM MAGIC DOUBLE	A Magic story...	40
	HOW TO CHOOSE YOUR MAGIC TRIM FOR MAINSHEET	42
	TECHNICAL SPECIFICATIONS	43
	SPRING PULLEY	45
	MAGIC PULLER	45
	SMART MAGIC DOUBLE	47
	SMART CARBON / TITANIUM MAGIC DOUBLE	48
	SIMPLE MAGIC TRIM	50
	MAGIC TESTA	51
	EASY SAILING	52
FURLER	CAPTIVE FURLER	56
	JIB FURLER	57
	CODE ZERO FURLER	59



FURLER	STRUCTURAL FURLER	62
	FOIL SWIVEL	63
	CODE 0 SWIVEL	63
	STRUCTURAL FURLER SWIVEL	63
HYDRAULIC SYSTEM	COMPACT ARRANGEMENTS	66
	CUSTOM ARRANGEMENTS	66
	ELECTRIC PUMPS AND PTO	67
	PUSH BUTTONS PANELS	68
	HYDRAULIC WINCH MOTORS	68
	HYDRAULIC DREAM	69
BULB - FIN	BULB	71
	FIN	72
LIFTING KEEL	LIFTING KEEL	76
	LIFTING KEEL RAMS	79
CANTING KEEL SYSTEM	THE BIGGEST CANTING KEEL IN THE WORLD... ... AND THE FASTEST	82
	VOLVO CANTING KEEL SYSTEMS	83
	CANTING & LIFTING KEEL SYSTEMS	84
	CRUISER AND CRUISER-RACER KEEL SYSTEMS	85
	RACER KEEL SYSTEMS	89
FOILING SYSTEM		91
SPECIAL PRODUCTS	ANCHOR STOWING	94
	ANCHOR STOWING SYSTEM KIT	95
	RETRACTABLE TABLE	96
	THRUSTER AND HYDRAULIC ROTATING PROPULSION	96
	LIFTING PROPULSION	97
	OTHER SPECIAL PRODUCTS...	98
DESIGN & CNC	DESIGN & CNC	100
	TEAM	107



## MANUAL CONTROL



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 Cariboni-Caritec valves are made of lightweight hard coated 7075-T651 aluminium body and they are all designed starting from the race know-how got from TP52, AC, VOR 70 and Open60 yachts.

Nowadays Caritec, the manual line of Cariboni, after 10 years of day-by-day development, offers to every kind of sailing boat a complete set of manual controls 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.

Cariboni-Caritec offers to customers different type of valves, pumps and accessories based on the same concept, which can be put together in virtual no-end arrangements.

**Quad line:** manual valves came 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 kind of valves installed on AC yachts and on most of the TP52 and IRC racing yachts. Lightweight single and double pumps, on line valves and accessories are available for pro racer.

**Bagolin line:** Cariboni's ultimate solution for manual control.



*Some installation  
of the Cariboni's hydraulic  
manual system*



**QUAD LINE**




After the experience on 2006 AC races, Cariboni has designed these new manual valves. Starting from the same mechanism of Race line valves, these new valves are designed to offer the best hi-tech manual control for a cruise-race sailing yacht.

Thanks to the special fittings and fixing arrangements, the new Quad valves are used to create a very compact manual panels which can be fitted in 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 other Cariboni's valves, each valve is able to control a single acting cylinder with a 3 position control knob (pump-hold-release) and it is available with max pressure valve and manometer gauge. All Quad line valves can run at 700 bar (10.000 PSI) working pressure and up to 8 lpm maximum oil flow. All these valves can be fitted on linear or crossed standard arrangement: custom solutions with manual pump are available on request.



Quad panel: 4 single valve, a manual pump, an analogic manometer and an electric power button in just 300x200mm! A race panel squeezed to the minimum.

VALVE TYPE	MAIN FEATURES	APPLICATION
<b>CM_VSBC_A_12322</b> 	Max working pressure: 700 bar (10.000PSI) Weight: 0,76kg (1,68lbs) Max oil flow: 8lpm 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* <i>Polished stainless steel knob available on request</i>	<b>Single valve with max pressure valve</b>  Single acting cylinder (backstay, forestay, inner forestay, halyard, outhaul, Cunningham etc.) Single acting boom vang Back-up valve in automatic hydraulic system
<b>CM_VSBC_A_08814</b> 	Max working pressure: 700 bar (10.000PSI) Weight: 0,84kg (1,85lbs) Max oil flow: 8lpm 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* <i>Polished stainless steel knob available on request</i>	<b>Single valve with max pressure valve and manometer</b>  Single acting cylinder (backstay, forestay, inner forestay, halyard, outhaul, Cunningham etc.) Single acting boom vang Back-up valve in automatic hydraulic system
<b>CM_VD_A_08897</b> 	Max working pressure: 700 bar (10.000PSI) Weight: 1,09kg (2,41lbs) Max oil flow: 8lpm 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* <i>Polished stainless steel knob available on request</i>	<b>Double valve</b>  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

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

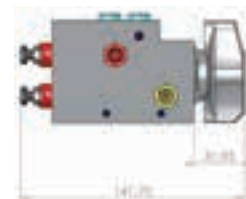
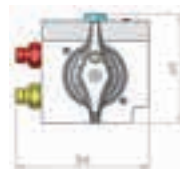
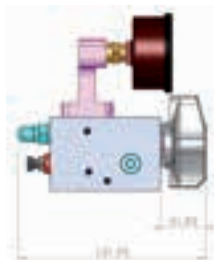
All valve types can be placed on linear or crossed aluminium manifold for standard or custom manual panel

## QUAD LINE

### QUAD LINE VALVE - MAIN DIMENSIONS

Single valve model with max pressure valve and manometer gauge

Double valve model



### Quad line PANELS

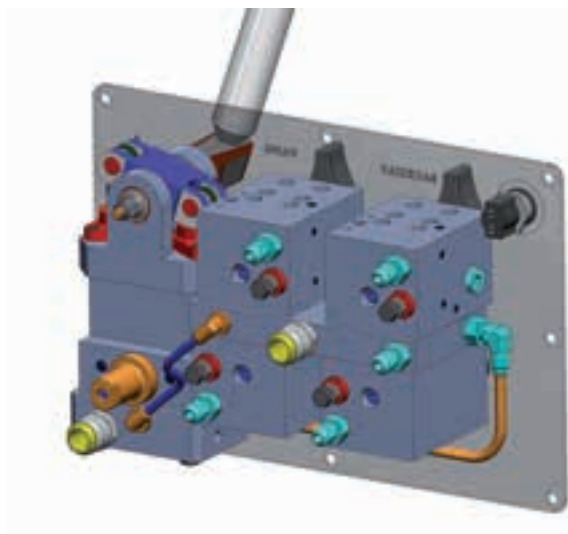
Quad line panels are the CARIBONI-CARITEC compact offer for race-cruising yachts. Thanks to the new valve design, Quad panels are very compact and can be installed on any kind of boat.

Shape and dimensions depend on the number of valves and pressure gauges installed on it. We offer a slim 2 valves panel (single valve, double or mixed), a BP3, BP4, BP5 (3, 4 or 5 single valves) or custom solution 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 on every panel.

The Quad panels are made on black hard coated aluminium; custom polished stainless steel and carbon fibre panels are available on request.

Each manual panel is available with electric pump power supply, able to achieve 700 bar.

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



**Baltic 45'**  
Design by Reichel Pugh

Equipped with custom Cariboni manual quad Panel to control vang, outhaul and Cunningham hydraulic rams



## RACE LINE

The best choice for all racing yachts is the race line. The body is made of 7075-T651 hardcoated aluminium fully machined for extreme weight saving. These valves have been tested on AC, STP 65 and TP52 yachts and ocean race boats.

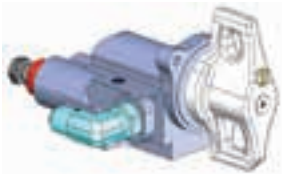
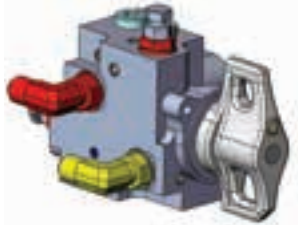
As for other Cariboni's valves, each valve is able to control a single acting cylinder with a 3 position control knob (pump-hold-release).

All Race line valves can run over 700 bar (10.000 PSI) working pressure and up to 8 lpm maximum oil flow; they can be fitted on linear or crossed standard arrangement with lightweight manifold.

*All race line valves can be supplied with servo controls.*



*Luna Rossa catamaran manual valves, pumps and titanium rams.*

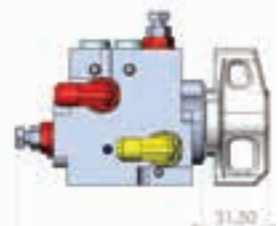
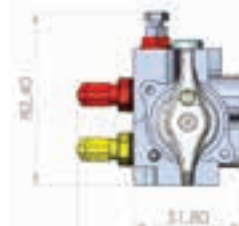
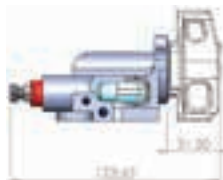
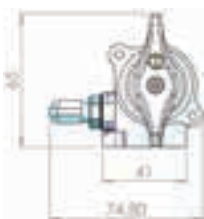
VALVE TYPE	MAIN FEATURES	APPLICATION
<b>CM_VSBC_A_12254</b> 	Max working pressure: 700 bar (10.000PSI) Weight: 0,311kg (0,685lbs) Max oil flow: 8lpm Hard coated aluminium Hold-pump-release positions Relief pressure valve incorporated Flow release control 7/16" JIC UNF 37° stainless steel fitting*	<b>Single valve with max pressure valve</b>  It can be used to run every kind of single acting cylinder on race sailing yachts.
<b>CM_VD_A_14744</b> 	Max working pressure: 700 bar (10.000 PSI) Weight: 0,560kg (1,234lbs) Max oil flow: 8lpm Hard coated aluminium Hold – pump A – pump B positions Relief pressure valve incorporated Flow release control 7/16" JIC UNF 37° stainless steel fittings*	<b>Double valve with max pressure valves</b>  Double acting cylinders Lifting keel manual back-up Canting keel manual back-up

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

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

## MAIN DIMENSIONS

Single valve model with max pressure valve	Double valve model with max pressure valves
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## RACE LINE

## RACE LINE VALVES PANELS &amp; 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:



aluminum 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
<b>LINEAR ARRANGEMENT</b> 	From 1 to 5 single or double valve as preferred, with or without max pressure valve	Weigh for position (a valve for each, single or double): 1 pos: 0,086 kg (0,19 lbs) 2 pos: 0,187 kg (0,41 lbs) 3 pos: 0,283 kg (0,62 lbs) 4 pos: 0,379 kg (0,84 lbs) 5 pos: 0,475 kg (1,05 lbs)
<b>CROSSED ARRANGEMENT</b> 	From 1 to 8 single or double valve as preferred, with or without max pressure valve	Weigh for position (a valve for each, single or double): 1 pos: 0,086 kg (0,19 lbs) 2 pos: 0,187 kg (0,41 lbs) 3 pos: 0,270 kg (0,6 lbs) 4 pos: 0,370 kg (0,82 lbs) 5 pos: 0,440 kg (0,97lbs) 6 pos: 0,539 kg (1,19 lbs) 7 pos: 0,610 kg (1,34 lbs) 8 pos: 0,710 kg (1,57 lbs)

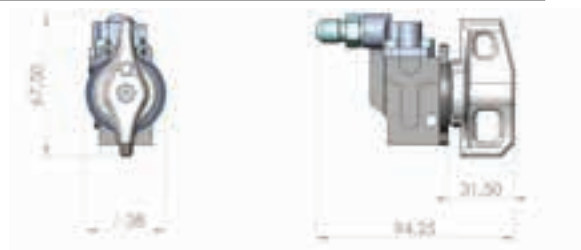
## BAGOLIN LINE

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. With the new manual knob, the release speed can be easily controlled.

VALVE TYPE	MAIN FEATURES	APPLICATION
<b>BAGOLIN CM VS A 21284</b> 	Max working pressure: 700 bar (10.000 PSI) Weight: 0,174kg (0,384lbs) Max oil flow: 6lpm Hard coated aluminium Hold – pump – release positions Manual release control 7/16" JIC UNF 37° stainless steel fittings*	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
<b>BAGOLON CM VS A 17807</b> 	Max working pressure: 700 bar (10000 psi) Weight: 0,195 kg (0.43 lbs) Max oil flow: 12 lpm Hard coated aluminium Hold – Pump – release positions Manual release control 7/16 UNF JIC 37° stainless steel fittings*	Each valve can be supplied with a servo actuator

\* Custom fitting available on request also made of titanium alloy



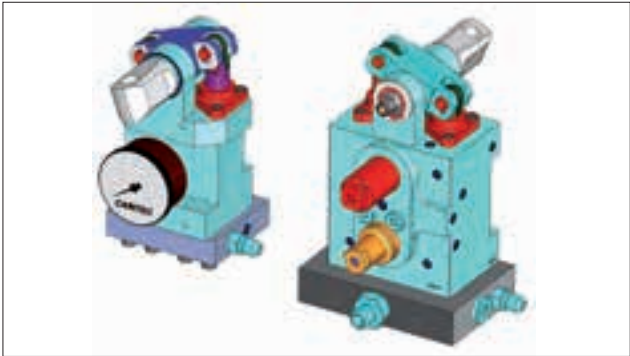
## QUAD LINE PUMPS

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 aluminum in order to guarantee lightweight and reliability.

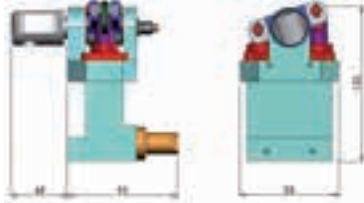
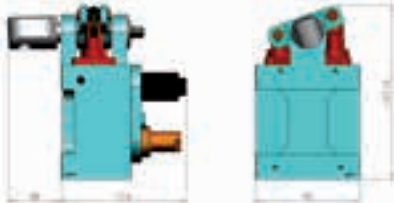
Cariboni-Caritec has two kind of alternate manual quad pumps: the extreme compact and lightweight single speed pump and the powerful two speed pumps.

The two speeds pumps have autoshift system which switches from "high flow" to "high pressure" mode to keep constant load on handle.

Every kind of pump has a max pressure valve to relief pressure and keep safe the hydraulic system if you're pumping without any open valve.



Quad line pumps

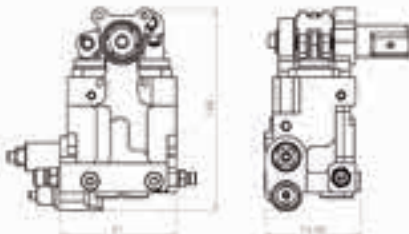
PUMP TYPE	MAIN FEATURES & APPLICATION
<p><b>IPA 0416</b></p> 	<p><b>Single speed alternate pump</b>            Integrated max pressure valve            Displacement: 3,6 cc            Working pressure: 700 bar (10.000 PSI)            Dry weight: 1,750 kg (3,86 lb)            Also available with integrated manometer.</p>
<p><b>IPA 1225</b></p> 	<p><b>Double speed alternate pump</b>            Adjustable auto-shift system            Integrated max pressure valve            Displacement: 3,4 cc (high pressure), 23,6 cc (high flow)            Working pressure: 700 bar (10.000 PSI)            Dry weight: 3,9 kg (8,6 lb)</p>

## RACE LINE PUMPS

Cariboni's race line manual pumps are designed for the top performances requested by worldwide racing yachts. Starting from a solid 7075-T651 hard coated aluminium alloy, both single and double speed race line alternate pumps have titanium pistons and lightweight components to reduce the overall weight. High speed seals let improve the flow of oil pumped and the performance of the system. All race line pumps are designed to work at 700 bar (10.000 PSI).

Race line pumps are ready to plug in an hydraulic system as the manifold is fully integrated in the pump design: 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 & APPLICATION
<p><b>IPA 1225 R</b></p> 	<p><b>Double speed alternate pump with auto shift and integrated max pressure valve.</b>             Bore &amp; Stroke: 12x16,1 mm (high pressure), 25x20mm (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 (10.000 PSI)            Titanium pistons, 17-4PH stainless steel or titanium shaft.</p>

All pumps are available with lightweight titanium pressure fittings and aluminium suction and return fittings.

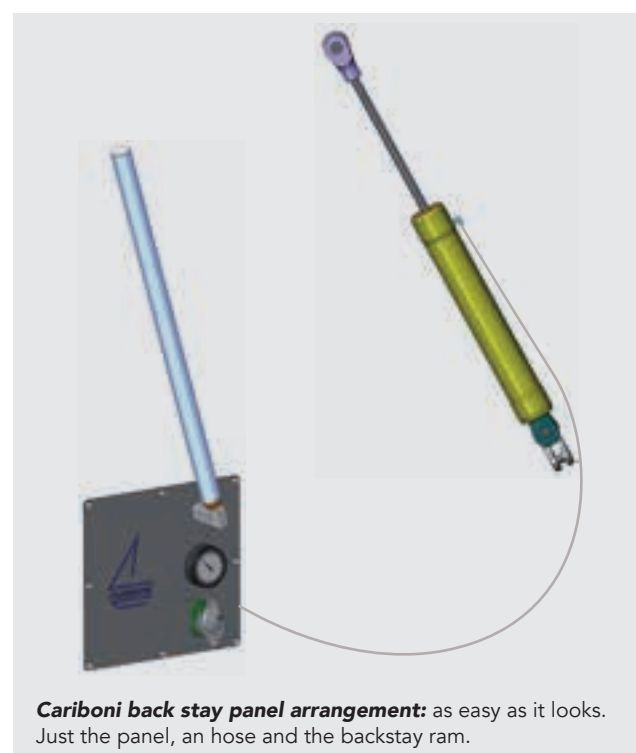
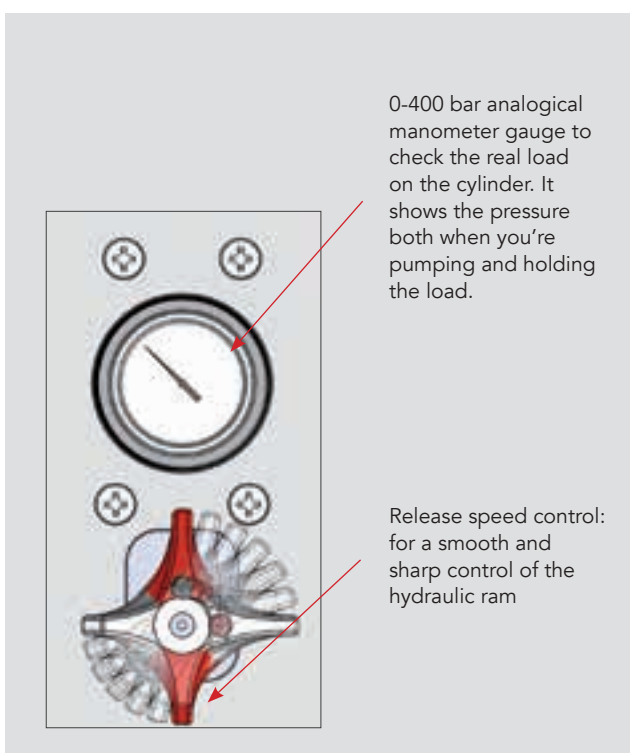


## MANUAL PANELS

Our manual panels start from a single valve system, and it can be added the number of valves needed. Panels are made of lightweight aluminium alloy, but also carbon fibre or stainless steel panels are available on request. Here be-

low an example of custom manual panel, the IPA 1225 A 04417 which matches together a double speed pump and a custom single acting valve. This minimize dimensions and weight of the system.

TYPE	DESCRIPTION
<p><b>IPA_1225_A_04417</b></p> 	<p>To drive single acting cylinder of Decision 35 catamaran mainsheet            Quad line double speed pump, with auto shift and max pressure valve.            Displacement: 3.6 cc (high pressure), 25.1 cc (high flow)</p> <p>Release speed control            45° pump handle movement</p> <p>Dimensions: 150 x 250 mm            Weight: 4.580 kg (10.1 lbs)</p>
<p><b>IPA_0416_A_12293</b></p> 	<p>This extra-compact panel is the new Cariboni's smart idea for small-medium sailing yacht to safety control the backstay.</p> <p>Just 446x416mm for:</p> <ul style="list-style-type: none"> <li>- Single speed alternate pump with max pressure valve</li> <li>- Release speed control valve</li> <li>- 0-400 bar analogical manometer</li> <li>- Up to 3 litres pressurized oil tank for varying backstay size (from 30' to 65' yacht size)</li> </ul>





## IN-LINE VALVES

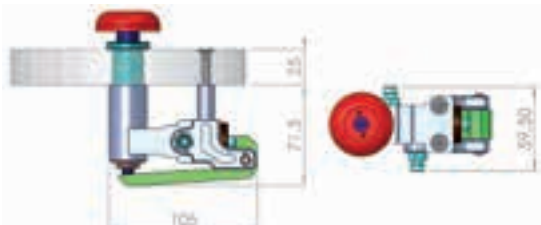
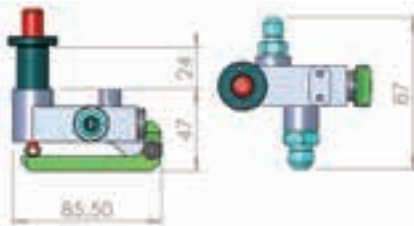
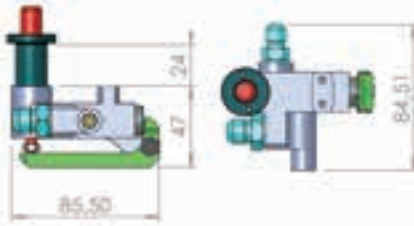
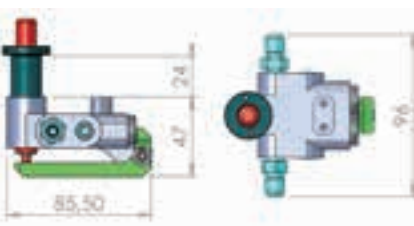
Cariboni-Caritec hydraulic equipment includes several types of in-line valves in order to satisfy any needs of cruiser and racer sailing yacht. All in-line valves are made of hard coated 7075-T651 aluminium and they are all designed to work at 700 bar (10.000 PSI).

Please contact our technical office for further informations: we are glade to provide you technical support in order to design an efficient, reliable and lightweight hydraulic system.

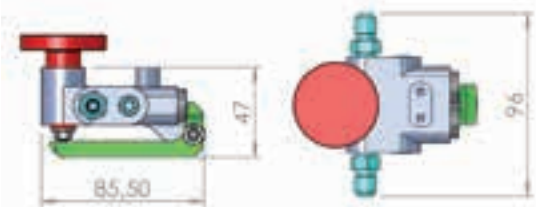
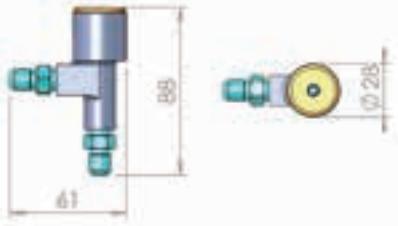
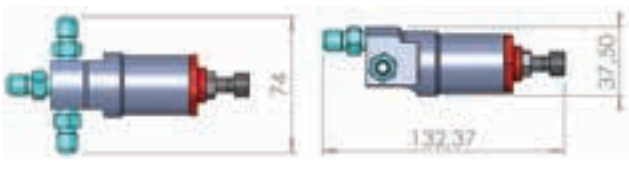
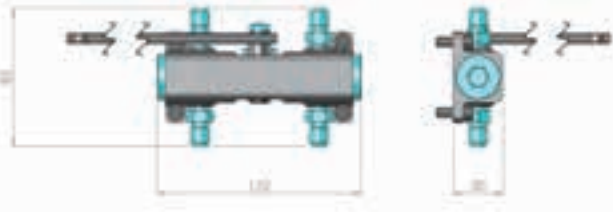
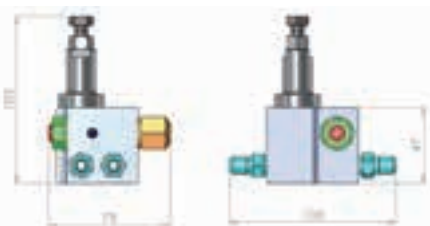
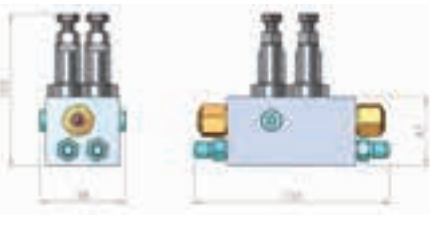
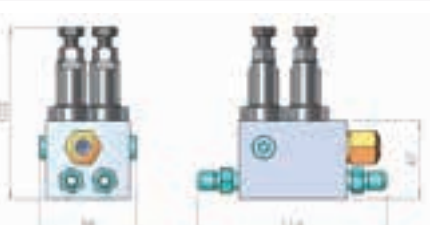
Each in-line valve is equipped with stainless steel fittings: extreme weight reduction can be achieved with optional titanium and aluminum fittings.



Installation of in-line valves

TYPE	MAIN FEATURES & APPLICATION
	<p>Black line quick release valve (P to T line)            Black hard coated aluminum 7075            Weight: 0,38kg (0,84lbs)            Max working pressure: 700bar (10.000PSI)</p> <p><i>Main applications: boom vang fast release, travelers, runners etc.</i></p>
	<p>Race line quick release (P to T line)            Hard coated aluminum 7075            Weight: 0,235kg (0,52lbs)            Max working pressure: 700bar (10.000PSI)            It can work with pressurized oil tank.</p> <p><i>Main applications: boom vang fast release, travelers, runners etc.</i></p>
	<p>Race line quick release (P to T line) with flow control (you can reduce the release speed)            Hard coated aluminum 7075            Weight: 0,286kg (0,63lbs)            Max working pressure: 700bar (10.000PSI)            It can work with pressurized oil tank.</p> <p><i>Main applications: back-up release valve for every cylinders</i></p>
	<p>Race line by-pass valve (A to B and B to A).            Hard coated aluminum 7075            Weight: 0,260kg (0,57lbs)            Max working pressure: 700bar (10.000PSI)            It can work with pressurized oil tank.</p> <p><i>Main applications: fast release for double acting cylinders, traveler fast release</i></p>


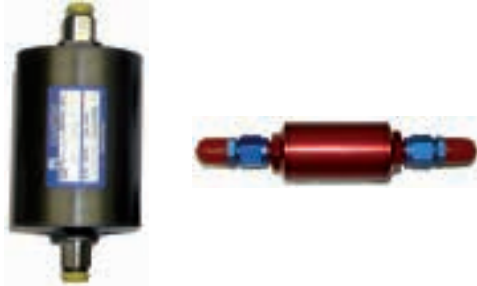

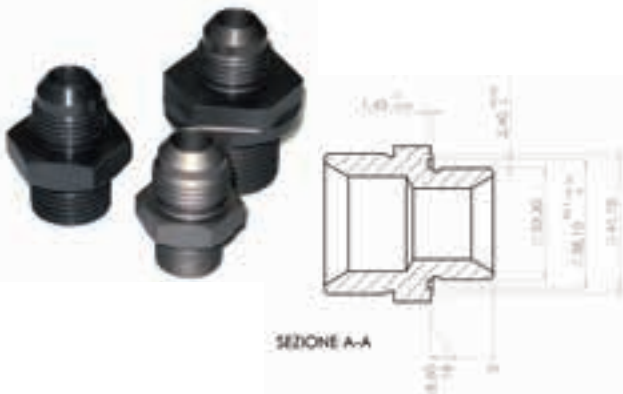
## IN-LINE VALVES

PUMP TYPE	MAIN FEATURES & APPLICATION
	<p>Race line link valve (A to B and B to A).  Hard coated aluminum 7075  Weight: 0,52kg (1,15lbs)  Max working pressure: 700bar (10.000PSI)  It can work with pressurized oil tank.</p> <p><i>Main applications: to put together to pressure line in hydraulic system</i></p>
	<p>Flow control valve (restriction from A to B. Flow is free from B to A).  Black hard coated aluminum  Weight: 0,18kg (0,39lbs)  Max working pressure: 700bar (10.000PSI)  It can work with pressurized oil tank.</p> <p><i>Main applications: release speed control in single and double acting cylinder.</i></p>
	<p>Max pressure valve (reduce max pressure line)  Hard coated aluminum 7075  Weight: 0,25kg (0,55lbs)  Max working pressure: 700bar (10.000PSI)  It can work with pressurized oil tank.</p> <p><i>Main applications: max pressure control in hydraulic system or in single/double acting cylinders.</i></p>
	<p>Manual By-pass valve  Hard coated aluminum 7075  Weight: 0,51kg(1,12lbs)  Max working pressure: 700bar (10.000PSI)  Top flow Up to 50lpm</p> <p><i>Main applications: by-pass valve to let move freely under load two twin cylinders</i></p>
	<p>Single anti-shock valve  Hard coated aluminum 7075  Weight: 0,45kg (1lbs)  Max working pressure: 700bar (10.000PSI)</p> <p><i>Main applications: for every double acting cylinder which can hold impulsive load.Adjustable anti-shock release speed. It reduces the peaks of pressure inside the ram (pressure moves from back port to head port of the ram).</i></p>
	<p>Double anti-shock valve for double acting cylinder  Hard coated aluminum 7075  Weight: 0,75kg (1,65lbs)  Max working pressure: 700bar (10.000PSI)  It can work with pressurized oil tank.</p> <p><i>Main applications: for every double acting cylinder which can hold impulsive load. It reduces the peaks of pressure inside the ram (pressure moves from back port to head port of the ram).</i></p>
	<p>Double anti-shock valve for double acting cylinder (with same oil volume on head and back).  Hard coated aluminum 7075  Weight: 0,65kg (1,43lbs)  Max working pressure: 700bar (10.000PSI)  It can work with pressurized oil tank.</p> <p><i>Main applications: for every double acting cylinder which can hold impulsive load. It reduces the peaks of pressure inside the ram (pressure moves from back port to head port of the ram).</i></p>

**HYDRAULIC ACCESSORIES**


As a wise man said: "Beauty is in the details". Every hydraulic system needs some small parts which are as important as the other "big" parts. Fittings, filters, gauges, hoses,

through deck glands etc. are all parts of Cariboni's accessories catalogue.

PRODUCT	DESCRIPTION
<p><b>Pressure gauges and sensors</b></p> 	<p>Digital and analogical Ø50mm gauge can be fitted in any sort of hydraulic system to monitor the line pressure or the hydraulic ram working load.</p> <p>The electronic pressure gauge, available both on 0-5V and 4-20mA signal, are used for Caritec electronic manometer, B&amp;G instruments, PLC instruments and for Cariboni Monitoring system.</p>
<p><b>Online filters</b></p> 	<p>Cariboni oil filters are designed to work with manual system keeping low pressure drop even at high flow. The filter houses are full made in lightweight aluminium and the cartridges can be replaced easily. Cariboni high flow filter can be used in electric return line thanks to its high flow rate.</p>
<p><b>Through deck glands</b></p> 	<p>Cariboni's trough deck glands are designed for Parker N3,N4, N6 and N8 hoses. These kind of hoses are the most common ones in cruising boats and copy every kind of needs. With the Cariboni deck glands, you don't need to cut the hoses and add new fitting: just fit the glands on the hoses. Less fittings means less chance to have oil leakages. Through deck glands are available in standard aluminium alloy or in polished stainless steel. Custom dimensions are available on demand.</p>
<p><b>Aluminum lightweight fittings</b></p> 	<p>Aluminum lightweight fittings are designed for pure racer yachts in order to reduce to the minimum the overall weight of the hydraulic system (you know, everything counts!)</p> <ul style="list-style-type: none"> <li>1/8" BSPP+OR – 7/16" JIC 37° (weight: 0,006 kg)</li> <li>1/4" BSPP+OR – 7/16" JIC 37° (weight: 0,010 kg)</li> <li>3/8" BSPP+OR – 7/16" JIC 37° (weight: 0,014 kg)</li> <li>1/4" BSPP+OR – 9/16" JIC 37° (weight: 0,010 kg)</li> <li>3/8" BSPP+OR – 9/16" JIC 37° (weight: 0,014 kg)</li> <li>1/2" BSPP+OR – 9/16" JIC 37° (weight: 0,022 kg)</li> <li>3/4" BSPP+OR – 9/16" JIC 37° (weight: 0,042 kg)</li> <li>3/8" BSPP+OR – 3/4" JIC 37° (weight: 0,016 kg)</li> <li>1/2" BSPP+OR – 3/4" JIC 37° (weight: 0,024 kg)</li> <li>3/4" BSPP+OR – 3/4" JIC 37° (weight: 0,044 kg)</li> <li>3/4" BSPP+OR – 3/4" BSPP SW. (weight: 0,06444 kg)</li> <li>1" BSPP+OR – 1" BSPP SW. (weight: 0,094kg)</li> </ul> <p>Same sizes are available made on titanium alloy too.</p>



## HYDRAULIC ACCESSORIES

PRODUCT	DESCRIPTION
<p><b>Cariboni custom tools</b></p> 	<p>Cariboni designs and machines standard and custom tools to service its own products and other system with Hawe components. We can also supply every kind of tools to easy service our products. Seal kits, spare parts and every kind of parts are available on demand for a complete service package.</p>

## HYDRAULIC ACCESSORIES / HOSES

MODEL	I.D.	O.D.	Rmin	W.P.	B.P.	Weight	Fitting
	mm	mm	mm	bar	bar	kg/m	
<b>6700</b>	4,0	8,0	40	500 (7.200PSI)	1500	0,04	7/16" UNF JIC 37°
<b>0461 VHP</b>	5,0	11,0	30	700 (10.000PSI)	2800	0,09	7/16" UNF JIC 37°
<b>2A DN 10</b>	10,0	19,5	152	700 (10.000PSI)	2080	0,25	9/16" UNF JIC 37°
<b>2A DN 13</b>	13,0	22,6	203	410 (6.000PSI)	1640	0,35	3/4" UNF JIC 37°

MODEL	I.D.	O.D.	Rmin	W.P.	B.P.	Weight	Fitting
	mm	mm	mm	bar	bar	kg/m	
<b>A02311-2T/C 3/16"</b>	4,8	7,5	30	700 (10.000PSI)	1600	0,028	7/16" UNF JIC 37°
<b>A02312-2 T/C 1/4"</b>	6,4	10,2	40	700 (10.000PSI)	1600	0,055	7/16" UNF JIC 37°
<b>A02313-3T/C 3/8"</b>	7,9	14	50	500 (7.200PSI)	1500	0,112	9/16" UNF JIC 37°
<b>A02315-3 T/C 1/2"</b>	8,5	18	75	400 (5.800PSI)	1200	0,135	3/4" UNF JIC 37°
<b>A02316-4 T/C 3/4"</b>	17,5	25	140	400 (5.800PSI)	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 level.

For race-cruiser and pure racer sailing yachts, we offer light-weight carbon fiber oil tanks in different sizes and custom arrangements.

Carbon fiber oil tanks are available in 3 different size and capacity:

- SCP\_2.1: 2.1 liters, L=250mm
- SCP\_5.1: 5.1 liters, L=600mm
- SCP\_9.4: 9.4 liters, L=850mm



*Carbon fibre oil tanks: 2,5 and 9 litres volume.  
On the right: custom arrangements for VOR 70*



*Standard pressurized oil tanks,  
2 and 4 litres volume*

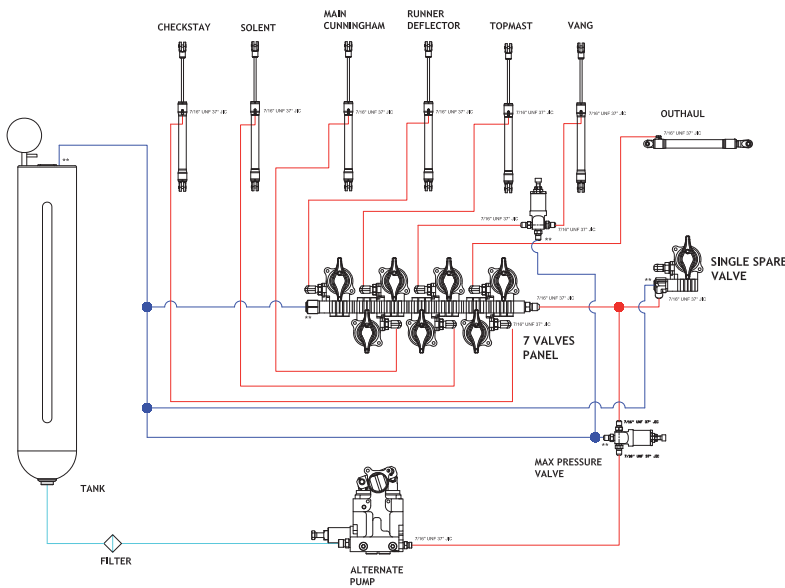
*Custom pressurized carbon  
fibre oil tank, 8 litres volume*



*Custom pressurized carbon fibre oil tank with piston. 4,5 and  
10 litres volume*



MANUAL SYSTEM

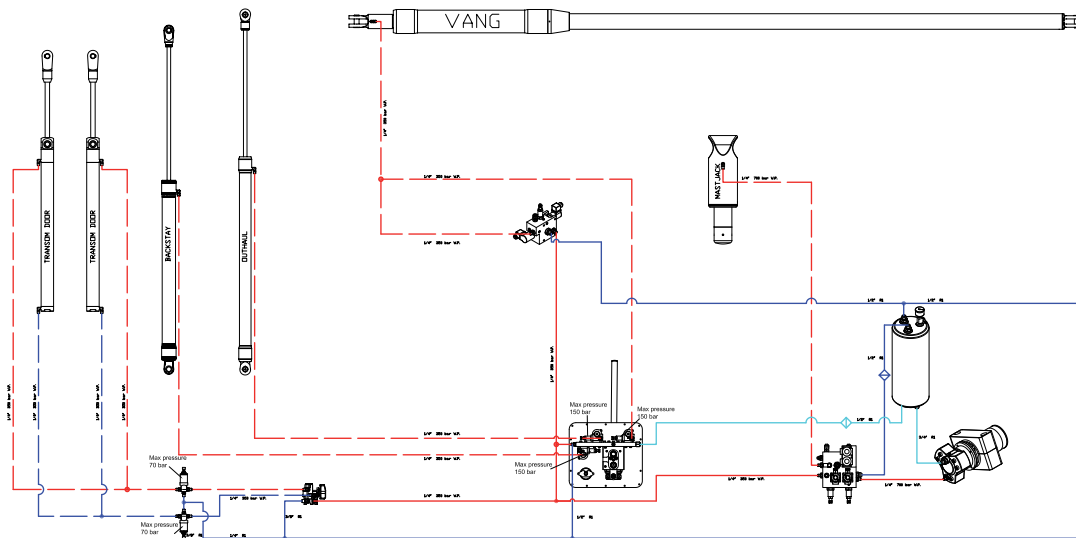


An example of a manual hydraulic deck equipment.

Cariboni can design and supply on request a complete hydraulic system, including all accessories like piping and fittings. The system is tested to assure that the connected components run smoothly. Cariboni's technicians are available to install hydraulic systems or to overlook the installation at the shipyard.



72' Alegre



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

An example of Cariboni's installation. Each hose is named and its path is as linear as possible, reducing weight and increasing performance and reliability.



Single and double valves in assembly & test area. Cariboni manual hydraulic components are all designed for 700 bar (10.000psi) working pressure and they are tested till their limits one by one.



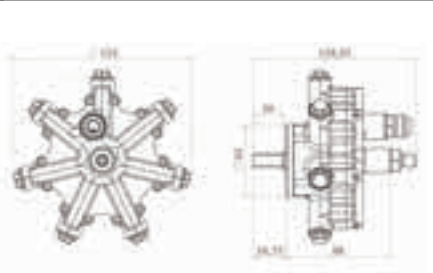
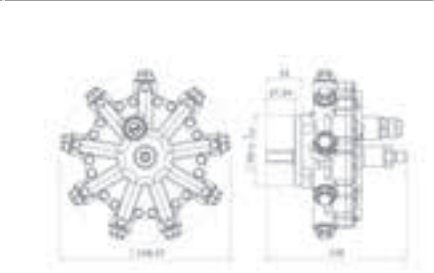
## ROTARY PUMPS

Cariboni's pedestal pumps have changed the hydraulics for cruise-racer and racer yachts. This kind of pump is compact and lightweight and can be arranged on coffer grinder to give highest performances and complete integration with winch handles.

Here below you can see the overall view of our radial pumps and their features.

Cariboni's radial pistons pump can be placed on cockpit to be driven by winch handle or under the deck for a coffee grinder arrangement.

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 gives oil at the first 1/5 or 1/16 round (depending on the pump type).

TYPE	IPR 7	IPR 9	
			

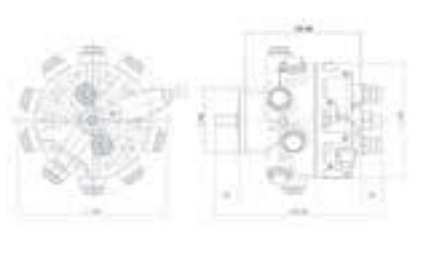
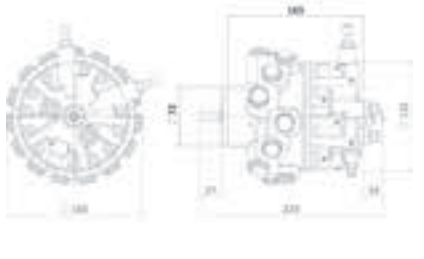
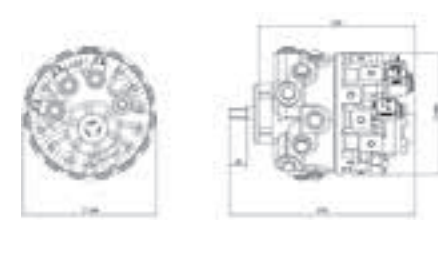
DESCRIPTION		<b>7 radial pistons</b> Hard coated 7075 T6 aluminium alloy	<b>9 radial pistons</b> Hard coated 7075 T6 aluminium alloy	
<b>PERFORMANCE</b>	<i>Working pressure</i>	700 bar (10000 PSI)	600 bar (8700 PSI)	
	<i>Weight</i>	1,35 kg (2,98 lb)	2 kg (4,41 lb)	
	<i>Tot oil flow per turn</i>	7,69 cc	12.2 cc	
	<i>Dim ø</i>	153x88 mm	168x110.5 mm	





**ROTARY PUMPS**



IPR 10	IPR 15	IPR 15 – 350
		
<p><b>10 radial pistons, 2 speed</b>                      (*) Hard coated 7075 aluminium alloy.                      Autoshift system with adjustable valve.                      Relief valve incorporated.</p>	<p><b>15 radial pistons, 3 speed</b>                      (*) Hard coated 7075 aluminium alloy.                      Autoshift system with adjustable valve.                      Relief valve incorporated.</p>	<p><b>15 radial pistons, 7 speed</b>                      Hard coated 7075 aluminium alloy.                      Shift system actuated by integrated solenoid valves.                      Speed can be changed by the user.                      Relief valve incorporated.</p>
<p>700 bar (10.000 PSI)</p>	<p>700 bar (10.000 PSI)</p>	<p>350 bar (5.000 PSI)</p>
<p>2,8 kg (6,17 lb)</p>	<p>5,8 kg (12,79 lb)</p>	<p>7,8 kg (17,20 lb)</p>
<p>16,54 cc (second speed)                      5,09 cc (first speed)</p>	<p>23,46 cc (third speed)                      12,01 cc (second speed)                      5,09 cc (first speed)</p>	<p>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)</p>
<p>165x129,5 mm</p>	<p>165x165 mm</p>	<p>198x233 mm</p>



(\*) you can have option with electro valve



## HYDRAULIC CYLINDERS



In worldwide sail competitions, Cariboni has led the design of the ultimate hydraulic cylinders for both race and fast cruisers boats.

An hydraulic ram seems to be an easy piece, but there are some features which set a gap between a good product and the best product ever. Cariboni faces rams design with a pure technical approach. Each ram is unique but all of them are designed considering:

### **Reliability**

Real marine environment is worse than any testing ground. During hard sailing, rams are stressed by many factors, which have all to be considered in the design.

### **Lightness**

Less weight on board helps to sail faster and with more efficiency even if the boat is just cruising. We don't mind 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 give more and more attention to functions and to how the single piece is integrated on the boat.

After 25 years, more than 250 different types of cylinders have been designed.

Aluminium, stainless steel or titanium tubes, single or double acting cylinders, from 2000 up to 10.000 PSI working pressure, from few kgs up to 358000kg of working load.



*JP 54 cruising boat*

*Cariboni has supplied all the hydraulics system and the rams for the vang, canting keel and the rams for the rotating live cell.*



*Botin 65 Caro*



*B42 day sailing yacht. Halyard, main track and mainsheet are all driven by Cariboni's aluminium rams.*

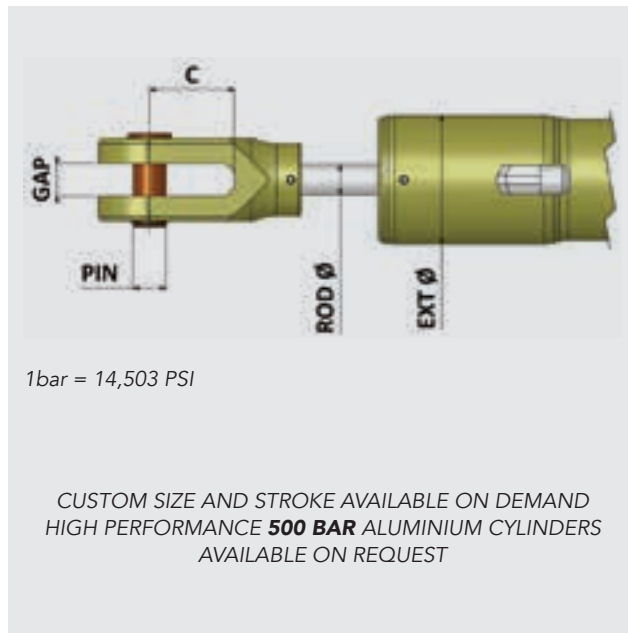
## STANDARD SINGLE ACTING CYLINDERS

Our standard single acting cylinders are available in different kind of models in stock or with short delivery time. 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 17-4PH stainless steel. All our cylinders have return spring air to easily release the load. Complete seal kits and service tools are available on request.

Notes:

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



SIZE	CARIBONI MODEL	Max pull load @ 350bar <sup>(1)</sup>	
		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	25499	56216
	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		



## STANDARD SINGLE ACTING CYLINDERS

	Max yield load		Gap & Pin <sup>(2)</sup> mm	C mm	Rod Ø mm	Ext Ø mm	Stroke mm	L min (pin-to-pin) mm	Dry weight kg	Oil volume litres
	kg	lb								
							250	544	0,9	0,04
	3865	8521	11,2	27	12	31	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
							250	557	1,5	0,15
	5631	12414	12,7	35	12	44	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
							250	574	2,3	0,26
	7738	17059	16	38	16	52	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. We design and machine a wide number of double acting cylinders to satisfy customer's needs.

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

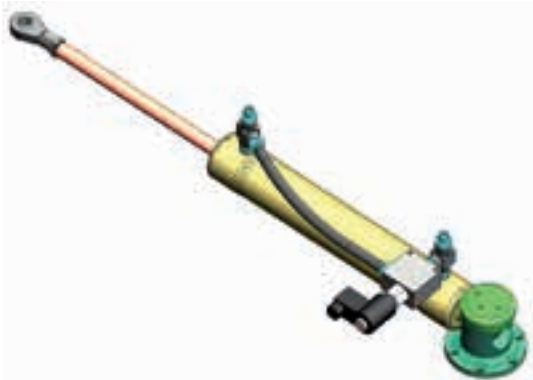
Here below a short list of double acting cylinders manufactured by Cariboni-Caritec for fast cruiser and race sailing yachts: steering cylinder, mast base control, lifting keel locking pin, transom door, bimini control and many other applications.

Custom models and linear sensor 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 load		Stroke		W.P.		Notes
	kg	lb	kg	lb	mm	in	bar	psi	
<b>CL 016 D 0160</b>	215	474	105	231	160	6,30	140	2000	Aluminium & Nitronic
<b>CL 019 D 0065</b>	731	1611	1445	3186	65	2,56	500	7250	Ergal & Titanium
<b>CL 025 D 0170</b>	1034	2280	1200	2646	170	6,69	350	5000	Aluminium & Nitronic
<b>CL 035 D 0546</b>	1186	2616	700	1543	546	21,5	200	2900	Stainless steel & Nitronic
<b>CL 055 D 0470</b>	8500	18739	12109	26696	470	18,5	500	7250	Aluminium & Nitronic
<b>CL 080 D 0600</b>	10350	22818	10350	22818	600	23,6	250	3625	Aluminium & Nitronic
<b>CL 135 D 0578</b>	42600	93917	51068	112586	578	22,8	350	5000	Titanium & 17-4 PH
<b>CL 180 D 0041</b>	59845	131936	64850	142970	41	1,61	250	3625	Stainless steel & Nitronic



Aluminium double acting cylinder for hydraulic steering system. 55 mm I.D. for 300 mm stroke. Over 5000 kg at 250 bar. On board by-pass valve for manual control. Installed on 75' luxury sailing yachts.



Double acting cylinder to control the mast base position. Made of aluminium, rod and tube terminal made of 17-4PH.



**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 (10.000 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	
<b>CL 060 S 0040</b>	20000	44092	40	1.57	85	3.35	56	2.20	60	2.36	700	10.000	Aluminium. Weight: 4kg
<b>CL 080 S 0125</b>	35000	77161	125	4.92	100	3.95	60	2.36	80	3.15	700	10.000	17-4 PH steel
<b>CL 100 S 0090</b>	55000	121254	90	3.54	130	5.12	80	3.15	100	3.94	700	10.000	17-4 PH steel

**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 twin cylinder: n.2 double acting cylinder move together in a common tube.  
Bore (each): 25mm Stroke: 190mm Working pressure: 700 bar  
Extreme light weight and compact design.*



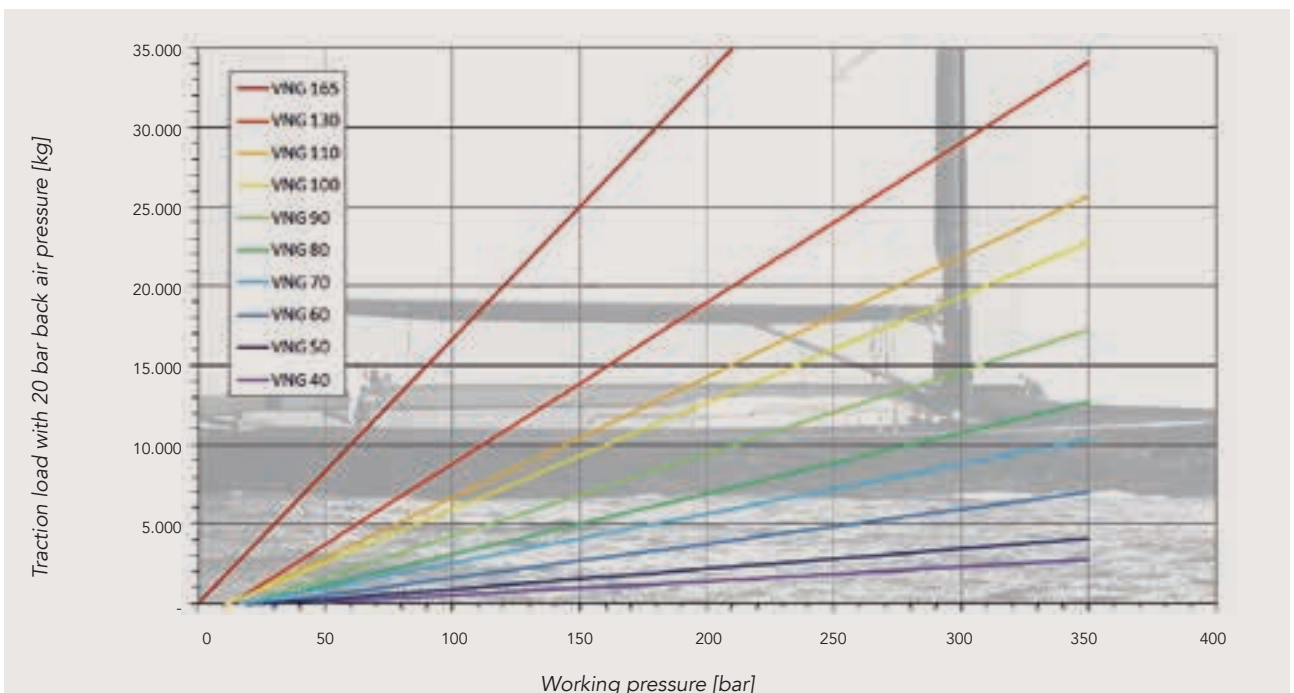
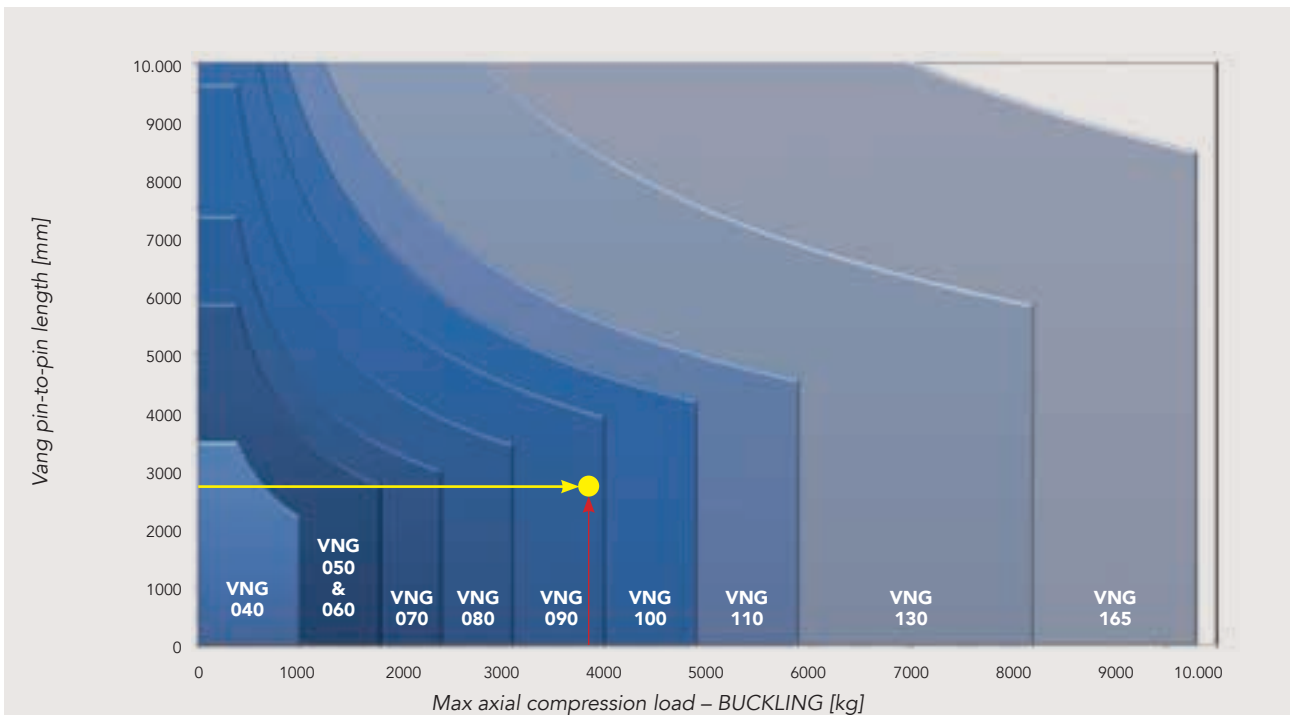
*From left to right: stainless steel locking cylinder for a centerboard keel; titanium double acting cylinder with installed potentiometer sensor.*

## VANG

The best way to find your own vang is easy. Here below some steps.

- 1 Have a look to the rigging geometry and find out the vang pin-to-pin distance (PCLC) with boom in horizontal position
- 2 Make some calculation to identify the compression axial load on the vang: we suggest to mind 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 happens!
- 3 Check in the vang buckling diagram the size of your Cariboni vang
- 4 Check in the traction load diagram if the power of the vang is enough for your hydraulic system which is the working pressure of the ram

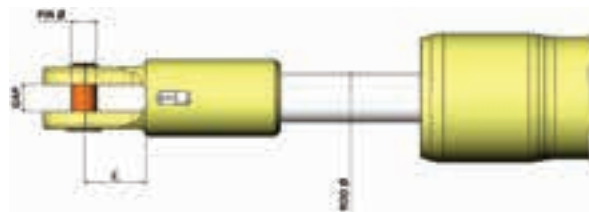
In the example shown in the diagram, with 3800 kg of maximum axial compression load and 2500 mm of PCLC, the right choice is a Cariboni VNG 90.





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

SIZE	MODEL	Max traction load <sup>(1)</sup>		Max return force <sup>(2)</sup>		Stroke		Rod Ø	Gap	Pin	C	Oil vol.	Weight		
		kg	lb	kg	lb	mm	in	mm	mm	mm	mm	litres	Wkg <sup>(3)</sup>	a	c
17	<b>VNG 40</b>	3127	6894	384	847	250	9,84	22	16,3	16,0	36,0	0,2	6	0,00204	1,7
20	<b>VNG 50</b>	4483	9884	600	1324	280	11,02	30	16,3	15,5	32,5	0,4	8	0,00303	2,9
24	<b>VNG 60</b>	7566	16679	865	1906	280	11,02	30	16,3	15,8	33,0	0,6	9	0,00303	3,7
30	<b>VNG 70</b>	10897	24023	1177	2595	300	11,81	31,8	19,5	19,0	47,0	0,9	14	0,00335	8,6
40	<b>VNG 80</b>	13450	29652	1537	3389	350	13,78	40	23,0	22,0	52,0	1,3	23	0,00511	11,6
60	<b>VNG 90</b>	18214	40154	1945	4289	360	14,17	40	25,0	25,0	52,0	1,8	31	0,00596	11,7
70	<b>VNG 100</b>	23538	51892	2402	5295	400	15,75	40	32,6	28,0	64,0	2,6	41	0,00681	22,9
90	<b>VNG 110</b>	26675	58808	2906	6407	430	16,93	50,8	32,6	31,8	66,2	3,2	54	0,00766	29,2
100	<b>VNG 120</b>	33345	73513	PUSH/PULL		450	17,72	50	36	35	64	5,1	59	0,01158	20
110	<b>VNG 130</b>	35517	78301	4059	8949	500	19,69	65	36,0	35,0	78,0	5,0	88	0,01290	51,9
195	<b>VNG 150</b>	42803	94365	5404	11914	500	19,69	85	45,0	45,0	95,0	6,0	114	0,01915	51,5
260	<b>VNG 165</b>	56043	123552	PUSH/PULL		526	20,71	85	50,8	50,8	112,5	11,3	134	0,02384	51,1
300	<b>VNG 180</b>	62768	138380	7782	17156	550	21,65	100	55,0	55,0	125,0	9,7	196	0,02785	100
400	<b>VNG 200</b>	84064	185330	9607	21180	550	21,65	100	55,0	55,0	135,0	13,0	280	0,03321	166
1	<b>VNG 220</b>	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 MADE ON TITANIUM and ALUMINIUM ALLOY

1	<b>VNG 55 C</b>	8971	19777	727	1602	280	11,02	28	16,3	16	35,5	0,49	4,80 kg w/o extension		
1	<b>VNG 60 C</b>	10808	23828	865	1906	280	11,02	30	16,3	16	36,0	0,59	5,75 kg w/o extension		
1	<b>VNG 70 C</b>	15516	34206	1177	2595	280	11,02	32	20,0	20	47,5	0,85	8,96 kg w/o extension		
1	<b>VNG 80 C</b>	19215	42362	1537	3389	400	15,75	40	25,4	25	60,0	1,51	20,00 kg w/o extension		
1	<b>VNG 95 C</b>	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:  
 $Wkg = (PCLCmm \times a) + c$  (PCLC is the vang length pin to pin cylinder closed in mm)  
 $Wlb = Wkg \times 2,205$



## BICYLINDERS

During **Mets trade fair 2007**, Cariboni presented its new astonishing product: two hydraulic cylinders to control the headstay and the Cunningham of TP52 yacht class, matched together in a new benchmark hydraulic cylinder. Our Bi-cylinder is the best choice for racing yachts which need to improve the control of their jibs.

During a sail, sometimes it is necessary to release the stay, so you have to remember first to release the Cunningham to avoid to overload it. With our Bi-cylinder 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 Bi-cylinder is to match together tubes of the headstay and tubes of the Cunningham cylinder in a single lighter and smaller double tube. This piece is machined out from a single block of aluminium (or titanium) alloy in order to reduce as much as possible the weight of the cylinder.

The Cunningham ram has a gas room for a 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 PBO stay; tube terminal is made of 17-4-PH to increase performances and avoid any problem of rust with carbon fibre headstay.



Cannonball 72

Cariboni's Bi-cylinder is fixed on board by 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 Bi-cylinders have

hard coated aluminium alloy tube, rod and tube terminals, nitronic 50 rods and 17-4PH headstay rod terminal.

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

Our Bi-cylinders are installed on racing and fast cruising yachts in different sizes and with customised terminals.



Bicylinder

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

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

## BICYLINDERS



**Bi-cylinder** developed for class yacht races.



Momo '72  
Judel Vrolijk design – Persico

## DECK ORGANIZERS



Caritec's deck organizers are designed for race sailing yachts to lead halyards and to control sheets to the cockpit. These new organizers are made of 7075 ergal or 6082 aluminium alloy on main body; 17-4PH or titanium are used for the fixing screws.

The core of the system is the high strength peek rollers which guarantee the minimum friction on the sheet even under big loads.

Deck organizers are available with single or double pulley, depending on the needs and for the best layout of the cockpit. Custom models available on request.

Organizers



MODEL	Weight		Dimensions		Sheet diameter		Notes
	kg	lb	mm	in	mm	in	
	0,146	0,31	78x35 34 (h)	3,07x1,38 1,34 (h)	15	0,59	<b>DOUBLE model</b> Black hard coated aluminium base, peek roller, 17-4PH fixing screws Double pulley to drive the sheet left and right under load.
	0,70	0,15	68x30 26 (h)	2,67x1,18 1,02 (h)	13	0,51	<b>SINGLE model</b> Ergal 7075 hard coated base, peek roller with ball bearings, titanium fixing screws. Single pulley to drive the sheet or left or right under load.

## INNERFORESTAY CYLINDERS

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

The system is made up by 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 pull down the stay by the hydraulic power; a gas spring help the system while easing.

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

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

Both innerforestay models are available in many sizes and strokes to achieve designers requirements.

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



Innerforestay ram with lashing arrangement

MODEL	Max pull load	Stroke	L min (pin to deck)	Weight	Working pressure	Oil vol.	Weight		Working pressure		Oil vol.
	kg						lb	mm	in	mm	
<b>PT 055 S 0250</b>	7355	16216	250	9,8	1187	55,15	9,7	21,4	350	5000	0,5
<b>PT 055 S 0400</b>	7355	16216	400	15,7	1502	59,13	12,3	27,1	350	5000	0,8
<b>PT 070 S 0260</b>	11979	26409	260	10,2	1606	46,73	13,8	30,4	350	5000	0,9
<b>PT 070 S 0270</b>	11979	26409	270	10,6	1616	63,62	14,0	30,9	350	5000	0,9
<b>PT 070 S 0300</b>	11979	26409	300	11,8	1646	64,80	14,2	31,3	350	5000	1,0
<b>PT 080 S 0300</b>	15411	33975	300	11,8	2278	89,68	24	52,9	350	5000	1,3
<b>PT 100 S 0500</b>	25197	55548	500	19,7	2430	95,67	40,4	89,1	350	5000	3,5



Swan 82' design by Frers. With the under deck inner forestay hydraulic tensioners, a full flush and clean design of the bow comes true. On the right, our innerforestay cylinders.

## MAGIC DOOR SYSTEM

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

By a simply and lightweight double acting cylinder, with a smart pulley system, this product let you to have an 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 at the same time all the 4 sheets which drive the cars on the tracks.

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

### Lightweight

Magic door consist 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 problem of rust.

### 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 manage the movements of the door; it is possible to stop the system in every moment without any risk. Moreover, the sheets work as a bumper to protect the system from waves hits and overloads.



SOLARIS 48' "CRAZY TOO" (above): customer rods link the transom door to the cars on the track of Magic Door system



Wally 80 "Inti" (former "Indio"): Magic Door ram controls the bath platform

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

This CARITEC pack counts:

- the Magic Door double acting hydraulic cylinder
- tracks with sheaves and cars for double rods system (700mm 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
- IP67 stainless steel push buttons to move up and down the transom door



MODEL	Bore		Stroke <sup>(1)</sup>		WP		Working load <sup>(2)</sup>		Weight <sup>(3)</sup>	
	mm	in	mm	in	bar	psi	kg	lbs	kg	lbs
<b>CL 035 D 350</b>	35	1.38	350	13.78	140	2000	1375	3032	2.5	5.51

(1) 350mm 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 MagicDoor Kit is 9.8 kg (21.56 lb)



## TRAVELER CYLINDERS

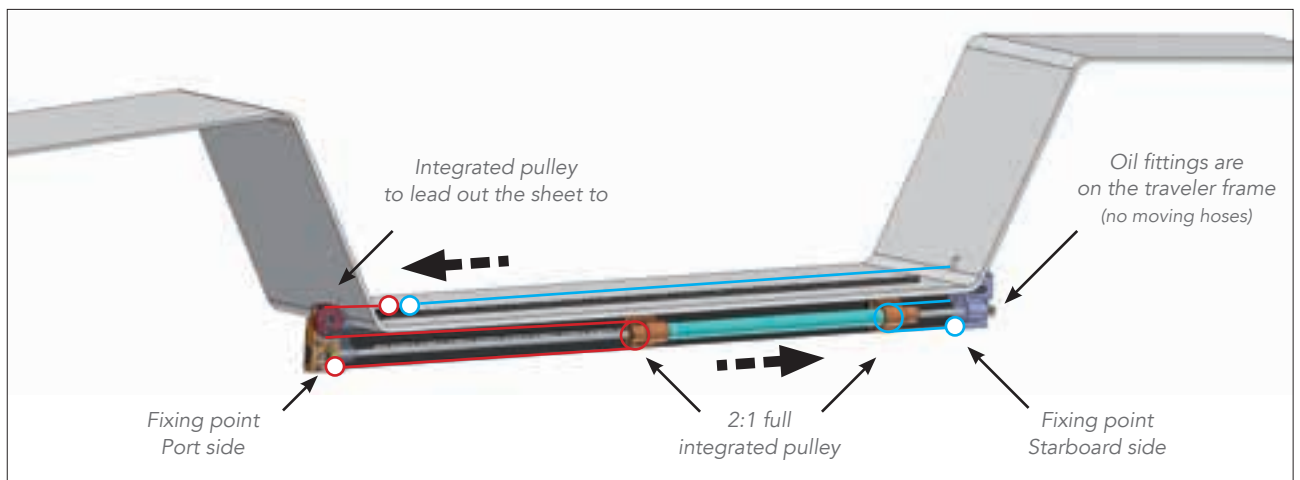
Designed for fast or race-cruiser sailing yachts, our hydraulic traveler let you to easily control the main or genoa cars.

The traveler 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 guarantee by the 2:1 integrated purchase system. Tube terminals have integrated pulleys for the tackle.



Hydraulic traveler installed on board



The travelers 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 framed can be removed, and it is possible to fix the traveler system straight to the bulkhead.

Custom models available on request.

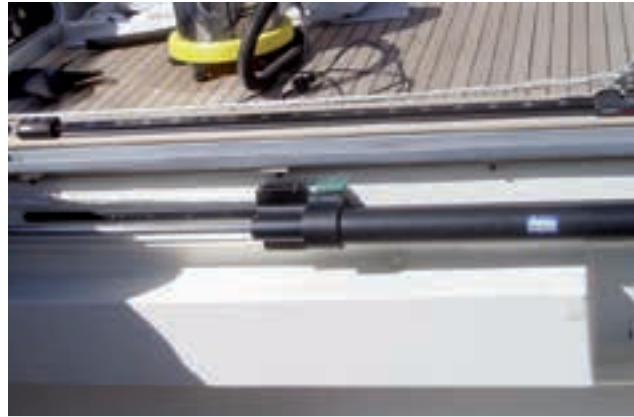
MODEL	Working load <sup>(1)</sup>		Bore Ø		Rod Ø		Stroke		Overall length	
	kg	lb	mm	in	mm	in	mm	in	mm	in
<b>CL 040 DS 0800</b>							800	31,5	2300	90,6
<b>CL 040 DS 1000</b>	1681	3707	40	1,57	20	0,79	1000	39,4	3130	123,2
<b>CL 040 DS 1500</b>							1500	59,1	3542	139,4
<b>CL 050 DS 0300</b>							300	11,8	1072	42,2
<b>CL 050 DS 0900</b>	2942	6487	50	1,97	20	0,79	900	35,4	2102	82,8
<b>CL 050 DS 1700</b>							1700	66,9	3802	149,7
<b>CL 055 DS 1100</b>							1100	43,3	2756	108,5
<b>CL 055 DS 1400</b>	3363	7413	55	2,17	25	0,98	1400	55,1	3265	128,5
<b>CL 055 DS 2150</b>							2150	84,6	4745	186,8
<b>CL 060 DS 0400</b>							400	15,7	1246	49,1
<b>CL 060 DS 1200</b>	4168	9189	60	2,36	25	0,98	1200	47,2	3254	128,1
<b>CL 060 DS 2250</b>							2250	88,6	4935	194,3
<b>CL 065 DS 2430</b>	5044	11120	65	2,56	25	0,98	2430	95,7	5211	205,2
<b>CL 070 DS 1200</b>	5604	12355	70	2,76	30	1,18	1200	47,2	3240	127,6
<b>CL 070 DS 2400</b>							2400	94,5	5434	213,9
<b>CL 085 DS 2755</b>	8862	19537	85	3,35	30	1,18	2755	108,5	6984	275
<b>CL 100 DS 2563</b>	12750	28108	100	3,94	30	1,18	2563	100,9	6253	246,2

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

## TRAVELER CYLINDERS



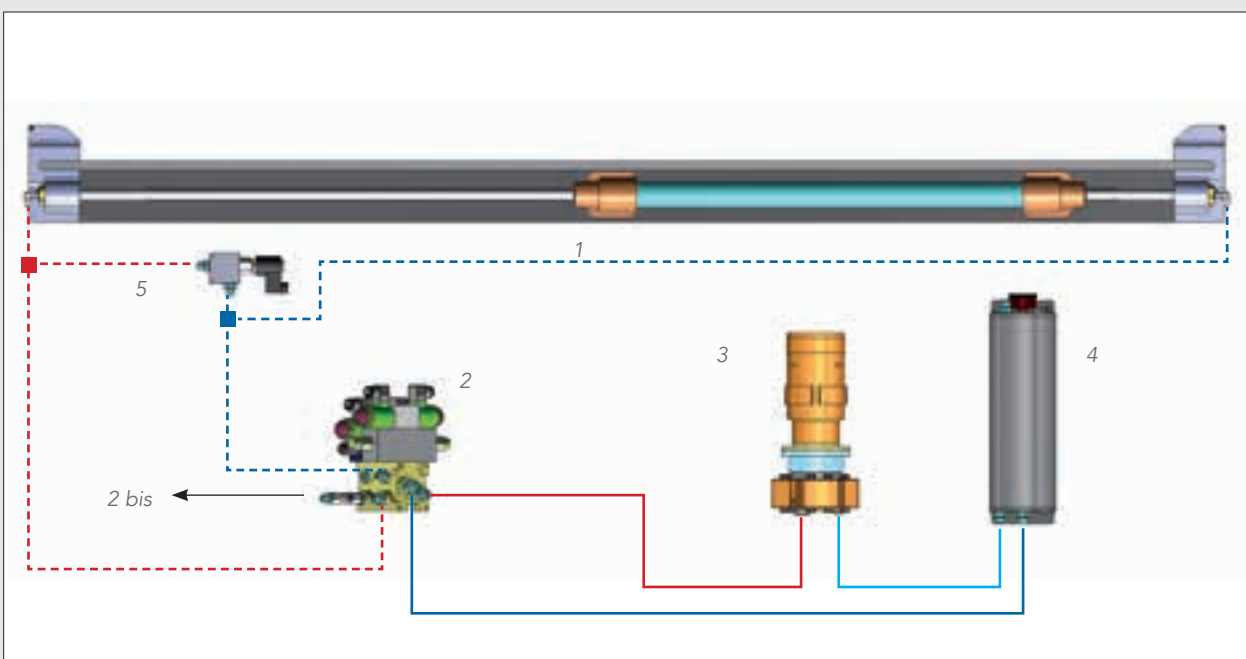
This double acting cylinder, closed to traveler arrangements is installed on a 90' race-cruiser yacht. It controls the jib car by two sheets and it is squeezed under the car track in a very small room.



Hydraulic traveler 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.

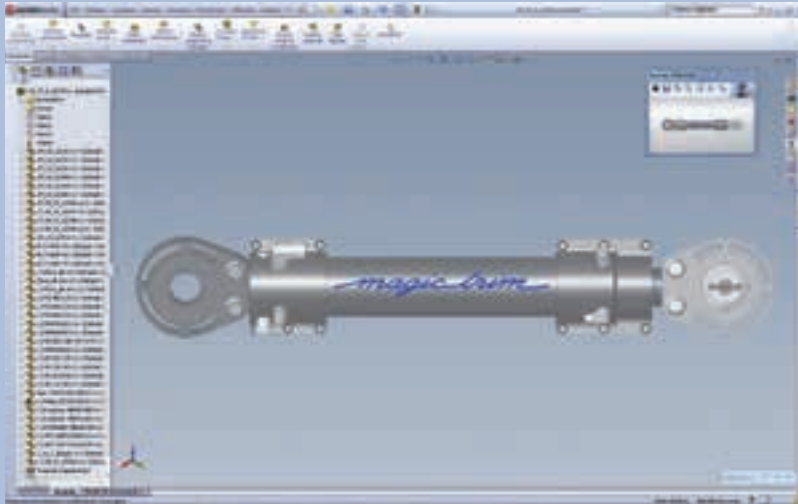
Our package can be composed by:

- traveler double acting cylinder (with custom bore, stroke and arrangement) **(1)**
- valve block to drive the traveller system made on lightweight aluminium manifold and stainless steel fittings **(2)**
- electric back-up for manual panel up to 500bar **(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 traveler 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 created in 1998. It has been the first hydraulic double acting cylinder with integrated 4:1 tackle designed to work with two different speeds.

It is the result of a pure Giovanni Cariboni's innovative idea; the product is **patented** from Cariboni.

Nowadays, the Magic Trim appears on more than a hundred sailing boats all over the world, pushed by the need to trim and release in a very short time the sheets under big loads. Magic Trim spreads 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 by 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, to trim the sails you can eliminate the need of winches on deck; the result is a clear deck with a powerful and fine 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 permits you to have 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 Cariboni's hydraulic system, it is possible to have fast and slow regulations even with heavy loads just pushing a button!

For fine tuning, Magic Trim is available with full 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 traveler or jib sheet regulations, and in every other occasion it is necessary to pull long sheets in a limited space (for lifting keel cylinder too).



*A flash and clear deck on "Sizzler" the astonishing 60' day  
sailer designed by Tony Castro.  
Magic Trim are used for jib and mainsheet controls tacking off  
the winches and any jam with the sheet!*





## A Magic story...

### **1998 - Magic Trim**

The original one, patented since 1998.

Cariboni improves hydraulic rams for sail trimming by developing the Magic Trim, faster than the conventional rams and with the peculiarity of having two speeds: this allows to have a 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**

It is a special version of Magic Trim, engineered for unique applications: those units have been installed on the 60' trimarans Tim an Bonduelle in which the mainsheet and the canting mast are hydraulically controlled by Magic Testa cylinder.

### **2002 - Magic Trim Double**

Magic Trim Double is the straight development of Magic Trim and Magic Simple concept: a fast Magic Trim and the powerful Magic Simple all in one. So you can have a smart system which copy the load on sheet and let 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 of the standard Magic Trim with a lighter and more compact system.

### **2005 - Magic Trim + Magic Double arrangement**

A Magic Trim ram to control faster the sheet and a Magic Double for a quick trimming. This kind of arrangement has often custom sheaves solution full integrated on the two Magic, according to the 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 are all the technologies of a magnetic field linear sensor ready to control time after time the cylinder status. This is the standard solution for a full automatic sail trimming system.



1998 - Magic Trim

### **2008 - Smart Magic Double**

Smart Magic Double matches together everything that you can ask from 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 quickly control of the rams with the incorporated max pressure and directional control valves. The ultimate solution for the next century sailing yachts.



Wally 148' Saudade

### **2009 - Magic Boom**

Take a Cariboni's Magic Trim, squeeze it on a modern sailing yacht boom and 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.



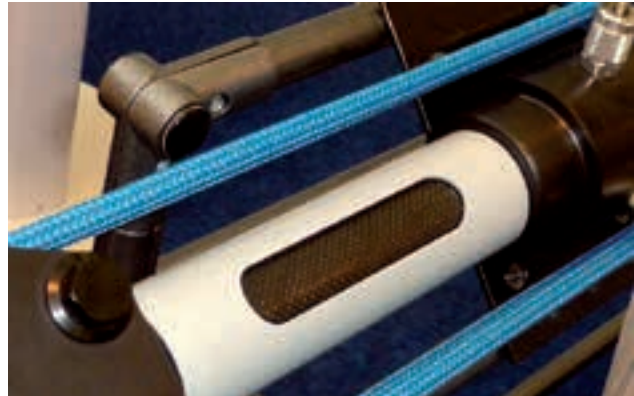
## A magic story...

### 2010 – Carbon Magic

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

### Special Magic

Every Magic Trim is special but, how do you call a Magic Trim with titanium rod? Or another one with 17-4 PH rod, titanium tube and high strength aluminum alloy parts? These Magic trim cylinders are just an hallmark of Cariboni's attitude for their customs needs. More power? Less weight? Something special? Just ask!



2010 – Carbon Magic

*...which goes on!*



**HOW TO CHOOSE YOUR MAGIC TRIM FOR MAINSHEET**

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

You need to know only two things:

- the effective main sheet 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
- $\alpha$  = back spread angle
- $\beta$  = effective maximum mainsail angle  
(ex:  $\alpha - 10^\circ$  to avoid any contact between mainsail and cross-trees)

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

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

the "c" dimension:

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

And the effective sheet stroke

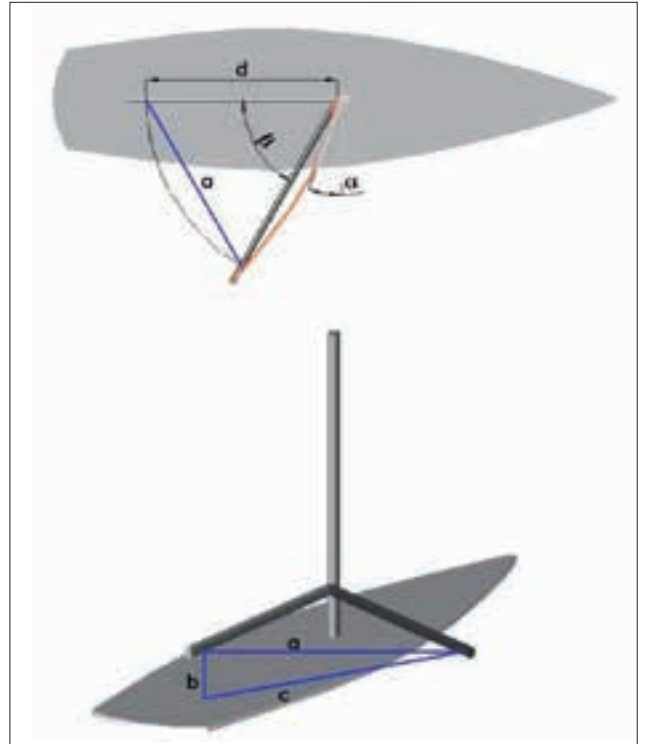
$$s = c - b$$

Suppose to have **d**=10m, **b**=2.5m and  $\beta = 60^\circ$  you calculate:

$$a = d = 10\text{m}$$

$$c = 10.3\text{m}$$

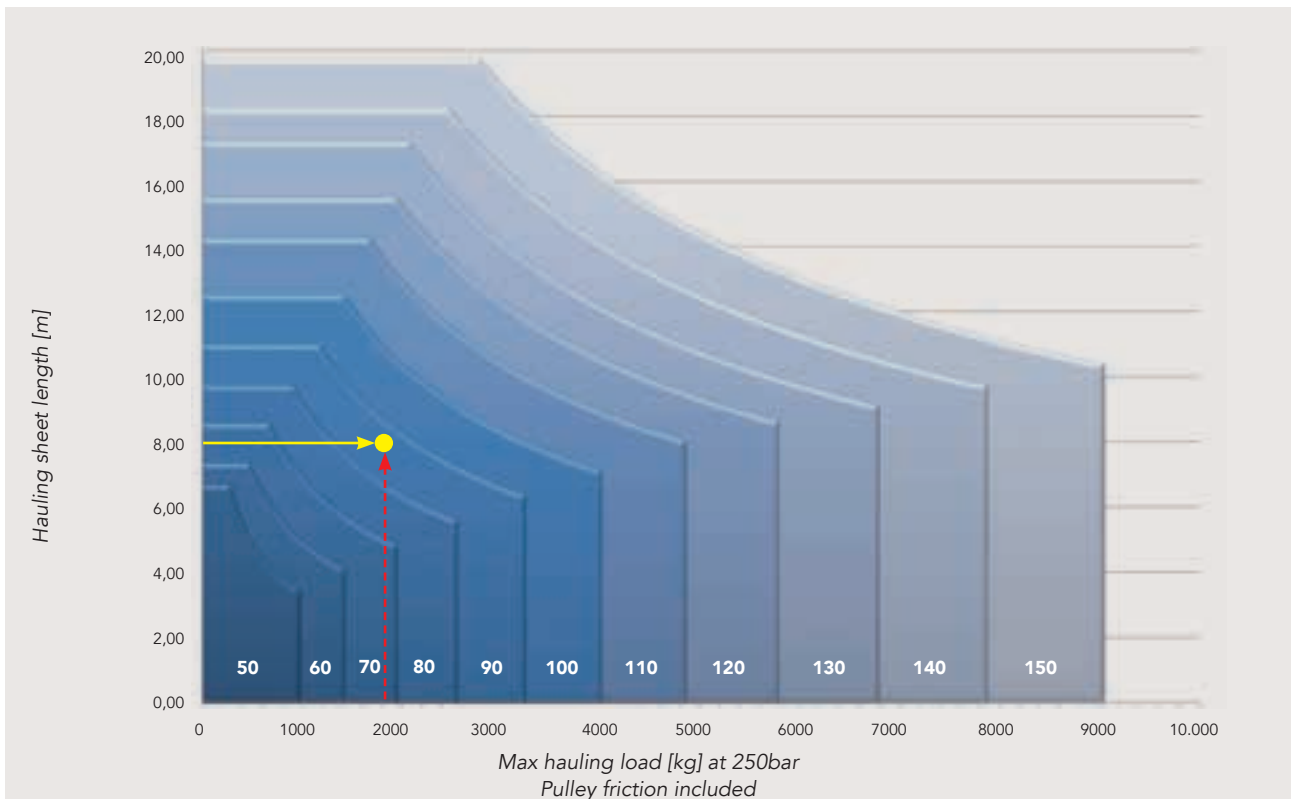
$$s = 7.8\text{ m}$$



Mainsheet length

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

Example: effective mainsheet stroke  $s = 7.8$  meters, load on sheet of 1800kg -> Your Magic Trim is: **MT\_90\_1850** (90mm of bore,  $7.8/4=1950\text{mm}$  of stroke)





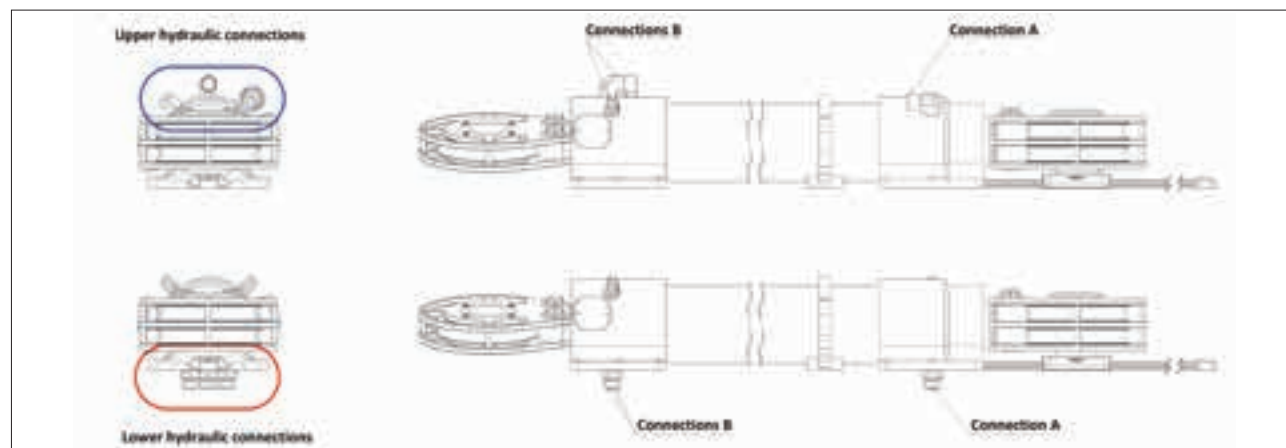
**TECHNICAL SPECIFICATIONS**

You can calculate the overall length of your Magic Trim, the dryweight and the working pressure of the cylinder filling the form below (in blue an example).

MODEL	Hauling Sheet Length	Stroke	Magic Max Length		Magic Weight			Working Pressure		
		Y	Const. Length	L <sub>MAX</sub>	Const. Weight	Weight Coefficient	Weight	Hauling Load	Pressure Coefficient	Pressure
		$Y = S/4$ (mm)	T	$L_{MAX} = S/2 + T$ (mm)	Q	U	$W = Q + U * S/4$ (kg)	F (kg)	C	$P = F * C$ (bar)
<b>MAGIC 50</b>			529		6,7	0,0072			0,1996	
<b>MAGIC 60</b>			532		8,2	0,0080			0,1388	
<b>MAGIC 70</b>			595		10,2	0,0115			0,1020	
<b>MAGIC 80</b>	7800 mm	1950	644	4554 mm	16,0	0,0119	39,25 kg	1800	0,0781	141 bar
<b>MAGIC 90</b>			766		24,6	0,0205			0,0617	
<b>MAGIC 100</b>			797		28,7	0,0235			0,0500	
<b>MAGIC 110</b>			800		30,7	0,0286			0,0413	
<b>MAGIC 120</b>			801		35,2	0,0331			0,0347	
<b>MAGIC 130</b>			884		46,5	0,0407			0,0296	
<b>MAGIC 140</b>			976		53,5	0,0441			0,0255	
<b>MAGIC 150</b>			1014		66,6	0,0492			0,0222	

On our website there is also a very simple program to choose your model and to have these basic data about you Magic Trim.

MagicTrim 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 available also with 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 to permit the sail to be furled.

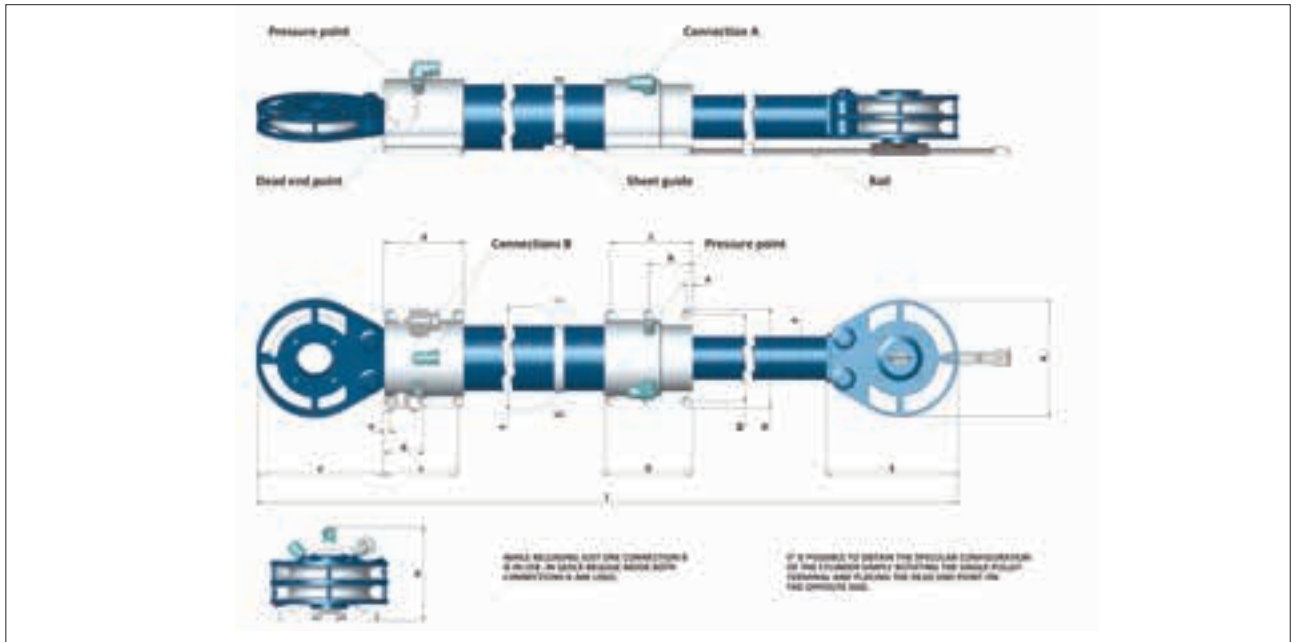


Single fixed pulley



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)
<b>MAGIC 50</b>	10,00	69,50	129,00	139,00	168,50	10,00	105,00	-	115,00	163,50
<b>MAGIC 60</b>	10,00	106,00	-	116,00	165,00	10,00	106,00	-	116,00	162,00
<b>MAGIC 70</b>	10,00	75,00	140,00	150,00	184,75	10,00	60,00	110,00	120,00	176,94
<b>MAGIC 80</b>	10,00	80,00	-	90,00	203,50	10,00	60,00	110,00	120,00	194,50
<b>MAGIC 90</b>	12,00	55,50	99,00	111,00	257,50	12,00	74,00	136,00	148,00	253,50
<b>MAGIC 100</b>	12,00	87,25	162,50	174,50	260,50	12,00	79,00	146,00	158,00	252,50
<b>MAGIC 110</b>	12,00	59,55	107,10	119,10	266,58	12,00	85,00	158,00	170,00	258,58
<b>MAGIC 120</b>	15,00	87,50	160,00	175,00	285,00	15,00	83,25	151,50	166,50	278,00
<b>MAGIC 130</b>	19,50	97,50	175,50	193,50	298,25	15,00	89,00	163,00	178,00	291,25
<b>MAGIC 140</b>	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)		
<b>MAGIC 50</b>	135,00	110,00	149,00	105,00	125,00	42	8	14	9/16" UNF - JIC 37°	9/16" UNF - JIC 37°
<b>MAGIC 60</b>	151,00	114,00	147,00	110,00	130,00	50	8	14	9/16" UNF - JIC 37°	9/16" UNF - JIC 37°
<b>MAGIC 70</b>	164,50	123,20	155,00	130,00	150,00	60	8	16	3/4" UNF - JIC 37°	3/4" UNF - JIC 37°
<b>MAGIC 80</b>	174,50	131,75	180,00	140,00	160,00	70	8	18	3/4" UNF - JIC 37°	3/4" UNF - JIC 37°
<b>MAGIC 90</b>	225,00	157,50	235,00	165,00	188,00	75	10	20	3/4" UNF - JIC 37°	3/4" UNF - JIC 37°
<b>MAGIC 100</b>	233,00	173,00	231,00	171,00	195,00	85	10	20	3/4" BSP	3/4" BSP
<b>MAGIC 110</b>	231,00	181,57	239,00	182,00	206,00	95	10	22	3/4" BSP	3/4" BSP
<b>MAGIC 120</b>	248,00	193,45	262,00	205,00	235,00	100	12	22	3/4" BSP	3/4" BSP
<b>MAGIC 130</b>	280,00	208,18	274,00	218,00	248,00	110	12	24	3/4" BSP	3/4" BSP
<b>MAGIC 140</b>	290,00	215,00	290,00	220,00	250,00	120	12	24	3/4" BSP	3/4" BSP



## SPRING PULLEY

Our spring pulley permits to avoid any jam 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 protect the system from any damage.

No hydraulic power requested.





**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
<b>SP 015</b>	351 x 57 x 60 (h)	13,8 x 2,2 x 2,4 (h)	15	0,6	1,0	2,2
<b>SP 024</b>	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 an high efficiency hydraulic engine matched together with a pulley or with an high strenght 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 model 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	Overall dimensions		Sheet Ø (1)		Weight		Working pressure		Note
	mm	in	mm	in	kg	lb	bar	psi	
	337x180 139(h)	13,3x7,1 5,5(h)	20	0,78	8,5	18,7	140	2000	For on line arrangement. Under the deck mounting position.
	302x283 164(h)	11,9x11,1 6,45(h)	20	0,78	7,65	16,8	250	3570	For step block arrangement. Deck mounting position.

(1) Custom models available for bigger sheet diameter



Single fixed pulley

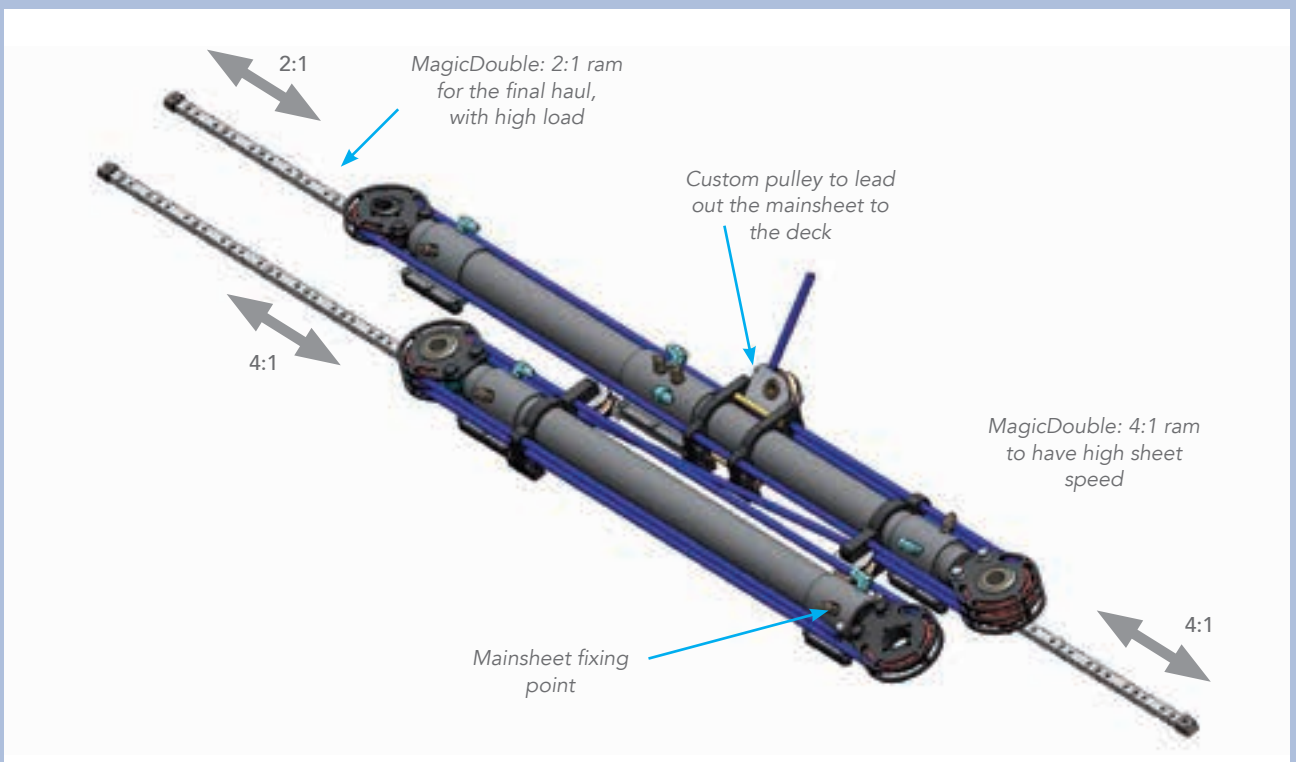


Double fixed pulley

# magic double

It is composed by two integrated rams: one works as a 4:1 tackle for the starting 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* has smaller dimensions, considering the same load. Lower size, less oil volume, saving of weight mean an increasing of performance and speed.

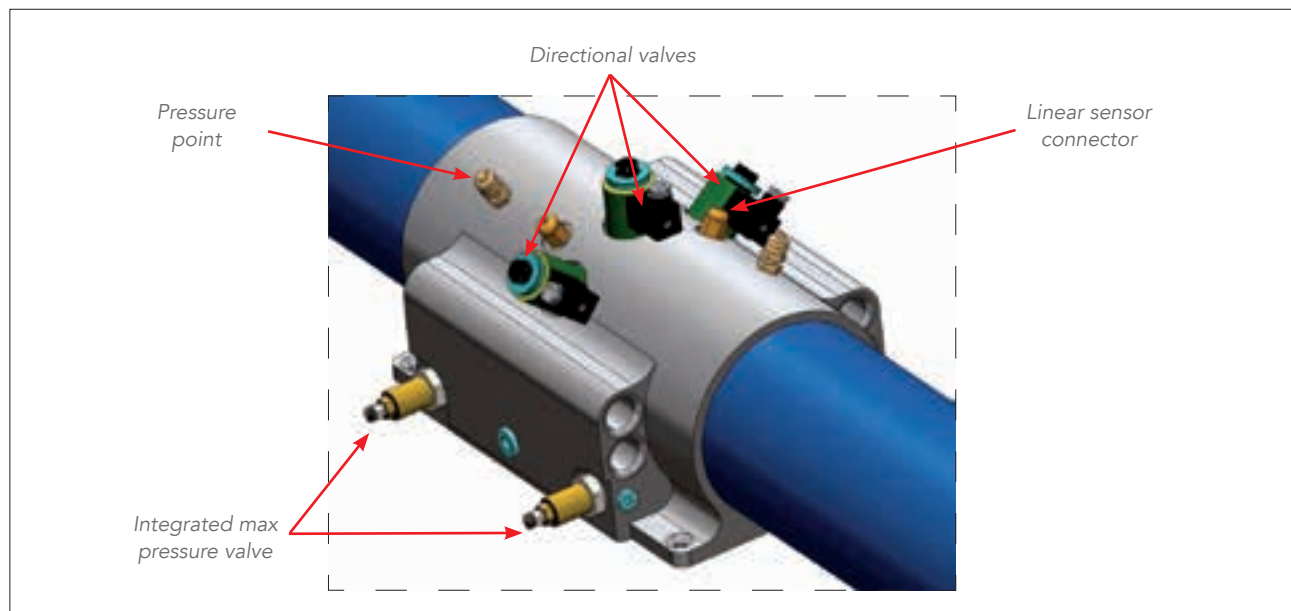
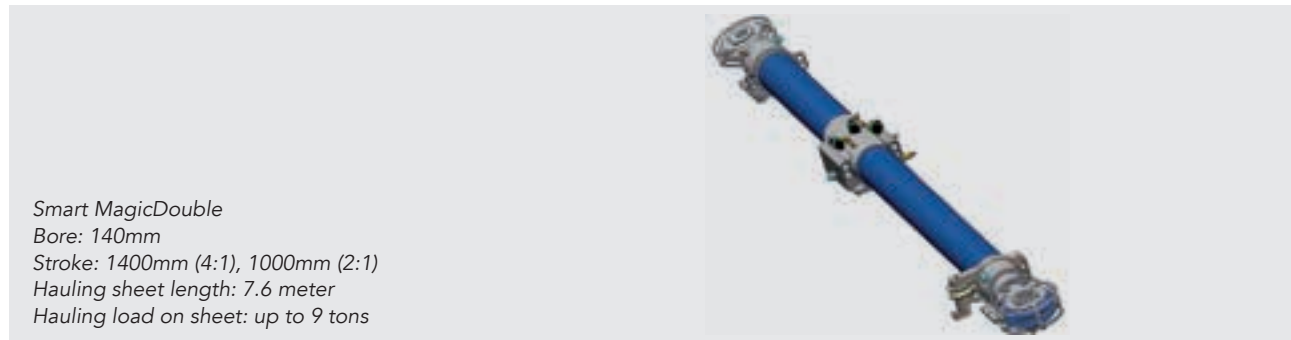


The mainsheet Magic Trim + Magic Double system developed for a Swan '60. Trim sequence: both cylinders closed, Magic Trim start to exit, than starts the 4:1 side of Magic Double tacking the mainsheet speed. When the 4:1 side of Magic Double is fully extended and the load of sheet increases, the 2:1 Magic Double ram completes the hauling of the sheet. Vice versa for easing sequence.

## 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 the maximum system reliability and safety.

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



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



Magic Trim and Smart Magic Double arrangements for Wally 130' shown at 2008 METS trade.



## SMART CARBON / TITANIUM MAGIC DOUBLE

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

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

The titanium tubes allow a working pressures up to 600 bar with lower wight and dimensions compared to a standard aluminium ram.

We developed the sizes 90, 100 and 110 and the first three units are installed on Wally Cento "Hamilton" to control the runners and the mainsheet. Wally Cento "Magic Carpet 3" is equipped with these rams.

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



Smart Carbon Magic Double

Model	Max hauling load		Max hauling lenght		Working pressure 2:1 ram		Stroke				Bore		Dry weight	
	kg	lb	mm	in	bar	PSI	2:1 ram		4:1 ram		mm	in	kg	lb
							mm	in	mm	in				
<b>MD 090</b> <b>0600-1800</b>	6000	13.200	8400	329	250	3625	600	23,6	1800	70,9	90	3,54	79	174
<b>MD 100</b> <b>0800-2150</b>	7700	16.940	10.200	400	250	3625	800	31,5	2150	84,6	100	39,3	116	255
<b>MD 110</b> <b>1000-2300</b>	9500	20.900	11.200	439	250	3625	1000	39,4	2300	90,5	110	4,3	182	401



Wally 100 Magic Carpet 3 and  
Wally 107 Open Season



## SIMPLE MAGIC TRIM

Simple Magic Trim comes 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.

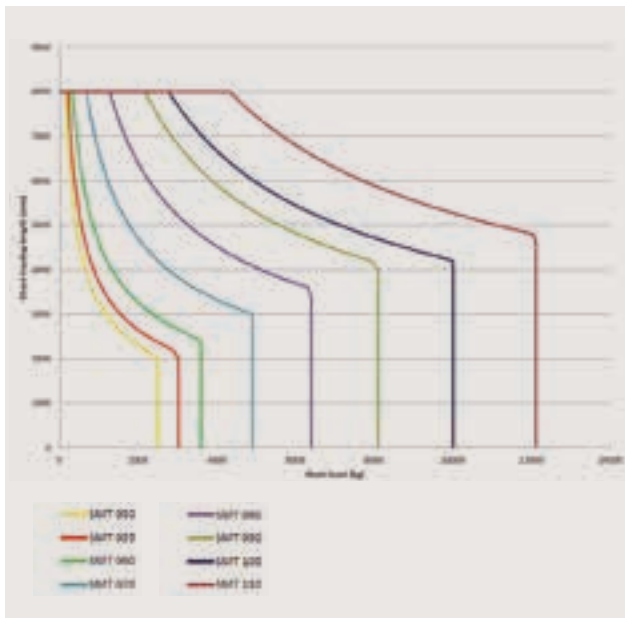
It is possible to control a single or a double sheet choosing the respective sheave. Even though the system is made by a tackle, the load transmitted to the fixing point is identical to the sheet working load.

The Simple Magic Trim is available in three high tech Titanium models and three 7075 Aluminium (Ergal) models with different load and stroke.



TITANIUM SMT 30 Ti FOR 2000 AMERICA'S CUP

MODEL	Max hauling load		Max oil pressure		Hauling breaking load		Oil fittings	
	kg	lb	bar	psi	kg	lb	Connection A	Connection B
<b>SMT 050</b>	2502	5516	250	3625	5000	11023	9/16 UNF – JIC 37°	9/16 UNF – JIC 37°
<b>SMT 055</b>	3027	6673	250	3625	6000	13228	9/16 UNF – JIC 37°	9/16 UNF – JIC 37°
<b>SMT 060</b>	3603	7943	250	3625	7000	15432	9/16 UNF – JIC 37°	3/4 UNF – JIC 37°
<b>SMT 070</b>	4904	10811	250	3625	10000	22046	9/16 UNF – JIC 37°	3/4 UNF – JIC 37°
<b>SMT 080</b>	6405	14121	250	3625	12000	26455	9/16 UNF – JIC 37°	3/4 UNF – JIC 37°
<b>SMT 090</b>	8106	17871	250	3625	16000	35274	3/4 UNF – JIC 37°	3/4 BSP
<b>SMT 100</b>	10008	22064	250	3625	20000	44092	3/4 UNF – JIC 37°	3/4 BSP
<b>SMT 110</b>	12109	26696	250	3625	24000	52911	3/4 UNF – JIC 37°	3/4 BSP



Allegra by Nigel Irens design - Green Marine

## SIMPLE MAGIC TRIM



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

## MAGIC TESTA

Magic Testa concept is a special version of Magic Trim, engineered for unique applications: the boat which installed Magic Testa on board, like the 60' trimarans Tim and Bonduelle, used it to hydraulically control the mainsheet and the canting mast.



Magic 95 Testa Canting Mast



The mainsheet is controlled by a smaller unit installed inside the boom.

The movement of the mast (both 20° left-right and bow-stern) is controlled by two Magic Testa horizontally installed in the side hulls, which act on the shroud through a pivoting pulley.



## EASY SAILING

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

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

With automatic mainsheet and jib control system, sail is more amusing and every tacking or jibing will be a pleasure!

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

- Lightweight hydraulic cylinder for the control of the sails (mainsheet, jib sheet, main car and jib cars)
- Furlers for main, 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 the power with accuracy for a quick, smooth and safe movement of all the automations
- On/off standard and proportional control button panels get easy the helm man's life giving the full control of the yacht

We can supply a full integrated easy sailing system for small and big yachts.

In the 33' Wallynano, Easy Sailing System is made by:

- Mainsheet MagicTrim 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 12V 2500Watt powerpack
- Electronic control with PLC system

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



Wally 143 "Esense"; mainsheet and jib sheet are full controlled by MagicTrim and MagicDouble cylinders.

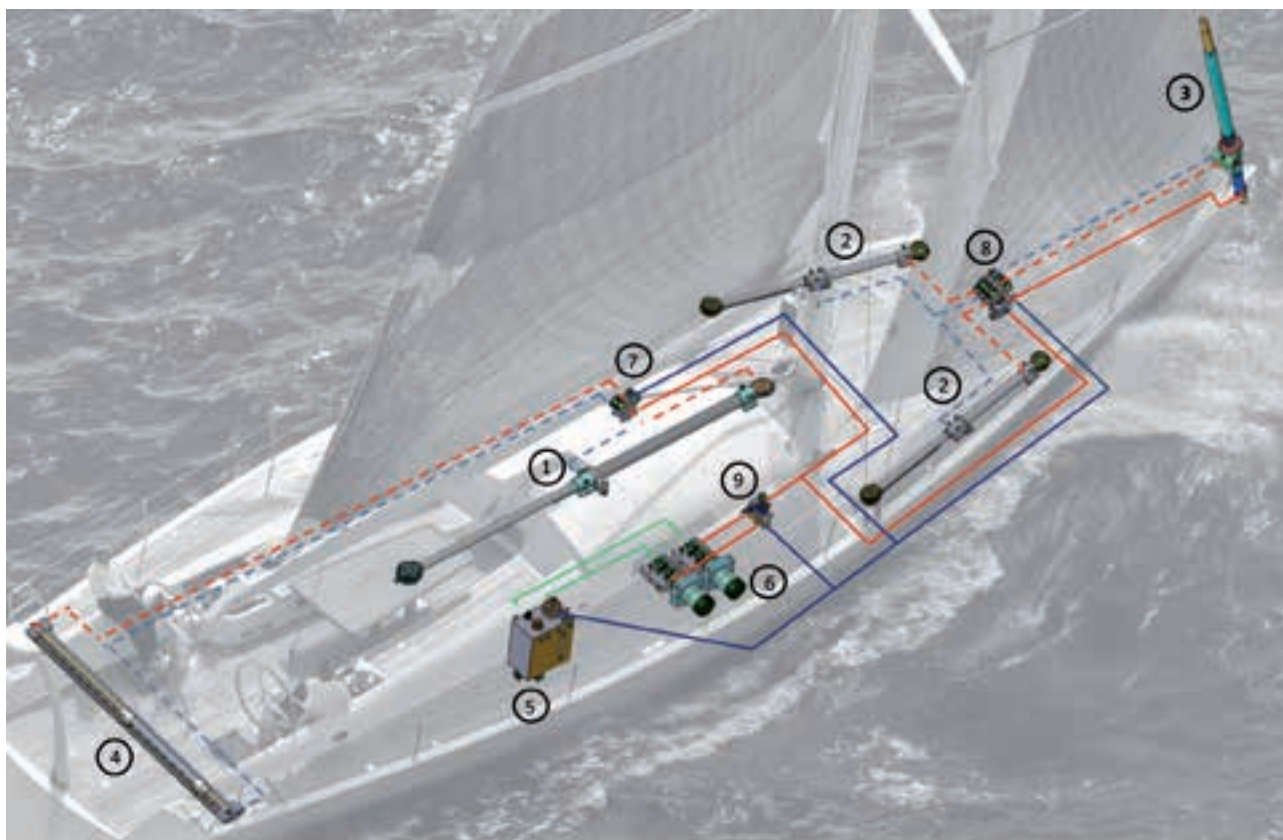


Wallynano 33' "Biancaneve" equipped with Easy Sailing System and Cariboni's hydraulic rams.



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

## EASY SAILING SYSTEM 60' SKETCH EXAMPLE



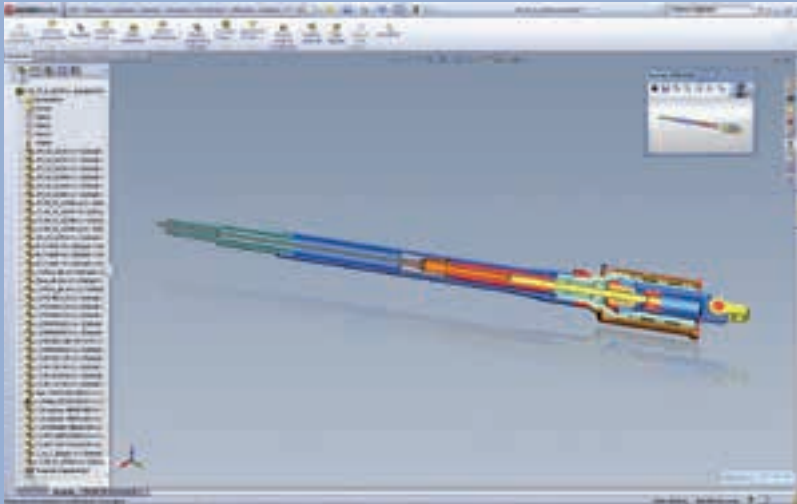
This is an example of a complete Easy Sailing System for a 60' fast cruising sailing yacht.

The system is composed by:

- 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 a better control of the sail.
- 4** Traveler: double acting double rods traveler system with bump system to release the main car
- 5** Lightweight aluminium oil tank with accessories to keep cool the oil
- 6** Two powerpacks with high pressure gear pumps and 4500 Watt electric engine to control mainsail and jib at the same time
- 7** Aluminium manifold block to control the mainsheet ram and the traveler system with quick release system 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 of the speed of all the functions for a 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 moving your mouse!

## FURLER



### **Furler**

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

Besides those qualities, obtained by a careful design and engineering, the use of the best materials and construction techniques, Cariboni hydraulic jib furlers have the exclusive 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 from the hydraulic tuning.

The foil seat tube has numerous position to choose in order to find the best setup.



*Structural furler GIRO ST 076P*





## CAPTIVE FURLER

It is a manual furler with 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 jutting for maximum safety. This compact furler system allows installation under the deck also for narrow bow yachts.

MODEL	Rod size	Furling rounds n°	Traction Load at 350 bar		Breaking Load		Cylinder stroke		Drum ø		Pin to tack distance		Furler weight		Oil volume
			kg	lb	kg	lb	mm	in	mm	in	mm	in	kg	lb	litres
<b>CF 30P</b>	30	30	5340	11772	14000	30864	113	5,22	156	6,14	349	13,72	18	39	0,17
<b>CF 40P</b>	40	32	7127	15712	18000	39700	133	5,22	165	6,50	375	14,76	21	46	0,26
<b>CF 60P</b>	48 - 60	42	14516	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®

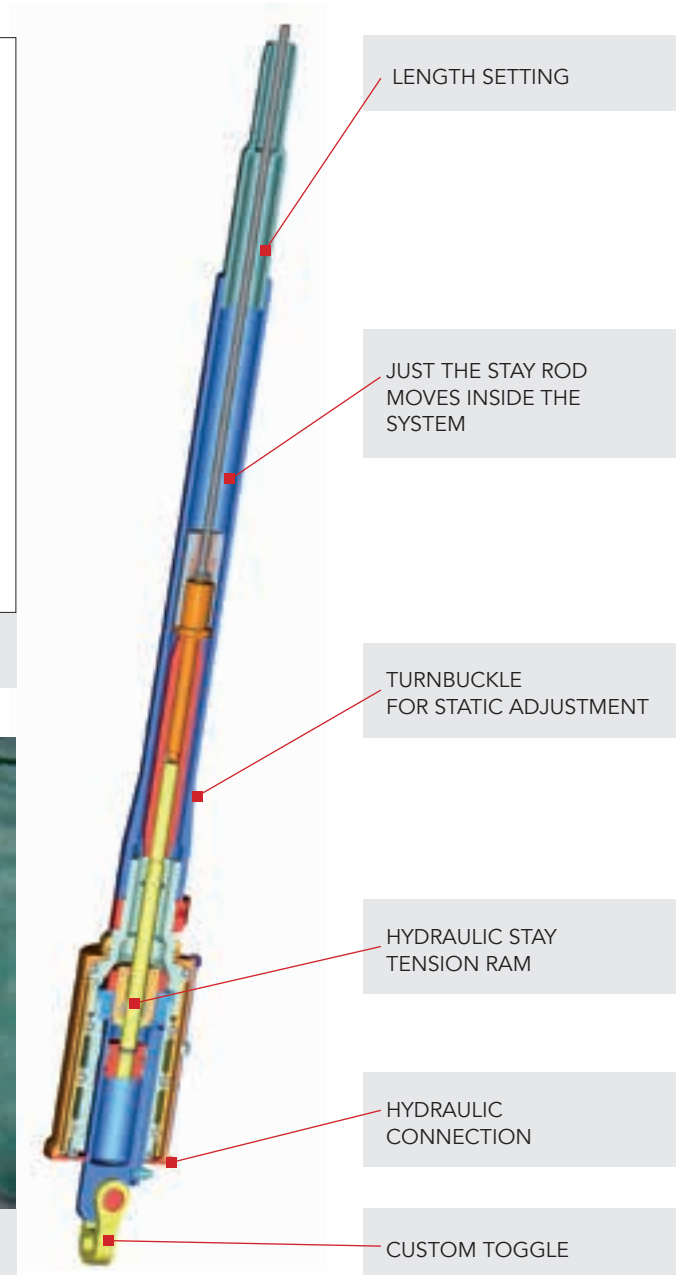
Cylinder tube: 17-4-PH stainless steel  
 Custom toggle: 17-4-PH stainless steel  
 Swivel: 6082T6 black hard coated aluminium



The captive furler drum with integrated stay tensioner.



Installation under the deck also for narrow bow yachts.





**JIB FURLER**

Compact dimensions, lightweight and reliability are the key features for any marine high performance product. We offer several furler sizes, with integrated tensioner or without integrated tensioner.

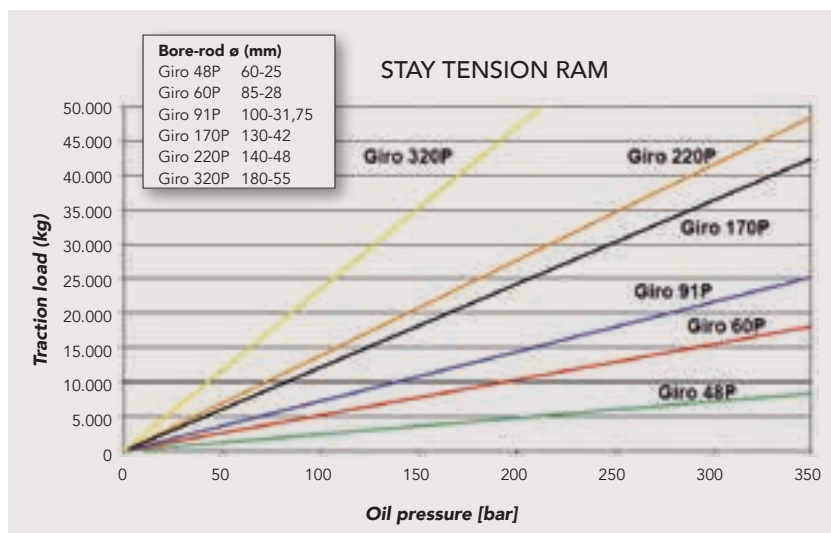
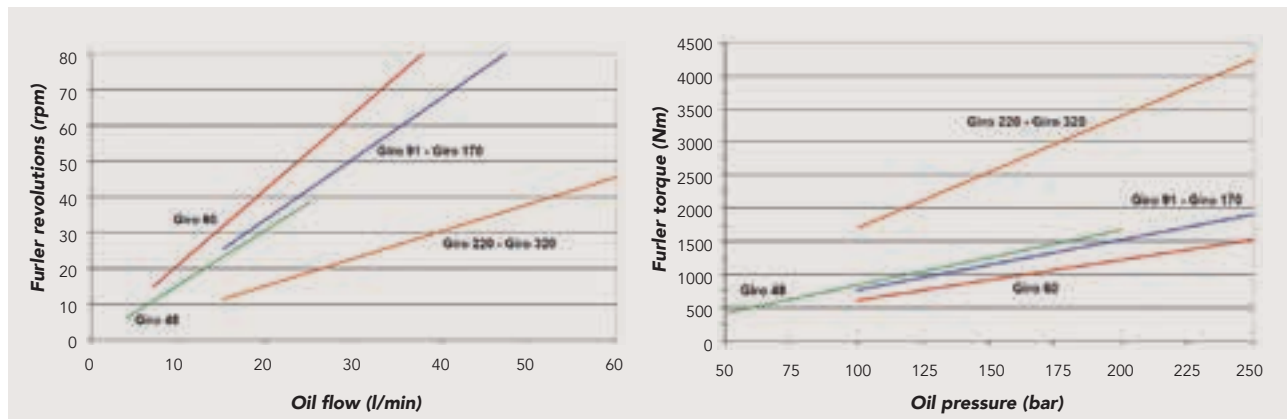
For a complete rig setting a turnbuckle system allows a mechanical adjustment independent from the hydraulic tuning. For a complete supply, aluminium and carbon fibre foils are available.

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



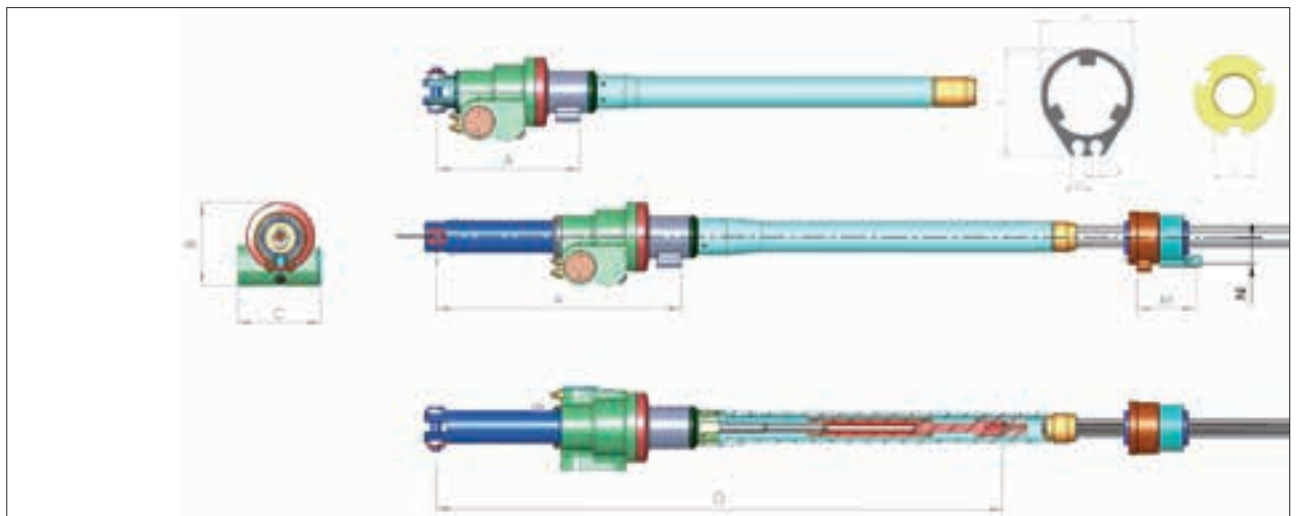
*The full integrated hydraulic stay tensioner is an essential feature when mast has angled spreaders: with the fine tuning of the load on the forestay you increase the performances of the sails and the reliability of all the rigging.*

MODEL	Stay rod size	Max furler pression		Stay tension ram stroke		Furler weight		Oil volume liters
		bar	psi	mm	in	kg	lb	
<b>Giro 48P</b>	48	140	2031	100	3,94	29,6	65,26	0,23
<b>Giro 48</b>	48	140	2031	-	-	21,5	47,40	-
<b>Giro 60P</b>	60-76	200	2900	110	4,33	57,8	127,43	0,55
<b>Giro 60</b>	60-76	200	2900	-	-	48,7	107,36	-
<b>Giro 91P</b>	76-91-115	350	5076	150	5,91	119,4	267,64	1,06
<b>Giro 91</b>	76-91-115	350	5076	-	-	92,4	203,70	-
<b>Giro 170P</b>	150-170	350	5076	205	8,07	197,2	434,74	2,44
<b>Giro 220P</b>	195-220	350	5076	202	7,95	246,0	542,32	2,74
<b>Giro 320P</b>	Up to 320	350	5076	250	9,84	289,0	635,80	6,35



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
<b>Giro 48</b>	342,75	13,49	207,25	8,16	208,30	8,20	1160,50	45,70	205,00	8,07	9/16"	9/16"	-	-
<b>Giro 48 P</b>	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"
<b>Giro 60</b>	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"	-
<b>Giro 60 P</b>	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"
<b>Giro 91</b>	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"	-
<b>Giro 91 P</b>	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"
<b>Giro 170 P</b>	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"
<b>Giro 220 P</b>	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"
<b>Giro 320 P</b>	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*	
		mm	in	mm	in	mm	in	mm	in	mm	in	m	ft	kg/m	lb/ft
<b>G 045</b>	CF30	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
<b>G 055</b>	Giro 48 CF40	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
<b>G 065</b>	Giro 60-91 CF60	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
<b>G 080</b>	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

(\*) Weight includes connectors

### SWIVEL

MODEL	M		N		Max load		Weight	
	mm	in	mm	in	kg	lb	kg	lb
<b>G 055</b>	150,00	5,91	43,00	1,69	2600	5732	1,1	2,43
<b>G 065</b>	162,00	6,38	62,00	2,44	3600	7937	1,8	3,97
<b>G 100</b>	270,00	10,63	73,35	2,89	6000	13228	6,2	13,67



## CODE ZERO FURLER

Our code zero furlers are the lightweight solutions to have an automatic furler to control code zeros by on board hydraulic. 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 IG 09000 size, a manual back-up system allows to furl the sail without hydraulic power. A special gear system doesn't let to unfurl the sail under high load and it doesn't keep pressure on the hydraulic system while sailing.

Many types of fixing ways are available for all sizes: custom length of chain plates turnbuckle available on request.



IG 09000 code zero furler

MODEL	Halyard Max working load		Max oil pressure		Min flow rate	Max speed @ max flow rate	Weight		Dimensions
	kg <sup>(1)</sup>	lb <sup>(1)</sup>	bar	psi	lpm	rpm @ lpm <sup>(2)</sup>	kg	lb	mm
<b>IG 04500</b>	4500	9921	140	2030	4	68 @ 25	9,2	20,3	170x170x185
<b>IG 09000</b>	9000	19841	140	2030	4	48 @ 20	16,7	36,8	204x207x280
<b>IG 16000</b>	16000	35273	400	5800	7	105 @ 48	35,0	77,2	227x262x298
<b>IG 23000</b>	23000	50705	400	5800	15	215 @ 128	67,8	149,5	303x331x368
<b>IG 47000</b>	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 proportional the amount of oil. Faster model available on request.



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

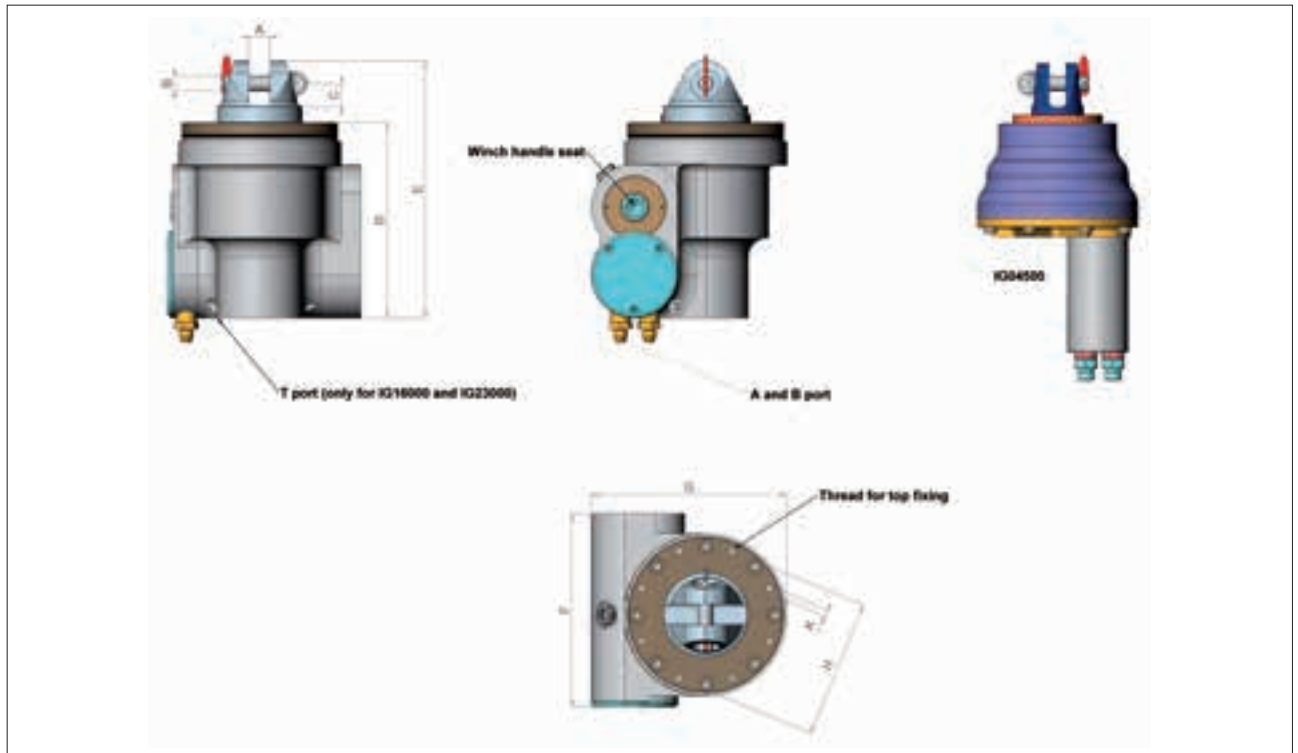


Cariboni's code zero furlers: from IG 04500 (left bottom) to the IG 47000 (top right). IG 47000 has a custom fork according to the stay terminal design

## CODE ZERO FURLER

Here below all the main dimensions of our code zero furlers. IG 47000 has the T port too. The T port (or drain line) must be connected straight to the oil tank.

To be able to control a furler, only a directional valve is required. In case of no turning of the furler, it is not required to use hydraulic pressure to keep the system in the position or to avoid the sail to unfurl under load.

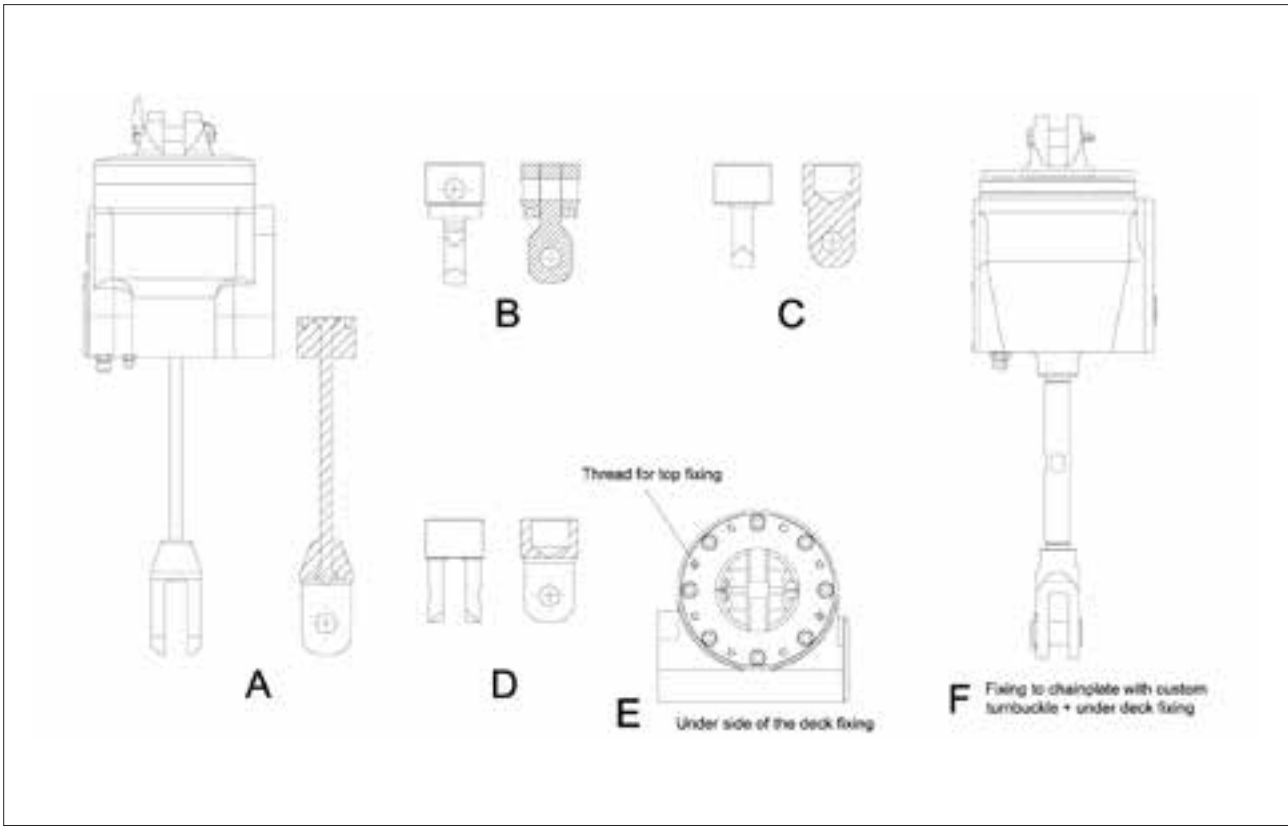


### FURLER MAIN DIMENSIONS

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	
	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 support also torque moment.  
Max angle between furler axis and luff of the sail is 15°.



IG 16000



IG 9000

## 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 furl both from bottom and top.

It can be designed with connection to the bottom bow or from the deck with 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 complete the unit for a full control, which can be automatically used to adjust 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	Cunningham max load	Furl torque	Unfurl torque	Weight	Dimensions
	kg	bar	bar	l/min	kg	Nm	Nm	kg	mm
<b>GIRO ST 070P STD</b>	11121	418	140	20	6760	700	400	92	1620x370x261
<b>GIRO ST 076P</b>	21250	420	140	20	6000	700	400	127	1930x358x279
<b>GIRO ST 080P</b>	27500	500	140	20	6000	700	400	99	1719x358x279
<b>GIRO ST 080P STD</b>	19250	350	140	20	3500	700	400	107	1474x380x279
<b>GIRO ST 120P</b>	40000	495	250	100	9700	2000	1100	257	2191x620x500 <sup>(2)</sup>

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

(2) Deck installation



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
<b>STC 10 300</b>	300	11,8	10000	22046	25	480	45	48	1048x239x297	41,3x9,4x11,7
<b>STC 12 500</b>	500	19,7	12000	26455	25	1305	16	69	825x281x330	32,5x11,1x13
<b>STC 18 650</b>	650	25,6	18000	39683	60	4450	29	109	1090x320x407	42,9x12,6x16
<b>STC 24 400</b>	400	15,7	24000	52911	30	2970	28	125	1332x328x425	52,4x12,9x16,7



## FOIL SWIVEL

MODEL	M		N		Max load		Weight	
	mm	in	mm	in	kg	lb	kg	lb
<b>G 055</b>	150,00	5,91	43,00	1,69	2600	5732	1,1	2,43
<b>G 065</b>	162,00	6,38	62,00	2,44	3600	7937	1,8	3,97
<b>G 100</b>	270,00	10,63	73,35	2,89	6000	13228	6,2	13,67



## CODE 0 SWIVEL



MODEL	J		W		X		X1		Z		Max load		Weight	
	mm	in	mm	in	mm	in	mm	in	mm	in	kg	lb	kg	lb
<b>FST 05 045</b>	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
<b>FST 06 4001</b>	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
<b>FST 08 016</b>	18,0	0,71	211,5	8,33	30,0	1,18	27,5	1,08	105,0	4,13	16000	35274	3,9	8,6
<b>FST 10 023<sup>(1)</sup></b>	30,0	1,18	362,0	14,25	30,0	1,18	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
<b>FST 060</b>	308 <sup>1</sup>	12,1	164	6,46	6000	13228	9,3	20,5
<b>FST 120</b>	225	8,9	87	3,43	12000	26455	5	11
<b>FST 160</b>	228	9,0	89	3,50	16000	35274	4,8	10,6
<b>FST 190</b>	239	9,4	108	4,25	19000	41800	7	15,4
<b>FST 200</b>	255	10,0	108	4,25	20000	44000	7,5	16,5
<b>FST 220</b>	316	12,4	144	5,70	22000	48400	14,2	31,2
<b>FST 260</b>	257	10,1	97	3,81	26000	57320	5,4	11,9
<b>FST 270</b>	326	12,8	145,5	5,73	27000	59400	14,8	32,5
<b>FST 330</b>	312	12,3	124	4,88	33000	72600	12,5	27,5
<b>FST 240 LOCK</b>	524	20,6	186 x 110 <sup>2</sup>	7,32 x 4,33 <sup>2</sup>	17500 <sup>3</sup> 6500 <sup>4</sup>	38500 14300	14,4	31,7
<b>FST 260 LOCK</b>	399	15,7	175 x 88 <sup>2</sup>	6,89 x 3,46 <sup>2</sup>	20000 <sup>3</sup> 6000 <sup>4</sup>	57320 13228	10,5	23,1
<b>FST 290 LOCK</b>	424	16,7	186 x 110 <sup>2</sup>	7,32 x 4,33 <sup>2</sup>	19000 <sup>3</sup> 10000 <sup>4</sup>	50706 13328	13	28,7
<b>FST 300 LOCK</b>	411	16,2	189 x 114 <sup>2</sup>	7,44 x 4,48 <sup>2</sup>	20000 <sup>3</sup> 10000 <sup>4</sup>	44000 22000	29	63,8
<b>FST 570 LOCK</b>	528,4	20,8	175 x 270 <sup>2</sup>	6,89 x 10,6 <sup>2</sup>	40000 <sup>3</sup> 17000 <sup>4</sup>	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



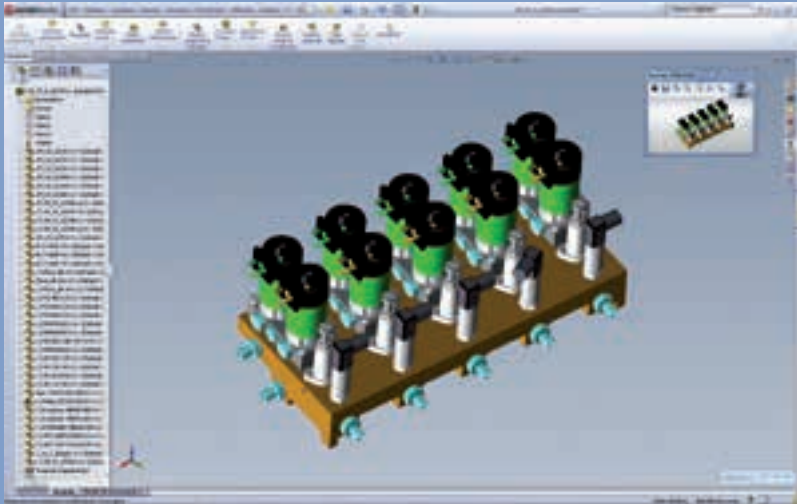
FST 04 060  
Titanium openable  
halyard swivel



FST 11 260 LOCK  
Titanium stay swivel  
with integrated halyard lock



## HYDRAULIC SYSTEM



We design, build, install and test the whole hydraulic system of a sailing yacht: power-packs, piping, manifolds, electric controls, with basic or special hydraulic devices.

Our guide lines are:

- Reliability
- Lightness
- Innovative & Technological approach

### **Reliability**

It is important for us to have a strong relationship with our suppliers: we create our system with the collaboration of technical offices in order to have always the best solution. Hydraulic components, electric engines and electronics controls are all tested in our firm. We supply our standard systems with stainless steel fittings to avoid problems of rust.

### **Lightness**

Gear pumps for medium and high pressures (up to 700 bar) are made of lightweight aluminum alloy and fit electric engines with aluminum flanges and 17-4 PH joints.

### **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 autoshift pumps: at low pressure all the three pumps work to get the maximum oil flow; at medium pressure one pump is excluded, at high pressure only one works. The current consumption is quite constant in all the ranges of pressure. This allow the use of the electric motor for longer time without overheating and overloading it.



*Cariboni PLC system, oil tank and powerpack for a 53' sailing yacht hydraulic system*

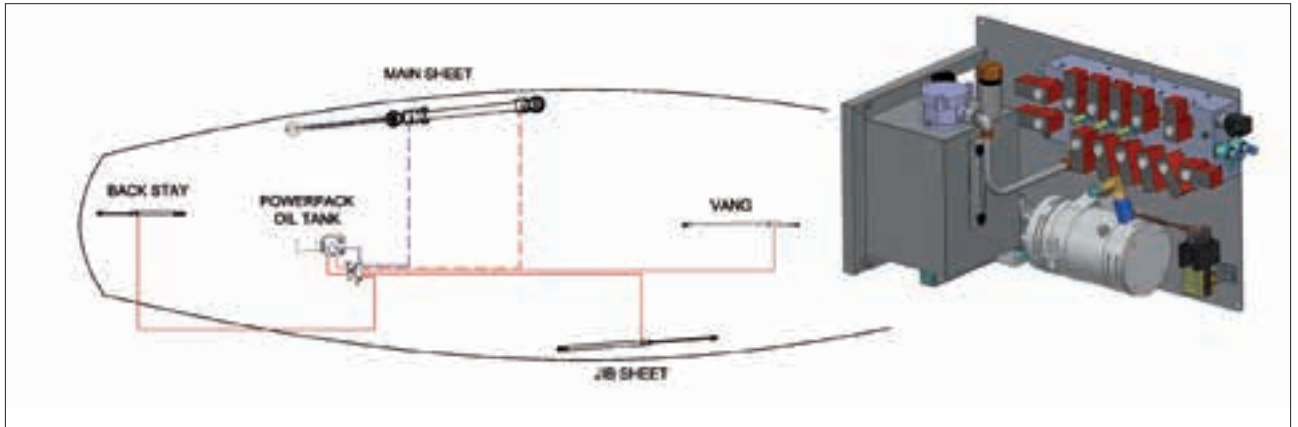


## COMPACT ARRANGEMENTS

For small boats, we create a compact system with oil tank, powerpak and manifold, all made of aluminium alloy. With this hydraulic system the installation on board gets easier and faster: the shipyard has only to fix the panel with few screws and plug the hoses to the cylinders.

Here below an example of easy sailing hydraulic system of a yacht:

- 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

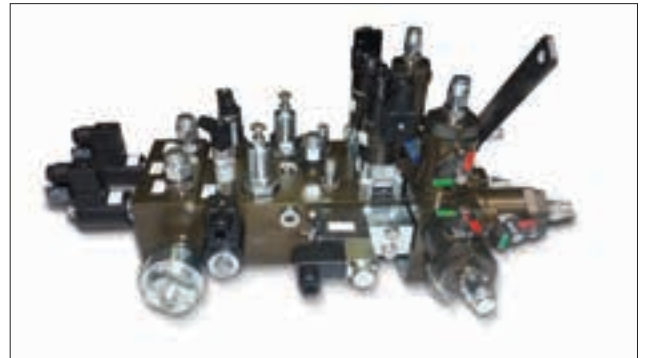


Custom compact hydraulic system for a 33' sailing yacht

## CUSTOM ARRANGEMENTS

The hydraulic system of Cariboni has been improved year by year with ultimate high-tech solutions. Proportional valve is getting a benchmark for sailing environment and is a standard for our professional system. The proportional controls of flow and pressure on hydraulic systems reduce un-wanted peaks of pressures and increase the control of hydraulic devices and their reliability. We verify this technology in several yachts, on their canting keel systems, for example.

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



Canting keel manifold VOR 65 with proportional valves



Softstart device for a 6000 Watt electric engine

In order to increase electric efficiency and the lifetime of electrical engine, we supply the softstart device together with our powerpack. This system controls the current consumptions of DC electric engine, getting a soft and smooth start and stop. Softstars are a must for bigger electric engines (over 4500 watts) in order to increase the available hydraulic power without increase too much the batteries size.

## ELECTRIC PUMPS AND PTO

We supply high performance powerpack for fast cruiser or race yachts. This kind of powerpack has a special high-pressure pump, made of light aluminium alloy, able to reach up to 700 bar (10.000PSI).

If high pressure and high flow rates are required, special dual stage pistons pump are available with custom flange to fit high performance DC electric engine.

We design and assemble single and multi-electric pumps to satisfy all the customer needs. Our pumps can be used to drive Magic Trim cylinders, single or double acting cylinders, furlers, winches, anchor stowing systems and whatever needs hydraulic power!



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

MODEL	Power	Voltage	Max flow @ 250 bar	Max flow @ 350 bar	Dimensions <sup>1</sup>		Weight <sup>1</sup>	
	W	V	l/min	l/min	Mm	in	kg	lb
<b>1x2000</b>	2000	24	3,8	2,7	Ø 128 x 314	Ø 5,0 x 12,4	10	22
<b>1x2500</b>	2500	12 or 24	4,8	3,4	Ø 130 x 342	Ø 5,1 x 13,5	13	28,6
<b>1x3000</b>	3000	24	5,8	4,1	Ø 130 x 342	Ø 5,1 x 13,5	13	28,6
<b>1x4500</b>	4500	24	8,6	6,2	Ø 161 x 472	Ø 6,3 x 18,6	27,5	60,6
<b>1x5000*</b>	5000	24	9,6	6,9	Ø 205 x 385	Ø 8,1 x 15,2	21,6	47,6
<b>1x6000</b>	6000	24	11,5	8,2	Ø 191 x 675	Ø 7,5 x 26,6	69	152

<sup>(1)</sup> indicative values depending on the type of pump installed

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

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



Rexroth pump assembled with custom clutch on 27kW Mastervolt generator PTO.  
Flow rate = 67.5 lit/min  
Max pressure = 250 bar



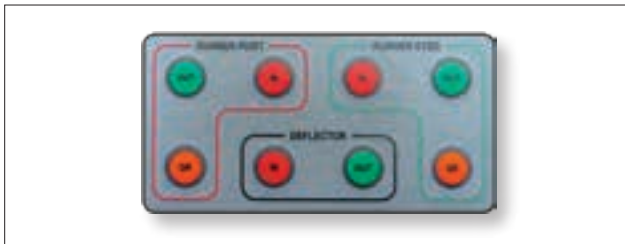
Complete service units on Volvo diesel engine for Volvo Ocean Race.

## PUSH BUTTONS 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 buttons panels, with n.1 M12 output cable.

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



An example of Push buttons panel, 8 buttons



An example of Push buttons panel, 12 buttons

Buttons	Without CAN BUS		With CAN BUS	
	Dimensions	Weight (2,5m cable included)	Dimensions	Weight (2,5m cable included)
	mm	g	mm	g
<b>2</b> <sup>(1)</sup>	100 x 40 x 14	250	-	-
<b>3</b> <sup>(1)</sup>	140 x 40 x 14	270	-	-
<b>4</b> <sup>(1)</sup>	180 x 40 x 14	284	-	-
<b>4</b>	80 x 80 x 14	340	80 x 80 x 23	342
<b>6</b>	120 x 80 x 14	360	120 x 80 x 23	434
<b>8</b>	160 x 80 x 14	660	160 x 80 x 23	554
<b>10</b>	200 x 80 x 14	720	200 x 80 x 23	674
<b>12</b>	240 x 80 x 14	750	240 x 80 x 23	794

(1) inline buttons

## HYDRAULIC WINCH MOTORS

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

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



Hydraulic winch motors

MODEL	Displacement	Specific torque	Peak pressure	Max rotational speed	Dimensions (Ø x length)	Weight
	cc/rev	Nm/bar	bar	rpm	mm	kg
<b>M A 075</b>	86	1,37	375	700		
<b>M A 110</b>	115	1,83	400	650	205 x 190	14
<b>M A 130</b>	129	2,05	375	650		



## HYDRAULIC DREAM

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

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

Sizzler has:

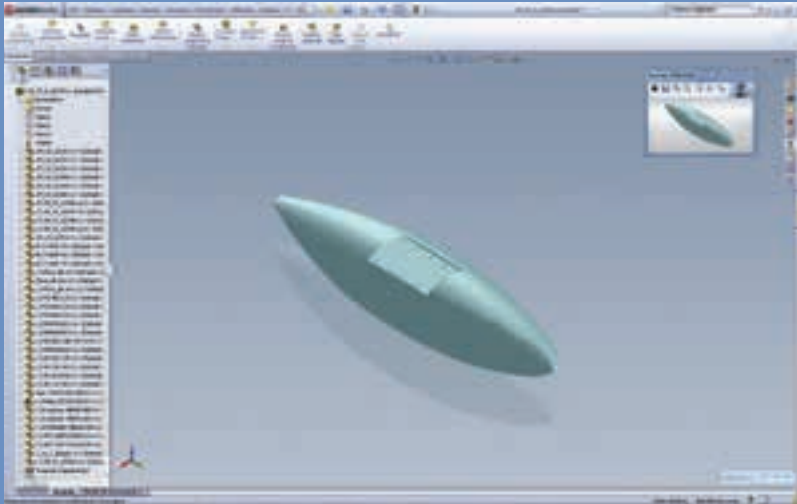
- MagicTrim for mainsheet control
- MagicTrim for jib sheet with easy sailing system
- Double acting vang with linear sensors for main furler
- Jib furler with hydraulic tensioner
- Hydraulic outhaul, halyard and backstay
- Hydraulic winches
- Bow and aft thrusters
- Lifting keel with locking system
- Hydraulic lifting cockpit table
- Hydraulic sliding doors

All these devices are driven by Cariboni's hydraulic system, controlled with two joint PLC.

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 bended and fixed on the boat by custom made wood rings. At the end, a spectacular light system underline the flush deck and all the on board equipment...



## BULB - FIN



Cariboni produces and machines at the CNC milling machine bulbs for performance sailing yachts.

The bulb production started with the re-fitting of a new GP42 by Barracuda Yacht Design.



*JP 54 Hydraulic system*

## BULB

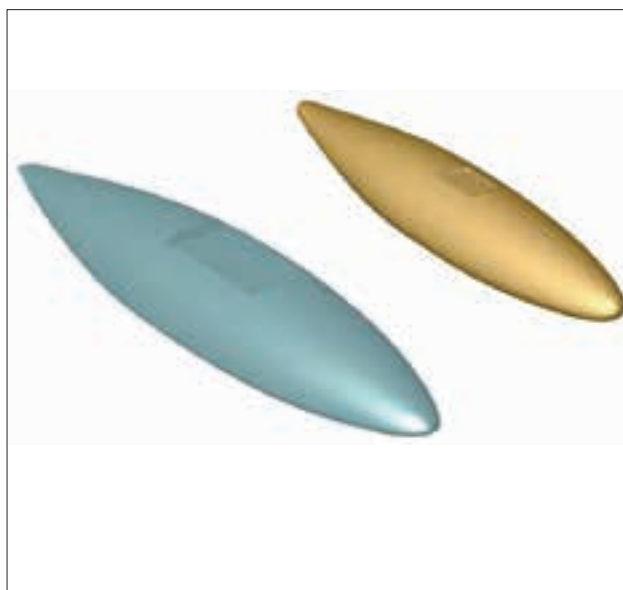
The advantages of a CNC milled bulb are:

- Best control of hydrodynamic shape to increase under-water performances
- Sharp 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 it to the fin
- Starting from the 3D design we machine out a plastic model of the bulb which will be used to build the mould for the real lead one
- The lead is placed on our CNC milling machine to get the final shape.

We can produce any size of bulb: from the small 2 tons unit for the GP42 race up to the 7 tons for a fast cruiser. Bigger bulb are also available on request.



Above you can see two 3D models of bulbs



3D model of the bulb



CNC milling machine



Bulb ready to be painted



**FIN**

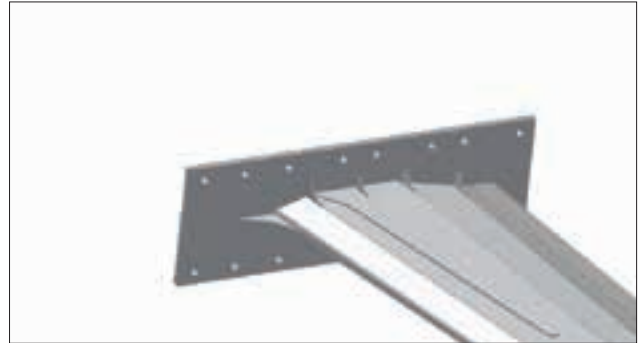
We have a long experience in fins design and construction for any kind of sailing yacht.

Fins can be created from a forged piece of high strength steel or welding sheets of Weldox material to have a lighter solution for higher performances.

For high performance sailing yachts, we offer our 17-4PH fin. This kind of fin is made starting 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.



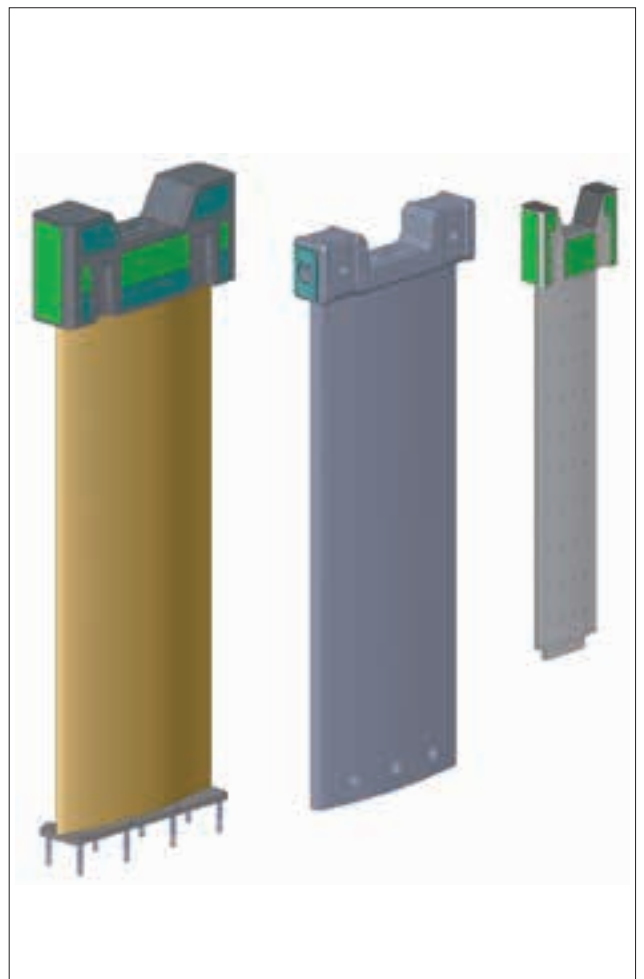
The fin on the left is CNC milling machined from a forged block to obtain the right shape. The one on the right is a welded fin made of Weldox.



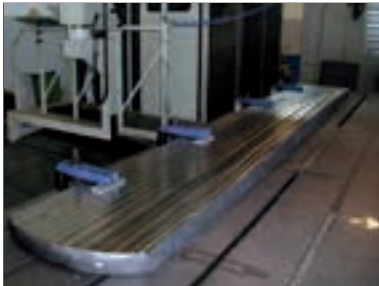
A detail of the upper part of the pin with the reinforcements.



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



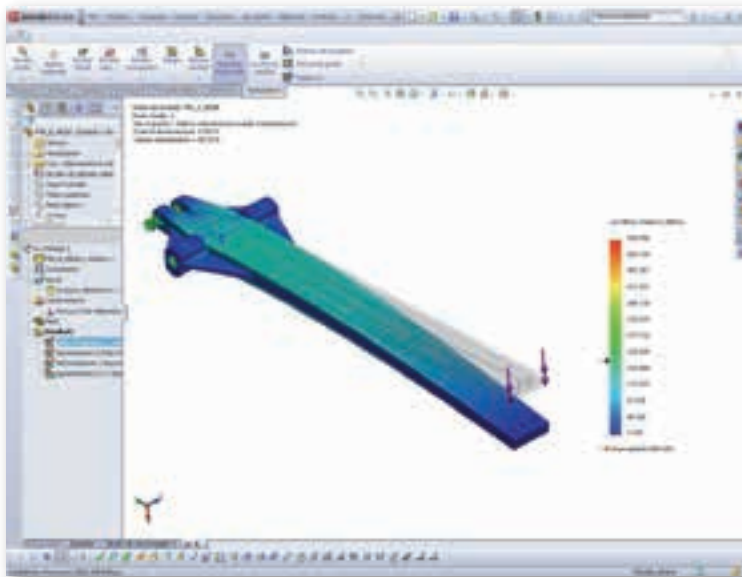
From left to right, the fin for a 100', 82' and for a 40' racing sailing yacht.



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



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

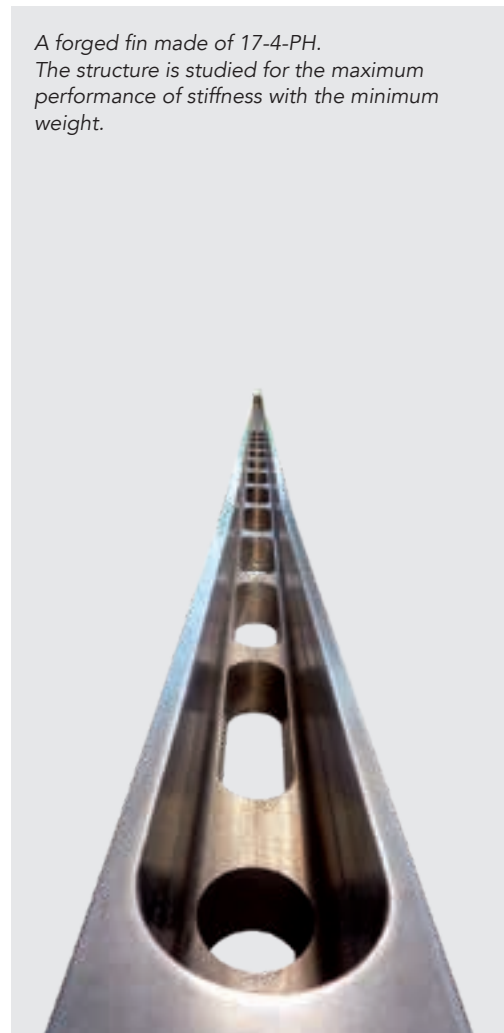


An example of stress study on a 67' canting keel fin.

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



The JP54 with Cariboni welded fin.



## LIFTING KEEL



The possibility to lift the keel can allow an easy entry in shallow water harbours 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 transfer the loads to the keel box.



*Botin 65' Caro  
Lifting keel system*



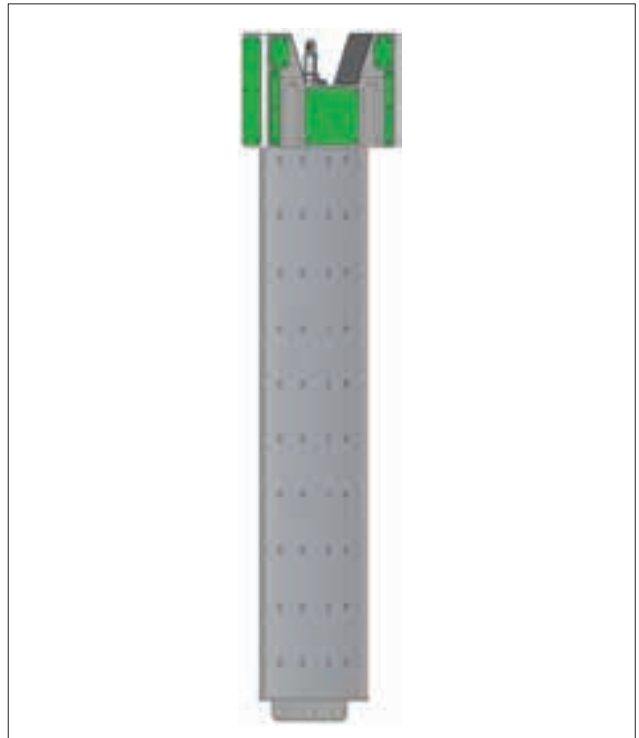
**LIFTING KEEL**

The main elements of our standard lifting keel system are:

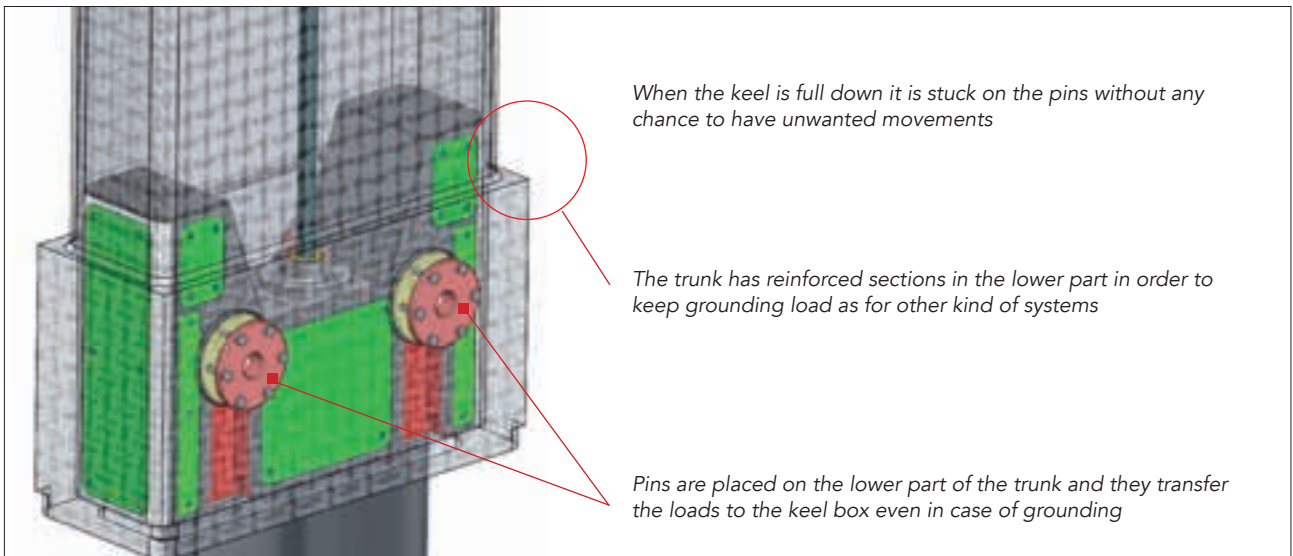
- **Keel head:** made of stainless steel, with sliders with low friction and reduced swell water characteristics. Machined at CNC milling machine, it is completed with seats for the 4 pins.
- **Lifting keel cylinder:** it is a double acting cylinder made of 17-4-PH flanged on the head.
- **Cylinder support:** made of stainless steel, it is placed on the top of the trunk and it is designed to support the weight of the keel and the bulb.
- **Keel pins:** made of stainless steel, they're the core of our keel system; they contribute to hold 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 capsize and they avoid lateral movement when the keel is lifted.
- **Keel box:** usually made of the same material of the boat (carbon fiber or fiber glass). To obtain the internal correct dimensions, we machine at the CNC milling machine a pre-size male mold.
- **Fin:** it can be made of several materials, like Weldox, SAF or forged stainless steel.
- **Testing:** keel box, fin, cylinder and pins are tested all together prior shipping to assure the perfect sliding inside the keel box.



Class 40' by Cantieri Navali d'Este



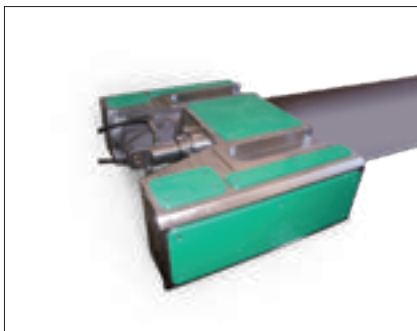
40' Cruiser-racer lifting keel fin



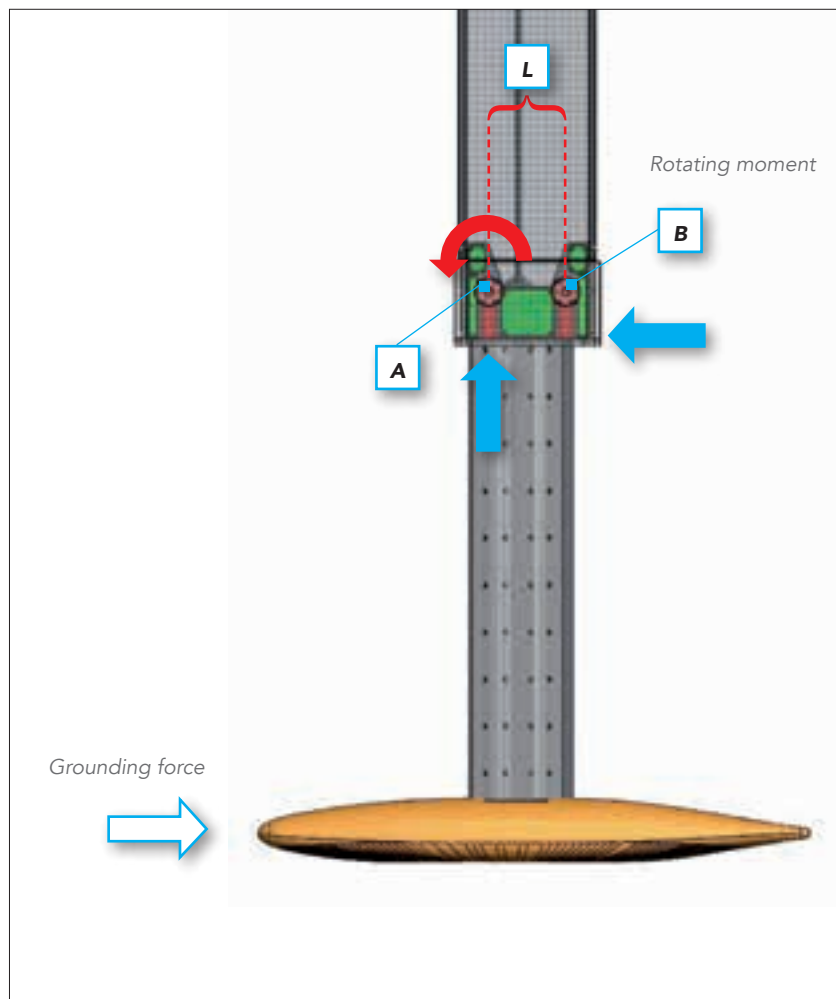
## LIFTING KEEL

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

- **Pin A** keeps the horizontal load to balance the grounding load.
- **Pin B**, thanks to the stiffness of the keel head, contributes to keep the fin in position and it transfers the load to the keel box through the pins and the sliding guides.
- The pins are placed as far as possible between each others in order to give good stability to the system (L).
- Lifting cylinder doesn't keep any load higher than the designed compression load. The cylinder can keep the fin and the bulb in position if the capsizes occurs.

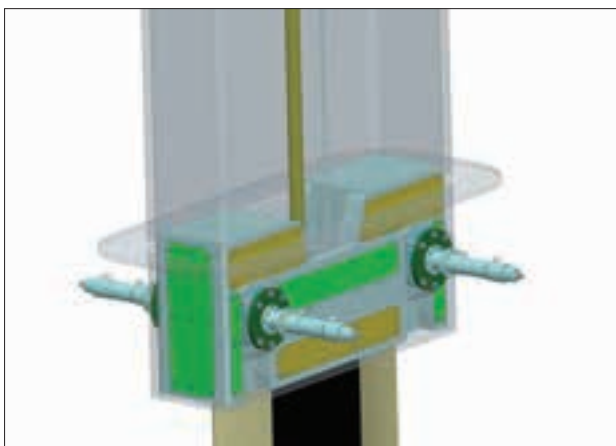


Fin head



Loads in grounding scenario

On the keel pins, it is possible to connect locking cylinders made of stainless steel.



Locking system example in a 65' sailing yacht

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

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



Freya 60' by Knierim Yachtbau

**LIFTING KEEL**

For small boats, it has been developed a lifting keel system which can easily be placed eventually inside the table basement. When the keel is down, the required space is reduced to the minimum.

The system is composed by two hydraulic cylinders and a compact hydraulic powerpack.

Systems in different heights are available on request.



*The lifting keel system for a 31' day sailer*

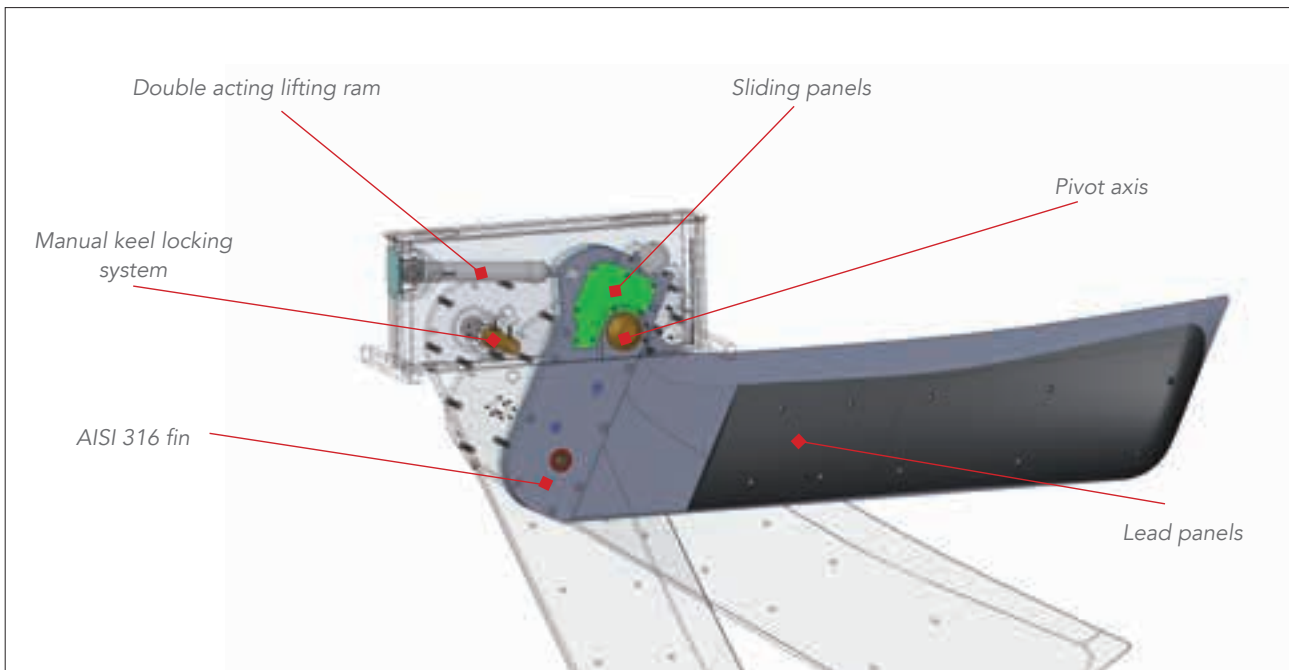


*The pivoting keel assembly for a 35' day sailer*

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

The keel has a pivot axis transverse to the boat. A double acting ram moves the keel up and down in order to reduce the overall draft of the boat (from 2m to 0,58m); 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.



*Main items on a pivoting keel*

## LIFTING KEEL RAMS

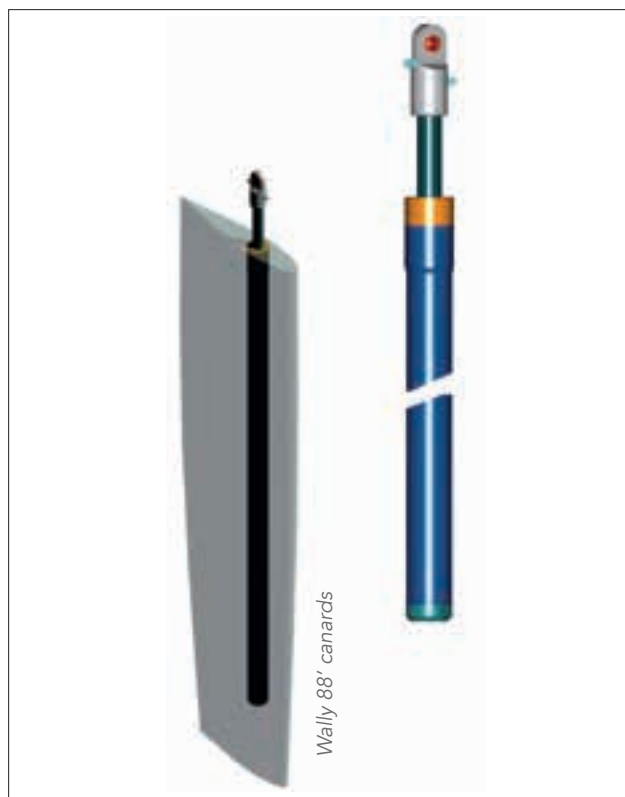
We supply also other types of lifting keel systems and hydraulic cylinders.

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**
- **pin connection**

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

The pin connection is used when there are no buckling problem, as for a canard.



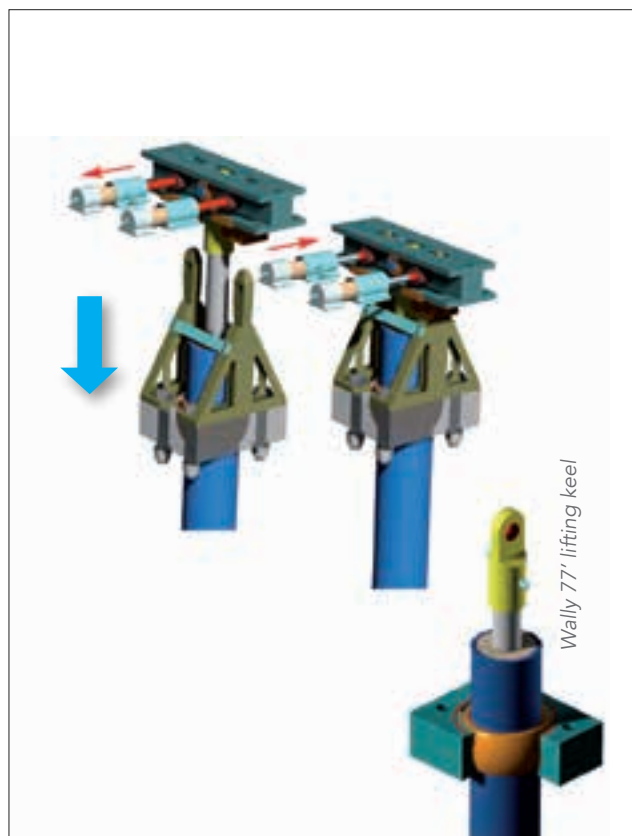
### **Pin connection**

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.

This system is often used for canards.

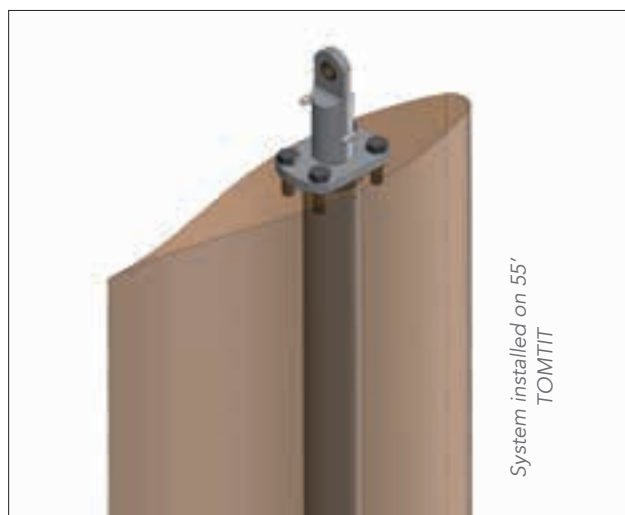


### **Bearing connection**

The spherical bearing is placed on the top of the fin.

The rod terminal has a spherical fixing part.

The tube of the cylinder is inside the fin.



### **Flange connection**

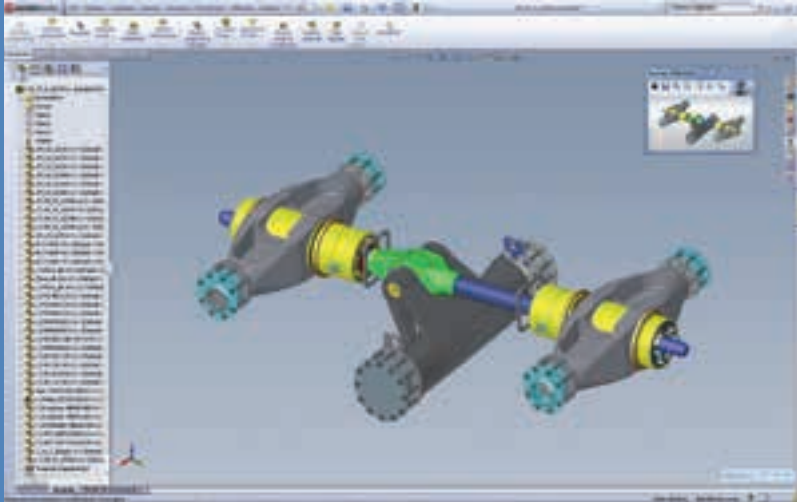
The cylinder tube head has a flange bolted to the fin. The rod terminal has a spherical bearing to allow small misalignment of the system.

Both oil fittings are placed on the rod terminal in order to avoid any movement of hoses.

The cylinders are usually made of stainless steel with structural parts made of high strength 17-4-PH.



## CANTING KEEL SYSTEM



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

Cariboni's experience in canting keel systems dates back to 1996, when *Junoplano* was designed; this single ram system, with a  $\pm 55^\circ$  canting angle, has been a milestone in sail history.

Cariboni designs and supplies canting keel system with:

- A single double acting cylinder
- Two double acting cylinders
- With integrated aluminium or stainless steel frame
- JIG system to build the keel bulkheads
- Aluminium, stainless steel and titanium rams

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 guarantee by special custom rubbers, placed between the rams and the longitudinal plates.

The keel frame allows to have a self-contained canting structure easily to be placed inside the boat. The shipyard has just to pick-up the structure and fix it between the two main bulkheads. The loads transmitted to the boat structures are exactly the same loads of a standard fixed keel.

These kind of systems are installed on several Wally boats and on the 60' race-cruisers "*Junoplano*", "*Kratos*" and "*Anyway*".

In the image you can see the canting keel system of the 105' Wally "*Kauris III*" designed by German Frers.

In order to reduce the overall weight of the canting keel, we developed an integrated system which doesn't need a frame as all the parts are placed straight on the boat bulkheads. A JIG structure is supplied to the shipyard to place the bulkheads correctly aligned and drilled inside the boat.

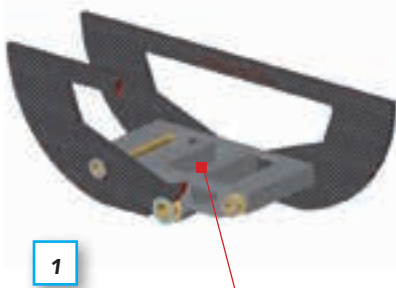
These canting keel mechanisms without frame are installed on most of the racers boats.



Cariboni's keel system with frame for a 105' sloop. This kind of system is fully tested in the firm before shipping.



MY SONG 80'



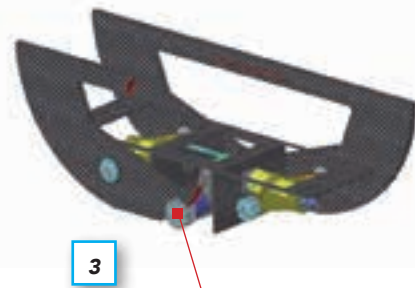
1

Mounting jig



2

Bulkheads and keel structure



3

Keel rams, bearings and keel bearings

Here 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 bulheads 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

## THE BIGGEST CANTING KEEL IN THE WORLD...

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

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

Cariboni cares a lot about reliability of its system. That is proved by the long sailed before the first service, made after 25000NM.



140' MARI-CHA IV

## ...AND THE FASTEST

Only 6.5 seconds from  $-55^{\circ}$  to  $+55^{\circ}$ !

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

The keel control is made by two double acting cylinders feed by PTO diesel engine pumps, with an extraordinary  $55^{\circ}$  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. ACC manual control and deck equipment complete the hydraulic system of this milestone boat.



Genuine risk

## VOLVO CANTING KEEL SYSTEMS

## VOLVO OCEAN RACE 2017 - 2018



**Dongfeng Race Team**  
Winner



**Mapfre**



**Team Brunel**

## VOLVO OCEAN RACE 2014 - 2015



**Abu Dhabi Ocean Racing**  
Winner



**Team Brunel**



**Dongfeng Race Team**

## VOLVO OCEAN RACE 2011 - 2012



**Groupama Sailing Team**  
Winner



**Team Telefonica**



**PUMA Ocean Racing by BERG**



**Abu Dhabi Ocean Racing**

## VOLVO OCEAN RACE 2008 - 2009



**Ericsson E4**  
Winner



**Puma "Il Mostro"**

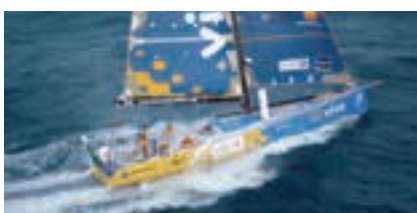


**Ericsson E3**

## VOLVO OCEAN RACE 2005 - 2006



**ABN AMRO ONE**  
Winner



**BRASIL 1**



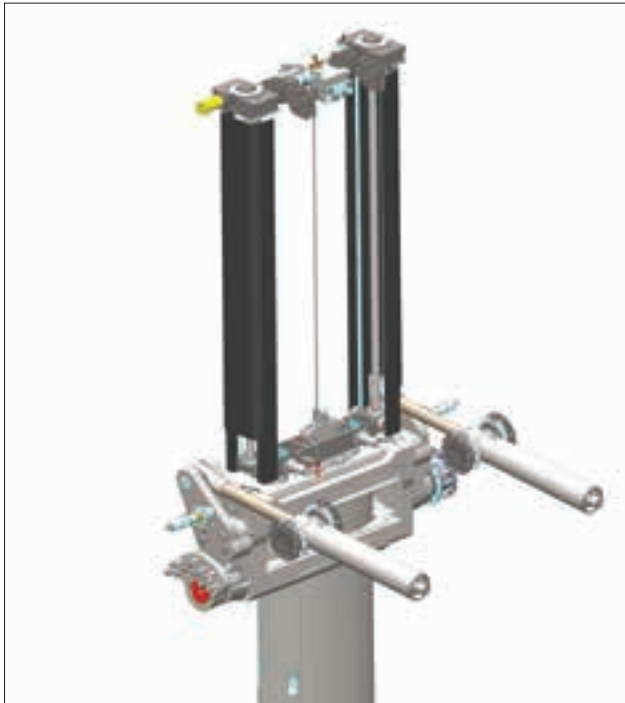
**ABN AMRO TWO**

**CANTING & LIFTING KEEL SYSTEMS**

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 in emergency with only one cylinder.  
 The screws keep the keel in lifted position in case of lifting mechanism failure. They allow to lower the keel in sailing position.  
 A CNC machined jig of the structure is supplied for the correct alignment of the bulkheads and for an easy installation on the boat of the keel mechanism.



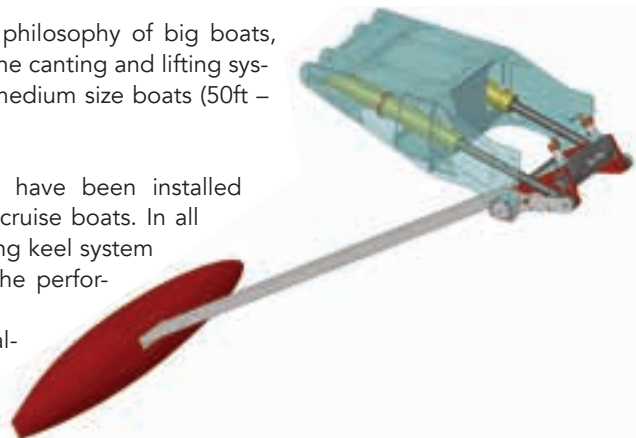
**MAIN FEATURES for 69' cruiser/racer:**  
 Max Canting Angle: 38°  
 Bulb weight: 5100 kg  
 Fin weight: 1550 kg  
 Lifting stroke: 1770 mm



**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

With the same philosophy of big boats, we developed the canting and lifting systems for small-medium size boats (50ft – 30ft).

Similar systems have been installed on regatta and cruise boats. In all cases, the canting keel system has enhanced the performance noticeably. The lifting keel allows the boat to access shallow waters.



**Main characteristics:**

- Keel is CNC milled; leading/trailing edges are also possible 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.



## CRUISER AND CRUISER-RACER KEEL SYSTEMS

The largest experience in canting, lifting and canting&lifting keel system in the world.  
Cruiser and cruiser-racer: alluminium and stainless steel for top reliability and lightweight.

YACHT	SIZE ft	MAIN SYSTEMS*	YEAR
<b>MD78</b>	78	Lifting keel, keel, hydraulic system, sailing cylinders	2024
<b>MILLS 41</b>	41	Lifting keel, fin, hydraulic system, sailing cylinders	2023
<b>ICE YACHTS - ICE 70 - 4</b>	70	Lifting keel, hydraulic system, sailing cylinders	2023
<b>ICE YACHTS - ICE 70 - 3</b>	70	Lifting keel, hydraulic system, sailing cylinders	2023
<b>KNIERIM 62</b>	62	Lifting keel, fin, hydraulic system, sailing cylinders	2023
<b>PERSICO MARINE - CS 80</b>	80	Canting keel, hydraulic system, sailing cylinders	2022
<b>ICE YACHTS - ICE 70 - 2</b>	70	Lifting keel, hydraulic system, sailing cylinders	2022
<b>ICE YACHTS - ICE 60 TARGA</b>	60	Lifting keel, hydraulic system, sailing cylinders	2022
<b>MD TECHNOLOGIES - 62 - 2</b>	62	Lifting keel, fin, hydraulic system, sailing cylinders	2022
<b>NEO YACHTS &amp; COMPOSITES - NEO 570</b>	57	Lifting keel, hydraulic system, sailing cylinders	2022
<b>ICE YACHTS - ICE 70</b>	70	Lifting keel, hydraulic system, sailing cylinders	2021
<b>NEO YACHTS &amp; COMPOSITES - NEO 430 - 3</b>	43	Lifting keel, fin, hydraulic system	2020
<b>NEO YACHTS &amp; COMPOSITES - NEO 430</b>	43	Lifting keel, fin, hydraulic system	2020
<b>SOUTHERN WIND</b>	96-3	Lifting keel, fin, hydraulic system, sailing cylinders	2020
<b>MYLIUS - CK 60</b>	60	Canting keel, fin, hydraulic system, sailing cylinders	2019
<b>MAXI DOLPHIN</b>	73	Lifting keel, fin, hydraulic system, sailing cylinders	2019
<b>PERSICO MARINE - FY 65</b>	65	Lifting keel (1550 mm), hydraulic system, sailing cylinders	2019
<b>ADRIA SAIL - HARRY 65</b>	65	Lifting keel, fin, hydraulic system, sailing cylinders	2019
<b>NACIRA</b>	69	Canting & Lifting keel, fin, hydraulic system, sailing cylinders	2019
<b>MAXI DOLPHIN</b>	73	Lifting keel, fin, hydraulic system, sailing cylinders	2018
<b>FY 65 - PERSICO MARINE</b>	65	Lifting keel (1550 mm), hydraulic system, sailing cylinders	2018
<b>SOUTHERN WIND</b>	96-2	Lifting keel, fin, hydraulic system, sailing cylinders	2018
<b>SOTO 77</b>	77	Lifting keel, fin, hydraulic system, sailing cylinders	2017
<b>SOUTHERN WIND</b>	96-1	Lifting keel, fin, hydraulic system, sailing cylinders	2017
<b>BOTIN 70</b>	70	Lifting keel, fin, hydraulic system, sailing cylinders	2017
<b>PREMIER COMPOSITE JV74</b>	74	Lifting keel, fin, lifting cylinders, locking cylinders	2017
<b>SALONA 67</b>	67	Lifting keel, fin, hydraulic system, sailing cylinders	2017
<b>KING MARINE 65</b>	65	Lifting keel, fin, hydraulic system, sailing cylinders	2015
<b>CONRAD YCC 91</b>	91	Lifting keel, fin, sailing cylinders	2014
<b>KNIERIM 60</b>	60	Lifting keel, fin, hydraulic system, sailing cylinders	2014

\* Where not indicated the fin has not been supplied by Cariboni

## CRUISER AND CRUISER-RACER KEEL SYSTEMS

YACHT	SIZE ft	MAIN SYSTEMS*	YEAR
<b>KNIERIM 65</b>	65	Lifting keel (1800 mm), fin, hydraulic system, sailing cylinders	2013
<b>SOTO 65</b>	65	Canting keel, hydraulic system, sailing cylinder	2013
<b>ICE 62</b>	62	Lifting keel (1550 mm), hydraulic system	2013
<b>DINAMICA</b>	31	Lifting keel (up to 540 mm)	2012
<b>BB</b>	36	Pivoting keel, fin, hydraulic system	2011
<b>KNIERIM 57 - OPAL</b>	57	Canting keel (one cylinder, 45°), fin, hydraulic system, cylinders	2011
<b>DREAM 67</b>	67	Canting keel (one cylinder, 40°), fin and bulb, hydraulic system, cylinders	2011
<b>COMET 100</b>	100	Lifting keel (2200 mm), keel, fin, locking pins, hydraulic system, furler, cylinders	2011
<b>RO620</b>	62	Fin and bulb	2011
<b>CONRAD</b>	66	Pivoting keel, locking pins, hydraulic system, transom door, cylinders	2009
<b>AD 54</b>	54	Canting keel (one cylinder, 40°), MagicTrims, cylinders, hydraulic system	2009
<b>SHIPMAN</b>	80	Lifting keel (1430 mm), locking pins, transom door	2009
<b>ESTE CLASS 40</b>	40	Lifting keel (1500 mm), fin, hydraulic system, keel, head	2008
<b>SHIPMAN 72</b>	72	Lifting keel cylinder (1430 mm), locking cylinders, transom door cylinders	2008
<b>SHIPMAN 63</b>	63	Lifting keel cylinder (1430 mm), locking cylinders, transom door cylinders	2008
<b>FINOT – OURSON RAPIDE</b>	60	Lifting keel (1500 mm), special cylinder for locking system, hydraulic system, mainsheet MagicTrim with auto-tacking system, anchor stowing, jib furler, turning mast cylinder.	2008
<b>SEAWAY 60</b>	60	Lifting keel (1350 mm) and fin	2006
<b>TONY CASTRO 60</b>	60	Lifting keel (1250 mm), easy Sailing hydraulic system with Magic Trim, hydraulic propulsion, jib furler, cylinders	2006
<b>FY 61</b>	61	Lifting keel (2000 mm), hydraulic system	2006
<b>KANAP-ONE</b>	86	Lifting keel (2000 mm), hydraulic system, transom door, furlers, manual control system, cylinders, MDA	2005
<b>SHAKA</b>	80	Canting keel (40°, 2 cylinders), easy sailing hydraulic system with Magic Trim, canard, manual control system, furler, cylinders, MDA	2005
<b>BLUSAIL 54</b>	54	Lifting keel (2000 mm), hydraulic system, jib furler, cylinders, MDA	2004
<b>RANDONNEUR 42</b>	42	Lifting keel (900 mm), hydraulic system	2004
<b>FINOT 40</b>	40	Magic Trim for lifting keel (1360 mm), special cylinders for locking keel, manual control system	2003
<b>FETCH IV</b>	79	Lifting keel (1160 mm), hydraulic system, manual control system, cylinders, MDA	2003
<b>DANGEROUS BUT FUN</b>	80	Canting keel (40°, 2 cylinders), easy sailing hydraulic system with Magic Trim, canard, manual control system, furlers, cylinders	2003
<b>MAGNITUDE 80</b>	80	Canting keel (50°, 2 cylinders), hydraulic system, manual control system, cylinders, pedestal pump	2003

\* Where not indicated the fin has not been supplied by Cariboni



## CRUISER AND CRUISER-RACER KEEL SYSTEMS

YACHT	SIZE ft	MAIN SYSTEMS*	YEAR
<b>KAURIS III</b>	105	<b>Canting keel</b> , (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
<b>AORI</b>	80	<b>Canting keel</b> (40°, 2 cylinders), easy sailing hydraulic system with Magic Trim, canard, manual control system, furlers, cylinders	2002
<b>ADP FINOT 52</b>	52	<b>Magic Trim for lifting keel</b> (1600 mm), Magic Trim for main sheet	2001
<b>ANYWAY</b>	64	<b>Canting keel</b> (40°, 2 cylinders), hydraulic system,	2001
<b>KRATOS</b>	60	<b>Canting keel</b> (40°, 2 cylinders), hydraulic system, canard	2001
<b>ONLY NOW</b>	104	<b>Canting keel</b> (40°, 2 cylinders)	2001
<b>TIKETITOO</b>	88	<b>Canting keel</b> (40°, 2 cylinders), easy sailing hydraulic system with Magic Trim, canard, furlers, cylinders	2001
<b>V .S. MARA</b>	88	<b>Lifting keel</b> (1900 mm), complete hydraulic system, cylinders, manual valves and pump	2001
<b>JULIA</b>	43	<b>Canting &amp; lifting keel</b> (40°, 2 cylinders), hydraulic system	2000
<b>TOMTIT</b>	55	<b>Lifting keel</b> (1105 mm), easy sailing hydraulic system, with Magic Trim and automatic jib tacking, cylinders	2000
<b>CARRERA (Wally 77.4)</b>	77	<b>Lifting keel</b> (1520 mm), easy sailing hydraulic system with Magic Trim, cylinders	1999
<b>SHINING</b>	65	<b>Magic Trim for lifting keel</b> (2250 mm), hydraulic system, cylinders	1999
<b>TIKETITAN</b>	88	<b>Canting keel</b> (40°, 2 cylinders), easy sailing hydraulic system with Magic Trim, canard, furlers, cylinders	1998
<b>JUNOPLANO</b>	60	<b>Canting keel</b> (55°, 1 cylinder)	1997

\* Where not indicated the fin has not been supplied by Cariboni







## RACER KEEL SYSTEMS

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

YACHT	SIZE ft	MAIN SYSTEMS*	YEAR
<b>MCe</b>	100	Canting keel, keel, hydraulic system, sailing cylinders	2024
<b>NAUTOR CS 80</b>	80	Canting keel, keel, hydraulic system, sailing cylinders	2022
<b>FELCI 33</b>	33	Canting keel, hydraulic system	2021
<b>NAUTOR - CS 125</b>	125	Canting keel, hydraulic system, sailing cylinders	2021
<b>MELGES 40</b>	40	Canting keel, hydraulic system - ONE DESIGN	2017
<b>INFINITI 46</b>	46	Canting keel, hydraulic system, sailing cylinders, fin	2015
<b>KNIERIM KER 56</b>	56	Canting keel, hydraulic system, sailing cylinders	2015
<b>NEW 3 - COMANCHE</b>	100	Canting keel, hydraulic system, sailing cylinders	2014
<b>NANDOR FA</b>	IMOCA 60	Canting keel, hydraulic system	2014
<b>VOR 65</b>	65	Canting keel, hydraulic system - ONE DESIGN	2013
<b>FARR 11 S</b>	34	Canting keel, sailing cylinders	2013
<b>BRENTA 33 SUPERSTAR</b>	33	Canting keel, fin, hydraulic system, sailing cylinders	2012
<b>ABU DHABI</b>	VOR 70	Canting keel, hydraulic system	2011
<b>PUMA</b>	VOR 70	Canting keel, hydraulic system	2011
<b>TELEFONICA</b>	VOR 70	Canting keel, hydraulic deck equipment	2011
<b>GROUPAMA</b>	VOR 70	Canting keel, hydraulic system, sailing cylinders	2011
<b>STRAVAGANZA</b>	42	Canting keel, fin, hydraulic system, sailing cylinders	2011
<b>CHEMINEES POUJOLAT</b>	IMOCA 60	Canting keel, deck equipment, manual hydraulic system	2011
<b>HUGO BOSS</b>	IMOCA 60	Canting keel refitting (ex Pindar), manual hydraulic system	2011
<b>GP42</b>	42	Keel fin and bulb	2009
<b>VIRBAC</b>	IMOCA 60	Canting keel cylinders	2009
<b>PRB</b>	IMOCA 60	Canting keel cylinders	2009
<b>LUNA ROSSA</b>	STP 65	Lifting keel, deck equipment	2008
<b>TH 38</b>	38	Canting keel, canting dagger board, hydraulic system	2008
<b>PUMA</b>	VOR 70	Canting keel, hydraulic system	2008
<b>ERICSSON 3</b>	VOR 70	Canting keel, hydraulic system	2008
<b>ERICSSON 4</b>	VOR 70	Canting keel, hydraulic system	2008
<b>SAFRAN</b>	IMOCA 60	Canting keel, hydraulic system	2007
<b>BEL</b>	IMOCA 60	Canting keel, hydraulic system	2007
<b>AVIVA</b>	IMOCA 60	Canting keel cylinders	2007
<b>ECOUPER</b>	IMOCA 60	Canting keel cylinders	2007
<b>PINDAR</b>	IMOCA 60	Canting keel, hydraulic system, special cylinders and components	2007
<b>WILD LADY (Wilke)</b>	49	Canting & lifting keel, fin, hydraulic system	2007-6
<b>DELTA DORE</b>	IMOCA 60	Canting keel cylinders	2006
<b>ABN AMRO ONE</b>	VOR 70	Canting keel, hydraulic system, manual control system, cylinders	2005
<b>BRASIL 1</b>	VOR 70	Canting keel, hydraulic system, manual control system, cylinders	2005
<b>ABN AMRO TWO</b>	VOR 70	Canting keel, hydraulic system, manual control system, cylinders	2005
<b>MAIDEN</b>	115	Canting & lifting keel, hydraulic system, , manual control system, special cylinders, water ballast system, front rudder	2003
<b>MARI-CHA IV</b>	140	Canting keel	2003
<b>GENUINE RISK</b>	90	Canting keel, hydraulic system, hydraulic propulsion, manual control system, cylinders, front rudder for CBTF, MDA	2003
<b>WIND</b>	OPEN 50	Canting keel	1999
<b>FILA</b>	OPEN 60	Canting keel, hydraulic system, special components	1997

\* Where not indicated the fin has not been supplied by Cariboni

## FOILING SYSTEM



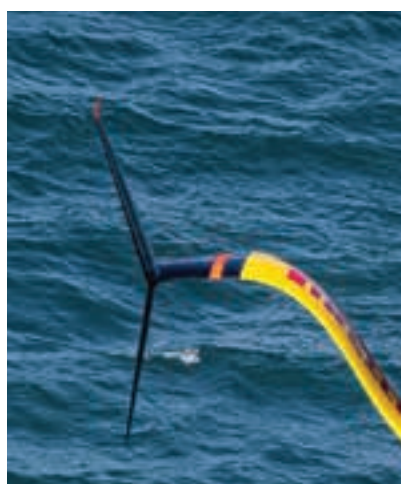
A different way of sailing, "Flying on foils". We have developed and produced different systems based on the boat specific needs. Mainly applied on racing boats, it could be also implemented on fast cruising ones. For boats from 25 foot up to..no limits!



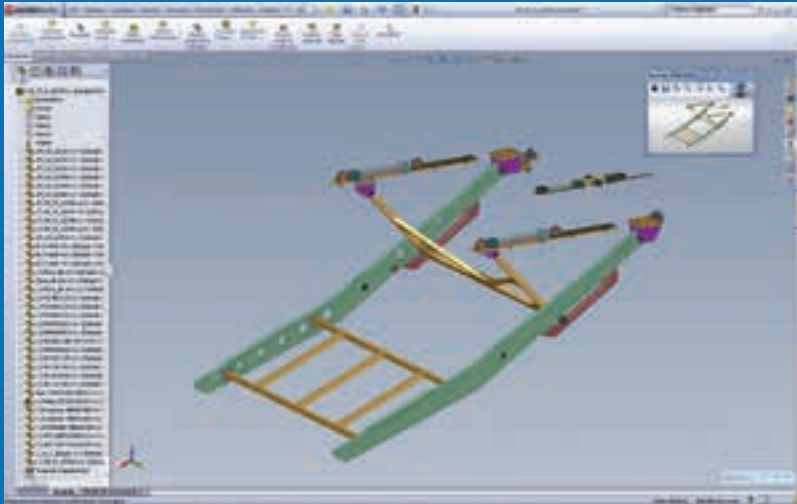


## FOILING SYSTEMS

YACHT	SIZE ft	MAIN SYSTEMS	YEAR
<b>RH410</b>	280	Foil control, hydraulic system, sailing cylinders	WIP
<b>JK RTW</b>	80	Foil control, hydraulic system, sailing cylinders	WIP
<b>BGH - HSV</b>	45	foil, foil control, propulsion system	2024
<b>AC75</b>	75	Foil control cylinders, sailing cylinders	2024
<b>LEQ12</b>	40	Foil control, hydraulic system, sailing cylinders	2023
<b>AC40</b>	40	Foil control cylinders, sailing cylinders	2023
<b>BALTIC 111</b>	111	Canting Foil cylinders	2023
<b>FLYING NIKKA</b>	60	Foil control, hydraulic system, sailing cylinders	2021
<b>KM 45</b>	45	Foils and flaps, foil control, hydraulic system, sailing cylinders	2021
<b>AC 75</b>	75	Foil control, sailing cylinders	2021
<b>TNZ 40</b>	40	Foil control, hydraulic system, sailing cylinders	2019
<b>LR 7.5</b>	25	Foil control, hydraulic system, sailing cylinders	2019
<b>AM 38</b>	38	Foil control, hydraulic system, sailing cylinders	2018



## SPECIAL PRODUCTS



The story of Cariboni counts many special systems designed for its customers. From small systems for deck equipment up to the automatic platforms for dinghy of large catamarans, we're always ready to fulfill the dreams of our customers.

*A custom arrangement to manually lift  
the propeller shaft.  
The system weights only 2,4 kg!*



## ANCHOR STOWING

Cariboni knows the importance of lightness on marine equipment. They have been developed, for cruising yachts, various lightweight anchor stowing motors.

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

The body is made of lightweight hard coated aluminium, gears are made 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 of need to turn around the headstay, an additional feature can be added on the motor.

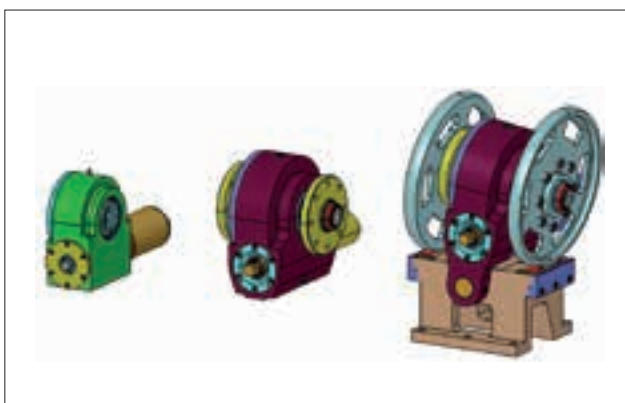


Anchor stowing motor

MODEL	Maximum moment	Dimensions		Weight		Working pressure		Flow required <sup>(1)</sup>
	Nm	mm	in	kg	lb	bar	psi	lpm
<b>AAS 800</b>	800	350 x 220 x 206	13,8 x 8,7 x 8,1	16	35,3	140	2000	3
<b>AAS 1300</b>	1300	377 x 260 x 246	14,8 x 10,2 x 9,7	25	55,1	140	2000	3
<b>AAS 3000</b>	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

(2) 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



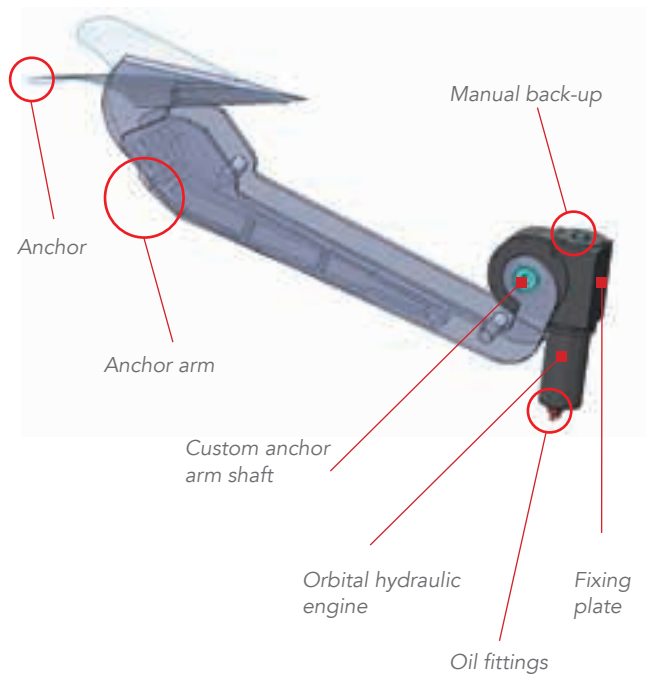
AAS 800



**ANCHOR STOWING SYSTEM KIT**



AAS 800 fitted powerboat



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



1



2



3



4

- 1 - Compact powerpack, with valves and integrated oil reservoir.
- 2 - PLC system to control the powerpack and limit switches to self controlled the system.
- 3 - CL16 double acting cylinder to open/close the hatch anchor
- 4 - AAS\_800 hydraulic anchor stowing system

**ANCHOR STOWING SYSTEM KIT**



## RETRACTABLE TABLE

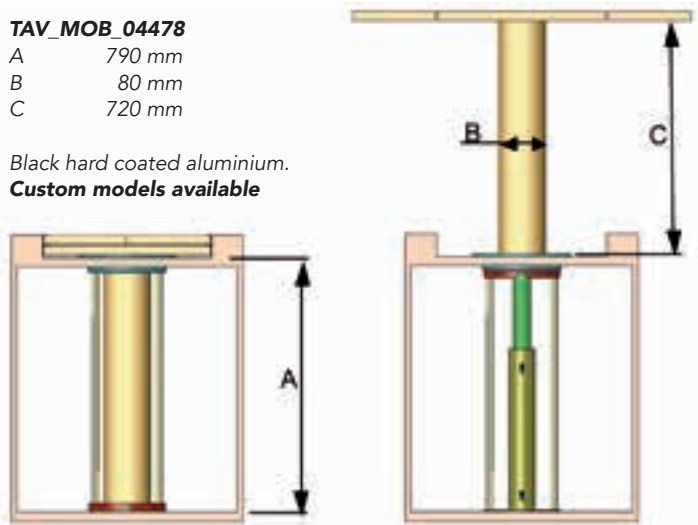
The retractable table has a telescopic hydraulic cylinder. It is required a minimum of space, but it guarantees an high stability in the open position.



**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 full comfortable and large table at rest just pushing a button.*



## THRUSTER AND HYDRAULIC ROTATING PROPULSION

Cariboni designed for Wally a new manoeuvring 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 manoeuvring. This system has been featured for the first time by Wally 105' "Nariida".

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



*Nariida in action*



*The rotating propulsion*

## LIFTING PROPULSION

### 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

**OTHER SPECIAL PRODUCTS...**

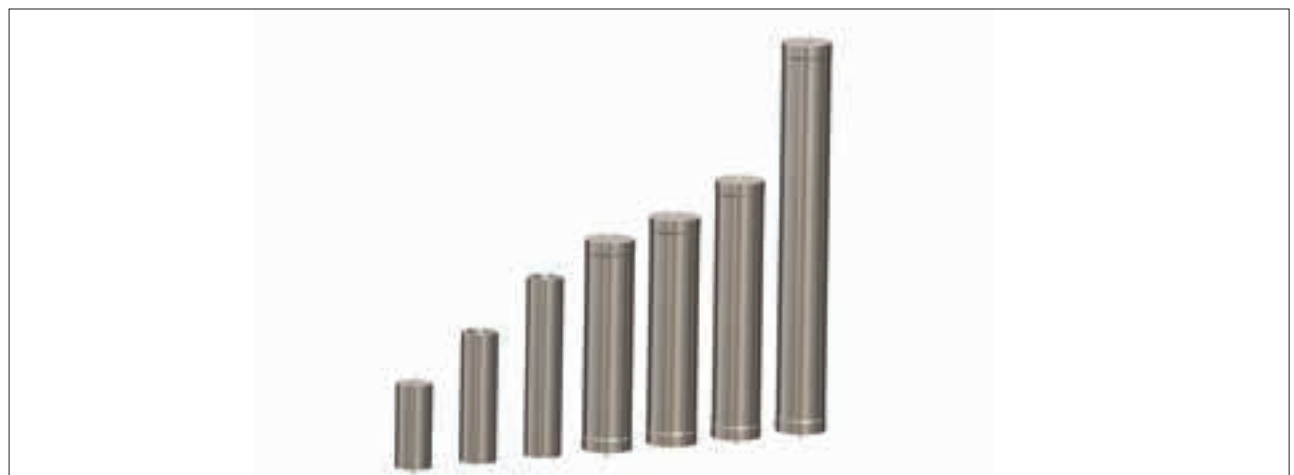
**CUSTOM SERVICE UNITS FOR PTO GENERATORS OR DIESEL ENGINE**

Cariboni designs and machinery custom PTO arrangements with clutch, rubber joint and hydraulic pump. Small dimensions, reliability and lightweight are guarantee.



**PISTON ACCUMULATORS**

Accumulator	Volume	Max pressure	Dimensions	Weight
	<i>L</i>	<i>bar</i>	<i>mm</i>	<i>kg</i>
<b>ACC A 075</b>	0.75	350	Ø98 x 228	4,3
<b>ACC A 125</b>	1.25	600	Ø99 x 351	5,9
<b>ACC A 200</b>	2	600	Ø99 x 483	6,9
<b>ACC A 450</b>	4,5	350	Ø134 x 571	10,3
<b>ACC A 500</b>	5	350	Ø136 x 615	11,9
<b>ACC A 600</b>	6	350	Ø132 x 698	10,5
<b>ACC A 1000</b>	10	350	Ø134 x 1057	15,6





**OTHER SPECIAL PRODUCTS...**

**JAMMER**



Jammer	Max Load <i>Kg</i>	Max pressure <i>bar</i>	Rope Diameter <i>mm</i>	Dimensions <i>mm</i>	Deck thickness <i>mm</i>	Weight <i>kg</i>
<b>JWM 014</b>	3500	500	14	57 x 67 x 180	45 - 48	2,3

**CUSTOM TRANSOM DOOR SYSTEMS**



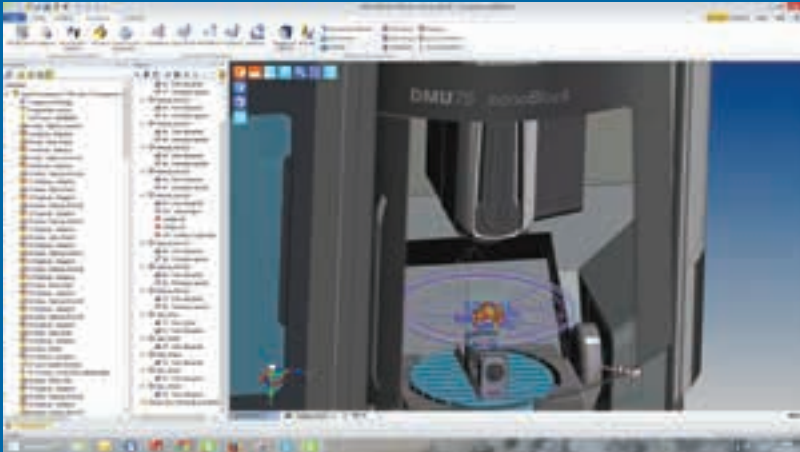
**LIGHTWEIGHT ALUMINIUM CAPTIVE WINCH**



**HEAT EXCHANGER WITH TITANIUM PLATES**



## DESIGN & CNC



*Design office*



*Cariboni's meeting room  
You are always welcome!*



*DMU 90 P duoBLOCK – Five axis simultaneous machining with 900mm X-axis, 1050mm Y-axis, 850 z-axis. 15.000rpm speedMASTER spindle and a tool magazine with 60 positions.*

*DMU 75 - Five-axis simultaneous machining with 750mm X-axis traverse (75:750mm), 20.000 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 0,25mm max taper angle 30°/56mm*



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



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



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



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



The "Tiger - TLM 4" CNC milling machine is the biggest machine of the firm. The birotating 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 the biggest parts for the custom arrangements.



The "Zanoletti" medium size 5 axes CNC lathe. Small and medium size cylinder parts are machined out 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 700mm. Big Magic Trim tube, rods and big cylinders components are made by this machine.



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



The "Tiger" CNC milling machine is one of the most reliable machine of the firm. The "Momac" lathe machine is used to produce small-medium pieces up to 400 x 1000 mm. Pins, small cylinder pistons and parts of manual components are machined out 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 as pump, valves and other small parts. It is a 5 axes mill with a working space of 710x500x500 mm.



The chain sawing cuts every size of pieces (aluminum, steel and titanium).



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



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



*Assembly and testing area*



*Engine testing room*



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



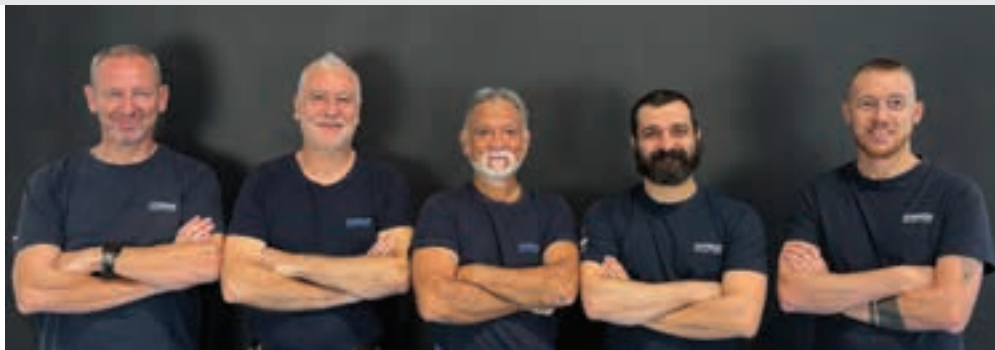
*Kardex. Automatic warehouses. Seals, parts and tested products are all stored here managed by a software.*



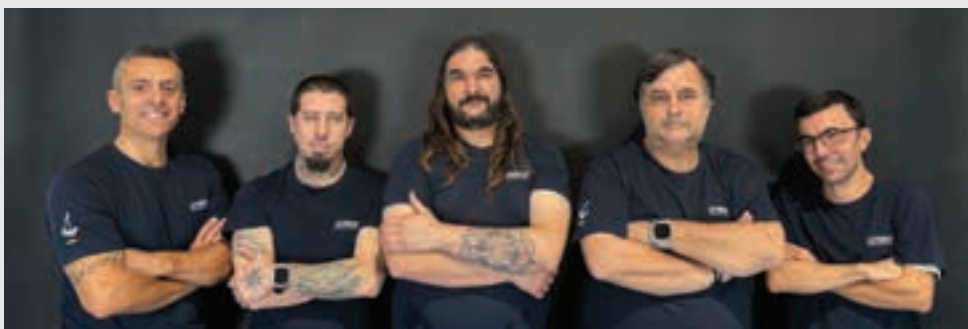
*Paolo, Daniele, Fabrizio and Alessandro*



*Claudio, Jacopo  
Sara, Pierluca  
and Marco*



*Dino, Marco,  
Gianni, Massimo  
and Maurizio*



*Domenico, Marco, Andrea,  
Andrea and Gianluca*



*Stefano, Massimo,  
Alessandro, Matteo and  
Ambrogio*



*Simone, Lara, Attilio and Sara*



*Giorgio, Nello and Ivano*



Gianni



Mary



Yoda 



Paola



Marco

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