

The New High Ground

The Sherwood Encore Dive Computer

Most large companies in the diving industry sell dive computers (DCs) these days; it's considered de rigeur to have at least one model in the product catalog, perhaps to demonstrate that high-tech manufacturing is within their reach. However, only a few manufacturers are capable of integrating decompression-modeling software, electronic hardware, and watertight cases.

That's why USD, Dacor, and Oceanic, traditionally competitors, now sell some DCs made by the same manufacturer (Pelagic Pressure Systems), and why the Beuchat Aladin Pro, the Parkway Legend, and the USD Monitor II display identical information and run identical dive profiles (Uwatec, in Switzerland, makes them all with essentially the same electronics).

Sherwood Scuba has experimented in recent years with various DC manufacturers, including Orca, Pelagic, and Cochran, but has now settled on a purposely unnamed Japanese firm to build the Encore.

It's unfortunate that Sherwood isn't publicizing its DC supplier's name, whose reputation for reliable, high-quality products revolutionized the wristwatch industry (oops, almost blew it), but that's not our call. The partnership between Sherwood and its manufacturer is likely to put a lot of pressure on the dive computer industry in general by raising "zero defects" to an attainable goal, which is just where it should be for underwater life-support equipment.

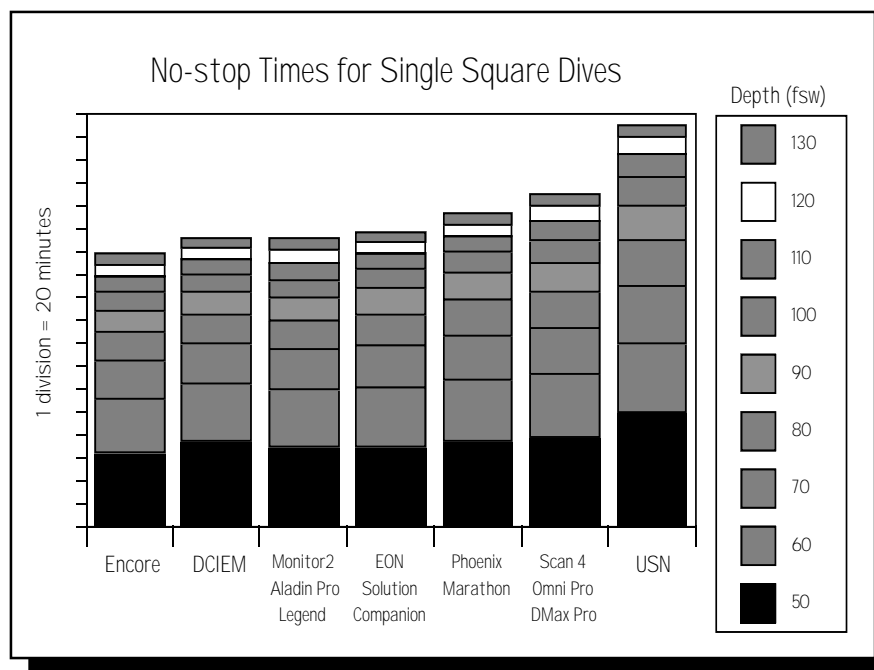
Notwithstanding all the debate about which DC has the "right" decompression algorithm or

model — or whether any of them do — DCs have suffered through more than a decade of serious mechanical and electronic failures. We've experienced unpredictable battery burnouts, screens that lost portions of their displays, calculation errors such as "clearing" residual nitrogen between dives, and other hazardous events. Japanese precision manufacturing seems to be about the most consistent on the planet, especially for consumer electronics. In this review, our West Coast editor takes the latest Sherwood-branded DC, the Encore, to Bonaire for a shakeout.

I've been edging farther and farther away from rating any dive computer based on the decompression profiles it allows. In the early days, DCs were compared to the US Navy

tables; DCs that allowed less time were considered conservative, and vice versa. However, given the multiplicity of decompression models out there (USN, DCIEM, BSAC, PADI/DSAT, Huggins, Bassett, Bühlmann, etc.) as well as a slew of computer-tuned variants on virtually every model, there are no accepted standards. Still, some computers definitely offer less no-stop time than others, especially on square (single-depth) profiles.

With this in mind, examine the figure below, which presents no-stop times for single square dives for several DCs that *In Depth* has reviewed. The total height of each stack shows where each instrument lies on a liberal-to-conservative scale. A tall stack indicates, on the



average, more time available at various depths; a short stack indicates the opposite. For comparison, USN and DCIEM tabled times are also shown.

Despite a search that is nearly a century old, nobody has found the ultimate set of equations for sport divers: maximum time underwater, and a zero chance of getting bent. The best you can do is to compare the various times allowed by the models, then try to guess where you might be on the imaginary scale between highly bendable and highly resistant to bends.

For those of you who don't mind trading some dive time for a sense of security, DCs toward the left end of the graph may be appropriate. Deep diving is always a trade-off between greed and paranoia, isn't it? Using our method of stacking no-stop times, the Encore is the sixth most conservative DC we've ever tested. Only the Scubapro DC-11, the Tekna Computek and MC36, and the Dacor MicroBrain and MicroBrain Pro Plus have been more conservative, and none of those is a current product. For no-stop single square dives — and probably for most multi-level dives — the Encore is probably the most conservative DC you can buy, excepting obsolete DCs. Note that there's no reason you can't dive any other DC in just as conservative a fashion by leaving yourself some safety margin (an excellent idea).

It's impossible to tell from the owner's manual exactly what theoretical decompression model the Encore runs. The manual says that Encore uses "Spencer's M-values-halftimes," which presumably means that some of Spencer's silent bubble work was incorporated. Halftimes seem to be between 5 and

354 minutes. The manual also alludes to algorithms "developed by Mr. C. Randy Bohrer and based on research of Dr. A. A. Bühlmann," but Bühlmann did lots of research, and there's no indication of how the algorithms were modified by Mr. Bohrer.

Field Tests

I dived the Encore for 4 days on Bonaire on a variety of multilevel single and repetitive dives. The water was in the high 70s. I ignored all the owner's manual warnings about

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care. I beat and kicked the Encore around, left it in the blazing sun for hours, and didn't wash it at all. Depths ranged to 182 feet, and as you might suspect, a number of dives had stop-required profiles. Even though I occasionally saw a ceiling as deep as 30 feet, I didn't linger beyond that point because stops deeper than 40 feet put the Encore out of range and shut it down for 24 hours.

The Encore worked perfectly on every dive. I'll highlight a few things I really liked, and a few that I didn't.

Wrist Stack

The Encore is about the same size as most other puck-

shaped diving instruments, a bit less than 2½ inches (6 cm) in diameter and ¾ inch (2 cm) thick. However, the stack-like wrist-mount boot is far too tall, increasing the height of the unit to almost 2 inches. It got in my way constantly when I reached into my pockets, used my camera, etc. The rubber strap on the wrist mount was also clunky. If you buy an Encore, get the console mount, or find another way to carry it safely.

No Prying

The Encore's case seems very sturdy. It's water activated via electrical contacts on the face — no mechanical switches to wear out or flood. There aren't any user-serviceable O-rings, and the case back is fastened down with little Torx screws that can't be opened with ordinary screwdrivers (if you try to get in, you'll kill the 2-year warranty). A sealed case exchanges reliability for ease of service. It's unlikely to leak, and if it does, you can't be blamed — unless you pried it open.

Although you can't change the battery yourself, it should survive between annual service intervals. The owner's manual states that the battery is rated at 900 days or 1,000 hours of continuous use. An engineer from Sherwood elaborated on this description. The battery life indicator works something like a clock. The clock starts with 900 clicks. Each day and each dive subtracts one click; three dives in one day would remove four clicks. At this rate, battery life should be 2 years for the average sport diver doing 100 dives a year. However, the display on my loaner, dived for only 4 days and less than a year old, indicates that ⅓ of its battery life is gone. Maybe my loaner sat around on

the shelf for a while, though it came in a new box.

Going Up!

The Encore has a variable ascent rate. In water less than 30 feet deep, you're supposed to ascend at less than 30 feet per minute; the rate increases in two steps to 60 fpm below 60 feet. This is very helpful to those of us who like deep diving. Most single-rate DCs use a maximum rate of 30 fpm to ensure a slow final ascent. Everybody agrees that a slow final ascent is a good idea, but coming up from the depths at 30 fpm seems to take forever. My concern isn't the time en route, it's the fact that for a lot of the ascent I'm still in deep water and taking on even more nitrogen, even though I'm headed up.

Let's 'fess up here. If you're like me, you've occasionally stayed longer on bottom than you expected ("Gotta finish my roll!"), and have discovered that you didn't have all that much air left when you started back up. If you don't have a lot of extra air in deep water, you're obviously going to hurry back into the shallows. At a minimum, you'll make your DC scream for mercy, and maybe even rat on you when you get back to the boat. Perhaps that's what ought to happen, but with a variable ascent rate, you can feel better about jamming back up to 20 feet where you can milk your last few hundred pounds for long enough to feel safe again.

Gangway, It's Lunchtime!

This is the first DC that incorporates a wristwatch-style date and time display, inadvertently revealing its manufacturing origins. In my opinion, every dive computer should show date and time. "Why?"

you ask. "I wear a backup depth gauge and timepiece, as my DC manual advises." Bogus, sez I. A backup depth gauge is practically worthless as a recovery device after a DC failure on any long multilevel dive, even if you can remember tabled times and depths. The only thing it's good for is to stay at some predetermined — or arbitrarily selected — decompression stop depth until you feel you have cheated the chamber and can come up. If that's all you need, your buddy can always show you his/her DC's depth gauge. Nearly everyone I dive with carries two DCs, anyway. Trips are getting pretty expensive, and a backup depth gauge and watch won't get you back in the water that day after a DC failure.

How about the watch? Now, there's something useful. Dive logbooks always have an entry for "time in" and "time out," right? Rather than force you to try to remember when you wrapped up your first dive in yesterday's four-dive sequence, the Encore shows you all you need to log in when queried. It will also let you know when it's time for lunch, a vital function on my dive trips.

Now That I'm Here, When Can I Dive?

Because it can calculate diving profiles up to 10,000 feet (3,000 m) above sea level, the Encore might be a good choice for you Rocky Mountain divers. The Encore will, when initialized, sense its own altitude and back off on sea-level times accordingly. Like the Uwatec and Suunto instruments, it divides altitudes into a few chunks and calculates times for the highest altitude in the chunk. This zone method is relatively insensitive to minor pressure variations and differ-

ences in transducers, making it simpler and more robust than trying to calculate profiles for an exact altitude. It also adds a safety factor if you're below the maximum altitude for the zone.

Unfortunately, the owner's manual doesn't address several critical issues in high-altitude diving, such as altitude changes before and after a dive, and in particular, acclimating to altitude. What if you've just arrived at a mountain lake in a quick drive up from sea level? Depending on how a DC does its math, you may be able to use its times to jump in right away, or you may need to wait a few hours or even a day to equilibrate to ambient pressure. Does the Encore assume you've got sea-level nitrogen pressures? What if you have to drive over a high pass after your dive? How long do you wait?

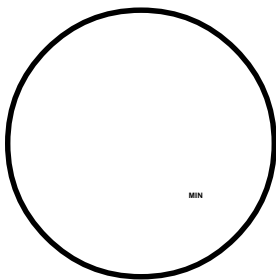
The lack of instructions for use at high altitude is a serious failing in an otherwise clear, nuts-and-bolts manual. There's another obvious hole related to high altitudes, too: the manual says nothing about flying after diving. I guess you're supposed to wait until the Encore goes entirely clear, but that's not stated anywhere.

Eat Bifocals, Ageist Pig!

Am I the only diver around who wears reading glasses? Or are all other divers younger than 40 years? I don't think so. . . . The sadistic designers of the Encore's display must have stock in companies that manufacture corrective lenses. Although nearly all of the information you could possibly want from a dive computer — except an ascent indicator — is there, you'd better have perfect close-up vision, or an excellent memory when buzzed out at depth, if you hope to decipher the display.

When underwater in no-stop mode, you're typically faced by a bar graph that shows nitrogen loading, and four numbers: depth, elapsed time, max depth, and no-stop limit. The numbers themselves are big enough, but the labels on the numbers give a whole new meaning to the word "tiny." I was scarcely able to read some of them. They didn't look all that bad when the Encore was sitting on my desk, but on the bottom it was a different story. For instance, no-stop time and elapsed time are denoted by faint lettering spelling MIN (for minutes) about 1/32 inch (0.8 mm) high.

I know, I know — all you fighter pilots are thinking, "Quit your whining and get contacts," but I'm not listening. My glasses are +1.75 diopters — hardly bottle-bottoms — and there's no excuse for providing *any* information on a diving instrument in microscopic type. If it's worth putting on the display, it should be readable. Could you read this through a foggy mask?



If not, welcome to the club. Unless your reading vision is perfect, you'll want to memorize the positions and meanings of all of the elements on the screen so you don't have to depend on reading their tiny labels in poor lighting.

Lots of Yellow Means Red, Right?

Warnings for fast ascents and stops required are not only too

small, but also counterintuitive, in my opinion. When you ascend too fast, what would you normally expect to see on a display? A blinking UP arrow? A triangle with an exclamation point in it? A SLOW message? Guess again. The Encore's depth readout just blinks. That's it! Calling attention to a rapidly changing depth display

The bar graph should be shouting a warning, not just resting in a maxed-out caution zone. Every trekkie knows that the next step after a yellow alert is a red alert.

is better than nothing, but you'd better remember what you read in the manual.

In stop-required mode, a DEC and an arrow only about 1/16 inch high (1.5 mm) light up, and all elements of the bar graph are filled. A fifth number appears showing ceiling depth, but there is nothing to indicate what it actually means, other than the same label (FT) given to the display of present depth. Furthermore, the bar graph itself is weirdly labeled. It has only two color-coded zones: a green NO DEC zone and a yellow CAUT(ion) zone. It does not have the appropriate red DEC section, though every trekkie knows that the obvious next step after a yellow alert is a red alert. The bar graph should be shouting a warning, not just resting in a maxed-out caution zone.

The Bottom Line

The Encore is a solid, well-constructed instrument that is likely to redefine the term "reliable" for the dive computer industry. Its decompression algorithms are conservative but not extreme compared to all current competitors. Its no-stop times are, in general, a few minutes shorter than those offered by most other dive computers for multilevel dives. Its variable ascent rate makes it easy to ascend fairly rapidly from deep water, a welcome feature from the standpoint of air supply. The presence of a real-time clock makes accurate dive logging easier than with any other DC on the market. Its capabilities for high-altitude diving and fairly extensive stop-required diving make it one of the most versatile instruments on the market.

Given Sherwood's reputation for customer service, the Encore will probably be easy to maintain in the years to come. However, full-time divers in remote locations would do well to confirm the availability of factory-authorized battery changes; the battery is not user-serviceable and probably has enough juice to last through only a year of every-day, all-day diving.

I found that the Encore's positive features were overshadowed by the most irritating display since the original Dacor MicroBrain. This is, of course, a matter of opinion; if you don't agree with me, feel free to write to me *c/o In Depth*. Please print clearly, using large, well-formed letters.

Suggested retail for the Encore capsule (without a console) is \$390.

