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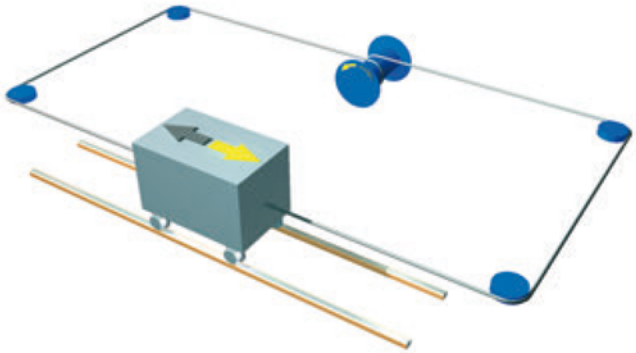
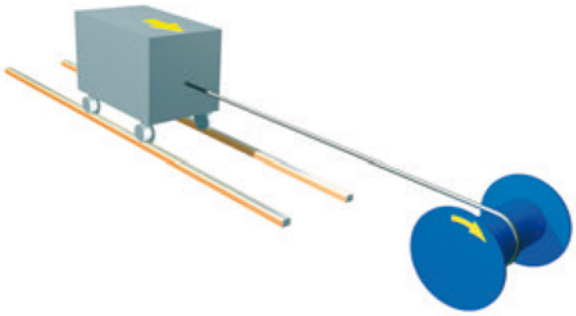
EQUIPOS INDUSTRIALES





Winches

12.1 Cable Winch: Handbook for Engineers

Content

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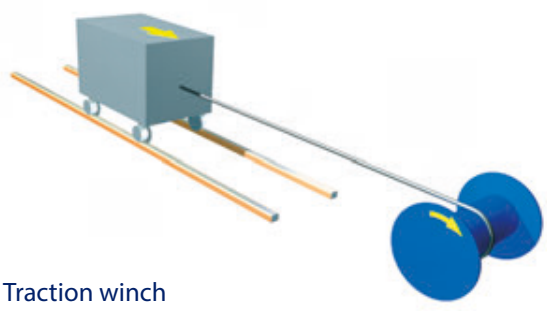
Rope winch types

Mode of application and load bearing capacity

Pulling winches are designed to pull loads on a 100% flat surface. The pulling force is calculated from the mass of the load to be pulled multiplied by the load's rolling resistance. The rolling resistances for the typical applications are around 0.150 for rubber wheels on concrete surfaces and around 0.005 for steel wheels mounted on an anti-friction bearing that are on tracks. If the load is hoisted on an angled surface, the cable winch must be designed as a hoist winch.

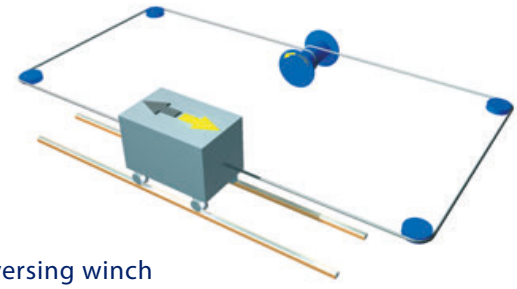


Traction winch

Hoist winches must be used if a load is to be raised and held by the cable winch. This applies to hoisting vertically and also to pulling the load along an angled track. Cable winches for hoisting are equipped with spring-loaded brakes on the motor as standard and therefore guarantee that the load will be held securely. In addition, rope winches for hoisting are equipped with higher safety factors than rope winches that are used purely for pulling for example.

Hoist winch

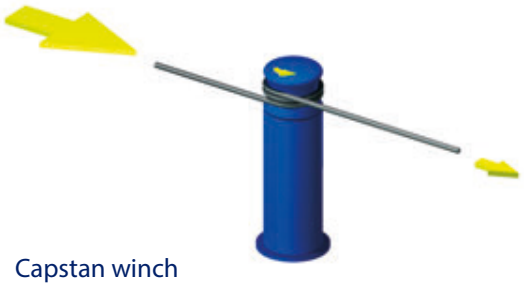
A **traversing winch** can be used to move a load in two directions on a level. You can therefore move a carriage forwards and backwards for example. The cable drum is designed for two cables, is scored and winds in only one layer.



Traversing winch

Capstan winches are endless winches that do not store the cable on a cable drum but allow the cable to run through "endlessly". A counterforce such as the operator's manual force is multiplied by winding the cable around the capstan head several times. In this way, a much larger pulling force can be achieved from manual force.

For example, they stand on deck on a ship and are used to pull cables and ropes in many different directions.



Capstan winch

Traction winches are endless winches like the capstan winches.

They work on the same principle of increasing force due to winding friction. The cable is better fed and protected thanks to their design with two traction sheaves and multiple scores.

Traction winches are normally located on carriages that travel forwards and backwards. The pulling cable is stretched between the two ends of the guide rail.

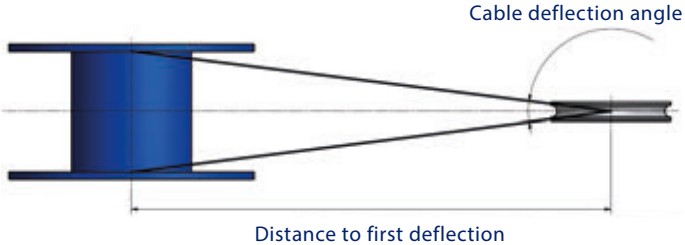
Traction winch

Information for safe operation:

To ensure that the cable is wound onto the cable drum in an orderly manner, the cable's permitted angle of deflection must not be exceeded. For this reason, the cable is normally guided from the cable drum over a fixed deflection roller at first.

This is aligned in the centre of the drum at a specified distance

from the cable drum. This prevents the angle of deflection being exceeded. This distance mainly depends on the drum length and the relationship between the drum diameter and the cable diameter, and is specified in each quotation.



Drive type

Manually operated rope winches are operated by the operator's manual force via a crank handle. The power is therefore limited to a certain value which is mainly generated by the pulling force and the cable speed. The higher the pulling force, the lower the cable speed if the power remains the same.

Electrically-operated cables are driven by three-phase motors or alternating current motors. Three-phase motor powers of up to 30 kW are available in our standard version. Higher powers are available on request. Due to the mains-related limitations, the power is limited to 2.2 kW when using alternating current motors. Hydraulically-operated rope winches are operated by orbital motors or radial piston motors depending on the power.

We will either work with your existing hydraulic supply or we will provide a unit. In the standard version, we install brake valves for a secure hold.

Pneumatically-operated rope winches are operated by multi-disc motors or radial piston motors depending on the power. We can provide compressed air rope winches with power of up to 22 kW. Please specify your compressed air supply data. Depending on the design, we will equip the rope winches with pneumatic allyactuated spring-loaded brakes.

Cable speed

Rope winches normally have a constant cable speed. The PFW, PCW and PHW rope winches can be designed for virtually any cable speed.

Thanks to appropriate motors that can operate at two speeds or thanks to freely-programmable frequency converter controllers, multiple speeds can also be achieved.

Site of operation

Do you have a height restriction, such as a maximum distance to the first deflection? In that case, we can construct the cable winch to fit as well as possible. If the winch has to be protected against wind and weather, or even against salt water, we can provide motors with higher protection classes, special thick protective coatings or complete housings.

Load type

There are four different safety classes for rope winches. These start with the standard cable winch according to DGUV norm 54 (D8) (German employers' insurance association), which you can use to transport or lift goods. You must prevent people standing in the region of or under the load. Next, we have the BGV D8+ cable winch designs, which guarantee safety for people under a suspended load if the cable winch is electrically shut down.

Cable winches in accordance with DGUV norm 17 (C1) also allow people to remain under the suspended load safely. In the highest safety classes, people may also be carried.

Two or more cable outflows

In order to be able to lift long cross beams or frames with large bases, you require several lifting points on the load to ensure that the load does not tip.

We can equip our rope winches with multi-cable drums for this purpose. Please let us know the number of load points and the distance between them.

Explosion protection class

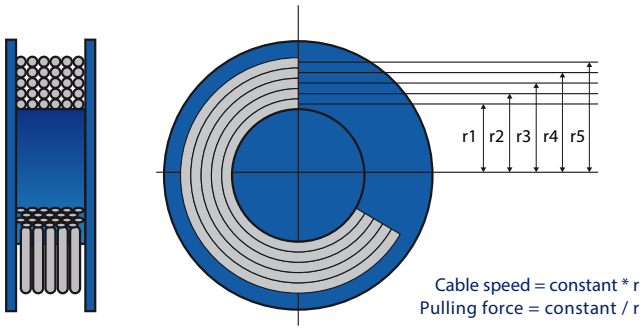
The PFW, PCW and PHW rope winches can be designed for use in locations at risk of explosion. Please inform us of the explosion protection class required. Further information can be found in our catalogue for ATEX hoists.

Information on multi-layer wound cable drums:

Cable drums are normally wound in multiple layers; i.e. the cable is wound around the cable drum layer by layer.

The lever that the cable uses to transfer the pulling force to the cable drum becomes larger with each cable layer.

However, the gear data such as the driving torque and the driving speed remain constant. Due to this, the cable speed increases and the pulling force decreases with each cable layer that is wound up.

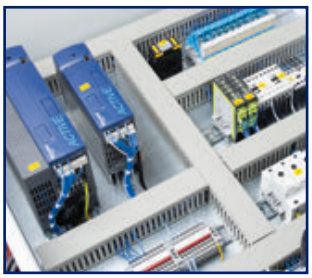


Information on applicable law

The following applies according to the machinery directive:

- Overrunning structural or required limits whose movement is generated by the cable winch must be prevented by limit switches. (Normally by spindle limit switches)
- The cable drum and other moving parts must be inaccessible or protected against drawing in. (Normally by covers)
- Cable winches with a lifting capacity of over 1.000 kg must be protected against an overload. (Normally by electrical overload protection in the switch cabinet) The electrical controller must be able to be powered off. (Normally by a mains plug or a mains isolator)
- The customer must ensure that the base to which the winch is fixed is structurally stable.

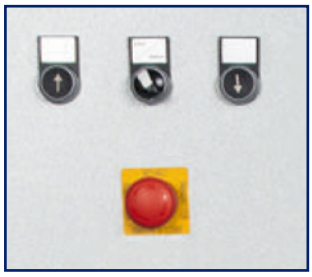
Extra equipment and options for winches



Frequency convertercontrol system converter

Contactor controller

Radio control



Push buttons

Manual control button for contactor controller

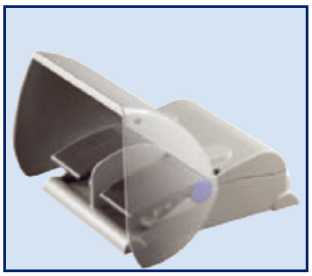
Selector switch

Mains isolator

Wall-mounted switch

Mains connection cable

Device attachment plug



Foot switch

Touch-Display

Control

Control systems provide the optimum interface between your winch and your application or safety concept. In the basic version with constant speed the following sources of error are automatically monitored and safely blocked:

- Mains monitoring: phase failure, undervoltage and phase sequence (series, always)
- Thermal overload of the motor (from 2.000 W motor power)
- Torque overload (too high load, from 1.000 kg)

Further safety aspects are the control circuit with low-voltage voltage, which is galvanically isolated from the power supply system, and the stable control boxes with a high protection class. You can choose between various operating options, including several, the control of different winches, individually and simultaneously, versions according to UL/CSA GOST or ATEX guidelines. If your application requires exact positioning, particularly smooth acceleration, variable speeds, automatic travel cycles, variable tensioning forces, even when the winch is at a standstill, we can extend your control system with a frequency converter. The parameterization comes directly from our company, based on many years of experience with the top product of the hoisting industry.

Operation

You have the option of controlling the cable winch using pushbuttons in the switch cabinet door, using a manual control button, a wallmounted switch, a foot switch, a radio controller or a combination of several operations.

The prerequisite for this is that you use a contactor controller or a frequency converter controller. Each of the operations contains the “UP“ and “DOWN“ pushbuttons and an “EMERGENCY STOP“ palm switch. If you require additional operating points, you can select the desired operating point on a selector switch on the switch cabinet door.

Control options

The power cord or the device attachment plug provide the winch with an electrical connection to the mains and consist of the desired length of connection cable and one of the plugs that correspond to the cable winch‘s operating voltage and power.

A mains isolator can be used to power off the cable winch (e.g. for servicing purposes) in the same way as a mains connection plug also can.

The electrical overload protection is integrated into the motor circuit and switches the winch off automatically if the load is too great.

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Grooved drum

Grooved drum

This is beneficial when a nonrotating wire rope is specified.

Right or left hand helical grooving of drum core to suit specified rope diameter regulates spooling of first rope layer and assists in higher layers.

It enables fleet angle to be increased from 1.5 to 2.5 degrees.

Even higher fleet angles can be reached with an additional spooling device (only upon request).

Drum pressure roller

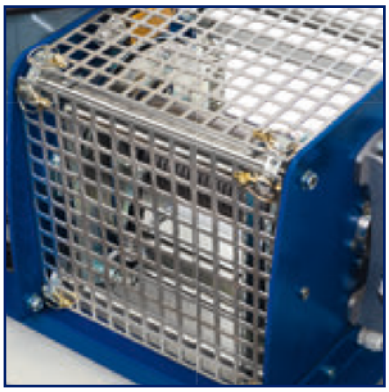
Drum pressure roller

The rope keeps tight on the drum as long as it is under tension.

But if it becomes slack, e.g. during shunting applications, when the waggon runs faster than the winch is able to store, a drum pressure roller can help.

It presses the rope onto the drum core and maintains it in a tidy condition.

The drum pressure roller is also recommended if a free spooling clutch is used.



Drum protection

Drum protection

Covering the cable drum prevents objects or items of the operator's clothing entering the cable drive.

This reduces the risk of accidents and damage to the winch.

Brake active on drum

The (manual and automatic) cable drum brake is an additional brake that only applies to the cable drum.

It can be an additional piece of safety equipment; e.g. for hoist winches with a free-wheeling coupling or for hoist winches to transport people.

Emergency hand crank

Up to a certain size, we can equip the PFW and PKW rope winches with emergency crank handles.

Therefore, if there is a loss of electrical power, you can raise or lower the load by hand.

Manual brake venting

The PHW rope winches can be equipped with manual brake venting.

Therefore, if there is a loss of electrical power, you can lower the load by hand by bleeding the spring-loaded brake using the release lever.

Spindle limit switch

Spindle limit switch

The spindle limit switch is coupled directly to the cable drum and determines the drum's revolutions.

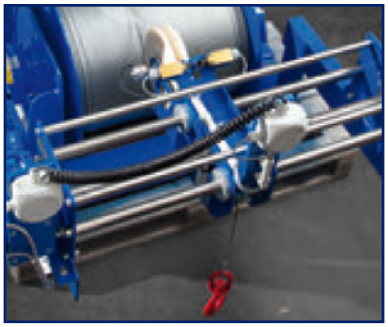
You can determine the cable winch's shut-off positions as required by adjusting the switching cam inside the switch.

As standard, our spindle limit switches have two contacts, in order to limit the top and bottom hook position for example. We can equip the switch with up to five contacts on request.

Therefore, you can switch something at interim positions (e.g. the alarm horn) or switch to a lower speed with rope winches that have two speeds.

Slack wire switch

Disengaging clutch



Spooling device

Slack wire switch

A slack wire switch determines whether the cable is laden or unladen.

The cable winch is switched off automatically once the load is set down.

This is advantageous for example in filling stations.

Disengaging clutch

You can couple cable drums for the PFW, PKW and PHW cable winch types with the freewheeling coupling of a braked drive.

The cable can then be easily wound by hand and does not have to be unwound at cable speed using a motor.

Freewheeling couplings are only permissible for traction winches.

The scored drum and cable contact roller options are recommended in order to ensure that the unladen cable is wound in an orderly manner.

Spooling device

If you cannot comply with the distance to the first deflection due to space limitations, we can offer an optional spooling device.

The cable is fed through a reel that moves forwards and backwards in a line in front of the cable drum, thereby ensuring that the cable is wound around the cable drum in an orderly manner.

The reel is coupled to the cable drum mechanically.

The system works automatically. In this way, the spooling device increases the cable's angle of deflection and shortens the distance to the first deflection.

VINCA products

- Bridges crane and gantry cranes
- Jib cranes
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- Elevators/Lifts for loads (PLT)
- Dock levelers
- Moving Dock levelers (RMC)
- Coats Furniture
- Wheel-lok (Vehicle Immobilizer)
- Safety equipment for docks
- Vacuum lifters VACU-LIFT
- Industrial Manipulators
- Pallet Inverters /Tippers
- Levelers NIVELMATIC
- Tilters inclinator
- Skips
- Industrial fans
- Industrial flexible doors, high speed doors
- Cold storage doors
- Fire doors
- Safety gates DOK-GUARDIAN
- Festoon for mobile equipment
- Lifting appliances
- Industrial Radio Controls
- After Sales Service for above equipment

ATEX classified equipment as option.















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— 10/05/2023 : 142600 —