



# Electric Winches

## USER GUIDE





## Overview

Through this informative manual and guide, we aim to bring users up to speed with all the specifics and technicalities involved with winch operation, proper practices and safety protocols. While this is a detailed guide, it cannot serve to educate on every single type of scenario associated with winches, their operations and their accessories and components.










Follow all safety protocols, employ good judgment, and only utilize proper equipment in any situation involving winches and their operation. Remain observant and ready to act at a moment's notice whilst being cautious of your environment and any people around or within close proximity of you and the winch.

You must read all and any instructions or manuals that come with each individual winch.

Remember, always think safety first and if in doubt, seek professional advice.

## A Guide to Easy & Safe Winching

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# Safety

Any situation involving the use of a winch can potentially lead to serious harm and injury. To ensure the safety of you, those around you and your surroundings, please read this user's guide. The construction of a winch involves the use of a numerous array of intertwined and moving parts in addition to sharp edges that could lead to cuts, burns, lacerations and many other serious injuries.

Employ a good sense of judgment, acquaint yourself with the particular operations of your winch and always practice the recommended safety protocols. Contained within this section are all the icons, warnings and cautions that are used throughout this user's guide. Refer back to this section in case of any confusion of any sort.



**Symbols  
Icons  
Dangers  
Warnings  
Cautions  
& Notices**

## Symbols



**1** - Danger: Represents a forthcoming danger, that if failed to avoid can lead to lethal injuries.



**2** - Warning: Represents a potentially dangerous situation, that if failed to avoid could result in serious injuries or even death.



**3** - Caution: Represents a potentially dangerous situation or a high-risk action, that if failed to avoid can result in serious injuries.



**4** - Notice: Represents high-risk or unsafe actions, that if failed to avoid can lead to permanent damage.



# Icons

The icons listed below are aimed to visually remind users throughout the manual of potentially dangerous and lethal actions and situations.



1. Refer to Owners Manual.



2. Electric Shock Hazard.



3. Fire and Burn Hazard.



4. High-Temperature Surface Hazard.



5. Moving Parts Hazard.



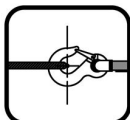
6. Sharp Edge Hazard.



7. Always use a Handsaver Strap for Safety.



8. Maintain a safe distance from the Winch, Rope and Load.



9. Ensure Load is correctly seated in the throat of the Hook.



10. When attaching a hook to an Anchor Point, utilize a strap or shackle.



11. Utilize Appropriate Protective Gear.



12. Utilize a Pair of Heavy Duty Protective Gloves.



13. Under No Circumstances Apply Load to the Latch or Hook Tip.



14. Under No Circumstances Couple the Hook and Rope.



15. Under No Circumstances Should You Place Fingers inside the Hook.



16. Under No Circumstances come in contact with Rope when under Tension or Load.



17. Under No Circumstances Utilize the Winch as a Hoist.



18. Under No Circumstances Apply the Use of a Winch to Secure a Load.



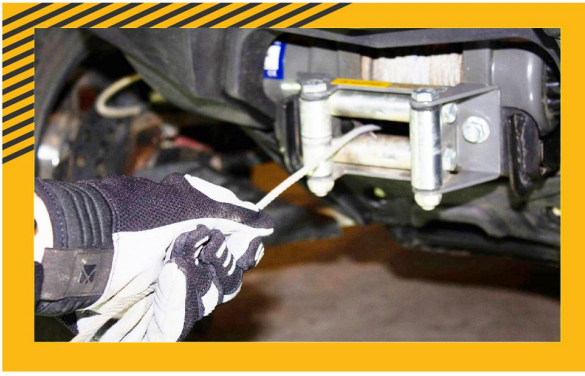
19. Under No Circumstances Utilize a Winch to lift and/or move People or animals.



20. Under No Circumstances Wind the Rope Over Top of Drum.



21. Risk of Explosion.



Each winching situation presents its own series of challenges and safety concerns. Potentially hazardous winching situations are in the tables to follow:

# Dangers

**⚠ DANGER**



## 1- Flammable gases are encased inside automotive batteries and can be involved in situations that lead to violent explosions.

- Utilize proper protective eye wear.
- Remove all personal objects such as jewellery and ensure long hair is tucked away out of reach from winch.
- Never deviate from instructions detailed in wiring diagrams.
- Keep a safe distance from onlookers.
- Under maintenance, always remove all sources of power from the winch.
- Under no circumstance ever install a winch on a running vehicle.
- Under no circumstance ever lean over the battery when placing connections.

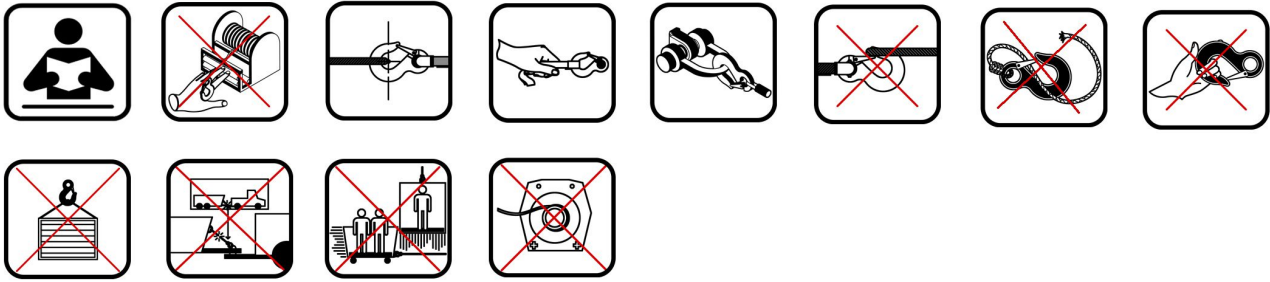
**⚠ DANGER**



## 2 - Potential fire and/or electrical shock from incorrect wiring

- Never deviate from instructions detailed in the wiring diagrams.
- Remove all personal objects such as jewellery.
- Regularly inspect all wiring and switchgear for any signs of improper connections, worn-out material, cracks, etc. Ensure all damaged components are swapped out before operation.
- Ensure all electrical wiring and connector terminals are insulated and shielded.
- Accompanying terminal boots must always be placed on wires and terminals as instructed by the installation guide.
- Under no circumstance connect a DC power winch to AC current and vice versa.
- Under no circumstance, route wires and/or place them in close proximity to sharp edges, high-temperature surfaces or moving components.
- AC current powered winches should never be operated in a corrosive or explosive environment.
- DC current powered winches should never be operated in an explosive environment.

## **⚠ DANGER**



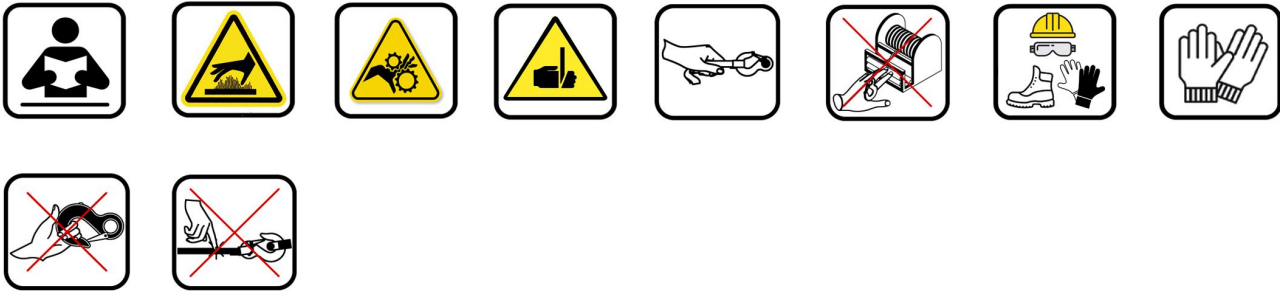
### **3- Wrong use and operation of the winch beyond its capabilities may result in the release of the load and rope malfunction.**

- Ensure that the freespool is fully in the engaged position before utilizing the winch.
- The load should always be applied to the throat (center) of the hook.
- Ensure your anchor is capable of supporting the load.
- Ensure the hook latch is not supporting a load and is closed.
- Ensure load is always seated in the throat (center) of the hook.
- When rigging your winch, under no circumstance attempt to speed up the process or take shortcuts.
- Ensure a hook is used in tandem with a latch.
- Under no circumstance release the freespool when the winch is supporting a load.
- Under no circumstance should a winch be operated by anyone under 18 years of age.
- Under no circumstance should a winch be operated by an individual that has consumed any form of alcohol, drugs, or medicine.
- Under no circumstance should a winch utilizing wire rope be subjected to an operation that involves less than 5 turns around the winch drum.
- Under no circumstance should a winch utilizing synthetic rope be subjected to an operation that involves less than 8 turns around the winch drum.
- Under no circumstance use a winch to secure any form of load in place. The load should always be secured first and detached from the hook during transportation.
- Under no circumstance should any area, mechanism, or individual part of a winch be modified, altered, welded or machined in any way.
- Under no circumstance should a winch be involved in an operation that involves the winch being placed overhead.
- Under no circumstance should the rope of a winch be wound over top the drum.
- Under no circumstance should a winch be utilized to lift, lower, hoist, or secure horizontally hinged doors or ramps without the accompaniment of secondary measures such as counter-balance springs, centrifugal locking devices, etc.
- Under no circumstance utilize a winch to lift and/or move people.



# Warnings

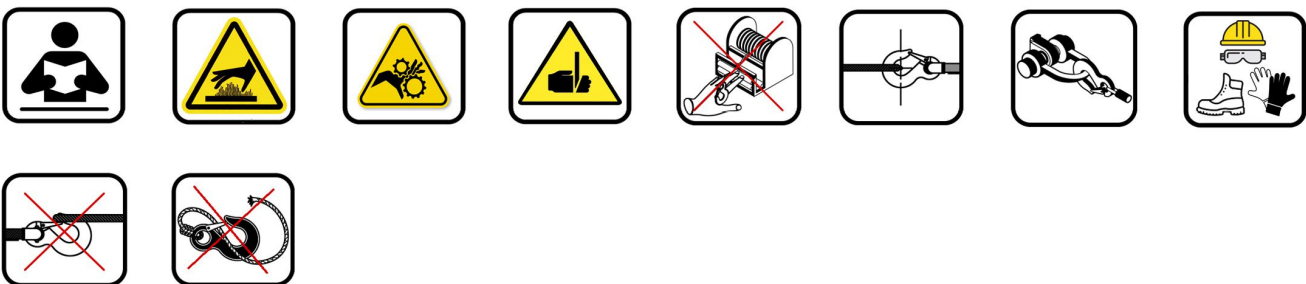
## ⚠ WARNING



### 1. - A winches' construction has a numerous array of moving parts in addition to sharp edges that could lead to cuts, burns, lacerations and many other serious injuries and could even lead to amputations.

- Ensure onlookers and any helping hands are kept at a safe distance when a winch is under operation.
- Ensure all people (yourself included) are at a safe distance from the winch and the rope during operation.
- Utilize heavy duty gloves that provide adequate protection against heavy use machinery.
- Use a hand saver when using the hook.
- Under no circumstance should you let the rope slip through your hands even whilst wearing heavy duty gloves.
- Under no circumstance should you place fingers inside the hook.
- Under no circumstance should you or anyone else be in contact or close proximity to the hook or rope when under tension, load, or during operation of the winch by an external body.
- Under no circumstance should any attempt be made to conceal any warning symbols, statements, signs, or instructions.

## ⚠ WARNING



### 2- A broken wire rope's recoil has the potential to inflict serious harm and injury. Rope life can be dramatically reduced through factors such as sharp edges, corrosion and/or weathering away of the rope.

- Ensure all hooks that exhibit any sign of significant wear or tear be replaced immediately.
- Examples of serious wear and tear include a deformed tip, an expanded and/or widened throat and a bent or misshapen latch.
- Ensure all ropes that exhibit any sign of significant wear or tear be replaced immediately.
- Examples of serious wear and tear included deformed, melted, and/or conjoined fibres, irregular stiffness levels across the rope, chemical contamination, broken strands and any irregularities within the shape of the rope.

# Warnings continued

- Ensure you conduct regular inspections of the entire rope, its protective casing and the attachment hook prior to each use.
- Ensure onlookers and any helping hands are kept at a safe distance when a winch is under operation.
- Ensure the lead of the handheld controller is fed through an open window when a winch is operated from the interior of a vehicle.
- Ensure the bonnet of the vehicle is open/raised up to protect the windscreen of the vehicle in case of an accident during winch operation.
- Under no circumstance should you or anyone else be in contact with or close proximity to the rope during operation.
- Utilize a rope dampener over the wire rope near the hook end to dampen any recoil.
- Under no circumstance should the rope come in contact or be in close proximity to high-temperature surfaces, heat sources or toxic chemicals.
- Under no circumstance should the rope be bent, knotted, or tied around any load or be used in a similar manner to fix a broken rope.
- Under no circumstance should the rope be pulled around non-rotary sheaves or rollers.
- Under no circumstance should the rope come in contact or be in close proximity to sharp edges, irregular surfaces or heat sources.
- Under no circumstance during operation should the rope be allowed to entangle or twist, as it could potentially break the rope before the winch ever stalls.
- Under no circumstance should the winch, rope or any of its components and accessories be subjected to sudden high impact loads.

## Cautions & Notices

### ⚠ CAUTION



**To keep safe and extend the life of your winch and its accessories always follow proper practices, employ safety standards and correct winching techniques and refer to the manual in case of any confusion.**

- Utilize switches and controls approved by the winch manufacturer in addition to other accessories and components.
- Ensure that accessories and components included but not limited to tackle, pulley blocks, straps, etc are always sized and rated to the correct specifications.
- Ensure the winch's remote control is always kept in a safe area free from any dirt, chemicals, or moisture.
- Ensure when using another vehicle as an anchor, to avoid any sort of damage to the vehicle's chassis.
- Utilize pulley blocks to ensure the pulling direction of the rope is at the correct angle – avoid pulling the rope from one side and winding all of the rope on to one side of the drum.
- Ensure load is applied to the throat (centre) of the hook.
- When attaching a hook to an anchor point, use a strap or shackle.
- Utilize appropriate protective gear.
- Under no circumstance ever apply load to the latch or hook tip.
- Under no circumstance should the rope be hooked back onto itself.
- Under no circumstance ever place fingers inside the hook.

### NOTICE



- Under no circumstance should a winch ever be submerged in water.



# Introduction

Before installation and use of your winch, the user/operator should thoroughly familiarise themselves with all the proper safety standards, practices and warnings, dangers and hazards associated with winches and their operation. Ultimately, responsibility for operating your winch safely and cautiously is the sole responsibility of the operator. Failure to follow proper guidelines and practice proper safety protocols can lead to serious injury, death and damage to the winch and its environment.

Winches must be properly installed with the correct mounting hardware and specifications to ensure safe operation. Your winch will come with all the necessary technical documentation and instructional guides required to perform a seamless and safe installation.

**The icons listed below are aimed to remind users throughout the manual of potentially dangerous and lethal actions, practises and situations.**



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## A. Usage Information

Level surfaces or inclines are the only conditions where a winch should be operated. Under no circumstances should they be used in an overhead position or be used to lift and/or move people or animals.

Due to its design, a winch is never intended to be operated for extended periods of time or near its stated maximum load capacity. Rather it should be used with regular gaps in between to allow for any build up of heat in the winch's components to dissipate.

If a winch exhibits signs of slowing down its operation, it means the winch is being subjected to a greater load than usual. This could lead to excessive temperatures and overheating. Do not operate for more than one minute at a time and allow to cool between operations.

In any situation, if the winch seems to have halted operation or stalled, under no circumstance should you continue to attempt to use the winch. This can lead to permanent damage to the winch, its electrical components and any accessories or external components. Re-examine your rigging. Attempt to use a double-line/snatch block if the situation permits.

- Maintain a safe distance from the winch, rope, and load.
- Utilize a pair of heavy duty protective gloves.
- Utilize appropriate protective gear.
- Ensure load is correctly seated in the throat of the hook.
- Under no circumstances utilize a winch to lift and/or move people.
- Ensure operatives are never children.
- Avoid winch operation when under the influence of alcohol, drugs, or medicine.

**WARNING**

- Always keep warning symbols, labels or signs in clear view.
- Refer to Owners Manual

- Under no circumstance Utilize the Winch as a Hoist.
- Under no circumstance utilize a Winch to lift and/or move people.
- Under no circumstance should a winch be utilized to lift, lower, hoist, or secure horizontally hinged doors or ramps without the accompaniment of secondary measures such as counter-balance springs, centrifugal locking devices or any other things that sure up the door of a moving ramp.

**WARNING**

- High temperature surface hazard

# Winch Construction

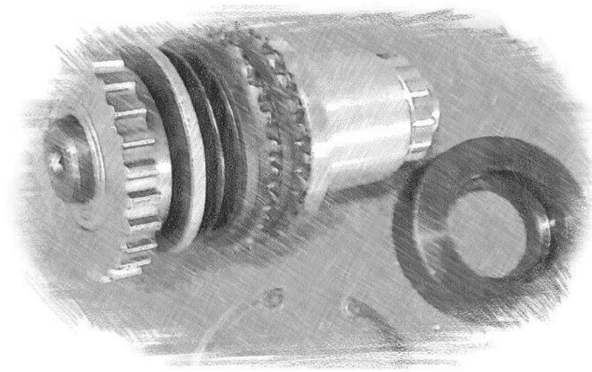
## Brake

Winches serve to extract loads from difficult areas and in doing so do not require a brake to carry out their operations. Winches do not always contain braking systems as a result. A winch equipped with one is not guaranteed to reduce undesirable effects such as coasting or drifting.

Winches employing a singular braking system are inadequately equipped to cater to minimizing the effects of coasting and drifting at the same time. As a result, winches are available with a dual braking system. Singular systems usually employ a dynamic or mechanical brake, while some may have both. Either braking system will automatically be deployed once the operator releases the control switch.

The action of extra rope being pulled in or out once the winch has ceased operation is known as coast. It's a similar concept as when one releases their finger from a power drill's trigger and the drill slows down. Drift is the action of a payload being subjected to the effects of gravity and creeping backward once a winch ceases winching.

Braking simulated by the electrical motor of a winch refers to a dynamic brake. Force is applied to the said motor by the dynamic brake which aims to halt the rotary motion of the motor. Serving to reduce or eliminate coast but not drift. Though keep in mind, even with a dynamic brake, winches may still experience coast. Prolonged usage of your winch will better accustom you to predicting coast, leading to safer winch operation.



Mechanical brakes employ either an automotive-style disc or drum brake in addition to various other mechanical stopping methods such as frictions pads or a spring-applied brake. These brakes apply a force to the winch in an attempt to eliminate or reduce drift. Drift may still be experienced even in the presence of a mechanical brake.

Mechanical brakes differ in terms of capacity, sometimes being less than that of your winch. The presence of mechanical brakes does not signify that the winch is capable of securing loads. Prolonged usage of your winch will better accustom you to predicting drift, leading to safer winch operation.

Like any braking system, the systems used in winches are regular wear and tear items. Excessive drift and coast can be an indication of excessive brake wear. During regular maintenance, the use of manufacturer-supplied spare parts is highly recommended. Refer to Section 7 to access a more detailed guide on how to effectively diagnose excessive brake wear, in addition to tips on how to extend the life of the system. Refer to the technical installation manual to find all relevant information on the installation and replacement parts number of your winch.

### ⚠ DANGER



- When attaching a hook to an Anchor Point, utilize a manufacturer-approved strap or shackle.
- Ensure freespool is fully in the engaged position before utilizing the winch.
- Never exceed the rated capacity of the winch.
- Under no circumstance should a winch be used to secure any form of load in place. The load should always be secured first and detached from the hook during transportation.
- Ensure your anchor is capable of supporting the load.

### ⚠ WARNING



- Keep a safe distance from onlookers.
- Never let the rope slip away from your hand, whether you are barehanded (not recommended) or utilizing a pair of heavy-duty gloves.
- Under no circumstance should you or anyone else be in contact or close proximity to the hook or rope when under tension, load, or during operation of the winch by an external body.

### ⚠ CAUTION



- Utilize switches, controls approved by Kartt in addition to other accessories and components.
- Ensure all accessories used with the winch, including items such as straps, tackles, hooks, etc. are rated at a load capacity that exceeds that of the winch.
- Ensure regular inspections of all equipment, immediately replace any parts that exhibit excessive wear or damage.



## Freespool

### Pull & Turn Lever



Various winches come installed with a freespool mechanism. This system, through the use of a control lever/knob, is used to decouple the drum from the winch's gearbox. By doing so a user is able to freely pull the rope out by hand, instead of having to use the motor to unspool enough rope. Some common freespool systems are detailed below.

Technical Installation Manuals that are provided with your winch will provide detail on all the relevant information needed to operate a freespool system properly and safely.

#### ⚠ DANGER



- Refer to owner's manual.
- Ensure freespool is fully in the engaged position before utilizing the winch.
- Under no circumstance ever wind the rope over the top of the drum.

#### ⚠ WARNING



- Use gloves that provide adequate protection against heavy use machinery and wear personal protective equipment.
- Sharp edges on moving parts.
- Use a handsaver strap.
- Maintain a safe distance from the winch, rope, and load.
- Moving parts hazard.
- Sharp edge hazard.
- Remove all personal objects such as jewelry and keep hair tied back.

## Gearing

Power is transferred to a winch's motor through a collection of gears. The rope of the winch is spooled in and out of the drum using this power. There is an assortment of different gears used in winches. These include multiple stage and single-stage planetary gear sets, or a worm gear set.

Planetary gear winches can incorporate anything from a single planetary gear set, up to even 4 stages of gear seats that are coupled together. A combination of a sun gear, planet gears and a ring gear make up a 'stage'. Each stage essentially powers the sun gear of the next stage, with the overall ratio of the system being a collection of all the stages working in unity. Such a system allows you to keep the physical size of the system compact while maintaining a larger gear ratio.



Gear ratios and the number and/or style of said gears is used to identify the gear arrangements. Typically a gear ratio measures how many rotations are required from the motor to have the drum complete a single rotation. Using that knowledge, a 158:1 gear ratio means your winch motor rotates a total of 158 times to complete a single drum rotation.

Refer to the technical installation manual provided alongside this guide to find out your winch's gearing system and ratios among other specifications.

#### NOTICE



Refer to owner's manual.

## Motor

Depending on your particular winch, a stable power source of either AC (Alternating Current) or DC (Direct Current) is required to operate the winch. DC-powered winches are designed to draw power from a vehicle's onboard battery. AC winches on the other hand are typically plugged into an external electrical socket, or hard-wired into an indoor electrical panel.

In North America, a typical automotive battery is capable of supplying 12 Volts and 500amps or greater to power a winch. Europe employs the same standard batteries, however, larger commercial vehicles such as trucks may utilize a 24 Volts battery specification.

The DC Motors within DC winches are mostly split into two categories, Permanent Magnet Motors, and Series Wound Motors. With Permanent Magnet Motors, permanent magnets are mounted around the armature, inside the motor, to create the magnetic field.

**NOTE** these paragraphs refer to information on exact power specifications and detailed technicalities to be found within the technical installation manual.

Series Wound Motors on the other hand have a magnetic field that is created by sending current through the windings of electrical wire placed inside the motor. Ensure that the source you are using to power your series wound motor is well within the specification of your winch.

One important thing to note is, like any other heavy-duty electrical equipment, these motors have a definite life span. Though by referring to section 7 of this guide, you can get yourself up to speed with all the tips and maintenance guides that can greatly help increase the lifespan of your winch motor.

## Solenoid/Electrical

Solenoids, direct switches or industrial grade relays may be utilized within DC winches to regulate the power going to the motor. These serve as a high-amp switch that sits between the wiring going to the vehicle's battery and the winch motor and is used to control, either Power-in or Power-out.

Mounting on the winch itself or by use of a handheld switch is how direct switches are mostly utilized in DC winches. Solenoids and industrial grade relays are controlled via a smaller low-current hand-held switch that is plugged into the winch or mounted on a heavy-duty surface such as an ATV's handlebar.

Solenoids and industrial grade relays typically mount in close proximity to the winch on the vehicle's frame or reside within the housing of the winch itself. The way a user operates a winch can greatly affect how long solenoids, industrial-grade relays and switches degrade and wear overtime. These items do not have an indefinite lifespan and are designed to be replaced.

### ⚠ DANGER



- Refer to Owner's Manual
- Under maintenance always remove all sources of power from the winch.
- Utilize proper eye protection gear.
- Under no circumstance connect a DC power winch to AC current and vice versa.
- AC current powered winches should never be operated in a corrosive or explosive environment.
- DC current powered winches should never be operated in an explosive environment.

### ⚠ WARNING



- Refer to Owner's Manual
- Ensure all ropes that exhibit any sign of significant wear or tear be replaced immediately
- Examples of serious wear and tear included deformed, melted, and/or conjoined fibers, irregular stiffness levels across the rope, chemical contamination, broken strands, and any irregularities within the shape of the rope.
- Ensure all electrical wiring and connector terminals are insulated and shielded.
- Accompanying terminal boots must always be placed on wires and terminals as instructed by the installation guide.
- Never deviate from instructions detailed in wiring diagrams.
- Under no circumstance should wires be routed and/or placed in close proximity to sharp edges, high-temperature surfaces, and moving components.
- Ensure the winches remote control is always kept in a safe area free from any dirt, chemicals, or moisture.

### ⚠ CAUTION

- Utilize switches, controls approved by the winch manufacturer in addition to other accessories and components.

### NOTICE



Refer to owner's manual.



## Continued

- Under no circumstance should you 'quick reverse' or invert the direction of the winch when it is still operating in the opposite direction.
- Under no circumstance should you "jog" or give the winch intermittent jolts of power in any operational direction.
- Ensure that the winch comes to a complete halt before ceasing operation and attempting to winch in the opposite direction.
- In a situation where the winch stalls, under no circumstances should you continue to try and operate the winch, as this can cause permanent damage to the winch and its components.
- Under no circumstance should the winch be operated for long periods of time when subjected to considerable load. Employ intermittent use and allow the winch adequate time to cool down.

### CAUTION



- Refer to Owner's Manual
- Regularly inspect all wiring and switchgear for any signs of improper connections, worn-out material, cracks, etc. Ensure all damaged components are swapped out before operation.
- Use switches, controls approved by the winch manufacturer in addition to other accessories and components.

Within this guide contains a section titled 'WINCH OPERATION' that will instill you all the information you need to prolong the service life of your winch. Only use **KARTT** replacement solenoids, heavy duty relays and direct switches as replacement parts to ensure quality and performance.

Refer to section 7 of this User Guide for information on being able to judge wear and tear on your winch and when is a good time to replace parts.

# Installing Your Winch

## Rope in & Rope out

Your winch's rope is designed to come out (Rope Out) in one direction and retract back into the winch (Rope In) in one direction. Under no circumstances should any attempt be made to alter these directions in any way.

Under drum wire rope orientation is the standard way in which winches are to operate. Though in very specific situations a winch may be operated utilizing a over wound orientation. These orientations refer to the direction in which the rope is spooled off the drum. From the bottom is under wound while from the top is overwound. Refer to figure 2 to get a detailed illustration of said orientations. Whatever orientation is utilized by your winch, ensure that the rope is always spooled onto the drum as dictated by the technical manual or the drum rotation decal.

To ensure safe and proper winching, ensure winches are mounted in the orientation dictated by the technical manual.

### DANGER



- Refer to Owner's Manual
- Under No Circumstances Wind the Rope Over Top of Drum
- Moving parts hazard
- Under no circumstance should any attempt be made to conceal any warning symbols, statements, signs or instructions.
- Under no circumstance should you install a winch on a running vehicle.
- Never lean over the battery when placing connections.



Figure 1.

Under wind operation



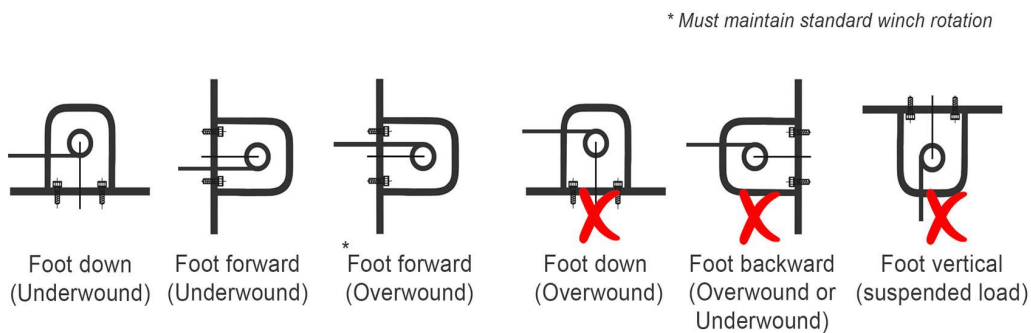
Figure 2.



## Mounting the Winch

When talking about the winch's mounting position, it is in reference to the mounting holes relative to the winches drum. Two positions are ideally suited towards mounting your winch, foot down, and foot forward.

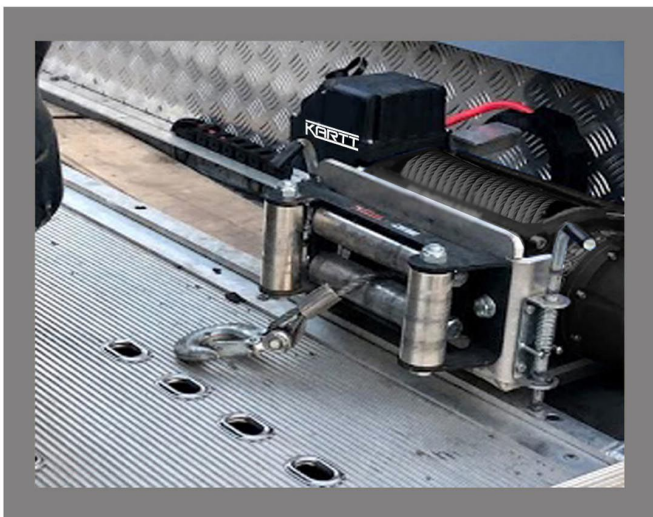
Foot down refers to when the mounting threads are underneath the winch drum. While a foot forward position refers to the threads being in front of the drum. Among these combinations, the most popular is foot down with an under wound rope orientation. All the combinations discussed within this and previous sections are detailed and illustrated below.



Always use a hard and stable surface as the winch's base. Any structural support that is used should be appropriate for the maximum pulling specification of your winch. Ensure that all components and accessories that are used are those recommended by the winch manufacturer. To reduce noise and vibration during winch operation, use bolts and lock washers as recommended.

The winch should be mounted within close proximity to the front of the trailer to ensure the vehicle is pulled onto the trailer. In a situation where the winch is installed underneath something, ensure there is adequate space left around it for safe winch operation.

Technical Manuals that accompany your winch provide detailed information for mounting your particular winch.



### WARNING



- Use Appropriate Protective Gear.
- Moving parts hazard
- Use a Pair of Heavy Duty Protective Gloves.
- Ensure that the winch is mounted in a position in which the rope is fed through the fairlead on the front of the winch, running parallel to the mounting surface and does not come in contact with the base and/or the exterior shell of the winch.
- Ensure your anchor is capable of supporting the load.
- Under no circumstance should a winch be involved in an operation that involves the winch being placed overhead.
- Under no circumstance should a winch be utilized to lift, lower, hoist, or secure horizontally hinged doors or ramps without the accompaniment of secondary measures such as counter-balance springs, centrifugal locking devices, etc.
- Under no circumstance should any area, mechanism, or individual part of a winch be modified, altered, welded, or machined in any way.

# Cables & Ropes

Your winch rope is a critical component of the load-bearing capacity of your winch. The rope that is supplied with your winch is engineered to work at the rated specifications of your particular winch. Ropes are always chosen for winches by assessing their capabilities in accordance with three metrics. Rope Strength, Rope Length, and Rope diameter.

Rope strength is derived from the material from which it is constructed, the diameter of the rope and all processes that are used to construct it.

Rope length is often chosen by taking a measurement of the distance from the winch to the suggested load. However, the strength of a winch's pulling capacity is optimized on the first layer of rope around a drum, so bear that in mind when choosing a rope length.

A shorter rope is often used to achieve greater pulling efficiency from the winch.

Another consideration is that the rope length is limited by how much rope can be wound around the drum. Therefore, if you increase rope diameter, you must reduce the length of the rope and vice versa.

Once a rope has been completely spooled around the drum, ensure the rope is taught against the drum to prevent it skipping off the drum and potentially damaging your winch and its components. A winch's rope, much like its other components is subject to regular wear and tear. A frayed and weakened rope is much more likely to snap when put under load, potentially leading to fatal situations. Ensure you conduct regular examinations of the rope, checking for compressed, pinched, kinked and frayed sections. If any such damage is found within the rope it should be replaced before continuing any form of winch operation.

Only rope that is approved by Kartt should be used as a replacement, ensuring that it is matched to the maximum pulling capacity of the winch. Section 7 provides more detailed instructions for identifying regular wear and tear on your winch and its components.

**To find out more details on part replacement, numbers, and installation, refer to The Technical manual that accompanies this guide.**

## Wire Rope

In case, your winch has wire rope, re-spool the rope as a safety precaution despite it coming spooled from the factory to ensure safe and reliable operation. New winches and replacements ropes must be re-spooled onto the winch under load.

The recommended minimum load is 100lb, any less will lead to damage of the rope.

### How to re-spool rope:

1. The rope should only wrap around the drum 7-8 times, the remaining should be unspooled.
2. Attach load to rope, ensure the load is equal to or exceeding 100 pounds in weight.
3. Select the 'Rope In' function on the handheld controller (or remote) and spool in several feet of rope.
4. Ensure the rope is spooled onto the drum tightly and in an even manner. The rope should not drop down between the coils of rope on the lower layer.
5. Repeat the process, a few feet at a time, until the whole rope is wound onto the drum.

### WARNING



- Refer to Owner's Manual
- Use a Pair of Heavy Protective Gloves.
- Ensure that accessories and components included but not limited to tackle, pulley blocks, straps, etc are always sized and rated to the correct specifications.
- Regularly inspect all wiring and switchgear for any signs of improper connections, worn-out material, cracks, etc. Ensure all damaged components are swapped out before operation.
- Ensure when using another vehicle as an anchor to avoid any sort of damage to the vehicle's chassis.
- Only use switches, controls and accessories approved by Kartt.
- Ensure you conduct regular inspections of the entire rope, its protective casing, and the attachments



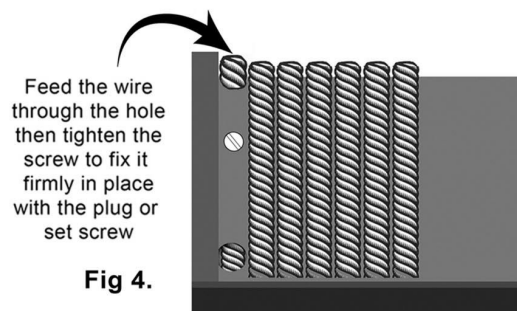
- Moving Parts Hazard.
- Sharp Edge Hazard.
- Always use a Handsaver Strap for Safety.
- Maintain a safe distance from the Winch, Rope, and Load.
- Use a Pair of Heavy Protective Glove
- Under no circumstance ever allow a child to operate a winch.
- Even if wearing gloves, under no circumstance ever allow the rope to slip through your hands



At regular intervals, it is important to re-spool the rope, however, this time do not apply a load to the rope. Do this by holding the rope in one hand and the remote switch (if required) in the other. Get as far away from the vehicle as possible before you begin to wind in the rope onto the drum while applying tension on the rope. Ensure you stop the operation of the winch when your hand comes in close proximity (4 feet) within any part of the winch. Ensure the rope is wound tightly and evenly around the drum, failure to do so may cause the rope to become intertwined or stuck.

A winches rope much like its other components is subject to regular wear and tear. A frayed and weakened rope is much more likely to snap when put under load, potentially leading to damage, injury or even death. Ensure you conduct regular examinations of the rope, checking for damage in the form of compressed, pinched, kinked, and frayed sections. If any such anomaly is found within the rope it should be replaced before continuing any form of winch operation.

Rope can be attached to the winches drum in one of several ways that differ based on your particular winch model. Some of these common methods include passing it through the hole in the drum, feeding it below the drum, utilizing a set screw or plug to anchor the end of the wire rope. Wire ropes utilizing a stop sleeve should pass the sleeve through the hole as illustrated in **Figure 4**.



**Fig 4.**

Once the wire rope has been fed through the hole, ensure that the plug or setscrew is properly tightened/installed back into place. Refer to Figure 4.

Remember that the plug or set screw within your winch under no circumstance will be able to secure rope onto the winches drum when it is subjected to a load. Rather the way a properly installed wire rope exerts pressure onto the drum is what secures it in place. As the rope is what actually keeps itself in place, under no circumstances should a winch be subjected to operation when there are less than 5 winds of rope around the drum.

Only use Kartt spare parts, cables/ropes & replace when required. See section 7 in this user guide on how to extend the life of your winch and please note that the technical installation manual that accompanies this user guide will help walk you through the installation of your winch along with the specifications and relevant part numbers to replace any components on your winch as deemed necessary from time to time



**WARNING**



- Moving parts Hazard.
- Sharp edge Hazard.
- Use a Handsaver Strap.
- Ensure all personnel are at a safe distance from the winch and the rope during operation.
- Use a Pair of Heavy Protective Gloves.
- Ensure the remote lead is fed through an open window when a winch is operated from the interior of a vehicle.
- Ensure all hooks that exhibit any sign of significant wear or tear be replaced immediately. - Examples of serious wear and tear include a deformed tip, an expanded and/or widened throat, and a bent or misshapen latch.
- Ensure the front bonnet of the vehicle is open/raised up to protect the windshield of the vehicle in case of an accident during winch operation.
- Use a rope dampener over the wire rope near the hook end.
- Under no circumstance should the rope come in contact or be in close proximity to sharp edges, irregular surfaces, and heat sources.
- Under no circumstance should a winch utilizing wire rope be subjected to an operation that involves less than 5 turns around the winch drum.
- Under no circumstance should a winch utilizing synthetic rope be subjected to an operation that involves less than 8 turns around the winch drum.
- Under no circumstance should the rope be hooked back onto itself.
- Under No Circumstance Should You Place Fingers inside the Hook.
- Under no circumstance should you let the rope slip away from your hand, whether you are barehanded (not recommended) or utilizing a pair of heavy-duty gloves.
- Under no circumstance should you or anyone else be in contact or close proximity to the hook or rope when under tension, load, or during operation of the winch by an external body.

**NOTICE**



- Refer to Owners Manual.
- Ensure you conduct regular inspections of the entire rope, its protective casing, and the attachment hook.
- During operation, under no circumstance should you exceed the rated capacity of the winch.

## Synthetic Rope

Winches supplied with synthetic rope are not necessarily pre-spoiled onto the drum. Synthetic ropes must be attached onto the drum then spooled under tension.

A synthetic rope is very commonly installed by feeding it through a hole from underneath the drum. The rope must then run across the whole width of the drum (see Fig. 5). Use duct tape to secure the synthetic rope to secure the rope to the drum. Ensure that the rope is spooled from underneath the drum and not over the top.

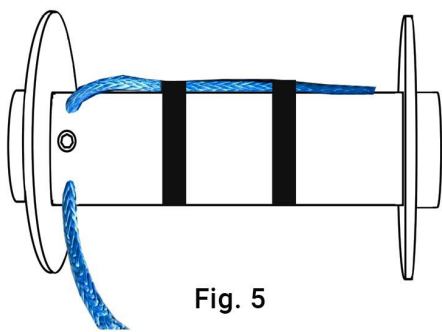


Fig. 5

### How to Spool Synthetic Rope on the Drum

1. Wrap the rope around the drum 8 times.
2. Ensure 8 wraps of rope are secured around the drum as you stretch out the rope as far as possible.
3. Secure the rope hook to a load ensuring that this load weighs in excess of 100lbs
4. Operate the winch by spooling in the synthetic rope
5. Ensure the rope is being wound around the drum tightly and evenly.

After regular intervals, it is important to re-spool the rope, however, this time do not apply a load to the rope. This process is conducted by holding the rope in one hand and the remote switch (if required) in the other.

Get as far away from the vehicle as possible before you begin to wind in the rope onto the drum while applying tension on the rope. Ensure you stop the operation of the winch when your hand comes in close proximity (4 feet) within any part of the winch. Ensure the rope is wound tightly and evenly around the drum, failure to do so may cause the rope to become intertwined or stuck.

A winch's rope much like its other components is subject to regular wear and tear. A frayed and weakened rope is much more likely to snap when put under load, potentially leading to damage, injury or even death.

Ensure you conduct regular examinations of the rope, checking for compressed, pinched, kinked, and frayed sections. If any such damage is found within the rope it should be replaced before continuing any form of winch operation.

Only use Kartt spare parts, cables/ropes & replace when required.

See section 7 in this user guide on how to extend the life of your winch and note that the technical installation manual that accompanies this user guide will help walk you through the installation of your winch along with the specifications and relevant part numbers to replace any components on your winch as deemed necessary from time to time.

### WARNING



- Moving parts Hazard.
- Sharp edge Hazard.
- Use a Handsaver Strap.
- Ensure all personal are at a safe distance from the winch and the rope during operation.
- Use a Pair of Heavy Protective Gloves.
- Ensure the remote lead is fed through an open window when a winch is operated from the interior of a vehicle.
- Ensure all hooks that exhibit any sign of significant wear or tear be replaced immediately. – Examples of serious wear and tear include a deformed tip, an expanded and/or widened throat, and a bent or misshapen latch.
- Ensure the front hood of the vehicle is open/raised up to protect the windshield of the vehicle in case of an accident during winch operation.
- Use a rope dampener over the wire roped near the hook end.
- Under no circumstance should the rope come in contact or be in close proximity to sharp edges, irregular surfaces, and heat sources.
- Under no circumstance should a winch utilizing wire rope be subjected to an operation that involves less than 5 turns around the winch drum.
- Under no circumstance should a winch utilizing synthetic rope be subjected to an operation that involves less than 8 turns around the winch drum.
- Under no circumstance should the rope be hooked back onto itself.
- Under No Circumstance Should You Place Fingers Inside the Hook.
- Under no circumstance should you let the rope slip away from your hand, whether you are barehanded (not recommended) or utilizing a pair of heavy-duty gloves.
- Under no circumstance should you or anyone else be in contact or close proximity to the hook or rope when under tension, load, or during operation of the winch by an external body.

### NOTICE



- Refer to Owners Manual.
- Ensure you conduct regular inspections of the entire rope, its protective casing, and the attachment hook.
- During operation, under no circumstance should you exceed the rated capacity of the winch.



# Key Winching Principles

## Intermittent Use

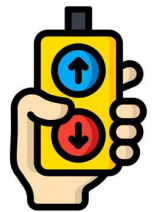
Winches powered by DC current are subjected to intermittent use. DC motors within a winch are engineered to work under a load for short intervals, usually less than a minute, after which, ample time should be allowed for the winch to cool. Your environment's temperature is the greatest factor in determining the cooldown time. During operation, even in the event of the winch being subjected to no-load, continuous operation should never last for greater than 2-3 minutes.

The greater the weight of the load, the more stress the winch motor is subjected to. This results in the motor heating up quicker than usual. With an increase in the rated weight of the load, the continuous run time of the winch should be decreased. Cool downtime for the winch should also be increased accordingly. Good judgment should be utilized to detect when the winch is operating normally and when it is being subjected to a much tougher load. Under all circumstances, extended durations of operations are to be avoided.

Use good judgment to tell when the winch is operating normally or when it is being subjected to heavier loads. Under all circumstances, the winch should not be subjected to extended periods of operation, always allowing for adequate cooling times.

Note: If wireless remote is provided, ensure it is powered off after use to save the battery.

If the remote can turn from wired to wireless by taking out the lead, ensure that the lead is disconnected first before using the remote to ensure that the signalling is clear between remote and the winch's receiver.





## Trailer Applications

Where winches are used on trailers, factors beyond the static weight of the load can be considered to select the correct winch.

The load will usually be on wheels, thus less force required. However it will also be moved up an incline, requiring more force and dependent on the degree of the slope. We show a chart below which can help in selecting the appropriate winch.

To use the chart, please consider the following:

- 1. The Gross Vehicle Weight (GVW) of the vehicle.** The gross weight of your vehicle is the curb weight of your vehicle in addition to any items placed inside the vehicle, including aftermarket accessories. Weight ratings for your specific vehicle are available online or within your vehicle's owner's manual.
- 2. The slope or the incline or which the vehicle has to be pulled.** The slope can easily be calculated by dividing the vertical height of the ramp you are using by the horizontal length of the ramp and multiplying it by 100. Refer to the illustration in **Figure 6A** more for a detailed representation.

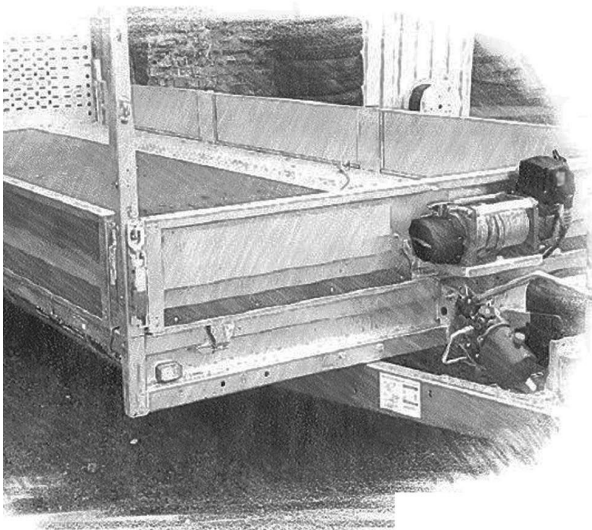
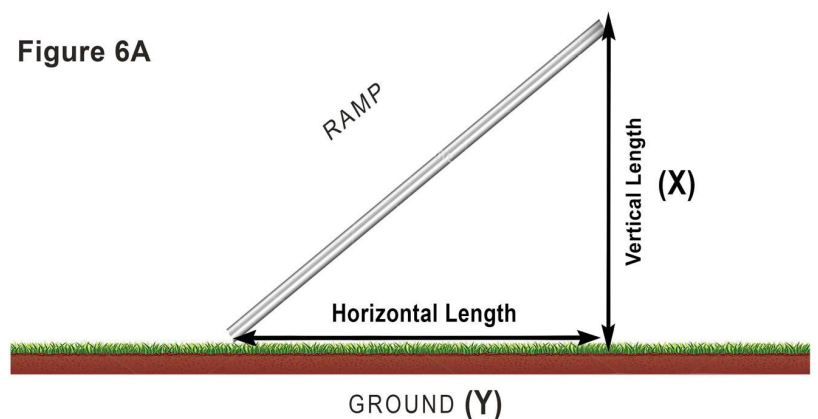


Figure 6A



The slope of the ramp = X divided by Y multiplied by 100

With knowledge of these parameters, the chart illustrated in Figure 6B may now be utilized to calculate what capacity winch will be better suited to your needs.

The left-hand side of the chart represents the GVW of your vehicle while the top sections refer to the incline of the slope. Plug your figures into this chart, where these values intersect is the necessary capacity of a winch that is equipped to pull your load up an incline and onto the trailer.

**Figure. 6B**

GVW (in pounds) Not exceeding	The Slope of The Ramp				
	10%	20%	40%	60%	80%
	Rolling Weight				
1,500	1,000	1,000	1,000	1,000	1,500
2,500	1,000	1,000	1,500	2,000	2,000
5,000	1,000	1,500	2,500	3,500	4,000
10,000	2,000	3,000	3,500	5,000	9,000
15,000	3,000	6,000	9,000	10,000	12,000
20,000	4,000	6,000	12,000	14,000	14,000
25,000	5,000	9,000	12,000	15,000	18,000
30,000	6,000	9,000	14,000	18,000	22,000
35,000	9,000	12,000	18,000	22,000	25,000
40,000	9,000	12,000	18,000	25,000	30,000
45,000	9,000	14,000	18,000	28,000	32,000

**Ensure the selected winch has 1.5 to 2 times the rolling weight.**

Winch capacity is one of the most crucial aspects when it comes to choosing your next winch. Though additional factors must be considered when we are talking about winches being involved with trailers. Factors such as winch speed and braking must also be accounted for as trailers usually involve situations where specialty vehicles are loaded and unloaded at a fairly high frequency.

Regular winches are not engineered to handle high-frequency operations. Winches rated at 2-3 feet per minute are better suited towards recovering a vehicle from precarious situations. Though trailer applications are unsuited for winches that may require several minutes of cool down before resuming operation. General-purpose winches having a rated speed in excess of 4 feet per minute are better suited for these situations. Given trailering situations usually involved precious cargo, having a winch that has both a dynamic and mechanical brake is the much safer bet. Winches utilizing a more rugged and softer braking setup are better for trailer applications since you avoid subjecting your load to violent jerks and shakes.

**⚠ WARNING**

- Refer to owners manual.
- Ensure freespool is fully in the engaged position before utilizing the winch.
- Sharp edge hazard.
- Ensure Load is correctly seated in the throat of the Hook.
- Use a handsaver strap.
- Ensure spectators and any helping hands are kept at a safe distance when a winch is under operation.
- Ensure your anchor is capable of supporting the load.
- During operation, under no circumstances should you exceed the rated capacity of the winch.
- Under no circumstance should a winch be utilized to lift, lower, hoist, or secure horizontally hinged doors or ramps without the accompaniment of secondary measures such as counter-balance springs, centrifugal locking devices, etc.
- Under no circumstance use the winch as a hoist.
- Under no circumstance use a winch to lift and/or move people or animals.
- Under no circumstance should you place fingers inside the hook.



# Rigging, Winching & Signalling

## Rigging

Rigging can be described as the process of attaching to the anchor point the pulling mechanism. This process usually involves the use of accessories such as tree saver straps, pulley blocks, nylon straps and shackles; more on this later within this section. Though despite what accessories might be used, the anchor point is critical to the process and must be selected very carefully.

Situations may arise where the vehicle to which the winch is mounted is being used as the anchor point, therefore it is going to be pulling another vehicle/object while the pulling vehicle itself is completely mobile and free. In this case, ensure that the pulling vehicle has been placed in neutral, block off the wheels with wood or specialized chocks and firmly press the brake pedal during the procedure. Refer to your vehicle's owner manual or consult the internet for exact specifications on your vehicle's load capacity.

When the vehicle to which the winch is attached needs to be recovered, the selection of the anchor point is critical. Ensure it is a firmly planted object that is more than equipped to handle the load of the winch and the mass of the vehicle. Usually, trees, a large boulder, or other vehicles are used as anchors. When a tree is used as an anchor, use a tree-saver strap. In case you're using a secondary vehicle, ensure the vehicle chassis is able to withstand the load and that the tow point has been securely mounted.

Ensure the line from the anchor to the winch is as straight as possible. Pulling at sharp angles for extended periods of time may damage your winch, rope and accessories. Under no circumstance should the winch's rope be wrapped around an object and anchored back onto itself. A strap or tow point should always be used to connect the winch to the anchor point.

In a trailer situation, ensure that the tow point on the vehicle to be pulled can withstand the forces applied by the winch and its own weight. Ensure nor your or any bystanders or helping hands are within close proximity to the winch, rope and the trailer during operation. Like all winching applications ensure a straight line of sight from the vehicle to be towed to the winch.

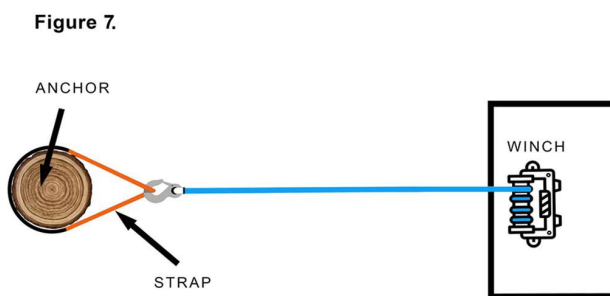


Figure 7 refers to an illustration of one of the most popular rigging methods. In this situation, a winch-mounted vehicle is being used with a nylon strap around a tree.

### **⚠ DANGER**



- Refer to the owner's manual.
- Ensure freespool is fully in the engaged position before utilizing the winch.
- Ensure your anchor is capable of supporting the load.
- Always operate the winch with an unobstructed view of the winching operation.
- When rigging your winch, under no circumstance should you attempt to speed up the process or take shortcuts.
- Ensure that the winch is mounted in a position in which the rope is feed through the fairlead on the front of the winch, running parallel to the mounting surface and does not come in contact with the base and/or the exterior shell of the winch.
- When attaching a hook to an Anchor Point, use a strap or shackle.
- Under no circumstance couple the hook and rope.
- Under no circumstances should you place fingers inside the hook.
- Under no circumstances wind the rope over top of drum
- Under no circumstance should you let the rope slip away from your hand, whether you are barehanded (not recommended) or use a pair of heavy-duty gloves.

### **⚠ WARNING**



- Use pulley blocks to avoid subjecting a winch to operate itself at sharp angles.
- Ensure you conduct regular inspections of the entire rope, its protective casing and the attachment hook.
- During operation, under no circumstance should you exceed the rated capacity of the winch.
- Ensure that neither you nor your or any bystanders or helping hands are within close proximity to the winch, rope, and the trailer during operation.

Refer to figure 8 for an illustration that highlights the use of a pulley block to gain a mechanical advantage in your rigging application. This application can effectively increase your pulling capacity by two times. The winch's hook is mounted to a point on the vehicle that is frame-mounted. Now two lines are effectively pulling with the same pulling force. This allows you to increase your pulling capacity without exceeding the rated capacity of your winch.

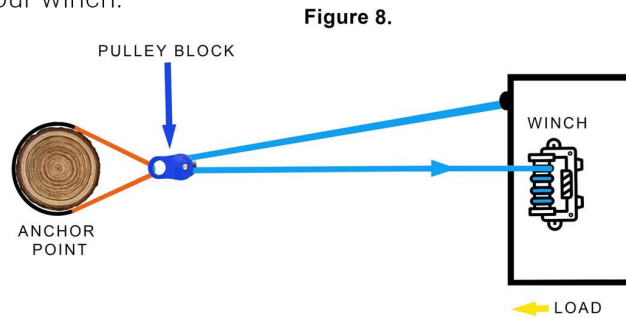


Figure 8.

Refer to figure 9 for an illustration that depicts the use of a pulley block in order to change the direction of the pull. The pulley block is attached to an anchor point with a nylon strap and shackle and therefore the winch's rope is redirected to the load.

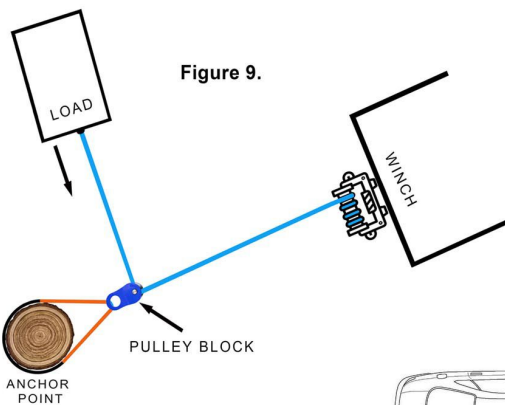


Figure 9.

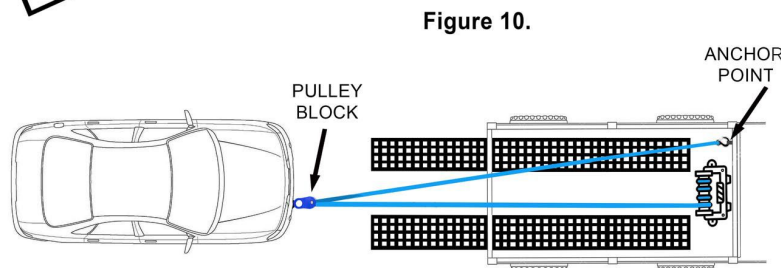


Figure 10.

Refer to figure 10 for an illustration that depicts the use of a pulley block to effectively lower the amount of stress the winch, rope, and battery are subjected to. The use of a double line decreases the pull speed, a desirable effect when the cargo to be towed is precious. By utilizing dual lines, load on the winch and rope is approximately halved as a result.

Ensure that all equipment used within the rigging process far exceeds the rated maximum line pull rating. When a double-line is used, pulley blocks should be rated to a minimum of two times (2X) the winch's line pull rating. Ensure the winch's rated capacity is never exceeded.

When utilizing a tow hook for double-lining, ensure that it is anchored to the trailer frame or the frame of the vehicle.

Figure 11 (overleaf) refers to an illustration for the correct use of a fairlead. A winch equipped with a fairlead can drastically reduce the stress the rope is subjected to when pulling at an angle. A fairlead's rollers reduce rubbing and abrasion to the rope. However, always try and winch in as straight a line as possible to avoid rope building upon one specific side of the drum. Ensure the trailer towing vehicle is powered on during the winching operation. Be careful not to winch with the engine turned off or you may drain the battery to the point where the vehicle may be unable to start!

**⚠ DANGER**


- Refer to the owner's manual.
- Ensure freespool is fully in the engaged position before utilizing the winch.
- Ensure your anchor is capable of supporting the load.
- Always operate the winch with an unobstructed view of the winching operation.
- When rigging your winch, under no circumstance should you attempt to speed up the process or take shortcuts.
- Ensure that the winch is mounted in a position in which the rope is fed through the fairlead on the front of the winch, running parallel to the mounting surface and does not come in contact with the base and/or the exterior shell of the winch.
- When attaching a hook to an Anchor Point, use a strap or shackle.
- Under no circumstance couple the hook and rope.
- Under no circumstances should you place fingers inside the hook.
- Under no circumstances wind the rope over top of drum
- Under no circumstance should you let the rope slip away from your hand, whether you are barehanded (not recommended) or use a pair of heavy duty gloves.



Figure 11.



Please note, whilst winching, a winch dampener, blanket or heavy jacket should be placed over the rope at a sensible point between the vehicle and the anchor point.

winch. If the rope does break, this redirects the kinetic energy towards the ground. Ensure the winch dampener is not tangled in any fairleads or pulley blocks. Safety is always the number one goal in any situation involving a winch.

## Winching

Winching is ready to commence when rigging is set. Ensure all personnel are kept at a safe distance from the winch during operation, a distance at least equal to the length of the rope in use. Safety should always be your number one goal in any winching situation.

In situations that involve recovering a vehicle, always assess how exactly the load will be moved once winching commences. If it's stuck in mud or caught on a rock try and determine why. Knowing why will help you determine if the winch is of any use in such applications. For example, winching a vehicle whose axle is stuck on a large rock will only serve to either eventually break the winch or some other unforeseen consequence.

Get acquainted with your surroundings. Winching a vehicle up or over an obstacle might be futile, remember if the winch is struggling. It's best to rethink the entire situation. Sometimes the way to get yourself unstuck is going out the way you came in.

## Hand Signals



During winching, it is advisable to have an additional person to assist you during the operation. One to direct the operation and observe from an external vantage point whilst another controls the winch and vehicle. The person directing the winch may free spool it, do the rigging and observe the operation. When two people are involved, ensure both people are up to speed on any basic winch hand signals. Refer to figure 13, for a detailed illustration on these hand signals.

WINCH OUT: Upper arm straight out, lower arm pointing DOWN, index finger moving in circles.

WINCH IN: Upper arm straight out, lower arm pointing UP, index finger moving in circles.

STOP: Arm raised, hand in a fist, motionless

### ⚠ DANGER



- Ensure regular inspections of all equipment, immediately replace any parts that exhibit excessive wear or damage.
- Keep a safe distance from onlookers.
- Use a pair of heavy duty protective gloves.
- Maintain a safe distance from the winch, rope, and load
- Ensure the hook latch is not supporting a load and is closed.
- Under no circumstance should you or anyone else be in contact or close proximity to the hook or rope when under tension, load, or during operation of the winch by an external body.
- Under no circumstance should the rope be bent, knotted or tied around any load or be used in a similar manner to fix a broken rope.
- Under no circumstance should the rope be pulled around non-rotary sheaves or rollers.
- Under no circumstance should wires be routed and/or placed in close proximity to sharp edges, high-temperature surfaces, and moving components.
- Under no circumstance during operation should the rope be allowed to entangle or twist, as it could potentially break the rope before the winch ever stalls.
- Under no circumstance should the winch, rope or any of its components and accessories be subjected to shock loads.

### ⚠ WARNING



- Hot surface hazard.
- Moving parts hazard
- Ensure freespools is fully in the engaged position before utilizing the winch.
- Maintain a safe distance from the winch, rope and load.
- Use appropriate protective gear.
- Keep a safe distance from onlookers
- Use a handsaver strap.
- Under no circumstance should you or anyone else be in contact or close proximity to the hook or rope when under tension, load or during operation of the winch by an external body.



**JOG IN:** The upper arm is straight out with the lower arm UP, simply move the thumb and finger in a clam-shell motion continually over and over again for operator to run winch IN, in fast intervals of 1 second.

**HANDS IN WINCH:** Both of your arms are held out with fingers extended in direction of winch. Operator secures controller to ensure it isn't accidentally used whilst the winch is freespooled or hook stowed.



Slack should be taken up slowly in the rope and rigging. Once taut, reassess your rigging application and situation, looking for any potential safety risks or potential failure points.

Once the winch is engaged, feed power to it smoothly, ensuring that you keep a close eye on all moving parts during operation. Especially the winch, rigging rope and any vehicles involved in the process. Use your ear and good judgment to listen out for telltale signs of whether the winch is under heavy load or operating normally. Under no circumstance should you engage in conversation or play music during winching operation.

In the event, the winch suddenly begins to change its tone and slows down, cease operation immediately and reassess your situation. Double-check the motor to ensure it has not overheated. Ensure adequate time is given for the winch to cool down. Analyzing and re-evaluating such situations becomes easier as you gain more experience.

## Securing & De-Rigging

Once the vehicle has been recovered, or the load relocated and the operation of the winch is complete, ensure the vehicle and/or load is secure and stable before releasing tension on the rope by powering the cable out. Under no circumstances should a winch be used to secure loads during transportation. Remove all components and accessories and store them in a secure area.

Power IN until the hook is around 3 feet / 1 meter from the winch. Under no circumstance should you hold the hook while doing so – use a hand saver for safety. Secure said hook to an item such as a shackle or a tow hook. Jog the winch in slowly, 1 second at a time till the cable is “snug”.

**UNDER NO CIRCUMSTANCE CONTINUE TO WINCH.** Snug the rope to a secure position. Ensure the hook is never attached to any part of the winch such as a tie bar or freespool control.

Ensure caution when pulling the thimble or hook all the way to the fairlead. Damage to the fairlead may occur, which could lead to rope damage. Always try and secure the hook to a side tow hook or any other stable component or structure.

### WARNING



- Use a handsaver strap.
- Use appropriate protective gear.
- Use gloves that provide adequate protection against heavy use machinery.
- Under no circumstance apply the use of a winch to secure a load.
- Under no circumstance should you release the freespool when the winch is supporting a load.
- Under no circumstance should you place fingers inside the hook.
- Ensure the hook latch is not supporting a load and is closed.

# Storing & Maintaining A Winch

## Examine the Winch

Ensure that after every operation of the winch, proper preparations are taken to store it. Inspect items such as the rope, rigging equipment, accessories and the installation for any damage that may have occurred.

Conduct an examination of the winch by inspecting the tightness of its mounting bolts and looking out for any loose or frail components and fasteners.



## Examine the Rope

Release the rope from the winch drum via the freespool to inspect it for any damage. Ensure no kinks, cuts, broken strands or any other damage has occurred since its last operation. Remove any debris or dirt from the rope. It is the duty of the owner to ensure proper care is taken of their winch and its rope to prolong its life.

Re-spool rope after inspection. Ensure this is done by exerting some tension on the rope and in an even manner around the winch drum.

Rope life can be extended through proper maintenance and with a good knowledge of how to prevent damage to the rope before it occurs. **Refer to Figure 14** for a detailed illustration of how to detect the formation of a kink in the rope, one of the most common causes of damage to a winch rope.

- A.** Kinks begin to form. The rope should be straightened immediately.
- B.** Winch rope was pulled and the loop tightened to a kink. The rope is beyond repair at this point and must be replaced immediately.
- C.** Wire strands begin to break when the rope has such tension exerted upon it. The load capacity of the rope is massively reduced and must be replaced immediately.

**Minimize Abrasion of Wire Rope.** Wire rope abrasions can be greatly minimized by ensuring the winch pulls in a dead straight line. Keep wire clear of any obstacles. Ensure that during operation, the wire does not come in contact with rocks, trees, or any other harmful objects. In a trailer application, ensure no metal to metal contact takes place between the rope and the trailer among other sharp and harmful objects. Abrasions reduce rope lifespan.

**Ensure rope stays clean** and debris is kept clear of the rope at all costs. This introduces abrasion into the rope.

Avoid Sharp Bends. Introducing sharp bends into the rope can drastically decrease tensile strength when the rope is subjected to load, leading to rope damage or failure.

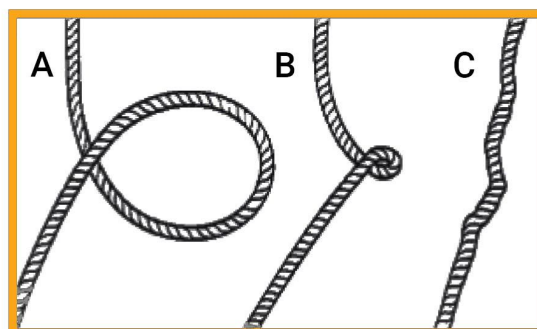


Fig.14

## Synthetic Rope

Synthetic rope care differs from wire rope care. Visual signs are keys to ensuring your synthetic rope is still in good condition.

When brand new, the rope has a smooth and very uniform finish. Upon first use, the rope will have a rougher and fuzzy appearance as the outer filaments of the rope are subjected to a load. It is advised to replace the rope when around one-quarter of the fibers show signs of abrasion.

Inspect both the inner and outer fibers of the rope. Compressing the rope length-wise (e) will open the strands of the rope. Examine for any signs of powdered fiber and abrasion, signs of internal abrasion of rope. Through this give a rough estimation of the internal wear of your rope.

Glazed or glossy rope can be caused for two differing reasons. Compression is the most common cause when the rope is wound on the winch drum through a pulley block. Lengthwise compression makes the rope more pliable and gives it a more natural rope look. In case the glazed section is hardened this can be an indicator of heat damage. Replace the rope immediately in this case. It is the duty of the owner to ensure proper care is taken of their winch and its rope to prolong its life.

Movable  
abrasion sleeve



In summary...

**Minimize the abrasion of your synthetic rope** - utilize a movable abrasion sleeve when the rope is to come in contact with sharp and rough objects. Move the sleeve along the rope as required to reduce abrasion and increase the lifespan of the rope.

**Ensure the rope stays clean.** Dirt and debris must be kept clear of the rope at all costs. This introduces abrasion into the rope.

**Avoid bends that are sharp.** Introducing sharp bends into the rope can drastically decrease tensile strength when the rope is subjected to load, leading to rope damage or failure.

New Rope



Replace the Rope





## Examining the Rigging Gear

**Conduct regular inspections of all rigging gear**, including tree-saver straps, pulley blocks, shackles, hook, etc. Look out for damage such as tears, cuts, bending, etc. Ensure all dirt and debris are removed from all equipment. Ensure the hook safety latch is operational. Towels sprayed with water displacement lubricants are great for cleaning pulley blocks.

Inspect the fairlead. In the case of a roller fairlead, examine the rollers for wear and tear and ensure all rollers run smoothly. Hawse fairleads should be inspected for burrs, nicks, and other damage on its hawse. Ensure all damaged components are replaced.

## Examining the Freespool

A Technical Installation Manual that accompanies the User Guide will provide all information specific to your particular winch.

## Storing Winch Equipment

When the winch is not to be used for extended periods of time, ensure it is stored in a clean, dry and non-corrosive atmosphere. Ensure drastic and large changes in temperature do not occur in storage. Ensure the winch is cleaned prior to usage. Winches are able to withstand temperatures ranging from -30° to +130° F (-35 to +55° C). In the case it is mounted to a vehicle, a neoprene winch cover is a great solution. While Neoprene covers can breathe to a certain degree, large changes in temperature and humidity are still hazardous to the winch. Ensure the cover is removed at regular intervals to remove any build up of condensation. Remove power to the winch by removing the battery positive lead and disconnecting any controls.

All winch electrical components are to be stored in a clean and dry location. For instance a glove box, toolbox or cargo shelf inside a truck. Remove batteries from any controllers that will not be used for an extended period of time.

Once the winch and its components are taken out from storage. Allow temperatures to settle in between -20° and +100° F (-30 to +38° C) prior to operation.

### ⚠ DANGER



- Never deviate from instructions detailed in wiring diagrams.
- Under maintenance always remove all sources of power from the winch.
- Ensure the winches remote control is always kept in a safe area free from any dirt, chemicals or moisture.
- Under no circumstance should you lean over the battery when placing connections.



# Tips & Keeping Safe

- Consider the environment, think of others and keep safety your #1 priority.
- Don't pull high loads over long periods... allow the winch to rest or adjust your rigging.
- Monitor the speed at which your winch is pulling; it's a great indicator of load.
- To help recognise when your winch is under stress, keep aware of the speed and sound of your winch.
- Like anything in life, practice, practice, practice your winching skills to ensure that they are up to scratch when you need to winch out of a tricky situation!
- If the winch doesn't appear or sound OK or looks damaged, stop immediately – NEVER use damaged equipment... DO NOT USE A DAMAGED WINCH.
- Ensure you only ever use genuine accessories and replacement parts.
- Fully inspect your winch prior to use so you can be assured you're winching safely.

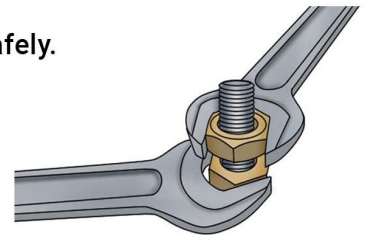


Fig. 15

## Troubleshooting Chart

Problems	Possible Reasons	How To Fix
Motor won't work or only works in one direction.	Weak battery or dead altogether	Check the system that charges the battery. Re-charge the battery or replace if required.
Motor won't work or only works in one direction.	The solenoid isn't grounded	Check the ground path between the battery 'negative' and solenoid
Motor won't work or only works in one direction.	The motor is damaged	Repair or replace motor. Check brushes as they could be worn or sticking
Motor won't work or only works in one direction.	Switch on handheld remote not working	Replace the switch or remote
Motor won't work or only works in one direction.	Stuck solenoid or damaged... likely because two spanners were't used when attaching solenoid - created by not holding inner nut to keep stud from turning.	<b>CAUTION - Disengage freespool before doing this test to ensure the winch drum isn't powered.</b> If a solenoid sticks just once it's likely to become a recurring problem so replace it immediately. Simply tap the solenoid to free stuck contacts. For individual 'single-coil' solenoids, check by applying voltage to the small solenoid terminal. Be sure solenoid is grounded back to battery. For block-style solenoids (multiple-coil), disconnect connections, 'ground' the center terminal and apply a voltage to outer terminals (one at a time). TIP! An audible 'click' will be heard by a solenoid that isn't stuck when first energized.
Motor won't work or only works in one direction.	Weak connections/ broken wires...usually winch problems are due to loose or damaged wires, corrosion etc.	Look for loose connections, corrosion & broken/damaged wires. Check <i>all</i> the wiring. Wires appearing damaged <i>must</i> be replaced. Damaged or corroded socket and plug connections on the hand held remote should also be checked. <b>CAUTION: Use two spanners (Figure 15.) if tightening or loosening solenoid and motor connections or solenoid or motor damage may occur!</b>
Motor runs but drum isn't turning	Freespool is not engaged	Engage the freespool!
Motor's running very hot	A damaged brake	Replace or repair brake!
Motor's running very hot	Very possibly a long period of operation	Allow to cool naturally
Motor's running very hot	The motor is damaged	Repair the motor or if needed replace it. Many motors are available by Kartt. Enquire at <a href="mailto:sales@kartt.co.uk">sales@kartt.co.uk</a>
Insufficient line speed or power from motor	Weak battery	Check the system that charges the battery. Re-charge the battery or replace
Insufficient line speed or power from motor	A weak electrical 'ground'.	Clean the connections and check them fully
Insufficient line speed or power from motor	Battery to winch wire possibly too long	User a larger gauge wire if required
Insufficient line speed or power from motor	A weak battery connection	Check battery terminals for corrosion, clean as required
Insufficient line speed or power from motor	A damaged brake	Replace the brake or repair it
Winch doesn't hold load	An excessive load has been put on the winch	Reduce load or double line (with aid of snatch block pulleys used safely)
Winch doesn't hold load	Possibly a worn/damaged brake	Replace the brake or repair it
The winch won't shut off	The solenoid is stuck "on"	If solenoid sticks on, reverse direction whilst holding trigger switch on until power lead can be disconnected. Safety on-off switch may be available on some models.

# Glossary

**DRUM:** Tube with flanges to store rope

**DRUM SUPPORTS:** A section of a winch's structure used to mount a winch or hold its drum.

**DISENGAGED:** Clutch position of the winch where freespool is engaged.

**ENGAGED:** Clutch position of the winch where the winch can operate.

**FAIRLEAD:** A device, mounted in front of the winch, comprised of vertical and horizontal rollers to aid the guidance of the rope onto the winch drum and taking side loads.

**FREESPOOL:** The act of putting the winch in the disengaged position, allows the rope to be pulled off the drum by hand.

**HANSAVER:** Used to hold the winch hook when handling it to prevent injury. Usually a short strap or bar.

**HAWSE:** Fairlead with no moving parts. Most commonly made of metal or HD plastic with smooth internal surface that helps to guide a synthetic rope on and off the drum.

**HOIST:** A device intended for lifting.

**JOG (JOG IN):** The act of making the winch operate in 1-second short intervals. Used to snug the hook after the winching has been completed. Under no circumstance should you jog when the winch is under load.

**LINE SPEED:** Speed of winch line. Typically represented in two ways: no load line speed (the speed at which rope is pulled back onto the drum with no load) and Full Load Line Speed (the speed of the winch pulling a full load).

**NO-LOAD:** When no load or tension is placed onto the rope. This represents the fastest 'line pull' capable by the winch.

**OVERWOUND:** When the winch rope comes off the drum OVER the rope WOUND onto the drum – i.e., the TOP of the drum. The opposite of Underwound.

**PULLEY BLOCK (SNATCH BLOCK):** A component that contains a grooved pulley that allows multiple lines to be attached to a load. Or to be used to change the direction of a pull.

**RIGGING:** Noun- Materials used to rig your winch ie. tree saver straps, pulley blocks, nylon straps

**RIGGING:** Verb- the act of connecting the pulling mechanism to the anchor point.

**ROLLER FAIRLEAD:** A fairlead with vertical and horizontal rollers.

**ROLLER HAWSE:** Merges the functionality of a fairlead and hawse into a single unit. Horizontal rollers handle vertical loads while smooth, large radius metal ends to guide the rope onto the drum during side pulls.

**ROLLING WEIGHT:** The force necessary to move weight on wheels.

**SOLENOID:** An assembly used as a switch, consisting of a coil and a metal core free to slide along the coil axis under the influence of an electrical magnetic field.

**STALL:** A situation when the winch has pulled the maximum amount and the drum no longer turns. Under no circumstance should you continue to apply power to a winch.

**TIE BAR:** Winch component inserted between drum supports designed to maintain a constant distance between drum supports.

**TREE SAVER STRAP:** A strap that is placed around a tree to protect it from damage.

**UNDERWOUND:** A condition where the winch rope under tension comes off the drum from UNDER the rope WOUND onto the drum – i.e., the BOTTOM of the drum. Most winches are mounted and operated Underwound.

**WINCH:** A device that is used to pulling horizontally while keeping contact with the ground.

**WINCH DAMPENER (WINCH WEIGHT):** Designed to be placed over a winch rope in an attempt to dampen the tension on the rope. Redirecting energy towards the ground and increases safety in case the rope breaks. A strap, heavy jacket, or blanket can be used when you don't have a winch dampener.



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