

# Radial®

# REVOLUTION



HARKEN ITALY'S TECHNICAL DIRECTOR ANDREA MERELLO TELLS THE INSIDE STORY BEHIND THE DEVELOPMENT OF RADIAL® WINCHES

**Editor's Note:** Harken entered the winch business in 1987, adapting original Barbarossa designs for Harken's standard line and adding a pure Grand Prix racing line. Grand Prix racers have always demanded constant innovation, but most sailors just wanted solid, efficient winches that would last for 30 years. Now sailors and boatbuilders want all that and more—faster installations, easier maintenance, and simpler upgrades.

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— Andrea Merello  
Technical Director

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### **A Blank Sheet of Paper**

Radial® winches were designed from the deck up with three key ideas in mind: safety and long-lasting performance, streamlined installations, and hydraulic and electric upgrades as integral parts of the design rather than afterthoughts. We started from a blank sheet of paper, addressing the needs of specific types of sailors. For example, racers mainly want the

most power for the lightest weight. A cruiser with a child on the other hand asks, “Wait a minute, if my kid puts hands on the winch while the electric power is turning it ...” They are more concerned with safety.

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INNOVATIVE SAILING SOLUTIONS



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### What Lean Manufacturing Means For You

By Adriano Rubinaccio  
Production Director

When we started talking about this project our aim was to use it as an opportunity to dramatically improve not just the product, but also the process. We wanted to actually change the company's manufacturing culture so we could increase production speed and eliminate waste while maintaining—even improving—the level of quality. We adopted "lean manufacturing" principles to increase speed and implemented a very simple "zero defect" approach. No defective components or products are allowed to move to the next step in the process. Any worker can stop a product moving through the process if a problem appears, and every worker is directly responsible for customer satisfaction.

### Winch #001

Product tracking is one benefit of the new process. Every molded component has a batch number, allowing for much tighter quality control. In addition, each finished product has a serial number (#001 is already in the museum). Customers calling in for support benefit directly because we can access very specific information on that customer's winch.

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Production Director

### New Product, New Process

No winch line has ever been designed with yacht builders in mind. No one asked, "What can we do to help boatbuilders who assemble in bigger quantities?" That's because if you went to a boatbuilding yard 10 years ago, they weren't using the highly efficient "lean" assembly systems used in automotive companies. These days, there's a bigger focus on the time required to install a winch, the weight and ease-of-handling from a worker's point of view, and the complexity of the assembly process.

### Grip with a Twist

The grip is one of the most critical areas of a winch. With a high-friction drum there will be more line wear, so designers must balance the need for controlled easing with line longevity. We also have to consider that the winch is interfacing with a product we don't make—we needed to find a grip that performed as well with high-tech line as with older cordage. So while we were happy with the sandblasting and knurling we had before, we wanted to find out if there was more we could do.

The new grip is very different from other winches with grooves or ribs. Other winches tend to push the line wraps up when easing. The Radial<sup>®</sup> grip works more like a screw, driving the wraps down when easing to keep them on the part of the drum where you have the best control.

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### Winch Abuse

Each size of each winch had to pass a minimum of 13 tests covering things such as wet and dry line grip, pulling power versus number of wraps, stress deformation, ease of servicing, and safety. The most grueling test was the endurance test, where our parameter was to have little to no wear after thousands of nonstop pulls at the Maximum Working Load.

### Combating Corrosion

Extensive testing helped us determine weak points for corrosion, where we needed to either replace or strengthen the materials we were using. We even removed the drum and lubrication for certain tests to see how well the internal components resisted corrosion from saltwater spray. The results of these tests are why we're using more stainless and one of several reasons we use composites in Radials<sup>®</sup>. For example, the extremely strong "metal replacement" material we use in the roller bearings is completely nonreactive to saltwater and most chemicals, has very good wear and abrasion resistance under tremendous loads, doesn't require lubrication, and doesn't gall or seize. Its low friction and hardness properties make it ideal for high-efficiency bearing systems.

### The Future

"No comments! No comments!" I can't go into details of course, but I can say we designed the Radial<sup>®</sup> to be flexible and may add more options for end customers. Beyond the Radial<sup>®</sup>, we're working on some totally new ideas at Harken for needs that aren't addressed by current winches. The prototypes haven't completed testing yet, but keep an eye out in the upcoming months.



**Complete Radial<sup>®</sup> Line:** aluminum and chrome; plain-top and self-tailing; electric and hydraulic; UniPower; Quattro

# Radial® Winches



## POWERFUL, EFFICIENT, DEPENDABLE

We have reached a new level of performance with the introduction of our Radial® Winch line. Details you'll like include reduced wear on the line: the gripping surfaces of Radial® Winches are shaped and do not depend on friction to hold the line. Also, we've completely covered the winch tops so fingers and clothing don't get caught in moving parts. Seasonal maintenance is now exceptionally easy—the top lifts out as a single unit, making reassembly quick and mistake-free.

## DETAILS MAKE THE DIFFERENCE

### MULTIPLE STYLES AND FINISHES

Radial® winches are available in aluminum alloy and chrome. Choices include 1-, 2-, and 3-speed self-tailing or plain-top styles; and manual, electric or hydraulic drives.

### INTEGRATED STRIPPER ARM

The strong, one-piece stripper arm completely covers the winch top for a stable platform that prevents fingers and clothing from catching in moving parts—an important safety feature, particularly when operating powered winches. The arm can be adjusted to multiple positions after the winch is mounted, and is shaped to smoothly feed line into and out of the self-tailing jaws.

### LIGHTWEIGHT, HIGH-STRENGTH MATERIALS

Composite roller bearings and bushings reduce friction under load, have excellent corrosion resistance, and don't require lubrication.

Snap-fit design keeps bearings captive in high-strength Delrin® cage when drum is removed for maintenance.

Load-carrying gears and pins are 17-4PH stainless steel for strength and durability.

Weight savings of 25 to 50 percent compared to the Classic Harken line.

### EASY TO SERVICE AND MAINTAIN

Winches can be disassembled and serviced on deck. The socket, washer, and screw-top snap-fit together to simplify maintenance and for mistake-free assembly.



### 1. Power-Grip Jaws

Composite self-tailing jaws of long-glass fiber are shaped for easy line entry and optimum gripping power.

The spring-loaded upper jaw adjusts under line pressure to accept a variety of line sizes. Teeth grip evenly with or without load.

### 2. Radial® Shaped Surface Grip

The drum's gripping surface is shaped for each winch size and drum material and features diagonal ribs (rather than textured abrasive materials) to maximize gripping power and greatly reduce line wear. When easing, the angle of the ribs stops line from rising, preventing overrides and providing a smooth controlled release as the line exits the winch.

### 3. Quick Installation

Patent-pending stud-bolt mounting system allows one person to quickly install a winch without removing the drum.

- Snap off the skirt at the base of the winch.
- Slide bolts through the slots in the winch base and snap the plastic skirt back on.
- Place the stud bolts into the predrilled holes on the deck and tighten from belowdeck.

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