# Features

## Summary of Features

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- Drums
- Microcontroller
- *Dynamic* Pulse Width Modulation
- Stall protection
- Low Battery Monitoring
- Low Battery Failsafe
- Scaled Linear Travel
- Input Deadband
- Voltage Protection
- Overrun Protection
- Power supply from 4, 5 or 6 cells (4.8 to 7.2 Volts)
- Integral 5 Volt regulator for single battery operation
- Wide travel range
- Ball bearing on output shaft

## Standard Equipment

- 300mm power supply flying leads
- Hitec/JR servo lead
- Double spool drum including M3 screw and washer. Default size 26mm (280), 32mm (380)
- 2 x M3 s/s pan head winch mounting screws
- SmartWinch User Guide (right click and select "save as")
- 12 months warrant
- Free Technical Support

## Description

**280ES** Powered by a Mabuchi RC280 motor. Suitable for classes from the IOM, Marblehead, R10R etc.

**280EL** Higher torque and longer travel version of the 280ES. Suitable for EC12 and similar size.

**380ES** Powered by a Mabuchi RS380 motor. By its physical size and shear grunt this is primarily a big boat winch. Ideal for classes such as the A, AC etc. However it should be noted that it is possible (but very rare) to have the Acetal gears on the this model to fail under shock load stall situations. However I personally choose to use a **380ES** in my own A class yacht as the risk is very low and the saving in cost and weight I consider is worth it.

**380EH** As per 380D but featuring combination metal / Acetal gears and larger output bearing. Suited to high stress applications such as the largest classes like the J, the large multihulls and spinnaker halyard winch etc.

## Drums

Three standard diameters, 42mm, 32mm, 26mm in standard and wide configurations are available to suit each model and various sheeting system configurations. There are also 3 sizes of Z shaped tapered spiral drums and 3 self tensioning drums

# Features

## Microcontroller

What makes this winch smart is its state of the art digital electronics controller. The controller is based on a Microcontroller Unit (MCU) which is a very small computer system in one chip. The MCU is controlled by a software program (ROM) which monitors all aspects of the winch's operation. Included in this program are some *'smart'* fail-safe features that can protect the winch from problems that may occur with your yacht's electrics or sheeting system. To fit all the features into the controller, surface mount technology is used on a double sided printed circuit board.

## Dynamic Pulse Width Modulation

Servo systems use Pulse Width Modulation (PWM) to reduce power and speed as the desired position is approached. This gives finer and smoother control when small movements are required. But the problem with standard P.W.M. is that as the desired position is approached, the reduction in power can cause the servo to stop short. This can result in excess power consumption and. This is what's happening when a servo is not moving but is buzzing. However, unlike other winches and servos the *SmartWinch* has *dynamic* PWM. If the *SmartWinch* controller detects that it has not reached the desired position, power is increased up to 100% if necessary until the desired position is reached.

## Stall Protection

When a conventional servo becomes stalled, it will stay stalled until the problem is solved. If not solved in time, the battery can be flattened, motor overheated, output transistors overheated and possibly damaged. But the SmartWinch knows when it is stalled and can protect itself by shutting down. The SmartWinch then signals that it is stalled by sounding a two-tone beep at 2 second intervals until reset. Stall mode can reset by moving the TX stick in the opposite direction. If this does not work, turn the SmartWinch off and on again.

## Battery Testing

The SmartWinch can monitor the battery for low voltage. If the voltage is below the warning level a warning signal (5 rising tones) will sound when the winch is switched on. If, during normal operation the voltage falls below the shutdown level, the winch will drive to the low battery failsafe position and hold there until the battery is replaced or voltage recovers. See Table 1. Default is battery monitoring OFF.

## Low Battery Failsafe Position

The default low battery failsafe position is booms half out. But this is only true if using a standard spool type drum. If a spiral drum is used then this position would be closer to full in and could make it difficult to get the boat ashore. To compensate for this the low battery failsafe position is also adjustable so you can choose whatever position you wish between full in and full out.

## Scaled Linear Travel

Travel response to the first 25% of TX stick movement from full in when single ended or both ends when double ended is adjustable from 1:1 at minimum to a maximum of 4:1. For example, if 50% is selected, each increment of the first 25% of the stick range results in half the travel of the default setting. This feature is similar to exponential adjustment in a computer TX. However scaled linear has the advantage of consistent incremental travel over the first 25% of stick movement whereas exponential is constantly varying. Default is 1:1.

## Input Deadband

Input deadband is the amount dithering in the Rx signal that a servo can tolerate without responding to by constantly jittering. This is adjustable from 0.8 to 10 microseconds. Deadband adjustment allows the optimization of TX fine trim control. The default setting is 5 microseconds.

# Features

## Voltage Protection

For protection of the electronics from over or under voltage conditions the circuit will disable itself when the supply voltage goes above 9 Volts or below 3.8 Volts.

## Overrun Protection

Once set up to suit the transmitter, the winch is programmed to ignore signals which are above maximum and below minimum pulse width of that transmitter. This means that should interference cause the receiver to send signals outside the normal range for that transmitter, the winch will just ignore those signals. It will not try to travel closer than close hauled or beyond square running positions.