Introduction
The Club Series is a new line of advanced winches, designed with 3D design technology and produced with precise laser cut and CNC machined parts to ensure quality. The Club Series originates from the Dutch Hydrostart glider winch (www.hydrostart.nl) where we proved our technology in over 40.000 launches. The Hydrowinch club series are available in 2 versions:

- Club 500 - unlimited performance for a takeoff weight up to 1400 lbs.
- Club 750 - unlimited performance for a takeoff weight up to 2100 lbs.

For more detailed specifications we refer to our technical data sheet

Hydrowinch LLC is the first glider winch manufacturer to use hydrostatic power. For several decades the glider world has been using torque converters (automatic transmissions) to drive their winches. While developing our winch concept we didn't just follow the masses, but asked ourselves the question: What is the best solution to achieve our goals to provide:

- Maximum safety, ease of use
- Reliability, high availability rate
- Economics, low operational and maintenance costs
- Performance, a good alternative for aerotow

Computer aided launch control

It's our goal to make winch launching as safe as possible. Hydrowinch spent 11 years of development in a Computer Aided Launch Control (CALC) system to assist the winch driver. The system has been tested for 7 years on the Hydrostart winch in the Netherlands.

CALC minimizes winch driver errors, maintains a consistent high launch quality and virtually eliminates the possibility of rope breaks and weak link failures.

Minimal experience is needed by the winch operator, maximizing training efficiency while cutting training costs and ensuring superior launches. As rope lengths increase to give higher launches, CALC becomes more necessary. It's simply more difficult to judge speeds at greater distances, so the tension control of CALC is key to safe, consistent launches.

CALC monitors the engine and hydraulic system. The winch driver can fully concentrate on the glider through the entire launch while being assured that the winch is performing in an optimal manner. If a problem occurs, a message is displayed on the graphical touch display.

The winch is controlled by a single stick. Separate control levers for brakes are not necessary. For situations where an immediate response is required, the stick is simply pulled back to idle and the hydraulics stop the drum in a fraction of a second. When a problem occurs, the rapid and intuitive control can make the difference on the other end. The hydraulic system is capable to stop the drum within a second.

CALC assists the winch driver to provide a powerful and smooth acceleration to the glider. By incorporating tension control, the pilot controls airspeed in an intuitive manner: pull back on the stick to slow down and push forward to speed up (unlike traditional winches with torque converters where pilot actions are counterintuitive). Tension control also enables the pilot to use thermals to his advantage.

CALC is programmed into a PLC (programmable logical computer). Launch characteristics are parametrical: Acceleration rate, rotation rate and climb angle can be configured by the customer. Service data, launch information and configuration settings are easily accessible through the PLC touch display.

The electrical system is very simple. A single wire J1939 CAN bus system has reduced the total number to 4 wires. CALC even self analyzes and reports problems to the winch driver to minimize potential down time!

Operational cost
Cost of ownership is another priority at Hydrowinch. Total operational costs are reduced by our advanced drum design that effectively reduces cable wear. No mechanical brakes, clutches, gears or other mechanical drive parts are used, which equates to lower maintenance costs. Our hydrostatic drive system yields a 92% efficiency, much higher than traditional torque converters. That is why we can offer greater fuel economy and lower emissions.

Industrial quality
Durability and ease of maintenance are designed into our Club Series. While torque converters on older generation winches, due to their inherent poor efficiency, tend to overheat during long launches, our hydrostatic drive system is designed to provide consistent SAFE launches. The engine, hydraulics and electronics are standard industrial components that are proven in heavy industrial applications. Spare parts and service companies are globally available. CALC tracks launch data and informs the operator when required service intervals are approached.

Plug and play
Flexibility is incorporated into the Hydrowinch design. Plug and play drum additions can be offered.

Key features
- Designed for durability with a minimum of maintenance.
- Increased launch heights up to 30% compared to conventional winches with similar rope lengths.
- Maximum rope length 10.000 ft (3000 m) for a launch height of 5000 ft (1500 m). Under normal conditions.
- Constant and high quality launch performance by an electronic control system, less dependent on the winch driver skills.
- "Pilot in command": The electronics sense multiple parameters during the launch and continually optimizes acceleration, speed and force, providing the pilot full control over the airspeed of his glider.
- Weak links should not normally break except due to normal wear, even under turbulent conditions.
- Only proven, readily available industrial components are used for mechanics, hydraulics and electronics.
- Fairleads and drums are optimized to reduce wear of Spectra and Plasma ropes, which minimizes operational costs.

Flight characteristics
- Removes slack with constant speed and without jerking.
- Powerful acceleration independent of glider weight and water ballast (automatically controlled).
- Automatic rope speed and force control during launch.
- Many settable parameters (password protected) to adjust the launch profile and performance to operator preference.
- Information from the system is shown on an easy to read display.

Chassis

The Hydrowinch Club Series is trailer based and supported by double axles. All parts of the chassis are powder coated, (zinc plating for a durable rust protection is optional). During operation, the winch is stabilized by manually operated legs.

Rope guidance

The Hydrowinch is fitted with a unique rope guidance system. This system is optimized for Spectra and Plasma ropes and reduces operational cost caused by rope wear.

The Hydrowinch also incorporates a reliable guillotine that is resistant to dirt and pollution. The guillotine requires no maintenance or checks and is activated by a push button on the dashboard, also when power is down.

Drums

The drums can hold up to 10.000 ft (3000 m) ropes, based on a 3/16” (5 mm) rope diameter. The revolutionary design of the drums effectively reduces rope wear, and resists to the extreme loads caused by Spectra rope. The lifetime (fatigue) of our drums is optimised by Final Elements Analyses and verified by stress measurements.

Power unit

All power units for the Club Series are common-rail industial diesel engines with turbocharger and intercooler. They comply with EPA/Carb Tier III and EU Stage III emission-requirements. These powerplants have a reduced noise level, lower fuel consumption and are very environmentally friendly. All our engines are equipped with a self protecting monitoring system and communicate with CALC through the single wire CAN-bus.

Hydrostatic drive

The drums are driven by standard hydraulic components with proven quality in heavy industrial and agricultural equipment. The hydraulic system is very simple, robust and reliable.

Temperature and pressure are constantly monitored by CALC to prevent damage to components. The system needs no maintenance other than periodic oil and filter replacement (oil every six years, filters once each year).

The drums are mounted directly on the hydraulic motors. There are no couplings, clutches, bearings or mechanical brakes. During pay out, the hydraulic motors automatically provide a constant braking force at speeds up to 20 mph. The maximum pay out speed is 30 mph. The hydraulic pump is directly mounted on the diesel engine’s flywheel.

Electronics
The Club Series is controlled by a PLC (Programmable Logical Controller) and Touch Screen. The PLC communicates with the engine by a “single wire” J1939 CAN bus system. This industrial bus system eliminates complicated wiring diagrams and simplifies fault diagnosis. All electronic components are available worldwide and comply with industrial availability standards.

Optionally, remote service and support can be provided by an additional cell phone modem or a RS232 serial connection with a computer connected to the internet .

Safety cabin
The cabin provides an ergonomic and safe environment for the winch driver. All controls are placed on the central dashboard in the cabin. The controls can be operated from both seats. The cabin has a low floor plan and is easily accessible through the two doors on either side of the cabin. The winch driver is protected by an impact resistant safety glass (polycarbonate) with UV-filter. Optionally, a combined heating/cooling system can be mounted.

Controls
The controls are placed on the central dashboard and are well accessible from both seats:

- Display
- Selection push buttons
- Throttle lever
- Guillotine activation push button
- Emergency stop push button

Computer Aided Launch Control (CALC) system
The Hydrowinch Club winch is operated by an electronic throttle lever which gives the winch driver full control of the winch. CALC simplifies the operation of the winch and assists in controlling the ideal speed and force for greater safety and optimal launch height.

The average launch height is significantly higher compared to conventional winches with torque converters or automotive transmissions for equivalent rope lengths. This is realized by:

- Smooth but powerful acceleration independent of glider type and weight (jerk free)
- Intelligent rope force control through CALC provides optimum airspeed during all stages of the launch

The pilot is able to control the airspeed himself. To reduce airspeed he or she gently pulls the stick, to increase airspeed the pilot gently eases forward on the stick. This is much better training for the student, rather than teaching them to pull to gain speed and push to lower speed as on older generation winches.

In contrast to traditional winches with torque converters, the glider can gain extra height in a thermal, maximizing launch efficiency. When the glider enters a thermal during the launch, the pilot reduces the increased airspeed by pulling the stick and gains extra height. CALC prevents a break of the weak link.

CALC constantly checks the status of the diesel engine and hydraulics. The status of the components is shown on the display to inform the winch driver. In the event of a technical failure, the electronic control system will prevent possible damage to the system.

The characteristics and performance of the Club Series winch can be easily adjusted to the operator's preferences via menus on the PLC display. The menus for the control parameters (e.g. acceleration properties, 'remove slack' speed, etc) can be protected with a password to prevent unauthorized adjustments to CALC.

Durability
The engine and hydraulics of the Hydrowinch have a calculated lifetime expectancy (L10h) of at least 100.000 launches.

Maintenance and service
Because the Club Series system is very simple, maintenance can be done by the club's winch technicians. Maintenance is limited to normal oil and filter changes of the diesel engine and the hydraulic system.

The Hydrowinch is built using only standard, globally available components supplied by well known companies. On site repairs of the engine, hydraulics and electronics can be done by the global service networks of our suppliers.

Documentation
Included with the Club Series are the following documents:

- User manual.
- Maintenance manual.
- Maintenance schedule.
- Assembly drawings, including exploded views and part numbers.
- Spare part list and specifications.
- CE conformity documents (Europe only)

Commissioning
The Club Series will be fully tested before shipment. On site commissioning includes setting the parameters of the CALC to your preferences, winch driver training and launch instruction.

Our company
With headquarters in Colorado Springs USA and an office in The Netherlands, Hydrowinch LLC produces glider winches for government and civil glider

operations. It is our goal to build and market the most cost effective, robust and safe glider winch in the industry to promote and grow the sport of soaring worldwide.

The Hydrowinch LLC team is formed by an international group of experts with a long experience in aviation and glider winch development, taking pride in providing our clients with the highest level of safety, performance and service.

Hydrowinch LLC brings a fresh and innovative approach to launching gliders, providing a cost effective and environmentally friendly alternative for tow planes. We are focused on setting new standards in winch launch safety.

Our experienced technicians combine their creativity, modern 3D design and simulation techniques to develop innovative technical solutions to improve winch safety and performance. Safety is not only in our products, we believe that clear procedures and good training is the key to safety. That is why our service includes training programs for maintenance, winch drivers, pilots and flight instructors.

For more information please visit our website: www.hydrowinch.com or email: info@hydrowinch.com