



Oceanographic Winches

What could be simpler than a winch ? . A simple device for pulling, winding and unreeling cable under tension ? . Surely, there can be nothing very complicated in designing a motorized storage drum with a guide for the cable as it winds in. On the contrary, experience shows that different applications call for different types of winch. Well aware of this, Kley France engineers have been studying, inventing, and patenting the most ingenious (and occasionally complex) winch systems for decades.

Four main types of winch are available to the customers :

- Single drum winch
- Twin-capstan winch (traction winch)
- Cobra multiple-pulley capstan winch
- Band winch



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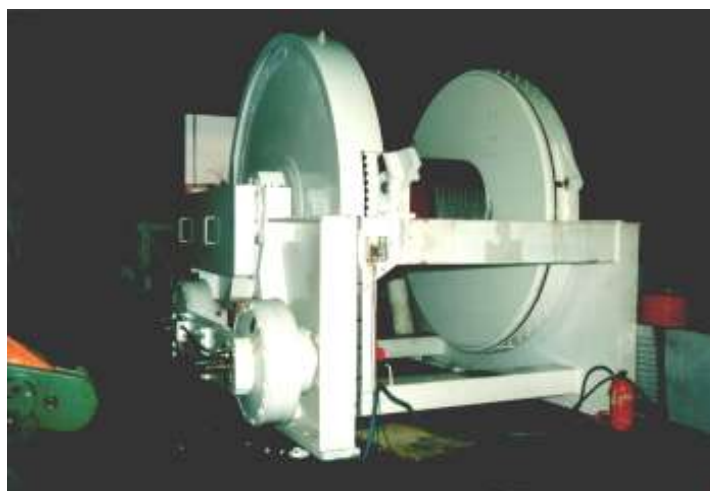
Single Drum Winch

Single drum winch is the traditional winch, familiar to everybody.

Among its advantages are :

- Simplicity.
- Compact design.
- Low cost.

But with over-delicate winding and wireguiding performance, the unit is hardly suitable for synthetic cables (e.g. aramid) ; it is vulnerable to tension variations (on outer layers in particular) and it exhibits high cable wear. This is why Kley France developed a special type of twin capstan winch.



A/R Winch 150 T.



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Twin Capstan Winch

This kind of winch solves the problem of tension variation and ensures optimum constant tension reeling.

Advantages :

- Optimum winding performance.
- Excellent resistance to load variations.
- High load-bearing capability.

On the other hand, the winch is large sized, exhibits high cable wear (especially at high winding speeds). It is hardly suitable for synthetic cables like aramid and it alternates the cable flexion.



4 T. capstan and 8000 m drum, for handling a 12 mm diameter cable at 2 m/s



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Cobra multiple-pulley Capstan Winch

This second generation of capstan winch brought a substantial improvement in cable and pulley wear.

The capstan has five in-line pulleys, independently motorized at optimum torque to reduce the friction of the cable slipping over the pulley groove (five-fold improvement over conventional capstan).

But though this type of winch gives excellent life-span results for traditional cables, new-generation cables are more vulnerable to alternate flexion.

Advantages :

- Optimum winding performance.
- Excellent resistance to load variations.
- High load-bearing and high-speed capability.
- Suitable for synthetic cables (e.g. aramid).
- Suitable for various cable diameters.

On the down side, the winch is large sized, has alternate cable flexion, and an anti-slip system is required.

This kind of winch is now replaced by the following winch : the band winch.



20 T. COBRA winch on board RRS DISCOVERY



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Band Winch

The third generation of capstan winch today used on several vessels solves all cable wear problems.

The principle consists in winding up the cable four wraps around a single capstan and in inserting a grooved plastic endless band between the cable and the capstan drum.

The cable lies into the groove without any relative slipping. The torque is transmitted by friction.

Following the cable elongation, the band supports the friction between the capstan drum and the band.

The transversal fleeting are done by two fleeting ball bearings.

The complex material of the band has been chosen after a 10 months trial in order to :

- Have a good friction with all types of cable.
- Show excellent resistance to load variations.
- Have the optimum friction with the stainless steel drum to transmit the torque and to permit relative displacement due to cable elongation.
- Support temperature and humidity
- Have the longest life time (> 100 operations to 4000 meters depth).
- Have an acceptable price.
- High winding diameter ratio ($D: d$ greater than 50).
- Exhibit no alternate cable flexion.

Consistent with this major design improvement, the systems features all-electric capstan and winder motorization, with AC motors and vectorial variable-speed drives.

This brings the following advantages : full control capabilities, uncomplicated maintenance and installation, fast trouble-free access, and upgrade ability.



BAND CAPSTAN 30 T. 2.2 m/s - 1.5 m dia.



8000 m storage drum with AC electrical motors and frequency converters.