

SETTING A NEW COURSE



Speedboat, 100' Juan Yacht Design, Cooksons Boats Ltd. — Gretchen Thor photo



HYDRAULICS MANAGER
ROBBIE YOUNG TALKS
ABOUT OUR ALL-NEW
HYDRAULICS PRODUCT LINE

Editors Note: Hydraulic-powered systems are becoming more and more popular on smaller cruising boats, all the way up to the Megayachts. With hydraulic power, you can run winches, furlers, anchor windlasses, bow thrusters, cylinders—basically any function on the boat, even the drive system. It was this increased demand that led us to develop a line of production hydraulic products.

Why Stick with the Status Quo

When developing products you can improve a design you already have, buy a company with existing tooling, or start fresh. We chose to start fresh. And because we could go in any direction we wanted, our only parameters were that loads, pressures, and lengths had to fit within sailboat industry standards. We thought, why stick with the status quo, let's go with something new and innovative to make our product stand above the rest on the market. In the standard Harken way, we took on the hardest jobs first because when we

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Hydraulics Manager

figured out how to do those, it would be easy to do the rest of the product line. We designed custom titanium cylinders for the +39 Challenge (2007 America's Cup) and a powered system for a 52 m Sparkman & Stephens in Turkey. This led directly into a range of cylinders: stainless steel, 6000 series aluminum, and 7000 series aluminum. These materials have different properties for different applications.



Materials Match Lifestyles

The housings come in different materials to suit the sailor's needs. A cruiser might say, I want a lightweight cylinder that lasts for a long time in salt water. In that case we use Hardkote-anodized 6061 aluminum. If they want a classic look, we use the same cylinder design, but change the material to corrosion-resistant 316 stainless steel bodies with the same mirror-polished finish as the winches.

A Grand Prix racer thinks differently: I want a lightweight cylinder than can handle very high pressure. 7000 series aluminum has nearly twice the strength of 6061 so we can make the walls thinner to save weight, reduce size, and still handle high loads. On Grand Prix sailboats, crew use 7075 aluminum cylinders knowing they have only a 2-year life

span in salt water. We won't sell a 7075 cylinder to a non- Grand Prix race boat. It's like selling a Formula 1 chassis to a person who's going to be driving down the bumpy roads of rural Wisconsin. You don't do it. It just won't last.

Titanium is also a favorite cylinder material for Grand Prix racers. It's the strongest and is corrosion resistant, but some class rules don't allow it.

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— Robbie Young
Hydraulics Manager

Full Range Of Cylinders

We designed cylinders for mast, sail, and keel controls that fit everything from cruiser/racers (35-40 ft, 9-12 m), up to your megayachts and Grand Prix Maxi

boats. We researched pistons, seal materials, seal types, and applications, and chose bronze-filled Teflon® piston seals and graphite-filled Teflon® rod seals that are extremely low friction and more durable than polyurethane seals. We ended up with a stronger, lighter, more modern cylinder for the same length.

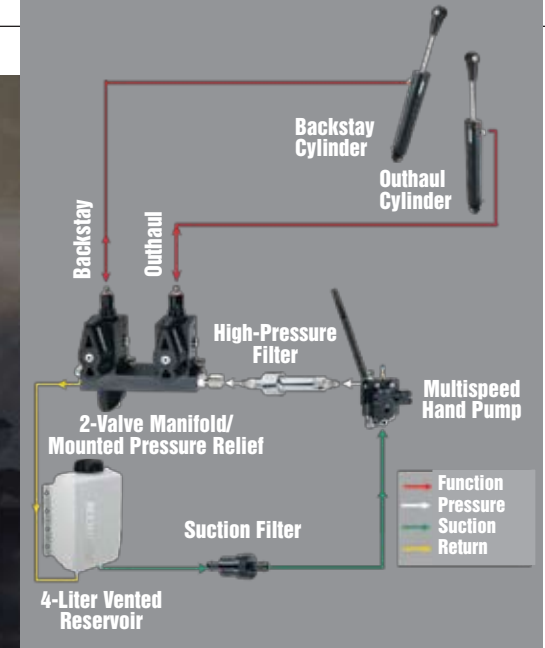
Cylinders include a standard clevis jaw on both ends, but can also be fitted with blocks and different eye types. Single-acting cylinders have hydraulic oil at one end and air at the other (like those used in car hatchbacks). Grand Prix cylinders come in single-acting or in double-acting designs with oil at the ends.

We have a full range of vang cylinders: standard rigid, double-acting, and are working on position indicators to tell you how far the vang extends. It's similar to technology used in the hydraulic crane world.



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Nazenin V — Mark Lloyd photo



Our HydroTrim line of cylinders is used to trim mainsheets, jib sheets, or whatever function you want. As the cylinder extends, it pulls in a multiplying amount of sheet in 1:4 or 1:6 reverse purchases. These cylinders are used on cruising boats and are available in 11 sizes.

Valves

The big question was, how do we make a good mousetrap even better? We discussed what we did and didn't like, and came up with some innovative ideas. We eliminated the large coil springs—the majority of the weight. We feel hydraulic systems should have a safety feature because in extreme conditions, you can't tell how much pressure is in the system. We built pressure release into every valve, with flow controls to adjust the speed of release. We combined pressure relief and release into one part—a patented feature. We also have dump valves for systems to quickly release pressure.



Handles

Valve handles are molded nylon-filled, long-glass fiber like our Carbo blocks. They're contoured so sheets and lines won't wrap around the edges and your hands won't slip. Handles mount in any direction so they can be uniform throughout the boat.

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Pumps

Currently, other companies have 2-speed hydraulic pumps. You push hard in first gear, then there's a shift, and it seems like you're pumping forever to get something to happen in second gear. The reason is, there's a big difference in the volume of oil between first and second gear. We decided to add a third speed to push more oil, faster and more efficiently through the system. The pump has preset points that automatically shift to the next speed. Shift points can be adjusted.

“We're using many off-the-shelf components. Spares for a cruising boat traveling around the world become minimal because these parts are available anywhere they go.”

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Power Packs

We have small power units that perform from 1 to 13 functions. For the larger units like those we developed for *Nazenin V*, where we're using computers and PLC's (Programmable Logic Controller), it gets a bit more involved. We've partnered with hydraulic innovators to bring technology from a variety of industries.

Off-The-Shelf

We're using many off-the-shelf components. For example, some of the O-rings and seals in our hydraulics can be bought anywhere on the planet. Spares for a cruising boat traveling around the world become minimal because these parts are available anywhere they go.

